ZEITRONIX

Zt-2
Wideband Air/Fuel Ratio Meter and Datalogging System

Zt-2 items:
ZT-2 Wideband AFR Controller
Oxygen Sensor Harness (10' length)
Signal Harness (1' length)
Bosch LSU Wideband Oxygen Sensor
Datalogging cable with RJ-12 to DB-9 converting plug
2 Pin EGT Sensor Connector+2 Crimp Pins
Datalogging software.

Additional displays, Boost (MAP) Sensor, EGT Sensor are included if purchased.

Installation instructions

The Wideband Oxygen sensor 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 cracking of the sensor ceramic element and protect sensor against water condensation.

The Zt-2 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 6pin connector to the oxygen sensor. Make sure the Oxygen Sensor 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.

Connect the 8-pin Oxygen Sensor Harness connector, the 12-pin Signal connector and the Serial Cable to the Wideband Controller. Tap the Signal Harness RED wire to the switched power (+12V) and BLACK wire to the ground. The Wideband Controller has a built in auto-resettable 4A fuse, therefore, no additional in line fuse is required. The cold sensor warm up time is about 15-30 seconds. Wait 15 seconds for the datalogger serial data activation. Make sure the COM port chosen in the logging software matches the COM port number of your PC laptop. If you are using a USB to serial adapter make sure the virtual COM port number assigned by the adapter driver is the same as chosen in the logging software. Some USB serial adapters assign COM ports into a higher number than COM 8. You can adjust the COM port number in the logging software by going into Settings, Plots/Com Port. The USB serial adapter COM port needs to be adjusted through a control panel.

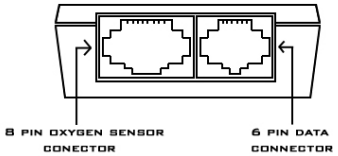
Zt-2 Inputs/Outputs
Bosch Wideband O2 sensor
Analog Wideband Output
Serial data output for the Zeitronix Wideband LCD Display
Serial data output for real time datalogging (PC laptop or PDA required)
Simulated Narrowband Output Signal with adjustable switching Point to feed stock ECU RPM input
Throttle position input.
Boost sensor input
EGT probe input
User Input
Warning Output

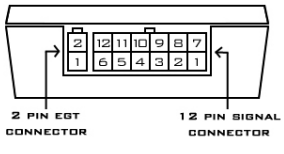
Signals	**range**
Lambda	1.43 to 0.64 Wideband
AFR	21.0 to 9.5 Wideband
EGT	200C to 1200C
	395F to 2200F
Boost	-650mmHg to 2.5 BAR
	-25inHg to 35.3 PSI
Throttle Position	%
RPM	0 to 18000
User Input	0 to 5V

Signal Harness

PIN #	WIRE COLOR	FUNCTION
1	RED	Switched power (ex. ignition)
2	WHITE	Wideband Analog Output
3	GREEN	RPM Input. 0-12V square wave, tach signal or primary (low voltage) side of ignition coil.
4	ORANGE	Zeitronix Boost (MAP) Sensor Input
5	WHITE/BLUE	Warning Output
6	YELLOW	Zeitronix Boost Sensor +5V Power. Connect ONLY to Zeitronix Boost Sensor RED.
7	BLACK	Power Ground
8	BROWN	Sensor Ground (EMS ground reference)
9	PURPLE	Simulated Narrowband O2 Output (for your stock ECU) / Linear Wideband Output
10	GREY	Throttle Position Sensor
11	BROWN	Sensor Ground (Boost Sensor ground reference)
12	BLUE	User Input 0-5V

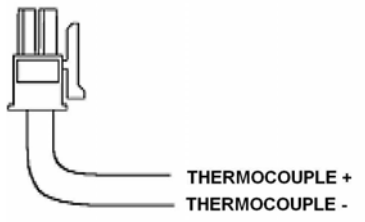
WHITE and BROWN wires are provided to connect the Zt-2 Wideband Controller to your favorite engine management system.





EGT Sensor

The Zt-2 is capable of reading and logging the Exhaust Gas Temperature through a commonly used Chromel Alumel K type thermocouple. The Zeitronix EGT probe plugs right into the Zt-2.
To retrofit your EGT probe connect the positive side of the thermocouple wire to pin #2 and negative wire to pin #1 of included two-pin connector. Pin #2 is the closest to the connector's lock. Typically a K type thermocouple red wire is negative, a yellow wire is positive. Note that a K type thermocouple extension wire needs to be used. Extending the EGT probe using a copper wire affects the EGT reading accuracy.



Boost Sensor (MAP Sensor)

The Boost Sensor is a 3.5 Bar Kavlico Zeitronix PN 80-2500-001. If a 5 Bar (75 PSI absolute pressure) MAP sensor is used PN 80-2500-002, select 75 PSI MAP from the ZDL software Setting/ Hardware Boost Settings/ 75 PSI MAP Sensor.
Both sensors can be calibrated for altitude offset via the ZDL software.

Connect the Boost Sensor to the Zt-2 as follows	
Zt-2 Wire Color	**Boost Sensor Wire Color**
YELLOW (+5V Supply)	RED
BROWN (Signal Ground)	BLACK
ORANGE (Boost Input)	GREEN

The Kavlico sensor was chosen for its precision and repeatability. This sensor is more accurate than most boost gauges.

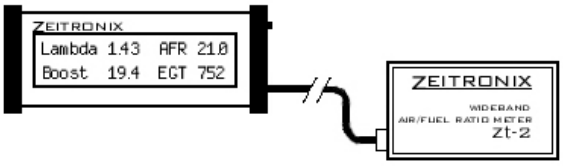
LCD Display selection between BOOST, USER and TPS.

Connect the Zt-2 Boost Input (orange wire) as follows:

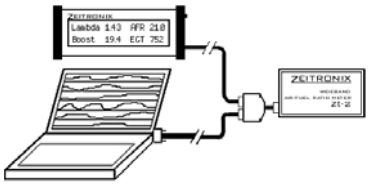
Zt-2 Boost Input Wire Color	Orange Wire Connection to:	LCD Display Selection
Zt-2 ORANGE	Boost Sensor GREEN	BOOST
Zt-2 ORANGE	Zt-2 BROWN	USER
Zt-2 ORANGE	Zt-2 YELLOW	TPS

The EGT and the Boost sensors are optional and do not affect Lambda and AFR readings.

Connecting the Zeitronix Wideband AFRM Display and the Zt-2



Connecting the Zt-2, PC and the AFRM Display through the provided serial data splitter



LCD Display peak and hold button

Short press- peak values, "**#**" shown next to Lambda and AFR, **C**/**F**, **P**SI/**B**AR units next to Boost and EGT. Long press- (3s) of the button resets peak values.

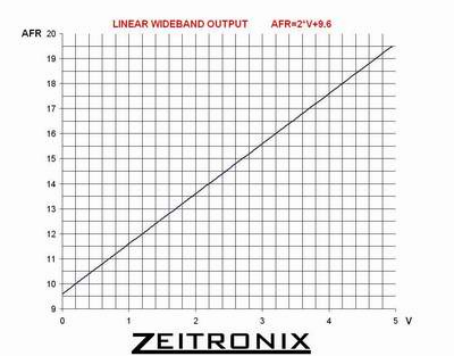
Analog Wideband Output (White Wire) Voltage vs. AFR table

V	0.15	0.31	0.46	0.62	0.78	0.93	1.09	1.24	1.4	1.56	1.71	1.87	2.02	2.18
AFR	9.7	9.9	10.1	10.3	10.5	10.7	11.0	11.4	11.7	12.1	12.4	12.8	13.2	13.7

V	2.34	2.5	2.65	2.80	2.96	3	3.12	3.27
AFR	14.2	14.7	15.6	16.9	18.5	18.8	19.9	21.2

Linear Wideband Output (Purple Wire)

Zt-2s rev11 and later are equipped with analog wideband output activated through the ZDL software V 2.0.8 or later by selecting 0-5V Linear Wideband Output from the Settings menu. The narrowband output (purple wire) becomes the Linear Wideband Output.
The Linear Wideband Output transfer function is AFR=2xV+9.6



Warning!

For automotive use only. Using the O2 wideband O2 sensor with leaded gasoline, two stroke or diesel engines will significantly shorten the sensor's life. This product is for off road use only. Do not expose to moisture. Do not disassemble, modify or tamper. Never leave the wideband oxygen sensor in the exhaust stream without power. The Wideband Controller must be powered and connected to the oxygen sensor at all times. 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 at the high-pressure side of the turbocharger. Never place the Wideband Controller or LCD display in a place, which obstructs the view. Never tune the car while driving.
To be used with Bosh LSU wideband sensor only.
Tune your engine responsibly. Zeitronix Inc. is not responsible for any damages.

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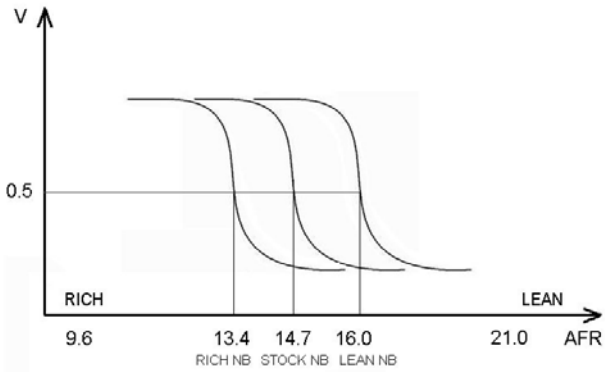
Selectable Simulated Narrowband Signal Switching Point

APPLICATIONS

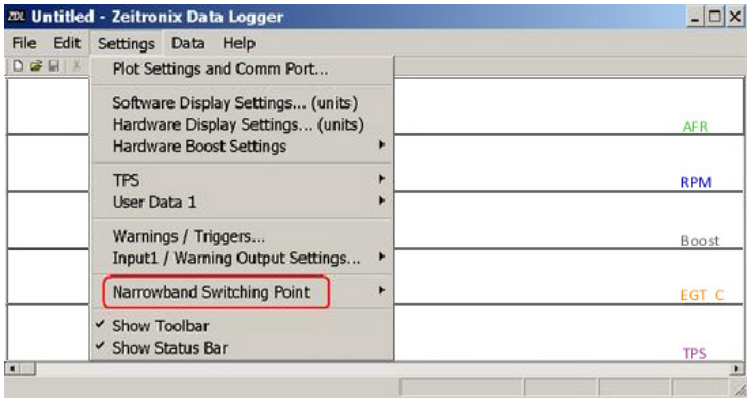
Narrowband Switching Point leaner than 14.7	Significant fuel savings
Narrowband Switching Point richer than 14.7	Help engine idle problems which may occur after major engine modifications (big cams)
Narrowband Switching Point at 14.7	Same as a stock narrowband O2 sensor

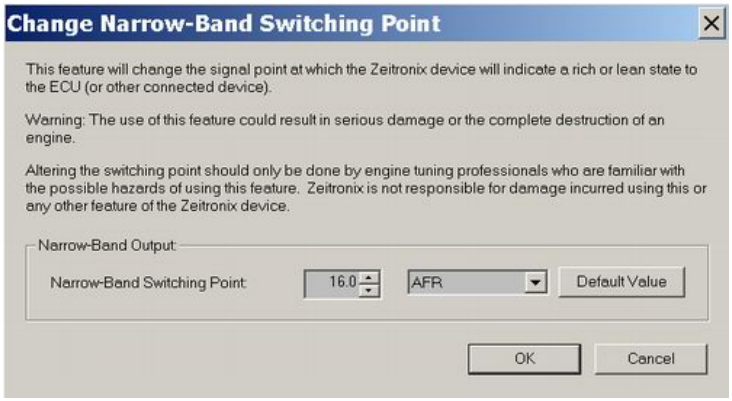
The switching point of the Simulated Narrowband Output can be selected to force the ECU to maintain richer or leaner mixture than 14.7 AFR (Lambda 1) in a closed loop. A stock narrowband O2 sensor switches at 14.7 AFR forcing the ECU to maintain 14.7 AFR at a closed loop. The ECU operates in a closed loop at idle and at low throttle (low engine load). The Zt-2 "knows" 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-2 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 chose 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. Most 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-2 Wideband AFR Meter into a PC COM port and power up the Zt-2. 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.

COMPATIBILITY

Zt-2s rev 9 and above purchased after May 08 2006 are equipped with Selectable Narrowband Switching Point feature. You can check compatibility by accessing the Alarms window in the Zeitronix Logging Software Version 2.0.4 or higher.
Open the Zeitronix Logging Software. Connect the Zt-2 Wideband AFR Meter into a PC COM port and power up the Zt-2. Make sure the log graphs are shown on the screen. Open Warnings and Triggers menu. The following message is displayed if an incompatible Zt-2 AFR Meter is detected. Contact sales@zeitronix.com for a possible Zt-2 upgrade.

Zeitronix Audio-Visual Warning and Trigger Box ZAVT-1.
(Sold separately)

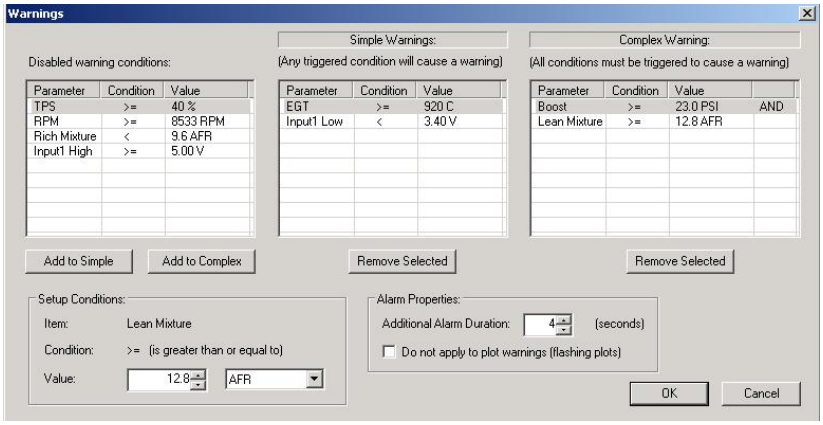
The Zt-2 is capable of setting an audio-visual alarm and triggering a relay though ZAVT-1 box.

The ZAVT-1 connects to the Zt-2 Warning Output (White wire with a blue stripe).

APPLICATIONS

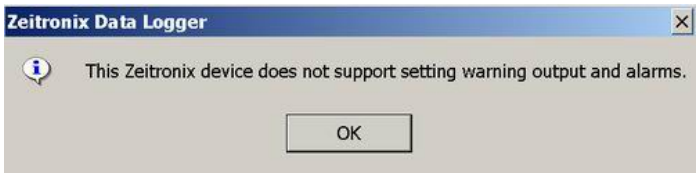
- AFR too rich — The alarm activates when too rich mixture is detected.
- AFR too lean — The alarm activates when too lean mixture is detected.
- A combination of AFR too rich and AFR too lean alarms can be used to tune for a specific AFR window.
- EGT too high — The alarm activates when EGT exceeds a safe user selected level.
- RPM too high — Shift-light functionality with a bonus of audio alarm and a relay trigger.
- TPS too high — The alarm activates when TPS exceeds a selected alarm level.
- 0-5V Input too high — The alarm activates when 0-5V User Input exceeds a selected alarm level.
- 0-5V Input too low — The alarm activates when 0-5V User Input is lower than a selected alarm level.
- Relay trigger — Open or close a relay circuit to activate or deactivate additional devices at a set warning level. Typically used to add a control to your boost setting, nitrous or alcohol injection and other devices capable of engine destruction. The relay output can trigger anything, on or off, from additional fuel pump, nitrous to alcohol injection.

SOFTWARE SETUP
Open the Zeitronix Logging Software. Connect the Zt-2 Wideband AFR Meter into a PC COM port and power up the Zt-2. Make sure the log graphs are shown on the screen. Then open the Warnings and Triggers menu. The Parameters can be selected as a Simple or Complex Warning.
A Simple Warning is set when any of selected parameters exceed preset warning level. Simple Warnings are independent from each other.
A Complex Warning is set when all selected parameters exceed preset warning level.



EXAMPLE
In an example shown here a warning will be activated if the EGT exceeds temperature of 920C **OR** if the Input1 lower than 3.4V. Also, a warning will be activated if the AFR mixture will be leaner than 12.8 AFR **AND** at the same time the boost level exceeds 23 PSI. The alarm is kept for additional 4 seconds to cool the engine down.

COMPATIBILITY
ZAVT-1 is compatible with the Zt-2 Wideband AFR Meter REV 9 or higher. Zt-2s purchased after May 9 2006 are compatible. You can check compatibility by accessing Alarms window in the Zeitronix Logging Software Version 2.0.8 or higher. Open the Zeitronix Logging Software. Connect the Zt-2 Wideband AFR Meter into a PC COM port and power up the Zt-2. Make sure the log graphs are shown on the screen. Open Warnings and Triggers menu. The following message is displayed if an incompatible Zt-2 AFR Meter is detected. Contact sales@zeitronix.com for possible Zt-2 upgrade.



Warning!
For automotive use only.
This product is for off road use only.
Never place in a location, which obstructs the view. Never tune the car while driving.
To be used with Zeitronix Zt-2 Wideband AFR Meter only.
Tune your engine responsibly. Zeitronix Inc. is not responsible for any damages.

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