

**ATTENTION:**

GENERAL MANAGER ☐  
 PARTS MANAGER ☐  
 CLAIMS PERSONNEL ☐  
 SERVICE MANAGER ☐

IMPORTANT - All  
 Service Personnel  
 Should Read and  
 Initial in the boxes  
 provided, right.


QUALITY DRIVEN® SERVICE



**SUBARU**

## SERVICE PROCEDURE

**APPLICABILITY:** 2010MY Legacy and Outback  
**SUBJECT:** Steering Wheel Vibration at  
 Highway Speeds


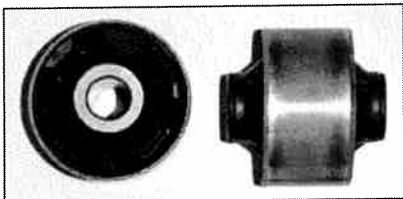
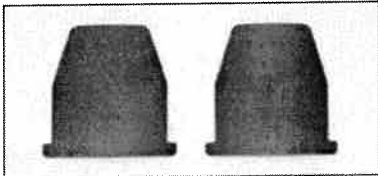

**NUMBER:** 05-48-10  
**DATE:** 07/26/10

### INTRODUCTION

In the event you encounter a customer concern of a steering wheel shake, shimmy or vibration at highway speeds, the following repair procedure should be performed to minimize the concern. While the majority of these conditions can be greatly reduced, some road feel may be considered characteristic and can be compared to like model vehicles with similar mileage.

**Note:** Refer to Service Bulletin 05-50-10 for the proper procedures for balancing and measuring radial force values.

### PART INFORMATION/MATERIAL REQUIRED

HARDWARE KIT - PART NUMBER 34190AJ020		
PART IMAGE	PART NAME	QUANTITY
	Engine Mount Insert	1
	Bushing: Front Arm Rear	2
	Rear Sub-frame Mount Bushing Inserts	4
	Rear Sub-frame Support Bracket Spacer	2

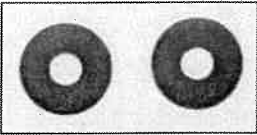

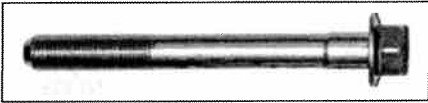





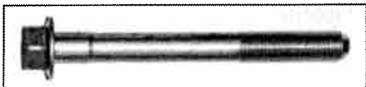
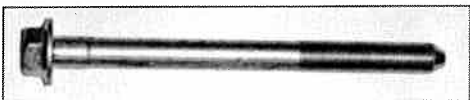
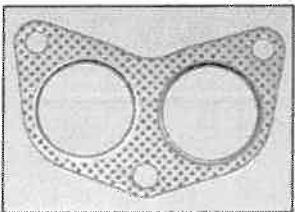
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**CAUTION: VEHICLE SERVICING PERFORMED BY UNTRAINED PERSONS  
 COULD RESULT IN SERIOUS INJURY TO THOSE PERSONS OR TO OTHERS.**

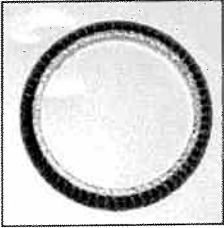
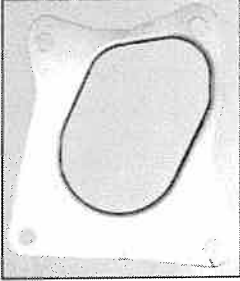
Subaru Service Bulletins are intended for use by professional technicians ONLY. They are written to inform those technicians of conditions that may occur in some vehicles, or to provide information that could assist in the proper servicing of the vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do the job correctly and safely. If a condition is described, DO NOT assume that this Service Bulletin applies to your vehicle, or that your vehicle will have that condition.

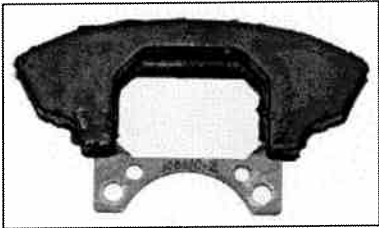

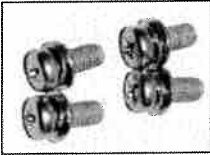
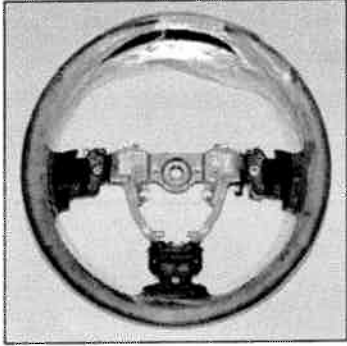
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The international standard for excellence in Environmental Management Systems. Please recycle or dispose of automotive products in a manner that is friendly to our environment and in accordance with all local, state and federal laws and regulations.

	Rear Sub-frame Mount Bushings Spacer	4
	Spring (75 kgf set value) Painted white	1
	Bolt: Front Arm	2
	Nut: Front Arm	2
	Bolt: Front Arm	2
	Nut: Front Arm	2
	Nut: Rear Differential Member	2
	Nut: Stabilizer Link	2
	Bolt: Rear Subframe – <b>Legacy Only</b>	4
	Bolt: Rear Subframe – <b>Outback Only</b>	4
	Gasket: Exhaust Manifold	2

*continued...*

	Gasket: Exhaust Center Pipe	1
	Gasket: Turbo Outlet	1

STEERING WHEEL KIT - PART NUMBER 34390AJ010 (LEATHER) 34390AJ000 (URETHANE)		
PART IMAGE	PART NAME	QUANTITY
	Dynamic Damper	1
	Screws: Dynamic Damper	2
	Screws: Paddle Switch	4
	Steering Wheel	1

- Liquid gasket: Three Bond 1215 (SOA Part # 004403007).
- Steering grease: Valiant grease M2, Conoco Phillips Multiplex Red #2 Grease (14 oz) or equivalent wheel bearing grease, NLGI GC-LB certified.

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## REPAIR PROCEDURE/INFORMATION

### 1) Wheel Balance and Radial Force Variation (RFV) Measurement

**Note:** Refer to Service Bulletin 05-50-10 for the proper procedures for balancing and measuring radial force values.

- 1.1) Before starting, mark the inside of each tire to identify the original placement (LF, LR, RF, RR).
- 1.2) Remove wheel and tire assemblies.  
**Note:** Do not remove wheel weights
- 1.3) Check and balance tires and check radial force variation (RFV). Refer to TSB 05-50-10 to adjust RFV if needed. Record all results.

**\*\*\* End of Wheel Balance & RFV Measurement Procedure \*\*\***

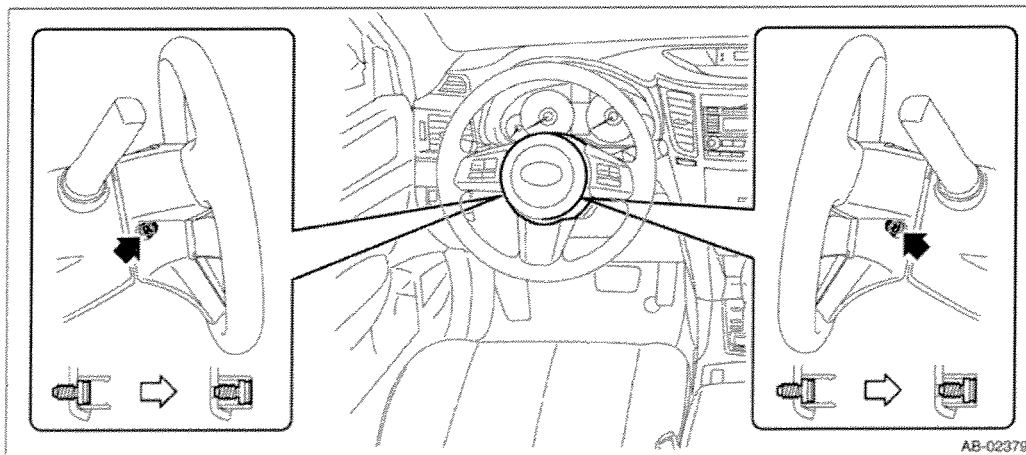
**If the concern has been resolved, STOP here.**

**If the concern still exists, continue to step 2.**

- 2) Record pre-set radio stations.
- 3) Place steering wheel in a straight ahead position. Adjust steering column "tilt and telescopic" to the center position.
- 4) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.

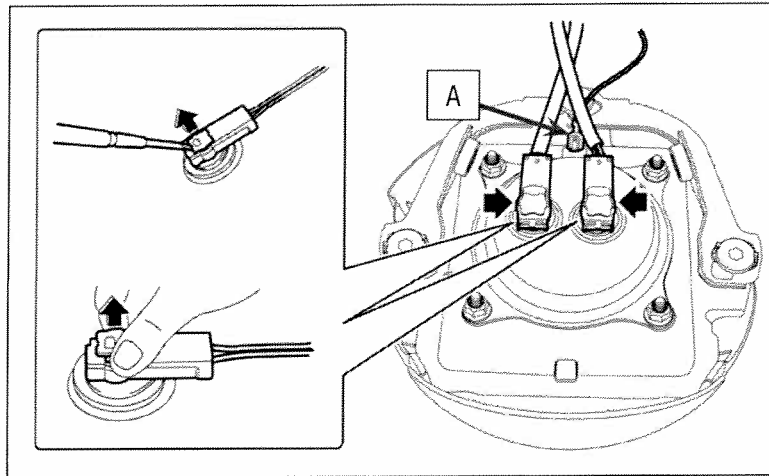
### 5) Remove Steering Wheel

- 5.1) Loosen the two TORX® bolts on the sides of the steering wheel.

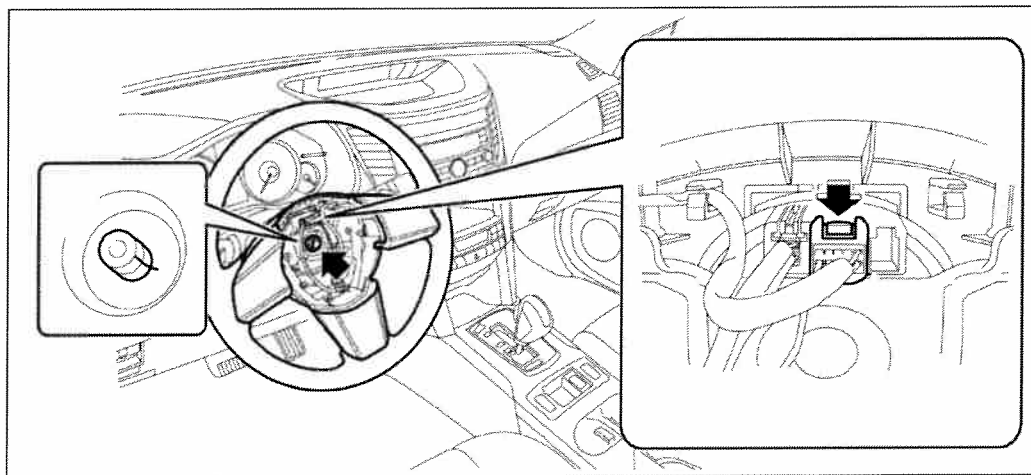


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- 5.2) Disconnect the airbag connector and remove the airbag module assembly.  
How to disconnect: Using a flat tip screwdriver, pry the push lock upward to unlock. Pull the connector to disconnect from the driver's airbag module assembly.



- 5.3) Disconnect the horn wire connector (A) (shown above).  
5.4) Disconnect the steering wheel wiring harness connector from the roll connector.



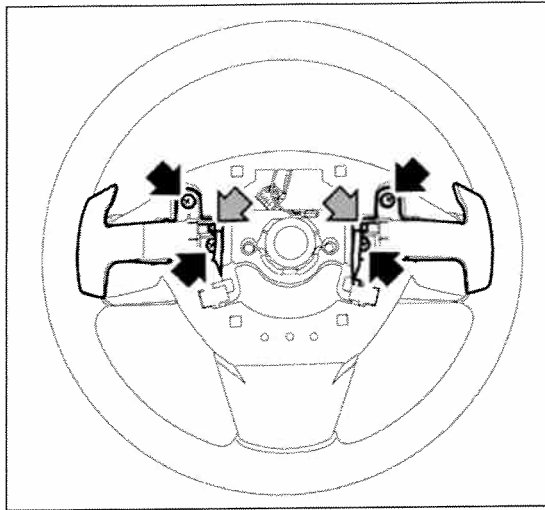
- 5.5) Remove the steering wheel nut and carefully pull off the steering wheel from the shaft using a steering wheel puller.

**CAUTION:**

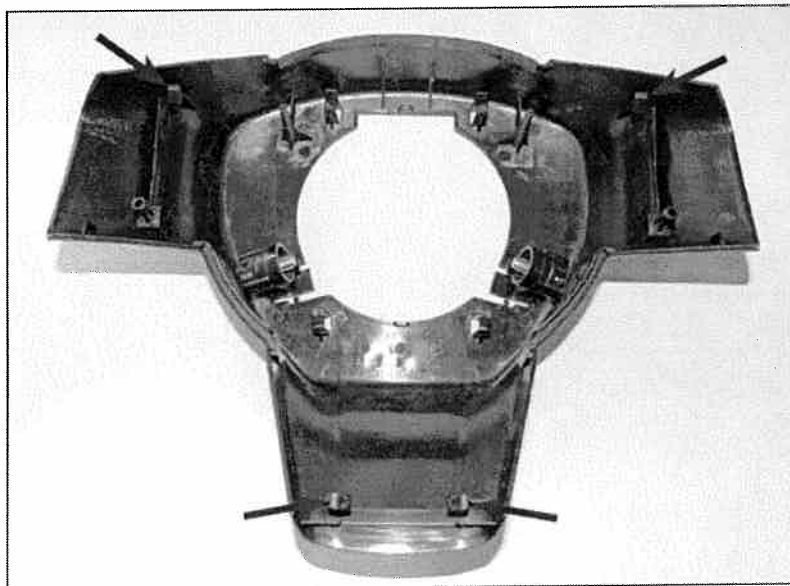
- Always use the steering wheel puller for removal to avoid deforming the steering wheel.
- After the steering wheel has been removed, make sure that the roll connector is not turned from the original position.

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- 5.6) Remove the satellite switches (audio / cruise) from the steering wheel.
- A) Remove and discard the screws from the paddle shift switches. (Model with paddle shift).



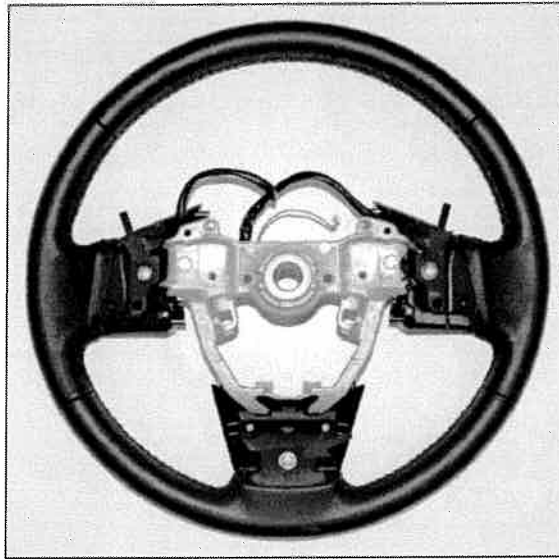
- B) Remove the rear steering wheel cover by carefully prying near the 4 clips. Remove the rear steering wheel cover and the paddle shifters as a unit.



Reverse side of Rear Cover, showing clips.

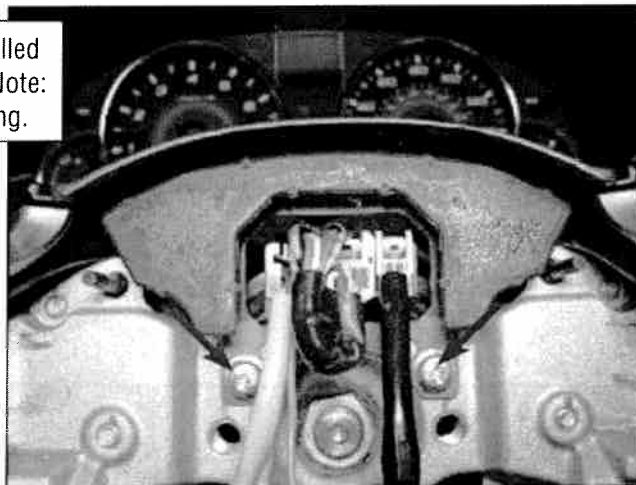
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- C) Remove the screws, then remove the satellite switches and the center steering wheel cover.



- 5.7) Transfer the center steering wheel cover, satellite switches and rear steering wheel cover to the new steering wheel. Observe wiring routing to ensure wiring is clear of any metal edges.
- 5.8) Install paddle shifters to the new steering wheel using new screws supplied with the kit.
- Tightening Torque: 1.7 N•m (0.2 kgf-m, 1.3 ft-lb)
- 5.9) Install the dynamic damper to the new steering wheel using the screws provided in the kit. Do not allow wiring harness to interfere with the dynamic damper.
- Tightening Torque: 1.7 N•m (0.2 kgf-m, 1.3 ft-lb)

Dynamic Damper Installed with supplied screws. Note: Correct harness routing.

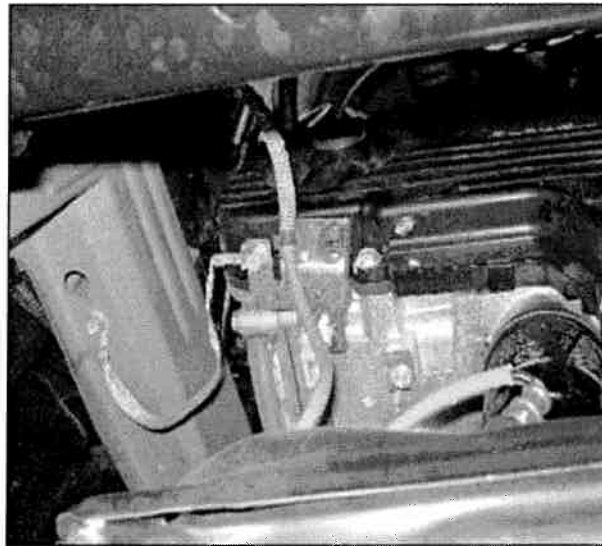
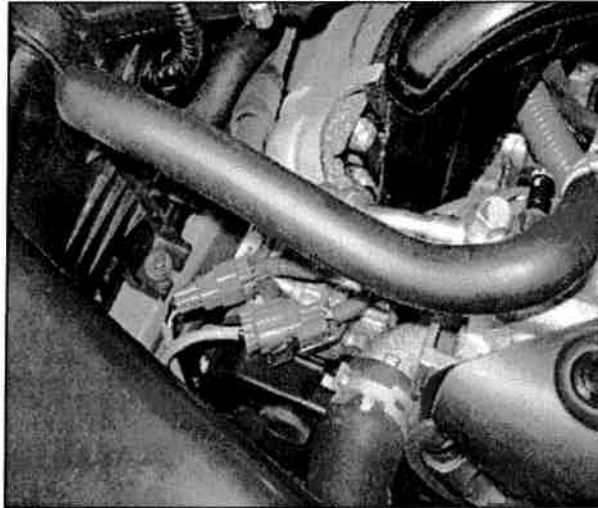


- 5.10) Install the airbag module assembly in reverse order of removal.

**\*\*\* End of Steering Wheel Procedure \*\*\***

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- 6) Disconnect air/fuel and oxygen sensor connectors and remove the clip which secures the harness.

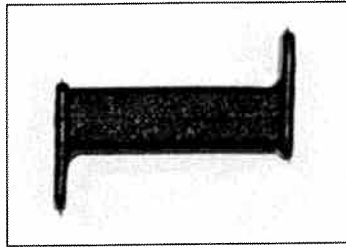


- 7) Raise vehicle on lift.
- 8) Raise vehicle and remove engine under cover.
- 9) Remove the front exhaust pipe.

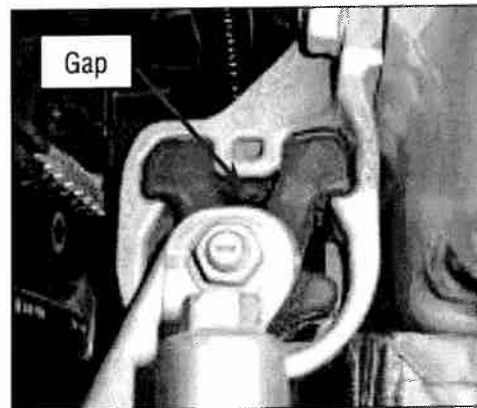
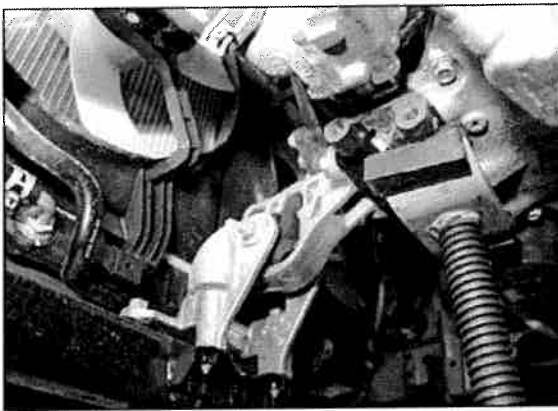
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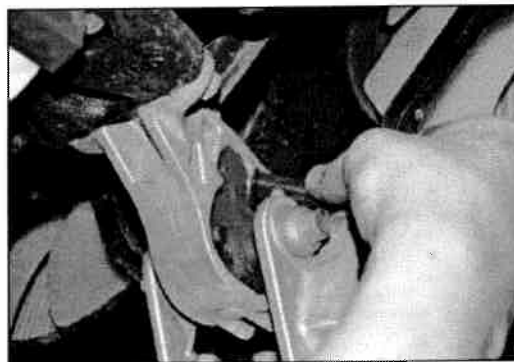
10) Install front engine mount insert (H4 engines only).



- A) With the vehicle on a lift, use a transmission jack to lift the engine assembly. This will create a gap in the front engine mount where the engine mount insert will be placed.

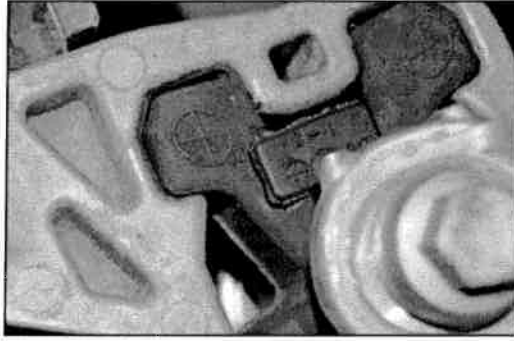


- B) Insert the engine mount insert into the gap above the front engine mount horizontal bolt. The two opposing tabs on the insert will point toward the front and the rear of the car, not up and down.



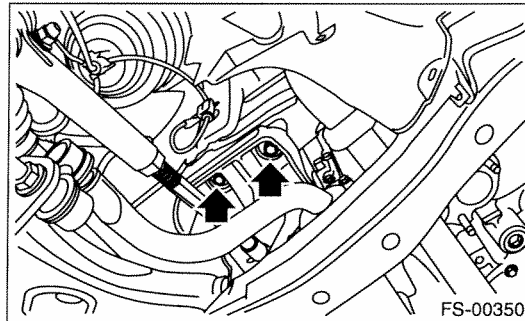
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Rubber engine mount insert installed.



C) Lower engine down into normal at rest position.

11) Torque front sub-frame mount bolts to 50 N•m (5.0 kgf-m, 36.8 ft-lb).



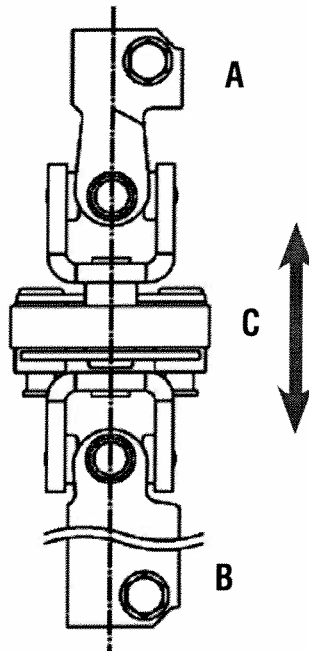
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12) Release preload on steering column universal joint assembly.

A) Loosen the universal joint bolts (A) Column shaft side and (B) Gear box side.

**Note:** Do not remove bolts. Keep the bolts loose, they will be tightened in Step 18.

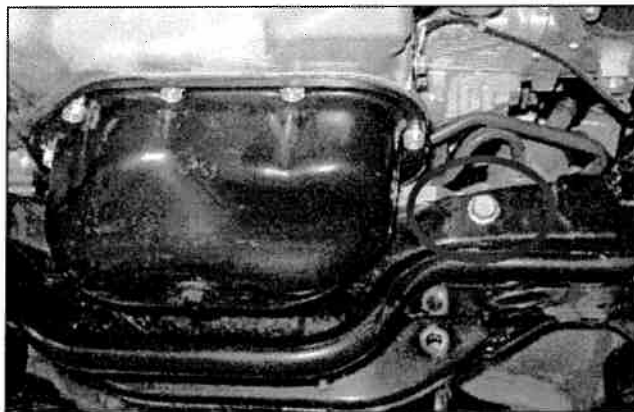
B) Grasp the universal coupling (C) and move the shaft back (towards the steering column) and forth (towards the steering rack) a few times, doing so will reduce any unwanted preload torque on the universal joint.



**Note:** Do not torque bolts, they will be tightened later in the procedure.

### **13) Steering Gearbox Sleeve Spring Replacement Procedure**

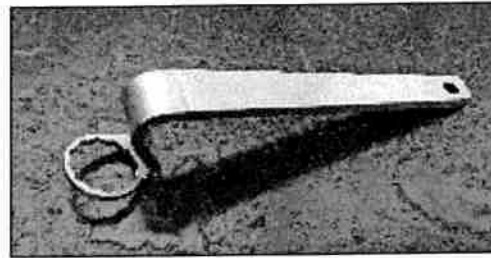
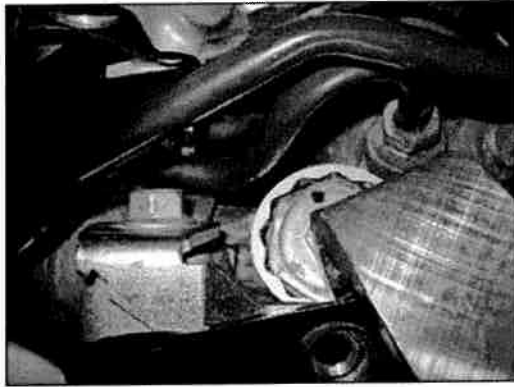
13.1) Remove the steering gear box bracket bolt.



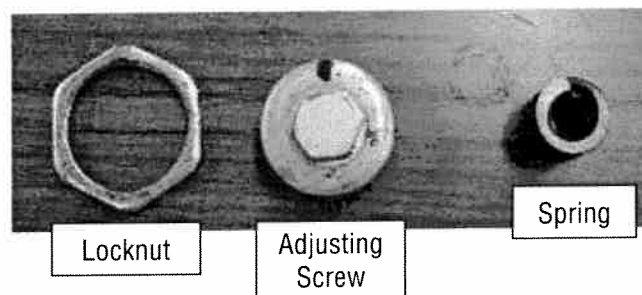
13.2) Using a permanent marker or paint, mark the steering gearbox adjusting screw in a vertical direction (at the 12 o'clock position). **Note:** Clean first if necessary.

*continued...*

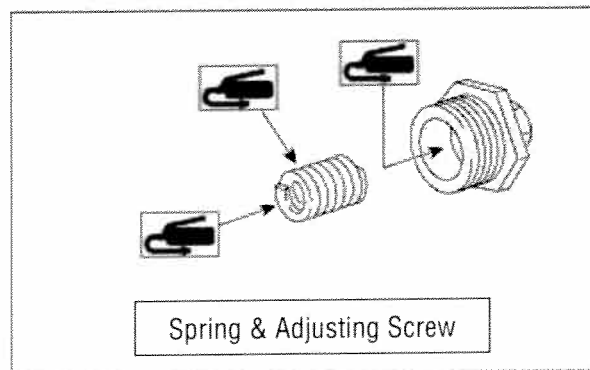
- 13.3) Loosen the lock nut using ST 34199AJ000.



- 13.4) Remove the lock nut, adjusting screw and spring.



- 13.5) Clean adjusting screw of any dirt and grease, especially the threads and the surrounding surface of the steering gearbox. Apply Three Bond 1215 to the entire perimeter of adjusting screw threads.
- 13.6) Apply a coat of grease to the seating surface and outside of the new spring.
- 13.7) Fill the inside of adjusting screw with grease, insert the spring into adjusting screw, and then install in steering gear box.

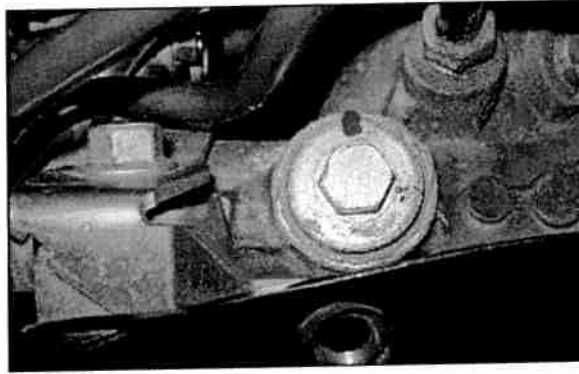


**Note:** An inch-pound beam or dial-type torque wrench should be used.

- 13.8) Tighten the adjusting screw to 9.8 N•m (1.0 kgf-m, 7.2 ft-lb; 86.4 in-lb) and then loosen it one full turn.

*continued...*

- 13.9) Re-tighten the adjusting screw to 9.8 N-m (1.0 kgf-m, 7.2 ft-lb) and then adjust until the mark is in the vertical (12 o'clock) position. The mark must be at 12 o'clock (-0/+5 degrees - 12:10). This is a critical step in this procedure.

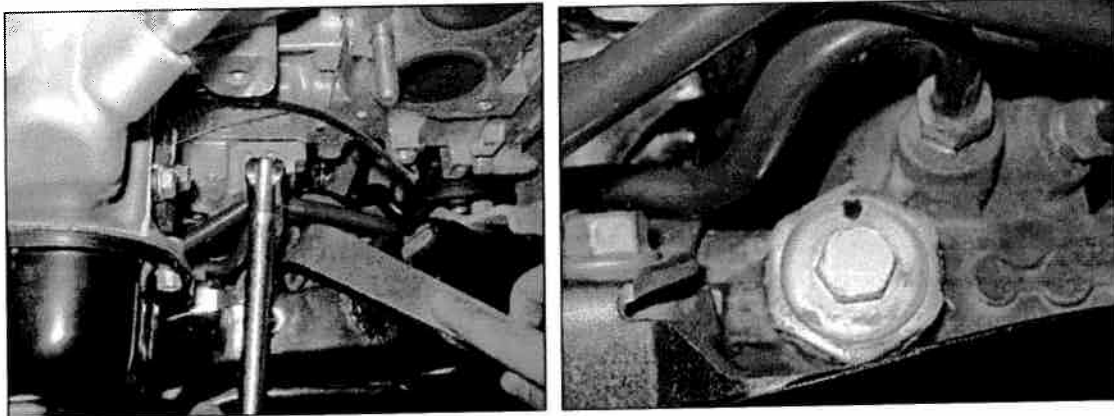


- 13.10) Reinstall Lock Nut and tighten by hand.



- 13.11) Use a socket to hold the adjusting screw in place to prevent it from turning while tightening the lock nut with the ST. Make sure the lock nut is tight.

**Note:** If the screw has moved the procedure will need to be performed again, starting from the beginning.



- 13.12) Install steering gearbox bracket bolt. 60 N•m (6.1 kgf-m, 44.3 ft-lb).

**\*\* END of Steering Gearbox Sleeve Spring Replacement Procedure \*\***

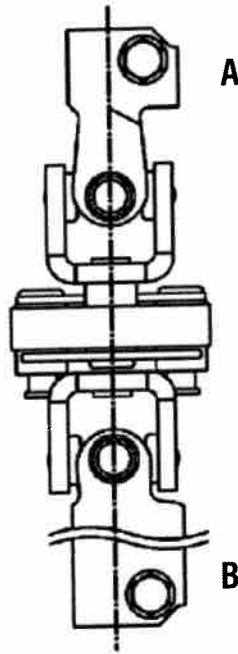
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14) Torque universal joint bolts, gearbox side (B) first.

A) Tighten the steering gearbox side (B) bolt to 24 N•m (2.4 kgf-m, 17.7 ft-lb).

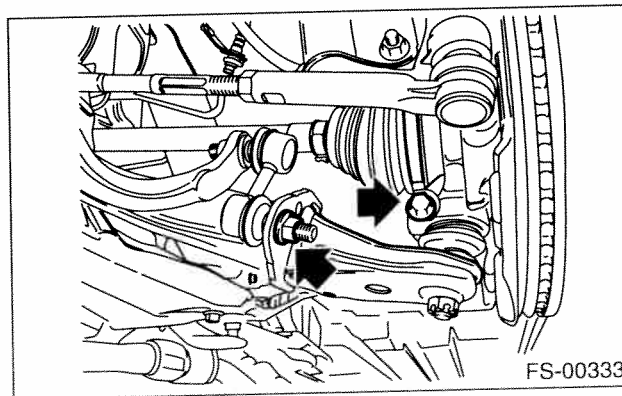
**Note: Always torque steering gear box side (B) first, otherwise the universal joint assembly will become preloaded again.**

B) Torque steering column side (A) bolt next to 24 N•m (2.4 kgf-m, 17.7 ft-lb).



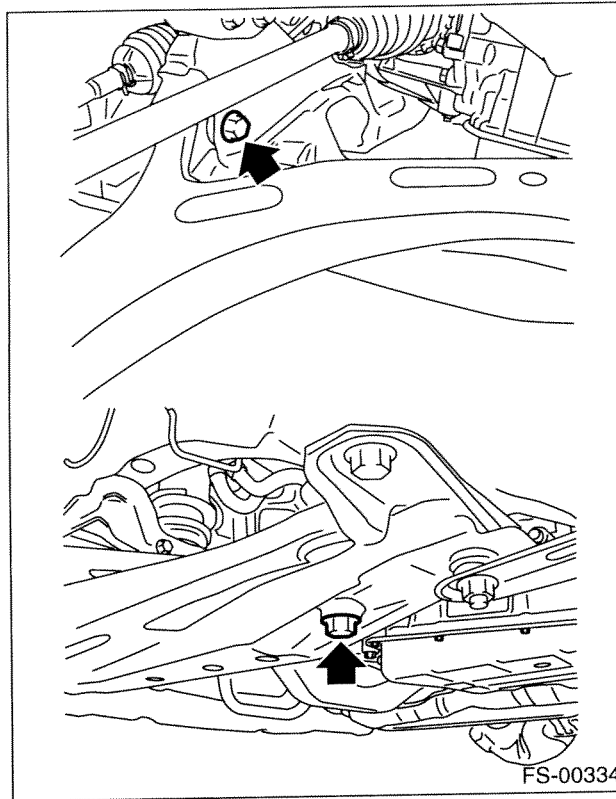
15) Replace rear bushing on front arm.

A) Remove the front stabilizer link and ball joint from the front arm.



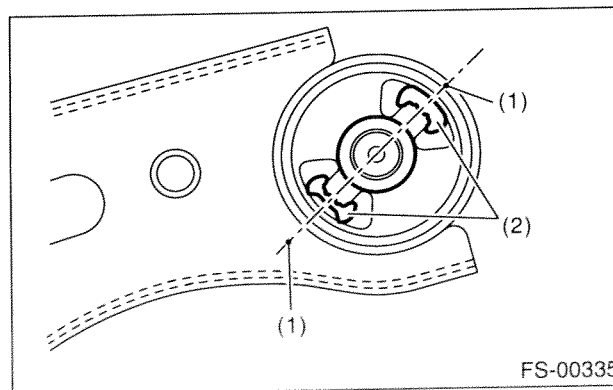
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B) Remove the bolts and remove the front arm.



C) Put an alignment mark on the front arm based on the center of the rear bushing recess portion.

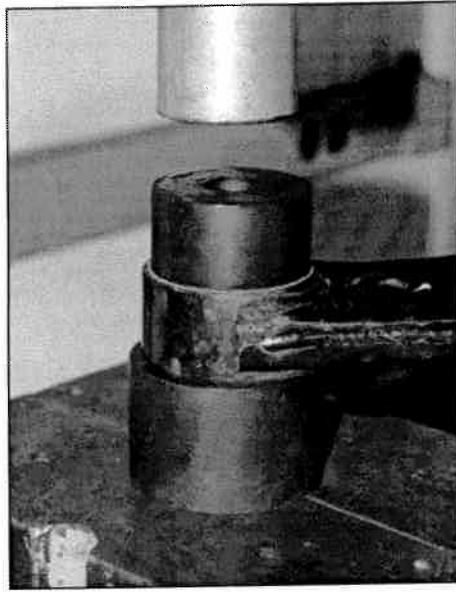
**CAUTION: Always put an alignment mark for aligning the position on bushing installation.**



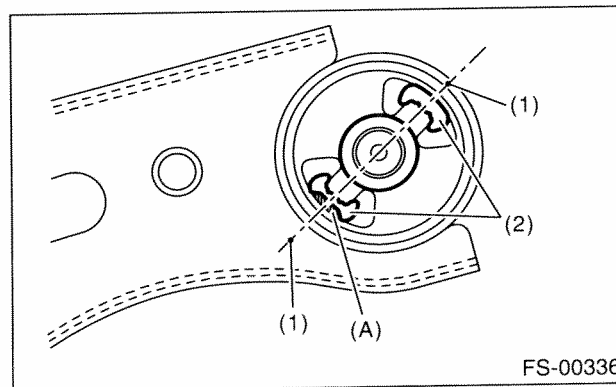
- (1) Alignment mark
- (2) Recess section

*continued...*

- D) Using the ST 20299AG000 (Remover) and ST 20299AG010 (Base) and a press, carefully remove the rear bushing from the front arm.



- E) Align the center of recess portion on the new bushing with the alignment mark that was previously made on the front arm. The protrusion (A) of the recess portion should be facing the front side of vehicle.



- (1) Alignment mark  
(2) Recess section  
(A) Protrusion of the recess portion

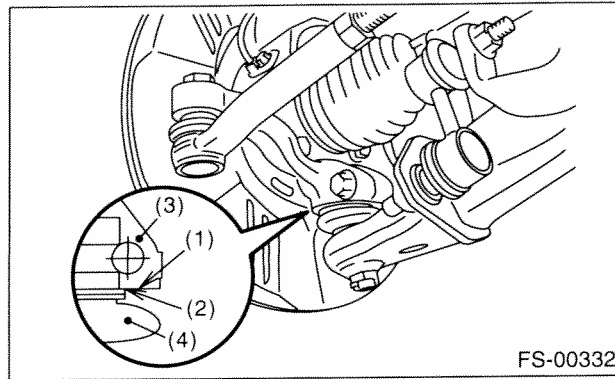
- F) Using the same ST from removal procedure and a press, carefully install the rear bushing while making sure the bushing does not rotate.  
G) Using new bolts and self-locking nuts temporarily tighten the front arm.

*continued...*



H) Install the ball joint into housing and torque to 50 N•m (5.1 kgf-m, 36.9 ft-lb).

**CAUTION:** Before tightening, make sure the lower side of housing and stepped section of ball joint are in contact.



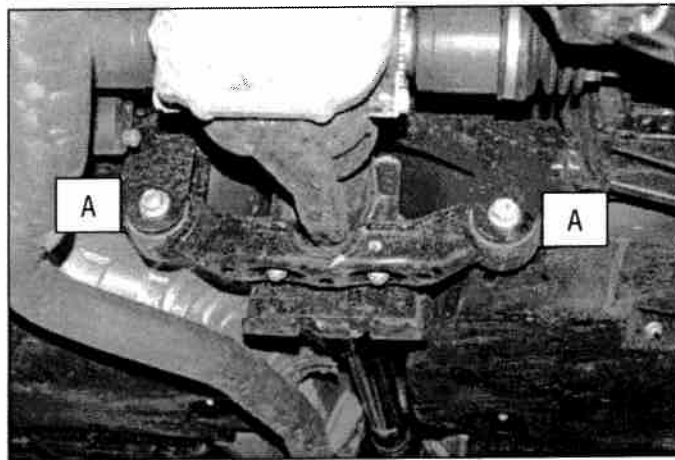
- (1) Housing bottom
- (2) Raised section of ball joint
- (3) Housing
- (4) Housing

I) Using new flange nuts, install the stabilizer link to the front arm.  
Torque to 60 N•m (6.1 kgf-m, 44.3 ft-lb).

**Note:** Do not torque front arm mount bolts. These will need to be tightened with the vehicle on level ground at curb weight.

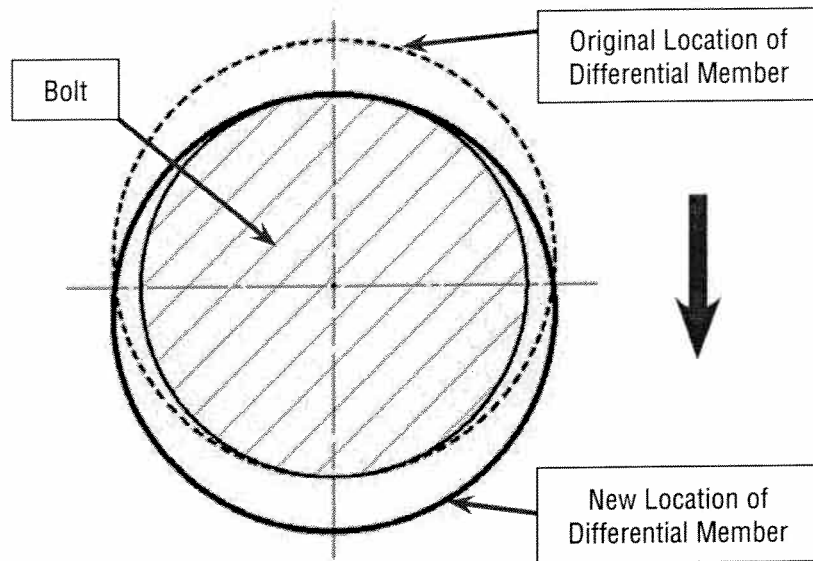
16) Reposition rear differential cross member.

A) Loosen the rear differential member mounting nuts (A).



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B) Reposition the differential assembly downward to the lower portion of the mounts.

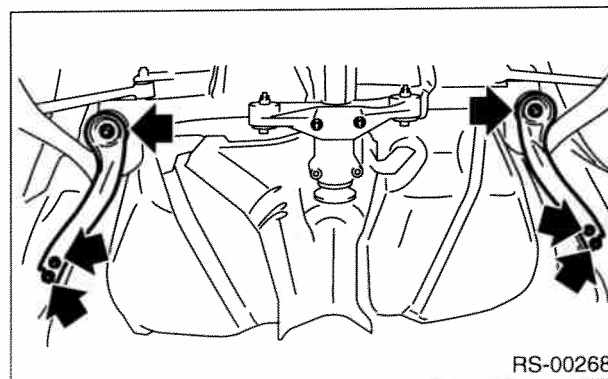


C) Using new self locking nuts, torque the differential mounting nuts starting with the Left and then the Right. Torque to 110 N•m (11.2 kgf-m, 81.1 ft-lb)

17) Install rear sub-frame support bracket spacers and bushing inserts.

A) Remove only the left subframe support bracket and bolts.

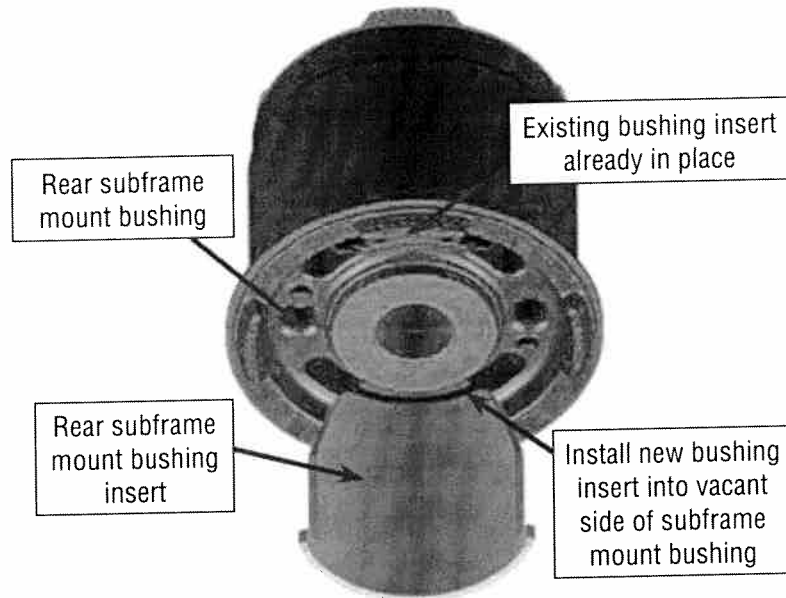
**Caution: DO NOT remove both the right and left side at the same time, otherwise the subframe can drop or alignment readings can be changed.**



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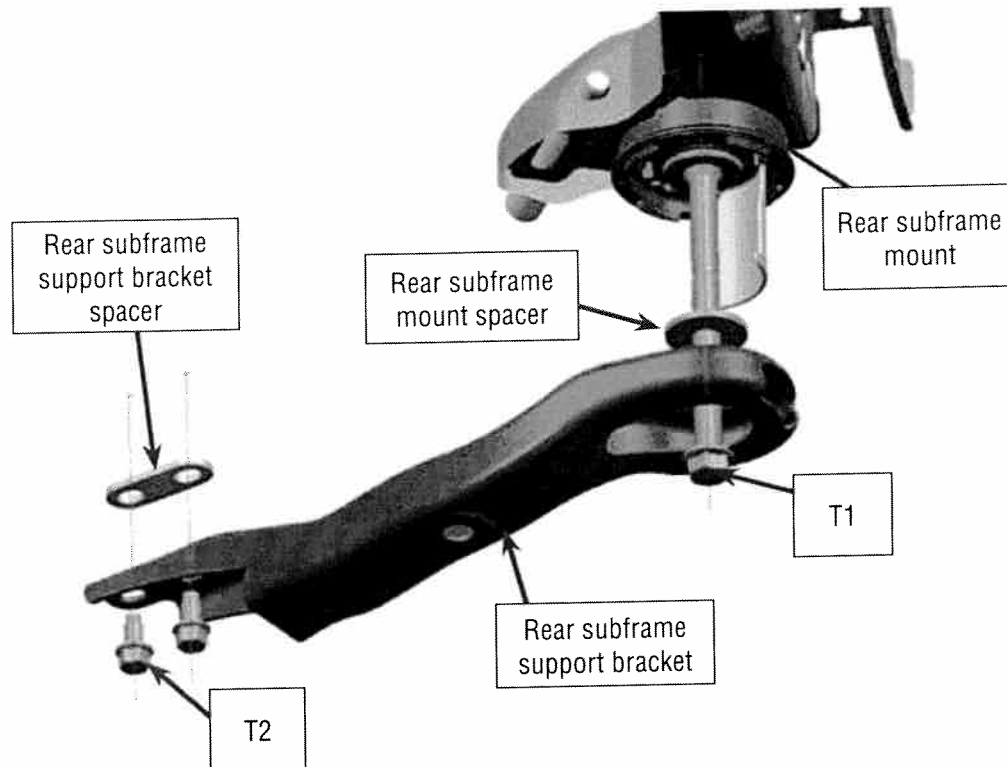
A-1) Insert the rear subframe mount bushing insert into the vacant side of the subframe mount bushing. Be sure that the bushing insert is fully seated in the bushing, it should be flush when fully inserted.

**Note:** There may be some excess or residual rubber inside the vacancy for the insert. If the insert does not fully seat in the bushing, use a flat blade screwdriver to break free the residual rubber.



A-2) Install the rear subframe support bracket spacer (between the vehicle body and the subframe support bracket) and the subframe mount spacer (between the rear subframe mount and the rear subframe support bracket.)

*continued...*



A-3) Using new hardware where required, install the rear subframe support bracket and torque the bolts accordingly.

T1: Tightening torque: 200 N•m (20.4 kgf-m, 147.5 ft-lb)  
 T2: Tightening torque: 60 N•m (6.1 kgf-m, 44.3 ft-lb)

**Note:** The hardware kit is applicable to both Legacy and Outback models. However, Legacy models use shorter length rear subframe bolts than Outback models. Make sure to compare the bolts that you removed from the vehicle you're working on with the ones in the hardware kit to ensure the correct bolts are being used. The extra 4 bolts can be discarded.

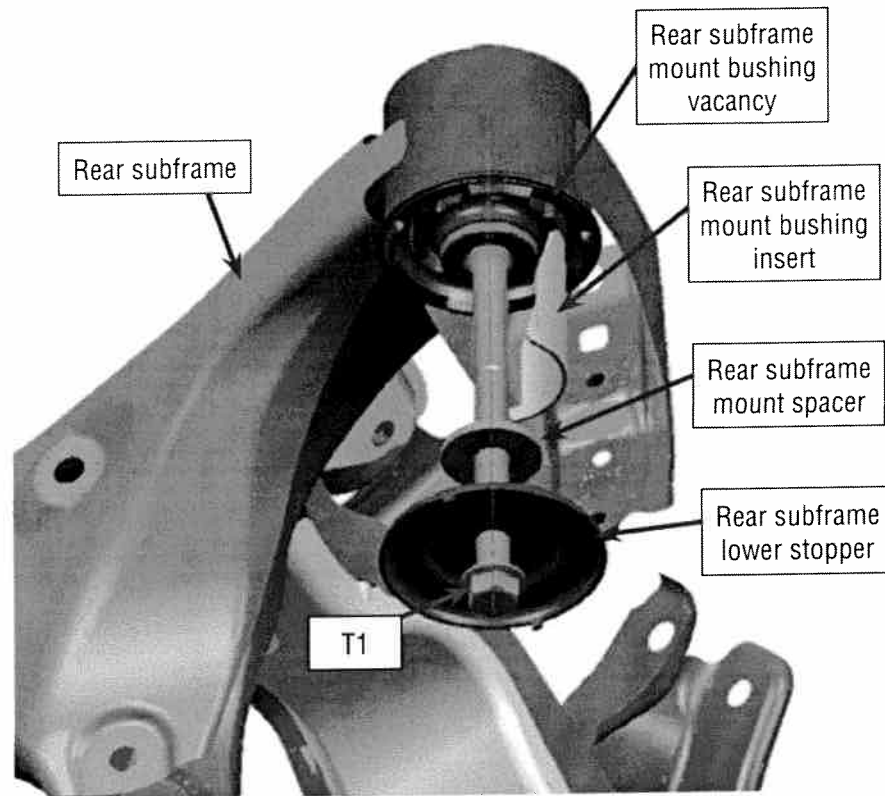
- B) Repeat the above steps A-1 through A-3 on the right side subframe support bracket.
- C) One at a time, remove the two remaining rear subframe lower stoppers from the mounts.

**Caution:** DO NOT remove both the right and left side at the same time, otherwise the subframe may drop or alignment readings can be changed.

C-1) Insert the rear subframe mount bushing insert into the vacant side of the subframe mount bushing. Be sure that the bushing insert is fully seated in the bushing, it should be flush when fully inserted.

**Note:** There may be some excess or residual rubber inside the space for the insert. If the insert does not fully seat in the bushing, use a flat blade screwdriver to break free the residual rubber.

*continued...*



C-2.) Install the rear subframe mount spacer and reinstall the rear subframe lower stopper using new hardware. Torque the new bolt.

T1: Tightening torque: 200 N•m (20.4 kgf-m, 147.5 ft-lb)

- 18) Install tires and wheels according to radial force values. The lowest rated tire should be installed in the left front position, the next at the right front position. Then the next highest should be at the left rear and finally the highest road force rated tire should be on the right rear.
- 19) Lower vehicle.
- 20) Reconnect negative battery cable and program radio stations.
- 21) Move vehicle to alignment rack. With the vehicle at curb height, torque the front control arm bushing bolt to 95 N•m (9.7 kgf-m, 70.1 ft-lb). Next, torque the rear control arm bushing bolt to 140 N•m (14.3 kgf-m, 103.3 ft-lb).
- 22) Adjust alignment as needed.
- 23) Install engine under cover.
- 24) Reset radio stations and clock.
- 25) Road test and verify fix.

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## WARRANTY/CLAIM INFORMATION

For vehicles within the Basic New Car Limited Warranty period, this repair may be claimed using the following:

LABOR DESCRIPTION	LABOR OPERATION #	FAIL CODE	LABOR TIME
Vibration Repair No Sublet Needed	A613-114	XBQ88	4.7
Vibration Repair & Sublet Alignment	B613-117		3.4
Vibration Repair & Sublet Wheel Balance/RFV Check	B613-227		3.7
Vibration Repair & Sublet the Alignment and Wheel Balance/RFV Check	B613-337		2.4
Sublet Repair, Administration Expenses	C101-108		0.3