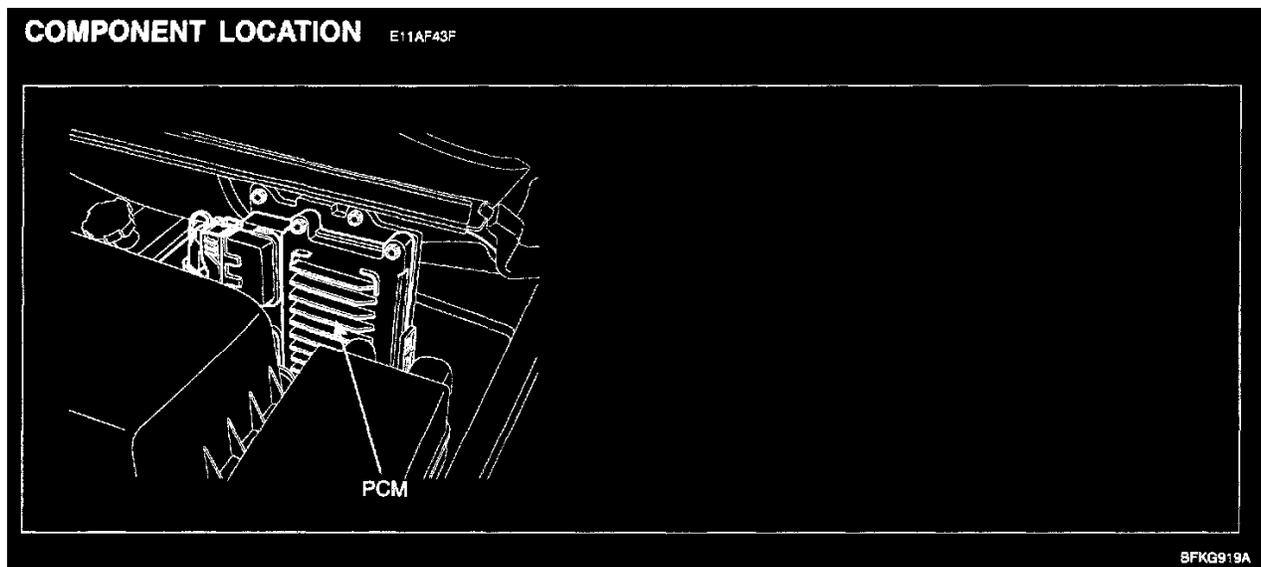


A L L Diagnostic Trouble Codes (DTC): P Code Charts

P161B

DTC P161B ECM/PCM INTERNAL ERROR - TORQUE CALCULATION



Component Location

GENERAL DESCRIPTION

Comparing actual torque and desired torque, PCM diagnoses calculated torque state. Actual torque keeps lower than desired torque, PCM checks if actual torque is higher than desired torque, dividing condition into two state, dynamic and steady states, PCM applies different diagnosis logic. Because the responses due to this code is similar to that of MAF control error, checking MAP at first.

DTC DESCRIPTION

If the difference between actual torque and desired torque is higher than the threshold value, PCM set P161B and MIL (Malfunction Indication Lamp) turns on.

| ITEM | | Detecting Condition | Possible Cause |
|-------------------|--------|--|---|
| DTC Strategy | | <ul style="list-style-type: none"> Determines if Delivered Torque Is Grossly Different from Desired Torque | <ul style="list-style-type: none"> Intake air leakage Faulty ETS System Clogged exhaust system Faulty PCM |
| Enable Conditions | Case 1 | <ul style="list-style-type: none"> Engine Running state Engine Speed > 600rpm Desired Flywheel Torque Within 20Nm > 1sec. | |
| | Case 2 | <ul style="list-style-type: none"> Pedal Position < 0.8% Torque Command Source = Accel pedal. Engine speed > desired target engine speed All injectors enabled | |
| Threshold value | Case 1 | <ul style="list-style-type: none"> Actual net target - desired torque > threshold | |
| | Case 2 | <ul style="list-style-type: none"> Normalized fuel flow > threshold | |
| Diagnosis Time | | <ul style="list-style-type: none"> Continuous | |
| MIL On Condition | | <ul style="list-style-type: none"> 1 Driving Cycle | |

DTC Detecting Condition

| 1.2 CURRENT DATA | | 34779 |
|------------------|------------------------|----------------|
| ✖ | ACTUAL TORQUE | 40.19Nm |
| ✖ | TORQUE CONTROL REQUEST | OFF |
| | ETC THROTTLE POSITION | 4.49 % |
| | CAM BANK1 ACTUAL POS. | 0.00 |
| | CAM BANK1 DESIRE POS. | 0.00 |
| | CAM BANK2 ACTUAL POS. | -0.05 |
| | CAM BANK2 DESIRE POS. | 0.00 |
| | CAMSHAFT CONTROL | ON |
| FIX | SCRN | FULL PART GRPH |
| Torque at Idle | | |

| 1.2 CURRENT DATA | | 33779 |
|---|------------------------|----------------|
| ✖ | ENGINE SPEED | 3018. rpm |
| ✖ | ACTUAL TORQUE | 51.81Nm |
| ✖ | TORQUE CONTROL REQUEST | OFF |
| | ACCEL POS.2 DUTY | 23.53% |
| | ACCEL POS.2 VOLTAGE | 0.59 V |
| | P/STEERING PRESS. | 1.76 psi |
| | CANISTER PURGE CONTROL | 99.6 % |
| | A/C SWITCH | OFF |
| FIX | SCRN | FULL PART GRPH |
| Torque at acceleration (About 3000 rpm) | | |

MONITOR SCANTOOL DATA

1. Connect scantool to DLC (Data Link Connector)
2. Warm-up the engine to normal operating temperature.
3. Monitor "Actual Torque & Torque Request" parameters on scantool
4. Monitor DTC related to "ETS or CAM" on scantool
5. Are there any DTC related to "ETS" or "CAM" on the scantool?

YES - Repair "ETS" or "CAM" system first, then, go to "Terminal and Connector Inspection" procedure.

NO - Go to "Terminal and Connector Inspection" procedure.

TERMINAL AND CONNECTOR INSPECTION

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

YES - Repair as necessary and go to "Verification of Vehicle Repair" procedure.

NO - Go to "System Inspection" procedure.

SYSTEM INSPECTION

1. Check air leakage
 1. Check contamination or installation of Gasket
 - Check throttle body gasket
 - Check gasket between intake manifold and surge tank.
 - Check contamination or clog by foreign material of gasket between intake manifold and injector.
 - Check contamination or open stuck resulting from foreign material between surge tank and PCSV.

2. Is there any air leakage?

YES - Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

NO - Go to "Check exhaust system for clogging".

2. Check exhaust system for clogging

1. Check exhaust system.
 - Clogged or broken muffler
 - Broken catalyst

2. Is the exhaust system clogged?

YES - Go to "Check throttle valve for stuck".

NO - Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

3. Check throttle valve for stuck

1. IG"OFF".
2. Remove air hose between throttle body and airflow sensor.

3. Check if throttle valve is stuck by foreign material.
4. Is the throttle valve normal?

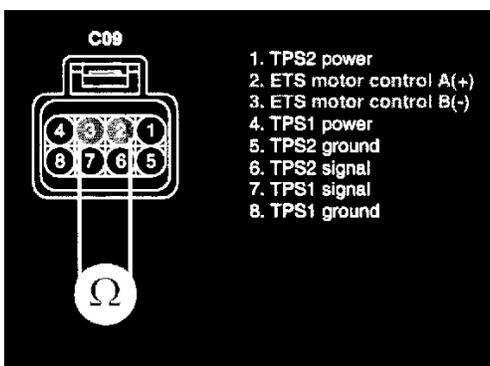
YES - Go to "Component Inspection" procedure.

NO - After getting rid of foreign material, check that throttle valve is normal and check for proper operation. If the problem is corrected, replace ETC and then go to "Verification of Vehicle Repair" procedure.

* PROCEDURE OF ETS INITIALIZATION

1. Erase the trouble codes on PCM
2. Turn the ignition key off and keep this condition until the main relay is turned off. (It will takes **10 sec.**)
3. Turn ignition key on more than **1 second** to record the throttle motor position on the EEPROM

COMPONENT INSPECTION



1. Check resistance of ETS Motor
 1. IG "OFF"
 2. Disconnect ETS motor & TPS connector.
 3. Measure resistance between terminal 2 and 3 of ETS motor & TPS connector. (Component Side)

Specification : Approx. **1.275 - 1.725 Ohms at 23 degrees C (73.4 degrees F)**

4. Is the measured resistance within specifications?

YES - Substitute with a known-good PCM and check for proper operation. If the problem is corrected, replace PCM and then go to "Verification of Vehicle Repair" procedure.

NOTE: There is a memory reset function on scantool that can erase optional parts automatically detected and memorized by PCM. Before or after testing PCM on the vehicle, use this function to reuse the PCM on the others.

NO - Substitute with a known-good ETC and check for proper operation. If the problem is corrected, replace ETC and then go to "Verification of Vehicle Repair" procedure.

* PROCEDURE OF ETS INITIALIZATION

1. Erase the trouble codes on PCM
2. Turn the ignition key off and keep this condition until the main relay is turned off. (It will takes **10 sec.**)
3. Turn ignition key on more than **1 second** to record the throttle motor position on the EEPROM

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Monitor and record the Freeze Frame Data for the Diagnostic Trouble Code (DTC) which has been diagnosed.
2. Using a Scantool, Clear the DTCs.
3. Operate the vehicle within conditions noted in the freeze frame data or enable conditions.
4. Monitor that all readiness test have been verified as "Complete".
5. Are any DTCs present?

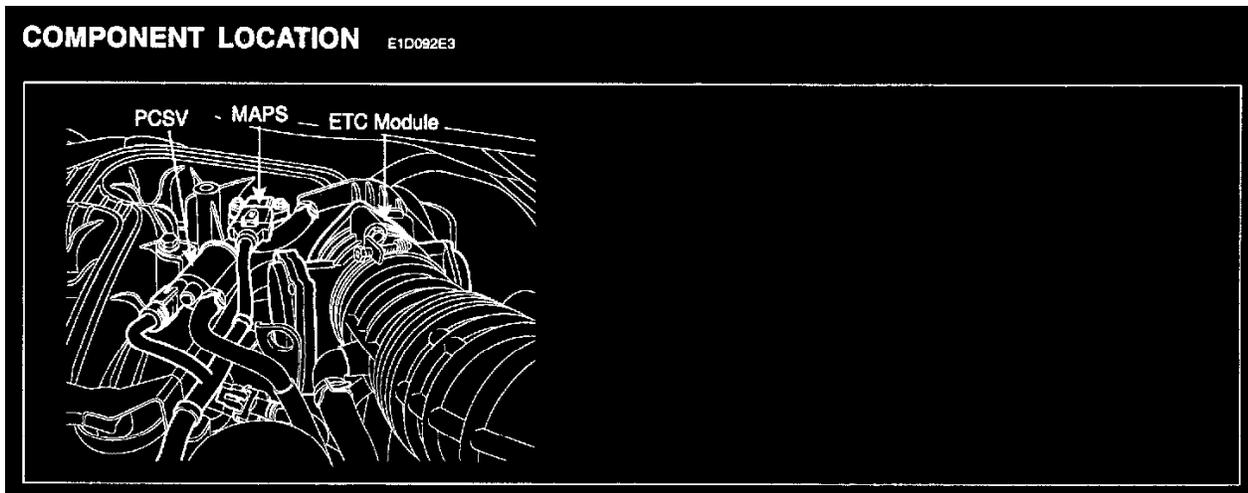
YES - Go to the applicable troubleshooting procedure.

NO - System is performing to specification at this time.

A L L Diagnostic Trouble Codes (DTC): P Code Charts

P2106

DTC P2106 ETC (ELECTRONIC THROTTLE CONTROL) SYSTEM MALFUNCTION - FORCED LIMITED POWER



Component Location

GENERAL DESCRIPTION

ETC (Electronic Throttle Control Valve) is the device controlling amount of air to engine according to driver's intension. Different from the existing mechanical throttle valve which is composed of accelerator pedal and connecting wire cable, ETC consists of a motor, a throttle body and a throttle position sensor. Receiving input signals from electronic accelerator pedal module, PCM lets ETC motor control throttle valve. With ETC, cruise control system works without any additional device.

DTC DESCRIPTION

PCM recognizes vehicle state as forced limited power mode under detecting condition, and sets P2106. MIL (Malfunction Indication Lamp) turns on.

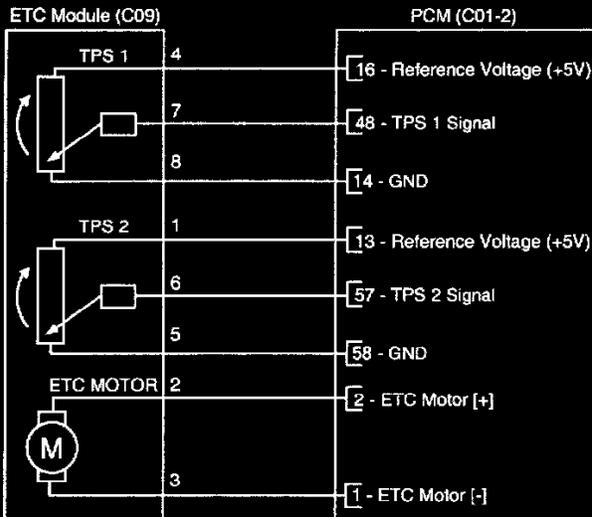
| DTC DETECTING CONDITION E9AEC9AF | | |
|---|--|--|
| Item | Detecting Condition | Possible cause |
| DTC Strategy | • This code detects if the system is in Limit Performance Mode | <ul style="list-style-type: none"> • Faulty APS • Faulty APS+Brake • Faulty APS + Vehicle speed sensor • Faulty APS + Vehicle speed sensor + Brake • Faulty PCM |
| EnableConditions | • Ignition "ON" | |
| Threshold value | • Limit Performance Mode is active | |
| DiagnosisTime | • - | |
| MIL On Condition | • 1 Driving Cycle | |

DTC Detecting Condition

SCHEMATIC DIAGRAM

E6CB9826

[CIRCUIT DIAGRAM]



[CONNECTION INFORMATION]

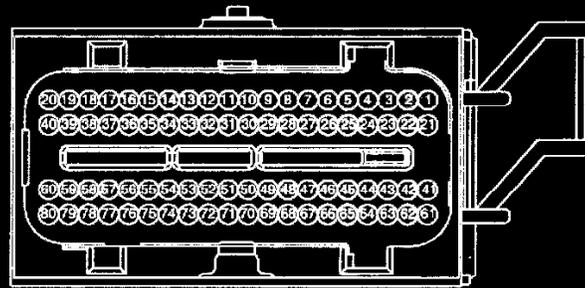
| Terminal | Connected to | Function |
|----------|----------------|-------------------------------|
| 1 | PCM C01-2 (13) | TPS 2 Reference Voltage (+5V) |
| 2 | PCM C01-2 (2) | ETC Motor [+] Control |
| 3 | PCM C01-2 (1) | ETC Motor [-] Control |
| 4 | PCM C01-2 (16) | TPS 1 Reference Voltage (+5V) |
| 5 | PCM C01-2 (58) | TPS 2 Ground |
| 6 | PCM C01-2 (57) | TPS 2 Signal |
| 7 | PCM C01-2 (48) | TPS 1 Signal |
| 8 | PCM C01-2 (14) | TPS 1 Ground |

[HARNESS CONNECTORS]



C09

ETC MODULE



C01-2

PCM

BFGK236A

Schematic Diagram

MONITOR SCANTOOL DATA

1. Connect scantool to DLC (Data Link Connector)
2. IG "ON" & Monitor that any different DTC (Diagnostic Trouble Code) is existed.
(There will be at least one more DTC which causes this DTC P2106 to retrieve)
3. Repair the DTCs cause DTC P2106 first according to the designated trouble shooting guide.
(After repairing the DTCs cause DTC P2106, don't forget to do "ETC Initialization").
4. Is the same DTC occurred?

YES - Substitute with a known-good PCM and check for proper operation. If the problem is corrected, replace PCM and then go to "Verification of Vehicle Repair" procedure.

NOTE: There is a memory reset function on scantool that can erase optional parts automatically detected and memorized by PCM. Before or after testing PCM on the vehicle, use this function to reuse the PCM on the others.

NO - Go to "Verification of Vehicle Repair" procedure.

* Procedure of ETS Initialization

1. Erase the trouble codes on PCM
2. Turn the ignition key off and keep this condition until the main relay is turned off. (It will takes **10 sec.**)
3. Turn ignition key on more than **1 second** to record the throttle motor position on the EEPROM

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Monitor and record the Freeze Frame Data for the Diagnostic Trouble Code (DTC) which has been diagnosed.

2. Using a Scantool, Clear the DTCs.
3. Operate the vehicle within conditions noted in the freeze frame data or enable conditions.
4. Monitor that all readiness test have been verified as "Complete".
5. Are any DTCs present?

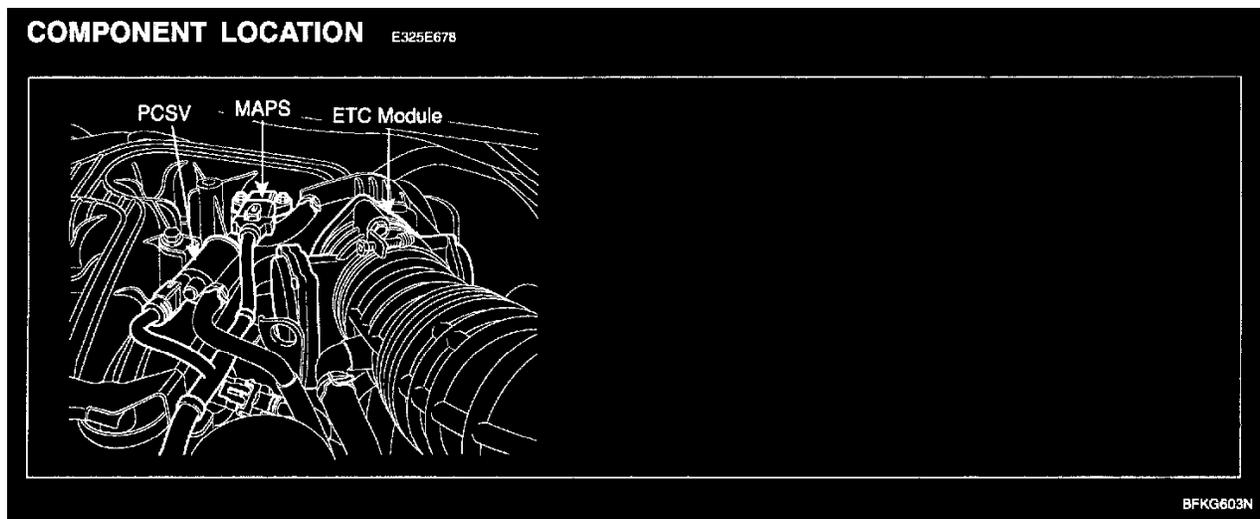
YES - Go to the applicable troubleshooting procedure.

NO - System is performing to specification at this time.

A L L Diagnostic Trouble Codes (DTC): P Code Charts

P1295

DTC P1295 ETC (ELECTRONIC THROTTLE CONTROL) SYSTEM MALFUNCTION - POWER MANAGEMENT



Component Location

GENERAL DESCRIPTION

ETC (Electronic Throttle Control Valve) is the device controlling amount of air to engine according to driver's intension. Different from the existing mechanical throttle valve which is composed of accelerator pedal and connecting wire cable, ETC consists of a motor, a throttle body and a throttle position sensor. Receiving input signals from electronic accelerator pedal module, PCM lets ETC motor control throttle valve. With ETC, cruise control system works without any additional device.

DTC DESCRIPTION

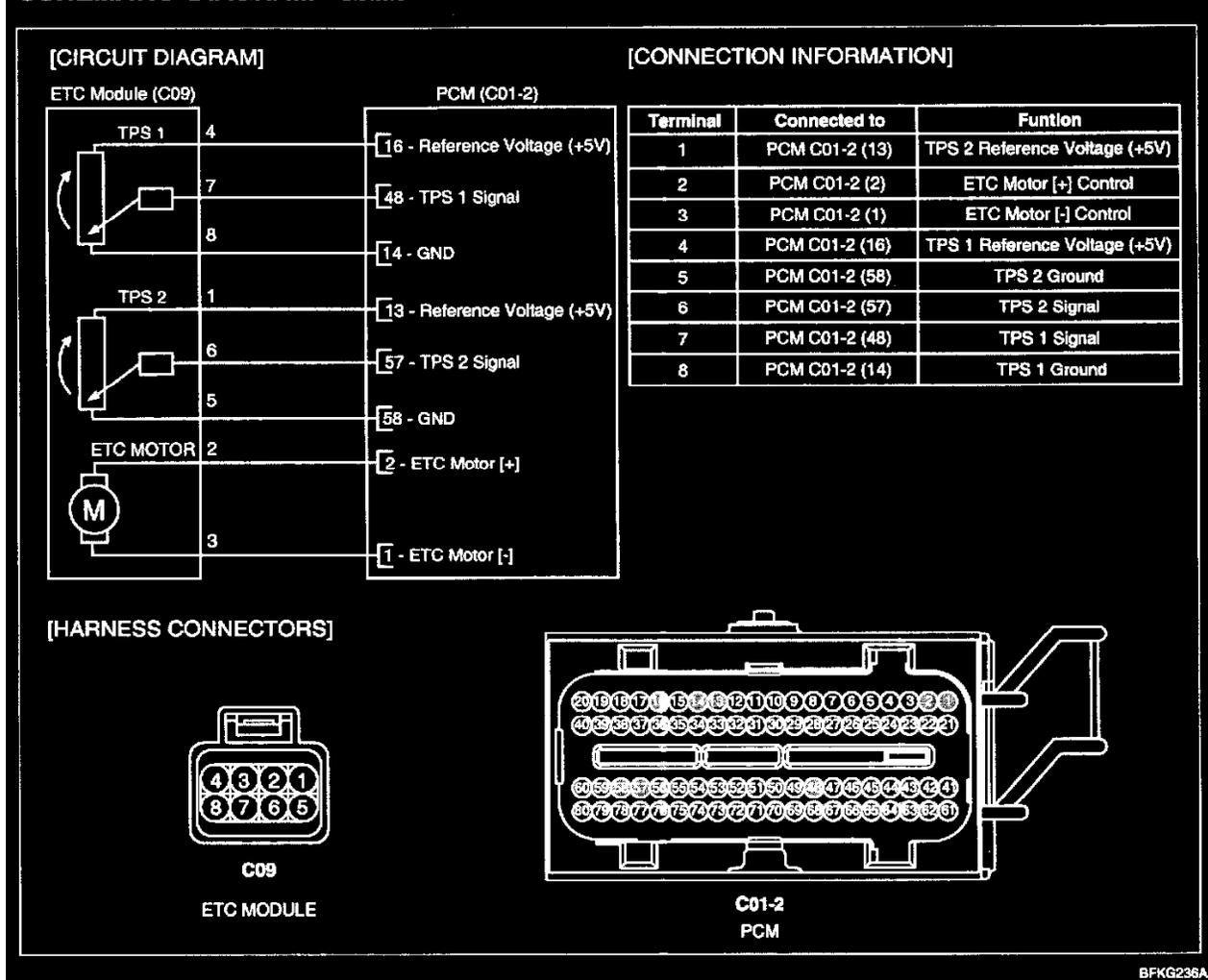
If power management mode is recognized under detecting condition, PCM sets P1295. And MIL (Malfunction Indication Lamp) turns on.

| DTC DETECTING CONDITION E652EBAD | | |
|----------------------------------|---|---|
| Item | Detecting Condition | Possible cause |
| DTC Strategy | <ul style="list-style-type: none"> This code detects if the system is in Power Management Mode | <ul style="list-style-type: none"> TPS Malfunction TPS Malfunction + MAFSMalfunction MAP Malfunction + TPSPMalfunction Faulty PCM |
| EnableConditions | <ul style="list-style-type: none"> Ignition On | |
| Threshold value | <ul style="list-style-type: none"> Power Management Mode is active | |
| DiagnosisTime | <ul style="list-style-type: none"> - | |
| MIL On Condition | <ul style="list-style-type: none"> 1 Driving Cycle | |

DTC Detecting Condition

SCHEMATIC DIAGRAM

E4B49873



BFGK236A

Schematic Diagram**MONITOR SCANTOOL DATA**

1. Connect scantool to DLC (Data Link Connector)
2. IG "ON" & Monitor that any different DTC (Diagnostic Trouble Code) is existed.
(There will be at least one more DTC which causes this DTC P1295 to retrieve)
3. Repair the DTCs cause DTC P1295 first according to the designated trouble shooting guide.
(After repairing the DTCs cause DTC P1295, don't forget to do "ETC Initialization").
4. Is the same DTC occurred?

YES - Substitute with a known-good PCM and check for proper operation. If the problem is corrected, replace PCM and then go to "Verification of Vehicle Repair" procedure.

NOTE: There is a memory reset function on scantool that can erase optional parts automatically detected and memorized by PCM. Before or after testing PCM on the vehicle, use this function to reuse the PCM on the others.

NO - Go to "Verification of Vehicle Repair" procedure.

* Procedure of ETS Initialization

1. Erase the trouble codes on PCM
2. Turn the ignition key off and keep this condition until the main relay is turned off. (It will takes **10 sec.**)
3. Turn ignition key on more than **1 second** to record the throttle motor position on the EEPROM

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Monitor and record the Freeze Frame Data for the Diagnostic Trouble Code (DTC) which has been diagnosed.

2. Using a Scantool, Clear the DTCs.
3. Operate the vehicle within conditions noted in the freeze frame data or enable conditions.
4. Monitor that all readiness test have been verified as "Complete".
5. Are any DTCs present?

YES - Go to the applicable troubleshooting procedure.

NO - System is performing to specification at this time.