GTECHPRO® EGS
expandable gauge system

Register your product for warranty and support. Help us get to know you so we can make even better products for your enjoyment in the future. Your information is confidential and will never be sold to anyone. Fill it out and send it to us. Thanks.

Today's Date _____

First Name _____

Last Name _____

Address _____

City _____ **State** _____ **Zip Code** _____

E-mail _____ **Phone #** _____

EGS was purchased through: (circle one)   **Catalog house   Dealer   Internet site   Retail store   other**

Name of the business where EGS was purchased _____

Vehicle Information   Make _____ **Model** _____ **Year** _____

Modifications _____

_____

Car Magazines You Read _____

Car Forums/Blogs/Sites You Visit _____

Comments About Your EGS (packaging, installation, ease of use, accuracy, features, materials, user experience, options etc.)

Use first class stamp

TESLA Electronics Inc.

G-TECH/Pro EGS REGISTRATION

1749 14th Street

Santa Monica, CA 90404-4300

U. S. A.

Warning: Always obey all local and federal traffic laws when using this device.

Warning: Adverse weather conditions can severely impair given vehicles controllability, especially at high speed. When using this device, drive cautiously and within the limits of your vehicle under the conditions.

Warning: Do not take your eyes of the road. This device is capable of recording any measurement and replaying it later after the car has been stopped in a safe environment. This device is designated as a recording instrument gauge for a given vehicle. Use it for that purpose only.

TESLA Electronics, Inc. or any of its subsidiaries shall not be held liable in any way for any accidental or consequential damages to the vehicle, driver, passengers, and/or other involved parties or property occurring while using G-TECH/Pro device.

TESLA Electronics Inc. reserves the right to make changes to this manual or other product specifications at any time and without any further notice.

The content of this manual is for informational use only and is not intended as a commitment of any kind.

Please drive safely.

Thank you for purchasing G-TECH/Pro EGS - Expandable Gauge System.

I would like to take this opportunity to thank you, our customer, for all the years of support. Without your appreciation of our products the effort we put behind all the research and development wouldn't be nearly as gratifying.

Judging by the thickness of this manual one could easily be intimidated. Not to worry, EGS is set up to be as simple or as involved as you want it to be. You can customize your EGS "as you go", by adding modules and expanding the functionality of your system at any time. This gives you an opportunity to get familiar with the gauge and then build-up a very powerful system that can give you a complete "window to your car's soul" regardless if you have a '69 Camaro or a modern-day Honda.

At the time of writing this document there is no other commercially-available gauge that has wideband oxygen sensor capability as well as OBDII (with CAN), not to mention Adaptive Alarms and other features EGS has.
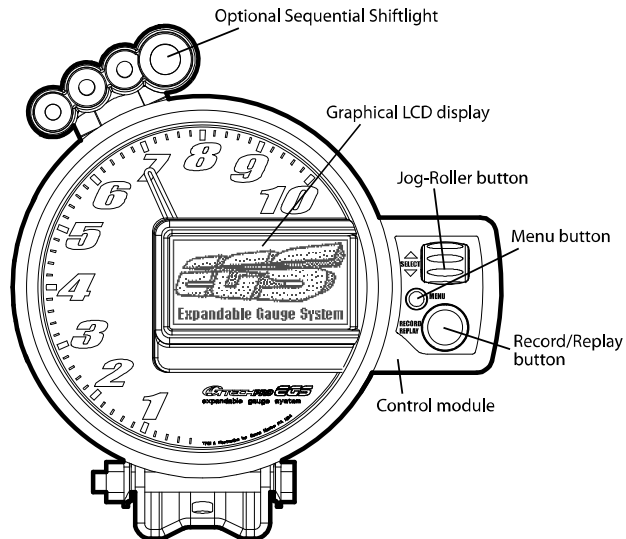
We are quite proud of the innovation in the G-TECH/Pro EGS product line. I hope you will enjoy it for many years and don't forget to tell your friends about it.

Sincerely,

Jovo Majstorovic,
President & CEO
TESLA Electronics Inc.

The Front

Optional Sequential Shiftlight

Graphical LCD display

Jog-Roller button
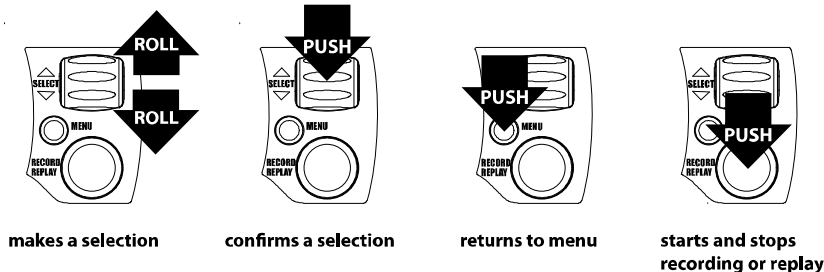
Menu button

Record/Replay button

Control module

The front side of your G-TECH/Pro EGS has the main RPM gauge window with the backlit numbers. Colors in the backlight are adjustable to your car's interior. During the time EGS is turned off the display will appear very dark, that's normal. As soon as the unit is powered the dial face and the RPM needle will become visible. The aluminum back of the EGS may get warm during the operation, not to worry, that means aluminum is doing its job and dissipating heat generated by the powerful backlight LEDs.

The graphical LCD has several functions. It's used to display the current measurement, set parameters and replay recorded data. This is one of the most unique features of the EGS which sets it apart from any other gauge. However,

there is a great deal of functionality in your EGS and we strongly encourage you to read this manual completely in order to take full advantage of all of its capabilities.

There is also the control module with all the buttons of the EGS. One of the features that you might appreciate especially if you are more serious racer is that the control module can be detached from the EGS. This will allow you to reach the EGS and start recording even though you might be strapped in a five point seatbelt. To do this you will need an extension cable for the control module. This can be any standard (straight-through 8 pin) Ethernet cable. You can purchase a cable like this at your local Radio-Shack or any other computer store.

To disconnect the control module from your EGS gently push the control module towards the back. Be careful when pushing the control module out since it has a metal lip allowing it to lock in place. Initially you will need more force to get it started and after that it will come out very easily. Santoprene rubber material is flexible allowing the control module to be inserted with not much force. Once you take out the control module you will see an aluminum lip that can be used to mount the control module somewhere for easier reach.

makes a selection   confirms a selection   returns to menu   starts and stops
                                                                                recording or replay

The light gray Jog-Roller button and the small yellow (Menu) button are used for navigating through the menus of the EGS. The big red (Record/Replay) button is used to start and stop the recording and replay.

SHORTCUT: *In most menu screens you will see an EXIT icon. This is a quick way to get back to the main display screen. Pushing the yellow Menu button will bring you back only one menu level while the EXIT icon will take you all the way back.*

During the use of your EGS you may need to enter some values using the Jog-Roller button. To make this a faster and easier the Jog-Roller has the ability to speed up and slow down. So if you roll it quickly the numbers will change very rapidly but when you slow down the numbers will also slow down giving you more precise control.

If your EGS is equipped with our Sequential Shiftlight module it will also be visible from the front of the unit.

The Back
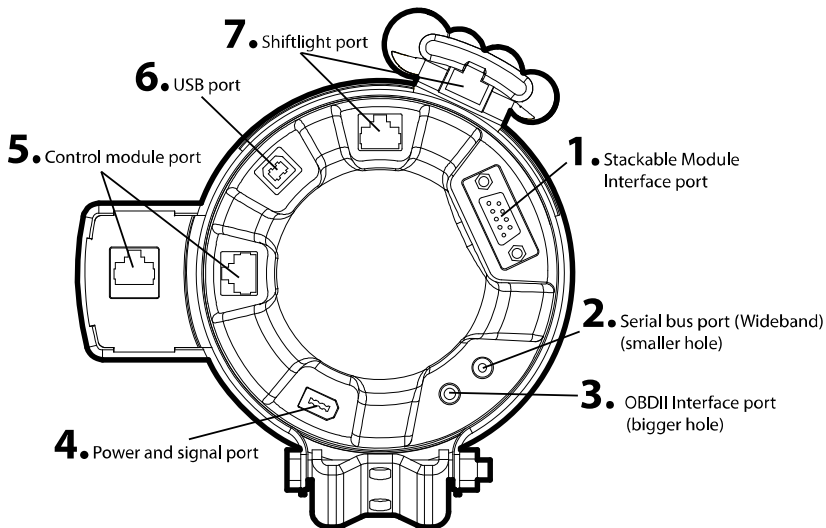
The back of the G-TECH/Pro EGS is filled with expansion ports. The most unique feature of the EGS is its expandability. To be able to simply plug in Wideband Oxygen sensor, an OBDII interface and an accelerometer among others is every car enthusiast's dream. The other benefit is to be able to move the EGS from one car to another without installation and rewiring.

These are the ports in the back of the EGS:

1. Expansion Module Interface (9 pin Serial Plug) is designed to allow you to have multiple expansion modules plugged in (stacked) at the same time

2. Serial bus plug is a smaller (2.5mm) round plug and is used for interfacing with the Wideband sensors. There could be a total of 8 wideband sensors daisy-chained.

3. OBDII plug is the bigger (3.5mm) round plug and it's used to plug in our optional OBDII Interface Module.

4. 6-pin Power plug provides the G-TECH/Pro EGS with 12VDC power from your car and the RPM signal. This is the main Installation (power) cable and it's included in your G-TECH/Pro EGS package.

5. 8-pin (RJ45) plug on the side of the EGS is intended for connecting with the Control (Switch) Module.

6. 4pin (USB) connector is a USB port which may be used in future for upgrades.

7. 8-pin (RJ45) plug on the top of the EGS is used for plugging in the Sequential Shiftlight, an optional module that's part of the EGS system.

Installation

Before you do anything you should disconnect the negative side of the battery. Always wear safety glasses and make sure you read the instructions carefully.

Included in your EGS package you will find following items:

1. G-TECH/Pro EGS Expandable Gauge System with mounting hardware

2. Installation (power) cable with 5 wires

3. Installation accessories pack containing wire splicers, twisters, mounting screws and zip ties

4. This user manual
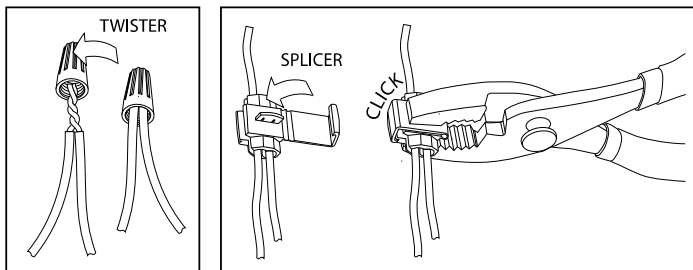
Twisters are used to connect ends of two wires, splicers are used to connect one wire end to another wire without damaging it.

mounting screws
mounting ring
mounting bolt
mounting bracket
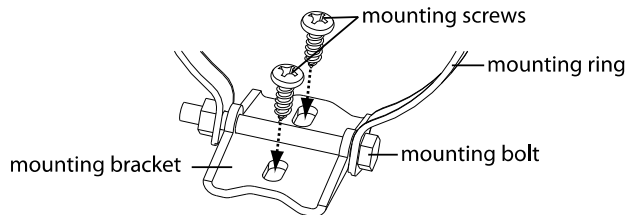
EGS is a 4" gauge. This makes it easier to install than common 5" gauges especially in newer cars. There are several ways you can mount your EGS, on the dashboard, the A-pillar, roll-bar etc.

1. Drill two 3/16" holes 1.5" apart (for softer materials like dashboard use 11/64")

2. Loosen the mounting bolt and pull out the EGS from the mounting ring.

3. Secure the mounting bracket with the two mounting screws (included).

4. Insert the EGS in the mounting ring and rotate it the way you want.

5. Tighten the mounting bolt so that the EGS holds its angle.

If you do not want to drill holes in your vehicle or if you want to move the EGS from one car to another, you might want to consider our TRIVAC semi-permanent mounting system. You can read more about the TRIVAC on page 58.

G-TECH/Pro EGS has one installation (POWER) cable that provides it with all the necessary connections for basic operation. There are 5 wires in the cable.
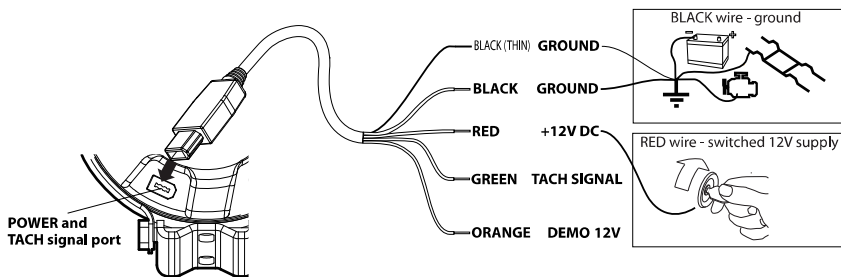
BLACK is ground. Try to get a solid connection to the ground, as close to the chassis or engine ground as possible.

RED is 12V supply. This should be switched supply. Meaning it should get 12V only when you turn on your ignition with a key. This will insure EGS doesn't drain your battery when vehicle is not operating.

GREEN is the RPM signal. This is where EGS gets its RPM. There will be more discussion about the methods of providing RPM signal to EGS starting on the next page.

ORANGE wire is demo supply. **This wire is not used in normal operation and it needs to be connected to ground.** If EGS is powered from this wire instead of RED wire it will continuously run a demo showing its capabilities.

BLACK (THIN) is the shield wire for the cable and it should be connected to ground

RPM (TACH) Signal

There are two ways to provide the EGS with the RPM signal: **TACH signal** output and **OBDII**.
EGS is far more adaptable than any other tachometer on the market today, meaning you have a better chance of having your RPM working on the EGS than any other tach available at the time of writing this document. Also, since it has two ways of getting RPM it's easier to install than any other tach.

RPM Through OBDII

This is a very easy way to get the RPM for your car. The car has to be 1996 and newer. All you need to do is plug in the optional EGS OBDII module and choose to have the mechanical pointer (RPM needle) driven by the OBDII RPM signal. By default, the pointer is normally driven by the RPM signal from the TACH wire.
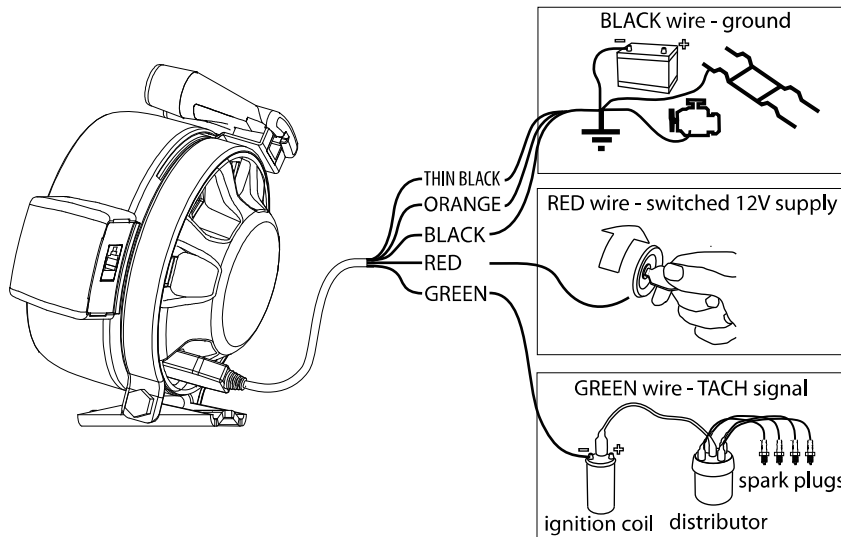

Follow these steps to set the pointer to be driven by the RPM signal from the optional EGS OBDII module. If you choose to use the RPM from your OBDII module you do not need to calibrate the RPM.
Using the OBDII RPM signal may be a very sensible choice for newer cars since newer cars with coil-on-plug systems are more difficult to get the TACH signal from. For proper setup and use of the EGS OBDII module please read the chapter about OBDII module on page 46. Some older cars may experience a "choppy" needle movement, this has to do with the OBDII update rate which is slower on older cars. On older cars RPM signal is much easier found through the TACH signal anyway. Generally, on older cars TACH signal will provide much better needle movement.

RPM Through TACH Signal

Traditionally, finding RPM signal somewhere in the vehicle has been the most common way of getting RPM signal to a tachometer. Almost all other tachometers use this method only. There are three major scenarios you will most likely encounter: standard inductive ignition, electronic ignition and late model ignitions. Please use caution and follow instruction very carefully when wiring the TACH signal. **IF NOT INSTALLED PROPERLY, DAMAGE TO YOUR EGS AND/OR YOUR VEHICLE CAN OCCUR.**

TACH Signal on a Standard OEM Ignition System

BLACK wire - ground

THIN BLACK
ORANGE
BLACK
RED
GREEN

RED wire - switched 12V supply

GREEN wire - TACH signal

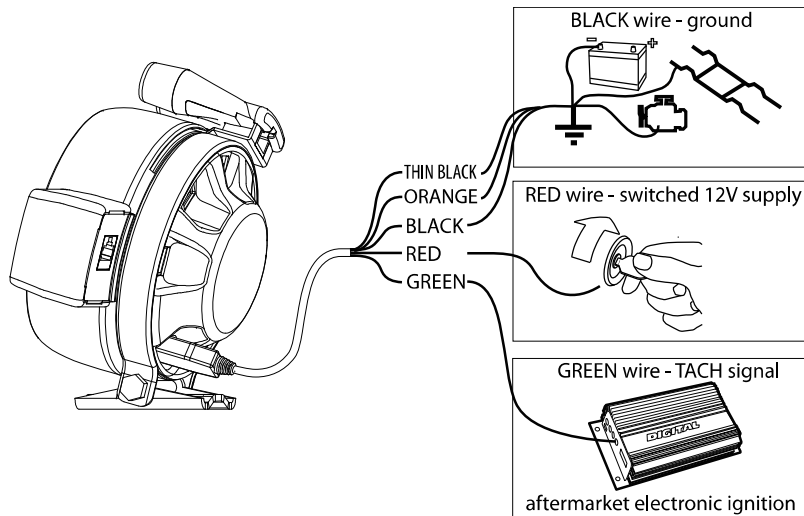ignition coil   distributor   spark plugs

This is the most common scenario you will encounter especially on older vehicles with points/breakerless ignition systems. This setup also works on Mallory Ignition system and Accel ignition coils. Some of Accel systems and some of the Capacitive Discharge systems with points require the GREEN (TACH) wire to be hooked up to the positive side of the coil instead of the negative side. In all other cases make sure that the GREEN wire goes to the negative side of the coil. Calibrate the RPM (page 34) and off you go.

WARNING: INDIVIDUAL COILS (COIL PACKS) AND COILS ON PLUGS ARE NOT THE SAME AS TRADITIONAL IGNITION COILS. DO NOT HOOK UP TO ANY POINTS OF COIL PACKS OR COIL ON PLUGS (USUALY FOUND ON NEWER CARS). THIS VOLTAGE IS EXTREMELLY HIGH AND WILL RESULT IN DAMAGE TO YOU EGS.

TACH Signal in Electronic Ignitions

Electronic ignitions include MSD (Multiple Spark Discharge), GM-HEI (High Energy Ignition) and all other aftermarket capacitive discharge electronic ignition boxes.

BLACK wire - ground

THIN BLACK
ORANGE
BLACK
RED
GREEN

RED wire - switched 12V supply

GREEN wire - TACH signal

aftermarket electronic ignition

Connect the TACH output from the ignition box to the GREEN (TACH) wire on the EGS cable. Calibrate the RPM (page 34) and off you go.

> **WARNING:** INDIVIDUAL COILS (COIL PACKS) AND COILS ON PLUGS ARE NOT THE SAME AS TRADITIONAL IGNITION COILS. DO NOT HOOK UP TO ANY POINTS OF COIL PACKS OR COIL ON PLUGS (USUALY FOUND ON NEWER CARS). THIS VOLTAGE IS EXTREMELLY HIGH AND WILL RESULT IN DAMAGE TO YOU EGS.

TACH Signal in Late Model Vehicles

Many newer cars have DIS-Distributorless Ignition Systems (coil-packs). Some have even newer ignition system COP-Coil On Plug. These ignition systems make it increasingly difficult to get the proper TACH signal. That's why you will find our alternative RPM sensing method through OBDII very valuable.

There are still situations where you may not want to obtain the OBDII module and you want your RPM to work. Not all is lost, there are still ways to get good TACH signal from your newer vehicle.

Here is a list of vehicles that have a useable TACH signal. But first, there are few things about the list that you should know. As you can imagine it's impossible to make list of this nature and have it be complete. Simply there are way too many cars with too many configurations. You might not find your make, model and year but you might get close. Vehicles share a lot of common parts across different platforms so it's a good idea to try the wire from a car closest to yours.
TESLA Electronics Inc. can not be held responsible in any way for the accuracy of this list or for any damage caused to the EGS or the vehicle while attempting to install RPM signal.
All we can do is make an absolute best effort to provide you with good instructions and illustrations, the rest is up to you or the person making the installation.

By all means check the internet and the forums for your particular vehicle for TACH signal location, chances are someone has already done all the work for you.

ACURA (most models) - Tach test connector near fender and firewall, an un-used 2-cavity connector with a single blue wire.
ACURA RSX 2004 2.0L - ECU pin # E26

AUDI A4 2000 1.8L - Pin 84 at ECU, purple with a yellow stripe.

BMW M Coupe 3.2L – Black wire pin 3 @ ECU
BMW M3 1995 3.0L – Black wire pin 47 @ ECU
BMW M3/Z3 1997-up 3.2L – Black wire pin 36 @ ECU

CADILLAC CTS 2004 5.7L – Green Connector, white wire pin 10 @ ECU (located behind bumper)
CADILAC (most models with Northstar engine) – White wire pin 56 @ ECU

CHEVY CAMARO 1996-1997 5.7L – White wire pin 13 @ ECU
CHEVY CAMARO 1998 5.7L LS1 – White wire Pin 35 of blue connector @ ECU.
CHEVY CAMARO 1999 3.8L – White wire pin 8 clear connector @ ECU
CHEVY CAMARO 1999-2002 5.7L LS1 – White wire Pin 10 of red connector @ ECU.
CHEVY CAMARO 2000 3.8L – White wire pin 54 blue connector @ ECU
CHEVY CAVALIER 1994 2.2L – White wire pin B11 ECU pink connector

CHEVY CAVALIER 1995 2.3L – White wire pin 20 @ ECU blue connector
CHEVY CAVALIER 1996-1998 2.4L – White wire pin 10 @ ECU blue connector (behind bumper) Z24 model pin 20
CHEVY CORVETTE 1997-1998 5.7 LS1 - White wire (or blue) Pin 35 of blue connector @ ECU.
CHEVY CORVETTE 1999-2004 5.7 LS1 - White wire Pin 10 @ ECU red connector
CHEVY CORVETTE 2005 6.0 L - White wire Pin 48 @ ECU blue connector
CHEVY FULL SIZE TRUCK 2000 5.3L – White wire pin 10 @ ECU red connector (later years green connector)
CHEVY LUMINA APV 1996 3.4L – White wire pin 9 @ ECU clear connector
CHEVY MALIBU 2002 3.1L – White wire pin 8 @ ECU clear connector (located underneath instrument panel)
CHEVY S10 1996 2.2L – White wire pin 20 @ ECU, blue connector
Chevy S10 1997-2000 2.2L – White wire pin 10 @ ECU black connector
CHEVY SSR 2005 6.0L – White wire pin 48 @ ECU blue connector

DODGE VIPER/RAM all yrs 8.0L – Gray wire with light blue stripe pin C31 @ ECU
DODGE AVENGER/SEBRING 1996-2000 2.5L – White wire pin 73 @ ECU
DODGE DAKOTA 1995 3.9L – Gray wire with light blue stripe, pin 43 @ ECU or negative side of the coil
DODGE DAKOTA RT all yrs 5.9L – Black wire with gray stripe pin 7 @ECU conn. 1 or same wire at ignition coil
DODGE DAYTONA all yrs. 2.2L – Gray wire with light blue stripe pin 50 @ ECU
DODGE DAYTONA TURBO/SPIRIT RT 1991-up 2.2L Turbo – Gray wire with light blue stripe pin 43 @ ECU
DODGE NEON 1995 2.0L – Gray wire with blue stripe pin 48 @ ECU
DODGE NEON 1996-1998 2.0L – Gray wire with blue stripe pin 73 @ ECU
DODGE STEALTH 1991-up 3.0L – White wire behind instrument cluster pin 53 or solid white wire @ ignition power transistor pin 5.
DODGE STRATUS 1996 2.5L – Black wire gray stripe pin 6 @ distributor assembly
DODGE STRATUS 2002 3.0L – Relay strip next to battery first port.

EAGLE TALON 1991-1996 2.0L & Turbo – White wire pin 4 @ ignition power transistor (close to coil)
EAGLE TALON 1997-up 2.0L & Turbo - White wire pin 73 @ ECU or white wire pin 24 @ instrument cluster

FORD CONTOUR/CONTOUR SVT 1996-up 2.0L & 2.5L – White wire with black stripe pin 48 @ ECU
FORD CROWN VIC 1992-up 4.6L – Tan wire with yellow stripe @ EDIS module, engine compartment driver side
FORD MUSTANG 1988-1995 5.0L – Dark Green (1991-up tan) with yellow stripe @ ignition coil or pin 11 @ ECU
FORD MUSTANG 1991-1994 2.3L – Tan wire with yellow stripe @ tachometer test port near ignition module
FORD MUSTANG 1994-1995 3.8L – Orange wire with white stripe pin 48 @ ECU
FORD MUSTANG 1996-up 4.6L – Orange with white stripe pin 48 @ ECU
FORD TAURUS SHO 1991 3.0L – Gray wire with orange stripe, Tach test connector engine bay by right strut
FORD TAURUS 3.2L – Tan wire with yellow stripe pin 12 @ ignition module
FORD TUNDERBIRD 1988 2.3L Turbo – Dark green wire with yellow stripe @ ignition module
FORD TNDERBIRD 1990 3.8 SC – Dark green wire with yellow stripe pin 4 @ ECU or pin 1 instrument cluster
FORD TUNDERBIRD 1991-1994 3.8 SC – Dark green wire with yellow stripe tach test connector engine bay
FORD TUNDERBIRD 1995 4.6L – Orange wire with white stripe pin 4 @ ECU or same color pin 2 @ ignition module
FORD FORD TUNDERBIRD 1995- 3.8 SC Orange with white stripe pin 4 @ ECU or pin 2 @ ignition module (same color
FORD EXPLORER 1994 4.0L - Tan wire with yellow stripe tach test connector passenger side near firewall
FORD TRUCK F150 1997-up 4.2L & 4.6L & 5.4L – White wire with pink stripe pin 48 @ ECU
FORD TRUCK F250 1999-up 6.8L - White wire pink stripe pin 48 @ ECU
FORD TRUCK F250 2003 5.4L – Light green wire with white stripe pin 48 @ ECU
FORD LIGHTNING 1995-up 5.8L – Tan wire with yellow stripe @ ignition coil or white wire with pink stripe pin 9 instrument cluster

FORD RANGER 1991-1993 4.0L – Tan wire with yellow stripe pin 4 @ ECU or pin 2 @ ignition module or tach test connector
FORD RANGER 1993-up 3.0L – Tan wire with yellow stripe @ ignition coil or tach test connector near fuse/relay box

HONDA (most models) Blue wire tach test connector, generally in engine compartment

HYNDAI TIBURON 1997-up 2.0L & 2.7L – White wire pin 47 @ ECU left side of steering column or pin 34 @ instrument cluster
HYNDAI TIBURON 2003 2.0L – White wire pin 66 @ ECU or pin 6 @ instrument cluster

INFINITY G35 2002-up 3.5L – White wire with green stripe pin 34 @ ECU

JEEP GRAND CHEROKEE 1998 5.2L – Gray wire with white stripe @ ignition coil
JEEP CHEROKEE 1986 2.8L – Green wire with white stripe @ ignition coil
JEEP CHEROKEE/WRANGLER 1991-up 2.5L & 4.0L – Gray wire (from 1996 black wire with gray stripe) @ ignition coil

LEXUS ES300 1997 3.0L - Black wire with orange stripe pin 13 @ ECU located passenger side under dash board.
LEXUS GS430 2001 4.3 – Black wire with yellow stripe pin 16 @ ECU, D connector
LEXUS IS300 2001 3.0L – Black wire pin 8 @ igniter
LEXUS IS300 2002 3.0L – Black wire pin 14 @ instrument cluster or pin 16 @ ECU or pin 9 @ data link connector

MAZDA MIATA 1990-up 1.6L – Yellow wire with blue stripe @ port D igniter or @ diagnostics connector
MAZDA MIATA MX5 1994 1.8L – Black wire with white stripe @ diagnostics connector or pin 11 @ ECU
MAZDA MX3 1994-up 1.6L – Yellow wire with blue stripe @ distributor or @ instrument cluster
MAZDA MX6 1993-up 2.5L & 2.0L – Green wire @ distributor or @ instrument cluster
MAZDA PROTÉGÉ 1990 1.8L – Yellow wire with blue stripe @ ignition coil or igniter
MAZDA PROTÉGÉ 1995 1.8L – White wire @ instrument cluster or pin 2 @ ignition module
MAZDA PROTÉGÉ 1998 1.8L – White wire pin F @ distributor
MAZDA PROTÉGÉ 2003 1.8L – Green wire with orange stripe pin 30 @ ECU
MAZDA PROTÉGÉ MP3 2001 2.0L – Violet wire with white stripe pin 48 @ ECU
MAZDA RX7 all yrs 1.3L Rotary – Negative side of coil

MITSUBISHI 3000GT 1991 3.0L – White wire pin 101 @ ECU or pin 5 @ igniter
MITSUBISHI 3000GT 1996 3.0L – White wire pin 4 @ ignition power transistor
MITSUBISHI DIAMANTE/ECLIPSE GT 2002-up 3.5L – White wire pin 2 @ distributor
MITSUBISHI ECLIPSE/GST/GALANT 1990-up 2.0L & 2.0L Turbo –pin 8 @ ECU or pin 24 @ instrument cluster
MITSUBISHI ECLIPSE/GS 1996-up 2.0L – White wire pin 73 @ ECU or pin 24 @ instrument cluster
MITSUBISHI ECLIPSE/SPYDER 2000-2002 2.4L – White wire with red stripe pin 43 @ ECU
MITSUBISHI ECLIPSE 2000-up 3.0L - Tach test connector @ drivers fender, connector # A16X
MITSUBISHI ECLIPSE 2003 2.4L – White wire pin 58 @ ECU
MITSUBISHI ECLIPSE AWD 1990 2.0L Turbo – White wire pin 109 @ ECU or white wire @ instrument cluster
MITSUBISHI EVOVIII/LANCER 2002-up 2.0L – Tach test connector, first connector inside relay box by the battery
MITSUBISHI MIRAGE 1991 1.6L – White wire pin 4 @ ignition power transistor
MITSUBISHI MIRAGE 1997 1.8L – White wire @ blue connector middle of firewall
MITSUBISHI MIRAGE 2000 1.5L – White wire @ distributor or pin 31 @ ECU
MITSUBISHI MIRAGE 2000 1.8L – White wire @ ignition failure sensor driver side by the end of cylinder head

NISSAN 200SX 1995-up 1.6L & 2.0L – Blue wire with orange stripe pin 3 @ ECU or pin 29 @ instrument cluster
NISSAN 240SX 1992-1994 2.4L – Yellow wire with red stripe pin 2 @ ECU or @ instrument cluster
NISSAN 240/SX 1995-1998 2.4L – Yellow wire with red stripe pin 3 @ ECU or blue wire with black stripe pin 12 @ instrument cluster
NISSAN 300ZX/TURBO 1990-up 3.0L – Yellow wire with red stripe pin 7 @ ECU or @ tach test connector on the EFI harness
NISSAN 350Z 2003-up 3.5L – Blue wire with orange stripe pin 22 @ instrument cluster
NISSAN FRONTIER 1998 2.4L – Black wire with red stripe @ distributor or purple wire with white stripe pin 1 @ ECU
NISSAN FRONTIER 1999-up 2.4L – Pink wire with blue stripe pin 3 @ ECU
NISSAN MAXIMA 1996-2001 3.0L – White wire with green stripe pin 5 @ ECU
NISSAN MAXIMA 2002 3.5L – White wire with green stripe pin 34 @ ECU
NISSAN PATHFINDER 1995-up 3.0L – White wire pin 2 @ ECU
NISSAN SENTRA/GXE 1996-1999 1.6L Blue wire with black stripe @ instrument cluster or pin 3 @ ECU
NISSAN SENTRA/SE-R/ Spec V/XE 2000-2002 1.8L – Blue wire with orange stripe pin 32 @ ECU
NISSAN SENTRA 2003 1.8L & 2.5L – Blue wire with orange stripe pin 36 @ ECU or pin 45 @ instrument cluster
NISSAN STANZA 1992 2.4L – Light green wire with black stripe @ ignition coil
NISSAN TURBO SR20 (SILILIA) 1993-up 2.0L – Blue wire with black stripe pin 2 @ ECU

PLYMOUTH PROWLER 1999-up 3.5L Gray wire with light blue stripe pin 73 @ ECU

PONTIAC FIREBIRD 1999 3.8L – White wire pin 8 @ ECU
PONTIAC GRAND AM 1994-1995 2.3L – White wire pin PB11 @ ECU (pink connector)
PONTIAC GRAND AM 1996 2.4L – White wire pin 20 @ ECU (blue connector)
PONTIAC GTO 2004 5.7L – Brown wire pin 10 @ ECU (green connector)
PONTIAC GTO 2005-up 6.0L – Brown wire pin 48 @ ECU (blue connector)
PONTIAC SUNBIRD 1992-up 2.0L – White wire pin A6 @ ECU (smaller blue connector)
PONTIAC SUNFIRE 1994-1997 2.4L – White wire pin 20 @ ECU (blue connector)
PONTIAC SUNFIRE 1998-up 2.4L – White wire pin 10 @ ECU (black connector)
PONTIAC TRANS AM 1998 5.7L LS1 – White wire pin 35 @ ECU (blue connector)
PONTIAC TRANS AM 1999-up 5.7L LS1 – White wire pin 10 @ ECU (red connector)

SATURN SC1 1997 1.9L – White wire pin 2 @ ECU (blue connector)
SATURN SC2/SL1 1995 1.9L – White wire port B @ ignition module
SATURN SC2/SL/SL2 1996-1999 1.9L – White wire pin D2 @ ECU (light blue connector "J1")

SCION TC 2005 – Black wire pin 9 @ data link connector (DLC) or pin 5 @ ECU (first connector)
SCION TC 2006 2.4L – Black wire with blue stripe pin E4-5 @ ECU

SUBARU IMPREZA 1996 1.8L – Red wire pin 64 @ ECU or @ instrument cluster
SUBARU SVX 1994 3.3L – Yellow wire pin A8 @ instrument cluster or pin C16 @ ECU
SUBARU WRX 2002 2.0L Turbo – Red/Green wire @ instrument cluster

TOYOTA CELICA/GT 1990-1991 2.0 Turbo – Black wire pin 4 @ igniter
TOYOTA CELICA 1994 1.8L – Gray wire pin10 @ instrument cluster
TOYOTA CELICA/GT/GTS 2000-up 1.8L – Brown wire with white stripe pin 27 @ ECU (connector B or E3)
TOYOTA COROLLA RWD 1985 1.6 DOHC – Black wire pin 4 @ igniter or factory tach @ instrument cluster
TOYOTA COROLLA 1997 1.6L – Black wire pin 5 @ igniter or pin 4 @ coil/distributor assembly

TOYOTA COROLLA 1998-1999 1.8L – Black wire pin 8 @ ECU (22 pin connector) or pin 3 @ instrument cluster
TOYOTA COROLLA 2000 1.8L Black wire pin 23 @ ECU ("C" connector, may be labeled " E6")
TOYOTA COROLLA 2001 1.8L – Black wire pin 27 @ ECU or pin 13 @ ECU or pin 3 @ instrument cluster
TOYOTA COROLLA 2003 1.8L Black wire pin 5 @ ECU (connector "D" or "E6") or pin 19 @ instrument cluster
TOYOTA MR2 2000-up 1.8L – White wire pin 27 @ ECU (connector B) or pin 6 @ instrument cluster (connector C)
TOYOTA pickup 22R & 2.4L & 3.0L – Black wire @ ignition igniter
TOYOTA SOLARA 2002 2.4L – Pin 27 @ ECU
TOYOTA SUPRA/TURBO 1987-1989 3.0L – Black wire @ igniter
TOYOTA SUPRA TURBO 1993 3.0L – Black wire pin 8 @ igniter drivers side fenderwall
TOYOTA SUPRA TURBO 1994 3.0L – Black wire with white stripe pin 16 @ ECU or same wire @ DLC
TOYOTA T-100 PICKUP 1995 2.4L – Black wire pin 4 @ igniter passenger side inner fender
TOYOTA TACOMA 1995-2000 2.4L & 3.4L – Black wire pin 8 @ igniter engine bay passenger side near air intake
TOYOTA TACOMA 1996-2000 2.7L – Black wire pin 15 @ ECU (26 pin connector) or pin 12 @ instrument cluster
TOYOTA TACOMA 1999 2.4L – Black wire pin 15 @ ECU or pin 4 @ instrument cluster
TOYOTA TACOMA 2001-2004 2.7L & 2.4L – Light green wire with black stripe pin 13 @ ECU (connector B)
TOYOTA TACOMA 2005-up 4.0L – Black wire with white stripe pin 1 @ ECU (connector D) or pin 9 @ DLC
TOYOTA TUNDRA 2001 3.4L – Black wire pin 8 @ igniter
TOYOTA TUNDRA 2002 4.7L – Black wire pin 8 @ igniter or blue wire with white stripe pin 4 @ ECU
TOYOTA TUNDRA 2003-2004 3.4L & 4.7L – Blue wire with white stripe pin 5 @ ECU behind glove box
TOYOTA TUNDRA 2005-2006 4.0L – Blue wire with white stripe pin 1 @ ECU (connector B)
TOYOTA TUNDRA 2007-up 5.7L – White wire with silver stripe. Right side of passenger legs. Lowest white connector.

VW BEETLE TURBO 2000-up 1.8L – Green wire with brown stripe pin 9 @ instrument cluster or pin 37 @ ECU
VW GOLF 1992 1.8L – Red wire with black stripe (smaller wire of the two if there are two) @ ignition coil
VW GOLF VR6 1995 2.8L – Black wire with brown stripe pin 8 @ ECU
VW GOLF GTI 2001-2003 1.8L Turbo & 2.8L – Green wire with brown stripe @ instrument cluster
VW JETTA 1999 2.0L – Green wire with brown stripe pin 27 @ ECU or @ instrument cluster

If you don't see your car on this list you might consider MSD part#8918 GMR-Giant Magnetoresistive Pickup or AutoMeter
Tach Adapter model 9117 in order to get the proper TACH signal. Please follow the instructions for whichever module
you get.

Do it Yourself TACH Signal

The internet is an excellent source of the TACH signals for most vehicles. Forums for your particular car or truck will most likely point you in the right direction. Service manuals on the internet are also a good choice with many manufacturers offering way to access the portions of the manual that are of interest at a fraction of the cost of printed versions.

You can also try finding the signal yourself. It only sounds scary, but it's not that difficult. You will need a buddy to help you rev the engine. You will also need a multimeter that has frequency measurements (most of them have it) and you will need a sewing needle.
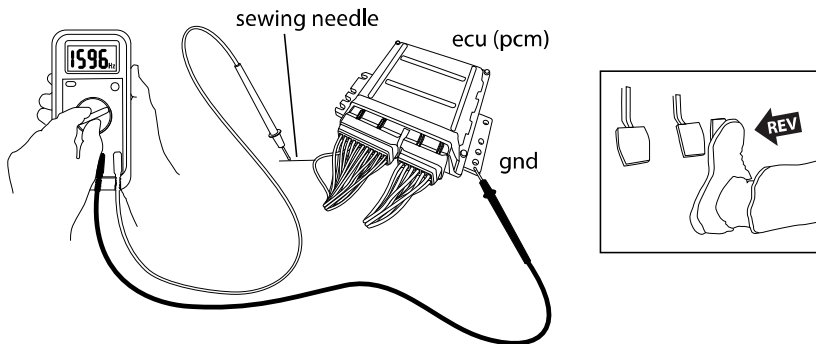
The best place to start is at your vehicles ECU (PCM). You will most likely need to lift the carpet and expose the wires, refer to your service manual for the location of the ECU in your vehicle. Set the multimeter to measure frequency (if the multimeter can see the signal so can the EGS). Connect the black probe to the ground and start probing the wires coming out of the ECU one by one using the red probe. Try to touch the metal in the connector directly with the probe, if not possible use the sewing needle. Needle is used to penetrate the insulation with minimal amount of damage to the wire. Make sure your finger is not on the bottom of the wire when you poke the needle in.

Have your buddy rev the engine as you are going from one wire to the next. You are looking for a frequency on the multimeter that's proportional to the RPM. For most cars the RPM range is between 50Hz and 1500Hz. Once you find the wire that tracks the RPM throughout the entire RPM range connect the GREEN (TACH) wire to it using the splicer. Calibrate the RPM (page 34) on the EGS and you're done. That's it.

Operation

Name of the parameter

Measurement units

Graphical icon of the parameter

Parameter bar-graph

Single parameter screen

Dual parameter screen
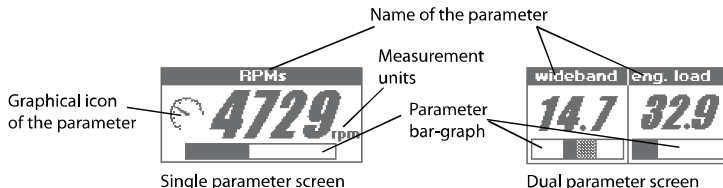
You can display one or two parameters on the digital LCD screen. The analog (mechanical) needle always shows RPM. If you have chosen to display two parameters the numbers will be smaller but you will have access to more measurements simultaneously. If you have chosen the single parameter screen the numbers are large and easily visible. Also, when displaying a single parameter there is a graphic icon indicating the type of parameter currently being displayed on the screen as well as the units of measurement (on the right side).

SHORTCUT: *You can scan through all available parameters by simply rotating the Jog-Roller button. This is a quick way to check values of all available parameters or to pick the parameter that you want to view.*

SHORTCUT: *If you hold down the Jog-Roller button and roll it at the same time you can quickly adjust the brightness of the display. This is similar to dimming instrument cluster light in your car. Brightness will go back to normal after a power-cycle.*

The upper bar on the screen will show the name of the parameter currently being displayed. The lower portion of the display will have a bar-graph visually indicating the value of the parameter being displayed. You will notice that the bar-graph is being updated much more frequently than the digits. Human brain can register visual changes of this type much faster than changes of digits.

You can make the selections with the Jog-Roller button. Record/Replay (big red) button is used to start and stop recording or replay. The small yellow button is the Menu button and it will pull-up a menu at any time. Regardless of where you are you can always get back to the main screen by pushing the Menu Button.

Recording (Logging) Data
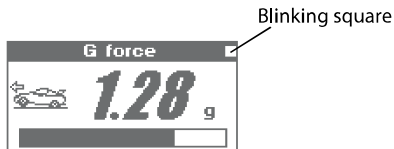
Blinking square

Anytime during normal operation you can start recording simply by pushing the red Record-Replay button. A small blinking square in the upper right corner of the display indicates that the recording is taking place.
To stop recording simply push the red Record-Replay button again and the small square will disappear. The EGS will automatically give the name to this folder (logged session) and save it. The name will be the exact time recording (log) started. If you push the Menu button during the recording there will be no screen with the folder name but the recording is still saved in the background. This is to prevent you from inadvertently aborting a log. If you actually decide that you don't want that log you can go to the **Saved Logs** menu and erase it.

The maximum length of a given log can be from 5-20 minutes depending on how many parameters you decide to record. When the memory limit for a log is reached, G-TECH will save that part of the log in the background and automatically start a new folder. This log will be spread over two folders. These folders will be linked. Linked folders are indicated with a line connecting the two folders. Linking of the folders will continue until there is no more memory left. So potentially you could have a recording lasting a couple of hours, in this case the recording would be spread over several linked folders. With optional memory module recording time is about 8 times longer (page 57).

You might encounter a situation when your memory is full and you want to start a new logging session. In this case EGS will inform you that you need to delete one of your other sessions in order to make space for the new one.

Once all of the available memory is depleted while logging EGS will go through recoding auto-shutoff and insure that all of the data up to that point in the session is safely stored.

Main Menu

Saved logs menu   Display, Log & Alarm   Main Setup
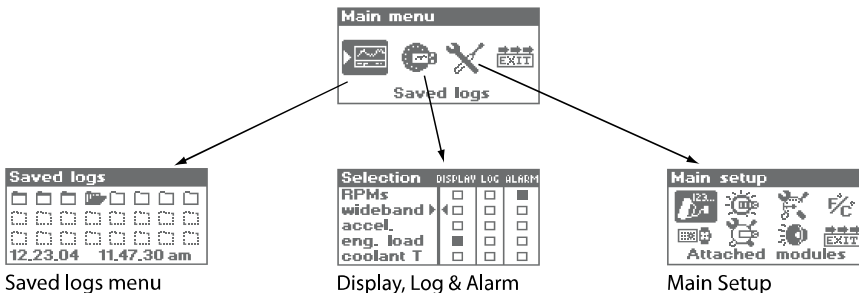
To get to the main menu simply push the yellow Menu button. If you are already in the Main Menu and you push the yellow Menu button you will go back to the parameter display screen. During normal operation your EGS will be in the parameter display screen showing currently measured values for the parameters (measurements) you have chosen.

The Main Menu has three major categories.

Saved logs menu is used to review the recorded sessions (logs) and to delete them if necessary.

Display, Log & Alarm is used to choose what you want your EGS to display on the main screen and to choose what you want to log in the background. This is also where you set-up your Adaptive Alarms.

Setup menu is the area where you can change all sorts of settings including the display color, choose standard or metric mode, change date and time, set-up shiftlights and more.

All configuration changes that you make in any of these menus will stay memorized when EGS is turned off.

Saved Logs

Linked folders

Full folder   Opened folder   Empty (available) folder

Unavailable folder

Name of the folder (log)
Month. Day. Year   time

Saved logs

12.23.04   11.47.30 am
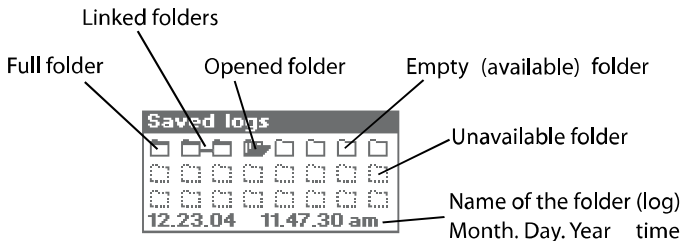
When you enter the **Saved logs** area you will see a group of folders. Each folder represents one recorded log. There is a fixed amount of folders. Keep in mind that it doesn't matter how short your recording is it will always take up at least one folder. In some cases, if the recording is long, it may overflow into the next folder, in that case these two folders will be linked. When you replay linked folders they behave as a single long folder. This way you are not limited by the size of a folder, in fact, you can have one long recording (exceeding an hour) linking multiple folders.

In the standard configuration your EGS will have the top row of 8 folders available for storage. If you have obtained the extra 2MB memory module then all of the 24 folders will be available.

On the bottom of the screen the selected folder's name is displayed. When you have recorded a particular session you will notice that the folder will appear full. This allows you to quickly see how many folders are full and how many are still free. To check how much recording time is left with currently chosen logging parameters simply hold the red Record/Replay button in the **Saved logs** screen.

Log name

12.23.04   11.47.30 am

Replay this log

When you select a particular folder (log), its name (time/date stamp) is displayed on the top and you have an option to replay it or erase it.

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Replaying Logs

When you want to replay a log first you need to decide which parameters you want to see on the graph and which parameters you want to see only numerically. Initially you are asked to choose a primary parameter to be graphed. This will be the thick line on the replay graph. After that you are asked to choose a secondary parameter (thinner line). Here you also have an option to select NONE. If you select NONE you will only see the primary parameter on the graph.

The cool thing is that at any given instance during replay, you can go back and choose to show different parameter on the graph. Simply push the yellow menu button once to go back one level and change the secondary parameter or push it twice to change the primary parameter. This is great when you want to look how one parameter affects the trend of another. Or how does an event affect a parameter. For example, does your fuel pressure drop at higher RPM? Or what happens to your Air/Fuel ratio when the nitrous kicks in? The possibilities are endless, enjoy.

Primary parameter
Secondary parameter
Cursor line
Numerical values
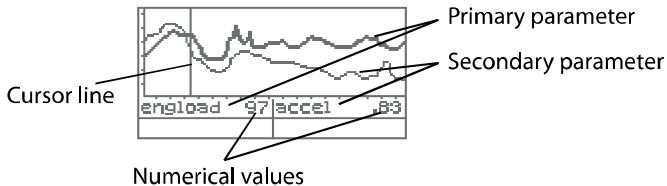
Once you have chosen what you want to display you will see a graph similar to the one above. This screen will show the graph lines for the parameters you chose with their numerical values on the bottom portion of the display. The thicker line on the graph is the primary parameter and the thinner line is the secondary parameter. Cursor line indicates the point in time for which the numerical values are displayed.

Additional logged parameter   Additional logged parameter
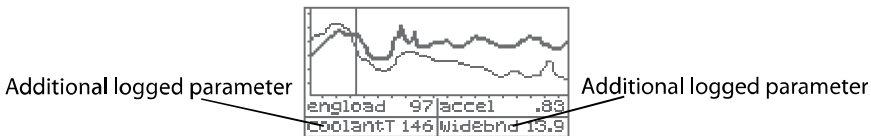
The other two logged parameters will have their numerical values displayed on the last row on the bottom. RPM is always recorded and replayed through the needle movement. If you need to record all four other parameters remember that you can always look at the RPM on the dial during replay. The mechanical needle will always move up and down

during replay indicating the exact RPM at that point in time. Shiftlights are also replayed indicating the time they were activated. This is great for determining your shiftlight reaction times.

START/STOP replay
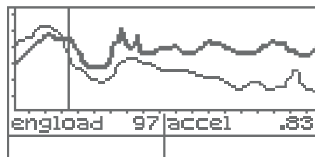
To start the Real-Time Replay push the big red Record-Replay button once. The graph will scroll during replay. You can fast forward or reverse the replay with the Jog-Roller button. To stop and start the replay at any time simply push the red Record/Replay button.
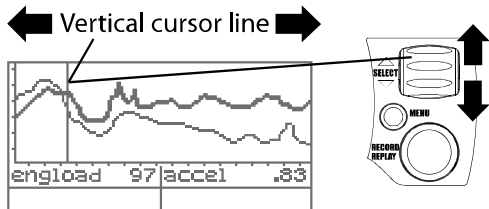
Once you stop the replay you can go back and forth in time at your own pace by using the Jog-Roller button. As you do this you will notice a vertical cursor line that indicates the exact moment in time. With this line you can pin-point the exact time and actually see all the parameter values and how they relate to each other at that exact moment. For example, you can see at what engine load and what RPM level is your car running lean or having too much ignition advance.

27
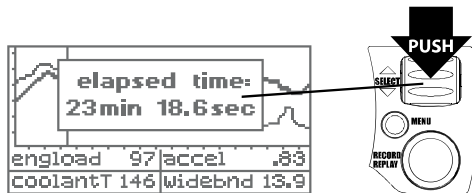
You can momentarily push the roller button at any time to get the exact elapsed time in that recording. The time resolution of the recording is 1/10th of a second.
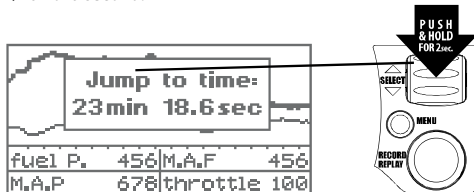
If you hold down the select button for 2 seconds you will enter Time Jump mode. Now you can quickly scroll through the recording in ten second increments. If you push the big red Record/Replay button in Time Jump mode it will take you to the end of the recording and if you push it again it will bring you back to the beginning. Time Jump mode is very handy when dealing with longer recordings.

Scrolling graph is great for visual indication of trends and for glancing over the recording quickly but the true value is in the numbers at the bottom of the screen. The key is in stopping the recording and using the scrolling line to look at how parameters influence each other. This data is the same whether you look at it on a computer monitor or the small EGS lcd screen, it's just that it's a whole lot more convenient than lugging a laptop and worrying when the battery will run out.

Based on our racing experience, data is only valuable if you can relate it to the actual events taking place relative to your car. The problem with most data-logging systems is that by the time you get home after a racing weekend you forget all the little things that make the big difference. For example what was the outside temperature, track conditions, atmospheric pressure or what was that noise that the car was making? When was that? Unless you are extremely diligent about taking notes most of that data will have limited value. With your EGS you get to see it all while it's still fresh in your mind and that makes all the difference. This is the only way to really see what's happening with your car and to come up with truly intelligent tuning decisions. That's why pro teams have telemetry and immediate access to the data.

Display, Log & Alarm

This is where you decide what you want to have displayed, logged or monitored in the background.
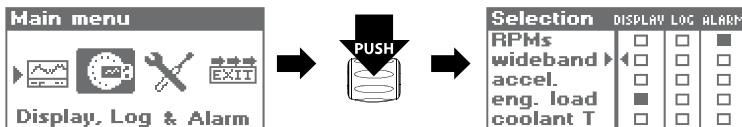
Displaying a parameter will put its numerical value on the LCD display along with its bar graph. You can choose to have one or two parameters displayed at any given time.

Logged parameters will be logged in the background during the recording. You can log up to any 4 parameters (RPM is always recorded in addition to the 4 parameters)

Alarm parameters (Adaptive Alarms) are monitored in the background and are not displayed until they get out of pre-determined "safe" range. For example, you can set the EGS to show you Wideband Air-Fuel ratio only if the value gets to be below 13 (rich condition). You can set the alarm to be activated if a given parameter goes above or below a particular value.
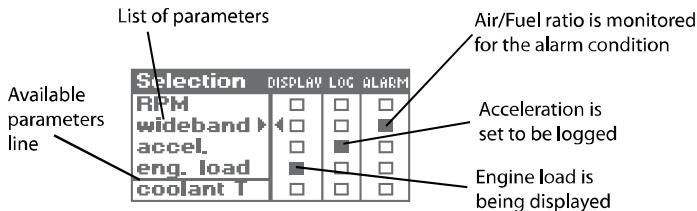
On the left side of the screen are all the parameters (Items) that G-TECH/Pro EGS can possibly display. The available parameters have priority and are automatically placed on the top of the list. Horizontal line separates available from non available parameters. For example the RPM and Battery voltage are always on the top of the list since they are always available.

If you, for example, have OBDII module plugged-in you will notice that there are many parameters like speed, throttle position, engine load etc. available and you can choose to display, log or set the alarm for them. If you didn't have the OBDII module plugged in those parameters would be on the bottom of the list under the Available Parameters Line.

On the right side of the display are the three categories that you can choose for any given parameter: display, log and alarm.
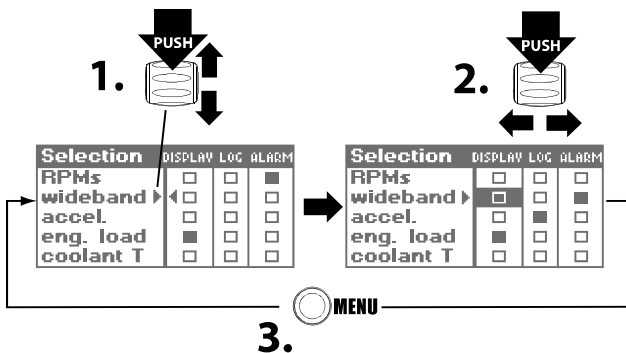
1. First choose the parameter that you want to work with. You do so by going up and down the list with the roller. Two small arrows will indicate which parameter is currently selected. If you choose a parameter that's not available (below the horizontal line) you will get a message instructing you where to obtain that particular EGS module.

2. If the parameter is available you will enter the right side of the screen where you can choose whether you want to display, log or set the alarm for this particular parameter. You will know that you have entered a parameter by seeing only one small arrow pointing towards the right side of the screen. The small squares indicate if a particular option has been selected or not.

3. You can go back and choose other parameters by pushing the yellow (Menu) button once.

You can display a maximum of two parameters at one time and log up to 4. Displaying and logging is separate so you can display different parameters from those that you are recording in the background. EGS will automatically ask you to replace the old parameter with the newly selected one if you already have maximum of parameters chosen. You can choose to have as many available parameters as you want monitored for Adaptive Alarms.

Adaptive Alarms

One of the most valuable features of your EGS is Adaptive Alarms. Just imagine having peace of mind while driving knowing that your gauge is keeping track of your engine temperature or battery voltage, fuel pressure and more.

EGS will keep track of chosen parameters and sound an alarm only in the case that they get out of the "safe zone". For example, you can set the Adaptive Alarms to inform you anytime the car starts running too lean. The parameter is monitored even while EGS is displaying something else and if the preset lean condition is ever reached EGS will beep and flash the backlight LEDs (the whole screen will flash initially) to get your attention and let you know this is happening. This will allow you to react and remedy the situation quickly, potentially preventing an expensive repair.

During the alarm EGS will override currently displayed parameters and display only the parameter that has activated the alarm. It will go back to normal operation only if and when the alarmed parameter goes back in the "safe zone". If there are two or more alarm conditions EGS will display them continuously in a sequence until the conditions that caused the alarms no longer exist.

To set the Adaptive Alarm for a particular parameter follow these steps.

First choose what parameter you want monitored, then select if you want the alarm to be activated when that parameter goes above or below a particular value. For example, for lean condition you would want to set it so that the alarm is activated if your Air/Fuel ratio goes *above* 20. For battery, on the other hand, you would want to set it so that it alarms when voltage goes *below*, let's say 10V.

You can set the Adaptive Alarms for as many of the parameters as you want. However, setting too many OBDII parameters to be monitored will slow down the update rate (this pertains to OBDII parameters only). You can read more about this limitation in the chapter on the OBDII interface module (page 46).

Main Setup
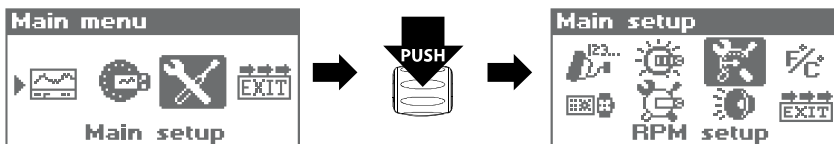
Main Setup has features designed to help you customize your EGS to operate in the way you want. From here you can go and adjust following things: **Attached modules**, **Display**, **RPM setup** (shown above), **U.S.** (Imperial) **or Metric mode**, **Date and time**, **Hardware setup** and **Keyclick** (sound) **setup.**

Attached Modules
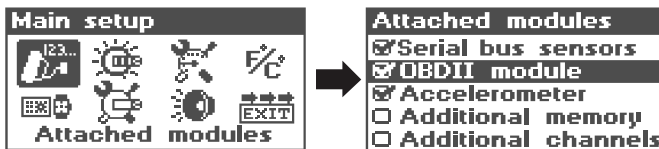
Attached Modules menu allows you to see what modules are attached at any given time to the EGS. Check mark next to a particular module indicates that the module is plugged in and recognized by the EGS. This is where you can setup additional data-logging channels, calibrate sensors and more. There are 5 different sensor protocols that EGS supports.

Serial bus sensors are used mainly for Wideband (Lambda) Air/Fuel ratio sensors. This protocol is compatible with Innovate Motorsports sensor protocol. You can read more about Wideband module on page 37.
OBDII module is a standard On-Board Diagnostics protocol module which interfaces directly with the engine computer and accesses many vital engine parameters. OBDII module works on all 1996 and newer cars (page 46).

Additional Channels ADC module turns you EGS into a powerful and user-friendly data-logger capable of recording and replaying digital or analog (0-5V) signals from any sensor. (page 49)
Accelerometer is a 3-axial g-force sensor that's robotically calibrated and fully temperature compensated using technology originally developed for our world-renowned G-TECH/Pro Performance Meters (page 55).
Additional memory module significantly expands the recording capability of your EGS (page 57)

All of the EGS modules are "Plug and Play" meaning that they get automatically recognized by the EGS.


```
Modules unplugged.
Reverting back to
default configuration.


Press any button
```

If you disconnect a given module from the EGS it will report that one or more modules were unplugged resulting in a changed parameter configuration. EGS will revert to the default configuration, showing RPM in a single parameter display. Once you reconnect a given module EGS will automatically recognize it again when powered on and make it available for viewing and recording.

NOTE: All modules must be plugged in before powering up the EGS. The modules are "plug-n'-play" but they are not "hot-swappable". Make sure to turn off the EGS before unplugging any modules. Not doing this will not damage the modules or the EGS but it might result in unpredictable behavior since module presence is detected only during power-up.

Display

This menu is used to customize your EGS display the way you like.


```
Display

          PRESET
EXIT
  Adjust brightness
```

Adjust brightness will allow you to set the overall brightness of the display. Keep in mind that the background light is comprised of three different colored LEDs: RED, GREEN and BLUE. You will affect your chosen color if you lower the brightness all the way.

Adjust Color menu gives you an option to play with each individual segment of the color RED, GREEN and BLUE. It's set-up as an equalizer so you can quickly get the color that perfectly matches your interior.

Preset color allows you to choose from a few predetermined colors like pure red, green, blue, amber and yellow.

Contrast sets the contrast of the LCD. In extreme temperature instances the LCD might need contrast readjustment.

RPM Setup
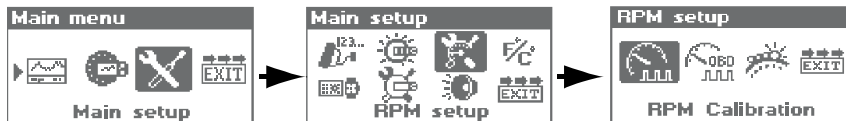
There are three things you can do under RPM Setup. First is the **RPM calibration**. Here you choose a number between 1 and 6 relating to the number of firings per revolution. Select the number that makes the needle pointer correct. Keep in mind that many cars have cylinders firing at the same time, this will result in 4 being the correct number for a V8, for example.

The second option is the **Pointer Signal Source**. Sometimes there is no easily obtainable RPM signal in the car. In this case you can use the OBDII RPM data. **Pointer Signal Source** option allows you to have the mechanical needle driven by the OBDII RPM signal instead of default wired TACH signal. This option is only available if the EGS OBDII module is plugged in.

The third option is the **Shiftpoint Setup**. This is discussed in the chapter on Sequential Shiftlights (page 36).

US or Metric Mode

This menu allows you to choose between displaying data in US (Imperial) or Metric mode. All the logs that were recorded in US mode are automatically converted to Metric mode and vice versa. No information is lost by switching between metric and imperial units.

Set Date and Time

G-TECH/Pro EGS has a battery-powered Real Time Clock. Battery should last over 5 years and can be easily replaced with a standard CR2032 cell. In order to replace battery, back cover needs to be removed by pulling it out from the rubber grommet. It's important to set the date and time correctly because this information is used for automatic naming of logged sessions. When you set the year and the date the EGS will automatically set the proper day of the week. You can adjust and select the values with the Roller button.

Hardware Setup
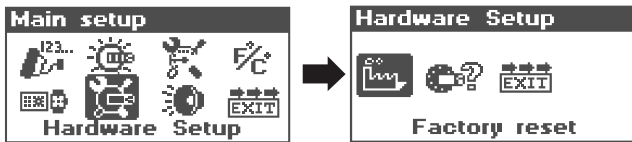
Factory Reset should be performed only when you want to clear all the settings and all your recorded sessions (logs) from your EGS. This will bring the EGS in the same state as the state it was in when it arrived from the factory.

About this unit menu gives you serial number, version number and other info for your particular EGS unit.

Keyclick Setup

By default EGS will make a short beep sound every time the button is pressed. This keyclick sound can be enabled or disabled in the **Keyclick Setup** menu.

Sequential Shiftlight
optional module
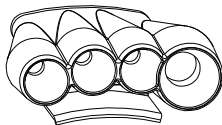
Sequential Shiftlight is an optional module in the Expandable Gauge System. It simply plugs in the back of the EGS and is automatically recognized by the EGS. It has sequential activation, allowing you time to anticipate when to shift resulting in better reaction times. This technology is used in Formula 1 and other types of top-level racing. The sequence of light activation (three yellow LEDs) will start 500 RPM before preset shiftpoint. When the shiftpoint is reached all lights will be activated including the big red LED. To set up your shift-point follow these steps and enter the RPM value.
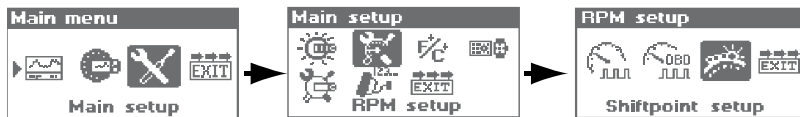
To turn off the shiftlights simply set the shiftpoint value below 1000 RPM, to turn them on set it at any value above 1000 RPM. LEDs in the Shiftlight are extremely bright. They are designed to be seen with your peripheral vision even in direct sunlight. However their active beam is rather narrow so you must be sure to have them pointing towards you otherwise their effectiveness drops significantly.

The Shiftlight is inserted in a groove on top of the EGS from the back. It can rotate around the gauge so it can be positioned to visually indicate redline. For example, if your car has a 7000 RPM redline you might want to slide the shiftlight so that the big red LED is just above the 7000 RPM. Another advantage of being able to rotate the shiftlight is the ease of installation since in some cases the shiftlight might interfere with some of the interior components in your vehicle.

The Shitlight can be detached and positioned anywhere you like. To do this you will need an extension cable. Any straight-through (standard) Ethernet cable will do. You can pick that up at your local Radio-Shack or similar store. When detaching the Shiftlight turn it while gently pushing it towards the back to overcome the retention of the EGS rubber.

Wideband Air/Fuel Ratio Sensor
optional module

Wideband
Oxygen sensor
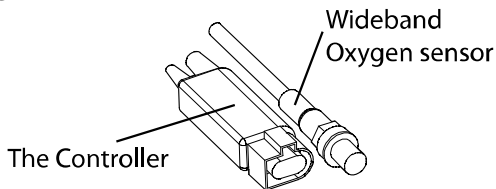
The Controller

NOTE: If you already have a Wideband sensor/controller (LC-1) from Innovate Motorsports you're in luck, it will work seamlessly with your EGS! Older LC-1 controllers have an extra wire (GREEN). This wire is not needed for operation with EGS.

WARNING: **The Sensor operates at very high temperature. Do not touch the sensor while powered. When powered, the sensor will heat up very quickly. Do not touch a combustible material with a hot sensor. Do not use it with or near flammable liquids or vapors. Not following these warnings may result in severe injury, explosions or fires.**

When the sensor is installed in the exhaust, it must be connected and operating whenever the car is running otherwise it will be permanently damaged.

Introduction

Air/Fuel Ratio (AFR), also known as Lambda, is the ratio of the amount of air compared to the amount of fuel inside the combustion chamber. Theoretically optimal Air/Fuel ratio is 14.7 pounds of air for every pound of fuel, at this ratio all available oxygen is mixed with all of the fuel. This is called Stoichiometric ratio. Stoichiometric ratio is different for different types of fuel, here are some of the more popular types:

Type of fuel	Stoichiometric ratio
CNG (Compressed Natural Gas)	17.2
LPG (Propane)	15.5
Gasoline	14.7
Diesel	14.6
Ethanol	9.0
Methanol	6.0

Lambda is the Air/Fuel Ratio over stoichiometric ratio. Lambda 1 = 14.7 (for gasoline engine)

The most amount of power can be extracted from an engine running slightly rich. Generally running in 12 to 13 Air/Fuel Ratio will produce highest horsepower.

EGS is capable of having up to 8 Wideband sensors installed in a daisy chain configuration using the Innovate Motorsports sensor protocol.

Installation

The installation is best performed by a professional. All the necessary hardware is included in the package.

Wideband sensor should be installed in the vehicles exhaust system before the catalytic converter. A hole should be drilled in the exhaust piping and the weld-in bung should be installed (welded) over the hole. The bung has inner threads allowing the sensor to be screwed in. Don't install the bung in the 6 o'clock position (hole facing down) in order to avoid water condensation issues. Cold water hitting a sensor that's warming up is not good for its health. Sensor operating temperature should be kept under 1300 degrees F (measured at the bung). The sensor housing temperature should be kept below 900 degrees F (measured at the sensor hexagon). In the case that these temperatures are exceeded EGS will freeze the reading indicating an error. Some turbocharged cars, rotary engines and other setups will generate enough heat to upset the sensor frequently. In this case you should obtain a heat sink from Innovate Motorsports (part# HBX-1 Heat-Sinking Bung Extender).

The controller, EGS Wideband Oxygen Sensor Module should be installed in a suitable under-body location where it will be as far from the exhaust system as the cable will allow.

There are 3 cables coming out of the controller.
First there is a cable that has 6 stripped wires that have the following connections:

RED   12V supply
BLUE   heater ground
WHITE   system ground
YELLOW   analog out - 1
BROWN   analog out - 2
BLACK   calibration wire

IN
OUT
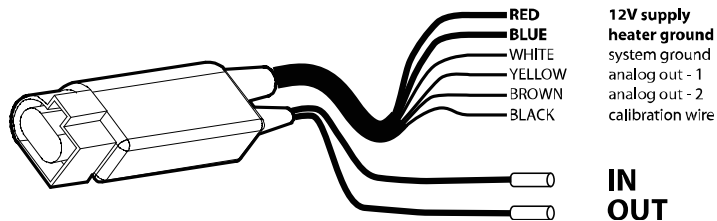
Second there is a cable with a 2.5mm female plug with IN symbol.
Finally there is a cable with a 2.5mm female plug with OUT symbol. These two cables are part of the Innovate Motorsports sensor protocol allowing multiple sensors to be daisy chained. Unused wires should be wrapped and set away.

These are the steps that should be performed for proper installation of your EGS Wideband module:

Ignition contact

RED   5A FUSE

12V supply
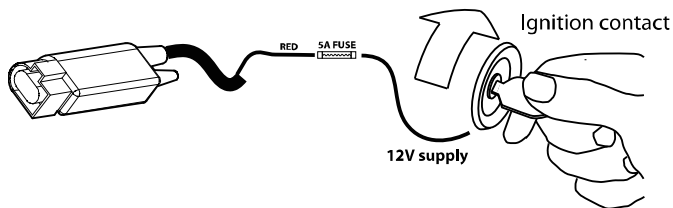
1. Connect the RED wire to the switched 12V source in your car. This is the wire that goes on as soon as the ignition is activated (key turned). This wire should be thick and have a 5A fuse.

engine ground or chassis ground
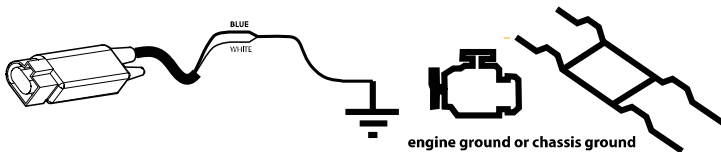
2. Connect BLUE and WHITE wires to the ground. It must be a solid ground like a chassis or engine ground. These two wires should be soldered together and connected to a single ground point. If possible try to solder the connections, since it's more secure than crimping.

Wideband controller

wideband sensor
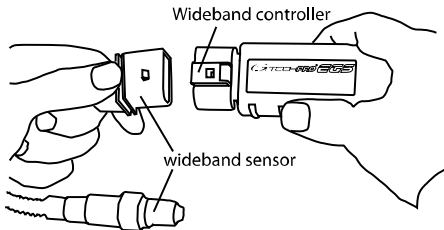
3. Plug the sensor into the controller with the 6 pin automotive connector. You should feel a solid click when doing this. (to unplug the sensor you must push the clip on the plug)

OBDII Interface port

Serial bus port (Wideband)

IN   terminal jack

OUT   2.5mm extension cord
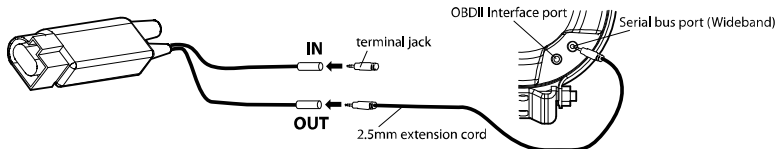
4. For one sensor operation, insert the terminal jack (included) in the plug with the IN symbol. If you are using more than one Wideband sensor then each controllers output should go to the next controllers input and first sensor in the chain should have the terminator in the input.

5. Connect the male 2.5mm extension cord to the plug with the OUT symbol. The other side of the extension cord goes to the 2.5mm (smaller) plug in the back of your EGS.

NOTE: The other wires are not necessary for the operation of the Wideband sensor with the EGS system. They are used for analog connection with a display/logger. The connection between the controller and the EGS is purely digital, that's why these wires are not needed. Have them neatly tucked away insuring that they can't make any electrical contact with surrounding objects.

Initial Setup

The controller module has to be setup (calibrated) for a given sensor. This operation is called **Sensor Heater Calibration** and it should be performed every time there is a new sensor connected to the controller. For this operation the sensor must be exposed to free air. It can not be screwed in the bung. Perform the Sensor heater calibration using following steps:

1. Leave the sensor disconnected from the controller.

2. Turn on the ignition – power the controller for **20 seconds**

3. Turn off the ignition – power off the controller for **20 seconds**

4. Connect the sensor to the controller (while sensor is exposed to air – not in the exhaust system)

5. Turn on the ignition – keep the controller powered for at least **2 minutes**

If you have made a mistake in the procedure you can start again from the first step regardless of where you stopped.

After you have performed the heater control calibration you should perform a **Free-air calibration**.
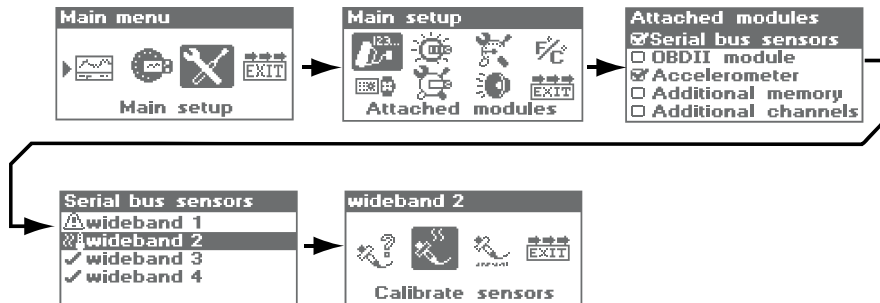
Go to the Setup from the Main Menu, Main Setup, Attached Modules, Serial Bus sensors and choose to perform the calibration. Keep in mind that you need to have the sensor exposed to free air (not screwed-in the bung). If you have more than one sensor, all of them will be calibrated at the same time, so **all sensors have to be exposed to free air during free air calibration. Not doing so will result in improper operation.**

In order to insure optimum sensor performance free-air calibration should be performed regularly. Sensors in non-turbo vehicles should be calibrated after 3 months of use and every 20,000 miles or once a year after that, for turbo cars every 10,000 miles or twice a year and for race cars once every race weekend.

Operation

Once properly installed the Wideband sensor becomes one of the parameters in your EGS system. Accurate Air/Fuel Ratio can be displayed, recorded and replayed just like any other sensor/parameter. One very cool feature of the EGS system is that you can set it to continuously look for a lean condition in the background and alarm you when it happens. Who knows, maybe it will save you an engine or two.

EGS will show Lambda in metric mode of operation, if you switch to standard (imperial) units of measure EGS will show the Air/Fuel Ratio as a numerical value. This method is what most people in U.S. are familiar with while Lambda is more common in Europe.

EGS is designed to be used with gasoline engines and shows 1 Lambda when Air /Fuel Ratio is 14.7. If you are using any other type of fuel you should use standard mode of operation (imperial units) because then the Air/Fuel ratio will be displayed which is more practical to use when running alternative fuels. When using alternative fuel make sure to remember the Stoichiometric ratio for that particular fuel (page 38).

Generally, when the sensor is not in the exhaust stream it will indicate a lean condition. At some point above 28:1 Air/Fuel ratio the controller determines that the sensor is probably not in the exhaust stream and is in **free air**, since no engines run that lean. At that point the display will change and show the percentage of oxygen in the air. This is important because this can be used to determine if the sensor is operational. Simply expose the sensor to free air and you should see about 20% which is the approximate amount of oxygen in the air we breathe.
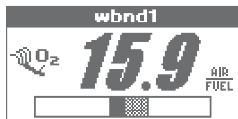
Normal operation   Free air operation

This change from showing the Air/Fuel ratio to showing Oxygen content percentage does not happen during recording. During recording the units will continue recording Air/Fuel. So for example, let's say you were recording and the sensor fell out of the bung and was exposed to free air. When you replay that recording you will always see the graph of Air/Fuel ratio even though it would be "pegged" lean from the point it was exposed to free air. This is designed to avoid any confusion during replay.

"Sensor is in free air" indication   Sensor status symbol

Wideband sensor controller always sends sensor status to the EGS. This sensor status indicates what's going on with a particular sensor and is indicated by small **Sensor Status icons** (symbols). This information is useful in getting the most out of your sensor. For example, the sensor is smart enough to know when it's time for it to be recalibrated. Wideband sensors need to be heated up in order to perform correctly when the engine is first started up. Warming up is also indicated on the display with a Sensor status symbol.
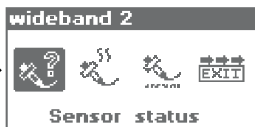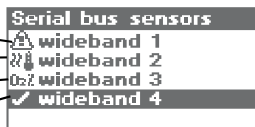
Sensor status symbols:

sensor needs attention ⎯

sensor is heating up ⎯

sensor is in free air ⎯

sensor working properly ⎯

Sensor status symbols are shown in two locations, on the main numerical display screen and in the Serial bus sensors list. During normal operation you won't see any symbols on the main numerical display since the "Sensor working properly" check mark is only displayed in the list. But if there is an issue with a sensor being displayed it will show up in the upper right side of the bar on top of the display as well as on the list.

To find out more information about a particular sensor choose that sensor from the Serial bus sensors list and go to the Sensor status. Here you will find out what is the exact issue with the sensor including sensor error codes.

Error 1 – **Heater circuit shorted** – Likely caused by an electrical short in the cable or the sensor. – 1. Repair or replace the cable. 2. Replace the sensor.

Error 2 – **Heater circuit open** – Likely caused by a damaged sensor cable or by cable connector not properly plugged in. – 1. Reconnect the sensor and the controller. 2. Repair/replace the cable/sensor.

Error 3 – **Pump cell circuit shorted** – Likely caused by: Short in sensor cable or short in sensor or sensor heater calibration being incorrect or sensor overheating or exhaust gas temperature above 1700 degrees F. – 1. Repair sensor cable. 2. Perform sensor heater calibration. 3. Replace the sensor. 4. Move the sensor further downstream from engine or add a heatsink (Innovate Part# HBX-1) to isolate the sensor from the exhaust pipe.

Error 4 - **Pump cell circuit open** – Likely caused by a damaged sensor cable or by sensor connector not fully seated or by incorrect sensor heater calibration. – 1. Verify the plug connection between the sensor and the controller. 2. Repair/replace the cable. 2. Perform Sensor heater calibration (page 41)

Error 5 – **Reference cell circuit shorted** – Likely caused by Short in the sensor cable or short in the sensor. – 1. Repair sensor cable. 2. Replace the sensor.

Error 6 – **Reference cell circuit open** – Likely caused by a damaged sensor cable or by sensor connector not fully seated or by a damaged sensor. – 1. Verify the plug connection between the sensor and the controller. 2. Replace the sensor.

Error 7 – **General system error** (typically a software error) – Power cycle the controller.

Error 8 – **Sensor timing error** (typically a damaged sensor) – Likely caused by a sensor overheating or other type of sensor damage. – 1. Perform Sensor heater calibration. 2. Refer to page 38 for proper operating temperature for the sensor. 3. Move sensor further downstream from the engine. 3. Add a heatsink. (Innovate Part# HBX-1) 4. Replace the sensor.

Error 9 – **Supply voltage too low** – Likely caused by not enough supply voltage from the car battery. – Check your 12V wiring for corrosion. 2. Replace the car battery.

# Getting the Most out of Your Wideband

There are few tricks to get the best results from your wideband sensor :

1. Avoid any exhaust leaks since they will introduce oxygen in your exhaust flow and cause incorrect lean readings.

2. Misfires will cause unburned oxygen to enter the exhaust system and will manifest itself as an incorrect lean condition.

3. If the engine is running rich and the exhaust system is restricted (clogged up catalytic) you will see incorrect rich conditions.

4. Non-catalytic cars can have the sensor installed much further downstream in the exhaust system. However if you install it too close to the end it will have free-air contamination resulting in false lean readings. This will be more evident at lower RPM and lower engine load.

5. Single cylinder engines have very irregular exhaust flow and a lot of outside air actually gets inside the exhaust resulting in false lean readings. The trick that helps during testing is wrapping some heat resistant cloth around the exhaust exit to prevent the entrance of outside air.

6. If your Air/Fuel ratio numbers don't change (no updating) this indicates that there is an issue with the sensor. This is usually due to the sensor not having outside air available as a reference gas. In this case perform a free air calibration. This problem could also be caused by the sensor being overheated. If this happens regularly it might be a good idea to use the Heat-Sink Bung Extender (Innovate Motorsports HBX-1) or move the sensor further down the exhaust stream. If the error persists it might be a time for a new sensor. You can obtain a new sensor from us at www.gtechpro.com or from www.innovatemotorsports.com or from your local VOLKSWAGEN dealer (part# 021-906-262-B)

7. This Wideband Oxygen Sensor technology was originally developed by our friends at Innovate Motorsports and they continue to be a leader in this industry. They have a wealth of knowledge in getting the most out of these sensors and we highly recommend visiting their website for more information.

OBDII Interface Module
optional module

OBDII Interface module is an expansion option for the EGS. OBDII (On-Board Diagnostics) is a vehicle communications protocol initially designed for emissions control. OBDII has the capability to give all sorts of valuable information from your vehicle not normally available on the standard display cluster.
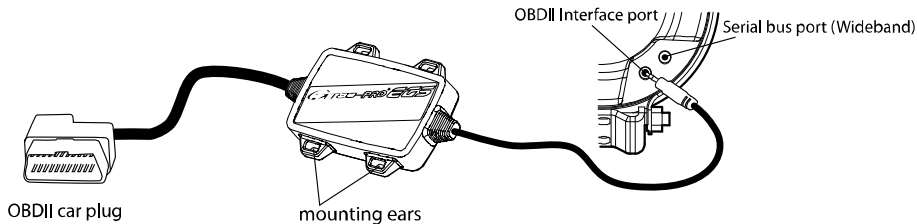

Most vehicles have the OBDII receptacle somewhere underneath the dash by the driver's knees. Plug the large, square OBDII car plug in the receptacle and plug the other side of the cable in the larger of the two holes in the back of your EGS. Notice that the actual OBDII Interface Module has the ears on the sides making it easy to mount anywhere in the vehicle with zip-ties.

Some manufacturers were slower than others to implement the protocol. There were several variations of the protocol with the latest being the CAN protocol which is faster and more flexible. EGS OBDII module has the capability to utilize all of the current protocols. EGS also has the ability to tell you if your car is ready to be smog tested or not.

When you plug OBDII Interface Module in to the back of the EGS it will automatically detect the newly connected module and it will attempt to establish communication with your car. Initially this may take up to a minute or so. After that this "handshake" between the vehicle and your EGS will take only seconds. Once the communication is established you will see many parameters that are now available for viewing and recording. However, the more parameters you choose to view or monitor the slower your update rate will be.

The reason for that is the actual refresh rate of the OBDII bus. OBDII parameters are updated only a few times per second. This has nothing to do with your EGS, it's a function of the car and its OBDII protocol and it varies from one vehicle to the next. Most newer cars use the CAN bus which is much faster and this problem is less evident.

OBDII Trouble Codes
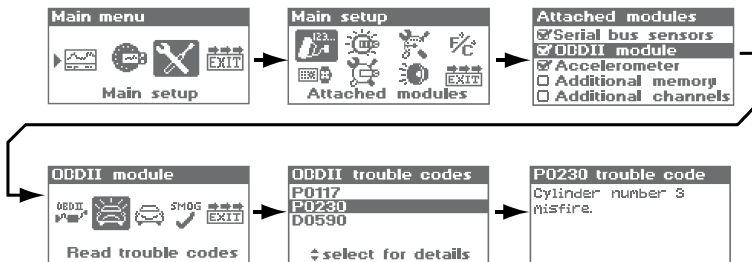
Your EGS will have the ability interpret and display trouble codes for your vehicle. There are about 3000 standard trouble codes that relate to vehicle's power-train. EGS will interpret these codes and show them to you in plain English. However, some manufacturers go beyond OBDII-mandated power-train codes and include manufacturer specific trouble codes. Some manufacturers actually have overlapping codes. In a case of a manufacturer specific (non standard) OBDII code EGS will display only the actual code. At that point you can go on and search the internet to find out what that code means for your particular vehicle. Simple search will most likely result in the exact definition of that particular code.

You have the ability to clear the trouble codes with EGS. If there are more than one code present, clearing trouble codes will clear them all at the same time. If the condition that caused the trouble code still exists, the trouble code will most likely come back, however this can take as little time as few seconds up to months. This has to do with how often your car's computer checks that particular parameter.

Use caution when clearing trouble codes, there are some codes that are really not critical for the operation of your vehicle, however most codes do mean something significant is wrong and it most likely should be taken care of sooner rather than later. The most valuable use of the trouble codes is the ability to determine what is exactly wrong so you can fix it or at least be prepared for that visit to the mechanic.

If you had the OBDII module plugged-in and you reset the EGS by disconnecting the power plug or cutting the ignition in your vehicle the EGS will automatically look for the OBDII module when it's powered on again. If it doesn't find it EGS will report that the modules were unplugged and it will revert to default displaying RPM and battery voltage. Sometimes this may happen even though your OBDII module is in fact plugged in. Your vehicles ECU may have rejected the request for communication ("handshake") due to some internal process at the time. Not to worry, just reset the EGS again and nine out of ten times this will take care of it.

Smog Check Readiness Test

Your EGS can give you an indication whether your car is ready to be smog tested or not. OBDII compliant vehicle's emissions system has a set of parameters that have to be operational before a smog test can be performed.
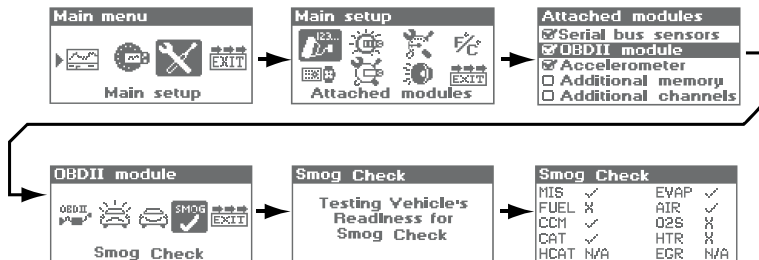
MIS – Misfire monitor
FUEL – Fuel system monitor
CCM – Comprehensive Component Monitor
CAT – Catalyst Monitor
HCAT – Heated Catalyst monitor
EVAP – Evaporative system monitor
AIR – Air conditioning system monitor
O2S – Oxygen sensor monitor
HTR – Oxygen sensor heater monitor
EGR – Exhaust Gas Recirculation monitor

A symbol next to each parameter indicates if it passed the test. In California your car can have up to two failed parameters and still pass the smog test. If it has more than two it will fail. Not available (N/A) parameters are not taken into account. Please check the rules for your state.

After clearing a particular trouble code you may still not see related Smog Test Readiness parameter cleared. This is because your car has to go through a drive cycle in order for the condition to be cleared. What qualifies as a drive cycle is a specific driving procedure that depends on the make of your car. Generally speaking it consists of having the car ignition on without engine running for 2 minutes, having the car idling for 2 minutes accelerating to 20mph 2 times (normal speed), accelerating to 40mph 2 times at medium speed, accelerating to 55mph 2 times briskly and driving a few hundred miles. This is just a rough guideline. Please check your car's specific requirements for a drive cycle.
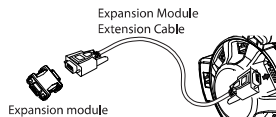
ADC 8 Channel Module
optional module (for advanced users)
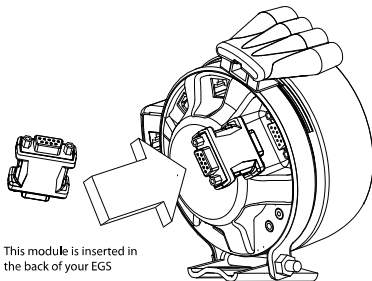
This module is inserted in the back of your EGS
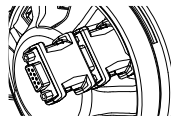
3-Axis ACCELEROMETER, MEMORY and ADC 8 CHANNEL module can be stacked

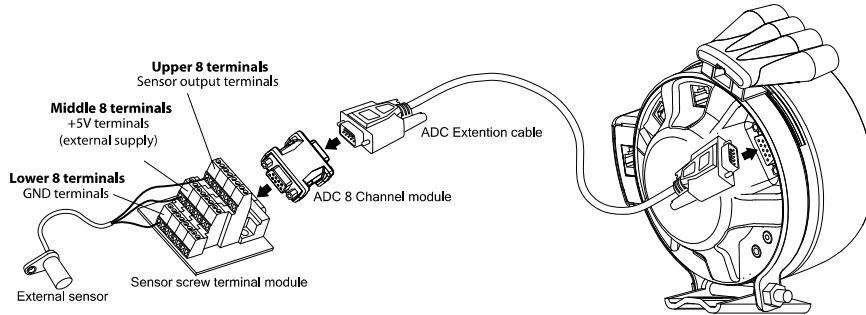Expansion Module Extension Cable

Expansion module

You can also mount stackable modules remotely using our Expansion Module Extension Cable.

NOTE: EGS Expandable Gauge System allows you to stack-up modules one on top of the other, however **ADC Module must be the last one in the chain**.

ADC 8 Channel Module gives you the ability to expand the capabilities of your EGS by attaching any sensor of your choice. Some examples are, EGT sensor, transmission temperature, Driveshaft RPM, Shock absorber travel etc. The options are endless. All the hardware that you need is included in the kit. All you need to do is hook-up actual sensors that you want monitored.

There are 8 channels for 8 independent sensors. The signal from the sensors can be analog or digital (pulse). It can also be a signal that can either be high or low, like nitrous activation switch, etc. The signal range is between 0V and 5V, this range is very common with automotive sensors. Make sure you follow the specifications for the sensor input. Exceeding this requirement could result in the damage to the module(s) or the EGS itself.

There is an infinite amount of sensors available and if you don't feel comfortable with this type of installation please seek out professional help from someone with data-acquisition experience. Getting the manufacturer specification (data sheet) for each sensor you plan to use should be your first step. It is not possible for us to give you any technical support besides what's in this manual simply because possible variations are endless and if you follow our sensor input specifications and instructions it all comes down to proper installation and the type of sensor you are using.

Upper 8 terminals
Sensor output terminals

Middle 8 terminals
+5V terminals
(external supply)

Lower 8 terminals
GND terminals

ADC Extention cable

ADC 8 Channel module

External sensor

Sensor screw terminal module

Sensors can be attached with bare wires to the Sensor screw terminal module. This small board with 3 rows of screw terminals (included) will make the job of connecting sensors a whole lot easier.

Lower 8 terminals are all connected to GND. This is where you connect the sensor GND wire. Do not connect external ground to any of the GND terminals since this would create a ground loop and cause improper operation. EGS will supply the GND signal to all the sensors.

Middle 8 terminals are for 5V sensor supply. You need to provide external 5V supply and put it in one of the eight middle terminals. All middle terminals are connected internally that's why all connected sensors will share the same supply. Make sure that there is enough current to supply all sensors that are getting their 5V supply from here. Also make sure that the sensors you hook up here are designed to work with 5V supply.

Upper 8 terminals are for individual channels from 1 to 8. This is where you hook up a sensor-output-wire. These are the lines where the sensors provide the measurement signals to the ADC 8 Channel module.

If you are using any of the other stackable modules (accelerometers or the memory module) you can put them between the ADC Extension cable and the ADC 8 Channel module. This may be easier for installation and it's the same as plugging them directly to the back of the EGS.

Once you have properly installed the sensor it will become available for viewing, recording and replay just like any other parameter. You can rename it and select it in the **Display, Log & Alarm** screen. However you will need to do a couple more things in the **Sensor setup** in order to have it work properly.

Sensor Setup
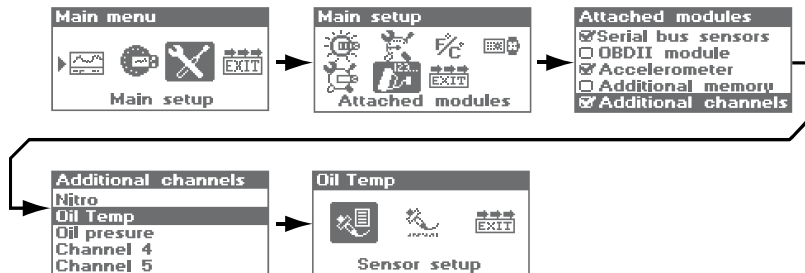
EGS will automatically configure the signal for you. All you have to do is go to **Sensor setup** and follow four easy steps:

1. Determine what type of the signal you will be measuring. Chose **Analog** if your sensor is outputting a DC voltage that is proportional to the signal output like a temperature sensor, pressure sensor etc. Choose **Pulse** if your sensor outputs pulses or frequency like an RPM sensor, Wheel Speed Sensor etc. Chose **On/Off** if your sensor outputs only high or low signal like Nitrous On/Off sensor, ABS On/Off sensor etc.
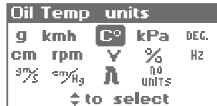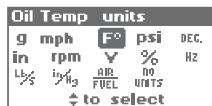
2. Choose the units that the EGS will display for that particular sensor, like mph, psi etc. NOTE: Units will vary based on chosen mode of operation, metric or standard.

Oil Temp scale	
INPUT	DISPLAY
MAX **5.00v** =	0 F°
MIN 0.00v =	0 F°

3. Enter the output range of the sensor. Most automotive sensors have 0-5V output. In that case, input 0V for the minimum and 5V for the maximum. We don't recommend using sensors outputting a signal smaller than 0-1V.

Oil Temp scale	
INPUT	DISPLAY
MAX 5.00v =	350 F°
MIN 0.00v =	**-40** F°

4. Tell the EGS how to interpret the signal. In the case of an analog signal you need to tell EGS what's the actual measurement value that needs to be displayed at the minimum and maximum output levels. EGS will automatically scale everything else in between. This example shows an Oil Temperature sensor that outputs 0V at -40F and 5V at 350F. Sensor output information is usually provided by the sensor manufacturer.

Wspeed scale	
INPUT	DISPLAY
MAX **2000Hz** =	100 mph
MIN 0.0Hz =	0.00 mph

Same thing goes for digital sensors except that the displayed value will be set for maximum and minimum frequency. So you may have a speed sensor that outputs 0Hz at 0mph and 2KHz at 100mph.

Nitro st.1 scale		
INPUT	DISPLAY	
MAX 5.00v=	**ON**	OFF
MIN 0.00v =	**OFF**	ON

If you chose the On/Off sensor, all you have to do is determine if high level (5V) indicates on or off state.

Nonlinear Sensors

Some sensors do not have a linear voltage output. This means that, lets say, at 50psi the voltage output is 2V and at 100psi it should be 4V but it's not it's more like 3.2V. This sensor has what is called nonlinearity curve. This curve describes how the voltage output varies with the measured value. Manufacturers describe this curve in the specs (data sheet) for a particular sensor. This curve is very important and is necessary in order to set up the sensor correctly.

Generally, temperature sensors, pressure sensors and other sensor that rely on the physical strain of the material in the actual sensor will have a tendency to be nonlinear. They are always **Analog** voltage type (page 51).

Before attempting to set up a nonlinear sensor you must obtain the nonlinearity curve. Sometimes the nonlinearity is described with numbers only. For example, you may see 20psi = 1V, 50psi =2V, 80psi = 3V etc. These values are called data-points. You need at least 3 data points, besides minimum and maximum, in order to describe a good nonlinearity curve.

After you have done the basic Sensor Setup (described earlier) EGS will ask you if the sensor has linear output or not. If you are dealing with a linear sensor simply enter linear here and you're done. However if you choose a nonlinear sensor you will see the following screen.
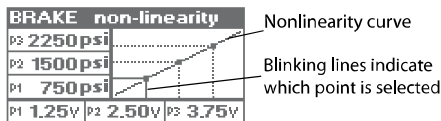
Initially you will see a curve that appears linear. This is because it's automatically generated based on minimum and maximum sensor values you entered earlier (page 52). In this case it's a brake-line pressure sensor with 0-5V output and 0-3000psi range. The curve is adjusted with 3 data points.

First you need to choose a data point to modify. As you use your Roller button you will see that you can select different points and that currently selected point has lines that are solid and blinking. To choose a particular point simply push the Select button (Jog-Roller).
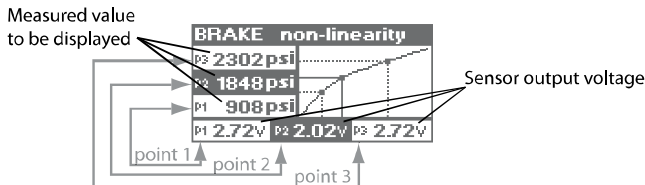

Each point is defined by two values, the voltage and the measurement at that voltage. When you choose a point the values for that point will be shown in inverse video indicating that they can be adjusted. You can select which value you want to adjust with the Roller button. Push Select to choose the value to adjust. At this point that value will start blinking indicating that it's being adjusted. Adjust the number with the Roller button and when you are satisfied push select. If you want to abort push the yellow Menu button and choose the other value to adjust. As you are making these adjustments you will notice that the point that you are adjusting is actually moving and affecting the nonlinearity curve. Push the Menu button to go back and choose another point for adjustment. Repeat the same process for other points and that's it.

Make sure that you are satisfied with the nonlinearity curve before leaving. Sensor setup is a one way process that requires a sequence of inputs. You will have to go through the entire sensor setup sequence in order to come back and adjust the nonlinearity curve. This only sounds hard but in reality it's not that bad especially if you are satisfied with your entries in the basic sensor setup. Just keep pushing the Select button and you will be back here in no time.
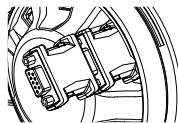
Once you are satisfied with the nonlinearity curve push the Menu button and your newly adjusted curve will be saved and used for that particular sensor.
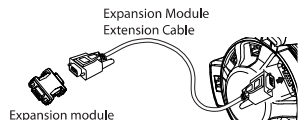
3-Axis Accelerometer Module
optional module
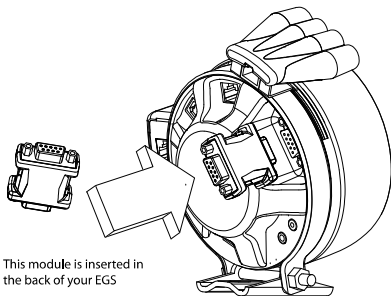
This module is inserted in the back of your EGS

3-Axis ACCELEROMETER, MEMORY and ADC 8 CHANNEL module can be stacked

Expansion Module Extension Cable

Expansion module

You can also mount stackable modules remotely using our Expansion Module Extension Cable.

Accelerometer module provides you with fully calibrated and temperature compensated longitudinal (forward) acceleration values. Measuring forward acceleration is the best indication of power gains or losses during tuning. Once you plug in the Accelerometer module EGS will automatically recognize it on power cycle and allow you to display g-force (acceleration) on the display. G-force becomes yet another parameter that can be recorded and replayed.

This is a 3-Axial accelerometer which makes it possible to orient the EGS in any direction and have it measure actual forward Gs. Traditionally the mounting of accelerometers in cars has been difficult because it required horizontal mounting. Using our experience gained in many years of R&D in G-TECH/Pro Performance Meters we were able to make this accelerometer module very easy to setup and get extremely accurate g measurements.

G-TECH/Pro EGS will automatically detect the Accelerometer module, as is the case with all other modules that are part of the Expandable Gauge System.

Prior to using the accelerometers you should have the EGS learn what its orientation is. This process is called accelerometer calibration. This is to insure that accelerometers measure acceleration in the exact same direction as the movement of the car regardless of how the EGS is positioned. Perform the accelerometer calibration by going through the steps shown on the following screens.
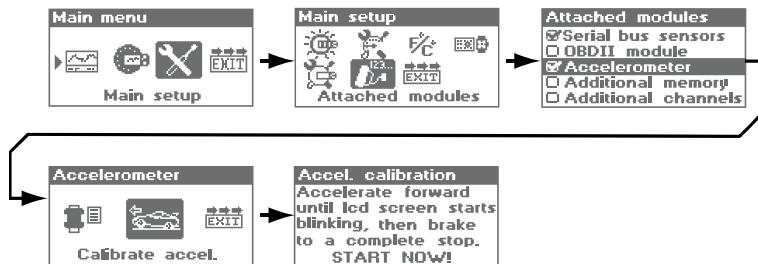
Start accelerating from a stand-still to insure proper calibration. Calibration procedure requires a .25g starting acceleration so the start should be slightly more brisk than in normal city driving. Once the screen starts blinking you can simply come to a complete stop. During the calibration procedure EGS learns what its orientation is relative to the direction of the movement. 3-axial accelerometer and this calibration procedure make it possible to orient the EGS in any position and still get accurate acceleration and braking G's.

EGS constantly checks its orientation and if it senses that it has been moved even slightly it might ask you to calibrate it again. Make sure you perform a calibration every time you see a screen like this:


With the Accelerometer module installed you will be able to graph forward acceleration against other parameters like Wideband Air-Fuel ratio, ignition advance, engine load and more. This gives you some very powerful tools for your tuning enjoyment.

Many other manufacturers are calculating acceleration from speed through OBDII. OBDII update time is few times per second. This causes poor timing resolution resulting in inaccurate performance measurements.
For all performance measurements knowing accurate acceleration is the key. The best way to get accurate acceleration is to measure it with an accelerometer. Beware of so-called performance meters that only have OBDII connection to the car. This approach simply isn't accurate enough.
15 year experience with accelerometers and OBDII allows us to take advantage of best aspects from each technology and insure best possible accuracy for all your tuning measurements.
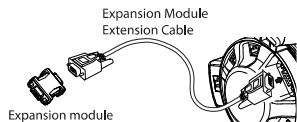
Memory Module
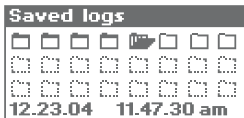## *optional module*
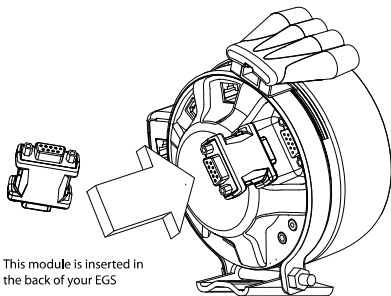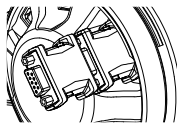
This module is inserted in the back of your EGS

3-Axis ACCELEROMETER, MEMORY and ADC 8 CHANNEL module can be stacked

Expansion Module Extension Cable

Expansion module

You can also mount stackable modules remotely using our Expansion Module Extension Cable.

Optional 2MB memory module will significantly increase the storage capability of your EGS. Not only do all of the 24 logging sessions become available but they are also increased in length. Memory module will effectively increase logging capability of your EGS by the factor of 8.


Standard EGS memory
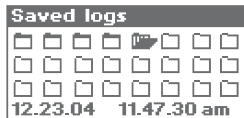
Optional memory module

There is a way to save all your important runs for baseline comparisons on the memory module and keep them there for a long time.

When you are ready to make some important logs make sure you have the optional memory module plugged in your EGS, and make sure that first row of runs is full even if you have to make some small empty logs. Then make your recordings that you want to keep. If the first row of recordings is full EGS will automatically record the next log directly to the memory module. Once you are done recording you can unplug the memory module, keep it safe and replay those logs for your reference whenever you like.

TRIVAC Mounting System
optional module
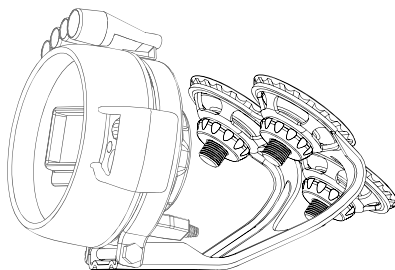
NOTE: Use of the TRIVAC mounting system physically limits the amount of stackable modules to two.
For a more elegant installation use our Expansion Module Extension Cable to remotely mount the modules.

G-TECH/Pro TRIVAC mounting system can be used in the case you don't want to make a permanent mount in your vehicle or you want to quickly move your EGS from one car to another. TRIVAC uses our proprietary suction cup design that is capable of pulling significantly more vacuum than ordinary suction cups.
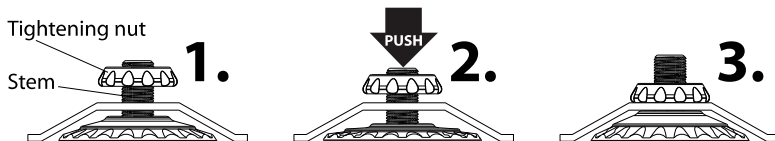
To insure proper mounting first unscrew the tightening nut so it's almost flush with the top of the stem. Second push the stem in order to expel as much air underneath the suction cup as possible. Finally tighten the suction cup in order to get a good vacuum.
TRIVAC is made out of aluminum and it can be bent in order to achieve desired viewing angle.

G TECH PRO® EGS
expandable gauge system

TESLA
electronics inc.

1 Year Limited

W A R R A N T Y

SEE REVERSE SIDE FOR COMPLETE DETAILS

Keep this warranty card at a safe place.
For technical support please visit our web site www.gtechpro.com or contact us at: support@gtechpro.com

Limited Warranty

TESLA Electronic Inc. ("Tesla") warrants this product and its accessories against defects in material and workmanship for a period of one (1) year from the date of purchase. Tesla will repair or replace this product with new or refurbished product or parts, at Tesla's option, free of charge in the USA.

This warranty extends only to the original purchaser. A purchase receipt or other proof of date of original purchase from an authorized seller (including TESLA Electronic Inc.) is required in order to perform warranty service.

G-TECHs bought from TESLA Electronics Inc. can be returned directly to TESLA Electronics Inc. If you bought your G-TECH from any other authorized dealer, the G-TECH must be returned to that dealer in order for warranty service to be provided.

Before you send back a G-TECH for warranty service, you must obtain a Return Merchandise Authorization number ("RMA number") from TESLA Electronics Inc. Units shipped without an RMA number will not be accepted. The RMA number should be visibly marked on the outside of the package.

This warranty covers failures due only to material or workmanship defects.

This warranty does not cover cosmetic damage or damage due to accident, misuse, abuse, negligence, commercial use, acts of God, or modifications of, or to any part of the Product, including accessories.

This warranty does not cover damage due to operation or maintenance, connection to improper voltage supply, or attempted repair by anyone other than a facility authorized by Tesla to perform service on this product.

This warranty does not cover consumables such as fuses. This warranty is only valid for the United States.

Tesla shall not be liable for incidental or consequential damages resulting from the use of this product, or arising out of any breach of this warranty. All express and implied warranties, including warranty of merchantability, are limited to the applicable warranty period set forth above. Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts. Therefore, the above exclusions or limitations may not apply to you.

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        Data\Microsoft\Templates\Normal.dot
Title:
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Creation Date: 5/27/2008 5:21:00 AM
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