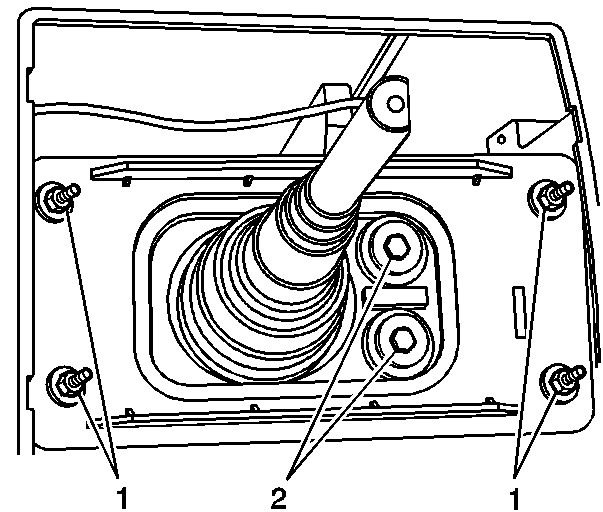
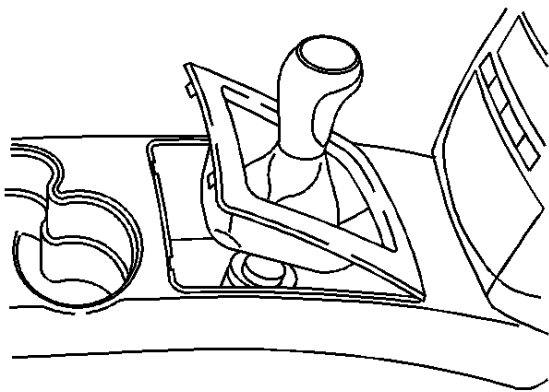


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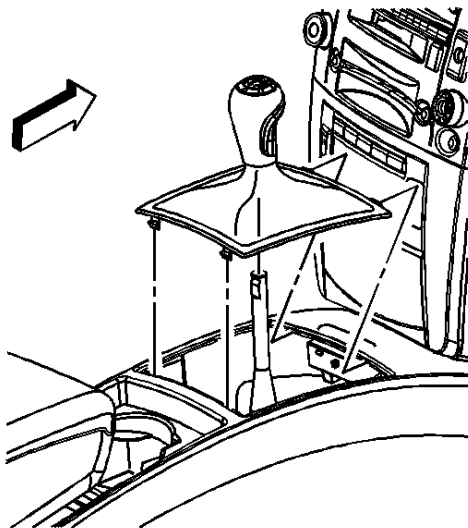
Short-throw Shifter Installation Guide

Removal Procedure



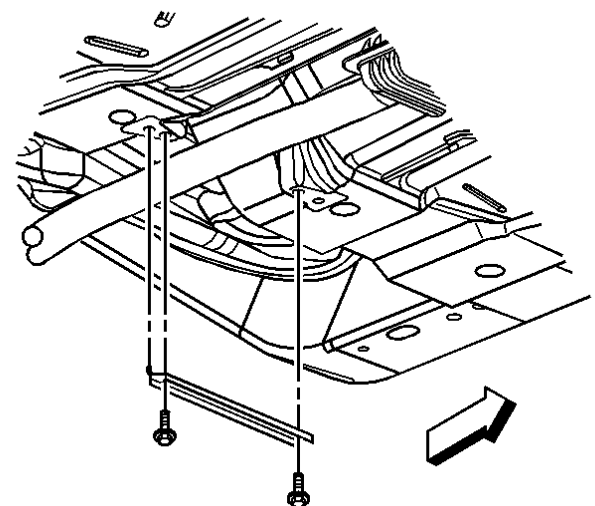
1) Remove the shift control knob.

- A. Lift up on the rear portion of the shift control closeout boot retaining ring and detach the retaining ring from the console.



3) Remove the bolts (2) securing the shift control assembly to the shift control adapter plate.

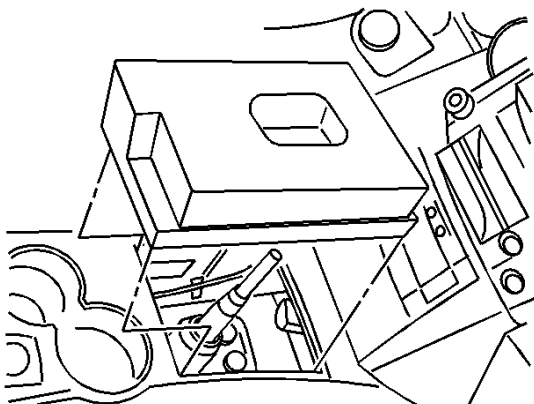
- 4) Raise the vehicle.
5) Remove the exhaust system.



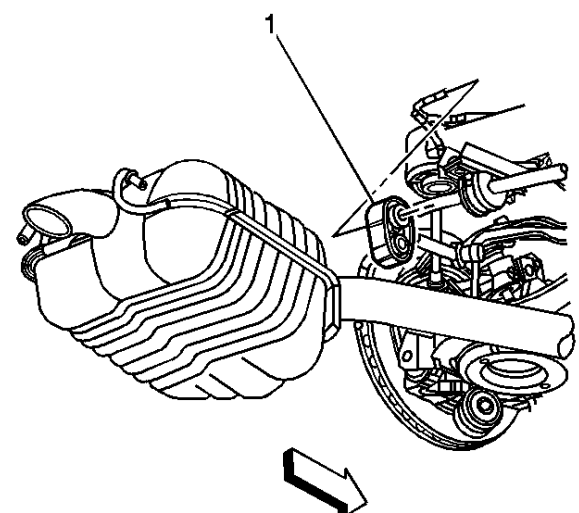
Important

Detaching the shift control knob from the shift lever may require a large amount of physical effort.

- B. Firmly grasp the shift control knob and pull straight up to detach the shift control knob from the shift lever.
C. Remove the shift control closeout boot and knob assembly.

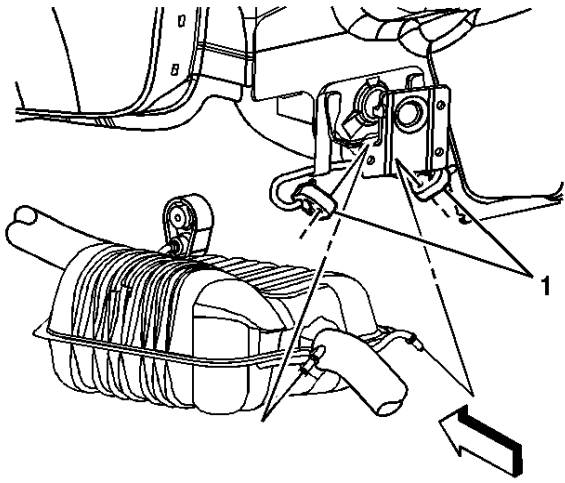


- A. Remove the 2 bolts securing the floor panel tunnel brace to the floor panel.
B. Remove the floor panel tunnel brace from the floor panel.
C. Suitably support the exhaust system.
D. Remove the exhaust pipe nuts securing the exhaust pipes to the catalytic converters

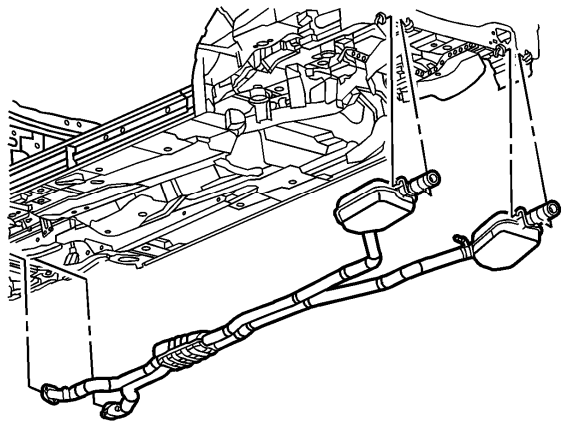


2) Remove the sound insulator foam block from the console.

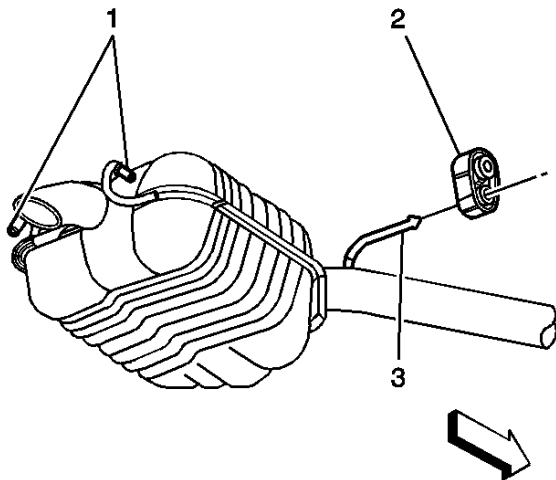
E. Pry the front exhaust hangers (1) free from the rear suspension hanger rods.



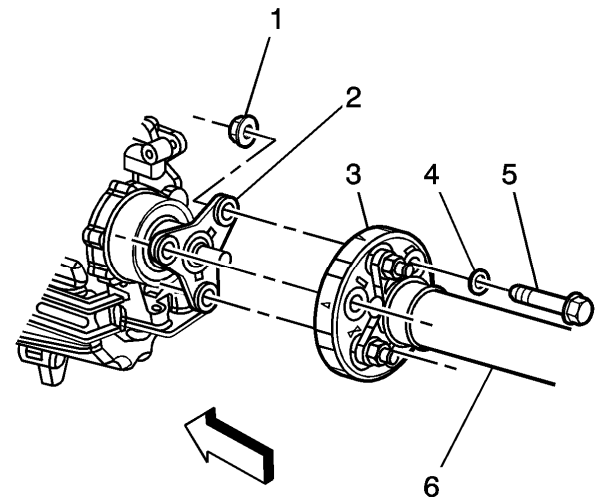
- F. Apply a suitable lubricant to the tail pipe hanger rods in order to ease the removal of the tail pipe hangers (1).
 G. Pry the tail pipe hangers (1) free from the tail pipe hanger rods.



- H. With the aid of an assistant, lower the exhaust system.
 I. Remove the catalytic converter seals. Do not reuse the seals.



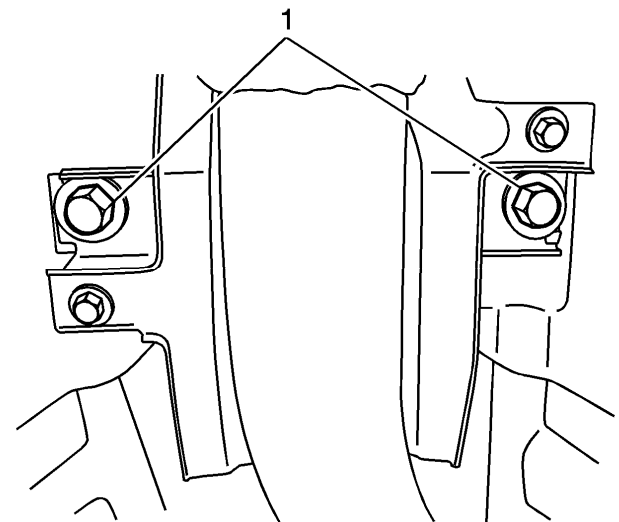
- J. While the exhaust system is on the floor complete the following:
 (1) Apply a suitable lubricant to the exhaust pipe hanger rods (3) in order to ease the removal of the front exhaust hangers (2).
 (2) Pull the front exhaust hangers (2) from the exhaust pipe hanger rods.



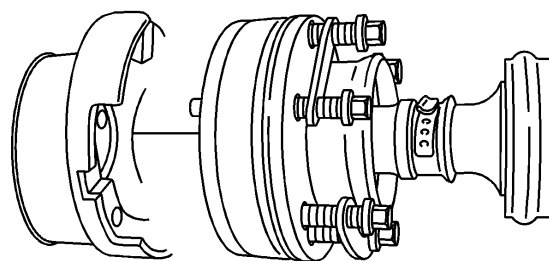
6) Remove the propeller shaft (6).

Notice

The propeller shaft must be supported during removal and/or installation so that the CV joint does not articulate more than 8 degrees. Allowing the propeller shaft to articulate greater than 8 degrees could cause damage to the CV boot. Damage to boot could lead to contamination or loss of lubrication which could lead to CV joint damage.

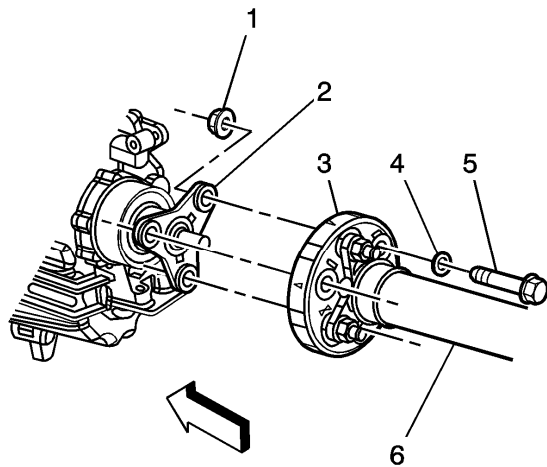


- A. Remove the bolts (1) securing the support bearing to the vehicle underbody.



- B. Reference mark the location of the propeller shaft CV joint to the differential flange.

C. Remove the propeller shaft CV joint-to-differential flange bolts.

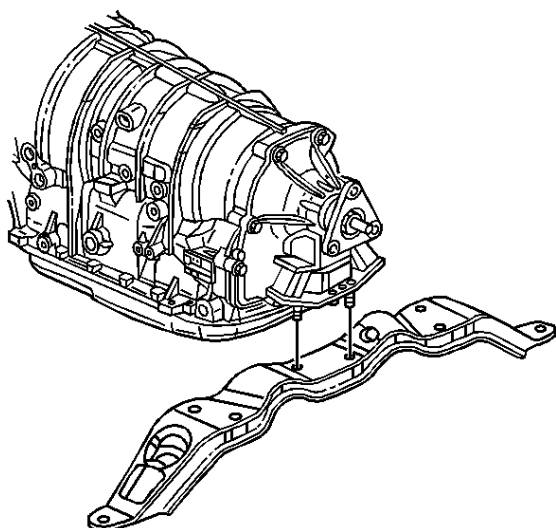


Important

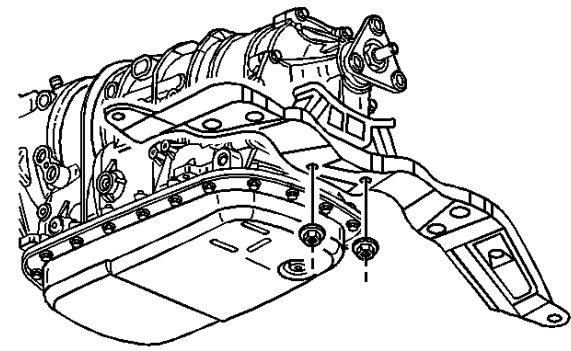
Remove only the propeller shaft coupler-to-transmission flange bolts. Do NOT remove the coupler from the propeller shaft.

- D. Remove the propeller shaft coupler-to-transmission flange bolts (5), nuts (1) and washers (4).
- E. Move the propeller shaft toward the front of the vehicle in order to release the propeller shaft CV joint from the differential flange.
- F. While holding the propeller shaft, lower the support device under the propeller shaft.
- G. Move the propeller shaft rearward to release the coupler from the transmission flange.
- H. Remove the propeller shaft from the vehicle.
- I. Inspect the propeller shaft coupler for the following conditions:
 - a. Splitting of the coupler
 - b. Deep cracking. Minor superficial cracking of the coupler is acceptable
 - c. Distorted or missing mounting bolt bushings
- J. If any of the above conditions are found, the propeller shaft requires replacement.
- K. If the propeller shaft coupler shows signs of heat related damage check for the following:
 - a. Exhaust system alignment or wear
 - b. Powertrain mount alignment or wear
- L. Inspect the propeller shaft CV joint assembly for the following conditions:
 - a. Grease leaking from the CV joint
 - b. Damage to the CV joint
 - c. Damage to the CV joint boot
- M. If any of the above conditions are found, the propeller shaft requires replacement.
- N. Inspect the propeller shaft-to-flange nuts, bolts, and washers. Replace if damaged or worn.

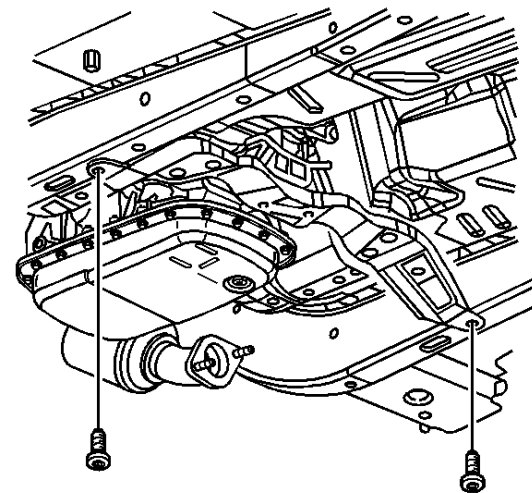
7) Support the transmission with a suitable jack.



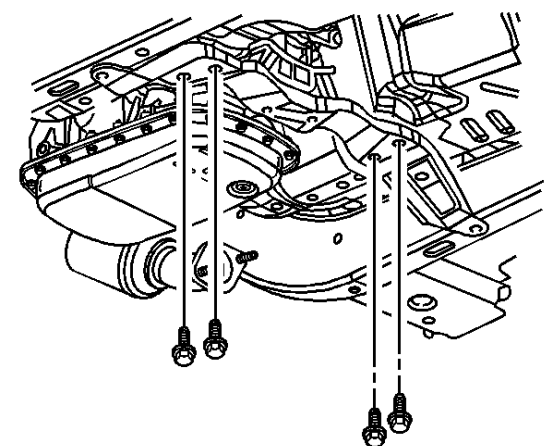
8) Remove the transmission support.



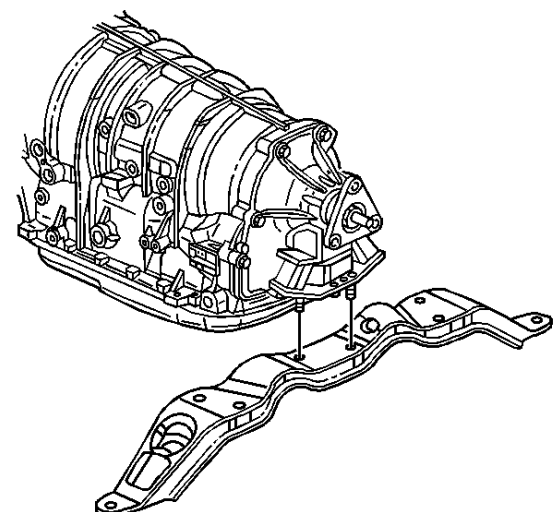
- A. Remove the transmission mount lower mounting nuts.
- B. Support the transmission with a screw jack and block of wood.



- C. Remove the outer transmission mounting bolts.

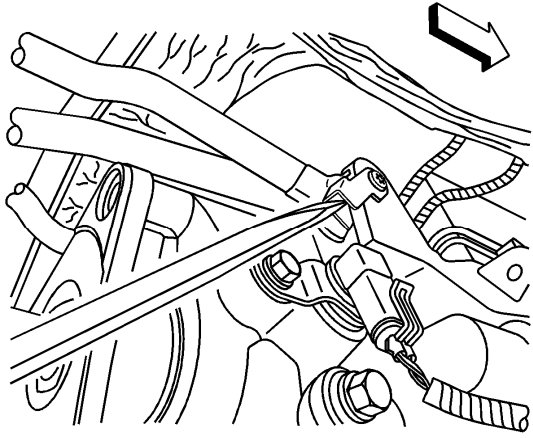


- D. Remove the inner transmission mounting bolts.

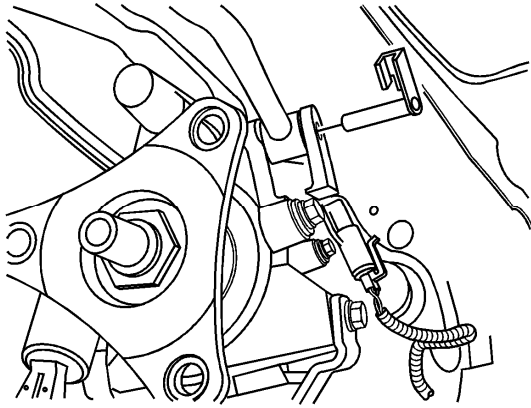


- E. Remove the transmission support from the vehicle.

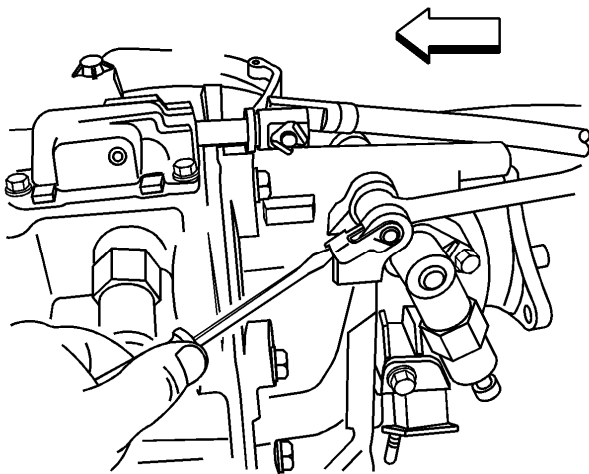
9) Lower the transmission assembly to gain access to the top of the transmission.



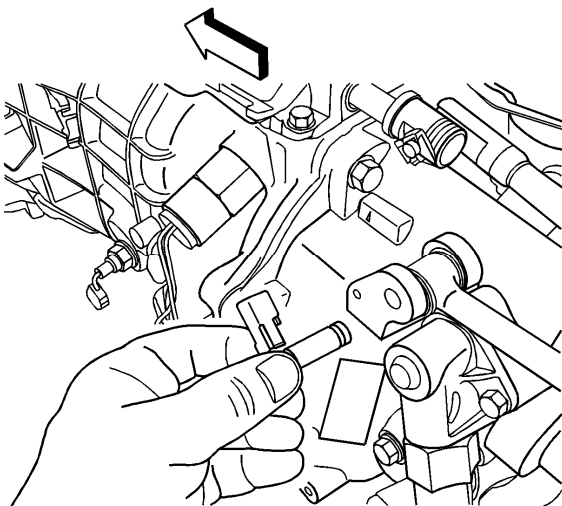
10) Using a flat blade tool, release the right side shift control rod pin retainer.



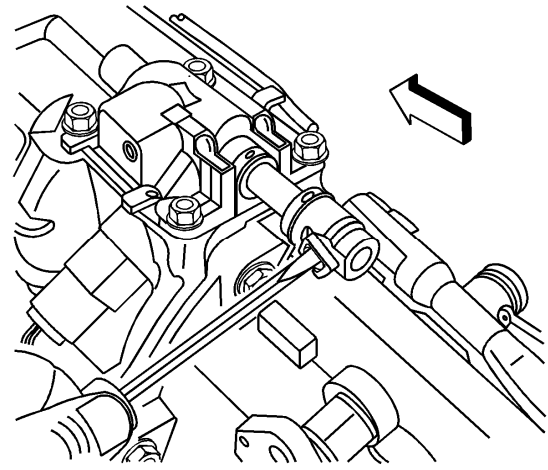
11) Remove the shift control rod pin.



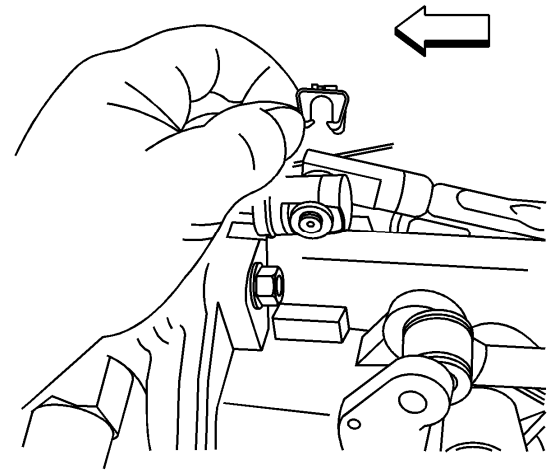
12) Using a flat blade tool, release the left side shift control rod pin retainer. The graphic shows the transmission removed for clarity.



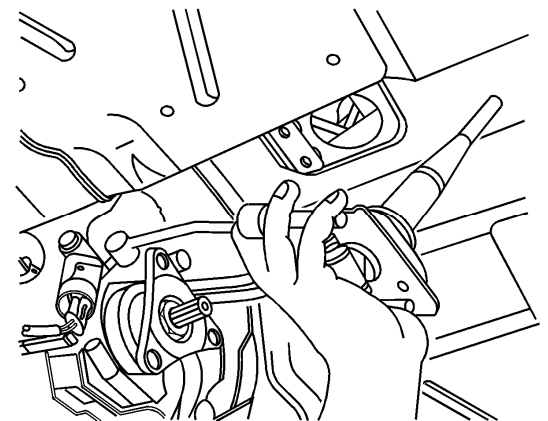
13) Remove the shift control rod pin.



14) Using a flat blade tool, release the center shift control rod pin retainer. The graphic shows the transmission removed for clarity.



15) Remove the center shift control rod pin retainer.



16) Remove the shift control assembly from the transmission. Remove the shift control assembly from the vehicle.



17) After noting the orientation of the horizontal shift rod, remove the shift rod from the shift lever.



18) After removing the shifter assembly from the vehicle, secure the shifter baseplate and prepare to drill out the two rivets that retain the shifter cover to the baseplate with the supplied 5/16 drill. Debur the drilled out rivet holes.



22) Using supplied 1/16" roll pin punch, drive out the roll pin retaining the T-shaped shifter end.



19) Pull up on the shifter to remove the shifter and shifter cover from the baseplate.



23) Remove the shifter boot black seal from old shifter. Lubricate linkage end of shifter and slide boot over new shifter as shown.



24) Install removed bushing, seals and spacer onto shift rod end of shifter.



20) Remove the nylon collar from the shifter



21) Remove the bushing, seals and spacer from the end of the shifter



25) Install half of the removed nylon collar as shown with the shift lever sphere positioned near the top of the collar. Apply a light coating of grease to the sphere surface and snap the other half of the collar in place.



- 26) Place the shift lever into the base plate and place the top retaining plate over the shift lever till it contacts the base plate.

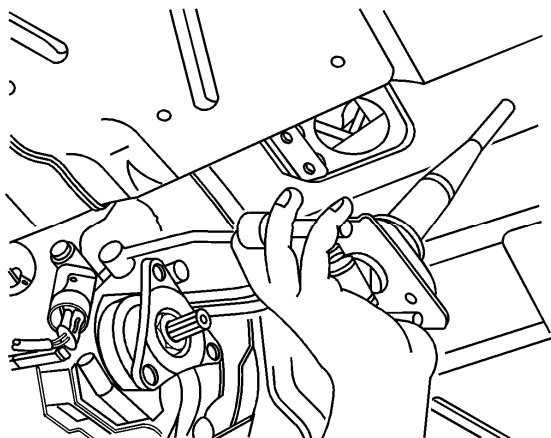


- 27) Insert the supplied pan head bolt through the top retaining plate rivet holes and secure underneath the baseplate with supplied flanged nuts.

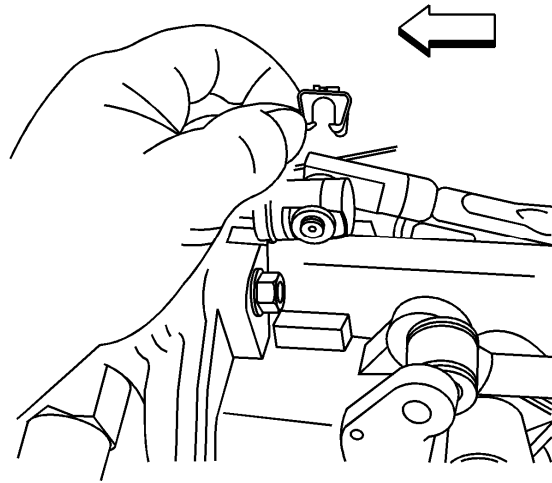


- 28) Reinstall shift rod onto shift lever, noting correct shift rod position and that the flat portion of the shift lever labeled FRONT is facing the front of the vehicle.

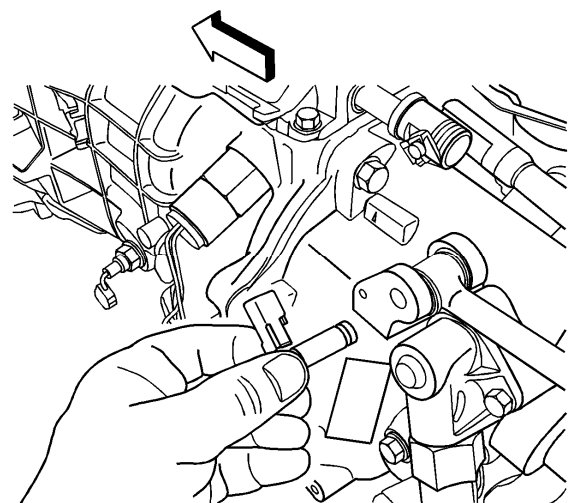
Installation Procedure



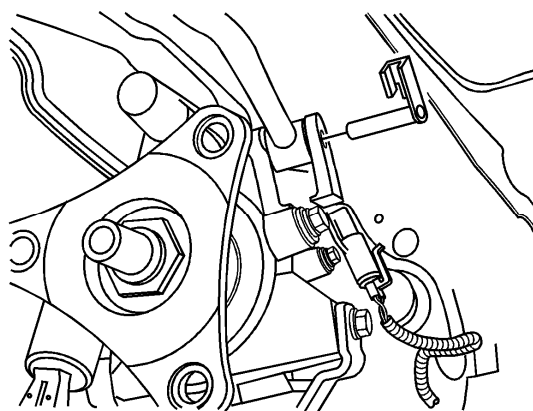
1. Install the shift control assembly to the transmission.



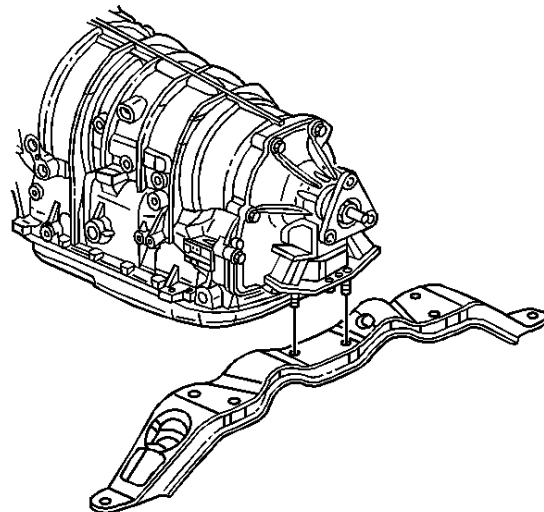
2. Install the center shift control rod pin retainer.



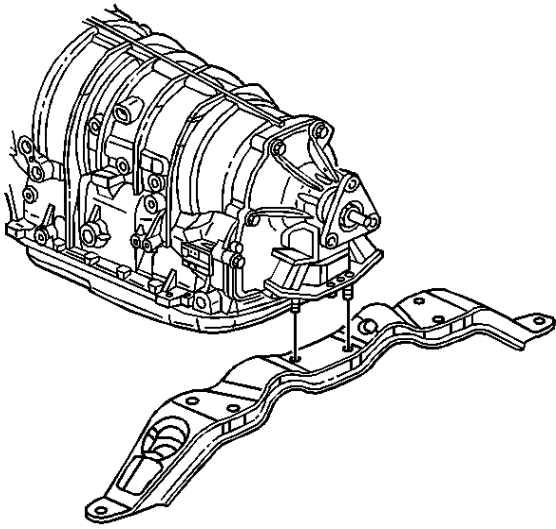
3. Install the left side shift control rod pin. Rotate the pin in order to lock the retainer into place on the transmission.



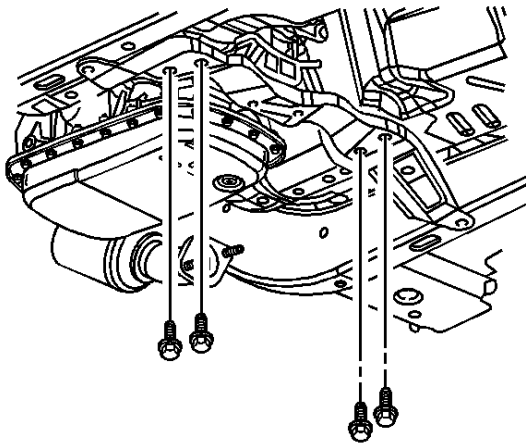
4. Install the right side shift control rod pin. Rotate the pin in order to lock the retainer into place on the transmission.



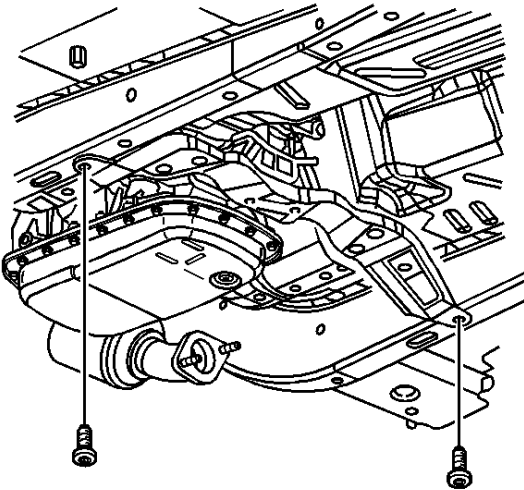
5. Raise the transmission.
6. Install the transmission support.



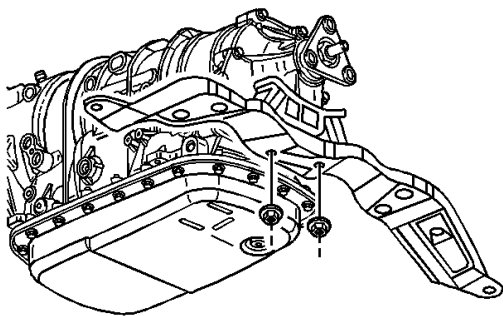
A. Install the transmission support to the vehicle.



B. Install the inner transmission support mounting bolts. Do not tighten at this time.

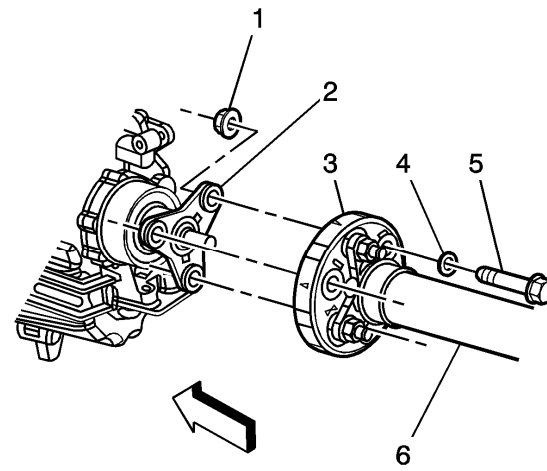


C. Install the outer transmission mounting bolts. **Tighten**
Tighten all the support bolts to 60 N·m (44 lb ft).
D. Remove the screw jack.



E. Install the transmission mount lower mounting nuts. **Tighten**
Tighten the nuts to 60 N·m (44 lb ft).

7. Remove the jack supporting the transmission.



8. Install the propeller shaft (6).

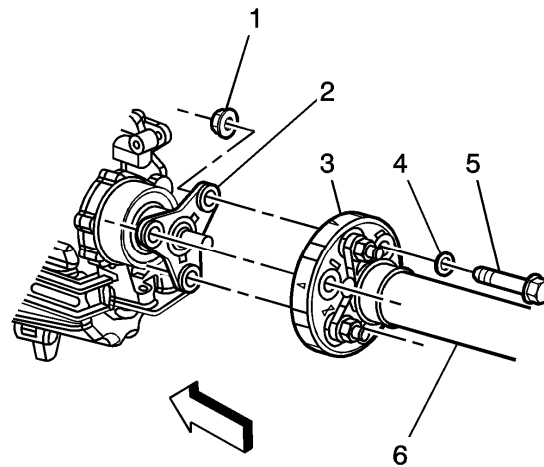
A. Using a clean shop cloth clean the following:

- Transmission flange centering pin
- Propeller shaft centering bushing

Important

The propeller shaft flange bolts must be installed toward the flanges.

B. Using a suitable jack support the propeller shaft close to the support bearing.
C. Using a suitable jack, and/or heavy mechanical wire support the front propeller shaft close to the rear CV joint.
D. Apply a small amount of lubricant GM P/N 1051344 (Canadian P/N 993037), or equivalent, to the propeller shaft centering bushing.



E. Install the front propeller shaft coupler (3) to the transmission flange (2).
F. Push the propeller shaft (6) to the front of the vehicle and install the propeller shaft to the differential flange.

Important

If reusing the propeller shaft-to-flange nuts and bolts, to ensure proper adhesion and fastener retention, the threads must be free of debris prior to the application of the threadlocker.

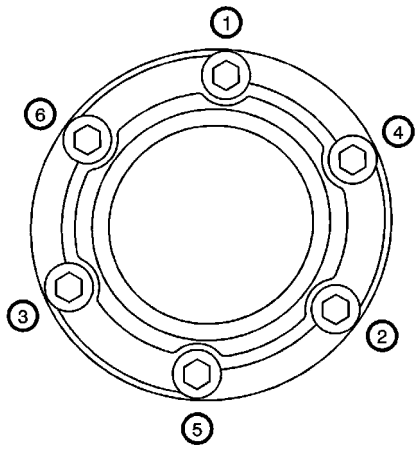
G. Thoroughly clean the threads using denatured alcohol, or equivalent, and allow to dry. Apply Threadlocker GM P/N 12345493 (Canadian P/N 10953488), or equivalent, to the propeller shaft-to-flange bolt. Ensure that there are no gaps in the threadlocker along the length of the filled area of the bolt. Allow the threadlocker to cure approximately 10 minutes before installation.
H. Install the propeller shaft coupler-to-differential flange washers (4) to the propeller shaft coupler-to-transmission flange bolts (1).
I. Install the propeller shaft coupler-to-transmission flange bolts (5) and washers (4) to the differential flange (2) and propeller shaft coupler (3).
J. Install the propeller shaft coupler-to-differential flange nuts (1).
Tighten
Tighten the bolts to 85 N·m (63 lb ft).

Important

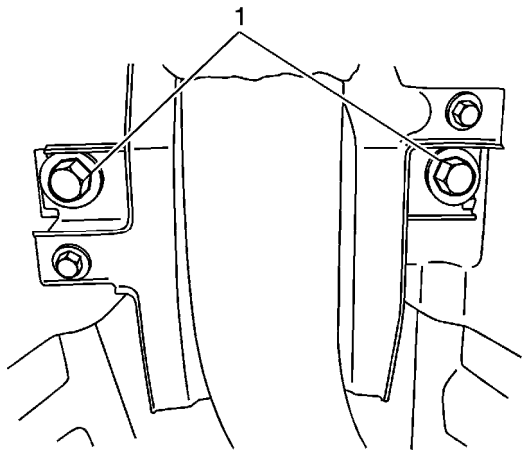
If reusing the propeller shaft-to-flange nuts and bolts, to ensure proper adhesion and fastener retention, the threads must be free of debris prior to the application of the threadlocker.

K. Thoroughly clean the threads using denatured alcohol, or equivalent, and allow to dry. Apply Threadlocker GM P/N 12345493 (Canadian P/N 10953488), or equivalent, to the propeller shaft-to-flange bolt. Ensure that there are no gaps in the

threadlocker along the length of the filled area of the bolt. Allow the threadlocker to cure approximately 10 minutes before installation.

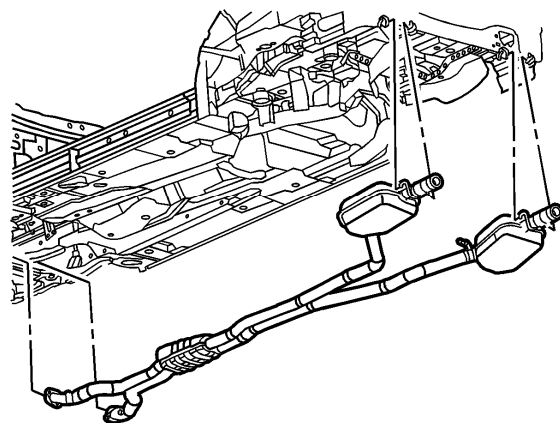


- L. Install the propeller shaft CV joint-to-differential flange bolts.
Tighten
 Tighten the bolts in sequence (1-6) to 60 N·m (44 lb ft).



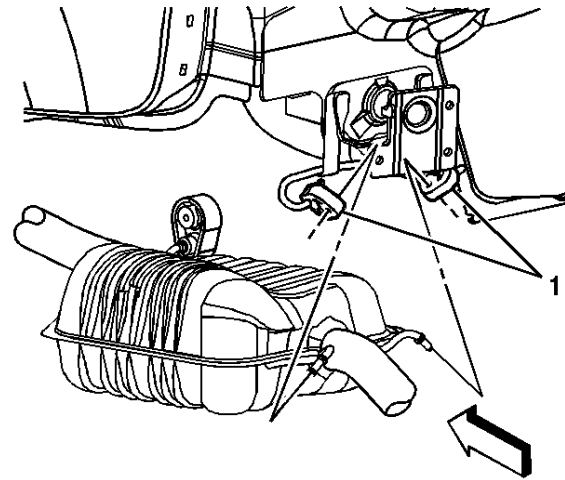
- M. Raise the support device in order to hold the support bearing in position.
 N. Install the center support bearing bolts (1) to the vehicle underbody. **Tighten**
 Tighten the nuts to 50 N·m (37 lb ft).

9. Install the exhaust system.

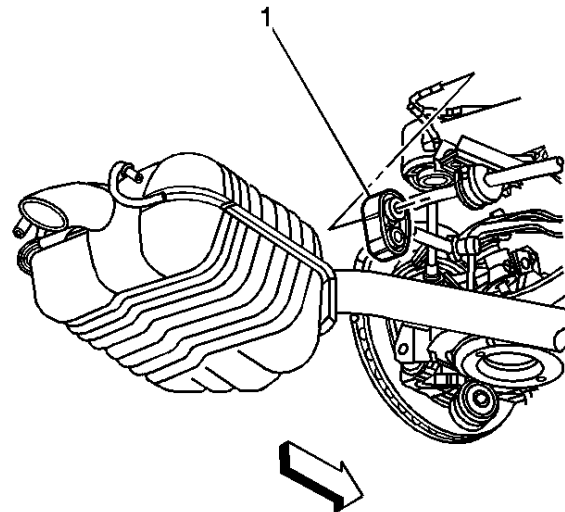


- A. While the exhaust system is on the floor complete the following:
1. Apply a soapy solution to the following in order to ease the installation of the hangers:
 - The inner diameter of the front exhaust hangers (2)
 - The exhaust pipe hanger rods (3)
 - The inner diameter of the tail pipe hangers
 - The tail pipe hanger rods (1)
 2. Press the front exhaust hangers (2) over the exhaust pipe hanger rods (3).
- A. Place NEW seals on the catalytic converter flanges.
 B. With the aid of an assistant, raise the exhaust system into position, aligning the exhaust pipe flanges with the studs located in the rear of the catalytic converters.

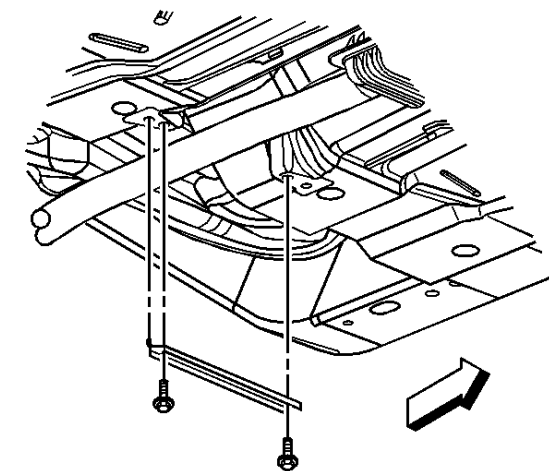
- C. Finger tighten the exhaust pipe nuts to the catalytic converter studs.



- D. Press the tail pipe hangers (1) over the tail pipe hanger rods.



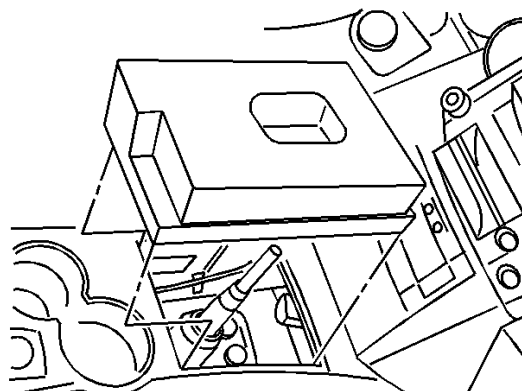
- E. Press the front exhaust hangers (1) over the rear suspension hanger rods.
 F. Tighten the exhaust pipe nuts. **Tighten**
 Tighten the nuts to 30 N·m (22 lb ft).



- G. Position the floor panel tunnel brace to the floor panel.
 H. Install the 2 bolts securing the floor panel tunnel brace to the floor panel. **Tighten**
 Tighten the bolts to 25 N·m (18 lb ft).

10. Lower the vehicle.

11. Install the bolts securing the shift control assembly to the adapter plate. Tighten
 Tighten the shift control bolts to 18 N·m (13 lb ft).



12. Install the sound insulator foam block into the console.

13. Modify and install the shift control knob.



A. Place flat washer over threaded end of shifter.



B. Remove shift knob retaining clip located underneath the shifter boot by depressing the two tabs on the shift knob with needle nose pliers. Discard removed retaining clip. Remove shift knob from shifter boot.



C. Cut off bottom of shift knob collar so that it is flush with leather portion of shift knob bottom



D. Place supplied tap (5/8x16NF) into a vise and proceed to tap the shifter knob hole till tap bottoms in shifter knob hole. Remove any plastic chips from shifter knob hole.



E. Install shifter boot over shifter and snap boot retainer ring into console opening. Install and carefully tighten thin nut onto threaded end on new shifter to secure shift boot to shifter shaft. Thread shift knob onto threaded end of shifter. Rotate knob as required to properly orient shift knob shift pattern.

If you have any questions or comments regarding the installation of your new Katech short-throw shifter, please contact us at: LS1@katechengines.com

Shifter removal and installation procedure and illustrations are courtesy of the GM Service Publication Group © 2004. Shifter modification and Katech shifter lever installation ©2005 Katech.

Short Throw Shifter Parts List

<u>Item</u>	<u>Quantity</u>
Shifter- aluminum or stainless steel	1
Washer-shift knob	1
Nut-shift knob	1
Bolt-5/16X24X1/2 button head socket cap	2
Nut-jet 5/16-24	2
Seal-exhaust manifold	2
Tap-5/8-18NF	1
Drill-5/16	1
Punch-pin 1/16	1