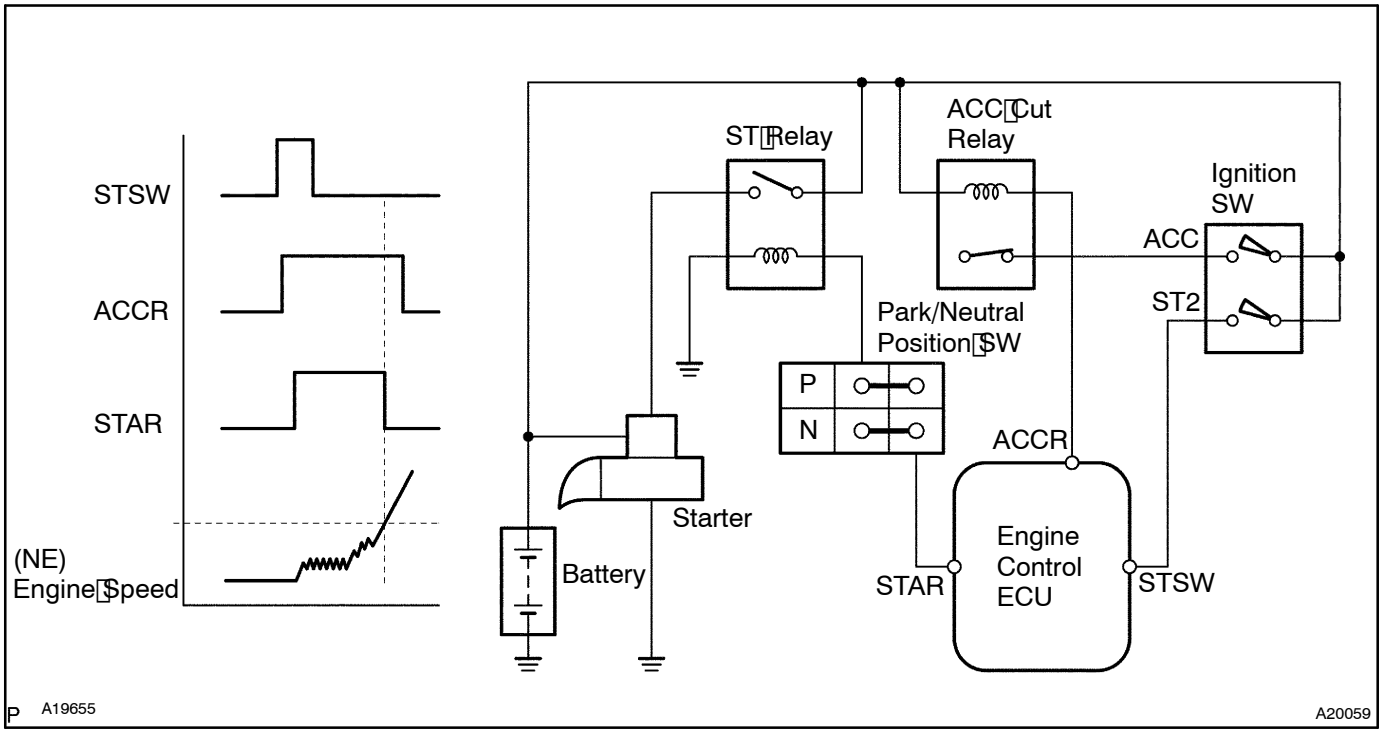
DIC2U–03

Cranking Hold Function Circuit

CIRCUIT DESCRIPTION

The starter is controlled by the engine control ECU, when the engine control ECU 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 even when the ignition switch is turned to START, the engine control ECU will not operate the starter.



WIRING DIAGRAM

Refer to DTC P0617 on page DI–200.

INSPECTION PROCEDURE

When using 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 / OBD/MOBD / DATA LIST / ALL / STARTER SIG.

CHECK:

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

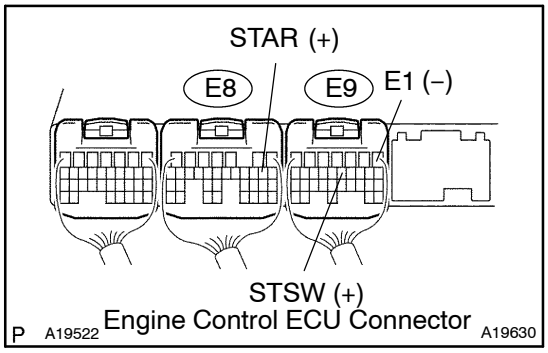
OK:

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 engine control ECU connector.



CHECK:

Measure the voltage between the terminals of the E8 and E9 engine control ECU connectors, while cranking the engine (ignition switch START position).

OK:

Tester Connection	Specified Condition
STAR (E8–9) – E1 (E9–1)	9 to 14 V
STSW (E9–12) – E1 (E9–1)	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

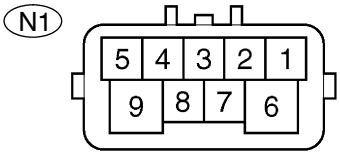
B → **Replace engine control ECU (See Pub. No. RM630E, page FI–74).**

C → **Go to step 9.**

A

4	Check neutral start switch.

Component Side:
Neutral Start Switch



PREPARATION:
Remove the N1 neutral start 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 neutral start switch.

OK

Check and repair harness and connector between neutral start switch and engine control ECU (See page IN–20).

5	Check starter relay (See Pub. No. RM630E, page ST–15).

NG → Replace starter relay.

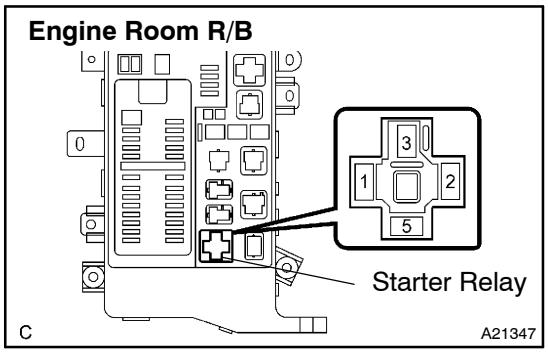
OK

6	Check for open and short in harness and connector between neutral start switch and starter relay, starter relay and body ground (See page IN–20).

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.**

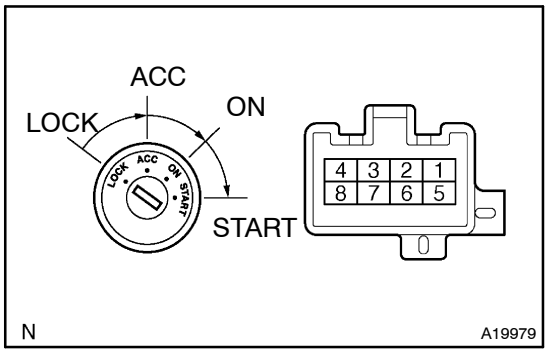
OK

8	Check starter (See Pub. No. RM630E, page ST–15).

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 engine control ECU and ignition switch, ignition switch and battery (See page IN–20).

When not using hand-held tester:

1	**Check operation of engine cranking.**

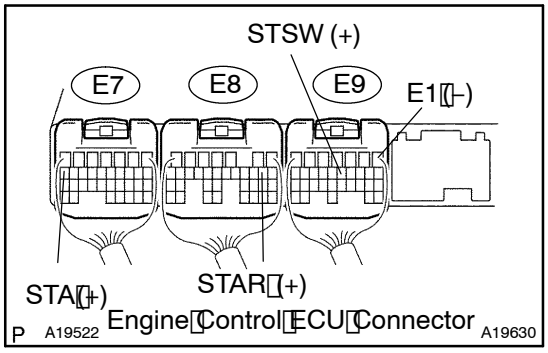
CHECK:

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 engine control ECU connector.**



CHECK:

Measure the voltage between the terminals of E7, E8 and E9 engine control ECU connectors while cranking the engine (ignition switch START position).

OK:

Tester Connection	Specified Condition
STA (E7–17) – E1 (E9–1)	9 to 14 V
STAR (E8–9) – E1 (E9–1)	9 to 14 V
STSW (E9–12) – E1 (E9–1)	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 engine control ECU (See Pub. No. RM630E, page FI–74).**

D → **Go to step 8.**

A

3	Check starter relay (See Pub. No. RM630E, page ST–16).

NG → Replace starter relay.

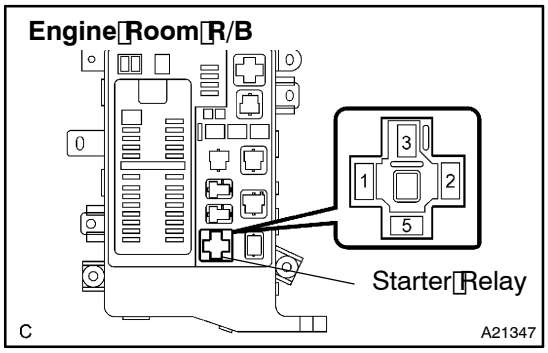
OK

4	Check for open and short in harness and connector between neutral start switch and starter relay, starter relay and body ground (See page IN–20).

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–20).

OK

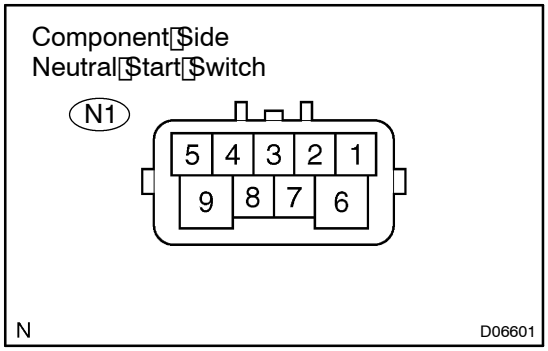
6	Check starter (See Pub. No. RM630E, page ST–15).

NG → Repair or replace starter.

OK

Check and repair harness and connector between starter relay and starter, starter and battery (See page IN–20).

7	Check neutral start switch.



PREPARATION:

Remove the N1 neutral start 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:

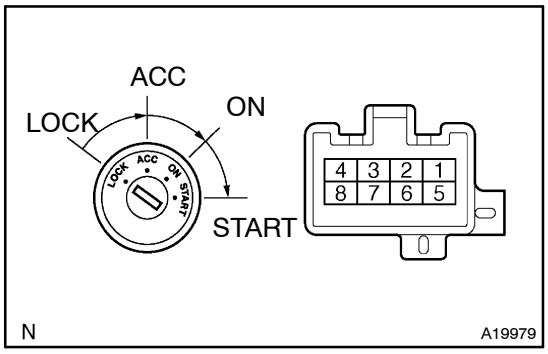
There is continuity.

NG → Replace the park/neutral position switch.

OK

Check and repair harness and connector between neutral start switch and engine control ECU (See page IN–20).

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 engine control ECU and ignition switch, ignition switch and battery (See page IN–20).