Table Of Contents

Table Of Contents

List Of Figures

G-TECH / Pro SS Performance Meter

Thank you for purchasing your **G-TECH / Pro SS** Performance Meter.

I am very pleased and proud to present this product to you and welcome you to our G-tech users family.

As you read along and especially as you start having fun with your G-tech you will realize something. You will see that this is a precision instrument with a high level of sophistication designed by guys who – just like you – have gasoline in their blood and love for cars. Guys who have spent years of sleepless nights to perfect this product.

It's up to you to decide how far you want to take the G-tech. You can do 0-60 mph and 1/4 mile measurements after only a brief setup procedure.

Or, as you become more familiar with the G-tech's powerful capabilities, you will learn how to create very valuable tuning records and increase the consistency of your measurements.

For us, the G-tech has been a labor of love. It has all of the features you'll ever want and there is truly nothing else like it in the world.

Our motto has always been to bring the latest technology and innovation into the hands of our customers and maybe contribute, in a small way, to brightening their day.

So, without further ado, go out there and have some fun.

Please drive safely.

Jovo Majstorovic
President, Tesla Electronics Inc.

Warning: Always obey all local and federal laws when using this device. This device is not intended for street or highway use. Use only in designated areas, closed courses and racetracks.

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

Warning: Don't take your eyes off the road. The G-tech will record your results for viewing and playback after the run. This device is designed as a test and tuning tool to measure performance and safety characteristics of a given vehicle. Use it for that purpose only.

Tesla Electronics, Inc. shall not be held liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance or use of this material.

Tesla Electronics, Inc. shall not be held liable in any way for any incidental or consequential damages to the vehicle, driver, passengers, and/or other involved parties or property occurring while using the G-tech.

TESLA Electronics Inc. reserves the right to make changes to this manual and other product specifications at any time 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.

Getting Started

This section tells you what you need to know before using your G-tech for the first time.

Every new user should read this section!!!

G-tech Front Side

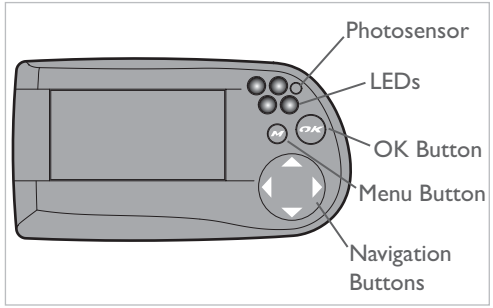


Figure 1: G-tech front

- **Photosensor** – measures ambient light
- **Light Emitting Diodes (LEDs)** – red light indicators
- **OK** button (OK) – used to confirm / select items
- **MENU** button (M) – brings up multi-line menus
- **Navigation buttons** (◀, ▶, ▲ and ▼) – used for moving cursor around in menus, graphs, etc.

G-tech Back Side

The back of the G-tech is shown in Figure 2:

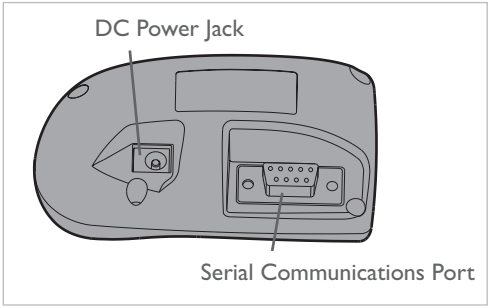


Figure 2: G-tech rear

- **DC Power Jack** – plug in either of the supplied DC power cables into this connector
- **Serial Communications Port** – allows communication between G-tech other devices such as a computer.

Cables

The G-tech ships with a power cable as shown below:

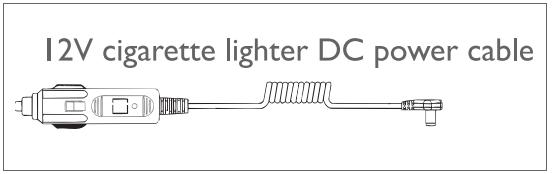


Figure 3: G-tech DC power cable

- **12V cigarette lighter DC Power Cable** – supplies power from vehicle's accessory (cigarette lighter) plug.

The DC Power Cable has a fuse in the end that plugs into your vehicle. If the cable does not seem to provide power, the fuse may be blown and need replacing.

To replace the fuse, unscrew the tip and replace the fuse with a standard 1 AMP fuse. Fuses can normally be purchased at any automotive parts store.

Icons and Navigation

The G-tech's functionality is accessible through its user-friendly icon interface.

Pressing the key from the Main Screen brings up the main menu, as shown below:

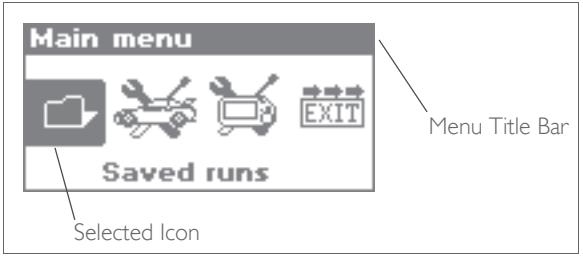


Figure 4: The G-tech's Main Menu

The name of the menu appears in the Menu Title Bar at the top of the display ("**Main Menu**").

The Main Menu has 4 icons. The first icon, a folder, is in "reverse video" because it is the active (selected) icon. Use the navigation buttons (◀, ▶, ▲ and ▼) to move amongst the different icons.

For example, pressing ▶ in Figure 4 would move the icon selection to the "**Car Setup**" icon, as shown below:

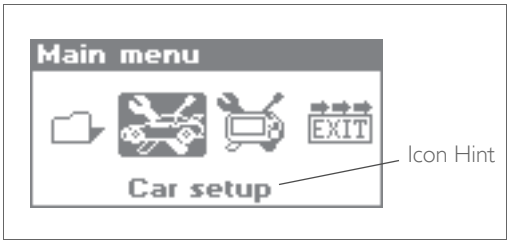


Figure 5: Main Menu: "Car Setup" icon selected

The "**Car setup**" Icon Hint in Figure 5 indicates that the selected icon represents car-related setup items.

Use the OK button to make a selection. For example, to customize the G-tech for your car, you would move to the "**Car Setup**" icon (), and then press OK.

Selecting the "**Exit**" icon (EXIT) on any menu brings you up one level. If you are on the Main Menu when you select "Exit", you will be returned to the Main Screen.

Quick Setup Before First Use

Please perform the following steps before using your G-tech for the first time:

Setup Item	Completion Time	Go to...
Set time & date	1 minute	p. 47
Set vehicle redline	1 minute	p. 40
Enter car weight	1 minute	p. 42
Calibrate RPMs	2 minutes	p. 41
Mount G-tech	2 minutes	p. 50

Figure 6: Quick setup steps

Quick reference

If you know what you want to do, but just don't know where to find the answer, this is the section for you!

If You Want To:	Go To:
Set up the G-tech so you can start using it	*"Quick Setup Before First Use" (p. 10)*
Calibrate RPMs	*"RPM calibration" (p. 41)*
Mount the G-tech	*"Mounting the G-tech" (p. 50)*
Measure your 1/4 mile performance	*"Measuring Your Runs" (p. 18)*
Measure 0-60 MPH	*"Measuring Your Runs" (p. 18) and "Overview — Run Results" (p. 24)*
Use the shiftlights to improve track times	*"Set redline / shiftlights" (p. 40)*
Measure horsepower and torque	*"Dyno plot" (p. 31) and "Horsepower, Torque & G-tech" (p. 67)*
Measure 60-0 braking distance	*"60-0 Braking Distance" (p. 34)*
Do a 0-100-0 MPH run	*"Speed graph" (p. 27)*
Measure lateral (cornering) G's	*"Real-time G Meter" (p. 15)*
Switch to metric mode	*"US or Metric mode" (p. 46)*
See where you shifted during a run	*"RPM replay" (p. 28)*
View the results from a previous run	*"Saved Runs" (p. 35) and "Viewing Results" (p. 23)*
Increase the accuracy of measurements	*"Tips for improving Accuracy" (p. 70)*

2 Everyday driving

This section will explain the Main Screen, which measures RPMs and G Forces.

Main Screen Overview

After power-on, the G-tech begins measuring G-force and RPMs, and displays the Main Screen (Figure 7):

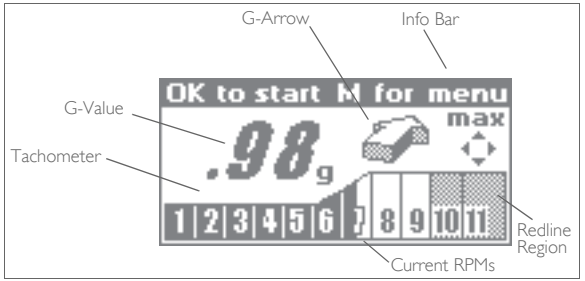


Figure 7: G-tech Main Screen

The Main Screen has 3 main indicators:

- **Tachometer** – vehicle RPMs
- **G-Value** – measured vehicle G-force
- **G-Arrow** – direction of G-force

The Info Bar at the top always provides customized information for the current display.

Tachometer

Note: *For the tachometer to work properly, you must set redline (p. 40) and perform an RPM calibration (p. 41).*

The G-tech's tachometer responds to real-time changes in your vehicle's RPM level.

The tach is customized for your vehicle, based on your redline setting and RPM calibration.

The lower RPM range is drawn with a narrow band. The upper RPM range, which is usually of greater interest to racers, is emphasized with a wider band for greater visibility.

The redline region is indicated as a shaded area in the upper RPM range.

If you have shiftlights enabled (p. 40), you will notice them turning on as you approach redline on the tachometer.

Real-time G Meter

Note: *For the Real-time G Meter reading to be accurate, your G-tech must be self-leveled. Any time you power on or move the G-tech, it needs to be self-leveled. See page 70 for more information. (The G-tech automatically self-levels every time you perform an acceleration run).*

Note: *The G Force Meter can only be used on flat, level ground. The readings will not be accurate on banked turns, hills, etc.*

The Real-time G Meter is a combination of the G-Value and the G-Arrow. It indicates both the amount and direction of G-force, whether your vehicle is braking, cornering, or blasting down the dragstrip.

The display is continuously updated in response to your driving, and tells you all you need to know about your vehicle's handling and acceleration capabilities.

The G-value indicates the *amount* of G-force to within a one-hundredth of a G. The G-Arrow indicates the *direction* of G-force.

Figure 8 illustrates how to read the Real-time G Meter.

G-Arrow	G-Value	Condition
	***.85***	Accelerating Fwd 0.85 Gs
	***.75***	Right Turn 0.75 Gs
	***.34***	Left Turn 0.34 Gs
	***1.55***	Braking 1.55 Gs
	***.28***	Left Turn & Accelerating 0.28 Gs
	***.56***	Right Turn while Braking 0.56 Gs
	***.00***	Minimal G-force

Figure 8: Real-time G Meter examples

G Peak Display

The G-tech monitors G-Force levels in all directions, watching for a new "peak" value in any direction. As shown in Figure 9, the peak G value in any direction can be displayed by tapping the appropriate navigation button (◀, ▶, ▲, ▼).

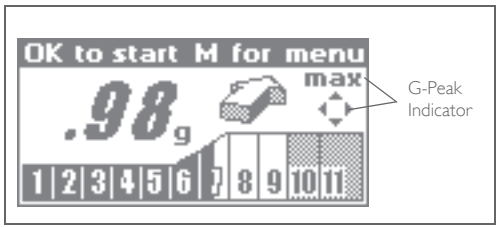


Figure 9: G-Peak Indicator

To see peak:	Briefly tap this button:
Forward Gs	▲
Braking Gs	▼
Left Turn Gs	◀
Right Turn Gs	▶

Example: Tapping ▶ from the Main Screen displays the maximum Gs that were measured while turning right (Figure 10):

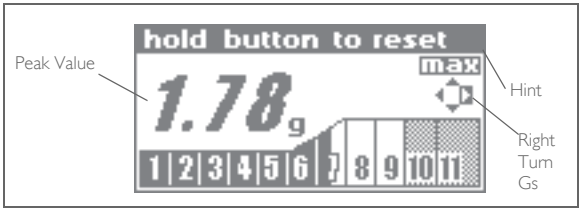


Figure 10: Right-turn G-Peak value

In this example, the highest measured G-force while turning right was 1.78 Gs. Note the small right arrow in reverse video, this indicates the displayed peak value is for right turns.

To reset the peak G value for a particular direction, from the Main Screen, you must press and hold the button for 2 seconds. The display will indicate that the G-force peak value for that direction has been reset to zero.

Note: *The peak G values are not saved when power is removed.*

3 Performing a Run

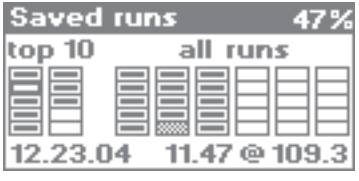
This section will show you how to use the G-tech to monitor your vehicle's straight-line performance.

Measuring Your Runs

Note: *The driving technique for accurate horsepower and torque measurements is very different than the driving technique for fast 1/4 mile times. Please be sure to read "Horsepower, Torque & G-tech" (p. 67) before using the G-tech to measure horsepower and torque.*

This section describes how to measure accelerating and braking performance.

1 Ensure the G-tech has enough free storage remaining to store your run by checking the Saved Runs screen (p. 36).



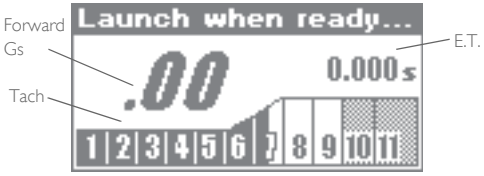
2 Make sure the G-tech is mounted properly, powered on, and return to the Main Screen.

3 Stop your vehicle on flat, level ground.

4 Press PAC. You will see a screen like this:

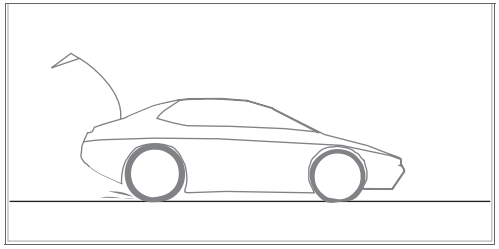
The G-tech ensures that the vehicle is stopped. This "staging" process takes about 1 second,

5 After about 1 second, the upper left LED will begin blinking, and the screen will change as shown below. At this point, the G-tech is ready to go!



The large ***.00*** indicates the forward Gs measured during the run. The smaller ***0.000s*** indicates elapsed time (E.T.) measured during the run. These begin updating as soon as the vehicle is launched.

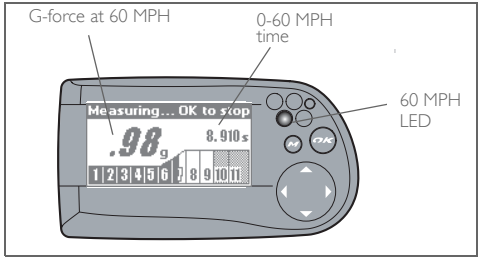
6 Accelerate your vehicle briskly off the line.



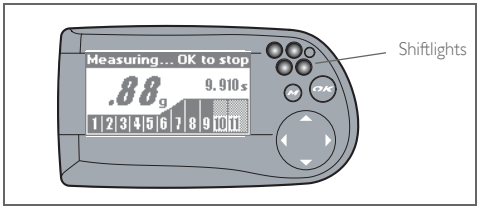
7 The G-tech will detect the forward acceleration and automatically activate the E.T. clock and G-reading. The blinking LED will turn off once you have launched successfully.

Note: *The G-tech requires some "oomph" off the starting line, so don't baby it! If your G-tech doesn't start timing, launch your car with more force.*

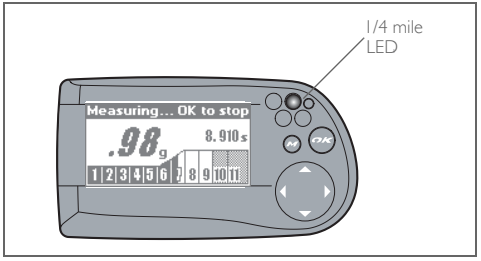
8 When you hit 60 MPH, the G-tech will briefly light an LED and display the 0-60 MPH time. (Don't worry, even though the G-tech display freezes briefly with the 60 MPH time, it is continuing to time in the background.)



9 If you have shiftlights enabled, they will illuminate as you approach the redline shiftpoint in each gear.



10 When you pass the 1/4 mile, the G-tech lights an LED to indicate the E.T and trap speed are saved.



11 To finish the run:

- if you also want to measure braking distance, brake strongly all the way to a complete stop, and wait for the E.T. clock to stop
- if you do not care about braking distance, simply let off throttle and coast for about 1 second, until the E.T. clock stops
- or simply press OK at any point to stop timing

The G-tech also stops timing when you travel 4000 ft or reach 300 MPH - most users will not encounter this situation though.

12 The run will be saved automatically. While the run is being saved, the display will show the G-Force and time measured at the 1/4 mile, 1/8 mile or 60 ft mark, depending on how far you traveled.

Note: *If you do not have enough free storage memory, or if you do not travel at least 60 ft., the run will be discarded.*

13 Once the run has been saved, you will be taken to the Run Results menu, where you can view the results.(p. 23).

14 When you exit the Run Results menu, you will be taken back to the Main Screen, where you can monitor G-force and RPMs, or get ready to do another run.

4 Viewing Results

This section will show you how to view and analyze your run results.

Overview — Run Results

The Run Results are all the details of a particular run. These results include:

- 0-60 MPH time
- 1/4 mile E.T. and trap speed
- Horsepower and torque
- RPM replay
- Intermediate milestones, such as 60 ft time, 330 ft time, 1/8 mile time and speed, 1000 ft time
- Forward G-force measurements

There are 2 ways to enter the Run Results menu:

- Automatically after you have performed a run.
- When you review a saved run (p. 35).

The G-tech remembers what type of result you most recently looked at (e.g. HP, 0-60 MPH, etc.) and brings you back to the same result when you view a new run.

Each entry in the run results menu has a 2 functions. First, when you select an entry, the highlighted result is displayed. Additionally, each entry has an associated graph that can be viewed by pressing OK. The title bar at the top of each entry indicates which graph will be shown when you press OK.

Use ▲ and ▼ to view the different results. Use M to exit.

Figure 11 below shows the 0-60 menu entry as an example.

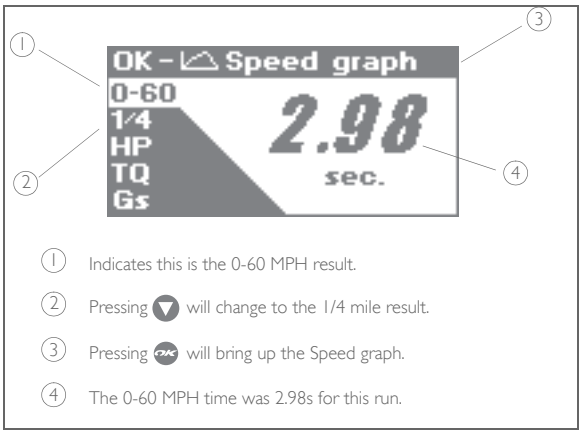
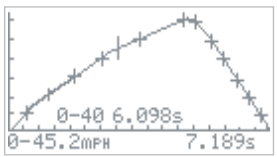
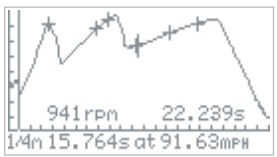
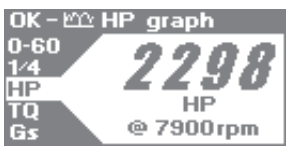


Figure 11: 0-60 MPH Run Results menu entry selected

Run Results Menu Entries

Menu entry	Pressing OK brings up:	Graph provides:	Graph is useful for:
 0-60 MPH time (also shows 60-0 braking distance if occurred)	 Speed Graph (p. 27)	Graph of vehicle speed throughout the run	• Measuring time to get from one speed to another speed (e.g. 0-100 MPH, 50-70 MPH, 0-100-0 MPH, etc.)
 1/4 mile E.T. and Trap Speed	 RPM replay (p. 28)	Graph of Vehicle RPMs throughout the run, and milestones such as 60 ft and 1/8 mile time	• Finding shift points • Measuring gear shifts • Viewing intermediate milestones (e.g. 60 ft time) • Detecting wheelspin
 Peak HP and RPM	 HP Graph (p. 30)	Graph of Horsepower output throughout the run	• Estimating effects of wind drag on your vehicle • Looking at horsepower throughout the run

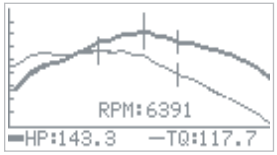
Menu entry	Pressing OK brings up:	Graph provides:	Graph is useful for:
 Peak Torque and RPM	 Dyno Plot (p. 31) (HP & TQ vs RPM Graph)	Graph of Horsepower and Torque throughout a particular RPM range in a single gear	• Getting a "dyno plot" for your vehicle • Determining the best shift-point
 Peak Forward Gs during run	 G force graph (p. 33)	Graph of G-force throughout the run	• See how strong your car was pulling (accelerating) throughout the run • See how well your car brakes • Detecting wheelspin

Figure 12: Summary of G-tech Results

Speed graph

The **Speed graph** provides you with a graph of speed throughout the run.

You can use this graph to measure:

- time to get from one speed to another speed (e.g., 0-50 MPH, 40-60 MPH, etc.)
- time to accelerate from 0 to a certain speed, and brake to 0 again (e.g., 0-100-0 test)
- time to brake to a halt from a particular speed (e.g., 60-0 braking time)

You will see a graph such as the one shown in Figure 13. Of course the shape of the curve, as well as the numbers and milestones, will be different for your vehicle.

Use ◀ and ▶ to move the cursor on the graph. As you move the cursor, the current speed and elapsed time indicators are updated to match the cursor position.

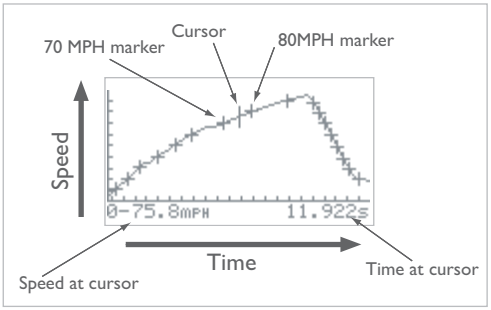


Figure 13: Speed graph

Each tic mark on the horizontal axis marks a 1-second difference. Each tic mark on the vertical axis marks a 10 MPH difference.

A plus sign (+) marks a 10 MPH change. Whenever you move the cursor past a plus sign, the numbers on the bottom of the graph are updated to reflect the time to get to that speed from 0 MPH.

Note: *The speed milestone indicator does not change until the cursor rolls over a different 10 MPH marker.*

Note: *See "Advanced Testing" (p. 57) for detailed information on using this graph.*

RPM replay

RPM replay provides you with a graph of vehicle RPMs throughout the run. **This is one of the most-used G-tech graphs.**

By looking at the data in this graph, you can find out:

- how much time you spent in each gear
- what time each shift occurred, and how long each shift lasted
- the RPM range in each gear
- the RPMs (and implied gear) for each milestone
- if wheelspin occurred (sudden sharp rise in RPMs)
- if you should refrain from shifting near the finish for better results (that shift into 4th just before the finish might be costing you!)

In order to give you the feel and excitement of the run, the RPMs are replayed in real-time, just as they were happening during the run. This means that if you did a 15-second run, it will take 15 seconds to draw the RPM replay. During RPM replay, the G-tech illuminates an LED at any point where the shiftlights were on during the run.

Note: *To finish the replay quickly, rather than in real-time, simply press the OK button while it is being drawn.*

Once the graph is fully drawn, you will see a graph such the one shown in Figure 14.

Note: *Your graph will look different due to your driving style and vehicle.*

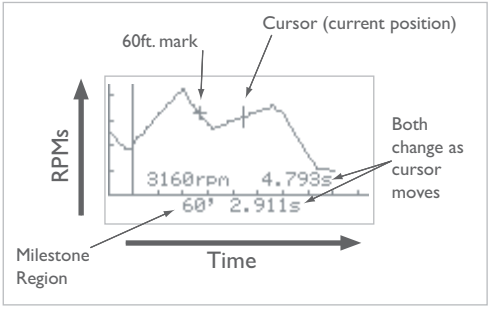


Figure 14: RPM replay

Use ◀ and ▶ to move the cursor along the RPM curve. As the cursor moves, the RPM value and timestamp value adjust to reflect the values at the cursor position.

Each tic mark on the horizontal axis represents 1 second. Each tic mark on the vertical axis represents 1000 RPM.

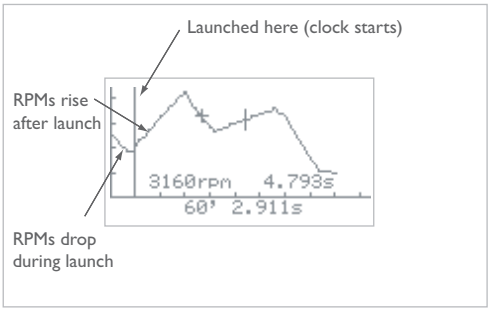


Figure 15: RPM replay — launch

A tall vertical bar marks where the G-tech began timing. Thus, you can see what your RPMs were at launch, and even for a brief period before launch.

Note: *The launch is the most crucial part of a run. The RPM replay (p. 28) and G force graph (p. 33), can help you perfect your launch technique and lower your times.*

You will see a plus sign (+) on the graph at each place where a milestone occurred (Figure 16). When you move the cursor over a milestone marker, the milestone region will be updated with the name of the milestone and its timestamp.

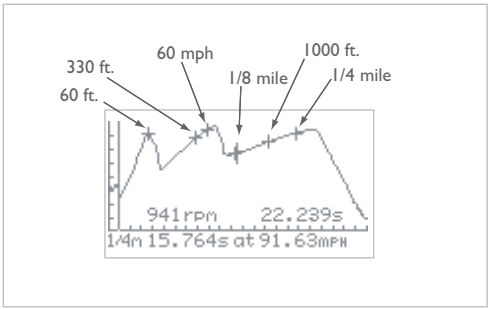


Figure 16: RPM replay — milestones

Note: *You must move the cursor over a milestone (from either direction) to update the milestone region. If you move the cursor near another milestone, but not over it, the milestone region will not be updated.*

Assuming that you let off the throttle during a shift, by placing the cursor at each peak in the graph, you can determine the time and RPM value where you shifted into each gear.

Figure 17 shows how to use this graph to analyze the time spent in each gear and how long each shift took.

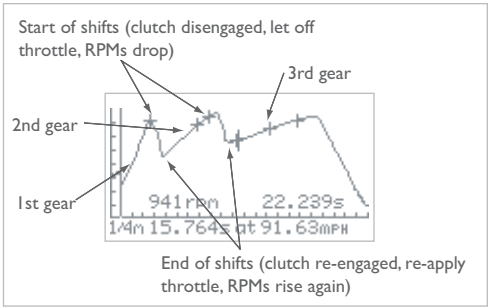


Figure 17: RPM replay — shifts and gears

You can determine how long a gear shift took by doing the following:

- place the cursor at a peak RPM value for one gear and make note of the time
- move the cursor to the right just until the RPMs begin rising again and make note of the time

The difference between these times is the shift time. Your vehicle actually slows a bit during shifts, so keep this time to a minimum!

HP Graph

The **HP graph** shows net horsepower throughout a run.

This is not the optimal graph for analyzing horsepower. It will show artifacts around shift points that are due to factors other than engine horsepower. It will also show the increasing effect of aerodynamic drag on the vehicle and the corresponding lower "net horsepower" as the speed increases.

The graph resembles the one shown in Figure 18. Of course the shape of the curve, as well as the numbers and ranges, will be different for your vehicle.

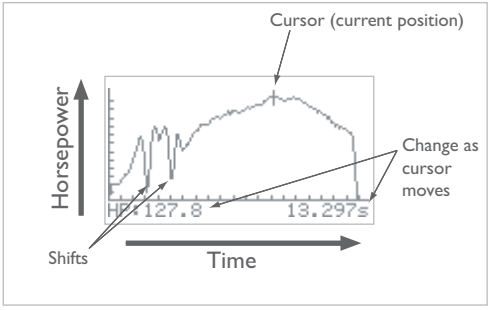


Figure 18: HP Graph

- As you move the cursor with ◀ and ▶, the horsepower and time values are adjusted to follow the cursor.
- Note the "dips" in measured horsepower on the 1-2 shift and the 2-3 shift. As soon as you push in the clutch to shift, you decelerate (due to aerodynamic drag), and there is no net horsepower delivered to the wheels.
- Notice how this was a "3rd gear horsepower run" because the user spent the most time in 3rd gear.
- Each tic mark on the horizontal axis represents 1 second.
- Each tic mark on the vertical axis represents 10 HP.

Dyno plot

One of the most exciting features of the G-tech is its ability to measure and graph your vehicle's horsepower and torque against an RPM range.

The G-tech's **Dyno plot** provides you with a graph of horsepower and torque throughout an RPM range in a single gear. This is the "dyno plot" that everyone is accustomed to seeing.

After you perform a run, the G-tech analyzes the data and then creates a graph based on the gear in which maximum horsepower was attained.

Note: *In order for you to get consistent HP & TQ graphs, there is a special driving technique. This technique is different than the driving technique you would use for a quick 1/4 mile!*

Please refer to "Horsepower, Torque & G-tech" on page 67 for more information on optimal technique for performing horsepower runs.

You will see a graph such the one shown in Figure 19. Of course the shape of the curve, as well as the numbers and ranges, will be different for your vehicle.

You will notice a few things about Figure 19:

- The horsepower curve is drawn with a **thick line**; the torque curve is drawn with a thin line.
- The peak horsepower and torque values are marked on the graph

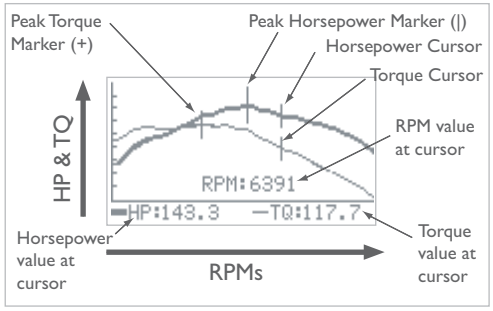


Figure 19: Dyno Plot

- The graph has moveable cursors for HP and TQ. The cursors move left and right using ◀ and ▶.
- The HP cursor rides along the HP curve, and the TQ cursor rides along the TQ curve.
- As the cursor moves, the "RPM," "HP," and "TQ" values are updated to reflect the current cursor position.

G force graph

The **G force** graph shows the measured G force throughout a run. Larger G values indicate stronger acceleration.

This graph is useful for seeing how hard your vehicle was pulling when it was accelerating (positive Gs) and how hard it was decelerating while braking (negative Gs).

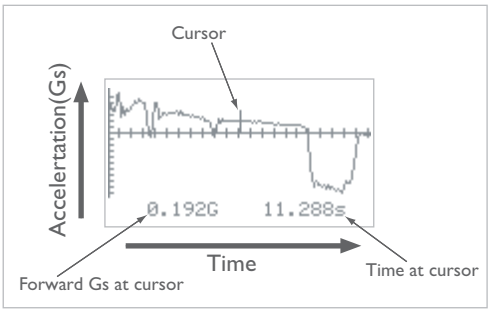


Figure 20: G Force Graph

Some things to note about this graph:

- Use ◀ and ▶ to move the cursor. The G-force and timestamp always pertain to the current cursor position.
- Each tic mark on the horizontal axis marks 1 second
- Each tic mark on the vertical axis marks 0.1G of acceleration

Figure 21 highlights some other useful information on the graph.

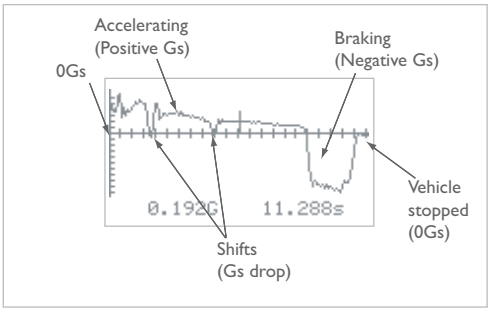


Figure 21: Braking and accelerating

- Positive G force means the vehicle is accelerating.
- Negative G force means the vehicle is decelerating (shifting, coasting, braking).

- The brief dips are shift points. When you shift, you temporarily remove power, and this causes the vehicle to decelerate briefly, until you re-engage the next gear.

- In a very powerful vehicle, or a traction-limited vehicle, you may also notice dips in acceleration that are not due to shifts. These dips are due to more power being applied to the wheels than can be handled. The net result is that the wheels spin and the vehicle does not accelerate much.

- The large dip you see at the end of the graph is hard braking at the end of the run.

- Notice at the end of the graph, Gs are zero. This is because the vehicle came to a stop. Hence there is no acceleration or deceleration.

60-0 Braking Distance

You can use the G-tech to measure 60-0 MPH braking distance. To measure your vehicle's 60-0 braking distance:

- perform an acceleration run as usual (you do not need to perform a full quarter mile, but make sure you reach at least 60 MPH)

- when you are done accelerating, brake hard all the way to a stop

Note: *If you do not brake to a complete stop at the end of your run, and wait for the E.T. clock stop, you will not get a 60-0 MPH braking distance measurement.*

The 0-60 results screen will also display the 60-0 braking distance as shown below. If you do not brake to a stop, the 60-0 braking distance is not shown on the results.

The 60-0 MPH braking distance is shown below the 0-60 MPH time if the run was completed by braking hard to a complete stop, and then waiting for the E.T. clock to stop.

5 Saved Runs

This section describes how to manage the runs that are stored on your G-tech.

The Saved Runs screen

The G-tech saves the last 30 runs you have performed.*

You can review your stored runs at any time by bringing up the Saved Runs screen and choosing the run you wish to review.

1 From the Main Screen, press for the Main Menu

2 Select "Saved runs" and press

This will bring up the Saved Runs screen, shown in Figure 22.

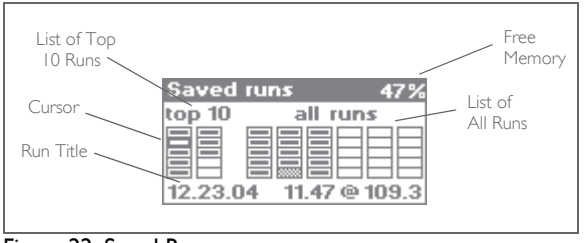


Figure 22: Saved Runs screen

Up to 30 saved runs are listed under the "all runs" section. Each "slot" represents a separate run.

The G-tech also lists the 10 best 1/4 miles (as determined by E.T.) on the left hand side for quick and easy recall.

The amount of free storage memory remaining is shown in the upper right-hand corner of the display. (As a guideline, 15-second run consumes approximately 5 percent of the free memory.)

Use the navigation keys (, , and) to move the cursor amongst the run slots.

When the cursor is located on a slot with a run stored in it, the run title is displayed at the bottom of the screen.

*
The G-tech can store up to 300 seconds of racing.The G-tech also imposes a limit of 30 runs total that can be stored, regardless of length. For example:

Run Length	No. of Runs Stored	Seconds Stored
20 seconds	15 runs	300 seconds
15 seconds	20 runs	300 seconds
10 seconds	30 runs	300 seconds
5 seconds	**30 runs**	**150 seconds**

To review a run's results, move the cursor to it and press OK.

The appearance of each slot indicates its status, as shown in Figure 23:

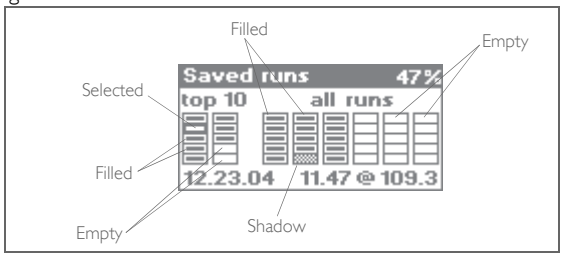


Figure 23: Status of run slots indicated by appearance

- Filled ( ) — slots that hold a saved run
- Empty ( ) — slots that do not hold a saved run
- Selected (or) — the slot containing the cursor is in reverse video (there is always 1 selected slot)
- Shadow ( ) — if the selected run is a top 10 run, the shadow indicator corresponds to the same run in the other list.

Top 10 run list

The 2 columns under the heading "top 10" represent the 10 fastest 1/4 mile runs as determined by E.T.

The runs are ordered as shown in Figure 24.

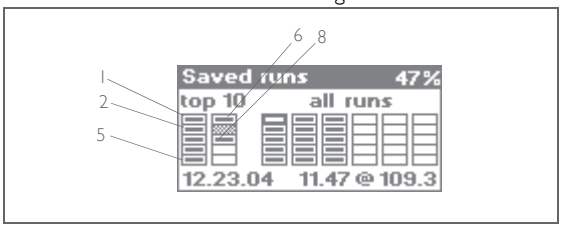


Figure 24: Run ordering of top-10 list

Every run listed in the top-10 list is also listed under "all runs".

Note: *There are 15 runs listed in "all runs", but only 8 runs in the "top 10" list. This indicates that only 8 of the 15 stored runs were full 1/4 miles. The other 7 runs were stopped before completing a 1/4 mile, and thus are not eligible for the "top 10" list.*

All runs list

The 6 columns under the heading "all runs" represent all the runs stored in the G-tech.

If less than 30 runs are stored, some of the slots under "all runs" will be empty.

The runs are ordered by date as shown in Figure 25.

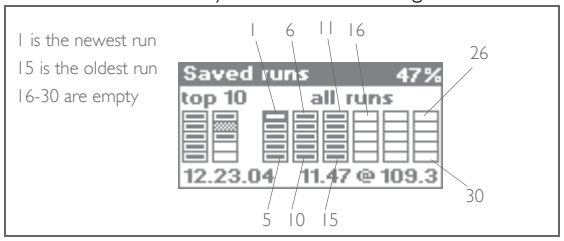
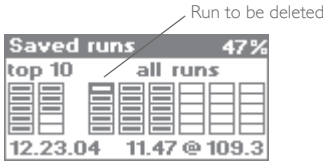


Figure 25: Run ordering of the "all runs" list

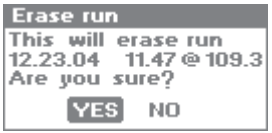
When the cursor is in the "all runs" region and positioned over a run that is one of the ten best 1/4 miles, the run's position in the "top 10" list will be indicated with the "shadow run" indicator ( ).

Deleting saved runs

1 Move the cursor to the run you wish to delete. This can be either a run in the "top 10" list, or the "all runs" list.



2 Press and hold OK for approximately 2 seconds, until a screen such as the following appears.



Choose **YES** or **NO**, then press OK to finish.

Note: *To delete **all** runs, press and hold OK for approximately 10 seconds in the step above. **There is no undo!***

6 Car Setup

This section explains the G-tech's "Car Setup" menu items.

Set redline / shiftlights

This section describes how to set the redline value in the G-tech, and how to enable/disable the shiftlights.

Setting the correct redline value for your vehicle is important for proper RPM calibration and shiftlight operation.

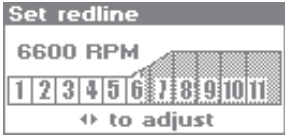
The G-tech has a sequential shiftlight that illuminates the first shiftlight LED when vehicle RPMs are 500 RPMs below redline. At 250 RPMs below redline, 2 additional LEDs turn on. When the vehicle is at redline, all four LEDs blink rapidly.

1 From the Main Screen, press M for the Main Menu

2 Select "**Car Setup**"  and press OK

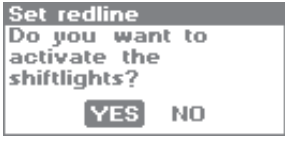
3 Select "**Set redline**"  , press OK

4



Use ◀ ▶ to adjust the redline value in increments of 100 RPMs, then press OK to continue.

5



Use ◀ ▶ for YES or NO, press OK to finish.

Note: *If you cannot control when your vehicle shifts (e.g. automatic transmission), you may wish to disable the shiftlights.*

RPM calibration

Every vehicle has a unique electronic "RPM signature," so the G-tech must learn the RPM signature at different RPM levels on your vehicle before it can measure and record RPMs.

Follow the steps below to calibrate the G-tech for your vehicle's RPM signature. For additional information on RPM calibration, please see "RPM Calibration Tips" on page 66.

Note: *Set redline in the G-tech (page 40) prior to this step!*

Note: *The steps documented here are current as of time of printing. Future enhancements may cause a deviation from the steps you see here... if so, just follow the on-screen instructions.*

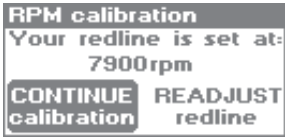
Note: *The values you see in the following steps (such as a redline of 6750) are not necessarily the same values you will see during your own calibration. Do not worry - this is fine.*

1 From the Main Screen, press M for the Main Menu

2 Select "Car Setup"  and press OK

3 Select "RPM calibration"  , press OK

4 The G-tech confirms that it has the correct value for your vehicle's redline. It is very important that the G-tech is configured with the proper value for redline prior to RPM calibration.



If the redline value is correct, select CONTINUE calibration and press OK. If not, select READJUST redline, enter the correct value for redline as described in the previous section, and then continue.

5 Rev the engine to the requested RPM level and hold it there. Then press OK when vehicle RPMs are steady at the requested value. Hold the RPMs steady until the G-tech indicates it is done measuring.

6 Again match vehicle RPMs to the requested value, and press OK when vehicle RPMs are steady at the requested value.

7 You will see a screen that indicates the RPM calibration procedure has been completed, and then you will be returned to the previous menu.

Enter car weight

Note: *Vehicle weight must be set properly in order to obtain accurate HP and TQ measurements. For help determining vehicle weight, please see page 72.*

1 From the Main Screen, press M for the Main Menu

2 Select "Car Setup"  and press OK

3 Select "Enter car weight"  , press OK

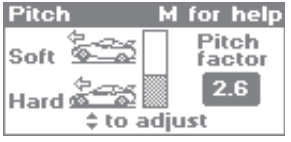
4 Move using ◀ ▶, adjust using ▲ ▼, press OK.

(Note: Press M for help during this process).

Pitch correction

Note: *The pitch factor depends on your vehicle's suspension. For help determining the pitch factor, please see page 64.*

1. From the Main Screen, press M for the Main Menu
2. Select "Car Setup"  and press OK
3. Select "Pitch correction"  , press OK
4. Adjust the pitch factor using ▲ ▼, press OK



The default pitch factor of 2.0 is fine for most vehicles.

Press ▲ to increase the pitch factor for vehicles with soft suspensions. Press ▼ to decrease the pitch factor for vehicles with stiff suspensions.

(Note: Press M for help during this process).

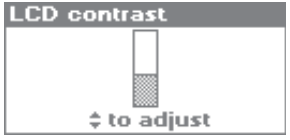
7 G-Tech Setup

This section explains the “G-Tech Setup” menu items.

LCD Contrast

The G-tech uses a Liquid Crystal Display (LCD) to display information. You may want to adjust the contrast on the LCD due to personal preferences, environmental conditions, etc.

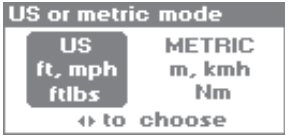
1. From the Main Screen, press M for the Main Menu
2. Select "G-Tech Setup" and press OK
3. Select "LCD Contrast" and press OK.
4. Use ▲ ▼ to adjust the contrast, and press OK to save changes and exit.



US or Metric mode

The G-tech can display units in U.S. units (feet, pounds, miles per hour, etc.) or metric units (meters, kilograms, kilometers per hour, etc.). The G-tech stores US and metric data on every run, so even if you perform a run while in U.S. mode, the G-tech is also monitoring and storing all the metric milestones as well.

1. From the Main Screen, press M for the Main Menu
2. Select "G-Tech Setup" and press OK
3. Select "US or metric mode", press OK
4. Choose U.S. Mode or Metric Mode, then press OK.



The following tables list the corresponding units and measurements for each mode.

Item	U.S. unit	Metric unit
Weight	lbs	kilograms
Speed	miles per hour	kilometers per hour
Distance	inches, feet	cm, meters
Power	horsepower	kilowatts
Torque	ft-lbs	newton-meters

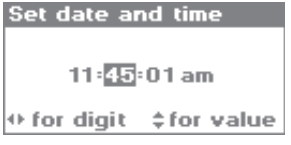
U.S. Mode Measurement	Metric Mode Measurement
60 ft time	20m time
330 ft time	100m time
1/8 mile time and speed	200m time and speed
1000 ft time	300m time
1/4 mile time and speed	400m time and speed
0-60 MPH time	0-100 km/h time

Figure 26: US and metric mode units and measurements

Set date and time

1. From the Main Screen, press M for the Main Menu
2. Select "**G-Tech Setup**"  and press OK
3. Select "**Set date and time**"  , press OK
4. Move using ◀ ▶, adjust using ▲ ▼, press OK.

5. Move using ◀ ▶, adjust using ▲ ▼, press OK.



Set to factory defaults

This option restores the G-tech to the condition it was in when it was shipped from the factory — it clears out all the configuration information and stored runs.

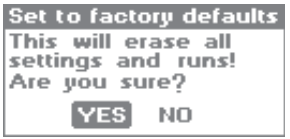
Note: *Resetting the G-tech to Factory Defaults resets nearly all the information stored in the G-tech. Perform this step only if you are sure that you want to delete all configuration information and stored runs!*

1 From the Main Screen, press for the Main Menu

2 Select "**G-Tech Setup**"  and press

3 Select "**Set to factory defaults**"  , press

4 Confirmation is required resetting to defaults.



Use ◀ ▶ to select either **YES** or **NO**, and then press to finish.

Note: *After you have performed this step, you will need to perform the steps in "Quick Setup Before First Use" on page 10 before using your G-tech!*

8 Mounting System

This section explains the G-tech's mounting system. In order to obtain accurate measurements, the G-tech must be mounted properly.
Please read this section carefully, it is very important!

Mounting the G-tech

The G-tech is shipped with a sophisticated mounting system that is used to hold the G-tech steady in your vehicle. This section describes:

- the different pieces of the mounting bracket
- how to assemble the mounting bracket
- how to mount the bracket in your vehicle

Figure 27 shows the pieces of the G-tech mounting bracket.

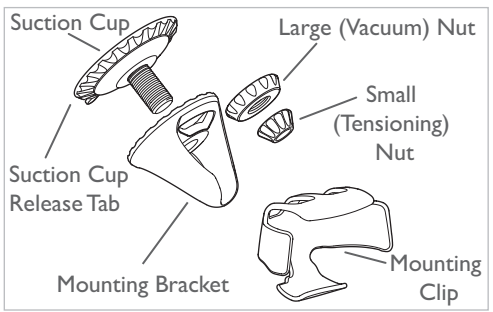
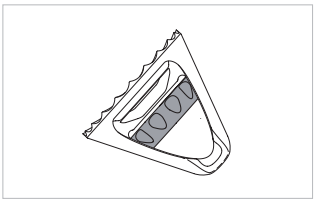


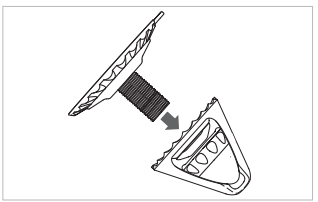
Figure 27: Mounting bracket parts

Assembling the Bracket

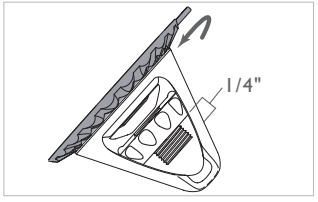
1 Insert Large Vacuum Nut into Mounting Bracket.



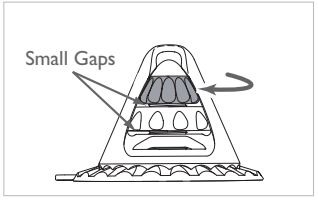
2 Insert suction cup into mounting bracket.



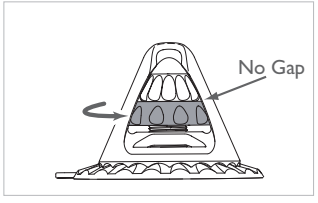
3 Turn suction cup clockwise into the Large Vacuum Nut until approximately 1/4 inch of threads protrude.



4 Place Small Tensioning Nut on threaded spindle, and turn it clockwise a until it is snug on the stem. There should be a small gap between the Small Tensioning Nut and the Large Vacuum Nut.



5 Turn Large Vacuum Nut counter-clockwise until it touches Small Tensioning Nut.



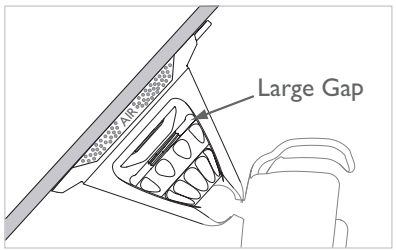
6 Gently insert rubber ball of mounting clip into mounting bracket. It should go in with very little force and should fit snugly. If rubber ball does not go in with little force, adjust tenisioning nut(s) until it goes in easily. Do not force rubber ball into mounting bracket, as this may deform / damage it.

Mounting the Bracket

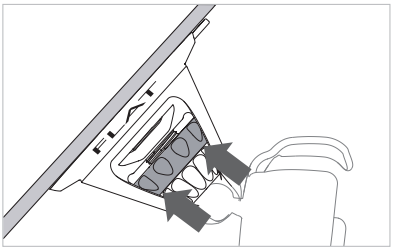
1 Find a place on your vehicle's windshield where you can mount the G-tech without affecting visibility.

Note: *Make sure the mounting area on the windshield is very clean and dry; otherwise, the mounting bracket may not work properly.*

2 Place the large rubber suction cup on the mounting area of the windshield. Make sure there is a large gap between the Large Vacuum Nut and the mounting bracket.

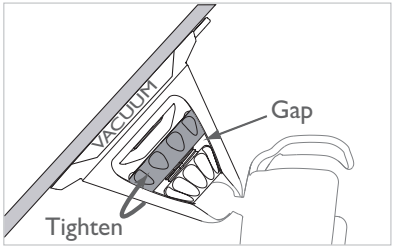


3 Push the Large Vacuum Nut firmly towards the windshield to expel all air between the suction cup and the windshield. **This is a very important step to ensure proper operation of the mounting system.**



4 At this point, the mounting bracket should stay attached to the windshield when you remove your hands. If it doesn't, inspect the rubber suction cup for cracks or tears, and make sure the windshield surface is clean.

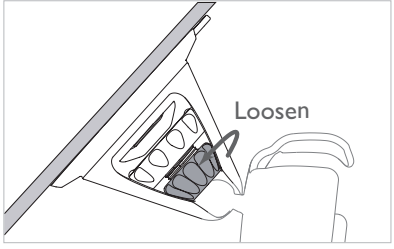
5 Turn the Large Vacuum Nut clockwise in order to expel air and create a vacuum between the suction cup and the windshield. **Be sure to turn the Large Vacuum Nut as far as possible.**



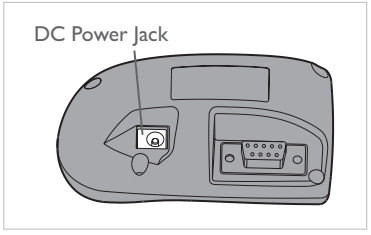
6 The mounting clip should be steady and should not move easily. If this is not the case, slowly turn the Small Tensioning Nut counter-clockwise just enough to secure the mounting clip.

Note: *You should only need to use the Small Tensioning Nut for fine adjustments the first time you mount the G-tech. After the initial mounting, you should secure the clip only by turning the Large Vacuum Nut clockwise to tighten it.*

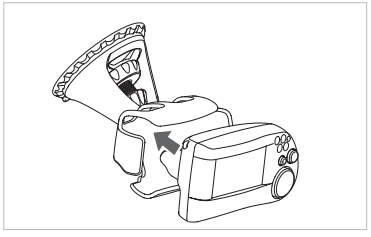
Note: *The clip should be completely rigid. A G-tech which moves or vibrates during a run will provide inaccurate results.*



7 Insert the small end of the power cord into the DC jack, which is located on the back of the G-tech.



8 Snap the G-tech into the mounting clip.



9 Plug the large end of the DC power cord into your vehicle's 12V cigarette lighter socket. The G-tech will power on.

Note: *Some vehicles supply power to the 12V socket only when the ignition is in the ACCESSORY position or when the vehicle is running.*

Note: *The G-tech does not have an ON/OFF switch. Please be sure to unplug the G-tech when exiting your vehicle to avoid draining your vehicle's battery.*

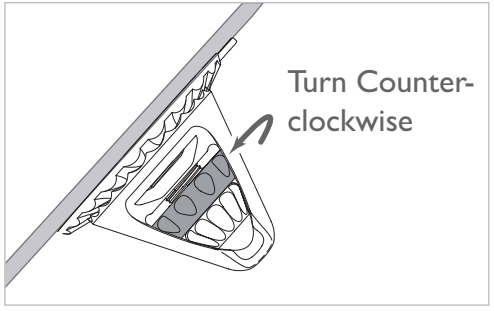
Note: *Please do not move the mounting clip if you need to adjust the orientation of the G-tech! This will damage your mounting system and will not be covered under warranty. To safely re-orient the mounting clip, please refer to "Adjusting the Bracket" on page 55.*

Adjusting the Bracket

This section describes how to adjust the position of the mounting clip for better viewing.

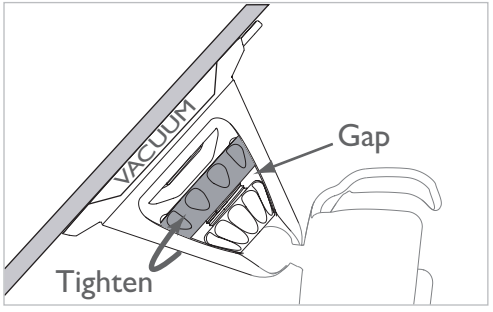
It is very important that this technique be followed in order to avoid damage to your mounting system.

1 Turn the Large Vacuum Nut *counter-clockwise* until the mounting clip can rotate freely.



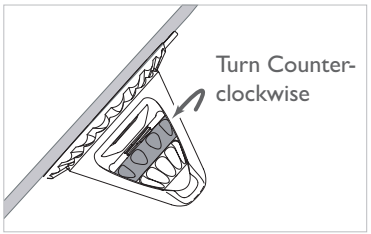
2 Adjust the position of the mounting clip gently. If the clip does not pivot easily, loosen the Large Vacuum Nut even more, otherwise you risk damaging the ball portion of the mounting clip.

3 Turn the Large Vacuum Nut *clockwise* until it is snug and the mounting clip is held firmly in place.

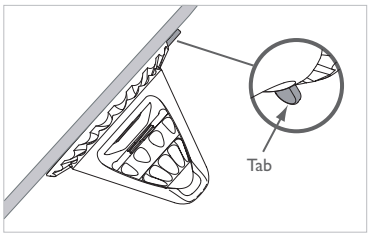


Removing the bracket

1 Turn the Large Vacuum Nut *counter-clockwise* until it is snug up against the Small Tensioning Nut.



2 Pull the suction cup's small rubber tab gently away from the windshield.



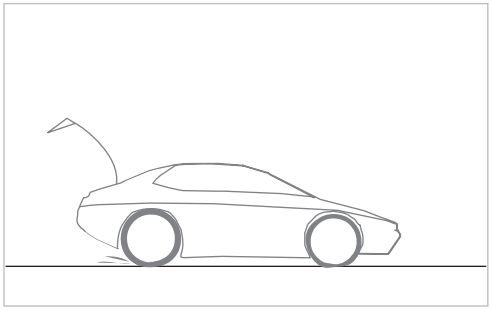
9 Advanced Testing

This section will show you how to use some of the more advanced speed measurements of the G-tech.

Measuring 0-40 MPH, etc.

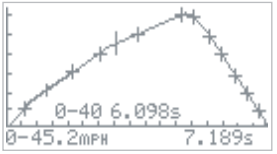
Suppose you want to measure the time it takes you to reach a certain speed (say, 40 MPH) from a standstill. (In this example, we measure 0-40 MPH time, but you can use the same procedure to measure the time it takes to reach any speed you wish.)

1 Perform an acceleration run, **making sure you hit the speeds you want to measure**.
In this example, we are measuring 0-40 MPH, so we made sure the driver reached 40 MPH during the acceleration run.



2 Select the **0-60** results menu choice and press OK to view the **Speed graph**.

3 Notice how the speed (vertical axis) rises for a while, and then falls again. This is because the vehicle braked to a complete stop at the end of the run. For now (0-40 MPH), we only care about the rising part of the graph, during acceleration from 0 to 40 MPH.
Use the ◀ ▶ keys to move the cursor over the 40 MPH milestone *on the rising part of the graph*. The 0-40 MPH time is displayed.



Measuring 50-70 MPH, etc.

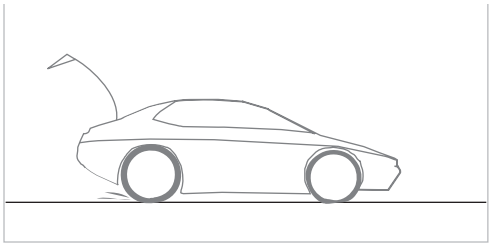
Suppose you want to measure a vehicle's acceleration at highway speeds (sometimes referred to as a "passing test"). This test is often done in the vehicle's top gear (5th or 6th gear in most vehicles) to measure how well the vehicle can accelerate on the highway without downshifting.

You may also wish to use this feature to measure the same interval (e.g. 50-70 MPH) in several different gears. For example, many vehicles can cover 50-70 MPH in 2nd gear, 3rd gear, 4th gear, and 5th gear. This measurement will tell you which single gear is the best choice for this speed range.

Let's suppose you want to measure your 50-70 MPH time. This example will show you how to use the G-tech to do it.

Note: *You can measure any interval you wish using the procedure described below — we have just chosen 40-60 MPH for this particular example.*

1 Perform an acceleration run, **making sure you hit the speeds you want to measure**.
In this example, we are measuring 40-60 MPH, so we made sure the driver reached 60 MPH during the acceleration run.

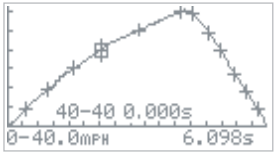


2 Select the **0–60** results menu choice and press OK to view the **Speed graph**.

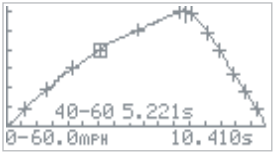
3 Notice how the speed (vertical axis) rises for a while, and then falls again. This is because the vehicle braked to a complete stop at the end of the run. For measuring the 40-60 MPH acceleration time, we only care about the *rising* part of the graph, during acceleration from 40 to 60 MPH.

Use the ◀ ▶ keys to move the cursor over the 40 MPH milestone *on the rising part of the graph.*

Press OK and a box will be drawn around the 40 MPH milestone. Since the cursor is still on 40 MPH, a 40-40 MPH time of 0.000 is displayed.



4 Now use the ▶ key to move the cursor over the 60 MPH milestone *on the rising part of the graph.* Since the cursor is now on 60 MPH, the 40-60 MPH time is displayed.



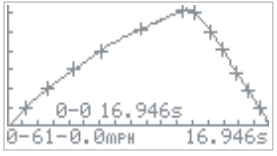
Measuring 0-60-0, 0-100-0, etc.

Suppose you want to perform a 0-60-0 MPH timed measurement... how quickly can your vehicle reach 60 MPH, and how quickly can it bring the vehicle back to a stop?

The G-tech provides you with all the tools you need to perform this test!

1. Stage the G-tech and launch your vehicle (page 18).
2. Accelerate up to the desired speed.
3. Immediately brake hard, all the way to a stop.
4. Keep the vehicle at a stop until the E.T. clock stops counting (about one second once you have completely stopped).
5. Select the **0-60** results menu choice and press OK to view the **Speed graph**.

6. Notice the "upside down V" shape to the curve. Use the ▶ key to move the cursor all the way to the right hand side of the screen. In this case, the driver actually went up to 61 MPH, so we get the 0-61-0 time, which is displayed on the bottom line.



Note: *You can use this same procedure to measure acceleration and braking to any speed, such as 100 MPH.*

10 More info

Additional detailed information and tips.

Rollout

The rollout distance is the distance that the vehicle moves before the E.T. clock starts timing. This is exactly what happens at a dragstrip.

By matching the rollout distance you use at the track to the rollout distance used by the G-tech, your times will be very close to those measured with the track's equipment.

The G-tech uses a roll-out distance of 12 inches. In other words, the G-tech starts timing when your vehicle has moved 12 inches.

At a dragstrip, to achieve a rollout of approximately 12 inches, you would creep your vehicle forward little by little, just until the stage bulb is lit. Once the stage bulb comes on, stop moving your vehicle forward immediately. This is called "shallow staging", because your vehicle barely "dipped its toe" into the staging area.

Had you continued to move your vehicle forward a few more inches (but not enough to un-block the stage beam), your vehicle would have been "deep staged."

Determining your pitch factor

"Vehicle pitch" is the up and down movement of the front (and back) of your vehicle during acceleration.

You may be aware that under strong braking conditions, most vehicles experience "nose dive." By the same token, most vehicles experience a slight raising of the front end under strong forward acceleration. You may not even notice it. But this motion means the G-tech's measurements require slight adjustments to obtain the highest accuracy.

The G-tech has an adjustable "pitch correction factor" that allows you to fine tune the G-tech's accuracy. You must set the pitch factor correctly to ensure the best accuracy.

Typical cars have a pitch correction factor of approximately 2 degrees per forward G of acceleration, and this is the default setting. Most cars will not require any adjustment at all. If you have particularly stiff suspension, lower the pitch factor. If you have a very soft suspension, consider raising it.

You can take the guesswork out of determining this value by going to your local dragstrip and doing a few runs while using the G-tech.

First, you *must* set your pitch correction factor to 0.0, or the following procedure *will not work*! (The default pitch correction factor is 2.0).

Perform a run at a dragstrip with the G-tech. Then you will have the track speed from your racing ticket and the G-tech trap speed from the G-tech results.

Your pitch correction factor can be calculated by the following formula:

$$\text{Pitch Factor} = \left(\left(\frac{\text{Gtech Trap Speed}}{\text{Track Trap Speed}} - 1\right) \times 57.3\right)$$

Note: *The above formula assumes that the G-tech's trap speed is always greater than the trap speed from the track timeslip, which it almost always is. If the G-tech's trap speed is lower than the timeslip's trap speed, use a pitch correction factor of 0.0.*

The following example shows how to calculate the pitch correction factor for a real-world situation.

Example: *Determine the correct pitch factor when the G-tech indicates a trap speed of 104.0 MPH and the track ticket gives a trap speed of 100.3 MPH.*

$$\text{Pitch Factor} = \left(\frac{\text{Gtech Trap Speed}}{\text{Track Trap Speed}} - 1\right) \times 57.3$$

$$= \left(\frac{104.0}{100.3} - 1\right) \times 57.3$$

$$= (1.03689 - 1) \times 57.3$$

$$= (0.03689) \times 57.3$$

$$= 2.1$$

After you enter a pitch factor of 2.1 into your G-tech for this vehicle, the G-tech traps speeds will agree more closely with the track timeslip.

Note: *Even with proper pitch correction, G-tech E.T.s may not agree closely with the timeslip unless you shallow stage!*

Changes to your vehicle's suspension, weight distribution, etc. can affect the pitch correction factor. Also, not all dragstrips are as level as they seem. This can also have small effects on your pitch correction factor on different terrains.

RPM Calibration Tips

The G-tech monitors vehicle RPMs constantly. In order to accurately convert your vehicle's electrical signature to RPMs, however, you must first perform an "RPM calibration" (page 41).

You can perform the RPM calibration while the vehicle is stationary or while it is moving (in gear).

The only thing that matters during RPM calibration is that the vehicle RPMs are stable (unchanging) and that they are at the value requested by the G-tech.

This means that if the G-tech instructs you to rev the engine to 4000 RPM and press OK, make sure the RPMs are steady right at 4000 RPM before pressing OK. The more careful you are during calibration, the better your RPM readings will be.

Some vehicles will allow you to rev the engine to redline while parked; others have a rev limiter that kicks in early (such as at 3000 RPM) when the vehicle is not moving.

If your vehicle rev limiter kicks in early while stopped, you will need to calibrate your RPMs while moving in gear. In this case, you should have assistance from a passenger. You can calibrate the RPMs when the vehicle is moving in gear, or in neutral and stopped, so long as the RPMs are at the specified level.

Vehicles with automatic transmissions might need to be placed in first gear to keep the transmission from upshifting during the High RPM calibration.

Some vehicles have a very faint RPM signal. If you have performed an RPM calibration but the G-tech tachometer does not accurately represent your RPMs, your vehicle might fall into this category.

On these vehicles, you may have better results by turning on some of your electrical systems (such as the headlights, defroster, or fan) during the RPM calibration process. If you do this, however, you should keep these systems powered when using the G-tech as well.

Another point of note: with many vehicles, the RPM signal is very weak below 1000 RPMs (even 1500 RPM on some vehicles). If this is true of your vehicle, at low RPMs the G-tech will register the default value of 750.

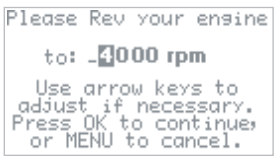
During the RPM calibration process, the G-tech suggests certain RPM values to use (e.g., 4000 RPM and 2000 RPM).

These suggestions are based on what you input for your vehicle redline.

In all but a few cases, the suggested RPM values will provide a good RPM calibration. If you are not pleased with how well the G-tech is measuring RPMs after a calibration, the G-tech will allow you to change the two RPM calibration points.

For example, for a vehicle with a redline of 6500 RPM, the G-tech may suggest revving to 4000 RPM for the high value, but you are free to change this number to a larger number, like 6000 RPMs, during the calibration process.

For example, during RPM calibration, the first screen may come up as such:



If you would like to calibrate at 6000 RPMs instead of 4000 RPMs, just press ▲ twice to change the "4000" to a "6000", and then rev your engine to 6000 RPMs and press OK.

Horsepower, Torque & G-tech

This section provides detailed information on the G-tech's horsepower & torque measurements and some guidelines and tips to help you get repeatable results.

The G-tech does not measure *engine horsepower at the crank*, which is what the automobile manufacturers and magazines typically report.

The G-tech does not measure *wheel horsepower* either (a dyno measures *wheel horsepower*). As you may know, *wheel horsepower* always measures lower than *engine horsepower*, since it includes drivetrain loss, the rolling resistance of the tires on the road, and other factors.

The G-tech measures *net horsepower*, which reads even lower than *wheel horsepower*. The G-tech's *net horsepower* value is a measurement of all the horsepower that is available to accelerate your vehicle after all power losses have been subtracted.

As one example, on a dyno, the vehicle is not experiencing any aerodynamic drag ("wind resistance") because it is not actually moving through the air — it is stationary on rollers.

However, in the "real world" (i.e., at the track), your vehicle has to contend with issues such as aero drag.

Suppose that two vehicles with identical engines, drivetrains, and tires go to the same dyno. One vehicle has been modified to minimize aerodynamic drag. They both go to the dyno in town and measure identically.

On the G-tech, the vehicle that is more aerodynamic will measure a higher *net horsepower*, because it loses less power due to aerodynamic drag on the track.

The driving technique for horsepower and torque measurements differs from the technique for obtaining the best 1/4 mile results.

We will describe the technique here and then provide some supporting information afterwards.

1. Stage the G-tech just as you would for a 1/4 mile run. Wait for the "Launch when Ready" message.
2. At a moderate RPM value, start your vehicle briskly off the line, enough to trigger the G-tech and start its clock. Don't launch as hard as you would for a quarter mile. For example, if your vehicle redline is 6000 RPM, launch at 1500 to 2000 RPM.
3. Shift out of 1st gear before you are halfway to your vehicle's redline. So if your vehicle has a 6000 RPM redline, shift to 2nd before you reach 3000 RPM in first gear. Be sure to let off the throttle between shifts, i.e., while the clutch is not fully engaged, and be sure to shift smoothly and avoid jerks.
4. As soon as 2nd gear is fully engaged (which should be at a low RPM, since you shifted out of 1st gear very early), floor the accelerator. Keep the "pedal to the metal" until your vehicle's redline.
5. This allows you to cover a very wide RPM range in 2nd gear at full throttle. Don't worry about the fact that you aren't in the "sweet spot" of your power band when you first shift into 2nd gear. That's the point: we're measuring the power over the whole RPM range.
6. Once you reach your upper RPM value (e.g. redline) in 2nd gear, shift into 3rd gear and accelerate briefly (maybe one second or so.) This does not have to be full-throttle, since we are using 2nd gear for our horsepower measurement.
7. At this point, you can press  to stop the G-tech from measuring, or just coast (foot off accelerator). The G-tech will stop its clock.
8. Now you can view the dyno plot (p. 31).

- There is significantly less wind drag in 2nd gear as opposed to 3rd gear; that is the reason we chose 2nd gear in this example.
- Shop dyno testing is often done in 4th gear, because in many cars, 4th gear provides a 1:1 gear ratio with the least amount of driveline loss. However, using 4th gear for dyno testing with the G-tech is usually not practical (and certainly not necessary) because of high speed and large aero drag.
- No matter which gear you do your runs in, be sure to use the same gear for all runs you wish to compare. Suppose you do a 2000-7000 RPM run in 2nd gear and another run from 2000-7000 RPM in 4th gear. The run in 4th gear was at a much greater speed, and hence the aero drag was much greater. This will have the effect of lowering the *net horsepower* on the 4th gear run.
- Vehicles with extraordinary power, or poor traction, may spin the wheels at full-throttle in 2nd (and even later) gears. The G-tech horsepower measurement relies on no wheelspin being present, just like a chassis dyno. If your vehicle experiences wheelspin in 2nd gear, please perform the run in 3rd (or 4th...) gear.
- Do multiple runs and average the results for the most accurate and repeatable numbers.
- With the G-tech, repeatability and tuning is the goal, not necessarily comparisons to magazines or dynos.
- Vehicle weight is factored into the horsepower calculation. This number should be as accurate as possible. Refer to "How much does my vehicle weigh?" on page 72 for more information on vehicle weight.
- External environmental conditions such as wind, air temperature, and humidity affect *net horsepower*. The same vehicle with the same driver will measure more *net horsepower* at 32 degrees Fahrenheit than it will at 100 degrees Fahrenheit. Cold air is more dense, and hence contains more combustible oxygen. That's why your vehicle feels so much stronger when it's cool outside!
- Cars with Continuously Variable Transmissions (CVT) might be a problem, as the G-tech relies on gear shifts and broad RPM ranges when determining peak horsepower and torque. For these situations, you can use the G-tech's Horsepower vs. Time graph to find the peak horsepower.
- Ensure your RPMs are calibrated properly and working throughout the entire RPM range before doing a horsepower run. Otherwise your torque values will be skewed.

Self-leveling the G-tech

Note: *The G-tech must only be used on flat, level ground. Any slope, bump or grade in the surface may cause inaccuracies.*

Note: *When the G-tech is mounted in your vehicle and the vehicle is stopped on flat, level ground, the G-Value will be very small. If not, you should "self-level" the G-tech (described below).*

Every time you do an acceleration run, the G-tech automatically self-levels. Thus, to self-level the G-tech, simply perform a brief acceleration run (page 18). You need only go far enough to trigger the G-tech and start the E.T. clock — just a few feet.

At this point, you can press OK to stop the G-tech from measuring, or just coast (foot off accelerator). Either way, the G-tech will stop its clock. If you are careful to go less than 60 feet forward, the run will be automatically discarded, otherwise you may wish to go into your Saved Runs and discard the newest run (page 38).

Once you have done this, be sure to not move the G-tech mounting clip. You G-tech is now self-leveled.

Tips for improving Accuracy

- Do your acceleration runs on a very flat / level track. Even a gentle slope may cause your readings to be off.
- Avoid measurements on windy days. A tail wind will artificially lower your time and increase your measured horsepower. A head wind will artificially increase your time and lower your measured horsepower.
- Do several runs in both directions to average out the effects of slope and wind.
- Ensure that the G-tech is not loose in its mounting bracket and also make sure the mounting bracket is firmly installed.
- A smooth, strong launch will typically yield the most repeatable measurements. A jerky or violent launch might cause the G-tech to trigger before or after you intend.
- When doing a braking test, bring the vehicle to a complete stop *and wait for the E.T. clock to stop counting*. If you begin moving again before the E.T. clock stops, you may not be able to view braking distance results.

- To get the results closer to the track timeslip, shallow-stage and fine-tune your pitch correction factor (p. 43).
- When trying to measure horsepower and torque, please follow the procedure in the manual very closely (p. 67)
- Avoid leaving your G-tech in any extreme temperature conditions. Extreme temperatures will not affect the physical appearance but may impact the accuracy of the G-tech's accelerometer calibration. Examples of extreme temperatures could include freezing outdoor temperatures and car interiors in direct summer sun-light.

As you analyze your runs with the G-tech and measure your horsepower and torque vs. RPMs (p. 31), you may determine that the best shiftpoint is not at vehicle redline, but at a different value.

Bypassing the Boot-up screen

When the G-tech is first turned on and initializing, an image of a car gradually appears on the screen.

Figure 28: G-tech screen during power-on initialization

If you wish to by-pass this altogether, simply press OK.

Version and serial number

If you need to determine the configuration information of the G-tech (such as the firmware version or unit serial number), follow this procedure.

- Before applying power to the G-tech, press and hold the ▲ button.
- While keeping the ▲ button pressed, apply power.
- Wait for a screen to appear that gives configuration information about the G-tech.
- Once the screen appears, you may release the ▲ button.
- After viewing the version information, you may press OK to continue.

How much does my vehicle weigh?

In order to calculate meaningful horsepower measurements, you must provide an accurate value for your vehicle's weight.

In this manual, the term "vehicle weight" refers to all the weight that is supported by the vehicle's tires (including the tires themselves). So this includes the driver's body weight, fuel weight, tools, fast food wrappers, etc.

If you are fortunate enough to have access to an accurate vehicle scale, go ahead and weigh the vehicle as it would be equipped at the track (i.e., with you in it, the correct amount and type of fuel in the tank, etc.)

Some tracks even have scales available for weighing your vehicle. Also, some towns have dumps or refuse collection areas with large scales that you may be able to use. Moving companies may have vehicle scales as well.

If you can't weigh your vehicle, estimate it. Use the manufacturer's data to obtain vehicle weight (from the Owner's Manual or the Internet). Then adjust the weight based on the difference between your car as it was stock, and as it is now (Have you added a heavier stereo? Have you removed the

spare tire?). Don't forget to include your own body weight and the fuel as well.

You do NOT want to use the Gross Vehicle Weight Rating **(GVWR)** value that is provided in the vehicle door jamb as the actual vehicle weight.

GVWR is the fully-loaded vehicle weight with passengers. Thus, **GVWR** is always higher than the actual vehicle weight, and if you enter **GVWR** instead of actual vehicle weight, your horsepower numbers will be artificially inflated.

A rough rule of thumb to estimate your vehicle weight from the **GVWR** exists, but don't rely on it being too accurate.

Again, this is a very ROUGH rule of thumb... each manufacturer calculates **GVWR** in its own way...

The rule of thumb is to take the passenger capacity of the vehicle (e.g., 5 for a mid-sized sedan) and subtract from the **GVWR** 180lbs for each missing person.

Example: Suppose **GVWR** = 4200 lbs, vehicle capacity is 5 people, but we have only a driver. Thus there are 4 missing passengers, which means we subtract 4x180lbs. The value 4200 lbs - 720lbs = 3480 lbs. Thus you would enter 3480 lbs into the G-tech for vehicle weight.

Getting more from your G-tech

As you use the G-tech and become more familiar with all of its features, you might be interested in expanding its capabilities. The RR model of the G-tech has some features that you might find of interest. Please visit **www.gtechpro.com** for information on upgrading your G-TECH/Pro SS to an RR.

With the RR upgrade, you can use the G-tech as a data-acquisition system. G-TECH/Pro RR can upload race data to a computer running G-tech PASS (Performance Analysis System Software), allowing you to overlay and compare runs and get very detailed information about your measurements.

Are you a Road Racer or a Solo (autocross) enthusiast? If so, the RR (Road Racer) is the right choice for you. Log over two hours of racing sessions and review the data later in G-tech PASS. This is what the professional teams do, only their equipment costs much more.

If you use the G-tech in more than one vehicle you will be able to store up-to four cars and easily switch between them.

For more information on upgrading, and to stay up-to-date with new developments, visit **www.gtechpro.com**.

Contact info

Tesla Electronics Main Company Website:
http://www.gtechpro.com

G-tech Technical Support:
http://www.gtechpro.com/support.html

G-tech Discussion Forums:
http://www.gtechproforums.com

Company Contact Information:
Tesla Electronics, Inc.
G-tech Division
1749 14th St.
Santa Monica, CA 90404
Phone: (310) 452-0030
Fax: (310) 452-0078

Index