Edelbrock Two Channel Wide Band O2 Kit
Catalog #91170 and #3532
INSTALLATION INSTRUCTIONS

- **PLEASE** study these instructions carefully before installing your new Edelbrock Two Channel Wide Band O2 Kit. If you have any questions, do not hesitate to contact our **Technical Hotline at: 1-800-416-8628,** from 7am-5pm, Monday through Friday, Pacific Standard Time, or via e-mail at: **QD2@Edelbrock.com.**

CAUTION: CAREFULLY READ INSTRUCTIONS BEFORE PROCEEDING

OVERVIEW

The Edelbrock Wide Band O2 kit is a dual channel air/fuel ratio (AFR) metering system designed to be used with an existing Data Acquisition or EFI system. The system has two 0-5 volt analog AFR outputs. The compact size and wide supply voltage range also allow operation from small rechargeable batteries in a broad range of applications.

The system uses low cost Bosch LSU 4.2 5-wire wide-band oxygen sensors. By utilizing miniature surface mount electronics technology, digital signal processing techniques, and a switching power supply for the sensor heater, the Edelbrock Wide Band O2 kit provides the same level of accuracy as lab systems costing thousands of dollars.

REPLACEMENT SENSORS AND ACCESSORIES

The Edelbrock Wide Band O2 kit uses standard Bosch LSU 4.2 sensors used on a VW production application (Bosch P/N 0 258 007 057/058 or VW P/N 021 906 262B). The proprietary VW connector is replaced with a smaller Deutsch DT-04-6P. We offer replacement sensors with the Deutsch connector installed (P/N 91171). If you are testing multiple engines, we also offer additional 18 x 1.5 mm weld nuts for sensor mounting and 18 x 1.5mm hex socket plugs that screw into the weld nuts and allow removing sensors after tuning.

INSTALLATION

1. Turn off the ignition switch and disconnect the battery ground cable before proceeding.
2. Ideally the sensor tip should be mounted face down to avoid accumulation of condensation. When choosing a mounting location, allow several inches clearance for the sensor wire harness. The wire harness must exit straight out from the sensor. Do not loop the harness back onto the sensor body.
3. 18 x 1.5 mm weld nuts must be welded onto the exhaust pipe. After welding, run an 18 x 1.5 mm tap through the threads. Failure to clean the threads may result in sensor damage. Note that most automotive muffler shops are familiar with oxygen sensor weld nut installation on custom pipes. Do not install the sensors until after the free air calibration procedure described in the following section. Always use an anti-seize lubricant such as Permatex 133A on the sensor threads.
4. Install the O2 Amp unit. The unit is fully sealed, but should be mounted away from sources of engine or exhaust heat. The unit can be secured by means of two #8 screws through the mounting flanges. Use nylon tie wraps to secure the wire harness near the unit.
5. Connect the Bosch sensors to the 6 pin mating connectors on the O2 Amp wire harness. Extension cables (P/N 91173) are available. The cable for sensor 1 exits at the top of the O2 Amp housing and is identified with a yellow band
6. Refer to Figure 2. Connect the heavy black O2 Amp wire to a good chassis ground location. Connect the thin black wire to the same point that the data acquisition system is grounded. Keep the ground connections as short as possible.
7. If your race vehicle uses any type of CD (capacitive discharge) ignition such as the MSD 6, 7, or 8 series, you must properly ground and filter the ignition unit. Unless your ignition unit is directly connected to the battery terminals, you must install a filter capacitor such as MSD P/N 8830. Visit www.msdignition.com, download the MSD 8 installation instructions, and refer to Figure 1 on the MSD instructions as a guide for installing the filter capacitor and grounding the ignition system. Do not ground your O2 Amp unit and data acquisition system to the same ground point used for the ignition system.
8. Connect the red O2 Amp wire to switched +12 volt power.
9. Connect the blue and white wires to your data aquisition analog inputs for channel 1 and 2 AFR.
10. Reconnect the battery ground cable.

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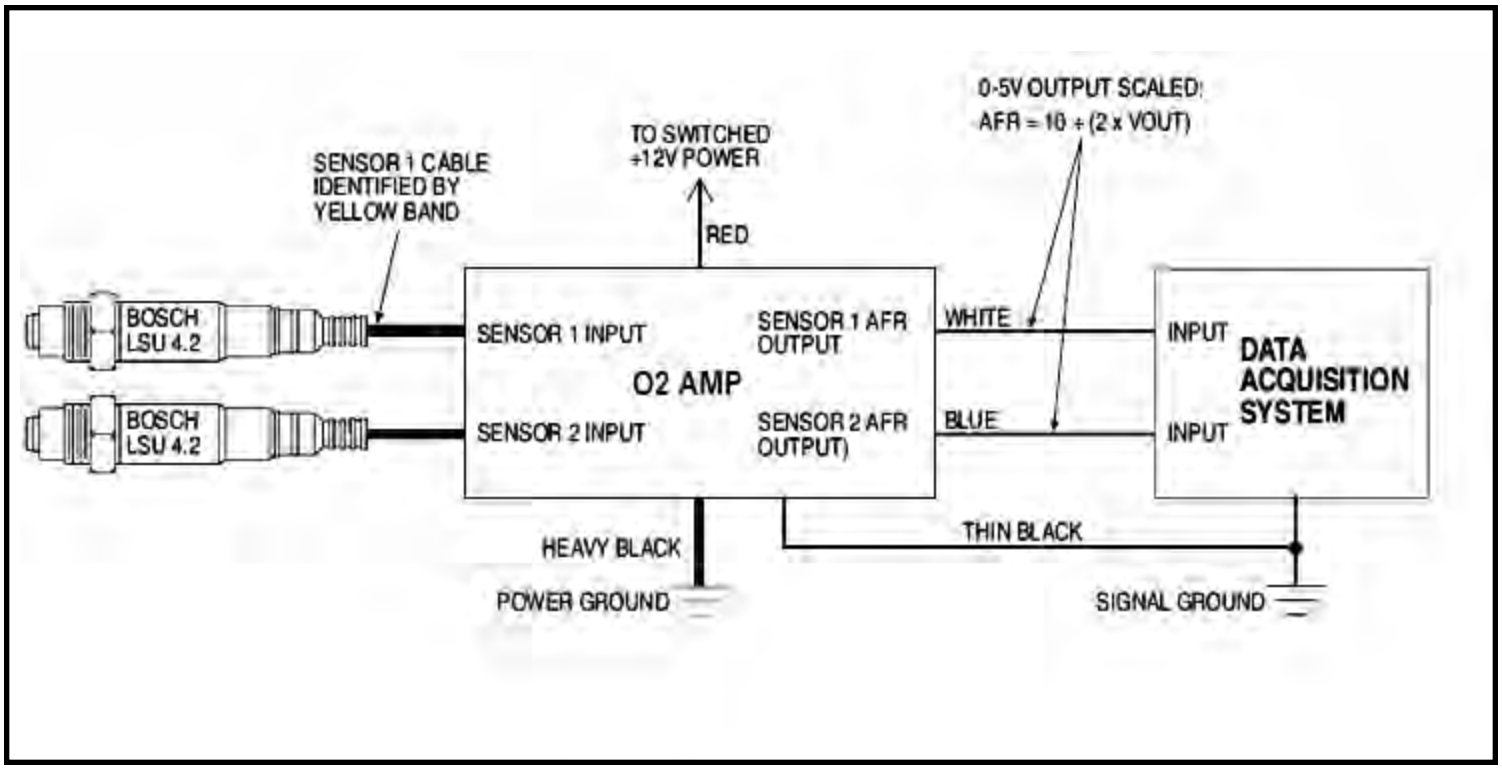
Figure 1 - Typical Hookup for Two Channel O2 Systems



The O2 Amp has red status LEDs for each channel. When power is turned on, the LEDs blink at a slow rate until the corresponding sensor has reached normal operating temperature.

After installation, the O2 Amp requires free air calibration. This should be done with the sensors dangling in free air. The environment must be free of hydrocarbon vapors. We suggest that you perform the free air calibration outdoors. Turn the free air calibration trimpots on the O2 Amp[full counterclockwise. Turn on power and wait for 60 seconds so the system can fully stabilize. Then slowly turn each free air calibration trimpot clockwise until the corresponding LED starts flashing at a rapid rate. Try to set each trimpot at the point where its LED just starts to flash.

CAUTION: Racing gasoline containing lead will quickly degrade the sensors. Under these conditions, expected sensor life is less than 10 hours. There is no warranty on sensors.

The O2 Amp includes internal diagnostics for abnormal battery voltage (less than 11 volts or greater than 16.5 volts), sensor open circuit, and sensor short circuit conditions. A fault condition causes the status LEDs to blink at the slow rate.

DATA ACQUISITION

The 0-5 volt analog outputs (white and blue wires) from the O2 Amplifiers are compatible with most data acquisition systems that have available analog inputs. After free air calibration, accuracy of the Edelbrock Air Fuel Monitor system is +- 0.1 AFR over the 10.3-19.5 AFR range. The 0-5 volt analog outputs are scaled:

AFR = 10 + (2 x Vout) or
Vout = (AFR – 10)/2

For example, an output of 2.5 volts corresponds to 15.0 AFR. Note that when power is first turned on and the sensors are not yet at their normal operating temperature, the analog outputs are held at less than 0.20 volts. During free air calibration and while the O2 Amplifier status LEDs are rapidly blinking, the analog outputs will be near 5.0 volts.

V Out to AFR		
Gas AFR	10.00	20.00
(VOLTS)	0.00	5.00

CALIBRATION INFORMATION

Below are the Gasoline Calibration Values for Edelbrock QwikData 2 and QwikData data systems.

QwikData 2	
Bits	**Value**
0	10.00
4095	20.00

QwikData		
Gas AFR	10.00	20.00
(VOLTS)	0.00	5.00

Edelbrock Pro Flo EFI Lambda Calibration

Pos	Bits	Lambda
1	0.000	**0.680**
2	68.00	**0.725**
3	136.0	**0.770**
4	204.0	**0.815**
5	272.0	**0.860**
6	340.0	**0.905**
7	408.0	**0.950**
8	476.0	**0.995**
9	544.0	**1.045**
10	612.0	**1.090**
11	680.0	**1.135**
12	748.0	**1.180**
13	816.0	**1.225**
14	884.0	**1.270**
15	952.0	**1.315**
16	1020.0	**1.360**

EXHAUST CONSIDERATIONS

The Edelbrock O2 system may give inaccurate results in certain situations:

Excessive exhaust back pressure. Wide-band sensors are affected by back pressure. Excessive back pressure causes exaggerated AFR indications under rich and lean conditions, but has little effect at 14.7 AFR (stoichiometric). Race vehicle exhaust systems are free flowing and problems with exhaust back pressure are not likely.

Exhaust reversion. Reversion is the term for a negative pressure wave that can suck ambient air back into the exhaust and cause an erroneous lean AFR indication. Open "drag pipes" usually suffer from reversion effects and may not be suitable for use with this O2 kit except at or near wide open throttle. Reversion effects will be most noticeable at idle, part throttle low RPM, and decel.

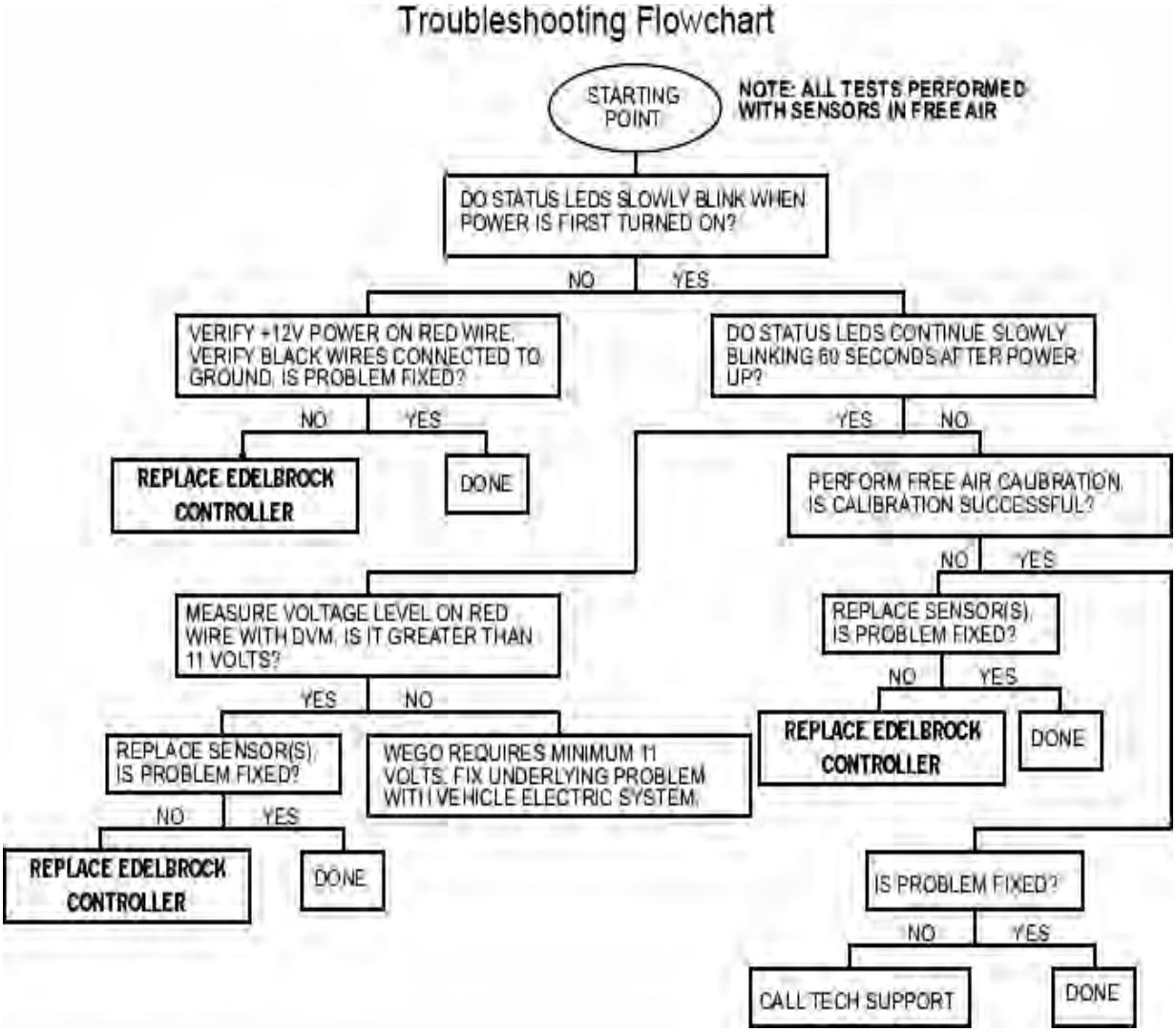
Excessive scavenging. Tuned exhausts in combination with a high overlap camshaft profile can pull unburned air and fuel mixture through the cylinder into the exhaust and cause an erroneous rich AFR indication. The same effect can occur with high boost turbo/supercharger applications.

Misfiring. If the AFR is so rich that the engine misfires, high levels of oxygen will remain in the exhaust gas and result in an erroneous lean indication

ENGINE TUNING GUIDELINES

Higher AFR values correspond to a leaner (less fuel) condition. The practical operating range for most engines using gasoline fuel is from approximately 11.5 to 14.7 AFR. Combustion of a stoichiometric mixture (exactly enough air to burn all the fuel) results in 14.7 AFR indication. Automotive engines with catalytic converters operate near 14.7 AFR during cruise and idle. Race engines usually require a richer mixture to limit cylinder head temperature and prevent detonation. The table below lists reasonable AFR values for race engines without emission controls.

Operating Mode	Recommended AFR
Cold start (first 30 sec.)	11.5-12.5
Idle	12.8 - 13.5
Part Throttle Cruise	13.0 - 14.0
Wide Open Throttle	12.5 - 12.8 (values down to 11.5) may be used to reduce detonation



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