

DH: Manifold Absolute Pressure (MAP) Sensor, Analog

← [DH: Introduction](#)

DH1 DIAGNOSTIC TROUBLE CODE (DTC) P0236, P1247 AND P1248

- DTC P0236 indicates a turbo boost sensor A circuit performance concern.
- DTC P1247 or P1248 indicate turbo boost pressure was low or not detected.
- Possible causes:
 - damaged MAP hose
 - low turbo boost
 - intake manifold or crossover tube hose leaks
 - damaged MAP sensor
 - damaged PCM
- Inspect MAP sensor hose and manifolds for damage, leaks, restriction and misrouting.

Are manifolds and MAP hose OK and free of damage?

Yes	No
GO to DH2 .	REPAIR leak as necessary. CLEAR DTCs and RETEST.

DH2 CHECK MAP SENSOR

Note: Refer to MAP voltage table at beginning of pinpoint test.

- Install breakout box; reconnect PCM to breakout box.
- Key on, engine off.
- Measure voltage between MAP sensor harness connector signal pin 79 and ground.

Is the voltage ± 0.5 V for given altitude?

Yes	No
GO to DH3 .	INSTALL a new MAP sensor. RESTORE vehicle. CLEAR DTCs and RETEST.

DH3 MAP SENSOR VOLTAGE CHECK

- Disconnect vacuum hose from MAP sensor.
- Key on, engine off.
- Using Pressure Adapter Kit 014-00761 or equivalent (gauge bar), apply 69 kPa (10 psi) of pressure to the MAP sensor.
- Measure voltage between MAP sensor harness connector signal pin 79 and ground.

Is the voltage reading 2.8 V \pm 0.3 V?

Yes	No
GO to DH4 .	INSTALL a new MAP sensor. RESTORE vehicle. CLEAR DTCs and RETEST.

DH4 MAP PERFORMANCE TEST

- Connect vacuum hose to MAP sensor.
- Disconnect MAP sensor vacuum hose from intake manifold and install a pressure (boost) gauge.
- Road test vehicle and accelerate vehicle to achieve full boost.

Is engine boost 82 kPa (12 psi) or greater?

Yes	No
RESTORE vehicle. CLEAR DTCs and RETEST. If DTC returns, INSTALL a new PCM.	INSPECT intake manifolds, crossover tubes for leaks. CHECK turbo condition. REFER to the Powertrain Group in the Workshop Manual.

DH: Manifold Absolute Pressure (MAP) Sensor, Analog Introduction

[DH: Pinpoint Tests](#)



Signal Functions

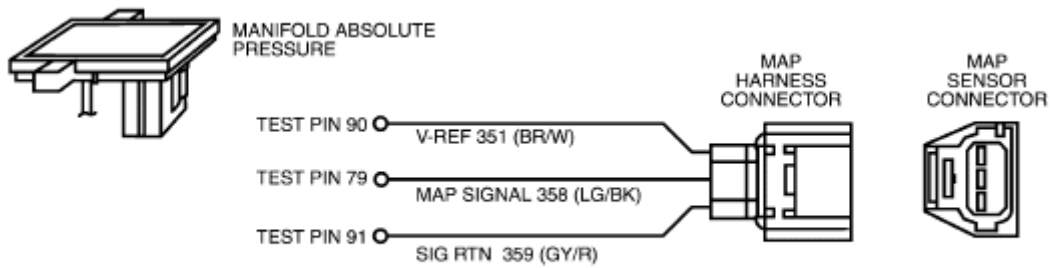
The manifold absolute pressure (MAP) sensor is a variable capacitance sensor that, when supplied with a 5-volt reference signal from the powertrain control module (PCM), produces an analog voltage signal that indicates pressure.

Smoke Control — The MAP signal is used to control smoke by limiting fuel quantity during acceleration until a specified boost pressure is obtained.

Dynamic Injection Timing — Optimizes injection timing for boost pressure measured.

Fault Detection/Management

A MAP signal that is detected by the PCM to be out of range or at an incorrect value for specific conditions will cause the PCM to ignore the MAP signal and operate the engine from an inferred boost pressure signal.



DA1520-B

Note

After removing connectors, always check for damaged pins, corrosion, loose terminals, etc.

DTC Descriptions

P0236 = Turbo boost sensor A circuit performance

P0237 = Turbo boost sensor A circuit low input

P0238 = Turbo boost sensor A circuit high input

Volts	kPa	PSIA
1.1	80	11.5
1.5	101	14.7
2.2	138	20
2.8	172	25
3.6	206	30
4.3	242	35

Note: ± 0.3 volt from expected voltage reading is allowed.

14. Boost Pressure Test

Purpose:

To determine if the engine can develop sufficient boost to obtain specific power.

Econoline

14. Boost Pressure Test

- Verify that MAP hose is not open, plugged or pinched.
- Monitor MGP (manifold gauge pressure) and RPM with the NGS Tester.
- Road Test - select appropriate gear to obtain desired engine speed at full load throttle position. Best accomplished climbing hill or truck fully loaded.

Parameter	Spec.	Measurement
MGP	13 PSI G MIN	

Measure between 2500 to 3000 RPM

F-Series

14. Boost Pressure Test

- Verify that MAP hose is not open, plugged or pinched.
- Verify that inner cooler hoses or intake are not leaking.
- Verify that the green Waste gate hose is not plugged.
- Monitor MGP (manifold gauge pressure) and RPM with the NGS Tester.
- Road Test - select appropriate gear to obtain desired engine speed at full load throttle position. Best accomplished climbing hill or truck fully loaded.

Parameter	Spec.	Measurement
MGP	16 PSI G MIN	

Measure between 2500 to 3000 RPM

DA1496-B

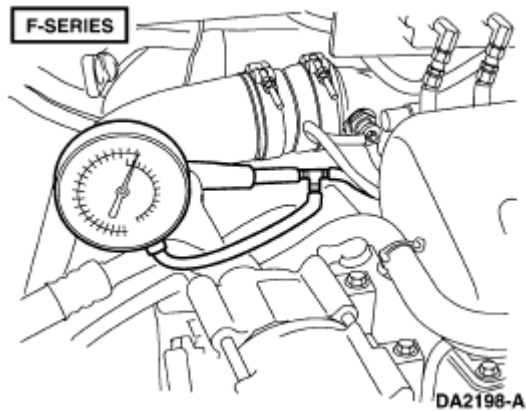
Recommended Procedure:

Monitor NGS Tester PID MGP and RPM. After the engine is up to operating temperature, find an open section of road and select the best gear to achieve a 2500-3000 rpm acceleration. With the accelerator at WOT, note the highest boost reading while accelerating through the 2500-3000 rpm range. Boost will level out after 3000 rpm. This is best accomplished either climbing a hill or with the vehicle fully loaded.

Alternate Procedure:

Install a T (manufactured locally out of common fittings) into the manifold absolute pressure (MAP) sensor line that comes from the intake manifold. Make sure the MAP sensor is hooked up for this test.

Connect a T to a 0-30 psi gauge that is temporarily installed in the cab. Route the hose so that it is not crimped and does not come in contact with any hot surface.



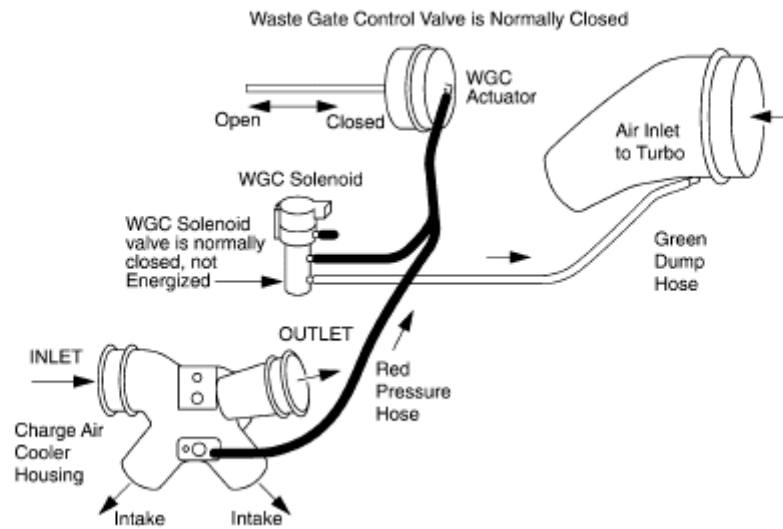
Possible Causes:

- MAP hose pinched or open
- Leaking intake, hoses or fittings
- Defective turbocharger
- Base engine failure

Added Causes for F-Series

- Plugged green wastegate hose or port in the charge air intake to the turbo
- Wastegate control solenoid not electrically but mechanically inoperative
- Wastegate actuator
- Wastegate valve
- Wastegate turbo
- Intercooler hoses leaking

A wastegated turbo is designed to reach maximum boost sooner than a conventional turbo, but overboosting will cause damage to the turbo. The PCM will control the boost pressure by duty cycle to the solenoid to maximize boosting performance. When pressure is supplied on the red hose going to the actuator (solenoid NOT energized) the valve will open, dumping boost. When low or no pressure is on the red hose going to the actuator (solenoid is being energized) the valve will stay closed.



DA1504-A