

## Zt-4 Dual Wideband Air/Fuel Ratio Meter

### Zt-4 Kit Items

Zt-4 Dual Wideband AFR Controller	Power / Signal Harness (1' length)
Wideband Oxygen Sensor LSU 4.9 x 2	Oxygen Sensor Harness (10' length) x 2

### Installation instructions

Connect the 6-pin Oxygen Sensor Harness Left and Right to the Zt-4 "O2 Sensor" ports. Plug both Oxygen sensors to corresponding Left and Right O2 harnesses,  
 Connect Signal Harness to the Zt-4 "Power / Signal" port. Connect the Signal Harness RED wire to the switched power (+12V) and BLACK wire to the ground. If Analog Wideband Output or Narrowband O2 Output is used ground the Zt-4 Black wire directly at the ECU (ECM) ground. Grounding Zt-4 Black wire at other location (ex. Chassis) will result in a ground offset and false readings.  
 The Wideband Controller has a built in auto-resettable 4A fuse, therefore additional in line fuse is optional. The cold O2 sensor warm up time is about 6 seconds.

The Wideband Oxygen sensors must be positioned after the turbocharger and before the catalytic converter. Recommended installation requires welding the O2 sensor bung in the down pipe at least 16" away from the turbo. A stock narrowband O2 sensor location is usually too hot for the wideband O2 sensor. The oxygen sensor must be positioned vertically (wires pointing upwards between 10 and 2 o'clock) to prevent damage to the sensor's ceramic heating element and protect sensor against water condensation.

The Zt-4 shall be mounted inside vehicle cabin. A small connector at the controller side of the Oxygen Sensor Harness allows for easy routing through the firewall. Make sure to not damage the connector when pulling through the firewall. Do not use pliers to pull the connector. Connect the larger 6 pin connector to the oxygen sensor. The O2 Harness is made from quality high temperature materials. However make sure the O2 Harness is secured and placed away from heat sources, specially the down pipe, catalytic converter, and hot engine parts. An overheated and internally shorted harness may damage the oxygen sensor and the Wideband Controller. O2 sensors should always be replaced in pairs.

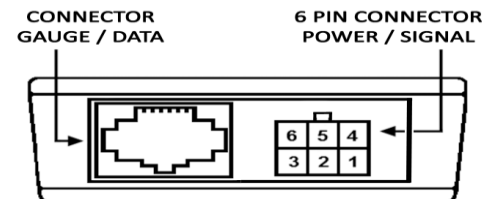
### Zt-4 Inputs/Outputs

Bosch Wideband O2 sensor  
 Power and data for Zeitronix ZR-4 Dual Wideband AFR Gauge  
 Serial data output for datalogging (PC laptop + Zeitronix Serial Cable, or Black Box required)  
 Left and Right Analog Wideband Outputs (configurable voltage vs. AFR)  
 Left and Right Simulated Narrowband Output Signal (configurable switching point)



Signal	Range
Lambda	1.43 to 0.64 Wideband
AFR	21.0 to 9.5 Wideband
Analog Output	0-5V
NB O2	0-1V

### POWER / SIGNAL Harness

PIN #	WIRE COLOR	FUNCTION
1	BLACK	Ground
2	GREY	Linear Wideband Analog Output RIGHT
3	WHITE	Linear Wideband Analog Output LEFT
4	RED	Switched power (e.g. 12 Volt ignition)
5	BLUE	Programmable Simulated Narrowband O2 Output RIGHT
6	PURPLE	Programmable Simulated Narrowband O2 Output LEFT



WHITE and BLACK wires can be used to provide a linear wideband signal and ground to a 3<sup>rd</sup> party engine management system. GAUGE / DATA port is used to interface digitally with Zeitronix gauges, displays and third party loggers. For true plug and play, Zeitronix gauges and displays are powered directly from the Zt-4 Data port.

<p><b>Connecting the Zt-4 and ZR-4 Display</b></p> 	<p><b>Connecting the Zt-4, PC and ZR-4 Gauge using optional Serial Data Splitter and Zeitronix Serial Cable</b></p> 
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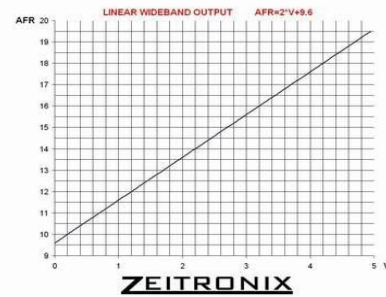
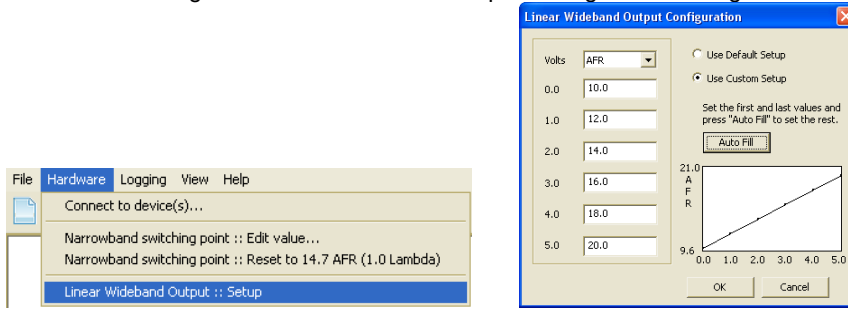
### Zeitronix ZDL Logging Software

ZDL Software can be downloaded from <http://www.zeitronix.com/zdl/>

An optional Zeitronix serial cable and Data Splitter (sold separately) is required to connect the Zt-4 to a PC. We also offer high quality USB to Serial Adapter in case your PC laptop is not equipped with a serial port. After installing ZDL on your PC connect the Zt-4 to PC serial port, power up the Zt-4. After 6 seconds LED between POWER / SIGNAL and DATA connectors will start blinking indicating data being sent to the PC. Press "S" on the keyboard to open "Connections Setup" window, then click button "Scan for Zeitronix Devices". ZDL software will help you detect existing COM ports with connected Zeitronix devices. A green blinking virtual LED shown next to a COM port indicates successfully detected data from the device. Select "Zeitronix Zt-4 Wideband System" from the pull down menu, click "OK" button to close the window. AFR LEFT and AFR RIGHT are among graphs shown on the screen. Additional logs can be closed by clicking on "X" at upper right log corner.

## Linear Wideband Output (White Wire)

The Linear Wideband Output default setup is 9.6 AFR at 0 volts and 19.6 AFR at 5 volts or  $AFR = 2 * V + 9.6$ . The output voltage can be customized through the Linear Wideband Output Configuration dialog.



### Selectable Simulated Narrowband Signal Switching Point

## APPLICATIONS

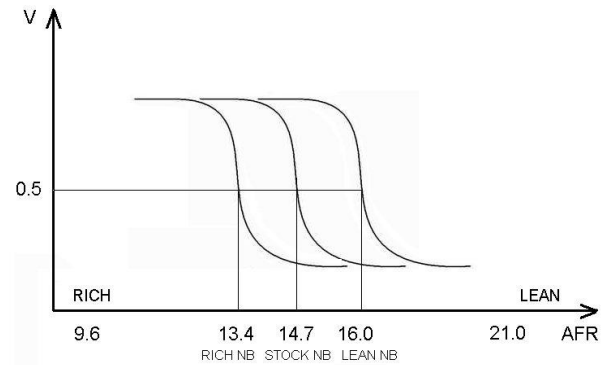
Narrowband Switching Point leaner than 14.7  
 Narrowband Switching Point richer than 14.7  
 Narrowband Switching Point at 14.7

Fuel savings  
 Help engine idle problems after major engine modifications (aggressive cams)  
 Same as a stock narrowband O2 sensor

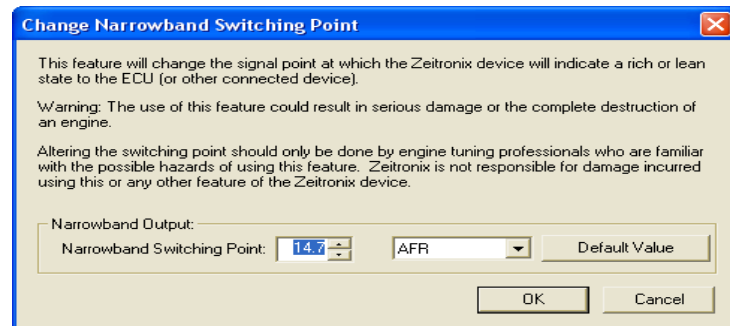
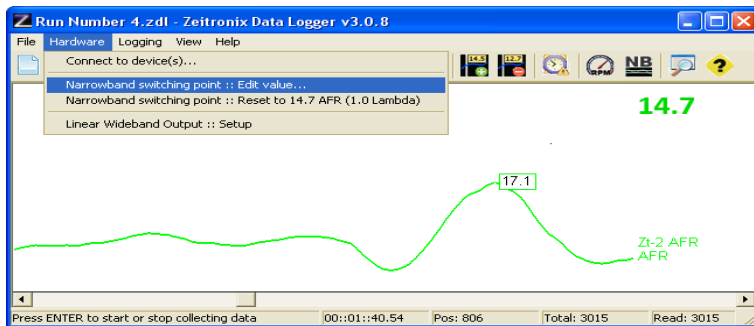
A stock narrowband O2 sensor switches at 14.7 AFR. The Simulated Narrowband Output switching point can be selected to force the ECU to maintain richer or leaner mixture than 14.7 AFR (Lambda 1) in closed loop operation. The ECU operates in a closed loop at idle and at low throttle (low engine load). The Zt-4 is reading the entire AFR range and is capable of shifting the narrowband switching point to a richer or leaner region. The default NBSP is the same as a stock narrowband O2 sensor, 14.7. You can program the Zt-4 to output as desired by the ECU curve anywhere from 9.5 to 21.0 AFR. This could be used for better or for worse. Your engine was designed for 14.7 AFR at closed loop. Most engines will idle and operate at a lean closed loop AFR 15.0-16.0. This leads to a significant fuel savings! You can also force the ECU to idle on the rich AFR side to cover up big cam idle problems.

Example here illustrates the switching point being shifted from a stock 14.7 AFR into 13.4 AFR and 16.0 AFR. You can choose any AFR switching point between 9.6 AFR and 21.0 AFR. Most engines will not operate properly in closed loop leaner than 16.0 AFR. Some ECUs will not richen the mixture beyond 13.0 AFR at idle and will ignore the O2 sensor closed loop feedback. A different than 14.7 AFR Narrowband Output will increase the smog output and may harm your engine and catalytic converter.

A different than 14.7 AFR Narrowband Output may trigger a Check Engine light. Use at your own risk and off road only.



## SOFTWARE SETUP



Open the Zeitronix Logging Software. Connect the Zt-4 Wideband AFR Meter into a PC COM port and power up the Zt-4. Make sure the log graphs are shown on the screen. Open the Narrowband Switching Point menu by selecting Settings/Narrowband Switching Point

To Change the Narrowband Switching Point, adjust the number in the menu and click OK. The Narrowband Switching Point can be restored to a default value of 14.7 AFR by clicking on the Default Value, then OK.

## Warning!

This product is for automotive use only and for off road use only. Never place the wideband controller or a display in a place which will obstruct your view or ability to operate the vehicle. Never tune while operating driving.

To be used with Bosch LSU 4.9 wideband sensors only. Using the wideband oxygen sensor with leaded gasoline, two stroke engines will significantly shorten the sensor's life. Do not expose the oxygen sensor to moisture. Do not disassemble, modify or tamper with the oxygen sensor. The oxygen sensor controller must be powered and connected to the oxygen sensor while the sensor is in an active exhaust stream. Leaving an unpowered oxygen sensor in the exhaust will result in sensor damage. Never mount the oxygen sensor in stock factory location or closer than 16" from the cylinder head exhaust ports or a turbocharger. Exposing the sensor to the temperature above 800 C will cause sensor damage. Never position the oxygen sensor on the high-pressure side of the turbocharger.

Tune your engine responsibly. Zeitronix Inc. is not responsible for any damages.