# Parts List
## Lingenfelter STOV-004 VSS Switch & Speed to Voltage Converter Controller (PN: L460340004)

| # | Description | Part number |
|---|---|---|
| 1 | VSS Switch & Speed to Voltage Converter | STOV-004 |
| 2 | Hook & loop tape | |
| 2 | Self-tapping screw | AV16037 |
| 1 | LPE decal | L920010000 |
| 1 | Instructions | |

### Tools & Materials Required

- Phillips head screwdriver
- Wire crimping tool
- Flat head screwdriver

### Optional Items

| Description | Part number |
|---|---|
| • LPE technician's screwdriver | L950050000 |
| • Sealed 40 amp relay kit | L450100000 |
| • E38/E67 ECM pin | MLX-0334680003 |
| • E-Boost2 boost controller | TS-0301-1003 |
| • EFILive FlashScan V2 | EFIFS2-S |
| • EFILive V2 FlashScan Tuner GM applications | EFIS2-GM |
| • Hall Effect speed sensor/driveshaft speed sensor | |
| • Red 12 vdc LED with 30 cm leads | L450120000 |

### Description:

The Lingenfelter STOV-004 is designed to read the vehicle speed signal (VSS) from a variety of sources and uses that signal to provide switched outputs and an analog output based on the speed signal. The STOV-004 can accept a speed signal from a Hall Effect VSS sensor, a reed sensor, the Engine Control Module (ECM), or Powertrain Control Module (PCM) on most late model vehicles.

The STOV-004 can be used to:

- Disable the fans above a certain vehicle speed.
- Lock a Torque Converter Clutch (TCC) above a certain vehicle speed.
- Enable a second stage of boost or nitrous above a certain vehicle speed.
- Trigger a buzzer or warning light above a specific vehicle speed (over-speed warning).
- Activate the door locks above a certain vehicle speed.
- Disable a two-step once the vehicle is moving.
- Control virtually any other device that needs to be turned on or off at a certain vehicle speed.
- The STOV-004 can also be used to simulate a stage/gear shift output that works with multi-stage boost and nitrous controllers including:
  - E-Boost2 boost controller from Turbosmart
  - AMS-1000 boost controller from NLR systems
  - Boost Leash, gear based, 1-6 from Leash Electronics

## Features

- Designed to work with most late model vehicles that have a 100 to 60,000 pulse per mile (PPM) vehicle speed output signal available or hall effect sensor.
- Offers the following output capabilities
  - Adjustable hysteresis on outputs
  - Normally Open and Normally Closed outputs
  - MPH activated Window Switch
  - MPH activated switch (simple on/off control)
  - 0-5 volts analog output proportional to speed. Speed range is 0-250 MPH
    - (0 volts = 0 MPH, 5 volts = 250 MPH). Analog output will increase at a rate of 0.02 volts per MPH (linear relationship between speed and voltage).
  - The 0-5 volts analog and switched outputs work simultaneously.
  - Outputs have a self protect feature and will turn OFF in case of direct short or over current condition.
- Offers three different modes
  - Speed Base Relay Control Mode
  - Simulated Stage/Gear Mode
  - VSS Pulse Counter Mode
- Custom molded high temperature glass filled Nylon 6 enclosure.
- Fully encapsulated (potted) construction for increased durability.
- One year warranty (from date of purchase).

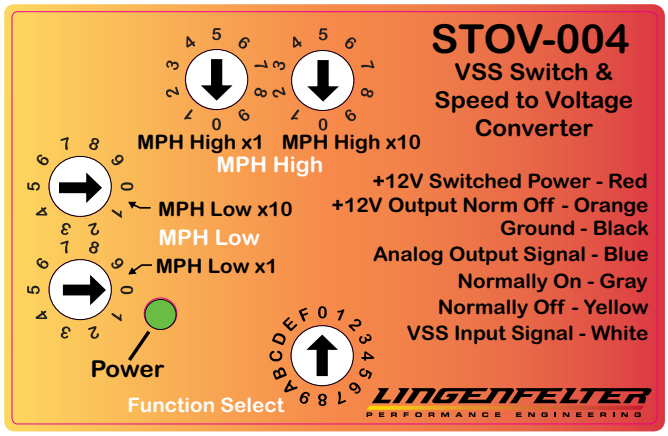
## Specifications

- The Lingenfelter Performance Engineering (LPE) STOV-004 Speed to Voltage Converter and MPH Activated Switch incorporates a precision 32-bit timer to realize microsecond precision over a wide operating frequency and MPH range.
- Current draw: 0.1 amp plus current draw of device being controlled.
  - Outputs are rated for up to 0.75 amp each.
  - The STOV-004 should control a relay for higher current level applications.
- Includes a built in 2.2 k Ohm pull up resistor enabled by a DIP switch inside the back cover.
- Operating voltage range: 9.0 to 18.0 volts.
- Input signal type: square wave 12 volts.
  - Processed Signal from ECM/PCM vehicle speed sensor.
  - Square wave output type sensor (i.e. Hall Effect Sensor)
  - Valid frequency range of 0.02778 to 2,350 Hz
- Valid pulse range 100 to 60,000 PPM
- Valid MPH ON and MPH OFF range 0 to 399 MPH
- Accepts speed signal from Hall Effect VSS sensor, a dreiveshaft VSS sensor, a read sensor, or the Engine Control Modue or Powertrain Conrtrol Module on most late models.
- Will NOT work with a magnetic VR (2 wire) VSS sensor.

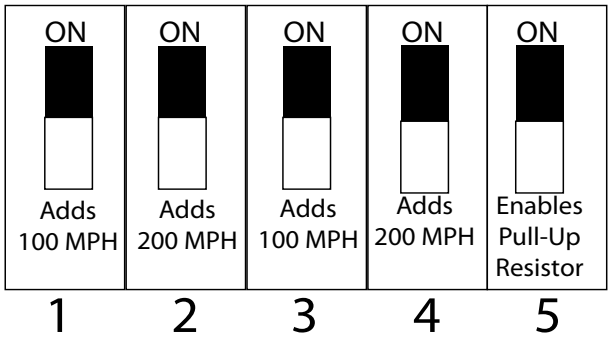
| **Table 1:** Wiring (as labeled on module) | | |
|---|---|---|
| **Wire Color** | **Label Notes** | **Notes** |
| Red | +12V Switched Power | Connects to a switched +12V source. |
| Orange | +12V Output/Normally OFF | This wire provides a +12V output (activated by the vehicle speed settings). |
| Black | Ground | Connects to a vehicle ground. |
| Blue | Analog Output Signal | This is the vehicle speed output voltage (analog voltage output). This is a 0-5 volt DC output. |
| Gray | Ground Output/Normally ON | This wire connects to the ground side of the device you plan to activate. |
| Yellow | Ground Output/Normally OFF | This wire connects to the ground side of the device you plan to activate. |
| White | PPM Input Signal (VSS) | This is the vehicle speed pulse input. This connects to the ECM/PCM Vehicle Speed Sensor (VSS) output signal or sensor signal wire. |

**Settings on the front face of the STOV-004:**

- Single 16 Function Select position switch used to set the PPM during programming.
- Two ten position switches for selecting MPH Low.
  - MPH Low x10
  - MPH Low x1
- Two ten position switches for selecting MPH High.
  - MPH High x10
  - MPH High x1



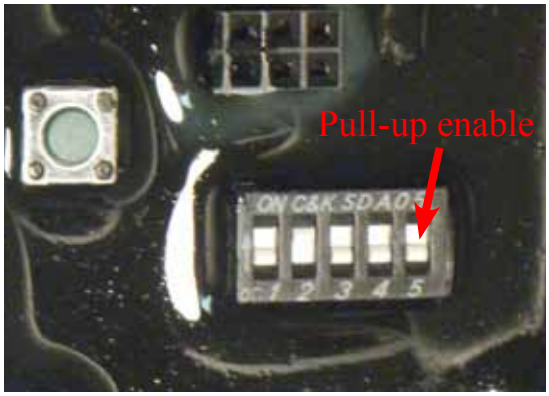
**Settings inside the rear cover of the STOV-004:**




- Five two position DIP switches (The location of these switches is shown below).
  - DIP switch #1 and #2 are used to control **MPH Low** VSS switch point adders.
    - DIP switch #1 in the ON (up) position adds 100 MPH to **MPH Low**.
    - DIP switch #2 in the ON (up) position adds 200 MPH to **MPH Low**.
  - DIP switch #3 and #4 are used to control **MPH High** VSS switch point adders.
    - DIP switch #3 in the ON (up) position adds 100 MPH to **MPH High**.
    - DIP switch #4 in the ON (up) position adds 200 MPH to **MPH High**.
  - DIP switch #5 toggles the built in pull-up resistor.
    - DIP Switch #5 in the ON (up) position enables the pull-up resistor.
- One push-button
  - One push button used to program the vehicle PPM signal.

**Pull-up Enable:**

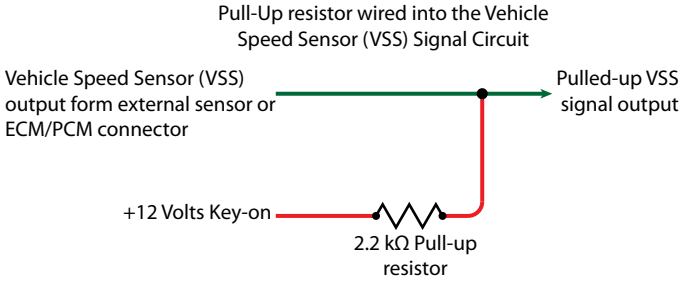
- In most applications, if you are connecting to a VSS signal wire already connected to the instrument cluster or speedometer, you will not need to enable the pull-up resistor. Some systems may allow you to enable a pull-up in the ECM/PCM software.
- If the ECM already has a VSS signal wired or a pull-up resistor enabled, do not enable the pull-up resistor on the DIP switch. Only one pull-up resistor should be active.
- Some speed sensors have a pull-up resistor contained in the sensor. Refer to the sensor documentation to verify. If the sensor does not have a pull-up resistor, you will have to enable the pull-up resistor on the STOV-004.




- The pull-up resistor is connected between the signal and the voltage supply.

**Pull-up Resistor Explanation:**

- Without the pull-up resistor, the signal would float because there are no other wires connected. This means that the signal may read a low or a high unpredictably. The pull-up resistor ensures that the current signal will be valid if there is no existing wire in your vehicle speed output pin/wire location. The resistor also ensures that there will not be a short in the circuit.




**Note:** A pull-up resistor is already built into the STOV-004, and it can be disabled or enabled by DIP switch 5. The user will not have to add another pull-up resistor relating to the VSS.

## Installation:

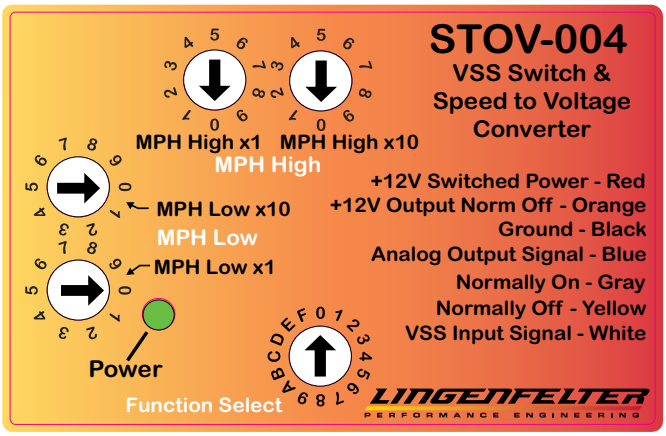
1. Determine if you are using ECM/PCM supplied signal or standard sensor (see Table 7 on pages 24-25 or consult your service information). Many newer vehicles no longer have a frequency based VSS going from the ECM/PCM to the dash. Some vehicles, especially heavy duty trucks and police vehicles, may have a vehicle speed output wire in the harness for use in connecting to external devices.
    - If your vehicle does not have a VSS output from the ECM/PCM enabled or have a VSS output wire available, you may be able to enable the vehicle speed output in the engine control module programming and then populate that output terminal in the wiring harness. Appendix A (pages 26-28) provides a brief explanation on populating the speedometer signal wire on the ECM (GM E38, E67 ECM's), and how to enable the ECM's vehicle speed signal output through EFILive Tune v7.5. In these applications you will likely also have to use the pull-up resistor DIP switch on the back of the STOV-004. Example vehicles this applies to include: 2007 to 2015 GM CK trucks (Sierra, Silverado, Suburban, Tahoe, Yukon), 2010-2015 Camaro and 2009-2015 CTS-V.
    - If your vehicle uses a Hall Effect (3 wire) VSS sensor, you may be able to use the signal directly from the sensor as long it is not being used by another device. Do NOT connect to it if it is being used by vehicle ABS, etc...
    - If you have a magnetic VR (2 wire) VSS sensor, it will NOT work with this STOV-004. (If you are not sure, consult service information or contact Lingenfelter Performance Engineering for your specific vehicle application). A new speed sensor (i.e. Hall Effect sensor) can also be mounted/installed into the vehicle (i.e. driveshaft).
2. Determine where you want to mount the STOV-004. It should be mounted away from heat and moving parts that may cause damage. Do not mount the STOV-004 in the line of site of high temperature objects such as exhaust manifolds, turbine housing etc. If needed, put a heat shield in between the heat source and the module to protect the case. The STOV-004 should be accessible for calibrating and/or making adjustments if needed.
3. Disconnect the negative battery terminal.
4. Connect the Black wire of the STOV-004 to a suitable vehicle ground
5. Connect the Red wire of the STOV-004 to a fused +12 volt ignition switched circuit.
6. Connect the White signal input wire to the source determined in Step 1.
7. Connect the control/output wires (Orange, Yellow, Gray, & Blue) as needed for your application.
8. See pages 20-23 for example wiring diagrams for MPH switch & LPE 2-step products.
9. Re-connect the negative battery terminal.

**⚠CAUTION**

# Pulse Per Mile (PPM) Programming Mode

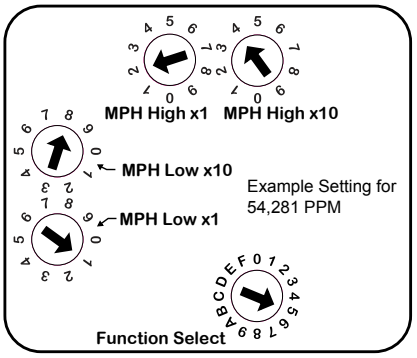
Programming Mode is used to calibrate the vehicle speed pulses per mile.

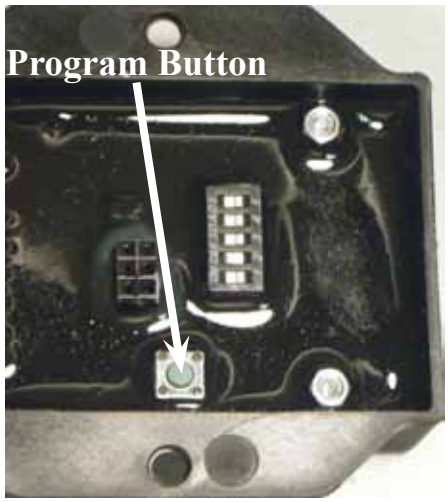
Two Programming Mode settings exist, one for if you know the vehicle pulse per mile count for the signal wire you are connected to and one where the STOV-004 measures and calculates the pulse per mile count when the vehicle speed is brought to 60 MPH.




If you know the vehicle pulse per mile (PPM) count for your application, enter Programming Mode as follows:

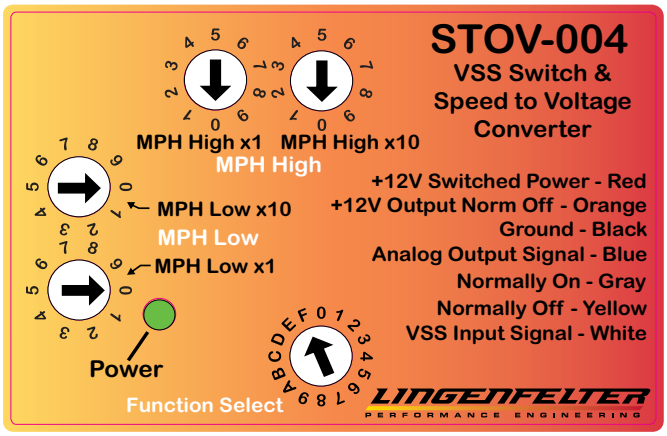
- Ignition off (STOV-004 power off)
- Set all four 10 position switches and the 16 position Function Select switch to 0. The "Low" setting switches should be pointing to the right, the "High" setting switches should be pointing down and the 16 position Function Select switch should be pointing up. See illustration on the top right of the page for switch positions.
- Ignition on
  - The LED should now blink GREEN and RED.
- Set the pulse per mile count using the 5 dials on the front.
  - The four ten position switches function as follows:
    - MPH Low x1 = 000X (ones)
    - MPH Low x10 = 00X0 (tens)
    - MPH High x1 = 0X00 (hundreds)
    - MPH High x10 = X000 (thousands)
  - The one 16 position Function Select switch functions as follows:
    - Position 0 = Adds 0 to the PPM.
    - Position 1 = Adds 10,000 to the PPM
    - Position 2 = Adds 20,000 to the PPM
    - Position 3 = Adds 30,000 to the PPM
    - Position 4 = Adds 40,000 to the PPM
    - Position 5 = Adds 50,000 to the PPM
    - Position 6 = 60,000 PPM
    - Any position past 6 also sets the PPM at 60,000
- After you have set the switches to the correct settings, press and hold the green button on the back of the STOV-004 (see image on the right) for approximately 1 second.
- Solid GREEN after pressing the PROGRAM button indicates the pulse per mile setting programmed successfully.
- Blinking RED after pressing the PROGRAM button indicates an invalid pulse setting. You must power down and attempt to program again.
- To exit Programming Mode, turn off the unit (ignition off) and while the STOV-004 is powered off set the front cover switches to the desired settings. Go to page 9 for more information.



# Pulse per Mile (PPM) Programming Mode (continued)

If you don't know the pulse per mile for the signal wire you are connected to, the STOV-004 can calculate this itself. This will require you bringing the vehicle to 60 MPH and then using the PROGRAM button to set the pulse count.




To enter VSS based Programming Mode:

- Ignition off (STOV-004 power off).
- Set set all four 10 position switches to 0 and the 16 position Function Select switch to "F". The "Low" setting switches should be pointing to the right, the "High" setting switches should be pointing down and the 16 position Function Select switch should be pointing up and slightly to the left (towards the "F" on the decal). See illustration on the right for switch positions.
- Ignition on
  - The LED should now blink GREEN and RED.
- Safely bring the vehicle to 60 MPH.
  - We recommend doing this on a chassis dynamometer or having an assistant perform the programming function while you drive the vehicle.
- Make sure the speedometer reading is accurate (using a GPS or the dynamometer speed reading).
- When you are at 60 MPH, press and hold the green PROGRAM button on the back of the STOV-004 for approximately 1 second.
- Solid GREEN after pressing the PROGRAM button indicates the pulse per mile setting programmed successfully.
- Blinking RED after pressing the PROGRAM button indicates an invalid pulse setting. You must power down and attempt to program again.
- To exit Programming Mode, turn off the unit (ignition off) and set the front cover switches to the desired settings. Go to the next page for more information.

# Speed Based Relay Control Mode

**Description:**

The STOV-004 can operate as a "Simple Switch" where the outputs switch at a single speed, or it can operate as a "Window Switch" where the outputs switch at one speed and then switch back at another speed (the "Window" being this speed range between the two speed settings).

**LED operation in Speed Based Relay Control Mode:**

- Solid RED when powered up, all settings good and NO VSS signal is present
- Solid GREEN when all settings good, VSS signal present and outputs are in the OFF state
- Blinking GREEN and RED indicates the outputs are ON
- Blinking RED indicates pulse per mile setting is invalid or MPH ON is greater than MPH OFF and MPH OFF is not equal to 0

**Hysteresis Settings:**

Use the 16 position Function Select switch to select a hysteresis value. Hysteresis refers to a margin above or below the set range in which a component is allowed to stay enabled or disabled in order to prevent the component from switching on and off rapidly.

**Table 2:** 16 Position Function Select Switch: Hysteresis Settings

| **Function Select switch position** | **Hysteresis Setting**** |
|---|---|
| 0 | 2 MPH |
| 1 | 4 MPH |
| 2 | 8 MPH |
| 3 | 12 MPH |
| 4 | 25 MPH |
| 5 | 50 MPH |
| 6 | 100 MPH |
| 7 | 1 MPH |
| 8 | 1 MPH |
| 9 | 1 MPH |
| A* | Stage/Gear Shift Output Mode, Function A |
| B* | Stage/Gear Shift Output Mode, Function B |
| C | 1 MPH |
| D | 1 MPH |
| E* | VSS Pulse Counter Mode |
| F | 1 MPH |

***If the 16 position Function Select switch is set to A,B, or E, you will no longer be in Speed Based Relay Control Mode.**

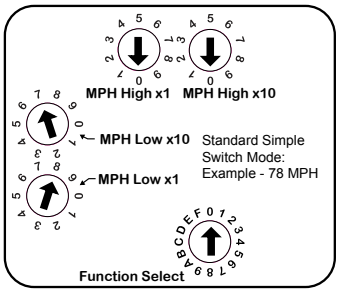
****If the hysteresis value is larger than the MPH set point, the hysteresis will adjust to half of the MPH low set point.**

**Example:**

- MPH Low = 40 MPH
- Hysteresis Setting = 50 MPH
- (Hysteresis Setting > MPH Low) NEW Hysteresis Setting = MPH Low/2 = 20 MPH

# Speed Based Relay Control Mode (continued)

**Simple Switch Mode, Standard Configuration:**




When used as a Simple Switch, the standard mode has a +12V output that is normally off (Norm OFF), a ground output that is normally off (Norm OFF) and a ground output that is normally on (Norm ON). In this mode the outputs function as they are labeled on the product decal.

For standard Simple Switch mode, set both the x1 and the x10 rotary switches for the MPH High setting to 0. Now set the desired switch speed using the MPH Low rotary switches with the x1 switch setting the speed in 1 mph increments and the x10 switch setting the speed in 10 mph increments. The image on the right shows an example of the rotary switches set to 78 MPH.

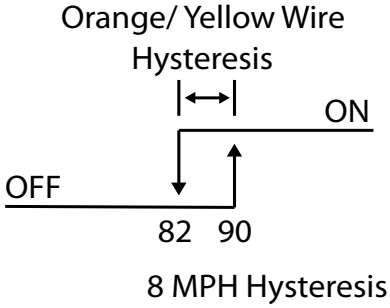
If you need to set the switch point to above 99 MPH, you will use the DIP switches found behind the back cover of the module. DIP switches 1 and 2 pertain to the MPH Low setting. If switch 1 is on it adds 100 to the MPH Low setting. If switch 2 is on it adds 200 MPH to the MPH Low setting. If 1 and 2 are both on then that adds 300 MPH to the MPH Low setting. The image on the right shows the DIP switch 2 in the on position. This adds 200 MPH to the previous image, and the STOV-004 would switch at 278 MPH.

**Example 1:**

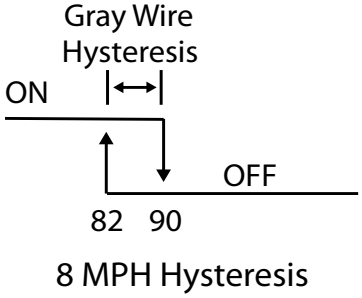
- Vehicle Speed Switch mode, standard configuration (outputs behave as labeled on the product decal)
- MPH Low = 90 [MPH Low x1 = 0, MPH Low x10 = 9, DIP switch 1 & 2 OFF]
- MPH High = 0
- Set Function Select Switch = 2 (8 MPH Hysteresis Setting)
- The Orange/ Yellow Wire (image on the left) switches OFF at 82 MPH and ON at 90 MPH
- The Gray Wire (image on the right) switches OFF at 90 MPH and ON at 82 MPH.

| Output (Wire Color) | Output state below MPH Low | Output state above MPH Low |
|---|---|---|
| +12v activation normally OFF (Orange) | OFF (0 volts) | ON (+12V) |
| Ground activation normally ON (Gray) | ON | OFF |
| Ground activation normally OFF (Yellow) | OFF | ON |
| STOV-004 LED status | Solid GREEN* | Blinking GREEN and RED |

***NOTE:** On initial power up the LED will be solid RED unless the PPM setting is invalid and will switch to solid green when a valid speed signal is present.




8 MPH Hysteresis

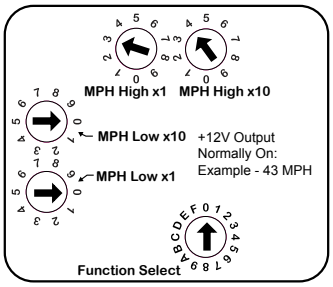



8 MPH Hysteresis

# Speed Based Relay Control Mode (continued)

**Simple Switch Mode, Reversed Outputs:**

The STOV-004 also allows you to change the switching logic so that the +12V output can be changed to be normally ON. This swaps the logic of the two ground outputs so now the outputs operate the opposite to what is on the product label.




If you need the +12V output to be normally on, set both of the MPH Low rotary switches to 0 and then set the desired switch point speed using the MPH High rotary switches. Like with the MPH Low switches, the x1 switch controls the speed setting in 1 MPH increments and the x10 switch controls the speed setting in 10 MPH increments. The image on the right shows an example of the rotary switches set to 43 MPH.

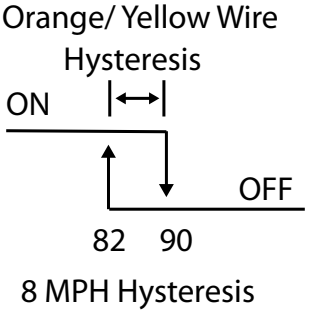
If you need a setting higher than 99 MPH, then DIP switches 3 and 4 behind the rear cover apply to the MPH High setting. DIP switch 3 on adds 100 MPH to the MPH High setting. DIP switch 4 on adds 200 MPH to the MPH High setting and DIP switch 3 and 4 on at the same time adds 300 MPH to the MPH High setting. The image on the right shows the DIP switch 3 in the on position. This adds 100 MPH to the previous image, and the STOV-004 would switch at 143 MPH.

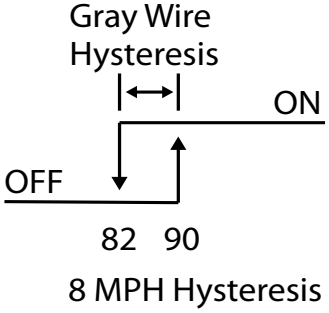
**Example 2:**

- Vehicle Speed Switch mode, reversed outputs (outputs behave the opposite to as they are labeled on the product decal)
- MPH Low = 0
- MPH High = 90 [MPH High x1 = 0, MPH Low x10 = 9, DIP switch 3 & 4 OFF]
- Set Function Select Switch = 2 (8 MPH Hysteresis Setting)
- The Orange/ Yellow Wire (image on the left) switches ON at 82 MPH and OFF at 90 MPH.
- The Gray Wire (image on the right) switches ON at 90 MPH and OFF at 82 MPH

| Output (Wire Color) | Output state below MPH High | Output state above MPH High |
|---|---|---|
| +12v activation normally OFF (Orange) | ON (+12V) | OFF (0 volts) |
| Ground activation normally ON (Gray) | OFF | ON |
| Ground activation normally OFF (Yellow) | ON | OFF |
| STOV-004 LED status | Blinking GREEN and RED* | Solid GREEN |

***NOTE:** On initial power up the LED will be solid RED unless the PPM setting is invalid and will switch to blinking green and red even if there is not a valid speed signal is present.



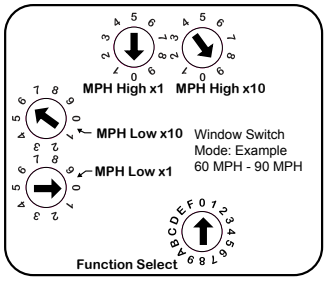



# Speed Based Relay Control Mode (continued)

**Window Switch Mode:**

When used as a Window Switch, the switch mode has a +12V output that is normally off (Norm OFF), a ground output that is normally off (Norm OFF) and a ground output that is normally on (Norm ON). When the output state is between MPH Low and MPH High, the STOV-004 will change the +12V output that is normally OFF to normally ON, the ground output that is normally OFF to normally ON, and the ground output that is normally ON to normally OFF.

For Window Switch mode, set the desired lower switch speed using the MPH Low rotary switches with the x1 switch setting the speed in 1 mph increments and the x10 switch setting the speed in 10 mph increments. Now set the desired upper switch point speed using the MPH High rotary switches. Like with the MPH Low switches, the x1 switch controls the speed setting in 1 MPH increments and the x10 switch controls the speed setting in 10 MPH increments. The image on the right shows an example of the MPH Low rotary switches set to 60 MPH and the MPH High rotary switches set to 90 MPH.




If you need a setting higher than 99 MPH from the MPH Low or the MPH High, you need to adjust the DIP switches behind the rear cover. Just as in Standard Mode, DIP switch 1 and 2 pertain to MPH Low and DIP switch 3 and 4 pertain to MPH High. DIP switch 1 and 3 on adds 100 MPH to the MPH Low and High settings respectively. DIP switches 2 and 4 on adds 200 MPH to the MPH Low and High settings respectively. DIP switch (1 and 2) and (3 and 4) on at the same time adds 300 MPH to the MPH Low and MPH High settings respectively. The image on the right shows DIP switch 1 and 3 in the on position. In relation to the previous image, the STOV-004 would switch between 160 MPH and 190 MPH.

NOTE: In order for the Window Switch mode to operate properly, MPH High must be greater than MPH Low.

**Example 3:**

- Vehicle Speed Window Switch mode
- MPH Low = 25
- MPH High = 100
- Set Function Select Switch = 2 (8 MPH Hysteresis Setting)

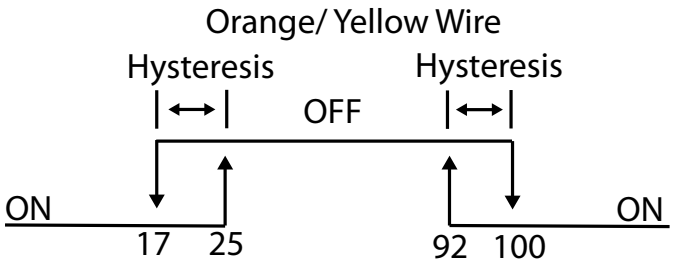
| Output (Wire Color) | Output state below MPH Low | Output state between MPH Low & MPH High | Output state above MPH High |
|---|---|---|---|
| +12v activation normally OFF (Orange) | OFF | ON | OFF |
| Ground activation normally ON (Gray) | ON | OFF | ON |
| Ground activation normally OFF (Yellow) | OFF | ON | OFF |
| STOV-004 LED status | Solid GREEN* | Blinking GREEN and RED | Solid GREEN |

***NOTE:** On initial power up the LED will be solid RED unless the PPM setting is invalid and will switch to solid Green when a valid speed signal is present.

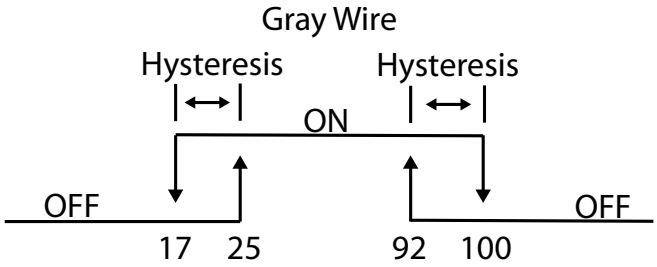
# Speed Based Relay Control Mode (continued)

**Example 3 (continued):**

- The Orange/ Yellow Wire (image on the left) switches ON at 17 MPH and switch OFF at 25 MPH. They also switch OFF at 92 MPH and ON at 100 MPH.
- The Gray Wire (image on the right) switches OFF at 17 MPH and ON at 25 MPH. The Gray Wire also switches ON at 92 MPH and OFF at 100 MPH.




8 MPH Hysteresis




8 MPH Hysteresis

# Stage/Gear Shift Output Mode

This mode is used to provide stage/gear shift output for boost controllers and other devices that need to see a gear shift position switch output to change stages such as:

- E-Boost2 boost controller from Turbosmart
- AMS-1000 boost controller from NLR systems
- Boost Leash, gear based, 1-6 from Leash Electronics

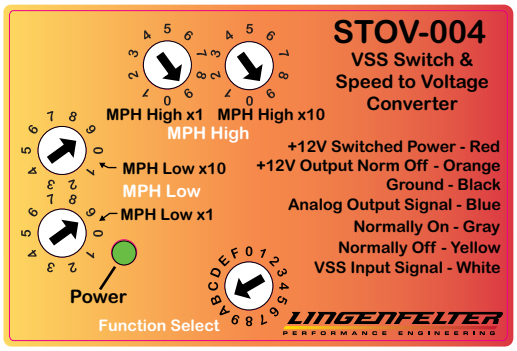
| **Table 3:** Wiring for Stage/Gear Shift Output Mode (as labeled on module) | | |
|---|---|---|
| **Wire Color** | **Label** | **Notes** |
| Red | +12V Switched Power | Connects to a switched +12 volt source. |
| Orange | +12V Output/Normally OFF | Activation - This wire provides a switched +12V output (activated by the vehicle speed settings). |
| Black | Ground | Connects to a vehicle ground. |
| Blue | Analog Output Signal | This is the vehicle speed output voltage (analog voltage output). This is a 0-5 volt DC output. |
| Gray | Ground Output/Normally ON | Increasing MPH pulse - This wire provides a pulsed ground output (activated by the vehicle speed settings). |
| Yellow | Ground Output/Normally OFF | Reset/Decreasing MPH pulse - This provides a pulsed ground output (activated by the vehicle speed settings). |
| White | PPM Input Signal (VSS) | This is the vehicle speed pulse input. This connects to the ECM/PCM Vehicle Speed Sensor (VSS) output signal or sensor signal wire. |

### Settings on the front face of the STOV-004:

- Single 16 position Function Select switch must be set to "**A**" or "**B**" depending on the Stage/Gear Shift Output Mode you are using.
- The four ten position switches are not used outside of programming.

# Stage/Gear Shift Output Mode (continued)

## Programming Mode:




To enter Stage/Gear Shift Output Programming Mode:

- Ignition off
- Set all four ten position switches to 9
- Set the 16 position Function Select switch to "A" or "B". See illustration on the right for switch positions. See pages 16 and 17 for an explanation of Output Mode Function A and Function B.
- Ignition on
  - The LED should now be green
- Set the maximum number of stages on the "MPH Low x1" switch
  - The number of stages must be between 1-6 stages.
- After you have set the switches to the correct settings, press and release the green button on the back of the STOV-004 to set the number of stages and the hysteresis.
  - The LED will blink once for each stage. (Choose 6 stages and the LED will blink 6 times)
- When the LED is done blinking, the controller is now ready to be programmed for the speed settings.
- Program the first stage by adjusting the "MPH Low" settings (per page 4). The first stage that you program will be used as a reset. If the boost controller you are using does not require a reset signal, set this value to 0 MPH.
- After you have set the switches to the correct settings, press and release the program button on the back of the STOV-004.
  - The LED will blink "X" number of times (once for each stage) depending on what stage you have just programmed.
  - Repeat this process for the remaining number of stages.

| **Table 4:** Programming MPH points for boost controller | | | | | | |
|---|---|---|---|---|---|---|
| **Stage** | Reset/Stage 1* | Stage 2 | Stage 3 | Stage 4 | Stage 5 | Stage 6 |
| **MPH** | MPH 1 | MPH 2 | MPH 3 | MPH 4 | MPH 5 | MPH 6 |

*If your boost controller does not require a reset or activation signal, set to 0 MPH

- Blinking RED and GREEN after programming all of stages indicates the stages have been programmed correctly.
- Blinking RED after any stage indicates an invalid MPH setting. You must power down and attempt to program again.
- To exit Programming Mode, turn off the unit (ignition off).

# Stage/Gear Shift Output Mode (continued)

**Stage/Gear Shift Output Mode Function A:**

This function allows you to sequentially switch between different boost settings depending on what the speed of your vehicle is. This mode is compatible with the e-Boost2 boost controller (SSA in e-Boost2 instructions), AMS-1000 boost controller, and Boost Leash, gear based, boost controller.

**The ORANGE and YELLOW wires are both used as RESET/ACTIVATION wires. Choose the correct wire depending on your device. If you are using the AMS-1000 boost controller, use the ORANGE wire. If you are using the e-Boost2 boost controller, use the YELLOW wire.**

Operation as MPH increases - When the Reset/Stage 1 MPH value is reached, the yellow wire "Normally Off" output will turn ON (output a ground signal) for 0.25 seconds then turn OFF. This provides a pulse to reset the boost controller.

When the Reset/Stage 1 MPH value is reached, the orange wire "+12V Output Norm Off" output will turn OFF (output a ground signal), starting stage 1 boost control. This output will remain OFF until the MPH value drops below the Reset/Stage 1 MPH value.

As MPH increases and becomes greater than or equal to the next stage MPH the gray wire "Normally On" output will turn ON (output a ground signal) for 0.25 seconds then turn OFF, this provides a pulse to increment the boost controller to the next stage. This process continues as MPH increases until the last stage is reached.

As MPH decreases and falls below the Reset/Stage 1 MPH, the yellow wire "Normally Off" output will turn ON (output a ground signal) for 0.25 seconds then turn OFF. This provides a pulse to reset the boost controller.

As MPH decreases and falls below the the Reset/Stage 1 MPH, the orange wire "+12V Output Norm Off" output will turn ON (output a +12V signal), resetting the sequence (and in most systems, resetting your nitrous or boost controller). If MPH increases the above sequence is performed again.

**LED operation:**

The LED will be red until you reach the MPH value of a stage. Once the value is reached, the LED will flash green.

**Example:**

For this example, MPH values were arbitrarily chosen. The MPH values are shown in the table below.

As the speed of your vehicle increases the STOV-004 will send a pulse to your boost controller telling your boost controller to go to the next stage. A pulse will only be sent to the boost controller as the speed of your vehicle increases or if you drop below your Reset MPH value. For example, if the speed of your vehicle is 55 MPH and you increase the speed of your vehicle to 75 MPH, the STOV-004 will output a pulse to your boost controller indicating that you have reached your Stage 5 MPH value. Then you continue to increase the speed of your vehicle to 80 MPH. Suddenly, you have to decelerate to 70 MPH. In Output Mode Function A, the STOV-004 will not send a pulse to the boost controller indicating that you dropped below your MPH set point. You will continue operating at Stage 5 boost control. Your boost controller will not reset until you drop below 5 MPH (Reset/Stage 1 speed).

**Table 5:** Example programmed MPH values for each stage.

| **Stage** | Reset/Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 | Stage 6 |
|---|---|---|---|---|---|---|
| **MPH** | 5 | 15 | 30 | 50 | 75 | 100 |

If you would like the STOV-004 to send a pulse to your boost controller indicating that the speed of the vehicle fell below your MPH set point, see Output Mode Function B on the next page.

# Stage/Gear Shift Output Mode (continued)

**Stage/Gear Shift Output Mode Function B:**

This function allows you to switch up and down between different boost settings depending on what the speed of your vehicle is. This mode is compatible with the e-Boost2 boost controller (SSb in e-Boost2 instructions).

**Note: The Reset/Stage 1 MPH value is not used in this function.**

Operation as MPH increases - When the next stage MPH value is reached, the gray wire "Normally On" output will turn ON (output a ground signal) for 0.25 seconds then turn OFF, starting the next stage boost control. This provides a pulse to increment the boost controller to the next stage.

Operation as MPH decreases - When the previous stage MPH value is reached, the yellow wire "Normally Off" output will turn ON (output a ground signal) for 0.25 seconds then turn OFF, starting the previous stage boost control. This provides a pulse to decrement the boost controller to the previous stage.

**LED operation:**

- Vehicle MPH increasing - Red LED
  - Next stage - Green LED flash
- Vehicle MPH decreasing - Green LED
  - Previous Stage - Red LED flash

**Example:**
For this example, MPH values will be the same as the example in Function A. The MPH values are shown in the table below.

As the speed of your vehicle increases, the STOV-004 will send a pulse to your boost controller telling your boost controller to go to the next stage. As the speed of your vehicle decreases, the STOV-004 will send a pulse to your boost controller telling your boost controller to go to the previous stage. For example, if the speed of your vehicle is 55 MPH and you increase the speed of your vehicle to 75 MPH, the STOV-004 will output a pulse to your boost controller indicating that you have reached your Stage 5 MPH value. Then you continue to increase the speed of your vehicle to 80 MPH. Suddenly, you have to decelerate to 70 MPH. In Output Mode Function B, the STOV-004 will send a pulse to the boost controller indicating that you dropped below your MPH set point. Depending on your boost controller, you will now be operating at Stage 4 boost control.

**Table 6:** Example programmed MPH values for each stage.

| **Stage** | Reset/Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 | Stage 6 |
|---|---|---|---|---|---|---|
| **MPH** | 0 | 15 | 30 | 50 | 75 | 100 |

# VSS Pulse Counter Mode

This mode is used to activate the relay outputs based on the number of pulses received (from stopped condition) from the Vehicle Speed Sensor (VSS). In VSS Pulse Counter mode, you can select the number of pulses from the VSS that must occur before the outputs on the STOV-004 are activated. You can also select the maximum amount of time the STOV-004 reads 0 MPH before the outputs on the STOV-004 are reset.

Given that you know your vehicle's PPM and the vehicle maintains traction, you can calculate the approximate distance traveled before the outputs are turned on.

$$\text{Distance (feet)} = \frac{5280 * (\text{Number of Pulses})}{\text{PPM}} \quad \text{or} \quad \text{Number of Pulses} = \frac{\text{PPM} * (\text{Distance (feet)})}{5280}$$

### Specifications:

- Number of Pulses
  - 0-399 pulses
- Minimum Time between Pulses
  - 0.0011 seconds
- Time-Out Condition
  - 0.1 - 9.9 seconds

### Settings on the front face of the STOV-004:

In the VSS Pulse Counter Mode, the MPH switches on the front face of the STOV-004 no longer control MPH settings. The changes are as follows:

- Single 16 position Function Select switch must be set to "**E**"
- Two ten position switches for selecting the number of pulses that must occur before the outputs are activated.
  - MPH Low x10 = Number of Pulses x10
  - MPH Low x1 = Number of Pulses x1
- Two ten position switches for selecting the Time-out condition.
  - MPH High x10 = Time (seconds) x1.0
  - MPH High x1 = Time (seconds) x0.1

### Settings inside the rear cover of the STOV-004:

In the VSS Pulse Counter Mode, the MPH switches inside the rear cover of the STOV-004 no longer control MPH settings. The changes are as follows:

- Five two position DIP switches (The location of these switches are shown in the figure below).
  - DIP switch #1 and #2 are used to control the **Number of Pulses** switch point adders.
    - DIP switch #1 in the ON (up) position adds 100 Pulses.
    - DIP switch #2 in the ON (up) position adds 200 Pulses.
  - DIP switch #3 and #4 do not function in VSS Pulse Counter Mode.
  - DIP switch #5 toggles the built in pull-up resistor.
    - DIP Switch #5 in the ON (up) position enables the pull-up resistor.

# VSS Pulse Counter Mode (continued)

**LED operation in VSS Pulse Counter Mode:**

- Solid RED when powered up, all settings good and outputs are in the OFF state
- Solid GREEN indicates a valid vehicle speed signal and outputs are in the OFF state
- Blinking GREEN and RED indicates the outputs are ON
- Blinking RED indicates pulse per mile setting is invalid

If the time-out condition is set to 0 seconds, the outputs will not turn off once activated until the device is powered off.

If the STOV-004 reads 0 MPH for the duration of the Time-Out condition, the outputs will turn off.

**Example 1:**

- VSS Pulse Counter Mode
- Time-Out Condition = 0.0 seconds
- Known PPM = 4000
- Number of Pulses = 27

The outputs will turn on after 27 pulses (approximately 35 feet). The outputs will not turn off until the device is powered off.

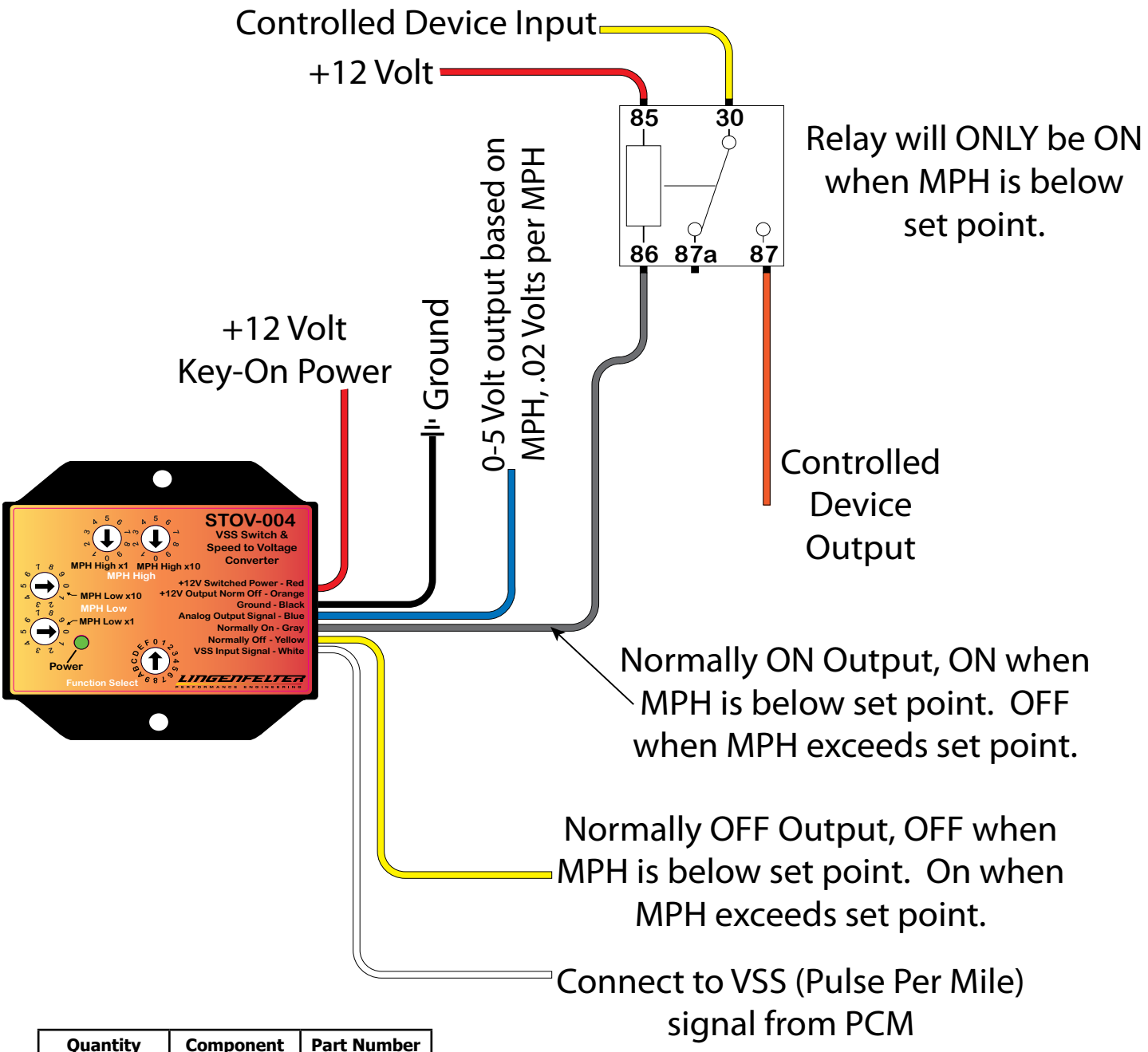
**Example 2:**

- VSS Pulse Counter Mode
- Time-Out Condition = 2.0 seconds
- Known PPM = 8000
- Number of Pulses = 100

The outputs will turn on after 100 pulses (approximately 66 feet). The outputs will turn off after the STOV-004 reads 0 MPH for 2.0 seconds or until the device is powered off.

| **Output (Wire Color)** | **Output state below Number of Pulses or Time-Out Condition is reached** | **Output state above Number of Pulses** |
|---|---|---|
| +12v activation normally OFF (Orange) | OFF | ON |
| Ground activation normally ON (Gray) | ON | OFF |
| Ground activation normally OFF (Yellow) | OFF | ON |
| STOV-004 LED status | Solid RED or Solid GREEN | Blinking GREEN and RED |

# Signal Disable Installation
# (Example- Fan Relay Control)

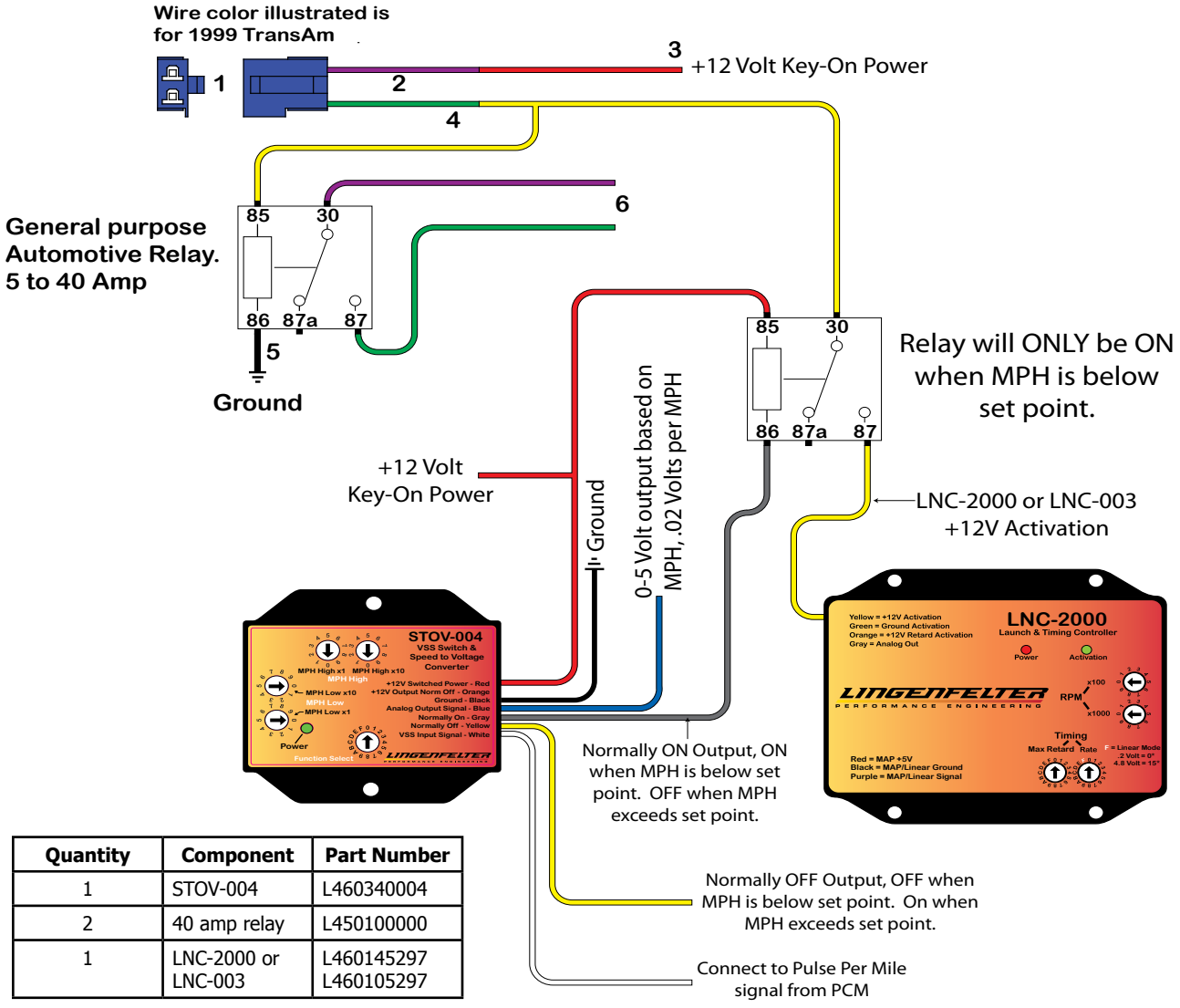



| Quantity | Component | Part Number |
|---|---|---|
| 1 | STOV-004 | L460340004 |
| 1 | 40 amp relay | L450100000 |

# 1998-2002 F-Body and 1997-2007 Corvette Factory Clutch Switch Diagram with the STOV-004 and LNC-2000 Modules

In this configuration, the STOV-004 is being used to only allow a 2-step controller to be active at the line. Once the vehicle is moving, the STOV-004 switches the relay, disabling the 2-step controller. Set the MPH switch point to a speed below your first gear shift point.

1 - Locate the CPP (Clutch Pedal Position) Switch and unplug the 2-wire connector.
2 - Cut wires appox. 3" back from connector.
3 - Find +12 volt Key On power source and connect to one wire of the CPP connector.
4 - Splice two wires onto the remaining CPP connector wire and connect one wire to #85 on the Relay. The extra wire will be used for LNC-2000 Launch Controller activation.
5 - Connect terminal #86 on the Relay to Ground.
6 - Connect wires cut from CPP Switch connector to Terminals #30 and #87 as shown.
7 - Set the STOV-004 MPH switch point to a speed just below your first shift point.




| Quantity | Component | Part Number |
|---|---|---|
| 1 | STOV-004 | L460340004 |
| 2 | 40 amp relay | L450100000 |
| 1 | LNC-2000 or LNC-003 | L460145297 L460105297 |

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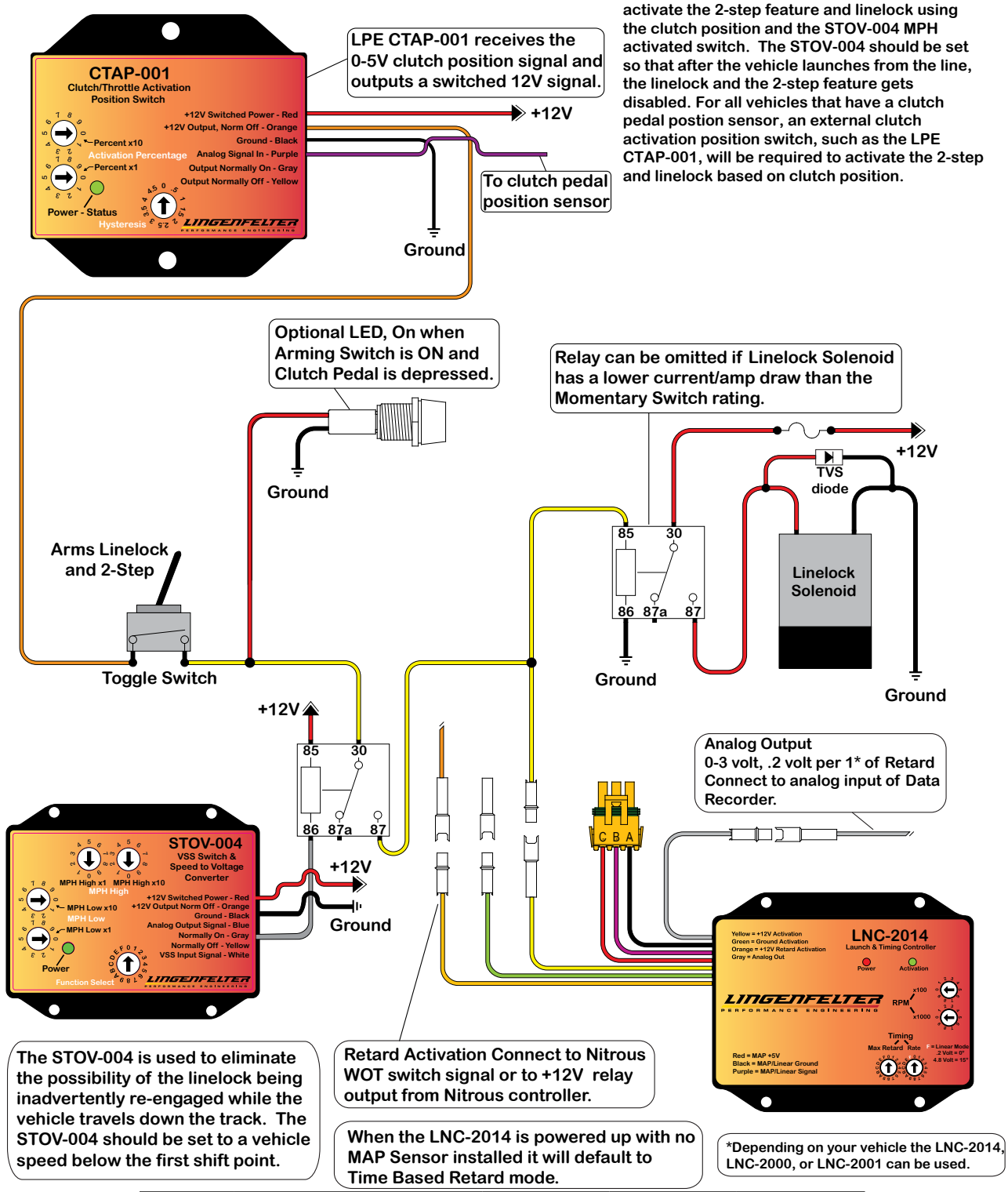
# Manual Transmission with Linelock & Clutch Pedal Position Sensor Equipped Vehicle

Use this wiring configuration to simultaneously activate the 2-step feature and linelock using the clutch position and the STOV-004 MPH activated switch. The STOV-004 should be set so that after the vehicle launches from the line, the linelock and the 2-step feature gets disabled. For all vehicles that have a clutch pedal postion sensor, an external clutch activation position switch, such as the LPE CTAP-001, will be required to activate the 2-step and linelock based on clutch position.

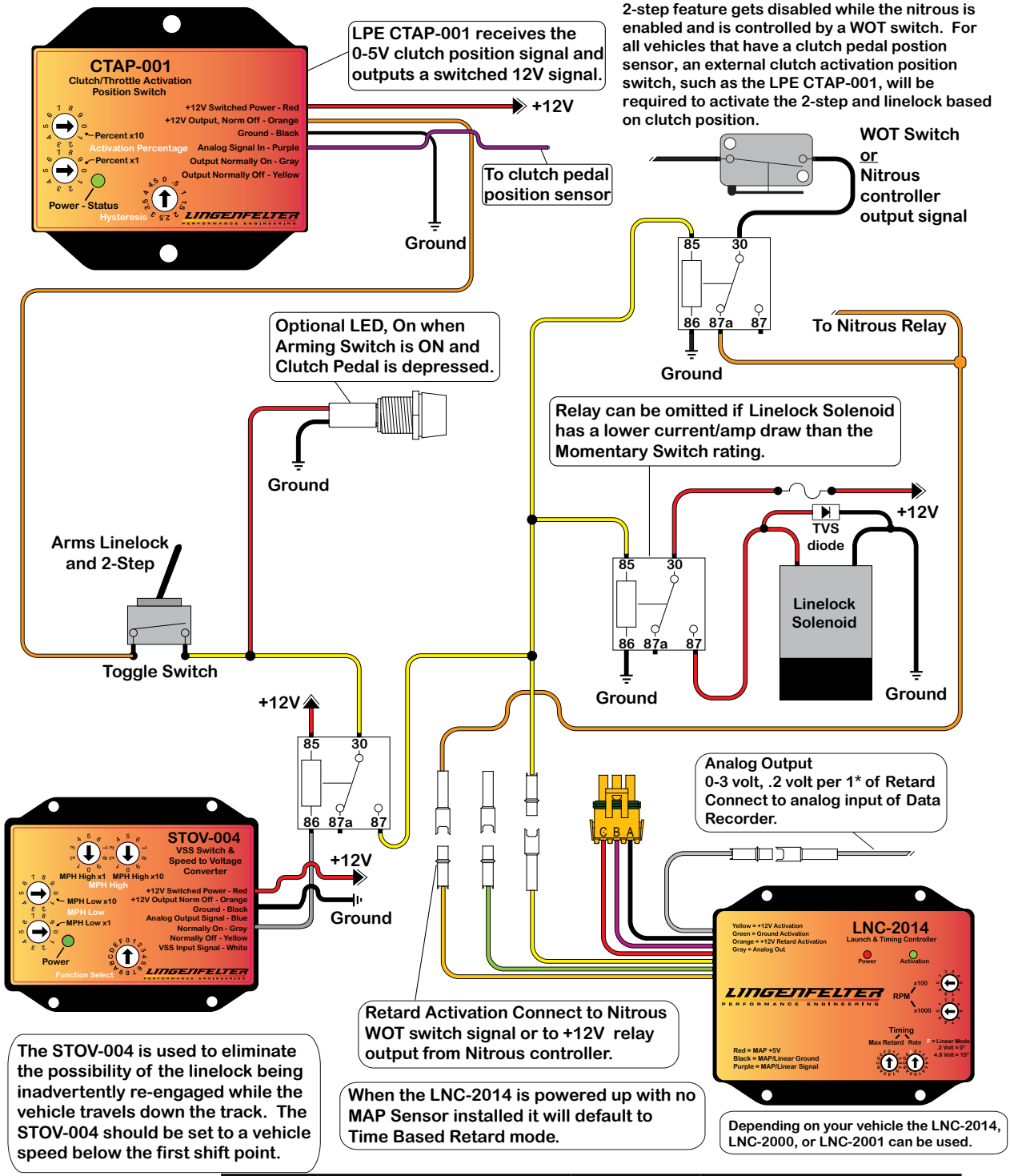



| Quantity | Component | Part Number | Quantity | Component | Part Number |
|---|---|---|---|---|---|
| 1 | STOV-004 | L460340004 | 1 | Toggle Switch | CLT-V1D1BC0B |
| 1 | *LNC-2014 | *L460306914 | 2 | 40 Amp Relay | L450100000 |
| 1 | CTAP-001 | L460190108 | 1 | **TVS Diode | L450080000 |

**There are 3 TVS diodes included in the LNC-2014, LNC-2000, and LNC-2001

# Manual Transmission with Linelock, Nitrous, & Clutch Pedal Position Sensor Equipped Vehicle

Use this wiring configuration to simultaneously activate the 2-step feature and linelock via clutch position and the STOV-004 MPH activated switch. The STOV-004 should be set so that after the vehicle launches from the line, linelock and the 2-step feature gets disabled while the nitrous is enabled and is controlled by a WOT switch. For all vehicles that have a clutch pedal postion sensor, an external clutch activation position switch, such as the LPE CTAP-001, will be required to activate the 2-step and linelock based on clutch position.




| Quantity | Component | Part Number | Quantity | Component | Part Number |
|---|---|---|---|---|---|
| 1 | STOV-004 | L460340004 | 1 | toggle switch | CLT-V1D1BC0B |
| 1 | LNC-2014 | L460306914 | 3 | 40 amp relay | L450100000 |
| 1 | CTAP-001 | L460190108 | 1 | TVS diode | L450080000 |

**Table 7**

**ECM/PCM Speed Output Information for Common GM and Ford Vehicles**

| Make | Model | Year | ECM/PCM Connector | Pin | Wire Color | Circuit Number | PPM** |
|---|---|---|---|---|---|---|---|
| Cadillac | CTS-V | 2004-2005 | C2 (Green) | 50 | Brown | 818 | 4,000 |
| Cadillac | CTS-V | 2006-2007 | C1 (Blue) | 39 | Brown | 818 | 4,000 |
| Cadillac | CTS-V | 2009-2015 | C1 (Blue) | 39 | N/A | N/A | 4,000 |
| Chevrolet | Camaro | 1996-1997 | C2 (Black) | 8 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Camaro | 1998 | C1 (Red) | 55 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Camaro | 1999-2002 | C2 (Red) | 50 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Camaro SS | 2010-2015 | C1 (Black) | 57 | N/A | N/A | 4,000 |
| Chevrolet | ZL1 Camaro | 2012-2015 | C1 (Blue) | 39 | N/A | N/A | 4,000 |
| Chevrolet | Caprice PPV | 2011-2013 | N/A | N/A | Orange | 818 | 4,000 |
| Chevrolet | Caprice PPV | 2014-2015 | N/A | N/A | White/Black | 381 | 4,000 |
| Chevrolet | CK Truck | 1999-2002 | C2 (Red) | 50 | Dark Green/White | 817 | 4,000 |
| Chevrolet | CK Truck | 2003-2006 | C2 (Green) | 50 | Dark Green/White | 817 | 4,000 |
| Chevrolet | CK Truck | 2007-2008* | C1/X1 (Black) | 57 | Yellow/Black | 1827 | 4,000 |
| Chevrolet | CK Truck | 2009-2012 | C1/X1 (Black) | 57 | Yellow/Black | 1827 | 4,000 |
| Chevrolet | Corvette | 1996 | C2 (Black) | 8 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Corvette | 1997-1998 | C1 (Red) | 55 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Corvette | 1999-2003 | C2 (Red) | 50 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Corvette | 2004 | C2 (Green) | 50 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Corvette | 2005 | C1 (Blue) | 21 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Corvette (Except ZR1) | 2006-2013 | C1/X1 (Black) | 57 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Corvette ZR1 | 2009-2013 | X1 (Blue) | 39 | Dark Green/White | 817 | 4,000 |
| Chevrolet | SSR | 2003-2004 | C2 (Green) | 50 | Dark Green/White | 817 | 4,000 |
| Chevrolet | SSR | 2005-2006 | C1 (Blue) | 21 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Trailblazer SS | 2006 | C1 (Blue) | 21 | Dark Green/White | 817 | 4,000 |
| Chevrolet | Trailblazer SS | 2007-2008 | C1/X1 (Blue) | 39 | Dark Green/White | 817 | 4,000 |
| Ford | Super Duty F-Series (Gas) | 2005-2007 | C2 | 01 | White/Orange | 0239 | 8,000 |
| Ford | Super Duty F-Series (Gas) | 2008-2010 | C2 | 01 | Purple/Orange | VMC05 | 8,000 |
| Ford | Super Duty F-Series (Gas) | 2011-2015 | C175B | 5 | Violet/Orange | VMC05 | 8,000 |
| Ford | Super Duty F-Series (Diesel) | 2005-2007 | C1 | 22 | White/Orange | 0239 | 8,000 |
| Ford | Super Duty F-Series (Diesel) | 2008-2010 | C1 | 32 | Purple/Orange | VMC05 | 8,000 |
| Ford | Super Duty F-Series (Diesel) | 2011-2015 | C1232B | 5 | Violet/Orange | VMC05 | 8,000 |
| Ford | E-Series (Gas) | 2010 | C | 05 | Violet/Orange | VMC05 | 8,000 |

**Table 7 (continued)**

| Make | Model | Year | ECM/PCM Connector | Pin | Wire Color | Circuit Number | PPM** |
|---|---|---|---|---|---|---|---|
| Ford | E-Series (Gas) | 2011-2014 | C175B | 5 | Violet/Orange | VMC05 | 8,000 |
| Ford | E-350 (Gas) | 2015 | C175B | 5 | Violet/Orange | VMC05 | 8,000 |
| Ford | E-450 (Gas) | 2015 | C1551B | 5 | Violet/Orange | VMC05 | 8,000 |
| Ford | E-Series (Diesel) | 2005-2007 | C1 | 22 | White/Orange | 0239 | 8,000 |
| Ford | E-Series (Diesel) | 2008-2009 | C1 | 22 | Gray/Black | 0679 | 8,000 |
| Ford | E-Series (Diesel) | 2010 | C1 | 22 | Violet/Orange | VMC05 | 8,000 |
| Pontiac | G8 | 2008-2009 | C1 (Black) | 57 | N/A | N/A | 4,000 |
| Pontiac | GTO | 2004 | C2 (Green) | 50 | Purple/White | 5197 | 10,000 |
| Pontiac | GTO | 2005-2006 | C1 (Blue) | 21 | Purple/White | 5197 | 10,000 |
| Pontiac | Firebird | 1996-1997 | C2 (Black) | 8 | Dark Green/White | 817 | 4,000 |
| Pontiac | Firebird | 1998 | C1 (Red) | 55 | Dark Green/White | 817 | 4,000 |
| Pontiac | Firebird | 1999-2002 | C2 (Red) | 50 | Dark Green/White | 817 | 4,000 |

* For the 2007-2008 CK Trucks, pin 57 on the PCM/ECM connector may or may not be populated by the wire listed above. If the pin position on the connector is not populated, the vehicle speed is being relayed via CAN Bus. If the vehicle does not relay the VSS signal through the ECM/PCM connector (i.e. 2007-present CK Truck*, 2010-present Camaro, 2009-present CTS-V, 2009-present Corvette ZR1, etc...), you may have to enable the pull-up resistor (DIP switch 5[on]).

**The PPM column shows known PPM values of Ford and GM vehicles. Most newer GM vehicles output 4000 PPM from the ECM. More PPM values for Ford and GM vehicles can be found in upfitter documentation or in your vehicle's service manual.

**Table 8**

**16 position Function Select Switch Settings**

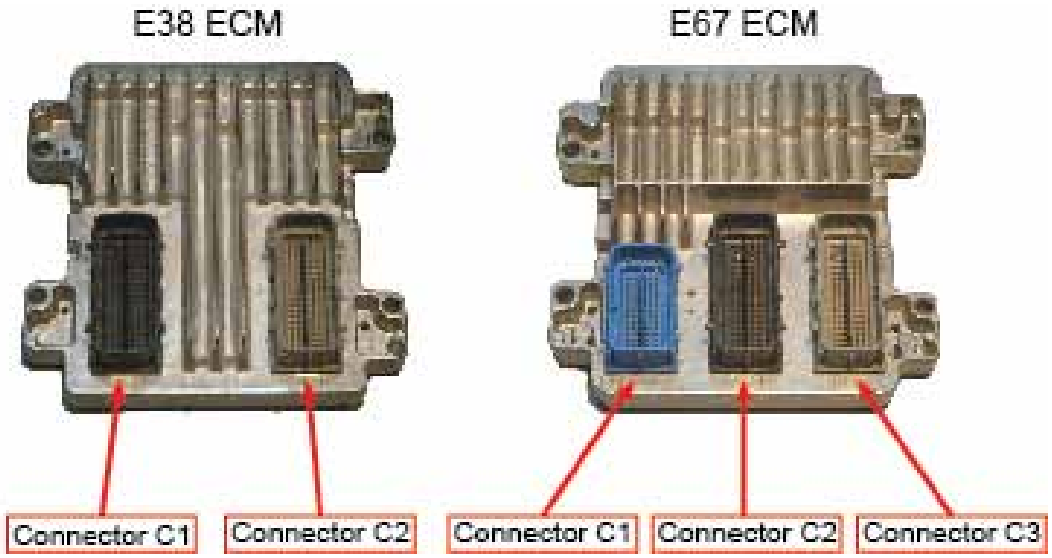
| Function Switch Position | PPM Adder | Notes |
|---|---|---|
| 0 | NA | Programming mode (known PPM); Speed Based Relay Control Mode: 2 MPH hysteresis |
| 1 | 10,000 | Speed Based Relay Control Mode: 4 MPH hysteresis |
| 2 | 20,000 | Speed Based Relay Control Mode: 8 MPH hysteresis |
| 3 | 30,000 | Speed Based Relay Control Mode: 12 MPH hysteresis |
| 4 | 40,000 | Speed Based Relay Control Mode: 25 MPH hysteresis |
| 5 | 50,000 | Speed Based Relay Control Mode: 50 MPH hysteresis |
| 6 | 60,000 | Maximum input is 60,000 PPM; Speed Based Relay Control Mode: 100 MPH hysteresis |
| 7 | 60,000 | Same as switch position 6; Speed Based Relay Control Mode: 1 MPH hysteresis |
| 8 | 60,000 | Speed Based Relay Control Mode: 1 MPH hysteresis |
| 9 | 60,000 | Speed Based Relay Control Mode: 1 MPH hysteresis |
| A | 60,000 | Stage/Gear Shift Output Mode, Function A |
| B | 60,000 | Stage/Gear Shift Output Mode, Function B |
| C | 60,000 | Speed Based Relay Control Mode: 1 MPH hysteresis |
| D | 60,000 | Speed Based Relay Control Mode: 1 MPH hysteresis |
| E | 60,000 | VSS Pulse Counter Mode |
| F | 60,000 | Programming mode (unknown PPM); Speed Based Relay Control Mode: 1 MPH hysteresis |

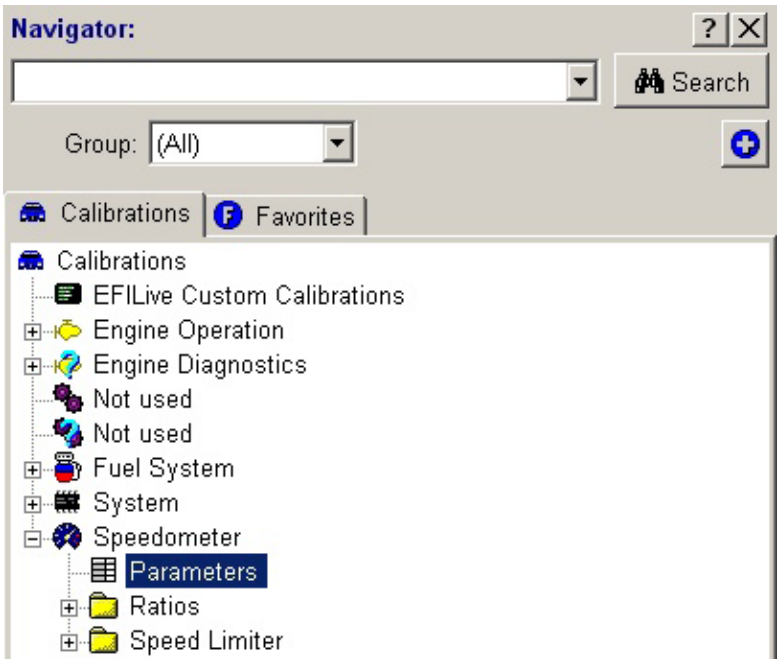
# Appendix A: Enabling ECM Vehicle Speed Signal Output

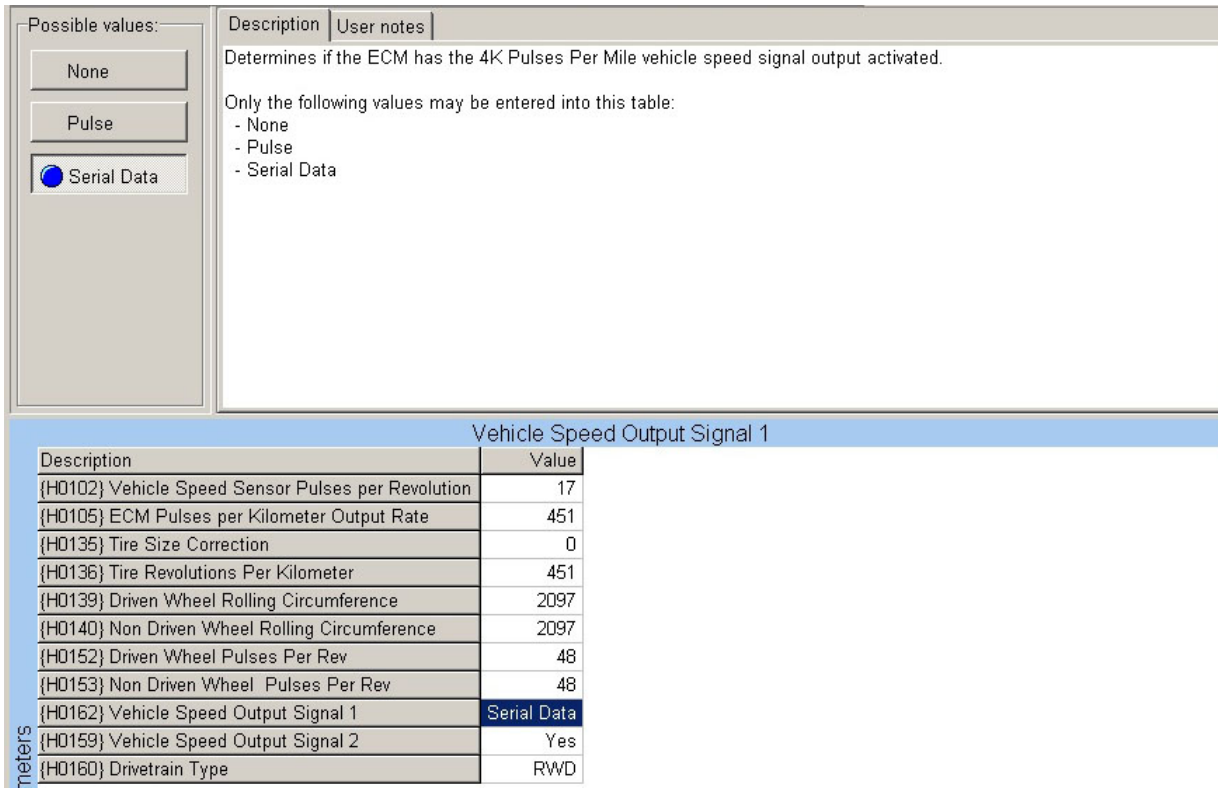
On some vehicles (such as the 2010-2015 Camaro, 2007-2015 C/K Trucks, and 2009-2015 CTS-V), the speedometer is not connected to the ECM by a direct Vehicle Speed Sensor (VSS) signal wire. Instead, the dash receives the VSS signal via some other method (such as serial data or CAN). In most cases, however, the vehicle's ECM has an unpopulated pin that can be used to communicate the VSS signal from the ECM to an external device, such as the STOV-004. The following sections explain how to connect a wire to the correct pin on the ECM, as well as how to enable the ECM VSS signal output using EFILive Tune v7.5.

**Populating the Speedometer signal wire on the ECM (GM E38, E67 ECM's)**

1. Determine the correct ECM pin location for the Vehicle Speed Sensor (VSS) output signal on your vehicle. A list of VSS signal pin locations for some GM vehicles has been provided in Table 7 (Pages 24-25).
2. Disconnect the ECM connector that houses the VSS output signal terminal. Use a small flat head screwdriver to open the wire enclosure on the back side of the connector. This exposes the wires as they come out of the connector.
3. If there is a terminal cover on the front side of the connector, use a small flat head screwdriver to remove it by prying up on each end. You should now see the terminals of each wire, along with colored terminal plugs in pin locations that are not currently populated.
4. Locate the ECM's VSS output signal pin location (page 24-25) on the connector. Remove the colored terminal plug from the connector with a small screwdriver.
5. Crimp a terminal (PN: 0334680003 -- for E38/E67 ECM's) to a piece of wire (long enough to reach from the ECM to the STOV-004), which will become your VSS output signal wire. The terminal will lock into the connector when oriented correctly, so make sure that you have the terminal correctly oriented before attempting to insert the terminal into the connector.
6. Insert the terminal into the correct pin location from the back side of the connector. You should hear an audible "click," which tells you that the terminal is inserted in the correct orientation and has locked into place.
7. Reinstall the terminal cover, close the connector wire enclosure, and reinstall the connector onto the ECM.
8. This wire can now be connected to the "VSS Input Signal" terminal on the STOV-004.

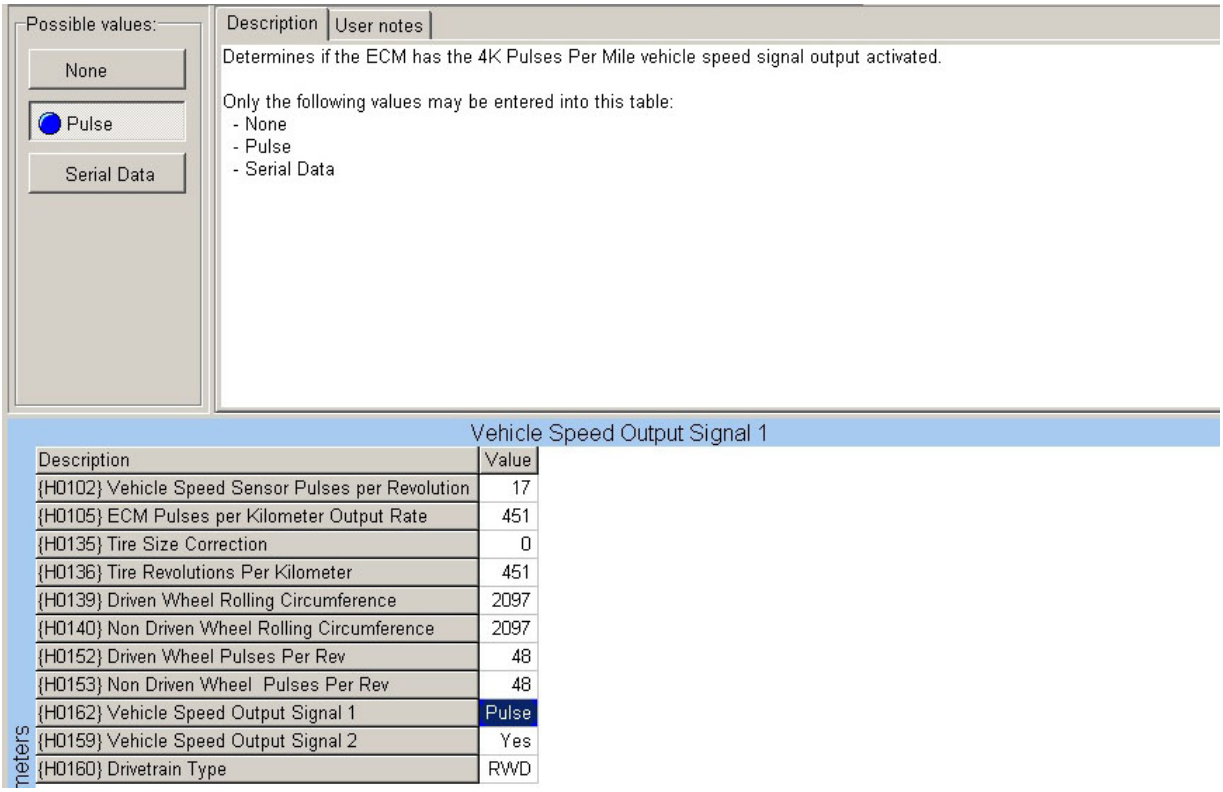



Navigator:
Search
Group: (All)
Calibrations
Favorites
Calibrations
EFILive Custom Calibrations
Engine Operation
Engine Diagnostics
Not used
Not used
Fuel System
System
Speedometer
Parameters
Ratios
Speed Limiter


Possible values:
None
Pulse
Serial Data
Description
User notes
Determines if the ECM has the 4K Pulses Per Mile vehicle speed signal output activated.
Only the following values may be entered into this table:
- None
- Pulse
- Serial Data
Vehicle Speed Output Signal 1
Description
Value
{H0102} Vehicle Speed Sensor Pulses per Revolution
17
{H0105} ECM Pulses per Kilometer Output Rate
451
{H0135} Tire Size Correction
0
{H0136} Tire Revolutions Per Kilometer
451
{H0139} Driven Wheel Rolling Circumference
2097
{H0140} Non Driven Wheel Rolling Circumference
2097
{H0152} Driven Wheel Pulses Per Rev
48
{H0153} Non Driven Wheel Pulses Per Rev
48
{H0162} Vehicle Speed Output Signal 1
Serial Data
{H0159} Vehicle Speed Output Signal 2
Yes
{H0160} Drivetrain Type
RWD

**Enabling the ECM's vehicle speed signal output through EFILive Tune v7.5**

1. In the "Navigation" window, under the "Calibrations" tab on the left side of the screen, double-click on "Speedometer" to reach the VSS related calibration parameters.




2. Double-click on 'Parameters' to bring up the window shown in following illustration, which should appear to the right of the browser window. This calibration is currently set to communicate the tachometer signal via serial data, as shown by the blue dot on the depressed 'Serial Data' button.
3. In the upper part of the same window, click on the 'Pulse' button. Pressing this button enables the VSS signal output from the ECM. There should now be a blue dot on the depressed 'Pulse' button, showing that the selection has been changed.
4. Save the calibration and then flash the new calibration to the vehicle.
5. Since no other device will be connected to the VSS signal output and the ECM, make sure to enable the pull-up resistor located on the back of the STOV-004.

**NOTE: Similar changes will be required if using HP Tuners or any other programming system.**

## Additional Notes and Warnings:

- Changes to the switch settings must be done with the STOV-004 powered off.
  - The switch positions are only read on start up (initial device power up).
- Make sure that the STOV-004 ground wire is sufficiently secured to a vehicle ground. Failure to fully secure the STOV-004 ground wire to a vehicle ground source could cause the STOV-004 to malfunction.
- Do NOT submerge the module in liquid or directly wash the unit with liquid of any type. The switches on the STOV-004 are sealed but are NOT rated for high pressure washing, use caution if power washing near the STOV-004 module.
- Do NOT mount the STOV-004 directly on top of the engine or near the exhaust manifolds due to heat concerns.
- Do NOT mount the STOV-004 in the line of site of high temperature objects such as exhaust manifolds, turbine housings, etc... If needed, install a heat shield in between the heat source and the module to protect the plastic case.
- Do NOT install within 6" of nitrous solenoids or other devices with strong magnetic fields.
- Do NOT install near the spark plugs or the spark plug wires (or other potential strong sources of electrical noise).
- LPE recommends the use of resistor type spark plugs and RFI (radio frequency interference) and EMI (Electromagnetic Interference) suppression spark plug wires on all EFI engines and any vehicle that has electronic control modules on board (including the STOV-004). Failure to do so may result in erratic operation of electronic device.

## Troubleshooting:

If you believe that the STOV-004 is switching at an incorrect vehicle speed, check the following:

- Verify that you are using the correct PPM for your vehicle.
  - Check the analog output using a Digital Multimeter (DMM) or a Digital Volt-Ohm Meter (DVOM)
    - If the STOV-004 is reading a vehicle speed that is less than the actual vehicle speed, the set PPM may be too high.
    - If the STOV-004 is reading a vehicle speed that is greater than the actual vehicle speed, the set PPM may be too low.
  - Reprogramming the STOV-004 may be necessary

If you are not receiving a speed signal, check the following:

- Verify that you are using a pull-up resistor if necessary (see page 5).
- Verify that you are using a correct vehicle speed output.

## NOTICES:

It is the responsibility of the purchaser to follow all guidelines and safety procedures supplied with this product and any other manufacture's product used with this product.

Lingenfelter Performance Engineering assumes no responsibility for damages resulting from accident, improper installation, misuse, abuse, improper operation, lack of reasonable care, or all previously stated reasons due to incompatibility with other manufacturer's products.

Lingenfelter Performance Engineering assumes no responsibility or liability for damages incurred from the use of products manufactured or sold by Lingenfelter Performance Engineering on vehicles used for competition racing.

It is the purchaser's responsibility to check the state and local laws and sanctioning body requirements pertaining to the use of this product for racing applications. Lingenfelter Performance Engineering does not recommend nor condone the use of its products for illegal street racing.

## DISCLAIMER:

The information provided in this document is intended for informational purposes only and is subject to change without notice. Lingenfelter Performance Engineering also reserves the right to make improvements and/or changes to the product described at any time without notice.

**For additional product installation information and technical support, contact LPE or your LPE products distributor. You can also find technical support and usage discussions regarding this product and many other LPE products in our Internet forums:**

**http://www.lingenfelter.com/forum_lingenfelter/index.php**

**Follow us on Facebook!**

**http://www.facebook.com/home.php#!/lpehp**

## Limited Warranty:

LPE warrants the Lingenfelter STOV-004 Speed Based Relay Control Module & Speed to Voltage Converter be free from defects in material and workmanship under normal use and if properly installed for a period of one year from the date of purchase. If the module is found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of LPE. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall LPE be liable for special or consequential damages.

Lingenfelter Performance Engineering
1557 Winchester Road
Decatur, IN 46733
(260) 724-2552
(260) 724-8761 fax
www.lingenfelter.com