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VPS

Vehicle Position Sensor

03/19

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Introduction

The Vehicle Position Sensor is designed to give the racer a new level of data that has been previously unavailable. Combining that data from multiple types of sensors including accelerometers, gyros, and magnetometers the VPS can quickly and accurately measure tiny changes in acceleration or rotation in all 6 axes, Gx, Gy, Gz, Pitch, Roll and Yaw.
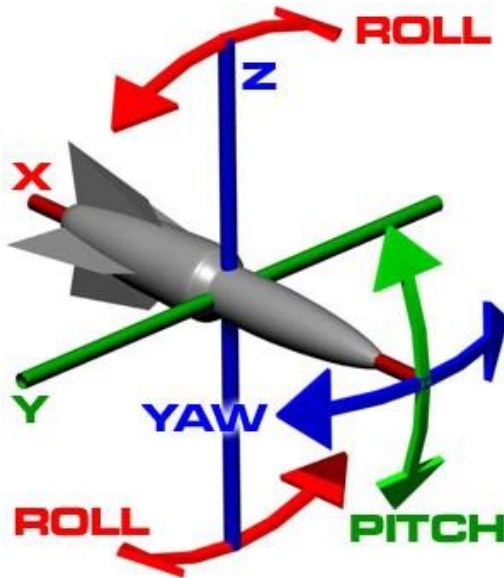
This data can be used to help determine the performance of the vehicle as well as control aspects of its behavior, such as excessive Pitch (wheelie). The VPS transmits its data through 5 analog outputs, serial (Profiler units only), and CAN-BUS.

The VPS provides the data in two formats. Direct data from the various sensors and Fusion data. Direct data is what it says, the data is sent directly from the internal sensors for that particular axis, i.e. Acceleration X, Y, Z or rotation rates from the Gyros. The Direct data is presented raw with no filtering for the utmost detail.

Fusion is an aggregate of multiple sensors "fused" together to provide the most well-rounded data. This type of data is commonly used in IMU's which you may find on the internet or used in toys such as drones and hover boards.

Fusion data however, is reliable only when all of the sensors are functioning as expected. In the harsh environment of a race car, this is often not possible due to the extreme vibrations and electromagnetic fields generated by the ignition systems and other electrical systems found in a race car.

Therefore, Fusion data is only used for static setup and calibration.

DO NOT USE FUSION DATA WHEN CAR IS RUNNING OR ON THE TRACK!!!!!!

The VPS is oil filled and temperature controlled to enhance the quality of the data. It is normal for the VPS to be warm when running, approx. 100F.

Remote Display

The VPS can use a Remote Display (purchased separately) for the user to interface with the unit for setup and configuration.

If the VPS is connected to a Profiler (not PFEFI), which has a built-in color touch screen, then the Remote Display is not required. The Profiler screen is used to interface with the VPS. The Remote display can be used with many other Davis products such as the Profiler, PFEFI, Smart Relay, Digital Ignition Controller, and the TC3 series.

Virtual Time Slip

The data is so accurate that the VPS can provide a Virtual Time Slip (VTS) that can be used to monitor vehicle performance even when no time slip is provided.

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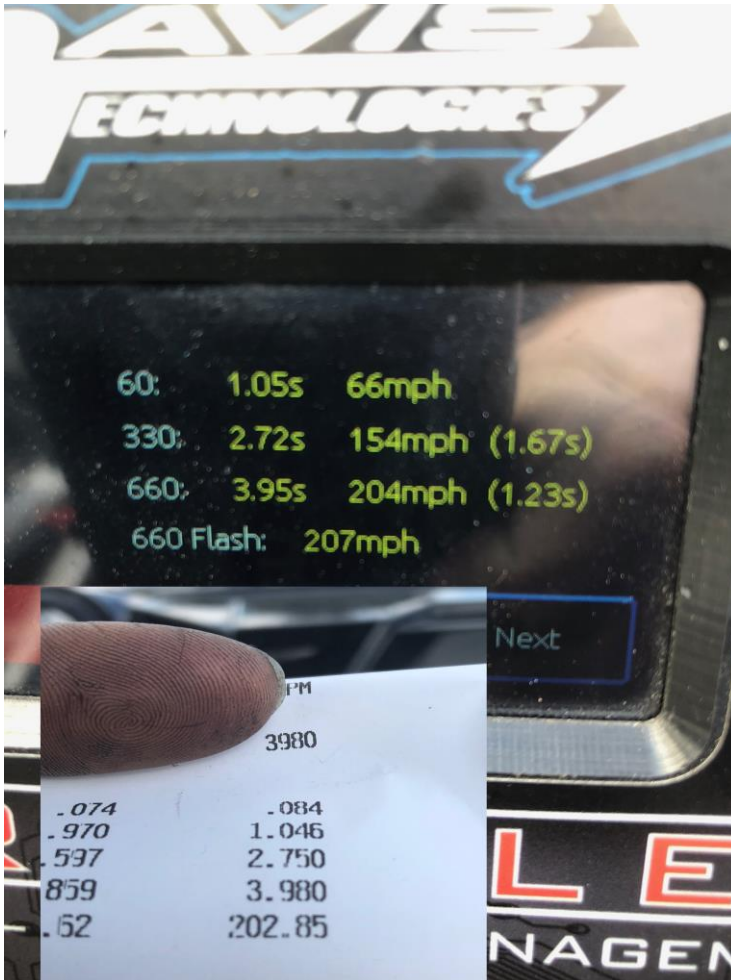
Optional Control Strategies

You can add other Davis Technologies systems as options to the VPS, such as Wheelie Control and Traction Control to make for a very powerful unit. Even a car with older ignition technology can use a VPS to add Wheelie control and Traction Control. Some systems may require the addition of a Digital Ignition Controller.

Wheelie Control (add-on purchased separately)

The VPS can have a <u>Wheelie Control</u> installed to control excessive pitch. The user can also take the analog data into another system, such as an EFI and create their own strategy of reactions to excessive movement. This could be configured to react to excessive reading in any axis.

Depending on the system receiving the VPS data, the user could build strategies to react to the vehicles movement that may be undesirable. Think about Roll Control, Pitch Control, Yaw Control, Side Impact, etc.

Example Screen of VPS Wheelie Control (optional)

VPS Wheelie			
	Output% Per Deg Rise **25**	Neutral Angle **2.5**	SmartDrop Angle **6.5**
	SmartDrop Level **1**	Output% Limit **80**	Start Time **.750**
	Back		
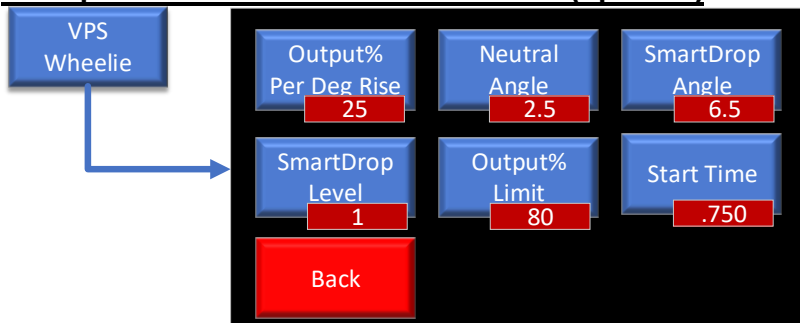
Traction Control (add-on purchased separately)

The VPS can optionally have a <u>Traction Control Strategy</u> installed to control excessive tire slip. The traction control can be in the form of either Davis Technologies' Non-Self Learning Traction Control or Self Learning Traction Control.

Example Screen of VPS Traction Control (optional)

Traction Control			
	Mode	Correction Hold	Correction Spread
	5	3	150
	Max Output Percentage	TC Enable	Max SD
	100	Enabled	1
	Back	Ramp In (%/s)	Minimum RPM
		500	450
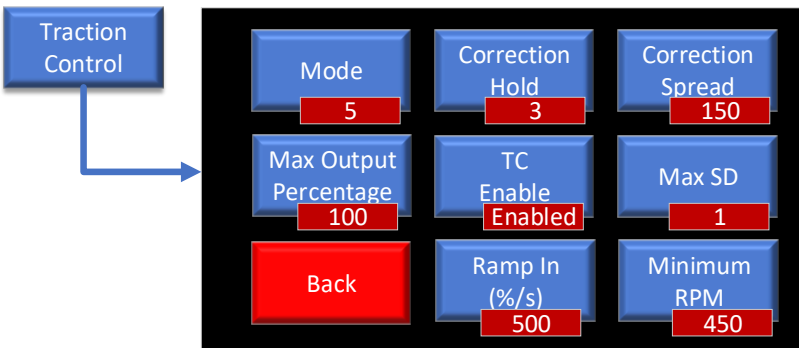
The optional control strategies can be installed at anytime online using the onboard USB port, after a license is purchased from Davis Technologies. Contact Davis Technologies for more information on how to add the optional features.

Digital Ignition Controller

The VPS can also be used in conjunction with the Digital Ignition Controller from Davis Technologies to control the ignition of most any type of stand-alone ignition system. The user does not need a Profiler or EFI to use the VPS for Wheelie Control or Traction Control. This can be useful for updating an older technology race car with some of today's latest technology. The Digital Ignition Controller (DIC) can be used to control timing, rev limiters as well as SmartDrop® cylinder dropping.

The outputs from the VPS can be used to signal the DIC to control the ignition to implement Wheelie Control or Traction Control.

Installation

Mounting

The VPS comes with mounts to clamp to a standard 1-5/8" roll bar. The VPS does need to be mounted securely in the vehicle in a level position and parallel with the centerline of the car front to rear. The VPS can be mounted with the sticker facing up or down and the connector pointing forward or backward.

The bar clamps are provided for ease of installation but are not required if you prefer to mount in another manner. However, the 3 studded rubber mounts *MUST* be used. Use care when installing the rubber mounts, and <u>DO NOT OVERTIGHTEN </u>the mount or the 8/32" nuts. The mounts are specially designed for the VPS and will tear apart if overtightened. **Do NOT use any other type of mount- the VPS will only function properly with the mounts supplied!**

If a mount is damaged during installation or during use, Super Glue or Black Weather Strip adhesive provides an excellent repair. **IT IS HIGHLY RECOMMENDED TO KEEP SOME SUPER GLUE IN THE TRAILER SHOULD THE NEED FOR REPAIR ARISE.** One spare mount is included in the kit.

Mounting Examples

Supplied Rubber mounts MUST be used.

Here are a few Mounted examples.

Wiring

As with all electronic devices, proper wiring techniques and methods will result in the best performance. Proper terminations, wire routing and overall quality of work are required for proper operation. You may want to refer to this document for some tips on basic wiring principles- https://moretraction.com/wp-content/uploads/2019/01/Wiring-How-To_Web.pdf.

The VPS requires power and ground from the car. We recommend powering the VPS with the ignition switch providing 12-18 volt. As always, a good ground must be provided.

A trans brake signal is required to zero the VPS just before launch as well as provide a reset for the Virtual Time Sip. The TB signal can be a positive or negative trigger.

An arming switch can also be installed to enable/ disable the Wheelie Control and Traction Control outputs if those features are installed.

If the VPS is installed in conjunction with a Profiler (not PFEFI), then you only need to connect the VPS to Power and Ground and the Serial RX / Serial TX wires. In this case, there is no need to connect a Trans Brake signal or Arming switch, as this info will be sent to VPS from the Profiler.

CAN is used to connect to other Davis products such as the Profiler EFI Module (PFEFI), TC3 Series, or The Digital Inline Controller (DIC). CAN may also be used with other manufactures equipment as

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those protocols are published and integrated.

The harness is populated with the wires for the most common installation. All other wires are included and can be installed by the user, along with spare pins.

 A special tool is recommended for pin removal (Molex #63824-4600 CT15), however a .025" round pin may work.

If pins are removed, the lock tab will need to be bent back into place if reinstalled in the connector.

Connector is a Molex Nano-Fit, using pin number #1053002200

Extraction Tool and replacement pins can be obtained from Digi-Key.
Extraction Tool-	WM11927-ND
Pins-			WM14957CT-ND

Analog Outputs

The 5 analog outputs (0-5v) can be wired to an external data system or EFI to record or use the data however the user sees fit. Each output can be configured to send out any of the available parameters, such as Pitch, Roll, Yaw or any axis of Acceleration data.

Scaling:

Accel-   **0-5v = -5g / +5g (2.5v = 0g)**

Rotation-   **0-5v = -12 deg / +12 deg (2.5v = 0 deg)**

Example Analog Output Setup Screen

Out (x)

1 Acc X   9 Fusion X
2 Acc Y   10 Fusion Y
3 Acc Z   11 Fusion Z
4 Gyro P
5 Gyro R
6 Gyro Y
7 WC/TC Retard
8 WC/TC SmartDrop

Save

+	+
0	1
-	-

Select the Axis to Be Output On Channel
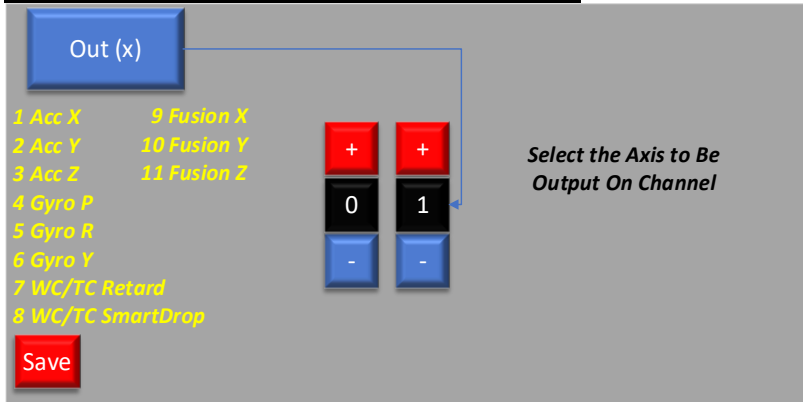
Acc X = Longitudinal Accel
Acc Y = Lateral Accel
Acc Z = Vertical Accel
Gyro P = Pitch
Gyro R = Roll
Gyro Y = Yaw
WC/TC Retard = Wheelie/TC Retard
WC/TC SmartDrop = Wheelie/TC SmartDrop
Fusion X = Fusion Pitch
Fusion Y = Fusion Roll
Fusion Z = Fusion Yaw
Fusion is only to be used when vehicle not running

Schematic

VPS
Vehicle Position Sensor

Vehicle Position Sensor

Yellow w/ Black (Pin 2) CAN Low
Yellow w/ Red (Pin 9) CAN High
Yellow w/ Black (Pin 10) Serial TX
Yellow w/ White (pin 3) Serial RX

Profiler SERIAL

CAN

Blue (pin 11) Optional Output
Red (pin 1) Ignition Switch
Tan (pin 5) Arming Switch

Orange w/ White (Pin 12) Analog Out 1
Green w/ White (Pin 13) Analog Out 2
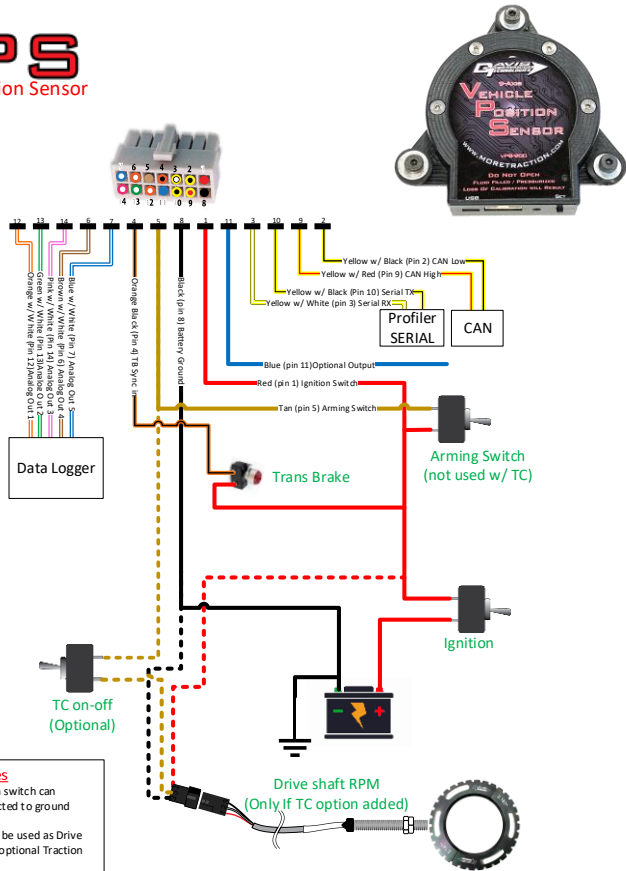Pink w/ White (Pin 14) Analog Out 3
Brown w/ White (Pin 6) Analog Out 4
Blue w/ White (Pin 7) Analog Out 5
Orange Black (Pin 4) TB Sync
Black (pin 8) Battery Ground

Data Logger

Trans Brake

Arming Switch
(not used w/ TC)

Ignition

TC on-off
(Optional)

Drive shaft RPM
(Only If TC option added)

Notes
- Trans Brake and arm switch can optionally be connected to ground source
- Tan Wire (Pin 5) can be used as Drive Shaft Speed input if optional Traction Control is installed.
- Analog Outputs are 0-5 volt
- Acceleration Axes are scaled -5g/+5g
- Angles are scaled -12 deg/+12 deg
- Profiler Serial only used with Profiler, not Profiler EFI Module
- CAN is for use with compatible systems only

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Pin Out

VPS- 14 Pin Connector (20ga)		
Pin	**Color**	**Function**
1	Red	Battery Positive - Ignition Switch
2*	Yellow w/ Black Stripe	CAN Low
3* #	Yellow w/ White Stripe	Serial RX
4	Orange w/ Black Stripe	Trans Brake Sync In
5	Tan	Arming Switch / DSRPM Input
6*	Brown w/ White Stripe	Analog Out 4
7*	Blue w/ White Stripe	Analog Out 5
8	Black	Battery Ground
9*	Yellow w/ Red Stripe	CAN High
10* #	Yellow w/ Black Stripe	Serial TX
11	Blue	General Purpose Output (50mA Batt Voltage / Gnd)
12	Orange w/ White Stripe	Analog Out 1
13	Green w/ White Stripe	Analog Out 2
14	Pink w/ White Stripe	Analog Out 3

• Included, but not installed in connector

For use with Profiler Only- Not Profiler EFI Module

WARNING- DO NOT INSTALL SERIAL RX/TX IF NOT CONNECTED!!

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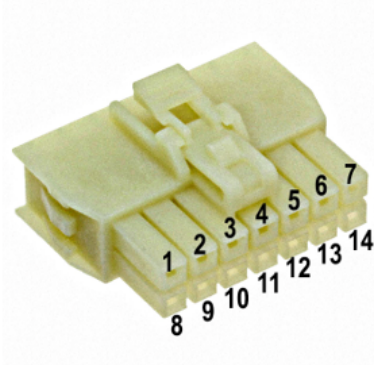
Setup and Configuring

The VPS is configured using either a Remote Display or the screen built into a Profiler. Let's take a look at the display screens and how to configure the various settings and options.

NOTE: ALL SETTINGS SHOWN ARE FOR EXAMPLE ONLY-INDIVIDUAL SETTINGS WILL VARY

Remote Display Screens

DAVIS TECHNOLOGIES VPS

Set Outputs	Settings	Virtual Time Slip
VPS Wheelie	Profiler Wheelie	Profiler Channels
	Traction Control	Utilities
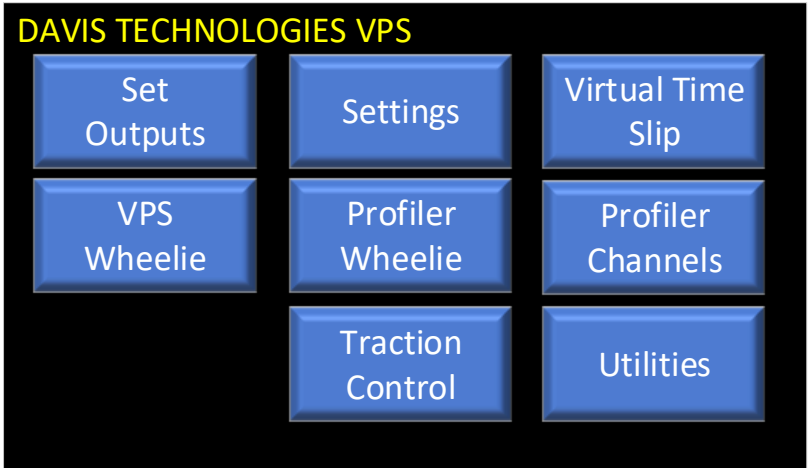
Set Outputs

Use this screen to configure what parameter you want transmitted on any analog output. If connected to a compatible EFI system, you may need to set the output to the appropriate EFI mode to control the Retard and SmartDrop functions of the EFI.
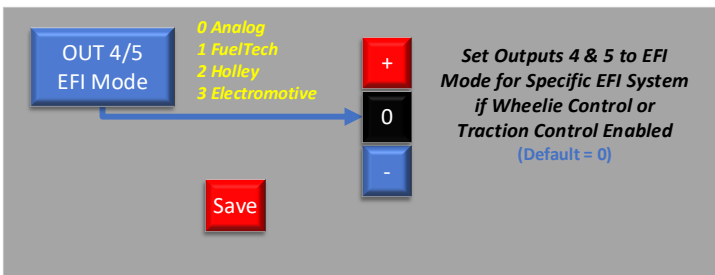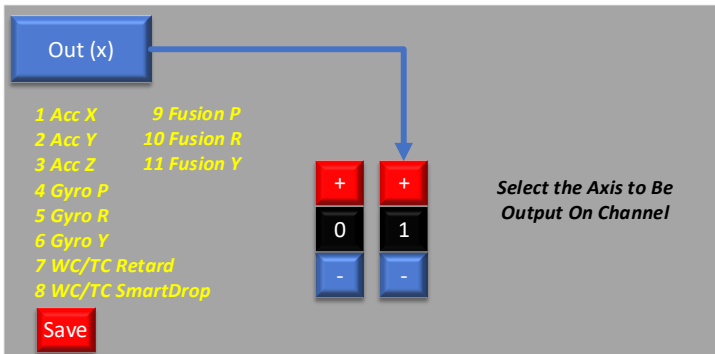
Set Outputs

Out 1 1	**Out 2** 2	**Out 3** 4
OUT 4/5 EFI Mode 0	**Out 5** 6	**Out 4** 5

Back

Out (x)

1 Acc X   9 Fusion P
2 Acc Y   10 Fusion R
3 Acc Z   11 Fusion Y
4 Gyro P
5 Gyro R
6 Gyro Y
7 WC/TC Retard
8 WC/TC SmartDrop

+ +
0 1
- -

Select the Axis to Be Output On Channel

Save

OUT 4/5 EFI Mode

0 Analog
1 FuelTech
2 Holley
3 Electromotive

+
0
-

Set Outputs 4 & 5 to EFI Mode for Specific EFI System if Wheelie Control or Traction Control Enabled
(Default = 0)

Save

Settings

Upon Installation various parameters need to be adjusted to match your cars configuration. RPM Pulses Per Rev only used if Traction Control Option is installed in VPS.

Settings	**RPM Pulses Per Rev** — 8 / **Arm Active State** — POS / **TransBrake Active State** — POS
	Orientation: Sticker — DOWN / **Orientation: Connectors** — BACK / **Gyro Settings**
	Back / **TimeSlip Settings**

RPM Pulses Per Rev

+	+
0	8
-	-

Set To The Number Of Triggers Per Revolution Of Measured Shaft
(Engine or Driveshaft)

Save

Arm Active State

○ POSITIVE Voltage

Select if Arm/Select is connected to Positive

● Negative Voltage

Select if Arm/Select is connected to Ground

Save

Transbrake Active State

○ POSITIVE Voltage — *Select if Transbrake trigger is connected to Positive*

● Negative Voltage — *Select if Transbrake trigger is connected to Ground*

Save

Be sure to set orientation setting to match mounted position of VPS.

Orientation: Sticker

○ Sticker Down — *Set Position of Sticker Orientation as Mounted*

● Sticker Up

Save

Orientation: Connectors

○ Connectors Front — *Set Position of Connector Orientation as Mounted*

● Connectors Rear

Save

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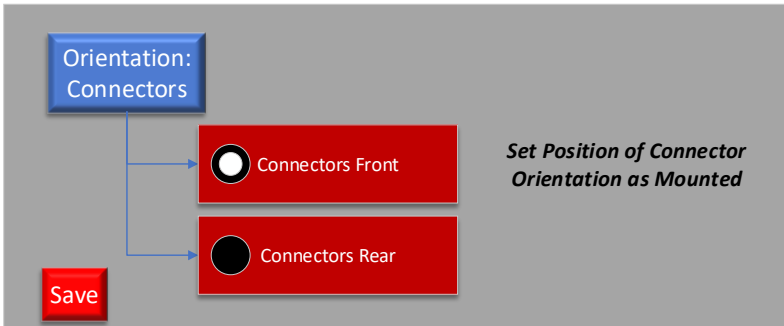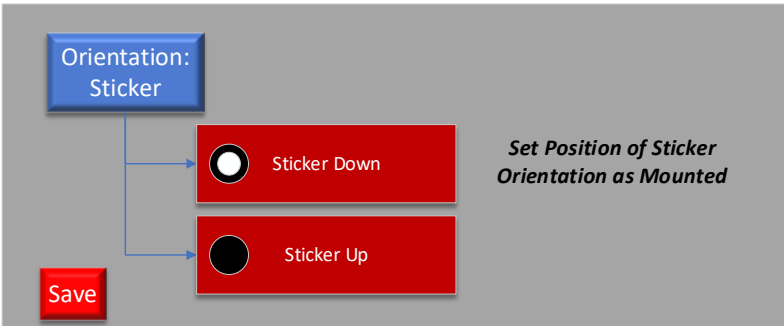
Gyro Settings

Gyro Scaling can be set to best fit a particular need. Gyro Leak should only be adjusted with the guidance of Davis Technologies.

Gyro Settings	

Gyro Scaling	Gyro Leak Enable
12 DEG	Enabled

Back

Gyro Scaling	0- 6 Deg	+	Set To The Desired Maximum

0- 6 Deg
1- 12 Deg
2 -24 Deg

+
1
-

Set To The Desired Maximum Scale +/- X Deg
(Default=1)
(-12 to +12 Deg)

Save

Gyro Leak Enable

○ ENABLED

● DISABLED

Enable / Disable Gyro Leak
(Default=ENABLED)
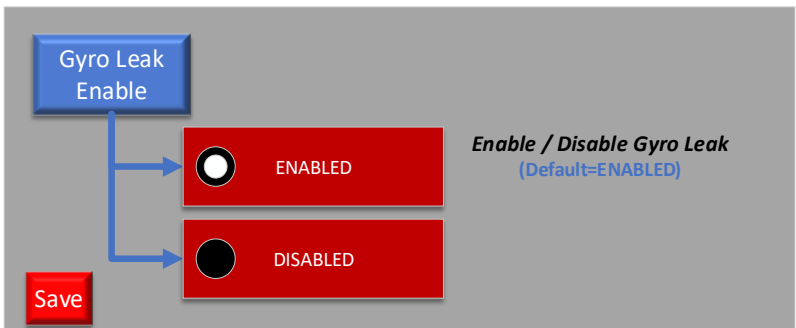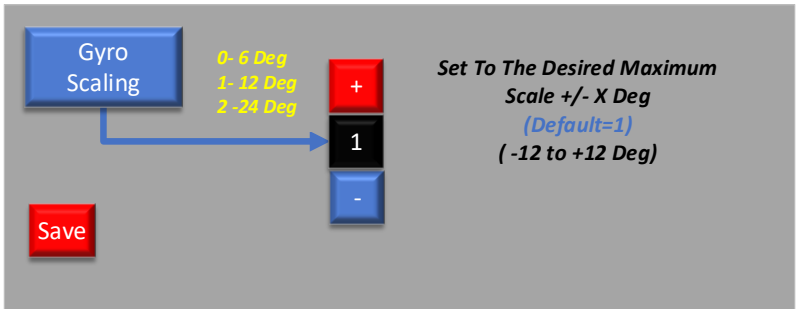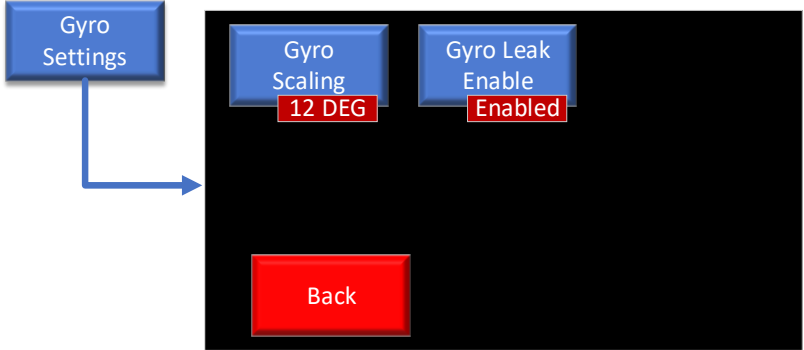
Save

Time Slip Settings

The Virtual Time Slip (VTS) is a very handy feature that can be used to monitor performance as changes are made.

Rollout greatly affects how the VTS compare to track slips, as the VPS begins calculating when the vehicle moves, and the track clocks start when the beams are triggered. If the VTS is SLOWER than the clocks, try INCREASING the Rollout setting. There will always be differences since it is nearly impossible to stage the car at exactly the same point on each pass. The data should be very consistent from one run to the next, so this can be very helpful when tuning without the aid of track clocks.

The Time Slip Distance calibrates the VPS for the distance it needs to measure. This parameter should be set to the current race distance. If this distance is not exceeded, then the VPS will continue to try to calculate the run and never finish, resulting in no slip. **The VPS stores 100 slips.**
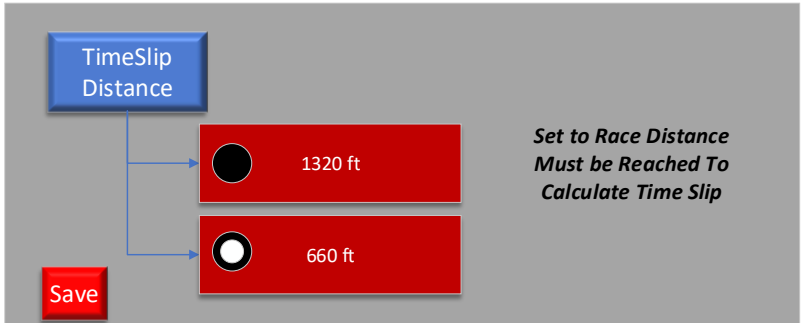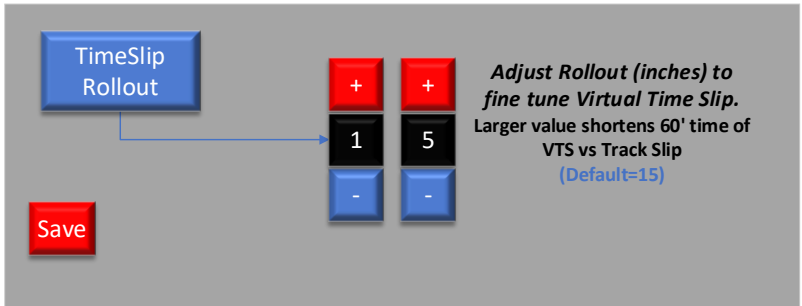
Example Virtual Time Slip (VTS)

Virtual Time Slip

```
0    60:   0.95s 0mph
     330:  095s  0mph (0.00s)
     660:  0.95s  65535mph (0.00s)
     1320: 0.95s  65535mph (0.00s)
     Max MPH at 660:   0mph
     Max MPH at 1320:  0mph
```

Back   Next   Next

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TimeSlip Settings

TimeSlip Rollout	TimeSlip Distance
15	660

Back

TimeSlip Rollout

+	+
1	5
-	-

Adjust Rollout (inches) to fine tune Virtual Time Slip.
Larger value shortens 60' time of VTS vs Track Slip
(Default=15)

Save

TimeSlip Distance

- ● 1320 ft
- ◎ 660 ft

Set to Race Distance Must be Reached To Calculate Time Slip

Save
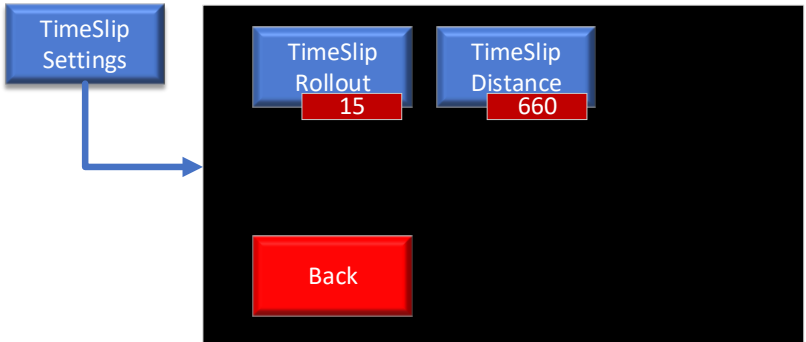
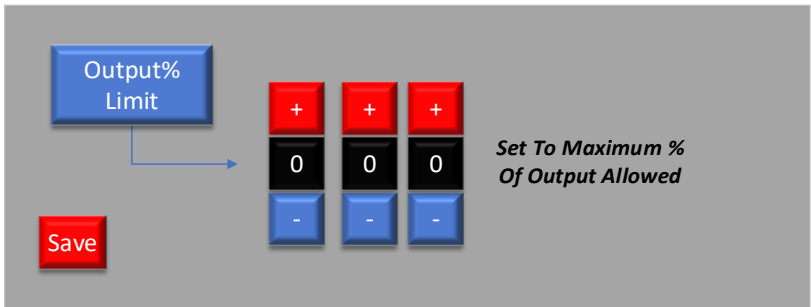# VPS Wheelie Control

If the optional Wheelie Control is installed, there are various parameter that need to be set for proper operation. The settings include the point at which the VPS will begin to send a signal to retard ignition timing (Neutral Angle- In Deg of Pitch) and the rate at which timing will be retarded (Output% Per Deg Rise)

VPS Wheelie			
	Output% Per Deg Rise **0**	Neutral Angle **0.000**	SmartDrop Angle **29.900**
	SmartDrop Level **0**	Output% Limit **100**	Start Time **0.000**
	Back		

Output% Per Deg Rise

+	+	+
0	0	0
-	-	-

Save

Set to Amount of Output % Per Degree Of Pitch Above Neutral Angle
(20%=1/5th total correction per degree of rise above neutral)

Neutral Angle

+	+	+
0	0	0
-	-	-

Save

Set to Angle Where Correction Will Begin
(2.5 is a common starting point)
(2.5 deg=approx. 5" Rise @ 110" Wheelbase)
*(Rise=SIN(DEG) x Wheelbase)*

Output Limit is the maximum amount of timing that can be retarded and is also adjustable. This setting is useful to limit the total retard that the Wheelie Control can retard on different systems. For example, a 100% Retard correction on FuelTech is 35 deg of ignition retard, if you never want to retard more than 15 deg., then you would set the limit to 42%.
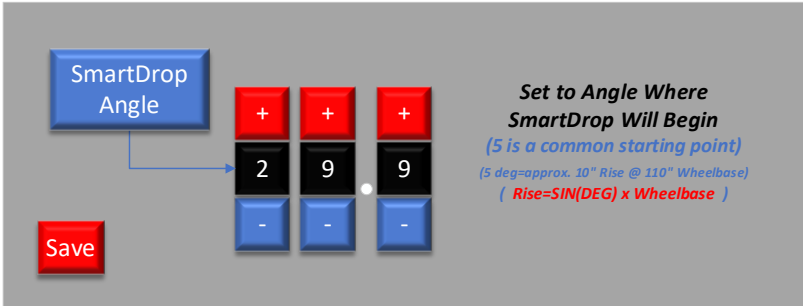
(15deg / 35deg=42%)

Output%
Limit

+ + +

0 0 0

- - -

*Set To Maximum %
Of Output Allowed*

Save
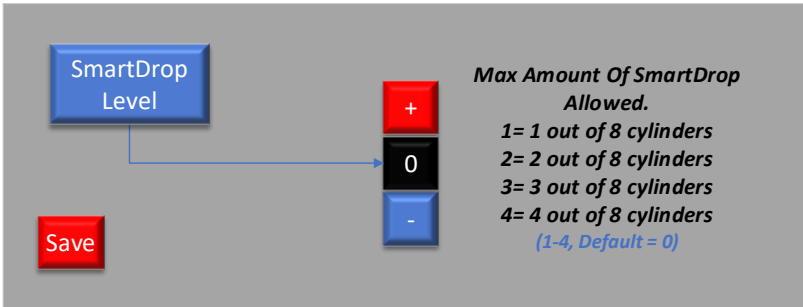
Start Time sets the time from Trans Brake release before the Wheelie Control is allowed to start controlling a wheelie. This can be useful on a car the does a harmless wheelie at the hit but pitching up later in the run is a problem and you need wheelie control down track.

Start
Time

+ + + + +

0 0 0 0 0

- - - - -

*Time From Trans
Brake Release Before
Wheelie Control Is
Active*

Save
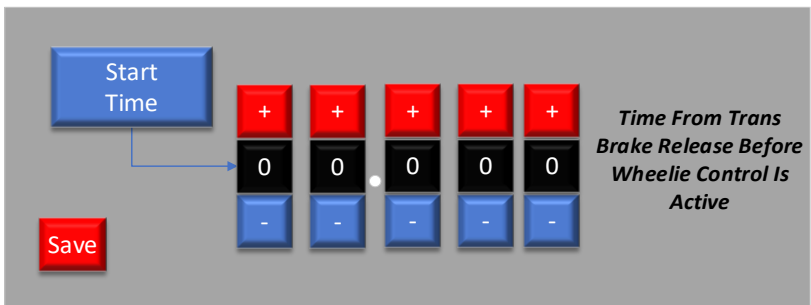
SmartDrop Angle is the angle at which the VPS will begin to send a signal to start dropping cylinders (SmartDrop) is also adjustable as well as the maximum level of SmartDrop, if any. This feature is only available when used with a compatible system, such as a Profiler, Davis Technologies Digital Ignition Controller, or some EFI systems (Holley, FuelTech).

SmartDrop Angle

+	+	+
2	9	9
-	-	-

Save

Set to Angle Where SmartDrop Will Begin
(5 is a common starting point)
(5 deg=approx. 10" Rise @ 110" Wheelbase)
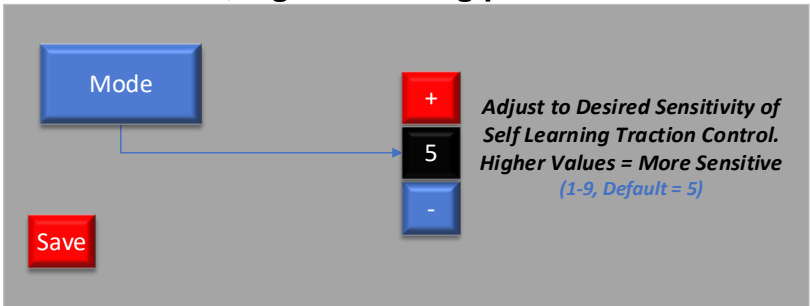*(Rise=SIN(DEG) x Wheelbase)*

SmartDrop Level

+
0
-

Save

Max Amount Of SmartDrop Allowed.
1= 1 out of 8 cylinders
2= 2 out of 8 cylinders
3= 3 out of 8 cylinders
4= 4 out of 8 cylinders
(1-4, Default = 0)

Traction Control

The VPS can also have Davis Technologies _Patented_ Traction Control installed as an option. If the Self Learning version of TC is installed, it can be disabled, and the TC can be used in Non-Self Learning Mode.

For maximum benefit, a few parameters need to be adjusted to suit your needs. These include things such as overall sensitivity (Mode), Total Retard (Max Output %), Max SmartDrop Allowed and Starting RPM.

<u>Mode</u> is overall sensitivity- the higher the value the more sensitive, a good starting point is 4-5.

Mode	+
	5
	-
Save	

Adjust to Desired Sensitivity of Self Learning Traction Control. Higher Values = More Sensitive (1-9, Default = 5)

If desired, the <u>Self Learn</u> function can be disabled and TC functions in Non-Self Learning Mode.

SL TC Enable

● ENABLED

◉ DISABLED

Save

Enable / Disable Self Learning Traction Control if Installed

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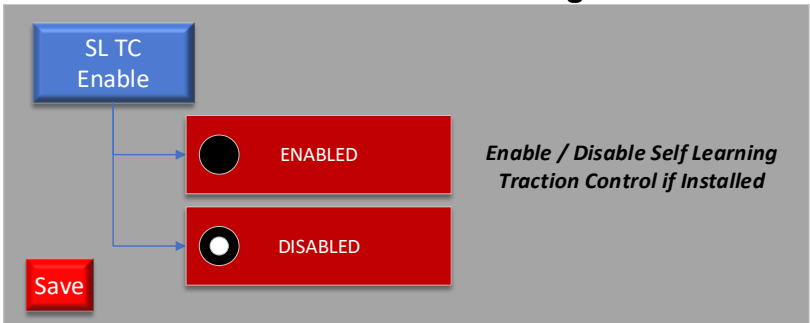
Correction Hold is used to force the TC system to hold the correction for X many revolutions of the measured shaft to give the vehicle some time to recover before the correction is removed.

Correction Hold	+	Minimum Duration in Measured Shaft Revolutions that Correction is Held Once a Correction is Triggered
	3	
Save	-	(0-9, Default = 3)

Correction Spread controls the rate at which the system reaches the maximum correction allowed. Once a slip is detected, if the RPM reaches the top of the correction spread, then the correction will reach maximum. The correction is linear, so if the RPM spike only reaches 50% of the spread, then only 50% of the max correction will be allowed.

Correction Spread	+	+	+	RPM Spread to Reach Maximum Correction After a Slip Is Detected
	1	5	0	
Save	-	-	-	(0-999, Default = 150)

If a correction is active, and the RPM spike exceeds the Correction Spread Value, then SmartDrop is initiated. If spread is set to 150, then at 151 RPM the first level of SmartDrop will be triggered. After that, if the RPM continues to spike, the SmartDrop will increase to the next level when the RPM increases another ½ of the correction spread setting. So, if spread = 150, then SmartDrop will increase every 75 RPM. The SmartDrop will only increase in level to the Max SD Limit. SmartDrop 0=Retard Only

Example (correction spread 150 / SD increase every 75)-
Spike up to 150 RPM=Retard Only
Spike of 151-225 RPM=Full Retard and SD level 1
Spike of 226-300 RPM=Full Retard and SD level 2
Spike of 301-376 RPM=Full Retard and SD level 3
Spike of 377-xxx RPM=Full Retard and SD level 4

Max SD		+
		0
Save		-

Max Amount Of SmartDrop Allowed. Begins Above Correction Spread
1= 1 out of 8 cylinders
2= 2 out of 8 cylinders
3= 3 out of 8 cylinders
4= 4 out of 8 cylinders
(1-4, Default = 0)

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Maximum Output Percentage sets the maximum amount of retard that will be allowed by an external retarder, such as the Digital Ignition Controller or EFI system. For example, a 100% Retard correction on FuelTech is 35 deg of ignition retard, if you never want to retard more than 15 deg., then you would set the limit to 42%.

(15deg / 35deg=42%)

Max Output Percentage

Save

+ + +
1 0 0
- - -

Set to Max Amount of Output % When at Full Correction
(20%=1/5th total correction maximum)

Ramp In is the rate at which timing retard is restored after a correction has ended. Ramp in is calibrated in % per sec. 100% restore rate will take 1 sec to restore the amount retarded, 1000% will take 10th of a second to restore the amount retarded.

Ramp In (%/s)

Save

+ + + + +
0 1 0 0 0
- - - - -

Speed At Which Correction Is Ramped Back In After Correction Ends.
(100%=Correction Restored Over 1 Second, 1000%= Correction Restored Over 1/10th of a Second)
(Default = 1000)

Minimum RPM sets the RPM of the measured shaft below which the TC is not able to make a correction. This allows some cars to "Get Up On The Tire" before any corrections are allowed.

Minimum RPM						*Measured Shaft RPM to Exceed Before Traction Control Is Active*
	+	+	+	+	+	
	0	0	0	0	0	
Save	-	-	-	-	-	
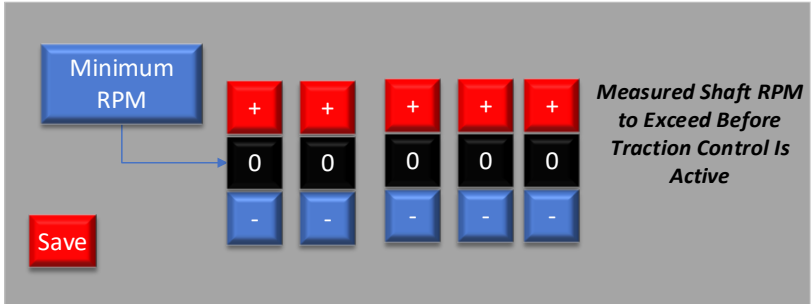
Utilities

The utilities menu has many useful features that can be used during initial setup, configuring features such as Wheelie Control, as well as information about current firmware or to execute a Factory Reset.

Utilities	Test Outputs	Live Display	About
			Factory Reset
Back			
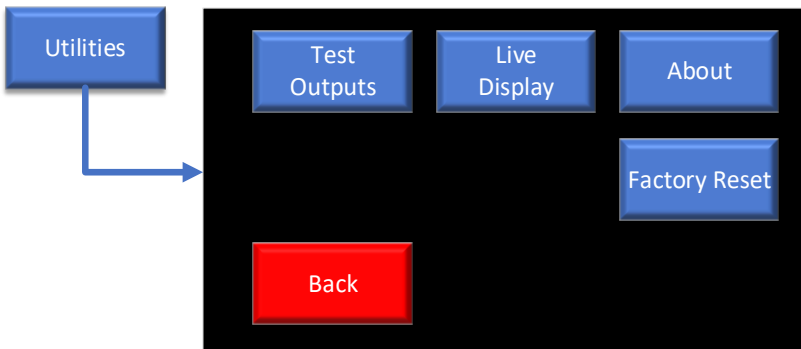
Test Outputs is useful when connecting to an external system to confirm that the devices are functioning as expected. Press any button to execute an output. The output will ramp up to 5v, then ramp down to 0v, and return to 2.5v idle until the Test screen is exited.

Test Outputs	Test 1	Test 2	Test 3
		Test 5	Test 4
Back	*Press Button To Manually Trigger Output*		
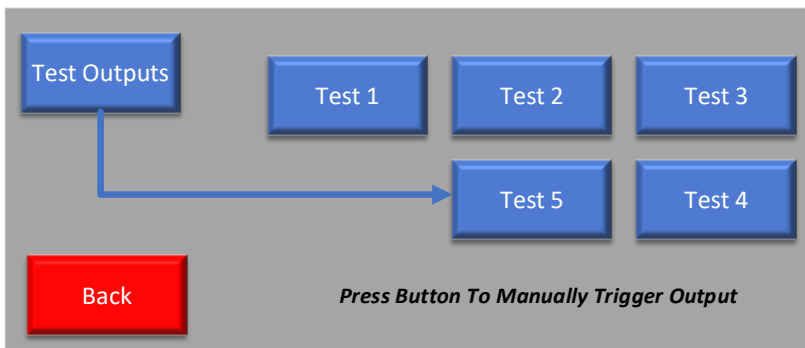
Live Display gives a real time display of all channels on the top half of the screen (in red) and the programmed outputs on the lower half (in blue). The red tags will display angles in fusion mode and are very useful when setting up features such as wheelie control. If the blue meters are set to display a non-fusion angle, then you will notice if you move to an angle and hold, the meter will "drift" back to neutral. If you move to an angle and constantly make tiny movements (vibrations, as if the car was running) at that angle, the meter will not drift.

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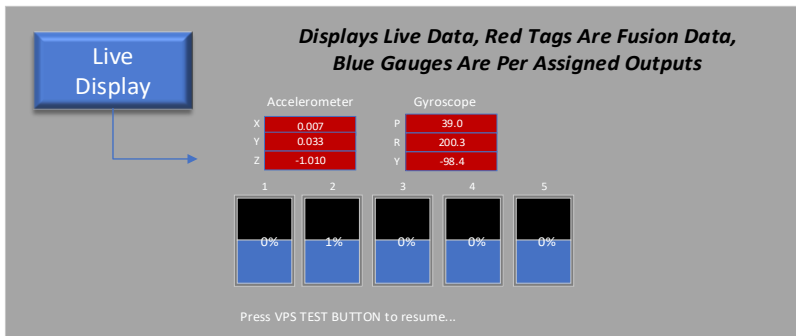
The <u>About</u> Screen provides info about current firmware and status.

About

Back

Davis Technologies Vehicle Position Sensor

Software Version: 2018-11-13-0
Fusion Status: Sensor fusion running
System Flags: 0x3F
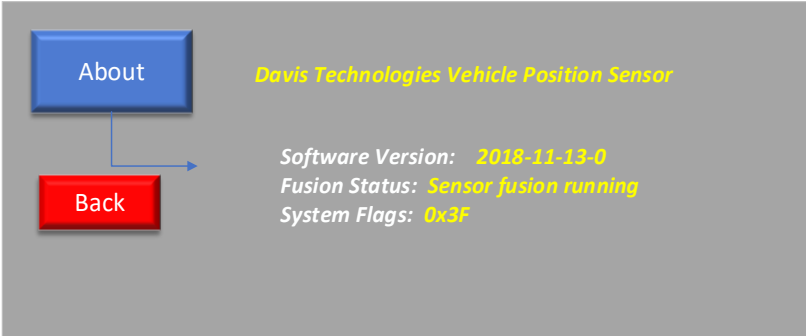
Factory Reset can be used to restore all settings to factory settings.

Factory Reset

● DEFAULT ON NEXT POWER-UP

○ Cancel Request

Save

Reset all Parameters To Factory Default On Next Power Cycle
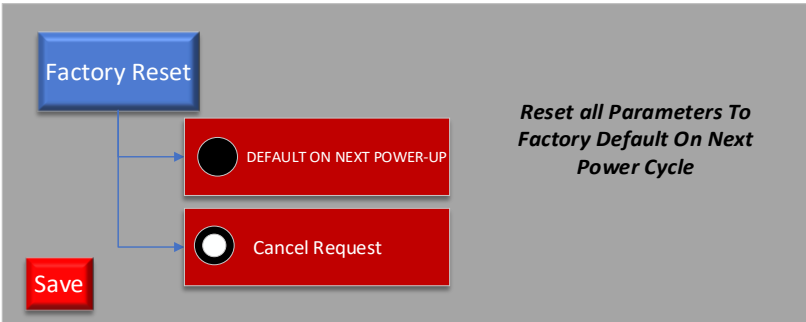
VPS Connected to a Profiler

When the VPS is connected to a Profiler, the touch screen built into the Profiler serves as the interface to the VPS.

Profiler Wheelie Control varies slightly from VPS Wheelie Control and has slightly different features.

The Profiler is also able to record and display any 2 of the outputs of the VPS. This is very useful for recording Acceleration (Gx) data on the Profiler to aid in tuning the DSRPM plot. If wheelie control is being used, it may also be beneficial to record Pitch (Gyro P) on the Profiler.

The data is presented on the DSRPM graph of the Profiler software. Acceleration data is zeroed along the 4000 RPM line, and every 1000 RPM is 1 G. We are mostly interested in the G trend, up/down to analyze and tune the DSRPM plot. We need to see when the G dropped, to determine tire slip.
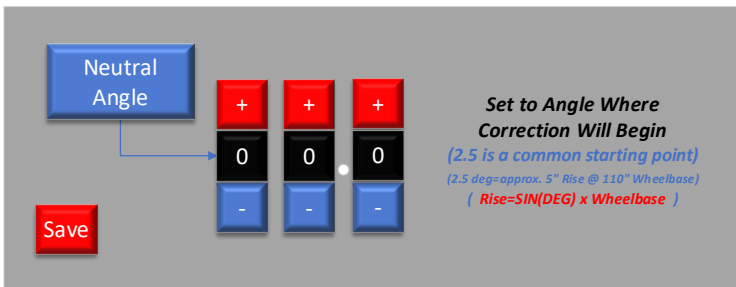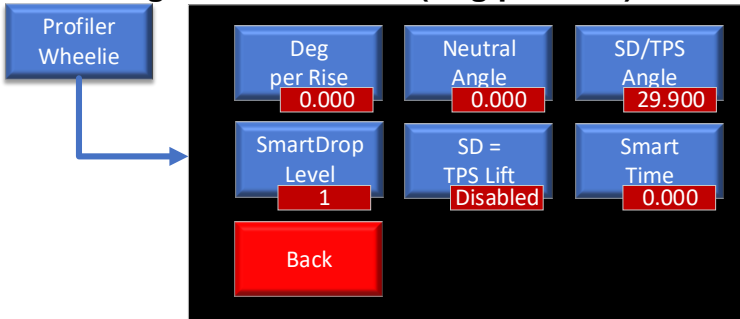
Angle data is presented on the DSRPM graph of the Profiler software also. Angle data is zeroed along the 3000 RPM line, and every 250 RPM is 1 Deg.

NOTE: To use the Profiler Wheelie Control, Profiler Channel 1 MU-ST be set to Pitch (parameter 4)

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Profiler Wheelie Control (Profiler Only)

If the VPS is connected to a Profiler (not PFEFI) *and* the optional Wheelie Control is installed, there are various parameter that need to be set for proper operation. The settings include the point at which the VPS will begin to send a signal to retard ignition timing (Neutral Angle- In Deg of Pitch) and the rate at which timing will be retarded (Deg per Rise)

Profiler Wheelie			
	Deg per Rise **0.000**	Neutral Angle **0.000**	SD/TPS Angle **29.900**
	SmartDrop Level **1**	SD = TPS Lift **Disabled**	Smart Time **0.000**
	Back		

Deg Per Rise

+ + +
0 0 0
- - -

Save

Set to Amount of Timing Retard Per Degree Of Pitch Above Neutral Angle
(20%=1/5th total correction per degree of rise above neutral)

Neutral Angle

+ + +
0 0 0
- - -

Save

Set to Angle Where Correction Will Begin
(2.5 is a common starting point)
(2.5 deg=approx. 5" Rise @ 110" Wheelbase)
(Rise=SIN(DEG) x Wheelbase)

The angle at which the VPS will begin to send a signal to start dropping cylinders (SmartDrop) is also adjustable as well as the maximum level of SmartDrop, if any.

SD/TPS Angel	+ + +	*Set to Angle Where SmartDrop/TPS Lift Signal Will Begin*
	2 9 · 9	*(5 is a common starting point)*
Save	- - -	*(5 deg=approx. 10" Rise @ 110" Wheelbase)*
		(Rise=SIN(DEG) x Wheelbase)

SmartDrop Level	+	*Max Amount Of SmartDrop Allowed.*
	1	*1= 1 out of 8 cylinders*
		2= 2 out of 8 cylinders
Save	-	*3= 3 out of 8 cylinders*
		4= 4 out of 8 cylinders
		(1-4, Default = 0)

Another unique feature of the Profiler Wheelie Control is the ability to trigger a pseudo TPS lift within the Profiler Events to cause one of the Outputs to react as if the driver pedaled, instead of dropping cylinders. This could be used to control a convertor dump, nitrous kit, shift, etc.

SD = TPS Lift	● ENABLED	*Enable to Send TPS Lift Signal to Events Instead of Dropping Cylinders When SmartDrop Level Exceeded*
Save	○ DISABLED	*(Default = DISABLED)*

Start Time sets the time from Trans Brake release before the Wheelie Control is allowed to start controlling a wheelie. This can be useful on a car the does a harmless wheelie at the hit, but pitching up later in the run is a problem and you need wheelie control down track.
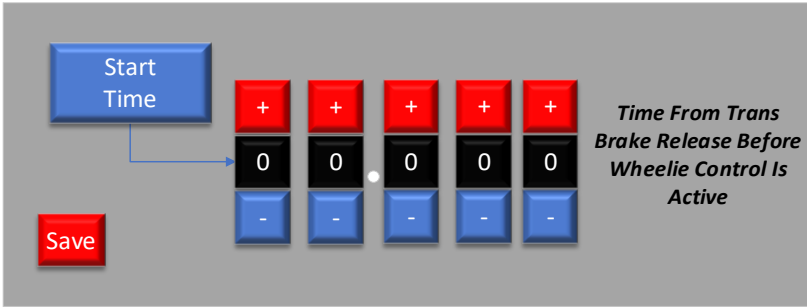
Note: To use the Profiler Wheelie Control, you must set Profiler Channel-1 to Parameter 4 (Pitch) to activate. See Profiler Channels in the next section for details.

Profiler Channels (Profiler Only)

When the VPS is connected to a Profiler (not PFEFI), you can also record any 2 channels on the Profiler and view them in the software. This is extremely useful for evaluating the acceleration performance of the car during the run. Determining when Longitudinal G is rising or falling is key to tuning the Profile to the proper levels.

Profiler Channels

Channel-1
4

Channel-2
1

Back

Set CH-1 = 4 to enable
Profiler Wheelie Control

Channel-1

1 Acc X   9 Fusion X
2 Acc Y   10 Fusion Y
3 Acc Z   11 Fusion Z
4 Gyro P
5 Gyro R
6 Gyro Y
7 WC/TC Retard
8 WC/TC SmartDrop

Save

+
4
-

Select VPS Parameter to be Recorded on Profiler Channel 1
(Default = 4)

Channel-2

1 Acc X   9 Fusion X
2 Acc Y   10 Fusion Y
3 Acc Z   11 Fusion Z
4 Gyro P
5 Gyro R
6 Gyro Y
7 WC/TC Retard
8 WC/TC SmartDrop

Save

+
1
-

Select VPS Parameter to be Recorded on Profiler Channel 2
(Default = 1)

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Firmware Updating

Davis Technologies may release firmware updates or upgrades periodically to ensure the best possible functionality of the system. These are typically installed using the USB connector and the supplied USB cable. Instructions for this procedure will be included in the firmware update file located on the web site.

Users should log onto https://moretraction.com/support/ occasionally to check for updates. And make sure their device has the most recent firmware.
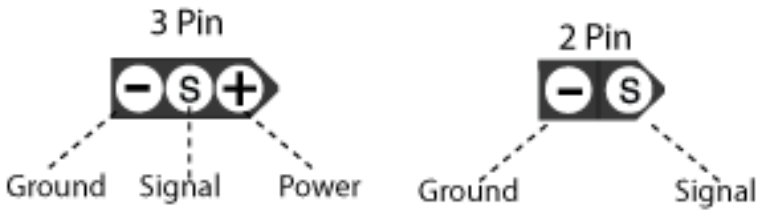
Appendix A

The VPS data can be recorded on a RacePak via a V-Net module.

RacePak part # 230-VM-5VDIFF can be used to record 1 channel. (approx.. $160)

RacePak part # 230-VM-USM can be used to record 4 channels. (approx.. $300)

RacePak® V-Net Pin Out

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Notes

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<u>Notes</u>

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