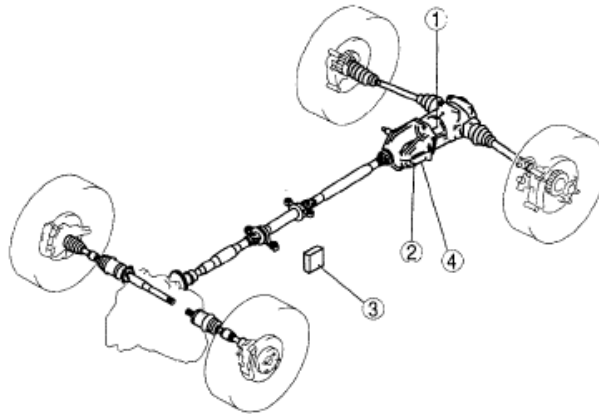


2008 DRIVELINE/AXLE

All Wheel Drive (AWD) - Mazda CX-9

ELECTRONIC AWD CONTROL SYSTEM LOCATION INDEX



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1	Differential oil temperature sensor (See 03-19-12 DIFFERENTIAL OIL TEMPERATURE SENSOR INSPECTION) (See 03-19-11 DIFFERENTIAL OIL TEMPERATURE SENSOR REMOVAL/INSTALLATION)
2	AWD solenoid (See 03-19-12 AWD SOLENOID INSPECTION)

3	AWD control module (See 03-19-2 AWD CONTROL MODULE INSPECTION) (See 03-19-3 AWD CONTROL MODULE REMOVAL/INSTALLATION)
4	Coupling component (See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION) (See 03-19-6 COUPLING COMPONENT DISASSEMBLY) (See 03-19-8 COUPLING COMPONENT ASSEMBLY)

Fig. 1: Identifying Wheel Drive Components (AWD)

Courtesy of MAZDA MOTORS CORP.

AWD CONTROL MODULE INSPECTION

NOTE:

- AWD CM terminal voltage can vary depending on measuring conditions and vehicle aging, resulting in misdiagnosis. Therefore, it is necessary to perform an overall inspection of the input/output systems and AWD CM to determine which part is malfunctioning.
- With the AWD CM connector connected, measure voltage by connecting the voltmeter negative (-) lead to the body ground and positive (+) lead to each AWD CM terminal.

1. Measure voltage or resistance at each AWD CM terminal using a voltmeter and an ohmmeter.
 - If not as specified, replace the AWD CM.

TERMINAL VOLTAGE LIST (REFERENCE)

2008 Mazda CX-9 Grand Touring

2008 DRIVELINE/AXLE All Wheel Drive (AWD) - Mazda CX-9



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Fig. 2: Identifying AWD Control Module Connector Terminal
 Courtesy of MAZDA MOTORS CORP.

TERMINAL VOLTAGE LIST (REFERENCE)

Terminal	Signal	Input/output	Connected to	Measuring item	Test condition		Voltage (V)/ Continuity	Inspection location in case of failure
A	Differential oil temperature sensor signal	Input	Differential oil temperature sensor	Voltage	Ignition key ON	Differential oil temperature 20°C {68°F}	3.0	<ul style="list-style-type: none"> Inspect differential oil temperature sensor Inspect related harness
						Differential oil temperature 60°C {140°F}	1.4	
B	-	-	-	-	-	-	-	-
C	Differential oil temperature sensor GND	-	Differential oil temperature sensor	Continuity	Any condition		Yes	<ul style="list-style-type: none"> Inspect related harness
D	-	-	-	-	-	-	-	-
E	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-
G	CAN_H	Input/output	-	Perform measurement during DTC inspection.				-
H	CAN_L	Input/output	-	Perform measurement during DTC inspection.				-
I	Power supply (Ignition switch)	Input	Ignition key	Voltage	Ignition key ON	B+		<ul style="list-style-type: none"> Inspect fuse Inspect related harness
					Ignition key OFF	1.0 or below		

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2008 DRIVELINE/AXLE All Wheel Drive (AWD) - Mazda CX-9

J	-	-	-	-	-	-	-	-
K	Power supply (Main)	Input	Battery	Voltage	Any condition		B+	<ul style="list-style-type: none"> Inspect fuse Inspect related harness
L	-	-	-	-	-	-	-	-
M	-	-	-	-	-	-	-	-
N	Ground	-	Ground	Voltage	Any condition		0	<ul style="list-style-type: none"> Inspect related harness
O	AWD solenoid (+)	Output	AWD solenoid	Voltage	Ignition key ON	B+	<ul style="list-style-type: none"> AWD solenoid Inspect related harness 	
					Ignition key OFF	1.0 or below		
P	AWD solenoid (-)	Output	AWD solenoid	Voltage	Ignition key ON	B+	<ul style="list-style-type: none"> AWD solenoid Inspect related harness 	
					Ignition key OFF	1.0 or below		

AWD CONTROL MODULE REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the dashboard undercover (Driver side). (See **DASHBOARD UNDER COVER REMOVAL/INSTALLATION** .)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

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2008 DRIVELINE/AXLE All Wheel Drive (AWD) - Mazda CX-9

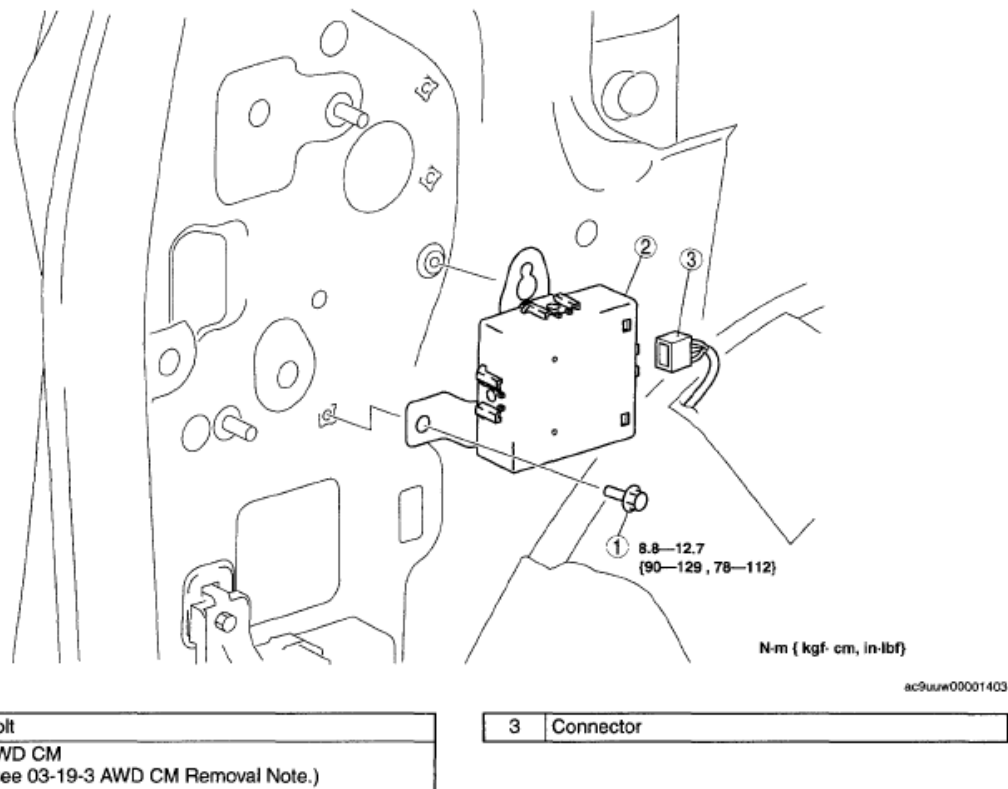


Fig. 3: Identifying AWD Control Module Connector, Bolt & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

AWD CM REMOVAL NOTE

1. Push up the AWD CM slightly, and remove it.

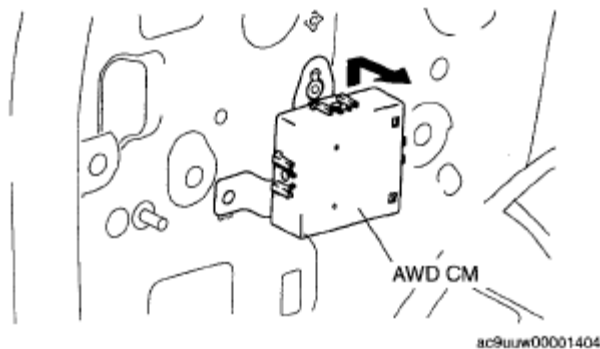


Fig. 4: Pushing Up AWD CM
Courtesy of MAZDA MOTORS CORP.

COUPLING COMPONENT REMOVAL/INSTALLATION

1. Drain the rear differential oil into a container.

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2. Remove the under guard (LH). (See **CHARCOAL CANISTER, CANISTER VENT (CV) SOLENOID VALVE, AIR FILTER COMPONENT REMOVAL/INSTALLATION [MZI-3.7]** .)
3. Remove the presilencer. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [MZI-3.7]** .)
4. Remove the presilencer insulator. (See **REFRIGERANT LINE REMOVAL/INSTALLATION** .)
5. Remove the propeller shaft. (See **PROPELLER SHAFT REMOVAL/INSTALLATION** .)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.
8. Add rear differential oil. (See **DIFFERENTIAL OIL REPLACEMENT** .)

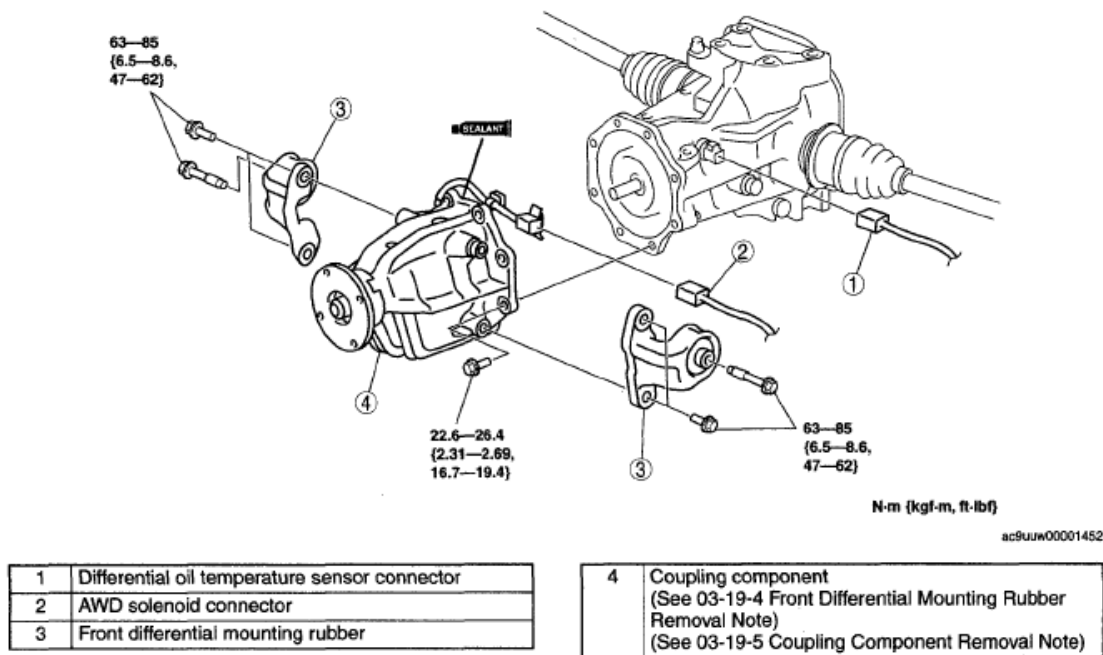
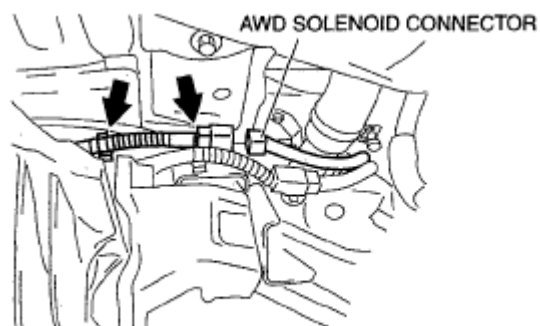


Fig. 5: Identifying Coupling Components & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

FRONT DIFFERENTIAL MOUNTING RUBBER REMOVAL NOTE

1. Detach clips as shown in the figure.



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Fig. 6: Identifying AWD Solenoid Connector
Courtesy of MAZDA MOTORS CORP.

2. Support the rear differential using a jack.
3. Remove the front differential mounting rubbers.

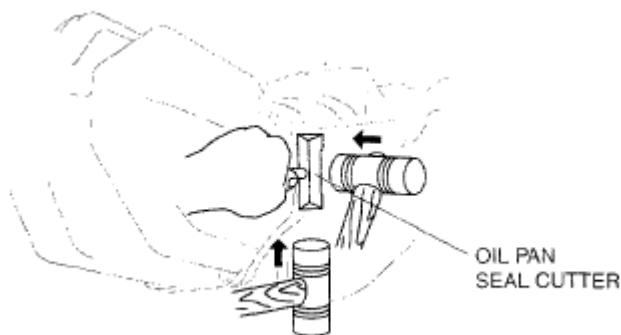


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Fig. 7: Supporting Rear Differential
Courtesy of MAZDA MOTORS CORP.

COUPLING COMPONENT REMOVAL NOTE

1. Support the coupling unit with a transmission jack.
2. Cut away the coupling unit using an oil pan seal cutter.



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Fig. 8: Cutting Coupling Unit
Courtesy of MAZDA MOTORS CORP.

COUPLING COMPONENT INSTALLATION NOTE

NOTE:

- Clean away the old sealant before applying the new sealant.
- Install the coupling unit within 10 min after applying sealant.
- Allow the sealant to set at least 30 min after installation before filling the differential with the specified oil.

1. Apply sealant to the coupling case surface that contacts the rear differential case.
2. Install the coupling unit to the rear differential so that the two tabs on the coupling unit engage the rear differential grooves (two locations).

Tightening torque

22.6-26.4 N.m {2.31-2.69 kgf.m, 16.7-19.4 ft.lbf}

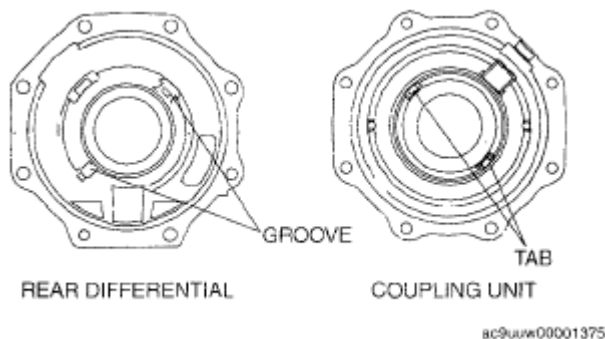


Fig. 9: Identifying Tabs On Coupling Unit
Courtesy of MAZDA MOTORS CORP.

COUPLING COMPONENT DISASSEMBLY

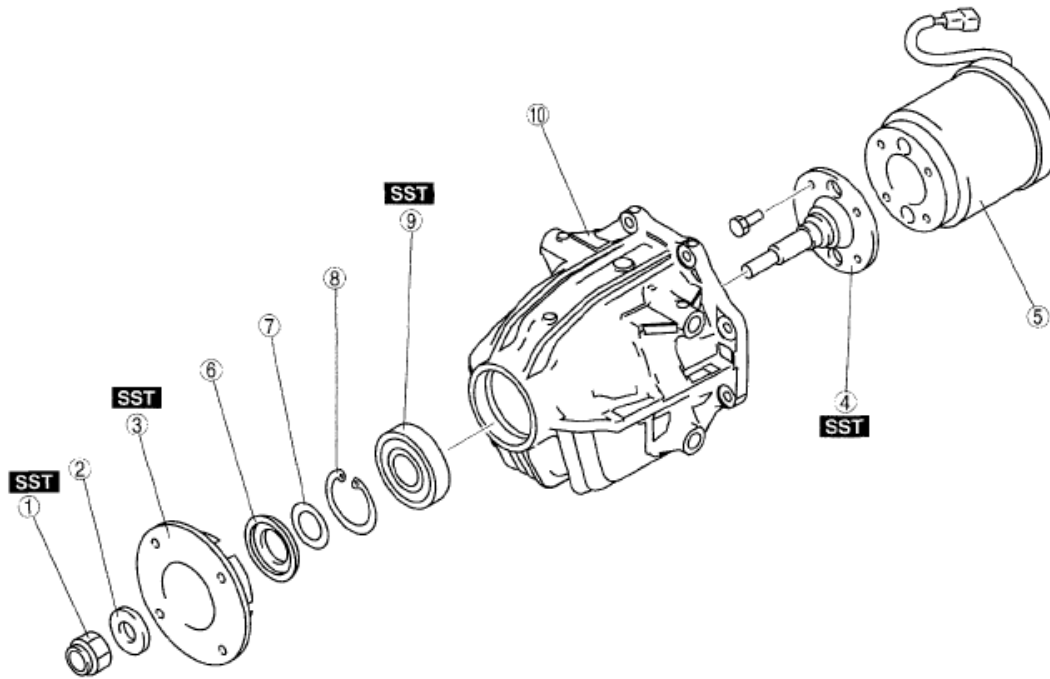
WARNING:

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

1. Disassemble in the order indicated in the table.

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2008 DRIVELINE/AXLE All Wheel Drive (AWD) - Mazda CX-9



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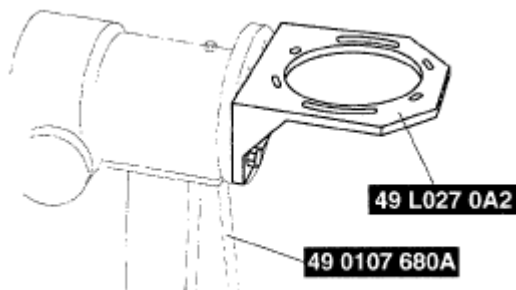
1	Locknut (See 03-19-7 Locknut Disassembly Note)
2	Washer
3	Companion flange (See 03-19-7 Companion Flange Disassembly Note)
4	Output shaft (See 03-19-8 Output Shaft Disassembly Note)

5	Coupling component
6	Oil seal
7	Shim
8	Snap ring
9	Bearing (See 03-19-8 Bearing Disassembly Note)
10	Coupling case

Fig. 10: Disassembling View Of Coupling Component
Courtesy of MAZDA MOTORS CORP.

LOCKNUT DISASSEMBLY NOTE

1. Assemble the SSTs to the engine stand.



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Fig. 11: Identifying SST
Courtesy of MAZDA MOTORS CORP.

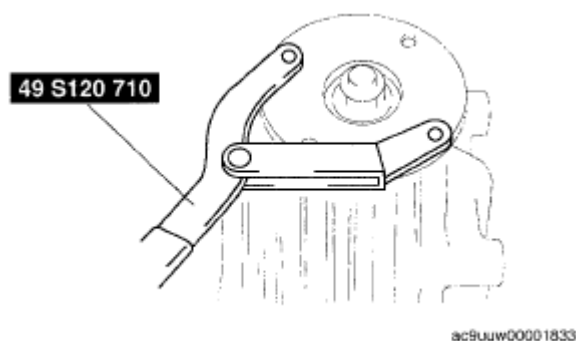
2. Install the coupling unit to the SSTs as shown.



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Fig. 12: Identifying SST
Courtesy of MAZDA MOTORS CORP.

3. Secure the companion flange using the SST, and remove the locknut.

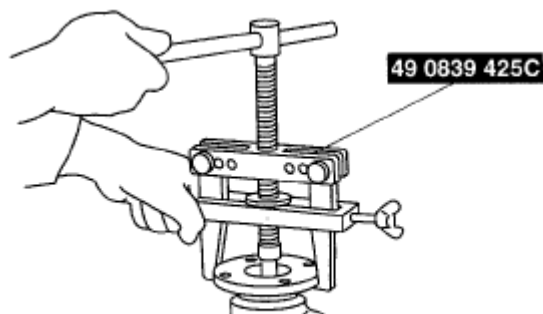


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Fig. 13: Identifying SST
Courtesy of MAZDA MOTORS CORP.

COMPANION FLANGE DISASSEMBLY NOTE

1. Remove the companion flange using the SST.

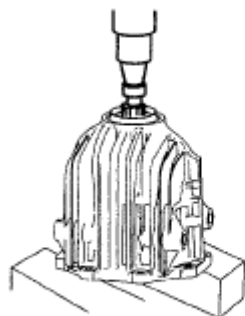


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Fig. 14: Removing Companion Flange
Courtesy of MAZDA MOTORS CORP.

OUTPUT SHAFT DISASSEMBLY NOTE

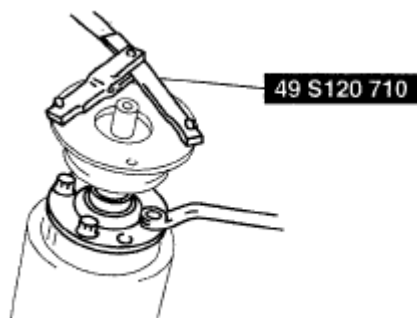
1. Remove the coupling unit from the SST.
2. Install the coupling unit to the press as shown, and remove the output shaft together with the coupling unit.
3. Install the companion flange to the output shaft.



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Fig. 15: Installing Coupling Unit
Courtesy of MAZDA MOTORS CORP.

4. Secure the companion flange using the SST , and remove the bolts.
5. Remove the output shaft.



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Fig. 16: Removing Companion Flange Bolts
Courtesy of MAZDA MOTORS CORP.

BEARING DISASSEMBLY NOTE

1. Remove the bearing using the SSTs and a press.

Substitution SST

- 49 S033 108

Outer diameter: 33-55 mm {1.30-2.16 in}

Height: 155 mm {6.10 in} or more

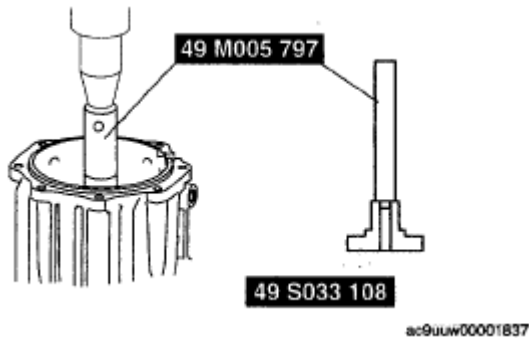


Fig. 17: Identifying SST
Courtesy of MAZDA MOTORS CORP.

COUPLING COMPONENT ASSEMBLY

WARNING:

- The engine stand is equipped With a self-lock mechanism, however, if the coupling unit is in a tilted condition, the self-lock mechanism could become inoperative, if the coupling unit unexpectedly rotates it could cause injury, therefore do not maintain the coupling unit in a tilted condition. When turning the coupling unit, grasp the rotation handle firmly.

1. Assemble in the order indicated in the table.

2008 Mazda CX-9 Grand Touring

2008 DRIVELINE/AXLE All Wheel Drive (AWD) - Mazda CX-9

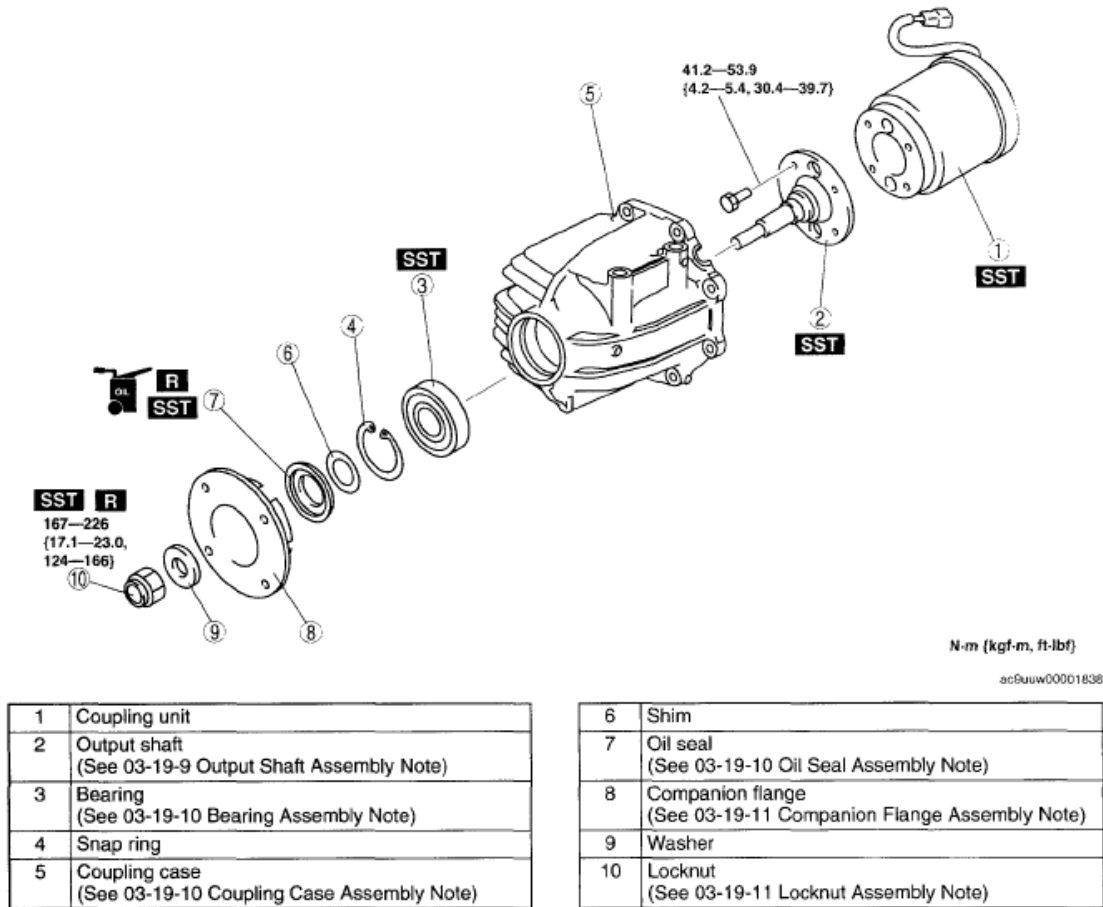


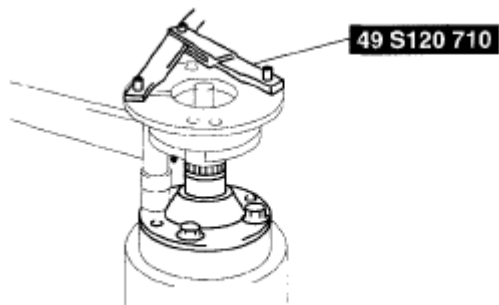
Fig. 18: View Of Coupling Components & Torque Specifications
 Courtesy of MAZDA MOTORS CORP.

OUTPUT SHAFT ASSEMBLY NOTE

1. Install the output shaft to the coupling unit and partially tighten the bolts.
2. Install the companion flange to the output shaft.
3. Secure the companion flange using the **SST** , and tighten the bolts.

Tightening torque

41.2-53.9 N.m {4.2-5.4 kgf.m, 30.4-39.7 ft.lbf}



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Fig. 19: Identifying SST
Courtesy of MAZDA MOTORS CORP.

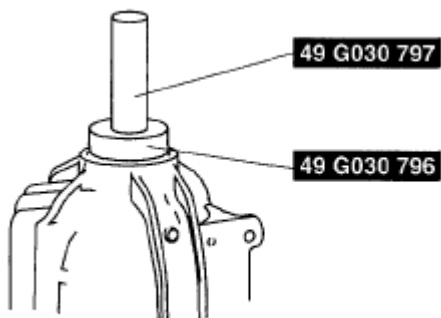
BEARING ASSEMBLY NOTE

1. Assemble the bearing to the coupling case using the SSTs.

Substitution SST

- 49 G030 796

Outer diameter: 58-61 mm {2.29-2.40 in}



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Fig. 20: Identifying SST
Courtesy of MAZDA MOTORS CORP.

COUPLING CASE ASSEMBLY NOTE

- CAUTION:**
- The coupling unit will be damaged if it is pressed directly by a press. Always press the coupling unit into the coupling case using the SST.

1. Assemble the coupling unit to the coupling case using the SSTs and a press.

Substitution SST

- **49 S032 333**

Outer diameter: 34.2-40.0 mm {1.35-1.57 in}

Inner diameter: 30.2-32.2 mm {1.19-1.26 in}

Inner depth: 65.2 mm {2.57 in} or more

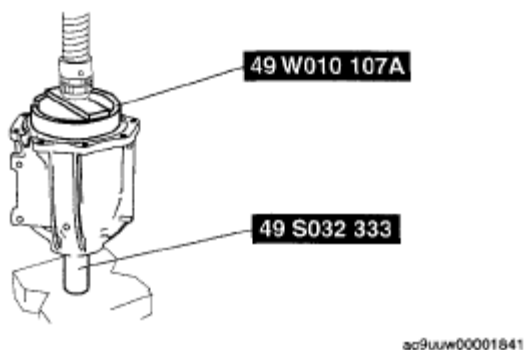


Fig. 21: Identifying SST
Courtesy of MAZDA MOTORS CORP.

OIL SEAL ASSEMBLY NOTE

1. Apply the specified oil to a new oil seal lip.
2. Install the oil seal to the coupling case using the **SST**.

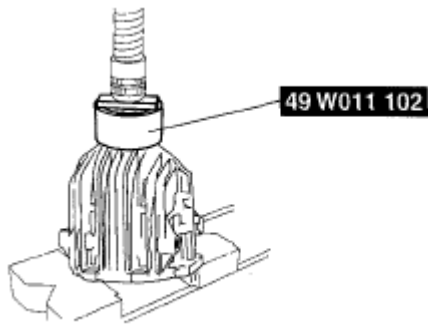
Substitution SST

- **49 W011 102**

Outer diameter: 66 mm {2.60 in} or more

Inner diameter: 54-60 mm {2.13-2.36 in}

Inner depth: 17.5 mm {0.69 in} or more



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Fig. 22: Identifying SST
Courtesy of MAZDA MOTORS CORP.

COMPANION FLANGE ASSEMBLY NOTE

1. Install the coupling case to the SSTs as shown.
2. Install the companion flange.



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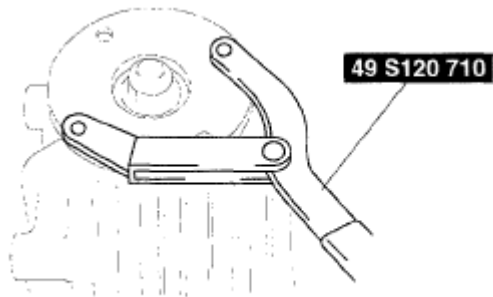
Fig. 23: Identifying SST
Courtesy of MAZDA MOTORS CORP.

LOCKNUT ASSEMBLY NOTE

1. Secure the companion flange using the SST, and tighten a new locknut.

Tightening torque

167-226 N.m {17.1-23.0 kgf.m, 124-166 ft.lbf}



ac9urw0001844

Fig. 24: Identifying SST
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL OIL TEMPERATURE SENSOR REMOVAL/INSTALLATION

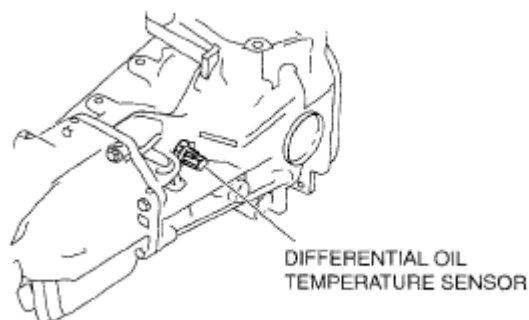
- WARNING:**
- Hot differential oil may cause severe burns. Do not perform maintenance while differential oil is hot.

1. Disconnect the negative battery cable.
2. Disconnect the differential oil temperature sensor connector.
3. Remove the differential oil temperature sensor.
4. Apply differential oil to the O-ring.
5. Install the differential oil temperature sensor.

Tightening torque

12.7-17.3 N.m {1.3-1.7 kgf.m, 9.4-12.7 ft.lbf}

6. Connect the differential oil temperature sensor connector.
7. Connect the negative battery cable.



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Fig. 25: Identifying Differential Oil Temperature Sensor Connector
Courtesy of MAZDA MOTORS CORP.

DIFFERENTIAL OIL TEMPERATURE SENSOR INSPECTION

WARNING: • Hot differential oil may cause severe burns. Do not perform maintenance while differential oil is hot.

1. Disconnect the negative battery cable.
2. Disconnect the differential oil temperature sensor connector and remove the differential oil temperature sensor.
3. Wrap the differential oil temperature sensor with plastic wrap and immerse it into a beaker filled with water. Gradually raise the water temperature, and measure resistance between differential oil temperature sensor terminals A and B.
 - If not as specified, inspect the harness for continuity. If there is normal continuity between the terminals, replace the differential oil temperature sensor.

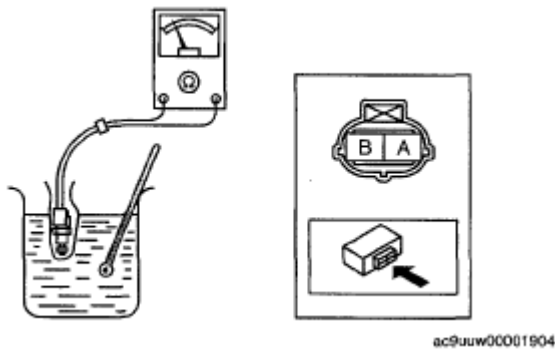


Fig. 26: Inspecting Differential Oil Temperature Sensor
 Courtesy of MAZDA MOTORS CORP.

Differential oil temperature sensor specification

RESISTANCE SPECIFICATION

Water temperature (°C {°F})	Resistance (kiohm)
0 {32}	91-100
10 {50}	56-61
20 {68}	35-39
30 {86}	23-25
40 {104}	14-17
50 {122}	10-11
60 {140}	7.1-7.9
70 {158}	5.0-5.6
80 {176}	3.6-4.0

4. Install the differential oil temperature sensor and connect the connector.
5. Connect the negative battery cable.

AWD SOLENOID INSPECTION

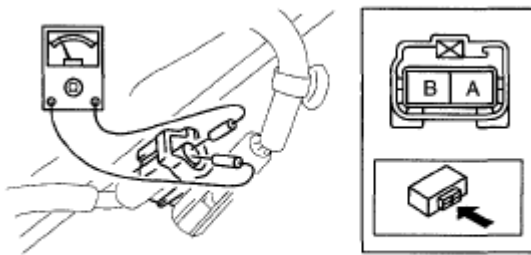
1. Disconnect the negative battery cable.
2. Disconnect the AWD solenoid connector.
3. Measure resistance between AWD solenoid connector terminals A and B.
 - If the resistance is not within the specification, replace the coupling unit.

AWD solenoid resistance

1.5-2.0 ohms

(Rear differential oil temperature at 20°C {68°F})

4. Connect the AWD solenoid connector.
5. Connect the negative battery cable.



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Fig. 27: Inspecting AWD Solenoid Connector
Courtesy of MAZDA MOTORS CORP.