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Service Category: Engine/Hybrid System	Section: Starting	
Model Year: 2008	Model: ES350	Doc ID: RM000000YA1027X
Title: 2GR-FE STARTING: SMART ACCESS SYSTEM WITH PUSH-BUTTON START: Engine does not Start (2008 ES350)		

[Engine does not Start](#)

DESCRIPTION

1. ENGINE START SYSTEM FUNCTION

- (a) If the engine switch is pressed with the shift lever in the P or N position and the brake pedal depressed, the main body ECU determines that it is an engine start request.
- (b) The certification ECU and other ECUs perform key verification via the LIN communication line.
- (c) The main body ECU activates the ACC relay.
- (d) The main body ECU activates the IG1 and IG2 relays.
- (e) The certification ECU outputs a steering UNLOCK signal. The signal is sent to the main body ECU via the steering lock ECU.
- (f) The main body ECU sends an engine start request signal to the ECM.
- (g) The ECM sends an ACC cut request signal to the main body ECU.
- (h) The ECM and main body ECU activate the ST relay.
- (i) The main body ECU deactivates the ACC relay until the ECU detects an engine start.
- (j) When engine revolution speed reaches 1200 rpm, the ECU determines that the engine has been started.

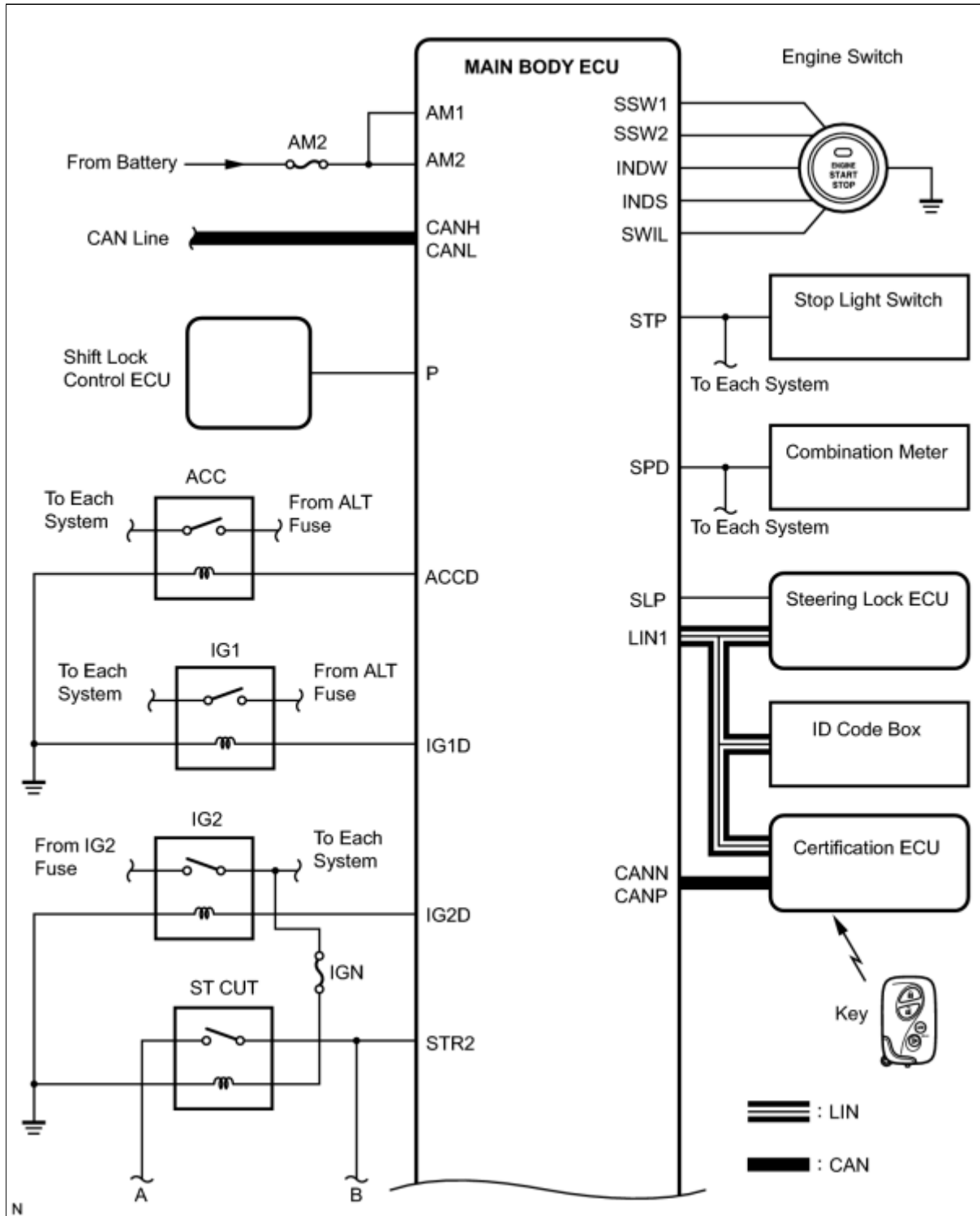
The ECM stop sending an ACC cut request signal to the main body ECU.

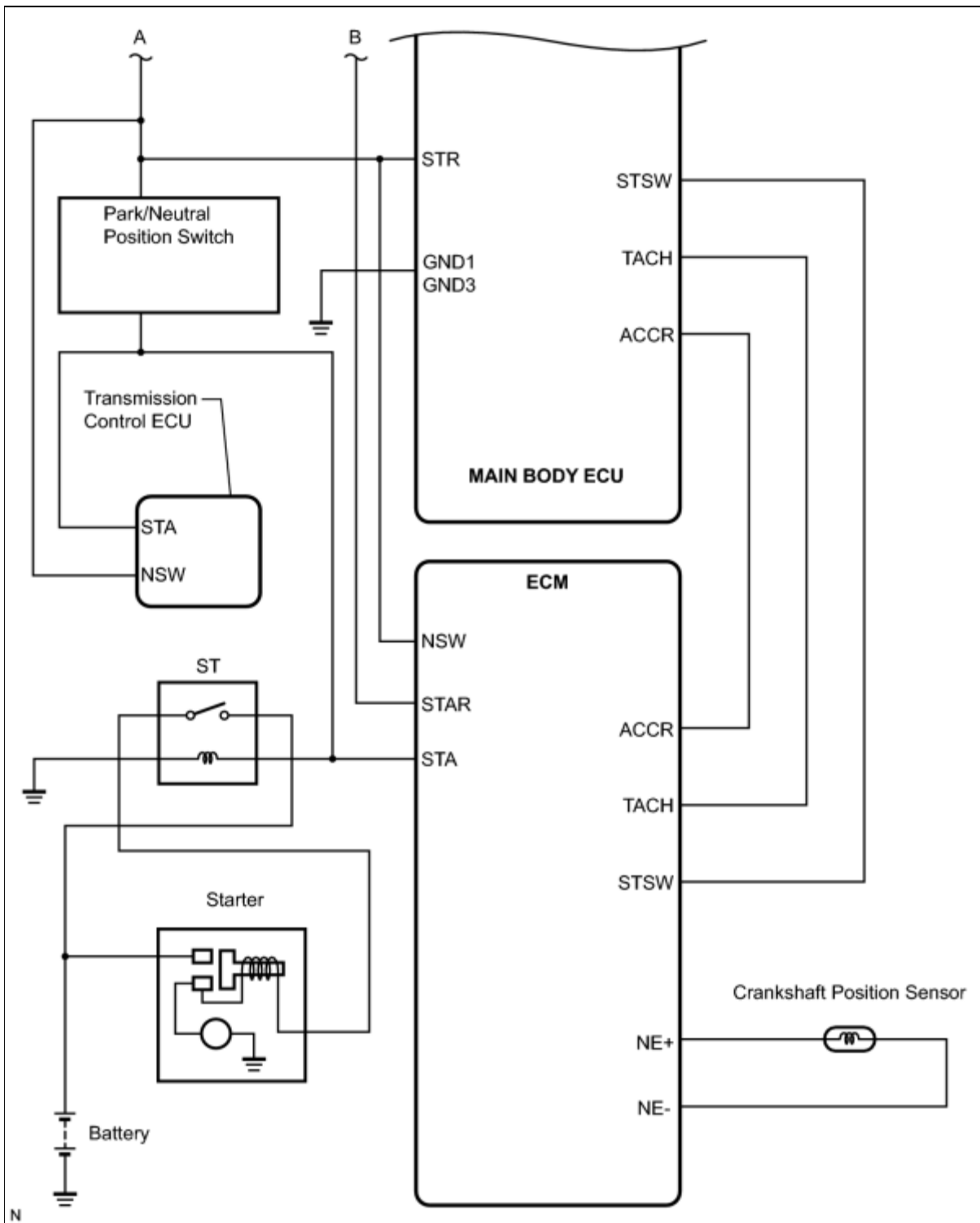
The main body ECU reactivates the ACC relay and turns off the engine switch indicator light.

SYMBOLS OF MAIN BODY ECU	SIGNALS	
STP	Stop light switch ON signal	Input
SSW1/SSW2	Engine switch ON signal	Input
ACCD	ACC relay operation signal	Output
SLP	Shift lock actuator position signal	Input
STP	Stop light signal	Input
IG1D	IG1 relay operation signal	Output
P	Shift lock signal	Input
IG2D	IG2 relay operation signal	Output
STR2	ST relay operation signal (Sub)	Output
STR	Park / neutral position switch signal	Input
TACH	Engine start detection signal	Input
STSW	Starter activation request signal	Output
ACCR	ACC cut request signal	Input

SYMBOLS OF ECM	SIGNALS	
ACCR	ACC cut request signal	Output

TACH	Engine revolution speed signal	Output
STSW	Starter activation request signal	Input
NSW	Park / neutral position switch signal	Input
STAR	ST relay operation signal (Main)	Output
STA	Starter activation signal	Input





WIRING DIAGRAM

See CRANKING HOLDING FUNCTION CIRCUIT [INFO](#) .

INSPECTION PROCEDURE

1. EMERGENCY ENGINE START CONTROL

- (a) If there is a malfunction in the stop light switch or STOP fuse, their signals may not be correctly transmitted to the main body ECU. This may result in the engine not starting even if the engine switch is pressed while the brake pedal is depressed and the shift lever is in the P position.

To activate the starter:

- (1) Turn the engine switch from off to on (ACC).
- (2) Press and hold the engine switch for 15 seconds.

HINT:

After the main body ECU, certification ECU, steering lock ECU, ID code box and/or ECM are/is replaced, perform the registration procedures for the engine immobiliser system INFO.

PROCEDURE

1. CHECK ENTRY FUNCTION DETECTION AREA

(a) Inspect entry detection area.

- (1) When the electrical key is in either of the 2 inspection points in the illustration, the shift lever is in the P position and the brake pedal is depressed, check that the engine switch indicator illuminates in green.

OK:

Engine switch illuminates in green.

HINT:

If the engine switch does not illuminate, perform troubleshooting according to the **PROBLEM SYMPTOMS TABLE** of the smart access with push-button start (starting) (engine switch indicator light does not come on) INFO and the smart access with push-button start (entry door lock) (matching for the inside of the cabin cannot be performed) INFO.

NG ▶ GO TO OTHER PROBLEM

OK



2. CHECK IF ENGINE STARTS (INITIALIZE STEERING LOCK)

- (a) Engine switch off.
- (b) Make sure that the shift lever is in the P position.
- (c) Open and close the driver's door.
- (d) When the shift lever is in the P position and the brake pedal is depressed, check if the engine can be started.

OK:

Steering lock/unlock function operates normally and engine can be started.

HINT:

After the battery is discharged and then recharged, the engine may not start unless the steering lock is initialized using

the above procedure  .

OK  END

NG



3. CHECK FOR DTC






(a) Delete the DTCs  .

(b) Check for DTCs again.

OK:

No DTC is output.

HINT:

- If smart access system with push-button start (starting function) DTCs are output,  .
- If smart access system with push-button start (entry lock function) DTCs are output,  .
- If electrical steering lock DTCs are output,  .
- If engine immobiliser system DTCs are output,  .
- If engine control system DTCs output (2GR-FE),  .

NG  GO TO DTC CHART

OK



4. CHECK ENGINE SWITCH CONDITION




(a) Check the power source mode change.

(1) When the key is inside the vehicle and the shift lever is in the P position, check that pressing the engine switch causes the power source mode to change as follows:

OK:

off → on (ACC) → on (IG) → off

HINT:

- If power mode does not change to ON (IG and ACC),  .
- If power mode does not change to ON (IG),  .
- If power mode does not change to ON (ACC),  .

NG  GO TO OTHER PROBLEM

OK



5.	CHECK CRANKING FUNCTION
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(a) Check the engine cranking function.

(1) When there is fuel in the fuel tank, the key is inside the vehicle, and the shift lever is in the P position, check that depressing the brake pedal and pressing the engine switch crank the engine.

OK:

Engine cranks.

OK ► **READ VALUE OF TECHSTREAM (ENGINE START REQUEST)**

NG



6.	READ VALUE OF TECHSTREAM (P SIGNAL)
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(a) Connect Techstream to the DLC3.

(b) Turn the engine switch on (IG).

(c) Read the DATA LIST according to the displays on the tester screen.

Main Body:

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Shift P Signal	Shift P signal / ON or OFF	ON: Shift position is P OFF: Shift position is not P	-

OK:

ON (P signal is ON) and OFF (P signal is OFF) appear on the screen.

HINT:

If the result is not as specified, perform troubleshooting for DTC B2281 ("P" signal malfunction) first .

NG ► **GO TO DTC B2281**

OK



7.	READ VALUE OF TECHSTREAM (STOP LIGHT SWITCH)
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(a) Connect Techstream to the DLC3.

(b) Turn the engine switch on (IG).

(c) Check the DATA LIST for proper functioning of the stop light switch.

Main Body:

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Stop Light SW	Stop light Switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

OK:

ON (brake pedal depressed) and OFF (brake pedal released) appear on the screen.

HINT:

If the result is not as specified, perform troubleshooting for DTC B2284 (Brake signal malfunction) first  .

NG  GO TO DTC B2284

OK



8.	READ VALUE OF TECHSTREAM (STEERING LOCK)
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(a) Connect Techstream to the DLC3.

(b) Turn the engine switch on (IG).


Main Body:

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Steering Unlock Switch	Steering lock condition / ON or OFF	ON: Steering is unlocked (Engine switch on (ACC)) OFF: Steering is locked (Engine switch off)	-

OK:

ON (steering is unlocked) and OFF (steering is locked) appear on the screen.

HINT:

If the result is not as specified, perform troubleshooting for DTCs B2285 (Steering lock position signal circuit malfunction) and B2288 (Steering lock signal circuit malfunction) first  .

NG  GO TO DTC B2285

OK



9.	CHECK STEERING LOCK
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(a) Check if the steering lock is released when turning the engine switch on (ACC).

OK:

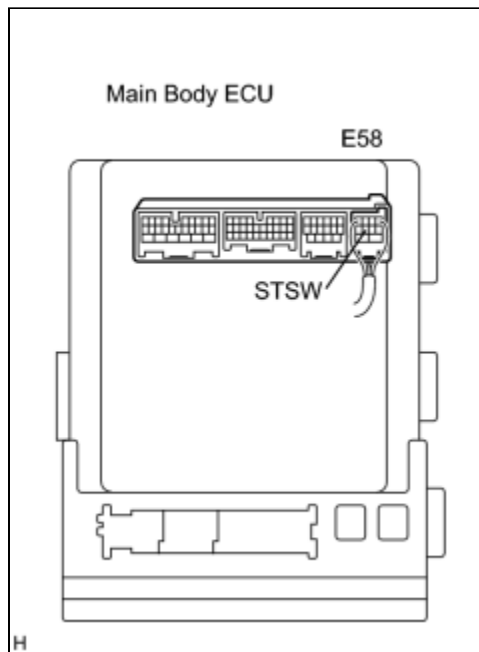
The steering lock is released.

NG ▶ READ VALUE OF TECHSTREAM (L CODE)

OK



10. INSPECT MAIN BODY ECU (STSW VOLTAGE)



(a) Disconnect the A10 ECM connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
E58-4 (STSW) - Body ground	Brake pedal depressed, engine switch held on (ST)	Output voltage at terminal AM1 or AM2 is -2 V or more.

HINT:

If the result is not as specified, perform troubleshooting for DTC B2275 (STSW monitor malfunction) first

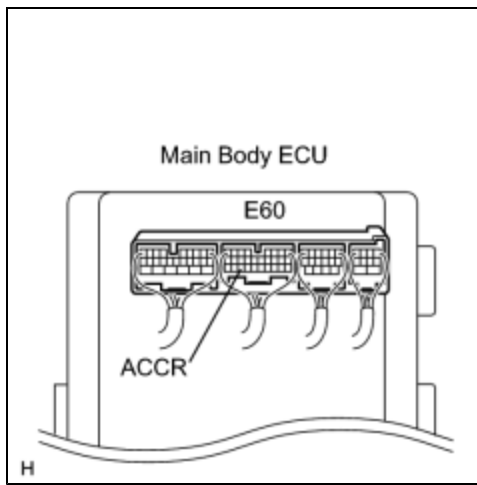
INFO

NG ▶ GO TO DTC B2275

OK



11. INSPECT ECM (ACCR VOLTAGE)



(a) Reconnect the connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
E60-3 (ACCR) - Body ground	Brake pedal depressed, shift lever P position, engine switch is pushed once → on (IG)	0.1 to 0.8 V* ¹ → Output voltage at terminal AM1 or AM2 is -2 V or more.

* ¹: Voltage is output only when the engine is cranking.

HINT:

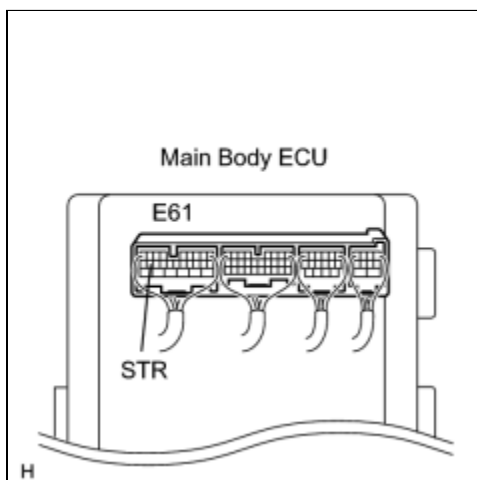
If the result is not as specified, perform troubleshooting for DTC B2276 (ACCR signal circuit malfunction) first INFO.

NG ▶ GO TO DTC B2276

OK



12. INSPECT MAIN BODY ECU (STR VOLTAGE)



(a) Measure the voltage according to the value(s) in the table below.

Standard voltage:

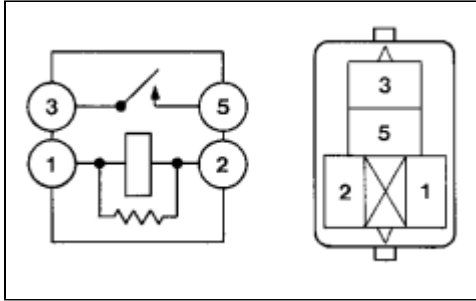
TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
E61-8 (STR) - Body ground	Shift lever P or N position → except P or N position	Below 1 V → Pulse generation

OK ► INSPECT RELAY (ST)

NG



13. INSPECT RELAY (ST CUT)



(a) Measure the resistance of the ST CUT relay.

Standard resistance:

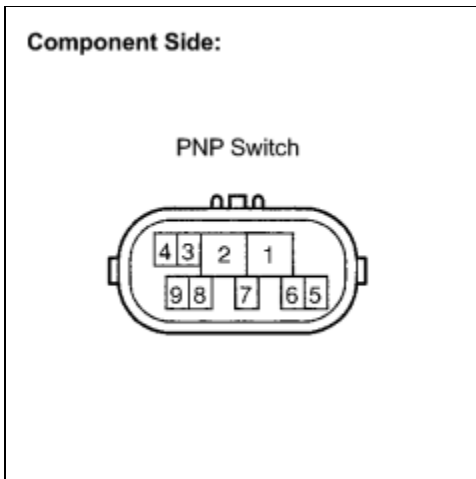
TESTER CONNECTION	SPECIFIED CONDITION
3 - 5	10 k Ω or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG ► REPLACE RELAY

OK



14. INSPECT PARK/NEUTRAL POSITION SWITCH



(a) Disconnect the park/neutral position (PNP) switch connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

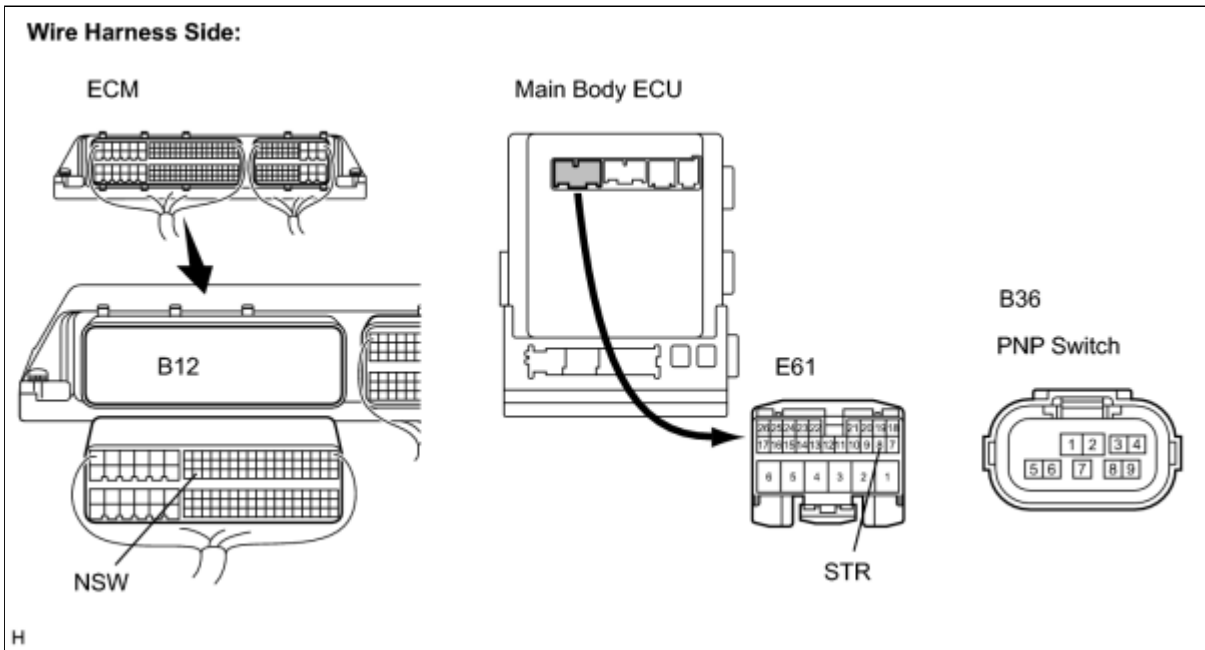
SHIFT POSITION	TESTER CONNECTION	SPECIFIED CONDITION
P	4 - 9	Below 1 Ω
N	4 - 9	Below 1 Ω
Except P and N	4 - 9	10 k Ω or higher

OK



15.	CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM, MAIN BODY ECU)
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(a) Measure the resistance according to the value(s) in the table below.



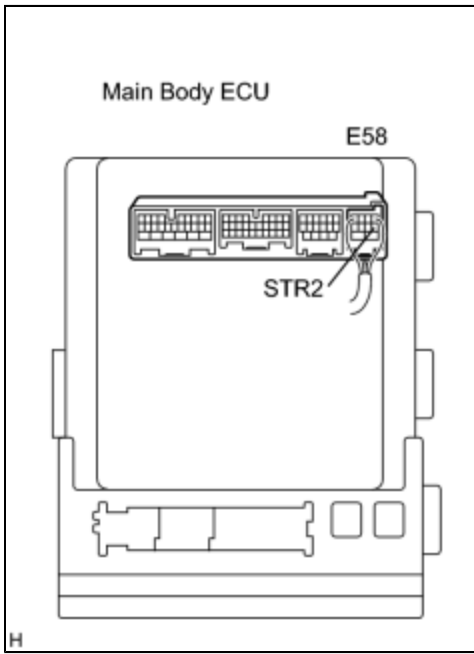
Standard resistance:

TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
B12-62 (NSW) - B36-4	Always	Below 1 Ω
B12-62 (NSW) - E61-8 (STR)	Always	Below 1 Ω
B12-62 (NSW) - Body ground	Always	10 k Ω or higher

OK



16.	INSPECT DRIVER SIDE JUNCTION BLOCK (STR2 VOLTAGE)
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(a) Disconnect the B12 ECM connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
E58-6 (STR2) - Body ground	Brake pedal depressed, shift lever P or N position, engine switch on (ST)	Output voltage at terminal AM1 or AM2 is -3.5 V or more.* ¹

* ¹: Voltage is output for 0.3 seconds when the engine is cranking to start. Disconnect the B12 connector from the ECM before measuring the voltage.

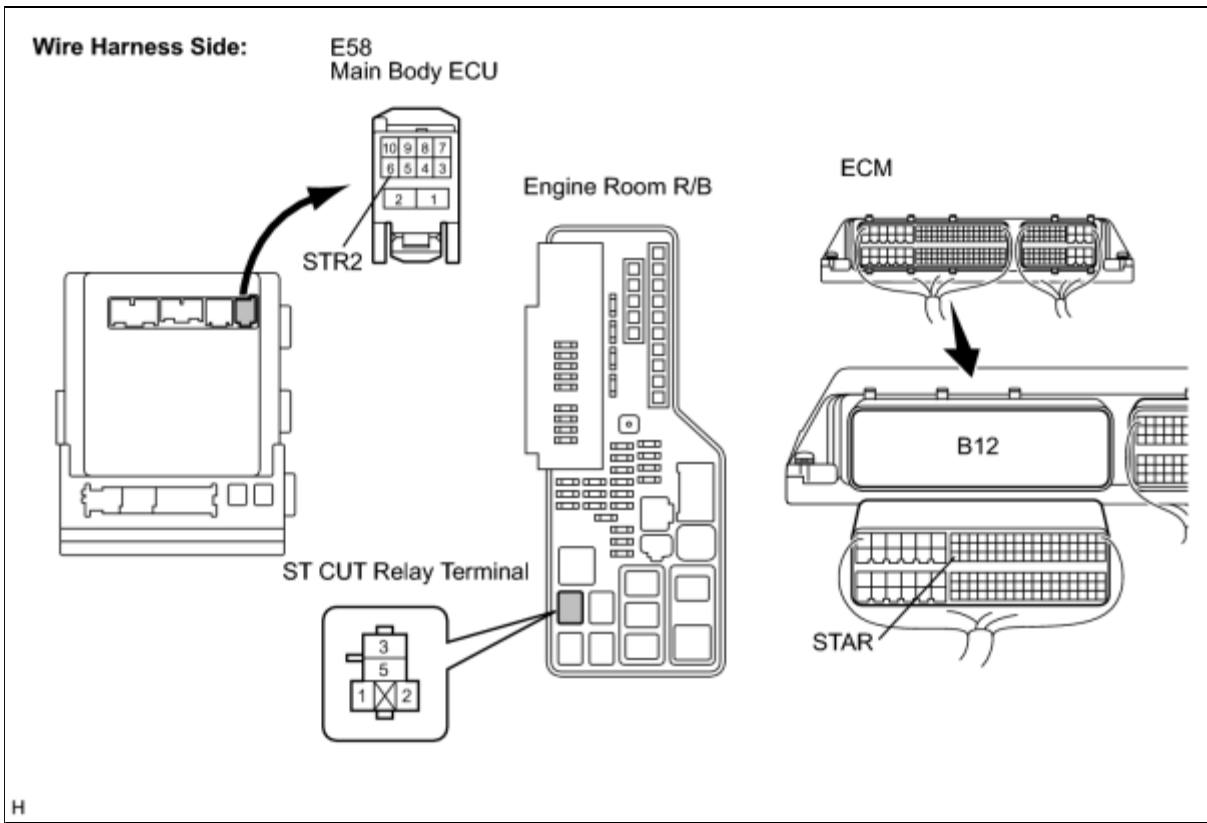
NG ▶ REPLACE MAIN BODY ECU

OK



17. CHECK WIRE HARNESS (MAIN BODY ECU - ECM - ENGINE ROOM R/B)

(a) Remove the ST CUT relay from the engine room R/B.



(b) Disconnect the E58 ECU connector.

(c) Measure the resistance according to the value(s) in the table below.

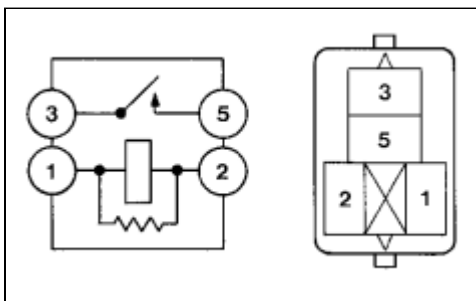
Standard resistance:

TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
B12-63 (STAR) - E58-6 (STR2)	Always	Below 1 Ω
B12-63 (STAR) - ST CUT relay terminal - 3	Always	Below 1 Ω
B12-63 (STAR) - Body ground	Always	10 k Ω or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

18. INSPECT RELAY (ST)



(a) Remove the starter relay from the engine room R/B.

(b) Measure the resistance of the starter relay.

Standard resistance:

TESTER CONNECTION	SPECIFIED CONDITION
3 - 5	10 k Ω or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

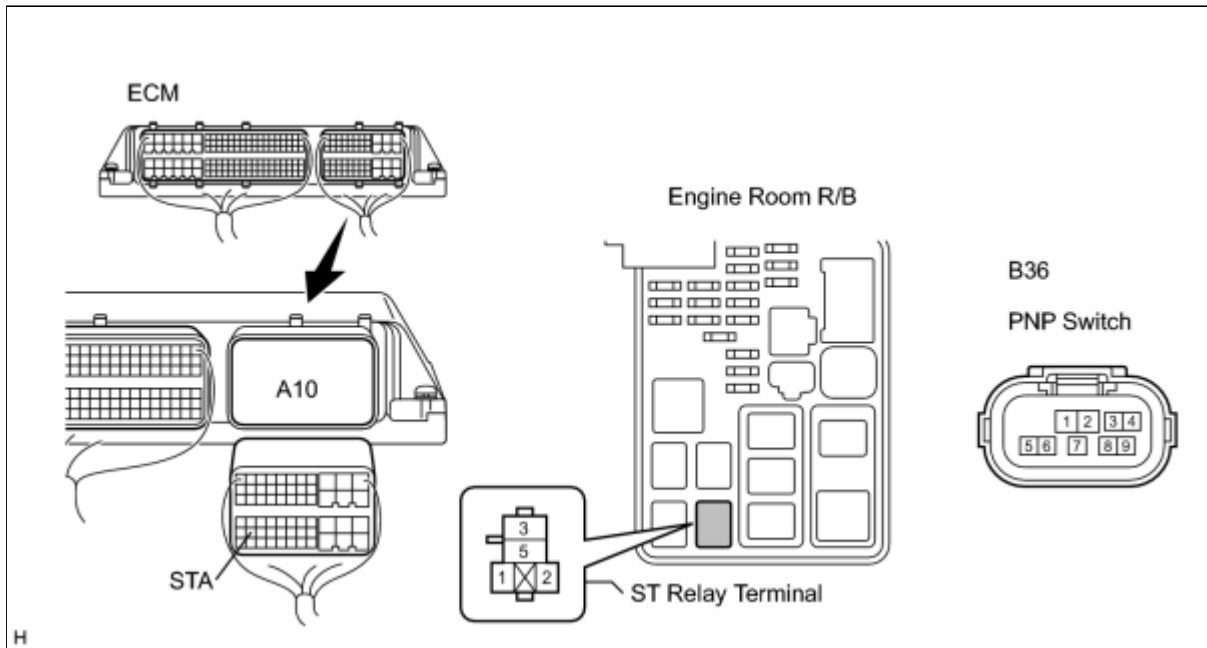
NG  **REPLACE RELAY**

OK



19. CHECK HARNESS AND CONNECTOR (ECM - ST RELAY, PNP SWITCH)

(a) Disconnect the A10 ECM connector.



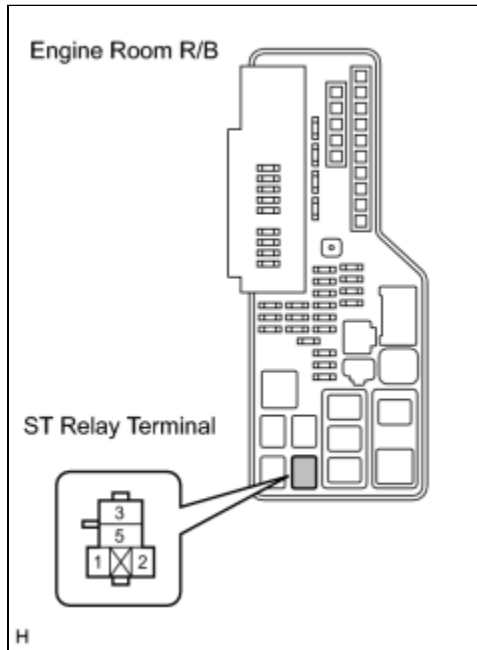
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION (SYMBOLS)	CONDITION	SPECIFIED CONDITION
A10-48 (STA) - ST relay terminal - 1	Always	Below 1 Ω
A10-48 (STA) - B36-9	Always	Below 1 Ω
A10-48 (STA) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK


20. INSPECT ENGINE ROOM RELAY BLOCK (ST RELAY VOLTAGE)


(a) Measure the voltage according to the value(s) in the table below.

Standard voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
ST relay terminal - 5 - Body ground	Always	9 to 14 V
ST relay terminal - 2 - Body ground	Always	Below 1 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK


21. INSPECT STARTER ASSEMBLY

HINT:

INFO

NG REPAIR OR REPLACE STARTER ASSEMBLY

OK REPAIR OR REPLACE HARNESS OR CONNECTOR (STARTER - BATTERY, ST RELAY)

23. READ VALUE OF TECHSTREAM (L CODE)

(a) Reconnect the connectors.

(b) Connect Techstream to the DLC3.

HINT:

When using Techstream with the engine switch off, turn on and off any of the door courtesy light switches repeatedly at 1.5 second intervals or less until communication between the tester and vehicle starts.

(c) Turn the engine switch on (IG).

Smart Key:

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
L Code Check	L code check / ON or NG	OK: Normal NG: Malfunction	Electrical key in the cabin

OK:

OK is displayed on the screen.

HINT:

If the result is not as specified, refer to **PROBLEM SYMPTOMS TABLE** of the electrical steering lock (steering wheel cannot be unlocked)  .

If the result is not as specified, there may be a malfunction with the steering lock ECU or the ID code box.

NG  GO TO STEERING LOCK SYSTEM

OK



24.	READ VALUE OF TECHSTREAM (ENGINE START REQUEST)
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(a) Connect Techstream to the DLC3.

HINT:

When using Techstream with the engine switch off, turn on and off any of the door courtesy light switches repeatedly at 1.5 second intervals or less until communication between the tester and vehicle starts.

(b) Turn the engine switch on (IG).

Smart Key:

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Engine Start Request	Start request signal response / OK or NG	OK: Received NG: Not received	-

OK:

OK (received) and NG (not received) appear on the screen.

NG  REPLACE CERTIFICATION ECU

OK



25.	READ VALUE OF TECHSTREAM (S CODE)
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(a) Connect Techstream to the DLC3.

HINT:

When using Techstream with the engine switch off, turn on and off any of the door courtesy light switches repeatedly at 1.5 second intervals or less until communication between the tester and vehicle starts.

(b) Turn the engine switch on (IG).

Smart Key:

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
S Code Check	S code check / OK or NG	OK: Normal NG: Malfunction	-

OK:

OK is displayed on the screen.

HINT:

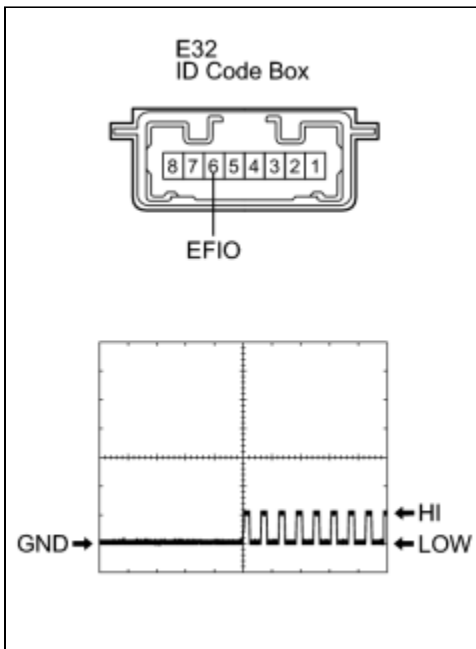
If the result is not as specified, there may be a malfunction with the certification ECU or the ID code box.

NG ▶ REPLACE CERTIFICATION ECU

OK



26.	INSPECT ID CODE BOX
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(a) Check the input signal waveform.

- (1) Connect an oscilloscope to terminal E32-6 (EFIO) and body ground.
- (2) Turn the engine switch on (IG).
- (3) Check the signal waveform according to the condition(s) in the table below.


ITEM	CONDITION
Tool setting	10 V/DIV., 100 ms./DIV.
Vehicle condition	Engine switch on (IG)

NG ▶ REPLACE ID CODE BOX

OK ▶ END

28.	REPLACE CERTIFICATION ECU
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(a) Replace the certification ECU.

(b) Perform the registration procedures for the engine immobiliser system  .

(c) Check if the engine can be started.

OK:

Engine can be started.

OK ▶ **END (CERTIFICATION ECU IS DEFECTIVE)**

NG ▶ **REPLACE ID CODE BOX**

