

Lingenfelter STOV-003
Speed Based Relay Control Module
(vehicle speed activated switch)
&
Speed to Voltage Convertor



PN: L460270000

Parts List

#	Part number	Description
1	STOV-003	LPE MPH Activated Switch
1		Hook & loop tape
2	AV16037	Self-tapping screw
1	L920010000	LPE decal
1		Instructions

Tools & Materials Required

- Phillips head screwdriver
- Wire crimping tool

Optional Parts List

Part Number	Description
0334680003	E38/E67 ECM pin
L450100000	Sealed 40 amp relay kit
L950050000	LPE technician's screwdriver

STOV-003 Basic Operation Description:

The STOV-003 is designed to read the pulse per mile (PPM) Vehicle Speed Signal (VSS) from the Engine Control Module (ECM) or Powertrain Control Module (PCM) on most late model vehicles and it then outputs a signal that can be used to control a variety of devices.

The STOV-003 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.
- Control virtually any other device that needs to be turned on or off at a certain vehicle speed.
- Disable a two-step once the vehicle is moving.

The STOV-003 outputs:

- 0-5vdc analog voltage proportional to vehicle speed
- Switched +12vdc normally OFF (open) for device or relay control
- Switched Ground normally OFF (open) for device or relay control
- Switched Ground normally On (closed) for device or relay control

The STOV-003 user configured controls:

- Four 10 position switches to select operating mode & activation speeds
- One 16 position switch to select frequency adder and enable programming mode
- One 5 position DIP switch for vehicle speed adder and pull-up resistor enable
- One push button switch for set point learn mode

The STOV-003 also has a bi-color LED for mode and error identification.

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Specifications:

- The Lingenfelter Performance Engineering (LPE) STOV-003 Speed To Voltage Convertor and MPH Activated Switch incorporates a precision 32-bit timer to realize microsecond precision over a wide operating frequency and MPH range.
- 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:
 - MPH activated Window Switch
 - MPH activated Switch (simple on/off control)
 - 0-5vdc 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 .02 volt per MPH (linear relationship between speed and voltage).
- The 0-5vdc Analog and Switched outputs work simultaneously.
- Current draw: 0.1 amp plus current draw of device being controlled (when active).
 - Outputs rated for up to 0.75 amps each.
 - The STOV-003 should control a relay for higher current level applications.
- Outputs have a self protect feature and will turn OFF in case of a direct short or over current condition.
- Includes a built in pull-up resistor enabled by a DIP switch inside the back cover.
 - Internal pull-up resistor value: 2.2 k ohms
- Operating voltage range: 9.0 to 18.0 volts.
- Input signal type: square wave 12vdc.
 - Processed signal from ECM/PCM vehicle speed sensor
 - Square wave output type sensor (i.e. Hall Effect Sensor)
 - Valid frequency range of 0.02778-6650 Hz.
- Valid pulse per mile range 100 to 60,000 PPM
- Valid MPH ON and MPH OFF range 0 to 399 MPH
- Custom molded high temperature glass filled Nylon low profile case.
- Fully encapsulated (potted) construction for increased durability.
- Warranty: One year from date of purchase.

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Table A: Wiring (also labeled on module)

Wire Color	Label	Notes
Red	+12V Switched Power	Connects to a switched +12 volt 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	Voltage Out	This is the vehicle speed output voltage (analog voltage output). This is a 0-5 volt DC output.
Gray	Normally On Output (ground)	This wire connects to the ground side of the device you plan to activate.
Yellow	Normally OFF Output (ground)	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.

Switch functions:

- Front cover:
 - Four 10 position switches used to set the switch points speeds. Also used to set the PPM during programming.
 - One 16 position switch. Used to set the PPM adder during programming. Some switches are not currently used for anything outside of programming mode(refer to page 16).
- Behind rear cover:
 - 5 position DIP switch
 - Four switches used to control VSS switch point adders
 - One switch used to enable pull-up resistor
 - Push-button switch used to program vehicle PPM signal

LED operation:

Power up not in Programming 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 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

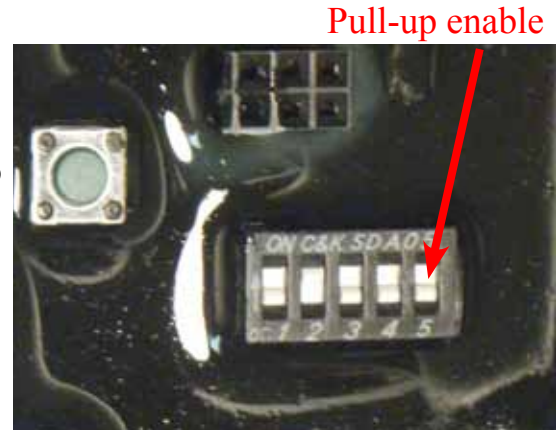
Power up in Programming Mode:

- Blinking GREEN LED indicates the unit is waiting for the user to press the Program button on the back of the unit.
- Other values as described in programming mode instructions (pages 6 and 7).



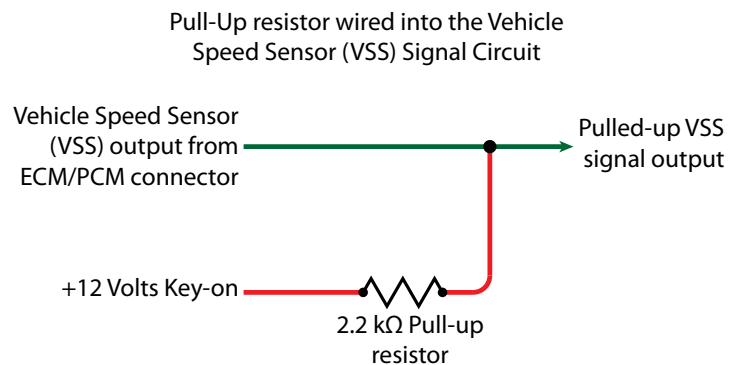
Pull-up Enable:

- 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.
- 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 currently wired into the in the STOV-003, 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 your vehicle currently has a VSS output from the ECM/PCM (see Table B on pages 15-16 or consult your service information). Many newer vehicles no longer have a frequency based VSS going from the ECM/PCM to the dash. Some of these vehicles, especially heavy duty trucks and police vehicles, will have a vehicle speed output wire in the harness for use in connecting to external devices. If your vehicle has neither of these, 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 17-19) 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-003. Example vehicles this applies to includes: 2007 to present GM CK trucks (Sierra, Silverado, Suburban, Tahoe, Yukon), 2010-present Camaro and 2009-present 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. If you have a magnetic IR (2 wire) VSS sensor, this will NOT work. (If you are not sure consult service information or contact LPE for your specific vehicle application). A new speed sensor (i.e. Hall Effect sensor) can also be wired into the vehicle (i.e. driveshaft).
2. Determine where you want to mount the STOV-003. It should be mounted away from heat or moving parts that may cause damage. Do not mount the STOV-003 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. It 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-003 to a suitable vehicle ground
5. Connect the Red wire of the STOV-003 to a fused +12vdc ignition switched circuit.
6. Connect the White signal input wire to the source determined in step 1.
7. Connect the control/output wires (Yellow, Gray, & Blue) as needed for your application.
8. See pages 11-14 for example wiring diagrams for MPH switch & LPE 2-step products
9. Re-connect the negative battery terminal

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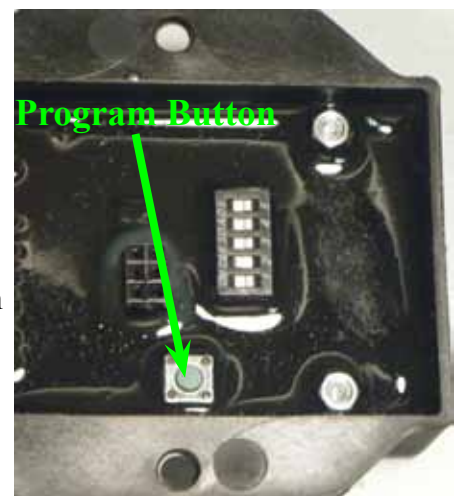
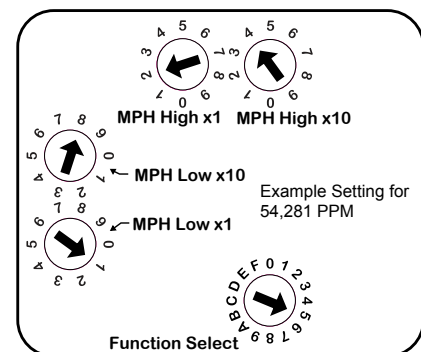
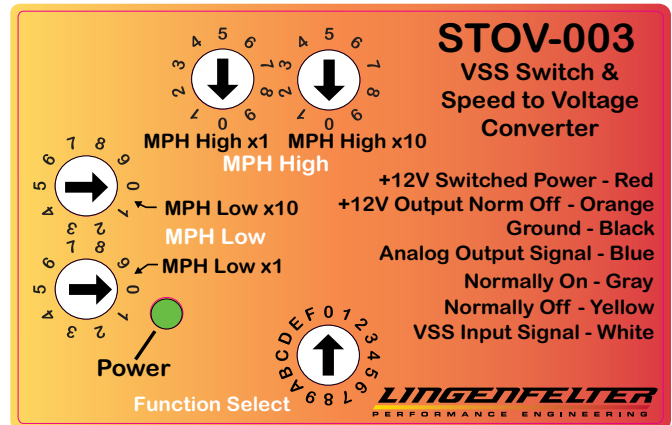
Programming Mode:

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-003 measures and calculates the pulse per mile count by bringing the vehicle to 60 MPH.

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

- Ignition off
- Set all four 10 position switches and the 16 position switch to 0. The “Low” setting switches should be pointing to the right, the “High” setting switches should be pointing down and the “Pulse Per Mile” 16 position switch should be pointing up. See illustration on the right for switch positions.
- Ignition on
 - The LED should now blink green.
- 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 sixteen position 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-003 (see image) for 1 second.
- Blinking RED and 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 (see page 8).

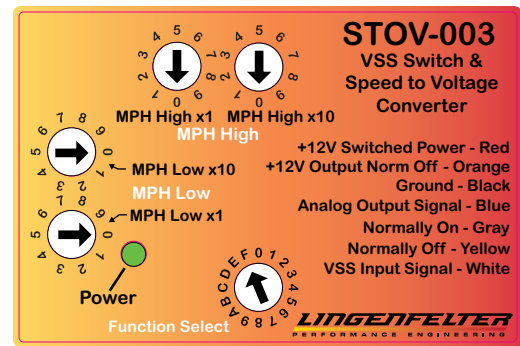


Programming Mode (continued):

If you don't know the pulse per mile for the signal wire you are connected to, the STOV-003 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
- Set all four 10 position switches to 0 and the 16 position switch to "F". The "Low" setting switches should be pointing to the right, the "High" setting switches should be pointing down and the "Pulse Per Mile" 16 position 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.
- 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-003 for 1 second.
- Blinking RED and 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.



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Configure the STOV-003 switch settings:

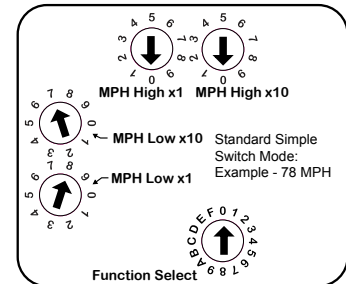
Notes:

- **Changes to the MPH switch point settings must be done with the STOV powered off.**
 - The switch positions are only read on initial power up.

The STOV-003 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).

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. The STOV-003 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.

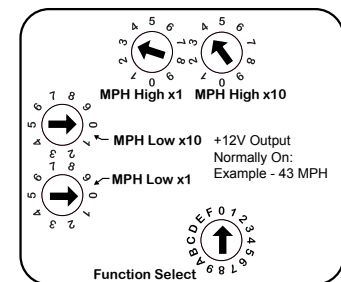
For standard Simple Switch mode, set both the x1 and the x10 rotary switches for the MPH High setting to 0. Now set the desired switch speed using the MPH Low rotary switches with the x1 switch setting the speed in 1 mph increments and the x10 switch setting the speed in 10 mph increments. The image 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-003 would switch at 278 MPH.



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-003 would switch at 143 MPH.



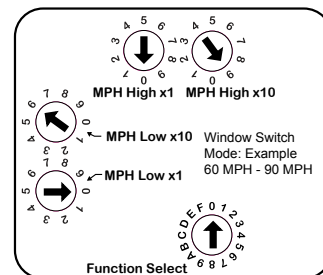
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Configure the STOV-003 switch settings (continued):

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-003 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. See Example 3 on page 10.

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 the 1 MPH increments and the x10 switch controls the speed setting in the 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-003 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.

Activation Reference Charts

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

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-003 LED status	solid GREEN*	blinking GREEN

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]

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-003 LED status	blinking GREEN*	solid GREEN

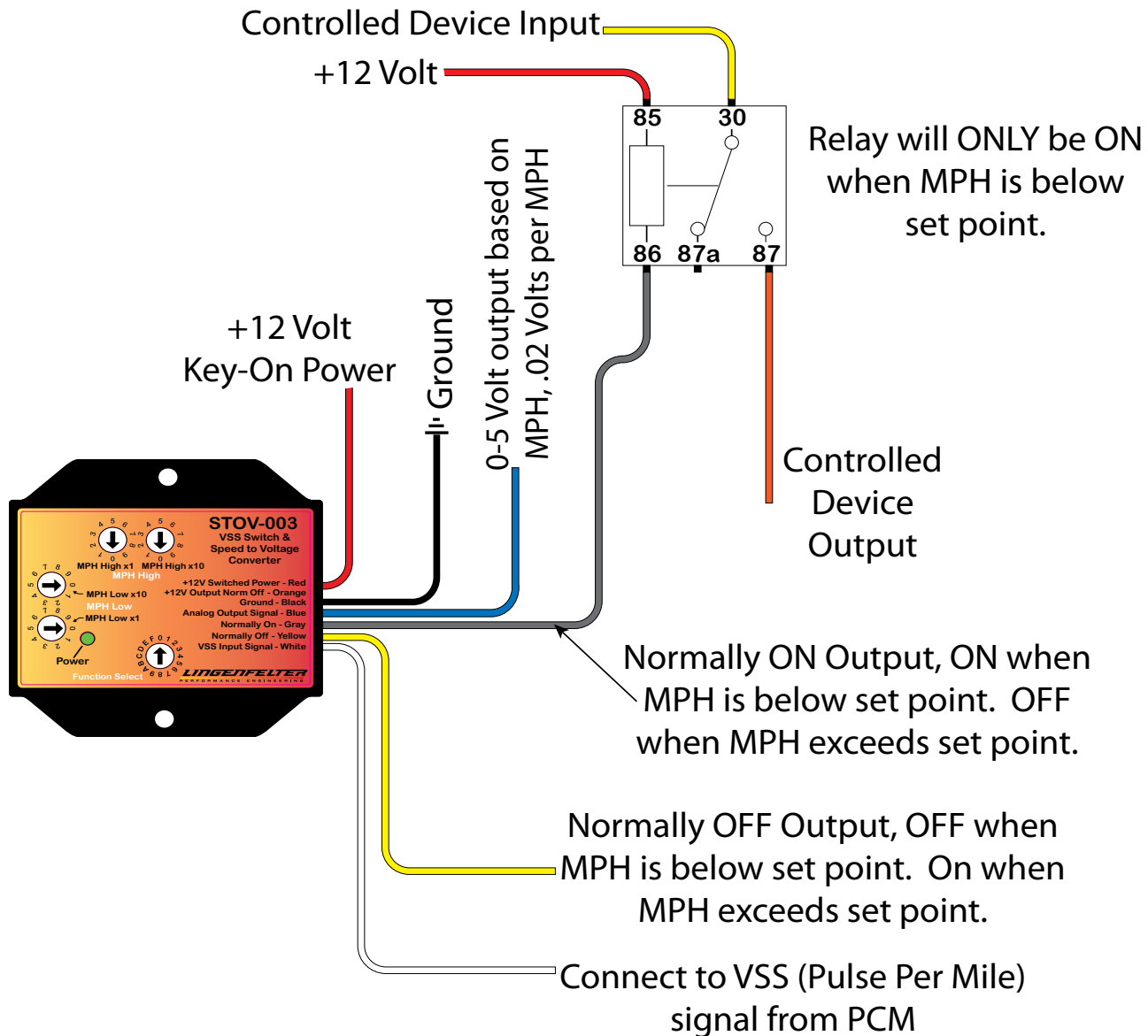
Example 3:

- Vehicle Speed Window Switch mode
- MPH Low = 25
- MPH High = 100

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-003 LED status	solid GREEN*	blinking GREEN	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 example in Example 2 where you will be blinking green even with no VSS signal.

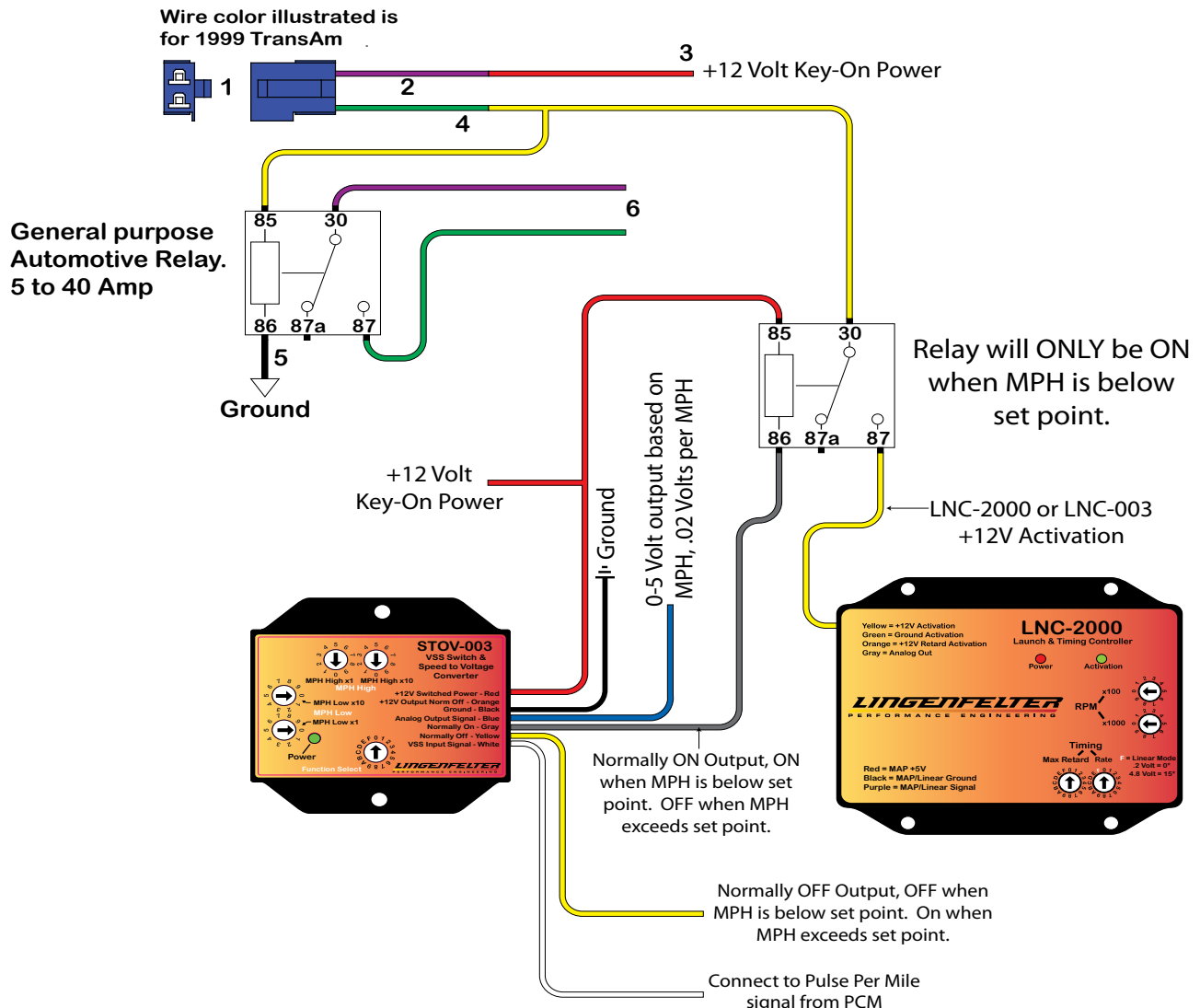
Signal Disable Installation (Example- Fan Relay Control)



1998-2002 F-Body and 1997-2007 Corvette Factory Clutch Switch Diagram with the STOV-003 and LNC-2000 Modules

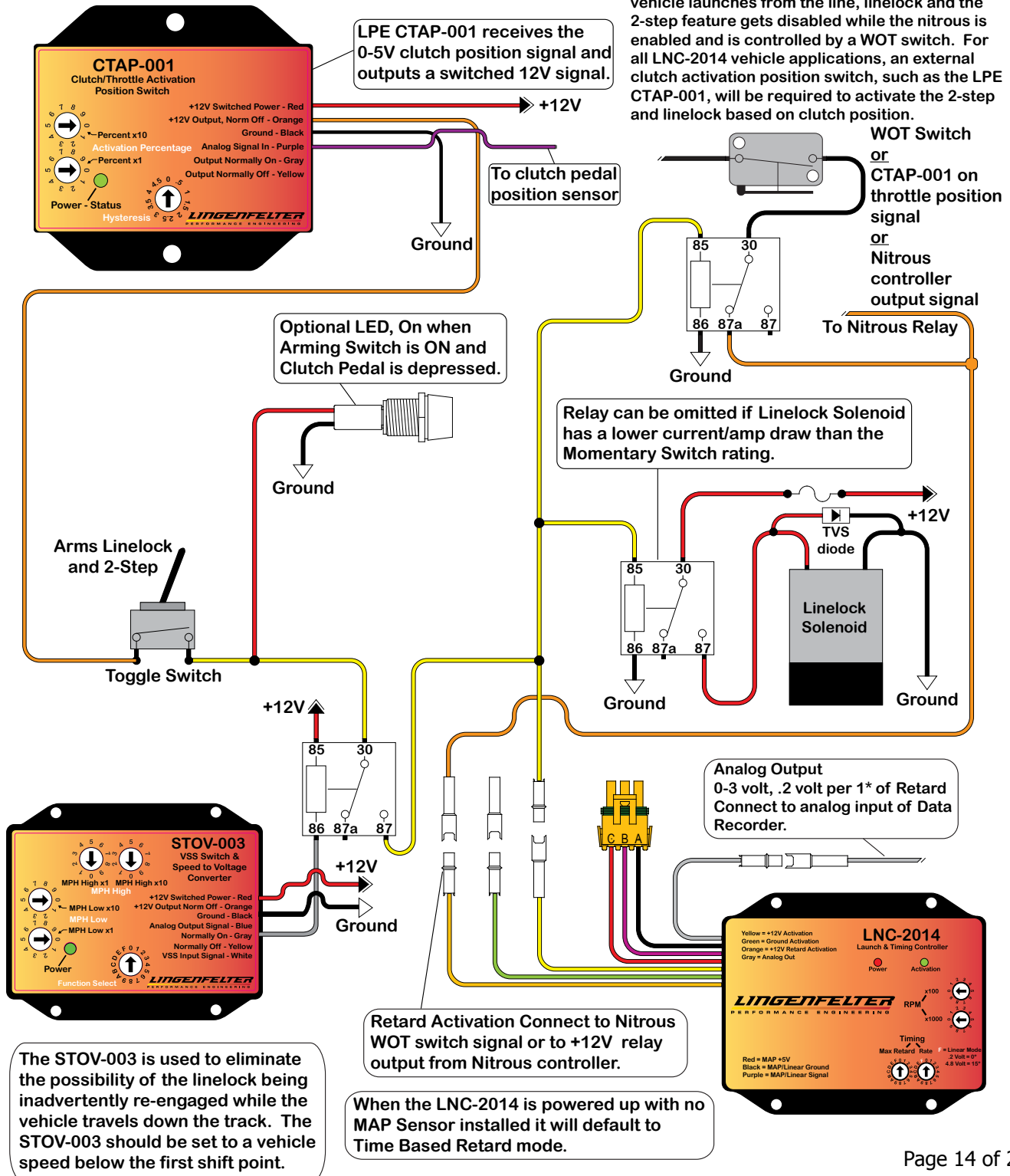
In this configuration, the STOV-003 is being used to only allow a 2-step controller to be active at the line. Once the vehicle is moving, the STOV-003 switches the relay, disabling the 2-step controller. Set the MPH switch point to a speed below your first gear shift point.

- 1 - Locate the CPP (Clutch Pedal Position) Switch and unplug the 2-wire connector.
- 2 - Cut wires approx. 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-003 MPH switch point to a speed just below your first shift point.



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-003 MPH activated switch. The STOV-003 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 LNC-2014 vehicle applications, 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.



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Table B

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

Make	Model	Year	ECM/PCM Connector	Pin	Wire Color	Circuit Number	PPM**
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	2011-2013	N/A	N/A	Orange	818	4,000
Chevrolet	Caprice	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	CTS-V	2004-2005	C2 (Green)	50	Brown	818	4,000
Chevrolet	CTS-V	2006-2007	C1 (Blue)	39	Brown	818	4,000
Chevrolet	CTS-V	2009-2015	C1 (Blue)	39	N/A	N/A	4,000
Chevrolet	Impala	2011-2015	-	-	Brown	818	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	Tahoe	2011-2014	-	-	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

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Table B (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	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 C

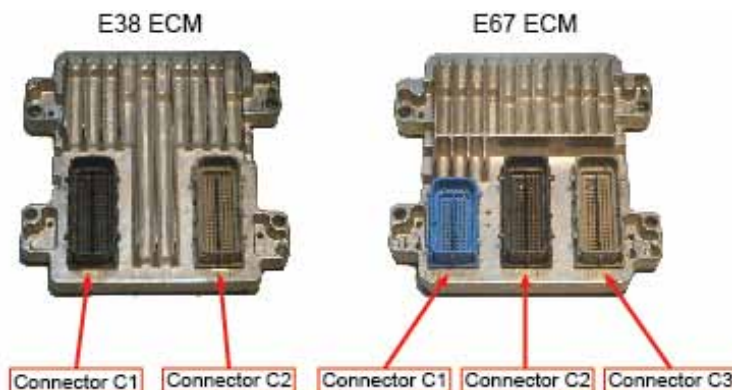
Function switch settings for PPM input signal adder		
Function switch position	PPM Adder	Notes
0	NA	Programming mode
1	10,000	
2	20,000	
3	30,000	
4	40,000	
5	50,000	
6	60,000	Not an adder as maximum input is 60,000 PPM
7+	60,000	Same as switch position 6 (reserved for future additions)
E		Special pulse only start mode (TBD)

Appendix A: Enabling ECM Vehicle Speed Signal Output

On some vehicles (such as the 2010-2013 Camaro, 2007-2013 C/K Trucks, and 2009-2013 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-003. 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.

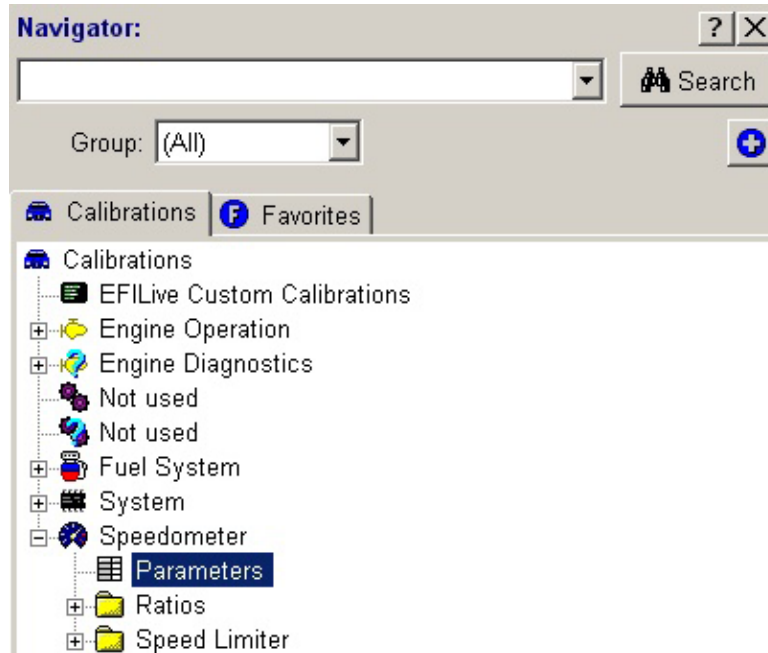
Populating the Speedometer signal wire on the ECM (GM E38, E67 ECM's)

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 B (Pages 15-16).
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 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-003), 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-003.



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.

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

- 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.

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	Pulse
{H0159} Vehicle Speed Output Signal 2	Yes
{H0160} Drivetrain Type	RWD

- Save the calibration and then flash the new calibration to the vehicle.
- 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-003.

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

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P E R F O R M A N C E E N G I N E E R I N G

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/LPEforumfiles>

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

Limited Warranty:

LPE warrants the Lingenfelter STOV-003 Speed Based Relay Control Module to 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.

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