EXHAUST SYSTEM REMOVAL/INSTALLATION

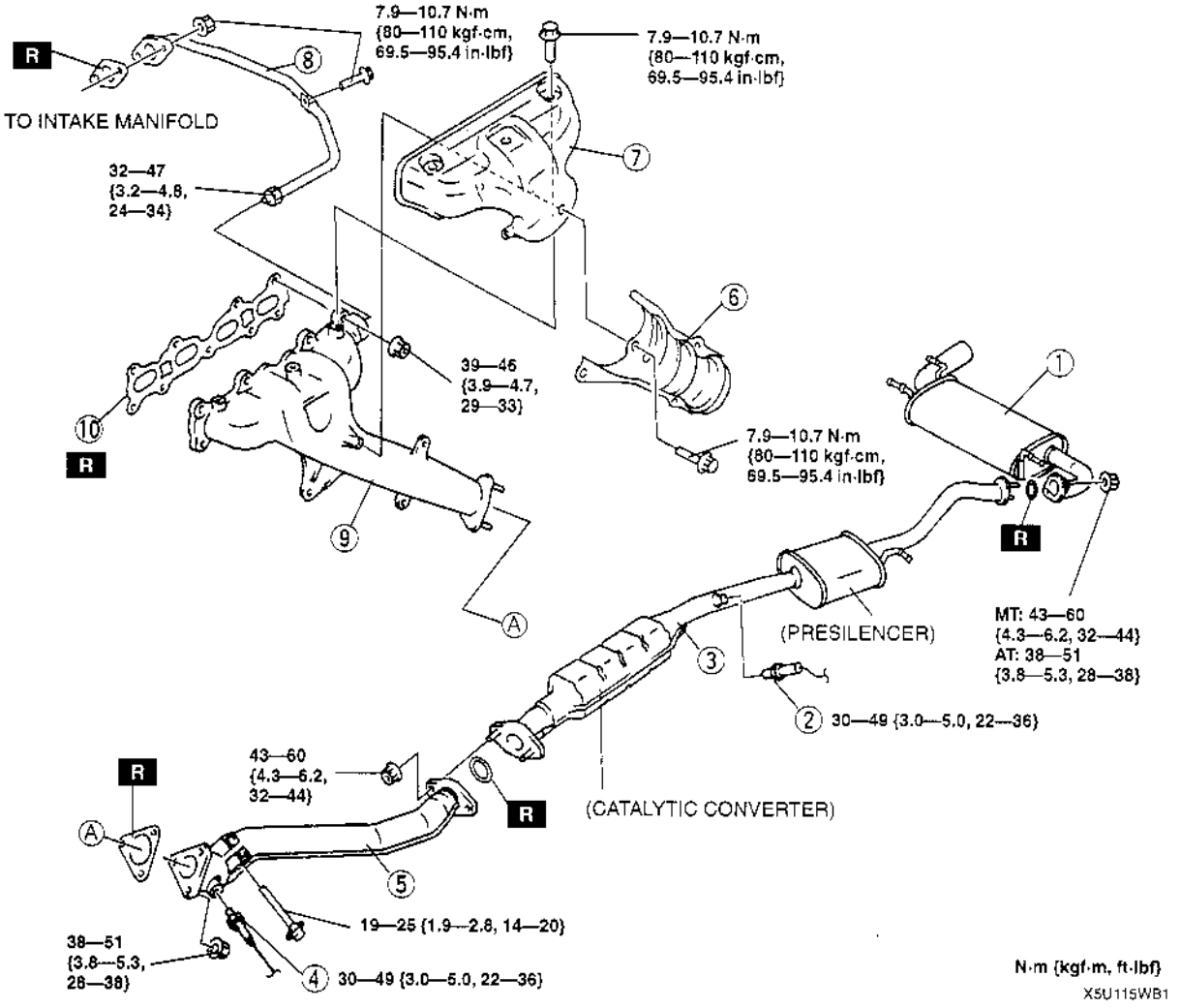
X5U115W03

Warning

- **When the engine and exhaust system are hot, they can badly burn. Turn off the engine and wait until they are cool before removing or installing the exhaust system.**

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

EXCEPT CALIFORNIA EMISSION REGULATIONS APPLICABLE MODEL



1	Main silencer
2	Heated oxygen sensor (Rear)
3	Middle pipe
4	Heated oxygen sensor (Front)
5	Front pipe
6	Exhaust manifold insulator No1 ☞ Removal Note

7	Exhaust manifold insulator No2
8	EGR pipe
9	Exhaust manifold
10	Exhaust manifold gasket ☞ Installation Note

2000 Mazda MX-5 Miata Workshop Manual

CONTENTS

FORWARD

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WARRANTY

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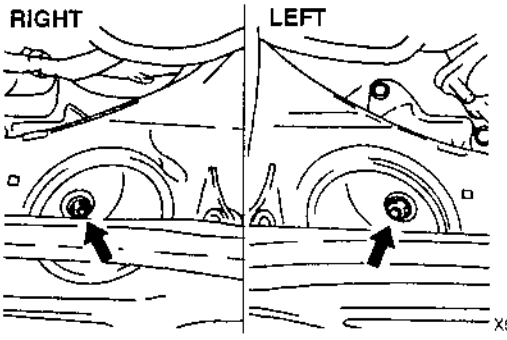
Engine Mount Nut Removal Note

1. Loosen the oil pan mounting bolts.
2. Remove the engine mounting nuts.



3. Lift the engine slightly by using a hoist.

Crossmember Bolt and Nut Removal Note

1. Support the crossmember by using a transmission jack.
2. Remove the crossmember bolts and nuts.

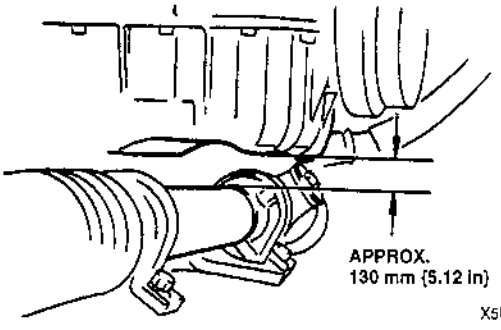
Caution

- **Do not damage the brake hoses, A/C pipes and P/S pipes when lowering the crossmember.**

Note

- Lower the crossmember after separating the steering intermediate shaft from the pinion shaft.

3. Lower the crossmember until the clearance between the oil pan and the steering gear housing exceeds **approx. 130 mm {5.12 in}**.



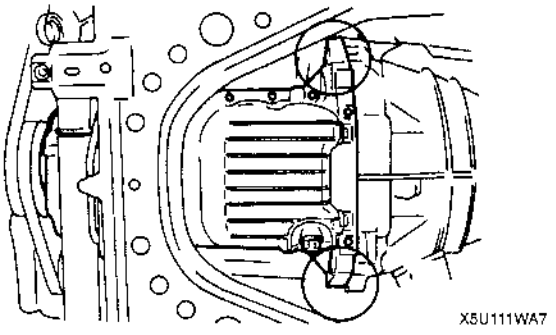
Oil Pan Removal Note

1. Remove the oil pan mounting bolts.

Caution

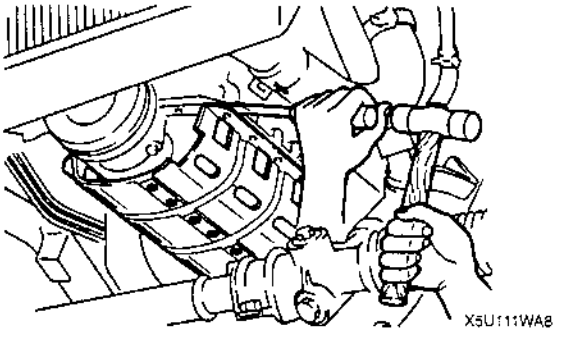
- **Pry tools can easily scratch the cylinder block and the oil pan contact surfaces. Prying off the oil pan can also easily bend the oil pan flange. Refer to the following instructions before removing the oil pan.**

2. Insert a screwdriver only at the points shown in the figure.



Oil Baffle Removal Note

- Insert a screwdriver or a separator tool between the cylinder block and the oil baffle.

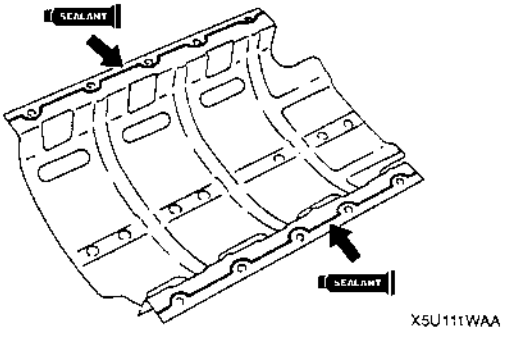


Oil Baffle Installation Note

- Apply silicone sealant to the oil baffle along the inside of the bolt holes.

Thickness

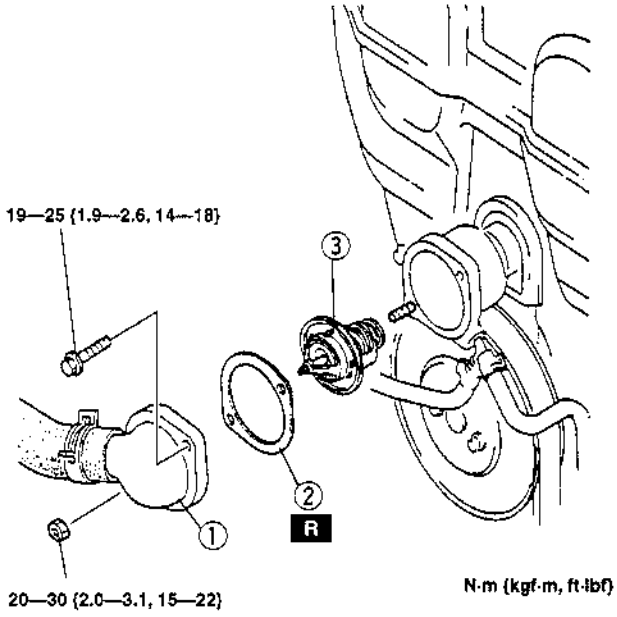
ϕ2.5—3.5 mm {0.099—0.137 in}



THERMOSTAT REMOVAL/INSTALLATION

X5U112W07

1. Disconnect the negative battery cable.
2. Remove the air hose.
3. Drain the engine coolant. (Refer to 01–12 ENGINE COOLANT REPLACEMENT.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

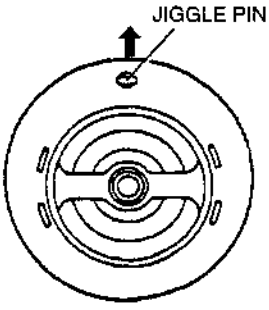


X5U112WA5

1	Thermostat cover
2	Thermostat cover gasket ☞ Installation Note
3	Thermostat ☞ Installation Note

Thermostat Installation Note

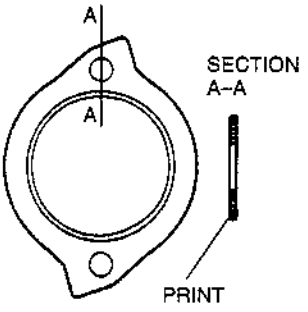
- Install the thermostat into the cylinder head with the jiggle pin at the top.



X5U112WA6

Thermostat Cover Gasket Installation Note

- Install a new gasket with the seal print side facing the cylinder head.



X5U112WA7

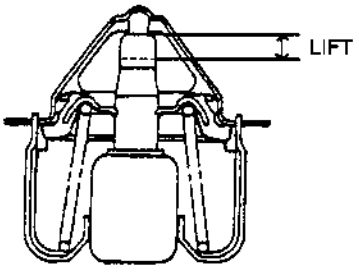
THERMOSTAT INSPECTION

X5U112W08

Inspect the thermostat for the following and replace as necessary.

- Open valve in room temperature
- Opening temperature and lift of the valve

Initial-opening temperature °C {°F}	83.5—88.0 {183—190}
Full-open temperature °C {°F}	100 {212}
Full-open lift mm {in}	8.5 {0.33} min.

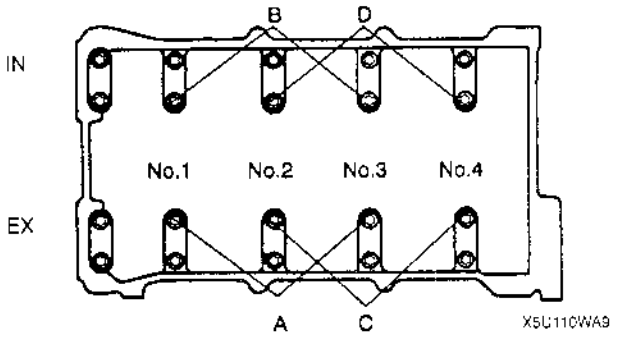


X5U112WA8

VALVE CLEARANCE ADJUSTMENT

Perform this same procedure for all camshafts requiring valve clearance adjustment.

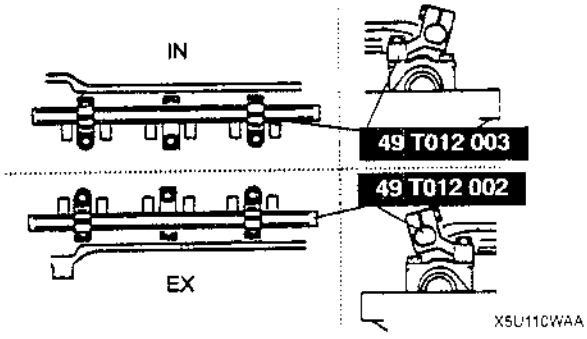
1. Turn the crankshaft clockwise so that the cams on the camshaft requiring valve clearance adjustment are positioned straight up.
2. Remove the camshaft cap bolts as necessary. Remove only one pair of cap bolts at a time. Install the cap bolts before removing the next pair.
   - A: For EX side No.1, 2, 3 cylinder adjustment shim removal.
   - B: For IN side No.1, 2, 3 cylinder adjustment shim removal.
   - C: For EX side No.2, 3, 4 cylinder adjustment shim removal.
   - D: For IN side No.2, 3, 4 cylinder adjustment shim removal.



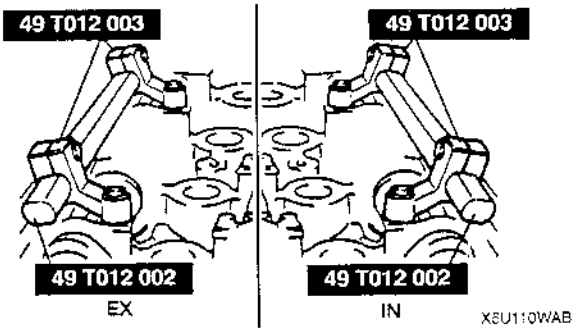
Note
- For EX side No.2, 3 cylinder adjustment shim removal, remove bolts either A or C.
- For IN side No.2, 3 cylinder adjustment shim removal, remove bolts either B or D.

3. Install the **SSTs** on the camshaft using the camshaft cap bolt holes.

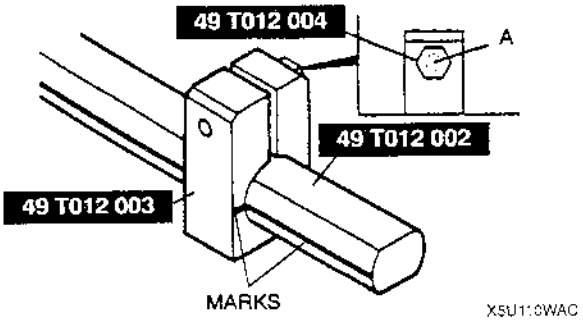
Tightening torque
11.3—14.2 N·m
{115—145 kgf·cm, 100—125 in·lbf}



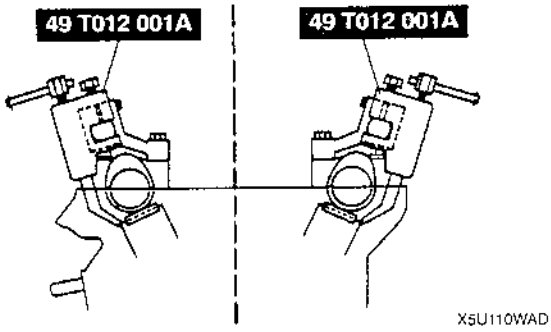
X5U110W04



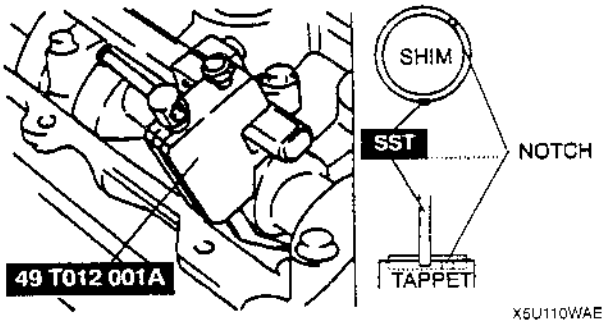
4. Align the marks on the **SSTs** (shaft and shaft clamp).
5. Tighten bolts A to secure the **SST** (shaft).



6. Face the **SST** (body) outside of the cylinder head, and mount it on the **SST** (shaft) at the point of the adjustment shim to be replaced.



7. Face the notch of the tappet so that a small screwdriver can be inserted.



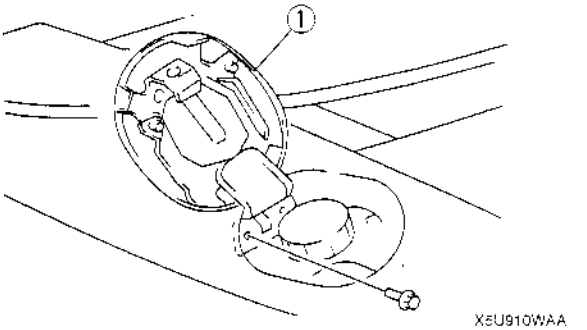
8. Set the **SST** on the tappet by its notch.
9. Tighten bolt B to secure the **SST** (body).

Caution
- **Cylinder head can be damaged when the tappet is pressed down.**

FUEL-FILLER LID REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Adjust the fuel-filler lid. (Refer to 09–10 FUEL-FILLER LID ADJUSTMENT.)

X5U910WC0



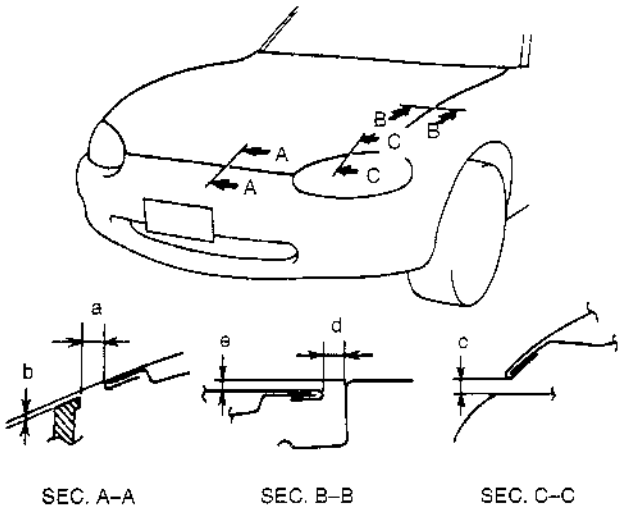
X5U910WAA

1	Fuel-filler lid

HOOD ADJUSTMENT

1. Measure the gap and height between the hood and the body.

Clearance
a: 3.8—6.2 mm {0.15—0.24 in}
b: –2.5—0.5 mm {–0.098—0.019 in}
c: 5.0—10.0 mm {0.20—0.39 in}
d: 3.8—6.2 mm {0.15—0.24 in}
e: –1.5—0.5 mm {–0.059—0.019 in}



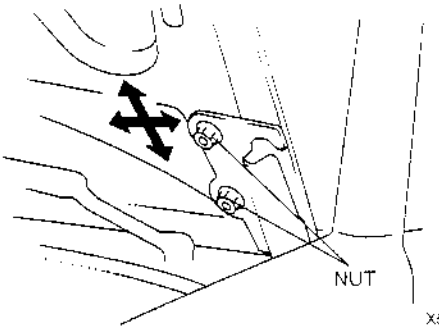
X5U910WA1

2. If not as specified, adjust the gap and height.
3. Adjust the hood lock after the hood has been aligned. (Refer to 09–14 HOOD LOCK ADJUSTMENT.)

X5U910WC2

Gap Adjustment

1. Loosen the hood installation nuts and reposition the hood.

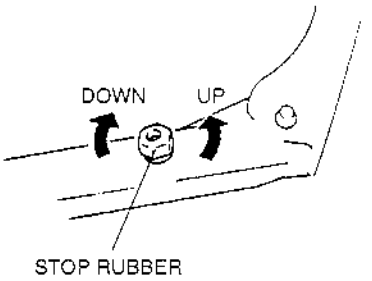


X5U910WA2

2. Tighten the hood installation nuts.

Height Adjustment

- Turn the stop rubber to adjust the height of the hood.



X5U910WA3

2001 Mazda MX-5 Miata Workshop Manual

FOREWORD

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Mazda Motor Corporation
HIROSHIMA, JAPAN

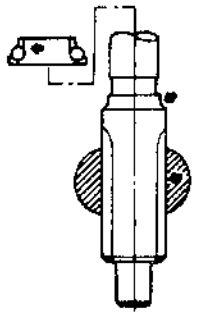
APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

CONTENTS

PRINTED IN U.S.A. JULY 2000
Form No. 1692-1U-00G
Part No. 9999-95-042B-01

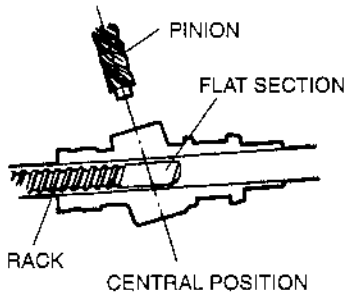
Pinion Shaft Assembly Note

1. Apply grease to the inner race of the upper bearing and install it to the pinion shaft.
2. Apply grease to the teeth of the pinion shaft.



U5U61125

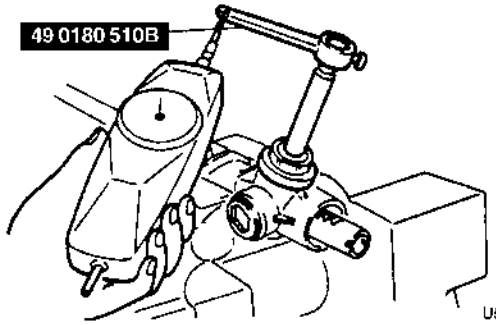
3. Turn the flat section of the rack toward the pinion, and insert the pinion.



U5U61126

Rear Cover Assembly Note

1. Apply grease to the outer race of the upper bearing and install it in the gear housing.
2. Install a new oil seal to the rear cover.
3. Apply sealant to the threads of the rear cover and install it into the gear housing.
4. Rotate the pinion to the left and right a few times to seat the bearing.
5. Tighten the rear cover so that the starting torque of the pinion is **2.0—3.4 N·m {20—35 kgf·cm, 18—30 in·lbf} (Pull scale reading: 20—34 N {2.0—3.5 kgf, 4.4—7.7 lbf})** as inspected by using the **SST** and a pull scale.



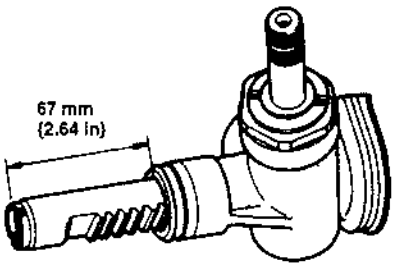
U5U61127

6. Tighten the locknut. Do not allow the rear cover to turn.

Tightening torque
50—68 N·m {5.0—7.0 kgf·m, 37—50 ft·lbf}

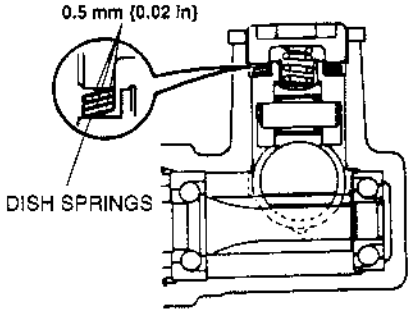
Adjusting Cover Assembly Note

1. Carefully move the rack so that the pinion is set to the center (neutral position) of the rack gear as shown.



X5U611WAB

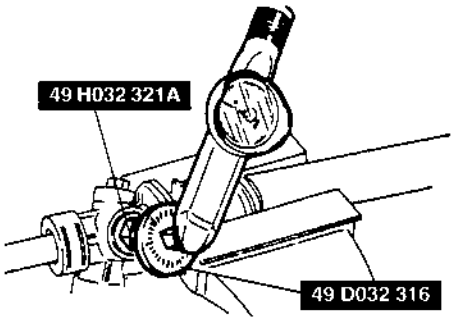
2. Install the roller component, needle roller, holder, dish springs, friction block, and the spring as shown.



U5U61129

3. Tighten the adjusting cover to **9.8 N·m {100 kgf·cm, 87 in·lbf}**, then loosen it **25°—45°**. Use the **SSTs** to secure the adjusting cover and the locknut.

Tightening torque
40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}



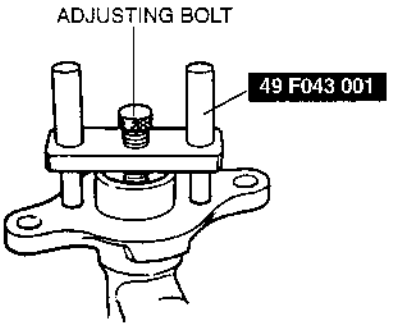
U5U61130

4. Measure the starting torque of the pinion by using the **SST**.

Center position ±90°
1.0—1.1 N·m
{9.5—11.5 kgf·cm, 8.3—9.9 in·lbf}

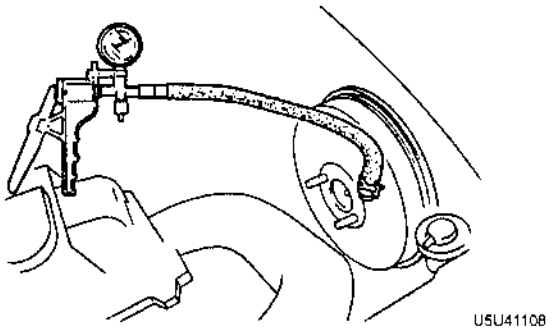
Master Cylinder Installation Note
Non ABS model

1. Measure the clearance between the push rod of the power brake unit and the piston of the master cylinder.
   (1) Place the **SST** at the top of the master cylinder. Turn the adjusting bolt until it contacts the bottom of the piston.



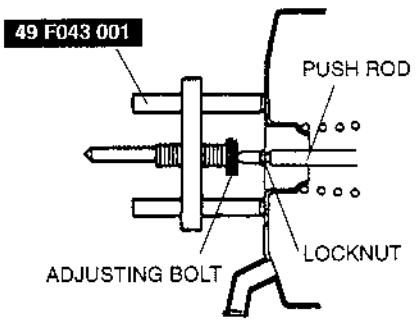
U5U41107

   (2) Apply a **66.7 kPa {500 mmHg, 19.7 inHg}** vacuum to the power brake unit by using a vacuum pump.



U5U41108

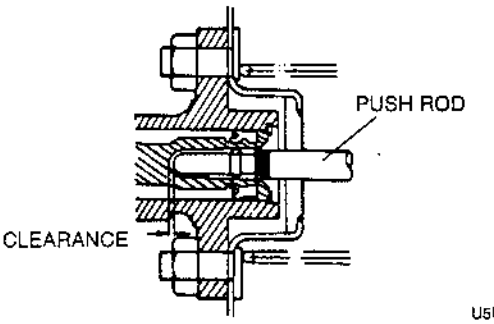
   (3) Invert the **SST** used in step 1, and place it on the power brake unit.
   (4) Measure the clearance between the end of the adjusting bolt and the push rod of the power brake unit. If it is not **0 mm {0 in}**, loosen the push rod locknut and turn the push rod to make the adjustment.



U5U41109

2. By making the above adjustment, the clearance between the push rod and piston (after installation of the brake master cylinder and the power brake unit) will be as shown in the table below.

Condition	Clearance
When vacuum applied to unit is approx. 66.7 kPa {500 mmHg, 19.7 inHg}.	0.1—0.4 mm {0.004—0.016 in}



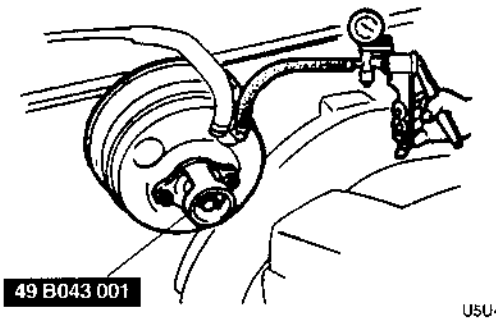
U5U41110

ABS model

1. Inspect the push rod clearance as follows.
   (1) Turn the nut of the **SST** clockwise to fully retract the **SST** gauge rod. Attach the **SST** to the power brake unit.

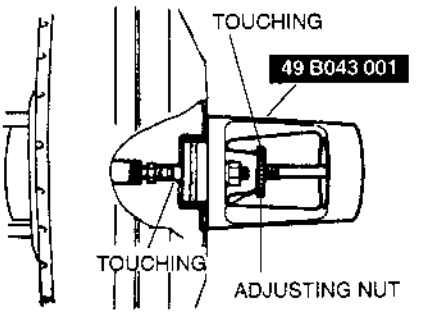
Tightening torque
9.8—16 N·m {1.0—1.6 kgf·m, 7.2—11 ft·lbf}

   (2) Apply a **66.7 kPa {500 mmHg, 19.7 inHg}** vacuum by using a vacuum pump.



U5U41111

   (3) Turn the adjusting nut of the **SST** counterclockwise until the gauge rod just contacts the push rod end of the power brake unit. Push lightly on the end of the gauge rod to be sure it is seated. Verify that there is no gap between the adjusting nut and **SST** body.



U5U41112

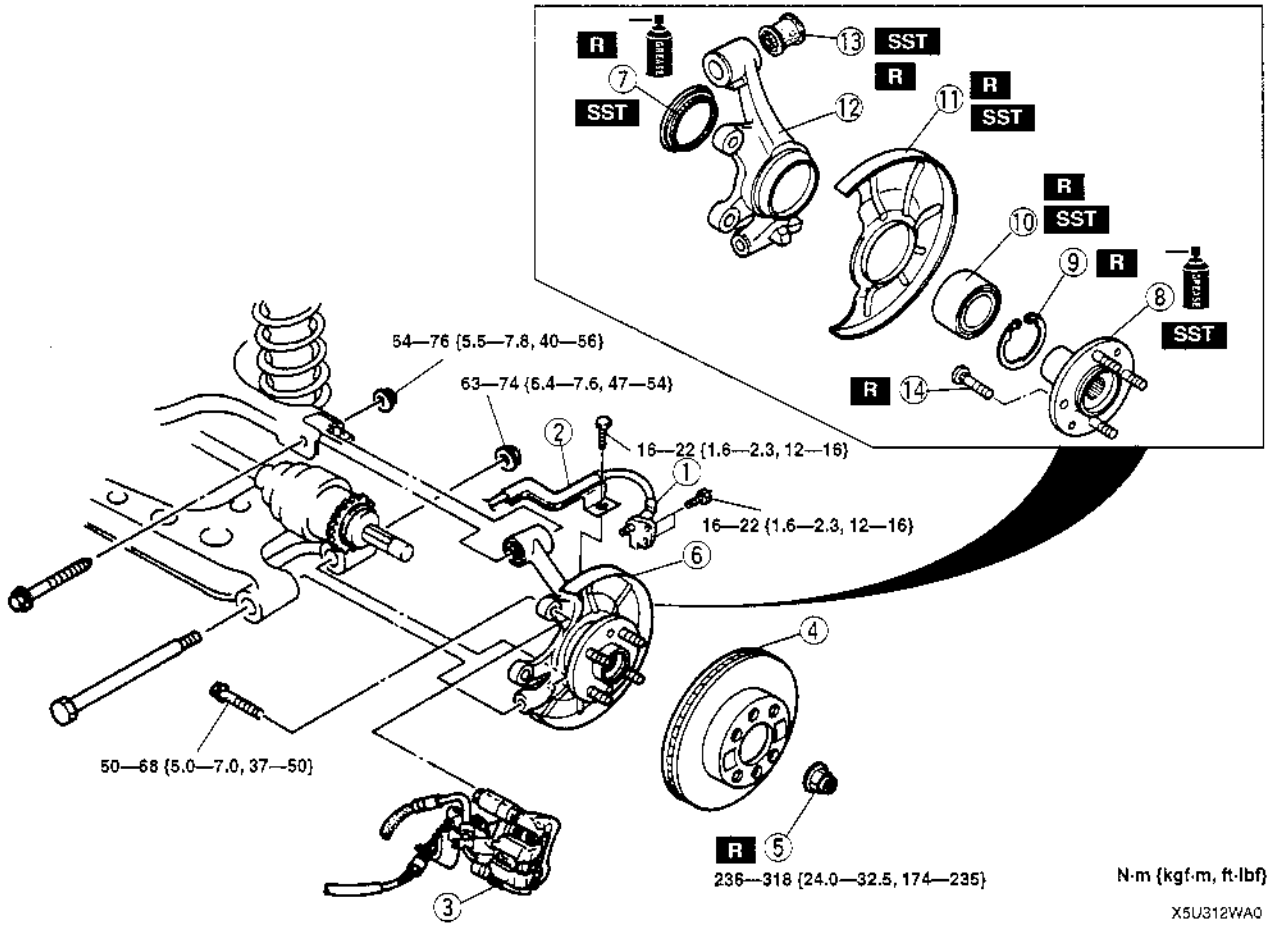
WHEEL HUB, KNUCKLE REMOVAL/INSTALLATION

X5U312W02

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



X5U312WA0

1	ABS wheel-speed sensor (if equipped)
2	Sensor bracket
3	Brake caliper component
4	Disc plate ☞ 04–11 FRONT BRAKE (DISC) REMOVAL/INSTALLATION, Disc Plate Removal Note ☞ 04–11 FRONT BRAKE (DISC) REMOVAL/INSTALLATION, Disc Plate Installation Note
5	Locknut ☞ Installation Note
6	Knuckle, wheel hub, and dust cover
7	Oil seal ☞ Installation Note
8	Rear wheel hub ☞ Removal Note ☞ Installation Note

9	Retaining ring
10	Wheel bearing ☞ Removal Note ☞ Installation Note
11	Dust cover ☞ Removal Note ☞ Installation Note
12	Knuckle
13	Bushing ☞ Removal Note ☞ Installation Note
14	Wheel hub bolt ☞ 03–11 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Wheel hub Bolt Removal Note

2002 Mazda MX-5 Miata Workshop Manual

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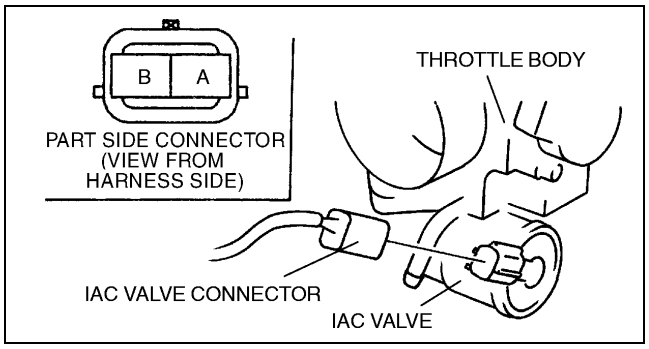
Mazda Motor Corporation
HIROSHIMA, JAPAN

3. Measure the resistance between the IAC valve terminals using an ohmmeter.
   - If as specified but the Simulation Test is failed, carry out the “Circuit Open/Short Inspection”.
   - If not as specified, replace the IAC valve. (See 01–13–5 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION.)

   Resistance

   8.7—10.5 ohms (24°C {75°F})



Y5U113WA1

4. Remove the IAC valve, and inspect it for any damage or clogging.
   - Replace the IAC valve if not as specified. (See 01–13–5 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION.)

Circuit Open/Short Inspection
Open circuit
- Power circuit (IAC valve connector terminal A and PCM connector terminal 2P)
- GND circuit (IAC valve connector terminal B and PCM connector terminal 2Q)

Short circuit
- IAC valve connector terminal A and PCM connector terminal 2P to GND

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION

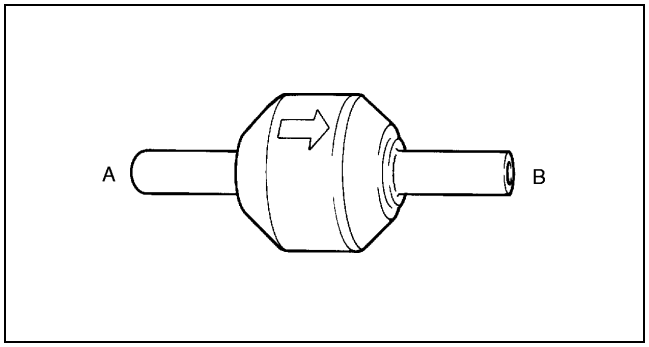
A5U011313995W01

1. Remove the VTCS check valve (one-way) or delay valve. (See 01–13–3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION.)

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION

A5U011313995W02

1. Remove the VTCS check valve (one-way) or delay valve. (See 01–13–6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION.)
2. Blow through A and verify that the air flows from B.
3. Blow through B and verify that the air does not flow from A.
   - If not as specified, replace the VTCS check valve (one-way) or delay valve.



X5U113WA7

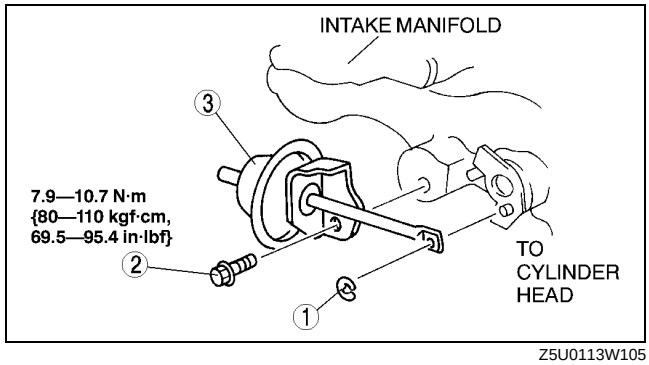
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION

A5U011320152W01

1. Remove the air hose. (See 01–13–3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	E ring
2	Bolt
3	VTCS shutter valve actuator

3. Install in the reverse order of removal.



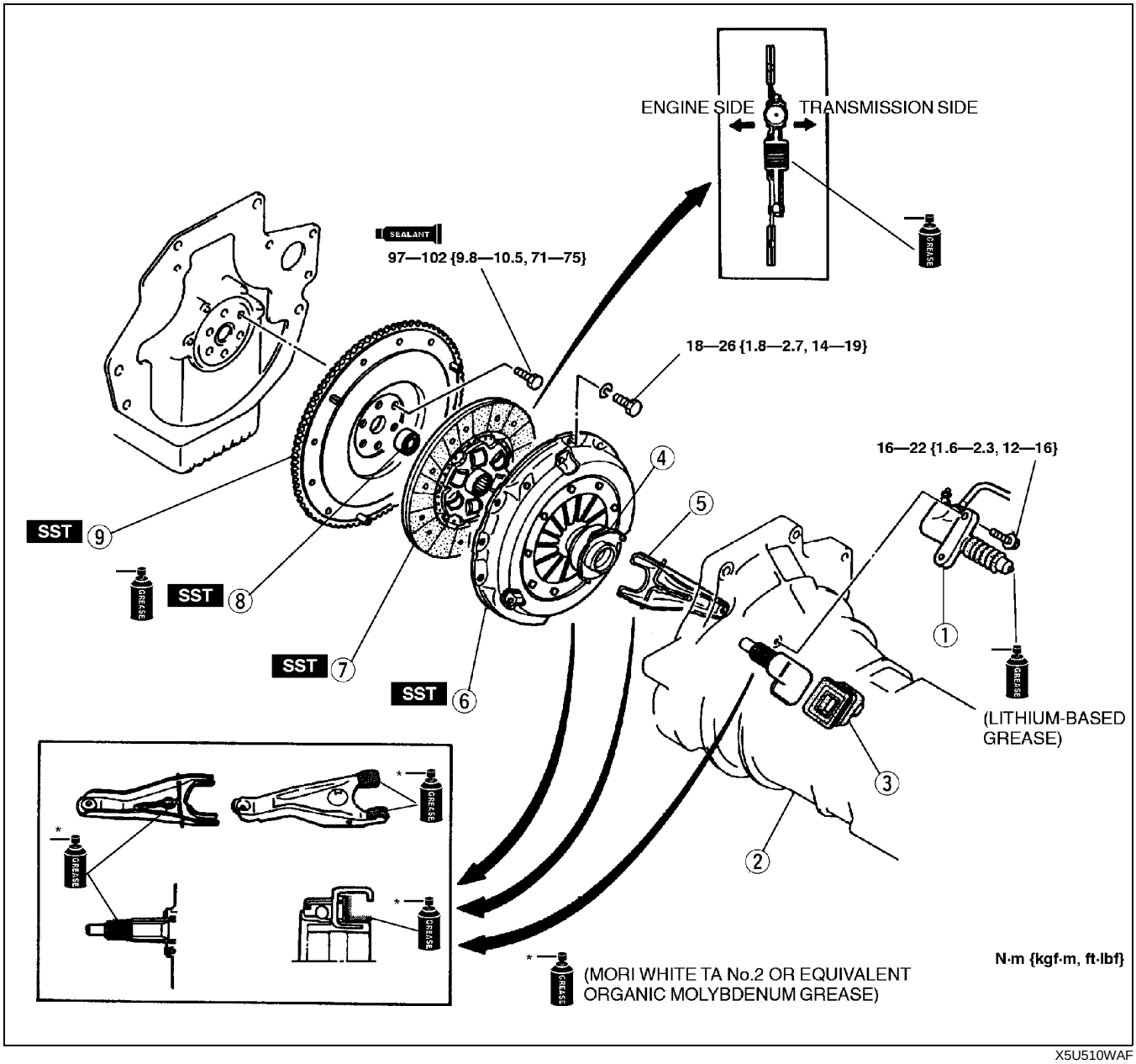
Z5U0113W105

CLUTCH UNIT REMOVAL/INSTALLATION

A5U051016000W01

Note
- The clutch release cylinder can be removed from the transmission with the clutch pipe connected.

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



X5U510WAF

1	Clutch release cylinder
2	Transmission (See 05–11A–4 MANUAL TRANSMISSION REMOVAL/INSTALLATION [M15M-D]) (See 05–11B–3 MANUAL TRANSMISSION REMOVAL/INSTALLATION [Y16M-D])
3	Boot
4	Clutch release collar (See 05–10–14 CLUTCH RELEASE COLLAR INSPECTION)
5	Clutch release fork

6	Clutch cover (See 05–10–12 Clutch Cover, Clutch Disc Removal Note) (See 05–10–13 Clutch Cover Installation Note)
7	Clutch disc (See 05–10–12 Clutch Cover, Clutch Disc Removal Note) (See 05–10–13 Clutch Disc Installation Note)
8	Pilot bearing (See 05–10–12 Pilot Bearing Removal Note) (See 05–10–13 Pilot Bearing Installation Note)
9	Flywheel (See 05–10–12 Flywheel Removal Note) (See 05–10–12 Flywheel Installation Note)

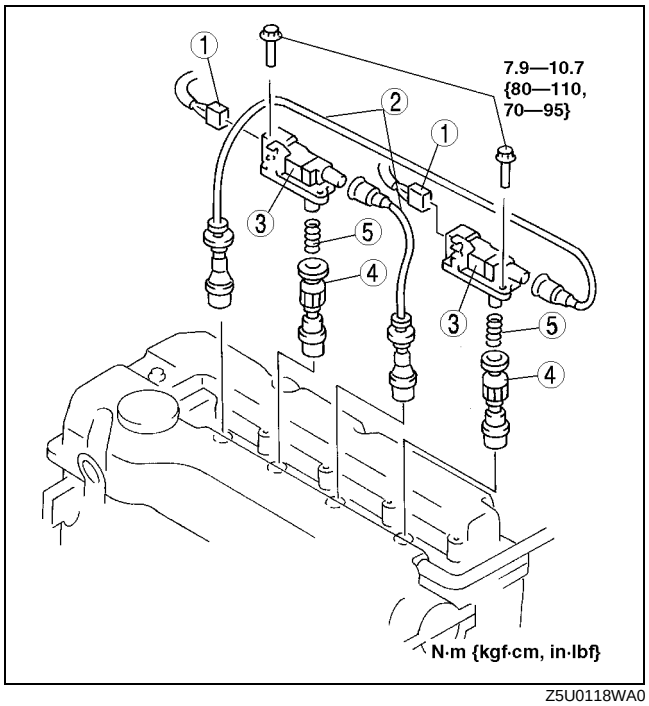
IGNITION COIL REMOVAL/INSTALLATION

A5U011818100W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Connector
2	High-tension lead
3	Ignition coil
4	Plug cap
5	Spring

3. Install in the reverse order of removal.



Z5U0118WA0

IGNITION COIL INSPECTION

A5U011818100W02

Igniter

1. Carry out spark test. (See 01–03–60 Spark Test.)

Ignition Coil Operation Inspection

1. Remove ignition coils, high-tension leads, and spark plugs.
2. Connect the ignition coil, high-tension lead, spark plug, and the battery as shown in the figure.

Caution

- **When connecting the ignition coil, be sure to attach as a female terminal to each terminal. Otherwise, coil terminals may come into contact and the ignition coil could be damaged.**

Note

- Use the high-tension lead and spark plug that function properly.

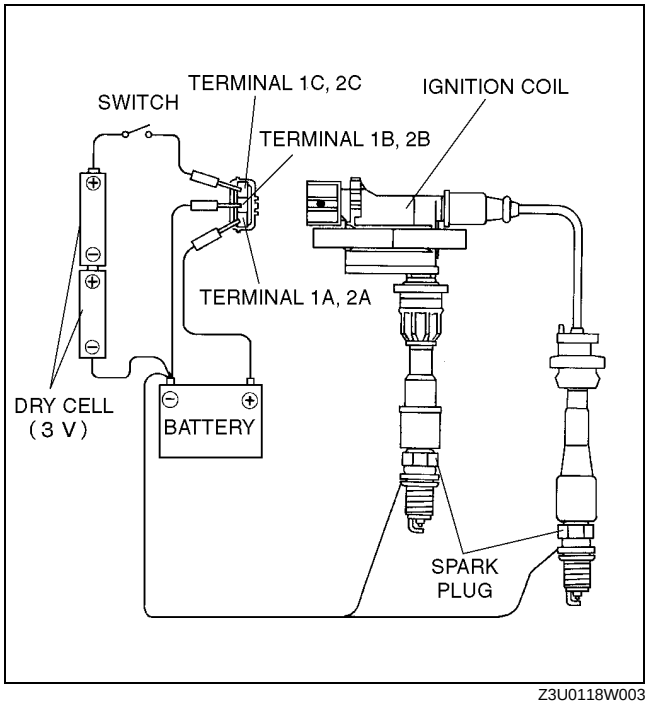
3. Verify that the spark plug produces a strong, pale spark when changing the switch off to on.

Warning

- **Do not hold the spark plug, high-tension lead, or ignition coil while inspecting the ignition coil. You may be subjected to a strong shock.**

Note

- No.1 and No.4 cylinders and No.2 and No.3 cylinder are ignited simultaneously.



Z3U0118W003

2003 Mazda MX-5 Miata Workshop Manual

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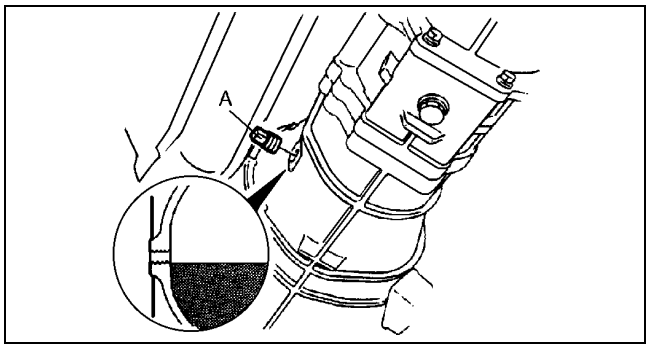
Mazda Motor Corporation
HIROSHIMA, JAPAN

TRANSMISSION OIL INSPECTION [M15M-D]

A5U051127001W01



A5U0511W001

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.

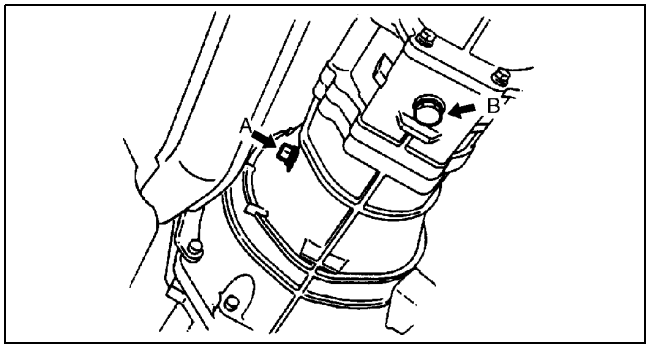
   Specified oil
   Grade: API service GL-4 or GL-5
   Viscosity: SAE 75W-90 (All season) or SAE 80W-90 (Above 10°C {50°F})

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]

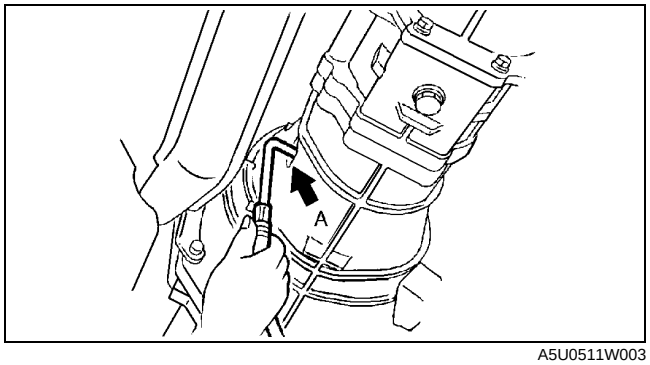
A5U051127001W02



A5U0511W002

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.

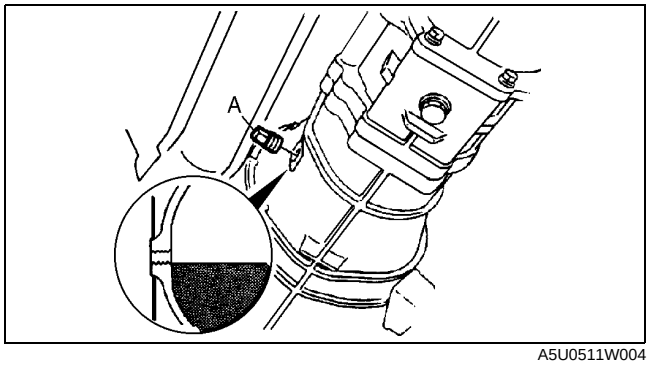
   Tightening torque
   B: 40—58 N·m {4.0—6.0 kgf·m, 29—43 ft·lbf}



A5U0511W003

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 (approximate quantity): 2.0 L {2.1 US qt, 1.8 Imp qt}



A5U0511W004

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}

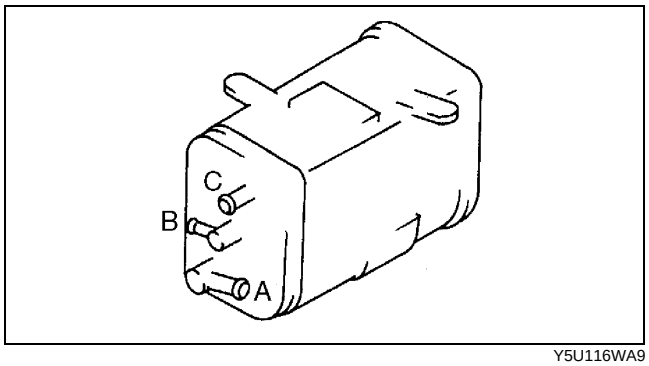
CHARCOAL CANISTER INSPECTION

A5U011613970W01

1. Remove the charcoal canister. (See 01–14–6 FUEL TANK REMOVAL/INSTALLATION.)
2. Plug ports A and B, then blow air into port C.

Caution
- **Do not apply more than 20 kPa {150 mmHg, 16 inHg} of pressure to the charcoal canister. Doing so may break the charcoal canister.**

3. Verify that there is no air leakage when pressure of **20 kPa {150 mmHg, 16 inHg}** is applied to port C.
   - If not as specified, replace the charcoal canister.



Y5U116WA9

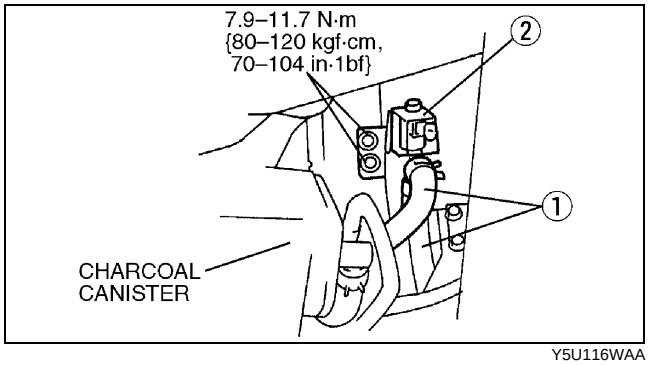
CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/INSTALLATION

A5U011618743W01

1. Disconnect the negative battery cable.
2. Raise the rear of the vehicle and support it with safety stands.
3. Remove in the order indicated in the table.

1	Evaporative hose (See 01–16–6 Evaporative Hose Installation Note)
2	CDCV

4. Install in the reverse order of removal.



Y5U116WAA

Evaporative Hose Installation Note

1. Install the evaporative hose until it contacts the stopper.

CANISTER DRAIN CUT VALVE (CDCV) INSPECTION

A5U011618743W02

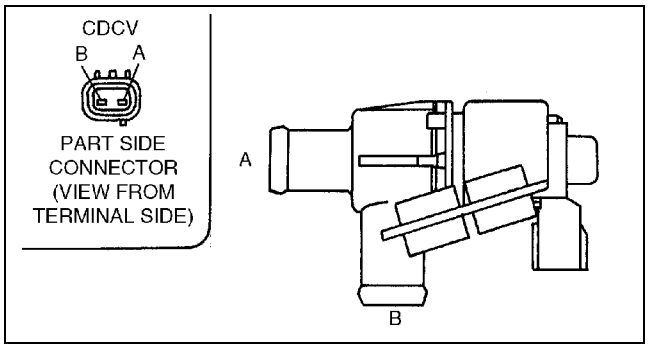
Simulation Test

1. Carry out the “Evaporative Emission (EVAP) Control System Inspection”. (See 01–03–59 Evaporative Emission (EVAP) System Leak Inspection Using Vacuum Pump.)
   - If not as specified, perform the further inspection for the CDCV.

Airflow Inspection

Note
- Perform the following test only when directed.

1. Remove the CDCV. (See 01–16–6 CANISTER DRAIN CUT VALVE (CDCV) REMOVAL/INSTALLATION.)
2. Inspect airflow between the ports under the following conditions.
   - If as specified but the “Evaporative Emission (EVAP) Control System Inspection” fails, inspect evaporative hoses for improper routing, kinks or leakage, and carry out “Circuit Open/Short Inspection”.
   - If not as specified, replace the CDCV.



A5U0116W002

○—○ : Continuity ○═○ : Airflow

Step	Terminal		Port	
	A	B	A	B
1	○—○		○═○	
2	B+	GND		

W6U116WAA

2004 Mazda MX-5 Miata Workshop Manual

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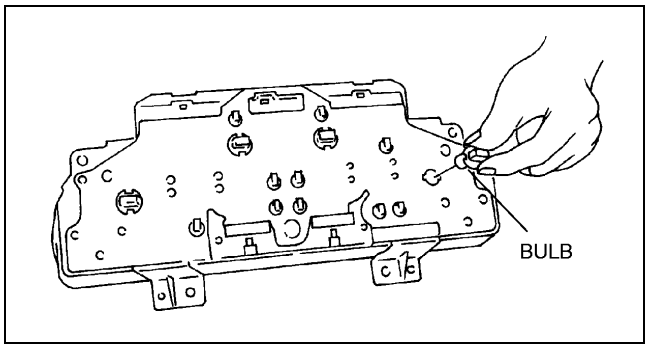
Mazda Motor Corporation
HIROSHIMA, JAPAN

WARNING AND INDICATOR LIGHT BULB REMOVAL/INSTALLATION

A5U092255431W01

1. Disconnect the negative battery cable.
2. Remove the instrument cluster. (See 09–22–3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
3. Turn the socket counterclockwise to remove the bulb as shown in the figure.
4. Install in the reverse order of removal.

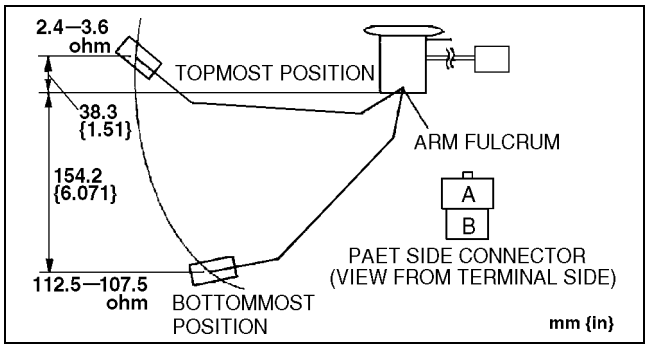


X5U922WAC

FUEL GAUGE SENDER UNIT INSPECTION

A5U092260960W01

1. Remove the fuel pump. (See 01–14–10 FUEL PUMP (FP) REMOVAL/INSTALLATION.)
2. Move the float to the topmost and bottommost positions, and verify that the resistance between terminals A and B of the unit and the position of the float are as indicated in the figure.
   - If they are not as indicated, replace the fuel gauge sender unit. (See 01–14–10 FUEL PUMP (FP) REMOVAL/INSTALLATION.)



A5U0922W101

OIL PRESSURE SWITCH INSPECTION

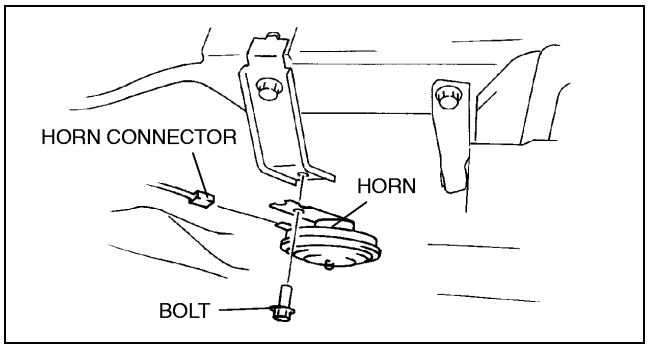
A5U092218500W01

1. Verify that the oil pressure gauge needle moves to H when the engine is started.
2. Verify that the oil pressure gauge needle moves to L when the engine is stopped.
   - If the oil pressure gauge needle does not move, inspect the oil pressure gauge and related wiring harness.
   - If the oil pressure gauge and related wiring harness are normal, inspect the oil pressure. (See 01–11–3 OIL PRESSURE INSPECTION.)
   - If the oil pressure is normal, replace the oil pressure switch. (See 01–11–3 OIL PRESSURE INSPECTION.)

HORN REMOVAL/INSTALLATION

A5U092266790W01

1. Disconnect the negative battery cable.
2. Remove the upper seal board.
3. Disconnect the horn connector.
4. Remove the bolt.
5. Remove the horn.
6. Install in the reverse order of removal.

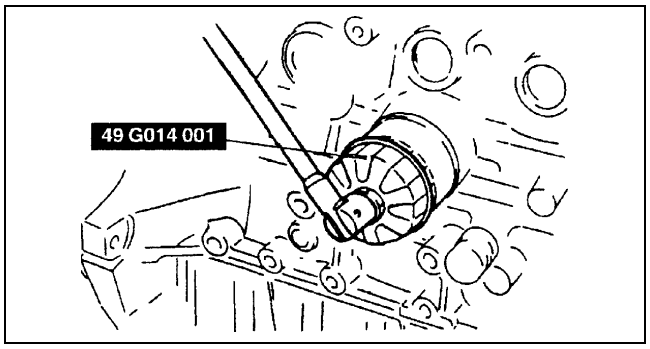


X5U922WAE

OIL FILTER REPLACEMENT

A5U011114300W01

1. Remove the oil filter using the **SST**.
2. Use a clean rag to wipe off the mounting surface on the oil filter body.
3. Apply clean engine oil to the O-ring of the oil filter.
4. Using the **SST**, tighten the filter according to the installation direction on the side of it or packing box.
5. Start the engine and inspect for oil leakage.
6. Inspect the oil level.
   - Add oil if necessary. (See 01–11–2 ENGINE OIL LEVEL INSPECTION.)



X5U111WA0

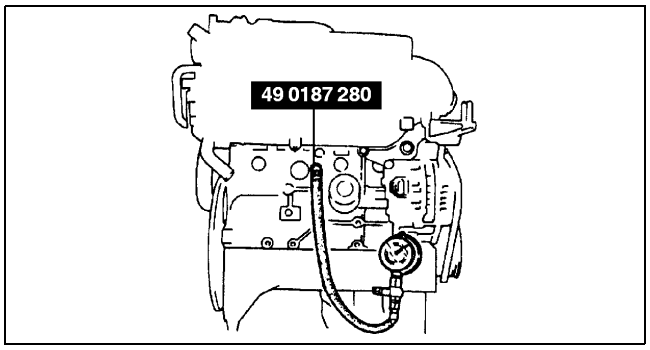
OIL PRESSURE INSPECTION

A5U011102000W01

Warning

- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin washing with soap and water immediately after working with engine oil.**
- **Hot engines and engine oil are hot, they can cause burns. Turn off the engine and wait until it and engine oil have cooled.**

1. Remove the oil pressure switch.
2. Screw the **SST** into the oil pressure switch installation hole.
3. Warm up the engine to normal operating temperature.
4. Run the engine at the specified speed, and note the gauge readings.
   - If the pressure is not as specified, inspect amount of engine oil, and inspect for oil leakage or any wear parts inside of engine, etc. Repair or replace if necessary.



X5U111WA1

Note

- The oil pressure can vary with oil viscosity and temperature.

Oil pressure
295—392 kPa {3.0—4.0 kgf/cm^2, 43—56 psi} [3,000 rpm]

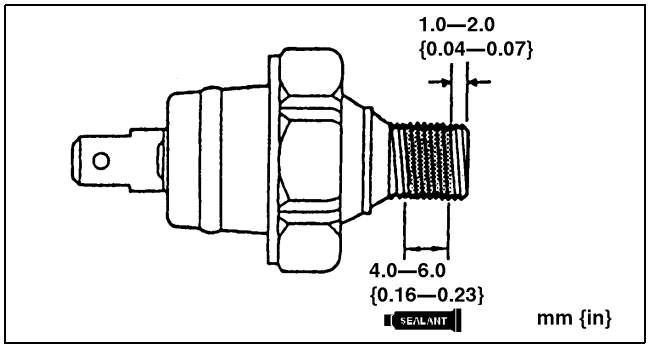
5. Stop the engine and wait until it is cool.
6. Remove the **SST**.
7. Apply silicone sealant to the oil pressure switch threads as shown.

Caution

- **Do not apply liquid gasket to the tip of the oil pressure switch by 1.0—2.0 mm {0.4—0.7 in }.**

8. Install the oil pressure switch.

Tightening torque
12—17 N·m {1.2—1.8 kgf·m, 9—13 ft·lbf}



Y5U111WA3

9. Start the engine and inspect for oil leakage.

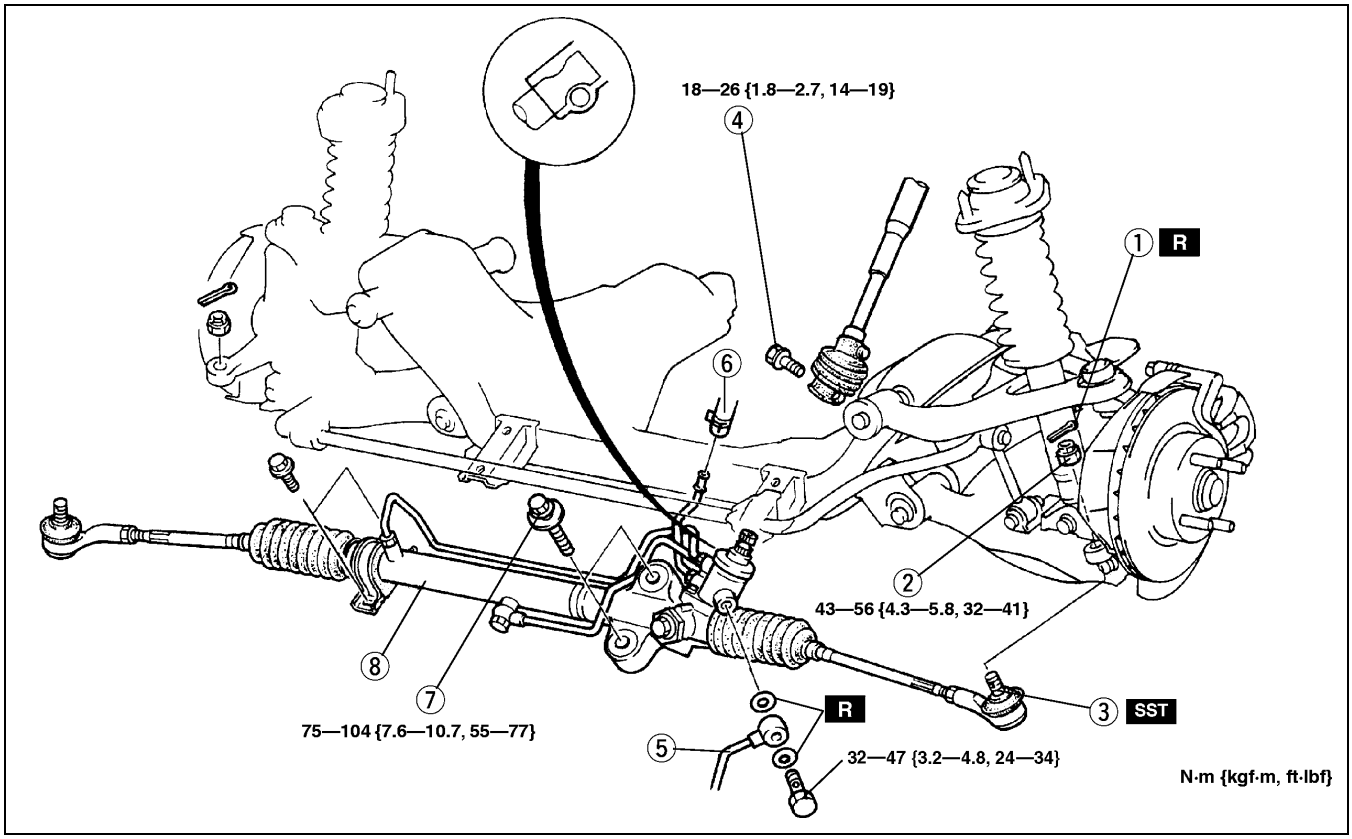
STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION (ENGINE SPEED SENSING POWER STEERING)

A5U061232960W01

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, inspect the toe-in. (See 02–11–1 FRONT WHEEL ALIGNMENT.)



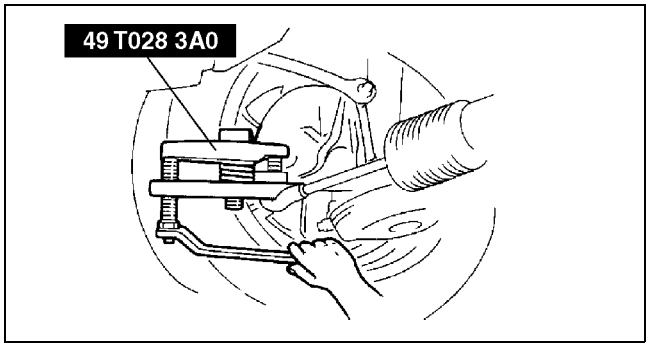
Z5U0612W111

1	Cotter pin
2	Nut
3	Tie-rod end ball joint (See 06–12–7 Tie-rod End Ball Joint Removal Note)
4	Bolt

5	Pressure pipe
6	Return hose
7	Mounting bracket bolt
8	Steering gear and linkage

Tie-rod End Ball Joint Removal Note

1. Separate the tie-rod end ball joint from the knuckle using the **SST**.



Z5U0611W130

INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC]

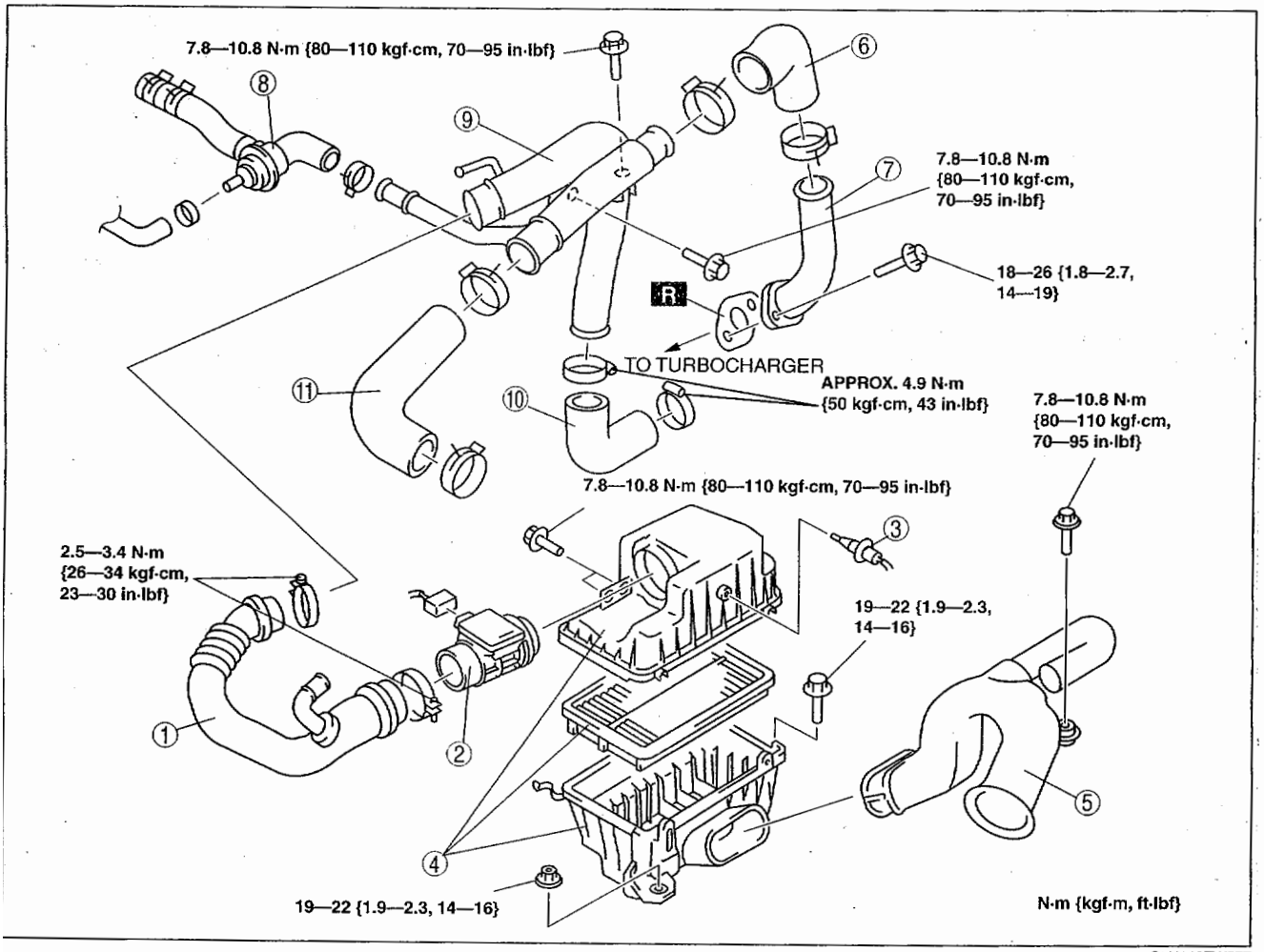
D5U011300000W05

Warning

- **A hot engine and intake air system can cause severe burns. Turn off the engine and wait until all components are cool before removing the intake air system.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure". (See 01–14–3 BEFORE SERVICE PRECAUTION [BP, BP WITH TC].)**

1. Disconnect the negative battery cable.
2. Drain the engine coolant from the radiator. (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the under cover.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Complete the "AFTER SERVICE PRECAUTION". (See 01–14–3 AFTER SERVICE PRECAUTION [BP, BP WITH TC].)

Step1

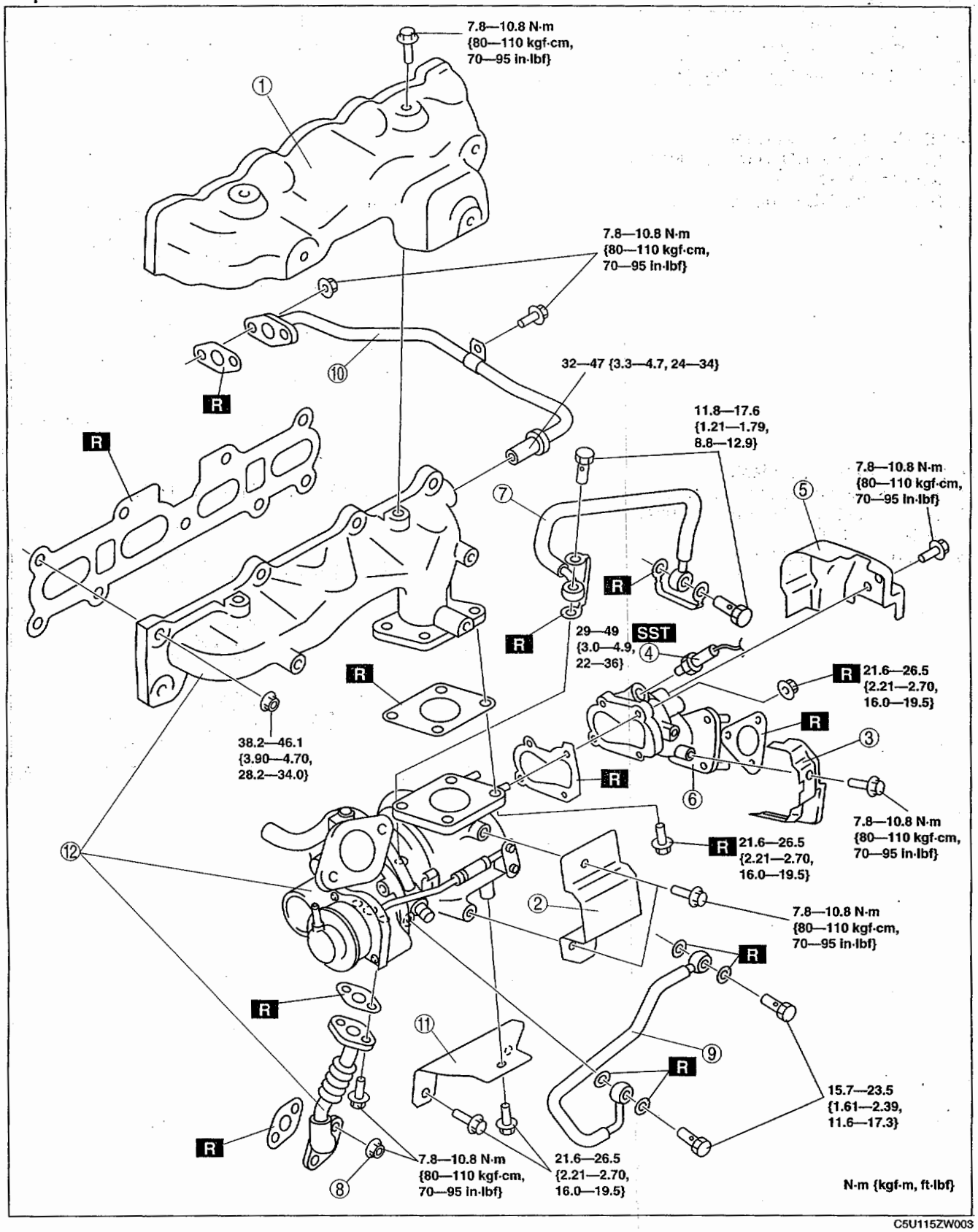


C5U113ZW777

1	Air hose No.1
2	MAF sensor
3	IAT sensor No.1
4	Air cleaner
5	Fresh-air duct
6	Air hose No.3 (See 01–13–10 Air Hose No.3 Removal Note.)

7	Air pipe No.2
8	Air bypass valve
9	Air pipe No.1
10	Air hose No.4
11	Air hose No.2

Step2



C5U115ZW003

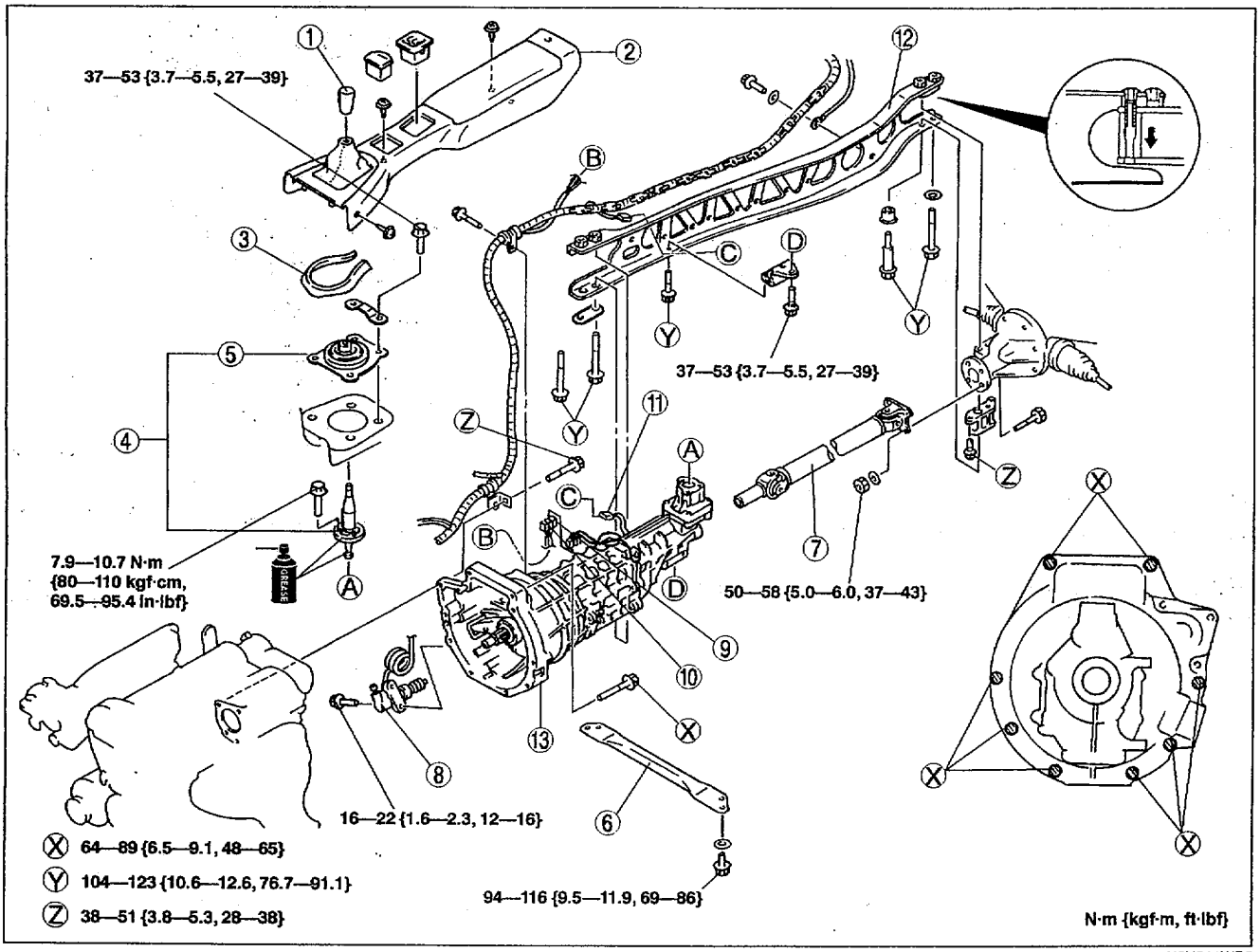
1	Exhaust manifold insulator
2	Turbocharger insulator
3	Joint pipe insulator No.1

4	HO2S (front) (See 01–15–6 HO2S (Front) Removal Note.)
5	Joint pipe insulator No.2

MANUAL TRANSMISSION REMOVAL/INSTALLATION [Y16M-D]

D5U051100000W04

1. Drain the transmission oil. (See 05–11B–2 TRANSMISSION OIL REPLACEMENT [Y16M-D].)
2. Remove the cross member. (16-inch wheel vehicles)
3. Remove the cross member bracket. (16-inch wheel vehicles)
4. Remove the rear crossbar. (16-inch wheel vehicles) (See 02–14–8 REAR CROSSMEMBER REMOVAL/INSTALLATION.)
5. Remove the undercover.
6. Remove the starter. (See 01–19–2 STARTER REMOVAL/INSTALLATION.)
7. Remove the front pipe and middle pipe. (See 01–15–2 EXHAUST SYSTEM REMOVAL/INSTALLATION [BP].) (See 01–15–4 EXHAUST SYSTEM REMOVAL/INSTALLATION [BP WITH TC].)
8. Remove in the order indicated in the table.
9. Install in the reverse order of removal.
10. Add the specified amount and type of transmission oil. (See 05–11B–2 TRANSMISSION OIL REPLACEMENT [Y16M-D].)
11. Warm up the engine and transmission, inspect for oil leakage, and verify the transmission operation.



X5U511WB5

1	Shift lever knob
2	Rear console
3	Insulator
4	Shift lever component (See 05–11A–9 Shift Lever Component Installation Note)
5	Dust boot
6	Front crossbar
7	Propeller shaft (See 03–15–2 PROPELLER SHAFT REMOVAL/INSTALLATION)
8	Clutch release cylinder

9	Back-up light switch connector
10	Neutral switch connector
11	Speedometer sensor connector
12	Power plant frame (PPF) (See 05–11A–6 Power Plant Frame (PPF) Removal Note) (See 05–11A–7 Power Plant Frame (PPF) Installation Note)
13	Transmission (See 05–11A–7 Transmission Removal Note) (See 05–11A–7 Transmission Installation Note)

Mazda
MX-5 Miata
& MAZDASPEED

2005 Workshop Manual

FOREWORD

This manual contains on-vehicle service and/or diagnosis procedures for the Mazda MX-5 Miata & MAZDASPEED.

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing.
As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

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Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

CONTENTS

PRINTED IN U.S.A., JULY 2004
Form No. 1828–1U–04G
Part No. 9999–95–042B–05

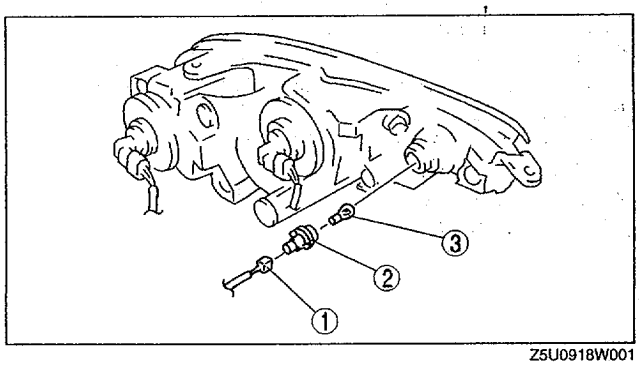
FRONT TURN LIGHT/PARKING LIGHT BULB REMOVAL/INSTALLATION

D5U091851040W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Connector
2	Socket
3	Front turn light/parking light bulb

3. Install in the reverse order of removal.



Z5U0918W001

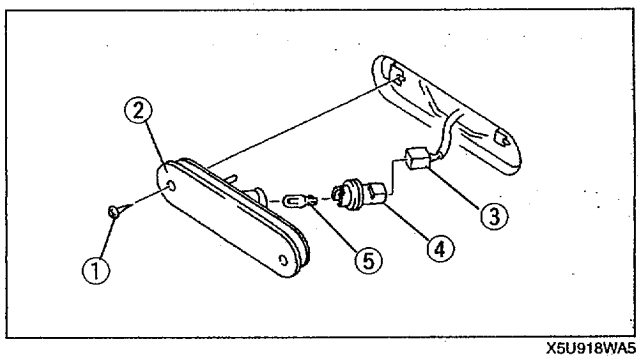
FRONT SIDE MARKER LIGHT REMOVAL/INSTALLATION

D5U091851120W01

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

1	Screw
2	Front side marker light
3	Connector
4	Socket
5	Front side marker light bulb

3. Install in the reverse order of removal.

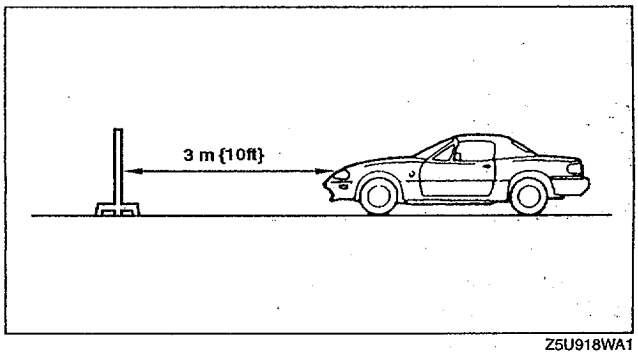


X5U918WA5

FRONT FOG LIGHT ADJUSTMENT [EXCEPT BP WITH TC]

D5U091851680W01

1. Adjust the tire air pressure to the specification.
2. Position the unloaded vehicle on a flat, level surface.
3. Seat one person in the driver's seat.
4. Position the vehicle straight ahead and perpendicularly to a wall.
5. Set the front fog light **3 m {10 ft}** from the white screen.
6. While adjusting one front fog light, disconnect the connector of the other.
7. Start the engine to charge the battery.
8. Turn over the mud guard.

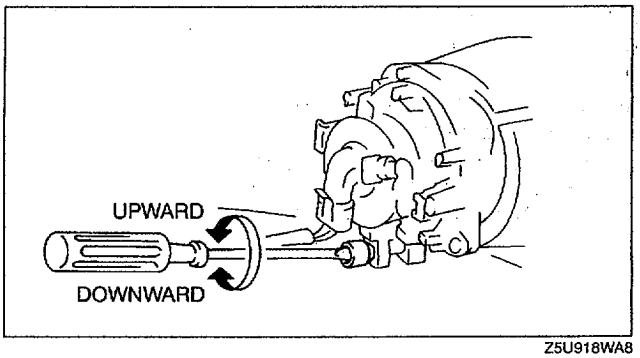


Z5U918WA1

9. Adjust the front fog light by turning the adjusting screws as shown in the figure. Loosen the screws first, then tighten them.

Note

- If the adjusting screws are tightened first, then loosened, they will continue to loosen when the vehicle is in motion and may cause the front fog light to become misaligned.



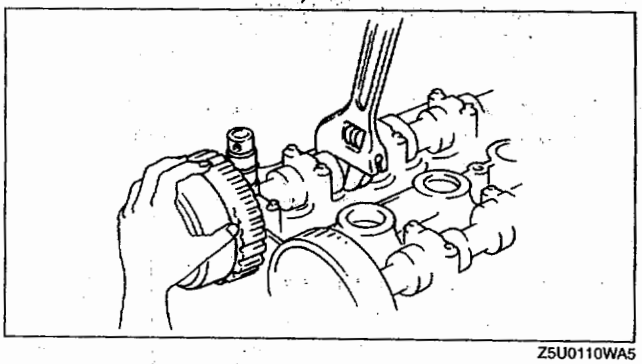
Z5U918WA8

VARIABLE VALVE TIMING ACTUATOR INSPECTION [BP]

D5U011012111W03

Stopper Pin

1. Disconnect the negative battery cable.
2. Remove the timing belt. (See 01–10–9 TIMING BELT REMOVAL/INSTALLATION.)
3. Hold a hexagonal part of the intake camshaft with an adjustable wrench to prevent the camshaft from rotating. Attempt to rotate the variable timing actuator by hand and verify that it does not move.
   - If the variable valve timing actuator moves, the stopper pin in the variable valve timing actuator is not operating. Replace the variable valve timing actuator.
4. Install in the timing belt. (See 01–10–9 TIMING BELT REMOVAL/INSTALLATION)



Z5U0110WA5

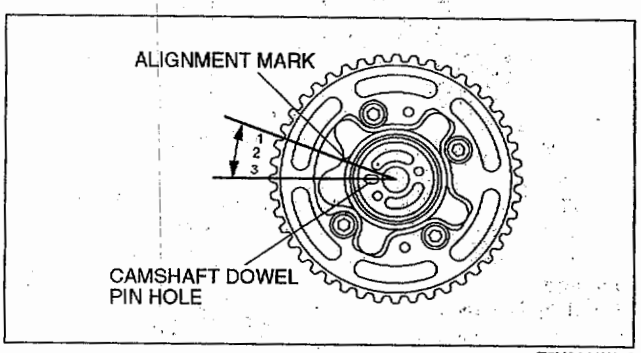
Extreme Spark Retard Position

1. Disconnect the negative battery cable.
2. Remove the variable valve timing actuator.

Caution

- **If engine oil gets on parts, they may not function properly. When removing the variable valve timing actuator, be sure to cover the other parts with a cloth to protect them from the oil.**

3. Verify that the camshaft dowel pin hole on the variable valve timing actuator is aligned with the top of the third tooth, by counting back 3 teeth to the sprocket gap which is aligned with the alignment mark.
   - If not as specified, the stopper pin in the variable valve timing actuator is not engaged at the position of maximum valve timing retard. Replace the variable valve timing actuator.
4. Install the variable valve timing actuator.



Z5U0110WA6

TIMING BELT REMOVAL/INSTALLATION

D5U011012040W01

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01–12–3 ENGINE COOLANT REPLACEMENT.)
3. Remove the front strut bar. (See 02–13–3 FRONT STRUT BAR REMOVAL/INSTALLATION [BP].) (See 02–13–4 FRONT STRUT BAR REMOVAL/INSTALLATION [BP WITH TC].)
4. Remove the air hose No.2, air hose No.1, air cleaner cover, and air pipe No.1 installation bolt. (BP with TC) (See 01–13–8 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC].)
5. Remove the air pipe. (BP) (See 01–13–6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP].)
6. Remove the drive belt. (See 01–10–3 DRIVE BELT ADJUSTMENT.)
7. Remove the CMP sensor. (BP with TC)
8. Remove the CKP sensor.
9. Remove the high-tension lead and ignition coil. (See 01–18–2 IGNITION COIL REMOVAL/INSTALLATION.)
10. Remove the spark plug. (See 01–18–3 SPARK PLUG REMOVAL/INSTALLATION.)
11. Remove in the order indicated in the table.
12. Install in the reverse order of removal.
13. Inspect the air gap between the crankshaft position sensor.
14. Inspect the engine oil level.

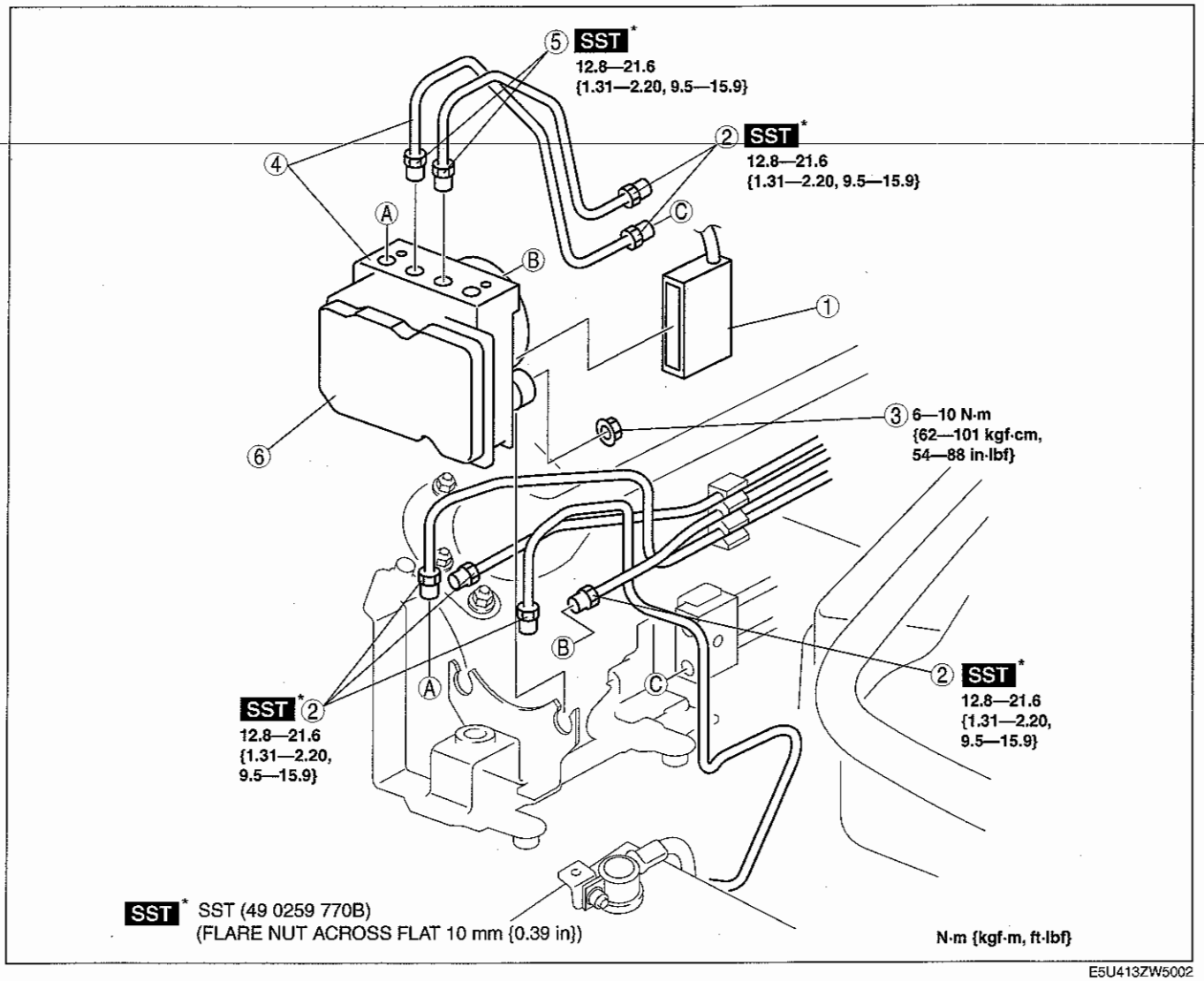
ABS HU/CM REMOVAL/INSTALLATION

E5U041343750W01

Caution

- **When replacing the DSC HU/CM with a new one, configuration procedure must be performed before removing the DSC HU/CM. If configuration is not completed before removing the DSC HU/CM, DTC B2477 will be detected.**
- **The internal parts of the ABS HU/CM could be damaged if dropped. Be careful not to drop the ABS HU/CM. Replace the ABS HU/CM if it is subjected to an impact.**

1. Perform ABS configuration. (See 04–13–3 ABS CONFIGURATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



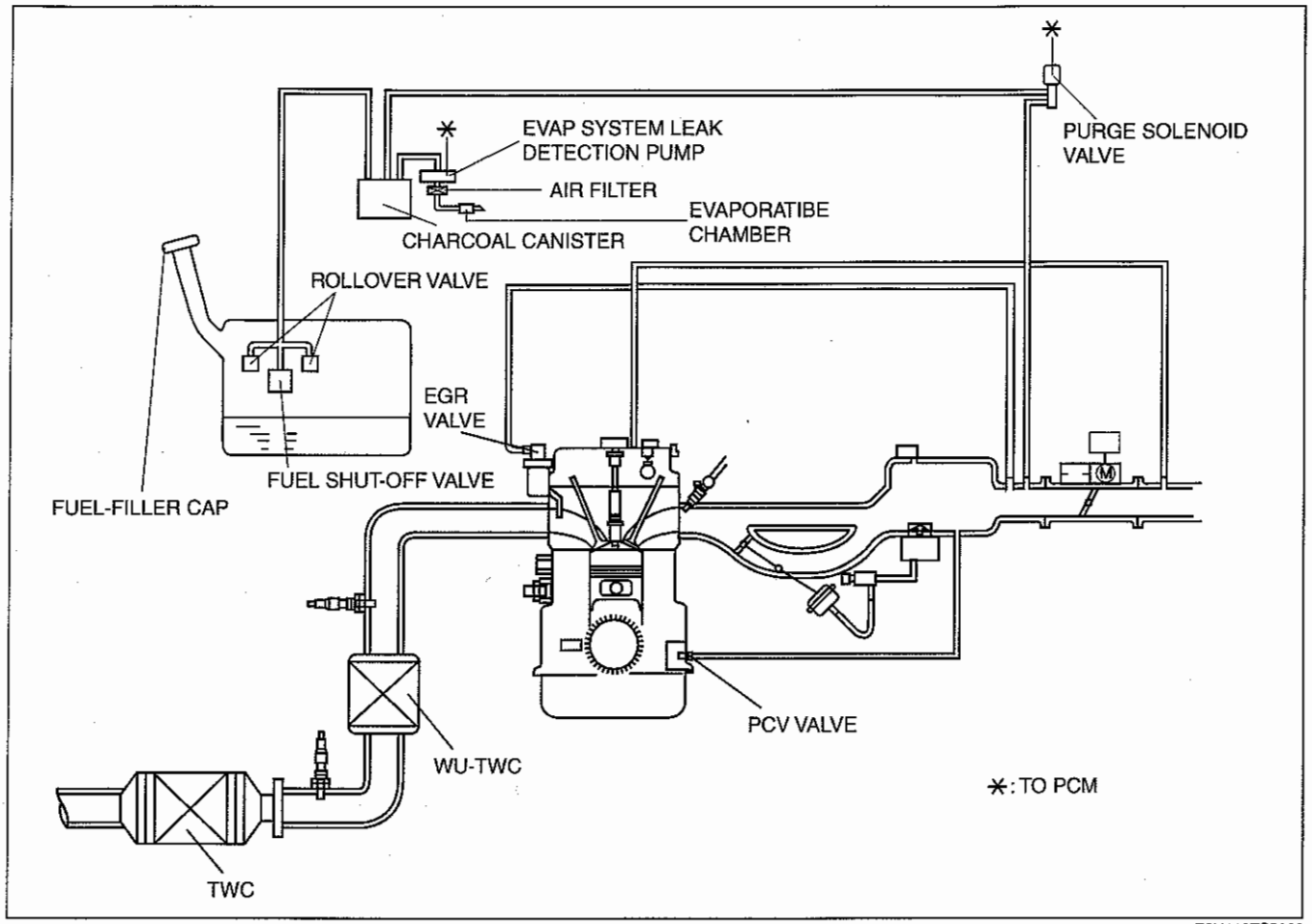
E5U413ZW5002

1	ABS HU/CM connector (See 04–13–5 ABS HU/CM Connector Removal Note.) (See 04–13–6 ABS HU/CM Connector Installation Note.)
2	Brake pipe (See 04–13–5 Brake Pipe Removal Note.) (See 04–13–5 Brake Pipe Installation Note.)

3	Nut
4	ABS HU/CM, brake pipe
5	Brake pipe (ABS HU/CM—brake pipe joint) (See 04–13–5 Brake Pipe (ABS HU/CM—brake pipe joint) Installation Note.)
6	ABS HU/CM

EMISSION SYSTEM DIAGRAM [LF]

E5U011600000W02



E5U116ZS5003

FUEL-FILLER CAP INSPECTION [LF]

E5U011642250W01

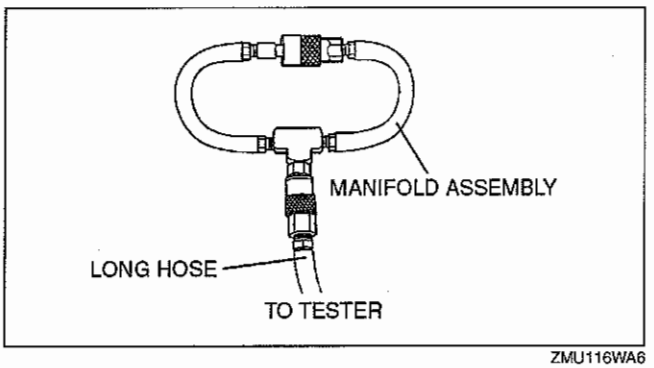
Leakage Inspection

1. Perform the following **SST** (Evaporative Emission System Tester 134-01049) self-test:

Note

- If the tester does not work correctly during self-test, refer to the tester operators manual for more detailed procedures.

(1) Verify the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester display should be off at this time.
(2) Connect the long hose (part of **SST**) to the tester.
(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.
(4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads **10 to 12 psi** (preset at factory).
  - If not, refer to the tester operators manual to contact tester manufacturer.
(5) Press the ON/OFF switch to turn on the **SST** and make sure the left display reads **0.0**.
(6) Turn the control valve on the tester to the FILL position.
(7) Verify the left display reading is **within 13.9 to 14.0 in of water**.
  - If not, adjust the pressure using the regulator knob located on the right side of the tester.
(8) Turn the control valve to TEST position and press the START switch.



ZMU116WA6

HOOD REMOVAL/INSTALLATION

E5U091056601W01

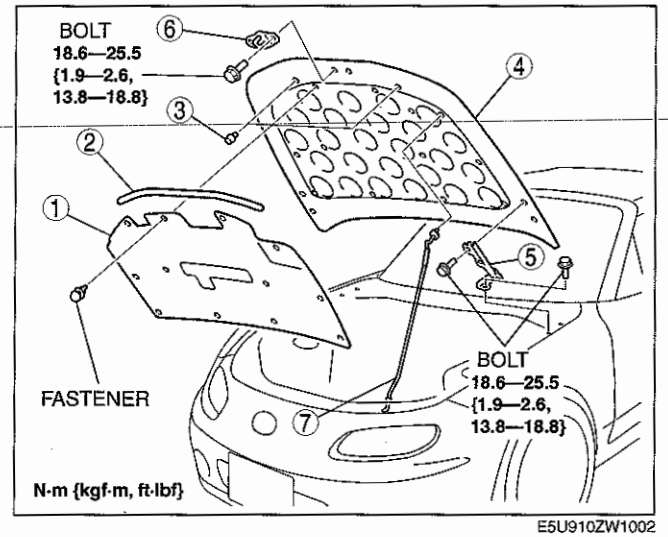
Warning

- **Removing the hood without proper support can be dangerous. The hood may fall and injure you. Always perform the following procedure with at least another person.**

1. Disconnect the negative battery cable. (See01–17–2 BATTERY REMOVAL/INSTALLATION [LF].)
2. To remove the hood hinge, remove the following parts:
   (1) Front bumper (See 09–10–7 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Front combination lights (See 09–18–4 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (3) Side step molding (See09–16–3 SIDE STEP MOLDING REMOVAL.) (See09–16–4 SIDE STEP MOLDING INSTALLATION.)
   (4) Front fender panel (See 09–10–11 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

1	Hood insulator
2	Shroud seal weatherstrip
3	Cushion rubber
4	Hood
5	Hood hinge
6	Hood striker
7	Hood stay

4. Install in the reverse order of removal.
5. Adjust the hood. (See 09–10–3 HOOD ADJUSTMENT.)



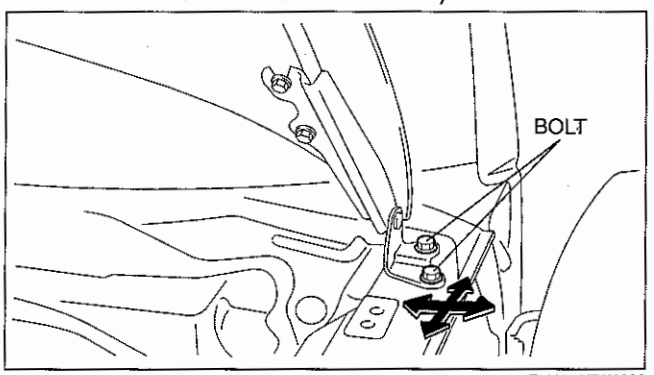
E5U910ZW1002

HOOD ADJUSTMENT

E5U091056601W02

Gap Adjustment

1. Disconnect the negative battery cable. (See01–17–2 BATTERY REMOVAL/INSTALLATION [LF].)
2. Remove the following parts:
   (1) Front bumper (See 09–10–7 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Front combination lights (See 09–18–4 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
   (3) Side step molding(See09–16–3 SIDE STEP MOLDING REMOVAL.) (See09–16–4 SIDE STEP MOLDING INSTALLATION.)
   (4) Front fender panel (See 09–10–11 FRONT FENDER PANEL REMOVAL/INSTALLATION.)
3. Loosen the hood hinge installation bolts and adjust the hood.
4. Tighten the bolts.



E5U910ZW1003

2006 Mazda MX-5 Workshop Manual

FOREWORD

This manual contains on-vehicle service and/or diagnosis procedures for the Mazda MX-5.

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Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

CONTENTS

Part No. 9999–95–042B–06

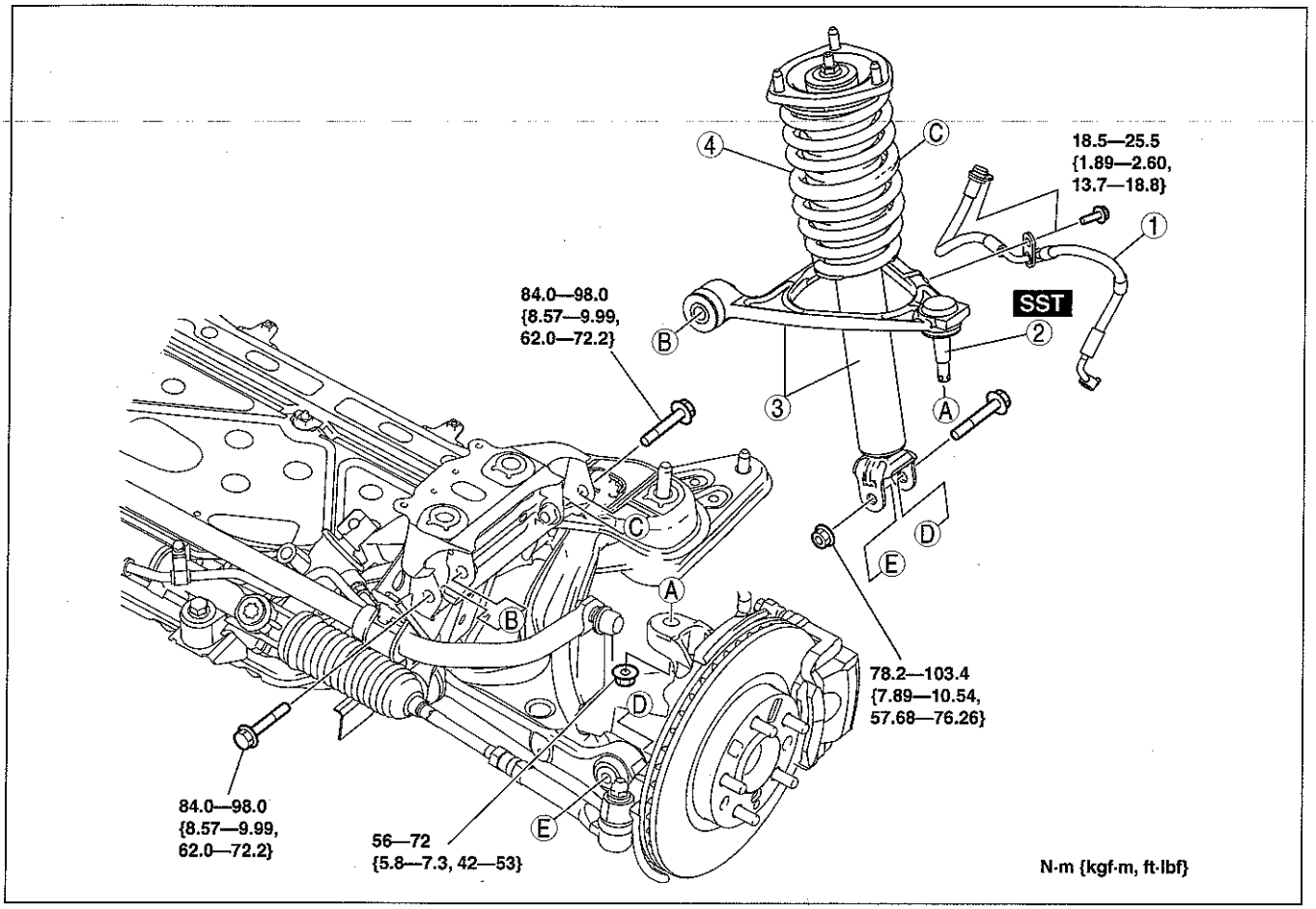
FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

E5U021304910W01

Caution

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled while servicing the vehicle.**

1. Remove the front suspension tower bar. (See 02–13–18 FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Inspect the front wheel alignment, and adjust it if necessary. (See 02–11–2 FRONT WHEEL ALIGNMENT.)



E5U213ZW5002

1	Brake hose bracket
2	Front upper arm ball joint (See 02–13–7 Front Upper Arm Ball Joint Removal Note.)

3	Front shock absorber, coil spring and front upper arm
4	Front shock absorber and coil spring

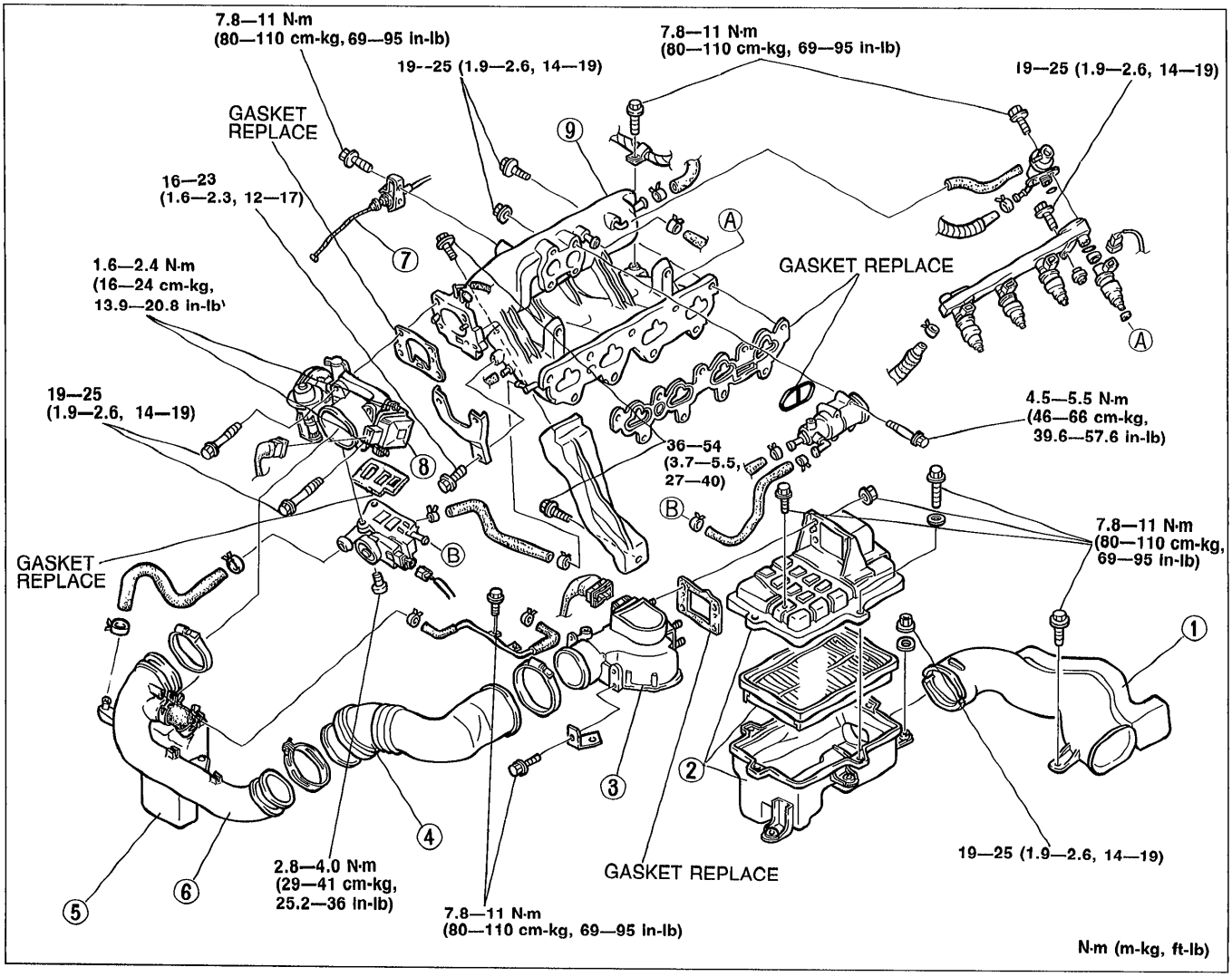
INTAKE AIR SYSTEM

COMPONENTS
Removal / Inspection / Installation

Warning
- **Before removing the intake manifold, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F–101.)**

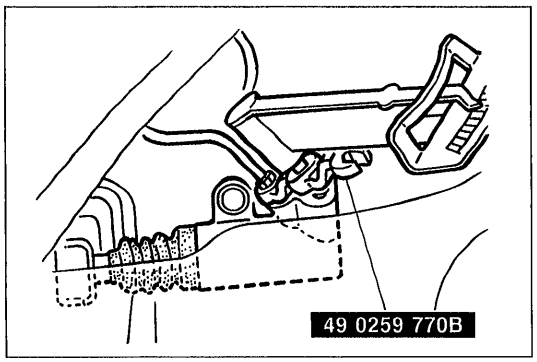
Note
- **Before disconnecting the water hoses, drain the engine coolant.**
- **Use new gaskets during reassembly.**

1. Remove in the order shown in the figure.
2. Check the components for damage and repair or replace as necessary.
3. Install in the reverse order of removal.



05U0FX-105

1. Air duct
2. Air cleaner
   Inspection ..... page F–73
3. Airflow meter
   Inspection / Replacement..... page F–92
4. Air hose
5. Resonance chamber
6. Air pipe
7. Accelerator pedal/cable
   Inspection / Replacement..... page F–96
8. Throttle body
   Removal / Inspection / Installation ..... page F–94
9. Intake manifold
   Removal / Installation ..... page F–95



05U0HX-018

Installation Note
Clutch pipe
Tighten the clutch pipe with the **SST**.

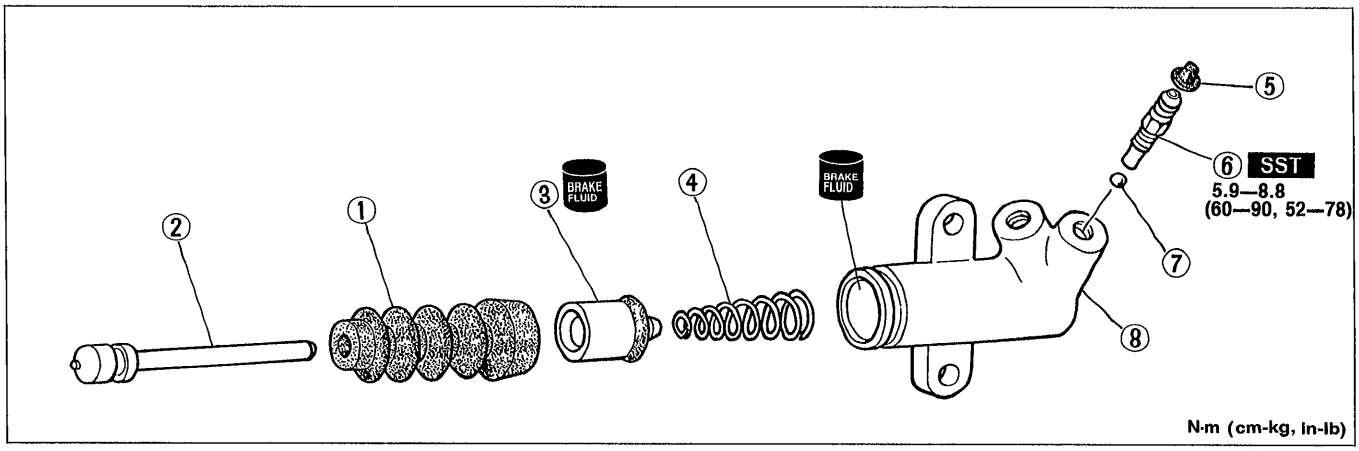
Tightening torque:
13—22 N·m (1.3—2.2 m-kg, 9.4—16 ft-lb)

Air Bleeding
After installation, bleed the clutch system.
(Refer to page H–9.)

OVERHAUL

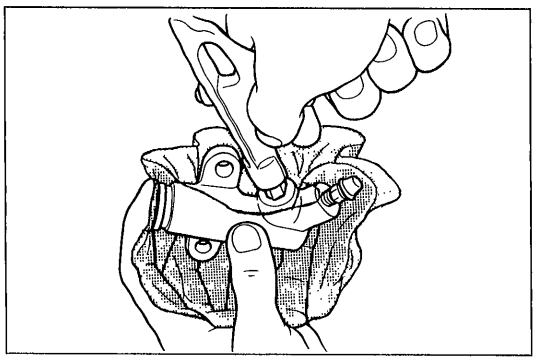
Caution
- **Clean the disassembled parts in solvent and blow through all ports and passages with compressed air.**
- **Before assembly, make sure all parts are completely clean.**
- **Apply the specified clutch fluid to the piston and cup assembly and cylinder bore before assembly.**

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly.



05U0HX-019

1. Boot
2. Push rod
3. Piston and cup assembly
   Disassembly Note..... page H–13
   Inspect for wear, scoring, and cracks
4. Spring
5. Bleeder cap
6. Bleeder screw
7. Steel ball
8. Release cylinder body
   Inspect cylinder bore for scoring and corrosion



05U0HX-020

Disassembly Note
Piston and cup assembly

Caution
- **Hold a rag over the release cylinder to prevent the piston and cup assembly from jumping out.**

Remove the piston and cup assembly by applying compressed air through the clutch pipe installation hole.

1990 Mazda MX-5 Miata Workshop Manual

FORWARD

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CONTENTS

Mazda Motor Corporation
HIROSHIMA, JAPAN

PRINTED IN JAPAN, MAR. '89
1193-10-89C

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

SHOCK ABSORBER AND SPRING

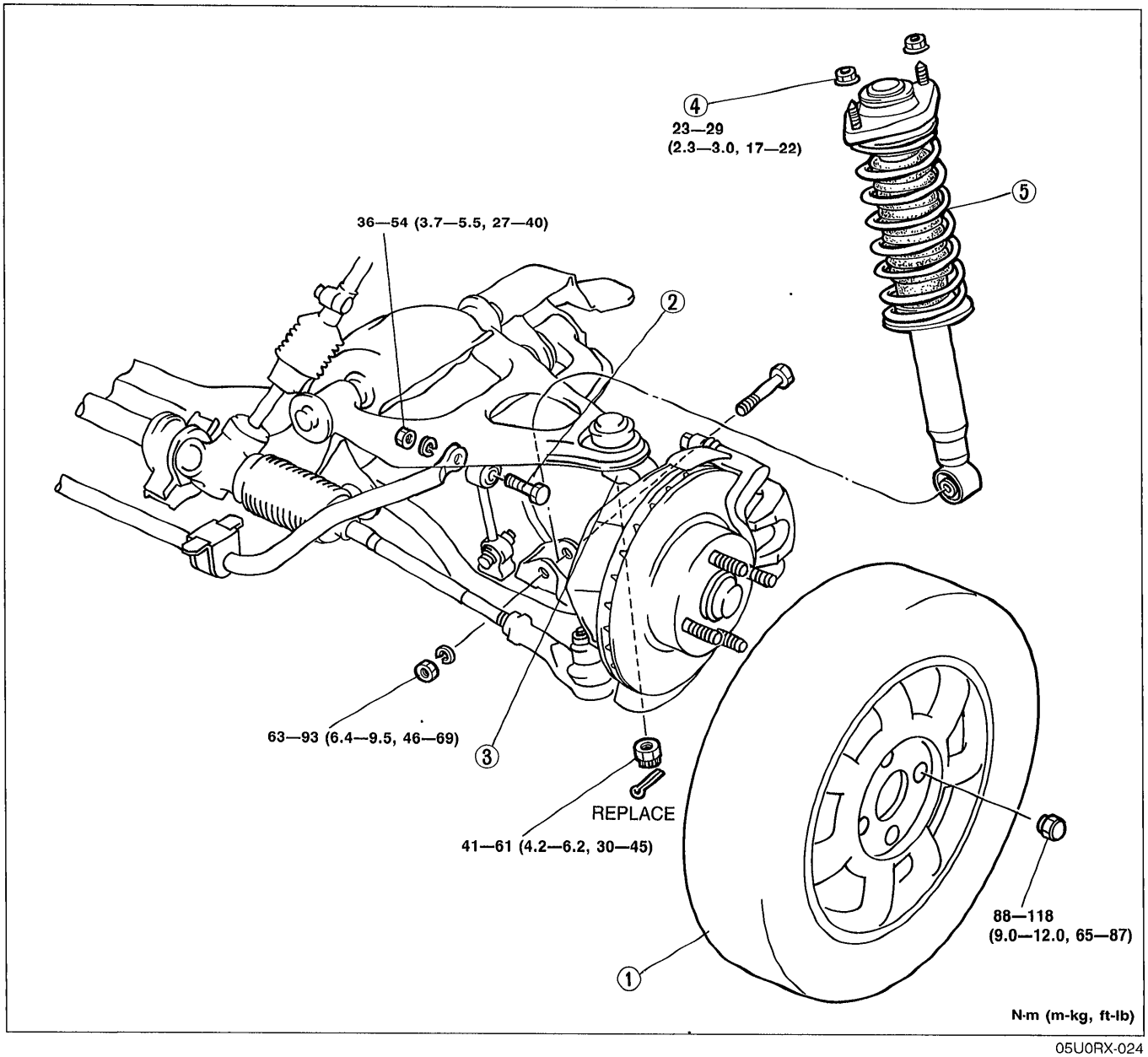
Removal / Installation

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the undercover.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Inspect all parts and repair or replace as necessary.
5. Install in the reverse order of removal.
6. Tighten all nuts and bolts to the specified torques, referring to the figure.

Note

- **Loosely tighten the shock absorber, upper arm, stabilizer control link, and stabilizer bracket bolts. Lower the vehicle and tighten all nuts and bolts to the specified torques with the vehicle unladed.**

7. Adjust the front wheel alignment. (Refer to page R–6.)



05U0RX-024

1. Wheel and tire
2. Stabilizer control link bolt
3. Upper arm ball joint
   Removal Note..... page R–17
4. Mounting plate nut
5. Shock absorber and spring
   Removal Note..... page R–13
   Disassembly / Assembly..... page R–13

WINDOW REGULATOR, GLASS, AND GUIDE

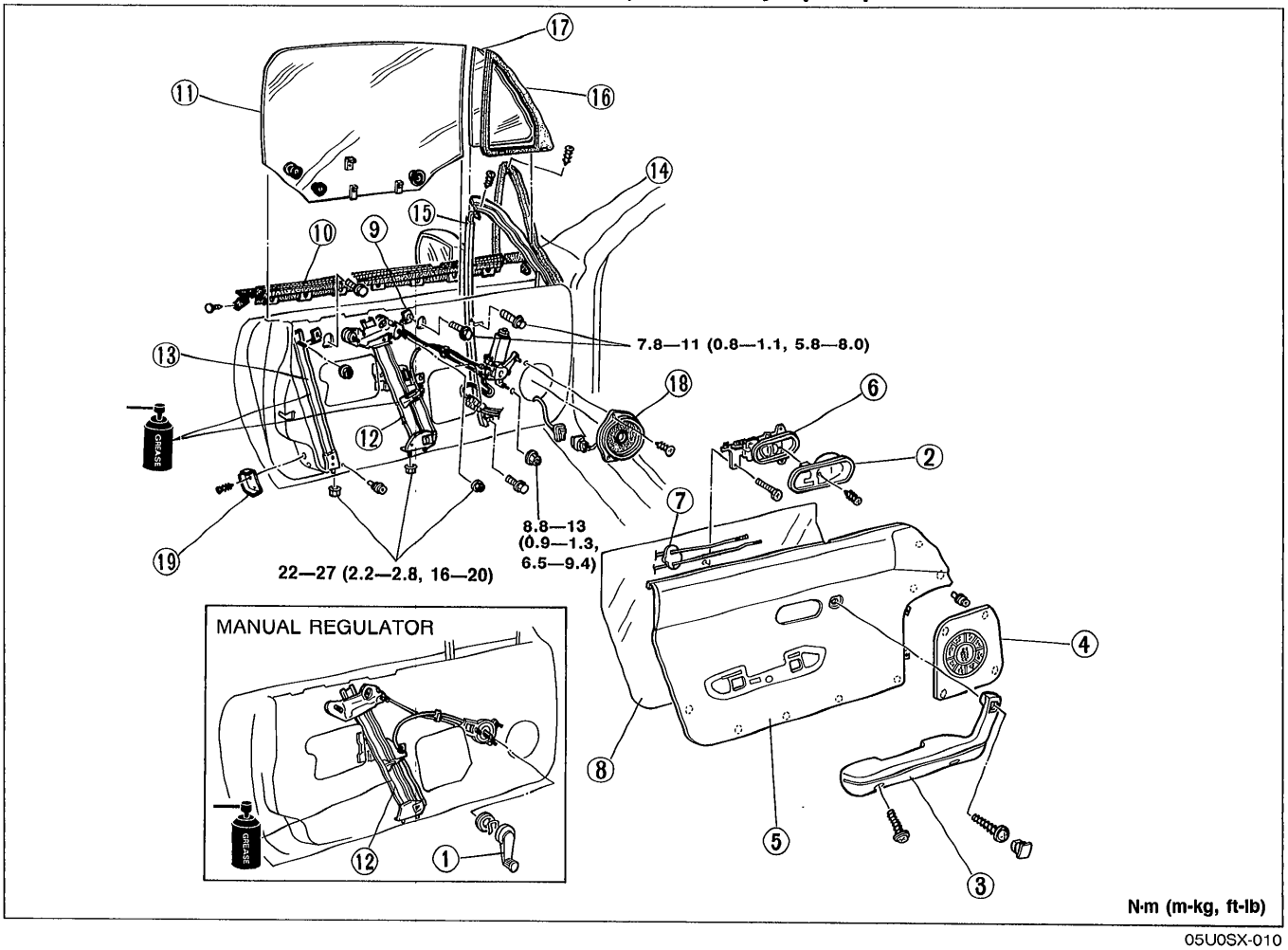
COMPONENTS

Caution
- **Obtain the code number and deactivate the audio anti-theft system before disconnecting the battery. (Refer to Section T.)**

Removal / Installation
1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.

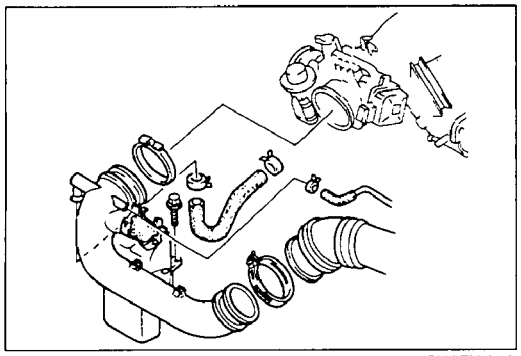
Caution
- **Remove the door screen carefully so that it may be reused.**

Note
- **Raise the door glass about 190mm (7.5 in) from fully-open position.**



05U0SX-010

1. Regulator handle
   Removal Note .. page S–10
   Installation Note page S–10
2. Inner handle cover
3. Arm rest
4. Speaker grille
   Removal Note .. page S–55
5. Door trim
   Removal Note .. page S–55
6. Inner handle
7. Sealing pad
8. Door screen
9. Upper stop
10. Front beltline molding
    Removal Note .. page S–28
11. Door glass
    Adjustment ..... page S–10
12. Window regulator
13. Glass guide
14. Door weatherstrip
15. Division channel
16. Weatherstrip
17. Quarter glass
18. Speaker (If necessary)
19. Dovetail (If necessary)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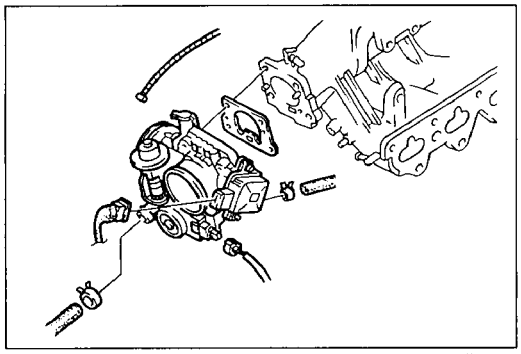
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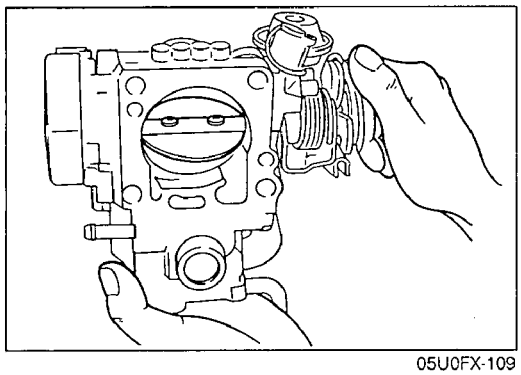
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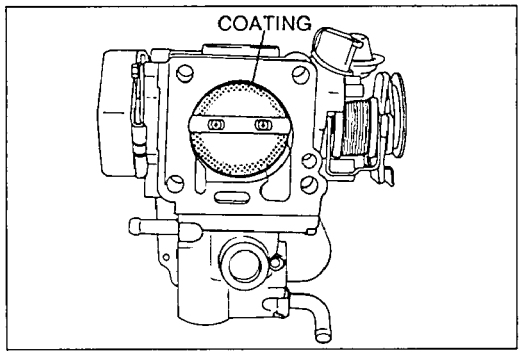

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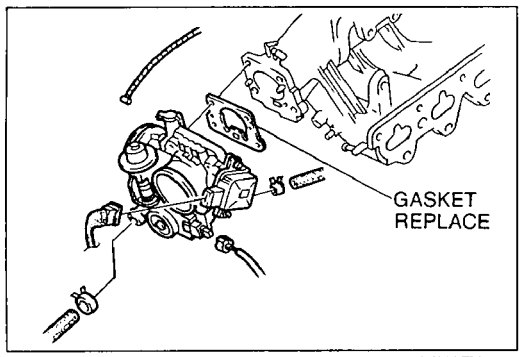

05U0FX-111

THROTTLE BODY

Caution
- **Obtain the code number and deactivate the audio anti-theft system before disconnecting the battery. (Refer to page T–115.)**

Removal
1. Remove the negative battery terminal.
2. Remove the air pipe.
3. Remove the accelerator cable from the throttle lever.

Note
- **Before disconnecting the water hoses, drain the engine coolant.**

4. Disconnect the water hoses.
5. Disconnect the connectors for the ISC valve and the throttle sensor.
6. Remove the throttle body.

Inspection
1. Verify that the throttle valve is fully closed.
2. Verify that the throttle valve moves smoothly when the throttle lever is moved from fully closed to fully open.
3. Replace the throttle body if necessary.

Caution
- **Do not remove the thin seal coating from the throttle valve or bore.**

Installation
Install in the reverse order of removal.

Note
- **Use a new mounting gasket.**

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

1991 Mazda MX-5 Miata Workshop Manual

FOREWORD

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HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

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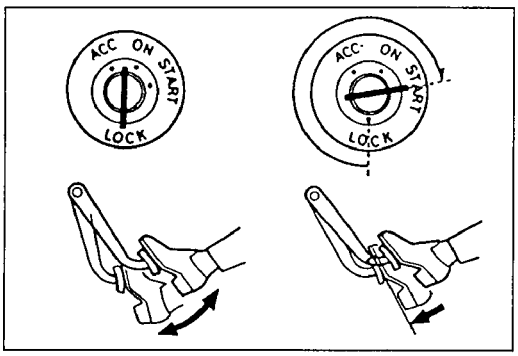
PRINTED IN JAPAN, AUG. '90 (N)
1238-10-90S



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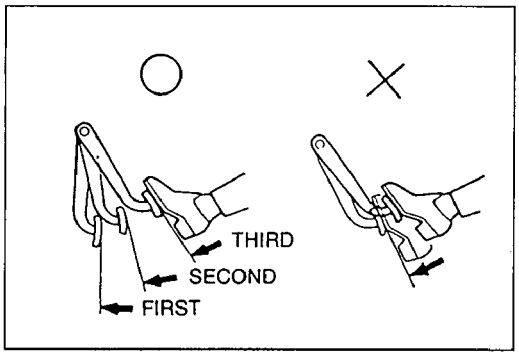

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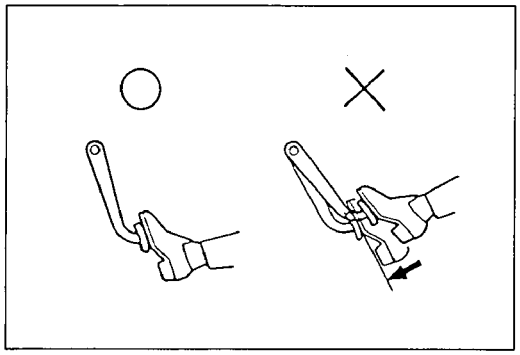
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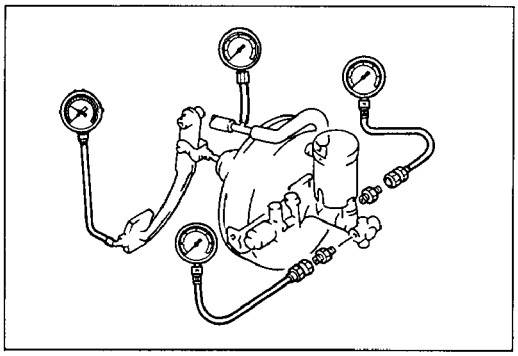
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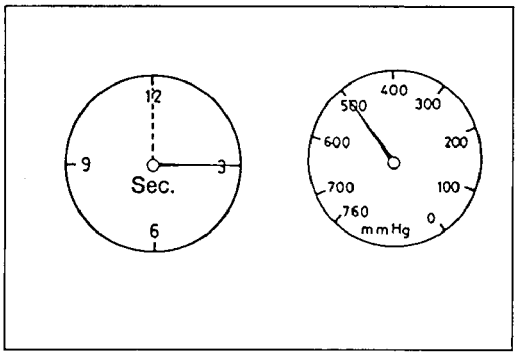


05U0PX-024

POWER BRAKE UNIT

Quick Inspection, On-vehicle

Power brake unit function check (Simple method)

Step 1

1. With the engine stopped, depress the pedal a few times.
2. With the pedal depressed, start the engine.
3. If immediately after the engine starts the pedal moves down slightly, the unit is operating.

Step 2

1. Start the engine and let it run **1 or 2 minutes**.
2. Stop the engine.
3. Depress the pedal with the usual force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
5. If a problem is found, inspect for damage or improper connection of the check valve or vacuum hose. Repair if necessary, and inspect it once again.

Step 3

1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engine with the pedal depressed.
4. Hold the pedal down for **about 30 seconds**.
5. If the pedal height does not change, the unit is operating.
6. If there is a problem, check for damage or improper connection of the check valve or vacuum hose. Repair if necessary, and check once again.

If the nature of the problem is still not clear after following the 3 steps above, follow the more detailed check described in "Method using tester," below.

(Method using tester)

Connect a pressure gauge, vacuum gauge, and pedal depression force gauge as shown in the figure. After bleeding the air from the pressure gauge, conduct the test as described in the 3 steps below.

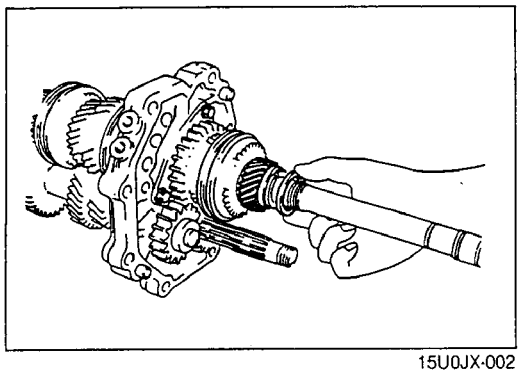
Note

- **Use commercially available gauges and pedal depression force gauge.**

a) Checking for vacuum loss

Unloaded condition

1. Start the engine.
2. Stop the engine when the vacuum gauge indicates **500 mmHg (19.7 inHg)**.
3. Observe the vacuum gauge for **15 seconds**. If the gauge indicates **475—500 mmHg (18.7—19.7 inHg)**, the unit is operating.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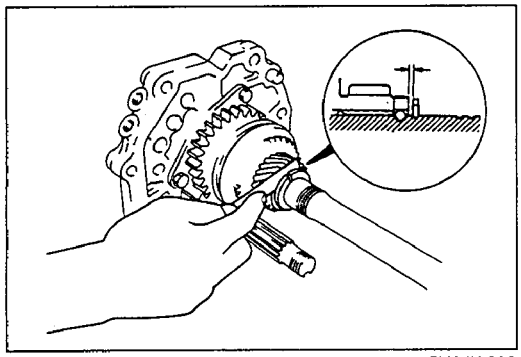
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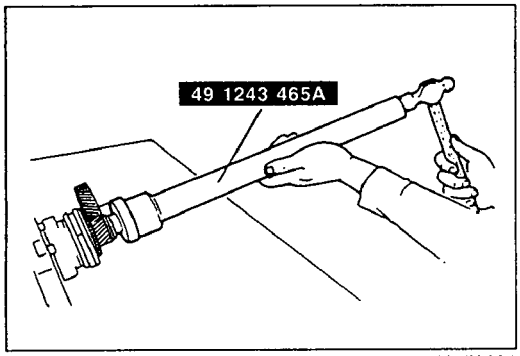

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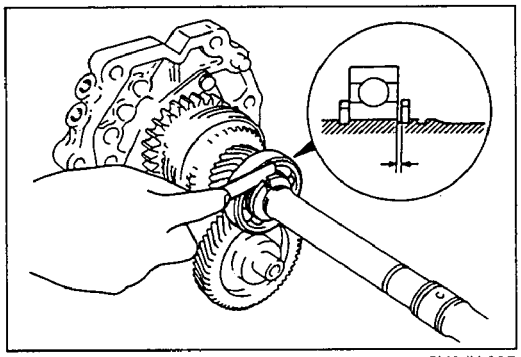
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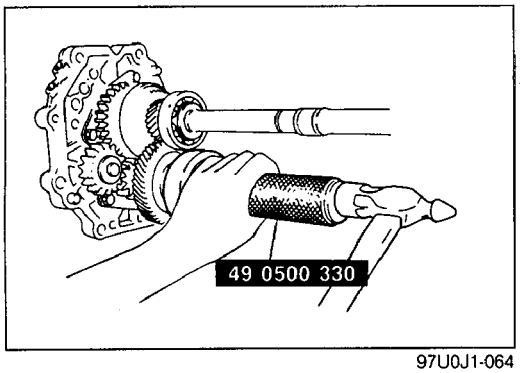


97U0J1-064

Thrust lock washer

1. Install the synchronizer ring and 5th gear.
2. Insert the steel ball and thrust lock washer.
3. Install only the two 3.0mm (0.118 in) thick C-washers in the front mainshaft groove and hold them with the retaining ring.

Note

- **If the C-washers are not pushed fully forward in the mainshaft groove the measurement will be incorrect.**

4. While pushing the C-washers forward, measure the clearance between the thrust lock washer and C-washers.
   If the clearance is not as specified select the proper thrust lock washer.

Standard play: 0.1—0.3mm (0.004—0.012 in)
Thrust lock washer thickness:
6.2mm (0.244 in), 6.4mm (0.252 in), 6.5mm (0.256 in), 6.6mm (0.260 in)

Mainshaft Rear Bearing

1. Drive on the mainshaft rear bearing using the **SST**, fully seating it against the front C-washers.
2. Install the original C-washers and hold them with the retaining ring.

Note

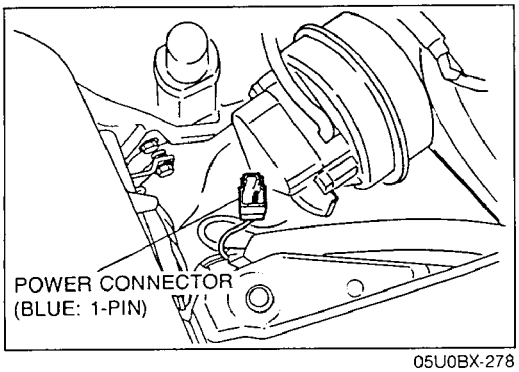
- **If the C-washers will not fit into the rear mainshaft groove, select the proper thickness C-washers. Ensure both C-washers at this position are the same thickness.**

3. Measure the clearance between the C-washers and mainshaft rear bearing.
   If the clearance is not as specified, select the proper C-washers.

Standard play: 0—0.1mm (0—0.004 in)
C-washer thickness:
2.9mm (0.114 in), 3.0mm (0.118 in), 3.1mm (0.122 in), 3.2mm (0.126 in)

Countershaft rear bearing

Drive the countershaft rear bearing onto the countershaft with the **SST**.



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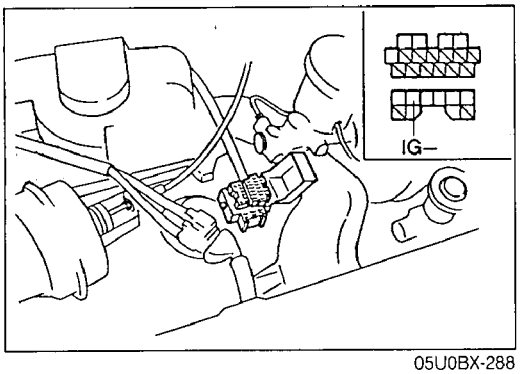

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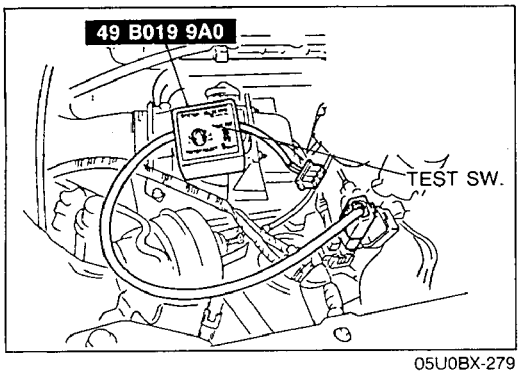

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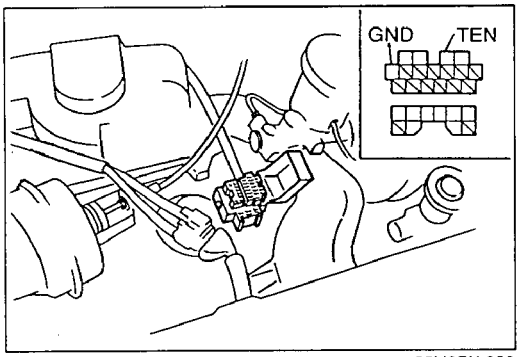

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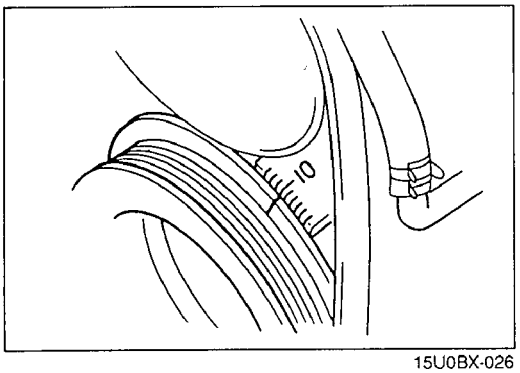
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IGNITION TIMING, IDLE SPEED

Preparation

1. Check the engine condition (spark plugs, leaks in hoses, etc.).
2. Warm up the engine to normal operating temperature.
3. Make sure all accessories are OFF.

Note

- **When using an externally powered timing light and/or tachometer, connect it to the power connector (Blue: 1-pin).**

Caution

- **Do not ground the power connector terminal (Blue: 1-pin); the wiper 20A fuse will be burned.**

4. Connect a timing light and a tachometer to the diagnosis connector terminal IG–.

Caution

- **Be extremely careful when making connections to the diagnosis connector because a mistaken connection will cause a malfunction.**

5. Connect the **SST**.
6. Set the **SST** switch Ⓐ to 1 position and test switch to SELF TEST position.

Note

- **If the SST is not used, jump across the (TEN) terminal and the (GND) terminal of the diagnosis connector.**

Ignition Timing

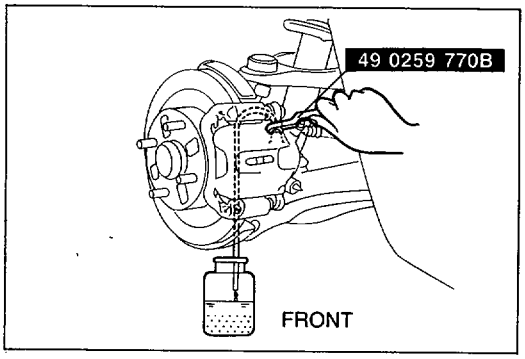
Inspection / Adjustment

1. Check the idle speed and set it to specification if necessary.

Idle speed: 850 ± 50 rpm

2. Verify that the timing mark (Yellow) on the crankshaft pulley is aligned with the timing belt lower cover mark.

Ignition timing (at idle speed)	M/T	10° ± 1° BTDC
	A/T	8° ± 1° BTDC



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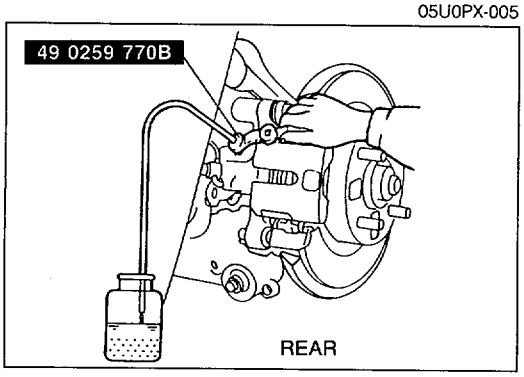


25U0PX-003

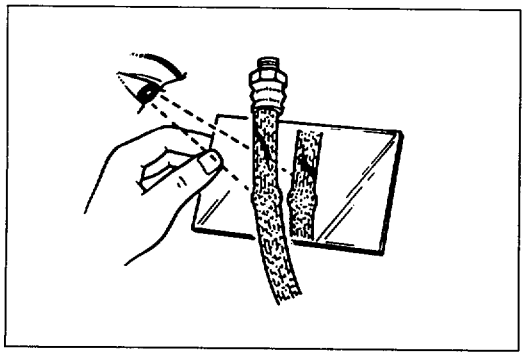
AIR BLEEDING

Caution
- **The fluid in the reservoir must be maintained at the 3/4 level or higher during air bleeding.**
- **Do not spill brake fluid onto painted surfaces.**

1. Jack up the vehicle and support it with safety stands.
2. Remove the bleeder cap and attach a vinyl tube to the bleeder screw.
3. Place the other end of the vinyl tube in a clear container.
4. One person should depress the brake pedal a few times, and then hold it in the depressed position.
5. A second person should loosen the bleeder screw, drain out the fluid, and retighten the screw by using the **SST**.

Caution
- **The two persons should stay in voice contact with each other.**
- **Be sure the pedal remains depressed until the air bleed screw is tightened.**

6. Repeat Steps 4 and 5 until no air bubbles are seen.
7. Check for correct brake operation.
8. Verify that there is no fluid leakage. Clean away any spilled fluid with rags.
9. After bleeding the air, add brake fluid to the reservoir up to the specified level.



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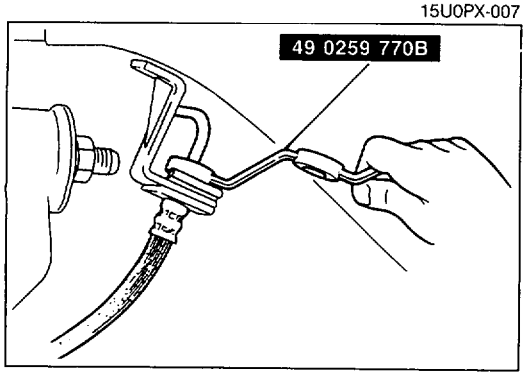

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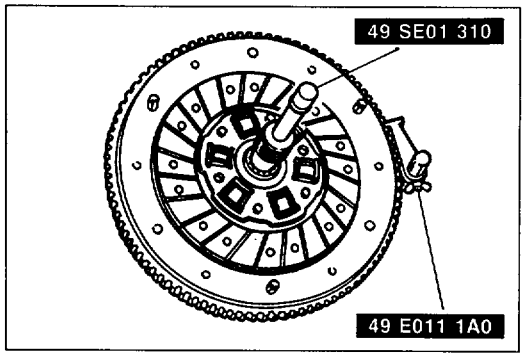
BRAKE HYDRAULIC LINE

On-vehicle Inspection

Check the following and replace parts as necessary.
1. Cracks, damage, and corrosion of the brake hose
2. Damage to the brake hose threads
3. Scars, cracks, and swelling of the flexible hose
4. All lines for fluid leakage

Removal / Installation

1. When disconnecting the flexible hose and brake line, remove the clip after loosening the flare nut with the **SST**.
2. When connecting the flexible hose, do not tighten it too tight or twist it.
3. Check that the hose does not contact other parts when the vehicle bounces or when the steering wheel is turned all the way to the left or right.
4. Bleed the air from the brake system.



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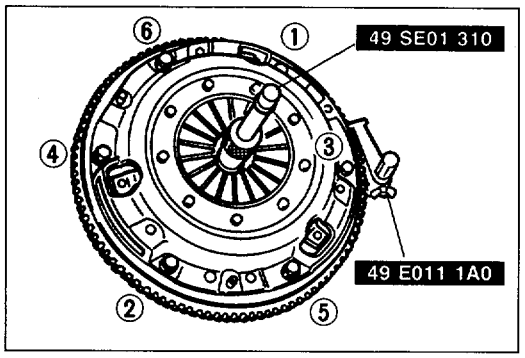

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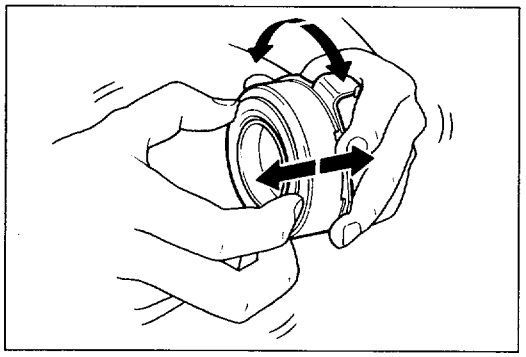
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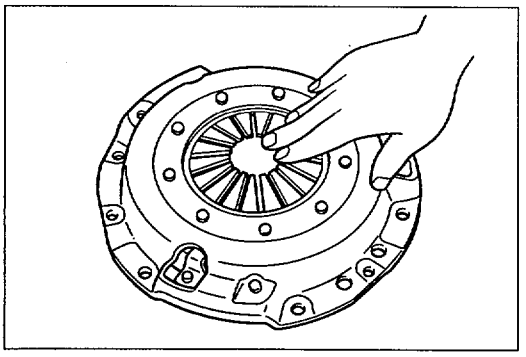
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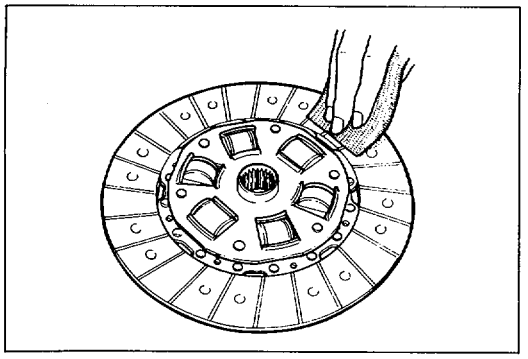
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Clutch disc

1. Clean the clutch disc splines and main drive gear splines, and apply Mori White TA No.2 or equivalent organic molybdenum grease.
2. Hold the clutch disc in position with the **SST**.

Clutch cover

1. Hold the flywheel with the **SST** or equivalent.
2. Align the dowel holes with the flywheel dowels.
3. Tighten the bolts evenly and gradually in the pattern shown.

Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)

RELEASE BEARING

INSPECTION

Note
- **The clutch release bearing is a sealed bearing and must not be washed in solvent.**

Turn the bearing while applying force in the axial direction. If the bearing sticks or has excessive resistance, replace it.

CLUTCH COVER

INSPECTION

Note
- **Minor scoring or burning should be removed with emery paper.**

1. Inspect the contact surface of the clutch disc for scoring, cracks, and burning. Repair or replace as necessary.
2. Inspect the contact surface of the clutch release bearing for wear and cracks.
3. If there is wear or cracks, replace the clutch cover.

CLUTCH DISC

INSPECTION

Note
- **Use sandpaper if the trouble is minor.**

1. Inspect the lining surface for burning and oil contamination. Replace the clutch disc if it is badly burned or oil soaked.
2. Inspect for loose facing rivets or torsion rubbers. Replace the clutch disc if any are loose.

1992 Mazda MX-5 Miata Workshop Manual

FOREWORD

This workshop manual is intended for use by service technicians of Authorized Mazda Dealers to help them service Mazda vehicles.

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Authorized Mazda Dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
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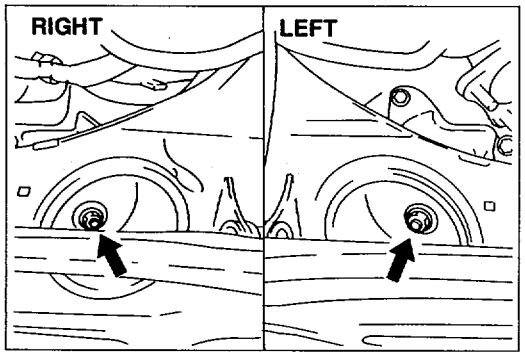

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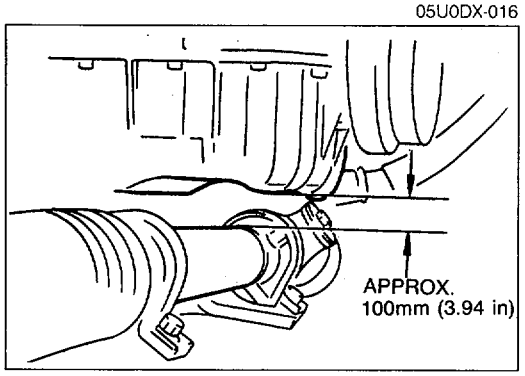

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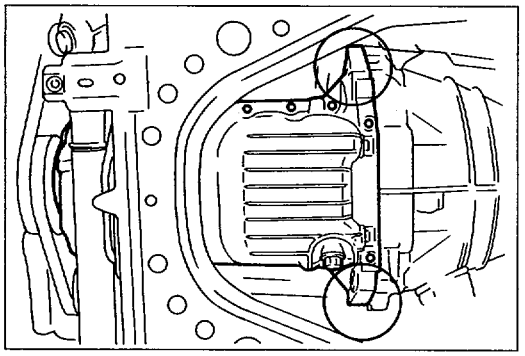
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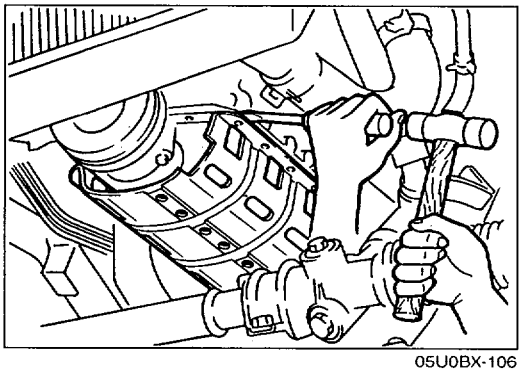
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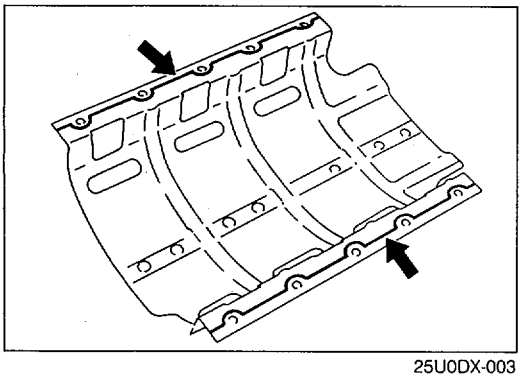

25U0DX-003

Removal Note
Engine mount nut
1. Loosen the oil pan mounting bolts.
2. Remove the engine mount nuts.
3. Lift the engine slightly with a hoist.

Crossmember installation bolt and nut
1. Support the crossmember with a transmission jack.
2. Remove the crossmember installation bolts and nuts.

Caution
- **Do not damage the brake hoses, P/S hoses, and A/C hoses when lowering the crossmember.**

Note
- **Lower the crossmember after separating the steering intermediate shaft from the pinion shaft.**

3. Lower the crossmember until the clearance between the oil pan and the steering gear housing exceeds **approx. 100mm (3.94 in)**.

Oil pan
1. Remove the oil pan mounting bolts.

Caution
- **Do not force a prying tool between the cylinder block and the oil pan, which may damage the contact surfaces.**
- **Do not damage or scratch the contact surfaces when removing the old sealant.**

2. Insert a screwdriver or a suitable tool only at the points shown in the figure.
3. Remove the oil pan.

Oil pan baffle

Caution
- **Do not bend the baffle when prying it loose.**

1. Insert a screwdriver or other suitable tool between the cylinder block and the baffle to separate them.
2. Remove the baffle.

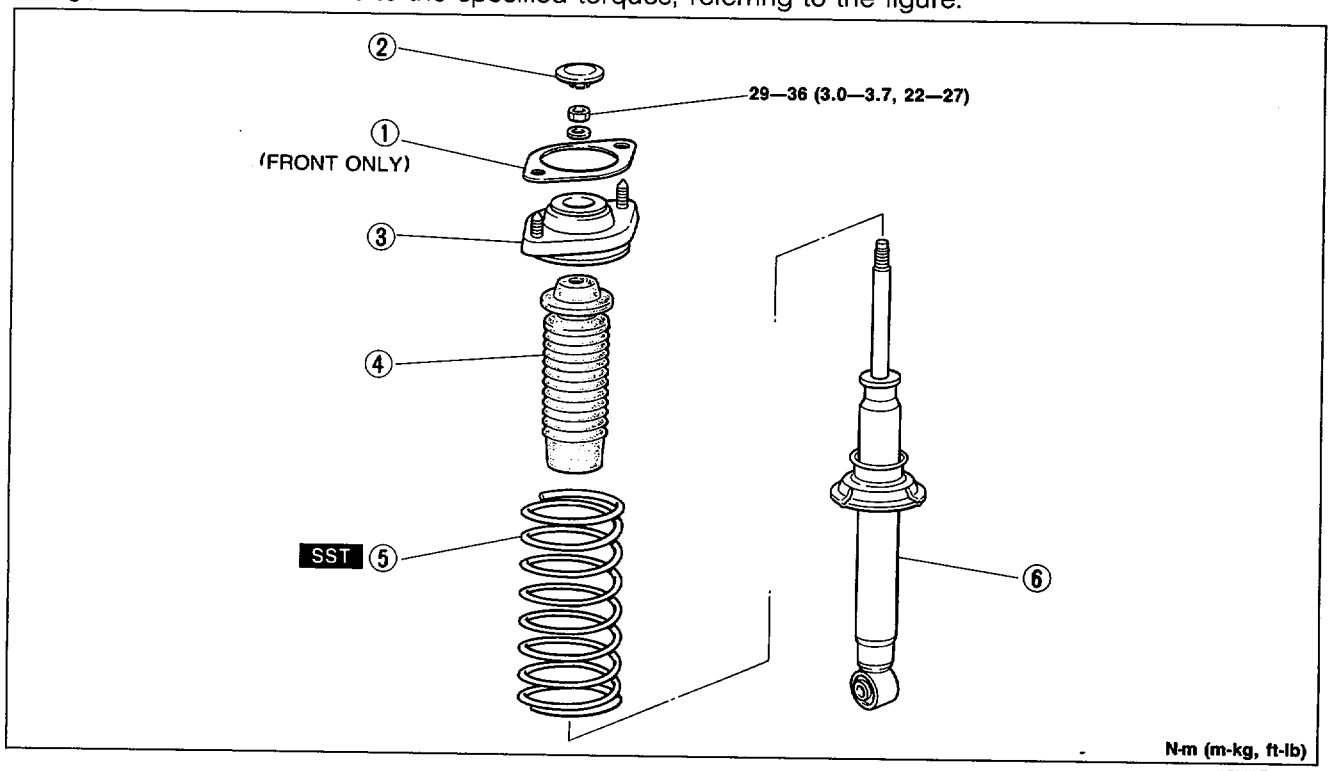
Installation Note
Oil pan baffle
1. Remove all foreign material from the contact surfaces.

Caution
- **The oil pan must be secured within 5 minutes after the sealant is applied to the baffle.**

2. Apply a continuous bead of silicone sealant to the baffle along the inside of the bolt holes.
3. Install the baffle.

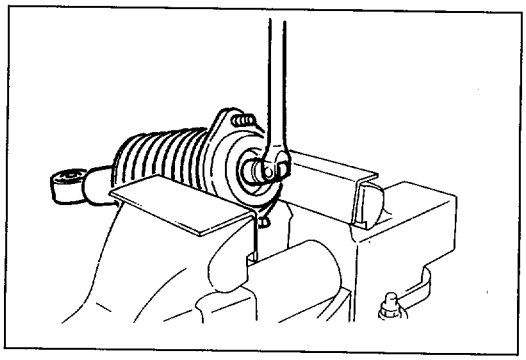
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.
4. Tighten all nuts and bolts to the specified torques, referring to the figure.



15U0RX-010

1. Sheet (front only)
2. Cap
3. Mounting plate
4. Bound stopper
   Inspect for damage
5. Coil spring
   Disassembly Note ..... page R–13
   Assembly Note ..... page R–14
6. Shock absorber
   Inspect for oil leakage and abnormal noise



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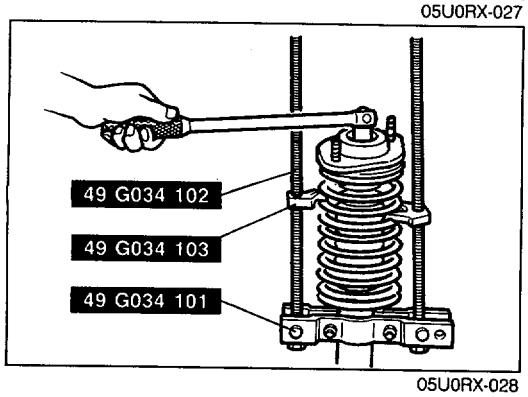


05U0RX-028

Disassembly note
Coil spring

Caution
- **Do not remove the nut.**
- **Use copper or aluminum plates in the jaws of the vise.**

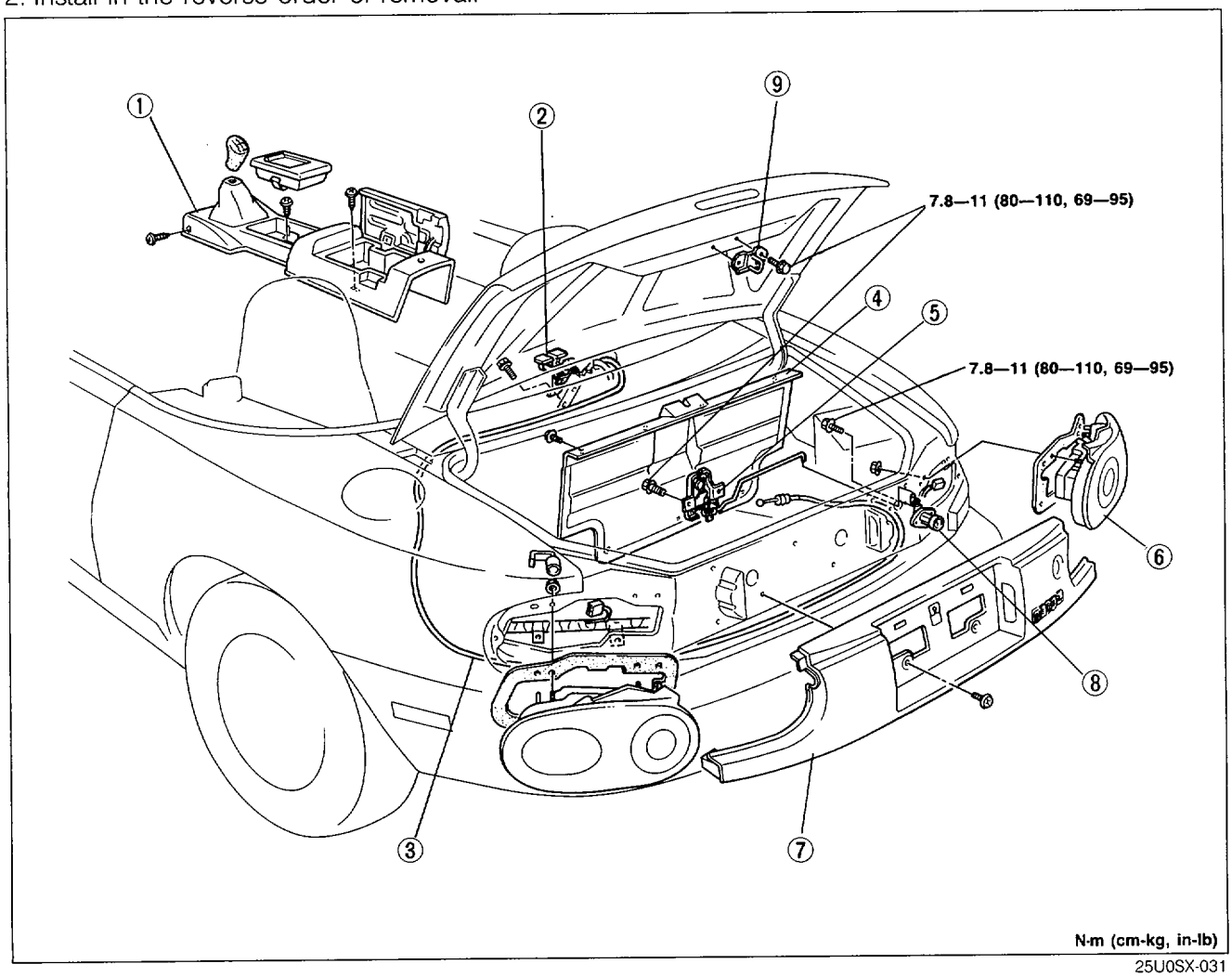
1. Loosen the piston rod upper nut several turns, but do not remove the nut.
2. Assemble the **SST**.
3. Compress the coil spring with the **SST**, and remove the upper nut.
4. Remove the coil spring.

TRUNK LID LOCK AND OPENER

COMPONENTS

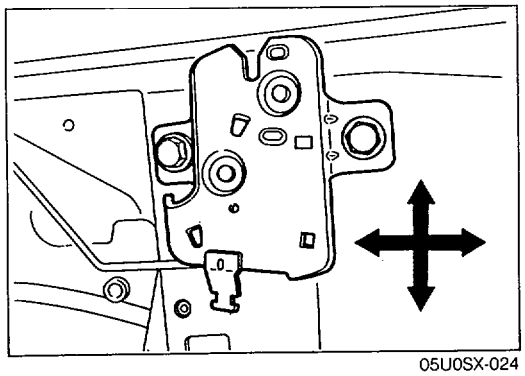
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



25U0SX-031

1. Rear console
   Removal / Installation ..... page S–52
2. Opener lever
3. Opener cable
4. Trunk end trim
5. Trunk lid lock assembly
   Adjustment ..... below
6. Rear combination light
   Removal ..... Section T
7. Rear finisher
   Removal Note ..... page S–28
8. Key cylinder
9. Striker



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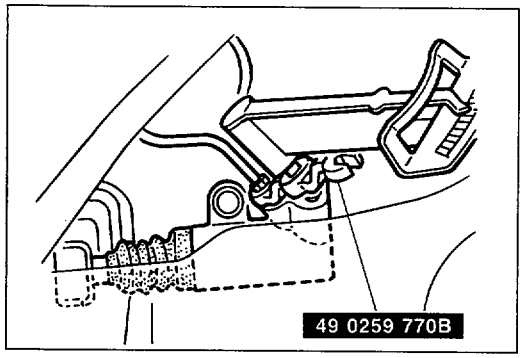
Adjustment

Trunk lid lock assembly

Verify that the trunk lid can be closed easily and whether there is any looseness. If necessary, loosen the lock assembly mounting bolts and adjust the lock assembly.



05U0HX-018

Installation Note
Clutch pipe
Tighten the clutch pipe with the **SST**.

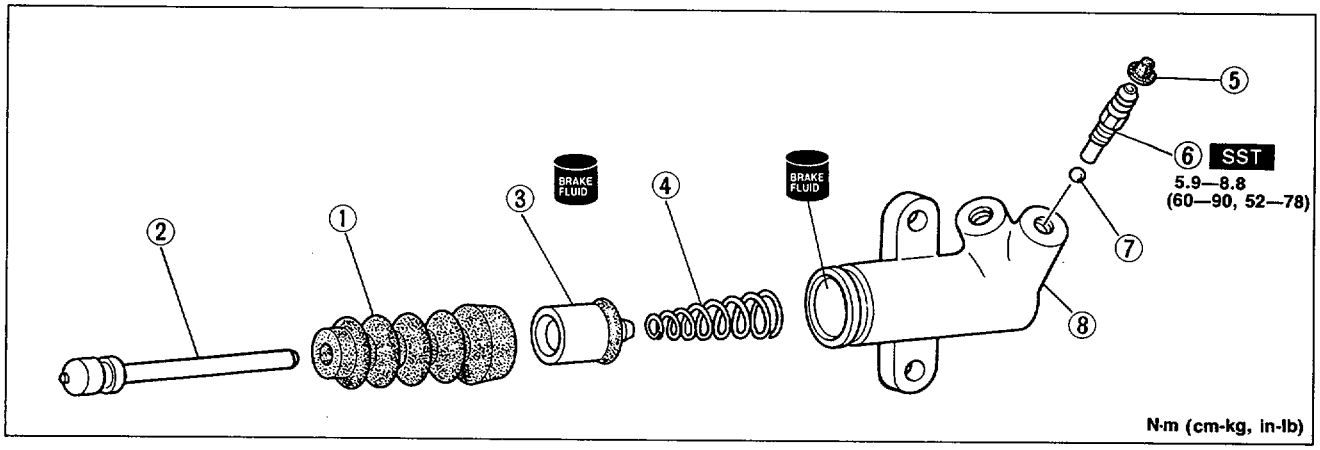
Tightening torque:
13—22 N·m (1.3—2.2 m-kg, 9.4—16 ft-lb)

Air Bleeding
After installation, bleed the clutch system.
(Refer to page H–9.)

OVERHAUL

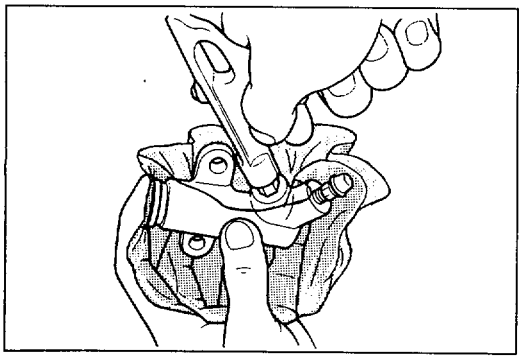
Caution
- **Clean the disassembled parts in solvent and blow through all ports and passages with compressed air.**
- **Before assembly, make sure all parts are completely clean.**
- **Apply the specified clutch fluid to the piston and cup assembly and cylinder bore before assembly.**

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly.



05U0HX-019

1. Boot
2. Push rod
3. Piston and cup assembly
   Disassembly Note
   ..... page H–13
   Inspect for wear, scoring, and cracks
4. Spring
5. Bleeder cap
6. Bleeder screw
7. Steel ball
8. Release cylinder body
   Inspect cylinder bore for scoring and corrosion



05U0HX-020

Disassembly Note
Piston and cup assembly

Caution
- **Hold a rag over the release cylinder to prevent the piston and cup assembly from jumping out.**

Remove the piston and cup assembly by applying compressed air through the clutch pipe installation hole.

1993 Mazda MX-5 Miata Workshop Manual

FOREWORD

This workshop manual is intended for use by service technicians of Authorized Mazda Dealers to help them service Mazda vehicles.

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Authorized Mazda Dealers. This manual should be kept up-to-date.

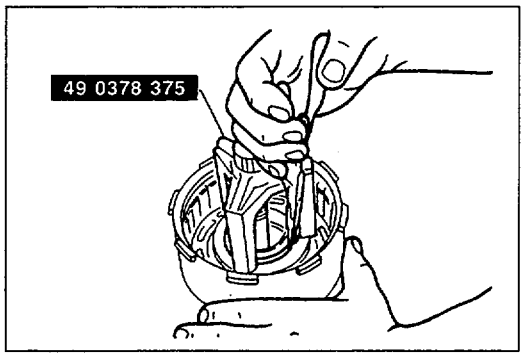
Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

CONTENTS

PRINTED IN USA, AUG. '92
1331-10-92H
(9999-95-042B-93)



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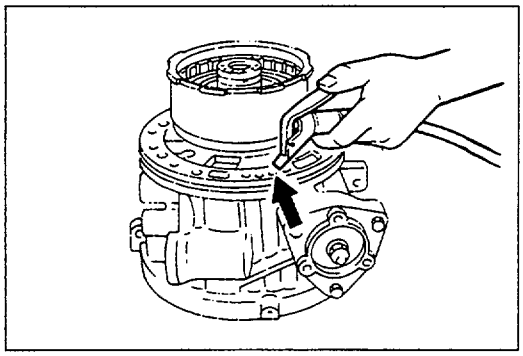

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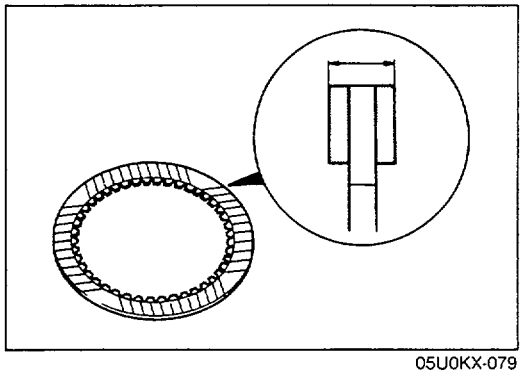

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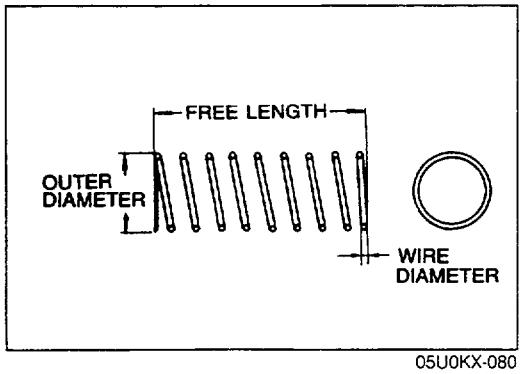

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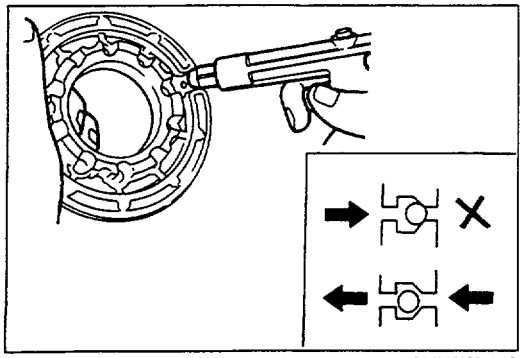


9MU0K2-146

Disassembly note
Snap ring

Caution
- **Do not damage the snap ring.**

1. Compress the spring with the **SST**, then remove the snap ring with snap-ring pliers.
2. Remove the spring retainer and springs.

Clutch piston
1. Install the direct clutch drum onto the drum support along with the seal rings.
2. Remove the piston by applying compressed air through the oil passage.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

Inspection
Drive plate
1. Measure the facing thickness in three places, and average the three readings.

Standard thickness: 1.6mm (0.063 in)
Minimum thickness: 1.4mm (0.055 in)

2. If not within specification, replace the drive plate(s).

Return spring
1. Measure the spring dimensions.

Specifications

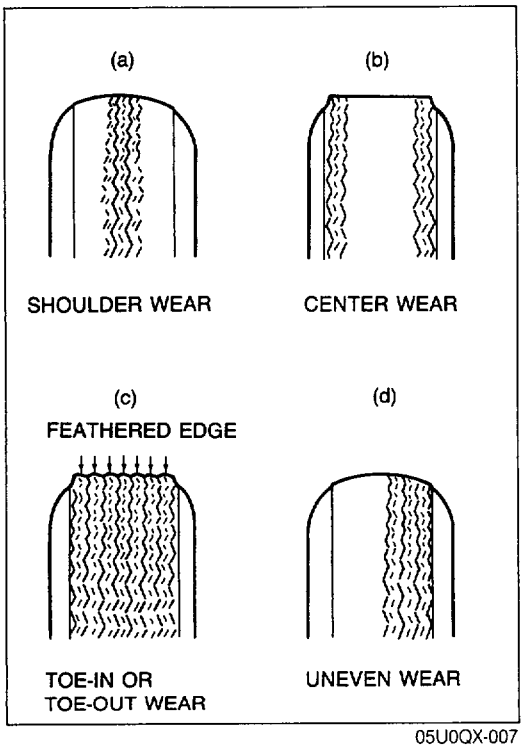
Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
8.0 (0.315)	30.5 (1.201)	14.5	1.3 (0.051)

2. If not within specification, replace the return spring.

Clutch piston
1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is airflow when applying compressed air through the oil hole on the return spring side.

Air pressure: 392 kPa (4.0 kg/cm^2, 57 psi) max.

3. If not correct, replace the clutch piston.



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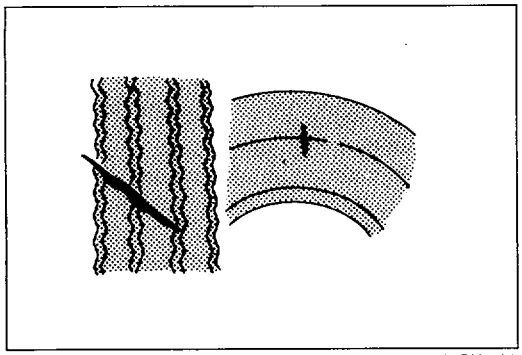

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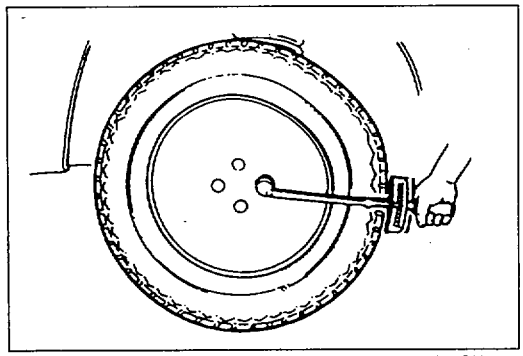

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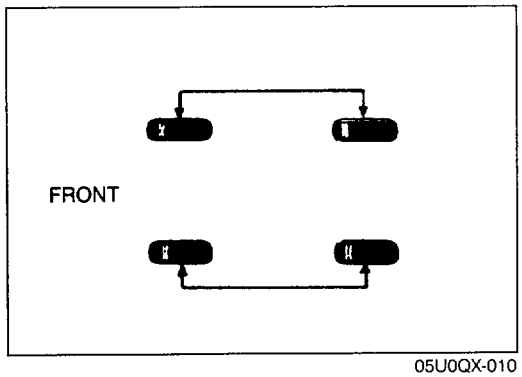


05U0QX-010

Troubleshooting guide

Abnormal tire wear patterns shown in the illustration can occur. Refer to the chart for the possible causes and actions.

	Possible cause	Action
(a)	• Underinflation (both sides worn) • Incorrect camber (one side worn) • Hard cornering • Lack of rotation	• Measure and adjust pressure • Repair or replace suspension parts • Reduce speed • Rotate tires
(b)	• Overinflation • Lack of rotation	• Measure and adjust pressure • Rotate tires
(c)	• Incorrect toe-in	• Adjust toe-in
(d)	• Incorrect camber or caster • Malfunctioning suspension • Unbalanced wheel • Out-of-round brake drum or disc • Other mechanical conditions • Lack of rotation	• Repair or replace suspension parts • Repair or replace • Balance or replace • Correct or replace • Correct or replace • Rotate tires

4. Cracks, damage, and foreign matter (such as metal pieces, nails, and stones) in the tire and cracks, deformation, and damage to the wheel.
5. Loose wheel lug nut(s).
6. Air leaking from valve stem.

REMOVAL / INSTALLATION

Tighten the lug nuts to the specified torque in a crisscross fashion.

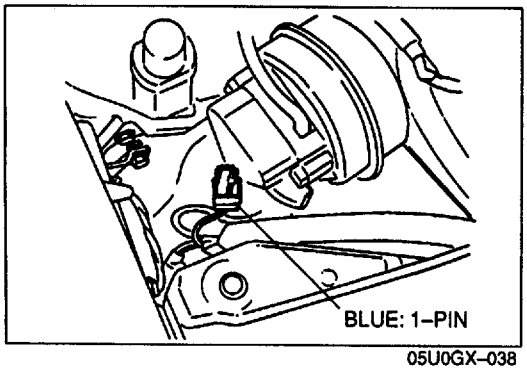
Tightening torque:
88—118 N·m (9—12 m-kg, 65—87 ft-lb)

Caution
- **The wheel-to-hub contact surfaces must be clean.**
- **Never apply oil to the nuts, bolts, or wheels, which cause looseness or seizure of the lug nuts.**

TIRE ROTATION

To prolong tire life and assure uniform tire wear, rotate the tires every 6000 km (3750 miles), sooner if irregular wear develops.

Caution
- **Do not include "TEMPORARY USE ONLY" spare tire in rotation.**
- **After rotating the tires, adjust each tire to the specified air pressure. (Refer to page Q–3.)**



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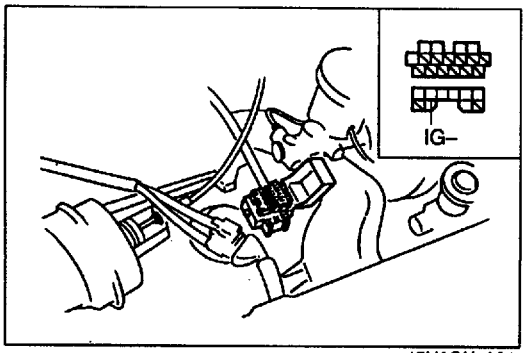

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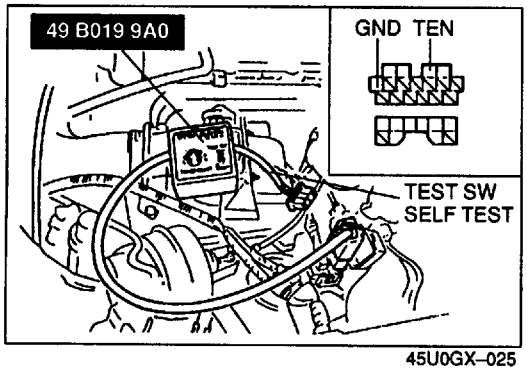

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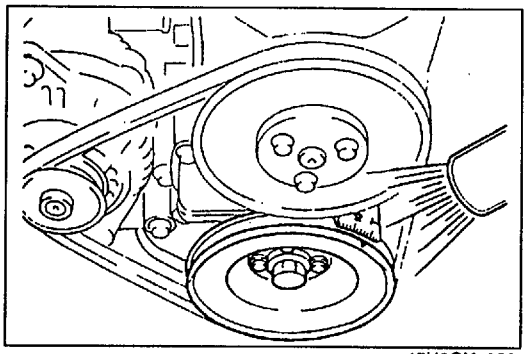
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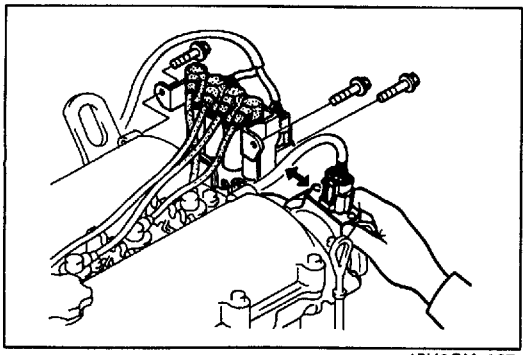
45U0GX–027

IGNITION TIMING

1. Check the condition of the engine (spark plugs, leaks in hoses, etc.).
2. Verify that all accessories are OFF.
3. Warm up the engine to the normal operating temperature.

Note
- When using an externally powered timing light and/or tachometer connect it to the power connector (Blue: 1–pin).

Warning
- **Do not ground the power connector terminal (Blue: 1–pin); some fuses will be burned.**

4. Connect a timing light and tachometer to the data link connector terminal (**IG–**).

5. Connect the **SST** and set TEST SW to "SELF TEST" or connect data link connector terminals TEN and GND with a jumper wire.
6. Check the idle speed, and set it to specification if necessary (Refer to section F.)

Idle speed (rpm):800—900 (MT)
750—850 (AT)

7. Verify that the timing mark (white) on the crankshaft pulley is aligned with the indicator pin.

Ignition timing: 9°—11° BTDC (at idle)

8. If the marks are not aligned, remove the ignition coil bracket and push the ignition coil aside for easy access and then loosen the crankshaft position sensor lock bolts, and turn the crankshaft position sensor to make the adjustment.
9. Tighten the crankshaft position sensor lock bolts to the specified torque.

Tightening torque:
19—25 N·m {1.9—2.6 kgf·m, 14—19 ft·lbf}

10. After adjusting the ignition timing, disconnect the jumper wire or **SST** from the data link connector.
11. Increase the engine speed and verify that the ignition timing advances.

1994 Mazda MX-5 Miata Workshop Manual

FOREWORD

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

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Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

WARRANTY

The manufacturer's warranty on Mazda vehicles and engines can be voided if improper service or repairs are performed by persons other than those at an Authorized Mazda Dealer.

Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

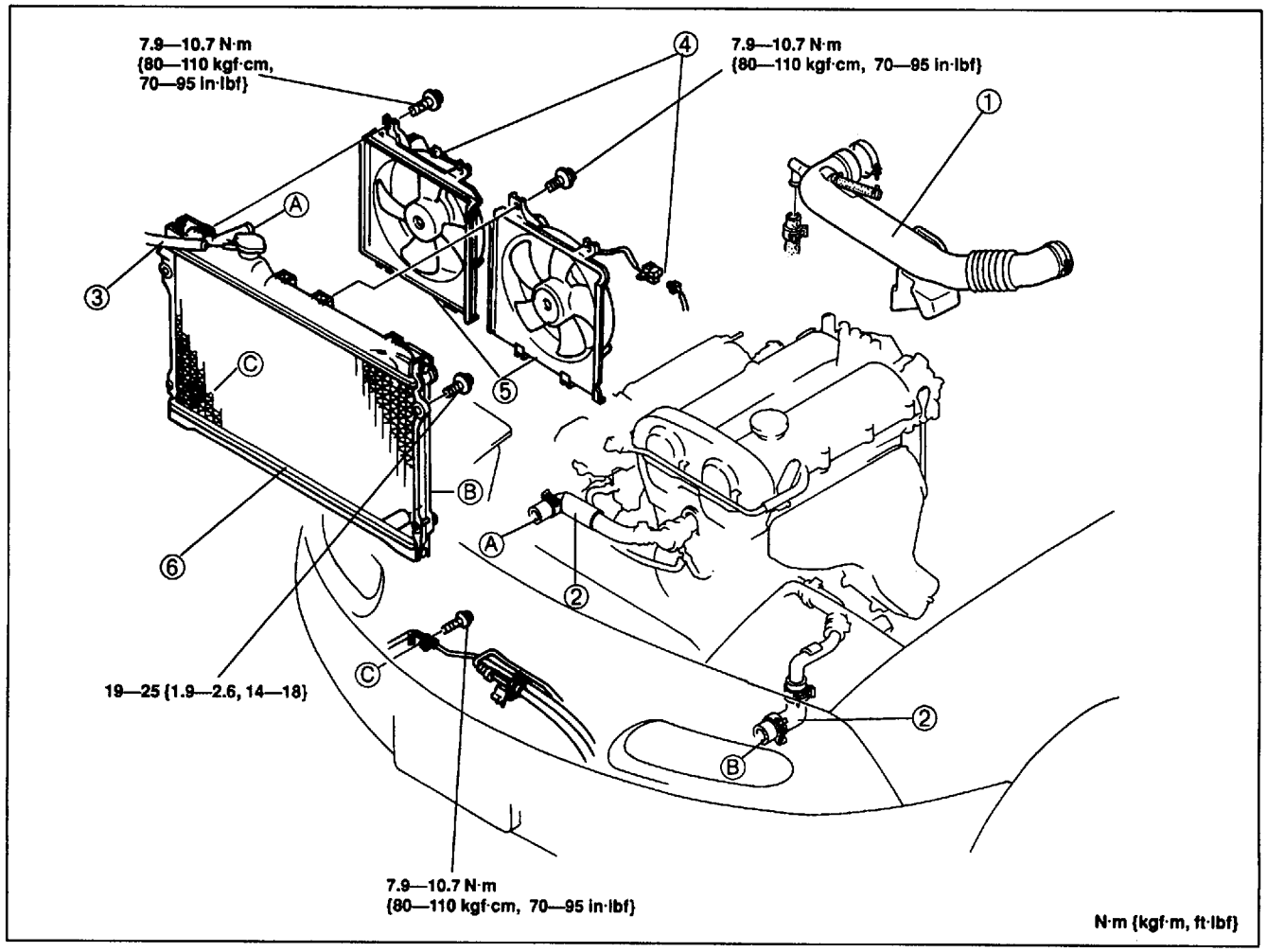
CONTENTS

PRINTED IN THE USA, AUG. '93
Form No. 1370-10-93H
Part No. 9999-95-042B-94

RADIATOR

REMOVAL / INSTALLATION

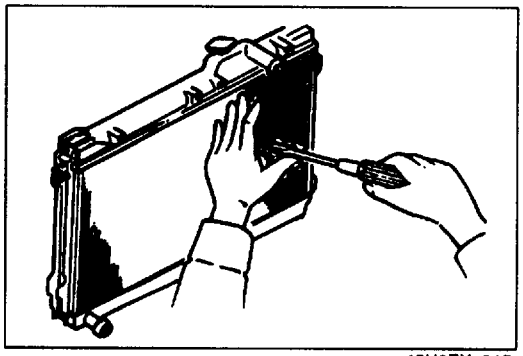
1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to page E–5 for **WARNING** and procedure.)
3. Remove the undercover.
4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.



45U0EX–019

1. Air intake pipe
2. Radiator hose
3. Coolant reservoir hose
4. Coolant fan motor connector, condenser fan motor connector
5. Coolant fan, condenser fan
6. Radiator

Inspection ..... below



45U0EX–015

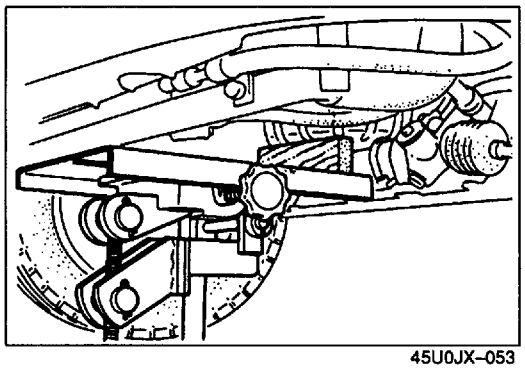
INSPECTION

Check for the following and repair or replace as necessary.

1. Cracks, damage, and water leakage.
2. Bent fins (repair with a screwdriver).
3. Distorted or bent radiator inlet.

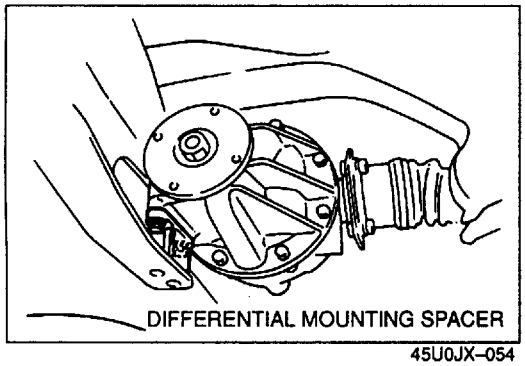
Steps After Installation

1. Install the undercover.
2. Connect the negative battery cable.
3. Fill the radiator with coolant. (Refer to page E–6 for **WARNING** and procedure.)


45U0JX-053

Installation note
Transmission
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}

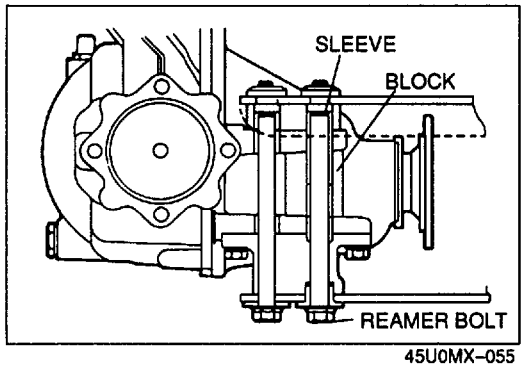


45U0JX-054

Power plant frame (PPF)
1. Install the differential mounting spacer.

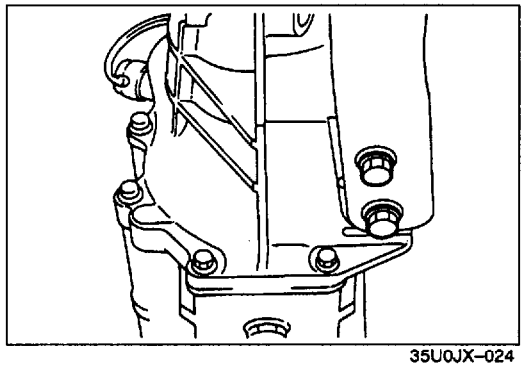
Tightening torque:
38—51 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

2. Support the transmission with a jack so that it is level.
3. Position the PPF and tighten the transmission-side bolts by hand.
4. Verify that the sleeve is installed into the block.



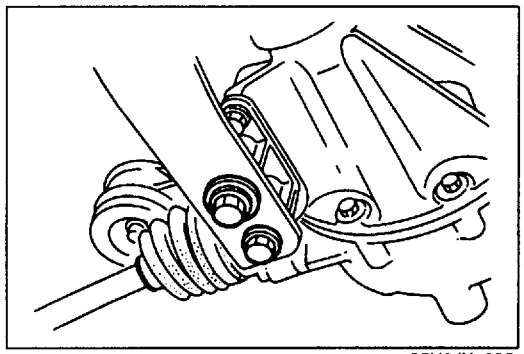
45U0MX-055

5. Install the spacer and reamer bolts in the forward hole, then hand tighten them.


35U0JX-024

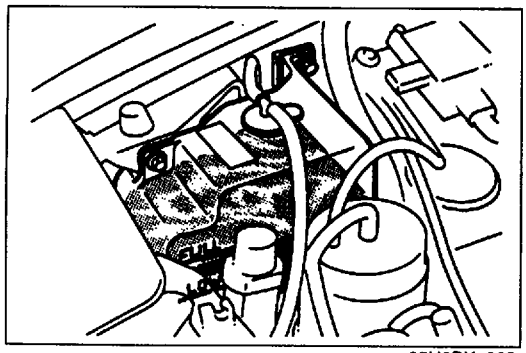
6. Snugly install the power plant frame bracket.
7. Tighten the transmission-side bolts.

Tightening torque:
104—123 N·m {10.6—12.6 kgf·m, 76.7—91.1 ft·lbf}


35U0JX-025

8. Tighten the differential-side bolts.

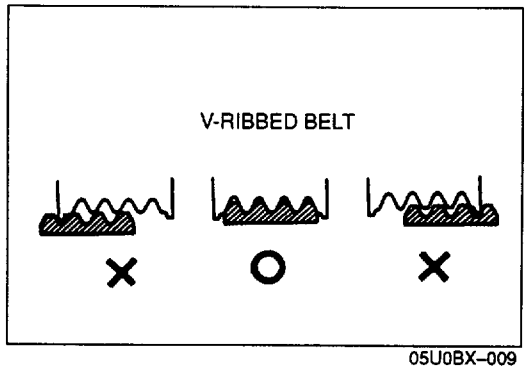
Tightening torque:
104—123 N·m {10.6—12.6 kgf·m, 76.7—91.1 ft·lbf}



05U0BX–008

Coolant quality

1. Verify that there is no buildup of rust or scale around the radiator cap or radiator filler neck.
2. Verify that the coolant is free of oil.
3. Replace the coolant if necessary.

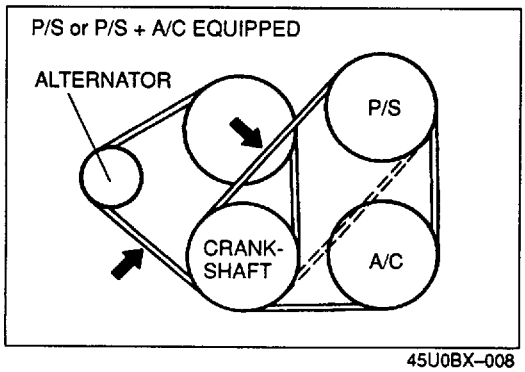


05U0BX–009

DRIVE BELT

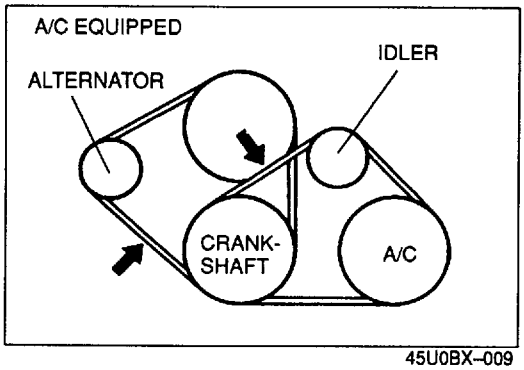
Inspection

1. Remove the air intake pipe.
2. Check the drive belts for wear, cracks, and fraying. Replace if necessary.
3. Verify that the drive belts are correctly mounted on the pulleys.



45U0BX–008

4. Check the drive belt deflection when the engine is cold, or at least 30 minutes after the engine has stopped. Apply moderate pressure **98 N {10 kgf, 22 lbf}** midway between the specified pulleys.



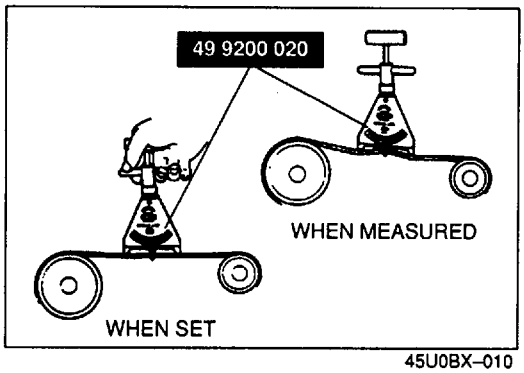
45U0BX–009

Deflection

mm {in}

Drive belt	New*	Used	Limit
Alternator	5.5—7.0 {0.22—0.27}	6.0—7.5 {0.24—0.29}	8.0 {0.31}
P/S, P/S + A/C	8.0—9.0 {0.32—0.35}	9.0—10.0 {0.36—0.39}	11.5 {0.45}
A/C	8.0—9.0 {0.32—0.35}	9.0—10.0 {0.36—0.39}	11.5 {0.45}

* A belt that has been on a running engine for less than five minutes.

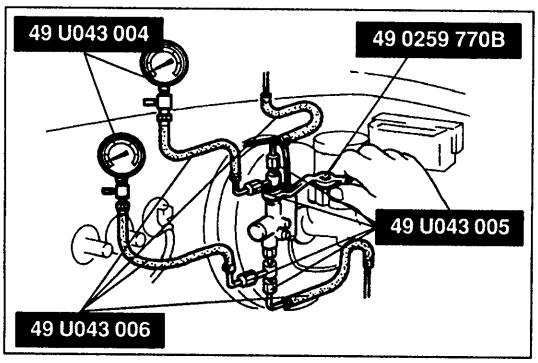


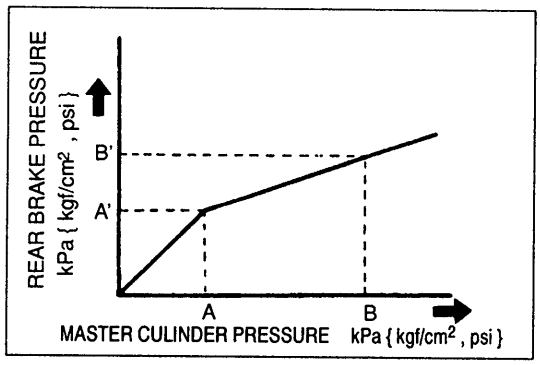
45U0BX–010

5. If the deflection is not within specification, adjust it.
6. Install the air intake pipe.

Drive belt tension check

Belt tension can be checked in place of belt deflection. Check the drive belt tension when the engine is cold, or at least 30 minutes after the engine has stopped. Using the **SST**, check the belt tension between any two pulleys.





PROPORTIONING BYPASS VALVE

Inspection

When disconnecting and connecting the brake pipes, do so by using the flare nut wrench **SST**.

1. Connect the **SSTs** and the adapters to the brake pipes as shown in the figure.
2. Bleed the air from the brake system. (Refer to page P–7.)
3. Measure the fluid pressure from the master cylinder and to the rear brakes. If not as specified, replace the valve assembly.

Specification

	Fluid pressure kPa { kgf/cm², psi }			
	A	A'	B	B'
NON ABS	2,943 { 30 , 427 }	2,943 { 30 , 427 } ± 294 { 3 , 43 }	5,884 { 60 , 850 }	4,120 { 42 , 597 } ± 392 { 4 , 57 }
ABS	3,923 { 40 , 569 }	3,923 { 40 , 569 } ± 294 { 3 , 43 }	5,884 { 60 , 850 }	4,707 { 48 , 683 } ± 392 { 4 , 57 }

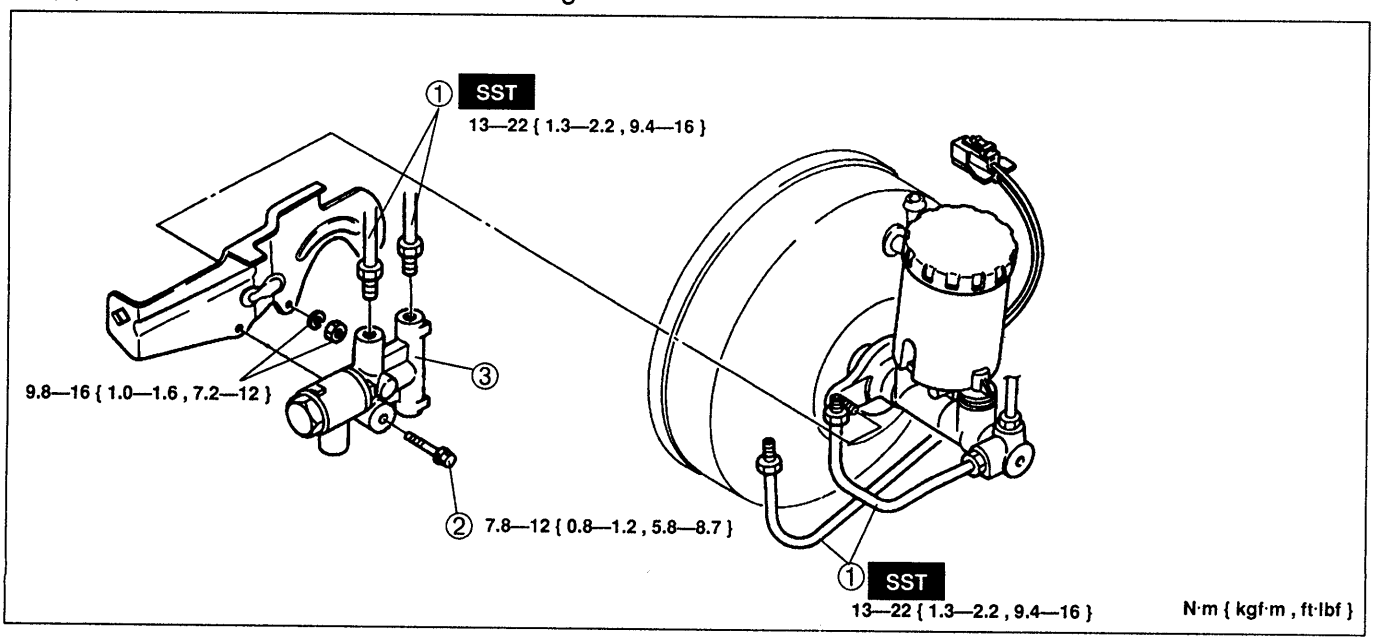
4. Add brake fluid and bleed the air. (Refer to page P–7.)
5. Check the brake lines for fluid leakage.

Replacement

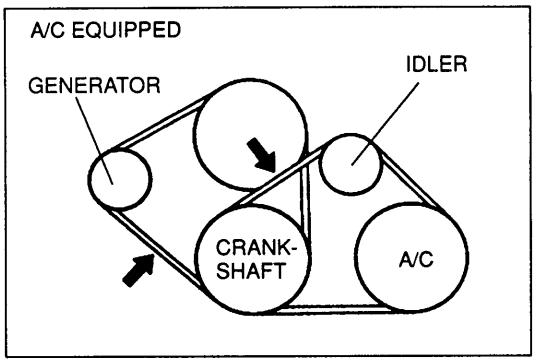
Caution

- **Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.**

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.
3. After installation:
   (1) Add brake fluid and bleed the air. (Refer to page P–7.)
   (2) Check the brake lines for fluid leakage.

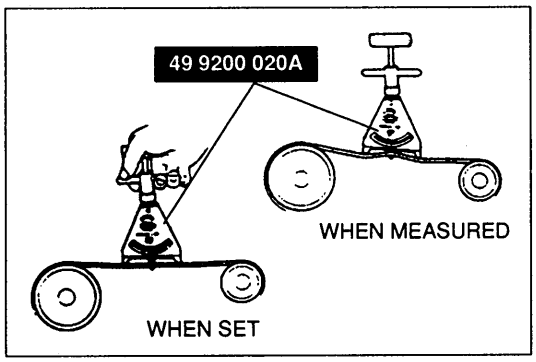


1. Brake pipe
   Removal Note ..... page P–24
   Installation Note ..... page P–24
2. Bolt
3. Proportioning bypass valve



5. Check the drive belt tension with a tension gauge.

Note
- Belt tension can be measured between any pulleys.



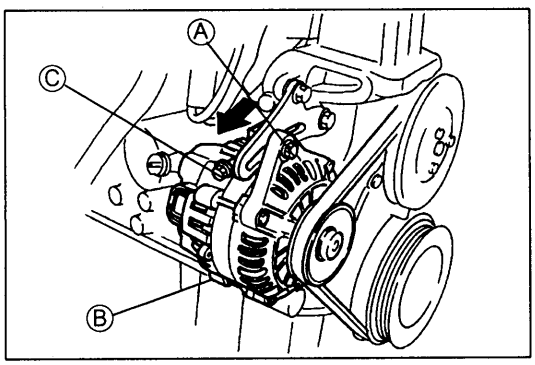
Tension

N { kgf , lbf }

Drive belt	New*	Used
Generator	491—745 { 50—76 , 110—167 }	491—706 { 50—72 , 110—158 }
P/S, P/S + A/C	491—588 { 50—60 , 110—132 }	422—490 { 43—50 , 95—110 }
A/C	491—588 { 50—60 , 110—132 }	422—490 { 43—50 , 95—110 }

* A belt that has been on a running engine for less than five minutes.

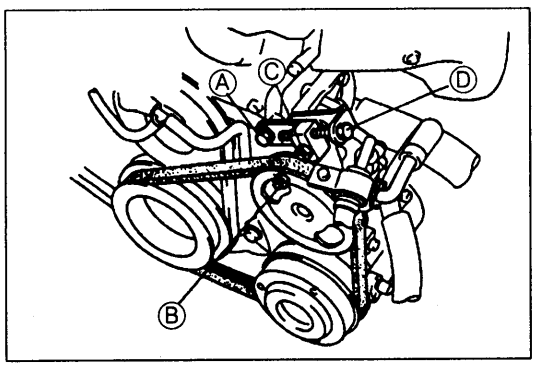
6. Install the intake air pipe.



Adjustment

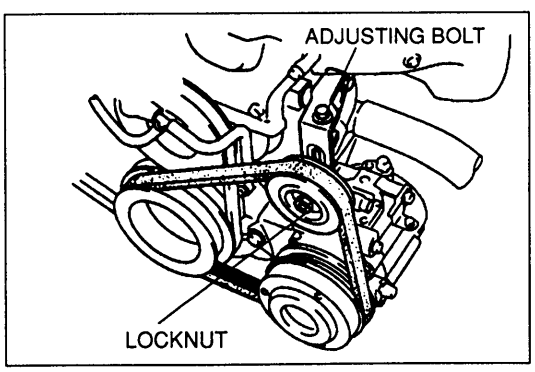
(1) Generator belt
Loosen generator bolts Ⓐ and Ⓑ and adjust the belt deflection by turning adjusting bolt Ⓒ.

Tightening torque
Ⓐ: 19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }
Ⓑ: 38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }



(2) P/S belt, P/S + A/C belt
Loosen P/S oil pump bolts Ⓐ and Ⓑ and nut Ⓒ, and adjust the belt deflection by turning adjusting bolt Ⓓ.

Tightening torque
Ⓐ: 32—46 N·m { 3.2—4.7 kgf·m , 24—33 ft·lbf }
Ⓑ: 37—53 N·m { 3.7—5.5 kgf·m , 27—39 ft·lbf }
Ⓒ: 19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }



(3) A/C belt
Loosen the locknut and adjust the belt deflection by turning the adjusting bolt.

Tightening torque:
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

1995 Mazda MX-5 Miata Workshop Manual

FOREWORD

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

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Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

CONTENTS

PRINTED IN THE U.S.A. JULY '94
Form No. 1450-10-94G
Part No. 9999-95-042B-95

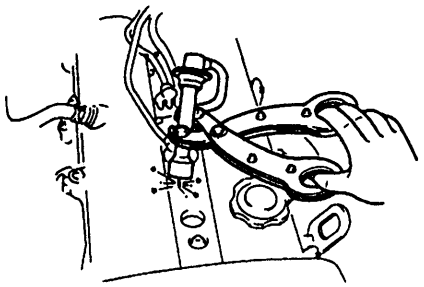
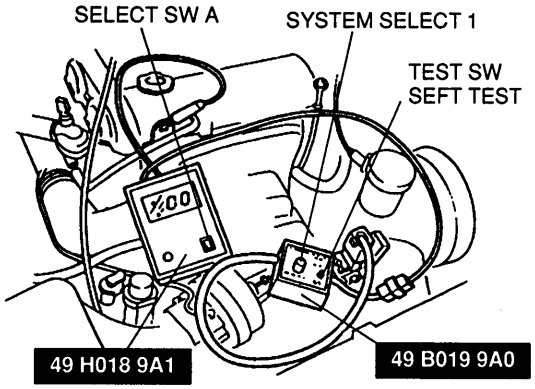
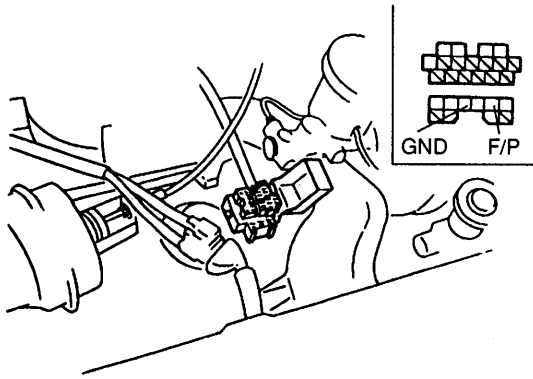
SYMPTOM TROUBLESHOOTING

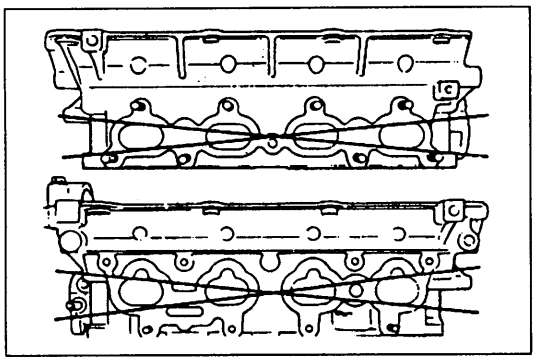
2	CRANKS NORMALLY BUT WILL NOT START (NO COMBUSTION)
DESCRIPTION	• Engine cranks at normal speed but shows no sign of "firing" • Battery in normal condition • Throttle valve not held wide open throttle while cranking • Fuel in tank

[TROUBLESHOOTING HINTS]
Because of no combustion, possibly no fuel is injected to engine or no ignition at all cylinders
① No spark
- Ignition control malfunction
- Ignition system component malfunction

② No fuel injection
- Fuel pump does not operate
- Fuel injector does not operate

③ Low fuel line pressure
④ Low engine compression

STEP	INSPECTION		ACTION
1	Check if strong blue spark is visible at disconnected high-tension lead while cranking engine 	Yes	Go to step 3
		No	Go to step 2
2	Check if "00" is displayed on Self Diagnosis Checker with ignition switch ON ☞ **page F–79** 	Yes	Check ignition system (Refer to Troubleshooting "Misfire") ☞ **section G**
		No	**Diagnostic trouble code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F–81**
			"88" flashes Check ECM terminal 1E voltage ☞ **page F–145** **Specification:** **Battery positive voltage (Ignition switch ON)** ➪ If OK, replace ECM ☞ **page F–143** ➪ If not OK, check wiring between ECM and Self-Diagnosis Checker ☞ **page F–7**
3	Connect data link connector terminals F/P and GND by using jumper wire and check for fuel pump operating sound with ignition switch ON ☞ **page F–114** 	Yes	Check if engine starts in this condition ➪ If starts, check fuel pump relay ☞ **page F–117** ➪ If does not start, go to step 5
		No	Go to step 4

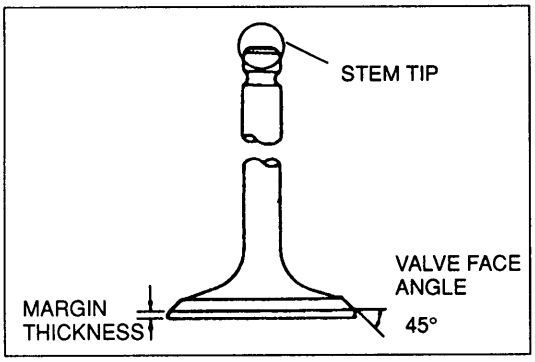


6. Measure the manifold contact surface distortion in the four directions as shown.

   Distortion: 0.15 mm { 0.006 in } max.

7. If distortion exceeds the maximum, grind the surface or replace the cylinder head.

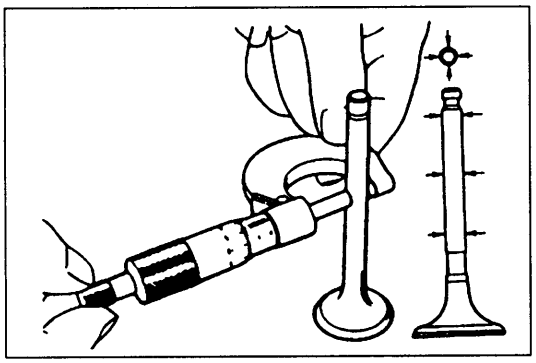
   Grinding: 0.20 mm { 0.008 in } max.



VALVE MECHANISM
Valve and Valve Guide

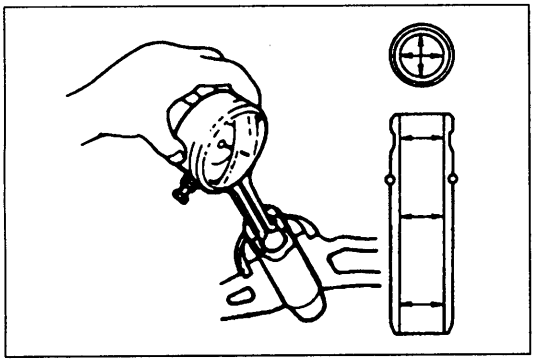
1. Inspect each valve for the following. Replace or resurface the valve if necessary.
   (1) Damaged or bent stem
   (2) Rough or damaged face
   (3) Damaged or unevenly worn stem tip
2. Measure the valve head margin thickness of each valve. Replace the valve if necessary.

   Margin thickness
   IN : 0.9 mm { 0.035 in }
   EX : 1.0 mm { 0.039 in }



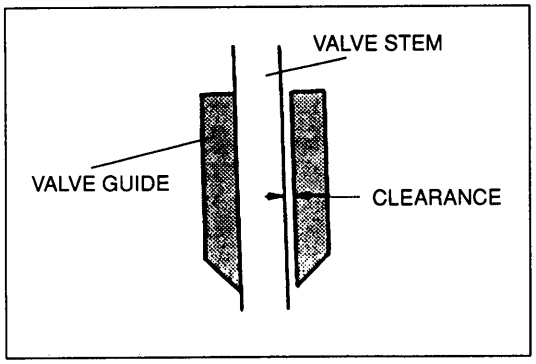
3. Measure the length of each valve.

   Length
   Standard
   IN : 101.89 mm { 4.0114 in }
   EX : 101.99 mm { 4.0153 in }
   Minimum
   IN : 100.39 mm { 3.9524 in }
   EX : 100.49 mm { 3.9563 in }



4. Measure the stem diameter of each valve at the points shown.

   Diameter
   IN : 5.970—5.985 mm { 0.2351—0.2356 in }
   EX : 5.965—5.980 mm { 0.2349—0.2354 in }
   Minimum
   IN : 5.920 mm { 0.2331 in }
   EX : 5.915 mm { 0.2329 in }



5. Measure the inner diameter of each valve guide at the points shown.

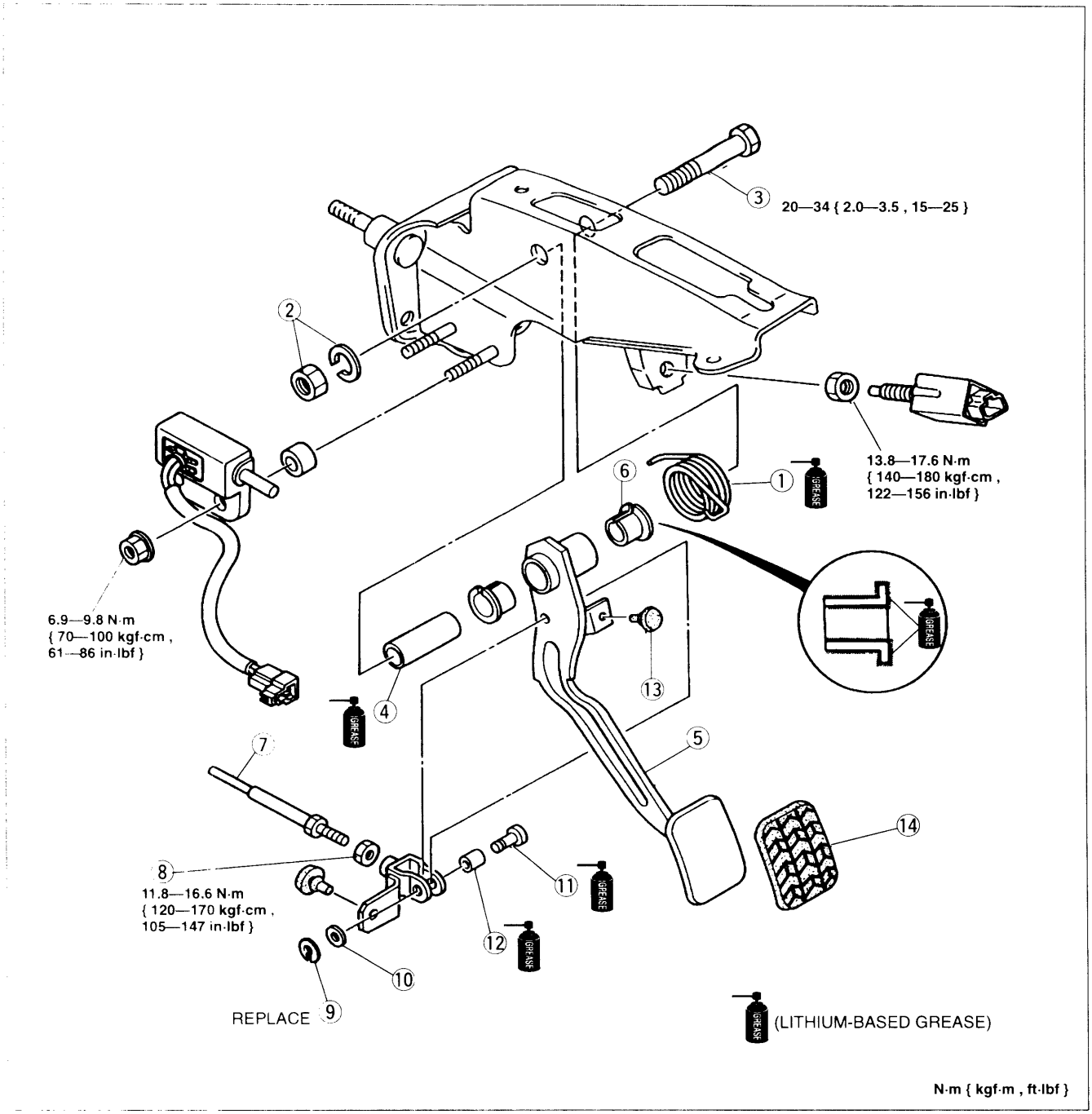
   Inner diameter
   IN : 6.01—6.03 mm { 0.2367—0.2374 in }
   EX : 6.01—6.03 mm { 0.2367—0.2374 in }

6. Calculate the valve stem-to-guide clearance. Subtract the outer diameter of the valve stem from the inner diameter of the corresponding valve guide.

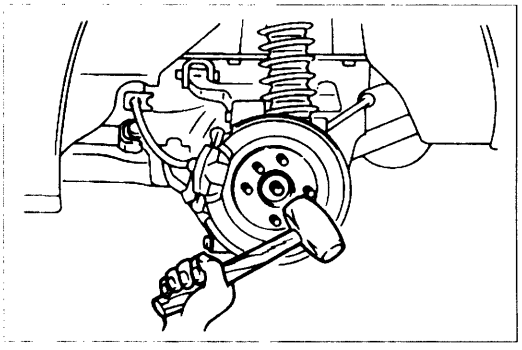
   Clearance
   IN : 0.025—0.060 mm { 0.0010—0.0023 in }
   EX : 0.030—0.065 mm { 0.0012—0.0025 in }
   Maximum: 0.20 mm { 0.008 in }

REMOVAL / INSPECTION / INSTALLATION

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.



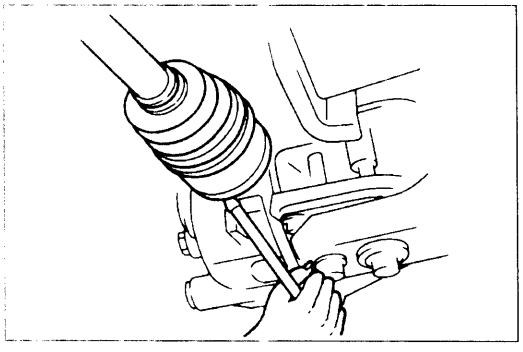
1. Spring
   - Removal Note ..... page H–7
   - Installation Note ..... page H–7
2. Nut and lock washer
3. Bolt
4. Spacer
5. Clutch pedal
6. Bushing
7. Push rod
8. Nut
9. Clip
10. Wave washer
11. Pin
12. Spacer
13. Stop
14. Pedal pad



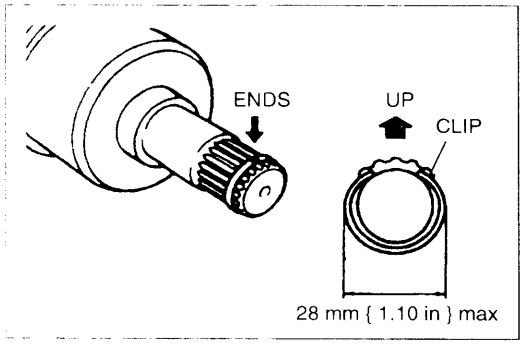
Removal note
Drive shaft

Note
- If the drive shaft will not come out of the rear hub support easily, install a discarded nut onto the drive shaft so that the nut is flush with the end of the drive shaft. Tap the nut with a copper hammer to loosen the drive shaft from the wheel hub.

1. Pull the rear hub support from the drive shaft.

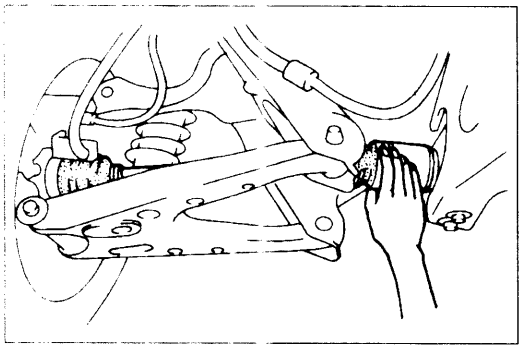


2. Remove the drive shaft from the differential by using a pry bar.

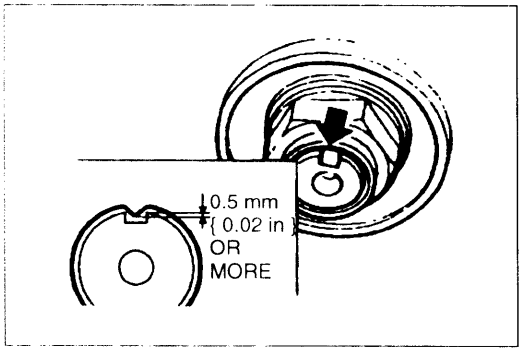


Installation note
Drive shaft
1. Install a new clip onto the drive shaft.
2. Measure the outer diameter of the clip after installing, and replace the clip if it exceeds the specification.

Caution
- **The sharp edges of the drive shaft snap ring can slice or puncture the oil seal. Be careful when installing the drive shaft to the transmission.**



3. With the ends of the clip facing upward, push the drive shaft into the differential.
4. After installation, pull outward on the double offset joint outer ring and verify that the drive shaft is securely held by the clip.



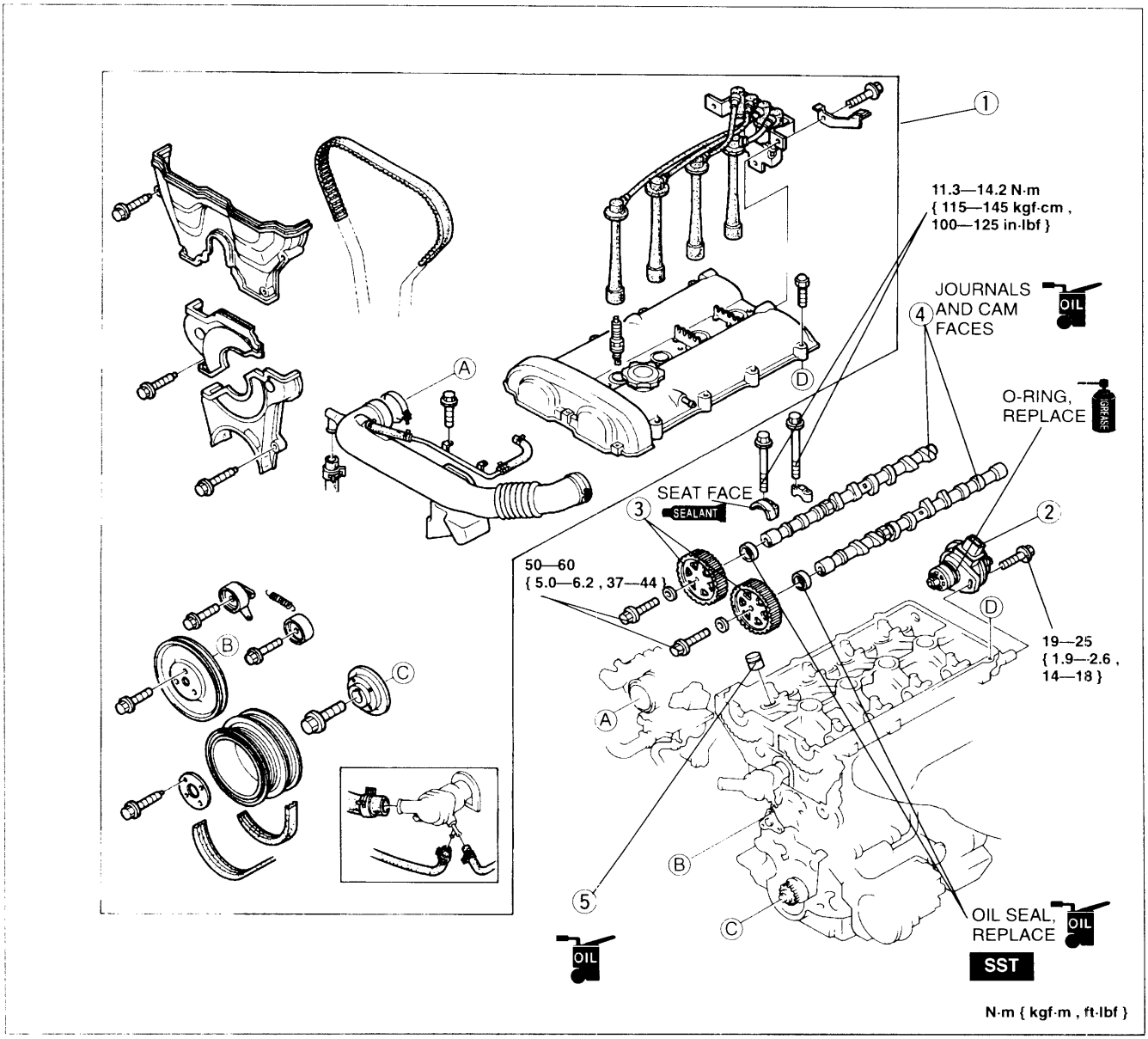
Locknut
Install a new locknut and stake it.

Tightening torque:
216—294 N·m { 22—30 kgf·m , 160—216 ft·lbf }

HLA
Removal / Installation

Caution
- **Removal and installation of the HLA must be carried out only when the problem cannot be solved by the HLA troubleshooting. (Refer to page B–9.)**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (Refer to section E.)
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Install in the reverse order of removal, referring to **Installation Note**.



1. Timing belt
   Removal / Installation ..... page B–12
2. Camshaft position sensor
   Installation Note ..... section G
3. Camshaft pulley
   Removal Note ..... page B–21
   Installation Note ..... page B–22
4. Camshaft
   Removal Note ..... page B–21
   Installation Note ..... page B–21
5. HLA
   Removal Note ..... page B–21
   Installation Note ..... page B–21
   Inspection ..... page B–53

1996 Mazda MX-5 Miata Workshop Manual

FOREWORD

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Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:
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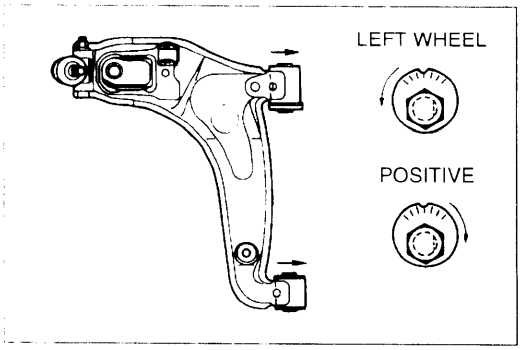
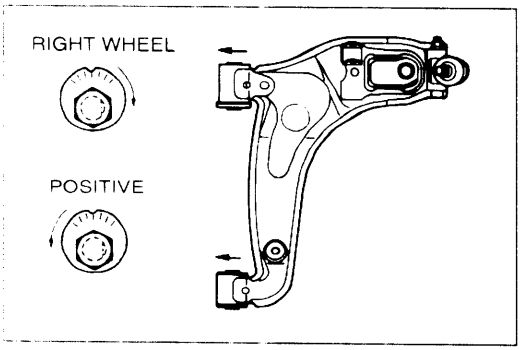
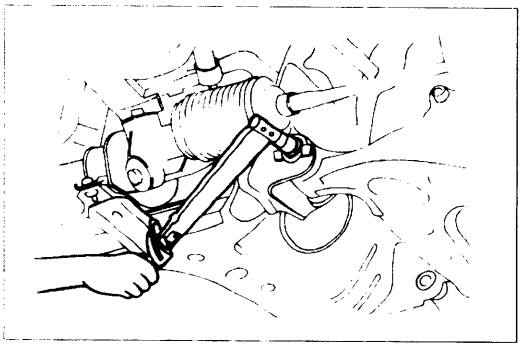
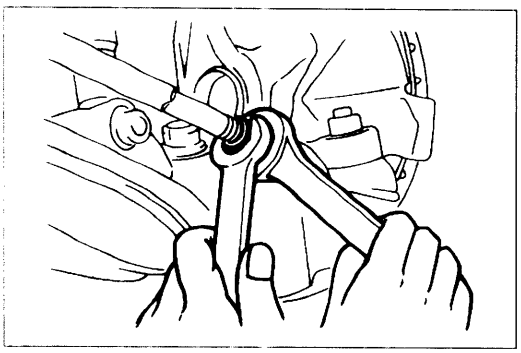
CONTENTS

PRINTED IN THE U.S.A. JULY '95
Form No. 1496-10–95G
Part No. 9999-95-042B-96









Camber

Camber is adjusted by turning the front and rear adjusting cam bolts at the lower arm.

Caution

- **Adjust the camber after adjusting the caster.**

1. Loosen the front and rear cam nuts.
2. Turn the front and rear adjusting cam bolts the same amount in the opposite direction to provide the correct camber angle.

Camber	Left wheel		Right wheel	
	Front cam	Rear cam	Front cam	Rear cam
Positive	Counter-clockwise	Clockwise	Clockwise	Counter-clockwise
Negative	Clockwise	Counter-clockwise	Counter-clockwise	Clockwise

Note

- Turning the front cam one graduation changes the camber about **25'** and the caster about **22'**. Turning the rear cam one graduation changes the camber about **2'** and the caster about **22'**.

Note

- If the cam cannot be turned far enough to make the adjustment, begin again at adjustment of the caster using the other cam.

3. Tighten the nuts.

Tightening torque:
94—112 N·m { 9.5—11.5 kgf·m , 69—83 ft·lbf }

4. Adjust the toe-in.

Toe-in

1. Remove the steering gear boot clamp.
2. Loosen the left and right tie rod locknuts, and turn the tie rods by the same amount.
3. Loosen the left and right tie rod locknuts and turn the tie rods equally. Both tie rods are right threaded, so turning the right tie rod toward the front of the vehicle and the left toward the rear increases toe-in.

Note

- Turning both tie rods one complete turn changes toe-in by about **7 mm { 0.28 in }**.

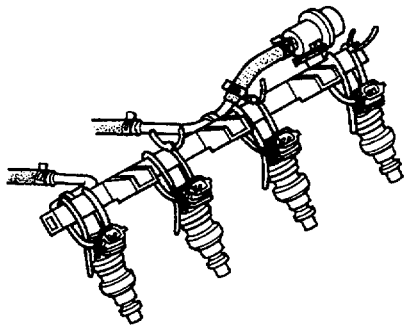
4. Tighten the tie rod locknuts to the specified torque.

Tightening torque:
35—39 N·m { 3.5—4.0 kgf·m , 26—28 ft·lbf }

5. Verify that the boot is not twisted, and install the boot clamp.

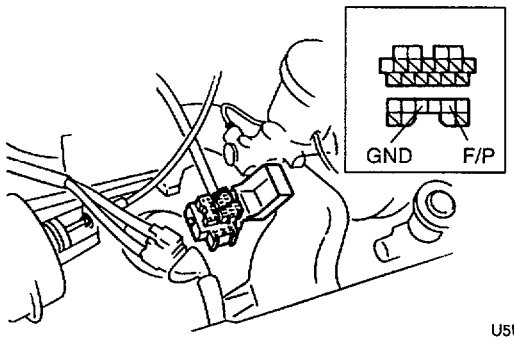
Fuel Leakage Test

1. Firmly affix the fuel injectors to the fuel distributor with wire.



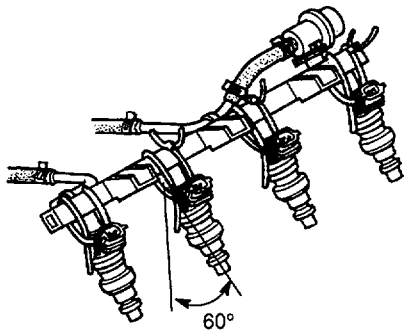
U5U11422

2. Disconnect the fuel injector connectors.
3. Remove the fuel distributor and fuel injectors together with the fuel hoses connected.
4. Connect data link connector terminals F/P and GND by using a jumper wire.



U5U11423

5. Turn the ignition switch to ON.
6. Tilt the fuel injectors **approx. 60 degrees** and verify that no fuel leaks from the fuel injector nozzles.



U5U11424

7. If fuel leaks from the fuel injector, replace it.

Leakage specification
1 drop/2 minutes

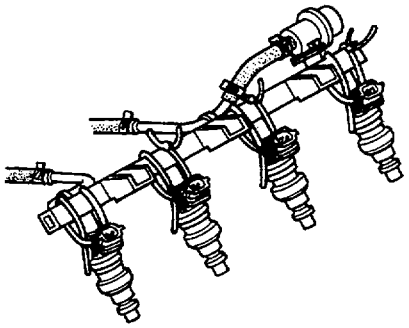
8. If not as specified, replace the fuel injectors.
9. Turn the ignition switch to OFF and remove the jumper wire.

Injection Volume Test

Warning

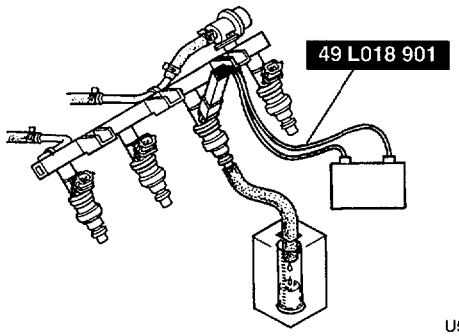
- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**

1. Firmly affix the fuel injectors to the fuel distributor with wire.



U5U11425

2. Disconnect the fuel injector connectors.
3. Remove the fuel distributor and fuel injectors together with the fuel hoses connected.
4. Connect the **SST** to the battery and an fuel injector.



U5U11426

5. Check the injection volume by using a graduated container.

Injection volumes
59—76 ml { 59—76 cc , 2.0—2.5 fl oz }/15 sec.

6. If not as specified, replace the fuel injectors.

1997 Mazda MX-5 Miata Workshop Manual

FOREWORD

This manual contains on vehicle service and diagnosis procedures for the Mazda MX-5 Miata. A thorough familiarization with this manual is important for proper repair and maintenance. It should always be kept in a handy place for quick and easy reference.

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Mazda Motor Corporation
HIROSHIMA, JAPAN

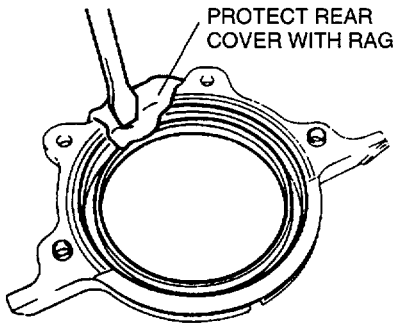
APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

CONTENTS

PRINTED IN U.S.A. JUL. 1996
Form No. 1549–10–96G
Part No. 9999–95–042B–97

Rear oil seal disassembly note

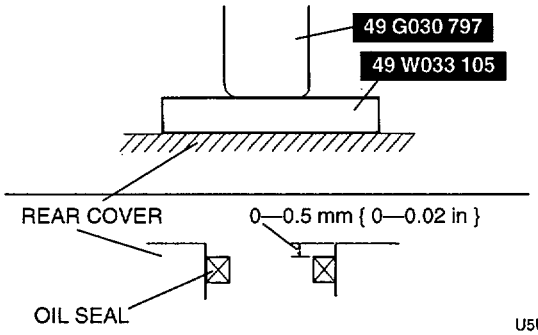
- Remove the oil seal by using a screwdriver protected with a rag.



U5U11094

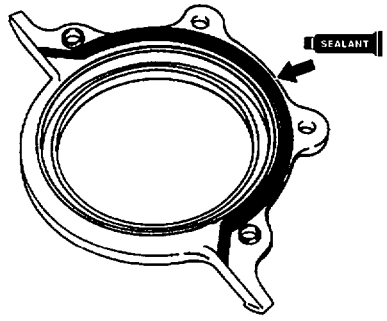
Rear cover assembly note

1. Apply clean engine oil to the new oil seal.
2. Install the oil seal into rear cover by hand.
3. Tap the oil seal in evenly by using the **SST** and a hammer.



U5U11095

4. Apply silicone sealant to the shaded area shown.



U5U11096

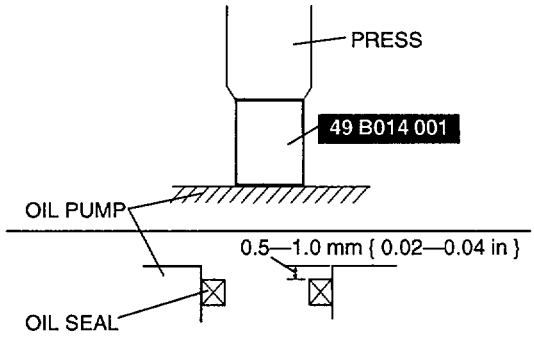
5. Install the rear cover.

Tightening torque
7.9—10.7 N·m { 80—110 kgf·cm , 70—95 in·lbf }

6. Cut away the portion of the silicone sealant that project from the rear cover toward the oil pan side.

Oil pump assembly note

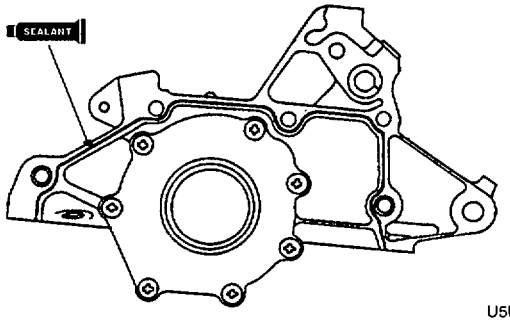
1. Apply clean engine oil to the new oil seal.
2. Install the oil seal into the oil pump body by hand.
3. Press the oil seal into the oil pump body by using the **SST**.



U5U11097

4. Apply silicone sealant to the oil pump as shown.

Thickness
ϕ1—2 mm { 0.040—0.078 in }



U5U11098

5. Install the oil pump within five minutes of applying the sealant.

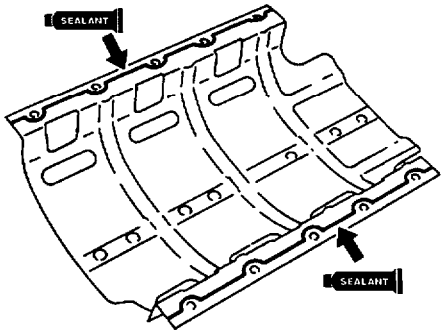
Tightening torque
19—25 N·m { 1.9—2.6 kgf·m , 14—18 ft·lbf }

6. Cut away the portion of the silicone sealant that project from the body toward the oil pan side.

Oil baffle assembly note

1. Remove all foreign material from the contact surfaces.
2. Apply silicone sealant to the oil baffle along the inside of the bolt holes, and install within five minutes.

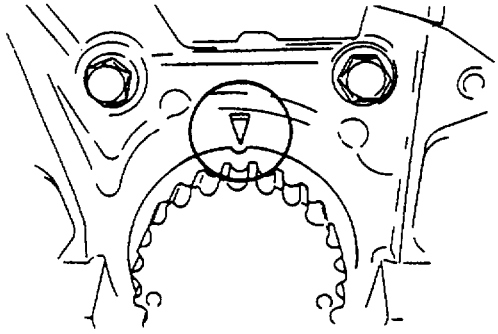
Thickness
ϕ2.5—3.5 mm { 0.099—0.137 in }



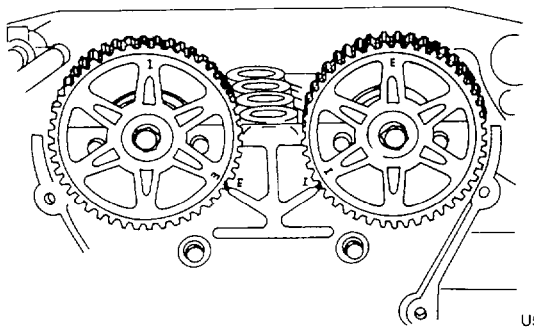
U5U110A0

Timing Belt Installation Note

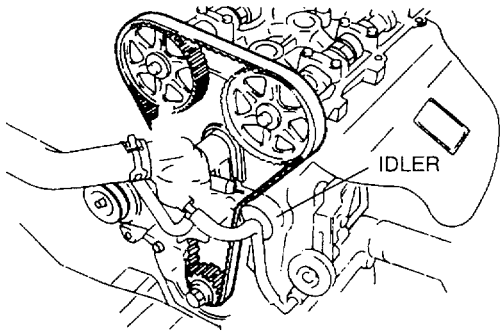
1. Verify that the timing belt pulley mark is aligned with the timing mark.


U5U11014

2. Verify that the camshaft pulley marks are aligned with the seal plate marks. E for intake side, and I for exhaust side.

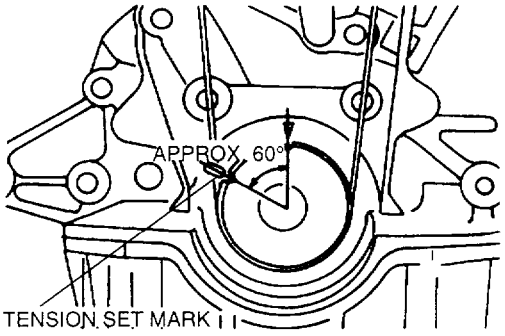

U5U11015

3. Install the timing belt so that there is no looseness at the idler side or between the camshaft pulleys.



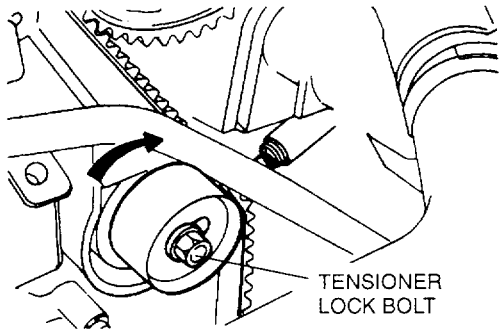
U5U11016

4. Install the pulley boss and pulley lock bolt.
5. Turn the crankshaft two turns clockwise and face the pin on the pulley boss straight up. Do not turn the crankshaft counterclockwise.
6. Verify that the camshaft pulley marks are again aligned with the seal plate marks. If not aligned, remove the timing belt and repeat from tensioner installation.
7. Turn the crankshaft 1 and 5/6 turns clockwise and align the timing belt pulley mark with the tension set mark for proper timing belt tension adjustment.



U5U11017

8. Using the **SST**, loosen the pulley lock bolt and remove the bolt and pulley boss. Do not turn the crankshaft.
9. Verify that the timing belt pulley mark is aligned with the tension set mark.
10. Loosen the tensioner lock bolt to apply spring tension to the timing belt. Be sure not to apply tension other than that of the tensioner spring.



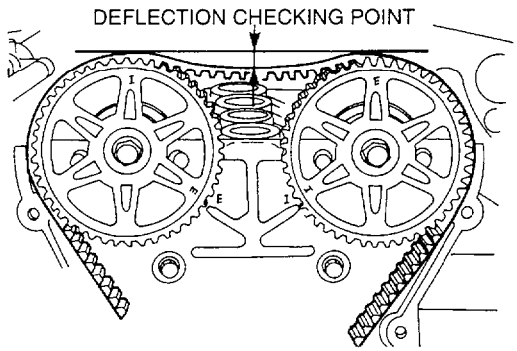
U5U11018

11. Tighten the tensioner lock bolt.

Tightening torque
38—51 N·m { 3.8—5.3 kgf·m , 28—38 ft·lbf }

12. Install the pulley boss and pulley lock bolt.
13. Turn the crankshaft 2 and 1/6 turns clockwise and verify that the timing marks are correctly aligned.
14. Measure the timing belt deflection by applying moderate pressure **98 N { 10 kgf , 22 lbf }** midway between the camshaft pulleys. If the deflection is not correct, repeat from step 10 above.

Deflection
9.0—11.5 mm { 0.36—0.45 in }

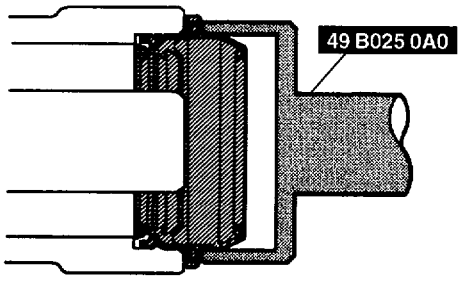


U5U11019

1	Oil seal ☞ Assembly Note
2	Snap ring
3	Steel ball
4	Speedometer drive gear
5	Snap ring
6	Transmission case
7	Extension housing ☞ Assembly Note
8	Main drive gear bearing ☞ Assembly Note
9	Snap ring
10	Countershaft front bearing ☞ Assembly Note
11	Snap ring
12	Adjustment shim ☞ Assembly Note
13	Gasket
14	Front cover
15	Speedometer driven gear
16	Neutral switch
17	Back-up light switch
18	Boot
19	Clutch release fork ☞ Assembly Note
20	Clutch release collar ☞ Assembly Note

Oil Seal Assembly Note

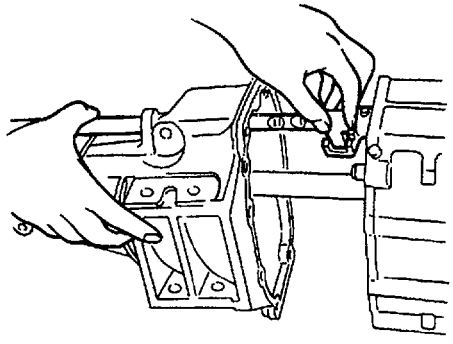
1. Apply transmission oil to the outer periphery.
2. Install a new oil seal with the **SST**.



U5U51126

Extension Housing Assembly Note

1. Apply sealant to the contact surfaces of the bearing housing and transmission case.



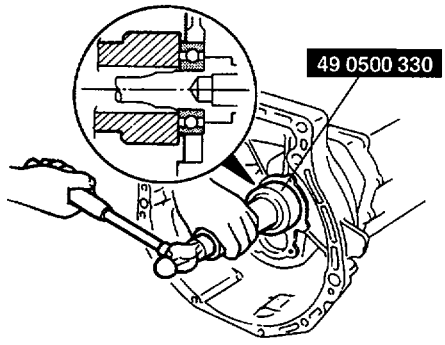
U5U51127

2. Align the inner shift lever and shift rod end groove, and install the extension housing.
3. Apply sealant to the bolt threads, and install the bolts.

Tightening torque
18—26 N·m { 1.8—2.7 kgf·m , 14—19 ft·lbf }

Main Drive Gear Bearing Assembly Note

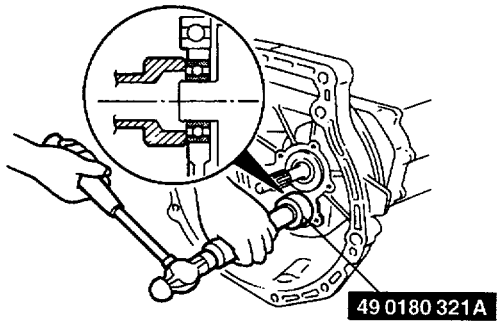
- Install the main drive gear bearing by using the **SST**, and secure it with a new snap ring.



U5U51128

Countershaft Front Bearing Assembly Note

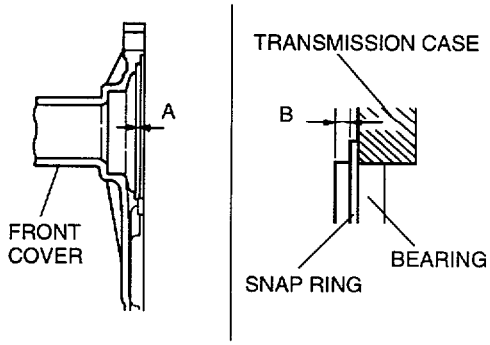
- Install the countershaft front bearing by using the **SST**, and secure it with a new snap ring.



U5U51129

Adjustment Shim Assembly Note

- After measuring dimensions A and B shown in the figure, use the adjustment shim(s) of the thickness corresponding to the value of A minus B, so that bearing end play will be within the specification.



U5U51130

1999 Mazda MX-5 Miata Workshop Manual

FORWARD

For proper repair and maintenance a thorough familiarisation with this manual is important and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawing and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Authorised Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

CONTENTS

WARRANTY

The manufacturer's warranty on Mazda vehicles and engines can be voided if improper service or repairs are performed by persons other than those at an Authorised Mazda Dealer

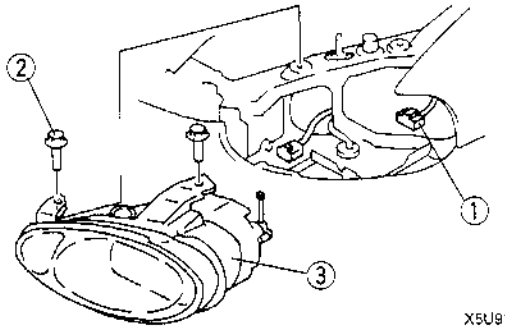
Mazda Motor Corporation
HIROSHIMA, JAPAN

FRONT COMBINATION LIGHT REMOVAL/INSTALLATION

X5U918W02

1. Disconnect the negative battery cable.
2. Remove the front bumper. (Refer to 09–10 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Adjust the headlight aiming. (Refer to 09–18 HEADLIGHT ADJUSTMENT.)

1	Front combination light connector
2	Bolt
3	Front combination light



X5U918WA1

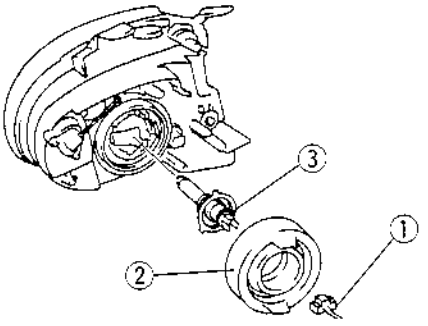
HEADLIGHT BULB REMOVAL/INSTALLATION

X5U918W03

Caution

- **A halogen bulb generates extremely high heat when it is used. If the surface of the bulb is soiled, excessive heat will build up and the light's life will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



X5U918WA2

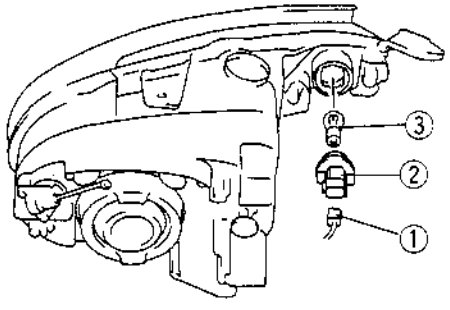
1	Headlight bulb connector
2	Cover
3	Headlight bulb

PARKING LIGHT/FRONT TURN LIGHT BULB REMOVAL/INSTALLATION

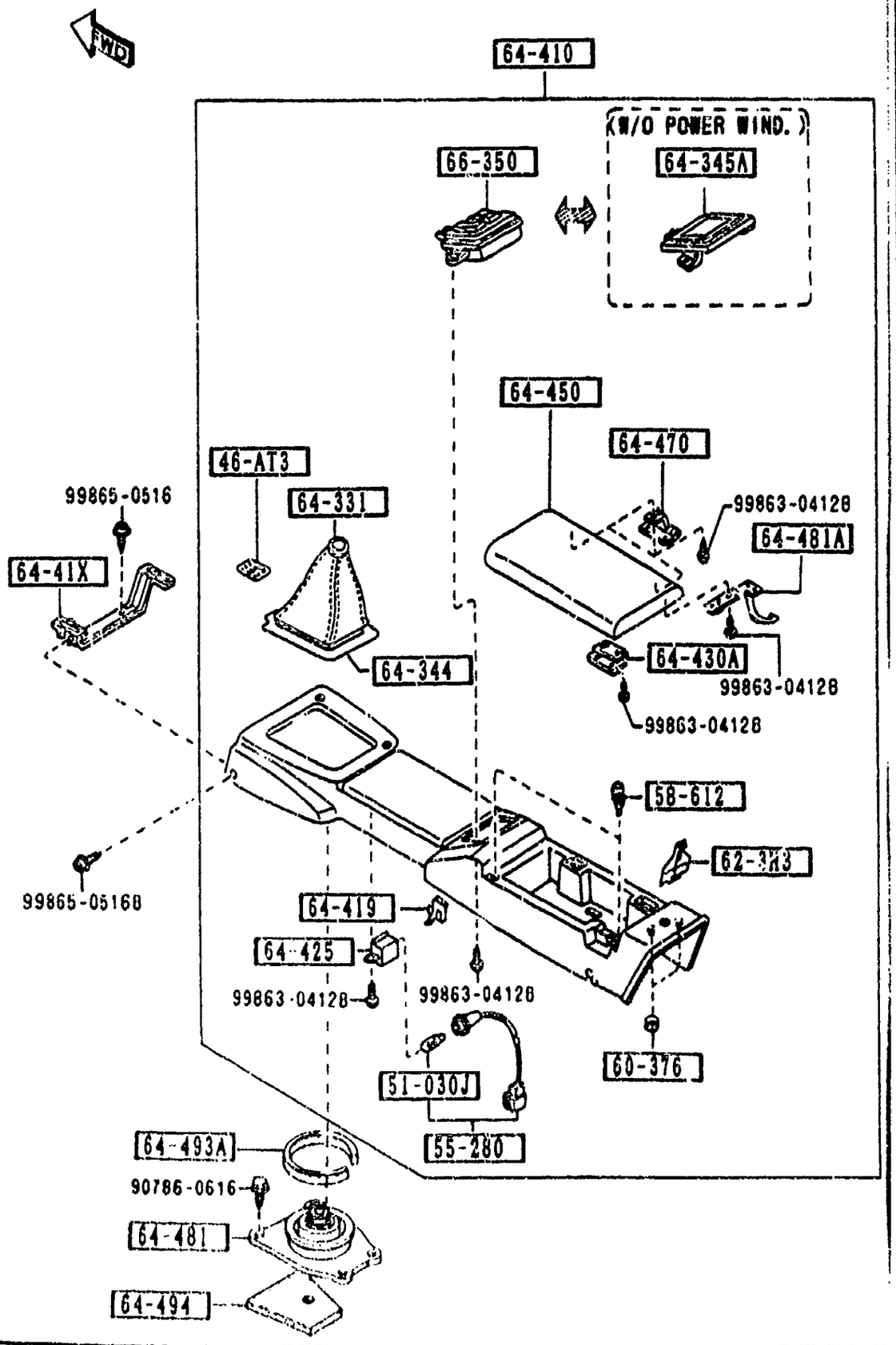
X5U918W05

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

1	Parking light/front turn light bulb connector
2	Socket
3	Parking light/front turn light bulb



X5U918WA4

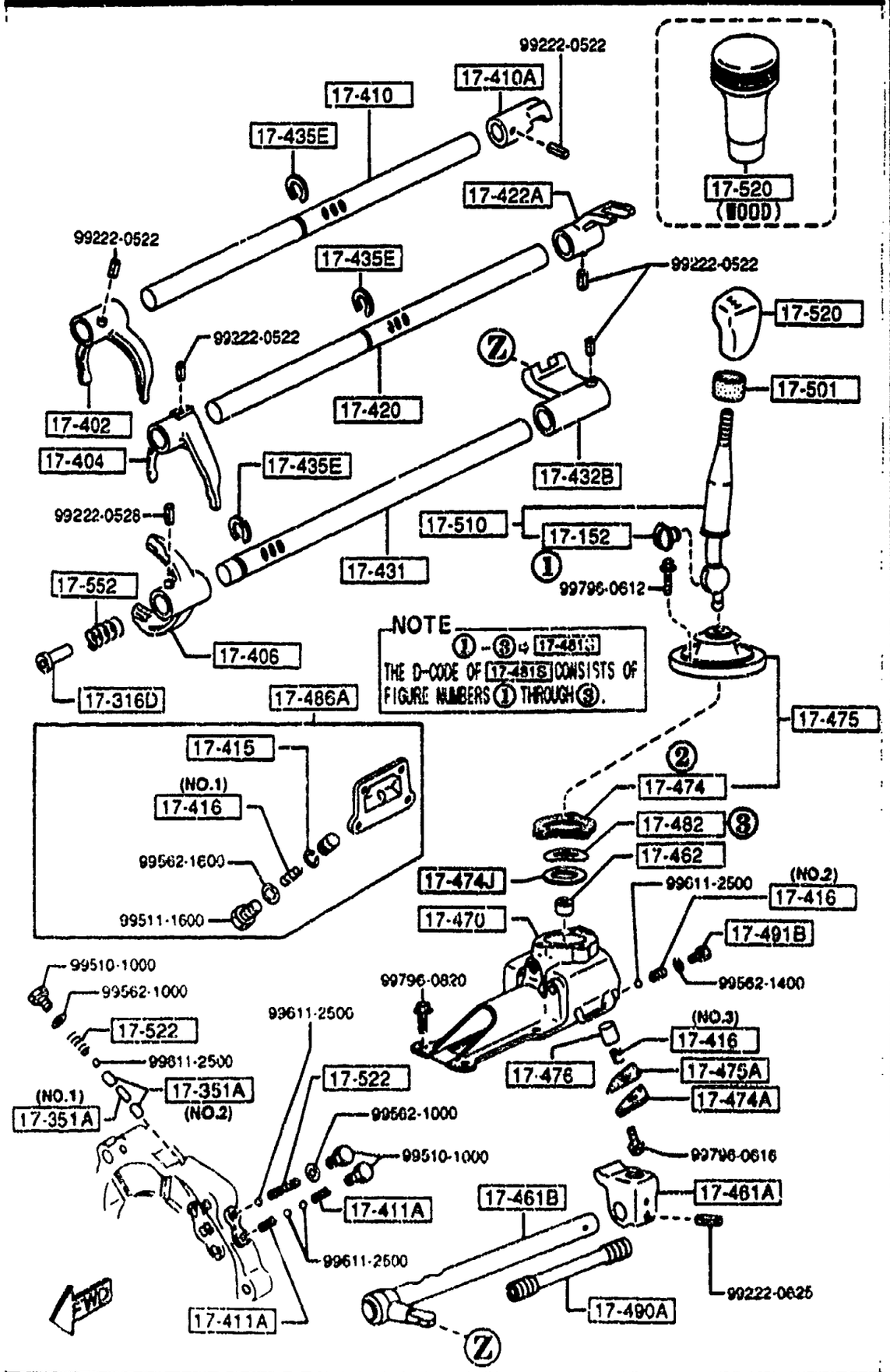


PART NO.	QTY	MODEL/RESTRICTION	MODEL/RESTRICTION	MODEL/RESTRICTION	FROM-TO
46-AT3		LABEL,CHANGE			
N002-46-AT3	1	(WOOD)			
51-030J		BULB			
3625-75-139	1	12V 1.4W,FOR WARNING			
55-280		BULB & SOCKET			
NA01-55-280	1	(MT)			
NA06-55-280	1	(AT)			
58-612		CUSHION,RUBBER			
B092-64-046	2				
60-376		NUT,TOP-CRASH PAD			
B092-60-376	2				
62-3H3		COVER,LEVER-OPENER			
NA01-64-424	1				
64-331		BOOT,CHANGE			
NA01-64-331	1	(MT)			
00	INT-	NA3 NA5 NA4 NA6 BLACK			
64-344		PLATE,BLACK-BOOTS RING			
NA01-64-344B	1	(MT)			
64-345A		BOX,COIN-CONSOLE			
NA01-64-437	1	BASE, PKG-A, PKG-R, (W/O POWER WIND.)			
00	INT-	NA3 NA5 NA4 NA6 BLACK			
64-41X		BRACKET,REAR CONSOLE			
NA01-64-416	1				
64-410		CONSOLE,REAR			
NA01-64-410D	1	BASE, PKG-A, (W/O P.WIND,W/O CHANGE LABEL) (MT)			
00	INT-	NA3 NA5 NA4 NA6			

AUNA04

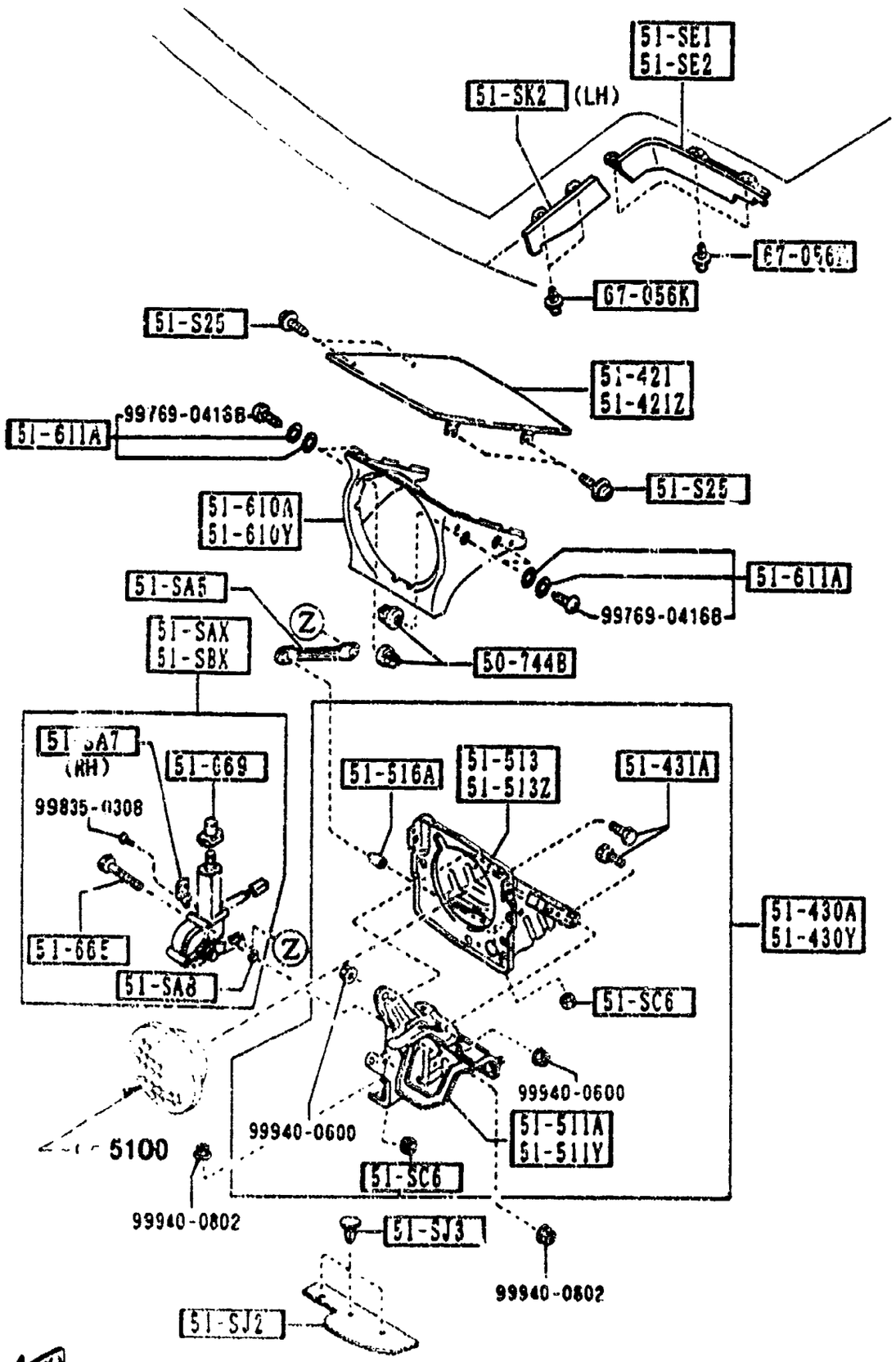
CAT. AUNA04-03

1995-04

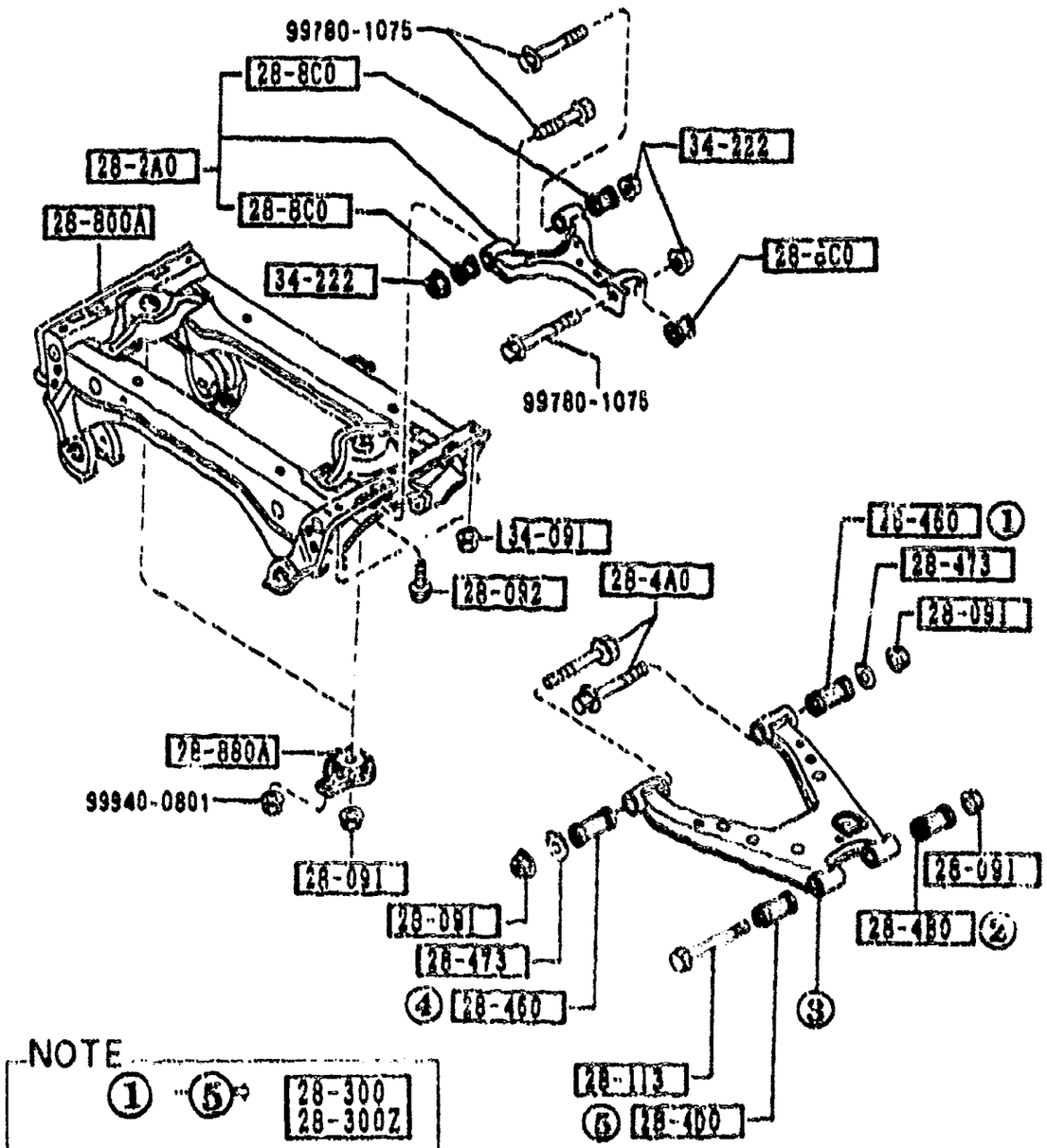


PART NO.	QTY	MODEL/RESTRICTION	MODEL/RESTRICTION	MODEL/RESTRICTION	FROM-TO
CONT'D					
M507-17-422	1				
17-431		ROD,SHIFT-OVER TOP & REVERSE			
M506-17-431A	1				
17-432B		END,SHIFT ROD(O/TOP& REV.)			
M508-17-432	1				
17-435E		RING,RETAINING			
R502-17-435	3				
17-461A		END,CONTROL LEVER			
M508-17-461A	1				
17-461B		ROD,CONTROL			
M516-17-450A	1				
17-462		SHEET,SPRING			
0398-17-462A	1				
17-470		CASE,CHANGE CONTROL			
M510-17-470C	1				
17-474		GASKET,COVER PLATE			
0303-17-474	1				
17-474A		CAP,SPRING			
M501-17-474	1				
17-474J		SHIM,ADJUST			
99963-3330	1	T=0.3MM			
17-475		BOOT,DUST-CHANGE LEVER			
M513-17-480A	1				
17-475A		GASKET,SPRING CAP			
M501-17-475	1				
17-476		SPINDLE,SELECT LOCK			
M502-17-476A	1				

5103 HEAD LAMP RETRACTORS



PART NO.	QTY	MODEL/RESTRICTION	MODEL/RESTRICTION	MODEL/RESTRICTION	FROM-TO
50-744B B481-50-744	8	GROMMET,SCREW			
51-SAX NA01-51-SAX	1	MOTOR(R),RETRACTABLE HEAD			
51-SA5 NA01-51-SA5	2	ROD,RETRACTABLE			
51-SA7 NA01-51-SA7	1	BRACKET,CLIP			
51-SA8 NA01-51-SA8	6	WASHER			
51-SBX NA01-51-SBX	1	MOTOR(L),RETRACTABLE HEAD			
51-SC6 KA01-51-SC6	4	NUT,STOPPER-LAMP HINGE			
51-SE1 NA01-51-SE1	1	PROTECTOR(R),RETRA H/L			
51-SE2 NA01-51-SE2	1	PROTECTOR(L),RETRA. H/L			
51-SJ2 NA01-51-SJ2	2	PROTECTOR(L),RETRA. FRONT (IN SPITE OF (L),THIS PART IS APPLICABLE TO BOTH RH&LH SIDE)			
51-SJ3 NAC1-51-SJ3	6	CLIP			
51-SK2 NA01-51-SK2	1	PROTECTOR(L),RETRA. SIDE			
51-S25 B534-51-S25A	8	BOLT,LAMP LID			



NOTE

① ··· ⑤ 28-300 28-300Z

THE D CODE OF 28-300 28-300Z CONSISTS OF FIGURE NUMBERS ① THROUGH ⑤.

PART NO.	QTY	MODEL/RESTRICTION	MODEL/RESTRICTION	MODEL/RESTRICTION	FROM-TO
28-091		NUT			
B037-28-091	8				
28-092		BOLT,CONTROL LINK			
NA01-28-092	2				
28-113		BOLT			
NA01-28-113	2				
28-2A0		ARM,UPPER-REAR			
NA01-28-2A0B	2				
28-300		ARM(R),LOWER-REAR			
NA01-28-300	1				
28-300Z		ARM(L),LOWER-REAR			
NA01-28-350	1				
28-4A0		BOLT,ADJUST			
NA01-28-4A0	4				
28-4B0		BUSHING,RUBBER-LOWER ARM			
NA01-28-4B0	2				
28-4D0		BUSHING,RUBBER-LOWER ARM			
NA01-28-4D0	2				
28-460		BUSHING,LOWER ARM			
NA01-28-460	4				
28-473		PLATE,CAM-SUB FRAME			
NA01-28-473	4				
28-8C0		BUSHING,RUBBER			
NA01-28-8C0B	6				
28-800A		MEMBER,CROSS			
NA75-28-800	1				
28-880A		WASHER,STOP			
NA01-28-880B	2				