

## Cold Start Injector Circuit

### — CIRCUIT DESCRIPTION —

The cold start injector is used to maintain the engine startability when it is cold. The injection volume, i.e., the length of time the injector is energized, is controlled by the ECU and the cold start injector time switch.

During a cold start, when the starter turns the contacts in the cold start injector time switch close. Thus current flows to the cold start injector coil, injecting fuel. At the same time, a bimetal in the heat coil is energized and heats up. This soon causes the contacts to open, cutting off the current flow to the injector coil and stopping fuel injection.

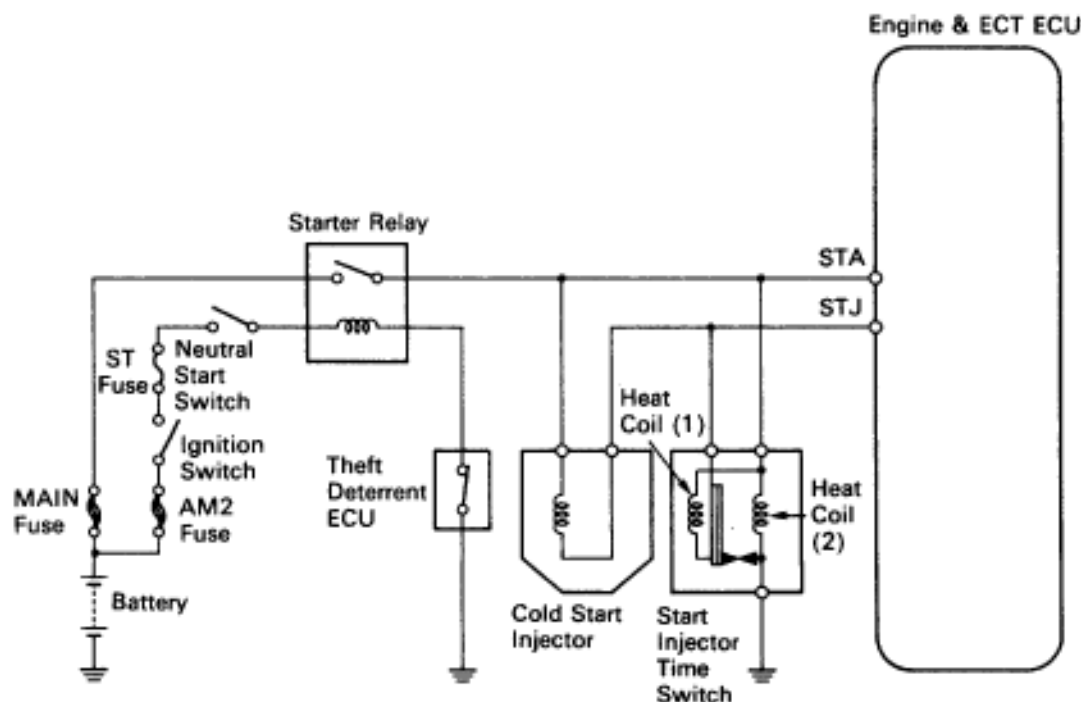
The injection duration of the cold start injector is determined by the coolant temperature and the length of time current flows to the heat coil. When the engine is warm, the contacts are opened by the bimetal and the cold start injector does not operate.

When the engine is hard to start and the starter is operated continuously, heat coil (2) heats up the bimetal keeping the contacts open to prevent spark plugs from becoming fouled, which is caused by the cold start injector operation when the open contacts close again.

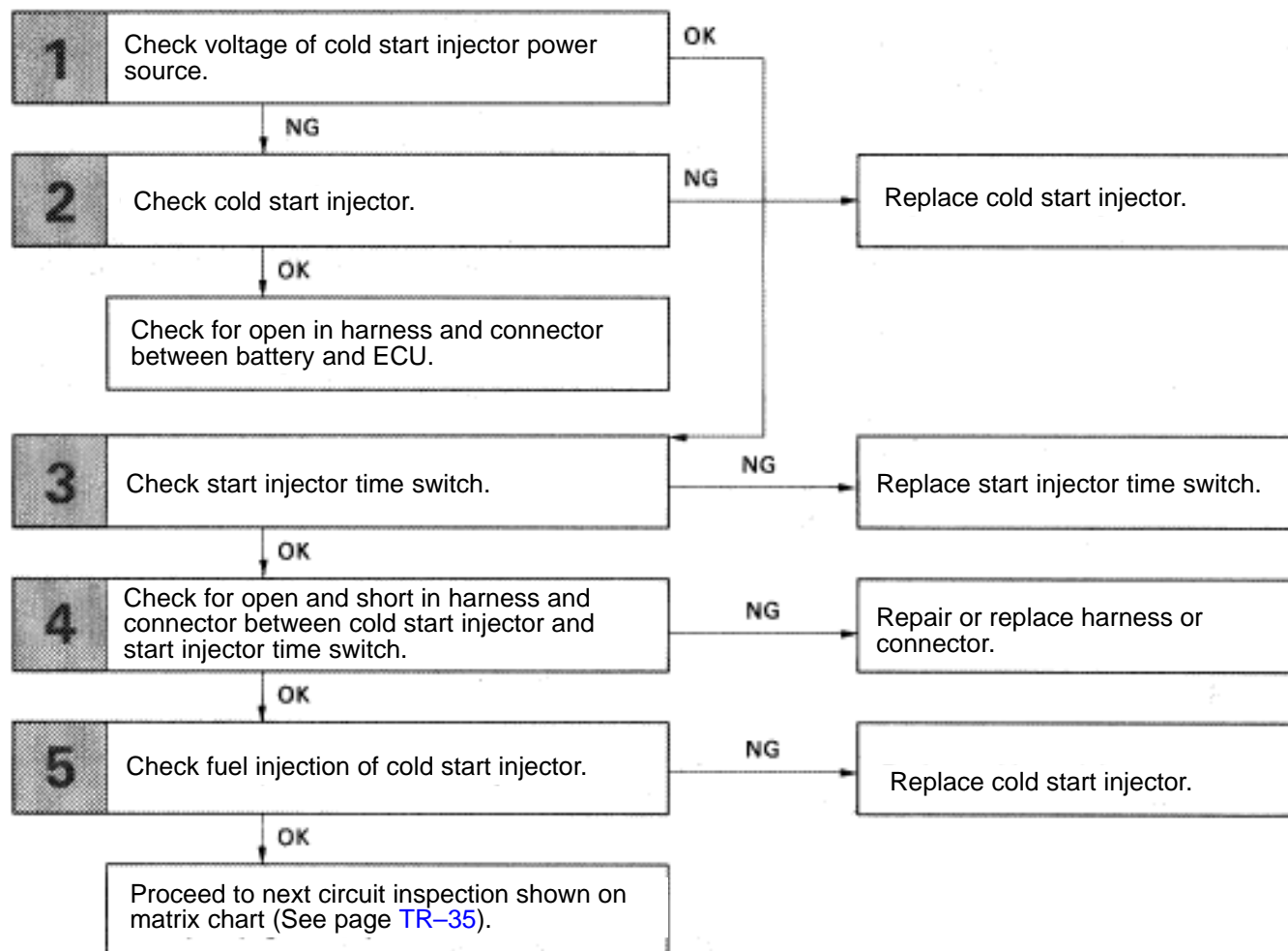
When the engine is started at a coolant temperature of 22°C (72°F) or lower, the cold start injector operation time is controlled by the cold start injector time switch.

When the coolant temperature is in the normal temperature range 22°C (72°F) or higher, the contacts of the cold start injector time switch are open and the time switch is off, instead, the ECU controls the operating time of the cold start injector.

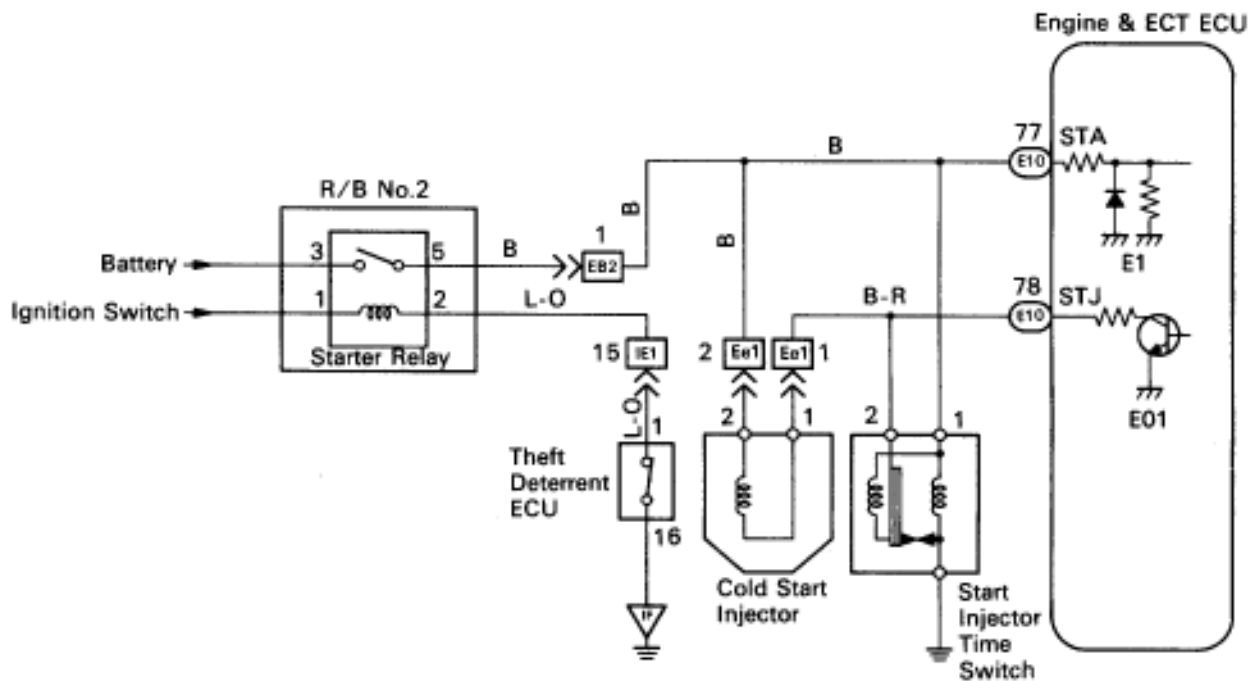
In this way, the CO and HC levels can be reduced while the engine is being started and the engine startability is maintained. Control by the ECU ends when the coolant temperature reaches 60°C (140°F).



## DIAGNOSTIC CHART

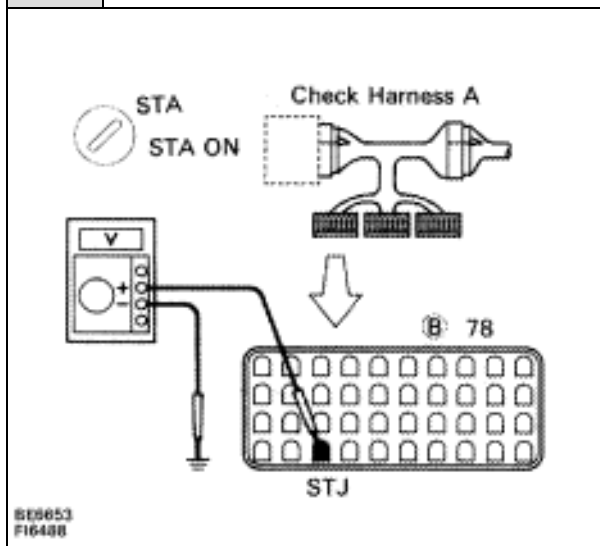


## WIRING DIAGRAM



# INSPECTION PROCEDURE

## 1 Check voltage between terminal STJ of engine & ECT ECU connector and body ground.



**P** Connect to the Check Harness A.

**C** (See page [TR-30](#))

**OK** Disconnect start injector time switch connector.

Disconnect engine & ECT ECU connector.

Measure voltage between terminal STJ of engine & ECT ECU connector and body ground when ignition switch is turned to STA.

10 – 14 V

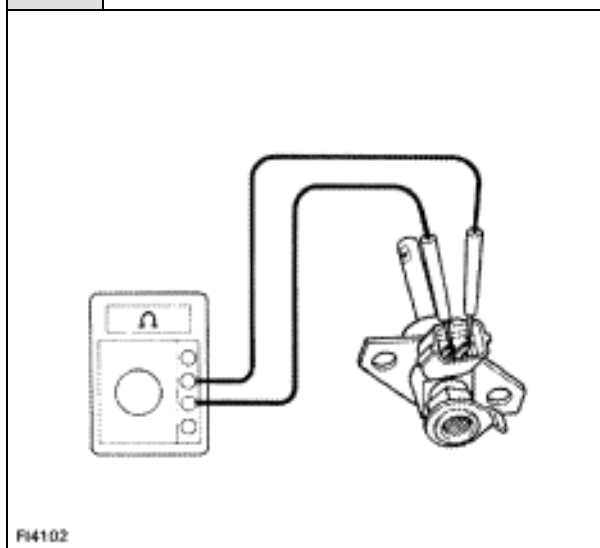
**Hint**

**NG**

**OK**

Go to step 3.

## 2 Check resistance of cold start injector.



**P** Remove cold start injector (See page [FI-27](#)).

**C** Measure resistance between terminals of cold start injector.

**OK**

Resistance: 2 – 4  $\Omega$  at 20°C (68°F)

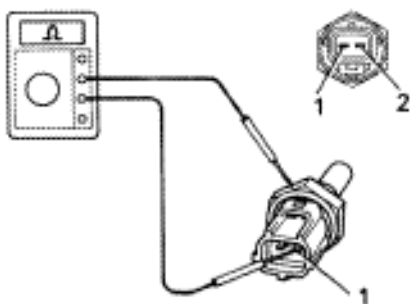
**Hint**

**OK**

**NG**

Replace cold start injector.

Check and repair harness and connector between engine & ECT ECU and cold start injector, cold start injector and battery.

**3 Check start injector time switch.**

FI4175

**P** Remove start injector time switch (See page FI-88).**C** Measure resistance between terminals shown below.**OK**

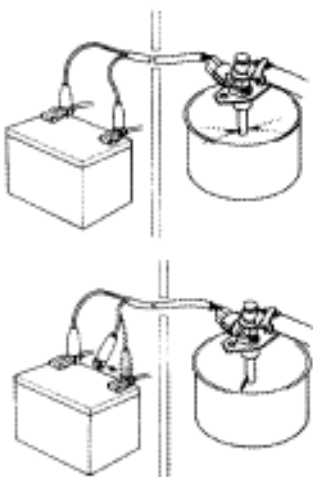
Terminals	Resistance	Coolant temperature
1 - 2	25 - 45 Ω	below 15°C (59°F)
	65 - 85 Ω	above 30°C (86°F)
1-Ground	25 - 85 Ω	—

**OK****NG**

Replace start injector time switch.

**4 Check harness and connector between cold start injector and start injector time switch (See page IN-27).****OK****NG**

Repair or replace harness or connector.

**5 Check fuel injection of cold start injector.**FI4104  
FI4105**P** Remove cold start injector (See page FI-27).**C** (2) Check fuel injection of cold start injector (See page FI-33).

(2) Check fuel leakage of cold start injector (See page FI-34).

**OK**

(2) Fuel is injected normally.

(2) Fuel leakage is less than one drop per minute.

**Notice:**

Perform this check within the shortest possible time.

**OK****NG**

Repair or replace cold start injector.

Proceed to next circuit inspection shown on matrix chart (See page TR-35).