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*. This is because it loses less power due to aerodynamic drag on the track as it is slicing through the air.

The optimal driving technique for measuring horsepower and torque is nothing like 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, for example.
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.
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 "Horsepower and Torque vs RPMs" graph for your run (p. 72).

Some notes on horsepower runs

- 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.
- 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.
- Be sure to do multiple runs and average the results for the most accurate and repeatable numbers. You can use the G-tech's PC Analysis Software to assist with this.
- Remember that with the G-tech, repeatability and tuning is the goal here, 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 "What does my vehicle weigh?" on page 160 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 value by hand.
- Make sure that your RPMs are calibrated properly and working throughout the entire RPM range before doing a horsepower run. Otherwise your results will be skewed.