

DC: Mass Air Flow (MAF) Sensor

← [DC: Introduction](#)

DC1 CHECK FOR DIAGNOSTIC TROUBLE CODES (DTCS)

Are DTCs P0102, P0103, P0104, P1100, or P1101 present?

Yes	No
For KOER and continuous memory DTC P0102, GO to DC5 . For DTC P0103, GO to DC21 . For KOER and continuous memory DTC P0104, GO to DC19 . For KOEO DTC P1101, GO to DC7 . For KOER and continuous memory DTC P1101, GO to DC2 . For continuous memory DTC P1100, GO to DC19 .	For all other symptoms without DTCs, GO to DC27 .

DC2 DTC P1101: CHECK FOR MAF SENSOR CONTINUOUS MEMORY DTCS

- Retrieve continuous memory DTCs.

Is a continuous memory MAF DTC present with the KOER DTC P1101?

Yes	No
GO to DC3 .	GO to DC5 .

DC3 VERIFY CONTINUOUS MEMORY DTC P0102

Is a continuous memory DTC P0102 present with the KOER DTC P1101?

Yes	No
GO to DC5 .	GO to DC4 .

DC4 VERIFY CONTINUOUS MEMORY DTC P0103

Is a continuous memory DTC P0103 present with the KOER DTC P1101?

Yes	No
GO to DC21 .	All other continuous memory DTCs: DISREGARD the current diagnostic trouble code (DTC) at this time. DIAGNOSE the next DTC. GO

to Section 4, [Diagnostic Trouble Code \(DTC\) Charts and Descriptions](#).

DC5 KOER AND CONTINUOUS MEMORY DTCS P0102, P0104 OR P1101: CHECK THE INTAKE AIR SYSTEM FOR LEAKS, OBSTRUCTIONS, AND DAMAGE

- Ignition OFF.
- Check the intake air system (air cleaner, housing, ductwork) for obstructions or blockage.
- Check for broken/loose air outlet tube clamps (throttle body and air cleaner assembly ends), cracks/holes in the air outlet tube, and worn gaskets between the MAF sensor and the air cleaner assembly. Check the throttle body bore for sludge. Verify the MAF sensor is connected. Repair as necessary.

Are there any concerns found during the visual inspection?

Yes	No
REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DC6 .

DC6 CHECK THE MAF PID

- Access the PCM and monitor the RPM PID.
- Run the engine up to 1,500 RPM for 5 seconds, then bring it back to idle.
- Access the PCM and monitor the MAF PID.

Is the voltage less than 0.23 V?

Yes	No
GO to DC9 .	GO to DC7 .

DC7 CHECK THE MAF SIGNAL SENT TO THE PCM

Note: DTC P1101 can be generated by a low charged vehicle battery or the garage exhaust ventilation system. Charge the battery as necessary, then remove the ventilation system and properly vent to the outside atmosphere. Check the intake air system (air cleaner, housing, ductwork) for obstructions or blockage. Repeat the KOEO self-test.

- Ignition OFF.
- MAF/IAT Sensor connector connected.
- Ignition ON, engine OFF.
- Access the PCM and monitor the MAF PID.

Is the voltage less than 0.2 V?

Yes	No
GO to DC8 .	GO to DC9 .

DC8 CHECK THE MAF SIGNAL SENT TO THE PCM

- Ignition ON, engine running.
- Access the PCM and monitor the MAF PID.

Is the voltage between 0.46 - 2.44 V?

Yes	No
Unable to identify the concern at this time. GO to Pinpoint Test Z .	GO to DC9 .

DC9 CHECK THE VPWR TO THE MAF SENSOR

- Ignition OFF.
- MAF/IAT Sensor connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) Vehicle Battery
VPWR - Pin 6	Negative terminal

Is the voltage greater than 10 V?

Yes	No
GO to DC10 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DC10 CHECK THE PWRGND CIRCUIT TO THE MAF SENSOR

- Measure the voltage between:

(+) Vehicle Battery	(-) MAF/IAT Sensor Connector, Harness Side
Positive terminal	PWRGND - Pin 5

Is the voltage greater than 10 V?

Yes	No
GO to DC11 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DC11 CHECK FOR SHORTS BETWEEN THE CIRCUITS IN THE MAF HARNESS

- Ignition OFF.
- MAF/IAT Sensor connector disconnected.
- PCM connector disconnected.
- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
MAF - Pin 3	PWRGND - Pin 5
MAF - Pin 3	MAF RTN - Pin 4
MAF - Pin 3	SIGRTN - Pin 2
MAF - Pin 3	IAT - Pin 1

Are the resistances greater than 10K ohms?

Yes	No
GO to DC12 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

DC12 CHECK THE MAF RTN CIRCUIT FOR AN OPEN IN THE HARNESS

- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
MAF RTN	MAF RTN - Pin 4

Is the resistance less than 5 ohms?

Yes	No
GO to DC13 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DC13 CHECK THE MAF RTN CIRCUIT FOR A SHORT TO PWRGND IN THE HARNESS

- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
MAF RTN - Pin 4	PWRGND - Pin 5

Is the resistance greater than 10K ohms?

Yes	No
GO to DC14 .	REPAIR the short circuit to GND. CLEAR the DTCs. REPEAT the self-test.

DC14 CHECK THE MAF CIRCUIT FOR A SHORT TO PWRGND IN THE PCM

- PCM connector connected.
- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
MAF - Pin 3	PWRGND - Pin 5

Is the resistance greater than 10K ohms?

Yes	No
GO to DC15 .	GO to DC31 .

DC15 CHECK THE MAF CIRCUIT VOLTAGE CYCLING INTEGRITY

- Ignition ON, engine OFF.
- Access the PCM and monitor the MAF PID.
- Connect a 5 amp fused jumper wire between the following:

Point A MAF/IAT Sensor Connector, Harness Side	Point B MAF/IAT Sensor Connector, Harness Side
MAF RTN - Pin 4	PWRGND - Pin 5
MAF - Pin 3	VPWR - Pin 6

- Record the PID reading while both jumpers are installed.
- Remove the VPWR jumper while observing the MAF PID.

Does the MAF PID change from greater than 4.50 volts to less than 0.20 volt when the VPWR jumper is removed?

Yes	No
INSTALL a new MAF/IAT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) .	GO to DC16 .

DC16 CHECK THE MAF CIRCUIT FOR AN OPEN IN THE HARNESS

- Ignition OFF.
- Remove the jumper wire(s).
- PCM connector disconnected.
- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
MAF	MAF - Pin 3

Is the resistance less than 5 ohms?

Yes	No
GO to DC17 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DC17 CHECK THE PWRGND CIRCUIT FOR AN OPEN IN THE HARNESS

- PCM connector disconnected.
- Measure the resistance between:

(+) MAF/IAT Sensor Connector, Harness Side	(-) Vehicle Battery
PWRGND - Pin 5	Negative terminal

Is the resistance less than 5 ohms?

Yes	No
GO to DC18 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DC18 CHECK THE MAF RTN CIRCUIT FOR AN OPEN IN THE HARNESS

- Measure the resistance between:

(+) PCM Connector, Harness Side	(-) MAF/IAT Sensor Connector, Harness Side
MAF RTN	MAF RTN - Pin 4

Is the resistance less than 5 ohms?

Yes	No
GO to DC31 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

DC19 DTC P1100: CHECK THE MAF CIRCUIT FOR INTERMITTENT VOLTAGE TO THE PCM

- Check for broken/loose air outlet tube clamps (throttle body and air cleaner assembly ends), cracks/holes in the air outlet tube, and worn gaskets between the MAF sensor and the air cleaner assembly. Verify the MAF sensor is connected.
- Ignition ON, engine running.
- Access the PCM and monitor the MAF PID.
- If idle is not stable, refer to Section 3, [No Diagnostic Trouble Codes \(DTCs\) Present Symptom Chart Index](#).
- Run the engine up to 1,500 RPM for 5 seconds, then bring it back to idle. Run the engine up to 1,500 RPM for 5 seconds, then bring it back to idle.
- Access the PCM and monitor the MAF PID.
- Lightly tap on the MAF sensor and wiggle the harness connector to simulate road shock.

Does the MAF PID go below 0.23 volt or above 4.6 volts?

Yes	No
INSPECT the MAF/IAT sensor connector. If OK, INSTALL a new MAF/IAT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) .	GO to DC20 .

DC20 CHECK THE MAF CIRCUIT FOR AN INTERMITTENT OPEN OR SHORTS

- Ignition ON, engine running.
- Access the PCM and monitor the MAF PID.
- Wiggle, shake, and bend small sections of the wiring harness while working from the sensor to the PCM.

Does the MAF PID go below 0.23 volt or above 4.6 volts?

Yes	No
REPAIR as necessary. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) .	Unable to duplicate or identify the concern at this time. CLEAR the DTCs. REPEAT the self-test.

DC21 DTC P0103: CHECK THE MAF SENSOR FOR CONTAMINATION

Note: DTC P0103 can be generated by foreign material blocking the MAF sensor screen, causing an air flow restriction.

- Check the MAF sensor screen for contamination or blockage.
- Check the air cleaner element and air tubes for proper installation and sealing.

Are any concerns present?

Yes	No
REPAIR as necessary. CLEAR the DTCs. REPEAT the self-test.	GO to DC22 .

DC22 DTC P0103: CHECK THE MAF SENSOR SIGNAL HIGH INPUT TO THE PCM

- Ignition ON, engine OFF.
- Access the PCM and monitor the MAF PID.

Is the voltage greater than 2.44 V?

Yes	No
GO to DC23 .	GO to DC25 .

DC23 CHECK THE MAF SENSOR SIGNAL SENT TO THE PCM

- Ignition OFF.
- MAF/IAT Sensor connector disconnected.
- Connect a 5 amp fused jumper wire between the following:

Point A MAF/IAT Sensor Connector, Harness Side	Point B MAF/IAT Sensor Connector, Harness Side
MAF RTN - Pin 4	PWRGND - Pin 5

- Ignition ON, engine OFF.
- Access the PCM and monitor the MAF PID.

Is the voltage less than 0.1 V?

Yes	No
CHECK the MAF/IAT sensor electrical connector for damage, corrosion, and water ingress. If OK, INSTALL a new MAF/IAT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) .	GO to DC24 .

DC24 CHECK THE MAF CIRCUIT FOR A SHORT TO VOLTAGE

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

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

MAF	Ground
-----	--------

Is the voltage less than 1 V?

Yes	No
GO to DC26 .	REPAIR the short circuit to PWR. CLEAR the DTCs. REPEAT the self-test.

DC25 CHECK THE MAF SIGNAL SENT TO THE PCM

- Ignition ON, engine running.
- Access the PCM and monitor the RPM PID.
- Monitor the MAF signal voltage while increasing the engine RPM from idle to approximately 2,500 RPM, and then back to idle.
- Access the PCM and monitor the MAF PID.

Is the voltage between 0.23 - 4.6 V?

Yes	No
This is an intermittent concern. GO to Pinpoint Test Z .	GO to DC23 .

DC26 VERIFY THE IDLE CONCERN

- PCM connector connected.
- MAF/IAT Sensor connector connected.
- Ignition ON, engine running.

Is an idle concern present?

Yes	No
DISREGARD DTC P0103 at this time. The concern is elsewhere. RETURN to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index to DIAGNOSE unique idle concerns.	GO to DC31 .

DC27 SYMPTOMS WITHOUT DTCS: CHECK THE CONDITIONS RELATED TO THE MAF SENSOR

- Check the intake air system (air cleaner, housing, ductwork) for obstructions or blockage.
- Check for broken/loose air outlet tube clamps (throttle body and air cleaner assembly ends), cracks/holes in the air outlet tube, and worn gaskets between the MAF sensor and the air cleaner assembly. Verify the MAF sensor is connected.

Is a concern present?

Yes	No
REPAIR as necessary. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) .	GO to DC28 .

DC28 DTCS P0171, P0172, P0174, P0175, P2195, P2196, P2197 OR P2198: CHECK THE FUNCTIONALITY OF THE MAF SENSOR

Note: A MAF PID value of less than 0.35 volt may indicate an incorrectly installed air cleaner or a leak in the air inlet system.

- Ignition ON, engine running.
- Allow the engine to stabilize at the correct operating temperature.
- Access the PCM and monitor the MAF PID.

Is the MAF PID at idle and Neutral between 0.35 volt and 1.3 volts?

Yes	No
GO to DC30 .	GO to DC29 .

DC29 CHECK TO ISOLATE THE MAF SENSOR FROM A LEAN DRIVEABILITY OCCURRENCE

Note: Due to increasingly stringent emission/OBD requirements, a fuel system DTC on some vehicles can be generated without a noticeable driveability concern with or without the MAF sensor disconnected. Under these conditions, if the MAF PID indicates a MAF sensor concern, install a new MAF sensor. Refer to the Workshop Manual Section 303-14, Electronic Engine Controls.

- Ignition OFF.
- MAF/IAT Sensor connector disconnected.
- Ignition ON, engine running.
- Drive the vehicle on the road.

Is the lean driveability symptom (lack of power, spark knock/detonation, buck/jerk or hesitation/surge on acceleration) gone?

Yes	No
INSTALL a new MAF/IAT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. RESET the keep alive memory (KAM). REFER to Section 2, Resetting The Keep Alive Memory (KAM) .	GO to DC30 .

DC30 VERIFY THE DTC

Are any of the following DTCs present:

P0171, P0172, P0174, P0175, P2195, P2196, P2197, or P2198?

Yes	No
Unable to duplicate or identify the concern at this time. GO to Pinpoint Test Z .	The concern is elsewhere. RETURN to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index , to DIAGNOSE performance while driving concerns.

DC31 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.
