Helpful Directions for MAP Sensors

Some vehicle owners might think a MAP sensor is some kind of glimmer that tracks the whereabouts of their vehicle. There are high-tech on-board navigational systems that can do just that, but the MAP sensor plays no role in such a system.

It is an engine sensor that provides information of a different sort. The MAP sensor’s job is to keep the computerized engine control system informed about engine load so it can fuel mix, spark timing and other emission functions can be adjusted to suit changing operating conditions. It's an essential job that requires accurate calibration and trouble-free operation for good engine performance and driveability. So here are some directions of our own about MAP sensors with diagnostic problems.

Follow These Directions To Find Problems With MAP Sensors

A MAP sensor reads engine vacuum through a hose connected to the intake manifold. It is an engine sensor that provides information of a different sort. The MAP sensor’s job is to keep the computerized engine control system informed about engine load so it can fuel mix, spark timing and other emission functions can be adjusted to suit changing operating conditions. It’s an essential job that requires accurate calibration and trouble-free operation for good engine performance and driveability. So here are some directions of our own about MAP sensors with diagnostic problems.

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To ensure that you receive the quarterly issue of Counter Point, please fill out the following form and send or fax it to Ron Raposa, Vice President Sales, Wells Mfg. Corp. P.O. Box 70, Fond du Lac, Wisconsin, 54936-0070. Letters and comments should be directed to: Ron Raposa, Counter Point Editor, 3642 Island Empire Blvd., Suite C200, Ontario, CA 91764.

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Q: “We have a 1985 BMW 325i that ran out of fuel. We thought the problem was in the fuel system. We replaced the fuel pressure regulator, fuel injection pump, and new fuel lines. The car still ran rough and is back to the same problem. How do we find the trouble?”

A: “The problem was not the fuel system. It was a intermittent spark problem. It is a well known problem with these cars. There are a few things to check:

1. Check the primary and secondary resistance of the coil.
2. Check the spark plugs and wires.
3. Check the ignition timing.

If you find a problem with the ignition system, you may need to replace the coil and the ignition module.”

Q: “We've replaced three control modules on our 1985 BMW 325i. What's causing the modules to burn out?”

A: “There are various reasons why a control module might fail. Some common causes include:

1. Overheating: If the module gets too hot, it can fail.
2. Moisture: Moisture can cause corrosion and short circuits.
3. Faulty connections: Loose or corroded connections can cause intermittent failures.
4. Electrical problems: Intermittent electrical issues can cause the module to fail.

It's also possible that the problem is not with the module itself, but rather with the system it controls. For example, if the air/fuel ratio is incorrect, it can cause the module to fail.”

Q: “What should I check?”

A: “Here are some things you can check:

1. Check the spark plugs and wires.
2. Check the ignition timing.
3. Check the fuel pressure regulator.
4. Check the fuel injection pump.

If you find a problem with the ignition system, you may need to replace the coil and the ignition module.”

Q: “We’ve replaced the one core module in our 1985 BMW 325i. What's causing the modules to burn out?”

A: “There are various reasons why a control module might fail. Some common causes include:

1. Overheating: If the module gets too hot, it can fail.
2. Moisture: Moisture can cause corrosion and short circuits.
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Q: “What gives?”

A: “What should I check?”

A: “Here are some things you can check:

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2. Check the ignition timing.
3. Check the fuel pressure regulator.
4. Check the fuel injection pump.

If you find a problem with the ignition system, you may need to replace the coil and the ignition module.”
All engines can be affected by vacuum leaks, but what should I check?

Q: “We have a 1985 BMW 325i that ran fine until we changed the oil. Now it idles poorly like it’s sucking air. What gives?”

Q: “We’ve replaced the air conditioning modules in the past two weeks on a 1985 Chevy Suburban 350. What’s causing the modules to fail out?”

Q: “Our 1984 CAI system is running with more effort to get the engine up to the same speed. Why?”

Q: “I’ve worked on a 1981 Volvo 244 Turbo for several years. We have noticed manifold vacuum leaks that are causing the engine to cycle 20 to 25 inches of vacuum. Any ideas? I was thinking the intake manifold gaskets are not sealing properly.”

Q: “What should I check?”

I suspect a bad coil but want to confirm before I replace it. What should I check?

Driveability symptoms that can be caused by a bad MAP sensor include hard starting, hesitation, engine stalls, and fuel economy issues. Under high-load low-vacuum conditions, the original equipment module used ballast resistance to limit the voltage to the coil. This could be a “spark” problem. This problem can cause the engine to misfire and emit black smoke. To troubleshoot this problem, check the ignition system for any loose or corroded connections, check for a bad spark plug, and inspect the wiring harness for any damaged or disconnected wires.

What are your experiences with MAP sensors? Do you have any tips or tricks for troubleshooting them? Share your experiences in the comments below. Thanks for reading!

If the reading falls in the voltage range of 4 to 5 volts, the sensor is functioning properly. If the reading is outside this range, the sensor may be defective and need to be replaced.

If you are driving a car with a MAP sensor and have noticed a drop in fuel economy, check for a stuck or failing sensor. A stuck sensor can cause the engine to run lean, resulting in poor fuel economy.

If the reading does not drop to about 290 to 330 on the four-cylinder scale, the sensor may be defective and need to be replaced.

If the reading drops to a low reading of 1 to 2 volts, check for a bad MAP sensor, a shorted or open circuit, or a problem with the harness connections.

Conduct the MAP sensor’s electrical circuit check:

1. Connect one jumper wire between the connector and the MAP sensor’s terminal “C”.
2. Check for proper grounding at terminals “A” and “C”.
3. Connect the positive lead on the distributor to terminal “B” (the sensor’s output terminal) and the negative lead to terminal “C”.

Start the engine and check for a voltage drop. If the voltage drops, check for a shorted or open circuit in the harness. If the voltage remains constant, check for a bad MAP sensor or a problem with the engine control module.

1. Connect the MAP sensor’s electrical circuit check:
2. Connect one jumper wire between the connector and the MAP sensor’s terminal “A”.
3. Connect the positive lead on the distributor to terminal “B” (the sensor’s output terminal) and the negative lead to terminal “C”.
4. Check the voltage drop at terminals “A” and “C”.
5. Connect the positive lead on the distributor to terminal “B” (the sensor’s output terminal) and the negative lead to terminal “C”.
6. Check the voltage drop at terminals “A” and “C”.
7. Connect the positive lead on the distributor to terminal “B” (the sensor’s output terminal) and the negative lead to terminal “C”.

This test verifies that the MAP sensor is responding to changes in engine vacuum. If the reading does not change, it means the sensor is faulty or the vacuum system is not functioning properly.

On Ford applications, a multimeter that can read vacuum will be required. To ensure accurate readings, connect the test lead to the MAP sensor’s vacuum source and measure the voltage drop.

If you want to measure engine vacuum using a tachometer, use a calibrated tachometer to ensure accurate readings. Do not apply more than 20 inches of vacuum (excessive vacuum can damage the sensor).
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So here are some directions of our own about MAP sensors and diagnosing problems:

**Follow These Directions To Find Problems With MAP Sensors**

1. **Where the sensor is located:** The MAP sensor is located in the engine compartment or under the dashboard. It's an engine sensor that provides directions of a different sort. The MAP sensor's job is to keep the computerized engine control system informed about engine load so the fuel mixture, spark timing and other emission functions can be adjusted to suit changing operating conditions. It's an essential job that requires accurate calibration and trouble-free operation for good engine performance and drivability.
2. **What it does:** The sensor generates a voltage signal that changes with pressure. As engine load changes, so does the MAP sensor's electrical output. The sensor's output voltage will vary depending upon intake vacuum, and atmospheric (barometric) pressure.
3. **What you can do:** You can use a hand-held voltmeter to measure the sensor's output voltage.
4. **How to troubleshoot:** First, make sure the engine is running at idle. Then, check the MAP sensor's output voltage. If it's low (as at wide-open throttle), the fuel mixture is rich, and atmospheric pressure is low. If the voltage is high (as at idle), pressure is high when intake vacuum is low. If intake vacuum is high when atmospheric pressure is low (as at wide-open throttle), the fuel mixture is lean, and atmospheric pressure is high.
5. **What CA codes mean:** Codes P0102 and P0103 mean that the MAP sensor is not operating properly. These codes can indicate a problem with the sensor itself, or with the computer that controls it.

Welcome To The First Counter Point Newsletter

Welcome to the first issue of Wells Counter Point newsletter, where we'll share the latest news and information about the automotive industry. Each issue will feature an in-depth technical article, as well as the one in this issue on QS-9000 Certification. That's the goal of Counter Point newsletter, a publication created to be a valuable resource for today's automotive technicians. It will be published four times a year.

Each Counter Point newsletter will feature a new technical article, as well as a feature called “Fine Tuning,” where we’ll provide technical updates as needed. Counter Point newsletter will also include a question-and-answer section, “Technical Services Director,” where technicians can ask questions about automotive diagnostics to Wells Technical Services Director Jim Bates, a nationally recognized expert.

At Wells Mfg. Corp., we believe that we are the recognized expert. We're even providing a feature, “Fine Tuning,” where technicians can ask questions about automotive diagnostics to Wells Technical Services Director Jim Bates, a nationally recognized expert.

And we'll give a free Wells shirt to people whose questions are published, so please send your shirt size along with those questions.

Counter Point newsletter will contain other useful information as well, as the article in this issue which explains the advantages of Wells' replacement ignition control module for Ford over its OE counterpart. In conjunction with the Counter Point newsletter, we will issue Counter Point Bulletin containing technical updates as needed.

We hope that you'll find a great deal of interest in this first newsletter. That's after all the point of Counter Point newsletter: to provide you with valuable information. If you have any questions, let us know what you think.