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INSTALLATION GUIDE
Digital Air Fuel Ratio Gauge
Part Number: M7008

*** Always disconnect the battery *before* attempting any electrical work on your vehicle.***

GENERAL INFORMATION

The Intellitronix Air/Fuel Ratio gauge is a measuring device which provides a more accurate, real-time method of determining the actual ratio of fuel to air in an engine's combustion chamber, by measuring the oxygen content in the exhaust. To operate properly, this gauge requires voltage input from an industry standard narrow-band oxygen sensor. On the gauge face, each LED light bar represents 0.1 Volts input from the sensor.

When two red, two yellow, and one green LED are lit, there is approximately a 14.7:1 air-to-fuel mixture. This is the stoichiometric (STOICH) air/fuel ratio, which is the chemically correct ratio and the point of lowest emissions. It is at this position that, in theory, all of the oxygen and all of the fuel in your engine has been consumed. When all light bars are lit, the vehicle is running full rich.

When only one or two red bars are lit, the vehicle is running lean. However, due to the fact that combustion is never perfect in the real world and oxygen sensor output changes with temperature and wear, it is impossible to indicate the exact richness or leanness with a standard narrow-band oxygen sensor. The figures shown on this gauge should only be used as a reference point for tuning and evaluation. If your vehicle is computer equipped, you will find that your gauge will continually fluctuate at idle and cruising speeds as the computer is rapidly adjusting the air-fuel ratio in an attempt to reach and sustain the point of lowest emissions. Also, depending on the type of oxygen sensor you are using, there may be a short lag in time before the gauge begins functioning as some sensors need a moment to reach operating temperature (heated sensors do not rely on exhaust gasses to bring them to operating temperature and will react much quicker).

If your vehicle's performance decreases and the gauge becomes sluggish, it is possible that your oxygen sensor is not working properly.

WIRING INSTRUCTIONS

Note: Automotive circuit connectors are the preferred method of connecting wires. However, you may solder if you prefer.

Ground - **Black** This is the main ground for the display system. A wire should be run from this board to the vehicle's main engine block ground. Use 18 AWG or larger wire to ensure sufficient grounding. Proper vehicle grounding is extremely important for any gauges (or electronics) to operate correctly. The engine block should have heavy ground cables to the battery, frame, and firewall. Failure to properly ground the engine block, senders, or digital dash can cause incorrect or erratic operation.

Power - **Red** Connect the power terminal to accessory +12V power from the fuse panel or vehicle wiring harness. This terminal should have power when the key is on or in accessory position. Use 18 AWG wire to ensure the system receives a sufficient power feed.

Oxygen - **Blue** Connect this wire to the output wire on the oxygen sensor. You can determine the correct wire by testing with a voltmeter with a milli-volt scale, or you can contact the manufacturer of the sensor. With the engine running, the sensing wire should put out a fluctuating 0-1V signal.

TUNING TIPS

While it is generally accepted that maximum horsepower is achieved in a rich condition, it is not totally true that the more fuel you feed an engine, the higher its output. Actually, an engine makes the most power when there is a sufficient amount of fuel to burn all of the oxygen in the combustion chamber. If there is more fuel than oxygen to support it, or if the flame extinguishes prematurely, leaving residual oxygen (generally due to an inadequate ignition system), the output of the engine diminishes. Also, the engine requires the most fuel at peak torque and then needs to be leaned out at peak horsepower. The volumetric efficiency of the engine is the highest at peak torque, since the combustion chamber contains the fullest charge, thus it requires the greatest amount of fuel.

Historically, most engines like an air/fuel ratio of 12.7:1 to 12.9:1 at peak torque, then lean out to 12.9:1 to 13.1:1 at the Wide Open Throttle (WOT) power peak. Of course, the severe consequences of detonation due to running an engine too lean under load are well documented. Fuel can also act as a coolant, quenching the cylinder and warding off detonation.

In many instances, you may choose to run the mixture slightly rich, giving away a small amount of power, but initiating a more aggressive spark advance curve due to the cooler combustion chamber. This logic often leads to a positive power gain. There are numerous factors to consider when tuning an engine, including horsepower, vehicle weight, altitude, and anticipated usage.