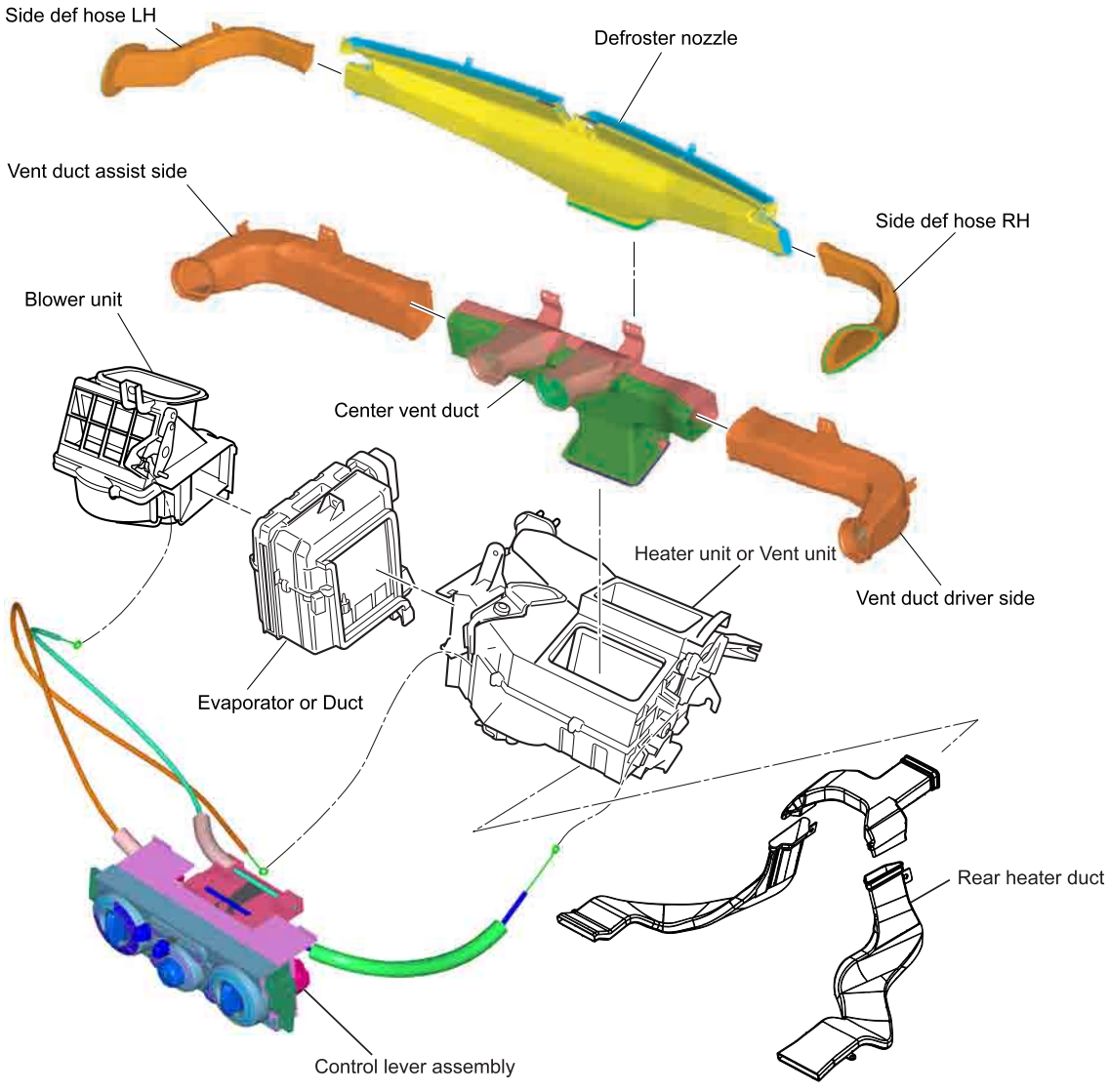
COMPONENTS (INSIDE CAB)



RTW710LF001301

DTC P0215 (Symptom Code B) (Flash Code 52)

Circuit Description

The engine control module (ECM) calculates the desired fuel injection quantity and timing using data sent from various sensors. These desired data are sent to the fuel injection pump control unit (PCU) via a controller area network (CAN) communication bus. The PCU also receives signals from the internal inputs: pump camshaft position (CMP) sensor that is located inside the fuel injection pump to determine the cam ring rotation angle and the fuel injection pump speed. The fuel temperature (FT) sensor is internal the PCU. These values are used to compare the desired values sent from the ECM then PCU determines the injection timer piston position and fuel injection quantity, and actuates timing control valve (TCV) & fuel injection solenoid valve based on control maps in the PCU.

The fuel injection solenoid valve is installed to the fuel injection pump rear side. The fuel injection event is determined by this solenoid ON/OFF command. The fuel injection solenoid valve cuts the fuel when the engine shutoff (ESO) solenoid valve is commanded shutoff from the PCU. (The fuel injection solenoid valve and engine shutoff (ESO) solenoid valve is same part. It calls ESO solenoid valve when fuel is shutoff.) When the ignition switch is turned OFF or commanded from fail-safe action, the ESO solenoid valve is commanded shutoff to stop the engine running. If the PCU detects that the ESO solenoid valve control circuit voltage level from the ECM to PCU is high, this DTC will set.

Condition for Running the DTC

- The ignition switch is ON.

Condition for Setting the DTC

- The PCU detects high voltage condition on the ESO solenoid valve control circuit for longer than 1 second when the ECM does not command shutoff.

Action Taken When the DTC Sets

- The ECM illuminates the malfunction indicator lamp (MIL) when the diagnostic runs and fails.

Condition for Clearing the MIL/DTC

- The ECM turns OFF the MIL when the diagnostic runs and does not fail.
- A history DTC clears after 40 consecutive driving cycles without a fault. Or clear with the scan tool.

Diagnostic Aids

- If an intermittent condition is suspected, refer to Intermittent Conditions in this section.

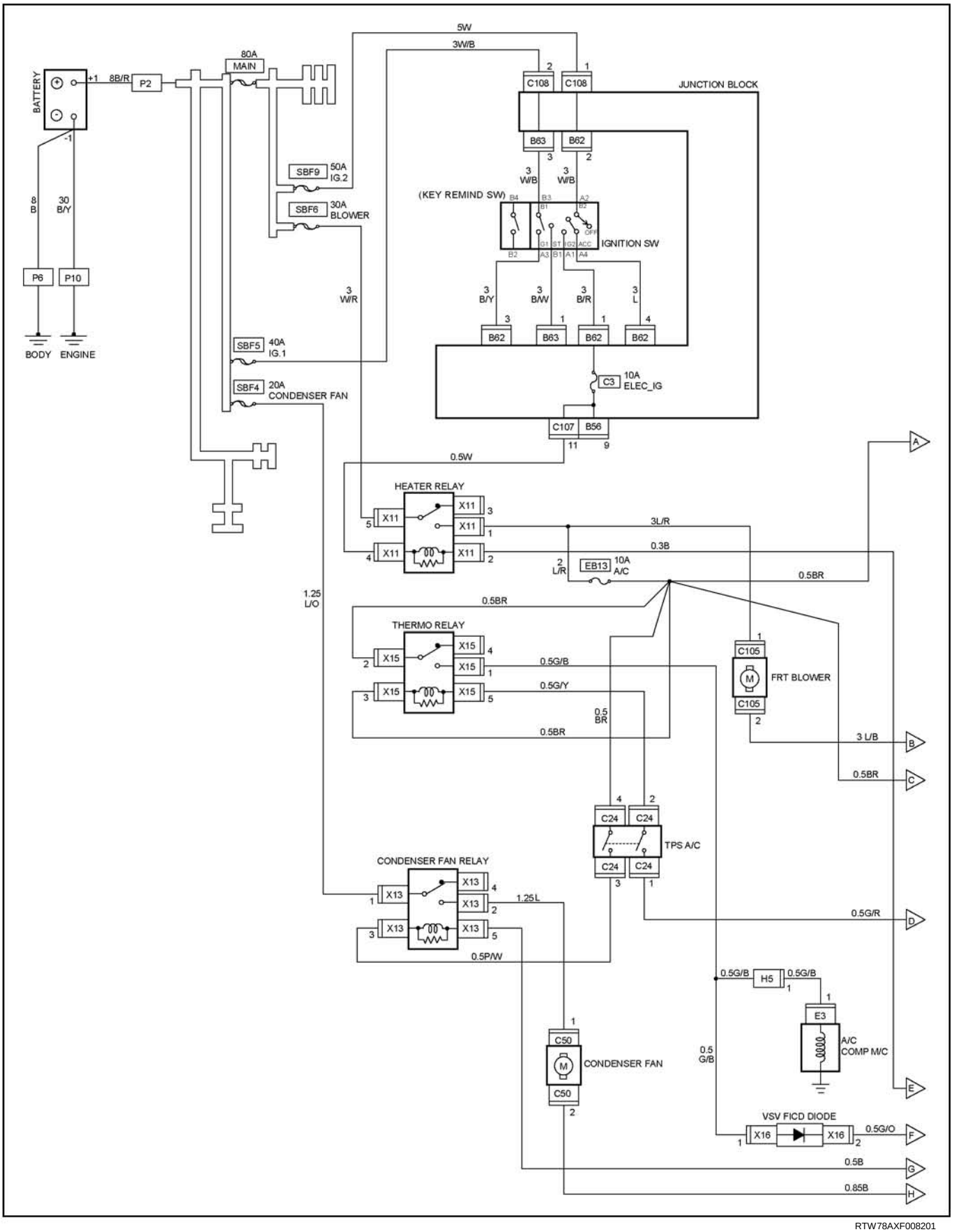
Notice:

- Fuel injection solenoid valve is internal to the fuel injection pump assembly.
- PCU is part of the fuel injection pump assembly.
- If this DTC is present, engine will not start.

DTC P0215 (Symptom Code B) (Flash Code 52)
Schematic Reference: Engine Controls Schematics
Connector End View Reference: Engine Controls Connector End Views or Engine Control Module (ECM) Connector End Views

Step	Action	Value(s)	Yes	No
1	Did you perform the Diagnostic System Check-Engine Controls?	—	Go to Step 2	Go to Diagnostic System Check-Engine Controls
2	1. Install the scan tool. 2. Turn OFF the ignition for 30 seconds. 3. Start the engine. If the engine does not start, crank over the engine. 4. Monitor the Diagnostic Trouble Code (DTC) Information with the scan tool. Does the DTC fail this ignition?	—	Go to Step 3	Go to Diagnostic Aids
3	1. Turn OFF the ignition. 2. Disconnect the fuel injection pump control unit (PCU) harness connector. 3. Connect a test lamp between the engine shutoff (ESO) solenoid valve control signal circuit (pin 5 of E-6 connector) and a known good ground. 4. Turn ON the ignition, with the engine OFF. Does the test lamp illuminate?	—	Go to Step 5	Go to Step 4

WIRING DIAGRAM (4JA1-T)



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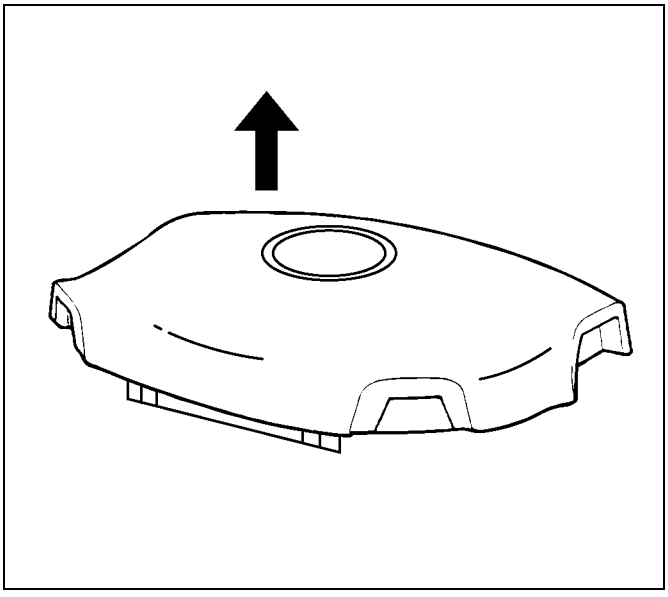
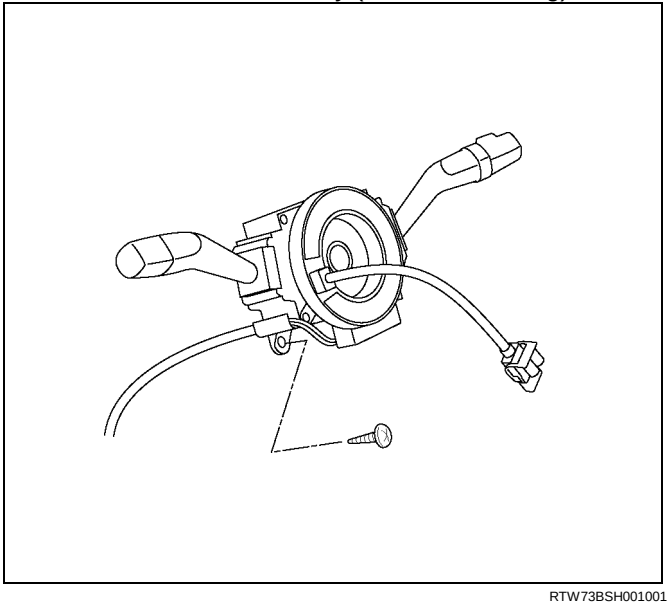


430R300007

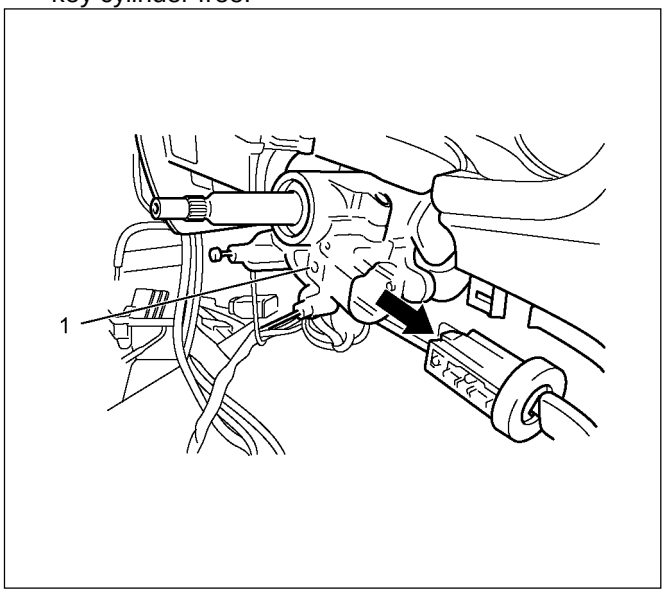
17. Remove steering column cover.
18. Disconnect the wiring harness connectors located under the steering column.
19. Remove the combination switch assembly with SRS coil.

NOTE: The SRS coil is a part of the combination switch assembly, which cannot be replaced separately. Therefore, be sure not to remove the SRS coil from the combination switch assembly (with SRS air bag).



RTW73BSH001001

20. Turn the ignition switch to the ACC position.
21. Insert a pin (1) into the hole and push on it. Pull the key cylinder free.

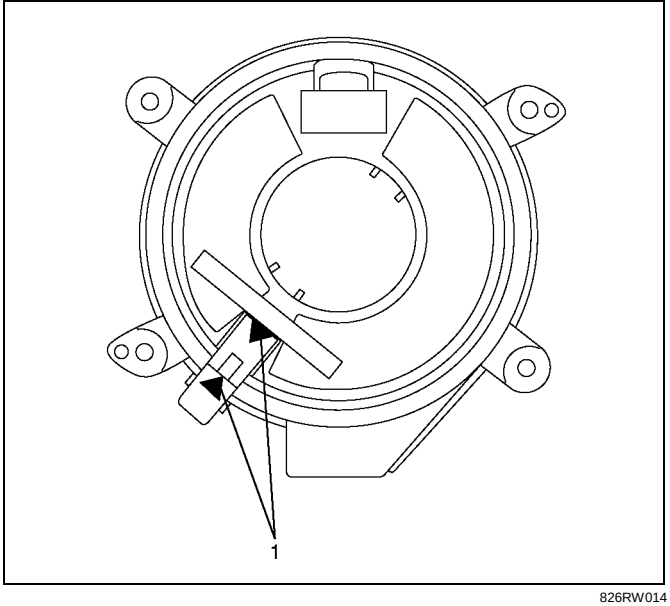


RUW53BSH000101

Installation

1. Install lock cylinder assembly.
2. Install the combination switch assembly with SRS coil (with SRS air bag).
3. Turn the SRS coil fully counterclockwise, return about 3 turns and align the neutral mark (with SRS air bag).

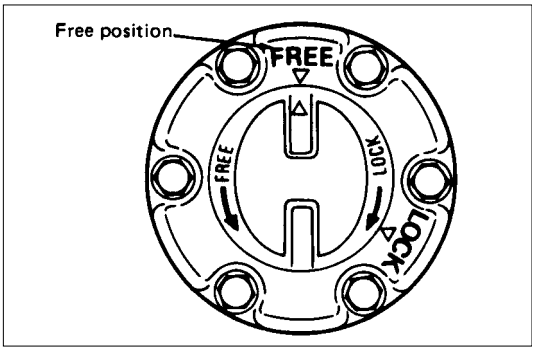
CAUTION: When turning the SRS coil fully counterclockwise, stop turning if resistance is felt. Further forced turning may damage the cable in the SRS coil (with SRS air bag).



826RW014

Legend

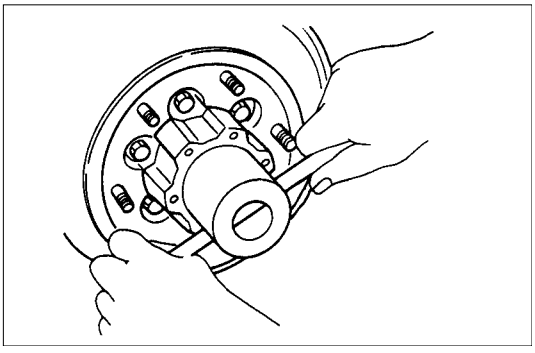
(1) Neutral mark



Important Operations

1. Bolt

Before removal, shift transfer lever into “2H” position and set free wheeling hub knob into “FREE” position.



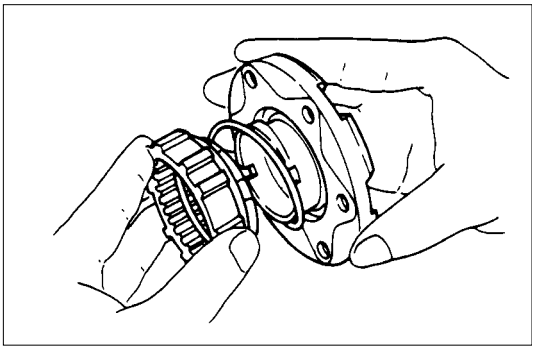
6. Hub nut

Wrench : 5-8840-2117-0

7. Hub and disc assembly

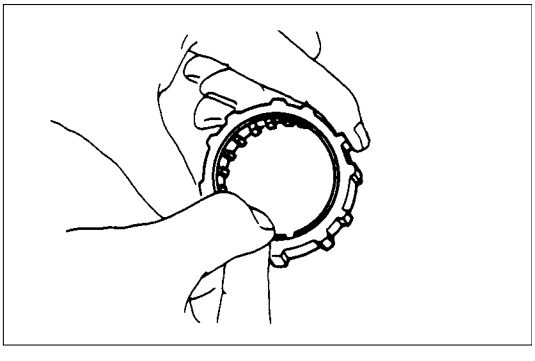
Before disassembly, remove the disc brake caliper assembly and hang it on the frame with wires.

Refer to Section “Brake” for disc brake caliper removal procedure.



14.Clutch Assembly

While pushing follower knob, turn clutch assembly clockwise and then remove clutch assembly from knob.



19.Retaining Spring

Remove retaining spring from clutch assembly by turning it counterclockwise.

5. Excessive Oil Consumption

Step	Action	Value(s)	Yes	No
1	Does the air cleaner element conditon OK? (Clogged or not)	—	Go to *Step 2*	Clean or replace the air cleaner element
2	Does PCV (Positive Crankcase Ventilation) Valve has problem?	—	Repair or replace the relation parts.	Go to *Step 3*
3	Was the oil pressure value more than normal value?	Less than 588 kPa (6.0 kg/cm^2, 85 psi)	Repair or replace the oil relief valve	Go to *Step 4*
4	Inspect the front and rear crankshaft oil seal. Was the oil leakage found?	—	Replace the failure part.	Go to *Step 5*
5	Was the oil leakage found from any gasket?	—	Replace the wrong gasket	Go to *Step 6*
6	Inspect the valve stem seal, the valve stem and the valve guide for worn. Were any worn found?	—	Replace the worn part.	Go to *Step 7*
7	Was the oil leakage found from the turbocharger oil seal?	—	Replace the oil seal.	Go to *Step 8*
8	Was the oil drain pipe of the turbocharger restricted?	—	Repair or replace the oil drain pipe.	Go to *Step 9*
9	Was the oil drain passage in the turbocharger center housing restricted?	—	Clean the center housing	Go to *Step 10*
10	Does turbine wheel has any impact damage?	—	Replace the turbocharger	Go to *Step 11*
11	Are any DTC stored?	—	Go to *indicated DTC*	Solved

DTC P0500 (Symptom Code 1, A) (Flash Code 24)

Circuit Description

The vehicle speed sensor (VSS) is used by the engine control module (ECM) and speedometer, which generates a speed signal from the transmission output shaft. The VSS has the following circuits.

- Ignition voltage feed circuit
- VSS signal circuit
- VSS low reference circuit

The VSS uses a hall effect element. It interacts with the magnetic field created by the rotating magnet and outputs square wave pulse signal. The 12 volts operating supply from the Meter fuse (except 2WD with A/T) or Back Up fuse (2WD with A/T). The ECM calculates the vehicle speed by the VSS. If the vehicle is 2WD with automatic transmission, VSS signals are sent from the transmission control module (TCM). If the ECM detects VSS signals are generated with high frequencies, this DTC will set.

Condition for Running the DTC

- The ignition switch is ON.

Condition for Setting the DTC

- The ECM detects that the vehicle speed is higher than 200 km/h (125 MPH) for 5 seconds. (Symptom Code 1)
- The ECM detects that the vehicle speed sensor signal frequency is too high for 0.6 seconds. (Symptom Code A)

Action Taken When the DTC Sets

- The ECM illuminates the malfunction indicator lamp (MIL) when the diagnostic runs and fails.
- The ECM uses a vehicle speed substitution of 5 km/h (3 MPH) for engine control.

Condition for Clearing the MIL/DTC

- The ECM turns OFF the MIL when the diagnostic runs and does not fail.
- A history DTC clears after 40 consecutive driving cycles without a fault. Or clear with the scan tool.

Diagnostic Aids

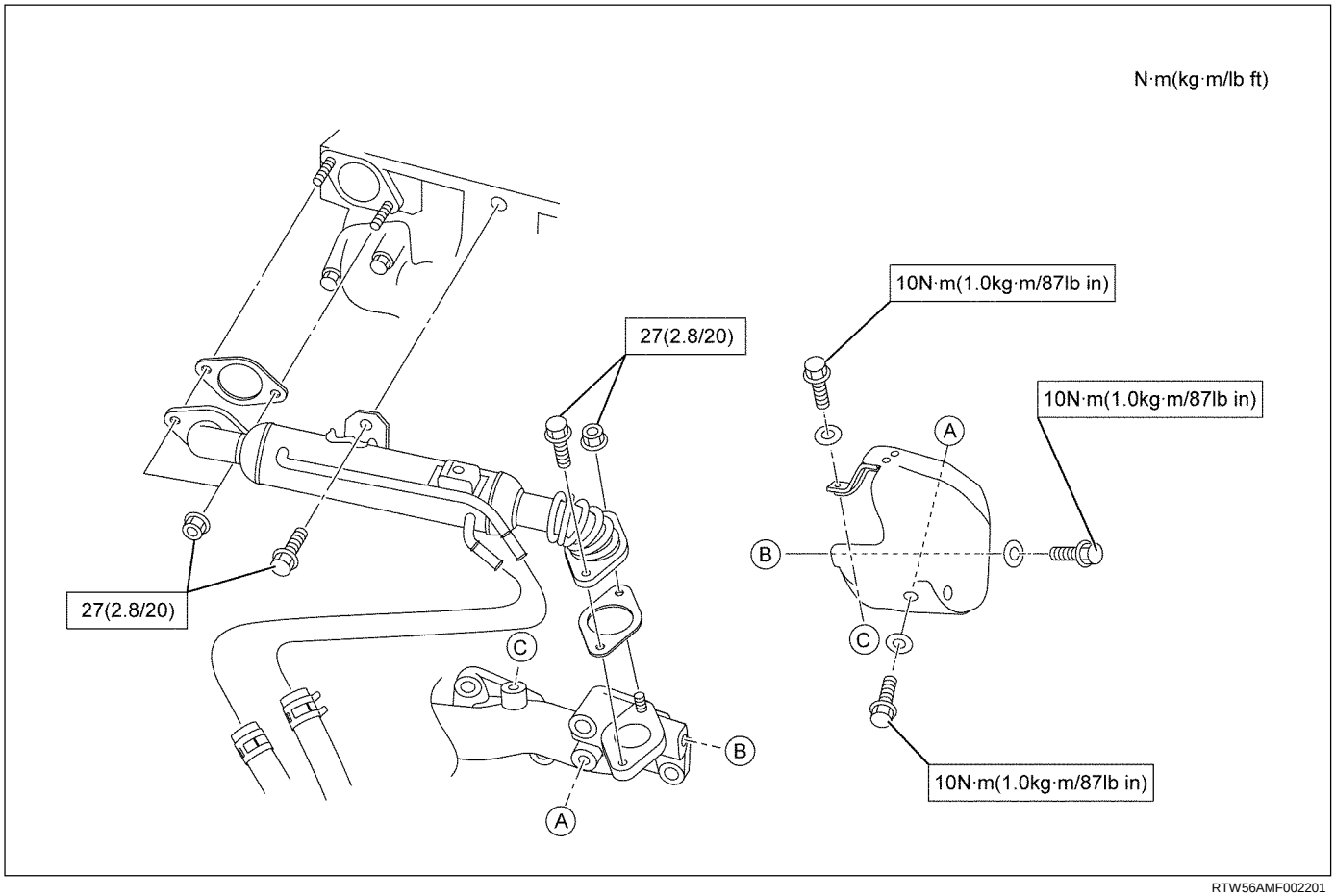
- Electrical or magnetic interference may affect intermittent condition.
- If an intermittent condition is suspected, refer to Intermittent Conditions in this section.

DTC P0500 (Symptom Code 1, A) (Flash Code 24)
Schematic Reference: Engine Controls Schematics
Connector End View Reference: Engine Controls Connector End Views or Engine Control Module (ECM) Connector End Views

Chart for 2WD with A/T

Step	Action	Value(s)	Yes	No
1	Did you perform the Diagnostic System Check-Engine Controls?	—	Go to Step 2	Go to Diagnostic System Check-Engine Controls
2	1. Inspect all of the circuits going to the automatic transmission (A/T) vehicle speed sensor (VSS) for the following: • Routed too closely to fuel injection solenoid wiring or components • Routed too closely to after-market add-on electrical equipment • Routed too closely to solenoids, relays, and motors 2. If you find incorrect routing, correct the harness routing. Did you find and correct the condition?	—	Go to Step 7	Go to Step 3
3	1. Turn OFF the ignition. 2. Disconnect the A/T VSS harness connector. 3. Inspect for an intermittent and for poor connections at the harness connector of the A/T VSS (pins 1, 2 and 3 of E-30 connector). 4. Repair the connection(s) as necessary. Did you find and correct the condition?	—	Go to Step 7	Go to Step 4

Torque Specifications (Standard Output)



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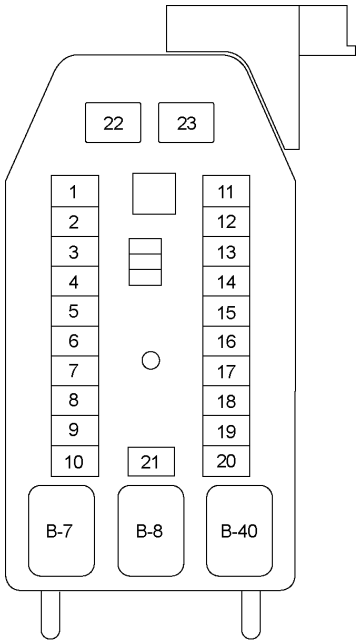
FUSE AND RELAY LOCATION (LHD & RHD)

FUSE BOX



FUSE

No.	Capacity	Indication on label	No.	Capacity	Indication on label
1	—	—	12	15A	CIGER/ACC SOCKET
2	10A	ABS/4WD	13	15A	AUDIO (+B)
3	10A	TRAILER	14	20A	DOOR LOCK
4	15A	BACK UP	15	10A	METER (+B)
5	15A	METER	16	10A	ROOM
6	10A	TURN	17	10A	ANTI THEFT
7	15A	ELEC.IG	18	15A	STOP
8	15A	ENGINE	19	—	—
9	20A	FRT WIPER	20	10A	STARTER
10	15A	EGR (RHD) IG.COIL (LHD)	21	10A	SRS
11	10A	AUDIO			

SLOW BLOW FUSE

No.	Capacity	Indication on label
22	20A	RR DEF
23	30A	POWER WINDOW

RELAY

Connector No.	B-7	B-8	B-40
C24SE	REAR DEFOGGER	POWER WINDOW	(NO RELAY)

24 Place the right-hand secondary timing chain tensioner (2) into position and loosely install the bolts (1) to the engine block.

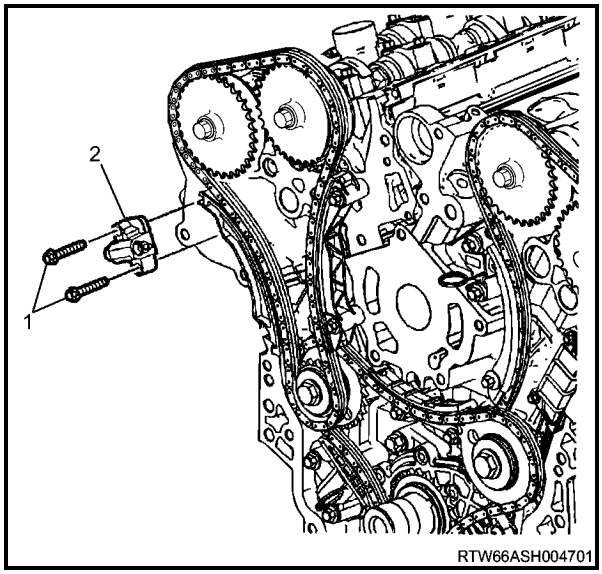


Figure 6A1 – 208

25 Verify the proper placement of the right-hand secondary timing chain tensioner gasket tab (1).

26 Tighten the right-hand secondary timing chain tensioner bolts (2) to the correct torque specification.

Secondary timing chain tensioner attaching bolt torque specification.....20.0 – 26.0 Nm

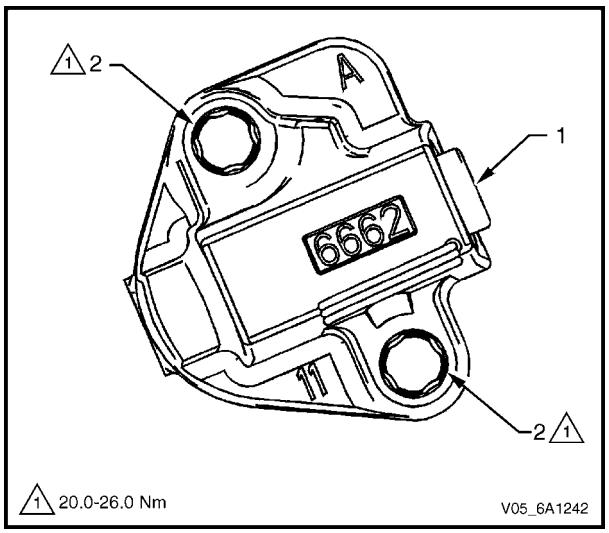


Figure 6A1 – 209

27 Release the right-hand timing chain tensioner (1) by pulling out Tool No. EN 46112 (2) and unlocking the tensioner plunger.

CAUTION

If Tool No. EN 46112 (1) is not removed from the tensioner body (2), the plunger will remain in the locked position and no tension will be placed on the timing chain, this will cause damage to the engine.

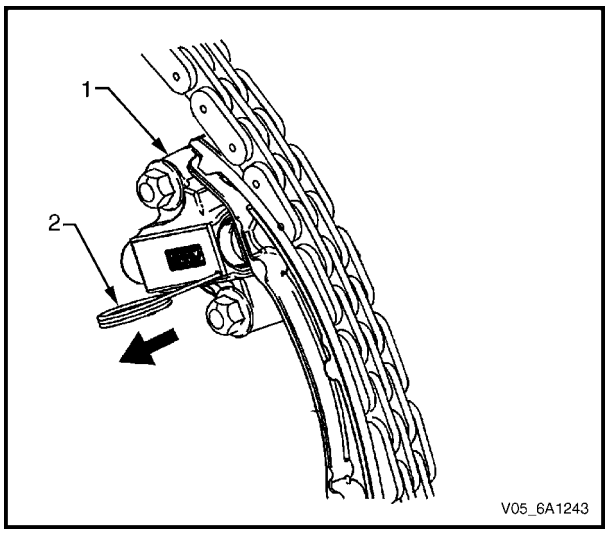


Figure 6A1 – 210

3.13 Crankshaft Balancer Assembly

Remove

1 Remove the accessory drive belt, refer to 3.5 Accessory Drive Belt.

2 Remove the starter motor, refer to Section 6D1-2 Starting System.

3 Install Tool No. EN-46106 (1) into the starter motor opening to stop the camshaft from rotating.

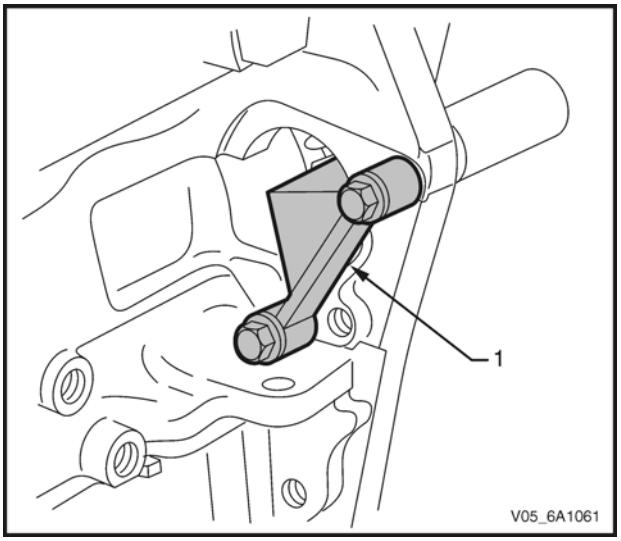


Figure 6A1 – 75

4 Remove the bolt (1) attaching the crankshaft balancer assembly (2) to the crankshaft.

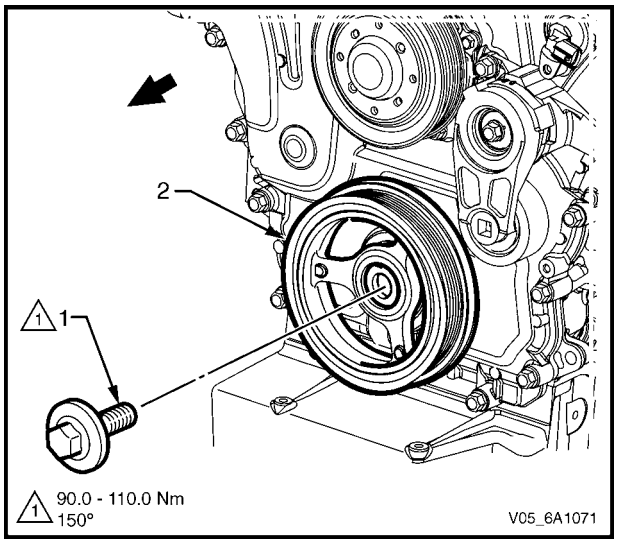


Figure 6A1 – 76

5 Remove the crankshaft balancer assembly (1) from the crankshaft using the appropriate tool:

Tool No. J-41816 (2) or equivalent.

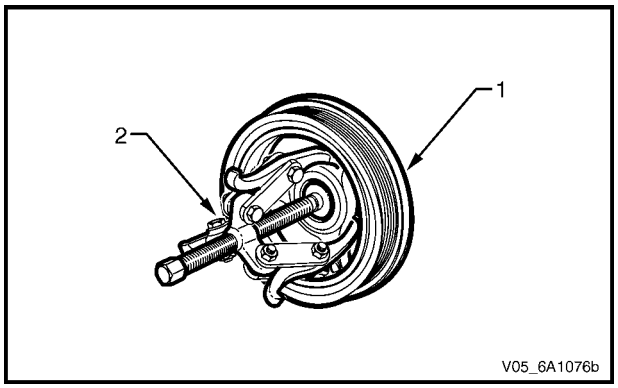


Figure 6A1 – 77

NOTE

- During the tapping process, repeatedly remove the tap and clean the swarf from the hole and the flutes of the tap.
- Ensure the tap has created full threads at least to the depth equal to the insert length.

6 Using a suitable tapping wrench, tap the threads of the drilled hole by hand only.

- M6 inserts require a minimum drill depth of 15 mm.
- M8 inserts require a minimum drill depth of 20 mm.
- M10 inserts require a minimum drill depth of 23.5 mm.

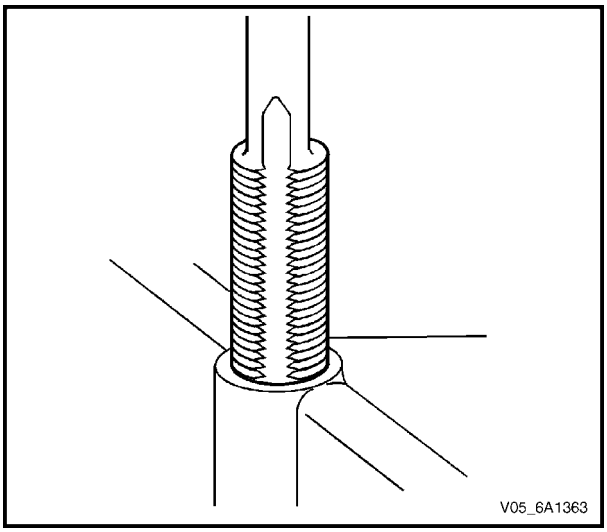


Figure 6A1 – 560

NOTE

All swarf must be removed from the tapped hole prior to insert installation.

WARNING

Safety glasses must be worn when using compressed air.

7 Using compressed air, clean out any swarf.

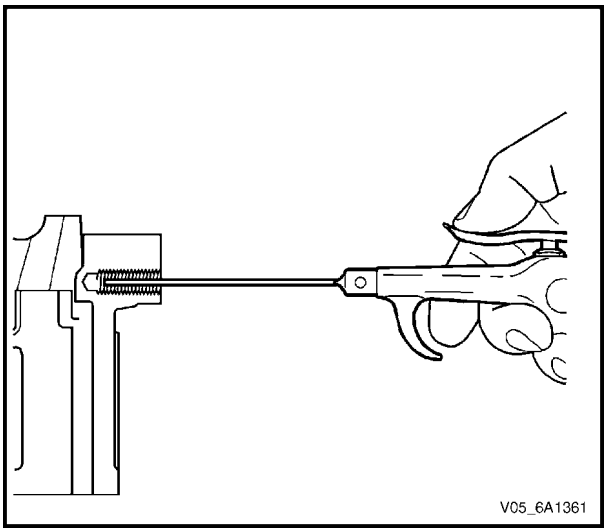


Figure 6A1 – 561

8 Spray a commercially available thread cleaner into the tapped hole.

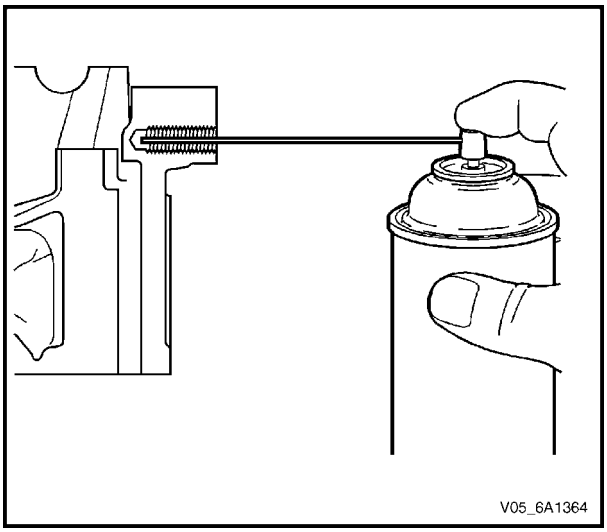
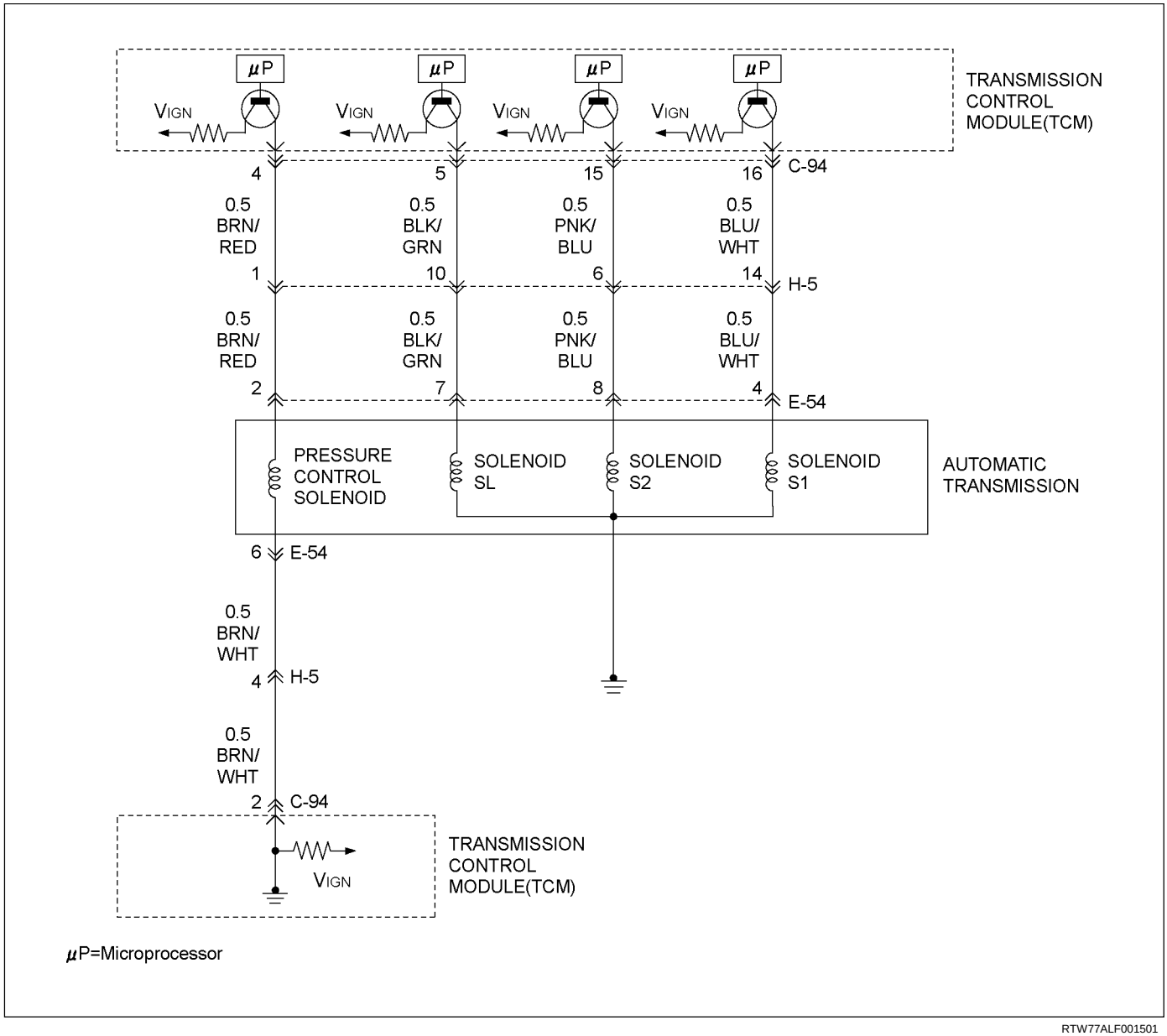


Figure 6A1 – 562

DTC P0746 (Flash Code 45)



RTW77ALF001501

Circuit Description

The pressure control solenoid is a PWM duty control solenoid located in the valve body.

The pressure control solenoid is a Transmission Control Module (TCM)-controlled device used to regulate transmission throttle pressure by energizing current from the TCM.

Condition For Running The DTC

All of the following conditions are met.

(1) All of the following conditions are met for 2 seconds or more.

- The supply voltage is more than 10.2 volts and less than 15.5 volts.

(2) Not emergency mode.

(3) All of the following conditions are met.

- Device Control is not operating.
- Disable Normal Communication Service is receiving enable.
- DTC Clear is not operating.

(4) Pressure control solenoid is not detecting failure or not deciding failure.

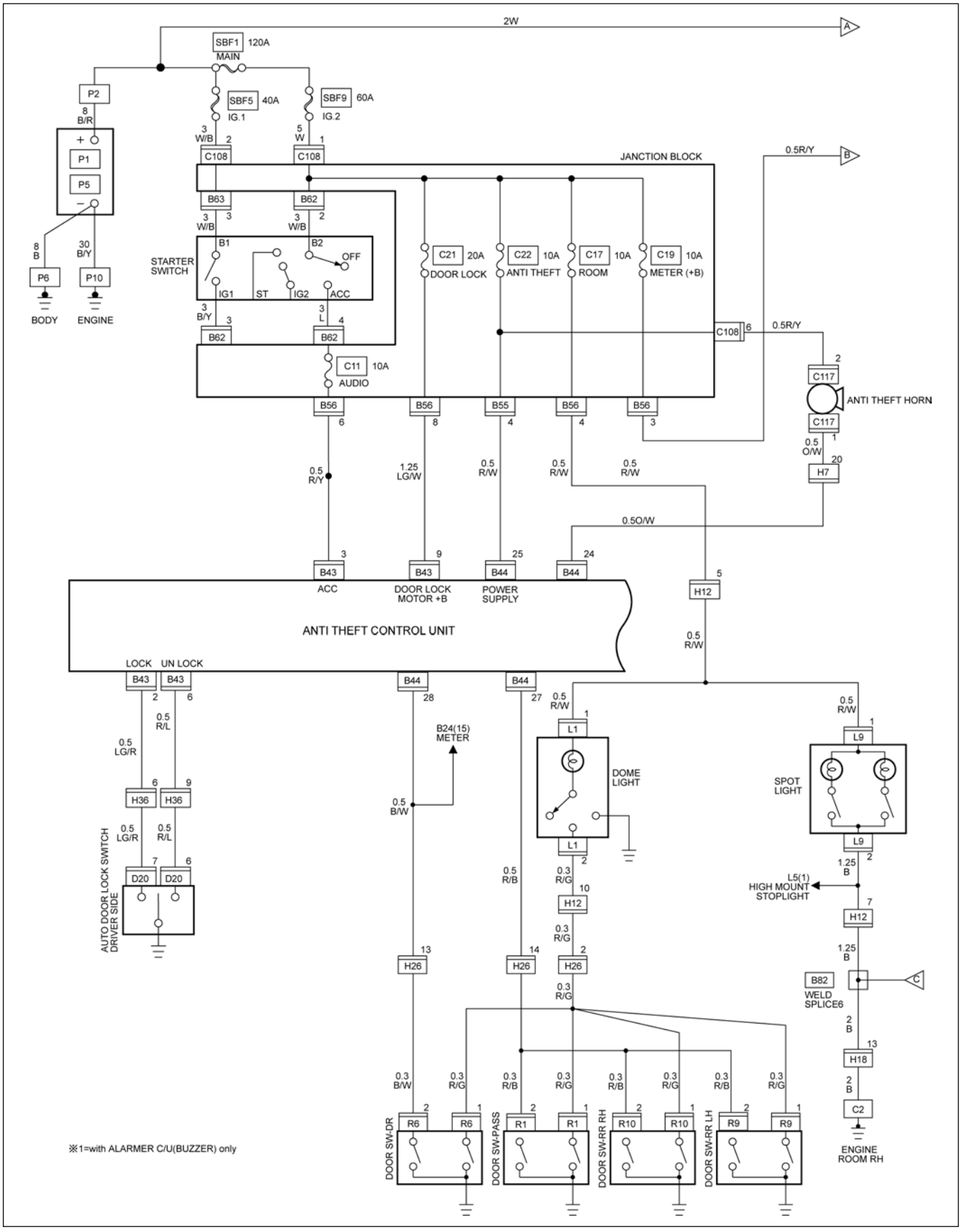
(5) Feedback AD value keeps less than 1000 for 0.5 seconds and also linear solenoid assured voltage keeps 10.5 volts for 0.5 seconds.

MAJOR INPUT/OUTPUT COMPONENT AND THEIR FUNCTIONS

Input	Speed sensor	Detects output shaft revolution and sends rpm signal to TCM.
	Turbine sensor	Detects input shaft revolution and sends rpm signal to TCM.
	Engine speed sensor	Inputs engine revolution from engine control computer.
	Brake switch	Detects brake pedal operation by the driver and sends signal to TCM.
	Inhibitor switch	Detects select lever position and sends signal to TCM.
	Mode select switch	Detects "Power Drive" or "3rd Start" selected by the driver and sends signal to TCM.
	4L switch (4WD Only)	Inputs 4L mode from transfer control computer.
	ATF thermo sensor	Detects ATF temperature and sends signal to TCM.
	High clutch oil pressure switch	Detects high clutch supply oil pressure and sends signal to TCM.
	2-4 brake oil pressure switch	Detects 2-4 brake supply oil pressure and sends signal to TCM.
	Low & Reverse brake oil pressure switch	Detects low & reverse brake supply oil pressure and sends signal to TCM.
	Accelerator Pedal position sensor	Inputs throttle opening angle from engine control computer.
	TCM	Judges necessary line pressure, gear shifting point and lock-up operation based on electrical signals from switches and sensors and sends appropriate signals to solenoids.
Output	Line pressure solenoid	Regulates oil pump delivery pressure to the appropriate line pressure for current driving conditions based on a signal from TCM.
	Low clutch solenoid	Selects appropriate gear shifting position for current driving conditions and regulates low clutch supply oil pressure based on a signal from TCM.
	High clutch solenoid	Selects appropriate gear shifting position for current driving conditions and regulates high clutch supply oil pressure based on a signal from TCM.
	2-4 brake solenoid	Selects appropriate gear shifting position for current driving conditions and regulates 2-4 brake supply oil pressure based on a signal from TCM.
	Low & Reverse brake solenoid	Selects appropriate gear shifting position for current driving conditions and regulates low & reverse brake supply oil pressure based on a signal from TCM.
	Lock-up solenoid	Regulates lock-up pressure to appropriate level for current driving conditions based on a signal from TCM.
	Mode indicator lamp	Indicates POWER DRIVE or 3rd START switch position.
	Speed meter signal (2WD Only)	Outputs vehicle speed to the speed meter.
	A/T OIL TEMP indicator lamp	Indicates A/T OIL TEMP indicator lamp in case of high temperature.
	CHECK TRANS indicator lamp	Indicates CHECK TRANS indicator lamp in case of malfunction.

CIRCUIT DIAGRAM 4JJ1-TC / 4JK1-TC (RHD) EXCEPT SOUTH AFRICA

Sheet 1/3



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