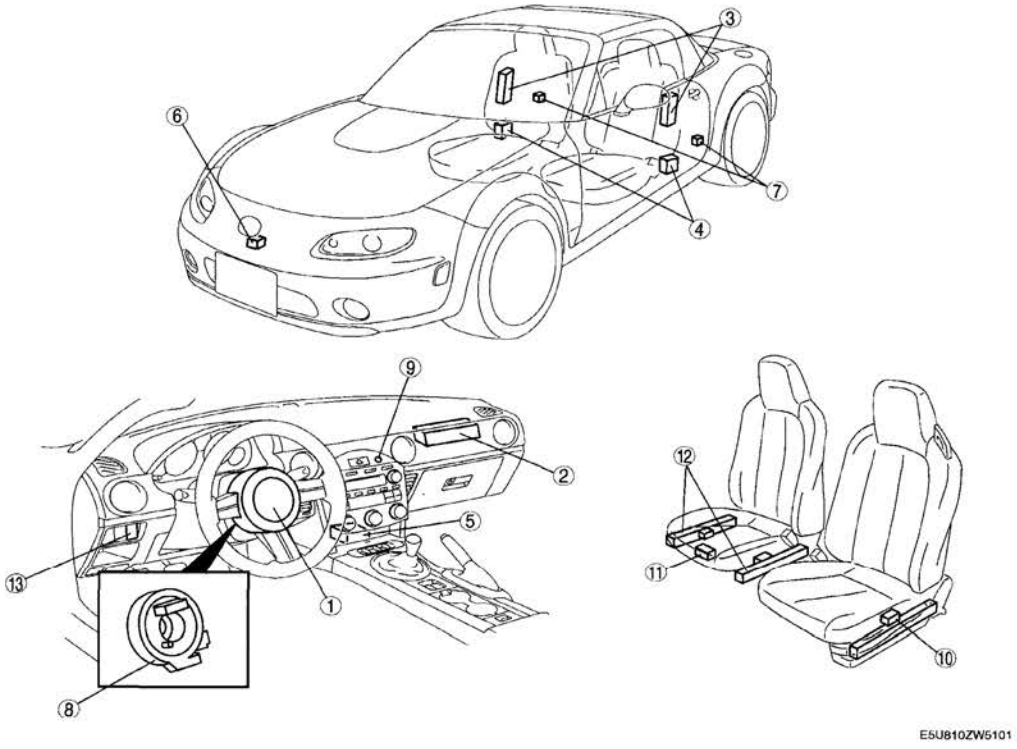
2008 RESTRAINTS

Air Bag System - MX-5 Miata

LOCATION INDEX



1	Driver-side air bag module
2	Passenger-side air bag module
3	Side air bag module
4	Pre-tensioner seat belt
5	SAS control module
6	Crash zone sensor
7	Side air bag sensor
8	Clock spring
9	Passenger air bag deactivation (PAD) indicator
10	Seat track position sensor
11	Seat weight sensor control module
12	Seat weight sensor
13	Passenger air bag deactivation (PAD) switch

Fig. 1: Identifying Location Of Airbag Components
Courtesy of MAZDA MOTORS CORP.

AIR BAG SYSTEM SERVICE WARNINGS

AIR BAG MODULE INSPECTION

- **Inspecting an air bag module using a tester can operate (deploy) the air bag module, which may cause serious injury. Do not use a tester to inspect an air bag module. Always use the on-board diagnostic function to diagnose the air bag module for malfunctions.**

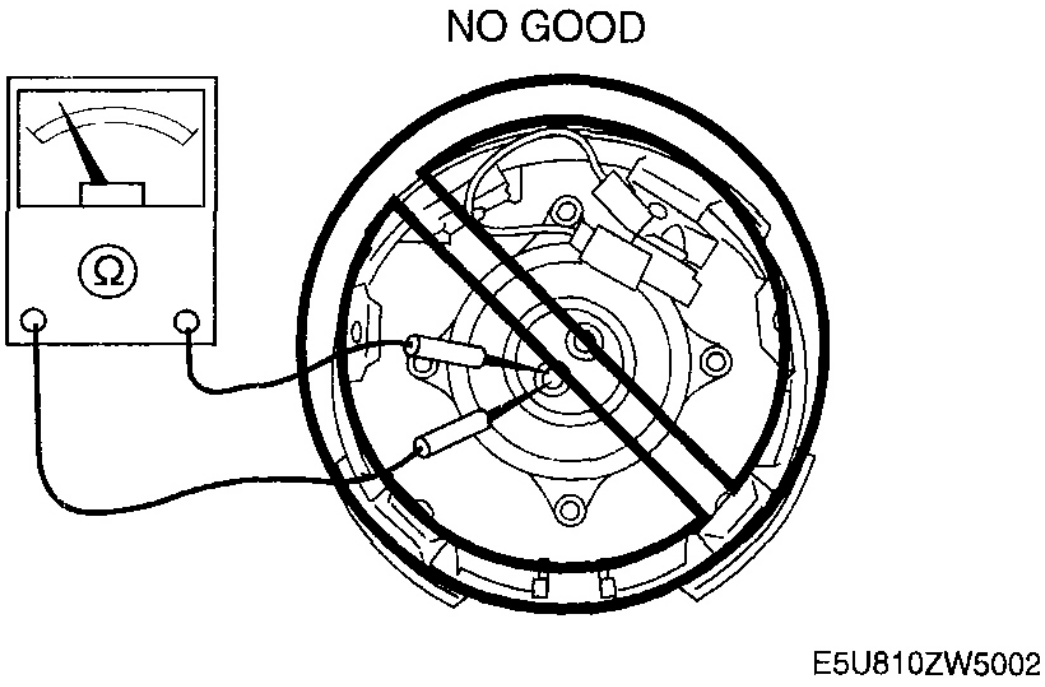


Fig. 2: Inspecting Air Bag Module Caution
Courtesy of MAZDA MOTORS CORP.

AIR BAG MODULE HANDLING

- **Before removing the air bag module or disconnecting the air bag module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **Handling a live (undeployed) air bag module that is pointed toward your body could result in serious injury if the air bag module were to accidentally operate (deploy). When carrying a live (undeployed) air bag module, point the deployment surface away from your body to lessen the chance of injury in case it operates (deploys).**

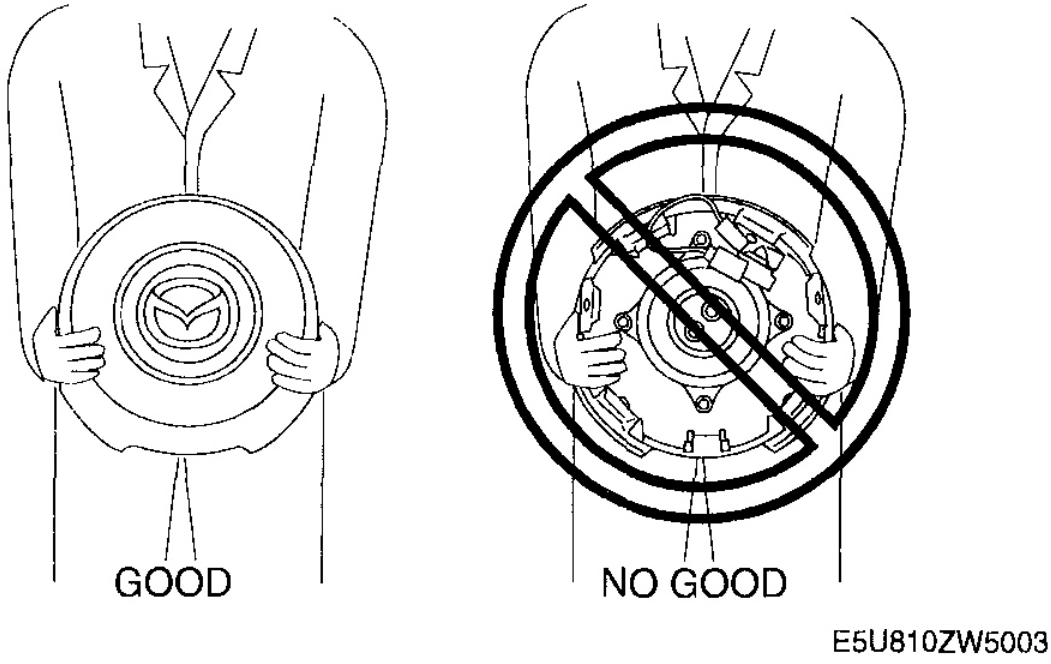


Fig. 3: Air Bag Module Handling (1 Of 2)
Courtesy of MAZDA MOTORS CORP.

- **A live (undeployed) air bag module placed with its deployment surface to ground is dangerous. If the air bag module were to accidentally operate (deploy), it could cause serious injury. Always place a live (undeployed) air bag module with its deployment surface up.**

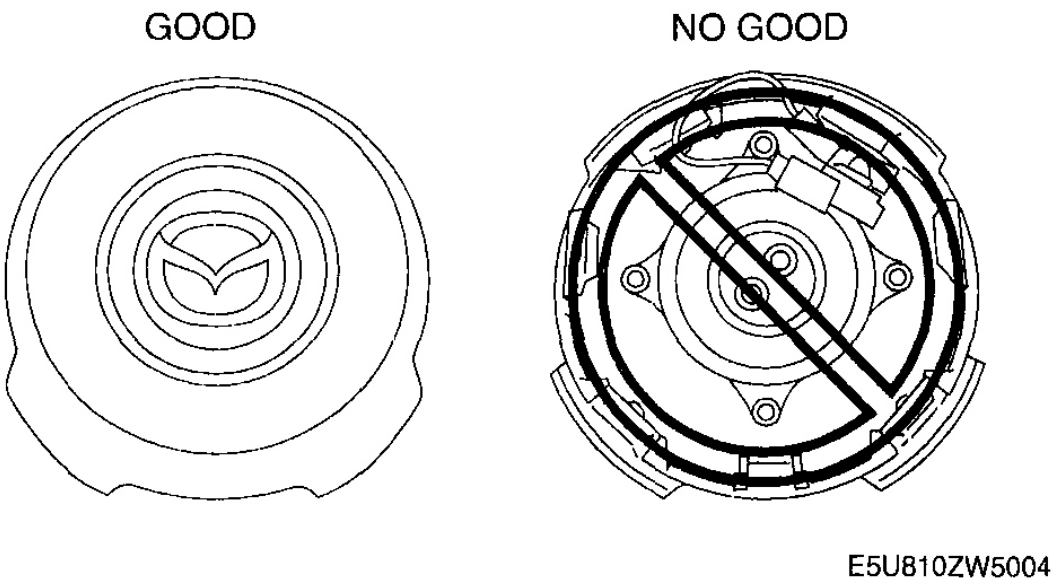


Fig. 4: Air Bag Module Handling (2 Of 2)
Courtesy of MAZDA MOTORS CORP.

SIDE AIR BAG MODULE HANDLING

- **When a side air bag module operates (deploys) due to a collision, the interior of the seat back (pad, frame, trim) may become damaged. If a side air bag does not operate (deploy) normally from a seat back that has been reused, a serious accident may result. After a side air bag has operated (deployed), always replace both the side air bag module and the seat back (pad, frame, trim) with new parts. After servicing, verify that the seat operates normally and that the wiring harness is not caught.**

SEAT WEIGHT SENSOR HANDLING

- **The passenger-side seat and the seat weight sensor may become deformed or otherwise damaged due to operation (deployment) of the front or side air bag in an accident. This may cause the passenger sensing function to operate improperly and result in a serious accident. Always replace the passenger seat and seat weight sensor with new ones after the front or side air bags have operated (deployed). After servicing, verify that the seat operates normally and that the wiring harness is not caught. If the collision is not hard enough to cause the front or side air bags to operate (deploy), inspect the seat weight sensor and replace it if there is any malfunction.**

SAS CONTROL MODULE HANDLING

- **Removing the SAS control module or disconnecting the SAS control module connector with the ignition switch at the ON position can activate the sensor in the SAS control module and operate**

(deploy) the air bags and pre-tensioner seat belts, which may cause serious injury. Before removing the SAS control module or disconnecting the SAS control module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.

- **Connecting the SAS control module connector with the SAS control module not securely fixed to the vehicle is dangerous. The sensor in the SAS control module could send an electrical signal to the air bag modules and pre-tensioner seat belts. This will operate (deploy) the air bags and pre-tensioner seat belts, which may result in serious injury. Therefore, before connecting the connector, securely fix the SAS control module to the vehicle.**
- **Because a sensor is built into the SAS control module, once the air bags and pre-tensioner seat belts have operated (deployed) due to a collision or other causes, the SAS control module must be replaced with a new one even if the used one does not have any visible external damage or deformation. The used SAS control module may have been damaged internally, which may cause improper operation. If the SAS control module is reused, the air bags and pre-tensioner seat belts may not operate (deploy) normally, which could result in a serious accident. Always replace the SAS control module with a new one. The SAS control module cannot be bench-checked or self-checked.**

CRASH ZONE SENSOR HANDLING

- **Removing the crash zone sensor or disconnecting the crash zone sensor connector with the ignition switch at the ON position can activate the crash zone sensor and operate (deploy) the air bags and pre-tensioner seat belts, which may cause serious injury. Before removing the crash zone sensor or disconnecting the crash zone sensor connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **If the crash zone sensor is subjected to shock or the sensor is disassembled, the air bags and pre-tensioner seat belts may accidentally operate (deploy) and cause injury, or the system may fail to operate normally and cause a serious accident. Do not subject the crash zone sensor to shock or disassemble the sensor.**
- **Because a sensor is built into the crash zone sensor, once the air bags and pre-tensioner seat belts have operated (deployed) due to a collision or other causes, the crash zone sensor must be replaced with a new one even if the used one does not have any visible external damage or deformation. If the crash zone sensor is reused, the air bags and pre-tensioner seat belts may not operate (deploy) normally, which could result in a serious accident. Always replace the crash zone sensor with a new one. The crash zone sensor cannot be bench-checked or self-checked.**

SIDE AIR BAG SENSOR HANDLING

- **Removing the side air bag sensor or disconnecting the side air bag sensor connector with the ignition switch at the ON position can activate the side air bag sensor and operate (deploy) the side air bag, which may cause serious injury. Before removing the side air bag sensor or disconnecting the side air bag sensor connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**

- **If the side air bag sensor is subjected to shock or the sensor is disassembled, the side air bag may accidentally operate (deploy) and cause injury, or the system may fail to operate normally and cause a serious accident. Do not subject the side air bag sensor to shock or disassemble the sensor.**
- **Because a sensor is built into the side air bag sensor, once the air bag has operated (deployed) due to a collision or other causes, the side air bag sensor must be replaced with a new one even if the used one does not have any visible external damage or deformation. If the side air bag sensor is reused, the side air bag may not operate (deploy) normally, which could result in a serious accident. Always replace the side air bag sensor with a new one. The side air bag sensor cannot be bench-checked or self-checked.**

PRE-TENSIONER SEAT BELT INSPECTION

- **Inspecting a pre-tensioner seat belt using a tester can operate (deploy) the pre-tensioner seat belt, which may cause serious injury. Do not use a tester to inspect a pre-tensioner seat belt. Always use the on-board diagnostic function to diagnose the pre-tensioner seat belt for malfunctions.**

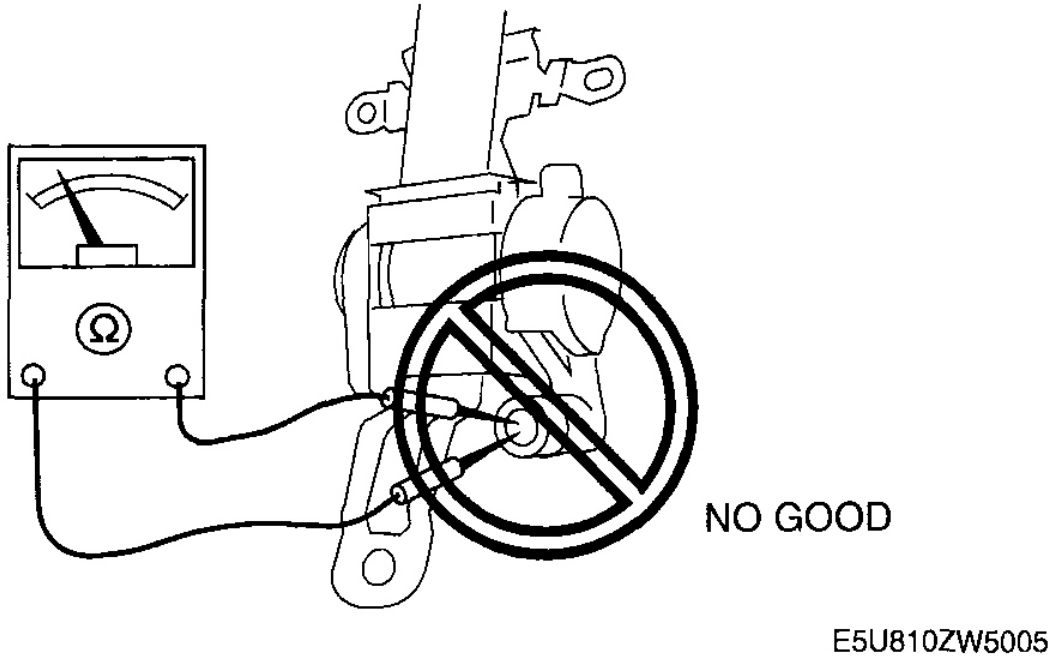


Fig. 5: Inspecting Pre-Tensioner Seat Belt Using Tester Caution
Courtesy of MAZDA MOTORS CORP.

AIR BAG SYSTEM SERVICE CAUTIONS

AIR BAG SYSTEM COMPONENT DISASSEMBLY

- **Disassembling the air bag system components could cause it to not operate (deploy) normally. Never disassemble any air bag system components.**

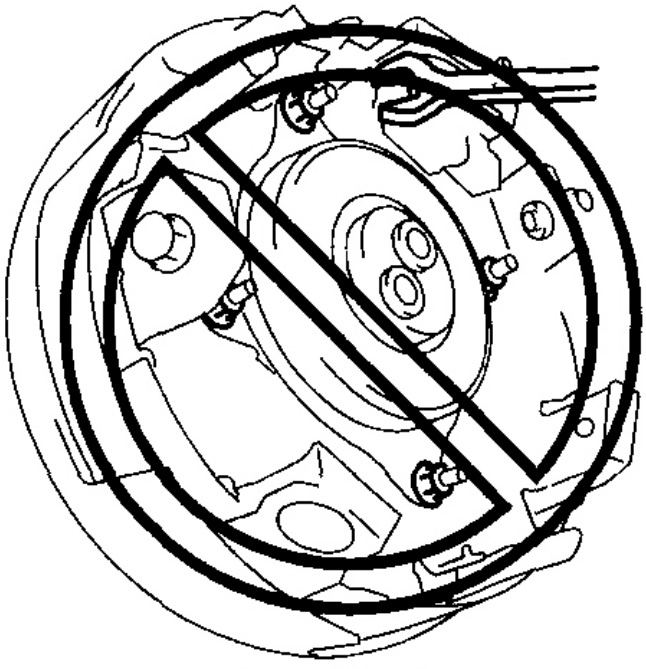


Fig. 6: Air Bag System Service Cautions
Courtesy of MAZDA MOTORS CORP.

AIR BAG MODULE, PRE-TENSIONER SEAT BELT HANDLING

- **Oil, grease, or water on the air bag modules may cause the air bags and pre-tensioner seat belts to fail to operate (deploy) in an accident. Never allow oil, grease, or water to get on the air bag modules or pre-tensioner seat belts.**
- **Inserting a screwdriver or similar object into the connector of an air bag module or a pre-tensioner seat belt may damage the connector and cause the air bag module or the pre-tensioner seat belt to operate (deploy) improperly, which may cause serious injury. Never insert any foreign objects into the air bag module or seat belt connectors.**

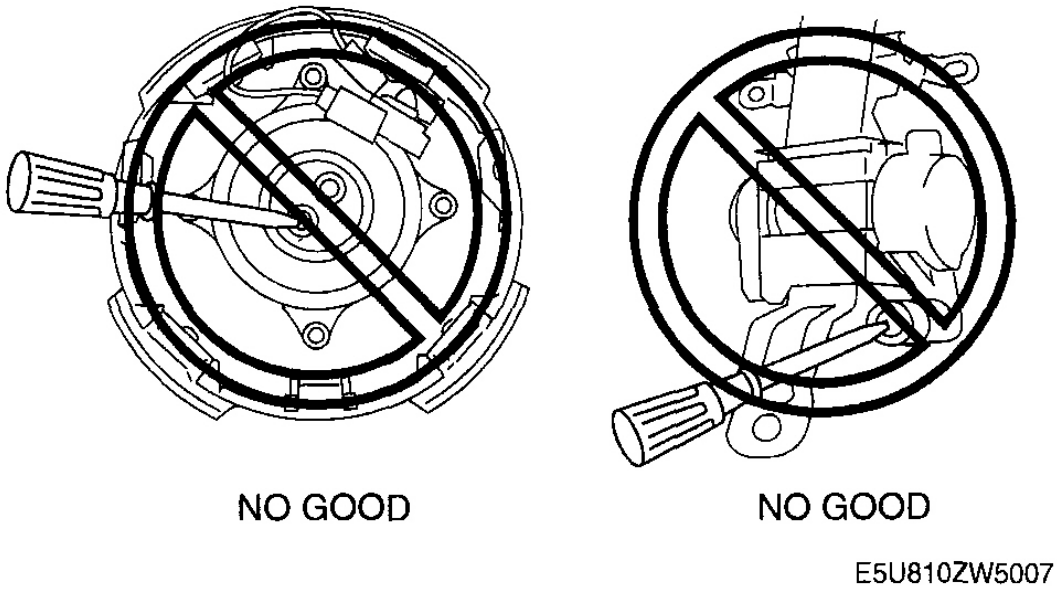


Fig. 7: Air Bag Module & Pre-Tensioner Seat Belt Handling Caution
Courtesy of MAZDA MOTORS CORP.

SEAT WEIGHT SENSOR HANDLING

- **The seat weight sensor has a built-in strain gauge which may operate improperly if the sensor is dropped by itself or when installed to the seat. If it is dropped, replace the seat weight sensor with a new one.**
- **Oil, grease, or water on the seat weight sensor may cause the system to operate (deploy) improperly. Never allow oil, grease, or water to get on the seat weight sensor.**
- **Foreign material in the seat weight sensor components may cause the system to operate (deploy) improperly. Always make sure that no foreign material can get into the seat weight sensor.**
- **Disassembling the seat weight sensor, or tightening any of the nuts and bolts installed to the sensor body may cause it to operate (deploy) improperly. Never disassemble the seat weight sensor or tighten any of the nuts or bolts installed to the body of the sensor.**

AIR BAG MODULE, PRE-TENSIONER SEAT BELT REUSE

- **Even if an air bag module or a pre-tensioner seat belt does not operate (deploy) in a collision and does not have any external signs of damage, it may have been damaged internally, which may cause improper operation. Before reusing a live (undeployed) air bag module and the pre-tensioner seat belts, always use the on-board diagnostic to diagnose the air bag module and the pre-tensioner seat belts to verify that they have no malfunction.**

AIR BAG WIRING HARNESS REPAIR

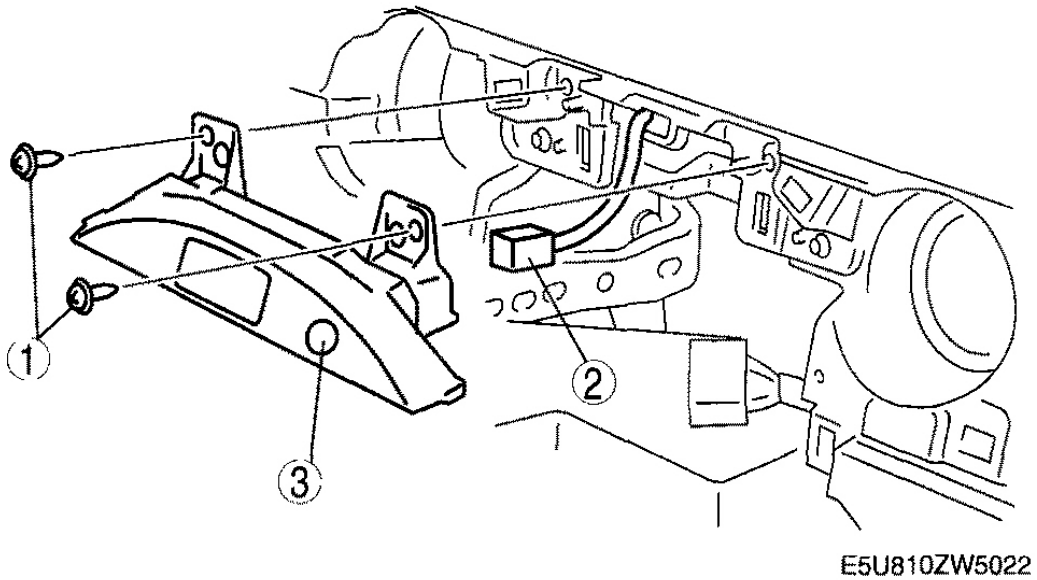
- **Incorrectly repairing an air bag wiring harness can accidentally operate (deploy) the air bag module and pre-tensioner seat belts. If a problem is found in the air bag wiring harness, always replace the wiring harness with a new one.**



Fig. 8: Identifying Air Bag Wiring Harness Repair Caution
Courtesy of MAZDA MOTORS CORP.

PASSENGER AIR BAG DEACTIVATION (PAD) INDICATOR REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the following parts:
    1. Side wall (See **SIDE WALL REMOVAL/INSTALLATION** .)
    2. Center panel unit (See **CENTER PANEL UNIT REMOVAL/INSTALLATION** .)
    3. Remove the glove compartment. (See **GLOVE COMPARTMENT REMOVAL/INSTALLATION** .)
    4. Decoration panel (See **DECORATION PANEL REMOVAL/INSTALLATION** .)
4. Remove in the order indicated in **Fig. 9** .



1	Screw
2	Connector
3	Passenger air bag deactivation (PAD) indicator

Fig. 9: View Of Passenger Air Bag Deactivation (PAD) Indicator & Components
Courtesy of MAZDA MOTORS CORP.

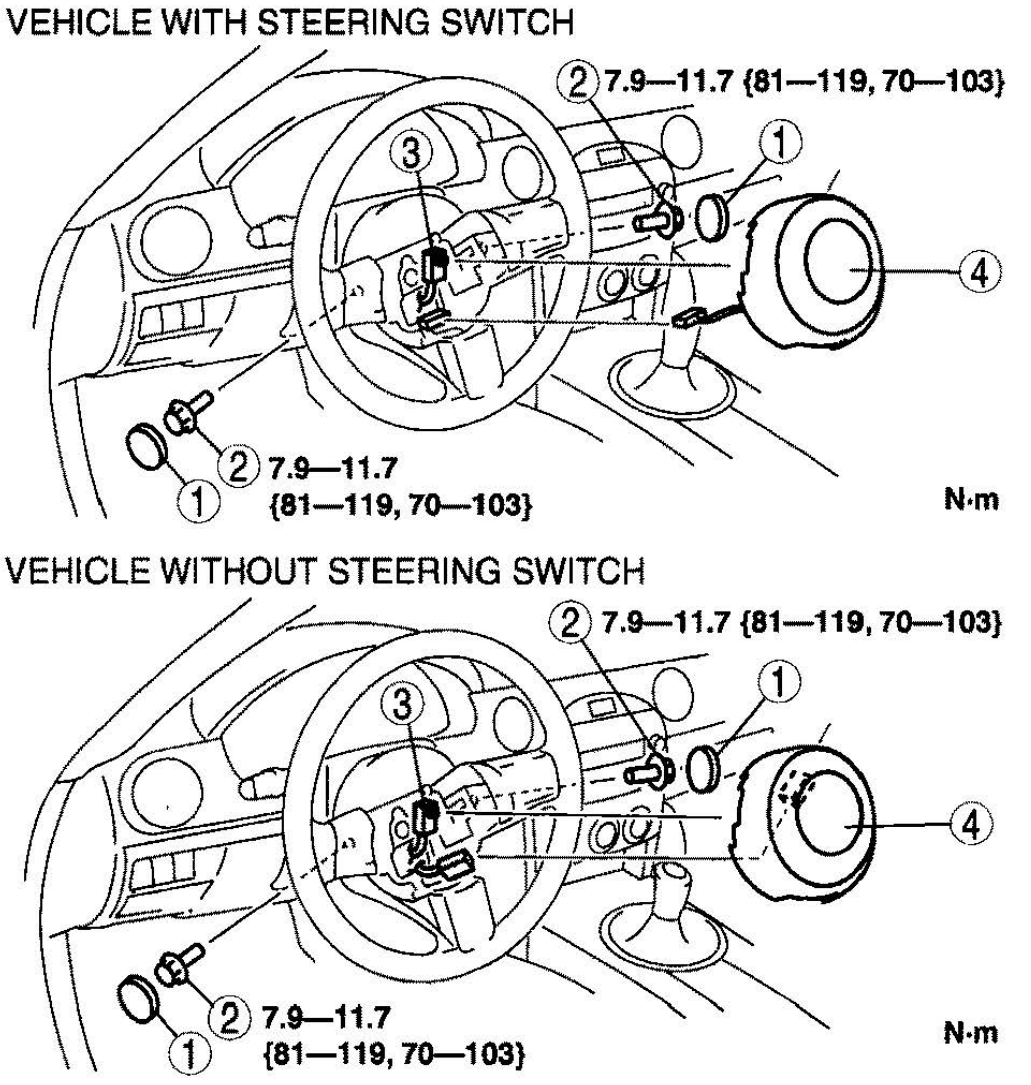
5. Install in the reverse order of removal.

DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

WARNING:

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove in the order indicated in **Fig. 10** .



1	Cover
2	Bolt
3	Connector
4	Driver-side air bag module

Fig. 10: View Of Driver-Side Air Bag Module & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.

6. Turn the ignition switch to the ON position.
7. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

CONNECTOR REMOVAL NOTE

1. Using a flathead screwdriver, pry out the connector stopper plate.

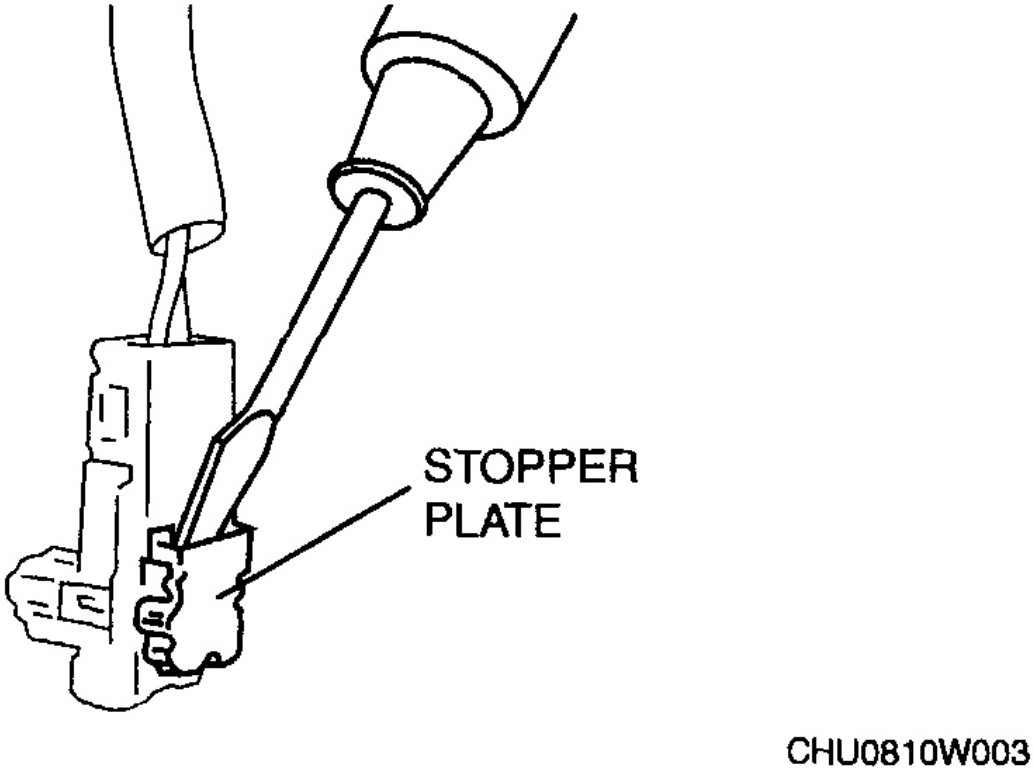


Fig. 11: Prying Out Connector Stopper Plate
Courtesy of MAZDA MOTORS CORP.

2. Disconnect the connector.

PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

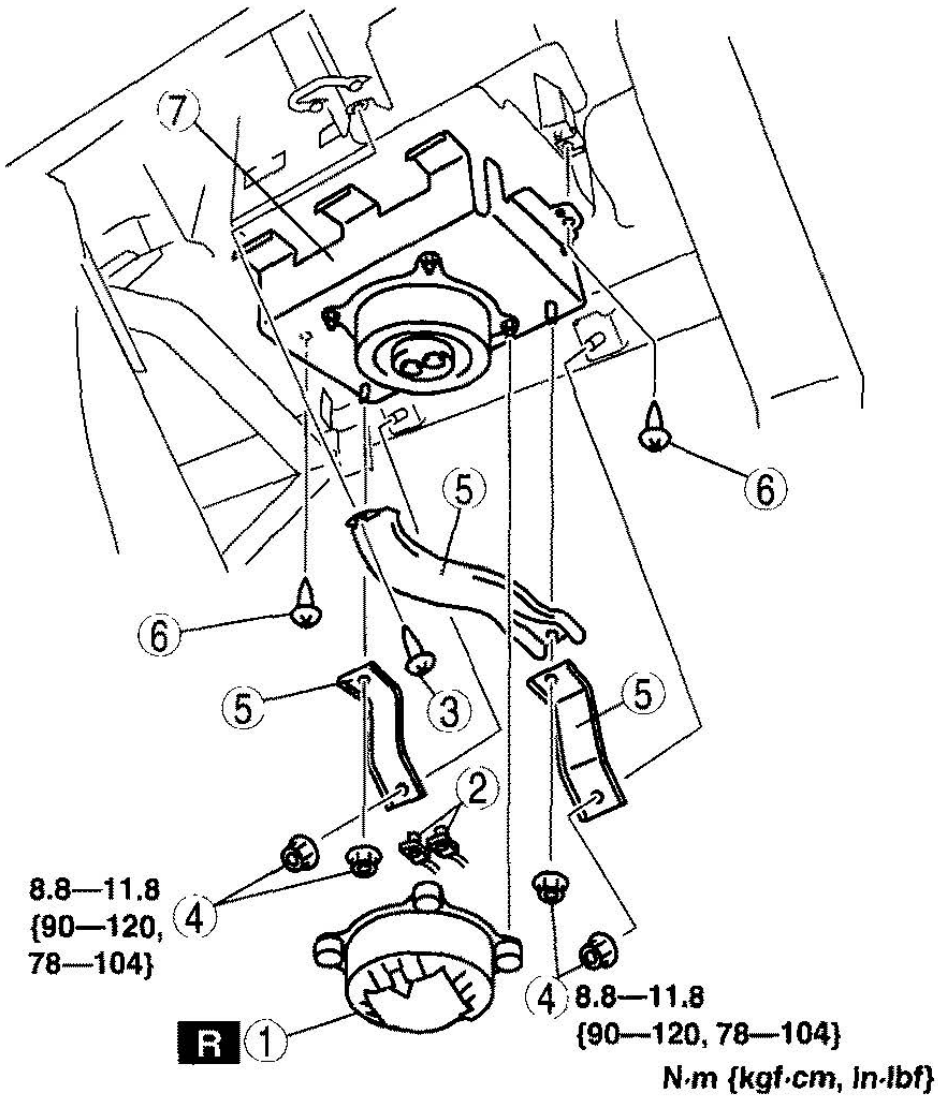
WARNING:

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the air bag**

system service warnings and cautions before handling the air bag module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)

- **If the passenger-side air bag module is installed with debris in the module, it may be scattered when the air bag module operates (deploys), causing injury. Verify that there is no debris in the passenger-side air bag module before installation.**
- **If a damaged passenger-side air bag module is installed, the vehicle may be damaged or the passenger may be injured when the air bag module operates (deploys). Verify that the passenger-side air bag has no damage before installation.**
- **Due to the adoption of 2-step deployment control in the passenger-side air bag module, depending on the impact force, it is possible that inflator No.2 might not deploy. In such cases, before disposing of the air bag module, make sure to follow the inflator deployment procedures and verify complete deployment of inflators No.1 and 2.**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the glove compartment. (See **GLOVE COMPARTMENT REMOVAL/INSTALLATION** .)
5. Remove in the order indicated in **Fig. 12** .



E5U810ZW5109

1	Cap
2	Connector
3	Screw A
4	Nut
5	Bracket
6	Screw B
7	Passenger-side air bag module

Fig. 12: View Of Passenger-Side Air Bag Module & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

6. Install in the reverse order of removal.
7. Turn the ignition switch to the ON position.
8. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

PASSENGER-SIDE AIR BAG MODULE REMOVAL NOTE

1. Remove the passenger-side air bag module in the order indicated below.
    1. Disengage the tab locks by sliding the passenger-side air bag module upward.
    2. Slide the passenger-side air bag module rearward.
    3. Remove the passenger-side air bag module by pulling it from the backside and then down.

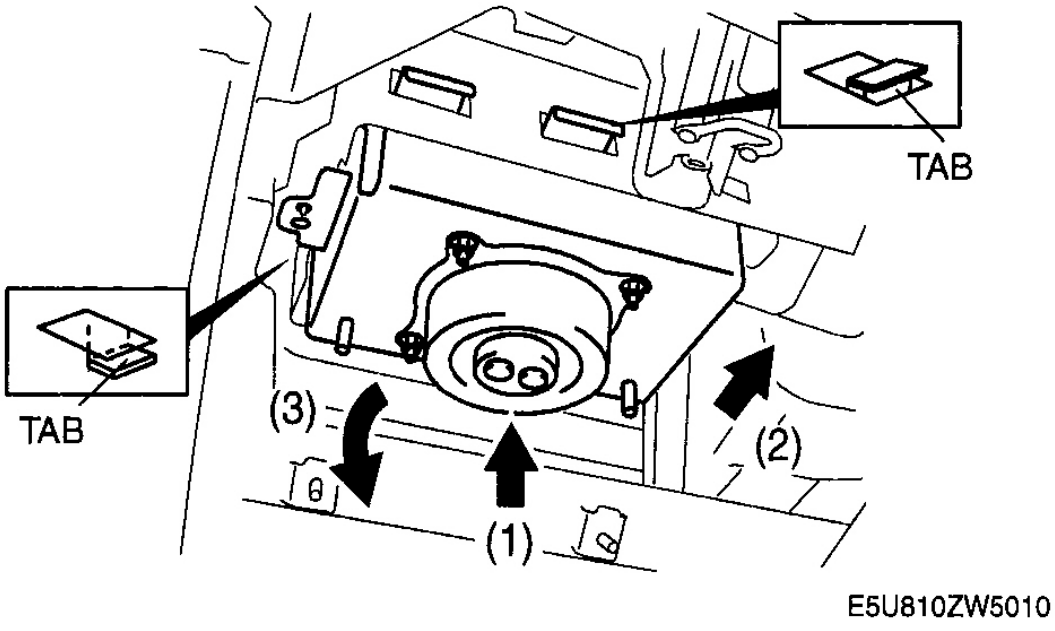


Fig. 13: View Of Passenger-Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

CONNECTOR REMOVAL NOTE

1. Using a flathead screwdriver, pry out the connector stopper plate.

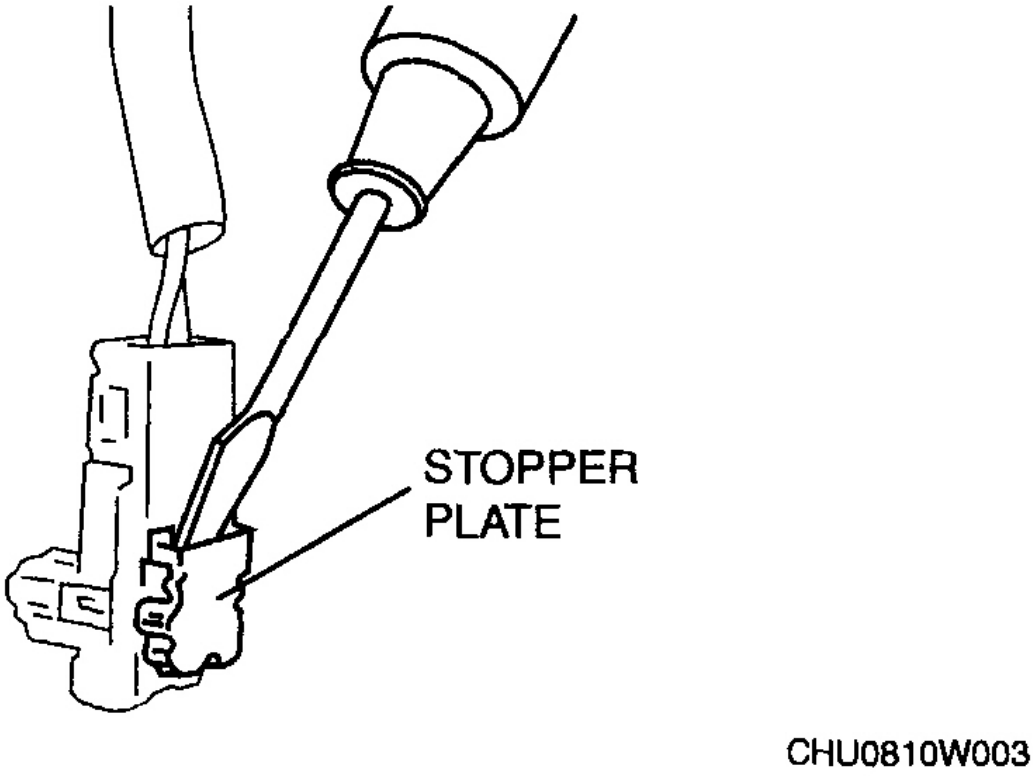


Fig. 14: Prying Out Connector Stopper Plate
Courtesy of MAZDA MOTORS CORP.

2. Disconnect the connector.

CAP INSTALLATION NOTE

1. The cap cannot be reused. Replace the cap with a new one when the cap or the passenger-side air bag module has been removed.

SIDE AIR BAG MODULE REMOVAL/INSTALLATION

WARNING:

- **Handling the air bag module improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**
- **If the side air bag module is installed with debris in the seat back,**

the foreign material may be scattered when the side air bag module operates (deploys), causing injury. Verify that there is no foreign material in the seat back before installing the side air bag module.

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the seat. (See **SEAT REMOVAL/INSTALLATION** .)
5. Detach the tab as shown in **Fig. 15** and remove the connector from the seat connector.

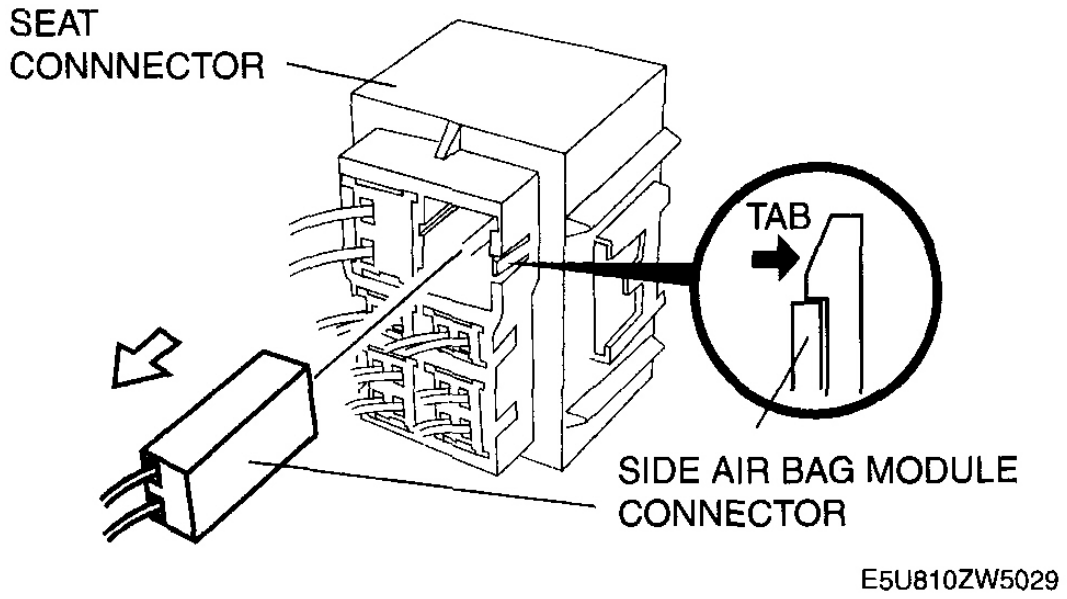
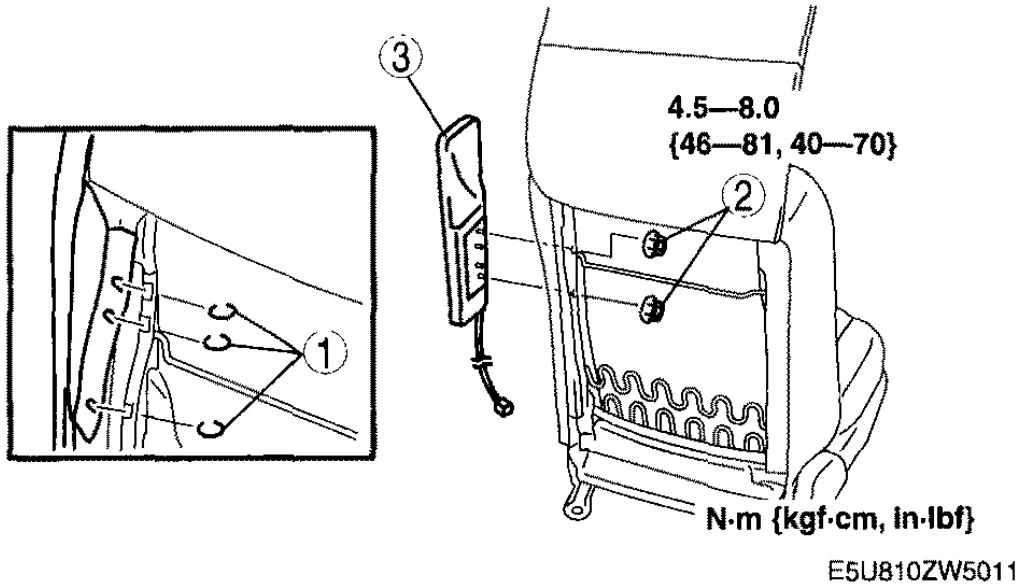


Fig. 15: Detaching Tab
Courtesy of MAZDA MOTORS CORP.

6. Partially peel back the seat back trim.
7. Partially peel back the seat back pad.
8. Remove in the order indicated in **Fig. 16** .



1	Hook
2	Nut
3	Side air bag module

Fig. 16: View Of Side Air Bag Module & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

9. Install in the reverse order of removal.
10. Turn the ignition switch to the ON position.
11. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

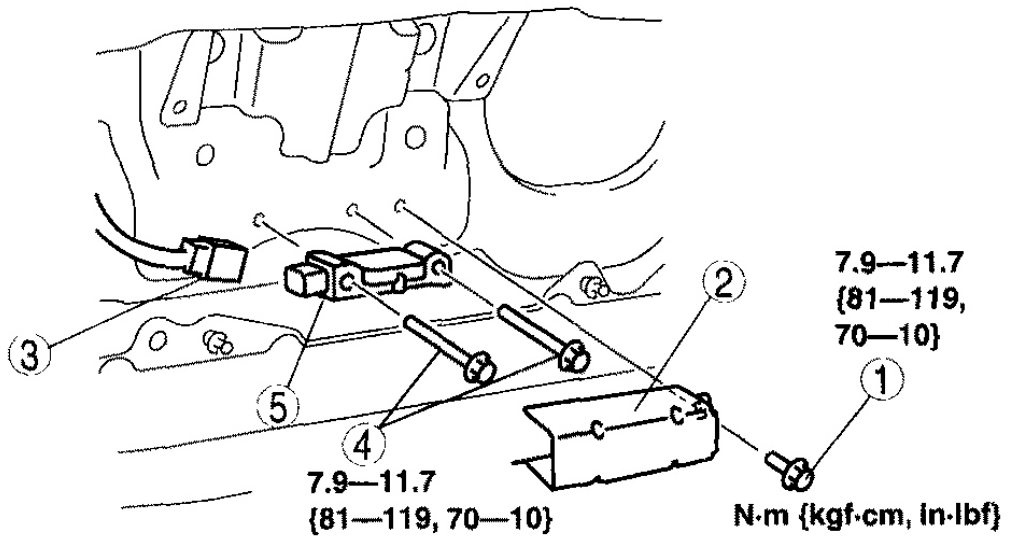
CRASH ZONE SENSOR REMOVAL/INSTALLATION

WARNING:

- **Handling the crash zone sensor improperly can accidentally deploy the air bags and pre-tensioner seat belts, which may seriously injure you. Read the air bag system service warnings and cautions before handling the crash zone sensor. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.

3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the front bumper. (See **FRONT BUMPER REMOVAL/INSTALLATION** .)
5. Remove the fresh-air duct. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
6. Remove in the order indicated in **Fig. 17** .



1	Bolt A
2	Cover
3	Connector
4	Bolt B
5	Crash zone sensor

Fig. 17: View Of Crash Zone Sensor & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

7. Install in the reverse order of removal.
8. Turn the ignition switch to the ON position.
9. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

SAS CONTROL MODULE REMOVAL/INSTALLATION

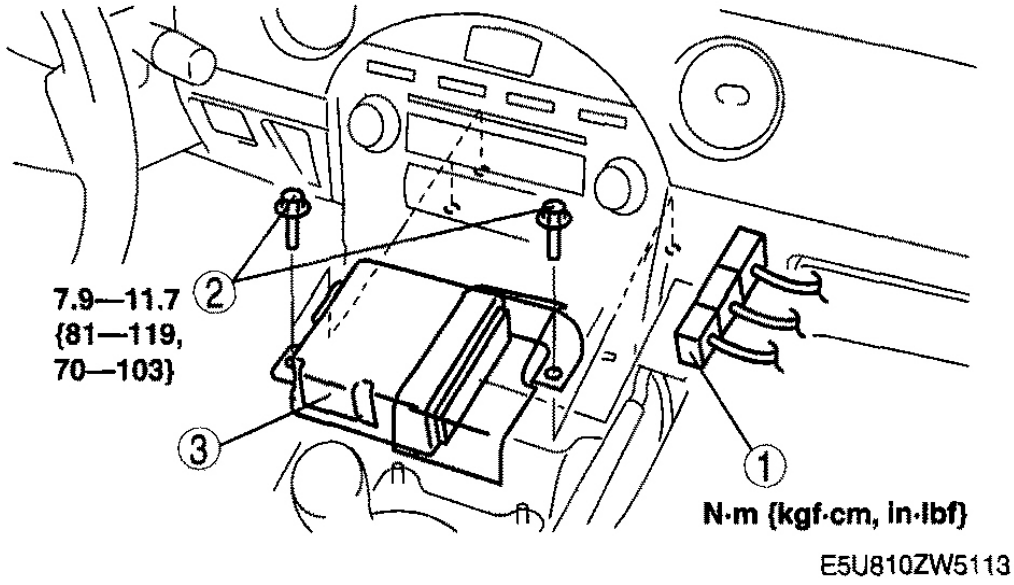
WARNING:

- **Handling the SAS control module improperly can accidentally deploy the air bag modules and pre-tensioner seat belt, which may seriously injure you. Read the air bag system service warnings and cautions before handling the SAS control module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**

CAUTION:

- **Handling the SAS control module improperly can accidentally deploy the air bag modules and pre-tensioner seat belt, which may seriously injure you. If configuration is not completed before removing the SAS control module, DTC B2477 will be displayed.**

1. Perform SAS control module configuration when replacing it. (See **SAS CONTROL MODULE CONFIGURATIONS** .)
2. Turn the ignition switch to the LOCK position.
3. Remove the battery cover.
4. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
5. Remove the following parts:
    1. Console (See **CONSOLE REMOVAL/INSTALLATION** .)
    2. Side wall (See **SIDE WALL REMOVAL/INSTALLATION** .)
    3. Console panel (See **CONSOLE PANEL REMOVAL/INSTALLATION** .)
6. Remove in the order indicated in **Fig. 18** .



1	Connector
2	Bolt
3	SAS control module

Fig. 18: View Of SAS Control Module Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

7. Install in the reverse order of removal.
8. Turn the ignition switch to the ON position.
   - If the SAS control module is replaced, turn the ignition switch to the ON position for **20 s or more** after completing the configuration. (See **SAS CONTROL MODULE CONFIGURATION** .)
9. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

SAS CONTROL MODULE CONFIGURATION

1. Connect the M-MDS to the DLC-2 Connector.

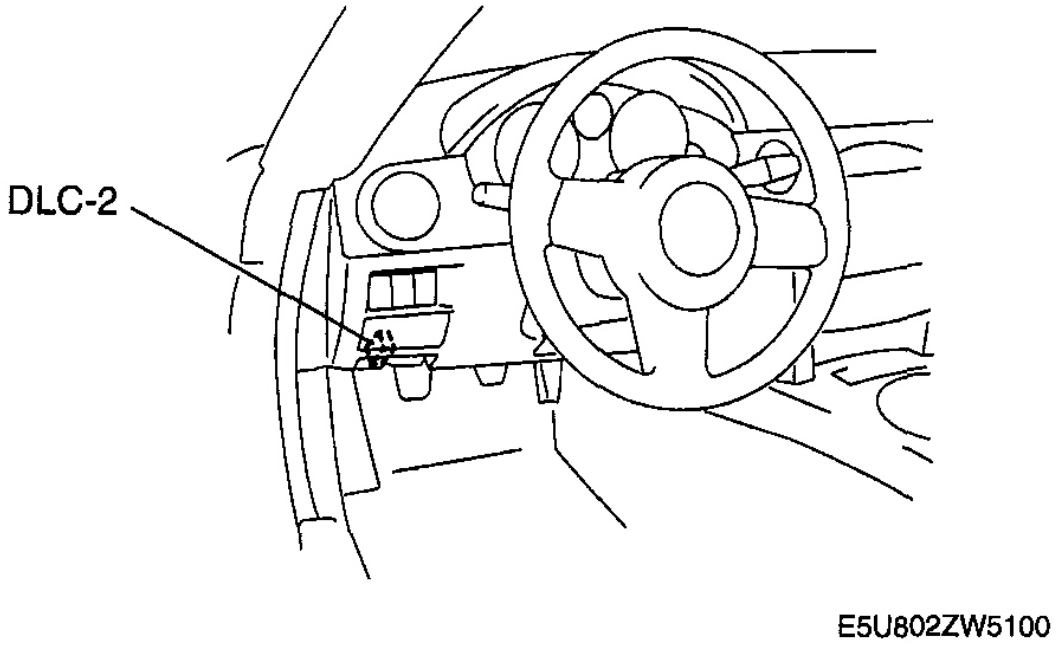


Fig. 19: Identifying DLC-2 Location
Courtesy of MAZDA MOTORS CORP.

2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
    - When using the IDS (Laptop PC)
        1. Select "Programming".
    - When using the PDS (Pocket PC)
        1. Select "Programming".
        2. Select "Module Programming".
3. Then Select the "Programmable Module Installation" and "RCM" from the screen menu.
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs using the M-MDS, then verify if DTCs are present.
    - If a DTC is present, perform the applicable DTC inspection.

SEAT TRACK POSITION SENSOR REMOVAL/INSTALLATION

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the driver's seat. (See **SEAT REMOVAL/INSTALLATION** .)

5. Detach the tab as shown in **Fig. 20** and remove the connector from the seat connector.

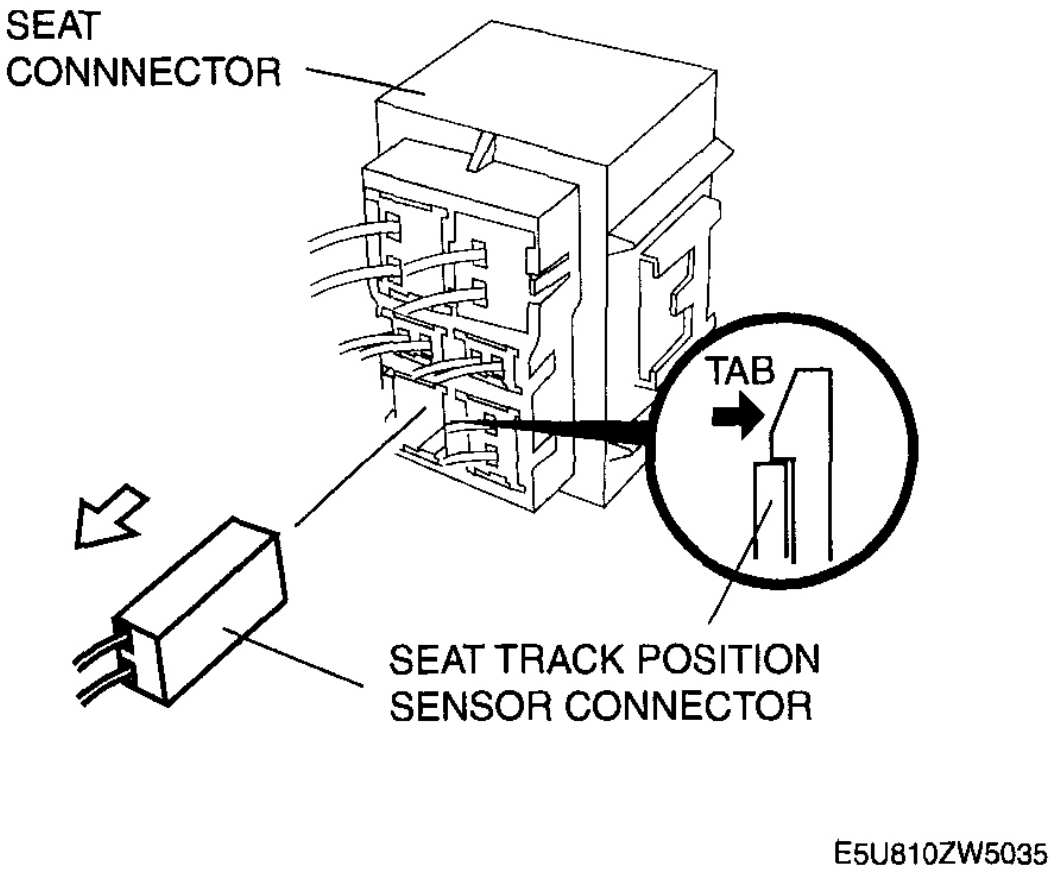
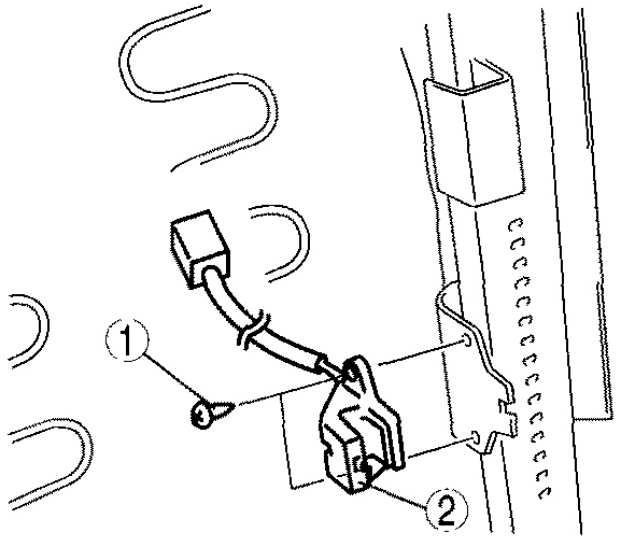


Fig. 20: Detaching Seat Connector Tab & Removing Connector From Seat Connector
Courtesy of MAZDA MOTORS CORP.

6. Remove in the order indicated in **Fig. 21** .



1	Screw
2	Seat track position sensor

Fig. 21: Removing Connector From Seat Connector
Courtesy of MAZDA MOTORS CORP.

7. Install in the reverse order of removal.

SEAT TRACK POSITION SENSOR INSTALLATION NOTE

- Verify that the seat track position sensor is not contacting the metal plate.

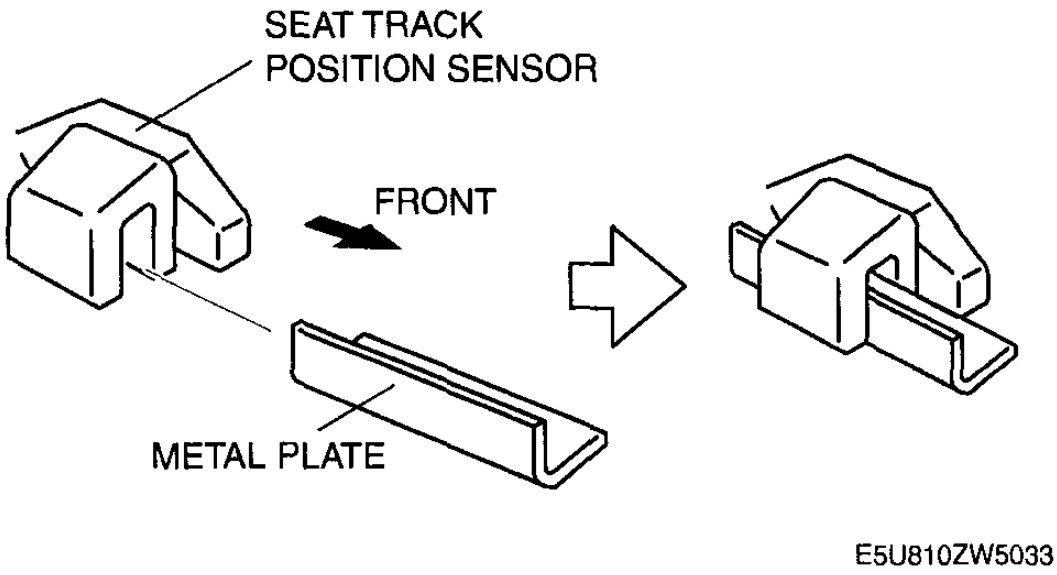
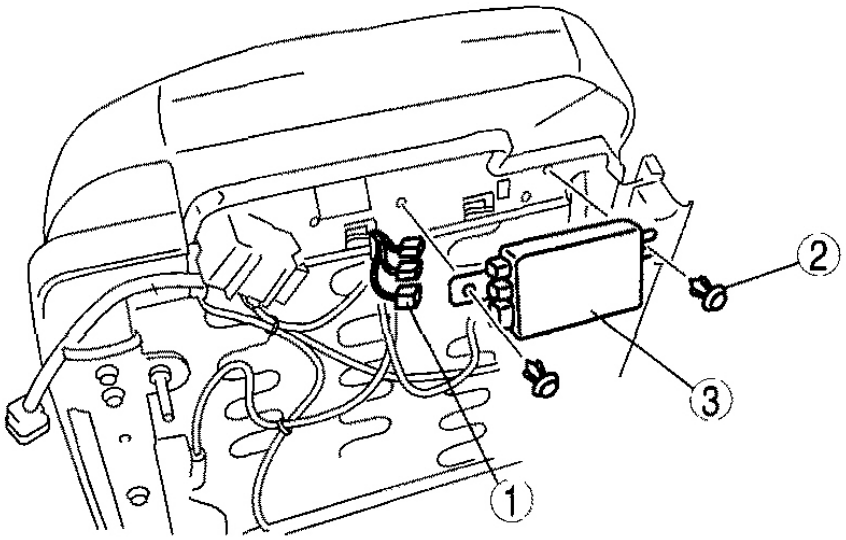


Fig. 22: View Of Seat Track Position Sensor
Courtesy of MAZDA MOTORS CORP.

SEAT WEIGHT SENSOR CONTROL MODULE REMOVAL/INSTALLATION

CAUTION:
- **When the seat weight sensor control module is replaced with a new one, perform the seat weight sensor calibration using the WDS or equivalent. (See SEAT WEIGHT SENSOR CALIBRATION .)**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove in the order indicated in **Fig. 23** .



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1	Connector
2	Fasner
3	Seat weight sensor control module

Fig. 23: View Of Seat Weight Sensor Control Module
Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.

SEAT WEIGHT SENSOR CALIBRATION

CAUTION:

- **If any of the following work is performed, perform the seat weight sensor calibration using the WDS or equivalent.**
  - **Replacement with a new seat weight sensor**
  - **Replacement with a new seat weight sensor control module**
  - **Replacement with new passenger-side seat parts**
  - **Disassembly of the passenger-side seat**
- **If any of the following work is performed, perform the seat weight sensor inspection using the WDS or equivalent. (See SEAT WEIGHT SENSOR INSPECTION .)**
  - **Removal of the passenger-side seat**
  - **Loosening and retightening of passenger's seat fixing bolts**

- **Or, the vehicle is involved in a collision**

1. Have two **20 kg {44 lb}** weights ready to use.
2. Connect the WDS or equivalent to the DLC-2 (16-pin).

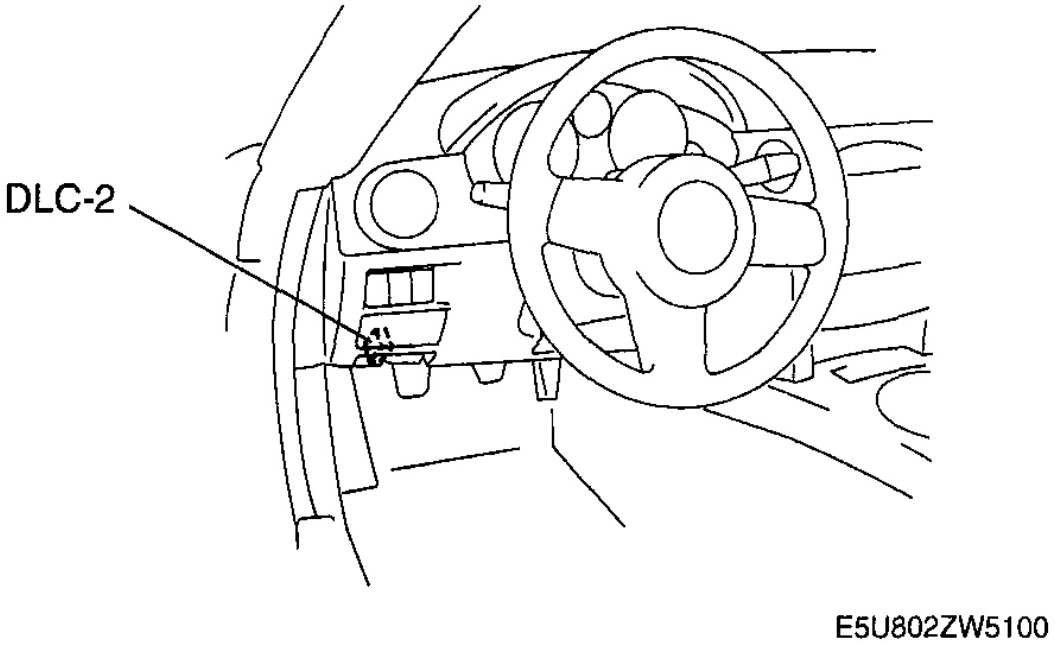


Fig. 24: Identifying DLC-2 Location
Courtesy of MAZDA MOTORS CORP.

3. Select "Body" from the menu.
4. Select "Restraints".
5. Select "Seat Weight Sensor ReZero Procedure".
6. Perform calibration following the procedures on the WDS or equivalent screen.

NOTE:

- **When "Lightly pat the passenger seat cushion" is displayed on the WDS or equivalent screen, lightly pat horizontally approx. five times on the headrest or upper side of the seat back trim of the passenger-side front seat.**

SEAT WEIGHT SENSOR INSPECTION

CAUTION:

- **If any of the following work is performed, perform the seat weight**

sensor inspection using the WDS or equivalent.

- **Removal of the passenger-side seat**
- **Loosening and retightening of passenger's seat fixing bolts**
- **Or, the vehicle is involved in a collision**

- **If any of the following work is performed, perform the seat weight sensor calibration using the WDS or equivalent. (See SEAT WEIGHT SENSOR CALIBRATION .)**
  - **Replacement with a new seat weight sensor**
  - **Replacement with a new seat weight sensor control module**
  - **Replacement with new passenger-side seat parts**
  - **Disassembly of the passenger-side seat**

1. Connect the WDS or equivalent to the DLC-2 (16-pin).

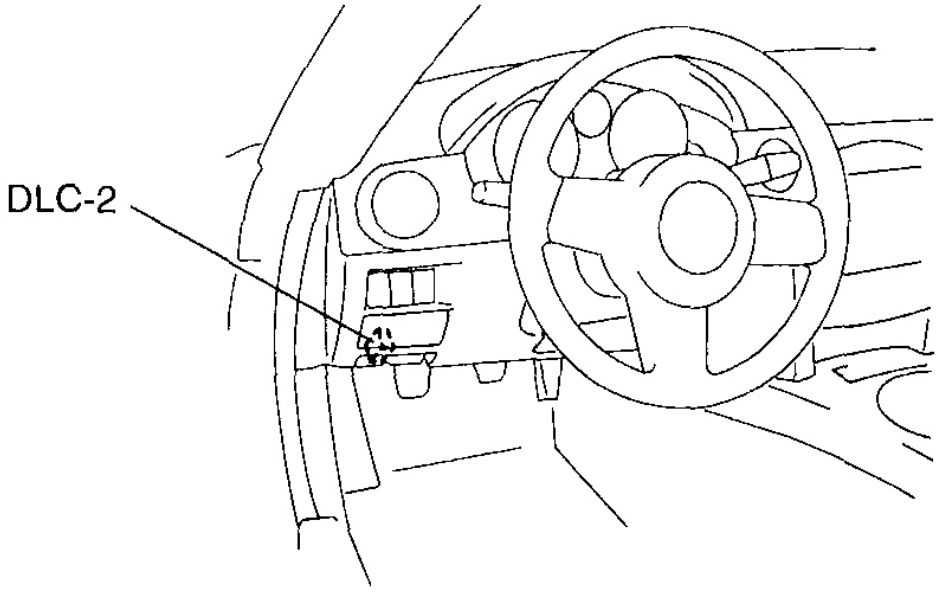


Fig. 25: Identifying DLC-2 Location
Courtesy of MAZDA MOTORS CORP.

2. Select "Body" from the menu.
3. Select "Restraints".
4. Select "Seat Weight Sensor ReZero Procedure".
5. Perform inspection following the procedures on the WDS or equivalent screen.

PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the side panel. (See **SIDE PANEL REMOVAL/INSTALLATION** .)
4. Disconnect the connector.
5. Remove the PAD switch.

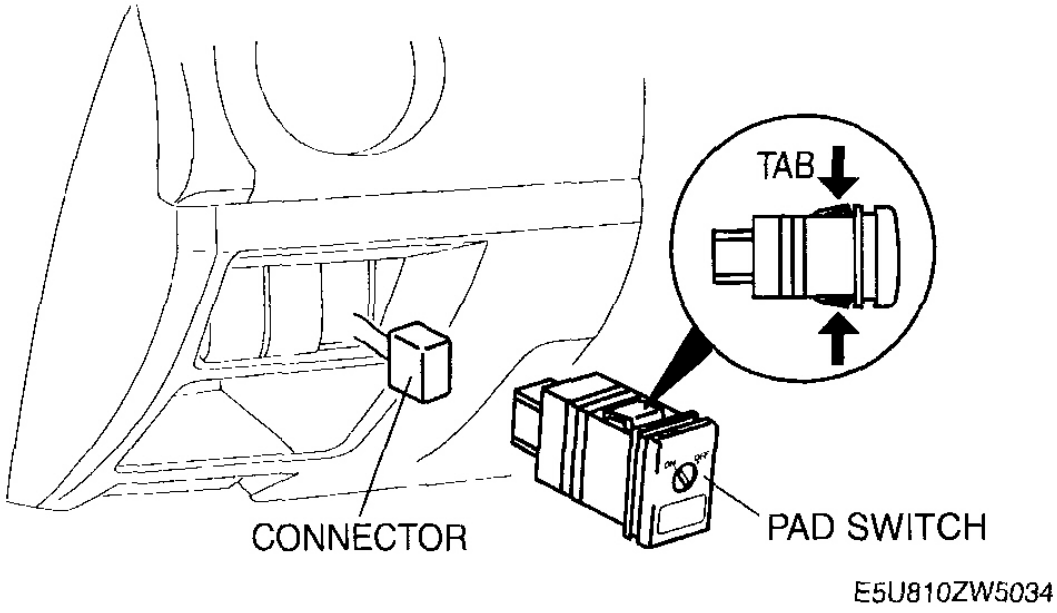


Fig. 26: View Of Passenger Air Bag Deactivation (PAD) Switch
Courtesy of MAZDA MOTORS CORP.

6. Install in the reverse order of removal.
7. Turn the ignition switch to the ON position.
8. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH INSPECTION

1. Remove the PAD switch. (See **PASSENGER AIR BAG DEACTIVATION (PAD) SWITCH REMOVAL/INSTALLATION** .)

2. Verify that the continuity between the PAD switch terminals is as indicated in **Fig. 27** .
   - If not as indicated in **Fig. 27** , replace the PAD switch.

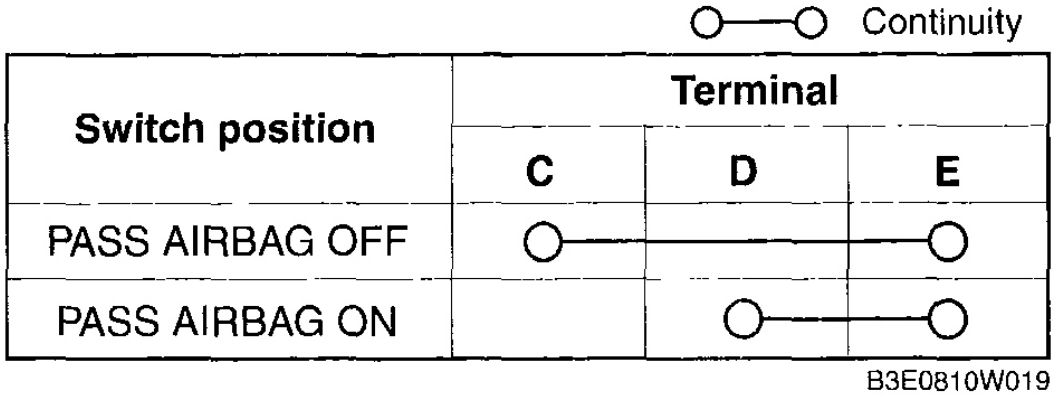


Fig. 27: PAD Switch Continuity Table
Courtesy of MAZDA MOTORS CORP.

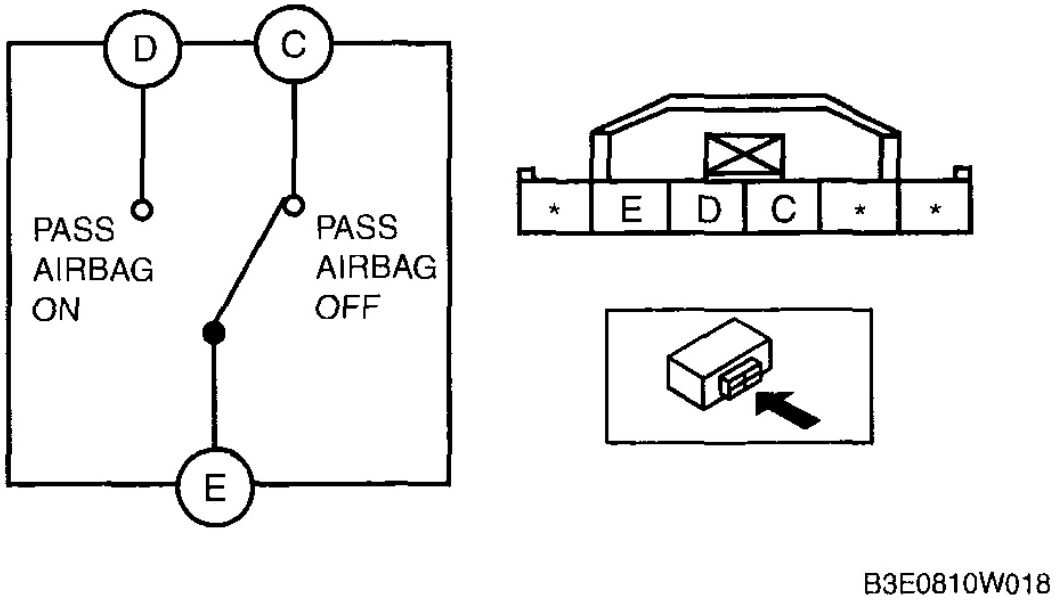


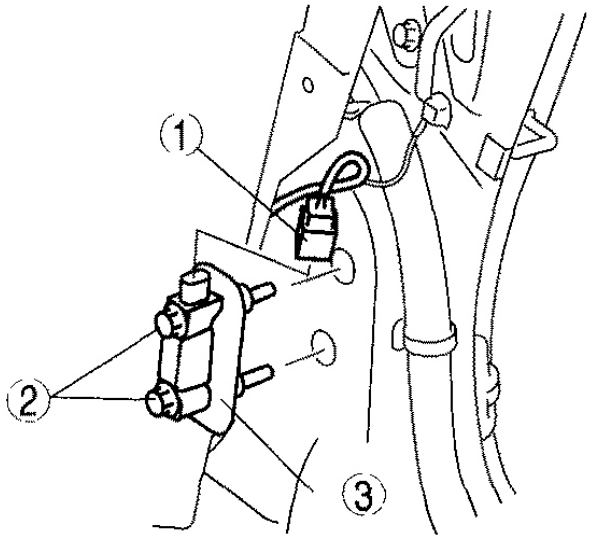
Fig. 28: Inspecting Passenger Air Bag Deactivation (PAD) Switch Connector Terminals
Courtesy of MAZDA MOTORS CORP.

SIDE AIR BAG SENSOR REMOVAL/INSTALLATION

WARNING:

- **Handling the side air bag sensor improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the side air bag sensor. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**

1. Turn the ignition switch to the LOCK position.
2. Remove the battery cover.
3. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the quarter trim. (See **QUARTER TRIM REMOVAL/INSTALLATION** .)
5. Remove the scuff plate. (See **SCUFF PLATE REMOVAL/INSTALLATION** .)
6. Remove the tire house trim. (See **TIRE HOUSE TRIM REMOVAL/INSTALLATION** .)
7. Remove in the order indicated in **Fig. 29** .



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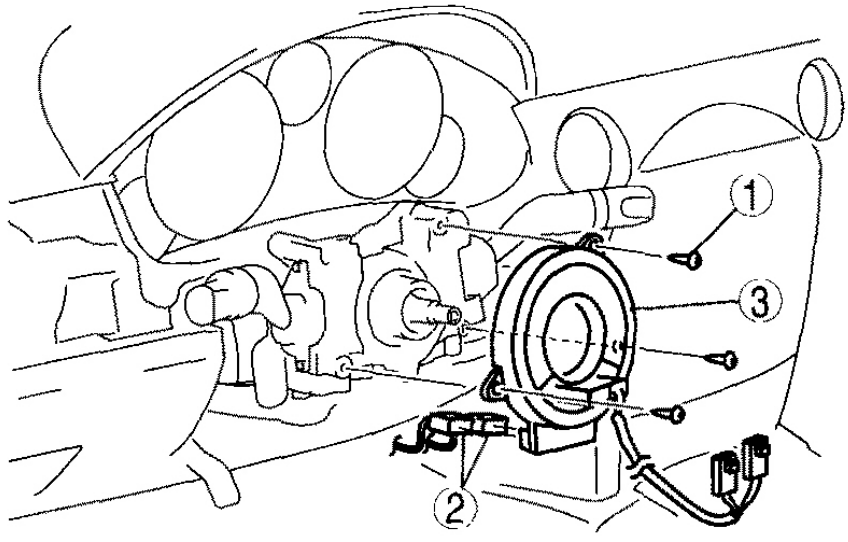
1	Connector
2	Bolt
3	Side air bag sensor

Fig. 29: View Of Side Air Bag Sensor & Components
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.
9. Turn the ignition switch to the ON position and hold for **5 s or more** .
10. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

CLOCK SPRING REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the following parts:
    1. Driver-side air bag module (See **DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
    2. Steering wheel (See **STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION** .)
    3. Column cover (See **COLUMN COVER REMOVAL/INSTALLATION** .)
4. Remove in the order indicated in **Fig. 30** .



E5U810ZW5017

1	Screw
2	Connector
3	Clock spring

Fig. 30: View Of Clock Spring Components

Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.
6. Turn the ignition switch to the ON position.
7. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to **RESTRAINTS -- ON-BOARD DIAGNOSTIC** system (air bag system) and perform inspection of the system.

CLOCK SPRING INSTALLATION NOTE

CAUTION:
- **If the clock spring is not adjusted, the spring wire in the clock spring could over-wind and break when the steering wheel is turned. Always adjust the clock spring after installing it.**

1. Adjust the clock spring after installing it. (See **CLOCK SPRING ADJUSTMENT** .)

CLOCK SPRING ADJUSTMENT

NOTE:
- **The adjustment procedure is also specified on the caution label of the clock spring.**

1. Set the front tires straight-ahead.

CAUTION:
- **The clock spring will break if over-wound. Do not forcibly turn the clock spring.**

2. Turn the clock spring clockwise until it stops.

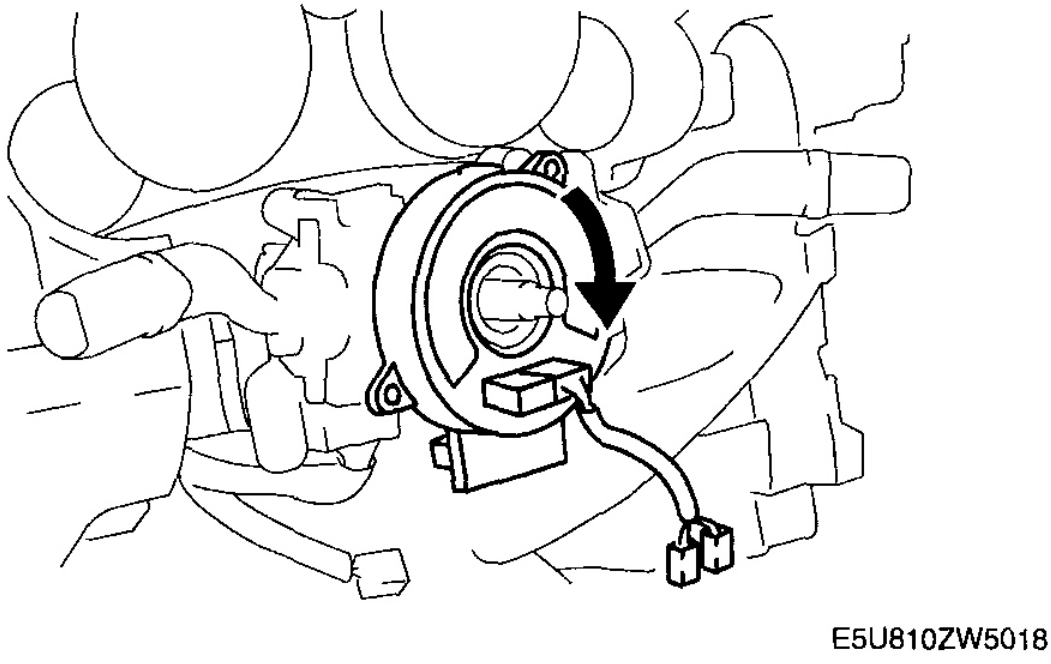


Fig. 31: Turning Clock Spring Clockwise
Courtesy of MAZDA MOTORS CORP.

3. From the stopped position, turn the clock spring counterclockwise **2 3/4 turns** .

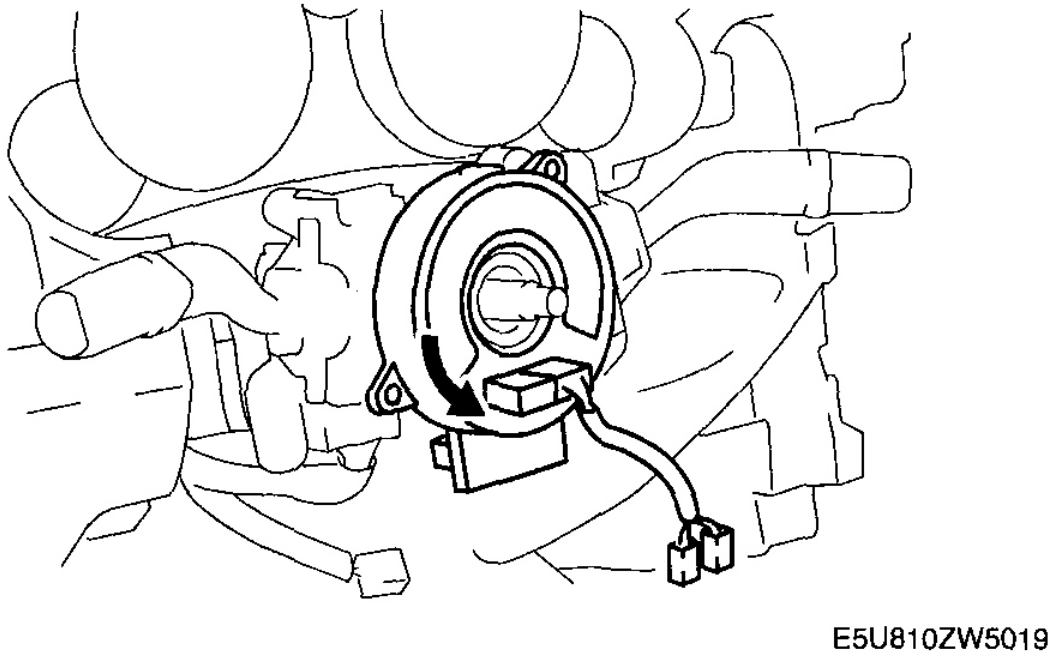


Fig. 32: Turning Clock Spring Counterclockwise 2 3/4 Turns
Courtesy of MAZDA MOTORS CORP.

4. Align the mark on the clock spring with the mark on the outer housing.

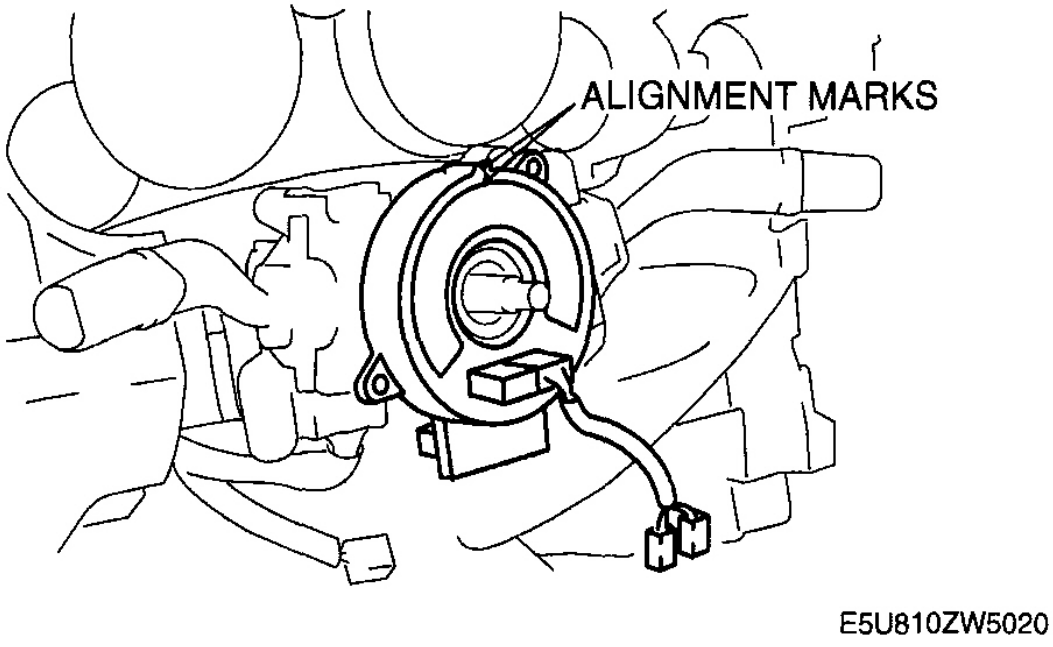


Fig. 33: Aligning Mark On Clock Spring With Mark On Outer Housing
Courtesy of MAZDA MOTORS CORP.

CLOCK SPRING INSPECTION

1. Remove the driver-side air bag module. (See **DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
2. Remove the steering wheel. (See **STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION** .)
3. Remove the clock spring. (See **CLOCK SPRING REMOVAL/INSTALLATION** .)
4. Verify that the continuity is as indicated in **Fig. 34** .
   - If not as indicated in **Fig. 34** , replace the clock spring.

NOTE:

- **When the vehicle-side connector for the clock spring is disconnected, terminals 1A, 1B, 1C and 1D are shorted to prevent unexpected operation (deployment) of the air bag module.**

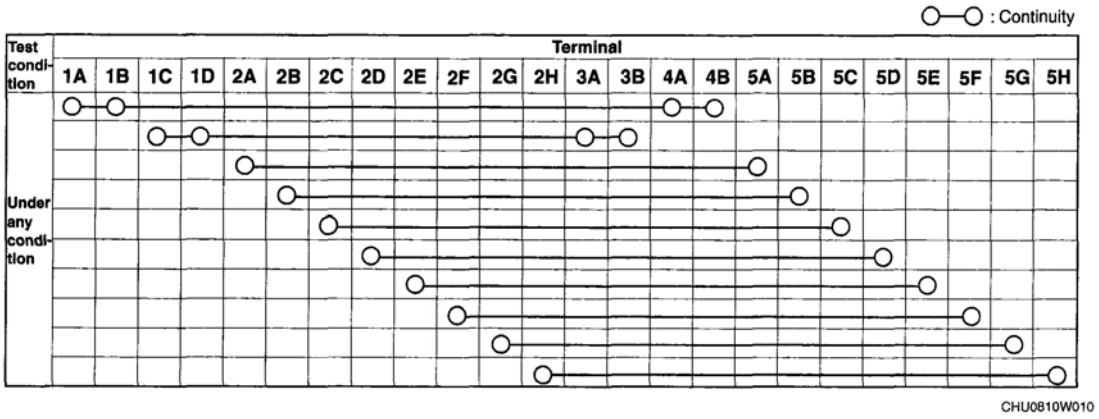


Fig. 34: Clock Spring Continuity Reference Table
Courtesy of MAZDA MOTORS CORP.

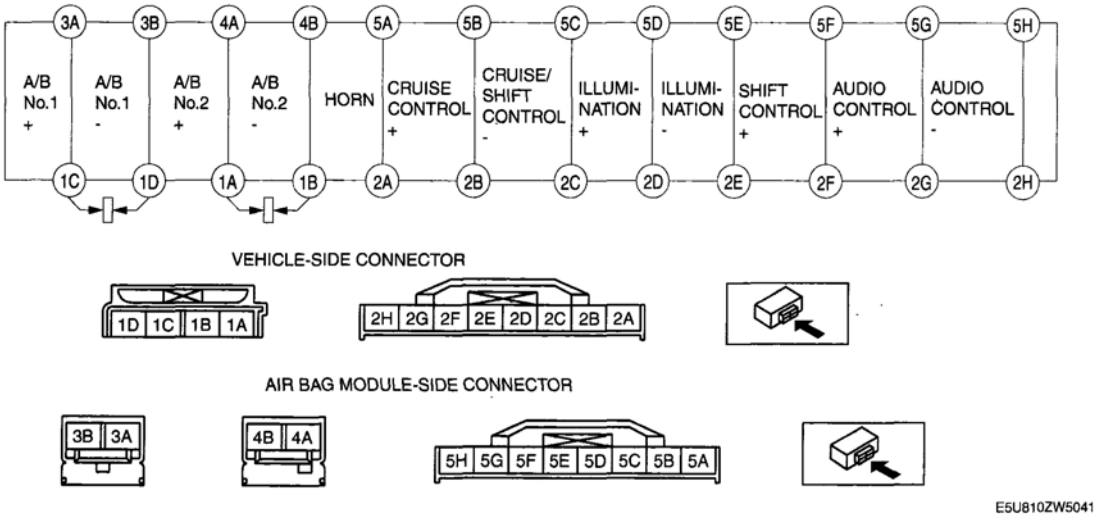


Fig. 35: Identifying Clock Spring Connector Terminals
Courtesy of MAZDA MOTORS CORP.

AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES

WARNING:

- **A live (undeployed) air bag module or pre-tensioner seat belt may accidentally operate (deploy) when it is disposed of and cause serious injury. Do not dispose of a live (undeployed) air bag module and pre-tensioner seat belt. If the SSTs (Deployment tool and Adapter harness) are not available, consult the nearest Mazda representative for assistance.**

CAUTION:

- **Deploying the air bag modules and pre-tensioner seat belts inside the vehicle may cause damage to the vehicle interior. When the vehicle is not to be scrapped, always deploy the air bag modules and pre-tensioner seat belts outside the vehicle.**

- If the vehicle is to be scrapped, or when disposing of any air bag modules or pre-tensioner seat belts, operate (deploy) them inside the vehicle by following the deployment procedure below and using the **SST** (Deployment tool).
- When disposing of an operated (deployed) air bag module and pre-tensioner seat belt, refer to **AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES** .

DEPLOYMENT PROCEDURE FOR INSIDE OF VEHICLE

1. Inspect the **SST** (Deployment tool). (See **INSPECTION OF SST (DEPLOYMENT TOOL)** .)
2. Move the vehicle to an open space, away from strong winds, and close all of the vehicle doors and windows.
3. Turn the ignition switch to the LOCK position.
4. Remove the battery cover.
5. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
6. Follow the procedure below for operating (deploying) the applicable air bag module or pre-tensioner seat belt.

DRIVER-SIDE AIR BAG MODULE

WARNING:

- **The driver-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both driver-side air bag module inflators simultaneously, following the procedure below.**

NOTE:

- **The SSTs , two types of adapter harnesses (for inflators No.1 and No.2) and two deployment tools are to be used to operate (deploy) the driver-side air bag module.**

1. Remove the driver-side air bag module. (See **DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
2. Connect the **SSTs** (Adapter harness) to the driver-side air bag module as shown in **Fig. 36** .
3. Install the driver-side air bag module. (See **DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)

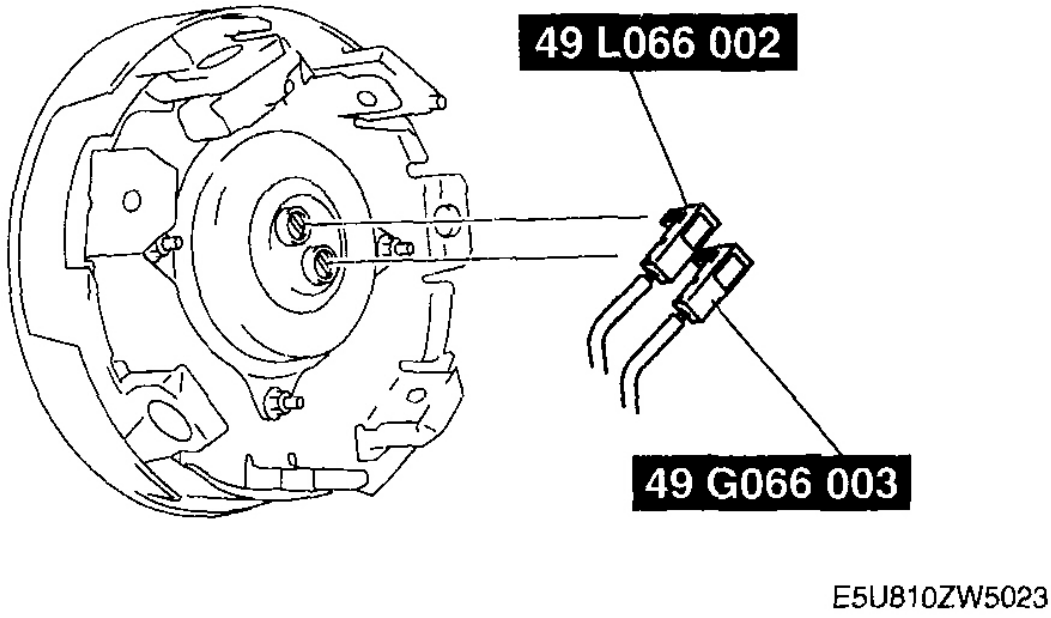


Fig. 36: Connecting SSTs (Adapter Harness) To Driver-Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

4. Connect the **SSTs** (Deployment tool) to the **SSTs** (Adapter harness).

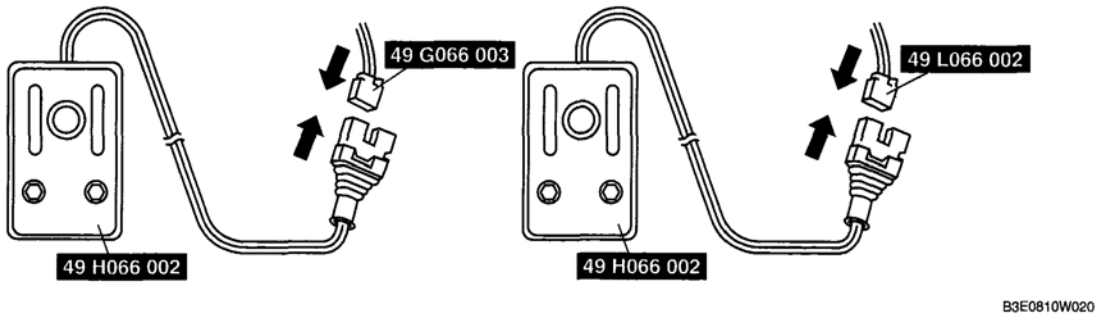


Fig. 37: Connecting SSTs (Deployment tool) To SSTs (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

5. Connect both **SSTs** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on both **SSTs** (Deployment tool) is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.
8. Press the activation switch on the **SST** (Deployment tool) connected with 49 L066 002 (a yellow

connector) of the **SST** (Adapter harness), and **after 3 s** , press the activation switch on the other **SST** (Deployment tool) to operate (deploy) the air bag module (both inflators).

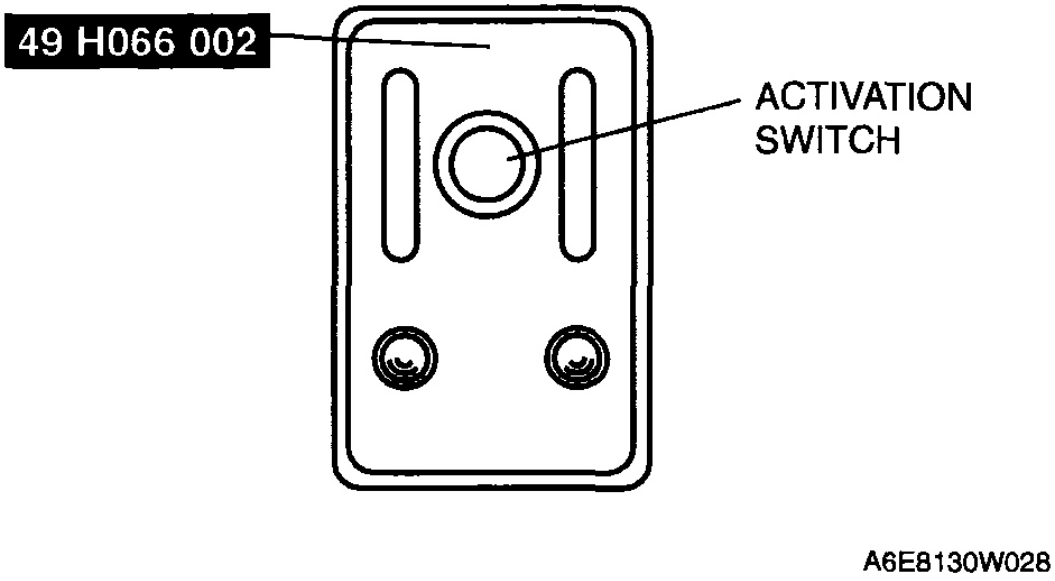


Fig. 38: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

WARNING:

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can get burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

PASSENGER-SIDE AIR BAG MODULE

WARNING:

- **The passenger-side air bag module is a dual inflator type. If one**

inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both passenger-side air bag module inflators simultaneously, following the procedure below.

NOTE:

- **The SSTs , two types of adapter harnesses (for inflators No.1 and No.2) and two deployment tools are to be used to operate (deploy) the passenger-side air bag module.**

1. Remove the glove compartment. (See **GLOVE COMPARTMENT REMOVAL/INSTALLATION** .)
2. Disconnect the passenger-side air bag module connector.
3. Connect the **SSTs** (Adapter harness) to the passenger-side air bag module as shown in **Fig. 39** .
4. Connect the **SSTs** (Deployment tool) to the **SSTs** (Adapter harness).

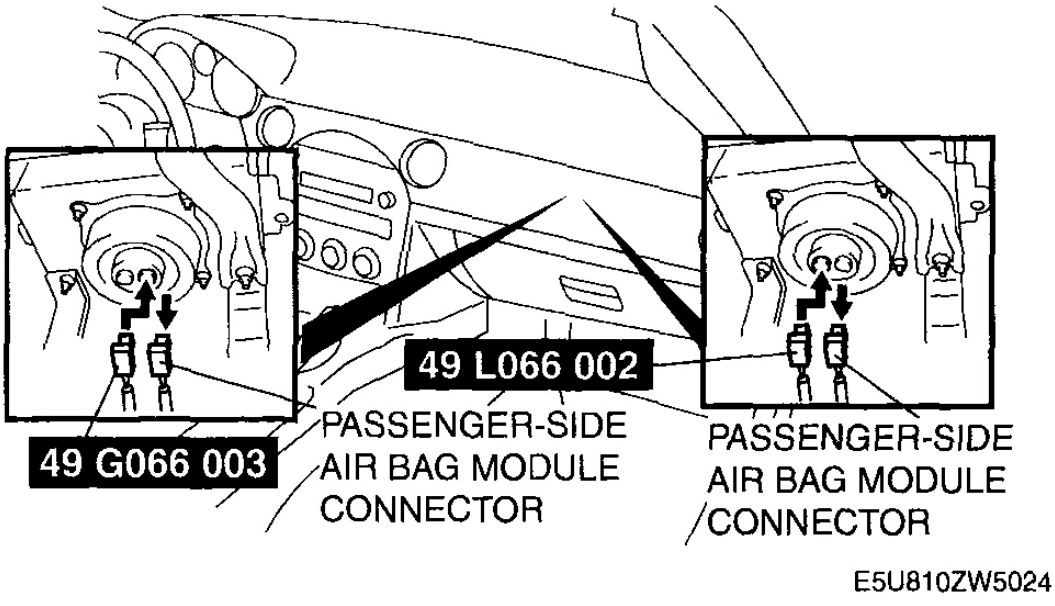


Fig. 39: Connecting SSTs (Adapter Harness) To Passenger-Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

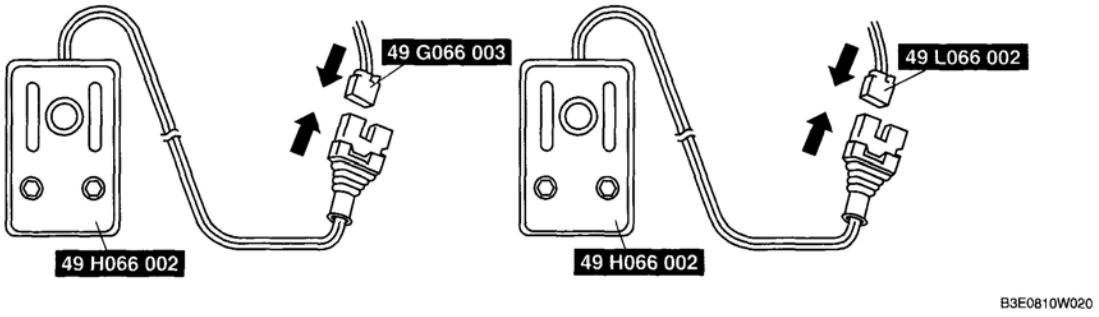


Fig. 40: Connecting SSTs (Deployment Tool) To SSTs (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

5. Connect both **SSTs** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on both **SSTs** (Deployment tool) is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.
8. Press the activation switch on the **SST** (Deployment tool) connected with 49 L066 002 (a yellow connector) of the **SST** (Adapter harness), and **after 3 s** , press the activation switch on the other **SST** (Deployment tool) to operate (deploy) the air bag module (both inflators).

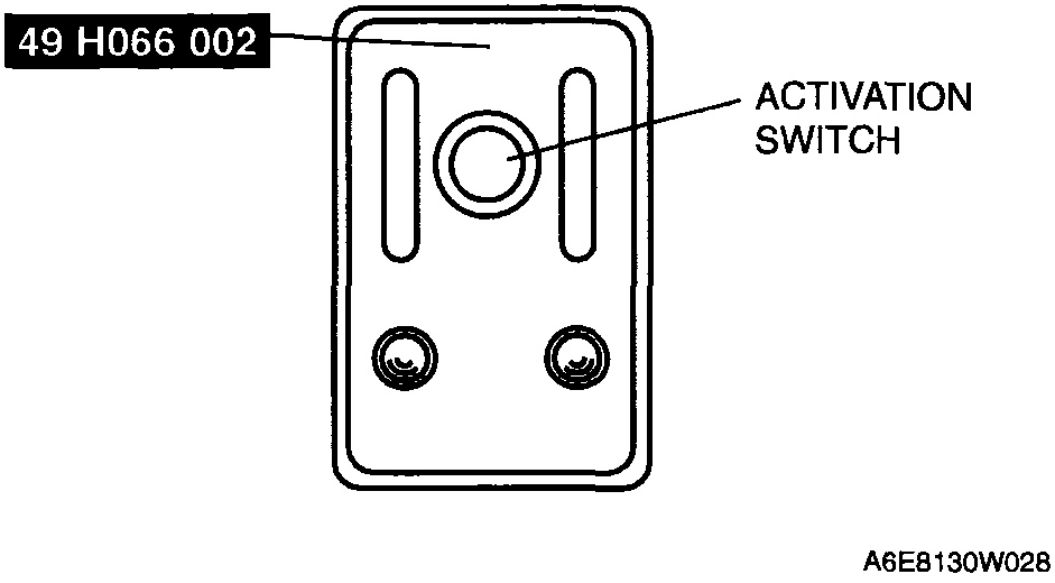


Fig. 41: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

WARNING:

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

SIDE AIR BAG MODULE

1. Disconnect the seat connector.
2. Connect the **SST** (Adapter harness) to the side air bag module as shown in **Fig. 42** .

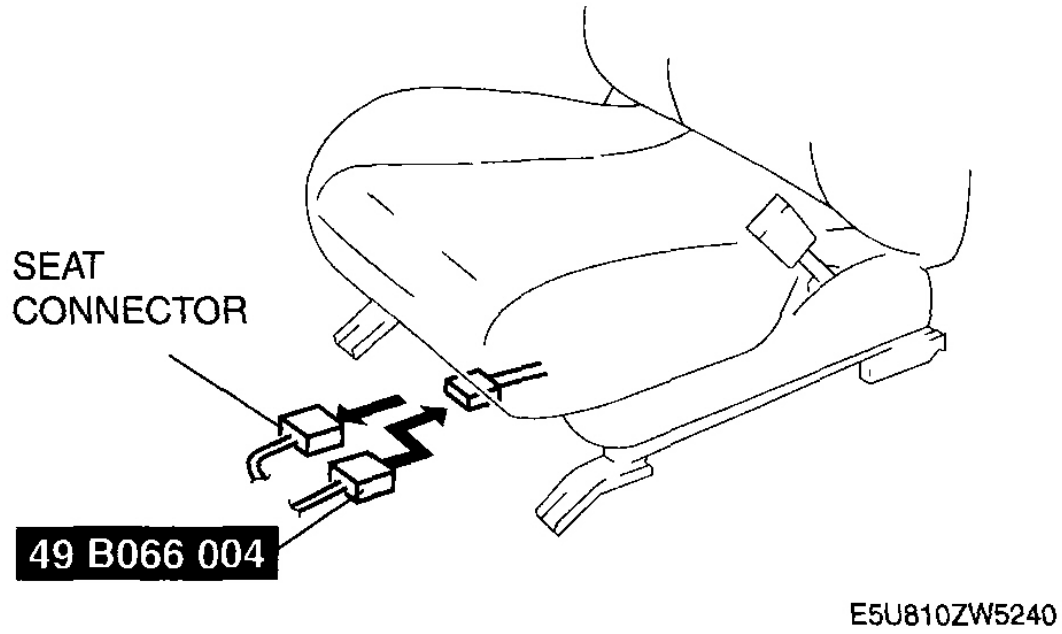


Fig. 42: Connecting SST (Adapter Harness) To Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

3. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
4. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
5. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
6. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

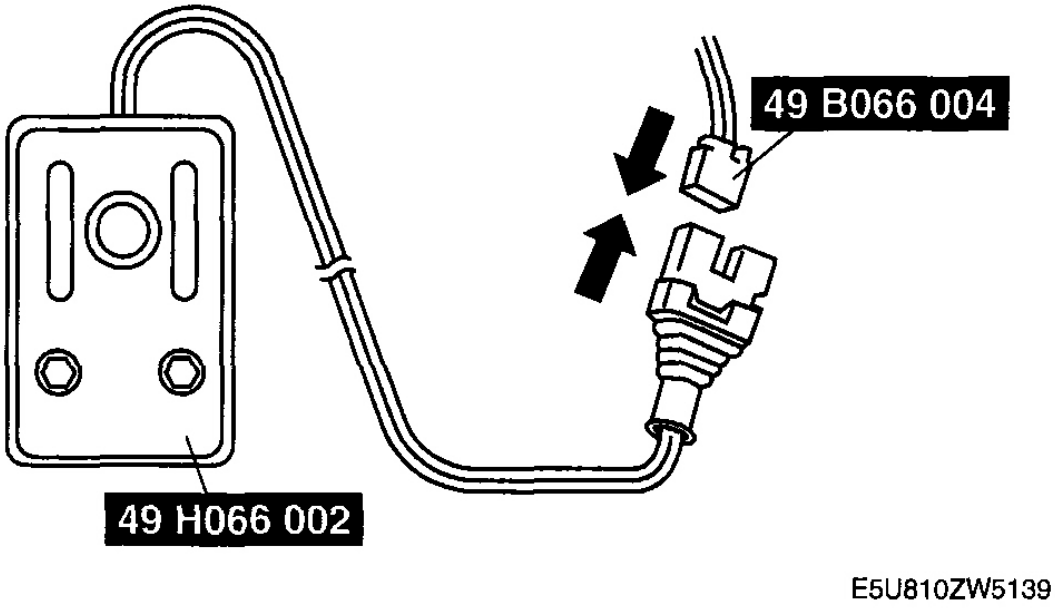


Fig. 43: Connecting SST (Deployment Tool) To SST (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

7. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the side air bag module.
8. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

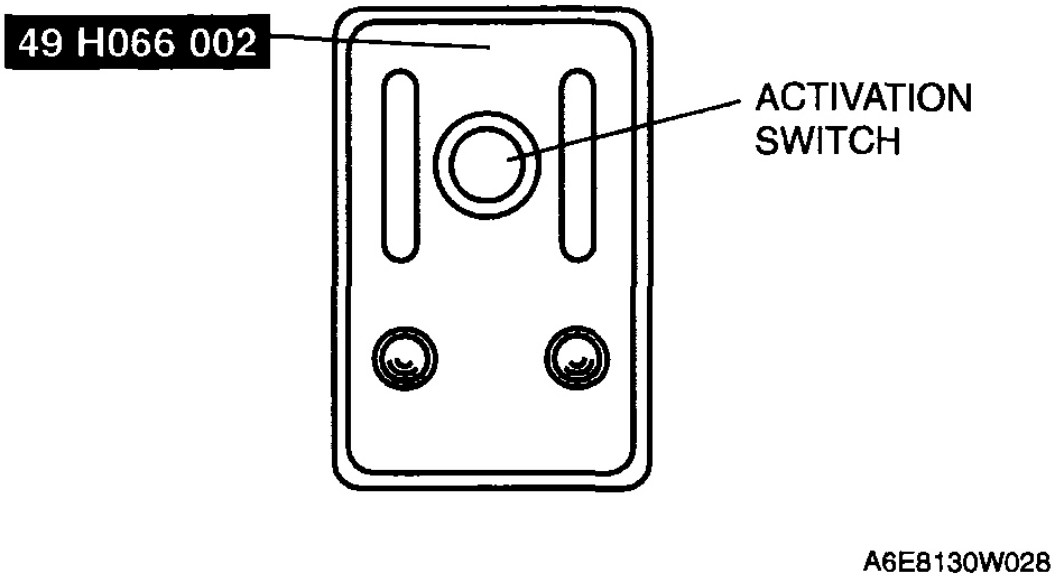


Fig. 44: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

PRE-TENSIONER SEAT BELT

1. Remove the back trim. (See **BACK TRIM REMOVAL/INSTALLATION** .)
2. Remove the pre-tensioner seat belt and connect the **SST** (Adapter harness) as shown in **Fig. 45** . (See **SEAT BELT REMOVAL/INSTALLATION** .)

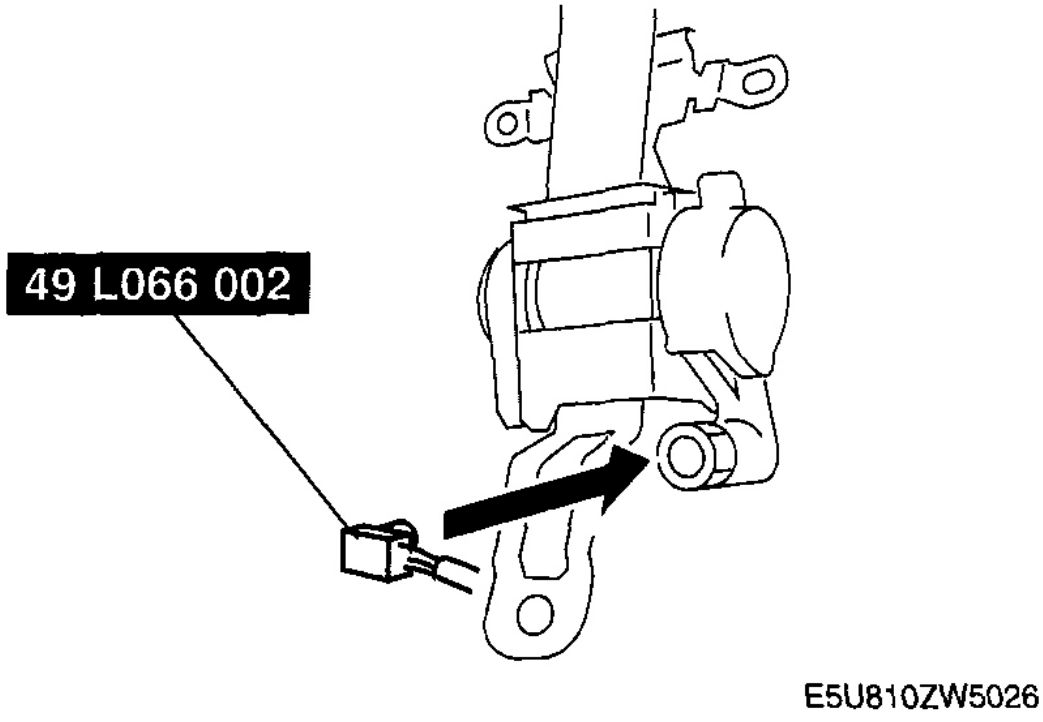


Fig. 45: View Of Pre-Tensioner Seat Belt & SST (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

3. Install the pre-tensioner seat belt.
4. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
5. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

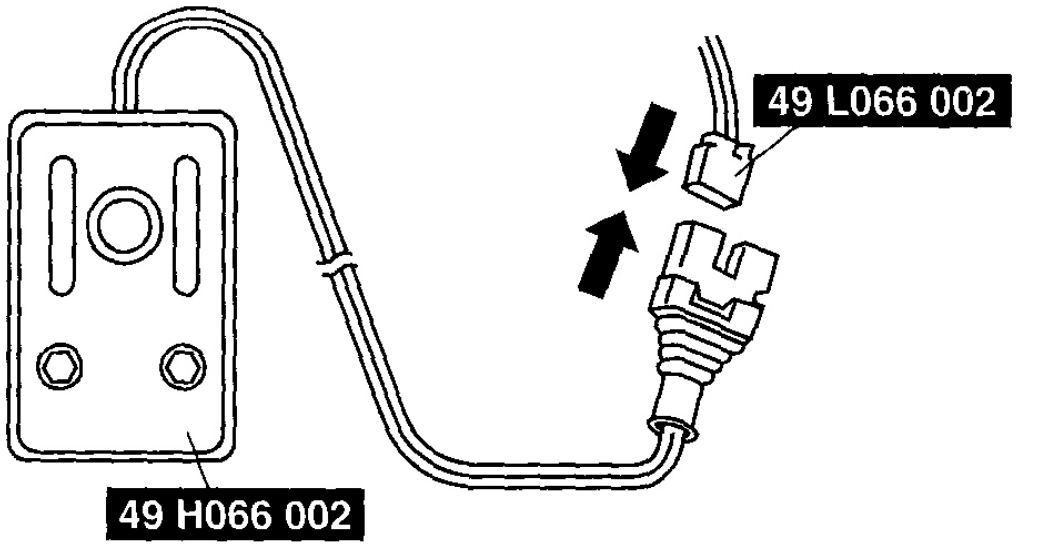


Fig. 46: Connecting SST (Deployment Tool) To SST (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

8. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the pre-tensioner seat belt.

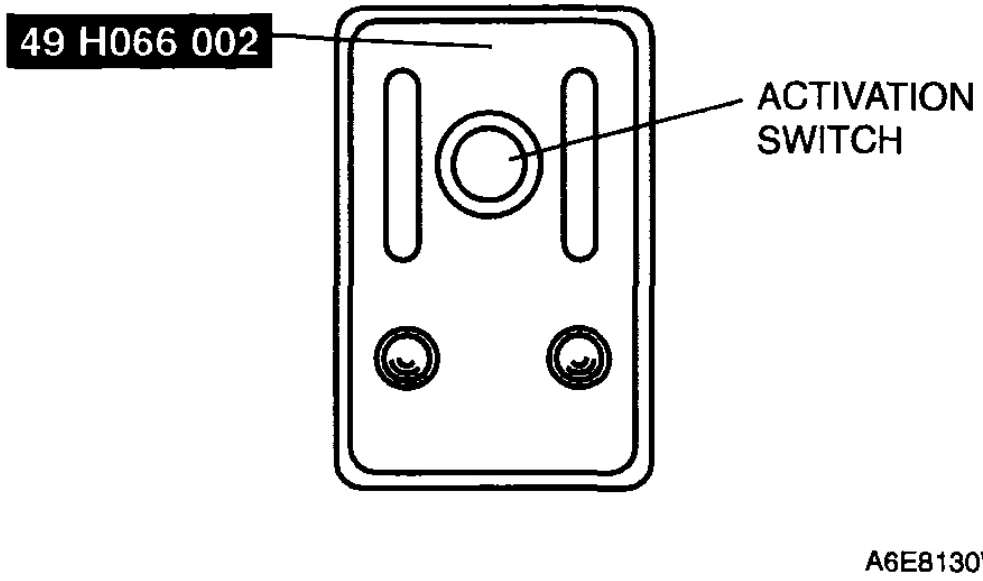


Fig. 47: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

9. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

DEPLOYMENT PROCEDURE FOR OUTSIDE OF VEHICLE

1. Inspect the **SST** (Deployment tool). (See **INSPECTION OF SST (DEPLOYMENT TOOL)** .)
2. Turn the ignition switch to the LOCK position.
3. Remove the battery cover.
4. Disconnect the negative battery cable and wait for **1 min or more** . (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
5. Follow the procedure below for operating (deploying) the applicable air bag module or pre-tensioner seat belt.

DRIVER-SIDE AIR BAG MODULE

WARNING:

- **The driver-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both driver-side air bag module inflators simultaneously, following the procedure below.**

1. Remove the driver-side air bag module. (See **DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
2. Connect the **SSTs** (Adapter harness) to the driver-side air bag module as shown in **Fig. 48** .

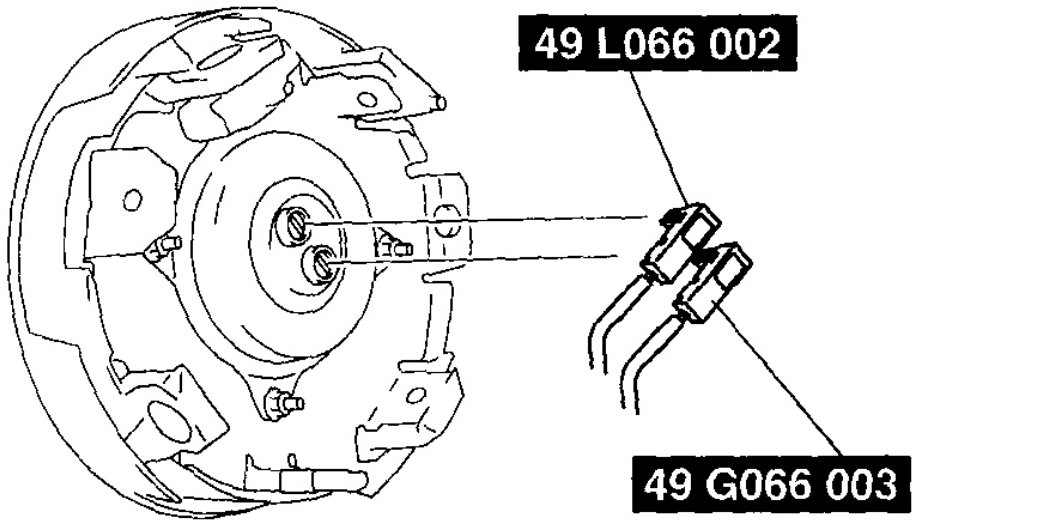


Fig. 48: Connecting SSTs (Adapter Harness) To Driver-Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

3. Place the driver-side air bag module on the center of the tire wheel with the padded surface facing up. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm^2 {0.002 in^2 } or more**) through the wheel and the bolt installation holes of the air bag module **at least 4 times** .

WARNING:

- **If the air bag module is not properly installed to the tire wheel, serious injury may occur when the module is operated (deployed). When installing the air bag module to the tire wheel, make sure the padded surface is facing up.**

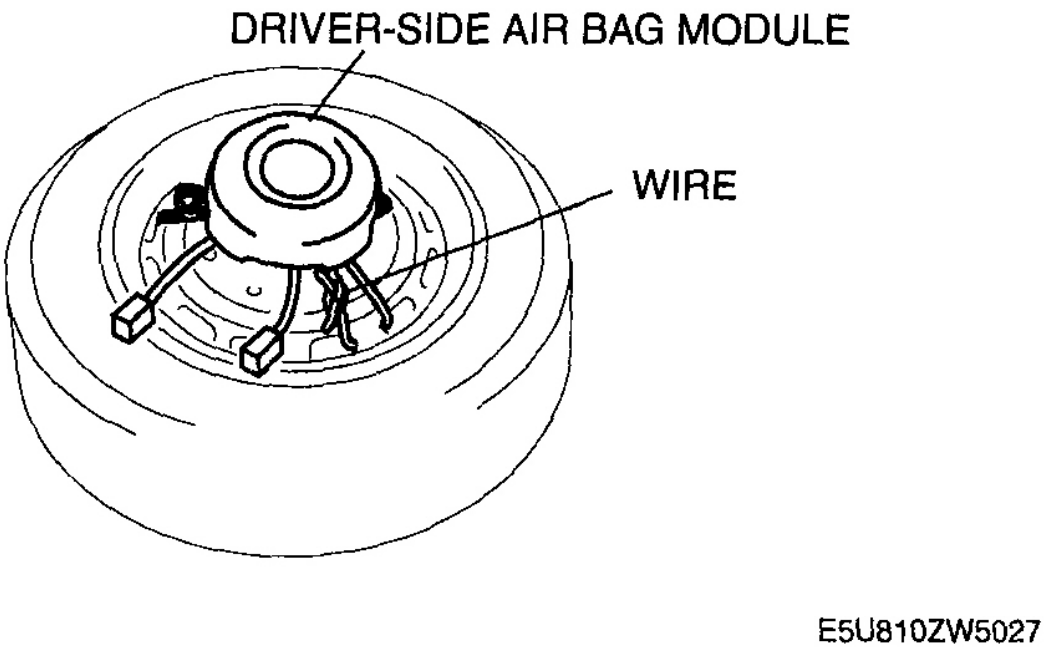


Fig. 49: Placing Driver-Side Air Bag Module On Center Of Tire Wheel
Courtesy of MAZDA MOTORS CORP.

4. Stack three tires without wheels on top of the tire with the driver-side air bag module, and then stack another tire with a wheel on the very top.

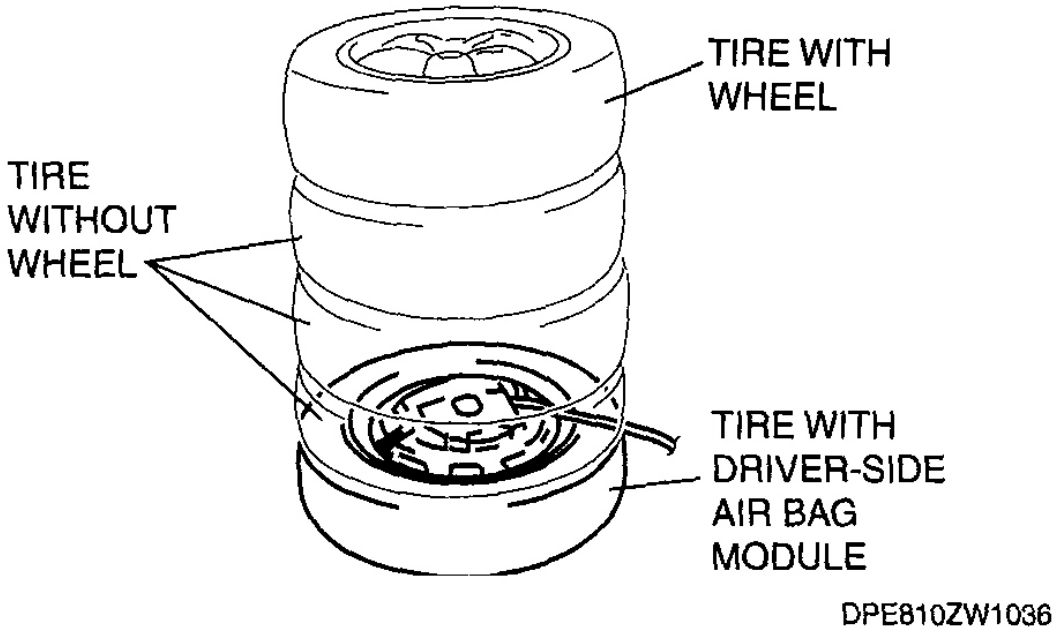
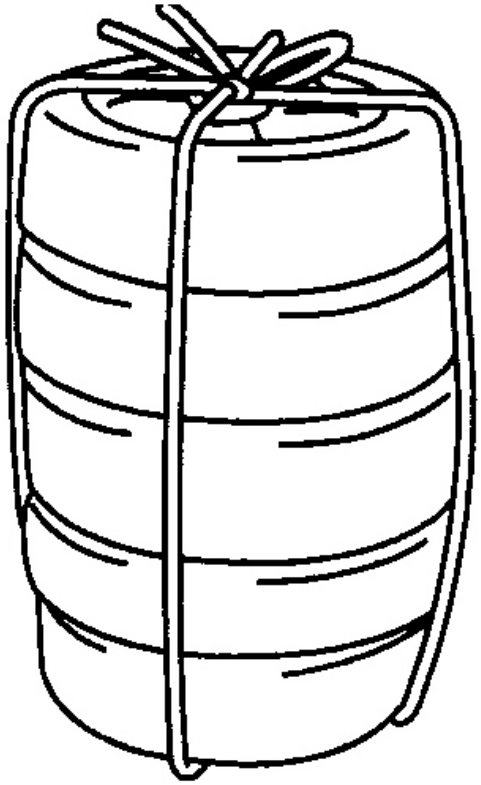


Fig. 50: Stacking Tires Without Wheels On Top Of Tire With Driver-Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

5. Secure the tires with wire.



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Fig. 51: Tying Tires Together With Wire
Courtesy of MAZDA MOTORS CORP.

6. Connect the **SSTs** (Deployment tool) to the **SSTs** (Adapter harness).
7. Connect both **SSTs** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on both **SSTs** (Deployment tool) is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

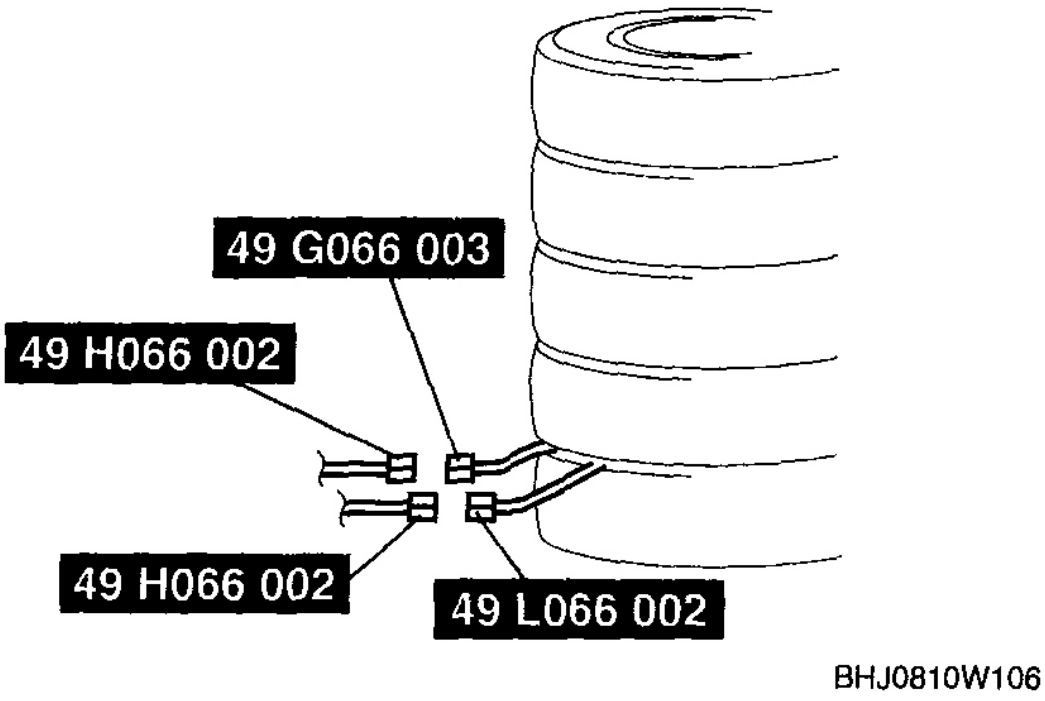


Fig. 52: Connecting SSTs (Deployment Tool) To SSTs (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

10. Press the activation switch on the **SST** (Deployment tool) connected with 49 L066 002 (a yellow connector) of the **SST** (Adapter harness), and **after 3 s** , press the activation switch on the other **SST** (Deployment tool) to operate (deploy) the air bag module (both inflators).

WARNING:

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

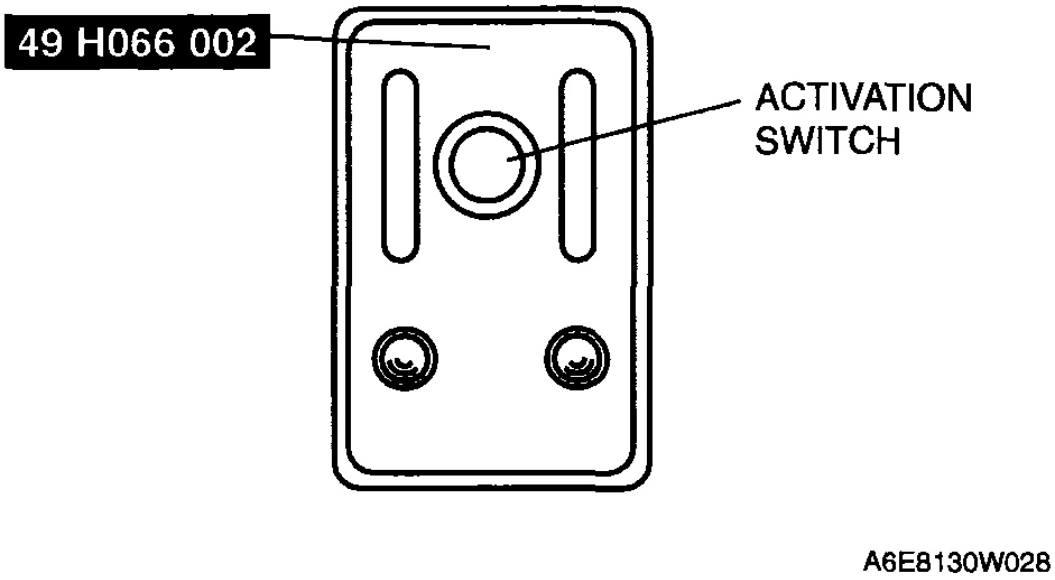


Fig. 53: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

11. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

PASSENGER-SIDE AIR BAG MODULE

WARNING:

- **The passenger-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both passenger-side air bag module inflators simultaneously, following the procedure below.**

1. Remove the passenger-side air bag module. (See **PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
2. Connect the **SSTs** (Adapter harness) to the passenger-side air bag module as shown in **Fig. 54** .

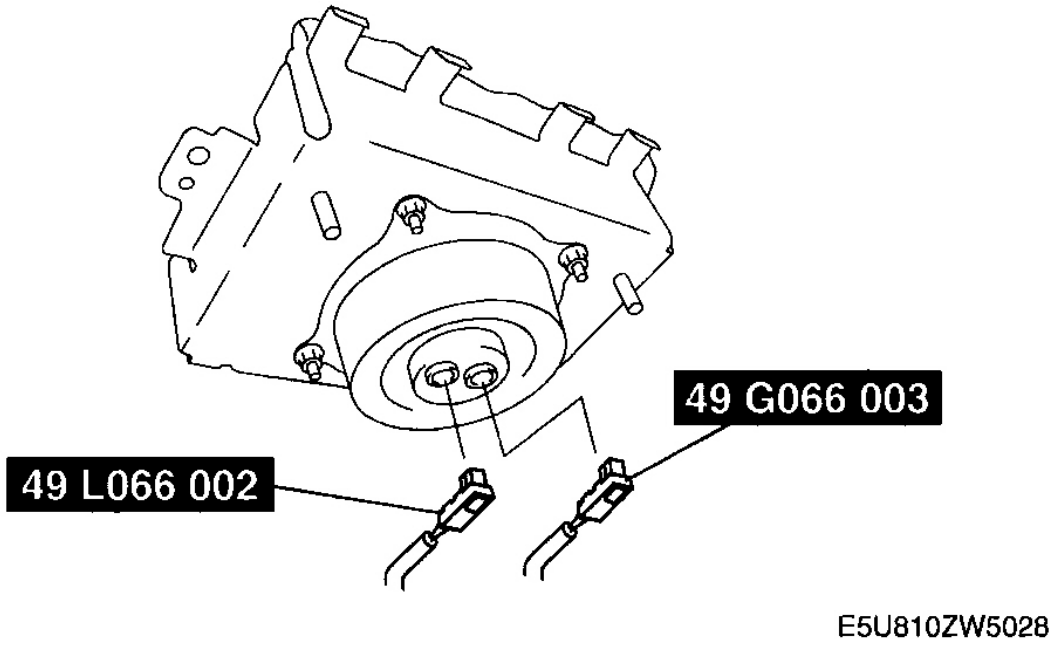


Fig. 54: Connecting SSTs (Adapter Harness) To Passenger-Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

3. Place the padded surface of the passenger-side air bag module facing the center of the tire as shown in **Fig. 55** . To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm^2 {0.002 in^2 } or more**) through the tire and the brackets **at least 4 times** as shown in **Fig. 55** .

WARNING:

- **If the air bag module is not properly secured to the tire, the tires may fall over by the impact of operation (deployment) and cause serious injury. To prevent this, secure the air bag module properly with the padded surface facing the center of the tire.**

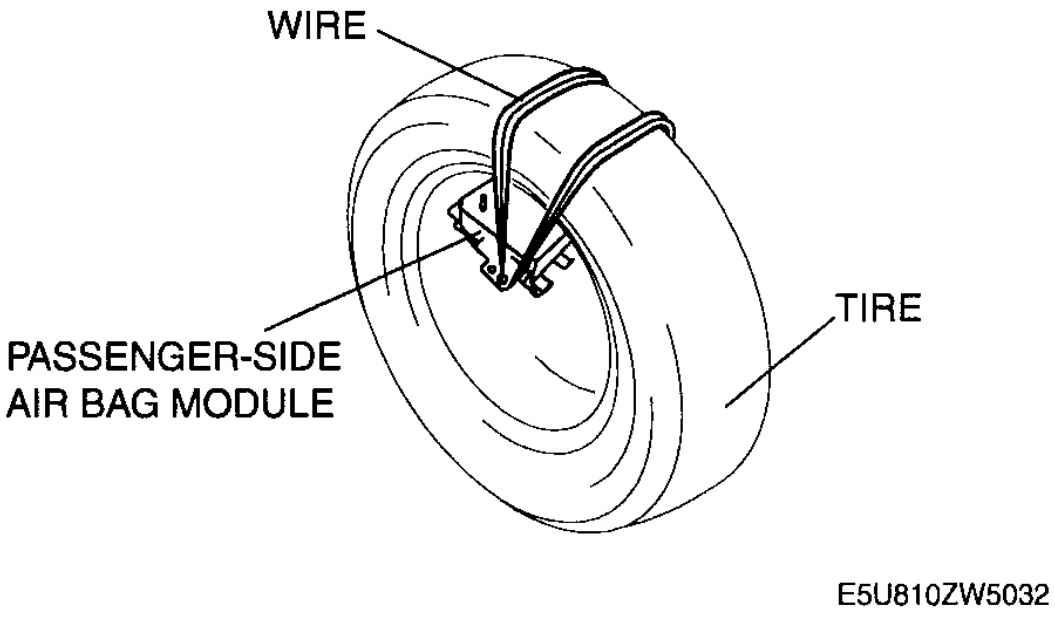


Fig. 55: Wrapping Wire Through Tire & Brackets
Courtesy of MAZDA MOTORS CORP.

4. Stack the tire with the passenger-side air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the passenger-side air bag module, and then stack another tire with a wheel on the very top.

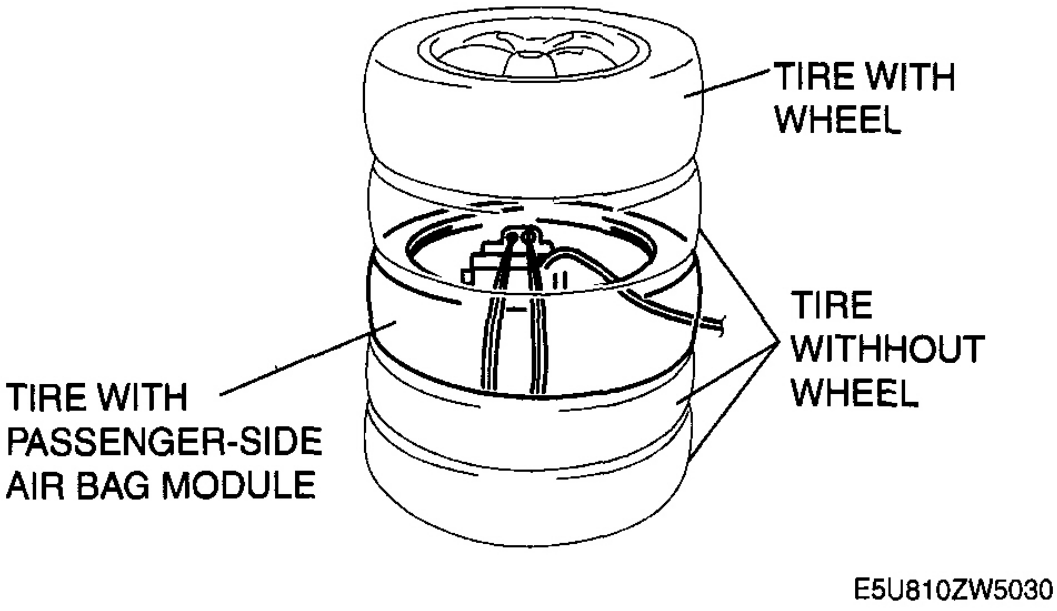
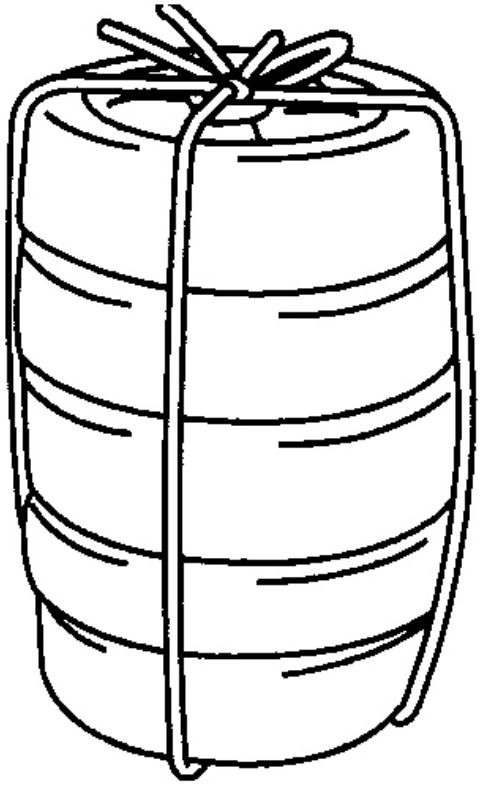


Fig. 56: Stacking Tire With Passenger-Side Air Bag Module On Top Of Two Tires Without Wheels
Courtesy of MAZDA MOTORS CORP.

5. Secure the tires with wire.



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Fig. 57: Tying Tires Together With Wire
Courtesy of MAZDA MOTORS CORP.

6. Connect the **SSTs** (Deployment tool) to the **SSTs** (Adapter harness).
7. Connect both **SSTs** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on both **SSTs** (Deployment tool) is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

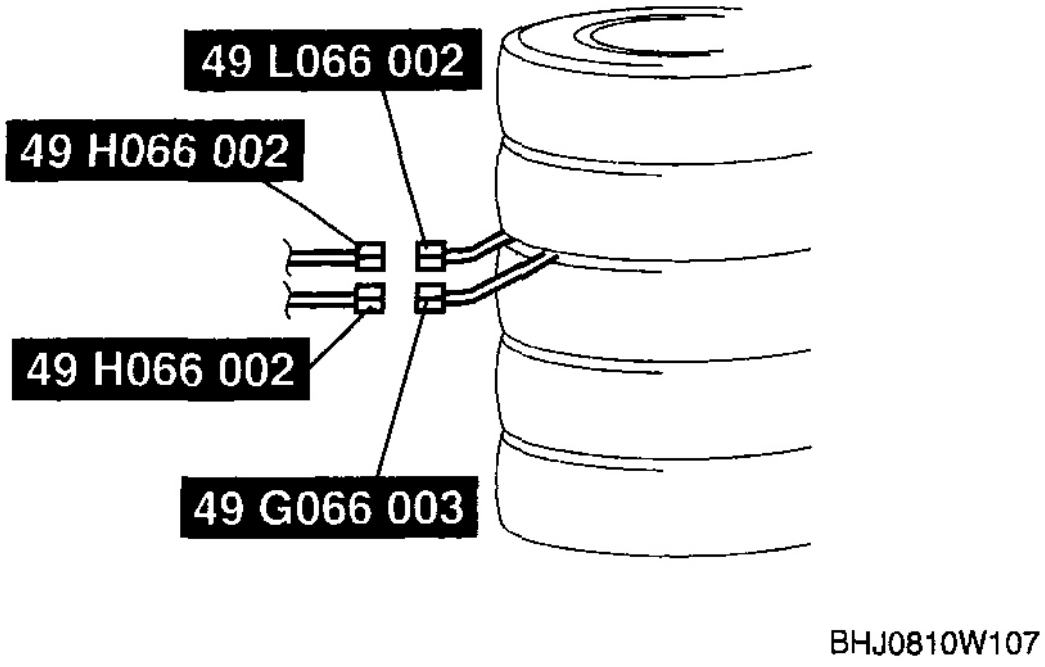


Fig. 58: Connecting SSTs (Deployment Tool) To SSTs (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

10. Press the activation switch on the **SST** (Deployment tool) connected with 49 L066 002 (a yellow connector) of the **SST** (Adapter harness), and **after 3 s** , press the activation switch on the other **SST** (Deployment tool) to operate (deploy) the air bag module (both inflators).

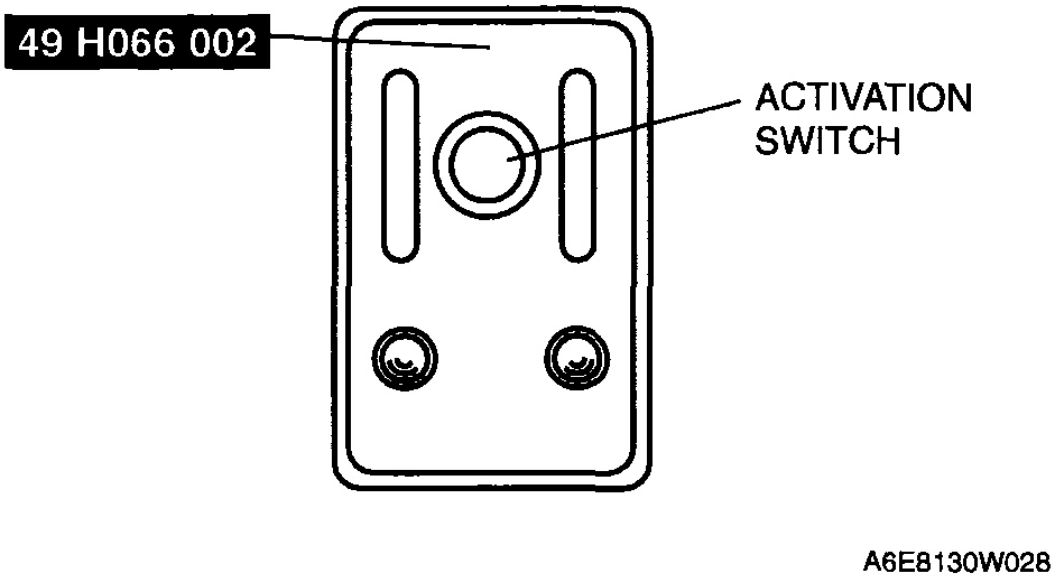


Fig. 59: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

WARNING:

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

11. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

SIDE AIR BAG MODULE

1. Remove the side air bag module. (See **SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
2. Install the nuts to the side air bag module as shown in **Fig. 60** , and connect the **SST** (Adapter harness).

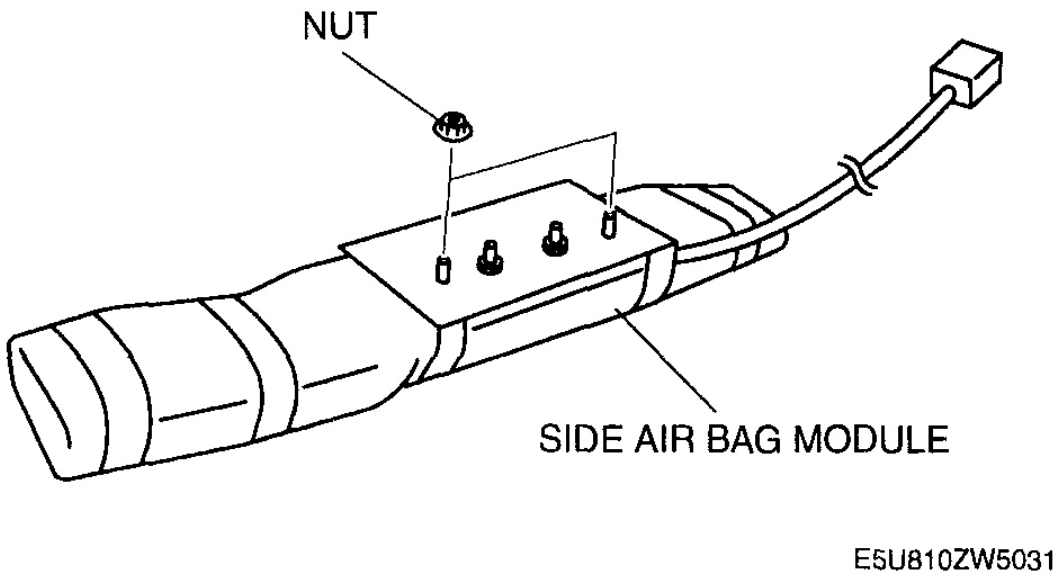


Fig. 60: View Of Nuts On Side Air Bag Module & SST (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

3. Place the padded surface of the side air bag module facing the center of the tire as shown in **Fig. 61** . To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm^2 {0.002 in^2 } or more**) through the tire and around the bolts **at least 4 times** .

WARNING:

- **If the air bag module is not properly secured to the tire, the tires may fall over by the impact of operation (deployment) and cause serious injury. To prevent this, secure the air bag module properly with the padded surface facing the center of the tire.**

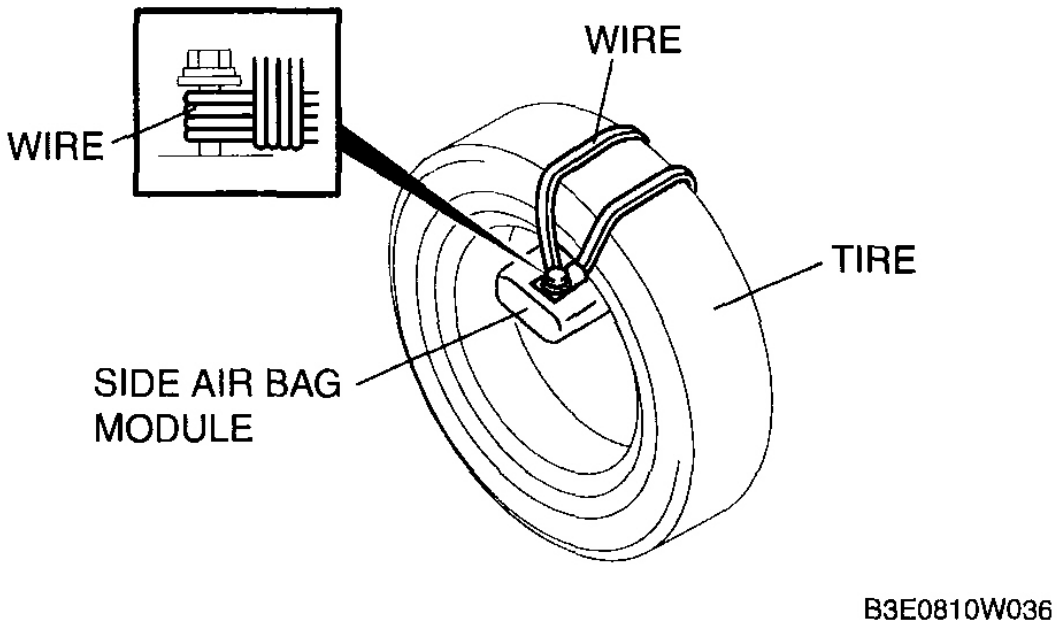


Fig. 61: Placing Padded Surface Of Side Air Bag Module Facing Center Of Tire
Courtesy of MAZDA MOTORS CORP.

4. Connect the **SST** (Adapter harness) to the side air bag module as shown in **Fig. 62** .

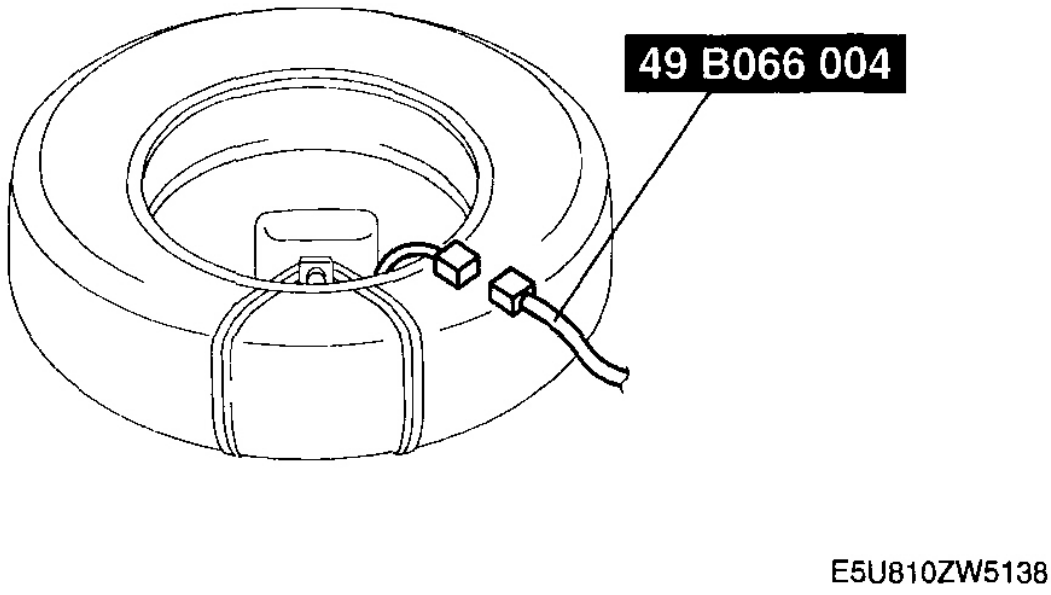


Fig. 62: Connecting SST (Adapter Harness) To Side Air Bag Module
Courtesy of MAZDA MOTORS CORP.

5. Stack the tire with the side air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the side air bag module, and then stack another tire with a wheel on the very top.

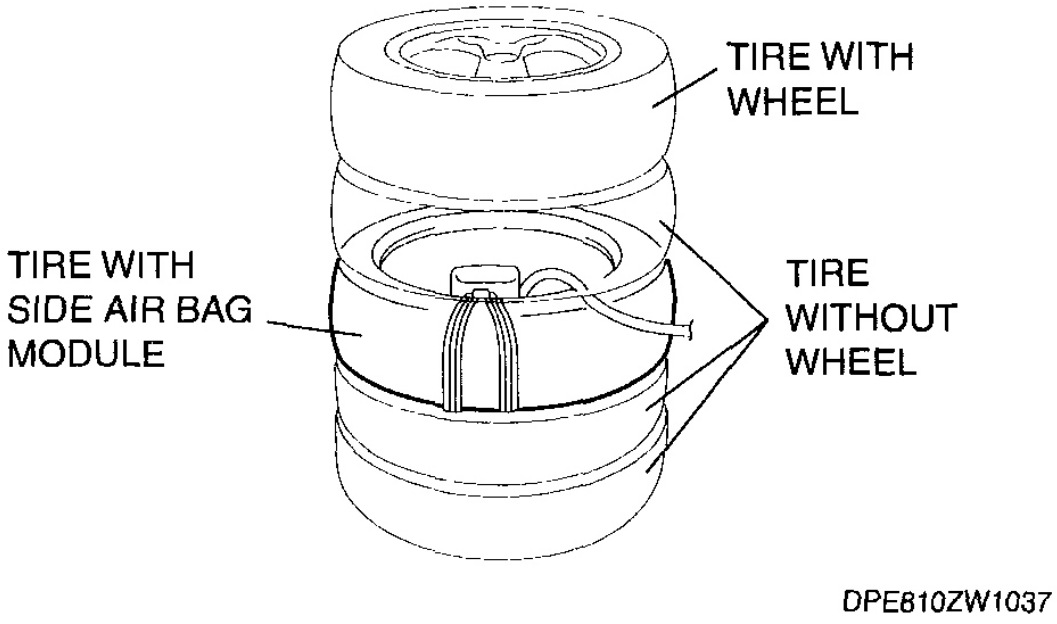
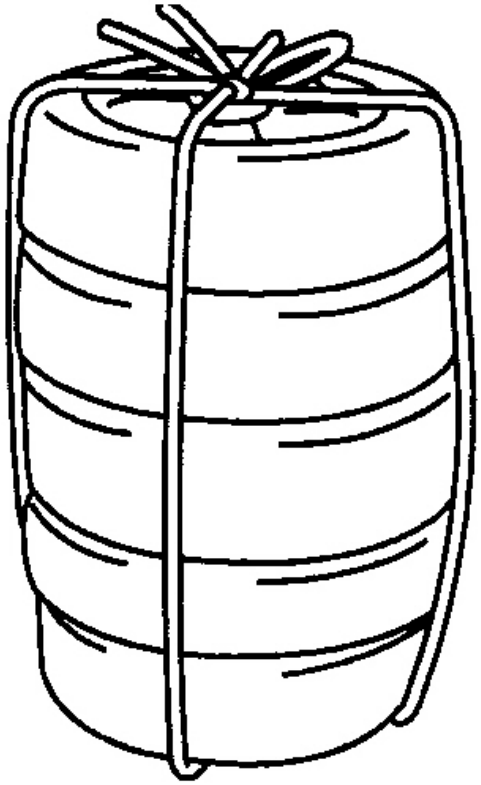


Fig. 63: Stacking Tire With Side Air Bag Module On Top Of Tires Without Wheels
Courtesy of MAZDA MOTORS CORP.

6. Secure the tires with wire.



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Fig. 64: Tying Tires Together With Wire
Courtesy of MAZDA MOTORS CORP.

7. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
8. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
9. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
10. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

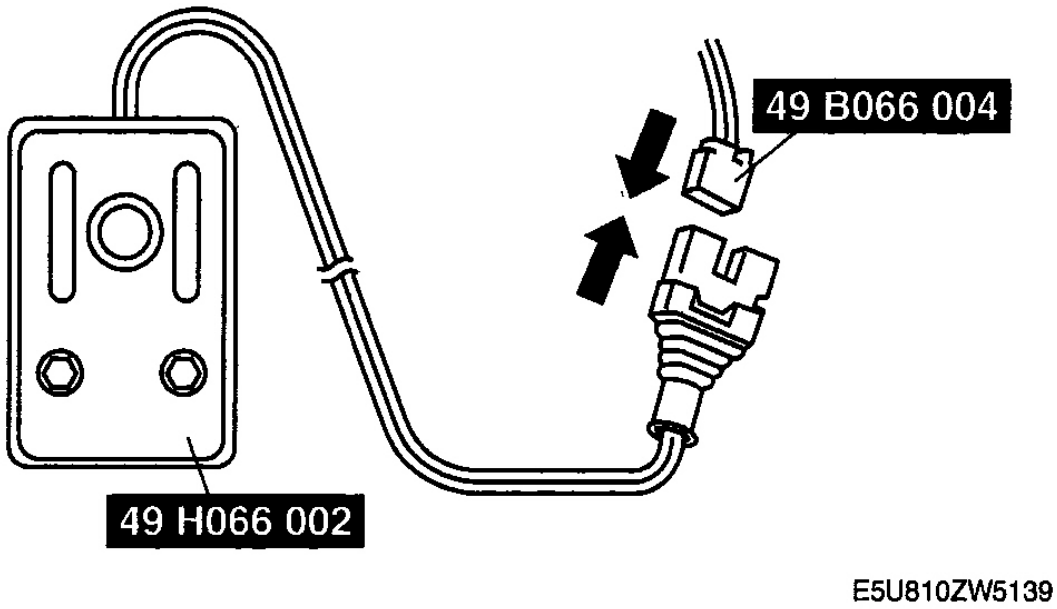


Fig. 65: Connecting SST (Deployment Tool) To SST (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

11. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the side air bag module.
12. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

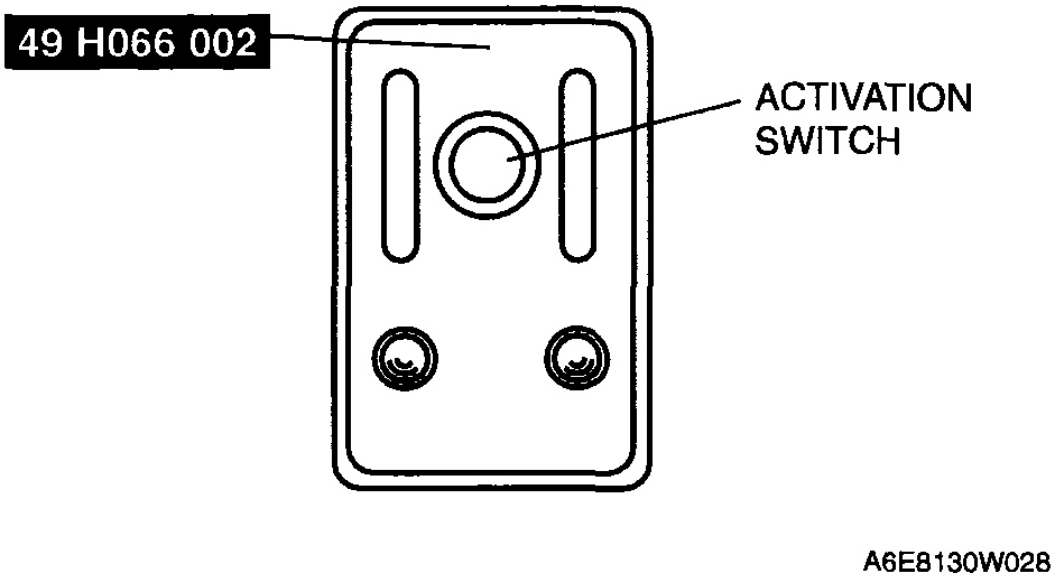


Fig. 66: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

PRE-TENSIONER SEAT BELT

1. Remove the pre-tensioner seat belt. (See **SEAT BELT REMOVAL/INSTALLATION** .)
2. Connect the **SST** (Adapter harness) to the pre-tensioner seat belt as shown in **Fig. 67** .

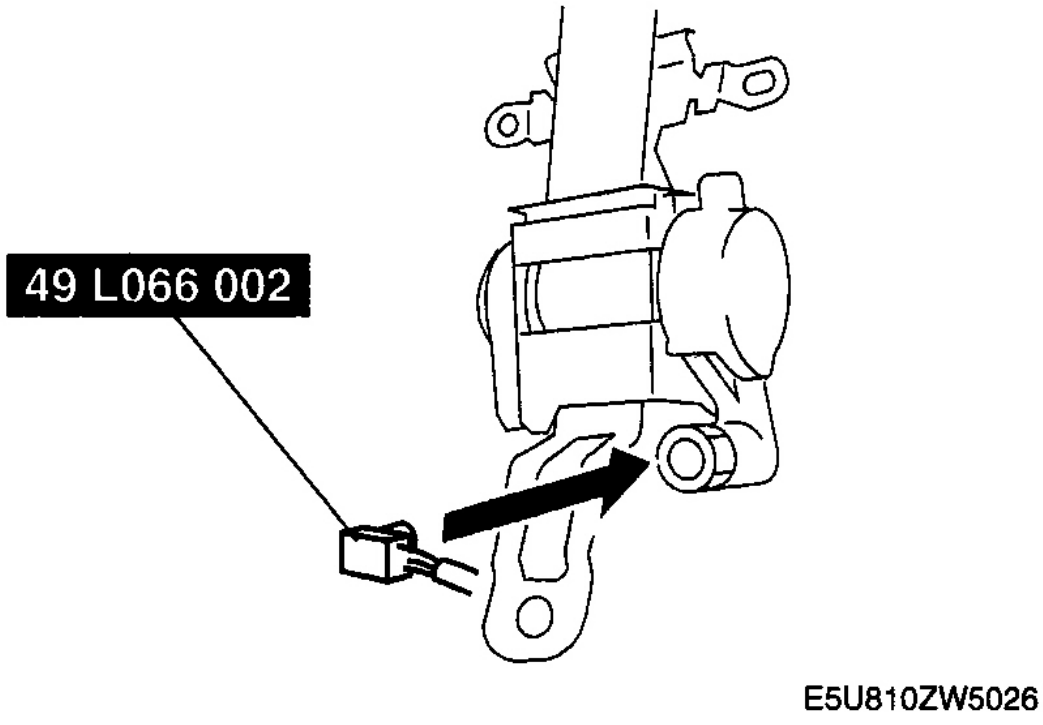


Fig. 67: Connecting SST (Adapter Harness) To Pre-Tensioner Seat Belt
Courtesy of MAZDA MOTORS CORP.

3. Put the pre-tensioner seat belt inside the tire and secure it to the tire by wrapping a wire (cross section of **1.25 mm^2 {0.002 in^2 } or more**) through the tire and the bolt installation holes **at least 4 times** .

WARNING:

- **If the pre-tensioner seat belt is not properly installed to the tire, serious injury may occur when the pre-tensioner part is operated (deployed). When installing the pre-tensioner seat belt to the tire, make sure the pre-tensioner part is inside the tire.**

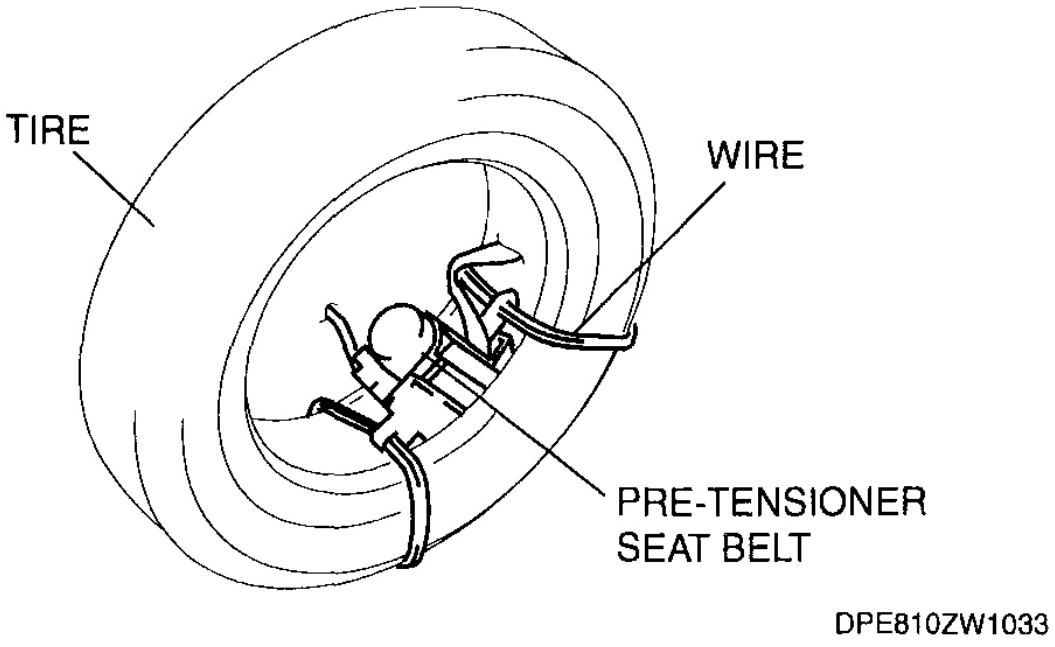


Fig. 68: Putting Pre-Tensioner Seat Belt Inside Tire & Secure To Tire By Wrapping Wire
Courtesy of MAZDA MOTORS CORP.

4. Stack the tire with the pre-tensioner seat belt on two of tires without wheels. Stack a tire without a wheel on top of the tire with the pre-tensioner seat belt, and then stack another tire with a wheel on the very top.

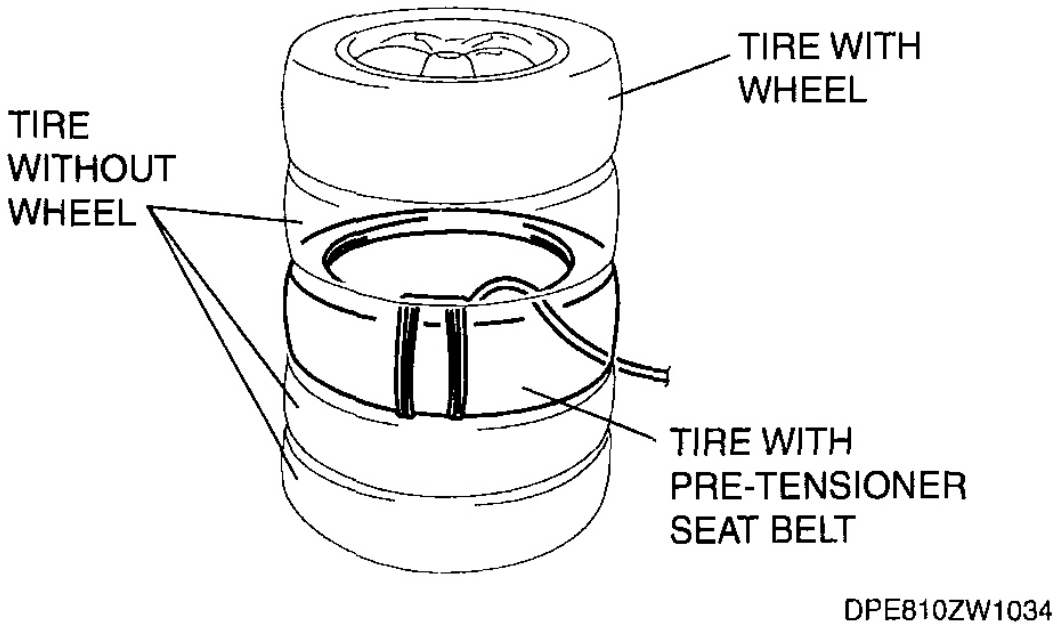
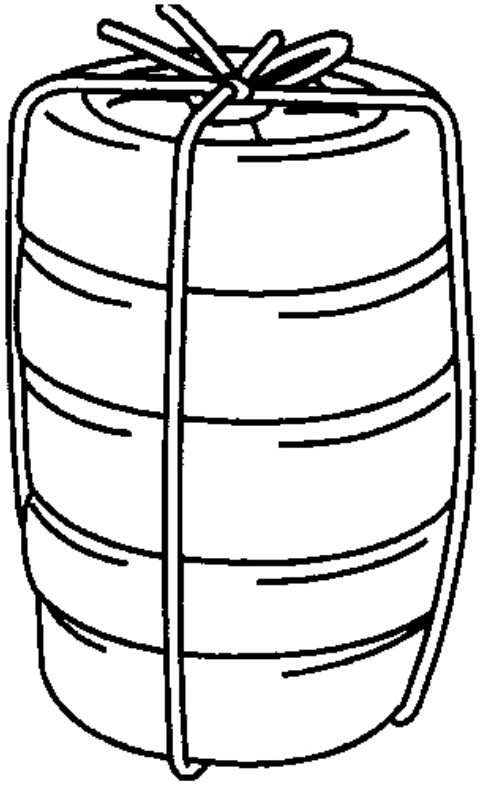


Fig. 69: Stacking Tire With Pre-Tensioner Seat Belt On Two Of Tires Without Wheels
Courtesy of MAZDA MOTORS CORP.

5. Secure the tires with wire.



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Fig. 70: Tying Tires Together With Wire
Courtesy of MAZDA MOTORS CORP.

6. Connect the **SST** (Deployment tool) to the **SST** (Adapter harness).
7. Connect the **SST** (Deployment tool) to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on the **SST** (Deployment tool) is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

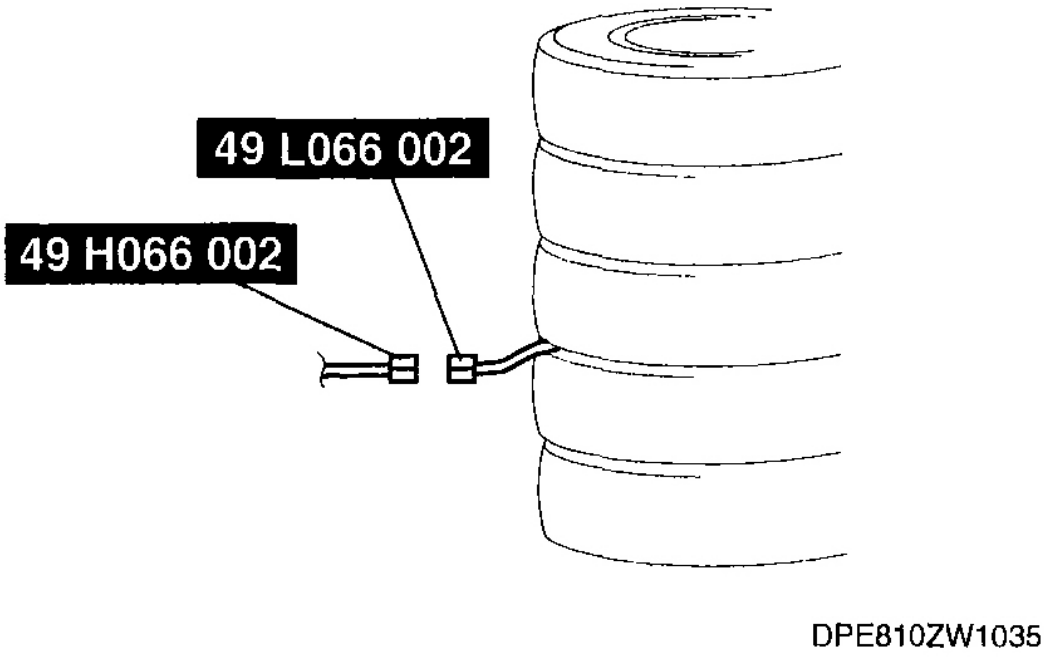


Fig. 71: Connecting SST (Deployment Tool) To SST (Adapter Harness)
Courtesy of MAZDA MOTORS CORP.

10. Press the activation switch on the **SST** (Deployment tool) to operate (deploy) the pre-tensioner seat belt.
11. Disconnect the **SSTs** (Deployment tool) from the **SSTs** (Adapter harness).

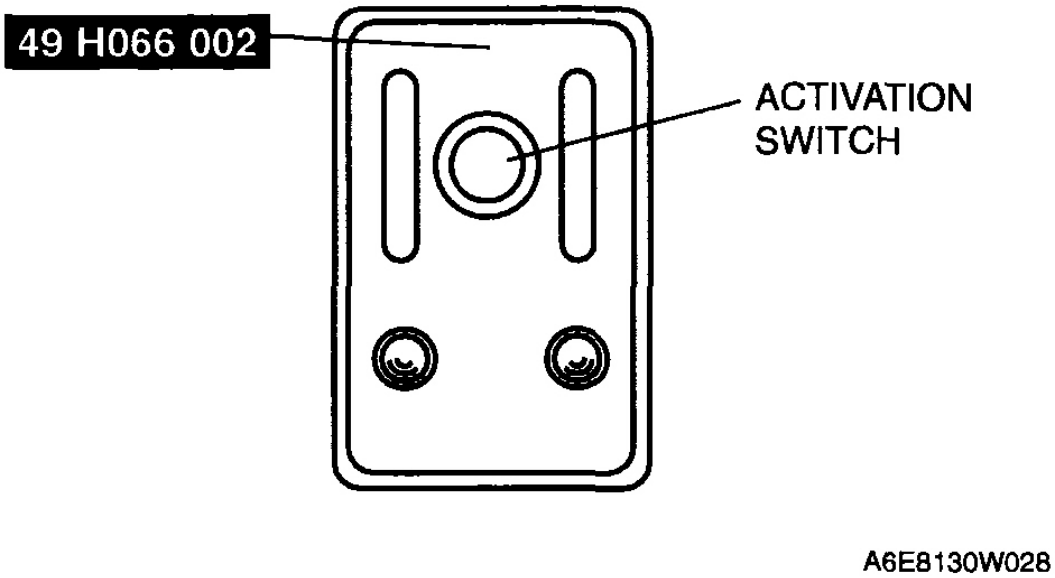


Fig. 72: Identifying Activation Switch
Courtesy of MAZDA MOTORS CORP.

AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES

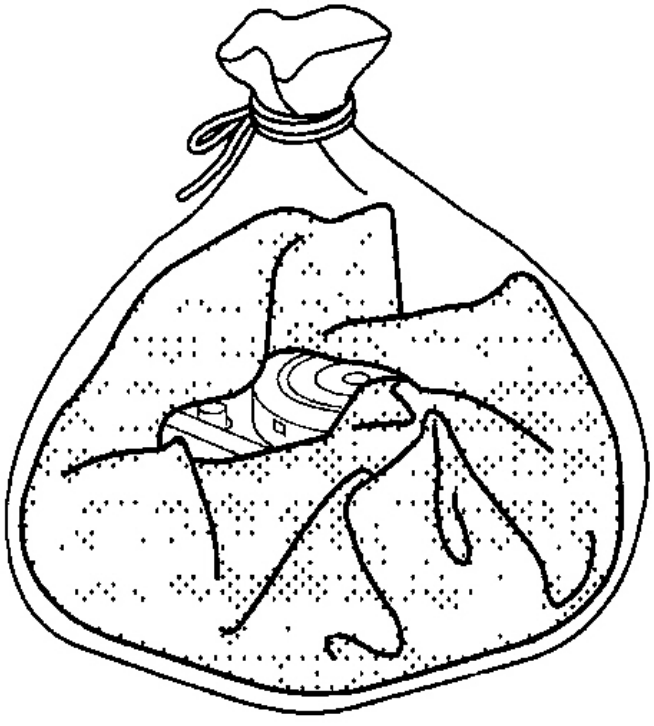
WARNING:

- **A live (undeployed) air bag module or pre-tensioner seat belt may accidentally operate (deploy) when it is disposed of and cause serious injury. Always refer to the AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES and dispose of air bag modules and pre-tensioner seat belts in a deployed condition.**
- **The air bag modules and the pre-tensioner seat belts are very hot immediately after they are deployed. You can be burned. Do not touch an air bag module and pre-tensioner seat belt for at least 15 min after deployment.**
- **Pouring water on the deployed air bag module and pre-tensioner seat belt is dangerous. The water will mix with the residual gases to form a gas that can make breathing difficult. Do not pour water on the deployed air bag module and pre-tensioner seat belt.**
- **The deployed air bag module or pre-tensioner seat belt may contain deposits of sodium hydroxide, a caustic byproduct of the gas-generated combustion. If this substance gets into your eyes or on your hands, it can cause irritation and itching. When handling the**

deployed air bag module and pre-tensioner seat belt, wear gloves and safety glasses.

- **Due to the adoption of 2-step deployment control in both the driver and passenger-side air bag modules, depending on the impact force, it is possible that inflator No. 2 might not operate (deploy). Before disposing of the air bag module, always follow the inflator deployment procedures and verify the complete operation (deployment) of inflators No. 1 and 2.**

1. Remove the deployed air bag module or pre-tensioner seat belt.
2. Put the air bag module or pre-tensioner seat belt in a plastic bag, seal the bag, and then dispose of it.



BHJ0810W023

Fig. 73: Putting Air Bag Module Or Pre-Tensioner Seat Belt In Plastic Bag
Courtesy of MAZDA MOTORS CORP.

INSPECTION OF SST (DEPLOYMENT TOOL)

1. Before using the **SST** (49 H066 002), inspect its operation.

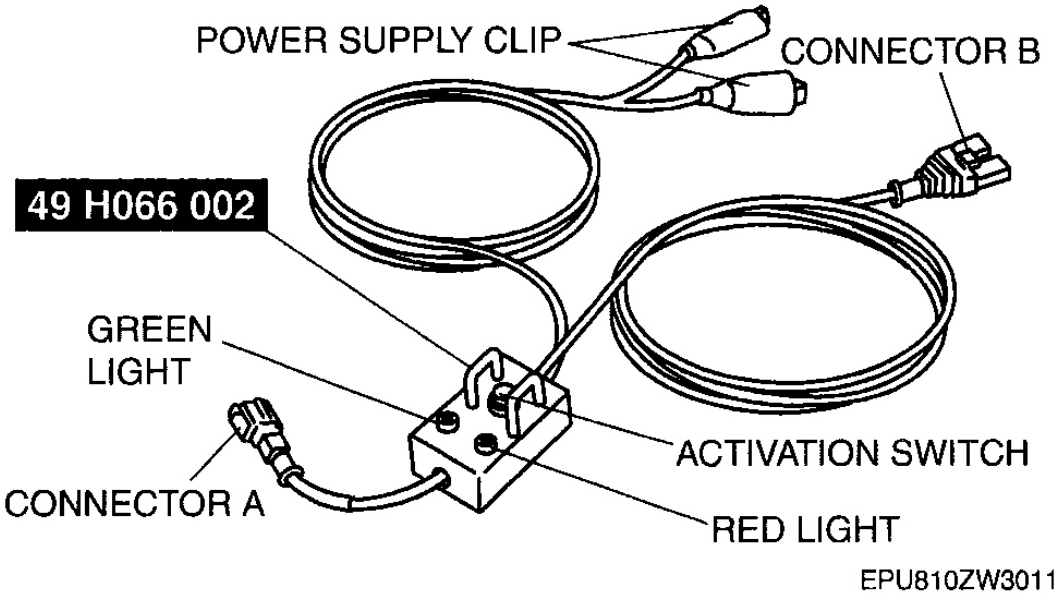


Fig. 74: Inspecting SST (Deployment Tool)
Courtesy of MAZDA MOTORS CORP.

INSPECTION PROCEDURE

1. Follow the steps below to inspect the **SST** (49 H066 002).
   - If not as indicated in **SST INSPECTION REFERENCE TABLE** , replace the **SST** (49 H066 002) because it has a malfunction.

WARNING:
- **Do not use a malfunctioning SST (49 H066 002), otherwise it could cause the air bag module or pre-tensioner seat belt to accidentally operate (deploy).**

CAUTION:
- **Because the permissible voltage for the SST (49 H066 002) is 12 V, do not connect a 24 V power source because it will damage the SST. Always connect only a 12 V power source.**

SST INSPECTION REFERENCE TABLE

Step	Inspection procedure	Light condition	
		Green	Red
1	Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.	On	Off
2	Connect connectors A and B.	Off	On

3	Press the activation switch.	On	Off

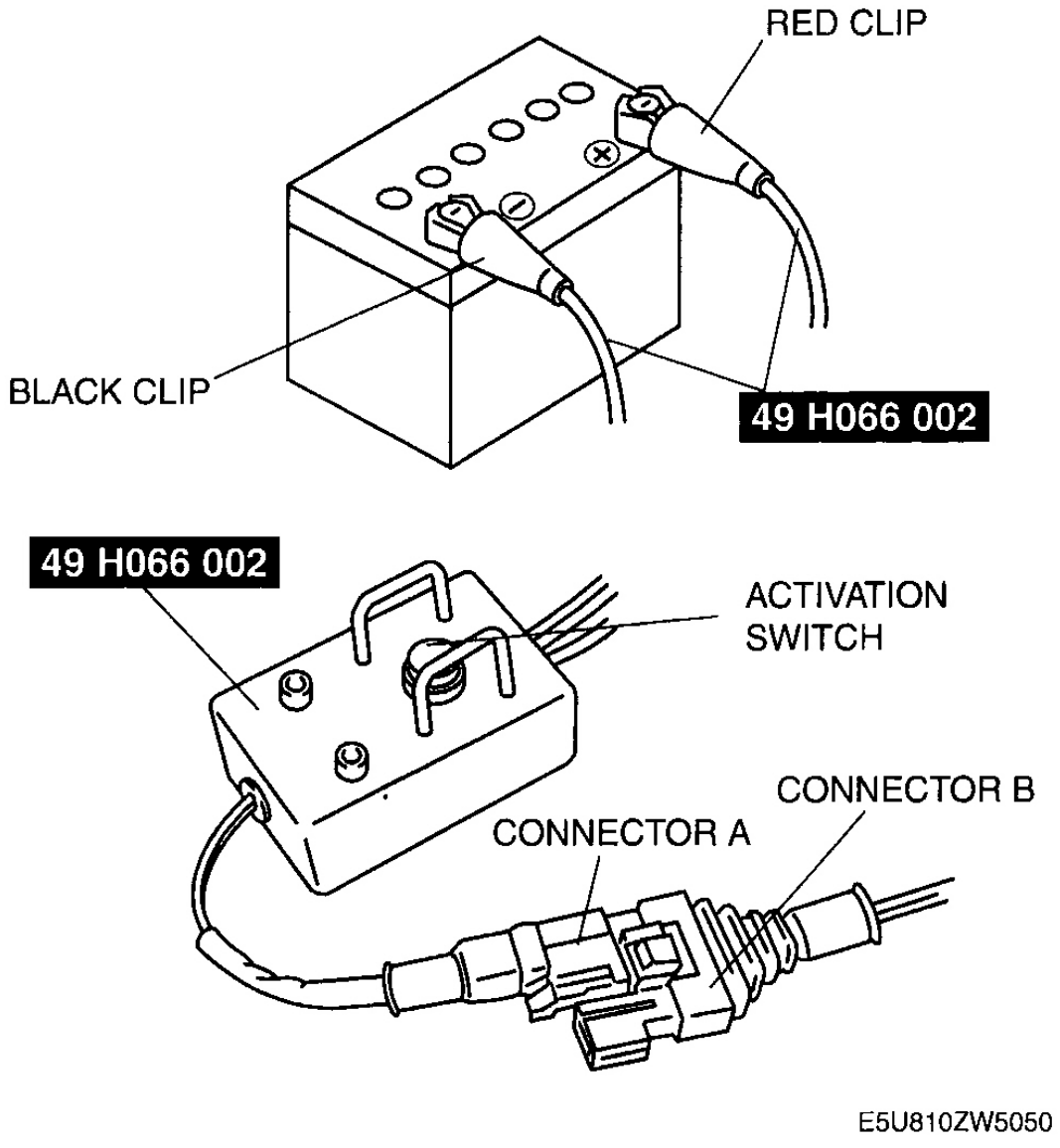
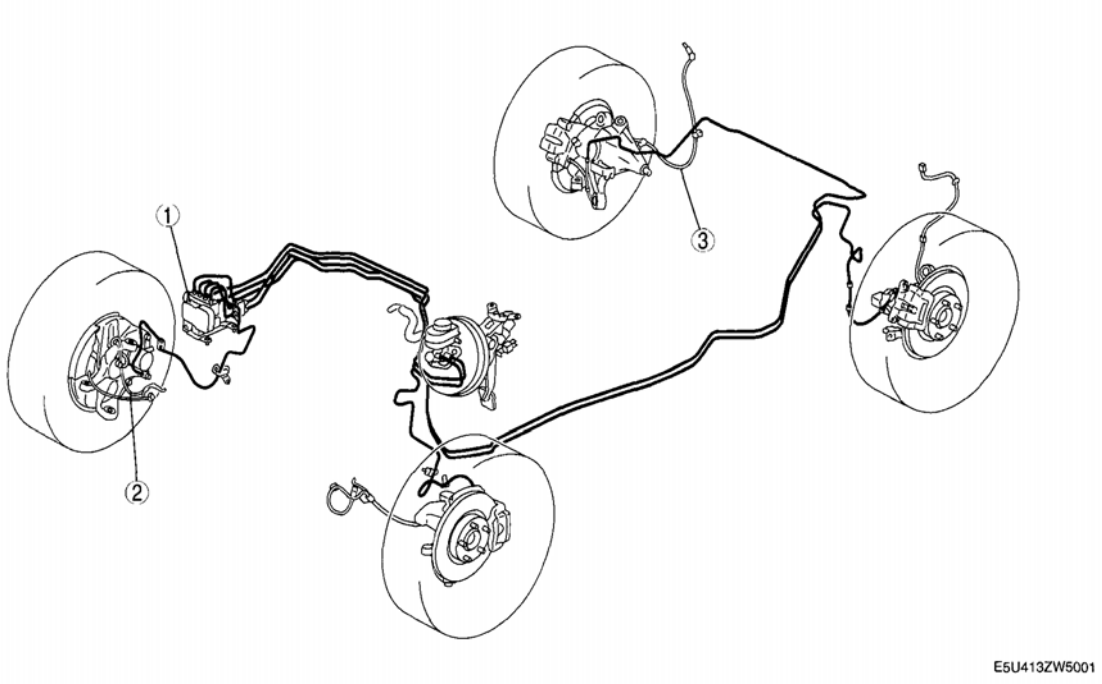


Fig. 75: Inspecting Activation Switch
Courtesy of MAZDA MOTORS CORP.

2008 BRAKES

Antilock Brake System - MX-5 Miata

ABS LOCATION INDEX



1	ABS HU/CM
2	Front ABS wheel-speed sensor
3	Rear ABS wheel-speed sensor

Fig. 1: Identifying Location Of ABS Components
Courtesy of MAZDA MOTORS CORP.

ABS SYSTEM WIRING DIAGRAM

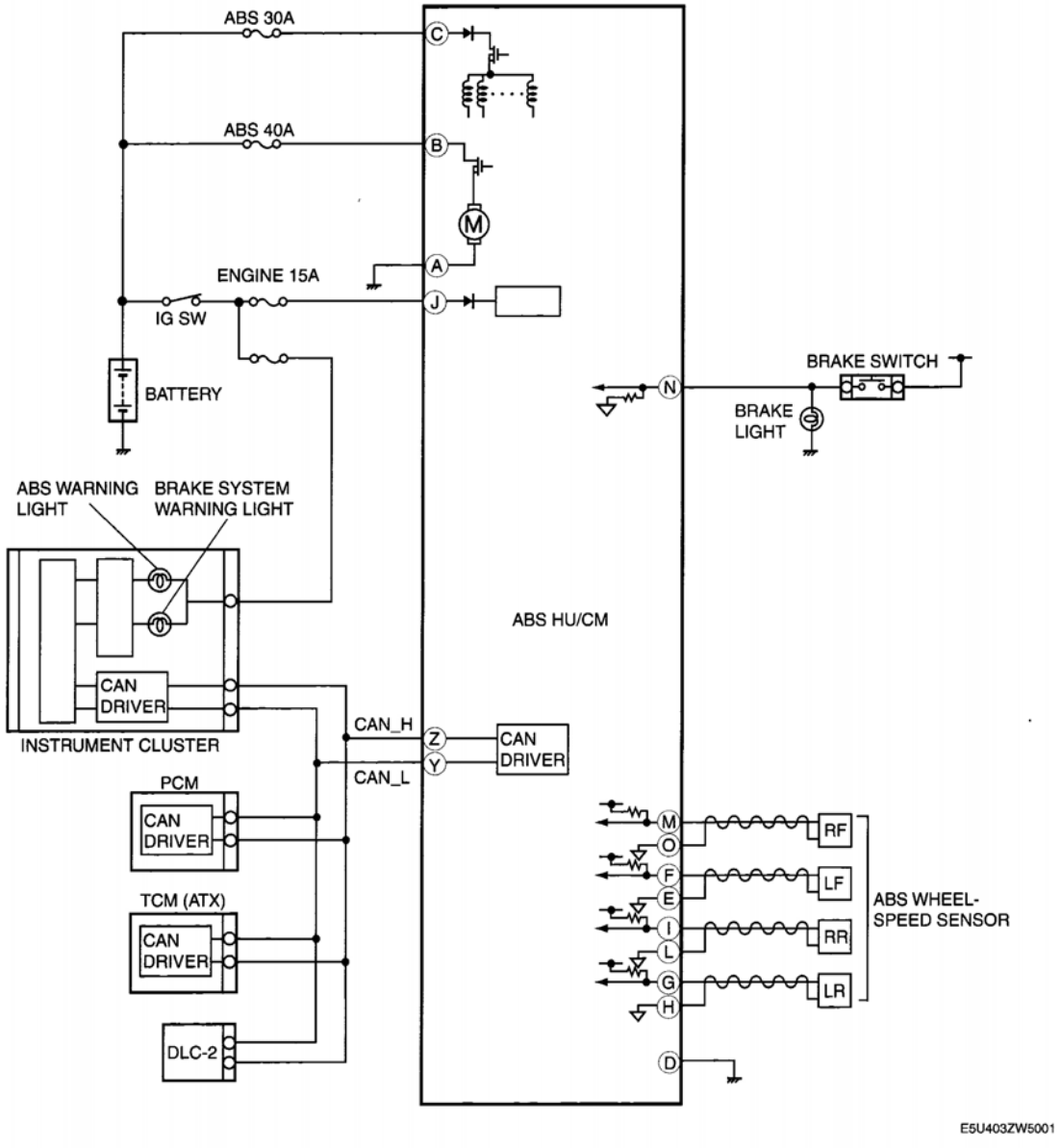


Fig. 2: ABS System Wiring Diagram
Courtesy of MAZDA MOTORS CORP.

ABS SYSTEM INSPECTION

ABS HYDRAULIC UNIT ON-VEHICLE INSPECTION

Preparation

1. Verify that battery is fully charged.
2. Turn the ignition switch to the ON position and verify that the ABS warning light goes out after **approx.**

3s .

3. Turn the ignition switch off.
4. Jack up the vehicle and support it evenly on safety stands.
5. Shift to neutral.
6. Release the parking brake.
7. Verify that all four wheels rotate.
8. Rotate the wheels by hand, and verify there is no brake drag.
    - If there is any brake drag, perform regular brake inspection.
    - If there is no brake drag, perform ABS HU/CM operation inspection.

Operation Inspection

1. Perform "Preparation".
2. Connect the M-MDS or equivalent to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

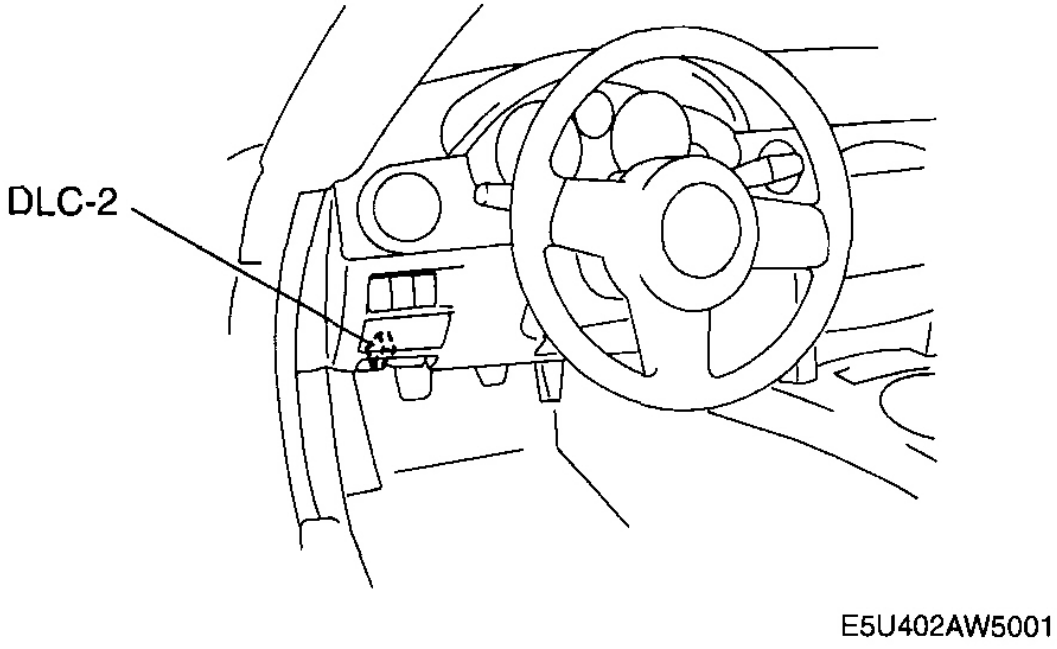


Fig. 3: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

ACTIVE COMMAND MODE INSPECTION REFERENCE TABLE

Operation	Command name			Command

condition	PMP_MOTOR	RF_OUTLET	RF_INLET	transmission type
Brake pressure retention	OFF	OFF	ON	Manual
Brake pressure reduction	ON	ON	ON	

The **ACTIVE COMMAND MODE INSPECTION REFERENCE TABLE** above shows an example of a right front wheel inspection.

CAUTION:

- **To protect the ABS HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

NOTE:

- **When working with two people, one should press on the brake pedal, and the other should attempt to rotate the wheel being inspected.**

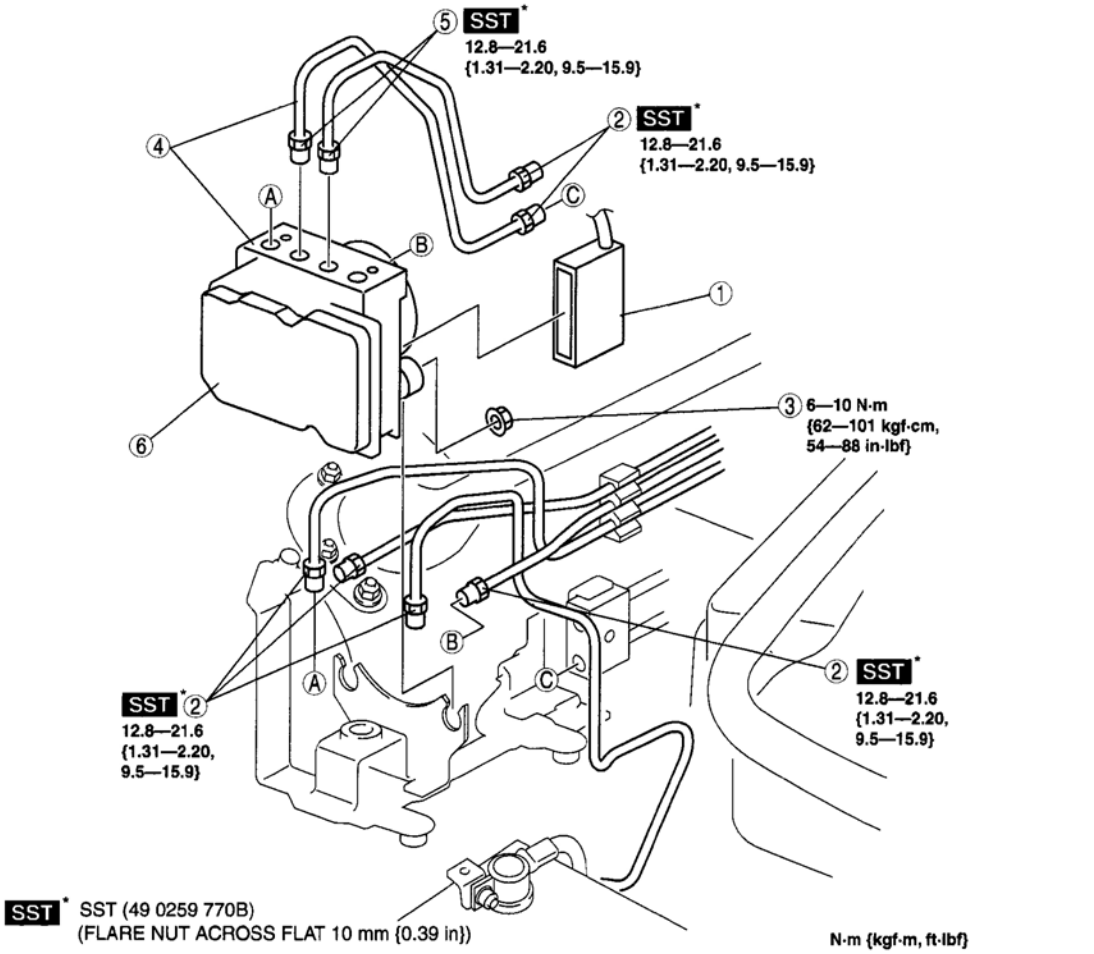
4. Send the command while depressing the brake pedal and attempting to rotate the wheel being inspected.
5. Performing the inspection above determines the following:
   - The ABS HU/CM brake lines are normal.
   - The ABS HU/CM hydraulic system is not significantly abnormal (including inside ABS HU/CM).
   - The ABS HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
   - The ABS HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
     - However, the following items cannot be verified.
     - Malfunction of ABS HU/CM input system wiring harnesses and parts
     - Extremely small leaks in the ABS HU/CM internal hydraulic system
     - Malfunction with intermittent occurrence of the above items

ABS HU/CM REMOVAL/INSTALLATION

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 **ABS CONFIGURATION** .)
2. Remove in the order indicated in **Fig. 4** .
3. Install in the reverse order of removal.



1	ABS HU/CM connector
2	Brake pipe
3	Nut
4	ABS HU/CM, brake pipe
5	Brake pipe (ABS HU/CM—brake pipe joint)
6	ABS HU/CM

Fig. 4: Identifying ABS HU/CM Steps (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

ABS HU/CM CONNECTOR REMOVAL NOTE

1. Pull the lock lever up in the direction of the arrow.
2. Pull the connector toward the vehicle rear and remove it.

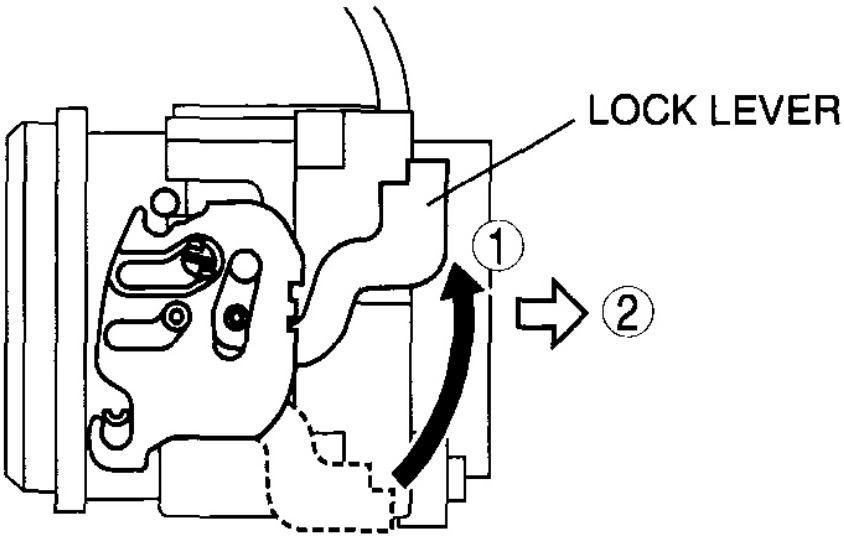


Fig. 5: Identifying Lock Lever Position
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE REMOVAL NOTE

1. Place an alignment mark on the brake pipe and ABS HU/CM.

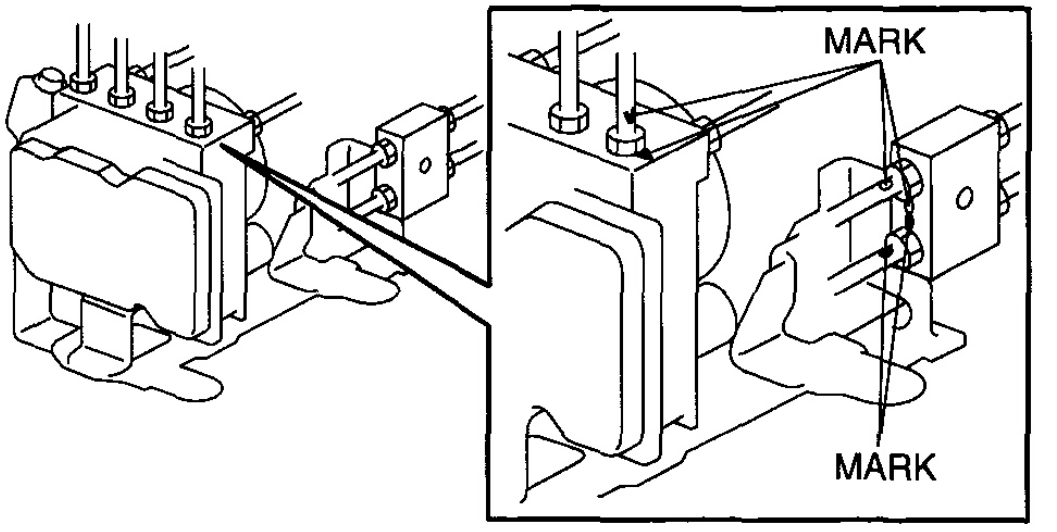


Fig. 6: Placing Alignment Mark On Brake Pipe & ABS HU/CM
Courtesy of MAZDA MOTORS CORP.

2. Apply protective tape to the connector to prevent brake fluid from entering.
3. Remove the brake pipe.

BRAKE PIPE (ABS HU/CM-BRAKE PIPE JOINT) INSTALLATION NOTE

1. Align with the mark made before removing the brake pipe and temporarily install the brake pipe to the ABS HU/CM.

CAUTION:
- **If the brake pipe is tightened to the specified torque, it may be difficult to install it to the vehicle. Therefore, only temporarily tighten the brake pipe so that it can still be moved.**

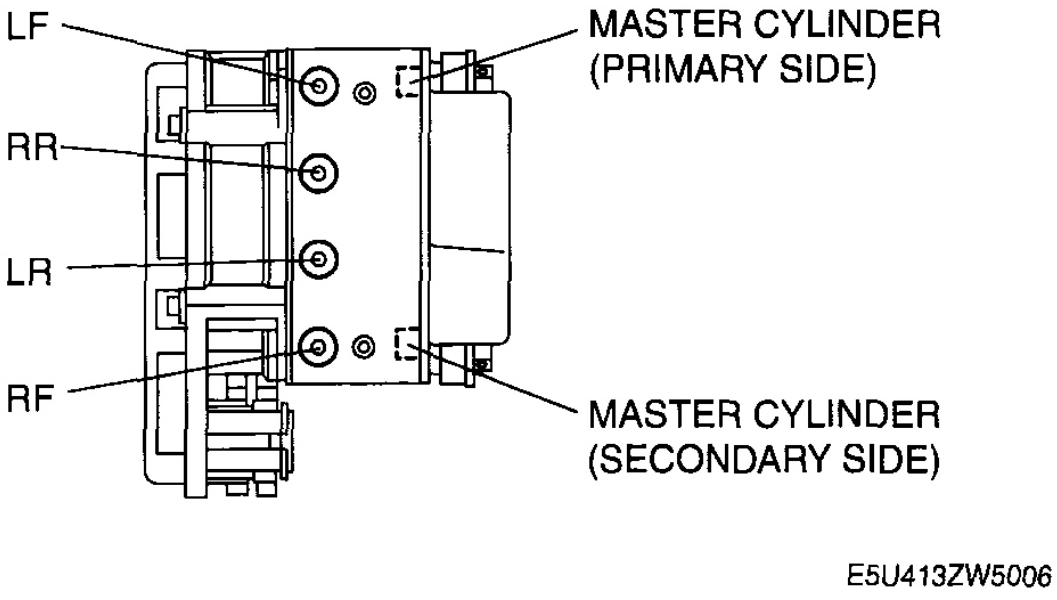


Fig. 7: Identifying Aligning Marks
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE INSTALLATION NOTE

1. Align the marks made before removal and install the brake pipe to the ABS HU/CM and brake pipe joint referring to **Fig. 7** .
2. Tighten the brake pipe to the specified torque using the **SST** (49 0259 770B).

ABS HU/CM CONNECTOR INSTALLATION NOTE

1. After connecting the connector, verify that the lock lever Is completely pushed in.

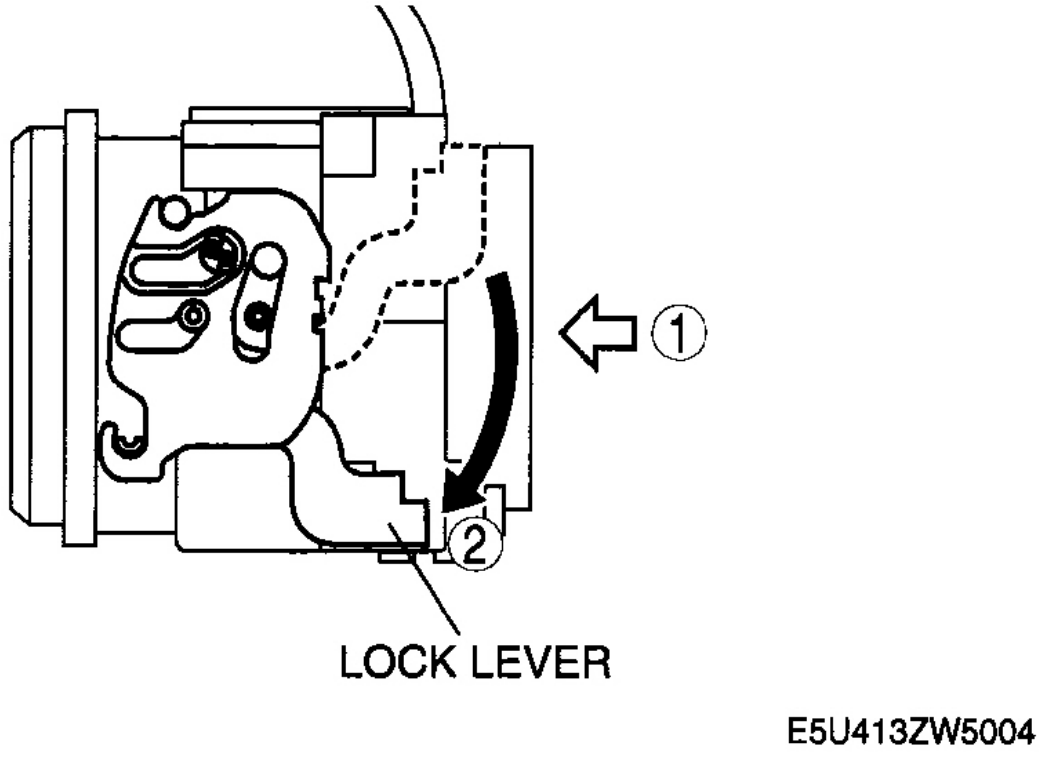


Fig. 8: Verifying Lock Lever Is Completely Pushed In
Courtesy of MAZDA MOTORS CORP.

ABS CONFIGURATION

1. Connect the M-MDS or equivalent to the DLC-2.

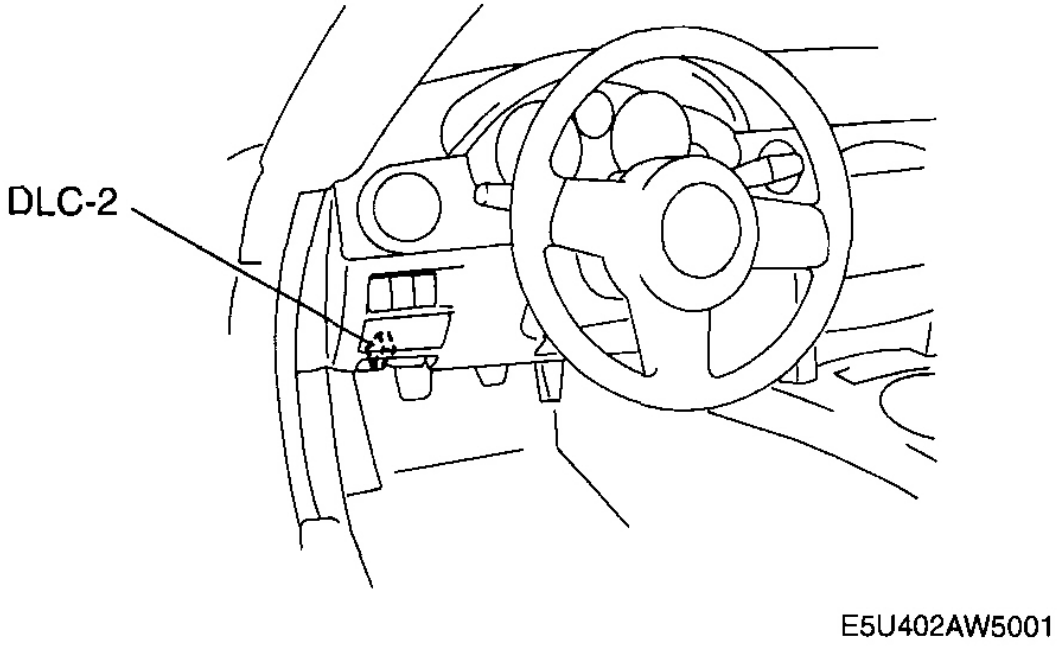


Fig. 9: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

2. After the Vehicle is identified, select the following items from the initial screen of the M-MDS.
    - When using the IDS (laptop PC)
        1. Select the "Module Programming".
    - When using the PDS (Pocket PC)
        1. Select "Programming".
        2. Select "Module Programming".
3. Then, select the "Programmable Module Installation" and "ABS" from the screen menu.
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs using the M-MDS, then verify if DTCs are present.
    - If a DTC is present, perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSTIC (ABS) -- MX-5 MIATA**)

ABS HU/CM INSPECTION

1. Disconnect the ABS HU/CM connector.
2. Connect the negative battery cable.
3. Attach the tester lead to the ABS HU/CM harness side connector, then inspect voltage, continuity or resistance according to the standard (reference value) on **STANDARD (REFERENCE VALUE)**

TABLE .

STANDARD (REFERENCE VALUE)

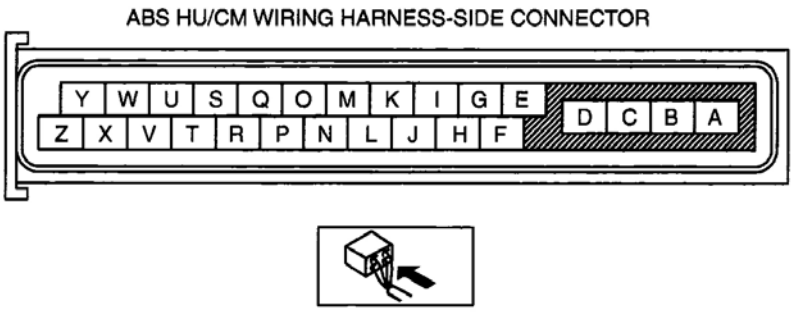


Fig. 10: Identifying ABS HU/CM Connector Terminals
Courtesy of MAZDA MOTORS CORP.

STANDARD (REFERENCE VALUE) TABLE

Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection Item (s)
A	Ground (ABS motor)	Ground point	Continuity	A-ground point	Continuity detected	• Wiring harness (A-ground point)
B	Power supply (ABS motor operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (B-battery)
C	Power supply (solenoid)	Battery	Voltage	Under any condition	B+	• Wiring harness (C-battery)
D	Ground (ABS system)	Ground point	Continuity	D-ground point	Continuity detected	• Wiring harness (D-ground point)
E	LF wheel-speed sensor (ground)	LF ABS wheel-speed sensor	Continuity	E-LF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (E-LF ABS wheel-speed sensor connector

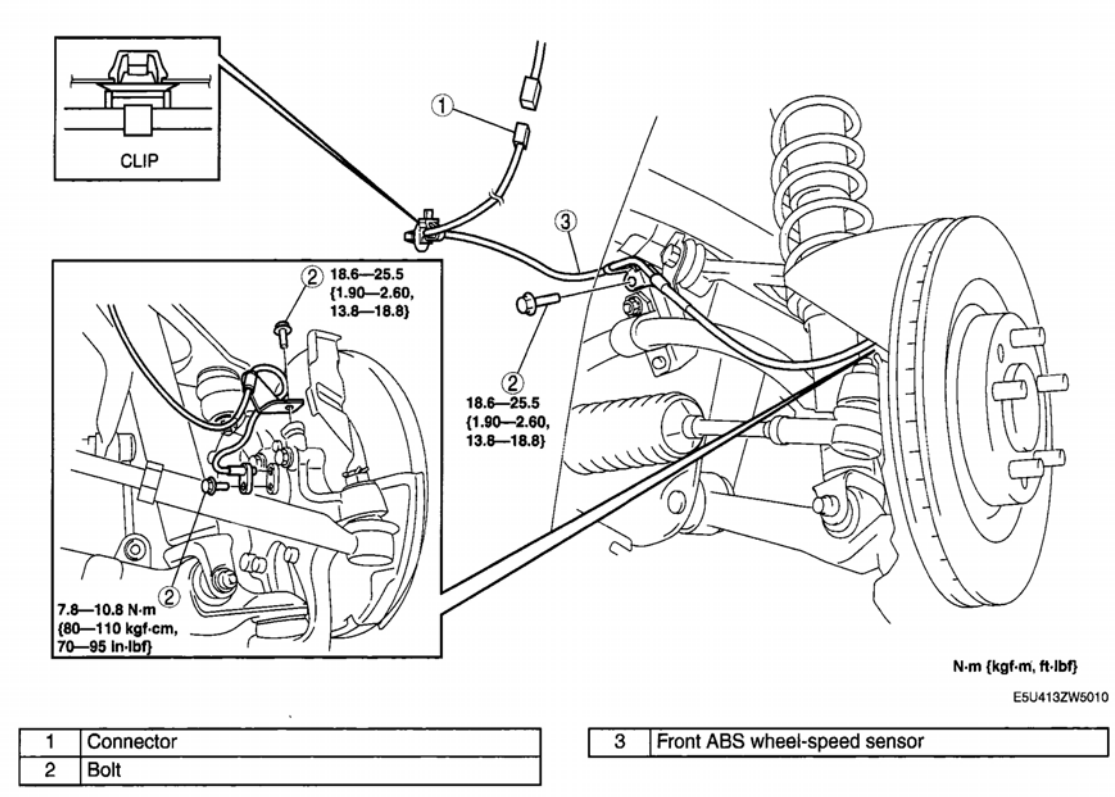
						terminal B)
F	LF wheel-speed sensor (single)	LF ABS wheel-speed sensor	Continuity	F-LF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (F-LF ABS wheel-speed sensor connector terminal A)
G	LR wheel-speed sensor (signal)	LR ABS wheel-speed sensor	Continuity	G-LR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (G-LR ABS wheel-speed sensor connector terminal A)
H	LR wheel-speed sensor (ground)	LR ABS wheel-speed sensor	Continuity	H-LR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (H-LR ABS wheel-speed sensor connector terminal B)
I	RR wheel-speed sensor (signal)	RR ABS wheel-speed sensor	Continuity	I-RR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (I-RR ABS wheel-speed sensor connector terminal A)
J	Power supply (system)	Ignition switch	Voltage	Ignition switch at ON	B+	• Wiring harness (J-ignition switch)
				Ignition switch is off.	1 V or less	-
K	-	-	-	-	-	-
L	RR wheel-speed sensor (ground)	RR ABS wheel-speed sensor	Continuity	L-RR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (L-RR ABS wheel-speed sensor connector terminal B)
						• Wiring

M	RF wheel-speed sensor (signal)	RF ABS wheel-speed sensor	Continuity	M-RF ABS wheel-speed sensor connector terminal A	Continuity detected	harness (M-RF ABS wheel-speed sensor connector terminal A)
N	Brake switch	Brake switch	Voltage	N-brake switch (Brake pedal depressed)	B+	• Wiring harness (N-brake switch) • Brake switch
				Y-brake switch (Brake pedal not depressed)	1 V or less	
O	RF wheel-speed sensor (ground)	RF ABS wheel-speed sensor	Continuity	O-RF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (O-RF ABS wheel-speed sensor connector terminal B)
P	-	-	-	-	-	-
Q	-	-	-	-	-	-
R	-	-	-	-	-	-
S	-	-	-	-	-	-
T	-	-	-	-	-	-
U	-	-	-	-	-	-
V	-	-	-	-	-	-
W	-	-	-	-	-	-
X	-	-	-	-	-	-
Y	CAN_L	DLC-2 (CAN_L)	Continuity	Y-DLC-2 terminal CAN_L.	Continuity detected	• Wiring harness (Y-DLC-2 terminal CAN_L)
Z	CAN_H	DLC-2 (CAN_H)	Continuity	Z-DLC-2 terminal CAN_H	Continuity detected	• Wiring harness (Z-DLC-2 terminal CAN_H)

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

1. Remove the mudguard.
2. Remove in the order indicated in the table.

3. Install in the reverse order of removal.



1	Connector
2	Bolt
3	Front ABS wheel-speed sensor

Fig. 11: Identifying Front ABS Wheel-Speed Sensor (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

FRONT ABS WHEEL-SPEED SENSOR INSPECTION

INSTALLATION VISUAL INSPECTION

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   1. Excessive play of the ABS wheel-speed sensor
   2. Deformation of the ABS wheel-speed sensor

CLEARANCE INSPECTION

1. Remove the front ABS wheel-speed sensor.
2. Measure the distance between the front ABS wheel-speed sensor installation surface and the ABS sensor rotor. This is dimension A.
3. Measure the distance between the front ABS wheel-speed sensor installation surface and the tip of ABS wheel-speed sensor. This is dimension B.

4. Calculate the clearance between the front ABS wheel-speed sensor and the ABS sensor rotor using the following formula:

   Clearance (mm {in}) = A - B

5. Verify that the clearance between the ABS sensor rotor and the front ABS wheel-speed sensor is as indicated below.
   - If there is any malfunction, replace it.

   Clearance

   0.3-1.0 mm {0.012-0.057 in}

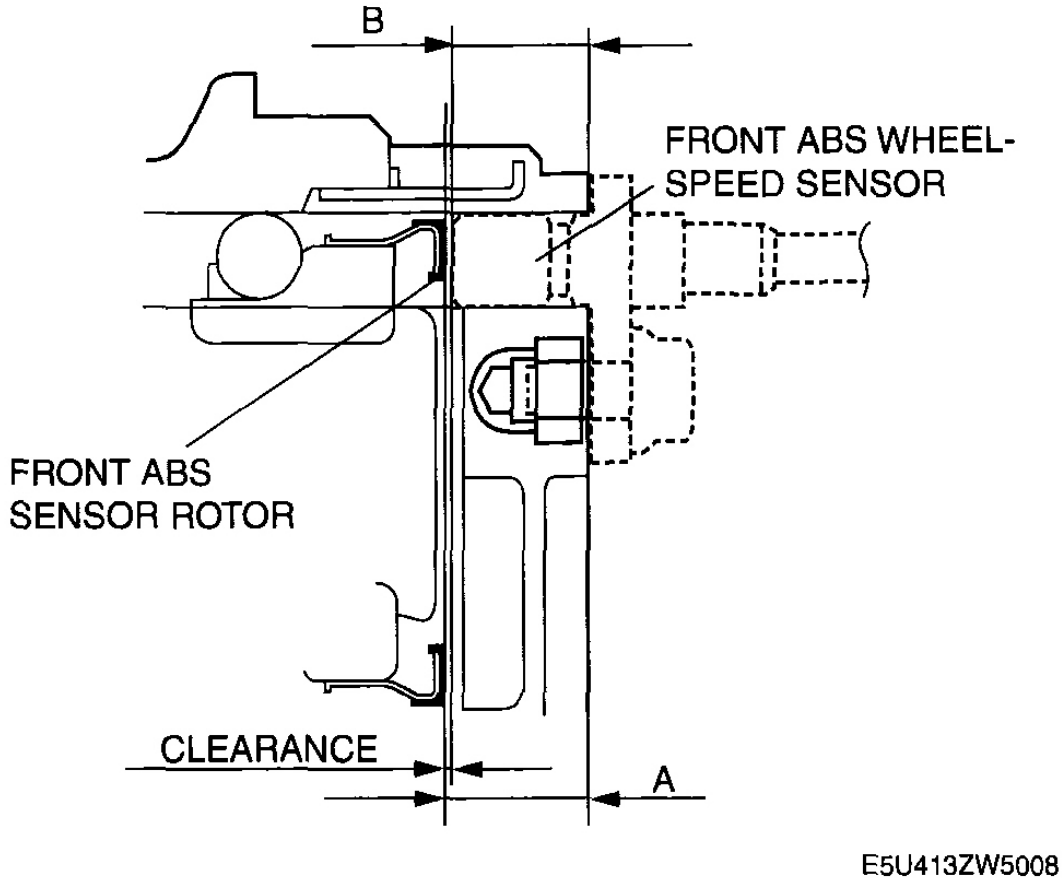


Fig. 12: Measuring Distance Between Front ABS Wheel-Speed Sensor Installation Surface & ABS Wheel-Speed Sensor Tip
Courtesy of MAZDA MOTORS CORP.

SENSOR OUTPUT VALUE INSPECTION

CAUTION:
- **Resistance inspection using other testers may cause damage to the ABS wheel-speed sensor internal circuit. Be sure to use the M-MDS or equivalent to inspect the ABS wheel-speed sensor.**

1. Turn the ignition switch off.
2. Connect the M-MDS or equivalent to the DLC-2.

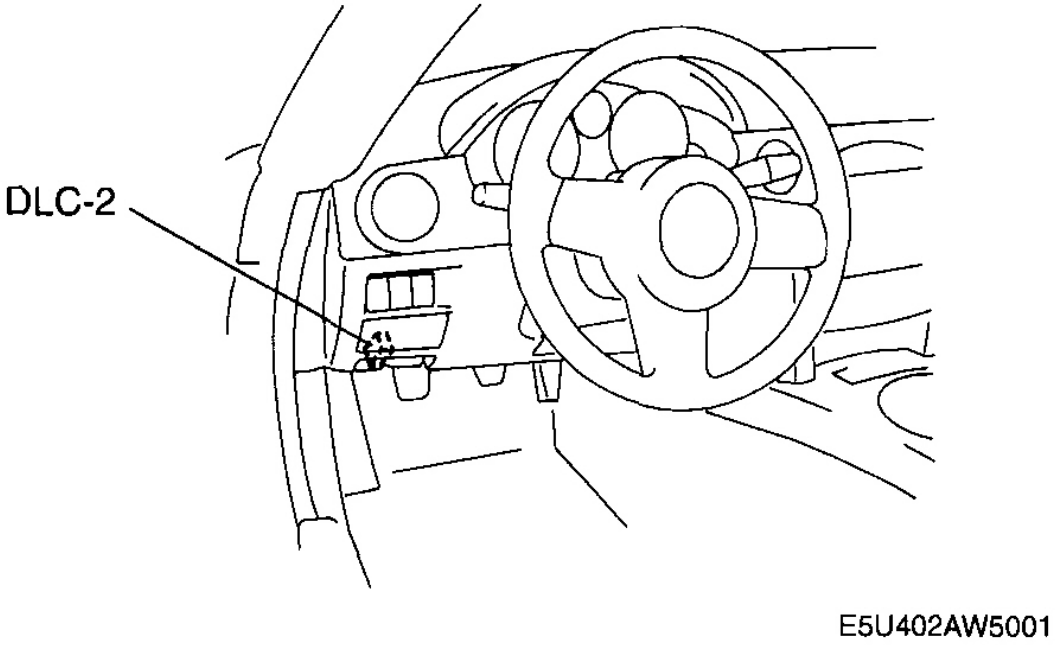


Fig. 13: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Select the following PIDs using the M-MDS or equivalent:
   - LF_WSPD

     (LF wheel-speed sensor)

   - RF_WSPD

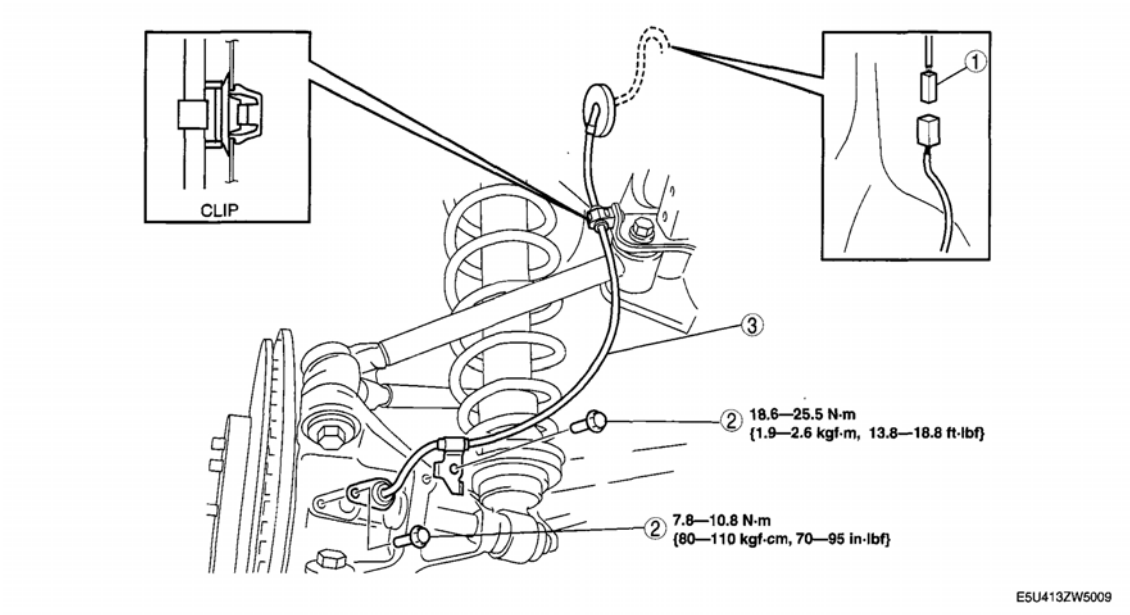
     (RF wheel-speed sensor)

4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS or equivalent shows the same value as the speedometer.

- If there is any malfunction, replace the front ABS wheel-speed sensor.

REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

1. Remove the trunk end trim. (See **TRUNK END TRIM REMOVAL/INSTALLATION** .)
2. Remove the partition board. (See **PARTITION BOARD REMOVAL/INSTALLATION** .)
3. Remove the trunk side trim. (See **TRUNK SIDE TRIM REMOVAL/INSTALLATION** .)
4. Remove the fuel-filler pipe protector. (See **FUEL TANK REMOVAL/INSTALLATION [LF]** .)
5. Remove in the order indicated in **Fig. 14** .
6. Install in the reverse order of removal.



1	Connector
2	Bolt
3	Rear ABS wheel-speed sensor

Fig. 14: Identifying Rear ABS Wheel-Speed Sensor (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR ABS WHEEL-SPEED SENSOR INSPECTION

INSTALLATION VISUAL INSPECTION

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   1. Excessive looseness or play of the ABS wheel-speed sensor
   2. Deformation of the ABS wheel-speed sensor
   3. Deformation or damage of the ABS sensor rotor

CLEARANCE INSPECTION

1. Verify the clearance between the ABS sensor rotor and the ABS wheel-speed sensor.
   - If there is any malfunction, check for improper installation, and replace if necessary.

   Clearance

   0.8-1.6 mm {0.032-0.062 in}

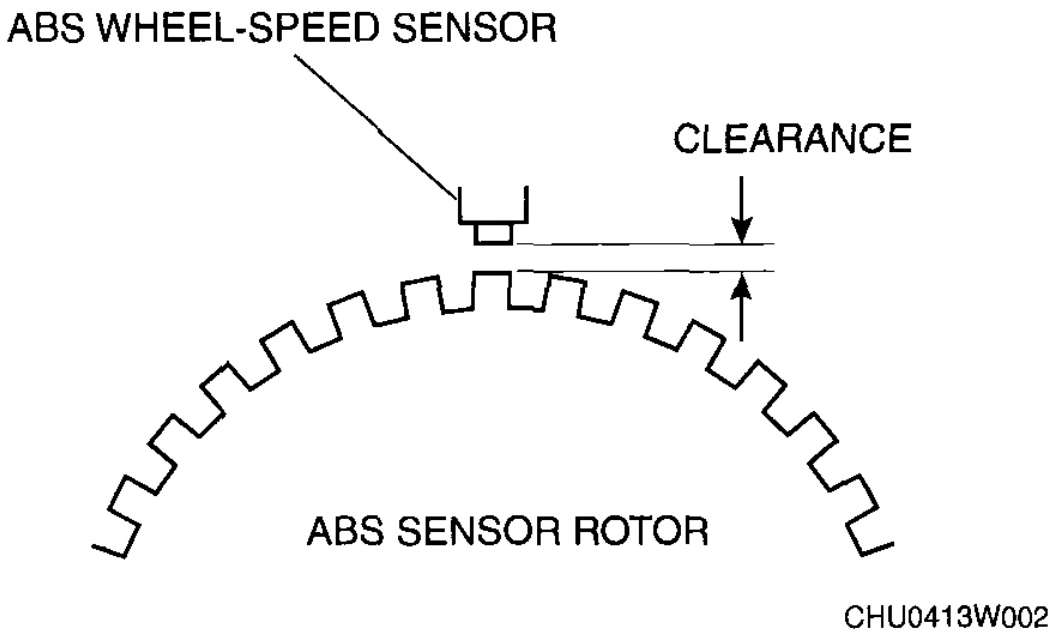


Fig. 15: Inspecting ABS Sensor-To-Rotor Clearance
Courtesy of MAZDA MOTORS CORP.

SENSOR OUTPUT VALUE INSPECTION

1. Turn the ignition switch off.
2. Connect the M-MDS or equivalent to the DLC-2.

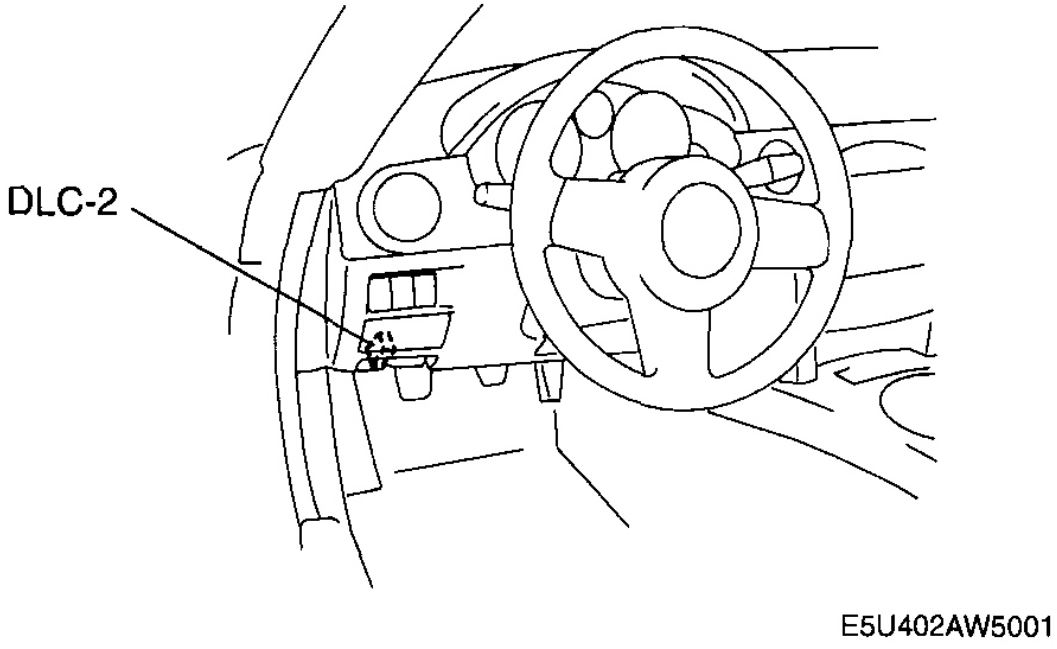


Fig. 16: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Select the following PIDs using the M-MDS or equivalent:
   - LR_WSPD

     (LR wheel-speed sensor)

   - RR_WSPD

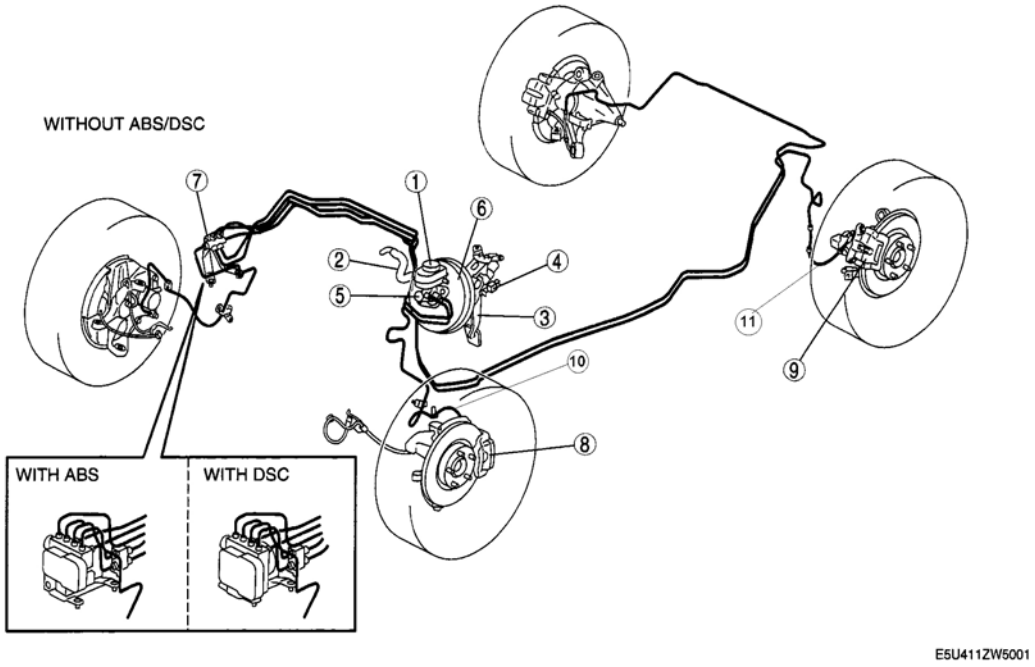
     (RR wheel-speed sensor)

4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS or equivalent shows the same value as the speedometer.
   - If there is any malfunction, replace the rear ABS wheel-speed sensor.

2008 BRAKES

Conventional Brake System - MX-5 Miata

CONVENTIONAL BRAKE SYSTEM LOCATION INDEX



1	Brake fluid
2	Vacuum line
3	Brake pedal
4	Brake switch
5	Master cylinder
6	Power brake unit
7	Dual proportioning valve
8	Front brake (disc)
9	Rear brake (disc)
10	Brake hose (Front)
11	Brake hose (Rear)

Fig. 1: Identifying Location Of Conventional Brake System Components
Courtesy of MAZDA MOTORS CORP.

AIR BLEEDING

CAUTION:

- **Brake fluid will damage painted surfaces. Be careful not to spill any on painted surfaces. If it is spilled, wipe it off immediately.**

NOTE:

- **Keep the fluid level in the reserve tank at 3/4 full or more during the air bleeding.**
- **Begin air bleeding with the master cylinder and then continue with the brake caliper that is furthest away from the master cylinder. Finish by bleeding air from the master cylinder again.**

Brake fluid type

SAE J1703, FMVSS 116 DOT-3

1. Remove the bleeder cap from the brake caliper, and connect a vinyl tube to the bleeder screw.
2. Place the other end of the vinyl tube in a clear container, and fill the container with fluid during air bleeding.
3. Working with two people, one should depress the brake pedal a few times and then depress and hold the pedal down.
4. While the brake pedal is being held down, the other person should loosen the bleeder screw using the **SST** , and bleed any fluid containing air bubbles. Once completed, tighten the bleeder screw.

   Tightening torque

   Front: 6.9-9.8 N.m {71-99 Kgf.cm, 62-86 in.lbf}

   Rear: 6.0-8.0 N.m {62-81 Kgf.cm, 54-70 in.lbf}

5. Repeat Steps 3 and 4 until no air bubbles are seen.
6. Perform air bleeding as described in the above procedures for all brake calipers.
7. After air bleeding, inspect the following:
   - Brake operation
   - Fluid leakage
   - Fluid level

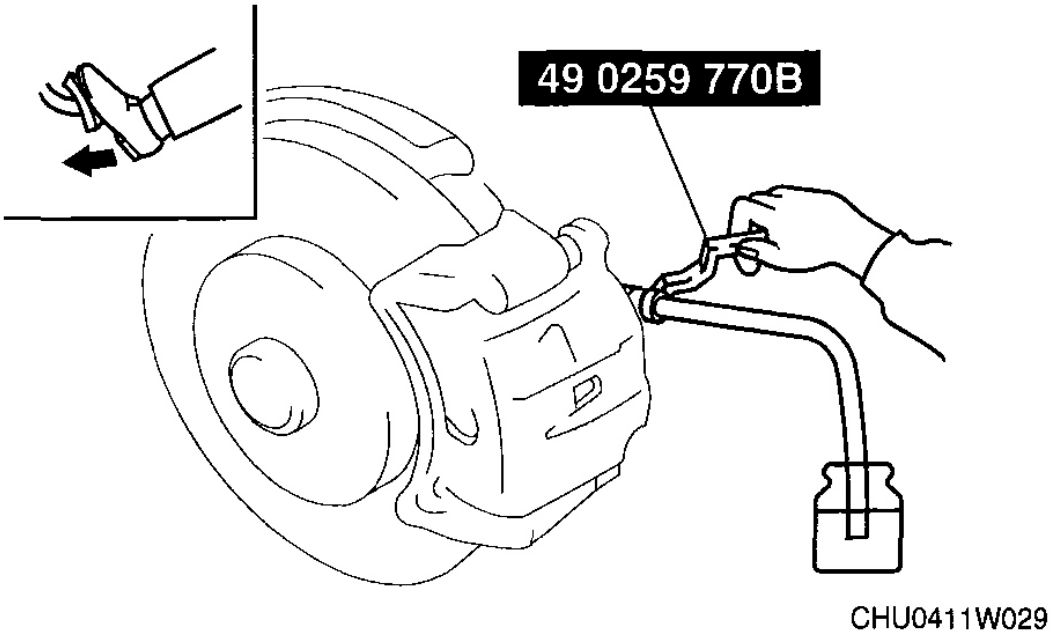


Fig. 2: Brake Bleeding Procedure
Courtesy of MAZDA MOTORS CORP.

VACUUM LINE INSPECTION

1. Remove the vacuum hose between the power brake unit and the intake manifold using pliers.
2. Verify that air can be blown from the power brake unit side of the vacuum hose towards the intake manifold side, and that air cannot be blown in the opposite direction.
    - If there is any malfunction of the inner check valve, replace it together with the vacuum hose as a single unit.

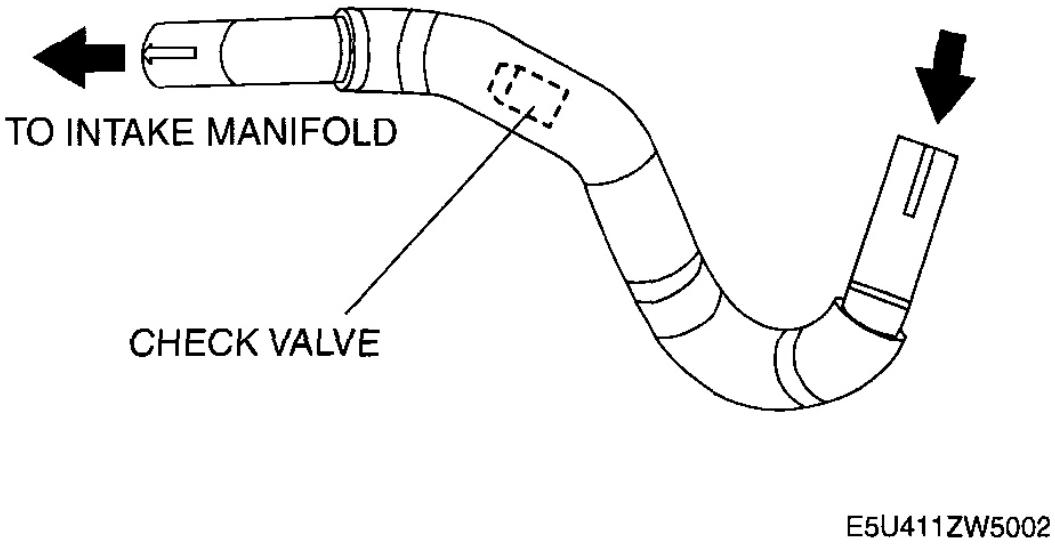


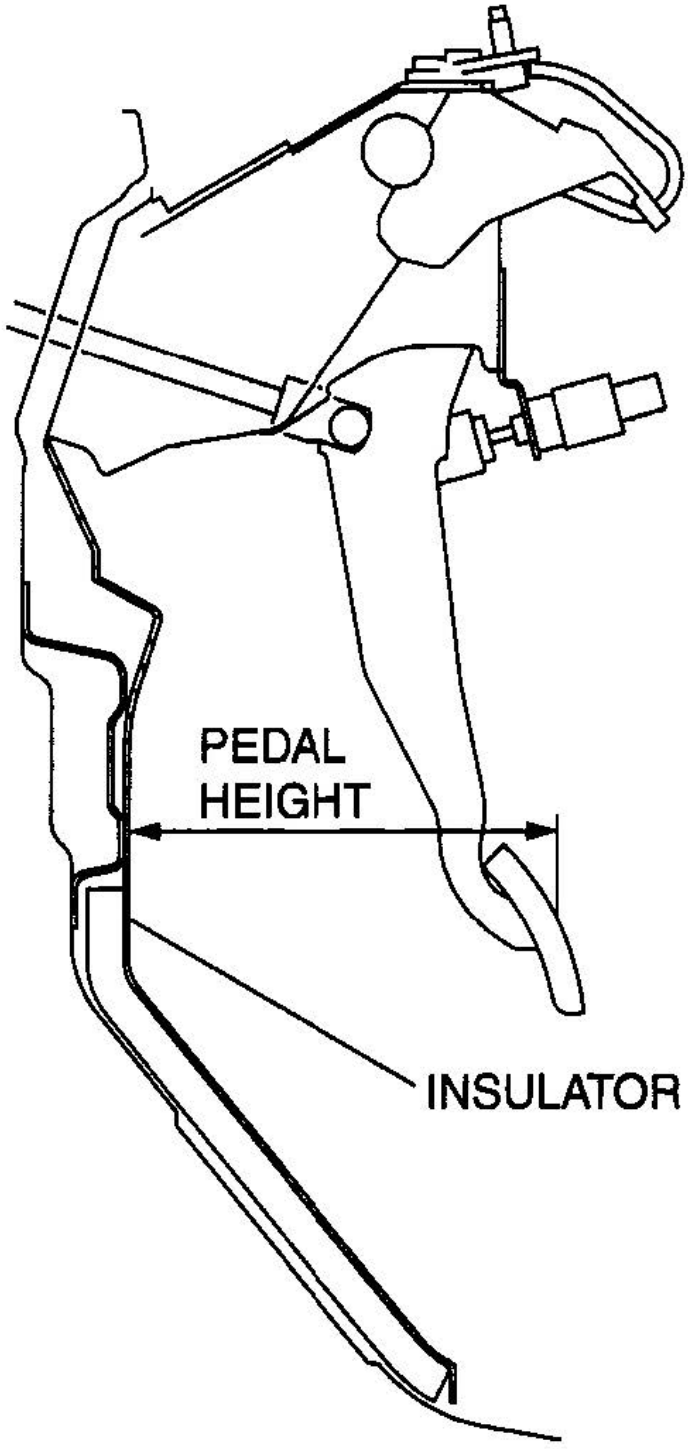
Fig. 3: Inspecting Vacuum Line Check Valve
Courtesy of MAZDA MOTORS CORP.

BRAKE PEDAL INSPECTION

BRAKE PEDAL HEIGHT INSPECTION

1. Measure the distance from the center of the upper surface of the pedal pad to the insulator and verify that it is as specified.
    - If not within the specification, adjust the pedal height.

Brake pedal height (reference value) 167 mm {6.57 in}



CHU0411W010

Fig. 4: Inspecting Brake Pedal Height
Courtesy of MAZDA MOTORS CORP.

BRAKE PEDAL HEIGHT ADJUSTMENT

CAUTION:

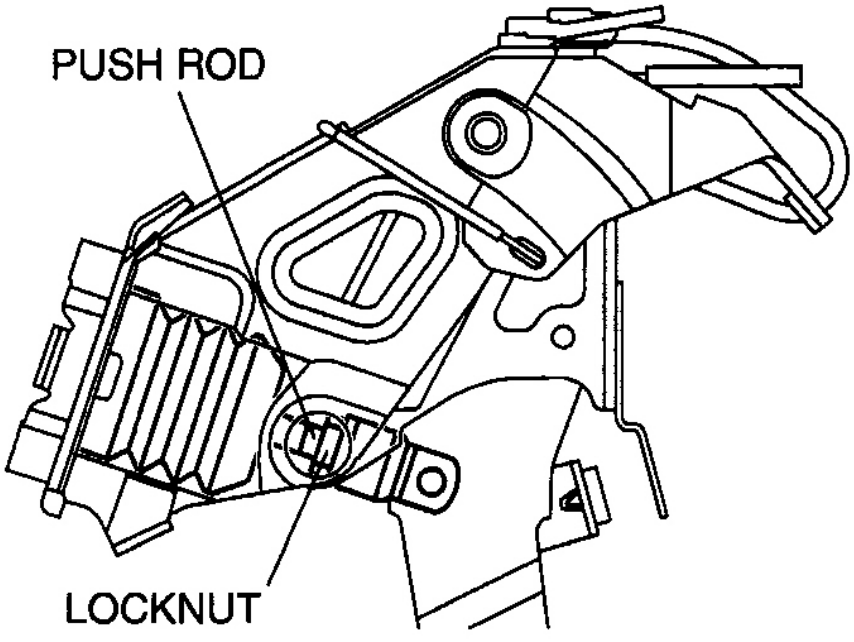
- **The brake switch may not operate normally after adjusting the pedal height. Whenever adjusting the pedal height, replace the brake switch with a new one.**
- **The interlock cable may not operate normally after adjusting the pedal height. Whenever adjusting the pedal height, refer to the interlock cable installation note. (See INTERLOCK CABLE INSTALLATION NOTE .)**

1. Loosen the locknut and turn the push rod to adjust the pedal height.
2. Tighten the locknut.

   Tightening torque

   20.4-30.6 N.m {2.09-3.12 Kgf.m, 15.0-22.5 ft.lbf}

3. After adjustment, inspect the pedal play.



CHU0411W011

Fig. 5: Adjusting Brake Pedal Height
Courtesy of MAZDA MOTORS CORP.

BRAKE PEDAL PLAY INSPECTION

1. Depress the pedal several times to release the vacuum in the power brake unit.
2. Gently depress the pedal by hand, and measure the pedal play.
   - If not within the specification, inspect the wear of the clevis pin and replace it if there is any malfunction.

Brake pedal play

2-5 mm {0.08-0.19 in}

NOTE:

- **If there is no malfunction in the clevis pin, there is a possibility that the power brake unit has some malfunction. Verify that there are no malfunctions, and replace it if necessary.**

PEDAL-TO-FLOOR CLEARANCE INSPECTION

1. Start the engine and depress the pedal with a pedal force of **147 N {15.0 kgf, 33.0 lbf}** .
2. Measure the distance between the pedal pad center and the insulator, and verify that it is as specified.
   - If the pedal-to-floor clearance is less than the specification, check for air in the brake system.

Brake pedal-to-floor clearance (Brake pedal when depressed at 147 N {15.0 kgf, 33.0 lbf}

106.9 mm {4.209 in} or more

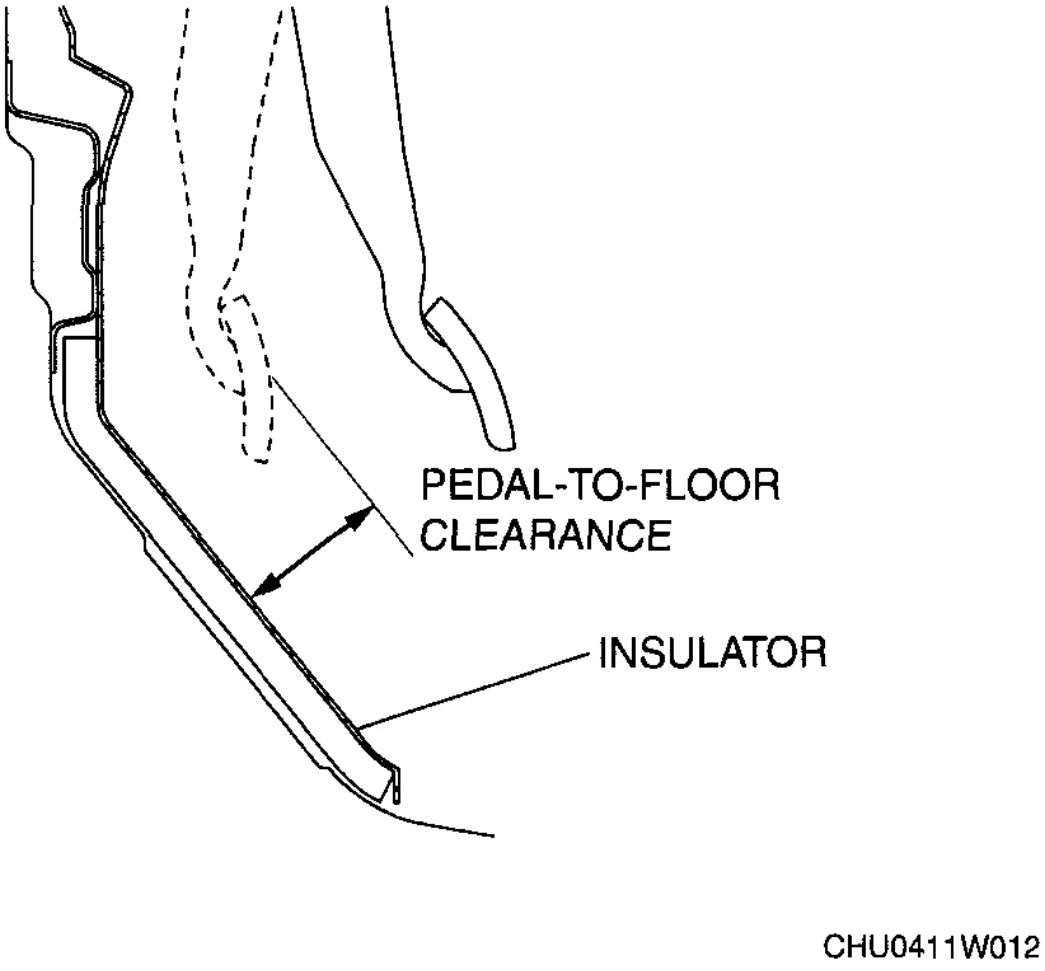


Fig. 6: Inspecting Pedal-To-Floor Clearance
Courtesy of MAZDA MOTORS CORP.

BRAKE PEDAL REMOVAL/INSTALLATION

CAUTION:

- **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch connector is connected after the brake switch has been properly installed. If the brake switch is not properly installed or the connector is connected before installation, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake switch is properly installed before connecting the connector.**
- **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new**

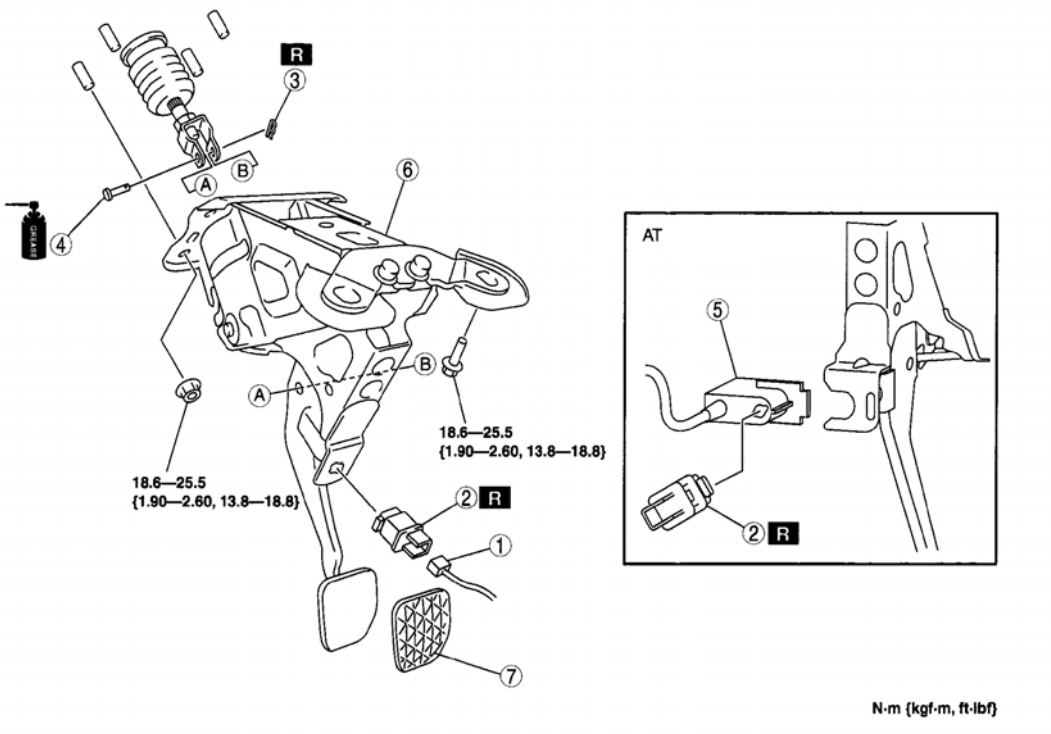
one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.

- **When replacing the brake pedal (AT), it is possible that the installation of the interlock cable could become defective. Always refer to the interlock cable installation note when replacing the brake pedal. (See INTERLOCK CABLE INSTALLATION NOTE .)**

NOTE:

- **When the brake switch connector is connected to the brake switch, the clearance between the pedal and the brake switch is adjusted automatically. However, this mechanism will only function one time.**

1. Remove in the order indicated in **Fig. 7**.
2. Install in the reverse order of removal.



1	Brake switch connector
2	Brake switch
3	Snap pin

4	Clevis pin
5	Interlock cable (AT)
6	Brake pedal
7	Pedal pad

Fig. 7: Identifying Brake Pedal Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

BRAKE PEDAL REMOVAL NOTE

1. Move the power brake unit to the vehicle front where the power brake unit fork does not interfere with the brake pedal arm.
2. Remove the brake pedal.

BRAKE SWITCH INSTALLATION NOTE

1. Install the new brake switch to the brake pedal (MT) or the interlock cable (AT), and secure it by turning it clockwise **45°** (AT) or counterclockwise **45°** (MT).

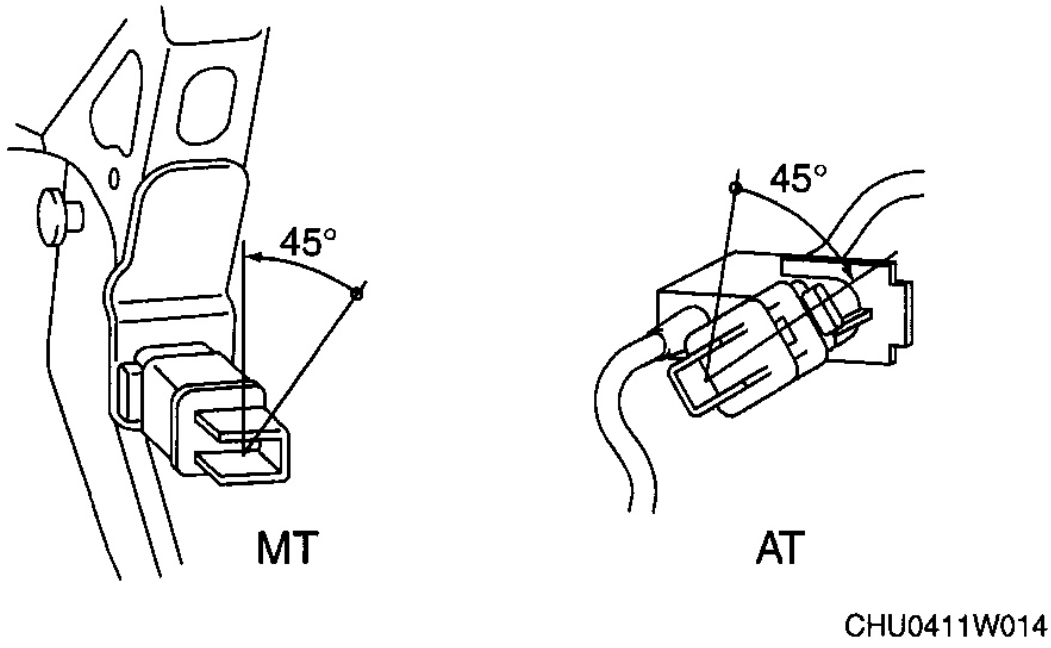


Fig. 8: Identifying Brake Switch Installing Angle
Courtesy of MAZDA MOTORS CORP.

BRAKE SWITCH CONNECTOR INSTALLATION NOTE

1. Inspect the brake pedal. (See **BRAKE PEDAL INSPECTION** .)
2. With the brake pedal in its original position, install the brake switch to the brake switch connector.

BRAKE SWITCH INSPECTION

CAUTION:

- **If the brake switch is removed from the brake pedal or the interlock unit, its proper functioning cannot be guaranteed when reinstalled. Therefore, inspect the brake switch with it still installed, or replace**

the brake switch if it is removed.

1. Verify continuity as indicated in **Fig. 9** .
    - If not as indicated in **Fig. 9** replace the brake switch.

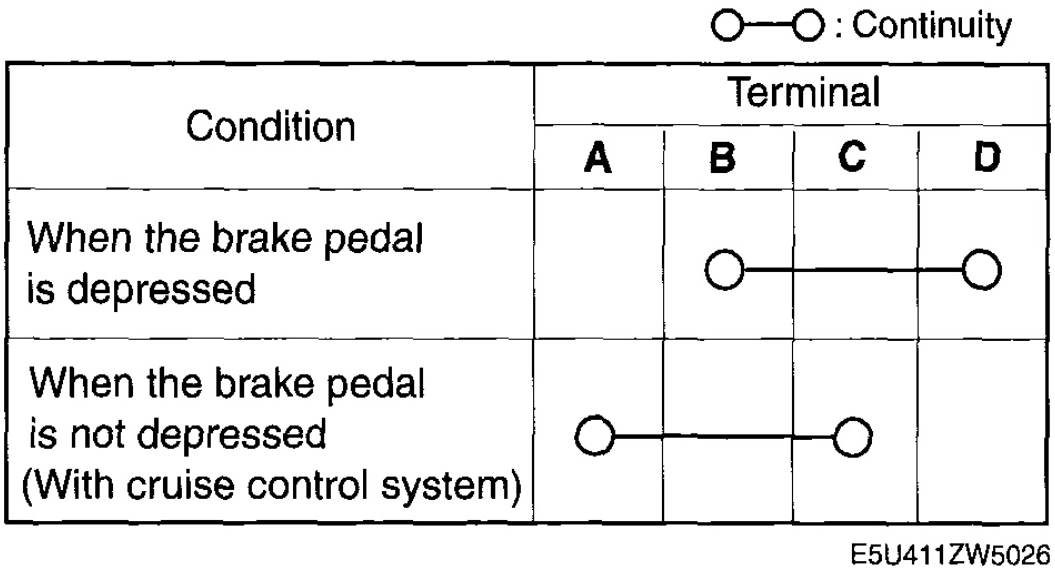


Fig. 9: Terminal Continuity Reference Table
Courtesy of MAZDA MOTORS CORP.

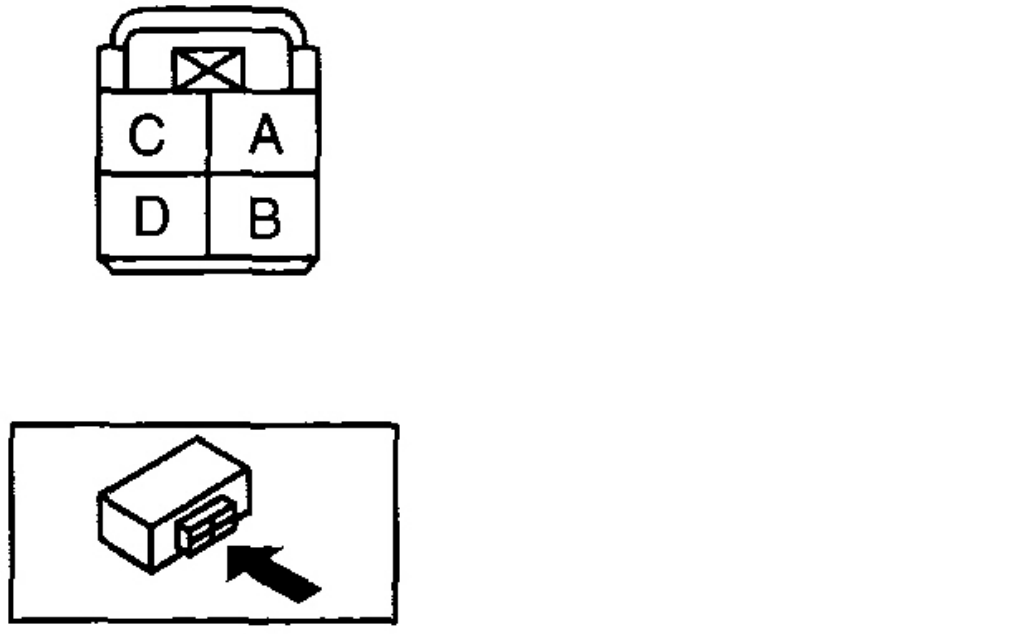
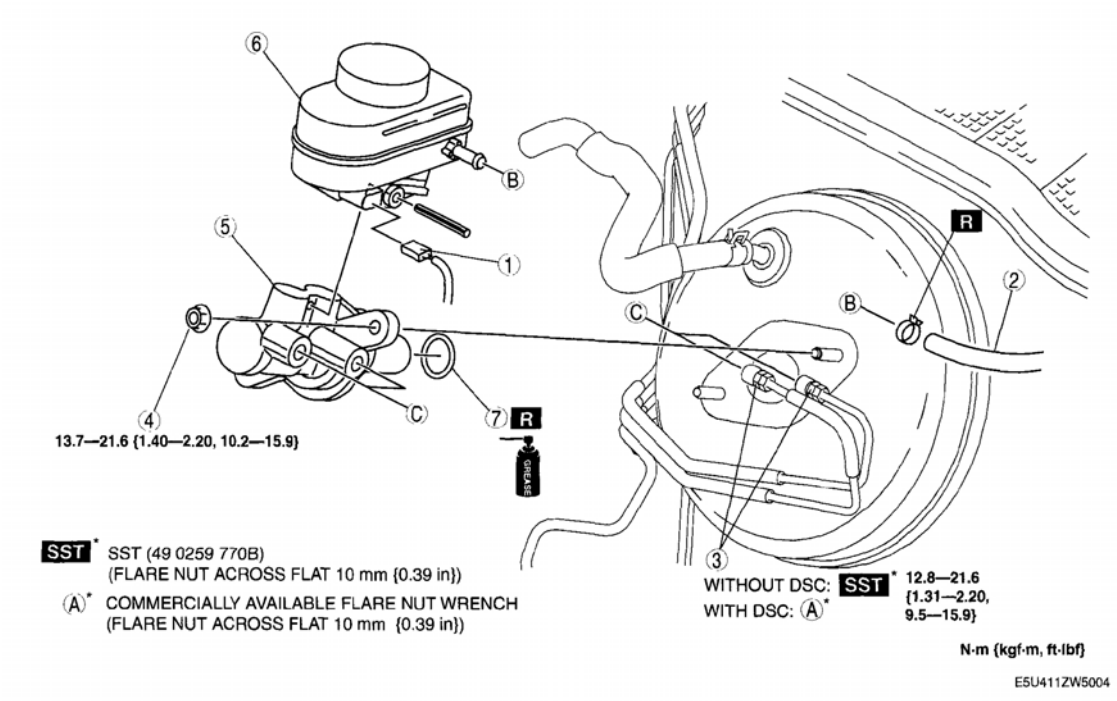


Fig. 10: Identifying Brake Switch Connector
Courtesy of MAZDA MOTORS CORP.

MASTER CYLINDER REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 11** .
2. Install in the reverse order of removal.



1	Brake fluid level sensor connector
2	Hose (MT)
3	Brake pipe
4	Nut

5	Master cylinder
6	Reserve tank
7	O-ring

Fig. 11: Identifying Master Cylinder Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

MASTER CYLINDER INSTALLATION NOTE

CAUTION:

- **If the master cylinder is installed at an angle, the master cylinder piston may push against the push rod retainer of the power brake unit causing poor air bleeding, brake drag, or other malfunctions. Be sure to install the master cylinder at a perpendicular angle to the power brake unit.**

1. Install the **SST** to the power brake unit and tighten to the specified torque.

   Tightening torque

   13.7-21.6 N.m {1.4-2.2 kgf.m, 10.2-15.9 ft.lbf}

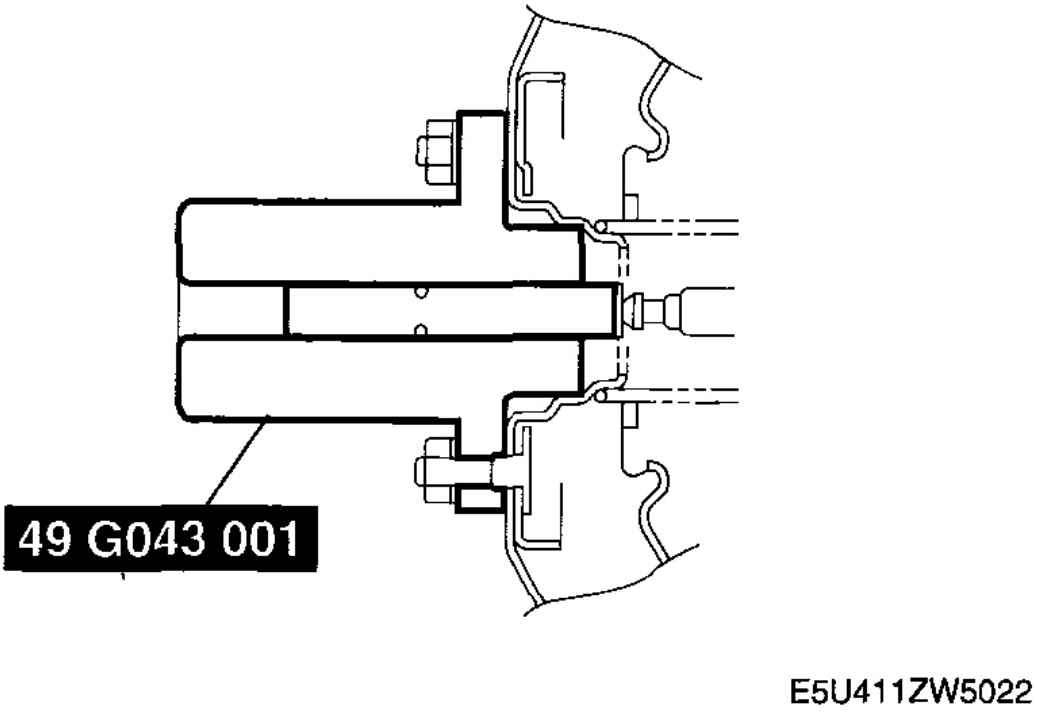


Fig. 12: Identifying Special Tool To Power Brake Unit
Courtesy of MAZDA MOTORS CORP.

2. Apply a vacuum of **66.7 kPa {500 mmHg, 19.7 inHg}** to the power brake unit using a vacuum gauge.

NOTE:

- **Use any commercially available vacuum gauge.**

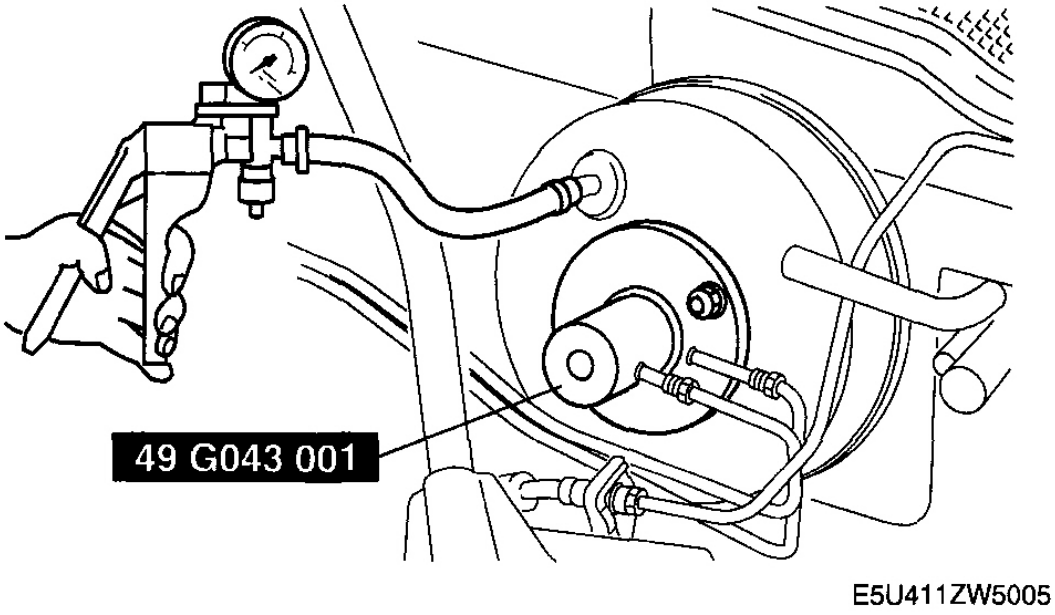


Fig. 13: Applying Vacuum To Power Brake Unit Using Vacuum Gauge
Courtesy of MAZDA MOTORS CORP.

3. Using calipers, measure dimension L as shown in **Fig. 14** .

   Standard L dimension

   30.4-30.6 mm {1.197-1.204 in}

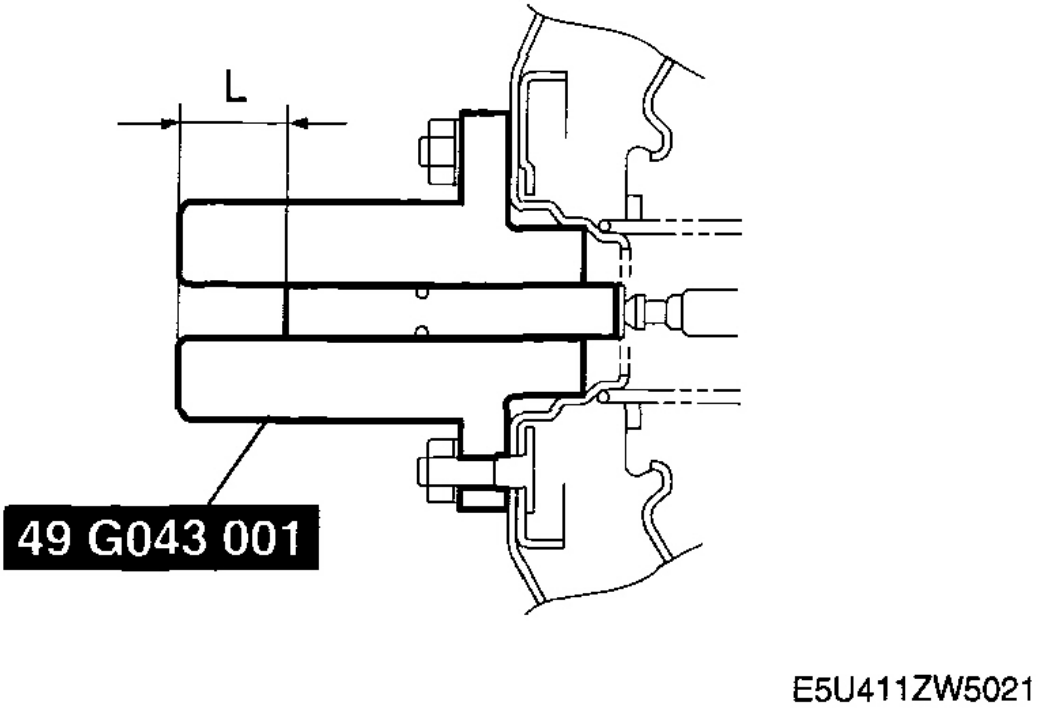


Fig. 14: Measuring Dimension L Using Calipers
Courtesy of MAZDA MOTORS CORP.

4. If dimension L is not within the standard, remove the **SST** (49 G043 001) and, while stopping the push rod rotation with the **SST** (49 E043 003A), adjust the push rod length with the **SST** (49 B043 004).
5. Switch the **SSTs** and remeasure dimension L.

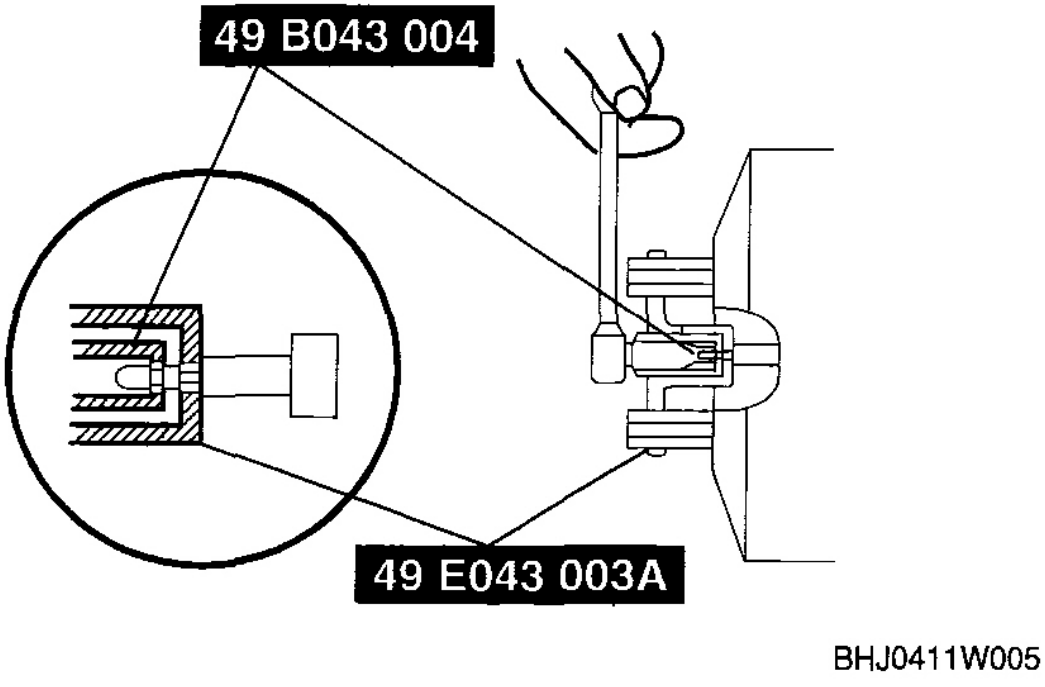


Fig. 15: Adjusting Pushrod Length
Courtesy of MAZDA MOTORS CORP.

6. Install the master cylinder to the power brake unit.

BRAKE FLUID LEVEL SENSOR INSPECTION

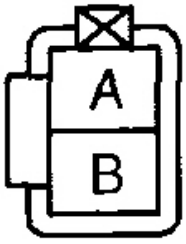
1. Disconnect the brake fluid level sensor connector from the master cylinder.
2. Inspect for continuity according to fluid level between the brake fluid level sensor terminals.
    - If not as indicated in **Fig. 16** , replace the reserve tank.

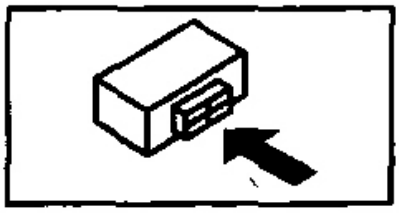
O—O: Continuity

Condition	Terminal	
	A	B
Above MIN		
Below MIN	O	O

CHU0411W017

Fig. 16: Brake Fluid Sensor Terminal Continuity Table
Courtesy of MAZDA MOTORS CORP.





BHJ0411W032

Fig. 17: Identifying Brake Fluid Level Sensor Connector
Courtesy of MAZDA MOTORS CORP.

POWER BRAKE UNIT INSPECTION

NOTE:

- **The following inspection methods are simple inspection methods to judge the function of the power brake unit.**
- **If there is any malfunction in the power brake unit, replace the power brake unit as a single unit.**

WITHOUT USING SST

Operation Inspection

1. With the engine stopped, depress the pedal several times.
2. With the pedal depressed, start the engine.
3. If the pedal moves down slightly immediately after starting the engine, the unit is normal.

Vacuum Function Inspection

1. Start the engine.
2. After driving the vehicle for **1-2 min** , stop the engine.
3. Depress the pedal with normal force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is normal.
    - If a problem is found, inspect for damage to or improper installation of the check valve and vacuum hose. After repairing, inspect again.

Vacuum Loss Function Inspection

1. Start the engine.
2. Depress the pedal with normal force.
3. With the pedal depressed, stop the engine.
4. Maintain the pedal depressed for **approx. 30 s** .
5. If the pedal height does not change during this time, the unit is normal.

USING SST

Pre-inspection Preparation

1. Install the **SST** (49 N043 001) in the orientation shown in **Fig. 18** , (with DSC)

NOTE:

- **Install the SST (49 N043 001) to the master cylinder using a commercially available flare nut wrench.**

- **Flare nut across flat: 12 mm {0.47 in}**

2. Connect the **SSTs** , a vacuum gauge and a pedal force gauge to the master cylinder and bleed the air from the **SSTs** and the brake line. (Bleed the air from the **SSTs** through air bleeding valve A.)

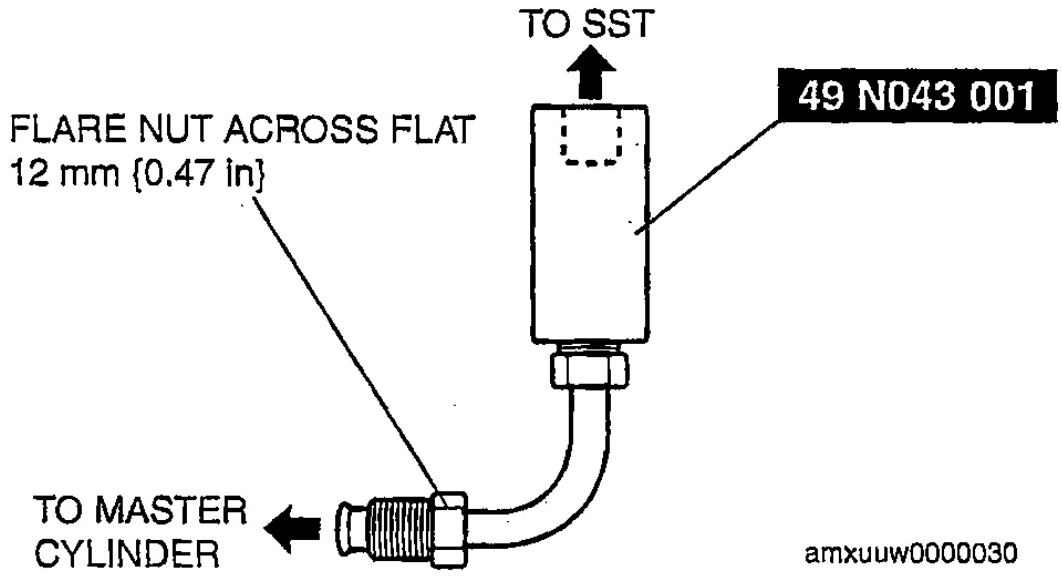


Fig. 18: Installing SST (49 N043 001)
Courtesy of MAZDA MOTORS CORP.

WITHOUT DSC

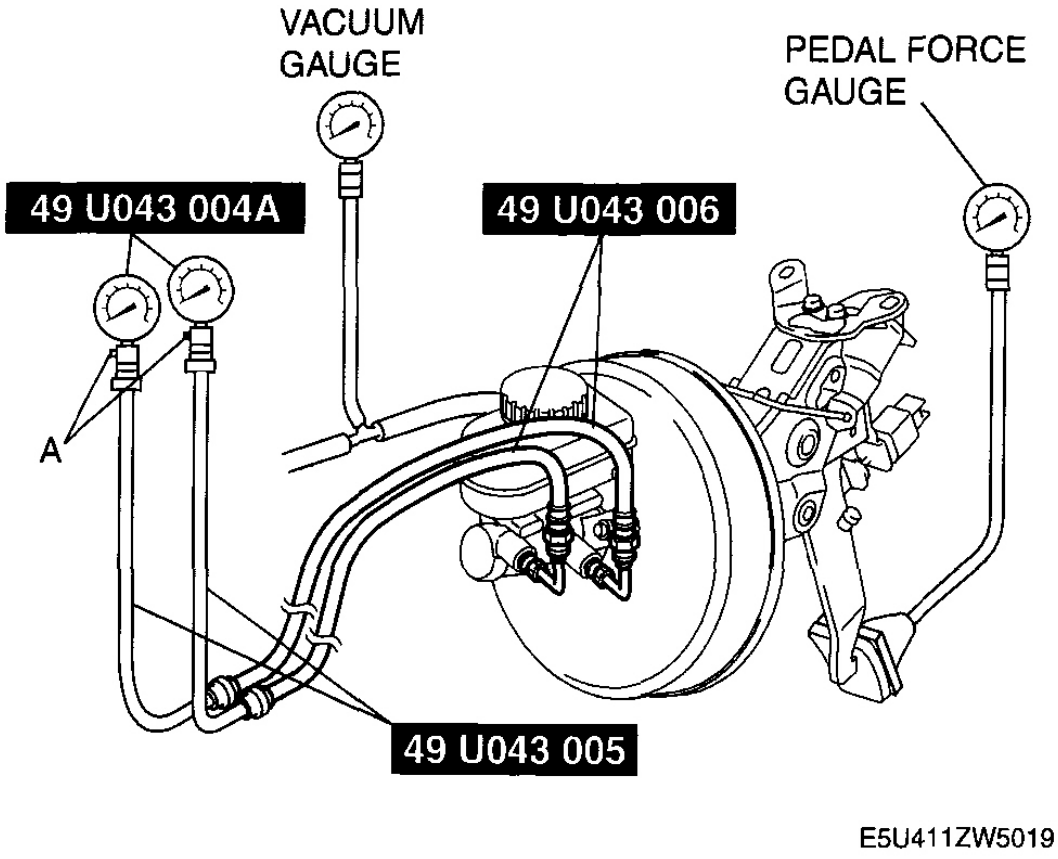


Fig. 19: Inspecting Vacuum Loss Function - Without DSC
Courtesy of MAZDA MOTORS CORP.

WITH DSC

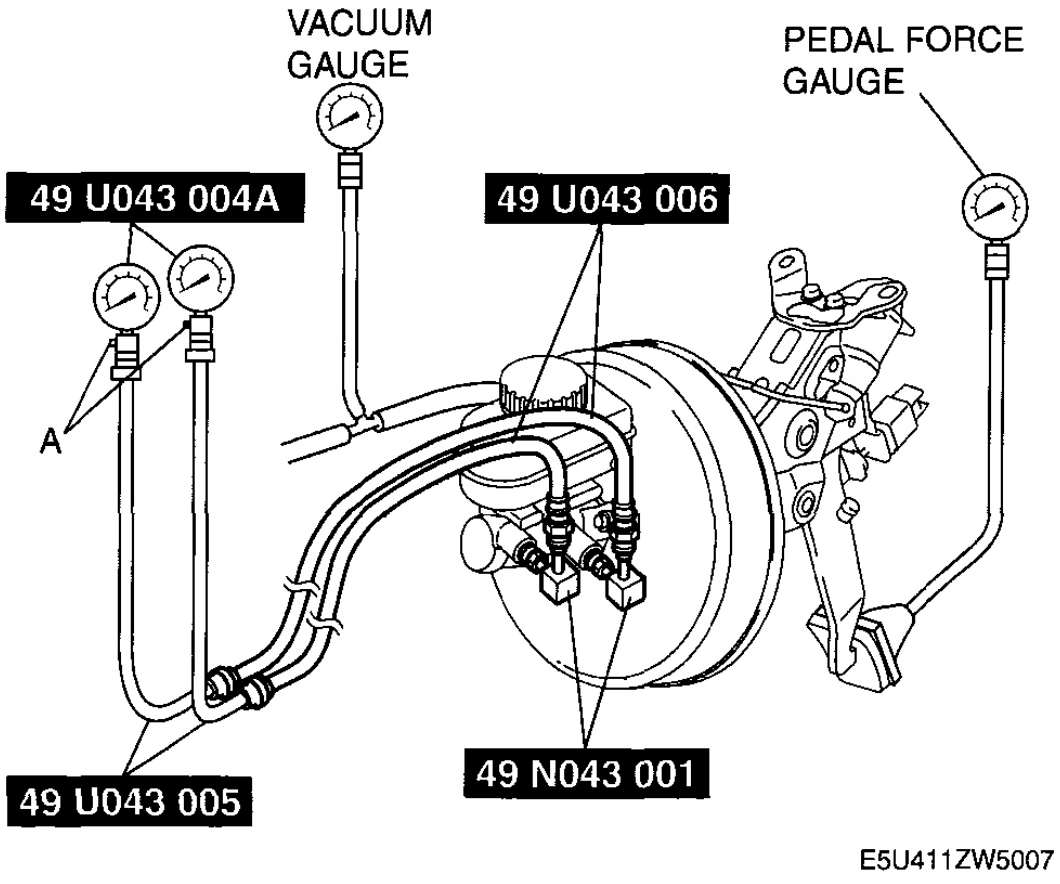


Fig. 20: Inspecting Vacuum Loss Function - With DSC
Courtesy of MAZDA MOTORS CORP.

Checking For Vacuum Loss (Loaded Condition)

1. Start the engine.
2. Depress the brake pedal with a force of **200 N {20.4 kgf, 44.9 lbf}** .
3. With the brake pedal depressed, turn off the engine when the vacuum gauge reaches **68 kPa {510 mmHg, 20.1 inHg}** .
4. Within **15 s** right after stopping the engine, measure the lowest amount of vacuum.
5. If the lowest amount is **3.3 kPa {25 mmHg, 1.0 inHg}** or less, the system is normal.

Lack of Hydraulic Pressure Inspection

1. With the engine stopped and the vacuum amount at **0 kPa {0 mmHg, 0 inHg}** if the pedal force and fluid pressure correlation is within the specification, the system is normal.

Power Brake Unit Fluid Pressure

POWER BRAKE UNIT FLUID PRESSURE SPECIFICATIONS

Vacuum amount at o kPa {0 mmHg, 0 inHg}	
Pedal force (N {kgf, lbf})	Fluid pressure (kPa {kgf/cm^2 , psi})
200 {20.4, 44.9}	620 {6.33, 90.0} or more

Hydraulic Pressure Inspection

1. Start the engine and when the vacuum amount reaches **66.7 kPa {500 mmHg, 19.7 inHg}** , depress the brake pedal.
2. At this time, apply the indicated pedal force and if the fluid pressure is within the specification, the unit is normal.

Power Brake Unit Fluid Pressure

POWER BRAKE UNIT FLUID PRESSURE SPECIFICATIONS

Vacuum amount at 66.7 kPa {500 mmHg, 19.7 inHg}	
Pedal force (N {kgf, lbf})	Fluid pressure (kPa {kgf/cm^2 , psi})
200 {20.4, 44.9}	6,340 {64.65, 919.6} or more

POWER BRAKE UNIT REMOVAL/INSTALLATION

1. Remove the master cylinder. (See **MASTER CYLINDER REMOVAL/INSTALLATION** .)
2. Remove the clutch pipe. (MT)

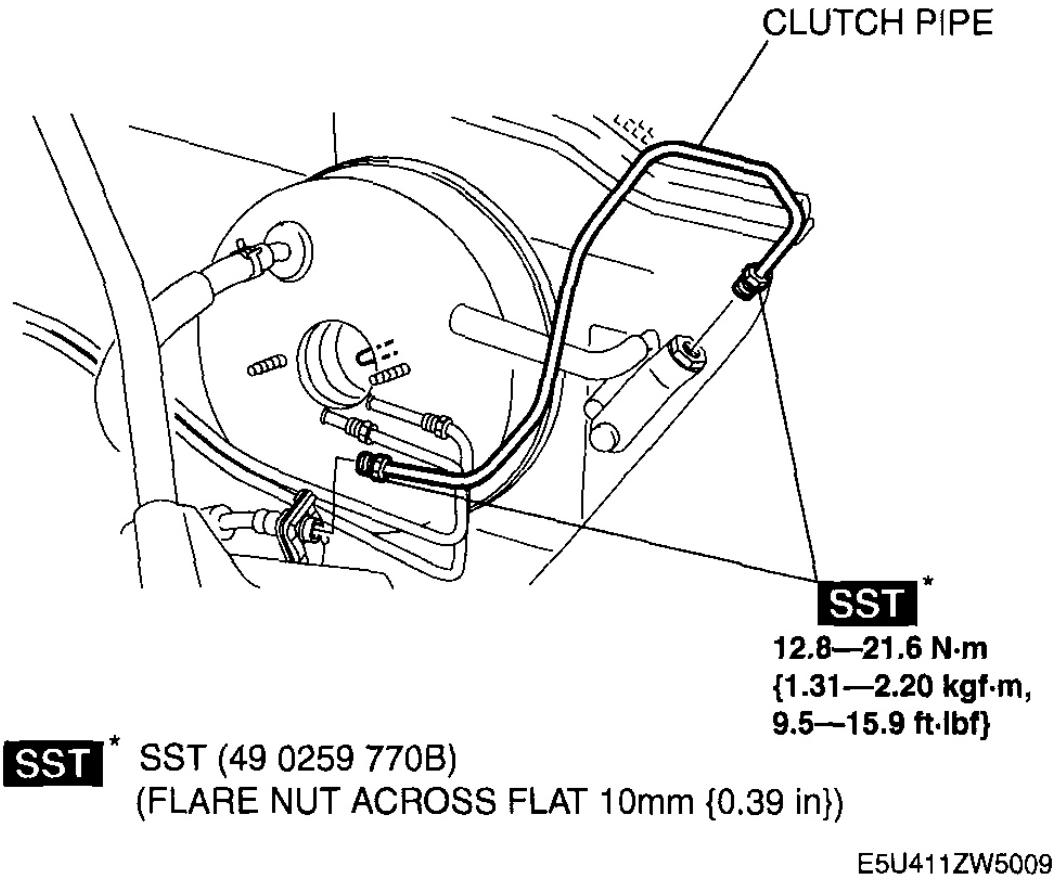


Fig. 21: View Of Clutch Pipe & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

3. Remove the nut shown in **Fig. 22** , then remove the cooler hose (LO) bracket from the vehicle.

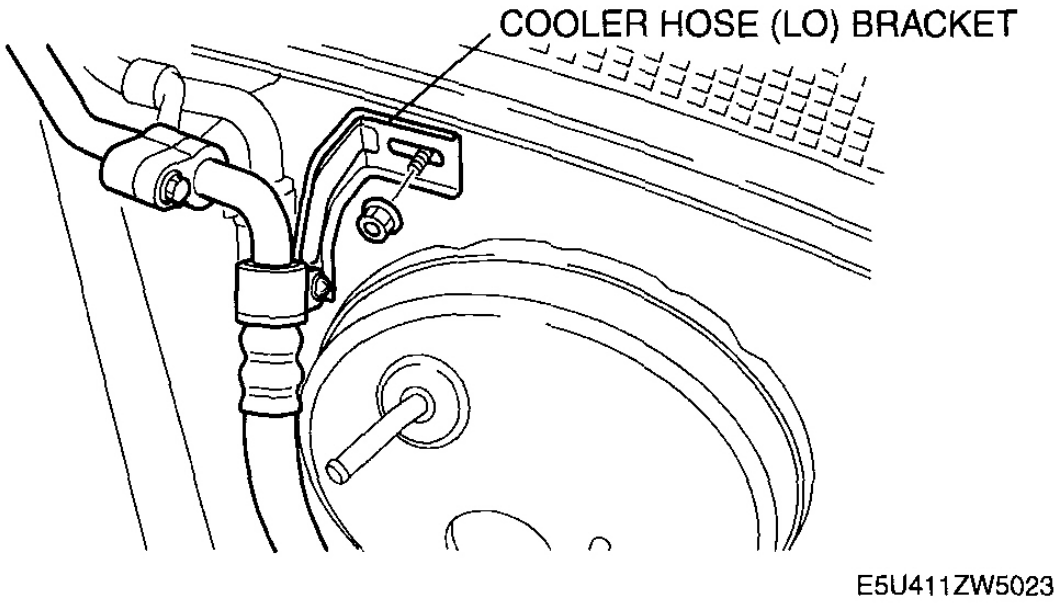
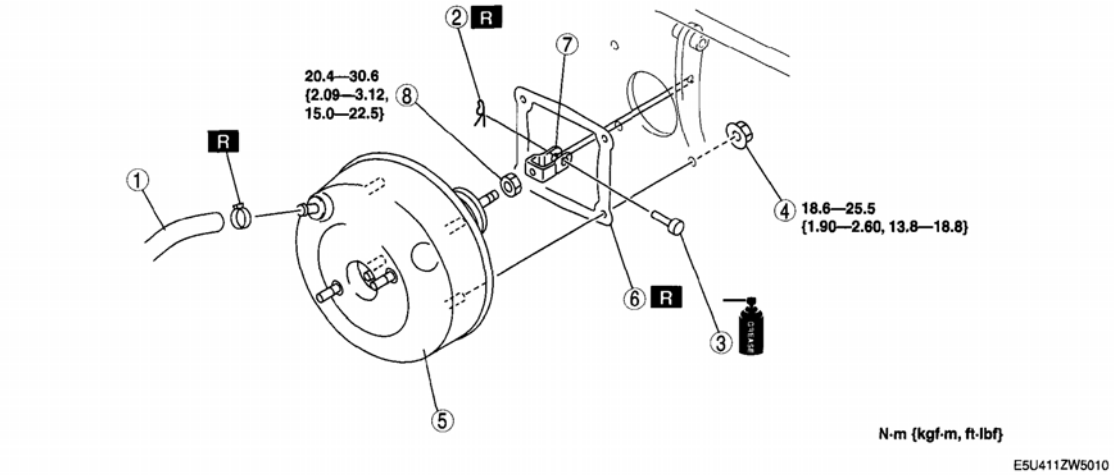


Fig. 22: View Of Cooler Hose (LO) Bracket
Courtesy of MAZDA MOTORS CORP.

4. Remove in the order indicated in **Fig. 23** .



1	Vacuum hose
2	Snap pin
3	Clevis pin
4	Nut

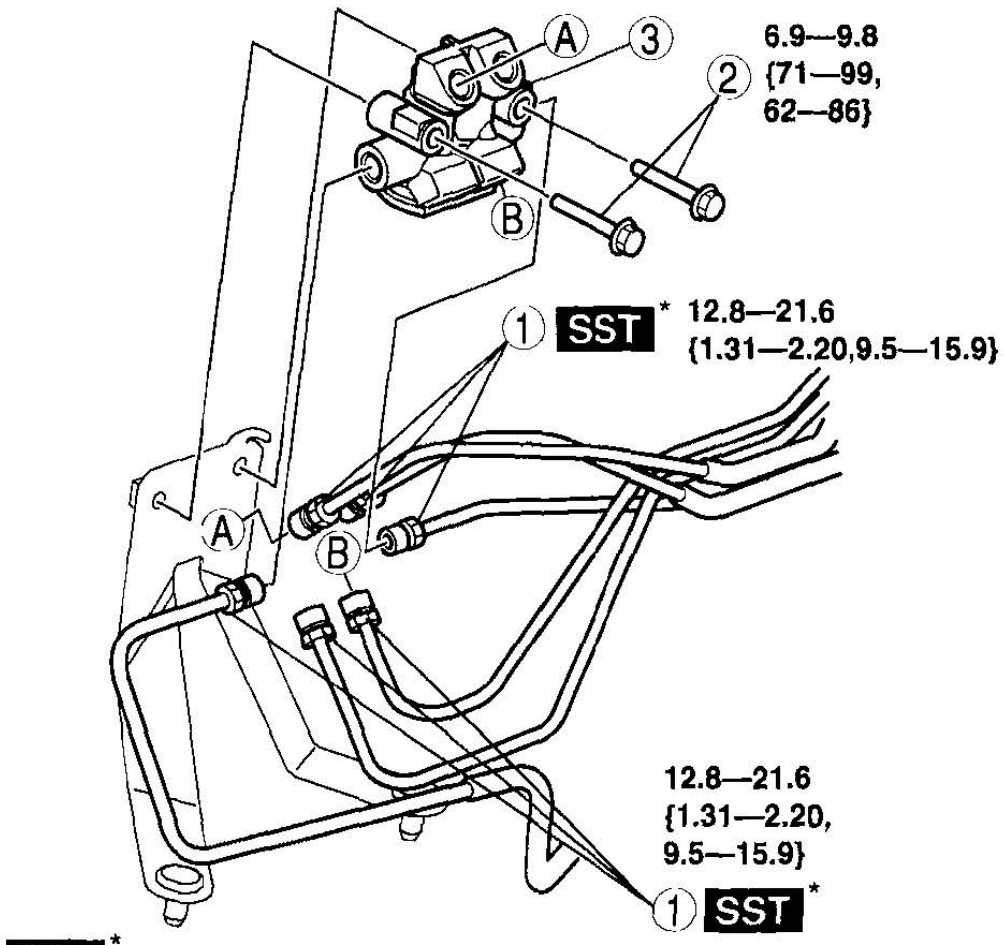
5	Power brake unit
6	Gasket
7	Fork
8	Locknut

Fig. 23: Identifying Power Brake Unit Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.
6. After installation, perform brake pedal inspection. (See **BRAKE PEDAL INSPECTION** .)

DUAL PROPORTIONING VALVE REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 24** .



1	Brake pipe
2	Bolt
3	Dual proportioning valve

Fig. 24: View Of Dual Proportioning Valve Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

2. Install in the reverse order of removal.

BRAKE PIPE REMOVAL NOTE

1. Place an alignment mark on the brake pipe and dual proportioning valve.

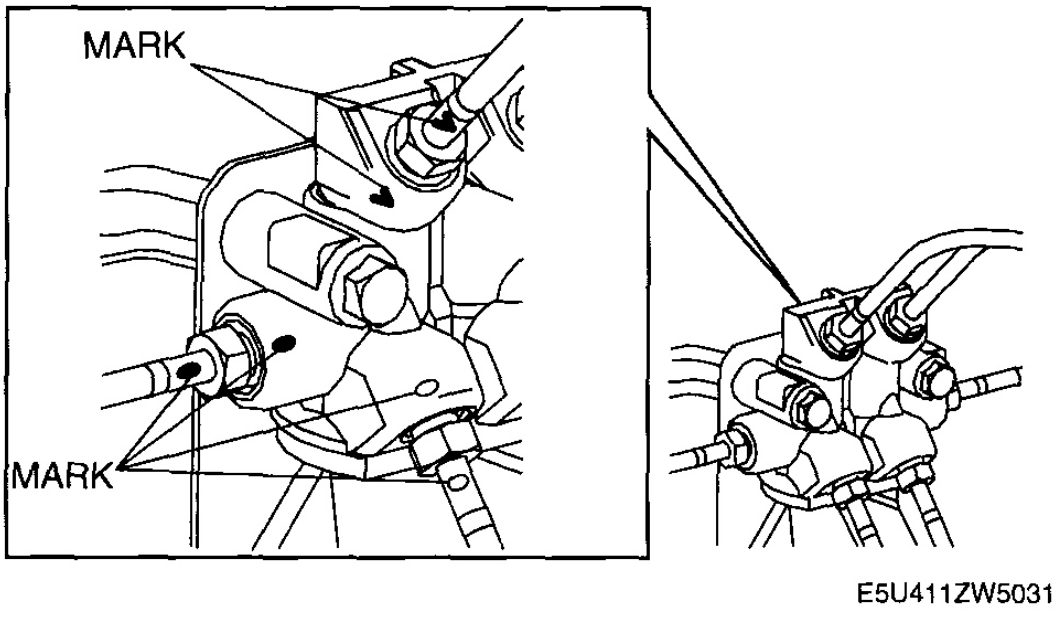


Fig. 25: Placing Alignment Mark On Brake Pipe & Dual Proportioning Valve
Courtesy of MAZDA MOTORS CORP.

DUAL PROPORTIONING VALVE INSTALLATION NOTE

1. Install the dual proportioning valve so that the R marks faces the upper side of the vehicle.

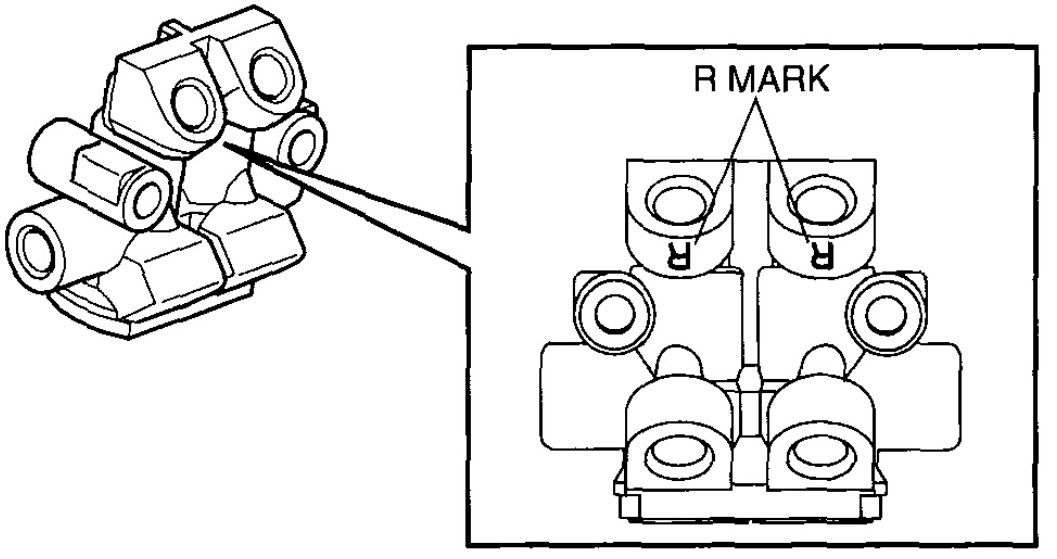


Fig. 26: Identifying Dual Proportioning Valve R Marks
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE INSTALLATION NOTE

1. Align the marks made before removal and install the brake pipe to the dual proportioning valve referring to **Fig. 27** .

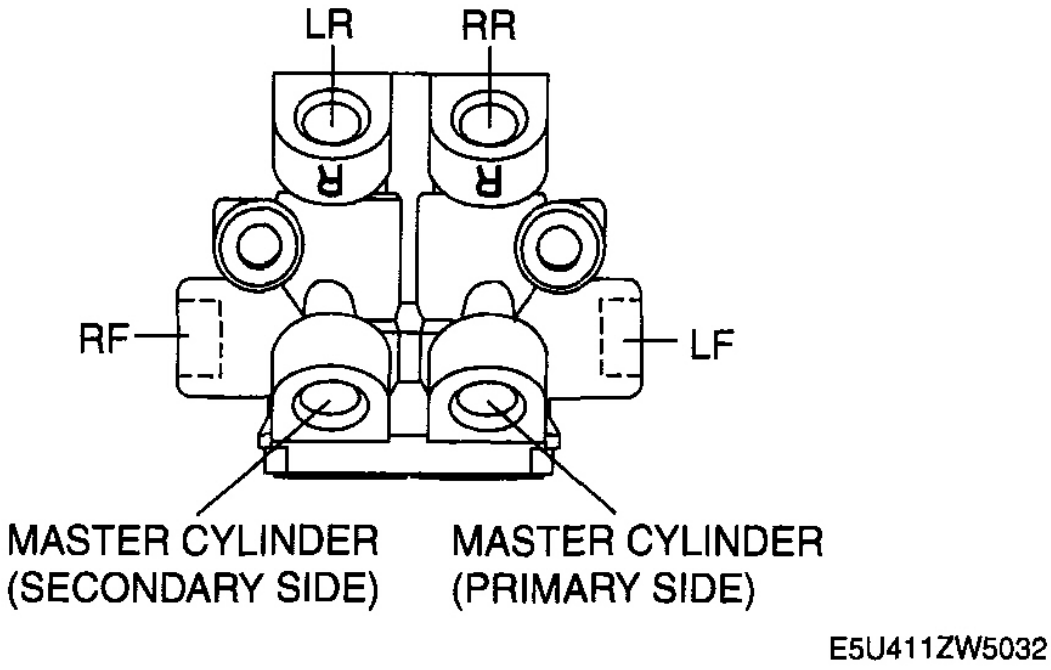


Fig. 27: Aligning Brake Pipe To Dual Proportioning Valve Marks
Courtesy of MAZDA MOTORS CORP.

DUAL PROPORTIONING VALVE INSPECTION

1. Connect the **SSTs** to the brake pipes as shown in **Fig. 28** .
2. Bleed the air from the brake system and the **SSTs** . (Bleed the air from the **SSTs** through air bleeding valve A.)

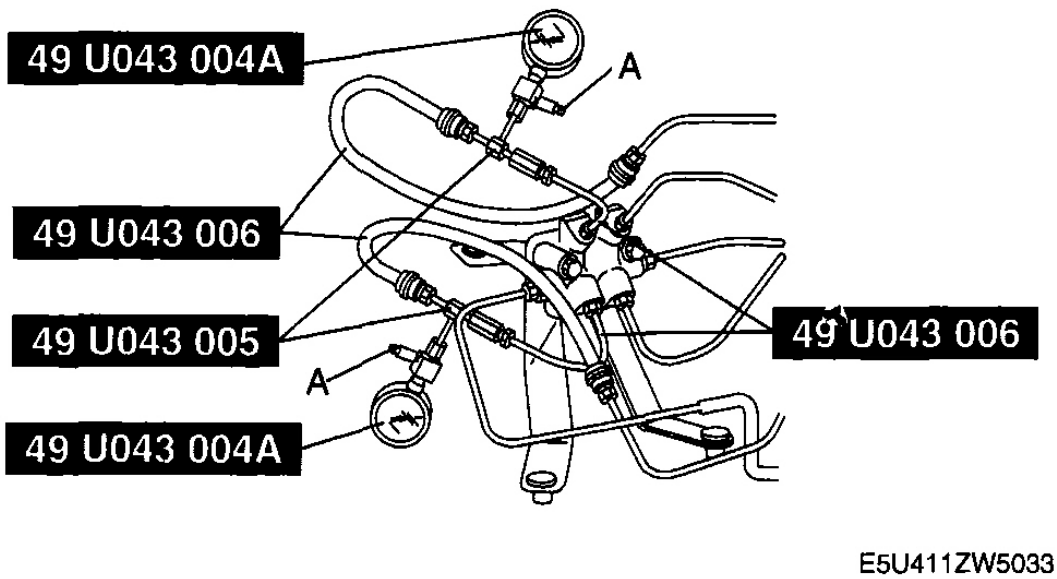


Fig. 28: Identifying Special Tools
Courtesy of MAZDA MOTORS CORP.

3. Measure the fluid pressure of the master cylinder and the rear brake.
    - If not within the specification, replace the dual proportioning valve.

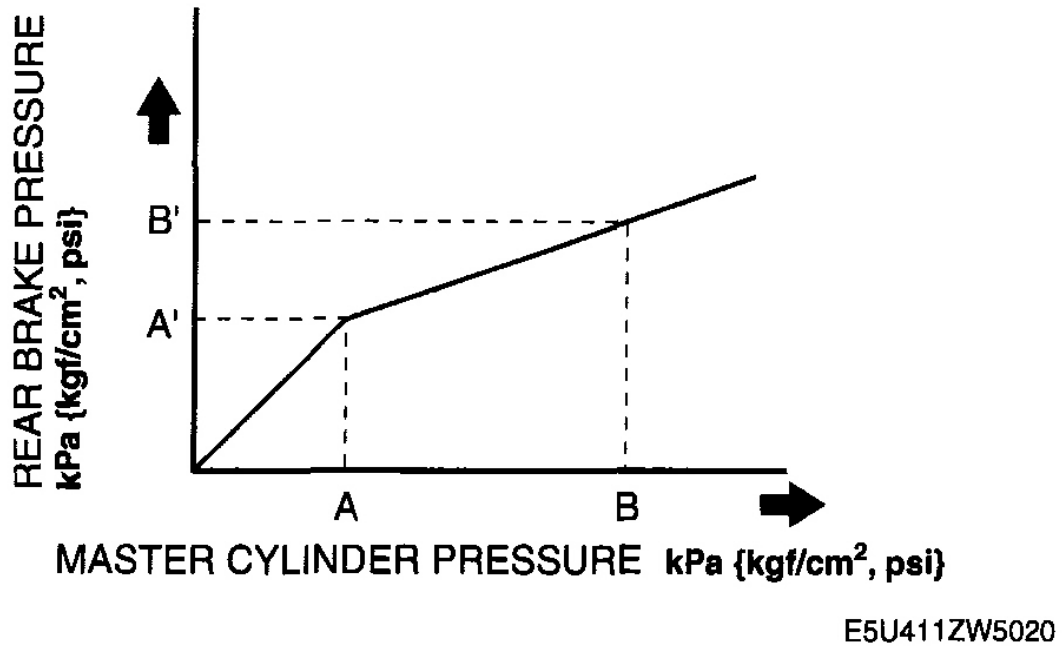


Fig. 29: Dual Proportioning Valve Fluid Pressure Graph
Courtesy of MAZDA MOTORS CORP.

DUAL PROPORTIONING VALVE FLUID PRESSURE SPECIFICATIONS

MASTER CYLINDER PRESSURE (kPa {kgf/cm^2 , psi})	REAR BRAKE PRESSURE (kPa {kgf/cm^2 , psi})
A: 3,430 {34.98, 497.5}	A': 3,130 {31.92, 453.9} - 3,730 {38.04, 540.9}
B: 5,880 {59.96, 852.8}	B': 4,010 {40.9, 581.7} - 4,810 {49.05, 697.6}

FRONT BRAKE (DISC) INSPECTION

BRAKE JUDDER REPAIR HINTS

Description

1. Brake judder concern has the following 3 characteristics:

Steering Wheel Vibration

1. Steering wheel vibrates in the rotation direction. This characteristic is most noticeable when applying brakes at a vehicle speed of **100-140 km/h {62.1-86.8 mph}** .

Floor Vibration

1. When applying the brakes, the vehicle body shakes back and forth. The seriousness of the shaking is not influenced by vehicle speed.

Brake Pedal Vibration

1. When applying brakes, a pulsating force tries to push the brake pad back. The pulsation is transmitted to the brake pedal.
2. The following are the main possible causes of brake judder:

Due To An Excessive Runout (Side-To-Side Wobble) Of The Disc Plate, The Thickness Of The Disc Plate Is Uneven

1. If the runout is **more than 0.05 mm {0.002 in}** at the position **10 mm {0.39 in}** from the disc plate edge, uneven wear occurs on the disc plate because the pad contacts the plate unevenly.
2. If the runout is **less than 0.05 mm {0.002 in}** , uneven wear does not occur.

The Disc Plate Is Deformed By Heat

1. Repeated panic braking may raise the temperature in some portions of disc plate by **approx. 1,000°C {1,832°F}** . This results in a deformed disc plate.

Due To Corrosion, The Thickness And Friction Coefficient Of Disc Plate Change

1. If a vehicle is parked in damp conditions for a long time, corrosion occurs on the friction surface of disc plate.
2. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

Inspection and Repair Procedure

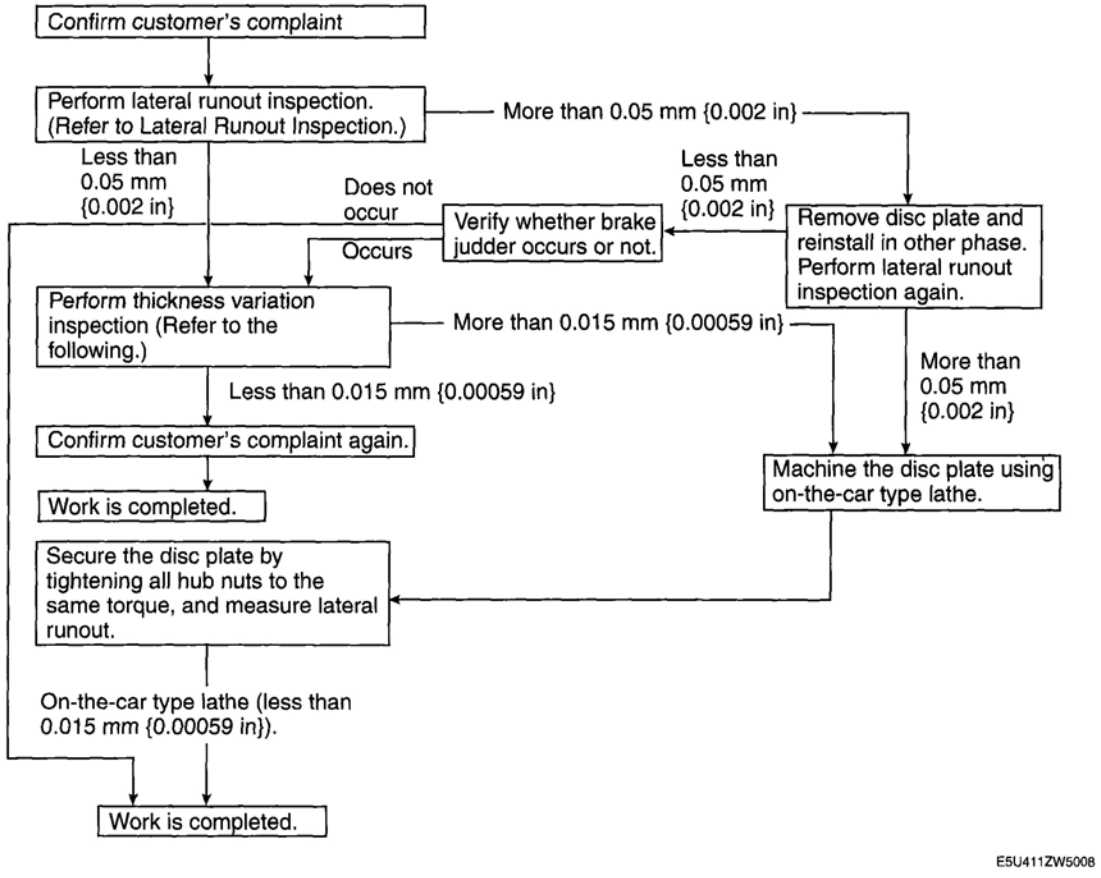


Fig. 30: Front Brake Inspection & Repair Flow Procedure
Courtesy of MAZDA MOTORS CORP.

Lateral Runout Inspection

1. To secure the disc plate and the hub, insert the washer (thickness **10 mm {0.39 in}** , inner diameter **more than 12 mm {0.47 in}**) between each hub bolt and the hub nut, then tighten all the hub nuts.

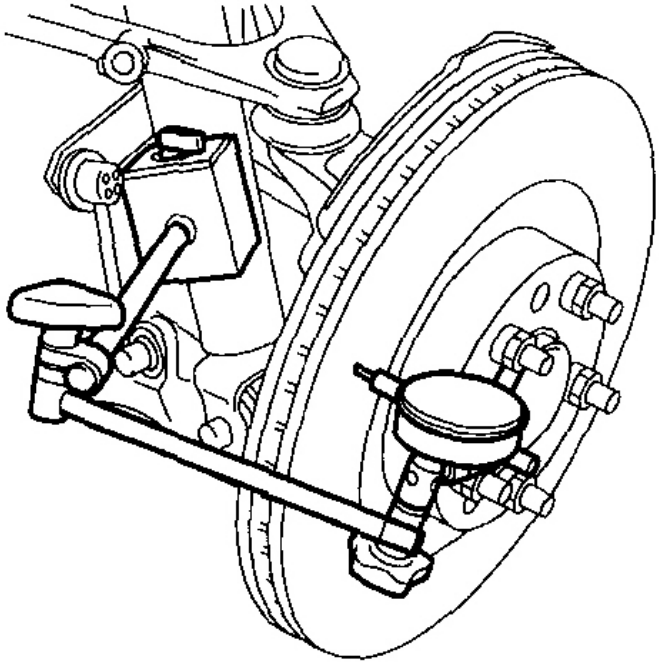
NOTE:

- **The component parts of the SST (49 B017 001 or 49 G019 003) can be used as a suitable washer.**

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.12-0.28 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

Front disc plate runout limit

0.05 mm {0.002 in}



CHU0411W030

Fig. 31: Measuring Front Disc Plate Runout
Courtesy of MAZDA MOTORS CORP.

Thickness Variation Inspection

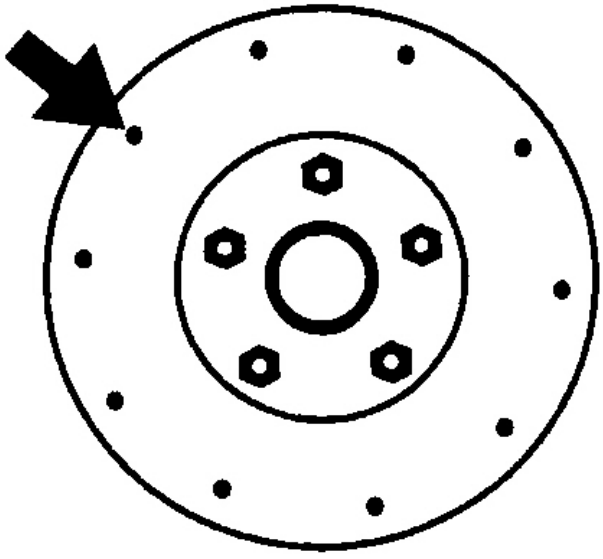
1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in **Fig. 32** using a caliper (micrometer).
3. Subtract the minimum value from the maximum, and if the result is not within specification, machine the disc plate using a lathe.

Thickness variation limit

0.015 mm {0.00059 in}

WARNING:

- **Do not exceed minimum disc plate thickness.**



CHU0411W027

Fig. 32: Inspecting Disc Plate-To-Pad Friction Surface
Courtesy of MAZDA MOTORS CORP.

Disc Plate Thickness Inspection

CAUTION:
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

Minimum front disc plate thickness

20 mm {0.79 in}

Minimum front disc plate thickness after machining using a brake lathe on-vehicle

20.8 mm {0.82 in}

Disc Pad Thickness Inspection

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

   Minimum front disc pad thickness

   2.0 mm {0.079 in} min.

4. Replace the pads as a set (right and left wheels) if either one is at or less than the minimum thickness.

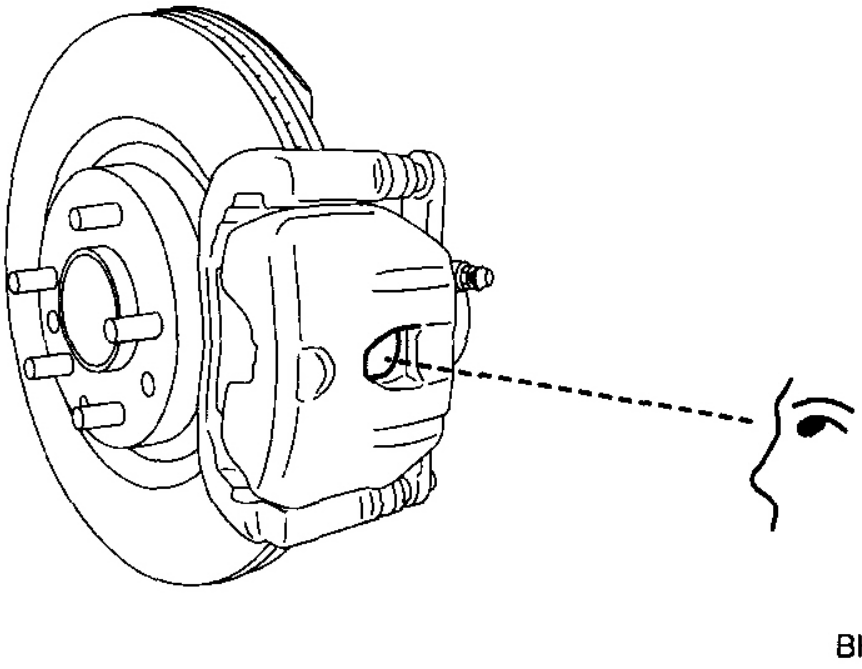
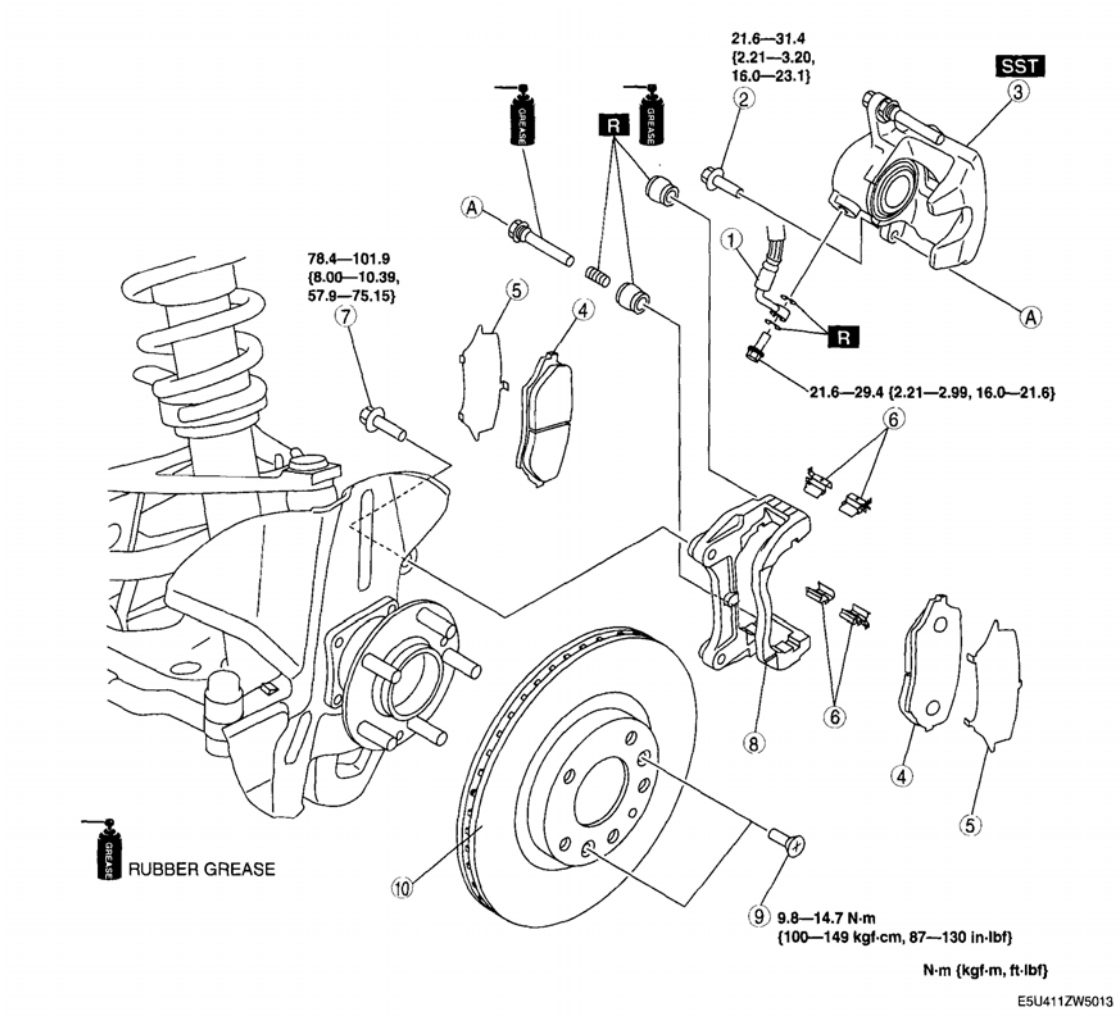


Fig. 33: Inspecting Disc Pad Thickness
Courtesy of MAZDA MOTORS CORP.

FRONT BRAKE (DISC) REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 34** .
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, then verify that the brakes do not drag.



1	Brake hose
2	Bolt
3	Caliper
4	Disc pad
5	Shim

6	Guide plate
7	Bolt
8	Mounting support
9	Screw
10	Disc plate

Fig. 34: Identifying Front Brake (Disc) Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

CALIPER INSTALLATION NOTE

1. Clean the exposed area of the piston.
2. Install the piston using the **SST** .
3. Install the caliper.

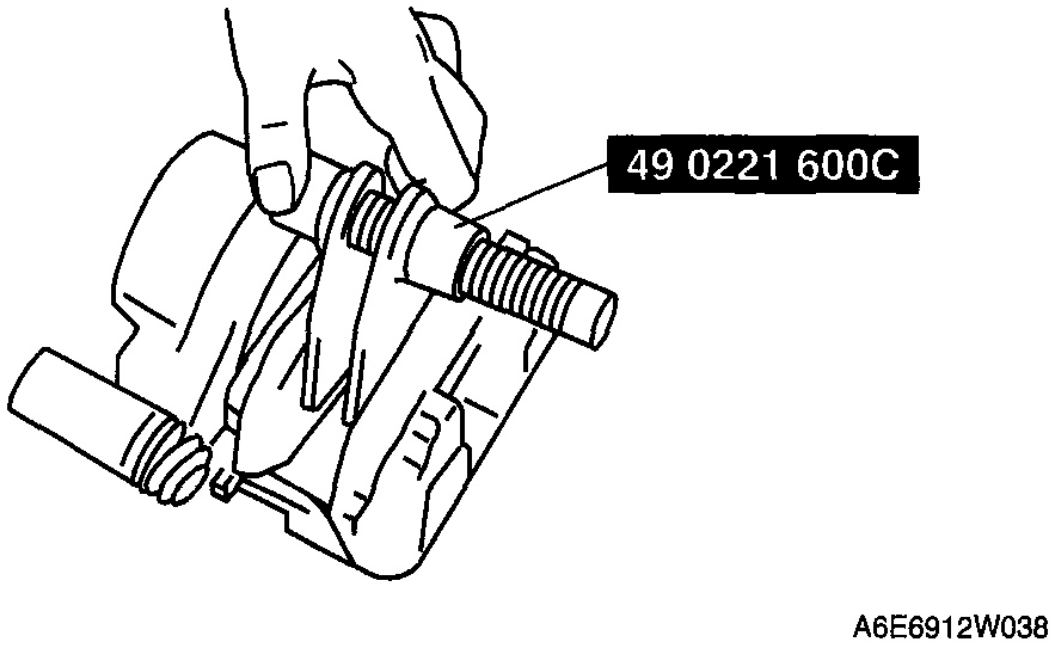
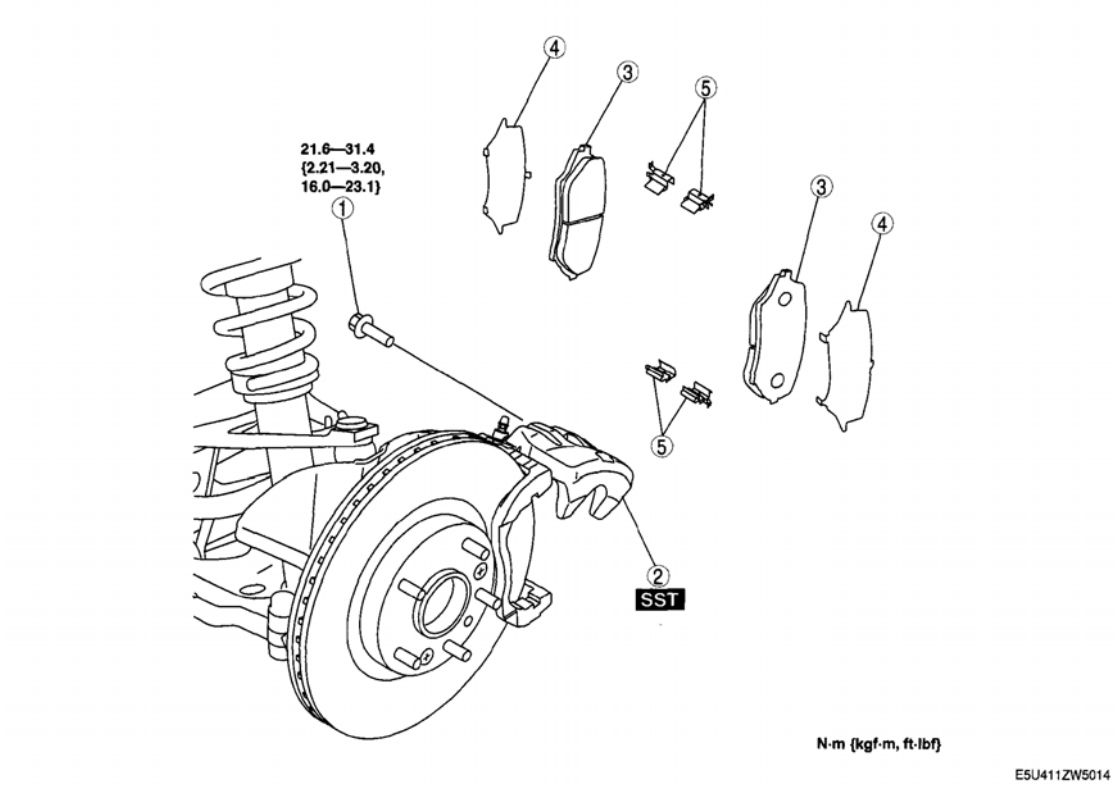


Fig. 35: Installing Piston Using Special Tool
Courtesy of MAZDA MOTORS CORP.

DISC PAD (FRONT) REPLACEMENT

1. Remove in the order indicated in **Fig. 36** .
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, then verify that the brakes do not drag.



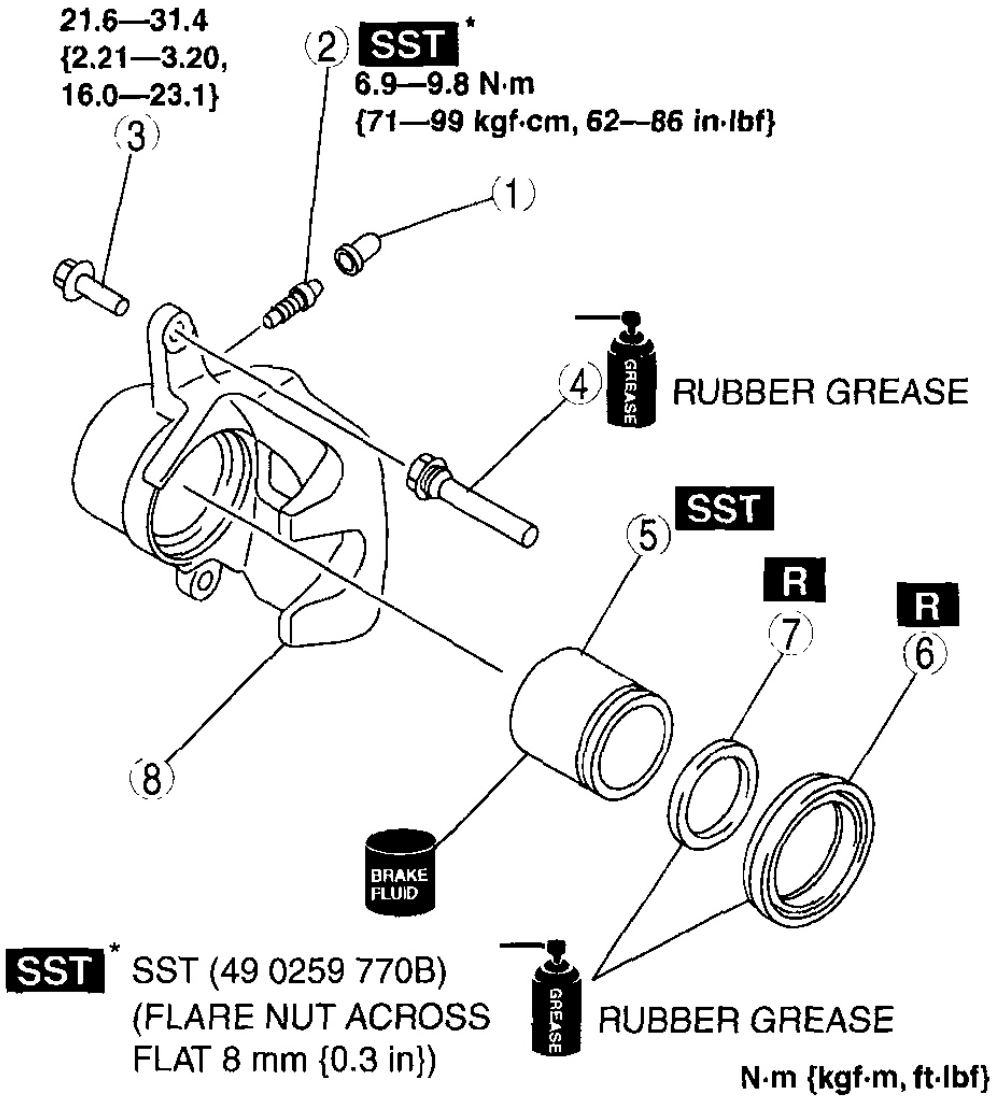
1	Bolt
2	Caliper
3	Disc pad

4	Shim
5	Guide plate

Fig. 36: Identifying Disc Pad Components (Front) (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

CALIPER (FRONT) DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in **Fig. 37** .



E5U411ZW5011

1	Bleeder cap
2	Bleeder screw
3	Bolt
4	Sleeve
5	Piston
6	Dust seal
7	Piston seal
8	Caliper body

Fig. 37: Exploded View Of Caliper (Front) (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

2. Assemble in the reverse order of disassembly.

PISTON DISASSEMBLY NOTE

CAUTION:
- **The piston could be damaged if blown out with great force. Blow the compressed air slowly to prevent the piston from suddenly popping out.**

1. Insert a piece of wood in the caliper as shown in **Fig. 38** , and then blow compressed air through the bleeder screw hole to remove the piston from the caliper body.

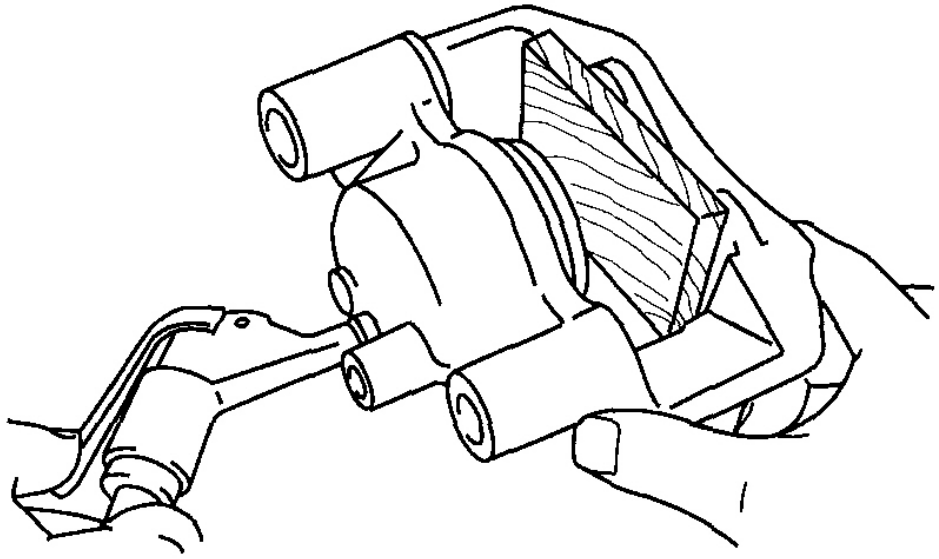


Fig. 38: Removing Piston From Caliper Body By Blowing Compressed Air Through Bleeder Screw Hole
Courtesy of MAZDA MOTORS CORP.

REAR BRAKE (DISC) INSPECTION

BRAKE JUDDER REPAIR HINTS

Description

1. Brake judder concern has the following 3 characteristics:

Steering Wheel Vibration

1. Steering wheel vibrates in the rotation direction. This characteristic is most noticeable when applying brakes at a vehicle speed of **100-140 km/h {62.1-86.8 mph}** .

Floor Vibration

1. When applying the brakes, the vehicle body shakes back and forth. The seriousness of the shaking is not influenced by vehicle speed.

Brake Pedal Vibration

1. When applying brakes, a pulsating force tries to push the brake pad back. The pulsation is transmitted to the brake pedal.
2. The following are the main possible causes of brake judder:

Due to an excessive runout (side-to-side wobble) of the disc plate, the thickness of the disc plate is uneven.

1. If the runout is **more than 0.05 mm {0.002 in}** at the position **10 mm {0.39 in}** from the disc plate edge, uneven wear occurs on the disc plate because the pad contacts the plate unevenly.
2. If the runout is **less than 0.05 mm {0.002 in}** , uneven wear does not occur.

The disc plate is deformed by heat.

1. Repeated panic braking may raise the temperature in some portions of disc plate by **approx. 1,000°C {1,832°F}** . This results in a deformed disc plate.

Due to corrosion, the thickness and friction coefficient of disc plate change.

1. If a vehicle is parked in damp conditions for a long time, corrosion occurs on the friction surface of disc plate.
2. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

Inspection and Repair Procedure

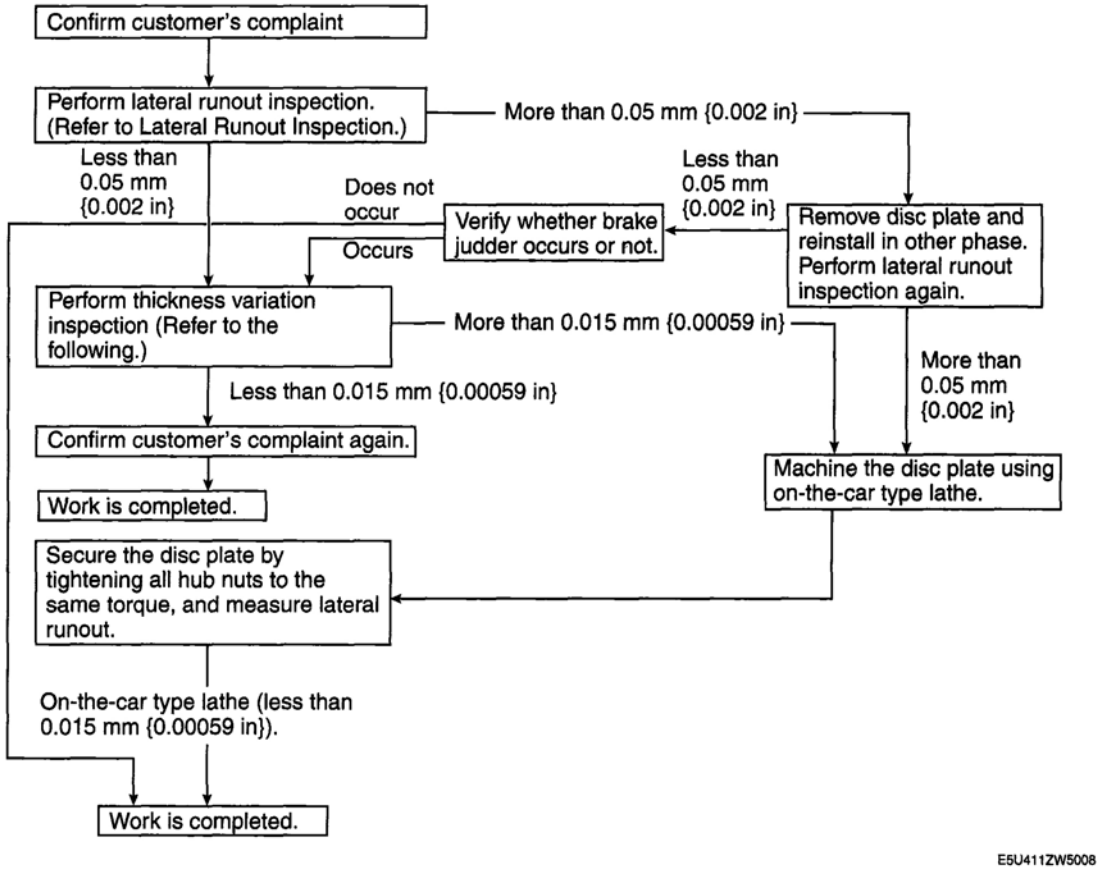


Fig. 39: Rear Brake Inspection & Repair Flow Procedure
Courtesy of MAZDA MOTORS CORP.

Lateral Runout Inspection

1. To secure the disc plate and the hub, insert the washer (thickness **10 mm {0.39 in}** , inner diameter **more than 12 mm {0.47 in}**) between each hub bolt and the hub nut, then tighten all the hub nuts.

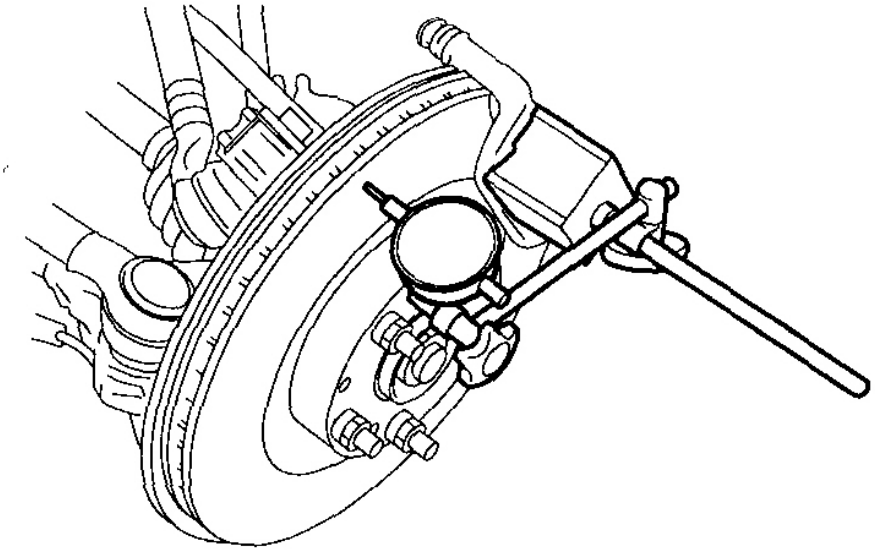
NOTE:

- **The component parts of the SST (49 B017 001 or 49 G019 003) can be used as a suitable washer.**

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.39 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

Rear disc plate runout limit

0.05 mm {0.002 in}



CHU0411W031

Fig. 40: Measuring Rear Disc Plate Runout
Courtesy of MAZDA MOTORS CORP.

Thickness Variation Inspection

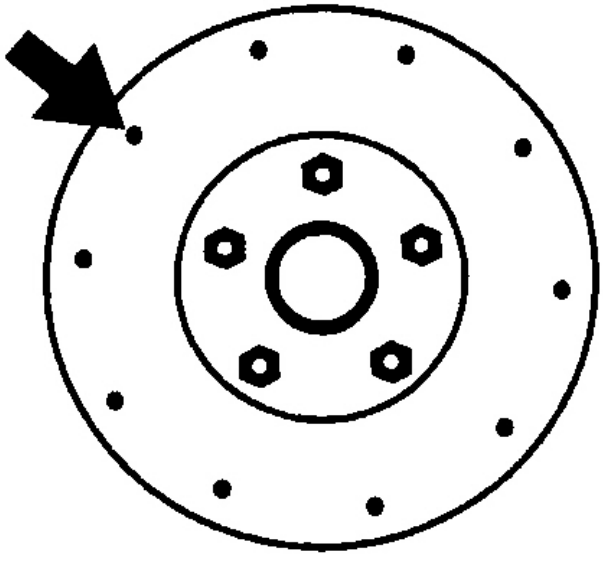
1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in **Fig. 41** using a caliper (micrometer).
3. Subtract the minimum value from the maximum, and if the result is not within specification, machine the disc plate using a lathe.

Thickness variation limit

0.015 mm {0.00059 in}

WARNING:

- **Do not exceed minimum disc plate thickness.**



CHU0411W027

Fig. 41: Inspecting Disc Plate-To-Pad Friction Surface
Courtesy of MAZDA MOTORS CORP.

Disc Plate Thickness Inspection

CAUTION:
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

Minimum rear disc plate thickness

8 mm {0.31 in}

Minimum rear disc plate thickness after machining using a brake lathe on-vehicle

8.8 mm {0.35 in}

Disc Pad Thickness Inspection

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

   Minimum rear disc pad thickness

   2.0 mm {0.079 in} min.

4. Replace the pads as a set (right and left wheels) if either one is at or less than the minimum thickness.

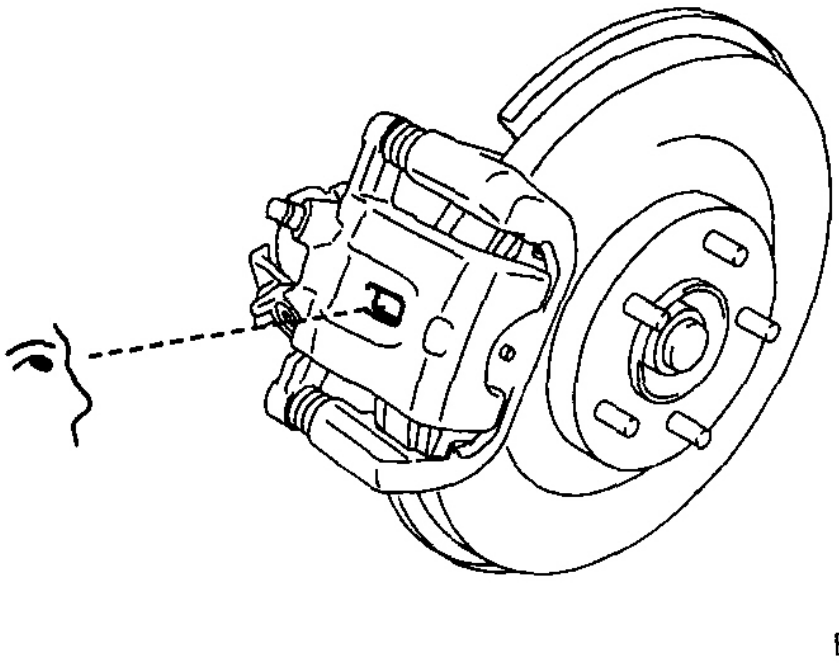
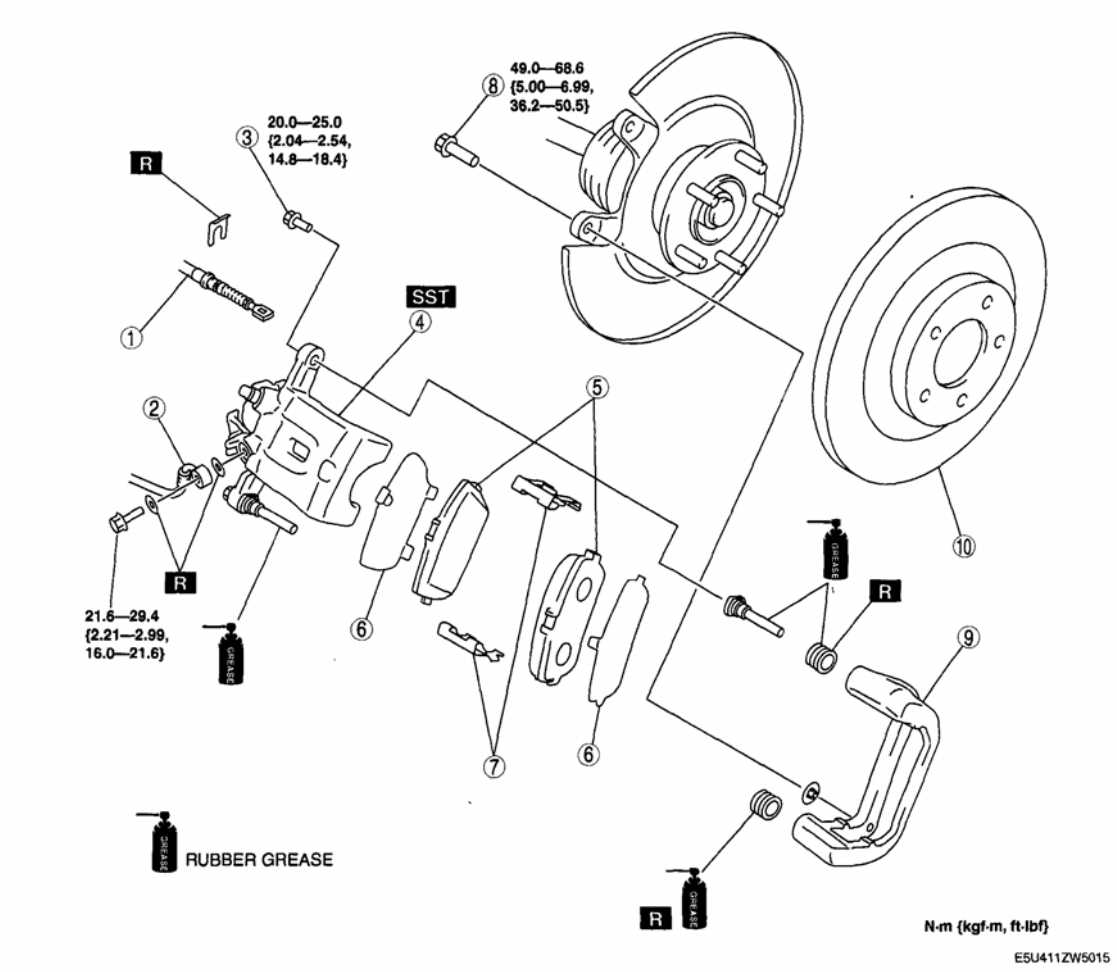


Fig. 42: Inspecting Disc Pad Thickness
Courtesy of MAZDA MOTORS CORP.

REAR BRAKE (DISC) REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 43** .
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, and inspect the following.
   - The disc pad projection is securely installed to the piston groove
   - Parking brake lever stroke
   - Brake drag



1	Parking brake cable
2	Brake hose
3	Bolt
4	Caliper
5	Disc pad

6	Shim
7	Guide plate
8	Bolt
9	Mounting support
10	Disc plate

Fig. 43: Identifying Rear Brake (Disc) Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

DISC PLATE REMOVAL NOTE

1. Mark the wheel hub and disc plate.
2. Remove the disc plate.

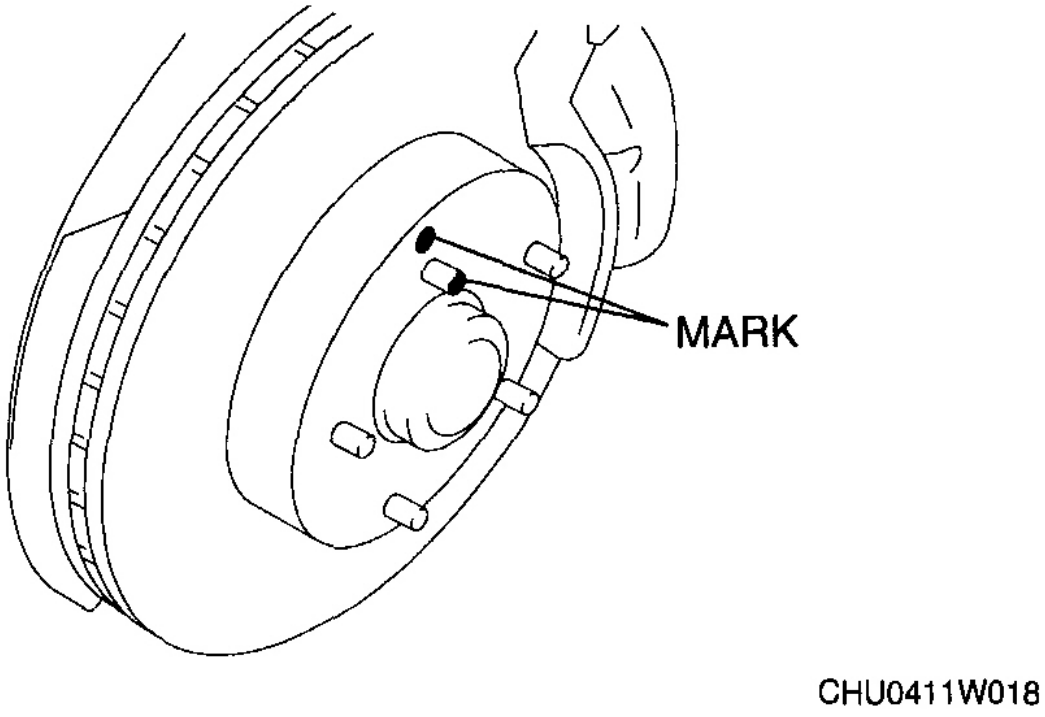


Fig. 44: Identifying Wheel Hub & Disc Plate Mark
Courtesy of MAZDA MOTORS CORP.

DISC PLATE INSTALLATION NOTE

1. Remove any rust or foreign material from the wheel hub and disc plate.
2. Align the marks made before removal and install the disc plate to the wheel hub.

CALIPER INSTALLATION NOTE

1. Clean the exposed area of the piston.
2. Rotate the piston clockwise slowly using the **SST** and push the piston completely until the piston grooves are in the position shown in **Fig. 45** .
3. Install the caliper.

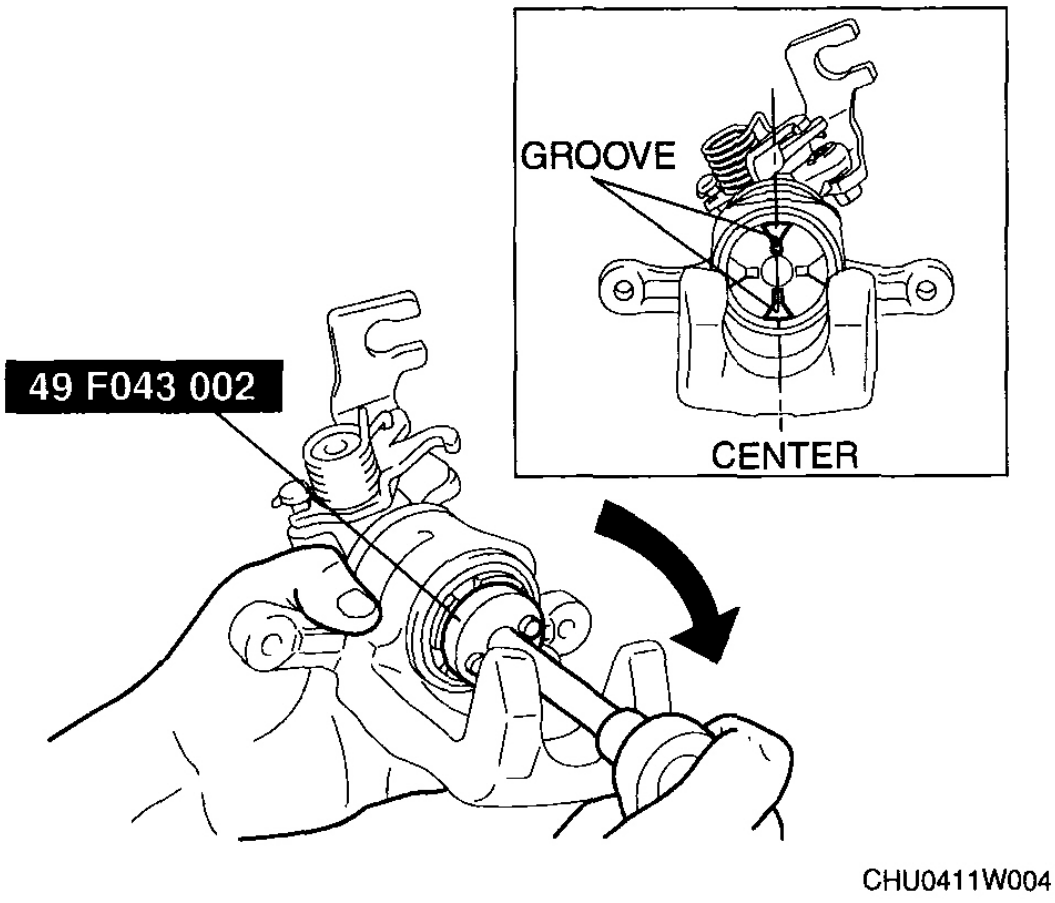


Fig. 45: Rotating Piston Clockwise Using SST
Courtesy of MAZDA MOTORS CORP.

PARKING BRAKE CABLE INSTALLATION NOTE

1. After installing the parking brake cable, verify that the operating lever returns to the stopper nut with the parking brake lever released.

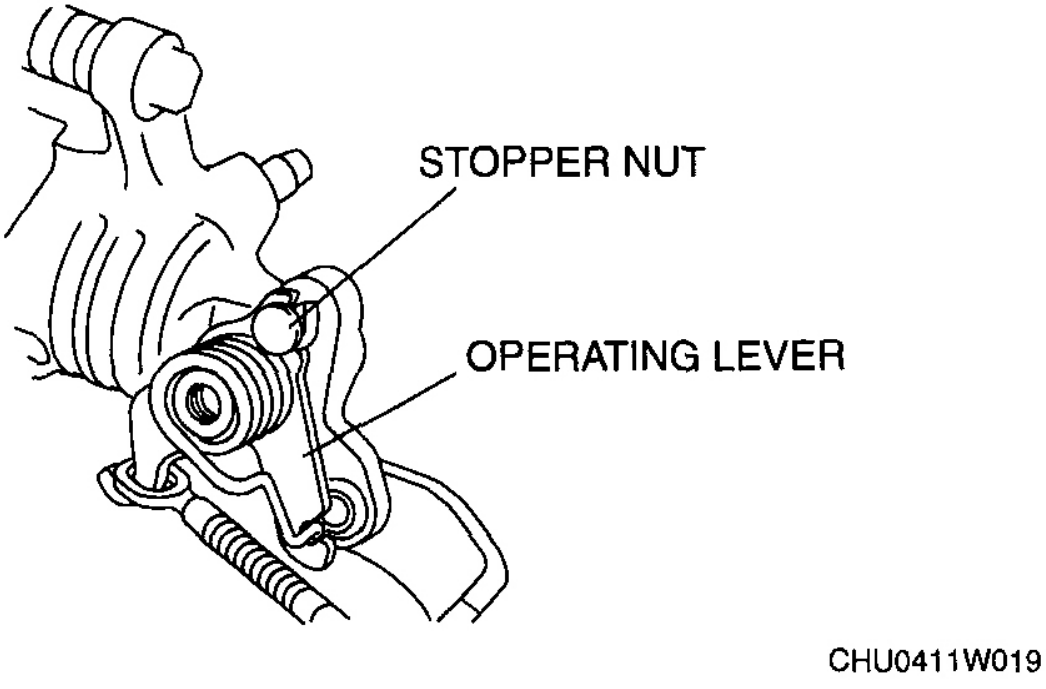
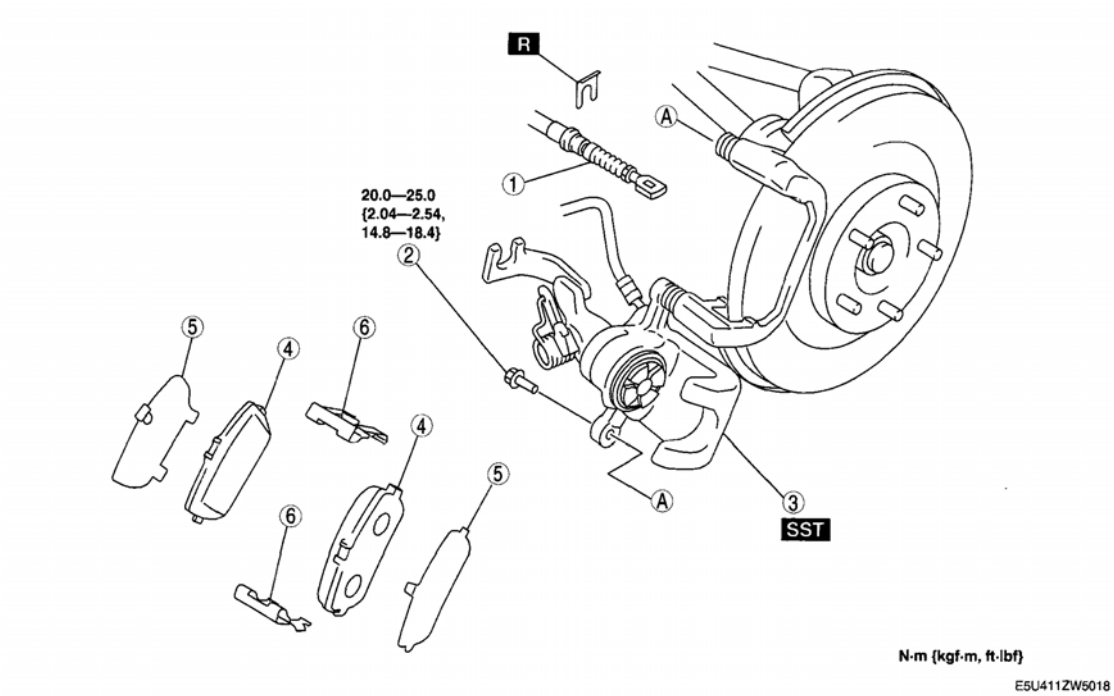


Fig. 46: Identifying Stopper Nut & Operating Lever
Courtesy of MAZDA MOTORS CORP.

DISC PAD (REAR) REPLACEMENT

1. Remove in the order indicated in **Fig. 47** .
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, and inspect the following.
    - The disc pad projection is securely installed to the piston groove
    - Parking brake lever stroke
    - Brake drag



1	Parking brake cable
2	Bolt

3	Caliper
4	Disc pad
5	Shim
6	Guide plate

Fig. 47: Identifying Disc Pad (Rear) Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

CALIPER INSTALLATION NOTE

1. Clean the exposed area of the piston.
2. Rotate the piston clockwise slowly using the **SST** and push in the piston completely until the piston grooves are in the position shown in **Fig. 48** .

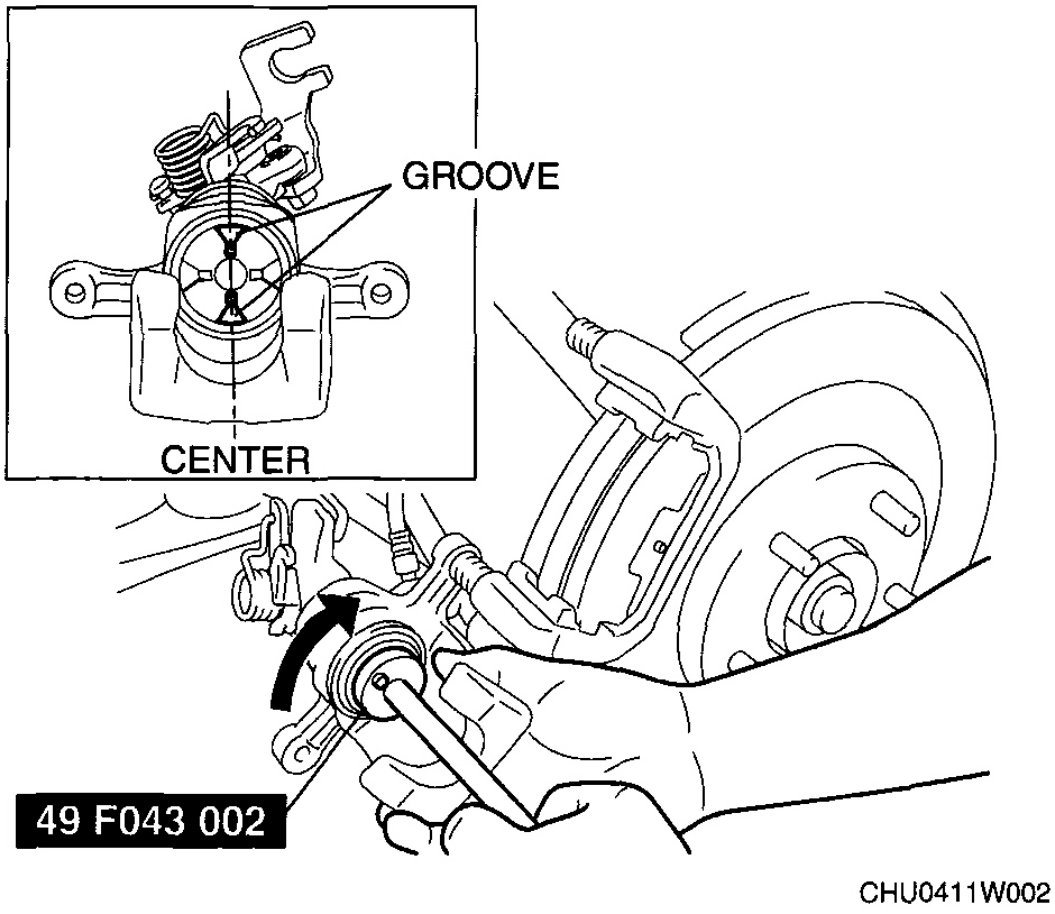
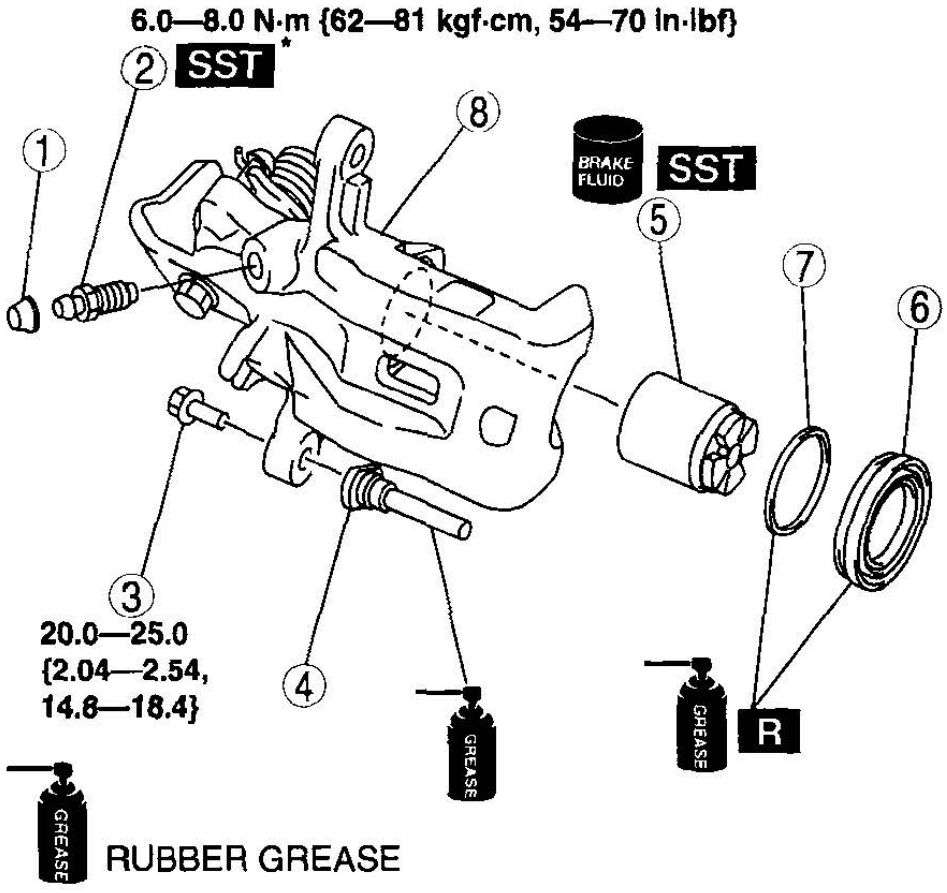


Fig. 48: Rotating Piston Clockwise Using SST
Courtesy of MAZDA MOTORS CORP.

3. Install the caliper.

CALIPER (REAR) DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in **Fig. 49** .



E5U411ZW5025

1	Bleeder cap
2	Bleeder screw
3	Bolt
4	Sleeve
5	Piston
6	Dust seal
7	Piston seal
8	Caliper body

Fig. 49: View Of Caliper (Rear) Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

2. Assemble in the reverse order of disassembly.

PISTON DISASSEMBLY NOTE

1. Rotate the piston counter-clockwise using the **SST** , remove the piston from the caliper body.

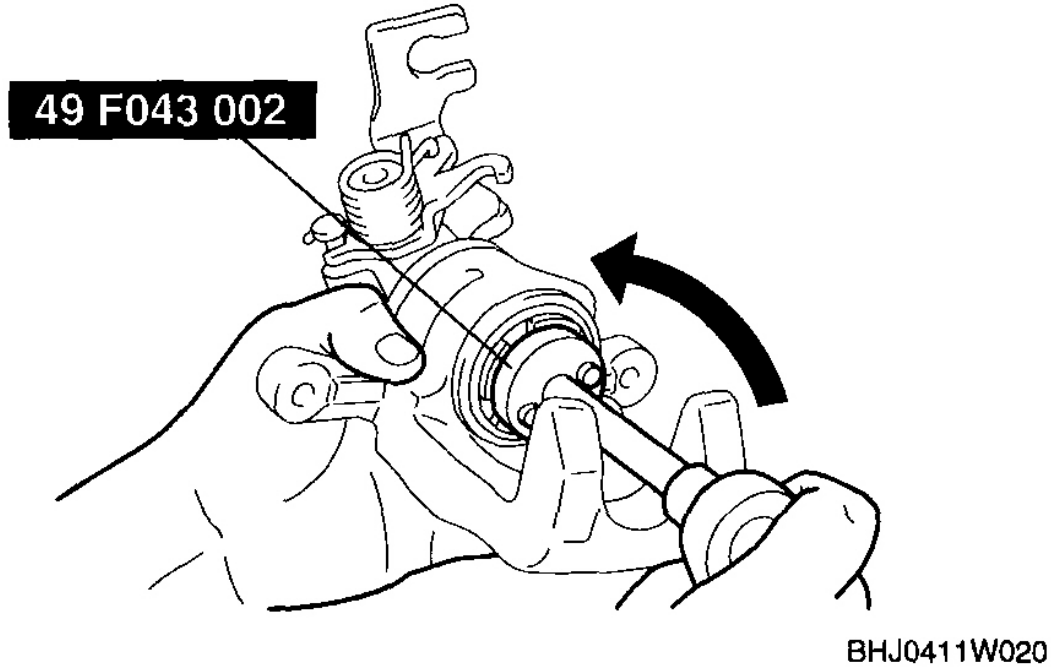


Fig. 50: Rotating Piston Counter-Clockwise Using SST
Courtesy of MAZDA MOTORS CORP.

DUST SEAL, PISTON ASSEMBLY NOTE

1. Assemble the dust seal to the piston.
2. Assemble the lip of the dust seal to the groove of the caliper body with the dust seal is assembled to the piston as shown in **Fig. 51** .

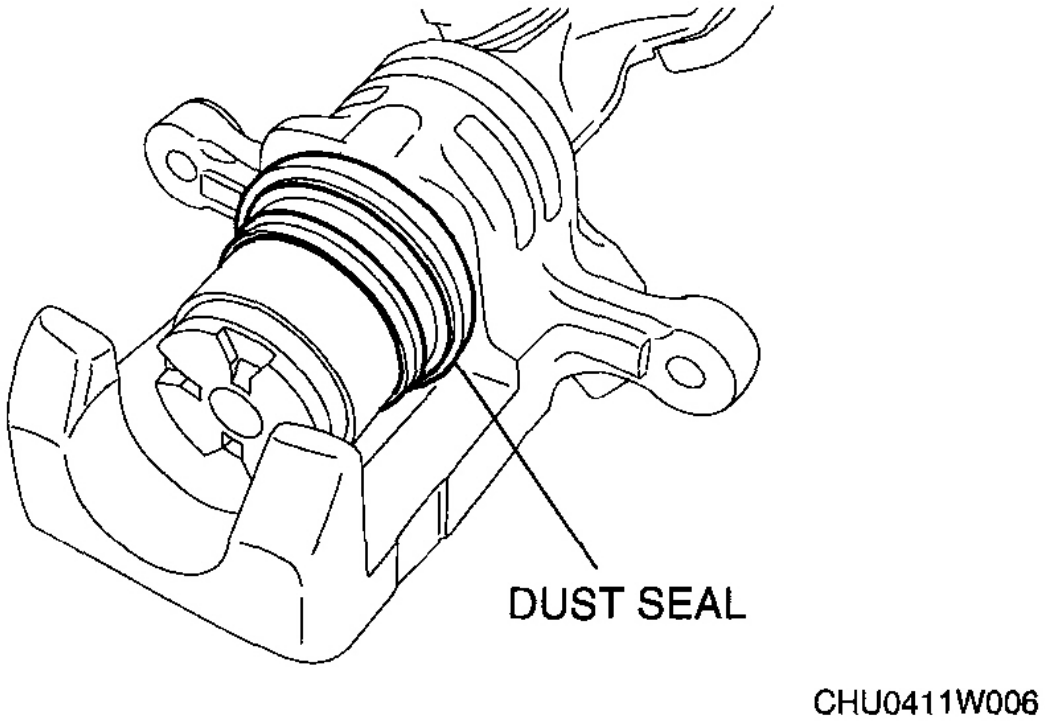


Fig. 51: Assembling Lip Of Dust Seal
Courtesy of MAZDA MOTORS CORP.

3. Rotate the piston clockwise using the **SST** slowly and push the piston inwards completely.
4. Verify that the dust seal is installed into the groove of the piston securely.

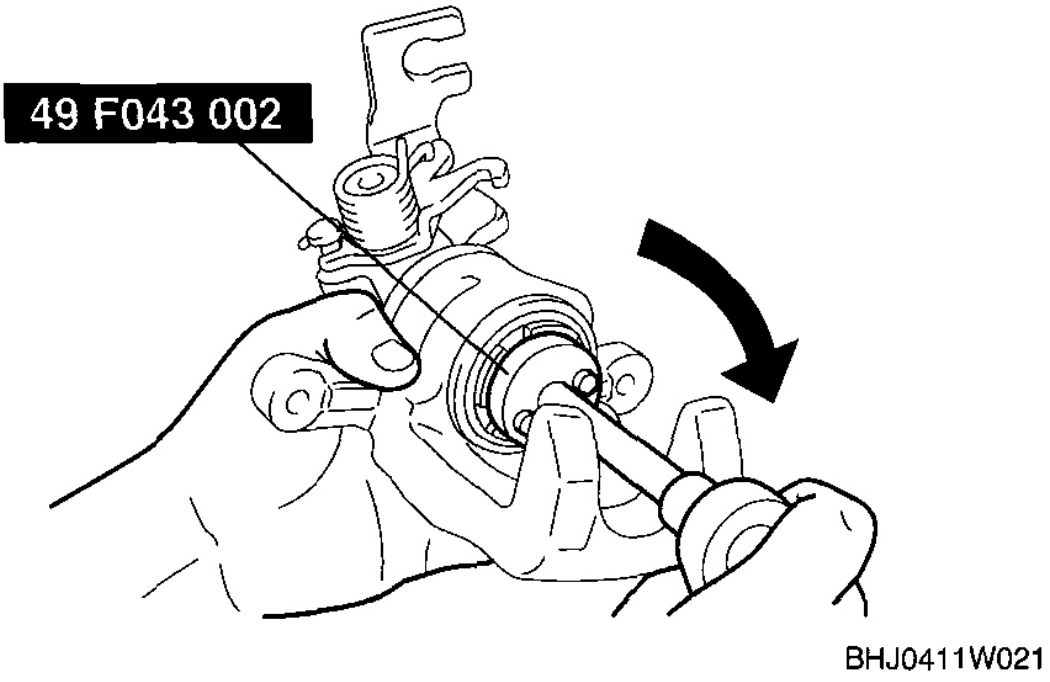
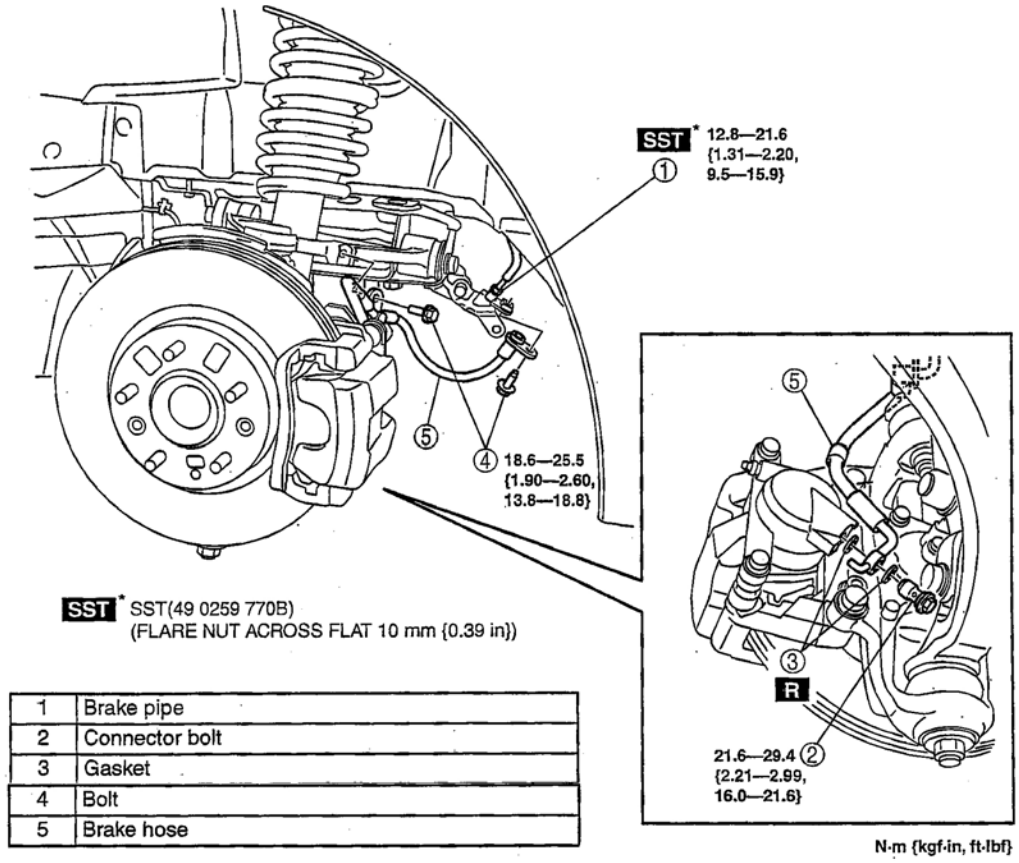


Fig. 52: Rotating Piston Clockwise Using SST
Courtesy of MAZDA MOTORS CORP.

BRAKE HOSE (FRONT) REMOVAL/INSTALLATION

1. Remove in the order indicated in FIG.....
2. Install in the reverse order of removal.
3. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See **AIR BLEEDING**.)

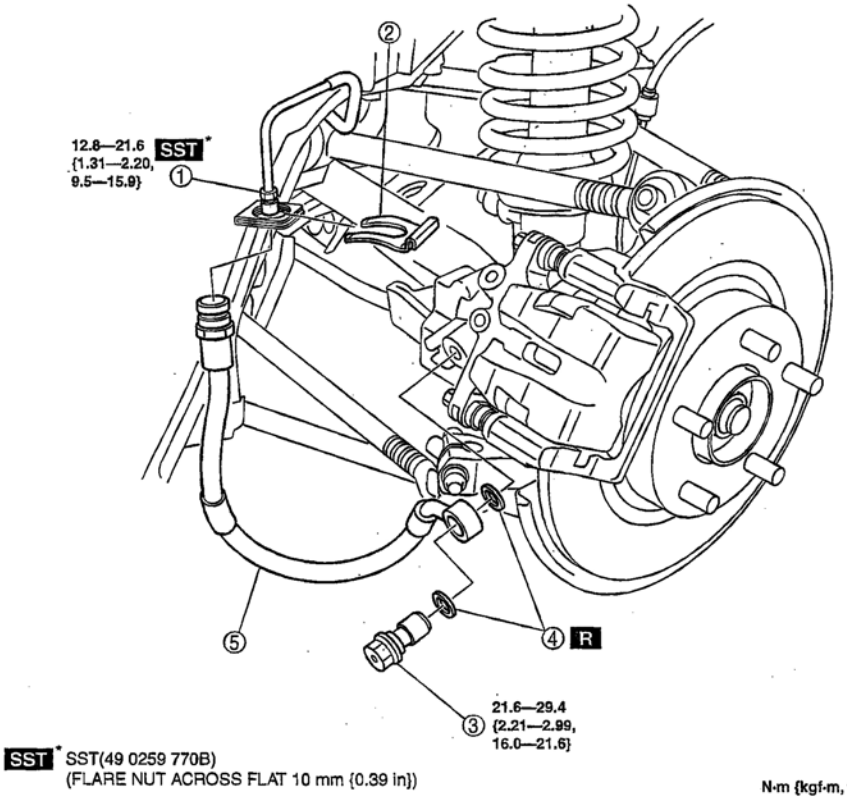


1	Brake pipe
2	Connector bolt
3	Gasket
4	Bolt
5	Brake hose

Fig. 53: Identifying Brake Hose (Front) Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

BRAKE HOSE (REAR) REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See **AIR BLEEDING**.)



1	Brake pipe
2	Clip
3	Connector bolt

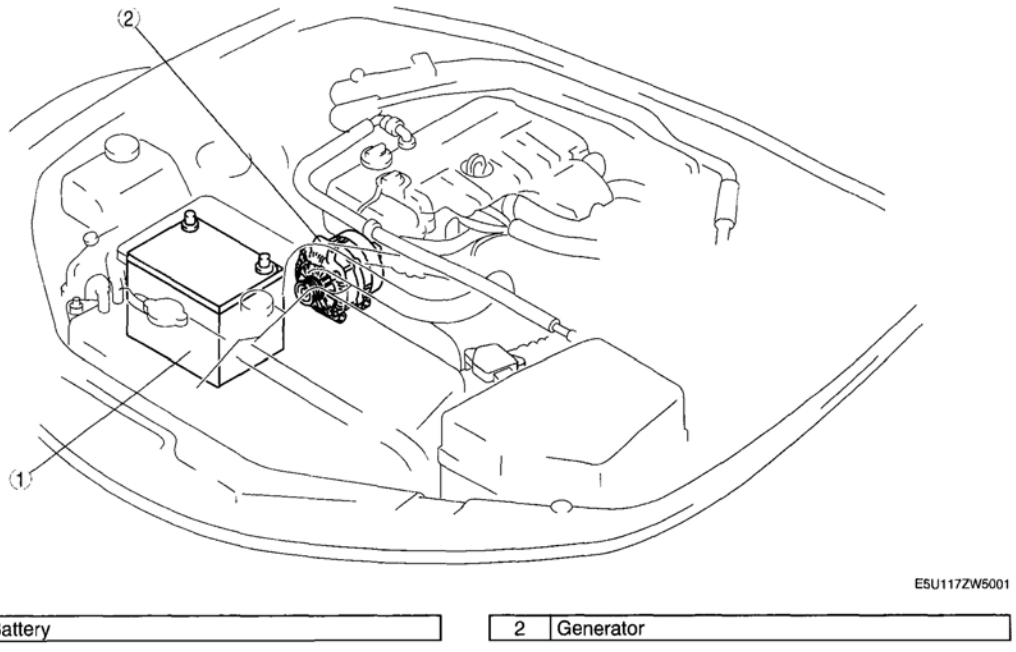
4	Gasket
5	Brake hose

Fig. 54: Identifying Brake Hose (Rear) Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

2008 ELECTRICAL

Charging System - MX-5 Miata

CHARGING SYSTEM LOCATION INDEX [LF]



1	Battery
2	Generator

Fig. 1: Identifying Location Of Charging System Components
Courtesy of MAZDA MOTORS CORP.

BATTERY REMOVAL/INSTALLATION [LF]

WARNING:

- **For vehicles with DSC, if the negative battery cable is disconnected, the stored initial position of the steering angle sensor will be cleared and the DSC will not operate properly, making the vehicle unsafe to drive. Perform the steering angle sensor initialization procedure after connecting the negative battery cable.**

1. Remove in the order indicated in **Fig. 2** .
2. Install in the reverse order of removal.
3. Perform the steering angle sensor initialization procedure. (See **STEERING ANGLE SENSOR INITIALIZATION PROCEDURE** .)

1	Battery cover
2	Negative battery cable
3	Positive battery cable
4	Battery clamp
5	Battery
6	Battery box
7	Battery tray
8	Battery duct

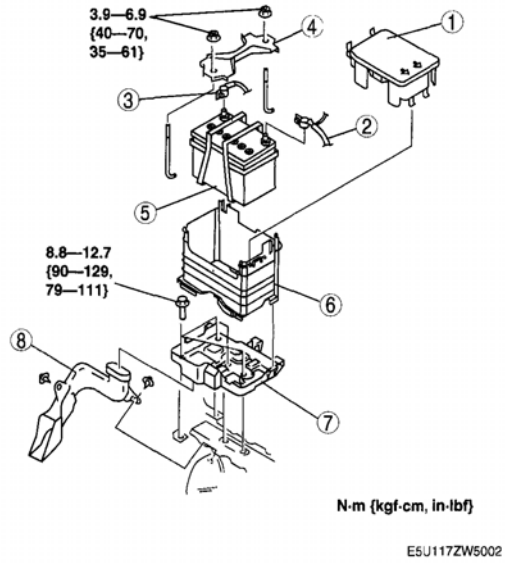


Fig. 2: Identifying Removal Order Of Battery & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

BATTERY COVER REMOVAL NOTE

1. Remove the rubber hose from the battery cover.

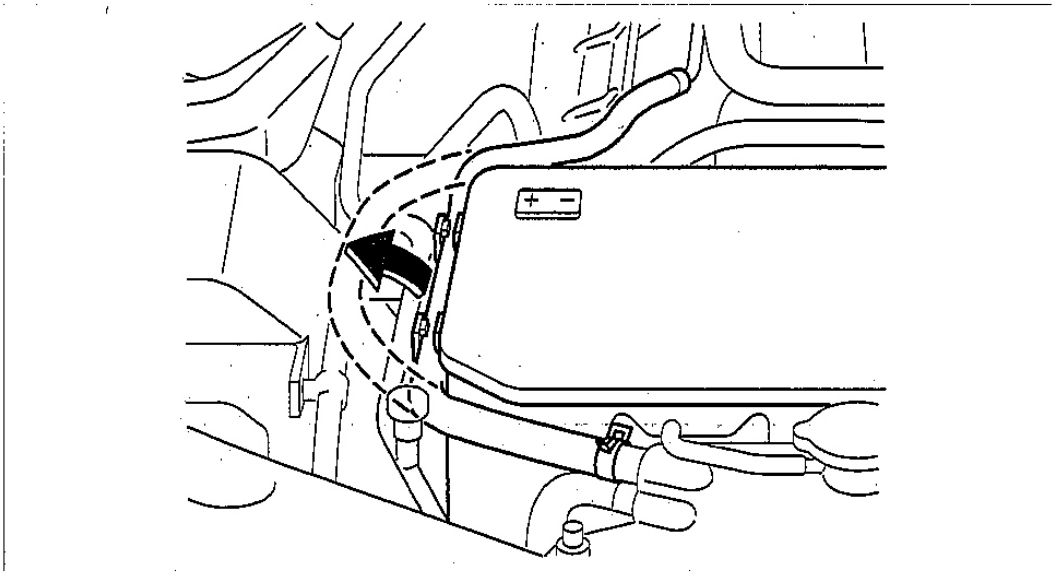


Fig. 3: View Of Rubber Hose
Courtesy of MAZDA MOTORS CORP.

2. Remove the battery cover from its right side.

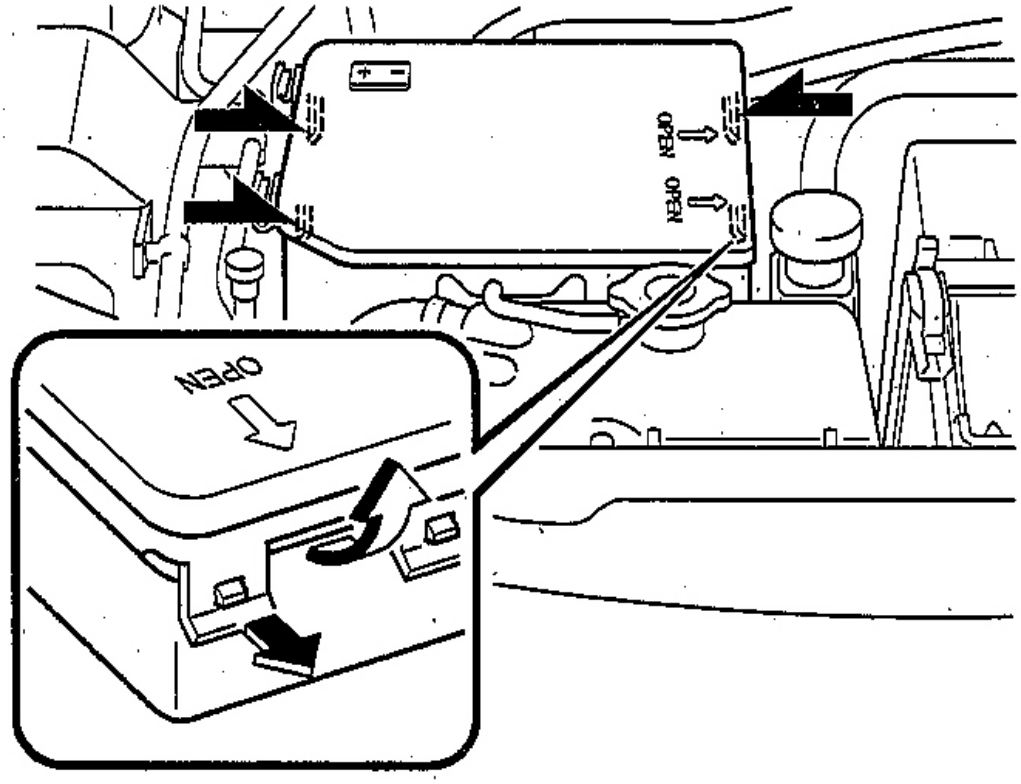


Fig. 4: View Of Right Side Battery Cover
Courtesy of MAZDA MOTORS CORP.

BATTERY DUCT REMOVAL NOTE

1. Remove the under cover.
2. Remove the battery duct.

NEGATIVE BATTERY CABLE INSTALLATION NOTE

1. When connecting the negative battery cable to the battery, connect the negative battery cable and the ground cable as shown in **Fig. 5** .

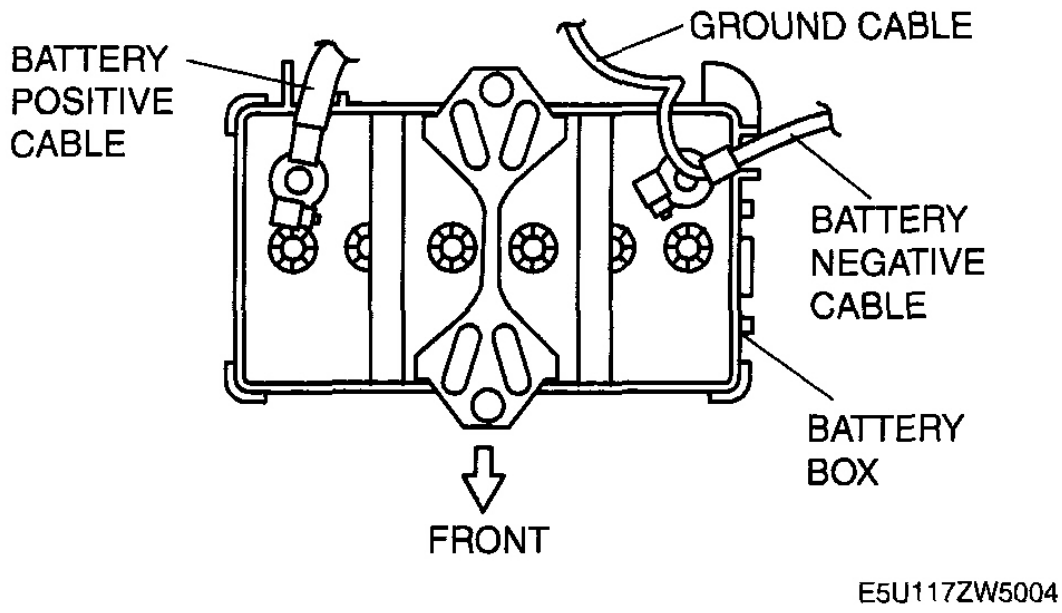


Fig. 5: Connecting Negative Battery Cable
Courtesy of MAZDA MOTORS CORP.

BATTERY INSPECTION [LF]

WARNING:

- **Since battery acid is toxic, be careful when handling the battery.**
- **Since battery acid is highly corrosive, be careful not to allow it to contact clothing or the vehicle.**
- **In case battery acid contacts skin, eyes, or clothing, flush it immediately with running water. Especially if the acid gets in the eyes, flush with water for more than 15 min. and get prompt medical attention.**

ELECTROLYTE SPECIFIC GRAVITY

1. Measure the electrolyte specific gravity using a hydrometer.
   - If it is less than the specification, recharge the battery. (See **BATTERY RECHARGING [LF]** .)

Battery electrolyte specific gravity [20°C {68°F}] 1.22-1.29

BATTERY VOLTAGE

1. Inspect the battery as follows:

BATTERY INSPECTION TABLE

Step	Inspection		Action
1	Measure the battery positive voltage.	12.4 V or more	Go to Step 3.
		Less than 12.4 V	Go to the next step.
2	Quick charge for **30 min.** and recheck voltage.	12.4 V or more	Go to the next step.
		Less than 12.4 V	Replace the battery.
3	Using the battery load tester, apply load current (see Battery load test current) and record battery voltage after **15 s.** Is voltage more than specification?	Yes	Normal
		No	Replace the battery.

Battery load test current

46B24L (36): 135 A

STANDARD SPECIFICATION

BATTERY STANDARD SPECIFICATION

Battery temp. (°C {°F})	Minimum voltage (V)
4 {39}	9.3
10 (50}	9.4
16 (61}	9.5
21 {70}	9.6

BACK-UP CURRENT

1. Verify that the ignition switch is off (key has been removed) and that all doors are closed.
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Connect the tester between the negative battery terminal and negative battery cable, leave the battery undisturbed for **30 min.** , and then measure the back-up current.
   - If not within the specification, measure the back-up current while removing the fuses one by one from the inside of the main fuse block and the inside of the fuse block.

NOTE:

- **If the battery is not left undisturbed for 30 min., the tester will indicate a high value (approx. 300 mA).**
- **If the key or any electrical accessory is operated within approx. 30 min. after the tester is connected, the battery must be left undisturbed for approx. 30 min. from that point.**

CAUTION:

- **Operating electrical loads while the back-up current is being measured can damage the tester.**

NOTE:

- **For vehicles with the immobilizer system, the system periodically shifts synchronization of the security light flashing. Therefore, 45 mA (0.1s) current is supplied when the security light is illuminated, and 25 mA (2s) current is supplied when the security light is not illuminated. In addition, the measuring instrument, which shows the average value, indicates around 30 mA.**

Battery back-up current

Vehicles with immobilizer system: 25-45 Ma

Vehicles without immobilizer system: 30 mA or less

5. Inspect and repair wiring harnesses and connectors of the fuse where the current has decreased.

BATTERY RECHARGING [LF]

WARNING:

- **Keep all flames away from the battery, otherwise evaporated gas from the battery fluid may catch fire, and cause serious injury.**
- **Remove the battery filler caps when recharging to prevent battery deformation or damage.**

CAUTION:

- **Do not quick charge for more than 30 min. It will damage the battery.**

1. Remove the battery and then place it in a pan of water.
2. Connect a battery charger to the battery and adjust the charging current as follows.

Battery slow charge current

46B24L (36): 3.5-4.5 A

Battery quick charge current [30 min.]

46B24L (36): 25 A

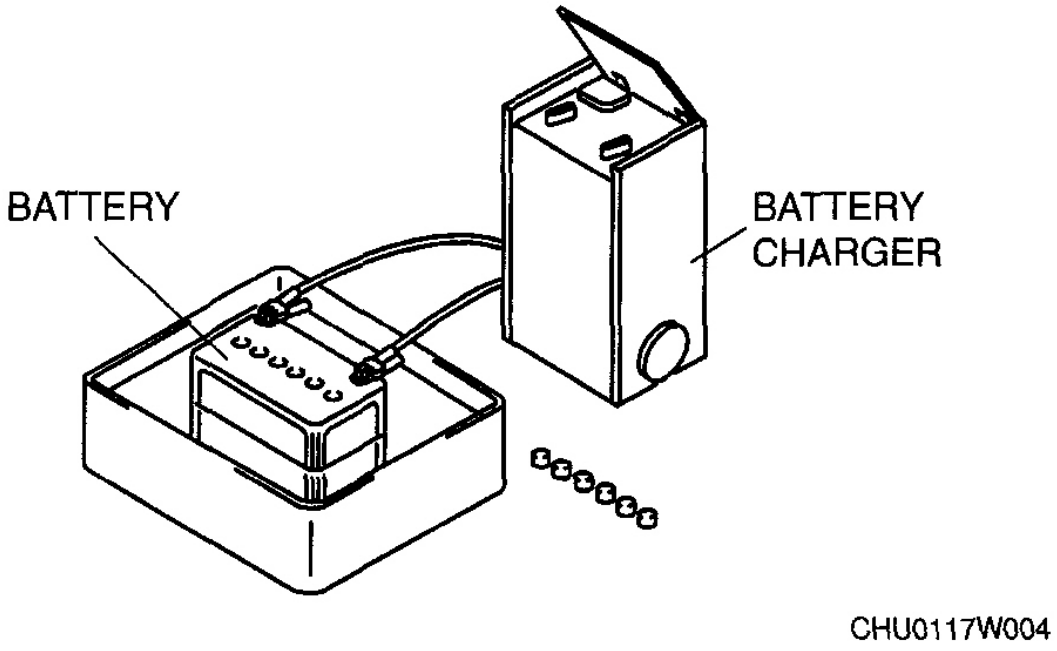


Fig. 6: Connecting Battery Charger To Battery
Courtesy of MAZDA MOTORS CORP.

3. After the battery is recharged, verify that the voltage is within the specification and remains at the same value for **1 h or more** after the recharging was completed.
   - If not within the specification, replace the battery.

Standard voltage

12.4 V or more

GENERATOR REMOVAL/INSTALLATION [LF]

WARNING:

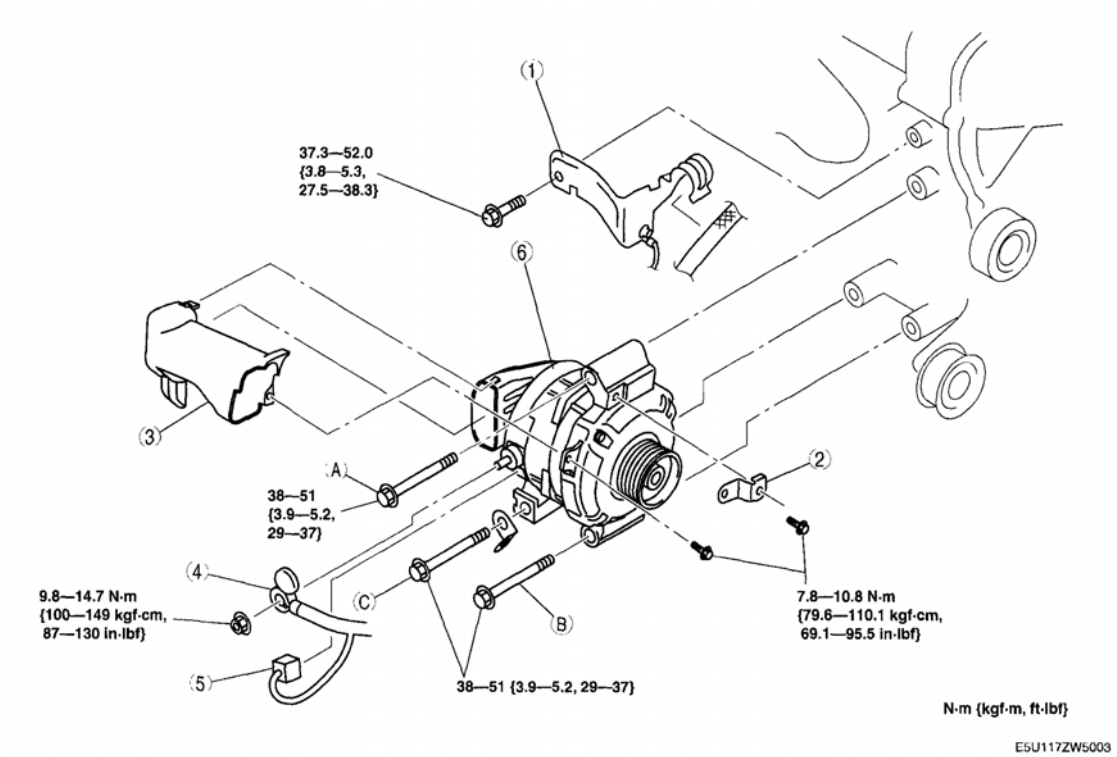
- **Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.**
- **When the battery cables are connected, touching the vehicle body with generator terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the battery negative cable before performing the following operation.**

CAUTION:

- **The generator can be damaged by the heat from the exhaust**

manifold. Make sure the generator duct is installed securely.

1. Remove the battery and battery tray. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
2. Remove the drive belt. (See **DRIVE BELT REPLACEMENT [LF]** .)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



1	P/S pressure hose bracket
2	Generator bracket
3	Generator duct
4	B terminal cable
5	Generator connector
6	Generator

Fig. 7: Identifying Removal Order Of Generator (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

GENERATOR INSTALLATION NOTE

1. Tighten bolt A temporarily.
2. Tighten bolt B, C to the specified tightening torque.
3. Tighten bolt A to the specified tightening torque.

GENERATOR INSPECTION [LF]

CAUTION:

- **Do not apply direct battery positive voltage to the generator terminal D, otherwise it could cause damage to the internal parts (power transistor) of the generator.**

GENERATOR WARNING LIGHT

1. Verify that the battery is fully charged.
2. Verify that the drive belt deflection/tension is correct. (See **DRIVE BELT INSPECTION [LF]** .)
3. With the ignition switch turned to the ON position, verify that the generator warning light illuminates.
   - If it does not illuminate, inspect the generator warning light and the wiring harness.
     - If the generator warning light and the wiring harness are normal, inspect the PCM.
4. Verify that the generator warning light goes out after the engine is started.
   - If it does not go out, inspect if any one of the following DTCs in the on-board diagnostic system are displayed: P0112, P0113, P2502, P2503, P2504. (See **DTC TABLE [LF]** .)

GENERATOR

Voltage

1. Verify that the battery is fully charged.
2. Verify that the drive belt deflection/tension is correct. (See **DRIVE BELT INSPECTION [LF]** .)
3. Turn off all electrical loads.
4. Start the engine.
5. Verify that the generator rotates smoothly without any noise while the engine is running.
   - If there is any noise, find the cause and repair or replace the generator.
6. Measure the voltage at each terminal using a tester.

   Generator standard voltage [IG-ON]

   Terminal B: B+

   Terminal P: Approx. 1 V or less

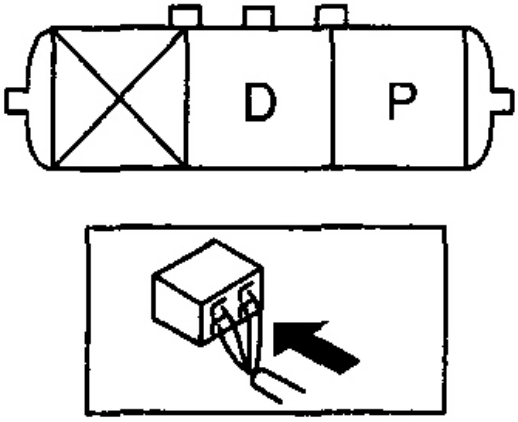
   Terminal D: Approx. 0 V

   Generator standard voltage [Idle, 20°C {68°F}]

   Terminal B: 13-15 V

   Terminal P: Approx. 3-8 V

   Terminal D: Turn the electrical loads (headlights, blower motor, rear window defroster) on and verify that the voltage reading increases.



CPJ117ZWB006

Fig. 8: Identifying Ignition Switch Connector Terminals
Courtesy of MAZDA MOTORS CORP.

Current

NOTE:

- **Since the charging current decreases rapidly after starting the engine, carry out the following procedure quickly, and read the maximum current value.**

1. Verify that the battery is fully charged.
2. Verify that the drive belt deflection/tension is correct. (See **DRIVE BELT INSPECTION [LF]** .)
3. Disconnect the negative battery cable.
4. Connect a tester, which can read **120 A or more** , between generator terminal B and the wiring harness.
5. Connect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
6. Turn off all electrical loads.
7. Start the engine.
8. Increase engine speed to **2,500 rpm.**

NOTE:

- **When the electrical load of the vehicle is low, the specified current**

will not be verified although the generator is normal. In this case, increase the electrical load (by turning on the headlight and leave it for a while, then discharge the battery or by similar methods) and recheck.

- **When the generator itself or the ambient temperature are too high, the specified current cannot be verified. In this case, cool down the generator and recheck.**

9. Turn the following electrical loads on and verify that the current reading increases more than the minimum value indicated below.
    - If it is not as specified, go to the **PCM AND GENERATOR SHEARING INSPECTION**.
    - Headlights (high-beam)
    - Blower motor (HI)
    - Rear window defroster
    - Brake light

    Generator generated current minimum value

    70% of the nominal output current (nominal output current: 100 A)

    [ambient temp. 20°C {68°F}, voltage 13.0-15.0 V, both engine and generator are hot]

PCM AND GENERATOR SHEARING INSPECTION

1. Connect the M-MDS or equivalent to the DLC-2.

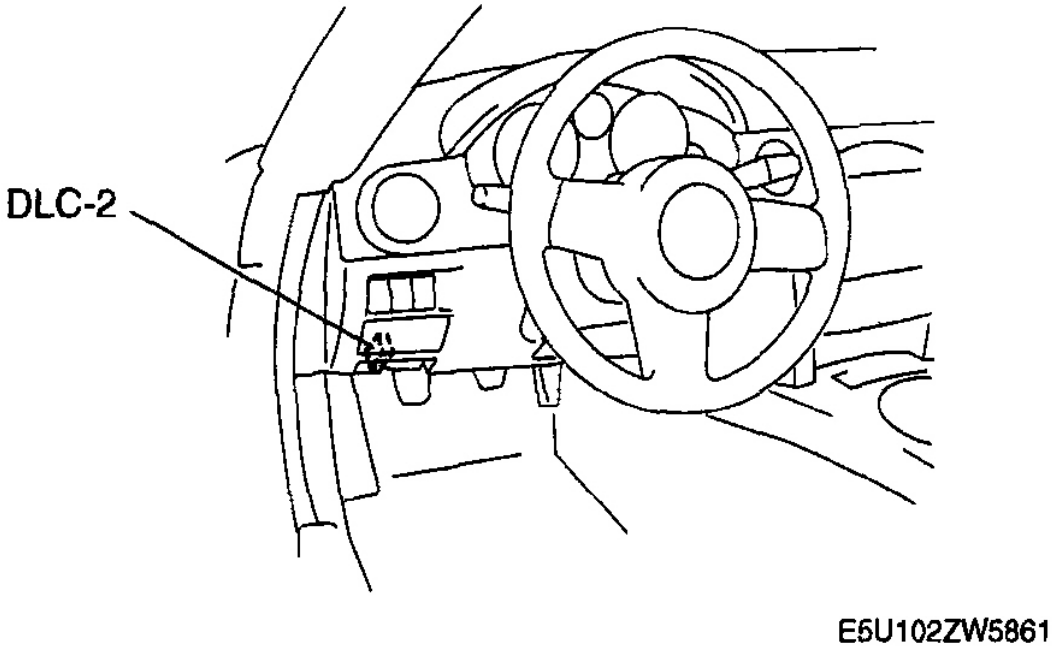
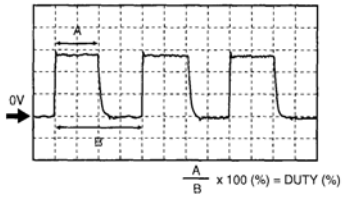
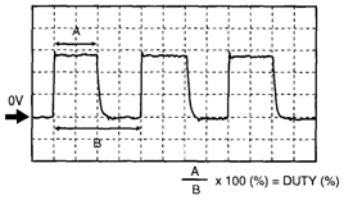


Fig. 9: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

2. Inspect as follows:

PCM AND GENERATOR SHEARING INSPECTION TABLE

Step	Inspection		Action
1	Measure the generator terminal B voltage when the electrical loads (1) are on and off.	15 V or more	Go to Step 2.
		13-15 V	Normal (2)
		13 V or less	Go to Step 3.
2	Monitor the ALTT V PID using the M-MDS or equivalent, or measure the voltage of PCM terminal 2AJ using a tester. Is the voltage between 13 and 15 V?	Yes	Go to Step 4.
		No	PCM input error.
3	Monitor the ALTT V PID using the M-MDS or equivalent, or measure the voltage of PCM terminal 2AJ using a tester. Is the voltage between 13 and 15 V?	Yes	Go to Step 5.
		No	PCM input error.
	Monitor the ALTF PID using the M-MDS or equivalent, or calculate the duty value of the PCM terminal 2AI using an oscilloscope. Is the duty	Yes	PCM input error.

4	 value 100%?	No	PCM, generator, or both are not normal.
5	Monitor the ALTF PID using the M-MDS or equivalent, or calculate the duty value of the PCM terminal 2AI using an oscilloscope. Is the duty  value 0%?	Yes	PCM input error.
		No	PCM, generator, or both are not normal.

(1) Headlights, blower motor, rear window defroster, and brake light.

(2) If the generator field coil duty value does not change when electrical loads (such as headlights, blower motor, rear window defroster, brake light) are on or off, inspection with discharged battery is needed.

GENERATOR INNER PARTS

Rotor

1. Measure the resistance between the slip rings using a tester.
   - If not within the specification, replace the rotor.

   Generator rotor resistance (between slip rings) [20°C {68°F}]

   2.0-2.3 ohm

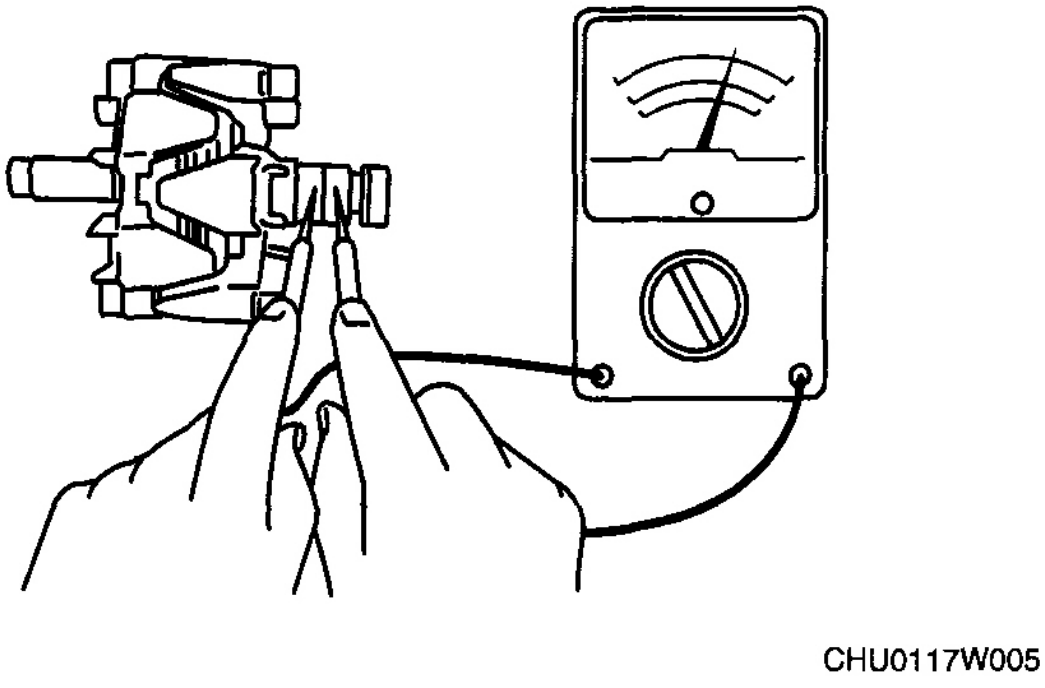


Fig. 10: Measuring Resistance Between Slip Rings Using Tester
Courtesy of MAZDA MOTORS CORP.

2. Verify that there is no continuity between the slip ring and core using a tester.
    - If there is continuity, replace the rotor.

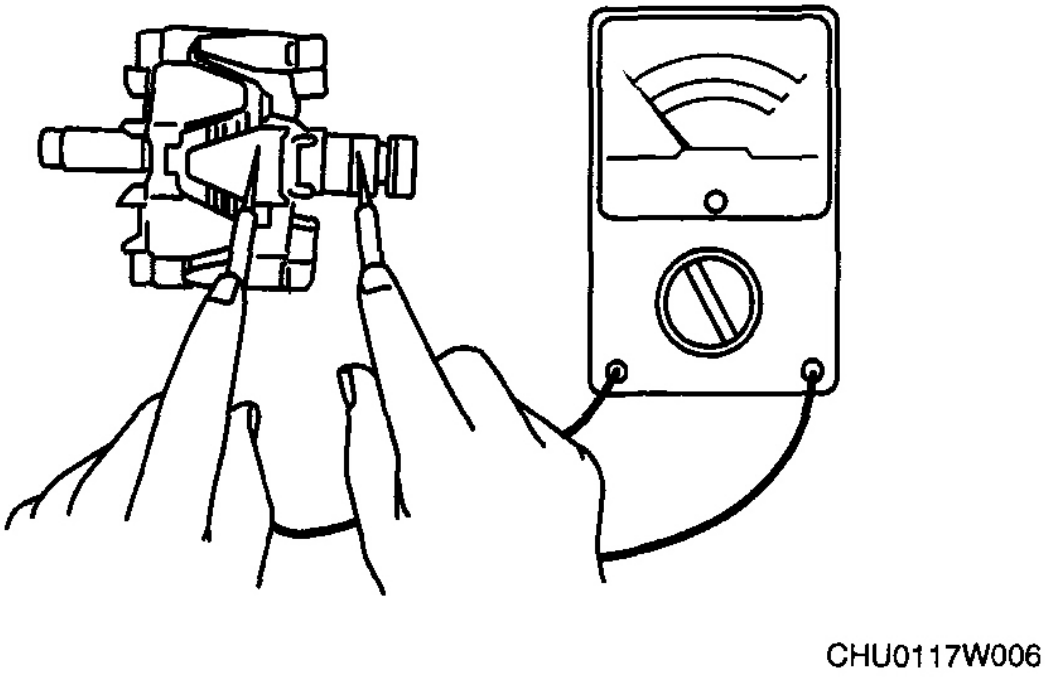


Fig. 11: Verifying There Is No Continuity Between Slip Ring & Core
Courtesy of MAZDA MOTORS CORP.

3. Inspect the slip ring surface condition.
    - If the slip ring surface is rough, use a lathe or fine sandpaper to repair it.

Stator Coil

1. Verify that the continuity is as indicated in **Fig. 12** .

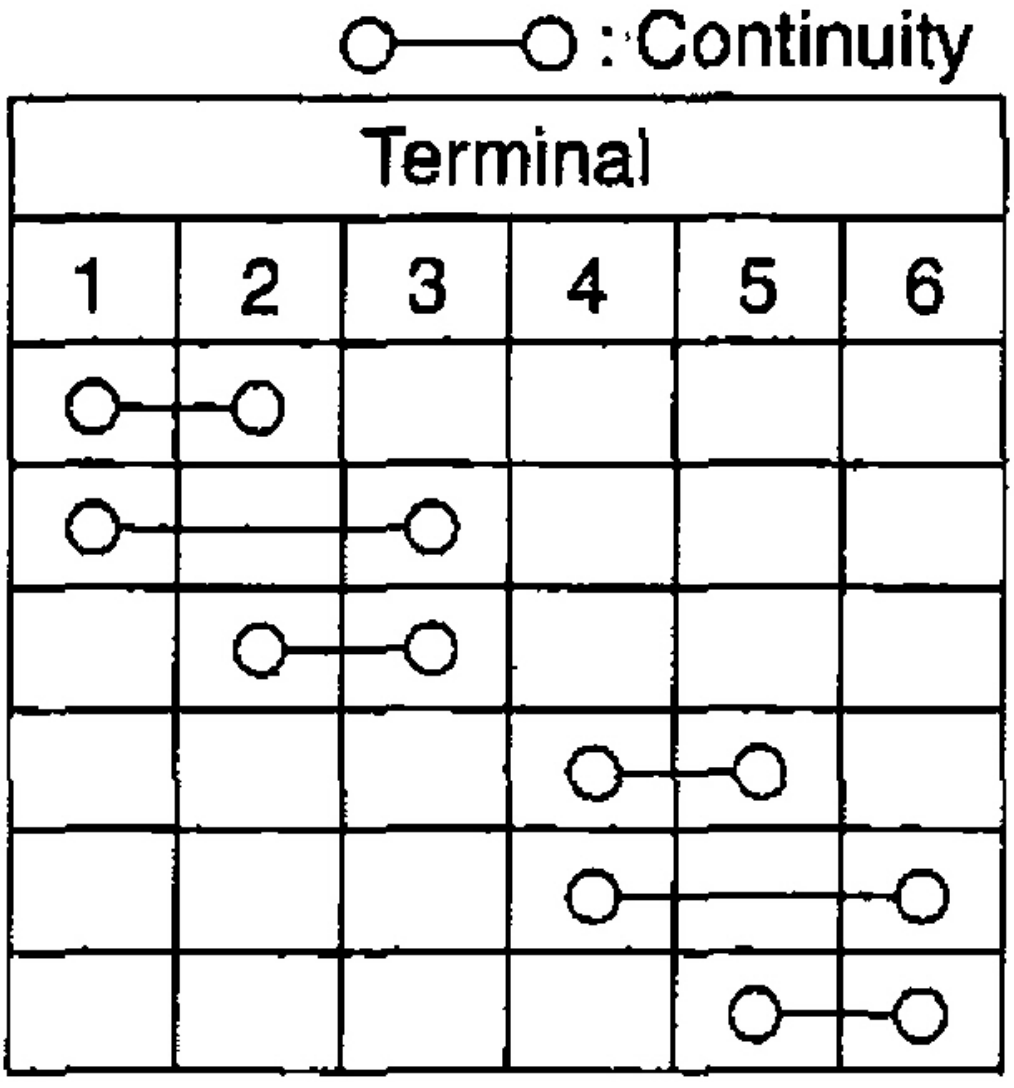


Fig. 12: Stator Coil Terminal Continuity Check Table
Courtesy of MAZDA MOTORS CORP.

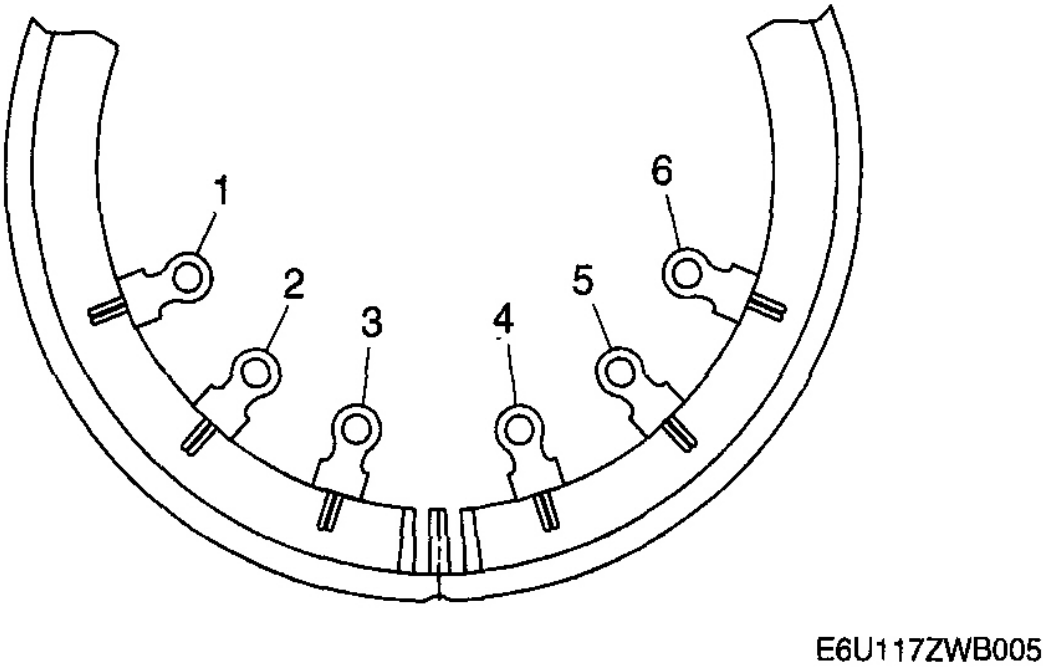


Fig. 13: Identifying Stator Coil Terminals
Courtesy of MAZDA MOTORS CORP.

- If there is any malfunction, replace the stator.

2. Verify that there is no continuity between the stator coil leads and core using a tester.
   - If there is continuity, replace the stator coil.

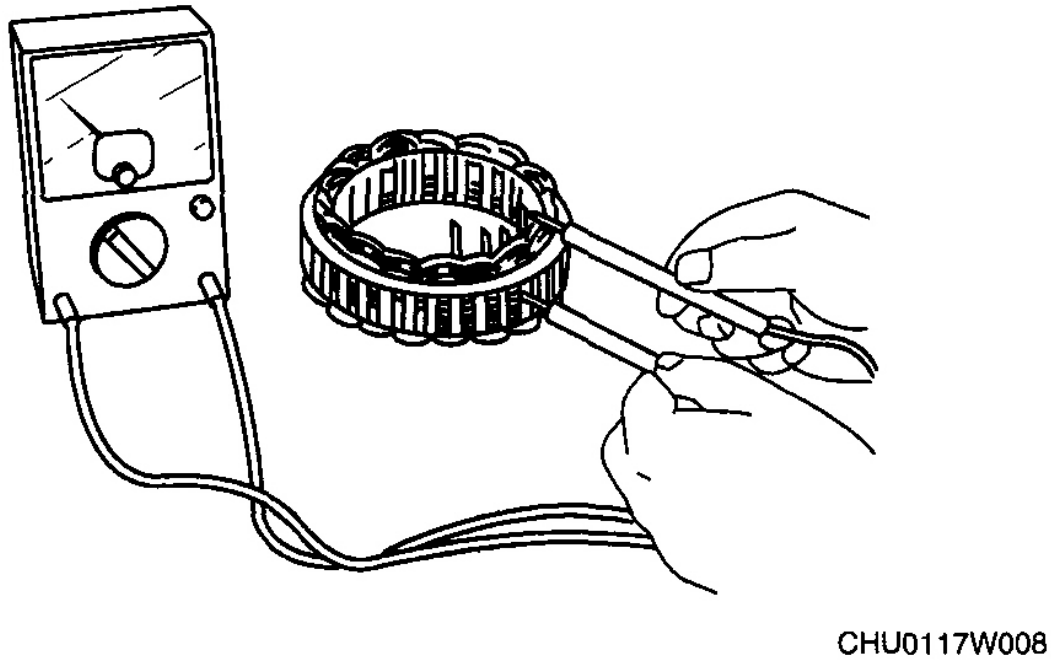


Fig. 14: Inspecting Continuity Between Stator Coil Leads And Core
Courtesy of MAZDA MOTORS CORP.

Brush

1. Inspect brushes for wear.
    - If any brush is worn almost to or beyond the limit, replace all of the brushes.

    Generator brush length

    Standard: 22.5 mm {0.89 in}

    Minimum: 5.0 mm {0.20 in}

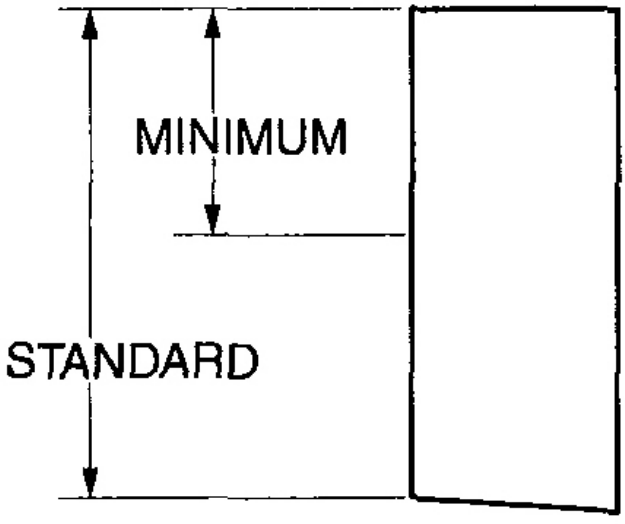


Fig. 15: Inspecting Brushes For Wear
Courtesy of MAZDA MOTORS CORP.

Brush Spring

1. Measure the force of the brush spring using a spring pressure gauge.

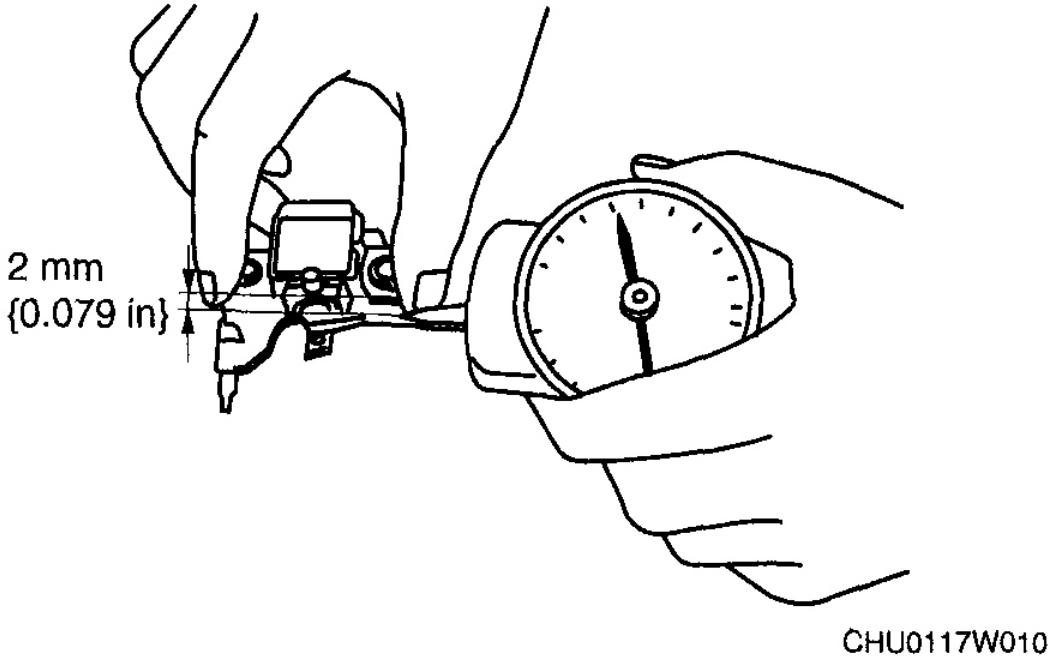


Fig. 16: Measuring Force Of Brush Spring Using Spring Pressure Gauge
Courtesy of MAZDA MOTORS CORP.

2. Read the spring pressure gauge at the brush tip projection of **2 mm {0.079 in}.**
   - Replace the brush spring if necessary.

Generator brush spring force

Standard: 4.1-5.3 N {0.42-0.54 kgf, 0.92-1.19 lbf}

Minimum: 1.7 N {0.17 kgf, 0.38 lbf}

Rectifier (Using an analog circuit tester)

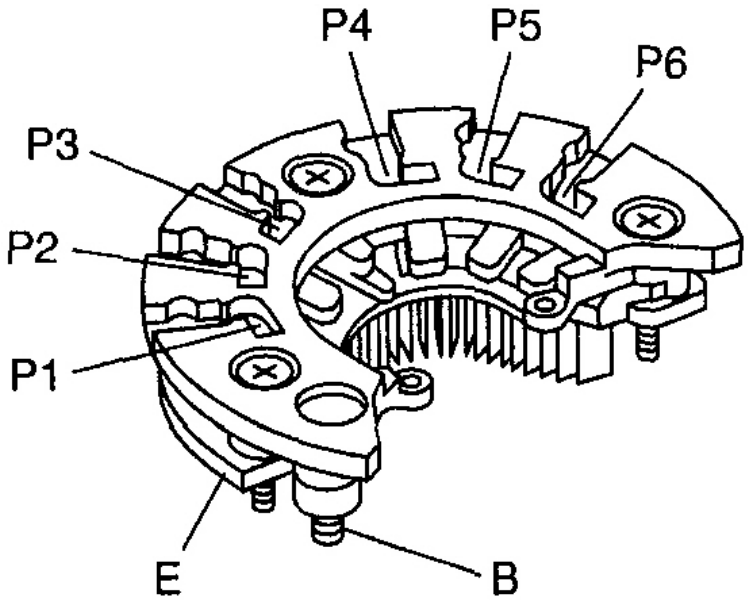
1. Inspect for continuity of the diodes using an analog circuit tester.
   - If not as specified, replace the rectifier.

Specification

RECTIFIER SPECIFICATION USING AN ANALOG CIRCUIT TESTER

Negative	Positive	Continuity
E	P1, P2, P3, P4, P5, P6	Yes

B	-	No
P1, P2, P3, P4, P5, P6	E	No
-	B	Yes



E6U117ZWB007

Fig. 17: Identifying Diodes
Courtesy of MAZDA MOTORS CORP.

Rectifier (Using a digital circuit tester)

1. Inspect for continuity of the diodes using a digital circuit tester.
    - If not as specified, replace the rectifier.

Specification

RECTIFIER SPECIFICATION USING AN DIGITAL CIRCUIT TESTER

Negative	Positive	Continuity
E	P1, P2, P3, P4, P5, P6	No
B	-	Yes
P1, P2, P3, P4, P5, P6	E	Yes
-	B	No

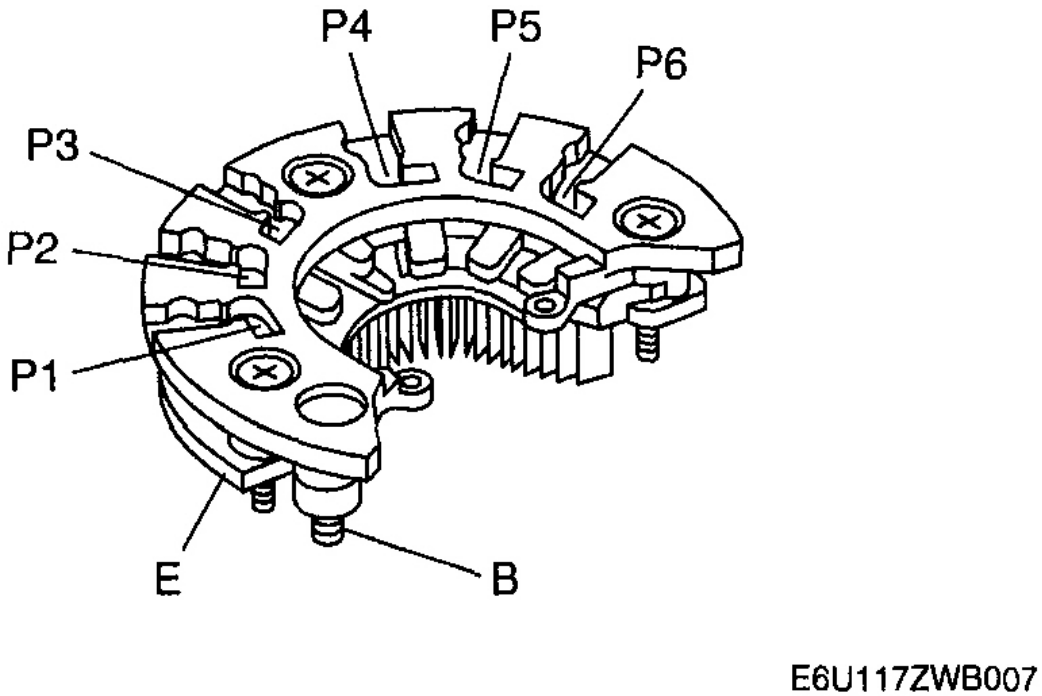
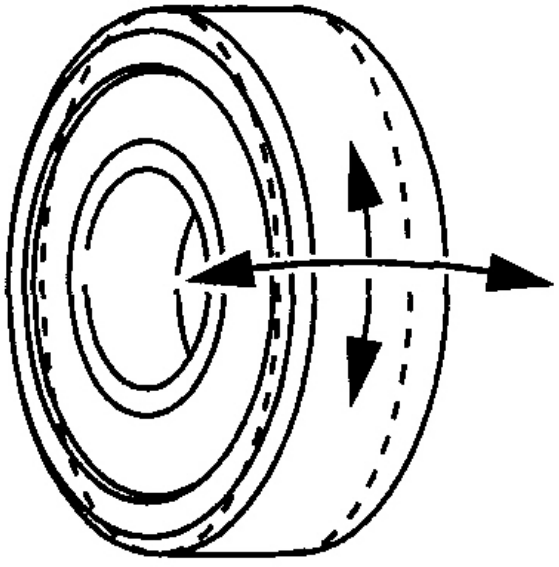


Fig. 18: Identifying Diodes
Courtesy of MAZDA MOTORS CORP.

Bearing

1. Inspect for abnormal noise, looseness, and sticking.
    - Replace the bearing if necessary.



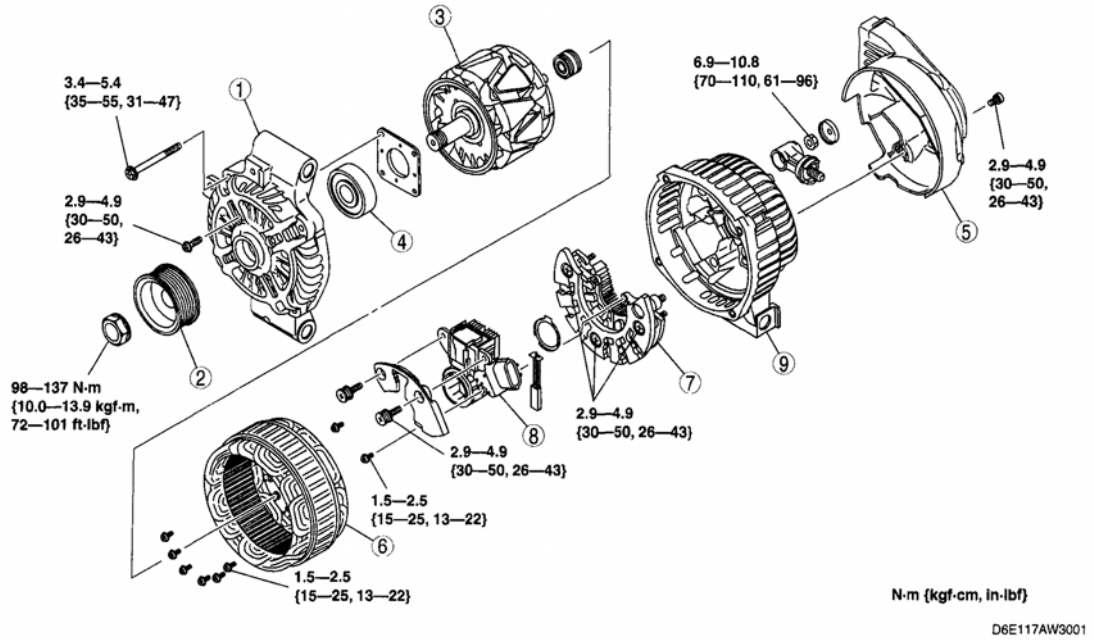
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Fig. 19: Inspecting Bearing
Courtesy of MAZDA MOTORS CORP.

GENERATOR DISASSEMBLY/ASSEMBLY [LF]

CAUTION:
- **Melt the solder quickly, otherwise the diodes (rectifier) and regulator will be damaged by excessive heat.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



1	Front cover
2	Pulley
3	Rotor
4	Bearing
5	Generator heat insulator

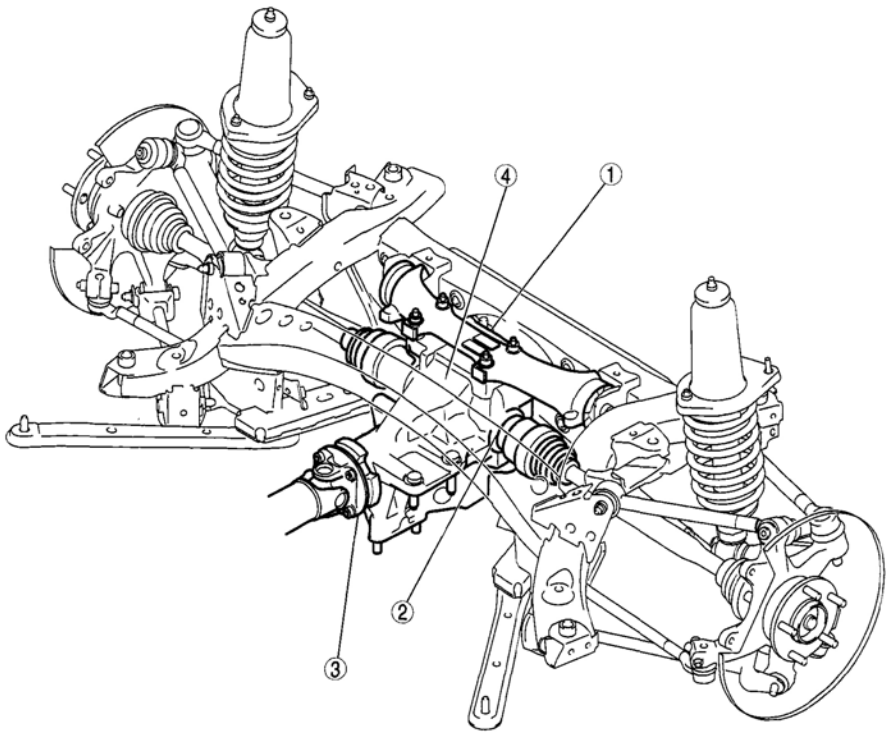
6	Stator coil
7	Rectifier
8	Brush holder
9	Rear bracket

Fig. 20: Identifying Disassemble Order Of Generator (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

2008 DRIVELINE/AXLES

Differential - MX-5 Miata

REAR DIFFERENTIAL LOCATION INDEX



1	Differential oil, oil-fill plug and drain plug	3	Oil seal (companion flange)
2	Oil seal (side gear)	4	Rear differential

Fig. 1: Identifying Location Of Rear Differential Components
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL OIL INSPECTION

1. Park the vehicle on level ground for approx. 5min. to stabilize the differential oil.
2. Remove the oil-fill plug and the washer.

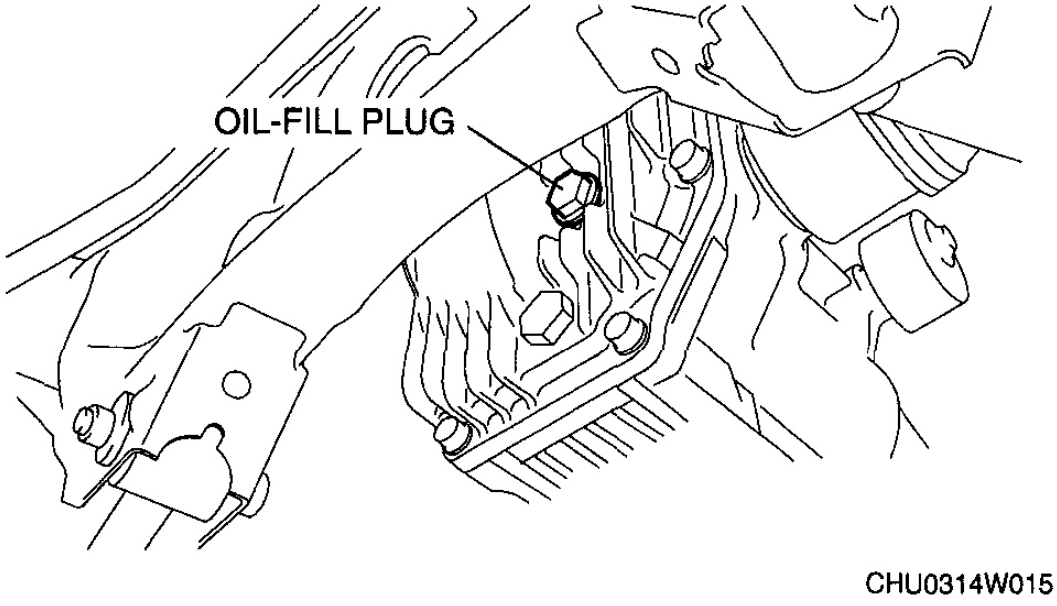


Fig. 2: Identifying Oil-Fill Plug
Courtesy of MAZDA MOTORS CORP.

3. Inspect if the oil level is close to the rim of the oil-fill plug hole.

NOTE:

- **Each vehicle is filled with a specified amount of oil (0.7 +/- 0.1 L) when it is delivered, therefore, the oil level is lower than the lower end of the plug hole as shown in the figure. However, this has no affect on the differential function.**

4. If the oil level is lower than approx. 12 mm {0.47 in} from the lower end of the oil-fill plug hole, inspect for oil leakage and add the specified oil.

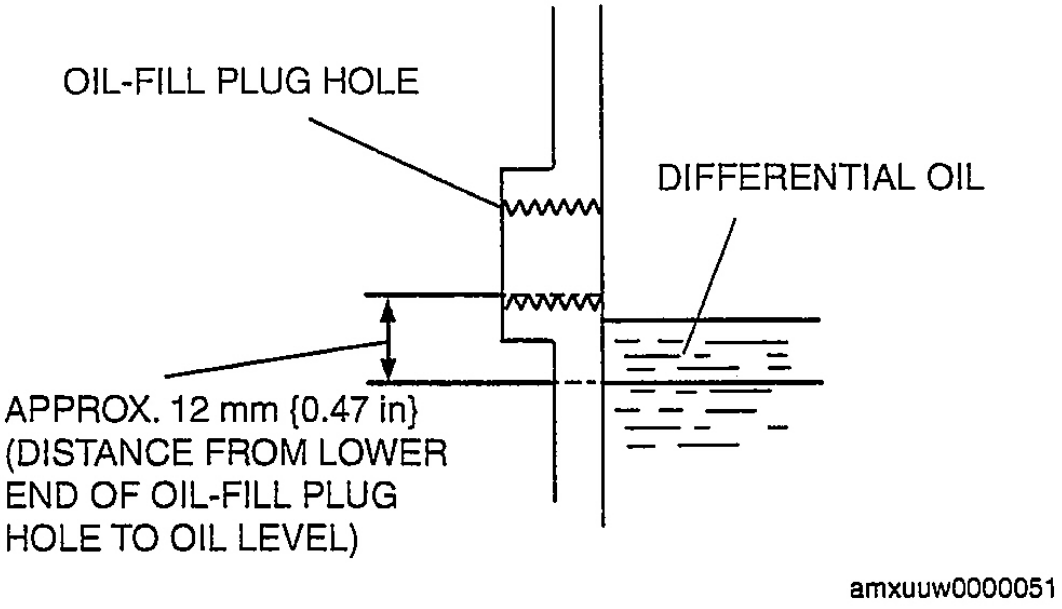


Fig. 3: Identifying Oil Fill Level
Courtesy of MAZDA MOTORS CORP.

Differential oil

Grade: API service GL-5

Viscosity: SAE 90, SAE 80W-90, SAE 75W-90 (Not available from Mazda)

5. Install the oil-fill plug with a new washer and tighten.

   Tightening torque

   39.2-53.9 N.m {4.00-5.49 kgf.m, 29.0-39.7 ft.lbf}

DIFFERENTIAL OIL REPLACEMENT

1. Park the vehicle on level ground.
2. Remove the oil-fill plug.
3. Remove the drain plug and drain the oil.

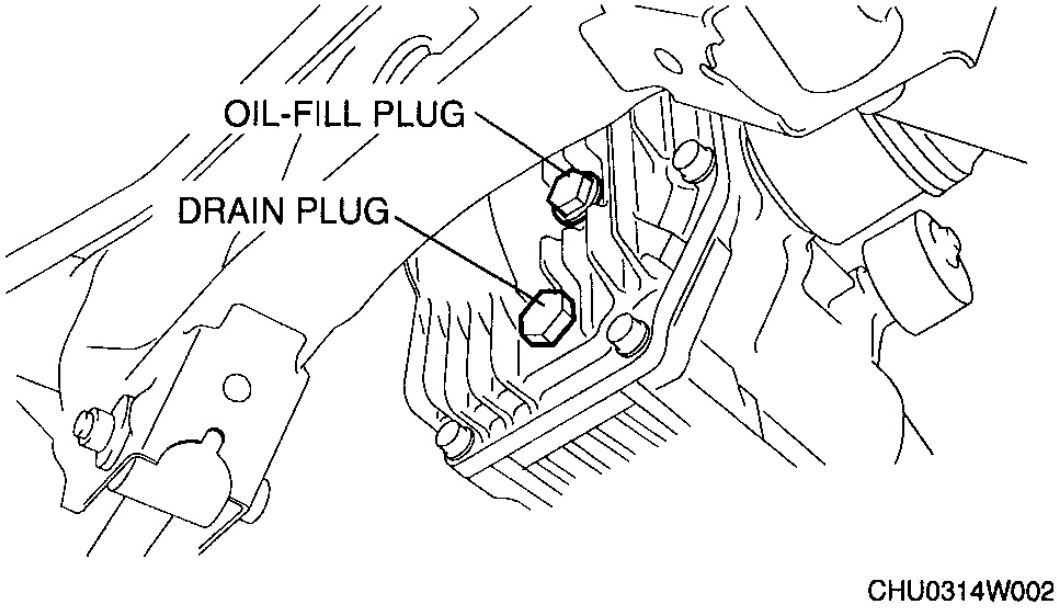


Fig. 4: Identifying Oil Fill Plug & Drain Plug
Courtesy of MAZDA MOTORS CORP.

4. Install the drain plug with a new washer and tighten.

   Tightening torque

   39.2-53.9 N.m

   {4.00-5.49 kgf.m, 29.0-39.7 ft.lbf}

5. Add the specified oil through the oil-fill plug hole until the oil level reaches the lower end of the plug hole.

   Differential oil

   Grade: API service GL-5

   Viscosity: SAE 90, SAE 80W-90, SAE 75W-90 (Not available from Mazda)

   Capacity (approx. quantity): 0.6-0.8 L {0.63-0.85 US qt, 0.53-0.70 Imp qt}

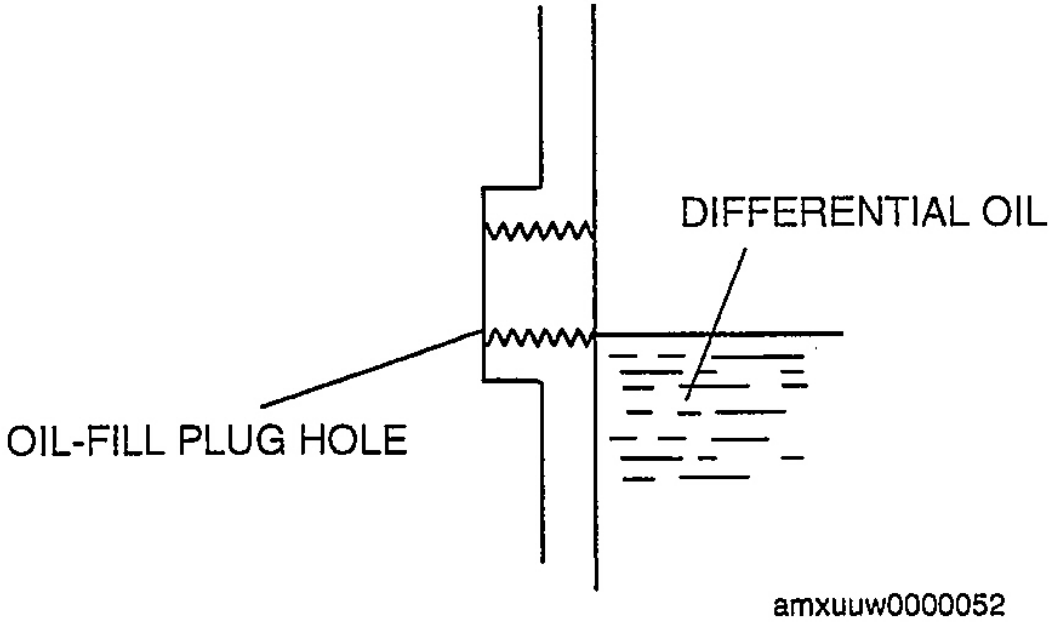


Fig. 5: Identifying Oil-Fill Plug Hole & Differential Oil
Courtesy of MAZDA MOTORS CORP.

6. Install the oil-fill plug with a new washer and tighten.

   Tightening torque

   39.2-53.9 N.m

   {4.00-5.49 kgf.m, 29.0-39.7 ft.lbf}

OIL SEAL (SIDE GEAR) REPLACEMENT

1. Remove the drain plug and drain the oil.
2. Install the drain plug with a new washer and tighten.

   Tightening torque

   39.2-53.9 N.m {4.00-5.49 kgf.m, 29.0-39.7 ft.lbf}

3. Disconnect the rear drive shaft on the differential side.

   (See **REAR DRIVE SHAFT, REAR KNUCKLE COMPONENT REMOVAL NOTE** .)

4. Remove the clip from the rear drive shaft.

CAUTION:
- **To prevent damaging the inside of the differential casing, wrap cloth on the end of the flathead screwdriver.**

5. Remove the oil seal from the differential carrier using a flathead screwdriver.
6. Apply differential oil to the lip of a new oil seal.

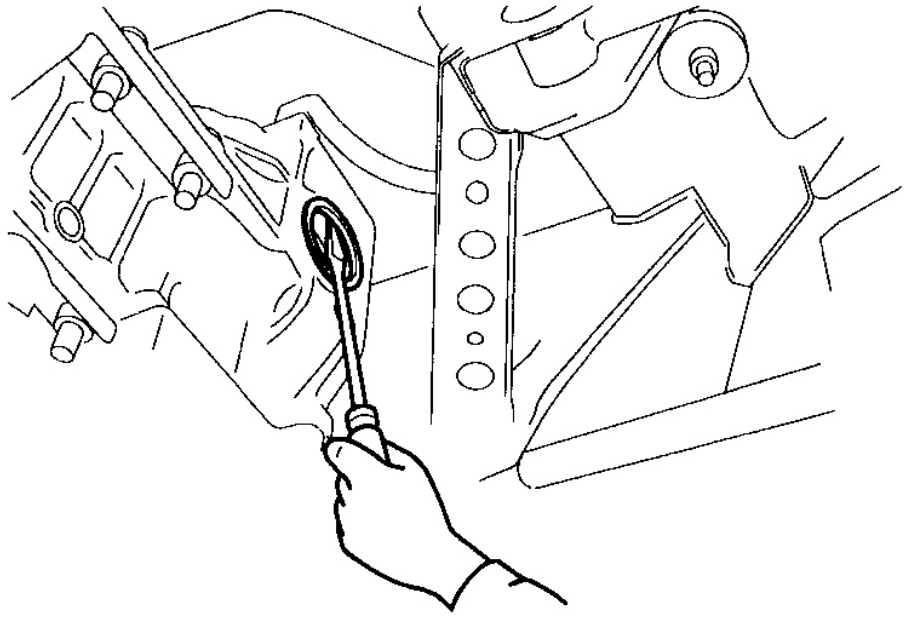


Fig. 6: Removing Oil Seal From Differential Carrier Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

7. Tap in the new oil seal until it reaches the differential carrier using the **SSTs** .

NOTE:
- **Install the oil seal at a straight angle.**

8. After installing a new clip to the rear drive shaft, insert it into the rear differential.

(See **REAR DRIVE SHAFT, REAR KNUCKLE COMPONENT INSTALLATION NOTE** .)

9. Verify that the rear drive shaft is held securely by the clip by pulling the outer ring on the differential side towards the axle.

10. Add differential oil.
11. After adding the oil, perform the oil level inspection. (See **DIFFERENTIAL OIL INSPECTION** .)
12. Install the oil-fill plug with a new washer and tighten.

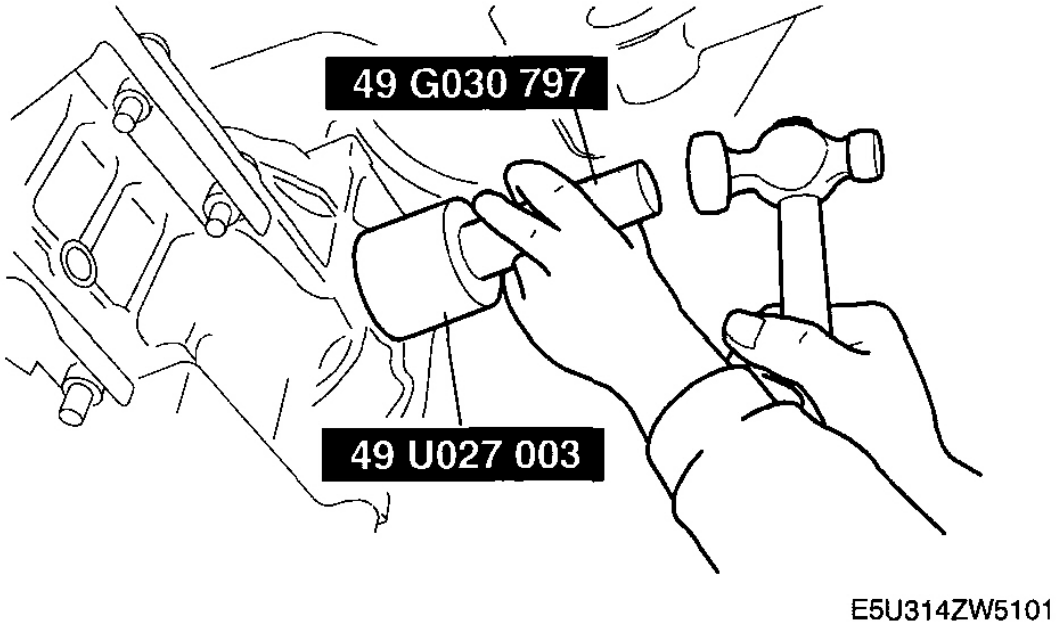


Fig. 7: Tapping In New Oil Seal Using SSTs
Courtesy of MAZDA MOTORS CORP.

Tightening torque

39.2-53.9 N.m {4.00-5.49 kgf.m, 29.0-39.7 ft.lbf}

OIL SEAL (COMPANION FLANGE) REPLACEMENT

1. Remove the rear differential. (See **REAR DIFFERENTIAL REMOVAL/INSTALLATION** .)
2. Replace the oil seal (companion flange) referring to the rear differential disassembly/assembly procedure. (See **REAR DIFFERENTIAL DISASSEMBLY** .) (See **REAR DIFFERENTIAL ASSEMBLY** .)
3. Install the rear differential. (See **REAR DIFFERENTIAL REMOVAL/INSTALLATION** .)

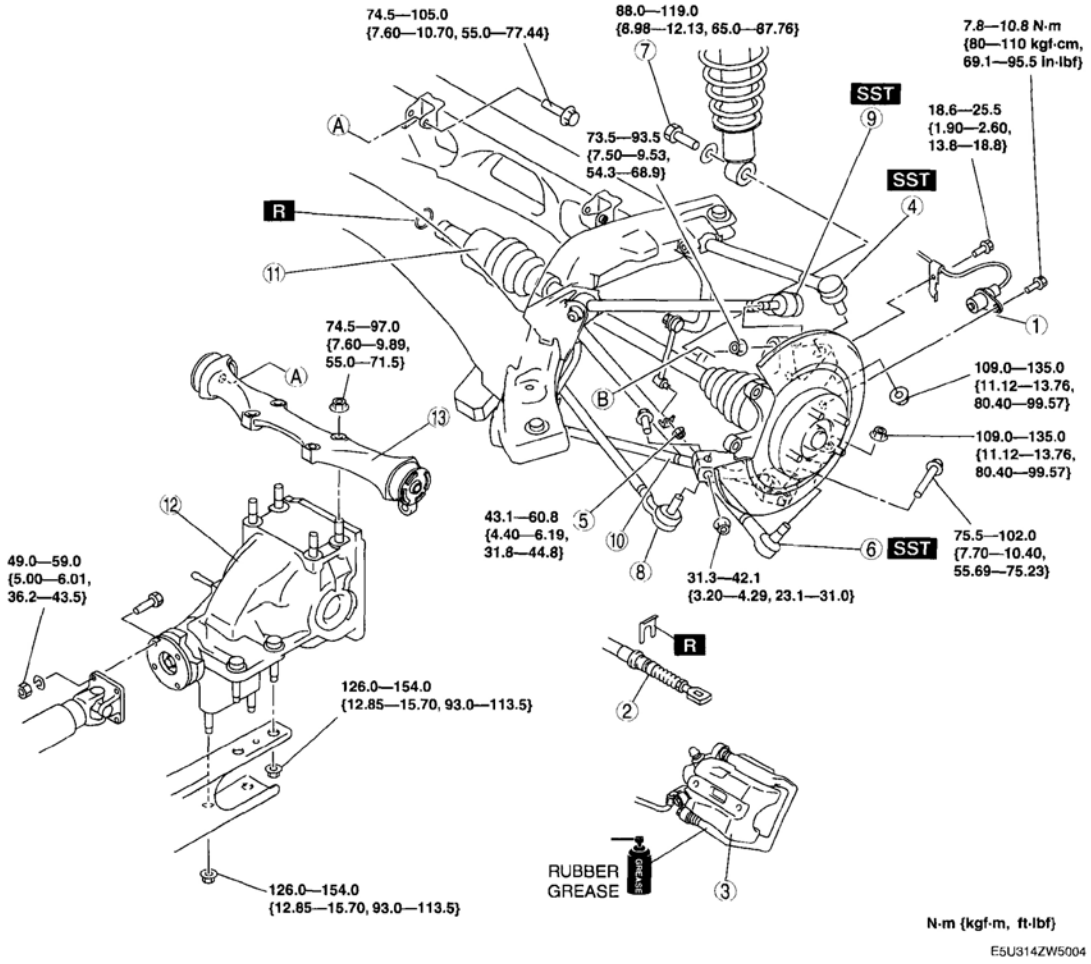
REAR DIFFERENTIAL REMOVAL/INSTALLATION

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 by mistake while servicing the vehicle.

1. Drain the rear differential oil.
2. Remove the middle pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [LF]** .)
3. Remove the propeller shaft. (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
4. Remove the power plant frame. (See **POWER PLANT FRAME REMOVAL NOTE** .) (See **POWER PLANT FRAME INSTALLATION NOTE** .) (See **POWER PLANT FRAME REMOVAL NOTE** .) (See **POWER PLANT FRAME INSTALLATION NOTE** .) (See **POWER PLANT FRAME REMOVAL NOTE** .) (See **POWER PLANT FRAME INSTALLATION NOTE** .)
5. Remove in the order indicated in **Fig. 8** .
6. Install in the reverse order of removal.
7. Add rear differential oil. (See **DIFFERENTIAL OIL REPLACEMENT** .)



1	ABS wheel-speed sensor
2	Parking brake cable
3	Brake caliper component
4	Rear lateral link (upper) ball joint
5	Stabilizer control link (lower)
6	Rear lateral link (lower) ball joint
7	Shock absorber bolt (lower)

8	Toe control link ball joint
9	Rear trailing link (upper) ball joint
10	Rear trailing link (lower) bolt (outer side)
11	Rear drive shaft, rear knuckle component
12	Rear differential
13	Differential mount

Fig. 8: Identifying Rear Differential Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

BRAKE CALIPER COMPONENT REMOVAL NOTE

1. Suspend the brake caliper component using a cable or equivalent.

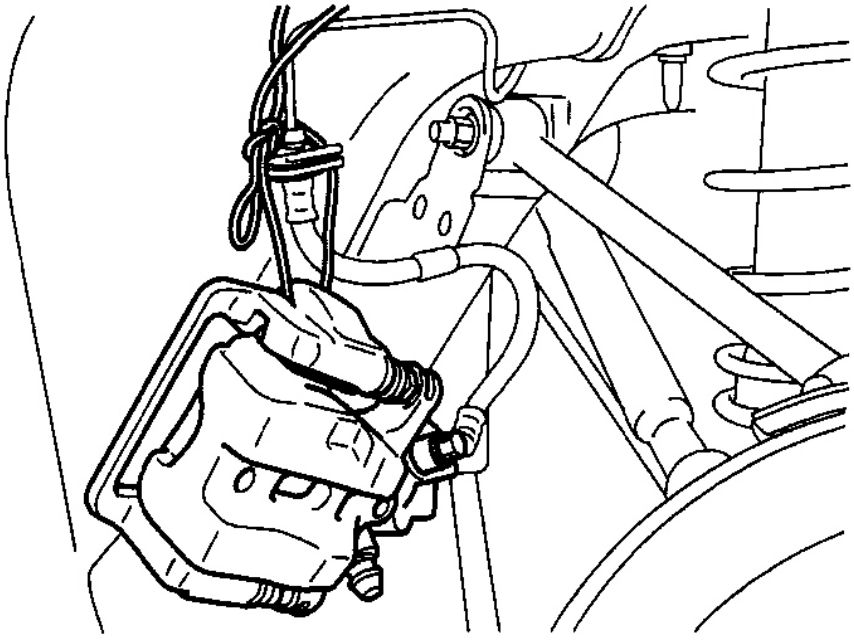


Fig. 9: Suspending Brake Caliper
Courtesy of MAZDA MOTORS CORP.

2. Temporarily tighten the wheel nut to prevent the disc plate from falling off.

REAR DRIVE SHAFT, REAR KNUCKLE COMPONENT REMOVAL NOTE

1. Insert a tire lever or equivalent between the rear differential and differential side outer ring, and remove the rear drive shaft.

CAUTION:
- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful not to damage the oil seal when removing the drive shaft from the differential.**

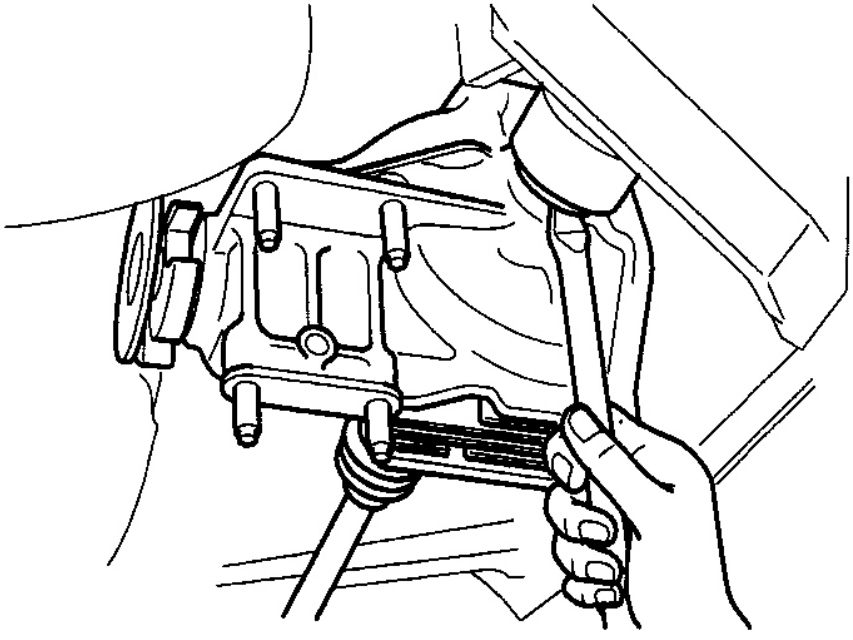


Fig. 10: Removing Rear Drive Shaft & Rear Knuckle Components
Courtesy of MAZDA MOTORS CORP.

2. Pull the rear drive shaft and rear knuckle component to the outer side, and detach the rear drive shaft from the rear differential.
3. To hold the rear drive shaft and rear knuckle component, install the rear lateral link (upper) to the rear knuckle temporarily after disconnecting the rear drive shaft.

REAR DIFFERENTIAL REMOVAL/INSTALLATION NOTE

WARNING:

- **If the rear differential falls off, it can cause serious injuries or death, and damage to the vehicle. When removing/installing the rear differential, verify that it is supported securely with a jack.**

1. Remove or install the rear differential, while supporting it securely with a jack, and moving the jack gradually.

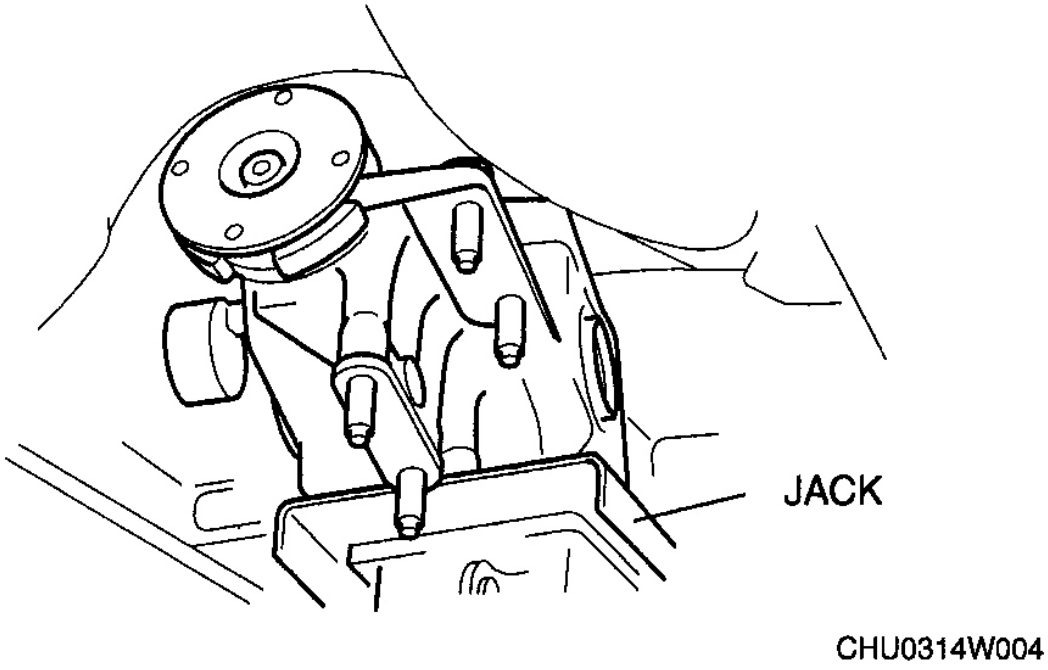


Fig. 11: Supporting Differential With Jack
Courtesy of MAZDA MOTORS CORP.

REAR DRIVE SHAFT, REAR KNUCKLE COMPONENT INSTALLATION NOTE

1. Install a new drive shaft clip to the clip groove at the top of the rear drive shaft with the clip opening facing upward and the clip width within the specification.

   Standard

   31.2 mm {1.23 in}

2. After installing the clip, measure the outer diametric if it exceeds the specification, reinstall a new clip.
3. Apply differential oil to the differential oil seal lip.

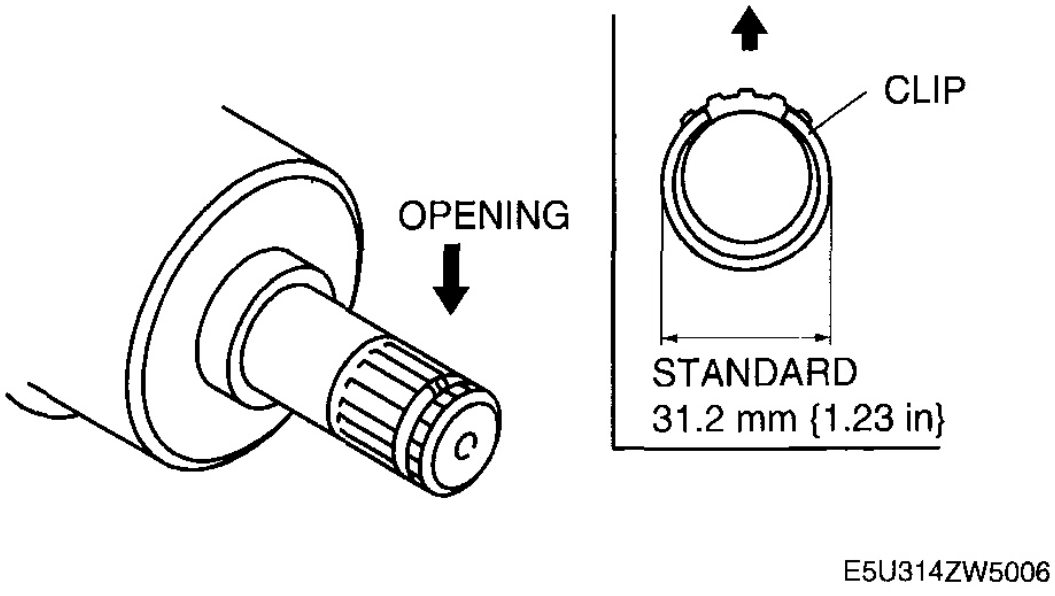


Fig. 12: View Of Drive Shaft Clip To Clip Groove At Top Of Rear Drive Shaft
Courtesy of MAZDA MOTORS CORP.

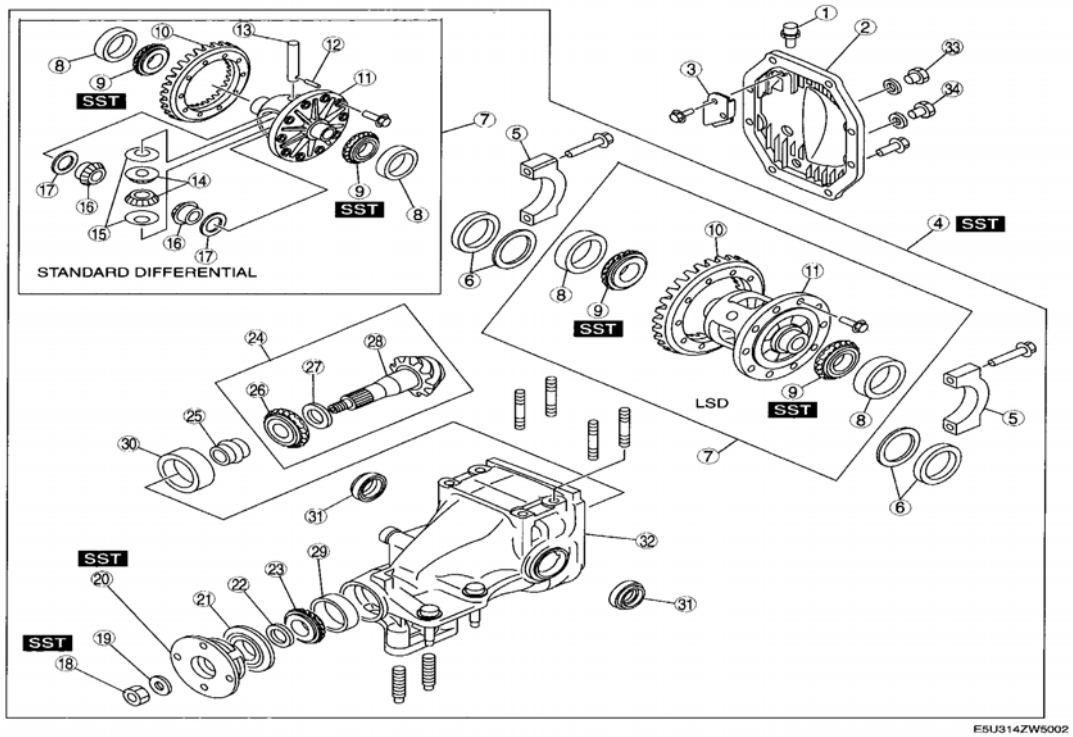
CAUTION:
- **The sharp edges of the rear drive shaft can slice or puncture the oil seal Be careful not to damage the oil seal when installing the rear drive shaft from the rear differential.**

4. Insert the rear drive shaft into the rear differential with the clip opening facing upward.
5. After installation, verify that the rear drive shaft is securely held by the clip by pulling the outer ring on the differential side towards the axle.

REAR DIFFERENTIAL DISASSEMBLY

WARNING:
- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is tilted, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates, it could cause injury, therefore do not maintain the rear differential tilted. When turning the rear differential, grasp the rotation handle firmly.**

1. Disassemble in the order indicated in **Fig. 13** .



1	Breather plug
2	Rear cover
3	Baffle plate
4	Differential component
5	Bearing cap
6	Adjustment shim
7	Differential gear case component
8	Side bearing outer race
9	Side bearing
10	Ring gear
11	Gear case
12	Roll pin
13	Pinion shaft

14	Pinion gear
15	Thrust washer
16	Side gear
17	Washer
18	Locknut
19	Washer
20	Companion flange
21	Oil seal (companion flange)
22	Spacer
23	Front bearing
24	Drive pinion component
25	Collapsible spacer
26	Rear bearing
27	Spacer
28	Drive pinion
29	Front bearing outer race
30	Rear bearing outer race
31	Oil seal (side gear)
32	Differential carrier
33	Oil-fill plug
34	Drain plug

Fig. 13: Exploded View Of Rear Differential Components
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL COMPONENT DISASSEMBLY NOTE

1. Install the differential component to the **SSTs** .

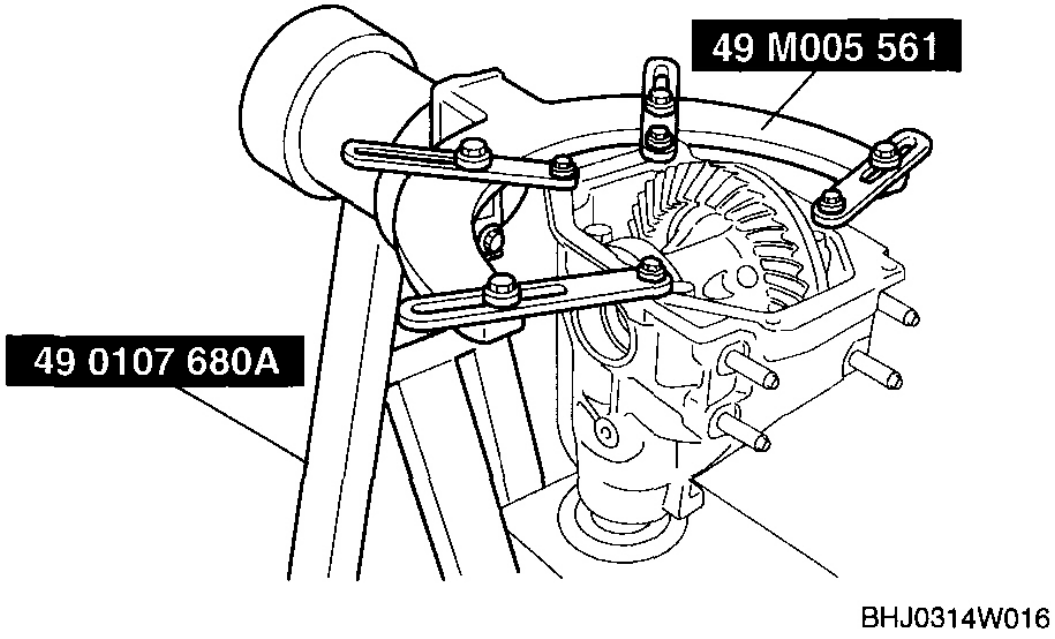


Fig. 14: Installing Differential Component To SSTs
Courtesy of MAZDA MOTORS CORP.

BEARING CAP DISASSEMBLY NOTE

1. Mark the bearing cap and differential carrier for proper installation.

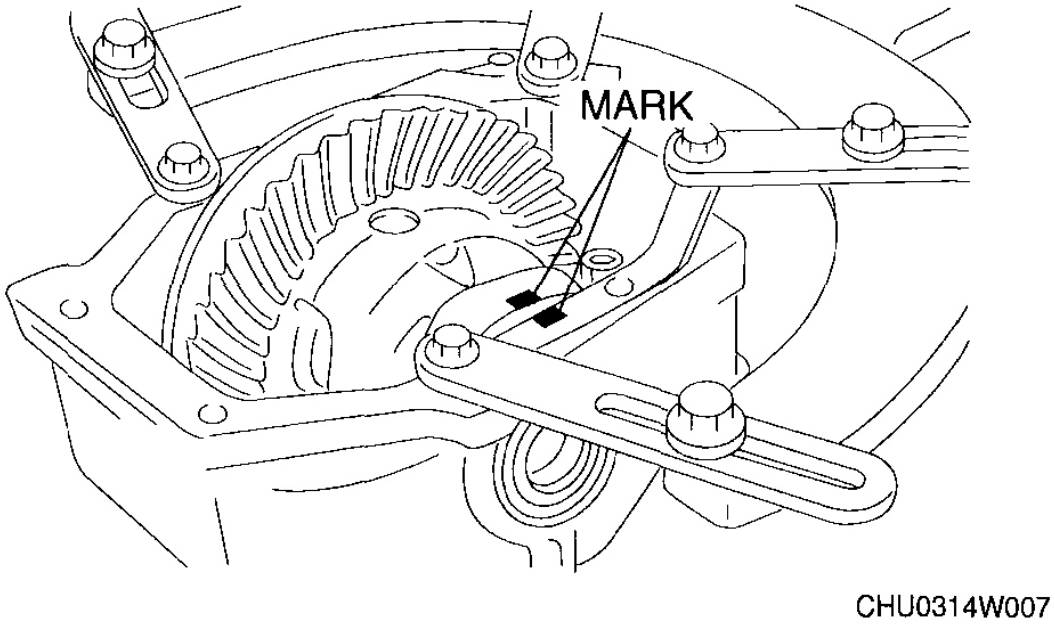


Fig. 15: Marking Bearing Cap & Differential Carrier For Installation
Courtesy of MAZDA MOTORS CORP.

ADJUSTMENT SHIM, SIDE BEARING OUTER RACE DISASSEMBLY NOTE

1. Remove the adjustment shim using a flathead screwdriver.

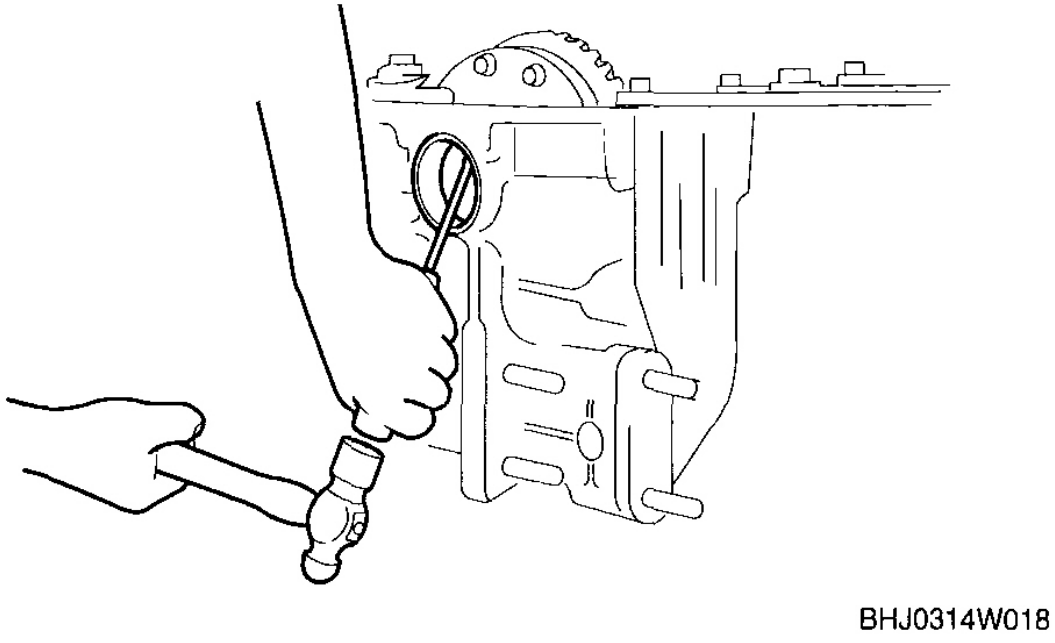


Fig. 16: Removing Adjustment Shim Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

2. Put left and right identification marks on the removed adjustment shims and side bearing outer races.

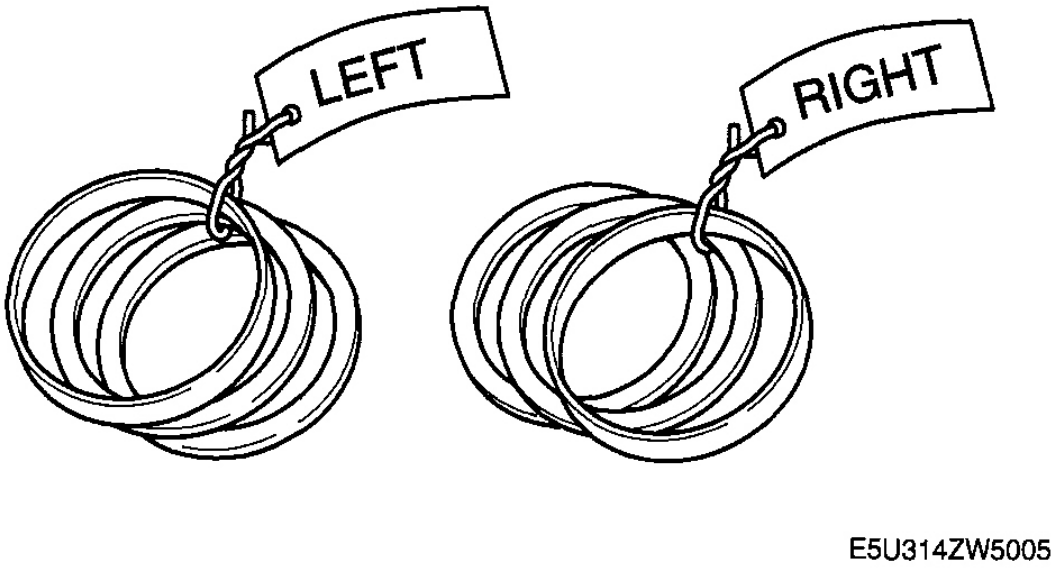


Fig. 17: Putting Left & Right Identification Marks On Adjustment Shims & Side Bearing Outer Races
Courtesy of MAZDA MOTORS CORP.

SIDE BEARING DISASSEMBLY NOTE

1. Remove the side bearing using the **SST** .
2. Put left and right identification marks on the removed side bearings.

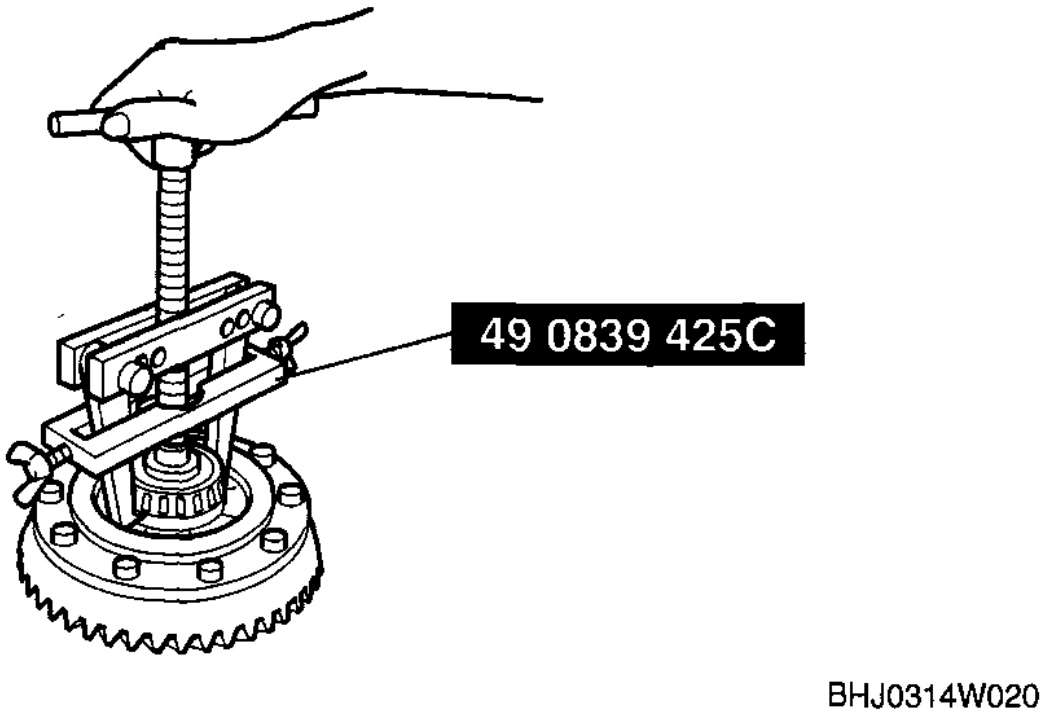


Fig. 18: Removing Side Bearing Using SST
Courtesy of MAZDA MOTORS CORP.

ROLL PIN DISASSEMBLY NOTE

1. Tap the roll pin out from the direction shown in **Fig. 19** using a pin punch.

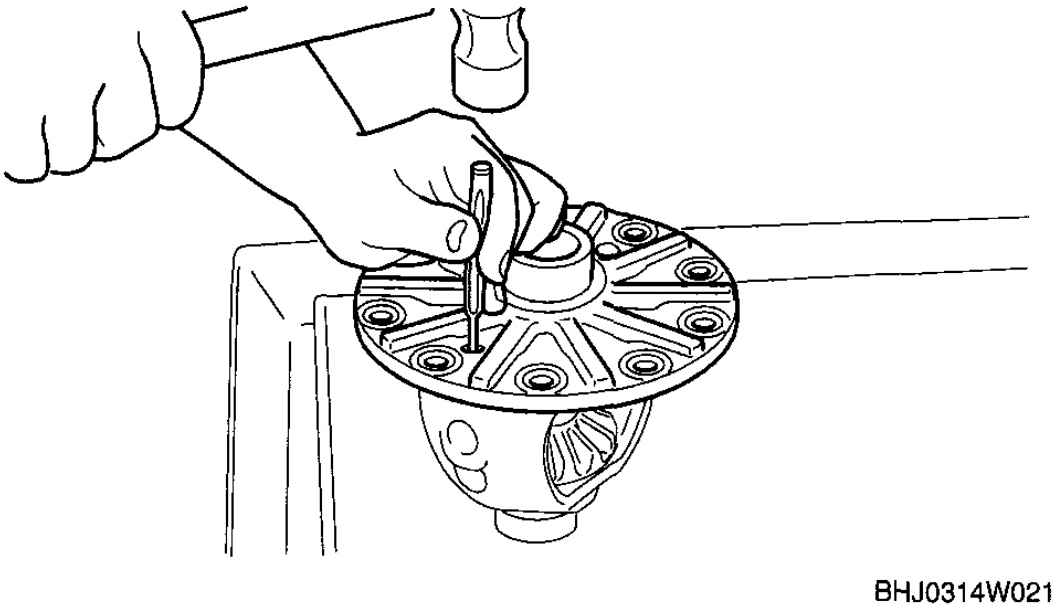


Fig. 19: Tapping Roll Pin Out Using Pin Punch
Courtesy of MAZDA MOTORS CORP.

LOCKNUT DISASSEMBLY NOTE

1. Remove the locknut while fixing the companion flange using the **SST** .

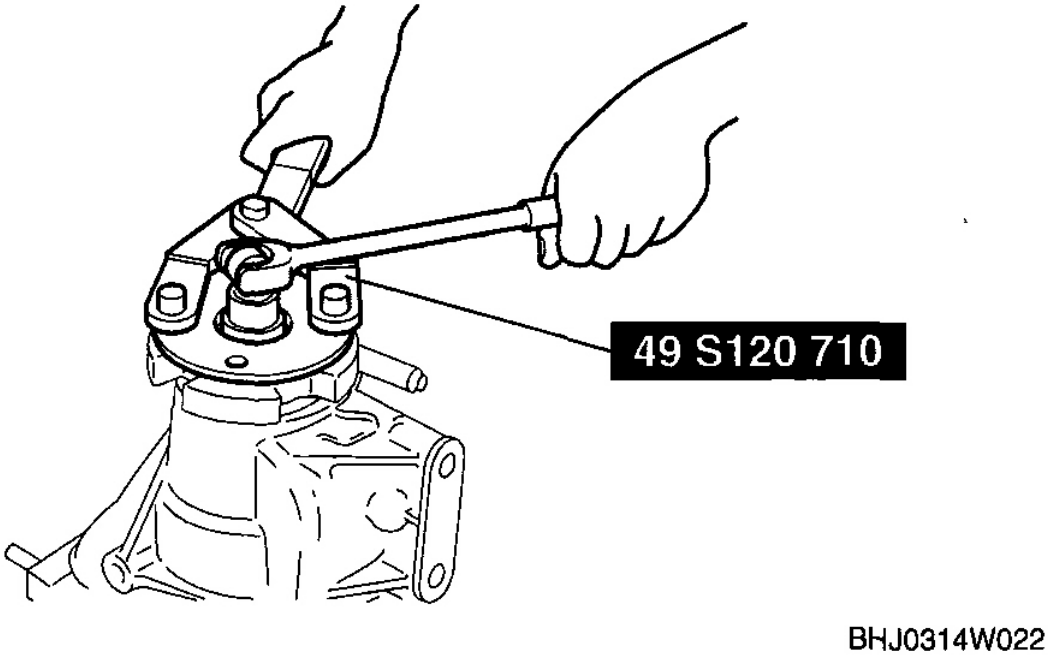


Fig. 20: Removing Locknut While Fixing Companion Flange Using SST
Courtesy of MAZDA MOTORS CORP.

COMPANION FLANGE DISASSEMBLY NOTE

1. Remove the companion flange using the **SST** .

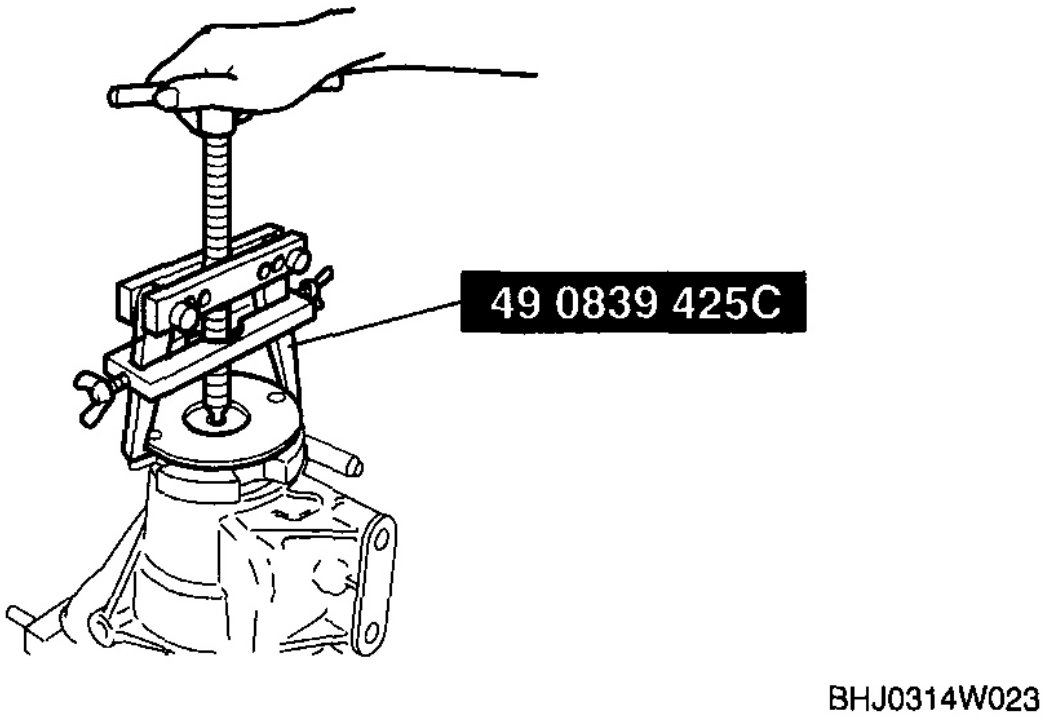


Fig. 21: Removing Companion Flange Using SST
Courtesy of MAZDA MOTORS CORP.

DRIVE PINION COMPONENT DISASSEMBLY NOTE

1. Install the removed locknut to the drive pinion top to prevent damage to the thread.
2. Remove the drive pinion component by tapping the locknut lightly using a plastic hammer.
3. Remove the locknut installed in Step 1.

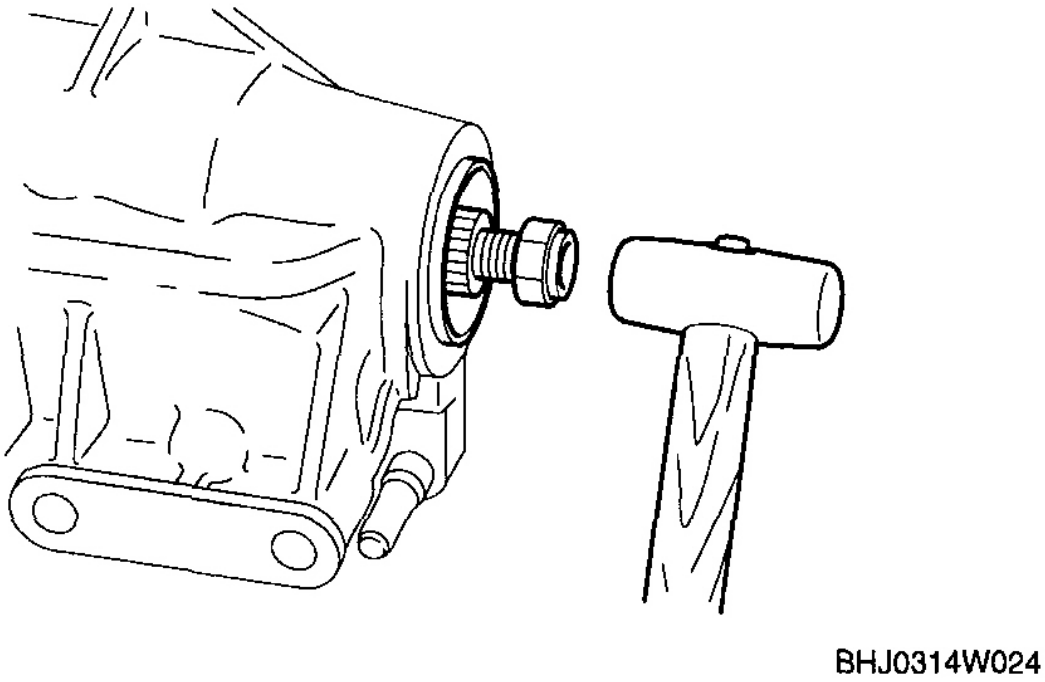


Fig. 22: Removing Drive Pinion Component By Tapping Locknut Using Plastic Hammer
Courtesy of MAZDA MOTORS CORP.

REAR BEARING DISASSEMBLY NOTE

CAUTION:
- **The drive pinion could be damaged if it falls off. Support the drive pinion with your hand when removing the rear bearing.**

1. Remove the rear bearing using the **SST** and a press.

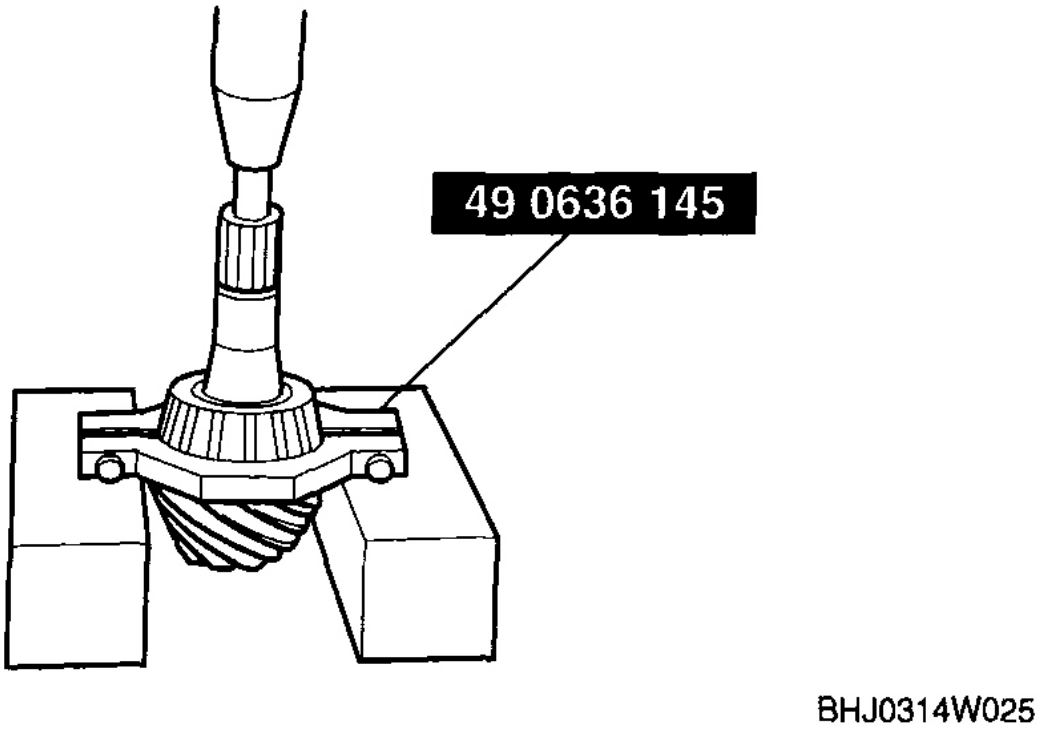


Fig. 23: Removing Rear Bearing Using SST & Press
Courtesy of MAZDA MOTORS CORP.

FRONT BEARING OUTER RACE, REAR BEARING OUTER RACE DISASSEMBLY NOTE

1. Remove the bearing outer race by lightly tapping the edge of the bearing outer race using a flathead screwdriver.

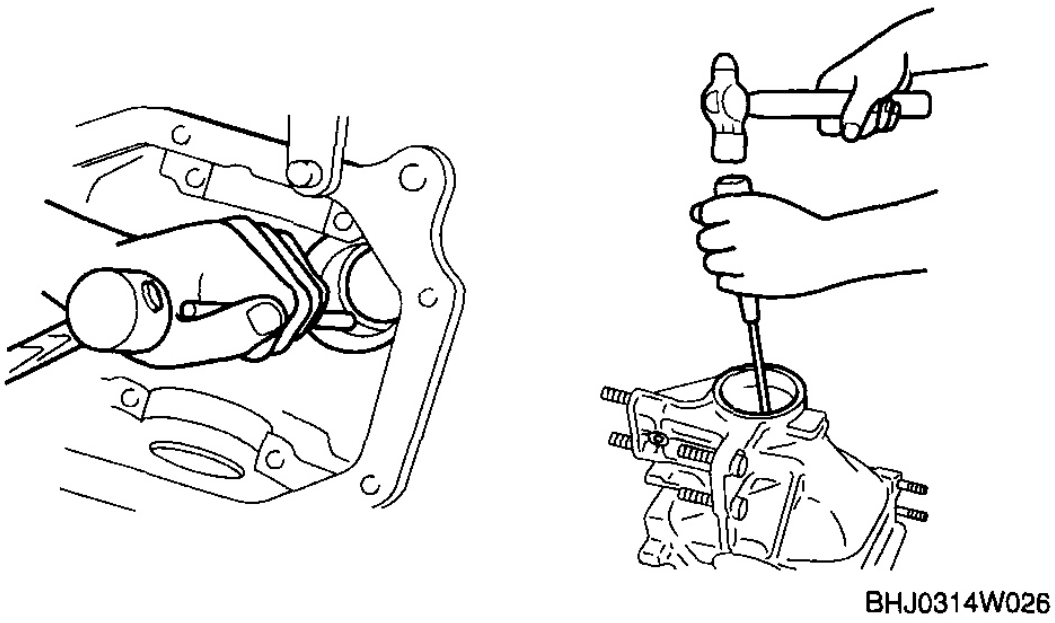


Fig. 24: Removing Bearing Outer Race By Lightly Tapping Edge Of Bearing Outer Race Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

REAR DIFFERENTIAL ASSEMBLY

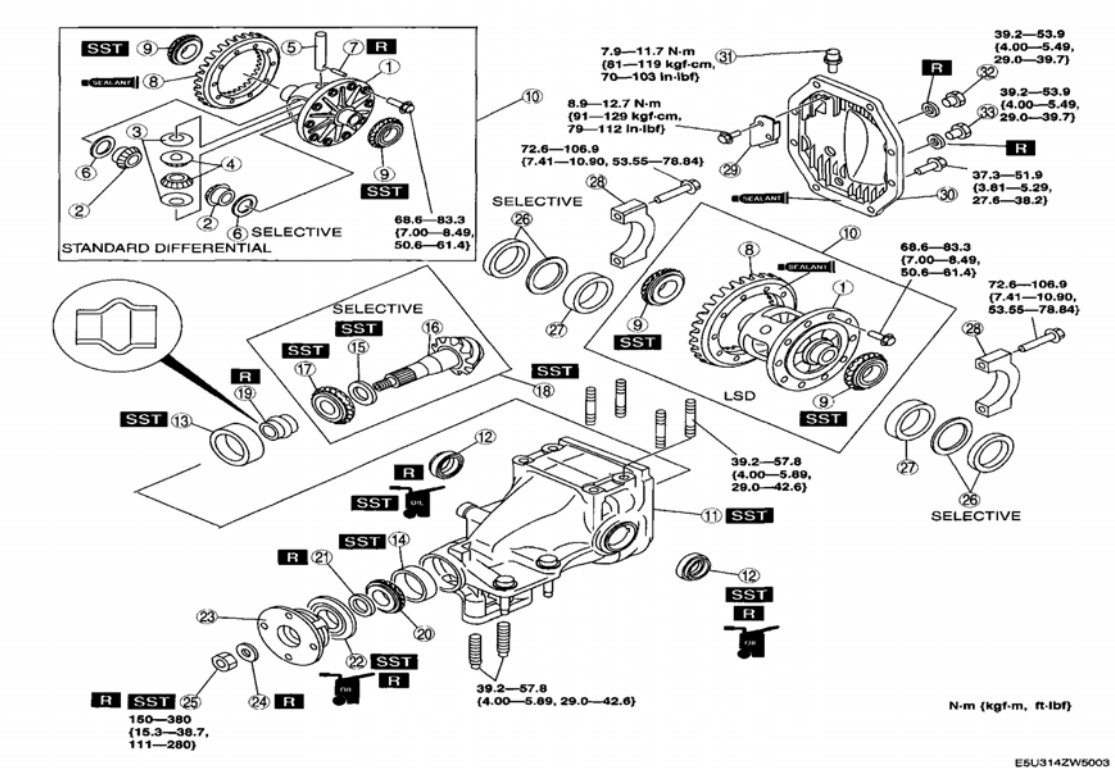
WARNING:

- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is tilted, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates, it could cause injury, therefore do not maintain the rear differential tilted. When turning the rear differential, grasp the rotation handle firmly.**

NOTE:

- **Clean away the old silicone sealant before applying the new silicone sealant.**
- **Install the rear cover within 10 min after applying the silicone sealant.**
- **Allow the sealant to set at least 30 min or more after installation before filling the differential with differential oil.**

1. Assemble in the order indicated in **Fig. 25** .



1	Gear case
2	Side gear
3	Thrust washer
4	Pinion gear
5	Pinion shaft
6	Washer
7	Roll pin
8	Ring gear
9	Side bearing
10	Differential gear case component
11	Differential carrier
12	Oil seal (side gear)
13	Rear bearing outer race
14	Front bearing outer race
15	Spacer
16	Drive pinion
17	Rear bearing
18	Drive pinion component

19	Collapsible spacer
20	Front bearing
21	Spacer
22	Oil seal (companion flange)
23	Companion flange
24	Washer
25	Locknut
26	Adjustment shim
27	Side bearing race
28	Bearing cap
29	Baffle plate
30	Rear cover
31	Breather plug
32	Oil-level plug
33	Drain plug

Fig. 25: Identifying Rear Differential Assembly Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

WASHER ASSEMBLY NOTE

1. Assemble the side gear, thrust washer, pinion gear, and the pinion shaft to the gear case.
2. Install the dial gauge with the measuring probe of the dial gauge attached perpendicularly to the end of

one of the pinion gear teeth.

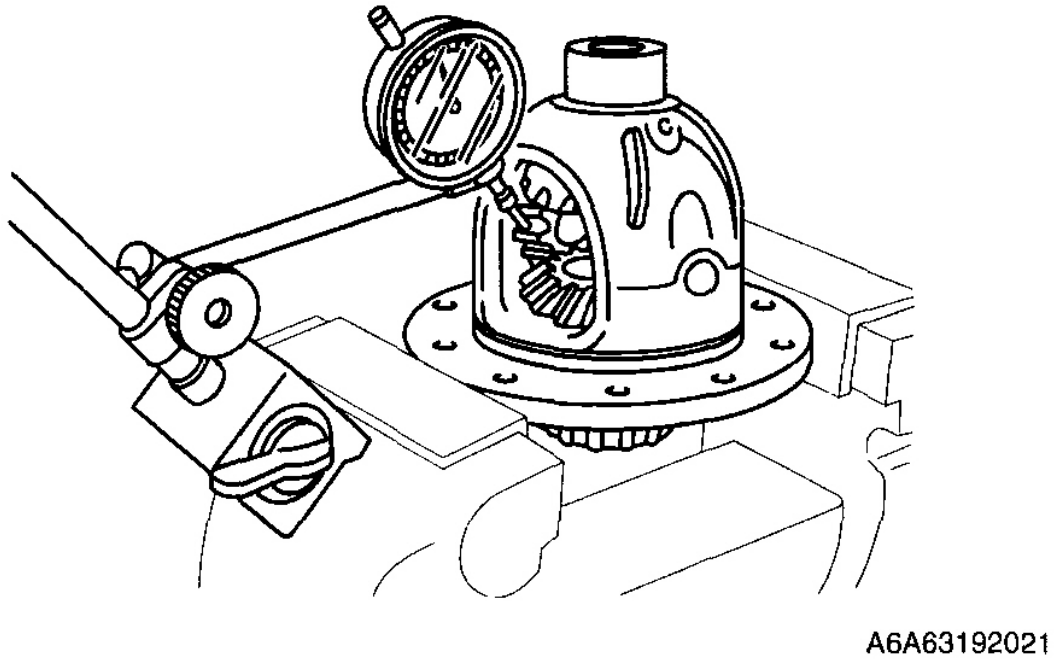


Fig. 26: View Of Dial Gauge
Courtesy of MAZDA MOTORS CORP.

3. Fix either one of the side gears.
4. Move the pinion gear and measure the backlash at the pinion gear top.
    - If it is not within the specification, adjust by choosing the proper washer.

Backlash of pinion gear and side gear

0.1 mm {0.004 in} or less

WASHER TABLE

Identification mark	Part name	Thickness (mm {in})
9	MA29 27 252	0.90 {0.0354}
95	MA29 27 253	0.95 {0.0374}
0	MA29 27 254	1.00 {0.0393}
05	MA29 27 256	1.05 {0.0413}
1	MA29 27 257	1.10 {0.0433}

ROLL PIN ASSEMBLY NOTE

1. Align the differential gear case and pinion shaft pin holes.
2. Tap the roll pin in using a pin punch.

RING GEAR ASSEMBLY NOTE

CAUTION:

- **The gear case and ring gear could be damaged if the ring gear is installed with old thread-locking compound remaining on the bolt threads. Before installing the ring gear, completely remove the old thread-locking compound from the bolt threads.**

1. Apply a small amount of thread-locking compound to each of points A on the back of the ring gear, and bolt thread areas B (around the entire ring).

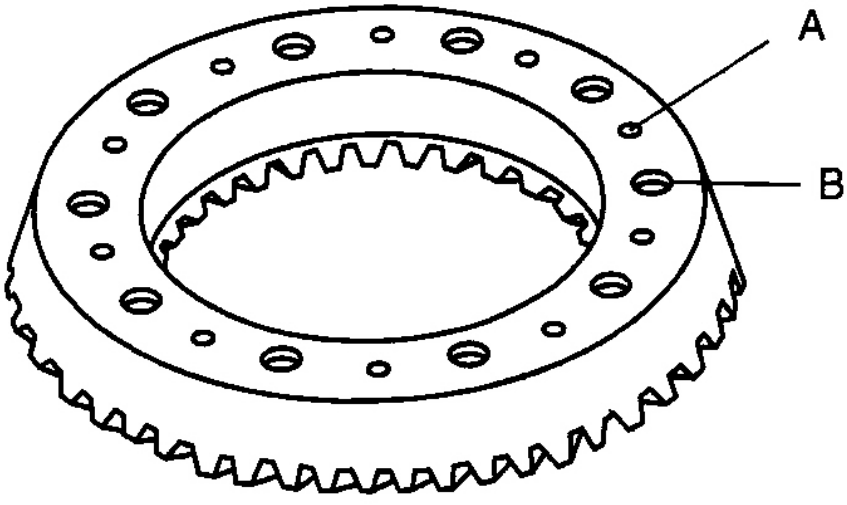
   Application thickness

   Back of ring gear points A:

   Approx. 0.4 cm^3 {0.4 cc, 0.024 cu in} (1 location approx. 0.04 cm^3 {0.04 cc, 0.0024 cu in})

   Ring gear bolt thread points B:

   Approx. 0.4 cm^3 {0.4 cc, 0.024 cu in} (1 location approx. 0.04 cm^3 {0.04 cc, 0.0024 cu in})



A6A63192022

Fig. 27: Identifying Ring Gear Assembly
Courtesy of MAZDA MOTORS CORP.

2. Install the ring gear to the differential gear case and tighten the bolts in a criss-cross pattern.

   Tightening torque

   68.6-83.3 N.m

   {7.00-8.49 kgf.m, 50.6-61.4 ft.lbf}

SIDE BEARING ASSEMBLY NOTE

NOTE:

- **When assembling the side bearings, do not mix the left and right side bearings that were identified during disassembly.**

1. Press the side bearing in using the **SST** and a press.

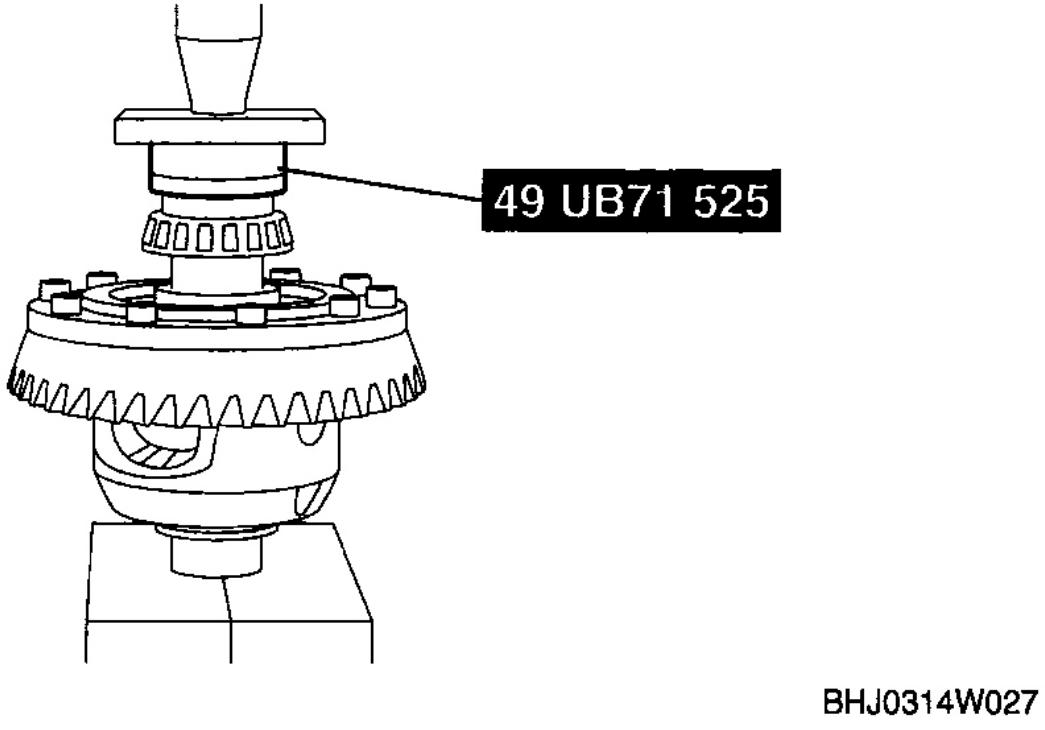


Fig. 28: Pressing Side Bearing In Using SST & Press
Courtesy of MAZDA MOTORS CORP.

OIL SEAL (SIDE GEAR) ASSEMBLY NOTE

1. Apply differential oil to the lip of a new oil seal.
2. Assemble the oil seal using the **SSTs** .

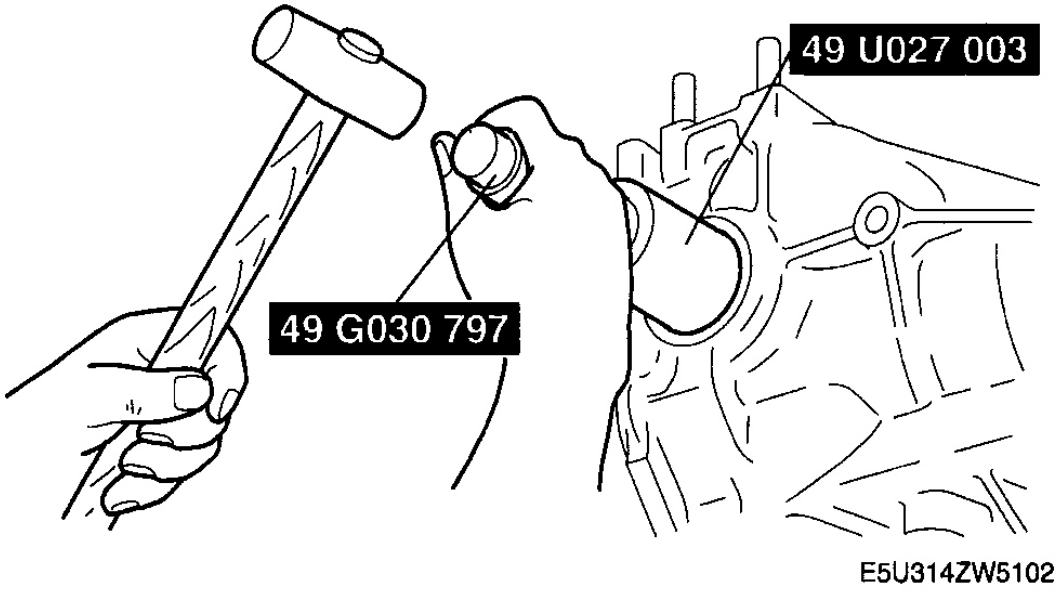


Fig. 29: Assembling Oil Seal Using SSTs
Courtesy of MAZDA MOTORS CORP.

REAR BEARING OUTER RACE ASSEMBLY NOTE

1. Press the rear bearing outer race into the differential carrier using the **SST** and a press.

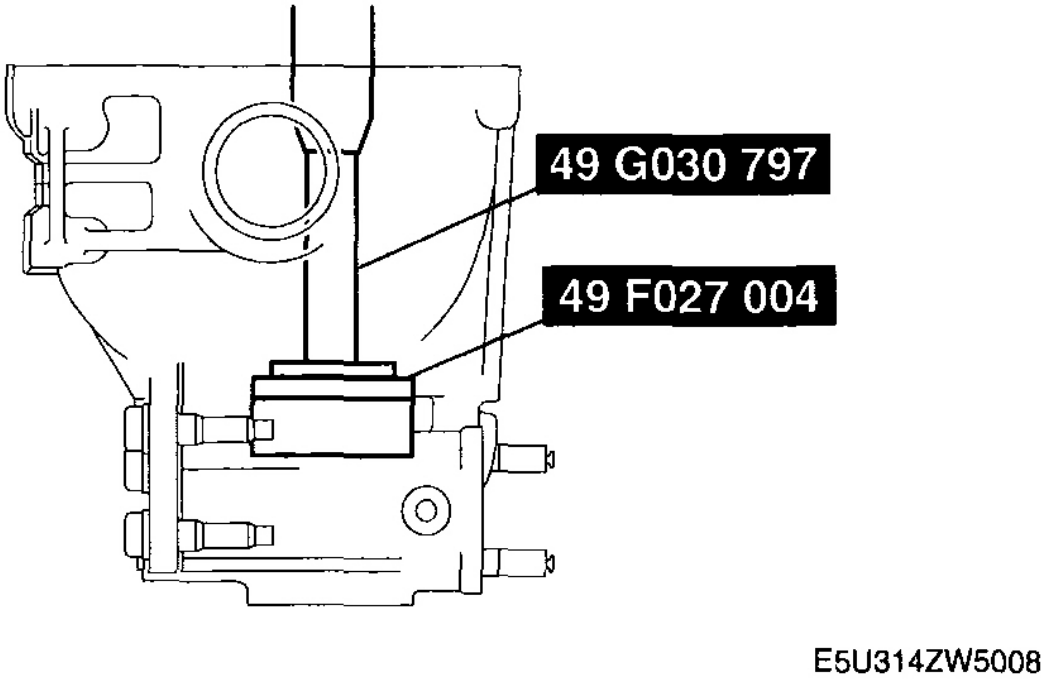


Fig. 30: Pressing Rear Bearing Outer Race Into Differential Carrier Using SST & Press
Courtesy of MAZDA MOTORS CORP.

FRONT BEARING OUTER RACE ASSEMBLY NOTE

1. Press the front bearing outer race into the differential carrier using the **SST** and a press.

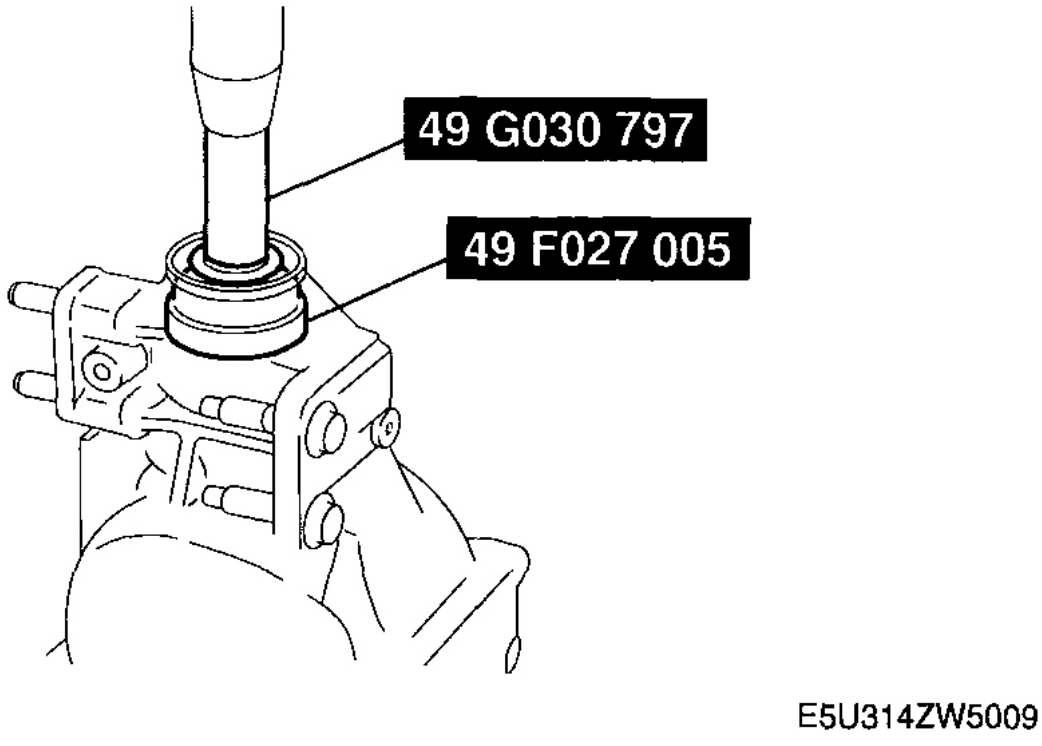


Fig. 31: Pressing Front Bearing Outer Race Into Differential Carrier Using SST & Press
Courtesy of MAZDA MOTORS CORP.

SPACER ASSEMBLY NOTE

Pinion Height Adjustment

NOTE:

- **Use the installed spacer when adjusting.**
- **Install the spacer with the chamfer on the SST side.**

1. Assemble the spacer, bearing inner race (rear side), and the **SST** (O-ring) to the **SST** (49 8531 565) as shown in **Fig. 32** .

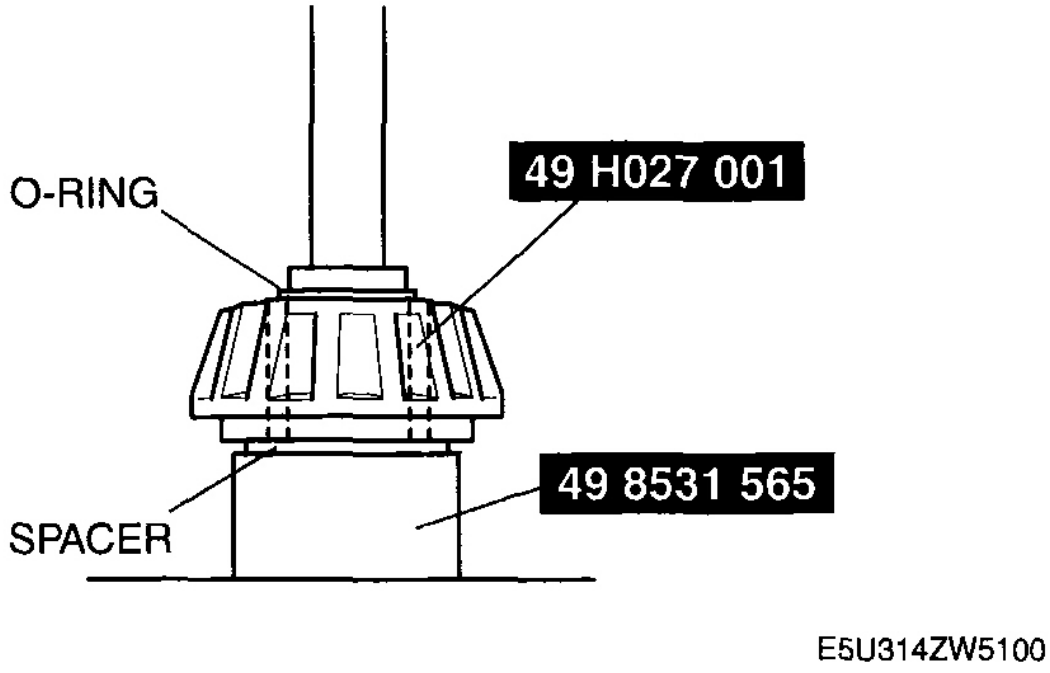


Fig. 32: Assembling Spacer, Bearing Inner Race (Rear Side) & SST (O-Ring) To SST (49 8531 565)
Courtesy of MAZDA MOTORS CORP.

2. Insert the set assembled in Step 1 from the rear side of the differential carrier.
3. Assemble the **SST** (49 8531 567) front bearing, companion flange, and a washer from the front side of the differential carrier.

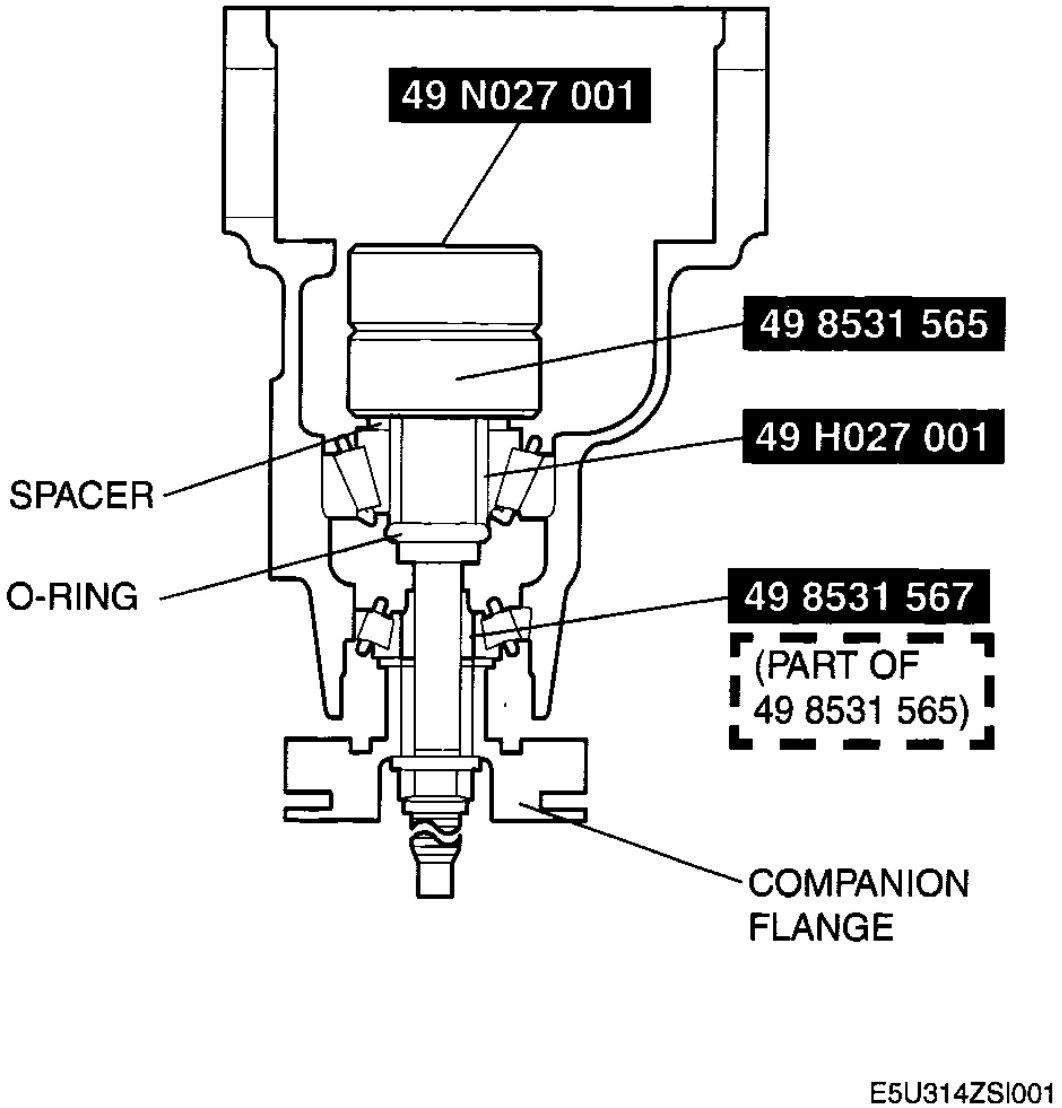


Fig. 33: Inserting Assembled Set In From Rear Side Of Differential Carrier
Courtesy of MAZDA MOTORS CORP.

4. Tighten the locknut to the extent that the **SST** (49 8531 565) can be turned by hand.
5. Place the **SST** (49 N027 001) on top of the **SST** (49 8531 565).
6. Place the **SST** on the surface plate and set the dial gauge to zero.

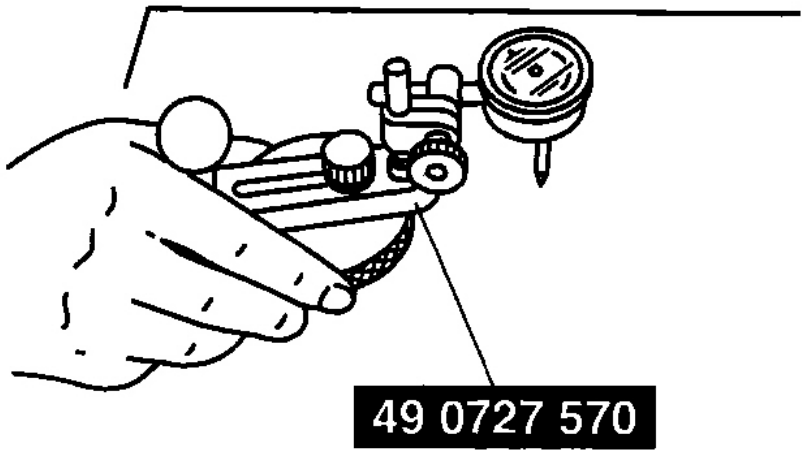


Fig. 34: Placing SST On Surface Plate & Setting Dial Gauge To Zero
Courtesy of MAZDA MOTORS CORP.

7. Set the **SSTs** as shown in **Fig. 35** .
8. Place the measuring probe of the dial gauge at the point where the side bearing is installed in the differential carrier and measure at the lowest position. Measure the left and right sides.

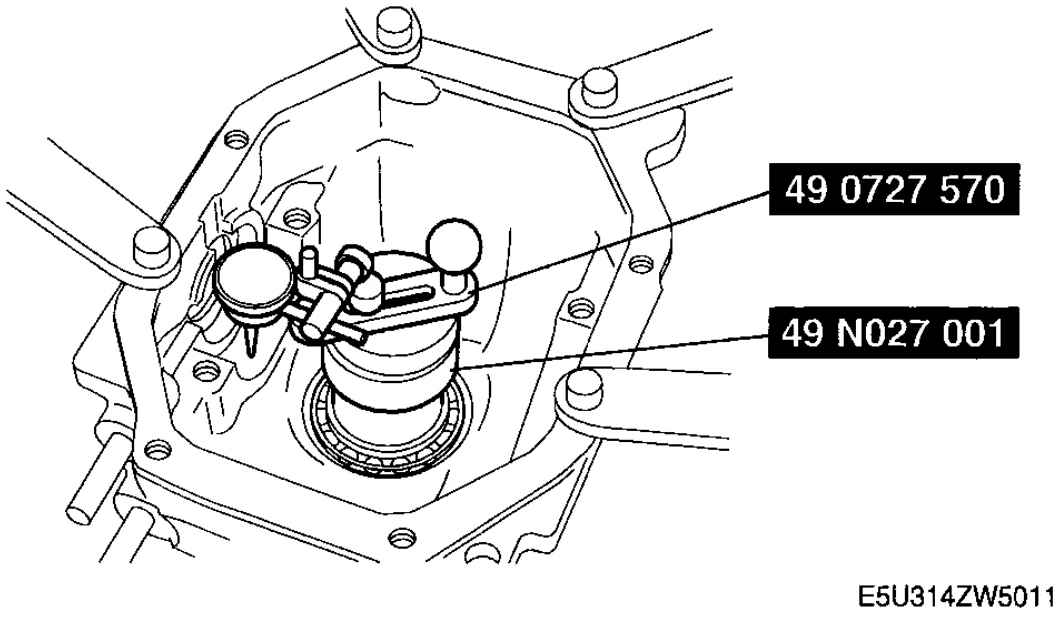


Fig. 35: Placing Measuring Probe Of Dial Gauge Where Side Bearing Is Installed In Differential Carrier
Courtesy of MAZDA MOTORS CORP.

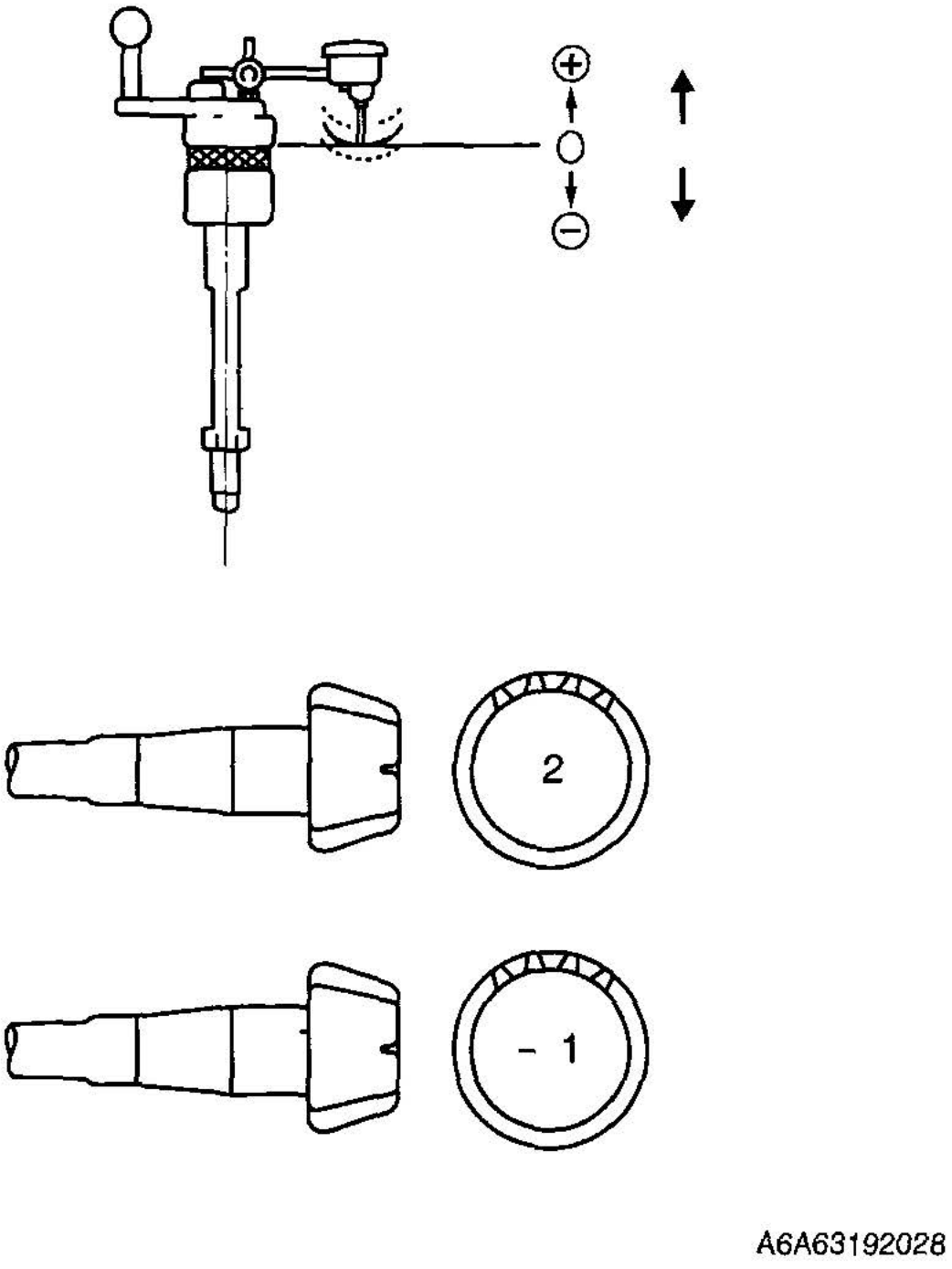


Fig. 36: Measuring Pinion Height Adjustment Value
Courtesy of MAZDA MOTORS CORP.

9. Add the two (left and right) values obtained by the measurements taken in Step 8 and then divide the total by **2** . From this sum, subtract the sum of the number inscribed on the end of the drive pinion divided by **100** . (If there is no figure inscribed, use 0.) This is the pinion height adjustment value.

   Differential pinion height

   0.038 mm {0.0015 in} or less

NOTE:

- **When the values obtained by the measurements taken in Step 8, 9 are 0.06 mm {0.0024 in}, 0.04 mm {0.0016 in} and the tip surface of the drive pinion value is 2, the formula is ((0.06+0.04)/2)-(2/100)=0.03. Therefore, assemble a spacer 0.03 mm {0.0012} thicker than the currently assembled one. The thickness settings are in increments of 0.015 mm {0.0006}, so choose one closest in thickness and install.**

SPACER TABLE

Identification mark	Thickness (mm {in})	Identification mark	Thickness (mm {in})
08	3.080 {0.1213}	29	3.290 {0.1295}
09	3.095 {0.1220}	30	3.305 {0.1301}
11	3.110 {0.1224}	32	3.320 {0.1307}
12	3.125 {0.1230}	33	3.335 {0.1313}
14	3.140 {0.1234}	35	3.350 {0.1319}
15	3.155 {0.1242}	36	3.365 {0.1325}
17	3.170 {0.1248}	38	3.380 {0.1331}
18	3.185 {0.1254}	39	3.395 {0.1337}
20	3.200 {0.1260}	41	3.410 {0.1343}
21	3.215 {0.1266}	42	3.425 {0.1348}
23	3.230 {0.1271}	44	3.440 {0.1354}
24	3.245 {0.1278}	45	3.455 {0.1360}
26	3.260 {0.1283}	47	3.470 {0.1366}
27	3.275 {0.1289}	-	-

REAR BEARING ASSEMBLY NOTE

NOTE:

- **Install the spacer with the chamfer on the gear side.**

1. Assemble the spacer selected in the pinion height adjustment to the drive pinion.
2. Press the drive pinion into the rear bearing using the **SSTs** and a press.

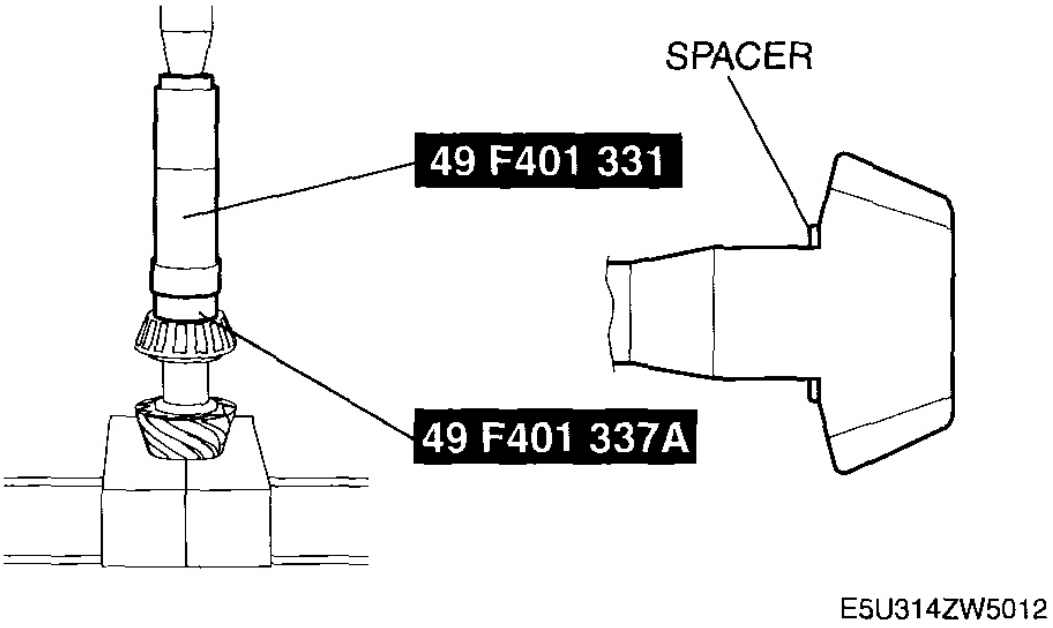


Fig. 37: Pressing Drive Pinion Into Rear Bearing Using SSTs & Press
Courtesy of MAZDA MOTORS CORP.

DRIVE PINION COMPONENT ASSEMBLY NOTE

Drive Pinion Preload Adjustment

NOTE:

- **Perform preload adjustment with the oil seal uninstalled.**

1. Assemble the following parts to the drive pinion.
   - New collapsible spacer
   - Front bearing
   - New spacer
   - Companion flange
   - New washer
   - New locknut
2. Turn the serrated part of the drive pinion by hand to seat the bearing.
3. Tighten the locknut temporarily tightened in Step 1 from the lower limit of the specified tightening torque using the **SST** , and obtain the specified preload. Record the tightening torque at this time.

Tightening torque

150-380 N.m {15.3-38.7 kgf.m, 111-280 ft.lbf}

Drive pinion preload

1.3-1.8 N.m {14-18 kgf.cm, 12-15 in.lbf}

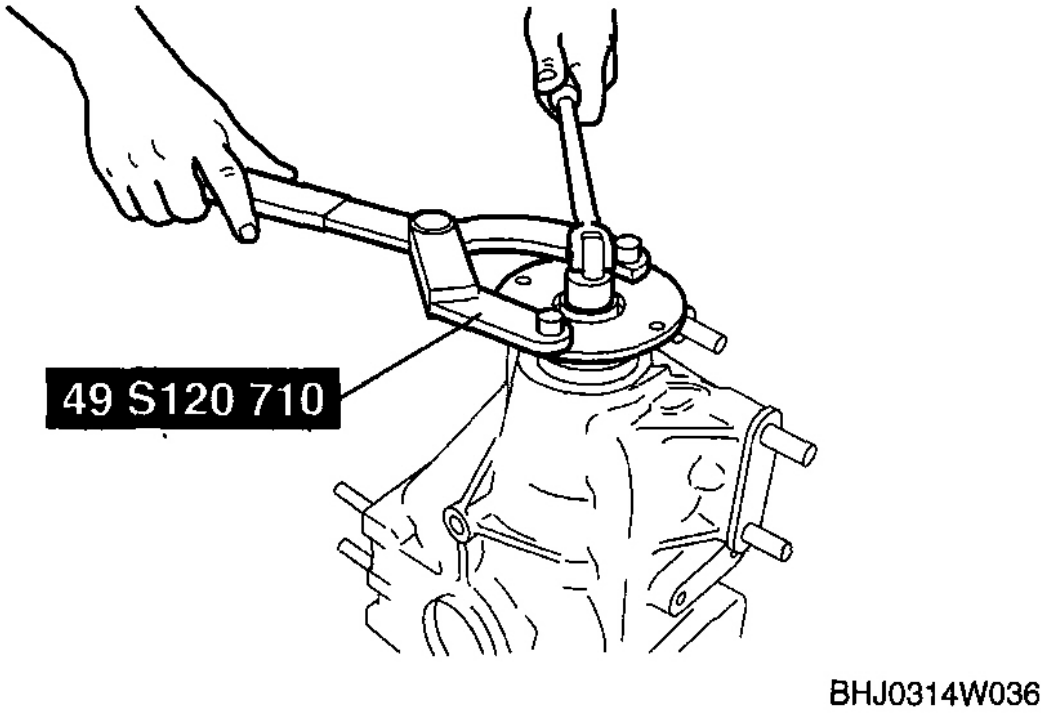


Fig. 38: Tighten Locknut Using SST
Courtesy of MAZDA MOTORS CORP.

- If the specified preload cannot be obtained within the specified tightening torque, replace with a new collapsible spacer and adjust again.

4. Remove the locknut, washer, and companion flange.

OIL SEAL (COMPANION FLANGE) ASSEMBLY NOTE

1. Apply differential oil to the lip of a new oil seal.
2. Assemble the oil seal using the **SST** .

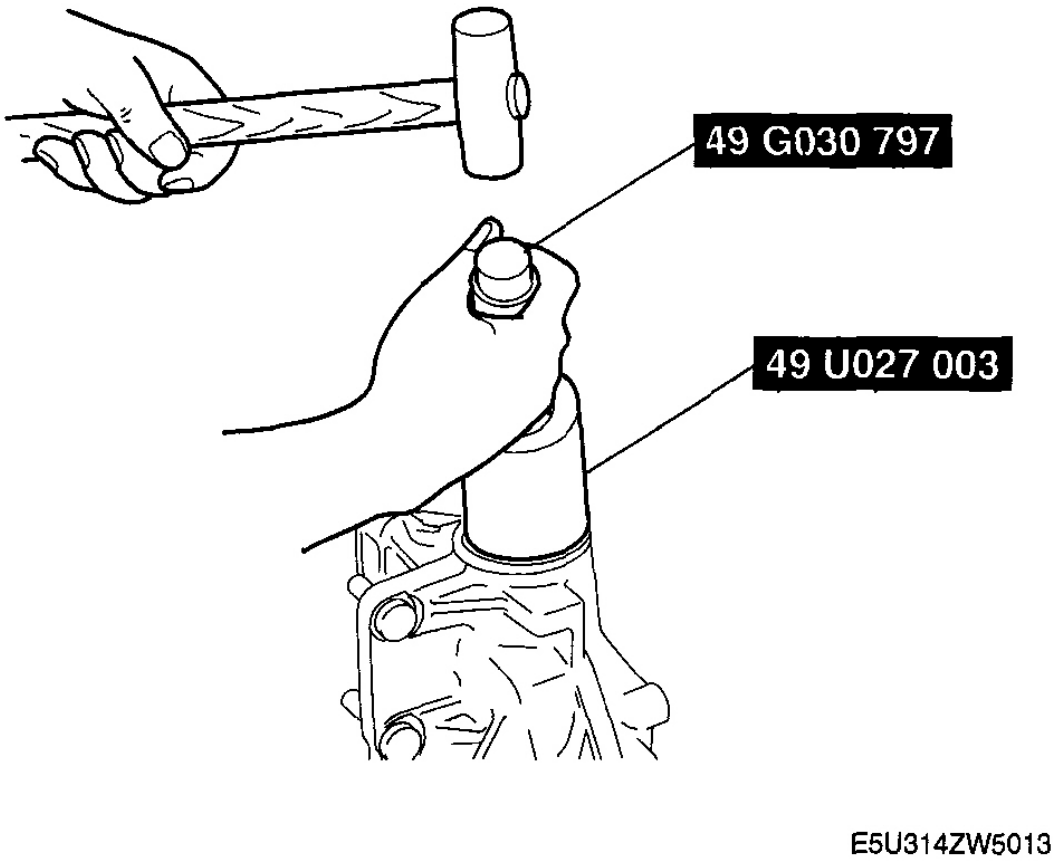


Fig. 39: Assembling Oil Seal Using SST
Courtesy of MAZDA MOTORS CORP.

LOCKNUT ASSEMBLY NOTE

1. Tighten a new locknut with the torque recorded at the drive pinion preload adjustment using the **SST** .

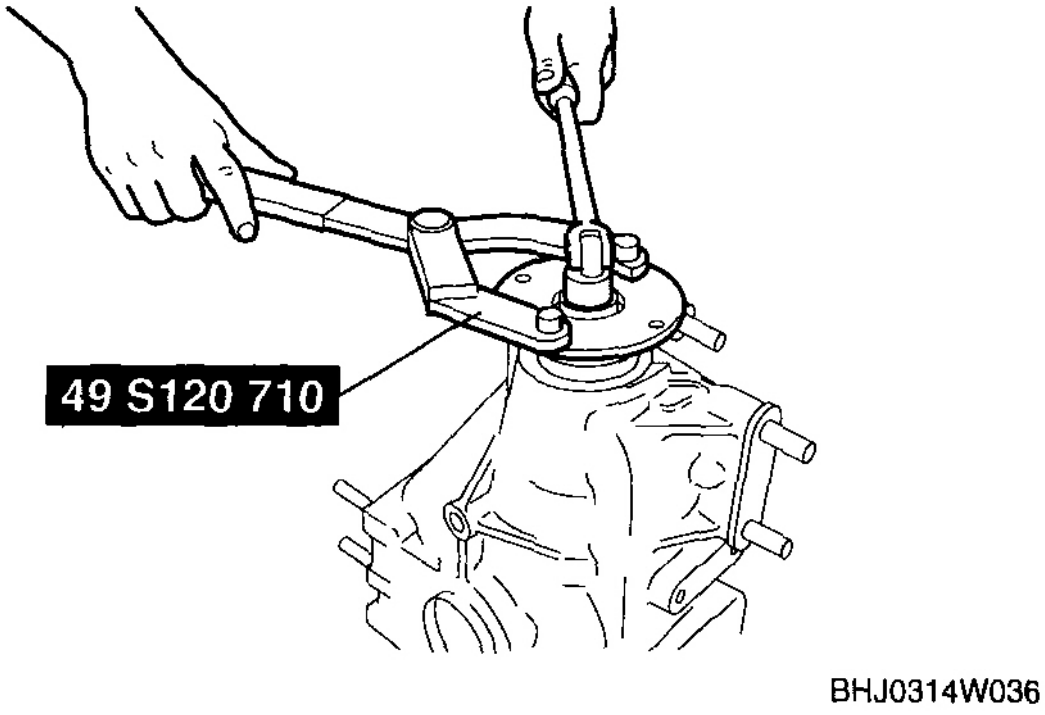


Fig. 40: Tightening Locknut Using SST
Courtesy of MAZDA MOTORS CORP.

2. Verify that the drive pinion preload is within the specification.
   - If not within the specification, perform the preload adjustment again.

Drive pinion preload

1.3-1.8 N.m {14-18 kgf.cm, 12-15 in.lbf}

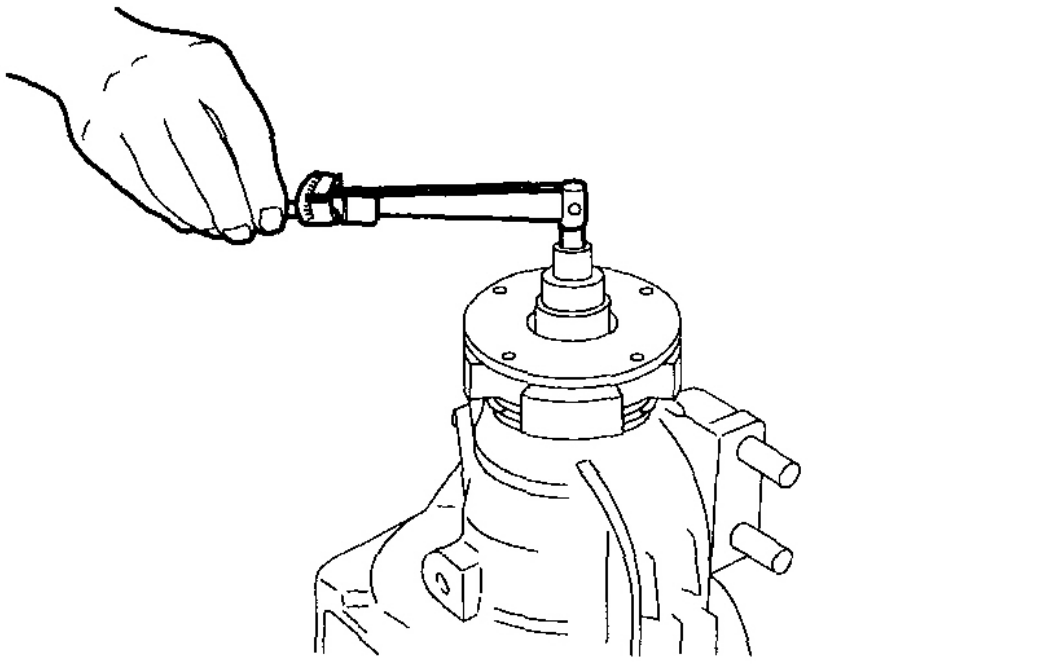


Fig. 41: Measuring Drive Pinion Preload
Courtesy of MAZDA MOTORS CORP.

ADJUSTMENT SHIM ASSEMBLY NOTE

Ring Gear Backlash Adjustment

1. Stack the side bearing race and differential gear case component on the surface plate as shown in **Fig. 42** and measure the height using a caliper and a ruler. This is value A.

   Standard Height A

   151.4-152.6 mm {5.961-6.007 in}

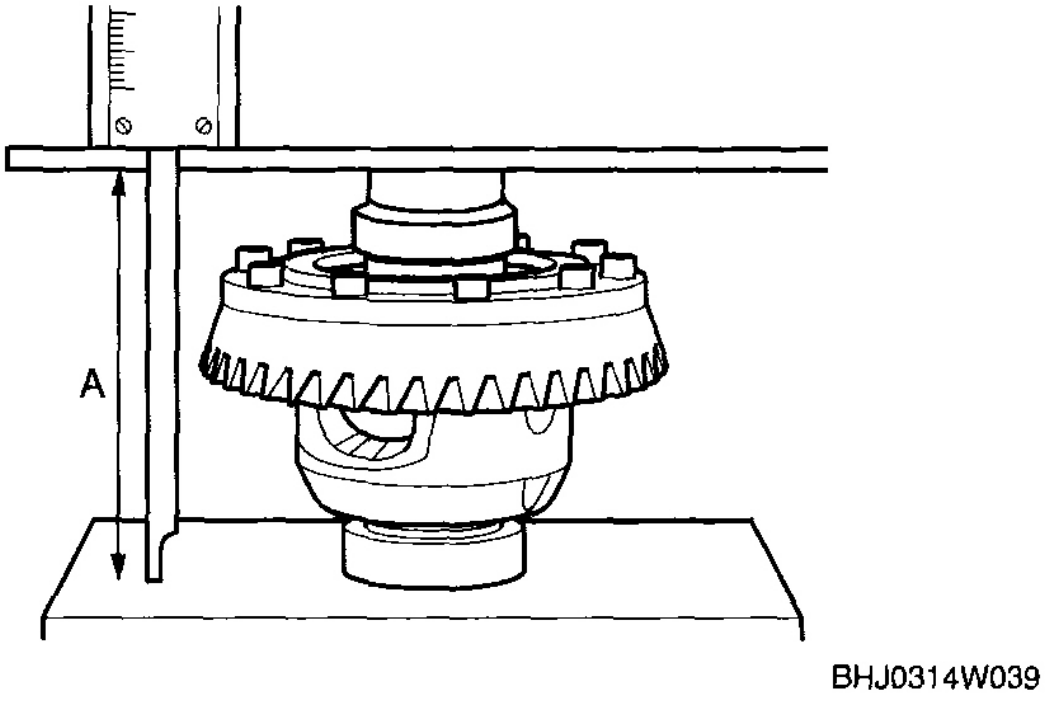


Fig. 42: Measuring Height Using Caliper & Ruler
Courtesy of MAZDA MOTORS CORP.

2. Measure the width of the section of the differential gear case component installed in the differential carrier. This is value B.

Standard width B

171 mm {6.73 in}

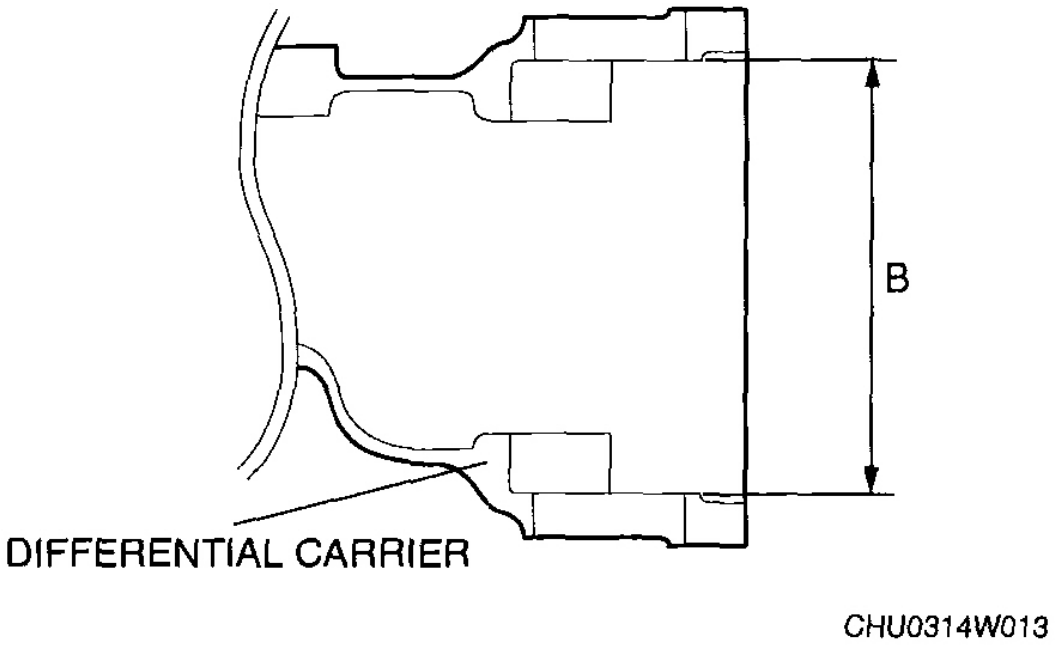


Fig. 43: Measuring Width Of Differential Gear Case Component In Differential Carrier
Courtesy of MAZDA MOTORS CORP.

1. The combined thickness of the left and right adjustment shims is obtained by the following formula.

   Shim thickness (mm {in}) =B-A+ (0.01-0.03 {0.0004-0.0118 in})

2. If the combined thickness of the previously assembled adjustment shims is equal to the calculated thickness, use the shims as they are.
3. If the combined thickness of the previously assembled adjustment shims is not equal to the calculated thickness, or if the adjustment shims have to be replaced, select two appropriate adjustment shims from the table below.

ADJUSTMENT SHIM TABLE

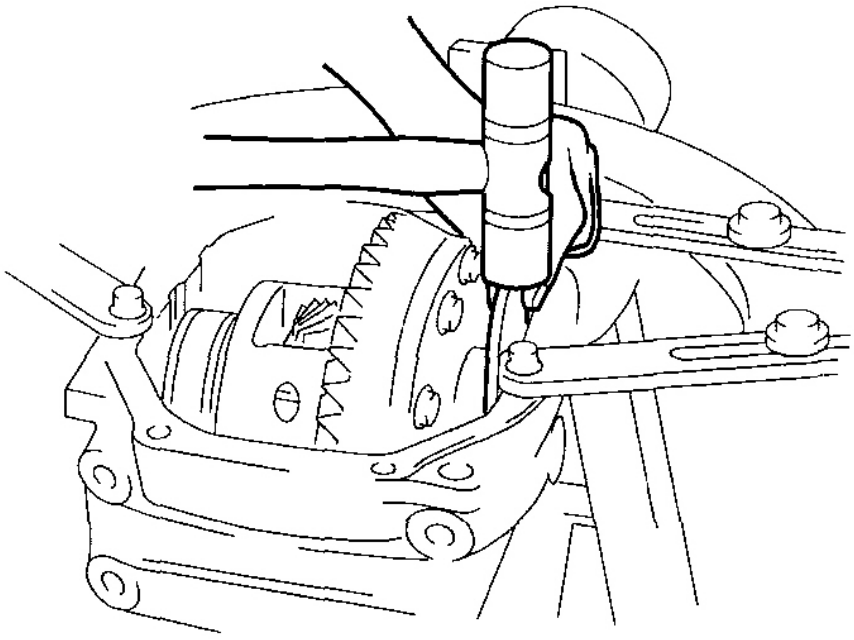
Identification mark	Thickness (mm {in})	Identification mark	Thickness (mm {in})
550	5.50 {0.217}	605	6.05 {0.238}
560	5.60 {0.220}	610	6.10 {0.240}
565	5.65 {0.222}	615	6.15 {0.242}
570	5.70 {0.224}	620	6.20 {0.244}
575	5.75 {0.226}	625	6.25 {0.246}
580	5.80 {0.228}	630	6.30 {0.248}
585	5.85 {0.230}	635	6.35 {0.250}

590	5.90 {0.232}	640	6.40 {0.252}
595	5.95 {0.234}	650	6.50 {0.256}
600	6.00 {0.236}	-	-

NOTE:

- **If the adjustment shims are to be reused, assemble the left and right shims that were identified during disassembly.**
- **When assembling the side bearing races, do not mix the left and right side bearings that were identified during disassembly.**

4. Assemble the differential gear case component and the side bearing race to the differential carrier.
5. Tap the selected adjustment shim between the differential carrier and the side bearing race with a plastic hammer as shown in **Fig. 44** .



BHJ0314W041

Fig. 44: Tapping Selected Adjustment Shim Between Differential Carrier & Side Bearing Race With Plastic Hammer
Courtesy of MAZDA MOTORS CORP.

6. Align the bearing cap alignment marks, assemble the bearing cap, and then temporarily tighten the bolts.
7. Install the dial gauge with the measuring probe of the dial gauge attached perpendicularly to the end of one of the ring gear teeth.

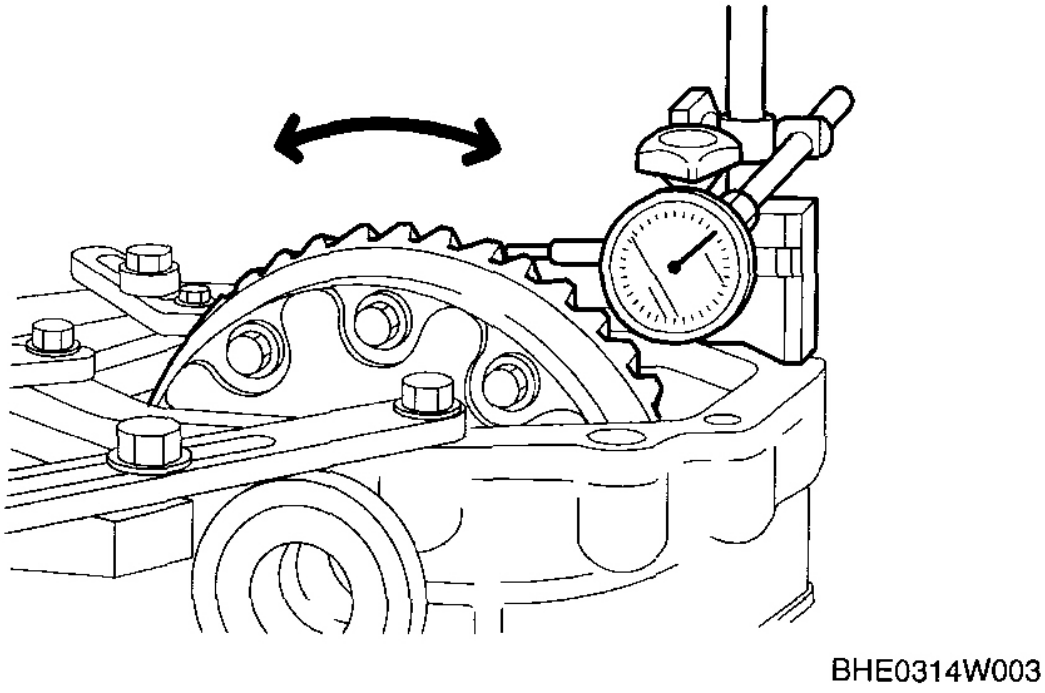


Fig. 45: Measuring Probe Of Dial Gauge Attached To End Of One Of Ring Gear Teeth
Courtesy of MAZDA MOTORS CORP.

8. Secure the drive pinion and measure the backlash of the ring gear.

Backlash of drive pinion and ring gear

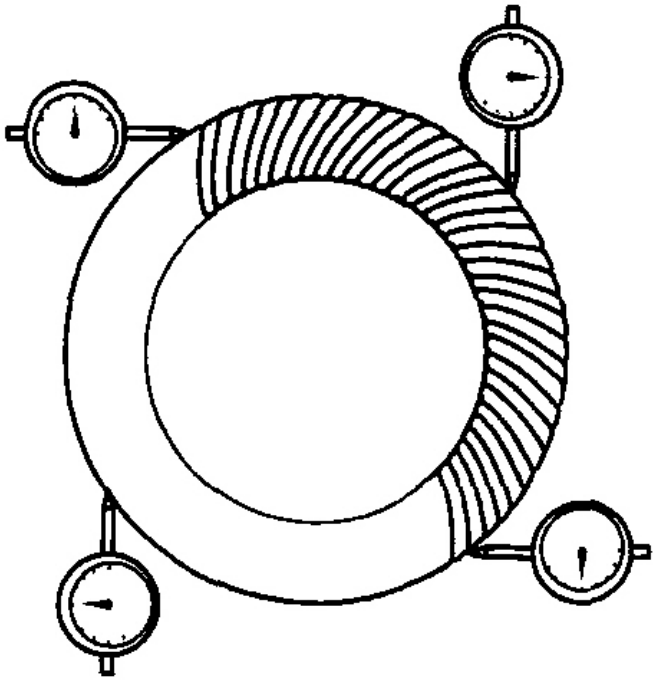
Standard: 0.09-0.11 mm {0.0035-0.0043 in}

Minimum value: 0.05 mm {0.0020 in} or more

Variance: 0.07 mm {0.0028 in} or less

NOTE:

- **Measure the backlash at 4 locations around the ring gear. Make sure all of the 4 locations are within specification, and the minimum value for the 4 locations is 0.05 mm {0.0020 in} or more and the variance is 0.07 mm {0.0028 in} or less**



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Fig. 46: Measuring Backlash At 4 Locations Around Ring Gear
Courtesy of MAZDA MOTORS CORP.

9. If the backlash is not within the specification, adjust the gear case component by moving it in the axial direction.

NOTE:

- **When moving the gear case component in the axial direction, replace the adjustment shims. If the adjustment shim on the right side is replaced with one that is 0.05 mm {0.0020 in} thicker, replace the one on the left with one that is 0.05 mm {0.0020 in} thinner.**

BEARING CAP ASSEMBLY NOTE

1. Align the bearing cap alignment marks and assemble the bearing cap with the arrow facing outward.

Tightening torque

72.6-106.9 N.m {7.41-10.91 kgf.m, 53.5-78.84 ft.lbf}

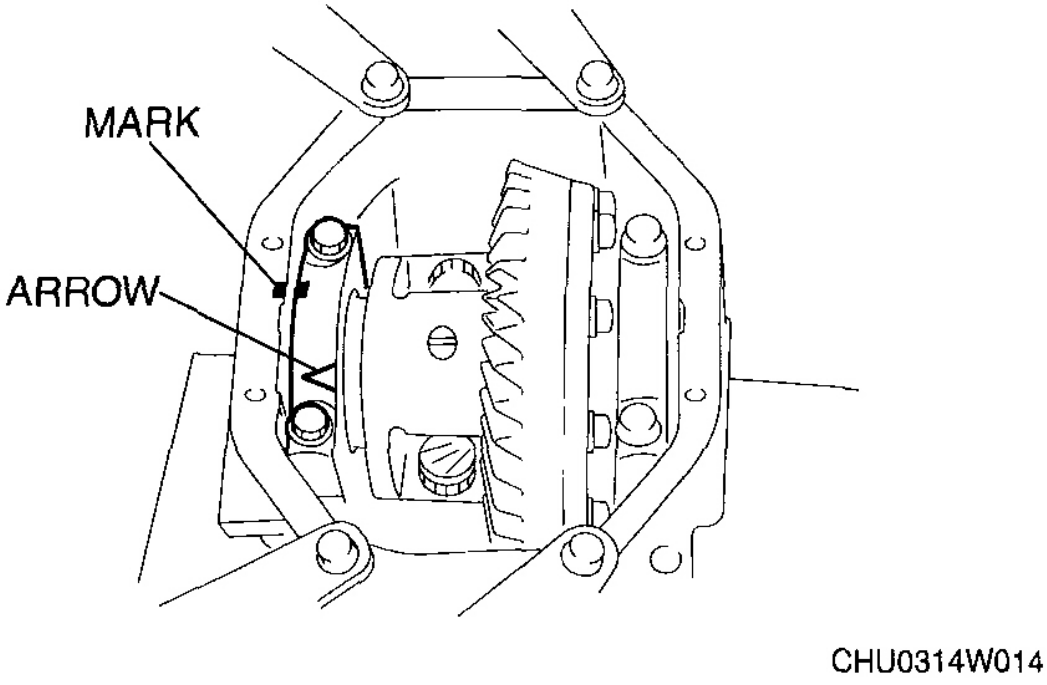


Fig. 47: Aligning Bearing Cap Alignment Marks & Assembling Bearing Cap
Courtesy of MAZDA MOTORS CORP.

2. Perform the drive pinion and ring gear tooth contact inspection.

DRIVE PINION, RING GEAR TOOTH CONTACT INSPECTION

1. Apply tooth marking compound evenly to both surfaces of the ring gear.
2. Rotate the ring gear back and forth for several times.
3. Inspect the tooth contact pattern in 4 locations around the ring gear, and verify that the tooth contact points exhibit the pattern shown in **Fig. 48** .
    - If the tooth contact points are normal, wipe off the marking compound.
    - If the tooth contact points are not normal, adjust the pinion height, then adjust the backlash.

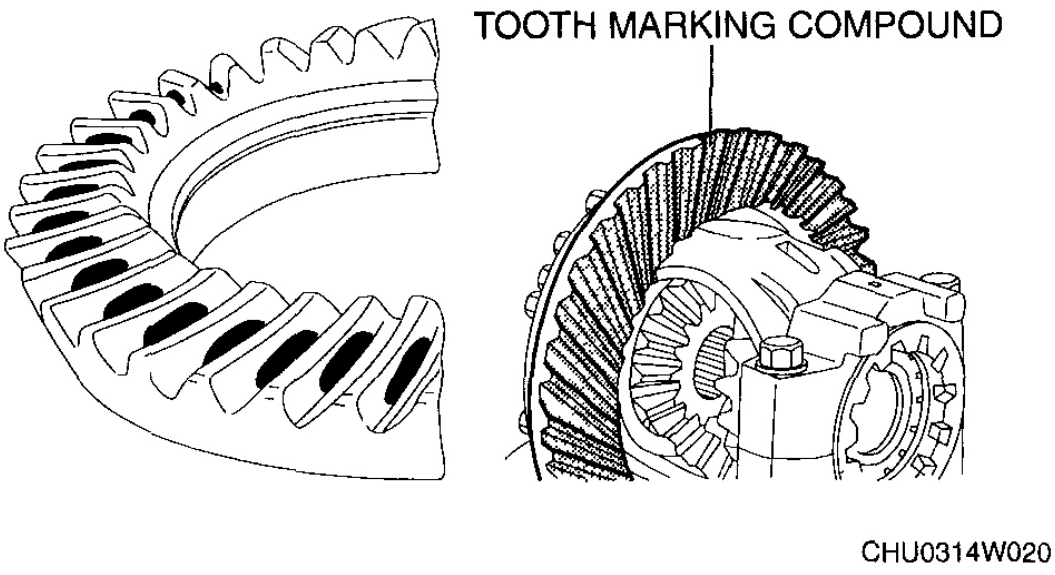


Fig. 48: Inspecting Tooth Contact Pattern In Locations Around Ring Gear
Courtesy of MAZDA MOTORS CORP.

4. If the toe and flank contact points appear as shown in **Fig. 49** after the drive pinion and ring gear teeth contact inspection, replace the spacer with a thinner one, and move the drive pinion outward.

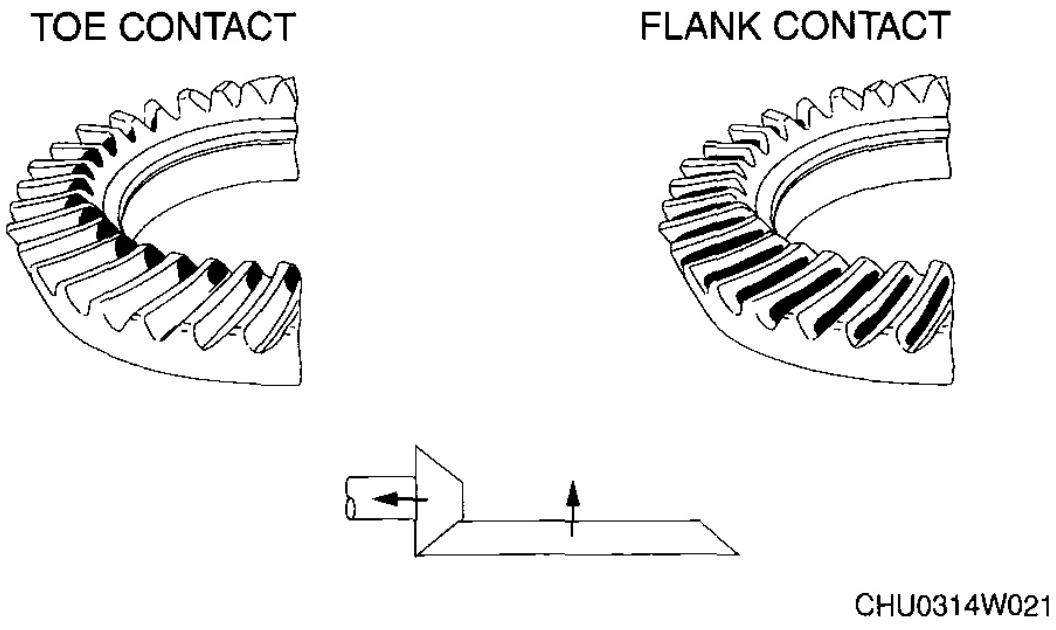


Fig. 49: Identifying Toe Contact & Flank Contact Points
Courtesy of MAZDA MOTORS CORP.

5. If the heel and face contact points appear as shown in **Fig. 50** after the drive pinion and ring gear teeth contact inspection, replace the spacer with a thicker one, and move the drive pinion inward.

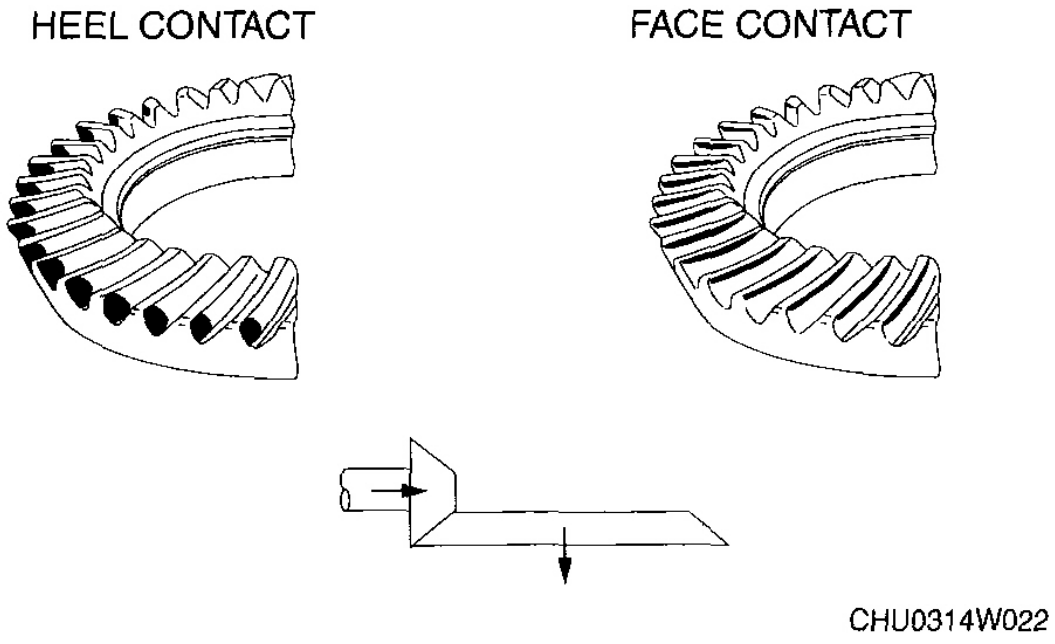
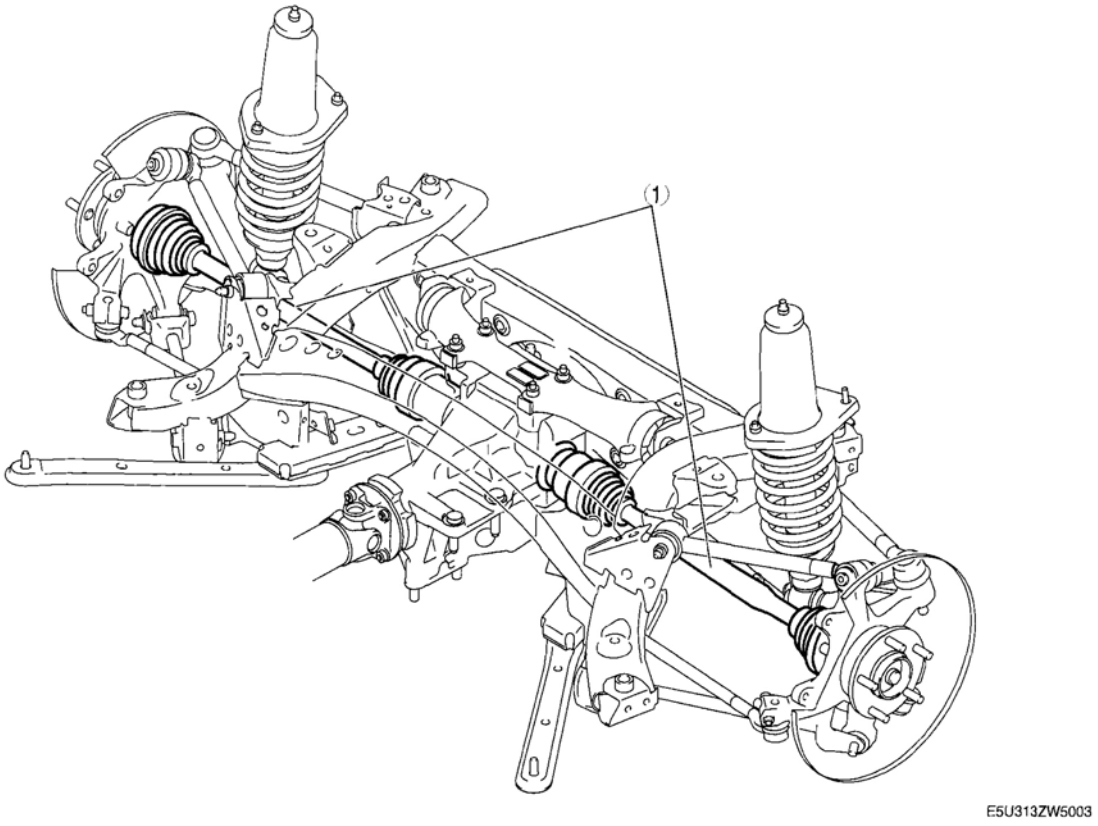


Fig. 50: Identifying Heel & Face Contact Points
Courtesy of MAZDA MOTORS CORP.

2008 DRIVELINE/AXLES

Drive Shaft - MX-5 Miata

REAR DRIVE SHAFT LOCATION INDEX



1	Rear drive shaft

Fig. 1: Identifying Location Of Rear Drive Shaft Components
Courtesy of MAZDA MOTORS CORP.

REAR DRIVE SHAFT INSPECTION

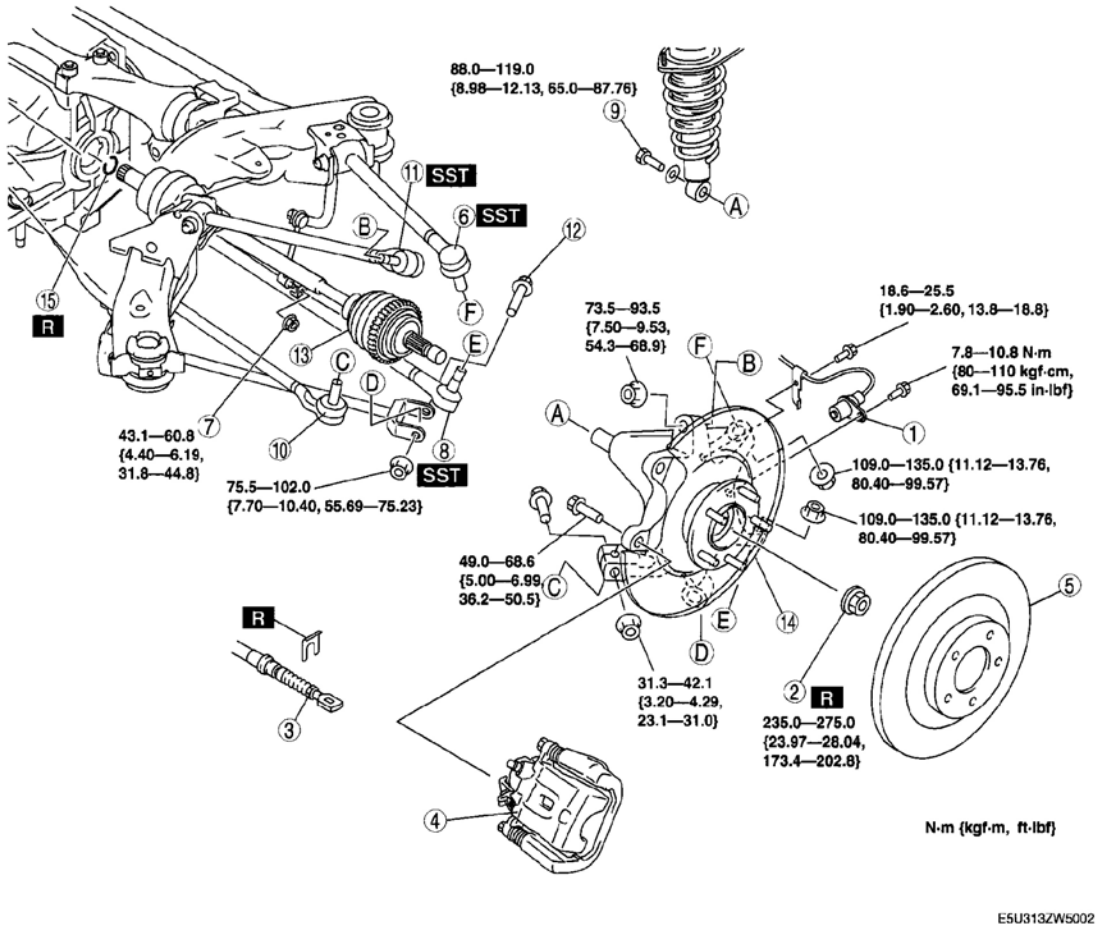
1. Verify that the drive shaft is not twisted or damaged.
    - If there is any malfunction, replace the applicable part.
2. Inspect the dust boot for damage and cracks.
    - If there is any malfunction, replace the applicable part.
3. Move the spline and joint up and down, left and right by hand and verify that there is no roughness.
    - If there is any malfunction, replace the applicable part.

REAR DRIVE SHAFT REMOVAL/INSTALLATION

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 by mistake while servicing the vehicle.**

1. Drain the rear differential oil.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Add rear differential oil. (See **DIFFERENTIAL OIL REPLACEMENT** .)



1	ABS wheel-speed sensor
2	Locknut
3	Parking brake cable
4	Brake caliper component
5	Disc plate
6	Rear lateral link (upper) ball joint
7	Stabilizer control link (lower)
8	Rear lateral link (lower) ball joint
9	Shock absorber bolt (lower)
10	Toe control link ball joint
11	Rear trailing link (upper) ball joint
12	Rear trailing link (lower) bolt (outer side)
13	Rear drive shaft
14	Rear knuckle component
15	Clip

Fig. 2: Identifying Rear Drive Shaft (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

LOCKNUT REMOVAL NOTE

1. Lock the disc plate by applying the brakes.
2. Knock the crimped portion of the locknut outward using a chisel and a hammer.

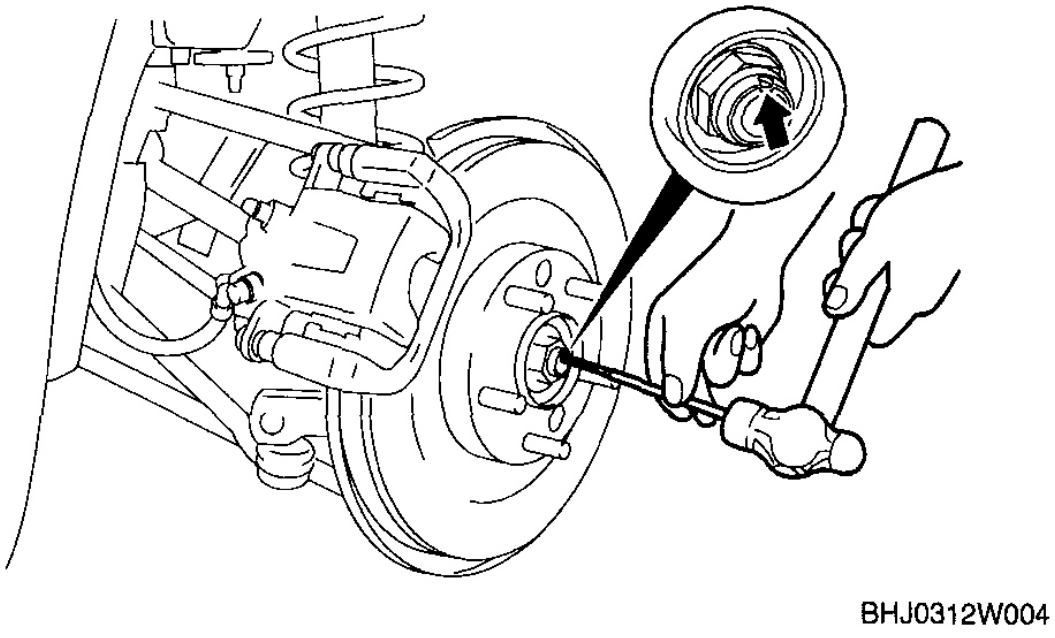


Fig. 3: Knocking Out Crimped Portion Of Locknut Using Chisel & Hammer
Courtesy of MAZDA MOTORS CORP.

3. Remove the locknut.

BRAKE CALIPER COMPONENT REMOVAL NOTE

1. Suspend the brake caliper component using a cable or equivalent.

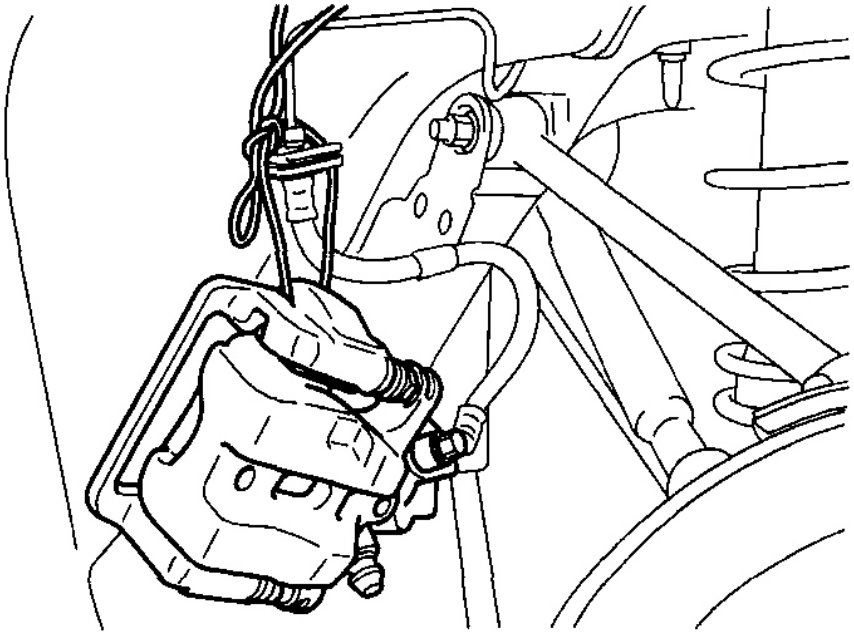
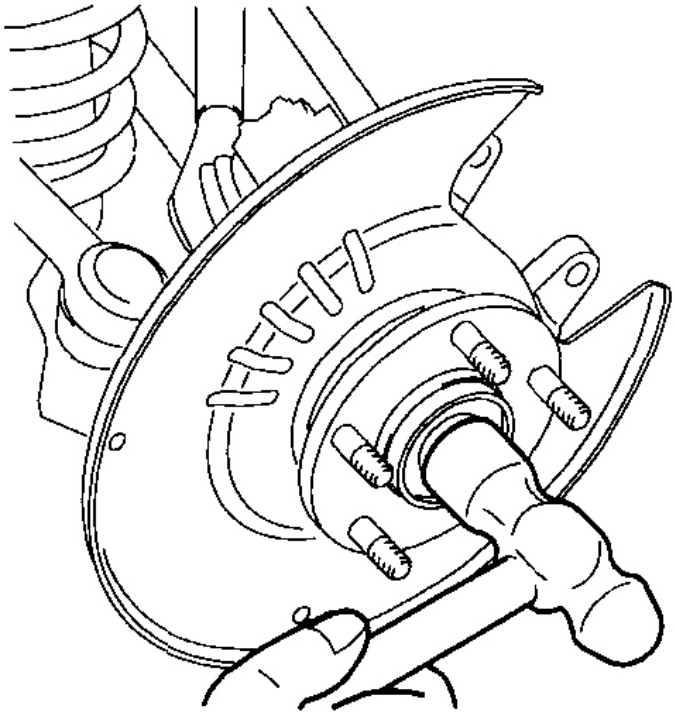


Fig. 4: Suspending Brake Caliper Component
Courtesy of MAZDA MOTORS CORP.

2. Temporarily tighten the wheel nut to prevent the disc plate from falling off.

REAR DRIVE SHAFT REMOVAL NOTE

1. Temporarily install a spare nut to the end of the rear drive shaft.
2. Knock the nut with copper hammer lightly and remove the rear drive shaft from the wheel hub.



BHJ0312W005

Fig. 5: Using Hammer To Remove Rear Drive Shaft From Wheel Hub
Courtesy of MAZDA MOTORS CORP.

3. Separate the rear drive shaft from the wheel hub.
4. Insert a tire lever or equivalent between the rear differential and differential side outer ring, and then remove the rear drive shaft.

CAUTION:
- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful not to damage the oil seal when removing the drive shaft from the differential.**

5. Pull the rear drive shaft to the outer side of the vehicle and disconnect it from the rear differential.
6. To hold the rear knuckle component, install the rear lateral link (upper) to the rear knuckle temporarily after disconnecting the rear drive shaft.

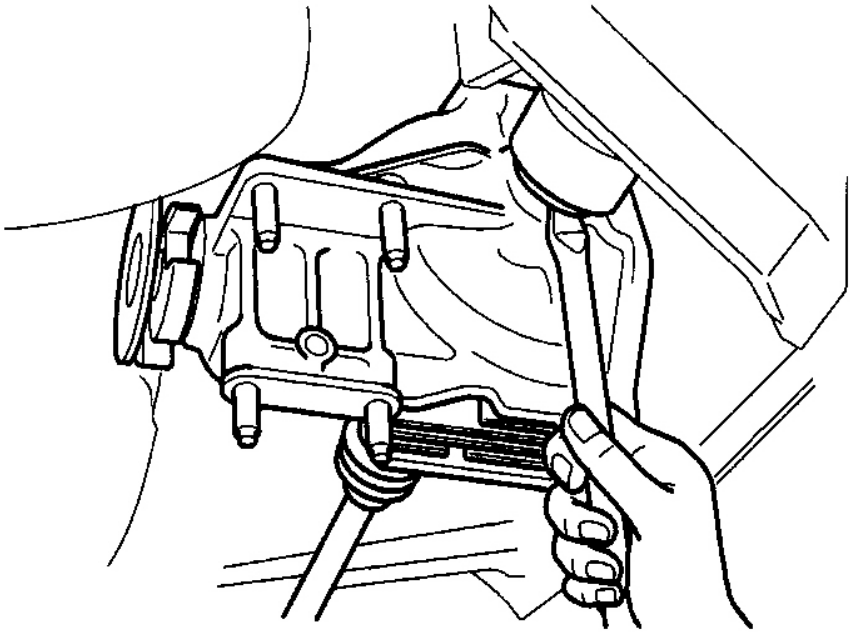


Fig. 6: Removing Rear Shaft
Courtesy of MAZDA MOTORS CORP.

CLIP INSTALLATION NOTE

1. Point the opening of the new drive shaft clip upward, install it to the clip groove at the end of the rear drive shaft with the installation width within the specification.

   Standard 31.2

   mm {1.23 in}

2. After installing the clip, measure the outer diameter. If it exceeds the specification, reinstall the new clip.

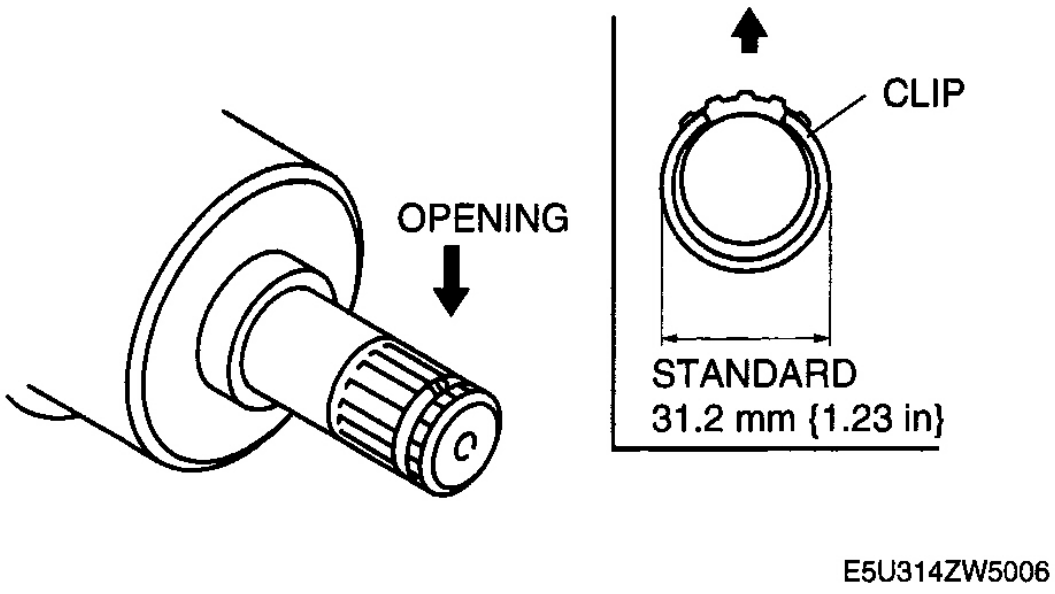


Fig. 7: Identifying Clip Groove End Of Rear Drive Shaft
Courtesy of MAZDA MOTORS CORP.

REAR DRIVE SHAFT INSTALLATION NOTE

1. Apply differential oil to the differential oil seal lip.

CAUTION:
- **The sharp edges of the rear drive shaft can slice or puncture the oil seal. Be careful not to damage the oil seal when installing the rear drive shaft from the rear differential.**

2. Insert the rear drive shaft into the rear differential with the clip opening facing upward.
3. After installation, verify that the rear drive shaft is securely held by the clip by pulling the outer ring on the differential side towards the axle.

LOCKNUT INSTALLATION NOTE

1. Tighten a new locknut.

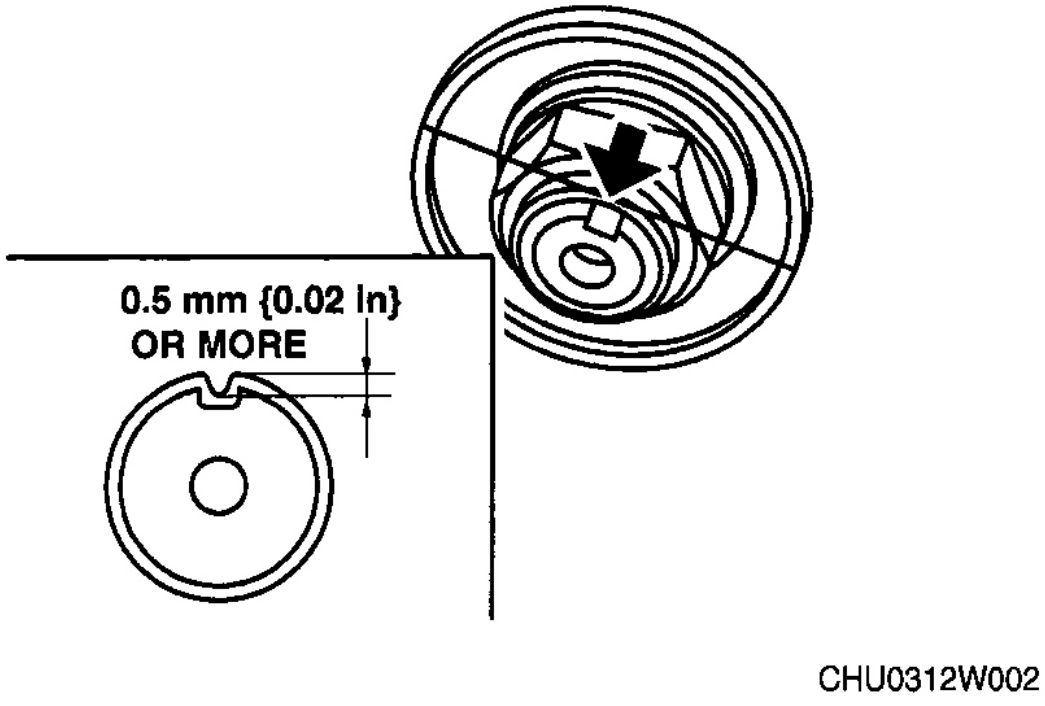
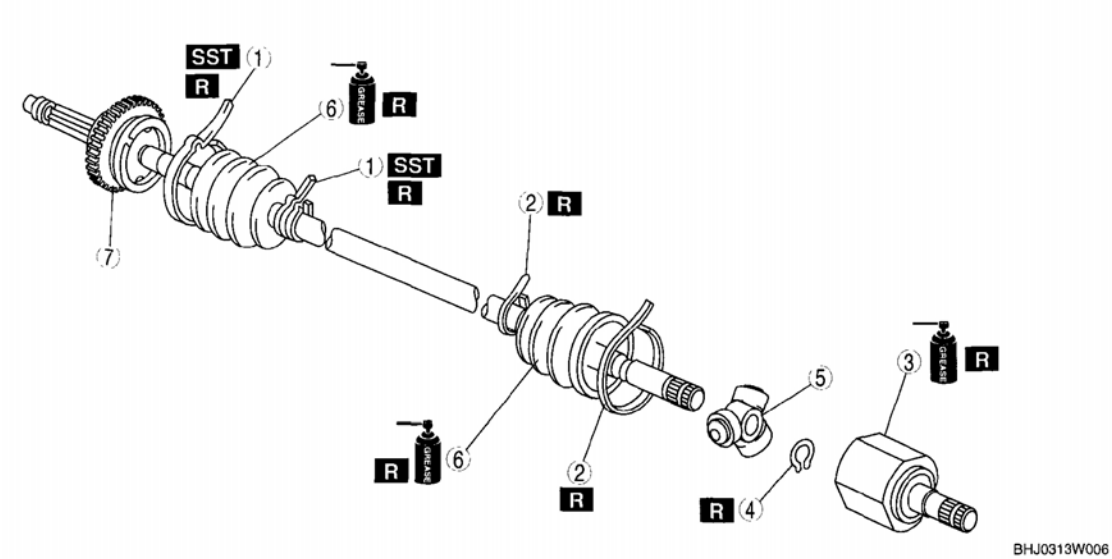


Fig. 8: Tightening New Locknut (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

2. Crimp the locknut, using a chisel and hammer.

REAR DRIVE SHAFT DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in **Fig. 9** .



1	Boot band (axle side)
2	Boot band (differential side)
3	Tripod joint socket
4	Snap ring
5	Tripod joint
6	Boot
7	Shaft and ball joint component

Fig. 9: View Of Rear Drive Shaft Components
Courtesy of MAZDA MOTORS CORP.

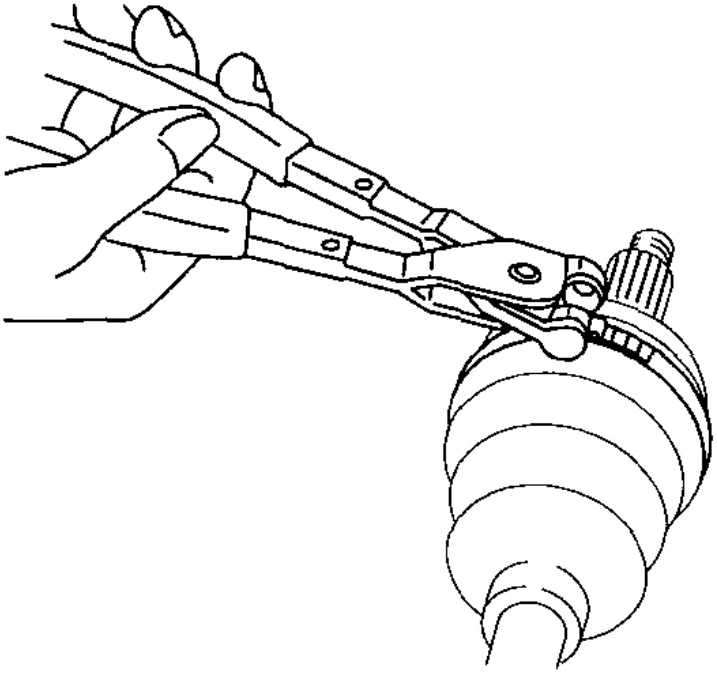
2. Assemble in the reverse order of disassembly.

BOOT BAND (AXLE SIDE) DISASSEMBLY NOTE

NOTE:

- **Remove the boot band only if there is an abnormality.**

1. Remove the boot band using end clamp pliers.



A6E6316W004

Fig. 10: Removing Boot Band Using End Clamp Pliers
Courtesy of MAZDA MOTORS CORP.

BOOT BAND (DIFFERENTIAL SIDE) DISASSEMBLY NOTE

1. Remove the crimp of the clip using a flathead screwdriver.

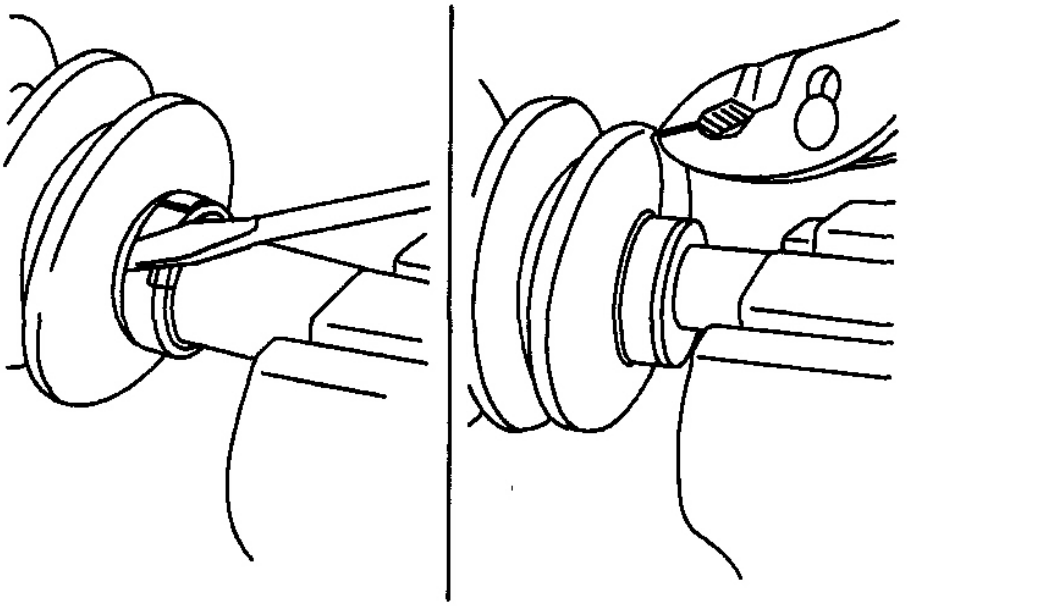


Fig. 11: Removing Crimp Of Clip Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

TRIPOD JOINT SOCKET DISASSEMBLY NOTE

1. Place an alignment mark on the drive shaft and the outer ring.

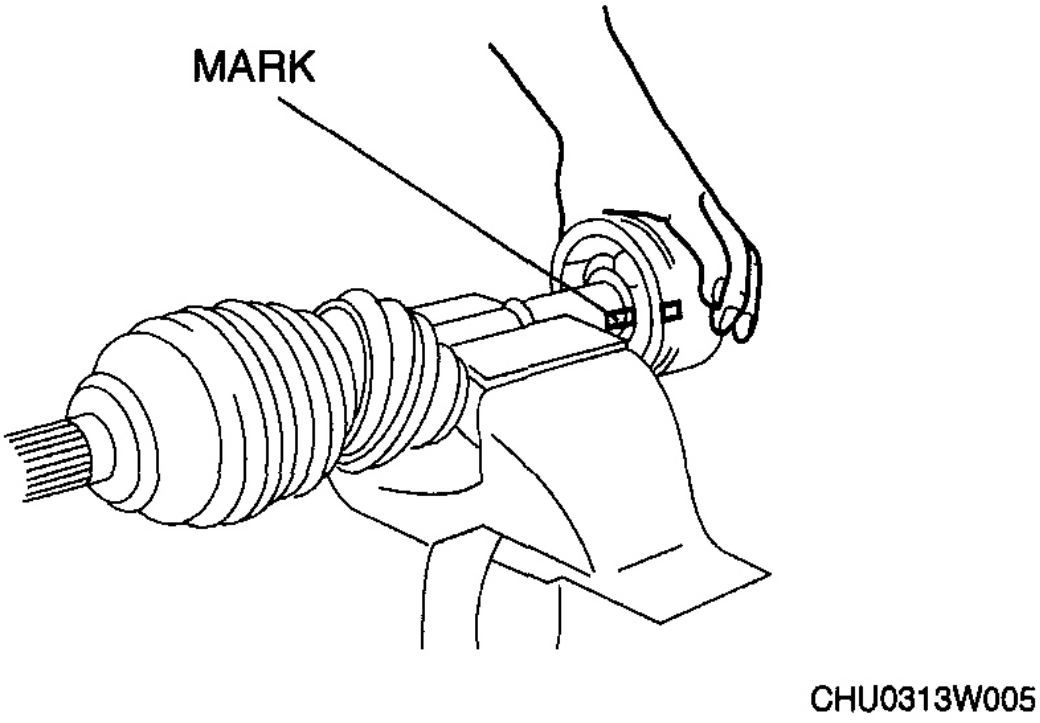


Fig. 12: View Of Alignment Mark On Drive Shaft & Outer Ring
Courtesy of MAZDA MOTORS CORP.

2. Remove the outer ring.

SNAP RING, TRIPOD JOINT DISASSEMBLY NOTE

1. Place an alignment mark on the shaft and tripod joint.
2. Remove the snap ring using a snap ring plier.

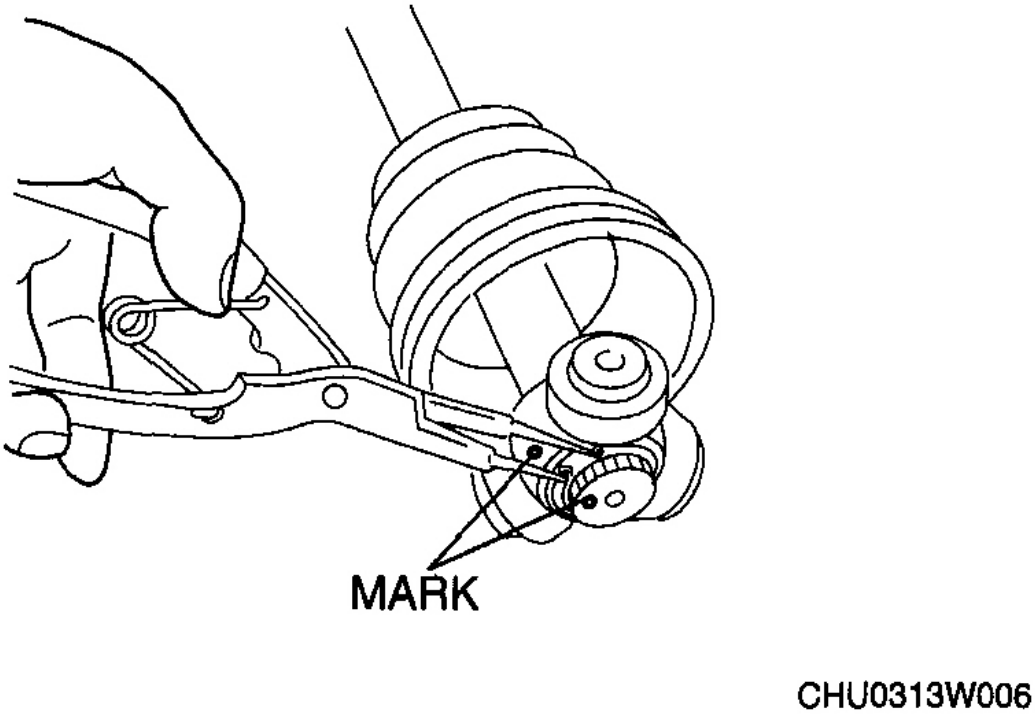


Fig. 13: Removing Snap Ring
Courtesy of MAZDA MOTORS CORP.

3. Remove the tripod joint from the shaft.

CAUTION:
- **To prevent damage to the component, do not use a hammer when removing it.**

BOOT DISASSEMBLY NOTE

NOTE:
- **Remove the axle side boot only if there is an abnormality.**

1. Wrap the shaft spline with vinyl tape.

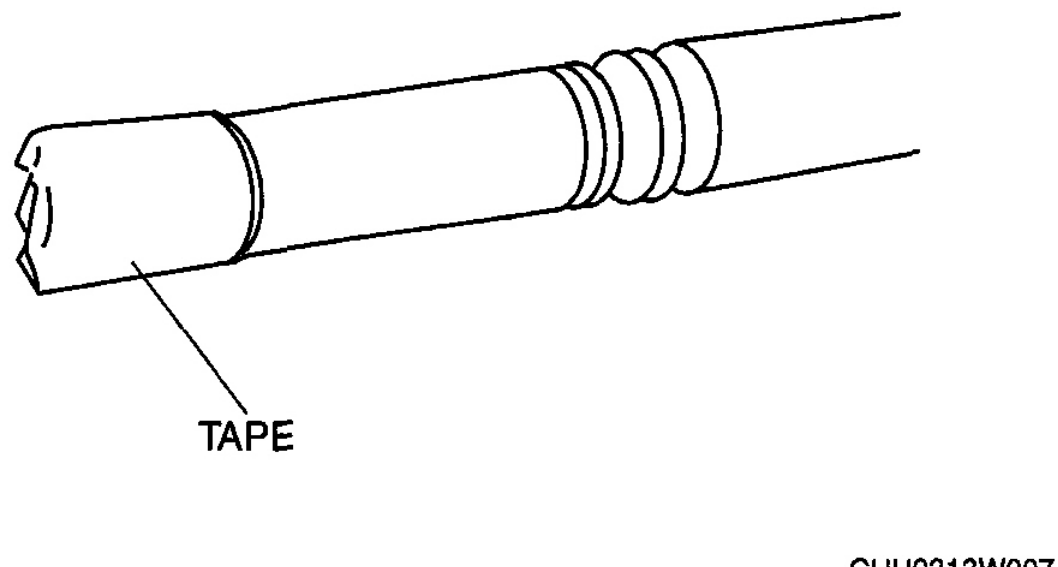


Fig. 14: View Of Shaft Spline With Vinyl Tape
Courtesy of MAZDA MOTORS CORP.

2. Remove the boot.

BOOT ASSEMBLY NOTE

NOTE:
- **The boot shapes on the axle side and the differential side are different so do not miss install them.**

1. Fill the inside of the new dust boot (wheel side) with grease.

NOTE:
- **Do not touch the grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

Grease amount

90-110 g {3.18-3.88 oz.}

2. Install the boot with the drive shaft spline still wrapped with vinyl tape.
3. Remove the vinyl tape.

TRIPOD JOINT, SNAP RING ASSEMBLY NOTE

1. Align the tripod joint with the shaft mark and insert it using a brass bar.

CAUTION:
- **To prevent damage to the component, do not tap the roller part when installing.**

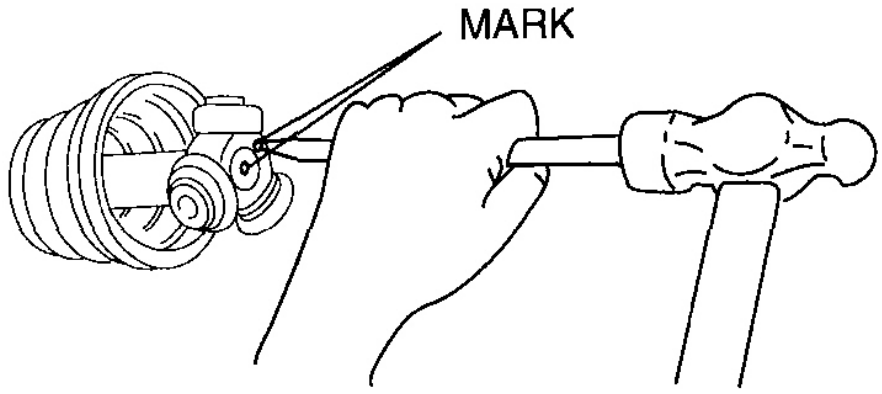


Fig. 15: Aligning Tripod Joint With Shaft Mark
Courtesy of MAZDA MOTORS CORP.

2. Install the new snap ring to the shaft installation slot securely using a snap ring pliers.

TRIPOD JOINT SOCKET ASSEMBLY NOTE

1. Fill the outer ring and boot (differential side) with the repair kit grease.

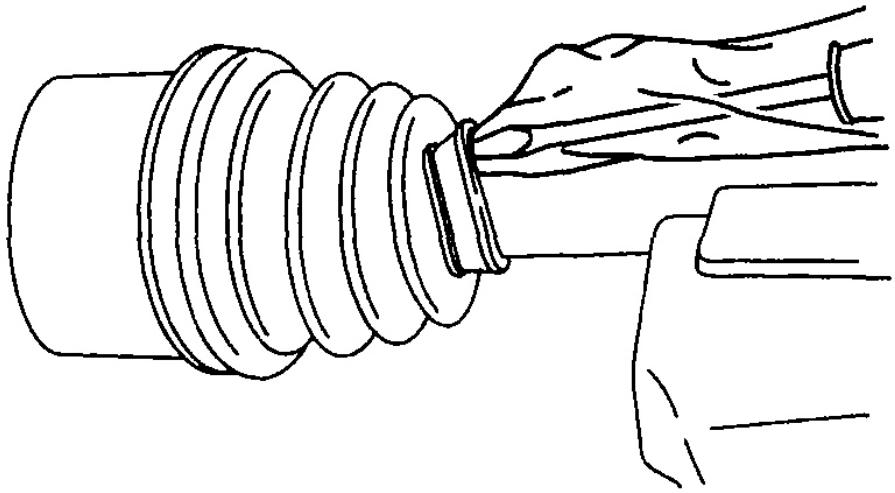
NOTE:
- **Do not touch the grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

Grease amount

135-155 g {4.77-5.46 oz.}

2. Assemble the outer ring.
3. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth wrapped screwdriver.

CAUTION:
- **Do not let the grease leak.**
- **Do not damage the boot.**



A6E6316W007

Fig. 16: Releasing Trapped Air From Boot
Courtesy of MAZDA MOTORS CORP.

4. Set the drive shaft length to the specification when the inside of the boots is at ambient pressure.

   Drive shaft length

   Left side: 778.5-788.5 mm {30.65-31.04 in}

   Right side: 818.5-828.5 mm {32.22-32.62 in}

5. After installation, verify that there is no boot damage or grease leakage.

BOOT BAND (DIFFERENTIAL SIDE) ASSEMBLY NOTE

1. Using pliers, pull the boot band around the boot slot in opposite direction of drive shaft forward rotation direction and tighten.
2. Insert the end of the boot band between the boot band clip and fold back the clip tabs using a flathead screwdriver to secure the boot band.

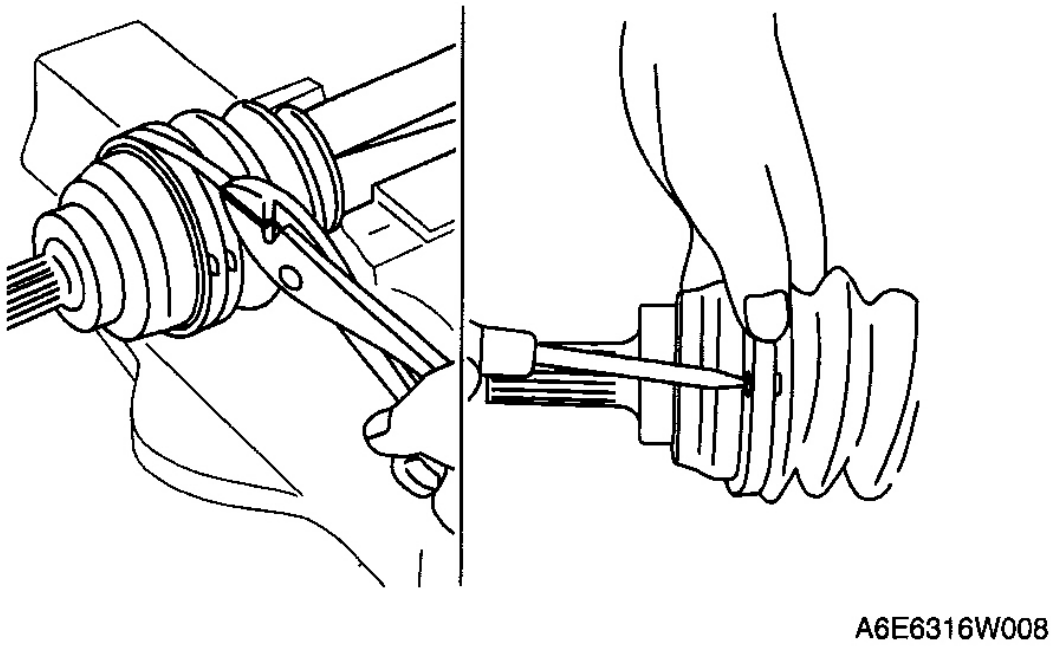


Fig. 17: Inserting End Of Boot Band Between Boot Band Clip & Fold Back Clip Tabs Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

3. Verify that the boot band is installed to the boot slot securely.

BOOT BAND (AXLE SIDE) ASSEMBLY NOTE

1. Turn the adjusting bolt of the **SST** and adjust the opening size to the specification A.

   Specification A

   2.9 mm {0.11 in}

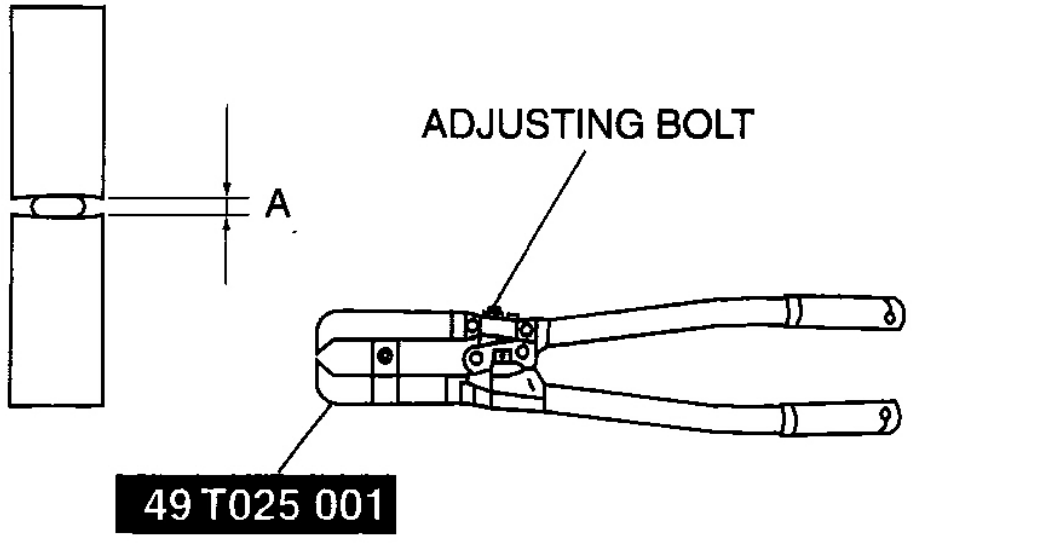


Fig. 18: Identifying Adjusting Bolt Of SST
Courtesy of MAZDA MOTORS CORP.

2. Crimp the boot band (small-size) using the **SST.**
3. Verify that the crimp value B is within the specification.
    - If the crimp value B exceeds the specification, reduce opening length A of the **SST** and recrimp the boot band.
    - If the crimp value B is less than the specification, increase opening length A of the **SST** and crimp the new boot band.

    Specification B

    2.4-2.8 mm {0.095-0.110 in}

4. Verify that the boot band does not protrude from the boot band installation area.
    - If the boot band protrudes from the installation area, replace it with a new band and repeat Step 2 thru 4.

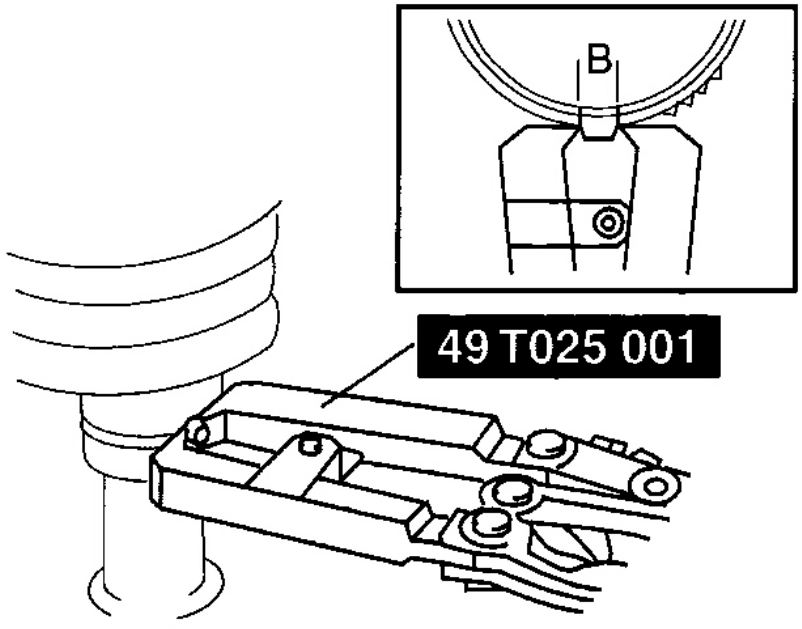


Fig. 19: Crimping Boot Band
Courtesy of MAZDA MOTORS CORP.

5. Fill the boot with the repair kit grease.
6. Adjust opening length A of the **SST** to the specification.

Specification A

3.2 mm {0.13 in}

7. Crimp the boot band (large-size) using the **SST.**
8. Verify that the boot band crimp value B is within the specification.
   - If crimp value B exceeds the specification, reduce opening length A of the **SST** and recrimp the boot band.
   - If the crimp value B is less than the specification, replace the boot band, increase opening length A of the **SST** , and then recrimp the new boot band.

Specification B

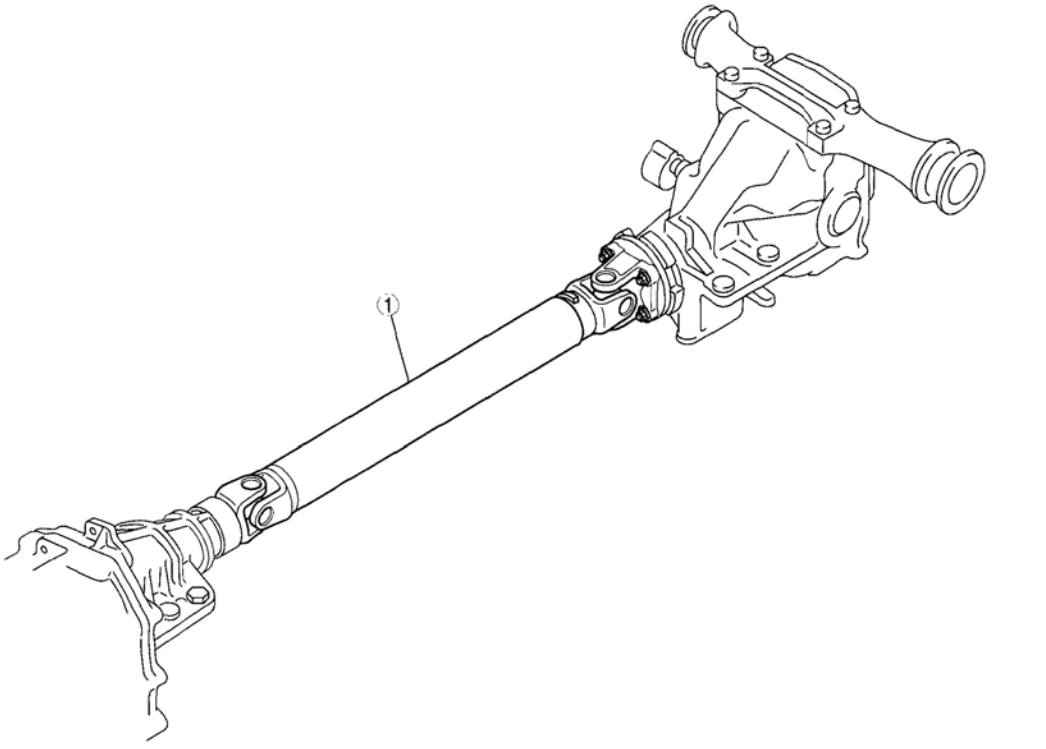
2.4-2.8 mm {0.095-0.110 in}

9. Verify that the boot band does not protrude from the boot band installation area.
    - If the boot band protrudes from the installation area, replace it with a new band and repeat Step 7 thru 9.

2008 DRIVELINE/AXLES

Propeller Shaft - MX-5 Miata

PROPELLER SHAFT LOCATION INDEX



1	Propeller shaft

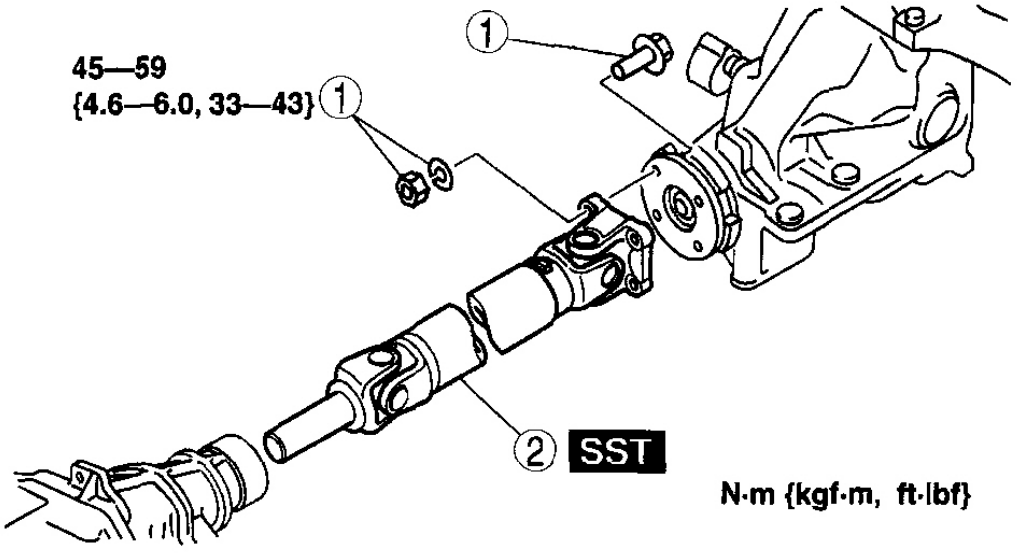
Fig. 1: Identifying Propeller Shaft
Courtesy of MAZDA MOTORS CORP.

PROPELLER SHAFT REMOVAL/INSTALLATION

1. Remove the member and the middle pipe.

   (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [LF]** .)

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



1	Bolt, nut
2	Propeller shaft

Fig. 2: Identifying Propeller Shaft Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

PROPELLER SHAFT REMOVAL NOTE

CAUTION:
- **When replacing with a new propeller shaft, mark the companion flange to match the position of the tag on the propeller shaft.**

1. Before removing the propeller shaft, make alignment marks on the yoke and differential companion flange.

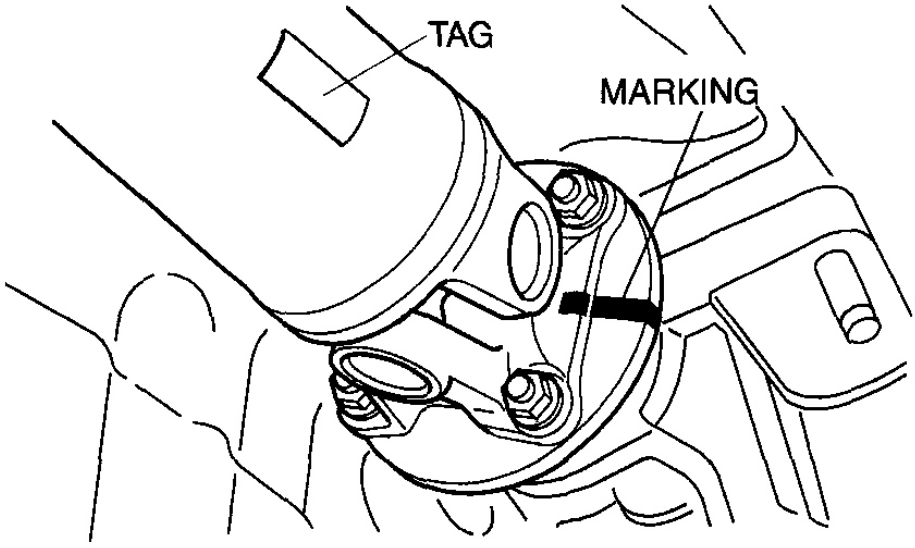


Fig. 3: Identifying Alignment Marks On Yoke & Companion Flange
Courtesy of MAZDA MOTORS CORP.

2. Install the **SST** to the extension housing.

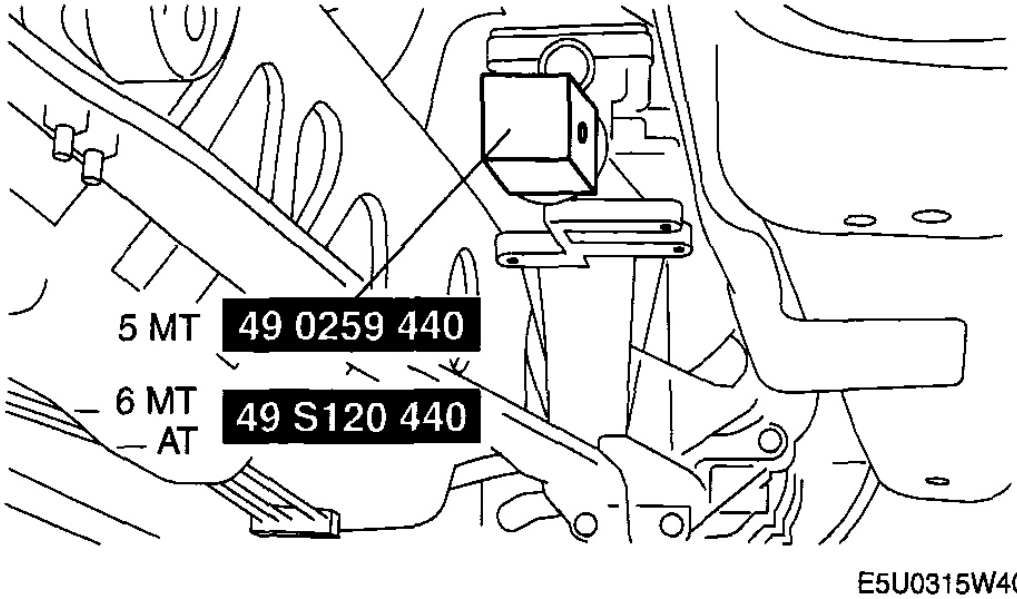


Fig. 4: Identifying SST To Extension Housing
Courtesy of MAZDA MOTORS CORP.

PROPELLER SHAFT INSTALLATION NOTE

1. Align the marks and install the propeller shaft.
2. When installing a new propeller shaft, align the differential companion flange mark with the tag on the propeller shaft and assemble.

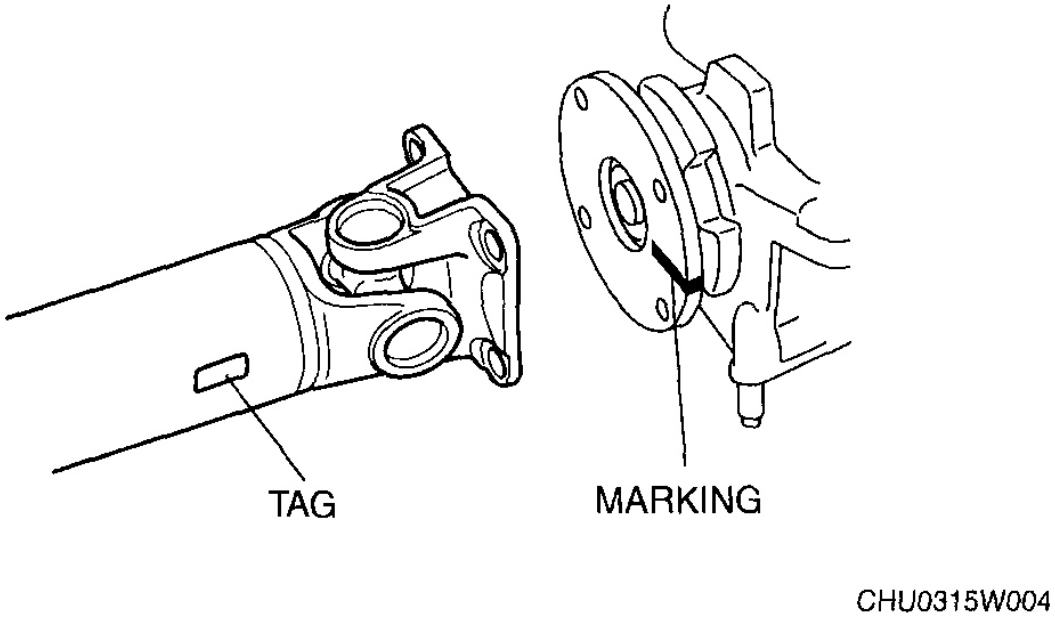


Fig. 5: Identifying Differential Companion Flange Mark And Tag
Courtesy of MAZDA MOTORS CORP.

PROPELLER SHAFT INSPECTION

1. Use a dial gauge to measure the runout of the propeller shaft at each position.
   - If it exceeds the maximum specification, replace the propeller shaft.

Maximum runout

0.4 mm {0.016 in}

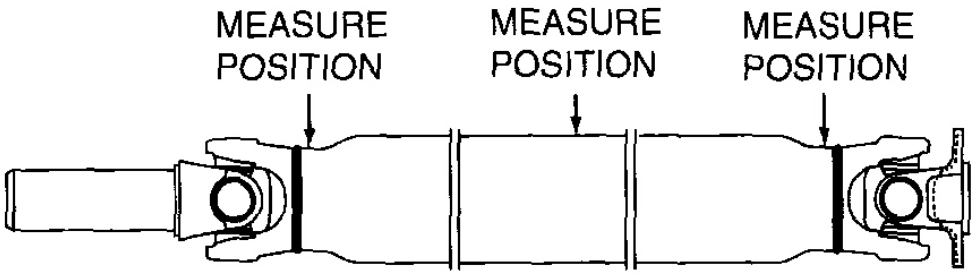


Fig. 6: Identifying Runout Measuring Points
Courtesy of MAZDA MOTORS CORP.

2. Inspect the play and rotation of the joint by turning the universal joint in the direction shown by the arrow

   Initial torque (Reference value)

   0.29-0.98 N.m

   {3.0-10 kgf.cm, 2.7-8.6 in.lbf}

   - If there is excessive play or initial torque, replace the propeller shaft.

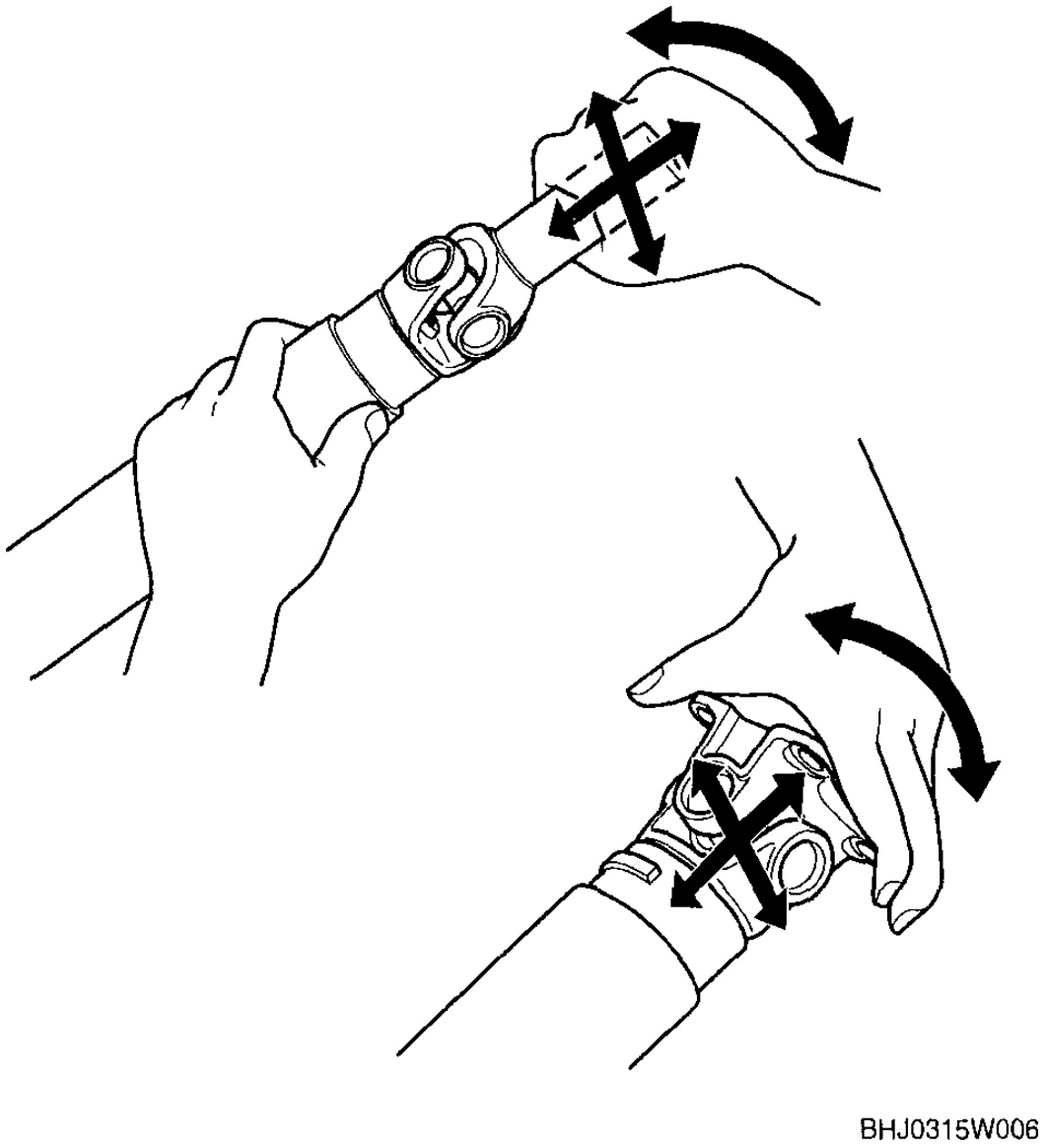
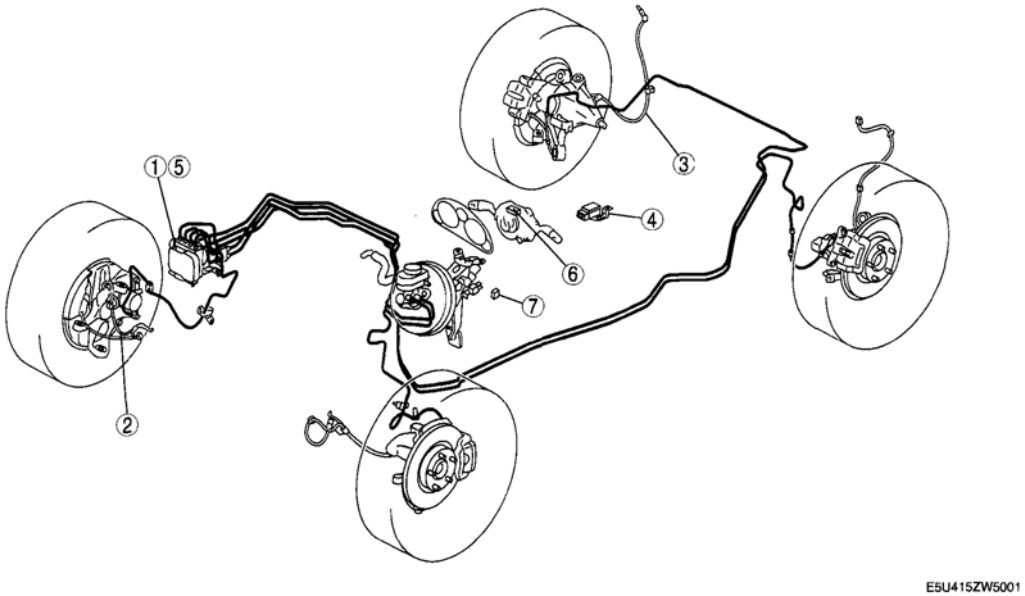


Fig. 7: Inspecting Play & Rotation Of Joint By Turning Universal Joint In Direction
Courtesy of MAZDA MOTORS CORP.

2008 BRAKES

Dynamic Stability Control - MX-5 Miata

DYNAMIC STABILITY CONTROL LOCATION INDEX



1	DSC HU/CM
2	Front ABS wheel-speed sensor
3	Rear ABS wheel-speed sensor
4	Combined sensor
5	Brake fluid pressure sensor (built-into DSC HU/CM)
6	Steering angle sensor
7	DSC OFF switch

Fig. 1: Identifying Location Of Dynamic Stability Control Connector Terminals
Courtesy of MAZDA MOTORS CORP.

DSC SYSTEM WIRING DIAGRAM

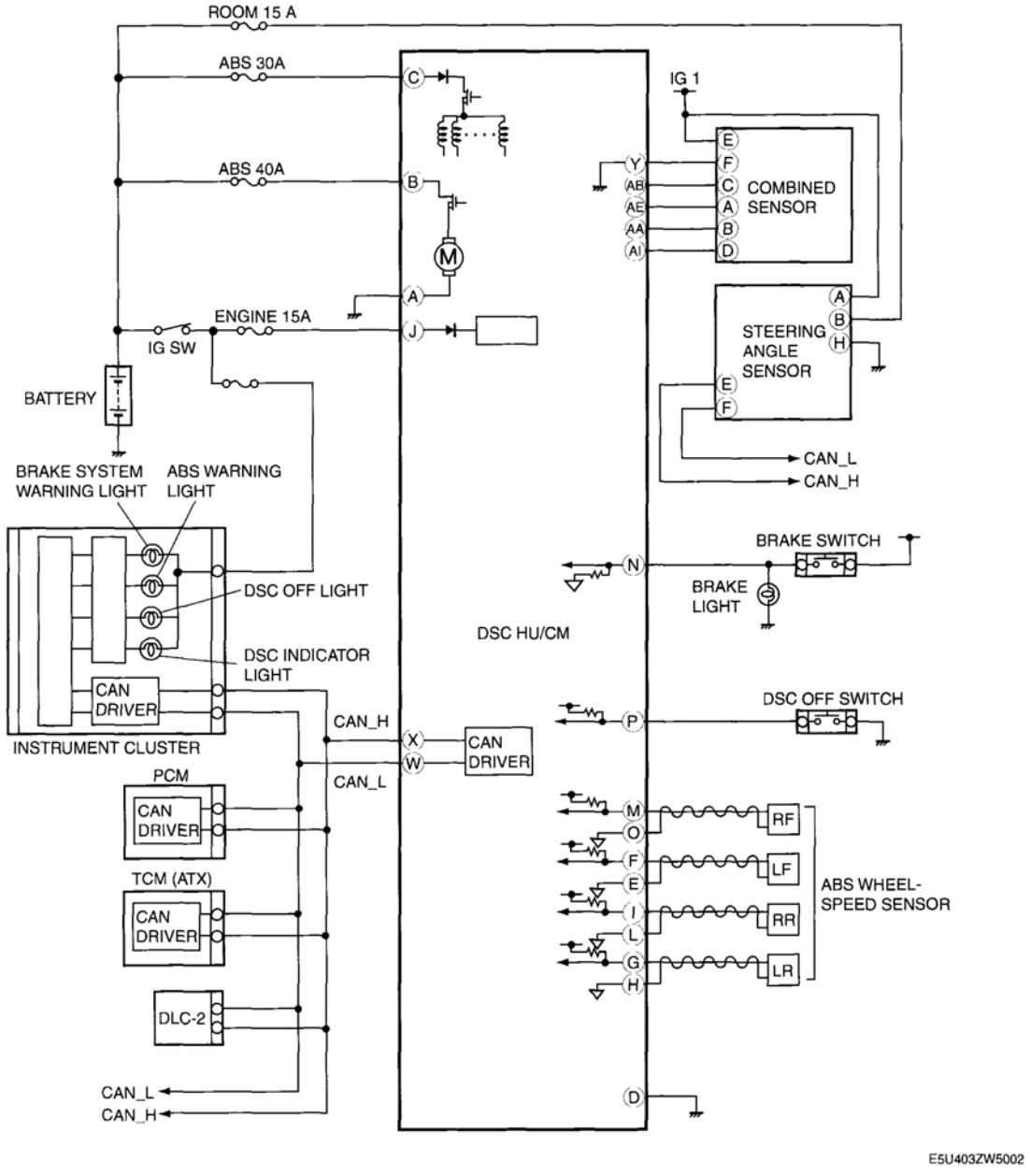


Fig. 2: DSC System Wiring Diagram
Courtesy of MAZDA MOTORS CORP.

DSC SYSTEM INSPECTION

PREPARATION

1. Verify that battery is fully charged.
2. Turn the ignition switch to the ON position, and verify that the ABS warning light goes out after **approx.**

3 s .

3. Turn the ignition switch off.
4. Jack up the vehicle and support it evenly on safety stands.
5. Shift to the N position.
6. Verify that all four wheels rotate.
7. Rotate the inspected wheels by hand, and verify there is no brake drag.
    - If there is any brake drag, perform regular brake inspection.
    - If there is no brake drag, perform DSC HU/CM operation inspection.

ABS CONTROL INSPECTION

1. Perform "Preparation".
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

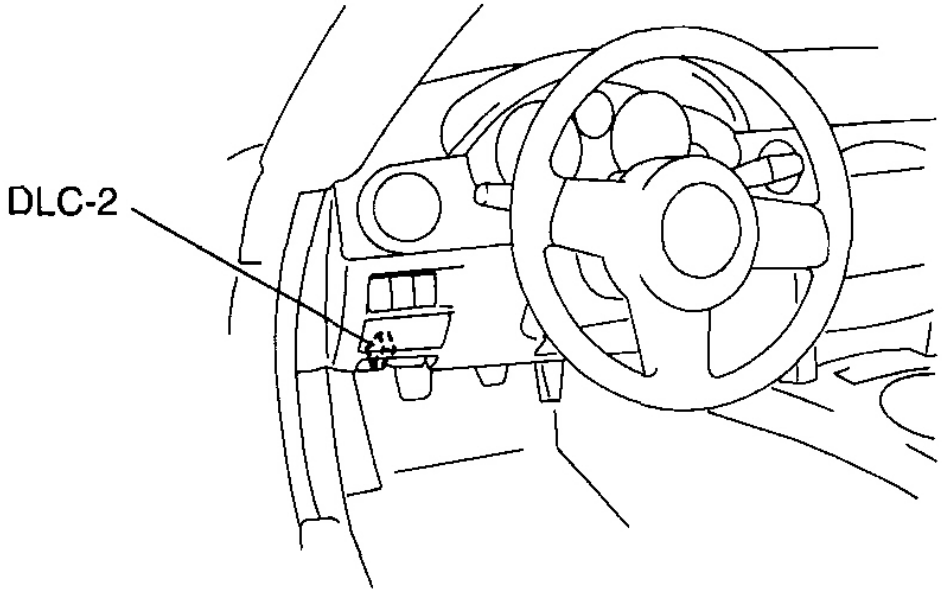


Fig. 3: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

BRAKE PRESSURE RETENTION

Command name	Inspected wheels			
	LF	RF	LR	RR

<table>
<tr><td>V_TRC_L</td><td colspan="4" rowspan="4">OFF</td></tr>
<tr><td>V_TRC_R</td></tr>
<tr><td>V_STB_L</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td>ON</td><td rowspan="4">OFF</td><td>OFF</td><td rowspan="5">OFF</td></tr>
<tr><td>LF_OUTLET</td><td rowspan="6">OFF</td><td rowspan="2">ON</td></tr>
<tr><td>LR_INLET</td></tr>
<tr><td>LR_OUTLET</td><td rowspan="5">OFF</td></tr>
<tr><td>RF_INLET</td><td>ON</td></tr>
<tr><td>RF_OUTLET</td><td rowspan="3">OFF</td></tr>
<tr><td>RR_INLET</td><td>ON</td></tr>
<tr><td>RR_OUTLET</td><td rowspan="2">OFF</td></tr>
<tr><td>PMP_MOTOR</td></tr>
</table>

BRAKE PRESSURE REDUCTION

<table>
<tr><th rowspan="2">Command name</th><th colspan="4">Inspected wheels</th></tr>
<tr><th>LF</th><th>RF</th><th>LR</th><th>RR</th></tr>
<tr><td>V_TRC_L</td><td colspan="4" rowspan="4">OFF</td></tr>
<tr><td>V_TRC_R</td></tr>
<tr><td>V_STB_L</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td rowspan="2">ON</td><td rowspan="3">OFF</td><td>OFF</td><td rowspan="5">OFF</td></tr>
<tr><td>LF_OUTLET</td><td rowspan="2">ON</td></tr>
<tr><td>LR_INLET</td><td rowspan="6">OFF</td></tr>
<tr><td>LR_OUTLET</td><td rowspan="5">OFF</td><td rowspan="2">ON</td></tr>
<tr><td>RF_INLET</td></tr>
<tr><td>RF_OUTLET</td><td rowspan="3">OFF</td></tr>
<tr><td>RR_INLET</td><td>ON</td></tr>
<tr><td>RR_OUTLET</td><td rowspan="2">OFF</td></tr>
<tr><td>PMP_MOTOR</td></tr>
</table>

CAUTION:

- **To protect the DSC HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

NOTE:

- **When working with two people, one should press on the brake pedal, and the other should attempt to rotate the wheel being inspected.**

4. Send the command while depressing on the brake pedal and attempting to rotate the wheel being inspected.
5. While brake pressure is maintained and a DSC HU/CM operation click sound is heard, confirm that the

wheel does not rotate. While brake pressure is being reduced and an DSC HU/CM operation click sound is heard, confirm that the wheel rotates.

- Performing the inspection above determines the following:
  - The DSC HU/CM brake lines are normal.
  - The DSC HU/CM hydraulic system is not significantly abnormal (including DSC HU/CM).
  - The DSC HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
  - The DSC unit and DSC HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
- However, the following items cannot be verified.
  - Malfunction with intermittent occurrence of the above items
  - Malfunction of DSC HU/CM input system wiring harnesses and parts
  - Extremely small leaks in the DSC HU/CM internal hydraulic system

DSC CONTROL INSPECTION

1. Perform "Preparation".
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

CAUTION:

- **To protect the DSC HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

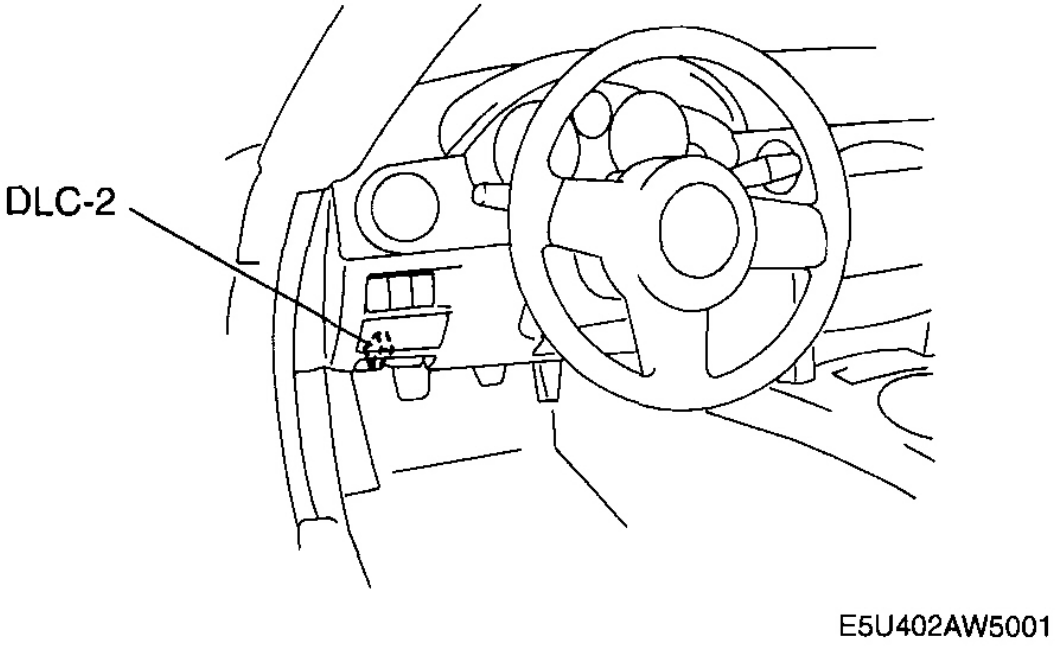


Fig. 4: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

ACTIVE COMMAND MODE INSPECTION

<table>
<tr><th rowspan="3">Command name</th><th colspan="4">Inspected wheels</th></tr>
<tr><th colspan="2">Understeer control inhibited</th><th colspan="2">Oversteer control inhibited</th></tr>
<tr><th>LF</th><th>RF</th><th>LR</th><th>RR</th></tr>
<tr><td>V_TRC_L</td><td>ON</td><td colspan="2">OFF</td><td>ON</td></tr>
<tr><td>V_TRC_R</td><td>OFF</td><td colspan="2">ON</td><td>OFF</td></tr>
<tr><td>V_STB_L</td><td colspan="4" rowspan="2">OFF</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td rowspan="6">OFF</td><td rowspan="2">OFF</td><td rowspan="4">OFF</td><td>ON</td></tr>
<tr><td>LF_OUTLET</td><td rowspan="7">OFF</td></tr>
<tr><td>LR_INLET</td><td>ON</td></tr>
<tr><td>LR_OUTLET</td><td rowspan="5">OFF</td></tr>
<tr><td>RF_INLET</td><td>ON</td></tr>
<tr><td>RF_OUTLET</td><td rowspan="3">OFF</td></tr>
<tr><td>RR_INLET</td><td>ON</td><td rowspan="2">OFF</td></tr>
<tr><td>RR_OUTLET</td><td>OFF</td></tr>
<tr><td>PMP_MOTOR</td><td colspan="4">ON</td></tr>
</table>

4. Send the command while rotating the wheel being inspected by hand in a forward direction.

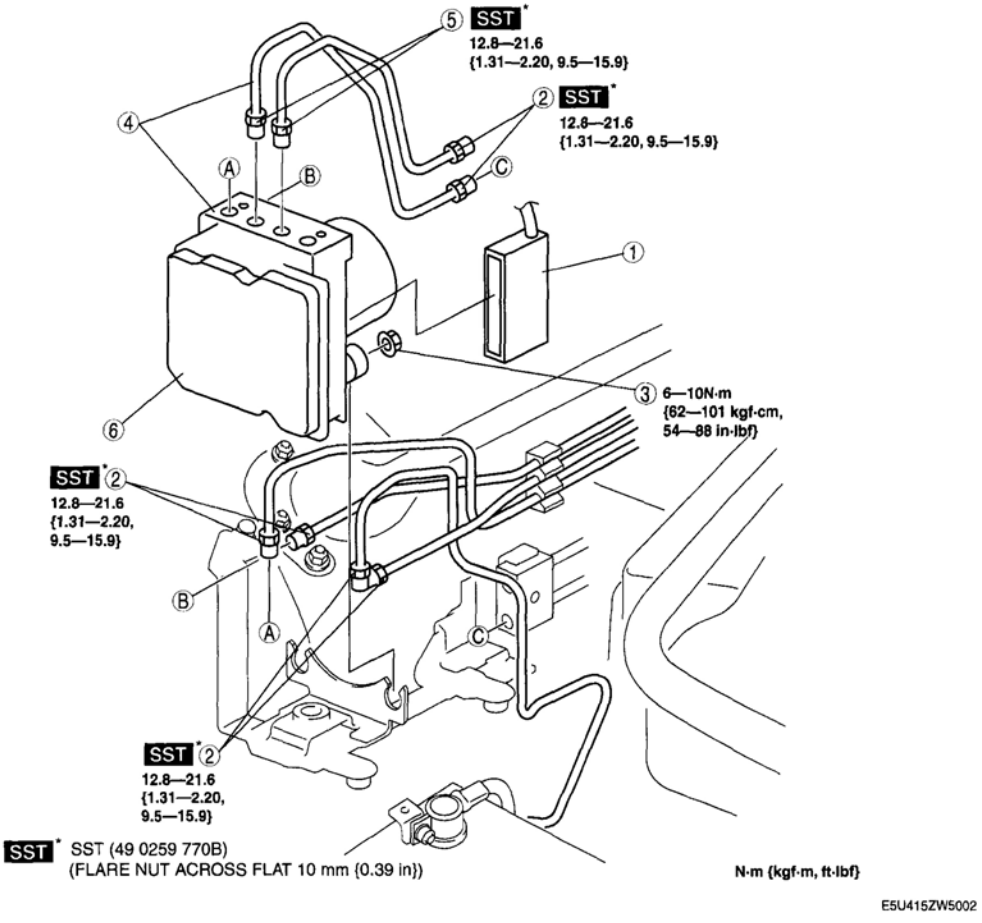
5. Confirm that the wheel does not rotate easily while a DSC HU/CM operation click sound is heard.
    - Performing the inspection above determines the following:
        - The DSC HU/CM brake lines are normal.
        - The DSC HU/CM hydraulic system is not significantly abnormal (including DSC HU/CM).
        - The DSC HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
        - The DSC unit and DSC HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
    - However, the following items cannot be verified.
        - Malfunction with intermittent occurrence of the above items
        - Malfunction of DSC HU/CM input system wiring harnesses and parts
        - Extremely small leaks in the DSC HU/CM internal hydraulic system

DSC HU/CM REMOVAL/INSTALLATION

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 DSC may not function normally when the DSC HU/CM is replaced. After installation, always perform the initialization procedures for the DSC HU/CM, combined sensor and the steering angle sensor. (See COMBINED SENSOR INITIALIZATION PROCEDURE .) (See STEERING ANGLE SENSOR INITIALIZATION PROCEDURE .) (See STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE .)**
- **The internal parts of the DSC HU/CM could be damaged if dropped. Be careful not to drop the DSC HU/CM. Replace the DSC HU/CM if it is subjected to an impact.**

1. Perform DSC configuration. (See **DSC CONFIGURATION** .)
2. Remove in the order indicated in **Fig. 5**.
3. Install in the reverse order of removal.
4. After installation, perform the combined sensor initialization procedure. (See **COMBINED SENSOR INITIALIZATION PROCEDURE** .)
5. After installation, perform the steering angle sensor initialization procedure. (See **STEERING ANGLE SENSOR INITIALIZATION PROCEDURE** .)
6. After installation, perform the steering angle signal initialization procedure. (See **STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE** .)



1	DSC HU/CM connector
2	Brake pipe
3	Nut
4	DSC HU/CM, brake pipe
5	Brake pipe (DSC HU/CM—brake pipe joint)
6	ABS HU/CM

Fig. 5: Identifying DSC HU/CM With Torque Specifications
Courtesy of MAZDA MOTORS CORP.

DSC HU/CM CONNECTOR REMOVAL NOTE

1. Pull the lock lever up in the direction of the arrow.
2. Pull the connector toward the vehicle rear and remove it.

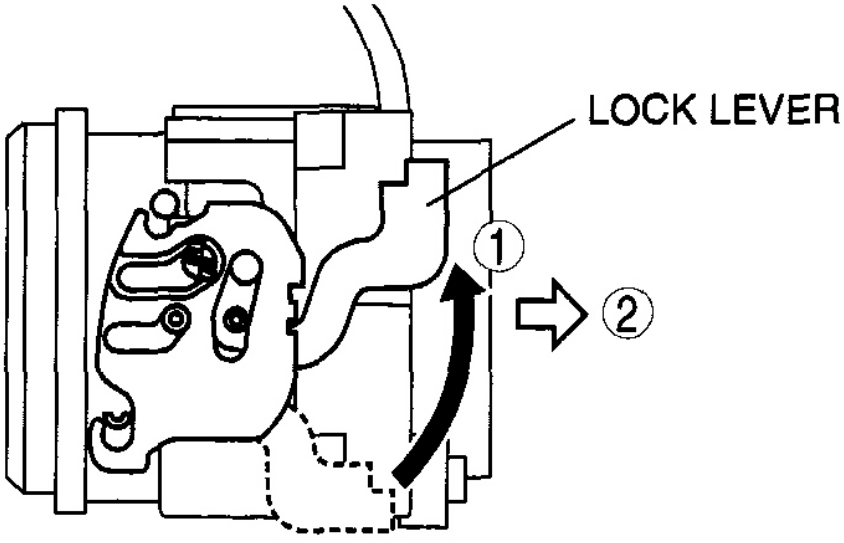


Fig. 6: Identifying Lock Lever Position
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE REMOVAL NOTE

1. Place an alignment mark on the brake pipe and DSC HU/CM.
2. Apply protective tape to the connector to prevent brake fluid from entering.
3. Remove the brake pipe.

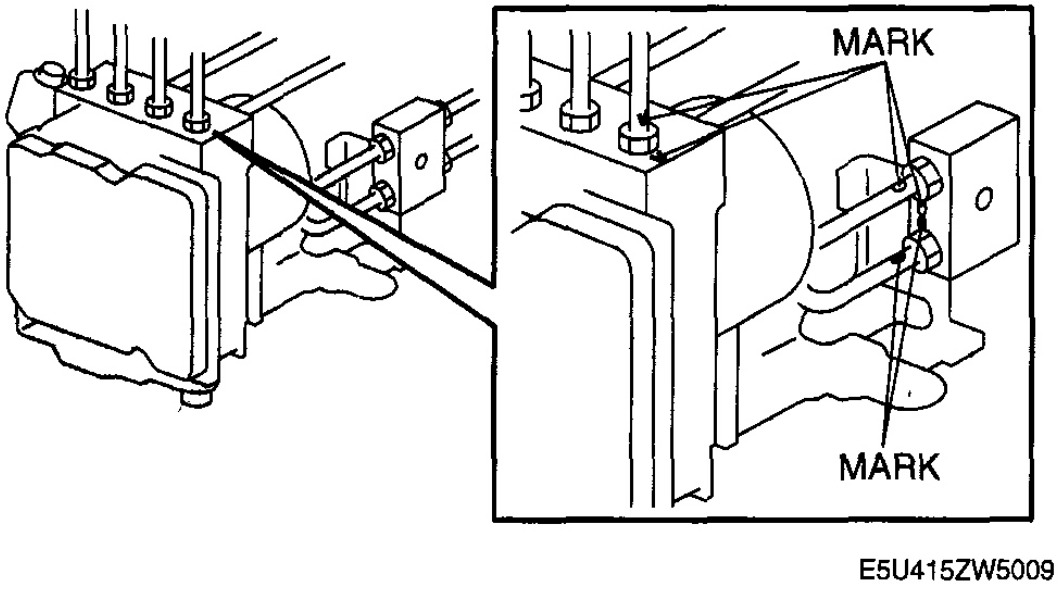


Fig. 7: Brake Pipe At DSC HU/CM
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE (DSC HU/CM-BRAKE PIPE JOINT) INSTALLATION NOTE

1. Align with the mark made before removing the brake pipe and temporarily install the brake pipe to the DSC HU/CM.

CAUTION:
- **If the brake pipe is tightened to the specified torque, it may be difficult to install it to the vehicle. Therefore, only temporarily tighten the brake pipe so that it can still be moved.**

BRAKE PIPE INSTALLATION NOTE

1. Align the marks made before removal and install the brake pipe to the DSC HU/CM and brake pipe joint referring to the figure.
2. Tighten the brake pipe to the specified torque using the **SST** (49 0259 770B).

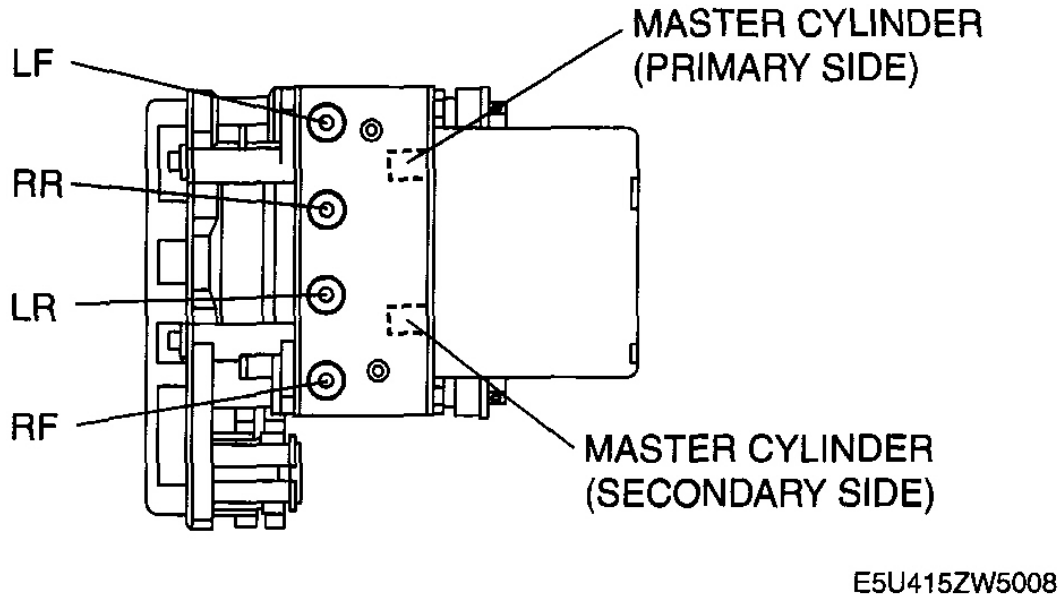


Fig. 8: Identifying DSC HU/CM
Courtesy of MAZDA MOTORS CORP.

DSC HU/CM CONNECTOR INSTALLATION NOTE

1. After connecting the connector, verify that the lock lever is completely pushed in.

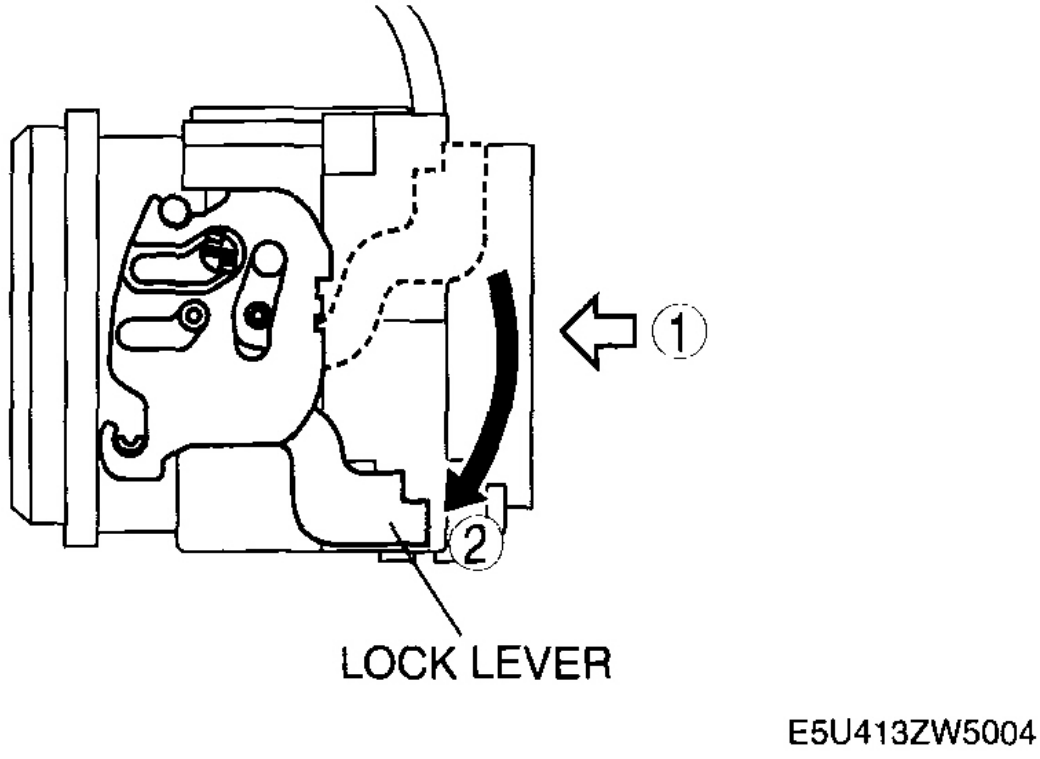


Fig. 9: Identifying Lock Lever Position
Courtesy of MAZDA MOTORS CORP.

DSC CONFIGURATION

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select the "Module Programming".
   - When using the PDS (Pocket PC)
     1. Select "Programming".
     2. Select "Module Programming".
3. Then, select the "Programmable Module Installation" and "ABS" from the screen menu..
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs using the M-MDS, then verify if DTCs are present.
   - If a DTC is present, perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSTIC (DYNAMIC STABILITY CONTROL SYSTEM)** .)

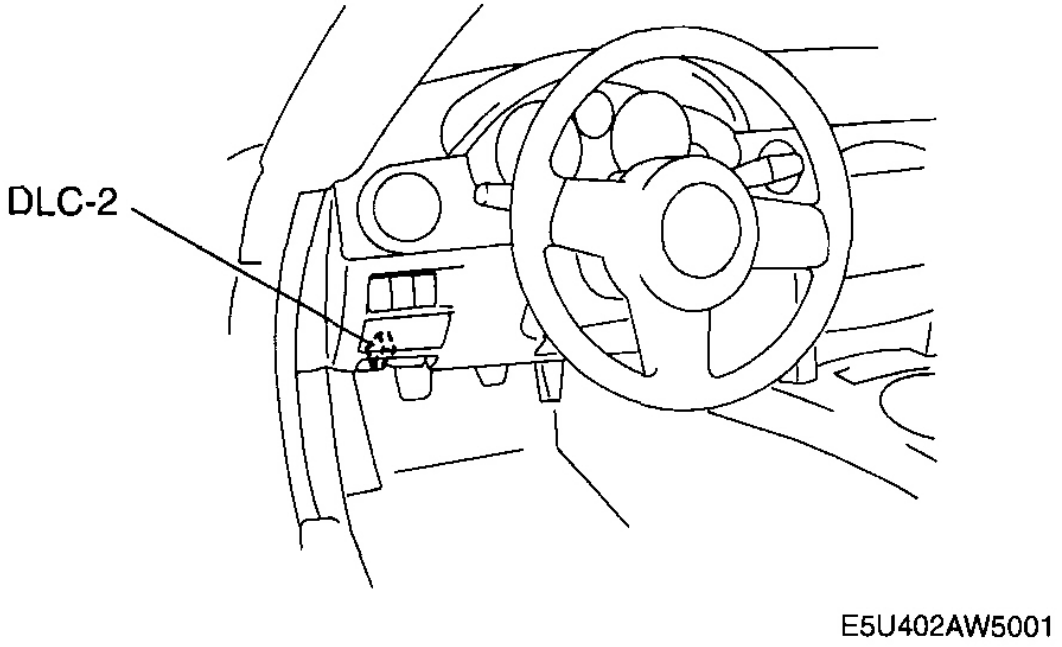


Fig. 10: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

DSC HU/CM INSPECTION

1. Disconnect the DSC HU/CM connector. (See **DSC HU/CM REMOVAL/INSTALLATION** .)
2. Connect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Attach the tester lead to the DSC HU/CM harness side connector, then inspect voltage, continuity or resistance according to the standard (reference value) on **REFERENCE VALUE TABLE** .

STANDARD (REFERENCE VALUE)



Fig. 11: Identifying DSC HU/CM Connector Terminals

Courtesy of MAZDA MOTORS CORP.

STANDARD REFERENCE VALUE TABLE

Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection item (s)
A	Ground (ABS motor)	Ground point	Continuity	A-ground point	Continuity detected	• **Wiring harness (A-ground point)**
B	Power supply (ABS motor operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (B-battery)
C	Power supply (solenoid operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (C-battery)
D	Ground (DSC system)	Ground point	Continuity	D-ground point	Continuity detected	• Wiring harness (D-ground point)
E	LF wheel-speed sensor (ground)	LF ABS wheel-speed sensor	Continuity	E-LF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (E-LF ABS wheel-speed sensor connector terminal B)
F	LF wheel-speed sensor (single)	LF ABS wheel-speed sensor	Continuity	F-LF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (F-LF ABS wheel-speed sensor connector terminal A)
G	LR wheel-speed sensor (signal)	LR ABS wheel-speed sensor	Continuity	G-LR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (G-LR ABS wheel-speed sensor connector

						terminal A)
H	LR wheel-speed sensor (ground)	LR ABS wheel-speed sensor	Continuity	H-LR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (H-LR ABS wheel-speed sensor connector terminal B)
I	RR wheel-speed (signal)	RR ABS wheel-speed sensor	Continuity	I-RR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (I-RR ABS wheel-speed sensor connector terminal A)
J	Power supply (system)	Ignition switch	Voltage	Ignition switch at ON	B+	• Wiring harness (J-ignition switch)
				Ignition switch is off.	1 V or less	-
K	-	-	-	-	-	-
L	RR wheel-speed sensor (ground)	RR ABS wheel-speed sensor	Continuity	L-RR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (L-RR ABS wheel-speed sensor connector terminal B)
M	RF wheel-speed sensor (signal)	RF ABS wheel-speed sensor	Continuity	M-RF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (M-RF ABS wheel-speed sensor connector terminal A)
				N-ground point (Brake pedal depressed)	B+	• Wiring harness (N-brake switch)

N	Brake switch	Brake switch	Voltage			• Brake switch
				N-ground point (Brake pedal not depressed)	1 V or less	-
O	RF wheel-speed sensor (ground)	RF ABS wheel-speed sensor	Continuity	O-RF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (O-RF ABS wheel-speed sensor connector terminal B)
P	DSC OFF switch	DSC OFF switch	Continuity	P-DSC OFF switch connector terminal A	Continuity detected	• Wiring harness (P-DSC OFF switch connector terminal A)
Q	-	-	-	-	-	-
R	-	-	-	-	-	-
S	-	-	-	-	-	-
T	-	-	-	-	-	-
U	-	-	-	-	-	-
V	-	-	-	-	-	-
W	CAN_L	DLC-2 (CAN_L)	Continuity	W-DLC-2 terminal CAN_L	Continuity detected	• Wiring harness (W-DLC-2 terminal CAN_L)
X	CAN_H	DLC-2 (CAN_H)	Continuity	X-DLC-2 terminal CAN_H	Continuity detected	• Wiring harness (X-DLC-2 terminal CAN_H)
Y	Ground (combined sensor)	Combined sensor	Continuity	Y-combined sensor connector terminal F	Continuity detected	• Wiring harness (Y-combined sensor connector terminal F)
Z	-	-	-	-	-	-
						• Wiring

AA	Yaw rate (signal)	Combined sensor	Continuity	AA-combined sensor connector terminal B	Continuity detected	harness (AA-combined sensor connector terminal B)
AB	Yaw rate (test signal)	Combined sensor	Continuity	AB-combined sensor connector terminal C	Continuity detected	• Wiring harness (AB-combined sensor connector terminal C)
AC	-	-	-	-	-	-
AD	-	-	-	-	-	-
AE	Yaw rate (reference signal)	Combined sensor	Continuity	AE-combined sensor connector terminal A	Continuity detected	• Wiring harness (AE-combined sensor connector terminal A)
AF	-	-	-	-	-	-
AG	-	-	-	-	-	-
AH	-	-	-	-	-	-
AI	Lateral-G (signal)	Combined sensor	Continuity	AI-combined sensor connector terminal D	Continuity detected	• Wiring harness (AI-combined sensor connector terminal D)
AJ	-	-	-	-	-	-
AK	-	-	-	-	-	-
AL	-	-	-	-	-	-
AM	-	-	-	-	-	-
AN	-	-	-	-	-	-
AO	-	-	-	-	-	-
AP	-	-	-	-	-	-
AQ	-	-	-	-	-	-
AR	-	-	-	-	-	-
AS	-	-	-	-	-	-
AT	-	-	-	-	-	-

STEERING ANGLE SIGNAL INITIALIZATION PROCEDURE

WARNING:

- **If the initialization procedure of the steering angle signal is not completed, the DSC will not operate properly and may cause an accident. Therefore, always perform initialization of the DSC HU/CM steering angle signal to ensure proper DSC operation when any of the following items are performed.**
  - **Steering angle sensor replacement**
  - **DSC HU/CM replacement**

1. Inspect the wheel alignment and inflation pressure.
   - If there is any malfunction, adjust the applicable part.
2. Park the vehicle on level ground.
3. Turn the ignition switch off.
4. Connect the M-MDS to the DLC-2.
5. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select "Chassis".
     2. Select "ABS/DSC".
     3. Select "Sensor Initialization".
   - When using the PDS (Pocket PC)
     1. Select "All Tests and Calibrations".
     2. Select "Sensor Initialization".
6. Perform the initialization procedure according to the directions on the screen.
7. Drive the vehicle forward.
8. After 5 min of driving, verify that the DSC system is normal.

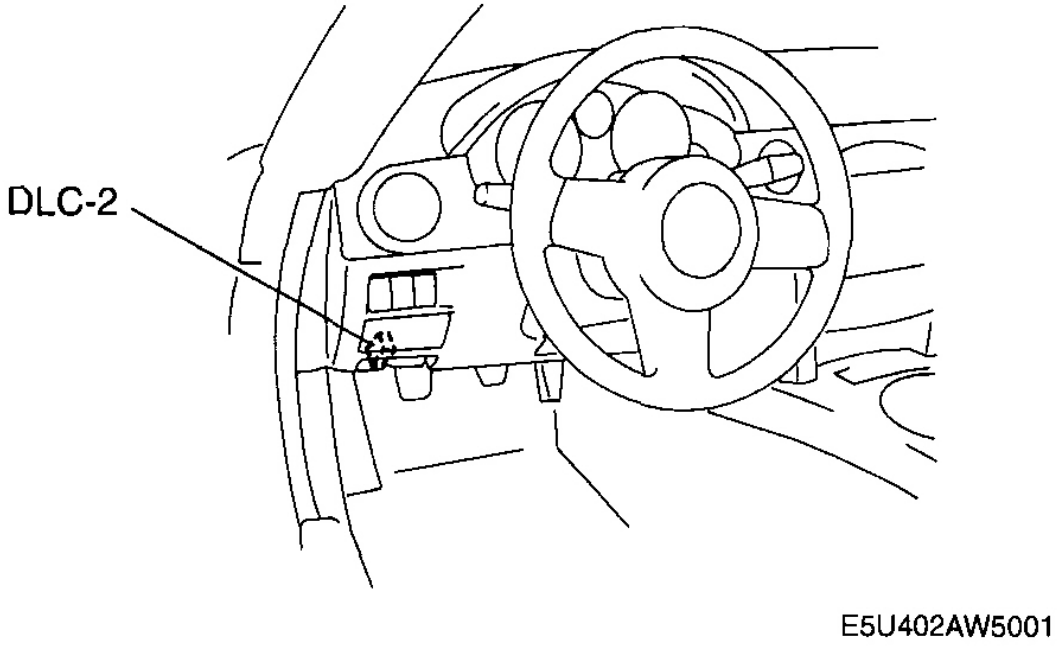


Fig. 12: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

1. Remove or install the front ABS wheel-speed sensor in the same order of vehicles with ABS. (See **FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)

FRONT ABS WHEEL-SPEED SENSOR INSPECTION

1. Inspect the front ABS wheel-speed sensor in the same order of vehicles with ABS. (See **FRONT ABS WHEEL-SPEED SENSOR INSPECTION** .)

REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

1. Remove or install the rear ABS wheel-speed sensor in the same order of vehicles with ABS. (See **REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)

REAR ABS WHEEL-SPEED SENSOR INSPECTION

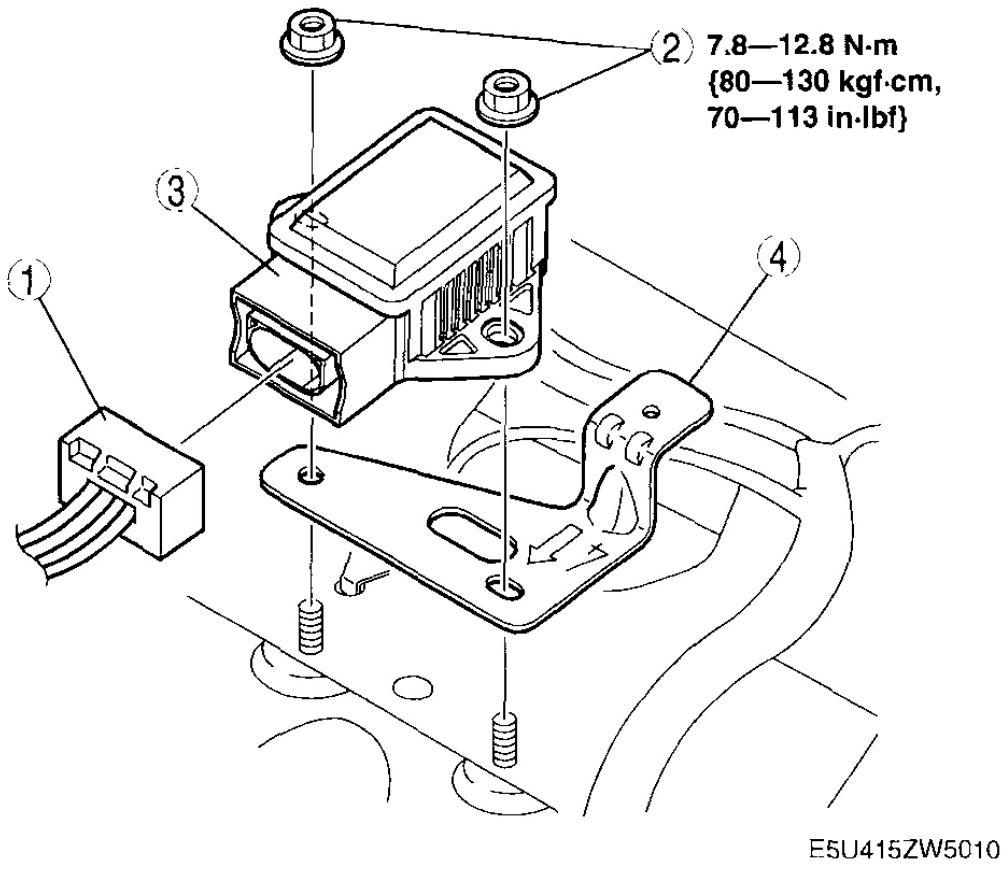
1. Inspect the rear ABS wheel-speed sensor in the same order of vehicles with ABS. (See **REAR ABS WHEEL-SPEED SENSOR INSPECTION** .)

COMBINED SENSOR REMOVAL/INSTALLATION

CAUTION:

- **The internal parts of the combined sensor could be damaged if dropped. Be careful not to drop the combined sensor. Replace the combined sensor if it is subjected to an impact. Also, do not use an impact wrench or other similar air tools when removing/installing the sensor.**

1. Remove the console. (See **CONSOLE REMOVAL/INSTALLATION** .)
2. Remove in the order indicated in **Fig. 13** .



1	Combined sensor connector
2	Nut
3	Combined sensor
4	Bracket

Fig. 13: Combined Sensor (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

3. Install in the reverse order of removal.
4. After installation, perform the combined sensor initialization procedure. (See **COMBINED SENSOR INITIALIZATION PROCEDURE** .)

COMBINED SENSOR INSPECTION

1. Turn the ignition switch off.

2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs, then inspect the lateral acceleration speed and the yaw rate.
    - LAT_ACCL: (lateral acceleration speed)
    - YAW_RATE: (yaw rate)
    1. Lateral acceleration speed inspection

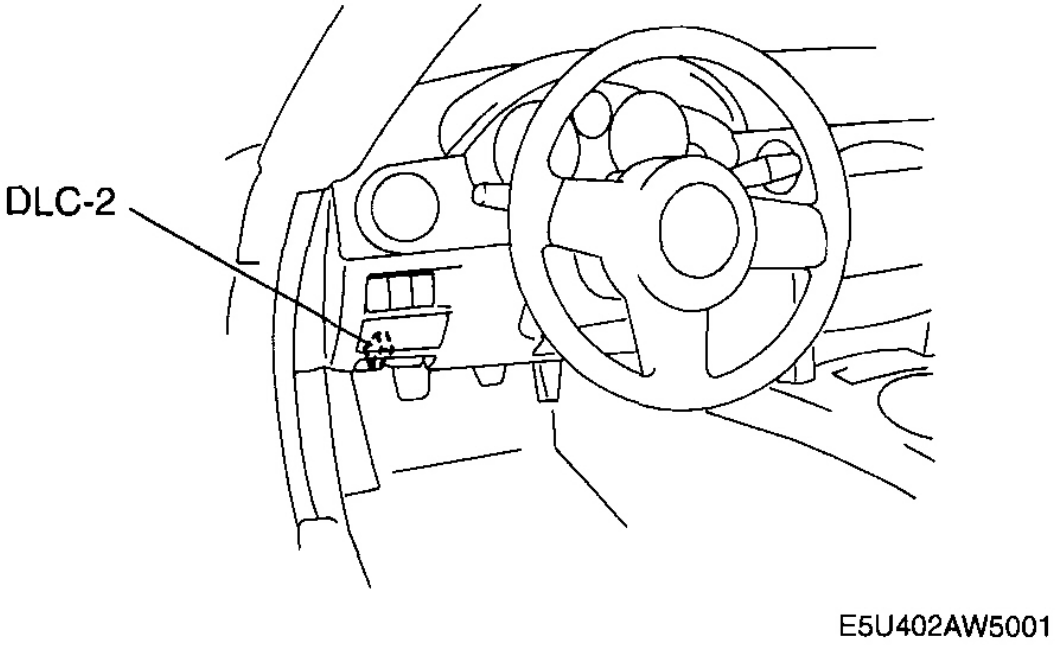


Fig. 14: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

1. Verify the LAT_ACCL change when the combined sensor is tilted to the left and right.
    - If there is any malfunction, replace the combined sensor.

Standard

When the sensor is tilted to the right (A):

LAT_ACCL changes negatively.

When the sensor is tilted to the left (B):

LAT_ACCL changes positively.

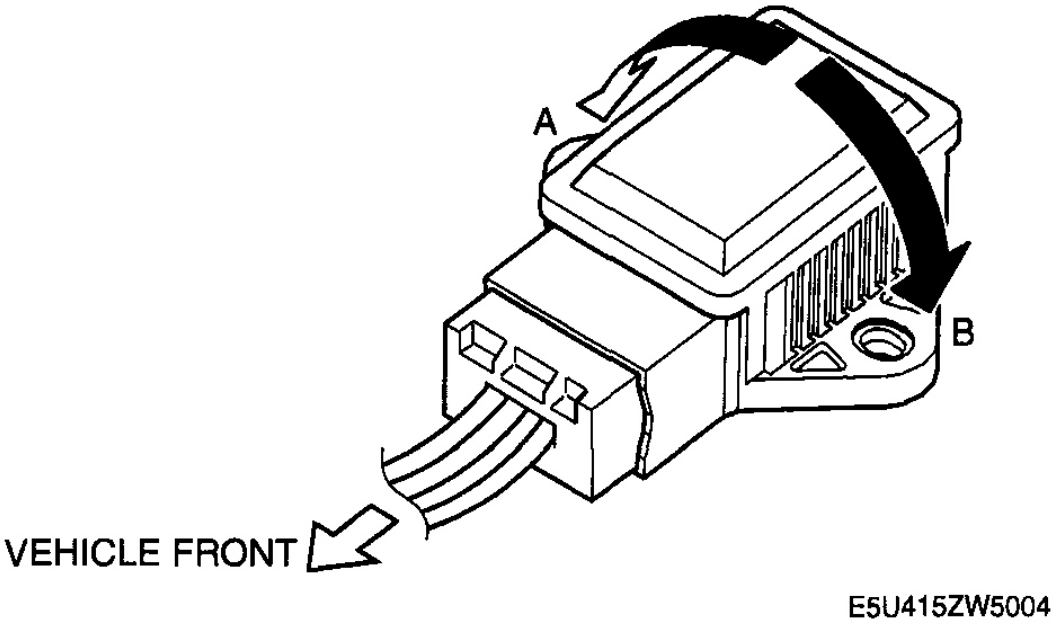


Fig. 15: Tilting Combined Sensor Left & Right
Courtesy of MAZDA MOTORS CORP.

2. Yaw rate inspection
    1. Verify the YAW_RATE change when the combined sensor is rotated to the left and right.
        - If there is any malfunction, replace the combined sensor.

Standard

When the sensor is rotated to the right (A):

YAW_RATE changes negatively.

When the sensor is rotated to the left (B):

YAW RATE changes positively.

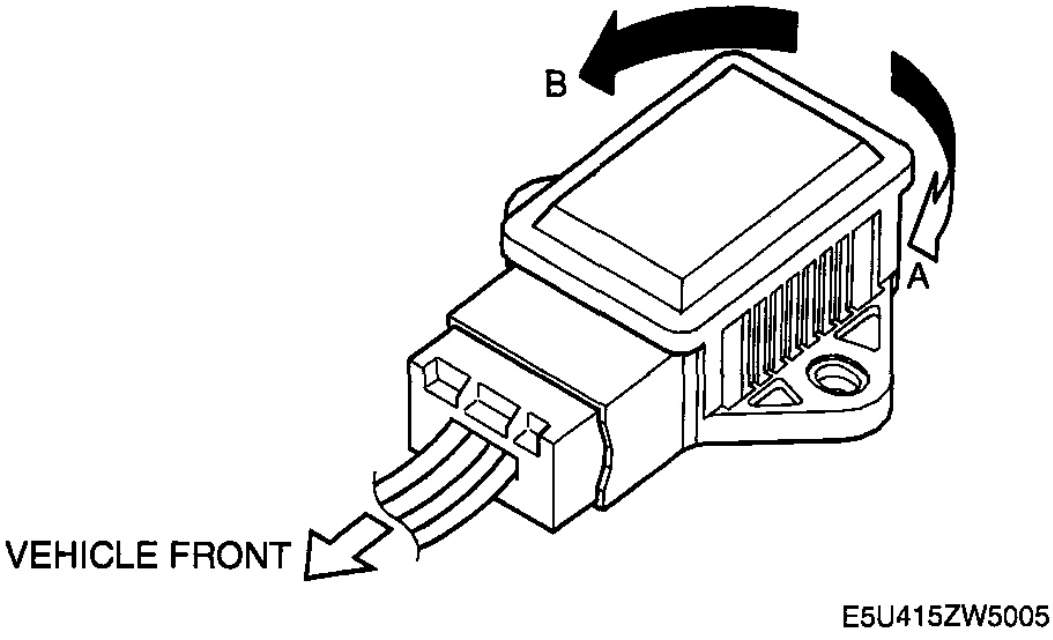


Fig. 16: Tilting Combined Sensor Left & Right
Courtesy of MAZDA MOTORS CORP.

COMBINED SENSOR INITIALIZATION PROCEDURE

WARNING:

- **Unless the initialization procedure of the combined sensor is completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the combined sensor and DSC HU/CM have been removed or replaced.**

1. Inspect the wheel alignment and inflation pressure.
   - If there is any malfunction, adjust the applicable part.
2. Park the vehicle on level ground.
3. Turn the ignition switch off.
4. Connect the M-MDS to the DLC-2.

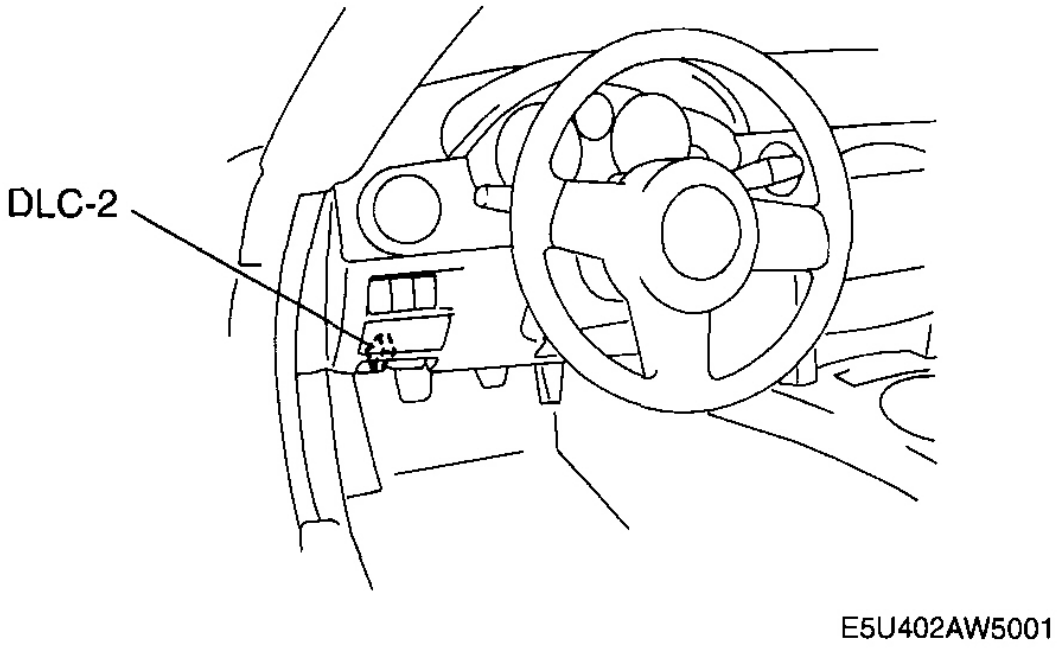


Fig. 17: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

5. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select "Chassis".
     2. Select "ABS/DSC".
     3. Select "Sensor Initialization".
   - When using the PDS (Pocket PC)
     1. Select "All Tests and Calibrations".
     2. Select "Sensor Initialization".
6. Drive the vehicle forward.
7. After 5 min of driving, verify that the DSC system is normal.

BRAKE FLUID PRESSURE SENSOR INSPECTION

1. Turn the ignition switch off.
2. Install the **SSTs** to the master cylinder.

NOTE:

- **Install the SST (49 N043 001) to the master cylinder using a commercially available flare nut wrench.**

- **Flare nut across flat: 12 mm {0.47 in}**

3. Bleed the air from the **SSTs** and the brake line. (Bleed air from the **SSTs** through air bleeding valve A.)

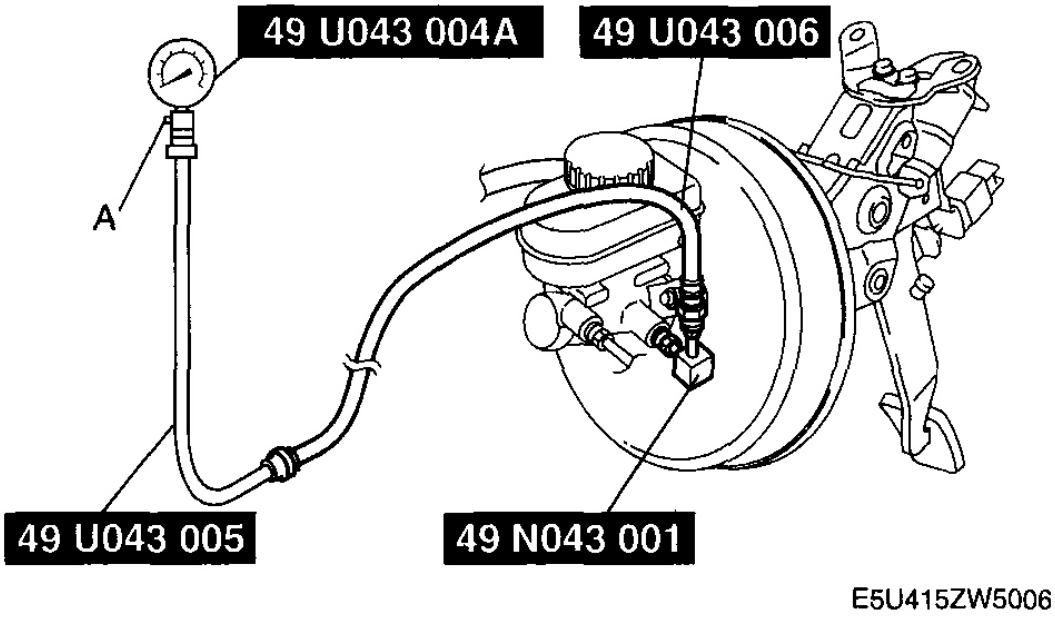


Fig. 18: Installing SSTs To Master Cylinder
Courtesy of MAZDA MOTORS CORP.

4. Connect the M-MDS to the DLC-2.
5. Select the MCYLI P PID.
6. Start the engine.
7. Depress the brake pedal, and confirm that the fluid pressure value of the **SST** (Gauge) and the value shown on the M-MDS are equal.
   - If the fluid pressures are different, replace the DSC HU/CM.

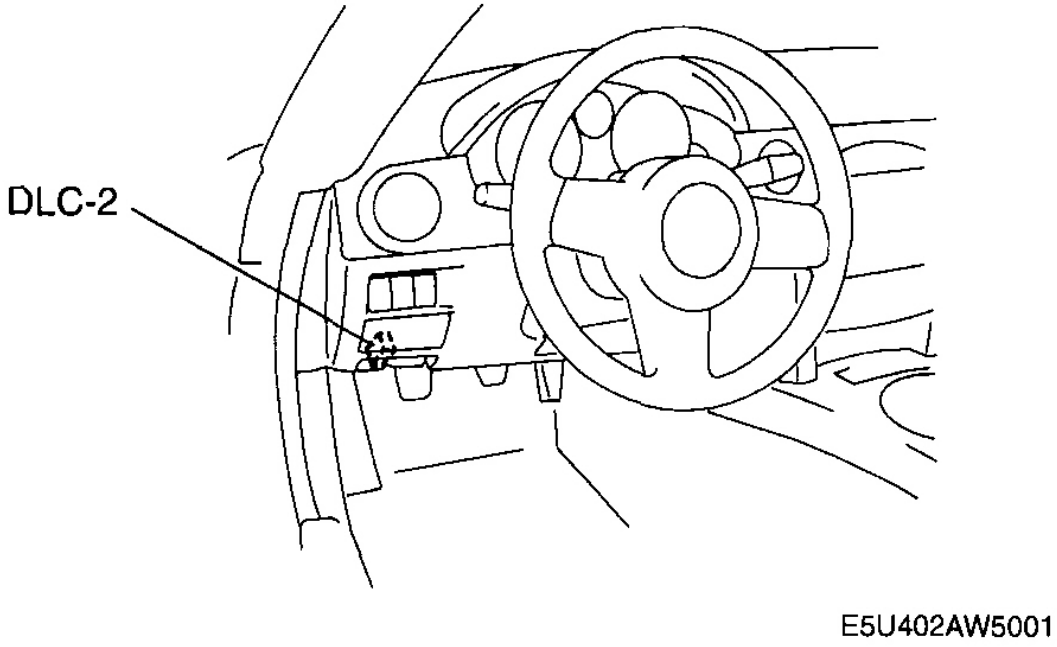


Fig. 19: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

STEERING ANGLE SENSOR REMOVAL/INSTALLATION

NOTE:

- **The steering angle sensor is integrated into the combination switch to ensure sensor performance. Replace the steering angle sensor and combination switch as a single unit. (See COMBINATION SWITCH REMOVAL/INSTALLATION .)**

STEERING ANGLE SENSOR INSPECTION

1. Remove the column cover. (See **COLUMN COVER REMOVAL/INSTALLATION** .)
2. Measure the voltage between steering angle sensor terminal B and ground.
   - If there is any malfunction, inspect the wiring harness between steering angle sensor terminal B and battery, then repair or replace if necessary.

Standard voltage

B+

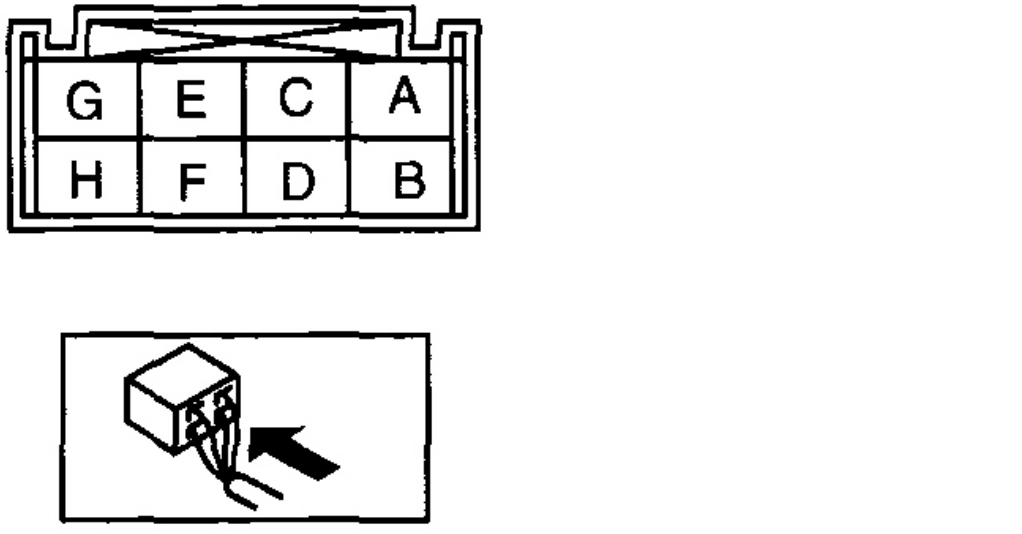


Fig. 20: Identifying Steering Angle Sensor Connector Terminals
Courtesy of MAZDA MOTORS CORP.

3. Turn the ignition switch to the ON position, then measure the voltage between steering angle sensor terminal A and ground.
    - If there is any malfunction, inspect the wiring harness between steering angle sensor terminal A and ignition switch, then repair or replace if necessary.

    Standard voltage

    B+

4. Measure the voltage between steering angle sensor terminal H and the ground.
    - If there is any malfunction, inspect the wiring harness between steering angle sensor terminal H and ground point, then repair or replace if necessary.

    Standard voltage

    0 V

5. Turn the ignition switch off.
6. Connect the M-MDS to the DLC-2.
7. Select the SWA_POS PID.
8. Verify the SWA_POS changes when the steering wheel is turned to the left and right.
    - If there is any malfunction, replace the steering angle sensor.

Standard

When the steering wheel is turned to the right:

SWA_POS changes positively.

When the steering wheel is turned to the left:

SWA_POS changes negatively.

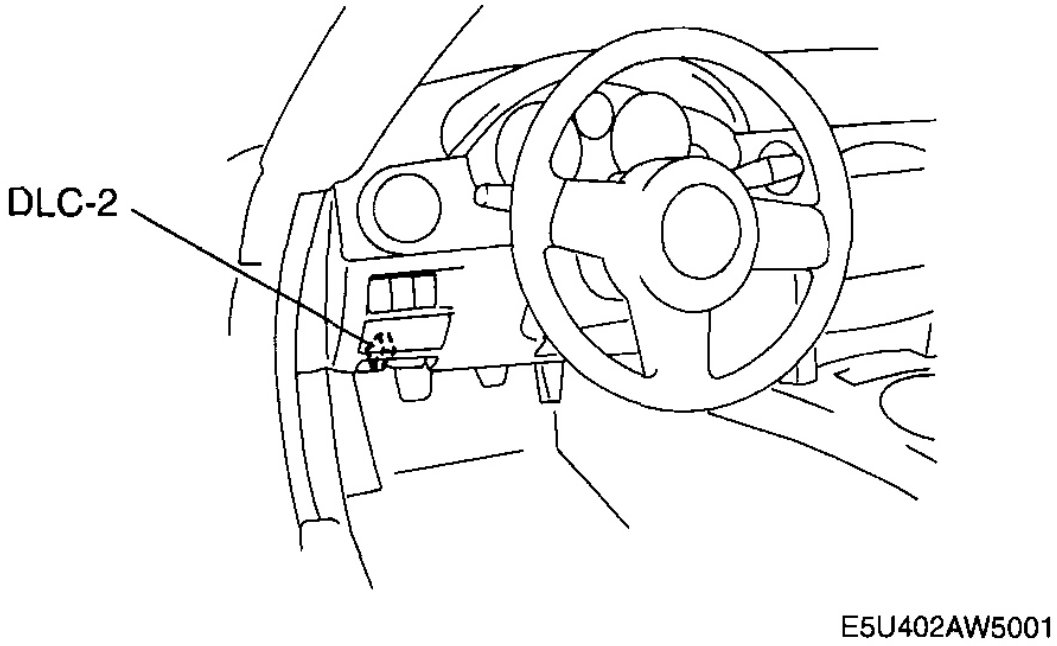


Fig. 21: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

STEERING ANGLE SENSOR INITIALIZATION PROCEDURE

WARNING:
- **Unless the initialization procedure of the steering angle sensor is**

completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the power supply to the steering angle sensor has been cut off due to disconnection of the steering angle sensor connector or negative battery cable, or any other cause.

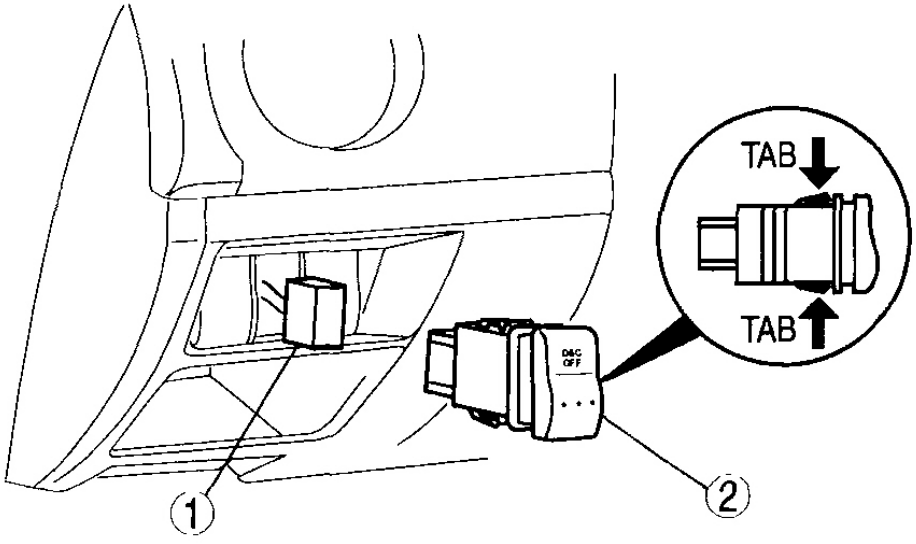
NOTE:

- **The initialization value of the steering angle sensor is stored using the battery power supply. Therefore, the battery power supply of the steering angle sensor is cut and the stored initialization value is cleared when any of the following items are performed.**
  - **Negative battery cable disconnection**
  - **Steering angle sensor connector disconnection**
  - **Fuse (ROOM 15A) removal**
  - **Wiring harness disconnection between battery and steering angle sensor connector**

1. Inspect the wheel alignment, inflation pressure, and the installation condition of the steering wheel.
   - If there is any malfunction, adjust the applicable part.
2. Connect the negative battery cable.
3. Turn the ignition switch to the ON position.
4. Confirm that the DSC indicator light illuminates and that the DSC OFF light flashes.
5. Turn the steering wheel to full right lock, then turn it to full left lock.
6. Confirm that the DSC OFF light goes out.
7. Turn the ignition switch off.
8. Turn the ignition switch to the ON position again, and confirm that the DSC indicator light goes out.
   - If the DSC indicator light does not go out, disconnect the negative battery cable, and perform the procedure again starting from Step 2 shown above.
9. Drive the vehicle for **approx. 10 min** , and confirm that the ABS warning and DSC indicator lights do not illuminate.

DSC OFF SWITCH REMOVAL/INSTALLATION

1. Remove the side panel. (See **SIDE PANEL REMOVAL/INSTALLATION** .)
2. Remove in the order indicated in **Fig. 22** .



1	DSC OFF switch connector
2	DSC OFF switch

Fig. 22: Identifying DSC OFF Switch
Courtesy of MAZDA MOTORS CORP.

3. Install in the reverse order of removal.

DSC OFF SWITCH CONNECTOR REMOVAL NOTE

1. Access the DSC OFF switch connector from behind of the dashboard, and squeeze the tabs of the switch connector.
2. Disconnect the DSC OFF switch connector from the DSC OFF switch.

DSC OFF SWITCH REMOVAL NOTE

1. Access the DSC OFF switch from behind of the dashboard, and squeeze the tabs of the switch.
2. Pull the DSC OFF switch towards the driver's side to remove it.

DSC OFF SWITCH INSPECTION

1. Remove the DSC OFF switch.

2. Verify that the continuity is as indicated in **Fig. 23** .
   - If not as indicated in **Fig. 23** replace the DSC OFF switch.

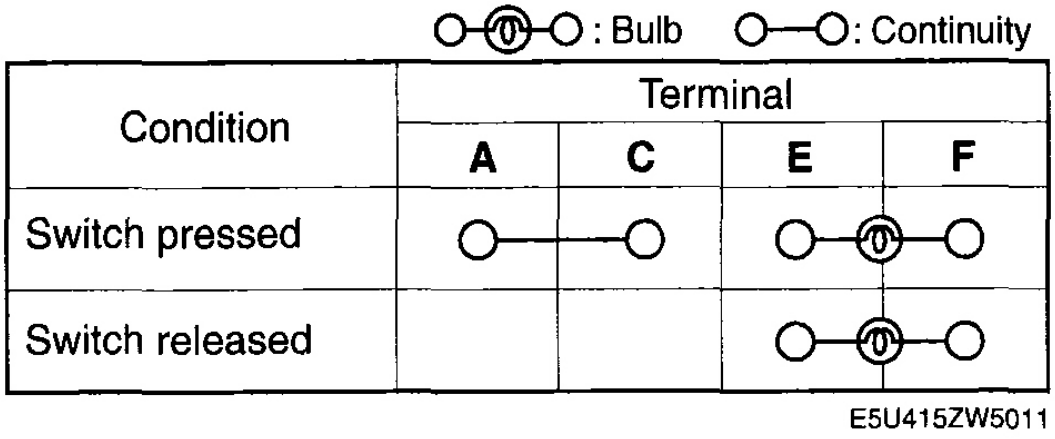


Fig. 23: DSC OFF Switch Continuity Table
Courtesy of MAZDA MOTORS CORP.

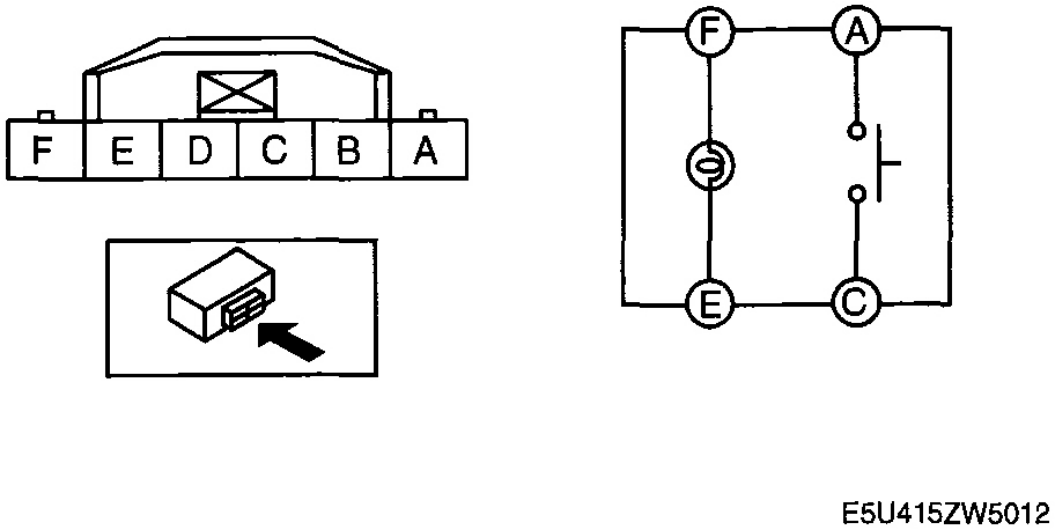


Fig. 24: Identifying DSC OFF Switch Connector Terminals
Courtesy of MAZDA MOTORS CORP.

2008 MAZDA

MX-5 Miata

BUZZERS, RELAYS & TIMERS

BUZZERS, RELAYS & TIMERS LOCATION

Component	Location
A/C Relay (AIR COND)	In relay & main fuse block. See **Fig. 1**.
Blower Relay (HEATER)	In relay & main fuse block. See **Fig. 1**.
Cooling Fan Relay No. 1 (COOLING FAN1)	In relay & main fuse block. See **Fig. 1**.
Cooling Fan Relay No. 2 (COOLING FAN2)	In relay & main fuse block. See **Fig. 1**.
Cooling Fan Relay No. 3 (COOLING FAN3)	In relay & main fuse block. See **Fig. 1**.
Drive-By-Wire Relay (ETV)	In relay & main fuse block. See **Fig. 1**.
Front Fog Light Relay (FOG)	In relay & main fuse block. See **Fig. 1**.
Fuel Pump Relay (CIRCUIT)	In relay & main fuse block. See **Fig. 1**.
Headlight Relay (HEAD)	In relay & main fuse block. See **Fig. 1**.
Horn Relay (HORN)	In relay & main fuse block. See **Fig. 1**.
Ignition Relay (IGNITION)	In relay & main fuse block. See **Fig. 1**.
Keyless Buzzer	Front of luggage compartment. See **Fig. 35**.
Main Relay (EGI)	In relay & main fuse block. See **Fig. 1**.
Rear Window Defroster Relay (DEFOG)	In relay & main fuse block. See **Fig. 1**.
Starter Relay (ST)	In relay & main fuse block. See **Fig. 1**.
TNS Relay (TAIL)	In relay & main fuse block. See **Fig. 1**.
Trunk Lid Opener Relay	Lower rear center of luggage compartment. See **Fig. 38**.

CIRCUIT PROTECTION DEVICES

CIRCUIT PROTECTION DEVICES LOCATION

Component	Location
Fuse Block	Behind left end of dash. See **Fig. 9**.
Relay & Main Fuse Block	Left side of engine compartment. See **Fig. 4**.

CONTROL UNITS

CONTROL UNITS LOCATION

Component	Location
ABS HU/CM	Right front of engine compartment. See **Fig. 16**.
DRL Control Module	Behind left side of dash. See **Fig. 40**.
DSC HU/CM	Right front of engine compartment. See **Fig. 17**.
Flasher Control Module	Behind left side of dash. See **Fig. 41**.

Keyless Control Module	Behind left end of dash. See **Fig. 32**.
PCM	Left front corner of engine compartment. See **Fig. 9**.
Power Retractable Hardtop Control Module	Left side of retractable top storage compartment. See **Fig. 57**.
SAS Control Module	Under front of center console. See **Fig. 24**.
Seat Weight Sensor Control Module	Under passenger seat. See **Fig. 27**.
TCM	Behind left end of dash. See **Fig. 19**.

MOTORS

MOTORS LOCATION

Component	Location
Airflow Mode Actuator	Behind center of dash. See **Fig. 22**.
Air Intake Actuator	Behind right side of dash. See **Fig. 22**.
Blower Motor	Integral to blower unit, behind right side of dash. See **Fig. 21**.
Cooling Fan Motor	Behind radiator. See **Fig. 5**.
Deck Panel Motor (Left)	Left side of retractable top storage compartment. See **Fig. 54**.
Deck Panel Motor (Right)	Right side of retractable top storage compartment. See **Fig. 52**.
Evaporative System Leak Detection Pump	Under rear center of vehicle. See **Fig. 14**.
Front Door Lock Actuator (Left/Right)	In respective front door. See **Fig. 36**.
Fuel Pump Unit	Under rear center of vehicle. See **Fig. 6**.
Mix Air Actuator	Behind right side of dash. See **Fig. 22**.
Power Outer Mirror (Left/Right)	On front respective door. See **Fig. 30**.
Power Window Motor (Left/Right)	In respective front door. See **Fig. 29**.
Roof Motor (Left)	Left side of retractable top storage compartment. See **Fig. 58**.
Roof Motor (Right)	Right side of retractable top storage compartment. See **Fig. 50**.
Starter	Lower left side of engine. See **Fig. 8**.
Trunk Lid Opener	Lower rear center of luggage compartment lid. See **Fig. 38**.
Washer Motor	On washer fluid reservoir. See **Fig. 43**.
Wiper Motor	On left side of firewall. See **Fig. 43**.

SENDING UNITS & SENSORS

SENDING UNITS & SENSORS LOCATION

Component	Location
ABS Wheel-Speed Sensor (Left Front)	At left front wheel. See **Fig. 16**.
ABS Wheel-Speed Sensor (Left Rear)	At left rear wheel. See **Fig. 16**.
ABS Wheel-Speed Sensor (Right Front)	At right front wheel. See **Fig. 16**.
ABS Wheel-Speed Sensor (Right Rear)	At right rear wheel. See **Fig. 16**.
Accelerator Pedal Position Sensor	Top of accelerator pedal assembly. See **Fig. 11**.
Brake Fluid Level Sensor	In brake fluid reservoir. See **Fig. 46**.
Camshaft Position Sensor	Right rear of engine. See **Fig. 12**.

Combined Sensor	Under rear of center console. See **Fig. 18**.
Crankshaft Position Sensor	On front of engine. See **Fig. 12**.
Crash Zone Sensor	At front center of engine compartment. See **Fig. 24**.
Driver-Side Side Air Bag Sensor	Near base of left "B" pillar. See **Fig. 25**.
Engine Coolant Temperature Sensor	Top rear of engine. See **Fig. 13**.
Evaporator Temperature Sensor	Behind right side of dash. See **Fig. 22**.
Heated Oxygen Sensor (Front)	Upstream side of catalytic converter. See **Fig. 10**.
Heated Oxygen Sensor (Rear)	Downstream side of catalytic converter. See **Fig. 10**.
Knock Sensor	Left front of engine. See **Fig. 10**.
Manifold Absolute Pressure Sensor	Left rear of engine. See **Fig. 13**.
Mass Air Flow Sensor	Near left front corner of engine. See **Fig. 11**.
Passenger-Side Side Air Bag Sensor	Near base of right "B" pillar. See **Fig. 25**.
Seat Track Position Sensor	Under driver's seat. See **Fig. 26**.
Seat Weight Sensor (Left/Right)	Under respective side of passenger seat. See **Fig. 27**.
Steering Angle Sensor	In steering column. See **Fig. 17**.
Throttle Position Sensor	Left front of engine. See **Fig. 12**.
Transmission Fluid Temperature Sensor	Inside valve control body on transmission. See **Fig. 20**.
Turbine Sensor	On transmission. See **Fig. 19**.
Vehicle Speedometer Sensor	On transmission or transaxle. See **Fig. 13**.

SOLENOIDS & SOLENOID VALVES

SOLENOIDS & SOLENOID VALVES LOCATION

Component	Location
EGR Valve	Rear of engine. See **Fig. 12**.
Fuel Injectors No. 1, 2, 3 & 4	Top of engine. See **Fig. 13**.
Line Pressure Control Solenoid	Inside valve control body on transmission. See **Fig. 20**.
Magnetic Clutch	Left front of engine, on A/C compressor. See **Fig. 23**.
Oil Control Valve	Right front of engine. See **Fig. 12**.
Purge Solenoid Valve	Left side of engine compartment. See **Fig. 12**.
Shift Solenoids A, B, C, D, E, F & G	Inside valve control body on transmission. See **Fig. 20**.
TCC Control Solenoid	Inside valve control body on transmission. See **Fig. 20**.
Variable Intake Air Solenoid Valve	Left side of engine. See **Fig. 12**.

SWITCHES

SWITCHES LOCATION

Component	Location
Back-Up Light Switch	On transmission. See **Fig. 42**.
Brake Switch	Top of brake pedal assembly. See **Fig. 14**.
Buckle Switch (Left/Right)	On respective seat belt buckle. See **Fig. 26**.

Clutch Pedal Position Switch	Top of clutch pedal assembly. See **Fig. 14**.
Deck Panel Limit Switch	Right side of retractable top storage compartment. See **Fig. 53**.
Door Lock-Link Switch (Left)	In driver's door. See **Fig. 34**.
Door Lock-Link Switch (Right)	In passenger door. See **Fig. 36**.
Door Switch (Left/Right)	On respective "B" pillar. See **Fig. 48**.
Hood Latch Switch	Center front of engine compartment. See **Fig. 36**.
Key Reminder Switch	On steering column. See **Fig. 45**.
Neutral Switch	On transmission. See **Fig. 14**.
Oil Pressure Switch	On left side of engine. See **Fig. 47**.
Parking Brake Switch	At base of parking brake lever. See **Fig. 47**.
Power Retractable Hardtop Limit Switch	Right side of retractable top storage compartment. See **Fig. 51**.
Power Steering Pressure Switch	Left front of engine. See **Fig. 13**.
Refrigerant Pressure Switch	Right front of engine compartment. See **Fig. 21**.
Starter Interlock Switch	Behind left side of dash. See **Fig. 8**.
Transmission Range Switch	On transmission. See **Fig. 8**.
Trunk Compartment Light Switch	Right rear of luggage compartment. See **Fig. 39**.
Trunk Lid Opener Cancel Switch	Lower center rear of luggage compartment. See **Fig. 38**.

MISCELLANEOUS

MISCELLANEOUS LOCATION

Component	Location
Audio Amplifier	Right side of luggage compartment. See **Fig. 44**.
Check Connector	In relay & main fuse block. See **Fig. 1**.
Clock Spring	In steering column. See **Fig. 24**.
Coil Antenna (Immobilizer)	In steering column. See **Fig. 37**.
Condenser (Ignition)	Right rear of engine. See **Fig. 10**.
Condenser (Rear Window Defogger)	At left "B" pillar. See **Fig. 28**.
Data Link Connector 2	Under lower left side of dash. See **Fig. 4**.
Driver-Side Air Bag Module	In steering wheel. See **Fig. 24**.
Driver-Side Pre-Tensioner Seat Belt	Near base of left "B" pillar. See **Fig. 25**.
Driver-Side Side Air Bag Module	In driver's seat. See **Fig. 25**.
Filament (Rear Window Defogger)	Left side of rear window. See **Fig. 28**.
Generator	Right front of engine. See **Fig. 7**.
Horn	Behind left side of front bumper. See **Fig. 49**.
Ignition Coils No. 1, 2, 3 & 4	Top of engine. See **Fig. 10**.
Joint Connector (C-18)	Behind left end of dash. See **Fig. 15**.
Joint Connector (C-19)	Behind left end of dash. See **Fig. 15**.
Joint Connector (C-20)	Behind center of dash. See **Fig. 15**.
	Right front of luggage compartment. See **Fig.**

Joint Connector (C-21)	**44**.
Joint Connector (C-22)	Left side of retractable top storage compartment. See **Fig. 56**.
Keyless Antenna (Center)	Under center console. See **Fig. 33**.
Keyless Antenna (Instrument Panel)	Behind right end of dash. See **Fig. 35**.
Keyless Antenna (Left/Right)	In respective door. See **Fig. 34**.
Keyless Antenna (Rear)	Center rear of luggage compartment. See **Fig. 34**.
Keyless Antenna (Rear No. 2)	Rear of center console. See **Fig. 33**.
Keyless Antenna (Trunk)	Front of luggage compartment. See **Fig. 33**.
Keyless Receiver	Behind right side of dash. See **Fig. 35**.
Keyless Receiver (Rear)	Front of luggage compartment. See **Fig. 32**.
Passenger-Side Air Bag Module	Behind right side of dash. See **Fig. 24**.
Passenger-Side Pre-Tensioner Seat Belt	Near base of right "B" pillar. See **Fig. 25**.
Passenger-Side Side Air Bag Module	In passenger's seat. See **Fig. 25**.
Power Metal Oxide Semiconductor Field Effect Transistor (Power MOS FET)	Behind right end of dash. See **Fig. 21**.
Seat Warmer (Left/Right)	In respective seat cushion. See **Fig. 31**.
Selector Lever Component	Under center console. See **Fig. 19**.
Transmission Fluid Temperature Connector	Behind left side of dash. See **Fig. 19**.

CONNECTORS

CONNECTORS LOCATION

Component	Location
C-02 (14 Pin)	Left side of engine. See **Fig. 10**.
C-03 (56 Pin)	Behind left side of dash. See **Fig. 4**.
C-04 (14 Pin)	Behind left side of dash. See **Fig. 4**.
C-05 (Except M/T) (Gray, 56 Pin)	Behind left kick panel. See **Fig. 9**.
C-05 (M/T) (Gray, 14 Pin)	Behind left kick panel. See **Fig. 9**.
C-06 (12 Pin)	Behind left kick panel. See **Fig. 4**.
C-08 (Except M/T) (56 Pin)	Behind left kick panel. See **Fig. 6**.
C-08 (M/T) (14 Pin)	Behind left kick panel. See **Fig. 6**.
C-10 (A/T) (Blue, 40 Pin)	Left side of engine compartment. See **Fig. 8**.
C-10 (M/T) (Gray, 14 Pin)	Left side of engine compartment. See **Fig. 8**.
C-11 (56 Pin)	Behind center of dash. See **Fig. 4**.
C-12 (Yellow, 4 Pin)	Behind center of dash. See **Fig. 24**.
C-13 (Yellow, 4 Pin)	Behind right kick panel. See **Fig. 24**.
C-14 (56 Pin)	Behind right end of dash. See **Fig. 44**.
C-15 (32 Pin)	Behind right kick panel. See **Fig. 29**.
C-16 (32 Pin)	Behind left kick panel. See **Fig. 29**.

C-17 (4 Pin)	Left side of luggage compartment. See **Fig. 34**.

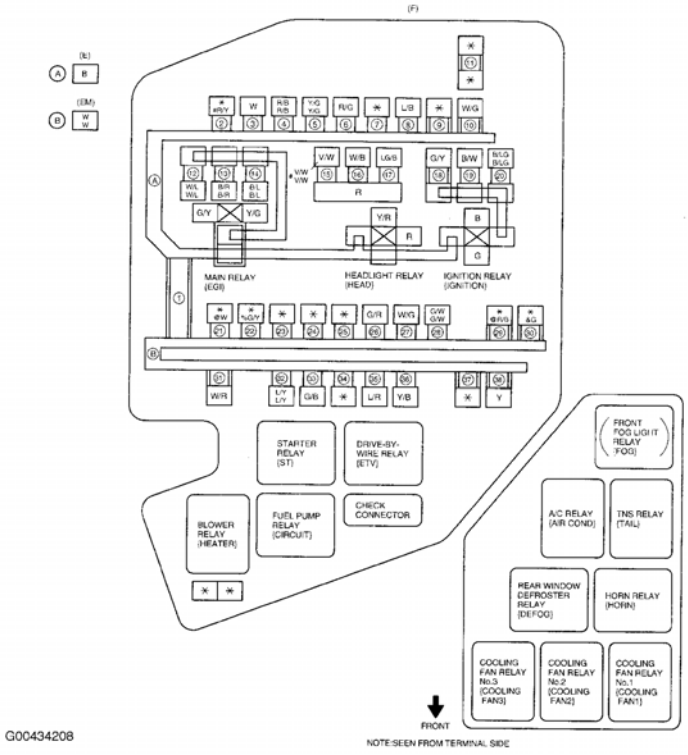
GROUNDS

GROUNDS LOCATION

Component	Location
G1	Left rear corner of engine compartment. See **Fig. 2**.
G2	Behind left kick panel. See **Fig. 2**.
G3	Left rear corner of engine compartment. See **Fig. 2**.
G4	Right rear corner of engine compartment. See **Fig. 2**.
G5	Behind left headlight assembly. See **Fig. 2**.
G6	Behind right headlight assembly. See **Fig. 2**.
G7	Center rear of engine compartment. See **Fig. 2**.
G8	Behind right side of dash. See **Fig. 3**.
G9	Behind left side of dash. See **Fig. 3**.
G10	Behind center of dash. See **Fig. 3**.
G11	Behind right kick panel. See **Fig. 3**.
G12	Under passenger's seat. See **Fig. 3**.
G13	Under front of center console. See **Fig. 3**.
G14	Under driver's seat. See **Fig. 3**.
G15	Under rear of center console. See **Fig. 3**.
G16	Base of left "B" pillar. See **Fig. 3**.
G17	Center rear of luggage compartment. See **Fig. 3**.
G18	Base of right "B" pillar. See **Fig. 2**.
G19	Left side of retractable top storage compartment. See **Fig. 59**.
G20	Left side of retractable top storage compartment. See **Fig. 55**.

COMPONENT LOCATION GRAPHICS

NOTE: Figures may show multiple component locations. Refer to appropriate table for proper figure references.



*...VACANT
%...WITH FRONT FOG LIGHT
@...WITH ABS, DSC
#...WITH DRL SYSTEM
&...WITH ADVANCED KEYLESS ENTRY & START SYSTEM AND KEYLESS ENTRY SYSTEM, BOSE

NO.	FUSE NAME	FUSE	NO.	FUSE NAME	FUSE
1	MAIN	120A	20	W/PEH	20A
2	(DRL)	15A	21	(ABS)	30A
3	HORN	15A	22	(FOG)	15A
4	STOP	10A	23	(R.FOG)	7.5A
5	ETV	10A	24	*	*
6	FUEL PUMP	15A	25	*	*
7	*	*	26	MAG	7.5A
8	HAZARD	10A	27	ST	20A
9	(P.WIND2)	20A	28	TAIL	15A
10	IG KEY1	40A	29	(ABS)	40A
11	*	*	30	(BTN)	30A
12	EGI INJ	10A	31	FAN	30A
13	EGI COMP1	10A	32	FAN	7.5A
14	EGI COMP2	10A	33	DEFOG	20A
15	HEAD LOW L	15A	34	(HICLEAN)	20A
16	HEAD LOW R	15A	35	ROOM	15A
17	HEAD	15A	36	IG KEY2	15A
18	(P.WIND)	20A	37	*	*
19	ENGINE	15A	38	HEATER	40A

( )NAME INDICATED ON FUSE BOX COVER
( )IF EQUIPPED

Fig. 1: Relay & Main Fuse Block
Courtesy of MAZDA MOTORS CORP.

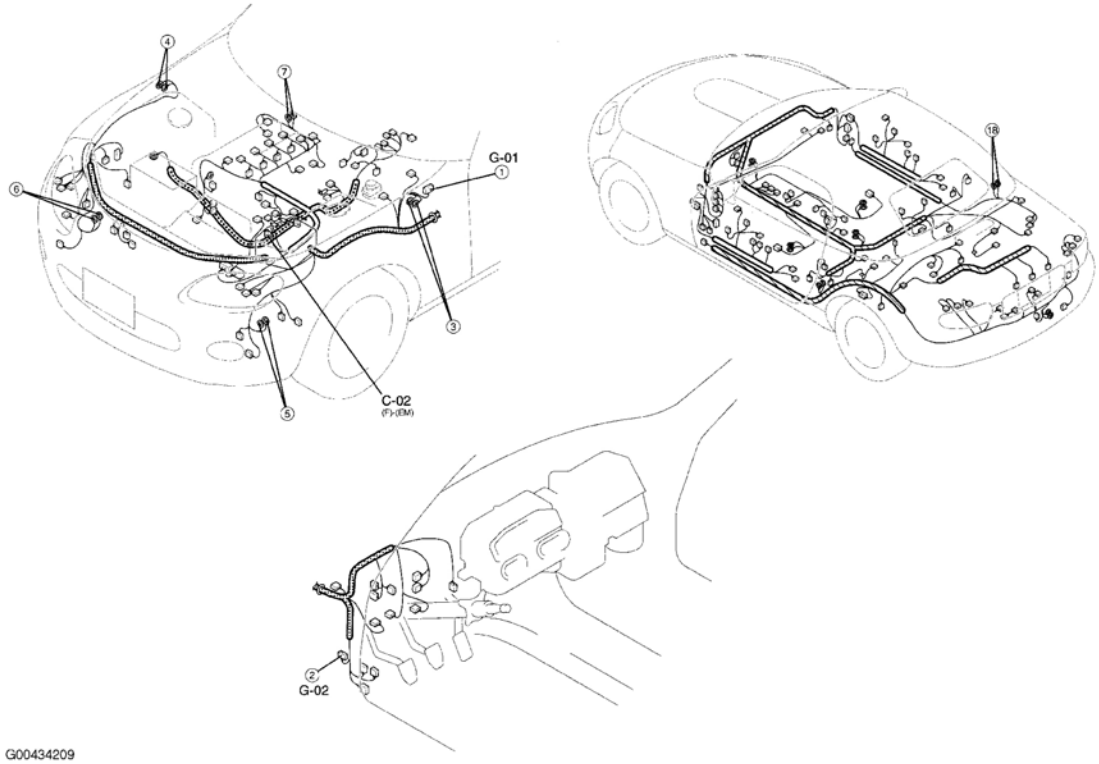


Fig. 2: Ground System
Courtesy of MAZDA MOTORS CORP.

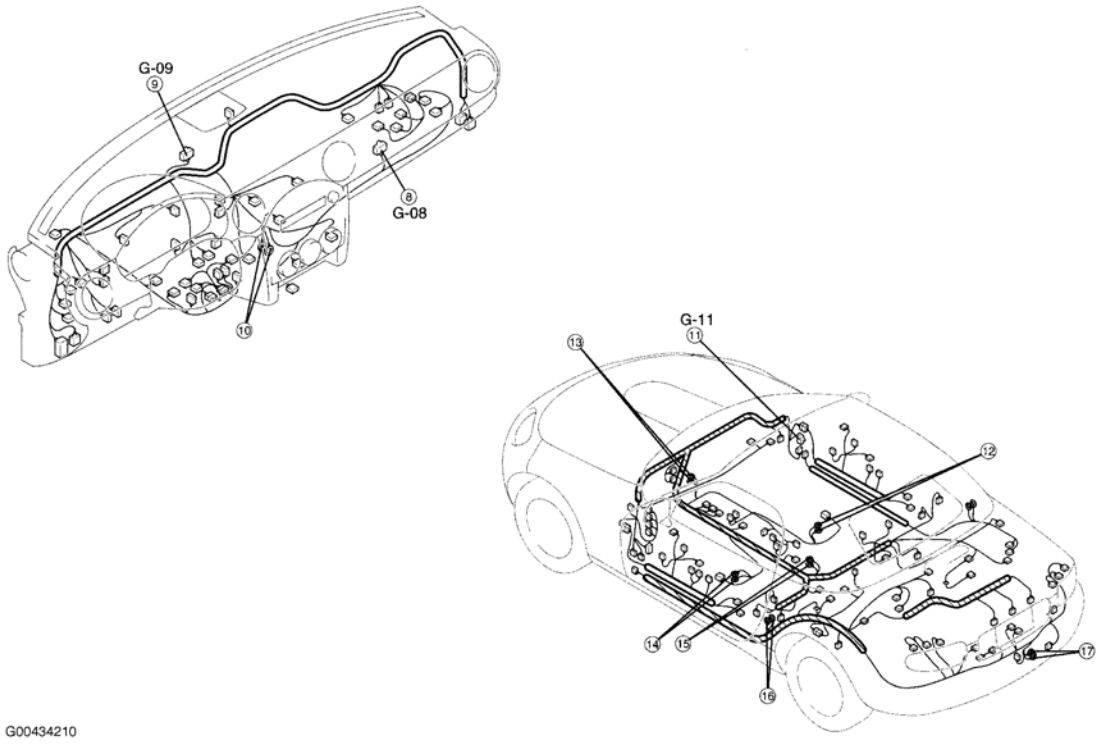


Fig. 3: Ground System
Courtesy of MAZDA MOTORS CORP.

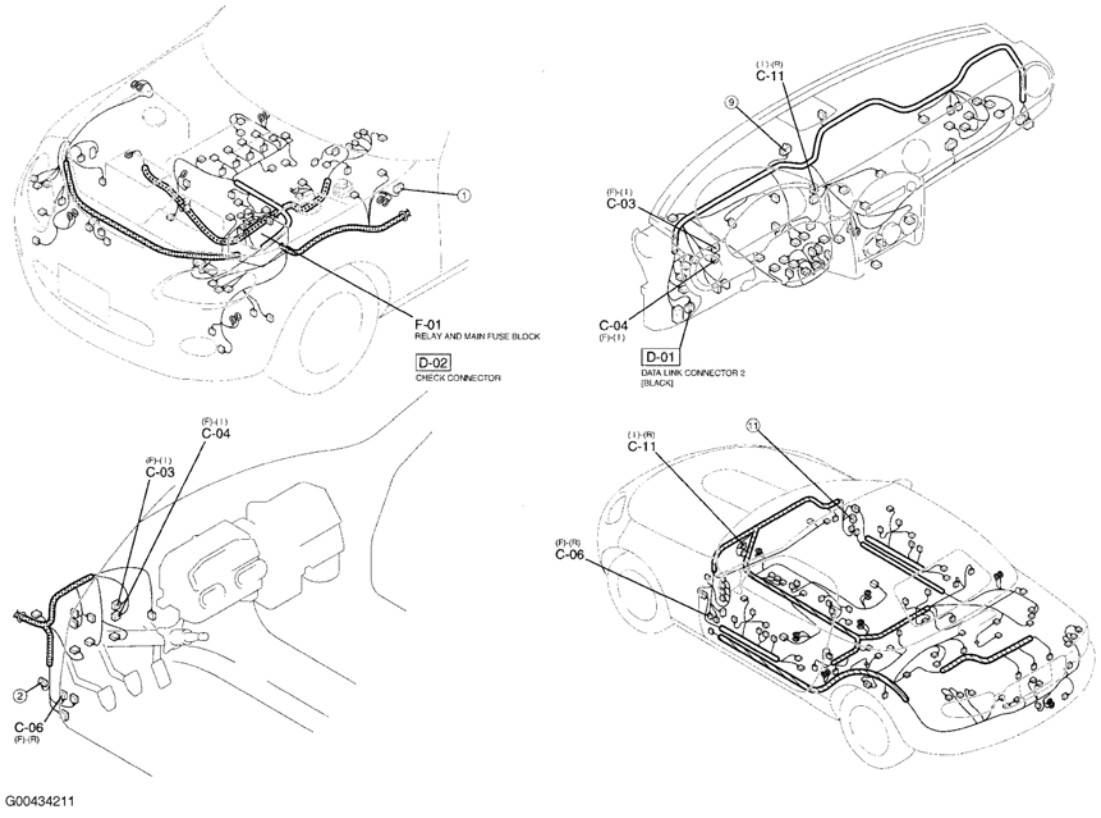


Fig. 4: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

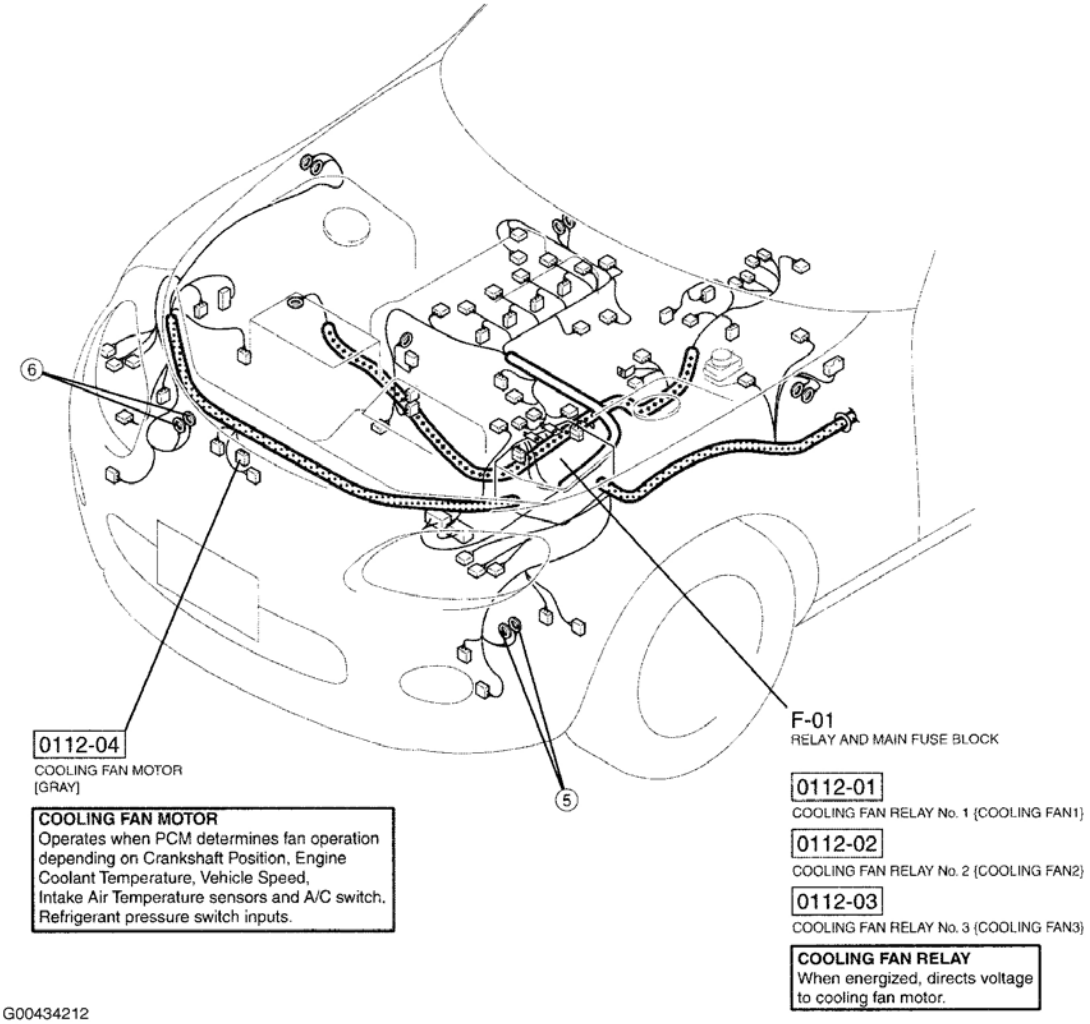


Fig. 5: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

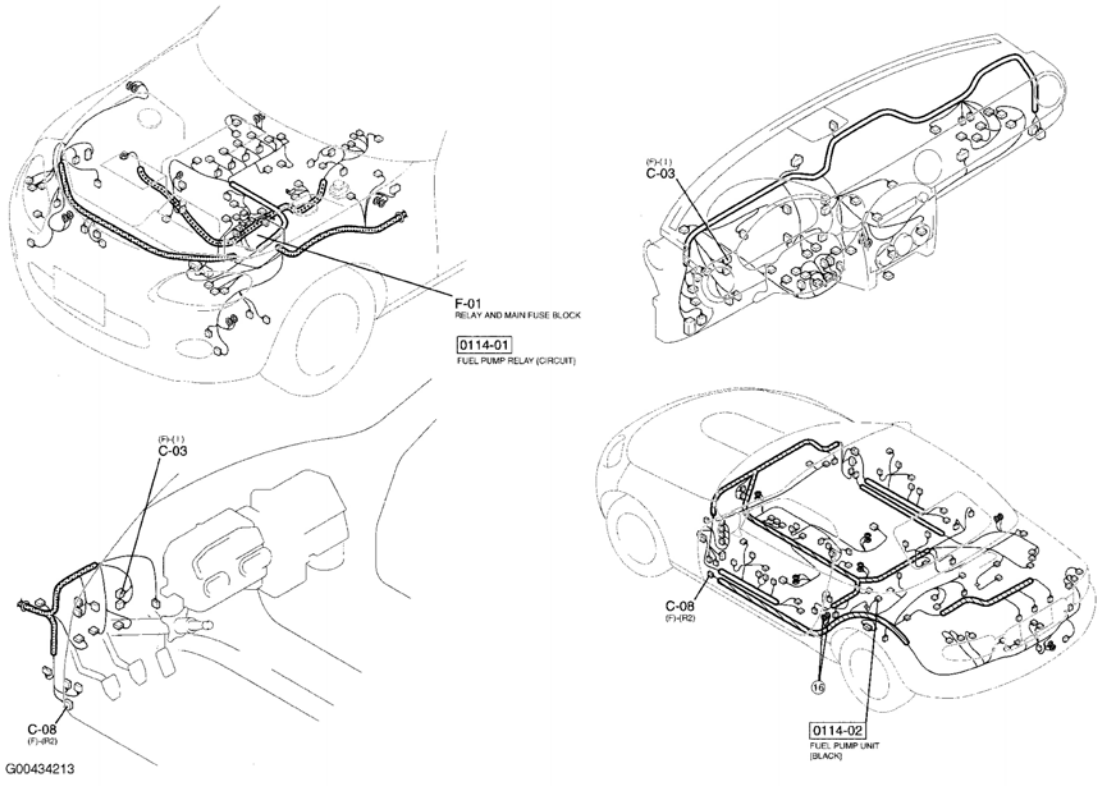


Fig. 6: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

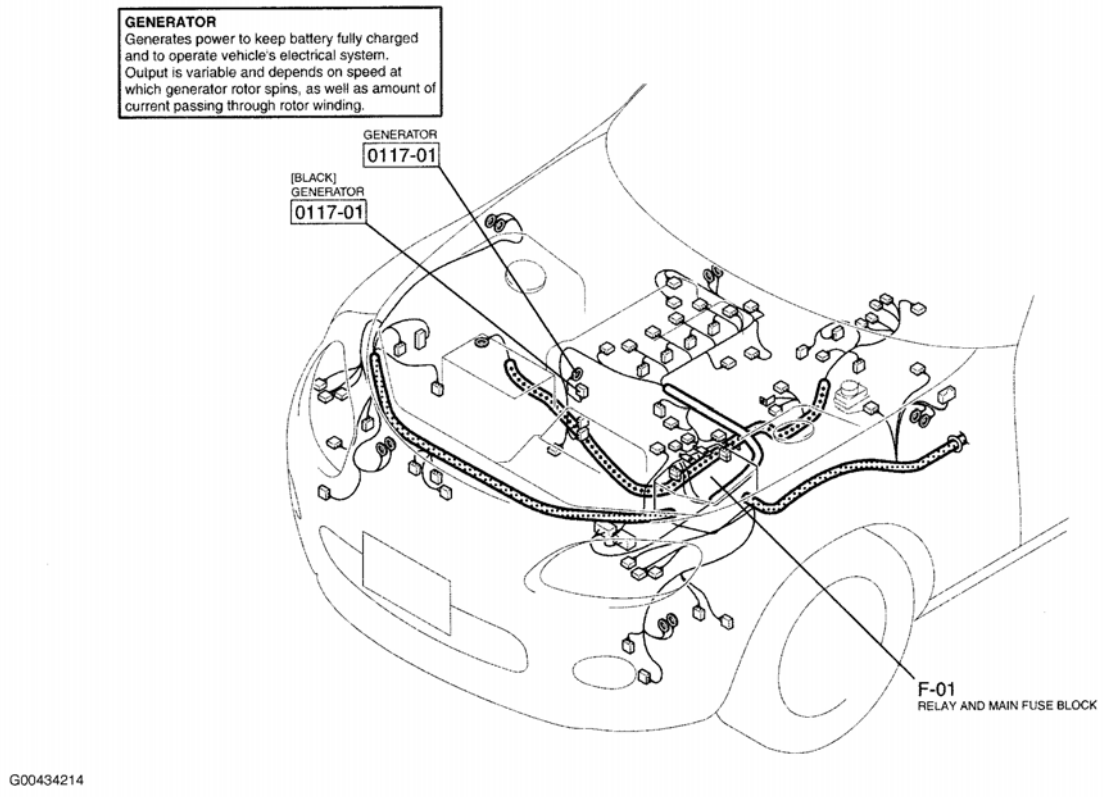


Fig. 7: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

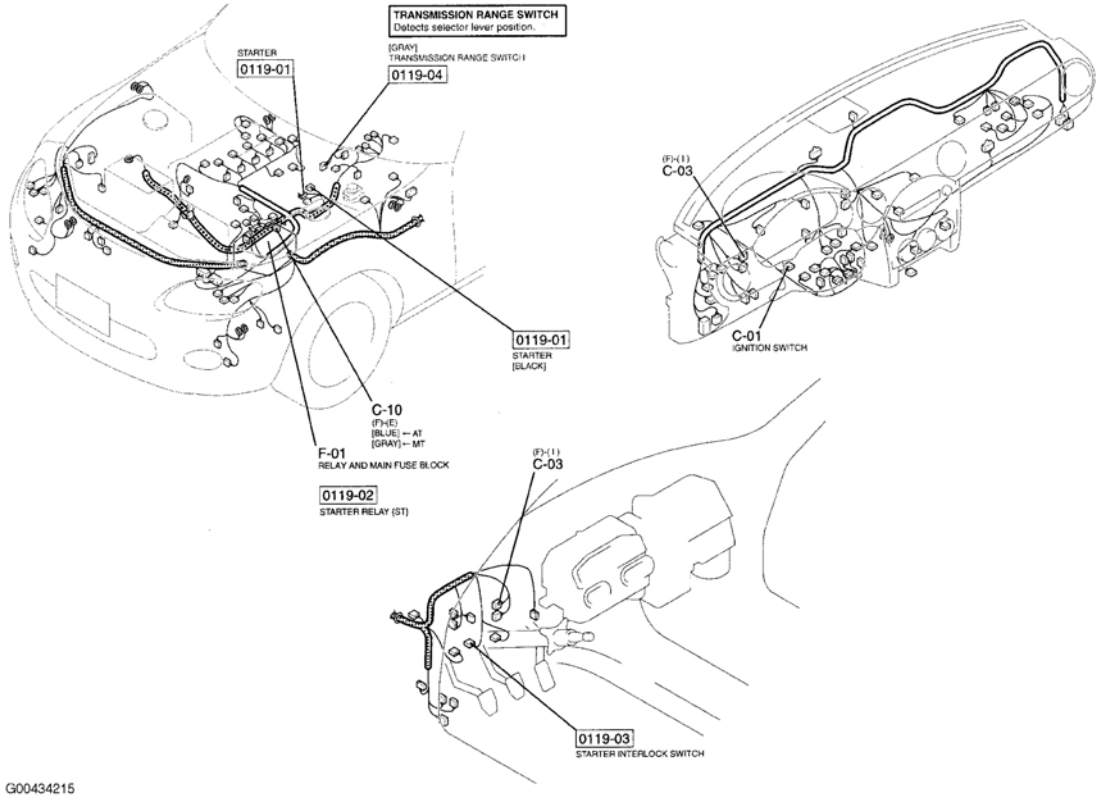


Fig. 8: Dash & Engine Compartment
Courtesy of MAZDA MOTORS CORP.

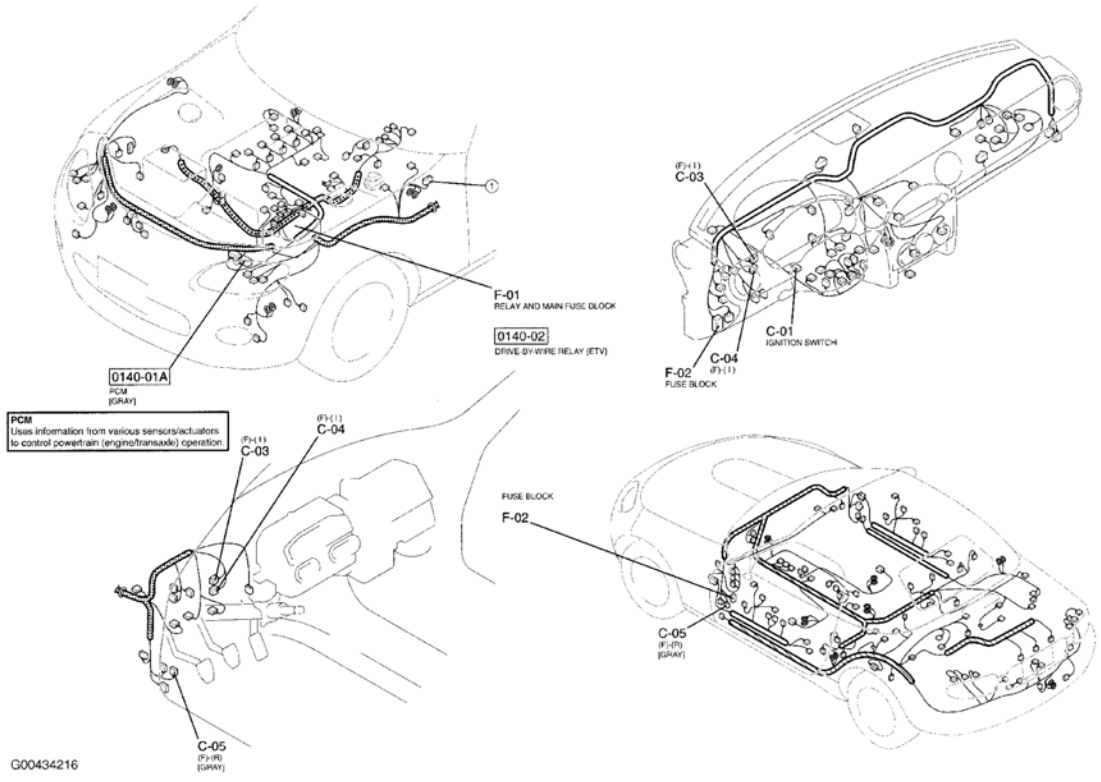


Fig. 9: Engine Control System
Courtesy of MAZDA MOTORS CORP.

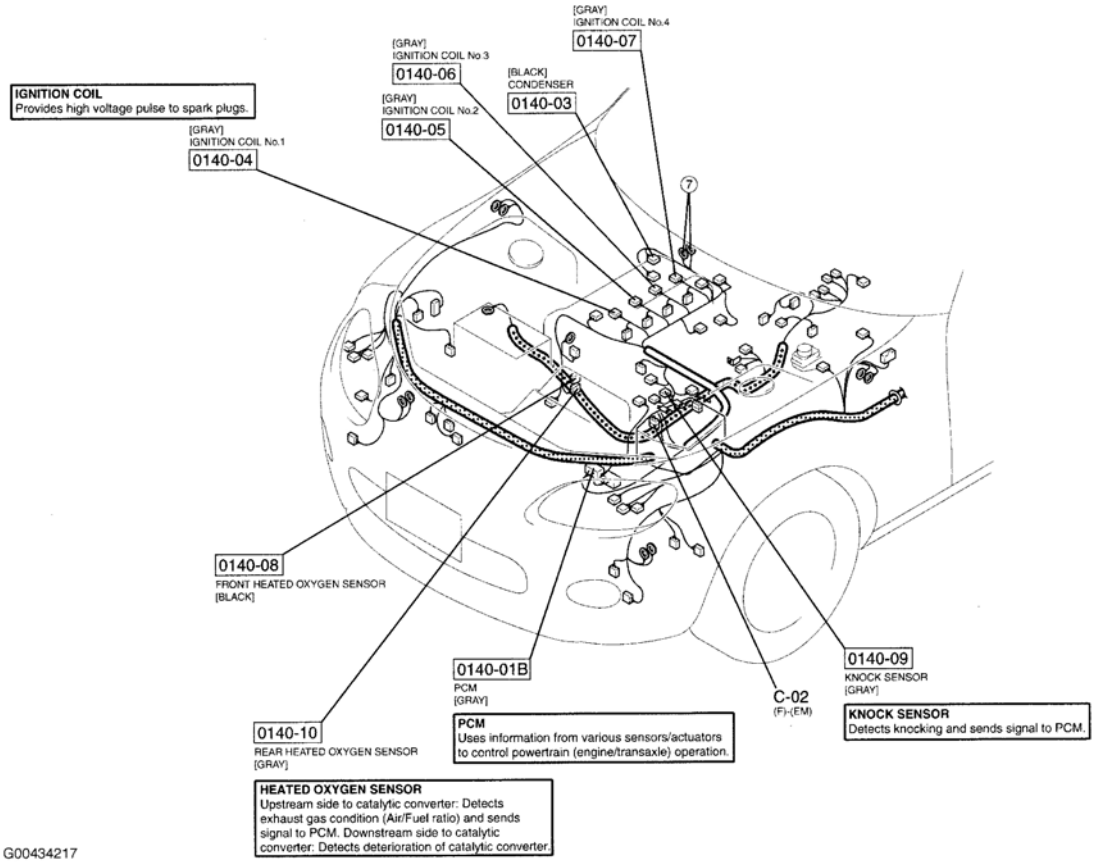


Fig. 10: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

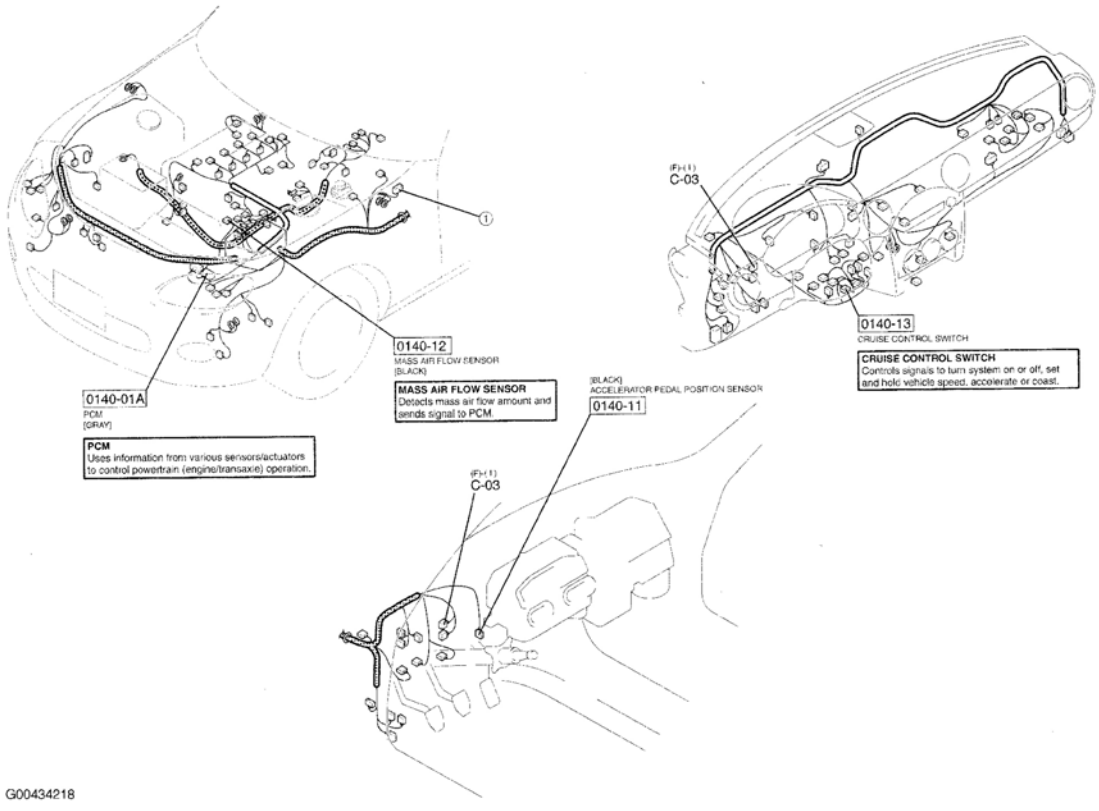


Fig. 11: Dash & Engine Compartment
Courtesy of MAZDA MOTORS CORP.

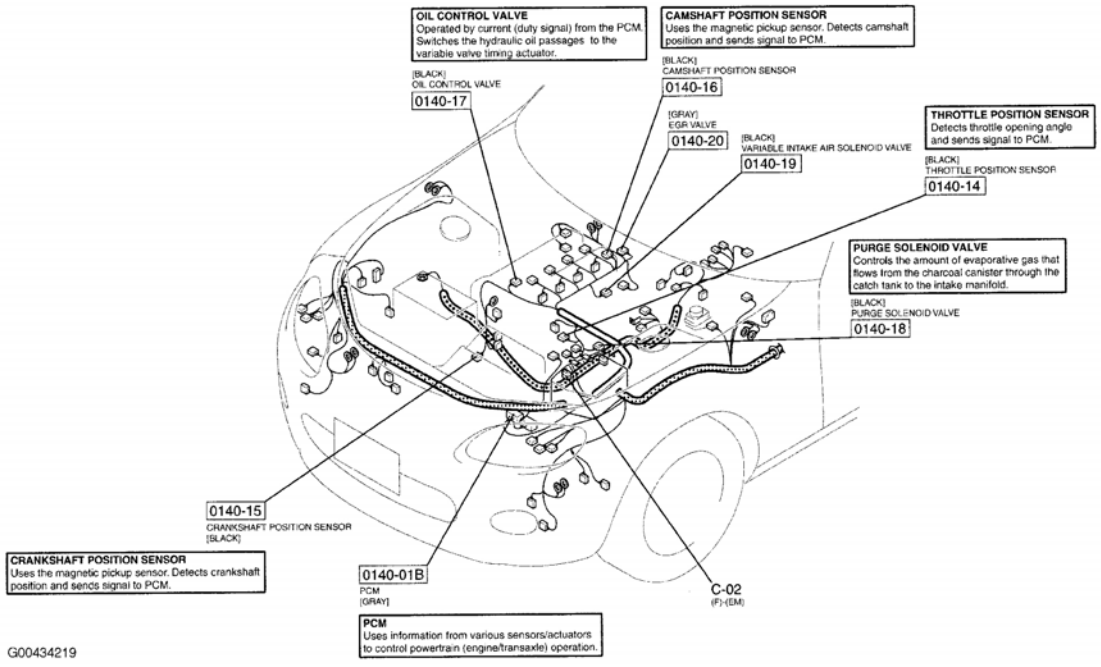


Fig. 12: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

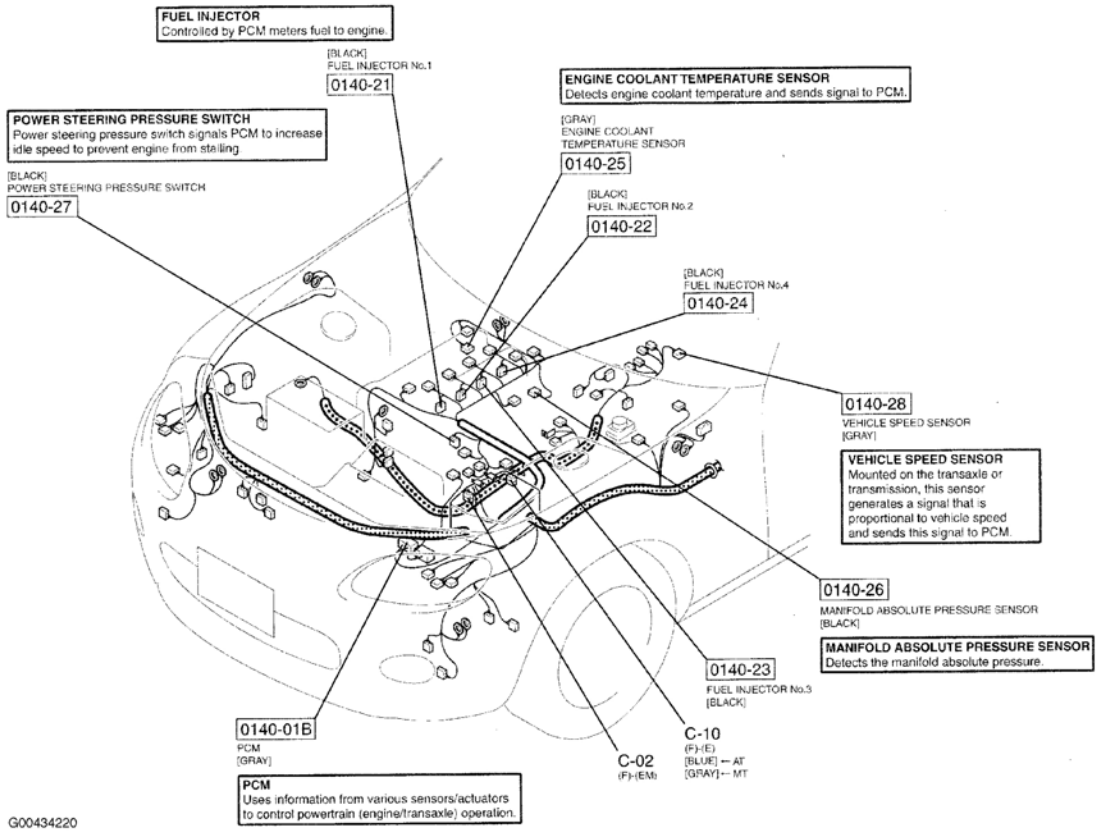


Fig. 13: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

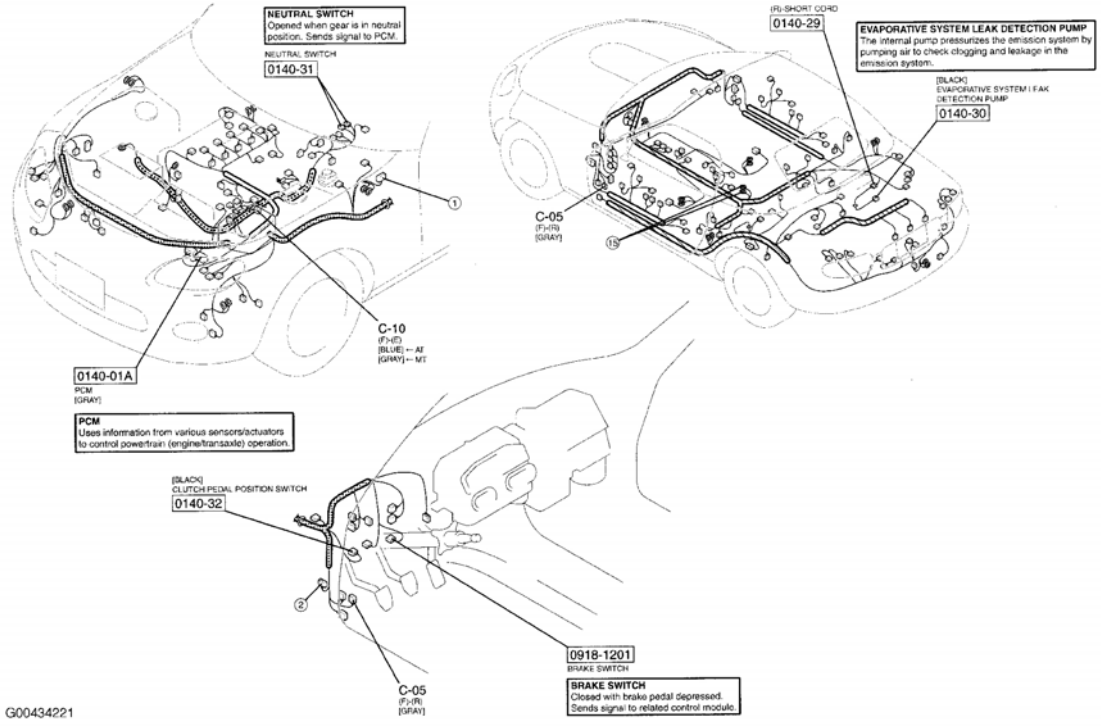


Fig. 14: Engine Control System
Courtesy of MAZDA MOTORS CORP.

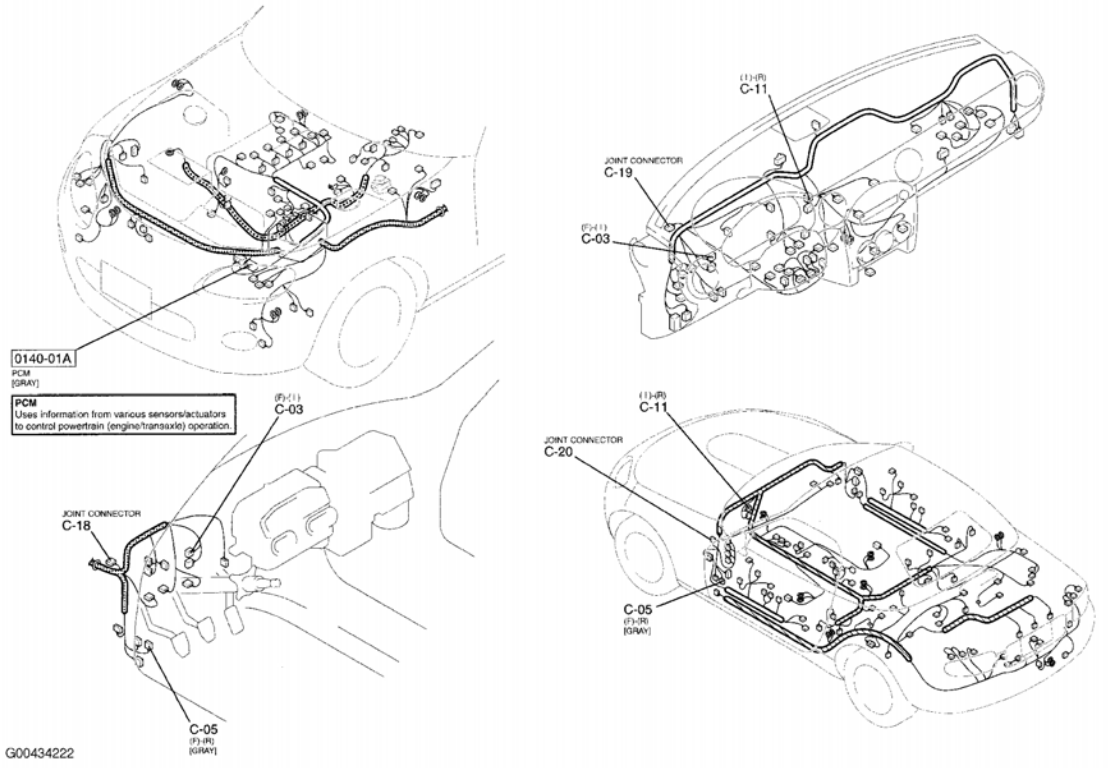


Fig. 15: Dash & Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

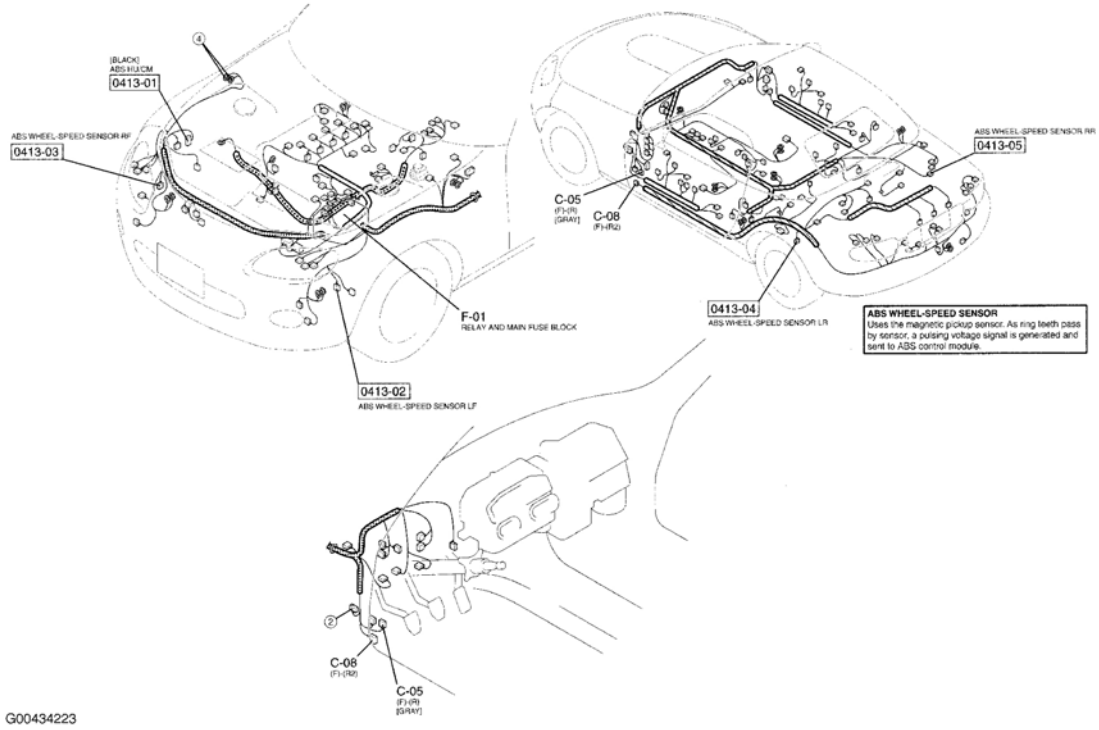


Fig. 16: Engine Compartment & Rear Of Vehicle
Courtesy of MAZDA MOTORS CORP.

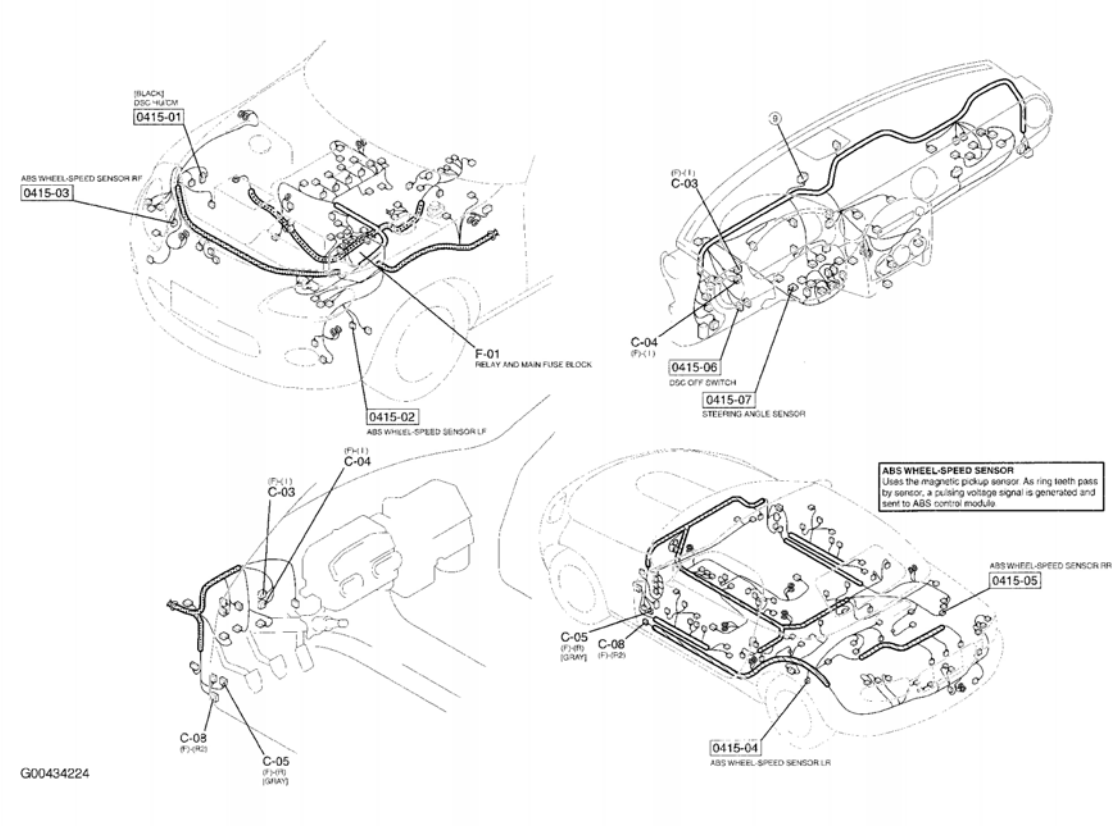


Fig. 17: Dash & Engine Compartment
Courtesy of MAZDA MOTORS CORP.

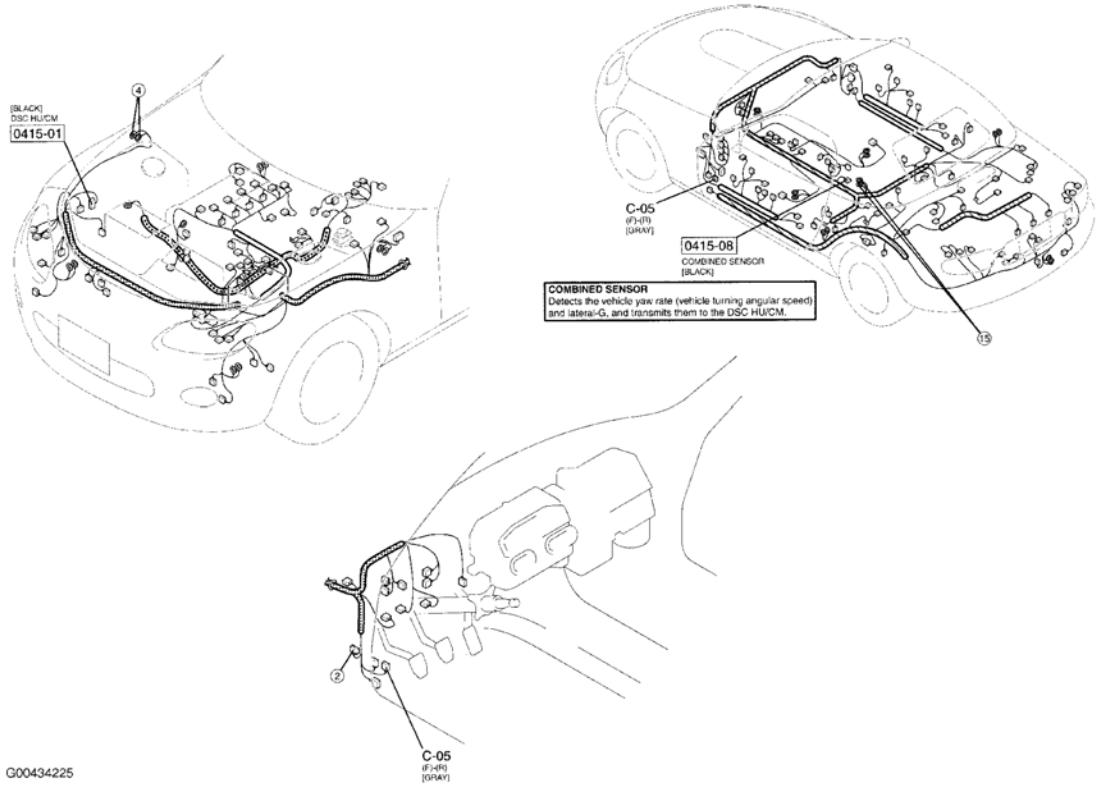


Fig. 18: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

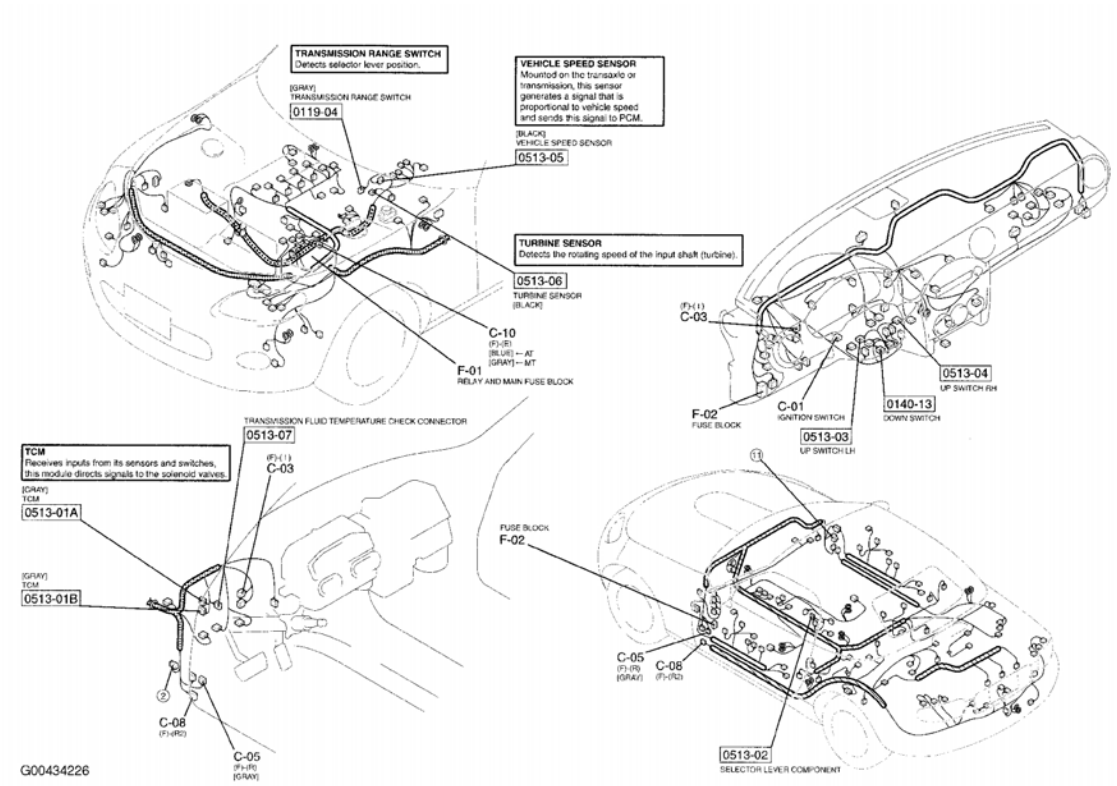


Fig. 19: Automatic Transmission Control System
Courtesy of MAZDA MOTORS CORP.

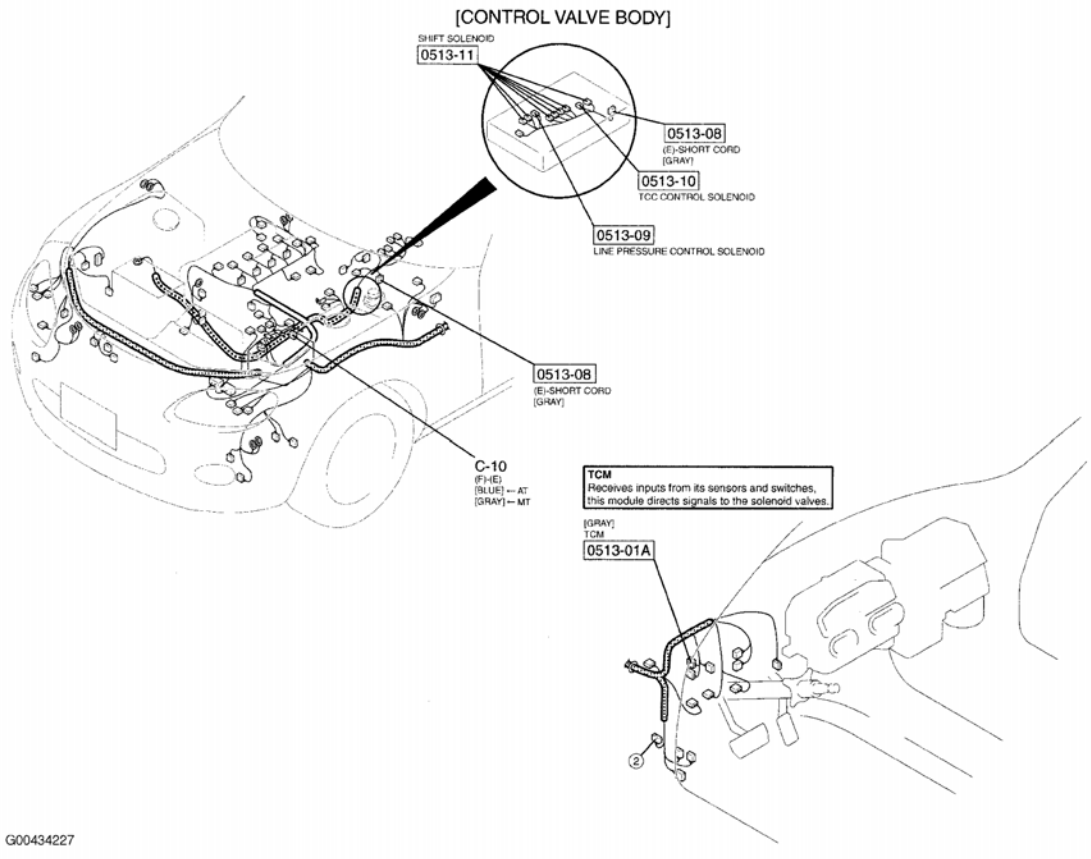


Fig. 20: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

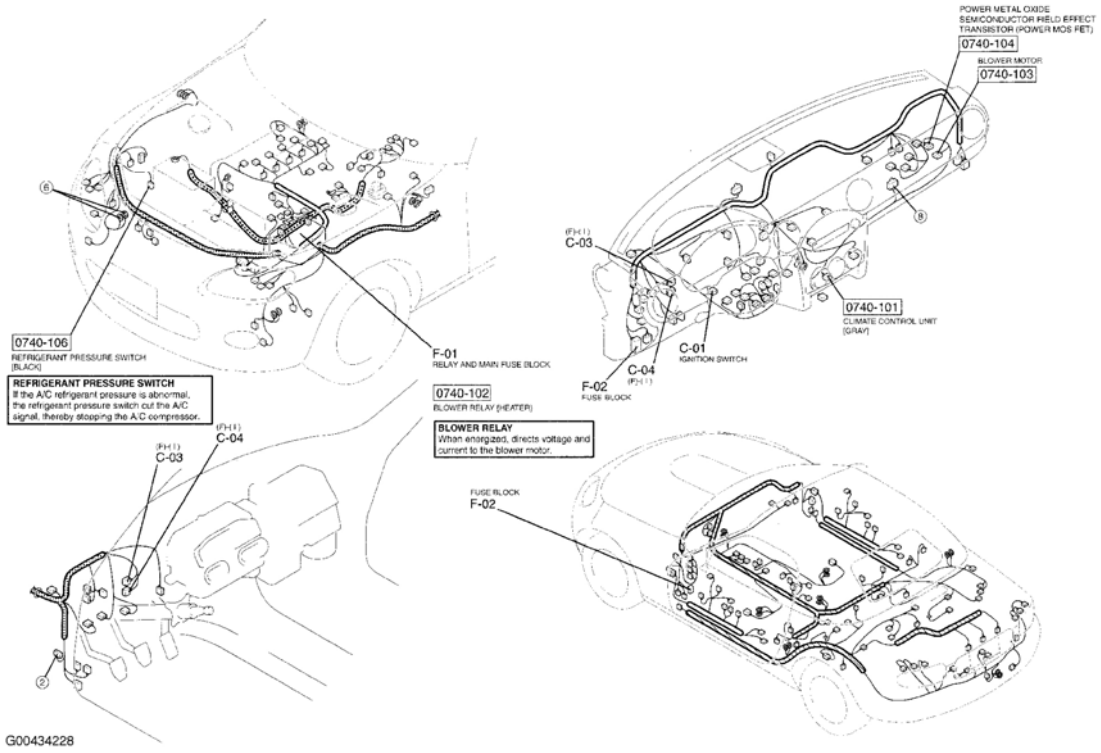


Fig. 21: Dash & Engine Compartment
Courtesy of MAZDA MOTORS CORP.

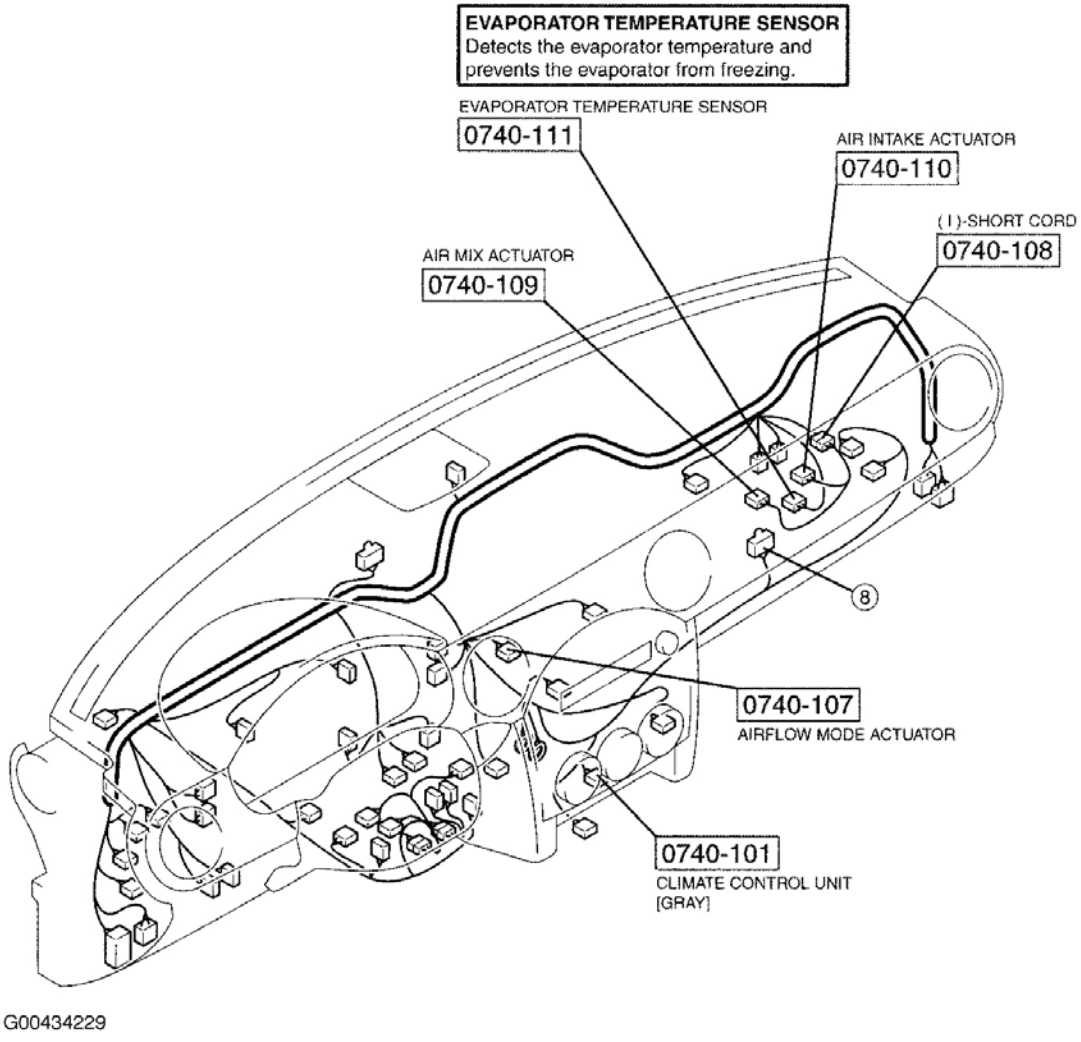


Fig. 22: Dash
Courtesy of MAZDA MOTORS CORP.

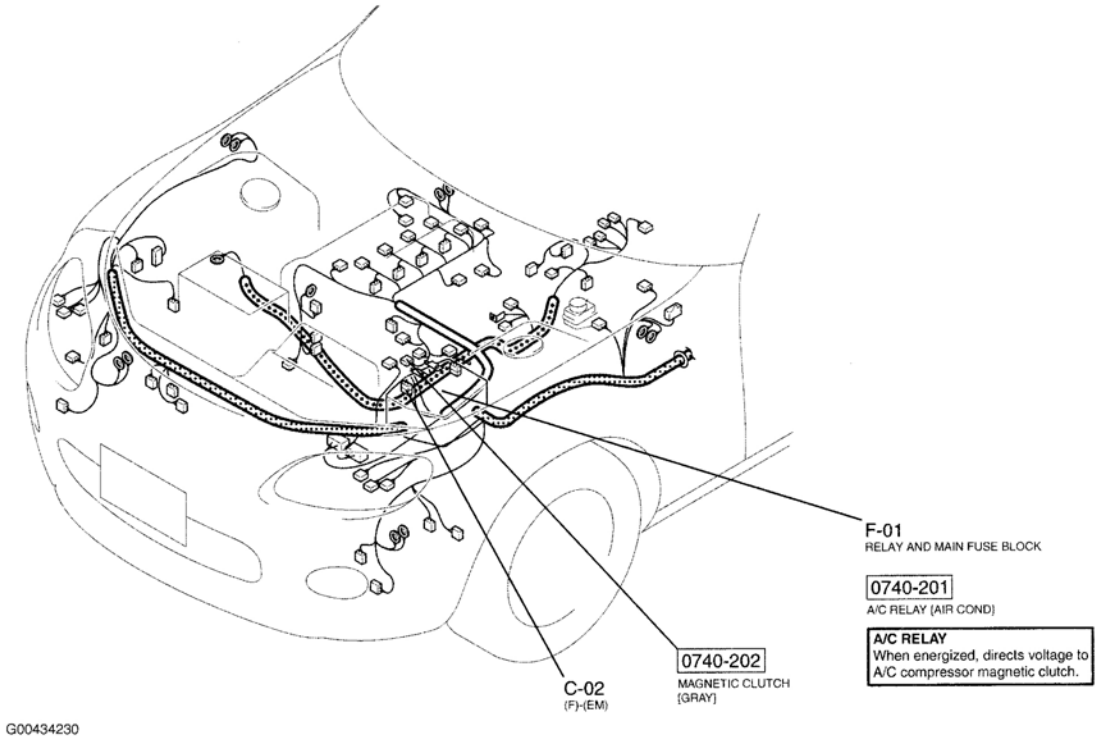


Fig. 23: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

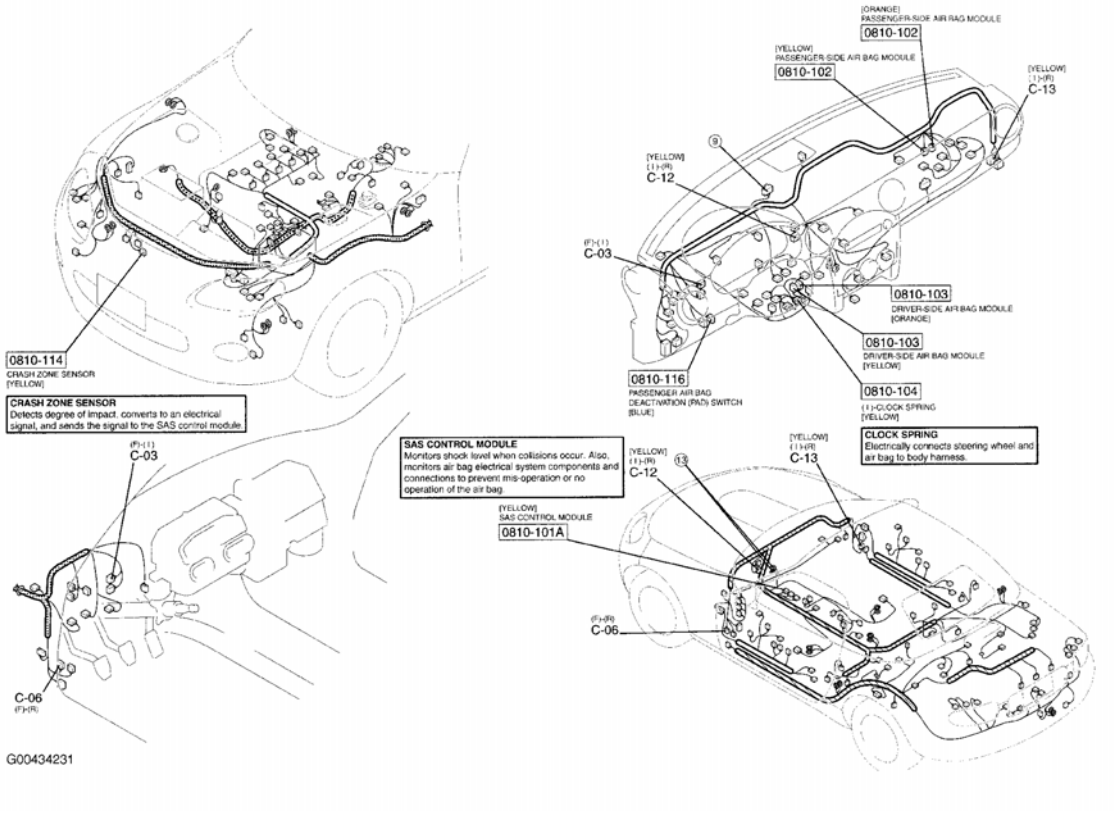


Fig. 24: Air Bag System
Courtesy of MAZDA MOTORS CORP.

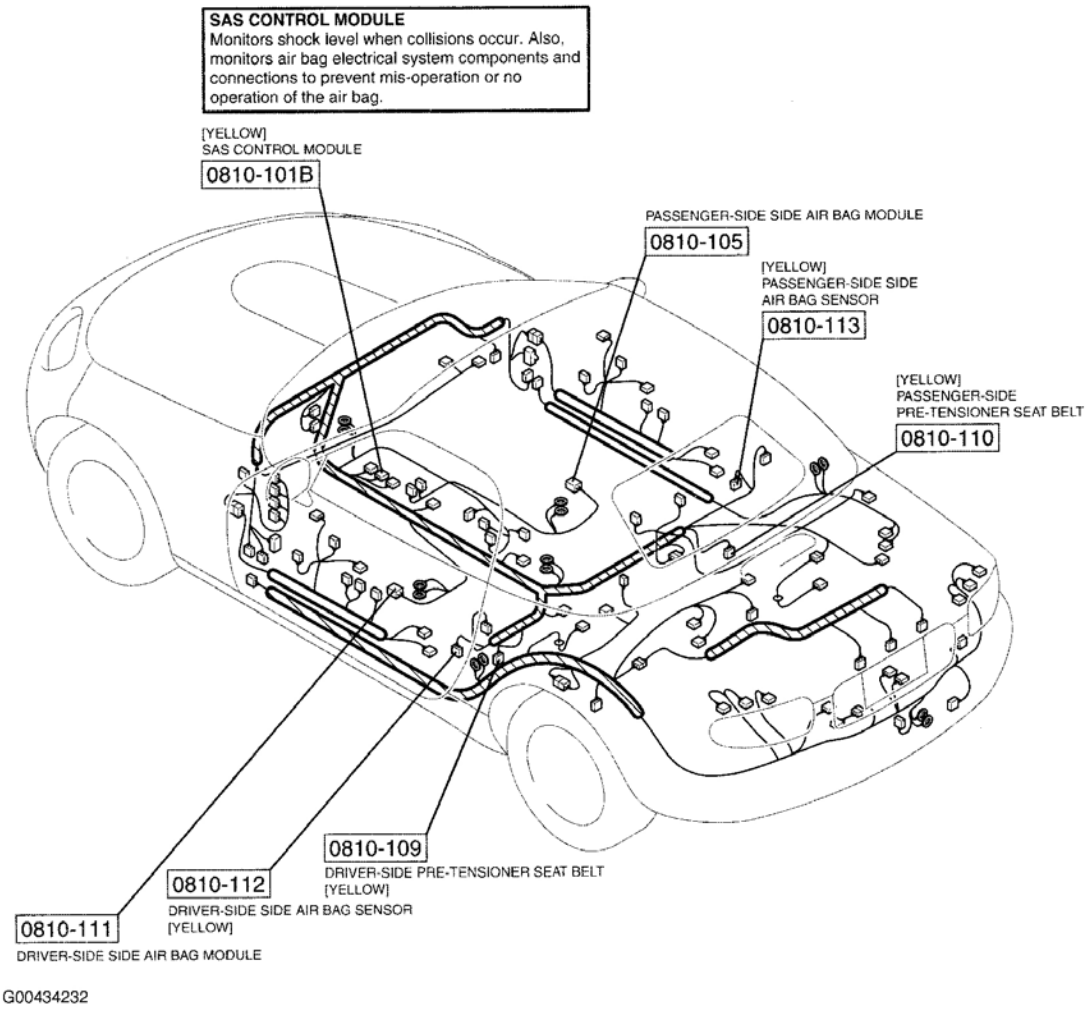


Fig. 25: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

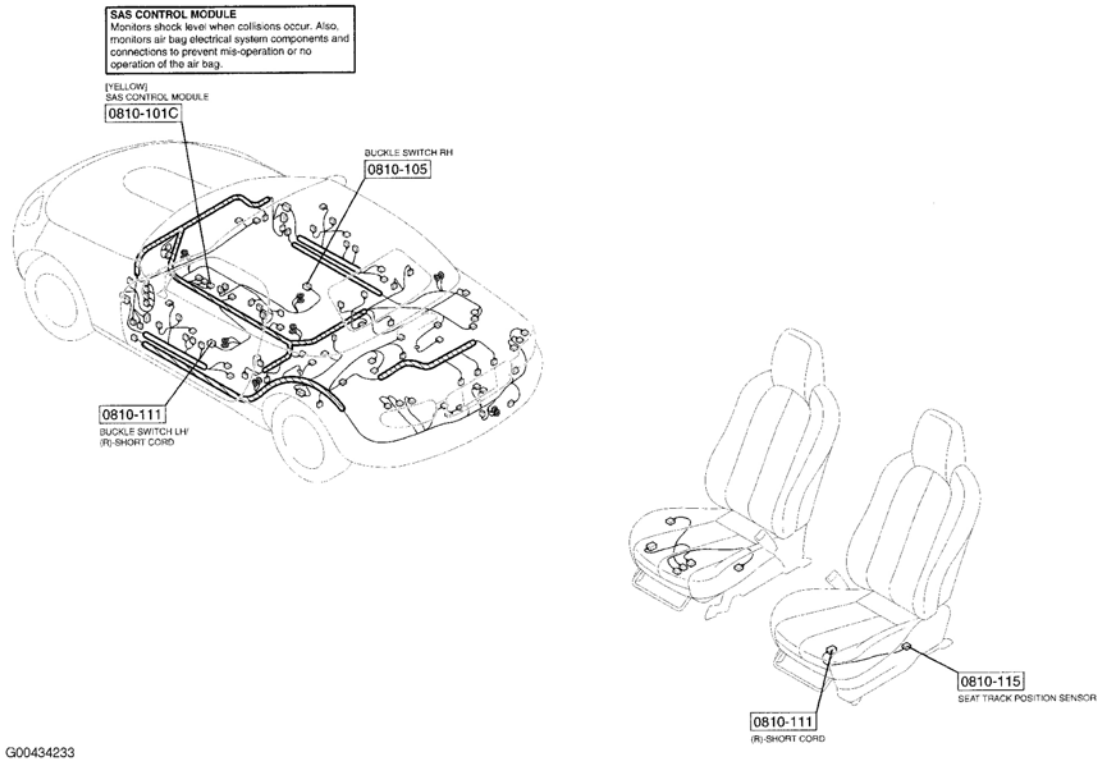


Fig. 26: Seats
Courtesy of MAZDA MOTORS CORP.

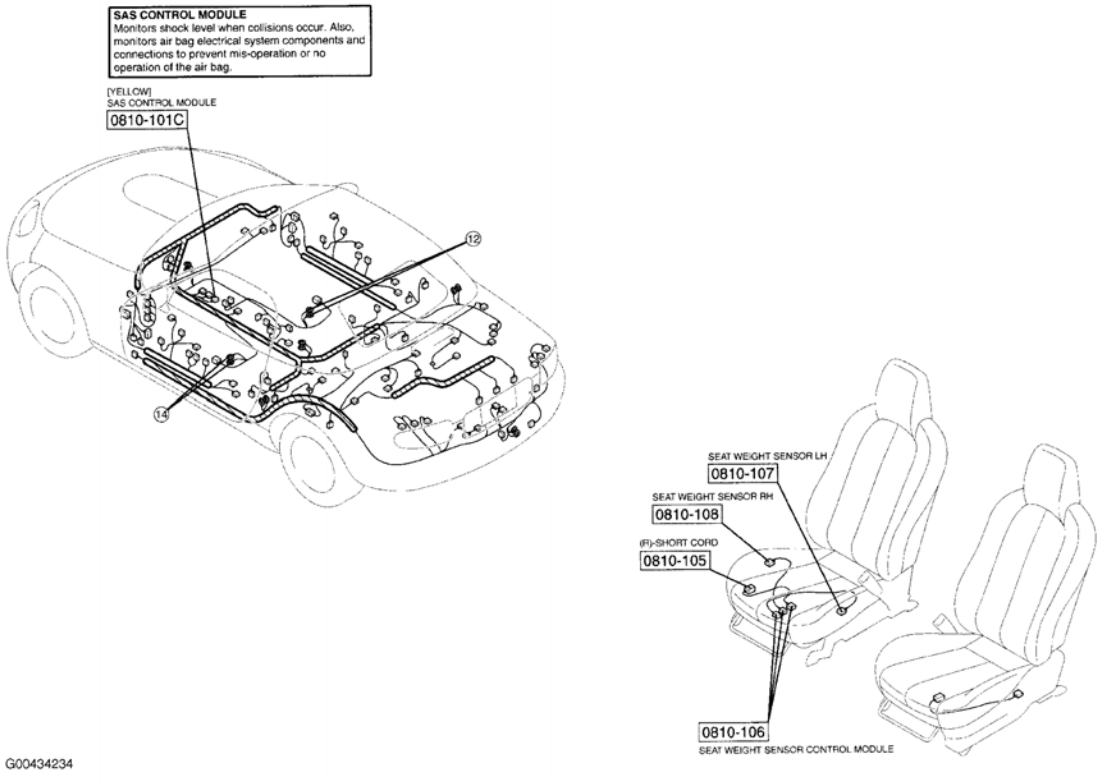


Fig. 27: Passenger Seat
Courtesy of MAZDA MOTORS CORP.

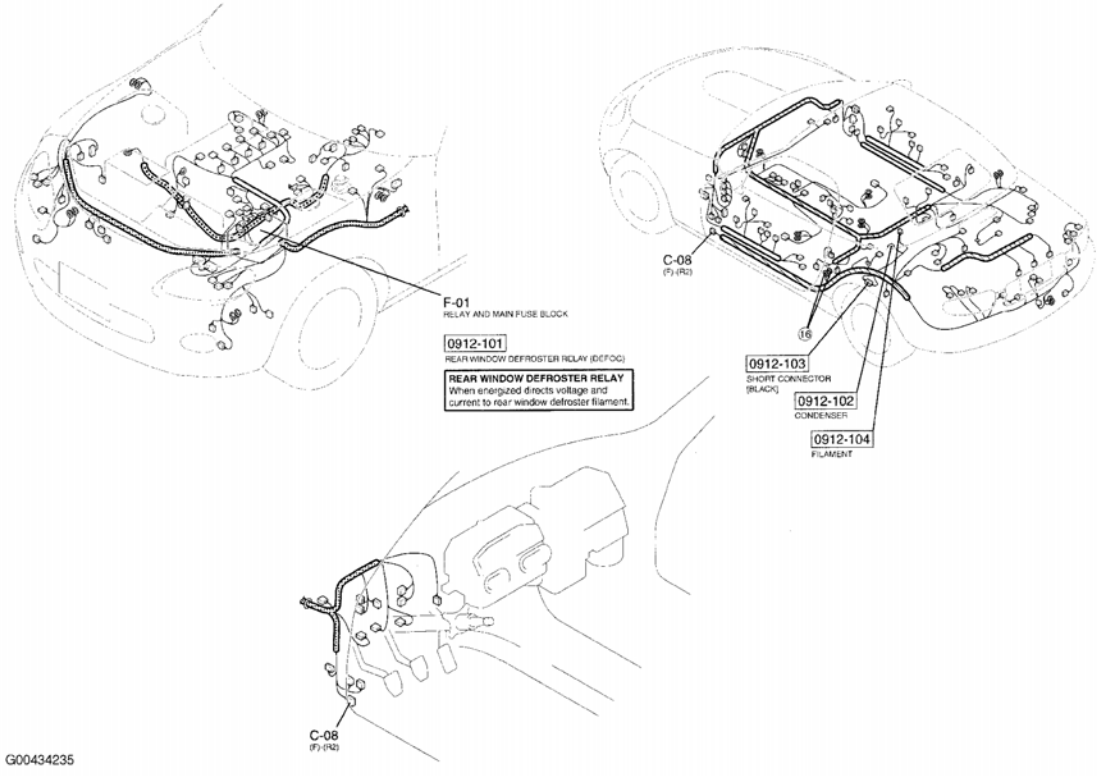


Fig. 28: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

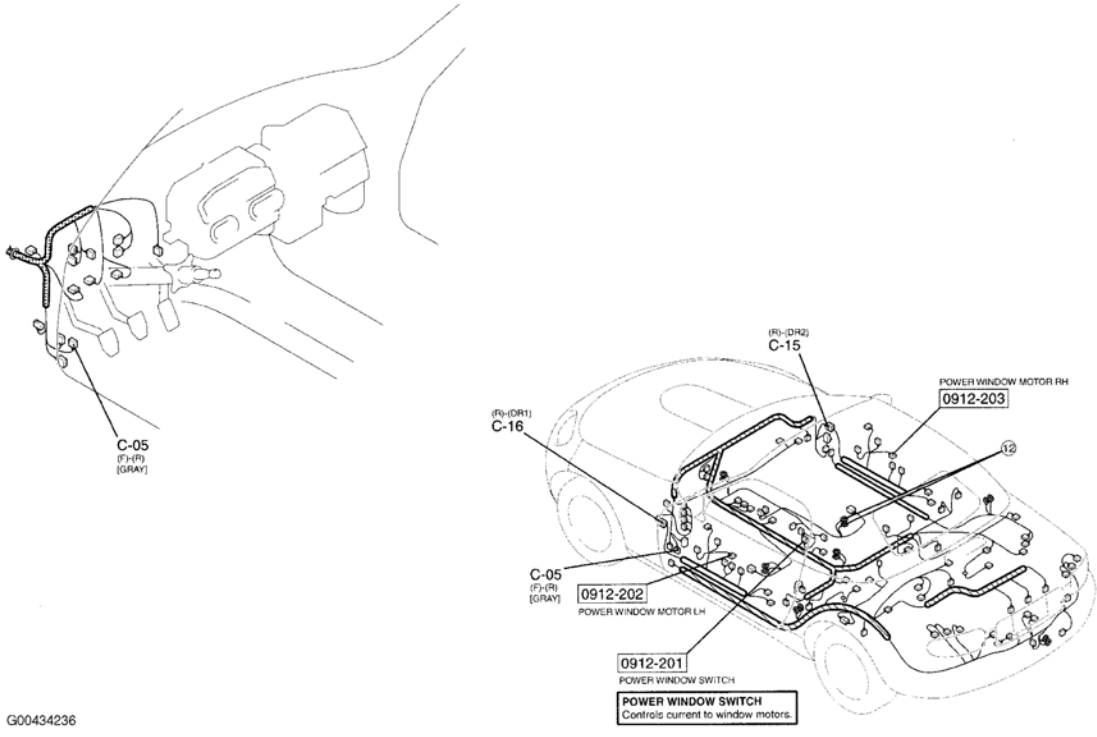


Fig. 29: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

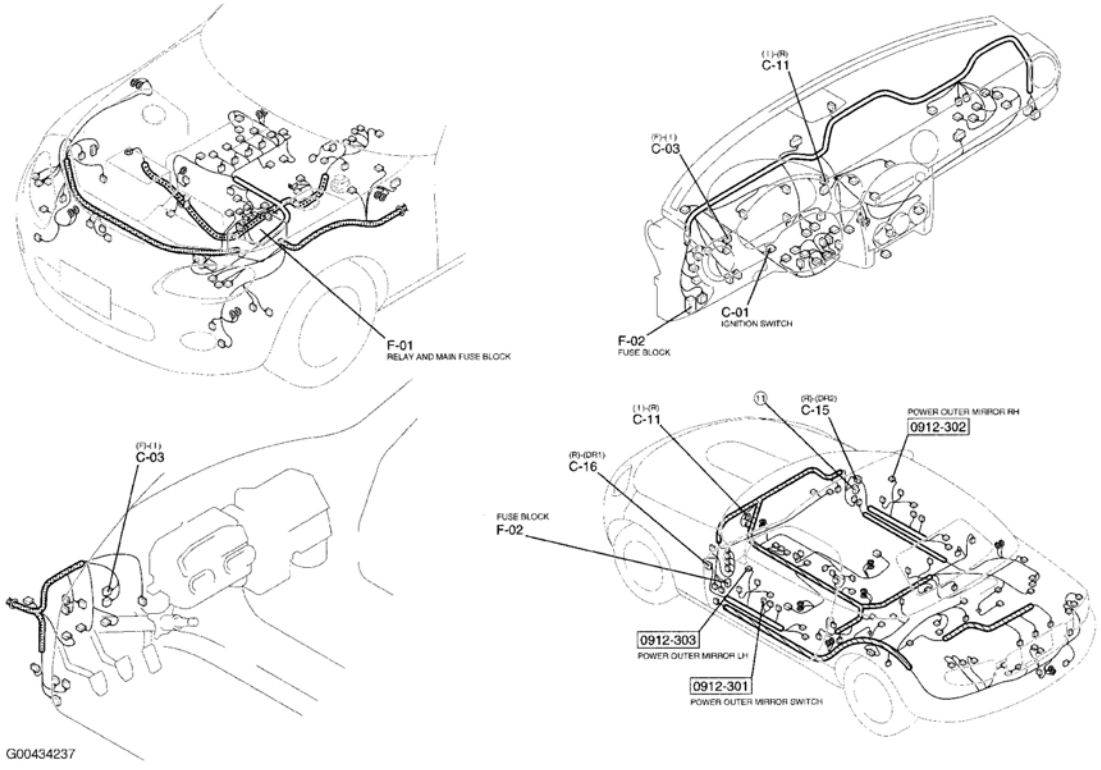


Fig. 30: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

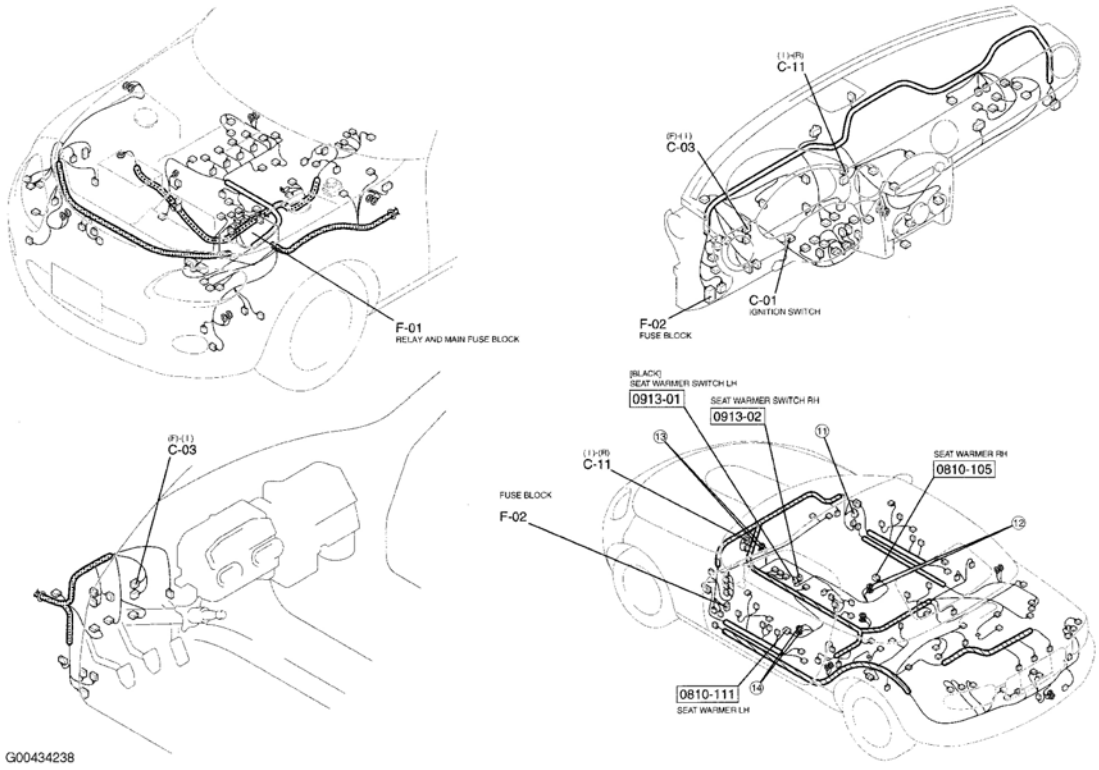


Fig. 31: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

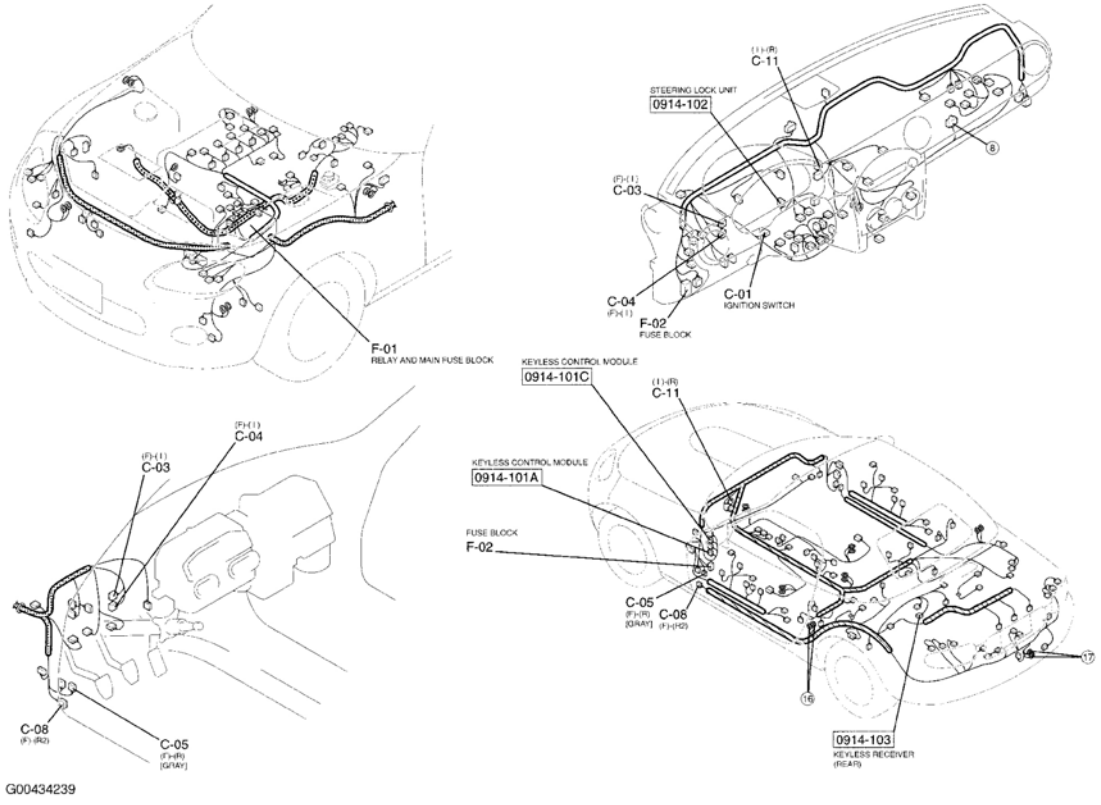


Fig. 32: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

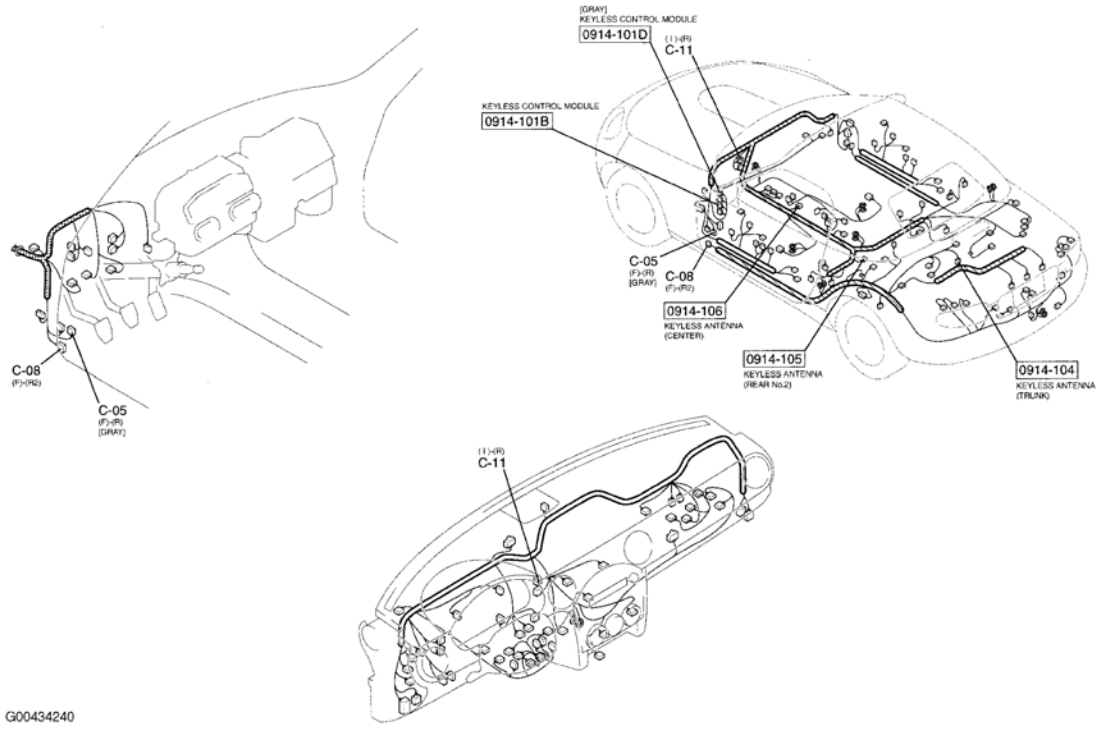


Fig. 33: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

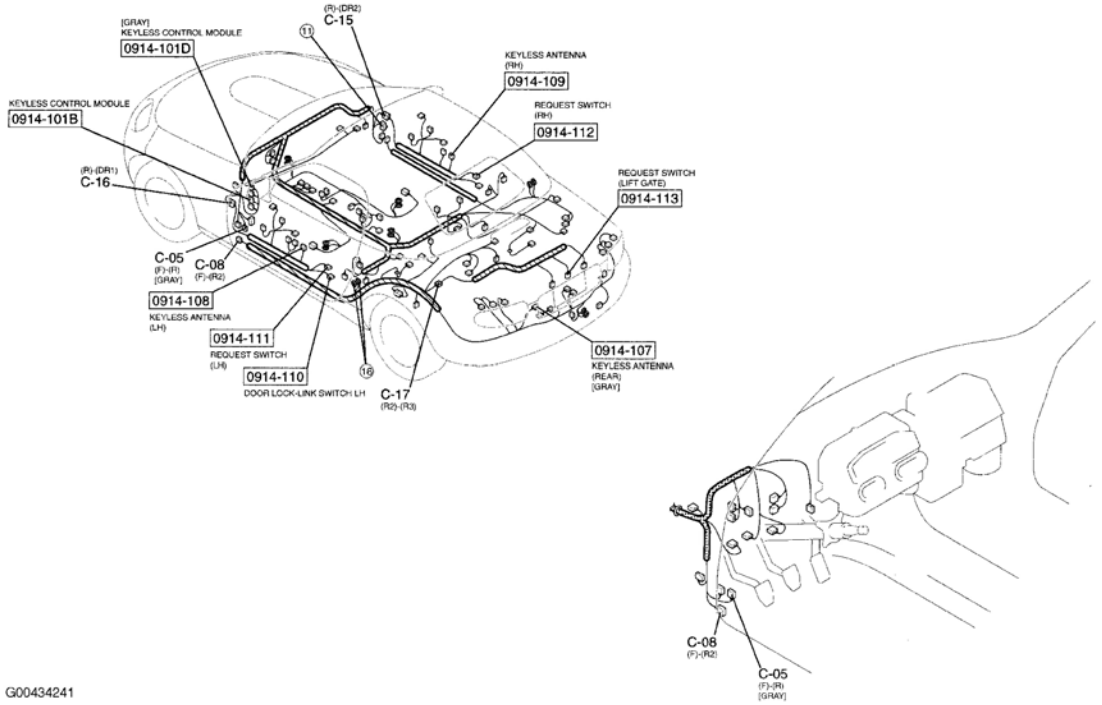


Fig. 34: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

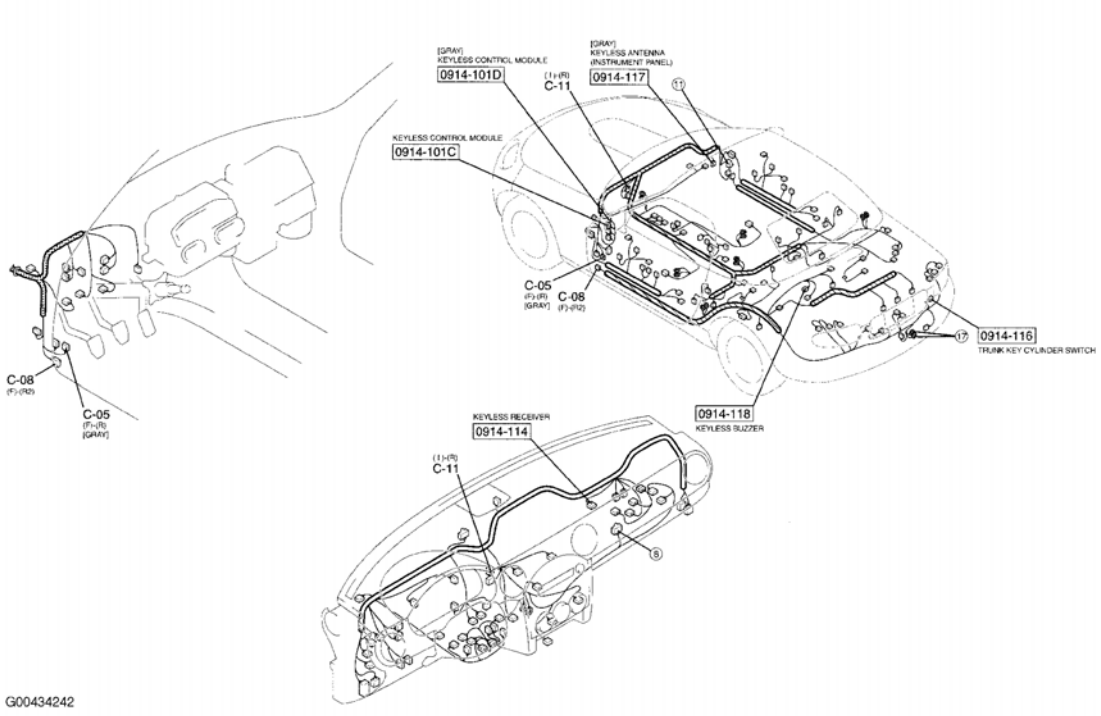


Fig. 35: Dash & Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

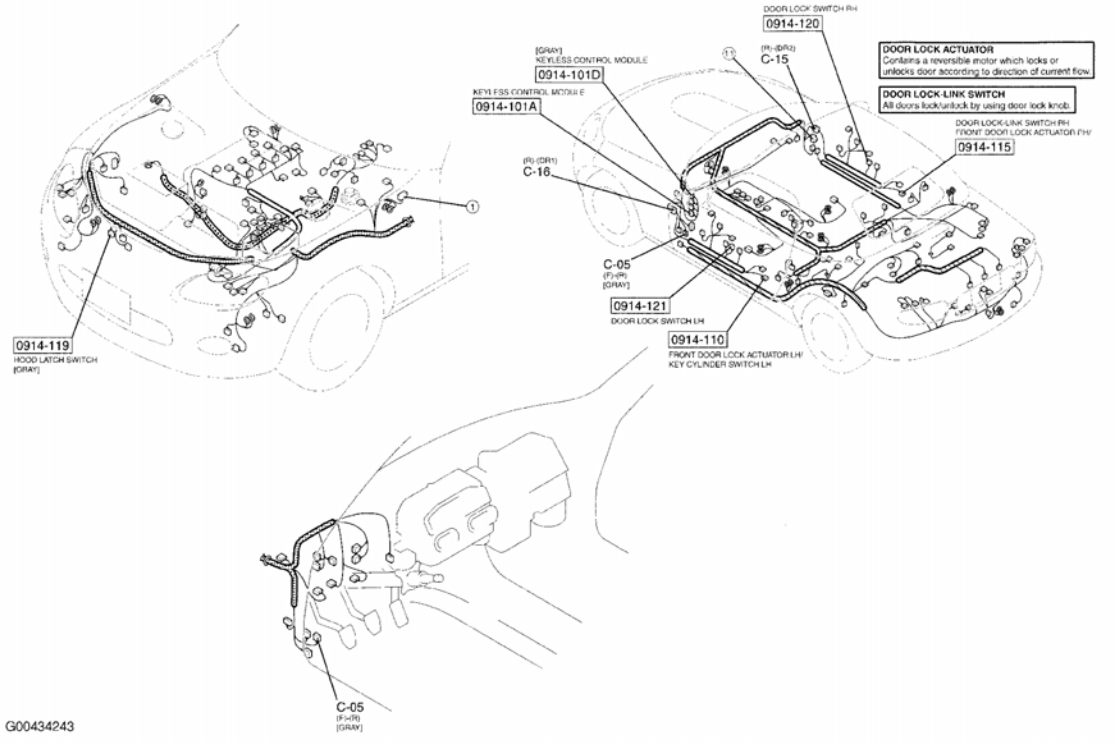


Fig. 36: Engine Compartment & Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

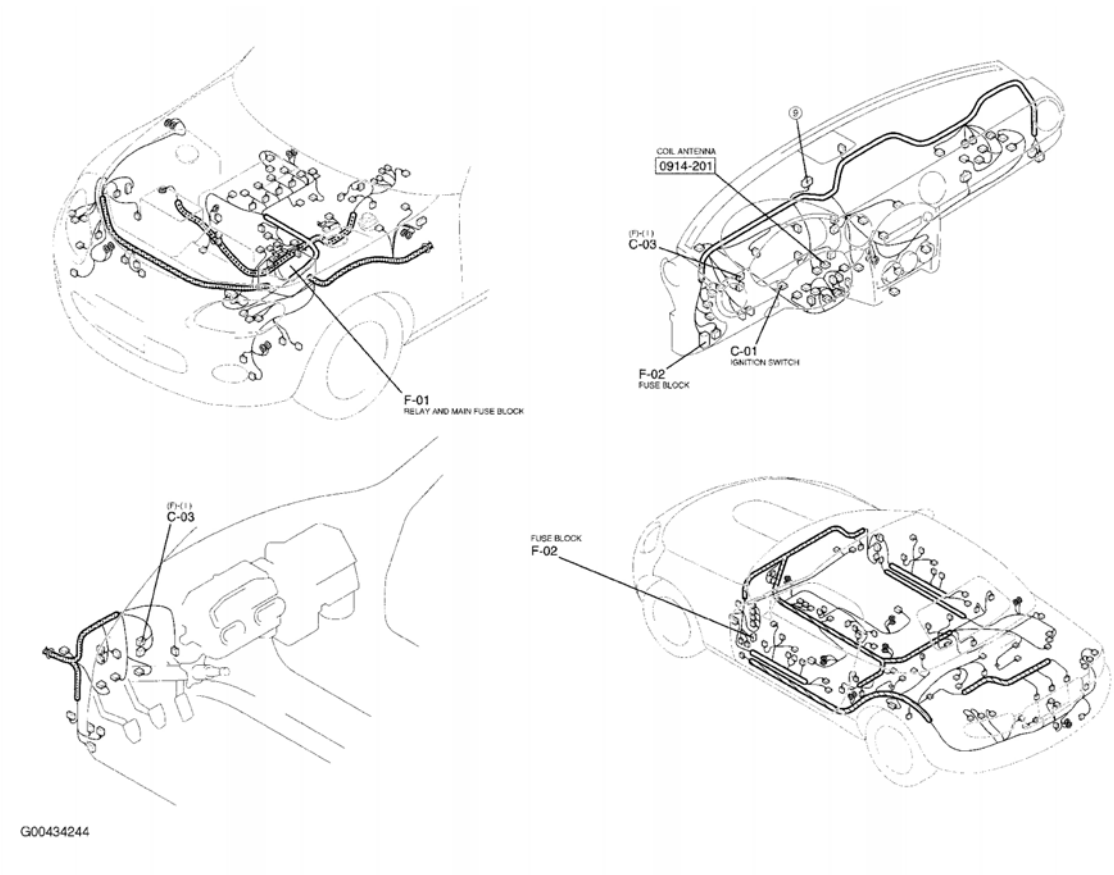


Fig. 37: Dash
Courtesy of MAZDA MOTORS CORP.

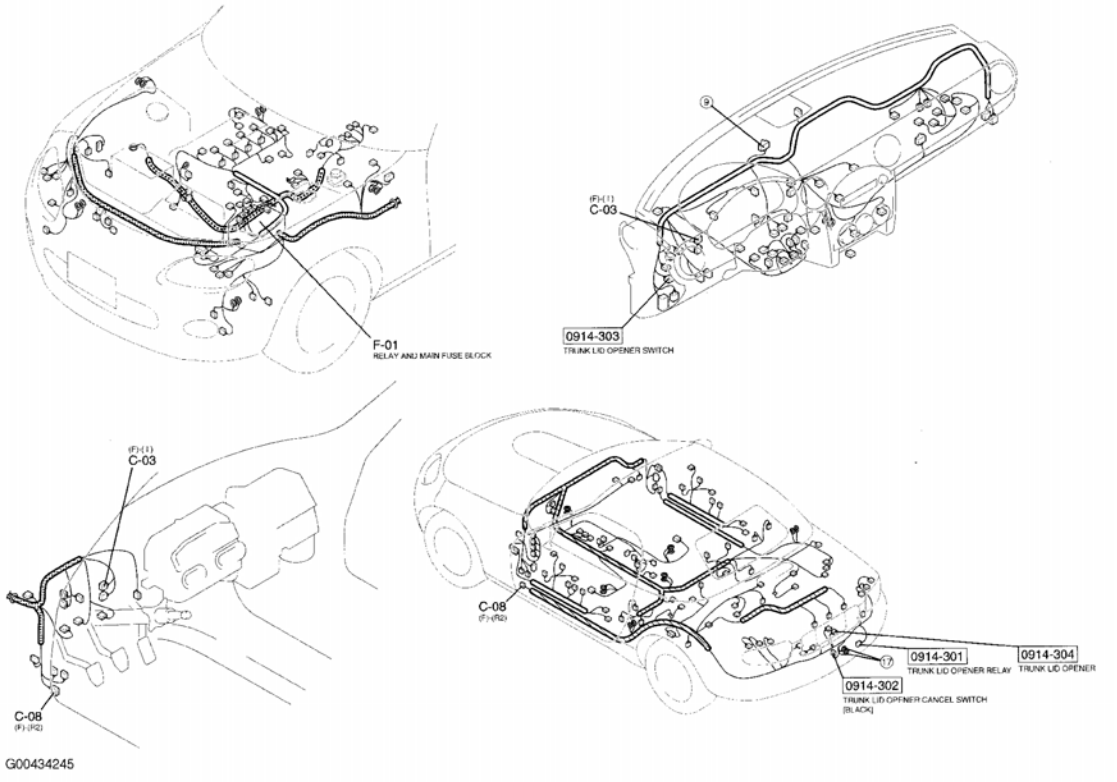


Fig. 38: Rear Of Vehicle
Courtesy of MAZDA MOTORS CORP.

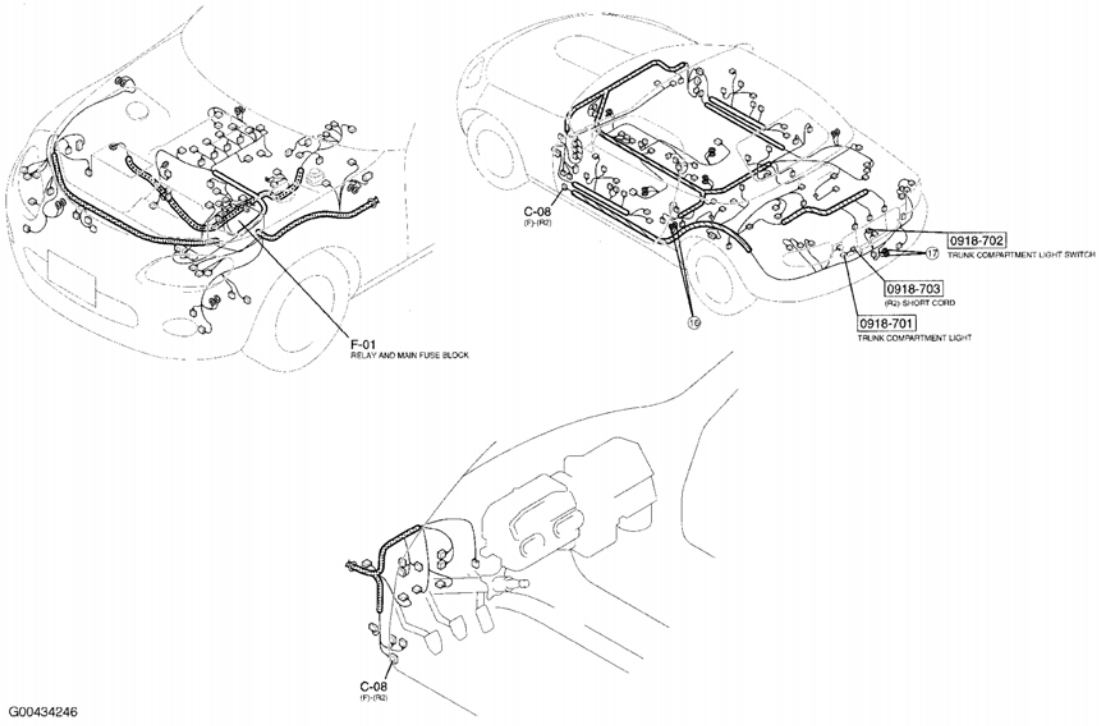


Fig. 39: Rear Of Vehicle
Courtesy of MAZDA MOTORS CORP.

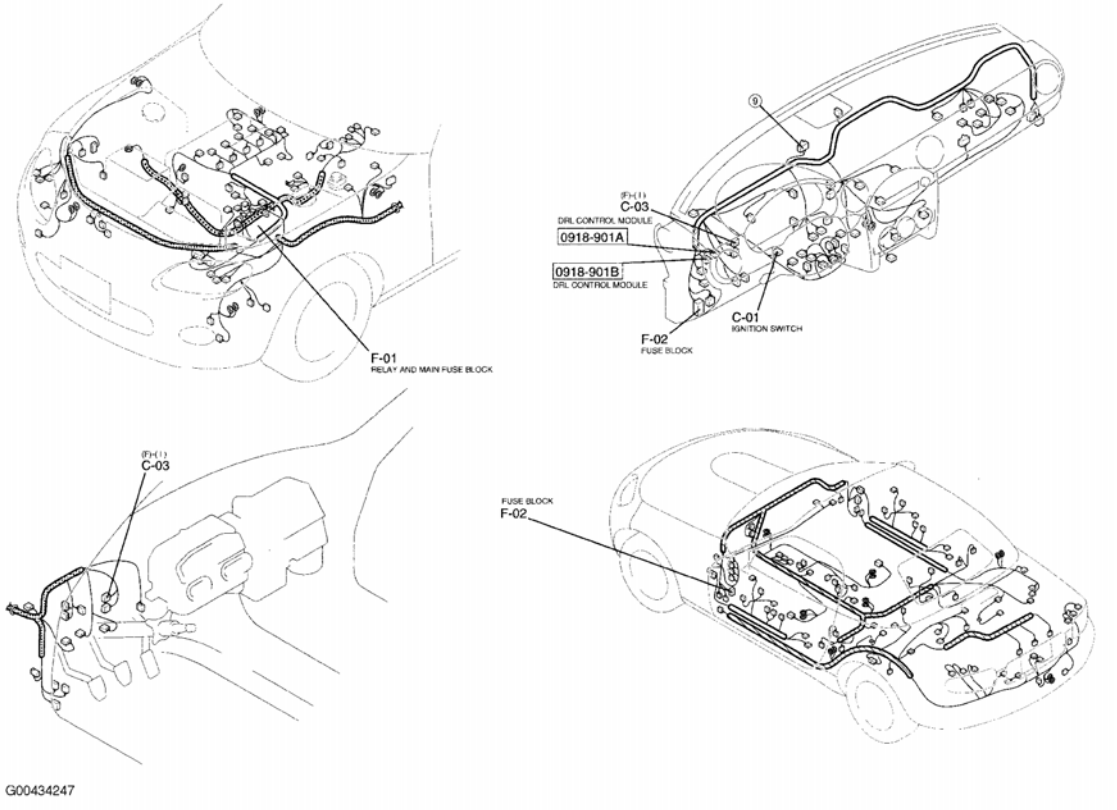


Fig. 40: Dash
Courtesy of MAZDA MOTORS CORP.

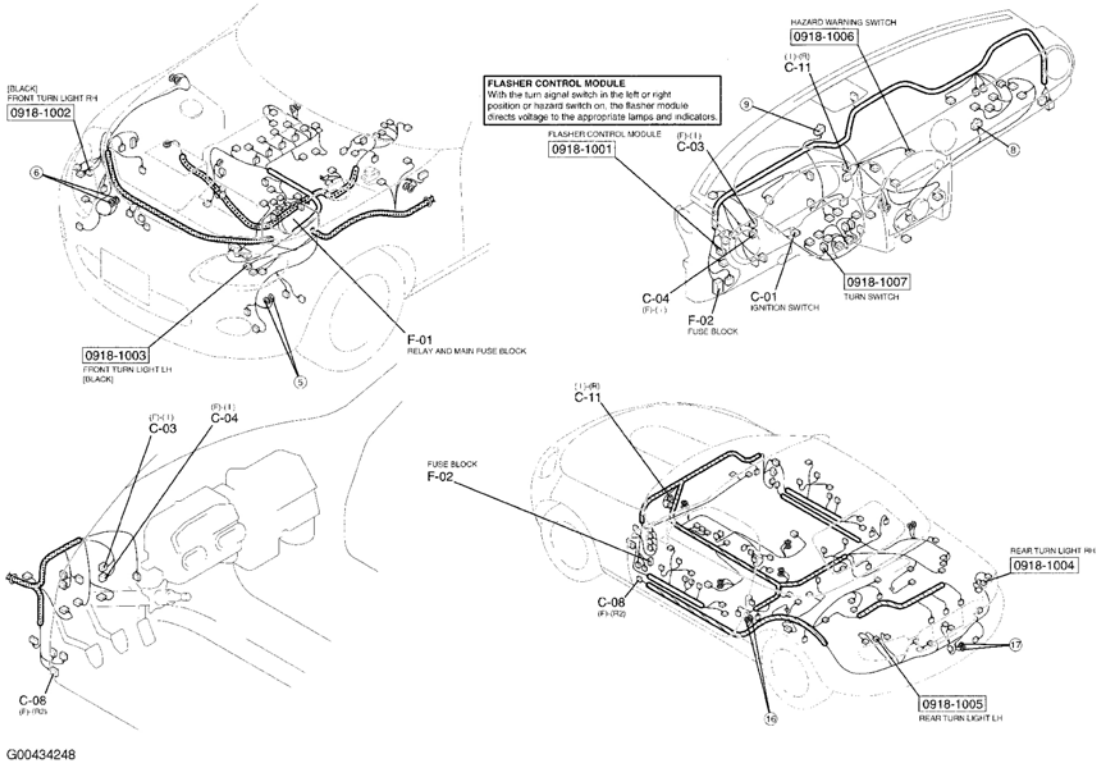


Fig. 41: Dash
Courtesy of MAZDA MOTORS CORP.

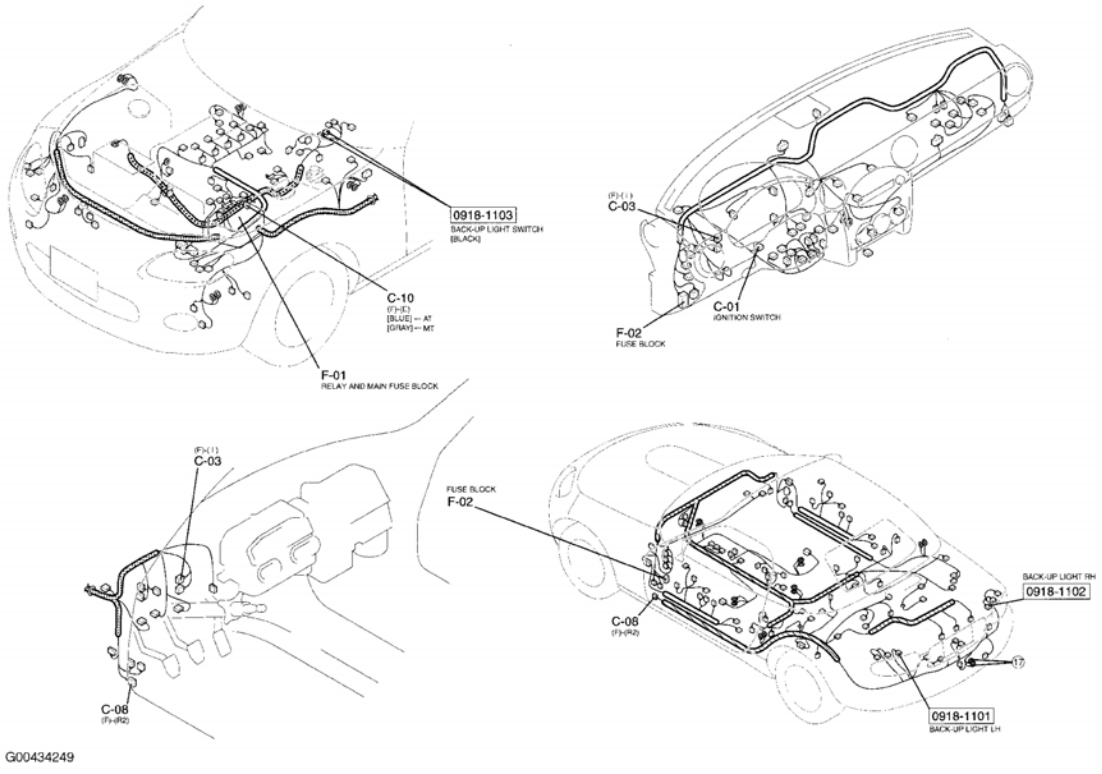


Fig. 42: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

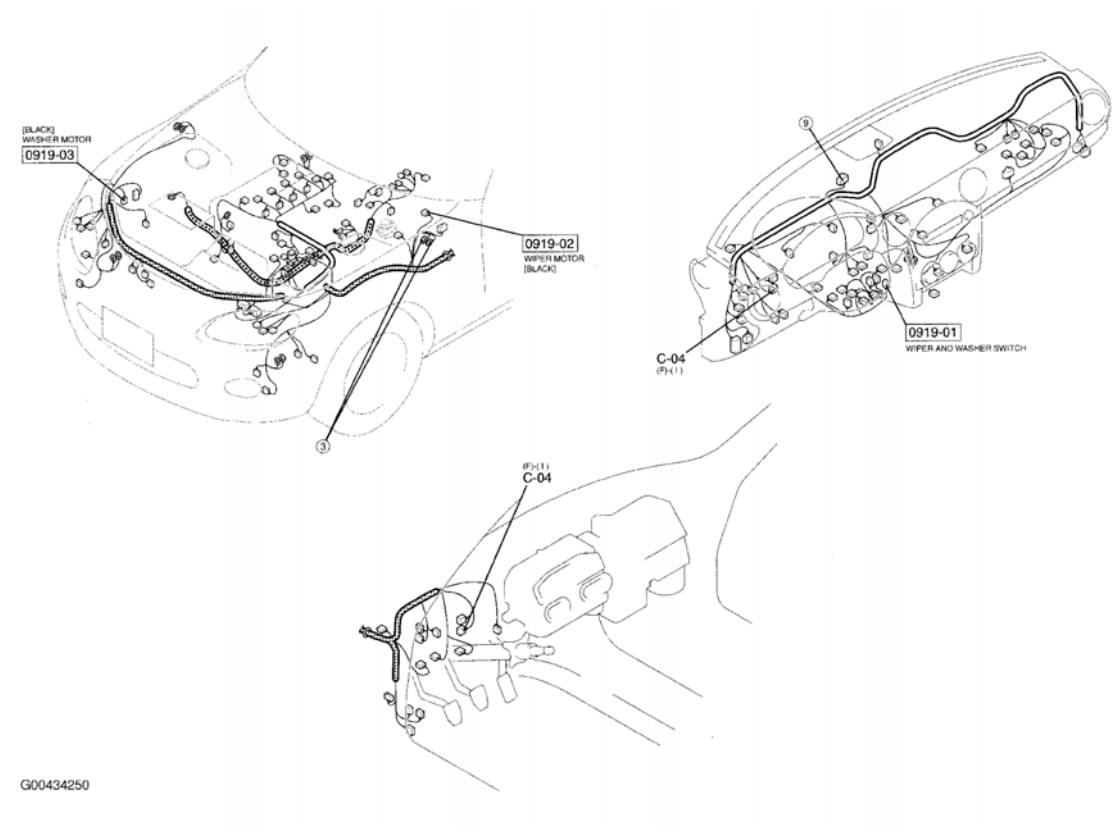


Fig. 43: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

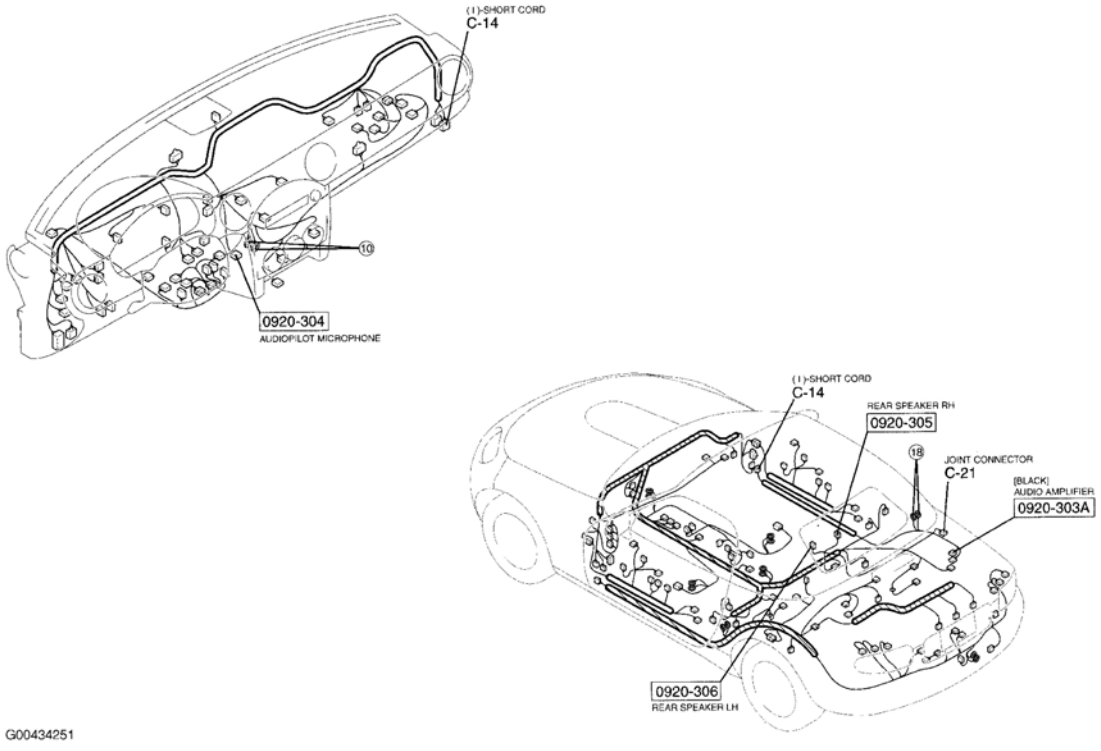


Fig. 44: Dash & Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

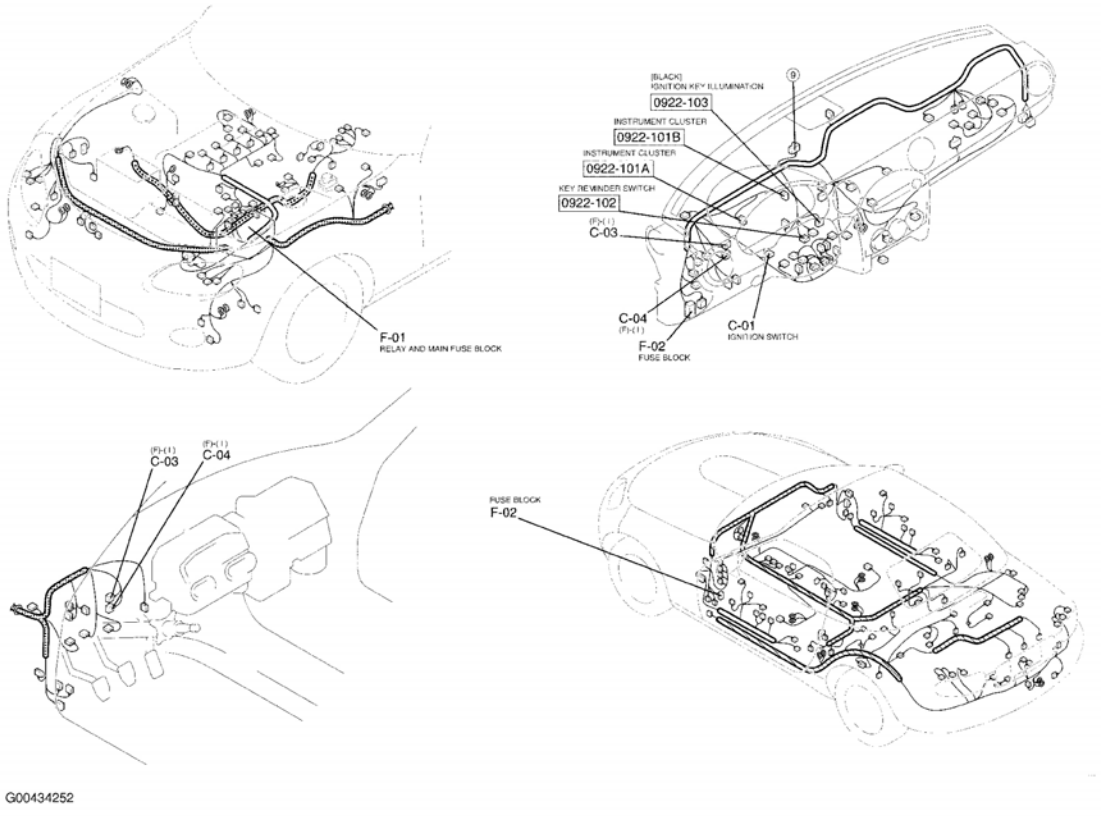


Fig. 45: Dash
Courtesy of MAZDA MOTORS CORP.

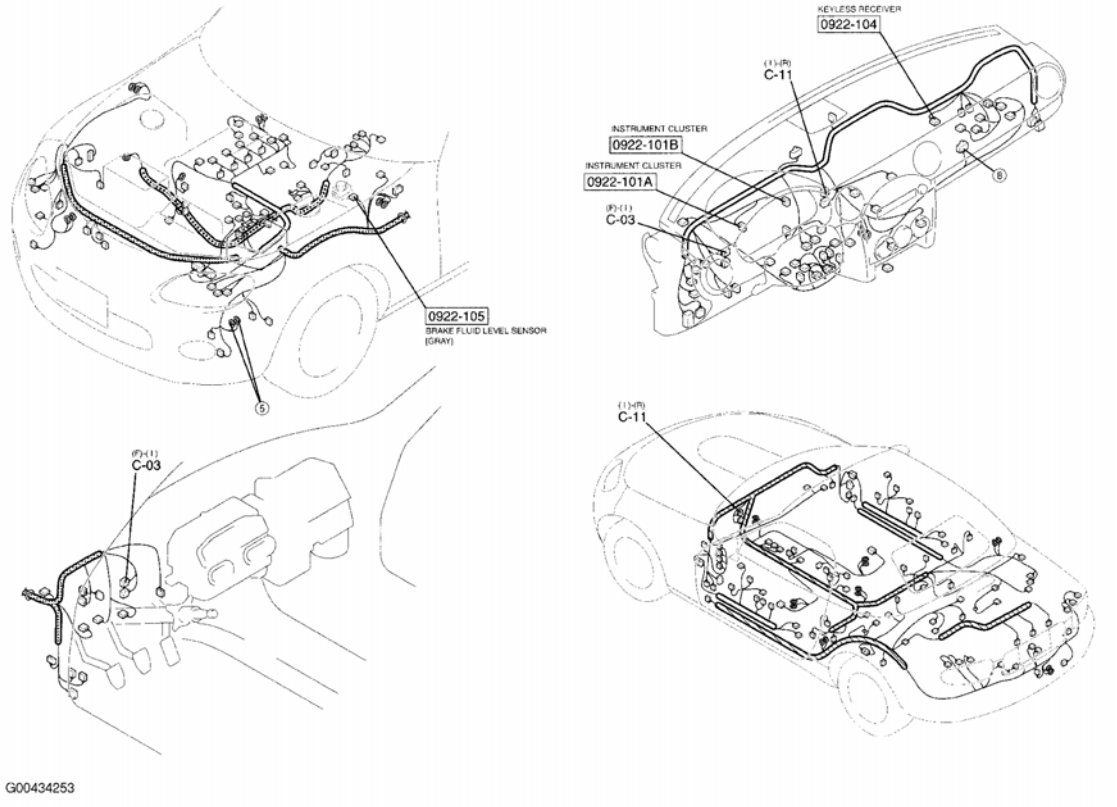


Fig. 46: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

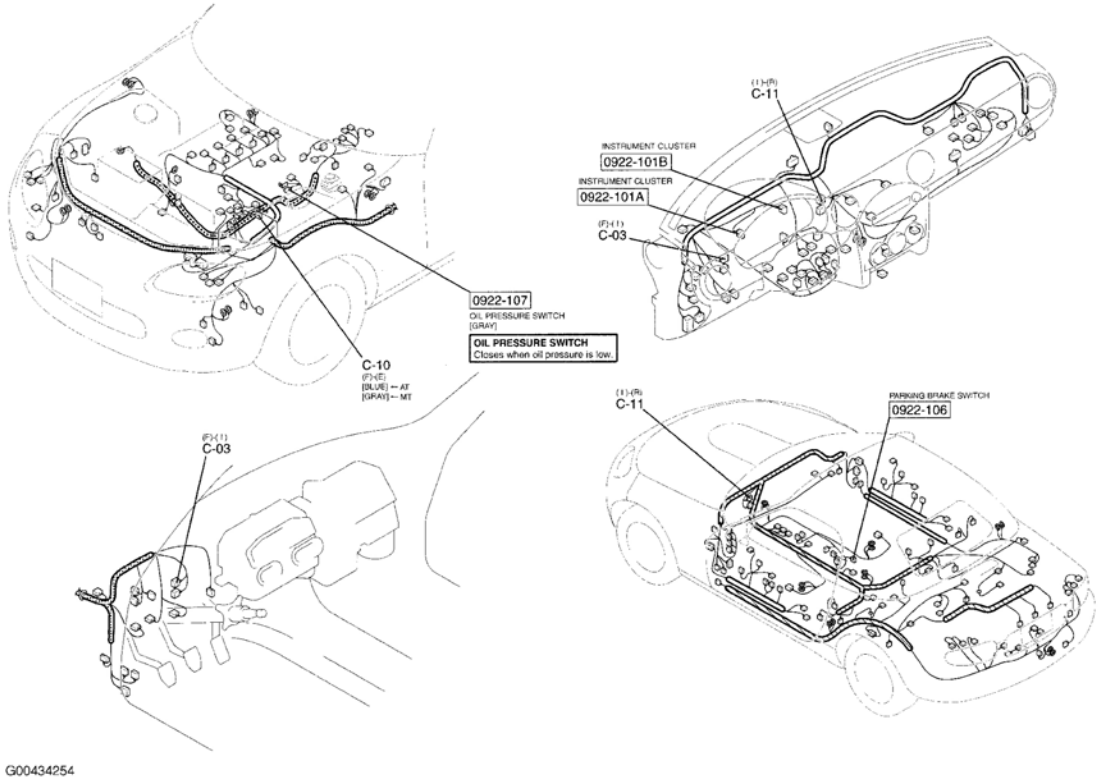


Fig. 47: Engine Compartment & Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

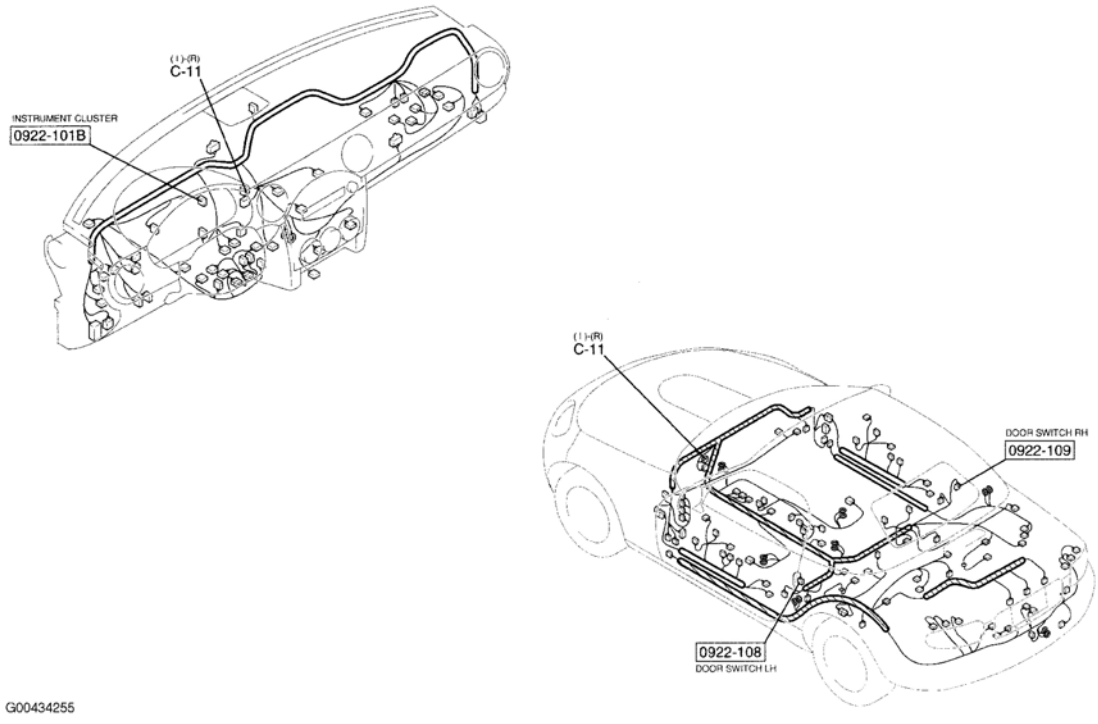


Fig. 48: Vehicle Overview
Courtesy of MAZDA MOTORS CORP.

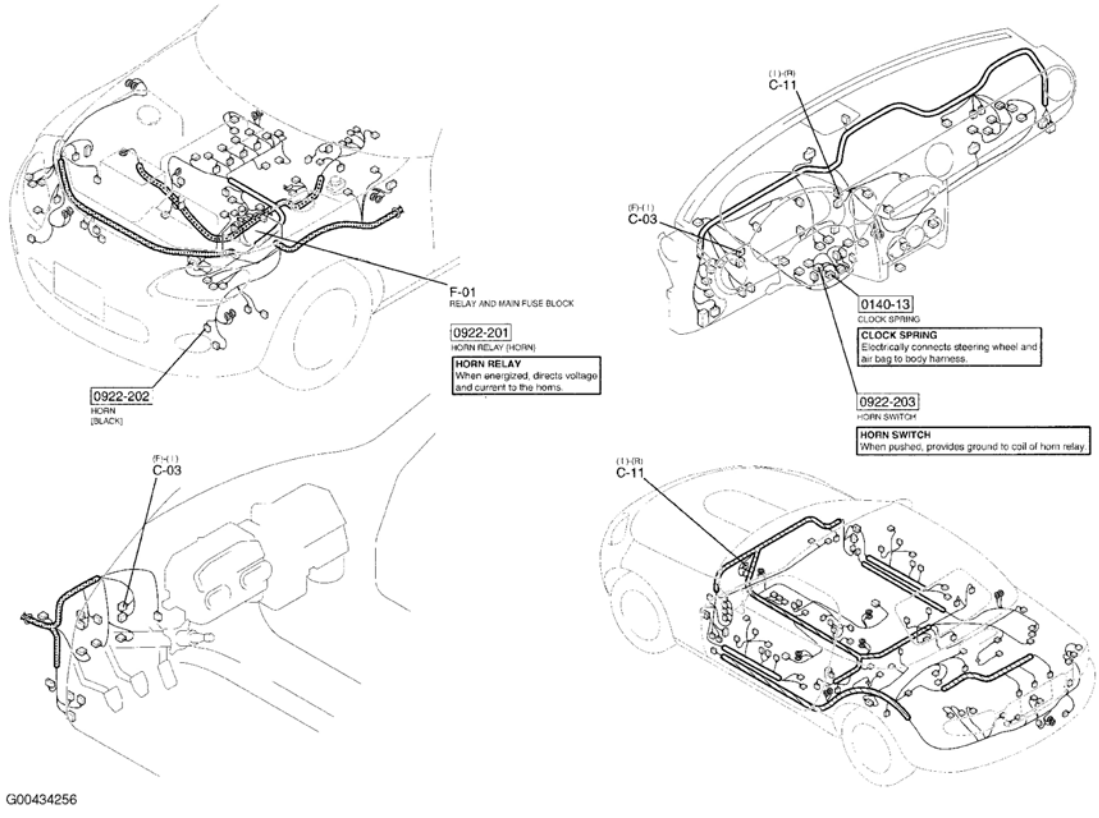


Fig. 49: Engine Compartment
Courtesy of MAZDA MOTORS CORP.

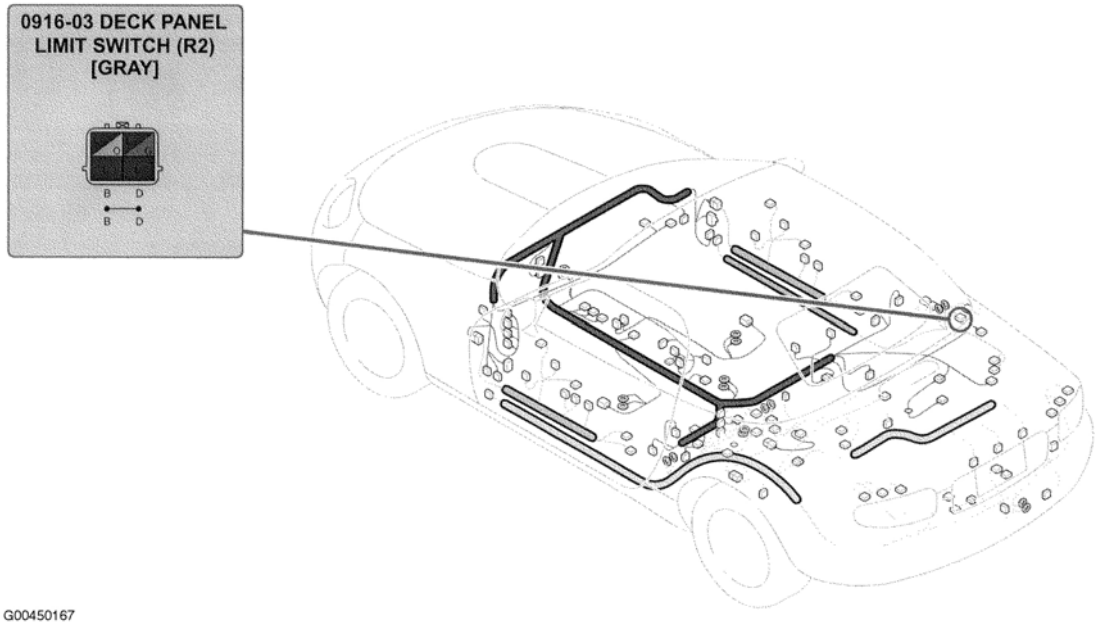


Fig. 50: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

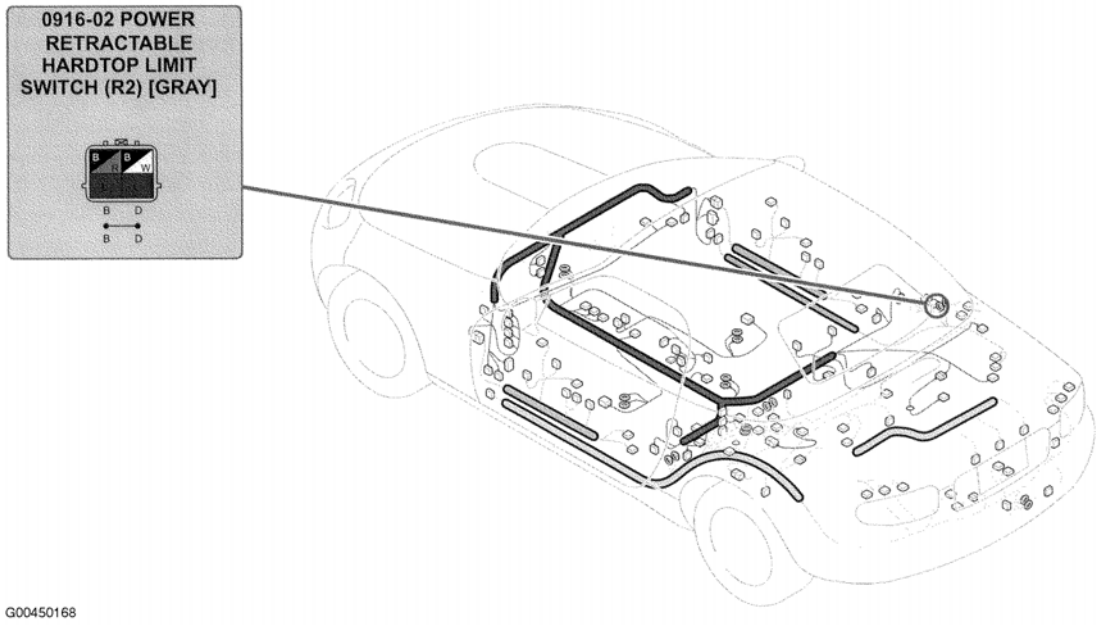


Fig. 51: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

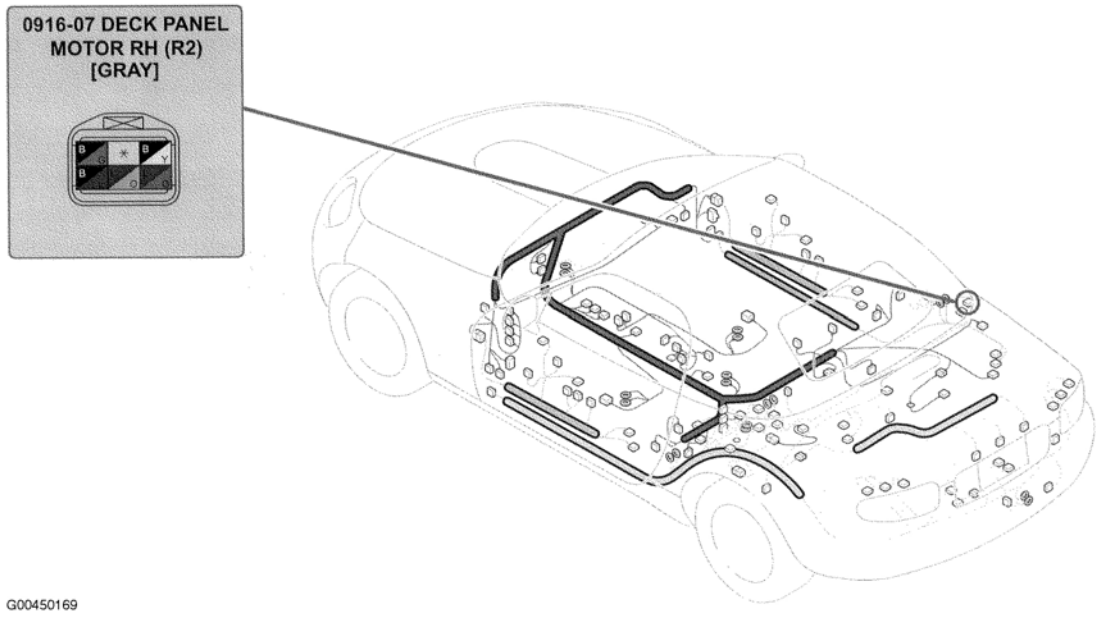


Fig. 52: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

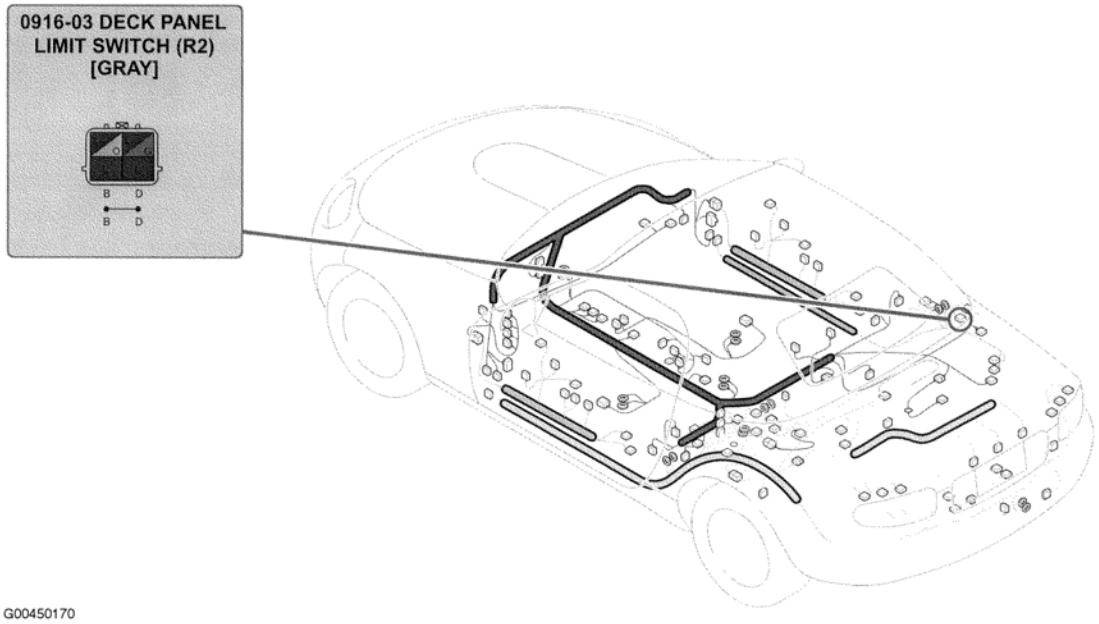


Fig. 53: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

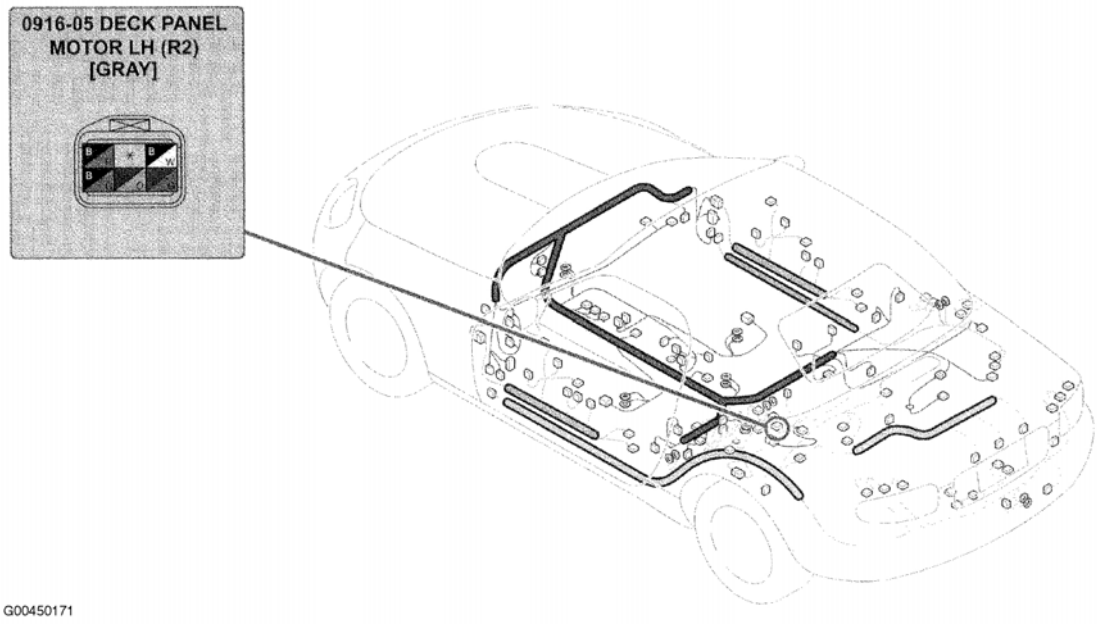


Fig. 54: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

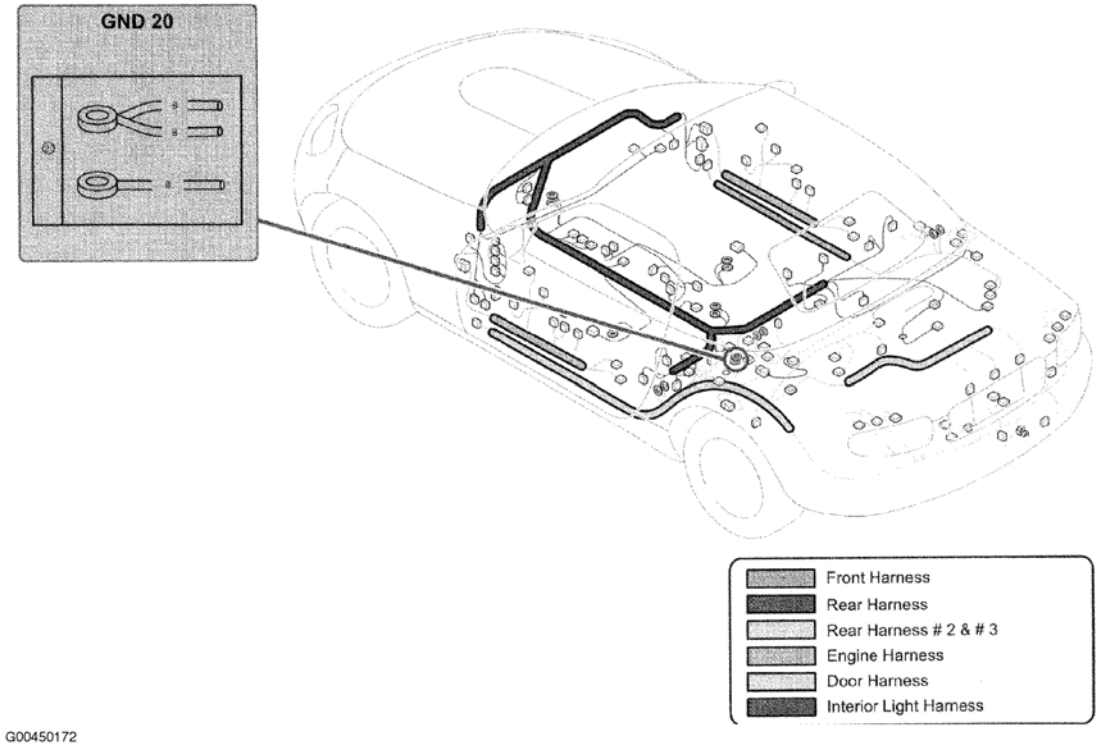


Fig. 55: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

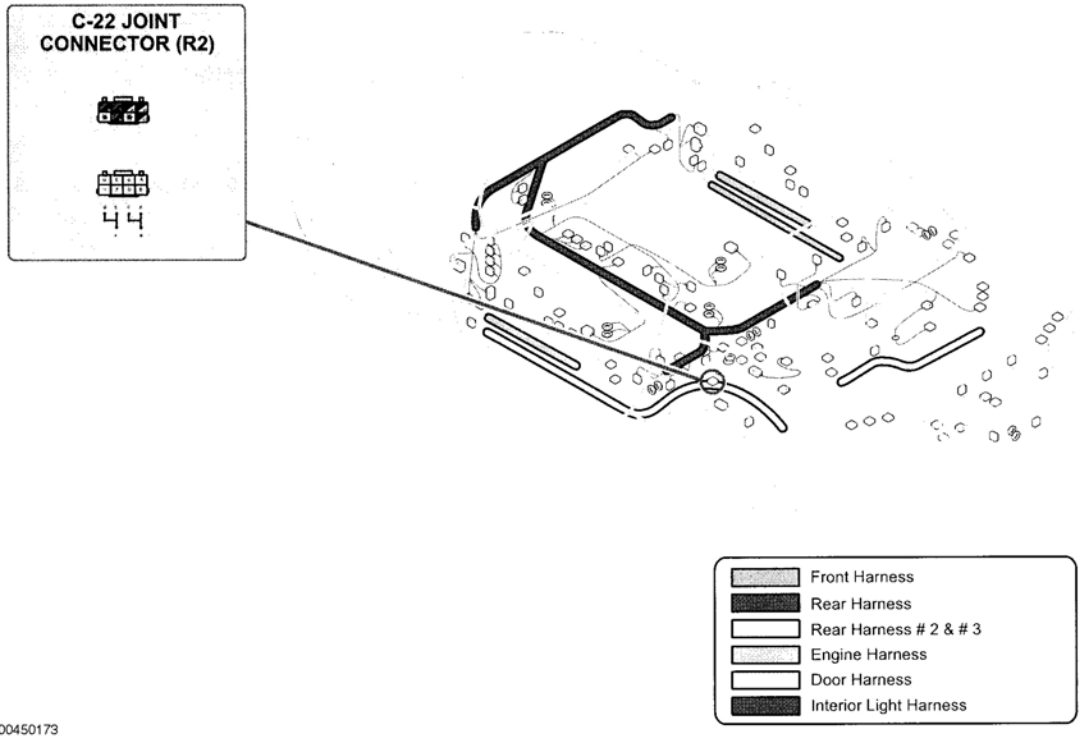


Fig. 56: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

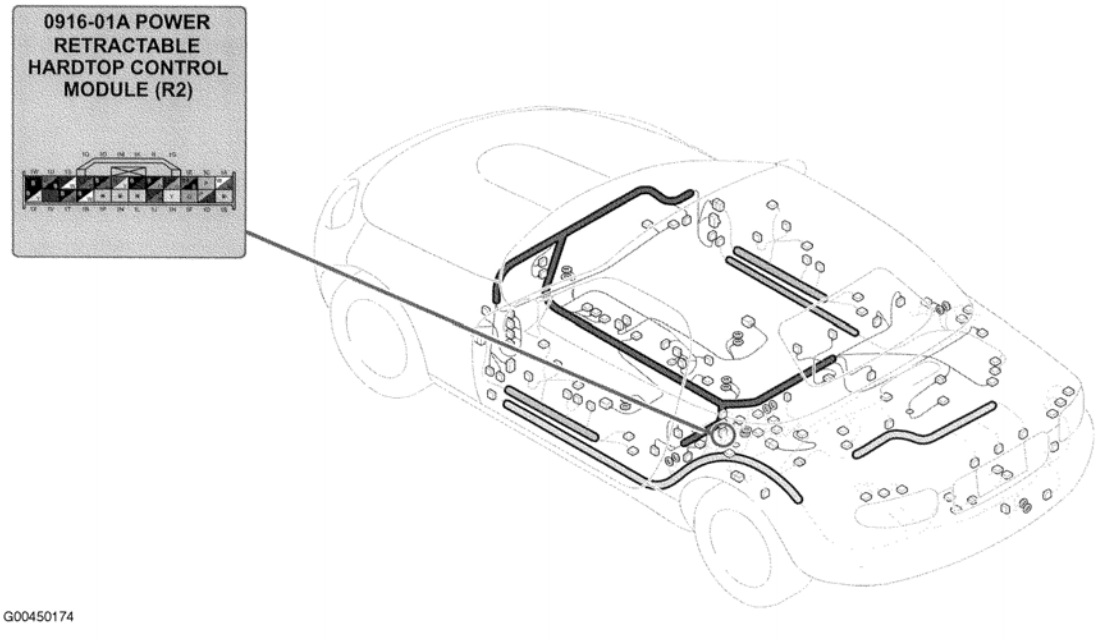


Fig. 57: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

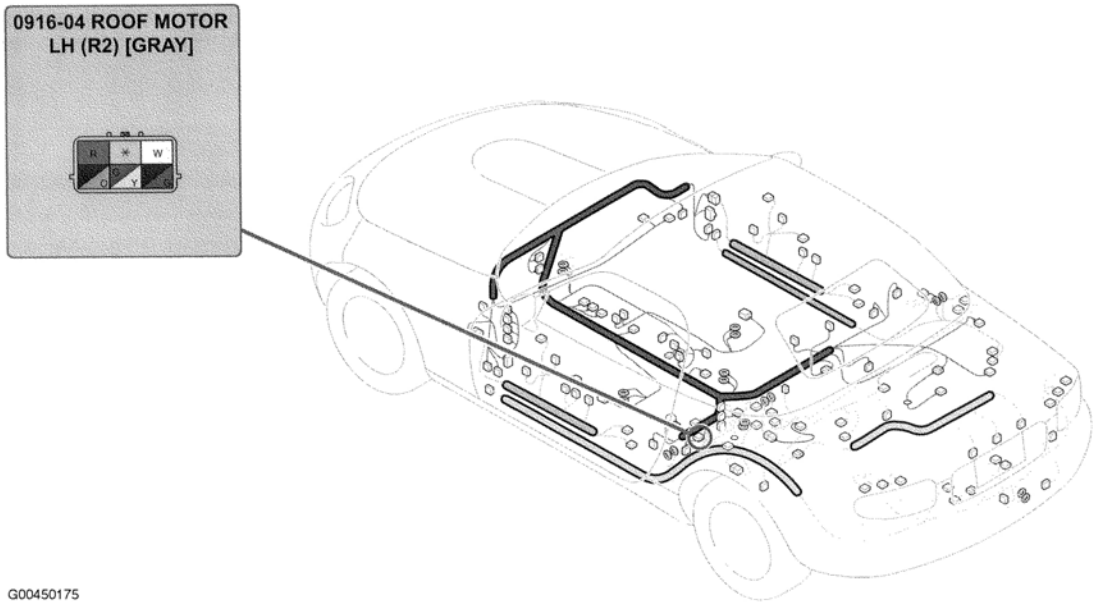


Fig. 58: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

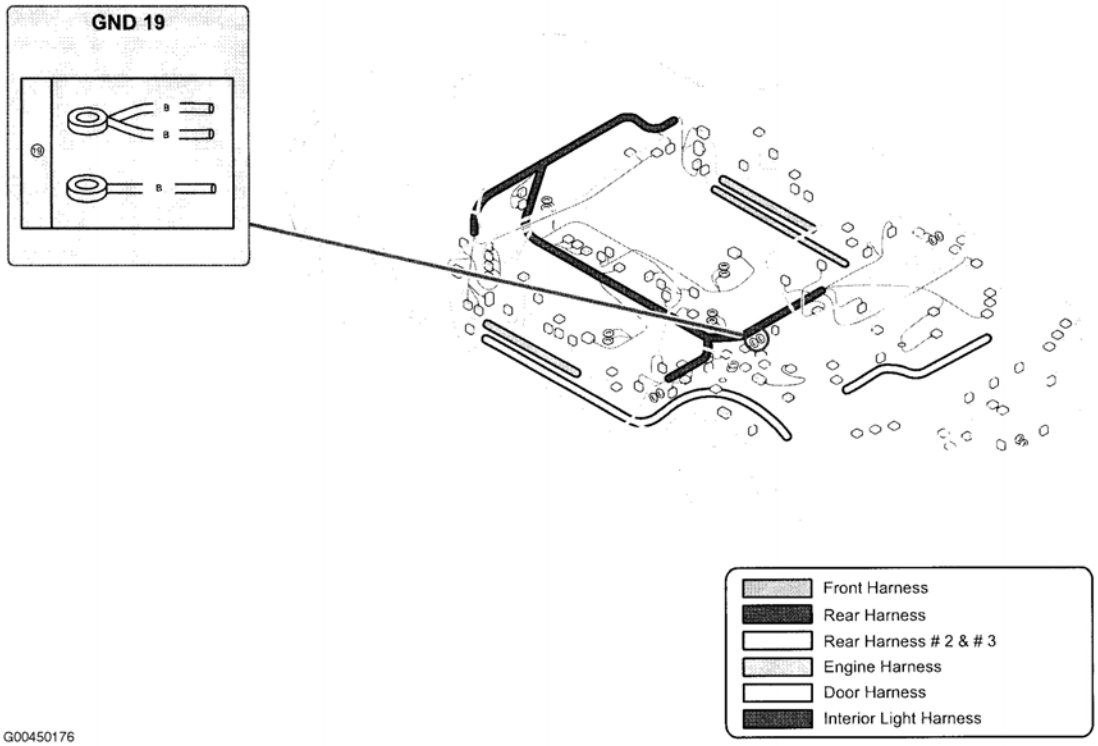


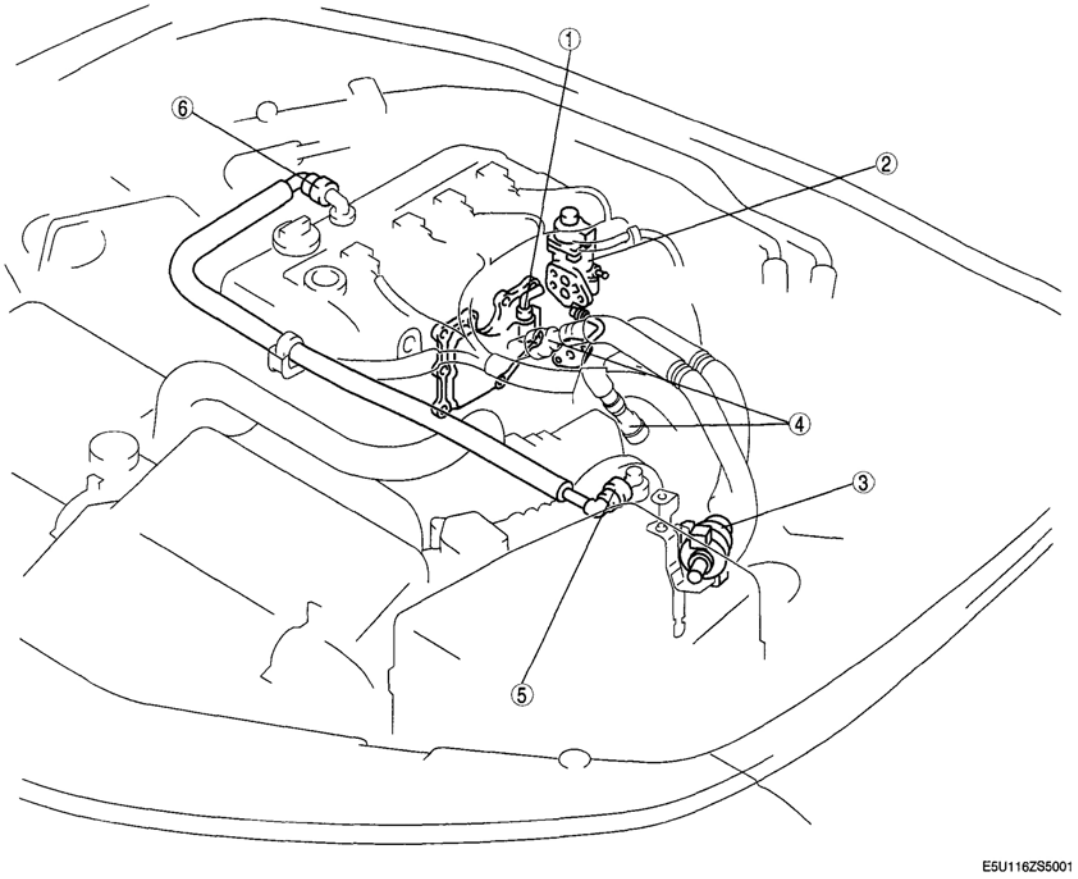
Fig. 59: Retractable Top Storage Compartment
Courtesy of MAZDA MOTORS CORP.

2008 ENGINE PERFORMANCE

Emission System - MX-5 Miata

EMISSION SYSTEM LOCATION INDEX [LF]

ENGINE COMPARTMENT SIDE



1	PCV valve
2	EGR valve
3	Purge solenoid valve
4	Quick release connector (Type A)
5	Quick release connector (Type B)
6	Quick release connector (Type D)

Fig. 1: Identifying Location Of Emission System Engine Compartment Side Components
Courtesy of MAZDA MOTORS CORP.

EXHAUST SYSTEM

1	WU-TWC
2	TWC

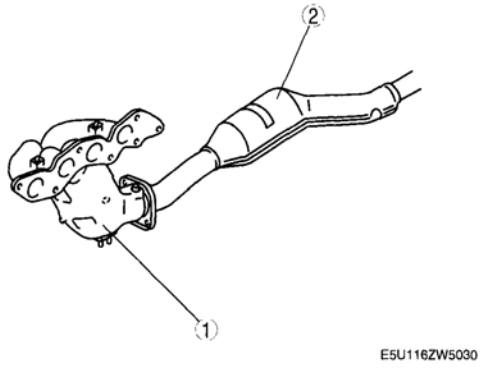
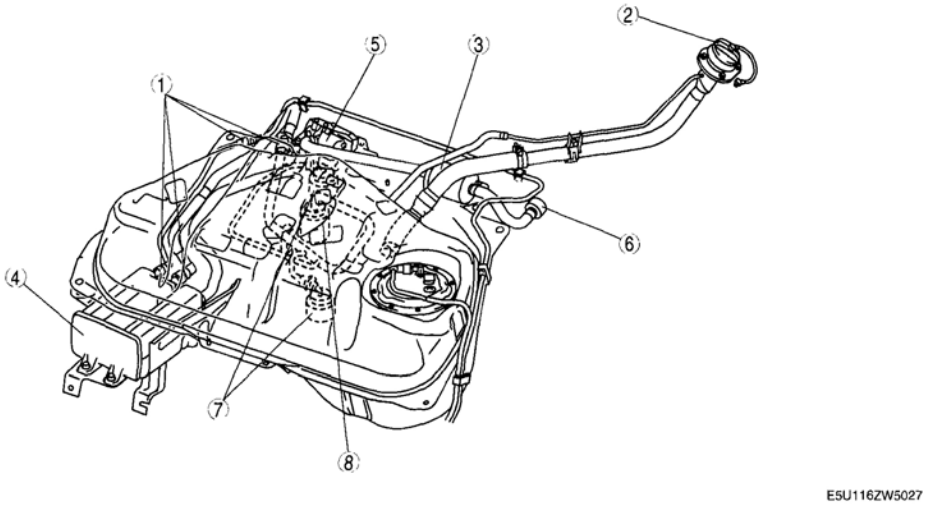


Fig. 2: Identifying Location Of Exhaust System Components
Courtesy of MAZDA MOTORS CORP.

FUEL TANK SIDE



1	Quick release connector (Type C)
2	Fuel-filler cap
3	Air filter
4	Charcoal canister
5	EVAP system leak detection pump
6	Evaporative chamber
7	Rollover valve
8	Fuel shut-off valve

Fig. 3: Identifying Location Of Fuel Tank Side Components
Courtesy of MAZDA MOTORS CORP.

FUEL-FILLER CAP INSPECTION [LF]

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 in **Fig. 4**.

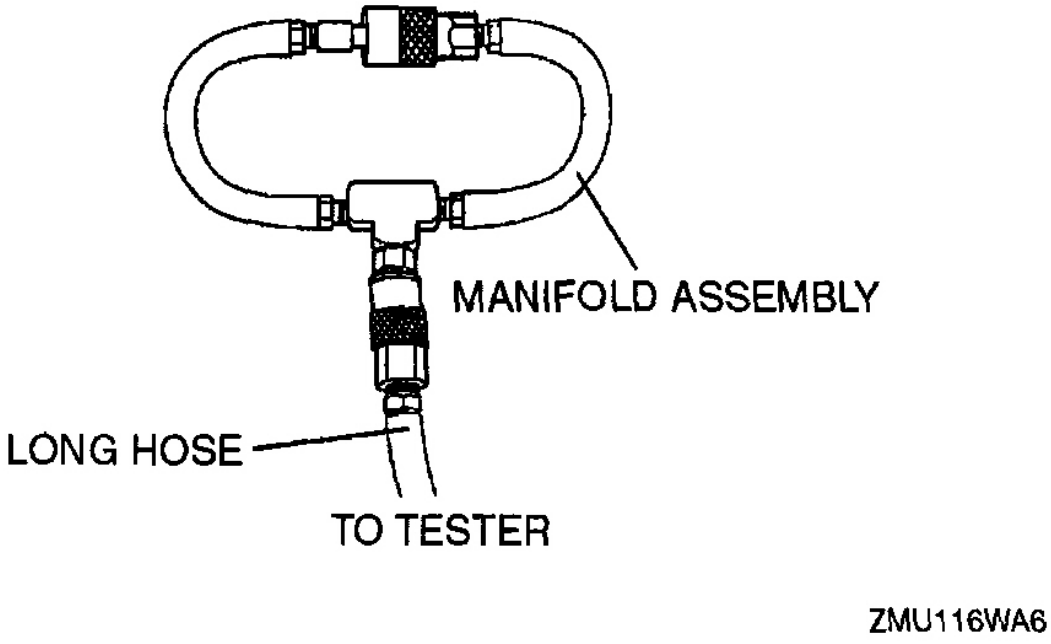


Fig. 4: Connecting Manifold Assembly To Long Hose
Courtesy of MAZDA MOTORS CORP.

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.

9. After the **2-min** countdown (left display) is completed, the right display shows the total pressure loss for that period. A **0.5 in of water** loss is acceptable on the self-test.
    - If the loss is **more than 0.5 in of water** , do one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).
2. Press the RESET switch to set the left display reading to **0.0** .
3. Connect the fuel cap receiver assembly (part of **SST**) to the manifold assembly and fuel-filler cap from the vehicle.
    - If the fuel-filler cap is not a genuine part, replace it.

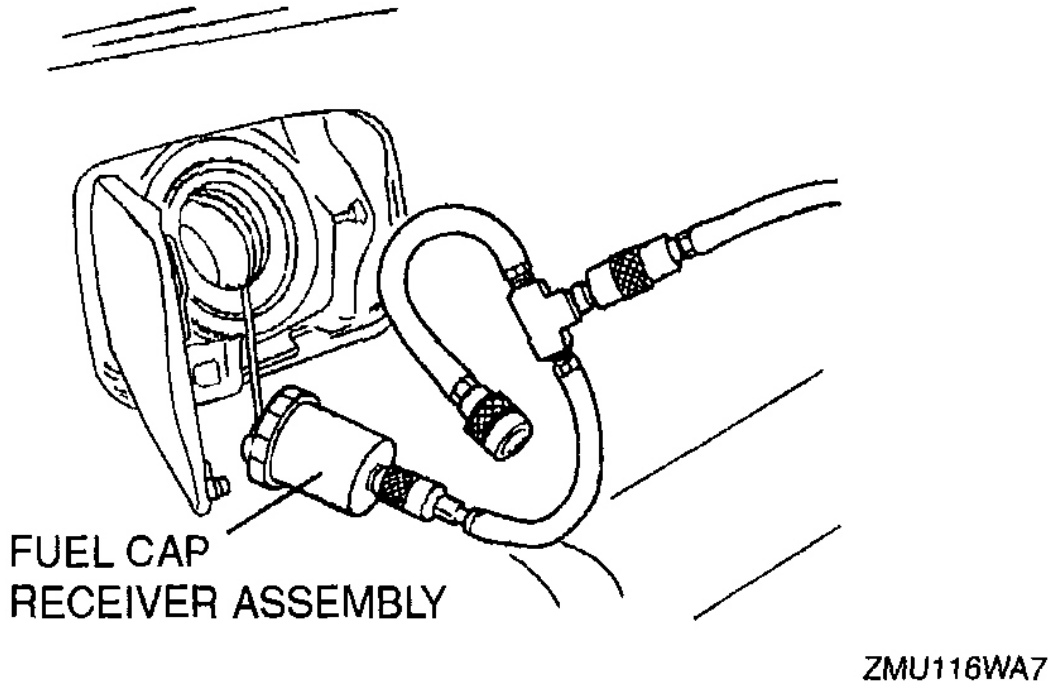


Fig. 5: Connecting Fuel Cap Receiver Assembly
Courtesy of MAZDA MOTORS CORP.

4. Turn the control valve to the FILL position.
5. Wait (**maximum 20s**) until the left display reads **13.9 to 14 in** of water.
    - If the reading is slightly below, adjust it using the regulator knob.
    - If the reading is far below, the fuel-filler cap has leak. Replace it.
6. Turn the control valve to the TEST position and press the START switch.
7. After the **2-min** countdown (left display) is completed, check the test result (the failed/passed light on the tester).
    - If the green light turns on, the fuel-filler cap is OK.

- If the red light turns on, the fuel-filler cap has leakage. Replace it.

8. Close the gas cylinder valve.
9. Turn the control valve to the FILL position.
10. Press the ON/OFF switch to turn off the tester.

EMISSION SYSTEM DIAGRAM [LF]

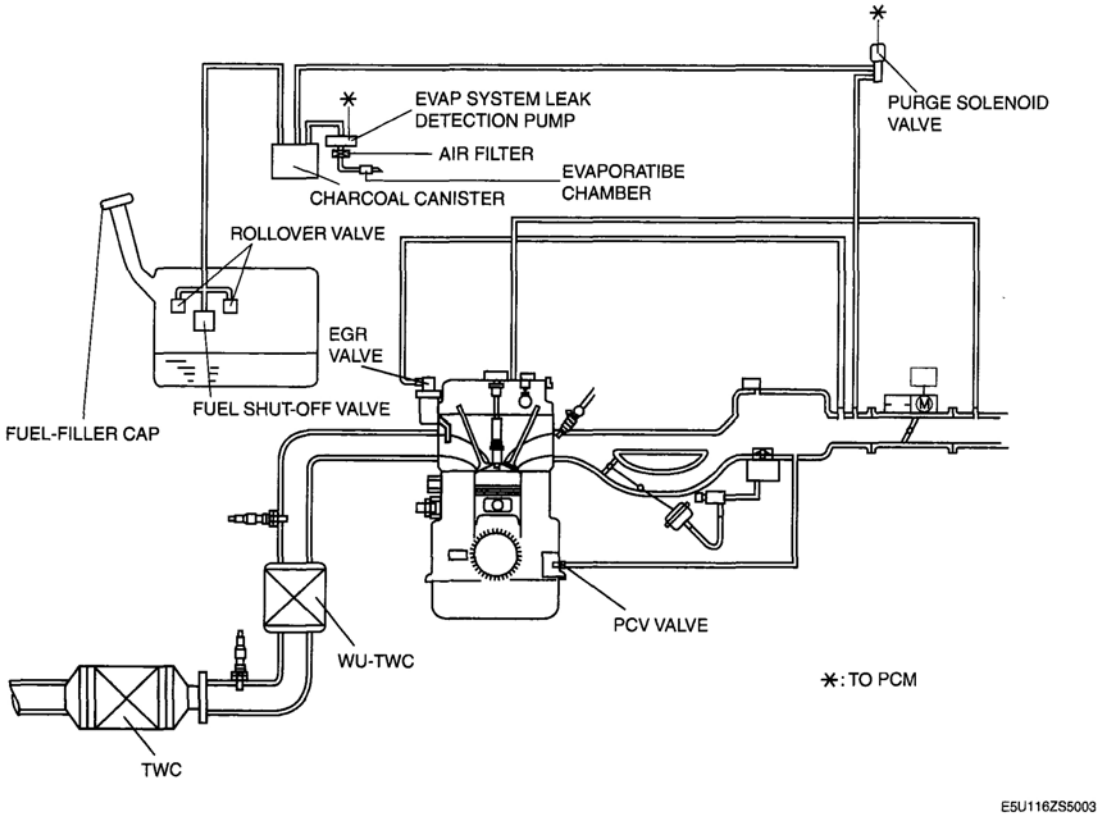


Fig. 6: Identifying Emission System Diagram [LF]
Courtesy of MAZDA MOTORS CORP.

AIR FILTER REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the evaporative hose from the air filter.
4. Cover the evaporative hose with vinyl sheets or the like to prevent them from being scratched or contaminated with foreign material.

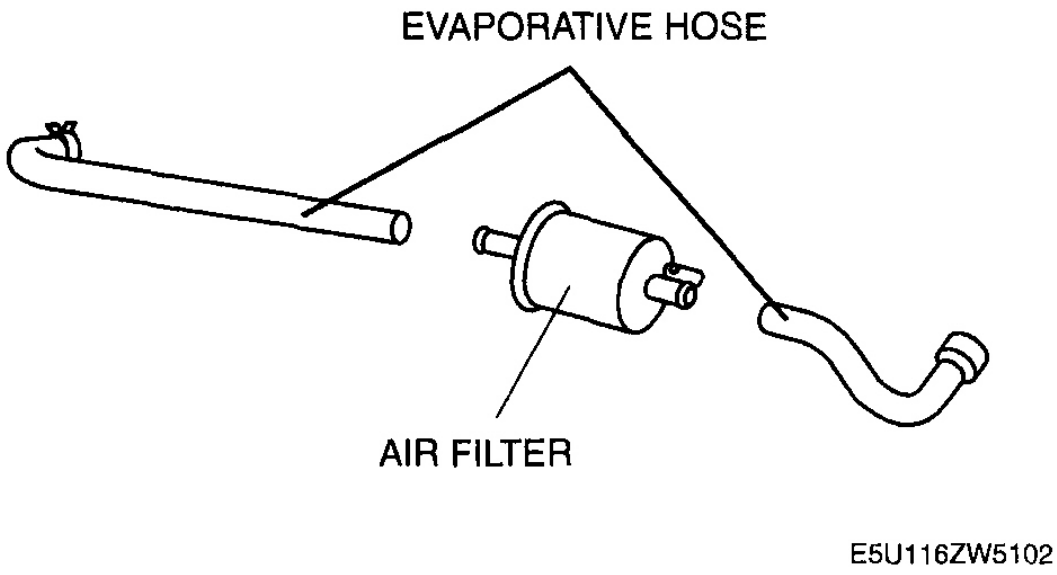


Fig. 7: Identifying Evaporative Hose And Air Filter
Courtesy of MAZDA MOTORS CORP.

5. Remove the air filter.
6. Install in the reverse order of removal.

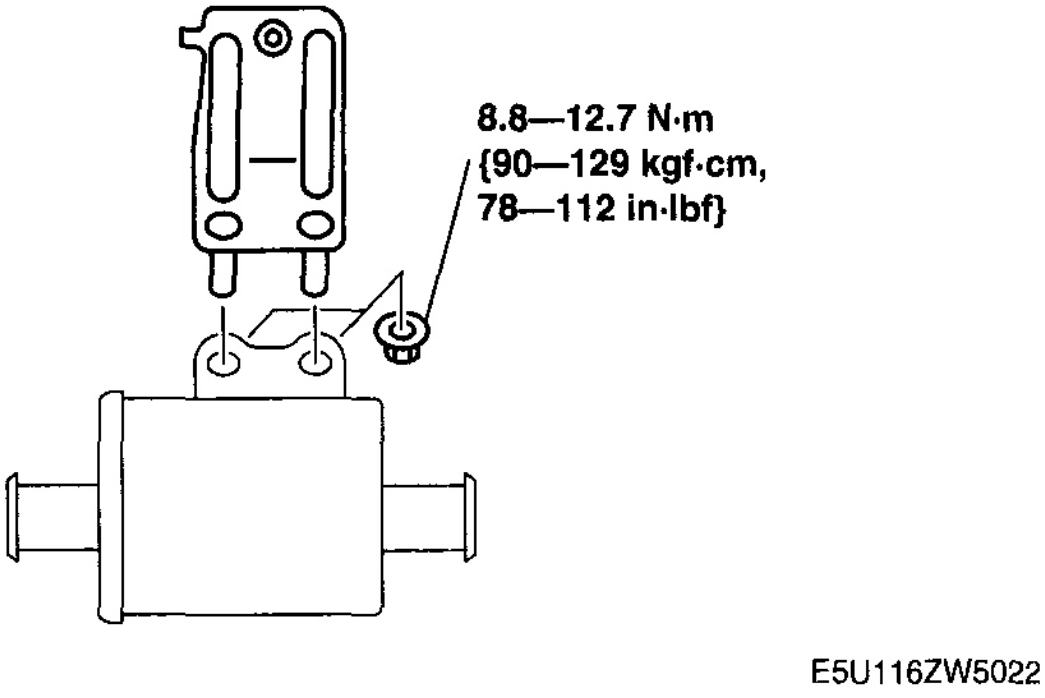


Fig. 8: View Of Air Filter (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

AIR FILTER INSPECTION [LF]

1. Remove the air filter. (See **AIR FILTER REMOVAL/INSTALLATION [LF]**).
2. Blow from port A and verify that there is airflow from port B.
   - If not as specified, replace the air filter.
3. Blow from port B and verify that there is airflow from port A.
   - If not as specified, replace the air filter. (See **AIR FILTER REMOVAL/INSTALLATION [LF]**).

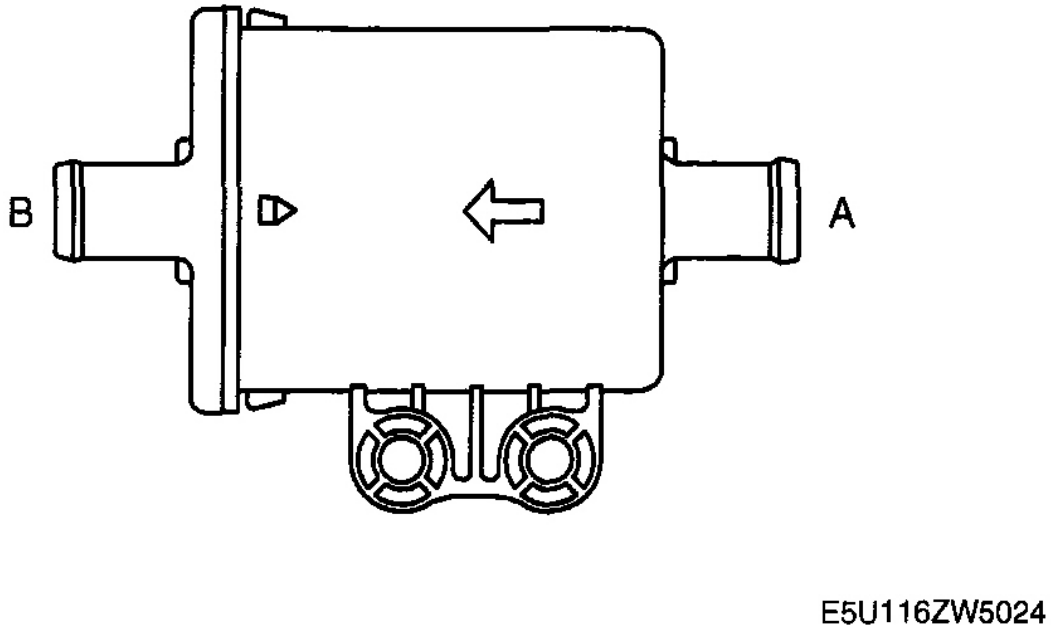


Fig. 9: Identifying Air Filter
Courtesy of MAZDA MOTORS CORP.

CHARCOAL CANISTER REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove in the order indicated in **Fig. 10** .
4. Install in the reverse order of removal.

1	Quick connector (Type C)
2	Evaporative hose
3	Charcoal canister bracket
4	Charcoal canister

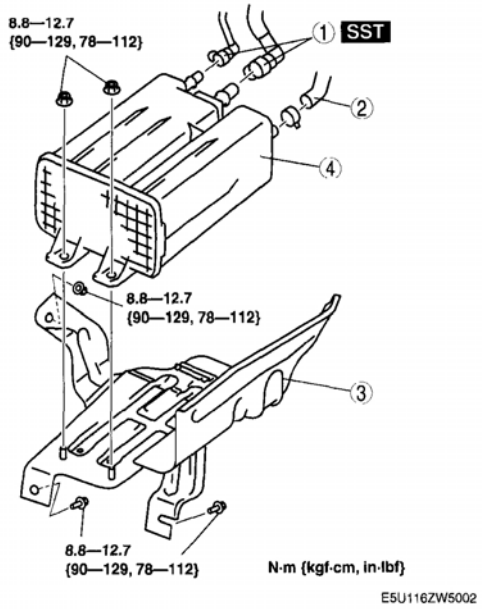


Fig. 10: Identifying Charcoal Canister Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

EVAPORATIVE HOSE INSTALLATION NOTE

1. Fit the evaporative hose onto the respective fittings, and install clamps as shown in **Fig. 11**.
    1. Insert the evaporative hose securely to the nipple.
    2. Inspect the evaporative hose for damage and deformation.

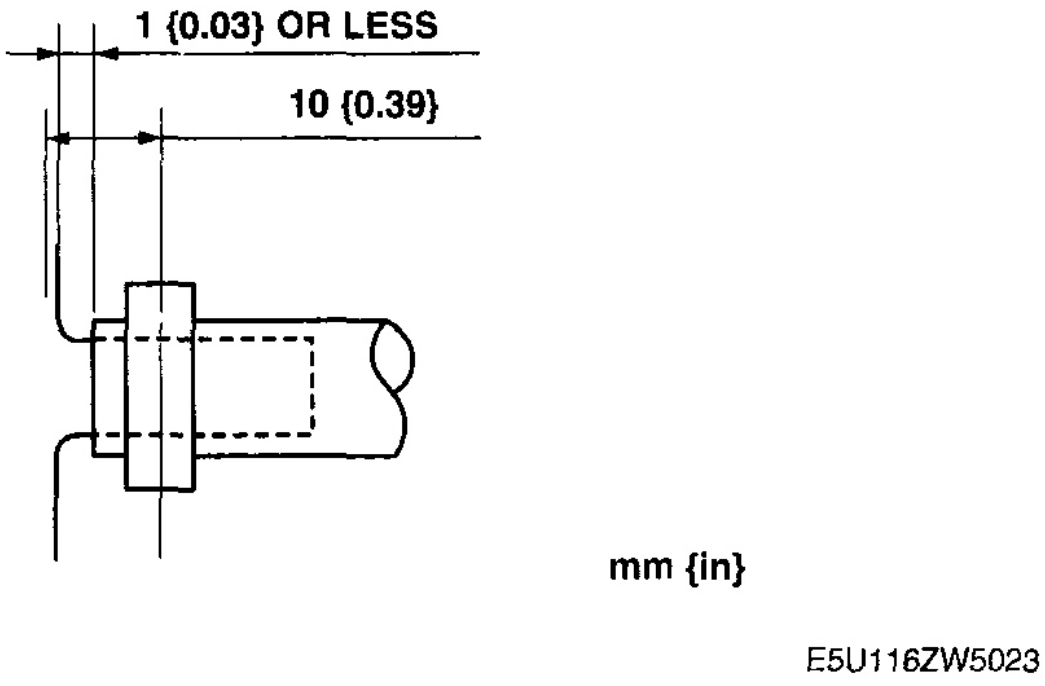


Fig. 11: View Of Evaporative Hose On Nipple
Courtesy of MAZDA MOTORS CORP.

CHARCOAL CANISTER INSPECTION [LF]

1. Remove the charcoal canister. (See **CHARCOAL CANISTER REMOVAL/INSTALLATION [LF]**).
2. Plug the EVAP leak detection pump side and purge solenoid valve side of the charcoal canister.
3. Inspect for air leakage when blowing air by mouth from the fuel tank side.
    - If air leaks, replace the charcoal canister. (See **CHARCOAL CANISTER REMOVAL/INSTALLATION [LF]**).

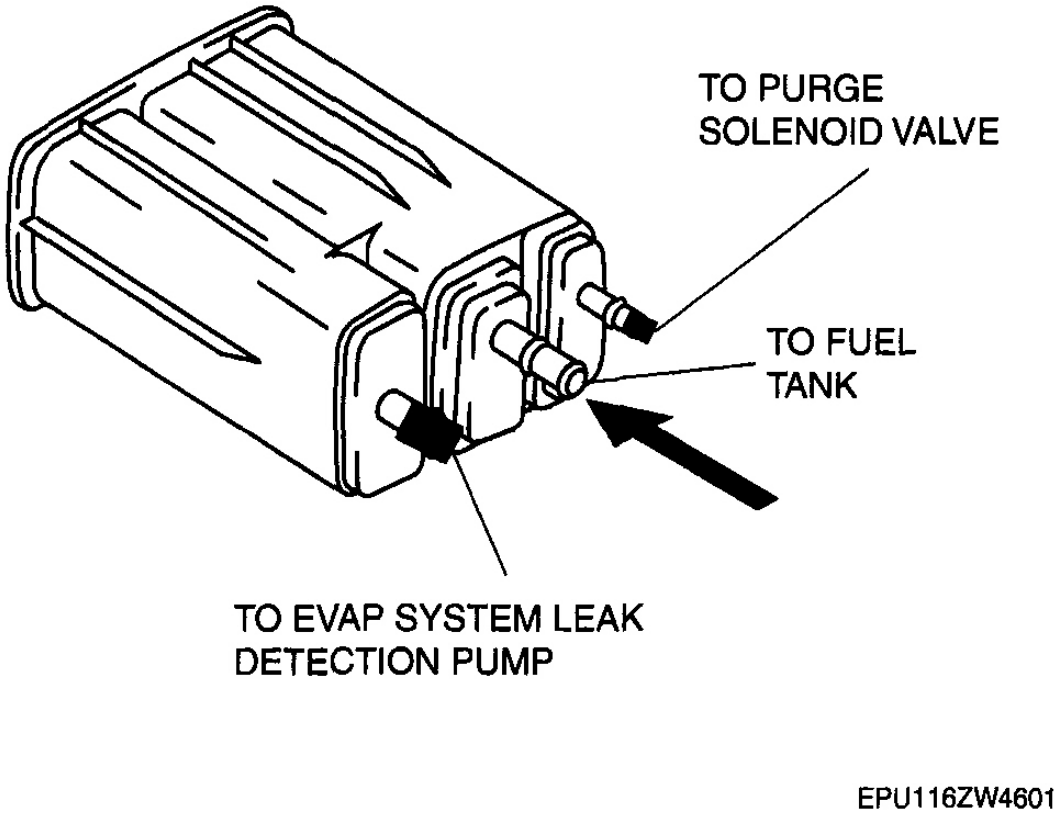


Fig. 12: Identifying Charcoal Canister
Courtesy of MAZDA MOTORS CORP.

EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the EVAP system leak detection pump connector.
4. Disconnect the evaporative hose from the EVAP system leak detection pump.
5. Cover the evaporative hose with vinyl sheets or the like to prevent them from being scratched or contaminated with foreign material.
6. Remove the EVAP system leak detection pump with the bracket.

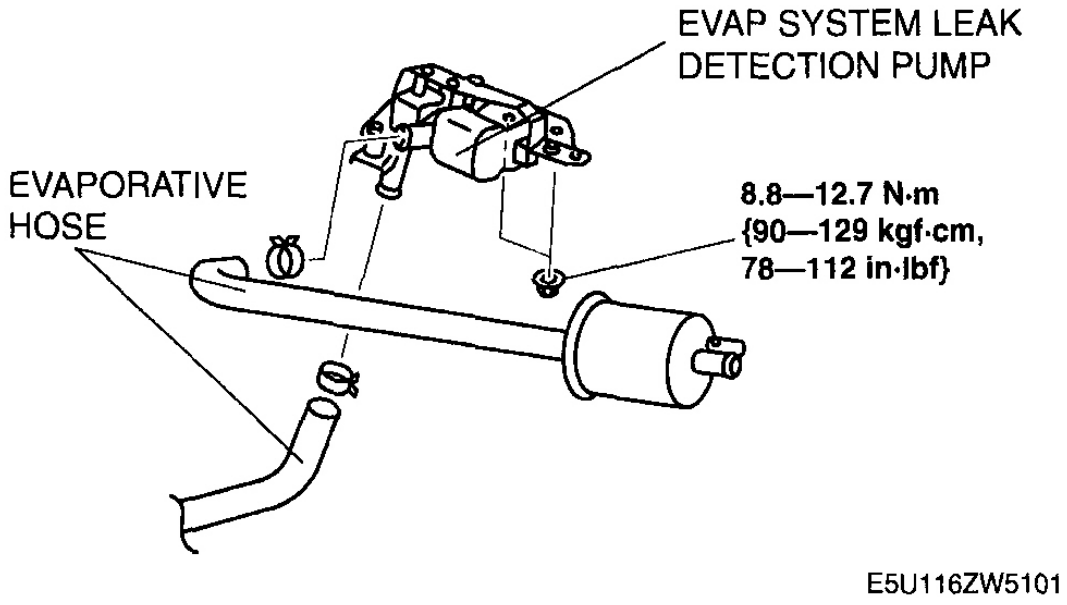


Fig. 13: Identifying Evaporative Emission System Leak Detection Pump & Evaporative Hose (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

7. Remove the bracket from the EVAP system leak detection pump.

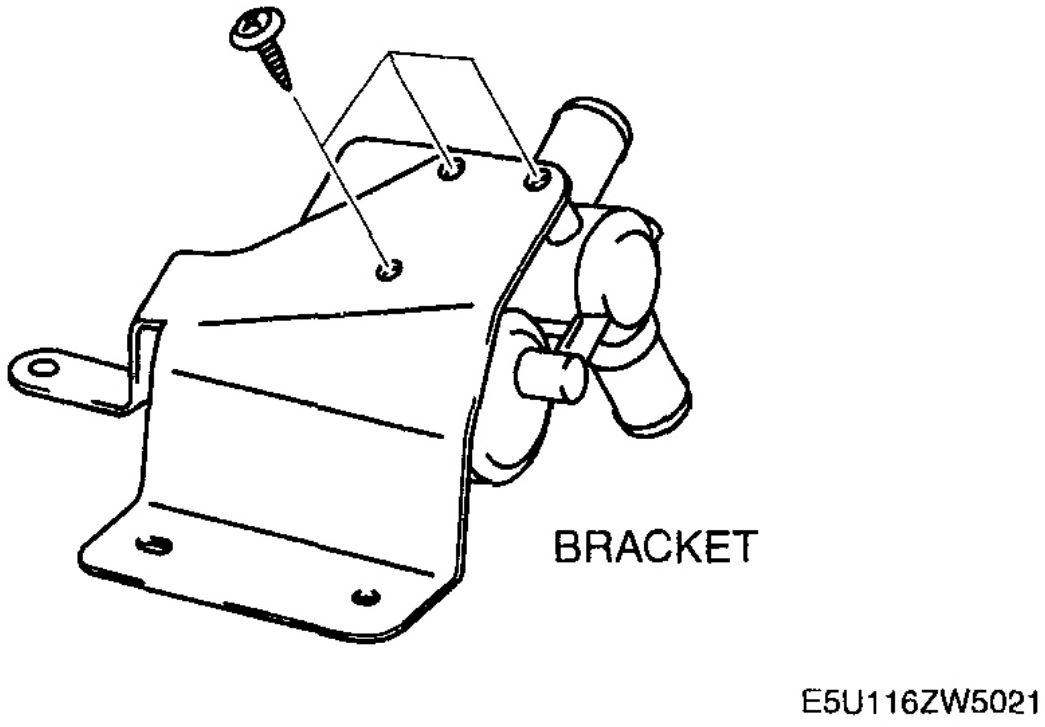


Fig. 14: View Of Bracket & EVAP System Leak Detection Pump
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.

EVAPORATIVE HOSE INSTALLATION NOTE

1. Fit the evaporative hose onto the respective fittings, and install clamps as shown in **Fig. 15**.
    1. Insert the evaporative hose securely to the nipple.
    2. Inspect the evaporative hose for damage and deformation.

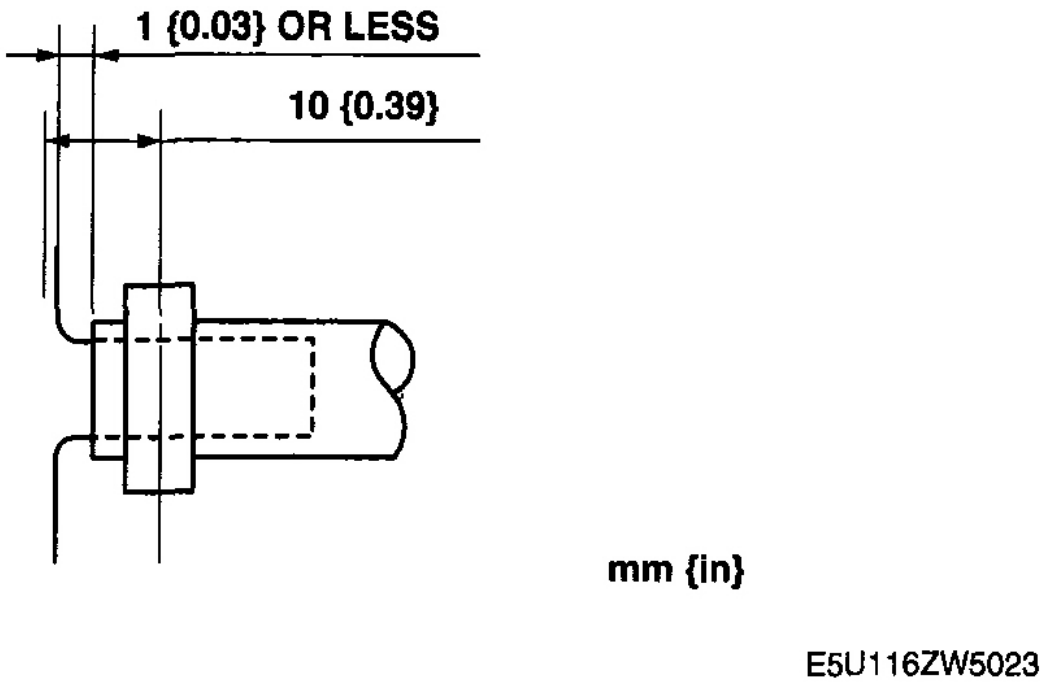


Fig. 15: Inserting Evaporative Hose Securely To Nipple
Courtesy of MAZDA MOTORS CORP.

EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION [LF]

NOTE:
- **Perform the following procedure only when directed.**

AIRFLOW INSPECTION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the EVAP system leak detection pump. (See **EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION [LF]** .).
4. Blow air into port A and verify that there is airflow from port B.
   - If not as specified, replace the EVAP system leak detection pump. (See **EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION [LF]**).
5. Blow air into port B and verify that there is airflow from port A.
   - If not as specified, replace the EVAP system leak detection pump. (See **EVAPORATIVE**

EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION [LF]).

- If as specified, perform the following "**RESISTANCE INSPECTION**".

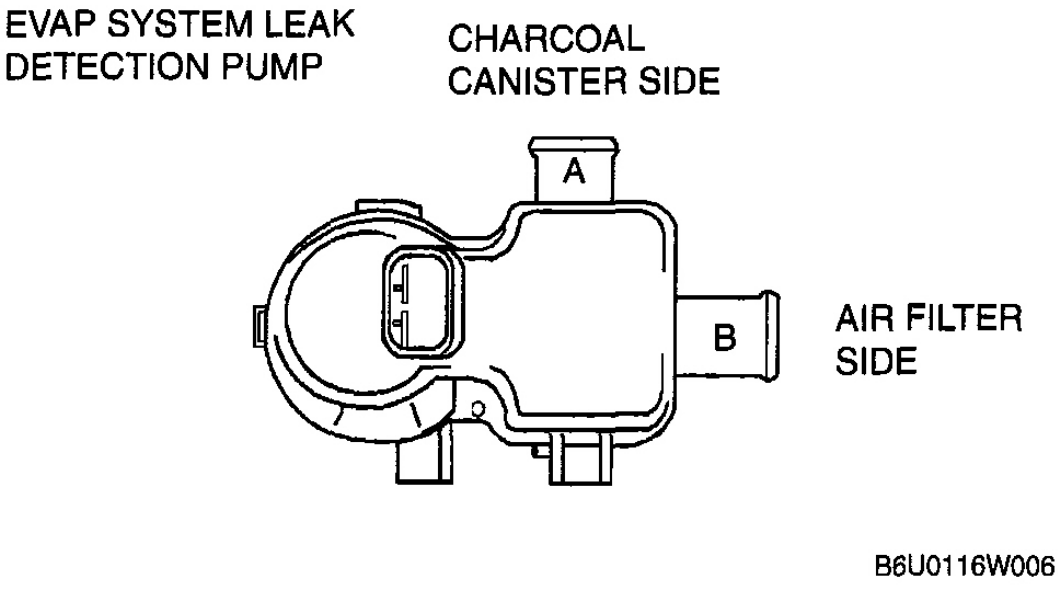


Fig. 16: Identifying Evaporative Emission System Leak Detection Pump Ports
Courtesy of MAZDA MOTORS CORP.

RESISTANCE INSPECTION

1. Inspect resistance of the EVAP system leak detection pump.
   - If not as specified, replace the EVAP system leak detection pump. (See **EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION [LF]**).
   - If as specified, carry out the **CIRCUIT OPEN/SHORT INSPECTION** .

EVAP SYSTEM LEAK DETECTION PUMP TERMINALS RESISTANCE SPECIFICATIONS

Terminals	Resistance (ohm)
A-B	20-50
A-C	26.6-32.4
A-D	MAX. 118

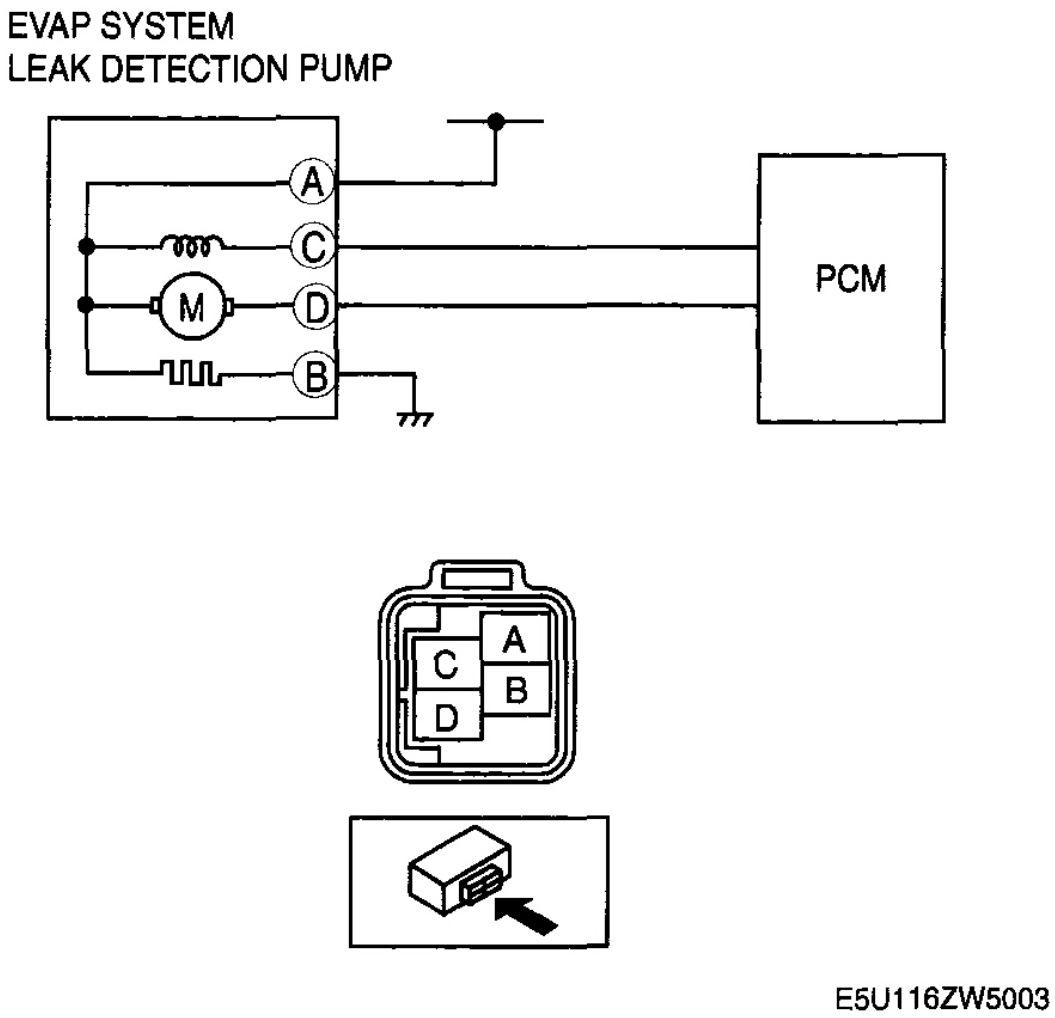


Fig. 17: Identifying EVAP System Leak Detection Pump Connector Terminals
Courtesy of MAZDA MOTORS CORP.

CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harness for open or short circuit (continuity check).

Open Circuit

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - EVAP system leak detection pump terminal C and PCM terminal 1V
  - EVAP system leak detection pump terminal D and PCM terminal 1U

- EVAP system leak detection pump terminal A and main relay
- EVAP system leak detection pump terminal B and body ground

Short Circuit

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - EVAP system leak detection pump terminal C and body ground
  - EVAP system leak detection pump terminal D and body ground
  - EVAP system leak detection pump terminal C and power supply
  - EVAP system leak detection pump terminal D and power supply
  - EVAP system leak detection pump terminal A and body ground
  - EVAP system leak detection pump terminal B and power supply

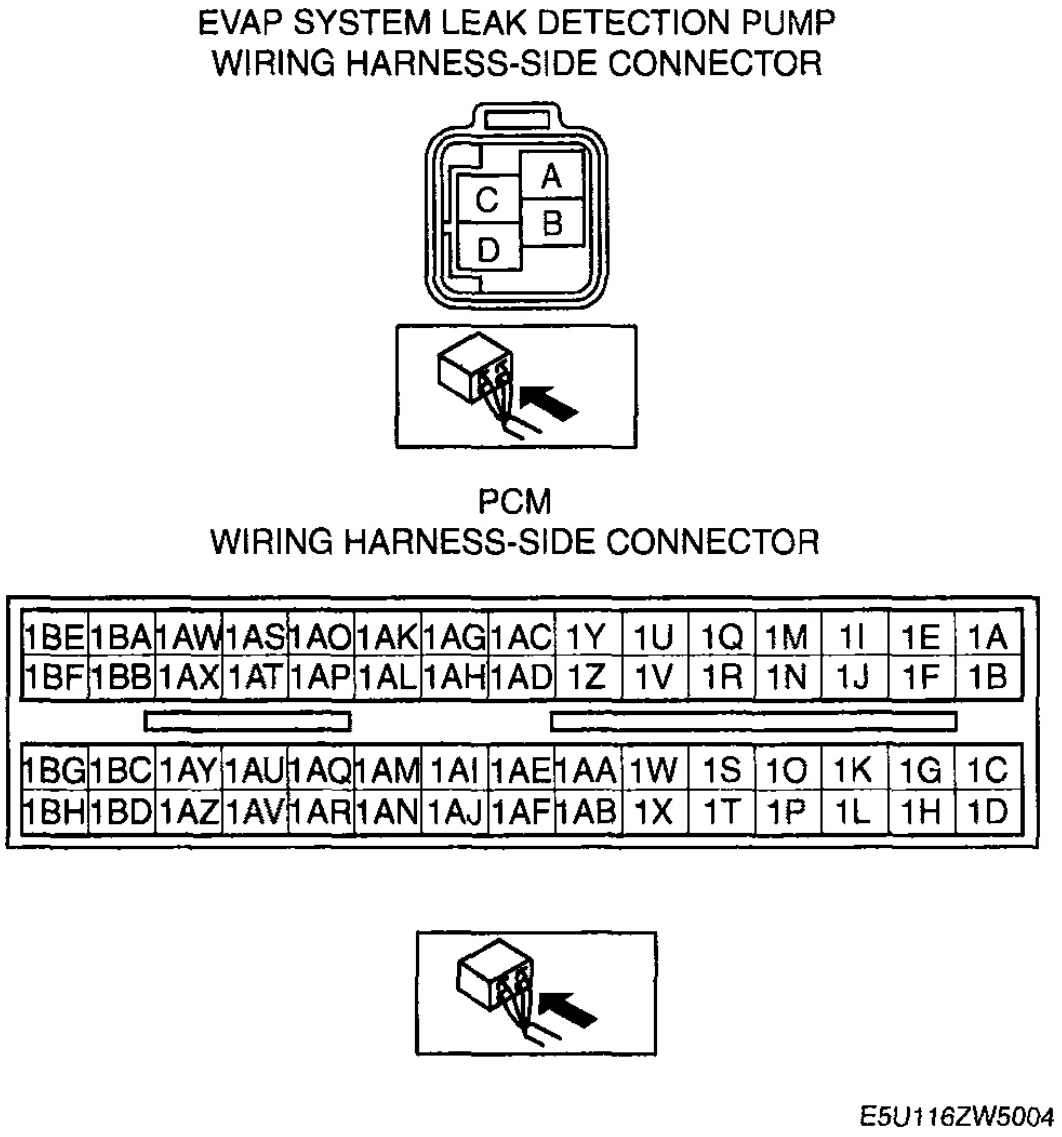


Fig. 18: Identifying PCM Wiring Harness-Side Connector
Courtesy of MAZDA MOTORS CORP.

PURGE SOLENOID VALVE REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the purge solenoid valve connector.
4. Disconnect the vacuum hose from the purge solenoid valve.
5. Remove the purge solenoid valve from the air hose.

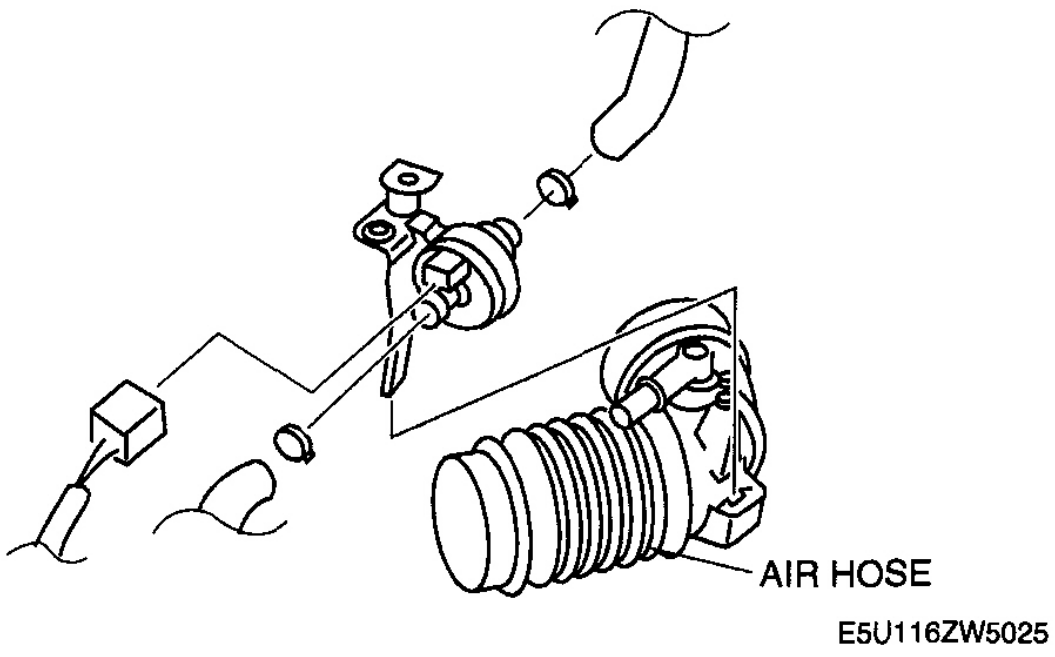


Fig. 19: View Of Purge Solenoid Valve & Air Hose
Courtesy of MAZDA MOTORS CORP.

6. Install in the reverse order of removal.

PURGE SOLENOID VALVE INSPECTION [LF]

NOTE:
- **Perform the following procedure only when directed.**

AIRFLOW INSPECTION

1. Remove the purge solenoid valve without disconnecting the evaporative hose. (See **PURGE SOLENOID VALVE REMOVAL/INSTALLATION [LF]**).
2. Verify that the airflow is as indicated in **PURGE SOLENOID VALVE AIRFLOW REFERENCE TABLE** .
   - If as specified in **PURGE SOLENOID VALVE AIRFLOW REFERENCE TABLE** , perform the **CIRCUIT OPEN/SHORT INSPECTION** .
   - If not as specified in **PURGE SOLENOID VALVE AIRFLOW REFERENCE TABLE** , inspect the purge solenoid valve. (See **PURGE SOLENOID VALVE REMOVAL/INSTALLATION [LF]** .)

PURGE SOLENOID VALVE AIRFLOW REFERENCE TABLE

Measured condition	Continuity between A-B
When voltage is not applied between terminals A and B	No airflow
When voltage is applied between terminals A and B	Airflow detected

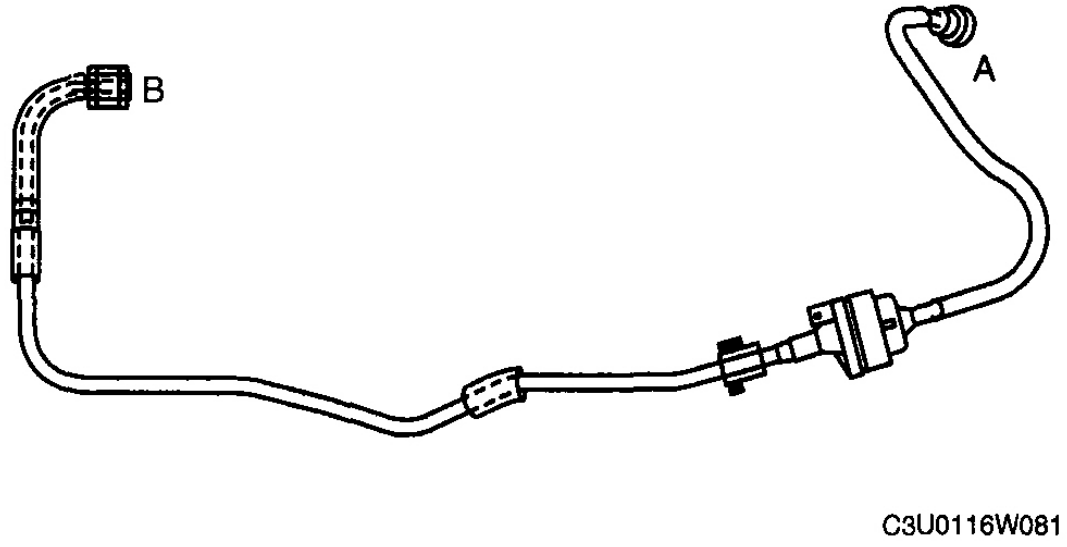


Fig. 20: Inspecting Airflow
Courtesy of MAZDA MOTORS CORP.

CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harnesses for open or short circuit (continuity check).

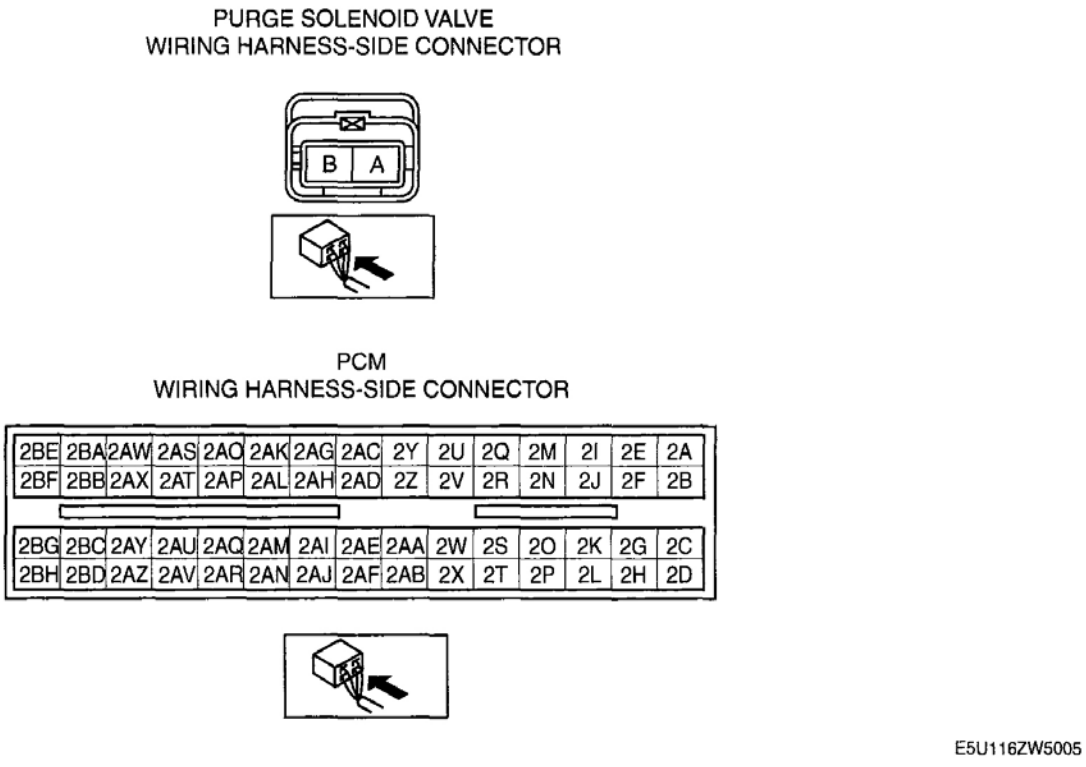


Fig. 21: Purge Solenoid Valve & PCM Connector
Courtesy of MAZDA MOTORS CORP.

Open Circuit

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - Purge solenoid valve terminal A and PCM terminal 2C
  - Purge solenoid valve terminal B and main relay

Short Circuit

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - Purge solenoid valve terminal A and power supply
  - Purge solenoid valve terminal A and body ground
  - Purge solenoid valve terminal B and body ground

EGR VALVE REMOVAL/INSTALLATION [LF]

1. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)

4. Drain the engine coolant from the radiator. (See **ENGINE COOLANT REPLACEMENT [LF]** .)
5. Remove the service hole cover.
    1. Remove the suspension tower bar (joint), (right side) and (left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
    2. Remove the wiper arm: (See **WIPER ARM AND BLADE REMOVAL/INSTALLATION** .)
    3. Remove the cowl grille. (See **COWL GRILLE REMOVAL/INSTALLATION** .)
    4. Remove the side cowl grille. (See **SIDE COWL GRILLE REMOVAL/INSTALLATION** .)
    5. Move the cooler pipe No.3 and heater pipe slightly out of the way.

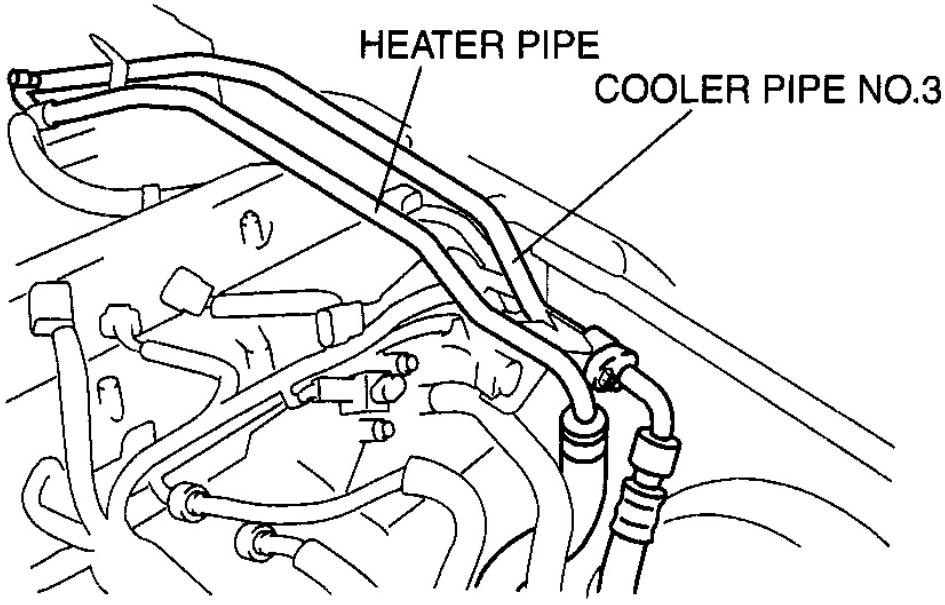


Fig. 22: Identifying Heater Pipe & Cooler Pipe No. 3
Courtesy of MAZDA MOTORS CORP.

6. Remove the service hole cover.

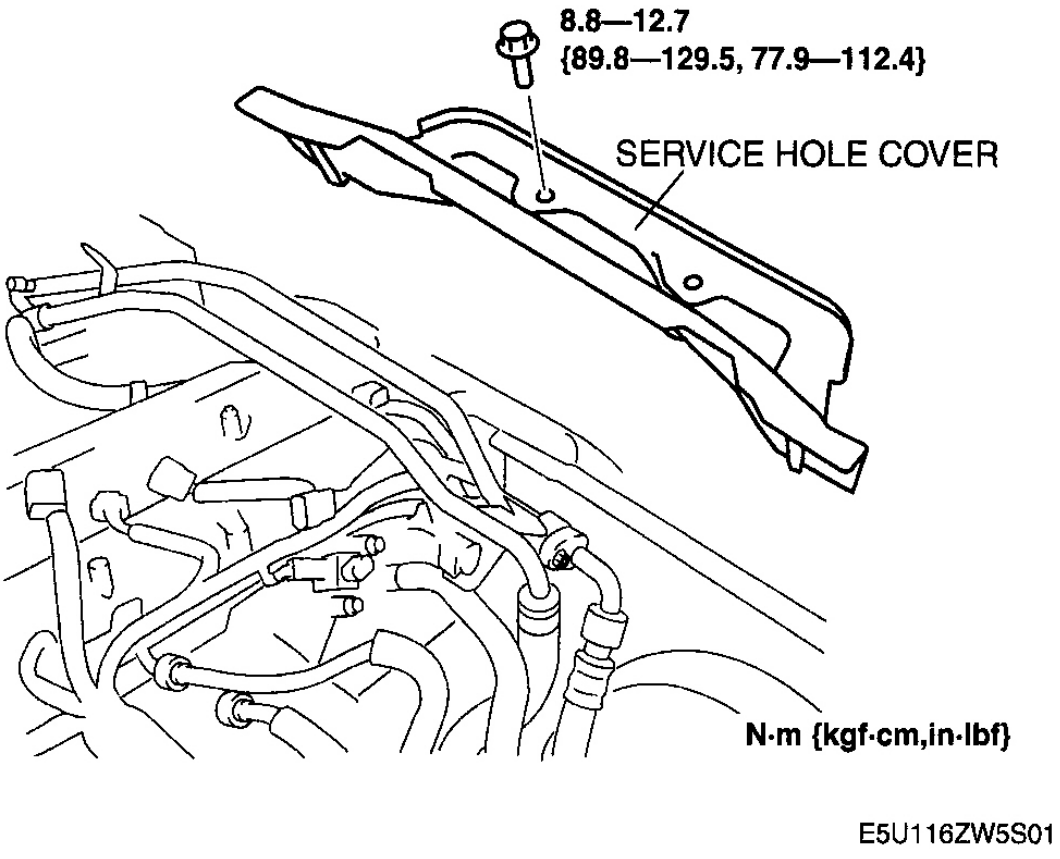


Fig. 23: View Of Service Hole Cover (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

6. Remove the harness bracket.

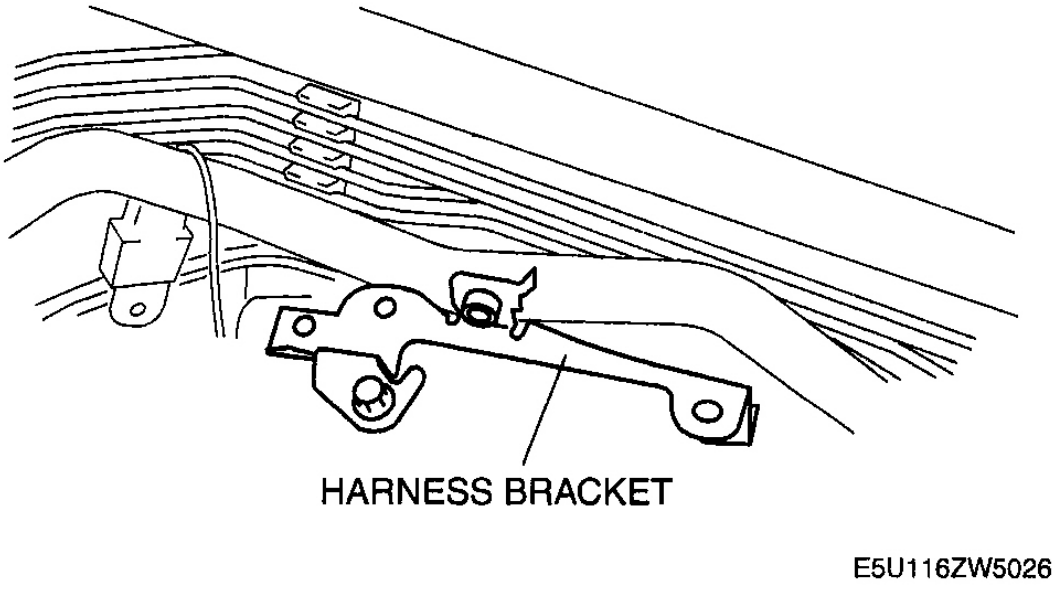


Fig. 24: View Of Harness Bracket
Courtesy of MAZDA MOTORS CORP.

7. Disconnect the heater hose and move the heater pipe slightly out of the way.

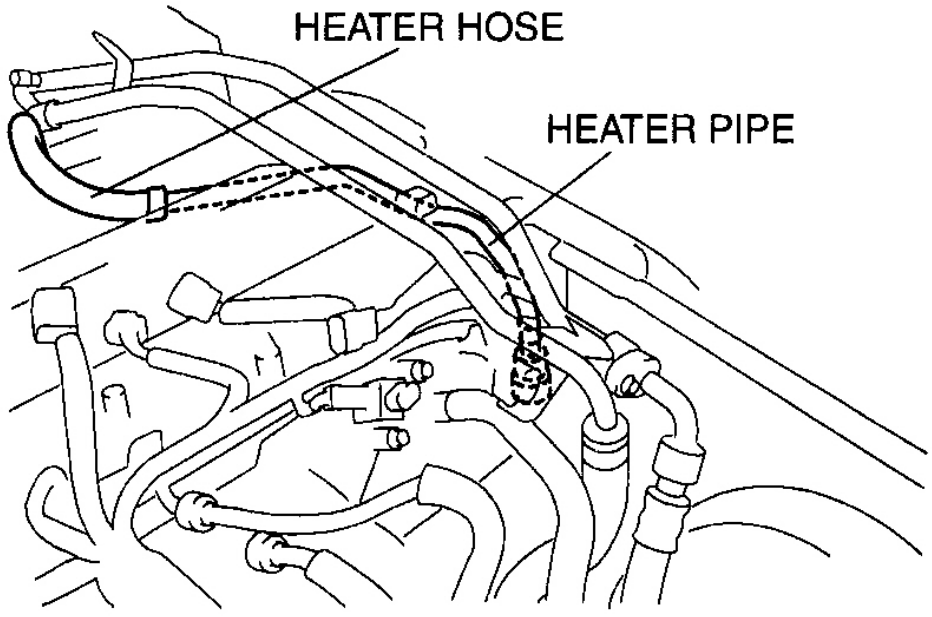


Fig. 25: Identifying Heater Hose & Heater Pipe
Courtesy of MAZDA MOTORS CORP.

8. Disconnect the EGR valve connector.
9. Set the **SST** to the EGR valve installation bolt.

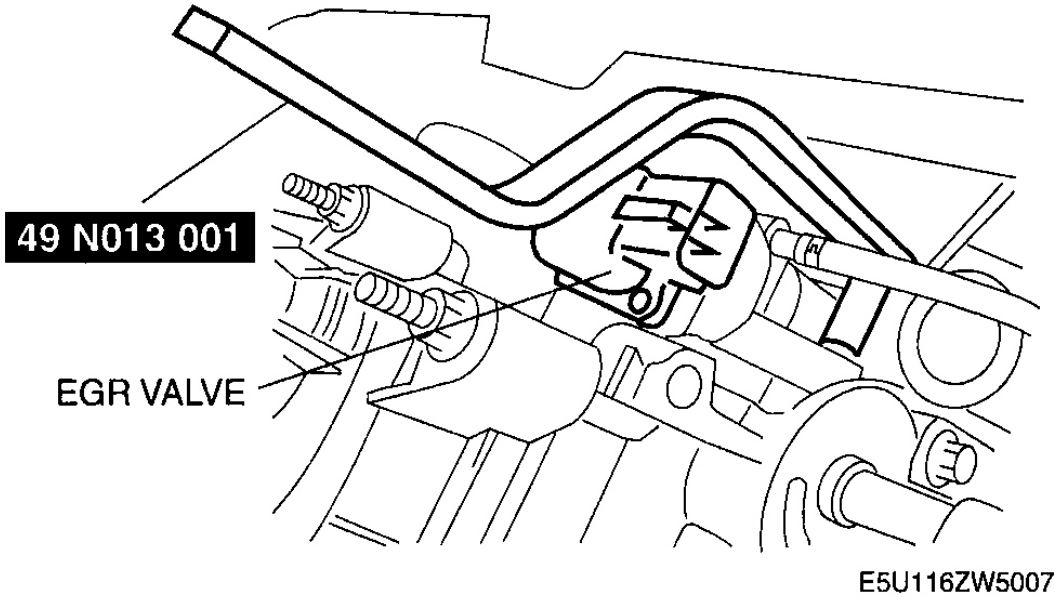


Fig. 26: Setting SST (49 N013 001) To EGR Valve Installation Bolt
Courtesy of MAZDA MOTORS CORP.

10. Remove both EGR valve installation bolts.
11. Remove the EGR valve with the engine coolant hose.

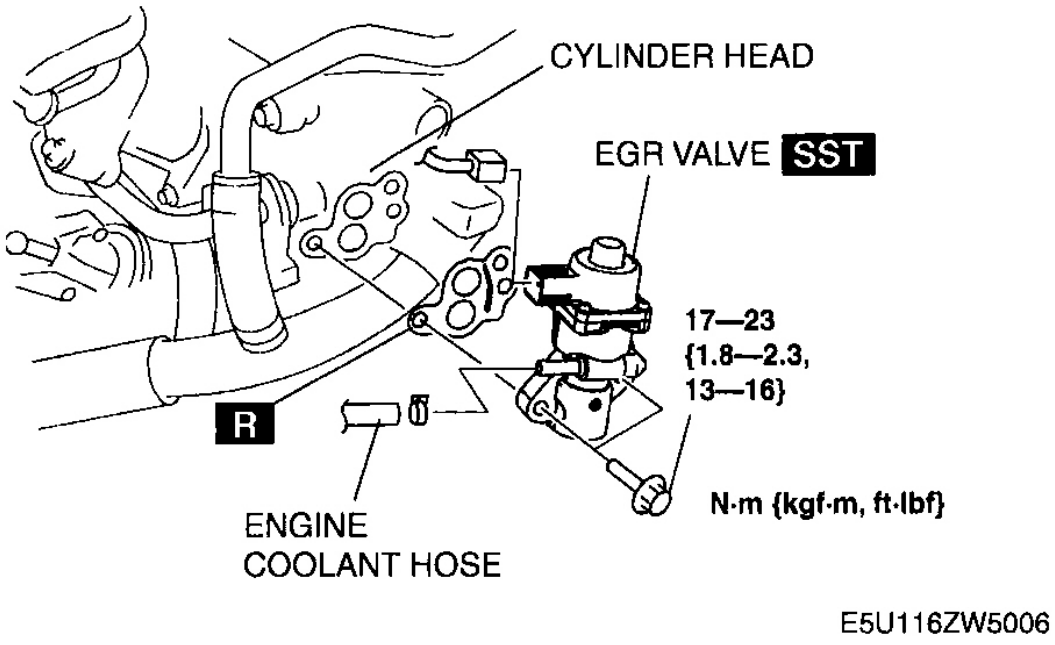


Fig. 27: View Of EGR Valve & Engine Coolant Hose Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

12. Disconnect the engine coolant hose from the EGR valve.
13. Replace the EGR valve gasket.
14. Install in the reverse order of removal.

EGR VALVE INSPECTION [LF]

NOTE:
- **Perform the following procedure only when directed.**

ON-VEHICLE INSPECTION

1. Verify that the buzzing sound (valve operation sound) is heard from the EGR valve when engine cranking.
   - If the buzzing sound is not heard, perform the resistance inspection.

RESISTANCE INSPECTION

1. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
2. Disconnect the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)

4. Disconnect the EGR valve connector. (See **EGR VALVE REMOVAL/INSTALLATION [LF]**).
5. Measure the resistance between the EGR valve terminals.
   - If within the specification, perform out the **CIRCUIT OPEN/SHORT INSPECTION** .
   - If not within the specification, replace the EGR valve. (See **EGR VALVE REMOVAL/INSTALLATION [LF]**).

STANDARD RESISTANCE SPECIFICATIONS

Terminal	Resistance (ohm)
C-E C-A D-B D-F	12-16

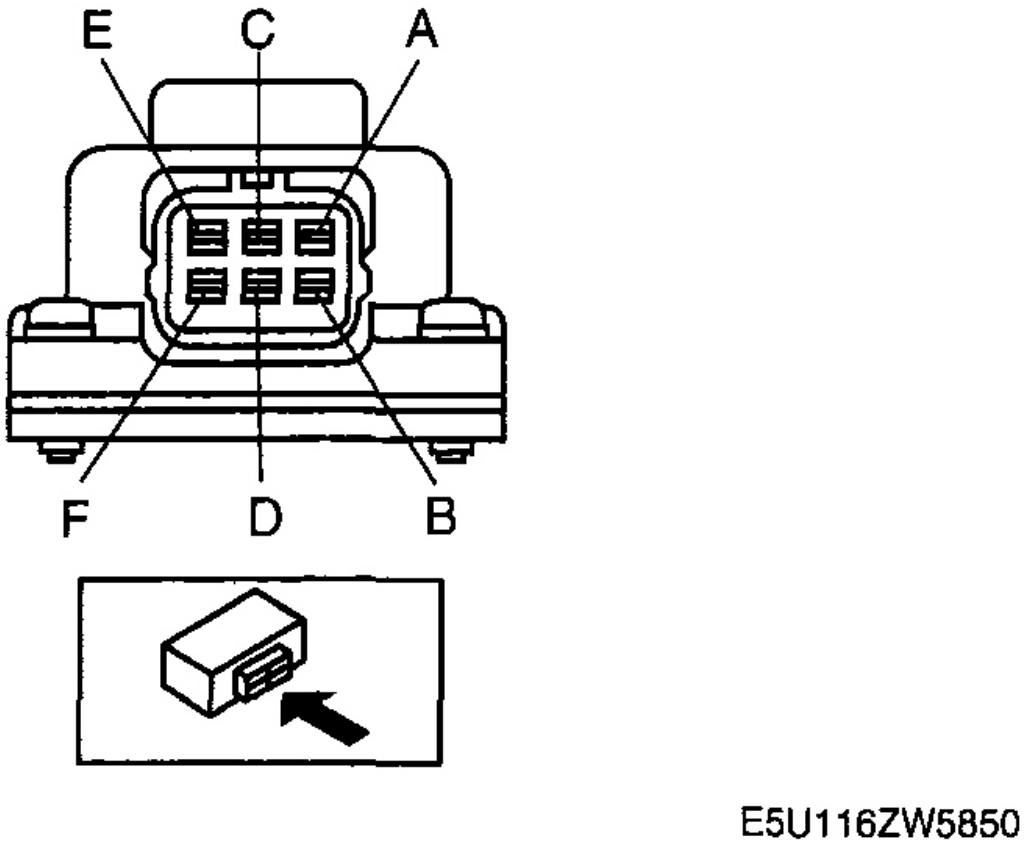


Fig. 28: Identifying EGR Valve Connector Terminals
Courtesy of MAZDA MOTORS CORP.

CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harnesses for open or short circuit (continuity check).

Open Circuit

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - EGR valve terminal A and PCM terminal 2G
  - EGR valve terminal B and PCM terminal 2L
  - EGR valve terminal E and PCM terminal 2K
  - EGR valve terminal F and PCM terminal 2H
  - EGR valve terminal C and main relay
  - EGR valve terminal D and main relay

Short Circuit

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - EGR valve terminal A and body ground
  - EGR valve terminal A and power supply
  - EGR valve terminal B and body ground
  - EGR valve terminal B and power supply
  - EGR valve terminal C and body ground
  - EGR valve terminal D and body ground
  - EGR valve terminal E and body ground
  - EGR valve terminal E and power supply
  - EGR valve terminal F and body ground
  - EGR valve terminal F and power supply

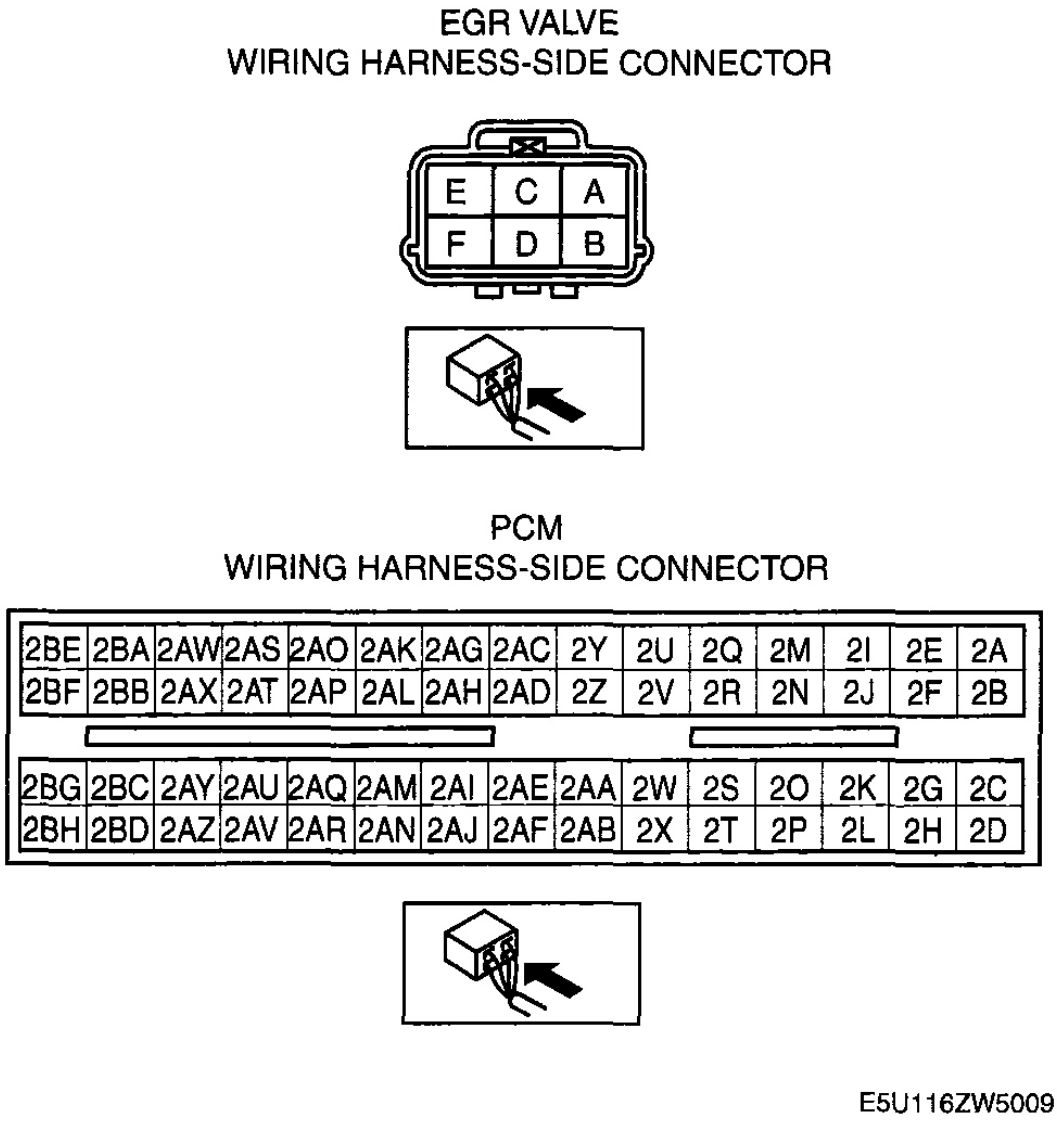
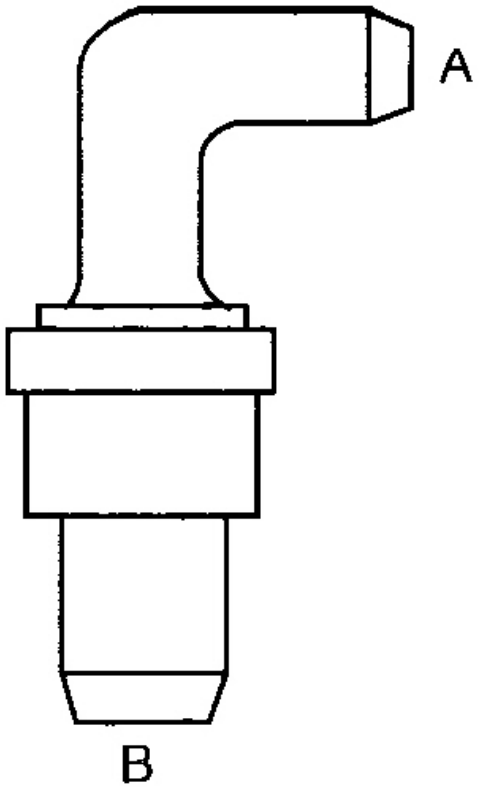


Fig. 29: Identifying EGR Valve & PCM Wiring Harness-Side Connector
Courtesy of MAZDA MOTORS CORP.

POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [LF]

1. Remove the intake manifold. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
2. Remove the PCV valve.
3. Verify that there is no airflow when pressure is applied to port A.
   - If there is airflow, replace the PCV valve.
4. Verify that there is airflow when vacuum is applied to port A.

- If there is no airflow, replace the PCV valve.



A6J3916W002

Fig. 30: Identifying PCV Valve
Courtesy of MAZDA MOTORS CORP.

WARM-UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION [LF]

NOTE:

- **Make sure that no HO2S DTCs have been detected. If detected, this inspection is not applicable for WU-TWC inspection.**

1. Connect the M-MDS or equivalent and monitor PIDs as following.
   - Monitor the WU-TWC using O2S11 PID for upstream HO2S and O2S12 PID for downstream HO2S.

2. Monitor the appropriate PIDs.
3. Drive the vehicle for **10 min** at **65-96 km/h {40-60 mph}** to allow the front catalytic converter to reach operating temperature.
4. Stop the vehicle and leave it in a safe place.
5. Idle the engine.
6. Record PIDs for **1 min** .
7. Select the appropriate PIDs and read the graph.
8. Count the number of times (inversions) that the upstream HO2S graph line actually crosses the **0.5 V** line.

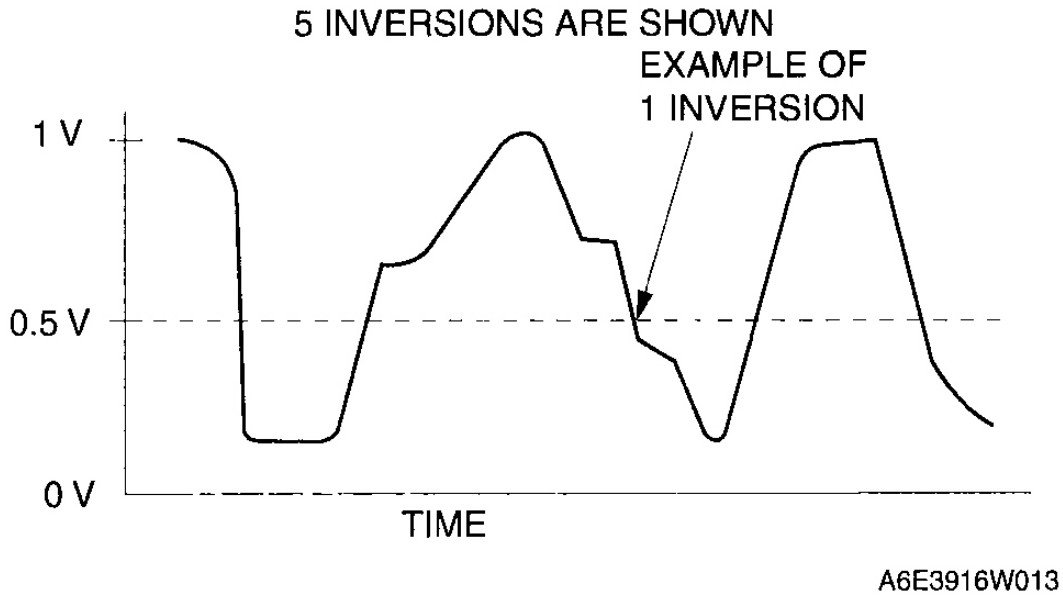


Fig. 31: Identifying HO2S Graph Line (5 Inversions)
Courtesy of MAZDA MOTORS CORP.

9. Count the number of times (inversions) that the downstream HO2S graph line actually crosses the **0.5 V** line.

NOTE:

- **Do not count the number of peaks. Refer to Fig. 31 .**

10. Using the following equation, calculate the value of ratio.

Equation

RATIO = Upstream HO2S inversion divided by downstream HO2S inversion

- If the ratio is **1.5 or more** or there is no downstream HO2S inversion, the WU-TWC is functioning properly.
- If the ratio is **less than 1.5** , the WU-TWC is not functioning properly. Replace the WU-TWC.

Upstream HO2S Graph Line Example

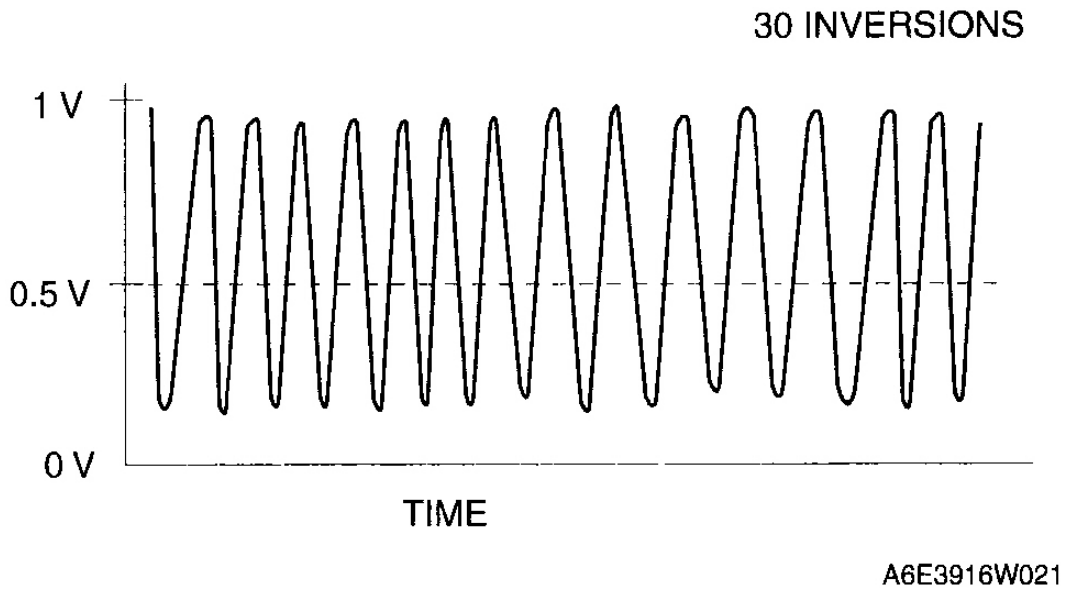


Fig. 32: Upstream HO2S Graph Line Example
Courtesy of MAZDA MOTORS CORP.

Downstream HO2S Graph Line Example 1

Equation

RATIO = 30 inversions (upstream HO2S inversions) divided by 5 inversions (downstream HO2S inversions) = 6.0 (good WU-TWC)

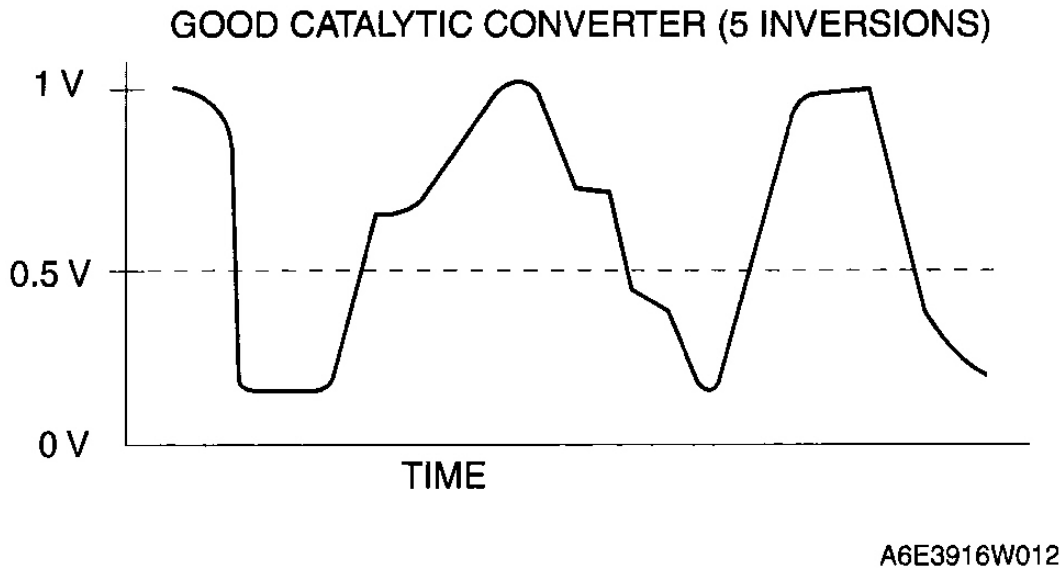


Fig. 33: Downstream HO2S Graph Line Example 1
Courtesy of MAZDA MOTORS CORP.

Downstream HO2S Graph Line Example 2

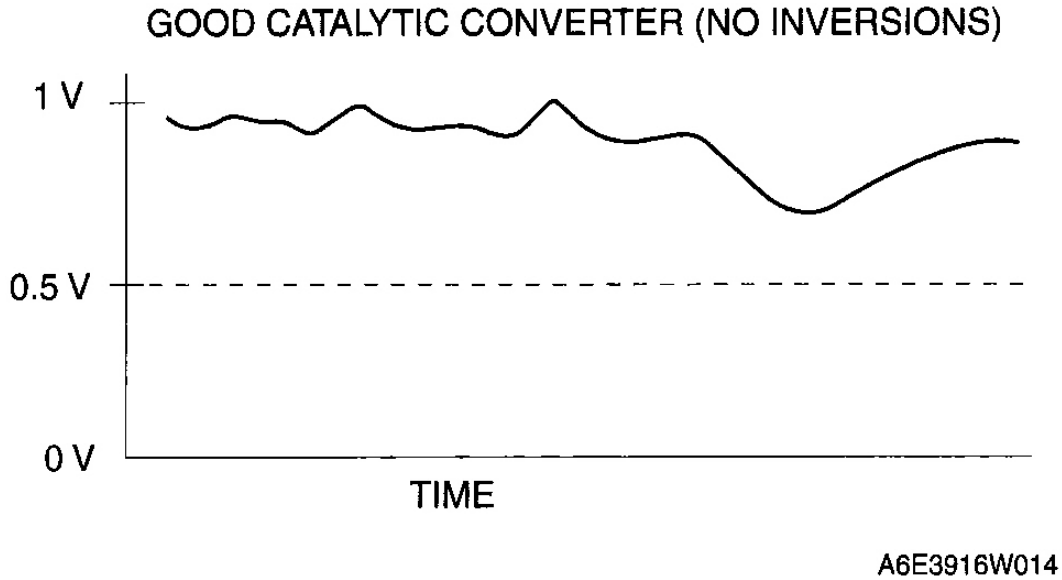


Fig. 34: Downstream HO2S Graph Line Example 2

Courtesy of MAZDA MOTORS CORP.

Downstream HO2S Graph Line Example 3

Equation

RATIO = 30 inversions (upstream HO2S inversions) divided by 27 inversions (downstream HO2S inversions) = 1.1 (bad WU-TWC)

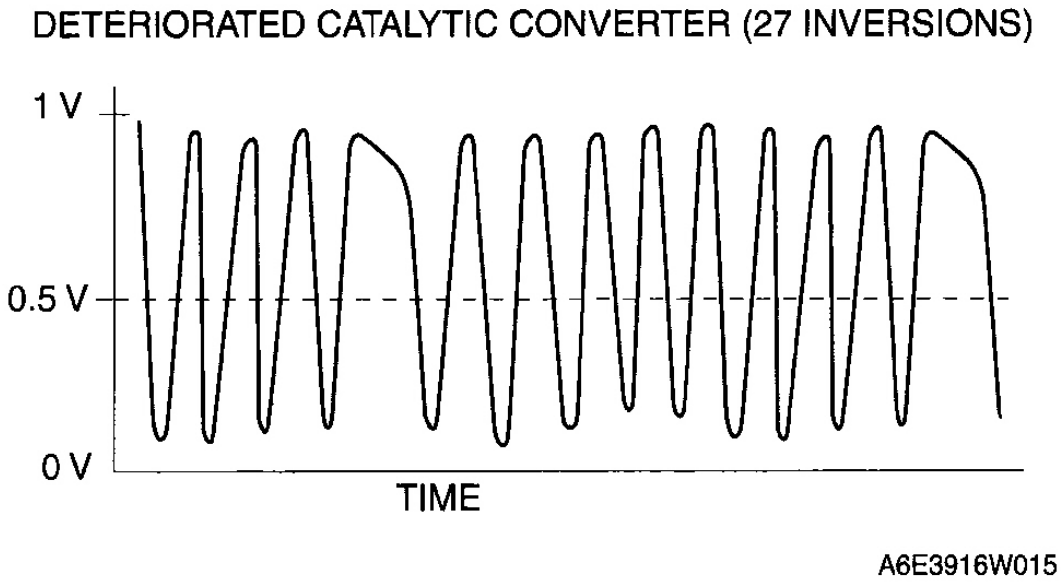


Fig. 35: Downstream HO2S Graph Line Example 3
Courtesy of MAZDA MOTORS CORP.

ROLLOVER VALVE REMOVAL/INSTALLATION [LF]

NOTE:

- **The rollover valve cannot be removed as it is built into the fuel tank.**

ROLLOVER VALVE INSPECTION [LF]

NOTE:

- **The rollover valve cannot be removed and inspected as it is built into the fuel tank.**

1. Perform the fuel tank inspection. (See **FUEL TANK INSPECTION [LF]** .)

FUEL SHUT-OFF VALVE REMOVAL/INSTALLATION [LF]

NOTE:

- **The fuel shut-off valve cannot be removed as it is built into the fuel tank.**

FUEL SHUT-OFF VALVE INSPECTION [LF]

NOTE:

- **The fuel shut-off valve cannot be removed and inspected as it is built into the fuel tank.**

1. Perform the fuel tank inspection. (See **FUEL TANK INSPECTION [LF]** .)

EVAPORATIVE CHAMBER REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the evaporative hose.
4. Remove the evaporative chamber.
5. Cover the evaporative hose with vinyl sheets or the like to prevent them from being scratched or contaminated with foreign material.
6. Install in the reverse order of removal.

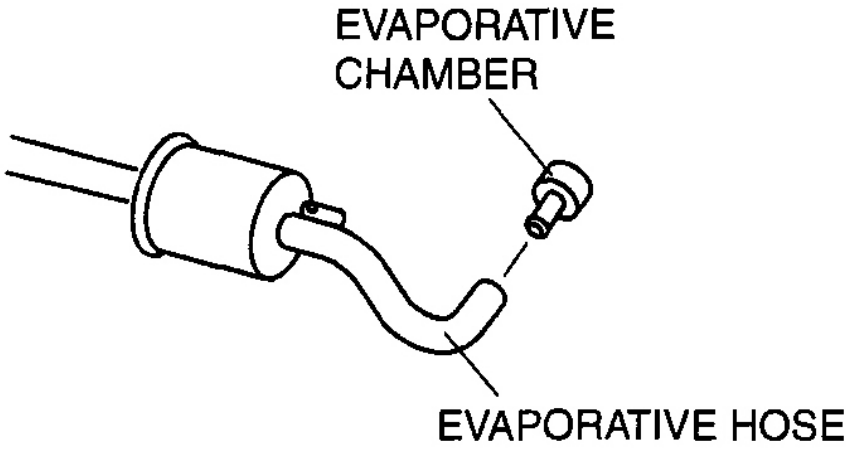


Fig. 36: Identifying Evaporative Chamber & Evaporative Hose
Courtesy of MAZDA MOTORS CORP.

EVAPORATIVE CHAMBER INSPECTION [LF]

1. Remove the evaporative chamber.
2. Blow from port A and verify that there is airflow from port B.
    - If not as specified, replace the evaporative chamber.

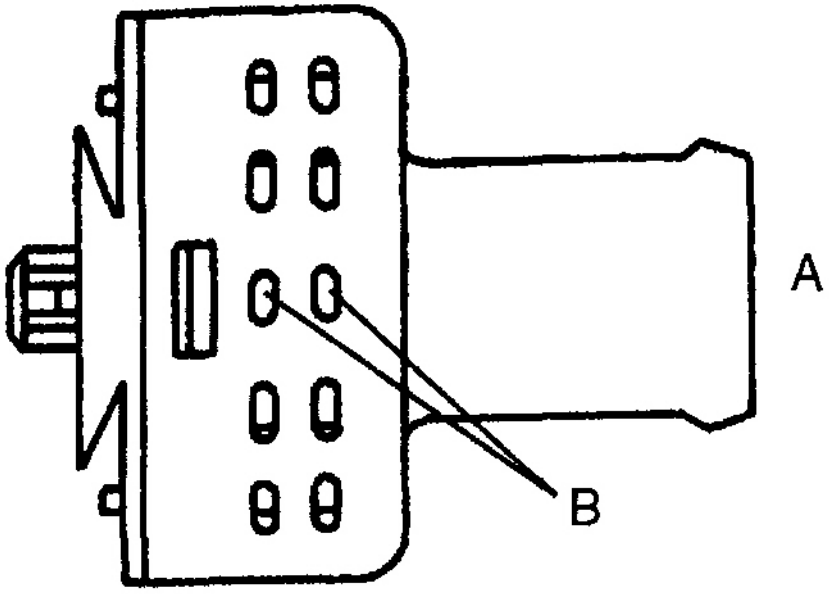


Fig. 37: Inspecting Evaporative Chamber Ports
Courtesy of MAZDA MOTORS CORP.

QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [LF]

QUICK RELEASE CONNECTOR TYPE

CAUTION:
- **There are four types of quick release connectors. Verify the type and location, and install/remove properly.**

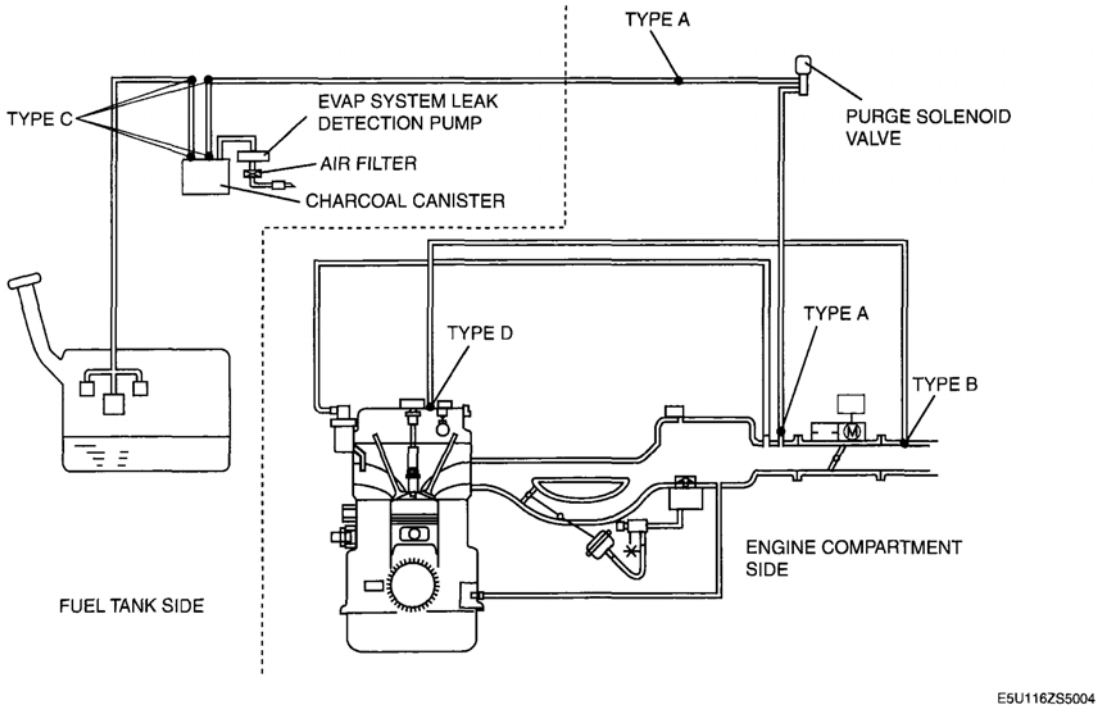


Fig. 38: Identifying Locations Of Different Quick Release Connectors
Courtesy of MAZDA MOTORS CORP.

TYPE A REMOVAL

CAUTION:
- **The quick release connector may be damaged if the release tab is bent excessively. Do not expand the release tab over the stopper.**

NOTE:
- **The evaporative hose can be removed by pushing it to the joint port side to release the lock.**

1. Rotate the release tab on the quick release connector to the stopper position.

NOTE:
- **The retainer is attached to the pipe even after the connector is disconnected.**

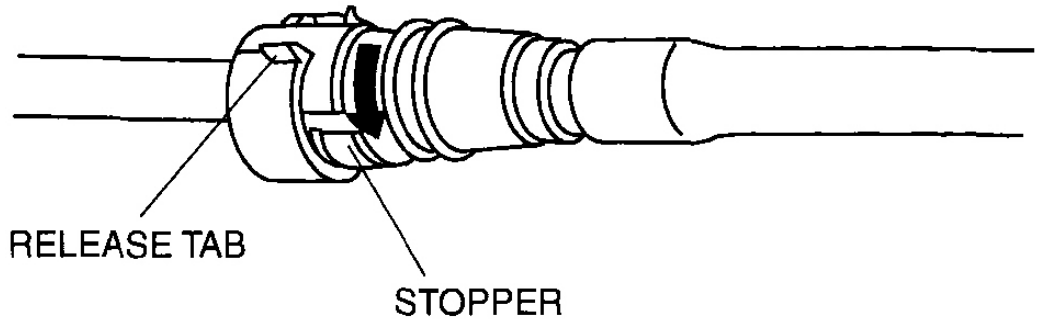


Fig. 39: Rotating Release Tab On Quick Release Connector To Stopper Position
Courtesy of MAZDA MOTORS CORP.

2. Pull out the evaporative hose straight from the joint port and disconnect it.

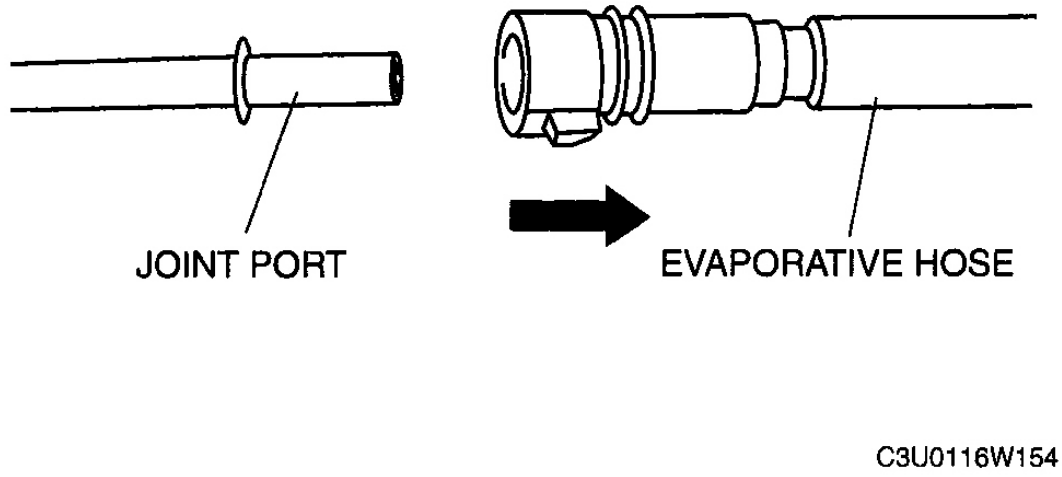
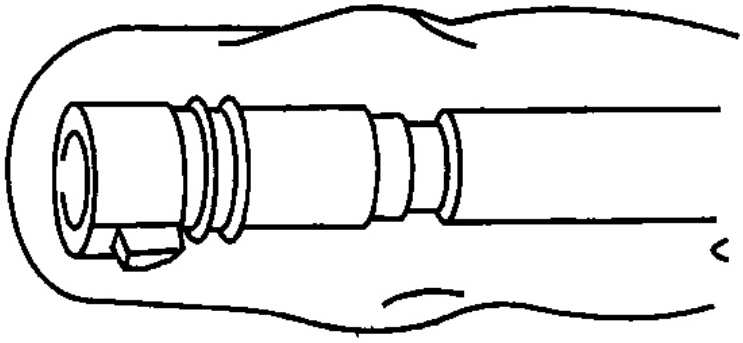


Fig. 40: Disconnecting Evaporative Hose Straight From Joint Port
Courtesy of MAZDA MOTORS CORP.

3. Cover the disconnected quick release connector and joint port with vinyl sheeting or a similar material to prevent it from scratches or dirt.



ADJ3912W019

Fig. 41: Covering Disconnected Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

TYPE B REMOVAL

1. Squeeze the release tab until the locks are released.

NOTE:
- **The retainer has two internal locking tabs which retain the joint port. Be sure that the squeezing place on the retainer is squeezed until it can be released from the joint port.**

2. Pull the quick release connector straight outward.

NOTE:
- **The retainer is attached to the pipe even after the connector is disconnected.**

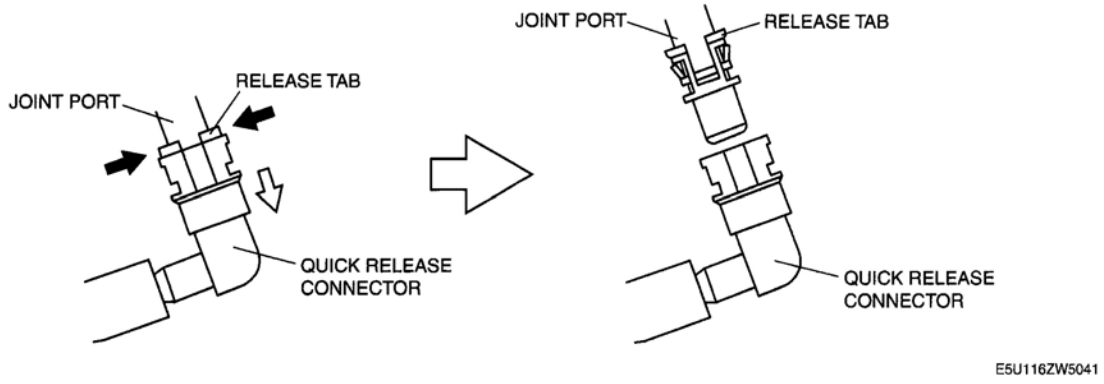


Fig. 42: View Of Type B Components
Courtesy of MAZDA MOTORS CORP.

3. Cover the disconnected quick release connector and joint port with vinyl sheeting or a similar material to prevent it from becoming scratched or dirty.

TYPE C REMOVAL

CAUTION:
- **Be careful not to damage the pipe when unlocking the retainer.**

NOTE:
- **If the quick release connector is removed, replace the retainer with a new one.**

1. Follow "BEFORE SERVICE PRECAUTION" and remove dirt from the connecting surfaces before performing any work operations.

NOTE:
- **The retainer is attached to the pipe even after the connector is disconnected.**

2. Set the **SST** parallel to the quick release connector.

NOTE:
- **The quick release connector can be removed by pushing the center of the retainer tabs.**

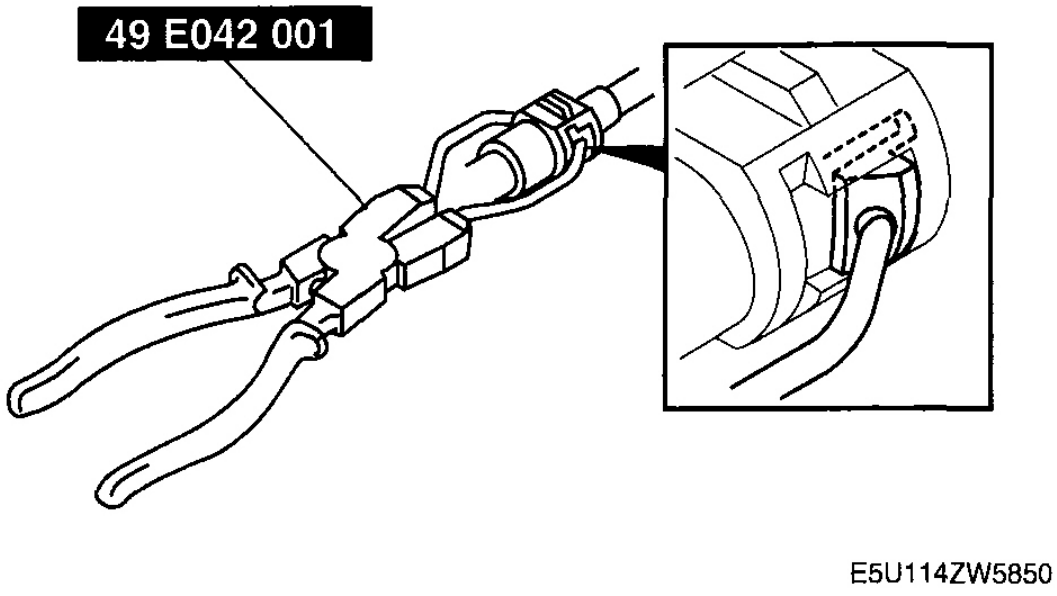


Fig. 43: Disconnecting Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

3. Hold the center of the retainer tabs with the **SST** ends and press the retainer.
4. Pull the connector side and disconnect the quick release connector.
5. Raise a retainer tab using the **SST** and remove the retainer.

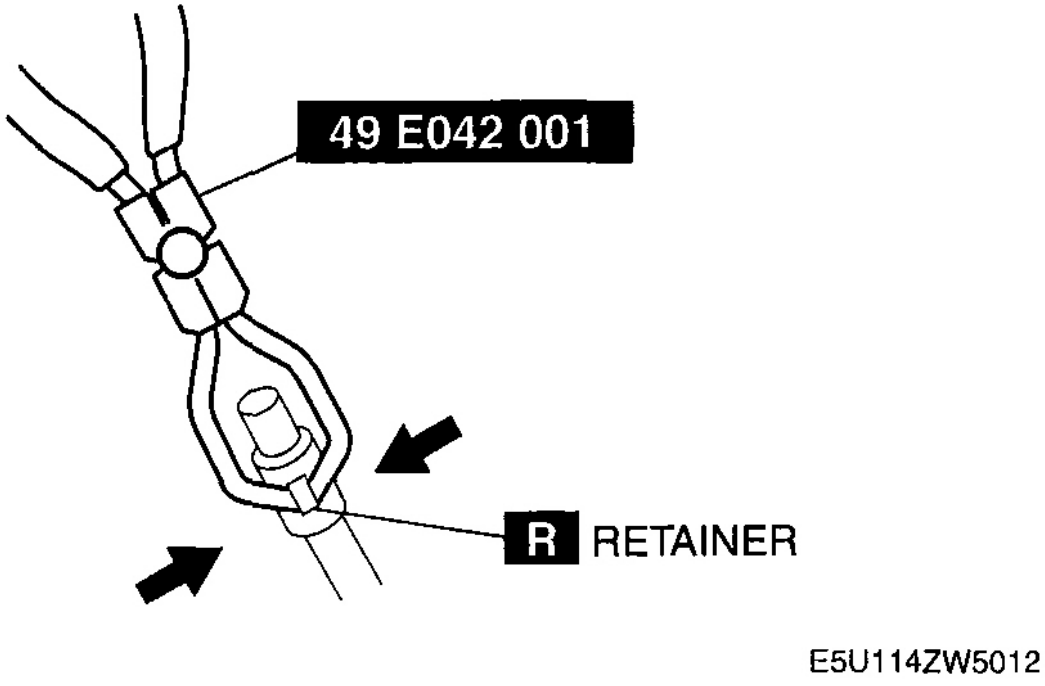


Fig. 44: Raising Retainer Tab Using SST
Courtesy of MAZDA MOTORS CORP.

6. Cover the disconnected quick release connector and joint port with vinyl sheeting or a similar material to prevent it from becoming scratched or dirty.

TYPE D REMOVAL

CAUTION:
- **When releasing the retainer locks, take extreme care not to damage the evaporative hose.**

1. Release the locks between the retainer and joint port by pressing each retainer lock one by one using a flathead screwdriver or a similar tool.

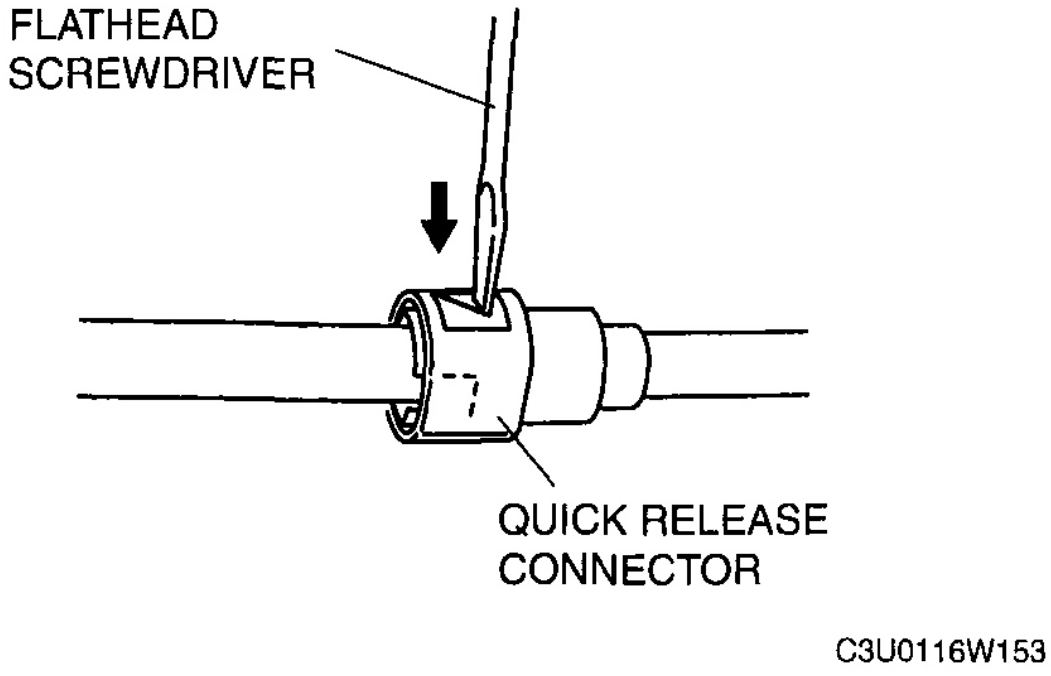


Fig. 45: Releasing Locks Between Retainer & Joint Port
Courtesy of MAZDA MOTORS CORP.

2. Pull out the hose straight from the joint port and disconnect it.

NOTE:
- **The retainer is attached to the pipe even after the connector is disconnected.**

3. Cover the disconnected quick release connector and joint port with vinyl sheeting or a similar material to prevent it from becoming scratched or dirty.

TYPE A INSTALLATION

NOTE:
- **If the quick release connector O-ring is damaged or has slipped, replace the evaporative hose.**
- **A checker tab is integrated with the quick release connector for new evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the joint port.**

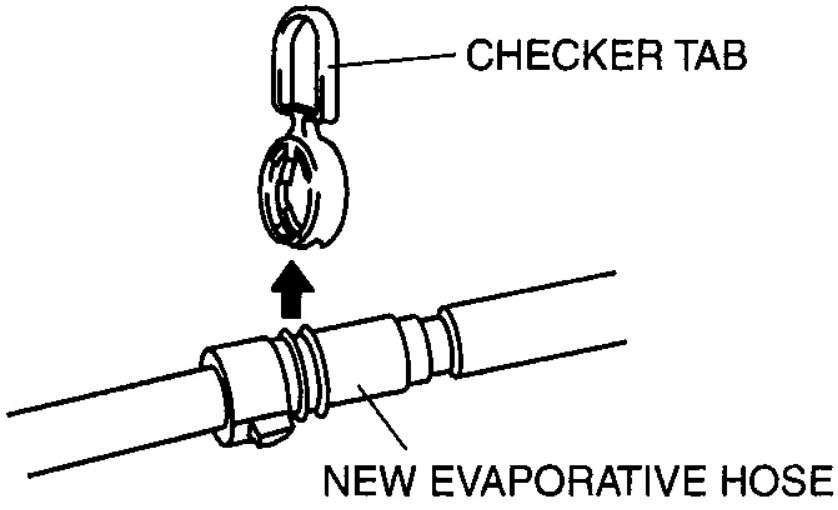


Fig. 46: View Of Checker Tab & Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

1. Inspect the evaporative hose and joint port sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the joint port.
3. Reconnect the evaporative hose straight to the joint port until a click is heard.

NOTE:
- **If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.**

4. Lightly pull and push the quick release connector a few times by hand, and then verify that it can move **2.0-3.0 mm {0.08-0.12 in}** and is connected securely.

TYPE B INSTALLATION

NOTE:
- **If the quick release connector O-ring is damaged or has slipped, replace the evaporative hose.**
- **When replacing with a new evaporative hose, disengage the release tabs from the join port.**

- **A checker tab is integrated with the quick release connector for new evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the joint port.**

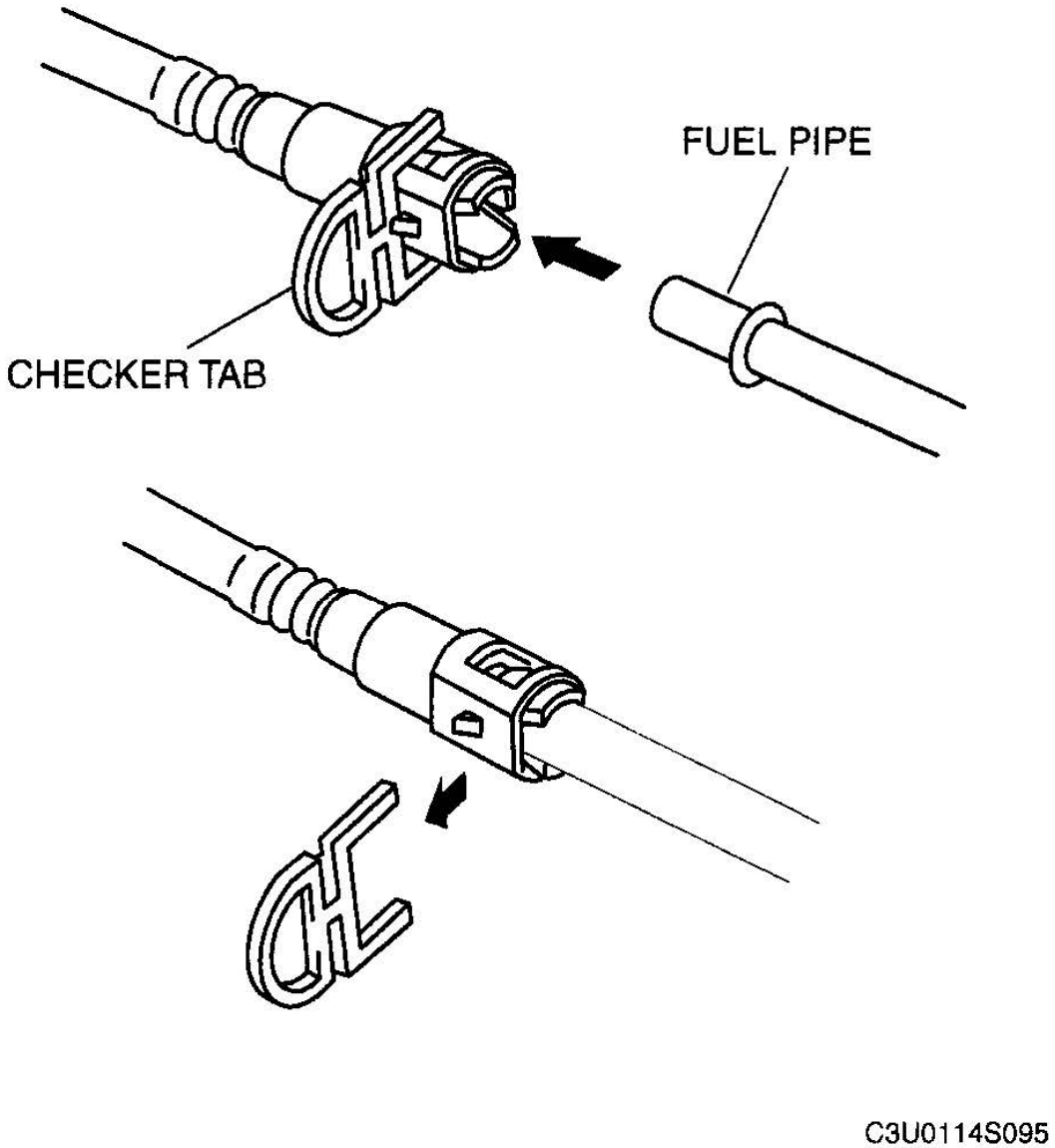


Fig. 47: View Of Checker Tab & Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

1. When newly replacing the quick release connector, remove the release tab using the following procedure.
    1. Widen the retainer lock using a flathead screwdriver, then pull out the release tab from the joint

port and remove it.

2. Inspect the quick release connector and joint port sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
3. Apply a small amount of clean engine oil to the sealing surface of the joint port.
4. Reconnect the quick release connector straight to the joint port until a click is heard.

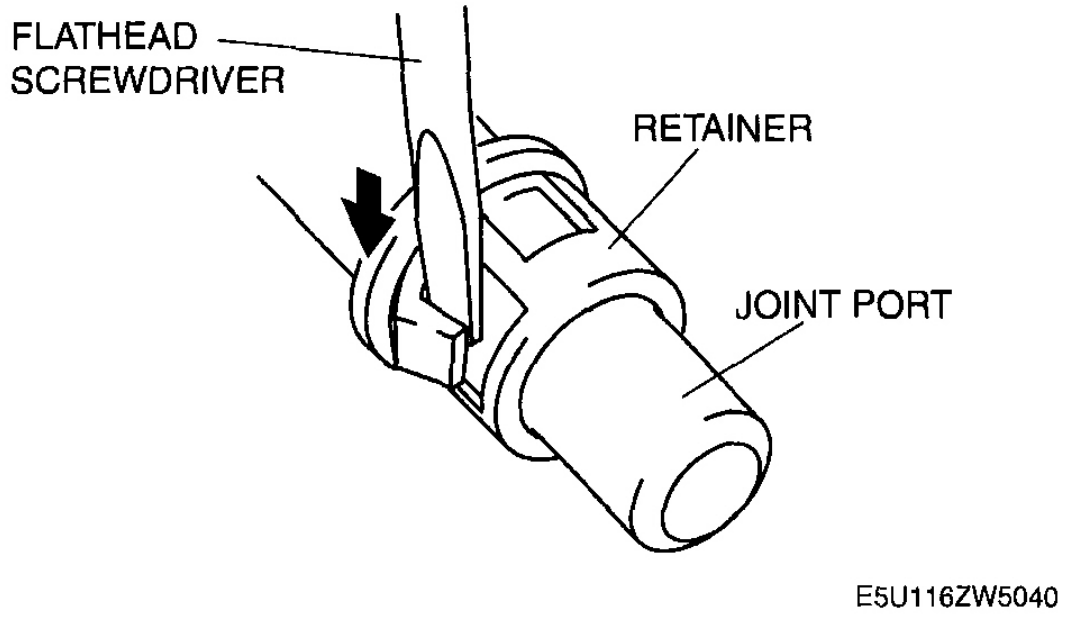


Fig. 48: Removing Tab From Joint Port
Courtesy of MAZDA MOTORS CORP.

NOTE:
- **If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.**

5. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.

TYPE C INSTALLATION

NOTE:
- **If the quick release connector O-ring is damaged or has slipped, replace the piping component.**
- **A checker tab is integrated with the quick release connector for new fuel hoses and evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel**

pipe.

CAUTION:
- **Be sure to replace the retainer with a new one to prevent gas leakage.**

1. Install a new retainer to the quick release connector.

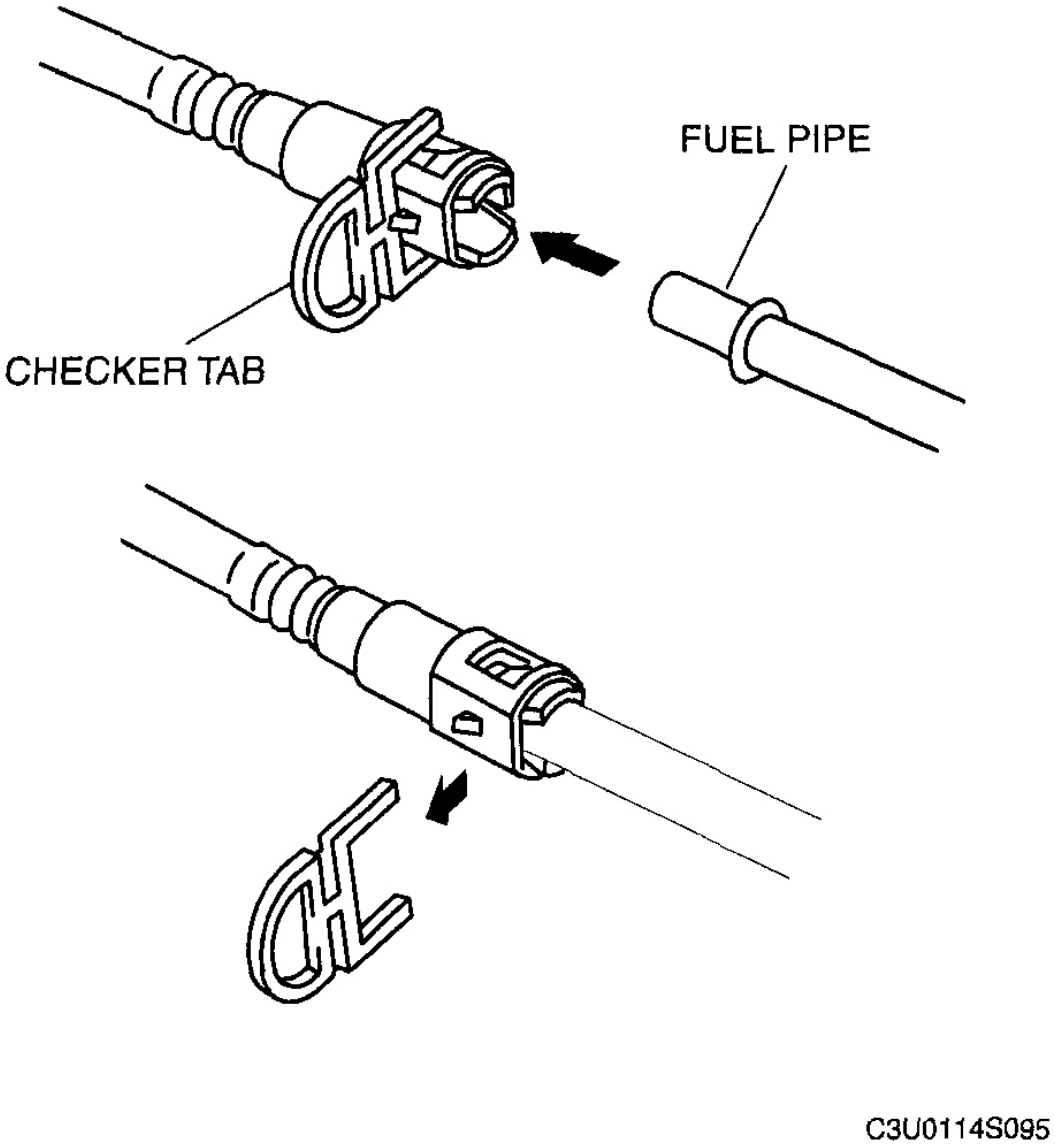


Fig. 49: View Of New Retainer & Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

2. Reconnect the hose straight to the pipe until a click is heard.
3. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.

TYPE D INSTALLATION

NOTE:

- **If the quick release connector O-ring is damaged or has slipped, replace the evaporative hose.**
- **When replacing with a new evaporative hose, disengage the release tabs from the join port.**
- **A checker tab is integrated with the quick release connector for new evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the joint port.**

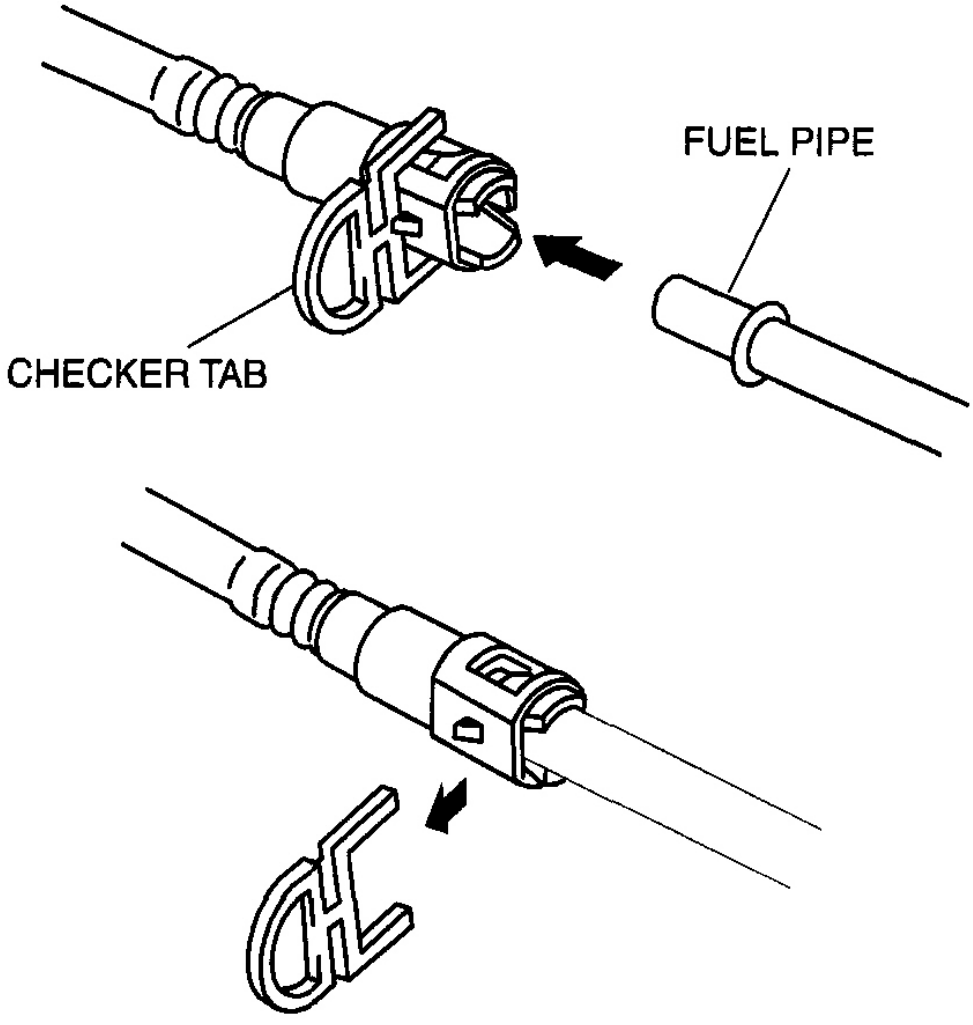


Fig. 50: View Of Checker Tab & Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

1. When newly replacing the quick release connector, remove the release tab using the following procedure.
    1. Widen the retainer lock using a flathead screwdriver, then pull out the release tab from the joint port and remove it.

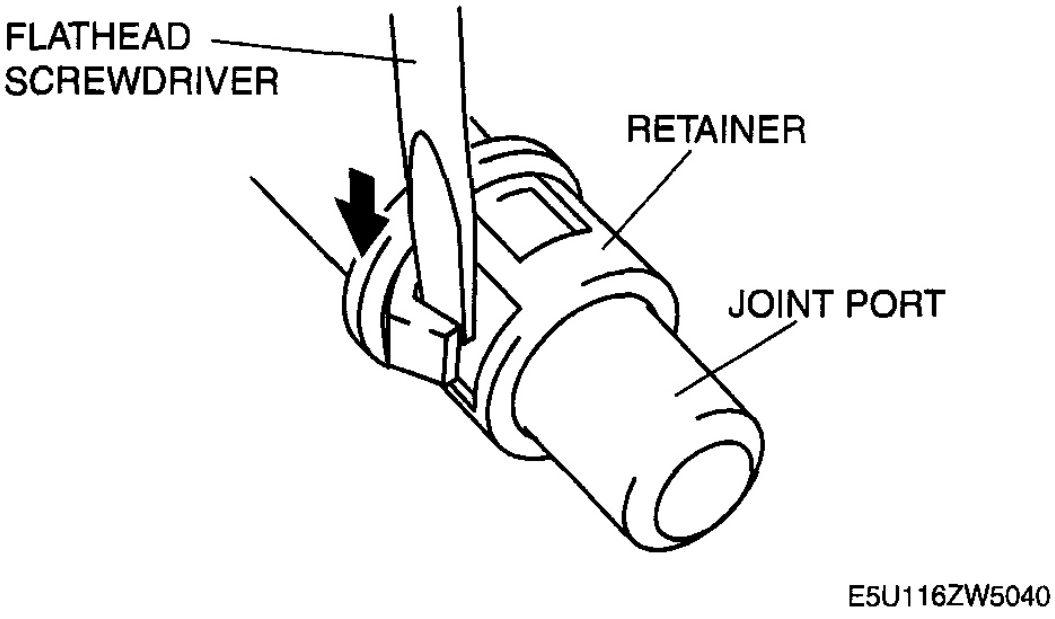


Fig. 51: Removing Tab From Joint Port
Courtesy of MAZDA MOTORS CORP.

2. Inspect the quick release connector and joint port sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
3. Apply a small amount of clean engine oil to the sealing surface of the joint port.
4. Reconnect the quick release connector straight to the joint port until a click is heard.

NOTE:

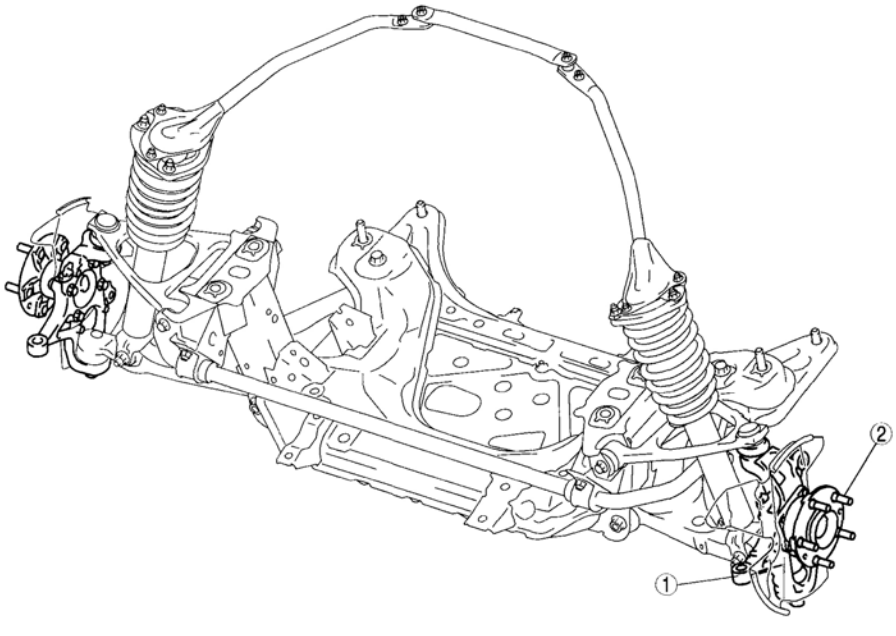
- **If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.**

5. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.

2008 DRIVELINE/AXLES

Front Axle - MX-5 Miata

FRONT AXLE LOCATION INDEX



1	Wheel hub, steering knuckle	2	Wheel hub bolt

Fig. 1: Identifying Front Axle Assembly
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB, STEERING KNUCKLE INSPECTION

WHEEL BEARING LOOSENESS INSPECTION

1. Install the magnetic vase and dial gauge as shown in **Fig. 2** , and inspect the wheel bearing for axial looseness.
   - If it exceeds the maximum specification, replace the wheel hub component.

   Maximum front wheel bearing play

   0.05 mm {0.002 in}

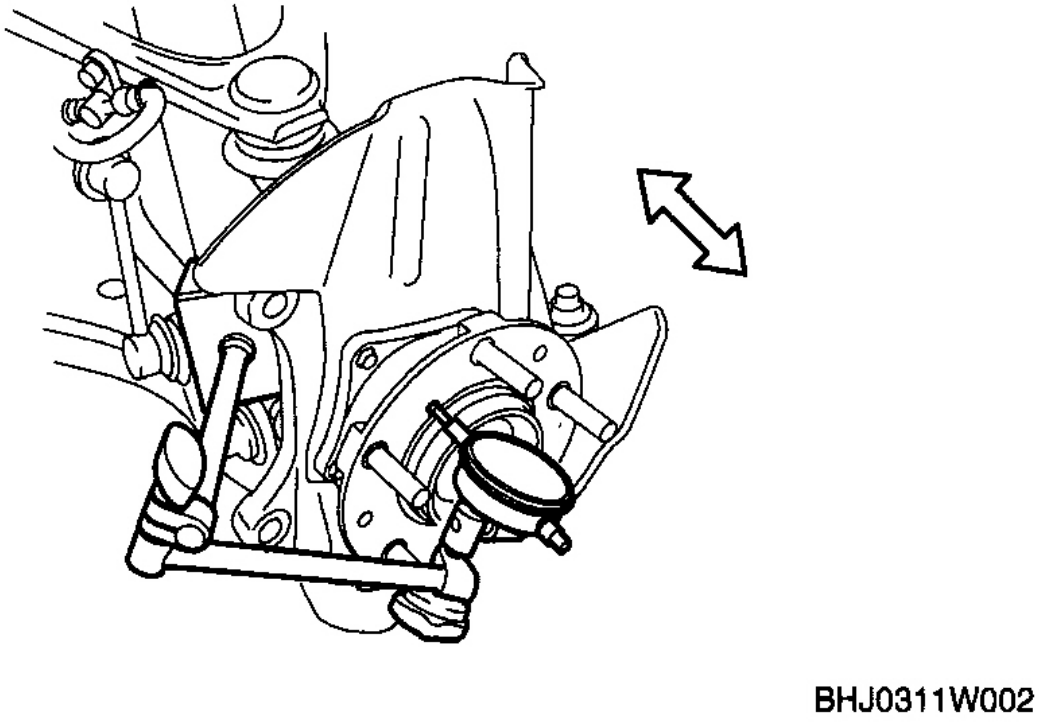


Fig. 2: Inspect Wheel Bearing For Axial Looseness
Courtesy of MAZDA MOTORS CORP.

FRONT WHEEL HUB BOLT REPLACEMENT

1. Remove the brake caliper component and disc plate.
2. Remove the wheel hub bolt using the **SST** as shown in **Fig. 3** .

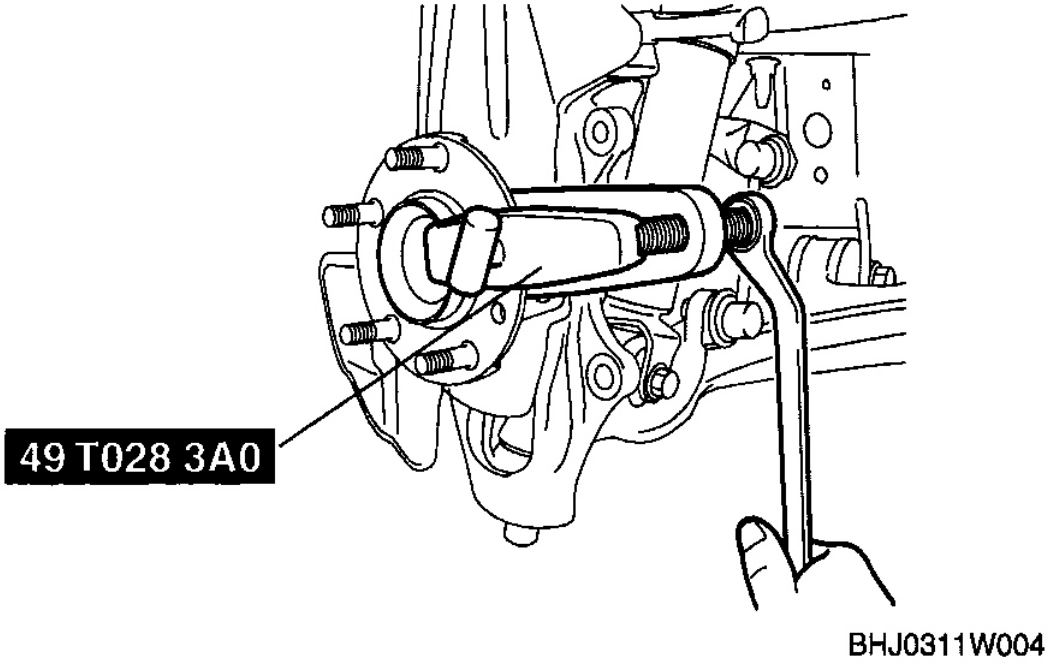


Fig. 3: Removing Wheel Hub Bolt Using SST
Courtesy of MAZDA MOTORS CORP.

3. Place a new wheel hub bolt in the wheel hub.
4. Install the wheel hub bolt by placing a proper sized washer on the hub, and tightening the nut as shown in **Fig. 4** .

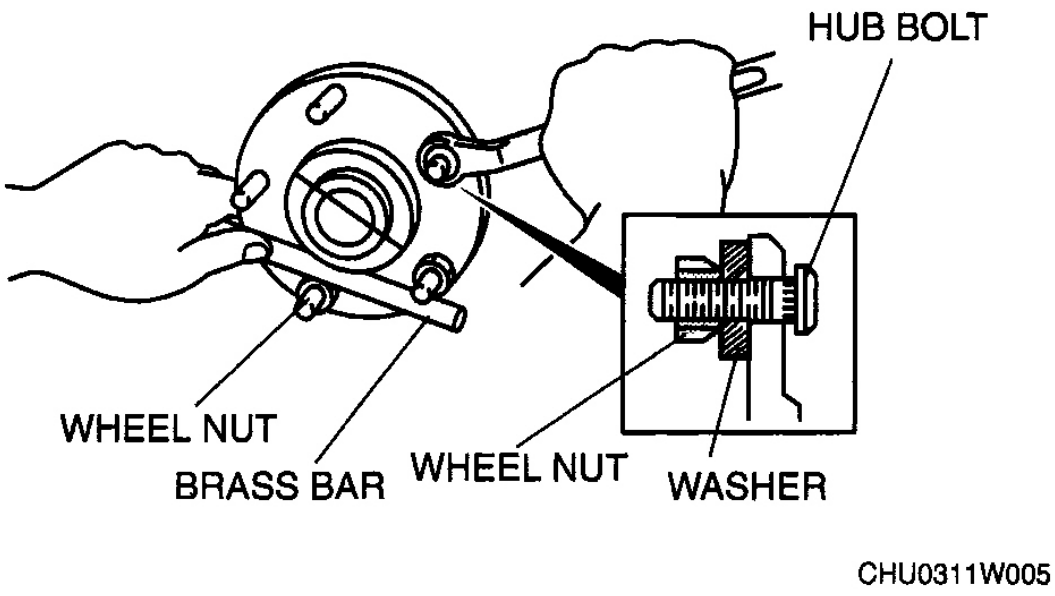


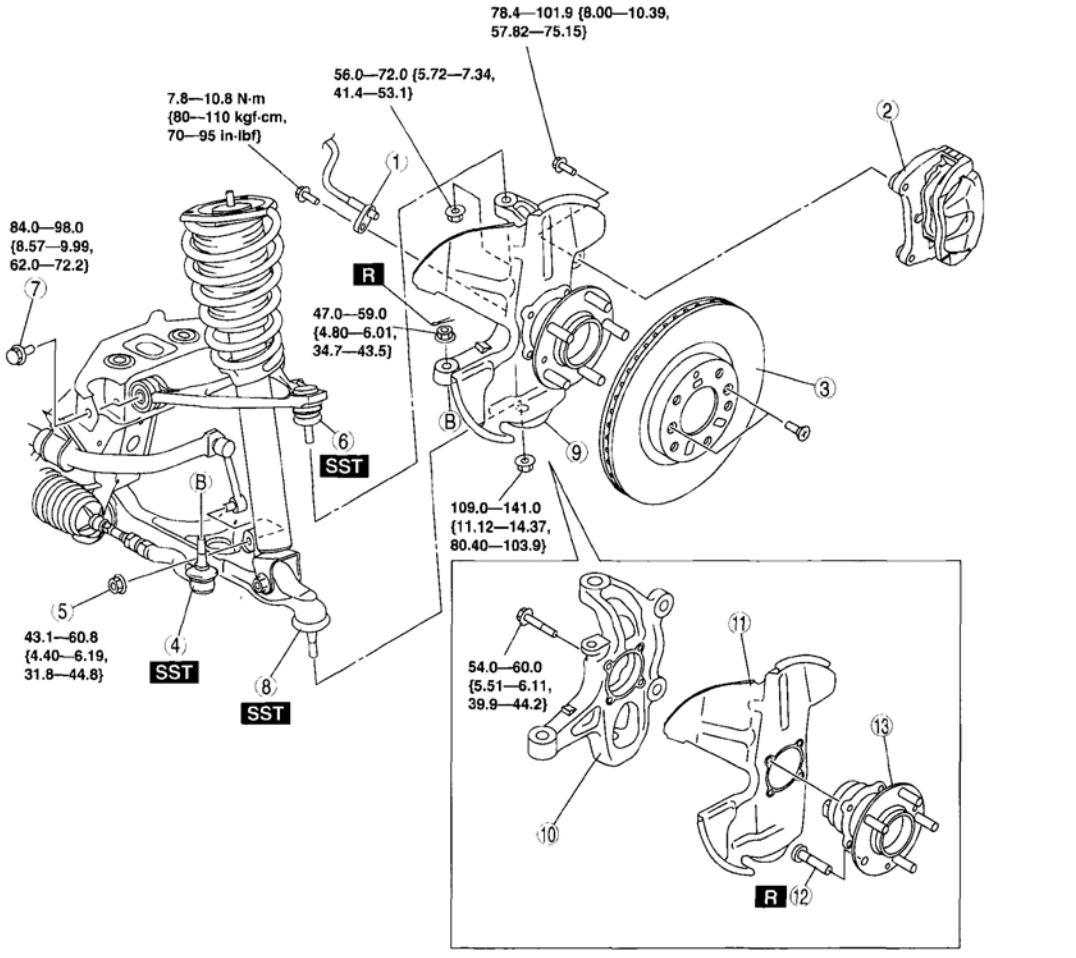
Fig. 4: Installing Wheel Hub Bolt By Placing Proper Sized Washer On Hub & Tightening Nut
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION

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, disconnect the ABS wheel-speed sensor harness connector (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 **Fig. 5** .
2. Install in the reverse order of removal.
3. After installation, inspect front wheel alignment. (See **FRONT WHEEL ALIGNMENT** .)



1	ABS wheel-speed sensor
2	Brake caliper component
3	Disc plate
4	Tie-rod end
5	Stabilizer control link nut (lower)
6	Front upper arm ball joint
7	Front upper arm bolt

8	Front lower arm ball joint
9	Steering knuckle component
10	Steering knuckle
11	Dust cover
12	Wheel hub bolt
13	Wheel hub component

Fig. 5: Identifying Wheel Hub, Steering Knuckle Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

BRAKE CALIPER COMPONENT REMOVAL NOTE

1. Suspend the brake caliper component using a cable or equivalent.

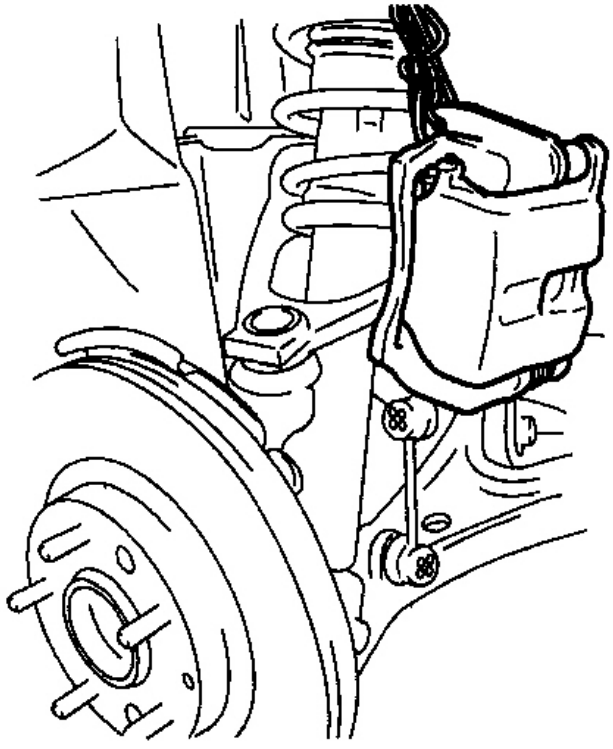


Fig. 6: Suspending Brake Caliper
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB BOLT REMOVAL NOTE

NOTE:

- **Remove the wheel hub bolt only if there is an abnormality.**

1. Remove the wheel hub bolts from the wheel hub using a press.

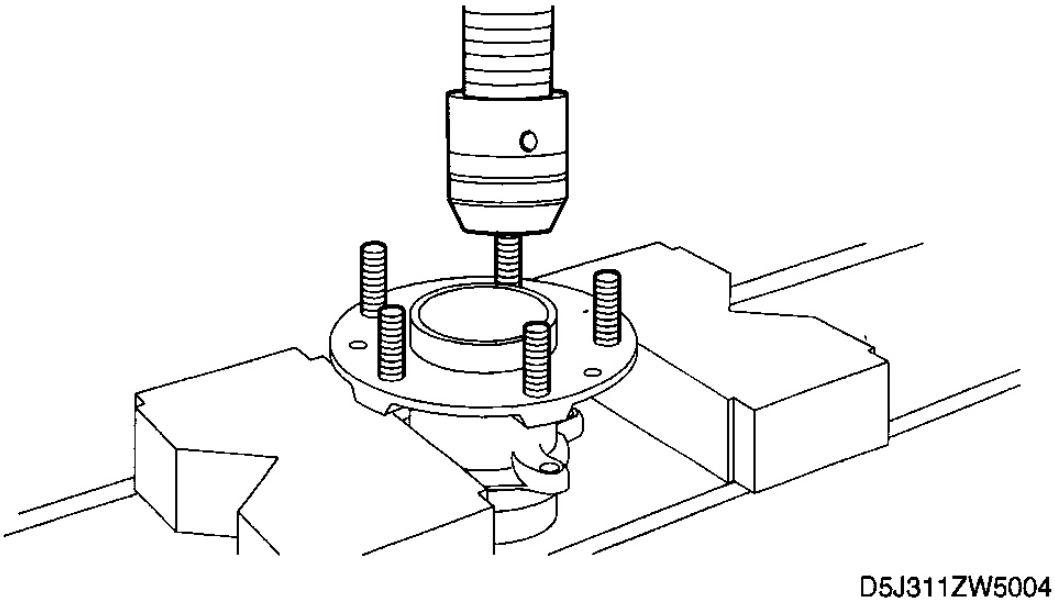


Fig. 7: Removing Wheel Hub Bolts From Wheel Hub Using Press
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB BOLT INSTALLATION NOTE

1. Press in new wheel hub bolts into the wheel hub using a press.

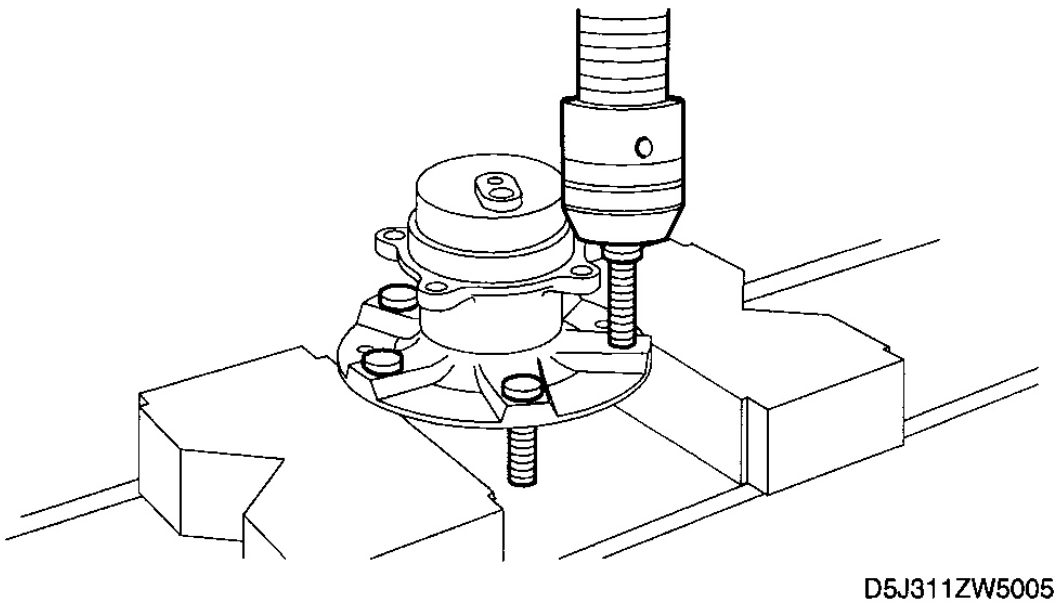
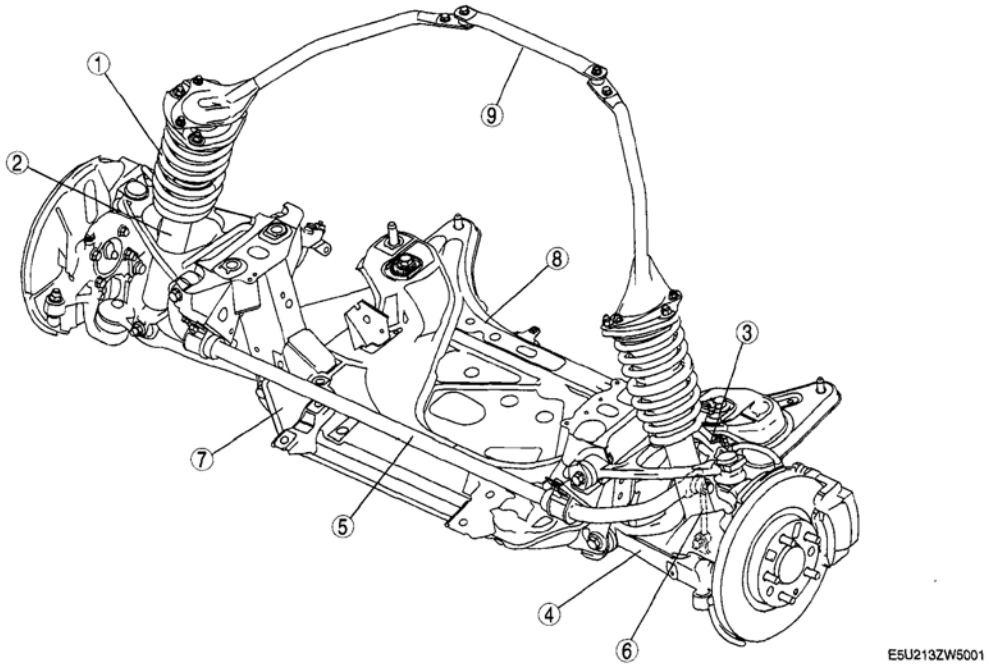


Fig. 8: Pressing New Wheel Hub Bolts Into Wheel Hub Using Press
Courtesy of MAZDA MOTORS CORP.

2008 SUSPENSION

Front Suspension - MX-5 Miata

FRONT SUSPENSION LOCATION INDEX



1	Front shock absorber and coil spring
2	Front shock absorber
3	Front upper arm
4	Front lower arm

5	Front stabilizer
6	Stabilizer control link
7	Front crossmember
8	Transverse member
9	Front suspension tower bar

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Fig. 1: Identifying Location Of Front Suspension Components
Courtesy of MAZDA MOTORS CORP.

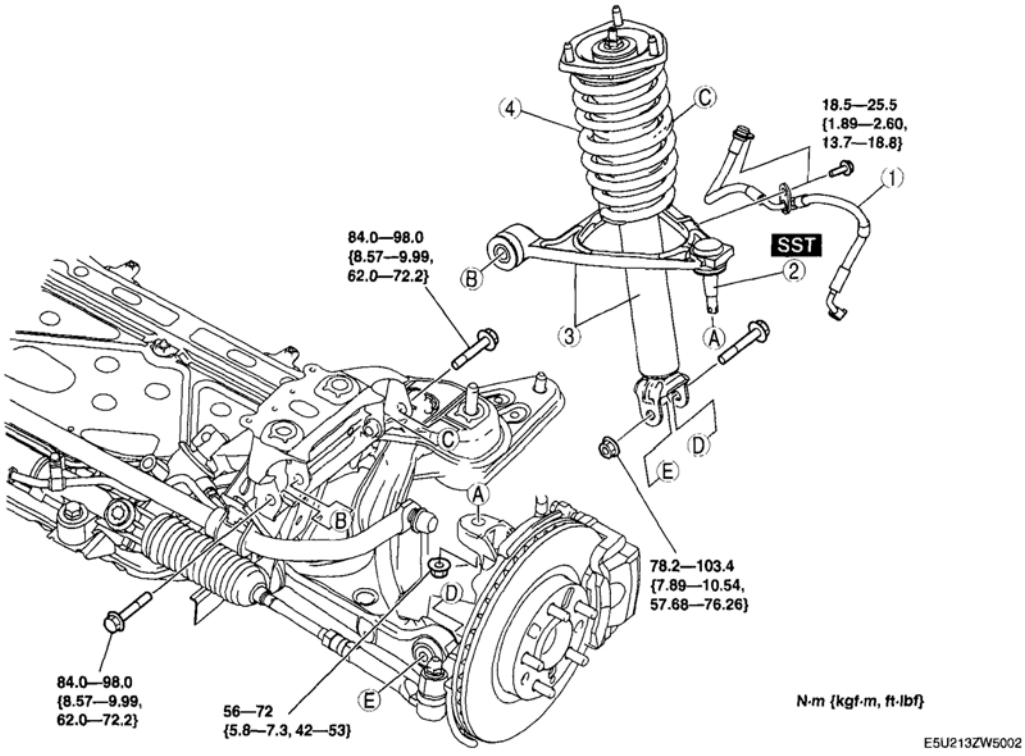
FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

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 **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 **FRONT WHEEL ALIGNMENT** .)



1	Brake hose bracket	3	Front shock absorber, coil spring and front upper arm
2	Front upper arm ball joint	4	Front shock absorber and coil spring

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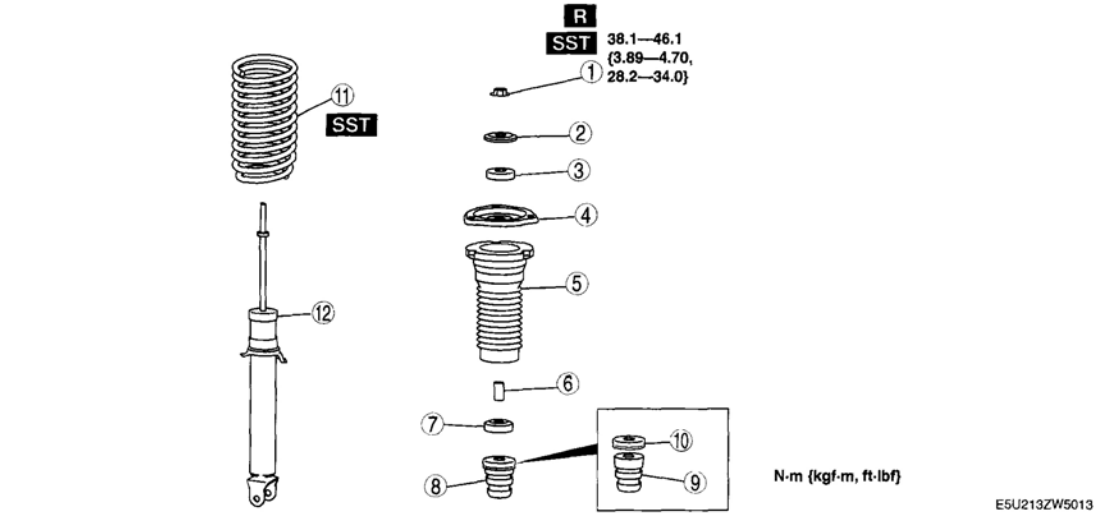
Fig. 2: Identifying Front Shock Absorber & Coil Spring Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

FRONT SHOCK ABSORBER AND COIL SPRING DISASSEMBLY/ASSEMBLY

WARNING:

- **Removing/installing the shock absorber and coil spring is dangerous. The shock absorber and coil spring could fly off and cause serious injury or death, and damage the vehicle.**

1. Remove the front shock absorber and coil spring. (See **FRONT SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION** .)
2. Remove in the order indicated in **Fig. 3** .
3. Install in the reverse order of removal.



1	Piston rod nut	7	Bushing
2	Retainer	8	Stopper casing and bound stopper
3	Bushing	9	Bound stopper
4	Upper spring seat	10	Stopper casing
5	Dust boot	11	Coil spring
6	Spacer	12	Front shock absorber

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Fig. 3: Identifying Front Shock Absorber & Coil Spring Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

PISTON ROD NUT REMOVAL NOTE

WARNING:

- **Before removing the piston rod nut, secure the shock absorber and spring in the SSTs. Otherwise, the shock absorber and spring could fly off under tremendous pressure and cause serious injury or death, or damage to vehicle parts.**

1. Protect the coil spring from scratches using a piece of cloth and install the **SSTs** .
2. Compress the coil spring using the **SSTs** and remove the piston rod nut.

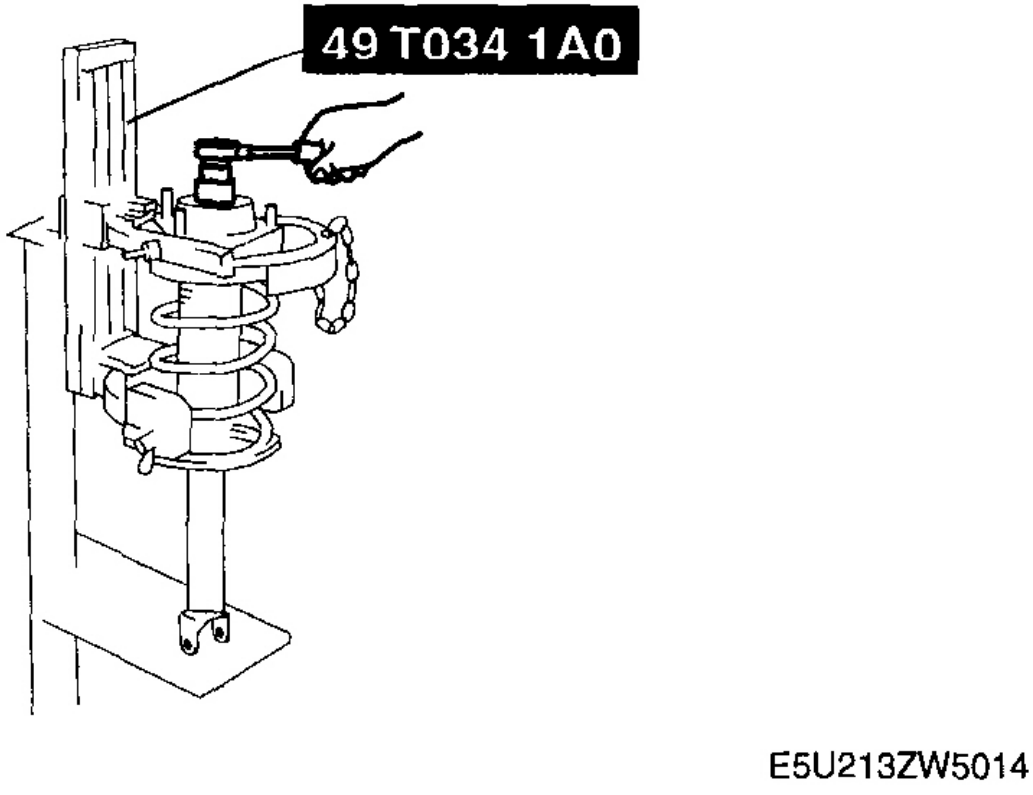


Fig. 4: Compressing Coil Spring Using SST's & Removing Piston Rod Nut
Courtesy of MAZDA MOTORS CORP.

COIL SPRING INSTALLATION NOTE

1. Protect the coil spring from scratches using a piece of cloth and install the **SSTs** .
2. Compress the coil spring using the **SSTs** .
3. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.

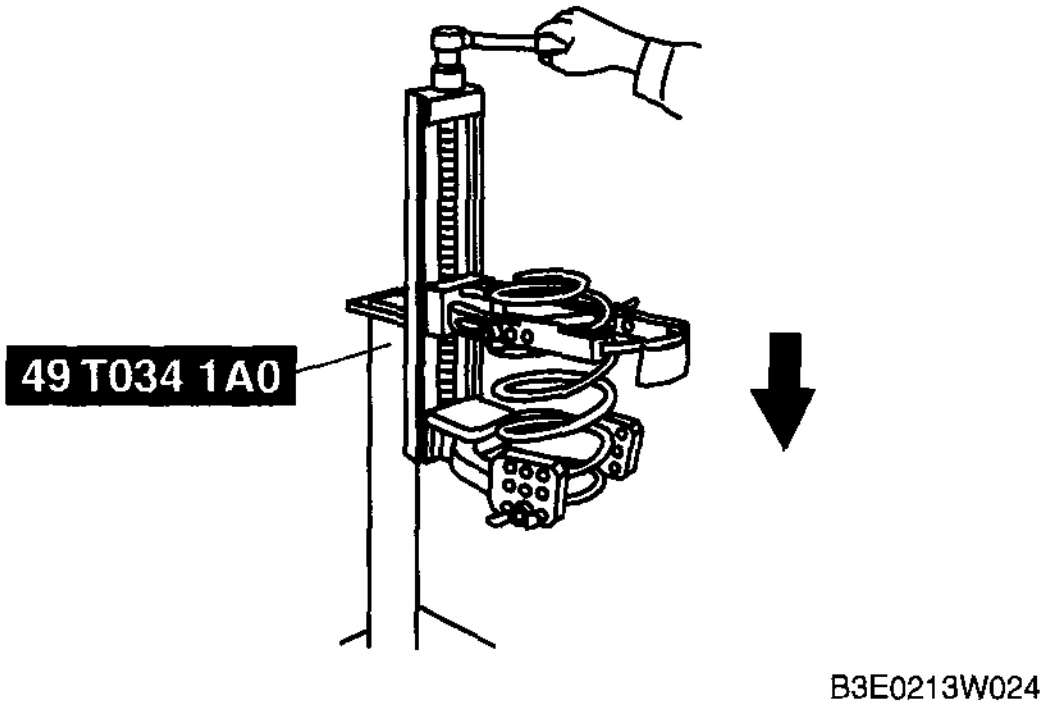


Fig. 5: Compressing Coil Spring Using SSTs
Courtesy of MAZDA MOTORS CORP.

UPPER SPRING SEAT INSTALLATION NOTE

1. Align the mark on the upper spring seat with the dust boot projection.

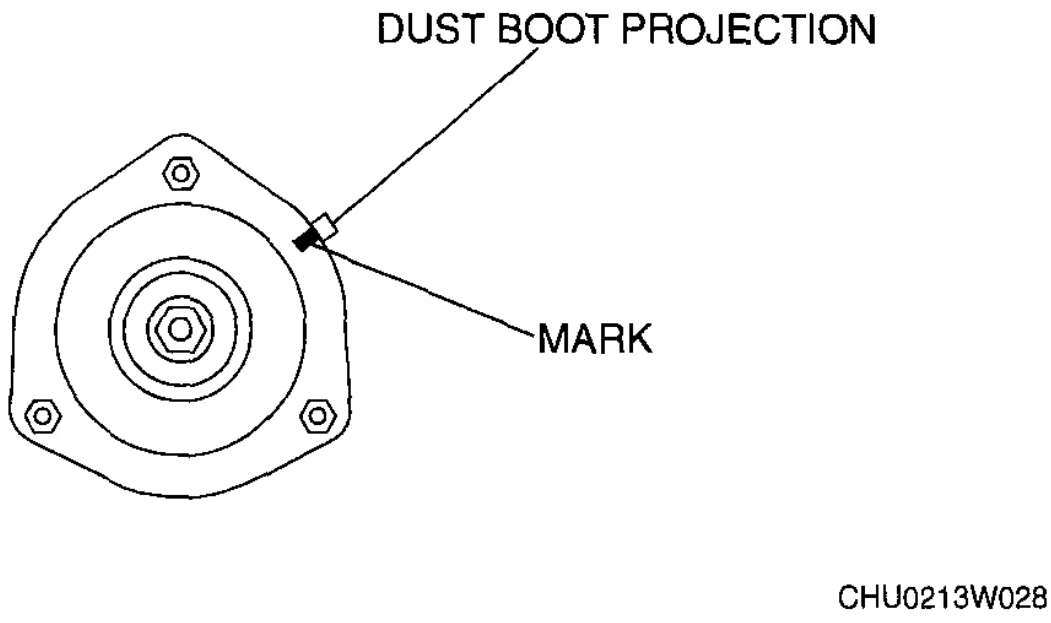


Fig. 6: Aligning Mark On Upper Spring Seat With Dust Boot Projection
Courtesy of MAZDA MOTORS CORP.

2. Install the upper spring seat so that the upper spring seat stud is at a **27°-33°** angle to the shock absorber installation shaft (lower side).

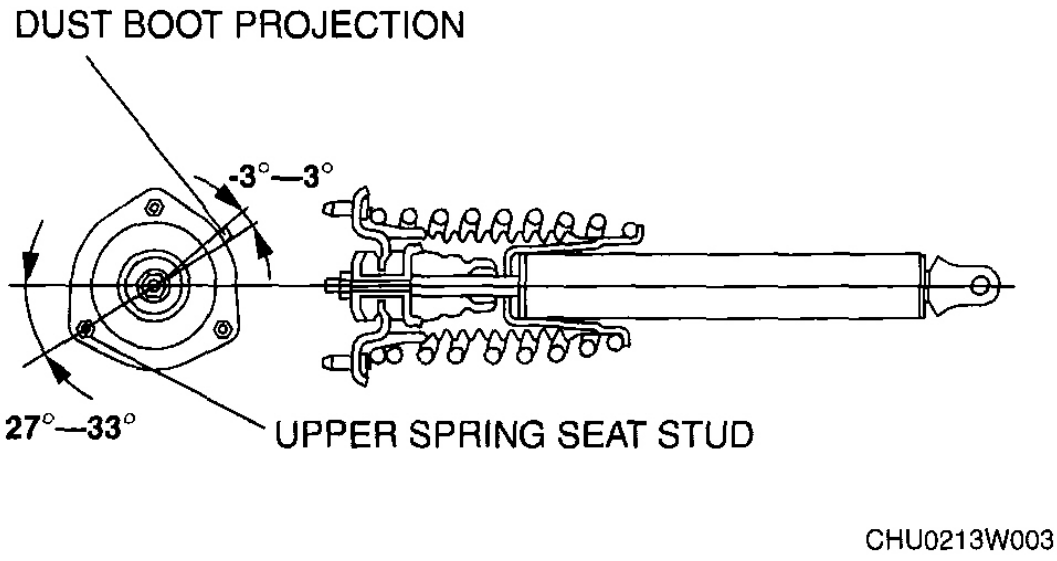


Fig. 7: Identifying Upper Spring Seat Stud Angle
Courtesy of MAZDA MOTORS CORP.

FRONT SHOCK ABSORBER INSPECTION

1. Remove the front shock absorber.
2. Inspect for damage and oil leakage.
3. Compress and extend the shock absorber piston rod at least three times at a steady speed. From the fourth compression stroke, verify that the operational force does not change and that there is no unusual noise.
    - If there is any malfunction, replace the shock absorber.

FRONT SHOCK ABSORBER DISPOSAL

WARNING:

- **Whenever drilling into a shock absorber, wear protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.**

1. Clamp the shock absorber on a flat surface.
2. Drill a **2-3 mm {0.08-0.12 in}** hole at a point **25 mm {0.98 in}** from the bottom of the tube, so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of waste oil according to local waste disposal law.

NOTE:

- **Shock absorber gas contains nitrogen gas.**
- **Shock absorber oil contains mineral oil.**

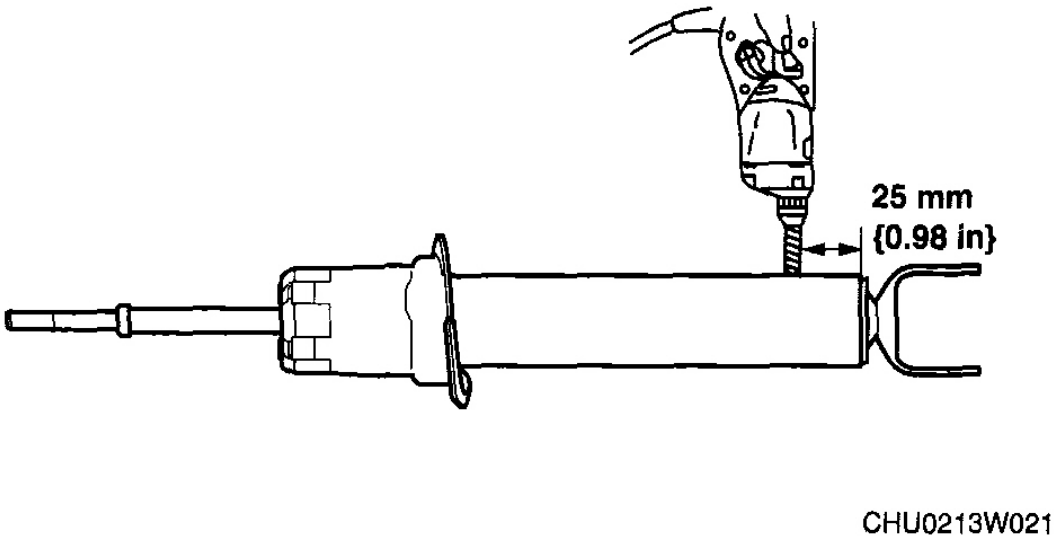


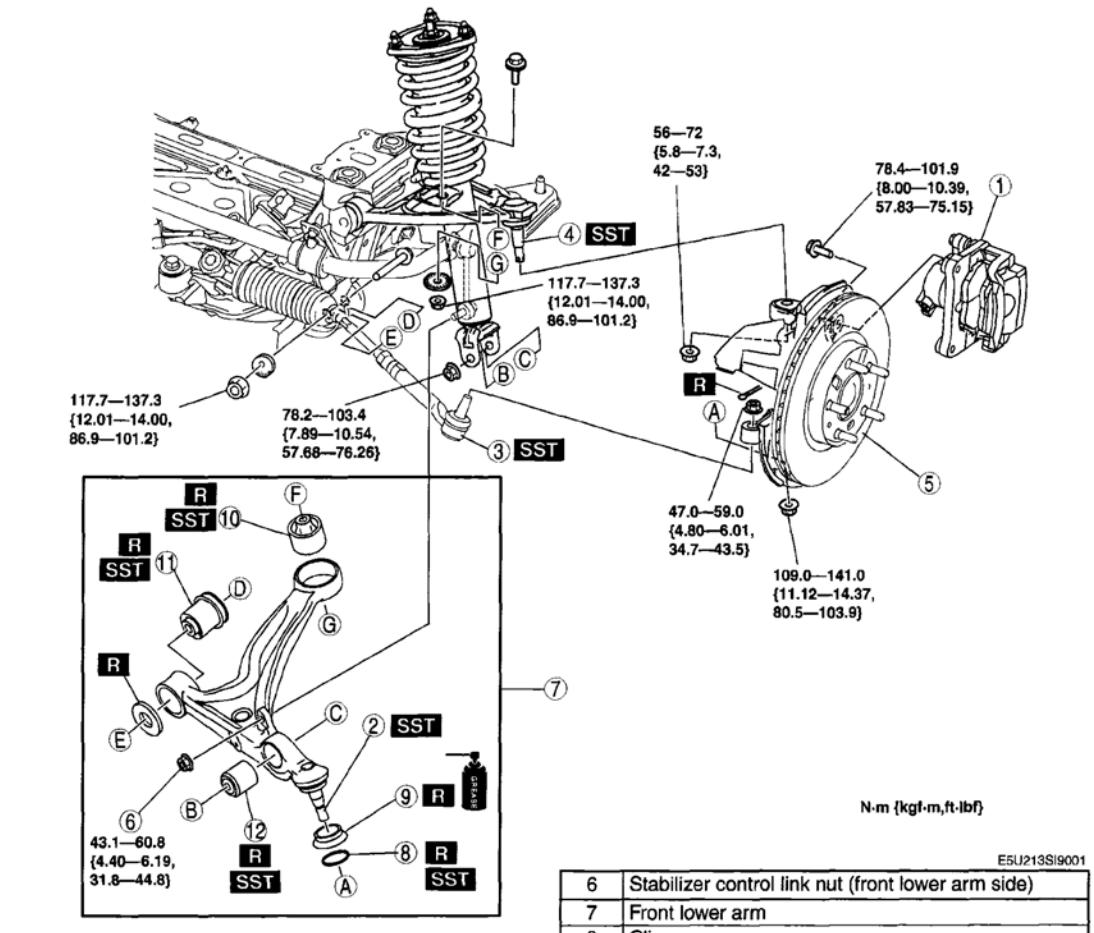
Fig. 8: Drilling Hole From Bottom Of Tube
Courtesy of MAZDA MOTORS CORP.

FRONT LOWER ARM REMOVAL/INSTALLATION

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 in the order indicated in **Fig. 9** .
2. Install in the reverse order of removal.



1	Caliper and mounting support
2	Front lower arm ball joint
3	Tie-rod end
4	Front upper arm ball joint
5	Front hub and steering knuckle component

6	Stabilizer control link nut (front lower arm side)
7	Front lower arm
8	Clip
9	Dust boot
10	Bushing (rear side)
11	Bushing (front side)
12	Bushing (shock absorber lower side connecting part)

Fig. 9: Identifying Front Lower Arm Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

CALIPER AND MOUNTING SUPPORT REMOVAL NOTE

1. Remove the caliper and mounting support from the steering knuckle and suspend it with a cable in a location out of the way.

FRONT LOWER ARM BALL JOINT REMOVAL NOTE

1. Disconnect the front lower arm ball joint from the steering knuckle using the **SST** .

NOTE:

- **When removing the front lower arm ball joint, the steering knuckle**

bushing may also come off. If it comes off, replace the steering knuckle.

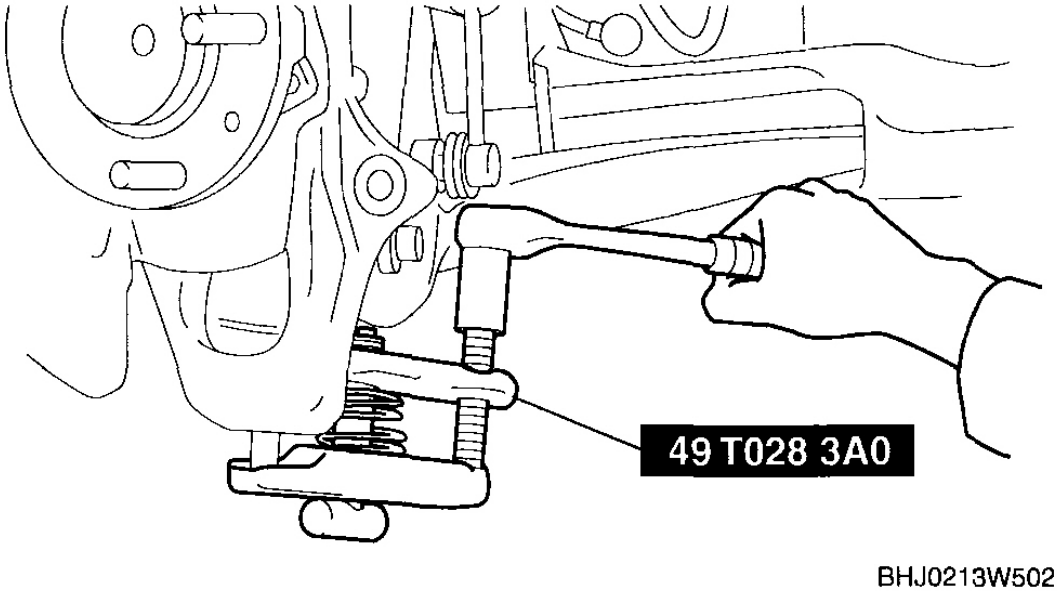


Fig. 10: Disconnecting Front Lower Arm Ball Joint From Steering Knuckle Using SST
Courtesy of MAZDA MOTORS CORP.

FRONT UPPER ARM BALL JOINT REMOVAL NOTE

1. Loosen the bolts on the vehicle side.
2. Disconnect the upper arm ball joint using the **SST** .

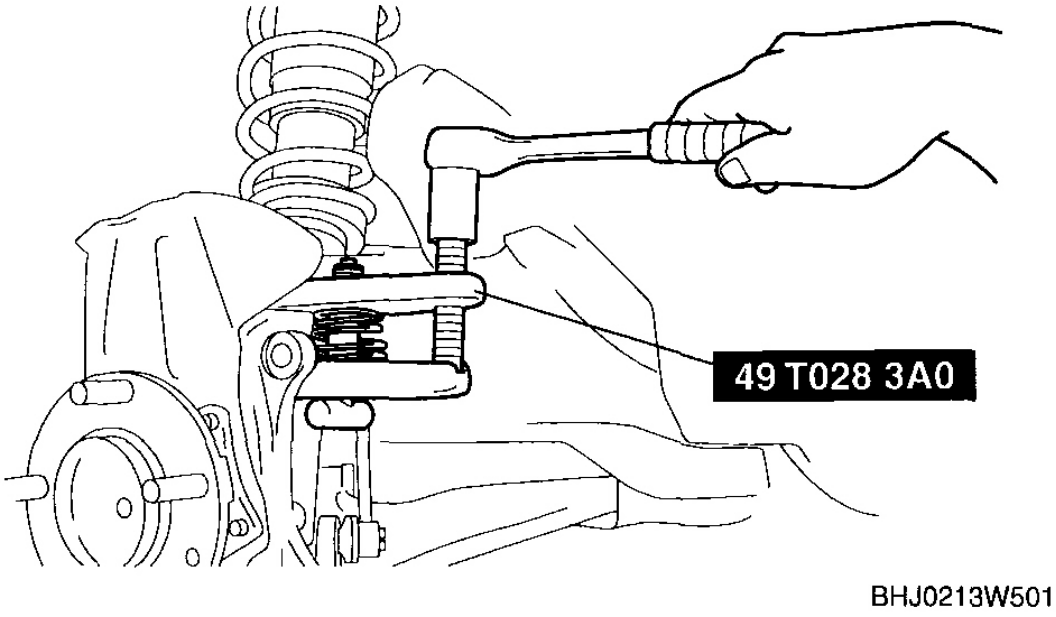


Fig. 11: Disconnecting Front Upper Arm Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

BUSHING (REAR SIDE) REMOVAL NOTE

CAUTION:
- **Be careful not to damage the front lower arm. If it is damaged, replace it.**

1. Mark the front upper arm as shown in **Fig. 12** .

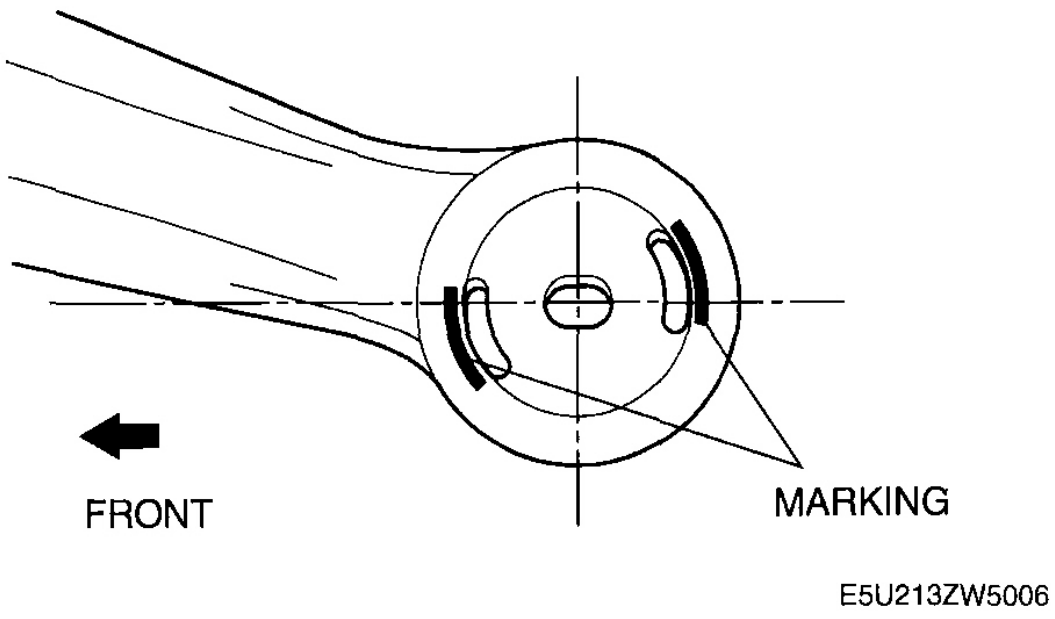


Fig. 12: Identifying Mark On Front Upper Arm
Courtesy of MAZDA MOTORS CORP.

2. Remove the bushing using the **SSTs** .

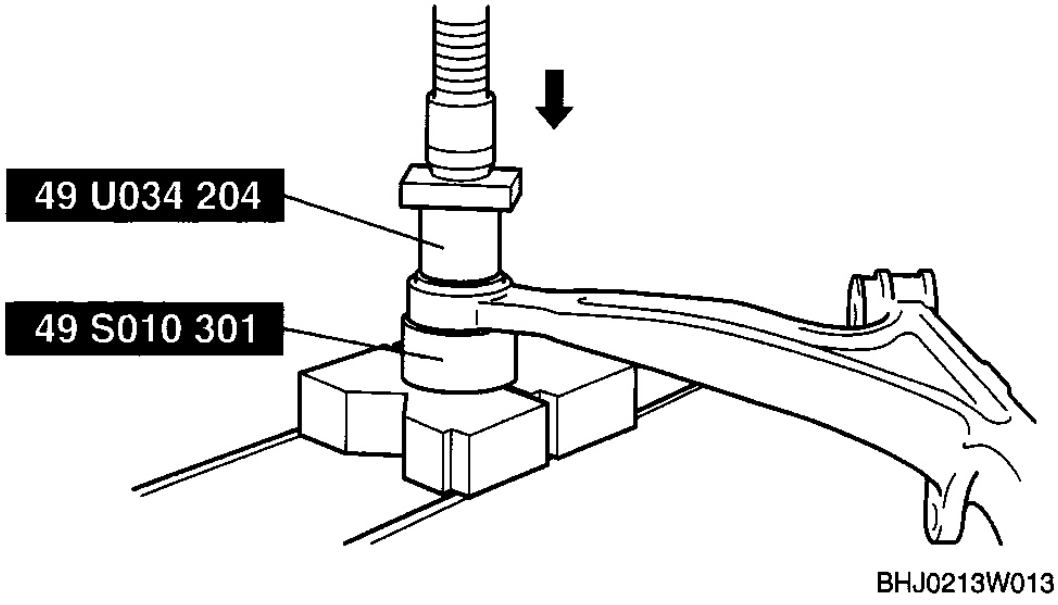


Fig. 13: Removing Bushing Using SST's
Courtesy of MAZDA MOTORS CORP.

BUSHING (FRONT SIDE) REMOVAL NOTE

CAUTION:
- **Be careful not to damage the front lower arm. If it is damaged, replace it.**

1. Cut off the stopper plate rubber using a razor.

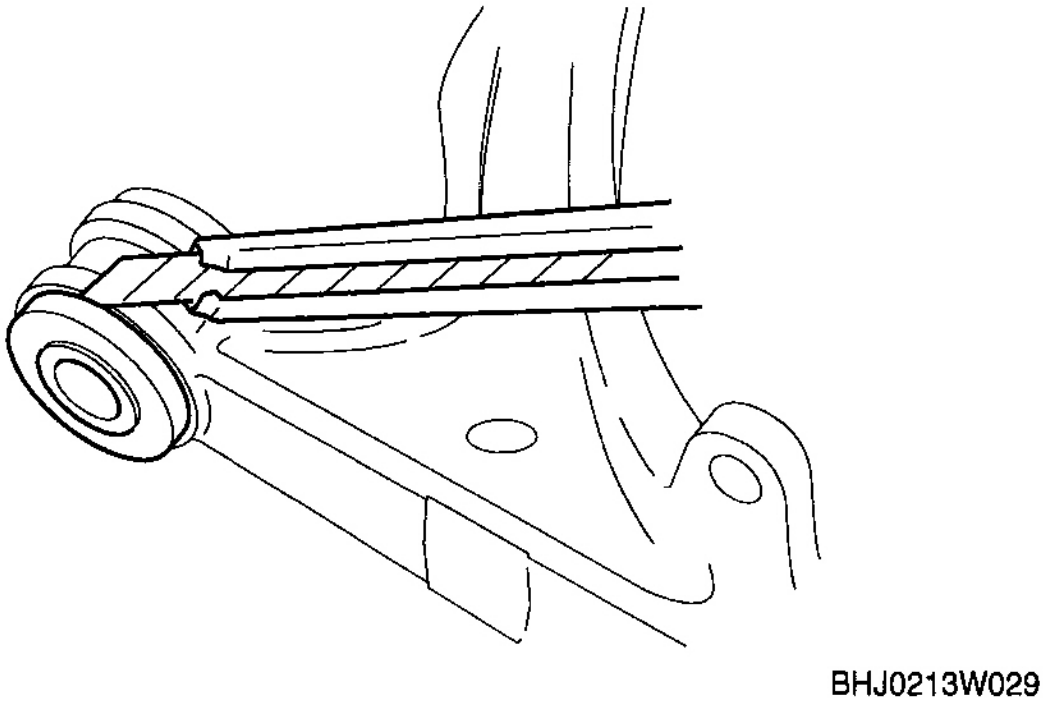


Fig. 14: Cutting Off Stopper Plate Rubber Using Razor
Courtesy of MAZDA MOTORS CORP.

2. Cut off **5-6 mm {0.20-0.23 in}** from each side of the knob end of the bushing using a hacksaw.

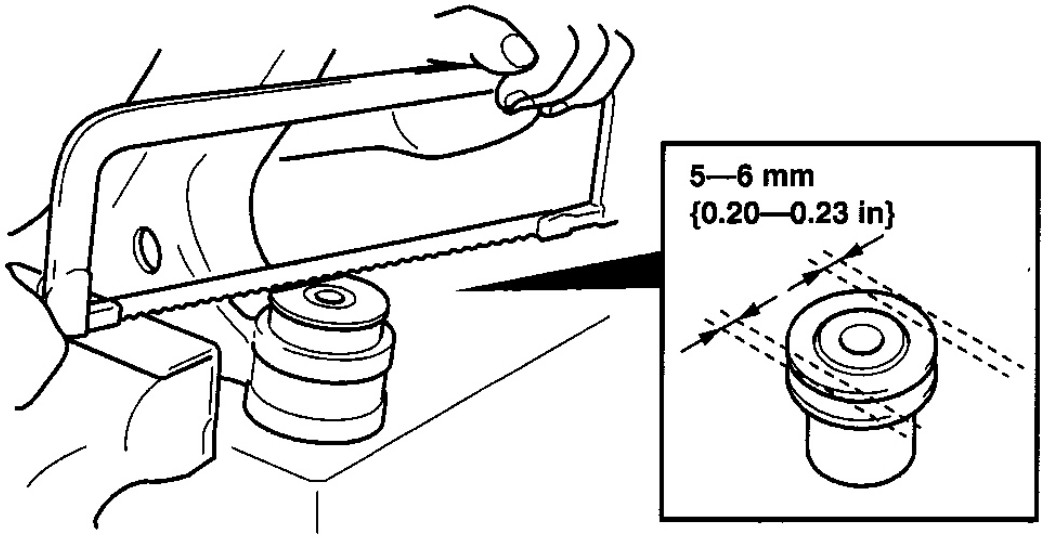


Fig. 15: Cutting Off From Each Side Of Knob End Of Bushing Using Hacksaw
Courtesy of MAZDA MOTORS CORP.

3. Remove the bushing using the **SSTs** .

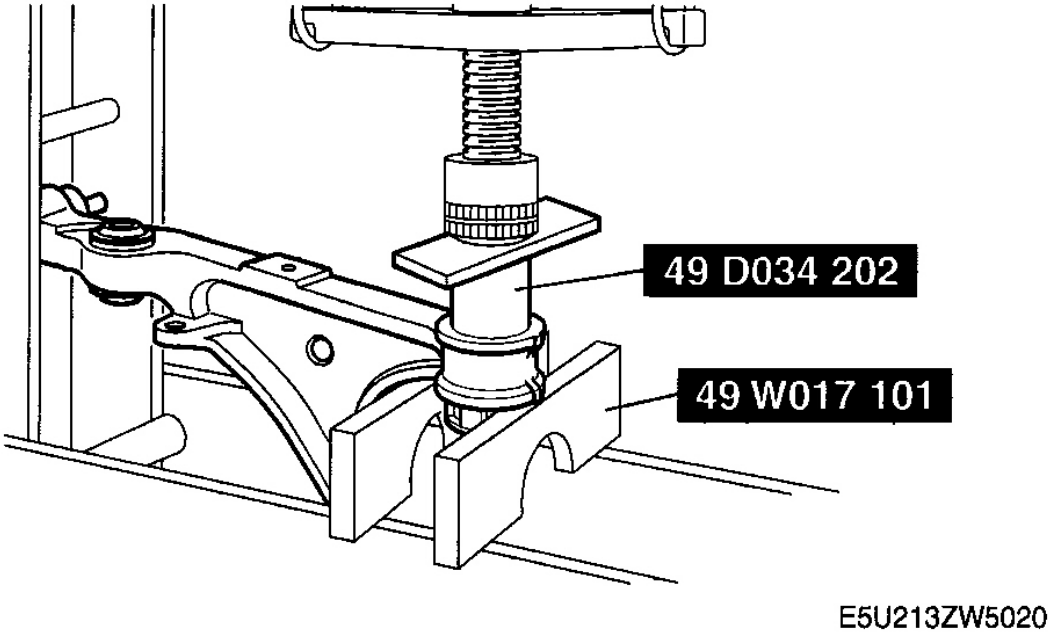


Fig. 16: Removing Bushing Using SST's
Courtesy of MAZDA MOTORS CORP.

BUSHING (SHOCK ABSORBER LOWER SIDE CONNECTING PART) REMOVAL NOTE

CAUTION:
- **Be careful not to damage the front lower arm. If it is damaged, replace it.**

1. Remove the bushing using the **SSTs** .

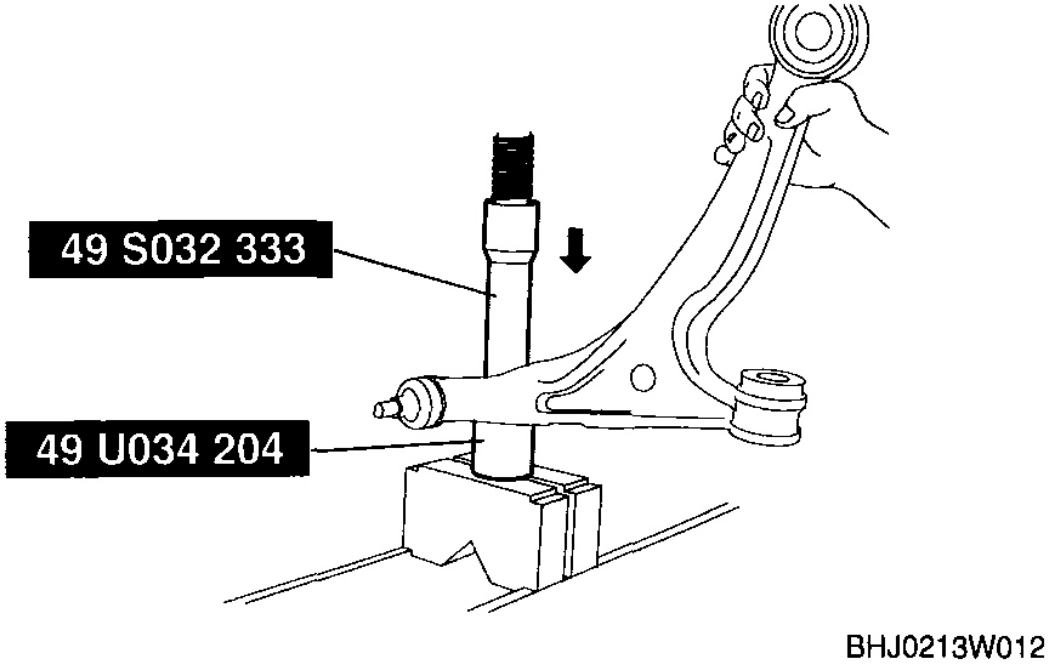


Fig. 17: Removing Bushing Using SSTs
Courtesy of MAZDA MOTORS CORP.

BUSHING (SHOCK ABSORBER LOWER SIDE CONNECTING PART) INSTALLATION NOTE

1. Compress the bushing using the **SSTs** .

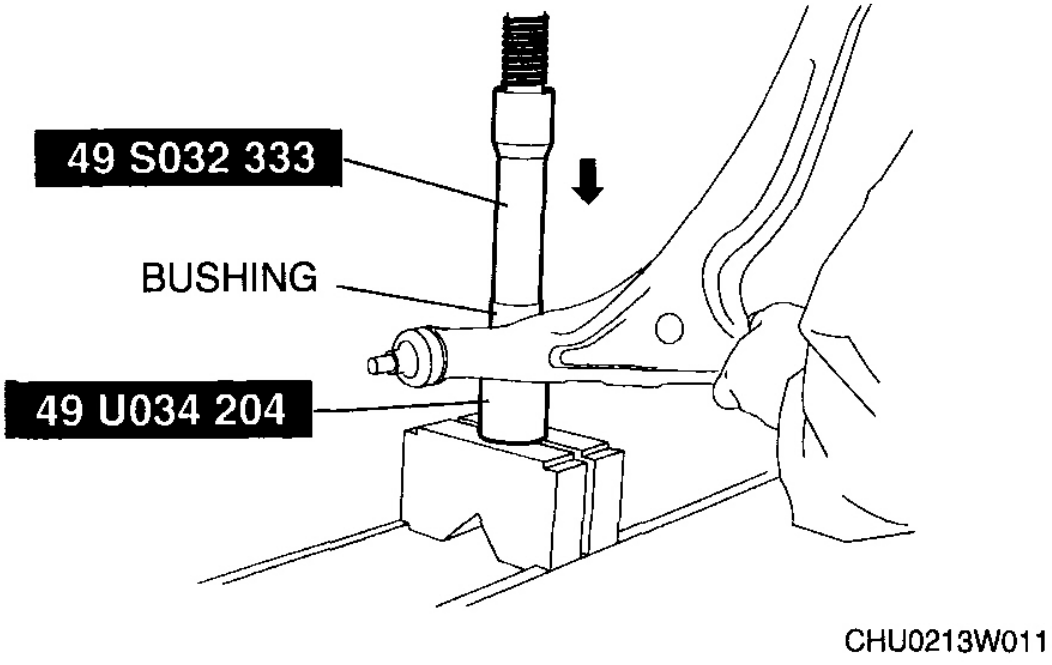


Fig. 18: Compressing Bushing Using SSTs
Courtesy of MAZDA MOTORS CORP.

BUSHING (FRONT SIDE) INSTALLATION NOTE

1. Press the bushing in using the **SSTs** .

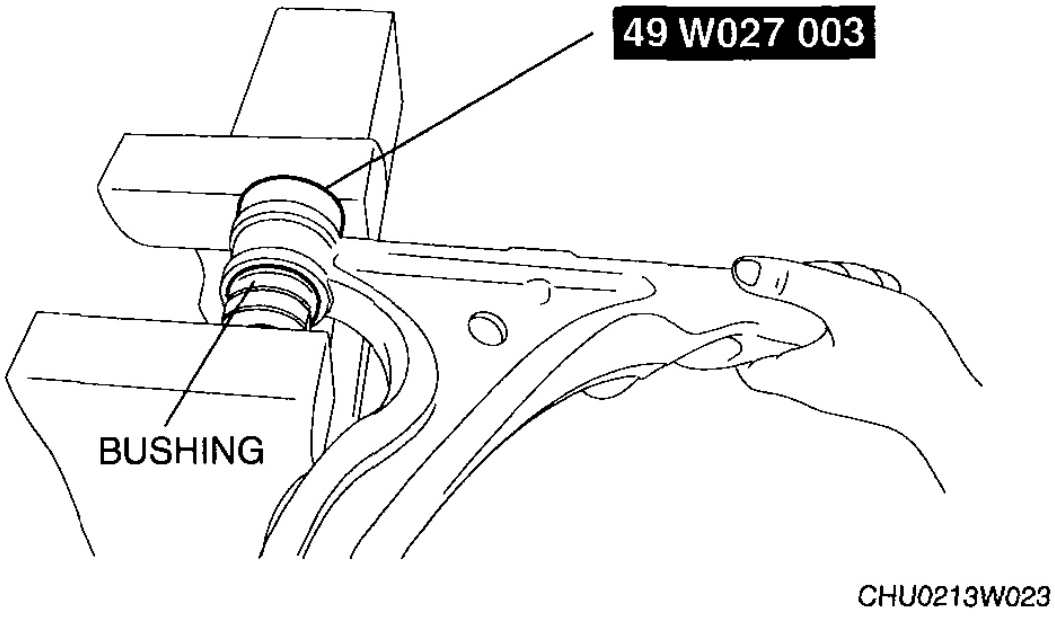


Fig. 19: Pressing Bushing In Using SSTs
Courtesy of MAZDA MOTORS CORP.

2. Insert the stopper plate rubber into the inner pipe of the bushing (front side).

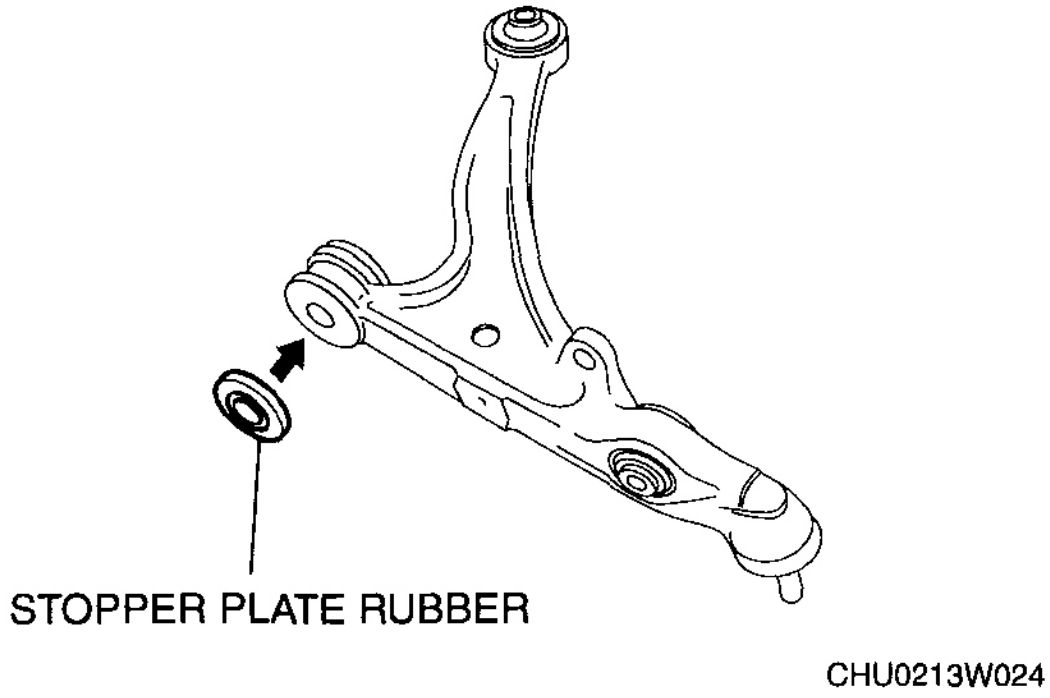


Fig. 20: Inserting Stopper Plate Rubber Into Inner Pipe Of Bushing (Front Side)
Courtesy of MAZDA MOTORS CORP.

BUSHING (REAR SIDE) INSTALLATION NOTE

1. Align the marks placed during removal and install the bushing.

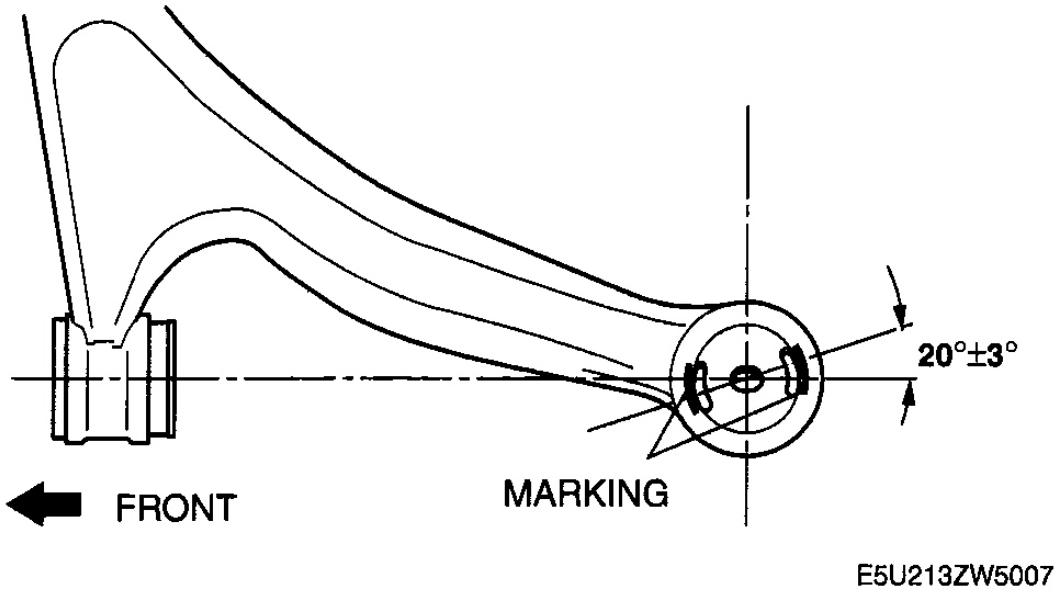


Fig. 21: Aligning Match Marks
Courtesy of MAZDA MOTORS CORP.

2. Press the bushing in using the **SSTs** .

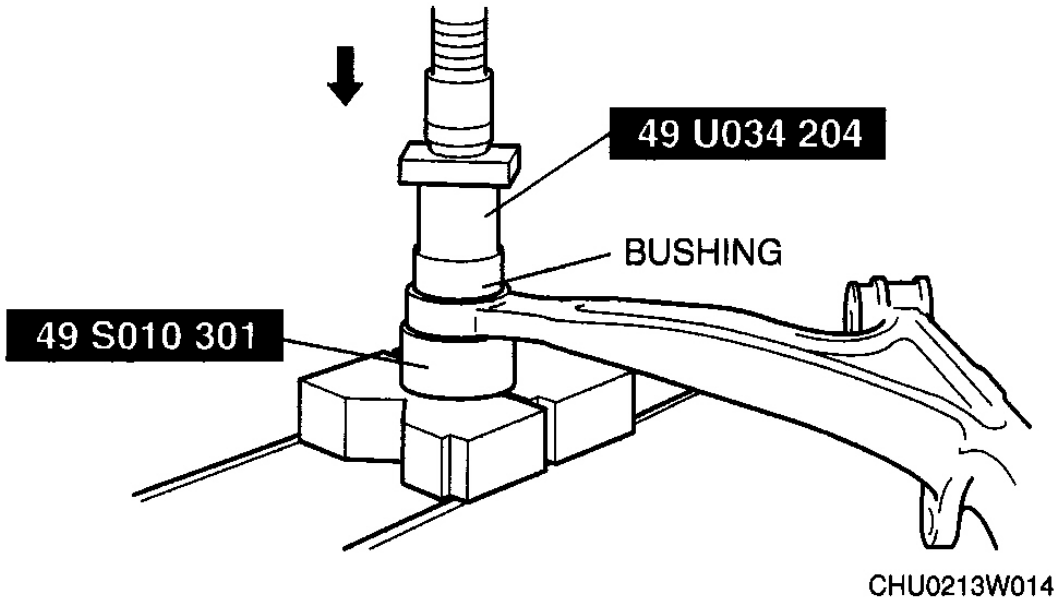


Fig. 22: Pressing Bushing In Using SSTs
Courtesy of MAZDA MOTORS CORP.

CLIP INSTALLATION NOTE

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Install the dust boot to the ball joint.
4. Install the clip using the **SST** .
5. Verify that the clip is installed securely to the groove.

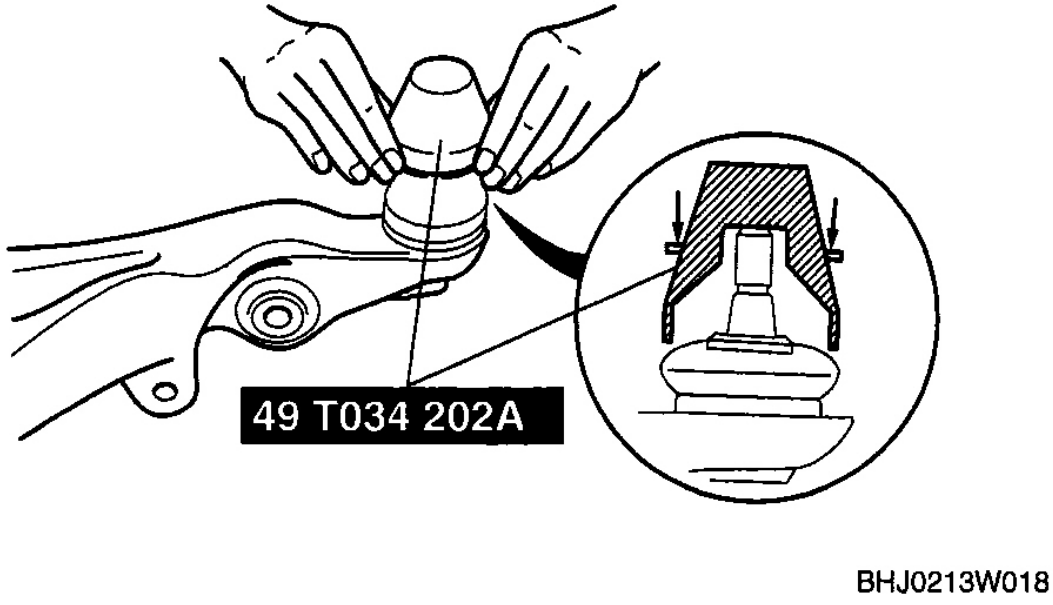


Fig. 23: Installing Dust Boot To Ball Joint
Courtesy of MAZDA MOTORS CORP.

6. Wipe off any excess grease.

FRONT LOWER ARM INSTALLATION NOTE

1. Install the front lower arm rear side bushing part horizontally.
2. Install the front lower arm front side bushing part.

FRONT LOWER ARM INSPECTION

1. Remove the front lower arm from the vehicle. (See **FRONT LOWER ARM**

REMOVAL/INSTALLATION .)

2. Inspect the front lower arm for bending or damage. If there is any malfunction, replace it.
3. Inspect the ball joint for excessive play. If there is any malfunction, replace the front lower arm.
4. Rotate the ball joint **5 times** .
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

Front lower arm ball joint rotational torque

0.4-2.9 N.m {5-29 kgf.cm, 4-25 in.lbf}

- If not within the specification, replace the front lower arm. (See **FRONT LOWER ARM REMOVAL/INSTALLATION** .)

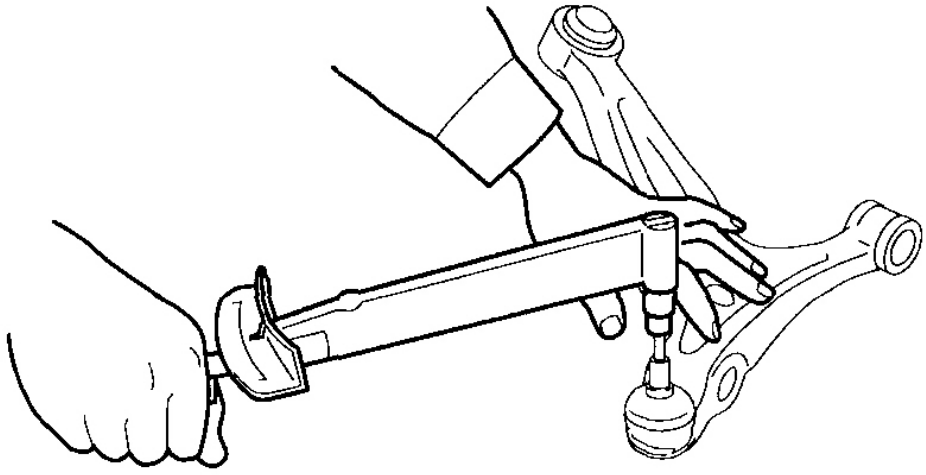


Fig. 24: Measuring Ball-Joint Rotational Torque
Courtesy of MAZDA MOTORS CORP.

FRONT UPPER ARM INSPECTION

1. Remove the front upper arm from the vehicle. (See **FRONT UPPER ARM REMOVAL/INSTALLATION** .)
2. Inspect the front upper arm for bending or damage. If there is any malfunction, replace it.
3. Inspect the ball joint for excessive play, and if there is any malfunction, replace the front upper arm.
4. Rotate the ball joint **5 times** .

5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Front upper arm ball joint rotational torque

   0.3-2.2 N.m {4-22 kgf.cm, 3-19 in.lbf}

   - If not within the specification, replace the front upper arm. (See **FRONT UPPER ARM REMOVAL/INSTALLATION** .)

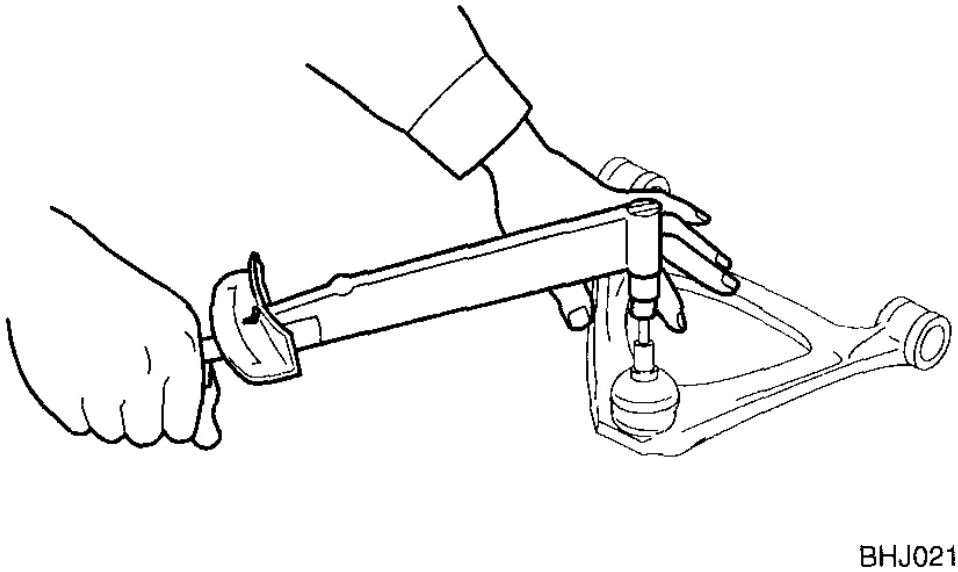
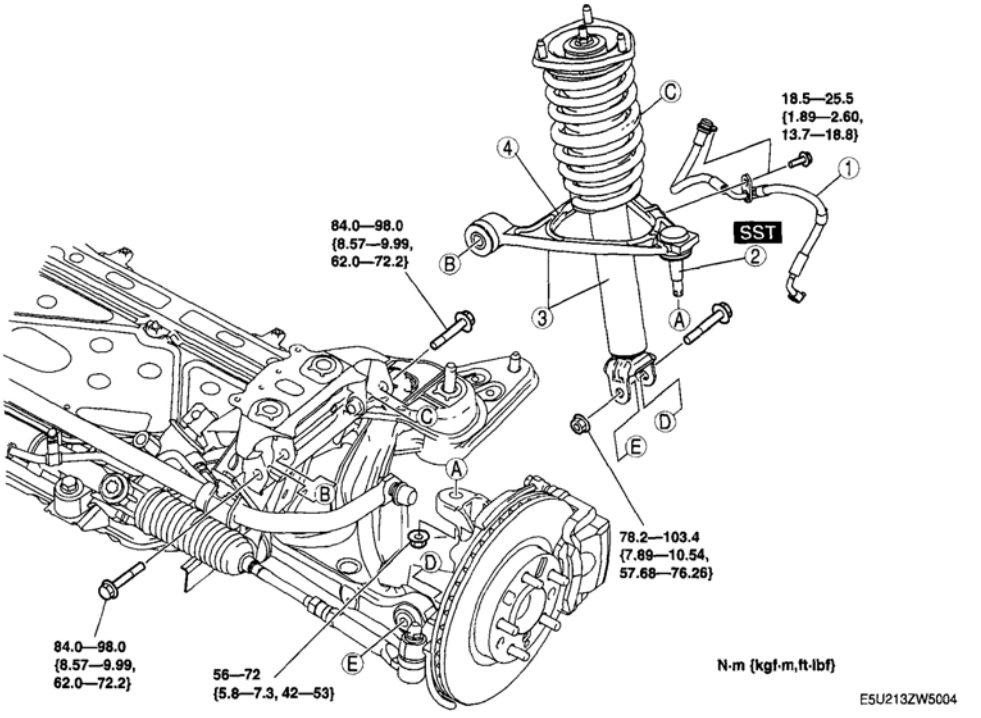


Fig. 25: Measuring Ball-Joint Rotational Torque Using Allen Wrench & Torque Wrench
Courtesy of MAZDA MOTORS CORP.

FRONT UPPER ARM REMOVAL/INSTALLATION

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 in the order indicated in **Fig. 26** .
2. Install in the reverse order of removal.
3. Inspect the front wheel alignment and adjust it if necessary. (See **FRONT WHEEL ALIGNMENT** .)



1	Brake hose bracket	3	Front shock absorber, coil spring and front upper arm
2	Front upper arm ball joint	4	Front upper arm

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Fig. 26: Identifying Front Upper Arm Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

FRONT UPPER ARM BALL JOINT REMOVAL NOTE

1. Remove the front upper arm ball joint from the steering knuckle using the **SST** .

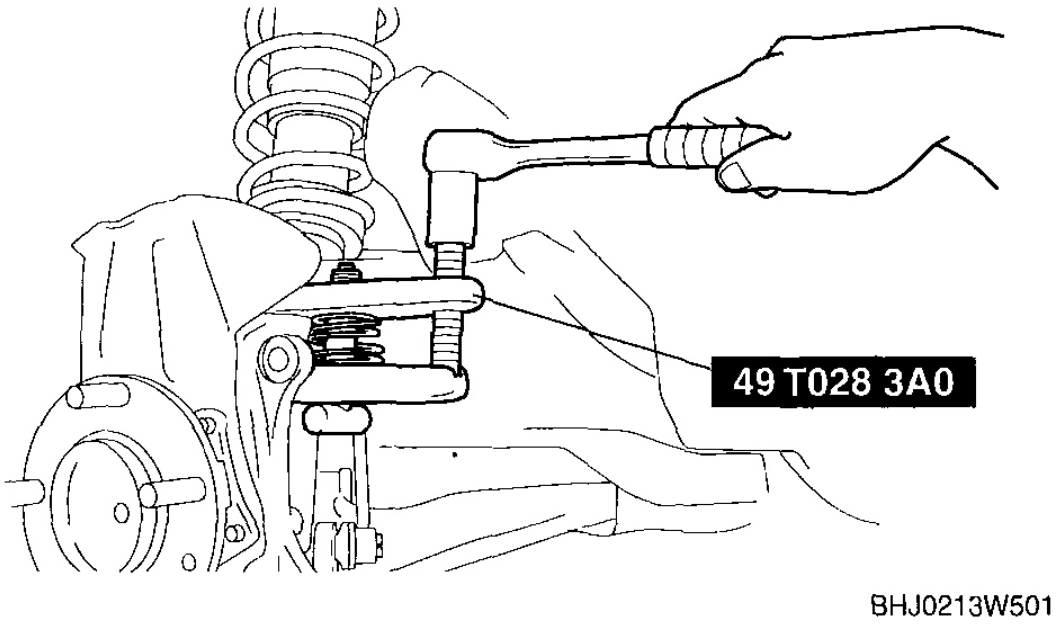


Fig. 27: Removing Front Upper Arm Ball Joint From Steering Knuckle Using SST
Courtesy of MAZDA MOTORS CORP.

FRONT SHOCK ABSORBER, COIL SPRING AND FRONT UPPER ARM REMOVAL NOTE

1. Loosen the shock absorber upper nuts.
2. Remove the front shock absorber lower bolt and nut.

FRONT UPPER ARM REMOVAL NOTE

1. Remove the front upper arm bolts.
2. Push down the front lower arm, and then remove the front upper arm from the gap between the shock absorber lower end and the front lower arm.

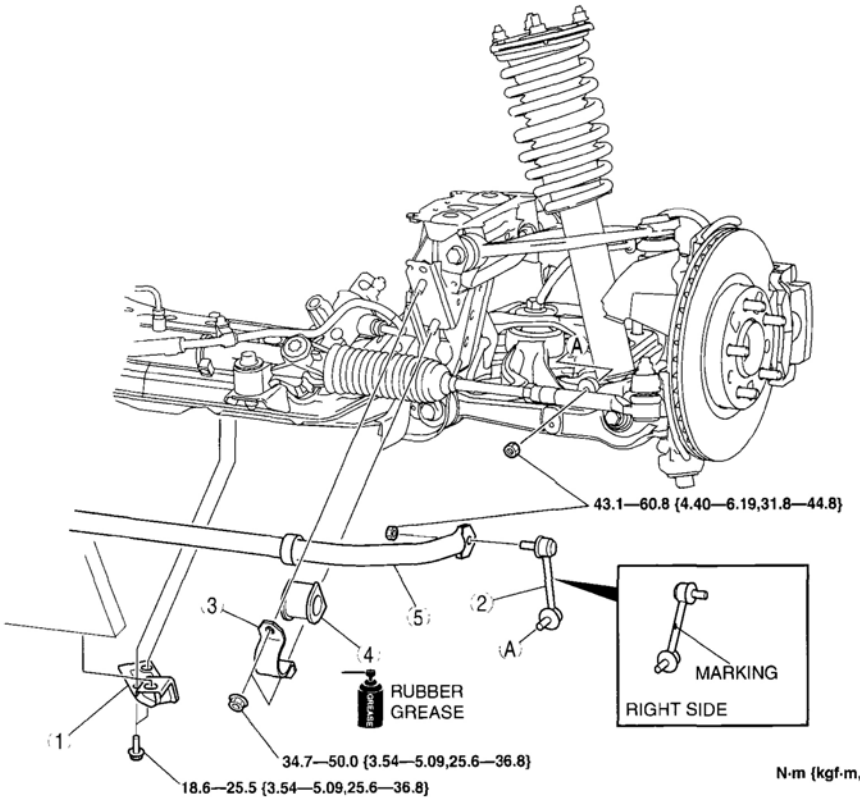
FRONT STABILIZER REMOVAL/INSTALLATION

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 in the order indicated in the table.

2. Install in the reverse order of removal.



1	Radiator mount bracket
2	Stabilizer control link
3	Stabilizer bracket
4	Stabilizer bushing
5	Front stabilizer

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Fig. 28: Identifying Front Stabilizer Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

STABILIZER BRACKET INSTALLATION NOTE

1. Apply rubber grease to the inner side of the stabilizer bushing.
2. Align the outer side of the stabilizer slide stopper with the stabilizer bushing.

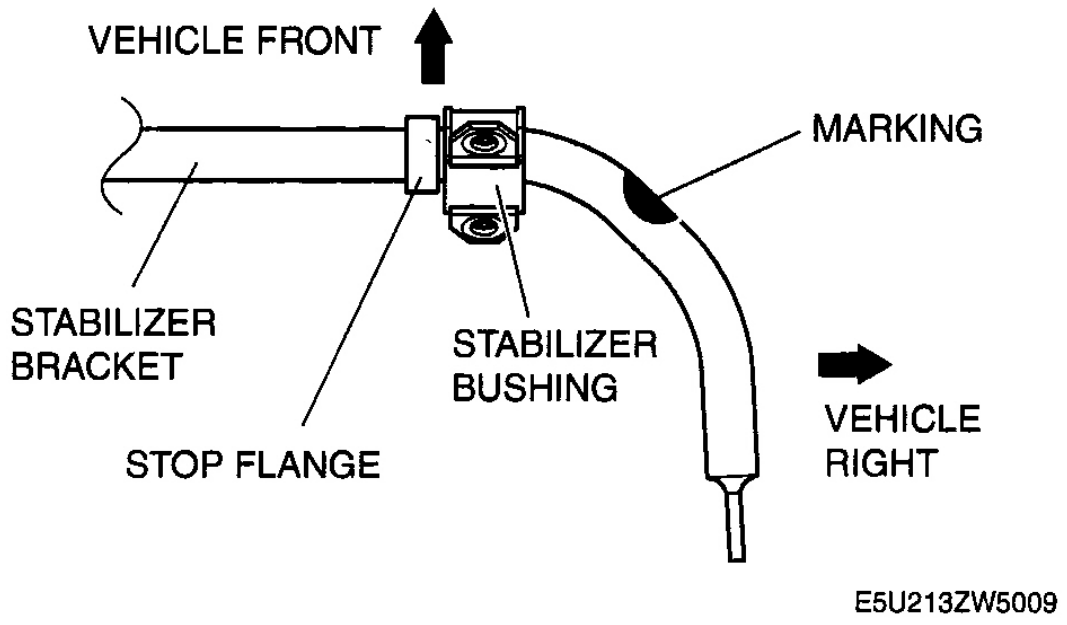


Fig. 29: Aligning Outer Side Of Stabilizer Slide Stopper With Stabilizer Bushing
Courtesy of MAZDA MOTORS CORP.

3. Install the stabilizer bracket.

FRONT STABILIZER CONTROL LINK INSPECTION

1. Remove the stabilizer control link from the vehicle. (See **FRONT STABILIZER REMOVAL/INSTALLATION** .)
2. Inspect the stabilizer control link for bending or damage. If there is any malfunction, replace it.
3. Rotate the ball joint stud **10 times** , and then rock it side to side **10 times** .
4. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

Stabilizer control link ball joint rotational torque

0.2-2.0 N.m {3-20 kgf.cm, 2-17 in.lbf}

- If not within the specification, replace the stabilizer control link. (See **FRONT STABILIZER REMOVAL/INSTALLATION** .)

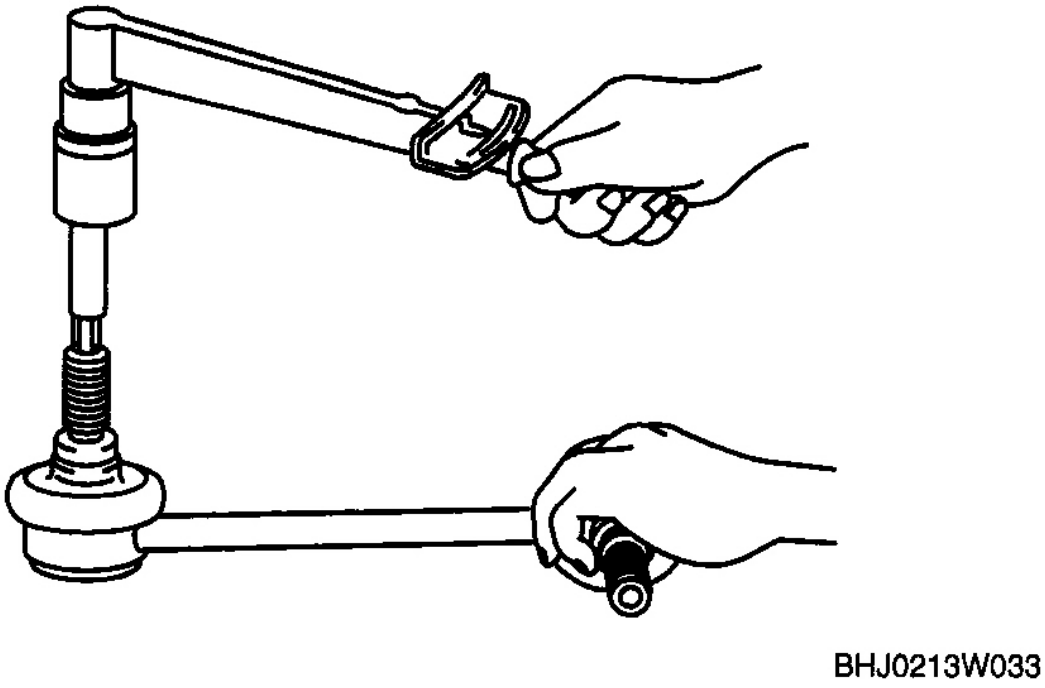


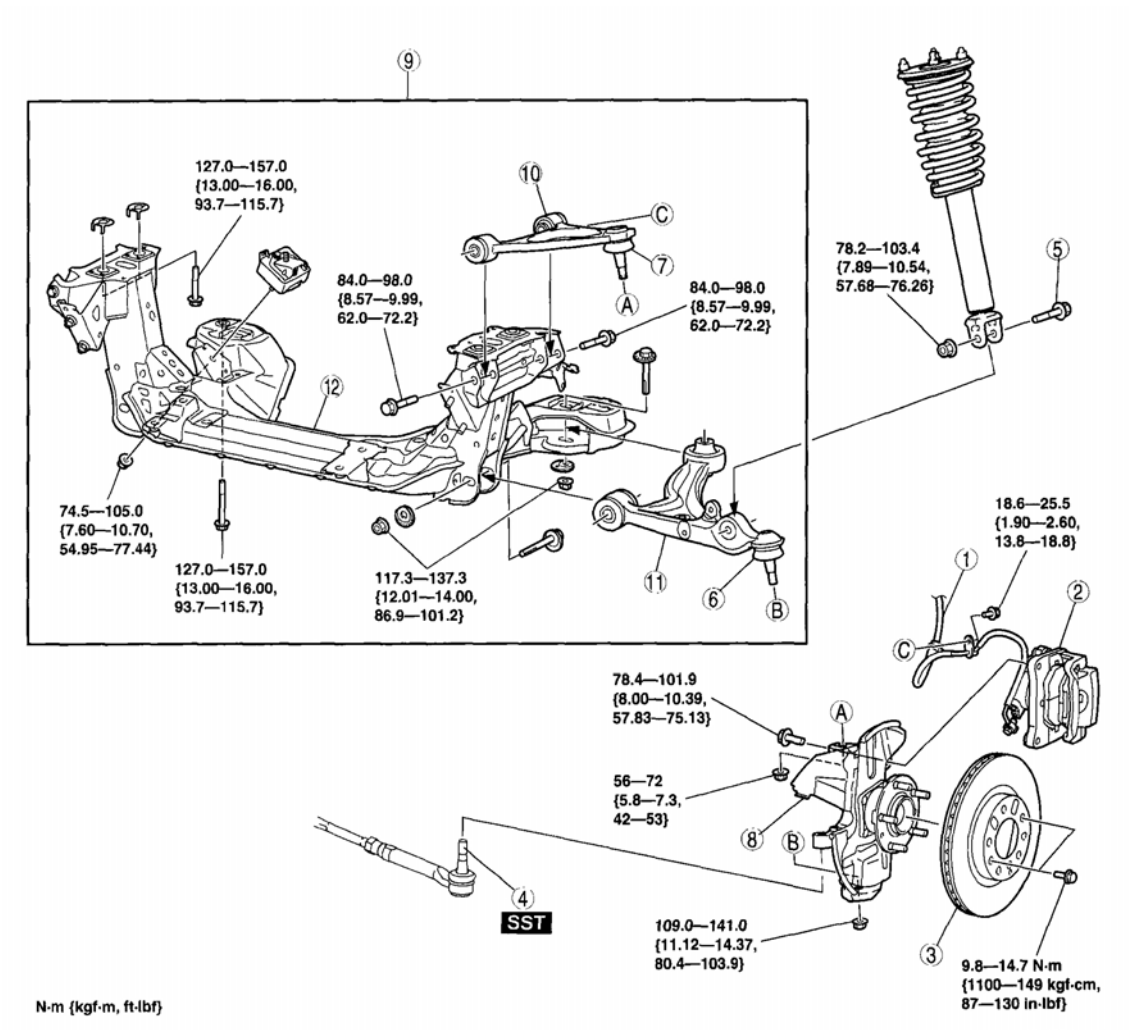
Fig. 30: Measuring Ball-Joint Rotational Torque
Courtesy of MAZDA MOTORS CORP.

FRONT CROSSMEMBER REMOVAL/INSTALLATION

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 **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
2. Remove the front stabilizer (See **FRONT STABILIZER REMOVAL/INSTALLATION** .)
3. Remove the transverse members (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
4. Remove the steering gear and linkage, and suspend it using a cable.
5. Remove in the order indicated in **Fig. 31** .
6. Install in the reverse order of removal.
7. Inspect the front wheel alignment. (See **FRONT WHEEL ALIGNMENT** .)



1	Brake hose	7	Front upper arm ball joint
2	Caliper and mounting support	8	Axle and hub component
3	Disc plate	9	Front crossmember component
4	Tie-rod end	10	Front upper arm
5	Shock absorber bolt (lower)	11	Front lower arm
6	Front lower arm bolt joint	12	Front crossmember

G04318139

Fig. 31: Identifying Front Crossmember Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

AXLE AND HUB COMPONENT REMOVAL NOTE

1. Loosen the front upper arm inner bolts.
2. Remove the axle and hub component.

FRONT CROSSMEMBER COMPONENT REMOVAL NOTE

1. Secure the chain to install the **SST** to the position shown in **Fig. 32** using the bolts (**M10 x 1.5** , length **30 mm {1.18 in}**).

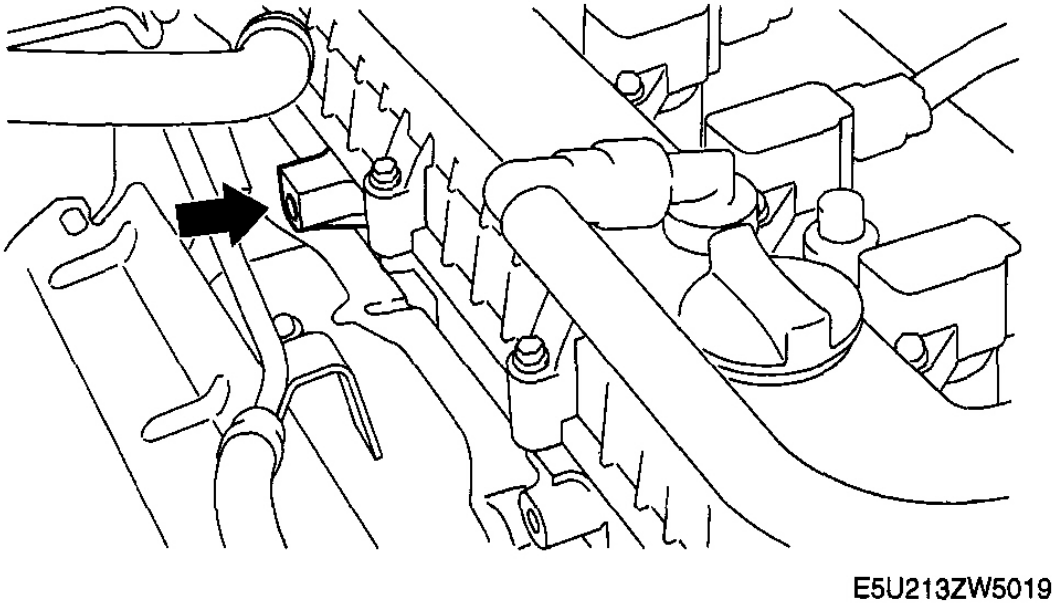


Fig. 32: Identifying Chain Bolt Location
Courtesy of MAZDA MOTORS CORP.

2. Suspend the engine.

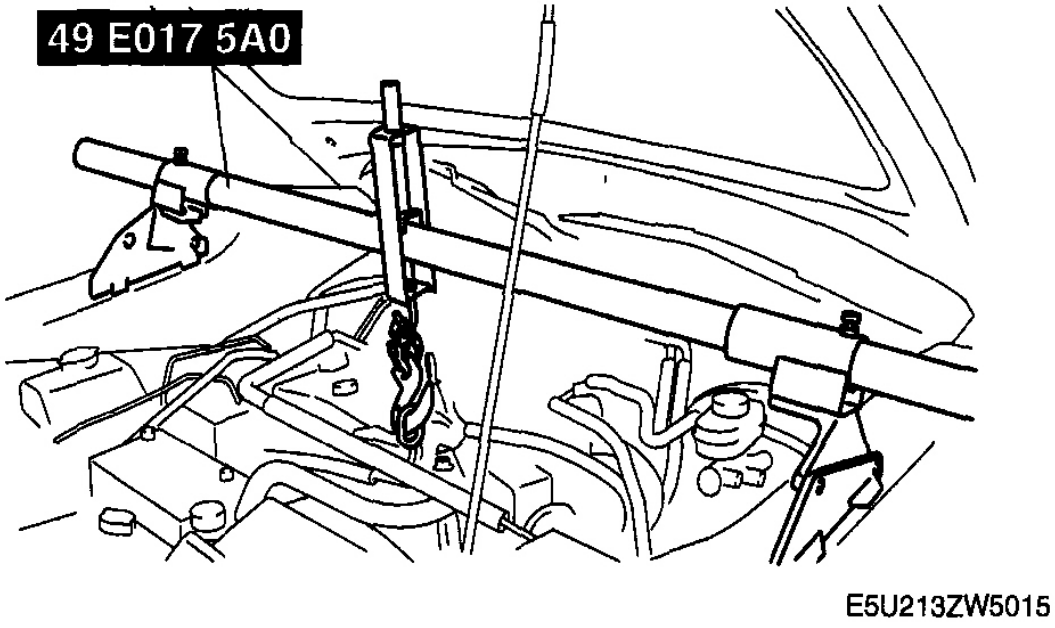


Fig. 33: Suspending Engine
Courtesy of MAZDA MOTORS CORP.

3. Support the front crossmember using a jack.

WARNING:

- **Verify that the crossmember component is securely supported by a jack. If the crossmember component falls, it could cause serious injury or death, or damage to the vehicle.**

4. Lower the front crossmember component slightly.
5. Remove the engine mounting rubber, pipes and hoses installed to the front crossmember.
6. Remove the front crossmember component.

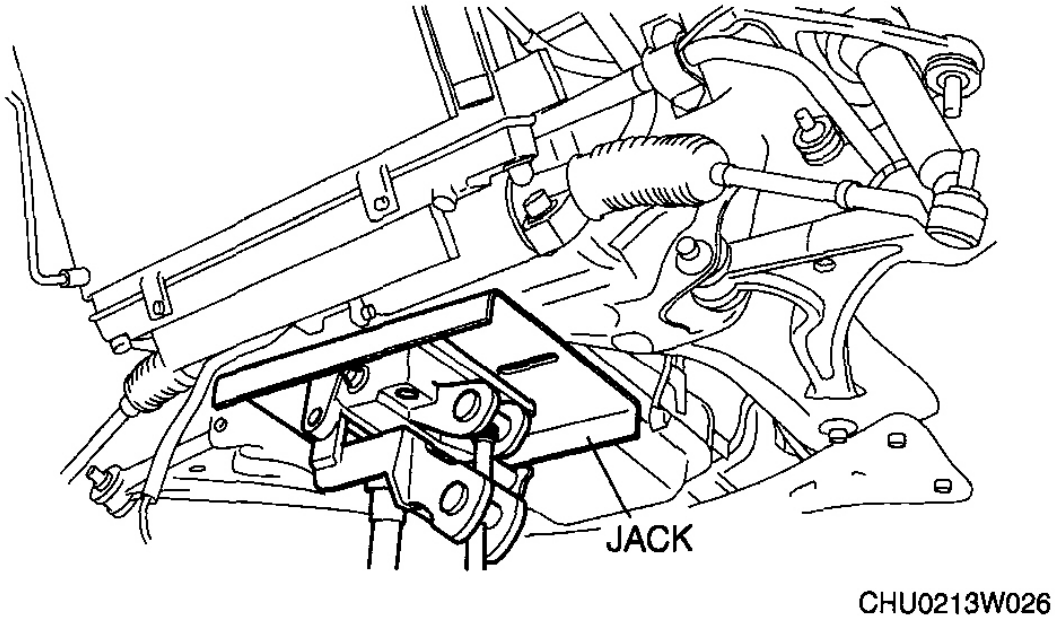


Fig. 34: Supporting Front Crossmember Using Jack
Courtesy of MAZDA MOTORS CORP.

TRANSVERSE MEMBER REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 35** .
2. Install in the reverse order of removal.

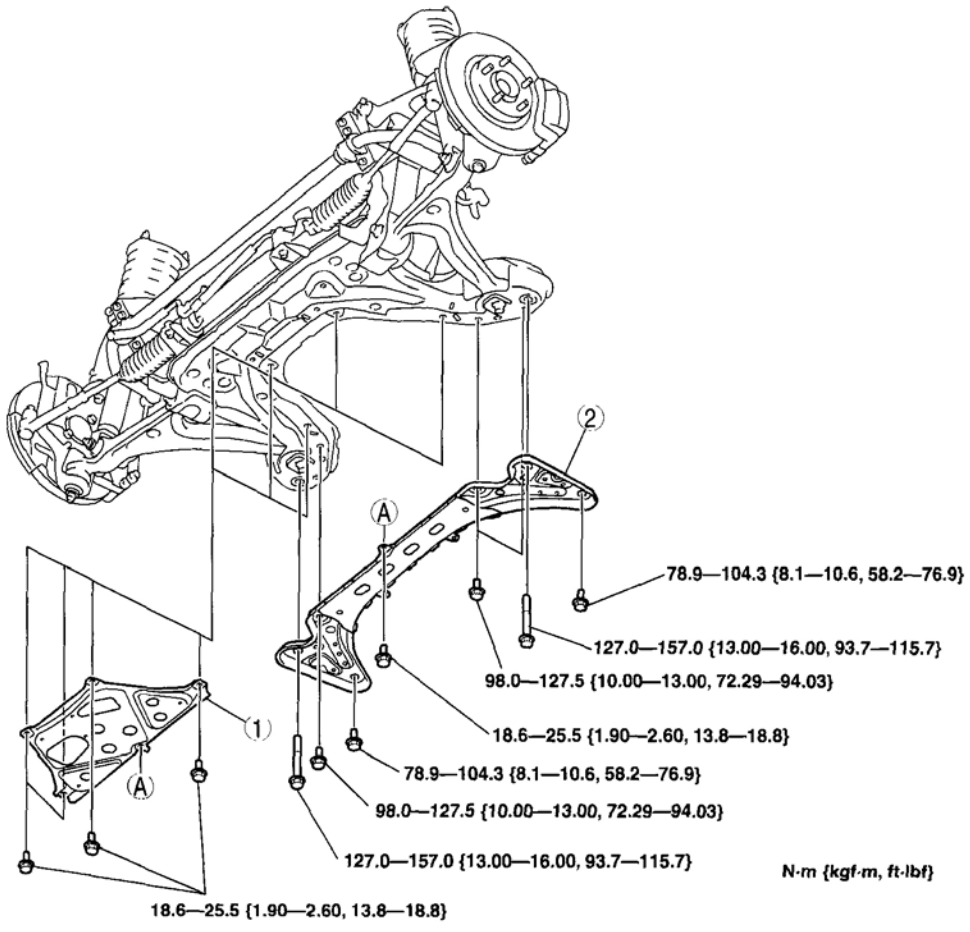


Fig. 35: Identifying Transverse Member And Under Cover (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

TRANSVERSE MEMBER REMOVAL NOTE

1. Support the crossmember using a jack.
2. Remove the transverse member.

UNDER COVER INSTALLATION NOTE

1. Align projection A with the transverse member opening to temporarily support the under cover.

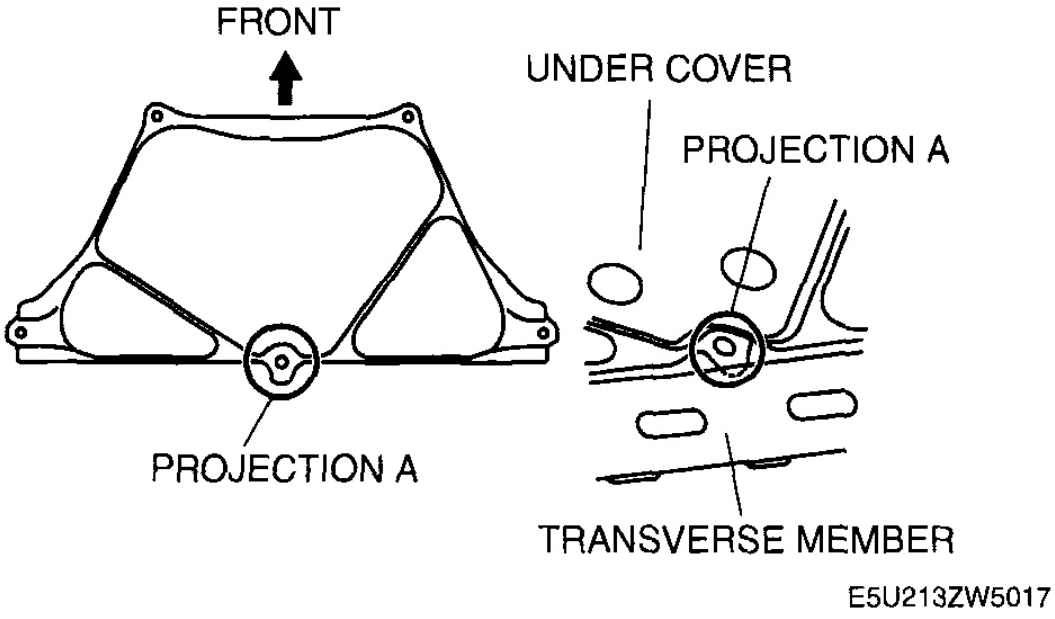


Fig. 36: Aligning Projection A With Transverse Member
Courtesy of MAZDA MOTORS CORP.

2. Tighten the bolts in the order of A, B and C.

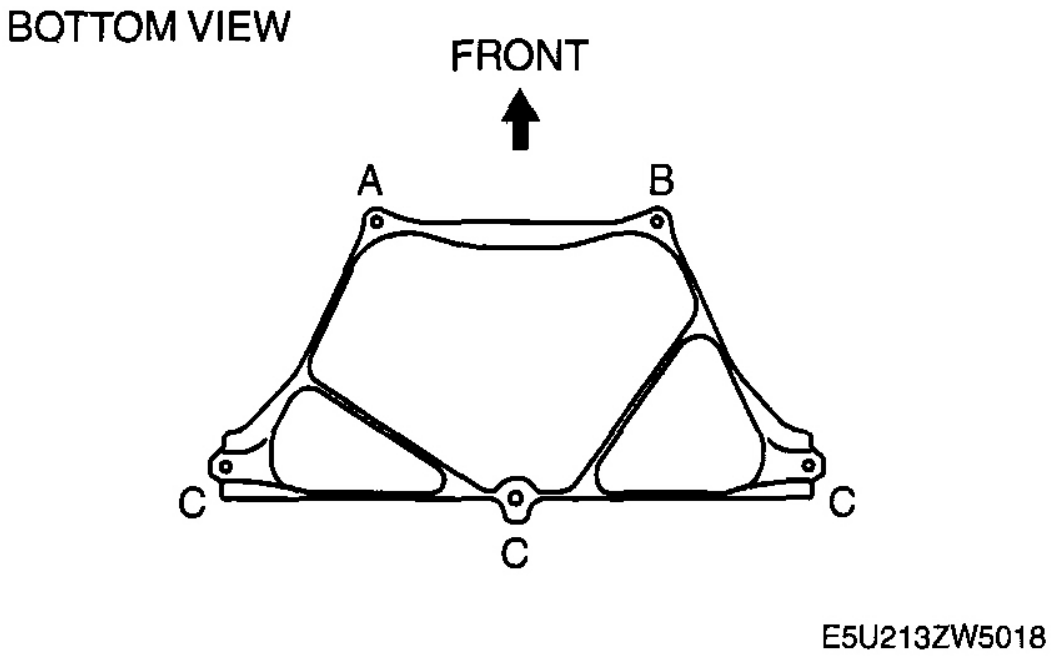
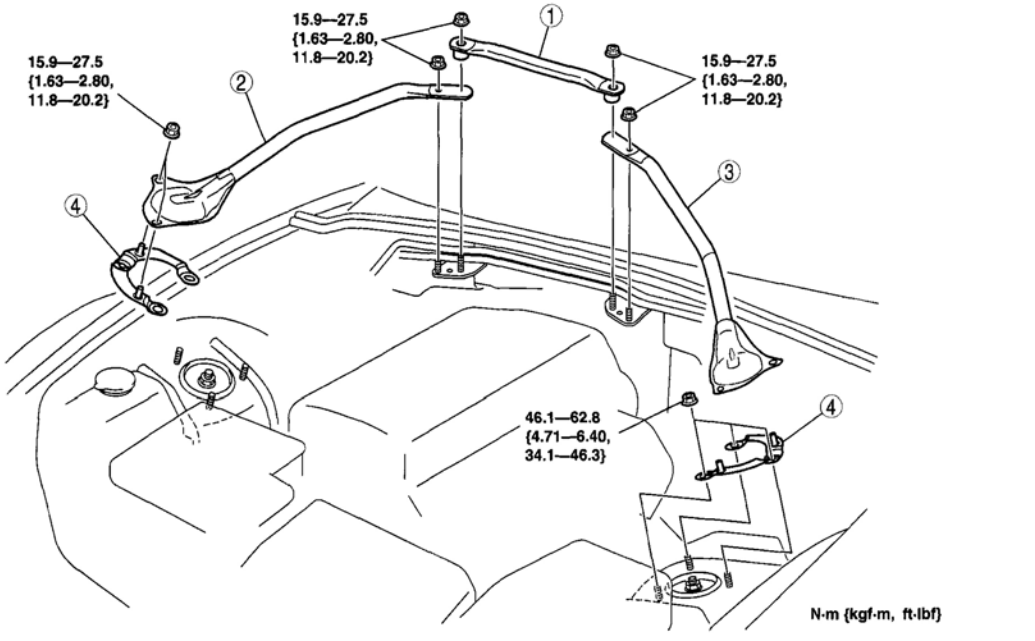


Fig. 37: Tightening Transverse Member Bolts In Sequence
Courtesy of MAZDA MOTORS CORP.

FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 38** .
2. Install in the reverse order of removal.



1	Front suspension tower bar (joint)	3	Front suspension tower bar (left side)
2	Front suspension tower bar (right side)	4	Plate

Fig. 38: Identifying Front Suspension Tower Bar Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

PLATE INSTALLATION NOTE

1. Install the plates with the identification marks facing upward.

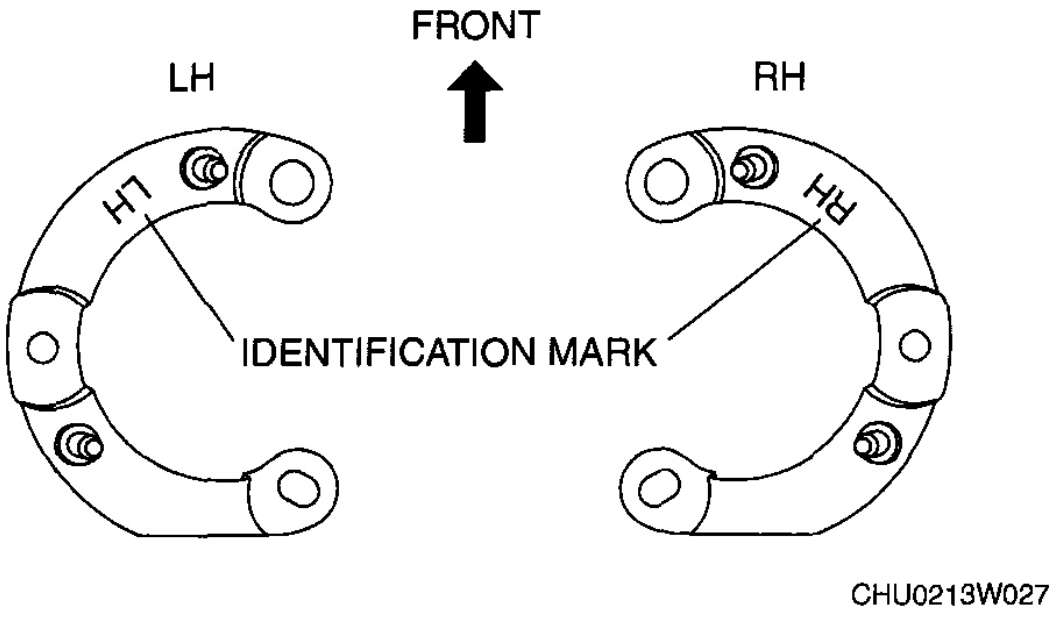


Fig. 39: Identifying Plate Identification Marks
Courtesy of MAZDA MOTORS CORP.

2008 ENGINE

Fuel System - MX-5 Miata

FUEL SYSTEM FLOW DIAGRAM [LF]

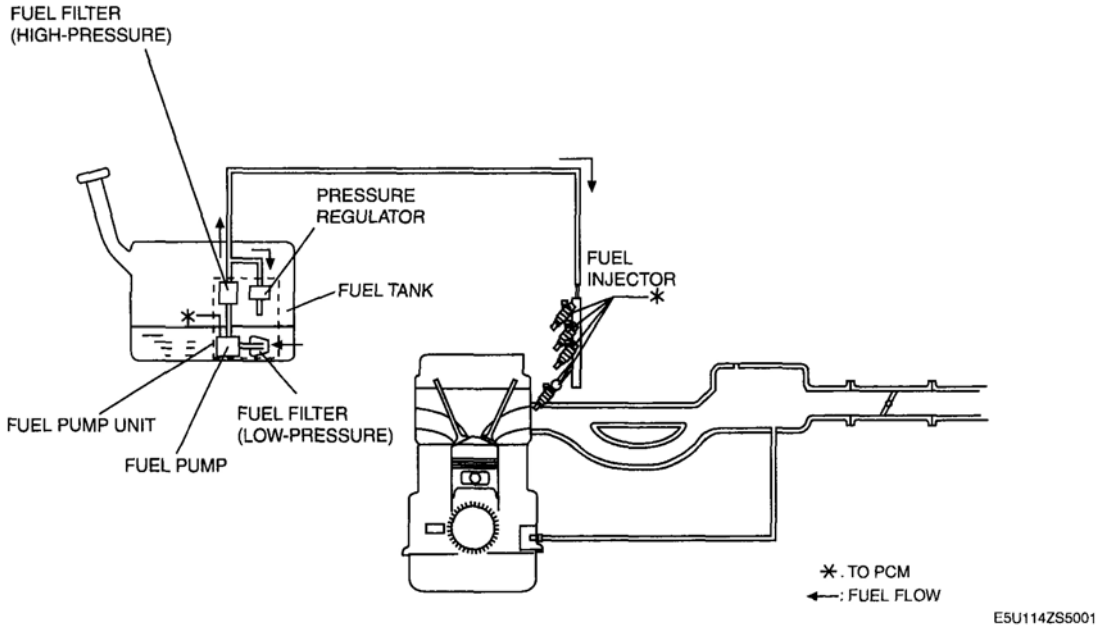
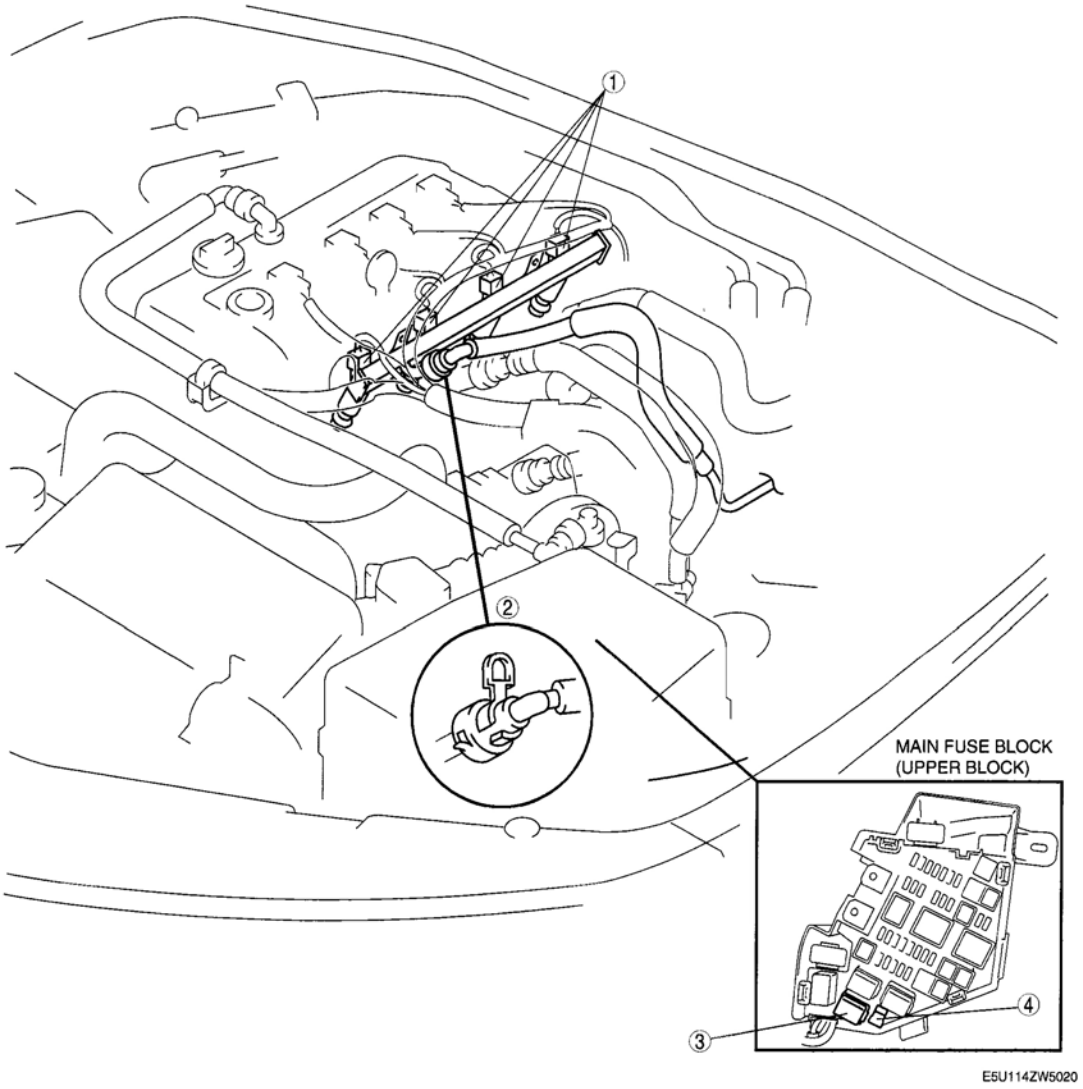


Fig. 1: Fuel System - Flow Diagram
Courtesy of MAZDA MOTORS CORP.

FUEL SYSTEM LOCATION INDEX [LF]

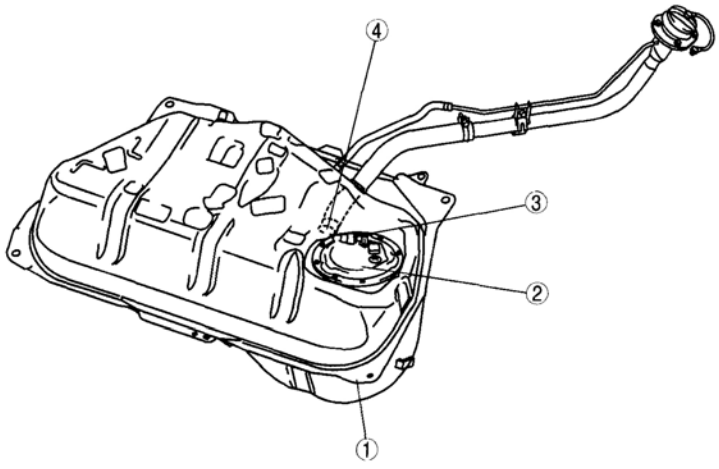
ENGINE COMPARTMENT SIDE



1	Fuel injector
2	Quick release connector (Type A)
3	Fuel pump relay
4	Check connector

Fig. 2: Identifying Location Of Fuel System Components (LF)
Courtesy of MAZDA MOTORS CORP.

FUEL TANK SIDE



E5U114ZW5007

1	Fuel tank
2	Fuel pump unit
3	Quick release connector (Type B)
4	Nonreturn valve

Fig. 3: Identifying Location Of Fuel Tank Side Components
Courtesy of MAZDA MOTORS CORP.

BEFORE SERVICE PRECAUTION [LF]

WARNING:

- **Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **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".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before performing work on the fuel system, discharge static electricity by touching the vehicle body.**

CAUTION:

- **If there is foreign material on the connecting area of the quick release connector, it might damage the connector or fuel pipe. To prevent this, disconnect the connector and clean the connecting area before connecting.**

FUEL LINE SAFETY PROCEDURE

1. Remove the fuel-filler cap to release the pressure inside the fuel tank.
2. Remove the fuel pump relay.

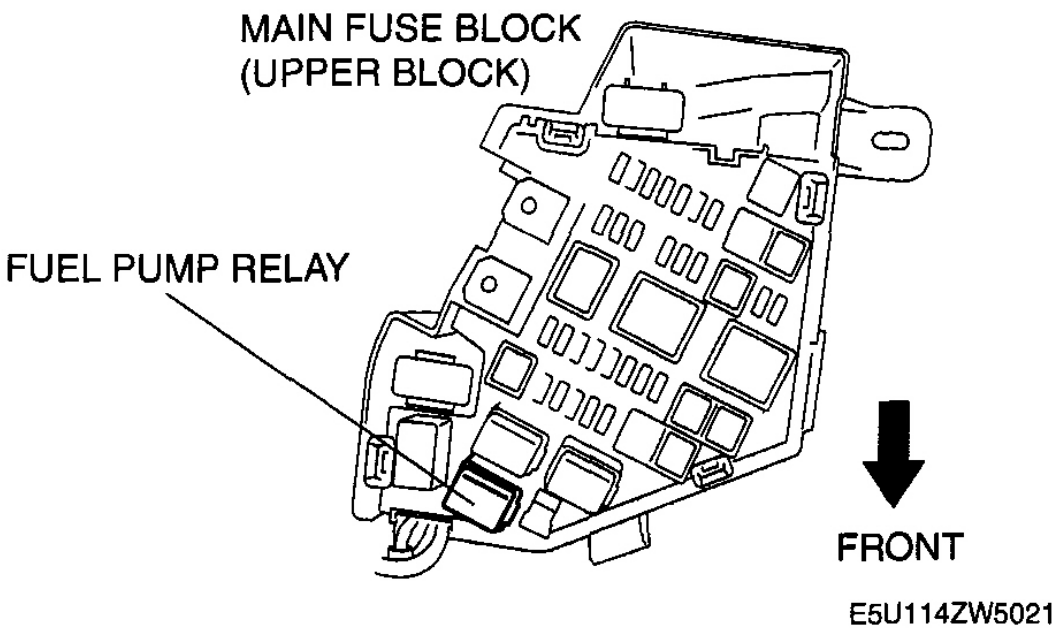


Fig. 4: View Of Fuel Pump Relay
Courtesy of MAZDA MOTORS CORP.

3. Start the engine.
4. After the engine stalls, crank the engine **several times** .
5. Turn the ignition switch to the LOCK position.
6. Install the fuel pump relay.

AFTER SERVICE PRECAUTION [LF]

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the Fuel Leakage Inspection.**

FUEL LEAKAGE INSPECTION

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, complete the following inspection with the engine stopped.**

Using M-MDS or Equivalent

1. Connect the M-MDS or equivalent to the DLC-2.

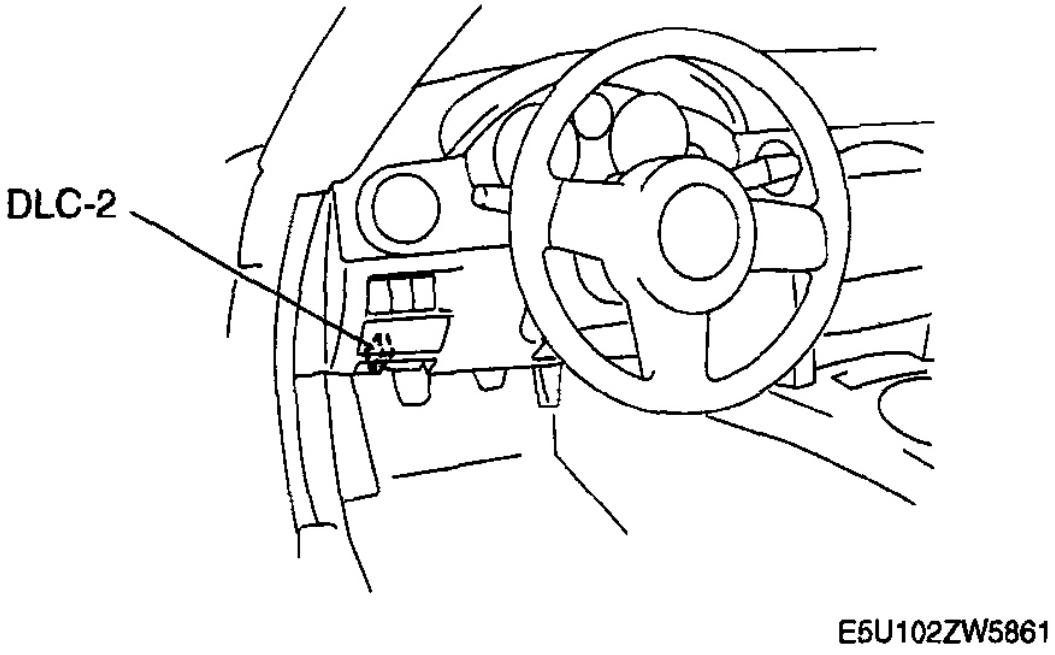


Fig. 5: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

2. Start the fuel pump using the "FP" simulation function.
3. Verify that there is no fuel leakage from the pressurized parts.
   - If there is leakage, replace the fuel hoses and clips.
   - If there is damage on the seal on the fuel pipe side, replace the fuel pipe.

   Standard

   There shall be no leakage after 5 min.

4. After reinstallation, repeat step 2-3 in the fuel leakage inspection.

Not Using SST (M-MDS or Equivalent)

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Short the check connector terminal F/P to ground using a jumper wire.

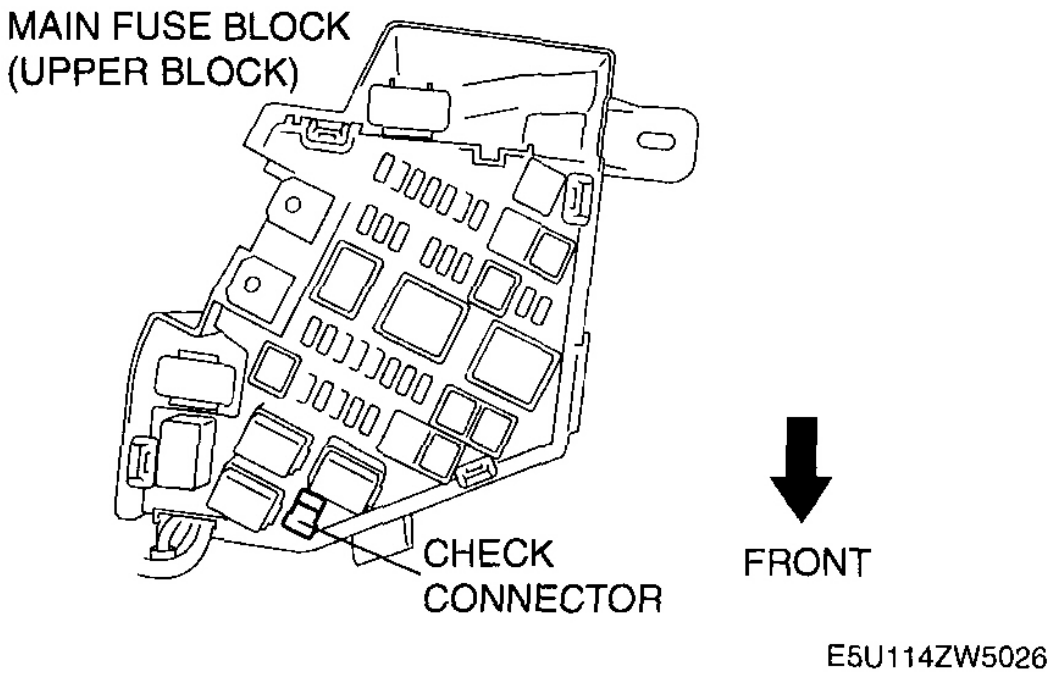


Fig. 6: Checking Connector Terminal F/P To Ground
Courtesy of MAZDA MOTORS CORP.

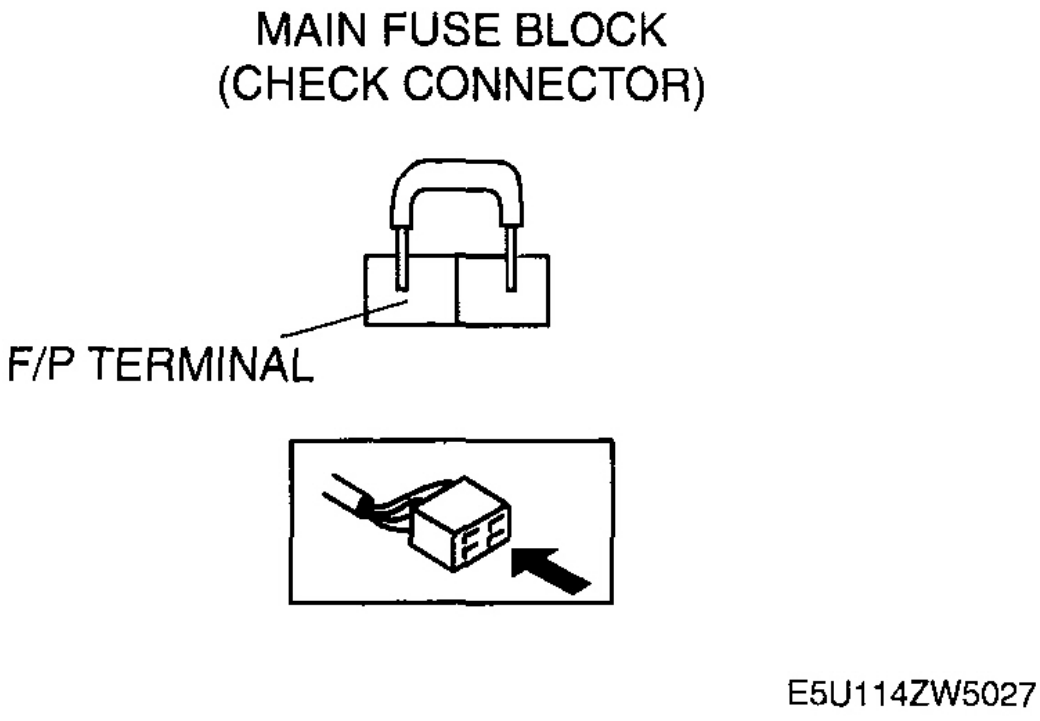


Fig. 7: Identifying F/P Connector Terminal
Courtesy of MAZDA MOTORS CORP.

4. Connect the negative battery cable.
5. Turn the ignition switch to the ON position to operate the fuel pump.
6. Verify that there is no fuel leakage from the pressurized parts.
   - If there is leakage, replace the fuel hoses and clips.
   - If there is damage on the seal on the fuel pipe side, replace the fuel pipe.

   Standard

   There shall be no leakage after 5 min.

7. After reinstallation, repeat step 5 thru 6 in the fuel leakage inspection.

FUEL LINE PRESSURE INSPECTION [LF]

WARNING:

- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. To prevent this, complete the following inspection with the**

engine stopped.

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the battery cover. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the negative battery cable.
4. Disconnect the quick release connector (in the engine compartment). (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
5. Turn the lever of the **SST** parallel to the hose as shown in **Fig. 8** .
6. Insert the **SST** quick release connector into the fuel pipe until a click is heard.

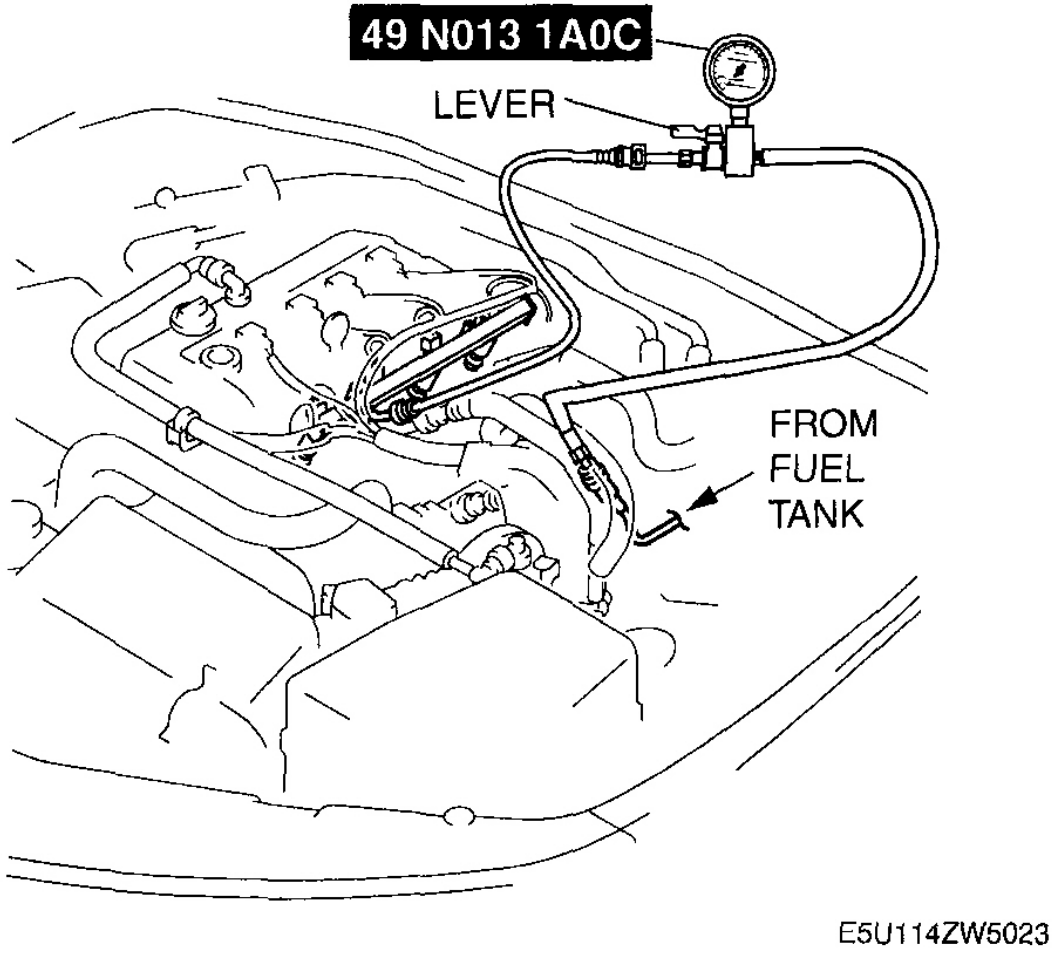


Fig. 8: Inserting SST Quick Release Connector Into Fuel Pipe Until Click Is Heard
Courtesy of MAZDA MOTORS CORP.

7. Verify that the quick release connector is firmly connected by pulling it by hand.
8. Start the fuel pump using the following procedure:

Using M-MDS or equivalent

1. Connect the negative battery cable.
2. Connect the M-MDS or equivalent to the DLC-2.

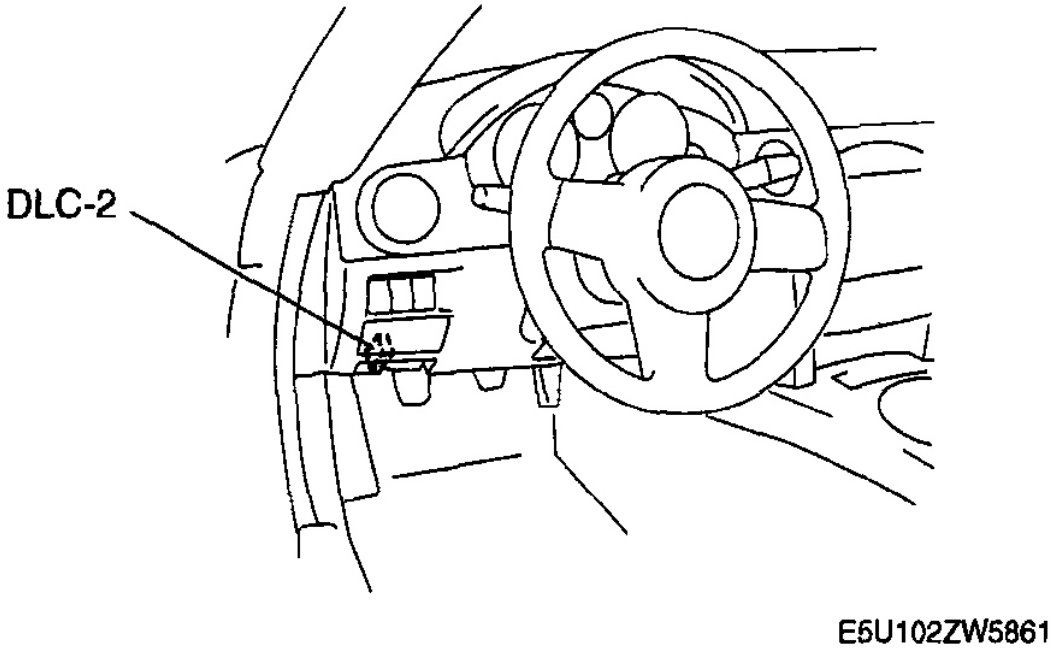


Fig. 9: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Start the fuel pump using the "FP" simulation function.

Not using M-MDS or equivalent

1. Short the check connector terminal F/P to ground using a jumper wire.

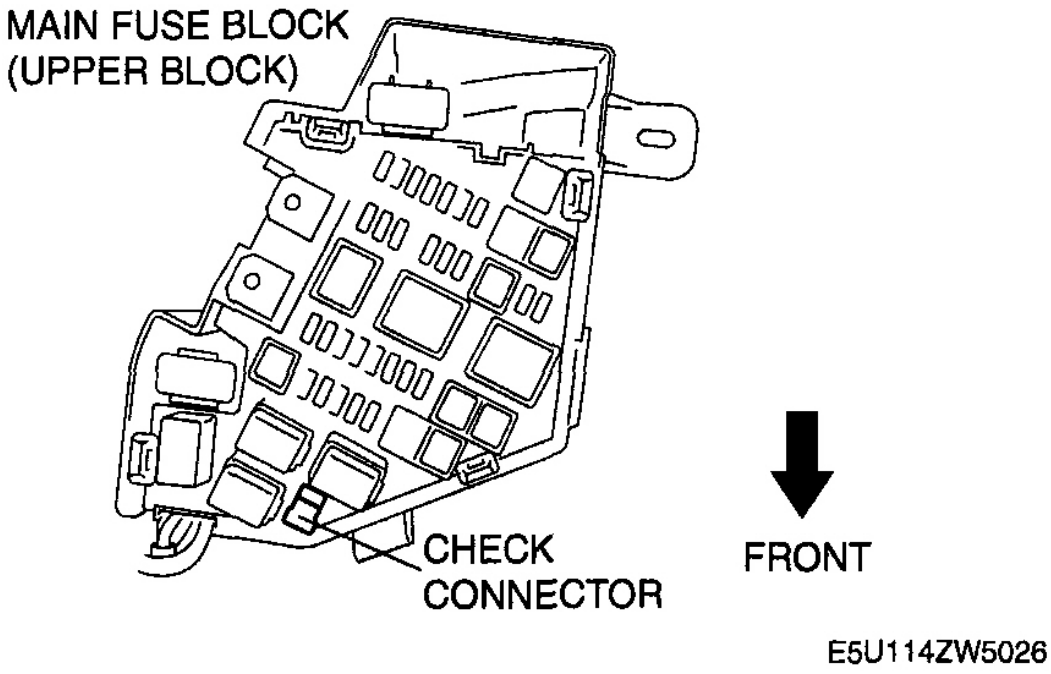


Fig. 10: Checking Connector Terminal F/P To Ground Using Jumper Wire
Courtesy of MAZDA MOTORS CORP.

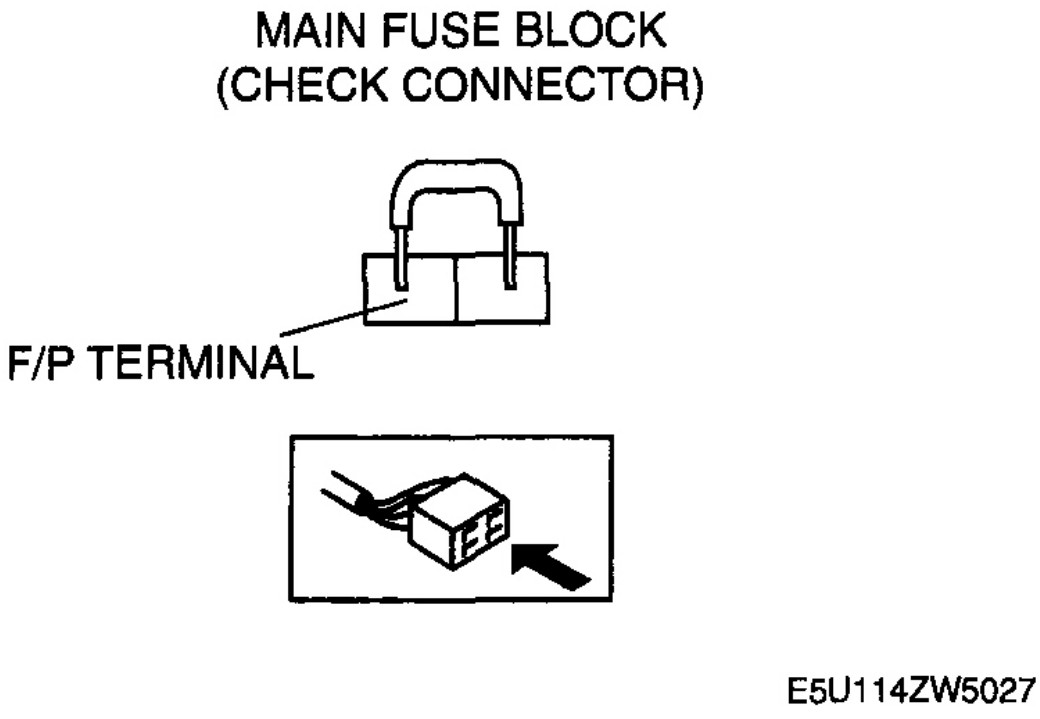


Fig. 11: Identifying F/P Connector Terminal
Courtesy of MAZDA MOTORS CORP.

2. Turn the ignition switch to the ON position to operate the fuel pump.

9. Operate the fuel pump for **10 s** .
10. Measure the fuel line pressure.
    - If not within the specification, inspect the following:

      If it less than the specification:

      - Fuel pump unit
      - Fuel line leakage

      If it exceeds the specification:

      - Fuel line clogging

Fuel pressure (Reference)

350-410 kPa {3.57-4.18 kgf/cm^2 , 50.8-59.4 psi}

11. Stop the fuel pump using the following procedure:

    Using M-MDS or equivalent

    1. Stop the fuel pump using the "FP" simulation function.

    Not using M-MDS or equivalent

    1. Turn the ignition switch to off to stop the fuel pump.
12. Measure the fuel hold pressure **after 5 min** .
    - If not within the specification, inspect the following:
      - Fuel line for clogging or leakage

    Fuel hold pressure (Reference)

    250 kPa {2.55 kgf/cm^2 ,36.2 psi} or more

13. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
14. Disconnect the **SST** .
15. Connect the quick release connector to the fuel distributor. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
16. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)

FUEL TANK REMOVAL/INSTALLATION [LF]

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "FUEL LINE SAFETY PROCEDURE", while referring to BEFORE SERVICE PRECAUTION [LF] .**
- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

1. Park the vehicle on a level surface.

2. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
3. Remove the battery cover.
4. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
5. Remove the following parts.
    1. Middle pipe (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [LF]** .)
    2. Propeller shaft (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
    3. Power plant frame (See **POWER PLANT FRAME REMOVAL NOTE** .) (See **POWER PLANT FRAME REMOVAL NOTE** .) (See **POWER PLANT FRAME REMOVAL NOTE** .)
    4. Rear drive shaft (See **REAR DRIVE SHAFT REMOVAL/INSTALLATION** .)
    5. Rear differential (See **REAR DIFFERENTIAL REMOVAL/INSTALLATION** .)
    6. Rear crossmember component (See **REAR CROSSMEMBER REMOVAL/INSTALLATION** .)
6. Perform the following procedure to remove the service hole cover.
    1. To remove the back trim, remove the following parts:
        1. Console (See **CONSOLE REMOVAL/INSTALLATION** .)
        2. Quarter trim (See **QUARTER TRIM REMOVAL/INSTALLATION** .)
        3. Scuff plate (See **SCUFF PLATE REMOVAL/INSTALLATION** .)
        4. Tire house trim (See **TIRE HOUSE TRIM REMOVAL/INSTALLATION** .)
        5. Aeroboard (See **AEROBOARD REMOVAL/INSTALLATION** .)
        6. Front seat bar garnish (See **SEAT BACK BAR GARNISH REMOVAL/INSTALLATION** .)
    2. Remove the back trim. (See **BACK TRIM REMOVAL/INSTALLATION** .)
    3. Remove the service hole cover.

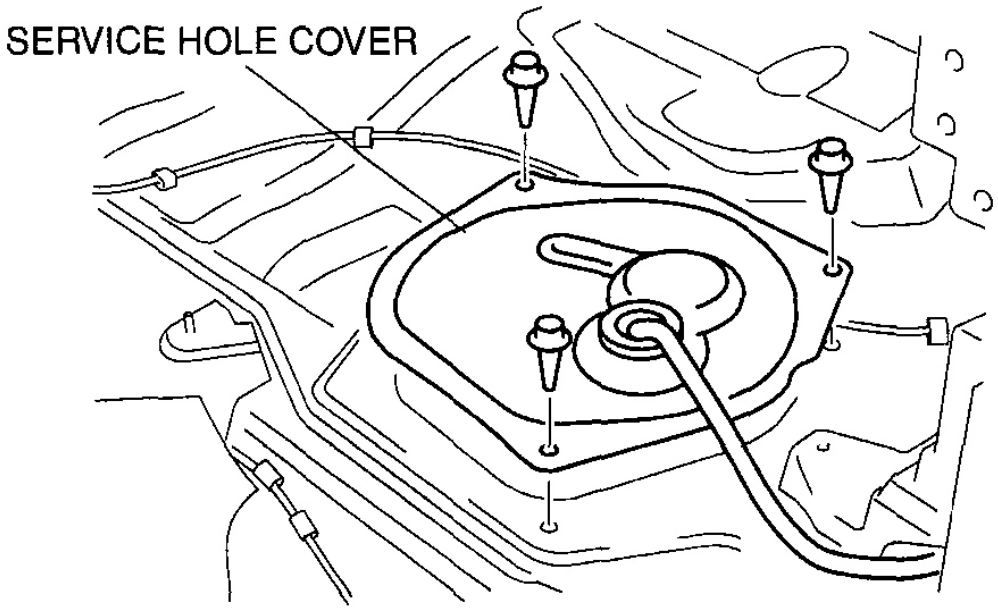
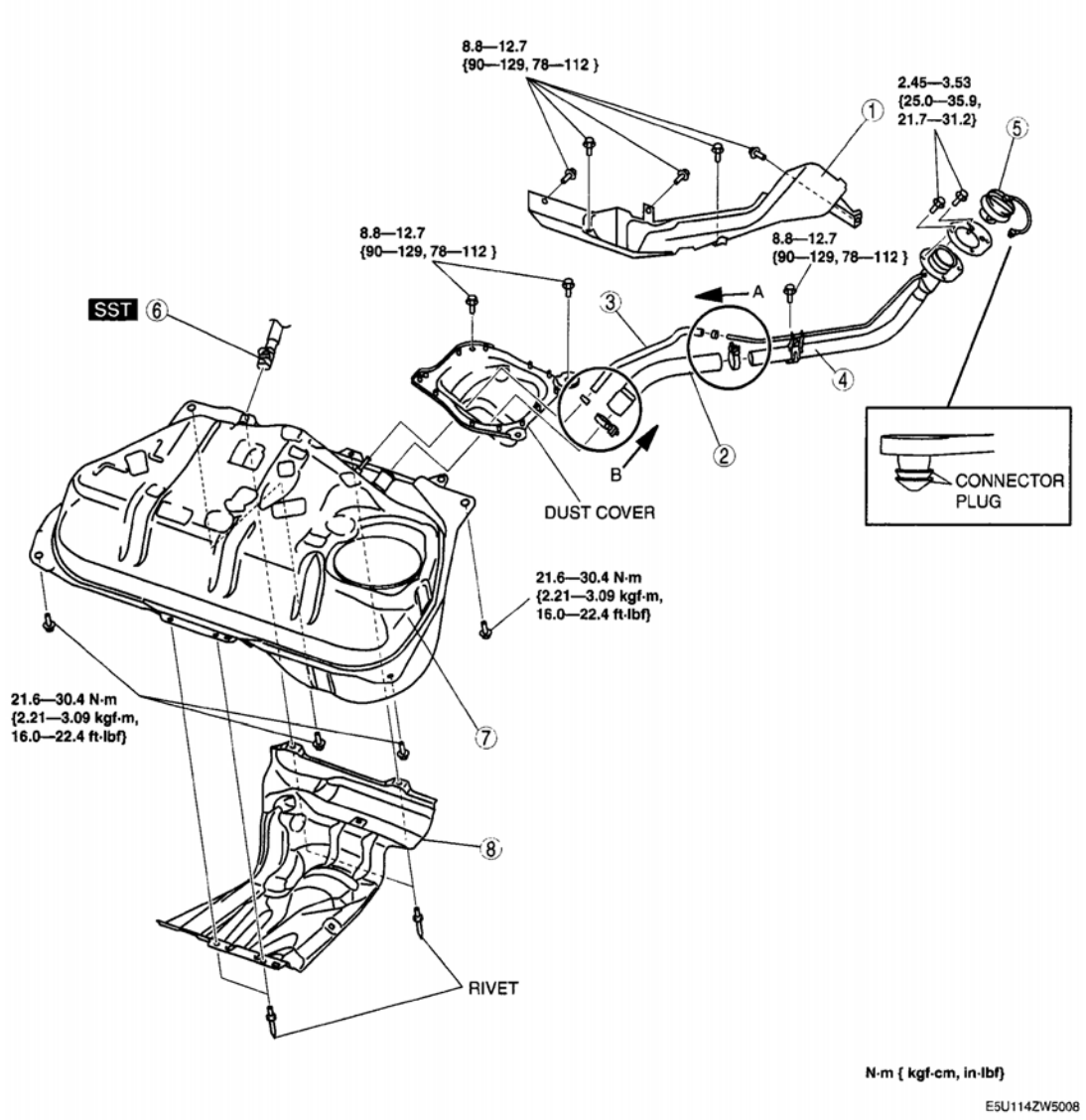


Fig. 12: Identifying Service Hole Cover
Courtesy of MAZDA MOTORS CORP.

7. Disconnect the quick release connector using the **SST** from the fuel pump unit. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
8. Remove the fuel pump unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [LF]** .)
9. Siphon the fuel from the fuel tank.
10. Remove in the order indicated in **Fig. 13** .
11. Install in the reverse order of removal.
12. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)



1	Protector
2	Joint hose
3	Breather hose
4	Fuel-filler pipe
5	Fuel-filler cap
6	Quick release connector (Type C)
7	Fuel tank
8	Insulator

Fig. 13: Identifying Fuel System Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

PROTECTOR REMOVAL NOTE

1. Remove the trunk side trim. (See **TRUNK SIDE TRIM REMOVAL/INSTALLATION** .)

FUEL TANK REMOVAL NOTE

1. Move the dust cover slightly out of the way.
2. Move the charcoal canister slightly out of the way. (See **CHARCOAL CANISTER REMOVAL/INSTALLATION [LF]** .)

INSULATOR REMOVAL NOTE

CAUTION:
- **Be careful not to damage the fuel tank when removing the rivet. If the fuel tank is damaged, it may cause fuel leakage.**

NOTE:
- **The insulator is installed using rivets.**
- **When reinstalling the rivet, install the same rivet or M5 bolt and nut.**

1. Push out the mandrel using a hammer and punch (**2-2.8 mm {0.08-0.11 in}** diameter).

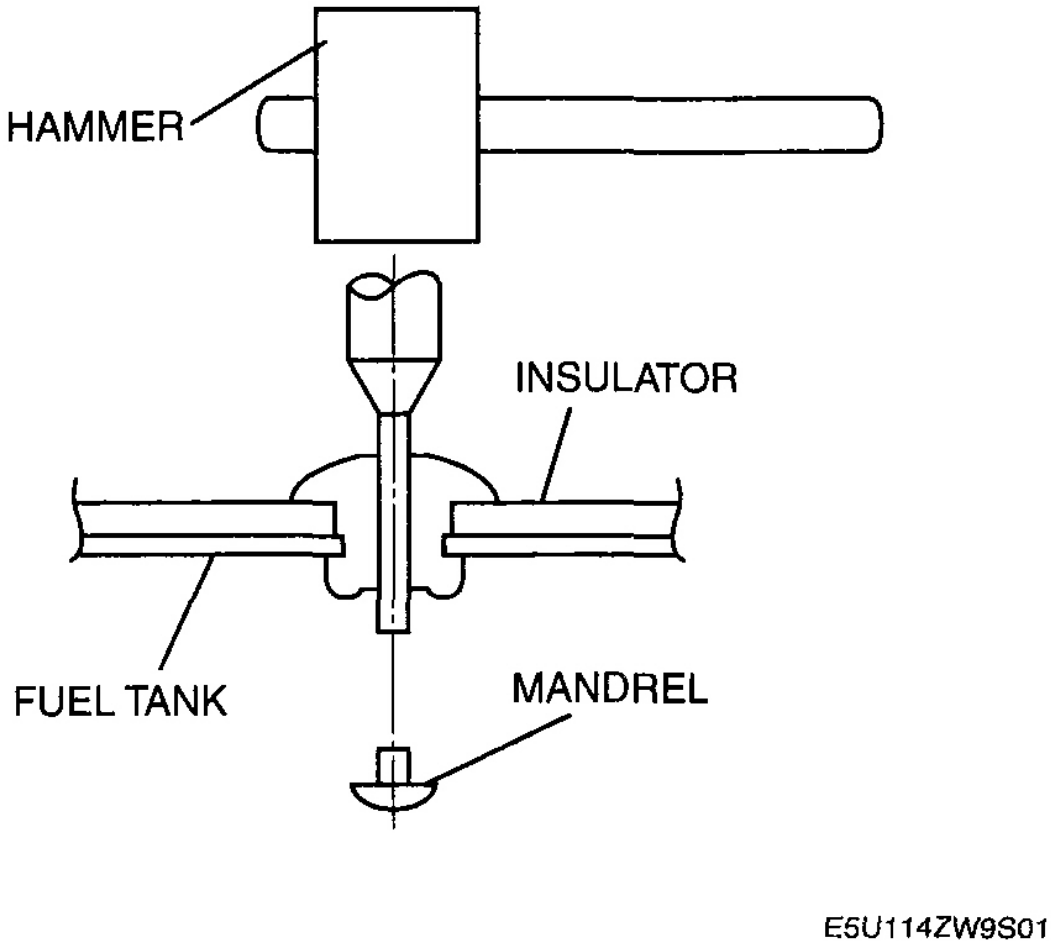


Fig. 14: Pushing Out Mandrel Using Hammer & Punch
Courtesy of MAZDA MOTORS CORP.

2. Remove the flange using a drill (**5 mm {0.20 in}** drill bit).

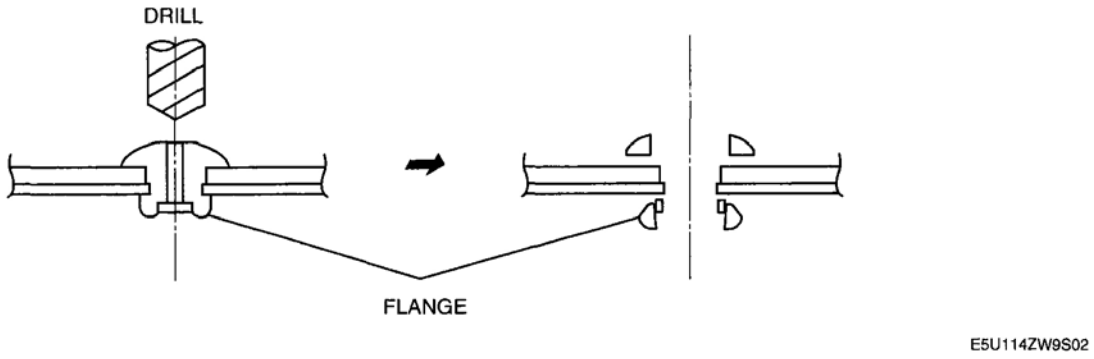


Fig. 15: Removing Flange Using Drill
Courtesy of MAZDA MOTORS CORP.

BREATHER HOSE INSTALLATION NOTE

1. Install the breather hose and clamp as shown in **Fig. 16** .

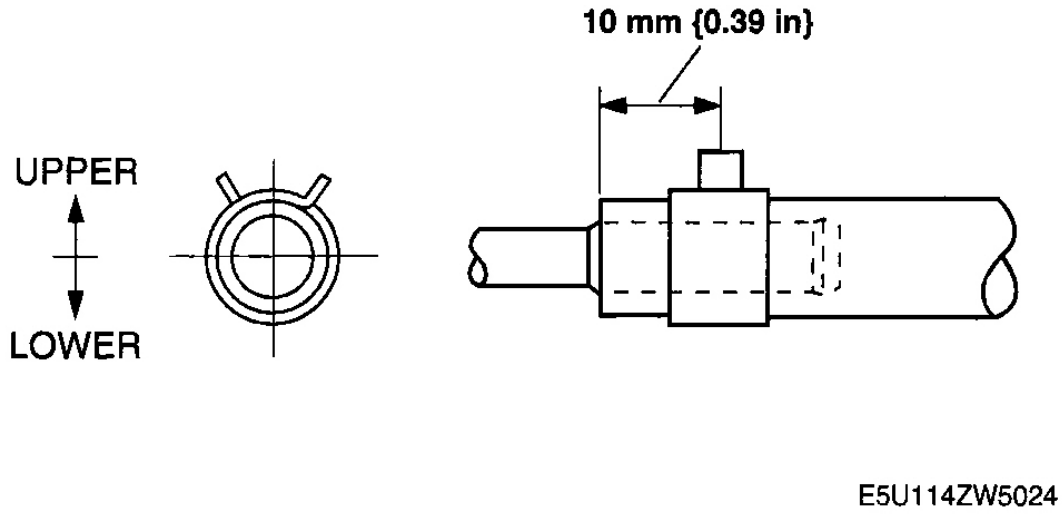


Fig. 16: Installing Breather Hose & Clamp
Courtesy of MAZDA MOTORS CORP.

JOINT HOSE INSTALLATION NOTE

1. Install the joint hose and clamp as shown in **Fig. 17** .

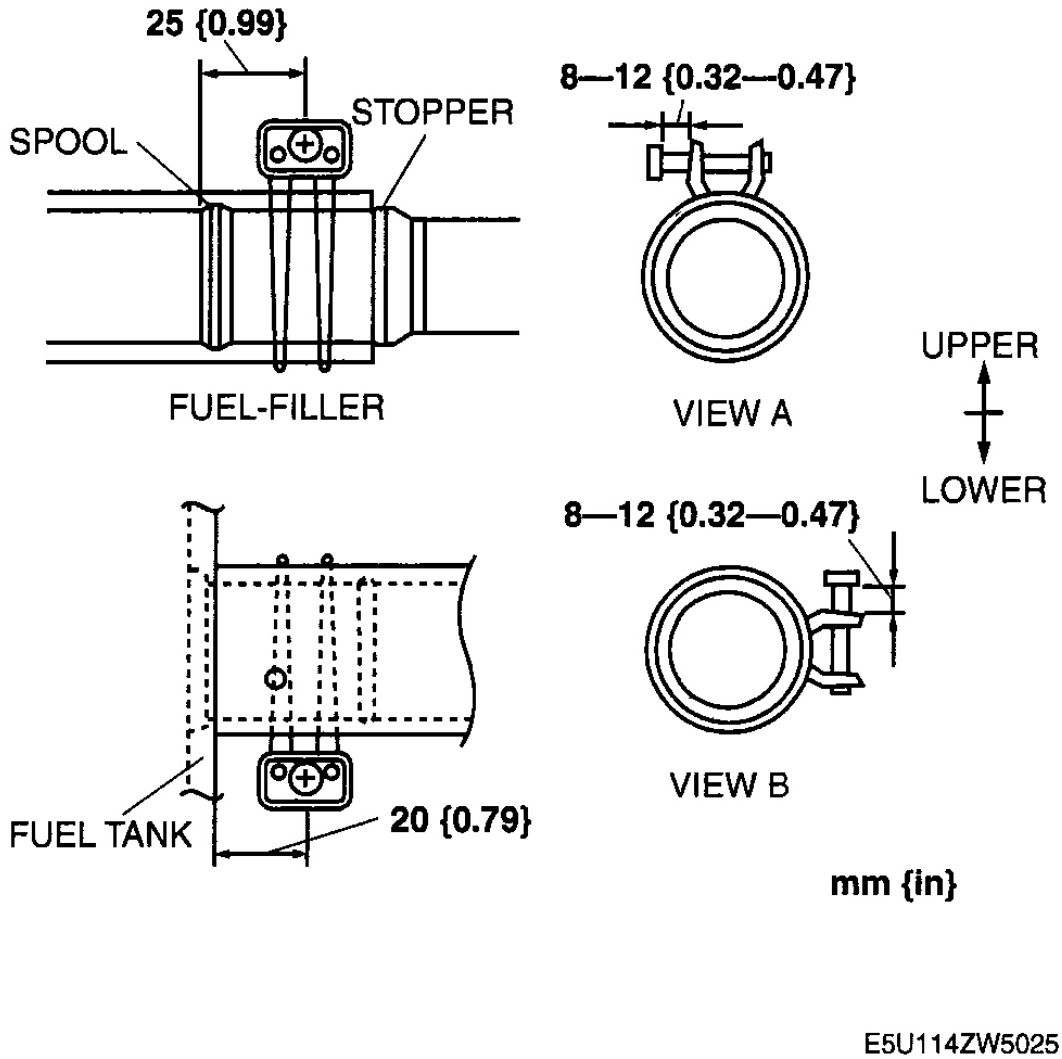


Fig. 17: View Of Joint Hose & Clamp
Courtesy of MAZDA MOTORS CORP.

2. Install the clamp between the spool and stopper without overlapping the stopper.

FUEL TANK INSPECTION [LF]

NOTE:

- **The two rollover valves built into the fuel tank and check valves (two-way) built into the rollover valves are inspected in this inspection.**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)

2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the fuel tank with the fuel pump unit. (See **FUEL TANK REMOVAL/INSTALLATION [LF]** .)
5. Perform the following procedure to verify the fuel tank airtightness.
    1. Plug the fuel pump unit pipe, port B and port C.

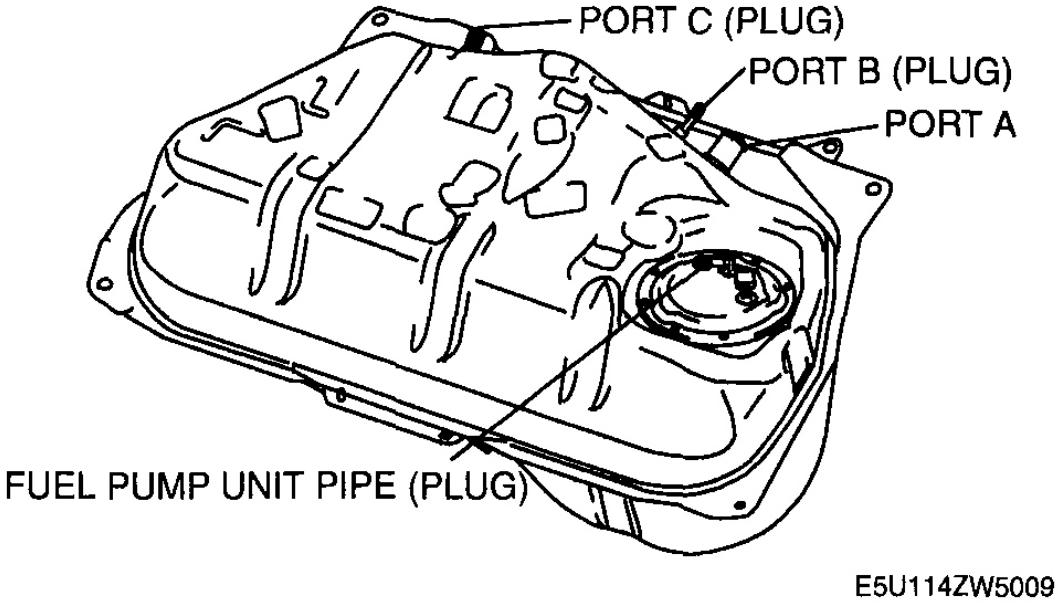


Fig. 18: Identifying Plug Fuel Pump Unit Pipe & Ports
Courtesy of MAZDA MOTORS CORP.

    2. Apply a pressure of **3 kPa {23 mmHg, 0.9 inHg}** to port A and wait for a while.
    3. Verify that there is no air leakage from the fuel tank.
        - If there is airflow, replace the fuel tank.
6. Plug the fuel pump unit pipe and port B.

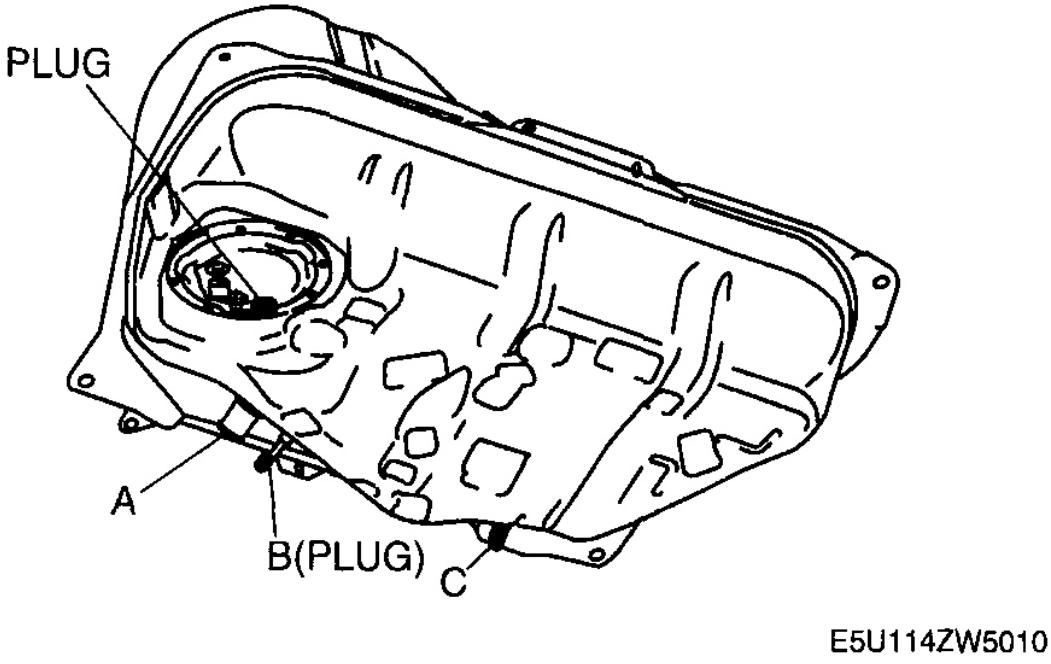


Fig. 19: Identifying Plug
Courtesy of MAZDA MOTORS CORP.

7. Level the fuel tank.
8. Apply a pressure of **3 kPa {23 mmHg, 0.9 inHg}** to port C and wait for a while.
9. With the pressure still applied, verify that there is airflow from port A and the pressure is **0- 3 kPa {0-22 mmHg, 0- 0.8 inHg}** .
   - If there is no airflow, replace the fuel tank.
10. Apply a pressure of **-0.5 kPa {-3.8 mmHg, -0.1 inHg}** to port C and wait for a while.
11. With the pressure still applied, verify that there is airflow from port A and the pressure is **-0.5- 0 kPa {-3.8- 0 mmHg, -0.2- 0 inHg}** .
    - If there is no airflow, replace the fuel tank.
    - If there is airflow, place the fuel tank upside down.
12. Apply a pressure of **3 kPa {23 mmHg, 0.9 inHg}** to port C and wait for a while.
13. With the pressure still applied, verify that there is no airflow from port A.
    - If there is airflow, replace the fuel tank.

NON-RETURN VALVE INSPECTION [LF]

WARNING:
- **Fuel is very flammable liquid. If fuel spills or leaks from the**

pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "FUEL LINE SAFETY PROCEDURE", while referring to the "BEFORE SERVICE PRECAUTION [LF]".

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the fuel pump unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [LF]** .)
5. Siphon the fuel from the fuel tank.

NOTE:

- **Non-return valve is integrated in the fuel tank.**
- **The non-return valve is normally closed by the spring force.**

6. Verify that the non-return valve is closed.
   - If the non-return valve is stuck open and dose not open even when pulled up by a finger, replace the fuel tank. (See **FUEL TANK REMOVAL/INSTALLATION [LF]** .)

FUEL PUMP UNIT REMOVAL/INSTALLATION [LF]

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "FUEL LINE SAFETY PROCEDURE", while referring to BEFORE SERVICE PRECAUTION [LF] .**
- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Perform the following procedure to remove the service hole cover.
   1. To remove the back trim, remove the following parts:
      1. Console (See **CONSOLE REMOVAL/INSTALLATION** .)
      2. Quarter trim (See **QUARTER TRIM REMOVAL/INSTALLATION** .)

3. Scuff plate (See **SCUFF PLATE REMOVAL/INSTALLATION** .)
4. Tire house trim (See **TIRE HOUSE TRIM REMOVAL/INSTALLATION** .)
5. Aeroboard (See **AEROBOARD REMOVAL/INSTALLATION** .)
6. Front seat back bar garnish (See **SEAT BACK BAR GARNISH REMOVAL/INSTALLATION** .)

2. Remove the back trim. (See **BACK TRIM REMOVAL/INSTALLATION** .)
3. Remove the service hole cover.

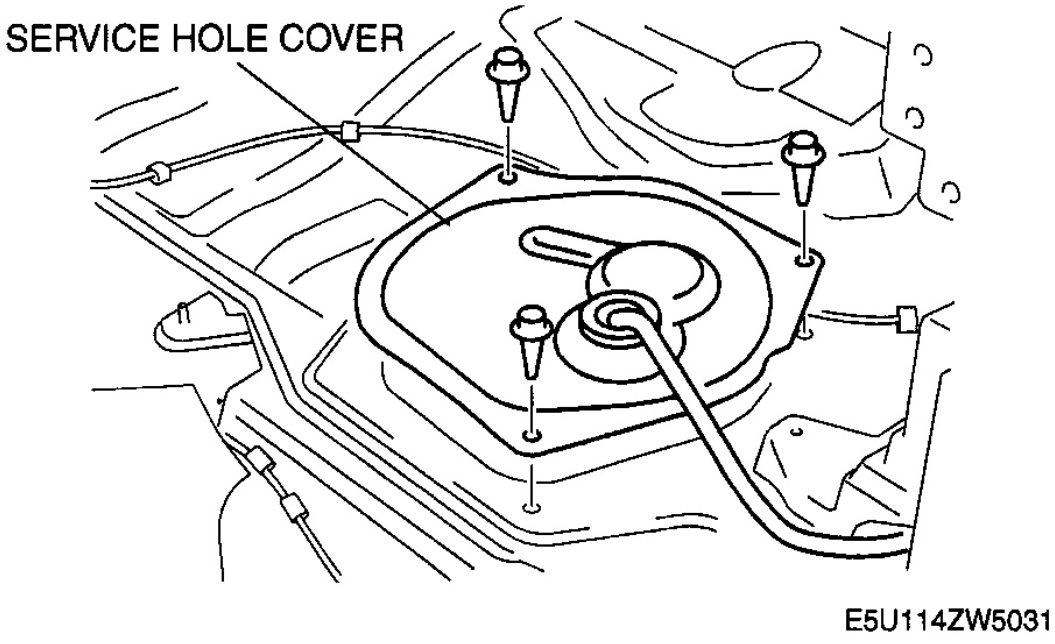
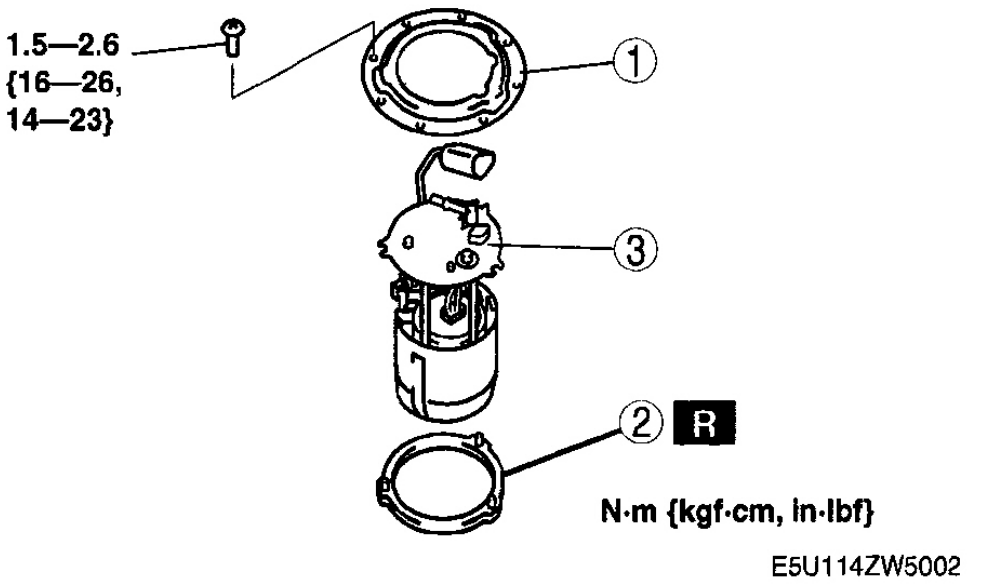


Fig. 20: Identifying Service Hole Cover
Courtesy of MAZDA MOTORS CORP.

5. Disconnect the quick release connector from the fuel pump unit. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
6. Disconnect the fuel pump unit connector.
7. Remove in the order indicated in **Fig. 21** .



1	Plate
2	Packing
3	Fuel pump unit

Fig. 21: Identifying Fuel Pump Unit (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.
9. Complete the "AFTER SERVICE PRECAUTION" (See **AFTER SERVICE PRECAUTION [LF]** .)

FUEL LEAKAGE INSPECTION AFTER PUMP UNIT INSTALLATION

1. Before installing the fuel tank, verify that there is no leakage when a pressure of **5.9 kPa {44 mmHg, 1.7 inHg}** is applied to the fuel tank.
2. Install the fuel tank. (See **FUEL TANK REMOVAL/INSTALLATION [LF]** .)
3. Drive the vehicle starting from a standstill and brake suddenly **five to six times** at a low speed.
4. Stop the vehicle and verify from outside the vehicle that there is no fuel leakage around the fuel pump unit.

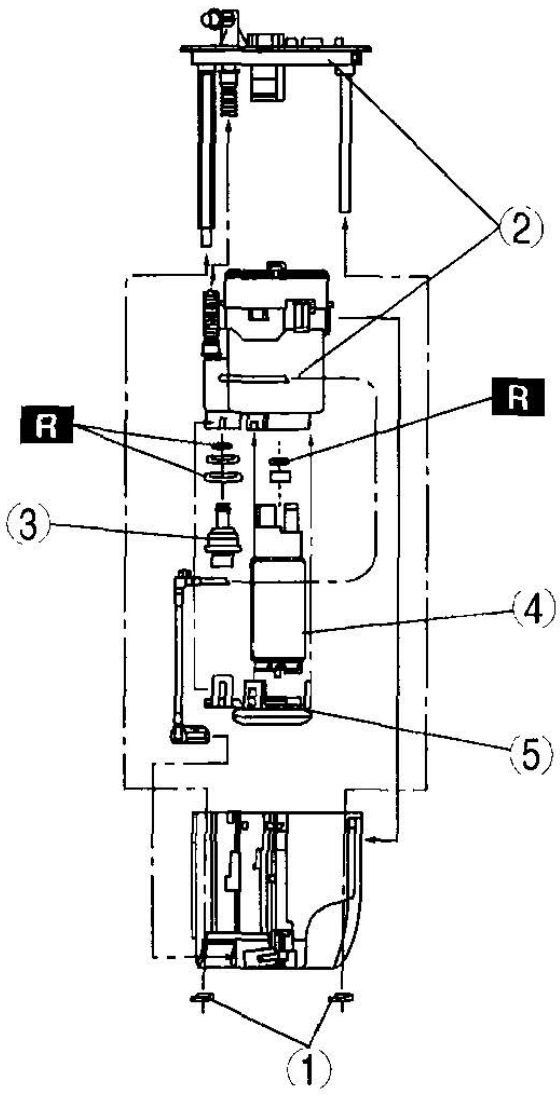
FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY [LF]

WARNING:

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate**

skin and eyes. To prevent this, do not damage the sealing surface of the fuel pump unit when removing or installing.

1. Disassemble in the order indicated in **Fig. 22** .
2. Assemble in the reverse order of disassembly.



E5U114ZW5022

1	E-ring
2	Fuel filter body
3	Fuel pressure regulator
4	Fuel pump
5	Fuel filter (low-pressure)

Fig. 22: View Of Fuel Pump Unit Components
Courtesy of MAZDA MOTORS CORP.

FUEL PUMP UNIT INSPECTION [LF]

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "FUEL LINE SAFETY PROCEDURE", while referring to BEFORE SERVICE PRECAUTION [LF] .**
- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

FUEL PUMP OPERATION INSPECTION

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the fuel-filler cap.
3. Start the fuel pump using the following procedure:

Using M-MDS

1. Connect the M-MDS to the DLC-2.

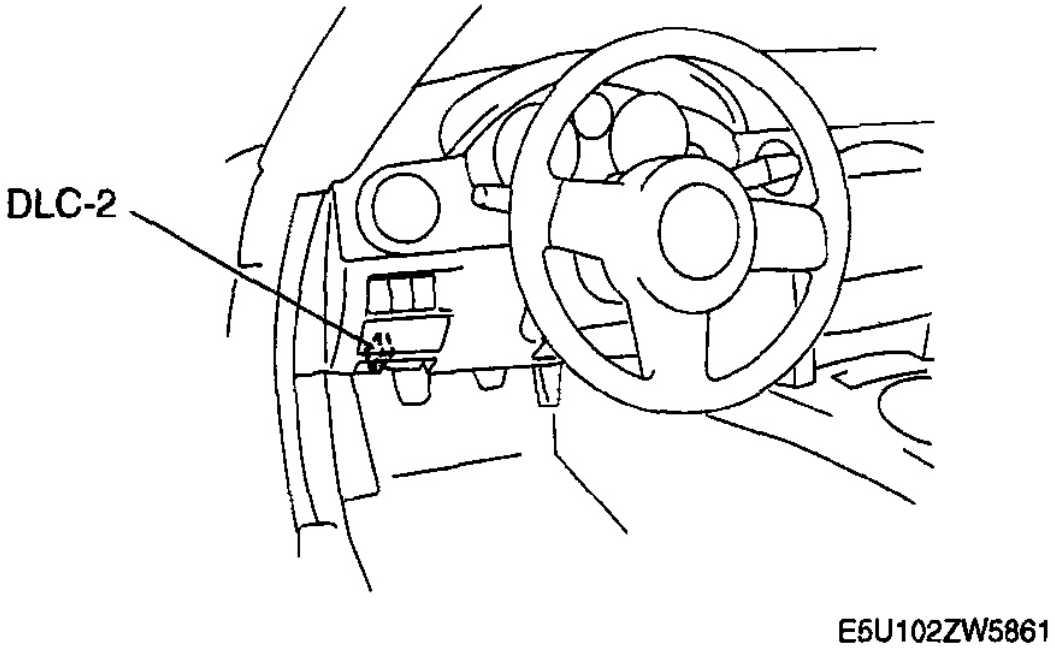


Fig. 23: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

2. Start the fuel pump using the "FP" simulation function.

Not using M-MDS or equivalent

1. Short the check connector terminal F/P to ground using a jumper wire.

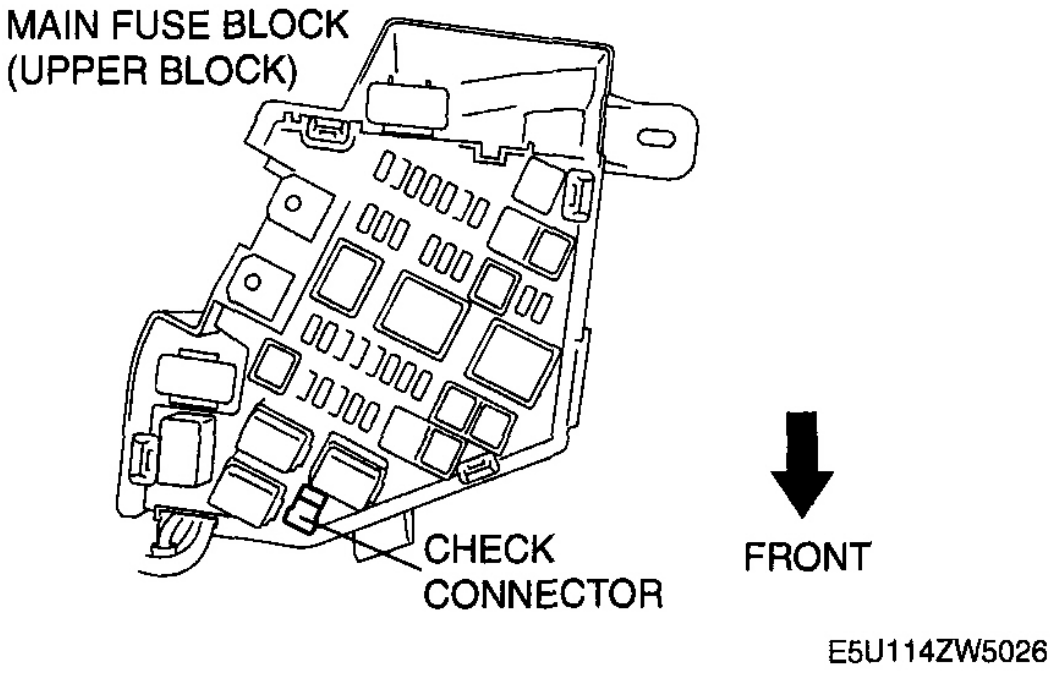


Fig. 24: Checking Connector Terminal F/P To Ground Using Jumper Wire
Courtesy of MAZDA MOTORS CORP.

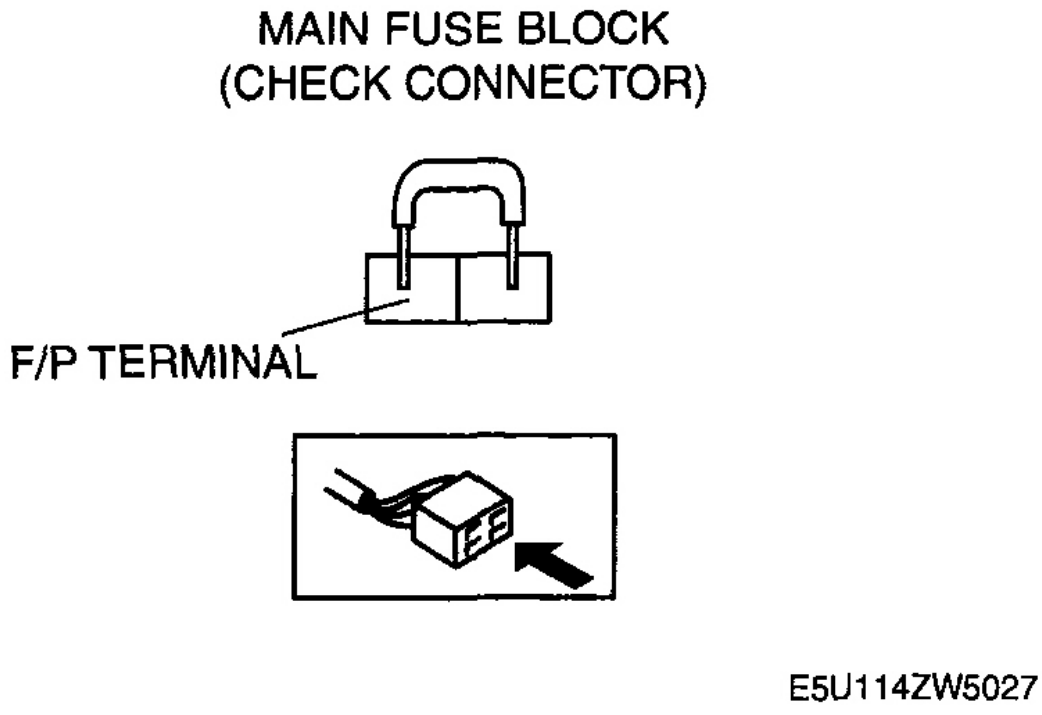


Fig. 25: Identifying F/P Connector Terminal
Courtesy of MAZDA MOTORS CORP.

2. Turn the ignition switch to the ON position to operate the fuel pump.

4. Verify that operation sound is heard from the fuel pump.
   - If the operation sound cannot be verified, measure the voltage at fuel pump unit wiring harness-side connector terminal B.
     - If as specified, inspect the following:
       - Fuel pump unit continuity
     - If not within the specification, inspect the following:
       - Fuel pump unit relay
       - Wiring harnesses and connectors between main relay and fuel pump relay
       - Wiring harnesses and connectors between fuel pump relay and PCM
       - Wiring harnesses and connectors between battery and fuel pump relay
       - Wiring harnesses and connectors between fuel pump relay and fuel pump unit

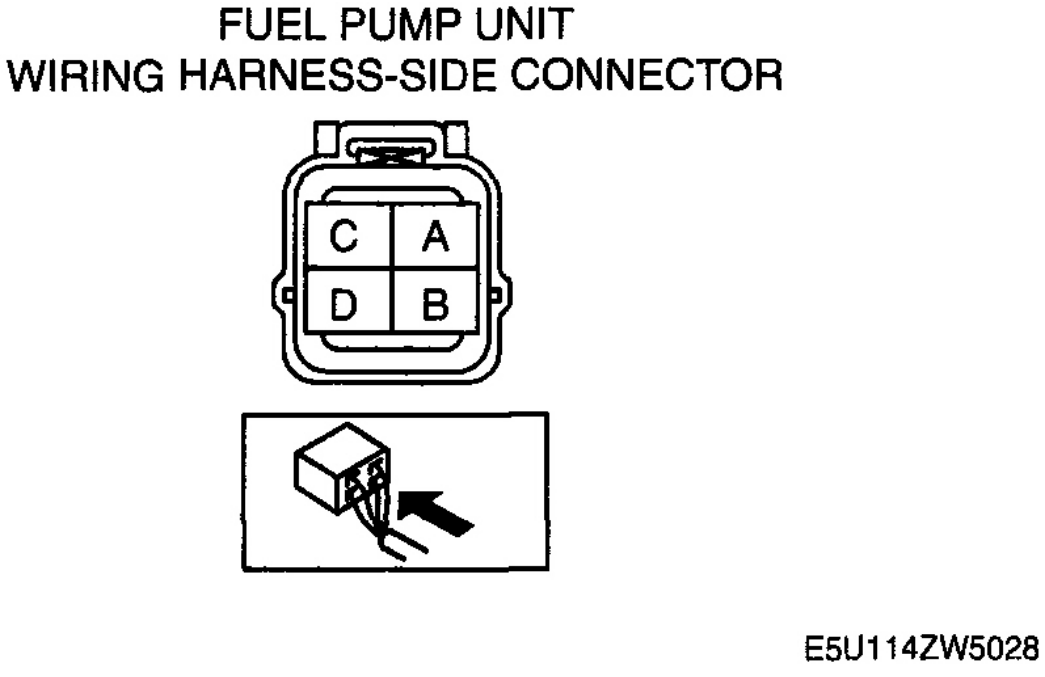


Fig. 26: Identifying Fuel Pump Unit Connector Terminal
Courtesy of MAZDA MOTORS CORP.

Standard

B+ (Ignition switch at ON)

CONTINUITY INSPECTION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the fuel pump unit connector. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [LF]** .)

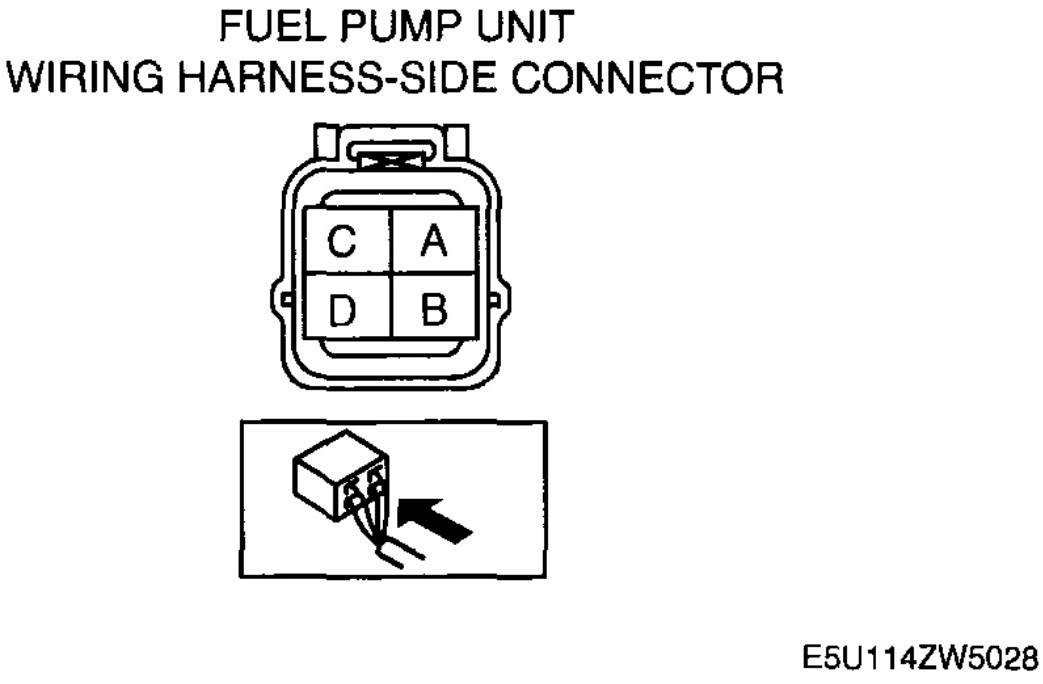


Fig. 27: Disconnecting Fuel Pump Unit Connector
Courtesy of MAZDA MOTORS CORP.

4. Inspect for continuity between fuel pump unit terminals B and D.
   - If there is continuity, perform the **CIRCUIT OPEN/SHORT INSPECTION**.
   - If there is no continuity, replace the fuel pump. (See **FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY [LF1]** .)

CIRCUIT OPEN/SHORT INSPECTION

1. Inspect the following wiring harnesses for an open or short circuit (continuity check).

   Open circuit

   - If there is no continuity, the circuit is open. Repair or replace the harness.
     - Fuel pump unit terminal D and body ground

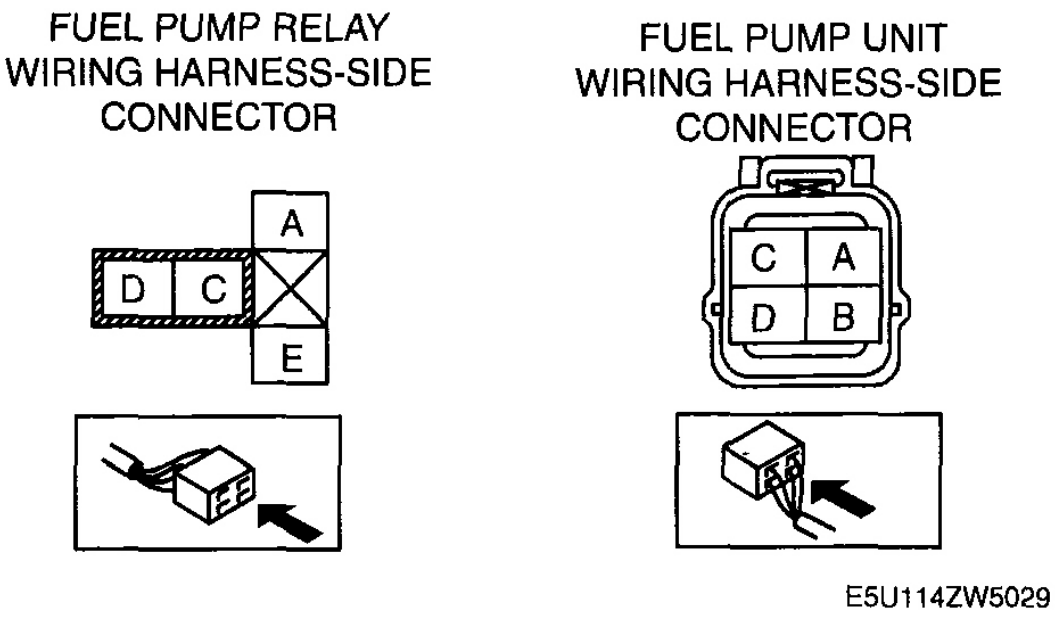


Fig. 28: Identifying Fuel Pump Unit Terminal
Courtesy of MAZDA MOTORS CORP.

FUEL STATIC PRESSURE INSPECTION

NOTE:

- **The fuel static pressure inspection cannot be performed because the pressure regulator is integrated with the fuel pump unit.**

QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "FUEL LINE SAFETY PROCEDURE", while referring to the BEFORE SERVICE PRECAUTION [LF] .**

QUICK RELEASE CONNECTOR TYPE

CAUTION:

- **There are two types of quick release connectors. Verify the type and location, and install/remove properly.**

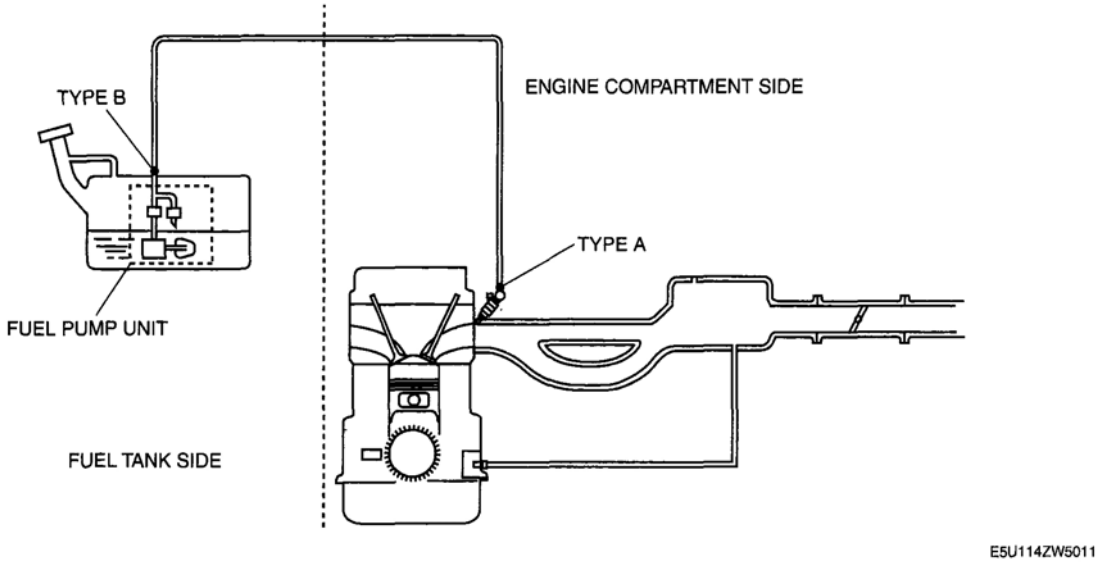


Fig. 29: Identifying Quick Release Connector (Fuel System)
Courtesy of MAZDA MOTORS CORP.

TYPE A REMOVAL

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)

CAUTION:
- **The quick release connector may be damaged if the release tab is bent excessively. Do not expand the release tab over the stopper.**

NOTE:
- **The fuel hose can be removed by pushing it to the pipe side to release the lock.**

2. Rotate the release tab on the quick release connector to the stopper position.

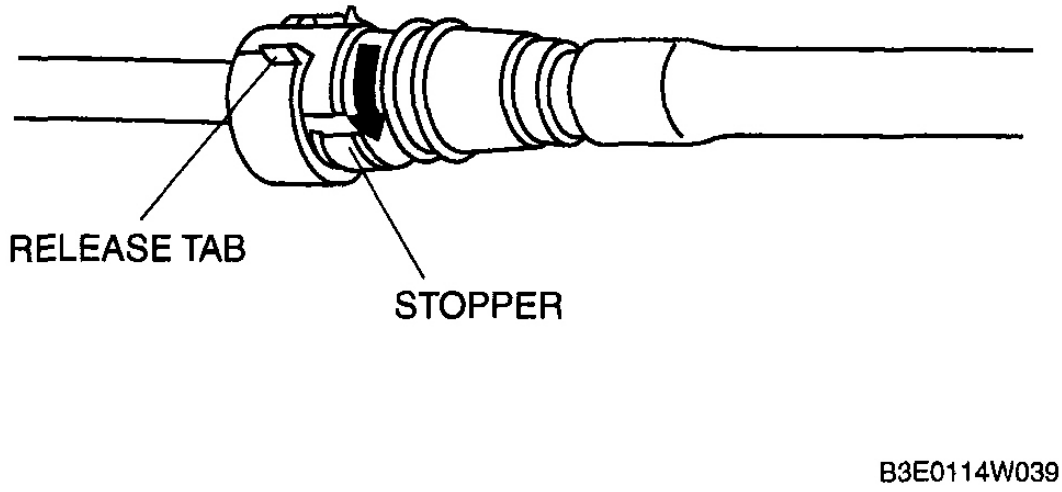


Fig. 30: Releasing Tab On Quick Release Connector To Stopper Position
Courtesy of MAZDA MOTORS CORP.

3. Pull out the fuel hose straight from the fuel pipe and disconnect it.

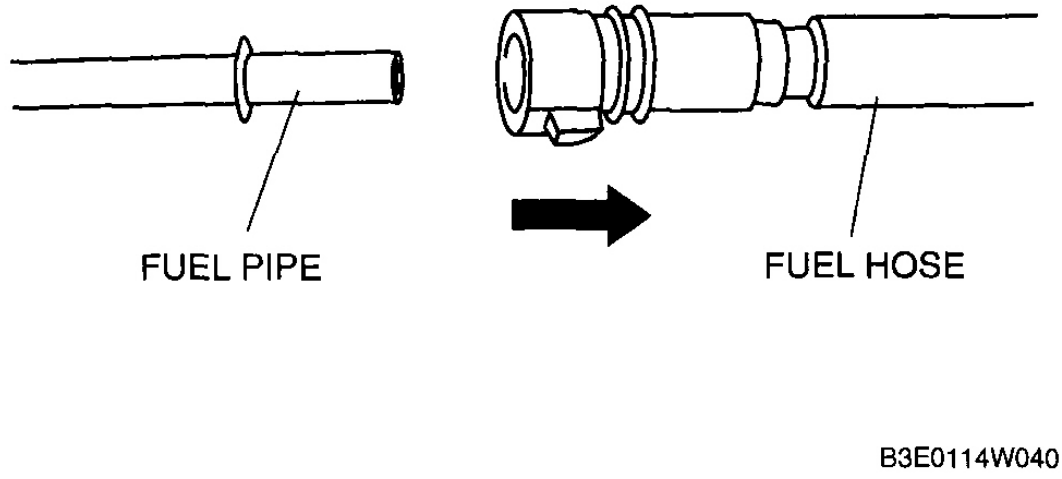
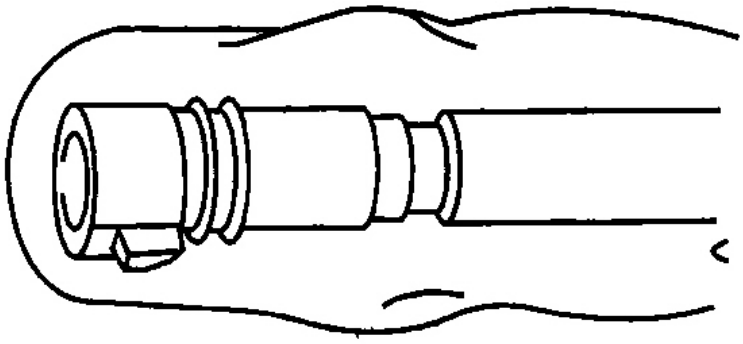


Fig. 31: View Of Fuel Hose & Fuel Pipe
Courtesy of MAZDA MOTORS CORP.

4. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from becoming scratched or dirty.



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Fig. 32: Covered Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

TYPE B REMOVAL

CAUTION:
- **Be careful not to damage the pipe when unlocking the retainer.**

NOTE:
- **If the quick release connector is removed, replace the retainer with a new one.**

1. Follow "BEFORE SERVICE PRECAUTION" and remove dirt from the connecting surfaces before performing any work operations. (See **BEFORE SERVICE PRECAUTION [LF]** .)

NOTE:
- **The retainer is attached to the pipe even after the connector is disconnected.**

2. Set the **SST** parallel to the quick release connector.

NOTE:
- **The quick release connector can be removed by pushing the center of the retainer tabs.**

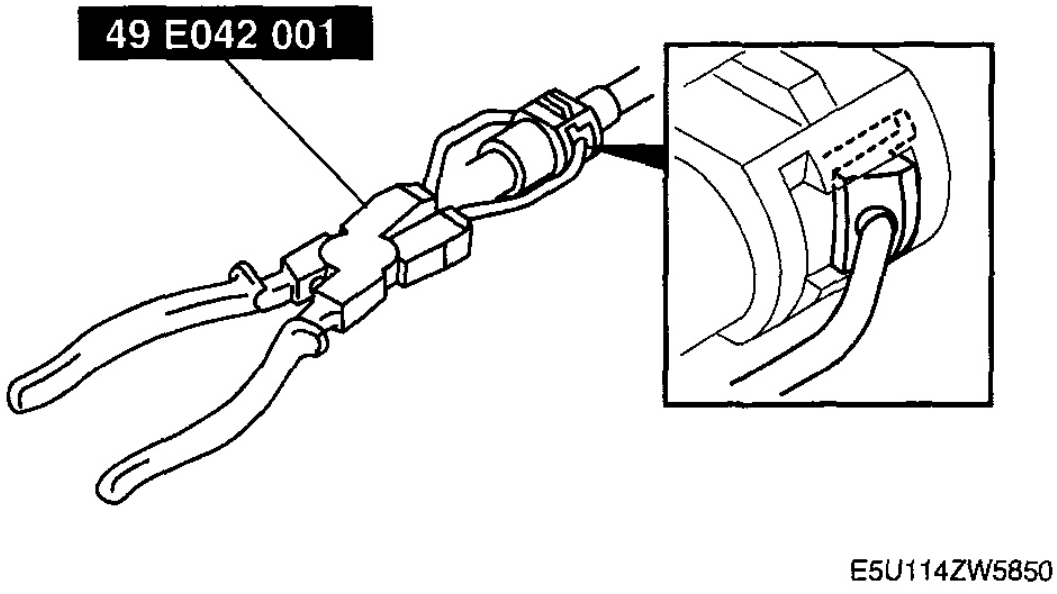


Fig. 33: Setting SST Parallel To Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

3. Hold the center of the retainer tabs with the **SST** ends and press the retainer.
4. Pull the connector side and disconnect the quick release connector.
5. Raise a retainer tab using the **SST** and remove the retainer.

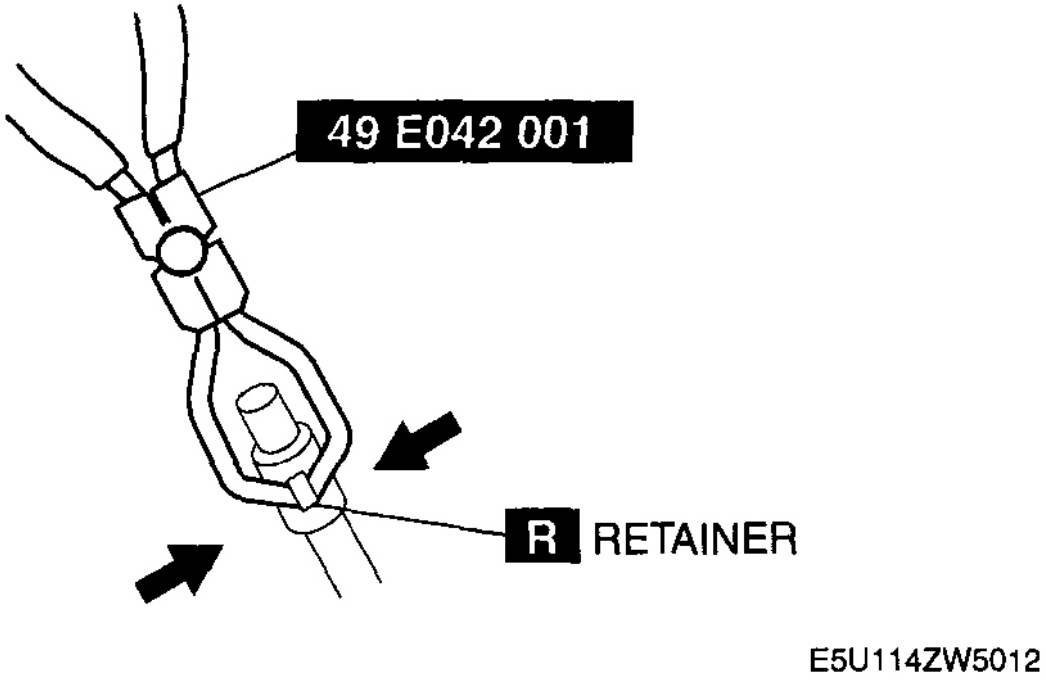


Fig. 34: Raising Retainer Tab Using SST & Removing Retainer
Courtesy of MAZDA MOTORS CORP.

6. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

TYPE A INSTALLATION

NOTE:

- **If the quick release connector O-ring is damaged or has slipped, replace the fuel hose.**
- **A checker tab is integrated with the quick release connector for new fuel hoses and evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel pipe.**

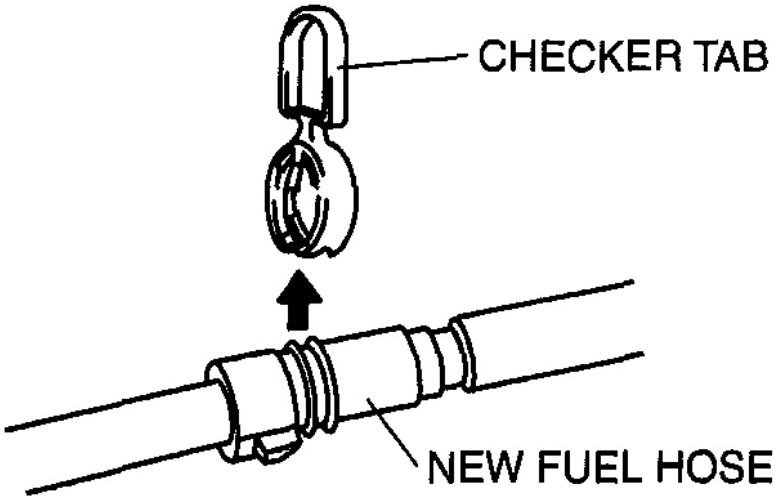


Fig. 35: Identifying Checker Tab
Courtesy of MAZDA MOTORS CORP.

1. Inspect the fuel hose and fuel pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the fuel pipe.
3. Reconnect the fuel hose straight to the fuel pipe until a click is heard.

NOTE:
- **If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.**

4. Lightly pull and push the quick release connector a few times by hand, and then verify that it can move **2.0-3.0 mm {0.08-0.12 in}** and is connected securely.
5. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)

TYPE B INSTALLATION

CAUTION:
- **Always replace the retainer with a new one when using SST 49 E042 001, otherwise, fuel leakage could result.**

NOTE:

- **If the quick release connector O-ring is damaged or has slipped, replace the piping component.**
- **A checker tab is integrated with the quick release connector for new fuel hoses and evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel pipe.**

1. Inspect the fuel hose and fuel pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the fuel pipe.
3. Install a new retainer to the quick release connector.

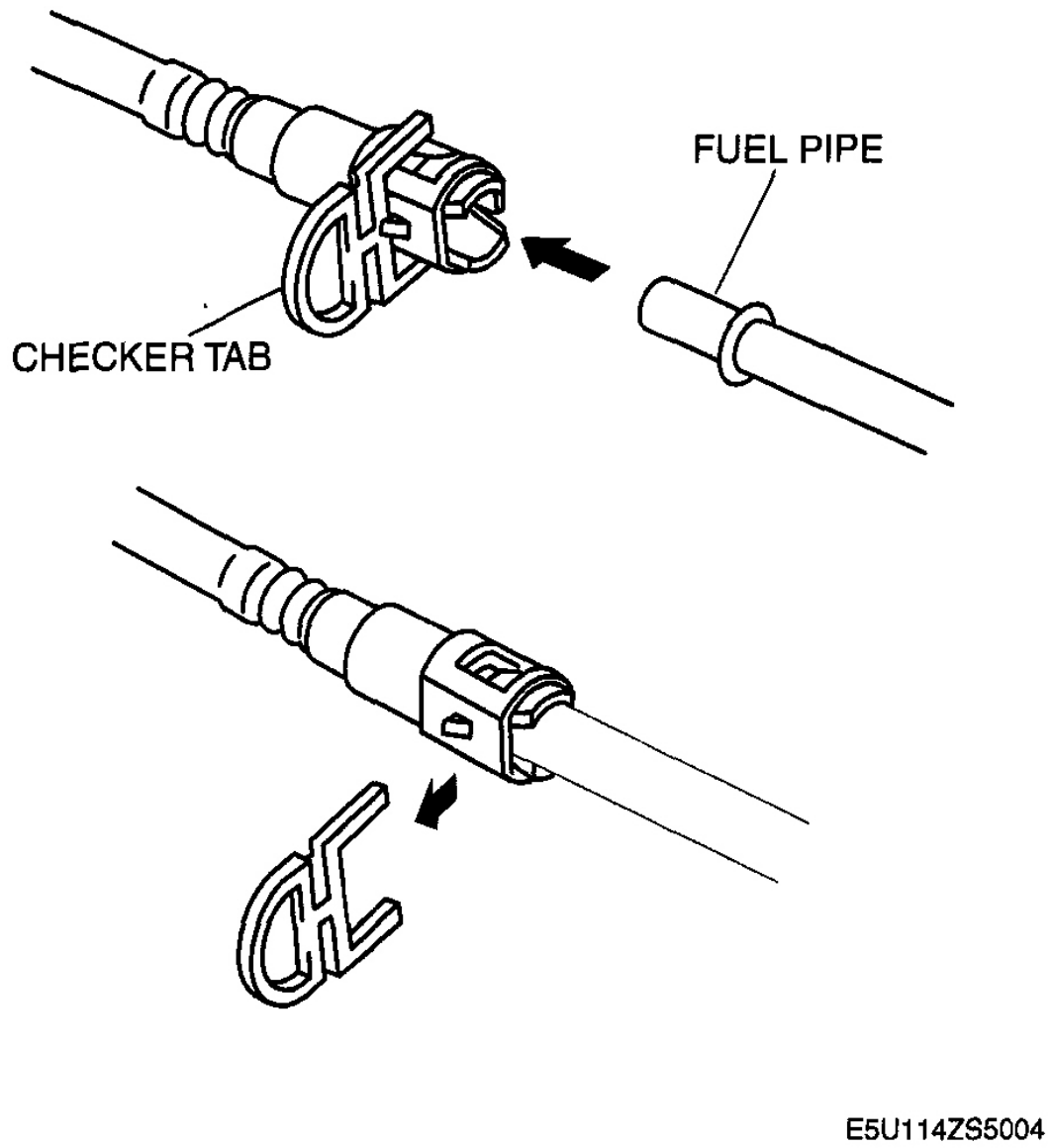


Fig. 36: Identifying Quick Release Connector
Courtesy of MAZDA MOTORS CORP.

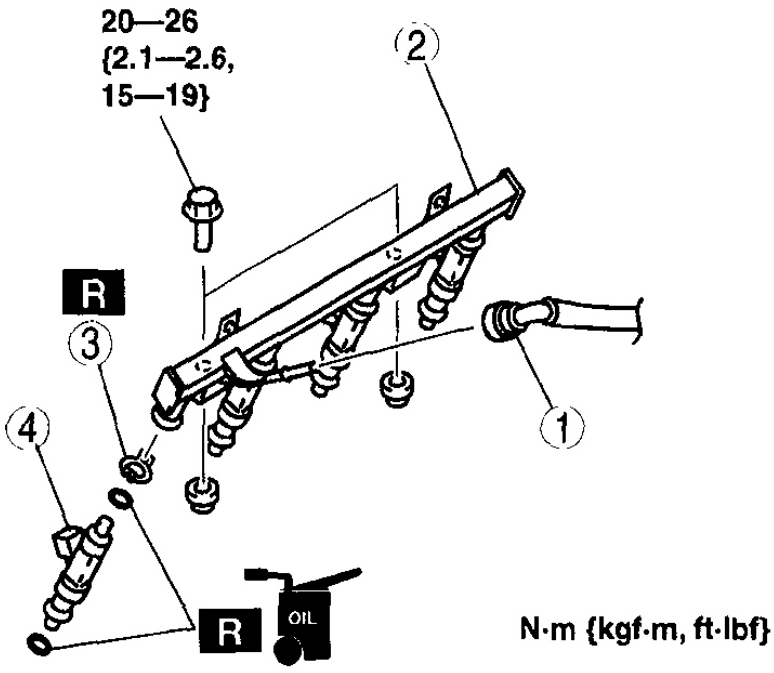
4. Reconnect the hose straight to the pipe until a click is heard.
5. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.
6. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)

FUEL INJECTOR REMOVAL/INSTALLATION [LF]

WARNING:

- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "FUEL LINE SAFETY PROCEDURE", while referring to the BEFORE SERVICE PRECAUTION [LF] .**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
3. Remove the battery cover.
4. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
5. Disconnect the fuel injector connector and move the harness slightly out of the way.
6. Remove in the order indicated in **Fig. 37** .



E5U114ZW5004

1	Quick release connector (Type A)
2	Fuel distributor
3	Injector clip
4	Fuel injector

Fig. 37: View Of Fuel Injector Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

7. Install in the reverse order of removal.
8. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)

FUEL INJECTOR REMOVAL NOTE

CAUTION:
- **Use of a deformed injector clip will cause the fuel injector to be connected incorrectly and could result in fuel leakage. It will also cause the injector to rotate. Therefore, always replace the clip when the injector is removed.**

1. Insert a flathead screwdriver between the injector cup and clip finger.

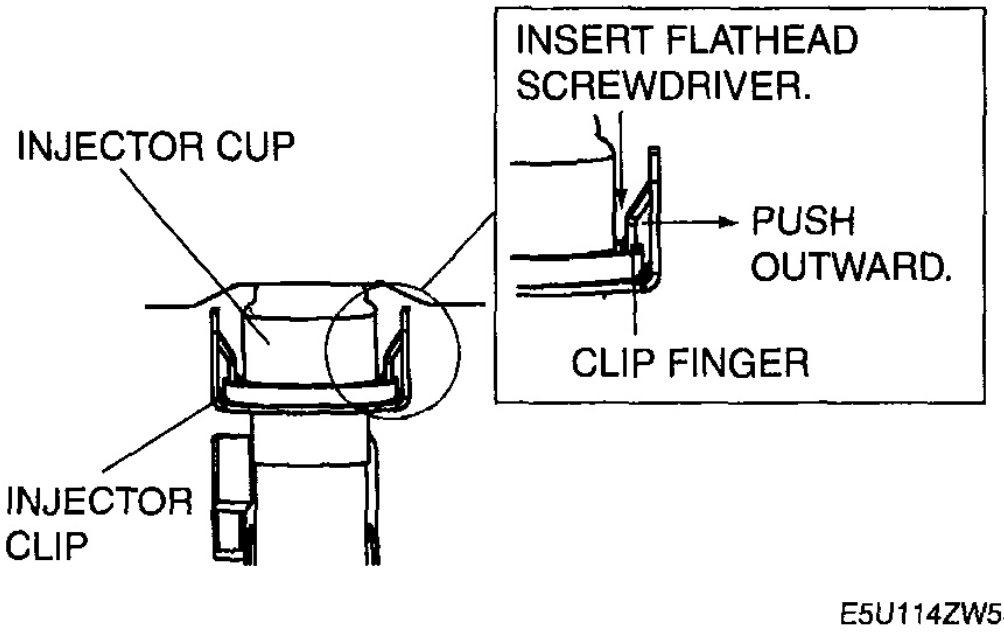


Fig. 38: Inserting Flathead Screwdriver Between Injector Cup & Clip Finger
Courtesy of MAZDA MOTORS CORP.

NOTE:
- **When pushing the clip finger outward, deform the finger until it is removed completely from the cup notch.**

2. Push the clip finger outward using a flathead screwdriver.
3. Remove the injector with the clip.
4. Remove the clip from the fuel injector using the following procedure:

NOTE:
- **The clip will not be reused.**

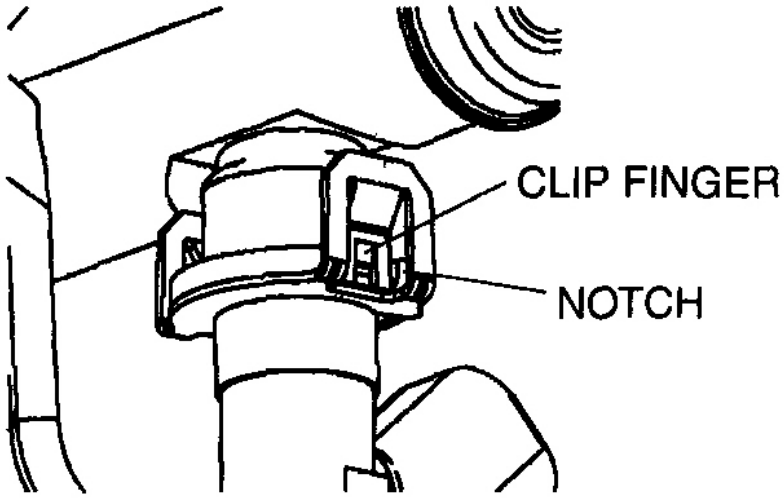


Fig. 39: Identifying Clip Finger And Notch
Courtesy of MAZDA MOTORS CORP.

1. Hold the clip using pliers.
2. Pull the clip parallel to the injector groove and remove it from the injector.

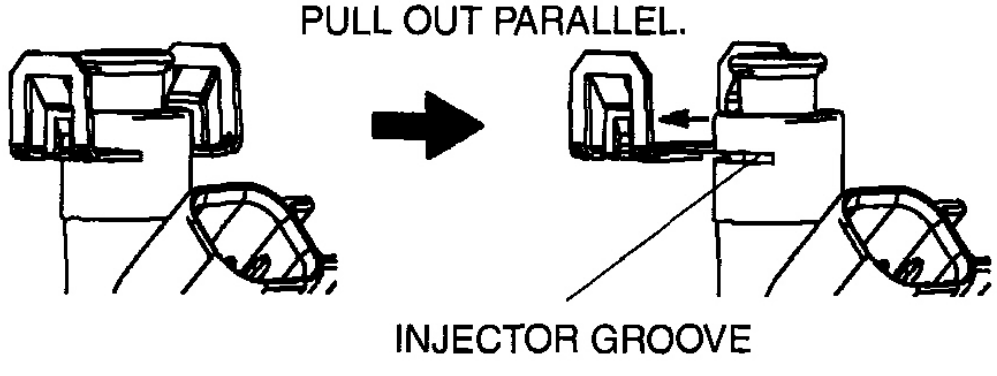


Fig. 40: Pulling Clip Parallel To Injector Groove
Courtesy of MAZDA MOTORS CORP.

FUEL INJECTOR INSTALLATION NOTE

1. Apply a small amount of clean oil to the injector groove and the O-ring.
2. Temporarily attach a new clip to the injector groove.

NOTE:
- **When the clip is attached correctly, the central area of the injector and the clip finger positions are aligned.**

3. Hold the injector firmly and push the clip into the injector until the clip stops sliding.
4. Verify that the injector connector position is correct.
5. Press the injector into the injector cup. Continue pressing until the clip contacts the lower surface of the injector cup.
6. Verify that the injector and clip are correctly installed with the clip locked onto the injector cup notch.

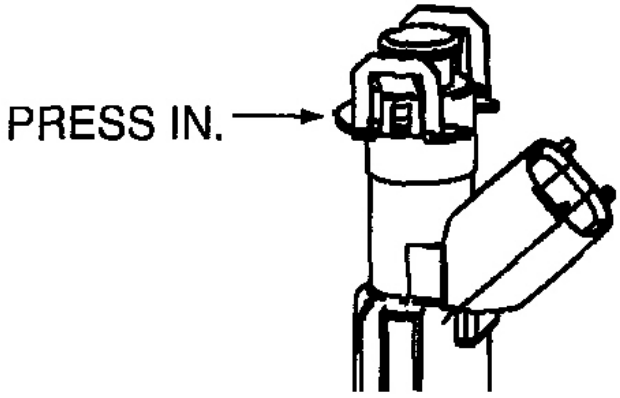


Fig. 41: View Of Fuel Injector
Courtesy of MAZDA MOTORS CORP.

FUEL INJECTOR INSPECTION [LF]

NOTE:

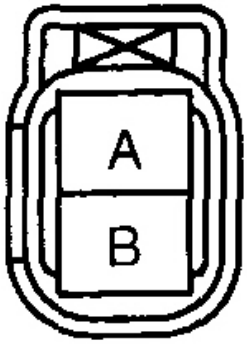
- **Perform the following inspection only when directed.**

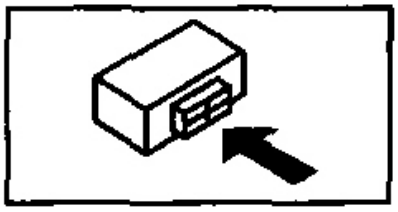
RESISTANCE INSPECTION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the fuel injector connector.
4. Inspect the resistance between fuel injector terminals A and B using a tester.
   - If within the specification, perform the **CIRCUIT OPEN/SHORT INSPECTION**.
   - If not within the specification, replace the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)

   Fuel injector resistance

   11.4-12.6 ohms [20°C {68°F}]





B3E0114W027

Fig. 42: Identifying Fuel Injector Terminals A & B Using Tester
Courtesy of MAZDA MOTORS CORP.

CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harnesses for open or short circuit (continuity check).

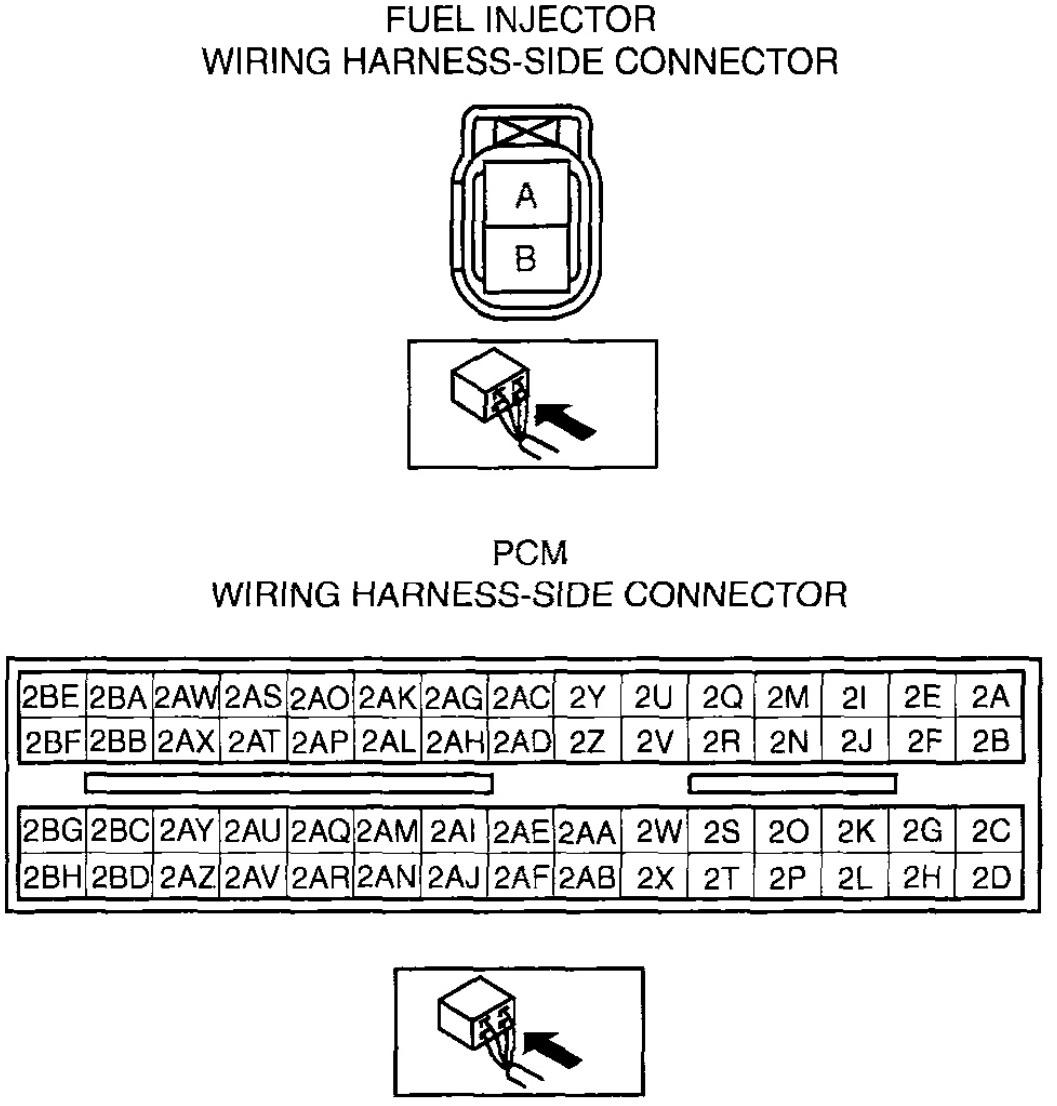


Fig. 43: Identifying Fuel Injector Connector & PCM Connector Terminal
Courtesy of MAZDA MOTORS CORP.

Open Circuit

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - Fuel injector No.1 terminal B and PCM terminal 2BB
  - Fuel injector No.2 terminal B and PCM terminal 2BC
  - Fuel injector No.3 terminal B and PCM terminal 2BD
  - Fuel injector No.4 terminal B and PCM terminal 2AZ
  - Fuel injector No.1 terminal A and main relay
  - Fuel injector No.2 terminal A and main relay
  - Fuel injector No.3 terminal A and main relay
  - Fuel injector No.4 terminal A and main relay

Short Circuit

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - Fuel injector No.1 terminal B and body ground
  - Fuel injector No.1 terminal B and power supply
  - Fuel injector No.2 terminal B and body ground
  - Fuel injector No.2 terminal B and power supply
  - Fuel injector No.3 terminal B and body ground
  - Fuel injector No.3 terminal B and power supply
  - Fuel injector No.4 terminal B and body ground
  - Fuel injector No.4 terminal B and power supply
  - Fuel injector No.1 terminal A and body ground
  - Fuel injector No.2 terminal A and body ground
  - Fuel injector No.3 terminal A and body ground
  - Fuel injector No.4 terminal A and body ground

LEAKAGE INSPECTION

WARNING:

- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. To prevent this, complete the following inspection with the engine stopped.**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the fuel injector and fuel distributor as a single unit. (See **FUEL INJECTOR**

REMOVAL/INSTALLATION [LF] .)

5. Fix the fuel injector to the fuel distributor with a wire or the equivalent.

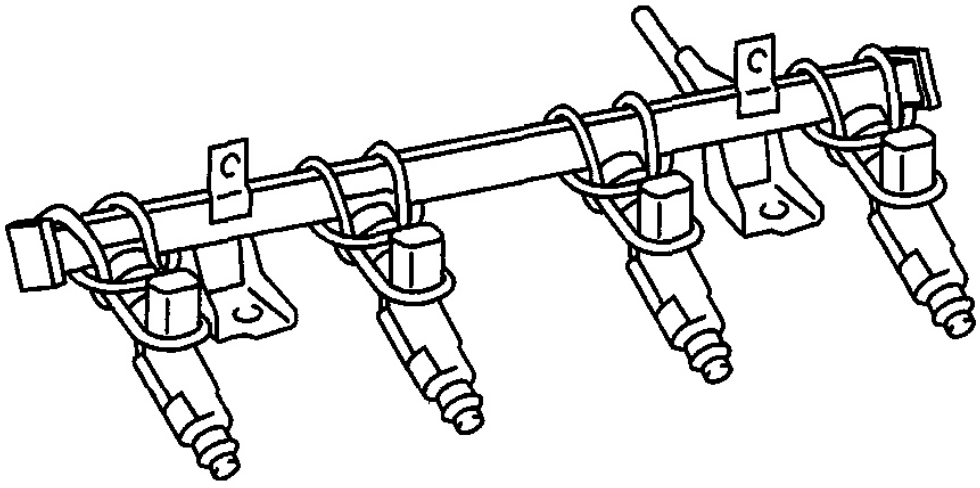


Fig. 44: Fixing Fuel Injector To Fuel Distributor With Wire
Courtesy of MAZDA MOTORS CORP.

6. Connect the fuel hose.
7. Start the fuel pump using the following procedure:

Using M-MDS

1. Connect the negative battery cable.
2. Connect the M-MDS to the DLC-2.

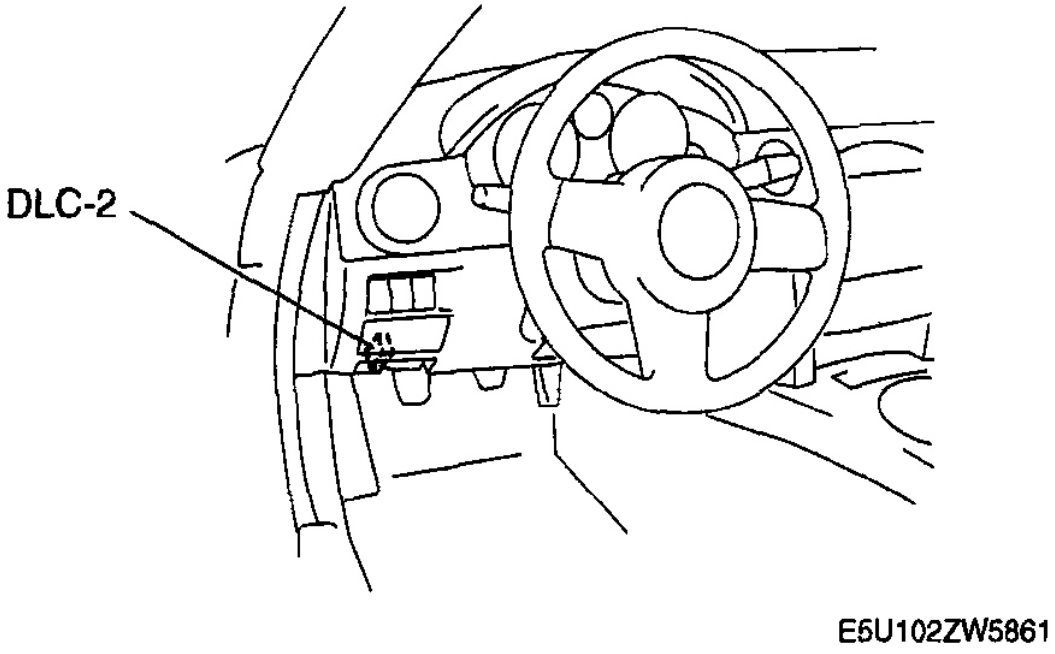


Fig. 45: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Start the fuel pump using the "FP" simulation function.

Not using M-MDS

1. Short the check connector terminal F/P to ground using a jumper wire.

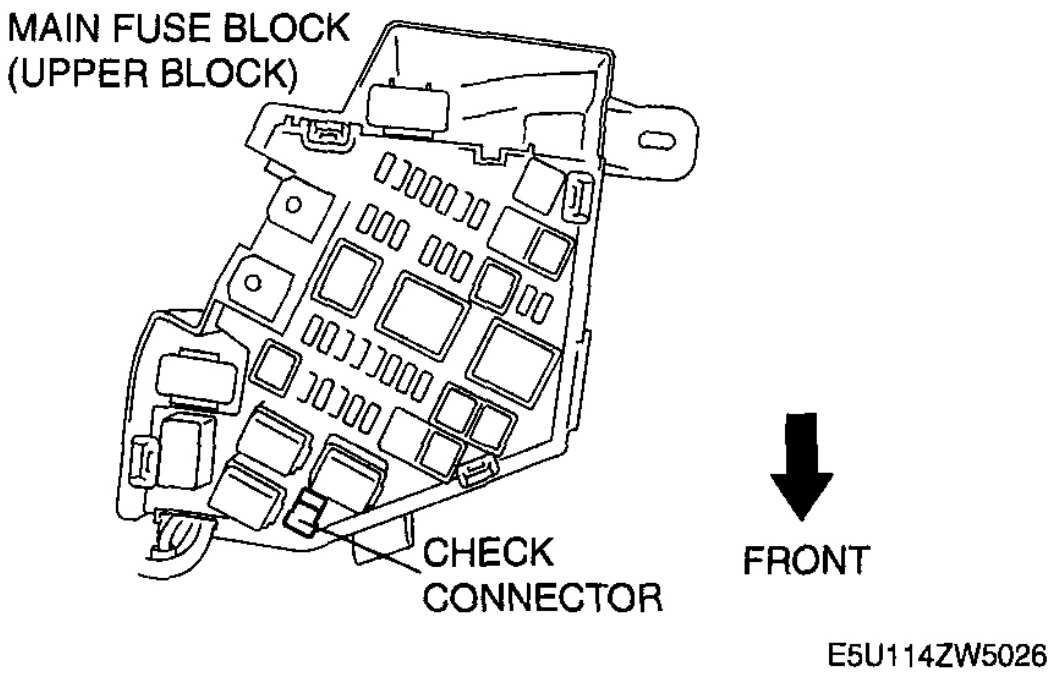


Fig. 46: Checking Connector Terminal F/P To Ground Using Jumper Wire
Courtesy of MAZDA MOTORS CORP.

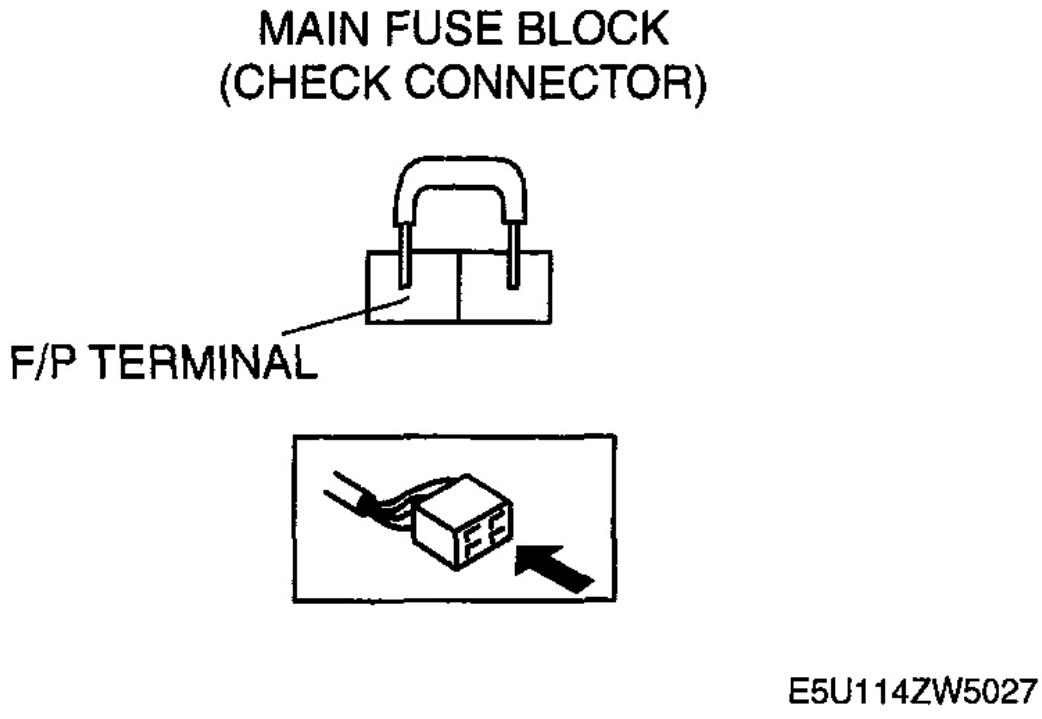


Fig. 47: Identifying F/P Connector Terminal
Courtesy of MAZDA MOTORS CORP.

2. Turn the ignition switch to the ON position to operate the fuel pump.

NOTE:
- **Prepare a container to collect the gasoline.**

8. Tilt the fuel injector at an angle of **24°** to inspect for leakage.
   - If not within the specification, replace the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .

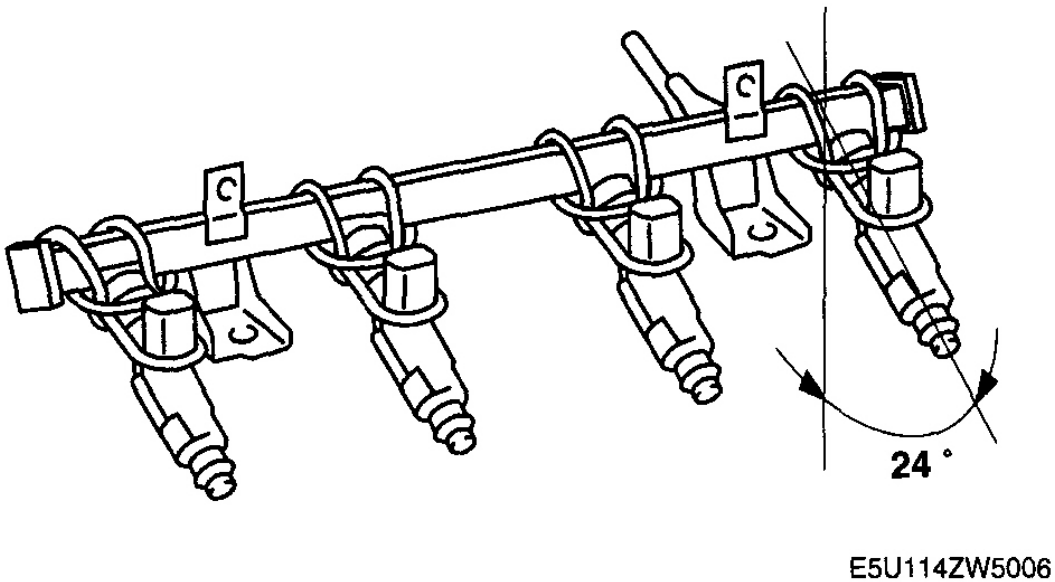


Fig. 48: Tilting Fuel Injector
Courtesy of MAZDA MOTORS CORP.

Fuel injector leakage amount

Less than 1 drop/2 min

9. Stop the fuel pump using the following procedure:

Using M-MDS

1. Stop the fuel pump using the "FP" simulation function.

Not using M-MDS

1. Turn the ignition switch to off to stop the fuel pump.

10. Remove the battery cover.
11. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
12. Remove the wire or equivalent securing the fuel injector.
13. Install the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
14. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)

INJECTION VOLUME INSPECTION

WARNING:

- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. To prevent this, complete the following inspection with the engine stopped.**

1. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Remove the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
5. Connect the fuel injector to the fuel injector tester.
6. Start the fuel pump using the following procedure:

Using M-MDS

1. Connect the negative battery cable.
2. Connect the M-MDS or equivalent to the DLC-2.

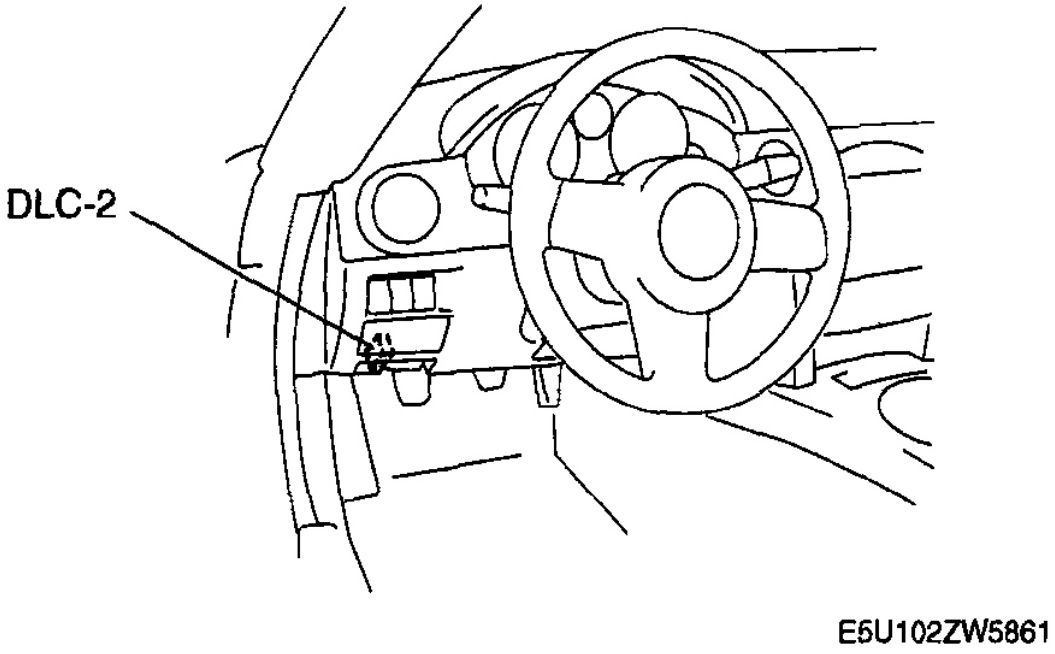


Fig. 49: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Start the fuel pump using the "FP" simulation function.

Not using M-MDS

1. Short the check connector terminal F/P to ground using a jumper wire.

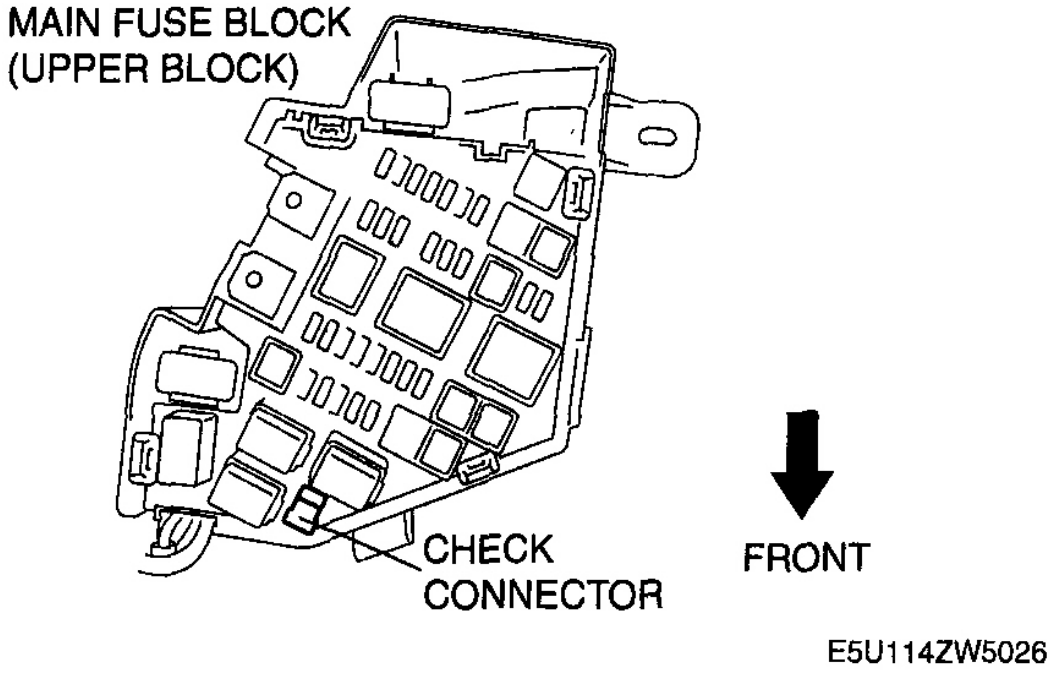


Fig. 50: Checking Connector Terminal F/P To Ground Using Jumper Wire
Courtesy of MAZDA MOTORS CORP.

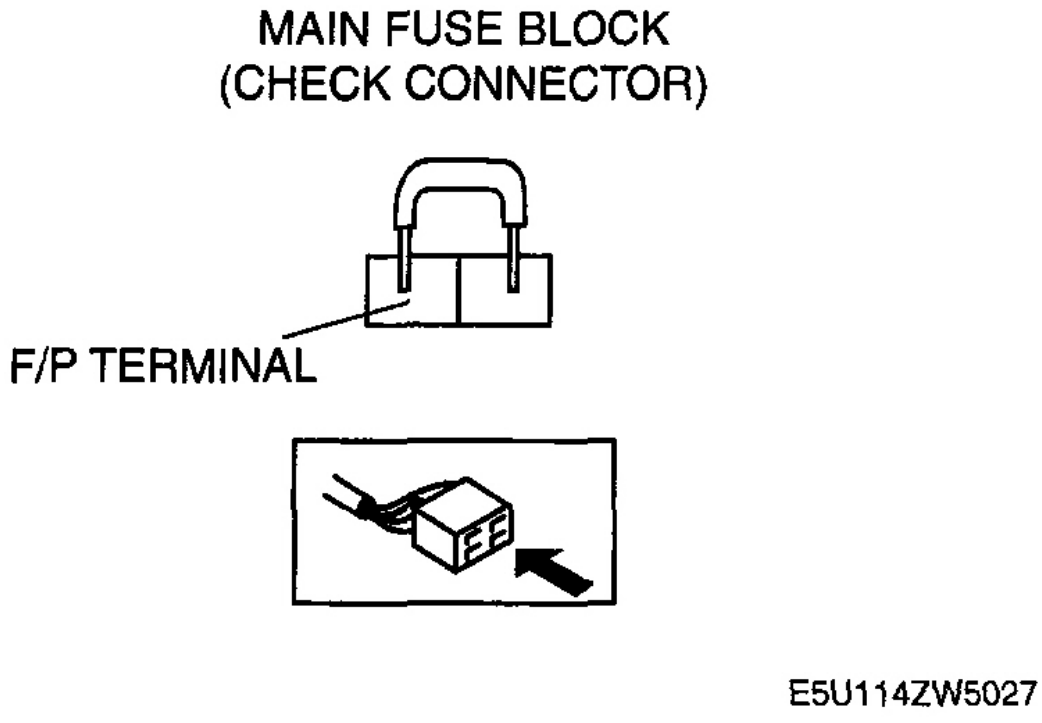


Fig. 51: Identifying F/P Connector Terminal
Courtesy of MAZDA MOTORS CORP.

2. Turn the ignition switch to the ON position to operate the fuel pump.

7. Measure the injection volume of each fuel injector.
   - If not within the specification, replace the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)

Fuel injection volume

204-216 ml {204-216 cc, 12.5-13.1 cu in}/min

8. Turn the ignition switch to off to stop the fuel pump.
9. Install the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
10. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [LF]** .)

ATOMIZATION INSPECTION

1. Inspect the atomization status.
   - If not normal, replace the fuel injector. (See **FUEL INJECTOR REMOVAL/INSTALLATION**

[LF] .)

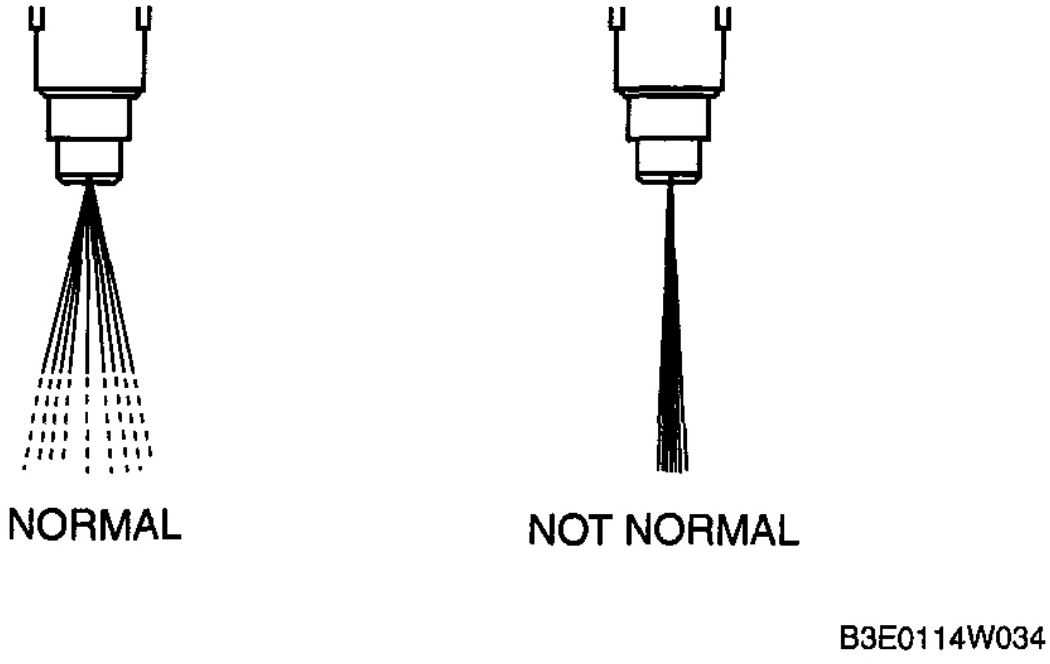
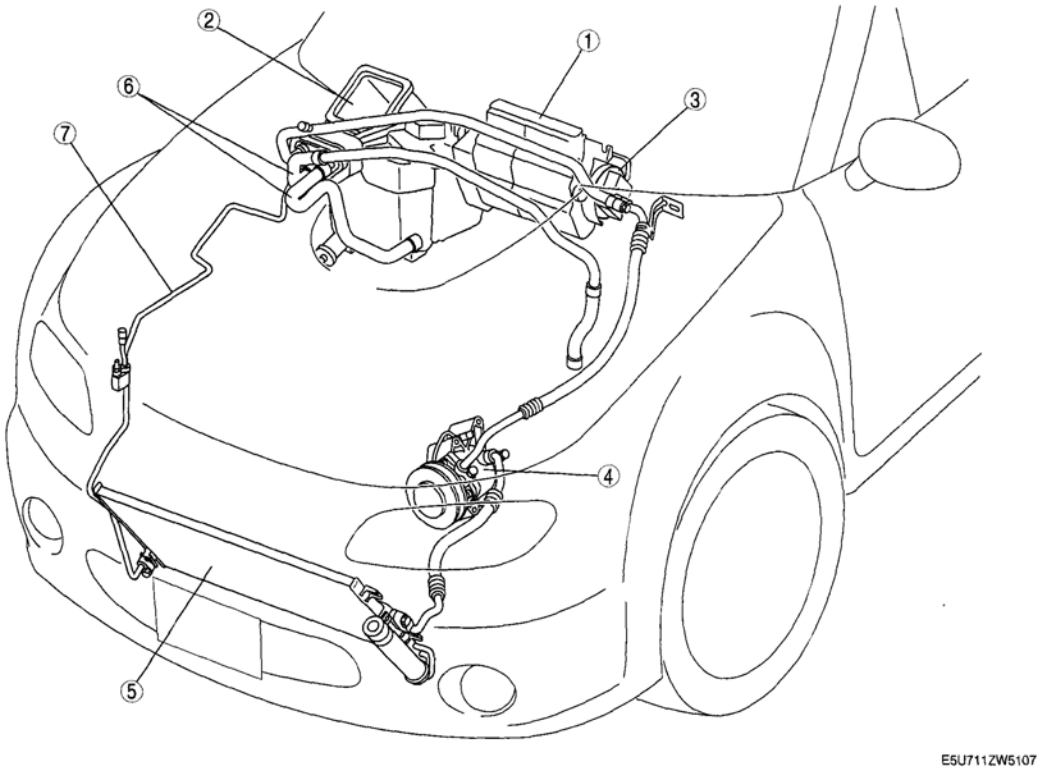


Fig. 52: Inspecting Atomization Status
Courtesy of MAZDA MOTORS CORP.

2008 HVAC

Basic System - MX-5 Miata

HVAC BASIC SYSTEM



1	Air dist unit
2	A/C unit
3	Airflow mode main link
4	A/C compressor
5	Condenser
6	Heater hose
7	Refrigerant line

Fig. 1: Identifying Location Of HVAC Basic System Components
Courtesy of MAZDA MOTORS CORP.

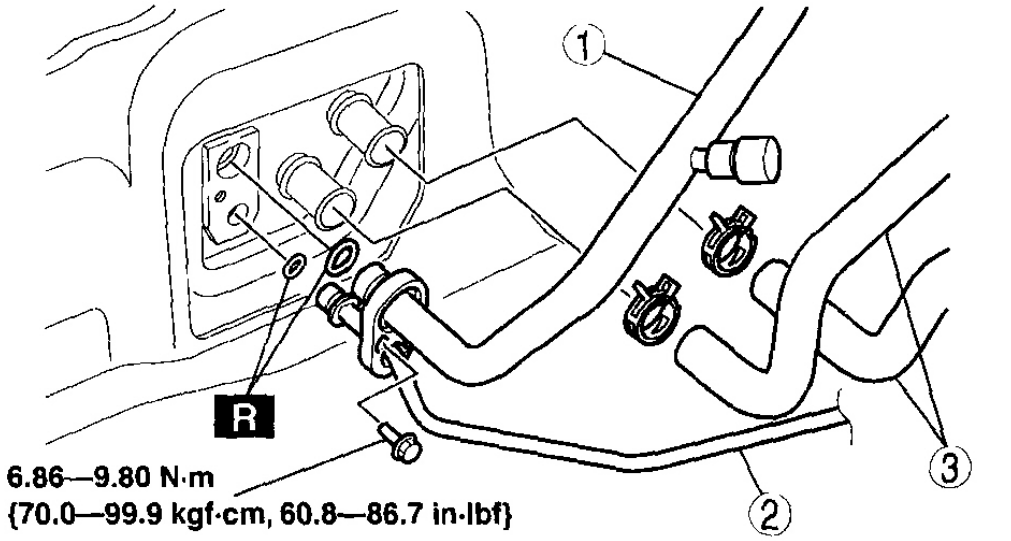
AIR DISTRIBUTION UNIT REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]**)
3. Discharge the refrigerant from the system. (See **REFRIGERANT RECOVERY** .) (See **REFRIGERANT CHARGING** .)
4. Drain the engine coolant. (See **ENGINE COOLANT REPLACEMENT [LF]** .)

5. Disconnect from A/C unit in the order in **Fig. 2** .

CAUTION:

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**



1	Cooler pipe No.3 (LO)
2	Cooler pipe No.2 (HI)
3	Heater hose

Fig. 2: View Of A/C Unit Pipe Lines & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

6. Remove the following parts:
    1. Console (See **CONSOLE REMOVAL/INSTALLATION** .)
    2. Glove compartment (See **GLOVE COMPARTMENT REMOVAL/INSTALLATION** .)
    3. Side wall (See **SIDE WALL REMOVAL/INSTALLATION** .)
    4. Console panel (See **CONSOLE PANEL REMOVAL/INSTALLATION** .)
    5. Center panel unit (See **CENTER PANEL UNIT REMOVAL/INSTALLATION** .)
    6. Lower panel (See **LOWER PANEL REMOVAL/INSTALLATION** .)
    7. Knee bolster

8. Column cover (See **COLUMN COVER REMOVAL/INSTALLATION** .)
9. Driver-side air bag module (See **DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION** .)
10. Steering wheel (See **STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION** .)
11. Combination switch (See **COMBINATION SWITCH REMOVAL/INSTALLATION** .)
12. Steering shaft (See **STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION** .)
13. Meter hood (See **METER HOOD REMOVAL/INSTALLATION** .)
14. Instrument cluster (See **INSTRUMENT CLUSTER REMOVAL/INSTALLATION** .)
15. Side panel (See **SIDE PANEL REMOVAL/INSTALLATION** .)
16. Hood release lever (See **HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM]** .)
17. Female bracket (See **CONVERTIBLE TOP DISASSEMBLY/ASSEMBLY** .)
18. A-pillar trim (See **A-PILLAR TRIM REMOVAL/INSTALLATION** .)
19. Scuff plate (See **SCUFF PLATE REMOVAL/INSTALLATION** .)
20. Front side trim (See **FRONT SIDE TRIM REMOVAL/INSTALLATION** .)
21. Fuse box No.1
22. Dashboard (See **DASHBOARD REMOVAL/INSTALLATION** .)

7. Remove the air distribution unit and A/C unit.

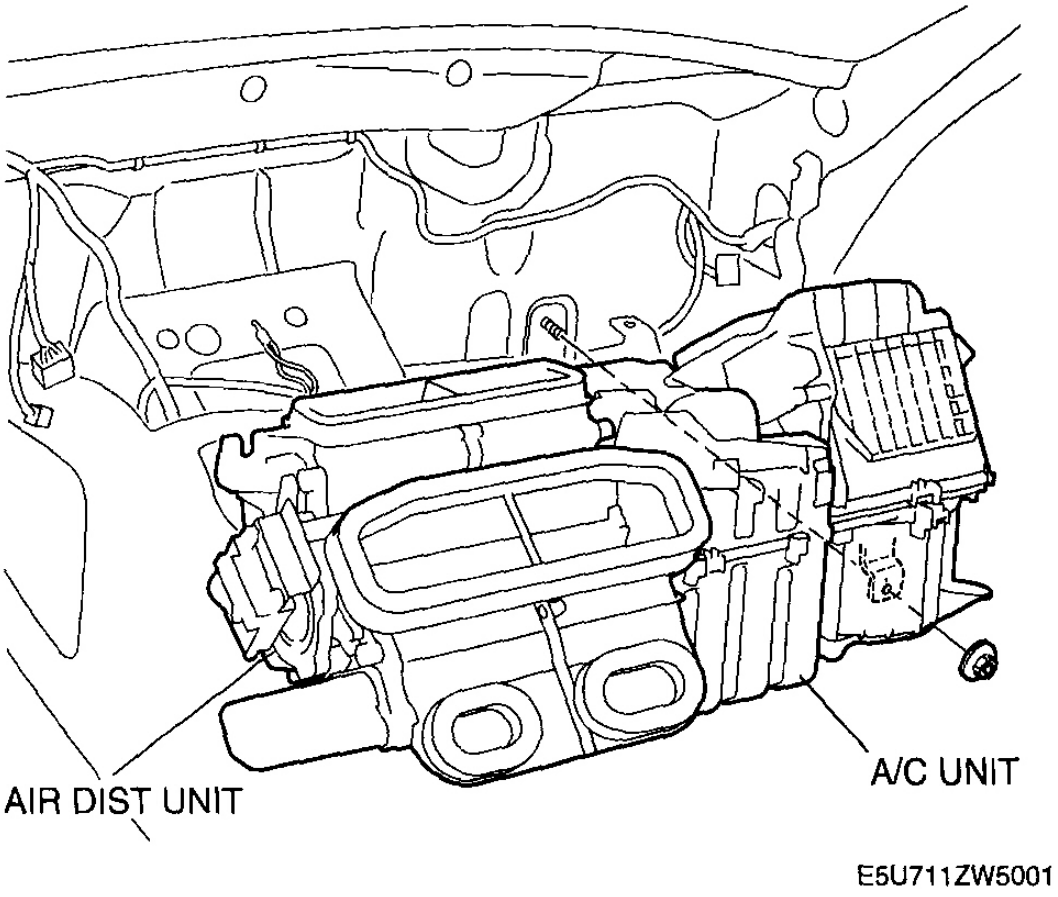


Fig. 3: View Of Air Distribution Unit & A/C Unit
Courtesy of MAZDA MOTORS CORP.

8. Disassemble the air distribution unit as shown in **Fig. 4** .
9. Install in the reverse order of removal.
10. Perform the refrigerant system performance test. (See **REFRIGERANT SYSTEM PERFORMANCE TEST** .)

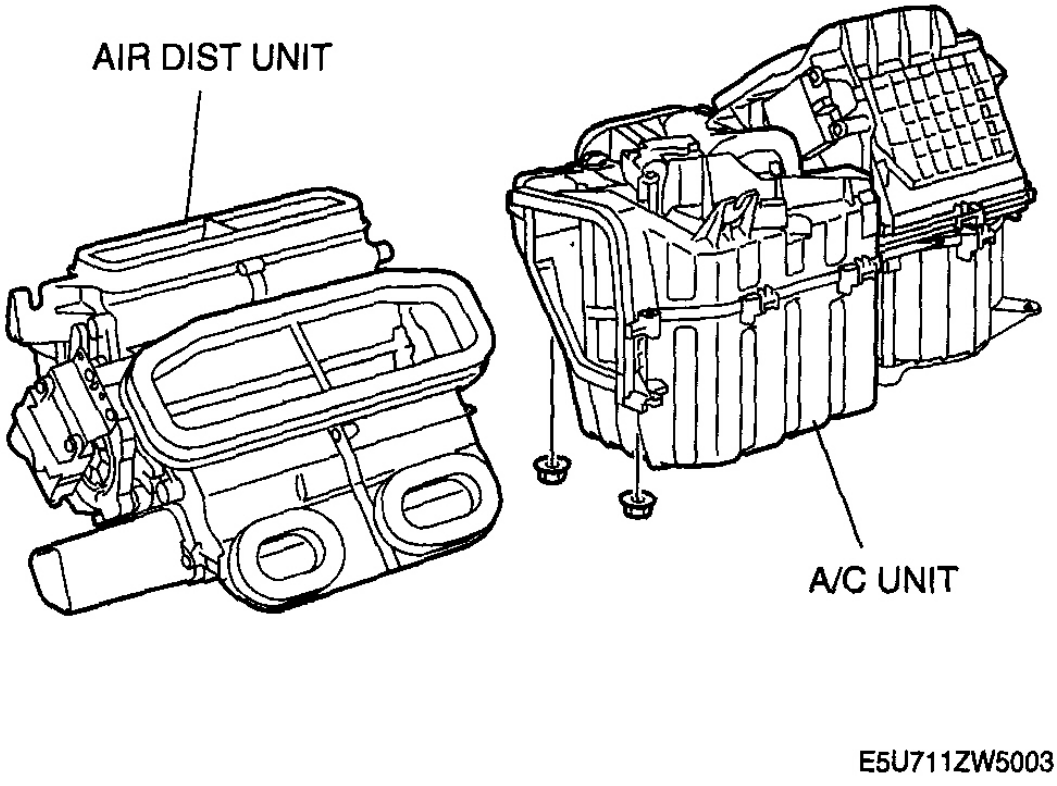


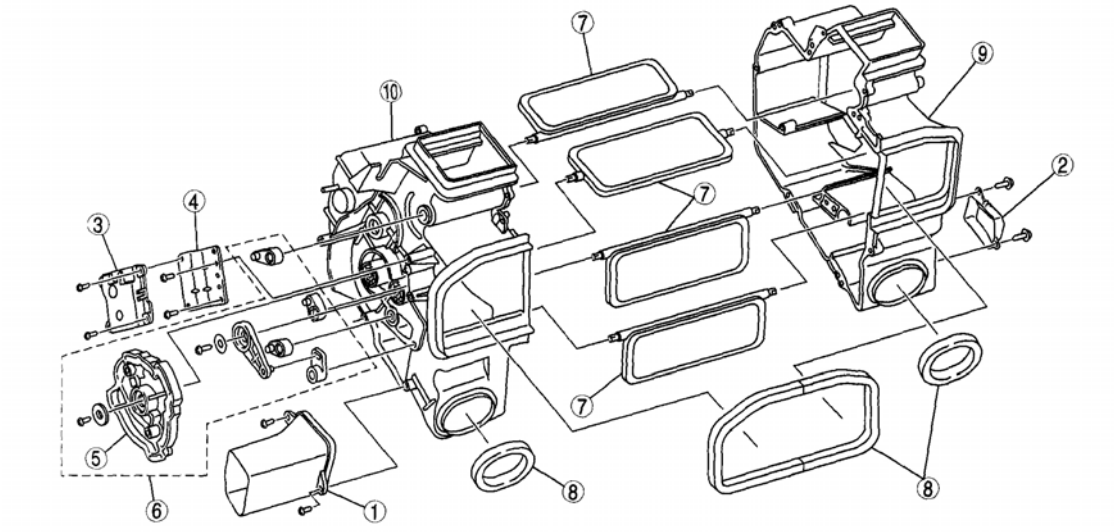
Fig. 4: Identifying Air Distribution Unit
Courtesy of MAZDA MOTORS CORP.

AIR DISTRIBUTION UNIT DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in **Fig. 5** .

CAUTION:

- **If a non-specified grease is used, it may result in abnormal noise or improper operation of the links. Apply only the specified grease to each link.**



1	Duct (1)
2	Duct (2)
3	Airflow mode actuator
4	Bracket
5	Airflow mode main link

6	Airflow mode link set
7	Airflow mode door
8	Polyurethane form
9	Case (1)
10	Case (2)

Fig. 5: Exploded View Of Air Distribution Unit Components
Courtesy of MAZDA MOTORS CORP.

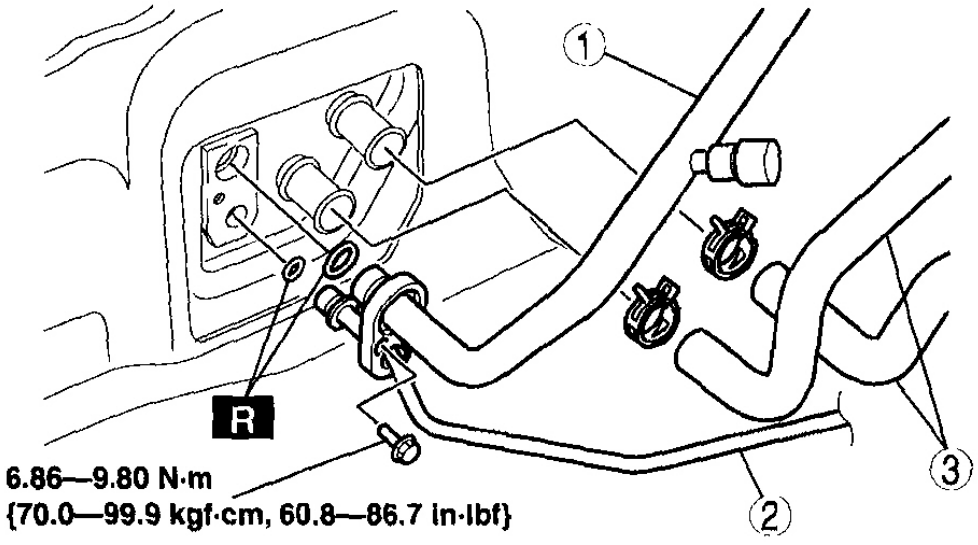
2. Assemble in the reverse order of disassembly.

A/C UNIT REMOVAL/INSTALLATION

1. Remove battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Discharge the refrigerant from the system. (See **REFRIGERANT RECOVERY** .) (See **REFRIGERANT CHARGING** .)
4. Drain the engine coolant. (See **ENGINE COOLANT REPLACEMENT [LF]** .)
5. Disconnect from A/C unit in the order in **Fig. 6** .

CAUTION:

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**



1	Cooler pipe No.3 (LO)
2	Cooler pipe No.2 (HI)
3	Heater hose

Fig. 6: View Of Refrigerant Line From A/C Unit & Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

6. Remove the A/C unit and air distribution unit. (See **AIR DISTRIBUTION UNIT REMOVAL/INSTALLATION** .)
7. Disassembly the A/C unit as shown in **Fig. 7** .
8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See **REFRIGERANT SYSTEM PERFORMANCE TEST** .)

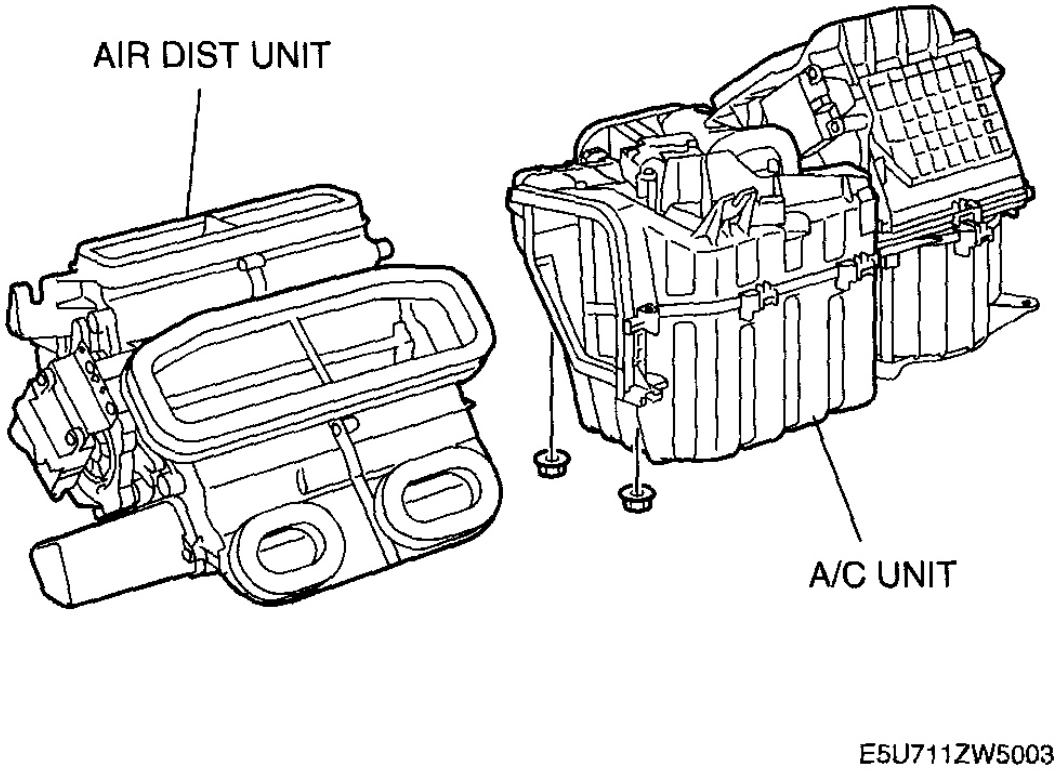


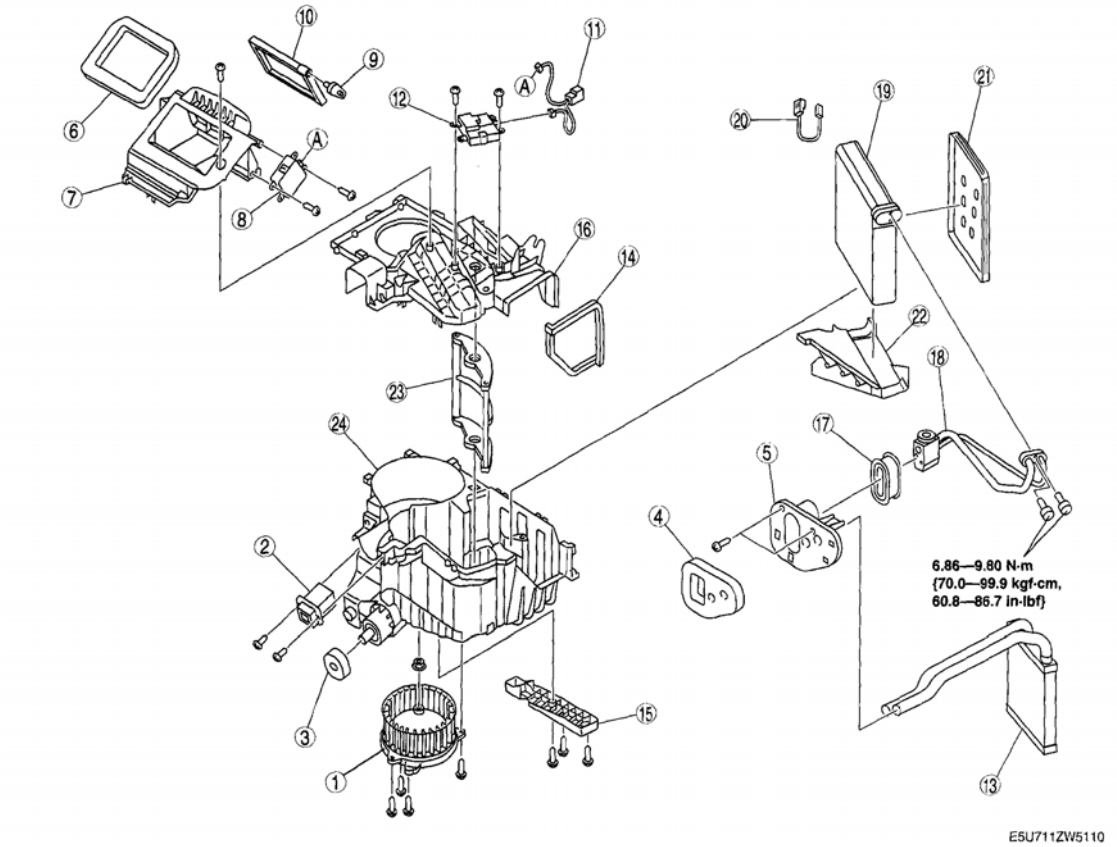
Fig. 7: Identifying A/C Unit
Courtesy of MAZDA MOTORS CORP.

A/C UNIT DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in **Fig. 8** .

CAUTION:
- **If a non-specified grease is used, it may result in abnormal noise or improper operation of the links. Apply only the specified grease to each link.**
- **If the air mix damper is removed and reinstalled improperly because the original installation position cannot be specified, the air mix damper and air mix actuator may be damaged when it is operated. Therefore, set the air mix to the middle position before disassembling so that the installation position can be specified.**

2. Assemble in the reverse order of disassembly.



1	Blower motor
2	Power MOS FET
3	Polyurethane foam (1)
4	Polyurethane foam (2)
5	Cover (1)
6	Adhesive polyurethane (1)
7	Air intake box
8	Air intake actuator
9	Air intake crank
10	Air intake door
11	Harness
12	Air mix actuator
13	Heater core

14	Adhesive polyurethane (2)
15	Cover (2)
16	A/C case (1)
17	Cover (3)
18	Expansion valve
19	Evaporator
20	Evaporator temperature sensor
21	Cover (4)
22	Insulator
23	Air mix damper
24	A/C case (2)

Fig. 8: Exploded View Of A/C Unit Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

EVAPORATOR TEMPERATURE SENSOR ASSEMBLY NOTE

1. Assemble the evaporator temperature sensor as shown in **Fig. 9** .

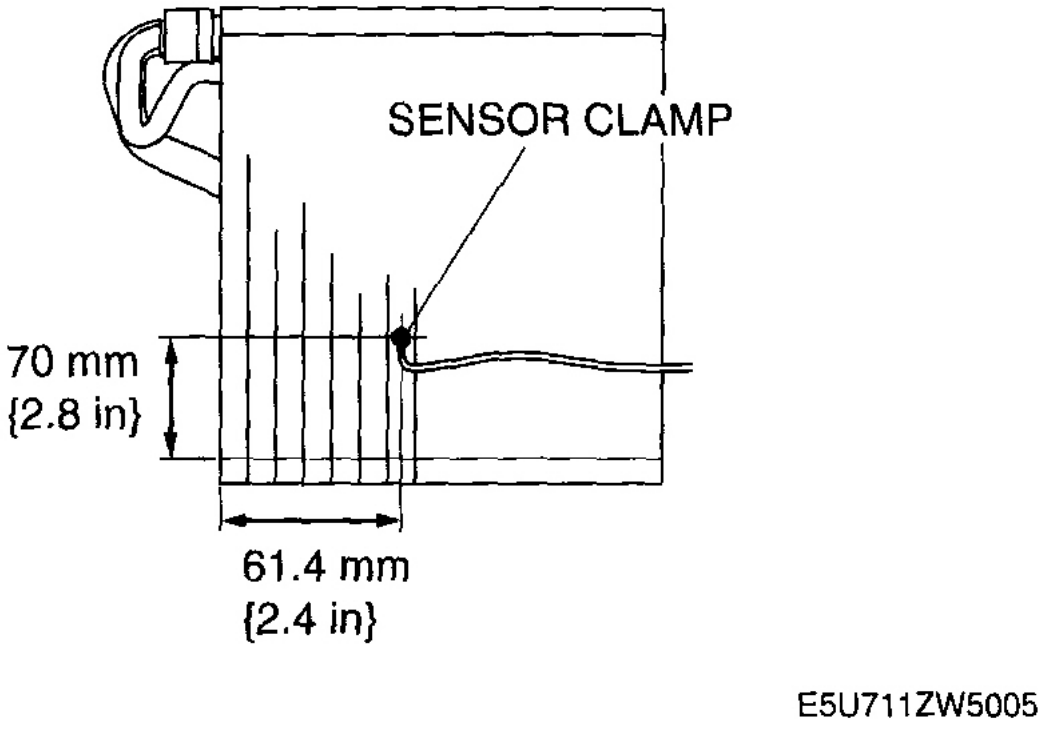


Fig. 9: Assembling Evaporator Temperature Sensor
Courtesy of MAZDA MOTORS CORP.

EVAPORATOR INSPECTION

1. Inspect the evaporator for damage, cracks and oil leakage.
   - If there is any malfunction, replace the evaporator.
2. Visually inspect the fins for bending.
   - If there is any bending, use the end of a flathead screwdriver to straighten the fins.

HEATER CORE INSPECTION

1. Inspect the heater core for damage, cracks and water leakage.
   - If there is any malfunction, replace the heater core.
2. Visually inspect the fins for bending.
   - If there is any bending, use the end of a flathead screwdriver to straighten the fins.
3. Visually inspect the heater hose for deformation.
   - Repair with pliers if there is deformation. If there is any malfunction, replace the heater core.

AIRFLOW MODE MAIN LINK REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the airflow mode actuator. (See **AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION** .)
4. Remove the airflow mode main link as shown in **Fig. 10** .
5. Install in the reverse order of removal.

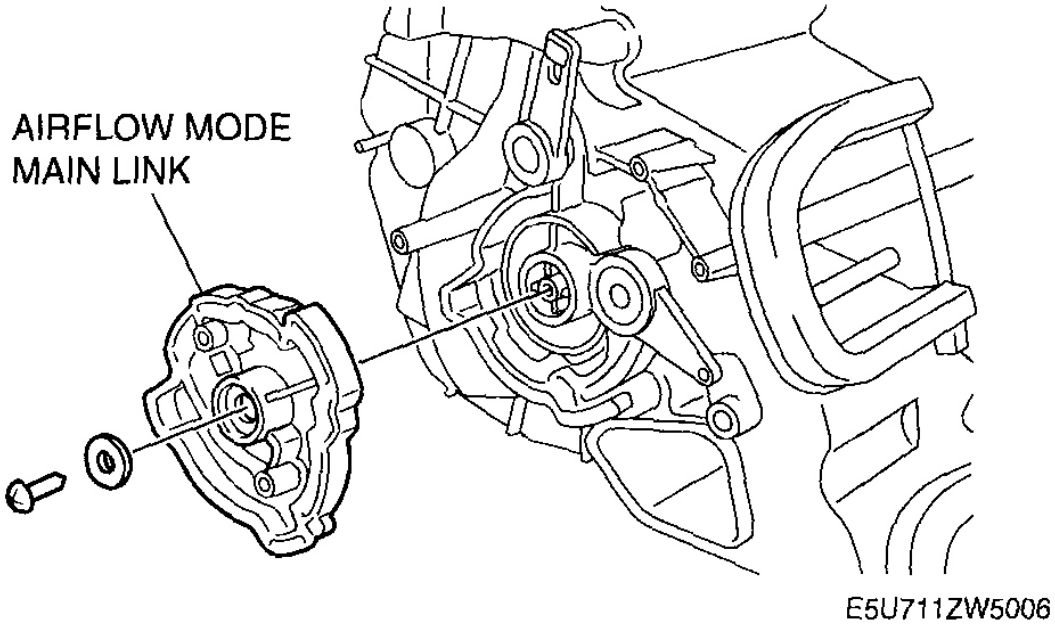


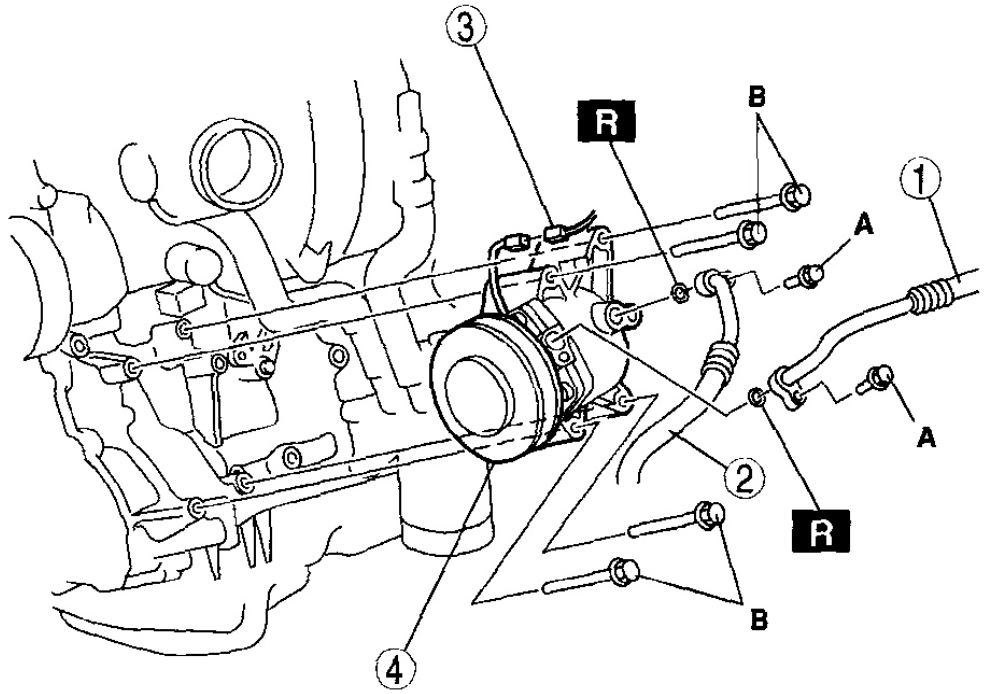
Fig. 10: View Of Airflow Mode Main Link
Courtesy of MAZDA MOTORS CORP.

A/C COMPRESSOR REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Discharge the refrigerant from the system. (See **REFRIGERANT CHARGING** .)
4. Remove the air cleaner. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
5. Remove the PCM. (See **PCM REMOVAL/INSTALLATION [LF]** .)
6. Remove the drive belt. (See **DRIVE BELT REPLACEMENT [LF]** .)
7. Do not allow remaining compressor oil in the A/C compressor and pipes to spill, and remove in the order indicated in **Fig. 11** .

CAUTION:

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**



A: 6.86—9.80 N·m {70.0—99.9 kgf·cm, 60.8—86.7 in·lbf}
B:17.6—26.5 N·m {1.80—2.70 kgf·m, 13.0—19.5 ft·lbf}

E5U711ZW5007

1	Cooler hose (LO)
2	Cooler hose (HI)
3	A/C compressor connector
4	A/C compressor

Fig. 11: View Of A/C Compressor Pipe Hose & Lines (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See **REFRIGERANT SYSTEM PERFORMANCE TEST** .)

A/C COMPRESSOR INSTALLATION NOTE

CAUTION:

- **Due to the high moisture-absorption characteristics of the compressor oil, it may absorb moisture if left over a long period of time thereby negatively affecting A/C operation. Drain the compressor oil and refill within 10 min. of each other.**

1. Rotate new A/C compressor shaft six to eight revolutions while draining new refrigerant oil in a clean measuring device. Use this refrigerant oil to refill new compressor. Do not allow refrigerant oil to become contaminated.
2. Rotate old A/C compressor shaft six to eight revolutions while draining old refrigerant oil in a separate, clean measuring device.
3. Compare those oil amounts. The amount of the oil drained from the new A/C compressor should be greater than the old one.
4. Pour the same amount oil of drained from the old A/C compressor back into the new A/C compressor.

A/C compressor oil type

DH-PR

A/C compressor oil sealed volume (approx. quantity)

130 ml {130 cc, 4.39 fl oz}

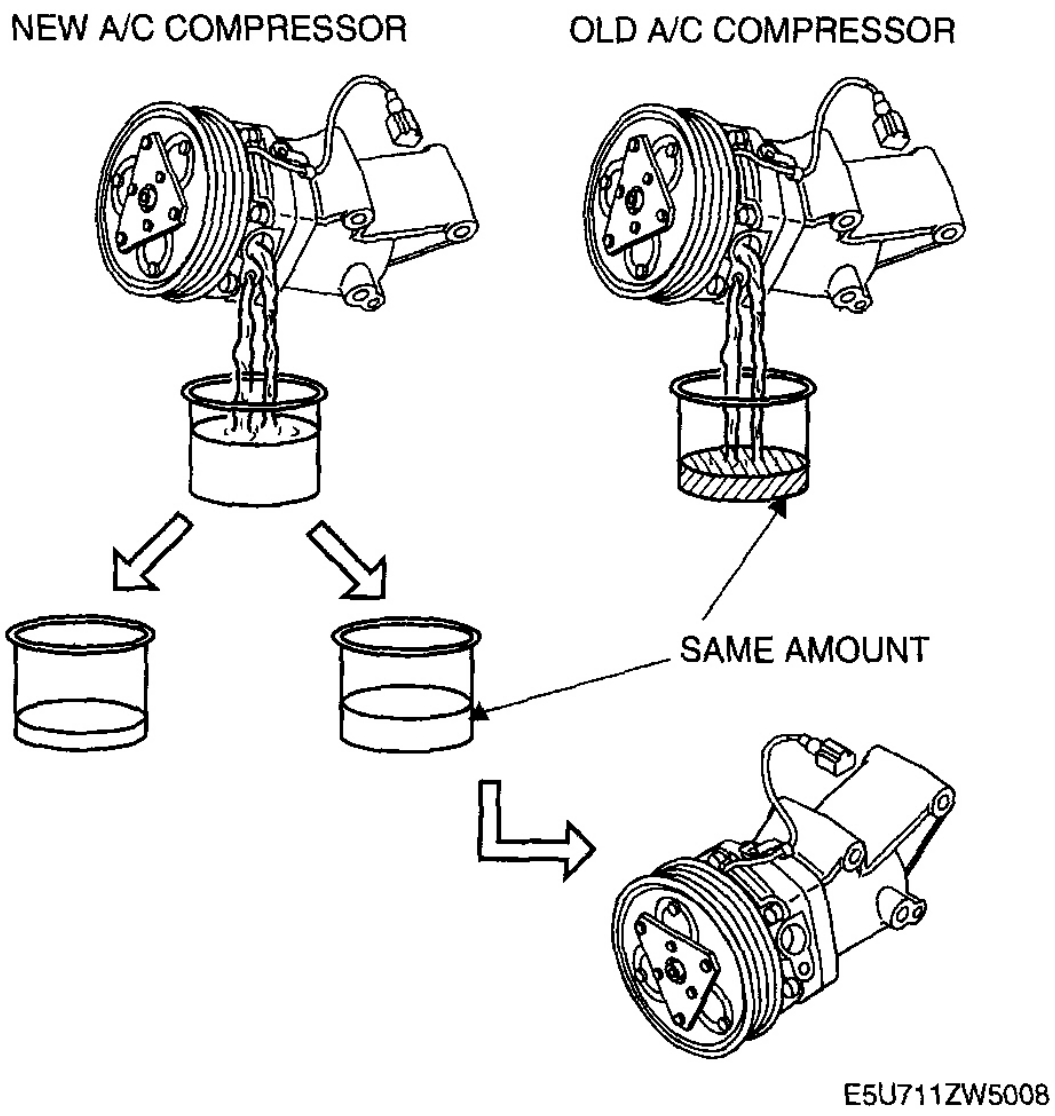


Fig. 12: Pouring Drained Oil From Old A/C Compressor Into New A/C Compressor
Courtesy of MAZDA MOTORS CORP.

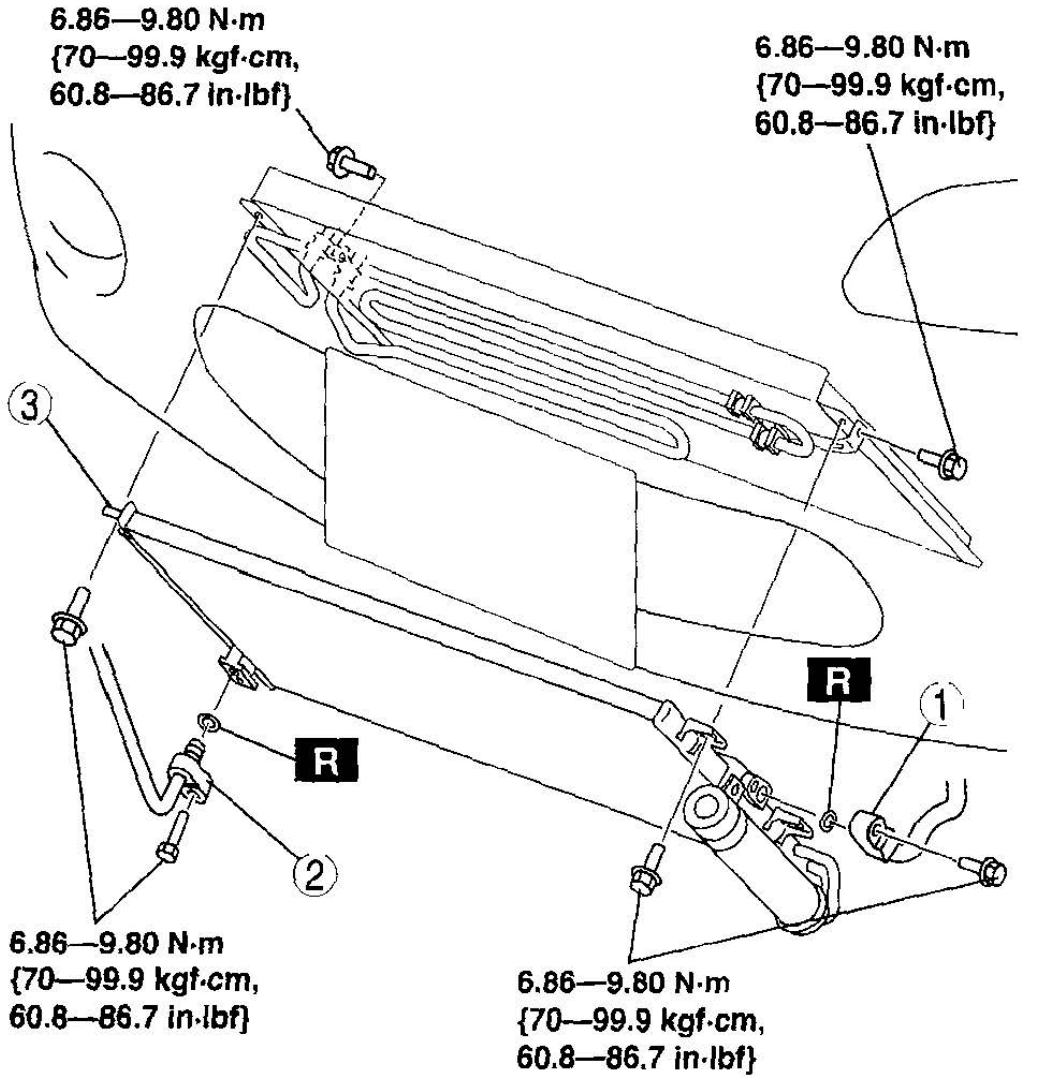
CONDENSER REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Discharge the refrigerant from the system. (See **REFRIGERANT CHARGING** .)
4. Remove the splash shields.
5. Remove the under cover.

6. Remove the cooling pipe installation bolts.
7. Do not allow remaining compressor oil in the condenser and pipes to spill, and remove in the order indicated in **Fig. 13** .

CAUTION:

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**



1	Cooler hose (HI)
2	Cooler pipe No.1 (HI)
3	Condenser

Fig. 13: View Of Cooling Pipe & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.

9. Perform the refrigerant system performance test. (See **REFRIGERANT SYSTEM PERFORMANCE TEST** .)

CONDENSER INSTALLATION NOTE

1. When replacing the new condenser, add compressor oil to the refrigeration cycle.

   Supplemental amount (approx. quantity)

   20 ml {20 cc, 0.7 fl oz}

CONDENSER INSPECTION

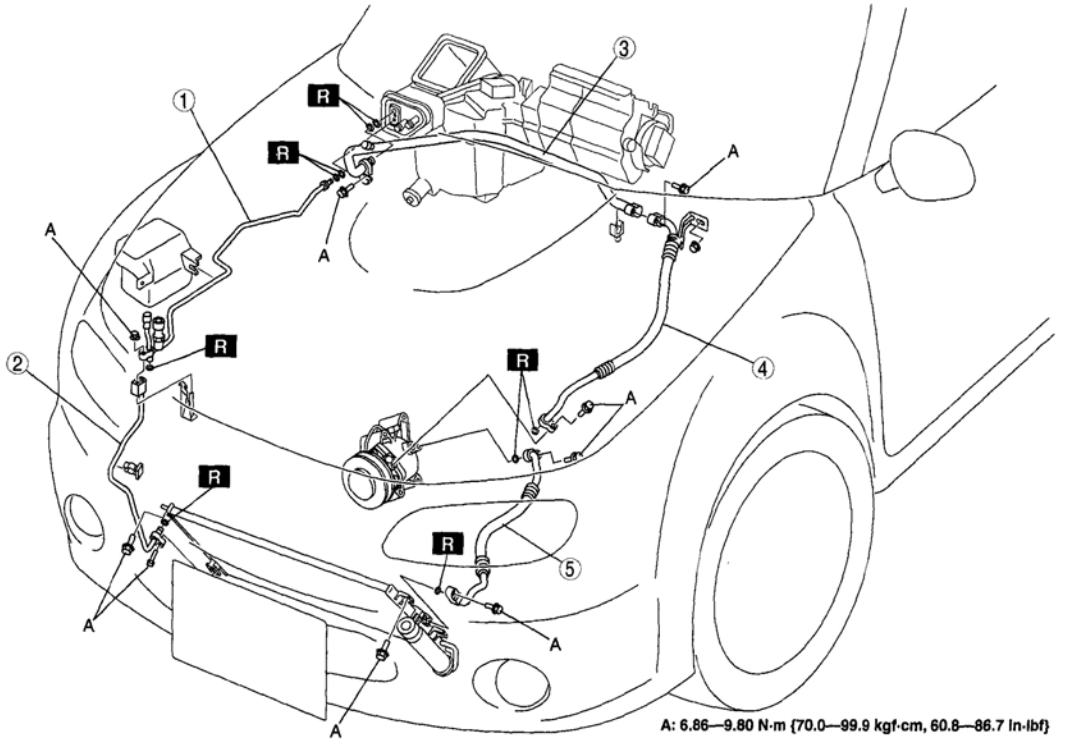
1. Inspect the condenser for cracks, damage, and oil leakage.
   - If there is any malfunction, replace the condenser.
2. Visually inspect the fins for clogging of foreign material.
   - If any fins are clogged, remove the foreign material.
3. Visually inspect the fins for bending.
   - If there is any bending, use the end of a flathead screwdriver to straighten fins.

REFRIGERANT LINES REMOVAL/INSTALLATION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Discharge the refrigerant from the system. (See **REFRIGERANT CHARGING** .)
4. Remove the air cleaner. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
5. Remove the splash shield.
6. Remove the under cover.
7. Do not allow remaining compressor oil in the piping and connecting parts to spill, and remove in the order indicated in **Fig. 14** .

CAUTION:

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise or other malfunction could occur. Always plug open fittings immediately after removing any refrigeration cycle parts.**



1	Cooler pipe No.2 (HI)
2	Cooler pipe No.1 (HI)
3	Cooler pipe No.3 (LO)
4	Cooler hose (LO)
5	Cooler hose (HI)

Fig. 14: View Of Refrigerant Lines & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

8. Install in the reverse order of removal.
9. Perform the refrigerant system performance test. (See **REFRIGERANT SYSTEM PERFORMANCE TEST** .)

REFRIGERANT LINE REMOVAL NOTE

1. Disconnect the block joint type pipes by grasping the female side of the block with pliers or similar tool and holding firmly, and then remove the connection bolt or nut.

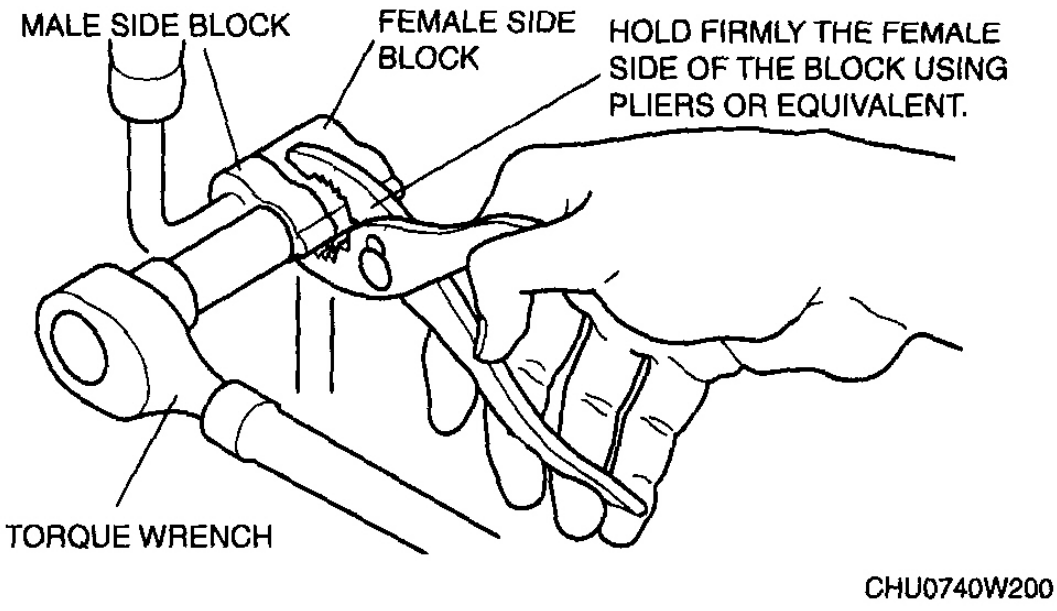


Fig. 15: Disconnecting Block Joint Type Pipes
Courtesy of MAZDA MOTORS CORP.

REFRIGERANT LINE INSTALLATION NOTE

1. Temporarily tighten the joint bolt by hand.
2. Connect the block joint type pipes by grasping the female side of the block with pliers or similar tool and holding firmly, and then tighten the connection bolt or nut with a torque wrench.

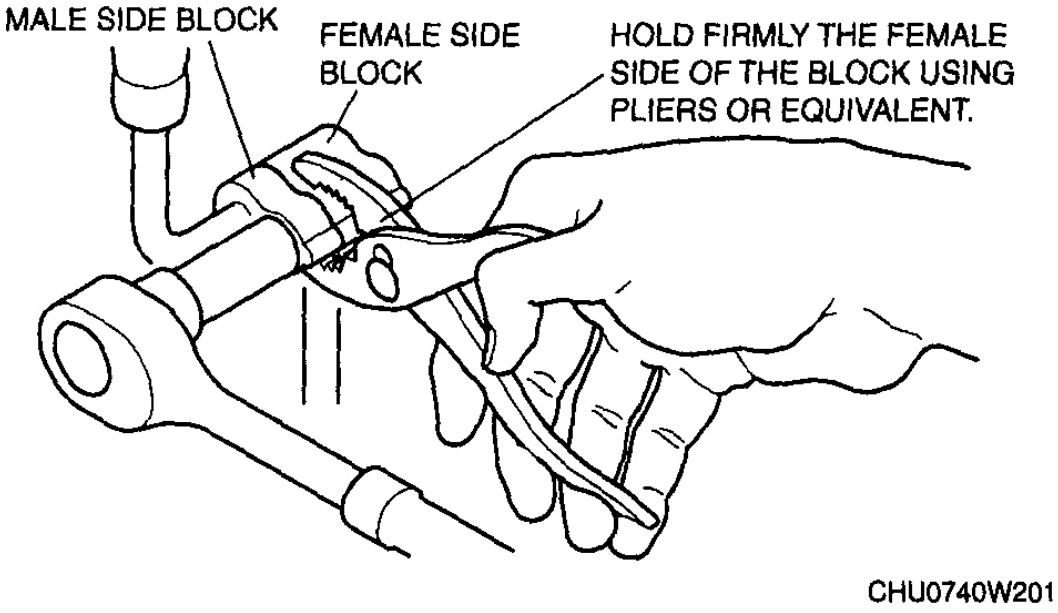
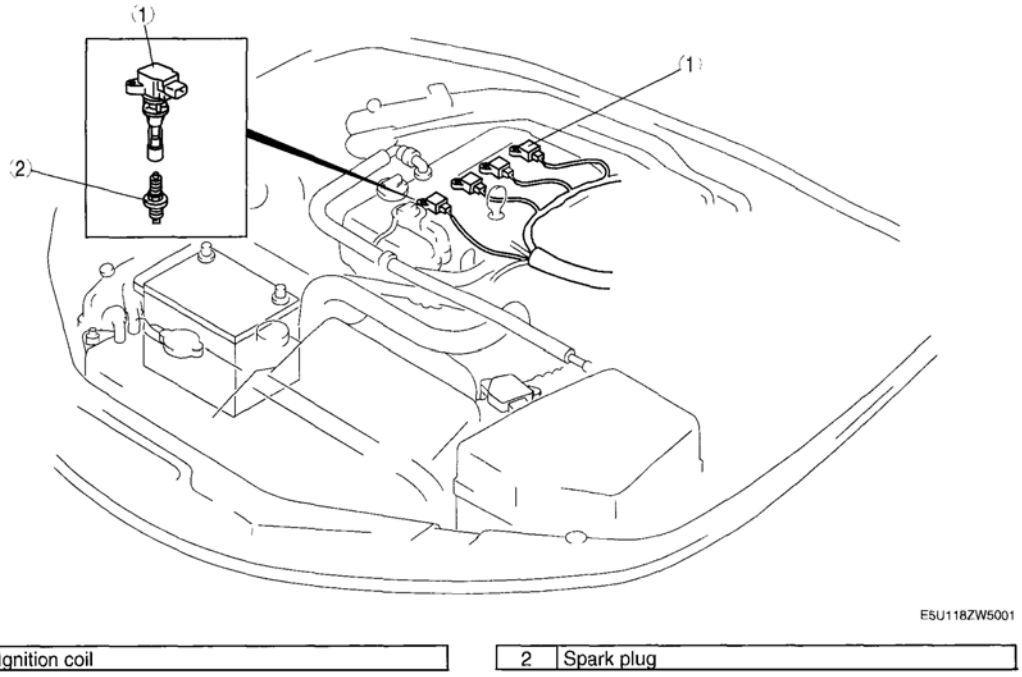


Fig. 16: Connecting Block Joint Type Pipes
Courtesy of MAZDA MOTORS CORP.

2008 ENGINE

Ignition System - MX-5 Miata

IGNITION SYSTEM LOCATION INDEX [LF]

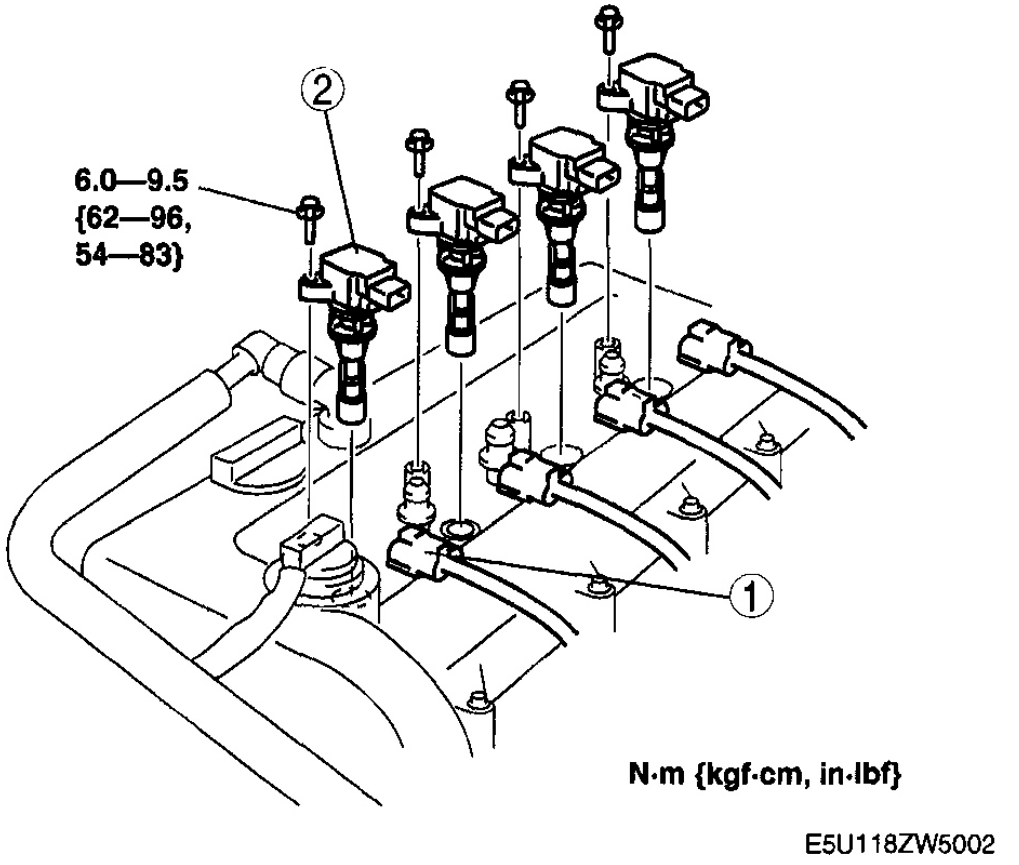


1	Ignition coil	2	Spark plug

Fig. 1: Identifying Location Of Ignition System Components
Courtesy of MAZDA MOTORS CORP.

IGNITION COIL REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
4. Remove the front suspension tower bar (joint). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
5. Remove in the order indicated in **Fig. 2** .
6. Install in the reverse order of removal.



1	Connector
2	Ignition coil

Fig. 2: Identifying Removal Order Of Ignition Coil (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

IGNITION COIL INSPECTION [LF]

IGNITION COIL INSPECTION

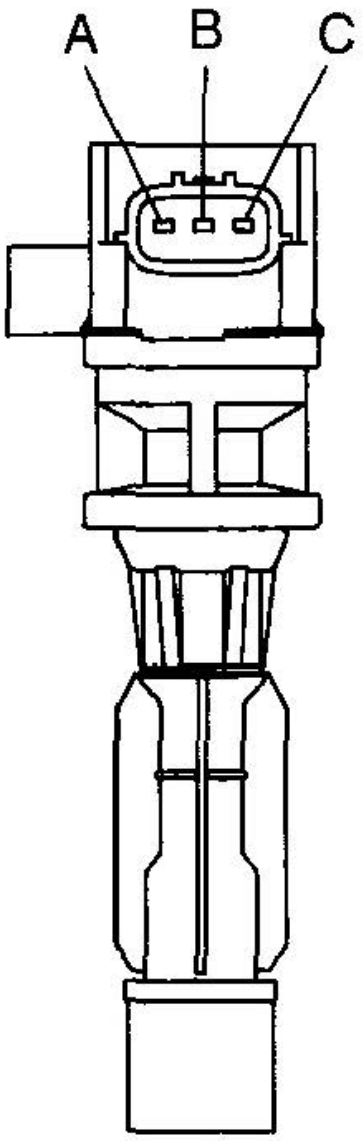
1. Perform the spark test and identify the malfunctioning cylinder.
2. Replace the ignition coil of the malfunctioning cylinder with that of a normal cylinder, and re-perform the spark test.
   - If the spark is not normal due to a malfunctioning ignition coil, replace that ignition coil.
   - It is unlikely that all four ignition coils fail to operate properly. To prevent replacing a normal component, perform the above procedure, identify the malfunctioning ignition coil, and replace it.

IGNITION COIL WITH BUILT-IN IGNITER INSPECTION

1. Disconnect the ignition coil connector.
2. Measure the resistance between each terminal on the ignition coil connector using an analog circuit tester.
    - If the measurement corresponds to the table, replace the ignition coil.

TESTER CONNECTION POSITION

Item	Tester Connection Position		Condition
	Positive	Negative	
Terminal	C	A	0 ohm is not normal (Infinity ohm is normal)
	A	C	
	C	B	
	B	C	
	A	B	Infinity or 0 ohm is not normal (several kilohm is normal)
	B	A	



CPJ118ZWB003

Fig. 3: Identifying Ignition Coil Connector Terminals
Courtesy of MAZDA MOTORS CORP.

SPARK PLUG REMOVAL/INSTALLATION [LF]

CAUTION:
- **If a spark plug that is not as specified is installed, engine performance will be deteriorated. Install only the specified spark plug when replacing.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
4. Remove the front suspension tower bar (joint). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
5. Remove the ignition coils. (See **IGNITION COIL REMOVAL/INSTALLATION [LF]** .)
6. Remove the spark plugs using a plug-wrench.
7. Install in the reverse order of removal.

Tightening torque

10-14 N.m {1.1-1.4 kgf.m. 8-10 ft.lbf}

SPARK PLUG INSPECTION [LF]

SPECIFICATION

Spark plug type

L3G2 18 110, L3Y1 18 110

PLUG GAP INSPECTION

CAUTION:
- **To avoid possible damage to the tip, do not adjust the plug gap.**
- **To prevent damaging the tip, use a wire type plug gap gauge when inspecting the plug gap.**

1. Measure the spark plug gap using a wire type plug gap gauge.
   - If it exceeds the specification, replace the spark plug.

Spark plug gap

1.25-1.35 mm {0.050-0.053 in}

CLEANING

CAUTION:
- **Carbon may adhere to the tip of the spark plug during vehicle delivery or repeated short distance driving during the winter time. If**

there is any malfunction such as rough idling or start difficulty due to carbon adhesion causing plug fouling, burn off the carbon by performing no-load racing of the engine.

- **When performing the no-load racing, apply the side brake and foot brake, move the shift lever to neutral (MT), or the selector lever to P position (AT) to prevent an accident and serious injury.**
- **To avoid possible damage to the spark plug tip, do not use a wire brush for cleaning.**

NOTE:

- **To avoid possible damage to the tip, use gasoline to clean the spark plugs after removing dirt.**
- **If the accelerator pedal is depressed continuously for a specified time, the engine speed may decrease to the idle speed. This is due to the fuel cut control operation, which prevents overheating, and it does not indicate a malfunction.**
- **Do not perform no-load racing at high engine speed continuously for 10s or more.**

1. If there is carbon adhering to the spark plug, perform no-load racing at **4,000 rpm for 2 min, 2 times** .

VISUAL INSPECTION

1. Inspect the following items:
   - If any of the following malfunction are indicated, replace the spark plug.
     - Insulator breakage
     - Worn electrode
     - Damaged gasket
     - Badly burned insulator (sparking side)

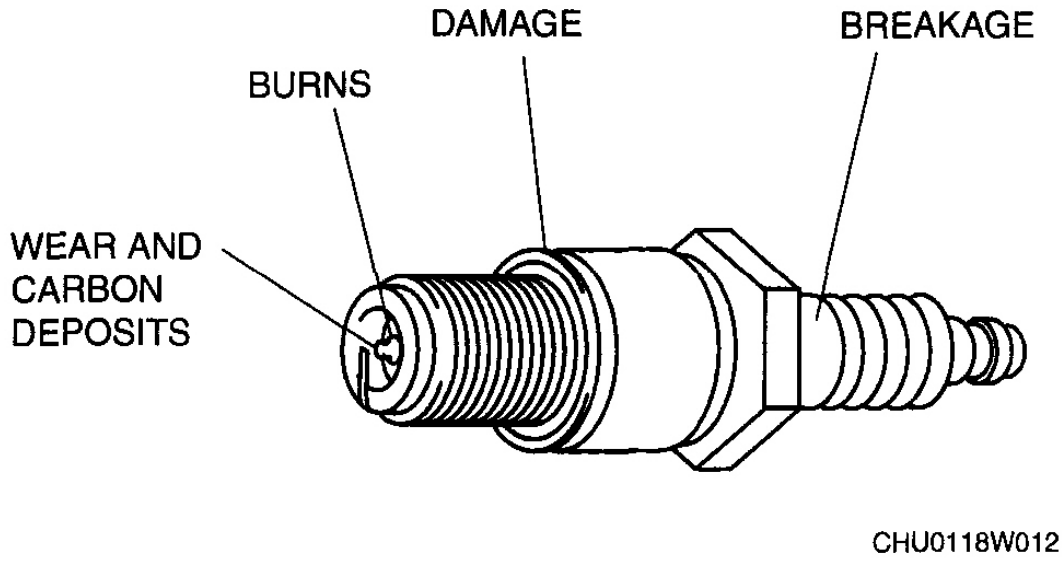


Fig. 4: Inspecting Spark Plug
Courtesy of MAZDA MOTORS CORP.

RESISTANCE INSPECTION

1. Measure the resistance of the spark plug using a tester as shown in **Fig. 5** .
    - If not within the specification, replace the spark plug.

Spark plug resistance [25°C {77°F}]

3.0-7.5 kilohms

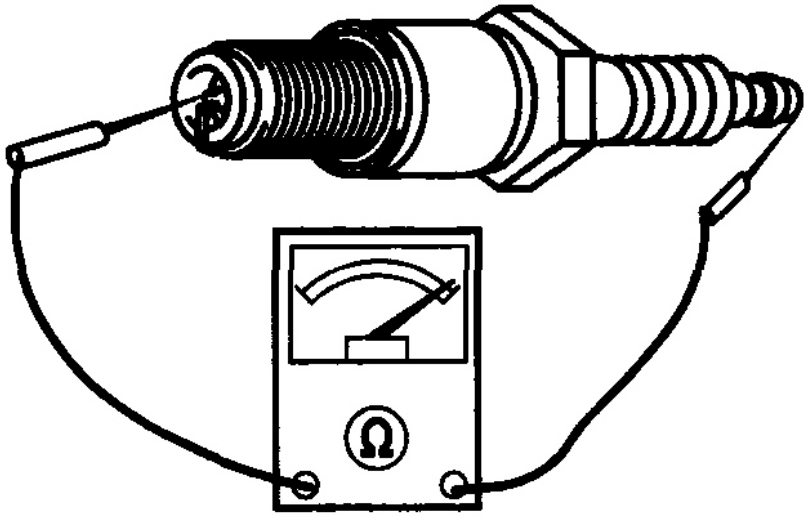


Fig. 5: Measuring Resistance Of Spark Plug
Courtesy of MAZDA MOTORS CORP.

2008 ENGINE PERFORMANCE

Intake Air System - MX-5 Miata

INTAKE AIR SYSTEM LOCATION INDEX [LF]

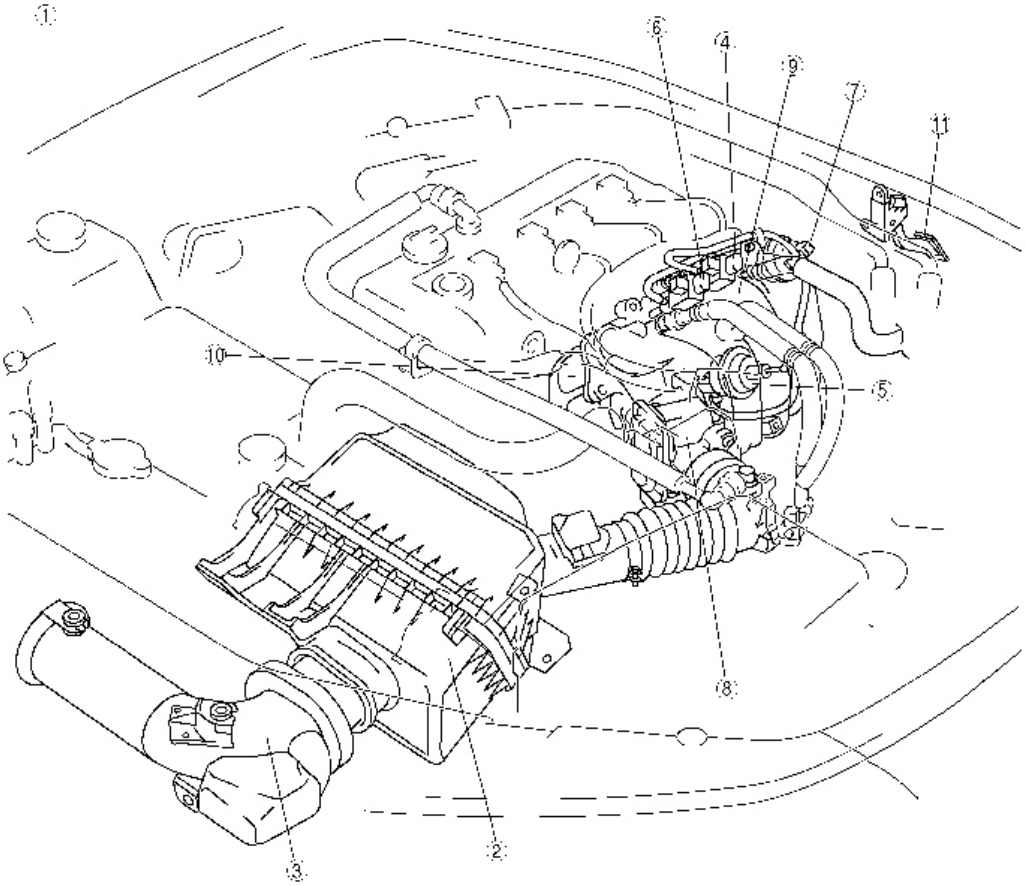


Fig. 1: Identifying Intake Air System Components
Courtesy of MAZDA MOTORS CORP.

Intake Air System Location Index [LF]

1	Intake-air system
2	Air cleaner
3	Fresh-air duct
4	Variable intake air solenoid valve
5	Variable intake air shutter valve actuator

6	Variable tumble solenoid valve (AT)
7	Variable tumble shutter valve actuator (AT)
8	Throttle body
9	Dynamic chamber
10	Intake manifold
11	Accelerator pedal

INTAKE AIR SYSTEM DIAGRAM [LF]

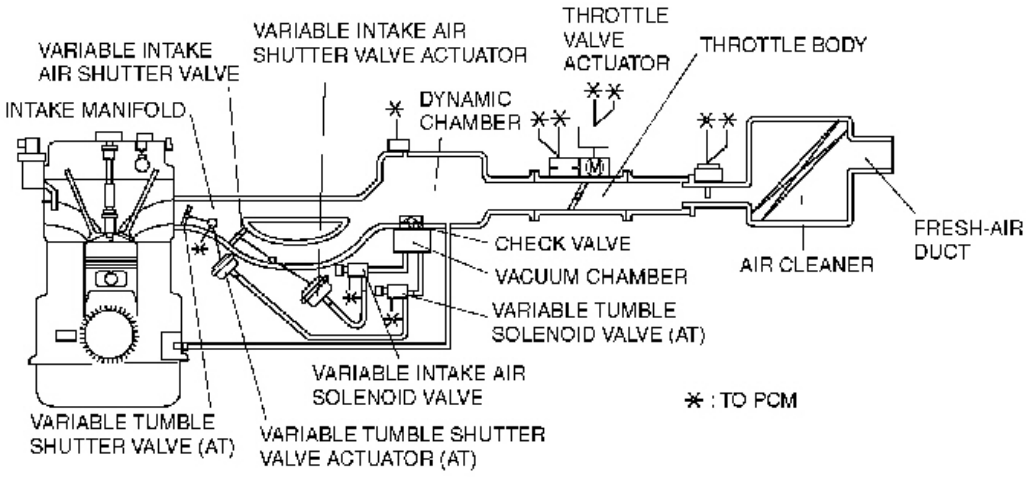


Fig. 2: Intake Air System Diagram
Courtesy of MAZDA MOTORS CORP.

INTAKE AIR SYSTEM HOSE ROUTING DIAGRAM [LF]

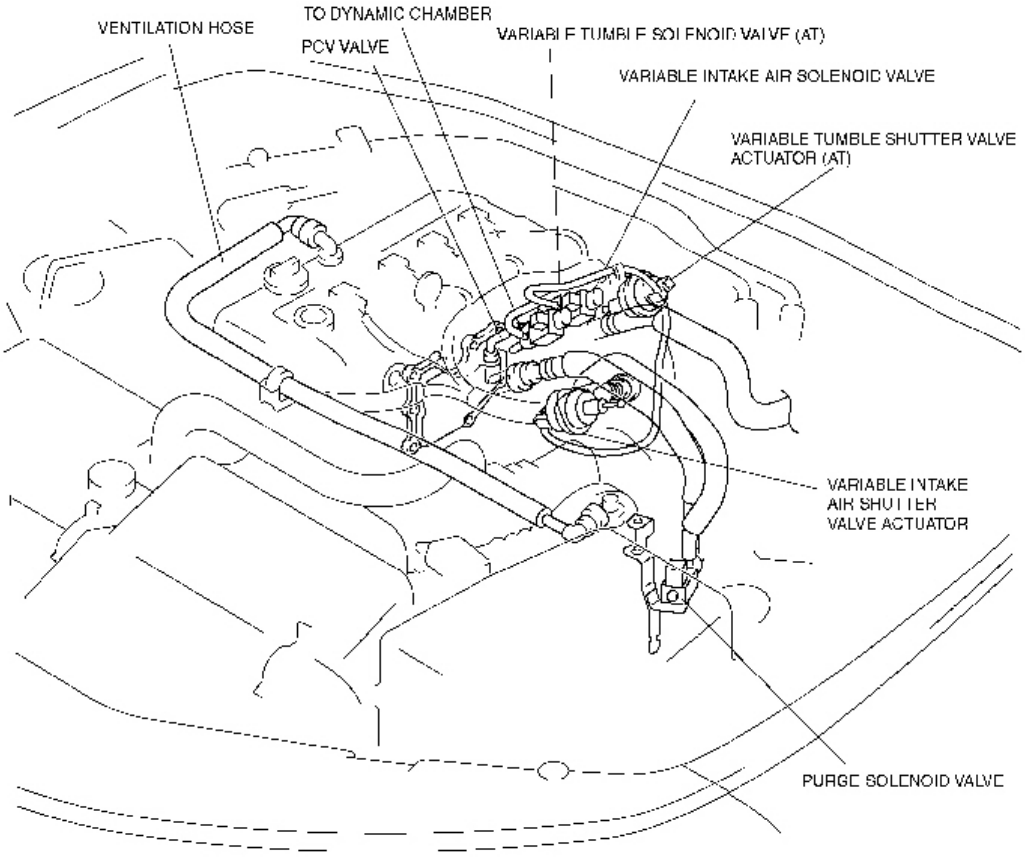


Fig. 3: Intake Air System Hose Routing Diagram
Courtesy of MAZDA MOTORS CORP.

INTAKE MANIFOLD VACUUM INSPECTION [LF]

1. Verify that the intake air hoses are installed securely.
2. Disconnect the vacuum hose connecting the intake manifold and the purge solenoid valve (purge solenoid valve side) and install the vacuum gauge.
3. Warm up the engine.
4. Measure the intake manifold vacuum while idling (no load) using the vacuum gauge.
    - If not within the specification, perform the following inspections.
        - Compression pressure (See **COMPRESSION INSPECTION [LF]** .)
        - Air intake
            - Each hose installation part
            - Throttle body installation part

- Fuel injector installation part
- PCV valve installation part
- Dynamic chamber installation port
- Intake manifold installation part

Standard

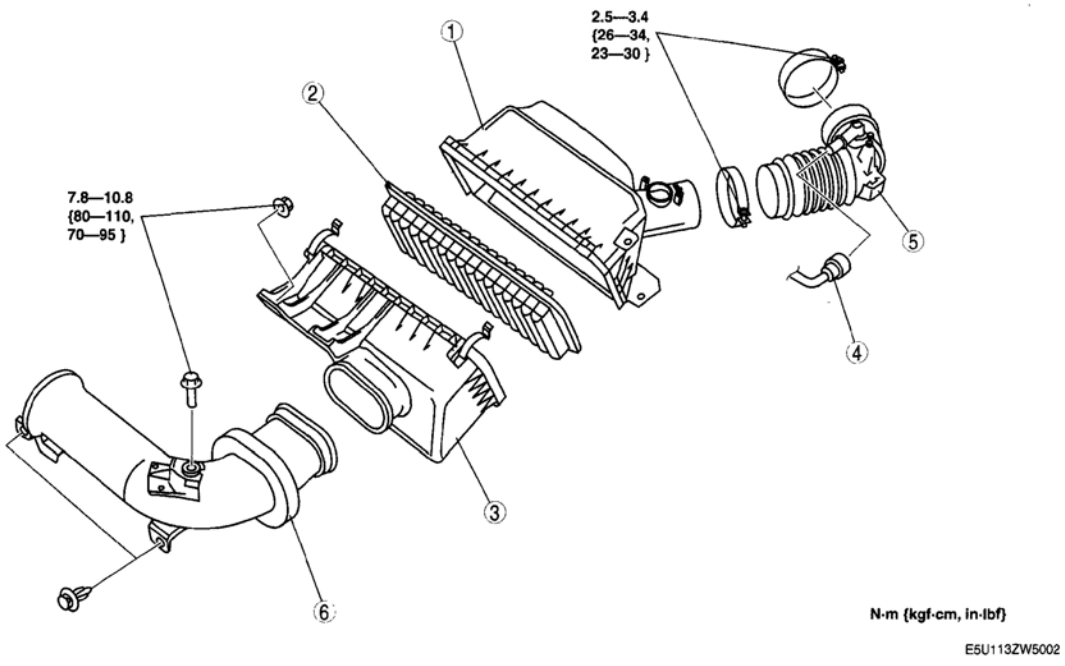
-60 kPa {-450 mmHg, -17.7 inHg} or more

INTAKE AIR SYSTEM REMOVAL/INSTALLATION [LF]

WARNING:

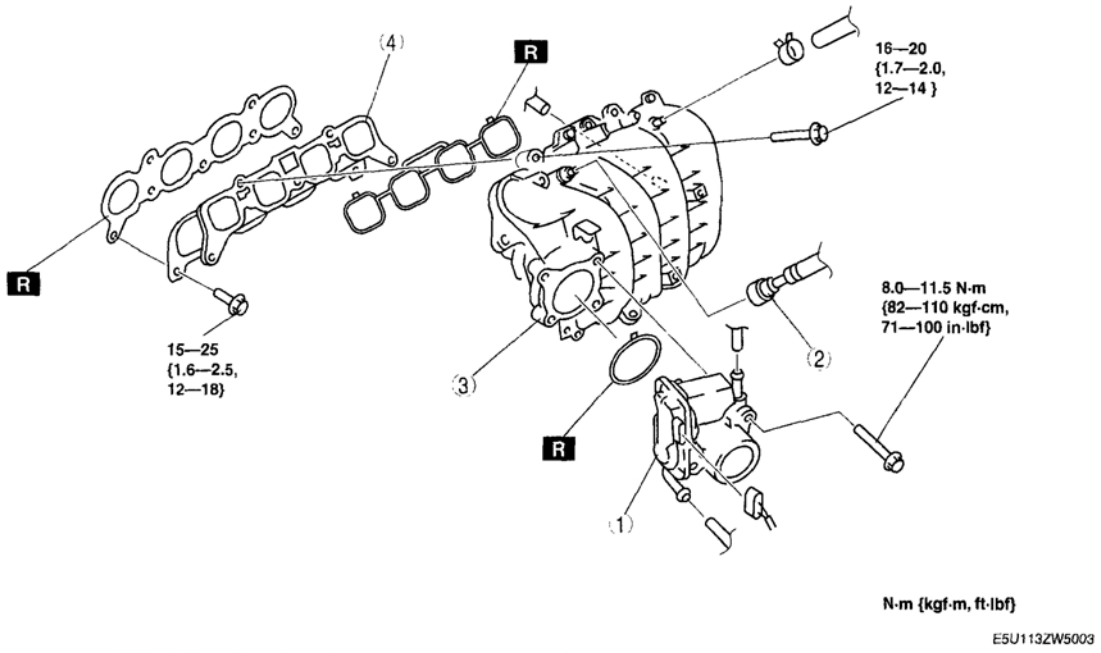
- **A hot engine and intake air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake-air system.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION [LF] ".**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



1	Air cleaner cover
2	Air cleaner element
3	Air cleaner case
4	Quick release connector (Type B)
5	Air hose
6	Fresh-air duct

Fig. 4: Identifying Removal Order Of Intake-Air System (Step 1) (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.



1	Throttle body
2	Quick release connector (Type A)
3	Dynamic chamber
4	Intake manifold

Fig. 5: Identifying Removal Order Of Intake-Air System (Step 2) (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

AIR CLEANER COVER REMOVAL NOTE

1. Remove the MAF/IAT Sensor. (See **MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [LF]** .)

AIR HOSE REMOVAL NOTE

1. Move the purge solenoid valve slightly out of the way. (See **PURGE SOLENOID VALVE REMOVAL/INSTALLATION [LF]** .)

FRESH-AIR DUCT REMOVAL NOTE

1. Remove the front bumper. (See **FRONT BUMPER REMOVAL/INSTALLATION** .)

THROTTLE BODY REMOVAL NOTE

1. Drain the engine coolant. (See **ENGINE COOLANT REPLACEMENT [LF]** .)

DYNAMIC CHAMBER REMOVAL NOTE

1. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
2. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
3. Remove the service hole cover.
    1. Remove the front suspension tower bar (joint), (right side) and (left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
    2. Remove the wiper arm. (See **WIPER ARM AND BLADE REMOVAL/INSTALLATION** .)
    3. Remove the cowl grille. (See **COWL GRILLE REMOVAL/INSTALLATION** .)
    4. Remove the side cowl grille. (See **SIDE COWL GRILLE REMOVAL/INSTALLATION** .)
    5. Move the cooler pipe No.3 and heater pipe slightly out of the way.
    6. Remove the service hole cover. (See **EGR VALVE REMOVAL/INSTALLATION [LF]** .)

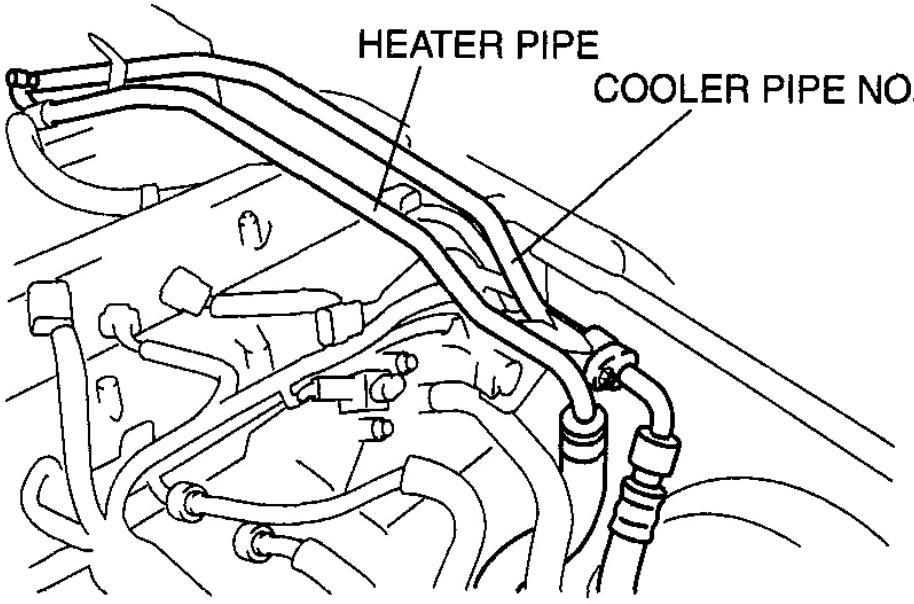


Fig. 6: View Of Cooler Pipe No.3 & Heater Pipe
Courtesy of MAZDA MOTORS CORP.

4. Disconnect the heater hose and move the heater pipe slightly out of the way.

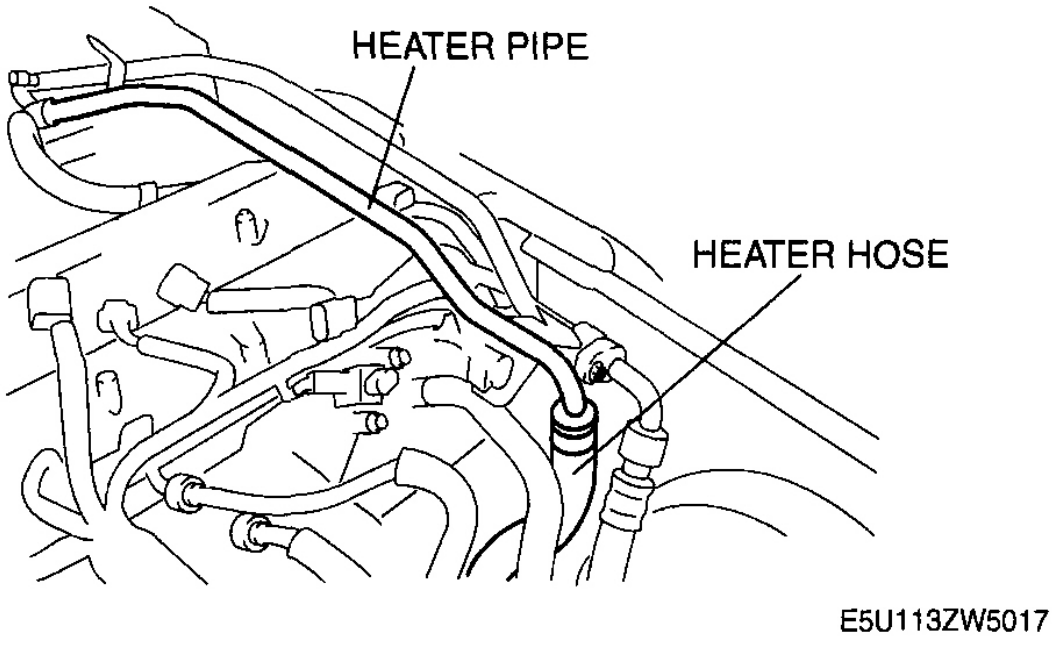


Fig. 7: View Of Heater Hose
Courtesy of MAZDA MOTORS CORP.

5. Disconnect the heater hose and move the heater pipe slightly out of the way.

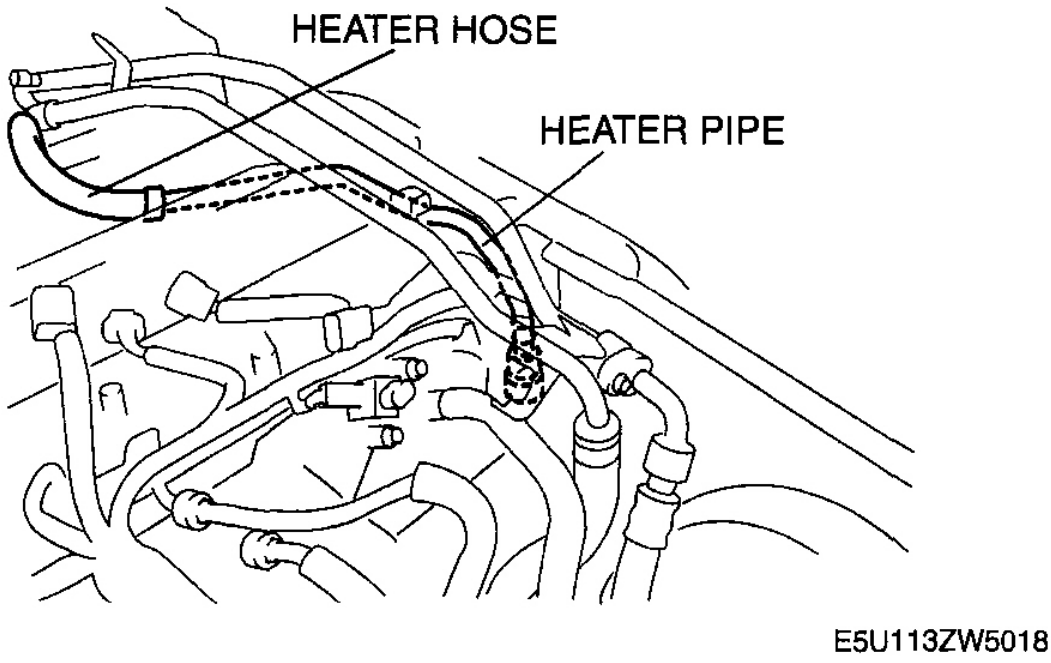


Fig. 8: Moving Heater Pipe
Courtesy of MAZDA MOTORS CORP.

6. Remove the harness bracket.

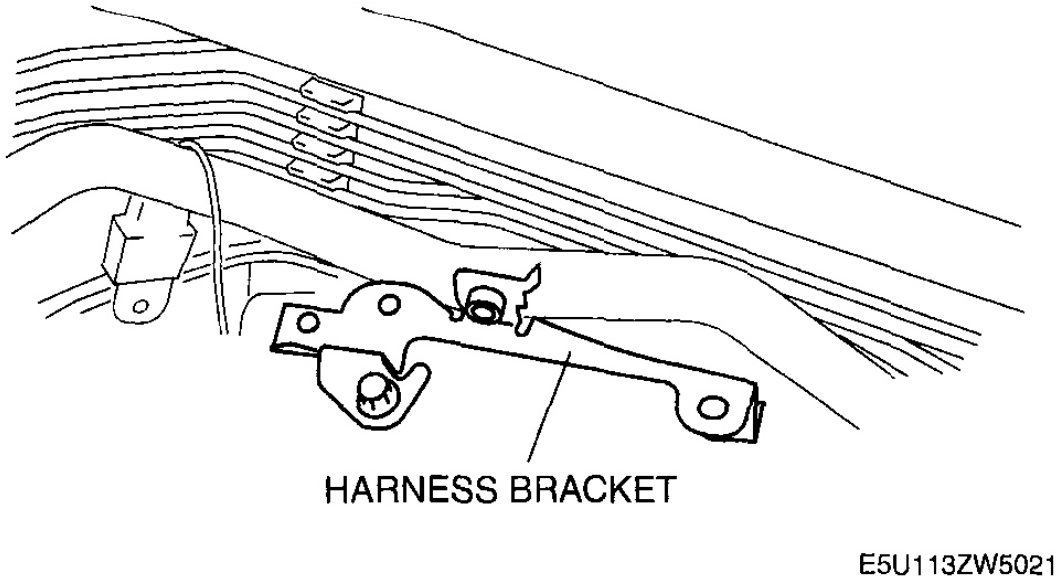


Fig. 9: View Of Harness Bracket
Courtesy of MAZDA MOTORS CORP.

7. Remove the under cover. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
8. Disconnect the variable intake air solenoid valve connector, EGR valve connector, CMP sensor connector and PSP switch connector.
9. Disconnect the ignition coil connector and fuel injector connector and move the harness slightly out of the way.
10. Disconnect the quick release connector from the fuel distributor. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
11. Remove the fuel distributor. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
12. Disconnect the water hose from the EGR valve.
13. Disconnect two water hoses from the thermostat.
14. Remove the heater hose and heater pipe from the dynamic chamber.
15. Remove the variable intake air solenoid valve. (See **VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [LF]** .)
16. Remove the variable tumble solenoid valve. (See VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [LF].)
17. Remove the dynamic chamber installation bolts.

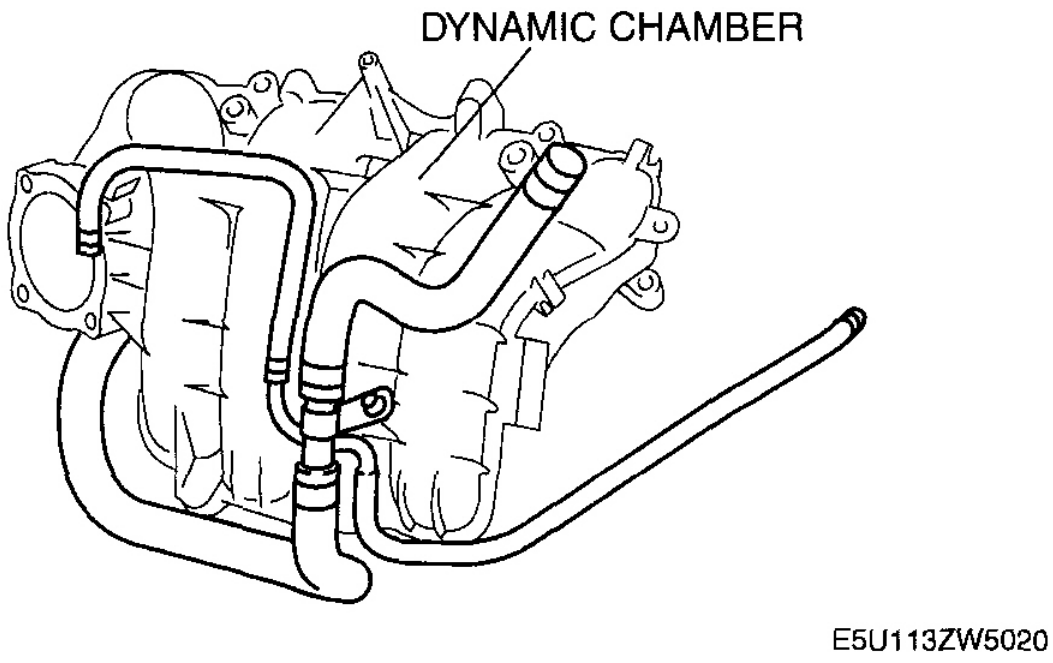


Fig. 10: View Of Heater Hose & Heater Pipe On Dynamic Chamber
Courtesy of MAZDA MOTORS CORP.

18. Remove the EGR pipe.

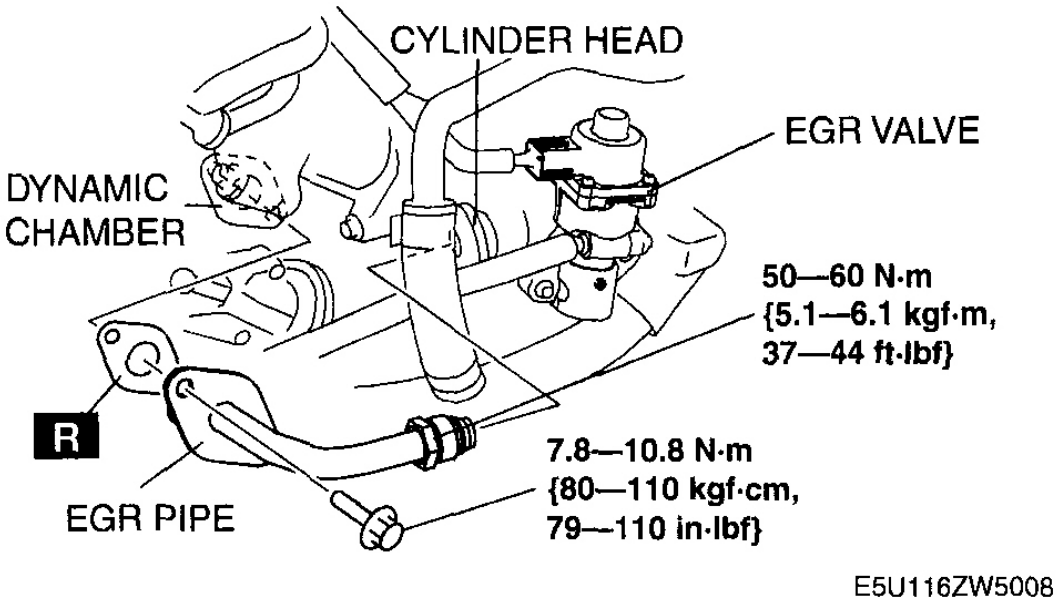


Fig. 11: Identifying EGR Pipe (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

19. Disconnect the connector from the A/C compressor.
20. Disconnect the knock sensor connector.
21. Move the vacuum hose between the purge solenoid valve and the charcoal canister slightly out of the way.
22. Move the clutch release cylinder slightly out of the way. (MT) (See **CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION** .)
23. Disconnect the evaporative hose with the dynamic chamber raised.

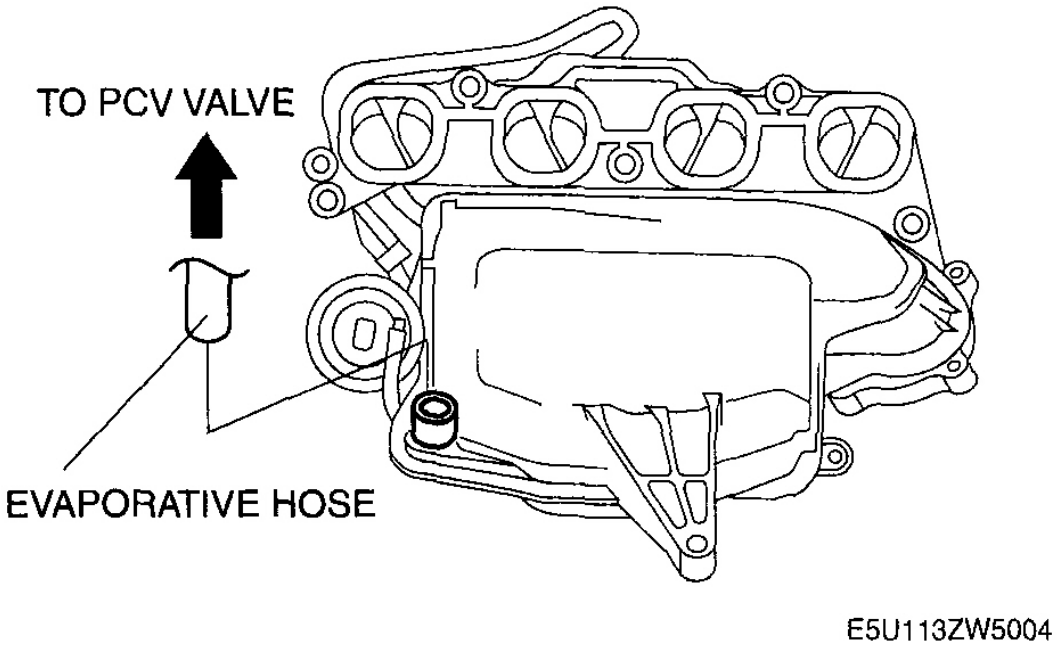


Fig. 12: Disconnecting Evaporative Hose
Courtesy of MAZDA MOTORS CORP.

24. Remove the dynamic chamber.
25. Remove the variable intake air shutter valve actuator. (See **VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]** .)
26. Remove the MAP sensor. (See **MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [LF]** .)

INTAKE MANIFOLD REMOVAL NOTE (AT)

1. Remove the intake manifold.
2. Remove the variable tumble shutter valve actuator. (See VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF].)

THROTTLE BODY INSTALLATION NOTE

1. Tighten the bolts in the order as shown in **Fig. 13** .

   Throttle body tightening torque 8.0-11.5 N.m {82-110 kgf.cm, 71-100 in.lbf}

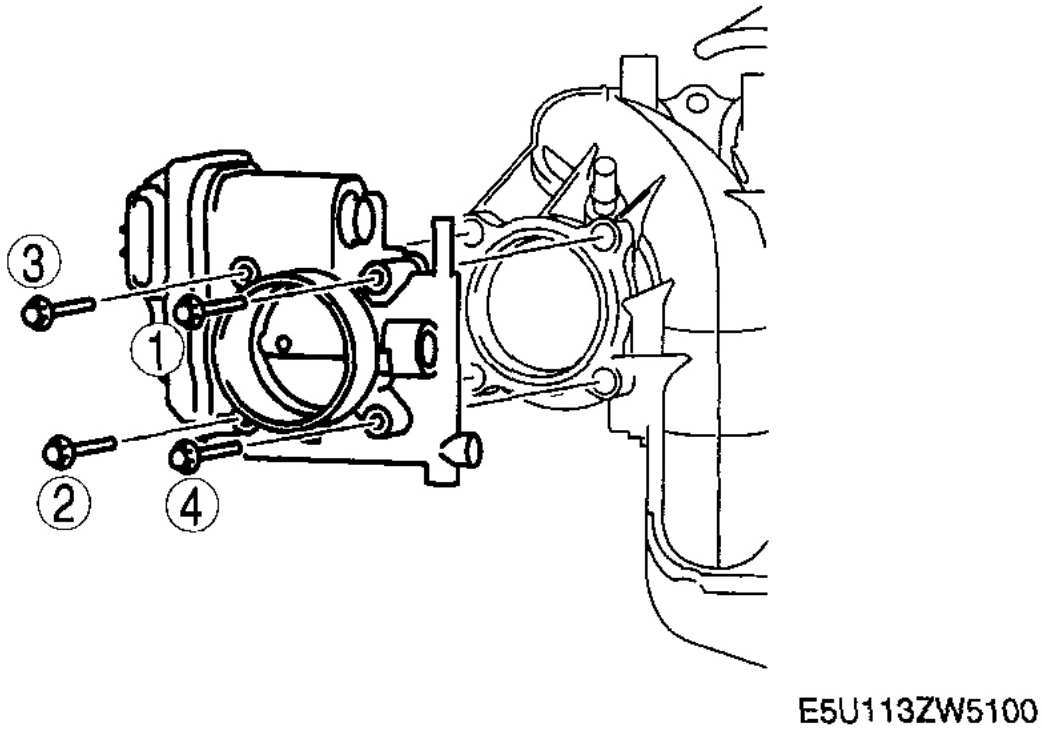


Fig. 13: Identifying Tightening Sequence Of Throttle Body Bolts
Courtesy of MAZDA MOTORS CORP.

AIR CLEANER ELEMENT INSPECTION [LF]

1. Remove the air cleaner element. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following items:
   - If there is any abnormality, clean or replace the air cleaner element.
     - Has the replacement interval come?
     - Is the air cleaner element soiled, damaged, or bent?
     - Are the air cleaner case and the air cleaner element correctly sealed?
     - Is the correct air cleaner element installed?

THROTTLE BODY INSPECTION [LF]

NOTE:
- **Perform the following inspection only when directed.**

RESISTANCE INSPECTION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the throttle body connector.
4. Measure the resistance between throttle actuator terminals A and B.
    - If not as specified, replace the throttle body. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
    - If as specified, carry out the **Circuit Open/Short Inspection** .

Specification

AMBIENT TEMPERATURE SPECIFICATION

Ambient temperature (°C {°F})	Resistance (ohm)
Approx. 20 {68}	0.3-100

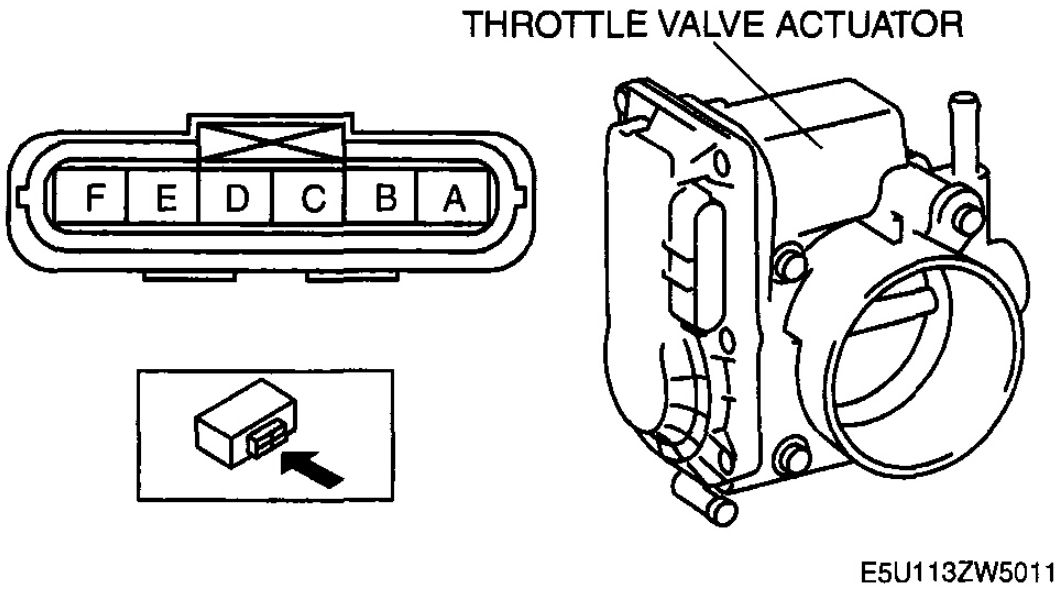


Fig. 14: Identifying Throttle Actuator Connector Terminals
Courtesy of MAZDA MOTORS CORP.

CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harnesses for open or short (continuity check).

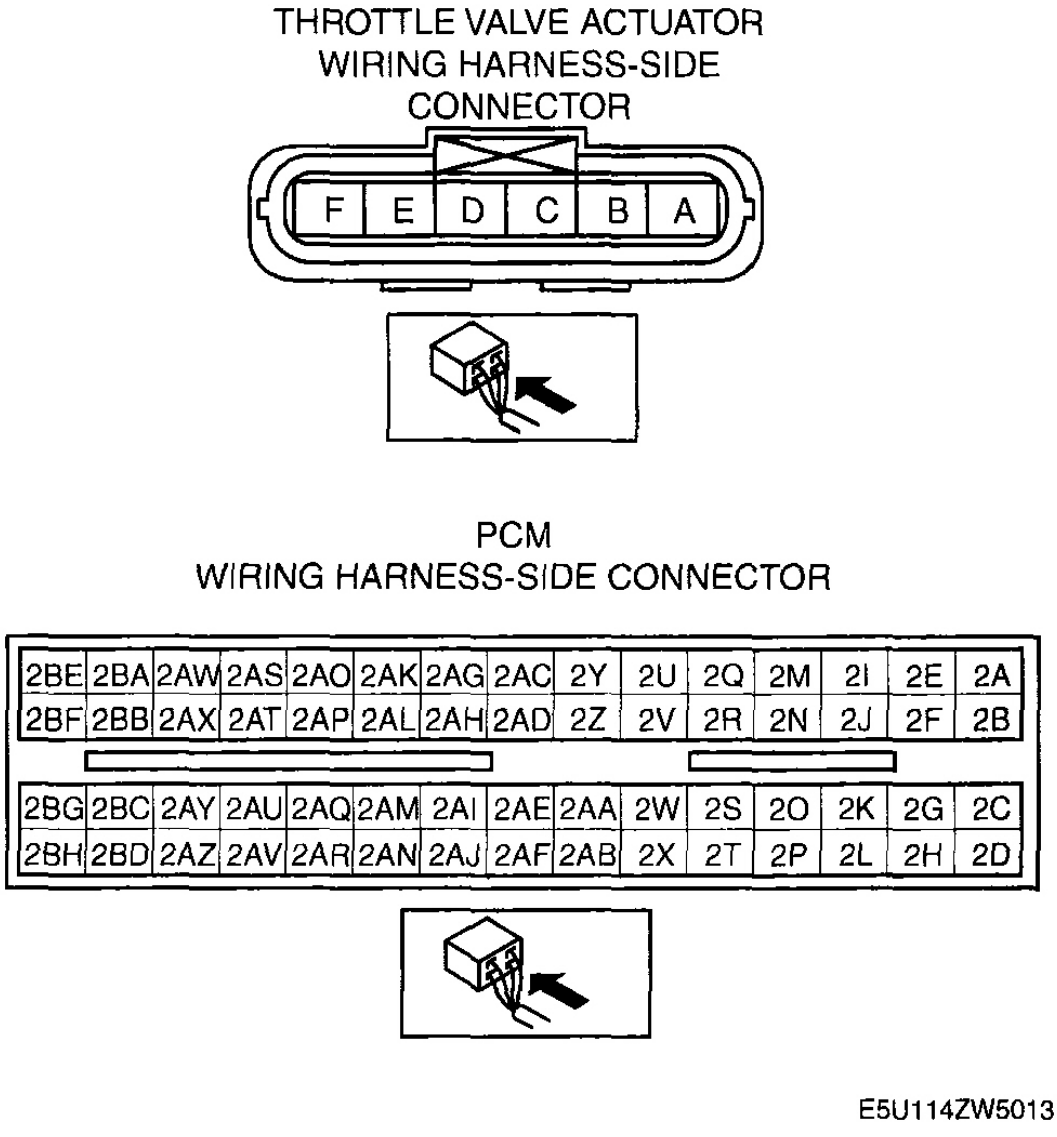


Fig. 15: Identifying Throttle Valve Actuator & PCM Connector Terminals
Courtesy of MAZDA MOTORS CORP.

Open Circuit

- If there is no continuity, the circuit is open. Repair or replace the wiring harness.
  - Throttle valve actuator terminal A and PCM terminal 2B
  - Throttle valve actuator terminal B and PCM terminal 2A

Short Circuit

- If there is continuity, the circuit is shorted. Repair or replace the wiring harness.
  - Throttle valve actuator terminal A and power supply
  - Throttle valve actuator terminal A and ground
  - Throttle valve actuator terminal B and power supply
  - Throttle valve actuator terminal B and ground

VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [LF]

1. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Move the variable tumble solenoid valve (AT), slightly out of the way. (See VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [LF].)
5. Remove in the order indicated in the table. .
6. Install in the reverse order of removal.

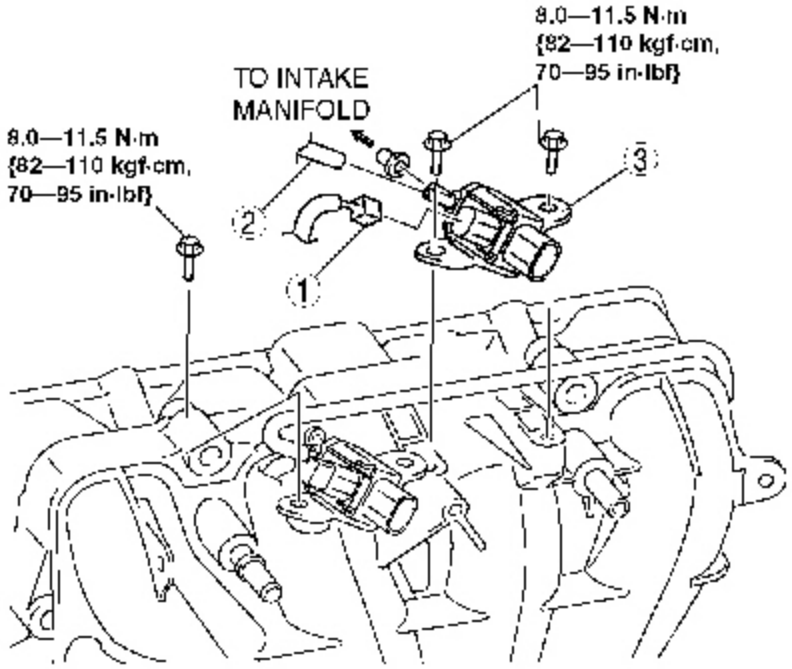


Fig. 16: Identifying Removal Order Of Variable Intake Air Solenoid Valve (With Torque

Specifications)
Courtesy of MAZDA MOTORS CORP.

Removal Order Of Variable Intake Air Solenoid Valve

1	Connector
2	Vacuum hose
3	Variable Intake air solenoid valve

VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [LF]

NOTE:
- **Perform the following inspection only when directed.**

AIRFLOW INSPECTION

1. Remove the battery cover
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the variable intake air solenoid valve. (See **VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [LF]** .)
4. Inspect airflow between the ports under the following conditions.
   - If not as specified, replace the variable intake air solenoid valve.
   - If as specified, carry out the **Circuit Open/Short Inspection** .

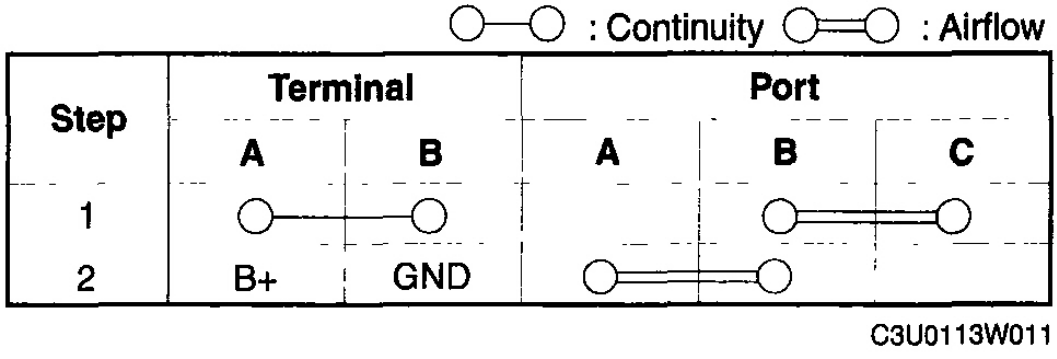


Fig. 17: Variable Intake Air Solenoid Valve Continuity Check Table
Courtesy of MAZDA MOTORS CORP.

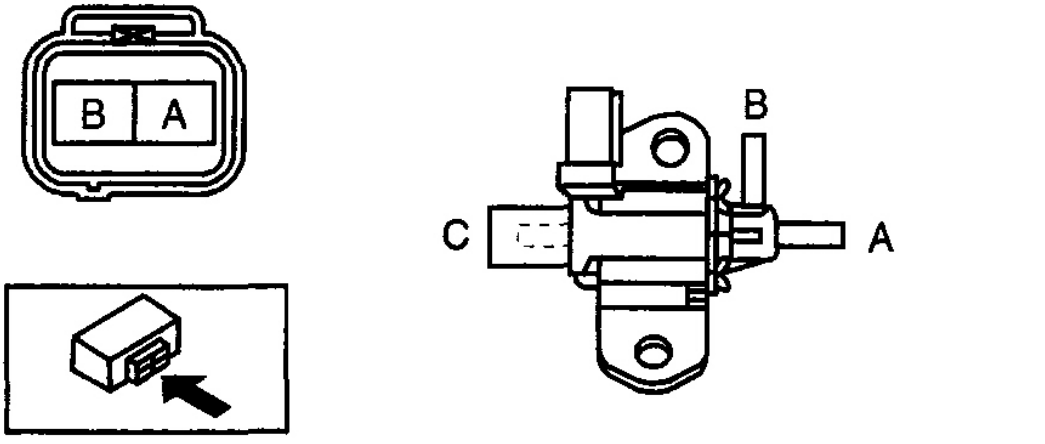


Fig. 18: Identifying Variable Intake Air Solenoid Valve Ports
Courtesy of MAZDA MOTORS CORP.

CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harness for open or short (continuity check).

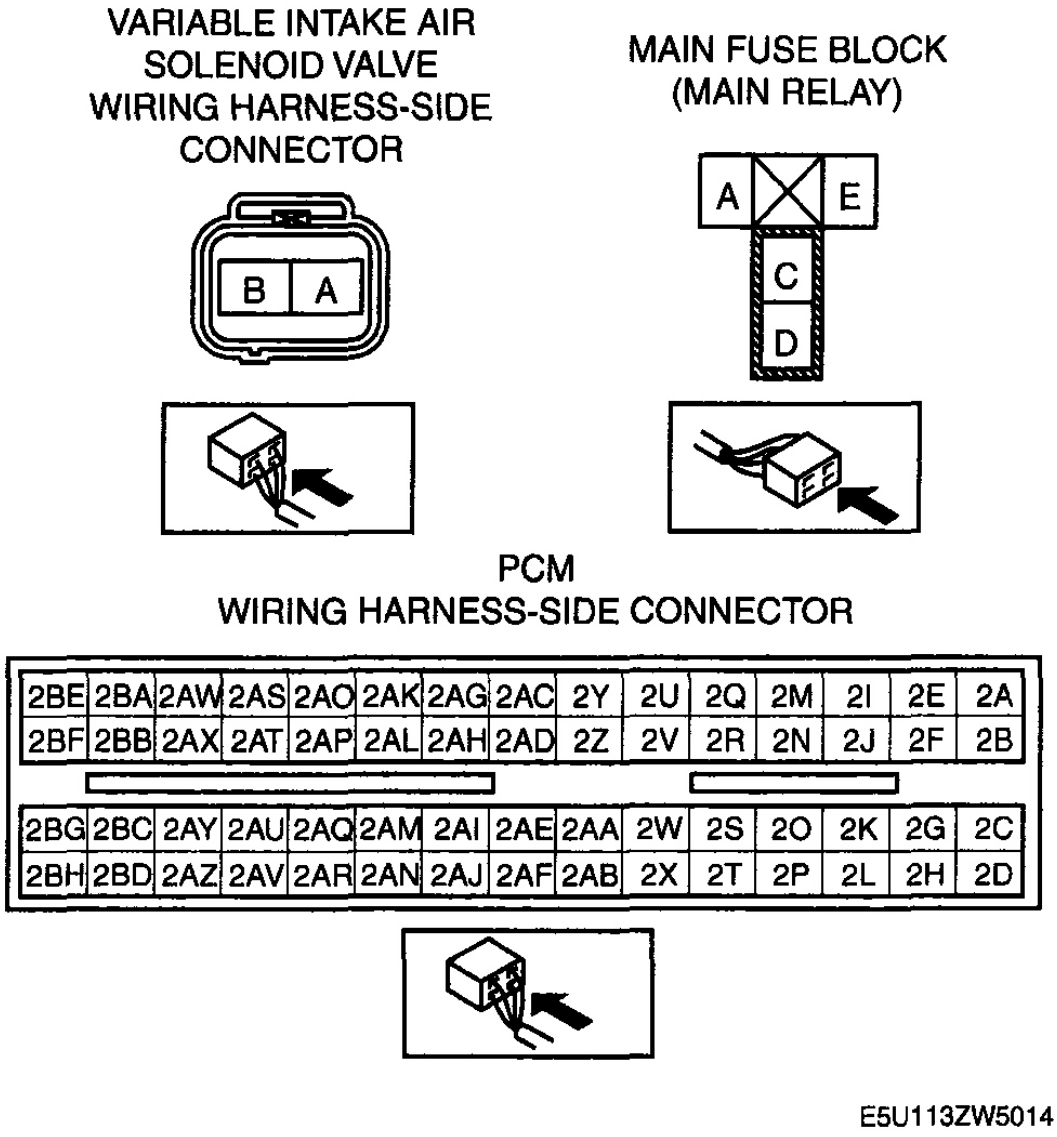


Fig. 19: Identifying Variable Intake Air Solenoid Valve, Main Relay & PCM Connector Terminals
Courtesy of MAZDA MOTORS CORP.

Open Circuit

- If there is no continuity, the circuit is open. Repair or replace the wiring harness.
  - Variable intake air solenoid valve terminal B and PCM terminal 2J
  - Variable intake air solenoid valve terminal A and main relay

Short Circuit

- If there is continuity, the circuit is shorted. Repair or replace the wiring harness.
  - Variable tumble solenoid valve terminal B and power supply
  - Variable tumble solenoid valve terminal B and body ground
  - Variable tumble solenoid valve terminal A and body ground

VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [LF]

1. Remove the service hole cover. (See **EGR VALVE REMOVAL/INSTALLATION [LF]** .)
2. Disconnect the vacuum hose from the variable tumble solenoid valve.
3. Connect a vacuum pump to the vacuum hose.

NOTE:

- **Verify that the variable tumble shutter valve actuator rod moves using a mirror.**

4. Apply vacuum and verify that the rod moves.
   - If the rod does not move, replace the variable tumble shutter valve actuator. (See **VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]** .)

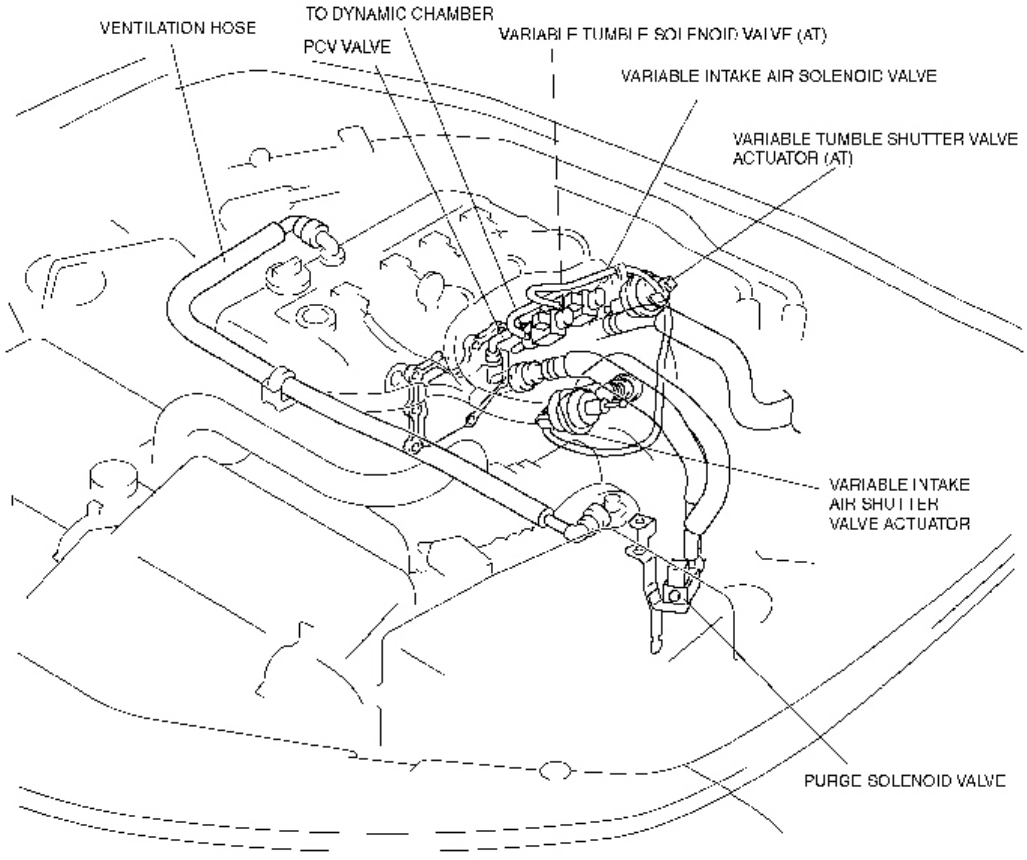


Fig. 20: View Of Variable Tumble Solenoid Valve & Actuator
Courtesy of MAZDA MOTORS CORP.

VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR ROD OPERATION REFERENCE

Vacuum kPa {mmHg, inHg}	Rod movement
Below -2.7 {-21, -0.9}	Not operate
Above -33.4 {-251, -9.89}	Fully pulled

VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]

WARNING:

- **A hot engine and intake-air system can cause severe burns. Turn off the engine and wait until they 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", while referring to the "BEFORE SERVICE PRECAUTION [LF] ".

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the throttle body. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
4. Disconnect the quick release connector (Type A) (See **QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [LF]** .)
5. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
6. Remove the service hole cover.
    1. Remove the front suspension tower bar (joint), (right side) and (left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
    2. Remove the wiper arm. (See **WIPER ARM AND BLADE REMOVAL/INSTALLATION** .)
    3. Remove the cowl grille. (See **COWL GRILLE REMOVAL/INSTALLATION** .)
    4. Remove the side cowl grille. (See **SIDE COWL GRILLE REMOVAL/INSTALLATION** .)
    5. Remove the service hole cover. (See **EGR VALVE REMOVAL/INSTALLATION [LF]** .)
7. Remove the harness bracket.

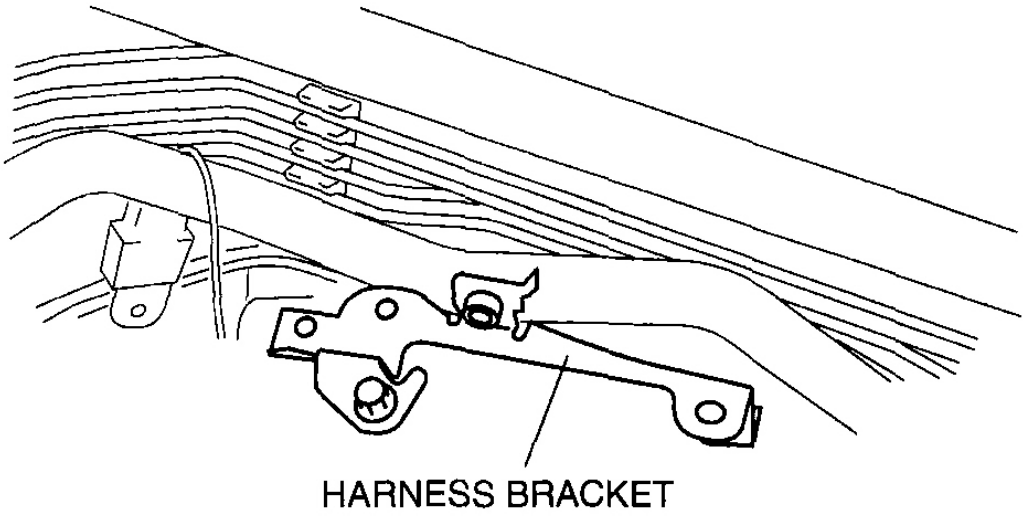


Fig. 21: Identifying Harness Bracket
Courtesy of MAZDA MOTORS CORP.

8. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
9. Remove the under cover. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
10. Disconnect the quick release connector from the fuel distributor. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
11. Remove the fuel distributor. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
12. Move the clutch release cylinder slightly out of the way. (MT) (See **CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION** .)

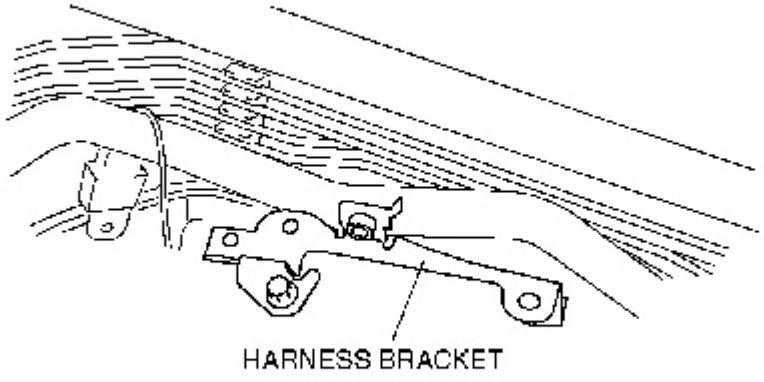


Fig. 22: View Of Harness Bracket
Courtesy of MAZDA MOTORS CORP.

13. Remove the dynamic chamber. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
14. Remove in the order indicated in the table. .

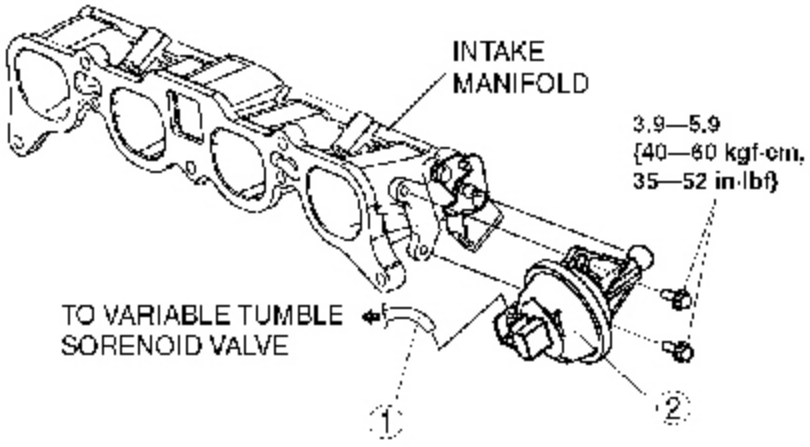


Fig. 23: Identifying Removal Order Of Variable Intake Air Shutter Valve Actuator (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

Removal Order Of Variable Intake Air Shutter Valve Actuator (With Torque Specifications)

1	Vacuum Hose
2	Variable Tumble Shutter Valve Actuator

15. Install in the reverse order of removal.

VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL NOTE

1. Disengage the variable tumble shutter valve actuator rod from the dynamic chamber on the opposite side using a suitable screwdriver or equivalent tool as shown in the figure. .

CAUTION:
- **Do not remove the lever, otherwise the variable tumble shutter valve opening angle will deviate. To prevent removal of the lever when removing the variable intake shutter valve actuator, press the lever firmly to the dynamic chamber side by hand.**

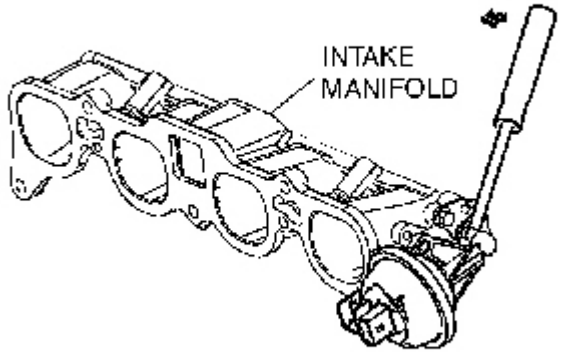


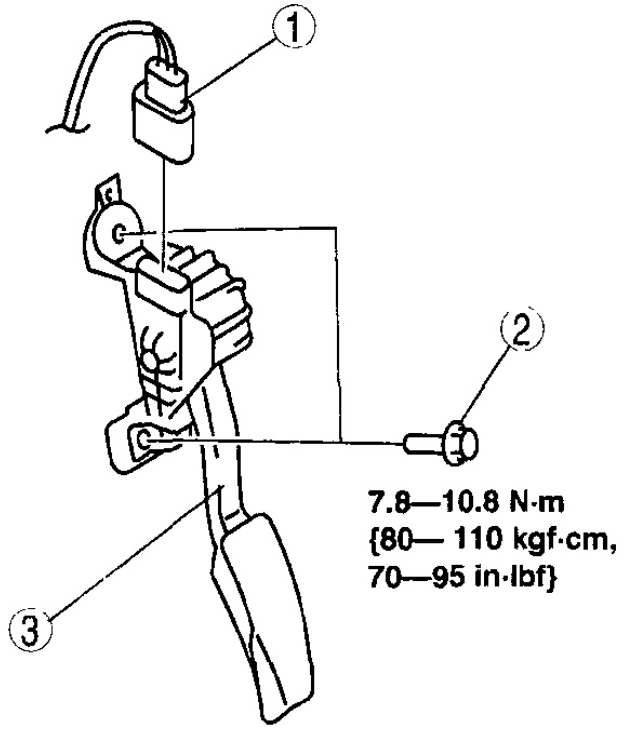
Fig. 24: Disengaging Variable Intake Air Shutter Valve Actuator Rod From Dynamic Chamber
Courtesy of MAZDA MOTORS CORP.

VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSTALLATION NOTE

1. Press the variable tumble shutter valve actuator rod into the dynamic chamber on the opposite side until a click is heard, and install it.

ACCELERATOR PEDAL REMOVAL/INSTALLATION [LF]

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove in the order indicated in **Fig. 25** .



1	Connector
2	Installation bolt
3	Accelerator pedal

Fig. 25: Identifying Removal Order Of Accelerator Pedal (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

4. Install in the reverse order of removal.

2008 BRAKES

Parking Brake System - MX-5 Miata

PARKING BRAKE SYSTEM LOCATION INDEX

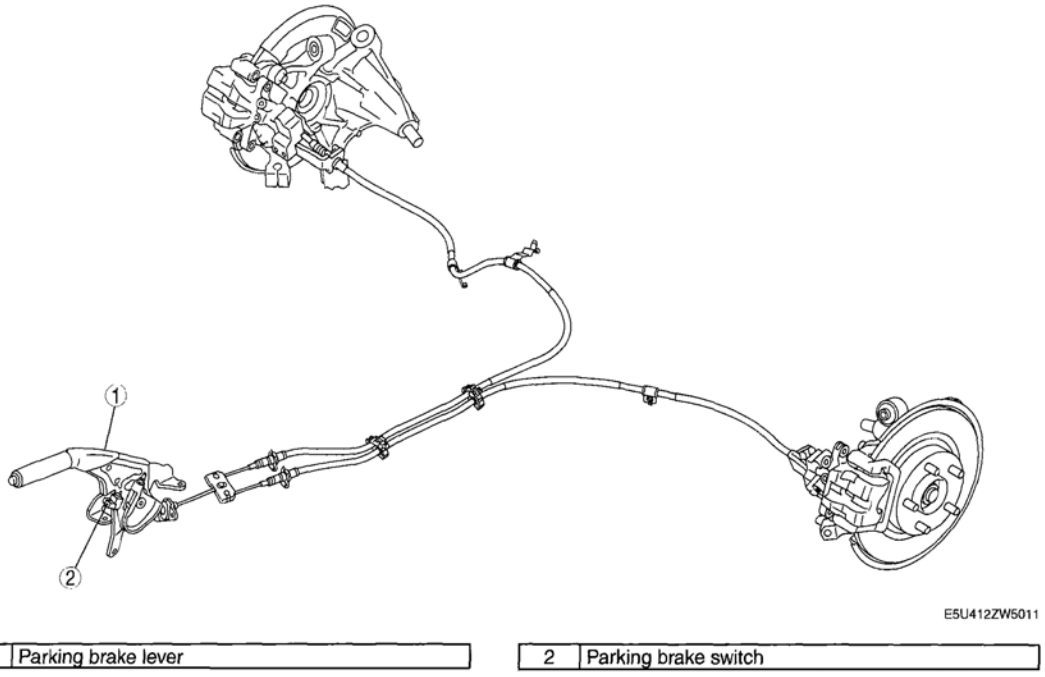


Fig. 1: Identifying Parking Brake System Components
Courtesy of MAZDA MOTORS CORP.

PARKING BRAKE LEVER INSPECTION

STROKE INSPECTION

1. Depress the brake pedal several times.
2. Pull the parking brake lever **2-3 times.**
3. Inspect the parking brake stroke by slowly pulling at point **A 50 mm {1.97 in}** from the end of the parking brake lever with a force of **98 N {10 kgf, 22 lbf}** and counting the number of notches (clicking sound).
    - If not within the specification, adjust the parking brake lever.

    Parking brake lever stroke when pulled at 98 N {10 kgf, 22 lbf}

    1-3 notches

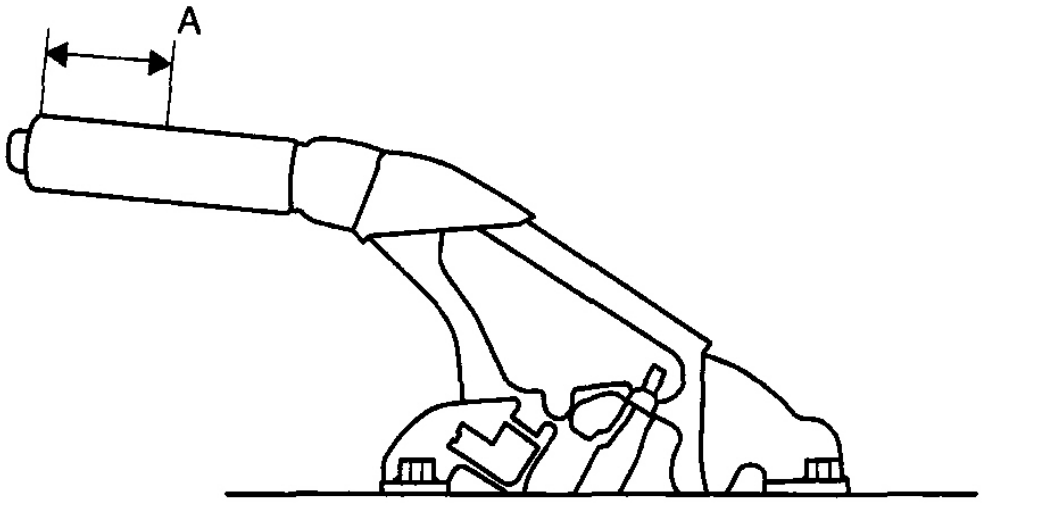


Fig. 2: Inspecting Parking Brake Stroke
Courtesy of MAZDA MOTORS CORP.

PARKING BRAKE LEVER ADJUSTMENT

1. Depress the brake pedal several times.
2. Remove the parking brake lever boot.
3. Turn the adjusting nut and adjust the parking brake lever.
4. After adjustment, pull the parking brake lever one notch and verify that the parking brake warning light illuminates.
5. Verify that the rear brakes do not drag.

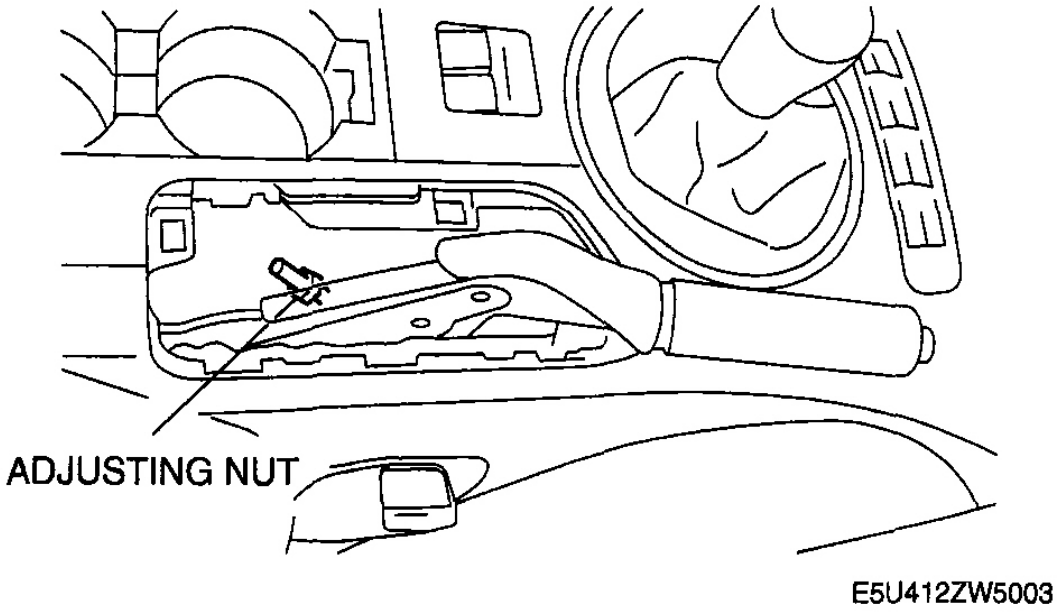
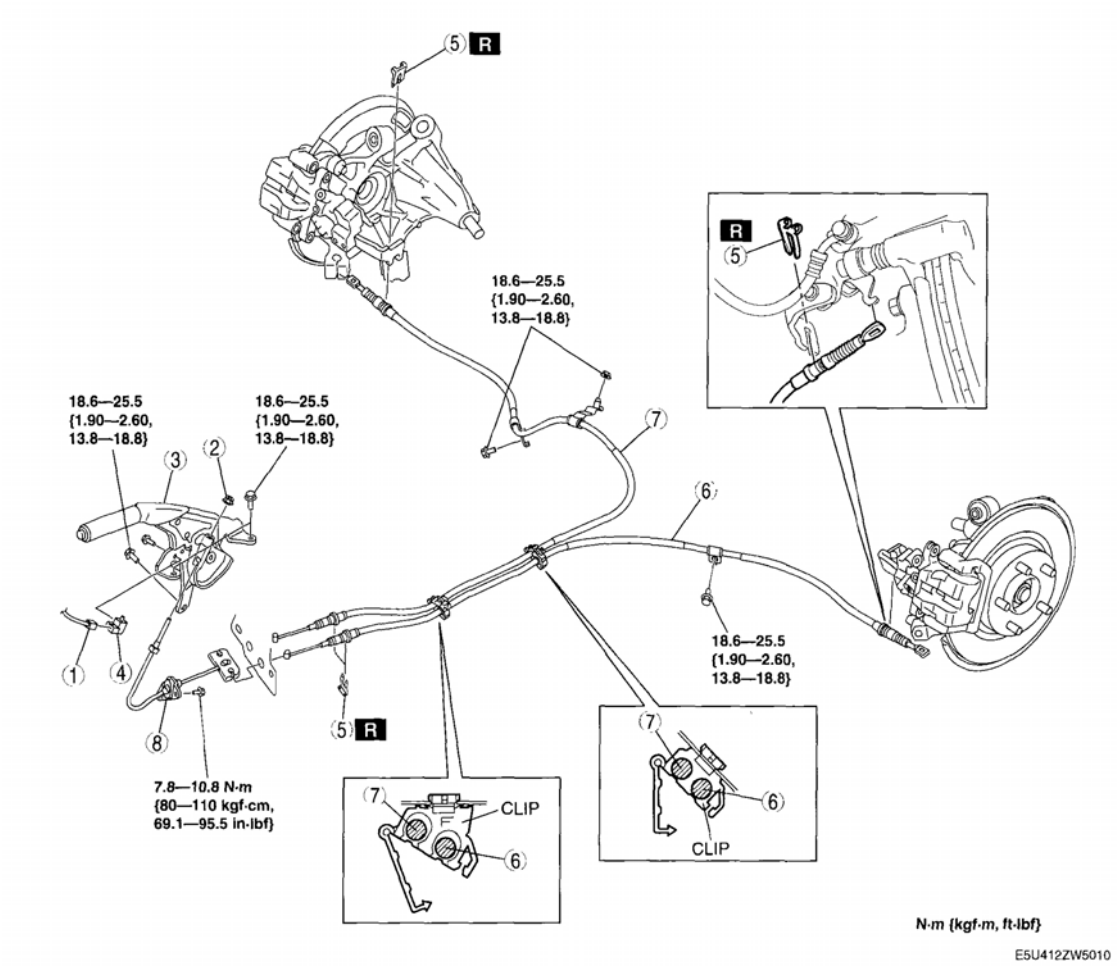


Fig. 3: Identifying Parking Brake Lever Adjusting Nut
Courtesy of MAZDA MOTORS CORP.

PARKING BRAKE LEVER REMOVAL/INSTALLATION

1. Remove the middle pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [LF]** .)
2. Remove the propeller shaft. (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
3. Remove the console. (See **CONSOLE REMOVAL/INSTALLATION** .)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. After installation, inspect the parking brake stroke and adjust if necessary.



1	Parking brake switch connector
2	Adjusting nut
3	Parking brake lever
4	Parking brake switch

5	Clip
6	Rear parking brake cable (LH)
7	Rear parking brake cable (RH)
8	Front parking brake cable

Fig. 4: Identifying Parking Brake Lever Removing/Installing Steps (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

PARKING BRAKE LEVER REMOVAL NOTE

1. Partially peel back the floor mat and remove the bolt shown in **Fig. 5** .
2. Remove the two bolts.
3. Remove the parking brake lever.

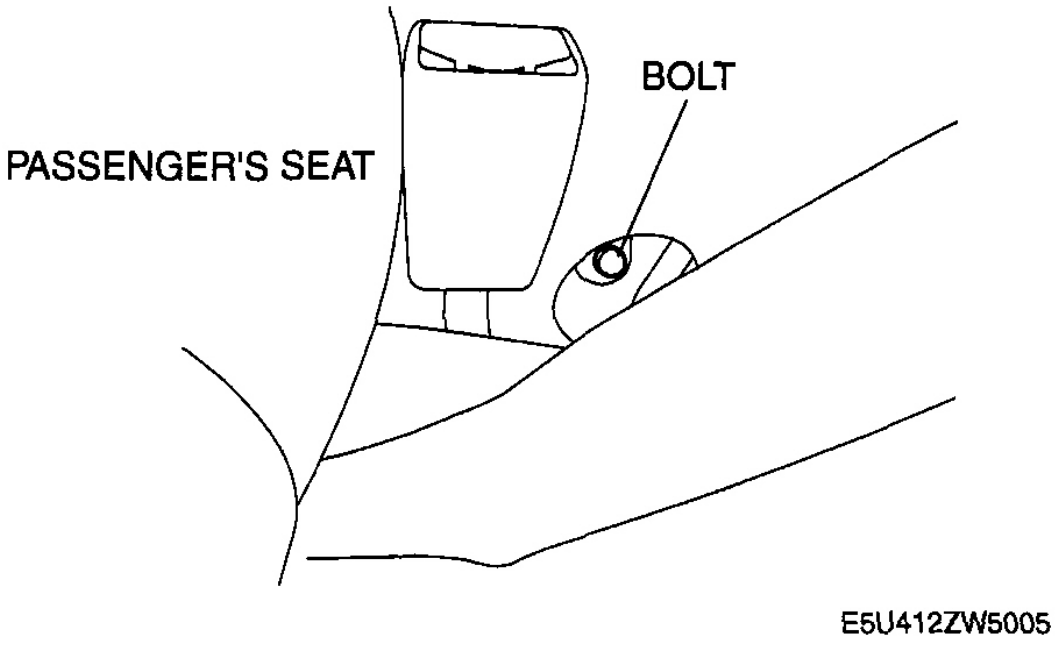


Fig. 5: Locating Bolt
Courtesy of MAZDA MOTORS CORP.

PARKING BRAKE SWITCH INSPECTION

1. Disconnect the parking brake switch connector.
2. Verify that the continuity is as indicated in **Fig. 6** .
    - If not as indicated in **Fig. 6** , replace the parking brake switch.

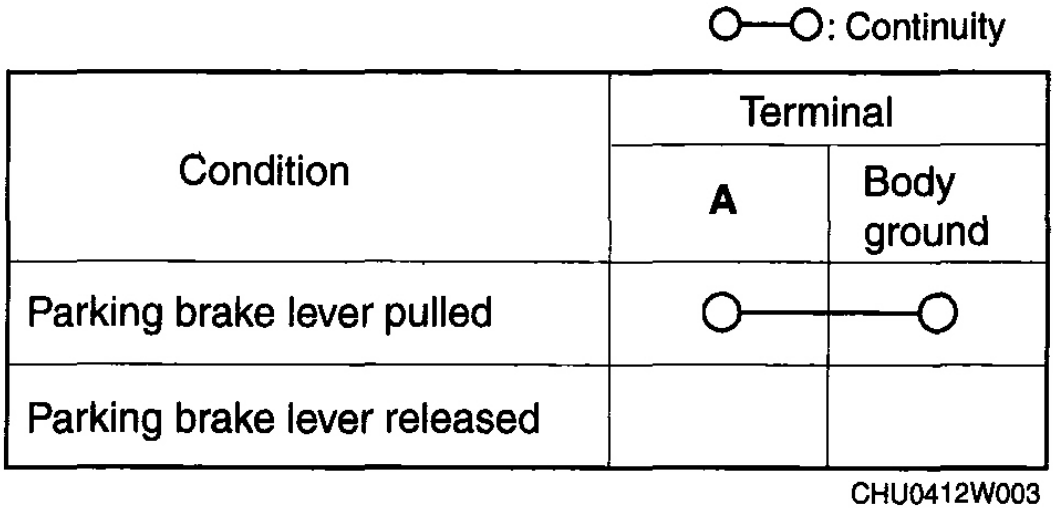


Fig. 6: Parking Brake Switch Continuity Reference Table
Courtesy of MAZDA MOTORS CORP.

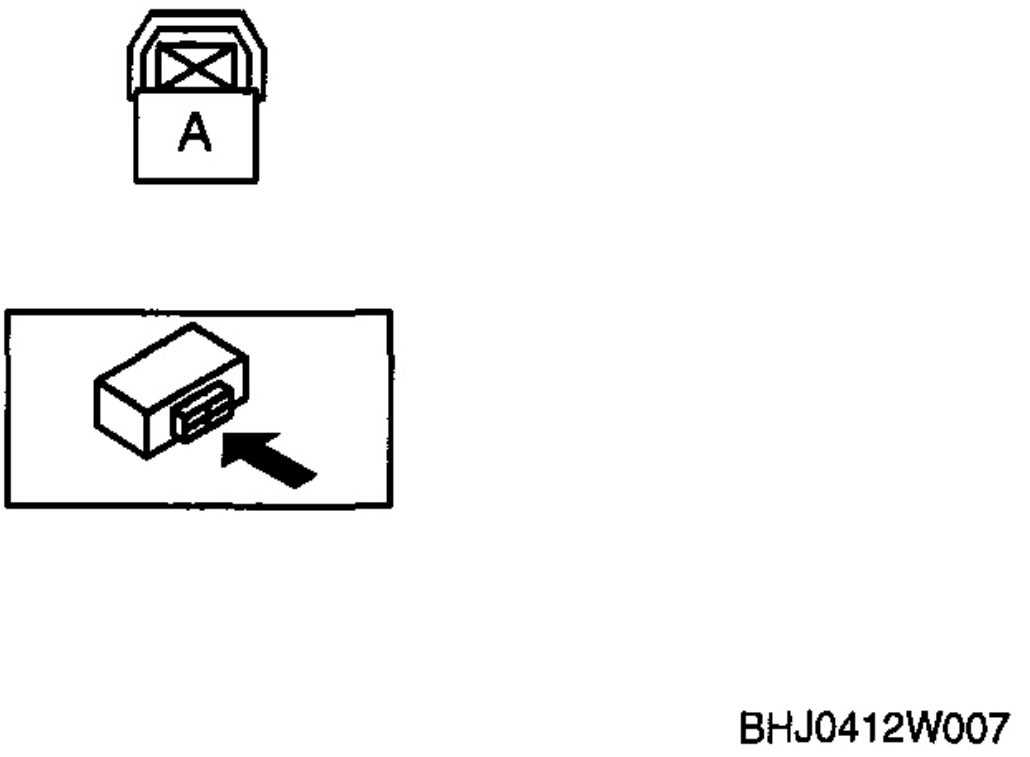
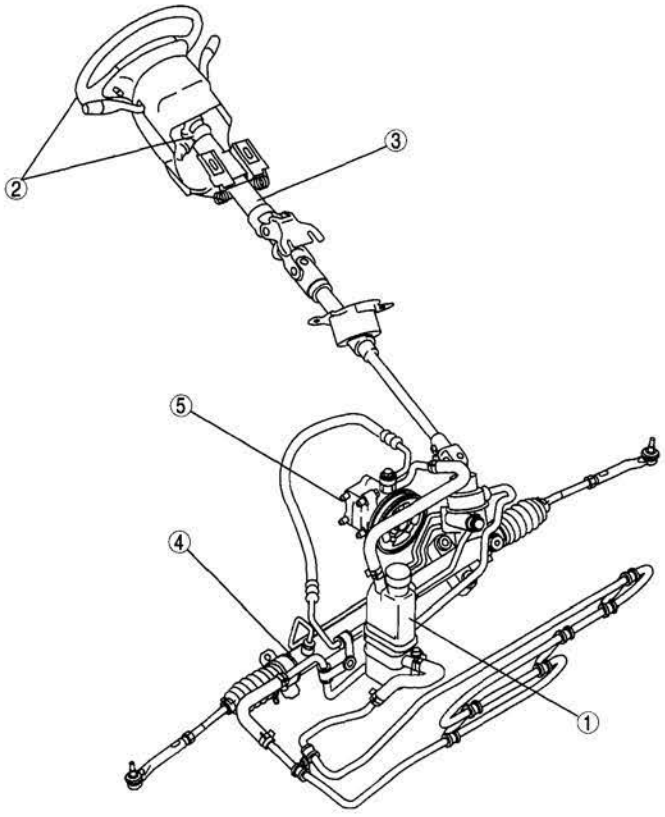


Fig. 7: Identifying Parking Brake Switch Connector
Courtesy of MAZDA MOTORS CORP.

2008 STEERING

Power Steering - MX-5 Miata

STEERING LOCATION INDEX



1	Power steering fluid tank
2	Steering wheel and column
3	Steering shaft
4	Steering gear and linkage
5	Power steering oil pump

Fig. 1: Identifying Location Of Steering Components
Courtesy of MAZDA MOTORS CORP.

AIR BLEEDING

CAUTION:
- **Do not turn the steering wheel during the fluid level inspection, otherwise the fluid level changes and cannot be inspected correctly.**

1. Inspect the fluid level. (See **POWER STEERING FLUID INSPECTION** .)
2. Jack up the front of the vehicle and support it on safety stands.
3. Turn the steering wheel fully to the left and right several times with the engine not running.
4. Reinspect the fluid level.
   - If it has dropped, add fluid.
5. Repeat Steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully to the left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
   - If the fluid level has dropped, add fluid as necessary and repeat Steps 8 and 9.

POWER STEERING FLUID INSPECTION

FLUID LEVEL INSPECTION

1. Inspect the power steering fluid level.
   - Add fluid to the specified level as necessary.

Power steering fluid type

ATF M-III or equivalent (e.g. Dexron®RII)

Power steering fluid capacity (approximate quantity)

1.19 L {1.25 US qt, 1.04 Imp qt}

FLUID LEAKAGE INSPECTION

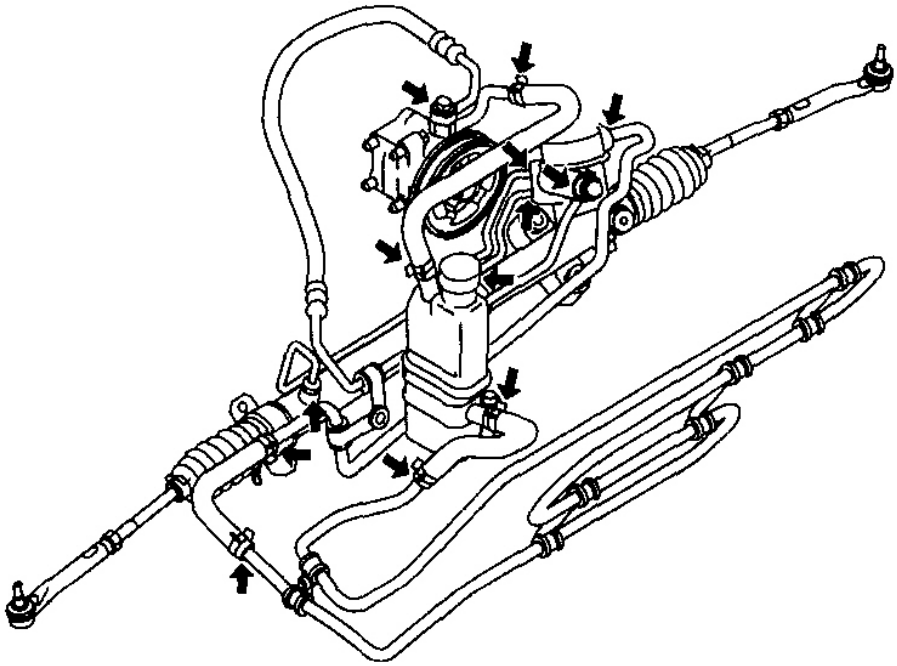
1. Start the engine and let it idle.
2. Turn the steering wheel fully to the left and right to apply fluid pressure.

CAUTION:
- **If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

3. Inspect for fluid leakage.
   - If fluid leakage is found, replace related pipe or hose.

NOTE:

- **The points where fluid leakage may occur are indicated in the figure.**



E5U614ZW5019

Fig. 2: Identifying Fluid Leakage Points
Courtesy of MAZDA MOTORS CORP.

FLUID PRESSURE INSPECTION

1. Assemble the **SSTs** as shown in **Fig. 3** .

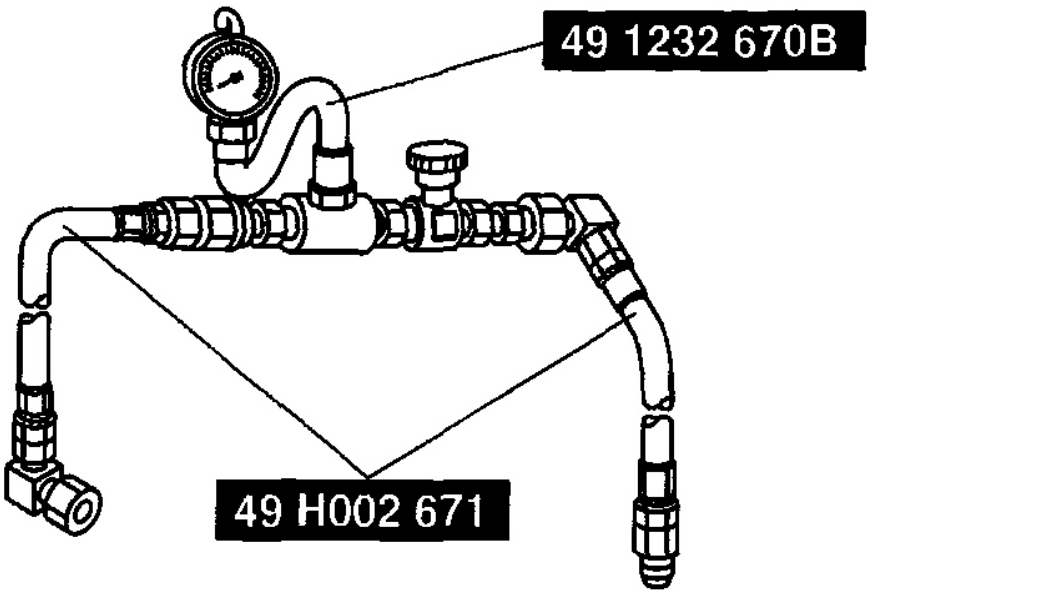


Fig. 3: Assembling SSTs
Courtesy of MAZDA MOTORS CORP.

2. Disconnect the pressure pipe from the oil pump, and connect the **SSTs** .

   Tightening torque

   29.4-44.1 N.m {3.00-4.49 kgf.m, 21.7-32.5 ft.lbf}

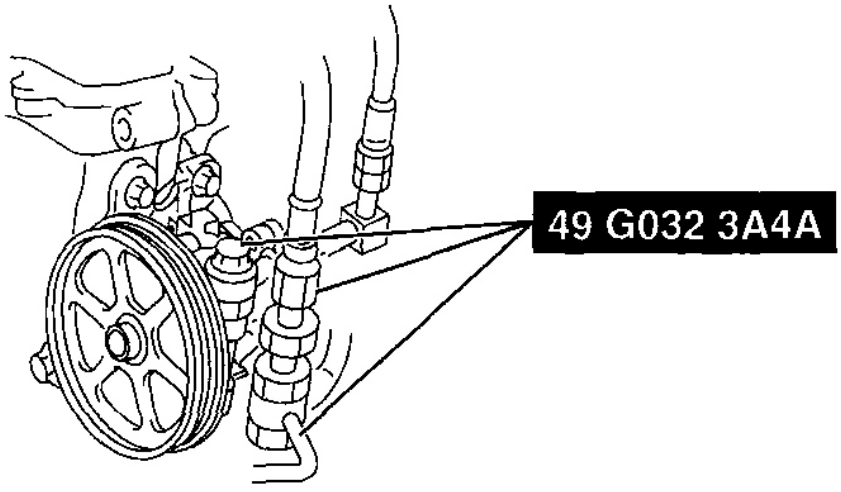


Fig. 4: Connecting SSTs
Courtesy of MAZDA MOTORS CORP.

3. Bleed the air from the system. (See **AIR BLEEDING** .)
4. Open the gauge valve fully.
5. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50-60°C {122-140°F}** .
6. Close the gauge valve completely.
7. Increase the engine speed to **1,000-1,500 rpm** and measure the fluid pressure generated by the oil pump.
    - If the pressure is not within the specification, repair or replace the oil pump component.

CAUTION:
- **If the valve is left closed for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

Oil pump fluid pressure

7.55-8.05 MPa {77.0-82.0 kgf/cm^2 , 1095-1167 psi}

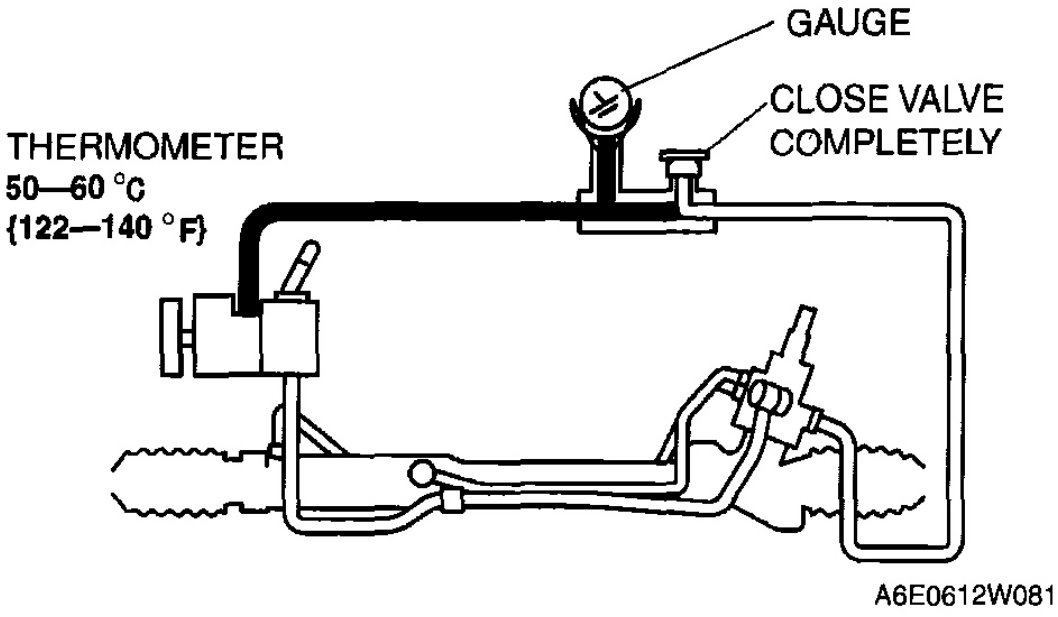


Fig. 5: Inspecting Fluid Pressure (Valve Closed)
Courtesy of MAZDA MOTORS CORP.

8. Open the gauge valve fully and increase the engine speed to **1,000-1,500 rpm** .
9. Turn the steering wheel fully to the left and right, then measure the fluid pressure generated at the gear housing.
    - If the pressure is not within the specification, repair or replace the steering gear component.

CAUTION:
- **If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

Gear housing fluid pressure

7.55-8.05 MPa {77.0-82.0 kgf/cm^2 ,1095-1167 psi}

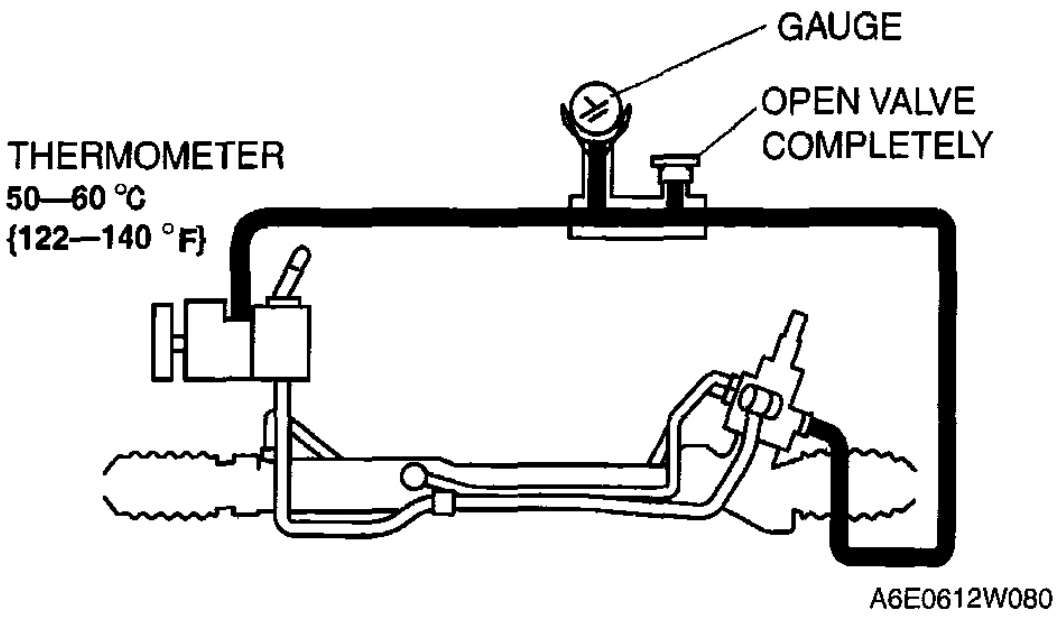


Fig. 6: Inspecting Fluid Pressure (Valve Open)
Courtesy of MAZDA MOTORS CORP.

10. Remove the **SSTs** . Install and tighten the pressure pipe to the specified torque.

    Tightening torque

    29.4-44.1 N.m {3.00-4.49 kgf.m, 21.7-32.5 ft.lbf}

11. Bleed the air from the system.

STEERING WHEEL AND COLUMN INSPECTION

STEERING WHEEL PLAY INSPECTION

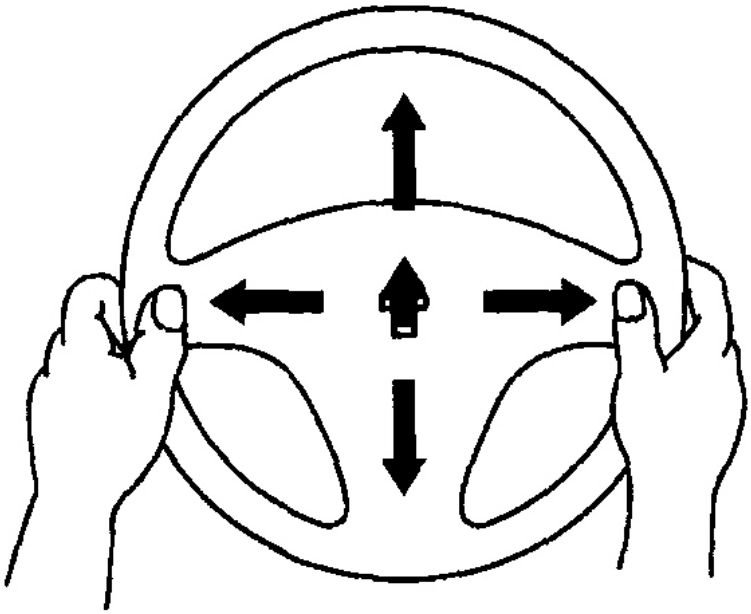
1. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within the specification.
   - If the play exceeds the specification, either the steering joints are worn or the backlash of the steering gear is excessive. Correct as necessary.

   Steering wheel play

   0-30 mm {0-1.18 in}

STEERING WHEEL LOOSENESS INSPECTION

1. Move the steering wheel as shown in **Fig. 7** to inspect for column bearing wear, steering shaft joint play, steering wheel looseness, and column looseness.
    - Repair or replace as necessary.



A6E0612W015

Fig. 7: Inspecting Steering Wheel Play
Courtesy of MAZDA MOTORS CORP.

STEERING WHEEL EFFORT INSPECTION

1. Inspect the following points:
    - Tire size and tire pressure
    - Fluid level
    - Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
3. Remove the air bag module.

WARNING:

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air**

bag module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)

4. Start the engine and warm the power steering fluid to **50-60°C {122-140°F}** .
5. Measure the steering wheel effort using a torque wrench.
   - If not within the specification, verify the following:
     - No air in steering system
     - No fluid leakage at hose or connectors
     - Function of oil pump and steering gear

Steering wheel effort

7.8 N.m {80 kgf.cm, 58 in.lbf} max.

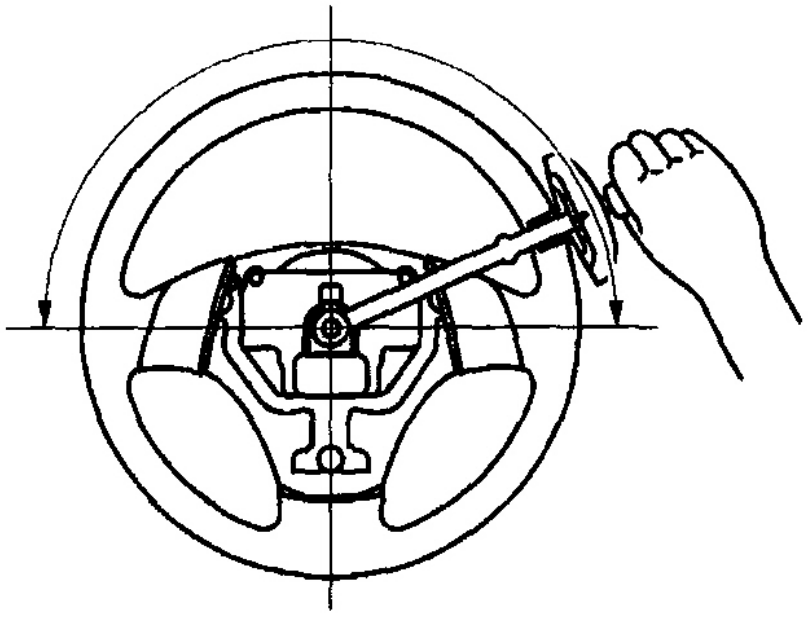


Fig. 8: Measuring Steering Wheel Effort Using Torque Wrench
Courtesy of MAZDA MOTORS CORP.

NOTE:

- **To determine whether the steering effort is satisfactory or not, perform the inspection on another vehicle of the same model and under the same conditions, and compare the results.**

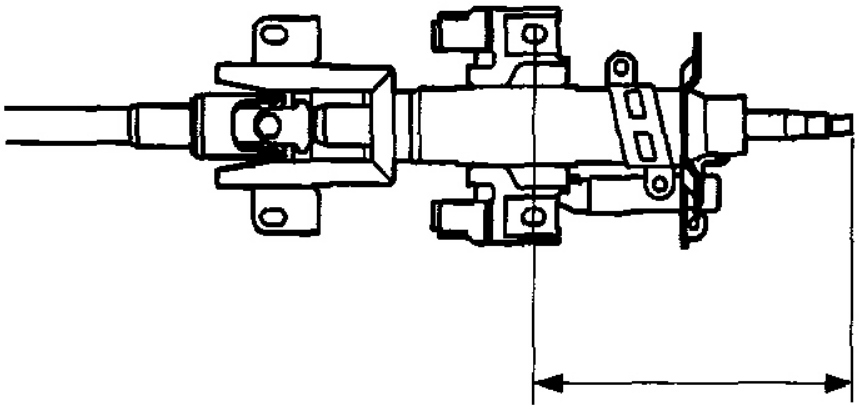
- **The steering wheel effort varies with conditions as shown below.**
  - **Road conditions, such as dry or wet, and asphalt or concrete.**
  - **Tire conditions, such as brand, wear, and tire pressure.**

STEERING SHAFT INSPECTION

1. Inspect the following.
   1. Column bearing for damage
   2. Steering shaft length
      - Replace the steering shaft component as necessary.

Steering shaft length

247.3 mm {9.736 in}



A6E0612W022

Fig. 9: Identifying Steering Shaft Length
Courtesy of MAZDA MOTORS CORP.

2. Inspect the tilt operation.
   1. Verify that the adjusting lever moves smoothly from unlock position to lock position.
   2. Verify that the steering shaft is fixed firmly when the adjusting lever is locked.
      - Replace the steering shaft component as necessary.

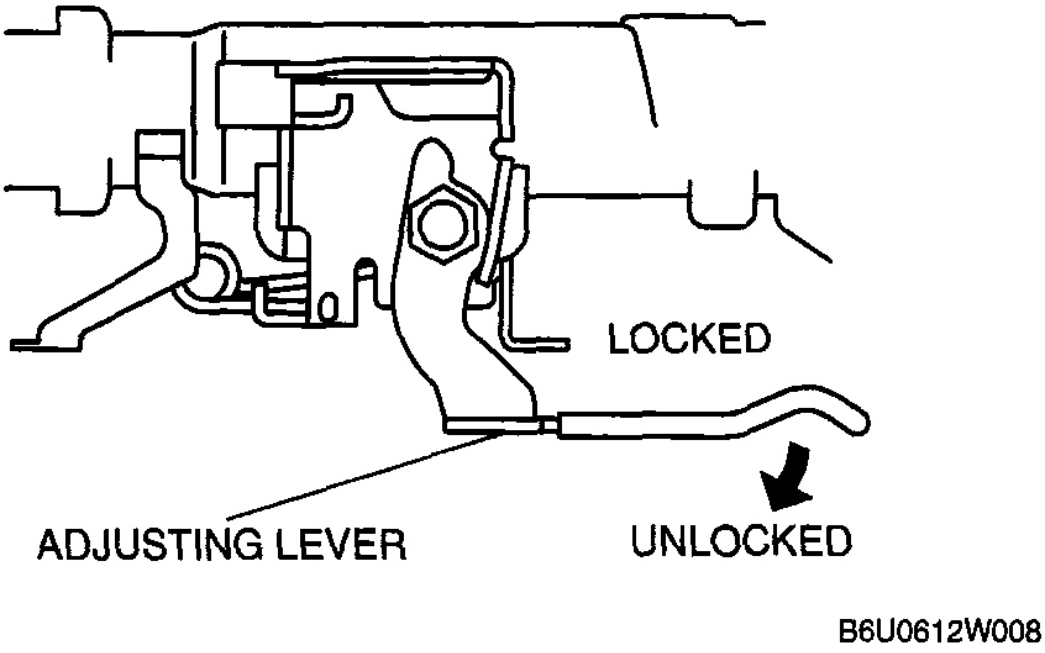


Fig. 10: Inspecting Tilt Operation
Courtesy of MAZDA MOTORS CORP.

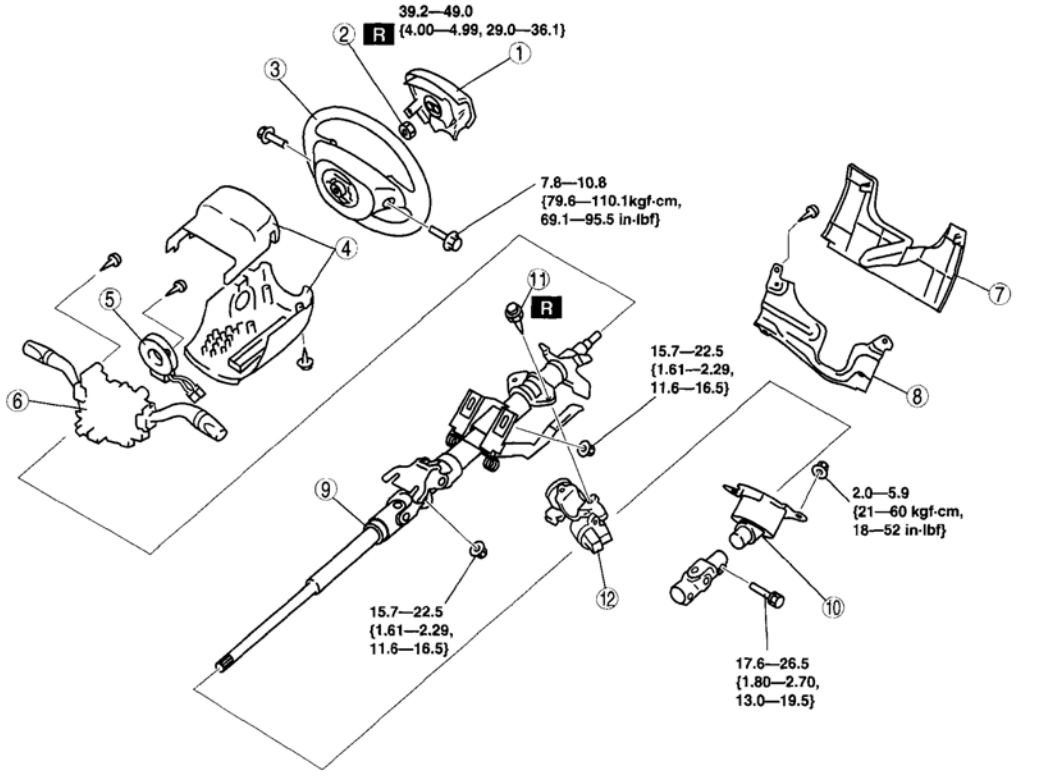
STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

WARNING:

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air bag module. (See AIR BAG SYSTEM SERVICE WARNINGS .) (See AIR BAG SYSTEM SERVICE CAUTIONS .)**

1. Remove in the order indicated in **Fig. 11**.
2. Install in the reverse order of removal.
3. If the steering lock component of a vehicle equipped with the advanced keyless system is replaced, perform the following procedure after installation.
   - Without immobilizer system
     - Steering lock unit programming (See **STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM]** .)
   - With immobilizer system
     - Immobilizer system resetting (See **IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS**

SYSTEM] .)



1	Air bag module
2	Locknut
3	Steering wheel
4	Column cover
5	Clock spring
6	Combination switch
7	Lower panel
8	Knee bolster
9	Steering shaft
10	Dust cover
11	Steering lock mounting bolts
12	Steering lock component

Fig. 11: Steering Wheel & Column Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

STEERING WHEEL REMOVAL NOTE

CAUTION:

- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

1. Set the vehicle in the straight-ahead position.
2. Remove the steering wheel using a suitable puller.

STEERING LOCK MOUNTING BOLTS REMOVAL NOTE

1. Make a groove in the heads of the steering lock mounting bolts using a chisel and a hammer.
2. Remove the bolts using a screwdriver.
3. Disassemble the steering lock component.

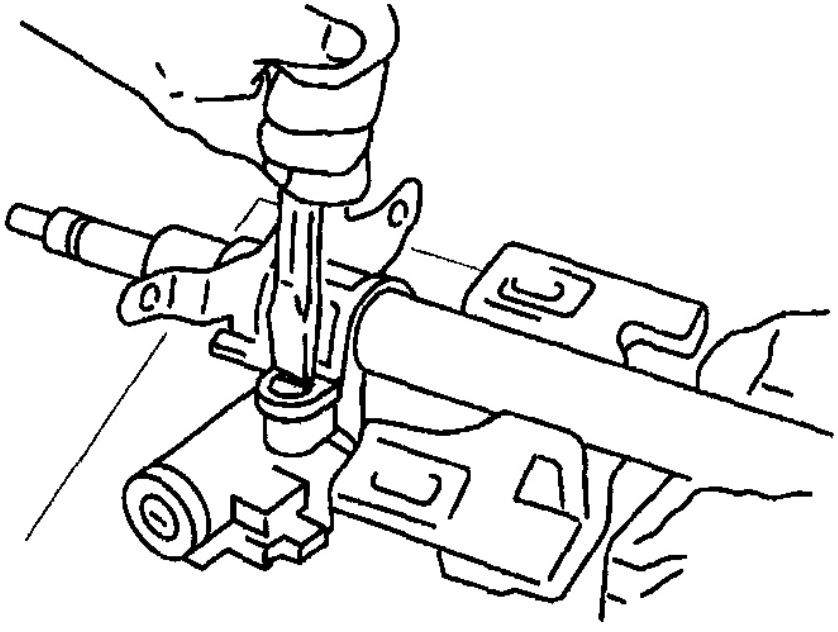


Fig. 12: Removing Bolts Using Screwdriver
Courtesy of MAZDA MOTORS CORP.

STEERING LOCK MOUNTING BOLTS INSTALLATION NOTE

1. Assemble the steering lock component to the steering shaft.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.

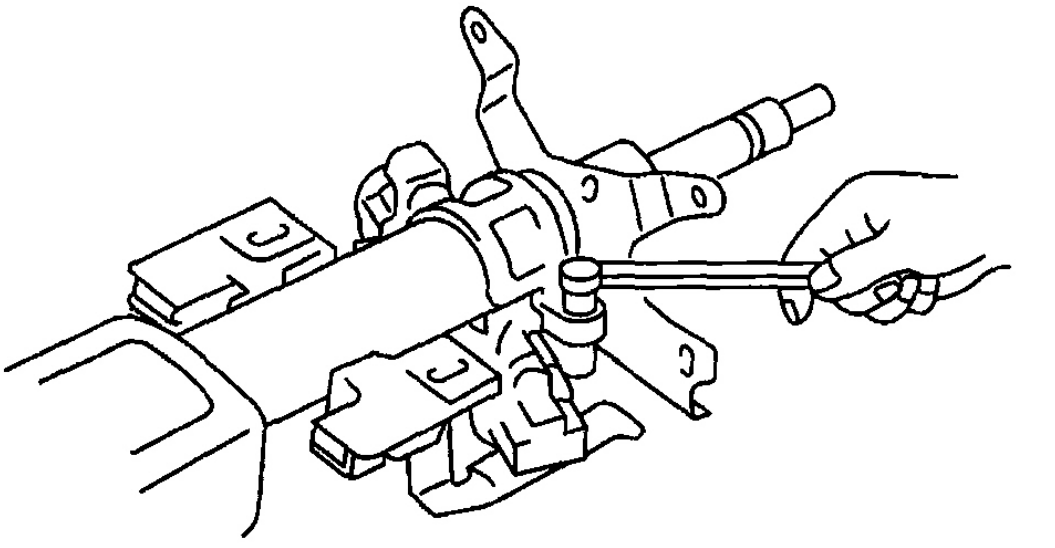


Fig. 13: Installing Steering Lock Mounting Bolts
Courtesy of MAZDA MOTORS CORP.

STEERING SHAFT INSTALLATION NOTE

CAUTION:
- **Do not apply a shock in the axial direction of the shaft.**

1. Lock the tilt lever.
2. Tighten nut A.
3. Tighten nut B.
4. Tighten bolt C.

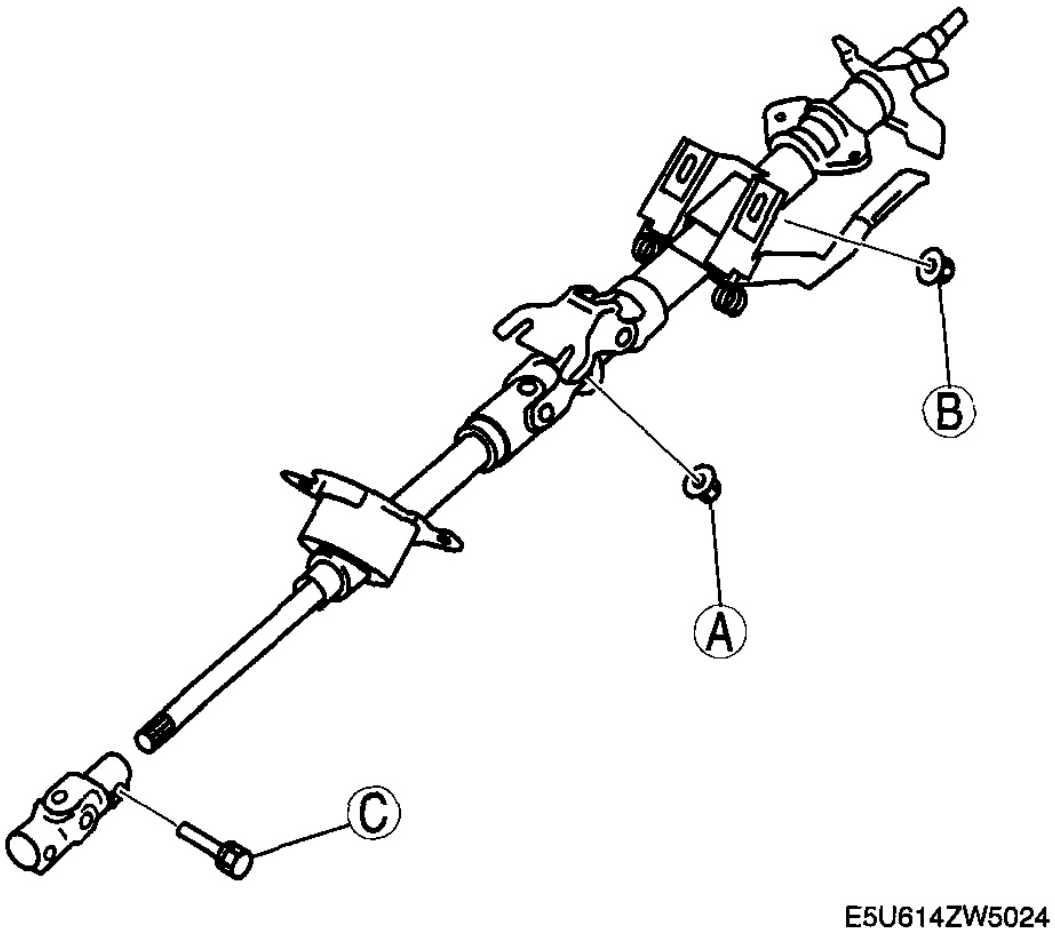


Fig. 14: Steering Shaft Nuts
Courtesy of MAZDA MOTORS CORP.

STEERING WHEEL INSTALLATION NOTE

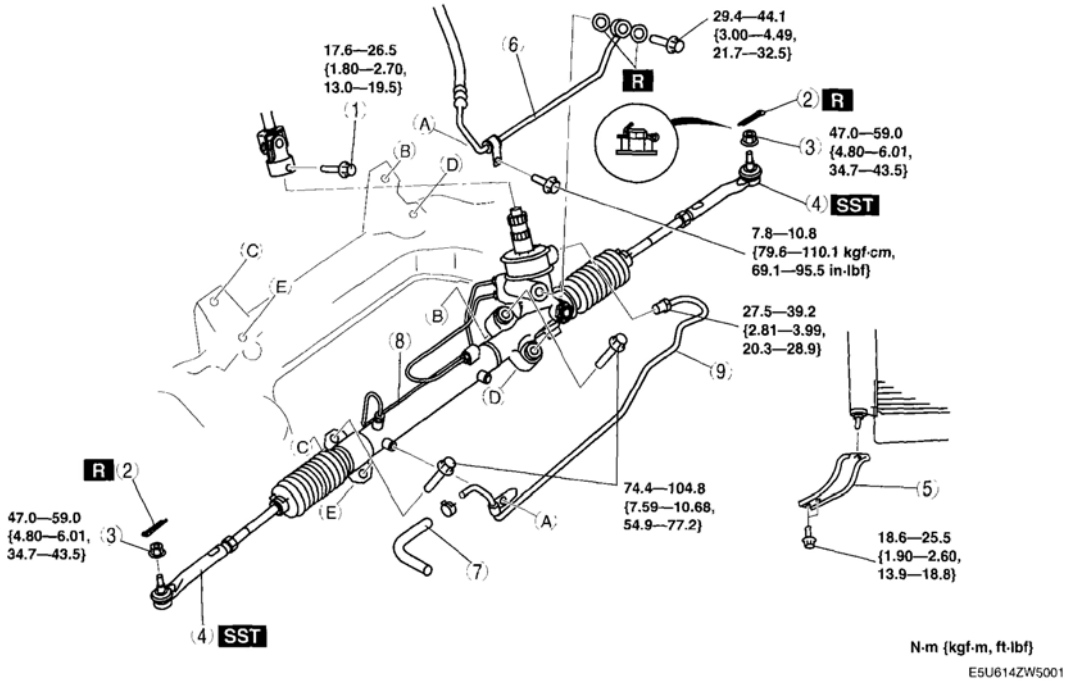
1. Make sure the wheels in the straight-ahead position, and install the steering wheel.

STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

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 the ABS wheel-speed sensor. (See **FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)
2. Remove the front stabilizer. (See **FRONT STABILIZER REMOVAL/INSTALLATION** .)
3. Remove in the order indicated in **Fig. 15**.
4. Install in the reverse order of removal.
5. After installation, adjust the total toe-in. (See **FRONT WHEEL ALIGNMENT** .)



1	Bolt (intermediate shaft)
2	Cotter pin
3	Nuts (tie-rod end ball joint)
4	Tie-rod end ball joint
5	Lower mounting rubber bracket
6	Pressure pipe
7	Return hose
8	Steering gear and linkage
9	Return pipe

Fig. 15: View Of Steering Gear & Linkage Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

BOLT (INTERMEDIATE SHAFT) REMOVAL NOTE

1. Mark the pinion shaft and gear housing for proper installation.

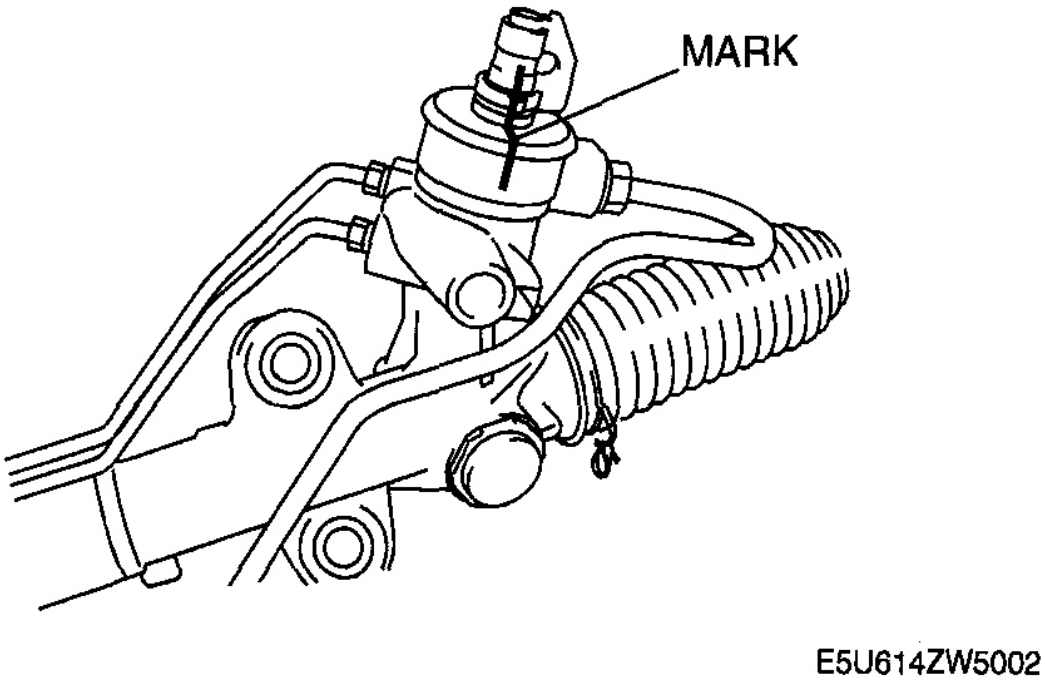


Fig. 16: Locating Mark On Pinion Shaft & Gear Housing
Courtesy of MAZDA MOTORS CORP.

TIE-ROD END BALL JOINT REMOVAL NOTE

1. Remove the tie-rod nut.
2. Separate the tie-rod end from the steering knuckle using the **SSTs** .

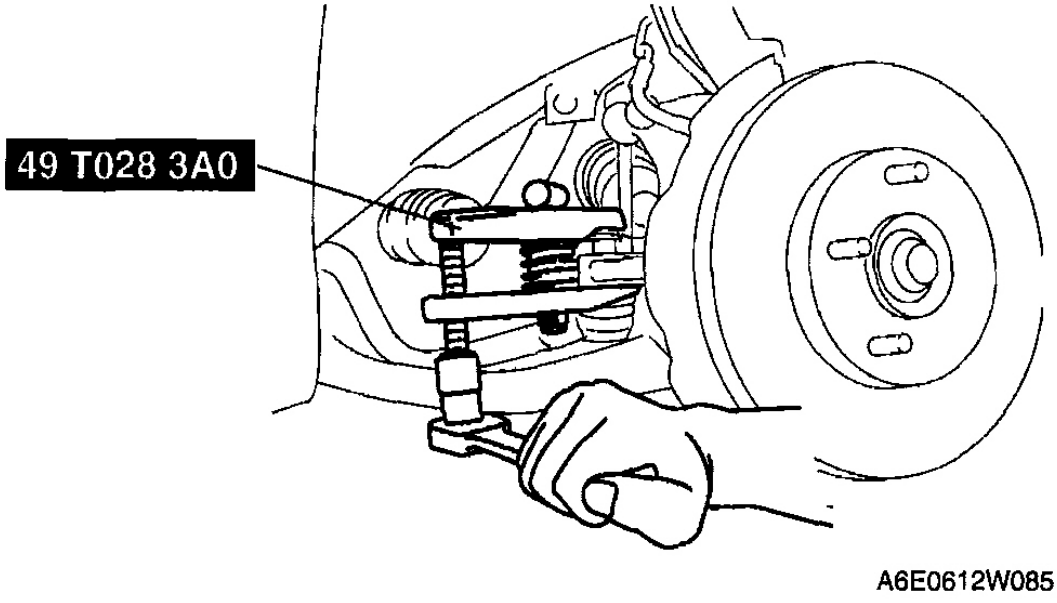


Fig. 17: Separating Tie-Rod End From Steering Knuckle Using SSTs
Courtesy of MAZDA MOTORS CORP.

STEERING GEAR AND LINKAGE REMOVAL NOTE

1. Remove the steering gear and linkage by pulling it from the right side.

STEERING GEAR AND LINKAGE INSTALLATION NOTE

1. Tighten bolts loosely.
2. Assemble the mounting bracket with the mark on the bracket facing the vehicle rear.

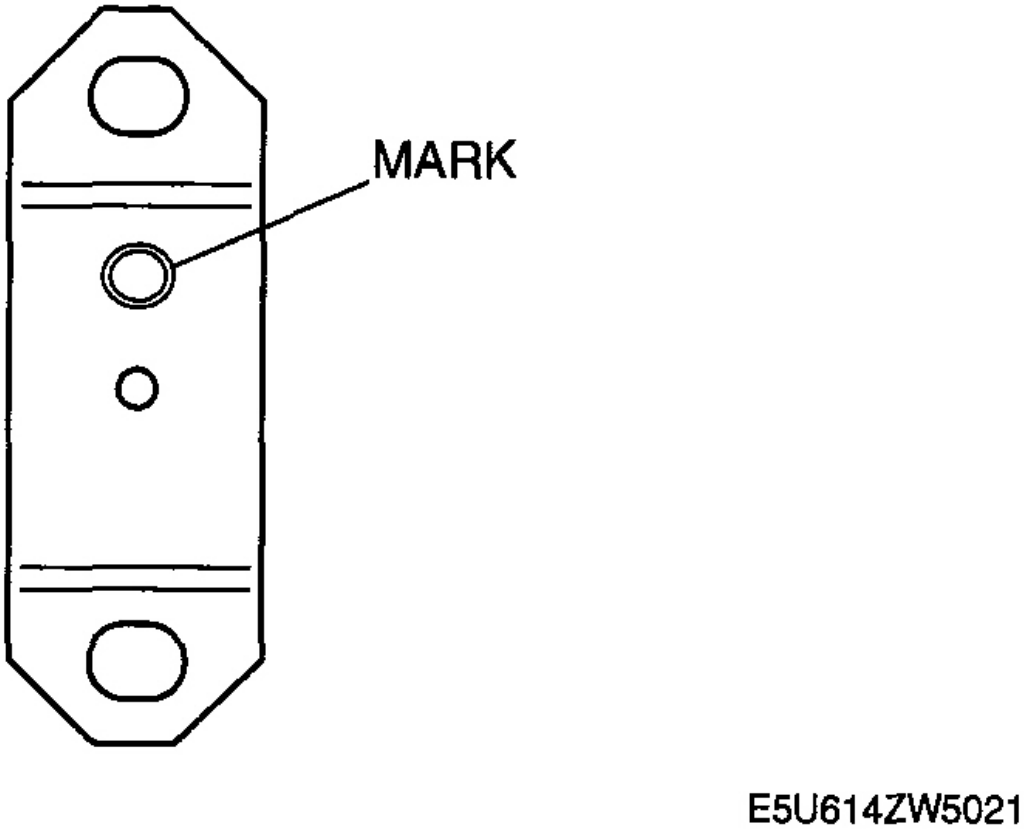


Fig. 18: Locating Mark On Bracket
Courtesy of MAZDA MOTORS CORP.

3. Tighten the mounting bracket bolts to the specified torque in the order shown.

Tightening torque

74.4-104.8 N.m {7.587-10.68 kgf.m, 54.88-77.29 ft.lbf}

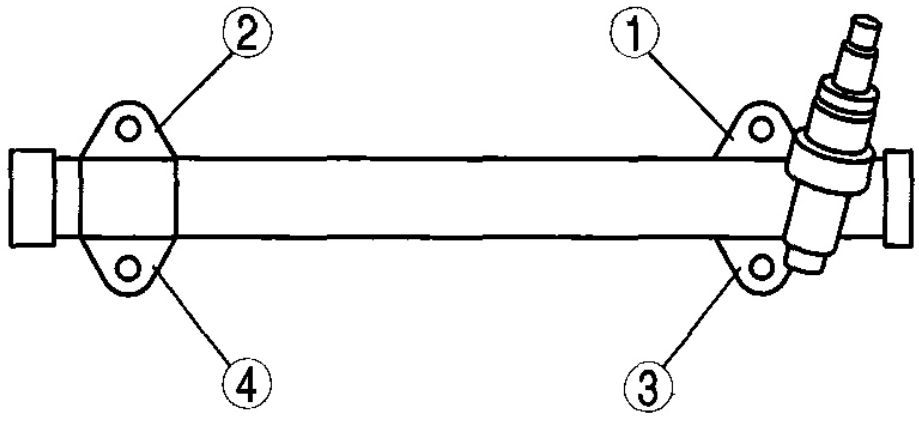


Fig. 19: Mounting Bracket Bolts Tightening Order
Courtesy of MAZDA MOTORS CORP.

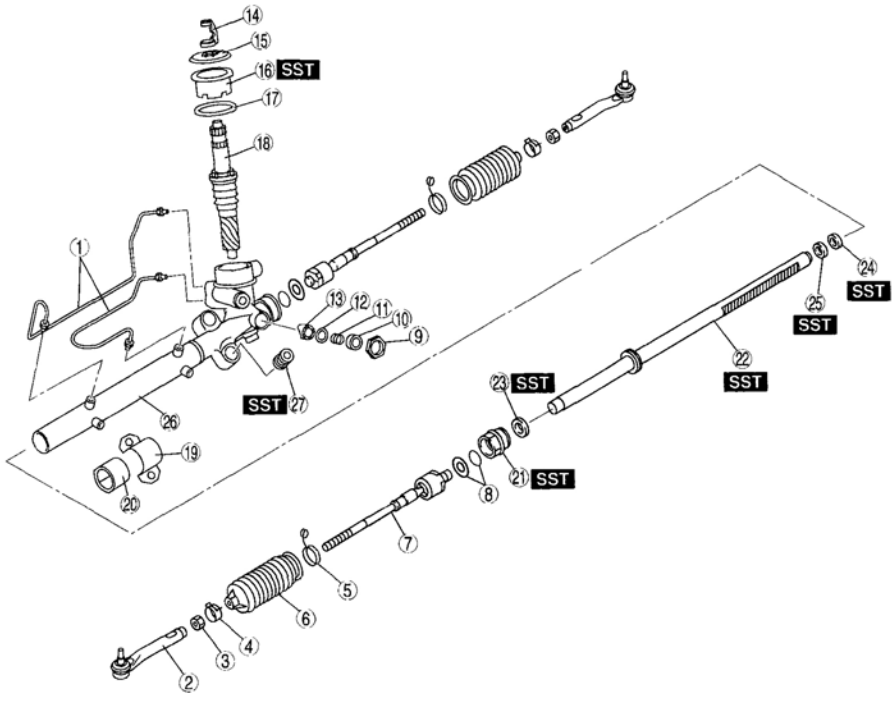
BOLT (INTERMEDIATE SHAFT) INSTALLATION NOTE

1. Align the marks and install the intermediate shaft and bolt.

STEERING GEAR AND LINKAGE DISASSEMBLY

CAUTION:
- **Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.**

1. Disassemble in the order indicated in **Fig. 20**.



E5U614ZW5006

1	Oil pipe
2	Tie-rod end
3	Locknut
4	Boot clamp
5	Boot band
6	Boot
7	Tie rod
8	Lock washer and o-ring
9	Locknut (adjusting cover)
10	Adjusting cover
11	Yoke spring
12	Washer
13	Support yoke
14	Clip
15	Dust cover
16	Pinion plug
17	O-ring

18	Pinion shaft component
19	Mounting bracket
20	Mounting rubber
21	Holder
22	Steering rack
23	Oil seal (holder side)
24	Inner guide
25	Oil seal (gear housing side)
26	Gear housing
27	Mounting rubber

Fig. 20: Exploded View Of Steering Gear & Linkage
Courtesy of MAZDA MOTORS CORP.

TIE ROD DISASSEMBLY NOTE

1. Unclamp the washer.
2. Remove the tie rod.

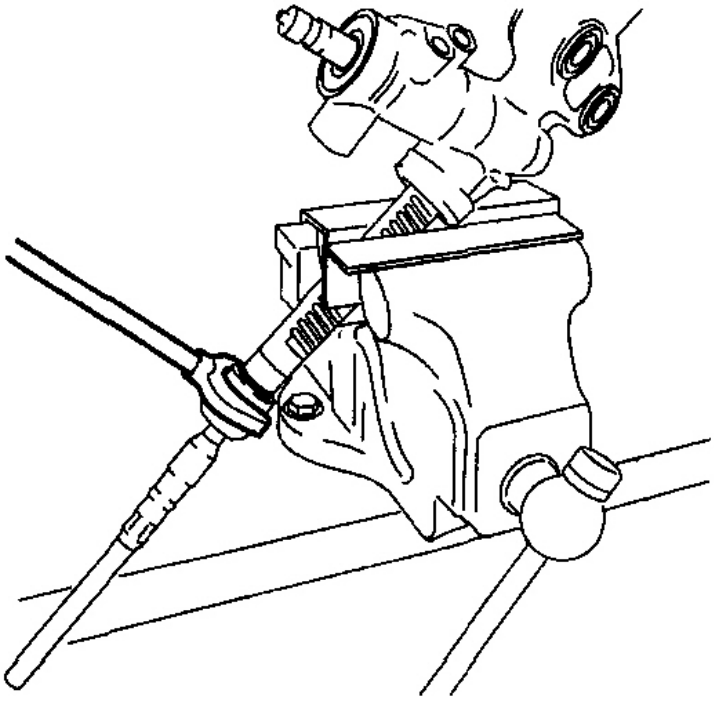


Fig. 21: Removing Tie Rod
Courtesy of MAZDA MOTORS CORP.

PINION PLUG, PINION SHAFT COMPONENT DISASSEMBLY NOTE

1. Remove the clip and the dust cover, then remove the pinion plug using the **SST** .

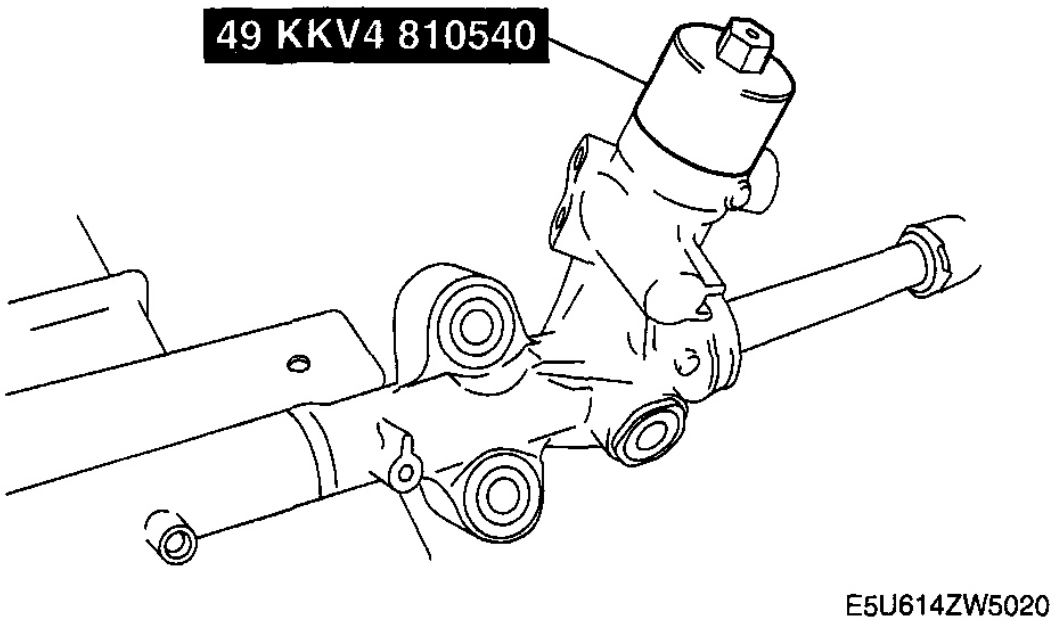


Fig. 22: Removing Pinion Plug Using SST
Courtesy of MAZDA MOTORS CORP.

2. Remove the pinion shaft component from the gear housing.

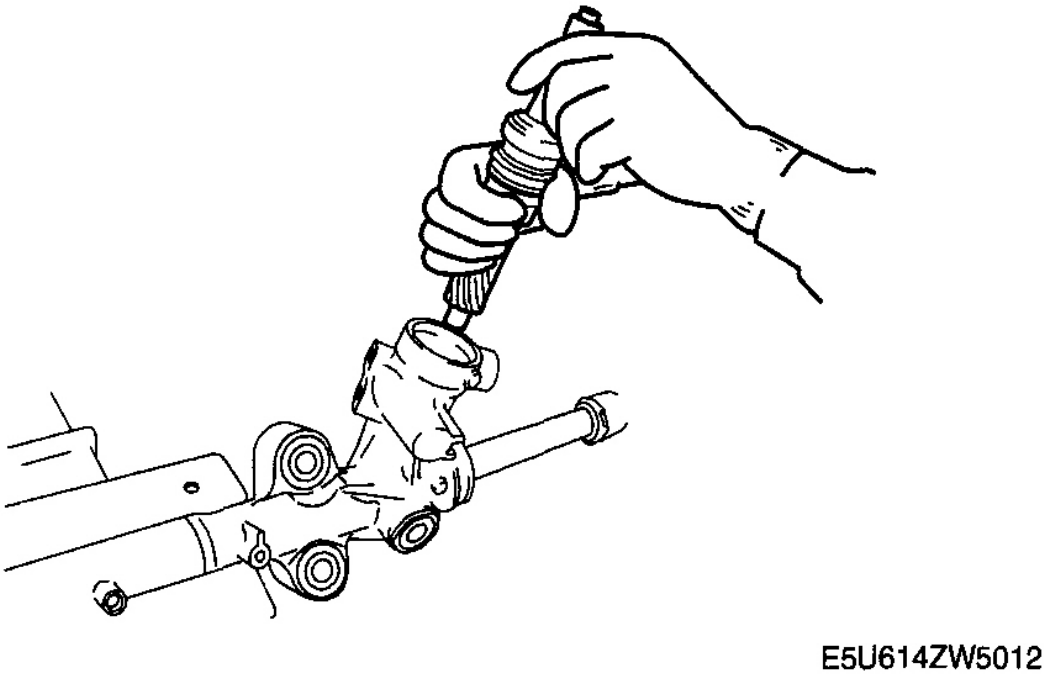


Fig. 23: Removing Pinion Shaft Component From Gear Housing
Courtesy of MAZDA MOTORS CORP.

HOLDER DISASSEMBLY NOTE

1. Remove the crimp from the holder and cylinder ends using a hacksaw.

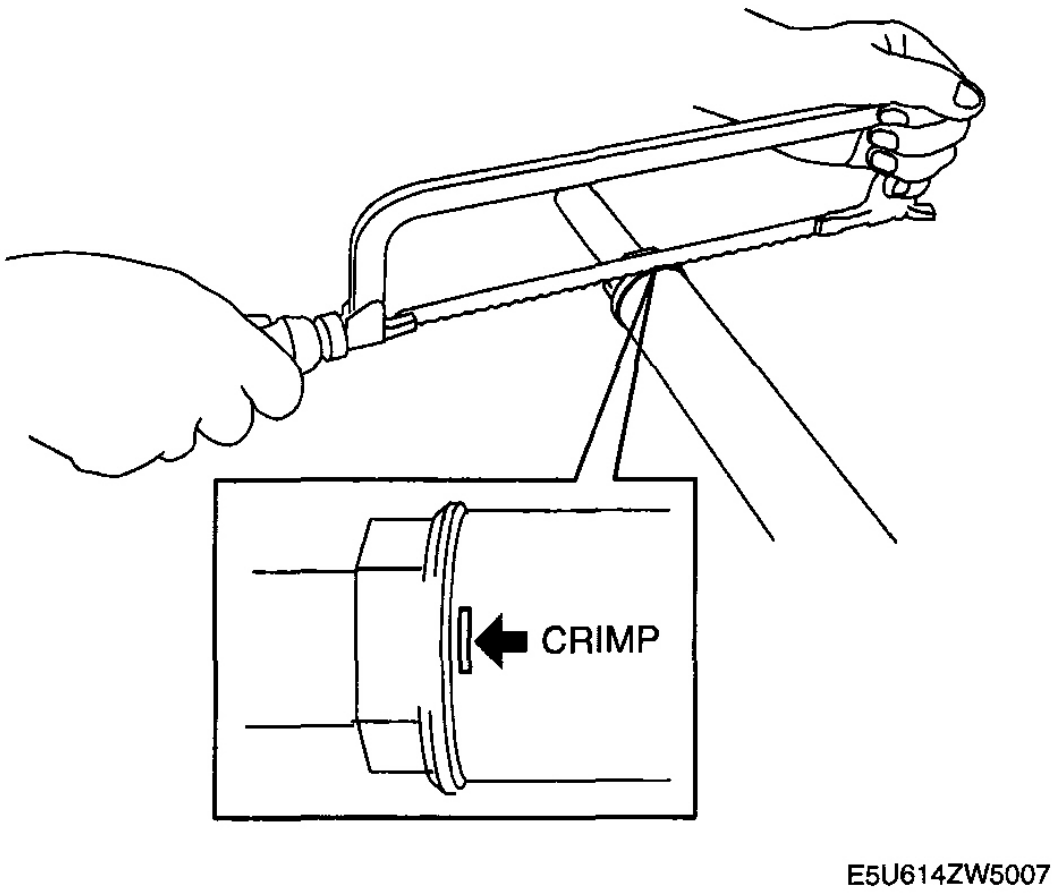


Fig. 24: Removing Crimp From Holder & Cylinder Ends Using Hacksaw
Courtesy of MAZDA MOTORS CORP.

2. Remove the holder using the **SST** .

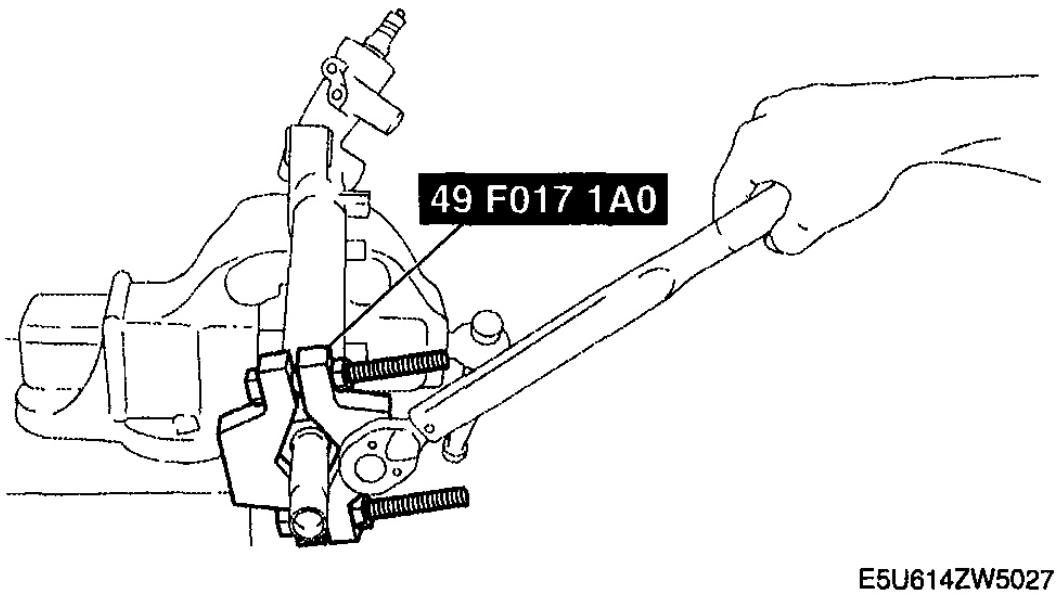


Fig. 25: Removing Holder Using SST
Courtesy of MAZDA MOTORS CORP.

STEERING RACK, OIL SEAL (HOLDER SIDE) DISASSEMBLY NOTE

1. Install the **SST** to the gear housing.
2. Remove the steering rack and oil seal (holder side) using a press.
3. Remove the oil seal (holder side) from the steering rack.

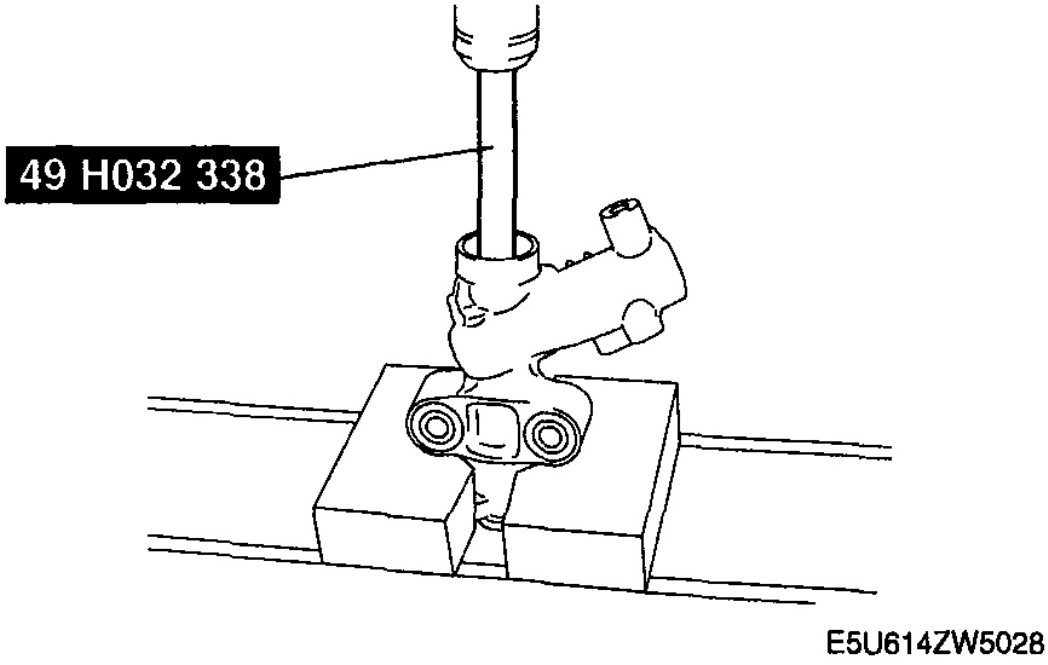


Fig. 26: Removing Steering Rack, Oil Seal (Holder Side)
Courtesy of MAZDA MOTORS CORP.

OIL SEAL (GEAR HOUSING SIDE), INNER GUIDE DISASSEMBLY NOTE

1. Set the **SSTs** as shown.
2. Install the **SST** to the gear housing.
3. Remove the oil seal (gear housing side) and inner guide using a press.

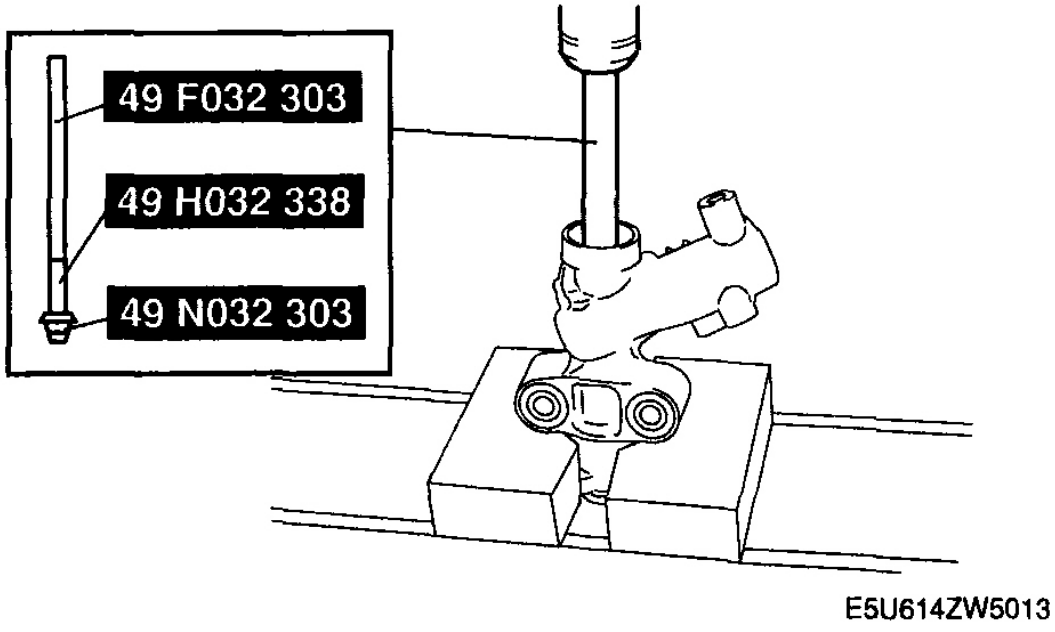


Fig. 27: Disassembling Oil Seal (Gear Housing Side)
Courtesy of MAZDA MOTORS CORP.

MOUNTING RUBBER DISASSEMBLY NOTE

- Press the mounting rubber out from the gear housing using the **SSTs** and a press.

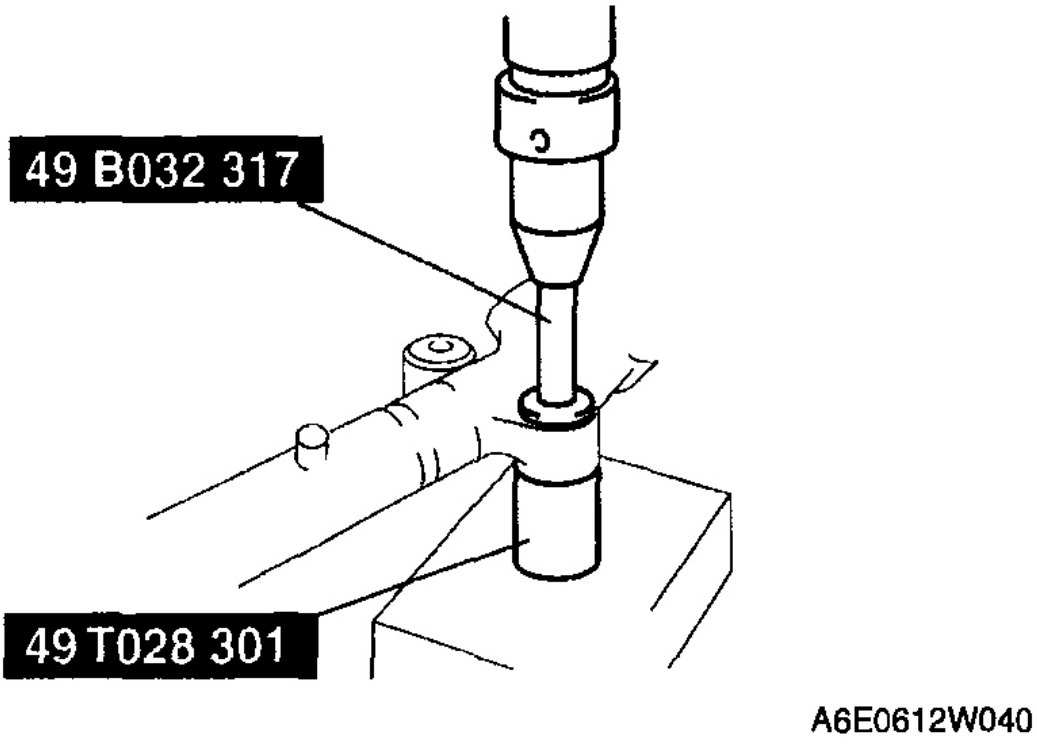


Fig. 28: Disassembling Mounting Rubber
Courtesy of MAZDA MOTORS CORP.

STEERING GEAR AND LINKAGE INSPECTION

RACK INSPECTION

1. Inspect the rack for cracking, damage, and tooth wear. Replace it if necessary.
2. Measure the runout of the rack.

   Steering rack runout

   Near point A: 0.08 mm {0.003 in} max.

   Near point B: 0.15 mm {0.006 in} max.

3. If not within the specification, replace the rack.

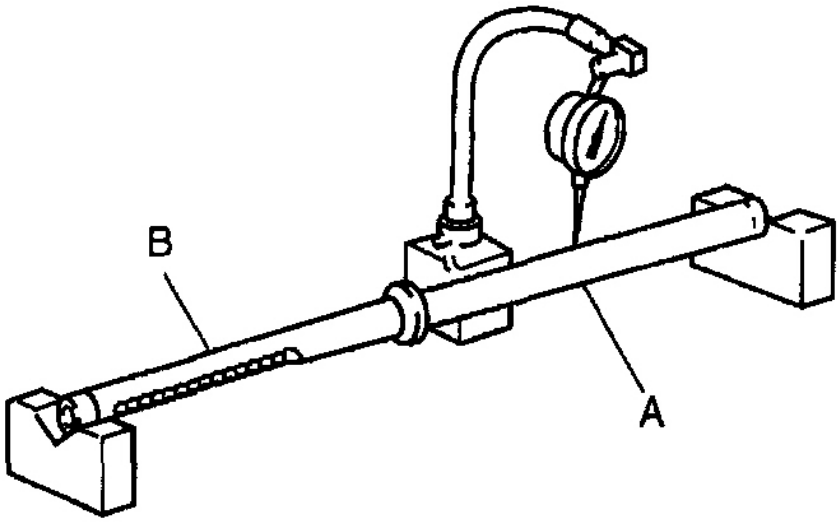


Fig. 29: Measuring Rack Runout
Courtesy of MAZDA MOTORS CORP.

TIE-ROD END INSPECTION

1. Inspect the tie-rod end for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie-rod end if necessary.
3. Rotate the ball joint five times.
4. Measure the rotation torque of the ball joint using the **SST** and a pull scale.

   Tie-rod end rotational torque

   0.4-3.0 N.m {3.5-30.5 kgf.cm, 3.1-26.5 in.lbf}

   [Pull scale reading: 3.5-29.9 N {0.35-3.05 kgf, 0.8-6.7 lbf}]

5. If not within the specification, replace the tie-rod end.

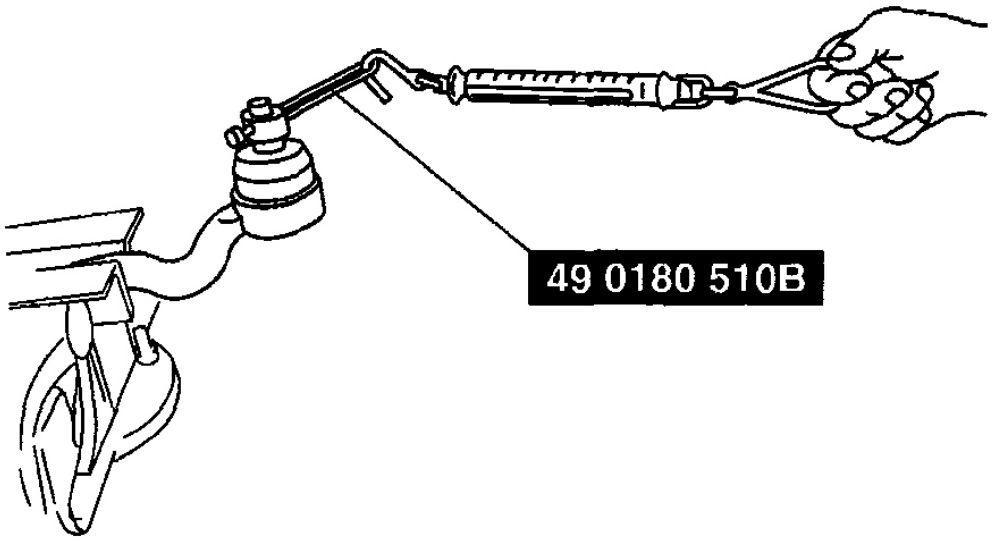


Fig. 30: Measuring Rotational Torque Of Ball Joint
Courtesy of MAZDA MOTORS CORP.

TIE ROD INSPECTION

1. Inspect the tie rod for bending and damage. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie rod if necessary.
3. Swing the tie rod five times.
4. Measure the swinging torque using a pull scale.

   Tie-rod swing torque

   0.1-4.1 N.m {1.1-41.8 kgf.cm, 1.0-36.2 in.lbf}

   [Pull scale reading: 0.6-24.4 N {0.06-2.49 kgf, 0.2-5.4 lbf}]

5. If not within the specification, replace the tie rod.

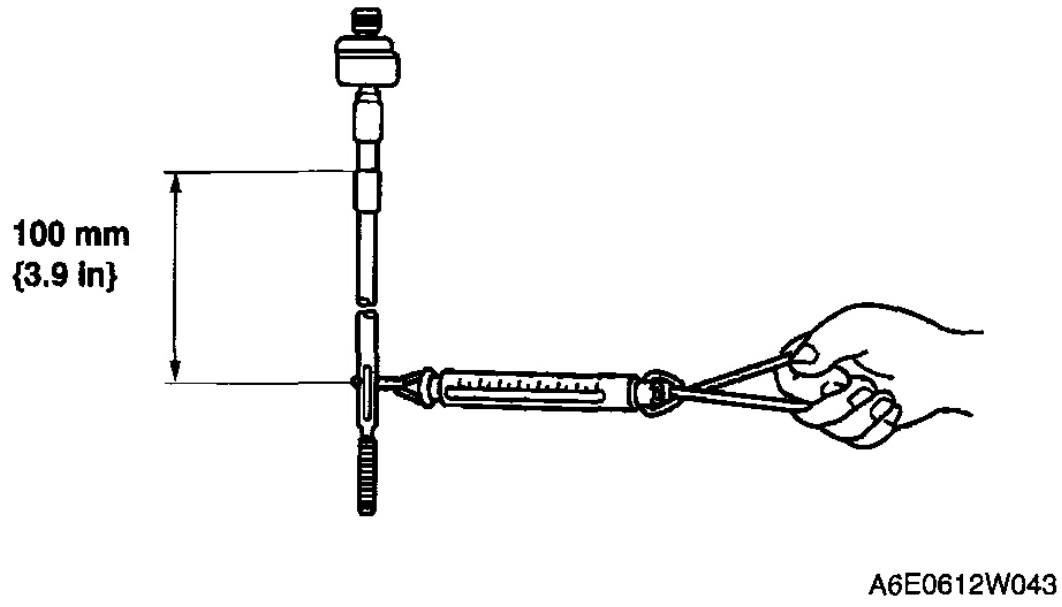
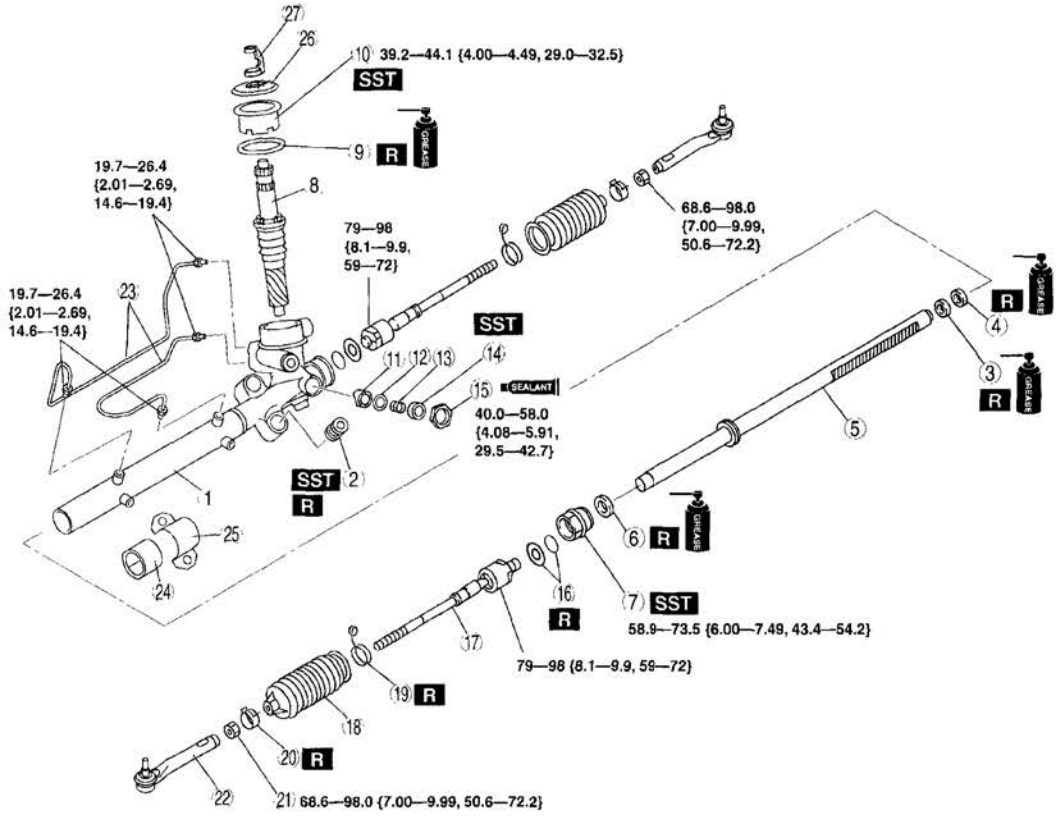


Fig. 31: Measuring Swinging Torque
Courtesy of MAZDA MOTORS CORP.

STEERING GEAR AND LINKAGE ASSEMBLY

CAUTION:
- **Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.**

1. Assemble in the order indicated in **Fig. 32** .



1	Gear housing
2	Mounting rubber
3	Oil seal (gear housing side)
4	Inner guide
5	Steering rack
6	Oil seal (holder side)
7	Holder
8	Pinion shaft component
9	O-ring
10	Pinion plug
11	Support yoke
12	Washer
13	Yoke spring

14	Adjusting cover
15	Locknut (adjusting cover)
16	Washer and O-ring
17	Tie rod
18	Boot
19	Boot band
20	Boot clamp
21	Locknut
22	Tie-rod end
23	Oil pipe
24	Mounting rubber
25	Mounting bracket
26	Dust cover
27	Clip

Fig. 32: View Of Steering Gear & Linkage Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

MOUNTING RUBBER ASSEMBLY NOTE

1. Install the mounting rubber so that two notches of mounting rubber are aligned to the steering rack.

2. Apply soapy water to the rubber part of the mounting rubber.

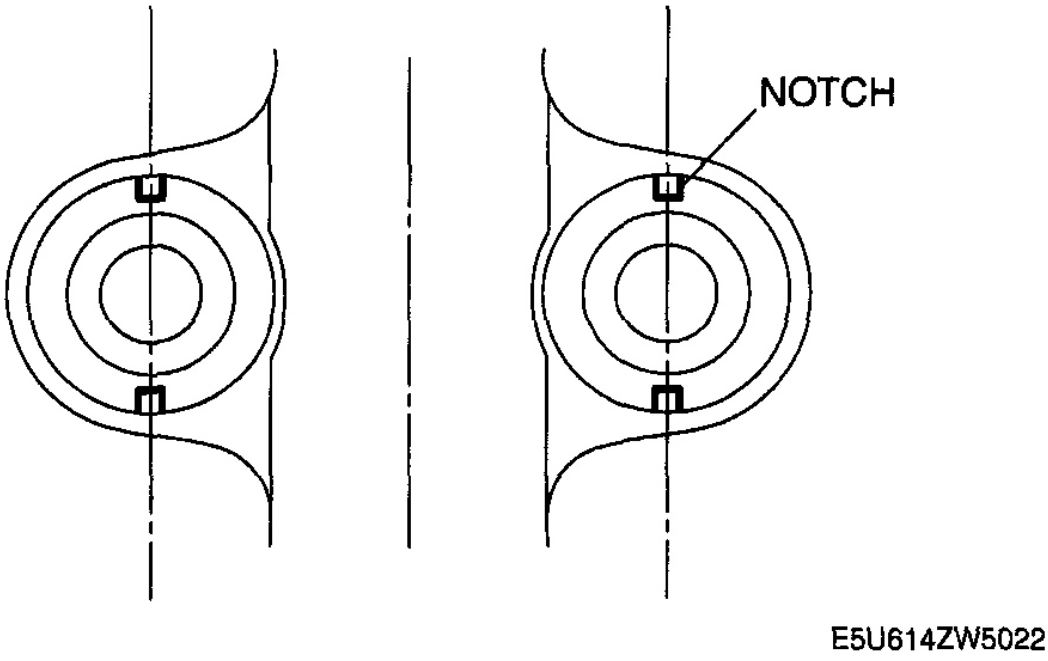


Fig. 33: Aligning Notches Of Mounting Rubber
Courtesy of MAZDA MOTORS CORP.

3. Press the mounting rubber until the mounting rubber end comes out completely from the gear housing using the **SSTs** and a press.

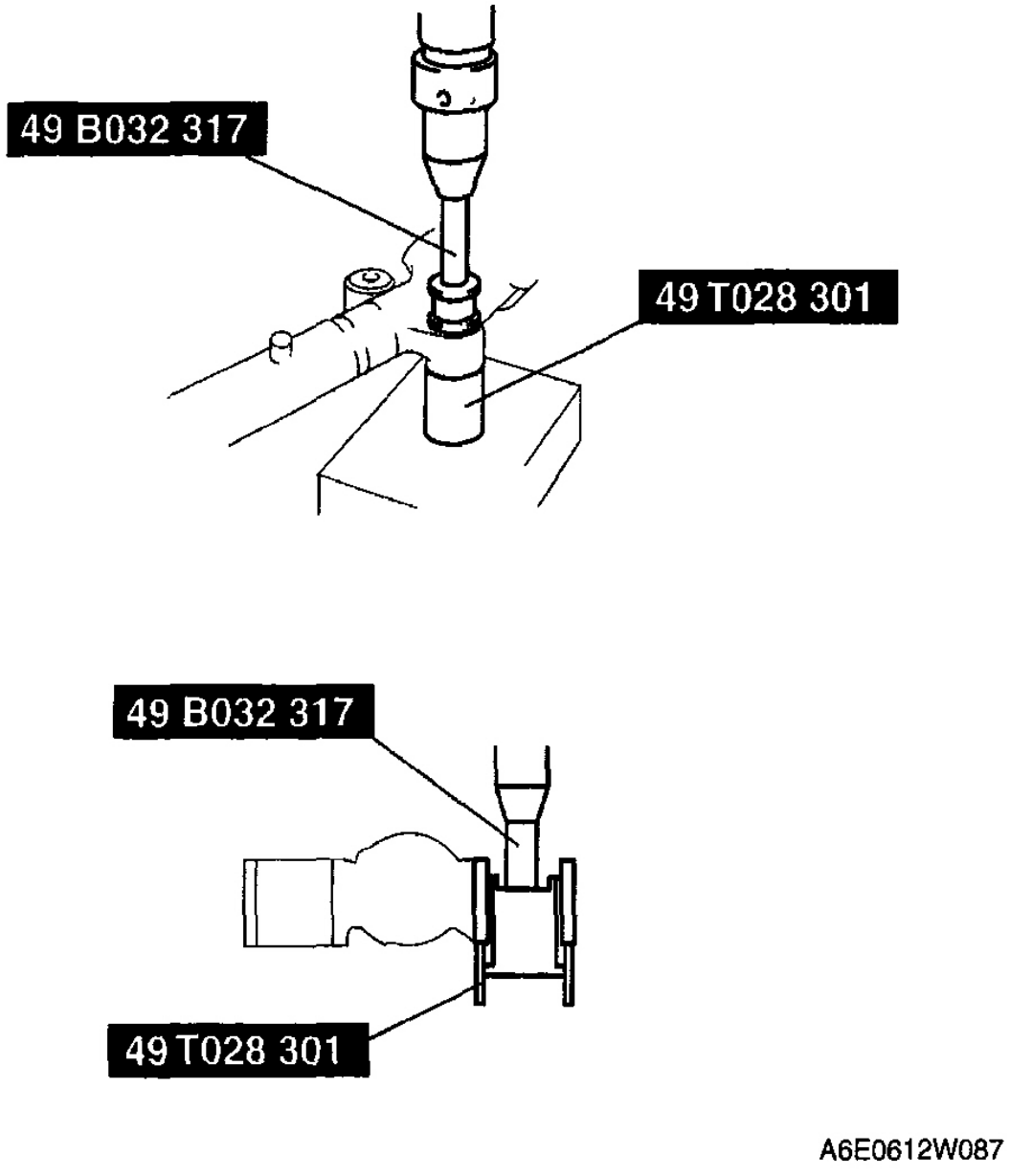


Fig. 34: Installing Mounting Rubber
Courtesy of MAZDA MOTORS CORP.

4. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes out completely from the other side. At this time, the mounting rubber end and steel pipe are aligned.

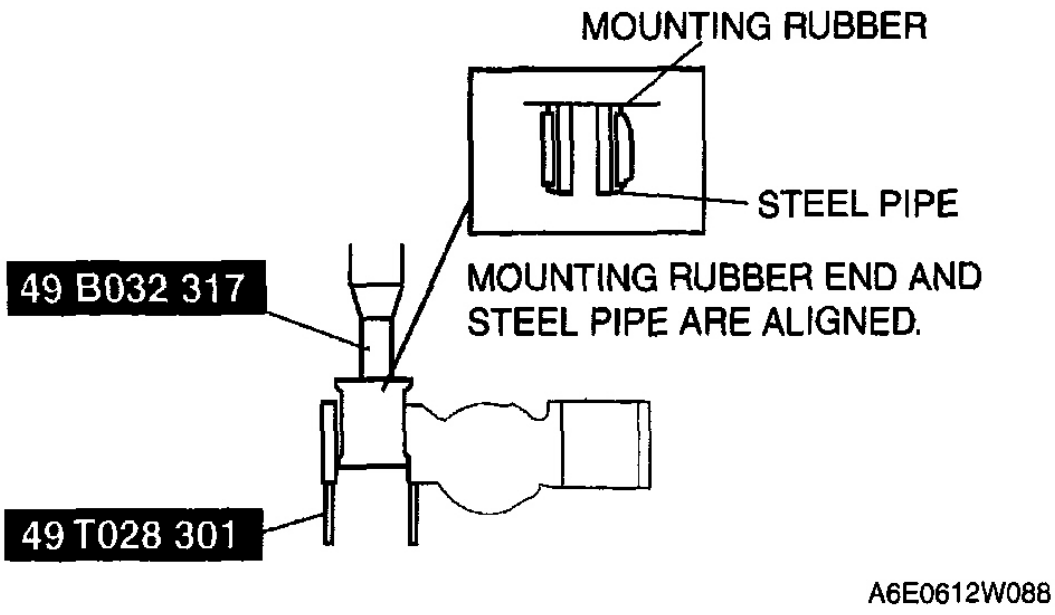


Fig. 35: Aligning Mounting Rubber End & Steel Pipe
Courtesy of MAZDA MOTORS CORP.

STEELING RACK, OIL SEAL (GEAR HOUSING SIDE), INNER GUIDE ASSEMBLY NOTE

1. Apply multi-purpose grease to the oil seal (gear housing side) and Inner guide.
2. Install the plastic bag to the steering rack teeth so as not to damage the oil seal (gear housing side) and the inner guide, and install the oil seal (gear housing side) and the inner guide to the seal. Move the oil seal (gear housing side) and the inner guide together with the plastic bag so that they pass the steering rack teeth, then remove the plastic bag.

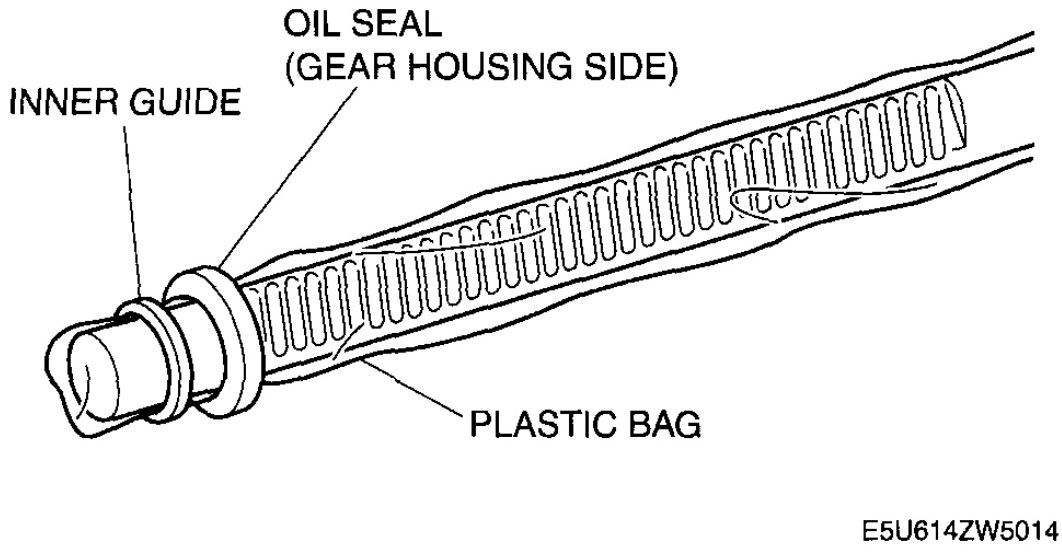


Fig. 36: Installing Plastic Bag To Steering Rack Teeth
Courtesy of MAZDA MOTORS CORP.

3. Put the steering rack into the gear housing.

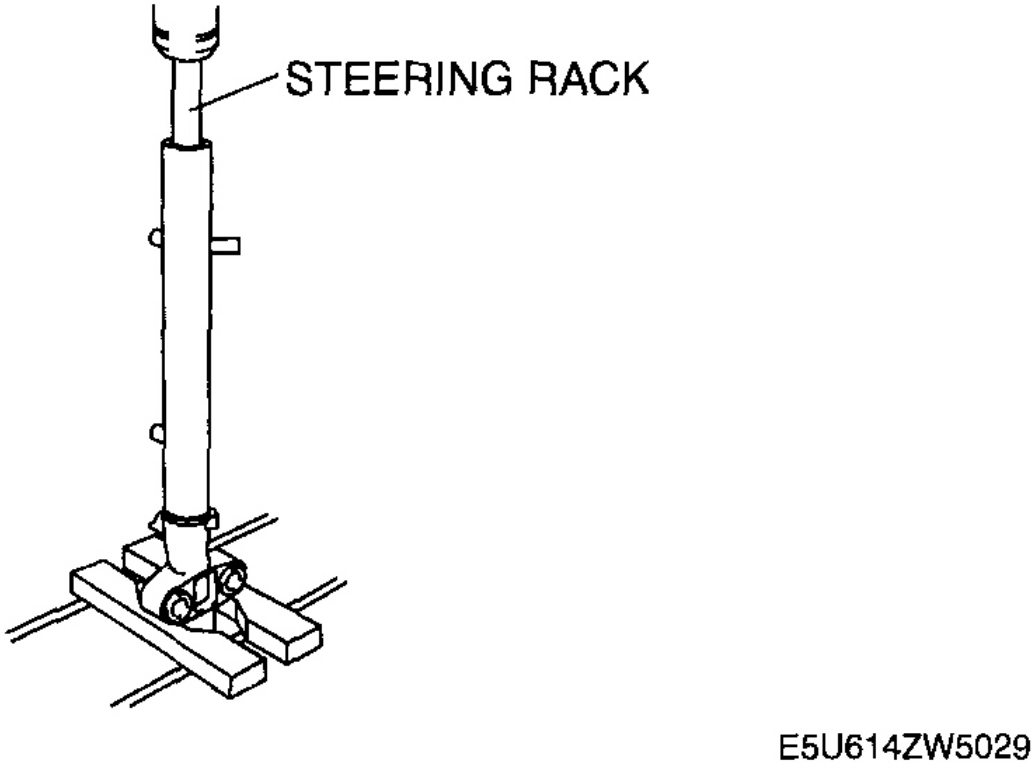


Fig. 37: Putting Steering Rack Into Gear Housing
Courtesy of MAZDA MOTORS CORP.

4. Using a press, press-in the oil seal (gear housing side) and inner guide until the press-in force increases rapidly.

OIL SEAL (HOLDER SIDE), HOLDER ASSEMBLY NOTE

1. Apply multi-purpose grease to the oil seal holder side)
2. Install the plastic bag to the steering rack end so as not to damage the oil seal (holder side) and install the oil seal (holder side) to the seal. Move the oil seal (holder side) together with the plastic bag so that they pass the steering rack end, then remove the plastic bag.
3. Install the holder and move the steering rack until it contacts the housing.

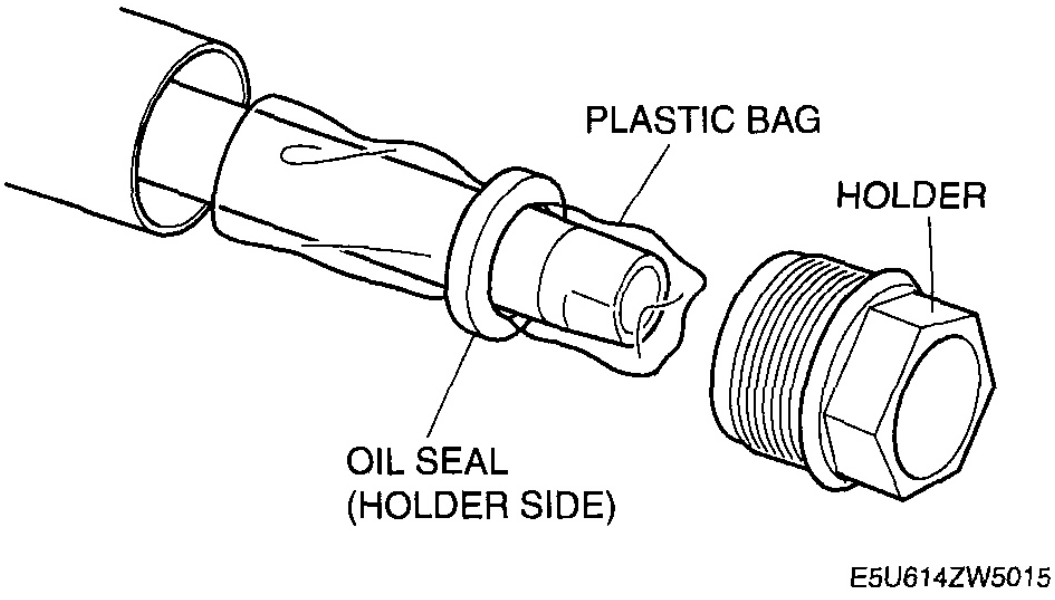


Fig. 38: Identifying Oil Seal (Holder Side), Plastic Bag And Holder
Courtesy of MAZDA MOTORS CORP.

4. Tighten the holder to the specified torque using the **SST** .

   Tightening torque

   58.9-73.5 N.m {6.00-7.49 kgf.m, 43.4-54.2 ft.lbf}

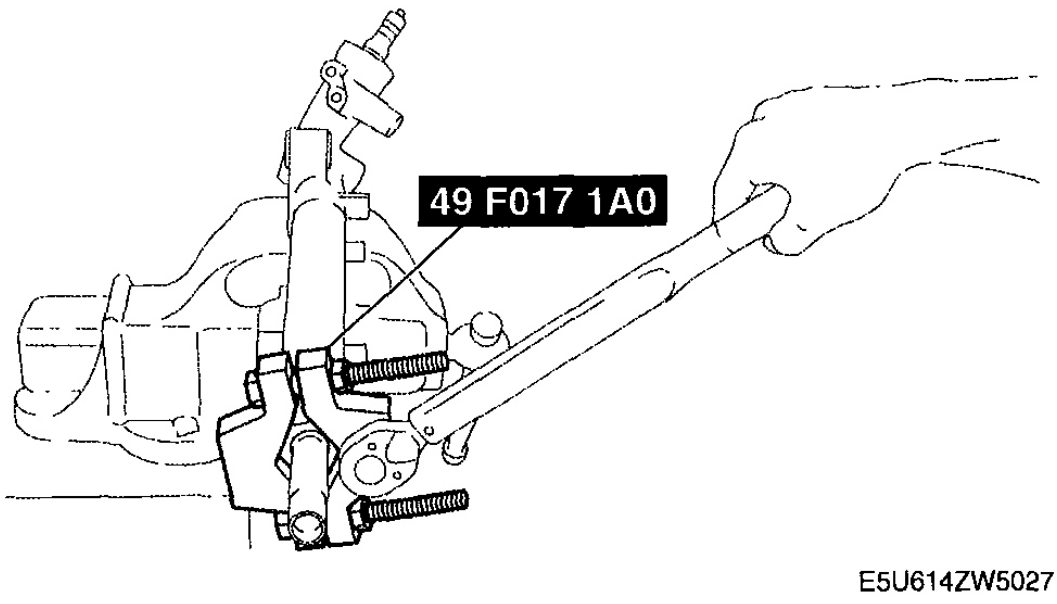


Fig. 39: Tightening Holder To Specified Torque
Courtesy of MAZDA MOTORS CORP.

5. After tightening the holder, crimp the cylinder end as shown in **Fig. 40** using a flathead screwdriver so that the holder does not loosen.

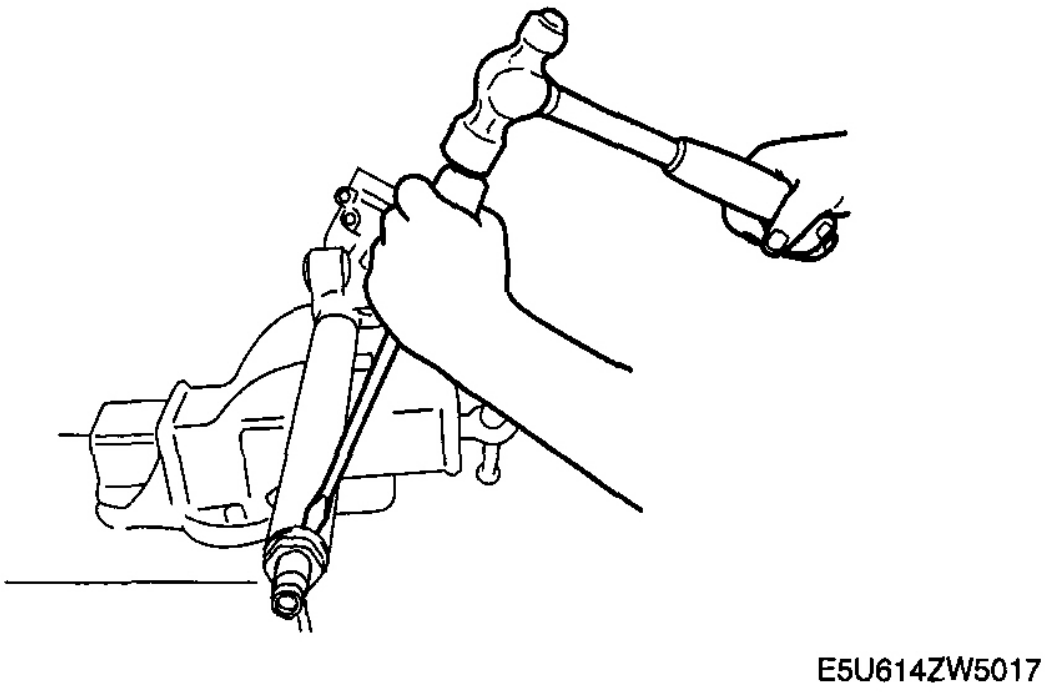


Fig. 40: Crimping Cylinder End Using Flathead Screwdriver
Courtesy of MAZDA MOTORS CORP.

PINION PLUG ASSEMBLY NOTE

1. Tighten the pinion plug using the **SST** .

   Tightening torque

   39.2-44.1 N.m {4.00-4.49 kgf.m, 29.0-32.5 ft.lbf}

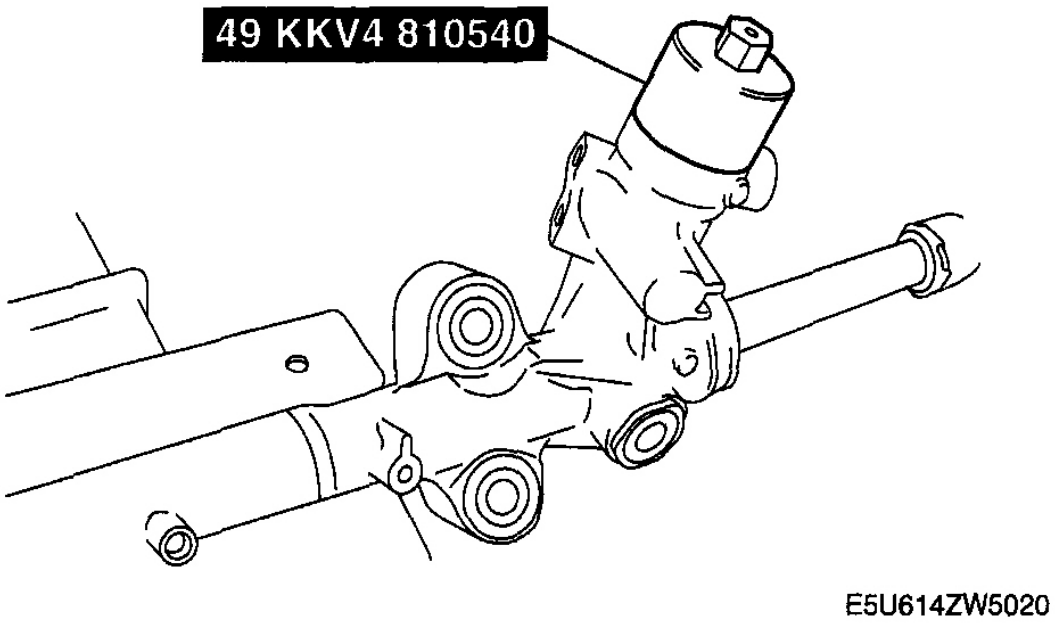


Fig. 41: Tightening Pinion Plug Using SST
Courtesy of MAZDA MOTORS CORP.

ADJUSTING COVER ASSEMBLY NOTE

1. Set the rack to the center position.
2. Tighten the adjusting cover to **20 N.m {2.0 kgf.m, 15 ft.lbf}** .
3. Rotate the pinion shaft thoroughly three times to make sure that the pinion shaft and the rack engage smoothly, then loosen the adjusting cover.
4. Retighten the adjusting cover to **4.9 N.m {0.5 kgf.m, 3.6 ft.lbf}** , then loosen it about **0 to 15°** using the **SST** .

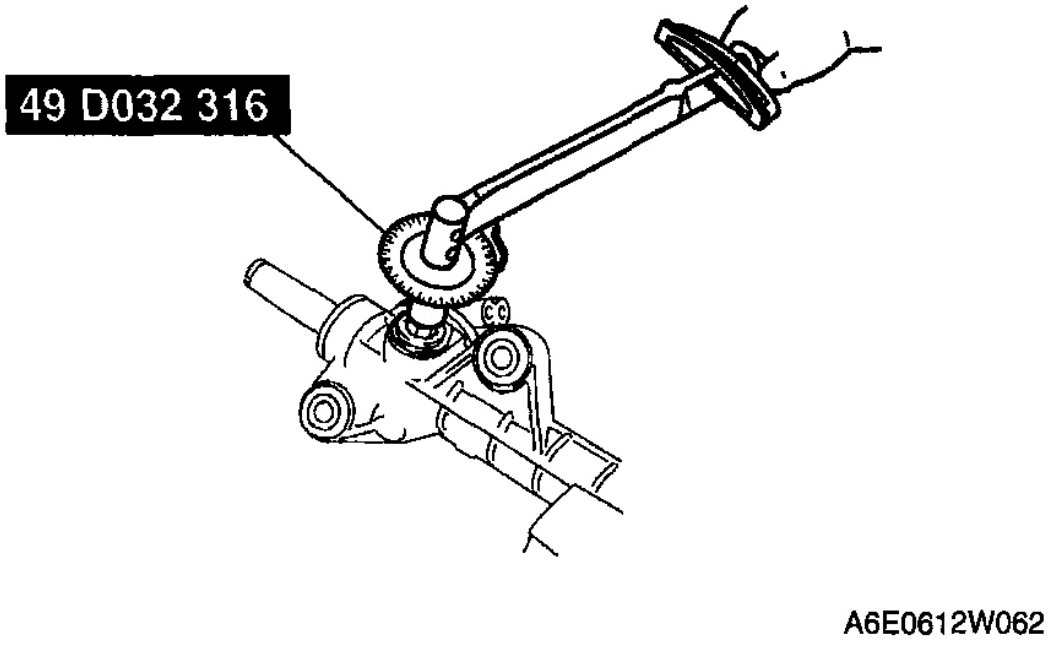


Fig. 42: Tightening Adjusting Cover
Courtesy of MAZDA MOTORS CORP.

5. Measure the rotation torque in the range **+/-90+/-** from the pinion gear neutral point using a **SST** and a pull-scale.
   - If not within the specification, repeat **Steps 2 - 4** .

   Pinion shaft rotation torque

   Center of rack +/-90+/-: 0.98-1.38 N.m {10.0-14.0 kgf.cm, 8.7-12.2 in.lbf}

   [Pull scale reading: 9.8-13.8 N {1.00-1.40 kgf, 2.21-3.10 lbf}]

   Except center of rack +/-90+/-: Less than 1.87 N.m {19.1 kgf.cm, 16.6 in.lbf}

   [Pull scale reading: Less than 19.5 N {1.99 kgf, 4.38 lbf}]

6. Apply sealant to the thread of the locknut.

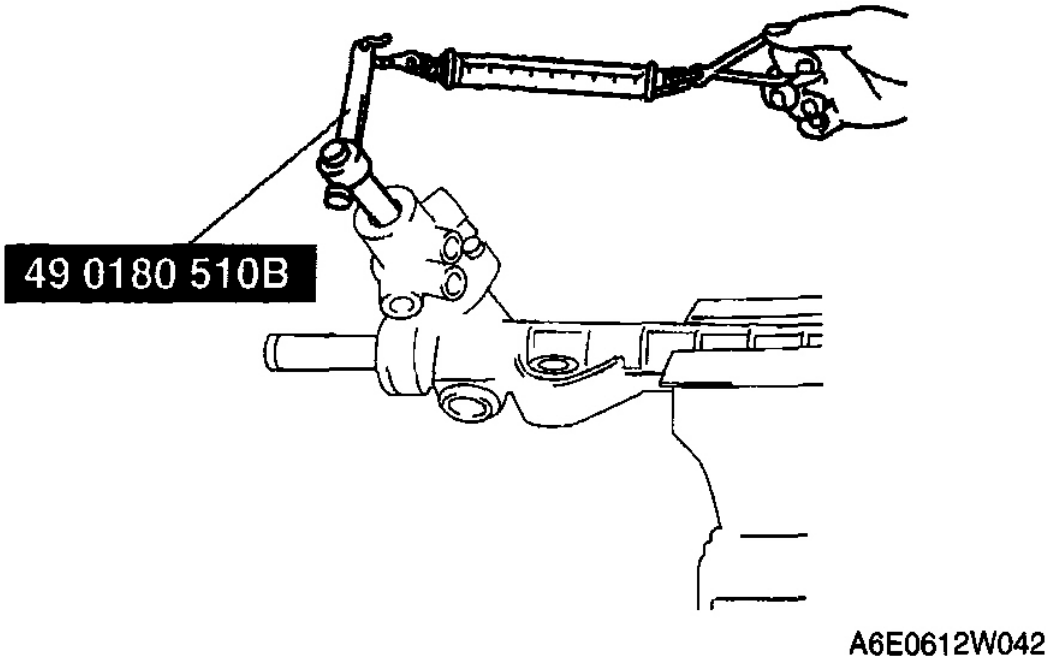


Fig. 43: Measuring Rotation Torque From Pinion Gear
Courtesy of MAZDA MOTORS CORP.

7. Hold the adjusting cover so as not to rotate and tighten the locknut.

   Tightening torque

   40.0-58.0 N.m {4.08-5.91 kgf.m, 29.5-42.7 ft.lbf}

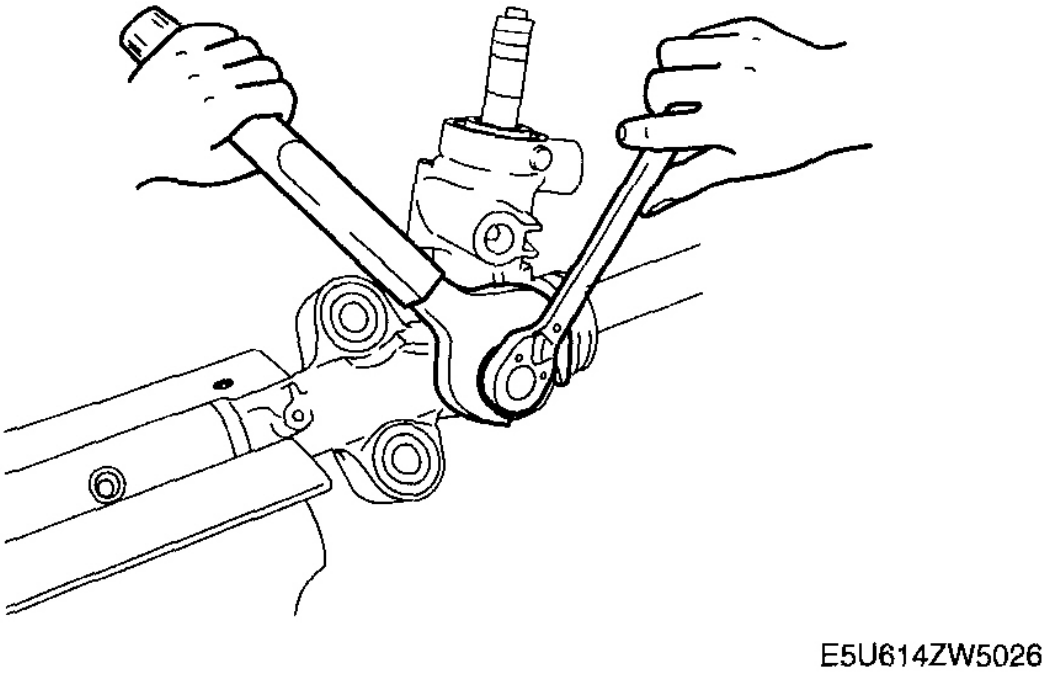


Fig. 44: Tightening Locknut
Courtesy of MAZDA MOTORS CORP.

HERMETIC SEALING INSPECTION

1. Connect the **SSTs** to the power cylinder section of the gear housing.
2. Apply **53.3 kPa {400 mmHg, 15.7 inHg}** vacuum with a vacuum pump and verify that it is held for at least **30 seconds** .
3. If the vacuum is not held, replace the oil seal.

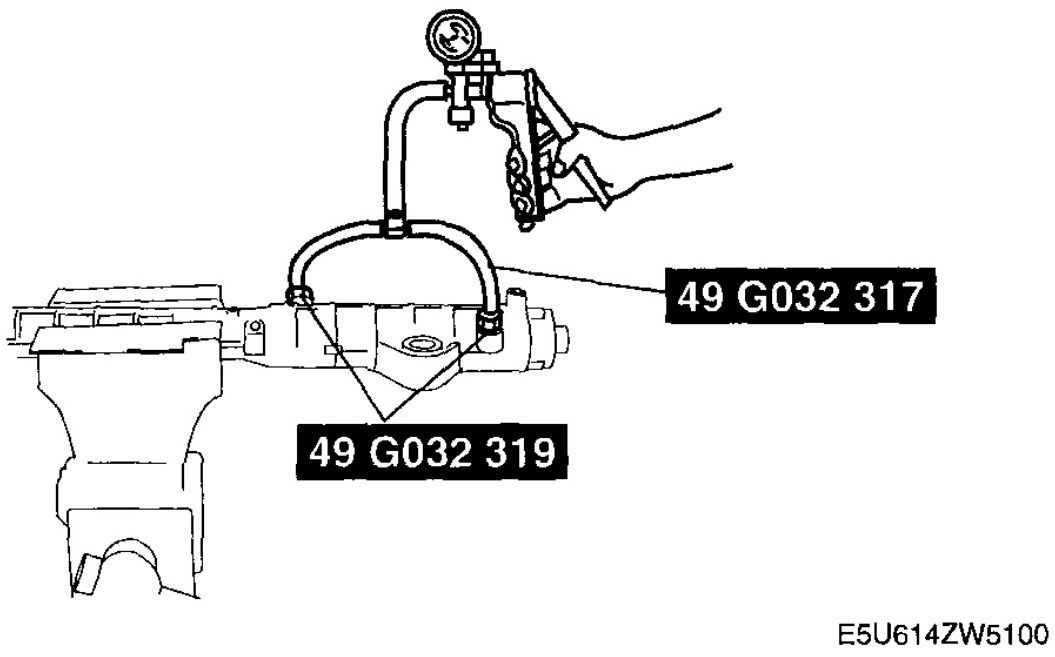
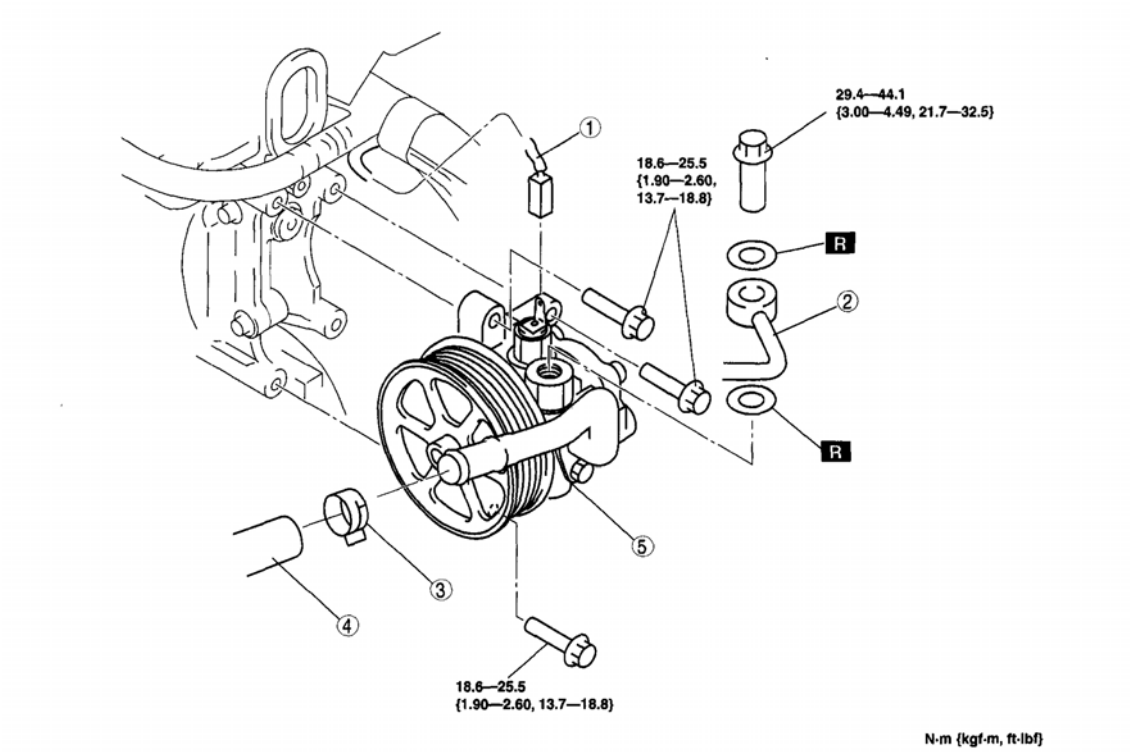


Fig. 45: Inspecting Hermetic Sealing
Courtesy of MAZDA MOTORS CORP.

POWER STEERING OIL PUMP REMOVAL/INSTALLATION

1. Remove the drive belt. (See **DRIVE BELT REPLACEMENT [LF]** .)
2. Remove in the order indicated in **Fig. 46** .
3. Install in the reverse order of removal.



1	Pressure switch connector
2	Pressure pipe
3	Hose band
4	Return hose
5	Power steering oil pump

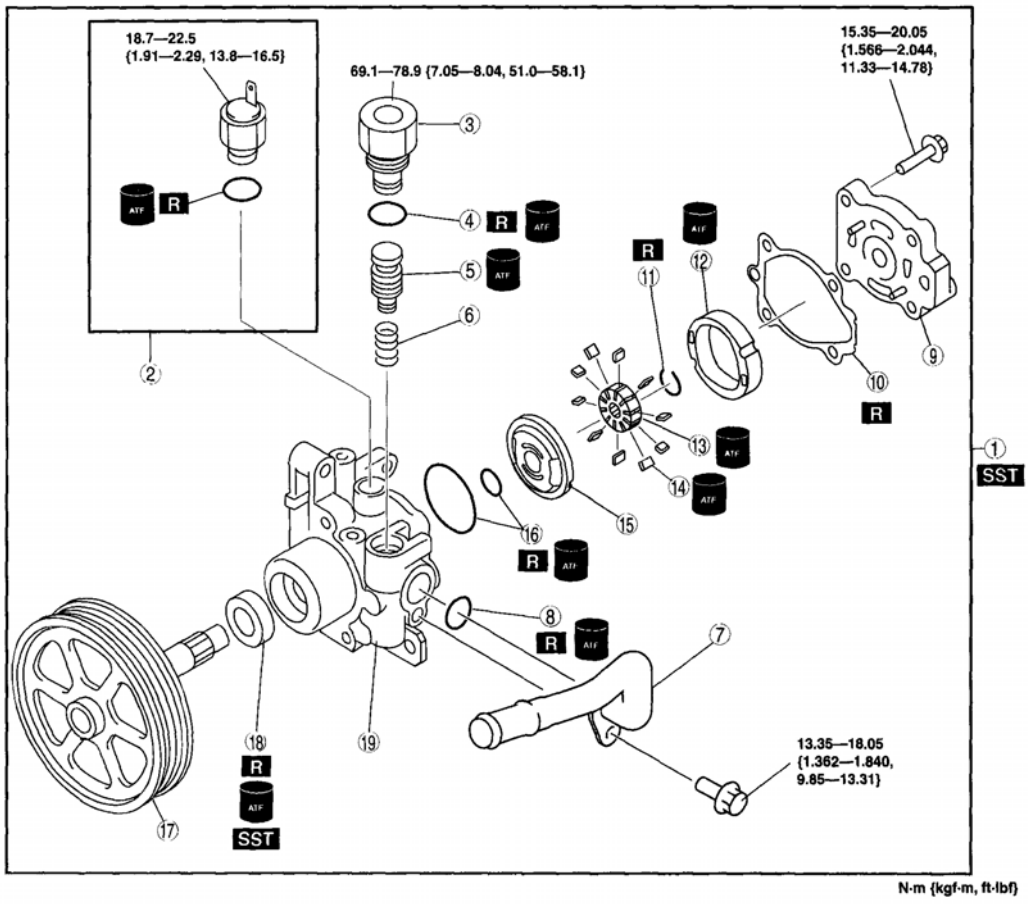
Fig. 46: View Of Power Steering Oil Pump Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY

NOTE:

- **The following procedure is for replacement of the O-ring and oil seal only. Replace the pump component if other repairs are necessary.**

1. Disassemble in the order indicated in **Fig. 47** .
2. Assemble in the reverse order of disassembly.



1	Power steering oil pump component
2	Pressure switch component
3	Pressure pipe fitting
4	O-ring
5	Control valve
6	Spring
7	Suction pipe
8	O-ring
9	Rear pump body
10	Gasket

11	Clip
12	Cam ring
13	Rotor
14	Vane
15	Side plate
16	O-rings
17	Shaft component
18	Oil seal
19	Front pump body

Fig. 47: Exploded View Of Power Steering Oil Pump (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

POWER STEERING OIL PUMP COMPONENT DISASSEMBLY NOTE

1. Secure the power pressure oil pump using the **SST** .

CAUTION:
- **Use the SST to prevent damage to the pump when securing it in a vise.**

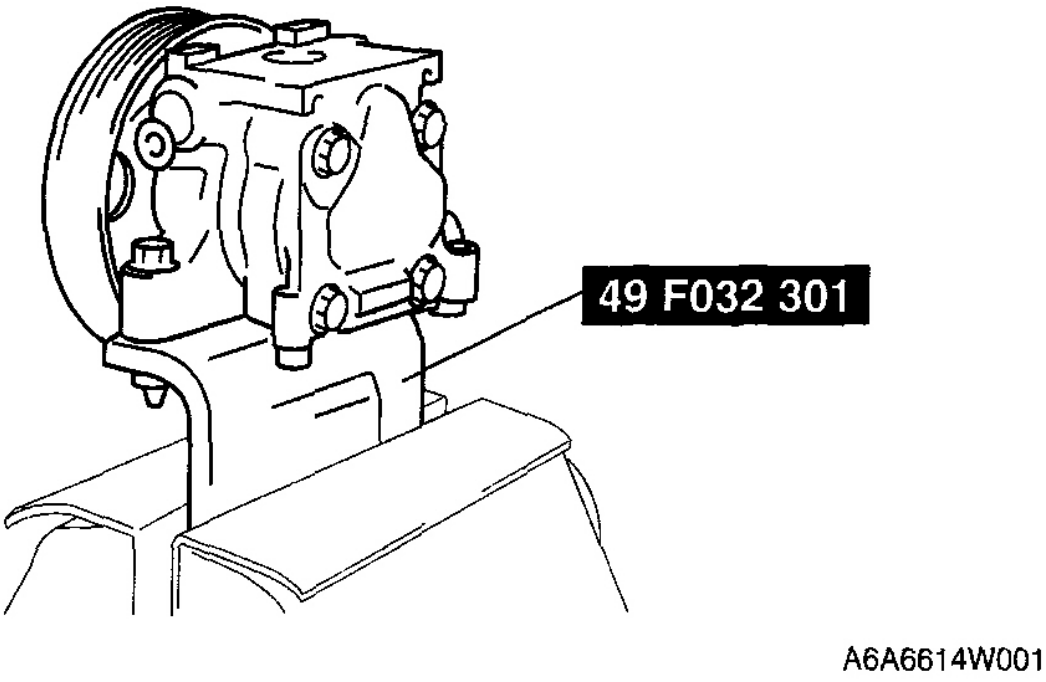


Fig. 48: Securing Power Pressure Oil Pump Using SST
Courtesy of MAZDA MOTORS CORP.

OIL SEAL ASSEMBLY NOTE

1. Install the oil seal in the front pump body using the **SST** and plastic hammer.

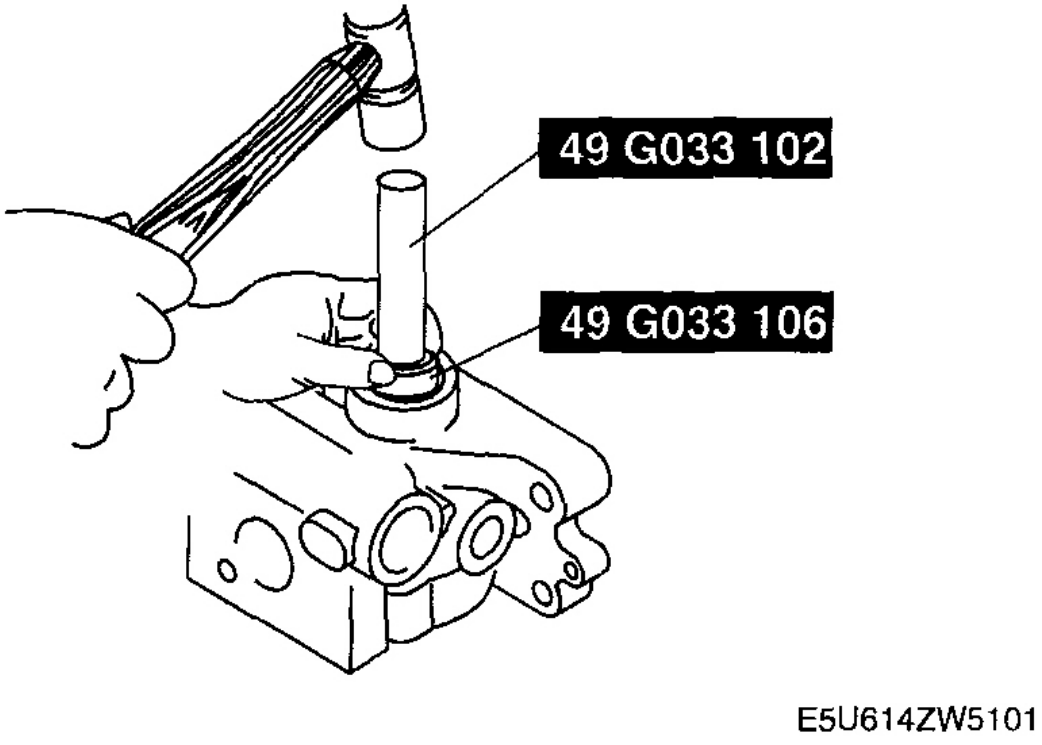


Fig. 49: Installing Oil Seal In Front Pump Body Using SST & Hammer
Courtesy of MAZDA MOTORS CORP.

VANE ASSEMBLY NOTE

1. Place the vanes in the rotor with the rounded edges contacting the cam.

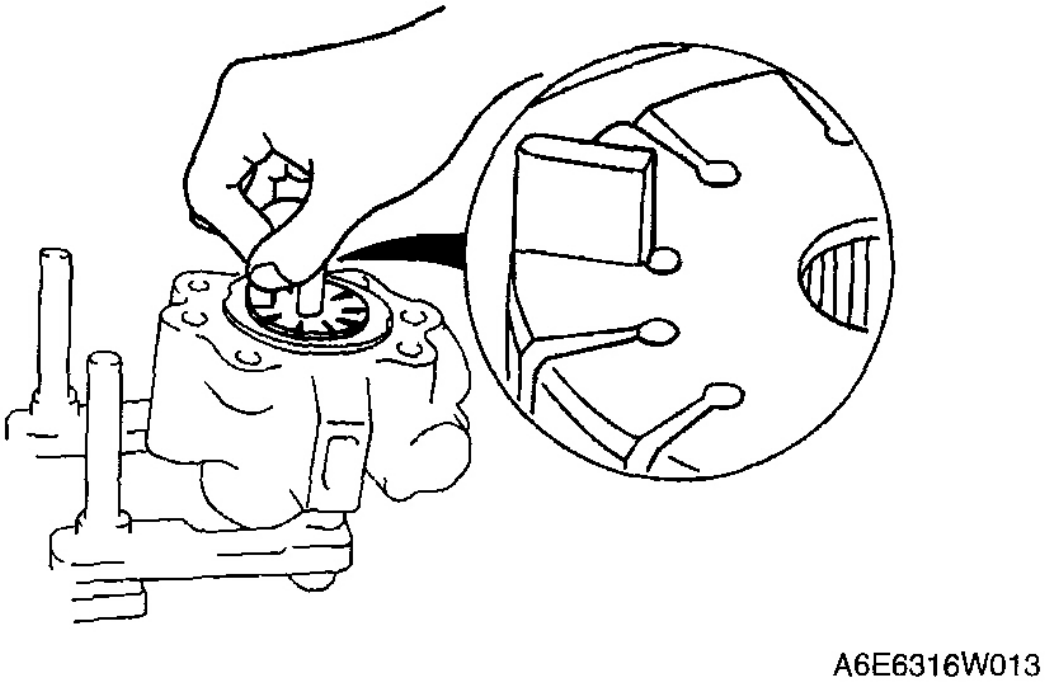


Fig. 50: Placing Vanes In Rotor With Rounded Edges Contacting Cam
Courtesy of MAZDA MOTORS CORP.

CAM RING ASSEMBLY NOTE

1. Install the cam ring in the front pump body with the mark facing upward.

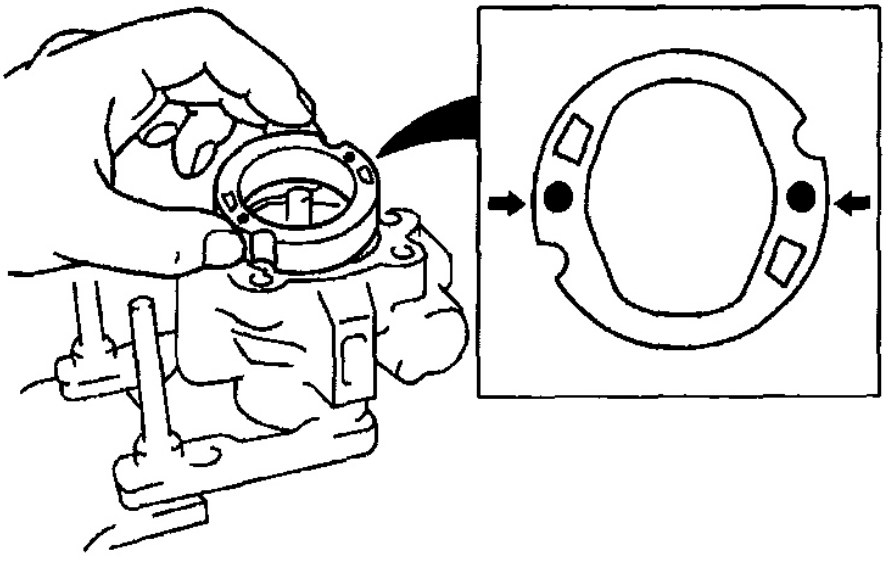


Fig. 51: Installing Cam Ring In Front Pump Body
Courtesy of MAZDA MOTORS CORP.

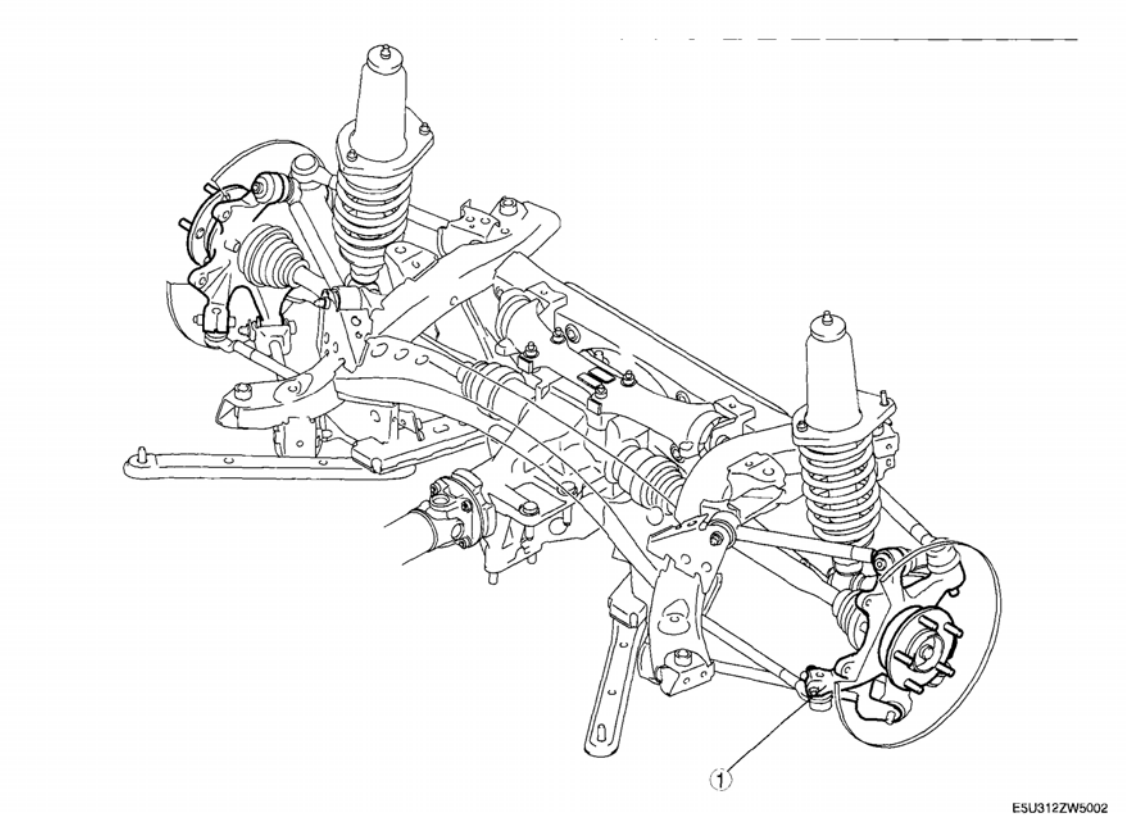
REAR PUMP BODY ASSEMBLY NOTE

1. After installing the rear body, manually turn the shaft to verify that it rotates smoothly.

2008 DRIVELINE/AXLES

Rear Axle - MX-5 Miata

REAR AXLE LOCATION INDEX



1	Wheel hub, rear knuckle

Fig. 1: Identifying Rear Axle Assembly
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB COMPONENT INSPECTION

WHEEL BEARING LOOSENESS INSPECTION

1. Install the magnetic vase and dial gauge as shown in **Fig. 2** , and inspect the wheel bearing for axial looseness.
   - If it exceeds the maximum specification, replace the wheel hub component.

   Maximum rear wheel bearing play

   0.05 mm {0.002 in}

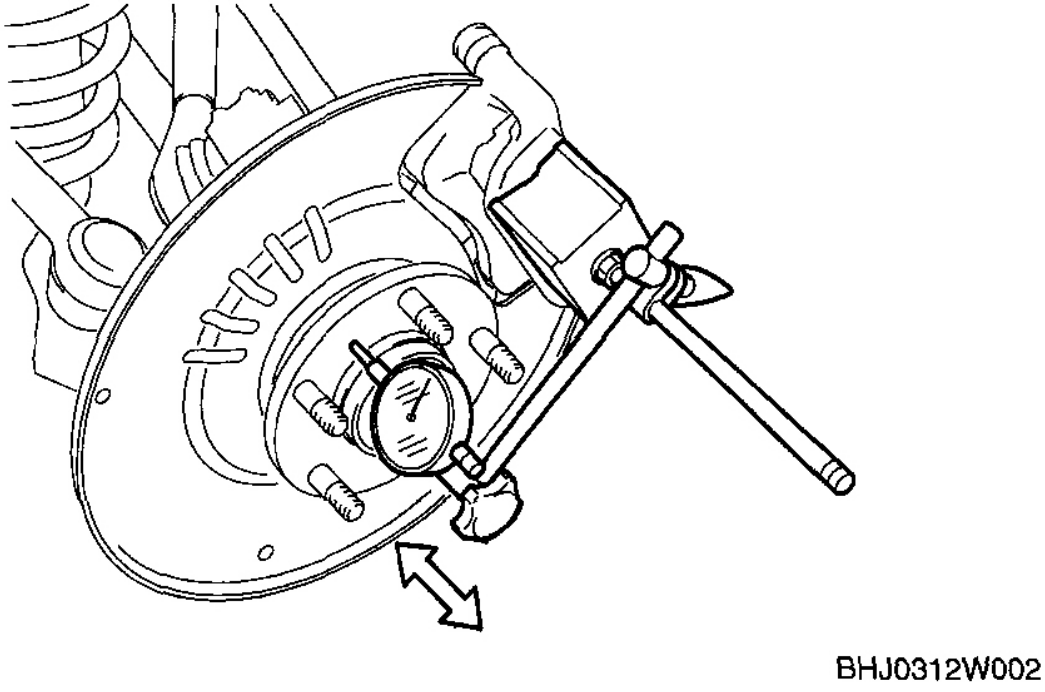


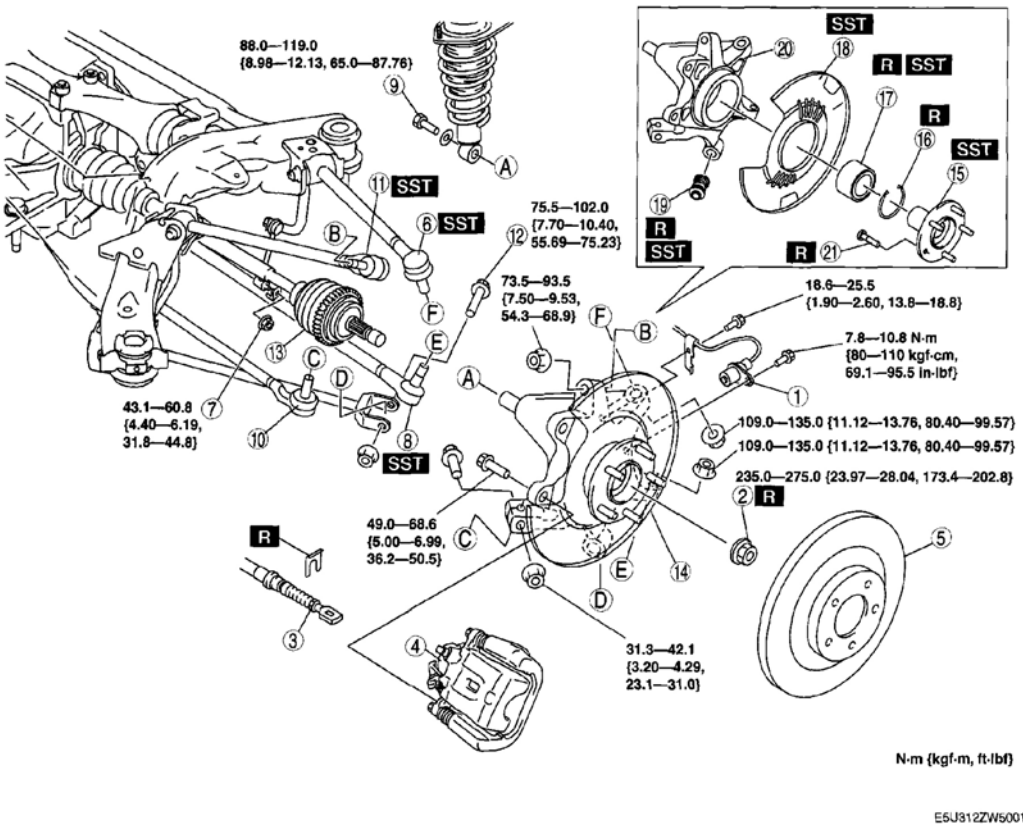
Fig. 2: View Of Magnetic Vase & Dial Gauge
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB COMPONENT REMOVAL/INSTALLATION

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 by mistake while servicing the vehicle.**

1. Remove in the order indicated in **Fig. 3** .
2. Install in the reverse order of removal.
3. After installation, inspect rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



1	ABS wheel-speed sensor
2	Locknut
3	Parking brake cable
4	Brake caliper component
5	Disc plate
6	Rear lateral link (upper) ball joint
7	Stabilizer control link nut (lower)
8	Rear lateral link (lower) ball joint
9	Shock absorber bolt (lower)
10	Toe control link ball joint
11	Rear trailing link (upper) ball joint

12	Rear trailing link (lower) bolt (outer side)
13	Rear drive shaft
14	Rear knuckle component
15	Wheel hub component
16	Retaining ring
17	Wheel bearing
18	Dust cover
19	Bushing
20	Rear knuckle
21	Wheel hub bolt

Fig. 3: Identifying Wheel Hub Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

LOCKNUT REMOVAL NOTE

1. Lock the disc plate by applying the brakes.
2. Knock the crimped portion of the locknut outward using a chisel and a hammer.
3. Remove the locknut.

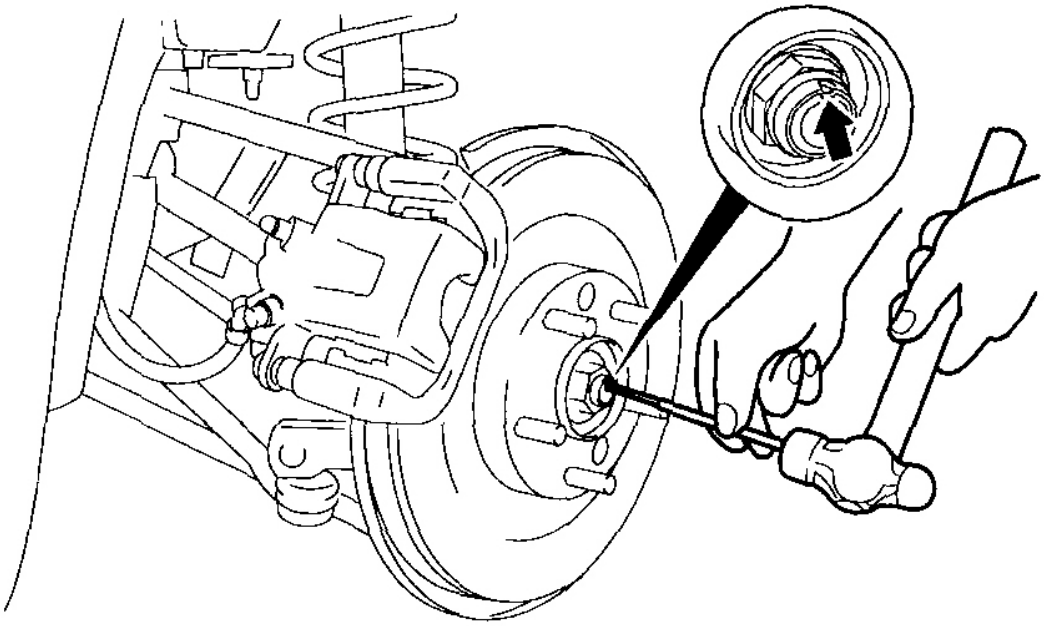


Fig. 4: Knocking Out Crimped Portion Of Locknut Outward Using Chisel & Hammer
Courtesy of MAZDA MOTORS CORP.

BRAKE CALIPER COMPONENT REMOVAL NOTE

1. Suspend the brake caliper component using a cable or equivalent.

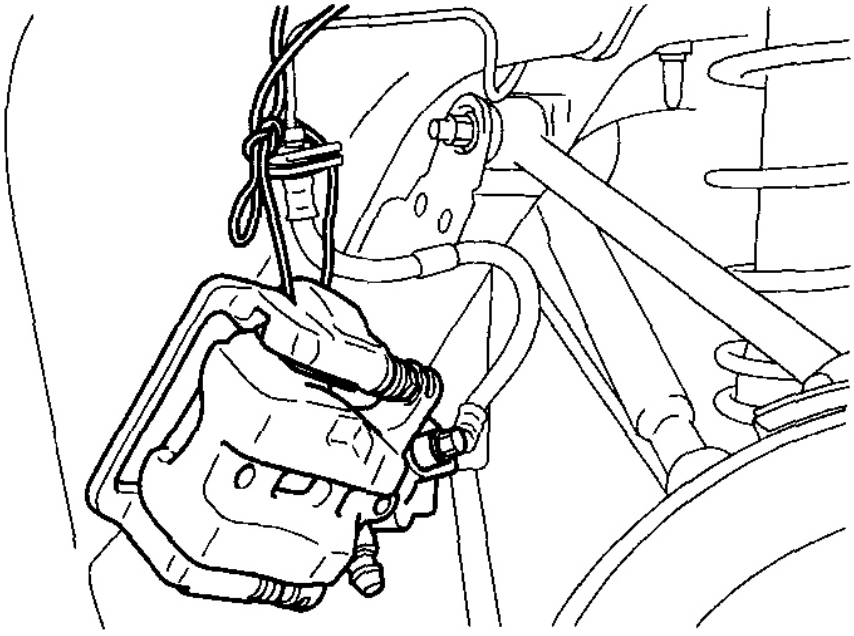
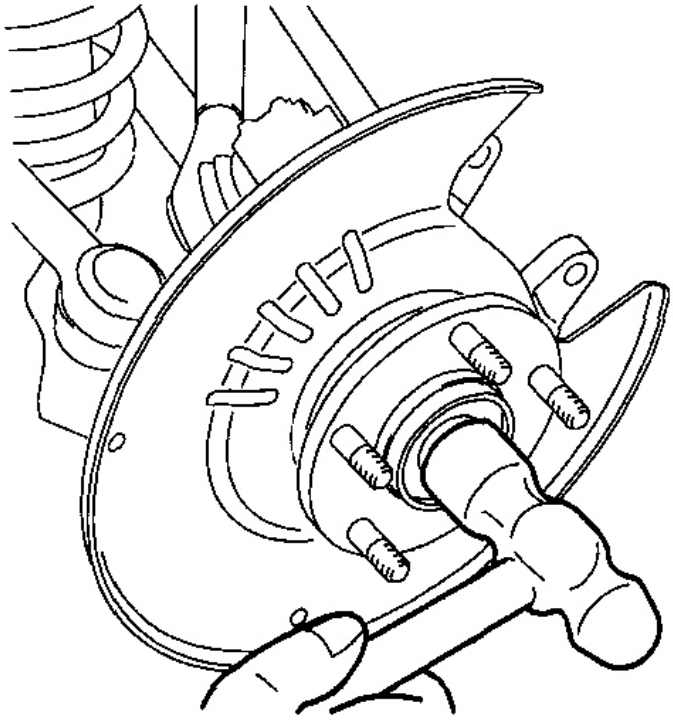


Fig. 5: View Of Brake Caliper Components
Courtesy of MAZDA MOTORS CORP.

REAR DRIVE SHAFT REMOVAL NOTE

1. Temporarily install a spare nut onto the end of the rear drive shaft.
2. Tap the nut with a copper hammer to loosen the drive shaft from the wheel hub.
3. Separate the rear drive shaft from the wheel hub.



BHJ0312W005

Fig. 6: Separating Rear Drive Shaft From Wheel Hub
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB COMPONENT REMOVAL NOTE

1. Wind the **SST** and backing plate contact area with packing tape two times.
2. Remove the wheel hub component using the **SSTs.**

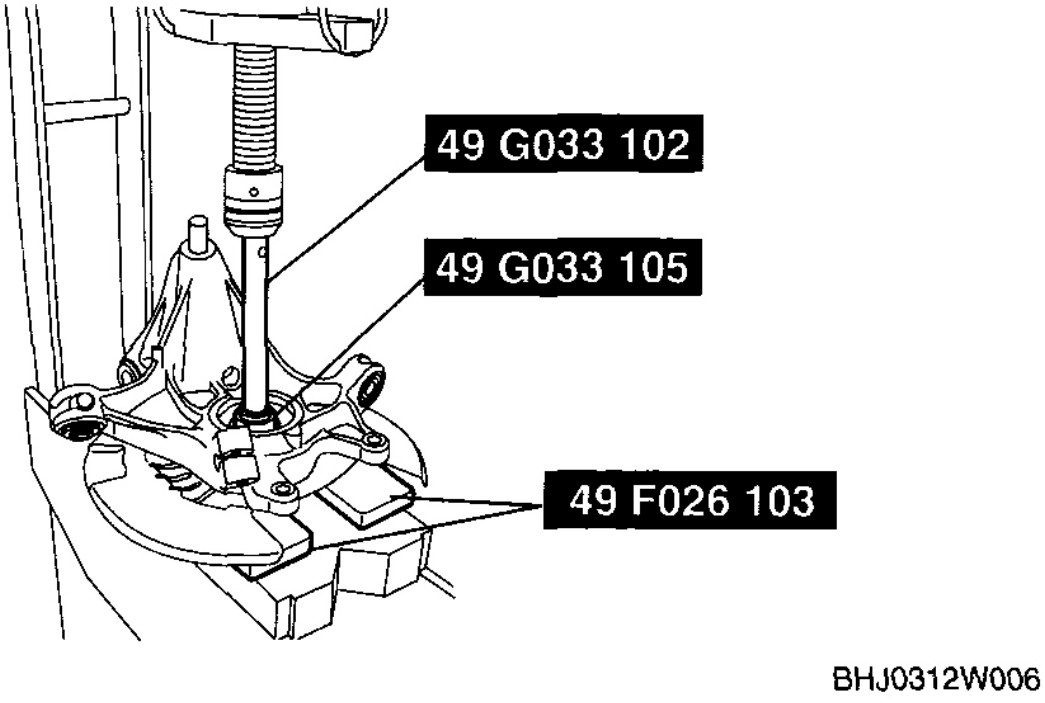


Fig. 7: Removing Wheel Hub Component Using SST's
Courtesy of MAZDA MOTORS CORP.

3. If the bearing inner race remains on the wheel hub component, use a chisel to secure a sufficient space for installing the **SST** between wheel hub component and bearing inner race.

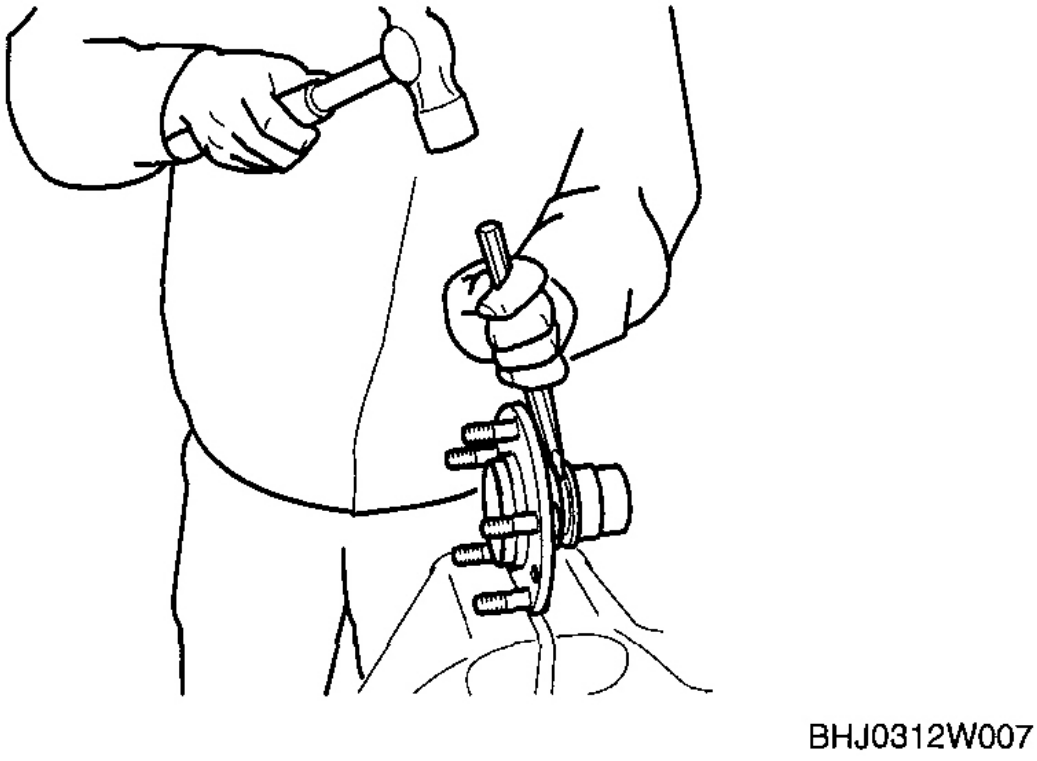


Fig. 8: Removing Inner Race Remains On Wheel Hub Component
Courtesy of MAZDA MOTORS CORP.

4. Remove the bearing inner race using the **SST.**
5. After removing the bearing, repair any backing plate deformation.

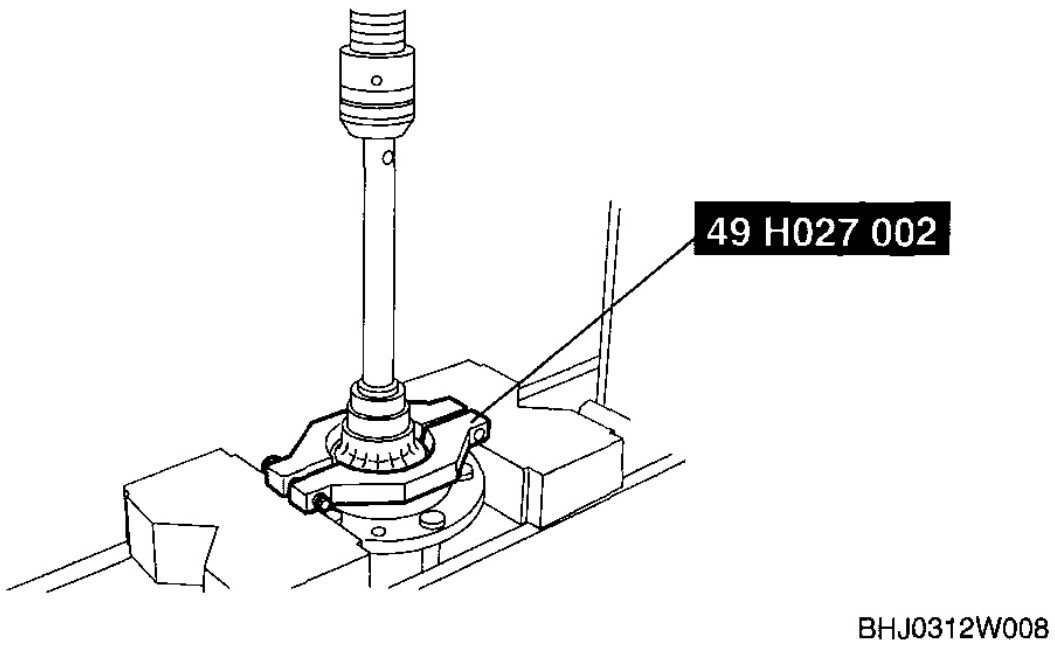


Fig. 9: Removing Bearing Inner Race Using SST
Courtesy of MAZDA MOTORS CORP.

WHEEL BEARING REMOVAL NOTE

1. Wind the **SST** and backing plate contact area with packing tape two times.
2. Remove the wheel bearing from the rear knuckle using the **SSTs.**
3. After removing the bearing, repair any backing plate deformation.

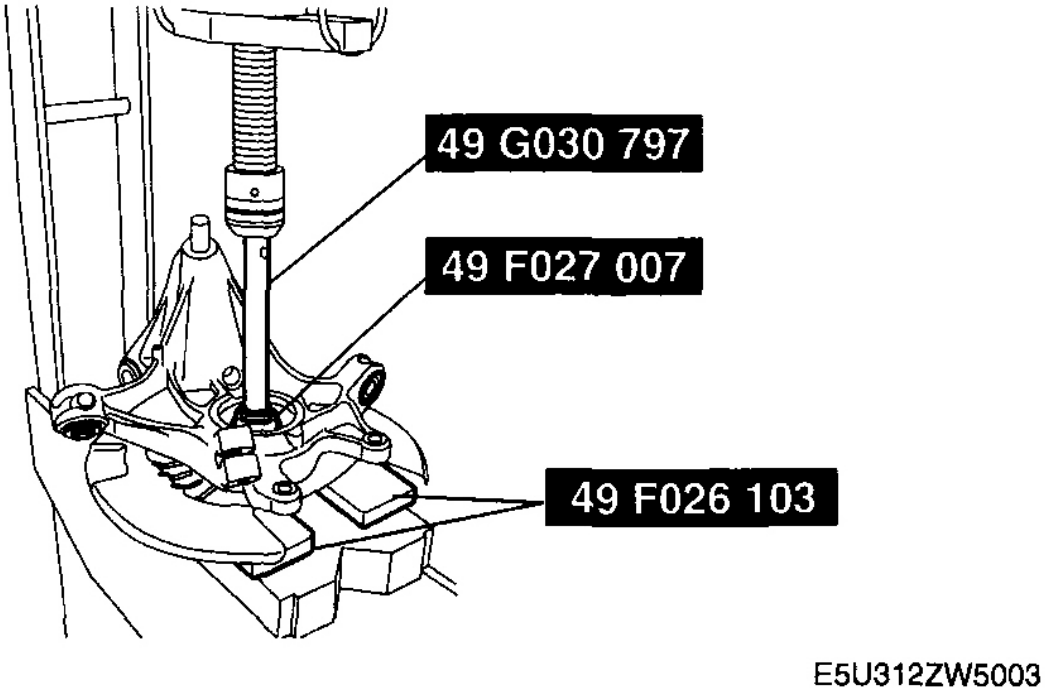


Fig. 10: Removing Wheel Bearing From Rear Knuckle Using SST's
Courtesy of MAZDA MOTORS CORP.

DUST COVER REMOVAL NOTE

NOTE:

- **Remove the dust cover only if there is an abnormality.**

1. Place an alignment mark on the dust cover and rear knuckle for proper installation.

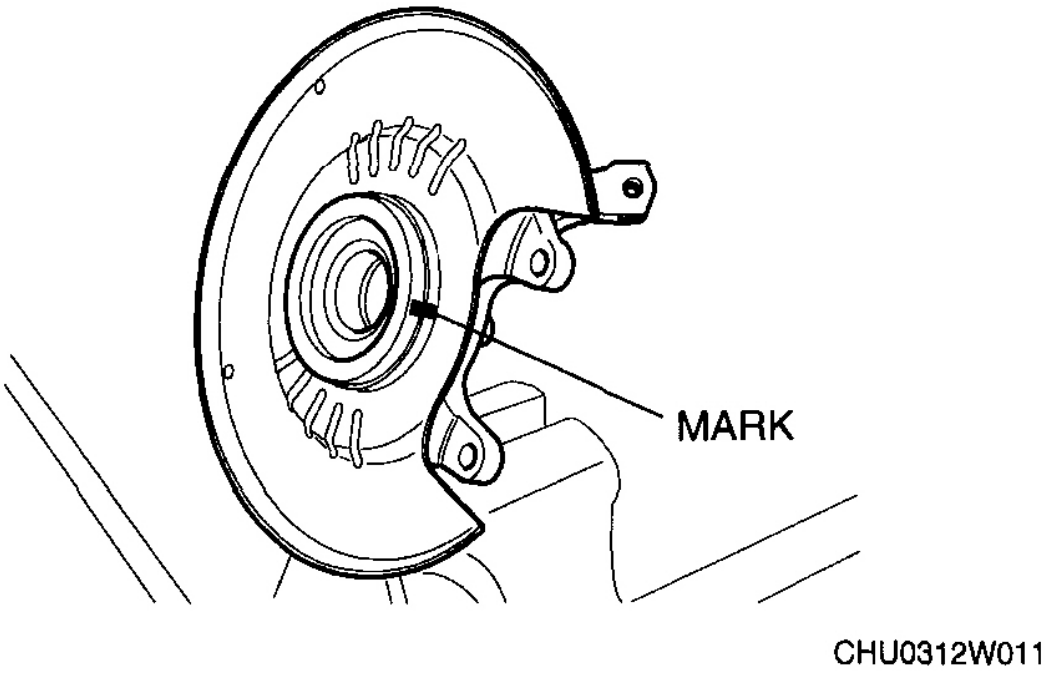


Fig. 11: Placing Alignment Mark On Dust Cover & Rear Knuckle
Courtesy of MAZDA MOTORS CORP.

2. Remove the dust cover using a chisel.

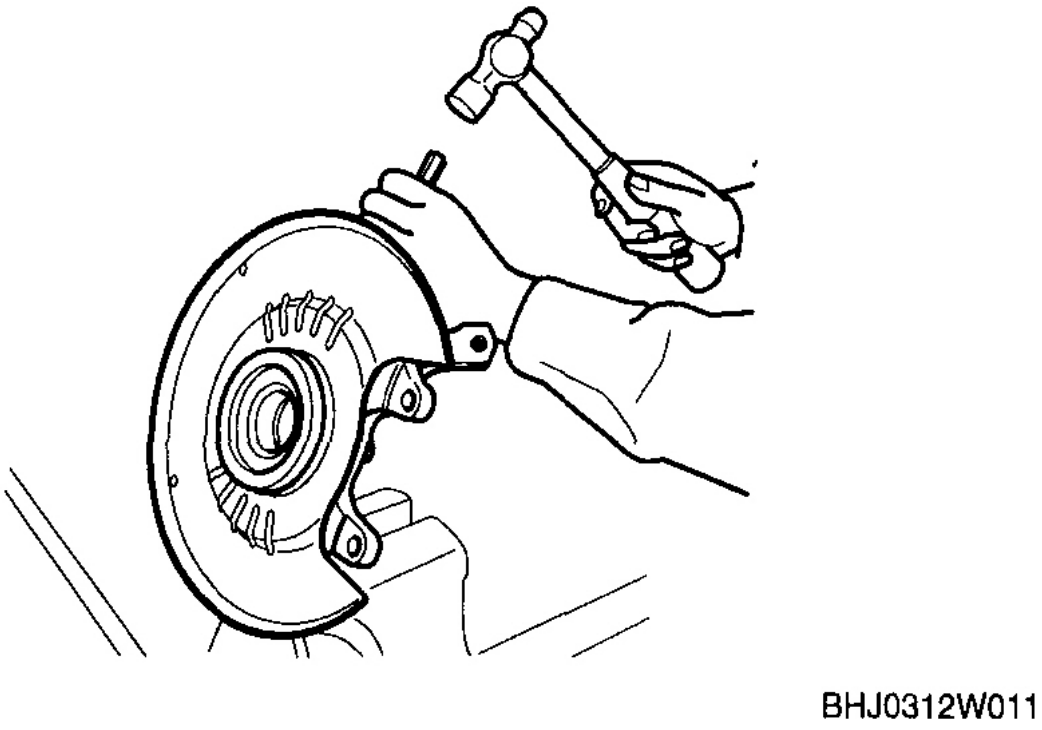


Fig. 12: Removing Dust Cover Using Chisel
Courtesy of MAZDA MOTORS CORP.

BUSHING REMOVAL NOTE

1. Remove the bushing from the rear knuckle using the **SSTs.**

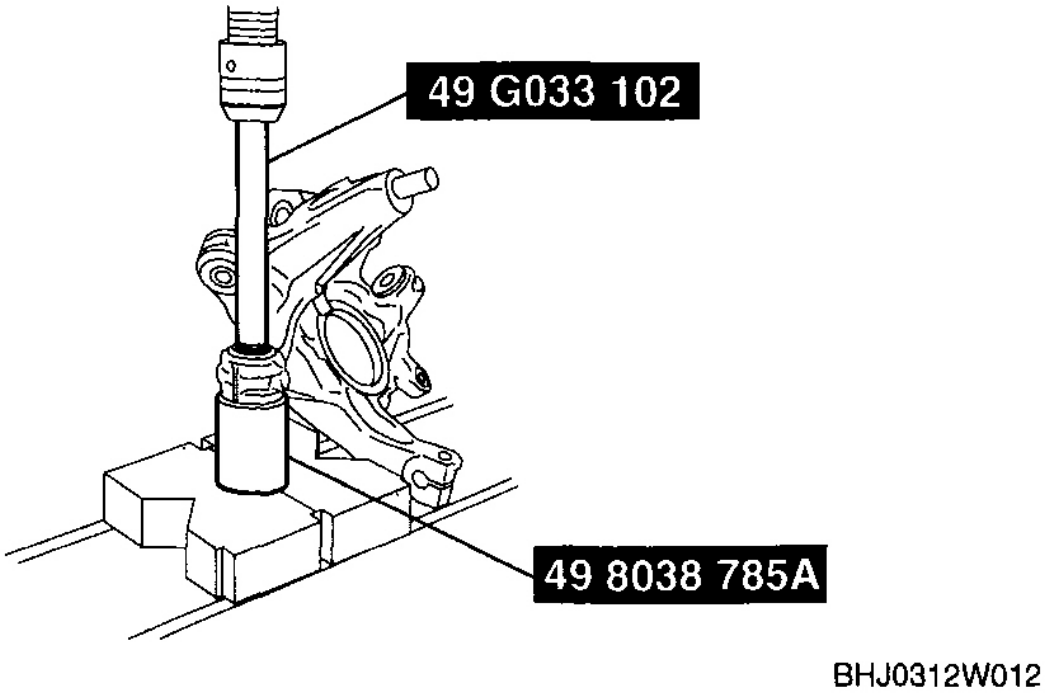


Fig. 13: Removing Bushing From Rear Knuckle Using SST's
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB BOLT REMOVAL NOTE

NOTE:

- **Remove the wheel hub bolt only if there is an abnormality.**

1. Remove the wheel hub bolts from the wheel hub using a press.

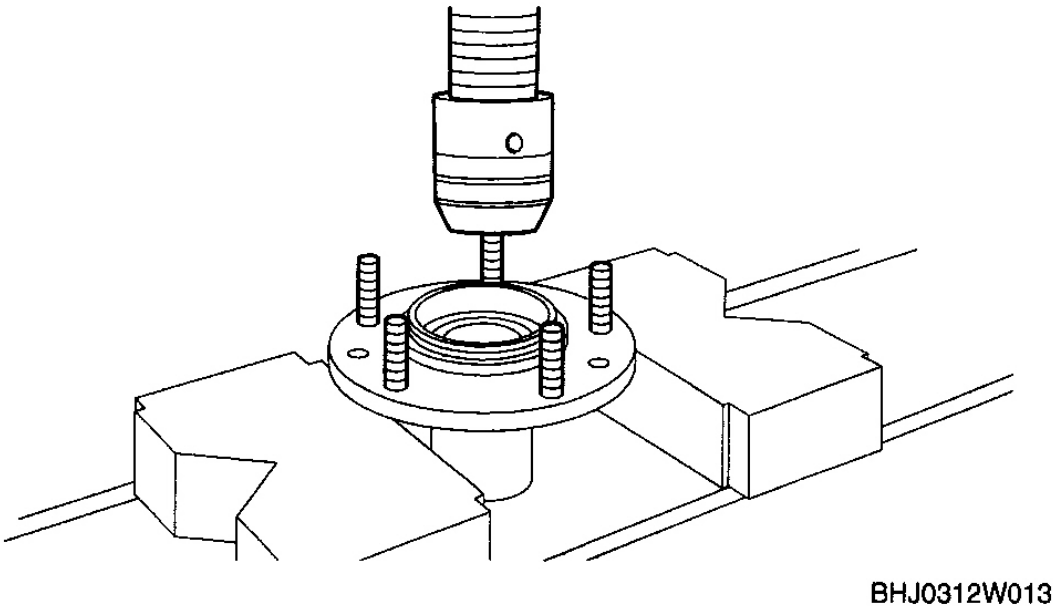


Fig. 14: Removing Wheel Hub Bolts From Wheel Hub Using Press
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB BOLT INSTALLATION NOTE

1. Press in new wheel hub bolts into the wheel hub using a press.

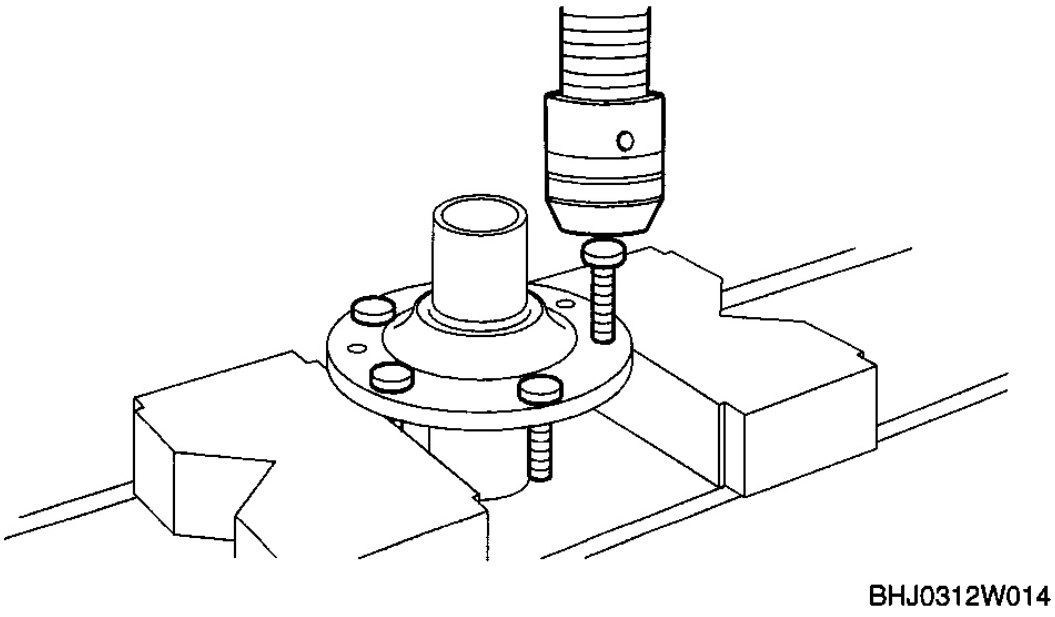


Fig. 15: Pressing New Wheel Hub Bolts Into Wheel Hub Using Press
Courtesy of MAZDA MOTORS CORP.

BUSHING INSTALLATION NOTE

1. Press the new bushing into the rear knuckle using the **SSTs.**

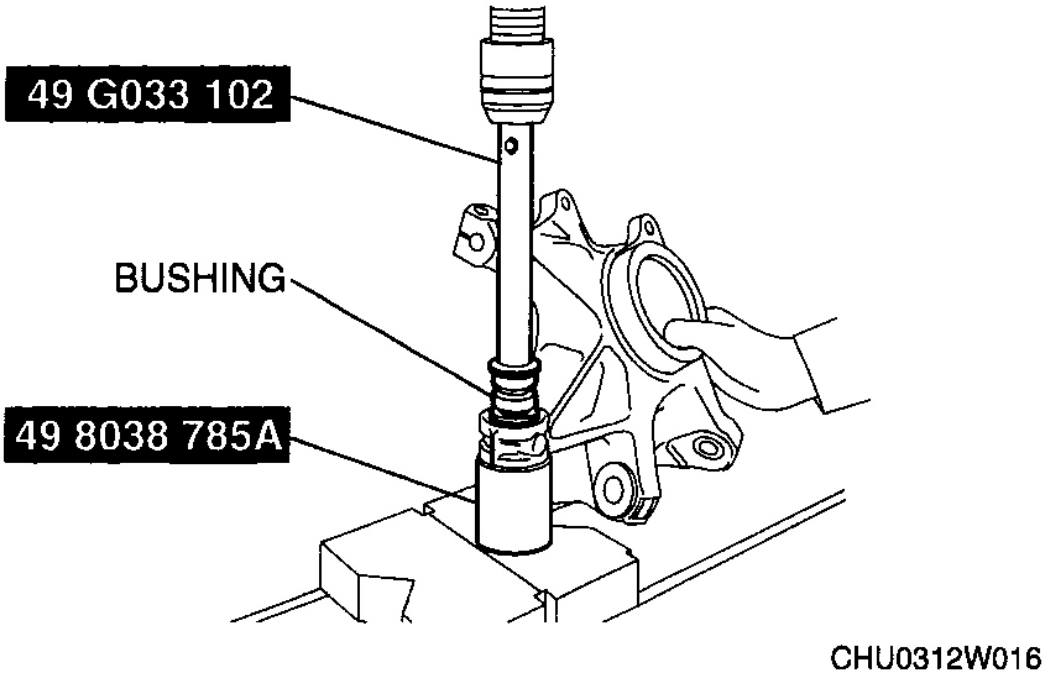


Fig. 16: Pressing New Bushing Into Rear Knuckle Using SST's
Courtesy of MAZDA MOTORS CORP.

DUST COVER INSTALLATION NOTE

1. Align the new and old dust covers and place alignment marks on the new dust cover.
2. Align the marks on the new dust cover and rear knuckle.

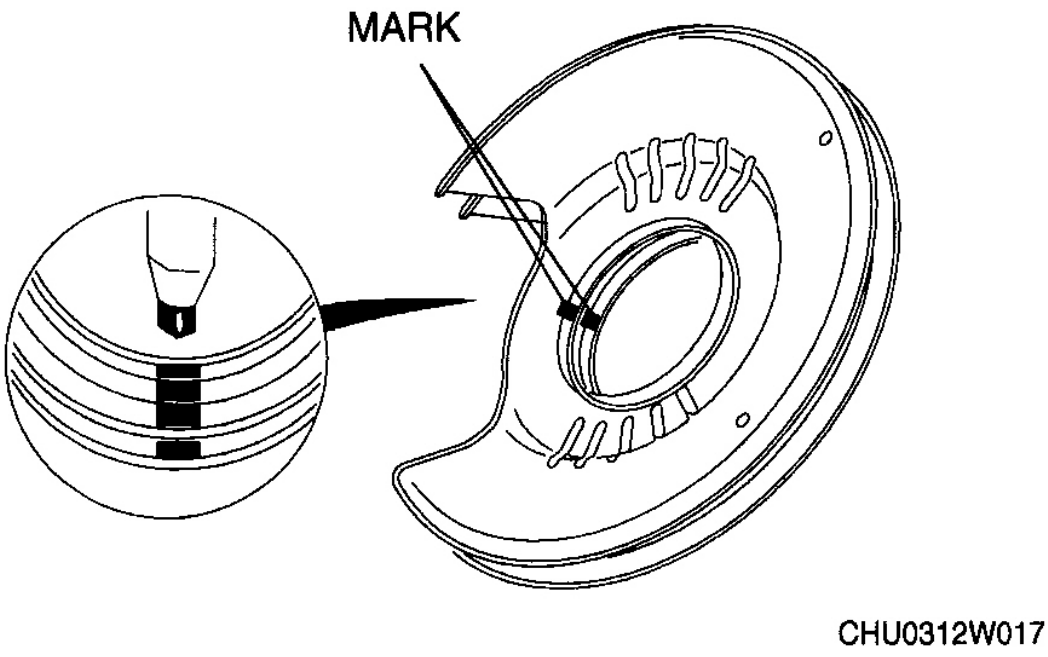


Fig. 17: Aligning Marks On New Dust Cover & Rear Knuckle
Courtesy of MAZDA MOTORS CORP.

3. Press the new dust cover onto the rear knuckle using the **SSTs.**

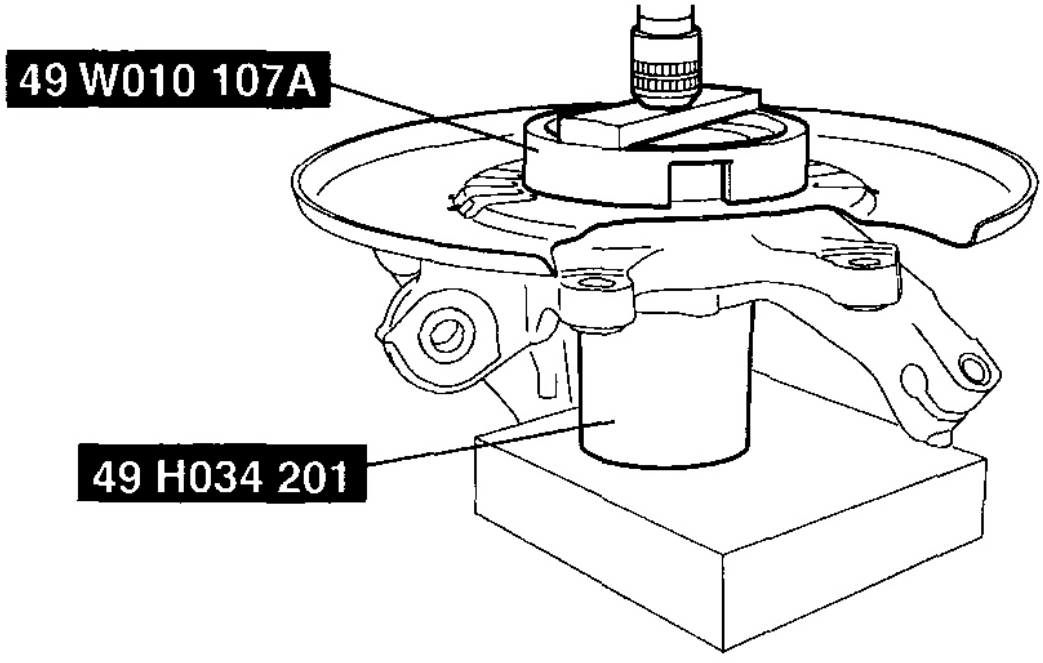


Fig. 18: Pressing New Dust Cover Onto Rear Knuckle Using SST's
Courtesy of MAZDA MOTORS CORP.

WHEEL BEARING INSTALLATION NOTE

1. Install a new wheel bearing using the **SSTs.**

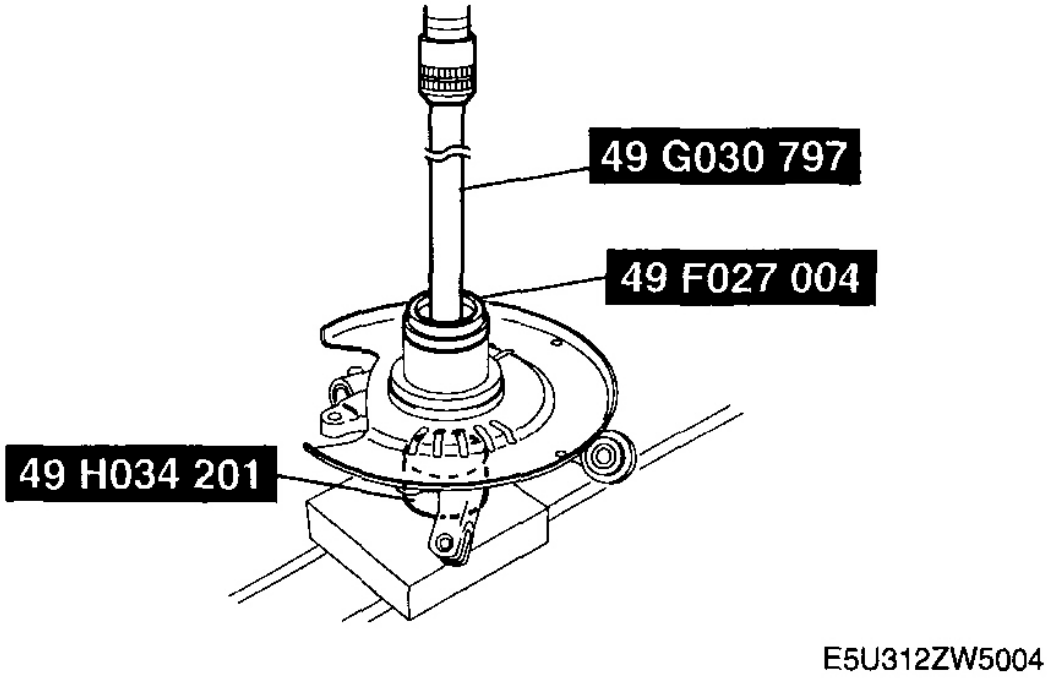


Fig. 19: Installing New Wheel Bearing Using SST's
Courtesy of MAZDA MOTORS CORP.

WHEEL HUB COMPONENT INSTALLATION NOTE

1. Install the wheel hub component using the **SSTs.**

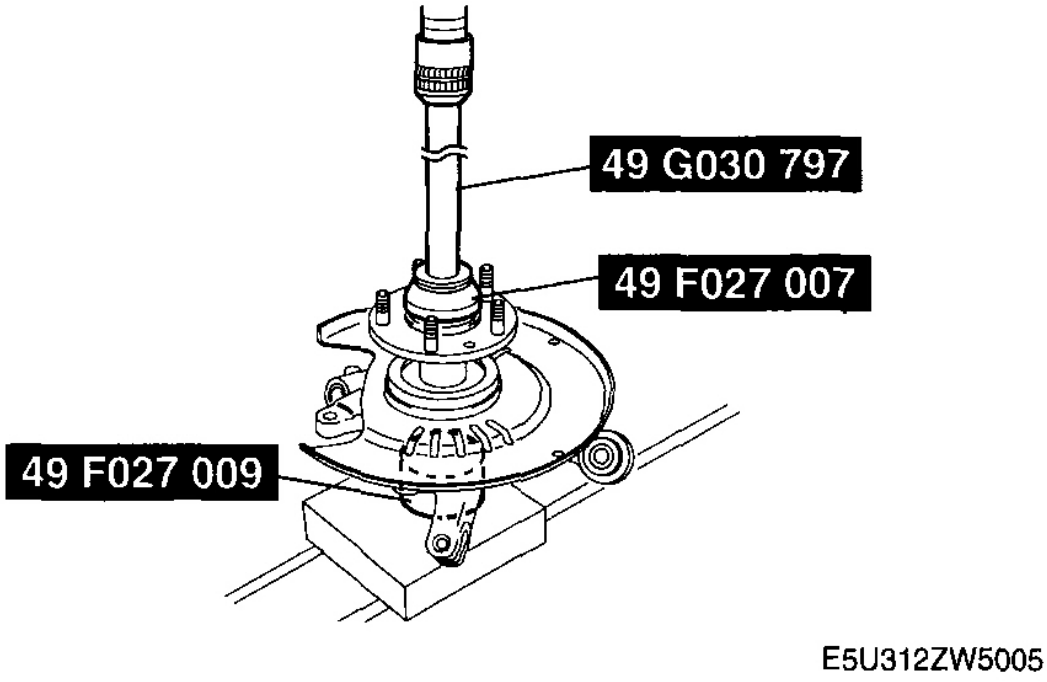


Fig. 20: Installing Wheel Hub Components Using SST's
Courtesy of MAZDA MOTORS CORP.

LOCKNUT INSTALLATION NOTE

1. Tighten a new locknut.
2. Install a new locknut and indent as shown to crimp the locknut, using a chisel and hammer.

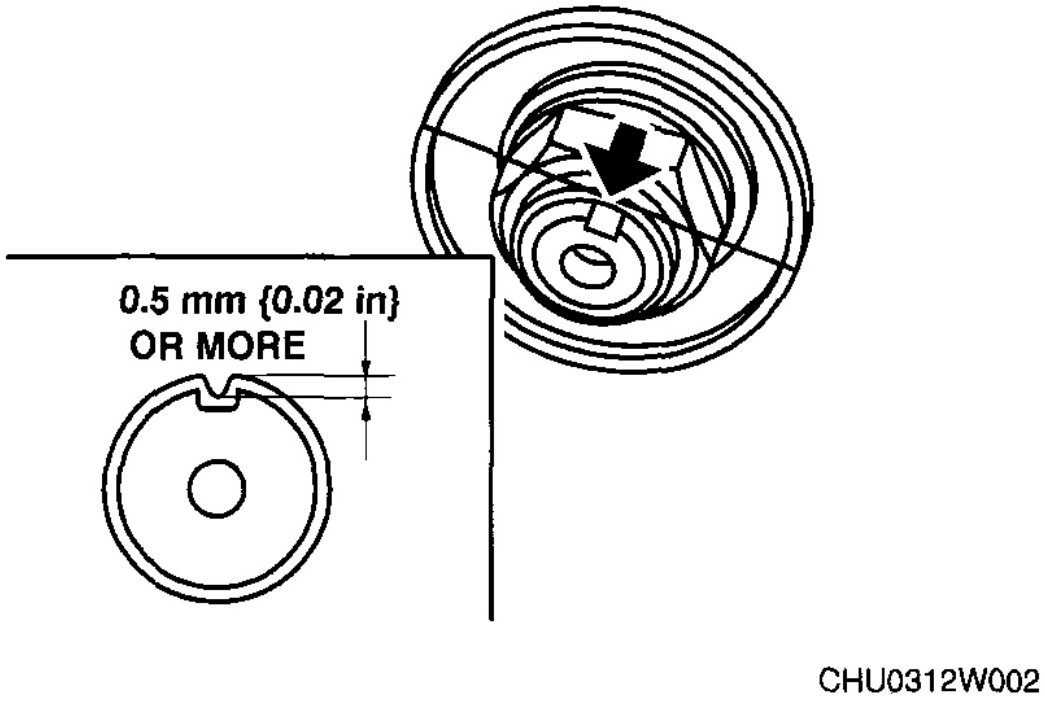
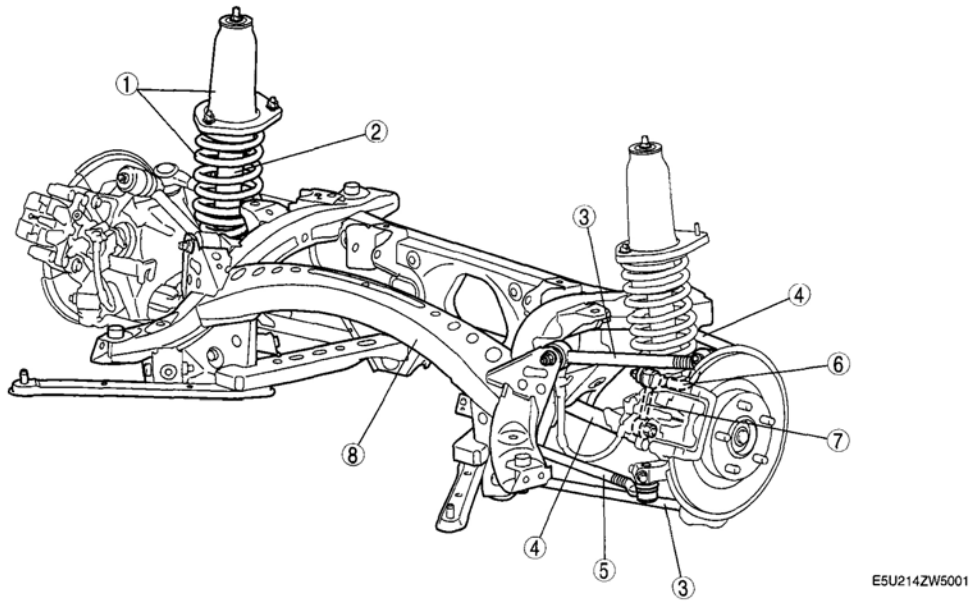


Fig. 21: Installing New Locknut
Courtesy of MAZDA MOTORS CORP.

2008 SUSPENSION

Rear Suspension - MX-5 Miata

REAR SUSPENSION LOCATION INDEX



1	Rear shock absorber and coil spring
2	Rear shock absorber
3	Rear trailing link
4	Rear lateral link
5	Toe control link
6	Rear stabilizer
7	Stabilizer control link
8	Rear crossmember

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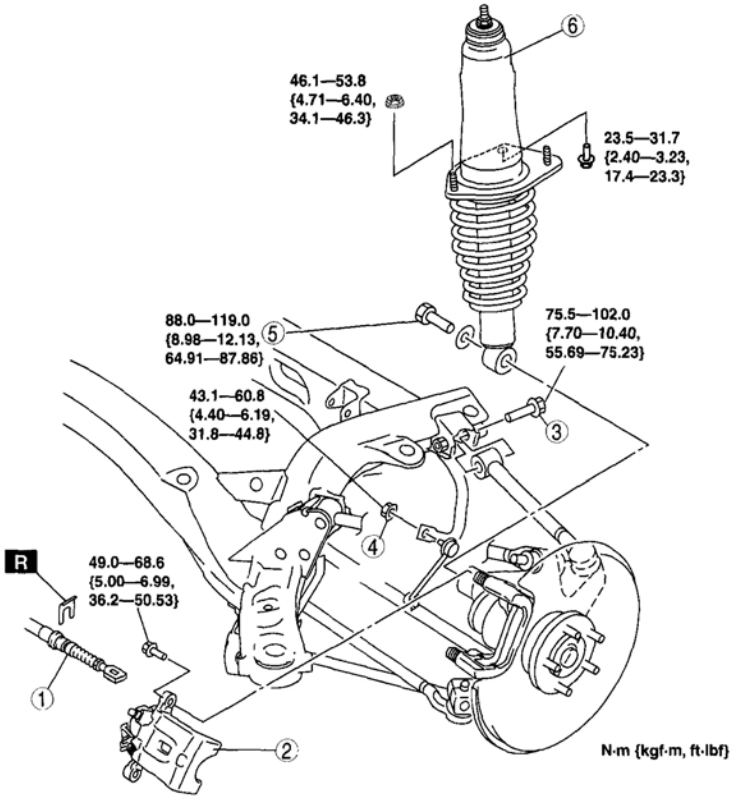
Fig. 1: Identifying Location Of Rear Suspension Components
Courtesy of MAZDA MOTORS CORP.

REAR SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION

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 operations, remove the ABS wheel-speed sensor (axle side), and move the sensor away from the harnesses.**

1. When working on the left side, remove the fuel tank protector. (See **FUEL TANK REMOVAL/INSTALLATION [LF]** .)
2. Remove in the order indicated in **Fig. 2** .
3. Install in the reverse order of removal.



1	Parking brake cable	4	Stabilizer control link upper nut
2	Caliper	5	Rear shock absorber lower bolt
3	Rear lateral link (upper) bolt	6	Rear shock absorber and coil spring

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Fig. 2: Identifying Rear Shock Absorber & Coil Spring (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

CALIPER REMOVAL NOTE

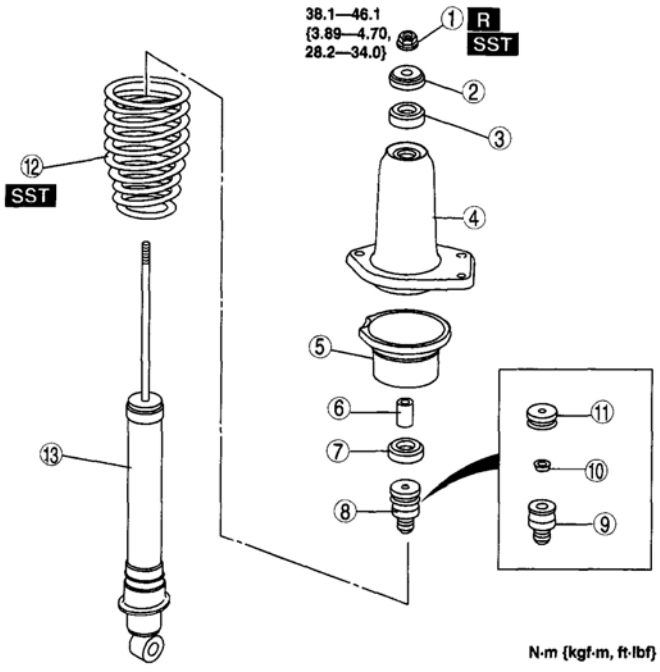
1. Remove the caliper, and hang the cable out of the way.

REAR SHOCK ABSORBER AND COIL SPRING DISASSEMBLY/ASSEMBLY

WARNING:

- **Removing/installing the shock absorber and coil spring is dangerous. The shock absorber and coil spring could fly off and cause injury or death, and damage the vehicle.**

1. Remove the rear shock absorber and coil spring. (See **REAR SHOCK ABSORBER AND COIL SPRING REMOVAL/INSTALLATION** .)
2. Remove in the order indicated in **Fig. 3** .
3. Install in the reverse order of removal.



1	Piston rod nut
2	Retainer
3	Bushing
4	Upper spring seat
5	Spring seat rubber
6	Spacer
7	Bushing
8	Bound stopper and stopper casing
9	Bound stopper
10	Collar
11	Stopper casing
12	Coil spring
13	Rear shock absorber

Fig. 3: Identifying Rear Shock Absorber & Coil Spring Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

PISTON ROD NUT REMOVAL NOTE

WARNING:

- **Before removing the piston rod nut, secure the shock absorber and spring in the SSTs. Otherwise, the shock absorber and spring could fly off under tremendous pressure and cause serious injury or death, or damage to the vehicle.**

1. Set the **SSTs** using cloth to prevent the spring from being damaged.
2. Using the **SSTs,** compress the coil spring and remove the piston rod nut.

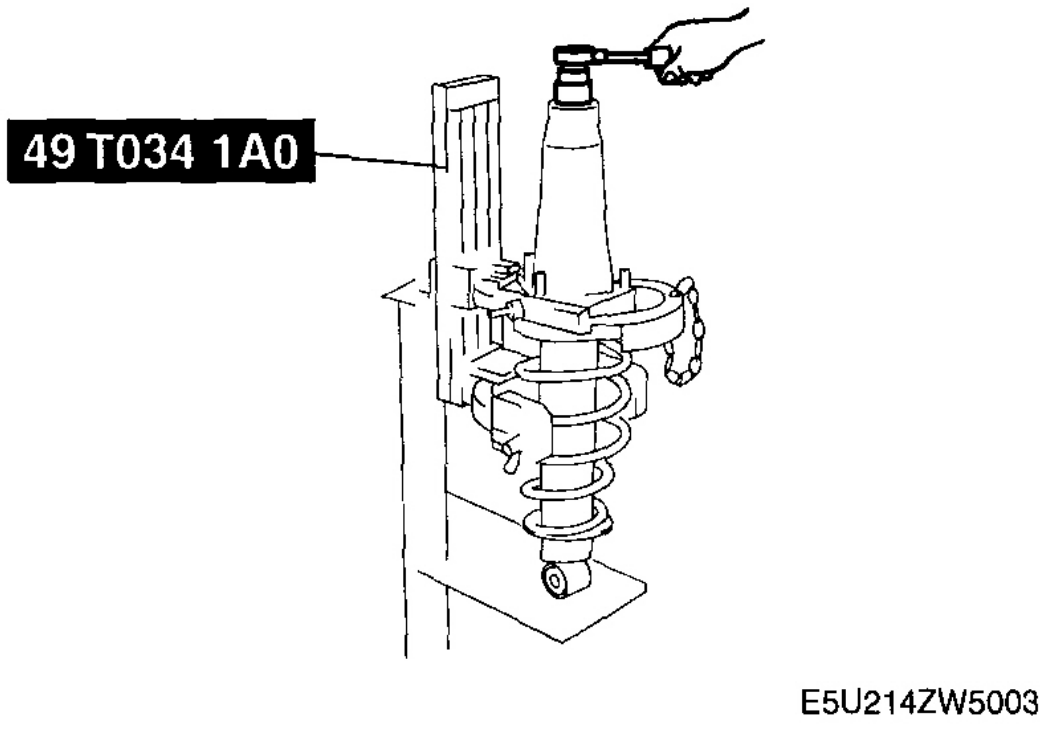


Fig. 4: Removing Piston Rod Nut
Courtesy of MAZDA MOTORS CORP.

COIL SPRING INSTALLATION NOTE

1. Set the coil spring to the **SSTs** using cloth.
2. Using the **SSTs,** compress the coil spring.
3. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.

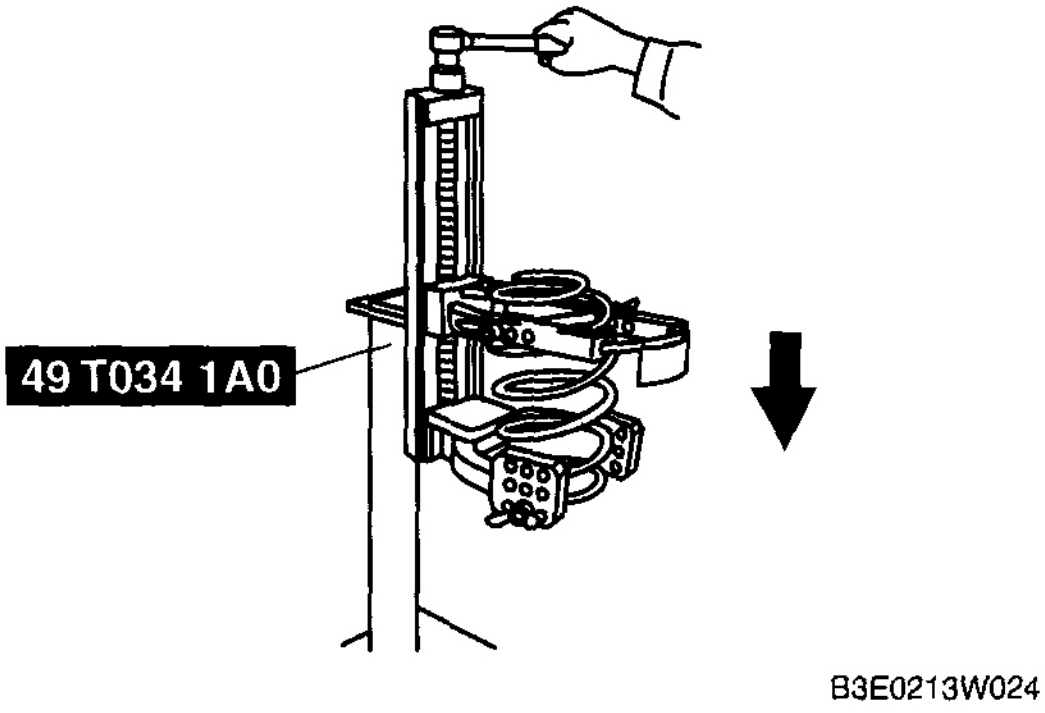


Fig. 5: Compressing Coil Spring Using SSTs
Courtesy of MAZDA MOTORS CORP.

COLLAR INSTALLATION NOTE

1. Install the collar so that the tapered side is facing downward as shown in **Fig. 6** .

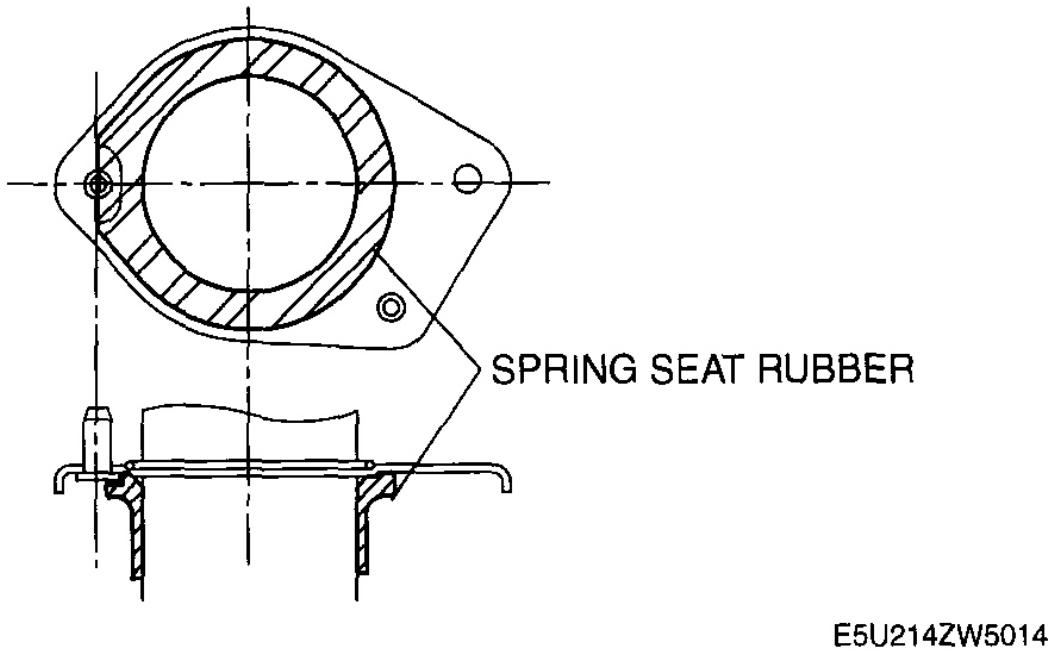


Fig. 6: View Of Collar Tapered Side Down
Courtesy of MAZDA MOTORS CORP.

SPRING SEAT RUBBER INSTALLATION NOTE

1. Install the spring seat rubber to the upper spring seat as shown in **Fig. 7** .

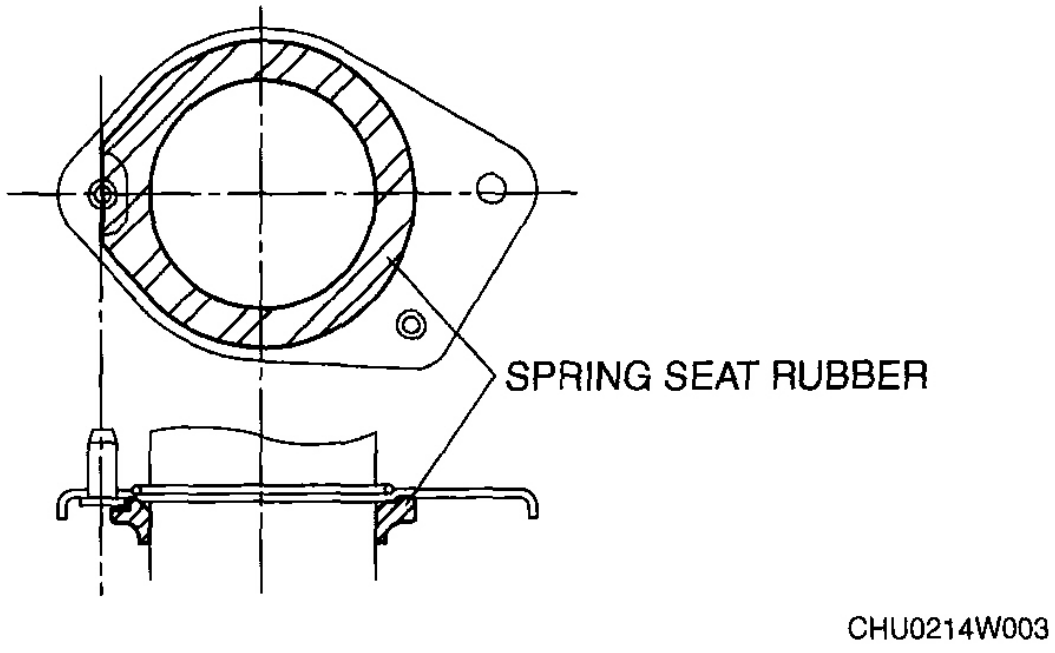


Fig. 7: View Of Spring Seat Rubber & Upper Spring Seat
Courtesy of MAZDA MOTORS CORP.

UPPER SPRING SEAT INSTALLATION NOTE

1. Install the coil spring with the lead lower end of the lower spring seat facing the direction shown in **Fig. 8** .

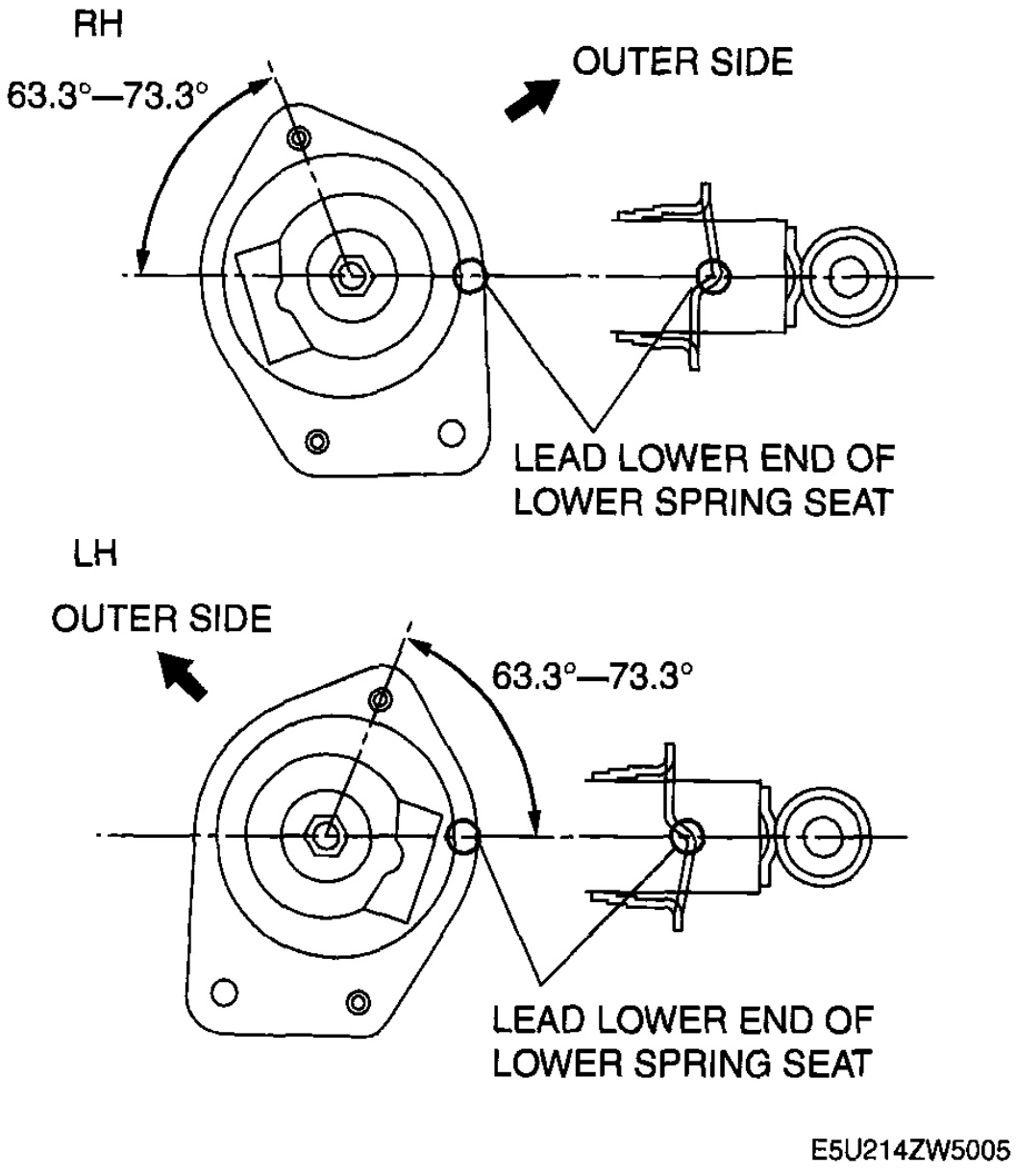


Fig. 8: Identifying Spring Seat Facing
Courtesy of MAZDA MOTORS CORP.

REAR SHOCK ABSORBER INSPECTION

1. Inspect the rear shock absorber in the same way as the front shock absorber. (See **FRONT SHOCK ABSORBER INSPECTION** .)

REAR SHOCK ABSORBER DISPOSAL

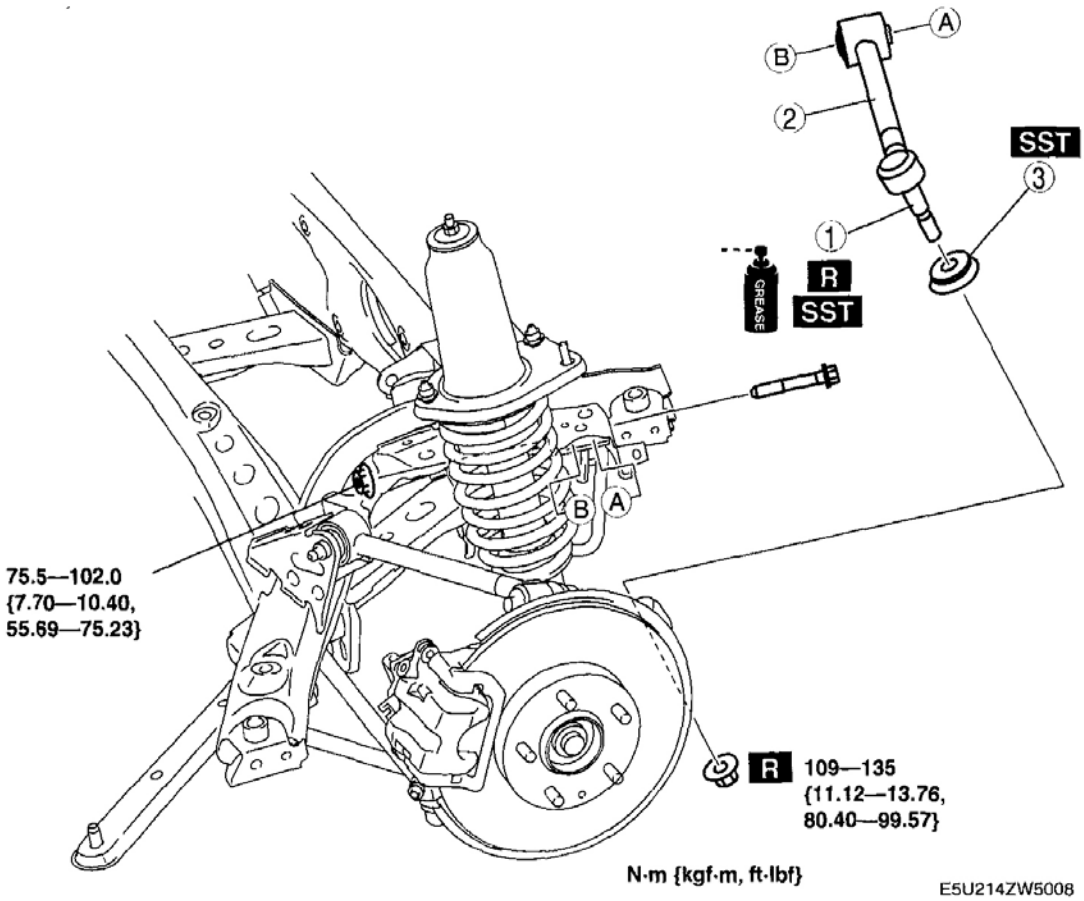
1. Dispose of the rear shock absorber in the same way as the front shock absorber. (See **FRONT SHOCK ABSORBER DISPOSAL**)

REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION

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 operations, remove the ABS wheel-speed sensor (axle side) and move the sensor away from the harnesses.**

1. Remove in the order indicated in **Fig. 9** .
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



1	Rear lateral link (upper) ball joint
2	Rear lateral link (upper)
3	Dust boot

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Fig. 9: Identifying Rear Lateral Link (Upper) Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR LATERAL LINK (UPPER) BALL JOINT REMOVAL NOTE

1. Using the **SST** , disconnect the rear lateral link (upper) ball joint.

NOTE:

- **When removing the rear lateral link (upper) ball joint, the rear knuckle bushing may also come off. If it comes off, replace the rear knuckle.**

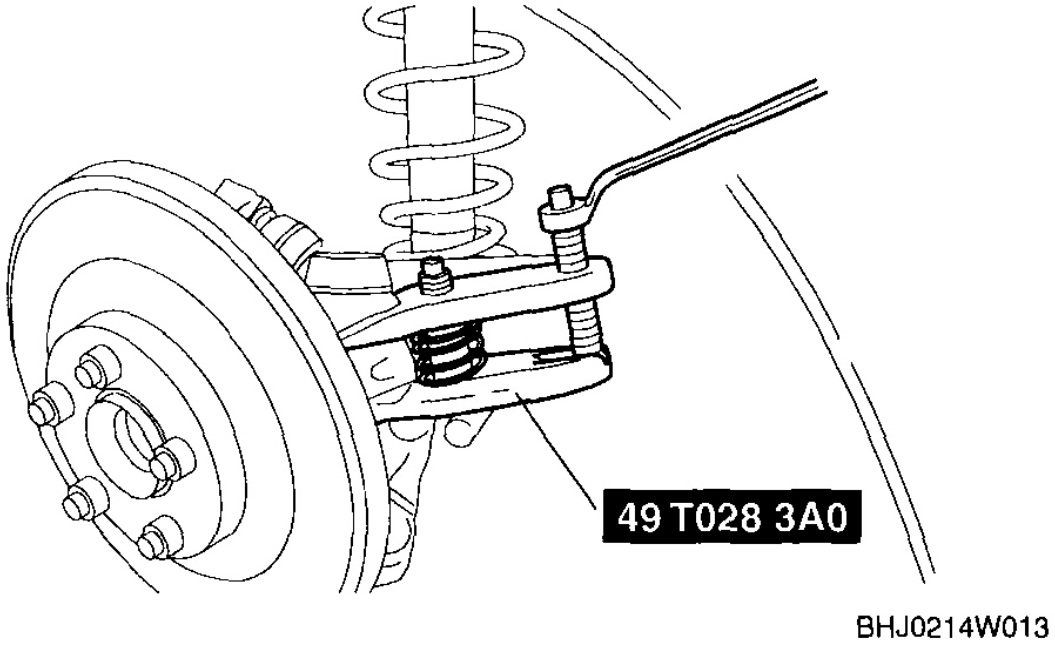


Fig. 10: Disconnecting Rear Lateral Link (Upper) Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

DUST BOOT INSTALLATION NOTE

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Using the **SST** , install the dust boot to the ball joint.
4. Wipe off the excess grease.

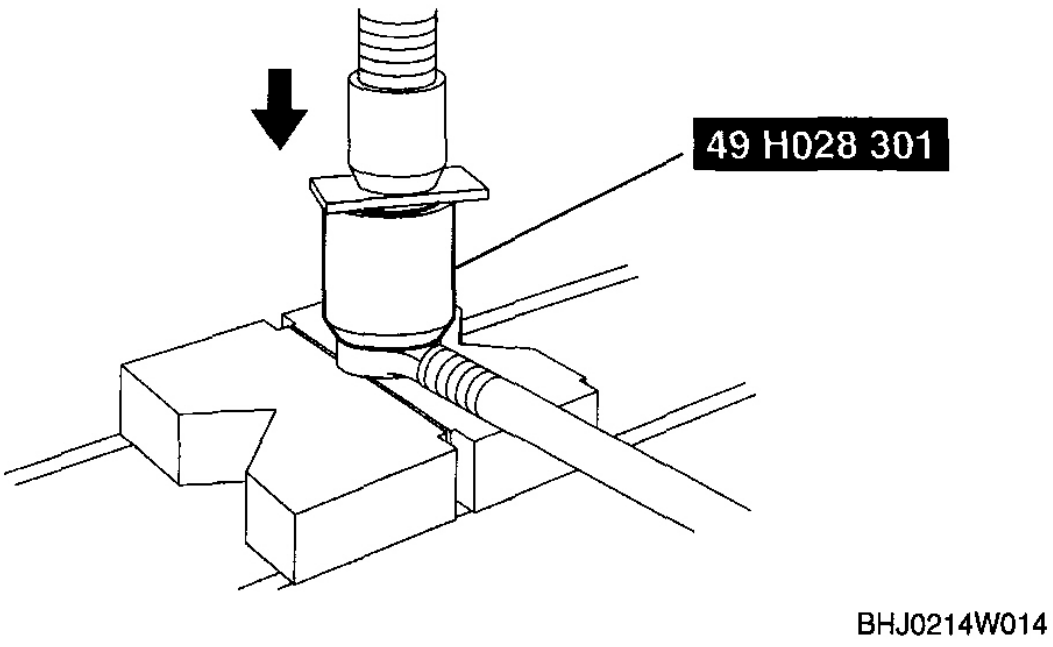


Fig. 11: Installing Dust Boot To Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

REAR LATERAL LINK (UPPER) INSPECTION

1. Remove the rear lateral link (upper) from the vehicle. (See **REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION** .)
2. Inspect the link for bending or damage. If there is any malfunction, replace the link.
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times.**
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Rear lateral link (upper) ball joint rotational torque

   0.4-2.8 N.m {5-28 kgf.cm, 4-24 in.lbf}

   - If not within the specification, replace the rear lateral link (upper). (See **REAR LATERAL LINK (UPPER) REMOVAL/INSTALLATION** .)

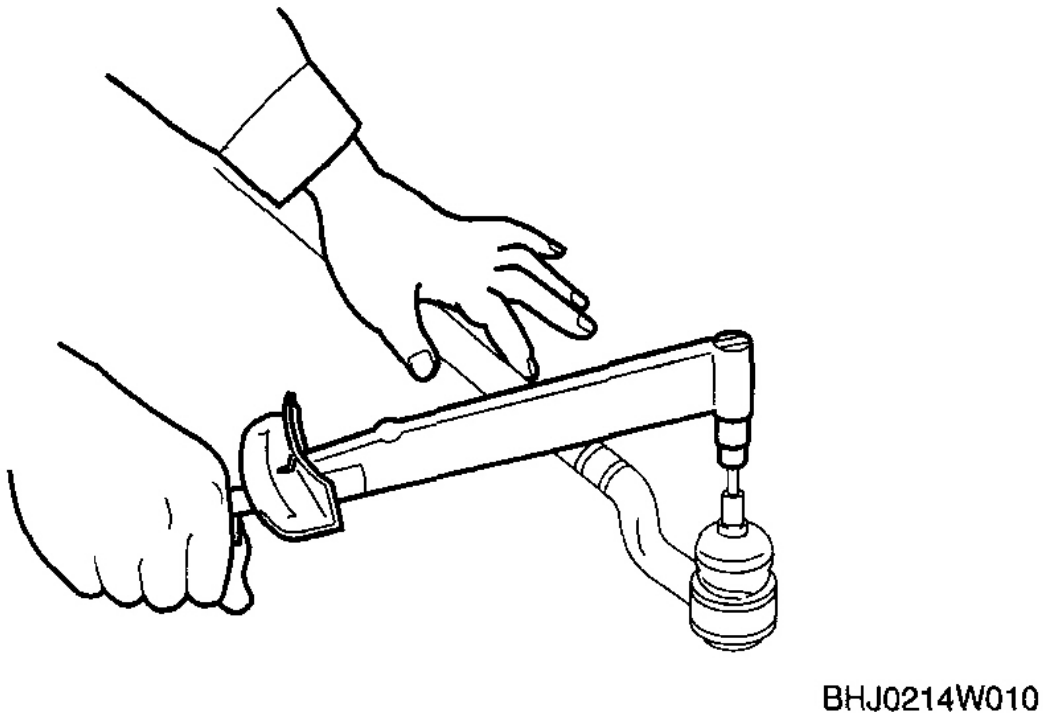
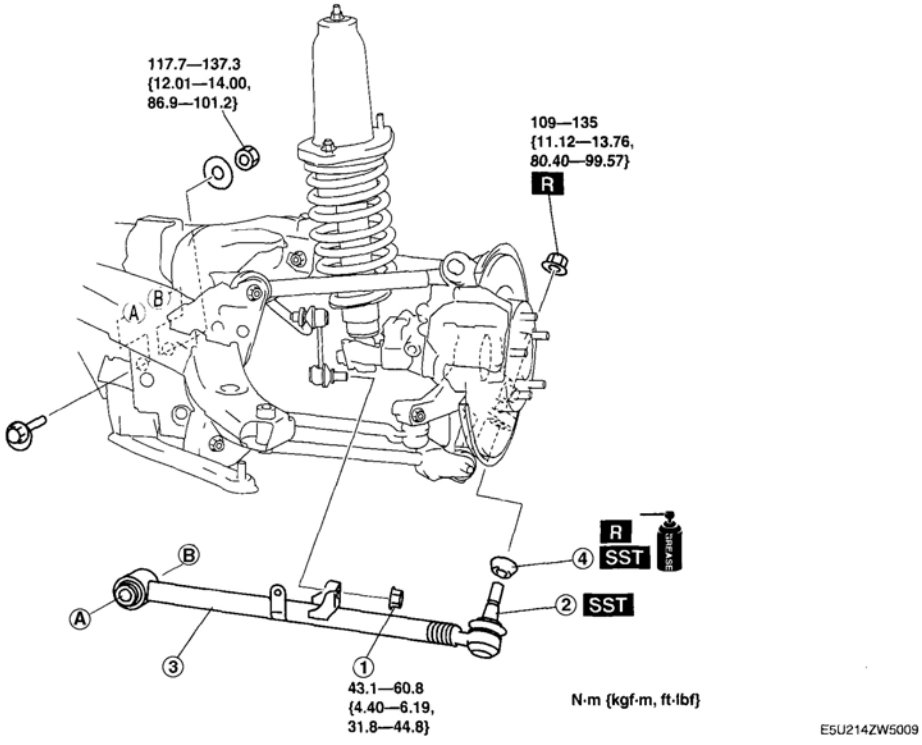


Fig. 12: Measuring Ball-Joint Rotational Torque Using Allen Wrench & Torque Wrench
Courtesy of MAZDA MOTORS CORP.

REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 13** .
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



1	Stabilizer control link lower nut	3	Rear lateral link (lower)
2	Rear lateral link (lower) ball joint	4	Dust boot

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Fig. 13: Identifying Rear Lateral Link (Lower) Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR LATERAL LINK (LOWER) BALL JOINT REMOVAL NOTE

1. Using the **SST** , disconnect the ball joint.

NOTE:

- **When removing the rear lateral link (lower) ball joint, the rear knuckle bushing may also come off. If it comes off, replace the rear knuckle.**

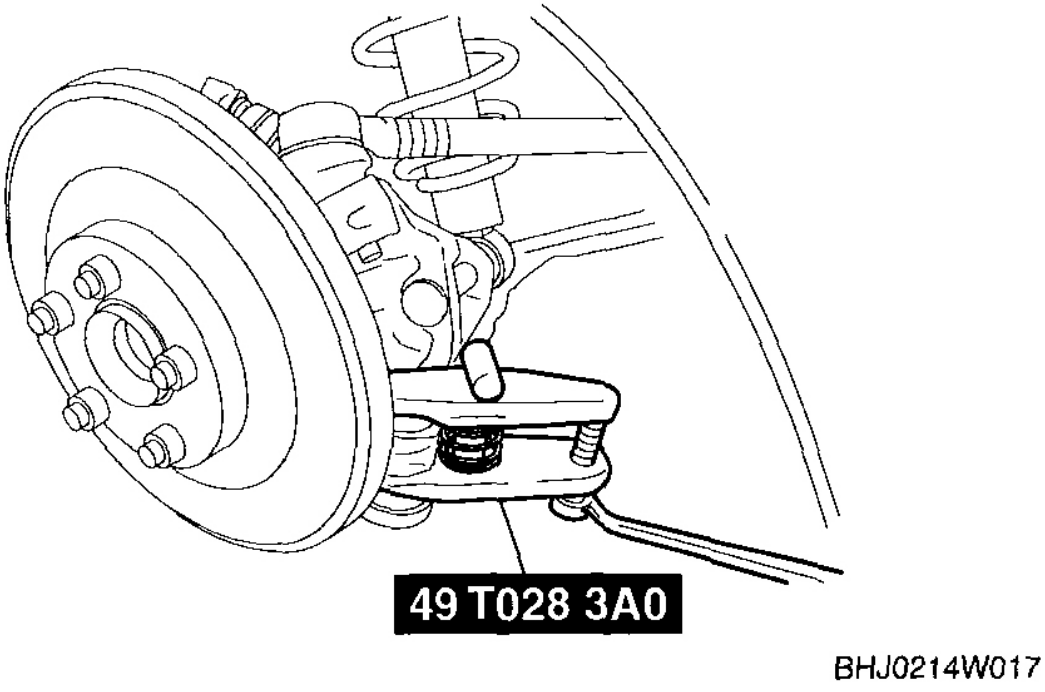


Fig. 14: Disconnecting Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

DUST BOOT INSTALLATION NOTE

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Using the **SST** , install the dust boot to the ball joint.
4. Wipe off the excess grease.

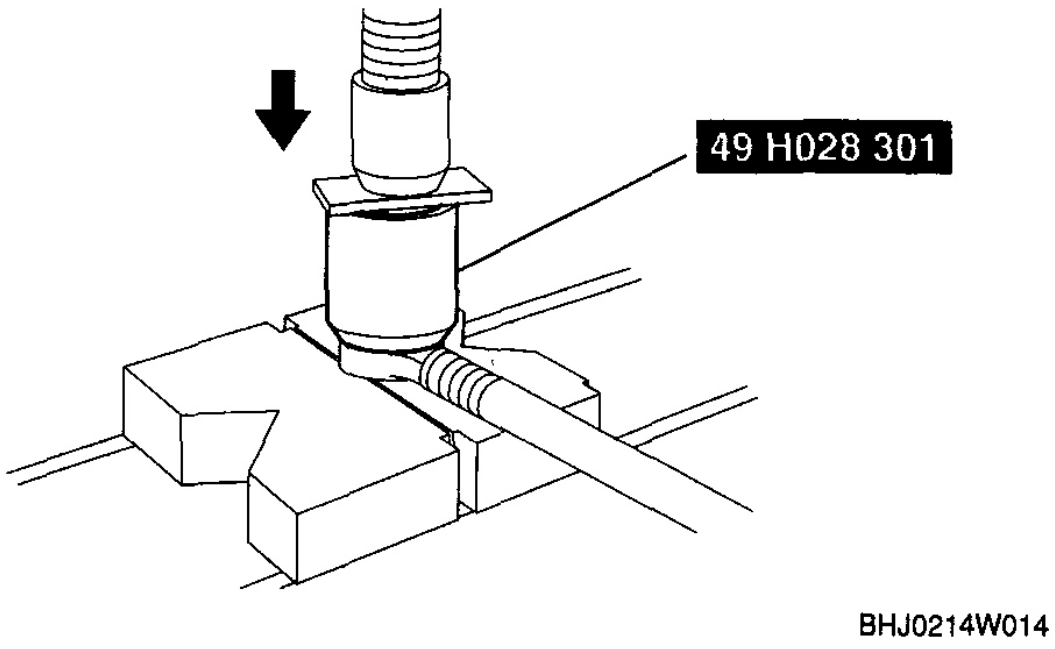


Fig. 15: Installing Dust Boot To Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

REAR LATERAL LINK (LOWER) INSPECTION

1. Remove the rear lateral link (lower) from the vehicle. (See **REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION** .)
2. Inspect the link for bending or damage. If there is any malfunction, replace the link.
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times.**
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Rear lateral link (lower) ball joint rotational torque

   0.4-2.8 N.m {5-28 kgf.cm, 4-24 in.lbf}

   - If not within the specification, replace the rear lateral link (lower). (See **REAR LATERAL LINK (LOWER) REMOVAL/INSTALLATION** .)

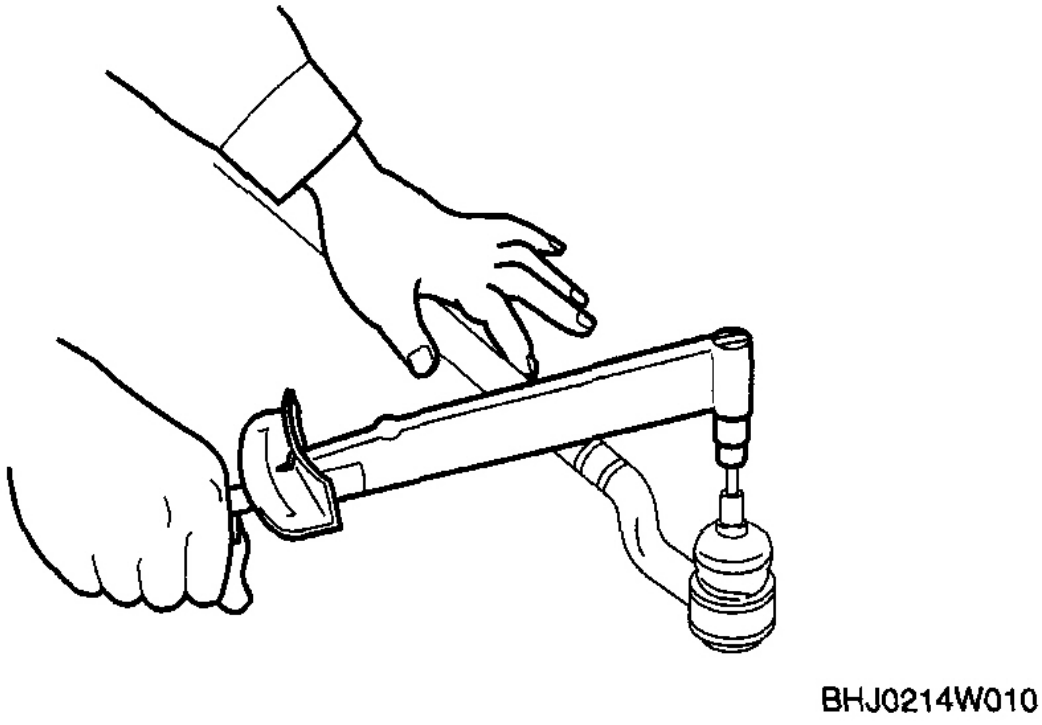
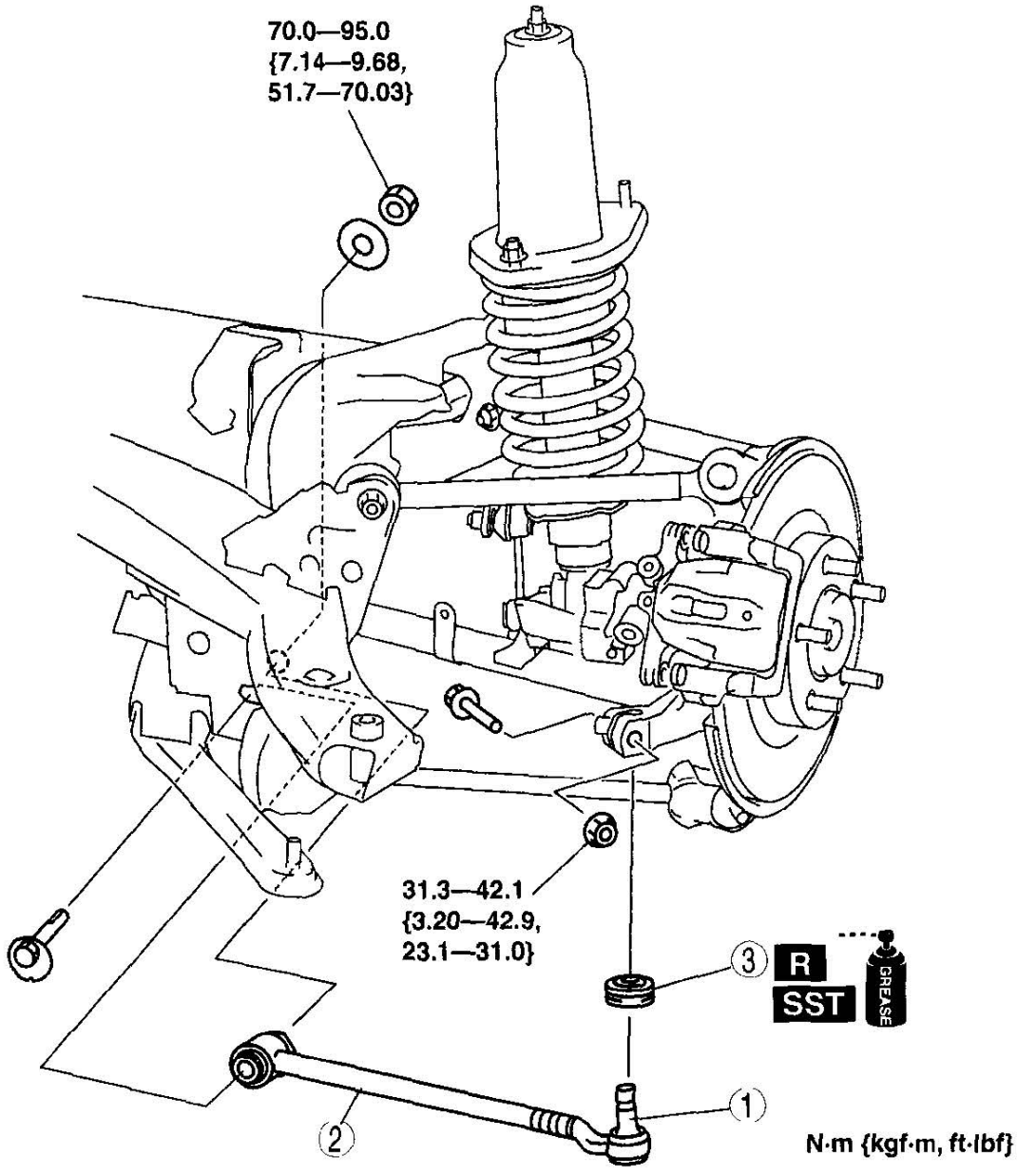


Fig. 16: Measuring Ball-Joint Rotational Torque Using Allen Wrench & Torque Wrench
Courtesy of MAZDA MOTORS CORP.

TOE CONTROL LINK REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 17** .
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



1	Toe control link ball joint
2	Toe control link
3	Dust boot

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Fig. 17: Identifying Toe Control Link (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

DUST BOOT INSTALLATION NOTE

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Using the **SST** , install the dust boot to the ball joint.
4. Wipe off the excess grease.

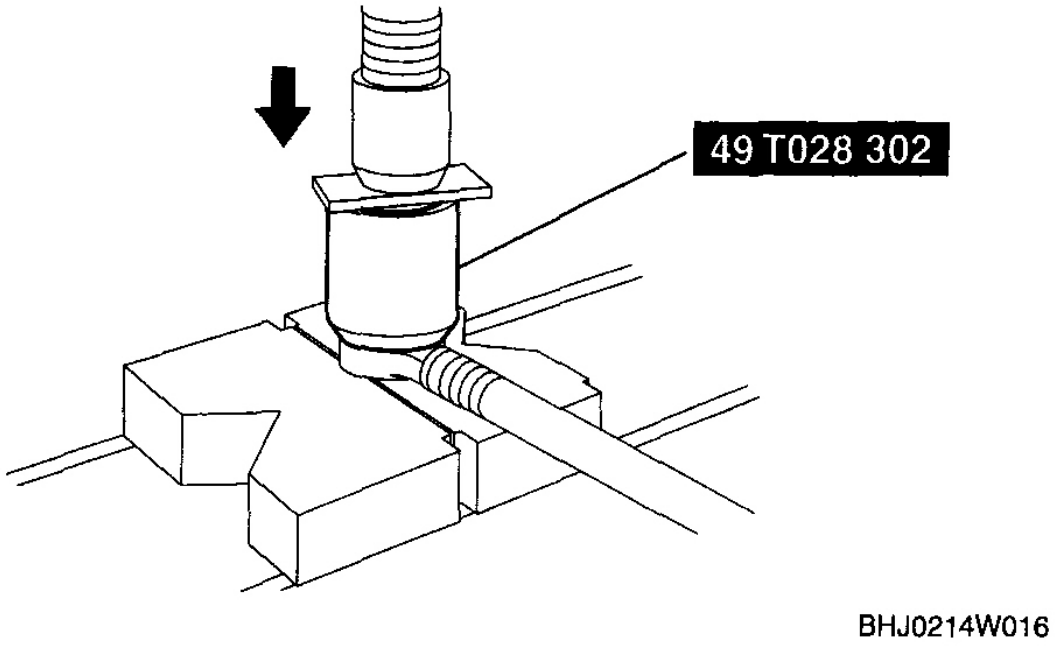


Fig. 18: Installing Dust Boot To Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

TOE CONTROL LINK BALL JOINT INSTALLATION NOTE

1. Install the toe control link ball joint so that the ball joint stud projection is within **-2-4 mm {-0.08-0.15 in}.**

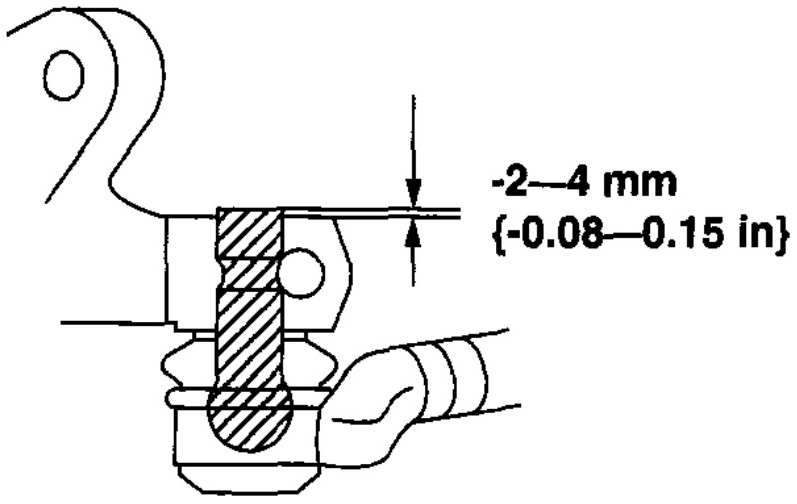


Fig. 19: View Of Toe Control Link Ball Joint
Courtesy of MAZDA MOTORS CORP.

TOE CONTROL LINK INSPECTION

1. Remove the toe control link from the vehicle. (See **TOE CONTROL LINK REMOVAL/INSTALLATION** .)
2. Inspect the lateral link for bending or damage. If there is any malfunction, replace the lateral link.
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times.**
5. Install the **SST** to the ball stud, and measure the ball joint rotational torque using a pull scale.

   Toe control link ball joint rotational torque 0.3-2.2 N.m {4-22 kgf.cm, 3-19 in.lbf}

   Pull scale reading: 3-22 N {0.3-2.2 kgf, 0.7-4.9 lbf}

   - If not within the specification, replace the toe control link. (See **TOE CONTROL LINK REMOVAL/INSTALLATION** .)

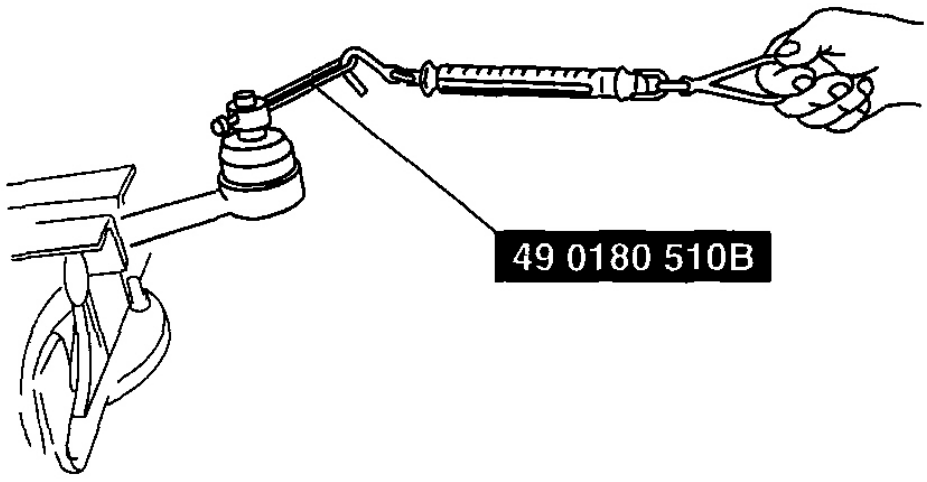
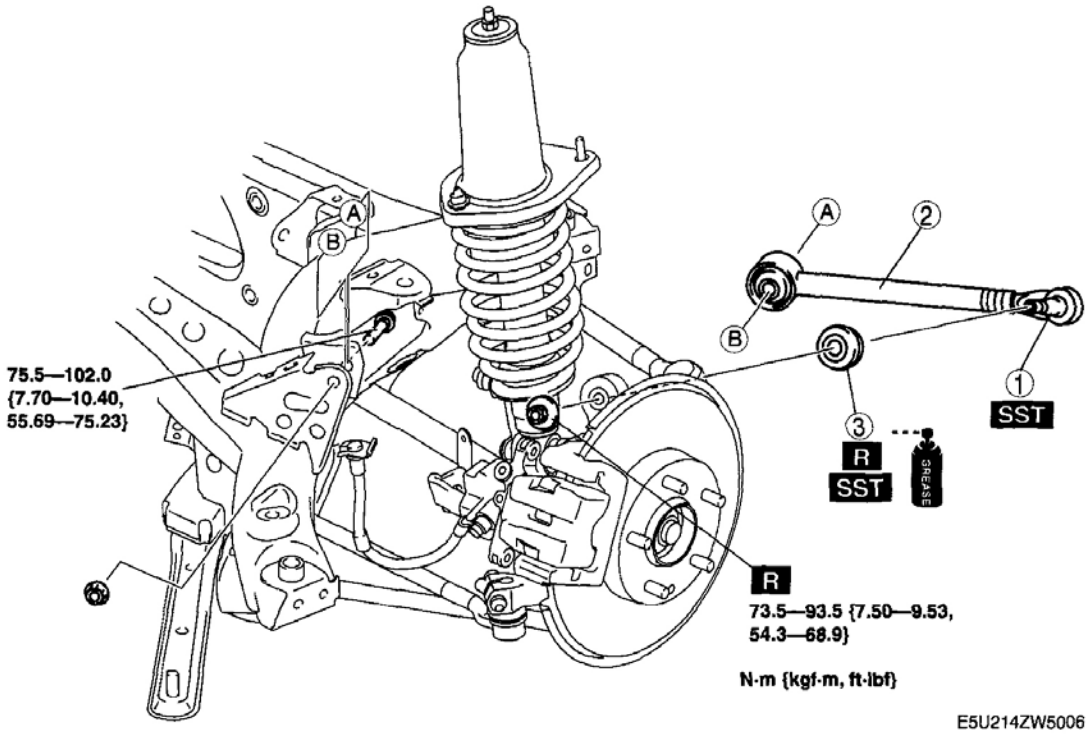


Fig. 20: Measuring Ball Joint Rotational Torque Using Pull Scale
Courtesy of MAZDA MOTORS CORP.

REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 21** .
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



1	Rear trailing link (upper) ball joint
2	Rear trailing link (upper)
3	Dust boot

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Fig. 21: Identifying Rear Trailing Link (Upper) (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR TRAILING LINK (UPPER) BALL JOINT REMOVAL NOTE

1. Using the **SST,** disconnect the ball joint.

NOTE:

- **When removing the rear trailing link (upper) ball joint, the rear knuckle bushing may also come off. If it comes off, replace the rear knuckle.**

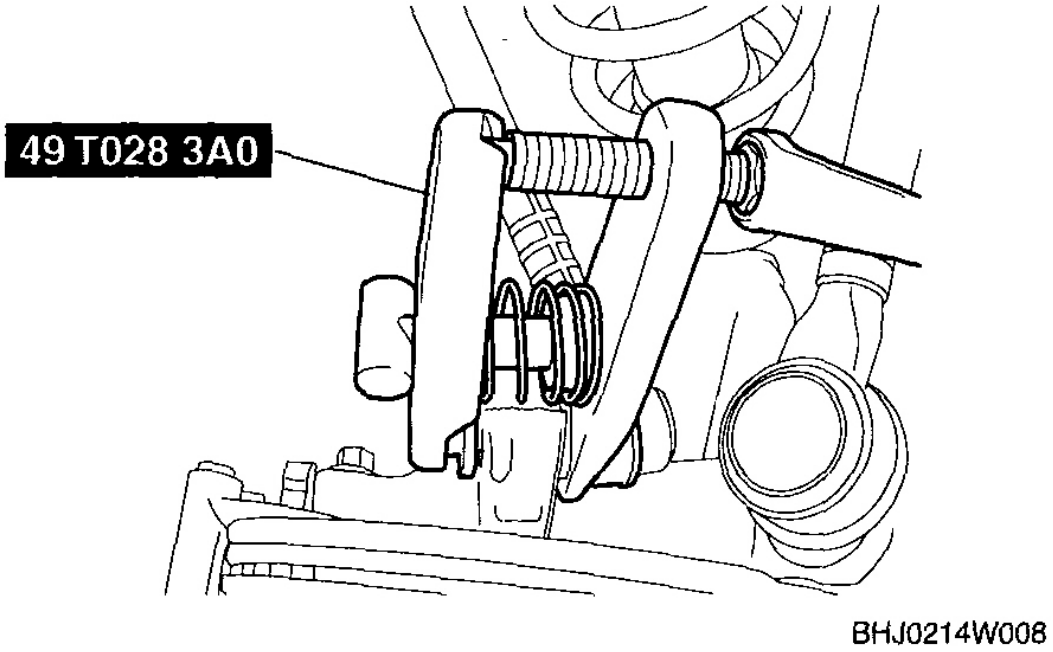


Fig. 22: Disconnecting Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

DUST BOOT INSTALLATION NOTE

1. Wipe the grease off the ball joint stud.
2. Fill the inside of the new dust boot with grease.
3. Using the **SST,** install the dust boot to the ball joint.
4. Wipe off the excess grease.

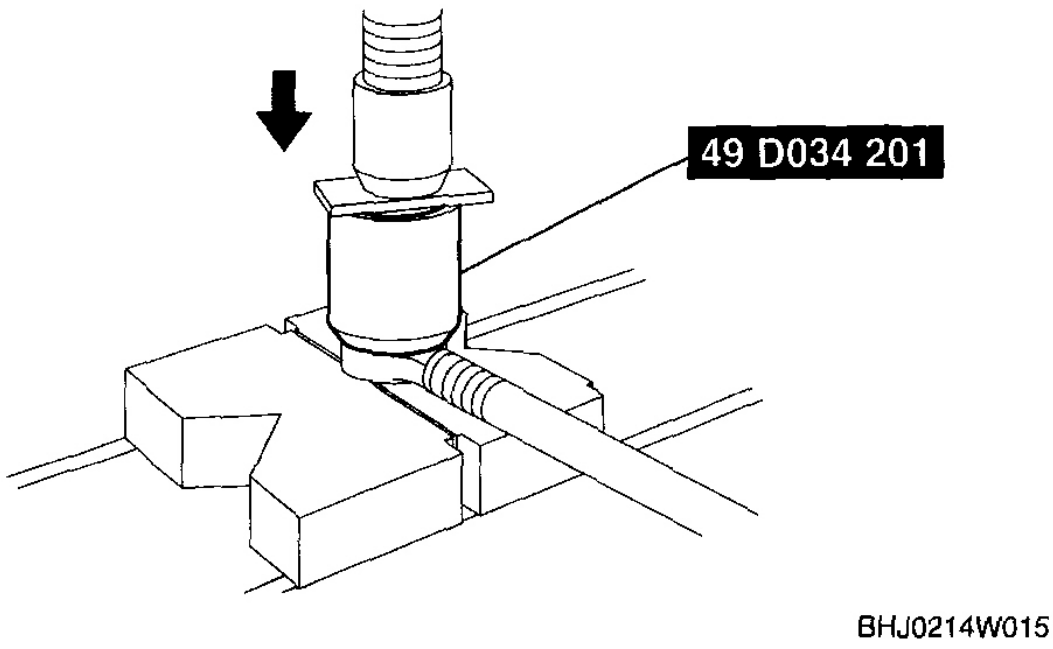


Fig. 23: Installing Dust Boot To Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

REAR TRAILING LINK (UPPER) INSPECTION

1. Remove the rear trailing link (upper) from the vehicle. (See **REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION** .)
2. Inspect the link or bending or damage. If there is any malfunction, replace the rear trailing link (upper).
3. Inspect the ball joint for looseness. If there is any malfunction, replace the ball joint.
4. Rotate the ball joint **5 times.**
5. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Rear trailing link (upper) ball joint rotational torque

   0.4-3.3 N.m {5-33 kgf.cm, 4-29 in.lbf}

   - If not within the specification, replace the rear trailing link (upper). (See **REAR TRAILING LINK (UPPER) REMOVAL/INSTALLATION** .)

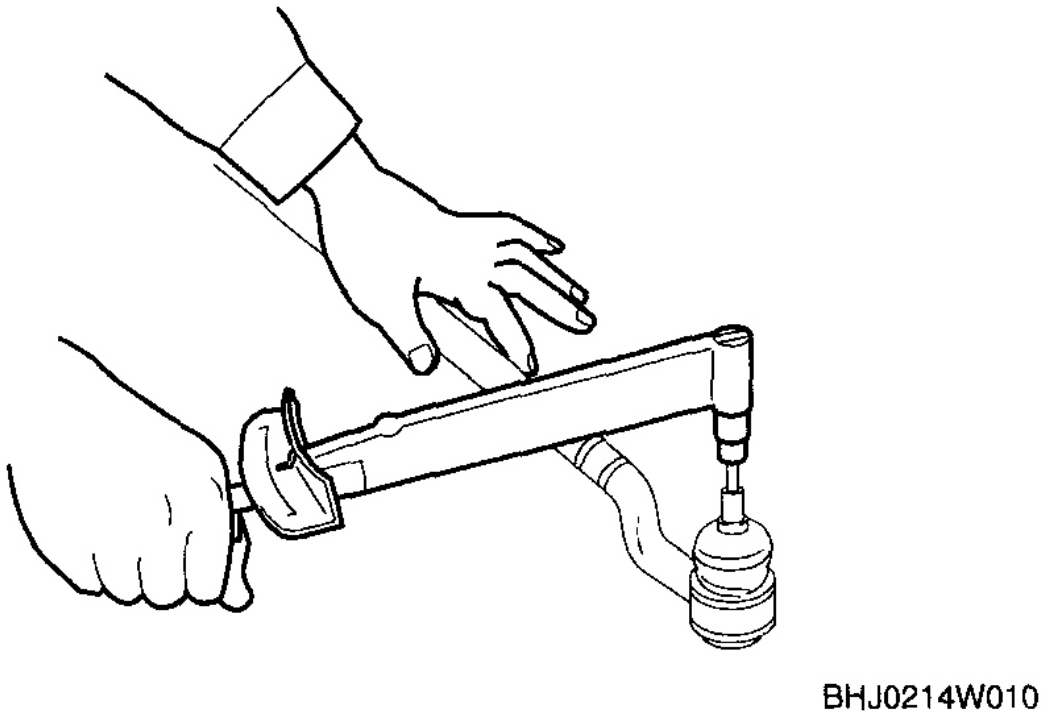
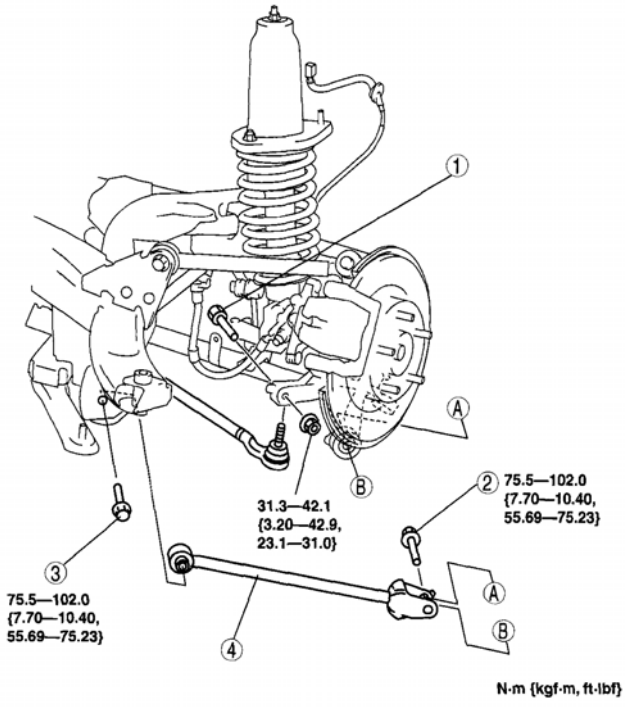


Fig. 24: Measuring Ball-Joint Rotational Torque Using Allen Wrench & Torque Wrench
Courtesy of MAZDA MOTORS CORP.

REAR TRAILING LINK (LOWER) REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 25** .
2. Install in the reverse order of removal.
3. Inspect the rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



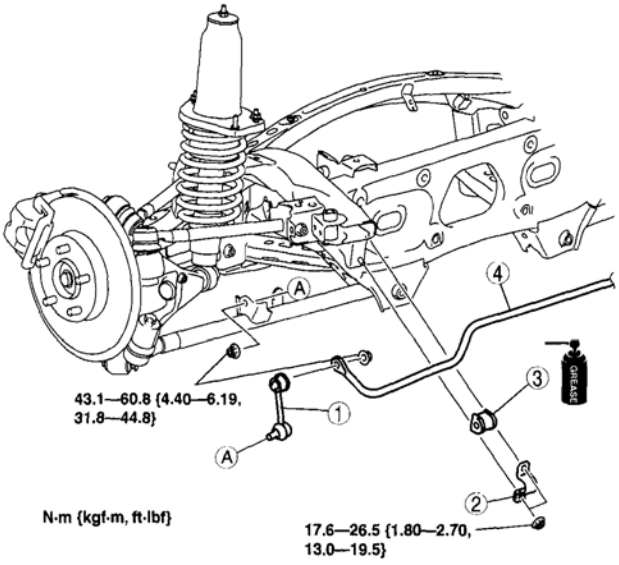
1	Toe control link outer bolt
2	Rear trailing link (lower) outer bolt

3	Rear trailing link (lower) inner bolt
4	Rear trailing link (lower)

Fig. 25: Identifying Rear Trailing Link (Lower) (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR STABILIZER REMOVAL/INSTALLATION

1. Remove in the order indicated in **Fig. 26**.
2. Install in the reverse order of removal.



1	Stabilizer control link	3	Bushing
2	Stabilizer bracket	4	Rear stabilizer

G04318173

Fig. 26: Identifying Rear Stabilizer (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR STABILIZER INSTALLATION NOTE

1. Install the rear stabilizer so that the identification mark is on the right side of the vehicle.

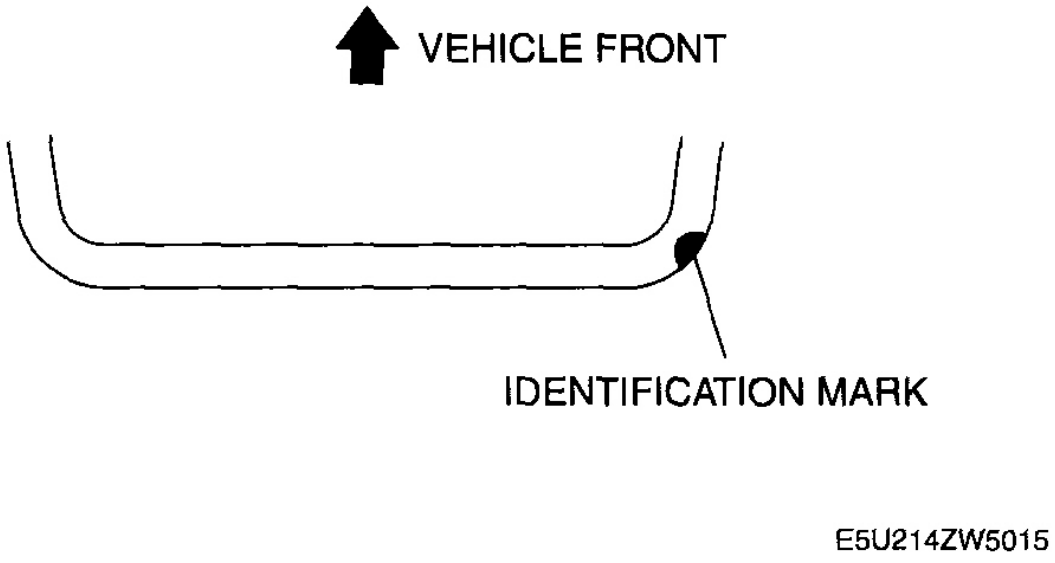


Fig. 27: Identifying Identification Mark
Courtesy of MAZDA MOTORS CORP.

STABILIZER CONTROL LINK INSTALLATION NOTE

1. Install the stabilizer control link in the proper angle as shown in **Fig. 28** .

CAUTION:

- **Be sure to install the stabilizer control link in the proper position. If it is not installed properly, the stabilizer control link may interfere with peripheral components when driving, causing damage to each other.**

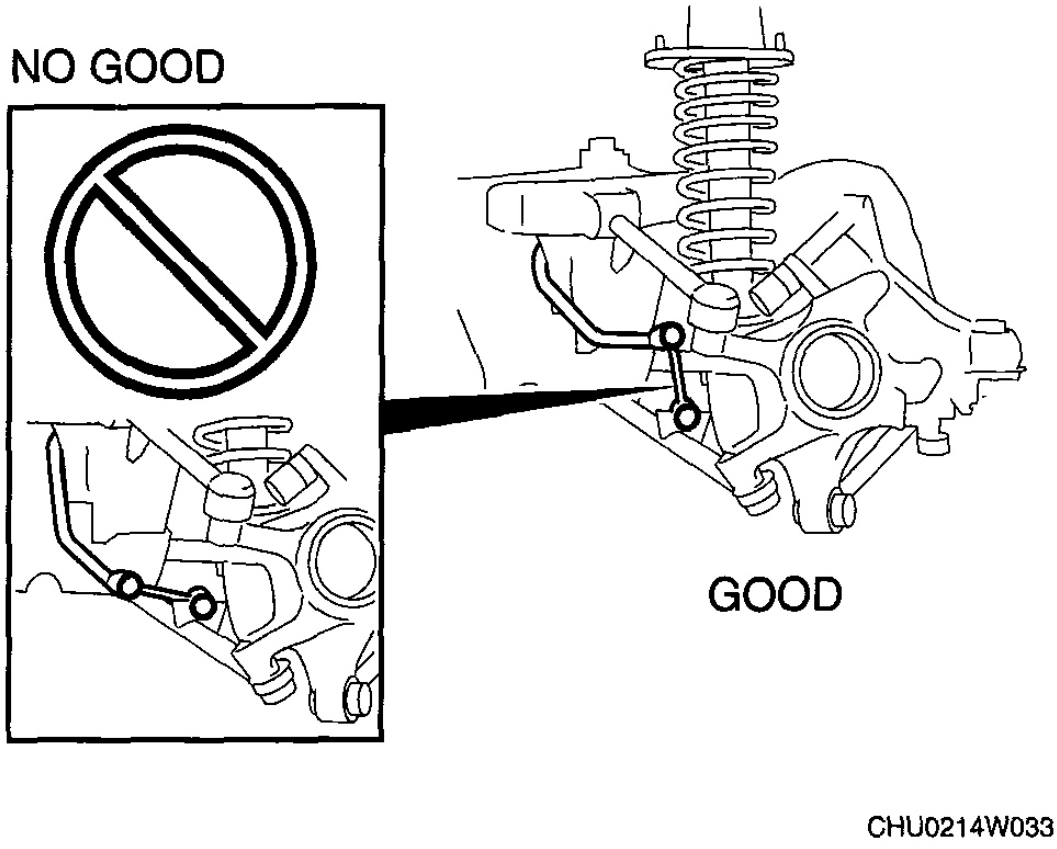


Fig. 28: Precaution For Stabilizer Control Link (1 Of 2)
Courtesy of MAZDA MOTORS CORP.

2. Place the vehicle on, the ground and verify that the stabilizer control link is installed in the angle shown in **Fig. 29** .

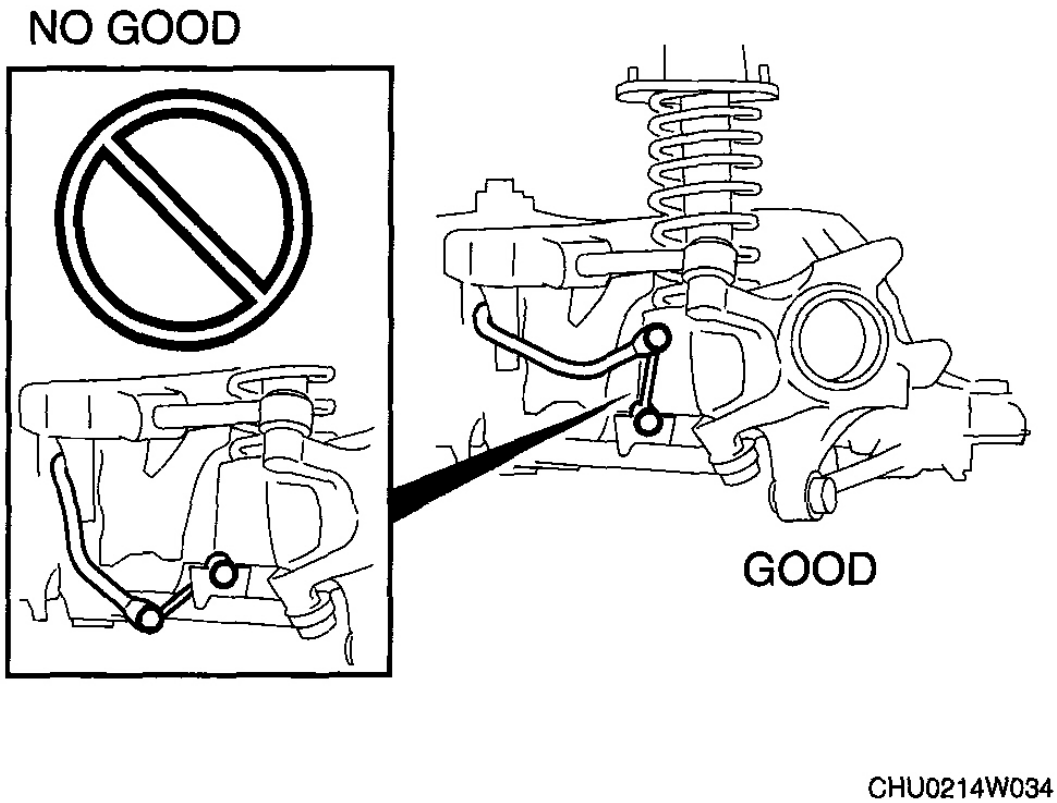


Fig. 29: Precaution For Stabilizer Control Link (2 Of 2)
Courtesy of MAZDA MOTORS CORP.

REAR STABILIZER CONTROL LINK INSPECTION

1. Remove the stabilizer control link from the vehicle. (See **REAR STABILIZER REMOVAL/INSTALLATION** .)
2. Inspect the link for bending or damage. If there is any malfunction, replace the link.
3. Rotate the ball joint **10 times,** and rock the ball joint **10 times.**
4. Measure the ball-joint rotational torque using an Allen wrench and a torque wrench.

   Stabilizer control link ball joint rotational torque

   0.23-0.47 N.m {2.35-4.79 kgf.cm, 2.04-4.15 in.lbf}

   - If not within the specification, replace the stabilizer control link ball joint. (See **REAR STABILIZER REMOVAL/INSTALLATION** .)

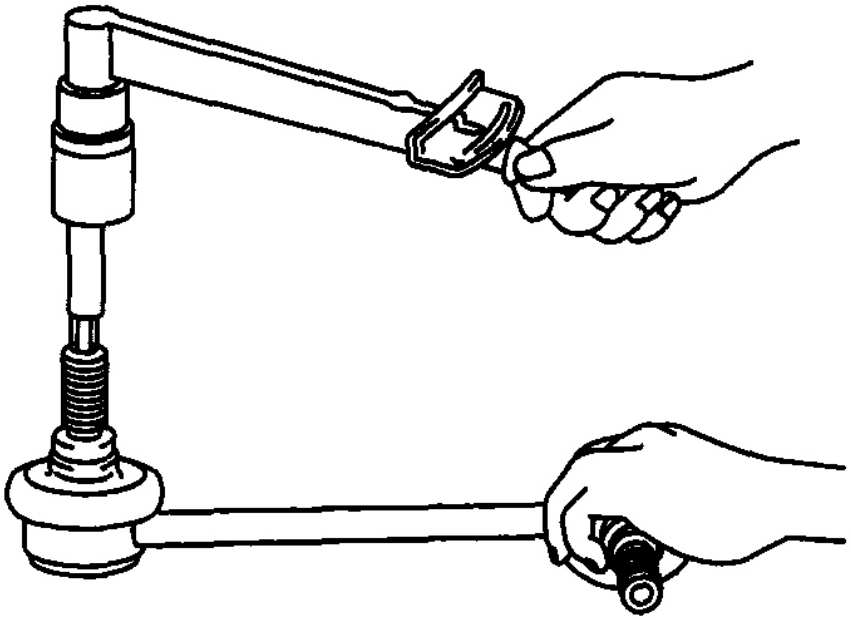


Fig. 30: Measuring Ball-Joint Rotational Torque Using Allen Wrench & Torque Wrench
Courtesy of MAZDA MOTORS CORP.

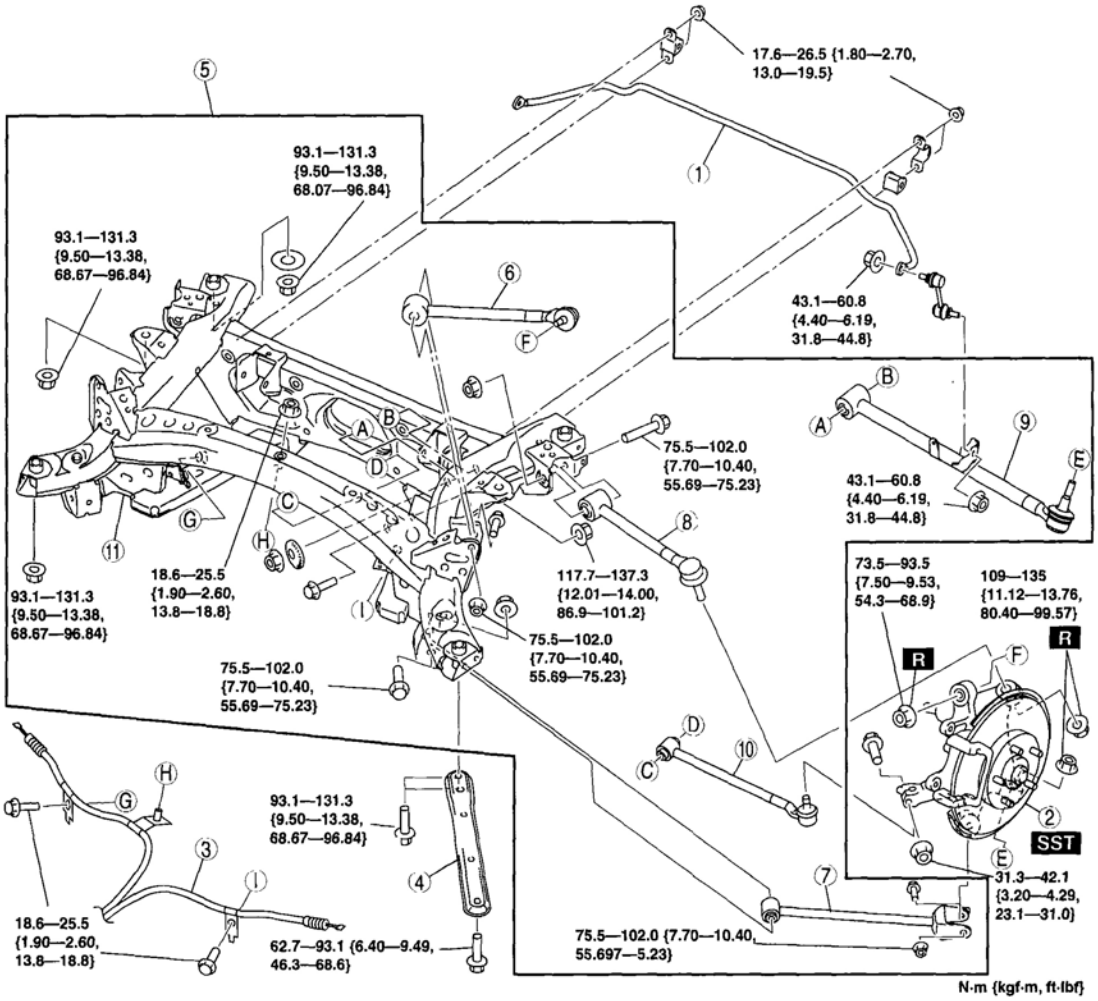
REAR CROSSMEMBER REMOVAL/INSTALLATION

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 operations, remove the ABS wheel-speed sensor (axle side) and move the sensor away from the harnesses.**

1. Remove the exhaust pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [LF]** .)
2. Remove the propeller shaft. (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
3. Remove the power plant frame. (See **TRANSMISSION REMOVAL/INSTALLATION [M15M-D]** .) (See **TRANSMISSION REMOVAL/INSTALLATION [P66M-D]** .) (See **AUTOMATIC TRANSMISSION REMOVAL/INSTALLATION [SJ6A-EL]** .)
4. Remove the rear drive shaft. (See **REAR DRIVE SHAFT REMOVAL/INSTALLATION** .)
5. Remove the rear differential. (See **REAR DIFFERENTIAL REMOVAL/INSTALLATION** .)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.

8. Inspect the rear wheel alignment. (See **REAR WHEEL ALIGNMENT** .)



1	Rear stabilizer
2	Rear axle component
3	Parking brake cable
4	Stopper plate
5	Rear crossmember component
6	Rear trailing link (upper)

7	Rear trailing link (lower)
8	Rear lateral link (upper)
9	Rear lateral link (lower)
10	Toe control link
11	Rear crossmember

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Fig. 31: Identifying Rear Crossmember Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR AXLE COMPONENT REMOVAL NOTE

NOTE:

- **When removing the ball joints, the rear knuckle bushings may also come off. If they come off, replace the rear knuckle.**

1. Support the knuckle using a jack.
2. Using the **SST** , disconnect the rear trailing link (upper) ball joint.
3. Remove the rear trailing link (lower) outer bolt.

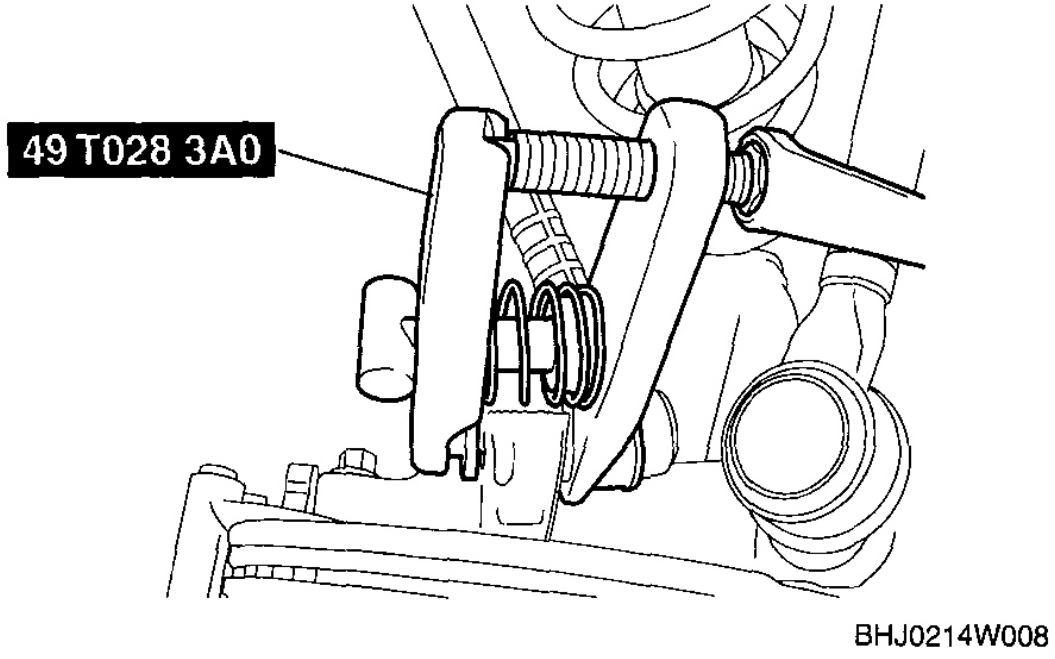


Fig. 32: Disconnecting Rear Trailing Link (Upper) Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

4. Using the **SST** , disconnect the rear lateral link (upper) ball joint.

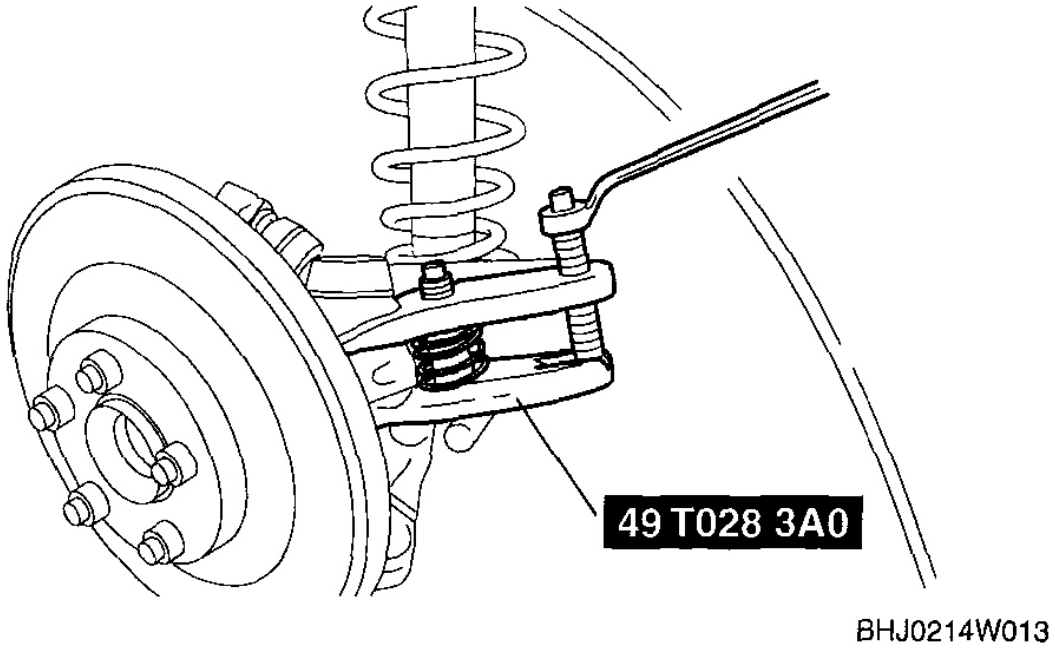


Fig. 33: Disconnecting Rear Lateral Link (Upper) Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

5. Using the **SST** , disconnect the rear lateral link (lower) ball joint.
6. Remove the toe control link outer bolt.
7. Remove the shock absorber lower bolt.
8. Remove the rear axle component.

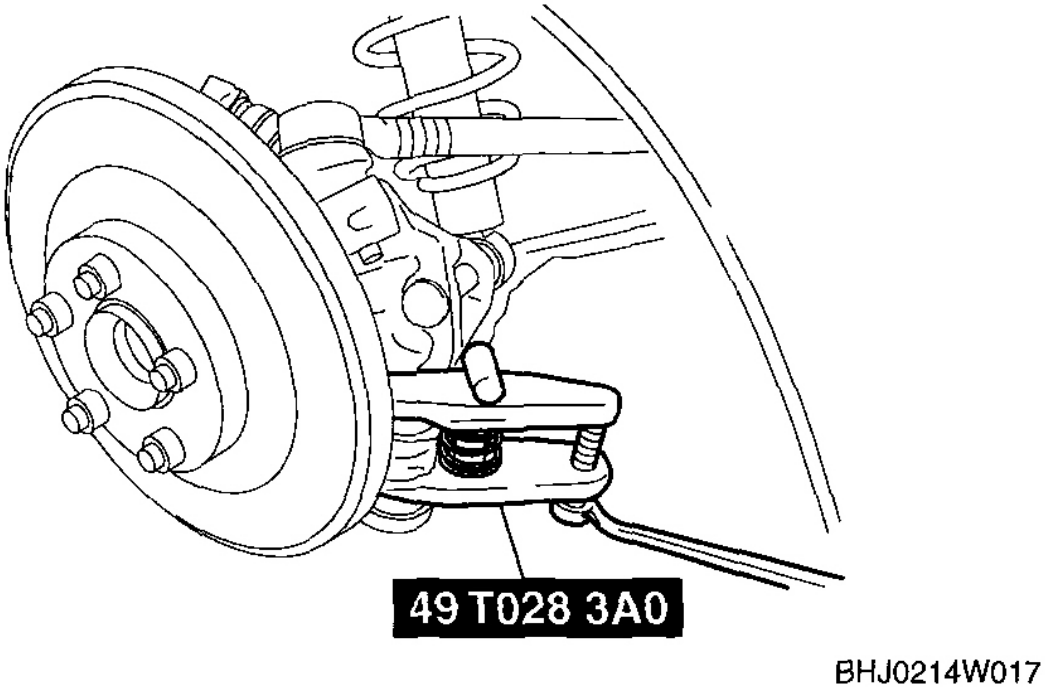


Fig. 34: Disconnecting Rear Lateral Link (Lower) Ball Joint Using SST
Courtesy of MAZDA MOTORS CORP.

REAR CROSSMEMBER COMPONENT REMOVAL NOTE

WARNING:

- **Be sure that the crossmember component is securely supported by the jack. If not securely supported, the crossmember component could fall, resulting in serious injury or death, and damage to the vehicle.**

1. Support the rear crossmember with the jack, and remove the bolt.

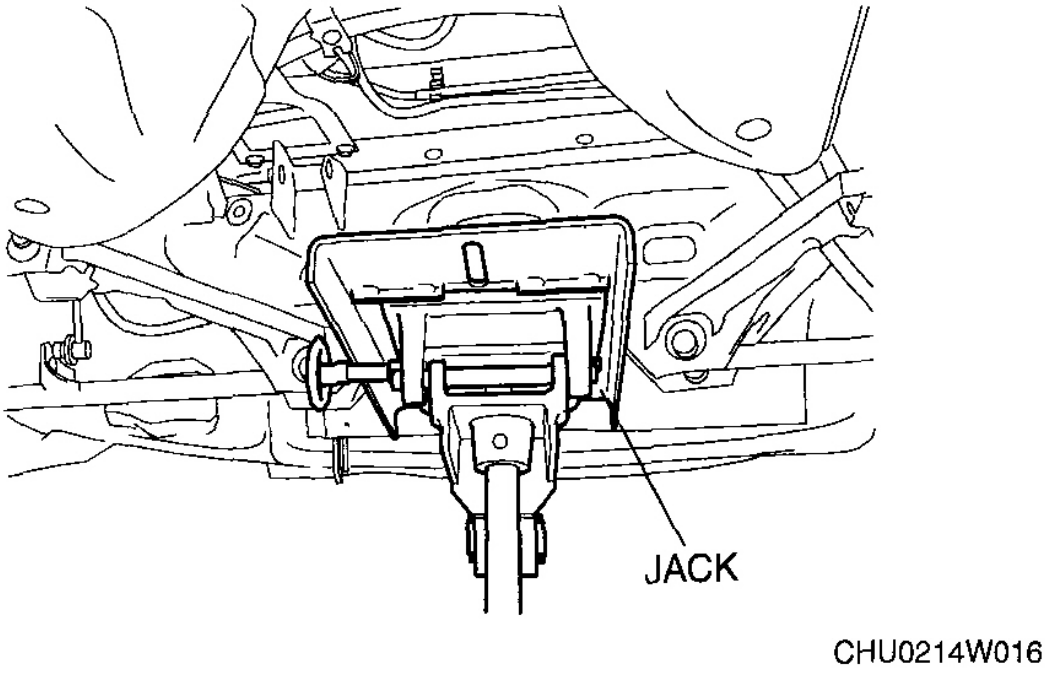


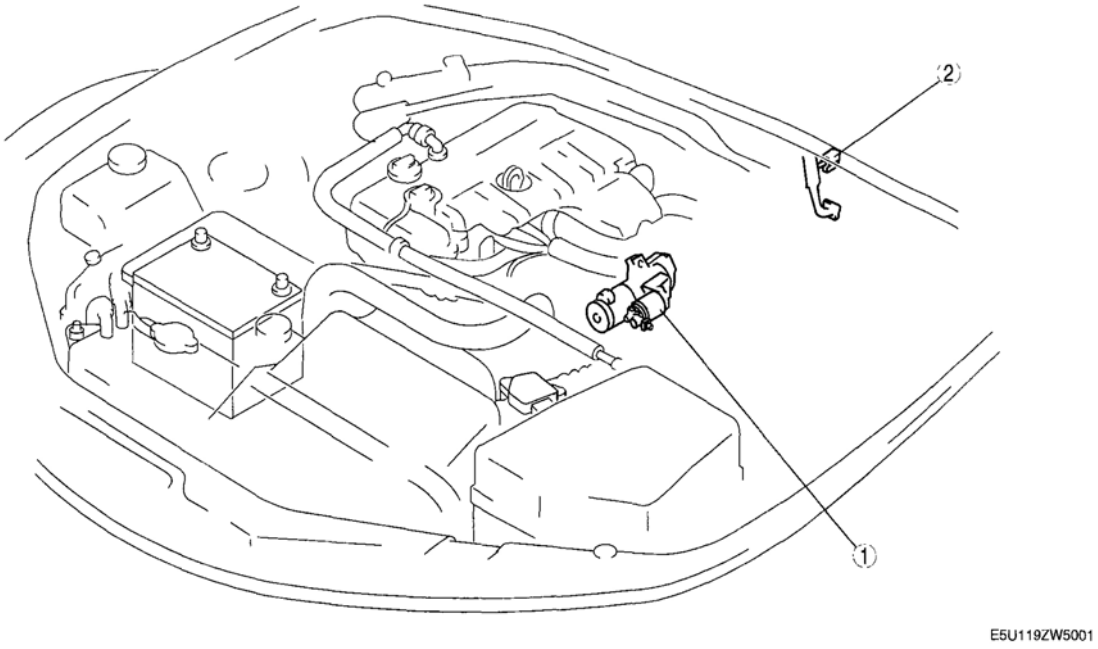
Fig. 35: Supporting Rear Crossmember With Jack
Courtesy of MAZDA MOTORS CORP.

2. Remove the rear crossmember component.

2008 ENGINE

Starting System - MX-5 Miata

STARTING SYSTEM LOCATION INDEX [LF]



1	Starter
2	Starter interlock switch (MT)

Fig. 1: Identifying Location Of Starting System Components
Courtesy of MAZDA MOTORS CORP.

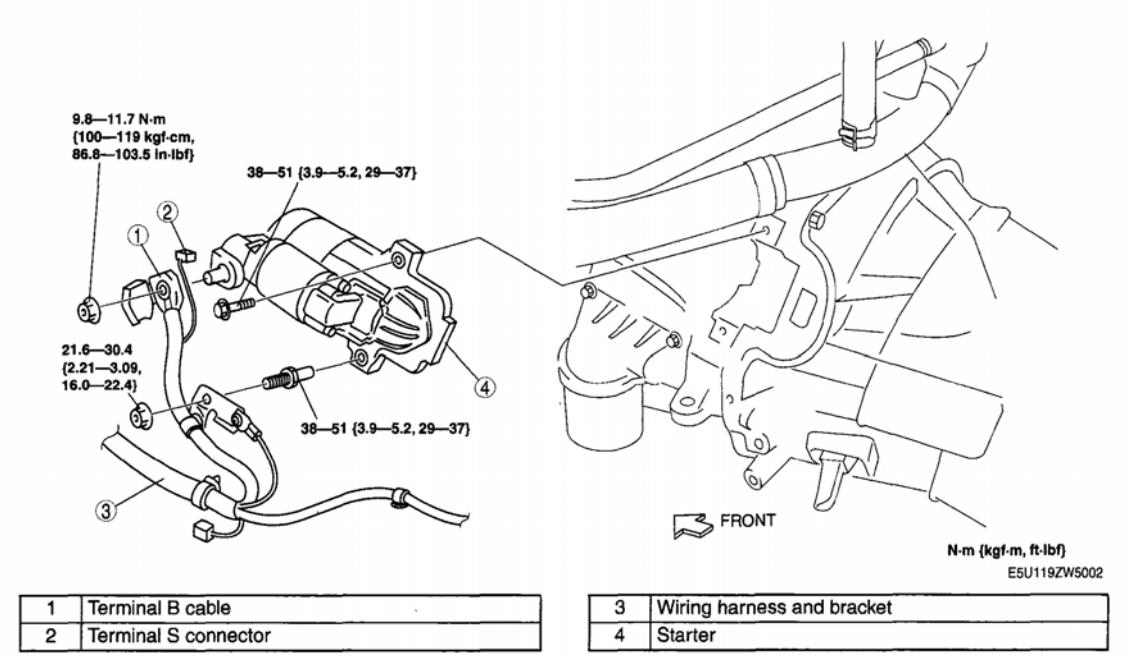
STARTER REMOVAL/INSTALLATION [LF]

WARNING:

- **Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.**
- **When the battery cables are connected, touching the vehicle body with starter terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the negative battery cable before performing the following operation.**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the side cover. (LH)

4. Remove the under cover. (MT) (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
5. Remove the clutch release cylinder with the pipes still connected. Position the clutch release cylinder so that it is out of the way. (MT) (See **TRANSMISSION REMOVAL/INSTALLATION [M15M-D]** .) (See **TRANSMISSION REMOVAL/INSTALLATION [P66M-D]** .)
6. Remove in the order indicated in **Fig. 2** .
7. Install in the reverse order of removal.



1	Terminal B cable	3	Wiring harness and bracket
2	Terminal S connector	4	Starter

Fig. 2: View Of Starter Removal Order & Components (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

STARTER INSTALLATION NOTE

NOTE:

- **If there is peeling on or damage to the insulator, attach a new insulator using the following procedure:**

1. Peel off the insulator from the starter completely using a scraper.

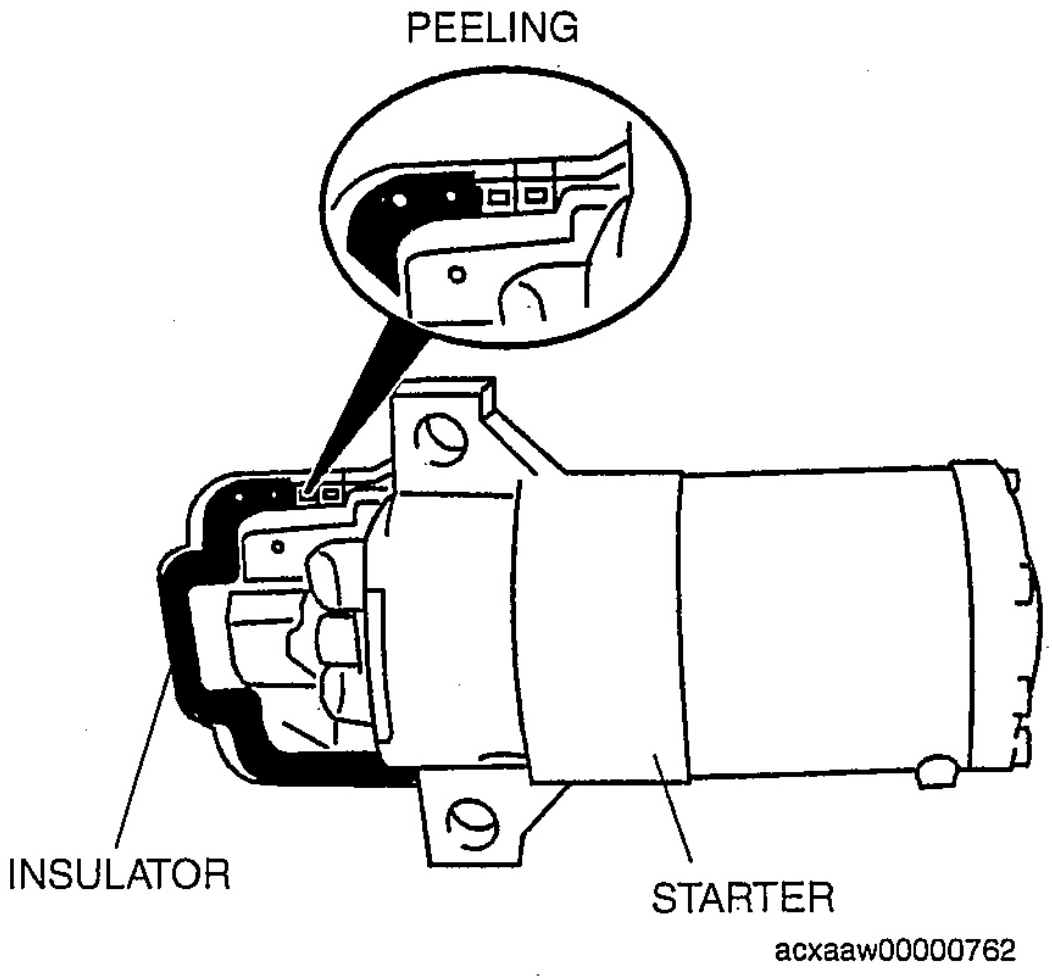


Fig. 3: Identifying Starter Insulator

2. Degrease the insulator attachment area.

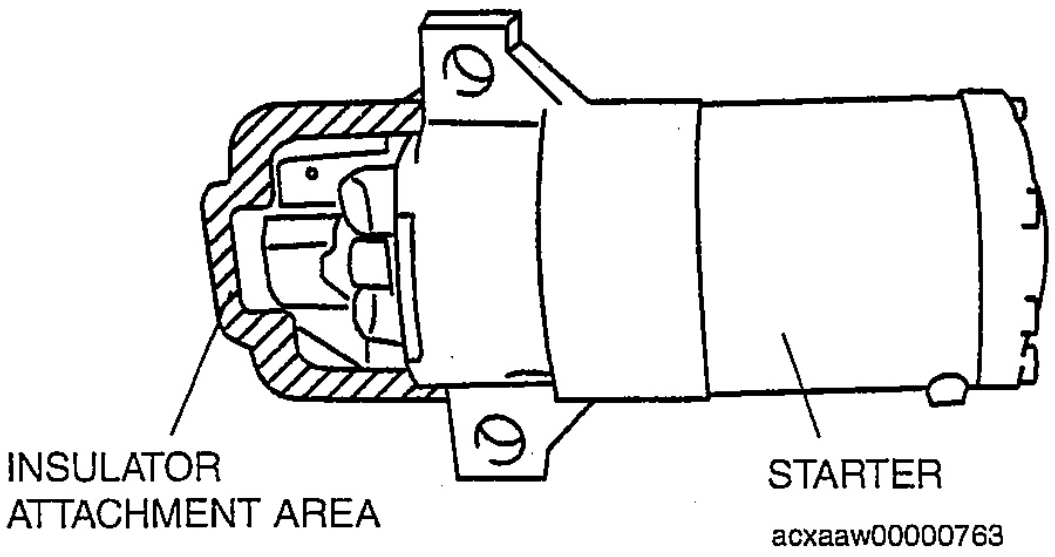


Fig. 4: Identifying Insulator Attachment Area

3. Attach a new insulator to the starter.

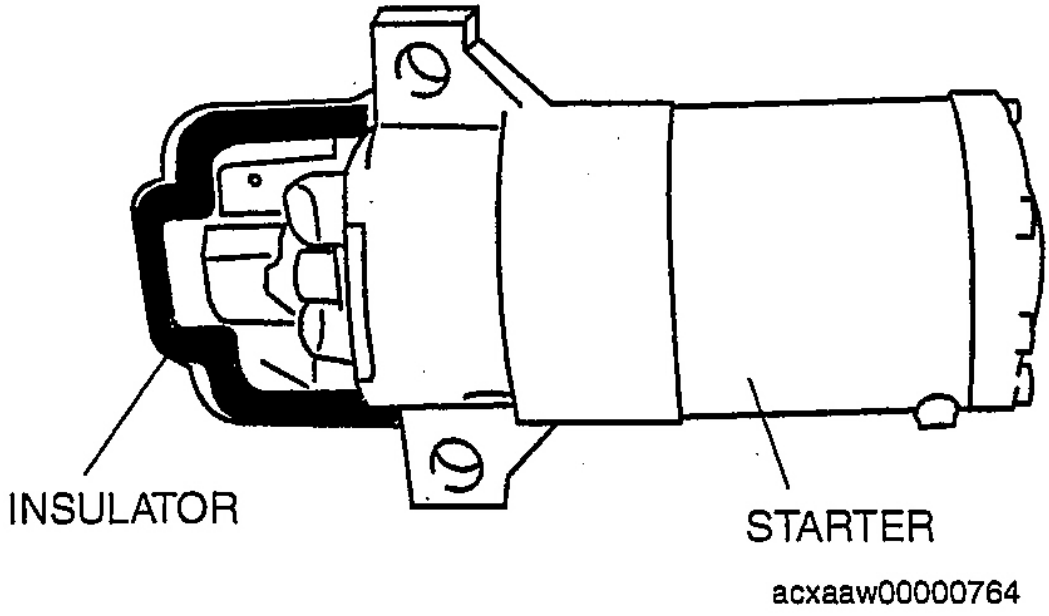


Fig. 5: Identifying New Starter Insulator

STARTER INSPECTION [LF]

ON-VEHICLE INSPECTION

1. Verify that the battery is fully charged.
2. The starter is normal if it rotates smoothly and without any noise when the engine is cranked.
    - If the starter does not operate, inspect the following:
        - Remove the starter, and inspect the starter unit.
        - Inspect the related wiring harnesses, the ignition switch, and the transmission range switch (AT).

NO-LOAD TEST

1. Verify that the battery is fully charged.
2. Connect the starter, battery and a tester as shown in **Fig. 6** .
3. Operate the starter and verify that it rotates smoothly.
    - If the starter does not rotate smoothly, inspect the starter unit.
4. Measure the voltage and current while the starter is operating.
    - If not within the specification, replace the starter.

Starter no load test voltage

11 V

Starter no load test current

90 A or less

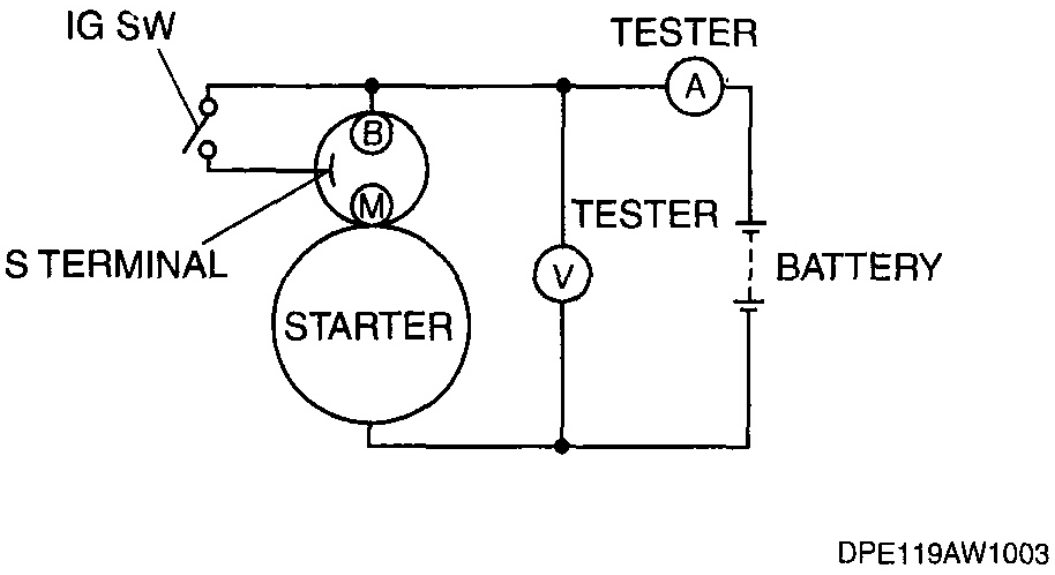


Fig. 6: No - Load Test - Circuit Diagram
Courtesy of MAZDA MOTORS CORP.

MAGNETIC SWITCH OPERATION INSPECTION

Pull-out Test

NOTE:

- **Depending on the battery charge condition, the starter motor pinion may rotate while in an extended state. This is due to current flowing to the starter motor through the pull-in coil to turn the starter motor, and does not indicate an abnormality.**

1. Verify that the starter motor pinion is extended while battery positive voltage is connected to terminal S and the starter body is grounded.
   - If the starter motor pinion is not extended, repair or replace the starter.

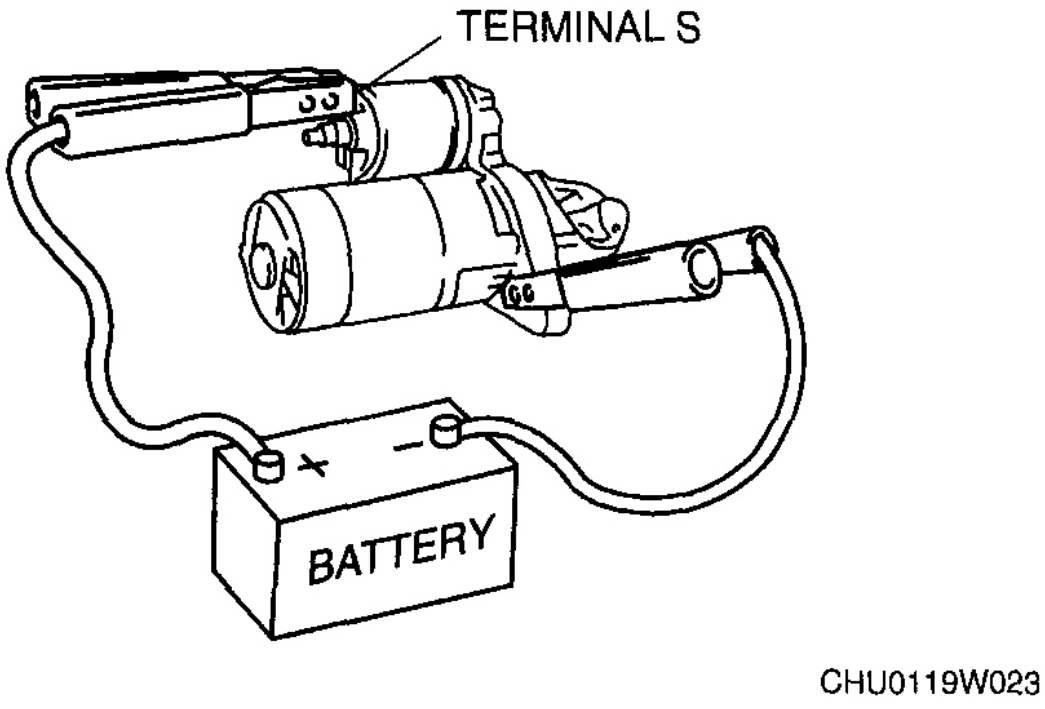


Fig. 7: Energizing Starter S Terminal
Courtesy of MAZDA MOTORS CORP.

Return test

1. Disconnect the motor wire from terminal M.
2. Connect battery positive voltage to terminal M and ground the starter body.

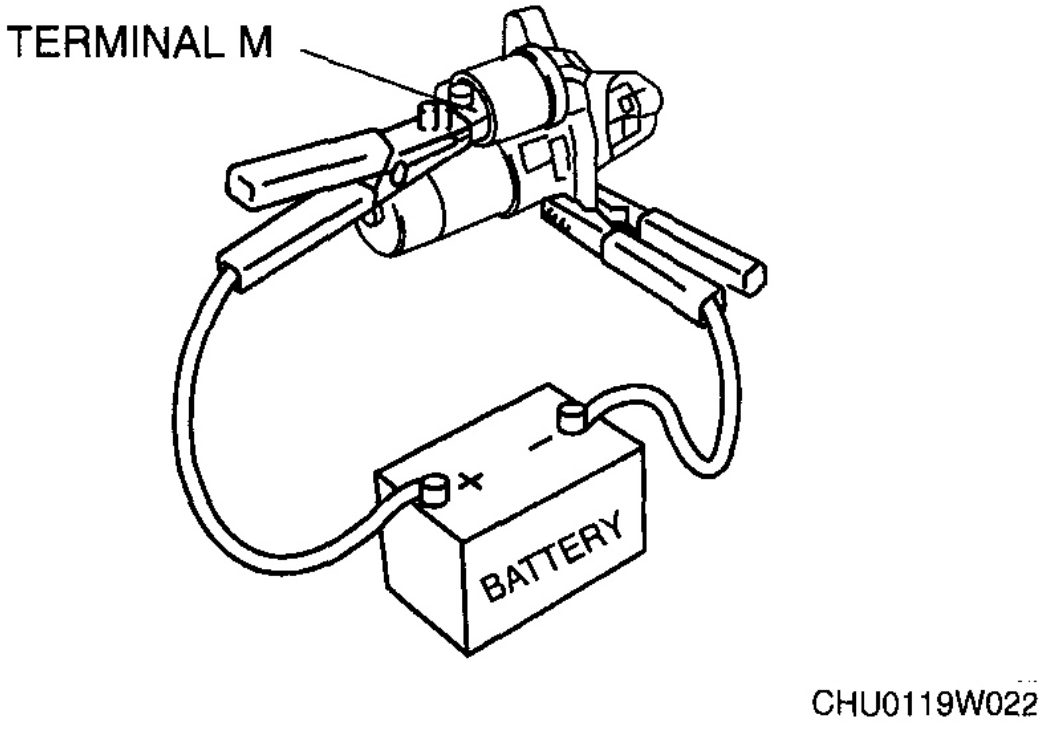


Fig. 8: Connecting Battery Positive Voltage To Terminal M & Ground Starter Body
Courtesy of MAZDA MOTORS CORP.

3. Pull out the drive pinion with a screwdriver. Verify that it returns to its original position when released.
   - If it does not return, repair or replace the starter.

PINION GAP INSPECTION

1. Pull out the drive pinion with the battery positive voltage connected to terminal S and the starter body grounded.

CAUTION:
- **Applying power for more than 10 s can damage the starter. Do not apply power for more than 10s.**

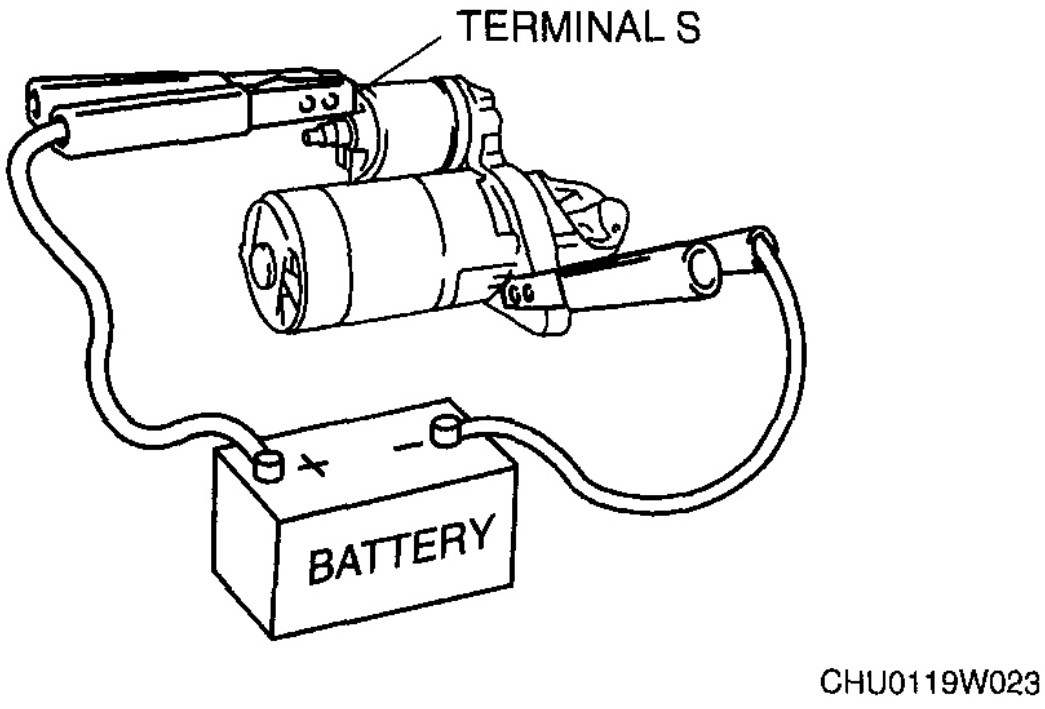


Fig. 9: Energizing Starter S Terminal
Courtesy of MAZDA MOTORS CORP.

2. Measure the pinion gap while the drive pinion is extended.
    - If not as specified, adjust with an adjustment washer (between drive housing front cover and magnetic switch).

Starter pinion gap

0.5-2.0 mm {0.02-0.07 in}

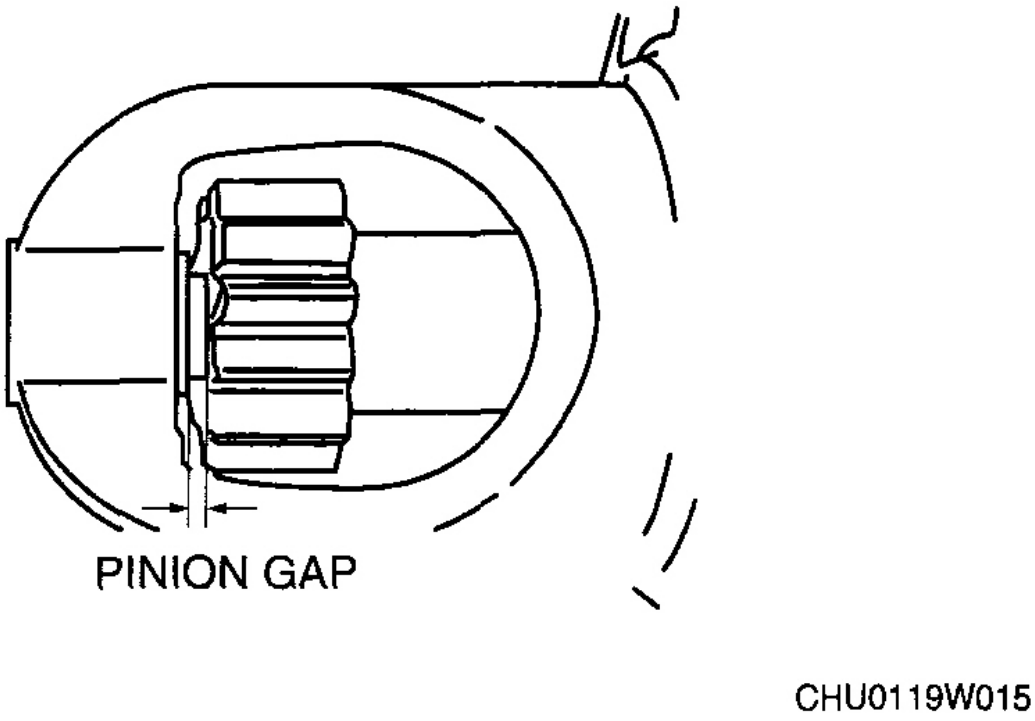


Fig. 10: Measuring Pinion Gap While Drive Pinion Is Extended
Courtesy of MAZDA MOTORS CORP.

STARTER INNER PARTS INSPECTION

Armature

1. Verify that there is no continuity between the commutator and the core at each segment using a tester.
    - If there is continuity, replace the armature.

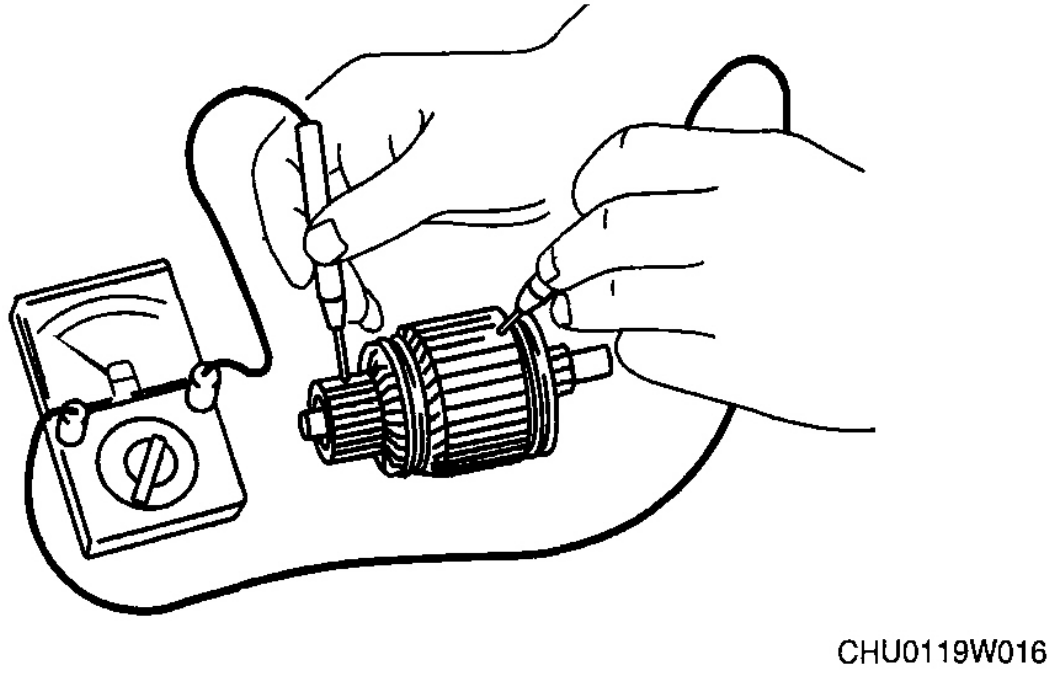


Fig. 11: Inspecting Continuity Between Commutator & Core
Courtesy of MAZDA MOTORS CORP.

2. Verify that there is no continuity between the commutator and the shaft using a tester.
    - If there is continuity, replace the armature.

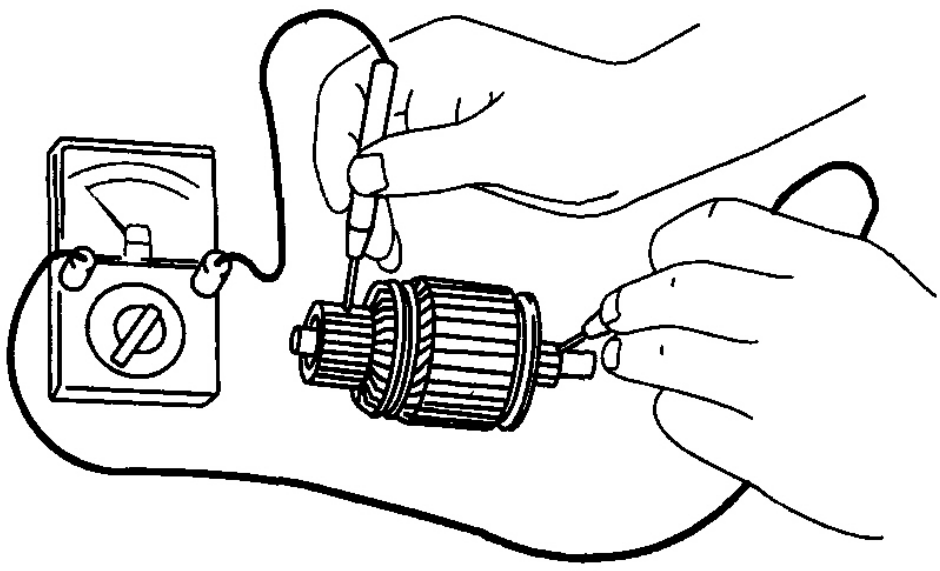


Fig. 12: Inspecting Continuity Between Commutator & Shaft
Courtesy of MAZDA MOTORS CORP.

3. Place the armature on V-blocks, and measure the runout using a dial indicator.

   Starter armature runout

   0.1 mm {0.004 in} max.

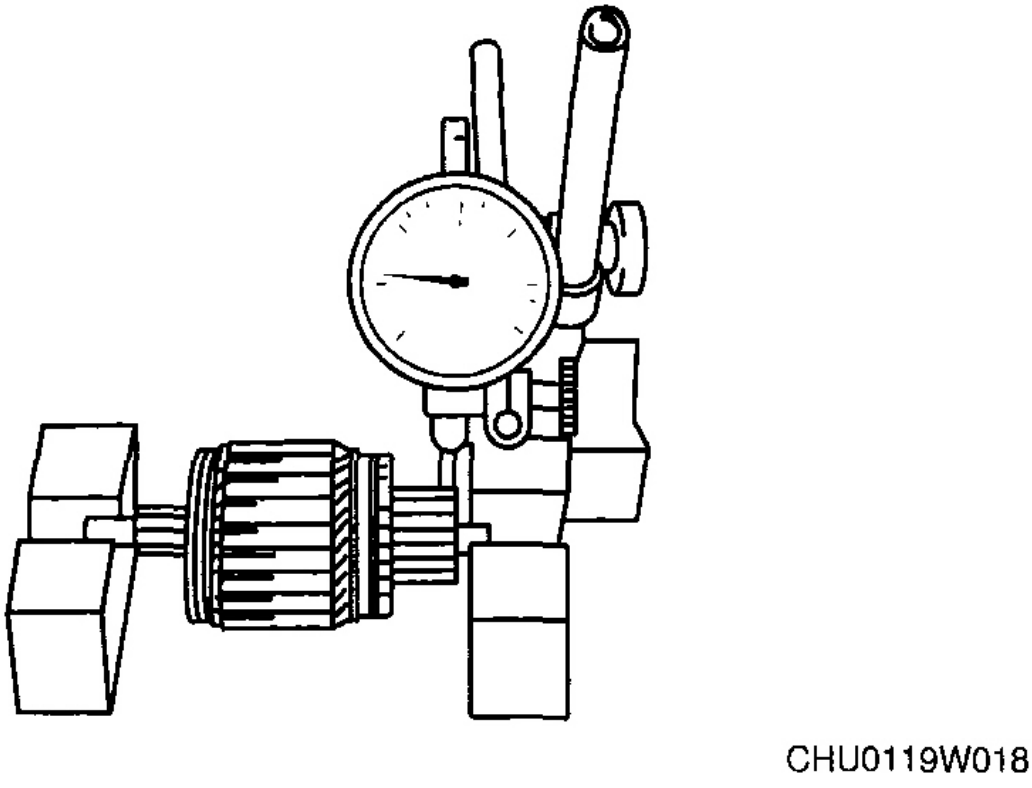


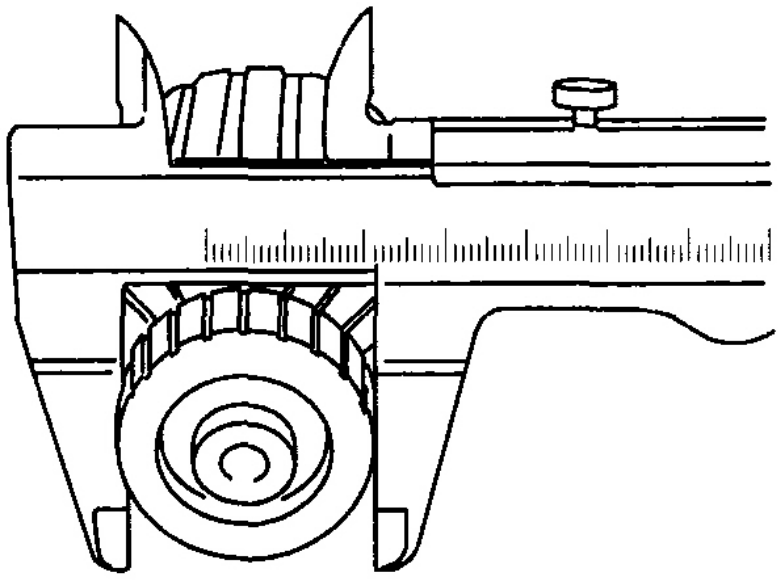
Fig. 13: Measuring Armature Runout Using Dial Indicator
Courtesy of MAZDA MOTORS CORP.

4. Measure the commutator diameter.
    - If not within the minimum specification, replace the armature.

Starter commutator diameter

Standard: 29.4 mm {1.16 in}

Minimum: 28.8 mm {1.13 in}



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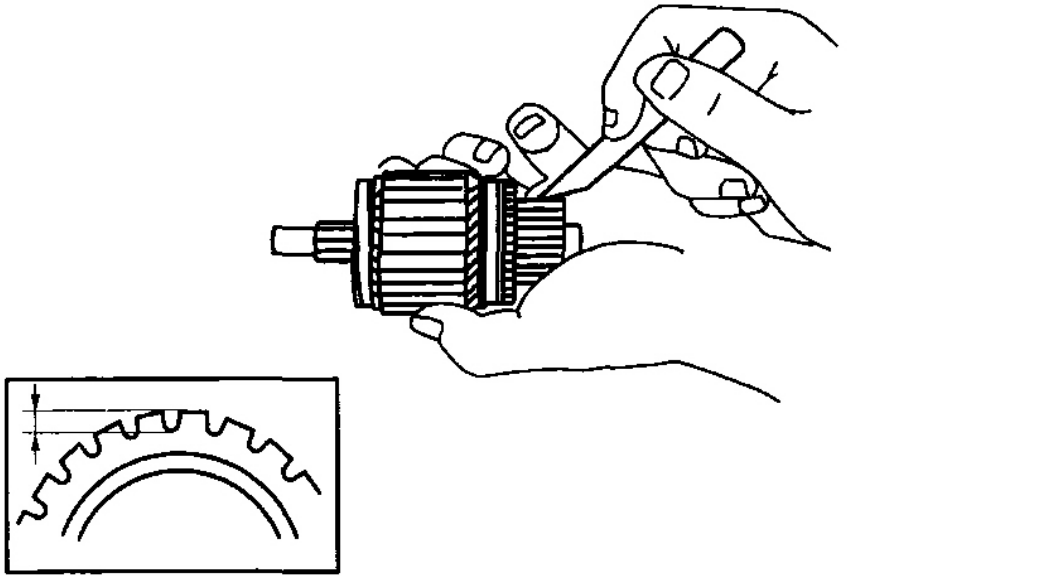
Fig. 14: Measuring Commutator Diameter
Courtesy of MAZDA MOTORS CORP.

5. Measure the segment groove depth of the commutator.
   - If not within the minimum specification, undercut the grooves to the standard depth.

Segment groove depth of starter commutator

Standard: 0.5 mm {0.02 in}

Minimum: 0.2 mm {0.008 in}



CHU0119W020

Fig. 15: Measuring Segment Groove Depth Of Commutator
Courtesy of MAZDA MOTORS CORP.

Magnetic Switch

1. Inspect for continuity between terminals S and M using a tester.
    - If there is no continuity, replace the magnetic switch.

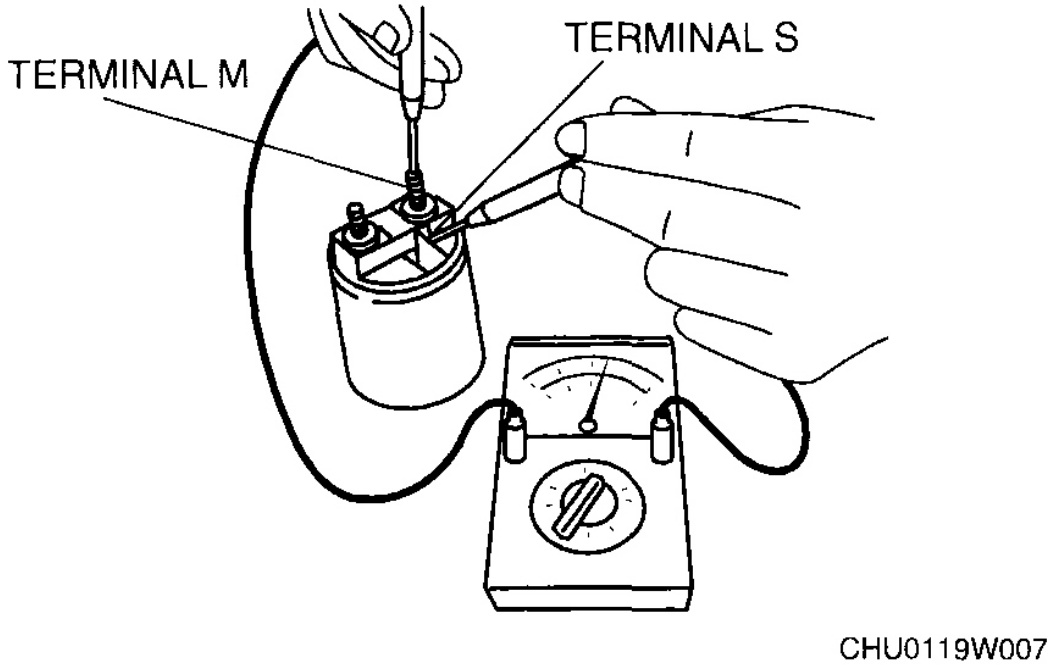


Fig. 16: Verifying If There Is Continuity Between Terminals S & M
Courtesy of MAZDA MOTORS CORP.

2. Inspect for continuity between terminal S and the body using a tester.
    - If there is no continuity, replace the magnetic switch.

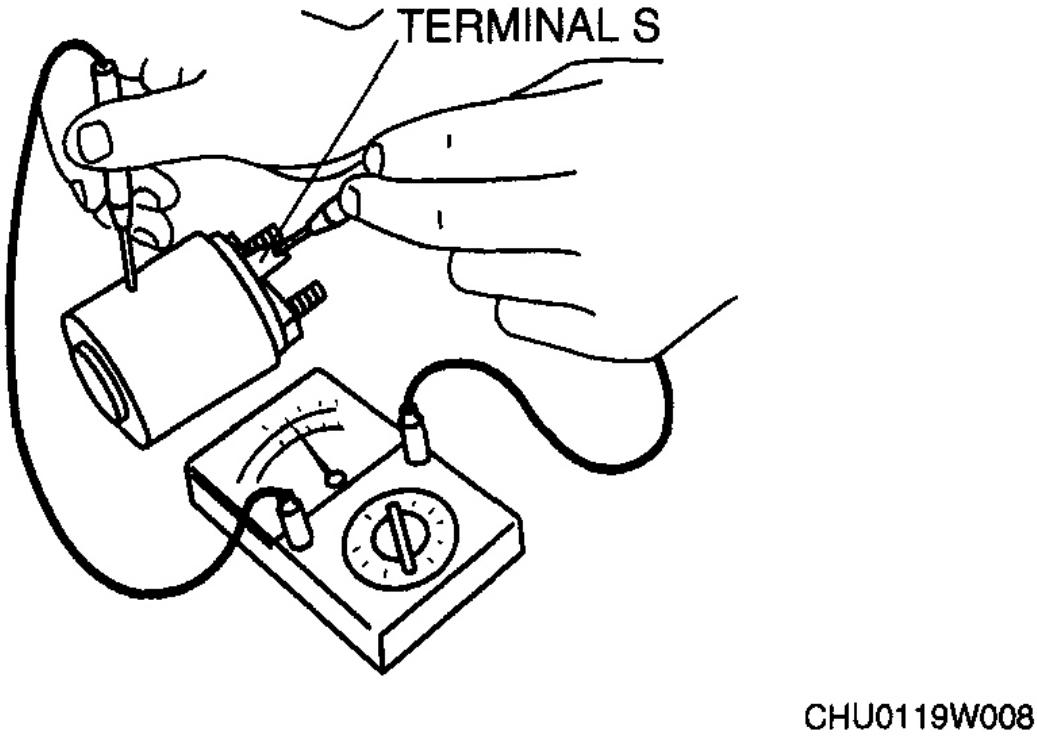


Fig. 17: Verifying If There Is Continuity Between Terminal S & Body
Courtesy of MAZDA MOTORS CORP.

3. Verify that there is no continuity between terminals M and B using a tester.
    - If there is continuity, replace the magnetic switch.

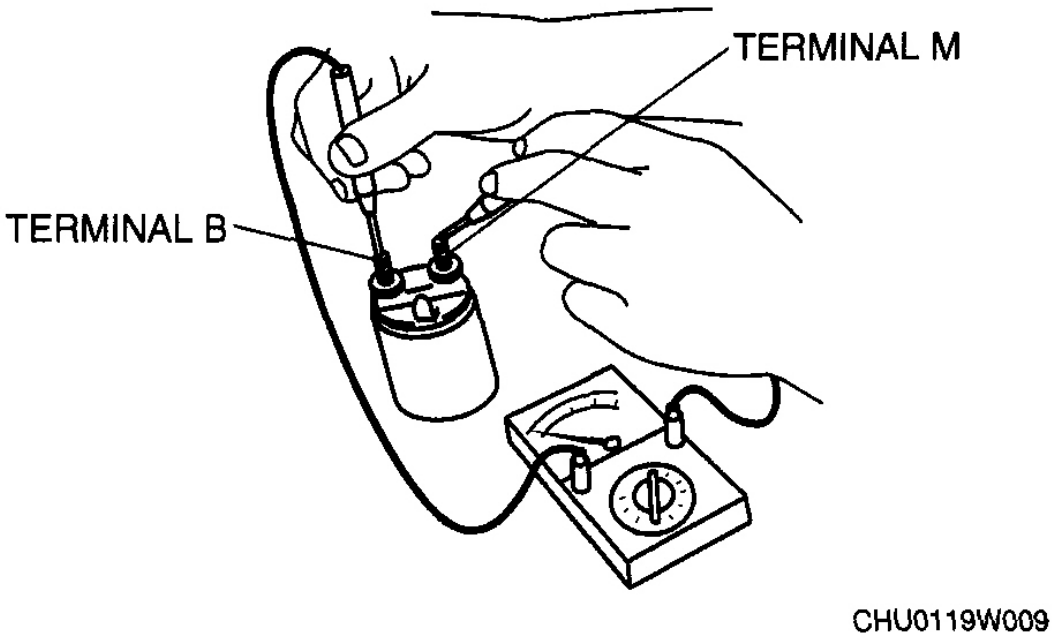


Fig. 18: Verifying If There Is No Continuity Between Terminals M & B
Courtesy of MAZDA MOTORS CORP.

Brush And Brush Holder

1. Verify that there is no continuity between each insulated brush and plate using a tester.
    - If there is continuity, replace the brush holder.

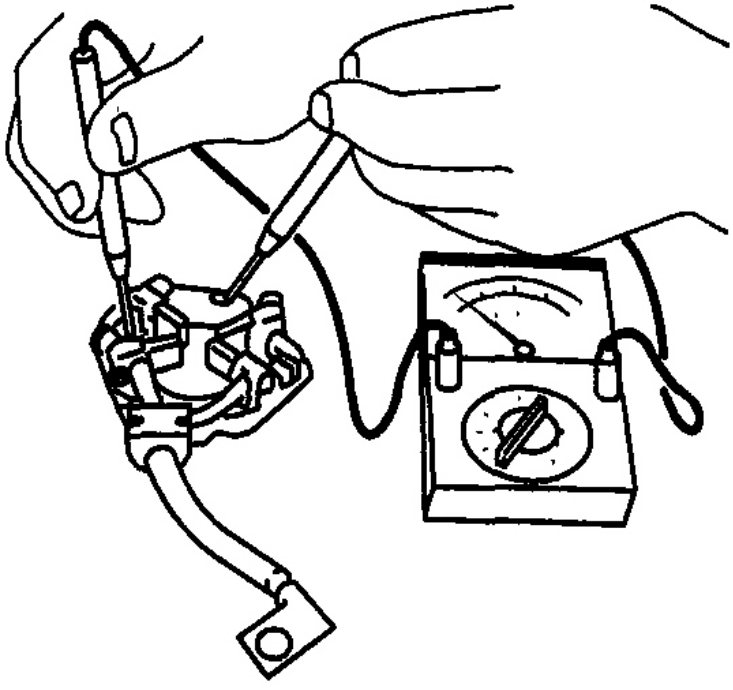


Fig. 19: Verifying If There Is No Continuity Between Insulated Brush & Plate
Courtesy of MAZDA MOTORS CORP.

2. Measure the brush length.
   - If any brush is worn almost to or beyond the minimum specification, replace all of the brushes.

     Starter brush length

     Standard: 12.3 mm {0.48 in}

     Minimum: 5.5 mm {0.22 in}

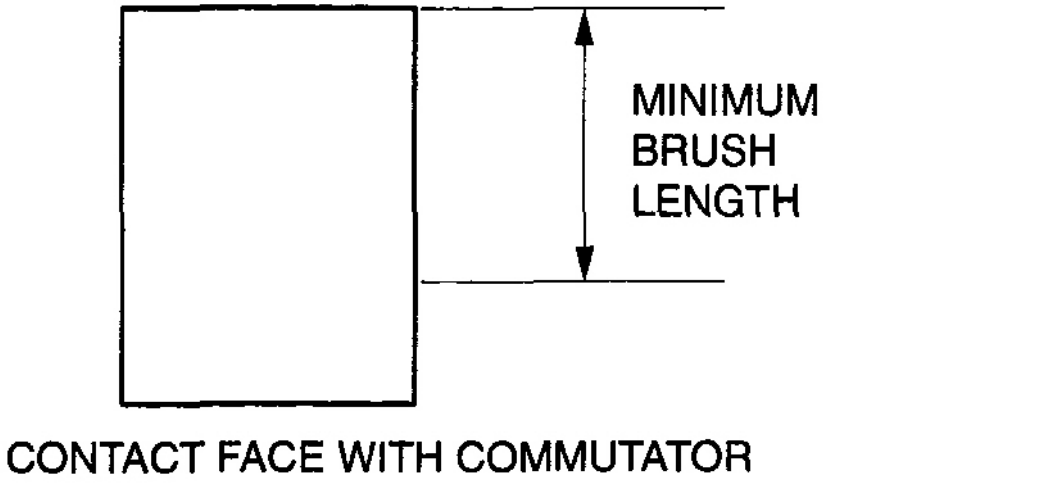


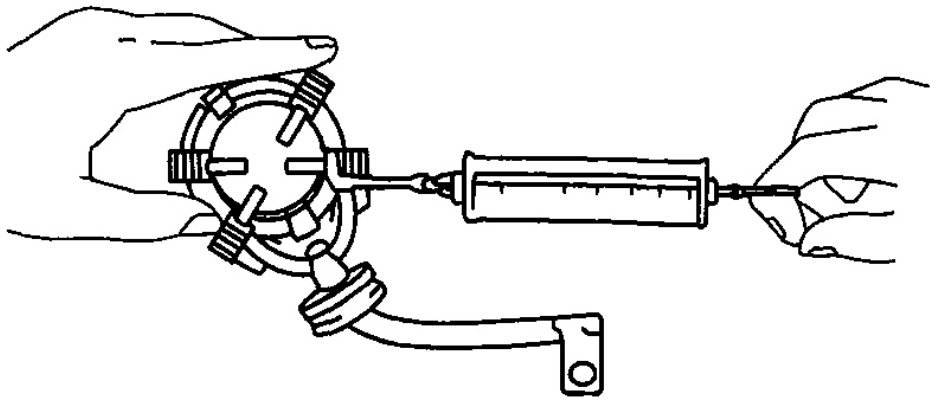
Fig. 20: Measuring Brush Length
Courtesy of MAZDA MOTORS CORP.

3. Measure the brush spring force using a spring balance.
   - If not within the minimum specification, replace the brush and brush holder component.

Starter brush spring force

Standard: 15.0-20.4 N {1.53-2.08 kgf, 3.38-4.58 lbf}

Minimum: 2.75 N {0.28 kgf, 0.62 lbf}

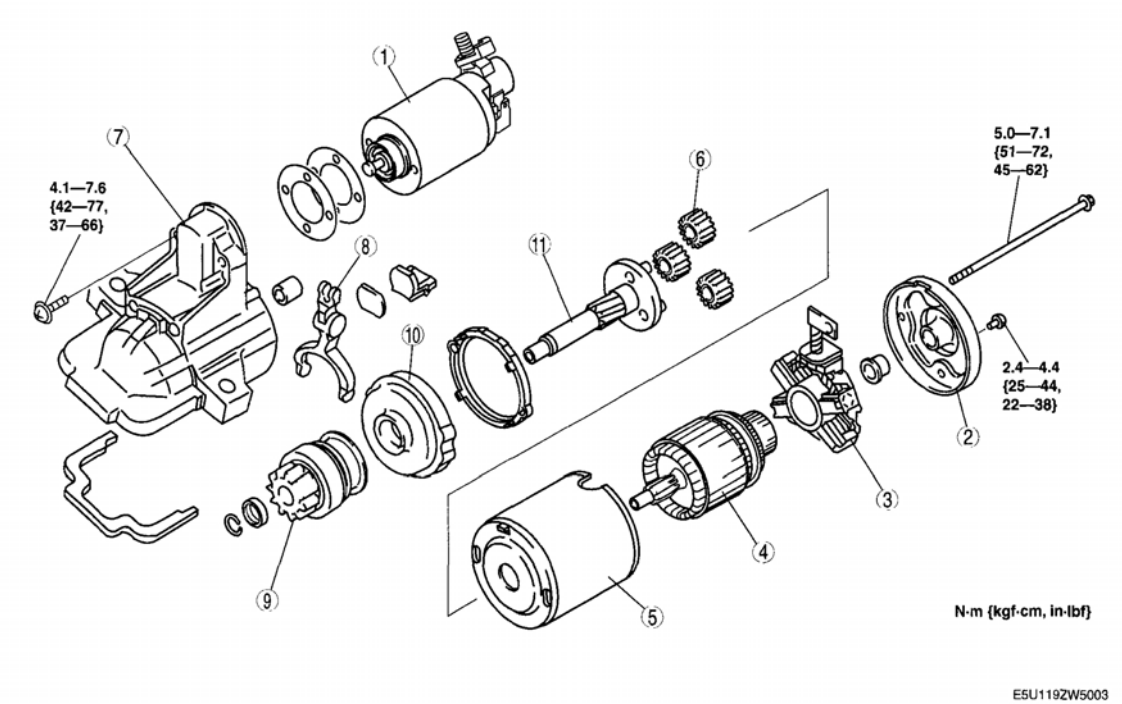


CHU0119W014

Fig. 21: Measuring Brush Spring Force Using Spring Balance
Courtesy of MAZDA MOTORS CORP.

STARTER DISASSEMBLY/ASSEMBLY [LF]

1. Disassemble in the order indicated in **Fig. 22** .
2. Assemble in the reverse order of disassembly.



1	Magnetic switch
2	Rear housing
3	Brush and brush holder
4	Armature
5	Yoke
6	Planetary gear

7	Front cover
8	Lever
9	Drive pinion
10	Internal gear
11	Gear shaft

Fig. 22: Identifying Disassemble Order Of Starter & Components (With Torque Specifications) Courtesy of MAZDA MOTORS CORP.

STARTER INTERLOCK SWITCH INSPECTION [MT]

CAUTION:

- **Do not reuse the starter interlock switch if it is removed from the vehicle even once. Replace with a new starter interlock switch when installing.**

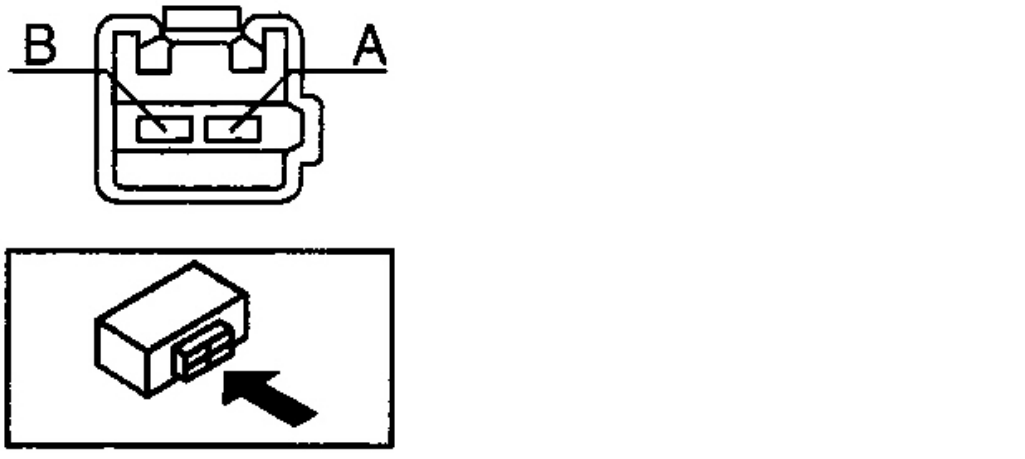
1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the starter interlock switch connector.
4. Verify that the continuity is as indicated in **Fig. 23** using a tester.
   - If the continuity is not as indicated in **Fig. 23** , replace the starter interlock switch.

○—○ : Continuity

Condition	Terminal	
	A	B
Clutch pedal is depressed	○	○
Clutch pedal is not depressed		

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Fig. 23: Starter Interlock Switch Continuity Check Table
Courtesy of MAZDA MOTORS CORP.



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Fig. 24: Identifying Starter Interlock Switch Connector Terminals
Courtesy of MAZDA MOTORS CORP.