The mass airflow sensor on your Mitsubishi vehicle (or Chrysler Sebring or Dodge Stratus) can be tested without a scan tool and in 4 easy steps. All you'll need is a digital multimeter that can read Hertz frequency.

Since quite a few Mitsubishi vehicles use this MAF sensor (and Chrysler Sebring and Dodge Stratus), at the bottom of this page, you'll find a complete list of vehicle that use this type of MAF sensor. By the way, this sensor is known as the volume air flow sensor in Mitsubishi tech speak.

Symptoms of a BAD Mitsubishi MAF Sensor

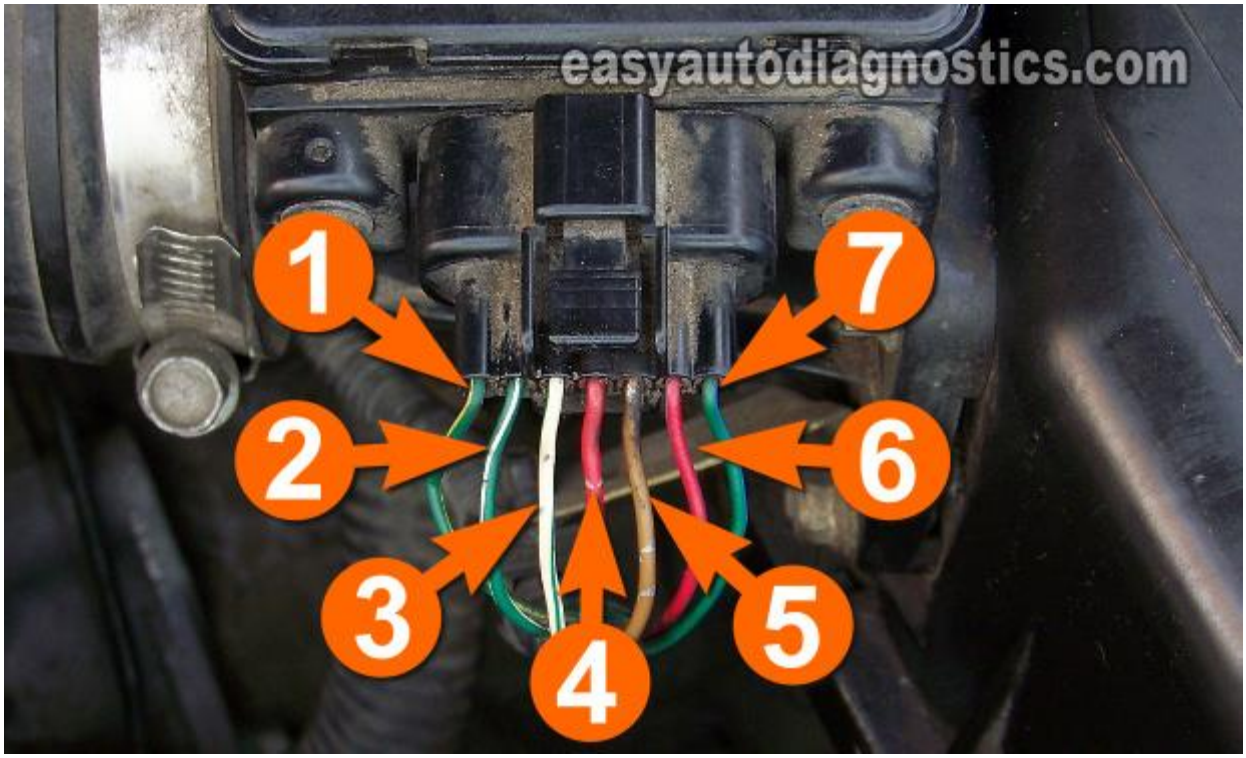
The most obvious one is that the CHECK ENGINE light (CEL) will be on on your instrument cluster and driving you nuts. Here are a couple of others:

1. A MAF sensor diagnostic trouble code (DTC) stored in your vehicle computer's memory.
    - **P0101:** Volume air flow circuit range/performance problem.
    - **P0102:** Volume air flow circuit low input.
    - **P0103:** Volume air flow circuit high input.
2. Lean and/or Rich Diagnostic Trouble Code(s).
    - P0171, P0174
3. Fuel trim diagnostic trouble code(s).
4. No power when you accelerate the car or truck.
5. Black smoke coming from the tail-pipe.
6. Your car or truck or SUV may idle rough and stall.

What Tools Do I Need?

You'll need a digital multimeter that can read Hertz (Hz) frequency (don't have a digital multimeter that can read Hertz frequency? Click here to see my recommendations: Buying a Digital Multimeter for Automotive Diagnostic Testing). As mentioned earlier, you don't need an automotive scan tool to test the MAF sensor. Having said that... a scan tool is one of those MUST have tools to be able check and diagnose today's modern cars and trucks, but for the tests in this article you don't need one.

Circuit Descriptions of the MAF Sensor Connector

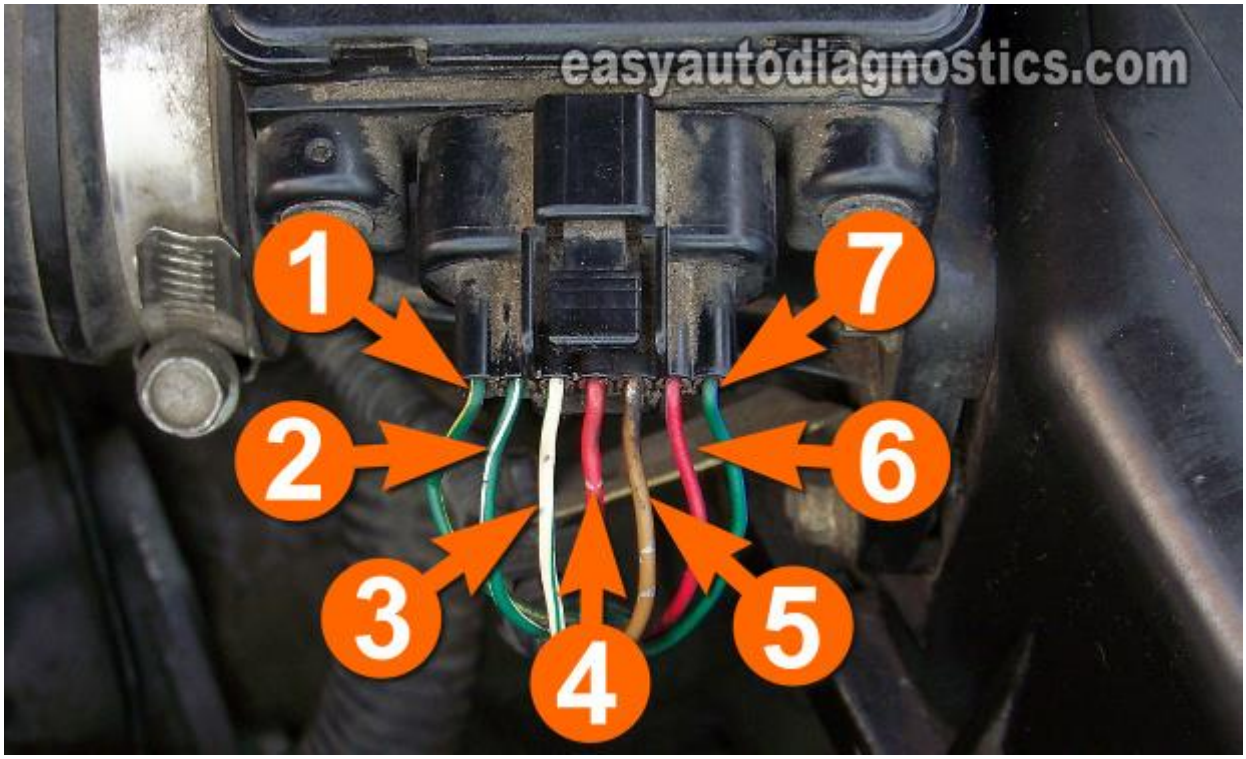


This Mitsubishi mass air flow (MAF) sensor has a total of 7 wires coming out of the connector. Although you won't be testing every single circuit, I've included the Circuit Descriptions of all them anyway for your viewing pleasure.

- Circuit labeled **1**:
  - 5 Volt Reference Voltage
- Circuit labeled **2**:
  - Barometric Pressure Sensor Circuit
- Circuit labeled **3**:
  - MAF Signal Output.
- Circuit labeled **4**:
  - Power (12 Volts) Circuit.
- Circuit labeled **5**:
  1. Sensor Return (Ground) Circuit.
- Circuit labeled **6**:
  - Intake Air Temp Sensor Circuit.
- Circuit labeled **7**:
  - MAF Reset Signal Output Circuit.

I did not include the color of the wires because as long as you're able to identify them by the number in the photo, you'll be OK. Also, the color of the wires in the photos may not be the color of the wires of the MAF on your specific vehicle.... and again this is no cause for concern.

TEST 1: Testing the Power Circuit for 12 Volts



The very first thing that has to be checked is that the MAF sensor on your Mitsubishi vehicle (or Chrysler Sebring or Dodge Stratus) is getting power (10 to 12 Volts), since without this voltage it won't work.

You can use a 12 V. test light or a multimeter for this test, although the following test steps assume you're using a multimeter:

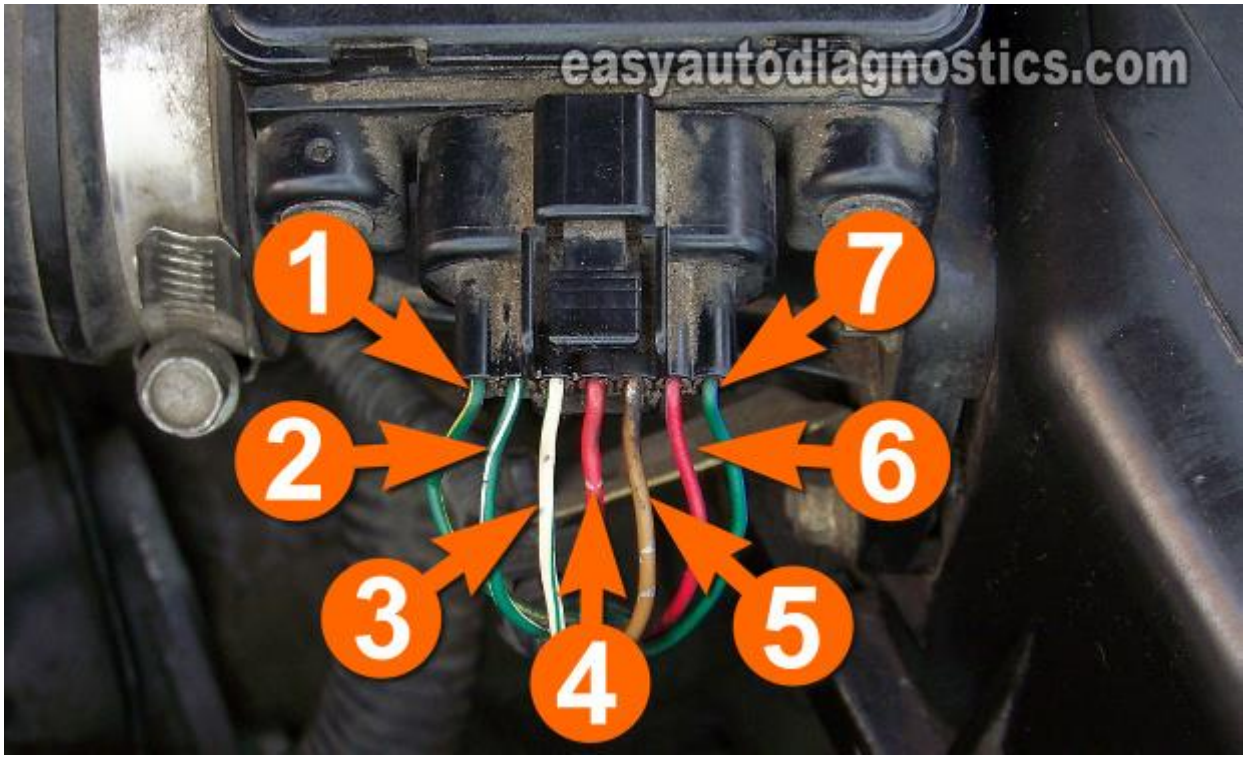
1. Place the multimeter in Volts DC mode.
2. Connect the RED multimeter lead to the wire identified with the **number 4** (see image viewer photos) using an appropriate tool.
3. Connect the BLACK lead of the multimeter to a good ground point on the engine or to the battery negative terminal.
4. Turn the key to the ON position and observe the voltage value the multimeter registers.
5. The multimeter should register between 10 to 12 Volts DC.

Let's take a look at what your test results mean:

CASE 1: The multimeter registered 10 to 12 Volts DC (or the if the test light came on), then this indicates that the MAF sensor is getting juice (12 Volts). The next step is to verify that it's also getting a good ground, go to TEST 2.

CASE 2: The multimeter DID NOT register 10 to 12 Volts DC (or the if the test light DID NOT come on), your next step is to find out why this voltage is missing since without power, the MAF won't work. Repairing the cause of the missing voltage will solve the MAF issue/problem lighting up the check engine on your car.

TEST 2: Testing the Ground Circuit



Testing the ground circuit follows pretty much the same procedure as the test steps for testing the power circuit. One word of caution... this ground is provided internally by the PCM, so you have to be careful NOT to short this circuit to power (12 Volts) or you'll damage the PCM. OK, here are the steps:

1. Place the multimeter in Volts DC mode.
2. Connect the BLACK multimeter lead to the BLACK (or BLACK with WHITE stripe) wire identified with the **number 5** (see image viewer photos) using an appropriate tool.
3. Connect the RED lead of the multimeter to the battery positive terminal.
4. Turn the key to the ON position and observe the voltage value the multimeter registers.
5. The multimeter should register between 10 to 12 Volts DC.

1. Place the multimeter in Volts DC mode.
2. Connect the RED multimeter lead to the PINK wire identified with the **number 4** (see image viewer photos) using an appropriate tool.
3. Connect the BLACK lead for the multimeter to a good ground point on the engine or to the battery negative terminal.

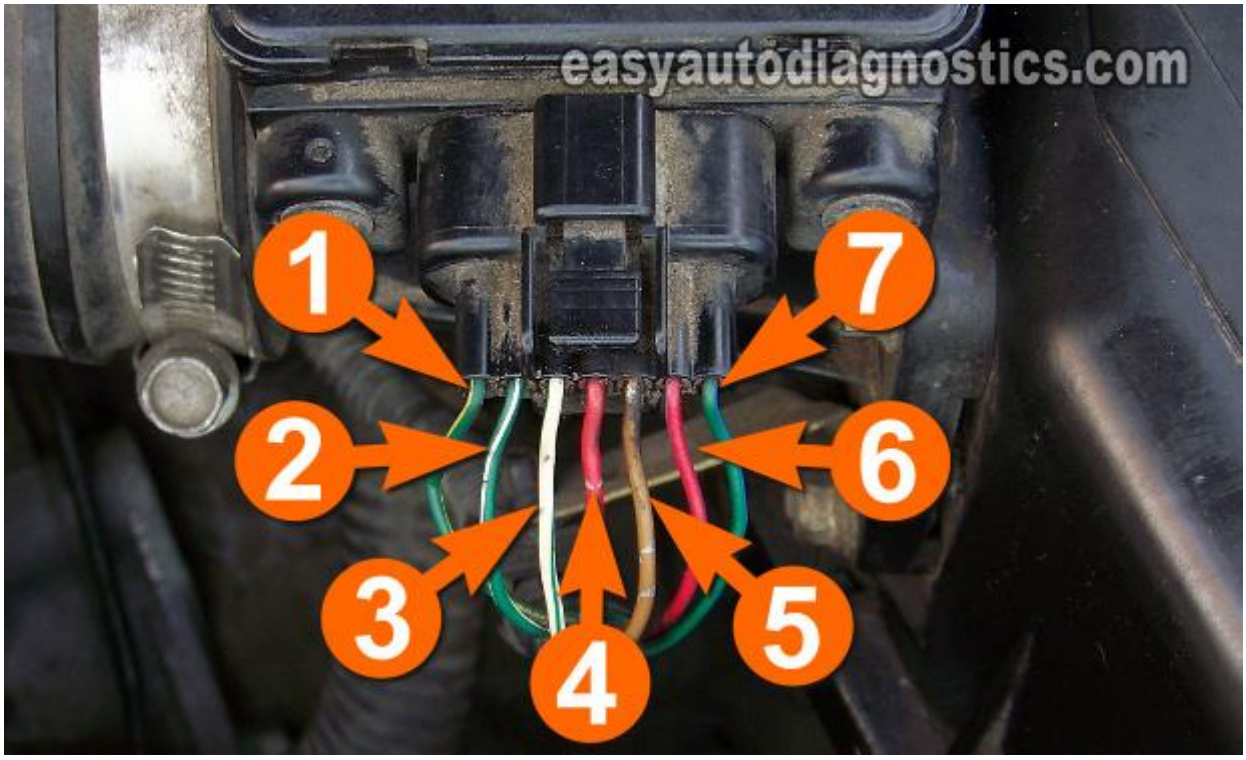
4. Turn the key to the ON position and observe the voltage value the multimeter registers.
5. The multimeter should register between 10 to 12 Volts DC.

Let's take a look at what your test results mean:

CASE 1: The multimeter registered 10 to 12 Volts DC (or the if the test light came on), then this indicates that the MAF sensor has a good ground. The next step is to verify that the MAF sensor is creating a good MAF signal based on the airflow the engine is breathing, go to TEST 3.

CASE 2: The multimeter DID NOT register 10 to 12 Volts DC (or the if the test light DID NOT come on), this exonerates the MAF sensor as being BAD, since without a good ground, the MAF sensor will not work and this will light up the CHECK ENGINE LIGHT (CEL) on your instrument cluster. Repairing the cause of the missing voltage will solve the problem.

TEST 3: Testing the MAF Signal Circuit



Before you jump into this last test, let's go over some basic working theory of how the mass air flow (MAF) sensor works that'll help you to breeze thru' it.

The MAF sensor's job is to measure the amount of air the engine is breathing at any given RPM and to convert this measurement into a Hertz frequency reading (as measured by a digital multimeter that can read Hz frequency) the PCM can use to calculate fuel injection. Therefore the more air the engine breathes, the higher the Hertz frequency that the MAF sensor will output to the PCM.

So keeping this in mind, the Hertz frequency reading will be higher at 2500 RPM's than at 800 RPM's. On your multimeter, this Hertz (Hz) reading will progress in a smooth way as you accelerate the engine and decrease in the

same way as the engine decelerates. Now, in testing the MAF sensor, you won't be looking for a specific Hertz (Hz) number at a specific RPM... but for crazy fluctuations in the signal that don't correspond to the amount of air entering the engine or no signal at all. OK, crash course is over, let's start testing.

Start the engine and let it reach it's normal operating temperature. You'll be using the Hertz reading you will obtain at idle as a base to diagnose the MAF sensor.

The MAF sensor must be connected to its connector to perform this test.

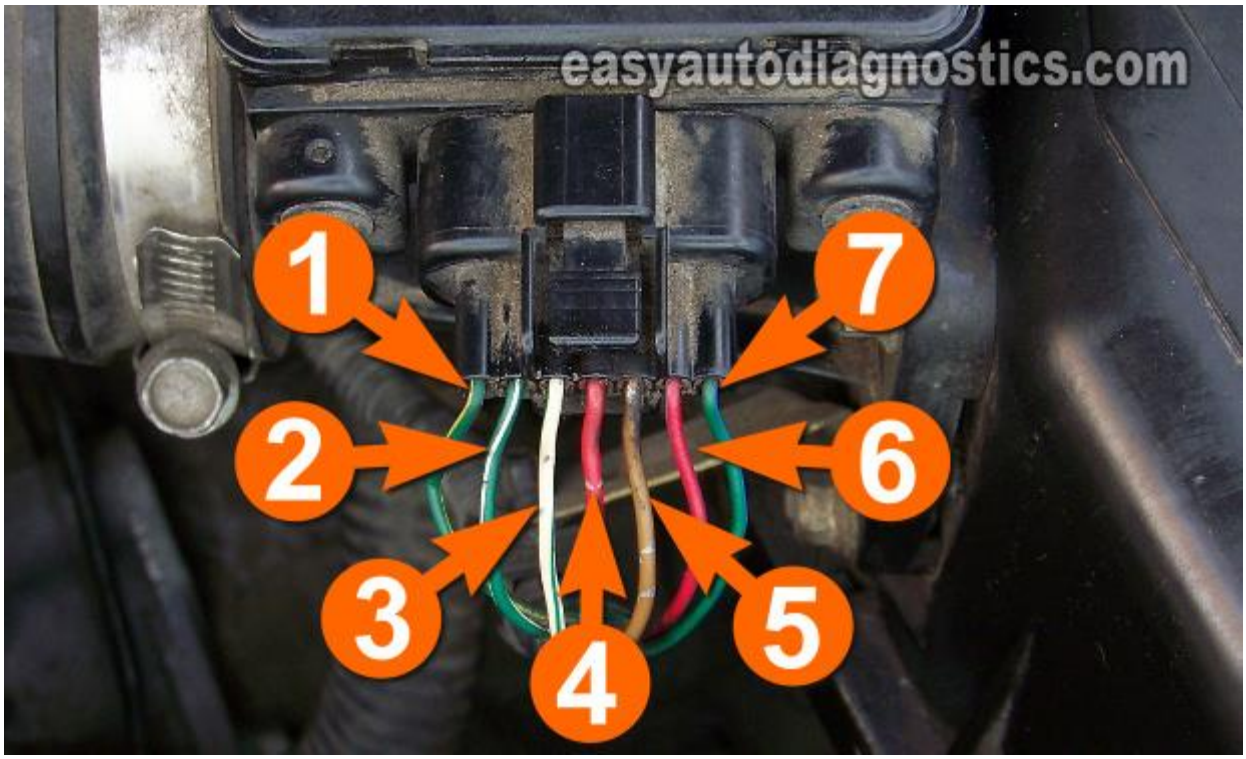
1. With the key in the OFF position.
2. With a suitable tool connected to the RED multimeter lead, probe the wire identified with the **number 3**.
3. Put the multimeter in Hertz frequency (Hz) mode (don't have a digital multimeter that can read Hertz frequency? Click here to see my recommendations: Buying a Digital Multimeter for Automotive Diagnostic Testing).
4. Connect the BLACK lead to the battery (-) negative terminal.
5. Start the already warmed up engine.
6. Note the Hertz reading on your multimeter at idle. Now, to give you a reference point, this Hertz value usually hovers around 10 to 14 Hertz at idle. This reading may be stable (with only small fluctuations) or unstable with very extreme fluctuations. No matter what the instability in the reading, this will be your base reading.
7. Manually accelerate the engine from the engine compartment as you watch the multimeter's frequency readings. The Hertz frequency readings should increase. At around 2,500 RPM's this Hertz reading will oscillate around 70 Hertz.
8. When you let go off of the throttle and the engine returns to idle, the Hertz reading should come down to the base Hertz reading you observed in step 6 of this test.
9. Repeat this as often as you need to verify that the Hertz numbers on the multimeter rise and decrease smoothly every single time.
10. If the MAF sensor is working correctly, the readings on your multimeter will not spike up and down crazily but will increase smoothly as you manually accelerate the engine and decrease smoothly as you let the engine return to idle.

Let's take a look at what your test results mean:

CASE 1: If the Hertz (Hz) signal rose smoothly and decreased smoothly as the engine was accelerated and decelerated respectively, then this indicates that the mass air flow (MAF) sensor is working correctly.

CASE 2: If the Hertz (Hz) signal DID NOT rise smoothly nor decreased smoothlyas the engine was accelerated and decelerated respectively, then this indicates that the mass air flow (MAF) sensor is BAD. Replace it.

TEST 4: Testing the MAF Reset Signal



The last part of the Mitsubishi volume air flow sensor (mass air flow sensor) is the verify that it's producing a Reset Signal the Fuel Injection Computer can use. This is just an On/Off type DC voltage signal that turns ‘On’ when the throttle opens and turns ‘Off‘ when the throttle closes.

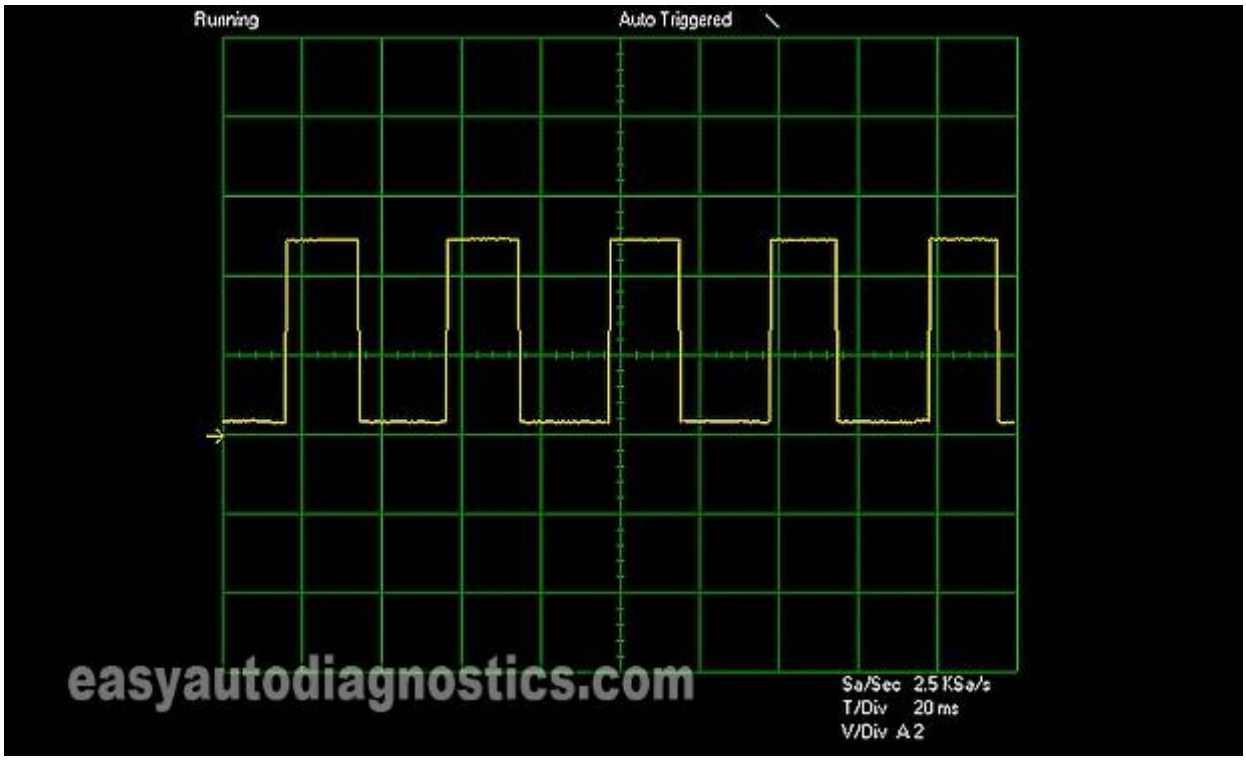
1. Place the multimeter in Volts DC mode.
2. Connect the RED multimeter lead to the wire identified with the **number 7** (see image viewer photos) using an appropriate tool.
3. Connect the BLACK lead of the multimeter to a good ground point on the engine or to the battery negative terminal.
4. Turn the key to the ON position and start the your Mitsubishi car (or Chrysler Sebring or Dodge Stratus).
5. Manually open and close the throttle from the engine compartment as you observe the multimeter. Now, since the engine will be running... take all necessary safety precautions.
6. With the engine at idle and the throttle closed, your multimeter should register around 1 Volt DC or less. This is the ‘Off’ voltage reading.
7. When you open the throttle about 1/3 or more, your multimeter should register 6 to 9 Volts. This is the ‘On’ voltage reading.
8. When you let go off the throttle and it closes (causing the engine to return to idle) the multimeter should register the Voltage you observed in step 6 of this test.

Let's analyze your test result:

CASE 1: The multimeter registered the ‘On’ and ‘Off’ voltage readings: This indicates that the mass air flow sensor is creating the Reset Signal. Your MAF sensor is working properly.

CASE 2: The multimeter DID NOT register the 'On' and 'Off' voltage readings: Recheck all of your multimeter connections and retest. If the indicated voltages are still not present then the MAF sensor on your Mitsubishi vehicle is not functioning correctly. Replace the MAF sensor.

TEST 5: Mitsubishi MAF Sensor Signal Wave Form



If you have access to an oscilloscope, this is what the mass air flow (MAF) sensor waveform looks like at idle.

If the MAF sensor is good then at idle and at any RPM, the waveform will stay perfectly formed. Also, as you accelerate the engine, the wave-length will become shorter while the wave amplitude stays the same.

Now, if the MAF Sensor is bad, the waveform will have missing pieces or no waveform will be formed at all.

If this info really saved the day, buy me a beer!