Section 7E4
Hydra-Matic 5L40-E Automatic Transmission – On-Vehicle Servicing

ATTENTION

Before performing any Service Operation or other procedure described in this Section, refer to 00 Warnings, Cautions and Notes for correct workshop practices with regard to safety and/or property damage.

1 General Information

The service operations detailed in this Section, relate to tasks that can be carried out on the 5L40-E Automatic Transmission while it is still installed in the vehicle. In addition, the procedures required to remove and reinstall the transmission assembly from/to the vehicle are also provided.

It is strongly recommended that the General Service Precautions provided in this Section be read and followed, whenever servicing operations are to be carried out on this transmission.

Dependent on vehicle specifications for different markets, the gearshift selector mechanism may be fitted with a Brake Transmission Selector Interlock (BTSI). Refer to Section 7E1 General Information for a description of this device and its operation. The service procedures for both selector types are described within this Section.

1.1 General Service Precautions

ATTENTION

All fasteners are important attaching parts as they affect the performance of vital components and/or could result in major repair expense. Where specified in this section, fasteners MUST be replaced with parts of the same part number or an approved equivalent. Do not use fasteners of an inferior quality or substitute design.

Torque values must be used as specified during reassembly to ensure proper retention of all components.

Throughout this section, fastener torque wrench specifications may be accompanied with the following identification marks:

- ■ **Fasteners must be replaced after loosening.**
- ● **Vehicle must be at curb height before final tightening.**
- ♦ **Fasteners either have micro encapsulated sealant applied or incorporate a mechanical thread lock and should only be re-used once. If in doubt, replacement is recommended.**

If one of these identification marks is present alongside a fastener torque wrench specification, the recommendation regarding that fastener must be adhered to.

Recommendations

When servicing this transmission, all parts should be cleaned and inspected as outlined under 'Cleaning and Inspection', in these recommendations. Individual units should be reassembled before disassembly of other units to avoid confusion and interchanging of parts.

WARNING

Machined surfaces of alloy transmission components (e.g. transmission case) have extremely sharp edges that are a very real safety hazard. It is recommended that machined edges are 'broken' with a sharp second cut file, taking care not to allow metal particles to enter the transmission.

1 Thoroughly clean the transmission exterior before removal of any component.

2 Disassembly and reassembly must be made on a clean work bench. Cleanliness is of the utmost importance. The bench tools, and parts must be kept clean at all times.

3 Before installing screws and other fasteners into aluminium parts, dip screws into transmission fluid (Only use Dexron® III) to prevent galling of the aluminium threads and to prevent screws from seizing.

4 To prevent thread stripping, always use a torque wrench when installing fasteners.

5 If threads in aluminium parts are stripped or damaged, the part can be rejuvenated by the use of commercially available, thread inserts.

6 Protective tools must be used when assembling seals to prevent damage. The slightest flaw in the sealing surface of the seal can cause a fluid leak.

7 Aluminium castings and valve parts are very susceptible to nicks, burrs, etc., and should be handled with care.

8 Internal snap rings should be expanded and external snap rings compressed if they are to be re-used. This will ensure proper seating when reinstalled.

9 O-rings, gaskets and oil seals that are removed, should be replaced with new parts.

10 Teflon oil seal rings should not be removed unless damaged.

11 During assembly of each unit, all internal moving parts must be lubricated with new transmission fluid of the correct specification.

Oil Cooler Pipes

Should any transmission fluid cooling pipe suffer accidental damage, then a genuine replacement pipe must be fitted. Refer to the current release of PartFinder™ to determine the correct part number for the particular engine and pipe involved. Reworking of damaged pipes or hand made replacements are not permitted.

Cleaning and Inspection

WARNING

Wear eye protection to prevent potential injury.

After the complete disassembly of a component, wash all metal parts in a clean solvent and dry with compressed air. Blow oil passages out and check to make sure they are not obstructed. Small passages should be checked with tag wire. All parts should be inspected to determine which parts are to be replaced.

Pay particular attention to the following:

1 Inspect linkage and pivot points for excessive wear.

2 Bearing and thrust surfaces of all parts should be checked for excessive wear and scoring.

3 Check for broken seal rings, damaged ring lands and damaged threads.

4 Inspect seal and O-rings.

5 Mating surfaces of castings should be checked for burrs. Irregularities may be removed by lapping the surface with emery paper. The emery paper is laid on a flat surface, such as a piece of plate glass.

6 Castings should be checked for cracks and porosity.

7 Do not use solvents on neoprene seals, composition faced clutch plates or thrust washers, as damage to these parts may occur.

2 Maintenance Operations

ATTENTION

All fasteners are important attaching parts as they affect the performance of vital components and/or could result in major repair expense. Where specified in this section, fasteners MUST be replaced with parts of the same part number or an approved equivalent. Do not use fasteners of an inferior quality or substitute design.

Torque values must be used as specified during reassembly to ensure proper retention of all components.

Throughout this section, fastener torque wrench specifications may be accompanied with the following identification marks:

- ■ **Fasteners must be replaced after loosening.**
- ● **Vehicle must be at curb height before final tightening.**
- ♦ **Fasteners either have micro encapsulated sealant applied or incorporate a mechanical thread lock and should only be re-used once. If in doubt, replacement is recommended.**

If one of these identification marks is present alongside a fastener torque wrench specification, the recommendation regarding that fastener must be adhered to.

2.1 Transmission Fluid Check

General Information

When adding or changing the transmission fluid, use only Dexron® III automatic transmission fluid. Refer to the appropriate Owner's Handbook for servicing intervals.

Because this transmission fluid changes colour and develops an odour very early in its life, these indicators should not necessarily be relied upon to diagnose either transmission internal condition nor fluid deterioration.

If, when following the Fluid Checking Procedure, a dark brown fluid colour is observed, coupled with a reported delayed shift pattern, this may only indicate that the fluid requires replacement and alone, is not a definite indication of a potential transmission failure.

NOTE

Do not overfill the transmission. Overfilling will cause foaming of the fluid, loss of fluid, shift complaints and possible damage to the transmission.

Transmission Fluid Colour

Transmission fluid colour when new and unused, is red. A red dye is added so that it can be distinguished from other oils and lubricants. The red dye is not an indicator of fluid quality and is not permanent. As the vehicle is driven, the transmission fluid will quickly begin to look darker in colour. The colour will then appear light brown. A DARK brown colour with a distinctively burnt odour MAY indicate fluid deterioration and a need for the fluid to be changed.

Using TECH 2 To Check Fluid Temperature

1 Connect the TECH 2 scan tool to the ALDL connector in the vehicle, then press the 'ON' button, to activate the scan tool.

2 At the 'Main Menu', select 'F0: Diagnostics / Model Year (05) 2005 / Vehicle Type'.

3 At the 'System Select' menu, select 'F1: Transmission / Automatic Transmission', turn Ignition ON', then 'Confirm' with the Soft Key.

4 At the 'Transmission Identifier' screen, press the 'Confirm' soft key once again, to show the 'Transmission Application' menu.

5 From the functions shown, select 'F2: Data Display', then scroll down until the 'Transmission Fluid Temperature' display is visible.

Transmission Fluid Checking Procedure

NOTE

View ‘A’ shows the RWD transmission filler and drain plug locations, while view ‘B’ shows the AWD plug locations.

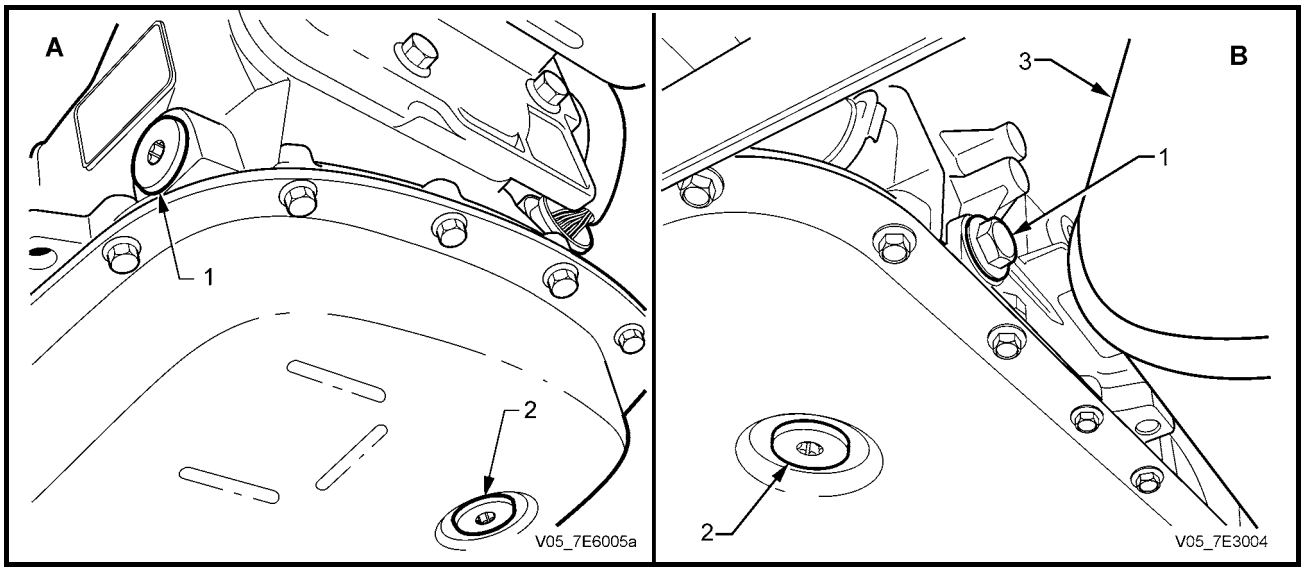


Figure 7E4 – 1

Legend

1	Fluid level plug	2	Fluid drain plug	3	Catalytic Converter

Step	Action	Value	Yes	No
1	1 Start the engine. 2 Depress the brake pedal and move the shift lever through all of the gear ranges, pausing a few seconds in each range. Return the shift lever to the Park range. 3 Raise the vehicle and support in a safe manner. The vehicle must be level, the engine running and the shift lever in the Park range. Refer to 0A General Information for the location of recommended lifting and support points. **WARNING** • **The engine must be running when the transmission fluid filler plug is removed, or excessive fluid loss will occur.** • **Take extreme care when removing the filler plug as it is very close to the catalytic converter and personal injury through burning can easily occur.** • **Transmission fluid may be hot. Since the actual fluid level is unknown, stand clear when removing the filler plug. Have a container ready to capture any lost fluid.** • **Do not turn the engine off with the filler plug removed, as you can be injured by hot transmission fluid being expelled out of the fluid level plug opening.** 4 Remove the transmission fluid level plug (1). See Figure 7E4-1 for the location. 5 Inspect the fluid colour. If necessary, use a small screwdriver as a dipstick. **NOTE** The transmission fluid may darken with normal use and does not always indicate contamination or oxidation. Is the fluid colour red or light brown with no burnt odour?	–	Go to Step 4	Go to Step 2
2	Does the fluid have a burnt odour or a dark brown colour?	–	Go to Step 8	Go to Step 3
3	Does the fluid have a cloudy or milky appearance?	–	Go to Step 7	Go to Step 8
4	1 Let the fluid temperature rise until it has reached the specified value. Check temperature using TECH 2. 2 Check the fluid level. The level should be even with the bottom of the threaded plug hole. Is the fluid level low?	30 – 50° C	Go to Step 5	Go to Step 11
5	1 Add Dexron® III automatic transmission fluid in increments of 0.5 litre until the fluid drains from the filler plug hole. Did you add more than 1.5 litres to the transmission?	–	Go to Step 6	Go to Step 11

Step	Action	Value	Yes	No
6	1 The transmission may have a leak. Refer to Fluid Leak Diagnosis in 7E3 Automatic Transmission – Hydraulic/Mechanical Diagnosis. Was a transmission leak found?	–	Go to Step 9	Go to Step 11
7	1 The transmission fluid is contaminated with engine coolant. 2 Repair or replace the transmission cooler in the radiator. Is the transmission cooler repair complete?	–	Go to Step 9	–
8	1 Drain the fluid by removing the transmission fluid pan drain plug (2). 2 Remove the transmission fluid pan. Refer to 3.1 Fluid Change and Filter Replace. **NOTE** A very small amount of material in the bottom of the pan is a normal condition. 3 Inspect the bottom pan for any excessive debris. Was excessive debris found?	–	Go to Step 9	Go to Step 10

Step	Action	Value	Yes	No
9	1 Repair/replace the transmission, as required. **NOTE** If the transmission is replaced/overhauled, then flushing the fluid cooler and pipes will be required. Refer to 2.2 Transmission Cooler/Lines Reverse Flush and Flow Rate Check, in this Section. 2 Add enough Dexron® III automatic transmission fluid to bring the fluid to the fluid level to the bottom of the threaded filler plug hole. Reinstall the filler plug. 3 Start the engine and run at idle speed. 4 Depress the brake pedal and move the shift lever through all of the gear ranges, pausing a few seconds in each range. Return the shift lever to the Park range. 5 Raise the vehicle and support in a safe manner. The vehicle must be level, the engine running and the shift lever in the Park range. Refer to 0A General Information for the location of recommended lifting and support points. **WARNING** • **The engine must be running when the transmission fluid filler plug is removed, or excessive fluid loss will occur.** • **Take extreme care when removing the filler plug as it is very close to the catalytic converter and personal injury through burning can easily occur.** • **Transmission fluid may be hot. Since the actual fluid level is unknown, stand clear when removing the filler plug. Have a container ready to capture any lost fluid.** • **Do not turn the engine off with the filler plug removed, as you can be injured by hot transmission fluid being expelled out of the fluid level plug opening.** 6 With TECH 2 still connected to the vehicle, allow the A/T fluid temperature to rise until it has reached the specified value. Remove the transmission filler plug. 7 If needed, add DEXRON®III automatic transmission fluid in increments of 0.5 litre until the fluid drains from the threaded filler plug hole. 8 Allow fluid to finish draining from the filler plug hole. Inspect the filler plug (1) and O-ring and, if undamaged, may be re-used. Reinstall the transmission filler plug (1) and tighten to the specified value. 9 Wipe any excess fluid from the transmission with a rag or shop towel. Is the repair complete?	30 – 50° C 20 Nm	System OK	–

Step	Action	Value	Yes	No
10	1 Change the fluid and fluid filter. Refer to 3.1 Fluid Change and Filter Replace. 2 Start the engine and run at idle speed. 3 Depress the brake pedal and move the shift lever through all of the gear ranges, pausing a few seconds in each range. Return the shift lever to the Park range. 4 Raise the vehicle and support in a safe manner. The vehicle must be level, the engine running and the shift lever in the Park range. Refer to 0A General Information for the location of recommended lifting and support points. **WARNING** • **The engine must be running when the transmission fluid filler plug is removed, or excessive fluid loss will occur.** • **Take extreme care when removing the filler plug as it is very close to the catalytic converter and personal injury through burning can easily occur.** • **Transmission fluid may be hot. Since the actual fluid level is unknown, stand clear when removing the filler plug. Have a container ready to capture any lost fluid.** • **Do not turn the engine off with the filler plug removed, as you can be injured by hot transmission fluid being expelled out of the fluid level plug opening.** 5 With TECH 2 still connected to the vehicle, allow the A/T fluid temperature to rise until it has reached the specified value. Remove the transmission filler plug (1). 6 If needed, add Dexron® III automatic transmission fluid in increments of 0.5 litre until the fluid drains from the threaded filler plug hole. 7 Allow fluid to finish draining from the filler plug hole. Inspect the filler plug (1) and O-ring and, if undamaged, they may be re-used. Reinstall the transmission filler plug (1) and tighten to the specified value. 8 Wipe any excess fluid from the transmission with a rag or shop towel. Is the repair complete?	30 – 50° C 20 Nm	System OK	–

Step	Action	Value	Yes	No
11	1 With TECH 2 still connected to the vehicle, allow the A/T fluid temperature to rise until it has reached the specified value. Remove the transmission filler plug (1). 2 Allow fluid to finish draining from the filler plug hole. Inspect the filler plug (1) and O-ring and, if undamaged, they may be re-used. Reinstall the transmission filler plug (1) and tighten to the specified value. 3 Wipe any excess fluid from the transmission with a shop towel or rag. Is the repair complete?	30 – 50° C 20 Nm	System OK	–

2.2 Transmission Cooler Reverse Flush and Flow Rate Check

LT Reference No. – 04-200

CAUTION

It is essential that a reverse flush and oil cooler flow rate check is performed, after ANY of the following situations:

- **Transmission is replaced.**
- **Fluid contamination is suspected.**
- **Whenever the oil pump and/or torque converter is replaced.**

NOTE

The reverse flush must be completed prior to conducting a flow rate check.

Reverse Flush

The recommended procedure for reverse flushing the transmission cooler and lines, particularly after an overhauled or replaced transmission has been installed into the vehicle, is as follows:

1 Disconnect the cooler line flange at the transmission and the quick connect fittings at the radiator cooler end. Refer to 3.6 Transmission Cooler Pipes/Hoses, in this Section. Do not lose the pipe sealing O-rings, when they are removed.

2 Disconnect the cooler pipe/hose combinations from the radiator, right hand tank. Refer to 3.6 Transmission Cooler Pipes/Hoses, in this Section.

3 Carefully check the cooler inlet fitting (upper) at the radiator end, to see whether any material is evident at this point. If so, dislodge and remove with a suitable tool and/or compressed air blown in the reverse direction through the cooler.

4 Using a commercially available pressure spray gun and clean solvent, such as white spirit:

   a Back flush through all cooler lines and hoses.

   b Back flush through the cooler, including an external cooler (if fitted).

   c Blow compressed air through the cooler and all cooler lines and hoses, to remove solvent.

   d Flush the cooler and pipes/hoses with transmission fluid.

5 Check the cooler pipe to cooler fitting and cooler pipe to transmission flange, sealing O-rings for damage, replacing as required.

6 Lubricate all O-rings with automatic transmission fluid before installing.

7 Reconnect cooler pipes to the cooler and transmission (refer to 3.6 Transmission Cooler Pipes/Hoses, in this Section) but leave the cooler return line to transmission connection open at the flexible hose, quick connect fitting from the lower cooler fitting.

8 Tighten the cooler pipe flange nuts at the cooler end to the specified torque. Refer to 3.6 Transmission Cooler Pipes/Hoses, Reinstall for the correct procedure.

Oil cooler pipe to radiator fitting torque specification .....25 Nm

9 Tighten the cooler pipe flange (3) to transmission housing retaining bolt (2) to the correct torque specification.

Transmission cooler pipe flange bolt to transmission torque specification	20 Nm

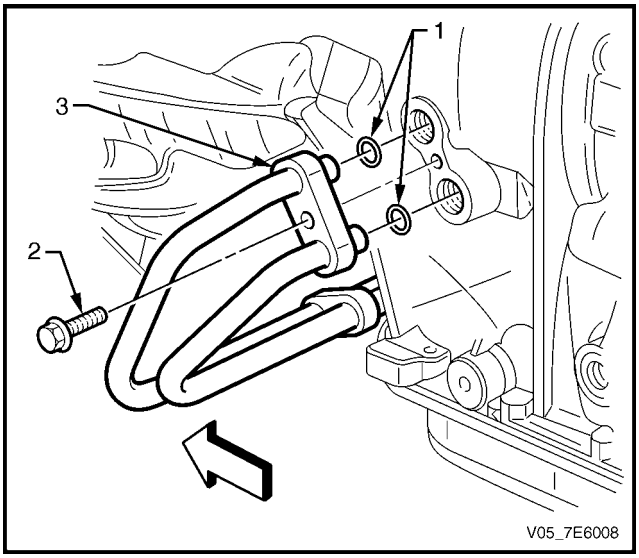


Figure 7E4 – 2

10 Conduct a flow rate test as described next, to ensure that any restriction has been cleared.

11 If flow rate is satisfactory, reconnect the return line, quick connect fitting. Refer to 3.6 Transmission Cooler Pipes/Hoses, in this Section.

12. Lower vehicle and check fluid level as detailed in 2.1 Transmission Fluid Check, in this Section.

Flow Rate Check

CAUTION

Do not run engine any longer than absolutely necessary, as too low a fluid level can cause aeration and foaming.

1 Following the flushing of the transmission cooler, pipes and flexible hoses, leave the cooler return line to transmission connection open at the flexible hose, quick connect fitting from the lower cooler fitting.

2 Ensure that the fluid level is to the recommended level, as detailed in 2.1 Transmission Fluid Check, in this Section.

3 Place an empty, clean container underneath the disconnected cooler hose. Clip the hose to the container.

4 With the selector lever in the PARK position, start the engine and observe the fluid flow into the container, after all air bubbles have ceased and a steady flow is evident. Measure the flow rate.

Result: The fluid flow rate should be approximately 1.9 litres in a 30 second period, with cold automatic transmission fluid (ATF). With ATF at normal operating temperature (86 – 93° C), the flow rate will increase and should be approximately 3 litres in a 30 second period.

If the flow rate is less than this specification, the source of the restriction must be located and rectified. Possibilities are either radiator tank cooler, faulty flexible hose/s and/or external cooler (if fitted).

5 Reinstall the cooler return line to the transmission quick connect. Refer to 3.6 Transmission Cooler Pipes/Hoses, Reinstall for the correct procedure.

6 Clean up any spilled automatic transmission fluid, start the engine and check for fluid leaks.

7 Check and correct the fluid level as detailed in 2.1 Transmission Fluid Check, in this Section, topping up as required.

3 On-Vehicle Service Operations

ATTENTION

All fasteners are important attaching parts as they affect the performance of vital components and/or could result in major repair expense. Where specified in this Section, fasteners MUST be replaced with parts of the same part number or an approved equivalent. Do not use fasteners of an inferior quality or substitute design.

Torque values must be used as specified during reassembly to ensure proper retention of all components.

Throughout this section, fastener torque wrench specifications may be accompanied with the following identification marks:

- ■ **Fasteners must be replaced after loosening.**
- ● **Vehicle must be at curb height before final tightening.**
- ♦ **Fasteners either have micro encapsulated sealant applied or incorporate a mechanical thread lock and should only be re-used once. If in doubt, replacement is recommended.**

If one of these identification marks is present alongside a fastener torque wrench specification, the recommendation regarding that fastener must be adhered to.

3.1 Fluid Change and Filter Replace

LT Section No. – 04-220

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

2 Place a suitable drain pan under the transmission fluid drain plug.

WARNING

Wear eye protection and protective clothing to prevent scalding from hot automatic transmission fluid.

3 Remove and discard the transmission fluid drain plug (2) and seal.

4 Allow the transmission fluid to drain.

5 Inspect the transmission fluid for discoloration and contamination while draining.

6 After the fluid has stopped draining, install a NEW transmission drain plug (2) and seal, then tighten the plug to the correct torque specification.

Drain plug torque specification	20 Nm

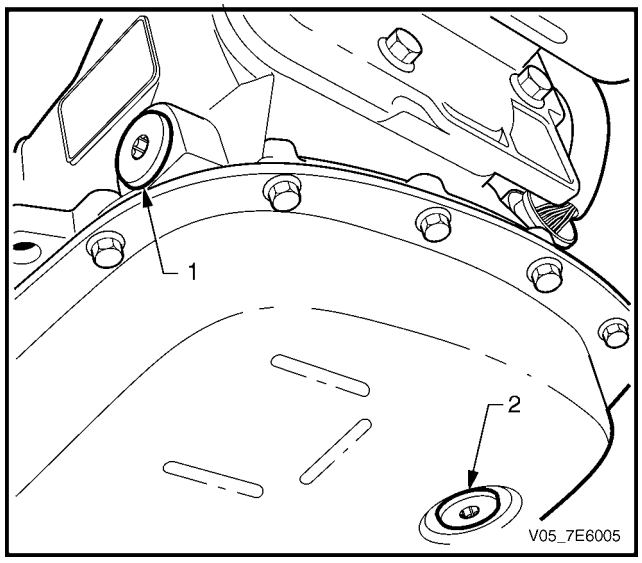


Figure 7E4 – 3

7 Remove the fluid pan bolts.

CAUTION

The fluid pan will retain a residual quantity of fluid that can splash, as will the fluid draining from the transmission components

8 Lightly tap the fluid pan (2) with a rubber mallet if necessary, to loosen.

9 Remove the fluid pan (2) and the gasket (4).

NOTE

The fluid pan gasket is re-usable, if undamaged.

10 Clean and inspect the following for damage or wear;

a Magnet (1)

b Fluid pan (2)

c Bolts (3)

d Fluid pan gasket (4)

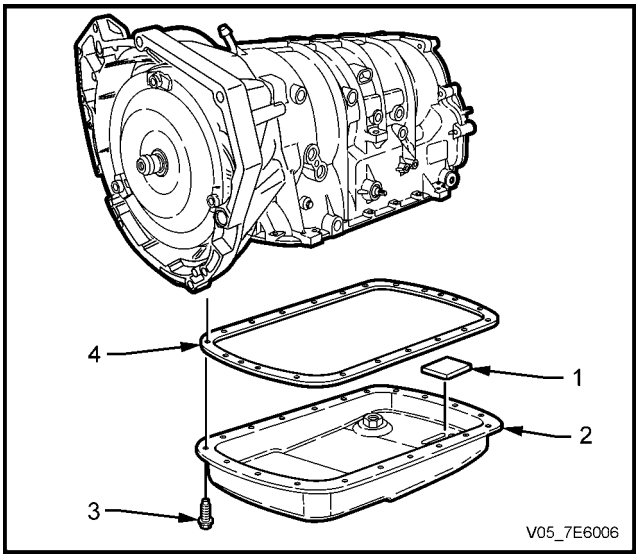


Figure 7E4 – 4

CAUTION

Do not lose the fluid filter neck spacer, following the filter removal.

11 Remove the fluid filter (1). Use a long screwdriver to prise the fluid filter neck from the seals in the fluid pump housing.

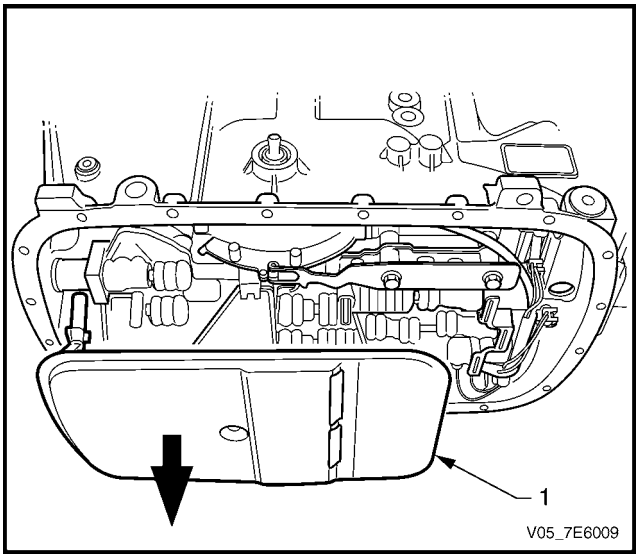


Figure 7E4 – 5

12 Using slide hammer, Tool No. J 6125-1B and remover J 23129, remove the two filter neck seals (57) from the transmission case. Discard the removed seals.

NOTE

If the filter is not being replaced, then removal of the seals is not necessary

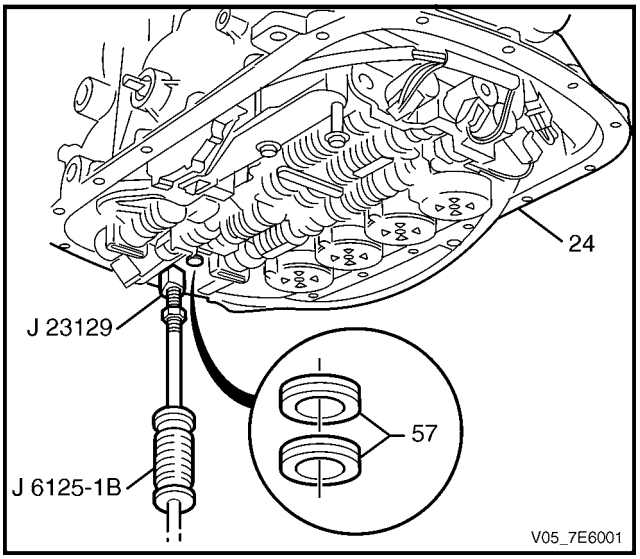


Figure 7E4 – 6

Reinstall

1 Coat the two 2 fluid filter seals (1) (supplied with a replacement filter assembly) with petroleum jelly (e.g. Vaseline™ or equivalent), then install into the transmission fluid filter neck.

CAUTION

Do not install the fluid filter without the spacer sleeve being fitted to the filter neck.

2 Install a NEW transmission fluid filter (2) and spacer sleeve into the case.

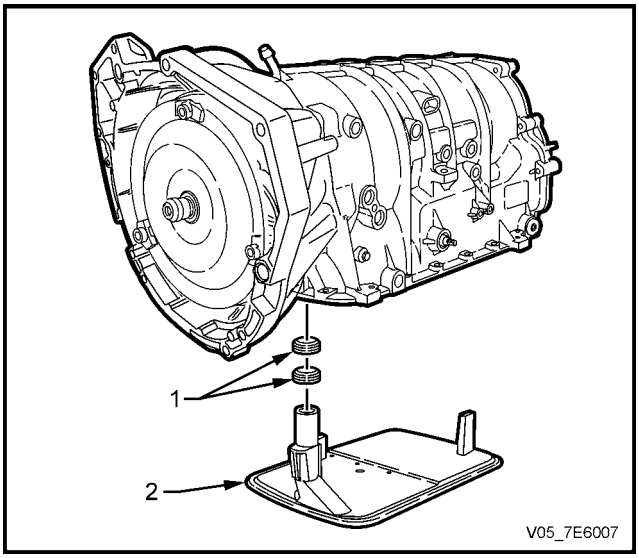


Figure 7E4 – 7

3 After checking that the magnet (1) is in the correct position in the fluid pan (2), install the fluid pan (2) and the gasket (4) at the same time.

4 Reinstall the fluid pan bolts (3), tightening to the correct torque specification.

Fluid pan bolt torque specification	11 Nm

5 Fill the transmission to the correct level. Refer to 2.1 Transmission Fluid Check procedure, in this Section.

6 Lower the vehicle to the ground.

7 Inspect the oil pan gasket for leaks.

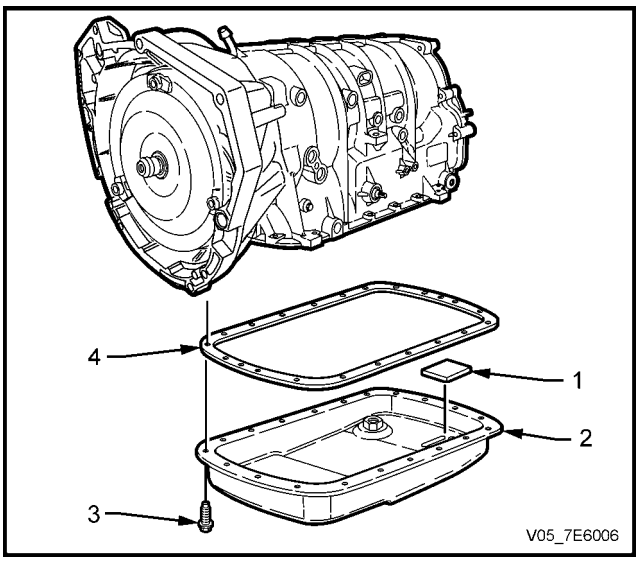


Figure 7E4 – 8

3.2 Selector Linkage – RWD Models

LT Section No. – 04-170

Remove

1 Set transmission selector lever to the Park position.

2 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of the recommended jacking and support points.

3 Remove locking bolt (1), dished washer (2), flat washer (3), insulator (4) and sleeve (5) from lower end of selector lever (9).

4 Slide trunnion (6) from selector rod (7).

5 While holding the transmission selector lever with an adjustable wrench, remove retaining nut (8), rod and lever assembly (7) from transmission manual shaft.

Inspect

Check all items for wear and/or damage, replace all worn or damaged items.

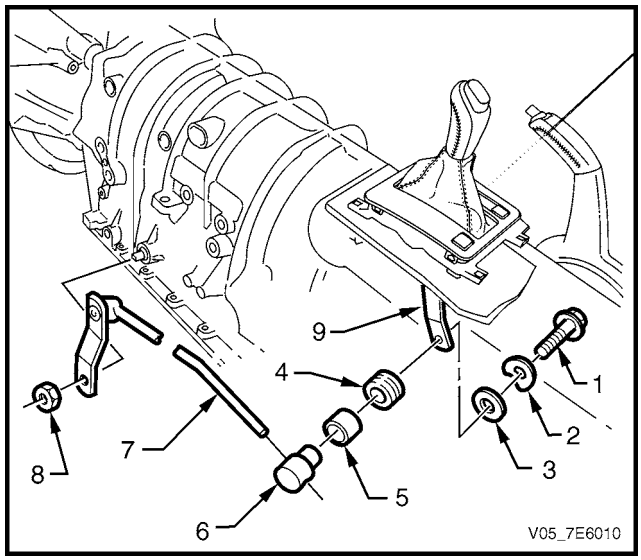


Figure 7E4 – 9

Reinstall

Reinstallation is the reverse of the removal procedure, except for:

1 While holding the selector lever with an adjustable wrench, tighten the retaining nut (8) to the correct torque specification.

Manual shift shaft lever nut torque specification	12 Nm

NOTE

Do not tighten the selector lever locking bolt (1) until the adjustment procedure is completed.

2 Adjust the selector linkage as described next.

Adjust

Refer to Figure 7E4 – 9.

1 Loosen locking bolt (1) at shift selector lever (9).

2 Position transmission shift selector lever in the Park position.

3 Position transmission manual shaft lever in the Park position (lever fully clockwise), then tighten the locking bolt at the shift selector lever, to the specified torque.

Shift selector lever locking bolt torque specification	30 Nm

4 Lower vehicle and test that the vehicle operates correctly.

5 Ensure that engine can only be started in Park and Neutral.

3.3 Shift Selector Cable – AWD Models

Remove

1 Remove floor console cover, lower extension side trim panels and the floor console assembly. Refer Section 1A3 Instrument Panel and Console.

2 Using a small bladed screwdriver (1), prise the upper end of the shift cable (2) from the shift selector lever linkage pin.

NOTE

To gain clear access to the cable end, release the two rear selector housing pegs (3) from the base and lift up.

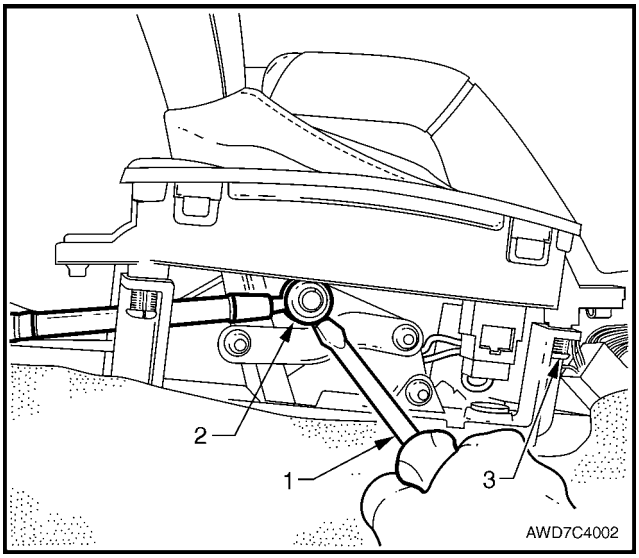


Figure 7E4 – 10

WARNING

Wear eye protection to prevent injury.

3 From inside the vehicle, use a screwdriver blade to rotate the outer cable retaining clip (1) (if needed), then remove the clip.

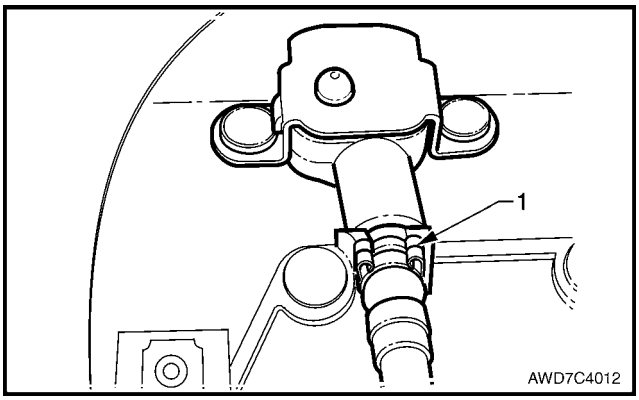


Figure 7E4 – 11

4 Raise the vehicle, support in a safe manner and lower the rear of the transfer case to gain access to the upper cable bracket to floor pan attaching nuts. Refer to Steps 6 – 17, in 3.5 Shift Selector Assembly – AWD Models, Remove, in this Section.

5 Use a set spanner to remove the two nuts securing the upper cable bracket and seal to the floor pan.

WARNING

Wear eye protection to prevent injury.

6 From under the vehicle, use a screwdriver (1) to release the cable to transmission bracket retaining clip (2).

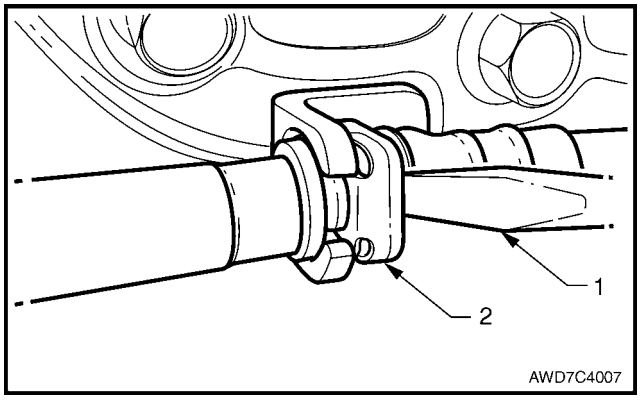


Figure 7E4 – 12

7 Use a small screwdriver (1) to prise the shift cable end (2) from the transmission external manual shaft lever (3).

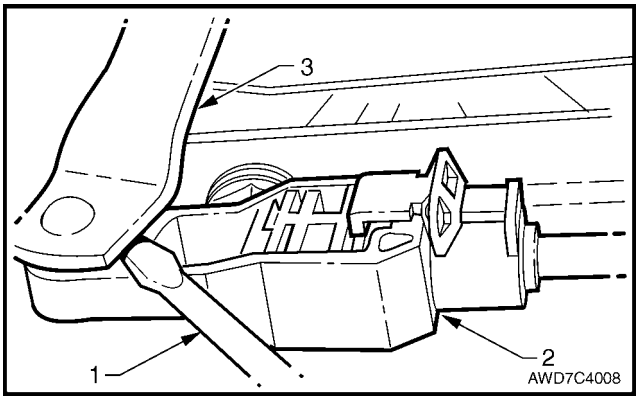


Figure 7E4 – 13

8 Slide the adjustment lock (2) back with the fingers, then push the white, square, inner lock (3) out, using a small screwdriver. Take care not to lose the inner lock when released.

9 Dislodge the upper cable bracket and seal from the floor pan and remove the cable assembly from inside the vehicle.

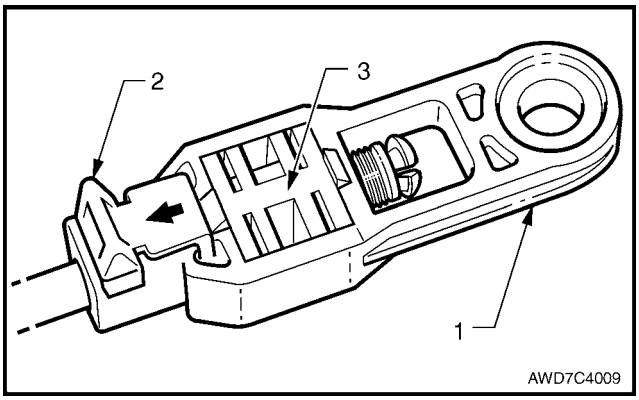


Figure 7E4 – 14

Reinstall

1 After checking that the upper cable bracket seal is in a serviceable condition, thread the shift selector cable through the aperture in the floor pan, until the upper cable bracket studs can be installed through the floor pan holes.

2 Install the upper end of the cable fitting to the shift selector linkage pin, by pushing inwards until the fitting is installed past the pin flange.

3 Engage the groove in the outer cable upper end with the slot in the shift selector base, then install a new retaining clip to secure. Check that the outer cable rubber grommet is correctly fitted at the upper cable end.

4 Under the vehicle, reinstall the two cable bracket and seal to floor pan retaining nuts and tighten to the correct torque specification.

Shift cable bracket to floor pan nut torque specification .....15 Nm

5 After checking that the cable is routed correctly, raise the rear of the transfer case and reinstall the mount bracket and rear crossmember to the vehicle underbody. Refer to Steps 3 to 7 inclusive, in 3.5 Shift Selector Assembly – AWD Models, Reinstall, in this Section.

6 Reinstall the shift cable end to the transmission external manual shaft lever pin, checking that it is fully installed to the pin. Leave the cable adjustment lock and white, square, inner lock in the released position, as the cable must be adjusted after installation.

WARNING

Wear eye protection to prevent injury.

7 Under the vehicle, reinstall the outer cable clip (2), checking that it is fully engaged and in the correct position, forward of the bracket that is bolted to the transmission case. Check that the outer cable rubber grommet is correctly fitted at the lower cable end.

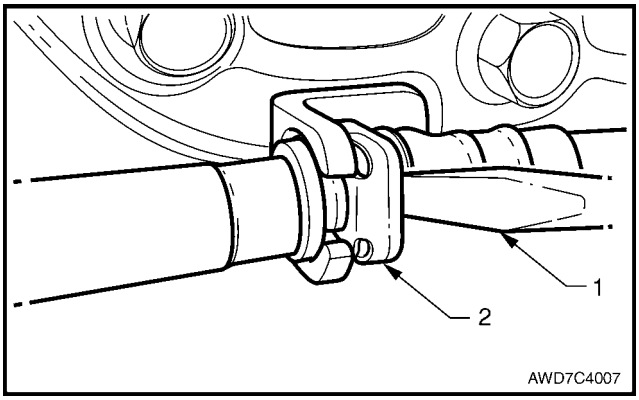


Figure 7E4 – 15

Cable Adjust

1 Move the transmission external shift lever into the Park position, then ensure that the transmission selector lever is also in the Park position.

2 Push the white square inner lock (1) inward to engage with the serrated cable end.

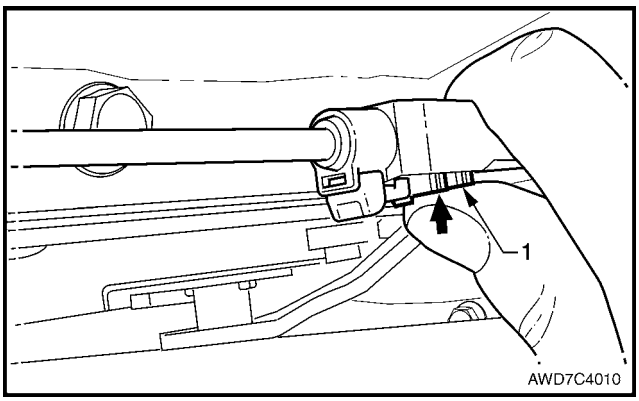


Figure 7E4 – 16

3 Secure the adjuster by sliding the adjustment lock forward.

4 Check that the engine can only be started when the selector lever is either in the Park or Neutral positions and will not crank when in any other selected position.

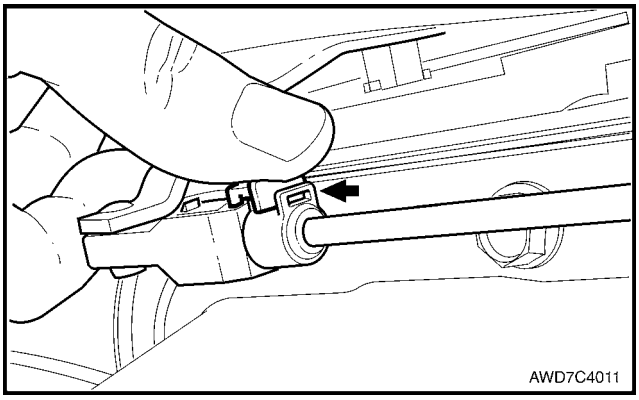


Figure 7E4 – 17

3.4 Shift Selector Assembly – RWD Models

LT Section No. – 04-190

Remove

1 Raise vehicle support in a safe manner. Refer Section 0A General Information for the location of recommended jacking and support points.

2 Remove floor console cover, lower extension side trim panels and the floor console assembly. Refer Section 1A3 Instrument Panel & Console.

3 Disconnect the wiring harness connector from the selector patch harness.

4 From beneath the vehicle, disconnect the selector rod and trunnion from the shift selector lever. Refer 3.2 Selector Linkage in this Section.

5 Remove the four nuts securing the selector lever assembly to the floor pan.

6 From inside the vehicle, lift the selector lever assembly from the floor pan.

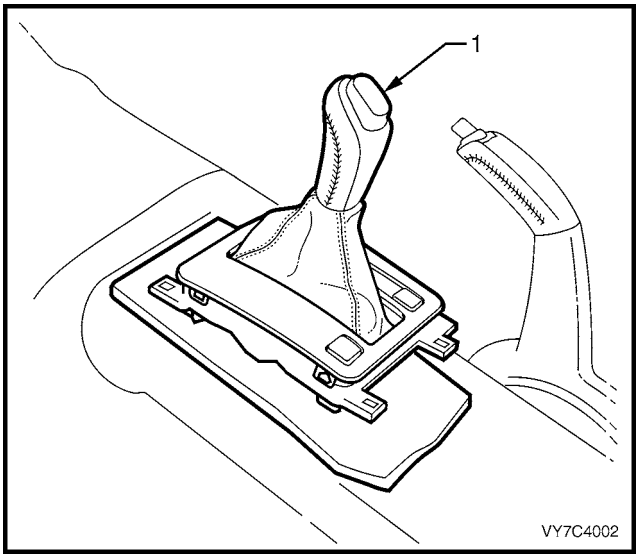


Figure 7E4 – 18

Disassemble

NOTE

- Unless specifically noted, the following procedures can be used for either design of selector lever assembly.
- While most views show the RHD version of the selector control lever assembly, LHD procedures can be assumed to be the same unless otherwise noted.

1 If the selector control lever assembly is of the BTSI design, manually release the interlock mechanism, as follows:

a First, press inwards at the front of the selector lever, just below the gearshift knob, as shown (1).

b Then, while still pressing inward (1), depress the selector knob with the other hand (2) and move the lever from the Park position and into 'D' Drive.

NOTE

This is the recommended reassembly position.

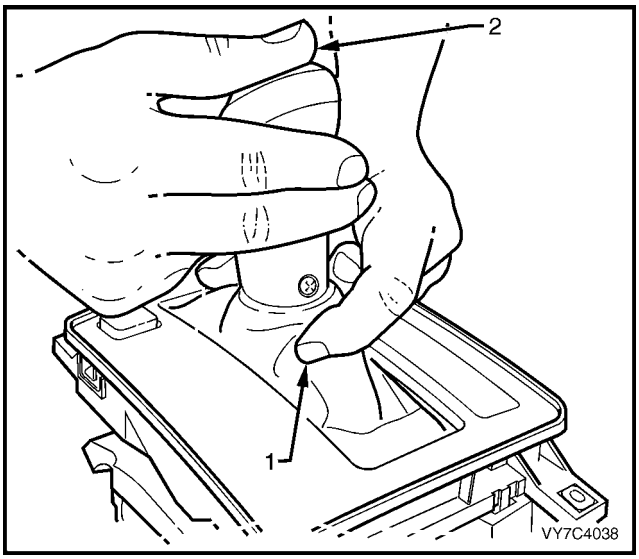


Figure 7E4 – 19

2 Using a commercially available Torx Plus (TX20) bit and suitable equipment, remove the self tapping screw (1). Select 'D' Drive.

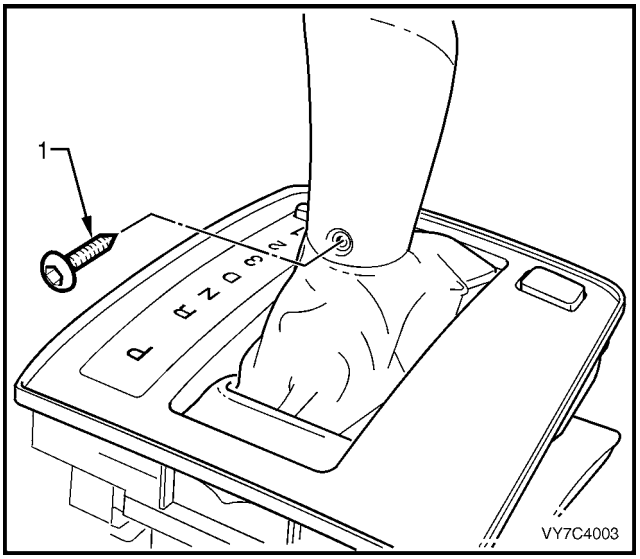


Figure 7E4 – 20

3 Using a small screwdriver (2), prise the locking tab on the wiring harness connector (1) at the rear of the shift selector assembly, while pushing away from the lower housing, as shown.

NOTE

This operation is optional with the BTSI shifter, as:

- The patch harness can be disconnected at the micro switch and the solenoid (in which case, step 3 is required).

OR

- Following separation of the lower housing and the base (see step 4), the wiring harness connectors could be removed from the 'PWR' and 'A/S' switches, leaving the harness with the base (step 3 not being required).

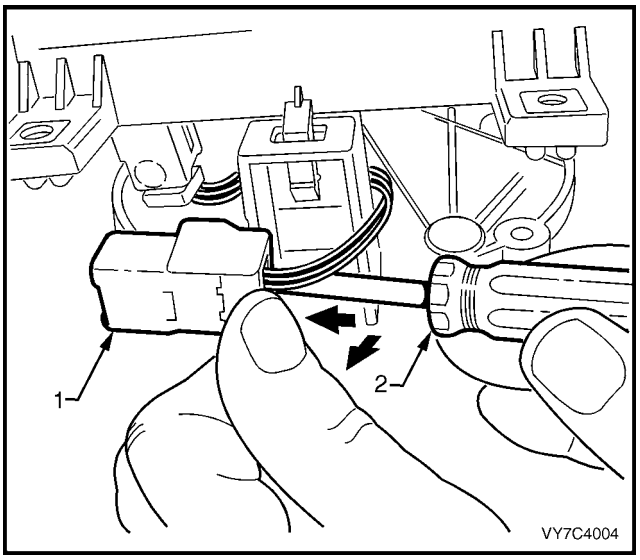


Figure 7E4 – 21

4 With the wiring harness connector free, disconnect the lower housing from the base (1) by pressing the tangs on each of the retaining legs (two front, one rear).

5 Lift the lower housing (1) from the base (2), together with the switch/es, patch wiring harness, boot and shift lever knob. Set the assembly to one side.

NOTE

With the BTSI shifter, when the patch harness is left behind (choice 'b' in step 3), the removed components will be; the lower housing (1), together with the switch/es, boot and shift lever knob.

6 As required, lift the insulator (3) from the base (2) and set to one side.

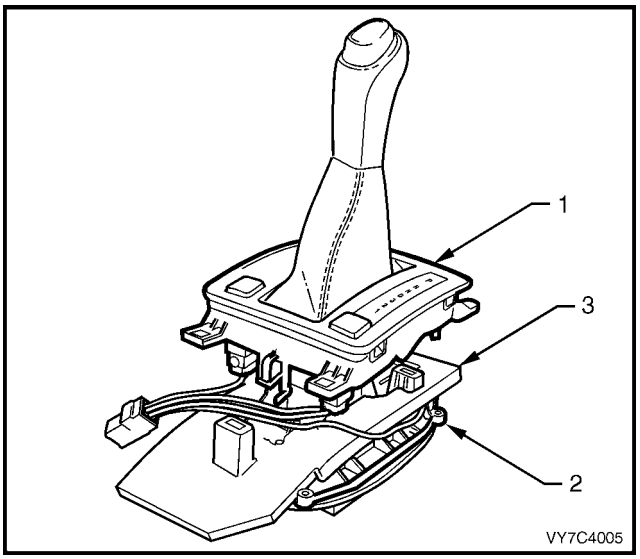


Figure 7E4 – 22

With the shift lever assembly now separated, select from the following choices for the service operation/s required.

Boot, Shift Lever Knob Remove

1 While holding the lower housing in an inverted position, gently prise each of the four securing lugs (1) to free the cover (2) from the lower housing (3). Lift the lower housing (3) from the gearshift selector knob, boot and upper cover assembly (2) and set to one side.

NOTE

If the lower housing assembly is not inverted before separation, then the boot will probably become dislodged from the locating tangs in the upper cover.

2 If boot replacement is required, free the boot from the upper cover locating tangs and set the cover to one side, being careful not to dislodge nor damage the PRNDL indicator lens in the process.

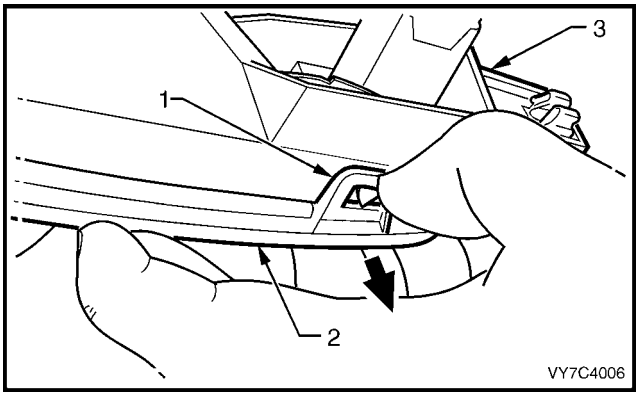


Figure 7E4 – 23

3 Turn the boot (2) inside out, over the gearshift selector knob, then cut the plastic tie (1) securing the boot to the knob. Remove the boot from the gearshift lever knob and discard.

NOTE

The plastic tie is a unique design and is markedly different from the usual cable tie.

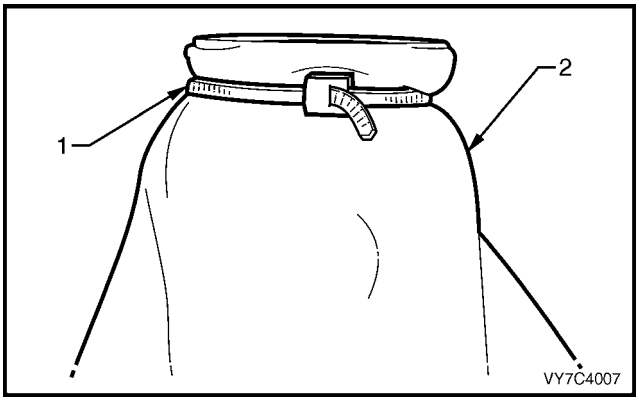


Figure 7E4 – 24

CAUTION

- **The knob is spring loaded and may fly free once dislodged.**
- **Take care when releasing the plated knob, as it is easily scratched.**

4 If the gearshift knob needs to be dismantled, use a small knife (2) or similar to free the lugs securing the control rod button from the gearshift knob (1).

5 Remove the two Phillips head self tapping screws, (located under the control rod button), then separate the knob components.

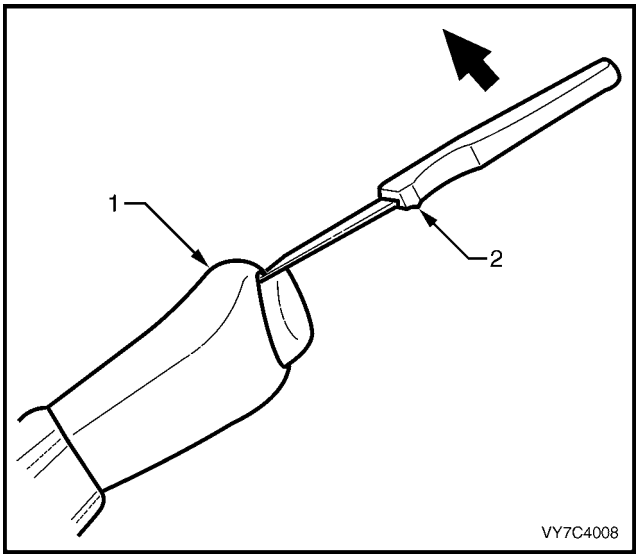


Figure 7E4 – 25

Patch Harness Remove

1 Remove the selector indicator lamp and holder from the switch housing by turning the lamp holder 90° to the left (counter-clockwise), then pull.

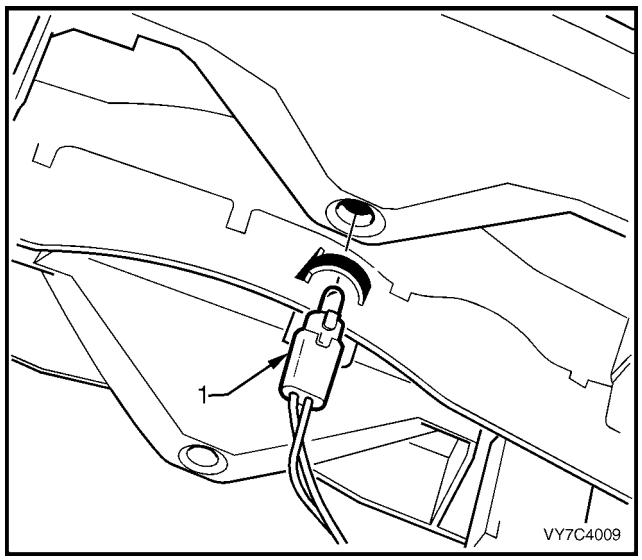


Figure 7E4 – 26

2 If not removed previously (step 3), release the switch connector retaining lug/s, then remove the connector/s.

NOTE

While each switch patch harness connector is the same colour (white), the Power/Economy (“PWR”) switch (when fitted) connector wiring is taped to the PRNDL indicator lamp wiring, as this switch will always be on the same side as this lamp. This situation remains the same for both RHD and LHD vehicles.

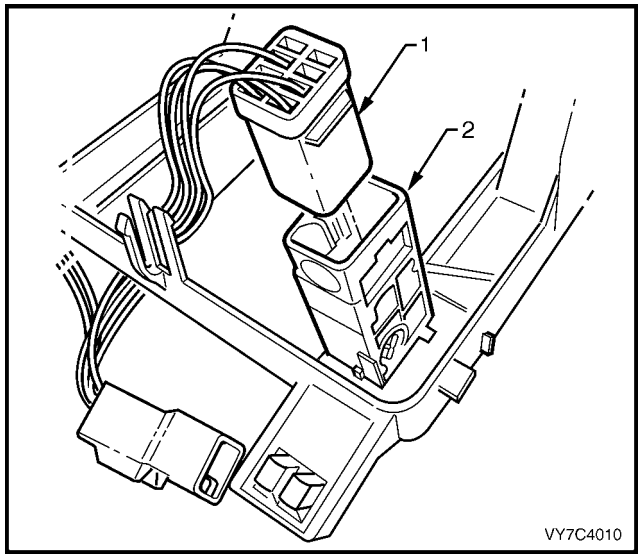


Figure 7E4 – 27

3 If the shift lever assembly is of the BTSI design, remove the patch harness wiring connectors from the solenoid (1) and the micro switch (2), taking note of the patch harness routing, for correct reinstallation.

4. Remove the patch harness and set to one side.

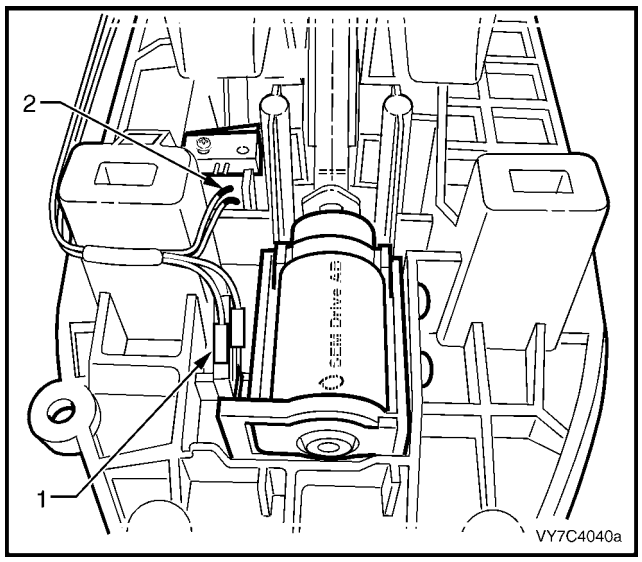


Figure 7E4 – 28

Switch Remove

NOTE

For this operation, the cover must be split from the lower housing. Refer to Step 4 in the Disassembly procedure.

1 To remove the A/S and/or PWR switch (if fitted), use a small bladed screwdriver and lever one of the switch retaining tangs from under the lower housing to free the particular switch, cock to one side, release the second tang and then remove the switch from above.

NOTE

Take note of the locating lug on the switch body that ensures the correct orientation of the switch when reinstalled.

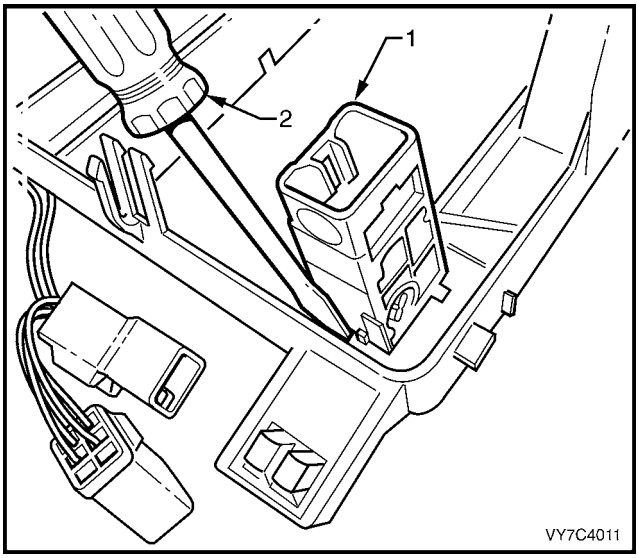


Figure 7E4 – 29

BTSI Solenoid and/or Micro Switch Remove

1 With the lower cover separated from the base, lift the insulator back and over the shift lever.

2 With the patch harness connectors (2 and 1) removed from the micro switch and the solenoid, remove the two Phillips headed screws (4) securing the solenoid or the single self tapping screw (3) from the micro switch.

3 Remove the solenoid and/or micro switch from the BTSI base.

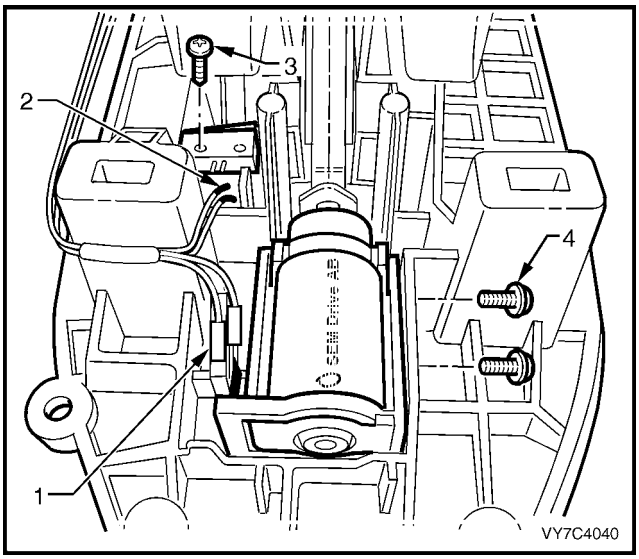


Figure 7E4 – 30

Base Disassembly

1 If not removed previously, remove the shift rod trunnion bolt from the lower end of the shift lever arm. Slide the trunnion from the arm, then remove the insulating grommet.

NOTE

This is necessary to provide clearance for the lever to be removed from the lower housing.

1 Remove the external seal (1) from the lever arm and set to one side.

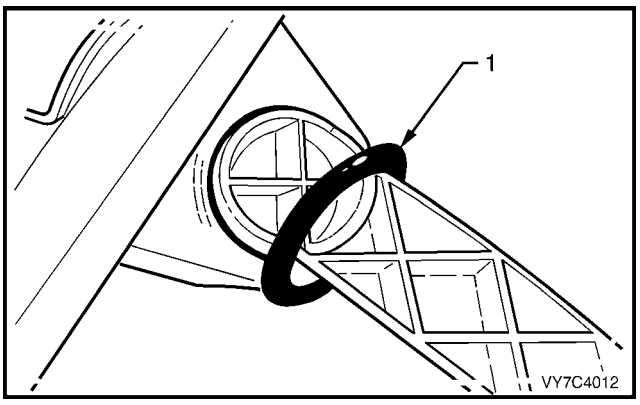


Figure 7E4 – 31

2 To remove the lever locking piece, use a small screwdriver (1) to lever the locking tang free while pulling on the locking piece (2) with long nosed pliers (3).

3. Push the lever assembly inwards to release the inner support pin and bush

NOTE

The bush may remain in the lower housing.

4 Lift the shift lever from the lower housing.

NOTE

While it will be necessary to manoeuvre the lever somewhat, sufficient space is provided to overcome any need to apply force to the lever assembly.

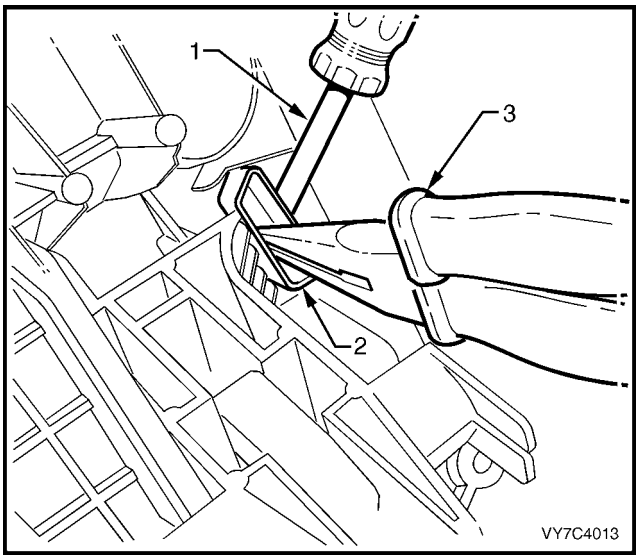


Figure 7E4 – 32

Lever Disassembly

Regardless of the shift lever type, further disassembly is not recommended, as there is a very real possibility that, during reinstallation of the roll pin, the shift lever will be cracked, unless sophisticated jigs are used. For this reason, the shift lever is only serviced as an assembly.

Reassemble

Base Reassembly

1 Inspect the external lever, inner bushing (1) for damage, replacing as required. Lubricate with a multi-purpose chassis grease such as NLGI No. 1 Lithium grease.

2 Reinstall the split inner support bush (2) to the selector lever pin, aligning the split in the bush with the key on the selector lever pin. Lubricate the external bush surface with a multi-purpose chassis grease such as NLGI No. 1 Lithium grease.

3 Reinstall the selector lever assembly (3), into the base. Align the small bush with the aperture in the base then push across to fully install the lever.

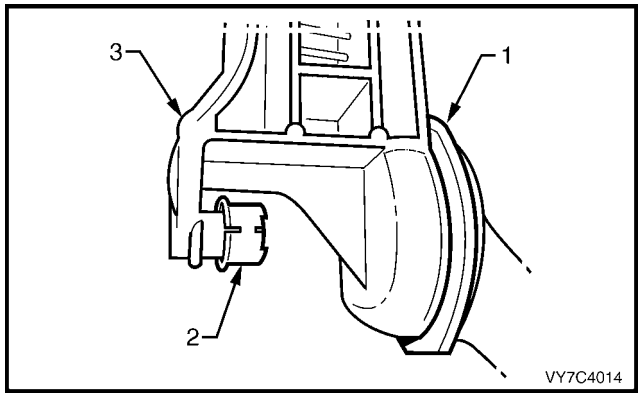


Figure 7E4 – 33

4 Reinstall the lever locking piece (1), using long nosed pliers. Correct reinstallation will have occurred when an audible click is heard, indicating that the tang on the locking piece has been installed correctly.

NOTE

While a standard shift lever is shown, the reinstallation is the same for the BTSI design.

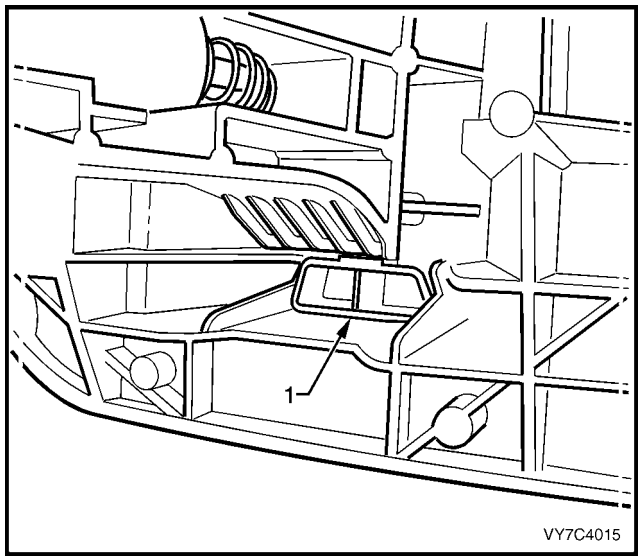


Figure 7E4 – 34

5 Apply a smear of multi-purpose chassis grease such as NLGI No. 1 Lithium grease to the outer, lipped seal (1), then reinstall over the external lever.

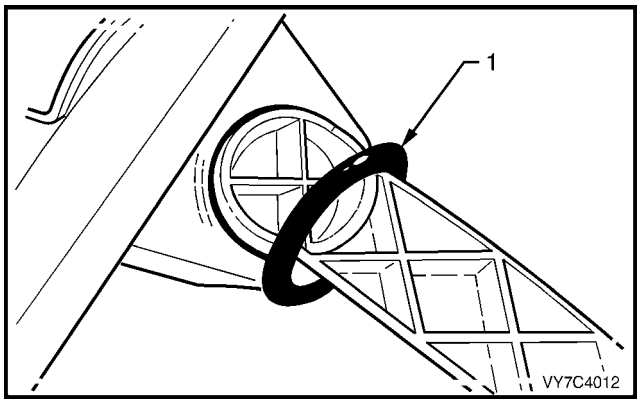


Figure 7E4 – 35

BTSI Solenoid and/or Micro Switch

1 Reinstall the solenoid and/or micro switch to the base, securing with two screws (4) for the solenoid and/or single self tapping screw (3) for the micro switch. Do not over-tighten the screws.

2 Reinstall the patch wiring harness connectors to the micro switch (2) and/or solenoid (1).

3 Reposition the insulating foam into position.

NOTE

No adjustment is required for the BTSI solenoid.

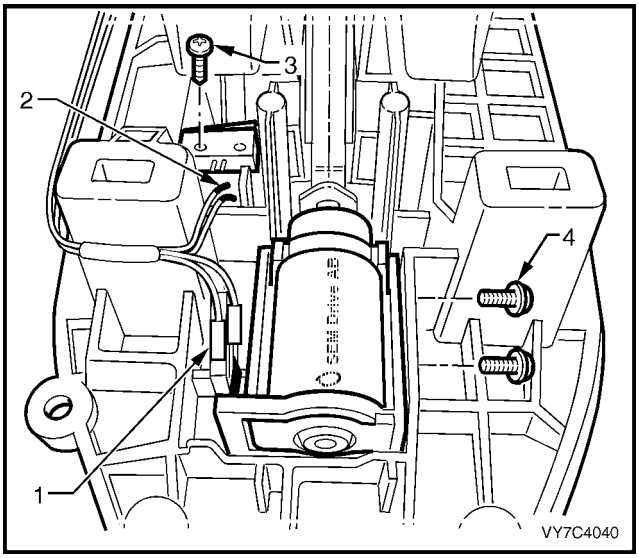


Figure 7E4 – 36

Lower Housing

1 If removed, reinstall the switch/es to the lower housing, ensuring that the locating lug on the switch body engages with the slot in the lower housing. If the vehicle is equipped with traction control, the correct location for this switch, is in the right hand aperture for RHD vehicles (the opposite side for LHD vehicles). This will always be behind the PRNDL indicator lens.

2 Reinstall the patch wiring harness, ensuring that the switch connector/s connection is correct. Also reinstall the PRNDL lamp and holder, by inserting and turning the holder a quarter turn to the left (counter-clockwise).

If of the BTSI design, it is recommended that the patch harness be reinstalled to the solenoid and micro switch first, then to the PWR and/or T/C switch (if fitted), prior to reassembling the lower housing assembly to the base (refer to Figure 7E4-29). In this instance, the wiring harness connector should also be installed to the bracket on the base, at this time.

3 If a new selector lever boot is to be installed, use the tie strap included with the new boot to firmly secure the boot to the gearshift selector knob. Trim excess length and discard.

4 With the upper cover (1) inverted, locate the boot (2) over each of the cover locating tangs (3), working gradually around until every tang is covered.

NOTE

The weight of the selector knob will be sufficient to keep the boot engaged with the tangs.

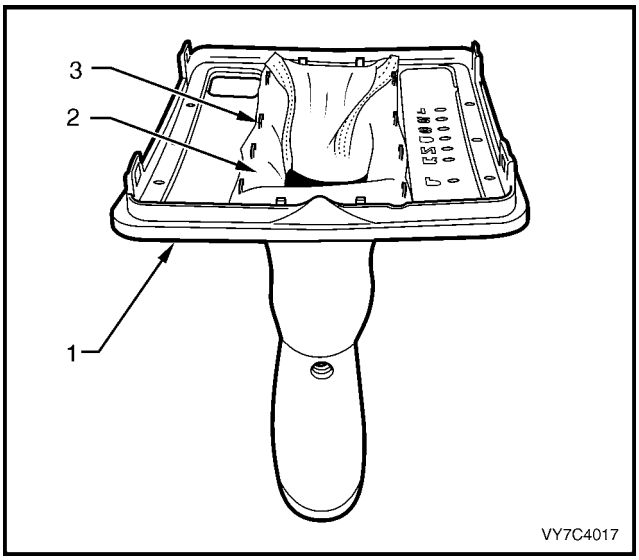


Figure 7E4 – 37

5 To reduce the possibility of the boot from becoming dislodged from the upper cover retaining tangs, reinstall the lower housing (1) to the cover (2), working in an inverted position, as shown.

NOTE

Before reassembling the lower cover to the base, check that the coloured indictor is in line with the two PRNDL display lamp holes (3). This will be the approximate position for correct reassembly.

6 Engage each of the tabs on the upper cover with the retaining lugs on the lower housing. When all four tabs have been engaged, the boot will be clamped and can no longer become disengaged.

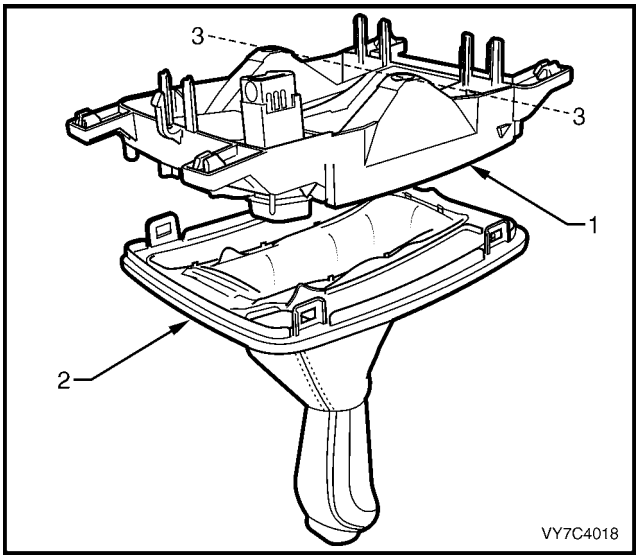


Figure 7E4 – 38

7 Ensure that the PRNDL indicator slide in the lower housing, is at the “D” position (the red colour will show opposite the “D” in the PRNDL lens).

8 After checking that the insulator (3) is undamaged, reinstall to the base (2).

9 After checking that the selector lever is also in the Drive position, reinstall the lower housing (1) over the shift lever and engage each of the three legs with the base apertures. Check that the PRNDL indicator slide pin is engaged with the slot in the selector lever.

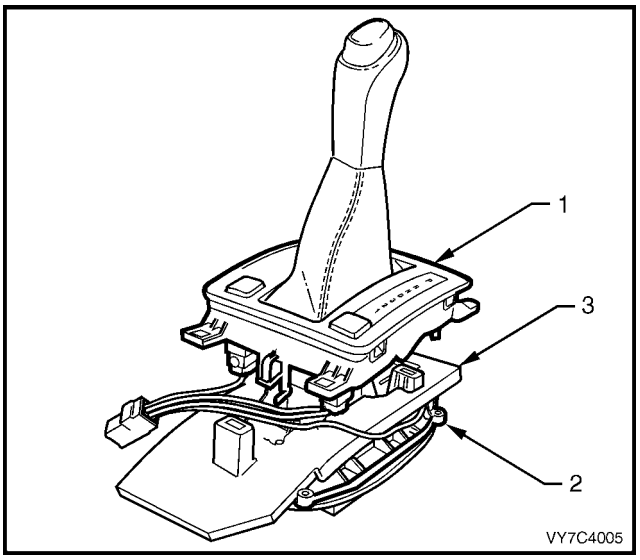


Figure 7E4 – 39

NOTE

If the shifter is of the BTSI design, before reassembling to the base, reinstall the patch harness connector/s (1) to the PWR and/or T/C switch (if fitted).

10 Reinstall the selector indicator lamp and holder (2) by inserting, then turn to the right (clockwise), to secure.

11 Re-engage the selector lever knob with the selector lever, aligning the control rod with the hole in the selector knob.

CAUTION

If the shifter is of the BTSI design, do not engage the PARK position during the next test process. If this does occur, the interlock will need to be manually released again (refer to Step 1 of the Disassemble process).

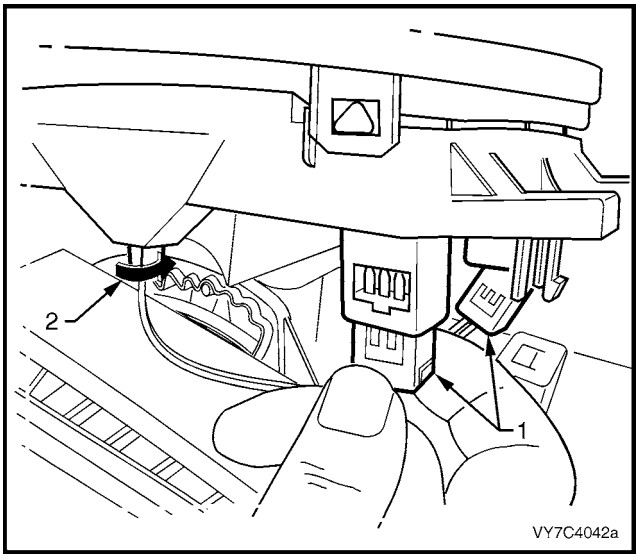


Figure 7E4 – 40

NOTE

Correct engagement of the PRNDL indicator can be easily checked by moving the selector lever. Should the coloured portion not move with the lever, then engagement is incorrect. Separate the lower housing and base and repeat steps 5 to 9 above.

12 Reinstall the selector knob retaining screw, using a TX20 Torx bit and suitable equipment, being careful not to over-tighten.

13 Reinstall the selector lever knob and spring, pushing down until the two locking tangs engage.

NOTE

If the selector lever knob and spring have not been removed, then re-engagement with the selector lever can still be achieved but some manoeuvring may be necessary.

14 If removed, reinstall the wiring harness connector to the bracket at the end of the base and push until the looking tang engages.

Reinstall

1 Clean mating surfaces of floor pan and inspect the base seal for damage, replacing if necessary.

2 Reinstall selector lever assembly (1) to the floor pan, install the four retaining nuts (2) and tighten to the correct torque specification.

Shift selector base retaining nut torque specification	15 Nm

3 The remainder of the reinstallation is the reverse of the removal procedure. As required, refer to Section 1A3 Instrument Panel & Console for installation procedures of the floor console assembly, lower extension side trim panels and floor console cover.

4 Adjust shift linkage; refer to 3.2 Selector Linkage, Adjust in this Section, tightening the selector rod locking bolt to the correct torque specification.

Shift selector lever locking bolt torque specification	30 Nm

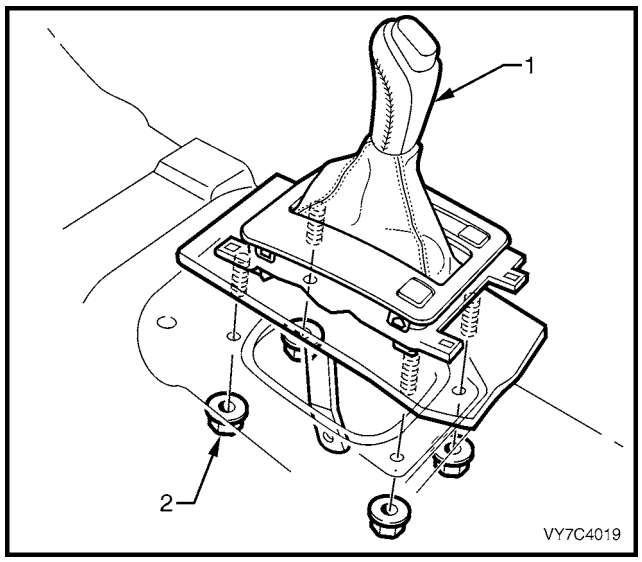


Figure 7E4 – 41

3.5 Shift Selector Assembly – AWD Models

Remove

1 Remove floor console cover, lower extension side trim panels and the floor console assembly. Refer Section 1A3 Instrument Panel and Console.

2 To disconnect the wiring harness connector (1) from the selector patch harness (2), squeeze the locking tang then pull the two wiring harness connector halves apart.

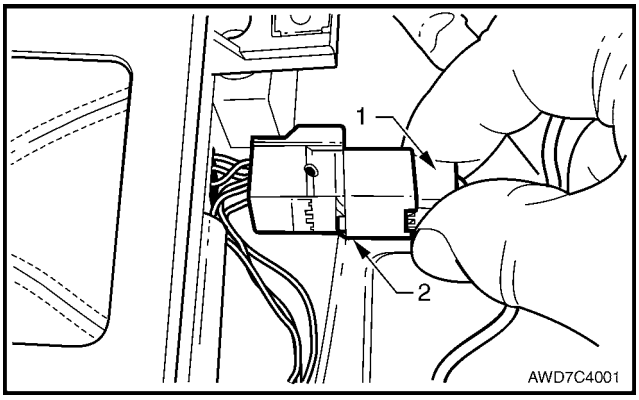


Figure 7E4 – 42

3 Using a small bladed screwdriver (1), prise the upper end of the shift cable (2) from the shift selector lever linkage pin.

NOTE

To gain clear access to the cable end, release the two rear selector housing pegs (3) from the base and lift up.

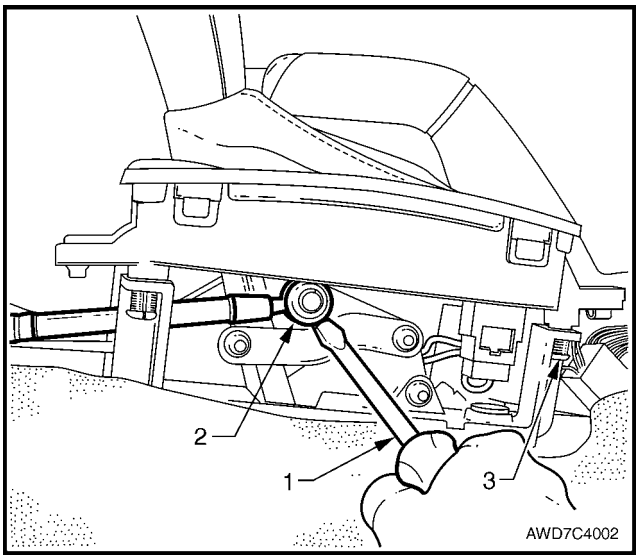


Figure 7E4 – 43

WARNING

Wear eye protection to prevent injury.

4 From inside the vehicle, use a screwdriver blade to rotate the outer cable retaining clip (1) (if needed), then remove the clip.

5 Raise vehicle and support in a safe manner. For location of jacking and support points, refer to Section 0A General Information.

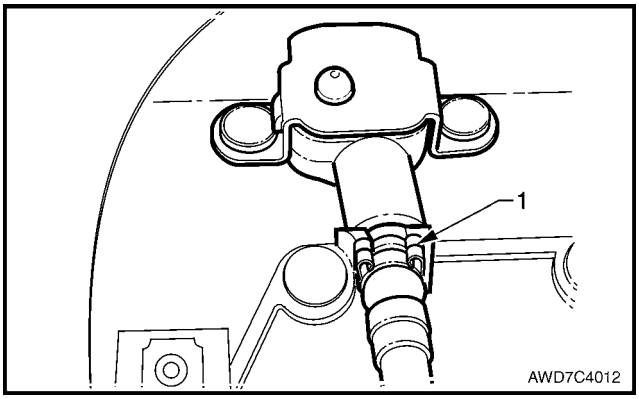


Figure 7E4 – 44

6 Using a felt tipped pen or similar (e.g. Whiteout correction fluid), mark the position of the rear crossmember (1) to the underbody side rails.

NOTE

This will assist in realigning the crossmember on reinstallation.

7 Remove the four bolts (2) attaching the rear crossmember (1) to the underbody side rails.

8 Remove the three bolts (3) securing the rear crossmember to the transfer case mount bracket (not visible). Remove the crossmember from the vehicle.

NOTE

Support of the transmission is not required at this time.

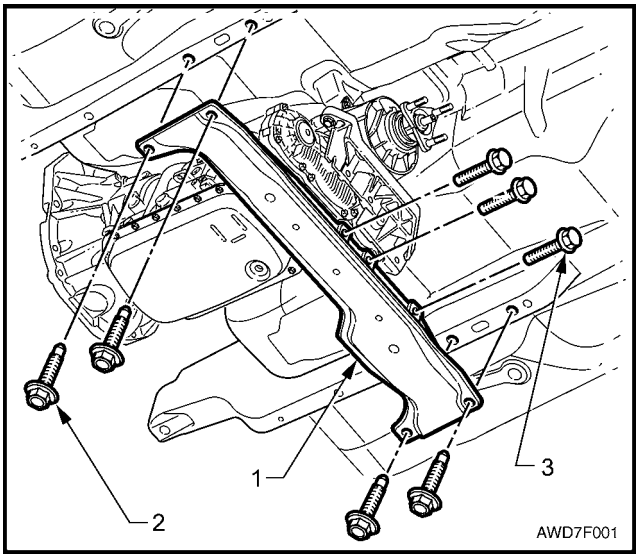


Figure 7E4 – 45

9 Remove the nuts securing the exhaust pipe bracket to each catalytic converter, then remove the two bolts securing the bracket to the transfer case adaptor housing. Remove the bracket.

10 Using suitable hydraulic lifting equipment, support the transmission/transfer case under the transfer case housing.

11 With the automatic transmission/transfer case supported, loosen the bolt (1) securing the transfer case rubber mount (2) to the transfer case rear mounting bracket (3).

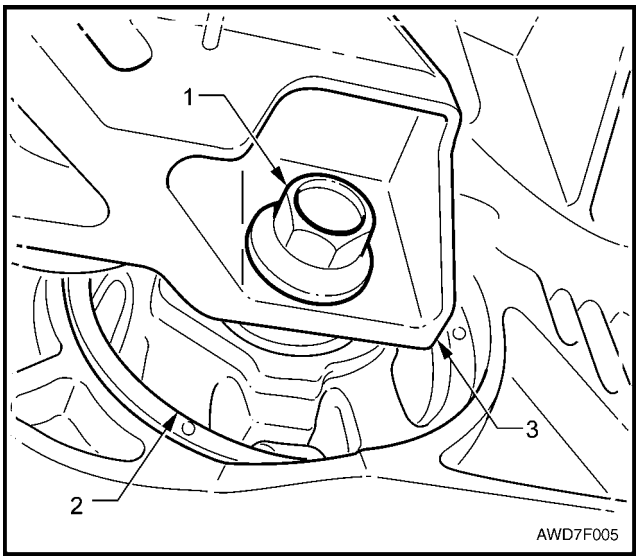


Figure 7E4 – 46

12 Using a felt tipped pen or similar (e.g. Whiteout correction fluid), mark the position of the transfer case rear mounting bracket to the vehicle underbody.

NOTE

This will assist in realigning the mounting bracket on reinstallation.

13 Loosen, then remove the three bolts (1) securing the transfer case rear mounting bracket (2) to the vehicle underbody.

14 Remove the loosened transfer case rubber mount to transfer case rear mounting bracket bolt.

15 Remove the transfer case rear mounting bracket (2) from the vehicle.

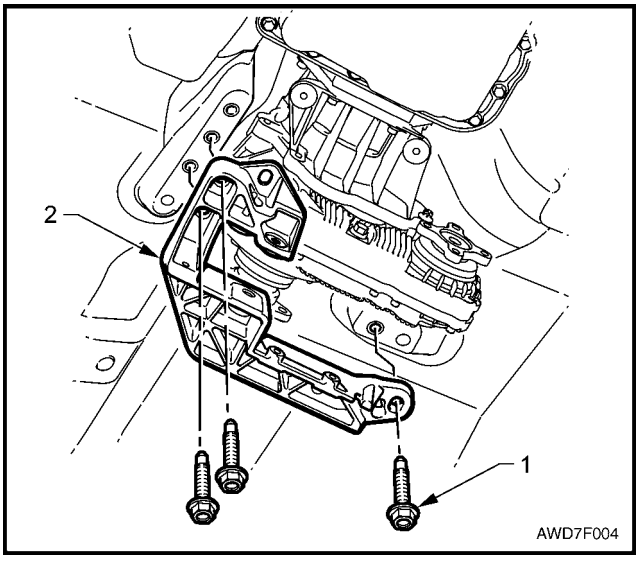


Figure 7E4 – 47

16 Lower the transmission/transfer case enough to gain spanner access to the four nuts (1) securing the shift selector assembly to the vehicle floor panel.

NOTE

Only two of the four nuts are visible in the view shown.

17 Remove the four nuts securing the shift lever assembly to the floor pan.

NOTE

To provide clearance to remove the shift selector, it will also be necessary to remove the two nuts securing the upper cable bracket and grommet to the floor pan.

18 From inside the vehicle, lift the shift lever assembly from the floor pan.

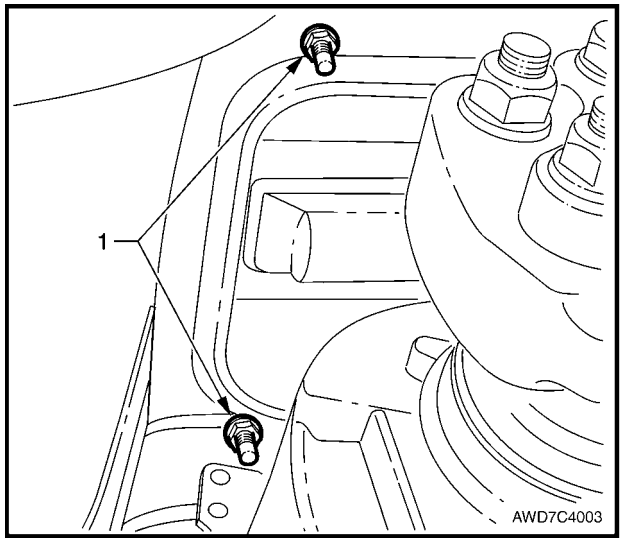


Figure 7E4 – 48

Disassemble

NOTE

Given that there are no serviceable items in the shift lever nor the lower base, disassembly is minimal and restricted to the lower housing and associated components only.

1 Remove the Phillips headed self tapping screw (1). Select ‘D’ Drive with the shift lever.

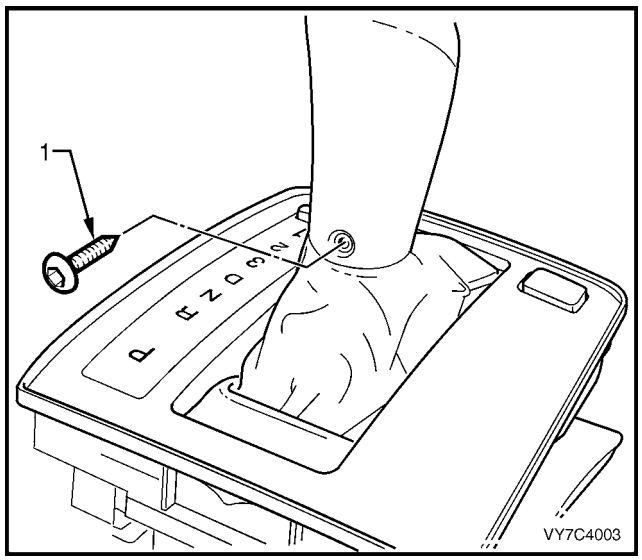


Figure 7E4 – 49

2 Use long nosed pliers to compress each of the lower housing pegs (1), allowing the peg to be separated from the base.

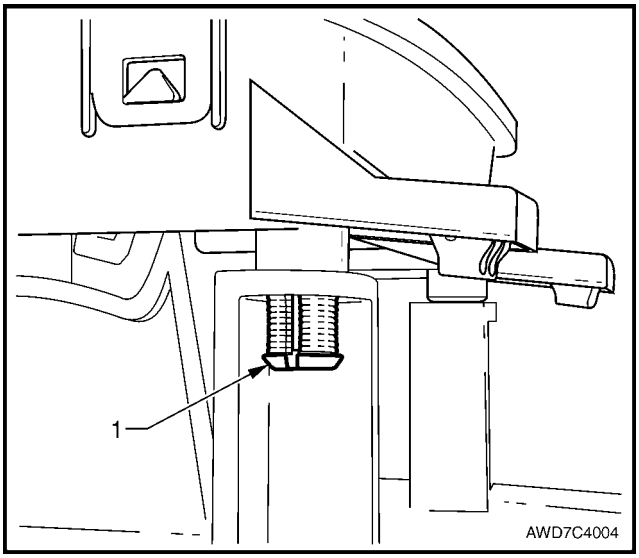


Figure 7E4 – 50

3 Lift the lower housing (1) from the base (2), together with the switch/es, patch wiring harness, boot and shift lever knob. Set the assembly to one side.

4 For any of the following service operations on the lower and upper housing assemblies, refer to 3.4 Shift Selector Assembly, in this Section:

- Boot Replacement
- Gearshift Lever Knob
- Cover Disassemble
- Patch Harness
- Switch Replace

Reassemble

1 If any of the items mentioned in Step 4 of the Disassemble process are involved, refer to 3.4 Shift Selector Assembly, in this Section.

2 Position the selector lever (2) in the position shown, then reinstall the lower housing assembly (3), over the shift lever, engaging the shift lever pin and the shift indicator lens connection (1), over the shift lever pin.

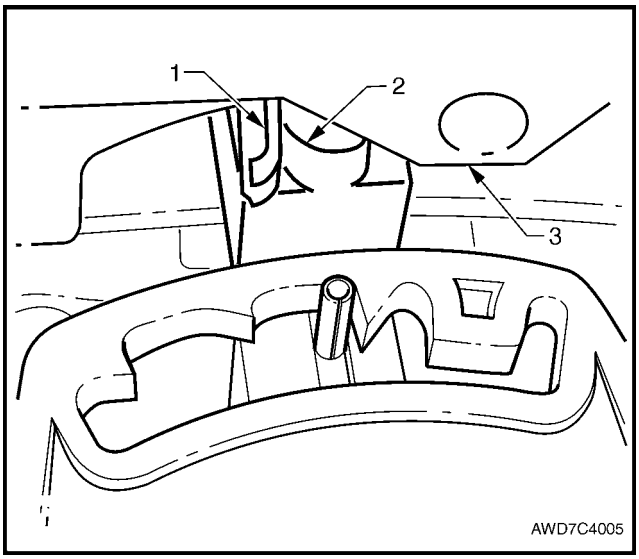


Figure 7E4 – 51

3 Engage each of the four pins (1) on the lower housing, with the holes in the base (2), then engage each pin with its respective hole, either by bumping with the heel of the hand or use long nosed pliers (3) to compress the pin and engage in the hole, as shown.

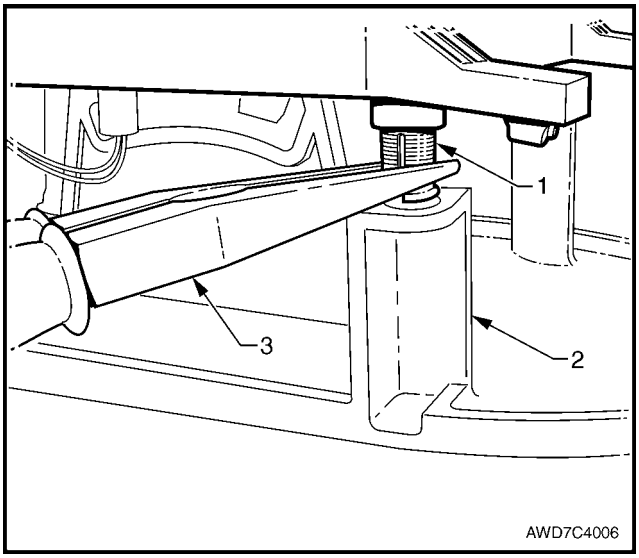


Figure 7E4 – 52

Reinstall

Reinstallation is the reverse to removal procedures except for the points noted;

1 Inspect the base insulator, replacing as required.

2 After reinstalling the shift selector assembly, reinstall the four retaining nuts and the upper cable bracket and grommet nuts, tightening all to the correct torque specification.

Shift selector base retaining nut torque specification .....15 Nm
Shift cable bracket to floor pan nut torque specification .....15 Nm

3 Reinstall the transfer case mount bracket, then reinstall the mount to bracket bolt. Do not tighten at this stage.

4 Raise the rear of the transfer case, realign the marks made before removal, then reinstall the three bracket retaining bolts and tighten to the correct torque specification.

Transfer case mounting bracket to underbody bolt torque specification .....58 Nm

5 Tighten the bracket to mount bolt to the correct torque specification.

Transfer case mount to bracket bolt torque specification .....100 Nm

6 Reinstall the rear crossmember, install the three crossmember to transfer case bracket bolts and the four crossmember to underbody side rail bolts. Tighten all fasteners to the correct torque specification.

Rear crossmember to transfer case bracket bolt torque specification .....54 Nm
Rear crossmember to underbody side rail bolt torque specification .....54 Nm

7 Reinstall the catalytic converter bracket, tightening the adaptor housing bolts and the catalytic converter to bracket nuts to the correct torque specification.

Catalytic converter bracket to adaptor housing bolt torque specification.....25 Nm
Catalytic converter bracket to catalytic converter nut torque specification .....25 Nm

8 Ensure that the rubber grommets at each end of the outer cable are fitted and in place. Failure to carry out this step could result in the inner cable kinking the first time the shift lever is moved. This kinking condition will result in the unnecessary replacement of the cable assembly.

9 Adjust the shift selector cable. Refer to 3.3 Shift Selector Cable – AWD Models, Cable Adjust in this Section.

10 Check the manual shaft position switch operation. Refer to 3.3 Shift Selector Cable – AWD Models, Adjust, in this Section.

3.6 Transmission Fluid Cooler Pipes/Hoses

LT Section No. – 04-150

Remove

Transmission Fluid Cooler Pipes

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Place an oil drain tray under the transmission fluid cooler pipes/hoses near the radiator.

3 Check that one of the fluid cooler flexible lines has a white tag attached and that the mating transmission cooler pipe has a similar tag. If these have been removed, apply adhesive tape to one pair of pipes/lines to ensure correct reassembly.

4 Remove each of the quick connect security clips by prising loose with a suitable lever (i.e. screwdriver).

5 Using disconnect Tool No. AU 525, disconnect each fluid cooler flexible line (1) from each pipe.

NOTE

The fluid cooler flexible lines are permanently attached to the radiator fluid cooler pipes.

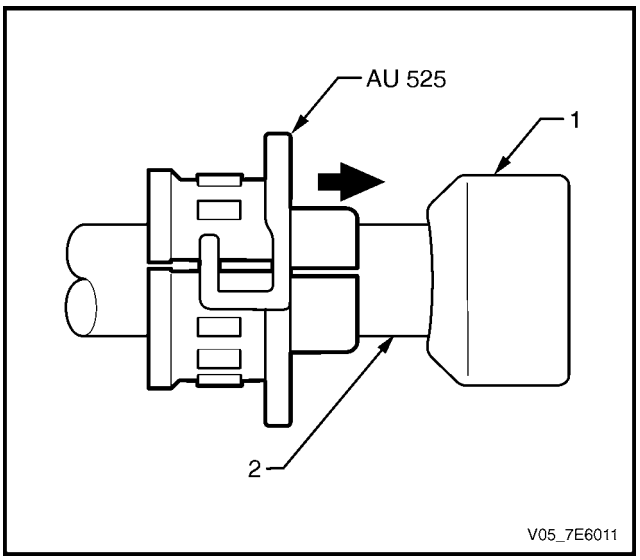


Figure 7E4 – 53

6 Remove the nut (1) securing the transmission fluid cooler pipe bracket (2) to the stud in the alternator mounting bracket.

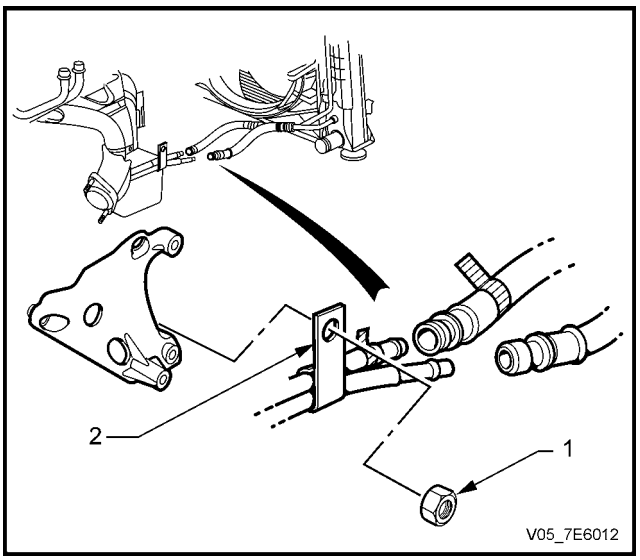


Figure 7E4 – 54

7 Remove the screw securing the transmission fluid cooler pipes bracket to the transmission case.

8 Remove the transmission fluid cooler pipes from the transmission.

9 Remove the two O-rings and discard, as they must be replaced on assembly.

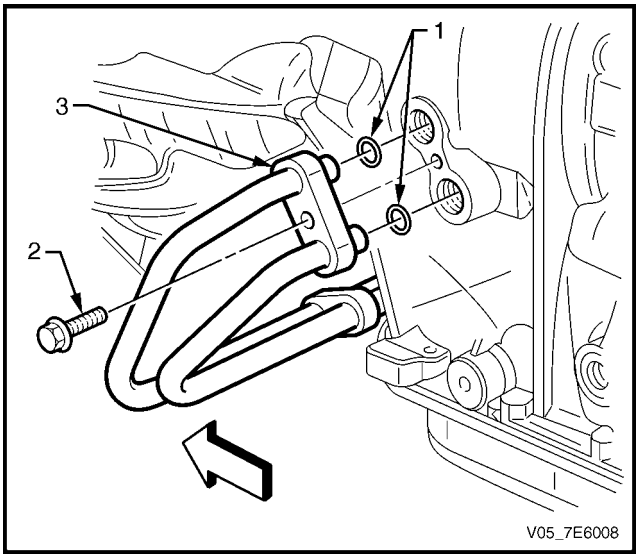


Figure 7E4 – 55

Radiator Cooler Pipes/Hoses

NOTE

As the hoses are permanently fitted to the cooler pipes leading to and from the radiator cooler, if hose replacement is required, then the complete pipe/hose combination must be fitted.

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Place an oil drain tray under the transmission fluid cooler pipes/hoses near the radiator.

3 Disconnect the transmission cooler pipes from the cooler hoses at the front, lower right side of the engine bay (refer to Step 3 in the Transmission Fluid Cooler Pipes removal procedure).

4 Referring to Figure 7E4 – 37, hold the lower cooler nut (4) at the radiator right hand header tank (1) with a back-up spanner and disconnect the oil cooler fluid return pipe (5) from that location. Plug the opened connections to prevent foreign matter entry.

5 Repeat this procedure for the upper cooler nut (2) and pipe/hose assembly (3) at the radiator right hand header tank (1).

6 Remove the radiator cooler pipes/hoses (3 and 5) from the vehicle.

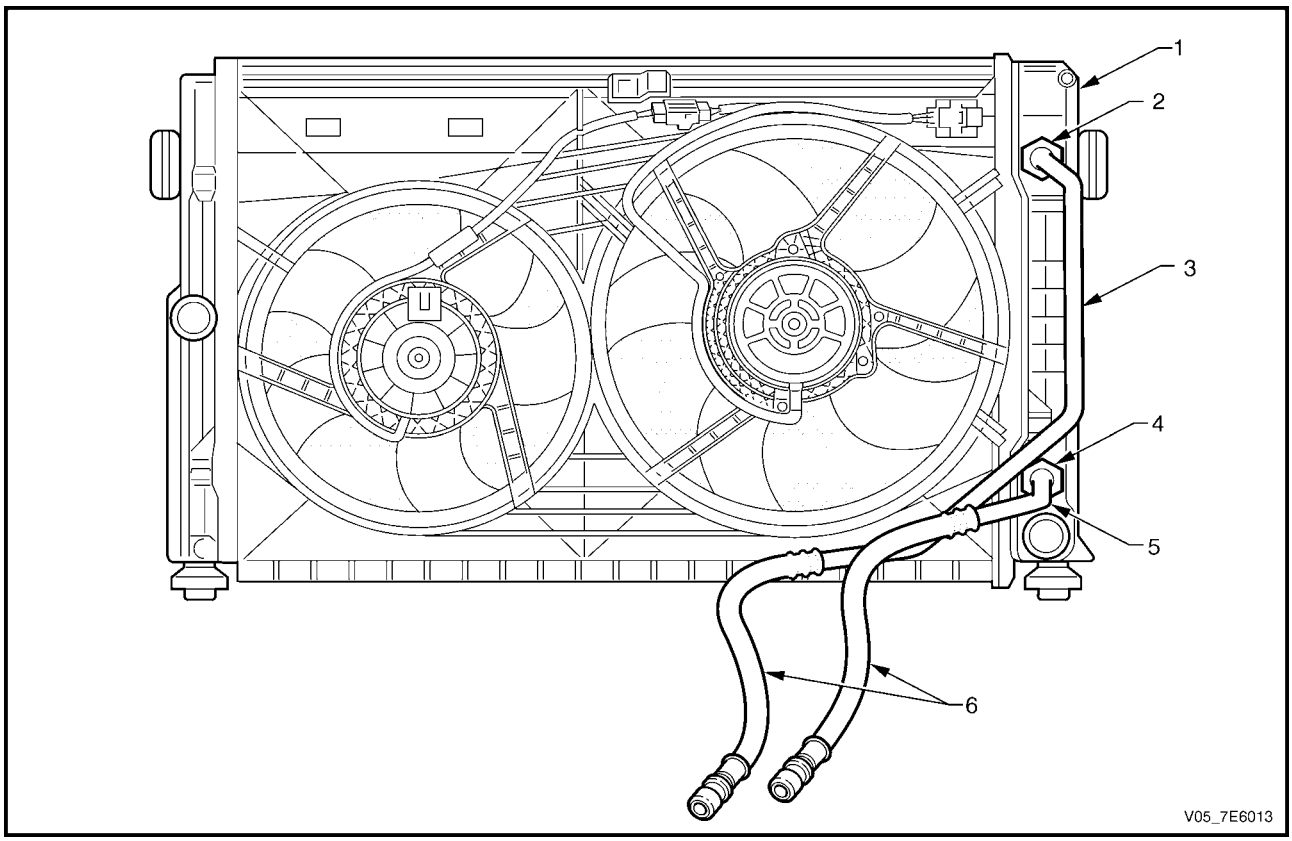


Figure 7E4 – 56 – Oil Cooler Pipe/Hose Layout

Legend

1	Radiator End Tank – Right	3	Fluid Cooler Pipe – Fluid Feed	5	Fluid Cooler Pipe – Fluid Return
2	Cooler Retaining Nut – Upper	4	Cooler Retaining Nut – Lower	6	Flexible Hoses & Quick Connect Fittings

Reinstall

The installation process of the oil cooler pipes/hoses, is the reverse to removal, except for the following:

Radiator Cooler Pipes/Hoses

1 Before reinstalling each pipe to the cooler, carefully inspect the pipe O-ring (3). If the centre, silicone portion shows signs of distress or damage, it must be replaced.

2 Remove the plugging from the pipe and fittings, fit the O-ring (3) to the cleaned cooler pipe (2), then reinstall the pipe into the radiator fluid cooler retaining nut (4).

CAUTION

Always use a back-up spanner to prevent the turning of the fluid cooler flare nut fitting (4).

3 Reinstall the tube nut (1) and tighten to the correct torque specification.

Cooler pipe tube nut to cooler fitting torque specification .....25 Nm

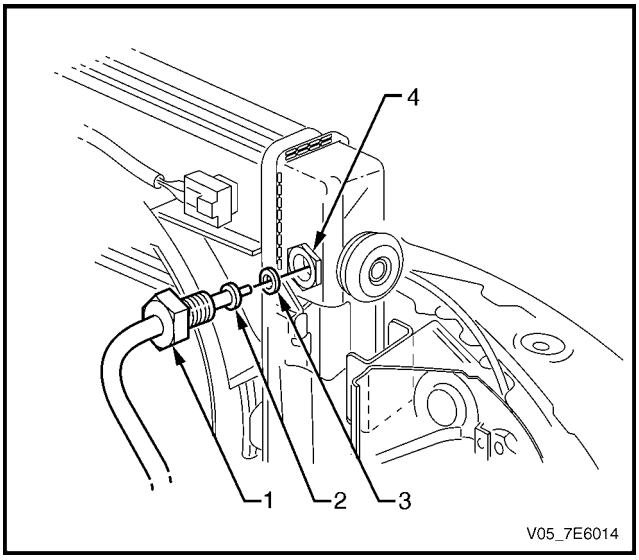


Figure 7E4 – 57

4 Repeat Steps 1 to 3 for the second pipe/hose assembly.

5 Check and adjust the transmission fluid level, as required. Refer to 2.1 Transmission Fluid Check, in this Section.

6 Inspect for transmission fluid leaks.

Transmission Fluid Cooler Pipes

1 Before reinstalling any quick connect fitting, remove plugs from pipes and hose fittings and wipe all exposed parts.

2 Smear, clean automatic transmission fluid over each cooler pipe end, then push into the flexible hose quick connect fittings until an audible 'click' is heard. As a security check, tug gently on each pipe to ensure correct engagement.

3 At the transmission end, again clean the pipe ends and install NEW O-rings (1) after lubricating each with clean, automatic transmission fluid.

4 Install the cooler pipes and bracket (3) to the transmission case.

5 Reinstall the securing bolt (2) and tighten to the correct torque specification.

Transmission fluid cooler pipe flange to transmission bolt torque specification .....20 Nm

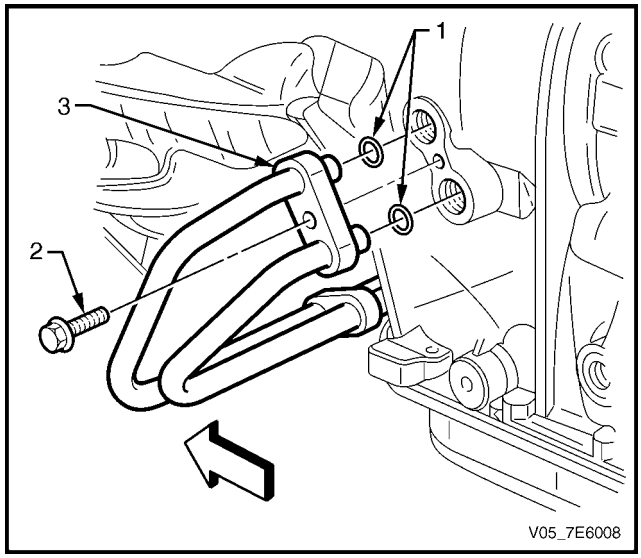


Figure 7E4 – 58

6 Reinstall the pipe bracket retaining nut (1) to the alternator bracket stud and tighten to the correct torque specification.

Transmission fluid cooler pipe bracket bolt torque specification.....20 Nm

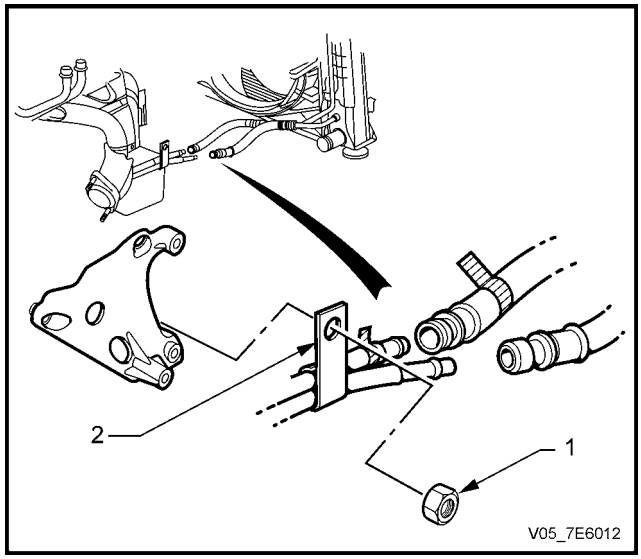


Figure 7E4 – 59

7 Check and top up transmission fluid level as required. Refer to 2.1 Transmission Fluid Check, in this Section.

8 Inspect for transmission fluid leaks.

9 Lower the vehicle to the ground.

3.7 Fluid Pressure Test Plug

LT Section No. – 04-200

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Using a 5 mm Allen key socket and suitable equipment, remove the pressure test plug (40) and O-ring seal (66).

3 Inspect the pressure test hole plug (40) and O-ring (66) for damage.

4 Install the pressure test plug (40) and O-ring (66), then tighten the plug to the correct torque specification.

Transmission pressure test plug to case torque specification.....11 Nm

5 Check the transmission fluid level, topping up as required. Refer to 2.1 Transmission Fluid Check, in this Section.

6 Check for transmission fluid leaks.

7 Lower vehicle to the ground.

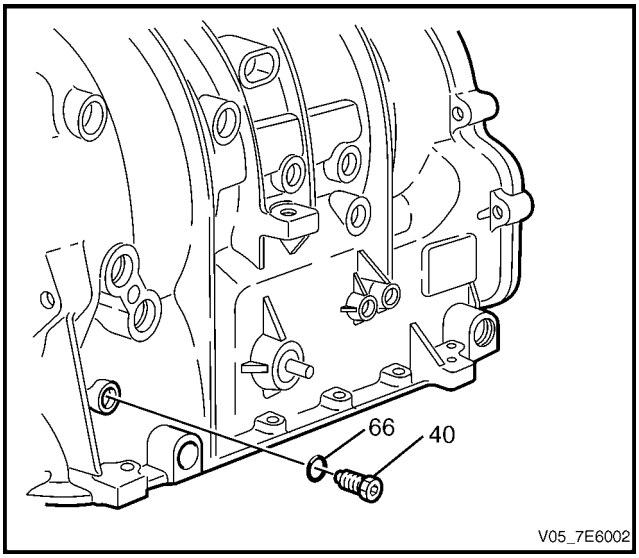


Figure 7E4 – 60

3.8 Transmission Mount and Mount Plate

LT Section No. – 04-020

Inspect

CAUTION

To avoid oil pan damage and possible engine failure, insert a block of wood that spans the width of the oil pan bottom between the oil pan and the jack support.

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Raise the transmission to remove the weight from the transmission mount and create slight tension in the rubber.

3 Observe the transmission mount while raising the transmission. Replace the transmission mount if the mount exhibits any of the following conditions:

a The hard rubber surface is covered with heat cracks.

NOTE

Black paint on the rubber will crack with time; this does not constitute a failure.

b The rubber is separated from the metal plate of the transmission mount.

c The rubber is split through the centre of the transmission mount.

4 If there is movement between the metal plate of the transmission mount and its attaching points, lower the transmission on the transmission mount. Tighten all fasteners attaching the transmission mount to the frame or transmission mount bracket to the correct torque specification

Transmission mount plate to extension housing bolt torque specification	55 Nm
Transmission mount to mount plate nut torque specification	55 Nm
Transmission mount to crossmember nut torque specification	25 Nm

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Mark the relationship of the transmission mount crossmember to each body side rail with a felt tipped pen or similar ('A').

NOTE

This is necessary to maintain alignment on reassembly.

3 Support the rear of the transmission oil pan with a block of wood that spans the width of the oil pan between the oil pan and the jack support.

4 Remove the four bolts (1) securing the transmission mount crossmember to the body side rails.

5 Remove the two nuts (2) securing the transmission mount to the crossmember (3). Remove the crossmember from the vehicle.

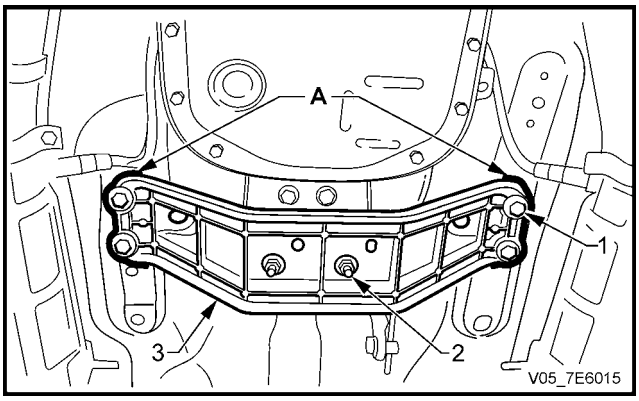


Figure 7E4 – 61

6 Remove the two nuts (1) securing the transmission mount (2) to the transmission mount plate (4), then remove the mount from the vehicle.

7 If required, remove the two bolts (3) securing the mount plate (4) to the transmission extension housing, then remove the plate from the vehicle.

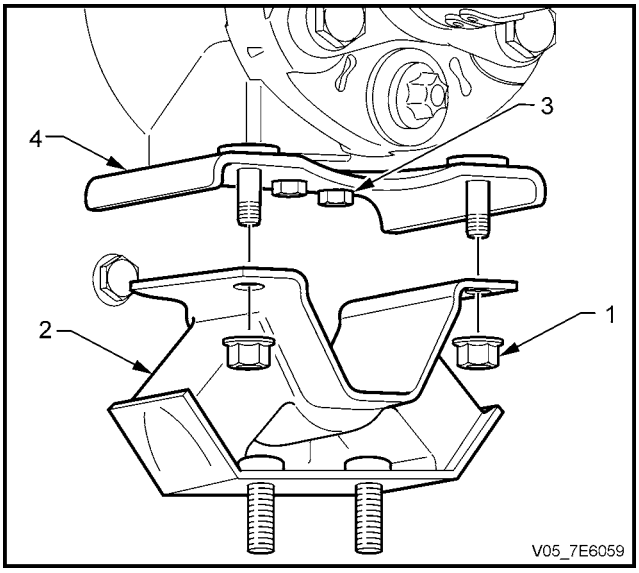


Figure 7E4 – 62

Reinstall

The reinstallation procedure is the reverse to removal, except for the items mentioned here:

1 If removed, reinstall the transmission mount plate to the transmission extension housing and tighten the two bolts to the correct torque specification.

Transmission mount plate to extension housing bolt torque specification.....55 Nm

2 Reinstall the transmission mount to the mount plate, securing with the two nuts tightened to the correct torque specification.

Transmission mount to mount plate nut torque specification .....55 Nm

3 Reinstall the transmission mount crossmember (3), noting the orientation and aligning the marks (‘A’) made before removal.

4 Reinstall the four bolts (1) securing the crossmember (3) to the body side rails and tighten to the correct torque specification.

Transmission crossmember to side rail bolt torque specification.....58 Nm

5 Lower the transmission support and remove the block of wood under the transmission oil pan.

6 Centralise the transmission mount studs in the crossmember holes, reinstall the nuts and tighten to the correct torque specification.

Transmission rear mount to crossmember nut torque specification .....25 Nm

7 Lower the vehicle to the ground.

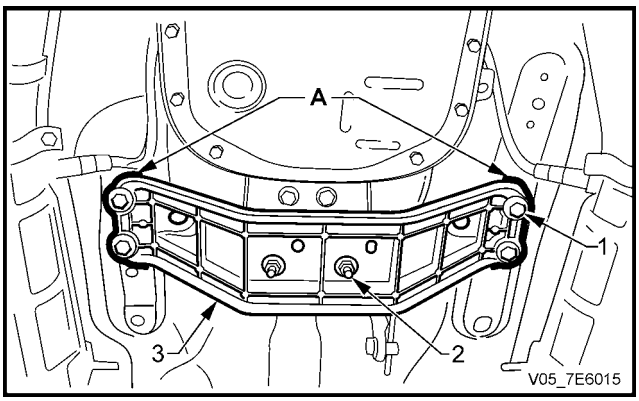


Figure 5A – 63

3.9 Output Drive Flange and Oil Seal – RWD

ATTENTION

The following fasteners MUST be replaced when performing these operations:

- **Output flange retaining nut.**
- **Front coupling to transmission output flange fasteners as noted in the text.**

CAUTION

A number of different methods of attaching the front coupling to the transmission output flange can be noted:

- **Hexagon headed bolts into threaded flange holes. With this method, the output flange threads are of the 'Spiralock' form that can only be loosened/tightened a maximum of ten times. Because of the safety factor involved, if the complete vehicle service history is not known, then both the flange and the bolts MUST be replaced on reassembly.**
- **Studs installed into the transmission output flange facing rearward, with the flange being secured by nuts.**
- **Torx headed bolts and nuts. Figure 7E4–64 shows this method.**

LT Section No. – 04-200

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

2 Using a felt tipped pen or similar, mark the relationship of the front coupling to the flange for reassembly.

3 Loosen, then remove the three front propeller shaft coupling (1) to output flange bolts (2), nuts and washers (4).

4 Push the front propeller shaft to the rear of the vehicle to release the front propeller shaft coupling from the transmission output shaft spigot.

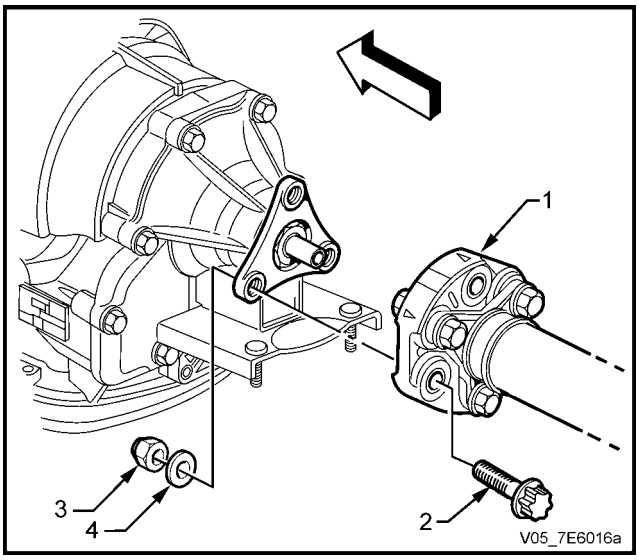


Figure 7E4 – 64

5 Use tie wire (2) or similar to support the front propeller shaft (1) to a convenient underbody point, such as the shift lever (3).

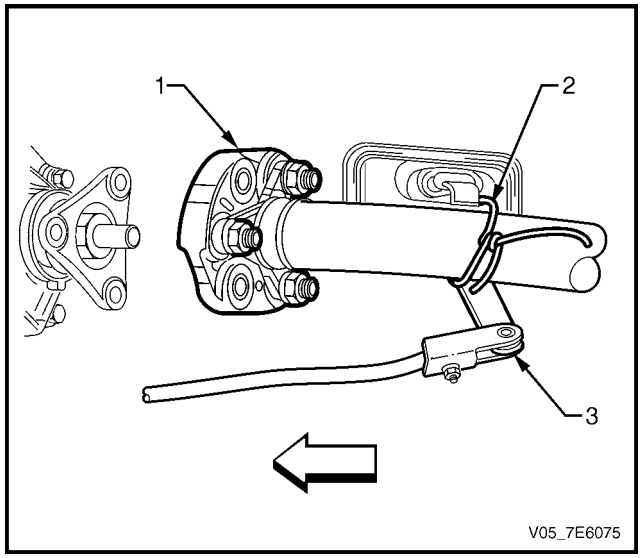


Figure 7E4 – 65

6 Install holding tool DT-47735 (also released as KM620-1A) to the transmission output flange, using three, fully threaded, M10 bolts and nuts.

NOTE

Using smaller OD bolts and nuts will not impact on the output flange 'Spiralock' thread forms, if used.

CAUTION

If Park is selected to lock the output shaft, DO NOT use impact equipment to loosen the flange nut.

7 Insert a suitable length of pipe (1) over the tang of the installed tool for leverage, then remove the output flange retaining nut, using a commercially available, 30 mm deep socket and socket bar (2).

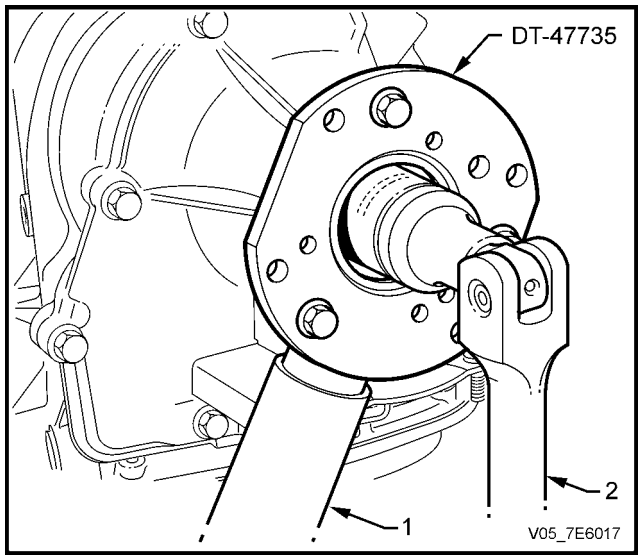


Figure 7E4 – 66

8 Remove holding tool DT-47735 (or KM 620-1A) from the output flange.

9 Remove the dished washer (4), then the output flange (2) and O-ring seal (3), from the transmission output shaft.

10 Remove the O-ring seal (3) from the output flange(2).

NOTE

- Discard parts ‘3’, ‘4’ and ‘5’, as they are included in the one service kit. Refer to the current release of Partfinder™ for the correct part number.
- The output shaft assembly retainer (1) can only be removed after the oil seal is removed (Step 11). This retainer is also included in the service kit.

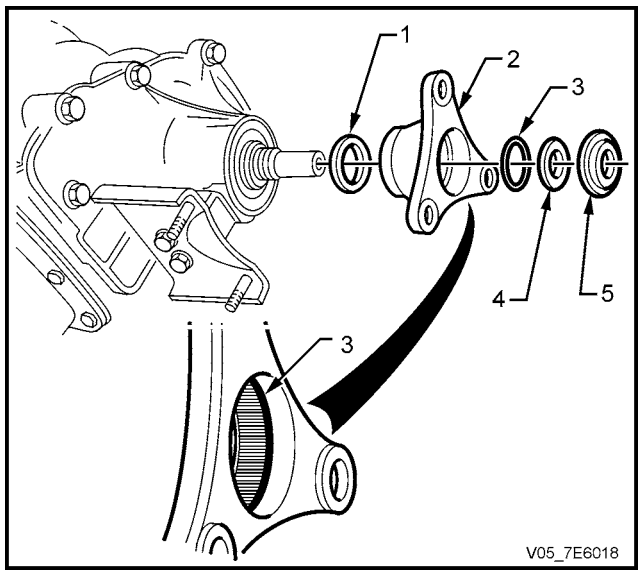


Figure 7E4 – 67

11 Remove the output flange oil seal (1), using seal remover J 23129 and slide hammer J 6125-1B or seal remover E308 (or commercial equivalent).

12 Using suitable snap ring pliers, remove the output shaft assembly retainer ('1' in Figure 7E4 – 46), then discard the removed retainer.

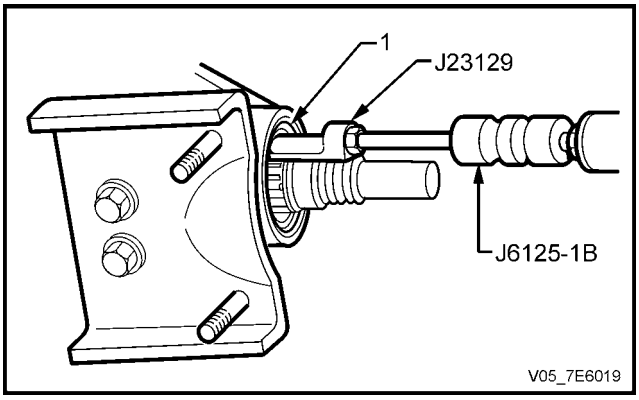


Figure 7E4 – 68

Reinstall

1 Install a NEW output shaft assembly retainer ('1' in Figure 7E4 – 70). Position the retainer over the end of the output shaft splines. The retainer will be installed to the correct depth when the output flange is installed.

2 Lubricate the lips of a NEW oil seal (1) then install onto the installation tool J 44765.

NOTE

Fitting the seal onto the installation tool before installation will prevent seal lip damage.

3 Install the NEW oil seal (1) into the transmission extension housing, using tool J 44765 and a hammer.

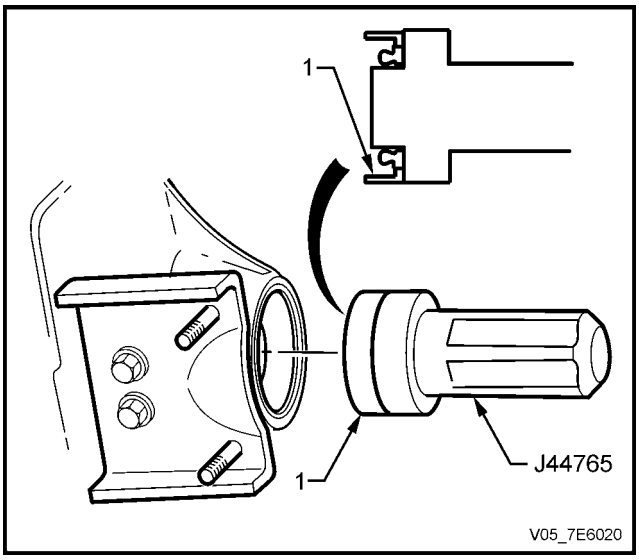


Figure 7E4 – 69

4 Clean all traces of thread sealant from the transmission output shaft threads, using a wire brush.

5 Lubricate a NEW O-ring seal (3) with transmission fluid, then install into the output flange (2).

6 Install the output flange (2) and O-ring (3) assembly over the splines of the transmission output shaft.

NOTE

Refer to the 'Caution' statement at the beginning of this Service operation to determine whether the flange is to be replaced or not.

7 Install a NEW dished thrust washer (4), with the curve facing outward.

8 Install a NEW output flange retaining nut (5).

NOTE

A new nut has micro-encapsulation applied to the threads.

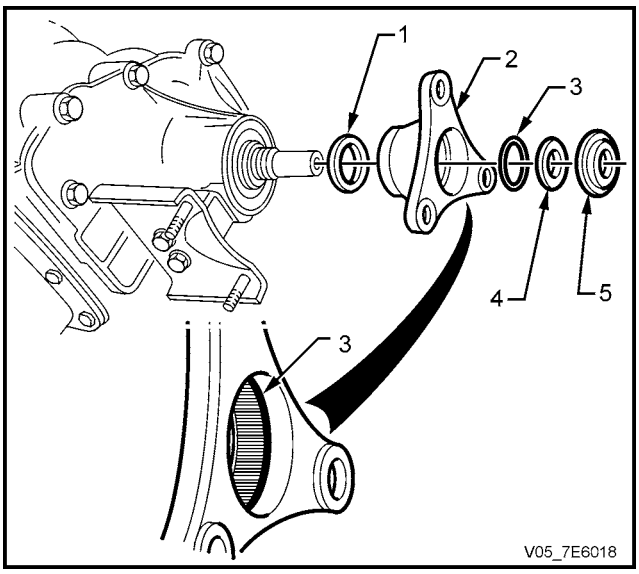


Figure 7E4 – 70

9 Install holding tool DT-47735 (also released as KM620-1A) to the transmission output flange, using three, fully threaded, M10 bolts and nuts.

NOTE

Using smaller OD bolts and nuts will not impact on the output flange 'Spiralock' thread forms, if used.

CAUTION

If Park is selected to lock the output shaft, DO NOT use impact equipment to tighten the flange nut.

10 Insert a suitable length of pipe (1) over the tang of the installed tool for leverage, then install the NEW output flange retaining nut, using a commercially available, 30 mm deep socket and socket bar (2). Tighten to the correct torque specification.

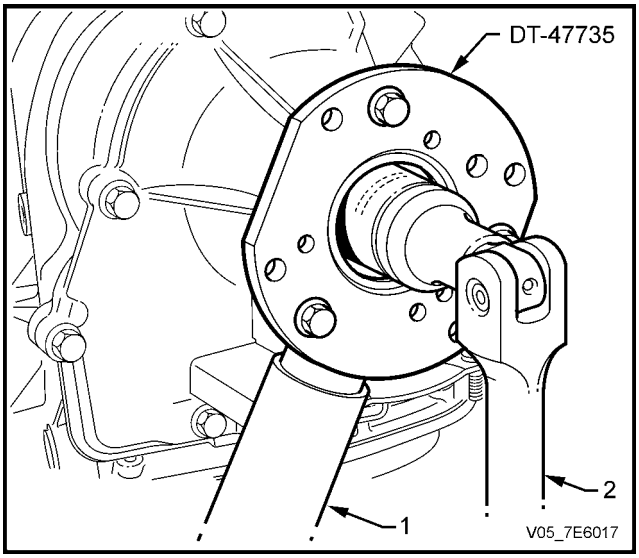


Figure 7E4 – 71

Transmission output flange retaining nut torque specification .....60 Nm

11 Remove holding tool DT-47735 (or KM620-1A) from the output flange.

12 Remove the tie wire supporting the front propeller shaft.

13 Smear NLGI No. 2 lithium soap based EP grease with molybdenum disulphide such as Shell Retinax HDX2 grease, BP Energrease LMS-EP 23 or equivalent over the transmission output shaft spigot.

14 Install the propeller shaft front coupling to the output flange.

NOTE

Refer to the 'Caution' statement at the beginning of this service operation to determine whether the bolts are to be replaced or not.

15 Align the felt tipped pen marks (A) made before removal.

16 Install fasteners to secure the coupling to the transmission output flange. Tighten the fasteners to the correct torque specification.

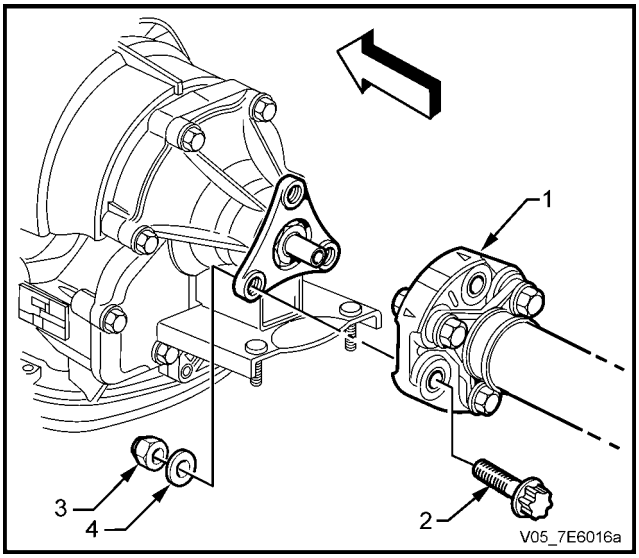


Figure 7E4 – 72

Front propeller shaft coupling nuts or bolts and nuts torque specification.....115 Nm

Front coupling bolts to ‘Spiralock’ flange threads torque specification .....85 Nm

17 Check the transmission fluid level, topping up as required. Refer to 2.1 Transmission Fluid Check, in this Section.

18 Check for transmission fluid leaks.

19 Lower vehicle to the ground.

3.10 Extension Housing

LT Section No. – 04-200

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

2 If the vehicle has an All Wheel Drive configuration, remove the transfer case. Refer to Section 7F Transfer Case and Adaptor Housing, for the necessary procedures.

3 If fitted, remove the exhaust pipe support bracket. Refer to Section 8B Exhaust System.

4 Remove the transmission output flange (2), refer to 3.9 Output Drive Flange and Oil Seal – RWD, in this Section for the necessary procedure.

NOTE

- If the extension housing oil seal is not removed, the output shaft assembly retainer (1) will be withdrawn, when the extension housing is removed.
- Discard parts '1', '3', '4' and '5', as they are included in the one service kit. Refer to the current release of Partfinder™ for the correct part number.

5 Remove the transmission mount. Refer to 3.8 Transmission Mount and Mount Plate, in this Section.

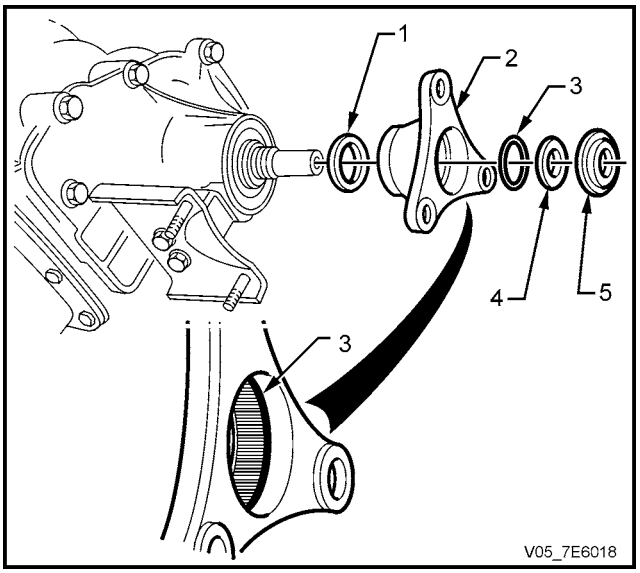


Figure 7E4 – 73

6 Place an oil drain pan under the rear of the transmission.

7 Remove the extension housing bolts (35).

8 Remove the extension housing (27) and sealing gasket (25).

NOTE

- View 'A' shows the RWD (HA/HE Models), while 'B' shows the AWD (HB Model).
- In not removed previously, the RWD (HA/HE Models) output shaft retainer ('1' in Figure 7E4 – 73), will slide from the output shaft during the extension housing removal operation.

9 Do not lose the selective thrust washer (22 – All models) and (67 – HB) when the extension housing is removed.

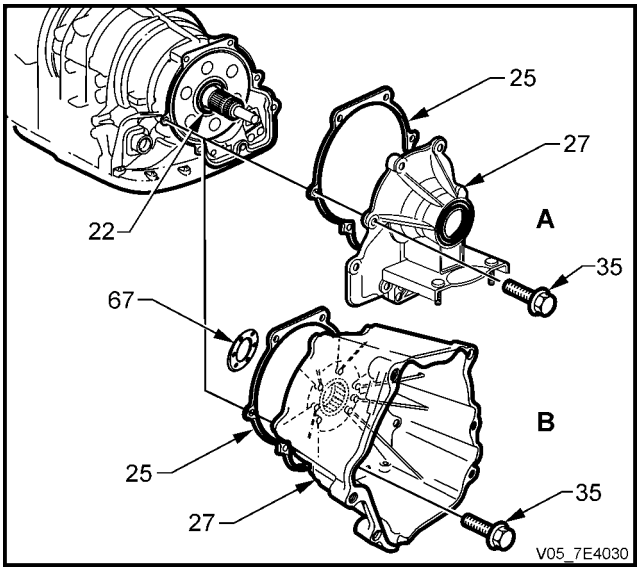


Figure 7E4 – 74

Reinstall

1 For RWD (HA/HE) models, smear the selective washer (22) and thrust bearing (23) with petroleum jelly (e.g. Vaseline™ or equivalent), install '22' then '23' over the output shaft.

2 For the AWD (HB) model, smear the output shaft thrust washer (67) with petroleum jelly (e.g. Vaseline™ or equivalent), then install to the extension housing (27), aligning the thrust washer tabs with the locating slots in the extension housing.

NOTE

The selection of the thrust washer (22) or (67) thickness is dependent upon the relationship of the transmission case end machined surface to the face of the output shaft. This dimension is not affected by an extension housing replacement.

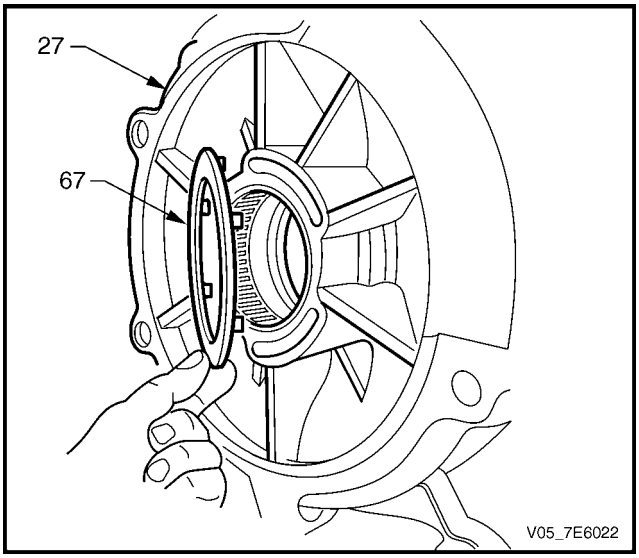


Figure 7E4 – 75

3 For the AWD (HB) model, install seal protector, Tool No. DT-47922-1 over the output shaft splines (1).

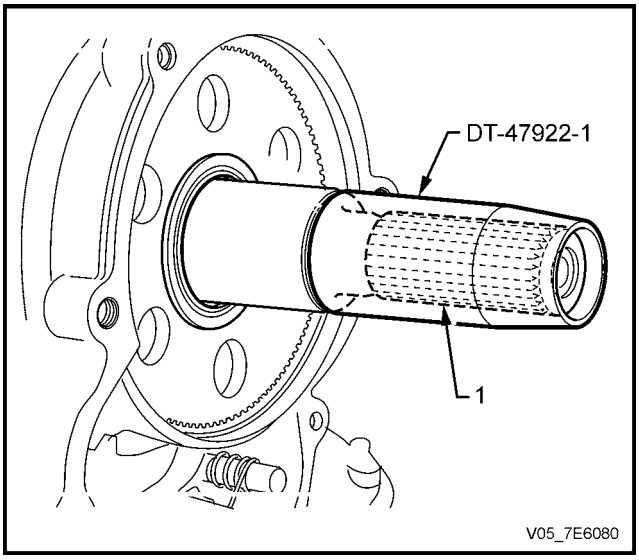


Figure 7E4 – 76

4 Reinstall the extension housing (27) and the sealing gasket (25) to the rear of the transmission.

NOTE

- View 'A' shows the RWD (HA/HE Models), while 'B' shows the AWD (HB Model).
- If the sealing gasket is undamaged, then it may be reused.

5 Reinstall the extension housing retaining bolts (35) and tighten to the correct torque specification.

Extension housing retaining bolt torque specification	22 Nm

6 For the AWD (HB) model, remove the seal protector, Tool No. DT-47922-1.

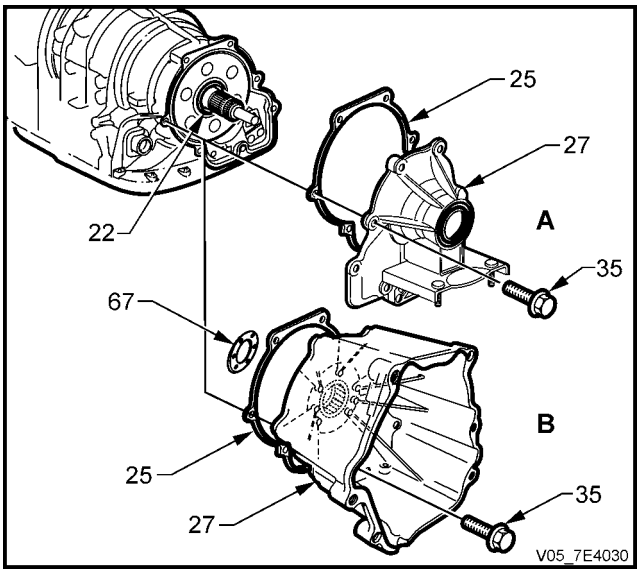


Figure 7E4 – 77

7 If the vehicle has an AWD configuration, reinstall the transfer case. Refer to Section 7F Transfer Case and Adaptor Housing, for the necessary procedure.

8 Reinstall the transmission rear mount and crossmember. Refer to 3.8 Transmission Mount and Mount Plate, in this Section.

9 If fitted, reinstall the catalytic converter bracket, tightening fasteners to the recommended torque specification.

Catalytic converter bracket to adaptor housing bolt torque specification.....25 Nm
Catalytic converter bracket to catalytic converter nut torque specification .....25 Nm

10 Install a NEW drive flange oil seal, then reinstall the drive flange. Refer to 3.9 Output Drive Flange and Oil Seal, in this Section.

3.11 Extension Housing Oil Seal – AWD

LT Section No. – 04-200

Replace

1 Remove the transfer case and adaptor shaft from the rear of the transmission. Refer to Section 7F Transfer Case and Adaptor Housing.

2 Place a drain tray under the rear section of the transmission.

3 Remove the seven bolts (1) securing the extension housing to the rear of the transmission.

4 If necessary, tap the side of the extension housing with a rubber hammer to break the gasket seal.

5 Remove the extension housing from the vehicle and place on a workbench.

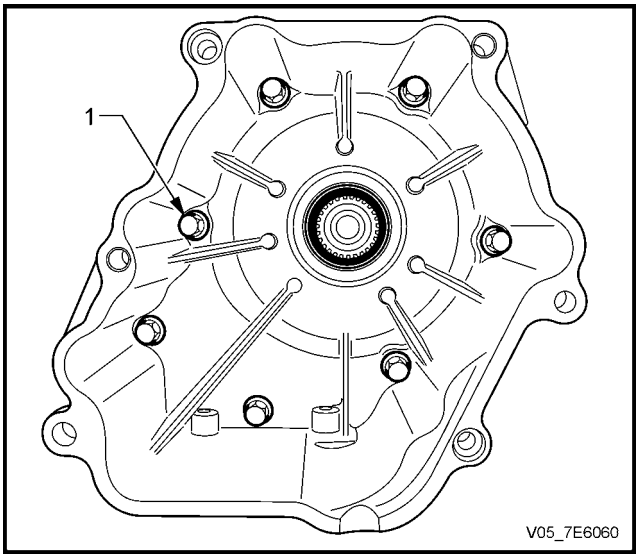


Figure 7E4 – 78

CAUTION

When removing the oil seal, take care not to scratch the machined seal surface in the extension housing.

6 Remove the oil seal using seal remover E308 and socket bar (also released as J 45000) or commercial equivalent.

7 Inspect the caged needle roller bearing for wear, damage and general serviceability.

8 Also inspect the transmission output shaft surface for wear in the bearing and oil seal areas.

NOTE

Should the output shaft wear be excessive and/or the caged needle bearing worn or damaged, then replace the transmission. Refer to 3.29 5L40-E Automatic Transmission.

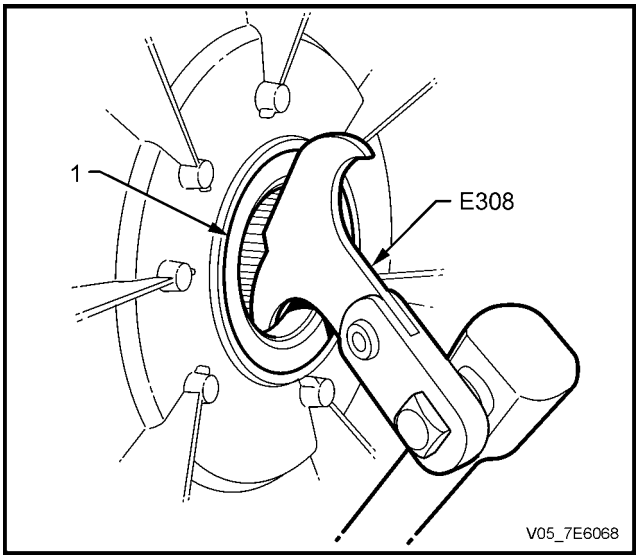


Figure 7E4 – 79

9 Smear the output shaft thrust washer (67) with petroleum jelly (e.g. Vaseline™ or equivalent), then install to the extension housing (27), aligning the thrust washer tabs with the locating slots in the extension housing.

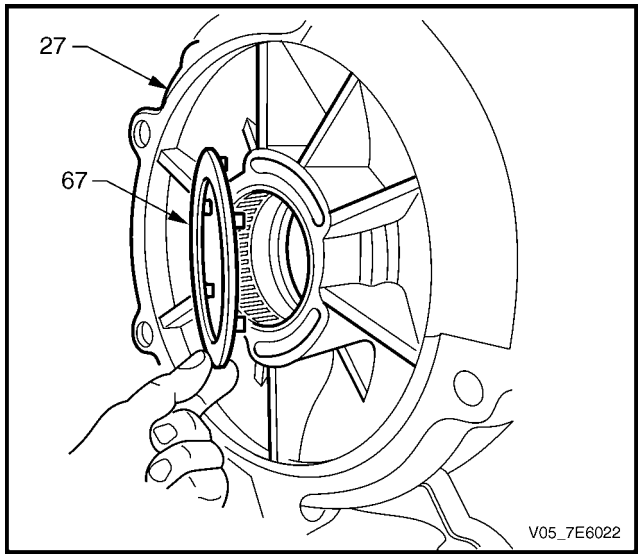


Figure 7E4 – 80

10 Reinstall the extension housing (27) and the sealing gasket (25) to the rear of the transmission (refer to 3.10 Extension Housing, in this Section).

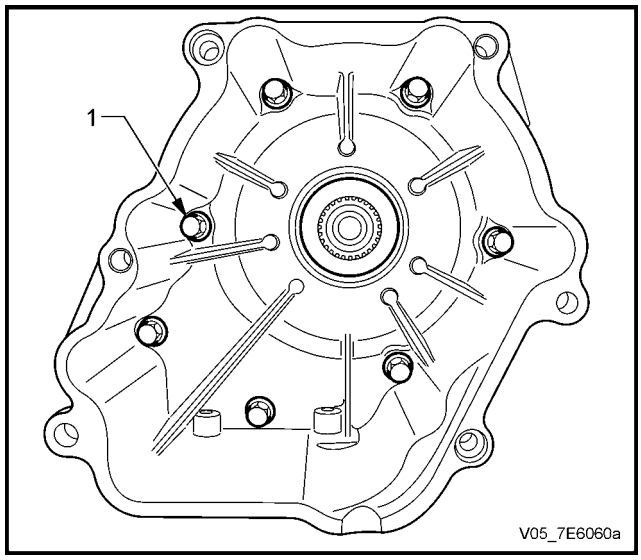


Figure 7E4 – 81

11 Install seal protector DT-47922-1 over the output shaft splines (1) and lubricate the protector outer surface with petroleum jelly such as Vaseline™ or equivalent.

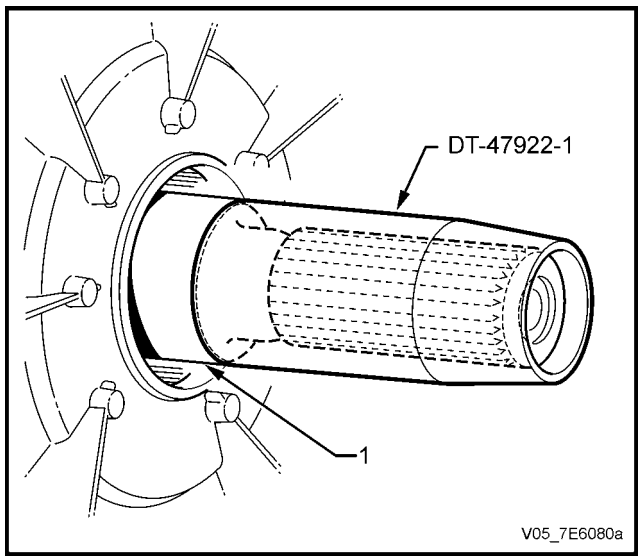


Figure 7E4 – 82

12 Install the NEW oil seal (1) over the seal protector.

13 Slide the seal installer Tool No. DT-47922-2 over the seal protector (DT-47922-1).

14 Using a plastic faced hammer, fully install the seal (1) into the extension housing, machined recess.

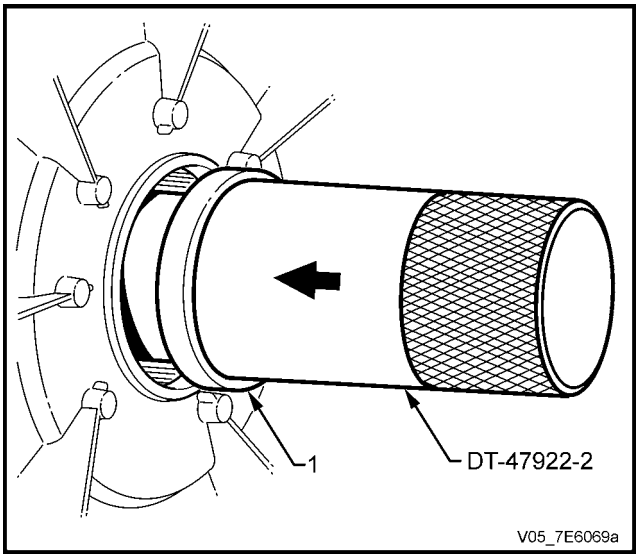


Figure 7E4 – 83

15 Remove the seal protector (DT-47922-1).

16 Reinstall the adaptor shaft and transfer case. Refer to Section 7F Transfer Case and Adaptor Housing.

17 Check and correct the transmission fluid level, as required. Refer to 2.1 Transmission Fluid Check, in this Section.

18 Road test the vehicle to check for correct operation.

3.12 Transmission Internal Electrical Harness

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Release the transmission wiring harness connector (1) by rotating the locking sleeve (2) in a counter-clockwise direction (to the left).

3 Pull on the connector to disconnect from the transmission internal harness connector.

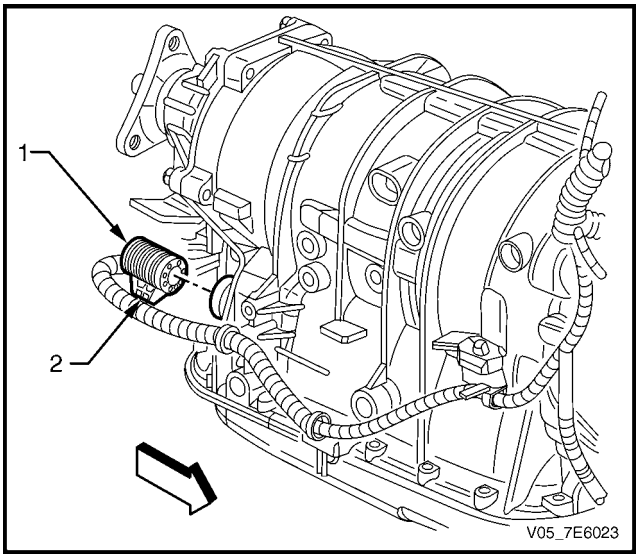


Figure 7E4 – 84

4 Remove the transmission fluid pan and filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

5 Lift the locking latch and disconnect the connectors from items 1 – 8.

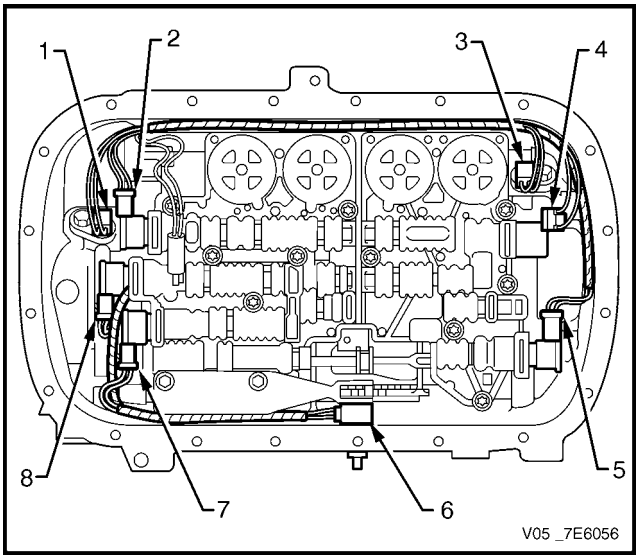


Figure 7E4 – 85

Legend:

1	Output Speed Sensor
2	1-2 Shift Solenoid
3	Input Speed Sensor
4	Pressure Control Solenoid
5	Torque Converter Clutch (TCC) PWM Solenoid
6	Manual Shaft Shift Position Switch
7	4-5 Shift Solenoid
8	2-3 Shift Solenoid

6 Remove the internal wiring harness connector retainer (2) from the connector (1).

7 Gently tap on the end of the wiring harness connector with a plastic hammer to dislodge the O-ring seal.

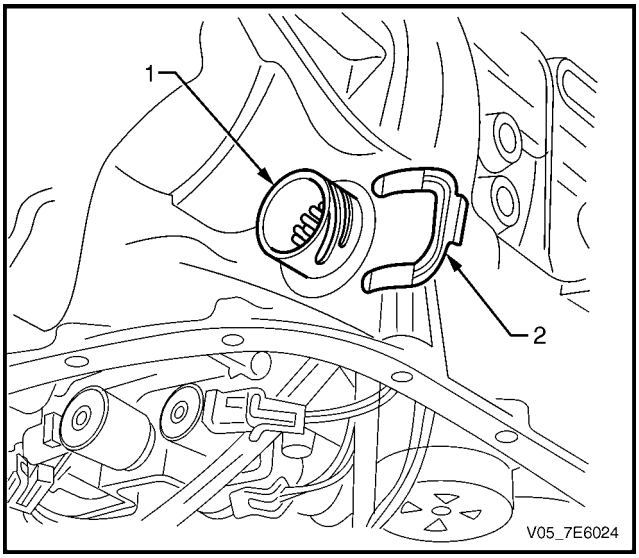


Figure 7E4 – 86

8 Remove the internal wiring harness (55) from the transmission.

9 Only remove the O-rings from the wiring harness connector, if they are worn or damaged.

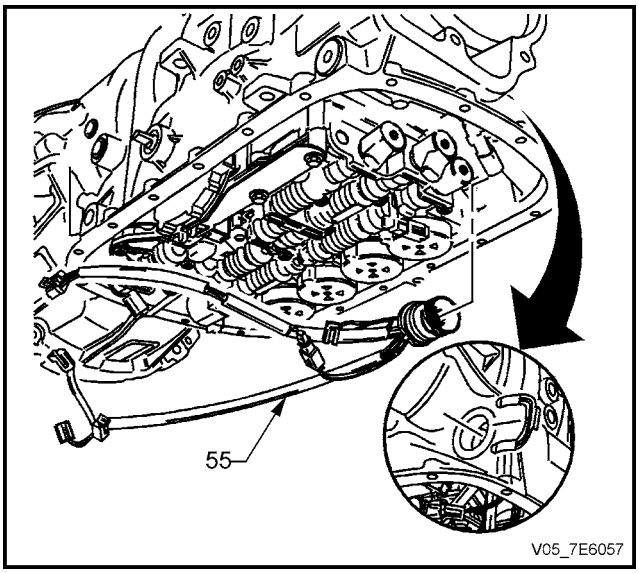


Figure 7E4 – 87

The installation process is the reverse to removal, except for the following:

10 If removed, apply transmission fluid to NEW O-ring seals and install to the internal wiring harness connector.

11 Install the wiring harness connector to the transmission case, aligning the lug on the connector body with the gap in the transmission case casting.

12 Secure the wiring harness connector (1) to the transmission case, with the retainer (2), noting the orientation.

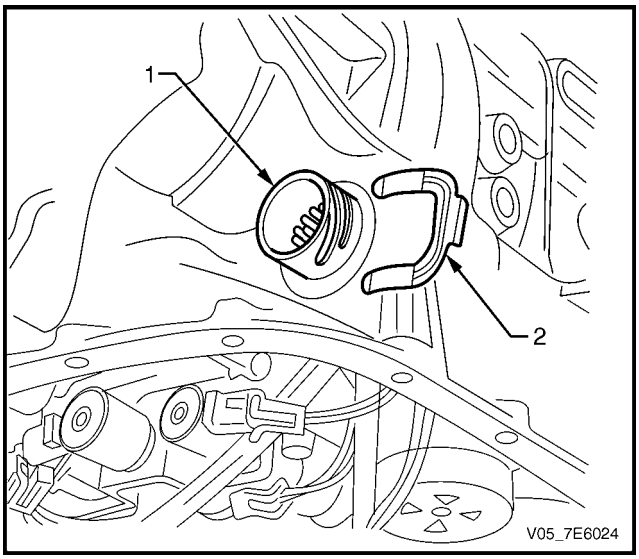


Figure 7E4 – 88

13 Reinstall each of the connectors to parts 1 – 8, checking that each connector security latch is engaged.

Legend:

1 Output Speed Sensor
2 1-2 Shift Solenoid
3 Input Speed Sensor
4 Pressure Control Solenoid
5 Torque Converter Clutch (TCC) PWM Solenoid
6 Manual Shaft Shift Position Switch
7 4-5 Shift Solenoid
8 2-3 Shift Solenoid

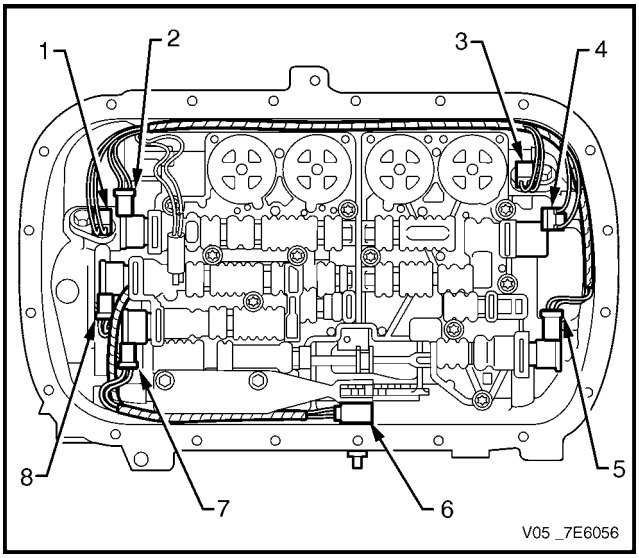


Figure 7E4 – 89

14 Install a NEW transmission fluid filter and the fluid pan to the transmission, reusing the original pan gasket seal, if undamaged. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

15 Reinstall the transmission wiring harness connector (1) to the transmission internal wiring harness connector and secure by rotating the locking sleeve (2) in a clockwise direction.

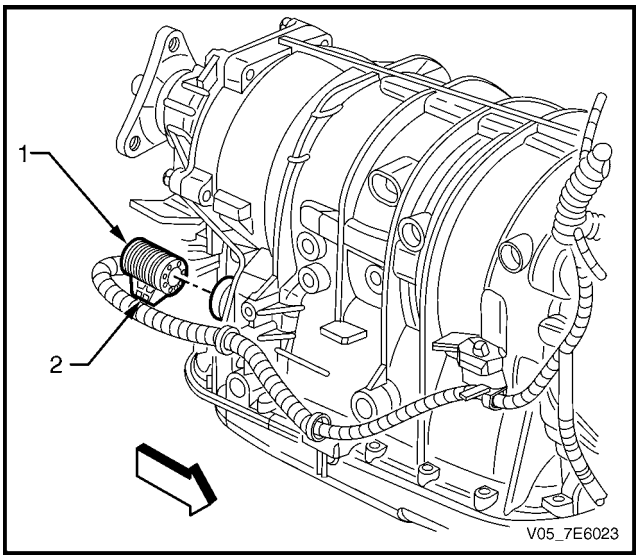


Figure 7E4 – 90

16 Remove the two nuts (1) securing the transmission mount (2) to the transmission mount plate (4), then remove the mount from the vehicle.

17 If required, remove the two bolts (3) securing the mount plate (4) to the transmission extension housing, then remove the plate from the vehicle.

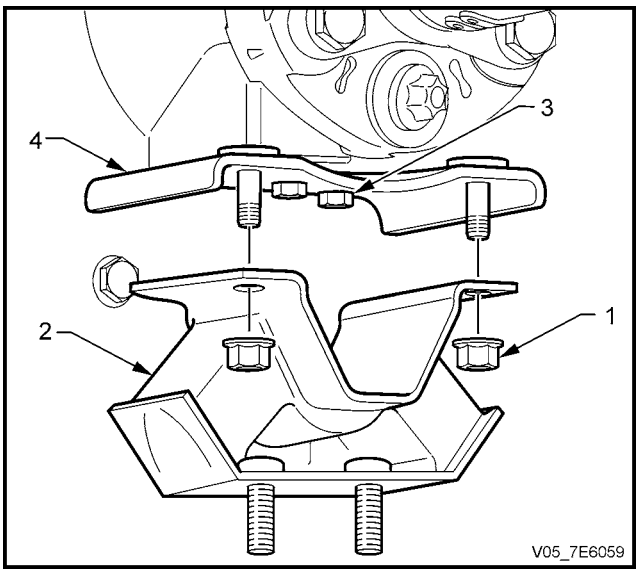


Figure 7E4 – 91

Reinstall

The reinstallation procedure is the reverse to removal, except for the items mentioned here:

1 If removed, reinstall the transmission mount plate to the transmission extension housing and tighten the two bolts to the correct torque specification.

Transmission mount plate to extension housing bolt torque specification.....55 Nm

2 Reinstall the transmission mount to the mount plate, securing with the two nuts tightened to the correct torque specification.

Transmission mount to mount plate nut torque specification .....55 Nm

3 Reinstall the transmission mount crossmember (3), noting the orientation and aligning the marks (‘A’) made before removal.

4 Reinstall the four bolts (1) securing the crossmember (3) to the body side rails and tighten to the correct torque specification.

Transmission crossmember to side rail bolt torque specification.....58 Nm

5 Lower the transmission support and remove the block of wood under the transmission oil pan.

6 Centralise the transmission mount studs in the crossmember holes, reinstall the nuts and tighten to the correct torque specification.

Transmission rear mount to crossmember nut torque specification .....25 Nm

7 Lower the vehicle to the ground.

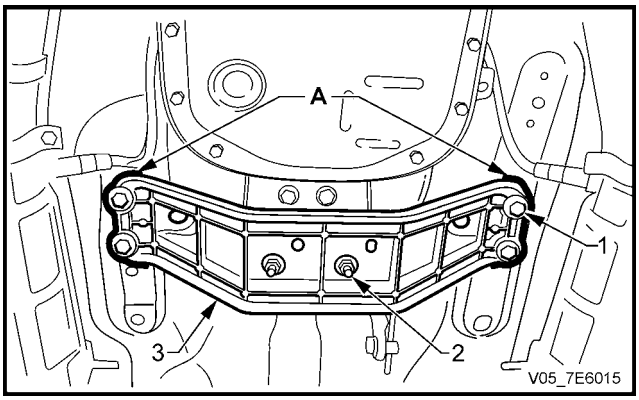


Figure 5A – 92

3.13 Output Drive Flange and Oil Seal – RWD

ATTENTION

The following fasteners MUST be replaced when performing these operations:

- **Output flange retaining nut.**
- **Front coupling to transmission output flange fasteners as noted in the text.**

CAUTION

A number of different methods of attaching the front coupling to the transmission output flange can be noted:

- **Hexagon headed bolts into threaded flange holes. With this method, the output flange threads are of the 'Spiralock' form that can only be loosened/tightened a maximum of ten times. Because of the safety factor involved, if the complete vehicle service history is not known, then both the flange and the bolts MUST be replaced on reassembly.**
- **Studs installed into the transmission output flange facing rearward, with the flange being secured by nuts.**
- **Torx headed bolts and nuts. Figure 7E4–64 shows this method.**

LT Section No. – 04-200

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

2 Using a felt tipped pen or similar, mark the relationship of the front coupling to the flange for reassembly.

3 Loosen, then remove the three front propeller shaft coupling (1) to output flange bolts (2), nuts and washers (4).

4 Push the front propeller shaft to the rear of the vehicle to release the front propeller shaft coupling from the transmission output shaft spigot.

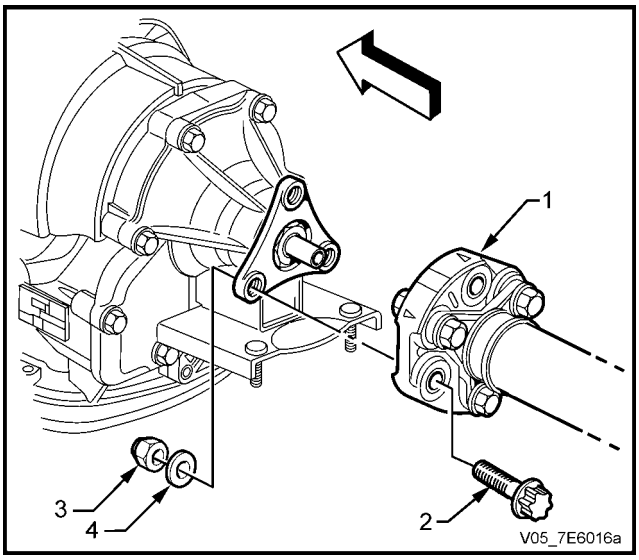


Figure 7E4 – 93

5 Use tie wire (2) or similar to support the front propeller shaft (1) to a convenient underbody point, such as the shift lever (3).

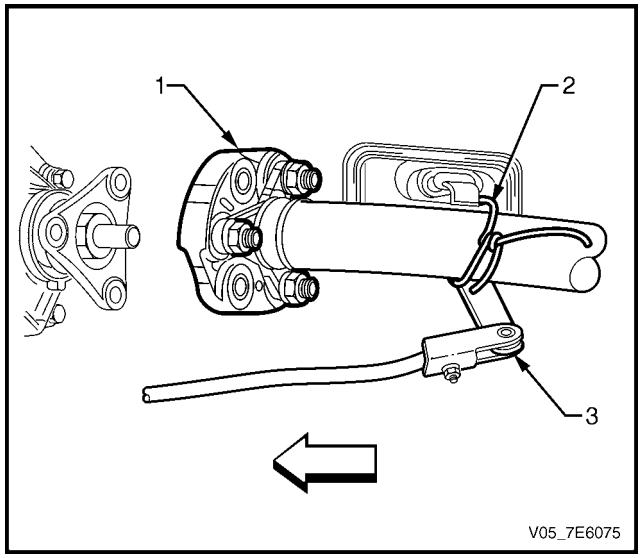


Figure 7E4 – 94

6 Install holding tool DT-47735 (also released as KM620-1A) to the transmission output flange, using three, fully threaded, M10 bolts and nuts.

NOTE

Using smaller OD bolts and nuts will not impact on the output flange 'Spiralock' thread forms, if used.

CAUTION

If Park is selected to lock the output shaft, DO NOT use impact equipment to loosen the flange nut.

7 Insert a suitable length of pipe (1) over the tang of the installed tool for leverage, then remove the output flange retaining nut, using a commercially available, 30 mm deep socket and socket bar (2).

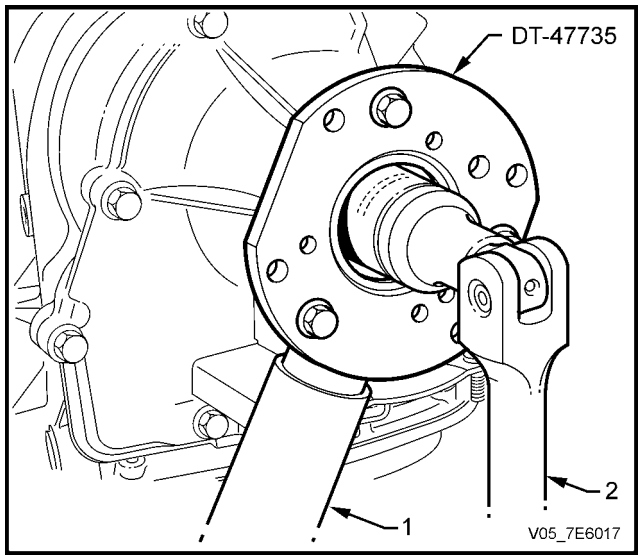


Figure 7E4 – 95

8 Remove holding tool DT-47735 (or KM 620-1A) from the output flange.

9 Remove the dished washer (4), then the output flange (2) and O-ring seal (3), from the transmission output shaft.

10 Remove the O-ring seal (3) from the output flange(2).

NOTE

- Discard parts ‘3’, ‘4’ and ‘5’, as they are included in the one service kit. Refer to the current release of Partfinder™ for the correct part number.
- The output shaft assembly retainer (1) can only be removed after the oil seal is removed (Step 11). This retainer is also included in the service kit.

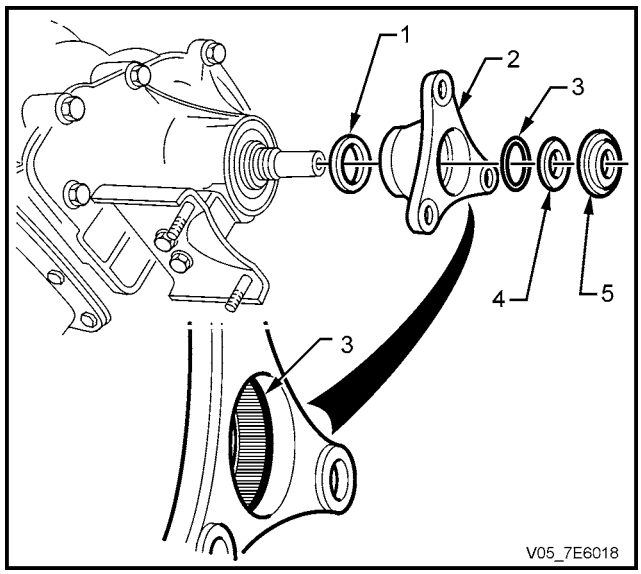


Figure 7E4 – 96

11 Remove the output flange oil seal (1), using seal remover J 23129 and slide hammer J 6125-1B or seal remover E308 (or commercial equivalent).

12 Using suitable snap ring pliers, remove the output shaft assembly retainer ('1' in Figure 7E4 – 46), then discard the removed retainer.

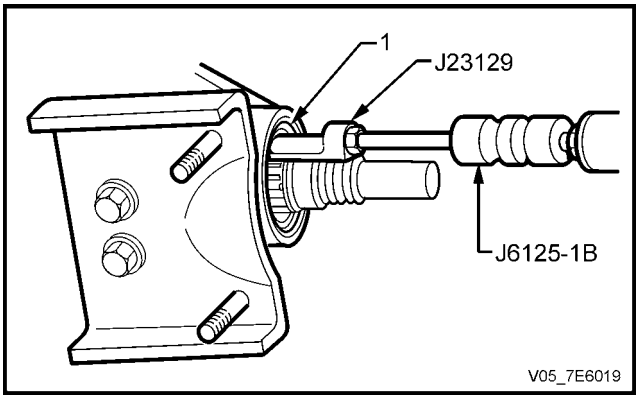


Figure 7E4 – 97

Reinstall

1 Install a NEW output shaft assembly retainer ('1' in Figure 7E4 – 70). Position the retainer over the end of the output shaft splines. The retainer will be installed to the correct depth when the output flange is installed.

2 Lubricate the lips of a NEW oil seal (1) then install onto the installation tool J 44765.

NOTE

Fitting the seal onto the installation tool before installation will prevent seal lip damage.

3 Install the NEW oil seal (1) into the transmission extension housing, using tool J 44765 and a hammer.

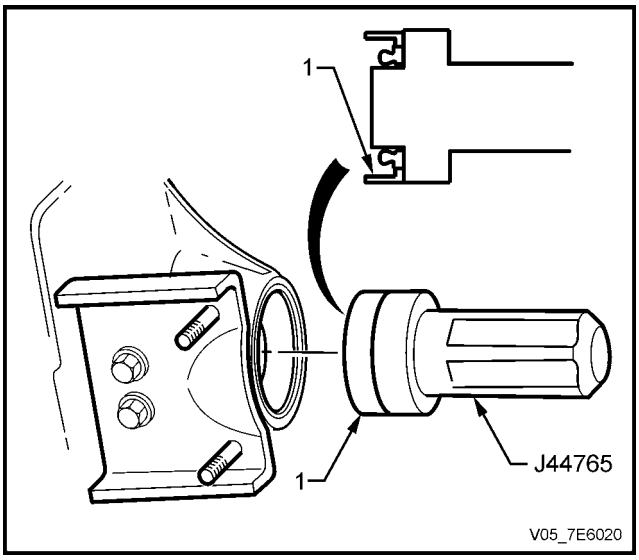


Figure 7E4 – 98

4 Clean all traces of thread sealant from the transmission output shaft threads, using a wire brush.

5 Lubricate a NEW O-ring seal (3) with transmission fluid, then install into the output flange (2).

6 Install the output flange (2) and O-ring (3) assembly over the splines of the transmission output shaft.

NOTE

Refer to the 'Caution' statement at the beginning of this Service operation to determine whether the flange is to be replaced or not.

7 Install a NEW dished thrust washer (4), with the curve facing outward.

8 Install a NEW output flange retaining nut (5).

NOTE

A new nut has micro-encapsulation applied to the threads.

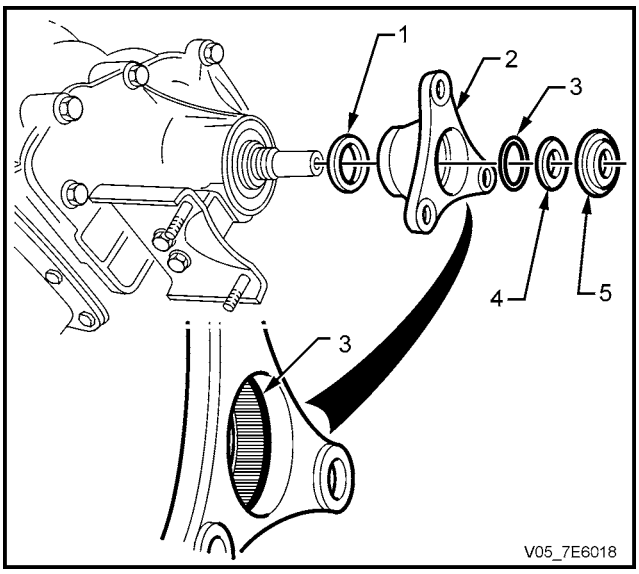


Figure 7E4 – 99

9 Install holding tool DT-47735 (also released as KM620-1A) to the transmission output flange, using three, fully threaded, M10 bolts and nuts.

NOTE

Using smaller OD bolts and nuts will not impact on the output flange 'Spiralock' thread forms, if used.

CAUTION

If Park is selected to lock the output shaft, DO NOT use impact equipment to tighten the flange nut.

10 Insert a suitable length of pipe (1) over the tang of the installed tool for leverage, then install the NEW output flange retaining nut, using a commercially available, 30 mm deep socket and socket bar (2). Tighten to the correct torque specification.

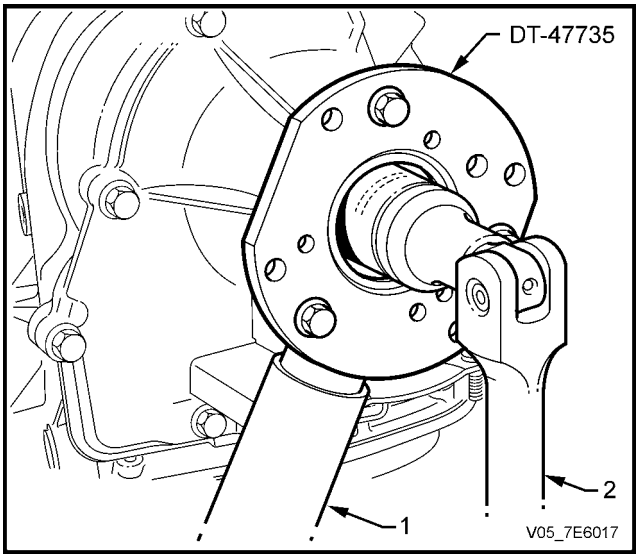


Figure 7E4 – 100

Transmission output flange retaining nut torque specification .....60 Nm

11 Remove holding tool DT-47735 (or KM620-1A) from the output flange.

12 Remove the tie wire supporting the front propeller shaft.

13 Smear NLGI No. 2 lithium soap based EP grease with molybdenum disulphide such as Shell Retinax HDX2 grease, BP Energrease LMS-EP 23 or equivalent over the transmission output shaft spigot.

14 Install the propeller shaft front coupling to the output flange.

NOTE

Refer to the 'Caution' statement at the beginning of this service operation to determine whether the bolts are to be replaced or not.

15 Align the felt tipped pen marks (A) made before removal.

16 Install fasteners to secure the coupling to the transmission output flange. Tighten the fasteners to the correct torque specification.

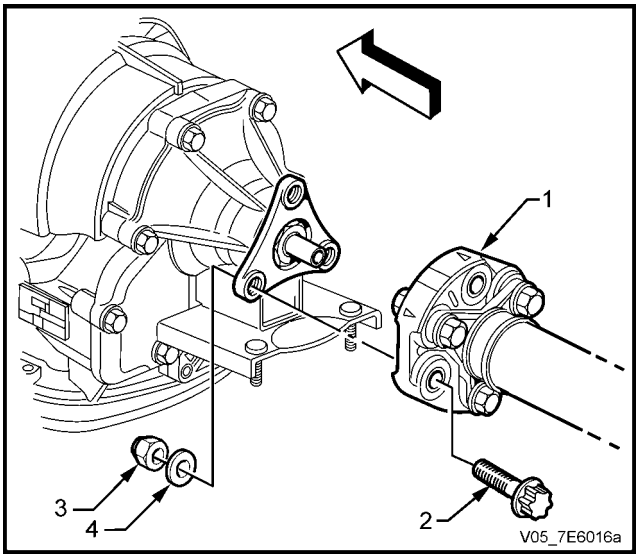


Figure 7E4 – 101

Front propeller shaft coupling nuts or bolts and nuts torque specification.....115 Nm

Front coupling bolts to ‘Spiralock’ flange threads torque specification .....85 Nm

17 Check the transmission fluid level, topping up as required. Refer to 2.1 Transmission Fluid Check, in this Section.

18 Check for transmission fluid leaks.

19 Lower vehicle to the ground.

3.14 Extension Housing

LT Section No. – 04-200

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

2 If the vehicle has an All Wheel Drive configuration, remove the transfer case. Refer to Section 7F Transfer Case and Adaptor Housing, for the necessary procedures.

3 If fitted, remove the exhaust pipe support bracket. Refer to Section 8B Exhaust System.

4 Remove the transmission output flange (2), refer to 3.9 Output Drive Flange and Oil Seal – RWD, in this Section for the necessary procedure.

NOTE

- If the extension housing oil seal is not removed, the output shaft assembly retainer (1) will be withdrawn, when the extension housing is removed.
- Discard parts '1', '3', '4' and '5', as they are included in the one service kit. Refer to the current release of Partfinder™ for the correct part number.

5 Remove the transmission mount. Refer to 3.8 Transmission Mount and Mount Plate, in this Section.

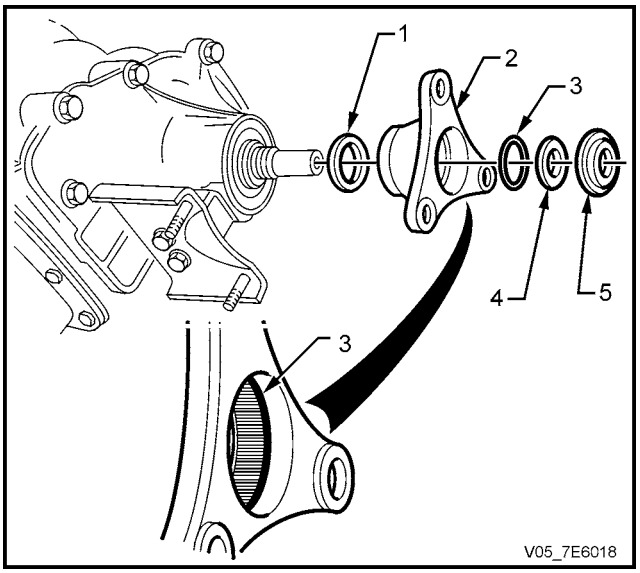


Figure 7E4 – 102

6 Place an oil drain pan under the rear of the transmission.

7 Remove the extension housing bolts (35).

8 Remove the extension housing (27) and sealing gasket (25).

NOTE

- View 'A' shows the RWD (HA/HE Models), while 'B' shows the AWD (HB Model).
- In not removed previously, the RWD (HA/HE Models) output shaft retainer ('1' in Figure 7E4 – 73), will slide from the output shaft during the extension housing removal operation.

9 Do not lose the selective thrust washer (22 – All models) and (67 – HB) when the extension housing is removed.

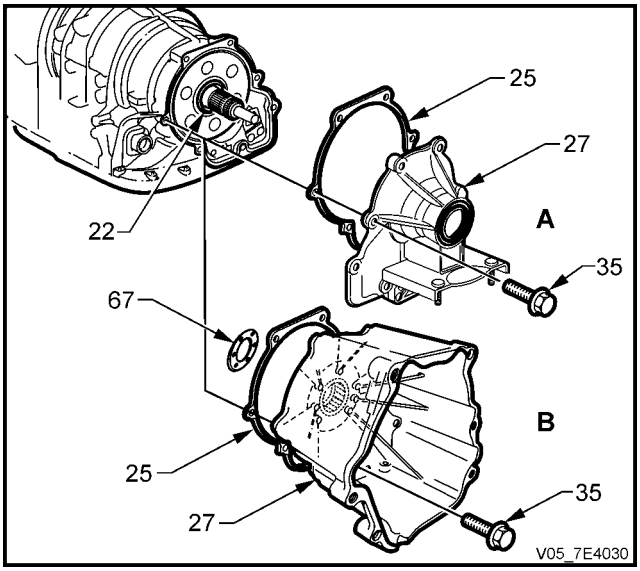


Figure 7E4 – 103

Reinstall

1 For RWD (HA/HE) models, smear the selective washer (22) and thrust bearing (23) with petroleum jelly (e.g. Vaseline™ or equivalent), install '22' then '23' over the output shaft.

2 For the AWD (HB) model, smear the output shaft thrust washer (67) with petroleum jelly (e.g. Vaseline™ or equivalent), then install to the extension housing (27), aligning the thrust washer tabs with the locating slots in the extension housing.

NOTE

The selection of the thrust washer (22) or (67) thickness is dependent upon the relationship of the transmission case end machined surface to the face of the output shaft. This dimension is not affected by an extension housing replacement.

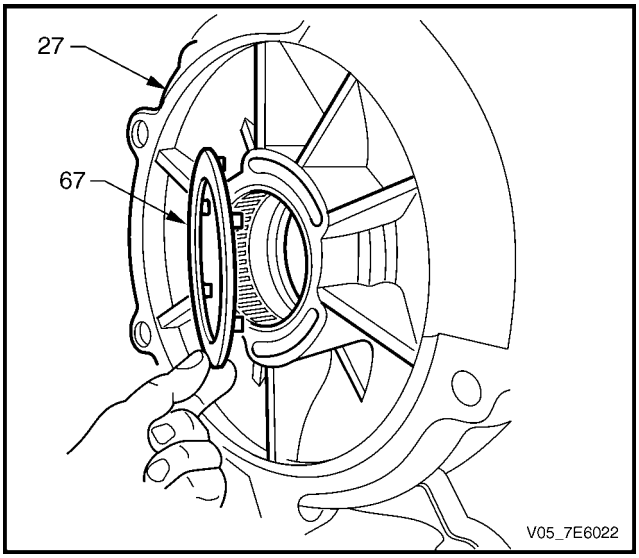


Figure 7E4 – 104

3 For the AWD (HB) model, install seal protector, Tool No. DT-47922-1 over the output shaft splines (1).

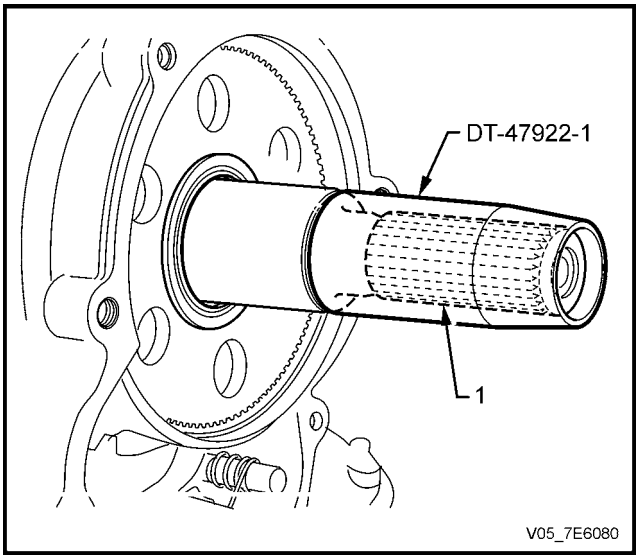


Figure 7E4 – 105

4 Reinstall the extension housing (27) and the sealing gasket (25) to the rear of the transmission.

NOTE

- View 'A' shows the RWD (HA/HE Models), while 'B' shows the AWD (HB Model).
- If the sealing gasket is undamaged, then it may be reused.

5 Reinstall the extension housing retaining bolts (35) and tighten to the correct torque specification.

Extension housing retaining bolt torque specification	22 Nm

6 For the AWD (HB) model, remove the seal protector, Tool No. DT-47922-1.

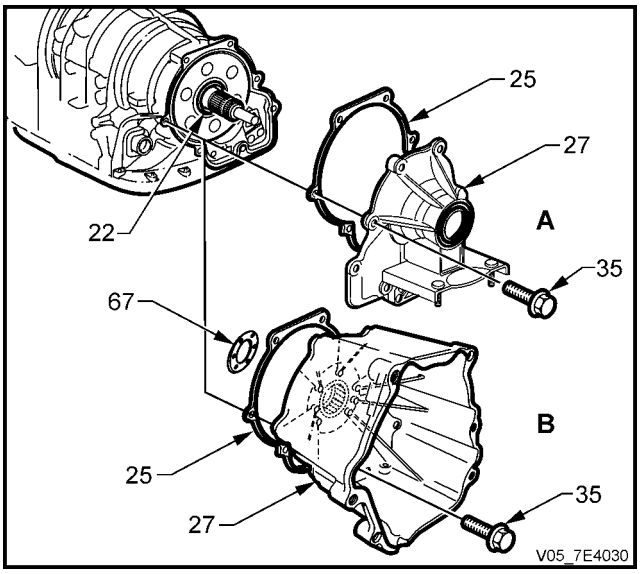


Figure 7E4 – 106

7 If the vehicle has an AWD configuration, reinstall the transfer case. Refer to Section 7F Transfer Case and Adaptor Housing, for the necessary procedure.

8 Reinstall the transmission rear mount and crossmember. Refer to 3.8 Transmission Mount and Mount Plate, in this Section.

9 If fitted, reinstall the catalytic converter bracket, tightening fasteners to the recommended torque specification.

Catalytic converter bracket to adaptor housing bolt torque specification.....25 Nm
Catalytic converter bracket to catalytic converter nut torque specification .....25 Nm

10 Install a NEW drive flange oil seal, then reinstall the drive flange. Refer to 3.9 Output Drive Flange and Oil Seal, in this Section.

3.15 Extension Housing Oil Seal – AWD

LT Section No. – 04-200

Replace

1 Remove the transfer case and adaptor shaft from the rear of the transmission. Refer to Section 7F Transfer Case and Adaptor Housing.

2 Place a drain tray under the rear section of the transmission.

3 Remove the seven bolts (1) securing the extension housing to the rear of the transmission.

4 If necessary, tap the side of the extension housing with a rubber hammer to break the gasket seal.

5 Remove the extension housing from the vehicle and place on a workbench.

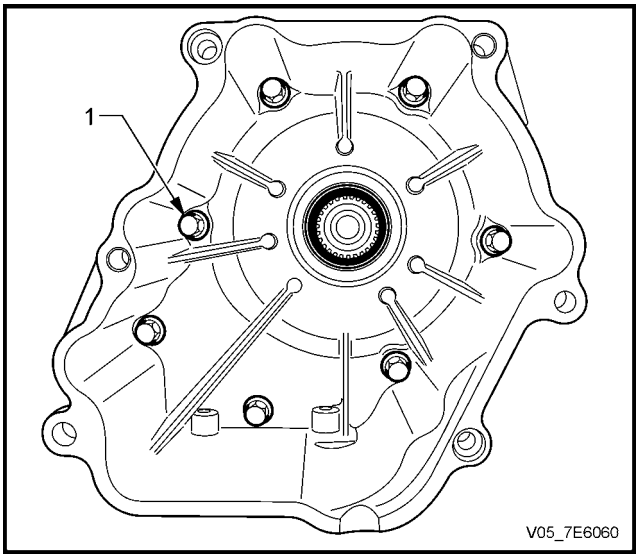


Figure 7E4 – 107

CAUTION

When removing the oil seal, take care not to scratch the machined seal surface in the extension housing.

6 Remove the oil seal using seal remover E308 and socket bar (also released as J 45000) or commercial equivalent.

7 Inspect the caged needle roller bearing for wear, damage and general serviceability.

8 Also inspect the transmission output shaft surface for wear in the bearing and oil seal areas.

NOTE

Should the output shaft wear be excessive and/or the caged needle bearing worn or damaged, then replace the transmission. Refer to 3.29 5L40-E Automatic Transmission.

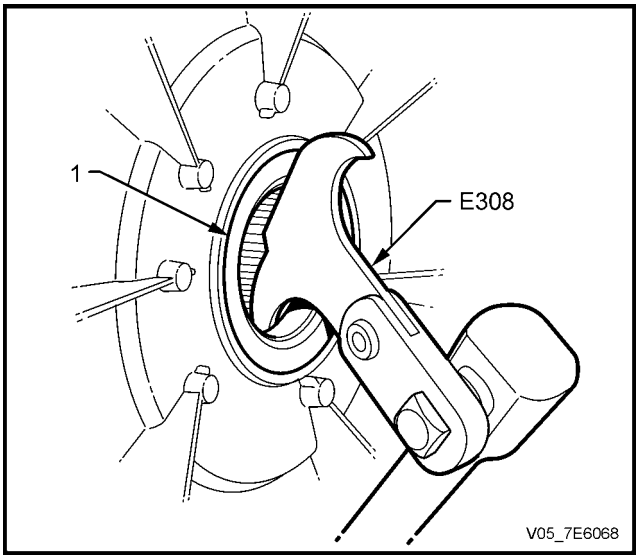


Figure 7E4 – 108

9 Smear the output shaft thrust washer (67) with petroleum jelly (e.g. Vaseline™ or equivalent), then install to the extension housing (27), aligning the thrust washer tabs with the locating slots in the extension housing.

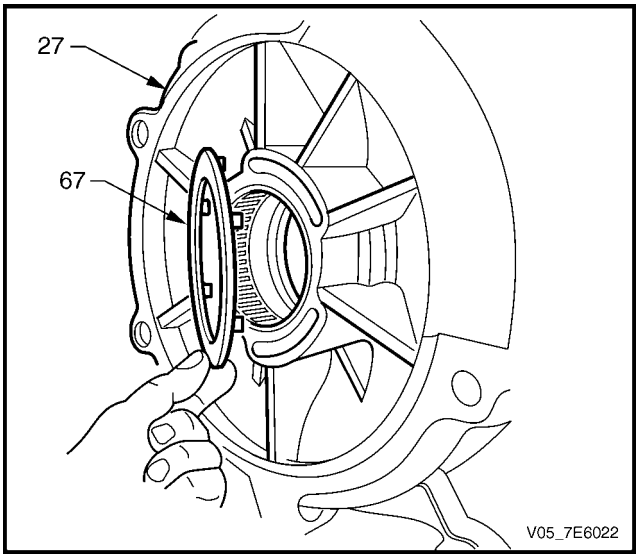


Figure 7E4 – 109

10 Reinstall the extension housing (27) and the sealing gasket (25) to the rear of the transmission (refer to 3.10 Extension Housing, in this Section).

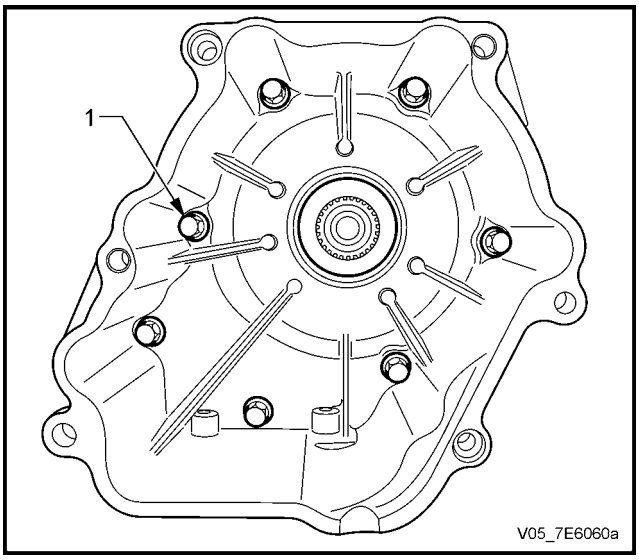


Figure 7E4 – 110

11 Install seal protector DT-47922-1 over the output shaft splines (1) and lubricate the protector outer surface with petroleum jelly such as Vaseline™ or equivalent.

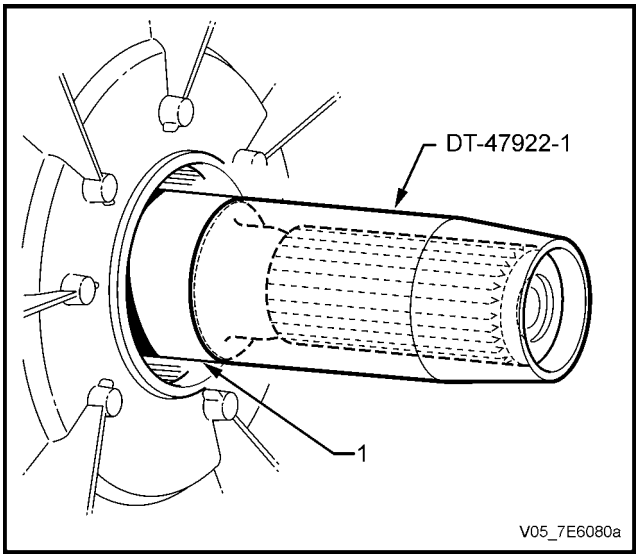


Figure 7E4 – 111

12 Install the NEW oil seal (1) over the seal protector.

13 Slide the seal installer Tool No. DT-47922-2 over the seal protector (DT-47922-1).

14 Using a plastic faced hammer, fully install the seal (1) into the extension housing, machined recess.

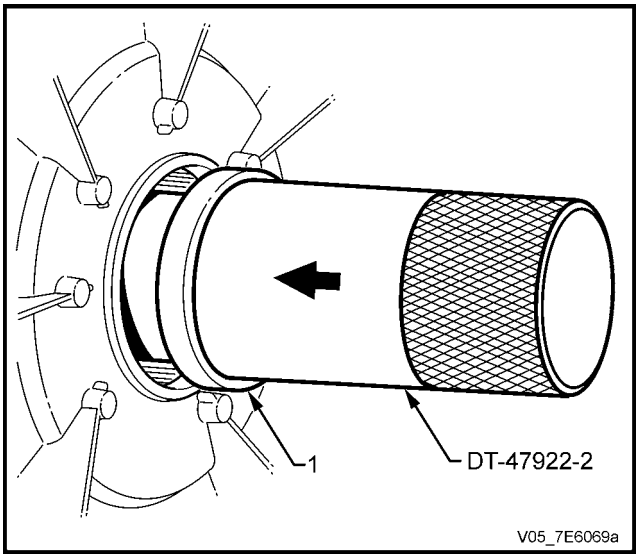


Figure 7E4 – 112

15 Remove the seal protector (DT-47922-1).

16 Reinstall the adaptor shaft and transfer case. Refer to Section 7F Transfer Case and Adaptor Housing.

17 Check and correct the transmission fluid level, as required. Refer to 2.1 Transmission Fluid Check, in this Section.

18 Road test the vehicle to check for correct operation.

3.16 Transmission Internal Electrical Harness

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Release the transmission wiring harness connector (1) by rotating the locking sleeve (2) in a counter-clockwise direction (to the left).

3 Pull on the connector to disconnect from the transmission internal harness connector.

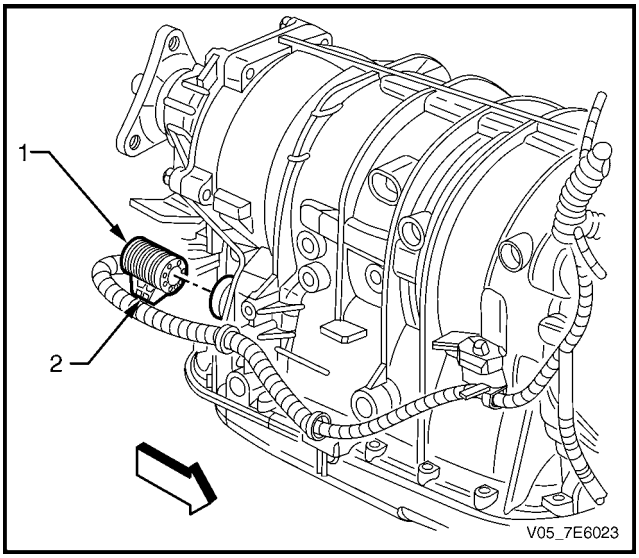


Figure 7E4 – 113

4 Remove the transmission fluid pan and filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

5 Lift the locking latch and disconnect the connectors from items 1 – 8.

Legend:

1	Output Speed Sensor
2	1-2 Shift Solenoid
3	Input Speed Sensor
4	Pressure Control Solenoid
5	Torque Converter Clutch (TCC) PWM Solenoid
6	Manual Shaft Shift Position Switch
7	4-5 Shift Solenoid
8	2-3 Shift Solenoid

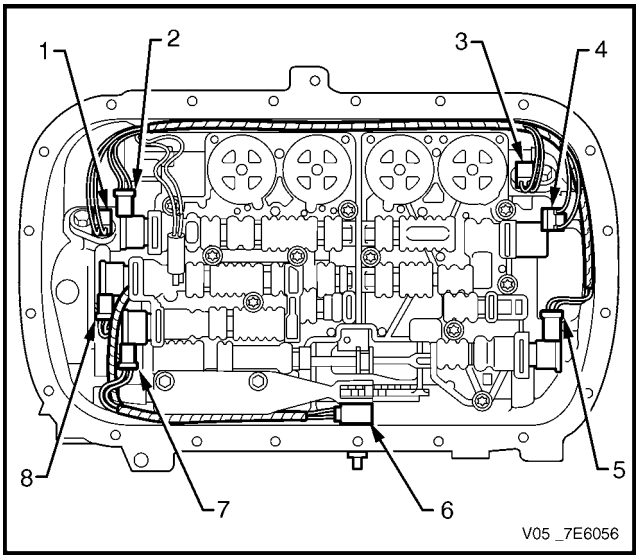


Figure 7E4 – 114

6 Remove the internal wiring harness connector retainer (2) from the connector (1).

7 Gently tap on the end of the wiring harness connector with a plastic hammer to dislodge the O-ring seal.

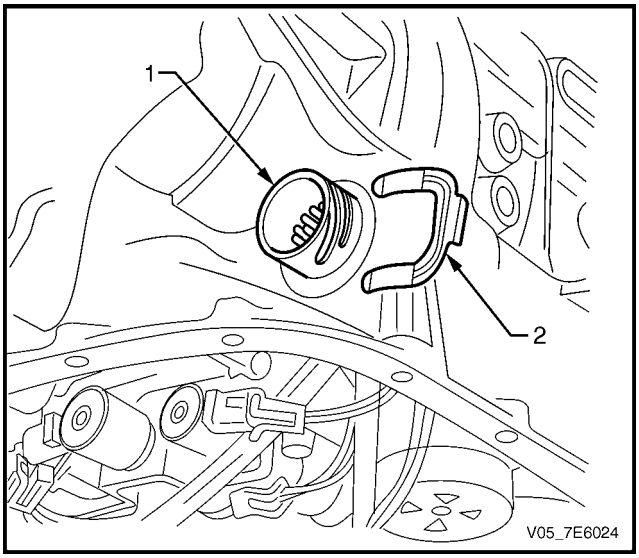


Figure 7E4 – 115

8 Remove the internal wiring harness (55) from the transmission.

9 Only remove the O-rings from the wiring harness connector, if they are worn or damaged.

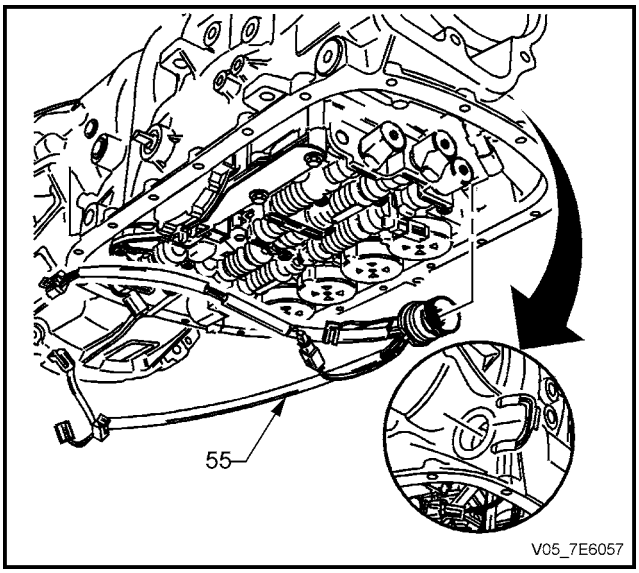


Figure 7E4 – 116

The installation process is the reverse to removal, except for the following:

10 If removed, apply transmission fluid to NEW O-ring seals and install to the internal wiring harness connector.

11 Install the wiring harness connector to the transmission case, aligning the lug on the connector body with the gap in the transmission case casting.

12 Secure the wiring harness connector (1) to the transmission case, with the retainer (2), noting the orientation.

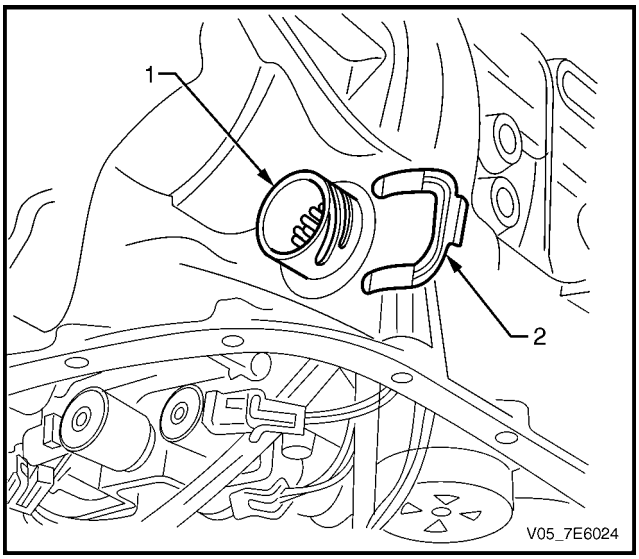


Figure 7E4 – 117

13 Reinstall each of the connectors to parts 1 – 8, checking that each connector security latch is engaged.

Legend:

1 Output Speed Sensor
2 1-2 Shift Solenoid
3 Input Speed Sensor
4 Pressure Control Solenoid
5 Torque Converter Clutch (TCC) PWM Solenoid
6 Manual Shaft Shift Position Switch
7 4-5 Shift Solenoid
8 2-3 Shift Solenoid

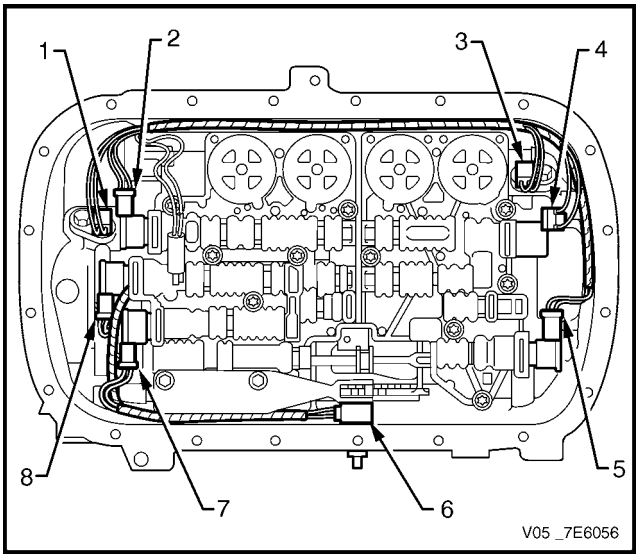


Figure 7E4 – 118

14 Install a NEW transmission fluid filter and the fluid pan to the transmission, reusing the original pan gasket seal, if undamaged. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

15 Reinstall the transmission wiring harness connector (1) to the transmission internal wiring harness connector and secure by rotating the locking sleeve (2) in a clockwise direction.

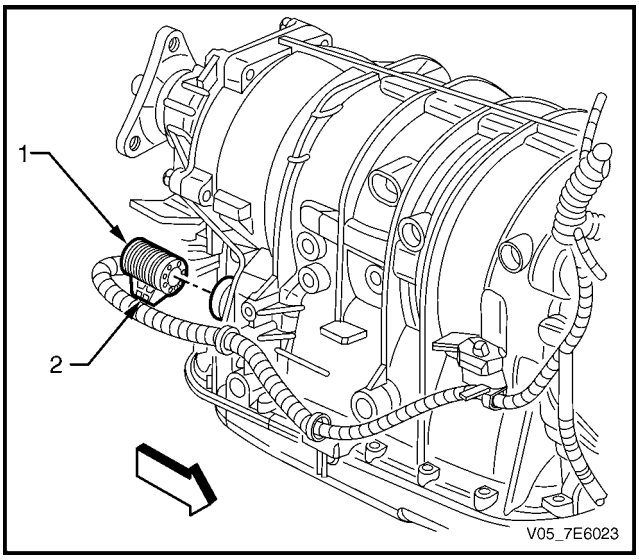


Figure 7E4 – 119

3.17 Manual Shaft Oil Seal

NOTE

This procedure requires the use of special tool No. AU 583. Should this tool not be available, the seal can still be replaced but involves the removal of the selector shaft from the transmission case. Refer to 3.18 Manual Shaft Position Switch, in this Section for the procedure.

LT Section No. – 04-200

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

2 While holding the transmission shift lever (2) with an adjustable wrench, remove the nut (1) securing the shift lever (2) to the transmission manual shift shaft.

3 Disconnect the shift lever from the transmission manual shift shaft.

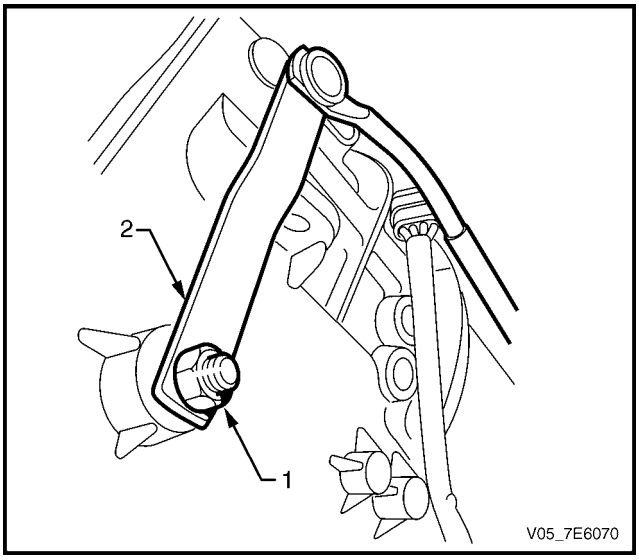


Figure 7E4 – 120

4 Assemble the remover nut (Tool No. AU 583-4) with the threaded section closest to the hexagonal head of the seal remover AU 583-3. Install the nut up to the hexagonal end.

5 Install the pre-assembled remover (Tool Nos. AU 583-3 and AU 583-4) over the manual shaft (1) and engage the tapered thread end of the seal remover into the seal. Tighten the seal remover until the tool thread grips the outer shell of the seal.

NOTE

Do not overtighten the seal remover into the seal.

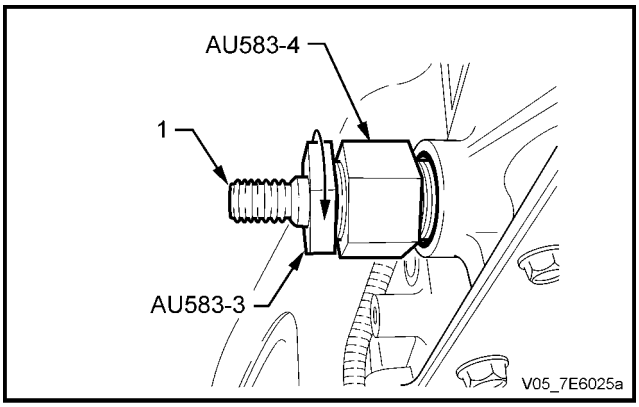


Figure 7E4 – 121

6 While holding the seal remover (AU 583-3) with a suitable spanner, use a second spanner to screw the remover nut (AU 583-4) up to the transmission case.

7 Continue tightening the remover nut until the seal is removed into the remover nut cavity.

8 Discard the removed seal.

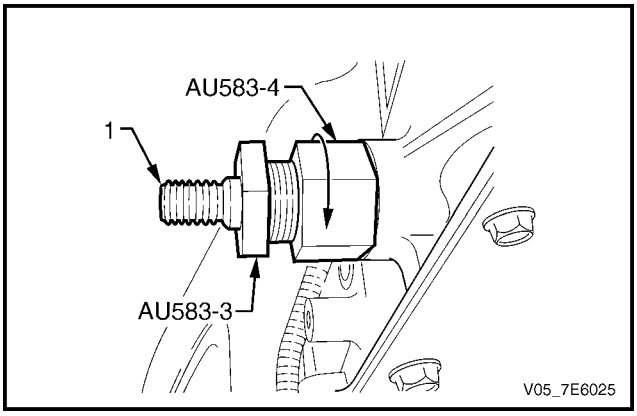


Figure 7E4 – 122

9 Pre-assemble the seal protector sleeve (AU 583-1) into one of the plastic seal installers (AU 583-2), as shown in the sectioned view.

10 Lubricate the seal lip of a new seal (1) with Dexron® III automatic transmission fluid, then install it (with the steel seal casing facing the installer) over the seal protector sleeve (AU 583-1).

11 Install the seal protector sleeve (AU 583-1), seal (1) and seal installer (AU 583-2), over the manual shaft and up to the transmission case.

NOTE

If the seal protector sleeve (AU 583-1) jams on the manual shaft, then the shaft will be burred over the flats that locate the shift lever. Use a fine file to remove burrs, then proceed.

12 Install the second plastic seal installer over the manual shaft until it seats against the first installer.

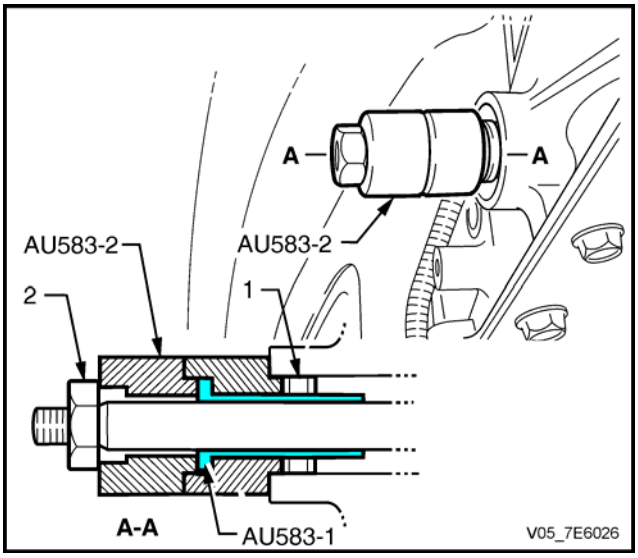


Figure 7E4 – 123

NOTE

The two plastic seal installers (AU 583-2) are required, because of the restricted space between the end of the manual shaft and the floor pan.

13 Install the manual shaft lever retaining nut (2) and tighten it to install the seal fully into place in the transmission case.

14 Remove installer tools, AU 583-2 (two pieces) and seal protector sleeve AU 583-1 from the manual shaft.

15 Reinstall the shift shaft lever to the transmission manual shaft, then install the retaining nut.

16 While holding the manual shift lever with an adjustable wrench, tighten the retaining nut to the correct torque specification.

Manual shift shaft lever retaining nut torque specification .....12 Nm

17 Check and adjust the shift control linkage. Refer to 3.2 Selector Linkage – RWD Models, Adjust, in this Section.

18 Check and top up transmission fluid level as required. Refer to 2.1 Transmission Fluid Check, in this Section.

19 Inspect for transmission fluid leaks.

20 Lower the vehicle to the ground.

3.18 Manual Shaft Position Switch

LT Section No. – 04-170

Remove

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Mark the relationship of the transmission mount crossmember to each body side rail ('A') with a felt tipped pen or similar.

NOTE

This is necessary to maintain alignment on reassembly.

3 Position a suitable transmission jack under the transmission rear mount crossmember.

4 Remove the four bolts securing the transmission mount crossmember to the body side rails.

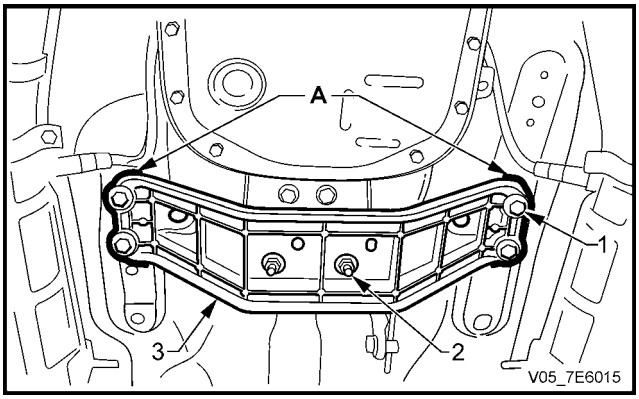


Figure 7E4 – 124

5 While holding the shift lever with an adjustable wrench, remove the nut (1) securing the transmission shift lever (2) to the transmission manual shift shaft.

6 Disconnect the shift lever from the transmission manual shift shaft.

7 Remove the transmission fluid pan and filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

8 Remove the electrical connector from the manual shift shaft position switch, after releasing the connector security latch.

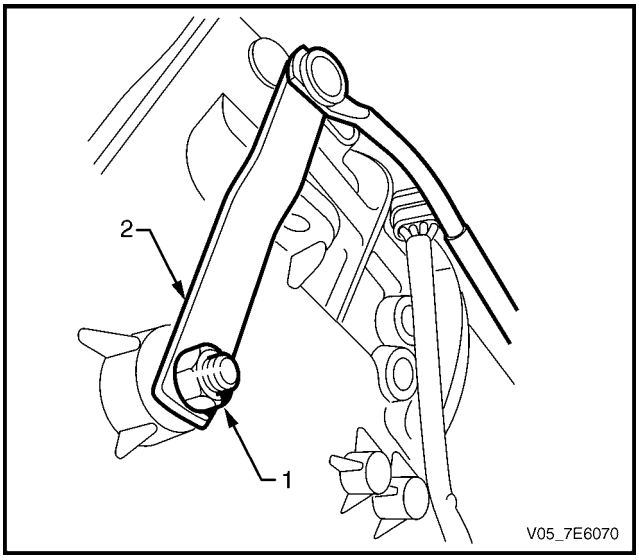


Figure 7E4 – 125

9 Using a suitable pin punch (2), remove the roll pin (1) securing the manual shaft position switch to the manual shaft.

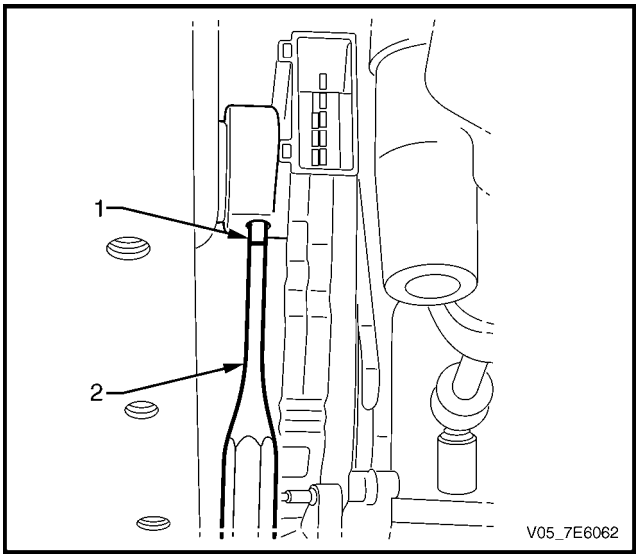


Figure 7E4 – 126

10 Remove the manual shaft detent spring (1) by removing the two bolts (2).

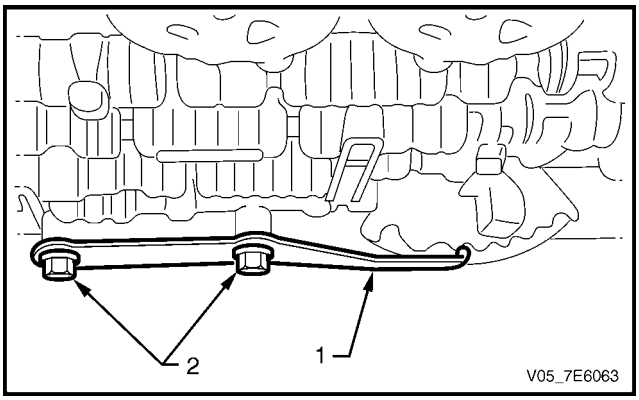


Figure 7E4 – 127

11 Lower the rear of the transmission, enough to provide clearance between the manual shift shaft (606) and the vehicle floor pan.

12 Remove the manual shift shaft (606) from the transmission case, enough to allow removal of the shift shaft position switch and associated components.

13 Remove the manual shift shaft position switch (602), manual shift shaft detent lever (600) and the park pawl actuator (613), as an assembly.

14 Disassemble the manual shift shaft position switch (602) from the manual shift shaft detent lever (600).

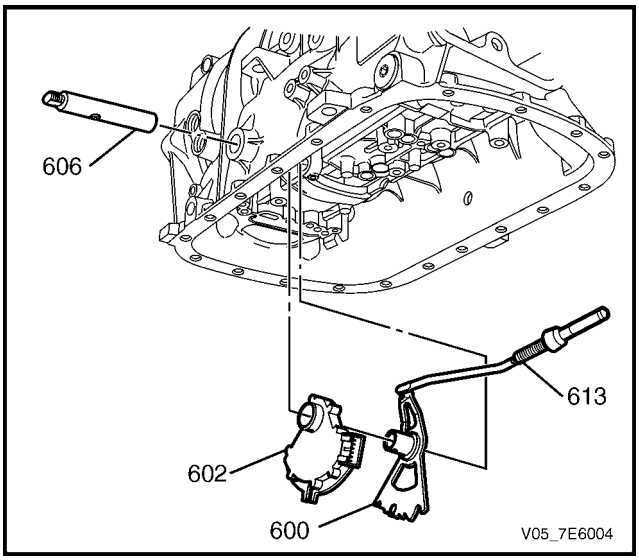


Figure 7E4 – 128

Reinstall

1 Refer to Figure 7E4 – 97. Reinstall the manual shift shaft position switch (602), the manual shift shaft detent lever (600) and the park pawl actuator (613) as an assembly.

2 Align the manual shift shaft detent lever (600) shaft hole with the case, then fully insert the manual shift shaft (606) into the transmission case.

3 Raise the rear of the transmission and align the crossmember position marks, made before removal.

4 Reinstall the four bolts securing the crossmember to the body side rails and tighten to the correct torque specification. Remove the transmission jack.

Transmission crossmember to side rail bolt torque specification.....58 Nm

5 Reinstall the manual shift shaft detent spring (1).

6 Reinstall the two control valve body and manual shift shaft detent spring retaining bolts(2). Do not fully tighten at this time.

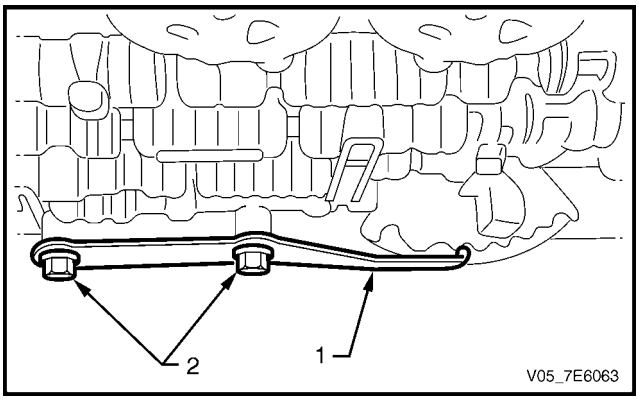


Figure 7E4 – 129

7 Confirm that the manual shift shaft detent pin (2) is engaged with the manual shaft link (1).

8 Confirm also, that the detent spring roller (4) is correctly engaged with the manual shift shaft switch (3).

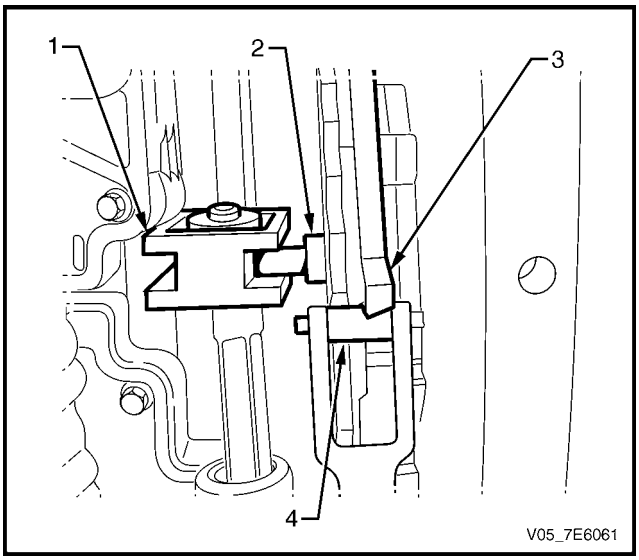


Figure 7E4 – 130

9 Using a suitable size pin punch, align the pin hole in the manual shift position switch with the hole in the manual shift shaft.

NOTE

With the pin punch inserted in the manual shift shaft, rotate the manual shift shaft detent lever (600) and check that the park pawl mechanism engages correctly.

10 Using a suitable size pin punch (2), install a NEW roll pin (1) to secure the manual shift shaft position switch to the manual shift shaft.

11 Reinstall the electrical connector to the manual shift shaft position switch and check that the security latch is fully engaged.

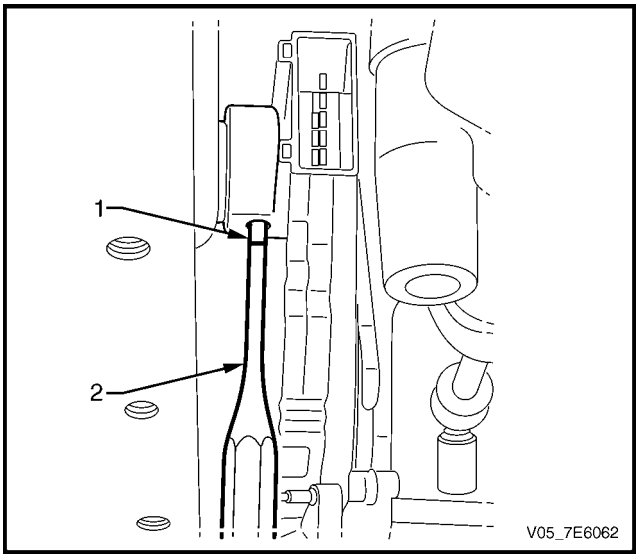


Figure 7E4 – 131

12 Install an 0.8 mm spacer ('A') (e.g. feeler gauges) between the manual shaft detent lever (600) and the manual shaft detent spring (52).

13 Tighten the two detent spring retaining bolts to the correct torque specification.

Manual shaft detent spring bolt torque specification	11 Nm

14 Remove the spacer.

15 Install a NEW transmission fluid filter, then the transmission fluid pan to the transmission, reusing the original pan gasket seal, if undamaged. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

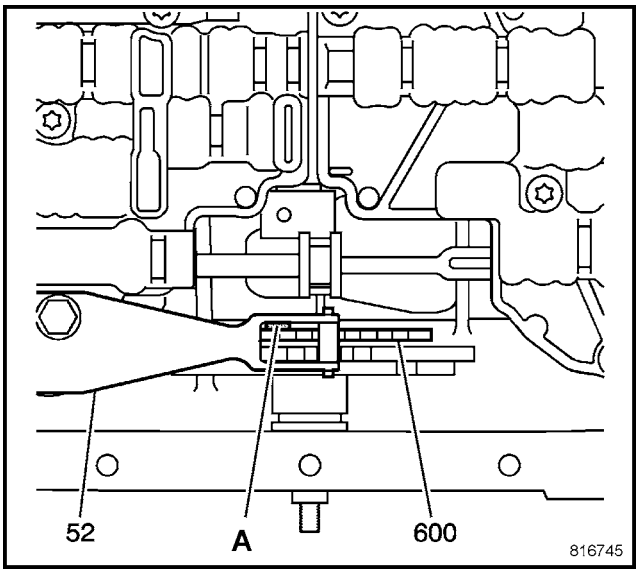


Figure 7E4 – 132

16 If the manual shift shaft oil seal was removed, install a NEW oil seal. Refer to 3.17 Manual Shaft Oil Seal, in this Section.

17 Reinstall the manual shift shaft select lever to the manual shift shaft.

18 Reinstall the manual shaft shift select lever retaining nut then, while holding the lever with an adjustable wrench, tighten the nut to the correct torque specification.

Manual shift shaft lever retaining nut torque specification	12 Nm

19 Check and adjust the shift control linkage as required. Refer to 3.2 Selector Linkage – RWD Models, Adjust, in this Section.

20 Check and top up transmission fluid level as required. Refer to 2.1 Transmission Fluid Check, in this Section.

21 Inspect for transmission fluid leaks.

22 Lower the vehicle to the ground.

3.19 Input Speed Sensor

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, then disconnect the connector (1) from the input speed sensor (2).

4 Remove the input speed sensor retaining screw (3), using a 10 mm socket and suitable equipment.

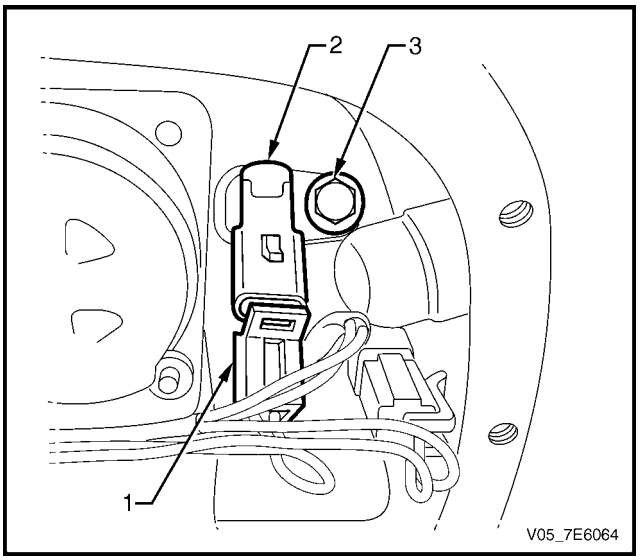


Figure 7E4 – 133

5 Remove the input speed sensor (1) from the transmission case.

6 Inspect the input speed sensor for the following:

- a A damaged or missing magnet.
- b Damaged housing.
- c Bent or missing electrical terminals.
- d Metal contamination adhered to the magnet.

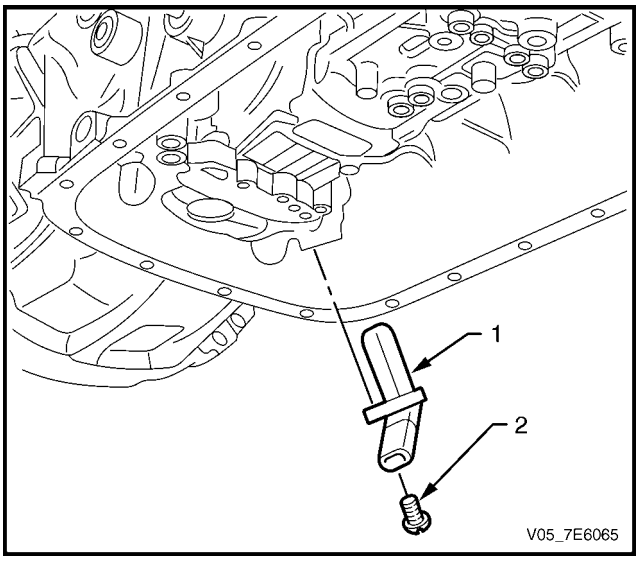


Figure 7E4 – 134

7 After reinstalling the input speed sensor, install the retaining screw, tightening to the correct torque specification.

Input speed sensor retaining screw torque specification.....11 Nm

8 Reinstall the electrical connector to the input speed sensor ensuring that the security latch is fully installed.

9 Install a NEW transmission fluid filter, then the transmission fluid pan to the transmission, reusing the original pan gasket seal, if undamaged. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3.20 Output Speed Sensor

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, the disconnect the connector (3) from the output speed sensor (2).

4 Using a 10 mm socket and suitable equipment, remove the output speed sensor retaining screw (1).

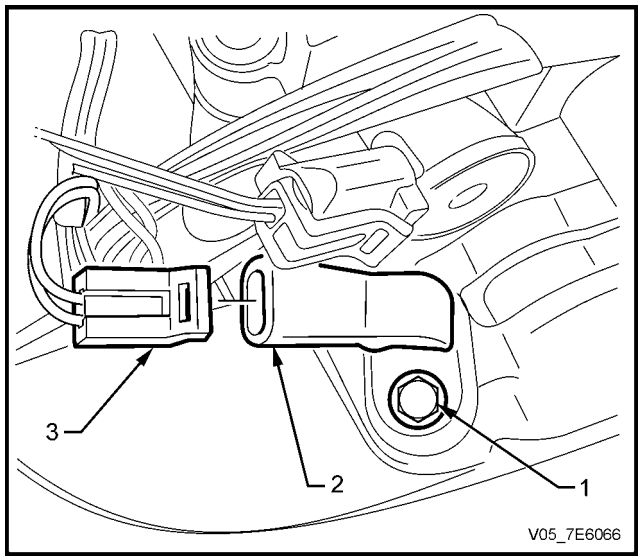


Figure 7E4 – 135

5 Remove the output speed sensor (2) from the transmission case.

6 Inspect the output speed sensor for the following:

- a A damaged or missing magnet.
- b Damaged housing.
- c Bent or missing electrical terminals.
- d Metal contamination adhered to the magnet.

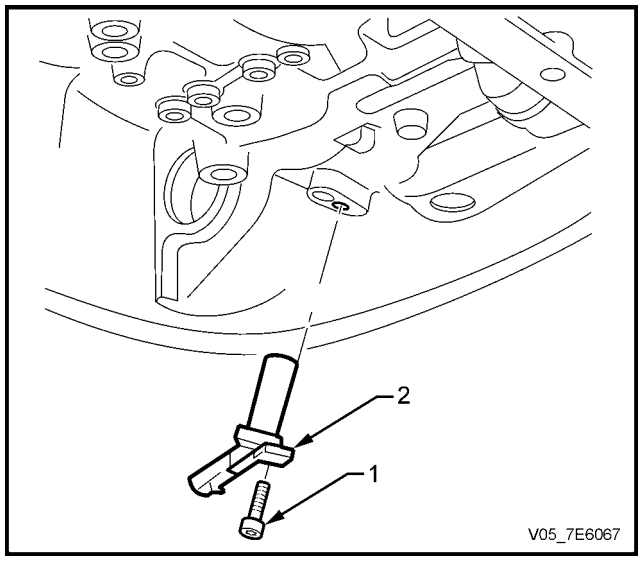


Figure 7E4 – 136

7 After reinstalling the output speed sensor, install the retaining screw and tighten to the correct torque specification.

Output speed sensor retaining screw torque specification.....11 Nm

8 Reinstall the electrical connector to the output speed sensor ensuring that the security latch is fully installed.

9 Install the fluid filter and the fluid pan to the transmission, reusing the original pan gasket seal, if undamaged. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3.21 1-2 Shift Solenoid

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, then disconnect the connector (1) from the 1-2 shift solenoid (2).

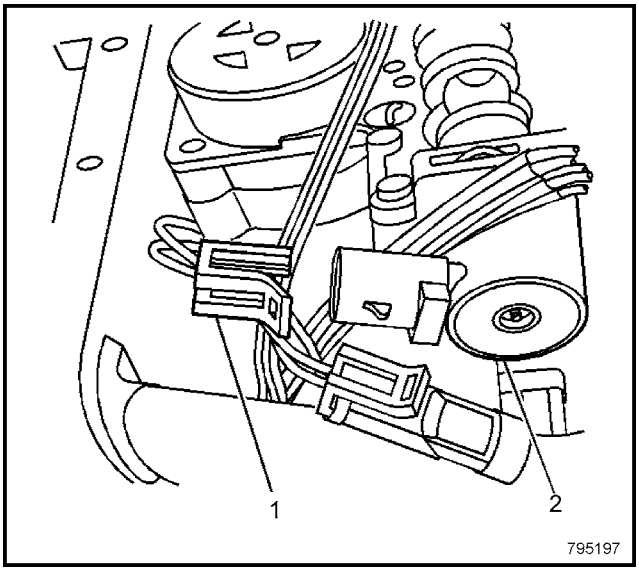


Figure 7E4 – 137

WARNING

Wear eye protection to prevent potential injury.

4 Using a small bladed screwdriver or a hooked piece of wire, remove the 1-2 shift solenoid retainer (1) from the control valve body.

5 Twist and pull on the 1-2 solenoid to remove it from the control valve body.

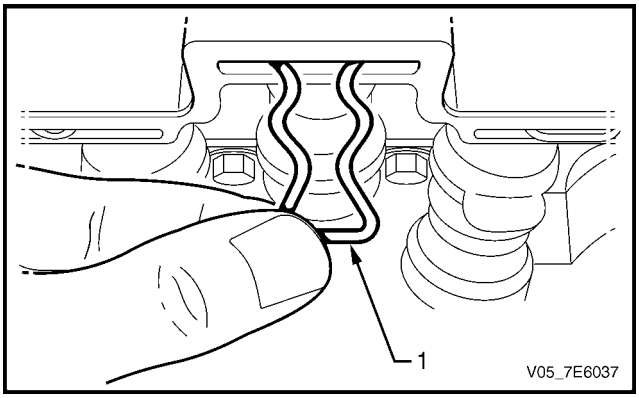


Figure 7E4 – 138

6 Remove the 1-2 shift solenoid (1) from the control valve body.

Reinstallation of the 1-2 shift solenoid is the reverse to removal, taking note of the following items:

WARNING

Wear eye protection to prevent potential injury.

7 After installing the 1-2 shift solenoid into the control valve body, install the retainer, to secure.

8 After installing the electrical connector, check that the connector security latch is secure.

9 Reinstall the fluid filter and fluid pan. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

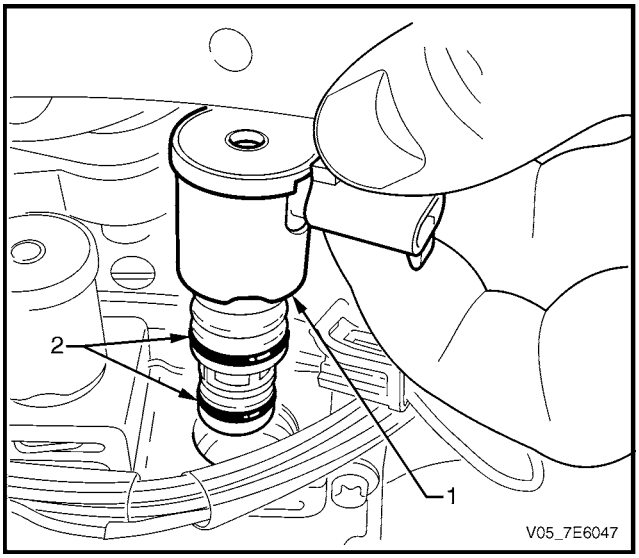


Figure 7E4 – 139

3.22 2-3 Shift Solenoid

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, the disconnect the connector (1) from the 2-3 shift solenoid (2).

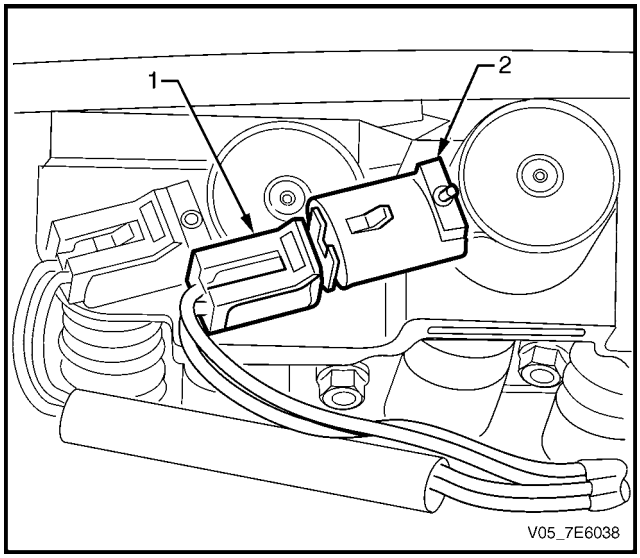


Figure 7E4 – 140

WARNING

Wear eye protection to prevent potential injury.

4 Using a small bladed screwdriver or a hooked piece of wire, remove the 2-3 shift solenoid retainer (1) from the control valve body.

5 Twist and pull on the 2-3 solenoid to remove it from the control valve body.

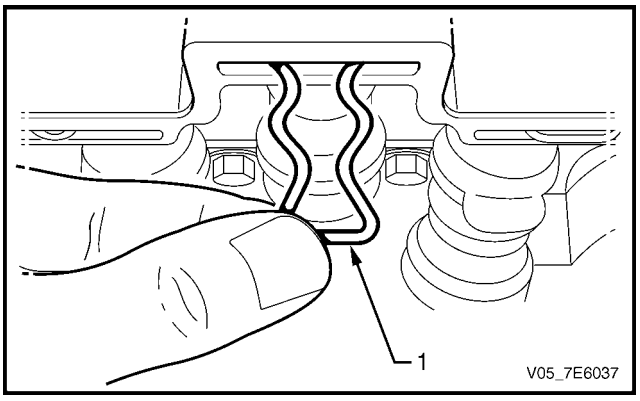


Figure 7E4 – 141

6 Remove the 2-3 shift solenoid (1) from the control valve body.

Reinstallation of the 2-3 shift solenoid is the reverse to removal, taking note of the following items:

WARNING

Wear eye protection to prevent potential injury.

7 Reinstall the 2-3 shift solenoid into the control valve body, then install the retainer, to secure.

8 Reinstall the electrical connector and check that the connector security latch is secure.

9 Reinstall the fluid filter and fluid pan. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

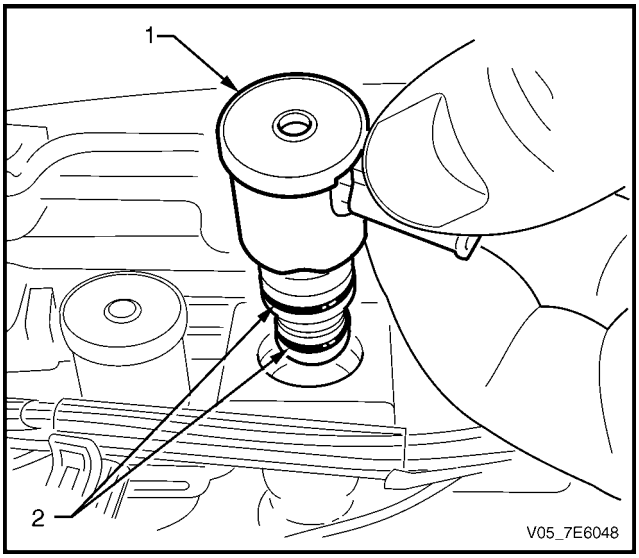


Figure 7E4 – 142

3.23 4-5 Shift Solenoid

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, the disconnect the connector (1) from the 4-5 shift solenoid (2).

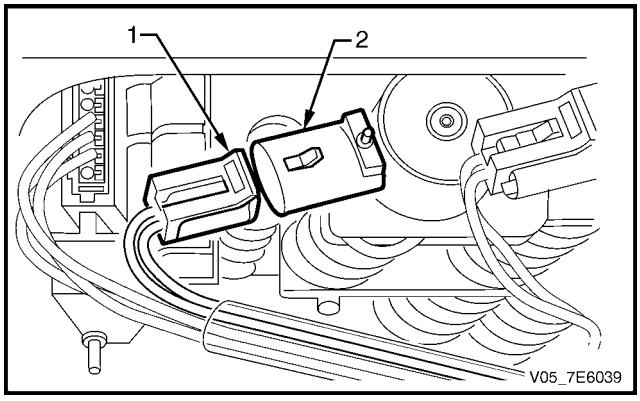


Figure 7E4 – 143

WARNING

Wear eye protection to prevent potential injury.

4 Using a small bladed screwdriver or a hooked piece of wire, remove the 4-5 shift solenoid retainer (1) from the control valve body.

5 Twist and pull on the 4-5 solenoid to remove it from the control valve body.

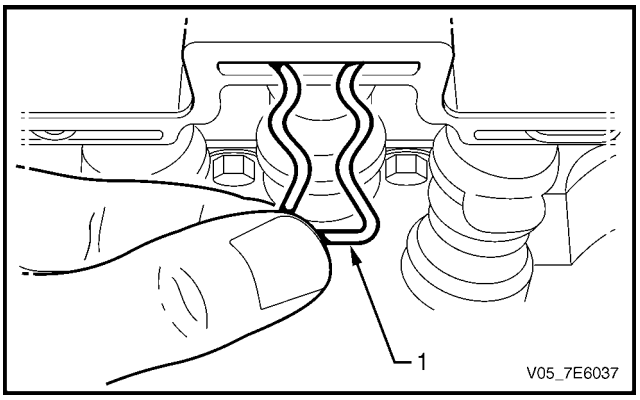


Figure 7E4 – 144

6 Remove the 2-3 shift solenoid (1) from the control valve body.

Reinstallation of the 4-5 shift solenoid is the reverse to removal, taking note of the following items:

WARNING

Wear eye protection to prevent potential injury.

7 After installing the 2-3 shift solenoid into the control valve body, install the retainer, to secure.

8 After installing the electrical connector, check that the connector security latch is secure.

9 Reinstall the fluid filter and fluid pan. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

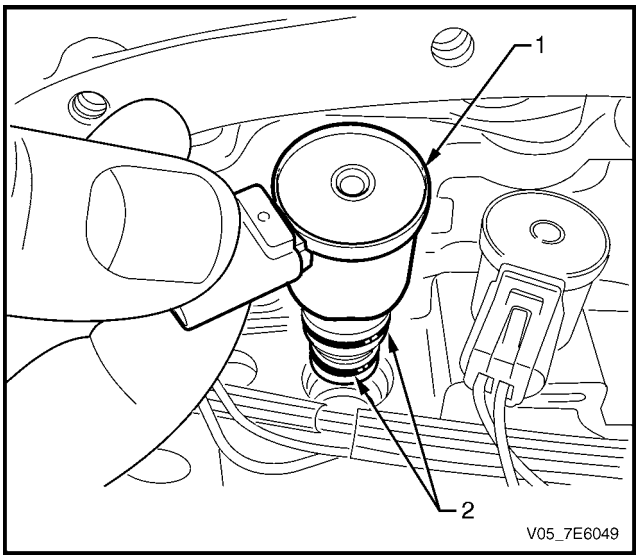


Figure 7E4 – 145

3.24 Pressure Control Solenoid

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, the disconnect the connector (2) from the pressure control solenoid (PCS) (1).

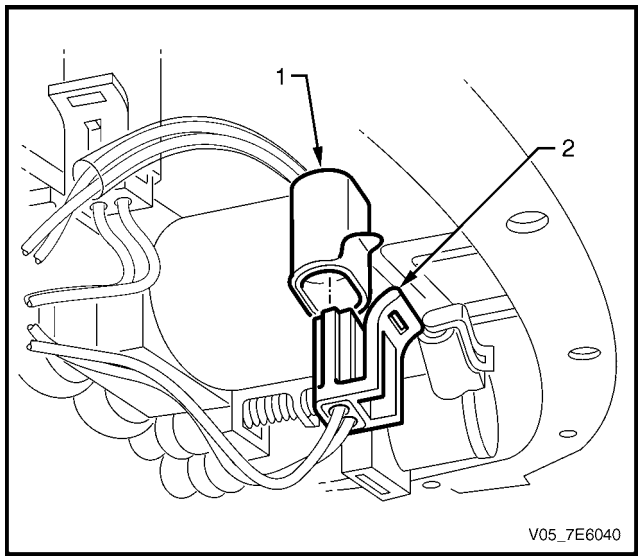


Figure 7E4 – 146

WARNING

Wear eye protection to prevent potential injury.

4 Using a small bladed screwdriver or a hooked piece of wire, remove the pressure control solenoid retainer (1) from the control valve body.

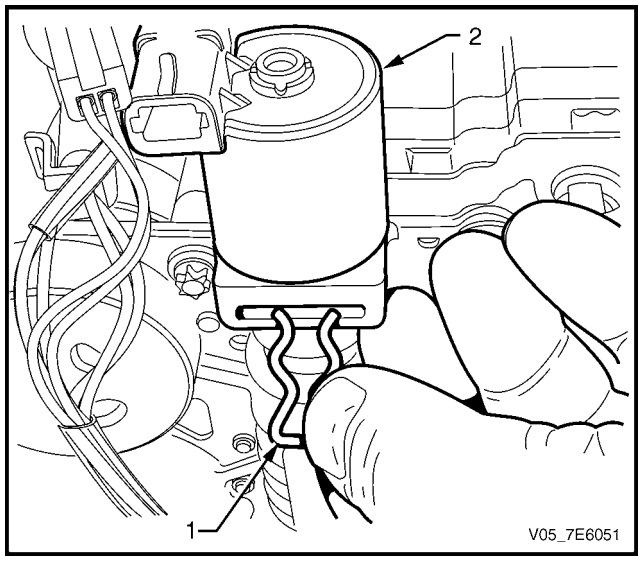


Figure 7E4 – 147

5 Twist the pressure control solenoid (1) through 90° to provide enough clearance, then pull to remove it from the control valve body.

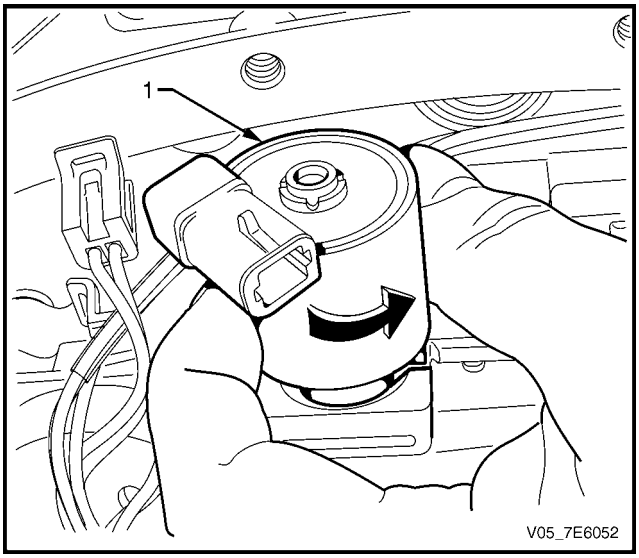


Figure 7E4 – 148

Reinstallation of the pressure control solenoid is the reverse to removal, taking note of the following items:

6 Reinstall the pressure control solenoid to the control valve body, then rotate the solenoid until the tang (1) on the solenoid body aligns with the slot (2) in the control valve body, as shown.

WARNING

Wear eye protection to prevent potential injury.

7 Install the retainer to secure the solenoid.

8 After installing the electrical connector, check that the connector security latch is secure.

9 Reinstall the fluid filter and fluid pan. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

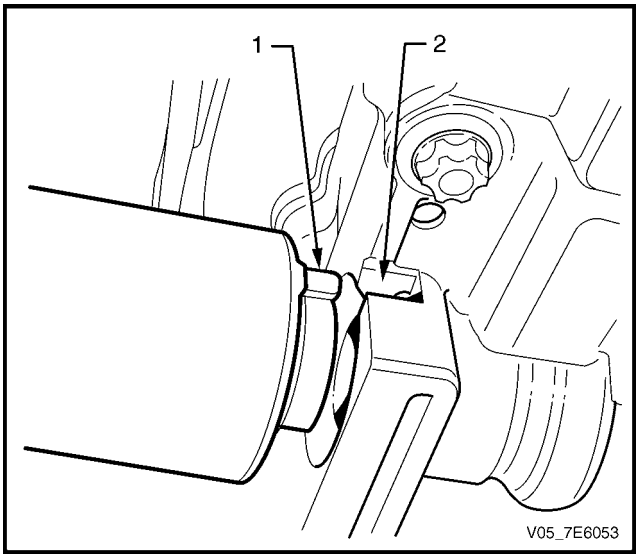


Figure 7E4 – 149

3.25 Torque Converter Clutch (TCC) PWM Solenoid

LT Section No. – 04-275

Replace

1 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

2 Remove the transmission fluid pan and fluid filter. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

3 Release the wiring harness connector security latch, the disconnect the connector (1) from the torque converter clutch PWM solenoid.

NOTE

There is insufficient clearance to remove the TCC PWM solenoid with the control valve body fully installed. Complete removal however, is not necessary.

CAUTION

DO NOT loosen the two TX-30 Torx screws (3).

4 Loosen the eight, E8 Torx headed control valve body bolts (2).

5 Loosen the one detent spring retaining bolt (4).

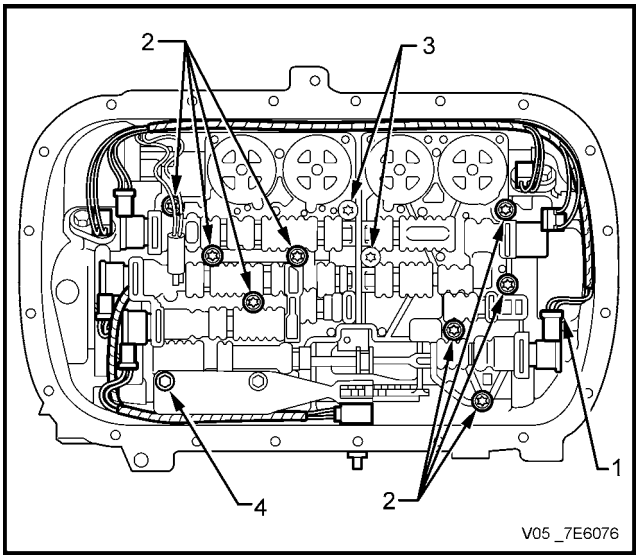


Figure 7E4 – 150

WARNING

- **Hold the solenoid in place while the retaining clip is removed, as the spring loaded TCC Regulator Valve will cause the solenoid to be ejected from the control valve body accumulator assembly.**
- **Wear eye protection to prevent potential injury.**

6 Using a small bladed screwdriver or a hooked piece of wire, remove the pressure control solenoid retainer (1) from the control valve body.

7 Release the spring pressure.

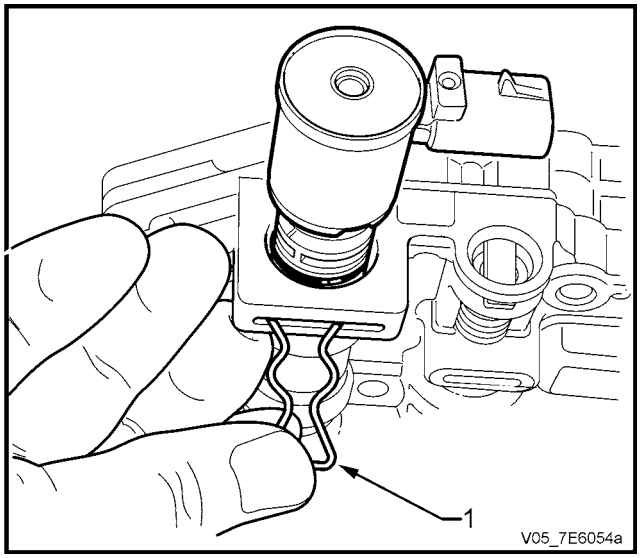


Figure 7E4 – 151

8 If necessary, loosen the control valve body bolts, lowering the valve body until sufficient clearance is gained to allow solenoid removal.

9 Remove the TCC PWM solenoid from the control valve body assembly.

Reinstallation of the TCC PWM solenoid is the reverse to removal, taking note of the following items:

10 Reinstall the TCC PWM solenoid to the Control Valve Body Accumulator assembly then, while holding the solenoid in against spring force, reinstall the retainer to secure the solenoid (see Figure 7E4 – 120).

11 Reinstall the wiring harness connector to the TCC PWM solenoid then check that the connector security latch is secure.

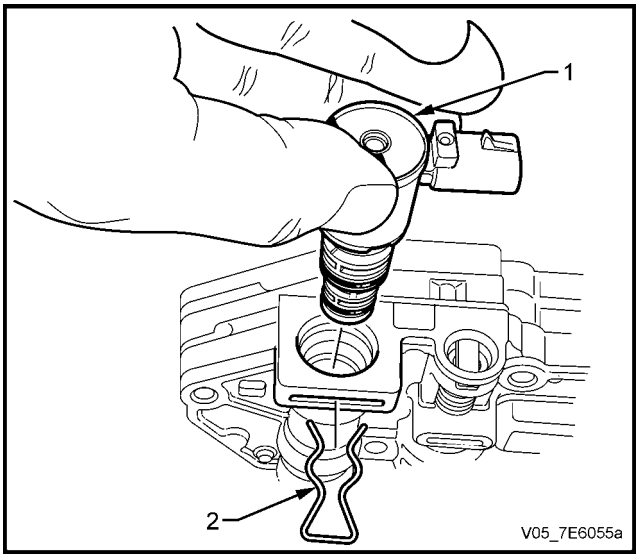


Figure 7E4 – 152

12 Gradually tighten the eight control valve body bolts but do not fully tighten, out of sequence.

13 Finally tighten the eight control valve body and accumulator to case bolts in the correct sequence as shown and to the correct torque specification.

Control valve body assembly to transmission case bolt torque specification	11 Nm

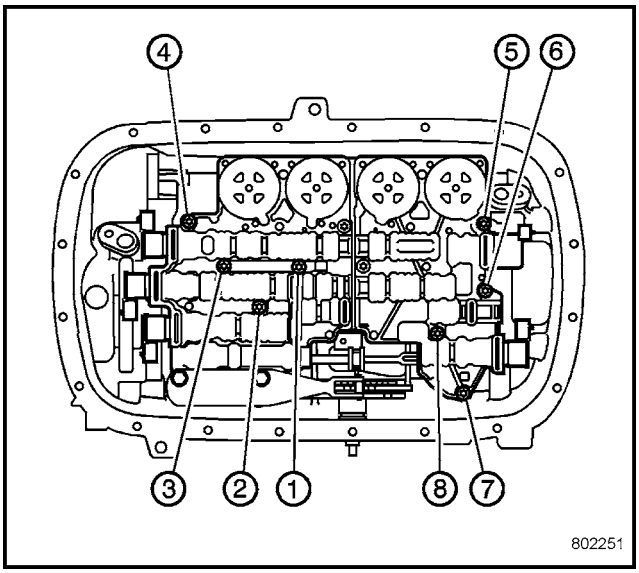


Figure 7E7 – 153

14 Install an 0.8 mm spacer ('A') (e.g. feeler gauges) between the manual shaft detent lever (600) and the manual shaft detent spring (52).

15 Tighten the loosened detent spring retaining bolt to the correct torque specification.

Manual shaft detent spring bolt torque specification	11 Nm

16 Remove the spacer.

17 Reinstall the fluid filter and fluid pan. Refer to 3.1 Fluid Change and Filter Replace, in this Section.

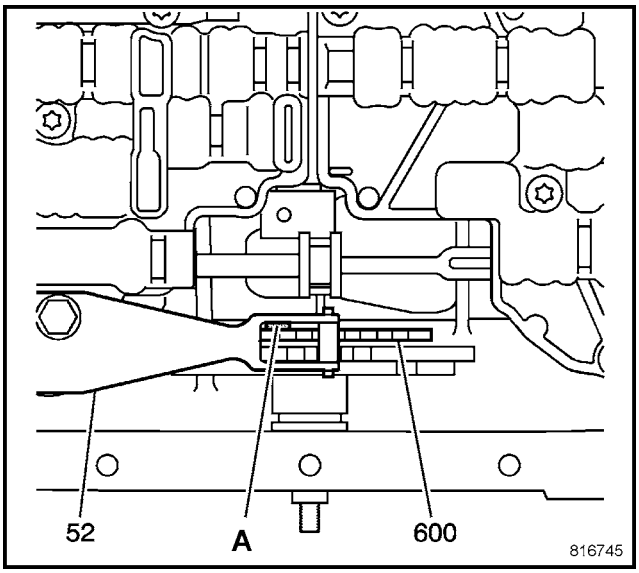


Figure 7E4 – 154

3.26 Solenoid Leak Testing

CAUTION

- **This procedure only tests ON/OFF solenoids such as the 1–2, 2–3 and 4–5 shift solenoid valves.**
- **Visually inspect the physical condition of the solenoid valve before testing. Also check the O-rings before and after testing to ensure that they are not cut or damaged.**

1 Remove the shift solenoid valve from the control valve body. Refer to 3.21 1-2 Shift Solenoid, 3.22 2-3 Shift Solenoid, or 3.23 4-5 Shift Solenoid, in this Section.

2 Install the shift solenoid valve (1) to be tested, into bore number 5 of Tool J 44246 Test Block. Secure with the original retaining clip (2).

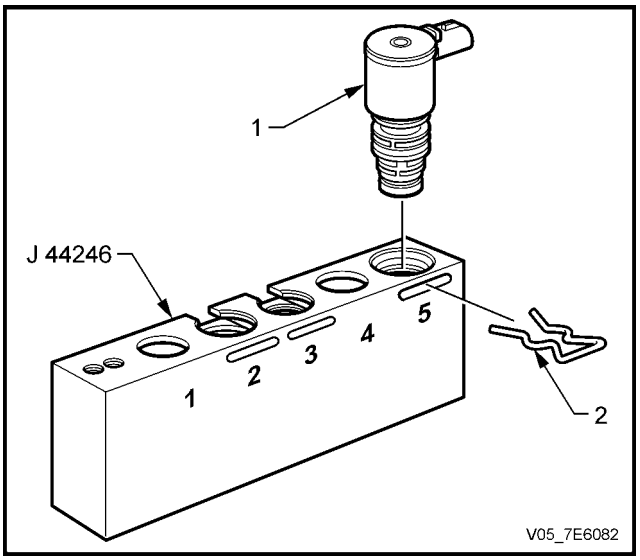


Figure 7E4 – 155

3 Connect the solenoid test harness (1) supplied with the J 44246 Solenoid Testing Kit to the solenoid (2).

CAUTION

Do not use air pressure exceeding 800 kPa. Excessive pressure will not allow the solenoid ball check valve to seat properly. Recommended air pressure is 350 kPa.

4 Apply compressed air (3) to the test kit block, as shown.

5 Connect the test harness to the 12 volt battery terminals.

6 Check that the solenoid is operating electrically by listening for an audible clicking noise as the test harness makes and breaks voltage contact.

NOTE

- All solenoids need to be energised to seal.
- A small amount of air leakage is normal (± 21 kPa).

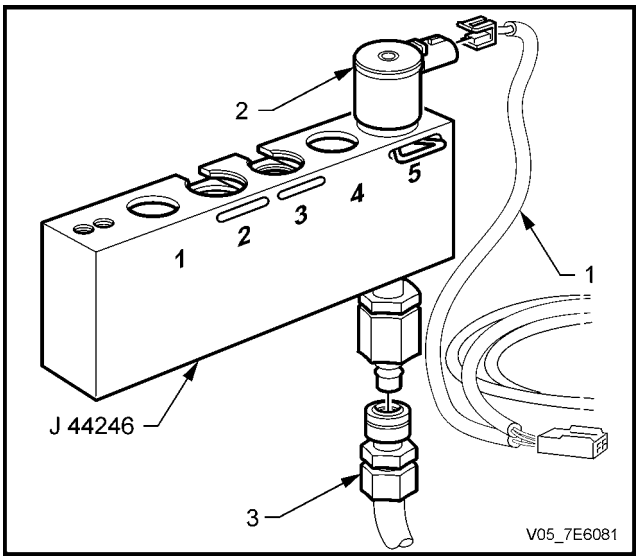


Figure 7E4 – 156

7 Observe the air flow through the solenoid. The flow will either completely or nearly stop, when the solenoid is energised. Replace any solenoid where an obvious air leak is observed when the solenoid is energised.

NOTE

Inspect the O-rings after testing to ensure that they are not cut or damaged.

8 Reinstall the solenoid valve to the control valve body. Refer to 3.21 1-2 Shift Solenoid, 3.22 2-3 Shift Solenoid, or 3.23 4-5 Shift Solenoid, in this Section.

3.27 Control Valve Body and Accumulator Assembly

The control valve body and accumulator assembly is not serviced. Therefore, if replacement is required, the complete transmission must be changed. Refer to 3.29 5L40-E Automatic Transmission, in this Section.

3.28 Transmission Control Module (TCM)

LT Section No. – 04-999

Remove

1 Ignition OFF.

2 Remove left hand front hinge pillar trim assembly. Refer to 2.8 Hinge Pillar Trim Assembly, Remove, in Section 1A8 Headlining & Interior Trim.

3 Prise the TCM free from the holder plastic clips. Finger tip pressure is only required.

4 Push the TCM upward, then pull outward and down at the lower edge, freeing the wiring harness and connector from the holder.

CAUTION

Twisting or tilting the transmission control module electrical connector while disconnecting, may result in bent or misaligned electrical terminal pins.

5 Unlock the transmission control module electrical connector by pulling the retainer (2) out from the electrical connector (1).

6 Carefully pull the electrical connector (1) straight out, from the TCM.

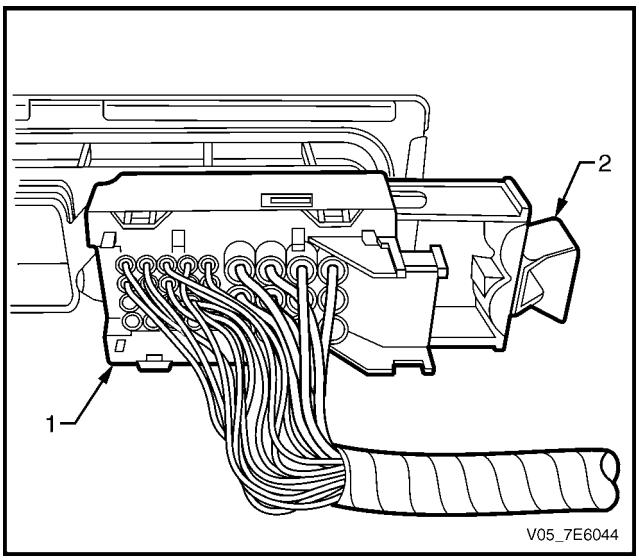


Figure 7E4 – 157

Reinstall

CAUTION

Twisting or tilting the transmission control module electrical connector while disconnecting, may result in bent or misaligned electrical terminal pins.

1 Carefully connect the transmission control module electrical connector (1) to the TCM.

2 Lock the transmission control module electrical connector securely to the TCM by pushing the retainer (2) into the electrical connector (1) until fully seated.

3 Reinstall the TCM to the mounting bracket, in the reverse to removal, ensuring that the TCM holding clips are all engaged.

NOTE

If the TCM is difficult to secure in the holding clips, check that the wiring harness is not fouling the TCM connector on the inside of the mounting bracket.

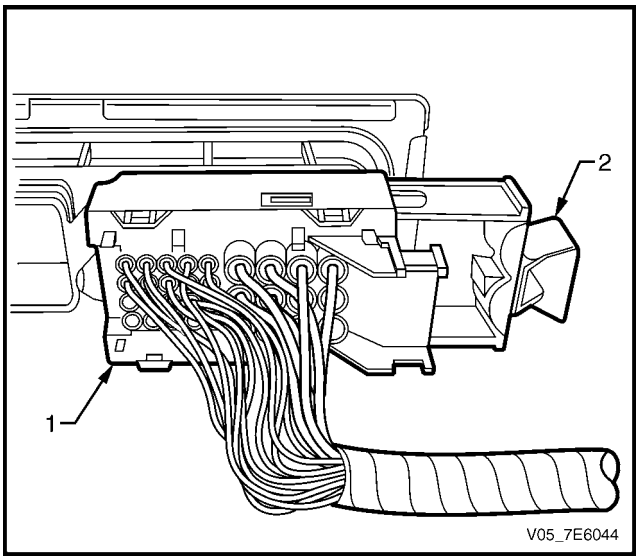


Figure 7E4 – 158

4 Reinstall the left hand front hinge pillar trim assembly. Refer to 2.8 Hinge Pillar trim Assembly, Reinstall, in Section 1A8 Headlining & Interior Trim..

5 The transmission control module must be programmed with the correct software/calibration. Refer to TCM Programming Procedure, in this Section.

TCM Programming Procedure

1 The transmission control module (TCM) must be programmed with the correct software/calibration. Ensure that the following conditions exist before starting the TCM programming procedure:

   a The battery is fully charged.

   b The TECH 2 cable connection at the data link connector (DLC) is secure.

   c The ignition switch is in the ON position.

2 Program the TCM using the latest software for the vehicle. Refer to the current release of TIS for the latest software and Section 0C Tech 2 for user instructions.

3 If the TCM fails to program, proceed as follows:

   a Ensure that the TCM connection is OK.

   b Check that TECH 2 is programmed with the latest software version.

   c Attempt to re-program the TCM. If the TCM still cannot be programmed properly, replace the TCM.

3.29 5L40-E Automatic Transmission

ATTENTION

The following fasteners MUST be replaced when performing these operations:

- **Torque converter to flexplate attaching bolts.**
- **Front propeller shaft fasteners, as noted in the text.**

LT Section No. – 04-200

Remove

CAUTION

A number of different methods of attaching the front coupling to the transmission output flange can be noted:

- **Hexagon headed bolts into threaded flange holes. With this method, the output flange threads are of the 'Spiralock' form that can only be loosened/tightened a maximum of ten times. Because of the safety factor involved, if the complete vehicle service history is not known, then both the flange and the bolts MUST be replaced on reassembly.**
- **Studs installed into the transmission output flange facing rearward, with the flange being secured by nuts.**
- **Torx headed bolts and nuts. Figure 7E4–131 shows this method.**

NOTE

Disconnection of the battery affects certain vehicle electronic systems. Refer to Section 00 Cautions and Notes, 5 Battery Disconnection Procedures before disconnecting the battery.

1 Disconnect the negative battery cable.

2 Drain the engine coolant into a clean container. Depending on the age of the coolant it may be able to be used again. Refer to Section 6B1 Engine Cooling – V6 Engine for further information.

3 Remove the engine thermostat housing. This is necessary to enable access to the upper transmission to engine attaching bolts. Refer to Section 6B1 Engine Cooling – V6 Engine.

4 Raise the vehicle and support in a safe manner. Refer to Section 0A General Information in this Service Information for the location of recommended lifting and support points.

5 Drain the transmission fluid. Refer to 3.1 Fluid Change and/or Filter Replace, in this Section.

6 While holding the transmission manual shaft lever (2) with an adjustable wrench, loosen then remove the transmission manual shaft lever retaining nut (1).

7 Disconnect the shift lever from the manual shaft.

8 Place the transmission in the Neutral range.

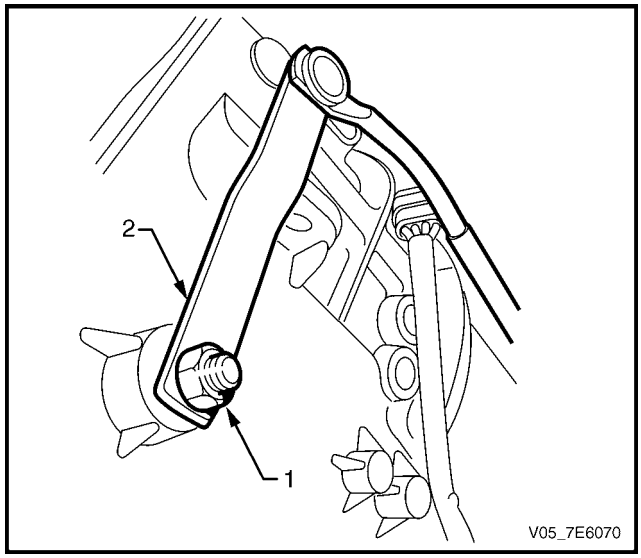


Figure 7E4 – 159

9 Remove both exhaust pipes and catalytic converters, back to the intermediate pipe flanges. Refer to Section 8B Exhaust System.

NOTE

While this operation is not essential, removal of the exhaust pipes does provide additional space around the transmission and will remove the possibility of accidental damage to the oxygen sensors.

10 Using a felt tipped pen or similar, mark the relationship of the front coupling to the transmission output shaft flange.

11 Loosen, then remove the three front propeller shaft coupling (1) to output flange bolts (2), nuts (3) and washers (4).

12 Push the front propeller shaft to the rear of the vehicle to release the front propeller shaft coupling from the transmission output shaft spigot.

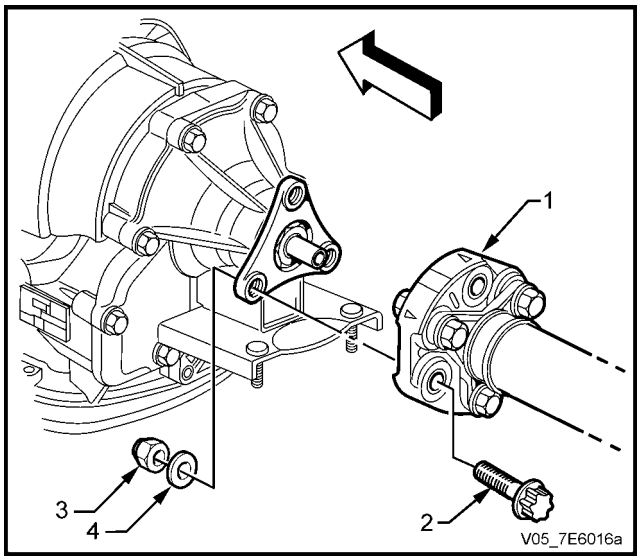


Figure 7E4 – 160

13 Use tie wire (2) or similar to support the front propeller shaft (1) to a convenient underbody point.

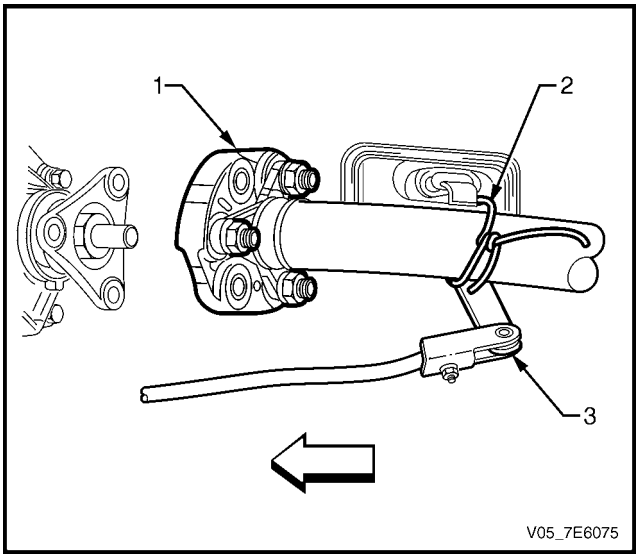


Figure 7E4 – 161

14 As access to the transmission wiring harness cable ties around the transmission is restricted, it is recommended that the transmission wiring harness be disconnected from the transmission control module (TCM) and removed with the transmission. Refer to 3.28 Transmission Control Module, in this Section.

15 Remove the starter motor. Refer to Section 6D1-2 Starting System – V6.

16 Mark the torque converter to flexplate orientation to ensure correct reinstallation alignment.

17 Rotate the engine harmonic balancer in a clockwise direction ONLY, to align a torque converter bolt with the starter motor opening.

18 Remove and discard the torque converter bolts, as they MUST be replaced on reassembly.

19 Repeat Steps 15 and 16 for the remaining two torque converter bolts.

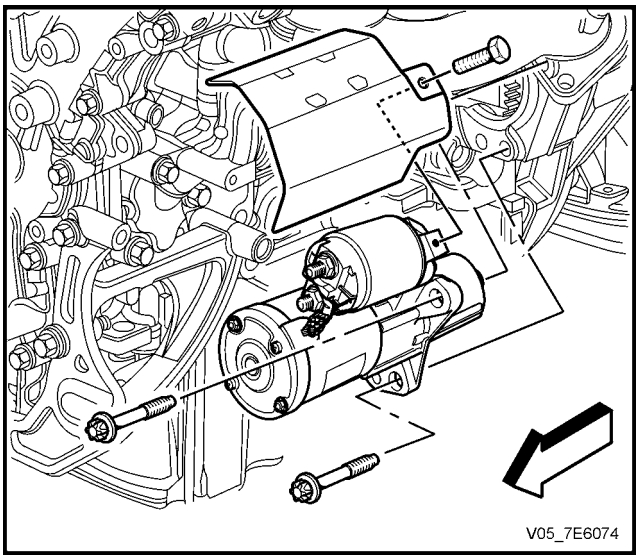


Figure 7E4 – 162

20 Place an oil drain pan under the transmission fluid cooler pipes.

21 Remove the nut (1) securing the transmission cooler pipe bracket (2) to the alternator mounting bracket stud.

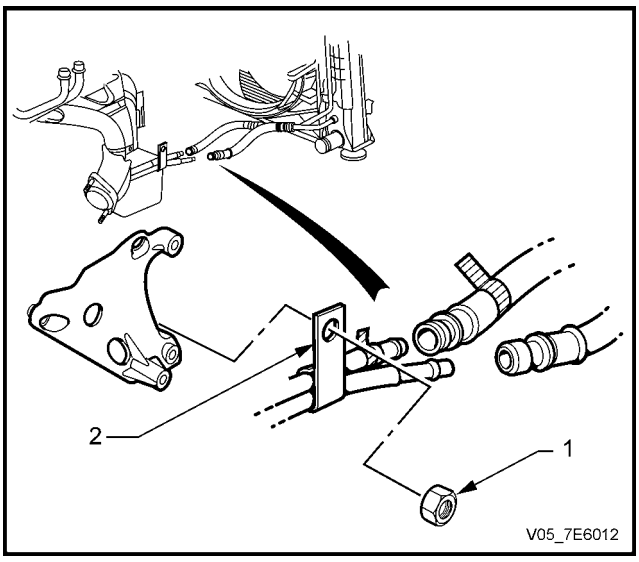


Figure 7E4 – 163

22 Remove the bolt (2) securing the transmission fluid cooler pipes bracket (3) to the transmission case.

23 Remove the transmission fluid cooler pipes from the transmission.

24 Remove the two O-rings (1) and discard, as they must be replaced on assembly.

25 Plug all open ends to stop fluid loss and foreign matter entry.

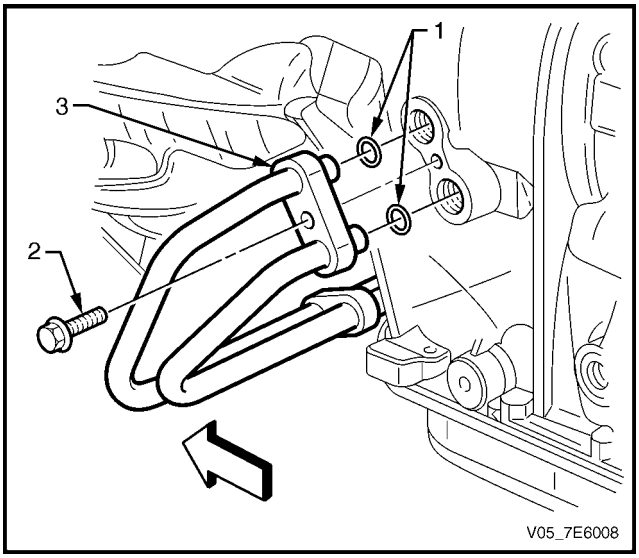


Figure 7E4 – 164

26 Check that one of the fluid cooler flexible lines has a white tag attached and that the mating transmission cooler pipe has a similar tag. If these have been removed, apply adhesive tape to one pair of pipes/lines to ensure correct reassembly.

27 Using disconnect Tool No. AU 525, disconnect each fluid cooler flexible line quick connect fitting (1) from each pipe.

NOTE

The fluid cooler flexible lines are permanently attached to the radiator fluid cooler pipes.

28 Plug all open ends to prevent fluid loss and foreign matter entry.

29 Remove the transmission cooler pipes from the vehicle.

30 Position a suitable transmission jack under the transmission fluid pan.

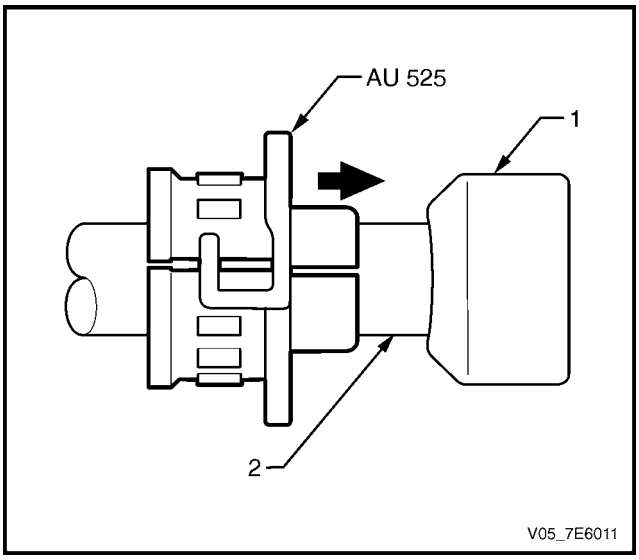


Figure 7E4 – 165

31 Mark the relationship of the transmission mount crossmember to each body side rail ('A') with a felt tipped pen or similar.

NOTE

This is necessary to maintain alignment on reassembly.

32 Remove the four bolts (1) securing the transmission mount crossmember to the body side rails.

33 Remove the two nuts (2) securing the transmission mount to the crossmember.

34 Remove the crossmember from the vehicle.

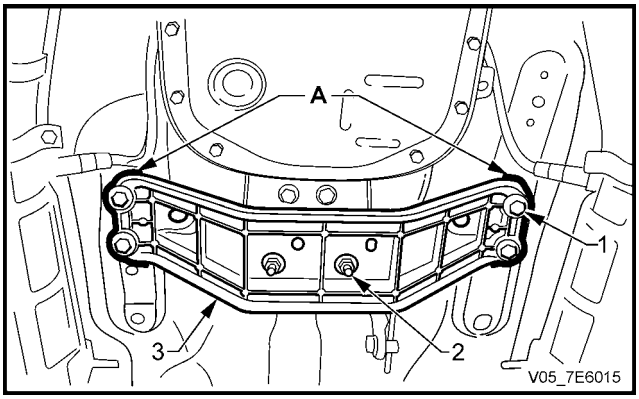


Figure 5A – 166

35 Lower the engine and transmission enough to gain access to the wiring harness securing clips (1 and 2).

36 Prise the two 'fir tree' wiring harness retaining clips (1 and 2) free from their locations.

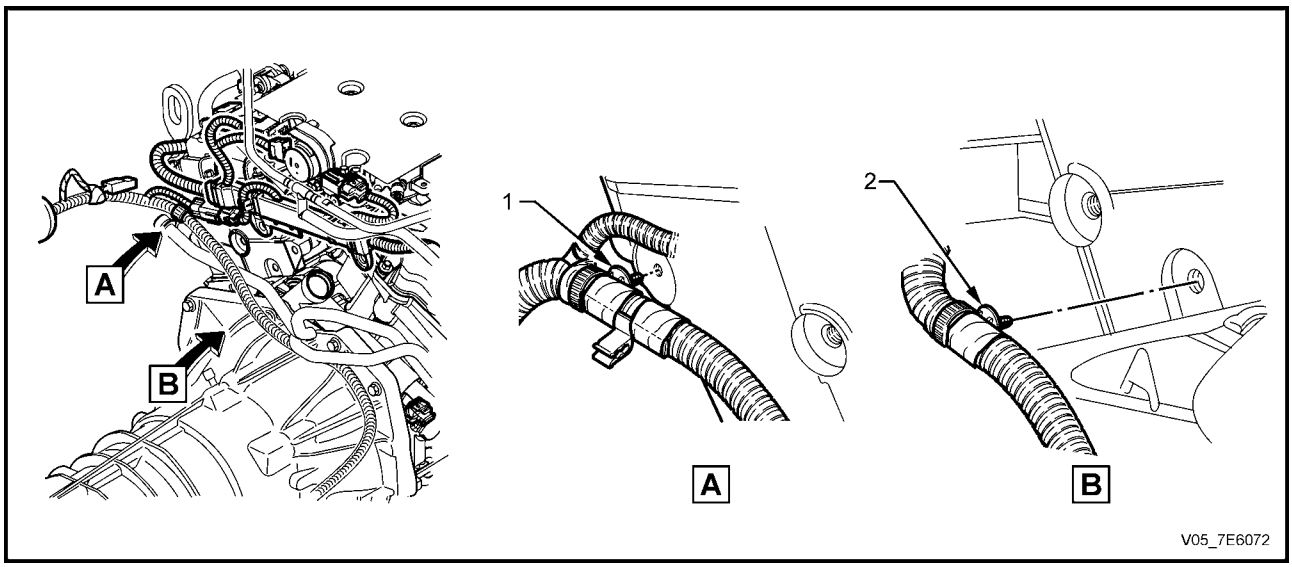


Figure 7E4 – 167

37 Remove the close-out cover screw (4), then remove the cover.

38 Lower the engine and transmission enough to gain access to the four upper transmission to engine mounting bolts (3).

39 Remove the four upper transmission to engine mounting bolts (3).

40 Remove the remaining six lower transmission to engine mounting bolts ('1' and '2').

NOTE

Three bolts are hidden from view.

41 Pull the transmission rearwards, enough to free the transmission from the two engine dowels.

CAUTION

Ensure clearance is maintained between the transmission and the following:

- **The catalytic converters and oxygen sensors [if the exhaust pipes were not removed (Step 9)].**
- **Wiring harnesses.**
- **The propeller shaft.**

42 Carefully lower the transmission from the vehicle.

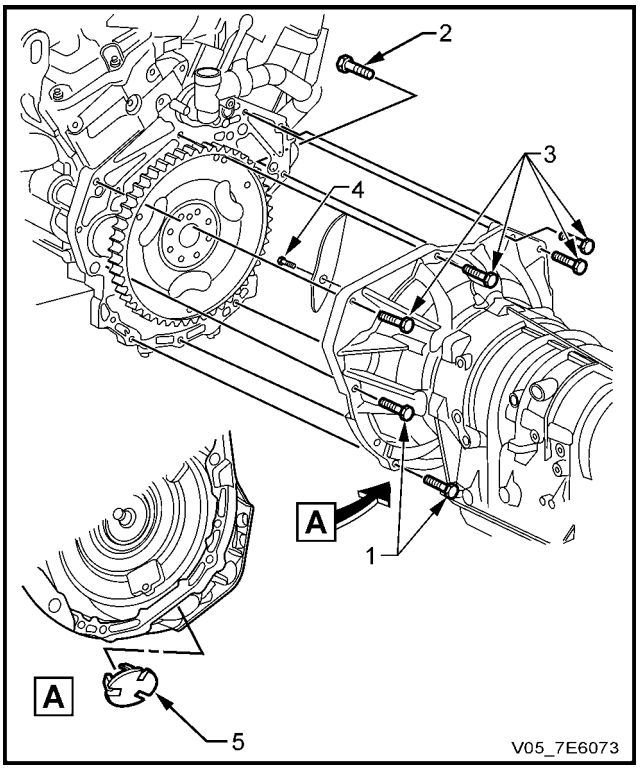


Figure 7E4 – 168

Reinstall

The reinstallation process is the reverse to the removal procedure except fort the items detailed here.

1 Lubricate the torque converter spigot with an NLGI No. 2 lithium soap based EP grease with molybdenum disulphide, such as Shell Retinax HDX2 grease or BP Energrease LMS-EP 23 (or equivalent).

2 After carefully reinstalling the transmission, using a transmission jack, align the engine dowels with the transmission and fully install to the rear of the engine.

3 Reinstall the six lower bolts (‘1’ and ‘2’), then tighten to the correct torque specification.

Transmission to engine bolt torque specification .....60 Nm

4 If necessary lower transmission at the rear to gain access to the upper transmission to engine fasteners.

5 Reinstall the four upper transmission to engine bolts (3) and tighten to the correct torque specification.

Transmission to engine bolt torque specification .....60 Nm

6 Reinstall the wiring harness retaining clips.

7 Reinstall the close-out cover and secure with the retaining screw (4), tightening to the correct torque specification.

Close-out cover retaining screw torque specification.....14 Nm

8 Reinstall the engine thermostat housing and replenish the engine coolant. Refer to Section 6B1 Engine Cooling – V6 Engine.

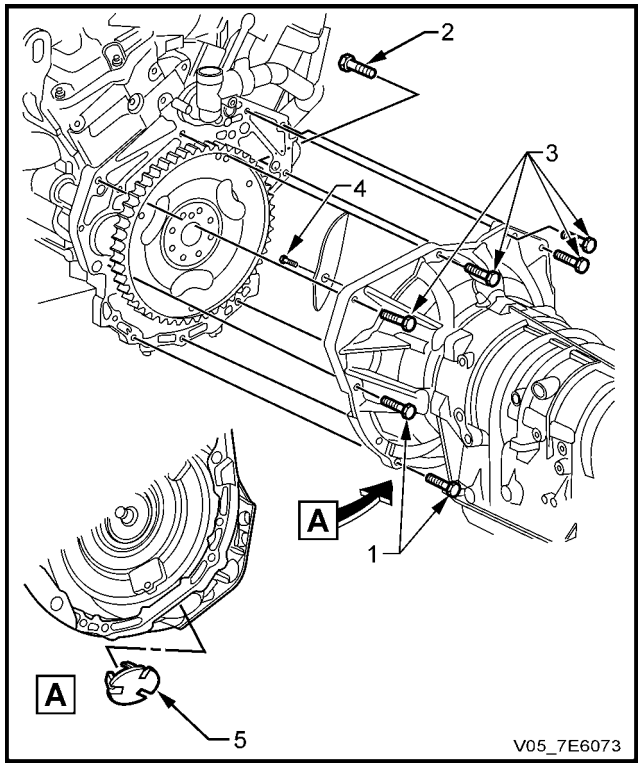


Figure 7E4 – 169

9 Raise the transmission, then reinstall the rear mount crossmember. Refer to 3.8 Transmission Mount and Mount Plate, Reinstall, in this Section.

10 Reinstall the transmission fluid cooler pipes and secure with the screw attaching the pipe bracket to the alternator bracket. Tighten the attaching bolt to the correct torque specification.

Transmission oil cooler pipe to alternator bracket bolt torque specification.....20 Nm

11 Remove all plugged cooler pipe/hose openings, wipe clean and reconnect each of the cooler hose quick connect fittings to the cooler pipes. Tug on each after installation, to check that engagement is correct. Refer to 3.6 Transmission Fluid Cooler Pipes/Hoses, Reinstall, in this Section.

12 Install NEW O-rings to the fluid cooler pipes at the transmission end, then reinstall them to the transmission. Refer to 3.6 Transmission Fluid Cooler Pipes/Hoses, Reinstall, in this Section.

13 Align the torque converter to flexplate orientation marks made before removal of the three attaching bolts.

14 Loosely install a NEW torque converter to flexplate attaching bolt.

15 Rotate the engine harmonic balancer attaching bolt in a clockwise direction only, to align the next torque converter to flexplate attaching bolt hole, then loosely installing a NEW bolt.

16 Repeat Step 9 for the remaining torque to flexplate attaching bolt, then tighten all bolts to the correct torque specification.

Torque converter to flexplate attaching bolt torque specification.....65 Nm

17 Reinstall the lower cover to the torque converter housing (‘5’ in Figure 7E4 – 138).

18 Reinstall the starter motor. Refer to Section 6D1-2 Starting System – V6.

19 Reinstall the transmission wiring harness connector to the transmission control module (TCM) and check that the sealing grommet is correctly installed to the cockpit module from the engine side. Refer to 3.28 Transmission Control Module, in this Section.

20 Remove the tie wire supporting the front propeller shaft.

21 Smear some NLGI No. 2 lithium soap based EP grease with molybdenum disulphide such as Shell Retinax HDX2 grease, BP Energrease LMS-EP 23 or equivalent over the transmission output shaft spigot.

22 Install the propeller shaft front coupling to the output flange, aligning the marks made before removal.

NOTE

Refer to the 'Caution' statement at the beginning of this service operation to determine whether the bolts are to be replaced or not.

23 Install fasteners to secure the coupling to the transmission output flange. Tighten the bolts to the correct torque specification.

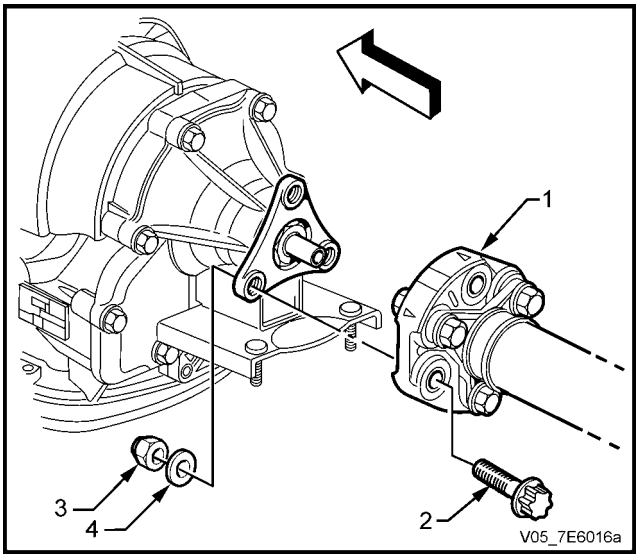


Figure 7E4 – 170

Front propeller shaft coupling nuts or bolts and nuts torque specification.....115 Nm

Front coupling bolts to 'Spiralock' flange threads torque specification .....85 Nm

24 Reinstall the transmission manual shaft lever and its attaching nut.

25 While holding the transmission manual shaft lever with an adjustable wrench, tighten the transmission manual shaft lever retaining nut to the correct torque specification.

Transmission manual shaft lever attaching nut torque specification.....12 Nm

26 Check and adjust the shift control linkage, as required. Refer to 3.2 Selector Linkage – RWD Models, Adjust, in this Section.

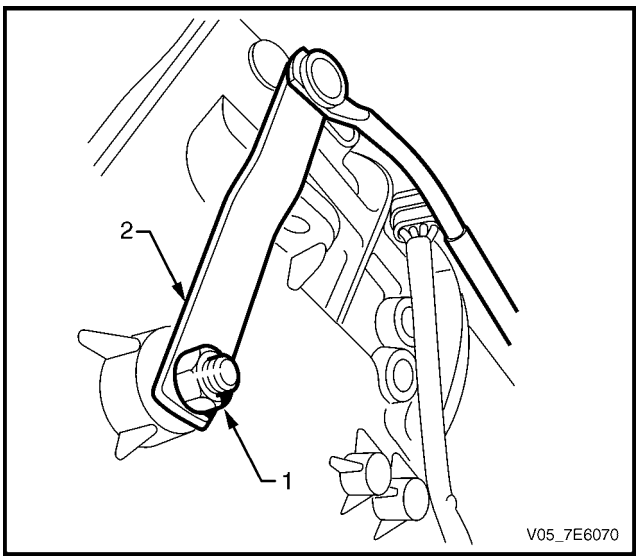


Figure 7E4 – 171

27 Reinstall the exhaust pipes and catalytic converters. Refer to Section 8B Exhaust System.

28 Reinstall the engine thermostat housing and replenish the engine coolant. Refer to Section 6B1 Engine Cooling – V6 Engine.

29 Connect the battery negative cable. Refer to Section 00 Cautions and Notes, 5 Battery Disconnection Procedures.

30 Re-program the transmission control module (TCM). Refer to 3.28 Transmission Control Module (TCM), Programming Procedure, in this Section.

Transmission Final Test and Inspection

Complete the following procedure after the transmission has been installed in the vehicle:

1 Flush the transmission oil cooler, pipes and hoses. Refer to 2.2 Transmission Cooler Reverse Flush and Flow Rate Check, in this Section.

2 Remove the engine control relay. Refer to Section 6C1-1 Engine Management – V6 – General Information for the location of this relay.

3 Crank the engine several times and listen for any unusual noises or evidence that any parts are binding.

4 Reinstall the engine control relay, start the engine and listen for any abnormal conditions.

5 With the engine running at idle speed, raise the vehicle and support in a safe manner. Refer to Section 0A General Information for the location of recommended lifting and support points.

6 With the engine continuing to run at idle speed, inspect under the vehicle for any fluid leaks. Correct any condition not considered to be to specification.

7 Check the transmission fluid level, topping up as required. Refer to 2.1 Transmission Fluid Check, in this Section.

8 Lower vehicle to the ground.

9 Perform a final inspection of all fluid levels.

10 Road test the vehicle to ensure correct operation.

3.30 Torque Converter and/or Seal

Replace

1 Remove the transmission from the vehicle. Refer to 3.29 5L40E – Automatic Transmission, in this Section.

WARNING

Take care when removing the torque converter as it is a heavy assembly (approximately 12 kilograms) and personal injury may result if lifted incorrectly.

2 Remove the torque converter assembly (1) by sliding it clear of the input turbine shaft. Drain fluid stored into the converter, into a suitable container.

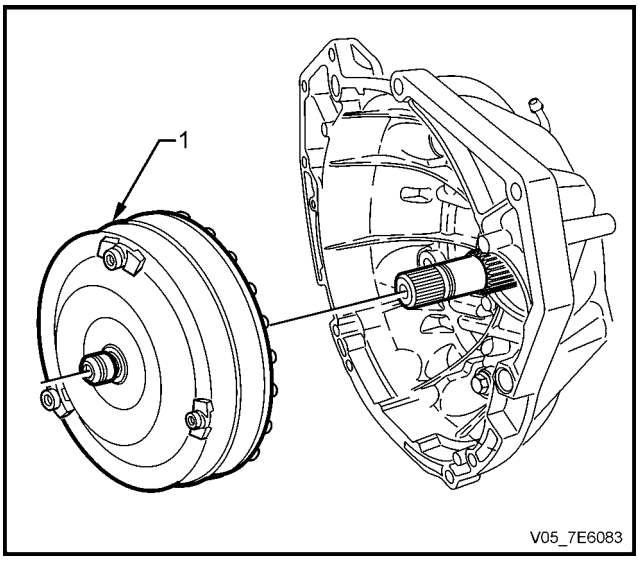


Figure 7E4 – 172

3 Using a fine bladed screwdriver, lever out and remove the input turbine shaft seal (430). Discard the removed O-ring.

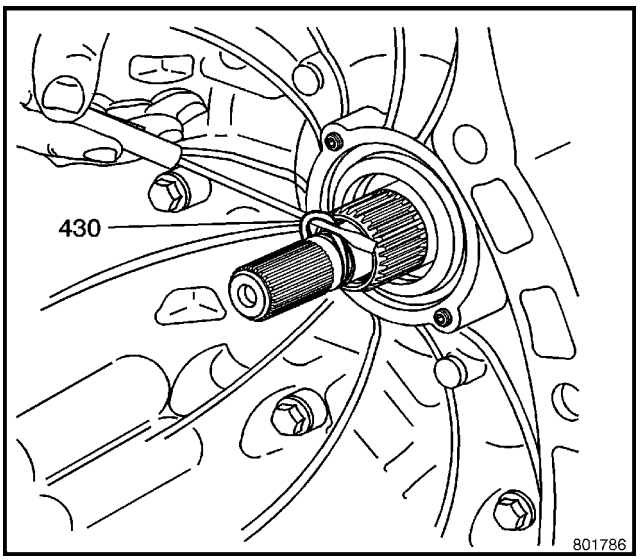


Figure 7E4 – 173

4 Remove the two screws (1), using Torx bit T20 and suitable equipment.

5 Remove the torque converter seal (2) using Tool J 45000 (as shown), E308 or commercial equivalent.

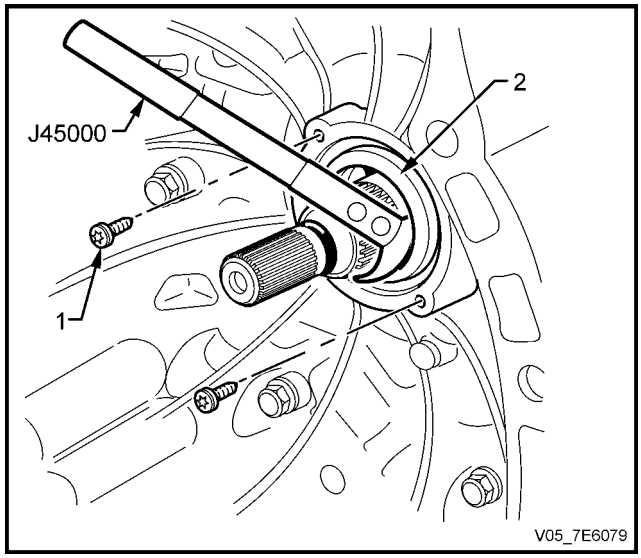


Figure 7E4 – 174

6 Assemble driver, Tool J 8092 to seal installer, Tool J 44766.

NOTE

Install the seal onto the installation tool before installing into the case to prevent damage to the seal lips.

7 Lubricate the lips of a new oil seal (229) with clean automatic transmission fluid (Dexron III ®).

8 Install the seal (229) onto installer, Tool J 44766.

9 While aligning the retaining screw holes, install the new seal (229) into the housing (3).

10 Install new seal screws (228) and tighten to the correct torque specification.

Torque converter seal to housing screw torque specification.....3.6 Nm

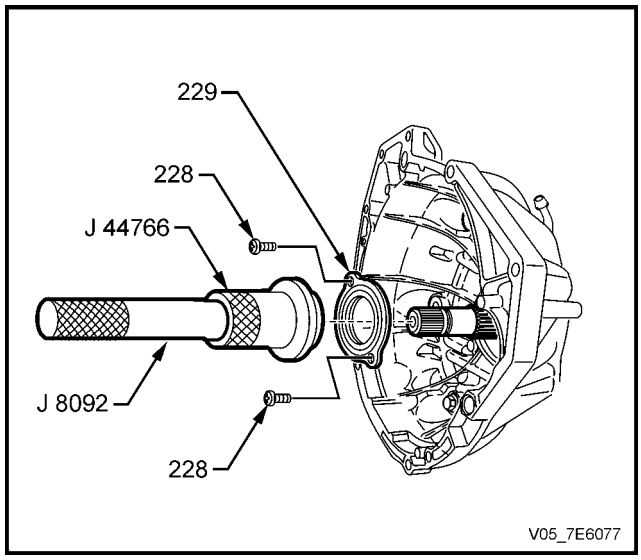


Figure 7E4 – 175

11 Lubricate a NEW input shaft O-ring seal (430) with transmission fluid and install to the groove provided.

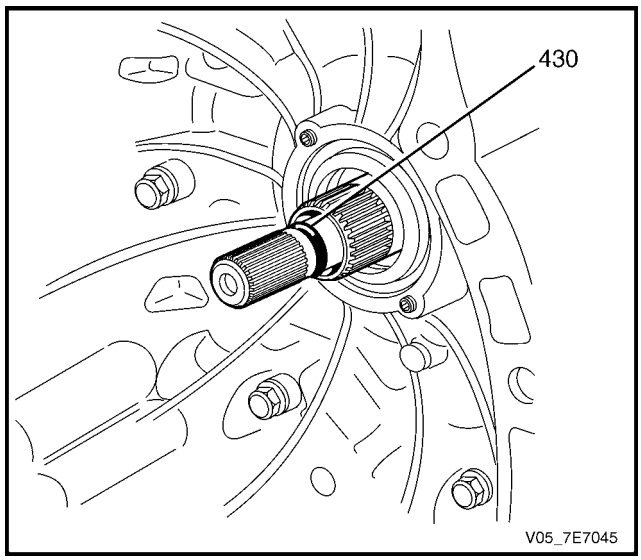


Figure 7E4 – 176

12 Lubricate the seal running area of the torque converter hub with clean, Dexron III™ transmission fluid.

13 Reinstall the torque converter assembly (1) by sliding it onto the input turbine shaft.

14 Rotate the torque converter back and forth to ensure spline engagement and full installation.

15 Lubricate the torque converter spigot with a smear of an NLGI No. 2 lithium soap based EP grease with molybdenum disulphide, such as Shell Retinax HDX2 grease or BP Energrease LMS-EP 23 (or equivalent).

16 Reinstall the transmission, refer to 3.29 5L40-E Automatic Transmission, Reinstall, in this Section.

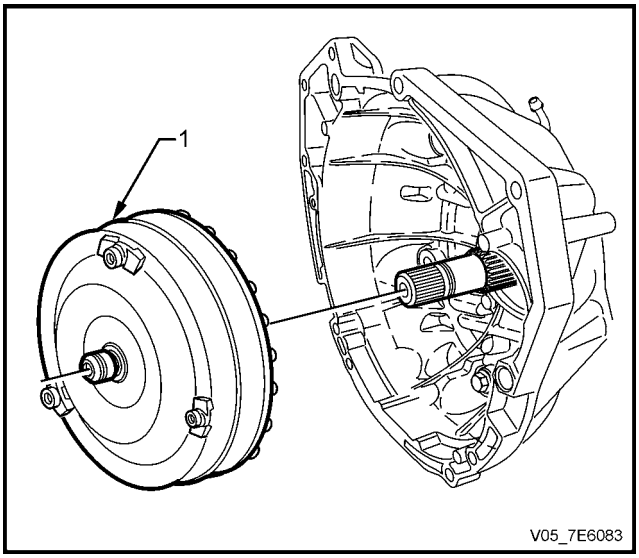


Figure 7E4 – 177

4 Specifications

NOTE

Only those specifications related to the service operations contained in this Section, are listed here.

General

Type		Hydra-matic 5L40-E
Transmission Model Application	HFV6 3.6 litre Petrol (RWD – P/O LY7)	5HAG
	HFV6 3.6 litre Petrol (AWD – P/O LY7)	5HBG
	HFV6 2.8 litre Petrol (P/O LP1)	5HEG
Special Features		Electronically controlled shift pattern, feel and torque converter operation
Selector Location		Floor mounted console

Gear Ratios

Park (P)	–
Reverse ®	3.03:1
Neutral (N)	–
5th Gear (D)	0.75:1
4th Gear (4)	1.00:1
3rd Gear (3)	1.60:1
2nd Gear (2)	2.21:1
1st Gear (L)	3.42:1

Shift Speeds

Refer to Automatic Transmission – Section 7E3 – 5L40-E – Hydraulic and Mechanical Diagnosis.

Fluid Pressure

Refer to Automatic Transmission – Section 7E3 – 5L40-E – Hydraulic and Mechanical Diagnosis.

Torque Converter

Number of Elements		3 plus torque converter clutch
Maximum Torque Ratio at Stall	3.6 litre petrol engine (P/O LY7)	1.90:1 (k=149)
	2.8 litre petrol engine (P/O LP1)	1.76:1 (k=163)
Nominal Diameter	3.6 litre petrol engine (P/O LY7)	258 mm
	2.8 litre petrol engine (P/O LP1)	245 mm

Lubricant

Type Recommended	Dexron® III
Total (Dry)	8.5 litres
Service Refill (Approximate for an 'On-Car' situation)	4.6 litres
Fluid Cooling	Engine coolant to fluid in right side radiator tank

Electrical Component Resistance Specifications

Component	Circuit Number	Wire Colour	Inline Connector Pin	Resistance at 20°C	Resistance at 70°C	Resistance to Ground (Transmission Case)
1 – 2 Shift Solenoid Valve	1525	WH	17	15.0 – 17.0 Ω	17.9 – 20.3 Ω	Greater than 50 kΩ
	1222	BK	14			
2 – 3 Shift Solenoid Valve	1525	WH	17	15.0 – 17.0 Ω	17.9 – 20.3 Ω	Greater than 50 kΩ
	1223	BU	9			
4 – 5 Shift Solenoid Valve	1525	WH	17	15.0 – 17.0 Ω	17.9 – 20.3 Ω	Greater than 50 kΩ
	898	GY	5			
Pressure Control Solenoid Valve	1228	GN	13	3.5 – 4.6 Ω	4.2 – 5.5 Ω	Greater than 50 kΩ
	1229	WH	8			
TCC PWM Solenoid Valve	1525	WH	17	10.0 – 11.5 Ω	11.8 – 13.6 Ω	Greater than 50 kΩ
	422	YE	20			
Input Speed Sensor	1230	YE	18	325 – 485 Ω	385 – 575 Ω	Greater than 50 kΩ
	1231	WH	15			
Output Speed Sensor	400	OR	1	325 – 485 Ω	385 – 575 Ω	Greater than 50 kΩ
	401	WH	3			
TFT Sensor	1227	RD	10	Refer to following chart for TFT Sensor Resistance Specifications		
	2762	WH	6			
All wire colours are internal to the transmission						

Transmission Fluid Temperature (TFT) Sensor Resistance Specifications

Temperature (°C)	Minimum Resistance (Ω)	Nominal Resistance (Ω)	Maximum Resistance (Ω)
-40	89 500	100 000	110 500
-30	46 419	51 400	56 381
-20	25 120	27 610	30 100
-10	14 160	15 450	16 740
0	8 278	8 972	9 666
10	5 005	5 391	5 777
20	3 120	3 342	3 564
30	2 000	2 132	2 264
40	1 317	1 397	1 477
50	888	938	988
60	613	645	677
70	432	453	474
80	310	324	338
90	228	237	246
100	170	176	182
110	128	132	136
120	98	101	104
130	77	79	81
140	60	62	64
150	48	49	50

5 Torque Wrench Specifications

NOTE

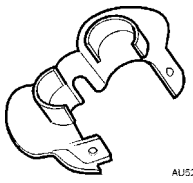
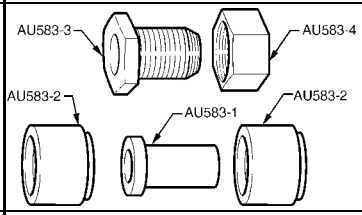
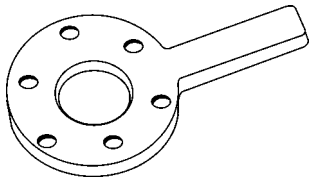
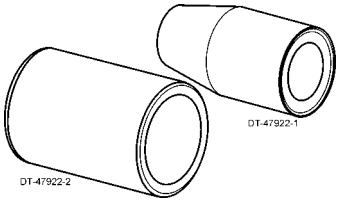
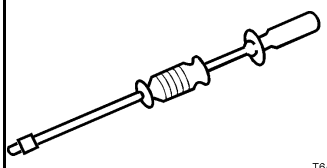
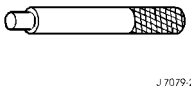
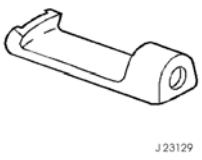
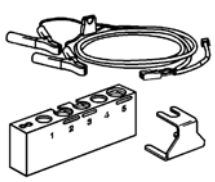
Only those torque specifications quoted in this Section, are listed here.

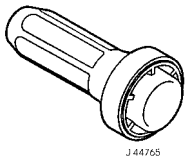
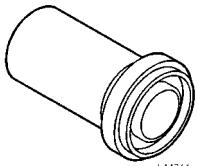
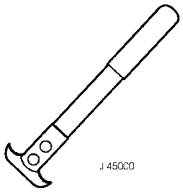
Catalytic converter bracket to adaptor housing bolt	25 Nm
Catalytic converter bracket to catalytic converter nut	25 Nm
Cooler pipe tube nut to cooler fitting	25 Nm
Close-out cover screw	14 Nm
Control valve body assembly to transmission case bolt	11 Nm
Crossmember to side rail bolt	58 Nm
Drain plug	20 Nm
Extension housing retaining bolt	22 Nm
Filler plug	20 Nm
Fluid cooler pipe bracket bolt to alternator bracket	20 Nm
Fluid cooler pipe flange bolt to transmission case torque	20 Nm
Fluid pan bolt	11 Nm
Front propeller shaft coupling attaching bolt or bolts and nuts	115 Nm
Front propeller shaft coupling bolts to ‘Spiralock’ flange threads	85 Nm
Input speed sensor retaining screw	11 Nm
Manual shift shaft lever retaining nut	12 Nm
Manual shaft detent spring bolt	11 Nm
Oil cooler pipe to radiator fitting	25 Nm
Output flange retaining nut	60 Nm
Output speed sensor retaining screw	11 Nm
Pressure test plug	11 Nm
Rear crossmember to transfer case bracket bolt (AWD only)	54 Nm
Rear crossmember to underbody side rail bolt (AWD only)	54 Nm
Shift cable bracket to floor pan nut (AWD only)	15 Nm
Shift selector lever locking bolt	30 Nm
Shift selector base retaining nut	15 Nm
Torque converter oil seal to front housing retaining screw	4 Nm
Torque converter to flexplate attaching bolt	65 Nm
Transfer case mounting bracket to underbody bolt (AWD only)	58 Nm
Transfer case mount to bracket bolt (AWD only)	100 Nm
Transmission mount to crossmember nut	25 Nm
Transmission mount plate to extension housing bolt	55 Nm
Transmission mount to mount plate nut	55 Nm
Transmission to engine bolt (See text for details)	60 Nm

6 Special Tools

NOTE

Only those special tools quoted in this Section, are listed here.

Tool Number	Illustration	Description	Classification
AU 525		**Quick Connect Release Tool** Used to release the quick connect fittings on the automatic transmission fluid cooler lines at the radiator end. Previously released.	Unique
AU 583		**Selector Shaft Seal Remover/ Installer** Used to remove and install the manual shaft oil seal with the transmission installed in the vehicle. Previously released.	Unique
DT-47735		**Holding Tool** Used to hold the final drive pinion flange when loosening/tightening the pinion nut. New release	Unique
DT-47922		**Seal Protector/Installer** Used to protect the AWD extension housing seal and to install the seal. AWD with 5L40-E transmission only. New release	Unique
J 6125-1B		**Slide Hammer & Adaptor** Used in conjunction with seal remover, J 23129 to remove both fluid filter seals from the fluid pump Previously released.	Unique
J 8092		**Driver Handle** Used in conjunction with J 44766 to install new torque converter seal Previously released	Unique
J 23129		**Universal Seal Remover** Used in conjunction with slide hammer J 6125-1B to remove fluid seals. New release.	Unique
J 44246		**Solenoid Testing Kit** Used to test the shift solenoid valves for leakage. New release	Available

Tool Number	Illustration	Description	Classification
J 44765	 J 44765	**Seal Installer** Used to install the extension housing, propeller shaft oil seal (RWD only). New release	Unique
J44766	 J 44766	**Seal Installer** Used in conjunction with driver handle J 8092 to install new torque converter seal. New release.	Unique
J 45000	 J 45000	**Seal Remover** Used to remove lipped seals. Also released as E308 and is commercially available. New release.	Available