

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

DynoTune Wideband Gauge

The DynoTune A/F Gauge will display the air/fuel ratio output from the LC-1 Wide-Band controller. The output of the LC-1/LM-1 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 (not LM-1).

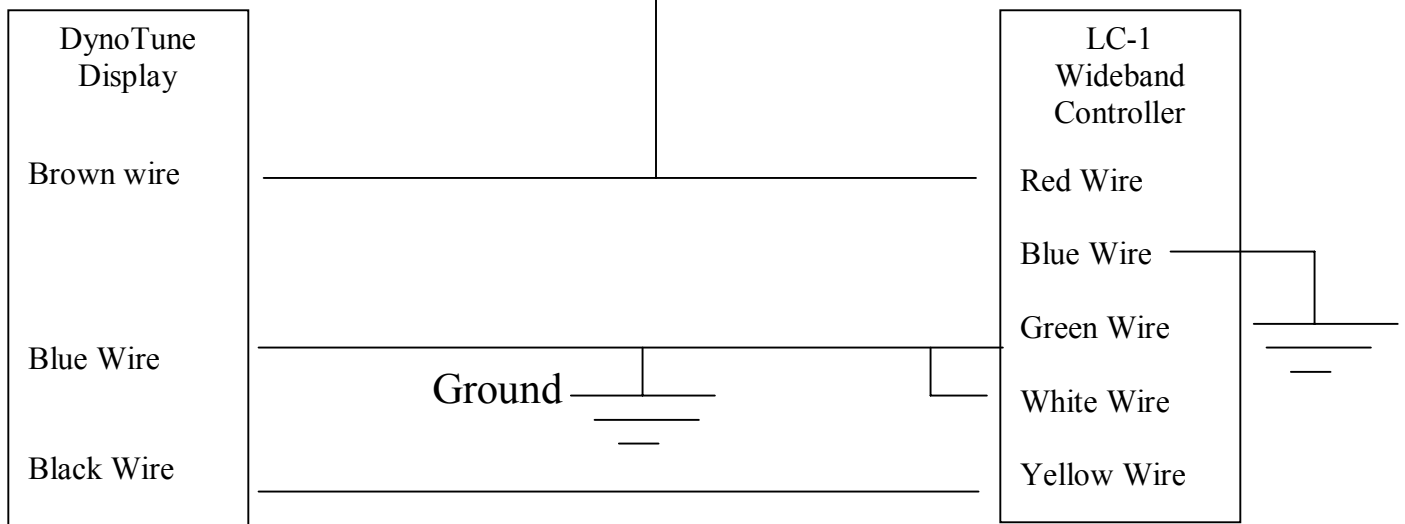
If at any time you have problems with operation, refer to the troubleshooting guidelines at the end of these installation instructions.

Read all these directions first!

DO NOT LEAVE THE TERMINATOR PLUG INSTALLED IN THE “IN” CONNECTOR WHILE OPERATING THE LC-1, ONLY WHILE PROGRAMMING IT! KEEP WATER OUT OF THE “IN & OUT” CONNECTORS!

LC-1 Installation

To a switched and fused 12V power source



Connect the wires as follows:

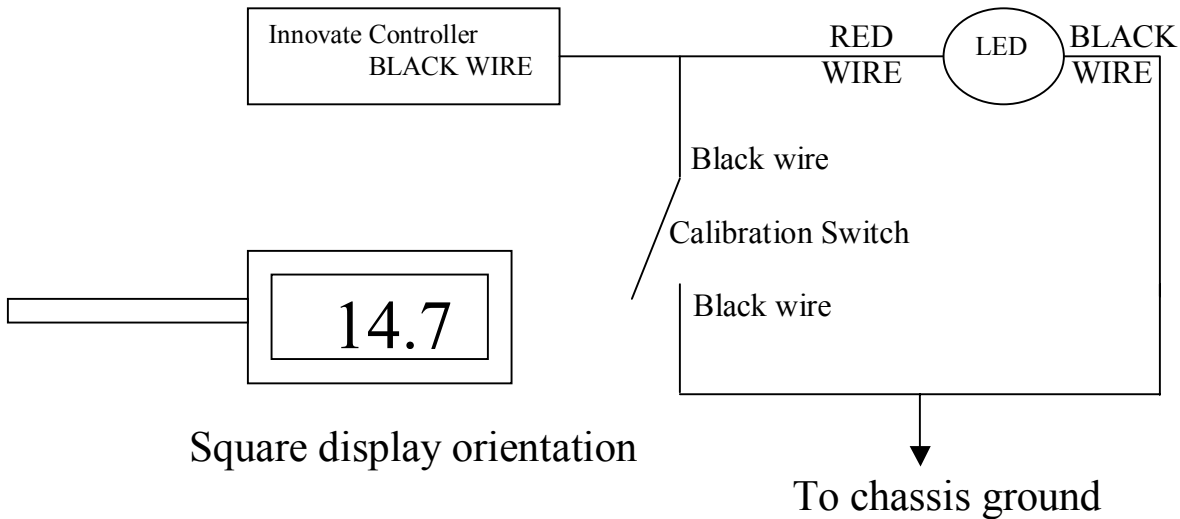
- 1) Connect the displays BROWN wire and the controller's RED wire to a switched and fused 12V power source.
- 2) Connect the displays BLUE wire and the controller's GREEN and WHITE wires all to a good solid ground. Keep all these grounds together secured to one location.
- 3) Hook the LC-1 BLUE wire to a chassis ground. **Do not connect this BLUE wire near any of the other ground wires!!!!**
- 4) Connect the Displays BLACK wire to the controller's YELLOW wire.

- 5) Hook up the calibration switch and LED as shown below.
 This switch and LED are required to recalibrate the unit or see diagnostics via the LED. Hooking up the switch and led are optional.

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

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

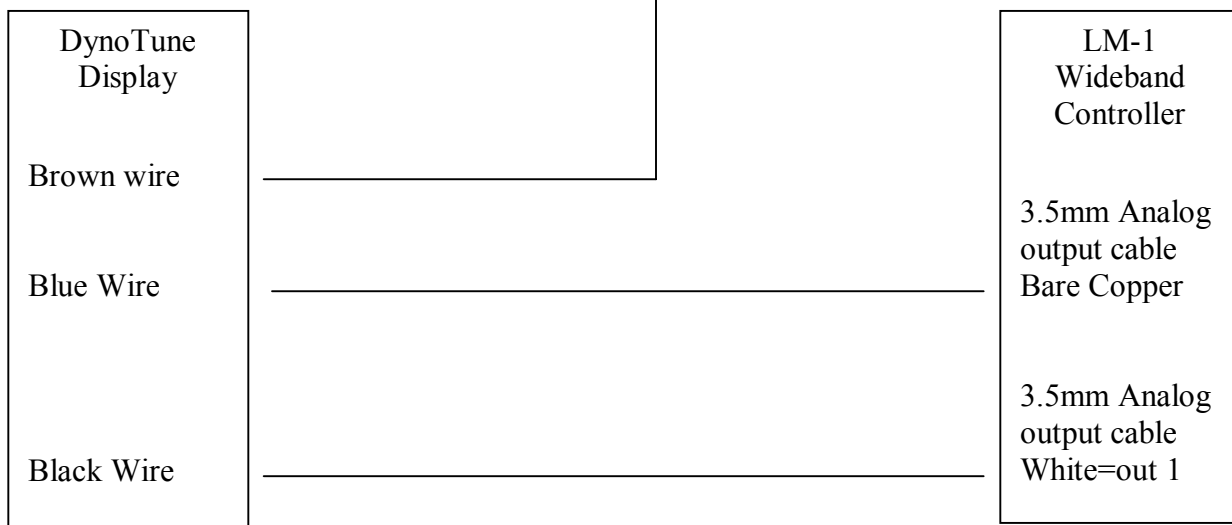
The WHITE wire on the Gauge is not used. Tape up both Wires and move them aside.



- 6) Run the serial connectors to a convenient location so you can use your laptop to change the configuration at some point if you need to. (Changing the configuration is optional)

LM-1 Installation

To a switched and fused 12V power source



Follow your LM-1 installation handbook and make sure your LM-1 is fully functional before you install the Dynotune Gauge.

Connect the wires as follows:

- 7) Connect the displays BROWN wire to a switched and fused 12V power source.
- 8) Connect the displays BLUE wire to the LM-1 controller's 3.5mm Analog output cables Copper shield wire.
Connect the Displays BLACK wire to the controller's 3.5mm Analog output cables White wire.
- 9) After your gauge and LC-1 is all hooked up you must follow this *first start* procedure!
 - a) Turn the key to the "on" position but do not start the vehicle! You will notice that the gauge will read approximately 00.0
 - b) Leave the key "on" for about 1 minute and then shut the key off.
 - c) Leave the key off for 30 seconds.
 - d) Start the engine and the gauge should read 00.0 again. Check the diagnostic LED and make sure it is flashing in an even steady pattern. This means the oxygen sensor is heating up. After a few minutes the oxygen sensor should be hot and the diagnostic LED should be on all the time letting you know that the system is fully warmed up and ready to go! Your Idle air fuel ratio should be about 14.7

Operation overview

We have pre-Programmed the Innovate LC-1 wideband controller to work with the DynoTune Gauge. 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. At idle the gauge should read 14.7 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 for troubleshooting information.

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

Please read the LC-1 controller handbook cover to cover so you understand the principles of operation.

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

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-1.
 - j. You are done! NOW REMOVE THE TERMINATOR PLUG FROM THE “IN” CONNECTOR!

Note: the configuration process for the LM-1 wideband controller is the same.

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 at the connector.
- b) Turn the key to the “on” position but do not start the vehicle!
- c) Leave the key “on” for about 1 minute and then shut the key off.
- d) Reconnect the oxygen sensor
- e) Turn the key to the “on” position but do not start the vehicle! You will notice that the gauge will read approximately 00.0.
- f) Leave the key “on” for about 1 minute and then shut the key off.
- g) Leave the key off for 30 seconds.
- d) Start the engine and the gauge should read 00.0 again. Check the diagnostic LED and make sure it is flashing in an even steady pattern. This means the oxygen sensor is heating up. After a few minutes the oxygen sensor should be hot and the diagnostic LED should be on all the time letting you know that the system is fully warmed up and ready to go! Your Idle air fuel ratio should be about 14.7

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 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 10 seconds. The display must read approximately 10.0 for the entire 10 seconds! If it does not read the 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 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.
- 6) Disconnect the o2 sensor from the innovate controller (big 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 Innovate Technology inc for service.

- 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-1 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-1 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.