



## M-200/250/300 Plug and Play Users Guide

Version 1.2 February 09, 2006

**\*Please read the instructions completely through at least once before proceeding with the installation to minimize errors.**

### 1) Select a location to mount the M-200/M-250/M-300 Plug and Play Controller

Choose a location where the device does not obstruct driver's view and/or ability to safely control the vehicle. Avoid locations exposed to direct sunlight and high temperatures. Never mount the device in the engine bay. Excessive heat will cause failure and damage to the unit.

### 2) Install the wideband oxygen sensor

Mount the wideband oxygen sensor before the catalytic converter and at least 24 inches downstream from your engine block or turbo for optimal performance. The sensor element will fail if it is exposed to exhaust gas temperatures above 850 deg Celsius. If you plan to replace your stock narrowband oxygen sensor with the PLX wideband, please read PLXApp004 online for more information. The sensor will directly screw into an 18mm X 1.5mm pitch sensor bung.

### 3) Connect the wire harness to the oxygen sensor

You will hear a "click" when the connectors are properly mated.



M-200



M-250/M300

### 4) Connect power (12V-18V) to the M-200/M-250/M-300 Plug and Play

Connect the negative wire (black) to your vehicle's ground. This is usually the negative terminal of your automobile's battery. Connect the positive wire (red) to your vehicle's ignition power. This power is only supplied when your key is turned passed a specific position and is off when your key is removed. Your power connection must be capable of supplying at least 3 amps of current.

If you plan to integrate the M-200/M-250/M-300 Plug and Play with other aftermarket devices by utilizing the analog output signal wires. Make sure that the negative wire (black) is connected as close as possible to your device's ground. This guarantees that both devices "see" the same reference ground and a more accurate interpretation of the output voltages will be achieved. Please refer to the PLXApp notes online for more information.

### 5) Connect the wire harness to the M-200/M-250/M-300 Plug and Play device by mating the two white connectors

### 6) Install noise filtering capacitors.

Ignore this step if you only intend on using the M-200/M-250/M-300 as a stand alone system. If you plan to integrate the M-200/M-250/M-300 with stand alone engine management systems, piggy back systems, data loggers or any

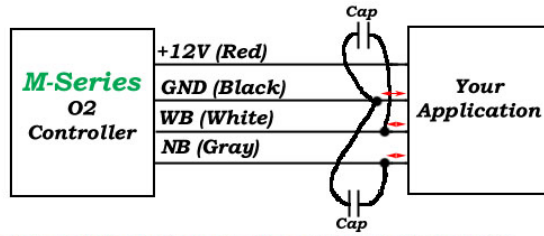
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other devices that utilize the two analog outputs (white, gray wires), noise filtering capacitors must be installed near the application. The included capacitors filter out unwanted electrical noise produced from your vehicle's ignition and other onboard systems. This provides added signal integrity for more accurate, reliable and consistent measurements. Any 0.1uF 50V ceramic capacitor will work.



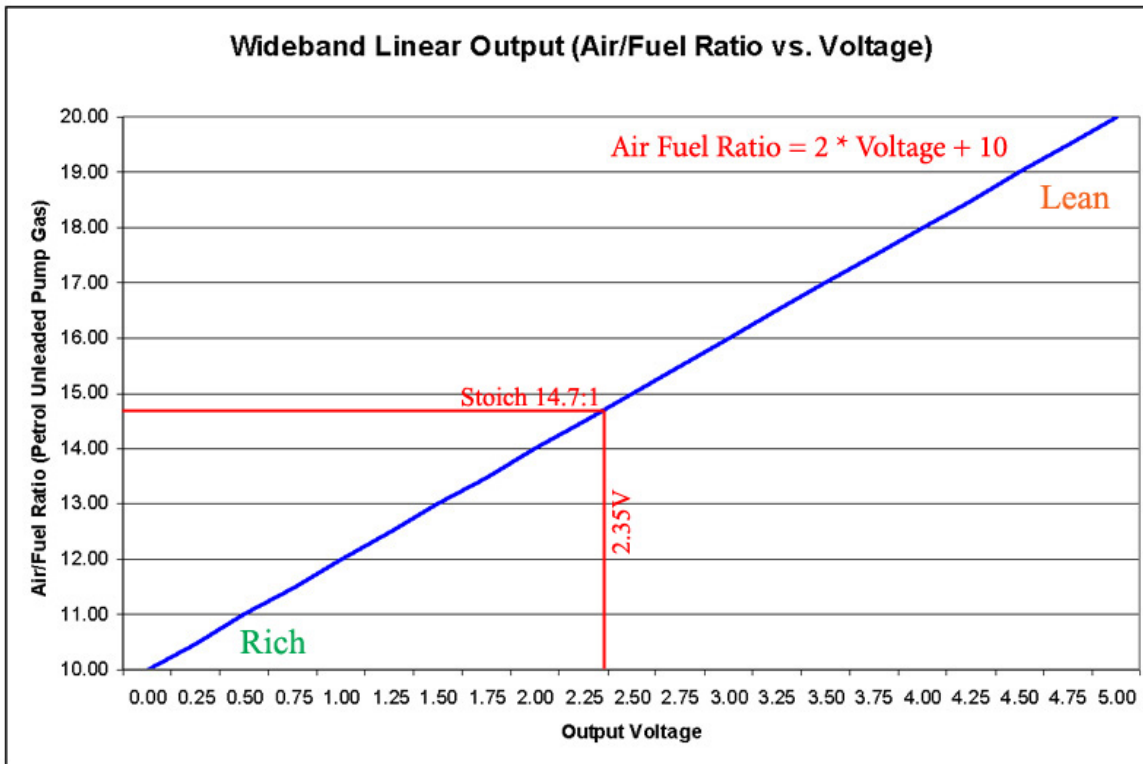
Red arrows indicate that connections must be made physically as close as possible to the application

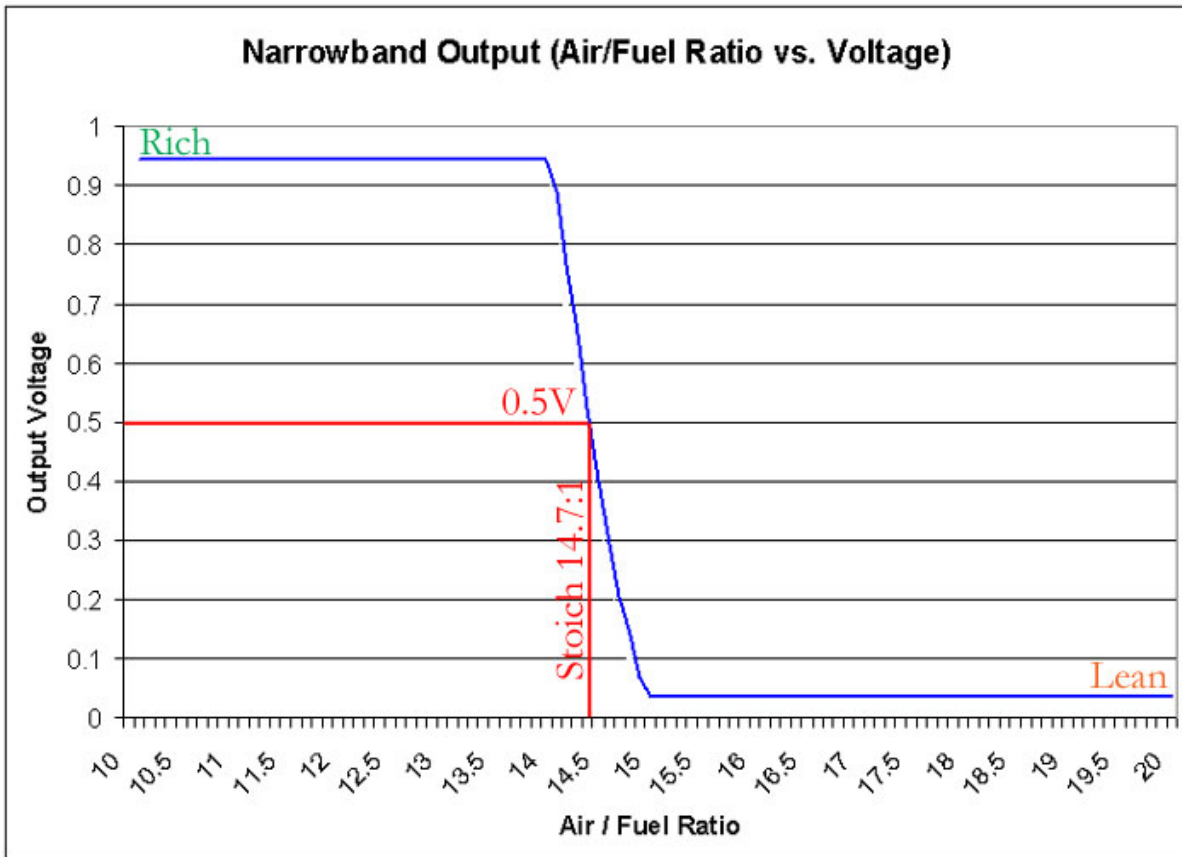
**7) Power up the device**

The unit takes approximately 45 seconds for the oxygen sensor to heat up and produce accurate measurements. If your M-200/M-300 Plug and Play display does not light up immediately, turn off the power immediately and check the power connection wires.

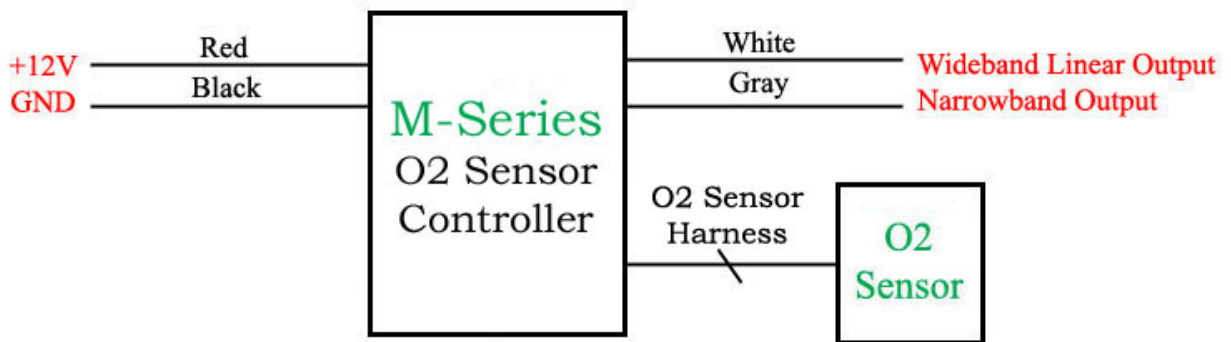
**8) Sensor calibration is not needed. The M-200/M-250/M-300 is self calibrating and no user intervention is required.**

When the wideband oxygen sensor is completely heated and exposed to free air, the analog linear wideband output (white wire) voltage should read 5.0V. The M-200/M-300 should display "Air."





## Connection Diagram



### Reading Lambda

A lambda value of 1.0 is considered to be "ideal combustion" and a stoichiometric combustion is achieved. To convert the above graphs to lambda, simply divide the air/fuel ratio axis values by 14.7

0V = 0.68 lambda

5V = 1.36 lambda

(mapped linearly)

## Compatibility with Other Fuels

The above graphs assume that the device will be used with gasoline (14.7). The M-Series controllers are also compatible with the following fuels.

- a. Diesel 14.6
- b. Methanol 6.4
- c. Ethanol 9.0
- d. LPG 15.5
- e. CNG 17.2

To find the new relationship of AFR to output voltage, simply multiply the lambda value by the specific fuel's stoichiometric air/fuel ratio.

Example: If your engine uses methanol instead of gasoline. The conversion will be as follows.

- 1) Divide the AFR value by 14.7 (gasoline) to obtain a lambda value
- 2) Multiply the lambda value by 6.4 (methanol)

If your engine is running methanol and the M-300/M-200 display readout shows 13.00. Your actual air/fuel ratio is  $13.0/14.7 * 6.4 = 5.66\text{AFR}$

## Package Contents

1. M-200/250/300 wideband controller
2. Wideband oxygen sensor (Optional for M-200)
3. Oxygen sensor harness
4. Two noise filtering capacitors 0.1uF 50V
5. Users guide

## TERMS OF USE

PLX Devices Inc. does not guarantee the M-200/M-250/M-300's functionality with any ECU, data logger or other devices that uses the output signals. Implementation and integration of the M-200/M-250/M-300 with any other device(s) must be done at your own risk. Improper installation and usage may lead to engine damage. Mount and install the M-200/M-250/M-300 in a location where it does not obstruct the driver's view and/or ability or safely control the vehicle.

## LIMITED WARRANTY

PLX Devices Inc. warrants this product to be free from defects for 90 days from the date of purchase. If applicable, Oxygen sensors and other non-serviceable items are excluded from stated warranty. Serviceable goods must be determined by PLX Devices to be defective before any warranty or replacement is issued. PLX Devices' obligation under warranty shall be limited to repairing or replacing, under the discretion of PLX Devices, any part proven defective. This warranty is limited to the repair or replacement of parts in the manufactured good and the necessary labor done to affect its repair or replacement.

## SERVICE UNDER WARRANTY

In the unlikely event that your PLX Devices hardware should fail during the warranty period, a Return Material Authorization number (RMA) must be first retrieved from PLX Devices Customer Support. Support can be contacted through email: [support@plxdevices.com](mailto:support@plxdevices.com) or by phone: 408-745-7591. All serviceable goods must be packaged securely with proof of purchase, RMA number, with all shipping charges prepaid and shipped to PLX Devices Inc. Goods returned under warranty must be received by PLX Devices Inc. within ten (10) business days after the RMA number has been issued. Goods received after this period is subject to fees for the service of repair or replacement. All repaired or replaced items shall be warranted for the remainder of the original product warranty.

## RETURNS AND RESTOCKING FEE

A 15% restocking fee will apply to applicable PLX Devices products for refund. All returns are to be packed in original condition including packaging, documentation, manuals, and accessories. Returns that do not include all the accessories and components may be returned to the customer or charged on a per item basis. The customer assumes responsibility for product until receipt at PLX Devices Inc., shipping via an insurable carrier is recommended. Any unauthorized shipping charges will be billed to the customer or shipment will be refused.

## DISCLAIMER

PLX Devices Inc. shall not be liable for direct, special, incidental, or consequential damages resulting from any legal theory including, but not limited to, lost profits, downtime, goodwill, damage, injury to persons, or replacement of equipment and property due to improper installation, integration and/or misuse of any PLX Devices Inc.'s product(s). This warranty applies to the original purchaser of product and is non-transferable. All implied warranties shall be limited in duration to the said 90 day warranty period.

## Revision History

|                       |   |
|-----------------------|---|
| Version 1.0 (5/11/05) | Initial release   |
| Version 1.1 (8/31/05) | Revised format to PDF<br>Added support for additional fuels |
| Version 1.2 (2/9/06)  | Added detailed information for Warranty and returns         |