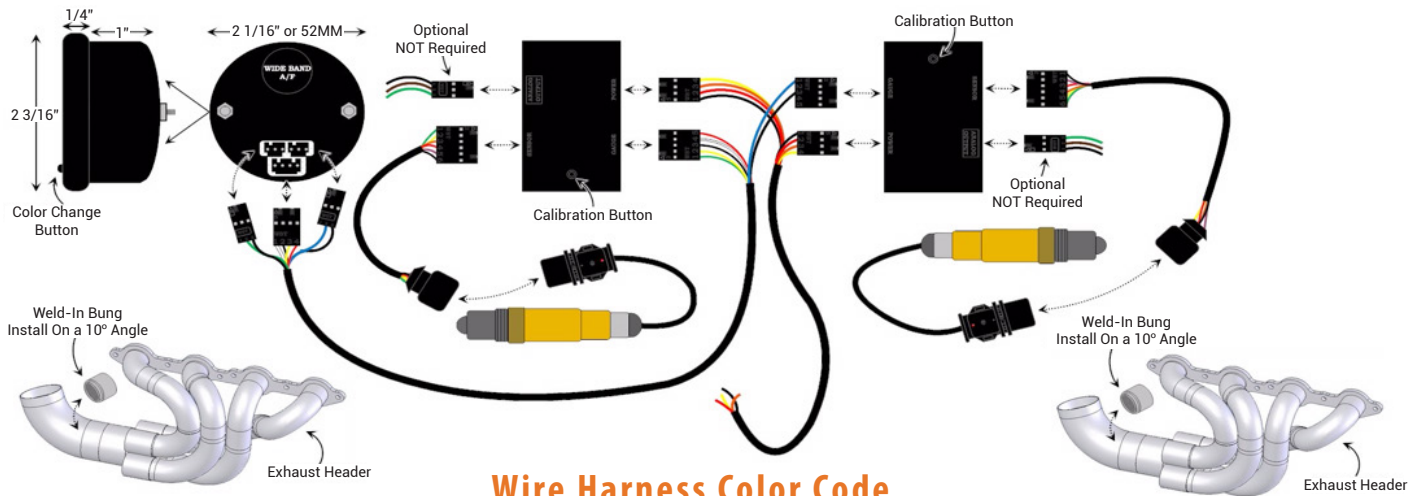


10 Color Digital Series Dual Digital Wideband Air/Fuel Ratio Gauge

Product Number: GS-TCD02W-Dual



Wire Harness Color Code

Yellow: 12v Constant Source (+) (**unswitched**)

Red: 12v Ignition Switched Source (+) (**switched**)

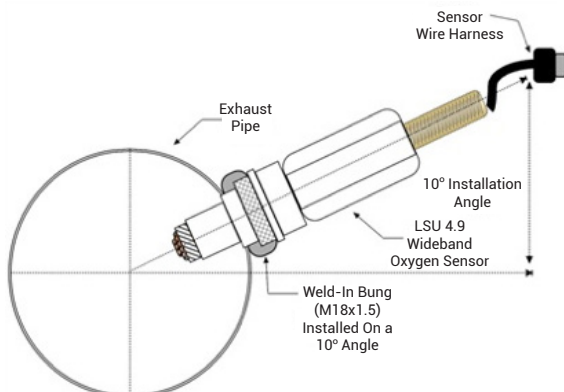
Black: Vehicle Ground (-)

Orange: 12v Headlight Switched Source (+) (**optional**)

1. Disconnect the negative battery cable.
2. Mount the controllers inside the vehicle away from heat, water, moisture, dirt and all moving parts, in an easily accessible location. This allows for the units to be accessible should calibration need to be performed.
3. Weld the matching exhaust bungs to the exhaust pipes.
 - **Note:** Be sure to use the appropriate bungs. Both mild and stainless steel bungs are provided. Use the bungs that match the metal of the exhaust pipes.
 - **Note:** Make sure the locations of each of the bungs are no less than 6 inches after the exhaust ports, but before the catalytic converter, and no more than 36 inches from the last exhaust port.
 - **Note:** The bungs must be installed to the top or side of the exhaust pipe at a minimum of 10 degrees for the top and 15 degrees for the side from a horizontal position with the electrical connection pointing up to prevent the collection of liquid at the element during the warm up phase.
4. Thread the provided LSU 4.9 sensors into the welded bungs.
 - **Note:** Use Anti-Seize on the bung threads so the sensors can be removed later if necessary.
5. Next, route and secure the sensor wire harnesses from the sensors

into the vehicle, close to the controllers' location. Be sure to use a grommet when routing the wires through the firewall to protect them from stripping.

- **Note:** The sensor plugged into the left port will read on the top display of the gauge while the sensor plugged into the right port will read on the lower display.
6. For this step, we recommend using GlowShift's Expandable Circuit to power the gauges. Locate the fuse panel and remove a fuse that does not exceed 15 amps for a switched 12 volt power source. Crimp the lead power wire to the Expandable Circuit's butt connector. Insert the fuse removed from the fuse panel into the open slot in the Expandable Circuit, then plug the Expandable Circuit into the open slot in the fuse panel. The expandable circuit is available for purchase at www.GlowShift.com.
 7. Using 18 gauge automotive grade wiring, connect the **yellow wire** to a positive 12 volt **constant (unswitched)** source. It may be connected to the fuse panel or to the vehicle's battery. If connecting to the battery, you must install a 3 amp fuse within 6-8 inches of the battery connection.
 8. Using 18 gauge automotive grade wiring, connect the **red wire** to a positive 12 volt **ignition (switched)** source. It may be connected to the fuse panel, an accessory wire, or any positive 12 volt source that turns on and off with the ignition.
 9. Using 18 gauge automotive grade wiring, connect the **black wire** to any good, clean **ground connection**. Alternatively, the black wire can be connected directly to the negative side of the vehicle's battery.
 10. Connect the **orange wire** to the positive 12 volt **headlamp** source. This wire enables the Nighttime Dimming feature which decreases the brightness of the gauge face by 50% when the headlights are turned on. This step is optional and will not affect the operation of the gauge if it is omitted.
 - **Note:** Do not connect the orange wire to a dimmer wheel. This will cause the gauge lighting to flicker.
 11. Reconnect the negative battery cable.



10 Color Digital Series Wideband Air/Fuel Ratio Gauge

Product Number: GS-TCD02W-Dual

Calibration Schedule:

Prior to calibration, remove the sensors from the bungs. 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.

Functions:

1. Prior to operation, the sensors must warm up for 30 seconds. This is a mandatory process every time the gauge and sensors are powered from a cold vehicle start. The LED displays will show a scrolling graphic until the warm up phase is complete.
2. If necessary, perform a manual calibration by pressing the buttons on the controllers for 3 seconds to initialize a controller /sensor calibration sequence. One of the LED displays 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 sensors and wire harnesses to and from the controller unit. If the connections are secure and in place, press the buttons on the controllers for 8 seconds to reset the controller to the original factory settings. The LED displays will show a "2" and then a "4". After this, the factory settings are programmed and restored to your controllers. If your display shows a "3" again, one of your sensors may be defective.

Data Logging Output: Offers two analog outputs for monitoring and capturing Air/Fuel Ratio using a third party data log device.

Wire Color	Function	Connection	Signal Voltage
Green	Provides the positive (+) analog NARROWBAND voltage output signals.	Data Logger (+)	0-1 volts
Brown	Provides the positive (+) analog WIDEBAND voltage output signals.	Data Logger (+)	0-5 volts
Black	Provides the negative (-) ground reference for both analog NARROWBAND & WIDEBAND voltage output signals.	Data Logger (-)	Ground

Digital Display:

This gauge is equipped with a Digital Air/Fuel Ratio (AFR) display with a range between 10 ~ 20 AFR. If the AFR is below 10 or higher than 20 for more than 3 seconds the display will flash.

AFR Quality	AFR Value
RICH:	10 ~ 12.9 AFR
OPTIMAL:	13 ~ 17.9 AFR
LEAN:	18 ~ 20 AFR

10-COLOR MODE

1. Press the color changing button to cycle between the ten different color options of both displays. The color will change each time the button is pressed.
2. To set a different color on the upper display than what is on the lower display, press the color changing button until the preferred color is set on the lower display. Then, hold the color changing button until the upper display starts to flash. While flashing, press the color changing button to cycle between the ten different color options of the upper display. When satisfied with the color of the upper display, wait for the gauge to stop flashing and the selected colors will be set.

The sequence of display colors is: blue, green, red, yellow, white, teal, purple, pink, amber, and orange. After orange, there are two automatic color-changing functions on the gauge that begin with the color blue. They are the 10 Color Cycle Mode and the 10 Color Fade Mode

ADDITIONAL INSTALLATION INFORMATION & MATERIAL REQUIREMENTS

- **GlowShift Gauges Approved Conductor Wires:** Successfully installing GlowShift gauges may require additional lengths of wire (sizes and quantity depend on the vehicle, gauge type, gauge location and/or sensor location). For accurate and proper GlowShift gauge installation and operation, we recommend the use of 18-20 gauge (wire diameter) automotive grade conductor wire with sheathing for one or more gauges per vehicle. Always be sure to use a rubber grommet when routing wires from the engine compartment to the inside of the vehicle cabin to prevent the stripping of the power supply and/or sensor wires, as these are necessary to deliver vital statistics from the engine to the installed GlowShift gauges. Never use wire nuts when fastening or connecting vehicle, gauge, or sensor wiring. GlowShift recommends the use of automotive crimp connectors or the soldering of individual wires together for optimum gauge installation and operation.
- **GlowShift Gauges Approved Installation Accessories:** Installation may require additional products, accessories, or adapters for a complete installation and efficient operation of a gauge or sensor. GlowShift recommends verifying the need for any additional vehicle-specific parts before beginning the installation process to ensure a smooth install.
- **GlowShift Gauges Installation Instructions:** Installation documents are provided solely as 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 or device, consult a professional mechanic or an Authorized GlowShift Installer.



ONE YEAR NON-TRANSFERRABLE LIMITED WARRANTY & DISCLAIMER

GlowShift Gauges, LLC ("GlowShift") 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, GlowShift will repair or replace this Product if it is determined by GlowShift 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.GlowShift.com, to determine the warranty coverage in the countries in which they are located.

GlowShift 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. GlowShift's warranty does not cover any expenses incurred in removing Products that are defective or reinstalling 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 GlowShift (but for customers in the contiguous United States, GlowShift 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. GlowShift will return the repaired or replaced Product, freight prepaid, to the Purchaser. GlowShift does not provide Purchasers with temporary replacement units during the warranty period or at any other time.

This limited warranty is nontransferable 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 & 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 GlowShift. All warranty claims must be made within the warranty period, and any Products returned to GlowShift must be shipped in accordance with GlowShift's procedures (including use of RMA numbers supplied by GlowShift 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. GlowShift does not provide a warranty on replacement gauge sensors.

2. **EXCLUSIVE REMEDY; ACCEPTANCE:** Purchaser's exclusive remedy and GlowShift's sole obligation is to supply (or pay for) all labor necessary to repair any Product found to be defective within the 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:** GlowShift 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 nonqualified 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. GlowShift excludes from warranty coverage Products sold AS IS and/or WITH ALL FAULTS. GlowShift 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, GLOWSHIFT 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 2312(3) OF THE UNIFORM COMMERCIAL CODE OR IN ANY OTHER STATE STATUTE.

LIMITATION OF LIABILITY

THE LIABILITY OF GLOWSHIFT, 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 GLOWSHIFT 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 nontransferable 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.