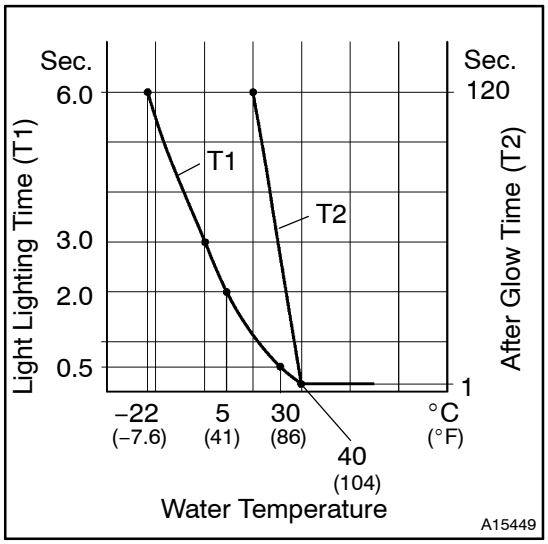
PRE–HEATING CONTROL CIRCUIT

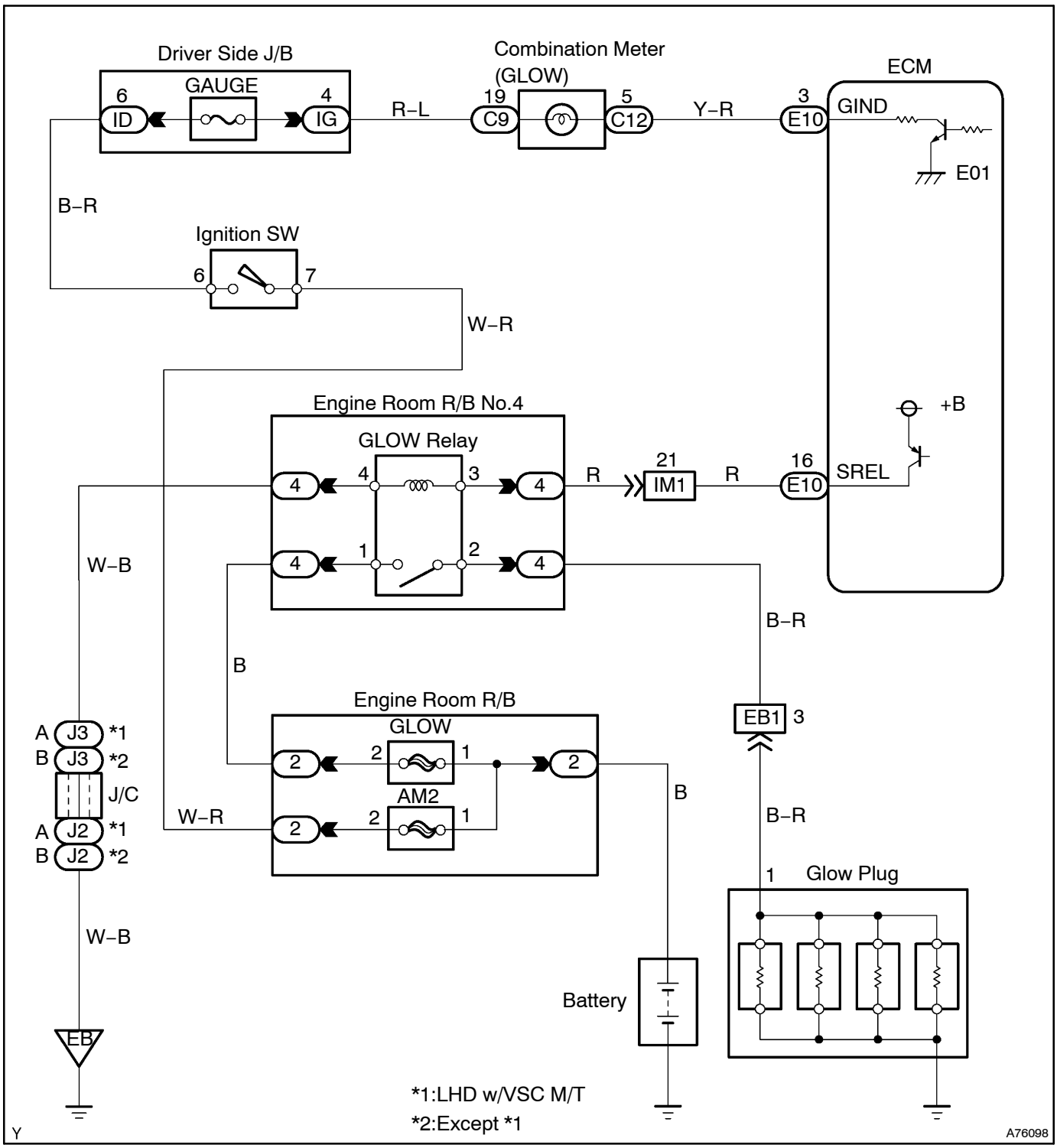
CIRCUIT DESCRIPTION



When the ignition switch turns On, the ECM calculates the glow indicator lighting time/heating corresponding to the coolant temperature at that time and turns ON the glow indicator light/ glow plug relay.

As the ceramics is used for a glow plug material, the current control is not performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

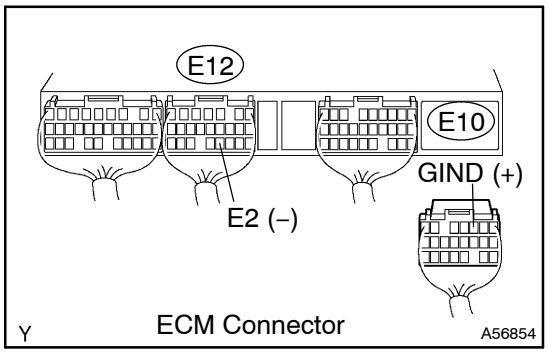
1 CHECK GLOW INDICATOR LIGHT

(a) Turn the ignition switch ON.
(b) Does the glow indicator light up?
(c) The glow indicator lights up for 0.5 sec. or more.

OK → **Go to step 6**

NG

2 INSPECT ECM



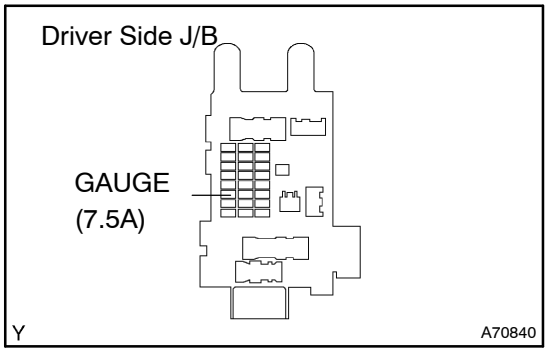
(a) Disconnect the ECM E10 connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminals of the ECM E10 and E12 connector.
Voltage:

Symbols (Terminal No.)	Specified condition
GIND (E10 – 3) ⇔ E2 (E12 – 20)	9 – 14 V

OK → **CHECK AND REPLACE ECM**

NG

3 CHECK FUSE(GAUGE FUSE)



(a) Remove the GAUGE fuse from the driver side J/B.
(b) Check the continuity of the GAUGE fuse.
Result: Continuity

NG → **CHECK FOR SHORT IN ALL HARNESS AND COMPONENTS CONNECTED GAUGE FUSE**

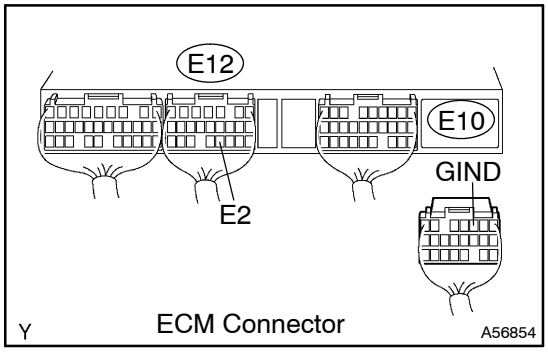
OK

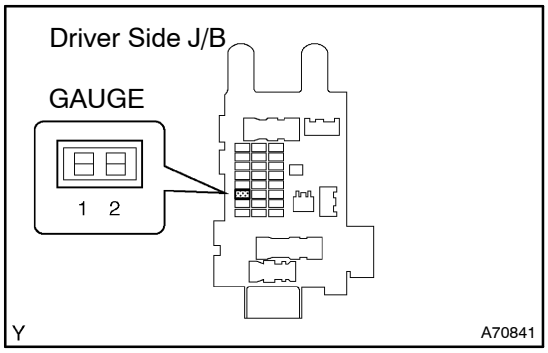
4 CHECK GLOW INDICATOR LIGHT(LIGHT BULB)

NG → **REPLACE BULB**

OK

5 CHECK HARNESS AND CONNECTOR(ECM – COMBINATION METER,AND COMBINATION METER – GAUGE FUSE)





(a) Disconnect the ECM E10 connector.
(b) Disconnect the combination meter C9 and C12 connector. (See page 71–25)
(c) Remove the GAUGE fuse from the driver side J/B.
(d) Check the continuity between the wire harness side connector.

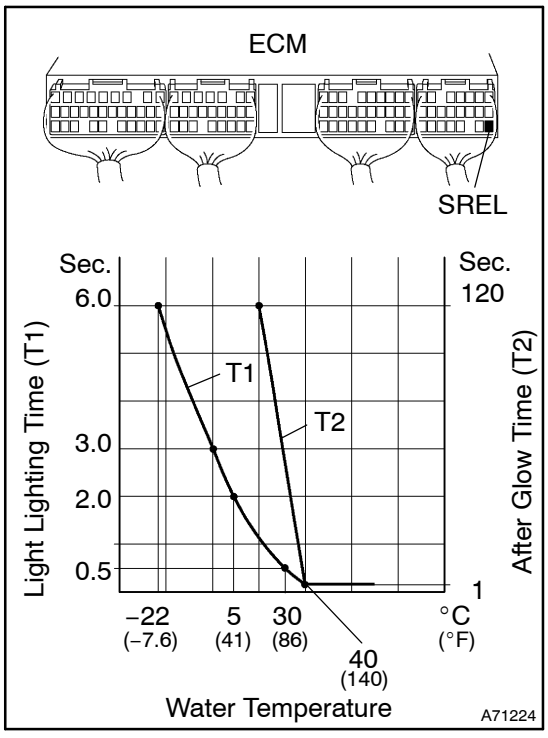
Symbols (Terminal No.)	Specified condition
GLW– (C12 – 5) (Terminal arrangement on 05–1554) ⇔ GIND (E10 – 3)	Continuity
L (GAUGE fuse terminal 2 of J/B) ⇔ IG+ (C9 – 19) (Terminal arrangement on 05–1554)	

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK AND REPLACE ECM

6 CHECK GLOW INDICATOR LIGHT(LIGHTING TIME)



(a) Inspect lighting time of glow indicator light.
(1) Turn the ignition switch ON, and measure the lighting time.
LIGHT LIGHTING TIME (T1): Refer to the chart graph
(b) Inspect after glow time.
(1) Turn the ignition switch to START, after the engine starts, measure the time when the battery voltage is applied to terminal SREL of the ECM.
AFTER GLOW TIME (T2): Refer to the chart graph

NG → CHECK AND REPLACE ECM

OK

7 READ OUTPUT DTC (See page 05–429)

Result:

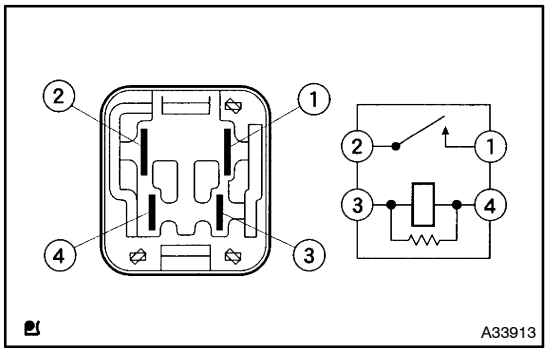
	A	B
RESULT	Other DTC is not output	Other DTC is output

SST 09843–18040

B → GO TO RELEVANT DTC CHART

A

8 CHECK GLOW PLUG (SUB) RELAY ASSY (See page 19–44)



(a) Check the glow plug relay for continuity.
(1) Using an ohmmeter, check that there is continuity between and terminal.

Specified condition:

Between terminal	Specified condition
1 – 2	No continuity
3 – 4	Continuity

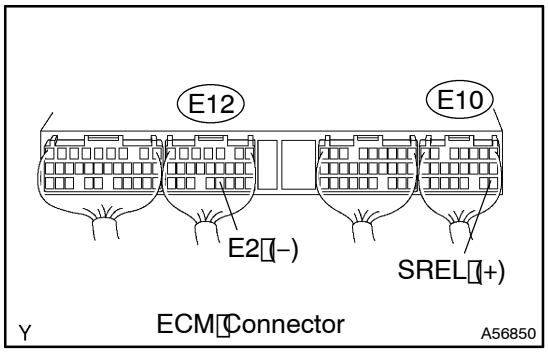
(2) Using an ohmmeter, check that there is continuity between terminals 3 and 4 when the battery voltage is applied across terminals 1 and 2.

Specified condition: Continuity

NG → REPLACE GLOW PLUG ASSY

OK

9 INSPECT ECM(CHECK VOLTAGE)



(a) Turn the ignition switch START.
(b) Measure the voltage between the terminals of the ECM E10 and E12 connector.

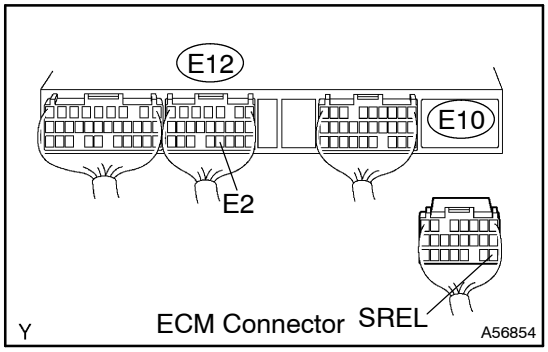
Voltage:

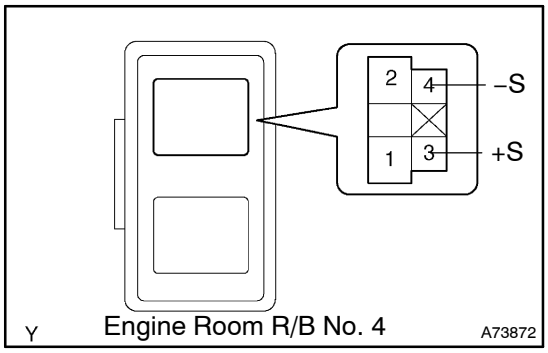
Symbols (Terminal No.)	Specified condition
SREL (E10 – 16) ⇔ E2 (E12 – 20)	9 – 14 V

NG → CHECK AND REPLACE ECM

OK

10 CHECK HARNESS AND CONNECTOR(ECM – GLOW PLUG RELAY,AND GLOW PLUG RELAY – BODY GROUND)





(a) Disconnect the ECM E10 connector.
(b) Disconnect the glow plug relay from the engine room R/B No. 4.
(c) Check the continuity between the wire harness side connector.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
+S (GLOW relay terminal 3 of R/B) ⇔ SREL (E10 – 16)	Continuity
–S (GLOW relay terminal 4 of R/B) ⇔ Body ground	

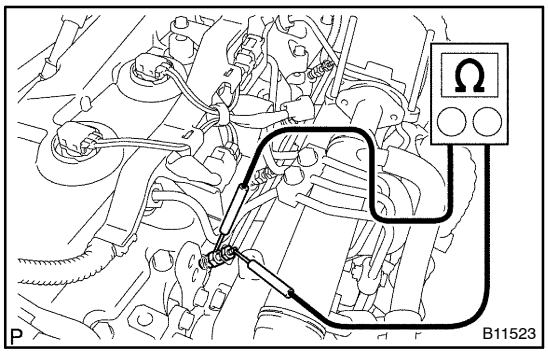
Standard (Check for short):

Symbols (Terminal No.)	Specified condition
SREL (E10 – 16) ⇔ E2 (E12 – 20)	No continuity

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

11 INSPECT GLOW PLUG ASSY



(a) Check the glow plug assy for resistance.
(1) Using an ohmmeter, check that there is continuity between the glow plug terminal and ground.

Standard resistance: Approx. 0.75 Ω at 20°C (68°F)
Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

NOTICE:

- **Be careful not to damage the glow plug pipes as it could cause an open circuit or shorten life of the glow plugs.**
- **Avoid getting oil and gasoline on the glow plug when cleaning.**
- **During inspection, be sure to wipe any oil of the terminal and bakelite washer with a dry cloth.**
- **Be careful no to apply more than 11 V to the glow plug as it could cause an open circuit.**

NG → **REPLACE GLOW PLUG ASSY**

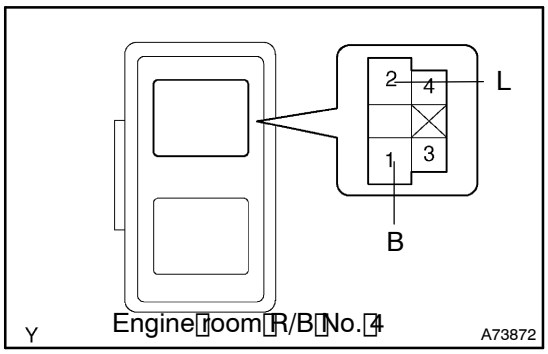
OK

12	INSPECT GLOW PLUG ASSY (INSTALLATION)

NG → TIGHTEN GLOW PLUG

OK

13	CHECK HARNESS AND CONNECTOR (GLOW PLUG RERAY – GLOW PLUG, GLOW PLUG RELAY – BATTERY)



(a) Remove the glow plug relay from the engine room R/B No. 4.

(b) Disconnect the glow plug wire.

(c) Check the continuity between the wire harness.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
L (GLOW relay terminal 2 of R/B) ⇔ Glow plug wire	Continuity
B (GLOW plug relay terminal 1 of R/B) ⇔ Positive terminal of the battery	

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05–443)