DM: Manifold Absolute Pressure (MAP) Sensor

DM: Introduction

DM1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0106, P0107, P0108, P0109, P012B, P012C, P012D, or P012E present?

Yes	No
For vehicles with an EGR system module (ESM), KOEO, KOER DTCs P0107, P0108, P012C, or P012D. GO to DM2. For vehicles without an EGR system module (ESM), any DTC P0106, KOEO, KOER DTCs P0107 or P0108, GO to DM20. For vehicles with an EGR system module (ESM) continuous memory DTCs P0107, P0108, P012C, P012D or KOEO P0109, or P012E. GO to DM14. For vehicles without an EGR system module (ESM) continuous memory DTCs P0107, P0108, or KOEO P0109, GO to DM26. For vehicles with an EGR system module (ESM) DTC P0106, or P012B. GO to DM15.	For all others, GO to Section 4, Diagnostic Trouble Code (DTC) Charts and Descriptions.

DM2 DTCS P0107 AND P0108: MONITOR THE MAP PID

Note: The SCIP_V PID on the Mustang 5.4L 4V is the same as the MAP PID on all other vehicles.

- Ignition ON, engine running.
- Carry out the KOER self-test.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.

Is the voltage between 0.05 - 4.95 V?

Yes	No
VERIFY the PCM is at the latest calibration level. REPROGRAM if necessary. If the PCM is at the latest calibration level, the concern is not present at this time.	GO to DM3.

DM3 VERIFY HARNESS AND CONNECTOR INTEGRITY

- Ignition OFF.
- ESM connector disconnected.
- Carry out a thorough visual inspection of the connector, pins and wires attaching to the pins.

Are there any concerns with the wiring or the ESM connection?

Yes	No
REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DM4 .

DM4 MONITOR THE MAP PID

- ESM connector connected.
- Ignition ON, engine OFF.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.

Is the voltage between 0.05 - 4.95 V?

Yes	No
The concern is not present at this time. CLEAR the DTCs. REPEAT the self-test.	GO to DM5 .

DM5 DETERMINE THE PRESENT MAP PID VOLTAGE

- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.

Is the voltage less than 0.05 V?

Yes	No
GO to DM6 .	GO to DM9 .

DM6 KOEO AND KOER DTC P0107: CHECK THE VOLTAGE BETWEEN THE VREF AND SIGRTN CIRCUITS AT THE ESM HARNESS CONNECTOR

- ESM connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) ESM Connector, Harness Side	(-) ESM Connector, Harness Side
VREF - Pin 2	SIGRTN - Pin 6

Is the voltage between 4 - 5.5 V?

Yes	No
GO to DM7 .	GO to Pinpoint Test C .

DM7 CHECK THE MAP CIRCUIT FOR A SHORT TO SIGRTN AND GND IN THE HARNESS

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) ESM Connector, Harness Side	(-)
MAP - Pin 3	Ground

- Measure the resistance between:

(+) ESM Connector, Harness Side	(-) ESM Connector, Harness Side
MAP - Pin 3	SIGRTN - Pin 6

Is the resistance greater than 10K ohms?

Yes	No
GO to DM8 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DM8 INDUCE THE OPPOSITE MAP SENSOR VOLTAGE TO SIMULATE A HIGH CONDITION

- PCM connector connected.
- Connect a 5 amp fused jumper wire between the following:

Point A ESM Connector, Harness Side	Point B ESM Connector, Harness Side
MAP - Pin 3	VREF - Pin 2

- Ignition ON, engine OFF.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.

Is the voltage greater than 4.6 V?

Yes	No
INSTALL a new ESM. REFER to the Workshop Manual Section 303-08, Engine Emission Control. CLEAR the DTCs. REPEAT the self-test.	GO to DM27 .

DM9 KOEO AND KOER DTC P0108: CHECK THE VOLTAGE BETWEEN THE VREF AND SIGRTN CIRCUITS AT THE ESM HARNESS CONNECTOR

- ESM connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) ESM Connector, Harness Side	(-) ESM Connector, Harness Side
VREF - Pin 2	SIGRTN - Pin 6

Is the voltage between 4 - 5.5 V?

Yes	No
GO to DM10 .	GO to Pinpoint Test C .

DM10 CHECK THE MAP AND SIGRTN CIRCUIT(S) FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) ESM Connector, Harness Side
MAP	MAP - Pin 3
SIGRTN	SIGRTN - Pin 6

Are the resistances less than 5 ohms?

Yes	No
GO to DM11 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DM11 CHECK THE MAP CIRCUIT FOR A SHORT TO VREF IN THE HARNESS

- Measure the resistance between:

(+) ESM Connector, Harness Side	(-) ESM Connector, Harness Side
MAP - Pin 3	VREF - Pin 2

Is the resistance greater than 10K ohms?

Yes	No
GO to DM12 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DM12 CHECK THE MAP CIRCUIT FOR A SHORT TO VPWR IN THE HARNESS

- Measure the resistance between:

(+) ESM Connector, Harness Side	(-) ESM Connector, Harness Side
MAP - Pin 3	VPWR - Pin 4

Is the resistance greater than 10K ohms?

Yes	No
GO to DM13 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DM13 INDUCE THE OPPOSITE MAP SENSOR VOLTAGE TO SIMULATE A LOW CONDITION

- PCM connector connected.
- Connect a 5 amp fused jumper wire between the following:

Point A ESM Connector, Harness Side	Point B ESM Connector, Harness Side
MAP - Pin 3	SIGRTN - Pin 6

- Ignition ON, engine OFF.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.

Is the voltage less than 0.1 V?

Yes	No
INSTALL a new ESM. REFER to the Workshop Manual Section 303-08, Engine Emission Control. CLEAR the DTCs. REPEAT the self-test.	GO to DM27 .

DM14 DTCS P0107, P0108 AND P0109: CHECK THE MAP CIRCUIT(S) FOR INTERMITTENT CONCERNS

- Ignition ON, engine OFF.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.
- Carry out a thorough wiggle test on the ESM harness.
- Lightly tap on the ESM and wiggle the harness connector to simulate road shock.

Does a sudden change in voltage occur while monitoring the PID?

Yes	No
ISOLATE the concern. REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z .

DM15 DTC P0106: MAP RANGE/PERFORMANCE

Note: If DTC(s) P0107, P0108 or P0109 are present, diagnose those DTC(s) first. If any mass air flow (MAF) sensor related DTCs are present, diagnose those DTCs prior to diagnosing DTC P0106. Disregard any DTC(s) generated as a result of this test.

- Ignition OFF.

- ESM connector disconnected.
- Connect a 5 amp fused jumper wire between the following:

Point A ESM Connector, Harness Side	Point B ESM Connector, Component Side
VREF - Pin 2	VREF - Pin 2
SIGRTN - Pin 6	SIGRTN - Pin 6

- Ignition ON, engine running.
- Measure the voltage between:

(+) ESM Connector, Component Side	(-) Vehicle Battery
MAP - Pin 3	Negative terminal

Is the voltage between 1 - 2 V?

Yes	No
GO to DM19 .	GO to DM16 .

DM16 CHECK THE MAP CIRCUIT FOR AN OPEN IN THE ESM HARNESS

- Ignition OFF.
- Remove the jumper wires.
- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) ESM Connector, Harness Side
MAP	MAP - Pin 3

Is the resistance less than 5 ohms?

Yes	No
GO to DM17 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DM17 CHECK THE MAP CIRCUIT FOR A SHORT IN THE ESM HARNESS

- Measure the resistance between:

(+) ESM Connector, Harness Side	(-) ESM Connector, Harness Side
MAP - Pin 3	SIGRTN - Pin 6
MAP - Pin 3	VREF - Pin 2
MAP - Pin 3	VPWR - Pin 4

Are the resistances greater than 10K ohms?

Yes	No
GO to DM18 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DM18 KOEO AND KOER MAP VOLTAGE

Note: The PID should change by at least 1.5 volts from ignition on engine off to ignition on engine running.

- Ignition OFF.
- ESM connector connected.
- PCM connector connected.
- Ignition ON, engine OFF.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.
- Record the KOEO MAP voltage.
- Ignition ON, engine running.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.
- Record the KOER MAP voltage.

Does the PID value change?

Yes	No
GO to DM19 .	CHECK the MAP hose for freezing or obstructions. If OK, INSTALL a new ESM. Refer to Workshop Manual Section 303-08 Engine Emission Control. CLEAR the DTCs. REPEAT the self-test.

DM19 COMPARE ACTUAL MAP VOLTAGE TO MAP PID VOLTAGE

- Ignition OFF.
- ESM connector disconnected.
- Connect a 5 amp fused jumper wire between the following:

Point A ESM Connector, Harness Side	Point B ESM Connector, Component Side
VREF - Pin 2	VREF - Pin 2
SIGRTN - Pin 6	SIGRTN - Pin 6
MAP - Pin 3	MAP - Pin 3

- Measure the voltage between:

(+) ESM Connector, Harness Side	(-)
MAP - Pin 3	Ground

- Record the actual MAP voltage values at ignition on engine off, idle, 1,000 and 2,000 RPM.
- For Mustang with 5.4L 4V engine,
- Access the PCM and monitor the SCIP_V PID.
- For all others,
- Access the PCM and monitor the MAP PID.
- Record the MAP PID voltage values at ignition on engine off, idle, 1,000 and 2,000 RPM.

Does the PID voltage stay within 0.5 volt of the actual voltage?

Yes	No
The concern is not present at this time. CLEAR the DTCs. REPEAT the self-test.	CARRY OUT a visual inspection. CHECK for loose connections, and damaged or corroded pins. WIGGLE the harness, attempting to RECREATE the concern. CLEAR the DTCs. REPEAT the self-test.

DM20 KOEO AND KOER DTCS P0106, P0107 AND P0108: CHECK THE VOLTAGE BETWEEN VREF AND SIGRTN AT THE MAP SENSOR

- MAP Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) MAP Sensor Connector, Harness Side	(-) MAP Sensor Connector, Harness Side
VREF	SIGRTN

Is the voltage between 4.5 - 5.5 V?

Yes	No
GO to DM22 .	GO to DM21 .

DM21 CHECK FOR VREF VOLTAGE AT THE SENSOR

- Measure the voltage between:

(+) MAP Sensor Connector, Harness Side	(-) Vehicle Battery
VREF	Negative terminal

Is the voltage between 4.5 - 5.5 V?

Yes	No
REPAIR the open SIGRTN circuit. CLEAR the DTCs. REPEAT the self-test.	GO to Pinpoint Test C .

DM22 CHECK MAP SIGNAL VOLTAGE AT THE SENSOR

- Measure the voltage between:

(+) MAP Sensor Connector, Harness Side	(-) MAP Sensor Connector, Harness Side
MAP	SIGRTN

Is the voltage between 4.5 - 5.5 V?

Yes	No
GO to DM24 .	GO to DM23 .

DM23 CHECK THE MAP CIRCUIT(S) FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) MAP Sensor Connector, Harness Side	(-) PCM Connector, Harness Side
MAP	MAP

Is the resistance less than 5 ohms?

Yes	No
GO to DM24 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DM24 CHECK THE MAP CIRCUIT FOR A SHORT TO VOLTAGE OR SIGRTN IN THE HARNESS

- Ignition OFF.
- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) PCM Connector, Harness Side
MAP	VREF
MAP	SIGRTN
MAP	VPWR

Are the resistances greater than 10K ohms?

Yes	No
GO to DM25 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DM25 INDUCE THE OPPOSITE SIGNAL

- PCM connector connected.
- Connect a 5 amp fused jumper wire between the following:

Point A MAP Sensor Connector, Harness Side	Point B MAP Sensor Connector, Harness Side
MAP	SIGRTN

- Access the PCM and monitor the MAP PID.

Is the voltage less than 0.1 V?

Yes	No
INSTALL a new MAP sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. CLEAR the DTCs. REPEAT the self-test.	GO to DM27 .

DM26 DTCS P0107, P0108 OR P0109: CHECK THE MAP CIRCUIT(S) FOR INTERMITTENT CONCERNS

- Ignition ON, engine OFF.
- Access the PCM and monitor the MAP PID.
- Carry out a thorough wiggle test on the MAP harness.
- Lightly tap on the MAP and wiggle the harness connector to simulate road shock.

Does a sudden change in voltage occur while monitoring the PID?

Yes	No
GO to DM20 .	Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z .

DM27 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
  - pushed out pins
  - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test and verify the concern is still present.

Is the concern still present?

Yes	No
INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) , Programming the VID Block for a Replacement PCM.	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.