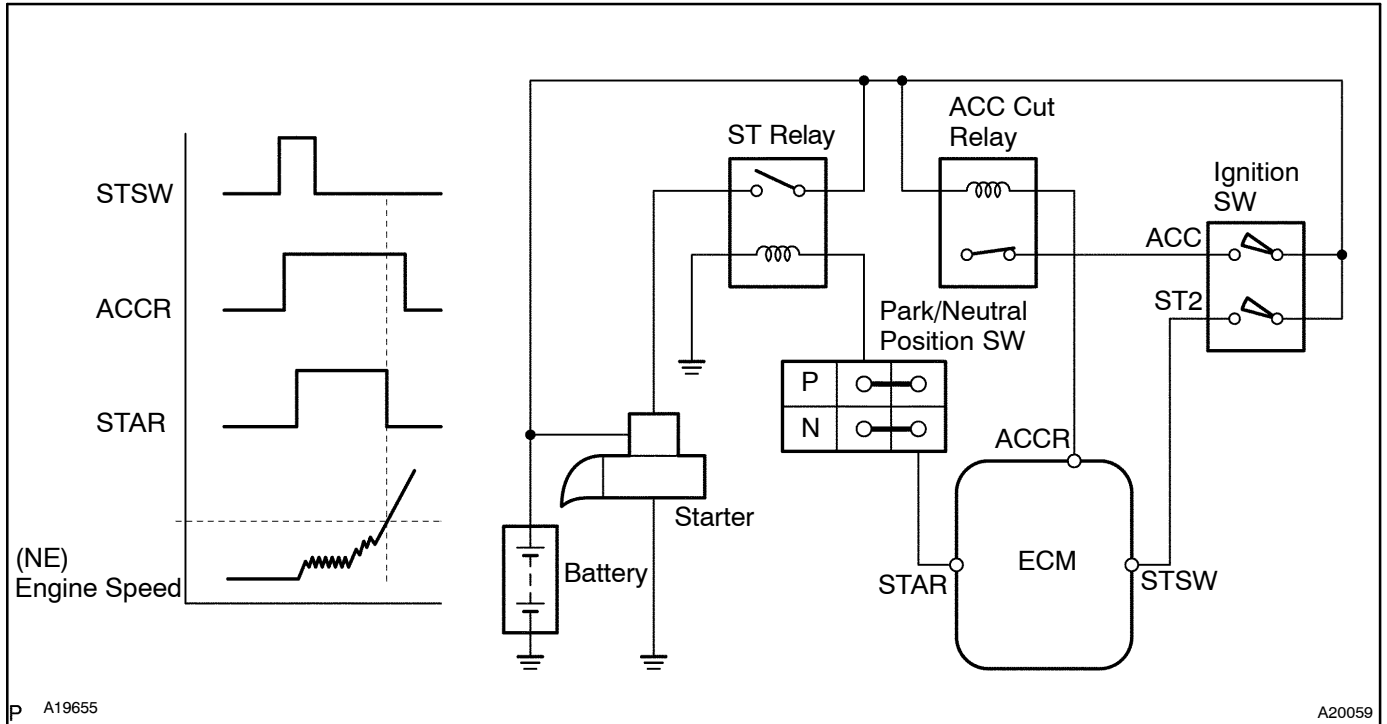


Cranking Hold Function Circuit

CIRCUIT DESCRIPTION

The starter is controlled by the ECM, when the ECM detects a start signal (STSW) from the ignition switch, this system monitors the engine speed (NE) and continues to operate the starter until it has determined that the engine has started (engine speed reaches approximately 500 rpm). If the engine is already running and the ignition switch is turned to START, the ECM will not operate the starter.



WIRING DIAGRAM

Refer to DTC P0617 on page [DI-301](#).

INSPECTION PROCEDURE

Hand-held tester:

1	Check operation of engine cranking.
---	-------------------------------------

CHECK:

When turning the ignition switch to the START position, check whether the starter motor starts.

OK:

Starter motor starts.

OK

Check for intermittent problems (See page [DI-3](#)).

NG

2 Connect hand-held tester, and check STA signal.

PREPARATION:

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the ignition switch ON, and push the hand-held tester main switch ON.
- (c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.

CHECK:

Read the STA signal on the hand-held tester while the starter operates.

OK:

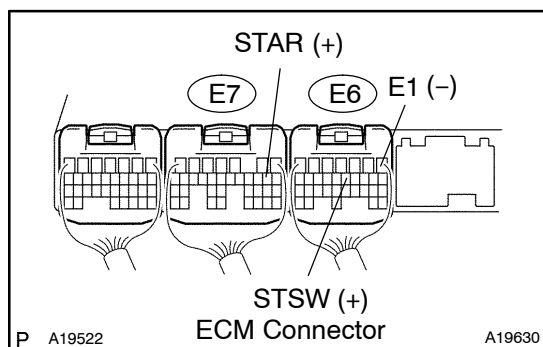
Ignition Switch Position	ON	START
STA Signal	OFF	ON

NG

Go to step 5.

OK

3 Check voltage between terminal STAR, STSW and E1 of ECM connector.



CHECK:

Measure the voltage between the terminals of the E6 and E7 ECM connectors, while cranking the engine (ignition switch START position).

OK:

Tester Connection	Specified Condition
STAR (E7-9) - E1 (E6-1)	9 to 14 V
STSW (E6-12) - E1 (E6-1)	9 to 14 V

RESULT:

Terminal STAR	Terminal STSW	Proceed to
9 to 14 V	9 to 14 V	A
0 V	9 to 14 V	B
0 V	0 V	C

B

Replace ECM (See page SF-60).

C

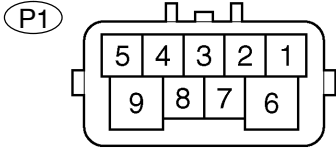
Go to step 9.

A

4 Check park/neutral position switch.

Component Side:

Park/neutral Position Switch



PREPARATION:

Remove the P1 park/neutral position switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each range.

Shift range	Terminal No. to continuity	
P	1 - 3	6 - 9
R	2 - 3	-
N	3 - 5	6 - 9
D	3 - 7	-
2	3 - 4	-
L	3 - 8	-

OK:

There is continuity.

NG

Replace the park/neutral position switch.

OK

Check and repair harness and connector between park/neutral position switch and ECM (See page [IN-36](#)).

5 Check starter relay (See page [ST-18](#)).

NG

Replace starter relay.

OK

6 Check for open and short in harness and connector between park/neutral position switch and starter relay, starter relay and body ground (See page [IN-36](#)).

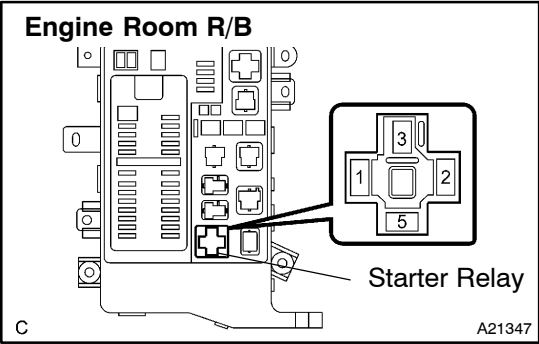
NG

Repair or replace harness or connector.

OK

7

Check engine room R/B (Starter relay voltage).



PREPARATION:
Remove the starter relay from the engine room R/B.

CHECK:
Measure the voltage between the terminal of the engine room R/B and body ground.

OK:

Tester Connection	Specified Condition
Starter relay (5) – Body ground	9 to 14 V

NG

Check and repair harness and connector between starter relay and battery.

OK

8

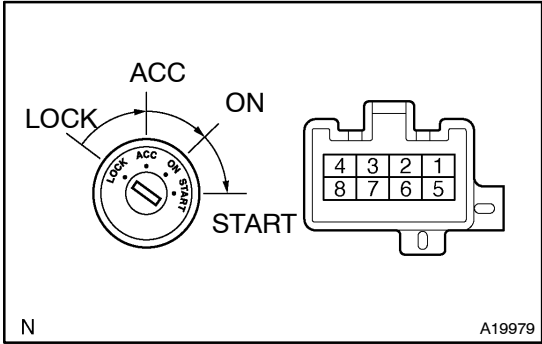
Check starter (See page [ST-16](#)).

NG

Repair or replace starter.

OK

9 Check ignition switch.



PREPARATION:

- (a) Remove the lower finish panel.
- (b) Disconnect the ignition switch connector.

CHECK:

Check continuity between terminals shown below.

OK:

Switch Position	Terminal No. to continuity	
LOCK	-	-
ACC	2-3	-
ON	2-3-4	6-7
START	1-2-4	6-7-8

NG

Replace ignition switch.

OK

Check for open in harness and connector between ECM and ignition switch, ignition switch and battery (See page [IN-36](#)).

OBD II scan tool (excluding hand-held tester):

1	Check operation of engine cranking.
----------	--

CHECK:

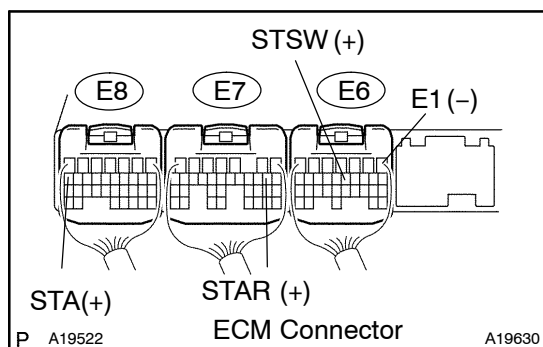
When turning the ignition switch to the ST position, check whether the starter motor starts.

OK

Check for intermittent problems (See page [DI-3](#)).

NG

2	Check voltage between terminal STSW, STAR, STA and E1 of ECM connector.
----------	--

**CHECK:**

Measure the voltage between the terminals of E6, E7 and E8 ECM connectors, while cranking the engine (ignition switch START position).

OK:

Tester Connection	Specified Condition
STA (E8-17) – E1 (E6-1)	9 to 14 V
STAR (E7-9) – E1 (E6-1)	9 to 14 V
STSW (E6-12) – E1 (E6-1)	9 to 14 V

RESULT:

Terminal STA	Terminal STAR	Terminal STSW	Proceed to
9 to 14 V	9 to 14 V	9 to 14 V	A
0 V	9 to 14 V	9 to 14 V	B
0 V	0 V	9 to 14 V	C
0 V	0 V	0 V	D

B

Go to step 7.

C

Replace ECM (See page [SF-60](#)).

D

Go to step 8.

A

3 Check starter relay (See page [ST-18](#)).

NG

Replace starter relay.

OK

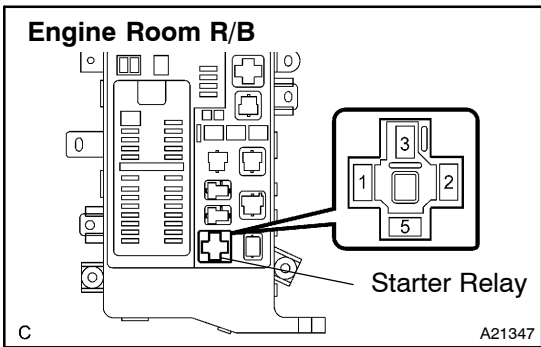
4 Check for open and short in harness and connector between park/neutral position switch and starter relay, starter relay and body ground (See page [IN-36](#)).

NG

Repair or replace harness or connector.

OK

5 Check engine room R/B (Starter relay voltage).



PREPARATION:

Remove the starter relay from the engine room R/B.

CHECK:

Measure the voltage between the terminal of the engine room R/B and body ground.

OK:

Tester Connection	Specified Condition
Starter relay (5) - Body ground	9 to 14 V

NG

Check and repair harness and connector between starter relay and battery (See page [IN-36](#)).

OK

6 Check starter (See page [ST-16](#)).

NG

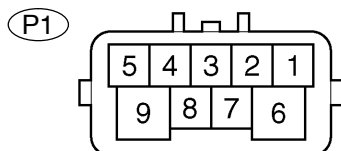
Repair or replace starter.

OK

Check and repair harness and connector between starter relay and starter, starter and battery (See page [IN-36](#)).

7 Check park/neutral position switch.

Component Side
Park/neutral Position Switch



PREPARATION:

Remove the P1 park/neutral position switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each range.

Shift range	Terminal No. to continuity	
P	1 - 3	6 - 9
R	2 - 3	-
N	3 - 5	6 - 9
D	3 - 7	-
2	3 - 4	-
L	3 - 8	-

OK:

There is continuity.

NG

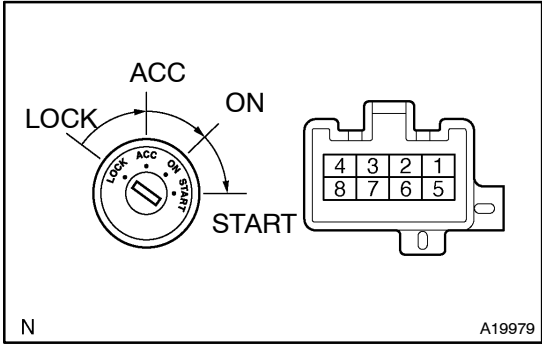
Replace the park/neutral position switch.

OK

Check and repair harness and connector between park/neutral position switch and ECM (See page [IN-36](#)).

8

Check ignition switch.



PREPARATION:

- (a) Remove the lower finish panel.
- (b) Disconnect the ignition switch connector.

CHECK:

Check continuity between terminals shown below.

OK:

Switch Position	Terminal No. to continuity	
LOCK	-	-
ACC	2-3	-
ON	2-3-4	6-7
START	1-2-4	6-7-8

NG

Replace ignition switch.

OK

Check and replace harness and connector between ECM and ignition switch, ignition switch and battery (See page [IN-36](#)).