

DynoTune Wideband Gauge

DISPLAY: RED GREEN BLUE
FACE: BLACK WHITE
BEZEL: BLACK SILVER
PACKAGE: ROUND SQUARE

The DynoTune A/F Gauge will display the air/fuel ratio output from the LC-2 Wide-Band controller. The output of the LC-2 controller feeds into the DynoTune gauge displaying actual air fuel ratio. This Gauge and controller combo is pre-configured to work right out of the box.

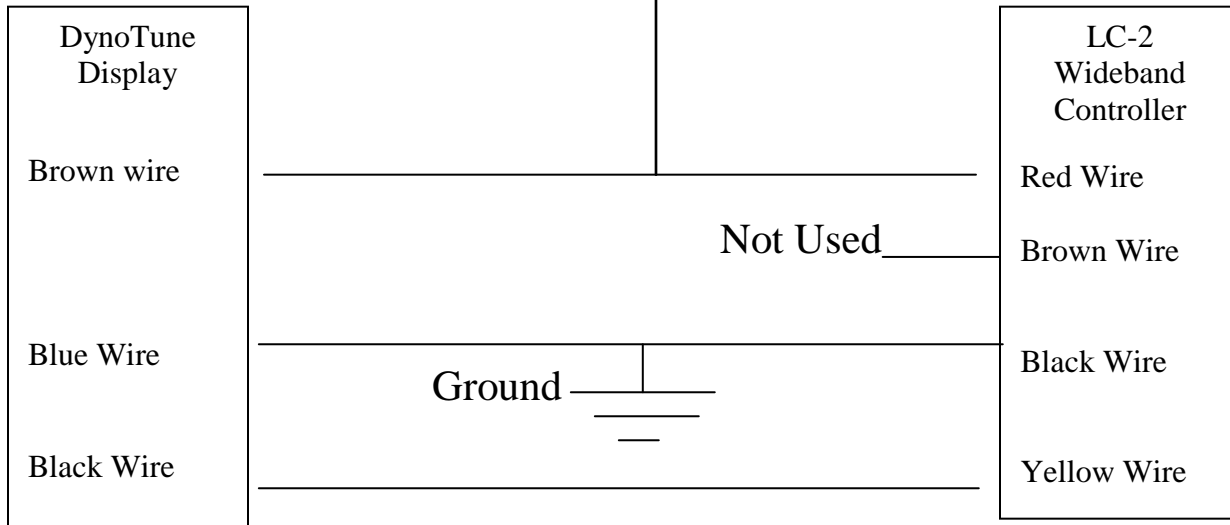
If at any time you have problems with operation, refer to the troubleshooting guidelines at the end of these installation instructions.

Read all these directions first!

Mount the LC-2 in a dry location as it is not water proof! Do not mount any of the wires near ignition or CDI wires! For wet applications wrap the LC-2 and connectors in plastic and tape it up good!

LC-2 Installation

To a switched and fused 12V power source



Connect the wires as follows:

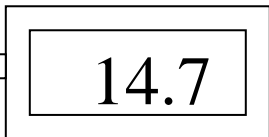
- 1) Connect the displays BROWN wire and the controller's RED wire to a switched and fused 12V power source.
- 2) Connect the displays BLUE wire and the controller's BLACK to a good solid ground, the best is battery ground. Keep all these grounds together secured to one location.
- 3) Connect the Displays BLACK wire to the controller's YELLOW wire.

Note: Controllers BROWN wire not used. You could use this Brown wire for a 0-5V output to your data logger.

NOTE: DO NOT RUN ANY GAUGE OR CONTROLLER WIRES NEAR IGNITION WIRES!

NOTE: The BROWN wire on the controller is not used.

The WHITE wire on the Gauge is not used if you have a white wire. Tape up both Wires and move them aside.



Square display orientation

Sensor Placement

Sensor Placement Optimum bung placement will vary from application to application, but using the guideline below will ensure the longest sensor life with the most accurate readings. Using a bung is the preferred method for mounting the oxygen sensor in all applications.

Weld the bung at least 24 inches downstream of the exhaust port outlet (after the collector), or 24 inches after the turbocharger if so equipped. The bung should be welded before the X or H pipe if so equipped.

Using a clock as reference, mount the bung between the 9:00 o'clock and 3:00 o'clock position. Welding the bung in the lower section of the exhaust pipe can result in sensor damage caused by condensation making contact with the sensor's internal heating element.

A 1" bung (provided in the kit) will best protect the sensor. When fully threaded, the sensor's tip will sit flush with the exhaust pipe, this does not adversely effect the readings.

The bung should always be welded before the Catalytic Converter. Welding the bung after the catalytic converter will skew the readings toward lean. The skew in readings will vary with engine load and the efficiency of the catalytic converter.

Leaded fuel and two stroke applications will reduce the sensor's life. There are many other factors that dictate the sensor's lifespan so it is impossible to predict it's total longevity.

Exhaust leaks, camshaft overlap, and open (shorty) exhausts will cause false lean readings at light engine loads. Typically, once the engine is under load and the exhaust gas volume increases, you will see accurate readings.

When installed in the exhaust, the oxygen sensor must be connected to a powered, functional LC-2 (no error codes) whenever the engine is running. An un-powered sensor will be damaged in a short period of time when exposed to exhaust gas.

Do not pre-warm the sensor before starting the engine, simply start the engine as normal. Allowing the sensor to pre-warm before starting the engine will increase the possibility of damaging the sensor from shock-cooling.

The maximum temperature of the sensor at the bung (the sensor mounting location) should not exceed 500 °C or 900 °F. If these temperatures are exceeded in your application you should install the Innovate Motorsports HBX-1 heat sink bung extender. (p/n 3729.)

Operation overview

We have pre-Programmed the Innovate LC-2 wideband controller to work with the DynoTune Gauge. NEVER POWER UP THE LC-2 WITHOUT THE SENSOR HOOKED UP BECAUSE THE CALBRATION IN THE LC-2 WILL BE RESET! When the gauge is first powered the readings will read approximately 00.0 until the sensor is warmed up. This typically takes about 30 seconds. The free air calibration is not typically needed as it has been performed at the Dynotune factory. Only do a free air calibration when you change sensors or once a year etc. At idle the gauge should read about 14.7-15.5 as this air fuel ratio is normal. For the most accurate readings wait until your engine is at full operating temperature before doing serious tuning.

A reading of 50.0 is typically an indication that the o2 sensor has gone bad and a new one is required. Check the troubleshooting section and all wires before ordering a new sensor. Check the LED status indicator on the side of the LC-2 for troubleshooting information.

If you have modified the setting in your LC-2 or need to set them back so your Dynotune gauge will work on output #1 YELLOW wire follow the steps below.

- 1) Connect your laptops program cable to the “OUT” connector on the LC-2
- 2) Launch the Innovate Configuration Software. A small box will pop up asking “make sure the LC-2 is connected”.
- 3) Now turn the key to the “on” position so the LC-2 has power. The configuration software screen will automatically pop up on the screen. You are now ready to configure the LC-2.

Set the parameters as follows:

- 1) Verify that the fuel setting is gasoline and set at 14.7
- 2) Click on the “analog output 1” tab.
- 3) Set analog output 1 as follows:
 - a. Select the “air fuel ratio” button
 - b. 1.000V= 10.00 a/f
 - c. 2.000V= 20.00 a/f
 - d. Select “advanced” button
 - e. Select the “Instant” sample rate.
 - f. Enter 0.00V at warm up.
 - g. Enter 5.00V at output error.
 - h. Press “OK”
 - i. Press the program Button. It takes one second to program, you will not get any message about programming completed but you will notice that the program button is now shaded. This confirms that you have programmed the LC-2.
 - j. You are done.

Troubleshooting your Wideband System

If you have problems with erratic readings or you have changed the oxygen sensor at some point, you will need to perform the following calibration. Try this first!

- a) Disconnect the oxygen sensor from the LC-2 at the connector.
- b) Remove the o2 sensor from the pipe and lay on the ground in “open air”.
- c) Turn the key to the “on” position but do not start the vehicle!
- d) Leave the key “on” for about 1 minute and then shut the key off.
- e) Reconnect the oxygen sensor, with the sensors still on the ground.
- f) Turn the key to the “on” position but do not start the vehicle! You will notice that the gauge will read approximately 00.0.
- g) Leave the key “on” for about 1 minute or until the display reads about 19.9 and then shut the key off.
- h) Leave the key off for 30 seconds. Install the o2 sensor back into the pipe.
- i) You are done!

CHECKING THE OXYGEN SENSOR OPERATION

1) Double check all your wiring, make sure the gauge’s black wire is connected to the innovate’s yellow wire.

2) Remove o2 sensor from exhaust. Lay on dry hard surface, the tip gets very hot and can burn you and other objects!

3) With the key “on” and engine not running you should get approximately 00.0 on the display. If it does not read 00.0, proceed to step 6

4) After thirty seconds the display should read around 20.0, again the engine still not running!
Note: sometimes it takes longer for the o2 sensor to heat up and read the 20.0, if after 5 minutes it does not read 20, proceed to step 6

5) With the key still “on” and engine not running, use a hand held BIC / butane cigarette lighter and spray the butane gas (don’t light the flame, you want gas only) into the tip of the o2 sensor. Hold it right up as close as you can get to the tip. Be a bit careful as the hot o2 sensor tip could ignite the lighter flame but we have never seen it happen. After a few seconds the display should go from 20.0 down to 10.0. Hold the lighter there for about 5 seconds. The display must read approximately 10.0 for the entire 5 seconds! If it does not read near 10.0 for 10 seconds the o2 sensor is bad and needs to be replaced. Turn off the lighter. After about 10 seconds the reading on the display will slowly rise from 10.00 up to 20.00. This should take about 10-15 seconds to rise from 10.0 to 20.0 . If at any point the display jumps or bounces around on its way up to 20.0 you may need to run the calibration procedure. Repeat this test as needed. The reading should slowly and consistently move up to around 20.0 or the sensor will need a new “free air calibration”.

6) Disconnect the o2 sensor from the innovate controller (black connector). With the key “on” the display should read approximately 50.0, if it does read 50.0 go to step 7.

If it does not read 50.0 with the o2 sensor disconnected then the controller needs re-programming or replacement. Contact DynoTune.

7) Your wideband oxygen (o2) sensor is bad and needs replacing! You can order another one from www.dynotunenitrous.com. These o2 sensors are not covered under and warranty policy due to the nature of their use. What kills o2 sensors?

Dropping or banging the sensor (detonation can do this as well)

Moisture in the exhaust from a car that sits a lot can damage the sensor, make sure the sensor is mounted on the top or sides of the pipe so the water will not hit the sensor. Leaded gasoline will shorten the life a bunch. Expect 2-4k miles usage. Rich fouled. Running your engine so rich that the sensor ports get clogged wit soot. Do not try and clean the o2 sensor with chemicals as this will defiantly kill the sensor.

Do not install the o2 sensor by using vise grips on the body of the sensor!

CHECKING THE DYNOTUNE DIGITAL DISPLAY OPERATION

- 1) Disconnect the gauges “black” wire from the Innovate LC-2 wideband controller. Join this “Black” wire to the Gauges Brown Wire (there will now be three wires connected together, the gauge brown wire, the gauge black wire and the LC-2 wideband controller red power wire). Turn the key to the on position. The gauge should read 138.00 or around this. The DynoTune Display is working properly if you see any reading between 110.00 to 150.00 on the display. If the Display is defective, contact DynoTune.