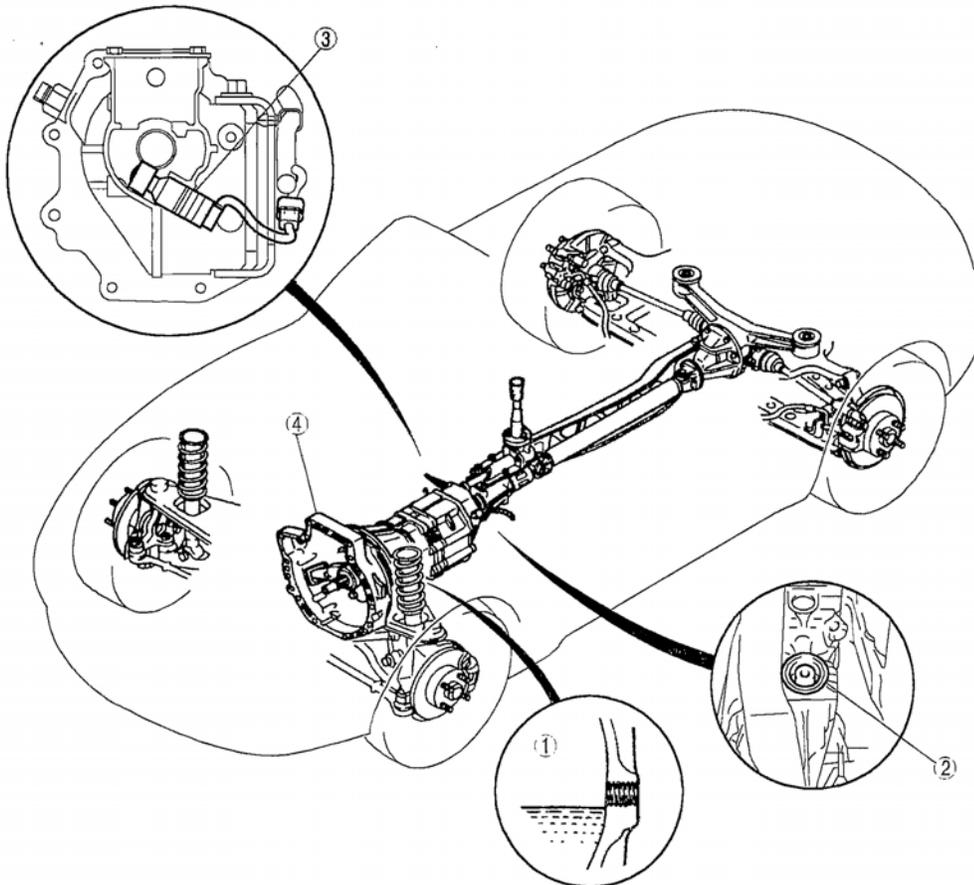


2005 TRANSMISSION

Manual Transmission [M15M - D] - MX-5 Miata

MANUAL TRANSMISSION [M15M-D] LOCATION INDEX



1	Transmission oil (See TRANSMISSION OIL INSPECTION [M15M-D]) (See TRANSMISSION OIL REPLACEMENT [M15M-D])
2	Oil seal (rear) (See OIL SEAL (REAR) REPLACEMENT [M15M-D])

3	Vehicle speedometer sensor (See VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [M15M-D]) (See VEHICLE SPEEDOMETER SENSOR INSPECTION [M15M-D])
4	Manual transmission (See MANUAL TRANSMISSION REMOVAL/INSTALLATION [M15M-D])

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Fig. 1: Identifying Manual Transmission [M15M-D] Components
Courtesy of MAZDA MOTORS CORP.

TRANSMISSION OIL INSPECTION [M15M-D]

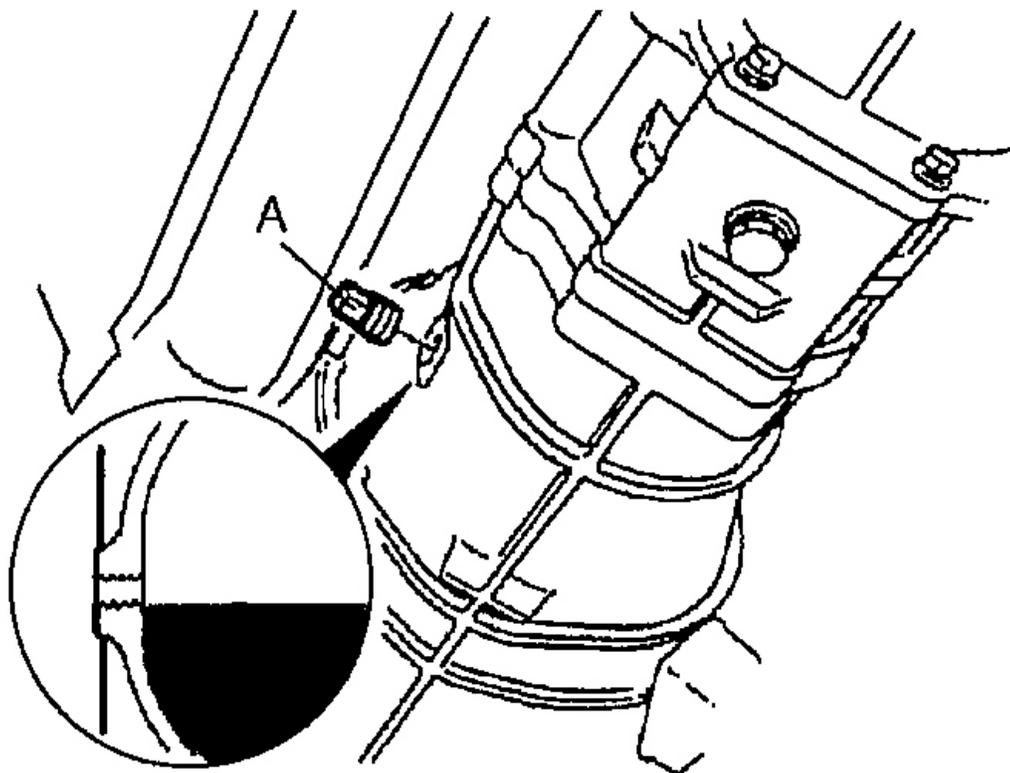
1. Remove the check plug A.
2. Verify that the oil is at the brim of the check plug hole as shown.

- If it is low, add the specified oil from the check plug hole.

Specified oil

Grade:API service GL-4 or GL-5

Viscosity:SAE 75W-90 (All season) or SAE 80W-90 (Above 10°C {50°F})



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Fig. 2: Removing Plug & Checking Oil Level
Courtesy of MAZDA MOTORS CORP.

3. Wipe the plug clean and apply sealant to the plug threads before installing.

Tightening torque

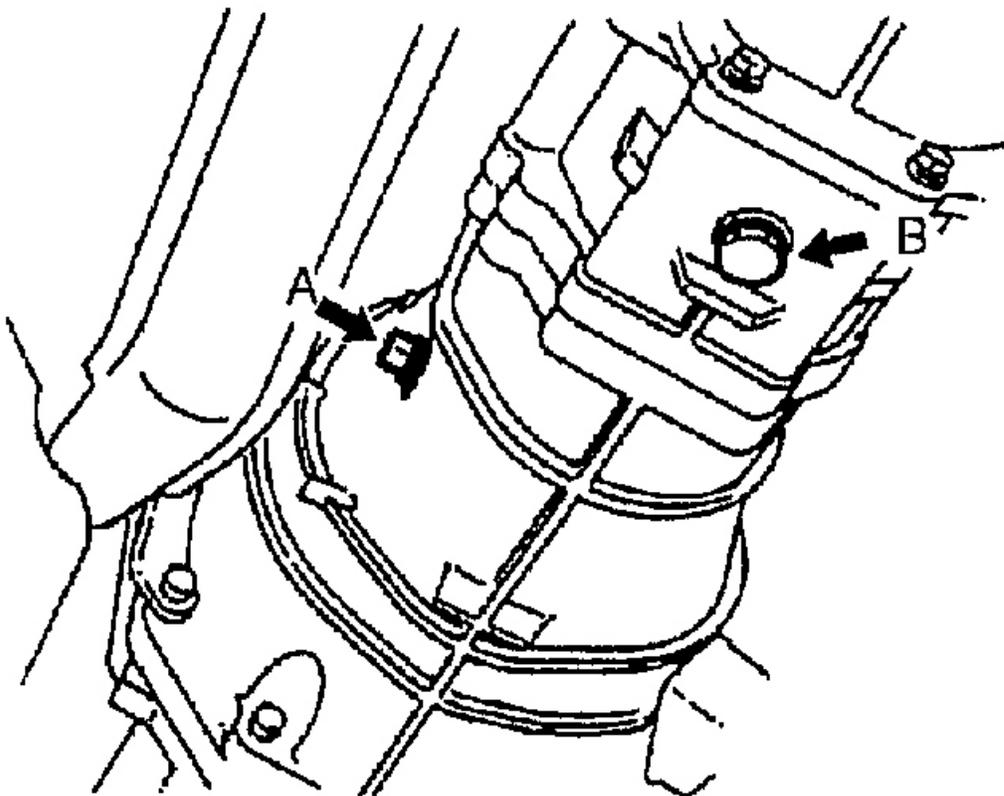
A:25-39 N.m {2.5-4.0 kgf.m, 19-28 ft.lbf}

TRANSMISSION OIL REPLACEMENT [M15M-D]

1. Remove the drain plug B with washer and the check plug A.
2. Drain the oil into a container.
3. Wipe all plugs clean.
4. Install the drain plug B with new washer.

Tightening torque

B:40-58 N.m {4.0-6.0 kgf.m, 29-43 ft.lbf}



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Fig. 3: Installing Drain Plug
Courtesy of MAZDA MOTORS CORP.

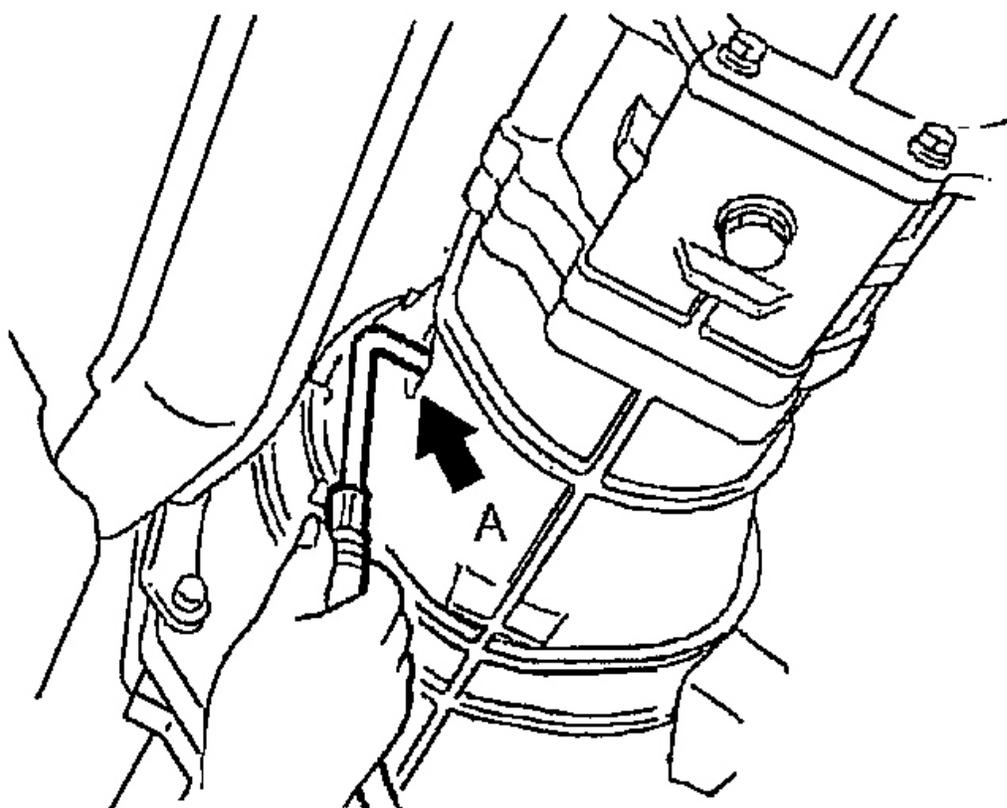
5. Add the specified oil from check plug A port until the level reaches the brim of check plug hole.

Specified oil

Grade:API service GL-4 or GL-5

Viscosity:SAE 75W-90 (All season) or SAE 80W-90 (Above 10°C {50°F})

Capacity (approx.quantity):2.0 L {2.1 US qt, 1.8 Imp qt}



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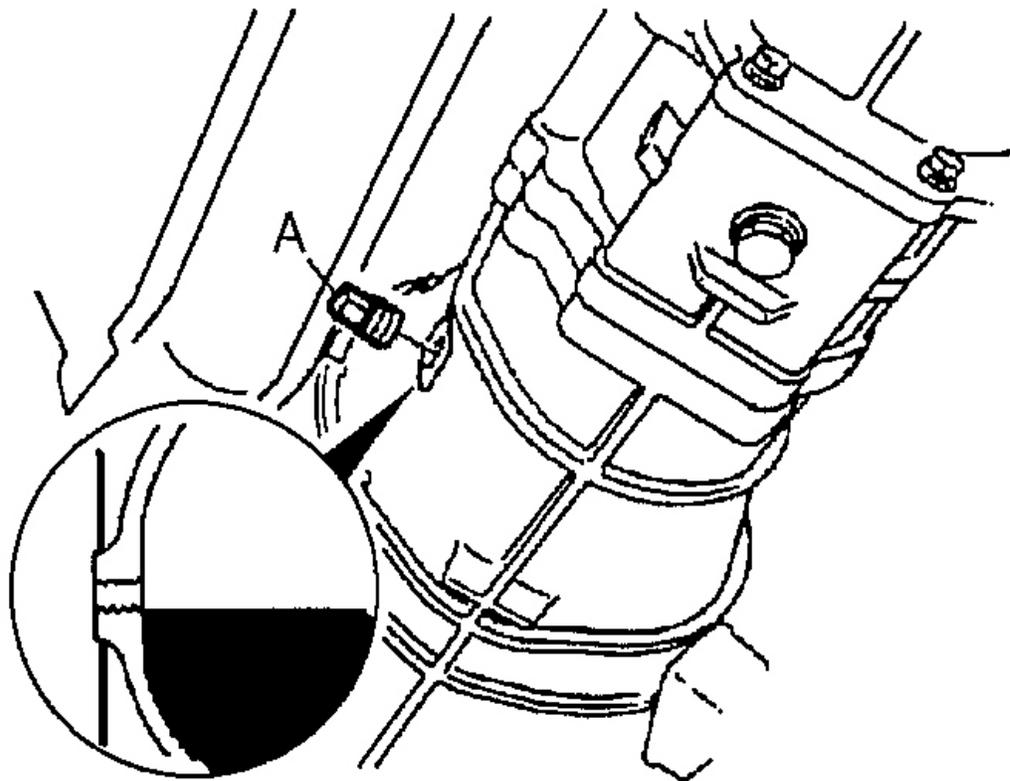
Fig. 4: Adding Oil

Courtesy of MAZDA MOTORS CORP.

6. Apply sealant to the threads of check plug A.
7. Install the check plug A.

Tightening torque

A:25-39 N.m {2.5-4.0 kgf.m, 19-28 ft.lbf}



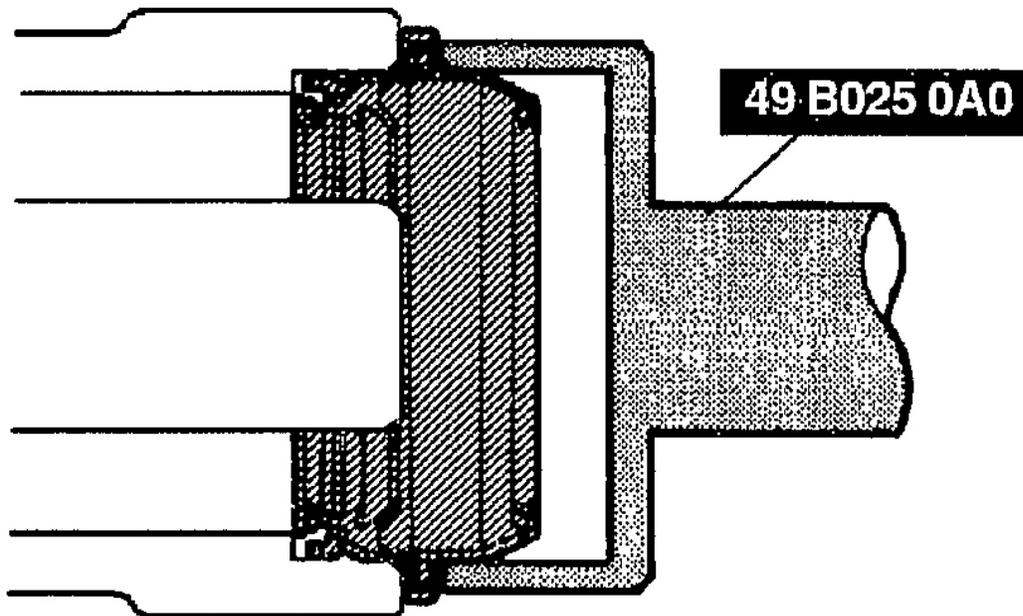
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Fig. 5: Installing Plug

Courtesy of MAZDA MOTORS CORP.

OIL SEAL (REAR) REPLACEMENT [M15M-D]

1. Raise the vehicle and support it with safety stands.
2. Remove the propeller shaft. (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
3. Remove the oil seal from the extension housing.
4. Apply the specified oil to a new oil seal.
5. Install the new oil seal using the SST.



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Fig. 6: Installing Oil Seal Using SST
 Courtesy of MAZDA MOTORS CORP.

6. Install the propeller shaft. (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
7. Inspect the oil level. (See **TRANSMISSION OIL INSPECTION [M15M-D]**.)

VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [M15M-D]

1. Disconnect the negative battery cable.
2. Drain the transmission oil. (See **TRANSMISSION OIL REPLACEMENT [M15M-D]**.)
3. Disconnect the vehicle speedometer sensor connector.
4. Remove the vehicle speedometer sensor.
5. Apply transmission oil to a new O-ring and install it on a new vehicle speedometer sensor.
6. Install the vehicle speedometer sensor.

Tightening torque

7.9-10.7 N.m {80-110 kgf.cm, 69.5-95.4 in.lbf}

7. Connect the vehicle speedometer sensor connector.
8. Add the specified amount and type of transmission oil. (See **TRANSMISSION OIL REPLACEMENT**

[M15M-D].)

9. Connect the negative battery cable.

VEHICLE SPEEDOMETER SENSOR INSPECTION [M15M-D]

1. Remove the vehicle speedometer sensor. (See **VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [M15M-D].**)
2. Measure voltage between terminals of the vehicle speedometer sensor while the gear is turning.

Meter needle	Action
Moves slightly under 5 V	Inspect wiring harness (Instrument cluster - vehicle speedometer sensor)
Does not move	Replace vehicle speedometer sensor

3. Install the vehicle speedometer sensor. (See **VEHICLE SPEEDOMETER SENSOR REMOVAL/INSTALLATION [M15M-D].**)

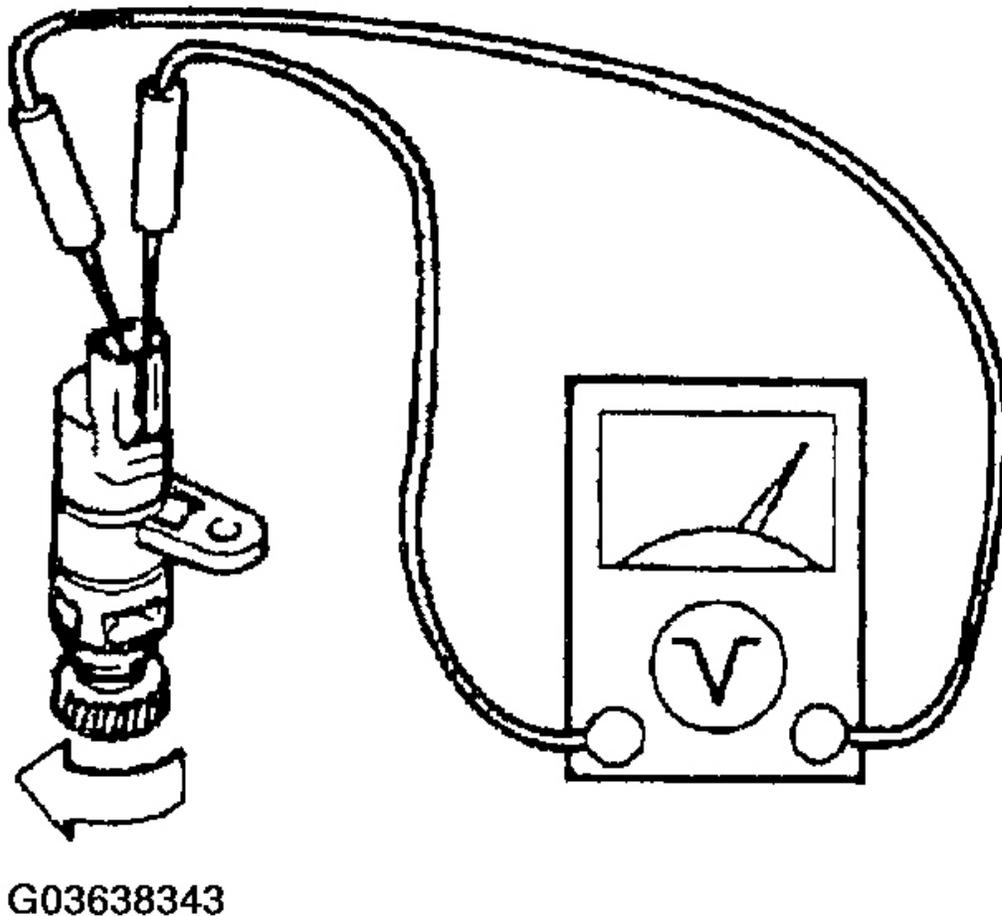


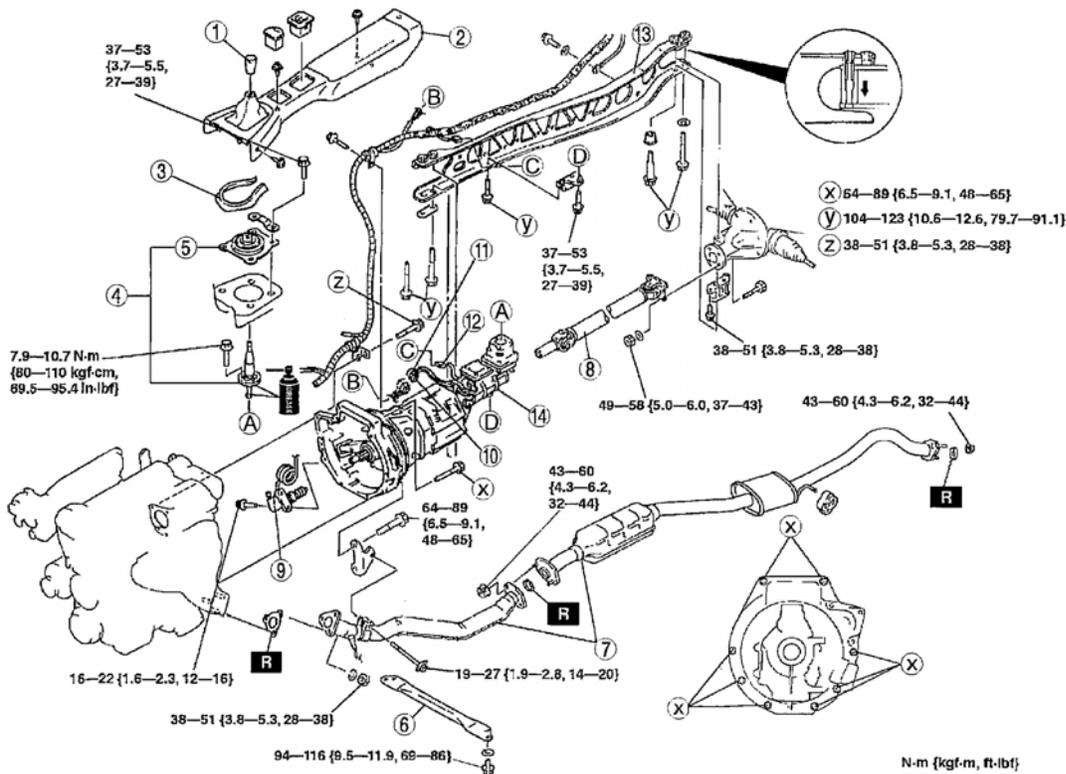
Fig. 7: Measuring Voltage Between Terminals Of Vehicle Speedometer Sensor
Courtesy of MAZDA MOTORS CORP.

MANUAL TRANSMISSION REMOVAL/INSTALLATION [M15M-D]

1. Drain the transmission oil. (See **TRANSMISSION OIL REPLACEMENT [M15M-D]**.)
2. Remove the cross member component.(16-inch wheel vehicles)
3. Remove the cross member bracket.(16-inch wheel vehicles)
4. Remove the crossbar.(16-inch wheel vehicles) (See **REAR CROSSMEMBER REMOVAL/INSTALLATION .**)
5. Remove the undercover.
6. Remove the starter. (See **STARTER REMOVAL/INSTALLATION .**)
7. Remove in the order indicated in the table.

2005 Mazda MX-5 Miata

2005 TRANSMISSION Manual Transmission [M15M - D] - MX-5 Miata



1	Shift lever knob
2	Rear console
3	Insulation
4	Shift lever component (See Shift Lever Component Installation Note)
5	Dust boot
6	Front crossbar
7	Front pipe and middle pipe (See EXHAUST SYSTEM REMOVAL/ INSTALLATION [BP])
8	Propeller shaft (See PROPELLER SHAFT REMOVAL/ INSTALLATION)

9	Clutch release cylinder
10	Back-up light switch connector
11	Neutral switch connector
12	Speedometer sensor connector
13	Power plant frame (PPF) (See Power Plant Frame (PPF) Removal Note) (See Power Plant Frame (PPF) Installation Note)
14	Transmission (See Transmission Removal Note) (See Transmission Installation Note)

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Fig. 8: Removing Manual Transmission - With Torque Specifications
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.
9. Add the specified amount and type of transmission oil. (See **TRANSMISSION OIL REPLACEMENT [M15M-D]**.)
10. Warm up the engine and transmission, inspect for oil leakage, and verify the transmission operation.

POWER PLANT FRAME (PPF) REMOVAL NOTE

1. Disconnect the wire harness from the PPF.

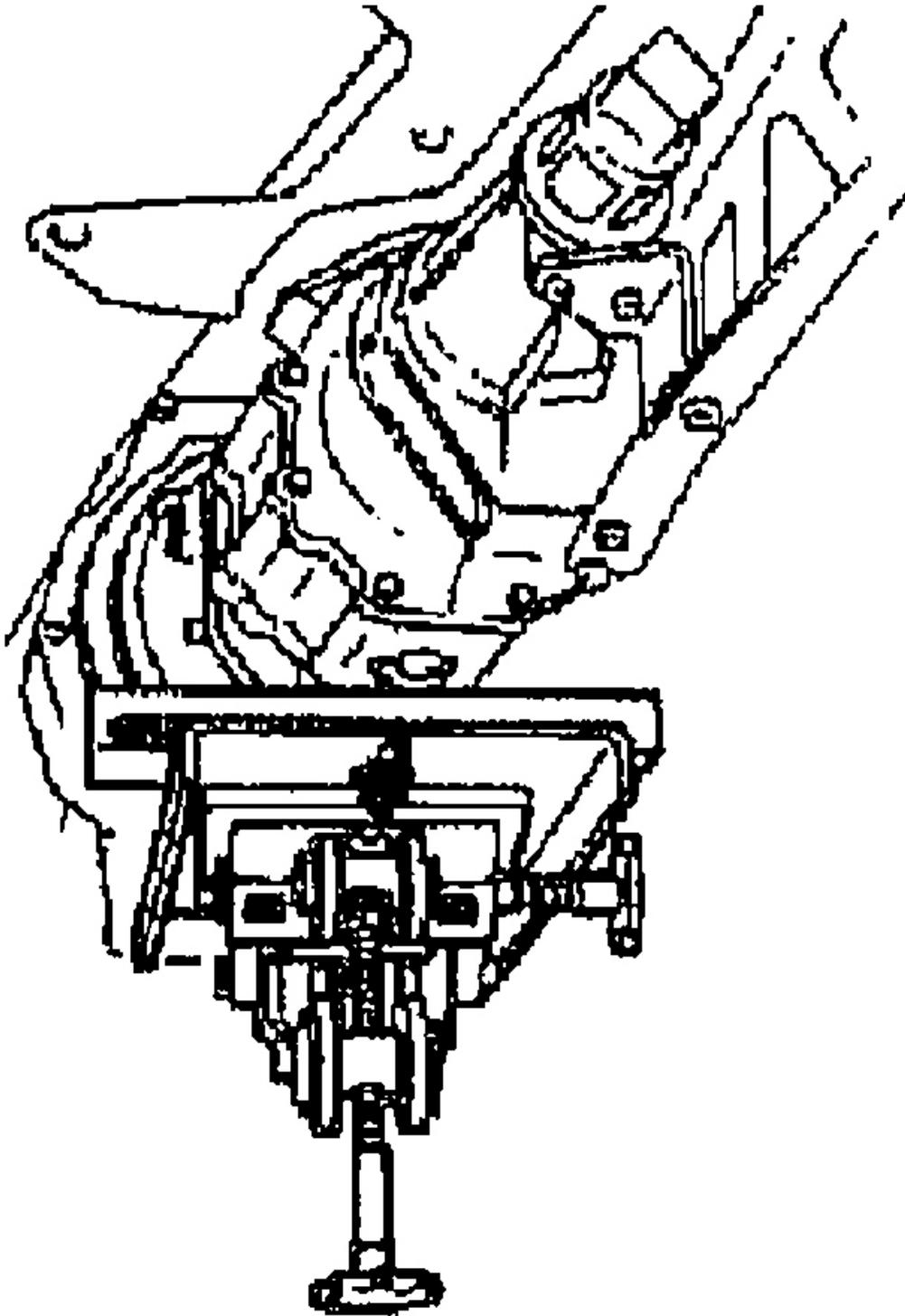
2005 Mazda MX-5 Miata

2005 TRANSMISSION Manual Transmission [M15M - D] - MX-5 Miata

2. Support the transmission with a jack.

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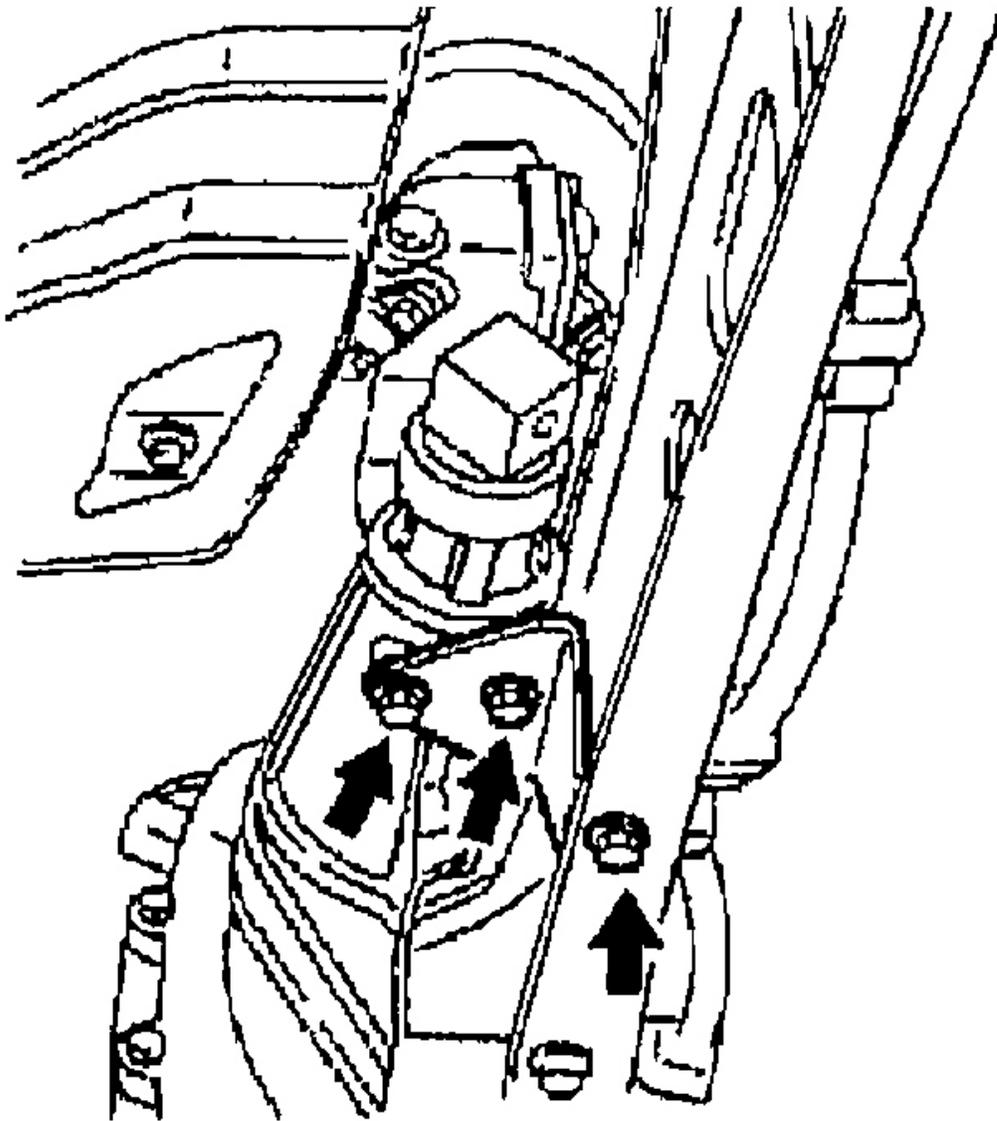
2005 TRANSMISSION Manual Transmission [M15M - D] - MX-5 Miata



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Fig. 9: Supporting Transmission With A Jack
Courtesy of MAZDA MOTORS CORP.

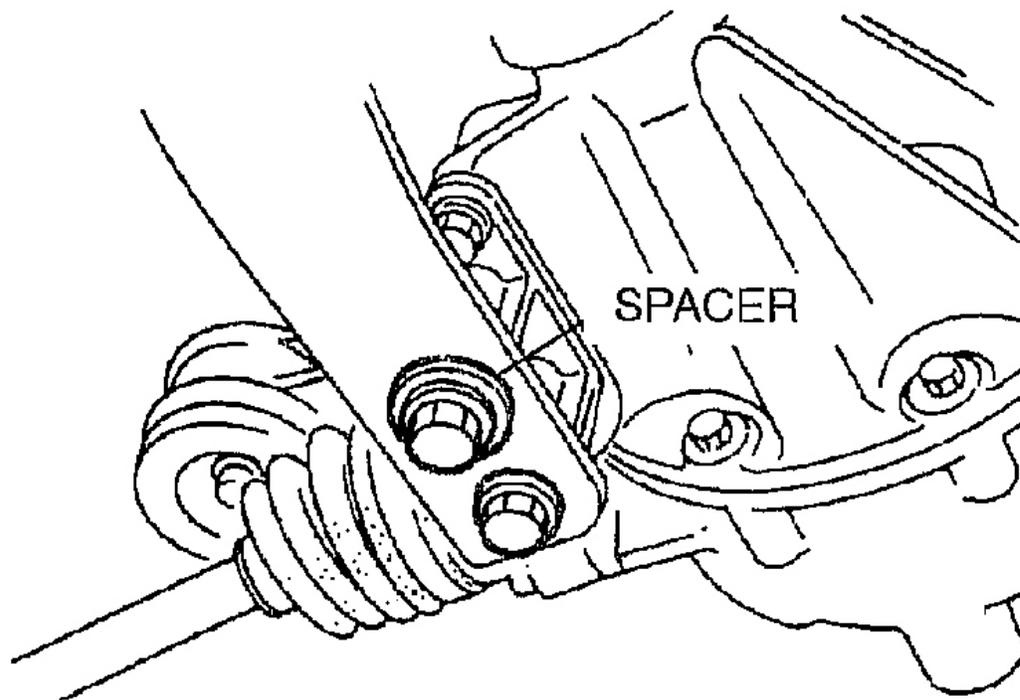
3. Remove the PPF bracket.



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Fig. 10: Removing PPF Bracket
Courtesy of MAZDA MOTORS CORP.

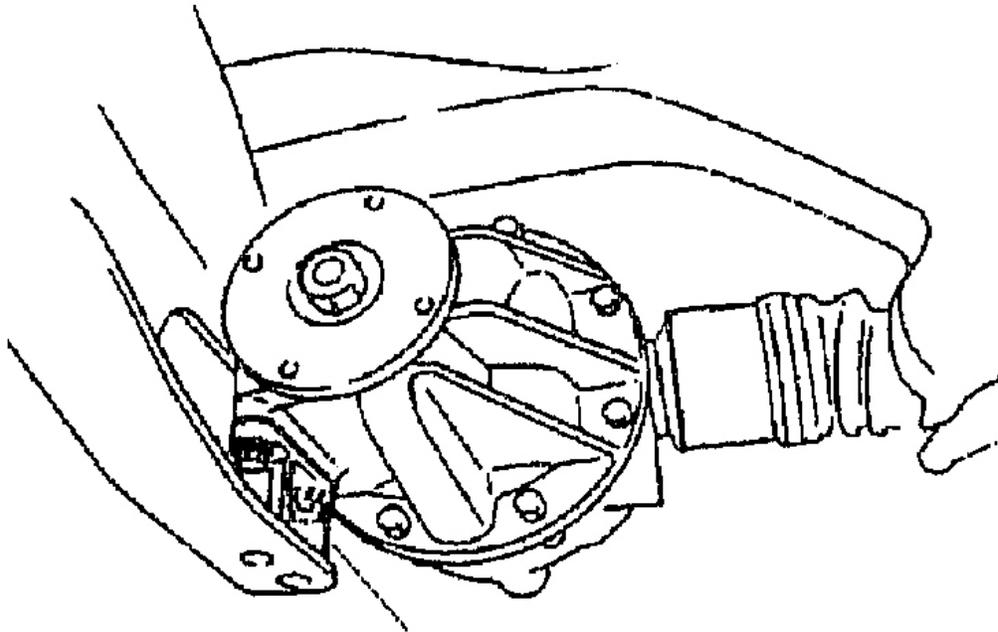
4. Remove the differential-side bolts, and pry out the spacer.



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Fig. 11: Removing Differential-Side Bolts And Pry Out Spacer
Courtesy of MAZDA MOTORS CORP.

5. Remove the differential mounting spacer.



DIFFERENTIAL MOUNTING SPACER

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Fig. 12: Removing Differential Mounting Spacer
Courtesy of MAZDA MOTORS CORP.

- CAUTION:**
- Removing the PPF spacers will reduce the performance of the PPF.
 - If the spacers are removed, replace the PPF as an component.

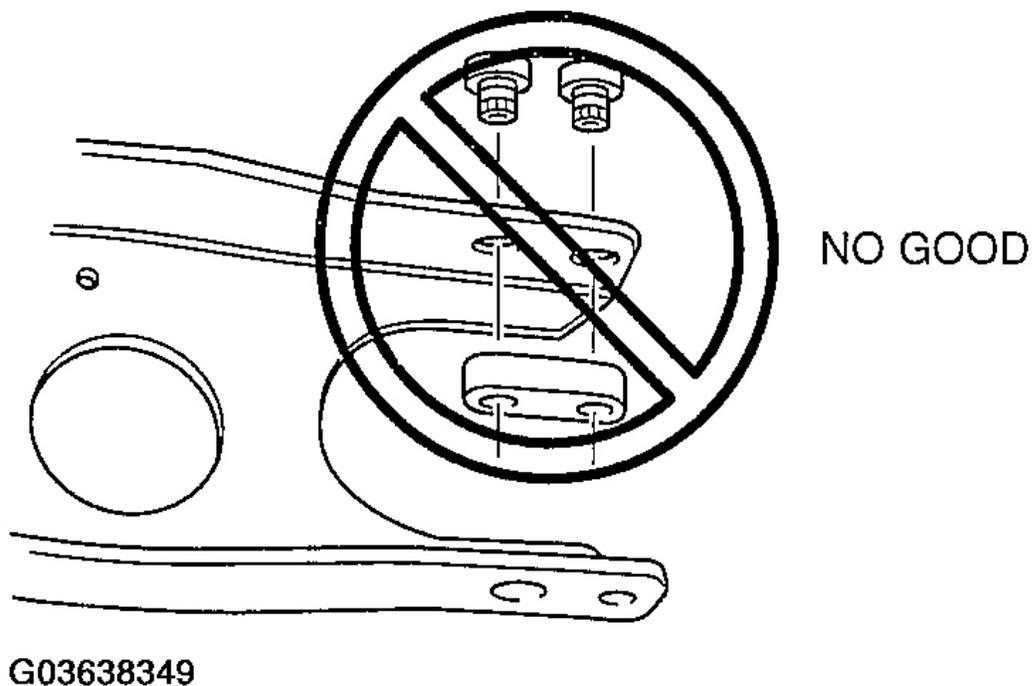


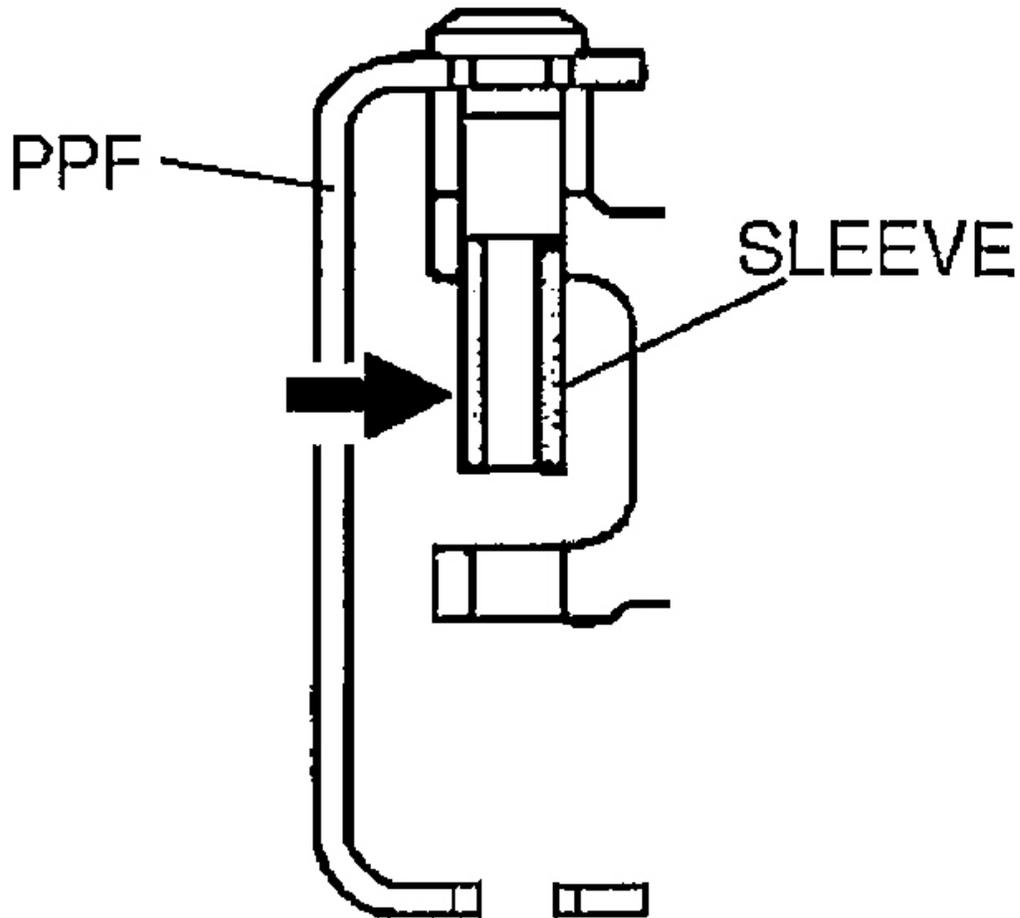
Fig. 13: Warning Against Removing Transmission-Side Bolts
Courtesy of MAZDA MOTORS CORP.

6. Remove the transmission-side bolts, and remove the PPF.

NOTE:

- If the sleeve can not be removed easily, tap the side of sleeve with a plastic hammer.

7. Remove the sleeve.



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Fig. 14: Removing Sleeve
Courtesy of MAZDA MOTORS CORP.

TRANSMISSION REMOVAL NOTE

1. Support the transmission with a transmission jack.
2. Loosen the transmission installation bolts.
3. Remove the transmission.

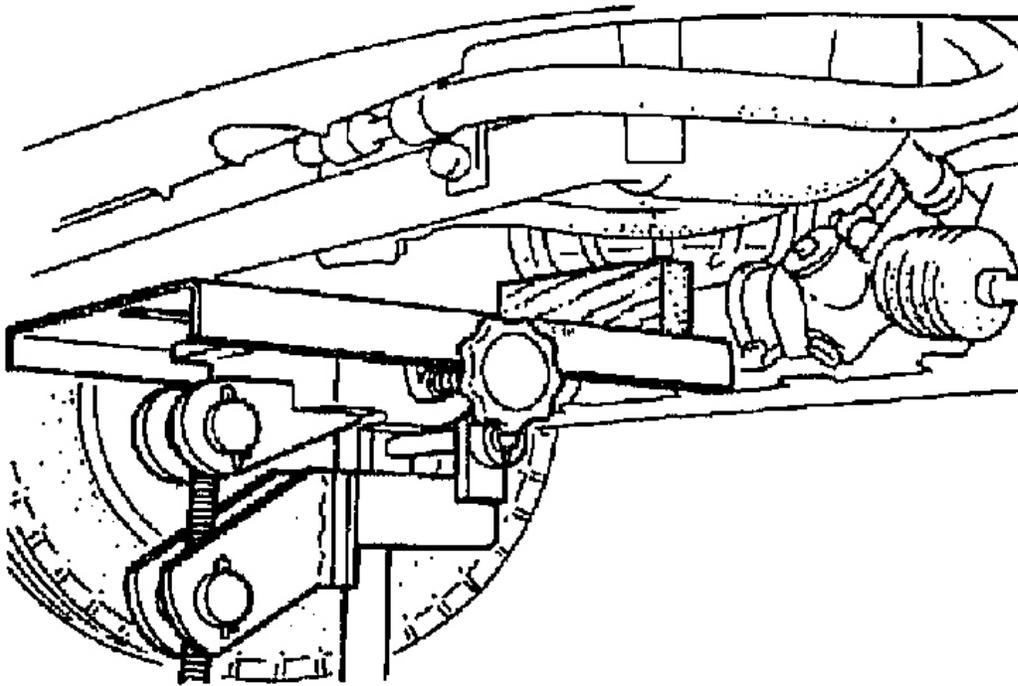
TRANSMISSION INSTALLATION NOTE

1. Tilt the engine by pushing up on the front of the oil pan with a wooden block and a transmission jack.

2. Support the transmission with a transmission jack.
3. Raise the transmission into place and install and tighten the installation bolts.

Tightening torque

64-89 N.m {6.5-9.1 kgf.m, 48-65 ft.lbf}



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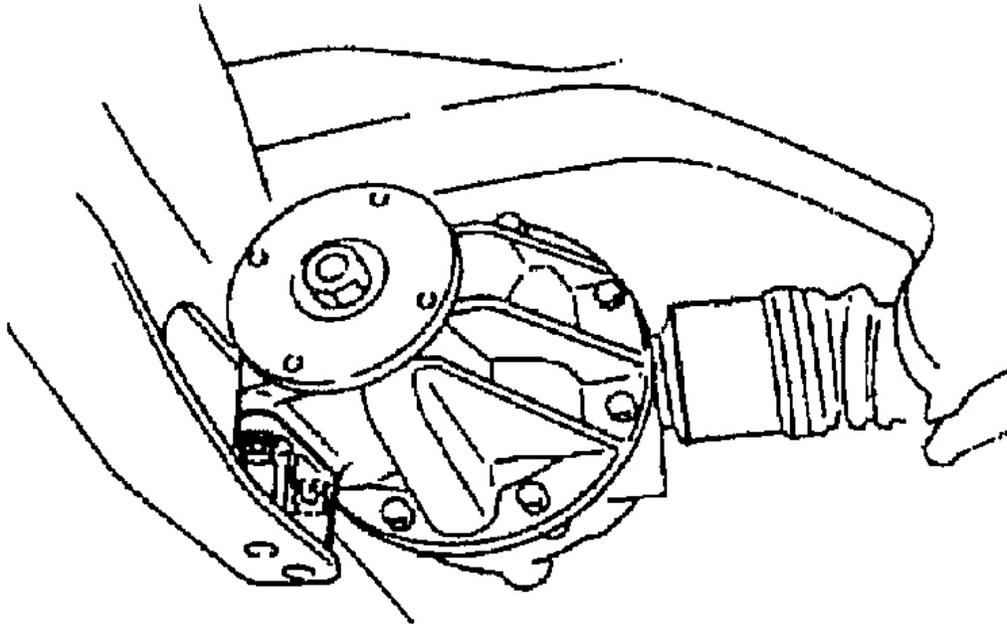
Fig. 15: Supporting Transmission With Transmission Jack
Courtesy of MAZDA MOTORS CORP.

POWER PLANT FRAME (PPF) INSTALLATION NOTE

1. Install the differential mounting spacer.

Tightening torque

38-51 N.m {3.8-5.3 kgf.m, 28-38 ft.lbf}

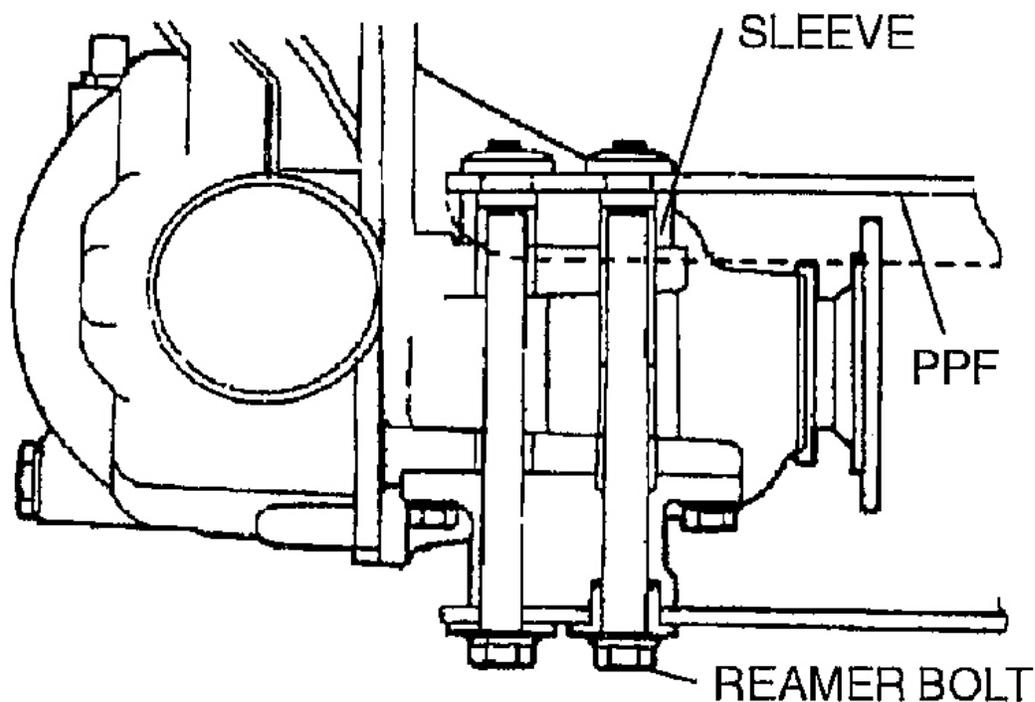


DIFFERENTIAL MOUNTING SPACER

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Fig. 16: Installing Differential Mounting Spacer
Courtesy of MAZDA MOTORS CORP.

2. Support the transmission with a jack so that it is level.
3. Position the PPF and install the sleeve.



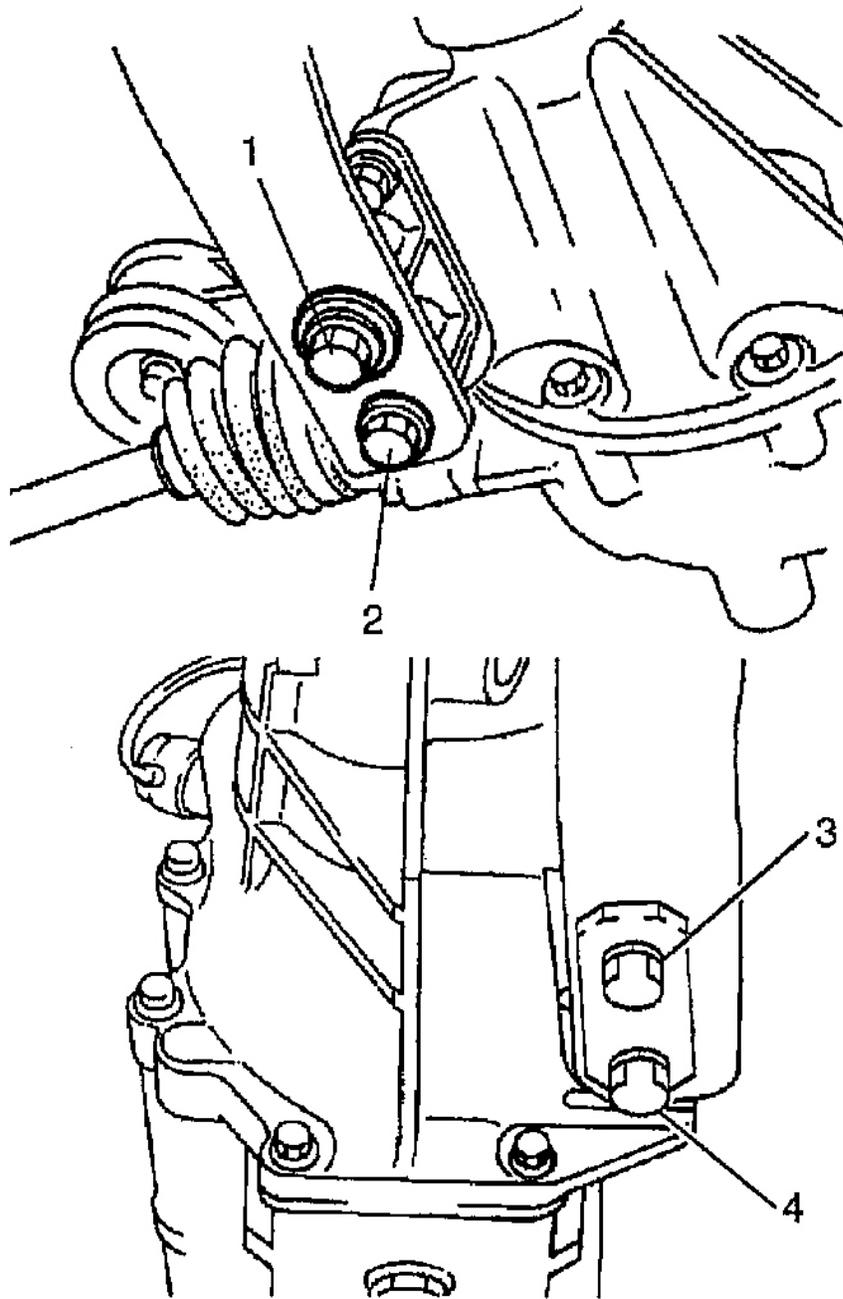
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Fig. 17: Positioning PPF And Installing Sleeve
Courtesy of MAZDA MOTORS CORP.

4. Install the spacer and bolts and tighten the reamer bolt making sure the threading is aligned properly. The reamer bolt should be installed in the forward hole.
5. Tighten the outer bolts making sure the threading is aligned properly.
6. Tighten the bolts to the specified torque in the order shown.

Tightening torque

104-123 N.m {10.6-12.6 kgf.m, 76.7-91.1 ft.lbf}



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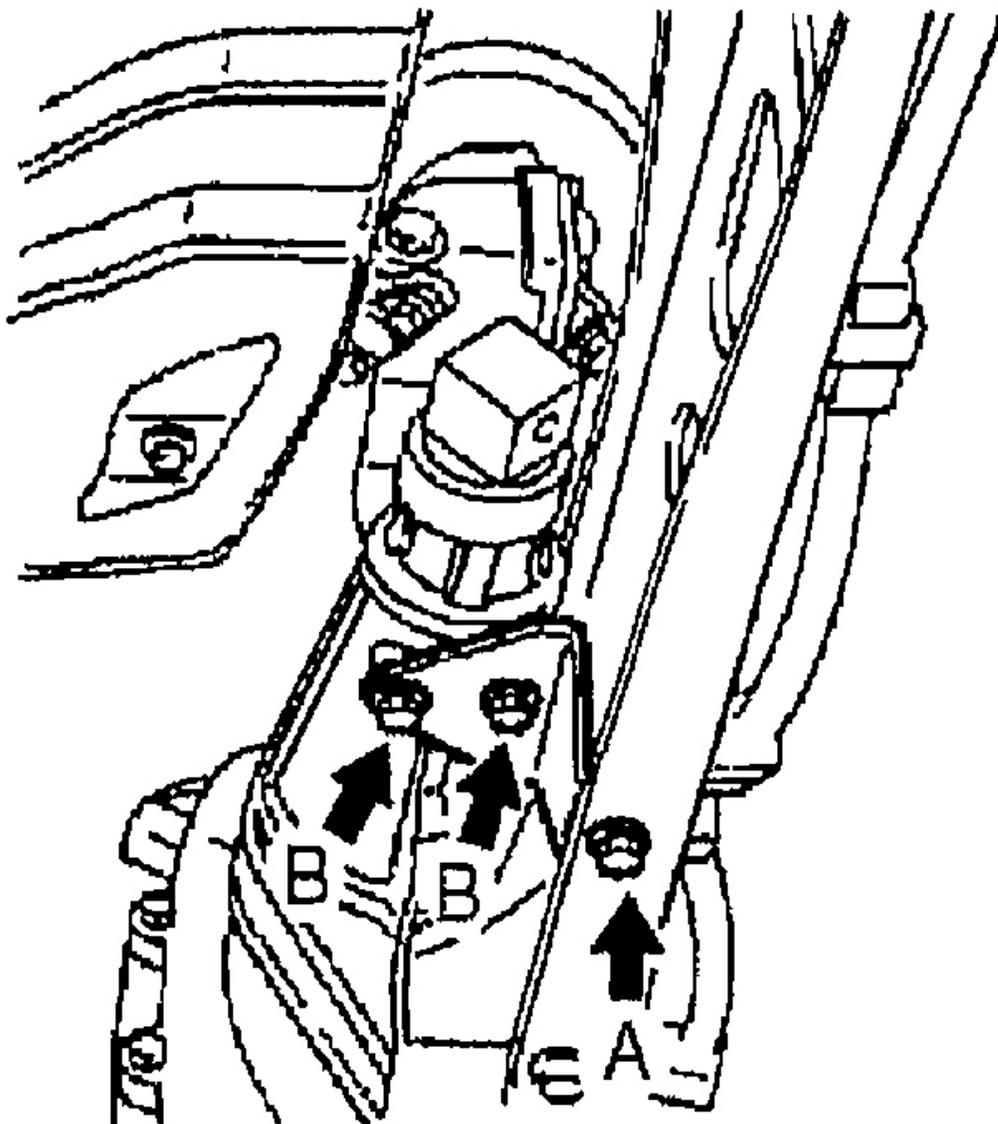
Fig. 18: Tightening Bolts In Order
Courtesy of MAZDA MOTORS CORP.

7. Install the PPF bracket.

Tightening torque

A:104-123 N.m {10.6-12.6 kgf.m, 76.7-91.1 ft.lbf}

B:37-53 N.m {3.7-5.5 kgf.m, 27-39 ft.lbf}



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Fig. 19: Installing PPF Bracket

Courtesy of MAZDA MOTORS CORP.

8. Remove the jack, and connect the wire harness.
9. Measure distance A with a straightedge and vernier calipers.
 - If the distance is not as specified, reposition the PPF to the transmission.

Distance

A:60.0-72.0 mm {2.37-2.83 in}

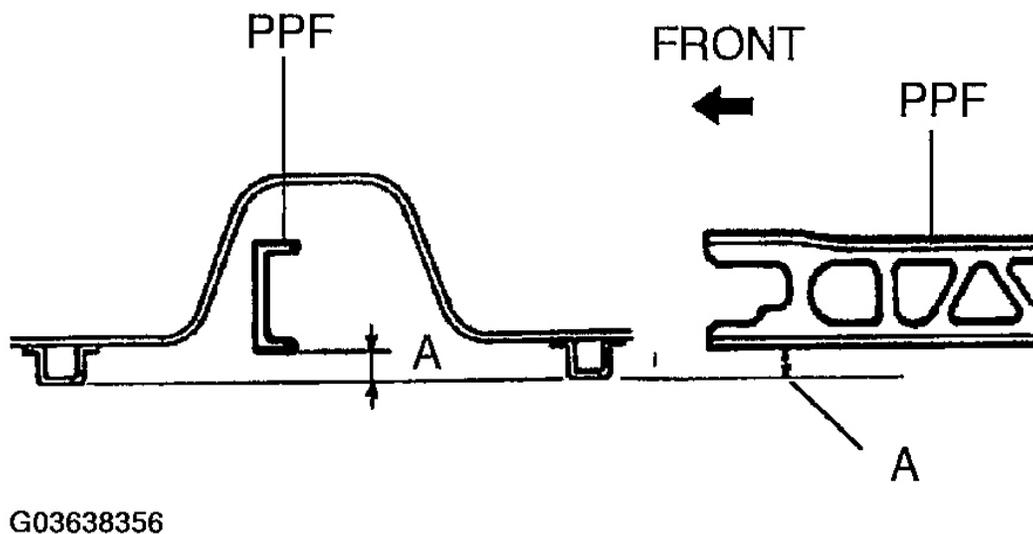


Fig. 20: Measuring Distance A With Straightedge And Vernier Calipers
 Courtesy of MAZDA MOTORS CORP.

SHIFT LEVER COMPONENT INSTALLATION NOTE

NOTE:

- The change control case must also be filled with the specified amount of oil whenever the extension housing has been removed or the transmission has been overhauled.

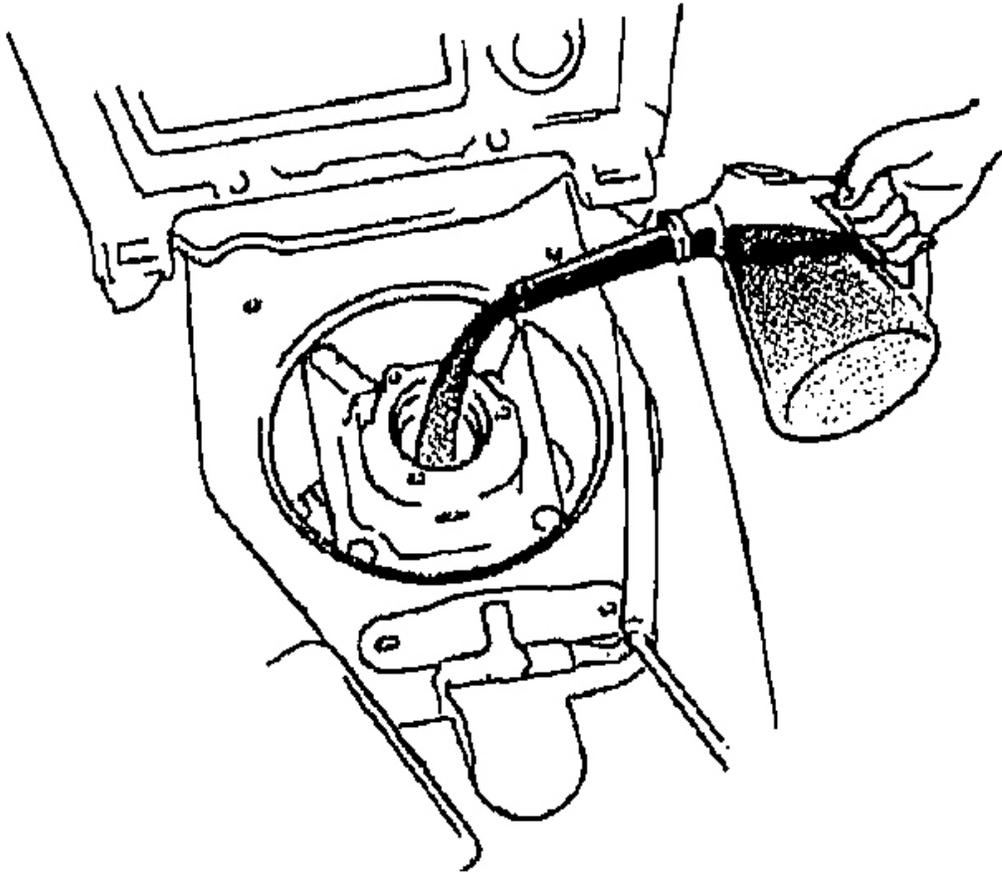
1. Pour the specified amount of oil into the change control case.

Specified oil

Grade:API service GL-4 or GL-5

Viscosity:SAE 75W-90

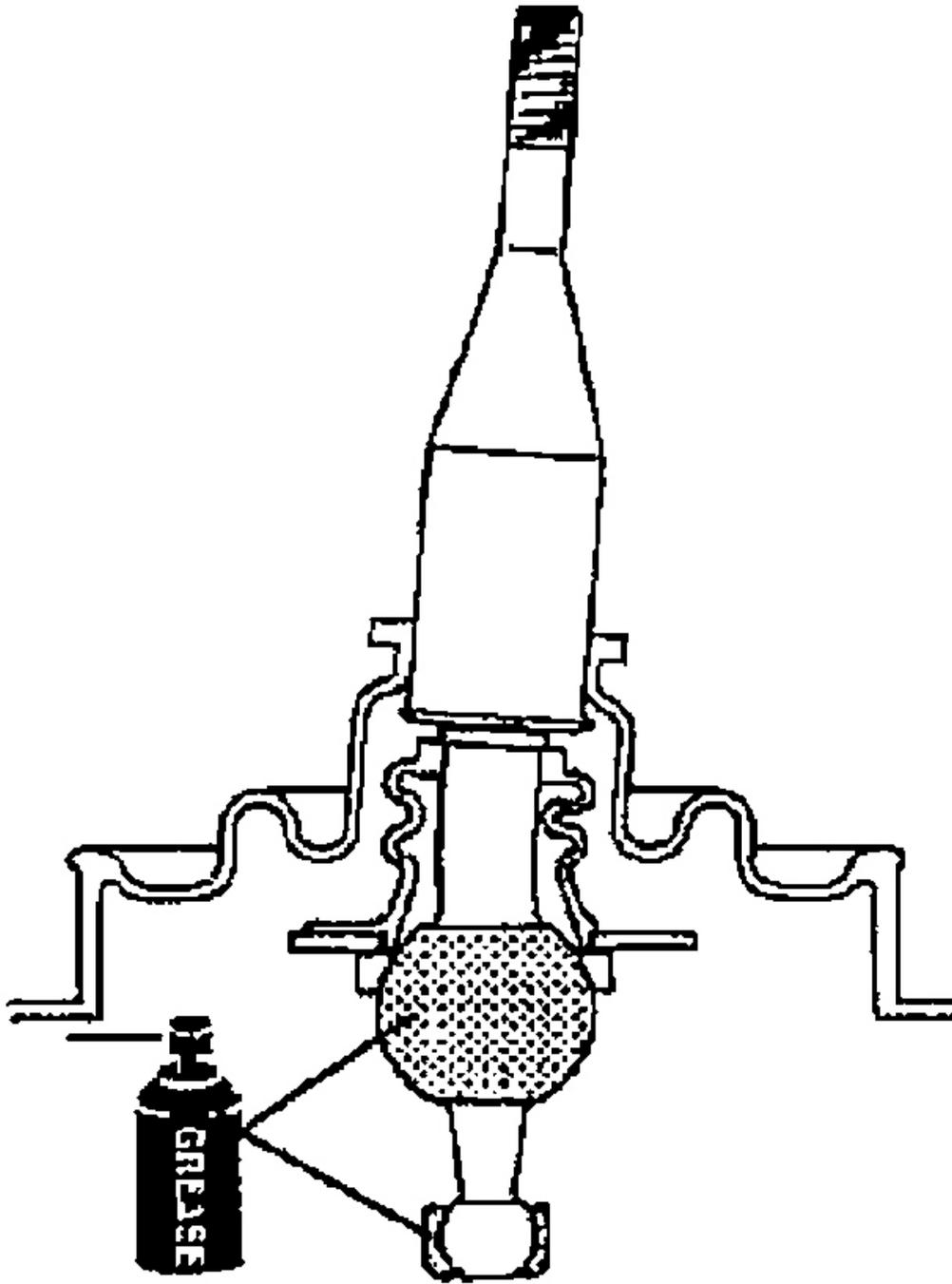
Capacity (approximate quantity):80-95 ml (80-95 cc, 4.9-5.8 cu in)



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Fig. 21: Pour Specified Amount Of Oil Into Change Control Case
Courtesy of MAZDA MOTORS CORP.

2. Apply grease to the shift lever component as shown in the figure.
3. Apply sealant to the contact surfaces of the shift lever component and the change control case.
4. Install the shift lever component.



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Fig. 22: Applying Grease To Shift Lever Component

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2005 TRANSMISSION Manual Transmission [M15M - D] - MX-5 Miata

Courtesy of MAZDA MOTORS CORP.