Fault Codes – P0234/34, P0299/34, P1251/34

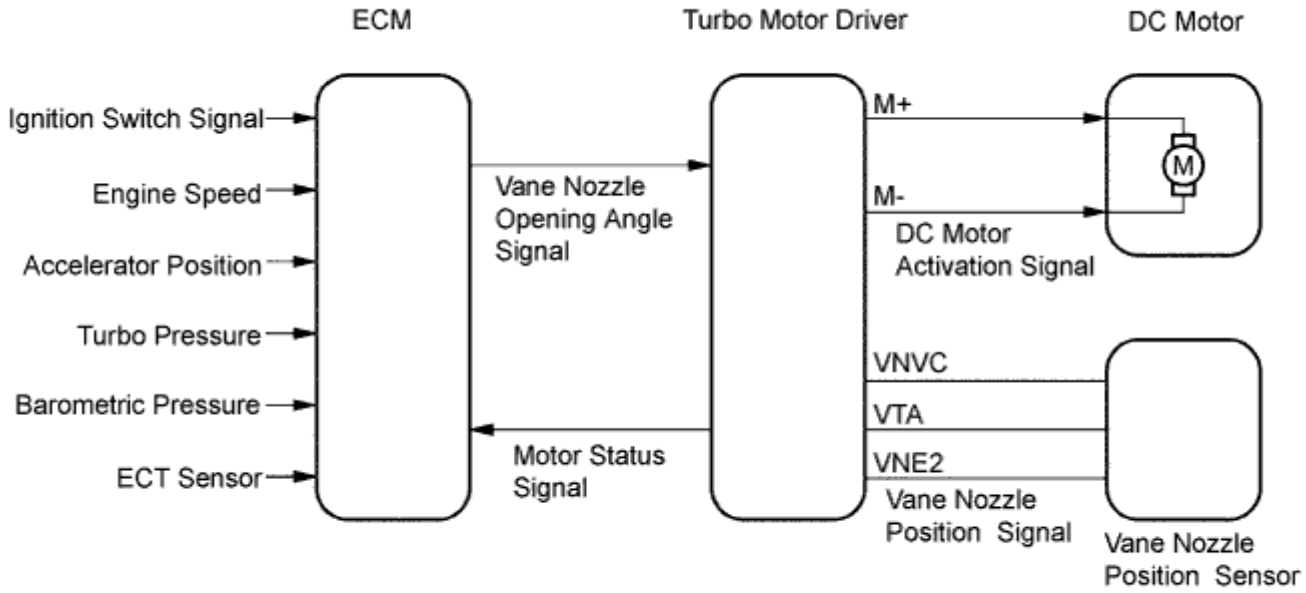
DESCRIPTION

The turbocharger system is comprised of the Variable Nozzle (VN) type turbocharger, the turbo motor drover and ECM.

The turbocharger has nozzle vane which opens and closes to control the volume of the exhaust gas flowing into the turbine. This, in turn, controls the boost pressure, when the nozzle vane moves towards the closing direction, the pressure increases. When the vane moves towards the opening direction, the pressure decreases.

The turbocharger actuator built on the turbine side activates the nozzle vane. The nozzle vane position sensor built on the actuator detects the opening angle of nozzle vane. The nozzle vane position sensor signal is sent via the turbo motor driver to the ECM. Then, based on the signal, the ECM actuates the actuator.

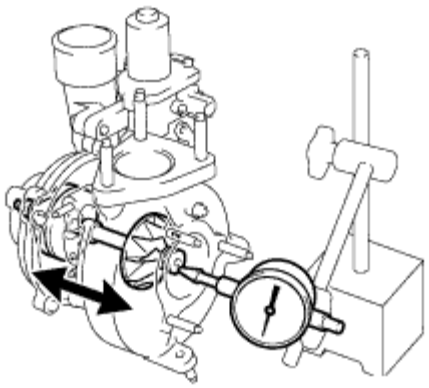
The ECM sends a target nozzle vane position signal to the turbo motor driver to obtain the nozzle vane position for the optimal boost pressure in accordance with the driving conditions.



DTC No.	DTC Detection Condition	Trouble Area
P0234/34	When turbocharger boost pressure continues to be higher than ECM's target boost pressure. (1 trip detection logic)	• Turbocharger sub-assembly • Turbo motor driver • Manifold absolute pressure sensor • MAF meter • EGR valve stuck closed • Exhaust system and intake system are modified or clogged • ECM
P0299/34	When turbocharger boost pressure continues to be lower than ECM's target boost pressure. (1 trip detection logic)	• Turbocharger sub-assembly • Turbo motor driver • Manifold absolute pressure sensor • MAF meter • EGR valve stuck open • Manifold absolute pressure sensor (hose disconnected) • Exhaust system and intake system are modified or clogged • ECM
P1251/34	When turbocharger boost pressure is higher than boost pressure for a short time in which there was possibility of engine damage. (1 trip detection logic)	• Turbocharger sub-assembly • Turbo motor driver • Manifold absolute pressure sensor • MAF meter • EGR valve assembly • Exhaust system and intake system are modified or clogged • ECM

Inspection: - Start with Precautionary tests:

1. INSPECT AXIAL PLAY OF TURBINE SHAFT



P

1. Using a dial indicator, insert the needle of the dial indicator into the exhaust side of the turbine shaft.

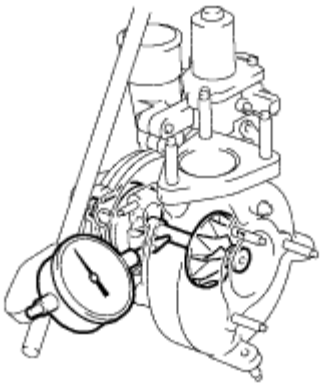
2. Move the turbine shaft in an axial direction and measure the axial play of the turbine shaft.

   Maximum axial play:

   0.11 mm (0.0043 in.)

   If the axial play is greater than the maximum, replace the turbocharger sub-assembly.

2. INSPECT RADIAL PLAY OF TURBINE SHAFT



P

1. Using a dial indicator, insert the needle of the dial indicator into the oil outlet hole, and set it in the center of the turbine shaft.

2. Move the turbine shaft in a radial direction and measure the radial play of the turbine shaft.

   Maximum radial play:

   0.112 mm (0.0044 in.)

   If the radial play is greater than the maximum, replace the turbocharger sub-assembly.

If NOT GOOD > Replace Turbo

If Good, Go to Step 3:

3.CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0234/34, P0299/34 AND /OR P1251/34)

1. Connect the intelligent tester to the DLC3.
2. Turn the ignition switch ON and turn the intelligent tester ON.
3. Enter the following menus: Powertrain / Engine / DTC.
4. Read the DTCs.

Result:

Display (DTC Output)	Proceed to
P0234/34, P0299/34 and/or P1251/34	Go to Step 4
P0234/34, P0299/34 and/or P1251/34 and other DTCs	See other DTCs first

4.READ VALUE USING INTELLIGENT TESTER (MAP)

1. Connect the intelligent tester to the DLC3.
2. Start the engine and warm it up. Turn the intelligent tester ON.
3. Enter the following menu: Powertrain / Engine / Data List / MAP.

Standard:

Item	Engine Speed*	Reference Value
MAP	Ignition switch ON	Same as atmospheric pressure
MAP	Idling	95 to 105 kPa (713 to 788 mmHg, 28.1 to 31 in.Hg)
MAP	3,000 rpm (no engine load)	110 to 135 kPa (825 to 1,012 mm Hg, 32.5 to 39.9 in.Hg)

HINT:

*: If no idling conditions are specified, the A/C switch and all accessory switches should be OFF with a fully warm engine.

If NOT GOOD > Replace

If GOOD > go to Step 5

5.CHECK EXHAUST SYSTEM

1. Turn the ignition switch ON.

2. Check the exhaust pipe for leaks.

   OK:
   Exhaust pipe has no leaks. > IF OK go to Step 6
   IF NOT OK > Fix Leaks

6.CHECK AIR CLEANER FILTER

1. Check that the air cleaner filter is not clogged.

   OK:
   Air cleaner filter is not clogged. > Go to Step 7
   NOT GOOD > Replace

7.CHECK INTAKE SYSTEM

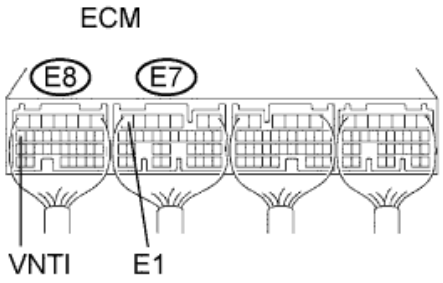
1. Disconnect the air cleaner hose.

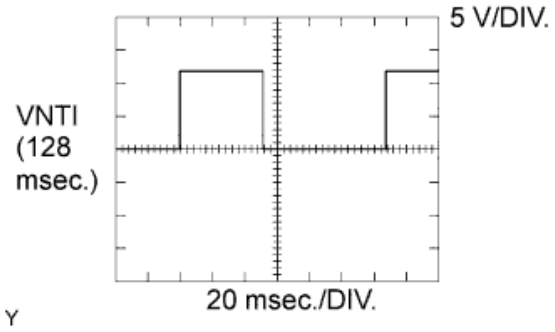
2. Use a mirror to visually check the turbocharger for any mechanical problems.

3. When the engine is cold, check that the impeller of the turbocharger rotates smoothly, and perform a contact check to confirm whether there is any damage on it.

   OK:
   impeller of turbocharger rotates smoothly. > Go to Step 8
   NOT GOOD >Check for obstructions, if none > Replace Turbo

8.CHECK ECM (VNTI VOLTAGE)





1. While idling the engine, check the waveform of the ECM connectors using an oscilloscope.

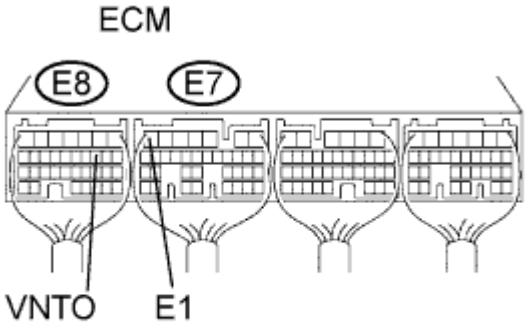
   Standard voltage:

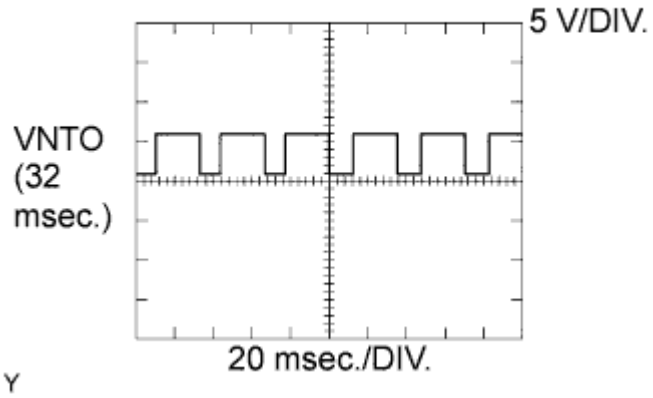
Tester Connection	Specified Condition
E8-17 (VNTI) - E7-7 (E1)	Correct waveform is shown

Tool Setting	Condition
5 V/DIV., 20 msec./DIV.	Idling with warm engine

If NOT GOOD > Replace ECM
If GOOD > Go to Step 9

9.CHECK ECM (VNTO VOLTAGE)





1. While idling the engine, check the waveform of the ECM connectors using an oscilloscope.

   Standard voltage:

Tester Connection	Specified Condition
E8-10 (VNTO) - E7-7 (E1)	Correct waveform is shown

Tool Setting	Condition
5 V/DIV., 20 msec./DIV.	Idling with warm engine

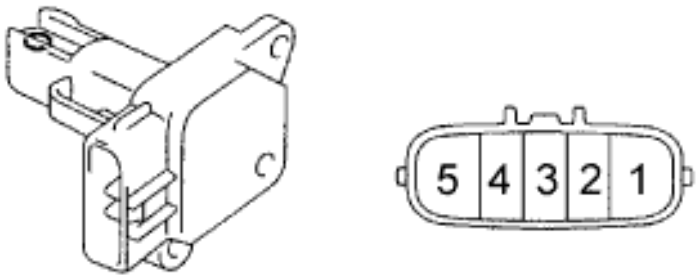
If NOT GOOD > Replace Turbo Motor Driver

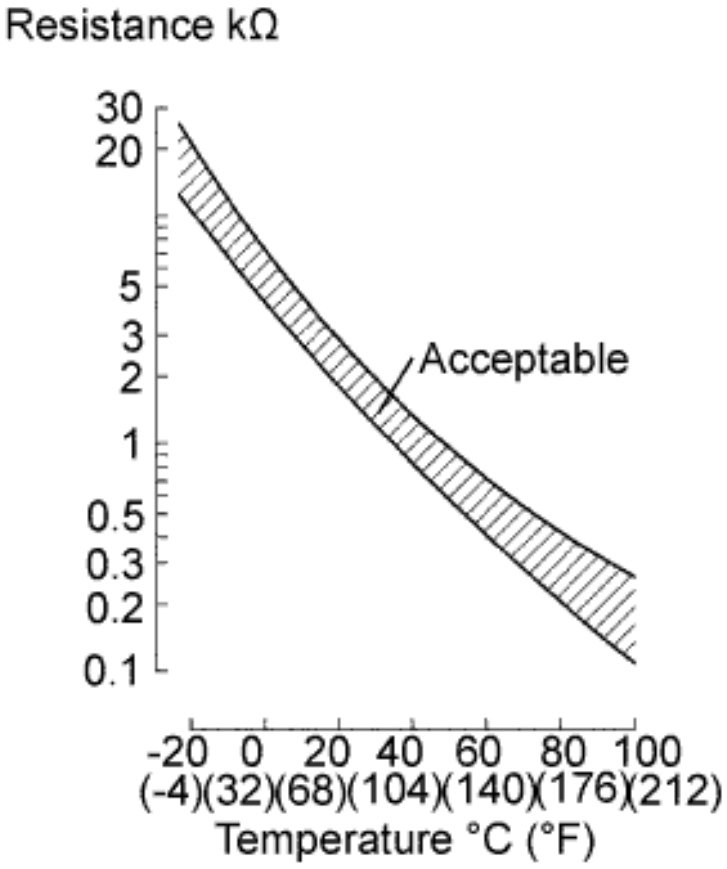
If GOOD > To go step 10

10.CHECK EGR VALVE ASSEMBLY

If NOT GOOD > Replace EGR Valve (or clean if obvious evidence of carbon build up and try that first)
If GOOD > go to step 11

10.INSPECT INTAKE AIR TEMPERATURE SENSOR





1. Check the IAT sensor.
    1. Remove the MAF meter.
    2. Measure the resistance of the sensor.

    Standard resistance:

Tester Connection	Condition	Specified Condition
4 - 5	-20°C (-4°F)	13.6 to 18.4 kΩ
4 - 5	20°C (68°F)	2.21 to 2.69 kΩ
4 - 5	60°C (140°F)	0.49 to 0.67 kΩ

If NOT GOOD > Replace Mass Air Flow Sensor
If GOOD> Replace ECM