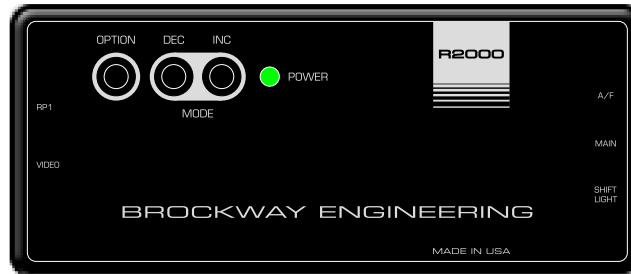


R2000 User Manual

v0.1.3



Installation

Connect the 4-pin connector of the included DC4 cable to the middle header on the R2000 labeled "DLC". The other end of the cable connects to the vehicle Data Link Connector. This is almost always located under the dash on the drivers side of the vehicle. Connect one end of the RCA video cable to the RCA jack on the R2000 and the other end to a video monitor.

The R2000 should power up immediately. If the vehicle ignition is not on, then the R2000 will go to sleep after about 5 seconds. After the ignition is turned on and the R2000 starts communicating with the ECU, then it will initialize and start retrieving sensor data.

Operation

To change the screen display mode, press the MODE INC or DEC button. The display will increment or decrement to the next screen mode. Here is a list of the available screen modes:

- MODE 1 - Any data from 1 to 4 parameters (custom screen mode)
- MODE 2 - VSS and Economy (only available if the vehicle has a MAF sensor)
- MODE 3 - RPM, VSS and ECT
- MODE 4 - RPM, O2 (voltage or A/F ratio) and MAP/MAF
- MODE 5 - RPM, FR and MAX FR (Fuel Rate)
- MODE 6 - VSS and Acceleration Timer (only available if AM1 is installed)

Note: The R2000 will display either the MAP or the MAF but not both. If the vehicle has a MAF sensor, then it will be displayed. Otherwise the R2000 will default to MAP. If the vehicle has both a MAP and a MAF sensor, then you can choose which one to be displayed in the option menu.

Sensor Description

RPM - Engine RPM.

TPS - Throttle Position Sensor. Displayed in %. Most vehicles read around 8% at closed throttle and around 90% at full throttle. This is perfectly normal and actually recommended in the OBD-II specification.

MAP - Manifold Absolute Pressure. Displayed in kPa (kiloPascals) or psi.

MAF - Mass Air Flow. Displayed in g/s (grams per second).

IGN - Ignition timing advance. Displayed in degrees.

ECT - Engine Coolant Temperature. Displayed in degrees (Celsius or Fahrenheit).

IAT - Intake Air Temperature. Displayed in degrees (Celsius or Fahrenheit).

O2 - Oxygen Sensor. Displayed in volts or A/F ratio. There is a conversion available for Honda/Acura vehicles with K-series engines. Vehicles factory equipped with wideband O2 sensors will always display A/F ratio.

VSS - Vehicle Speed Sensor. Displayed in mph or km/h.

STF - Short Term Fuel Trim.

CLV - Calculated Load Value

BAT - Battery Voltage

EGT - Exhaust Gas Temperature. 0 - 1000 C (1832 F)

External Sensor Description

A/F - Air Fuel ratio (requires the LC-1 from Innovate, range is 10:1 - 20:1)

MAP - kPa or psi (requires the AP1)

EGT - Exhaust Gas Temperature (requires the EGT1)

Option Menu

To select an option, press the OPTION button. The display will increment through the options and then return back to the previous screen mode. To change an option value, press the MODE INC or DEC button (some options only use the DEC button to change).

Available Options

Metric/English Units - Metric or English. This option effects VSS, ECT, IAT, EGT and ECONOMY. Gauge 1 through 4 data selection.

Shift Light Output type - On/Off signal or Auto Timer data.

Shift Light RPM - 3,000 to 9,900. (this Menu Option is skipped if the Auto Timer function is enabled)

VSS Correction - 75% to 150%

External Sensor - OFF, A/F, MAP, or EGT

O2 Sensor Display - Voltage or A/F ratio (Honda K-Series) or LC-1

MAP/MAF sensor display - MAP or MAF

MAP Units - kPa or psi (this Option is skipped if MAF is selected in the previous Menu Option)

ECT Alarm - 70 C to 125 C (value shown will be converted to F if "English Units" are selected)

Engine Size - Liters (only available if "MAP" is selected in MAP/MAF menu option)

Fuel Rate - lbs/hr or cc/min

Fuel Weight - Default is 2815 grams/gallon (this Option is skipped if MAF is not selected)

LT AVG (Long Term Average) Reset (this Option is skipped if MAF is not selected)

Stored DTC's

DTC status

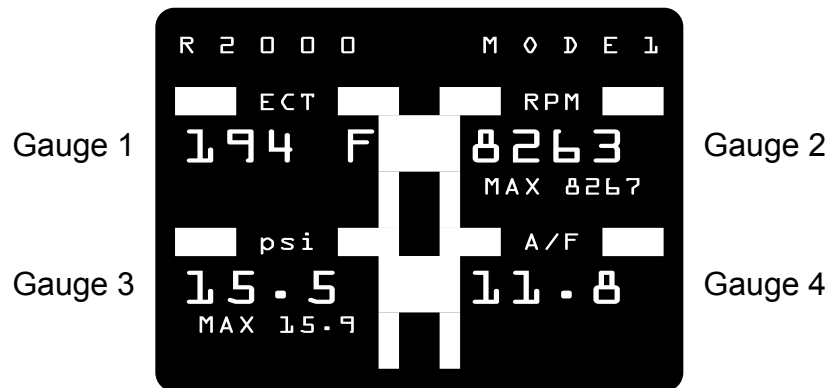
Gauge Selection

Gauge 1 - IGN, RPM, TPS, IAT, ECT, VSS, STF, CLV

Gauge 2 - OFF, IGN, RPM, TPS, IAT, ECT, VSS, MAP/MAF, O2, STF, CLV, EGT, BAT

Gauge 3 - OFF, IGN, RPM, TPS, IAT, ECT, VSS, MAP/MAF, O2, STF, CLV, EGT, BAT

Gauge 4 - OFF, IGN, RPM, TPS, IAT, ECT, VSS, MAP/MAF, O2, STF, CLV, EGT, BAT



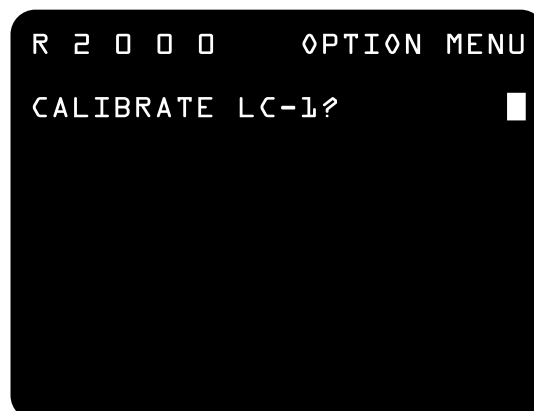
Note: The update rate of the sensor data is affected by the number of active gauges. The more active gauges, the slower the update rate. This is a limitation of the OBD2 protocol and not the R2000. See our website for more details. www.brockwayengineering.com/obd2.html

External Sensor Operation

The external sensor input can be used for either an LC-1 A/F ratio sensor from Innovate, an AP1 MAP sensor or an EGT1 exhaust gas temperature sensor. For any sensor, simply plug it in, select the sensor type in the Option Menu and you are ready to view the data (assuming you have properly connected the sensor to the engine). Whenever the external sensor is set to LC-1 or AP1, this becomes the source for A/F data or MAP data, respectively. This is an analog input and may be used with other wideband O2 sensors such as the PLX SM-AFR.

A/F Sensor

The R2000 is designed to use the analog output from an Innovate LC-1 wideband O2 sensor. This requires the ES4 cable pigtail. The R2000 can perform the “free air” calibration in the Option Menu. To do this, press the DEC button. The display will read “Calibrating”. After about 2 seconds, the calibration is complete. It will also report any errors with the LC-1 by blinking a solid block on the right side of the screen. Consult the LC-1 manual for more information on error reporting.



Stored DTC's

If there are no DTC's stored, then 0 is displayed. If there are DTC's stored in the ECU, then the number of DTC's is displayed on the first line and "Retrieve DTC's?" is displayed on the second line. Pressing the MODE DEC button will retrieve the DTC's and display them. Up to 6 DTC's will be displayed.

Clear DTC's

If there are DTC's stored in the ECU, then the option to clear them will appear on the screen. "Clear DTC's?" is displayed. Pressing the MODE DEC button will clear the DTC's. After the DTC's have been cleared, then "DTC's Cleared" is displayed. Pressing the OPTION button again exits the Option Menu.

Fuel Economy

The R2000 can calculate and display instant economy and average economy. The economy is derived from the engine air flow divided by the A/F ratio. Economy is displayed in screen mode 2. Gauge 1 on the display shows the vehicle speed (VSS). The second gauge shows the instant economy (MPG or KPL). The third gauge shows average economy (AVG) and the 4th gauge shows long term (LT AVG) economy. The average (AVG) is updated approximately every 30 seconds and is a running average. The average value is not updated while the vehicle speed is 0. The LT AVG is updated approximately every 10 minutes. To reset this value, you must enter the Option Menu, step through the options until "LT AVG" is displayed and press the MODE DEC button. If the R2000 is unplugged, both average values will reset to 0. Fuel economy calculations are based on an average fuel weight. This fuel weight will fluctuate with temperature. The fuel weight that the R2000 uses can be adjusted for greater accuracy. To adjust the fuel weight, step through the Option Menu until "Fuel Weight" is displayed. Pressing the MODE INC or DEC button will change the weight by 1 gram. The range is 2500 to 3100 grams if in English mode or 500 to 1000 grams in Metric mode. This represents either 1 gallon or 1 liter of fuel. Economy is displayed in miles per gallon (MPG) for English mode and kilometers per liter (KPL) for Metric mode. If the vehicle has a standard oxygen sensor, then "E" will precede the "MPG" or "KPL". This is because the A/F ratio is assumed to be 14.7:1, thus resulting in an "Estimated" fuel economy. If the vehicle has a wideband oxygen sensor, then the "E" will not appear. This means that the calculation is based on the actual A/F ratio and will be extremely accurate... even at wide open throttle. If the Menu Option for engine size appears, then the engine size must be entered in order for the economy calculation to be accurate.

Fuel Rate

The fuel rate is displayed in screen mode 5. This can be viewed as either lbs/hr or cc/min. This rate is calculated by dividing the engine air flow by the A/F ratio. This value will always be accurate in closed loop driving, however for accuracy in open loop (WOT) then the vehicle must have a wideband oxygen sensor. This value is total consumption, so to figure out how much fuel each injector is flowing, then simply divide the value by the number of injectors.

Acceleration Timer

The acceleration timer is active in screen mode 5. This screen mode is only available if the Acceleration Timer module (AM1) is installed. The timer is completely automatic. The timer resets when the vehicle speed is at 0. The vehicle must be stopped for about a second before the timer is ready, at which time an "R" will appear in the middle of the display. The timer starts as soon as the vehicle starts moving and stops at either 60 mph or 100 km/h (English or Metric mode). The value is then displayed in seconds and tenths of a second. This value will continue to be displayed until the vehicle comes to a complete stop, at which time it will be reset. The timer is exceptionally accurate and very repeatable (within a tenth of a second), however its "true" accuracy cannot be guaranteed due to variations in tire diameter and speed sensor gearing that are out of our control. **The R2000 module must be mounted so that the video output is toward the rear of the vehicle in order for the timer to trigger properly.**

Record/Playback

The Record and Playback functions are only available if the optional RP1 is connected and only in screen mode 1, which allows you to select the data you want to view. When recording, the red LED on the RP1 is illuminated. When playing back a recording, the green LED on the RP1 is illuminated. For either record or playback, when the function is active, the "R2000" text in the upper left corner of the screen is replaced by a time counter. The format is minutes, seconds and tenths of a second (0:00:0). Maximum recording time is 1 minute, 42 seconds. All data is sampled at 10 Hz (ten times per second). Playback can be initiated from any screen mode and when the playback is stopped, the R2000 will return to the previous screen mode that was active before the playback was initiated. Only one recording is stored, however this recording will reside in nonvolatile memory, so it is stored until it is over-written by another recording. Recording is initiated by pressing the Record button on the RP1 and stopped by again pressing the Record button. Playback is initiated by pressing the Play button on the RP1 and stopped by again pressing the Play button.

Shift Light

The shift light illuminates whenever the engine rpm is above the RPM setting. The shift light output is intended to be used with the SL1 LED shift light or SL3 LED shift light from Brockway Engineering.

Precision Engineered and Manufactured in USA. www.brockwayengineering.com

Limited 2 Year Warranty

Brockway Engineering, LLC hereby warrants that this product will be free of defects in materials and workmanship for a period of 2 years after date of purchase. At it's option, Brockway Engineering, LLC will repair or replace the defective product.