TM-Drag Pro

Davis technology

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Introduction

We would first like to thank you for your purchase of our system. We believe it is the best system available to you on the market today. This system balances effectiveness with ease of installation, broad field of uses, and cost.

As with all technical devices such as engines, shocks, carburetors, clutches etc., the product's performance is based largely on your ability to use it properly. Testing in controlled circumstances will help you determine the proper settings for your application and your situation. Testing is very important since it will help you utilize this product to its full potential.

Please read all of the instructions and information thoroughly before attempting to install or use this product.

How Does It Work?

This system differs from other systems that you may be familiar with because it does not use any external wheel or ground speed sensors. Instead it uses a patented method that simply monitors engine speed or driveline speed to determine when wheel spin occurs. This process is a very simple way to effectively detect wheel slippage and evoke a means of correcting the slippage. In this case retarding the ignition timing degrades the engine performance. When the ignition timing is retarded the loss of power is instant and generally sufficient to stop or greatly reduce the wheel spin.

However, there are limits to the unit. It is not a "Fix-All." It will not fix a bad tune up or poor driving. It will however help a good driver in a good car get the power to the ground better and make more full passes. This allows the user to collect data to use to determine how to make adjustment to the car to get a better setup. A full pass, even if it is a few hundredths slow is very valuable compared to blowing the tires off 100 feet out.

For example, if your racecar experiences a loss of traction around 300' the system will detect this and send a signal to the ignition to retard the timing. This will reduce the amount of torque delivered to the drive wheels and help to regain grip much faster than the driver can "pedal" the throttle.

With a little practice the system is easy to configure and use. Typically after only a few test runs the proper settings can be reached. Most drivers adapt quickly to a car that does a little of the driving for them. The driver simply has to accept the fact that the microprocessor in the system is much faster than his/her reflexes. In fact the system typically monitors for wheel spin 25 times a second, and the microprocessor used can process 3 million commands a second!!

For more info on this technology and how it differs from other systems please refer to Appendix A in the back of this manual.

Installation

Installation of the system is very simple. It is very important to *make all connections correctly*. Improper installation could result in poor system performance or damage to the unit.

Keep all wires away from any spark plug wires and coils or other sources of electrical noise and heat.

The unit should be mounted away from any sources of electrical noise or high heat. It can be easily mounted with Velcro to allow for easy removal.

Make the connections as follows:

2 Pin Connector (power in)

1. Connect pin "A" (RED wire) to 12v positive (16v systems are compatible).

2. Connect pin "B" (BLACK wire) to ground.

3 Pin Connector (Sensor)

The sensor gap between the sensor and ring needs to be 0.020''-0.040''. Do not apply more the 10 ft/lbs. The sensor is not solid stainless steel and if over tightened the sensor will split and fail. This condition is hard to diagnose. Remove the sensor from the bracket and run the nut from the start of the threads to the base of the sensor. If the nut tightens up, while the threads appear clean, the sensor has been split.

1. Connect the pin marked "A" (RED wire) to the red wire on the sensor (12v positive)

2. Connect the pin marked "B" (BLACK wire) to the black wire on the sensor (ground).

3. Connect the pin marked "C" (WHITE wire) to the RPM signal you are using as a source

If another type of sensor is used, check with the manufacturer to determine connections. (IMPORTANT--The sensor must be capable of 15Khz resolution!!)

2 Pin Connector (Output)

1. Pin "A" (Pink wire) is the first output.

2. Pin "B" (Tan wire) is the second output

These leads will output 12 volt+ (Input Voltage) when unit is making corrections. The signal can be used to trigger any engine/chassis function. Power interrupt, ignition mapping, fuel pump, throttle actuator, shock setting, and brake control are a few examples. They are cumulative, meaning that a small correction will turn on the Pink wire and a large correction will turn on the Pink and Tan wires.

It is also very helpful to tie these connections into a data channel if available. That way the user can see what the Traction Control system did during a pass. This info is very useful for adjusting the setup. Consult with your data acquisition supplier.

Testing

After installation it is recommended that you test the system. To do so please follow these instructions step by step.

Sensor Test:

This test is useful for setting up the trigger ring and sensor if used.

1. Set the dial to "OFF"

2. Rotate the RPM trigger-

The LED will flash each time a trigger is sensed. The unit is not active in any other way and no corrections will be made. The LED will not flash above a speed of 200 RPM.

RPM Window Test:

This mode is useful to check that the system is reading the RPM signal properly and activating the retard stages.

1. Set the dial to "AUX"

2. Start the engine and accelerate the driveline.

3. When the RPM is within the window of 1000 to 2000 rpm the LED will glow solid and the unit will make a large correction, both stages will be active.

Forced Activation Test:

This test is useful to check both stages of retard with or without the engine running.

This is also useful to test the connections to a data system if used.

1. **Set the dial to any setting between 1 to 6.**
2. **Connect a timing light to the engine**
3. **Turn "on" the power to the unit, the light should begin to flash.**
4. **Start the engine.**
5. **With the engine idled up to about 3500 rpm; press the Test button on the unit until the light glows solid. The first timing retard stage will activate for 4 seconds, then the second stage next 4 seconds.**

If unit does not pass all test, recheck all connections and test again.

Tuning

Different tracks, cars, conditions, etc. may require different settings for the system to function effectively. The dial on the face of the unit is used for this setting. The value is referred to as the "Threshold".

"Threshold" is the acceleration limit at which you want the system to begin limiting the amount of power delivered to the drive wheels. *Threshold may need to be adjusted occasionally to match the current track and conditions. The higher the setting, the more aggressive the traction control will be.*

The light on the system is useful in determining the settings. Once the driveline has crossed 1500 rpm (default) for the first time the light will go out. After the light goes out, it will flash when the system is making a correction. If the unit seems to be making too many corrections then the Threshold setting may be too high. If the unit does not seem to making enough corrections then the Threshold may be set too low. Once the driveline falls below 750 rpm for more than 2 seconds the system will reset and the light will begin to flash once again.

Valid settings are 0 through 6. The higher the setting, the more aggressive the traction control will be. . ***A good starting point is T=3.***

Note: If the car feels "Jerky or Surges" the system is set too high, decrease the Threshold setting by one number and retest. When the Threshold dial changed the new setting is used immediately.

Setting the dial to "OFF" deactivates the system. (Sensor Test).

With testing and good record keeping, you should be able to easily predict the necessary settings for current conditions. The settings will not vary much once you determine what works best for your setup. Even at different tracks, the settings typically do not change more than one Threshold value.

Configuring

Starting RPM: (default 3 /1500rpm)

The driveline RPM at which the unit begins to make corrections can be set by the user. Some users may want the unit to start as low as 500 RPM while others may want a higher setting so as not to affect the clutch setup. Once set the value will remain until changed by the user. To change the starting RPM value, follow these steps.

1. Set the dial to "3"

2. Hold down the "Test" button

3. Turn the power On

4. While holding the "Test" button down, move the dial to the desired starting rpm/500

(example- 1500rpm/500=3)

5. Release the "Test" button,

The led will flash to show the value the unit is now set to.

(3 flashes=1500/ 5 flashes=2500)

Trigger Count: (default= 8)

The unit must be configured for the number of counts it will receive per revolution of the driveline. Once set the value will remain until changed by the user. To change the value, follow these steps.

1. Set the dial to "4"

2. Hold down the "Test" button

3. Turn the power On

4. While holding the "Test" button down, move the dial to the desired number of triggers divided by two.

   (example- 12 triggers/2=6)

5. Release the "Test" button,

   The led will flash to show the number of triggers the unit is now set to.

The configuration values can be verified at any time by following these steps.

1. Turn the power "On"

2. Set dial to any position other than "Off".

3. Press the "Test" button and hold down.

4. The LED will glow solid for 8 seconds.

5. Once the LED goes out it will blink once briefly, followed by a pause.

6. Next the LED will Flash 1, 2, or 3 times to indicate an internal setting, followed by a pause.

   (this setting is of no importance to the user)

7. The Led will now flash for the value of trigger counts, followed by a pause.

8. Lastly, the LED will flash the value for the starting RPM. Remember, this value is the starting rpm divided by 500.

   (3 flashes=1500/ 5 flashes=2500)

Appendix A

Another advantage of these systems is that they are actually able to detect wheel slip better than most wheel speed sensor based systems. The reason for this is that our systems monitor the rotation of the driveline. With 8 triggers on the driveline you can measure slip within 1/8 of a rotation. Now factor in a 5:1 final drive *(rear end)* ratio and tire rotation can be measured within 1/40 of a turn (that is about 2-3 inches on most tires). The fact that the driveline is turning much faster than the wheels, amplifies the slip at the driveline, making these systems much more sensitive than the typical wheel speed systems. Put simply, if the tires slip the driveline revs. The only reason for the sudden increases in revs in the driveline is wheel spin.

Sensor based systems usually measure tire rotation about every 1/4 of a turn. The front and rear are compared to each other to check for slip. With a margin of error of 1/4 of a turn at each wheel, it may take as much as 1/2 of a turn of tire slip for the system to react. If a tire is allowed to slip a half a turn before a correction is made, it is very hard to stop the slip.

A system that uses a preset percentage of slip, between the rear wheel speed to front wheel (or ground) speed, cannot compensate for these changing conditions that are inherent in all types of racing. Sometimes the driver needs to "slip" the tires through one corner more than another, this is impossible if the system only allows a certain percentage of speed difference between the front and rear wheels.