

Wideband Air/Fuel Ratio Gauge



The following instructions are for the installation of your Wideband Air/Fuel Ratio Gauge. Before you begin, lay out all items and ensure there are no missing parts. If any items are missing, please STOP immediately and contact MaxTow Gauges.

What's Included

- Wideband Air/Fuel Ratio Gauge
- 4.9 Wideband Oxygen Sensor
- Power, Sensor, Gauge & Data Logging Harnesses
- Data Logging Controller
- Weld-In Bung & Plug
- Mounting Bracket
- Gauge Visor

Wire Schematic

Yellow: 12v Constant Source (+)

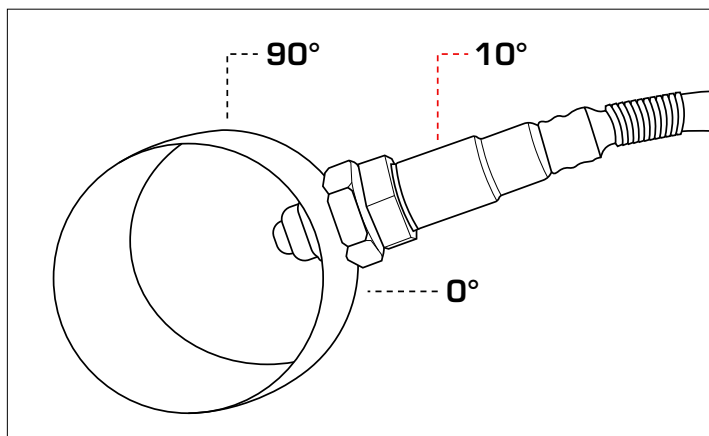
Red: 12v Ignition Switched Source (+)

Orange: 12v Headlight Switched Source (+)

Black: Vehicle/Engine Ground (-)

⚠ WARNING Disconnect negative battery terminals before starting any work on the vehicle.

1. If your exhaust does not have an available M18 x 1.5 bung to install the Wideband o2 Sensor, locate an open space on the exhaust before the catalytic converter. We recommend 3 feet from the exhaust ports to avoid excessive heat.
 - The bung should be placed in a 10-90 degree upward angle with the tip of the sensor pointing down to prevent condensation build-up in the sensor.

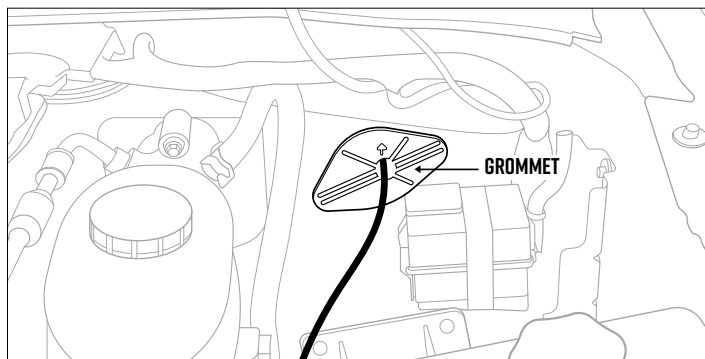


2. To install the weld-in bung, drill a hole into the exhaust using a 15/16" size drill bit. Once drilled, weld the bung to the pipe.

Note: Clamp-on Bung Adapters are available at www.MaxTow.com if welding is not available.
3. Mount the controller inside the vehicle in an easily accessible location away from heat, water, moisture, dirt and all moving parts to allow for any future calibration.
4. Thread the provided Wideband o2 sensor into the bung in the exhaust.

Note: After calibration we recommend applying fresh Anti-Seize on the threads of the Wideband o2 sensor after it has been removed so that you can unscrew the sensor when necessary for calibration.

5. Next, route and secure the sensor wire harness from the sensor into the vehicle, close to the controller's location. Be sure to use a grommet when routing the wires through the firewall to protect them from any damage.



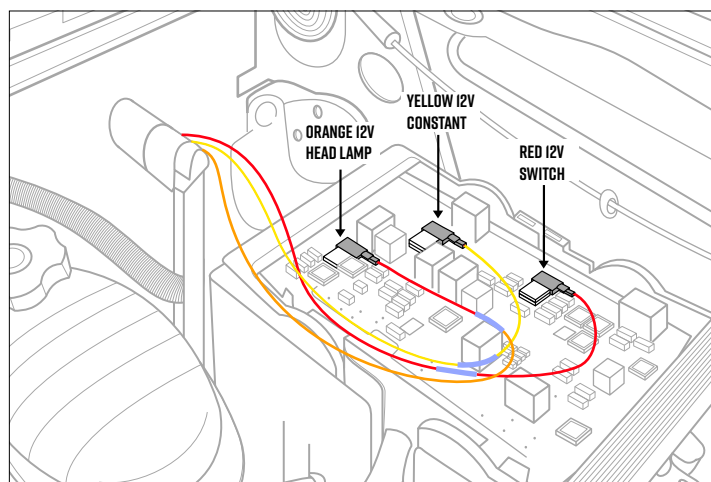
Gauge Wiring

1. Plug your Wideband o2 sensor harness into the controller.
2. Plug your Wideband gauge harness into the controller and route up to the gauge location.
3. Plug the Wideband power harness into the controller.
4. In order to test for power, reconnect the Negative Battery Terminal.
5. It may be necessary to remove the Vehicle Trim and/or Kick Panels in order to gain access to the vehicle's Fuse Box.
6. Using a test light, locate a constant 12-Volt power source in the vehicle's fuse panel that receives 12-Volt power when the ignition is turned off. You can splice into the circuit or use an optional Expandable Circuit. Connect the **Yellow Wire** of the gauge to the Constant 12-Volt Power Source.
7. Repeat the same step for the **Red Wire** of the gauge to locate an Ignition Switched 12-Volt Power Source. This source should not have any power with the key turned off and have 12-Volts with the key turned on.

8. Connect the **Orange Wire** of the gauge to the positive Headlight Switch Power Source using a Splice Connector, either in the fuse box or at the switch itself.

Note: Make sure the connection source does not dim. If the voltage is reduced when you lower the Dimmer Wheel it will cause the gauges to flicker from not having enough voltage.

9. Locate a clean, reliable grounding source and connect the **Black Wire** from the gauge.
10. After all wiring is complete, turn the vehicle's key to the "On" position and confirm that your gauge illuminates.
11. Turn on the headlights to ensure that the gauge is dimming.
12. Reinstall any panels that may have been removed.
13. Ensure your gauge is functioning properly.



Selectable Brightness Levels

The Double Vision Gauge Series features 3 selectable brightness settings for both day and nighttime lighting modes. Below are the instructions on how to program each lighting mode.

Daytime Mode

- Press and hold the button located on the gauge face until a "d1" appears in the digital display.
- Press the button again to cycle through the 3 dimming modes.
- Press the button until you have selected your desired setting. Do not touch the button for 5 seconds and the gauge will save your selection.

Nighttime Mode

- This mode is only available if the orange dimmer wire is connected and your headlights are powered.
- Press and hold the button located on the gauge face until an "n1" appears in the digital display.

- Press the button again to cycle through the 3 dimming modes.
- Press the button until you have selected your desired setting. Do not touch the button for 5 seconds and the gauge will save your selection.

Gauge Start Up

1. Prior to operation, the sensor must warm up for 30 seconds. This is a mandatory process every time the gauge and sensor are powered. The LED display will show a scrolling graphic until the warm up phase is complete.
2. If necessary you may perform a manual calibration by pressing the button on the controller for 3 seconds, to initialize a controller /sensor calibration sequence. The LED display on the gauge will show a [2] until the calibrating process is over.
3. If the LED display on the gauge shows a [3] then there is a sensor error detected. Check and confirm the connection of the sensor and wire harness to and from the controller unit. If the connections are secure and in place, press the button on the controller for 8 seconds to reset the controller to the original factory settings. The LED display will show a [2] and then a [4]. After this the factory settings are programmed and restored to your controller. If your display shows a [3] again, your sensor may be bad.
4. If the LED display on the gauge shows a [5] then there is a control box error detected.

Calibration Schedule

Prior to calibration remove the sensor from the bung. This will ensure a proper calibration. To obtain the most accurate results from your gauge, please follow the calibration schedule pre and post installation:

A. For Everyday Driven Vehicles

- Calibrate after installation.
- Calibrate again, after 3 months of use.
- Calibrate twice a year or every 10,000 miles (whichever comes first).

B. For Race Vehicles

- Calibrate after installation.
- Calibrate once per race weekend.

C. Dynamometer Use

- Calibrate after installation.
- Calibrate every 2-3 days, depending on the amount of usage.



Data Logging Reference Chart

Wideband Formula in AFR = $(V/0.5)+10$

Wideband Formula in Lambda = $(v7.42942)+0.686$

Volts	Gasoline AFR	Lambda
0.00	10.01	0.683
0.125	10.26	0.700
0.16	10.33	0.705
.250	10.50	0.717
.031	10.62	0.725
0.375	10.75	0.734
0.47	10.94	0.747
0.500	11.00	0.751
0.62	11.25	0.768
0.78	11.57	0.790
0.875	11.76	0.803
0.94	11.88	0.811
1.000	12.01	0.820
1.09	12.19	0.832
1.125	12.26	0.837
1.25	12.51	0.854
1.375	12.76	0.871
1.40	12.80	0.874
1.500	13.01	0.888
1.56	13.13	0.896
1.625	13.26	0.905
1.72	13.45	0.918
1.750	13.51	0.922
1.87	13.76	0.939
2.000	14.01	0.956
2.03	14.06	0.960
2.125	14.25	0.973
2.18	14.37	0.981
2.250	14.50	0.990
2.34	14.69	1.003
2.375	14.77	1.008

Volts	Gasoline AFR	Lambda
2.50	15.02	1.025
2.625	15.27	1.042
2.65	15.31	1.045
2.750	15.51	1.059
2.81	15.63	1.067
2.875	15.76	1.076
2.96	15.92	1.087
3.000	16.01	1.093
3.12	16.25	1.109
3.125	16.26	1.110
3.250	16.51	1.127
3.28	16.55	1.130
3.375	16.76	1.144
3.43	16.88	1.152
3.500	17.01	1.161
3.625	17.26	1.178
3.59	17.27	1.179
3.74	17.49	1.194
3.750	17.51	1.195
3.875	17.76	1.212
3.90	17.81	1.216
4.000	18.02	1.230
4.06	18.11	1.236
4.125	18.27	1.247
4.21	18.43	1.258
4.250	18.52	1.264
4.37	18.75	1.280
4.52	19.06	1.301
4.68	19.37	1.322
4.84	19.67	1.343
4.99	20.00	1.365

Data Logging Output

Offers an analog output for monitoring and capturing Air/Fuel Ratios using a third party data log device.

Wire	Function	Signal	Signal Voltage
Brown	Provides the positive (+) analog WIDEBAND voltage output signal.	Data Logger (+)	0-5 volts
Black	Provides the negative (-) ground reference for the WIDEBAND voltage output signal.	Data Logger (-)	Ground

At the end of its life the sensor becomes slow to respond and does not read rich properly. In some cases an Error Code 3 will be displayed on the gauge face. Regular free air calibrations will maintain the accuracy of the sensor over its lifetime.

		Error Code
1)	Sensor Heating	--
2)	Calibrating	[2]
3)	No Signal from Sensor	[3]
4)	Reset to Original Settings	[4]
5)	Control Box Malfunction	[5]

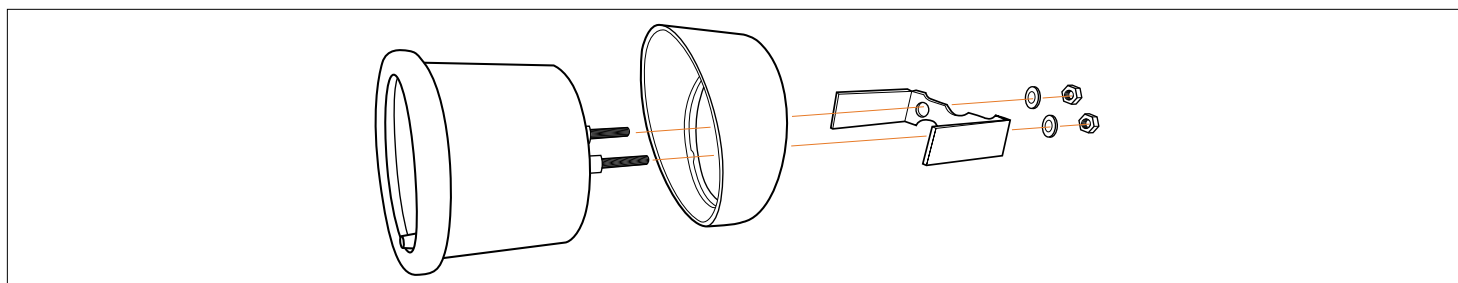
Sensor Lifetime

The lifetime of the sensor is highly dependent on the application in which it is being used. Some factors that reduce sensor lifetime include:

- If the sensor is not positioned at at least a 10(degree) upward angle moister will collect at the sensor tip and fail the sensor.
- Dropping the sensor, which will break the ceramic tip
- Contaminants such as water, moisture, silicon, lead, oil, etc. (be sure to use sensor-friendly sealants)
- Thermal cycling and exposure to exhaust fumes without any heating control active.
- Incorrect placement in the exhaust that can overheat the sensor.
- Leaded fuel, which will quickly reduce sensor life.

Periodic cleaning of the sensor may be necessary by removing the sensor and spraying it with brake cleaner. Be sure to hold it so that the tip is facing down allowing everything to flow out of it. Afterwards, let the sensor air dry and then reinstall.

Additional Information



- The supplied optional gauge visor is intended to be placed on the gauge so that the thickest part is at the top, creating a cover over the gauge to help keep sun glare off of the gauge face.
- The included mounting bracket is designed to be used on a flat universal-style mount in order to keep the gauge secure. In some cases one or both legs of the bracket may need to be modified to fit the thickness and contour of the mount. Our A-pillar gauge pods do not require the use of the mounting bracket but can be used if you desire, and there is enough space to fit it between the gauge and the gauge pod. When installing the bracket onto the gauge, make sure **not** to over-tighten as it could pull the rear studs on the back of the gauge and damage it.
- MaxTow Gauges Installation Instructions: Installation documents are solely to provide a guide for individuals that are mechanically and electronically able to install products. If you are unsure about the correct procedure of installation for a product, you should consult a licensed professional.



INSTALLATION INSTRUCTIONS

1.877.7MAXTOW • Support@MaxTow.com



ONE YEAR NON-TRANSFERABLE LIMITED WARRANTY AND DISCLAIMER

MaxTow Performance, LLC. ("MaxTow") warrants to the original retail consumer purchaser, and not any other purchaser or subsequent owner, that this Product will be free from defects in material or workmanship for a period of **one (1) year** from the purchase date.

For a period of **one (1) year** from the date of purchase, at no charge to the Purchaser, MaxTow will repair or replace this Product if it is determined by MaxTow to be defective. After the warranty period, the Purchaser must pay all charges for parts and labor.

Coverage under this warranty is only valid within the United States, including its territories, as well as in certain other countries. Purchasers should check our website, www.MaxTow.com, to determine the warranty coverage in the countries in which they are located.

MaxTow does **not warrant the installation** of the Product, which is the sole responsibility of the Purchaser. Installation should be done by licensed professionals. Improper installation may cause damage to the Product and any vehicle in which it is installed, and may cause burns and electrical injury to individuals. MaxTow's warranty does not cover any expenses incurred in removing Products that are defective or re-installing replacement Products in their place.

During the warranty period, to have the Product repaired or replaced, the Purchaser must return the Product, freight prepaid by the Purchaser, to MaxTow (but for customers in the contiguous United States, MaxTow will pay the shipping charges if any Product fails during the first thirty (30) days after purchase). The Product must be returned in its original carton or in a similar package affording an equal degree of protection. MaxTow will return the repaired or replaced Product, freight prepaid, to the Purchaser. MaxTow does not provide Purchasers with temporary replacement units during the warranty period or at any other time.

This limited warranty is non-transferable and will automatically terminate if the original retail consumer purchaser resells the Product or transfers the vehicle in which the Product is installed. An "original retail consumer purchaser" is a person who originally purchases the Product, or a gift recipient of a new Product that is in its original packaging and unopened.

This limited warranty is subject to all of the following terms and conditions:

TERMS AND CONDITIONS

1. NOTIFICATION OF CLAIMS; WARRANTY SERVICE: If Purchaser believes that a Product is defective in material or workmanship, written notice with an explanation of the claim shall be given promptly by Purchaser to MaxTow. All warranty claims must be made within the warranty period, and any Products returned to MaxTow must be shipped in accordance with MaxTow's procedures (including use of RMA numbers supplied by MaxTow after notification). The repair or replacement of any Product or part thereof shall not extend the original warranty period. The specific warranty on the repaired part only (not including gauge sensors) shall be in effect for a period of ninety (90) days following the repair or replacement of that part, or the remaining period of the Product warranty, whichever is greater. MaxTow does not provide a warranty on replacement gauge sensors.

2. EXCLUSIVE REMEDY; ACCEPTANCE: Purchaser's exclusive remedy and MaxTow's sole obligation is to supply (or pay for) all labor necessary to repair any Product found to be defective within the warranty period and to supply new or rebuilt replacements for defective parts. MaxTow will refund the purchase price for such Product only if repair or replacement fails to remedy the defect. Purchaser's failure to make a claim as provided in paragraph 1 above or continued use of the Product shall constitute an unqualified acceptance of such Product and a waiver by Purchaser of all claims thereto.

3. EXCEPTIONS TO LIMITED WARRANTY: MaxTow shall have no obligation to Purchaser with respect to any Product that is subjected to any of the following: abuse, improper use, negligence, accident, modification, failure to follow the operating procedures outlined in the user's manual, failure to follow the maintenance procedures in the service manual for the Product, attempted repair by non-qualified personnel, operation of the Product outside of the published environmental and electrical parameters, or if the Product's original identification (trademark, serial number) markings have been defaced, altered, or removed. MaxTow excludes from warranty coverage Products sold AS IS and/or WITH ALL FAULTS. MaxTow also excludes from warranty coverage any consumable items such as fuses and batteries.

All software and accompanying documentation furnished with, or as part of the Product is furnished "AS IS" (i.e., without any warranty of any kind), except where expressly provided otherwise in any documentation or license agreement furnished with the Product.

4. PROOF OF PURCHASE; REGISTRATION: The Purchaser's dated bill of sale must be retained as evidence of the date of purchase and to establish warranty eligibility. Registration of any Product or of this limited warranty is voluntary, and failure to register will not diminish any rights available under this warranty.

DISCLAIMER OF WARRANTY

EXCEPT FOR THE FOREGOING WARRANTIES, MAXTOW HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTY WITH REGARD TO ANY CLAIM OF INFRINGEMENT THAT MAY BE PROVIDED IN SECTION 2-312(3) OF THE UNIFORM COMMERCIAL CODE OR IN ANY OTHER STATE STATUTE.

LIMITATION OF LIABILITY

THE LIABILITY OF MAXTOW, IF ANY, AND PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR DAMAGES FOR ANY CLAIM OF ANY KIND WHATSOEVER, REGARDLESS OF THE LEGAL THEORY AND WHETHER ARISING IN TORT OR CONTRACT, SHALL NOT BE GREATER THAN THE ACTUAL PURCHASE PRICE OF THE PRODUCT FOR WHICH SUCH CLAIM IS MADE. IN NO EVENT SHALL MAXTOW BE LIABLE TO PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION, REIMBURSEMENT OR DAMAGES ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS OR FOR ANY OTHER REASON WHATSOEVER.

GOVERNING LAW: This non-transferable limited warranty shall be governed by the law of the State of New Jersey, U.S.A., and the United States of America, excluding their conflicts of laws principles. The courts of Camden County, New Jersey, shall have the exclusive jurisdiction over any legal action with respect to this warranty.

This limited warranty gives specific legal rights. You may also have other rights that may vary from state to state or from country to country. Some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you. You are advised to consult applicable state or country laws for a full determination of rights.