

05-17 AUTOMATIC TRANSAXLE

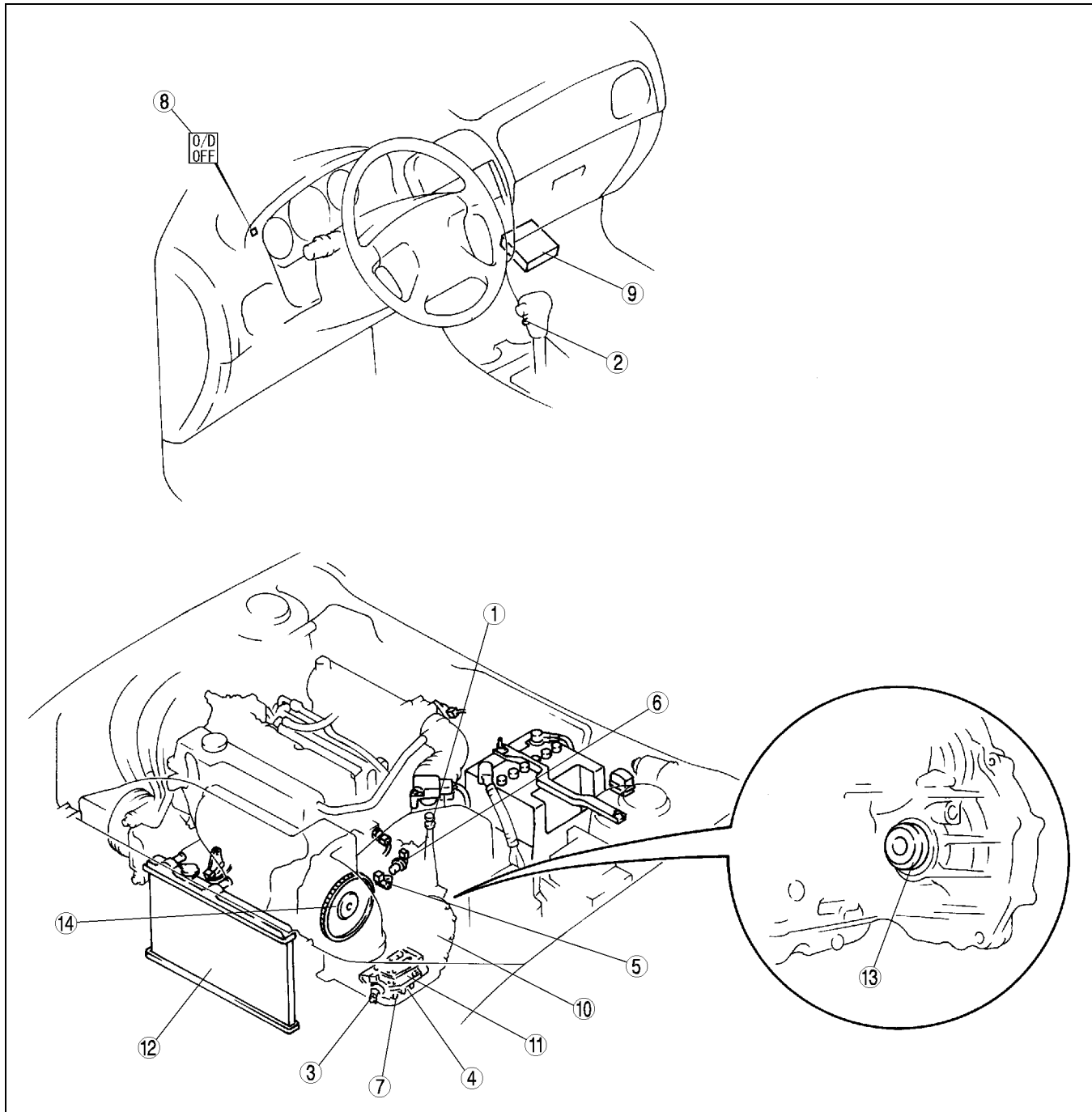
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AUTOMATIC TRANSAXLE

AUTOMATIC TRANSAXLE LOCATION INDEX

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Z3U517W01

1	ATF (See 05-17-17 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION.) (See 05-17-18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
2	O/D OFF switch (See 05-17-19 O/D OFF SWITCH INSPECTION) (See 05-17-19 O/D OFF SWITCH REMOVAL/INSTALLATION)
3	TR switch (See 05-17-20 TRANSAXLE RANGE (TR) SWITCH INSPECTION) (See 05-17-20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION) (See 05-17-23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT)

4	TFT sensor (See 05-17-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION) (See 05-17-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION)
5	Input/turbine speed sensor (See 05-17-26 INPUT/TURBINE SPEED SENSOR INSPECTION) (See 05-17-26 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION)
6	Vehicle speedometer sensor (without ABS) (See 05-17-28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX]) (See 05-17-27 VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX])

AUTOMATIC TRANSAXLE

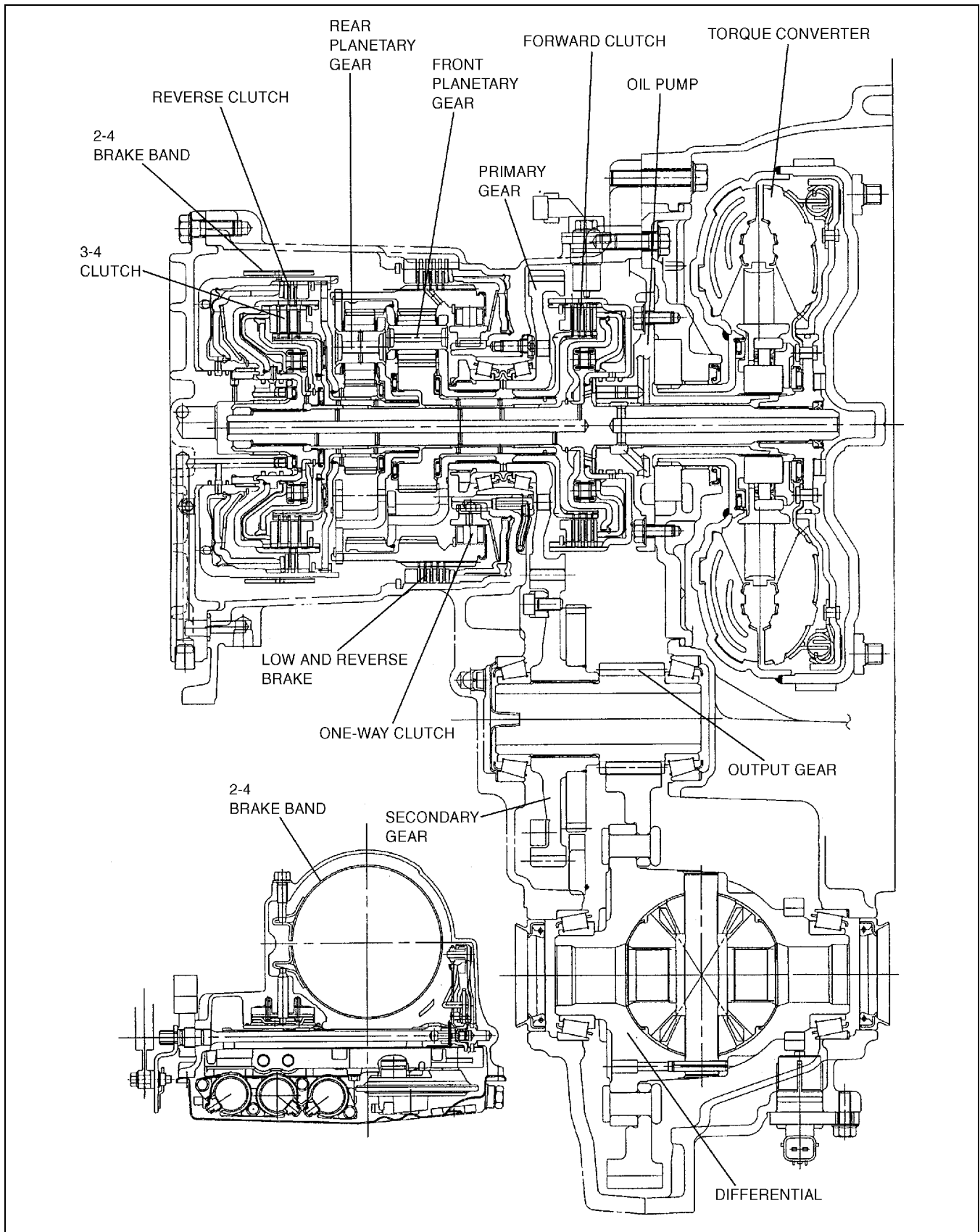
7	Solenoid valve (See 05-17-28 SOLENOID VALVES INSPECTION) (See 05-17-30 SOLENOID VALVES REMOVAL/INSTALLATION)
8	O/D OFF indicator light (See 05-17-30 O/D OFF INDICATOR LIGHT INSPECTION)
9	PCM (See 05-17-30 PCM REMOVAL/INSTALLATION)
10	Transaxle (See 05-17-31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION)
11	Control valve body (See 05-17-36 CONTROL VALVE BODY REMOVAL/INSTALLATION)

12	Oil cooler (See 05-17-40 OIL COOLER FLUSHING) (See 05-17-41 OIL COOLER REMOVAL/INSTALLATION)
13	Oil seal (transaxle) (See 05-17-36 OIL SEAL (TRANSAXLE) REPLACEMENT)
14	Drive plate (See 05-17-46 DRIVE PLATE REMOVAL/INSTALLATION)

AUTOMATIC TRANSAXLE

AUTOMATIC TRANSAXLE (ATX) CROSS-SECTIONAL VIEW

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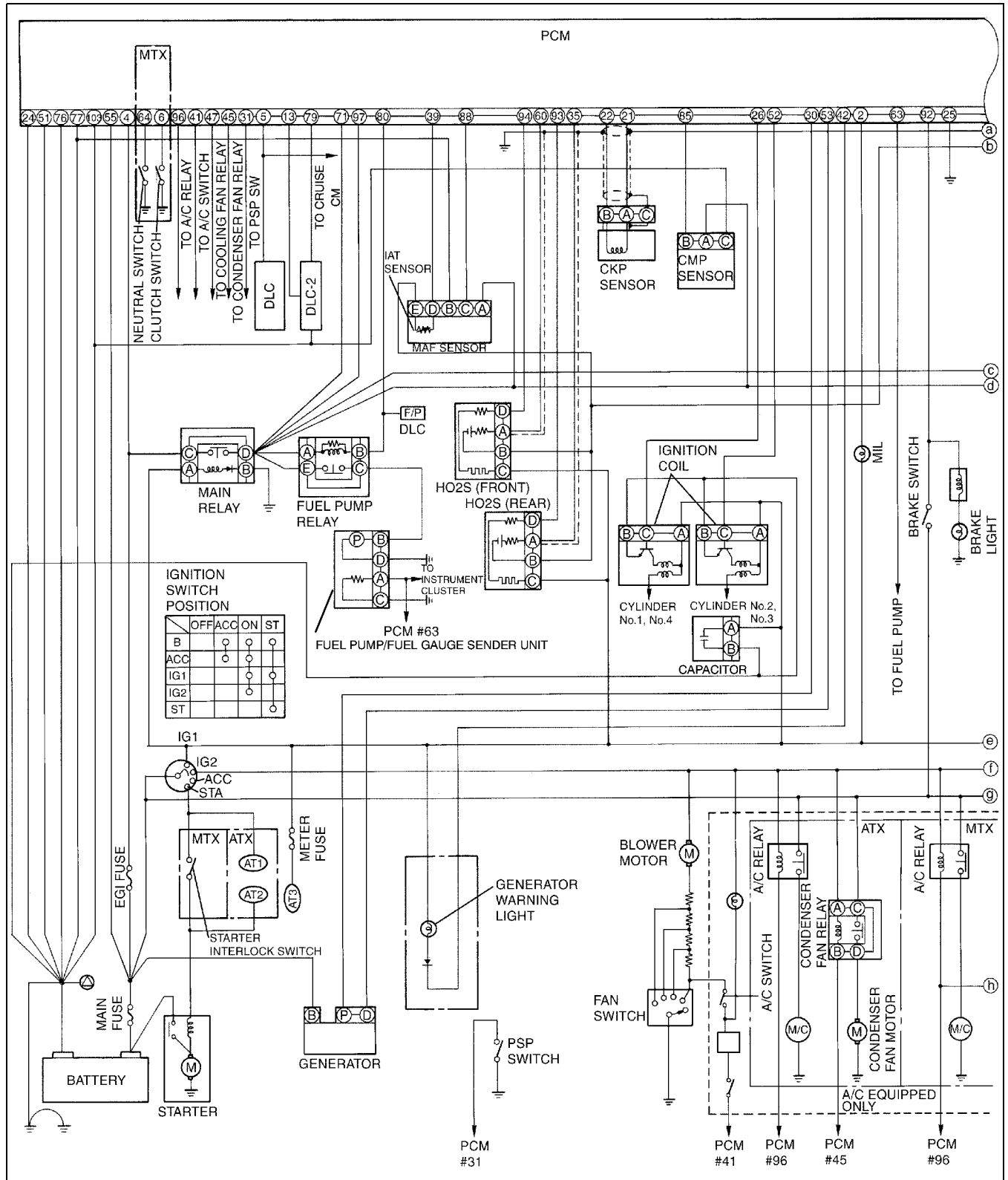
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AUTOMATIC TRANSAXLE

SYSTEM WIRING DIAGRAM

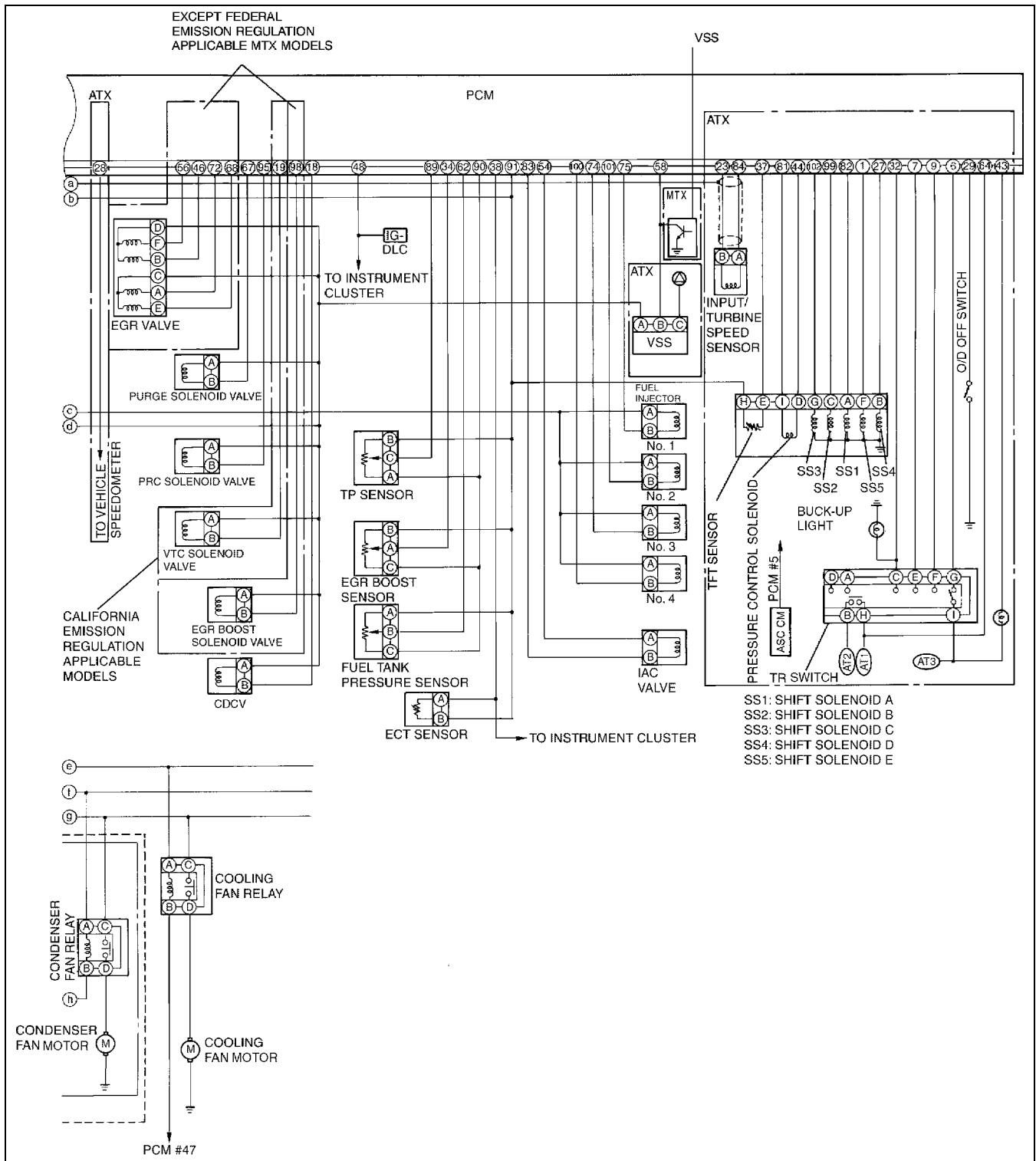
ZM Engine

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AUTOMATIC TRANSAXLE

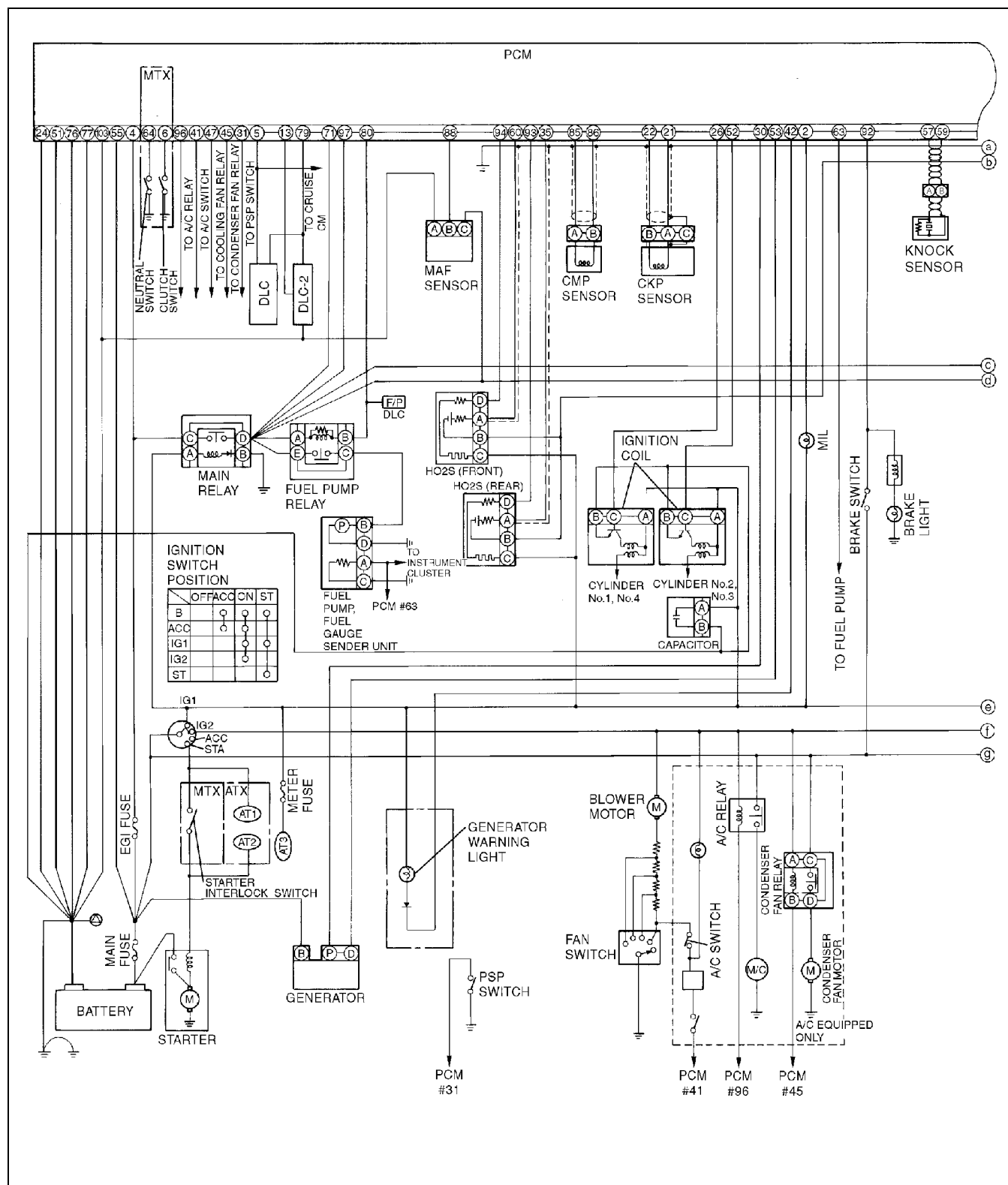


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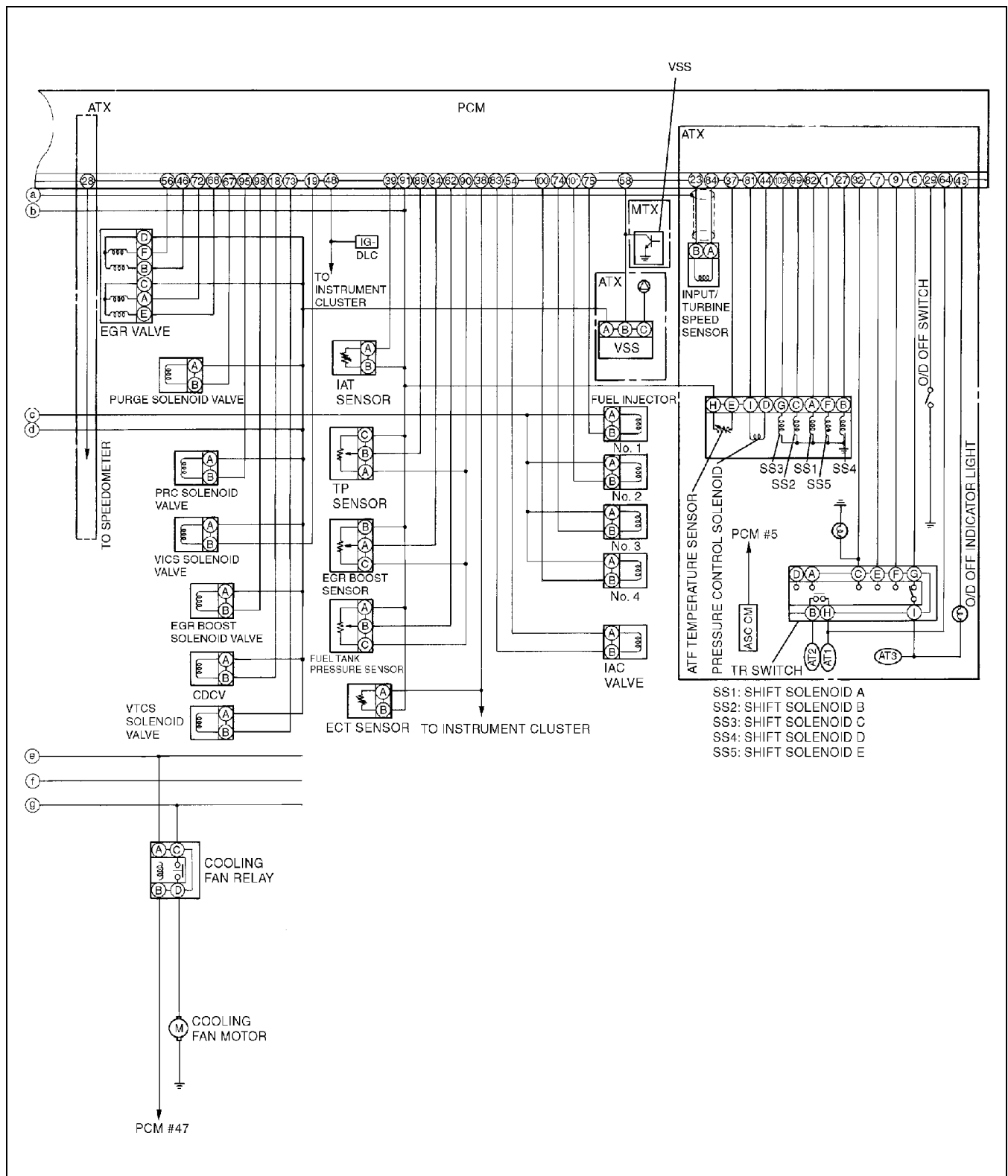
AUTOMATIC TRANSAXLE

FS Engine



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AUTOMATIC TRANSAXLE



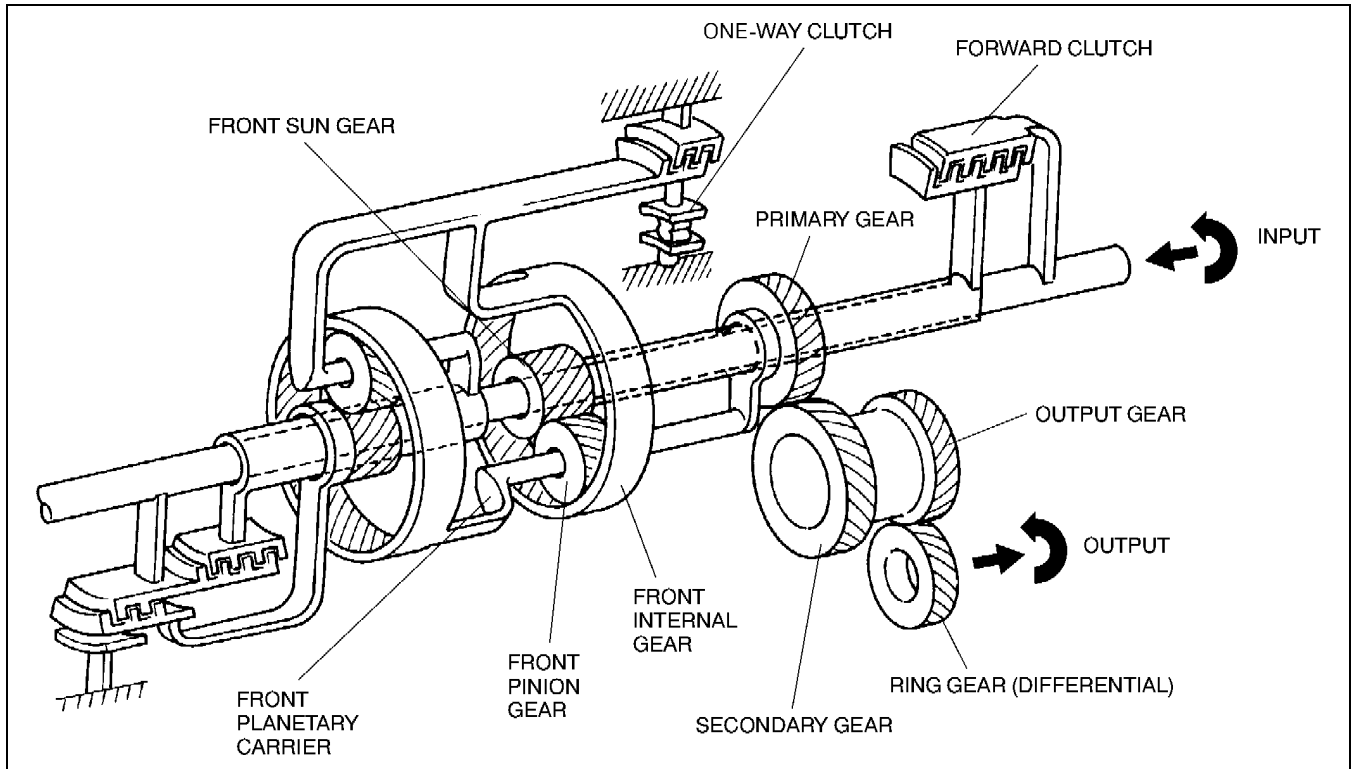
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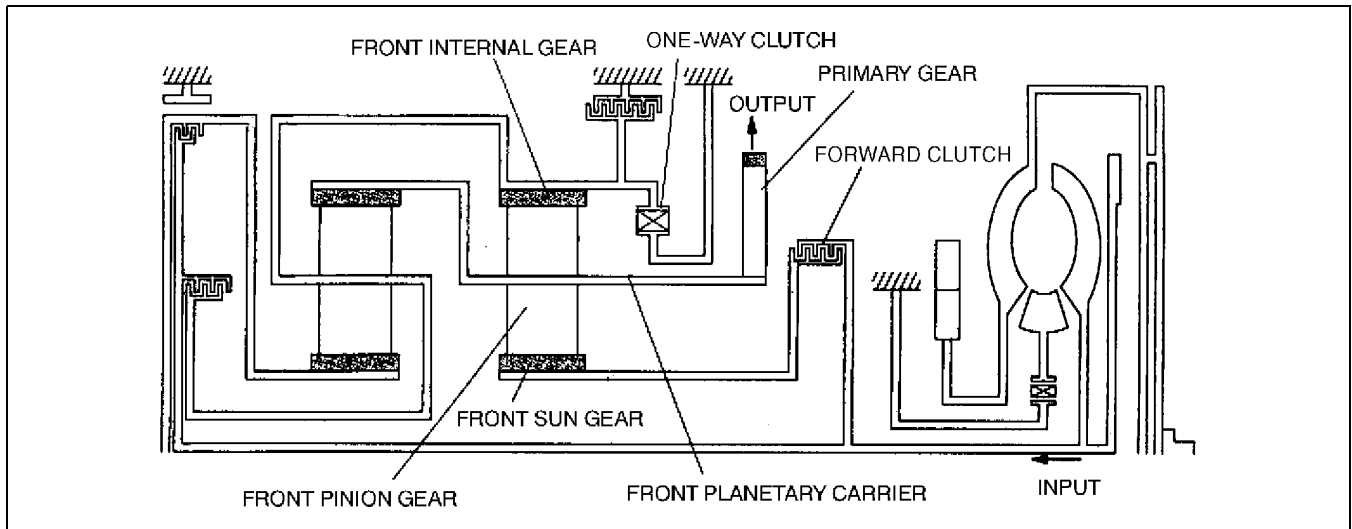
AUTOMATIC TRANSAXLE

AUTOMATIC TRANSAXLE (ATX) POWERTRAIN STRUCTURAL VIEW

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AUTOMATIC TRANSAXLE

EC-AT Operation Chart

Position/Range	Mode	Gear position		Shift pattern			Transaxle							Operation of shift solenoid				
				Shift	TCC	Engine brake	Forward clutch	3-4 clutch	Reverse clutch	2-4 brake band		Low and reverse brake	One-way clutch	Solenoid valve (duty-cycle type)			Solenoid valve (ON/OFF type)	
										Applied	Released			Shift solenoid A	Shift solenoid B	Shift solenoid C	Shift solenoid D	Shift solenoid E
P	-	Neutral	-	-										-	-	-	ON	OFF
R	-	Reverse	2.648	-		×			×			×		OPEN	OPEN	OPEN	OFF	OFF
N	-	Neutral	-	-										-	-	-	ON	OFF
D	*1 POWER/ NORMAL	1GR	2.816	↕			×						×	OPEN	CLOSE	CLOSE	OFF	OFF
		2GR	1.497			×	×		×			OPEN	OPEN	CLOSE	OFF	OFF		
		3GR	1.000			×	×	×	×	×		OPEN	OPEN	OPEN	OFF	OFF		
		4GR	0.725			×		×	×			CLOSE	OPEN	OPEN	ON	OFF		
			4GR *2 TCC ON	0.725		×	×		×	×			CLOSE	OPEN	OPEN	ON	ON	
2	-	2GR	1.497	↑		×	×			×				OPEN	OPEN	CLOSE	OFF	OFF
		3GR*3	1.000	↑		×	×	×		×	×			OPEN	OPEN	OPEN	OFF	OFF
		4GR*3	0.725	↑		×		×		×				CLOSE	OPEN	OPEN	ON	OFF
1	-	1GR	2.816	↑		×	×					×	×	OPEN	OPEN	CLOSE	ON	ON
		2GR*3	1.497	↑		×	×			×				OPEN	OPEN	CLOSE	OFF	OFF
		3GR*3	1.000	↑		×	×	×		×	×			OPEN	OPEN	OPEN	OFF	OFF
		4GR*3	0.725	↑		×		×		×				CLOSE	OPEN	OPEN	ON	OFF

*1: Automatically switches between POWER and NORMAL modes according to accelerator pedal depressing speed

*2: Performs TCC operation in NORMAL mode

*3: Engine overspeed protection

*4: Transmits the torque only when driving

*5: Indicates operation although the band servo remains deactivated due to the large area of the release pressure side.

×: Operating

※: Transmits the torque only when driving

OPEN: Engages the line pressure to the clutch pressure (Solenoid de-energized)

CLOSE: Drains the clutch pressure (Solenoid energized)

ON: Engages the output port and the supply port (Solenoid reducing pressure)

OFF: Engages the output port and the drain port (Drains the output port)

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MECHANICAL SYSTEM TEST

A3U051701030W05

Mechanical System Test Preparation

1. Apply the parking brake and use wheel chocks at the front and rear of the wheels.
2. Inspect the engine coolant. (See 01-12-2 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-2 ENGINE COOLANT LEVEL INSPECTION.)
3. Inspect the engine oil. (See 01-11-2 ENGINE OIL INSPECTION.)
4. Inspect the ATF levels. (See 05-17-18 Automatic Transaxle Fluid (ATF) Level Inspection.)
5. Inspect the ignition timing. (See 01-10A-25 Ignition Timing Inspection.) (See 01-10B-25 Ignition Timing Inspection.)
6. Inspect the idle speed. (See 01-10A-26 Idle Speed Adjustment.) (See 01-10B-26 Idle Speed Adjustment.)

AUTOMATIC TRANSAXLE

Line Pressure Test

1. Perform mechanical system test preparation. (See 05–17–11 Mechanical System Test Preparation.)

Warning

- Removing the square-head plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the square-head plug, allow the ATF to cool.

2. Connect the **SSTs** (49 0378 400C, 49 B019 901B and 49 H019 002) to the line pressure inspection port.
3. Start the engine and shift the selector lever to D range and read the line pressure at idle.

Warning

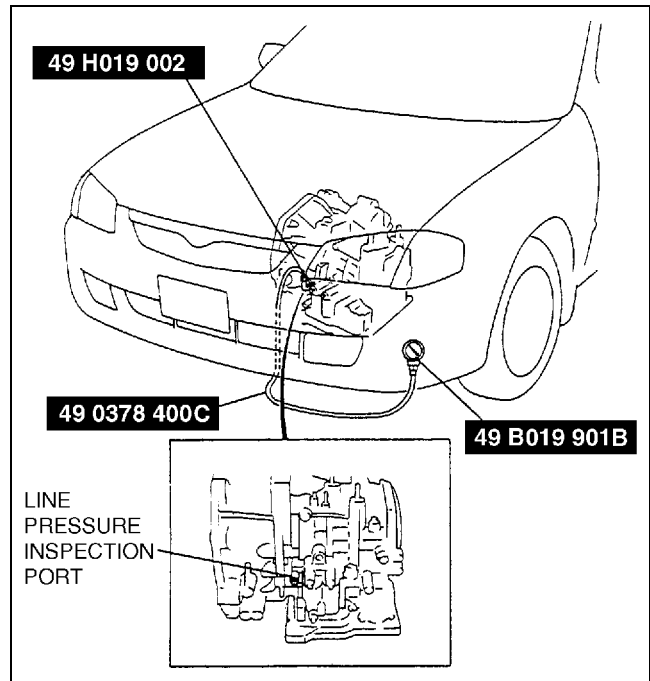
- Removing the **SST** when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the **SST**, allow the ATF to cool.

4. Turn the engine off and remove the **SST** (49 B019 901B), and replace the gauge part of the **SST** (49 B019 902).

Caution

- Do not maintain WOT in any position/range for more than 5 seconds, or transaxle damage will occur.

5. Start the engine and firmly depress the brake pedal with the left foot, and then depress the accelerator pedal to floor (WOT) with the right.
6. When the engine speed no longer increases, quickly read the line pressure and release the accelerator pedal.
7. Shift the selector lever to N position and let the engine idle for **1 minute** or more to cool the ATF.
8. Read the line pressure at idle and at the engine stall speed for the 2, and 1 ranges and R position in the same manner.



Z3U502W02

Line pressure specification

Position /range	Line pressure kPa {kgf/cm ² , psi}			
	Idle		Stall	
	ZM	FS	ZM	FS
D, 2, 1	330—470 {3.4— 4.7, 49—66}		1,200— 1,360 {12.3—13.8, 175—196}	1,160— 1,320 {11.9—13.4, 170—190}
R	490—710 {5.0— 7.2, 72—100}		1,470—1,690 {15.0—17.2, 214—244}	

9. Shift the selector lever to P position and turn off the engine.

Warning

- Removing the **SST** when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the **SST**, allow the ATF to cool.

10. Remove the **SST**.
11. Install a new square head plug in the inspection port.

Tightening torque

4.91—9.80 N·m {50—100 kgf·cm, 43.4—86.7 in·lbf}

AUTOMATIC TRANSAXLE

Evaluation of line pressure test

Condition	Possible cause
Low pressure in all positions/ranges	<ul style="list-style-type: none"> • Worn oil pump • Oil leaking from oil pump, control valve body, and/or transaxle case • Pressure regulator valve stuck • Pressure control solenoid malfunction • Solenoid reducing valve stuck
Low pressure in D, 2, 1 only	<ul style="list-style-type: none"> • Oil leaking from forward clutch hydraulic circuit
Low pressure in 2 only	<ul style="list-style-type: none"> • Oil leaking from 2-4 brake band hydraulic circuit
Low pressure in 1, R only	<ul style="list-style-type: none"> • Oil leaking from low and reverse brake hydraulic circuit
Low pressure in R only	<ul style="list-style-type: none"> • Oil leaking from reverse clutch hydraulic circuit
Higher pressure in all positions/ranges	<ul style="list-style-type: none"> • Pressure control solenoid malfunction and/or open harness • Pressure regulator valve stuck • PCM malfunction

Stall Test

1. Perform mechanical system test preparation. (See 05–17–11 Mechanical System Test Preparation.)
2. Start the engine and shift the selector lever to R position.

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Caution

- **Do not maintain WOT in any position/range for more than 5 seconds, or transaxle damage will occur.**

3. Firmly depress the brake pedal with the left foot, and depress the accelerator pedal to floor (WOT) with the right.
4. When the engine speed no longer increases, quickly read the engine speed and release the accelerator pedal.
5. Shift the selector lever to N position and let the engine idle for **1 minute** or more to cool the ATF.
6. Perform stall tests of D, 2, and 1 ranges in the same manner.

Engine stall speed

ZM engine: 2,300—2,600 rpm

FS engine: 2,200—2,500 rpm

7. Turn off the engine.

Evaluation of stall test

Condition	Possible cause
Above specification	Insufficient line pressure, torque converter pressure
	<ul style="list-style-type: none"> • Worn oil pump • Oil leaking from oil pump, control valve, and/or transaxle case • Pressure regulator valve sticking • Converter relief valve sticking • Pressure control solenoid malfunction
	In D, 2 and 1 ranges
	<ul style="list-style-type: none"> • Forward clutch slipping
	In 2 range
Below specification	<ul style="list-style-type: none"> • 2-4 brake band slipping
	In 1 range and R position
	<ul style="list-style-type: none"> • Low and reverse brake slipping
Above specification	In R position
	<ul style="list-style-type: none"> • Low and reverse brake slipping • Reverse clutch slipping <p>Perform road test to determine whether problem is in low and reverse brake or reverse clutch</p> <ul style="list-style-type: none"> • Engine braking felt in 1 range: Reverse clutch is defective. • Engine braking not felt in 1 range: Low and reverse brake is defective.
Below specification	<ul style="list-style-type: none"> • Engine lack of power

AUTOMATIC TRANSAXLE

Time Lag Test

1. Perform mechanical system test preparation. (See 05–17–11 Mechanical System Test Preparation.)
2. Start the engine and warm up the engine until the ATF temperature reaches **60—70 °C {141— 158 °F}**.
3. Shift the selector lever from N position to D range.
4. Use a stopwatch to measure the time it takes from shifting until engagement is felt. Take 3 measurements for each test and average the results using the following formula.

$$\text{Formula} \\ \text{Average time lag} = \frac{\text{Time 1} + \text{Time 2} + \text{Time 3}}{3}$$

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5. Perform the test for the following shifts in the same manner.
 - N position→R position

Average time lag

N position→D range: 0.4—0.7 sec

N position→R position: 0.4—0.7 sec

Evaluation of time lag test

Condition		Possible cause
N→D shift	More than specification	<ul style="list-style-type: none">• Low line pressure• Forward clutch slipping• Oil leaking from forward clutch fluid circuit• Shift solenoid A not operating properly
	Less than specification	<ul style="list-style-type: none">• Forward accumulator not operating properly• Shift solenoid A not operating properly• Excessive line pressure
N→R shift	More than specification	<ul style="list-style-type: none">• Low line pressure• Low and reverse brake slipping• Reverse clutch slipping• Shift solenoid B not operating properly
	Less than specification	<ul style="list-style-type: none">• Servo apply accumulator not operating properly• Shift solenoid B not operating properly• Excessive line pressure

ROAD TEST

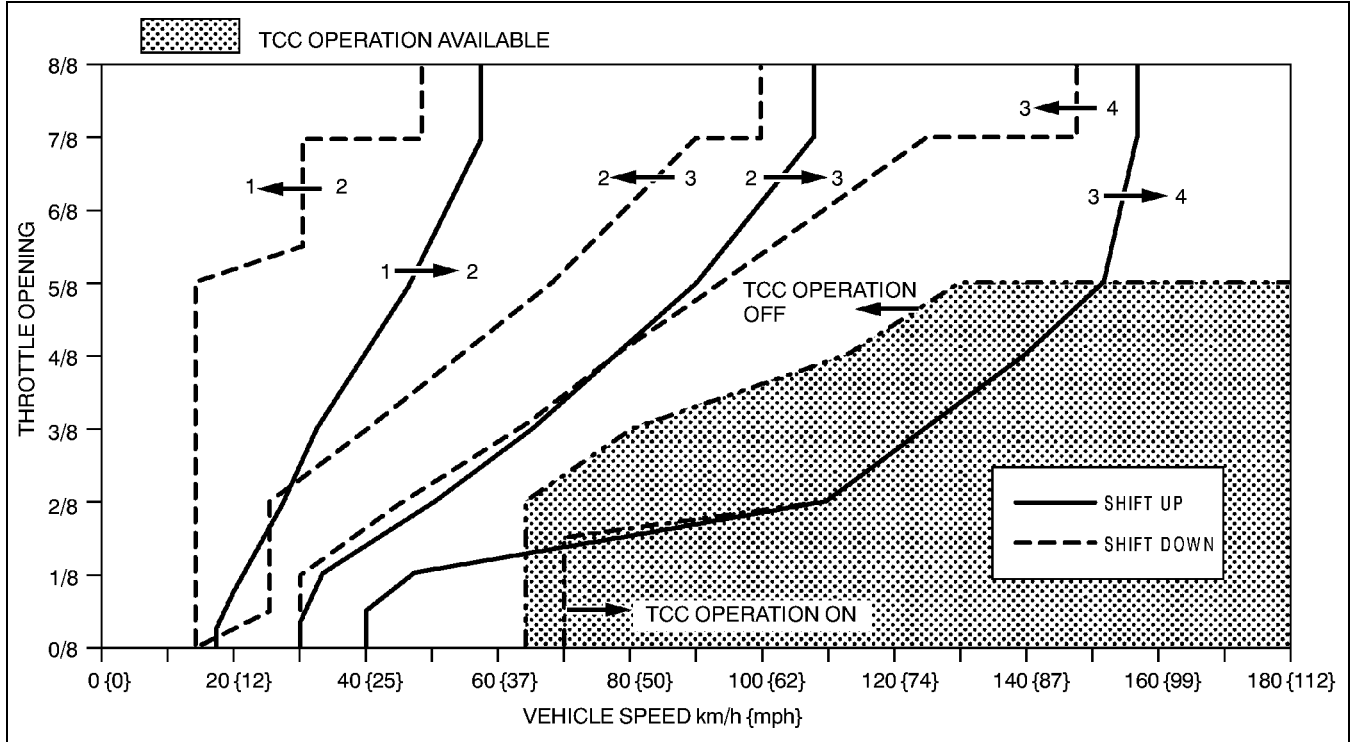
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Road Test Preparation

1. Inspect the engine coolant. (See 01–12–2 COOLING SYSTEM SERVICE WARNINGS.) (See 01–12–2 ENGINE COOLANT LEVEL INSPECTION.)
2. Inspect the engine oil. (See 01–11–2 ENGINE OIL INSPECTION.)
3. Inspect the ATF levels. (See 05–17–18 Automatic Transaxle Fluid (ATF) Level Inspection.)
4. Inspect the ignition timing. (See 01–10A–25 Ignition Timing Inspection.) (See 01–10B–25 Ignition Timing Inspection.)
5. Inspect the idle speed. (See 01–10A–26 Idle Speed Adjustment.) (See 01–10B–26 Idle Speed Adjustment.)
6. Bring up the engine and transaxle to normal operating temperature.

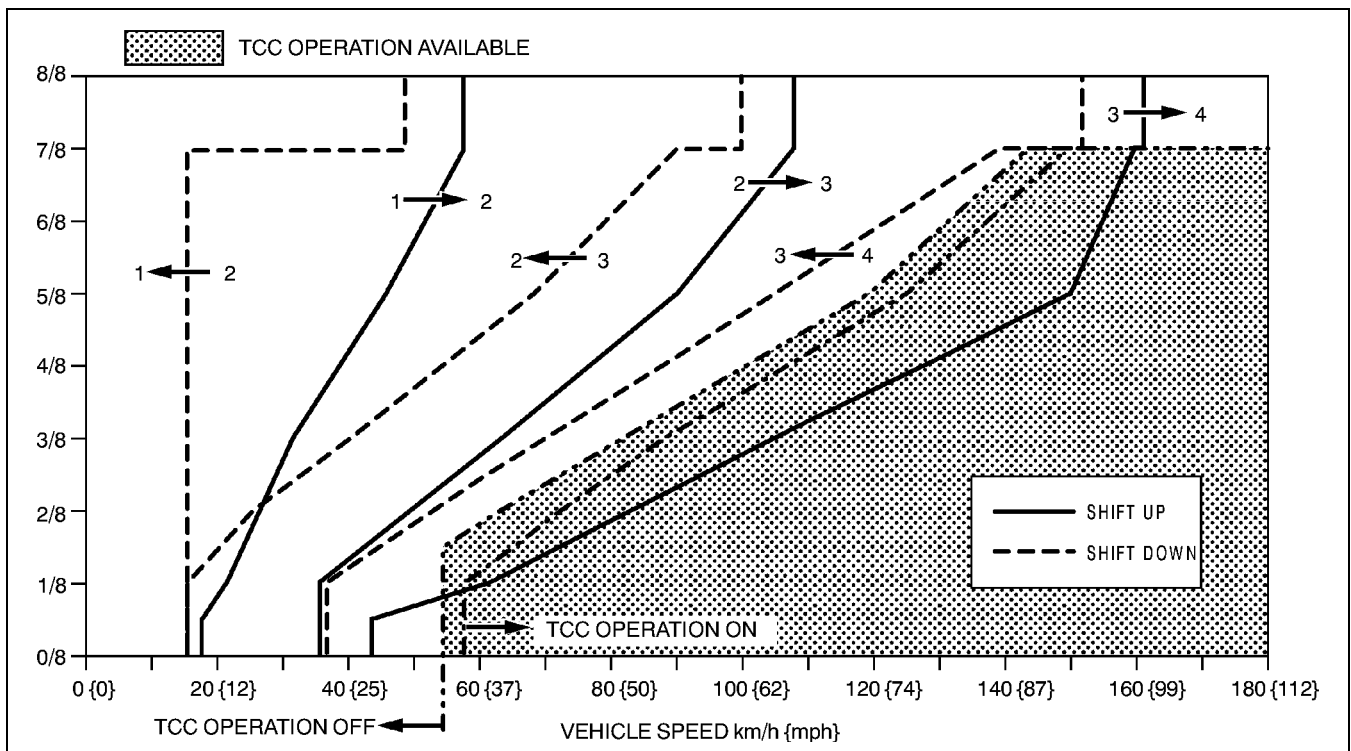
AUTOMATIC TRANSAXLE

Shift Diagram
D range (normal mode, O/D OFF switch OFF)
ZM



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FS



Z3U517W11

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AUTOMATIC TRANSAXLE

Vehicle speed at shift point table

Range	Mode	Throttle condition	Shift	Vehicle speed km/h {mph}		Turbine speed (rpm)	
				ZM	FS	ZM	FS
D	Normal	WOT	D ₁ →D ₂	56—62 {35—38}	56—62 {35—38}	5,750—6,300	5,750—6,300
			D ₂ →D ₃	106—114 {66—70}	106—114 {66—70}	5,750—6,150	5,750—6,150
			D ₃ →D ₄	154—164 {96—101}	158—168 {98—104}	5,600—5,900	5,750—6,050
		Half throttle	D ₁ →D ₂	35—43 {22—26}	34—42 {22—26}	3,500—4,450	3,400—4,350
			D ₂ →D ₃	69—86 {43—53}	68—85 {43—52}	3,750—4,650	3,650—4,650
			D ₃ →D ₄	127—150 {79—93}	113—142 {71—88}	4,600—5,450	4,100—5,100
			TCC ON (D ₄)	127—150 {79—93}	113—142 {71—88}	3,350—3,950	3,000—3,700
		CTP	D ₄ →D ₃	27—33 {17—20}	33—39 {21—24}	750—850	900—1,000
			D ₃ →D ₂	11—17 {7—10}	12—18 {8—11}	400—600	450—650
			D ₂ →D ₁	11—17 {7—10}	12—18 {8—11}	600—900	700—950
			D ₃ →D ₁	11—17 {7—10}	12—18 {8—11}	400—600	450—650
		Kickdown (WOT)	D ₄ →D ₃	143—153 {89—94}	147—157 {92—97}	3,800—4,000	3,900—4,100
			D ₃ →D ₂	96—104 {60—64}	96—104 {60—64}	3,500—3,750	3,500—3,750
			D ₂ →D ₁	45—51 {28—31}	45—51 {28—31}	2,450—2,750	2,450—2,750
	Power	WOT	D ₁ →D ₂	56—62 {35—38}	56—62 {35—38}	5,750—6,300	5,750—6,300
			D ₂ →D ₃	106—114 {66—70}	106—114 {66—70}	5,750—6,150	5,750—6,150
			D ₃ →D ₄	154—164 {96—101}	158—168 {98—104}	5,600—5,900	5,750—6,050
		Half throttle	D ₁ →D ₂	35—43 {22—26}	34—42 {22—26}	3,500—4,450	3,400—4,350
			D ₂ →D ₃	69—86 {43—53}	68—85 {43—52}	3,750—4,650	3,650—4,650
			D ₃ →D ₄	127—150 {79—93}	113—142 {71—88}	4,600—5,450	4,100—5,100
		CTP	D ₄ →D ₃	27—33 {17—20}	33—39 {21—24}	750—850	900—1,000
			D ₃ →D ₂	11—17 {7—10}	12—18 {8—11}	400—600	450—650
			D ₂ →D ₁	11—17 {7—10}	12—18 {8—11}	600—900	700—950
			D ₃ →D ₁	11—17 {7—10}	12—18 {8—11}	400—600	450—650
		Kickdown (WOT)	D ₄ →D ₃	143—153 {89—94}	147—157 {92—97}	3,800—4,000	3,900—4,100
			D ₃ →D ₂	96—104 {60—64}	96—104 {60—64}	3,500—3,750	3,500—3,750
			D ₂ →D ₁	45—51 {28—31}	45—51 {28—31}	2,450—2,750	2,450—2,750
2	—	—	2 ₄ →2 ₃	154—160 {96—99}	158—164 {98—101}	4,050—4,200	4,150—4,300
			2 ₃ →2 ₂	99—105 {62—65}	97—103 {61—63}	3,600—3,800	3,550—3,700
1	—	—	1 ₄ →1 ₃	154—160 {96—99}	158—164 {98—101}	4,050—4,200	4,150—4,300
			1 ₃ →1 ₂	99—105 {62—65}	97—103 {61—63}	3,600—3,800	3,550—3,700
			1 ₂ →1 ₁	42—48 {27—29}	42—48 {27—29}	2,300—2,600	2,300—2,600

D Range Test

1. Perform road test preparation. (See 05-17-14 Road Test Preparation.)
2. Shift the selector lever to D range.
3. Accelerate the vehicle at half and WOT.
4. Verify that 1→2, 2→3, and 3→4 upshifts and downshifts are obtained. The shift points must be as shown in the table below.
 - If not as specified, inspect the PCM and ATX. (See 01-40A-7 PCM INSPECTION [ZM].) (See 01-40B-7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
5. Drive the vehicle in 4GR, 3GR, and 2GR and verify that kickdown occurs for 4→3, 3→2, 2→1 downshifts, and that the shift points are as shown in the table below.
 - If not as specified, inspect the PCM and ATX. (See 01-40A-7 PCM INSPECTION [ZM].) (See 01-40B-7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
6. Decelerate the vehicle and verify that engine braking effect is felt in 2GR, 3GR and 4GR.
 - If not as specified, inspect the PCM and ATX. (See 01-40A-7 PCM INSPECTION [ZM].) (See 01-40B-7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

AUTOMATIC TRANSAXLE

7. Drive the vehicle and verify that TCC operation is obtained. The operation points must be as shown in the table below.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
8. Select O/D OFF mode.
9. Accelerate the vehicle to half throttle and WOT, and verify that 1→2 and 2→3 upshift and downshift are obtained. The shift points must be as shown in the table below.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
10. Drive the vehicle in 3GR, 2GR and verify that kickdown occurs for 3→2, 2→1, and that the shift points are as shown in the table below.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
11. Decelerate the vehicle and verify that engine braking effect is felt in 2GR and 3GR.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

2 Range Test

05–17

1. Perform road test preparation. (See 05–17–14 Road Test Preparation.)
2. Shift the selector lever to 2 range.
3. Accelerate the vehicle with half throttle and WOT, and verify that 2GR is held.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
4. Decelerate the vehicle and verify that engine braking effect is felt.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

1 Range Test

1. Perform road test preparation. (See 05–17–14 Road Test Preparation.)
2. Shift the selector lever to 1 range.
3. Accelerate the vehicle with half throttle and WOT, and verify that 1GR is held.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)
4. Decelerate the vehicle and verify that engine braking effect is felt.
 - If not as specified, inspect the PCM and ATX. (See 01–40A–7 PCM INSPECTION [ZM].) (See 01–40B–7 PCM INSPECTION [FS].) (See ATX Workshop Manual.)

P Position Test

1. Shift into P position on a gentle slope. Release the brake and verify that the vehicle does not roll.
 - If the vehicle rolls, inspect the ATX. (See ATX Workshop Manual.)

AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION

A3U051719001W01

Automatic Transaxle Fluid (ATF) Condition Inspection

1. One way of determining whether the transaxle should be replaced is by noting:
 - If the ATF is muddy or varnished.
 - If the ATF smells strange or unusual.

ATF condition

Condition		Possible cause
Clear red	Normal	—
Light red (pink)	Contaminated with water	<ul style="list-style-type: none"> • Broken oil cooler inside of radiator • Poor filler tube installation: Problem could be occurring to parts inside of transaxle by water contamination. • If necessary, replace transaxle.
Reddish brown	Has burnt smell and metal specks are found	Defect powertrain components inside of transaxle: Specks cause wide range of problems by plugging up oil pipe, control valve body and oil cooler in radiator. <ul style="list-style-type: none"> • When large amount of metal specks are found. Replace transaxle if necessary. • Implement flushing operation as there is a possibility to have specks plugging up oil pipe and/or oil cooler inside of radiator.
	Has no burnt smell	Deteriorated ATF <ul style="list-style-type: none"> • Discoloration by oxidation.

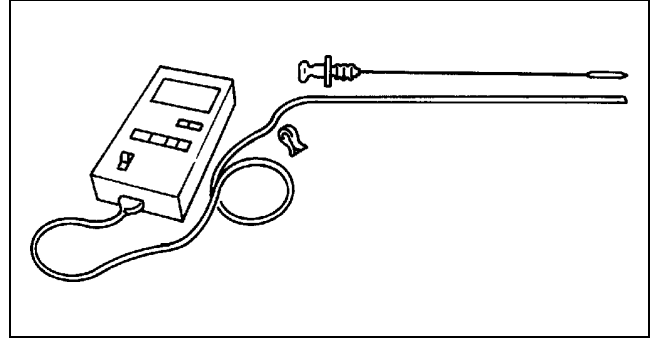
AUTOMATIC TRANSAXLE

Automatic Transaxle Fluid (ATF) Level Inspection

Caution

- The ATF amount varies according to ATF temperature. Therefore, when checking the ATF level or replacing the ATF, use a thermometer to measure the temperature then adjust the ATF amount to the specified level according to the specified temperature.

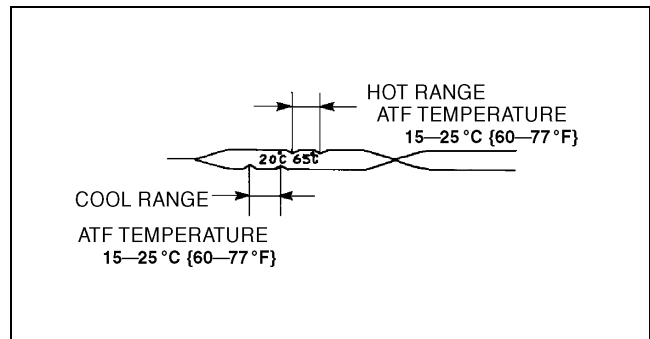
1. Park the vehicle on level ground.
2. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.
3. Adjust the length or thermistor probe to measure the same depth as the oil dipstick and hold the probe with a paper holder.
4. Insert into the filler tube and measure the temperature.
5. Inspect the ATF level before warming up the engine. In this case, use the cool (**20 °C {68 °F}**) range.
6. Warm up the engine until the ATF reaches (**60—70 °C {141—158 °F}**).
7. While depressing the brake pedal, shift the selector lever to each range (P—1), pausing momentarily in each range.
8. Shift back to P position.
9. While the engine is idling, verify that the ATF level is in the HOT (**65 °C {149 °F}**) range. Add ATF to the specification, if necessary.



X3U517WA3

ATF type

M-V or equivalent (e.g. Dexron®III)



Y3U517WA5

AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT

A3U051719001W02

Warning

- When the transaxle and ATF are hot, they can badly burn you. Turn off the engine and wait until they are cool before changing the ATF.

1. Remove the oil dipstick.
2. Remove the drain plug and washer.
3. Drain the ATF into a container.
4. Install a new washer and the drain plug.

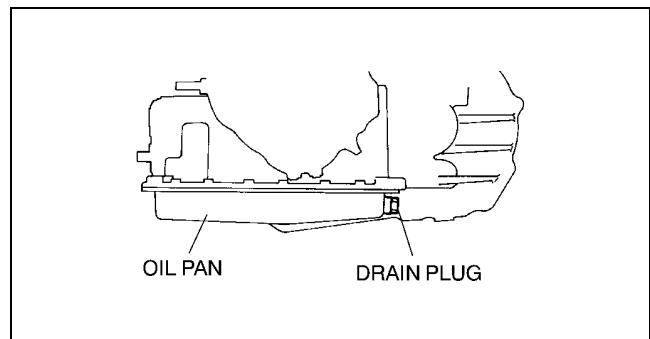
Tightening torque

30—41 N·m {3.0—4.2 kgf·m, 22—30 ft·lbf}

5. Add the specified type of ATF through the oil filler tube until ATF level reaches lower notch of dipstick.

ATF type

M-V or equivalent (e.g. Dexron®III)



X3U517WA5

6. That the ATF level is in the HOT (**65 °C {149 °F}**) range.
7. Add ATF to the specified level if necessary.

O/D OFF SWITCH INSPECTION

A3U051746040W01

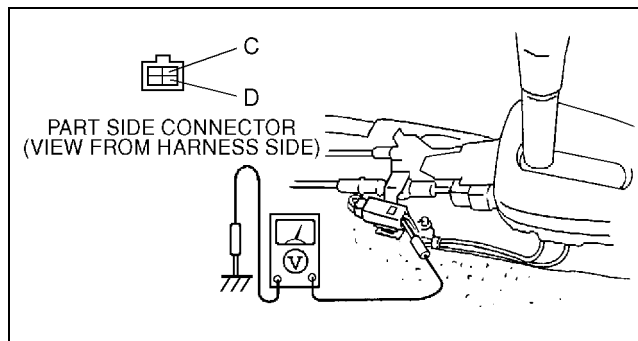
Inspection of Operation

1. Turn the ignition switch from OFF to ON.
2. Verify that the O/D OFF indicator light is not illuminated. Depress the O/D OFF switch and verify that the O/D OFF indicator light illuminates.
 - If not as specified, inspect the terminal voltage of the O/D OFF switch. (See 05-17-19 Inspection of Voltage.)

Inspection of Voltage

1. Turn the ignition switch at ON.
2. Measure the voltage at the O/D OFF switch connector.
 - If not as specified, inspect for continuity at the O/D OFF switch. (See 05-17-19 Inspection of Continuity.)

Position	Connector terminal	
	C	D
Normal	B+	0
Depressed	0	0



Z3U517W02

05-17

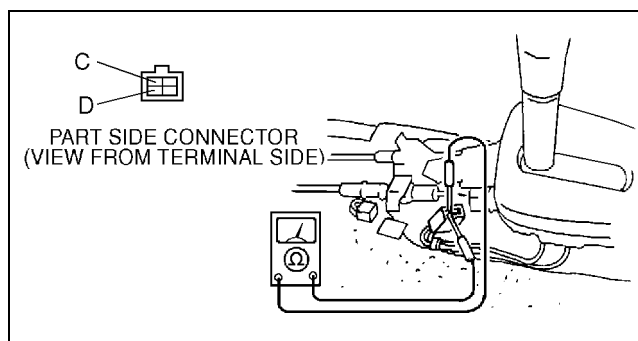
Inspection of Continuity

1. Inspect for continuity at the O/D OFF switch.
 - If the switch is okay, inspect the wiring harness. (O/D OFF switch — PCM, O/D OFF switch — Body ground)
 - If not as specified, replace the selector lever knob component. (See 05-18-8 SELECTOR LEVER DISASSEMBLY/ASSEMBLY.)

○—○ : Continuity

Position	Connector Terminal	
	C	D
Normal		
Depressed	○—○	○—○

X3U517WCN



Z3U517W03

O/D OFF SWITCH REMOVAL/INSTALLATION

A3U051746040W02

1. Disconnect the negative battery cable.
2. Remove the center console.
3. Remove the selector lever nuts.
4. Disconnect the connector and remove the O/D OFF switch terminals. (See 05-18-8 Connector Disassembly Note.)
5. Remove the selector lever knob component.
6. Install a new selector lever knob component.

Tightening torque

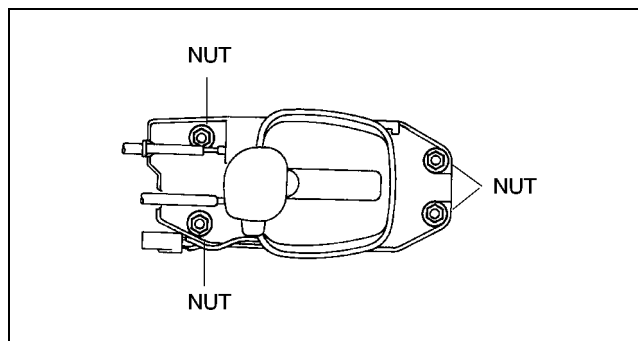
2.0—2.9 N·m {20—30 kgf·cm, 18—26 in·lbf}

7. Install the selector lever nuts.

Tightening torque

16—22 N·m {1.6—2.3 kgf·m, 12—16 ft·lbf}

8. Install the O/D OFF switch terminals and connect the connector.
9. Install the center console.
10. Connect the negative battery cable.



Z3U517W04

AUTOMATIC TRANSAXLE

TRANSAXLE RANGE (TR) SWITCH INSPECTION

A3U051719440W01

Inspection of Operation

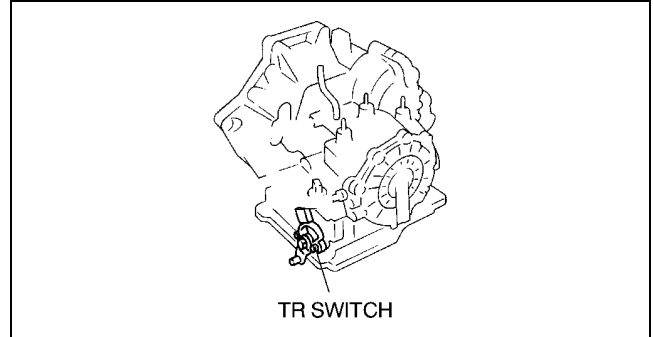
1. Verify that the starter operates only with the IG SW at the START position and the selector lever in P and N positions.
 - If not as specified, inspect for continuity at the TR switch. (See 05-17-20 Inspection of Continuity.)
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch at the ON position.
 - If not as specified, inspect for continuity at the TR switch. (See 05-17-20 Inspection of Continuity.)

Inspection of Continuity

1. Inspect for continuity at the TR switch.

○—○ : Continuity

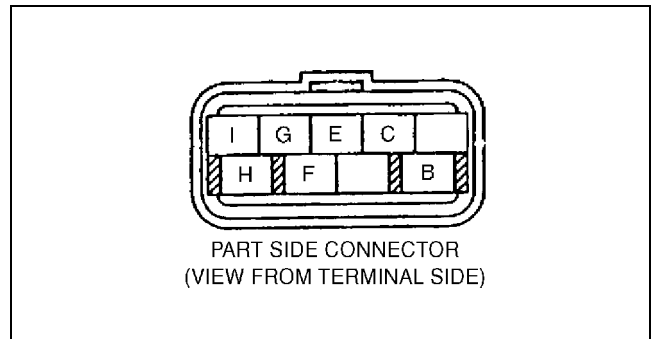
Position	Connector terminal								
	A	B	C	D	E	F	G	H	I
P	○	○						○	○
R			○						○
N		○						○	
D				○			○		○
2						○			○
1					○				○



X3U517WA9

Z3U517W13

- If not as specified, replace or adjust the TR switch. (See 05-17-20 TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION.) (See 05-17-23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT.)

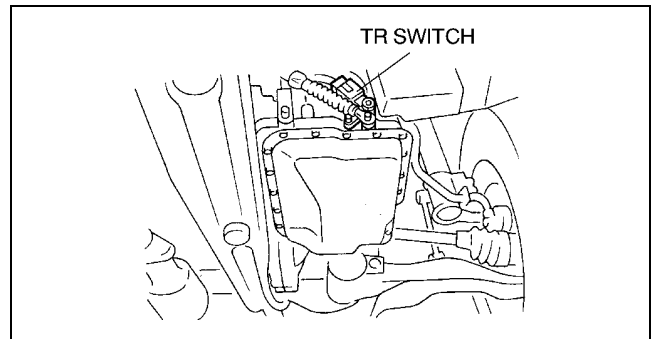


Z3U517W14

TRANSAXLE RANGE (TR) SWITCH REMOVAL/INSTALLATION

A3U051719440W02

1. Disconnect the negative battery cable.
2. Remove the fresh-air duct and air cleaner component. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove the splash shield.
4. Disconnect the TR switch connector.



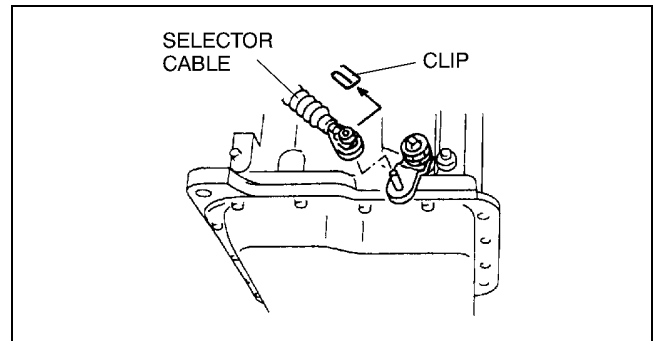
X3U517WAB

AUTOMATIC TRANSAXLE

5. Remove the clip and disconnect the selector cable.

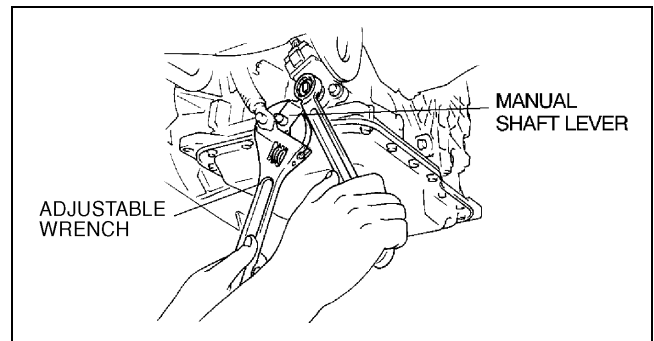
Caution

- Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, or the transaxle may be damaged.



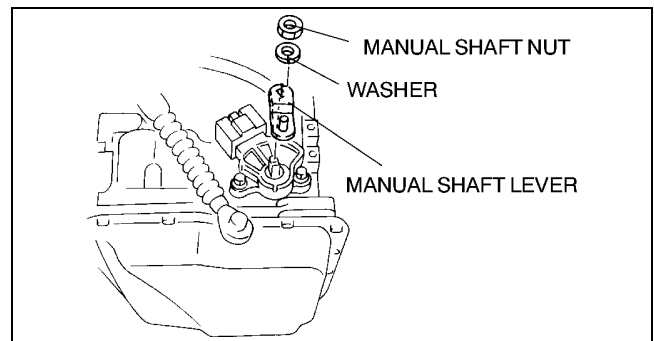
X3U517WAC

6. Set the adjustable wrench as shown to hold the manual shaft lever.
7. Remove the manual shaft nut and washer.



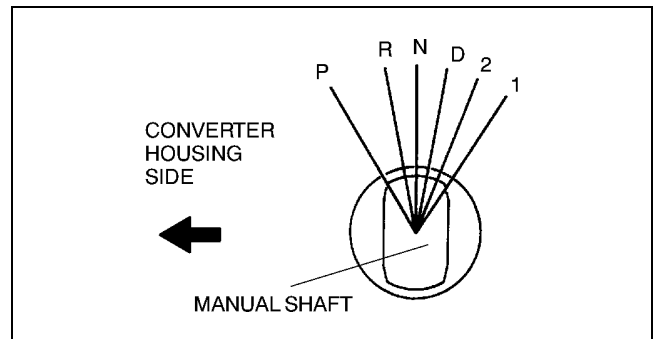
Y3U517WAM

8. Remove the manual shaft lever.
9. Remove the TR switch.



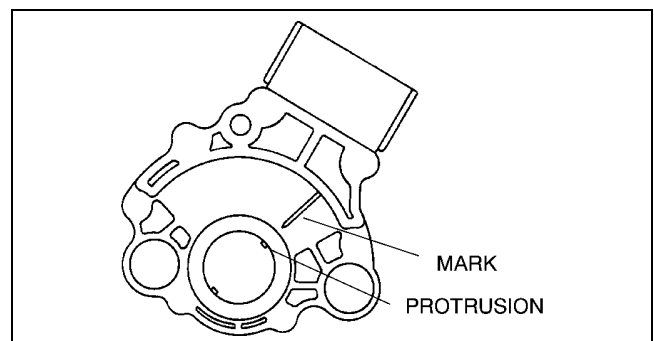
X3U517WAD

10. Rotate the manual shaft to the converter housing side fully, then return 2 notches to set the N position.



X3U517WAE

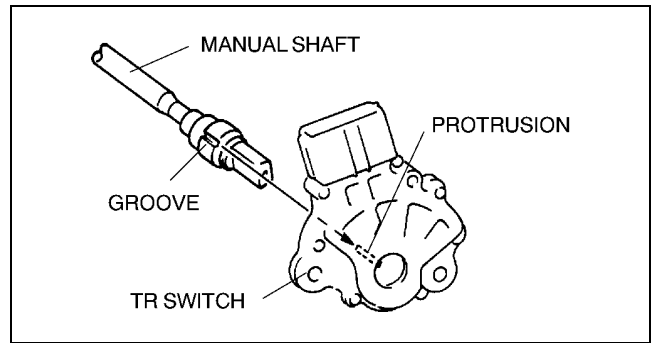
11. Align the protrusion and mark as shown.



X3U517WCW

AUTOMATIC TRANSAXLE

12. Install the TR switch while aligning the protrusion and groove as shown.

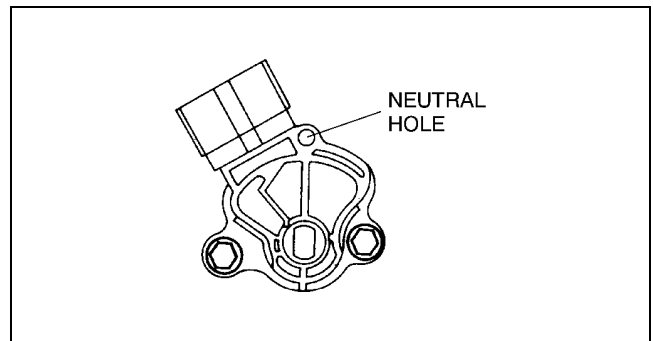


X3U517WCX

13. Turn the TR switch so that the neutral hole is in line with the flat, straight surfaces on either side of the manual shaft.
14. Hand-tighten the TR switch bolts.
15. Perform the TR switch adjustment. (See 05-17-23 TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT.)
16. Install the manual shaft lever and washer.

Caution

- Do not use an impact wrench. Hold the manual shaft lever when tightening the manual shaft nut, or the transaxle may be damaged.

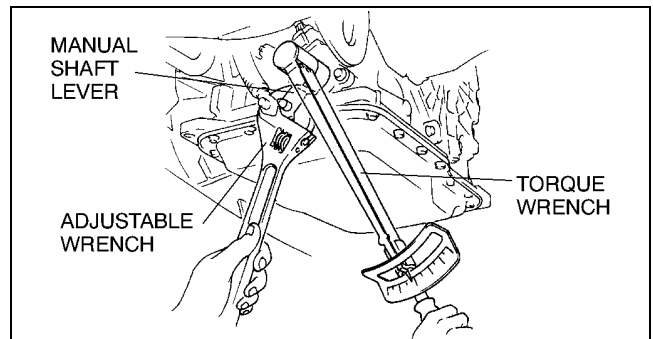


X3U517WAF

17. Set the adjustable wrench as shown to hold the manual shaft lever.
18. Tighten the manual shaft nut using a torque wrench.

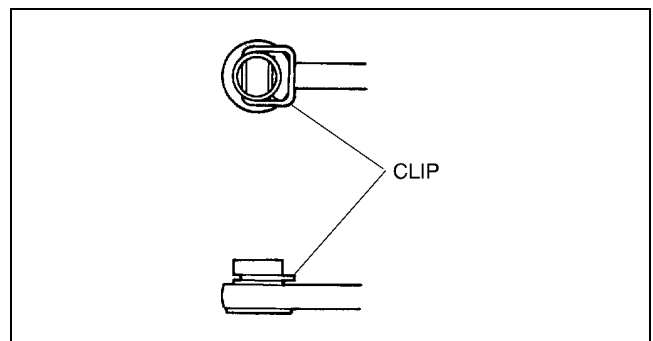
Tightening torque

32—46 N·m {3.2—4.7 kgf·m, 24—33 ft·lbf}



X3U517WAJ

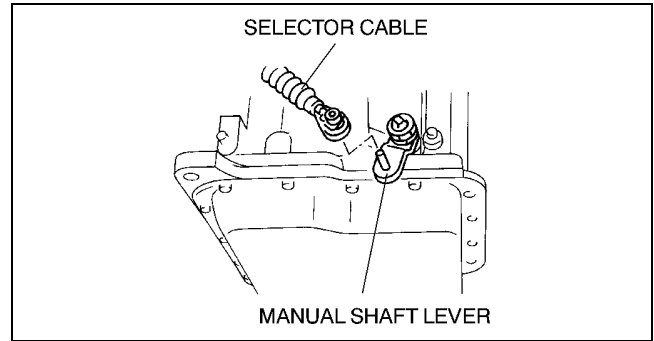
19. Install the clip as shown in the figure.



X3U517WCZ

AUTOMATIC TRANSAXLE

20. Verify that the selector lever range position and TR switch are aligned, then connect the selector cable.
21. Inspect for continuity at the TR switch. (See 05-17-20 Inspection of Continuity.)
22. Connect the TR switch connector.
23. Install the splash shield.
24. Install the air cleaner component and fresh-air duct. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
25. Connect the negative battery cable.
26. Inspect operation of the TR switch. (See 05-17-20 Inspection of Operation.)



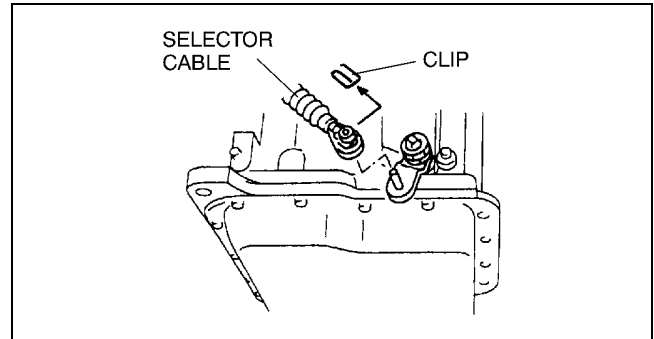
X3U517WAK

TRANSAXLE RANGE (TR) SWITCH ADJUSTMENT

A3U051719440W03

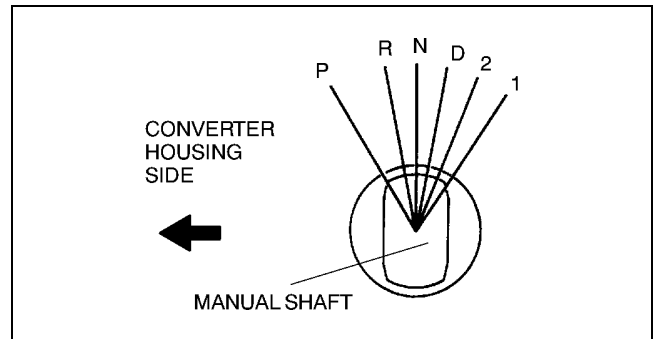
05-17

1. Disconnect the negative battery cable.
2. Remove the fresh-air duct and air cleaner component. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Remove the splash shield.
4. Remove the clip and disconnect the selector cable.



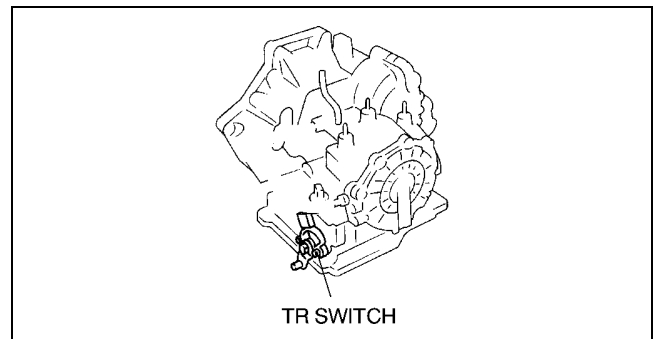
X3U517WD0

5. Rotate the manual shaft to the converter housing side fully, then return 2 notches to set the N position.



X3U517WD3

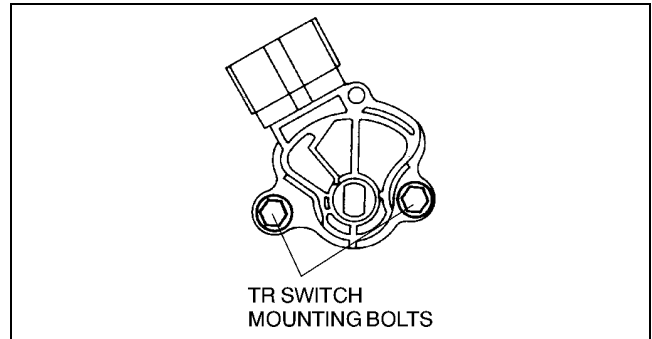
6. Disconnect the TR switch connector.



X3U517WAL

AUTOMATIC TRANSAXLE

7. Loosen the TR switch mounting bolts.



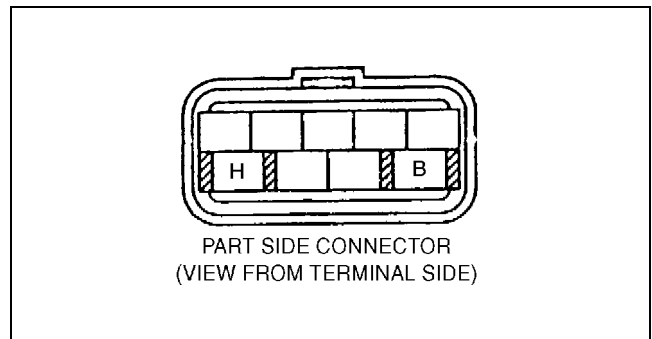
X3U517WAM

8. Connect an ohmmeter between terminals B and H.
9. Adjust the switch to the point where there is continuity between the terminals.
10. Tighten the TR switch mounting bolts.

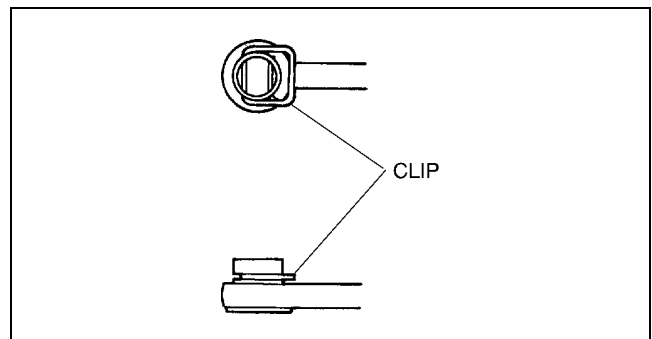
Tightening torque

7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

11. Verify that the selector lever range position and TR switch are aligned.
12. Connect the TR switch connector.
13. Install the clip as shown in the figure.

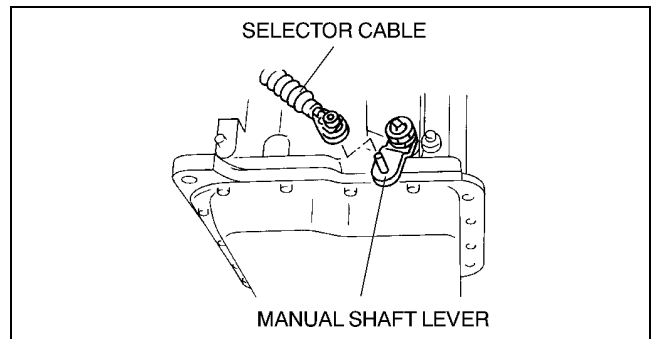


Z3U517W15



X3U517WD1

14. Connect the selector cable.
15. Install the splash shield.
16. Install the air cleaner component and fresh-air duct. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
17. Connect the negative battery cable.



X3U517WD2

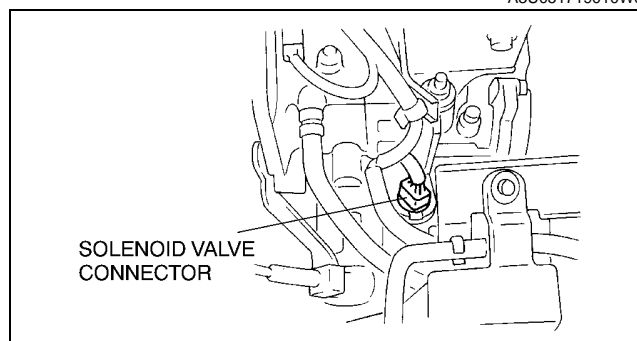
AUTOMATIC TRANSAXLE

TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION

A3U051719010W01

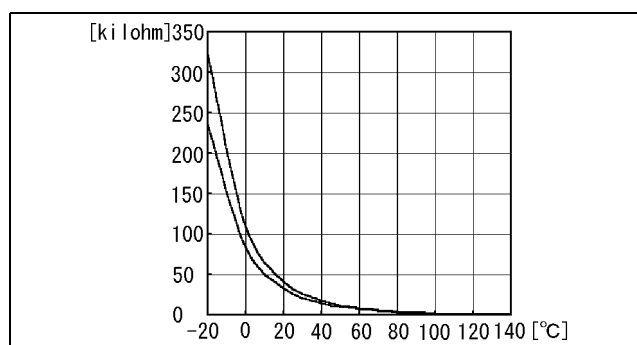
1. Measure the resistance between the terminals E and H.
 - If it is out of specifications, replace the TFT sensor. (See 05-17-25 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION.)

ATF temperature (°C {°F})	Resistance (kilohm)
-20 {-4}	236—324
0 {32}	84.3—110
20 {68}	33.5—42.0
40 {104}	14.7—17.9
60 {140}	7.08—8.17
80 {176}	3.61—4.15
100 {212}	1.96—2.24
120 {248}	1.13—1.28
130 {266}	0.87—0.98

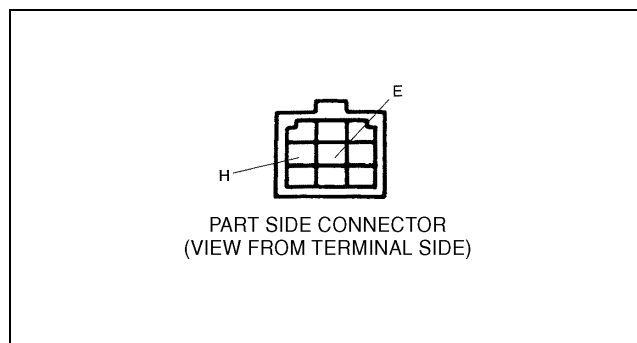


X3U517WAP

05-17



Z3U517W12



Y3U517WAA

TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION

A3U051719010W02

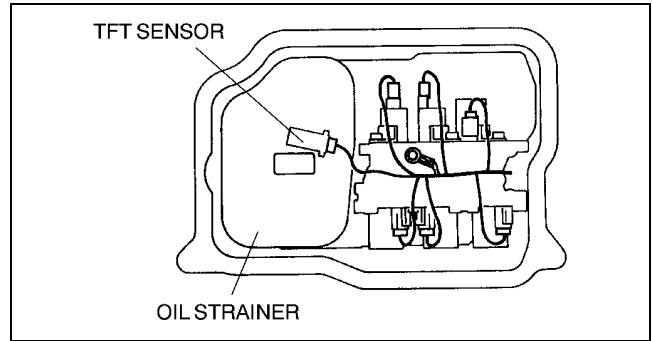
Warning

- When the transaxle and ATF are hot, they can badly burn. Turn off the engine and wait until they are cool before performing this procedure.

1. Remove the oil pan. (See 05-17-36 On-vehicle Removal.)
2. Disconnect the TFT sensor connector.

AUTOMATIC TRANSAXLE

3. Remove the TFT sensor.
4. Install a new TFT sensor.
5. Connect the TFT sensor connector.
6. Install the oil pan. (See 05-17-38 On-vehicle Installation.)
7. Carry out the mechanical system test. (See 05-17-11 MECHANICAL SYSTEM TEST.)



X3U517WAR

INPUT/TURBINE SPEED SENSOR INSPECTION

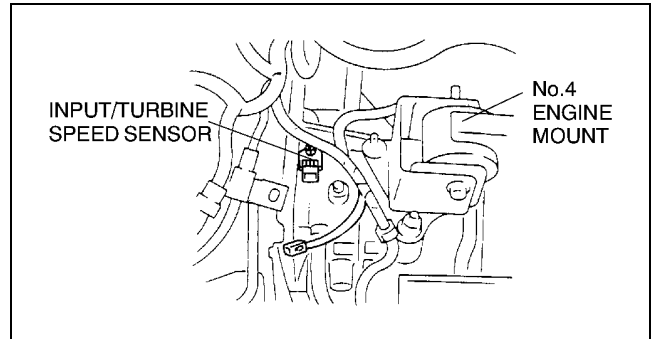
Resistance Inspection

1. Measure the resistance between the terminals of the input/turbine speed sensor.

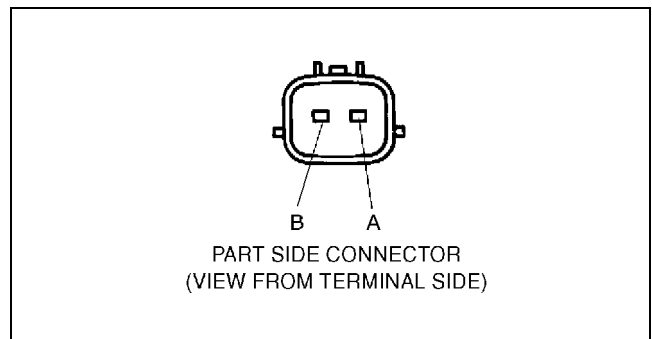
Resistance

250—600 ohms (ATF temperature: -40—160 °C {-40—320 °F})

- If not as specified, replace the input/turbine speed sensor. (See 05-17-26 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION.)



X3U517WAS



Z3U517W16

INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION

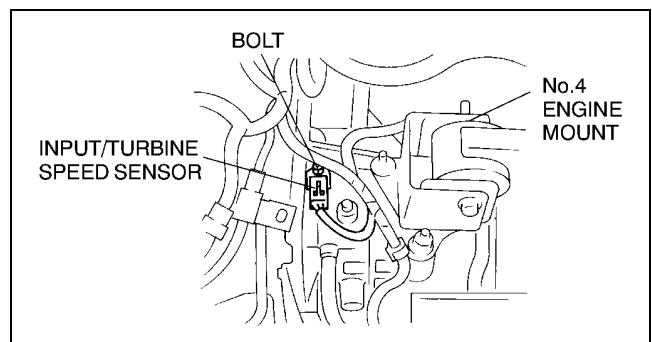
A3U051721550W02

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
3. Disconnect the input/turbine speed sensor connector.
4. Remove the input/turbine speed sensor.
5. Apply ATF to a new O-ring and install it on a new input/turbine speed sensor.
6. Install the input/turbine speed sensor.

Tightening torque

7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

7. Connect the input/turbine speed sensor connector.
8. Install the air cleaner component. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
9. Connect the negative battery cable.



X3U517WAU

VEHICLE SPEEDOMETER SENSOR (VSS) INSPECTION [ATX]

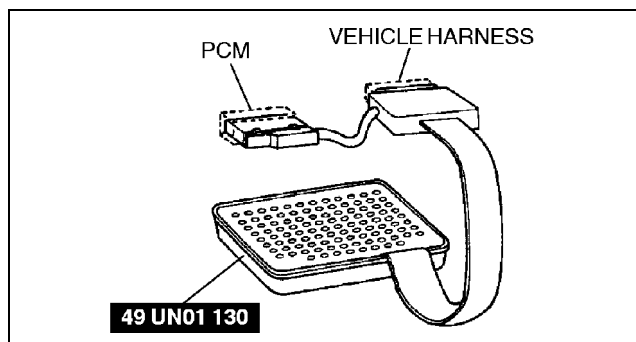
A3U051717401W01

Visual Inspection

1. Remove the VSS. (See 05-17-28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX].)
2. Make sure that the sensor is free of any metallic shavings or particles.
 - If any are found on the sensor, clean them off.
3. Install the VSS. (See 05-17-28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX].)

Wave profile Inspection

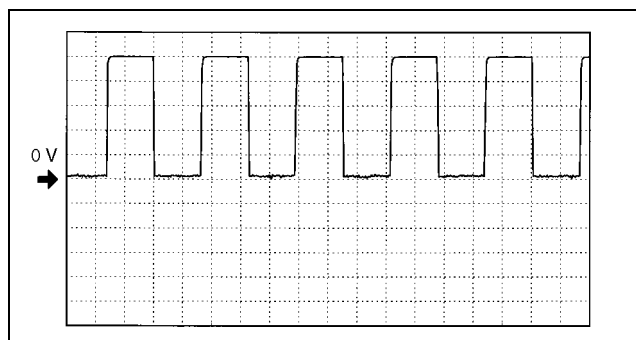
1. Remove the PCM. (See 01-40A-7 PCM REMOVAL/INSTALLATION [ZM].) (See 01-40B-7 PCM REMOVAL/INSTALLATION [FS].)
2. Connect WDS or equivalent to DLC-2 connector.
3. Connect the **SST** (104 Pin Breakout Box) to the PCM as shown.
4. Connect oscilloscope test leads to the following PCM connector terminals.
 - (+) lead: PCM terminal 58
 - (-) lead: PCM terminal 103
5. Start the engine.
6. Monitor VSS PID.



A3U0517W001

05-17

7. Inspect wave profile.
 - PCM terminal: 58 (+)-103(-)
 - Oscilloscope setting: 1 V/DIV(Y), 2.5 ms/DIV(X), DC range
 - Vehicle condition: drive the vehicle with 32 km/h{20 mph}
 - If wave profile or voltage are out of specifications, carry out the "Open Circuit Inspection" or "Short Circuit Inspection"



Z3U0140W013

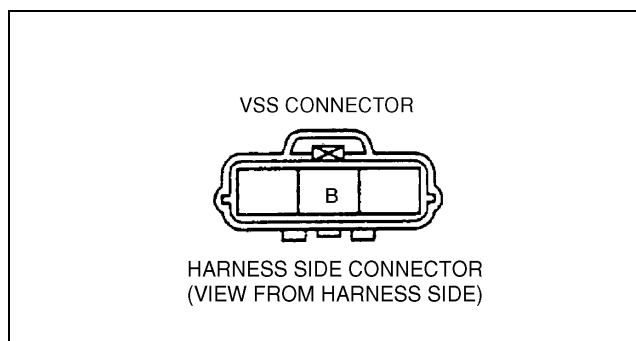
Power Supply Voltage Inspection

1. Disconnect the VSS connector.
2. Turn the ignition switch to ON.
3. Measure voltage at VSS connector terminal B (wiring harness side).

Specification

4.5—5.5 V

- If voltage is okay, go to "See 05-17-27 Open Circuit Inspection" and "Short Circuit Inspection".
- If voltage is wrong, repair wiring harness between VSS and PCM.



Y3U517WAE

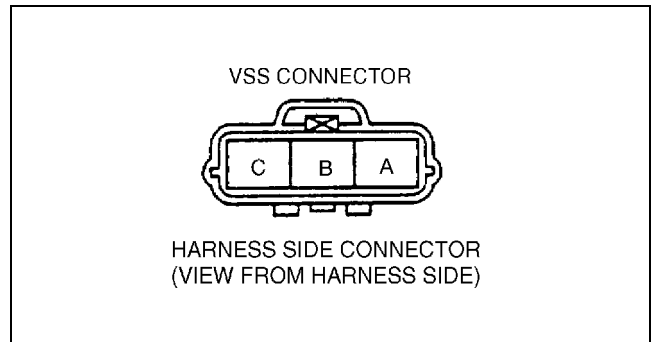
Open Circuit Inspection

1. Inspect the following circuit for open.
 - Power circuit (VSS connector terminal A to main relay terminal D)
 - Ground circuit (VSS connector terminal C to GND)
 - If an open circuit or short circuit is found, repair the malfunctioning wiring harness.
 - If there are no open or short circuits, perform the sensor rotor inspection. (See 05-17-28 Sensor Rotor Inspection.)

AUTOMATIC TRANSAXLE

Short Circuit Inspection

- Inspect the following circuit for short.
 - Power circuit (VSS connector terminal A to main relay terminal D)
 - If an open circuit or short circuit is found, repair the malfunctioning wiring harness.
 - If there are no open or short circuits, perform the sensor rotor inspection. (See 05-17-28 Sensor Rotor Inspection.)



Z3U517W17

Sensor Rotor Inspection

- Remove the VSS. (See 05-17-28 VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX].)
- Shift the selector lever to N position.
- Inspect sensor rotor surface via VSS installation hole while rotating the front tire manually.
 - Is sensor rotor free of damage and cracks?
 - Is sensor rotor free of any metallic shavings or particles?
 - If sensor rotor is okay, replace VSS.
 - If there is a problem, clean or replace the sensor rotor.

VEHICLE SPEEDOMETER SENSOR (VSS) REMOVAL/INSTALLATION [ATX]

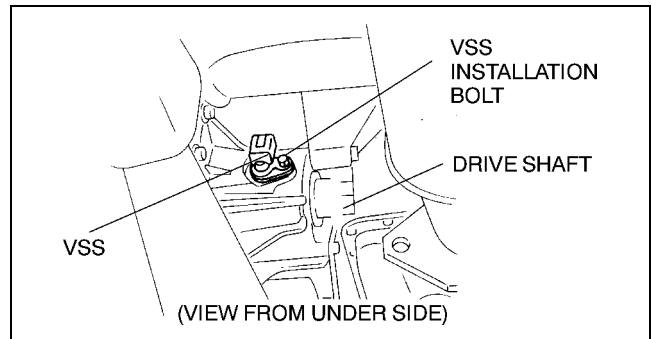
A3U051717401W02

- Disconnect the negative battery cable.
- Disconnect the VSS connector.
- Remove the VSS.
- Apply ATF to a new O-ring and install it on a new VSS.
- Install the VSS.

Tightening torque

7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

- Connect the VSS connector.
- Connect the negative battery cable.



X3U517WAZ

SOLENOID VALVES INSPECTION

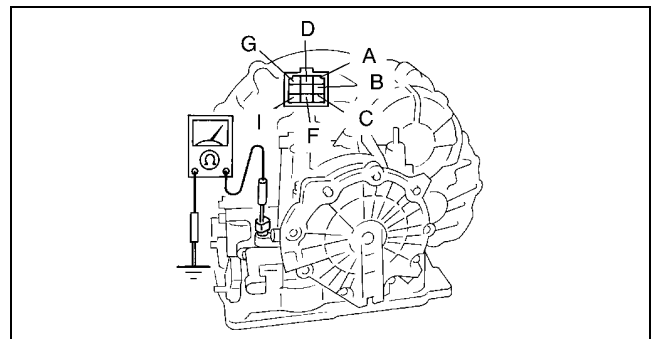
A3U051721280W01

Inspection of Resistance (On-vehicle)

- Measure the resistances between the following terminals.
 - If any resistances are out of specifications, inspect the ground, then perform the operation and the part inspection.

ATF temperature: -40—150 °C {-40—302 °F}

Terminal	Solenoid valve	Resistance (ohm)
A-GND	Shift solenoid A	1.0—4.2
B-GND	Shift solenoid D	10.9—26.2
C-GND	Shift solenoid B	1.0—4.2
D-I	Pressure control solenoid	2.4—7.3
F-GND	Shift solenoid E	10.9—26.2
G-GND	Shift solenoid C	1.0—4.2



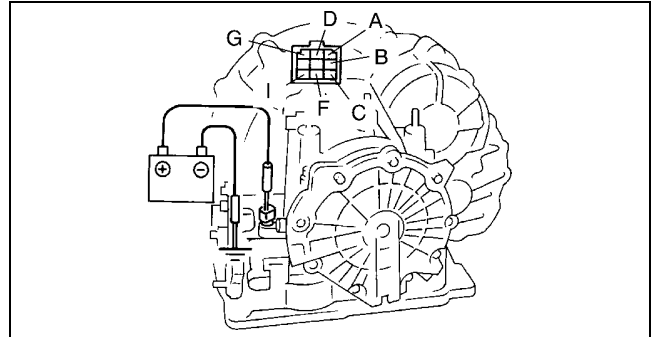
X3U517WB2

Inspection of Operation

Note

- When inspecting the pressure control solenoid, connect the GND connection to the GND terminal (I terminal) of the pressure control solenoid inside the solenoid valve connector.
- Do not apply voltage for more than **3 seconds**.

1. Apply B+ to terminal A, B, C, F, or G and battery negative voltage to GND, and verify that a click sound is heard from each solenoid.
 - If the click sound is not heard from each solenoid, replace solenoids.
2. Apply B+ to terminal D and battery negative voltage to terminal I, and verify that a click sound is heard from solenoid.
 - If the "click" is not heard, replace the solenoid valve. (See 05-17-30 SOLENOID VALVES REMOVAL/INSTALLATION.)



X3U517WB3

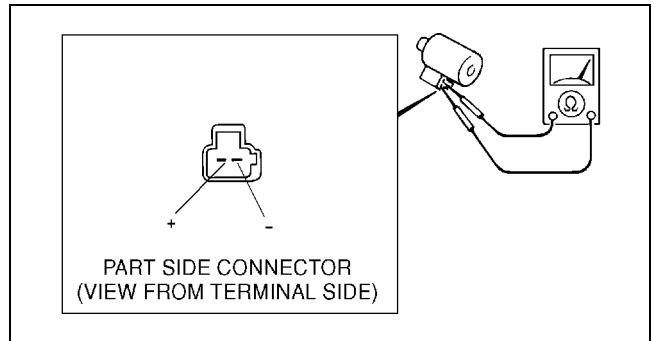
05-17

Resistance Inspection (Off-vehicle)

1. Measure the resistance of each solenoid valve individually.
 - If not as specified, replace the solenoid valve.

Pressure control solenoid

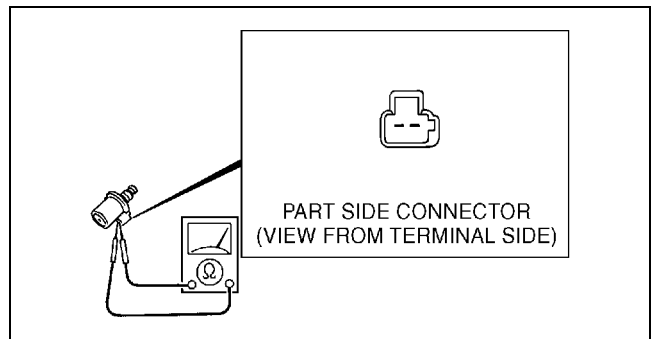
Resistance: 2.4—7.3 ohms



Z3U517W05

Shift solenoid A, B, C

Resistance: 1.0—4.2 ohms

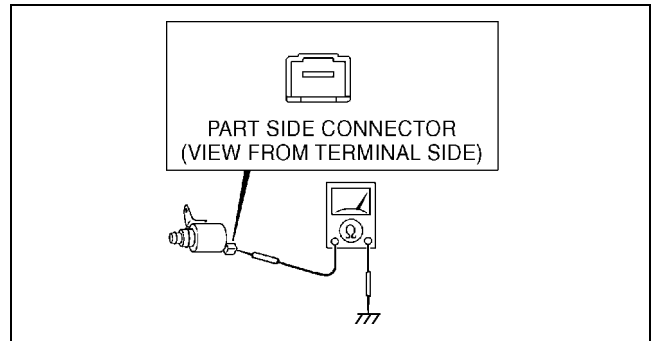


Z3U517W06

AUTOMATIC TRANSAXLE

Shift solenoid D, E

Resistance: 10.9—26.2 ohms



Z3U517W07

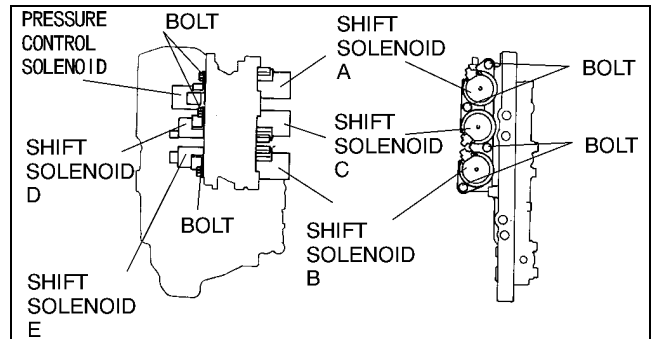
SOLENOID VALVES REMOVAL/INSTALLATION

A3U051721280W02

1. Remove the control valve body. (See 05-17-36 On-vehicle Removal.)
2. Remove the solenoid valve(s).
3. Apply ATF to a new O-ring and install it on the solenoid valve.
4. Install the solenoid valve in the control valve body.

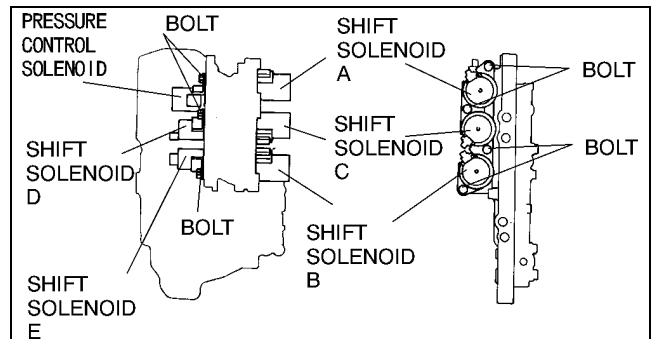
Tightening torque

7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U517WB7

5. Install the control valve body. (See 05-17-38 On-vehicle Installation.)
6. Add in ATF and, with the engine idling, inspect the ATF level and inspect for leakage. (See 05-17-18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.) (See 05-17-18 Automatic Transaxle Fluid (ATF) Level Inspection.)
7. Carry out the mechanical system test. (See 05-17-11 MECHANICAL SYSTEM TEST.)
8. Carry out the road test. (See 05-17-14 ROAD TEST.)



X3U517WB8

O/D OFF INDICATOR LIGHT INSPECTION

A3U051755480W01

Inspection of Operation

1. Turn the IG SW from OFF to ON.

Note

- The O/D OFF indicator light flashes when any malfunction exists in the EC-AT system components.
2. Verify that the O/D OFF indicator light is not illuminating.
 3. Depress the switch and verify that the O/D OFF indicator light illuminates.
 - If the O/D OFF switch does not function, inspect the O/D OFF switch, and then inspect the terminal voltage of the O/D OFF indicator light.

PCM INSPECTION

A3U051718880W01

1. Inspect the PCM. (See 01-40A-7 PCM INSPECTION [ZM].) (See 01-40B-7 PCM INSPECTION [FS].)

PCM REMOVAL/INSTALLATION

A3U051718880W02

1. Remove and install the PCM. (See 01-40A-7 PCM REMOVAL/INSTALLATION [ZM].) (See 01-40B-7 PCM REMOVAL/INSTALLATION [FS].)

AUTOMATIC TRANSAXLE (ATX) REMOVAL/INSTALLATION

A3U051701030W07

1. Drain the ATF. (See 05-17-18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
2. Remove the tires and splash shield.
3. Remove the battery and battery carrier.
4. Remove the fresh-air duct and air cleaner component. (See 01-13A-5 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [ZM].) (See 01-13B-6 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [FS].)
5. Remove the EGR pipe, front pipe and TWC. (See 01-15-1 EXHAUST SYSTEM REMOVAL/INSTALLATION.)

Warning

- Improperly jacking a transaxle is dangerous. It can slip off the jack and may cause serious injury.

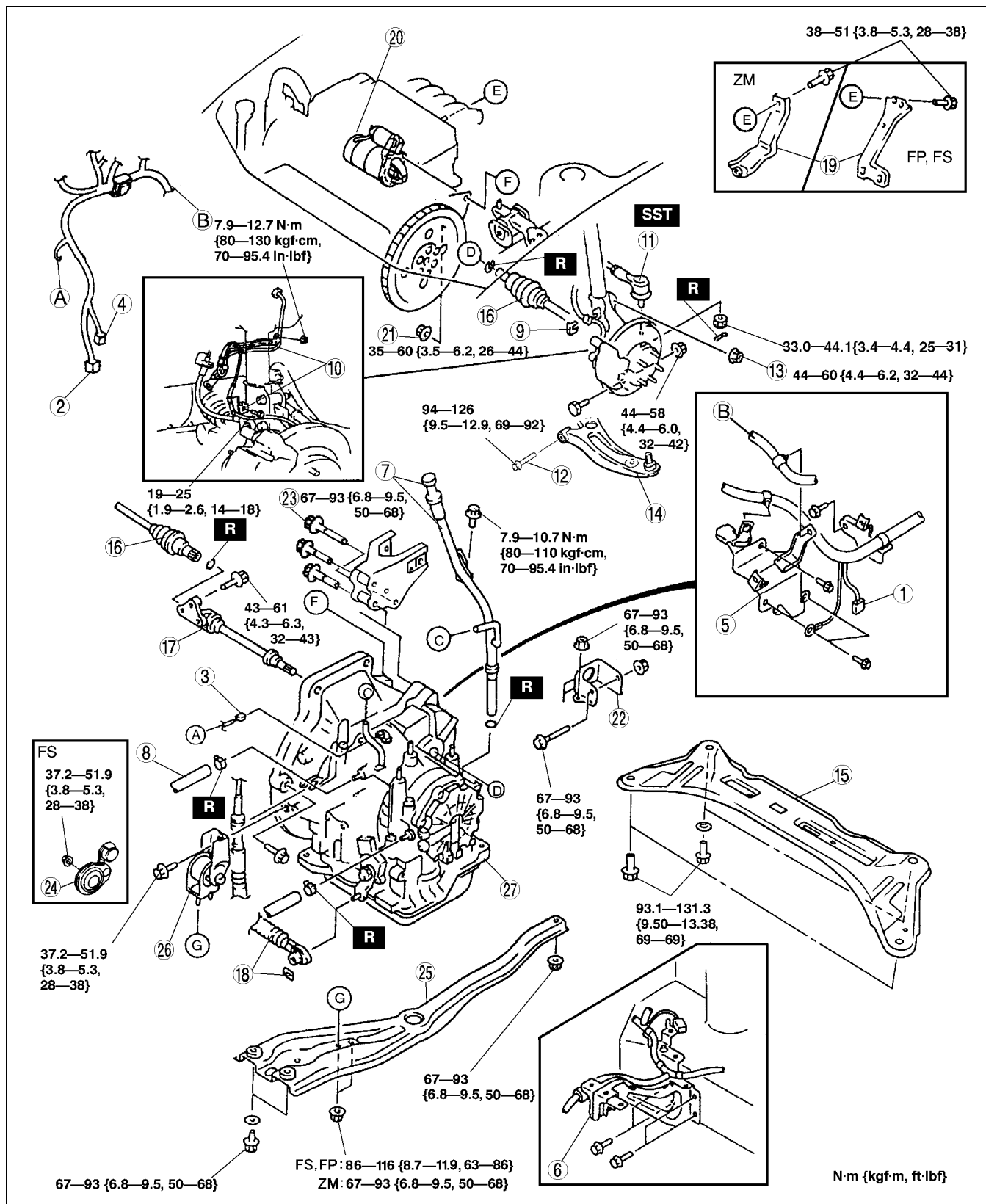
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.
8. Add ATF to the specified level. (See 05-17-18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
9. Carry out the mechanical system test. (See 05-17-11 MECHANICAL SYSTEM TEST.)

Service item	Test item		
	Line pressure test	Stall test	Time lag test
ATX replacement	×		
ATX overhaul	×	×	×
Torque converter replacement	×	×	
Oil pump replacement	×		
Clutch system replacement	×		

× : Test to be performed after the service work

10. Carry out the road test. (See 05-17-14 ROAD TEST.)

AUTOMATIC TRANSAXLE



A3U0517W005

1	Vehicle speedometer sensor connector
2	TR switch connector
3	Input/turbine speed sensor connector
4	Transaxle connector
5	Harness bracket
6	Battery tray bracket

7	Oil dipstick and filler tube
8	Oil hose
9	Brake hose clip
10	ABS wheel speed sensor bracket
11	Tie rod end (See 06-12-9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)

AUTOMATIC TRANSAXLE

12	Bolt
13	Stabilizer control link nut
14	Lower arm (See 05-17-33 Lower Arm Removal Note.)
15	Transverse member (See 02-13-9 TRANSVERSE MEMBER (ZM (ATX), FS) REMOVAL/INSTALLATION.)
16	Drive shaft (See 03-13-9 DRIVE SHAFT REMOVAL/INSTALLATION.)
17	Joint shaft (See 03-13-3 JOINT SHAFT REMOVAL/INSTALLATION.)
18	Selector cable
19	Intake manifold stay
20	Starter
21	Torque converter installation nuts (See 05-17-34 Torque Converter Installation Nuts Removal Note.)

22	No.4 engine mount (See 05-17-34 No.4 Engine Mount Removal Note.) (See 05-17-35 No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note.)
23	No.1 engine mount bolts
24	Roll damper (FS)
25	Engine mounting member (See 05-17-35 No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note.)
26	No.2 engine mount (See 05-17-35 No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note.)
27	Transaxle (See 05-17-34 Transaxle Removal Note.) (See 05-17-35 Transaxle Installation Note.)

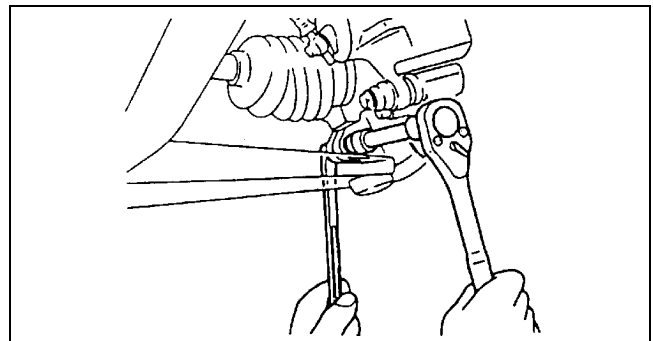
05-17

Lower Arm Removal Note

1. Remove the clinch bolt from the lower arm ball joint.

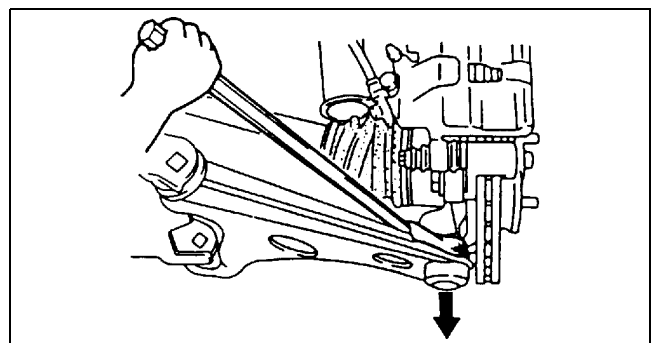
Caution

- Wrap a rag around the ball joint dust seal to protect it from damage.



Y3E5614W005

2. Pry the lower arm out of the knuckle.

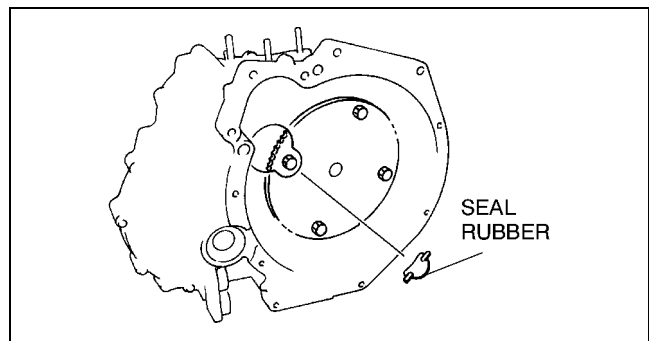


Y3E5614W006

AUTOMATIC TRANSAXLE

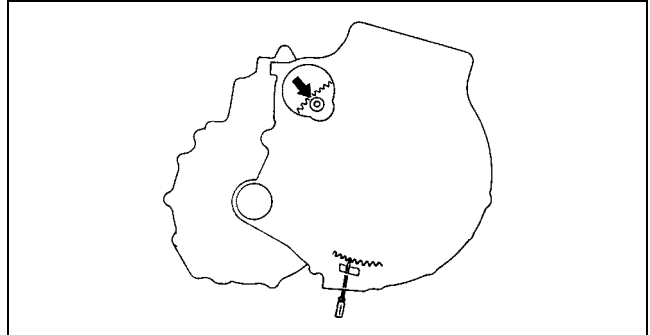
Torque Converter Installation Nuts Removal Note

1. Remove the seal rubber from the end plate.



Y3E5614W007

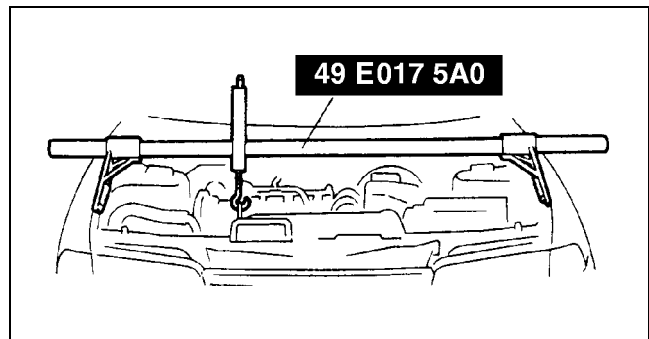
2. Remove the torque converter nuts.



Y3E5614W008

No.4 Engine Mount Removal Note

1. Support the engine by using the **SST** before removing the engine mounting member.
2. Remove the No.4 engine mount.



Z3U110WFK

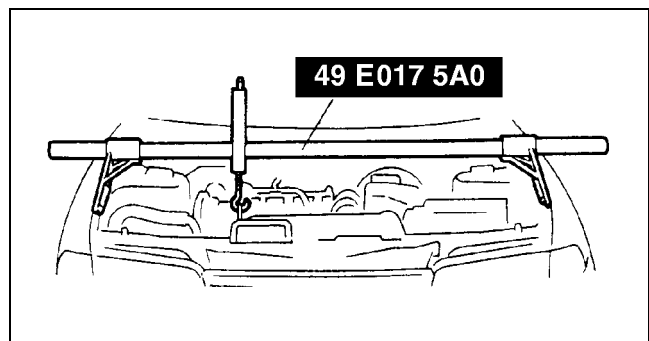
Transaxle Removal Note

1. Loosen the **SST (engine support)** and lean the engine toward the transaxle.
2. Support the transaxle on a jack.

Warning

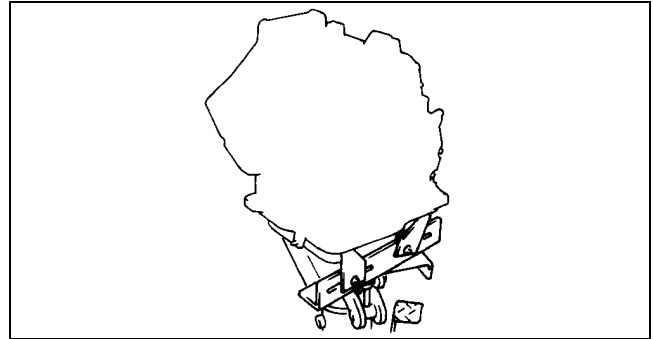
- Do not allow the transaxle to fall from the jack.

3. Remove the transaxle mounting bolts.



Z3U110WFK

4. Remove the transaxle.



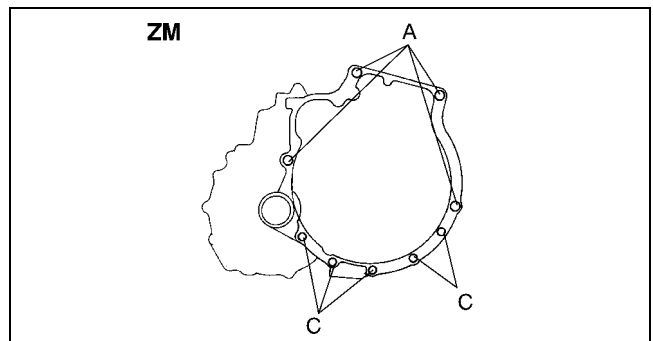
Y3E5614W010

Transaxle Installation Note

Warning

- Do not allow the transaxle to fall from the jack.

1. Set the transaxle on a jack and lift it.
2. Install the transaxle mounting bolts.

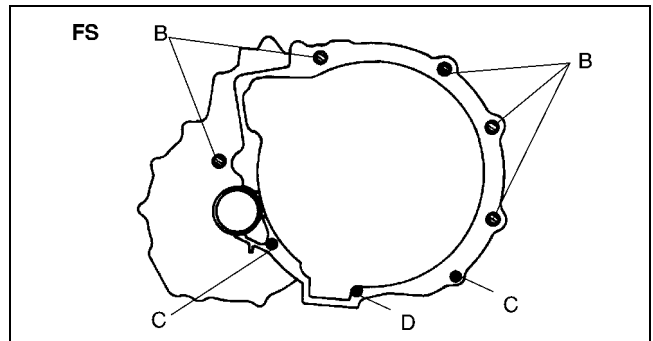


Y3E5614W011

Tightening torque

- A: 64—89 N·m {6.5—9.1 kgf·m, 48—65 ft·lbf}
- B: 90—116 N·m {9.1—11.9 kgf·m, 66—86 ft·lbf}
- C: 38—51 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}
- D: 19—25 N·m {1.9—2.6 kgf·m, 14—18 ft·lbf}

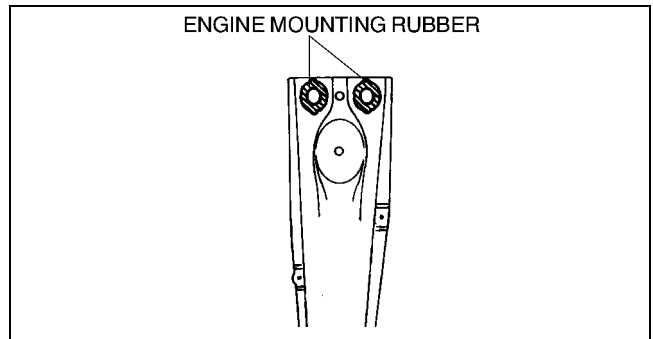
3. Tighten the **SST** (49 E017 5A0) so that the engine is located at the specified position.



Z3U517W08

No.2 Engine Mount, Engine Mounting Member, No.4 Engine Mount Installation Note

1. Verify that the engine mounting rubber is installed as shown.
2. Install the No.2 engine mount to the transaxle.
3. Put the No.2 engine mount stud bolts in the installing holes when installing the engine mounting member.



Y3E5614W013

AUTOMATIC TRANSAXLE

4. Install the bolts and nuts A, then the nuts B as shown.

Tightening torque

A: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

B (ZM): 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

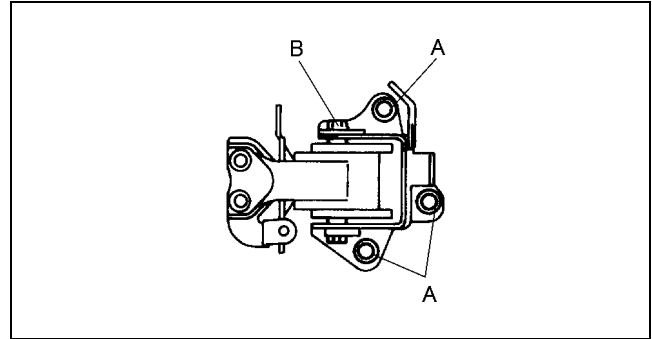
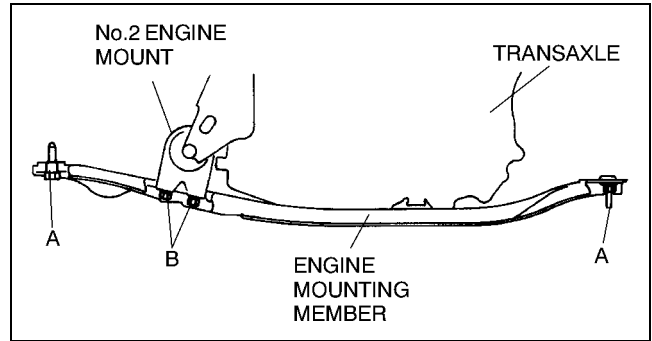
B (FS): 86—116 N·m {8.7—11.9 kgf·m, 63—86 ft·lbf}

5. Install the No.4 engine mount bracket by passing it through the stud bolt on the transaxle.
6. Match the positions of the No.4 engine mount bracket and the rubber, then temporarily tighten installation bolt A.
7. Tighten installation nut B, then tighten bolt A.

Tightening torque

A, B: 67—93 N·m {6.8—9.5 kgf·m, 50—68 ft·lbf}

8. Remove the SST (49 E017 5A0).



OIL SEAL (TRANSAXLE) REPLACEMENT

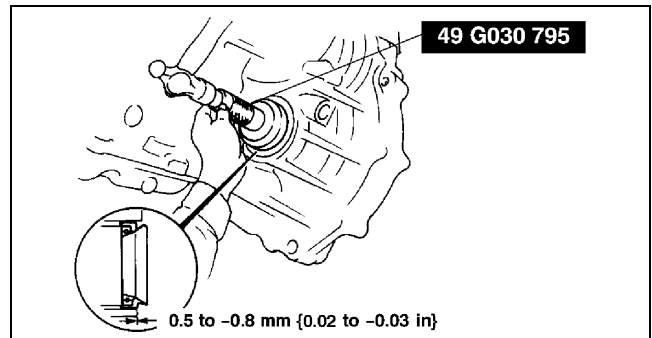
A3U051719240W01

1. Drain the ATF. (See 05—17—18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
2. Remove the drive shaft. (See 03—13—9 DRIVE SHAFT REMOVAL/INSTALLATION.)
3. Remove the oil seal.
4. Using the **SST** and a hammer, tap a new oil seal in evenly until the **SST** contacts the transaxle case.
5. Coat the lip of the oil seal with transaxle oil.

Caution

- The oil seal is easily damaged by the sharp edges of the drive shaft splines. Do not let the splines contact the oil seal.

6. Install the drive shaft. (See 03—13—9 DRIVE SHAFT REMOVAL/INSTALLATION.)
7. Add ATF to the specified level. (See 05—17—18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
8. Carry out the mechanical system test. (See 05—17—11 MECHANICAL SYSTEM TEST.)



CONTROL VALVE BODY REMOVAL/INSTALLATION

A3U051721100W01

On-vehicle Removal

Warning

- Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.

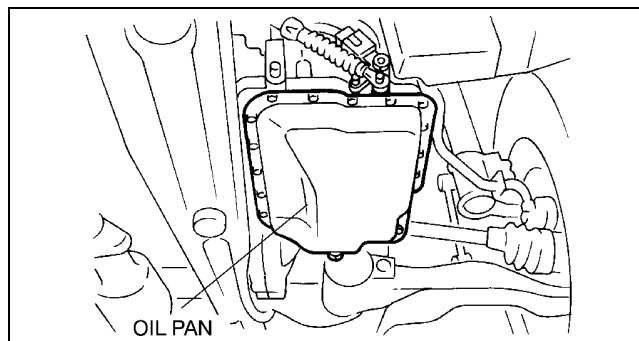
Caution

- Clean the transaxle exterior throughout with a steam cleaner or cleaning solvents before removal.
- If any old sealant gets into the transaxle during installation of the oil pan, trouble may occur in the transaxle. Remove any old sealant from the transaxle case and oil pan, and clean with cleaning fluids.

1. Disconnect the negative battery cable.
2. Drain the ATF into a separate suitable container. (See 05—17—18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)

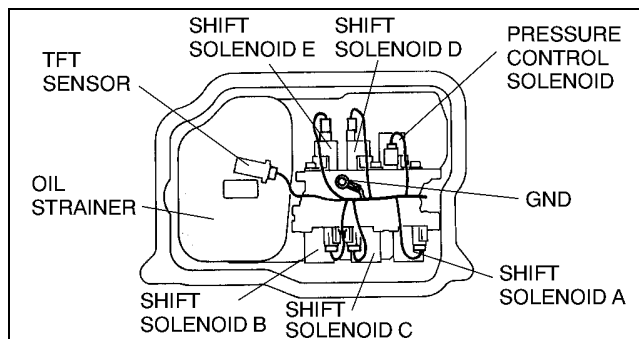
AUTOMATIC TRANSAXLE

3. Remove the splash shield.
4. Remove the oil pan.
5. Disconnect the solenoid connectors and TFT sensor connector and GND.



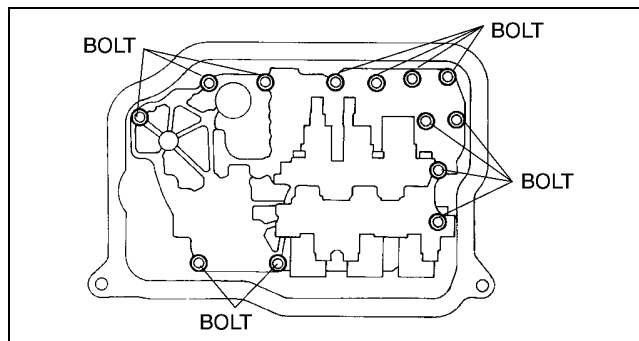
X3U517WBP

6. Remove the oil strainer.



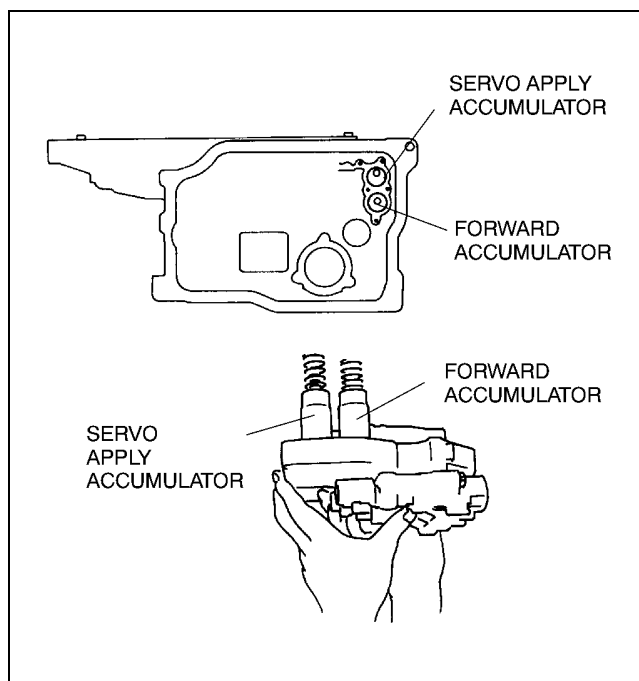
X3U517WBQ

7. Remove the control valve body component as shown.



X3U517WBR

8. Remove the accumulators and accumulator springs.



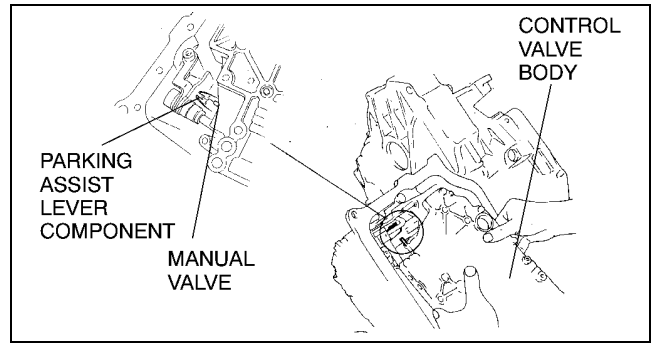
X3U517WCU

AUTOMATIC TRANSAXLE

On-vehicle Installation

Caution

- Be sure to align the parking rod and the manual valve.

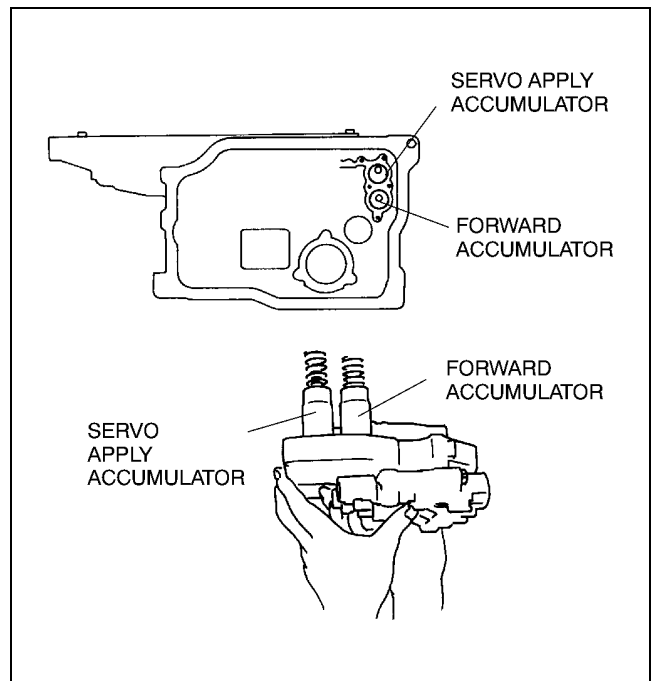


X3U517WBS

1. Install the accumulator springs and accumulator into the transaxle case.

Accumulator springs specification

Spring	Outer diameter (mm {in})	Free length (mm {in})	No. of coils	Wire diameter (mm {in})
Servo apply accumulator or large spring	21.0 {0.827}	67.8 {2.67}	10.3	3.5 {0.14}
Servo apply accumulator or small spring	13.0 {0.512}	67.8 {2.67}	17.1	2.2 {0.087}
Forward accumulator or large spring	21.0 {0.827}	75.0 {2.95}	10.7	2.3 {0.091}
Forward accumulator or small spring	15.6 {0.614}	55.0 {2.17}	12.9	2.4 {0.094}



X3U517WBT

2. Install the control valve body component.

Tightening torque

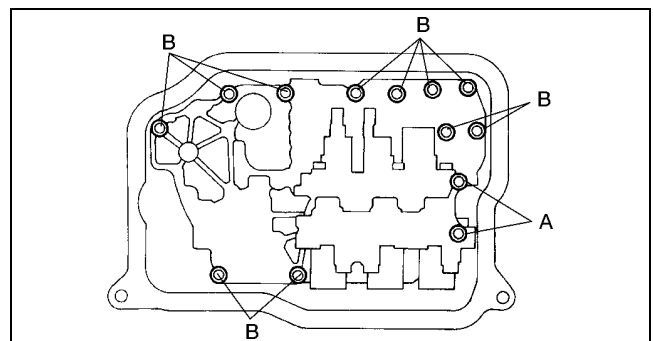
7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}

Bolt length (measured from below the head)

A: 70 mm {2.8 in}

B: 40 mm {1.6 in}

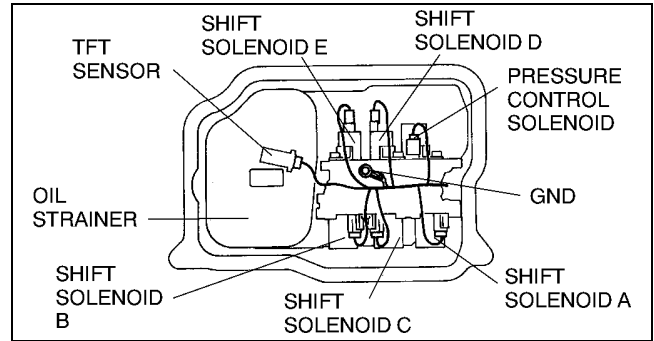
3. Install the oil strainer.



X3U517WBU

AUTOMATIC TRANSAXLE

4. Match the harness colors, then connect the solenoid connectors and TFT sensor connector.

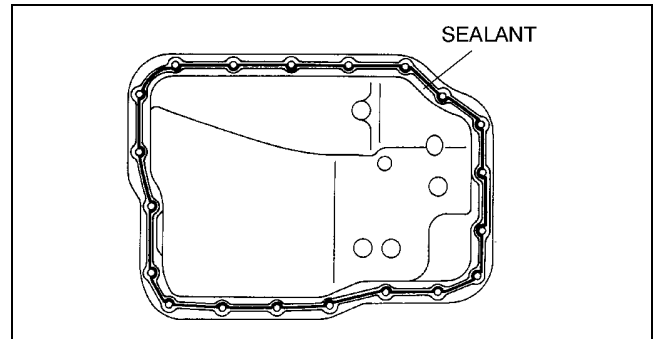


X3U517WBV

5. Apply a light coat of silicon sealant to the contact surfaces of the oil pan and transaxle case.
6. Install the oil pan.

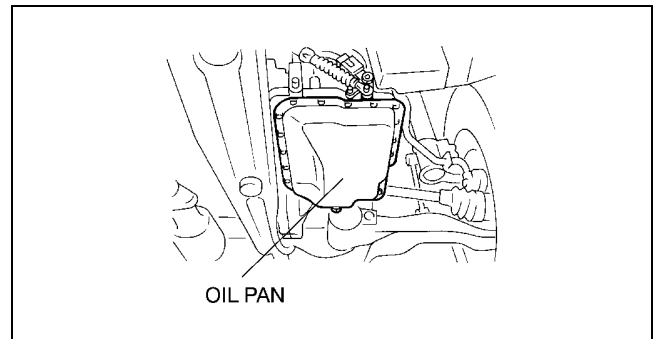
Tightening torque

7.9—10.7 N·m {80—110 kgf·cm, 69.5—95.4 in·lbf}



X3U517WBW

7. Install the splash shield.
8. Connect the negative battery cable.
9. Add ATF, and with the engine idling, inspect the ATF level. (See 05-17-18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.) (See 05-17-18 Automatic Transaxle Fluid (ATF) Level Inspection.)
10. Carry out the mechanical system test. (See 05-17-11 MECHANICAL SYSTEM TEST.)
11. Carry out the road test. (See 05-17-14 ROAD TEST.)



X3U517WBX

05-17

OIL COOLER FLUSHING

A3U05171990W01

Note

- The contaminated cooler line (oil pipes and hoses) and auxiliary cooler (if equipped) must be flushed completely when ATX is overhauled or replaced.

- Remove the two oil cooler line hoses and apply air pressure of **200 kPa {2.0 kgf/cm², 28 psi}** from the return hose (pipe) side.
 - If there is no ventilation, flush the oil cooler lines using the power-flushing tool. (See 05–17–40 Power Flushing)
 - If there is ventilation, go to next step.

Caution

- Power flushing should be performed very carefully when removing the accumulated debris from the fluid baffle, otherwise the debris cannot be removed or the problem becomes even worse.

Recommended Power-flushing Manufacturer

Manufacturer	Part number	Description
Kent Moore	J35944-AMAZ	Flushing kit or equivalent
OTC	60081	Portable torque converter, oil cooler cleaner or equivalent

- Carry out the followings steps.

- (1) Remove the oil pan and inspect the fluid filter element from the front filter.

- If the element is covered with too much debris or particles and cannot be seen, replace the oil cooler. (See 05–17–41 OIL COOLER REMOVAL/INSTALLATION.)
- If the element can be seen, flush the oil cooler lines using the power-flushing tool.

Note

- Performing back and reverse power flushing **2 times** each does not work because debris or particles flow out from the feed pipe side of ATX.

Power Flushing

Repair procedure

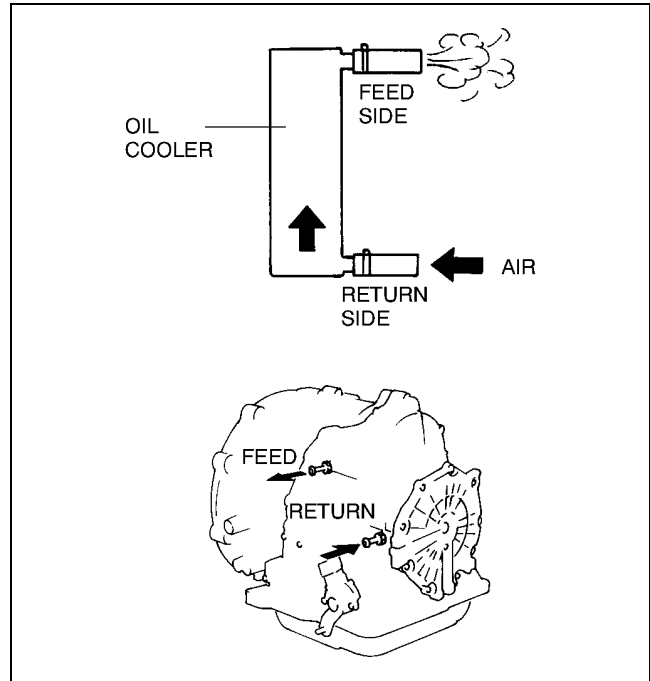
- Before power flushing, inspect the hoses/lines and clamps. Power flushing must begin with back flushing followed by forward flushing to quickly dislodge the restriction.
 - If back flushing is not performed before forward flushing, the restriction could further reduce the ATF flow through the internal mesh type baffle of the cooler and flushing will not be effective or possible.

Inspecting oil lines & clamps

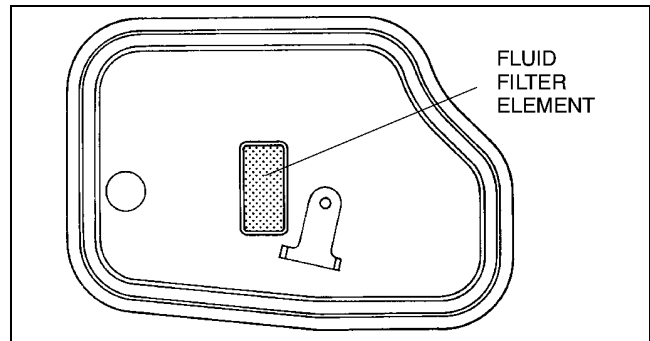
- Be sure to inspect the lines (hoses/pipes) for cuts, crimps (pinched), cracks or any other damage before reusing them.
 - If any problems exist, replace hoses and/or pipes.

Caution

- Always use new clamps when replacing hoses.



X3U517WBY



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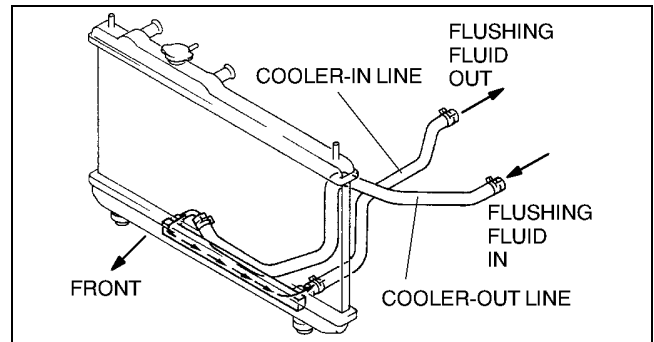
AUTOMATIC TRANSAXLE

Back flushing

1. Using the power flushing equipment manufacturer's instructions, connect equipment so the flushing fluid flows in the opposite direction of normal fluid flow.
2. Flush oil cooler/lines until discharge fluid is clean.

Caution

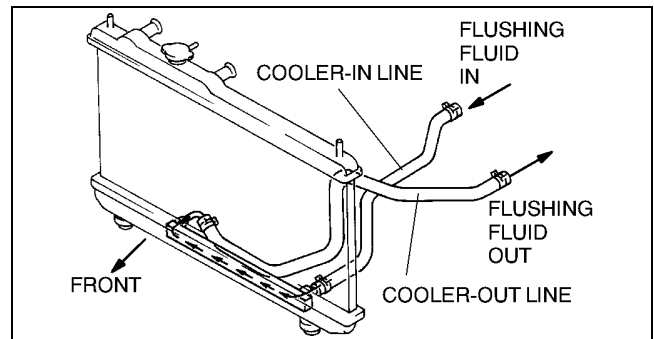
- If the cooler can not be properly flushed using recommended equipment, send the radiator out for sublet cleaning or replace.



X3U517WD4

Forward flushing

1. Connect power flushing equipment so the flushing fluid flows in the direction of normal fluid flow.
2. Flush oil cooler/lines until discharge fluid is clean.



X3U517WD5

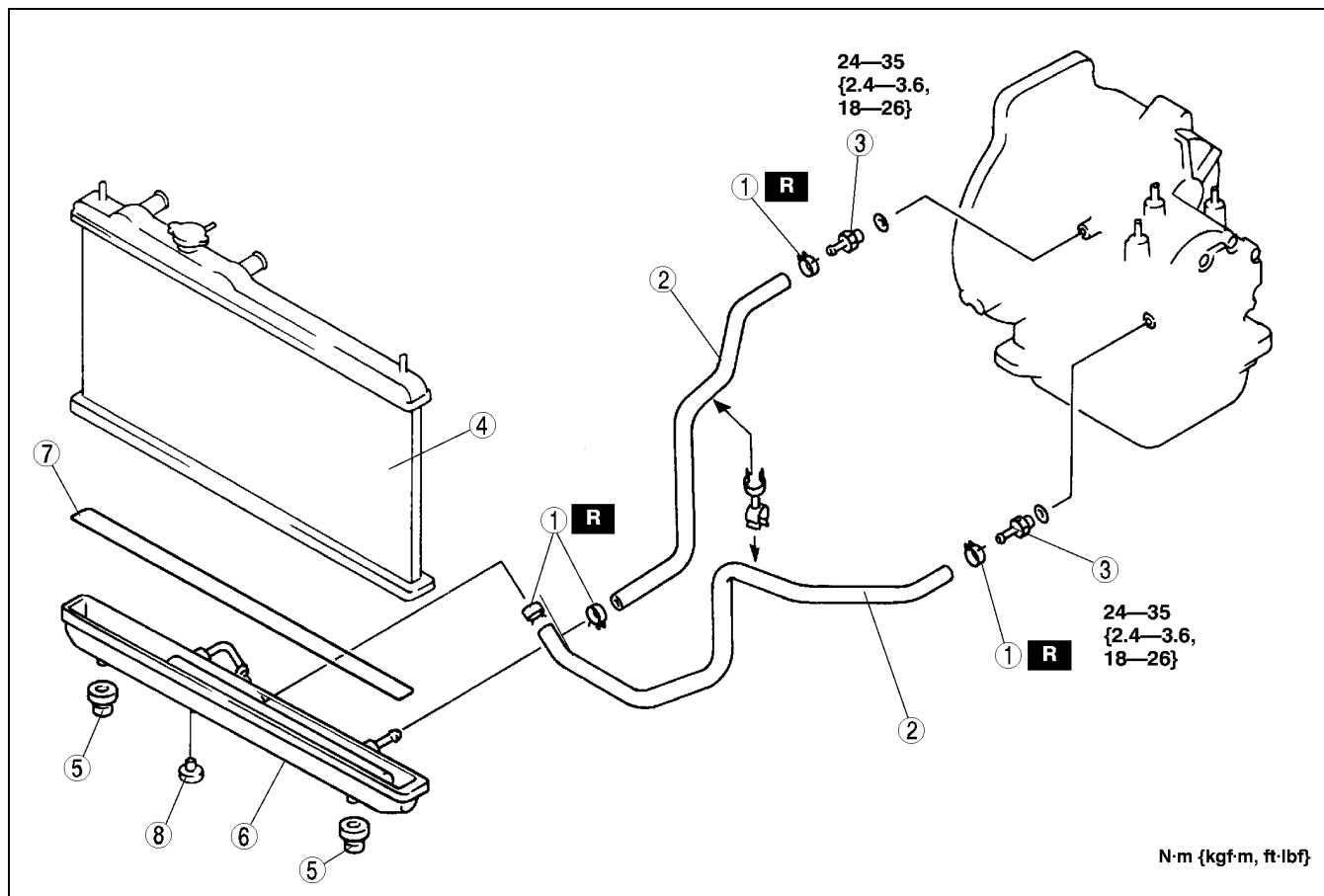
OIL COOLER REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. Add engine coolant. (See 01-12-2 COOLING SYSTEM SERVICE WARNINGS.) (See 01-12-3 ENGINE COOLANT REPLACEMENT.)
4. Add ATF to the specified level. (See 05-17-18 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT.)
5. Inspect for the coolant and ATF leakage.
6. Carry out the mechanical system test. (See 05-17-11 MECHANICAL SYSTEM TEST.)
7. Carry out the road test. (See 05-17-14 ROAD TEST.)

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05-17

AUTOMATIC TRANSAXLE



X3U517WC0

1	Hose clamp
2	Oil hose (See 05-17-45 Oil Hose Installation Note.)
3	Connector bolt
4	Radiator (See 05-17-45 Radiator Installation Note.)
5	Mount rubber

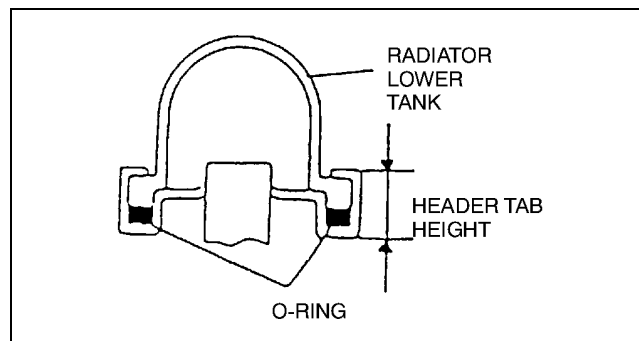
6	Radiator lower tank (in tank oil cooler) (See 05-17-42 Radiator Lower Tank (In Tank Oil Cooler) Removal Note.) (See 05-17-43 Radiator Lower Tank (In Tank Oil Cooler) Installation Note.)
7	O-ring
8	Drain cock

Radiator Lower Tank (In Tank Oil Cooler) Removal Note

1. Inspect the height of the header tabs.
2. Insert the end of a medium tip screwdriver between the end of the header tab and the lower tank.

Note

- Do not open more tabs than necessary for tank removal.



X3U517WC5

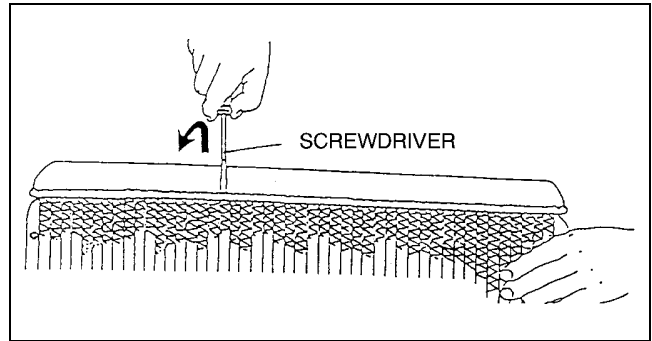
AUTOMATIC TRANSAXLE

3. Pivot the screwdriver to pry the tab away from the tank and repeat the procedure for each tab.
4. Remove the radiator lower tank and O-ring (gasket) from the core header when all of the tabs are opened.

Note

- If any header tabs are missing from the core, replace the radiator.

5. Verify that the gasket surface of the radiator core header is clean and free of foreign material or damage.
6. Inspect the radiator lower tank for warping.
 - If it is warped, replace the radiator tank.



X3U517WC6

Radiator Lower Tank (In Tank Oil Cooler) Installation Note

1. Install a new O-ring and ensure it is not twisted.

Note

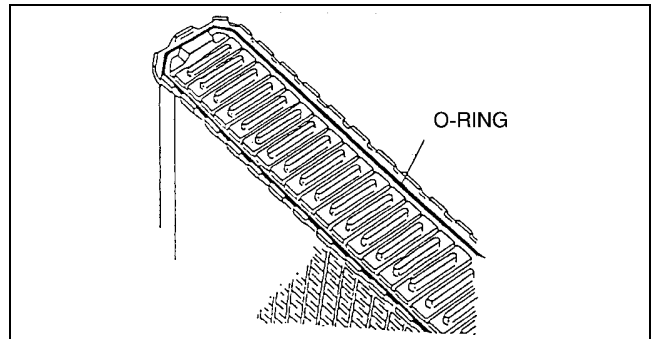
- The old O-ring must be replaced.

2. Position the radiator tank in the original direction to the core using care not to scratch the tank sealing surface with the header tabs.

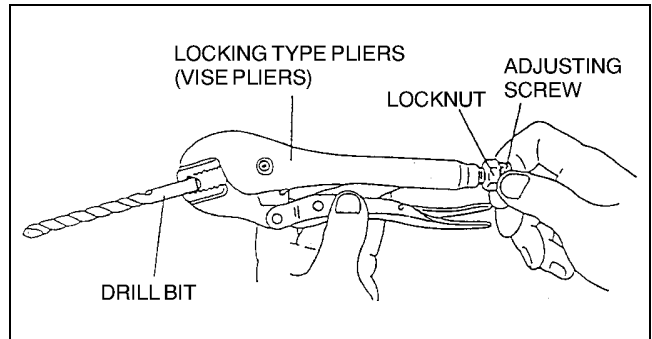
Note

- Step 3 will set jaw opening to the correct specification.

3. With the jaws of locking-type pliers (vise grips) closed and locked, turn the adjusting screw to position the jaws against the drill bit with the diameter measured (height) in removal procedure.
 - Tighten the lock nut on the adjusting screw against the handle to lock the adjustment in place.



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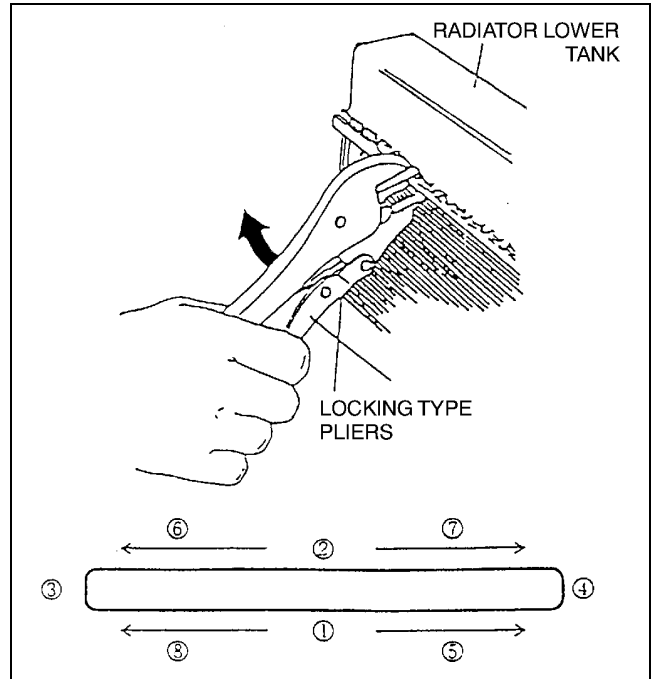


X3U517WC8

05-17

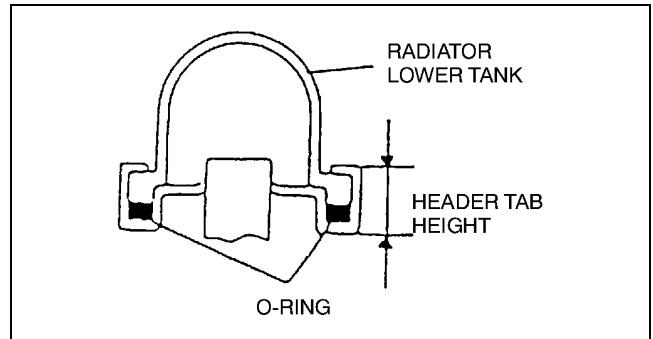
AUTOMATIC TRANSAXLE

4. Squeeze the header tabs down in order as shown against the lip of radiator lower tank base with locking-type pliers while rotating the pliers toward the tank.



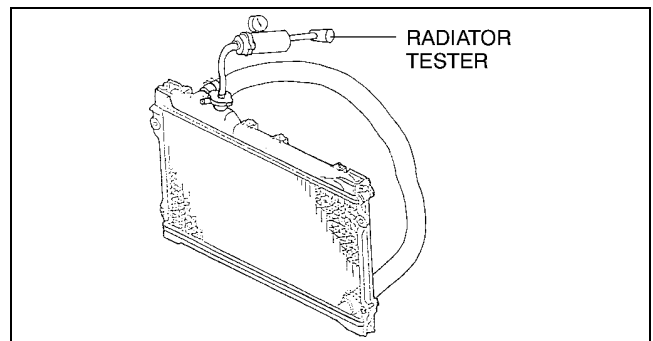
X3U517WC9

5. Verify the height of the header tabs is same as the height before removal.
6. Inspect for the leakage of radiator according to the following procedure.
 - (1) Blind the radiator inlet and outlet.
 - (2) Blind the ATF cooler inlet and outlet.
 - (3) Connect a radiator tester.



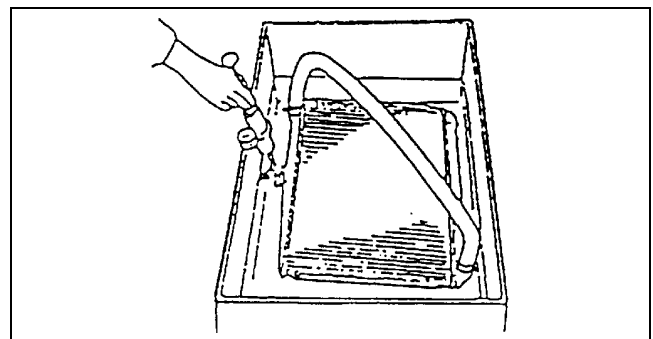
X3U517WCA

- (4) Apply pressure of **150 kPa {1.5 kgf/m², 21 psi}** and verify that the pressure is held.



X3U517WCB

- (5) Put the radiator into water slowly with the radiator tester connected.
- (6) Inspect for air leakage.



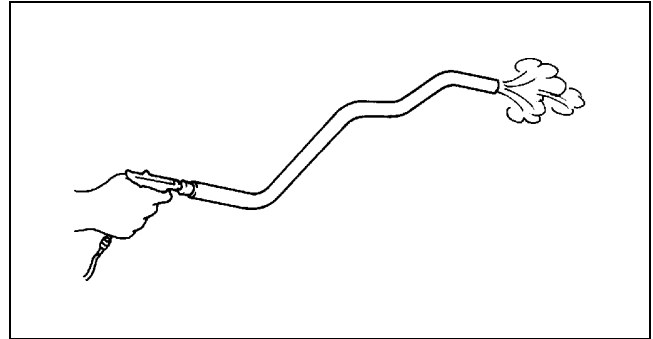
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Radiator Installation Note

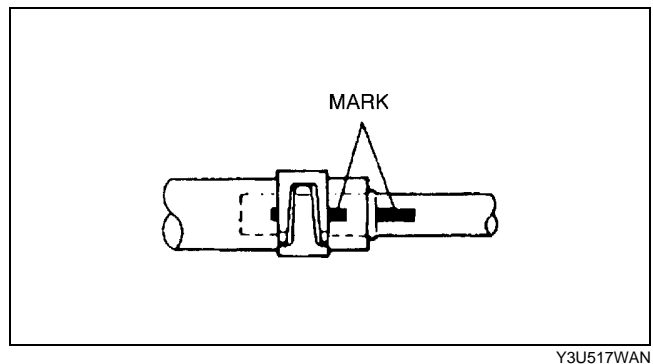
1. The ATX oil cooler flushing must be performed whenever a transaxle is removed for service because the existing fluid may be contaminated, and to prevent contamination of new fluid. The flushing must be performed after installation of the overhauled or replaced transaxle. (See 05-17-40 OIL COOLER FLUSHING)

Oil Hose Installation Note

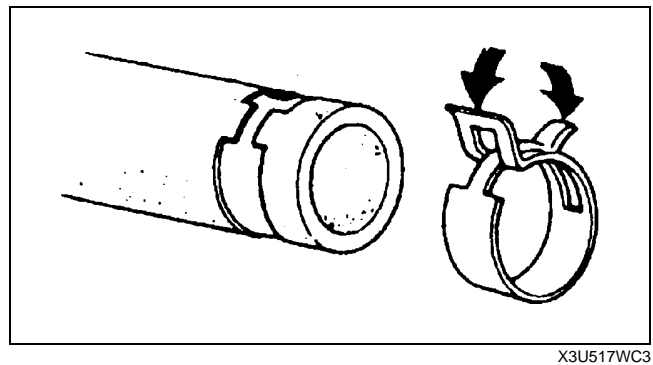
1. Apply compressed air to cooler-side opening more than **1 minute**, and blow any remaining grime and foreign material from the cooler pipes.



2. Align the marks, and slide the oil hose onto the oil pipe until it is fully seated as shown.



3. Install the hose clamp onto the hose.
 - If reusing the hose, install a new hose clamp exactly on the mark left by the previous hose clamp.
4. Verify that the hose clamp does not interfere with any other components.



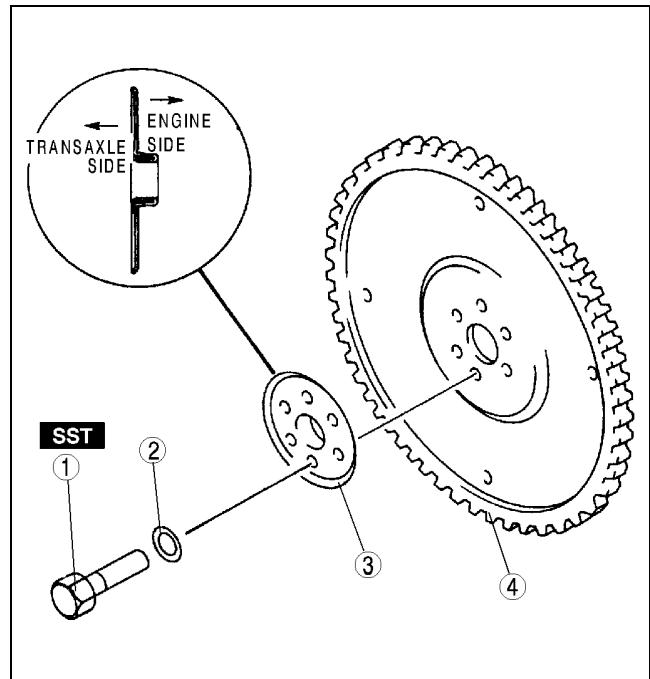
AUTOMATIC TRANSAXLE

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DRIVE PLATE REMOVAL/INSTALLATION

1. Remove the transaxle. (See 05-17-31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/ INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Install the transaxle. (See 05-17-31 AUTOMATIC TRANSAXLE (ATX) REMOVAL/ INSTALLATION.)

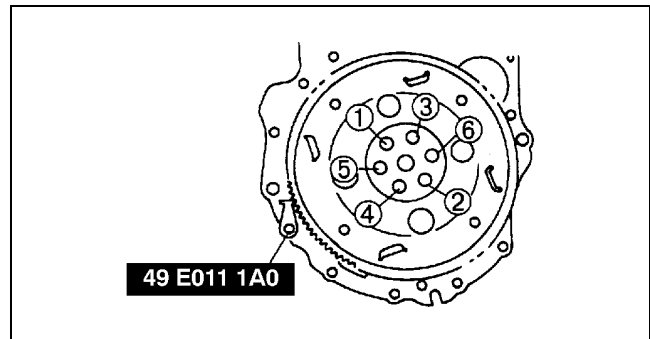
1	Drive plate mounting bolt (See 05-17-46 Drive Plate Mounting Bolts Removal Note.) (See 05-17-46 Drive Plate Mounting Bolts Installation Note.)
2	Washer
3	Adapter
4	Drive plate



X3U517WCD

Drive Plate Mounting Bolts Removal Note

1. Set the **SST** or equivalent against the drive plate.
2. Remove the drive plate mounting bolts.



X3U517WCE

Drive Plate Mounting Bolts Installation Note

Caution

- If the bolts are reused, remove the oil sealant from the bolt threads. Tightening a bolt that has old sealant on it can cause thread damage.

1. Remove the sealant from the bolts hole in the crankshaft and from the drive plate mounting bolts.

Note

- If all the previous sealant cannot be removed from a bolt, replace the bolts.
- Do not apply sealant if new bolts are used.

2. Install the drive plate.
3. Install the adapter.
4. Apply sealant to the drive plate mounting bolts and install them.
5. Set the **SST** or equivalent against the drive plate.

Caution

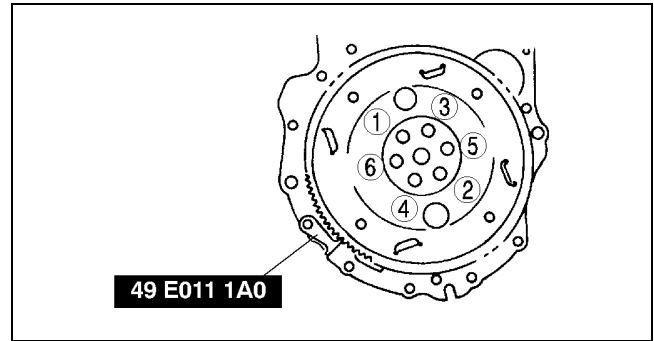
- When installing sealant covered bolts tighten them immediately. Leaving these bolts in a half installed condition could cause them to be stuck that way, due to the natural hardening of the sealant.

AUTOMATIC TRANSAXLE

6. Tighten the drive plate installation bolts in 2 or 3 steps as shown.

Tightening torque

97—102 N·m {9.8—10.5 kgf·m, 70.9—75.9
ft·lbf}



X3U517WCF