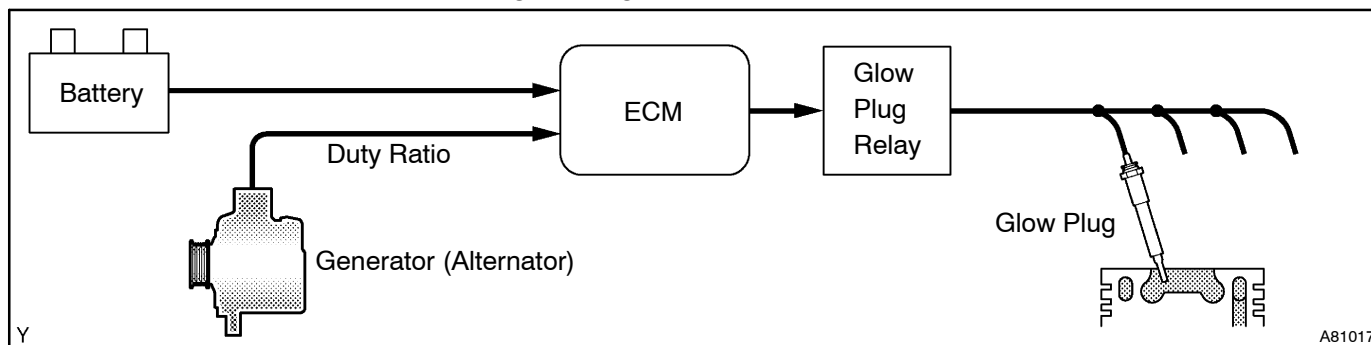


DTC	P0380	GLOW PLUG/HEATER CIRCUIT "A"
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CIRCUIT DESCRIPTION

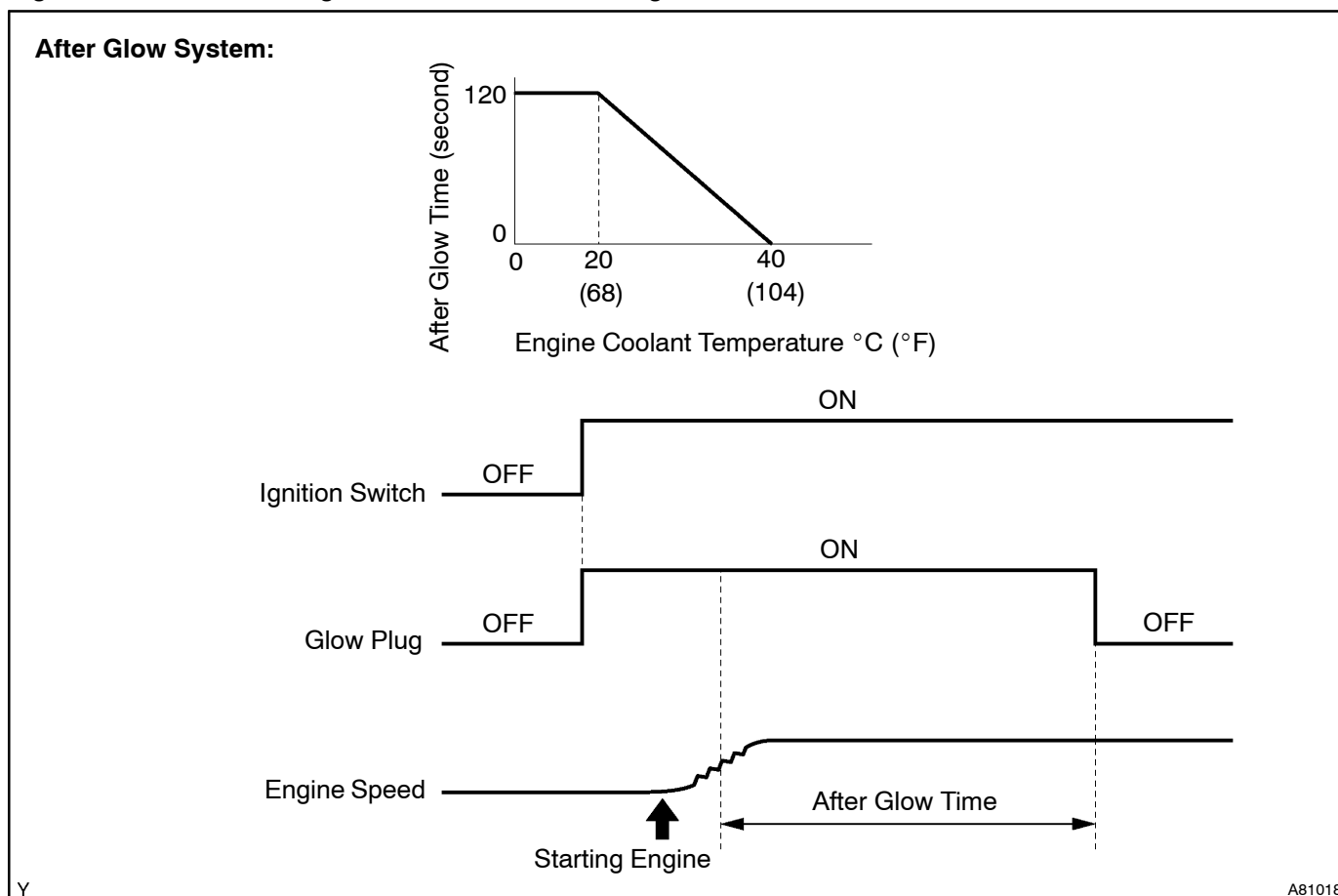
The glow plug is mounted inside the engine combustion chamber. To ensure the efficient engine starting with a cold engine, the ECM calculates a time interval of the current needs to flow through the glow plug depending on the starting engine coolant temperature when the ignition switch is turned to ON. The ECM then turns on the glow plug relay and permits the current to flow through the glow plug based on the ECM's calculated time. The glow plug is then heated, and enhances fuel combustion with a cold engine.

This DTC will be set if there is open in glow plug itself or the circuit.



HINT:

After the engine is started, the ECM performs an "after-glow" for a certain period of time. In proportion to the actual engine coolant temperature, the time period varies. The after-glow reduces diesel engine knocking, white smoke and engine noises with a cold engine.



DTC No.	DTC Detection Condition	Trouble Area
P0380	When the glow plug is turned from ON to OFF, or vice versa, conditions (a) and (b) are satisfied: (2 trip detection logic) (a) Battery voltage does not change (b) Duty ratio from terminal M of the generator (alternator) does not change	<ul style="list-style-type: none"> • Open or short in glow plug circuit • Glow fuse • Glow plug relay • Glow plug • ECM

MONITOR DESCRIPTION

When starting a cold engine, the ECM supplies current to the glow plug for a certain period of time. As supplying the current to the glow plug is terminated, the large current is suddenly cut off, therefore the battery voltage then varies and also the output (duty ratio) from terminal M of the generator (alternator) varies. If these variations are not occurred when the glow plug is turned from ON to OFF, or vice versa, the ECM judges that the current has not been supplied to the glow plug, and interprets this as an open malfunction of the glow plug or glow plug circuit.

MONITOR STRATEGY

Required sensors	Glow plug circuit
Frequency of operation	Twice per driving cycle
Duration	3 minutes
MIL operation	2 driving cycles

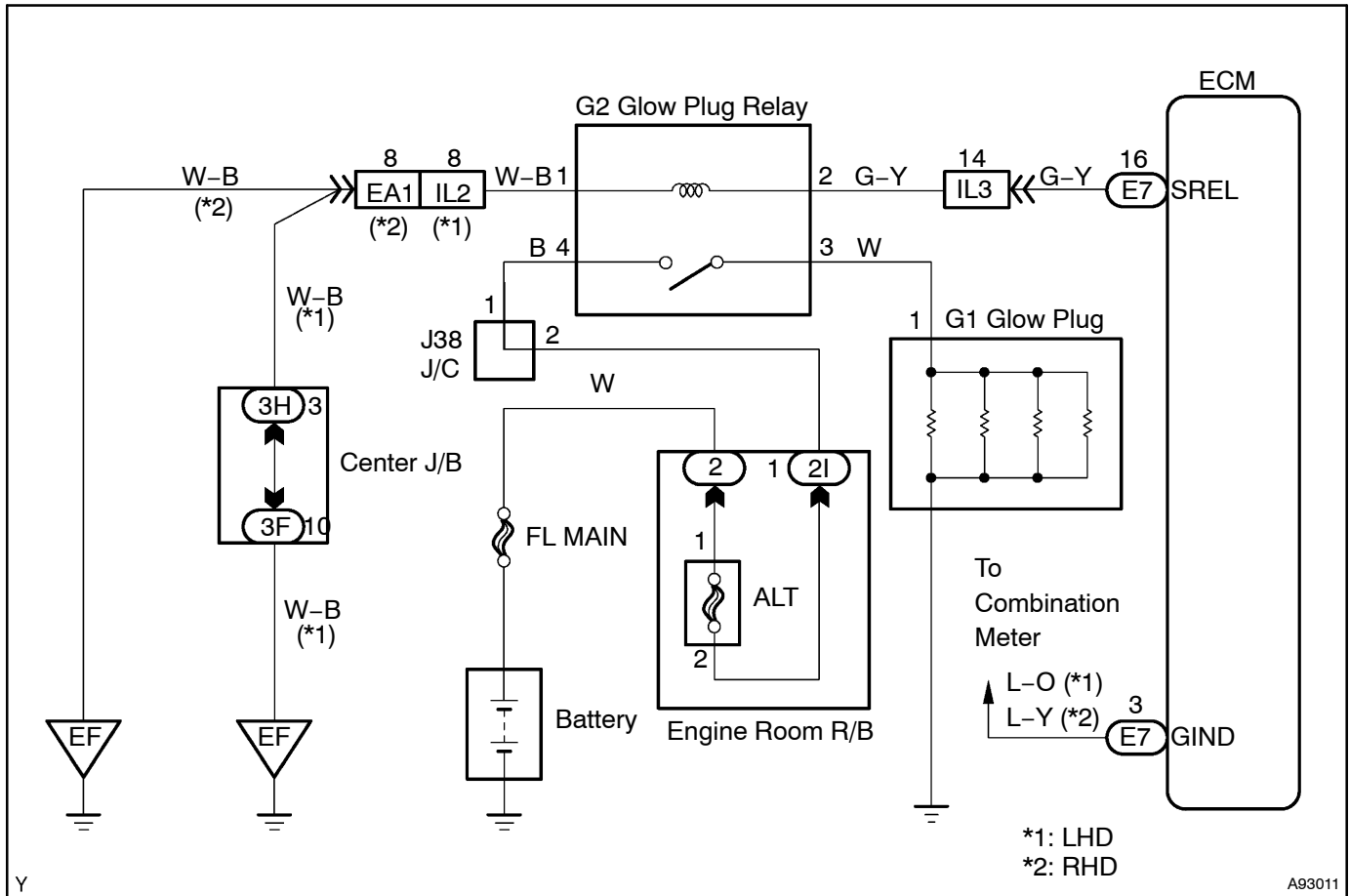
TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
Battery voltage	11 V	–
Engine speed	700 rpm	2,000 rpm
Engine coolant temperature	–	40°C (104°F)
Engine speed is stable	–	
Time after engine start	8 seconds	–
Any switches, which vary electrical loads, have not been being operated	–	
The monitor will not run if the generator (alternator) circuit is malfunctioning		

TYPICAL MALFUNCTION THRESHOLDS

Threshold
When the battery voltage, or output (duty ratio) from terminal M of the generator (alternator) does not change, despite the ECM turning the glow plug from ON to OFF, or vice versa

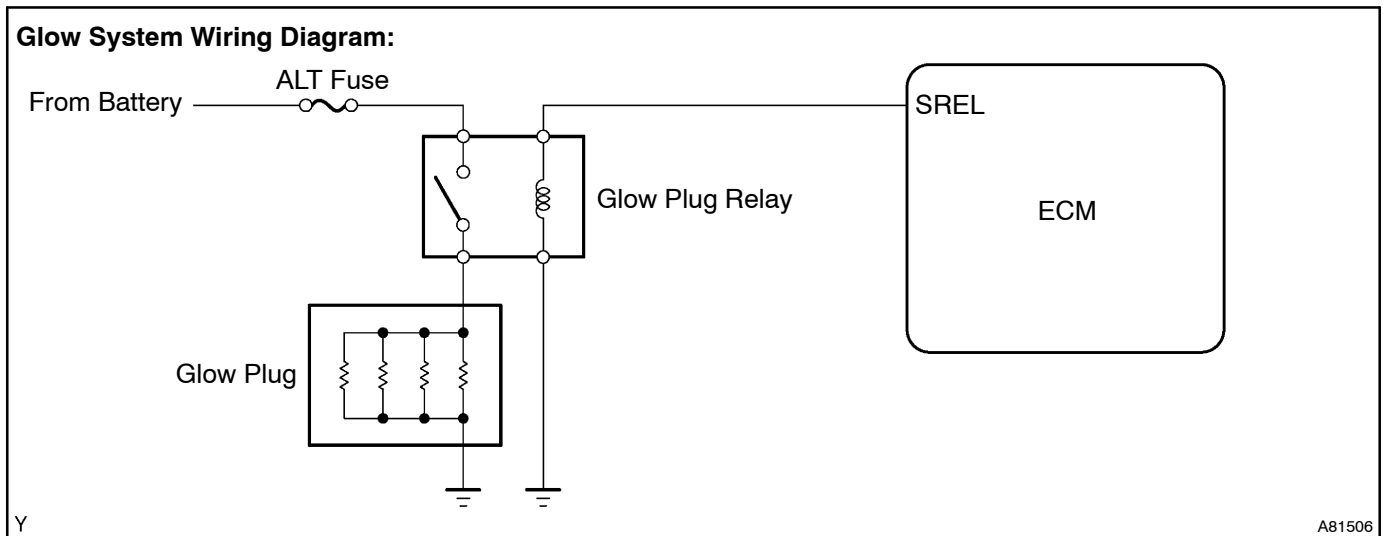
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- After completing repairs, confirm that P0380 is not set again.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, and other data from the time the malfunction occurred.



1

CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0380)

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch to ON and turn the intelligent tester ON.
- (c) Select the following menu items: Powertrain / Engine and ECT / DTC.
- (d) Read DTCs.

Result:

Display (DTC Output)	Proceed To
P0380	A
P0380 and P0622	B

HINT:
If any DTCs other than P0380 and P0622 are output, troubleshoot those DTCs first.

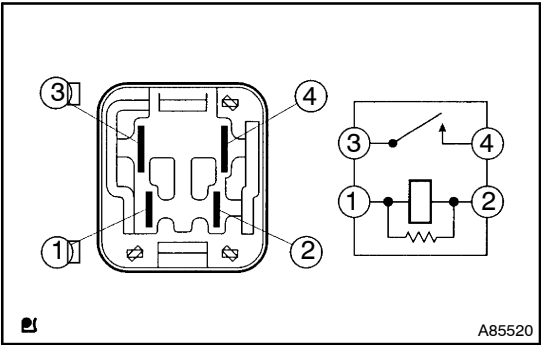
B

GO TO RELEVANT DTC CHART
(See page 05-458)

A

2

INSPECT GLOW PLUG RELAY ASSY



- (a) Remove the glow plug relay.
- (b) Check the glow plug relay resistance.

Standard:

Tester Connection	Specified Condition
3 - 4	10 kΩ or higher
3 - 4	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

- (c) Reinstall the glow plug relay.

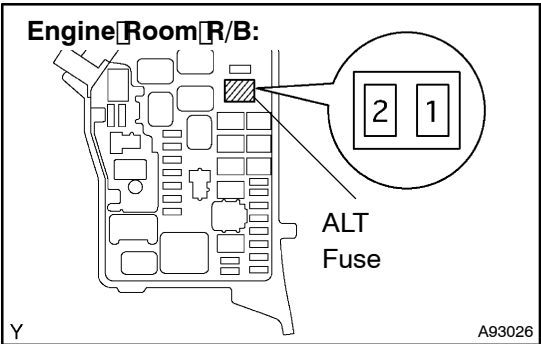
NG

REPLACE GLOW PLUG RELAY ASSY

OK

3

INSPECT FUSE (ALT FUSE)



- (a) Remove the ALT fuse from the engine room R/B.
- (b) Check the ALT fuse resistance.

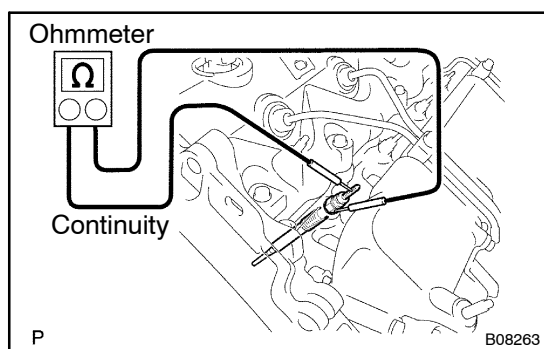
Standard: Below 1 Ω

- (c) Reinstall the ALT fuse.

NG

CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED TO FUSE

OK

4 INSPECT GLOW PLUG ASSY

- (a) Disconnect the glow plug wire.
(b) Measure the glow plug resistance.

Standard:

Tester Connection	Specified Condition
Glow plug terminal – Body ground	Approximately 1.1 Ω at 20°C (68°F)

NOTICE:

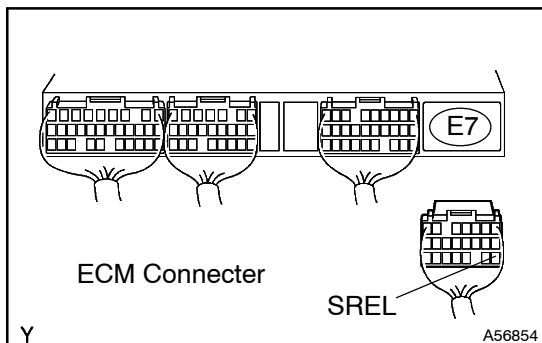
- Exercise extreme care not to damage the glow plug pipes. Damaging them could cause an open circuit, or shorten the life of the glow plugs.
 - Keep the glow plug free of oil and fuel while cleaning.
 - Wipe any oil off the terminal and Bakelite washer with a clean-dry cloth during inspection.
 - Do not apply more than 11 V to the glow plug as it could cause an open circuit.
- (c) Reconnect the glow plug wire.

NG

REPLACE GLOW PLUG ASSY
(See page 19-18 of Pub. No. RM864E AVENSIS
VERSO/ PICNIC REPAIR MANUAL)

OK**5 INSPECT GLOW PLUG ASSY(INSTALLATION)****NG****TIGHTEN GLOW PLUG****OK**

6 CHECK HARNESS AND CONNECTOR(GLOW PLUG RELAY - ECM, AND GLOW PLUG RELAY - BODY GROUND)



- Disconnect the E7 ECM connector.
- Remove the glow plug relay.
- Check the resistance.

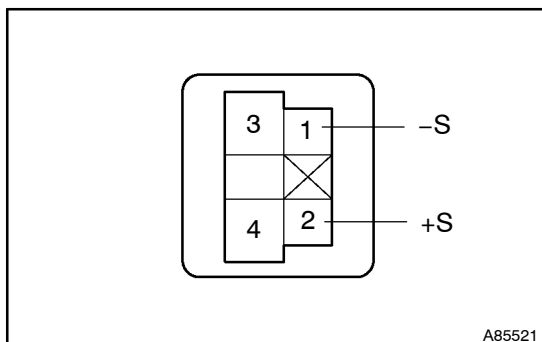
Standard (Check for open):

Tester Connection	Specified Condition
+S (Glow plug relay terminal 2) - SREL (E7-16)	Below 1 Ω
-S (Glow plug relay terminal 1) - Body ground	

Standard (Check for short):

Tester Connection	Specified Condition
SREL (E7-16) - Body ground	10 k Ω or higher

- Reconnect the ECM connector.
- Reinstall the glow plug relay.

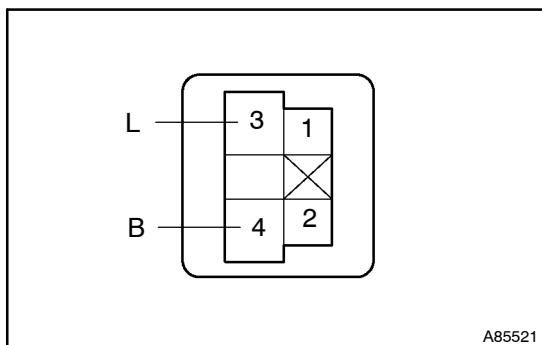


NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7 CHECK HARNESS AND CONNECTOR(GLOW PLUG RELAY - GLOW PLUG, AND GLOW PLUG RELAY - BATTERY)



- Remove the glow plug relay.
- Disconnect the glow plug wire.
- Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
L (Glow plug relay terminal 3) - Glow plug wire	Below 1 Ω
B (Glow plug relay terminal 4) - Positive battery terminal	

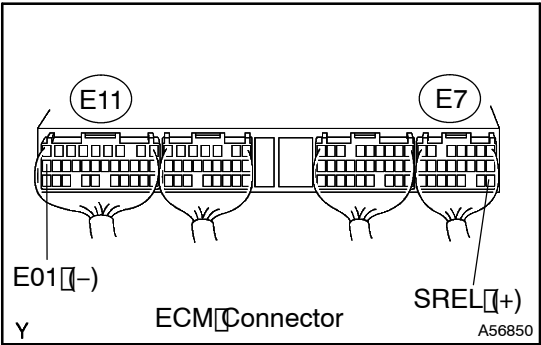
- Reinstall the glow plug relay.
- Reconnect the glow plug wire.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8 INSPECT ECM(SREL VOLTAGE)



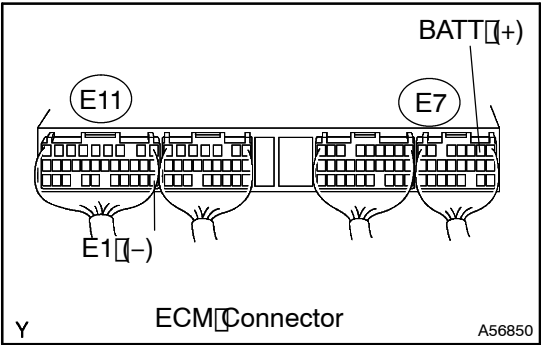
- (a) Turn the ignition switch to START.
(b) Measure the voltage between the specified terminals of the E7 and E11 ECM connectors.
- Standard:**

Tester Connection	Condition	Specified Condition
SREL(E7-16) - E01(E11-21)	Engine coolant temperature is 40°C (104°F) or less	9 to 14 V

NG REPLACE ECM (See page 10-30)

OK

9 INSPECT ECM(BATT VOLTAGE)



- (a) Measure the voltage between the specified terminals of the E7 and E11 ECM connectors.
- Standard:**

Tester Connection	Specified Condition
BATT(E7-11) - E1(E11-22)	9 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - ECM)

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05-440)