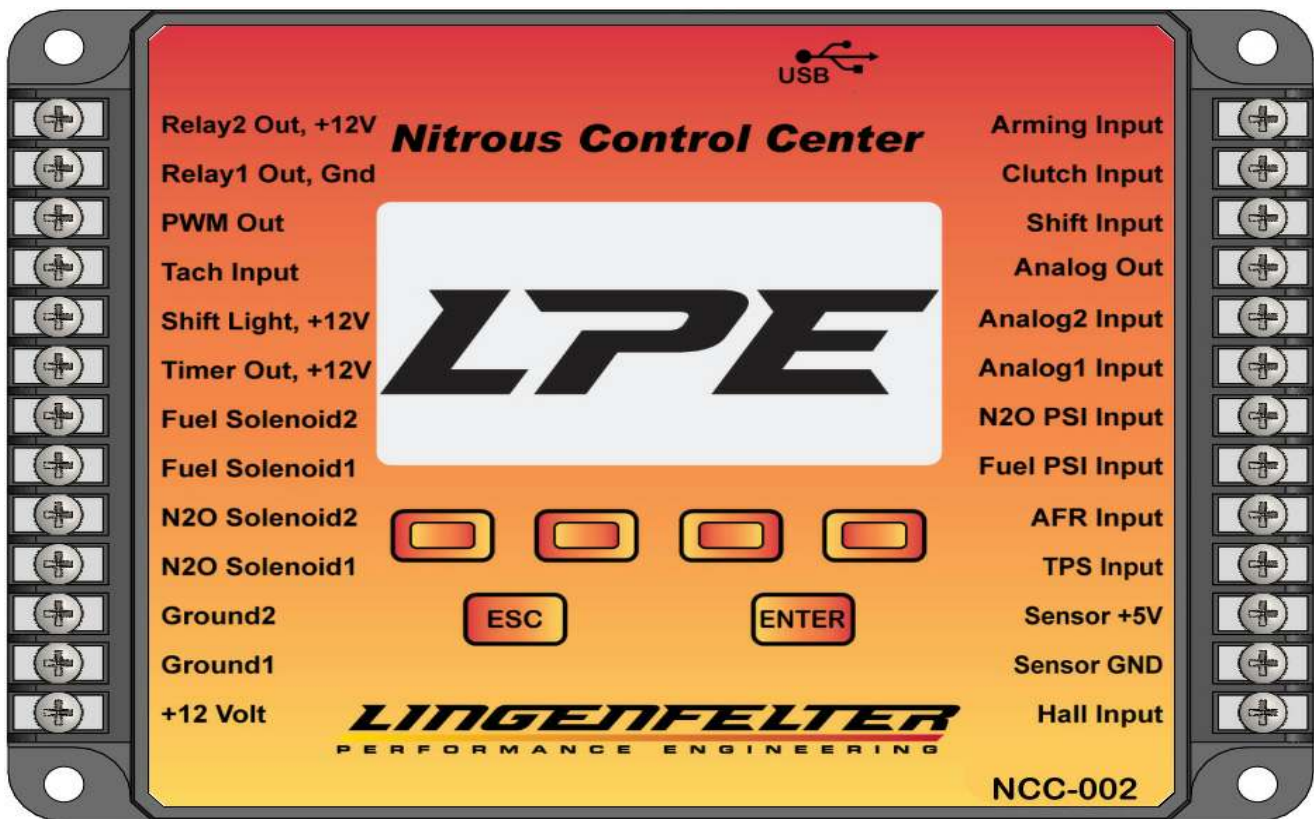


## Lingenfelter NCC-002 Nitrous Control Center Installation and Operating Instructions



PN: L460240000

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# Introduction

**Part**



# 1 Introduction

Thank you for purchasing the NCC-002 Progressive Nitrous Control Center by Lingenfelter Performance Engineering. There are few nitrous controllers on the market that can come close to the feature set offered by the Lingenfelter Performance Engineering (LPE) NCC-002 Nitrous Control Center. The NCC-002 is capable of controlling up to four stages of nitrous (if the fuel supply is controlled by the ECM or other method), with many different available triggering and disabling input options available for each. The NCC-002 controller interface is designed for ease of use and access at the track as all of the settings and options available in the NCC-002 software program are also available on the controller itself. The NCC-002 controller also features enough internal memory to save three user-defined nitrous programs for quick access in the case that track conditions change and a different setup is desired.

While the NCC-002 Nitrous Control Center can be installed into virtually any vehicle, it was especially designed for late model EFI vehicles. Special attention was paid to integrating the NCC-002 into GM LS powered vehicles including:

- 1998-2002 Camaro
- 1997-2013 Corvette
- 2010-2014 Camaro SS
- 2004-2006 Pontiac GTO

The features alluded to already, as well as the numerous other features listed in the following section, make the NCC-002 Nitrous Control Center from Lingenfelter Performance Engineering one of the most advanced Nitrous Controllers available while still offering the ease of use that renders it practical for seasoned race veterans and weekend racers alike.



## 1.1 NCC-002 Features

- Two independent progressive stages of nitrous and fuel
  - Independent control of both nitrous and fuel duty cycle for each stage
  - Four stages of nitrous (if used to only control nitrous solenoids)
- Timer/RPM based output (+12V)
- Relay output (+12V) - programmable based on any combination of: Arming input, clutch input, shift input, TPS %, AFR, Nitrous1 %, Fuel1 %, Nitrous2 %, Fuel2 %, RPM, MPH, Fuel PSI, Nitrous PSI
- Relay output (Ground) - programmable based on any combination of: Arming input, clutch input, shift input, TPS%, AFR, Nitrous1 %, Fuel1 %, Nitrous2 %, Fuel2 %, RPM, MPH, Fuel PSI, Nitrous PSI
- Shift light output, +12 volt
- Analog voltage output, programmable - for sending to a data acquisition system or to an ECM for external fuel or spark control. Also can link to the LNC-2000 for progressive timing retard on GM LSx V8 engine vehicles.
- PWM output (for future features - not currently enabled in the software)
- 5 volt and ground output for Fuel Pressure and Nitrous Pressure sensors (for improved signal accuracy)
- Arming input (Ground or +12 volt selectable)
- Clutch input - for clutch switch, linelock, or transbrake input (Ground or +12 volt selectable)
- Shift input - for gear position (Ground or +12 volt selectable)
- Nitrous bottle pressure input, 0-5 volt
- Fuel pressure input, 0-5 volt
- AFR input, 0-5 volt
- TPS input - accepts rising and falling voltage signal sensors, 0-5 volt
- Two analog inputs - accepts rising and falling voltage clutch position sensors, 0-5 volt
- Frequency input (vehicle speed, possible other inputs later)
  - Software enable/disable pull-up resistor on frequency input
- Engine speed (tach) input
  - Software enable/disable pull-up resistor on tachometer input
  - Accepts most engine configurations
- Time based safety over-ride
- Fuel pressure safety over-ride
- Air fuel ratio safety over-ride
- Closed loop bottle heater control (using relay output and nitrous pressure input)
- Time based nitrous control
- RPM based nitrous enable
- MPH based nitrous enable
- Gear position based nitrous enable
- Independent Stage 1 and Stage 2 delay adjustments
- User configurable between Hold & Wait or full reset when activation is removed and re-enabled. Hold & Wait resumes the progressive system at the point where the system was disabled (for example, where the throttle was released).
- Independent Stage 1 and Stage 2 nitrous and fuel resume ramp rates
- Independent Stage 1 and Stage 2 fuel advance settings > These settings allow you to fine tune the system so that the low pressure fuel is delivered to the engine at the same time or before the high pressure nitrous, helping reduce the chances of initial lean spikes when each stage of nitrous is activated
- Multiple solenoid frequency settings (independent for Stage 1 & 2)
- PC programmable USB interface software - Windows XP, Vista, and 7 compatible.
- No PC required - can be programmed at the unit
- Built in display to view inputs, outputs and settings
- Data logging built in (PC required to read and view data). All channels logged at 100 samples second. 25 second logging time.
- Nitrous user settings stored in each data log for ease of recalling past nitrous settings.
- Free software updates (PC and Internet access required)

## 1.2 NCC-002 Warnings

- **DO NOT** submerge the NCC-002 controller in liquid or directly wash the controller with a liquid of any type.
- It is the responsibility of the purchaser to follow all guidelines and safety procedures provided within this manual, as well as any other manufacturer's product that will be used in the installation or operation of the NCC-002 Nitrous Control Center.
- It is the responsibility of the purchaser to follow all guidelines and safety procedures supplied with this product and any other manufacturer's product used with this product. It is also the responsibility of the purchaser to determine compatibility of this device with the vehicle and other components.
- 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. Lingenfelter Performance Engineering neither recommends nor approves the use of products manufactured or sold by Lingenfelter Performance Engineering on vehicles which may be driven on public highways or roads, and assumes no responsibility for damages incurred from such use.
- The NCC-002 Nitrous Control Center are intended for use in the controlled environment of a racing facility. **NEVER** use a nitrous oxide injection system on public roadways as it may be illegal, but also extremely dangerous.
- It is the purchaser's responsibility to check the state and local laws pertaining to the use of nitrous oxide for racing applications. Lingenfelter Performance Engineering denounces the use of its products in illegal street racing activities.
- LPE recommends that nitrous safety solenoids be used anytime the primary nitrous solenoids are pulse-width modulated. The use of nitrous safety solenoids allow the flow of nitrous to be terminated in the event that either of the primary nitrous solenoids get stuck open.
- Before switching the NCC-002 Nitrous Control Center ON for the first time, check the wiring to verify that all wires are correctly routed and securely attached to the controller. Incorrect wiring of the NCC-002 could potentially lead to damage of the controller, as well as the vehicle itself.
- LPE strongly recommends that you position your nitrous bottle pressure sensor on the tank side of the nitrous bottle valve. If the nitrous pressure sensor is located on the tank side of your nitrous bottle valve, the valve can be closed between runs as the sensor can still sense the bottle pressure while it is being heated. If your nitrous pressure sensor is located on the outgoing side of your valve, the valve must stay open anytime the bottle is being heated so that the nitrous pressure sensor can regulate the pressure. Heating the bottle with the pressure sensor on the outgoing side of the valve and the valve shut could potentially cause an extremely dangerous over-pressure condition. If you choose to position your nitrous bottle pressure sensor on the outgoing side of the nitrous bottle valve, you will be doing so at your own risk. Per NHRA rules, the bottle's over-pressure safety disk should be connected to a blow down tube that allows nitrous to be vented out of the vehicle in the event that the safety disk ruptures. Before using the nitrous bottle(s), make sure that they are properly secured to the vehicle. If using a bottle heater, make sure that the bottle heater is properly secured to the bottle and that it lays completely flat around the bottle.
- All electrical joints, as well as any other places where exposed wires are present, should be sufficiently insulated using heat shrink tubing and possibly electrical tape. Failure to do so could lead to damage to the wires, as well as the electrical components that they are connected to.
- The NCC-002 Nitrous Control Center is designed to be mounted somewhere in the passenger compartment of the vehicle. Do not mount the NCC-002 where it could be exposed to extreme heat, such as the engine compartment.



- 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, as well as any vehicle that has electronic control modules on board (including the NCC-002). Failure to do so may result in erratic operation of not just the NCC-002, but all electrical control modules in the vehicle.
- Nitrous solenoids are capable of drawing massive amounts of current, which can allow the NCC-002 to see too much current and to possibly overheat. The NCC-002 controller is rated to withstand a maximum, non-sustained current draw of 30 amps per solenoid channel or a maximum, non-sustained current draw of 60 amps for all four solenoid channels combined. The NCC-002 is not designed for continuous current draw at any amperage. For higher current applications, LPE recommends using relays so that the controller does not see too much current.

### **1.3 Limited Warranty**

LPE warrants the Lingenfelter NCC-002 Nitrous Control Center to be free from defects in material and workmanship under normal use and if properly installed for a period of 180 days from date of purchase. If the controller 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.

## 1.4 NCC-002 Notes

- For the sake of simplicity, options and settings that are accessed through either the Nitrous1 (N2O-1) or Nitrous2 (N2O-2) menus will be accompanied by an illustration of the setting for Nitrous1 only. Note that the Nitrous1 and Nitrous2 menus have the exact same options and settings—they just control different nitrous stages.
- Many of the wiring descriptions and diagrams for the NCC-002 in this manual assume you have the optional NCC-002 wiring harness (PN: L480310000). This harness features wires that are pre-labeled with the NCC-002 terminal labels, as well as ring terminals with heat shrink insulation on one end.
- The wiring descriptions and diagrams in this manual that involve connecting the NCC-002 to a fuel or nitrous pressure sensor assume that you have the optional fuel pressure harness (PN: L480290000) and nitrous pressure harness (PN:L480300000). These harnesses feature wires that are pre-labeled with the applicable NCC-002 terminal labels, as well as ring terminals with heat shrink insulation on one end.
- The NCC-002 is not designed for use on aircraft.
- Because the Nitrous Control Center computer software and the NCC-002 firmware are not organized in the same way, settings and options are not necessarily found in the same places on both platforms. The options and settings described in this instruction manual are organized in the same manner as the NCC-002 controller.

# Parts List

**Part**



## 2 Parts List

Quantity	Description	Item ID/PN
1	NCC-002 Nitrous Control Center	NCC-002
1	USB drive loaded with NCC-002 software	
1	6ft USB 2.0 A Male to Mini-B 5pin Male 28/24AWG Cable w/ Ferrite Core (Gold Plated)	MONO-8634
4	Self-tapping screws, #6	99663A156
26	Slotted ring terminal, 16-22 AWG	DK321288
1	LPE 9" decal	L920010000
2	LPE bumper stick & sponsor decal, 10-3/4 x 3-1/4"	L920180000
1	Binder	
1	Instructions	

### 2.1 Additional Required Components

Description	Item ID/PN
Nitrous solenoids	
Fuel solenoids (unless supplying fuel by other means)	
Nitrous tank	
Nitrous bottle heater	
Nitrous filter	

### 2.2 Tools & Materials Required

- Wire stripper
- Wire crimper
- Heat shrink tubing
- Heat source for heat shrink tubing (heat gun, lighter, etc...)
- Phillips head screwdriver
- Wires of various color, length, and gauge
- Electrical connector pin removal tool

## 2.3 Optional Items

Description	Item ID/PN
0-15 psi pressure sensor (for fuel pressure)	L480250015
0-150 psi pressure sensor (for fuel pressure)	L480260150
0-2000 psi pressure sensor (for nitrous pressure)	L480272000
Fuel pressure sensor harness, 10 ft	L480290000
Nitrous pressure sensor harness, 10 ft	L480300000
NCC-002 harness, 10 ft	L480310000
LNC-2000 Launch Control Module with timing retard feature	L460145297
Red LED 7 warning light, 10 ft two wire cable	RP-WLRBLK001
Red LED lighted paddle toggle switch, 20 amp	DC-7600500
Sealed 40 amp relay kit	L450100000
Holley EFI nitrous solenoid driver	554-111
Wide open throttle (WOT) switch	N/A
E38 terminal	0334680003



0-150 PSI fuel pressure sensor (PN: L480260150)



0-2000 PSI nitrous pressure sensor (PN: L480272000)



Fuel sensor harness (PN: L480290000)



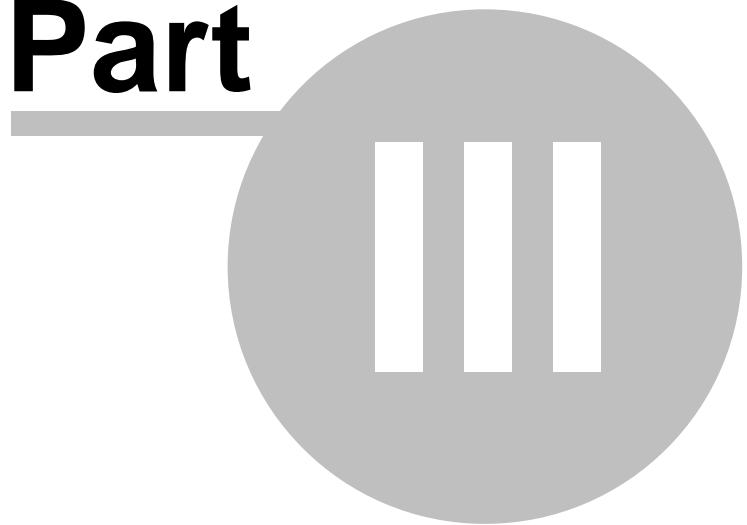
**Nitrous sensor harness (PN: L480300000)**



**NCC-001 harness (PN: L480310000)**

# Installation of the NCC-002 Nitrous Control Center

**Part**



## 3 Installation of the NCC-002 Nitrous Control Center

The following subsections detail the installation of both the NCC-002 controller in the vehicle, as well as the Nitrous Control Center and NCC Controller Flash Utility software programs onto a personal computer. In the following subsections that cover the installation of the controller itself, several wiring configurations have been provided to give you ideas of how the controller can be installed. Please note that a combination of these configurations may be necessary to achieve your desired operation. In the subsections that cover the installation of the Nitrous Control Center and NCC Controller Flash Utility software, the installation steps described should be explicitly followed in order to properly install the software. If the software is being installed on a Windows Vista or Windows 7 equipped computer, some of the screens and dialog boxes may differ slightly from the screen shots provided in this manual as the example installation was done on a Windows XP equipped computer.

### 3.1 Installation of the NCC-002 Hardware

The following sub-sections detail the installation of the NCC-002 Nitrous Controller in a vehicle. Each sub-section will have a description of the configuration and a wiring diagram. Please note that the following configurations represent just a small number of possible wiring configurations for the NCC-002 Controller. The optional NCC-002 wire harness (PN: L480310000) is composed of 22 color-coded wires (10 feet in length) that are all individually labeled on their insulation. Make sure that each of the wires required for the desired configuration are correctly installed into their respective terminals. If you choose not to use the optional NCC-002 wire harness, use the supplied terminals to make your own harness. The terminals on the NCC-002 will accept 16-22 AWG wire. It is recommended that the controller ground wires, the controller +12 volt power wires, and the solenoid ground wires should all be 16 gauge wire. All other wires can be 20 gauge wire. Refer to [Appendix C: Tables and Diagrams](#) for a chart showing the recommended gauge for a length of wire based on current draw and voltage drop. After crimping a terminal to one end of the wire, use heat shrink tubing to seal and insulate the end going to the NCC-002 to reduce the chance of a short circuit.

The configurations that will be shown in the following sub-sections are:

- [Progressive Nitrous Without Fuel Control](#)
- [One Stage of Progressive Nitrous and Fuel](#)
- [Two Stages of Progressive Nitrous and Fuel](#)
- [NCC-002 Controlling the Solenoids Via Nitrous Solenoid Driver](#)
- [NCC-002 Controlling Nitrous Solenoids Via Relays](#)
- [NCC-002 Controlling a Bottle Heater](#)
- [NCC-002 Connected to the LPE LNC-2000 Launch Controller](#)
- [NCC-002 Connected to the LNC-2000 for Simple On/Off Control](#)
- [NCC-002 Connected to the Pin on the ECM for EFiLive Nitrous Operating System and Fuel Control](#)
- [Connecting the NCC-002 to Throttle Position Sensors on Mechanical and Electronic Throttle Vehicles](#)
- [NCC-002 Connected to the Clutch Position Sensor](#)
- [NCC-002 Connected to the Clutch Position Switch](#)
- [Converting a CPP Sensor Signal Into a 12 Volt Signal Via Conversion Module](#)

**NOTE:** The wire colors in the wiring diagrams below will most likely differ from the wiring in your vehicle. Identify the wires of all applicable components in your vehicle and confirm their individual functions before beginning to wire the NCC-002 controller.

**WARNING:** LPE recommends that Nitrous safety solenoids be used anytime the primary solenoids are pulse-width modulated. The use of nitrous safety solenoids allow the flow of nitrous to be terminated in the event that either of the primary nitrous solenoids get stuck open.

**NOTE:** The wiring of the NCC-002 Nitrous Controller may require additional lengths of wire depending on where the NCC-002 will be mounted on the vehicle.

**NOTE:** The wire harness colors described in this installation manual assume that you are installing the optional NCC-002 wiring harness.

Refer to [Appendix C: Tables and Diagrams](#) for assistance in determining the proper RPM pulse count, engine speed wiring locations, vehicle speed wiring locations, etc.



### 3.1.1 Progressive Nitrous Without Fuel Control

Use this configuration to control the nitrous solenoids, but not the fuel solenoids. This configuration is known as "Dry Nitrous" due to the controller not providing fuel control. Users installing the controller in this configuration will still need to supply the fuel, just through means other than the controller itself. Two examples of ways to achieve the proper fueling with this configuration are:

- Use the Relay Output to trigger the nitrous/E85 mode in the ECM via the EFILive Ethanol Custom Operating System, as shown in [Section 3.1.7](#).
- Connect the [Analog Output](#) to an auxiliary injector controller or aftermarket ECM input.

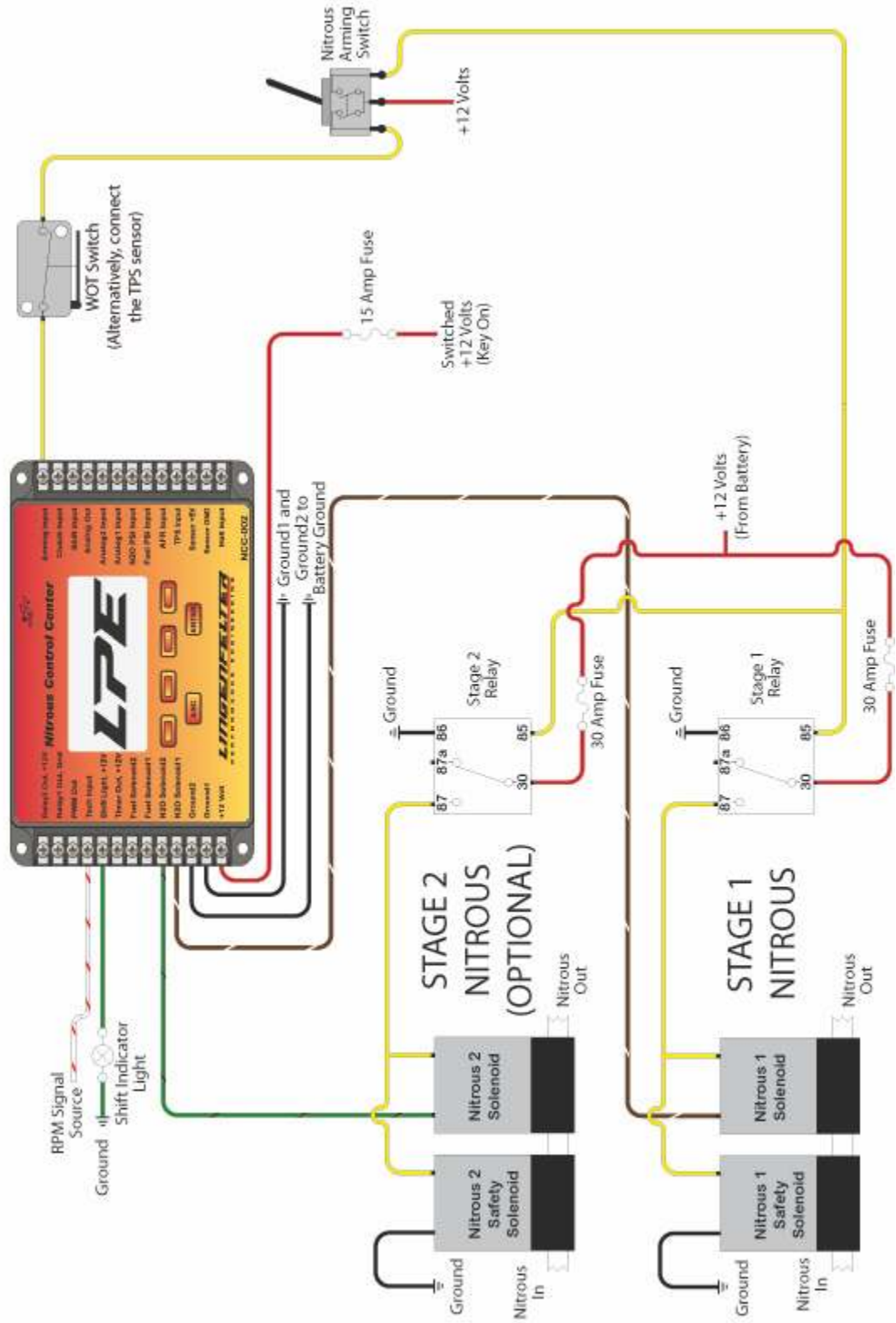
**NOTE:** Because the fuel solenoids are not controlled using this configuration, a third and fourth stage of nitrous could be achieved by connecting the third and fourth nitrous solenoids to the "Fuel Solenoid 1" and "Fuel Solenoid 2" outputs on the NCC-002 nitrous controller. The third and fourth nitrous solenoids would then be configured by changing the ["Fuel1" and "Fuel2" graphs](#).

**WARNING:** Nitrous solenoids are capable of drawing massive amounts of current, which can allow the NCC-002 to see too much current and to possibly overheat. The NCC-002 controller is rated to withstand a maximum, non-sustained current draw of 30 amps per solenoid channel or a maximum, non-sustained current draw of 60 amps for all four solenoid channels combined. The NCC-002 is not designed for continuous current draw at any amperage. For higher current applications, LPE recommends using relays so that the controller does not see too much current.

**WARNING:** DO NOT leave the nitrous arming switch ON as it can overheat the safety solenoids.

- Connect the solid red wire labeled "12 VOLT PWR" to the "+12 Volt" terminal on the NCC-002 and to a fused (15 amp) and switched 12 volt DC source.
- Connect the solid black wires labeled "GROUND1" and "GROUND2" to the "Ground1" and "Ground2" terminals on the NCC-002 and to the battery ground stud. Be sure to connect BOTH ground wires. Since the NCC-002 controls the ground side of the solenoids, much more current will travel through the ground side of the NCC-002 than the +12 Volt side.
- Connect the yellow wire labeled "ARMING INPUT" to the "Arming Input" terminal on the NCC-002, through a WOT switch (alternatively, the TPS can be connected to the TPS Input), and to one of the wiring terminals on the Nitrous Arming Switch. The Nitrous Arming Switch output should then be connected to the input of the nitrous solenoid(s). If the combined current load of the nitrous and/or fuel solenoids exceeds the capacity of the NCC-002, LPE recommends controlling the solenoids via relays. Depending on the current rating and quantity of the solenoids you are using, it may be necessary to use separate relays for each of the nitrous stages. If using relays to control the solenoids, see example wiring instructions in [section 3.1.3](#).
- Connect the striped dark brown wire labeled "N2O SLND 1" to the "N2O Solenoid1" terminal on the NCC-002 and to the ground side of Nitrous Solenoid 1.
- If a second stage of nitrous is desired, connect the striped green wire labeled "N2O SLND 2" to the "N2O Solenoid2" terminal on the NCC-002 and to the ground side of Nitrous Solenoid 2.
- If the user desires to activate the nitrous using engine speed, to data log the RPM, or to control a shift light, connect the striped white wire labeled "TACH INPUT" to the "Tach Input" terminal on the NCC-002 and to a suitable RPM Signal Source. The RPM signal source could be the tachometer output lead of the vehicle, the switched side of the ignition coil (negative side), or the 5 volt RPM reference signal. See [Appendix C: Tables and Diagrams](#) for the location of the tachometer output wiring on some common GM vehicles.
- If the addition of a shift indicator light is desired, connect the solid green wire labeled "SHIFT LIGHT" to the "Shift Light, +12V" terminal on the NCC-002 and to the shift indicator light.

## NCC-002 Wired for 1 or 2 Stages of Progressive Nitrous Without Fuel Control (Dry Nitrous)



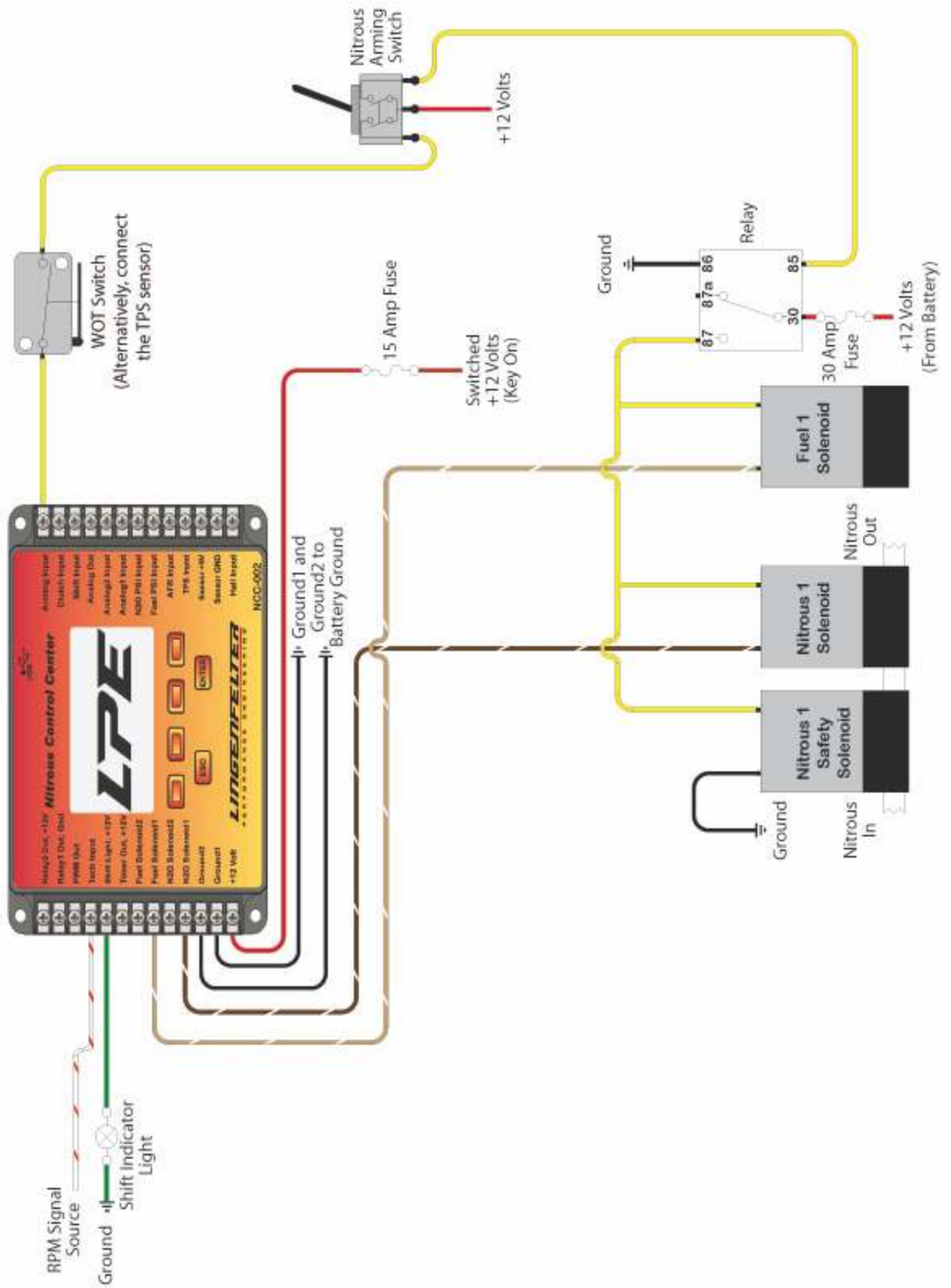
### 3.1.2 One Stage of Progressive Nitrous and Fuel

Use this configuration to control the one stage of progressive nitrous and fuel.

- Connect the solid red wire labeled "12 VOLT PWR" to the "+12 Volt" terminal on the NCC-002 and to a fused and switched 12 volt DC source.
- Connect the solid black wires labeled "GROUND1" and "GROUND2" to the "Ground1" and "Ground2" terminals on the NCC-002 and to the battery ground stud.
- Connect the yellow wire labeled "ARMING INPUT" to the "Arming Input" terminal on the NCC-002, through a WOT switch (alternatively, the TPS can be connected to the TPS Input), and to one of the wiring terminals on the Nitrous Arming Switch. The Nitrous Arming Switch output should then be connected to the input of the nitrous solenoid(s). If the combined current load of the nitrous and/or fuel solenoids exceeds the capacity of the NCC-002, LPE recommends controlling the solenoids via relays. Depending on the current rating and quantity of the solenoids you are using, it may be necessary to use separate relays for each of the nitrous stages. If using relays to control the solenoids, see example wiring instructions in [section 3.1.3](#).
- Connect the striped dark brown wire labeled "N2O SLND 1" to the "N2O Solenoid1" terminal on the NCC-002 and to Nitrous Solenoid 1.
- Connect the striped tan wire labeled "FUEL SLND 1" to the "Fuel Solenoid1" terminal on the NCC-002 and to Fuel Solenoid 1.
- If the user desires to activate the nitrous using engine speed, to data log the RPM, or to control a shift light, connect the striped white wire labeled "TACH INPUT" to the "Tach Input" terminal on the NCC-002 and to a suitable RPM Signal Source. The RPM signal source could be the tachometer output lead of the vehicle, the switched side of the ignition coil (negative side), or the 5 volt RPM reference signal. See [Appendix C: Tables and Diagrams](#) for the location of the tachometer output wiring on some common GM vehicles.
- If the addition of a shift indicator light is desired, connect the solid green wire labeled "SHIFT LIGHT" to the "Shift Light, +12V" terminal on the NCC-002 and to the shift indicator light.

**WARNING: The fuses that are positioned in series between the 12 volt power source and the relays are labeled as 30 amps each. It is important to note that the amperage rating for these fuses are just suggestions and that the amount of current that your solenoids can pull will determine the correct fuses for your system.**

## NCC-002 Wired for One Stage of Progressive Nitrous and Fuel Control

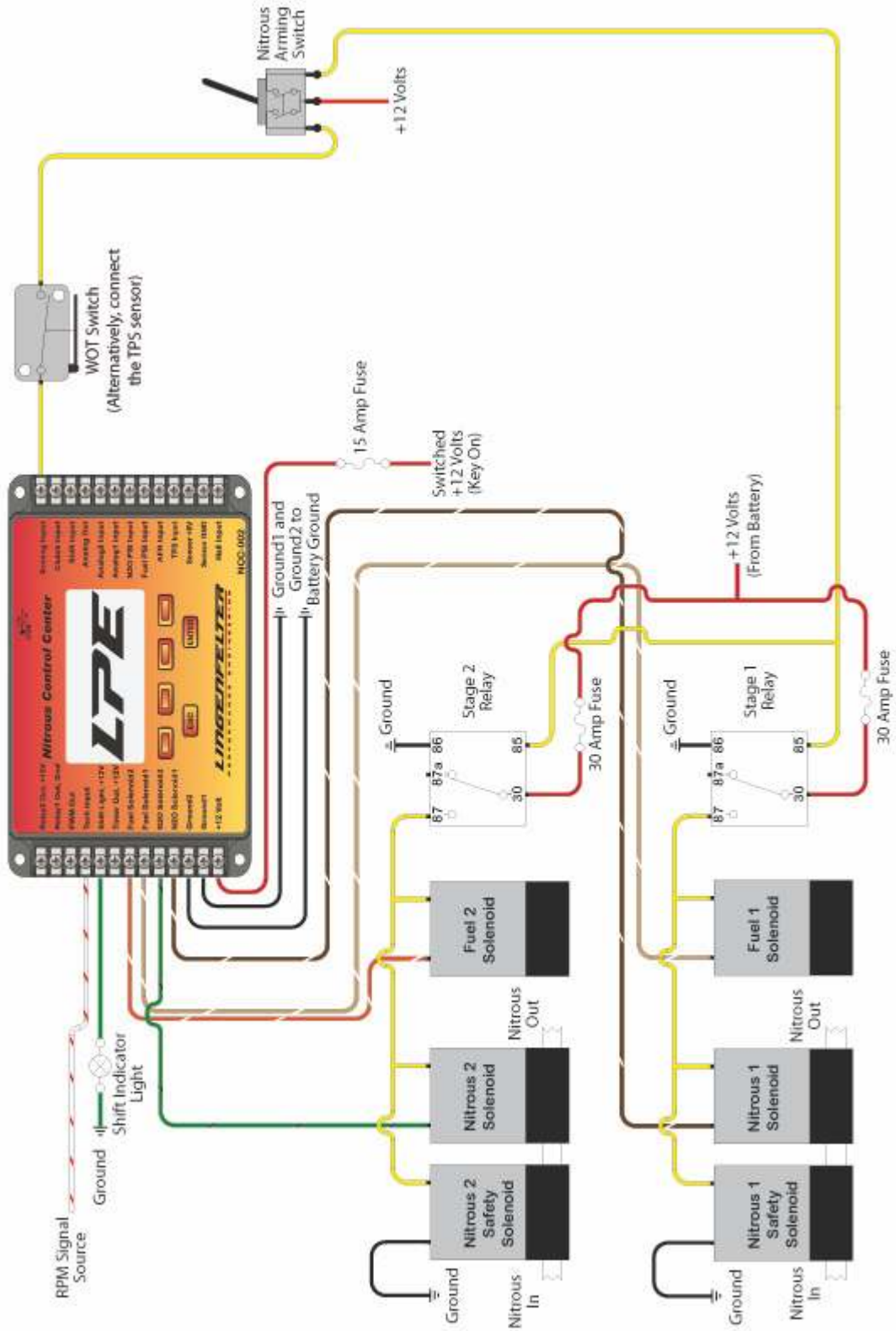


### 3.1.3 Two Stages of Progressive Nitrous and Fuel

Use this configuration to control two stages of progressive nitrous and fuel.

- Connect the solid red wire labeled "12 VOLT PWR" to the "+12 Volt" terminal on the NCC-002 and to a fused and switched 12 volt DC source.
- Connect the solid black wires labeled "GROUND1" and "GROUND2" to the "Ground1" and "Ground2" terminals on the NCC-002 and to the battery ground stud.
- Connect the yellow wire labeled "ARMING INPUT" to the "Arming Input" terminal on the NCC-002, through a WOT switch (alternatively, the TPS can be connected to the TPS Input), and to one of the wiring terminals on the Nitrous Arming Switch. The Nitrous Arming Switch output should then be connected to the input of the nitrous solenoid(s). If the combined current load of the nitrous and/or fuel solenoids exceeds the capacity of the NCC-002, LPE recommends controlling the solenoids via relays. Depending on the current rating and quantity of the solenoids you are using, it may be necessary to use separate relays for each of the nitrous stages. If using relays to control the solenoids, see example wiring instructions in [section 3.1.3](#).
- Connect the striped dark brown wire labeled "N2O SLND 1" to the "N2O Solenoid1" terminal on the NCC-002 and to Nitrous Solenoid 1.
- Connect the striped green wire labeled "N2O SLND 2" to the "N2O Solenoid2" terminal on the NCC-002 and to Nitrous Solenoid 2.
- Connect the striped tan wire labeled "FUEL SLND 1" to the "Fuel Solenoid1" terminal on the NCC-002 and to Fuel Solenoid 1.
- Connect the striped orange wire labeled "FUEL SLND 2" to the "Fuel Solenoid2" terminal on the NCC-002 and to Fuel Solenoid 2.
- If the user desires to activate the nitrous using engine speed, to data log the RPM, or to control a shift light, connect the striped white wire labeled "TACH INPUT" to the "Tach Input" terminal on the NCC-002 and to a suitable RPM Signal Source. The RPM signal source could be the tachometer output lead of the vehicle, the switched side of the ignition coil (negative side), or the 5 volt RPM reference signal. See [Appendix C: Tables and Diagrams](#) for the location of the tachometer output wiring on some common GM vehicles.
- If the addition of a shift indicator light is desired, connect the solid green wire labeled "SHIFT LIGHT" to the "Shift Light, +12V" terminal on the NCC-002 and to the shift indicator light.

## NCC-002 Wired for Two Stages of Progressive Nitrous and Fuel Control



### 3.1.4 NCC-002 Controlling the Solenoids Via Nitrous Solenoid Driver

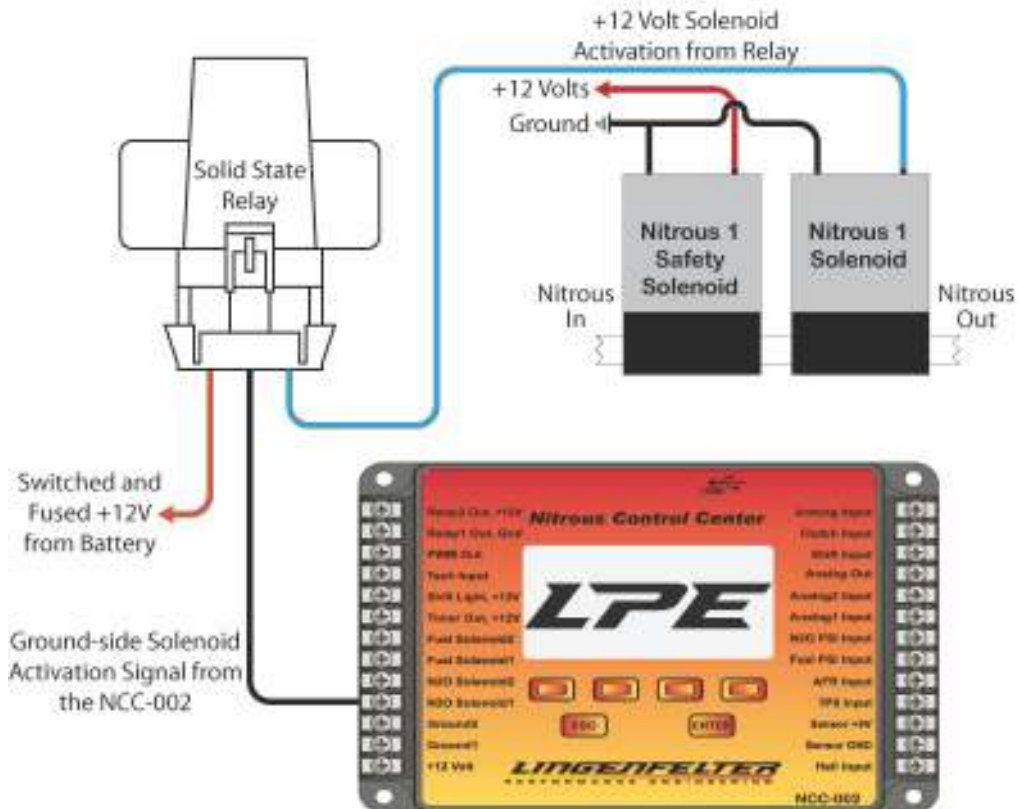
Use this wiring configuration to activate the solenoids through a Solid State Solenoid Driver. Solid State Solenoid Drivers provide faster response time and can generally handle higher current loads than standard 5-40 amp automotive relays. While this wiring diagram only shows a single stage of nitrous control, multiple stages of nitrous and fuel can be controlled via Solid State Solenoid Drivers by simply repeating this wiring procedure for each nitrous and fuel solenoid.

NOTE: While the NCC-002 controls the ground-side of the solenoids, the Solid State Solenoid Driver switches the signal and controls the +12 volt side of the solenoids.

NOTE: Because of the difference in response time between solid state relays and mechanical automotive relays, solid state relays and mechanical automotive relays should not both be used to control solenoids in the same circuit. The solenoids being activated through the mechanical automotive relays will react slower than the solenoids activated through the solid state relays.

- The Solid State Solenoid Driver should receive +12 volts from the battery through an in-line fuse.
- The activation signal from the NCC-002 that progressively controls the solenoids will be the input to the solenoid driver.
- The output from the Solid State Solenoid Driver should go to the +12 Volt side of the solenoid to be controlled.

The NCC-002 Providing the Progressive Activation Signal to a Nitrous Solenoid through a Solid State Solenoid Driver. (Single Stage)



### 3.1.5 NCC-002 Controlling Nitrous Solenoids Via Relays

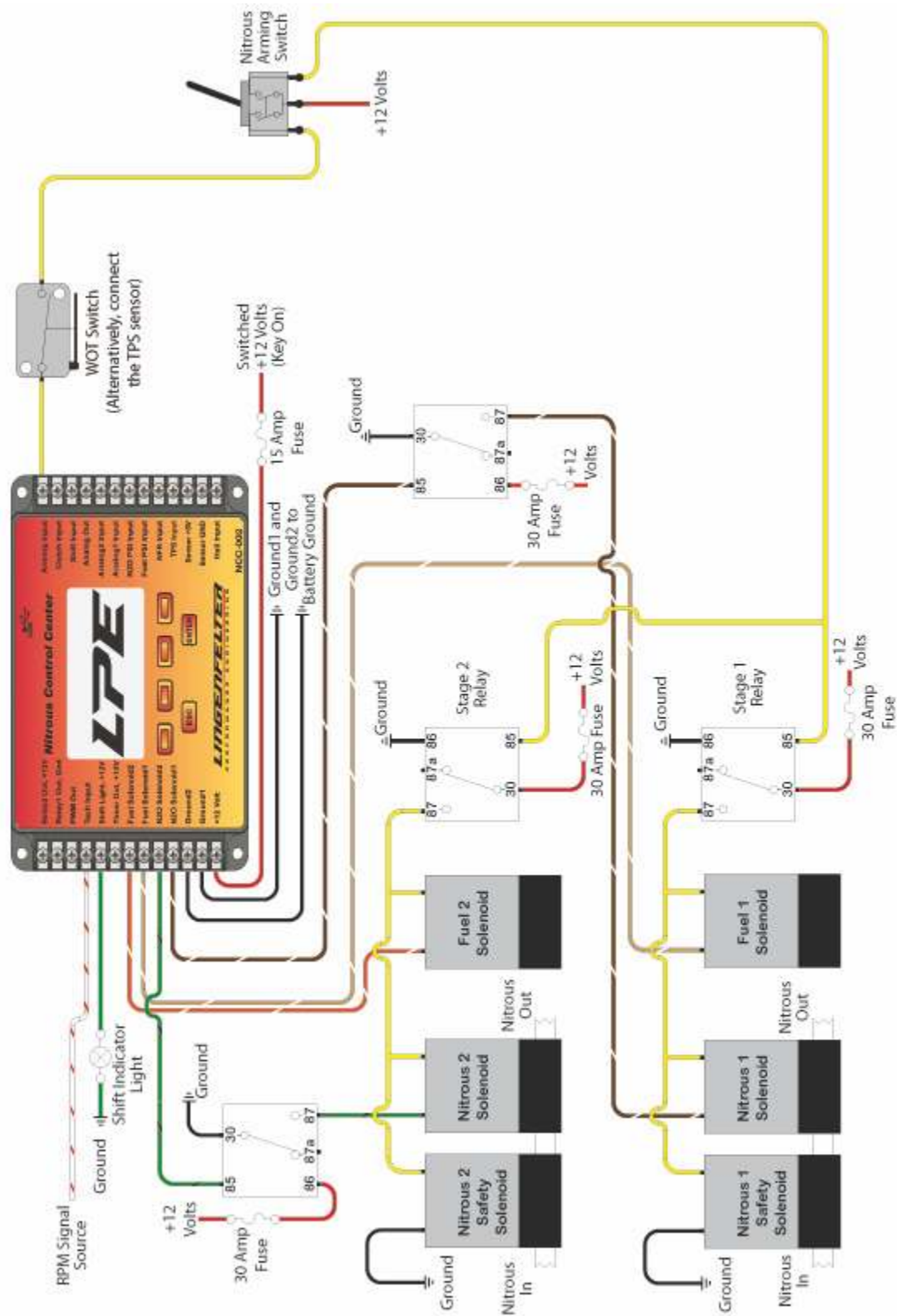
Use this configuration to control the nitrous solenoids using relays. If you are using nitrous solenoids that pull high current, it is best to use a relay between the solenoid and controller to protect the controller from the current of the nitrous solenoids.

**NOTE: For better PWM performance, LPE recommends installing automotive relays that do not contain resistors or diodes when using relays to control the solenoids.**

- Connect the solid red wire labeled "12 VOLT PWR" to the "+12 Volt" terminal on the NCC-002 and to a fused and switched 12 volt DC source.
- Connect the solid black wires labeled "GROUND1" and "GROUND2" to the "Ground1" and "Ground2" terminals on the NCC-002 and to the battery ground stud.
- Connect the yellow wire labeled "ARMING INPUT" to the "Arming Input" terminal on the NCC-002, through a WOT switch (alternatively, the TPS can be connected to the TPS Input), and to one of the wiring terminals on the Nitrous Arming Switch. The Nitrous Arming Switch output should then be connected to the input of the nitrous solenoid(s). If the combined current load of the nitrous and/or fuel solenoids exceeds the capacity of the NCC-002, LPE recommends controlling the solenoids via relays. Depending on the current rating and quantity of the solenoids you are using, it may be necessary to use separate relays for each of the nitrous stages. If using relays to control the solenoids, see example wiring instructions in [section 3.1.3](#).
- Connect the striped dark brown wire labeled "N2O SLND 1" from pin 87 of an automotive relay to Nitrous Solenoid 1. A wire should then be run from pin 85 of the relay to the terminal labeled "N2O Solenoid1" on the NCC-002. Next, a wire should connect pin 86 to a fused 12 volt source, such as the battery. Finally, use a wire to connect pin 30 on the relay to a reliable ground source.
- Connect the striped green wire labeled "N2O SLND 2" from pin 87 of an automotive relay to Nitrous Solenoid 2. A wire should then be run from pin 85 of the relay to the terminal labeled "N2O Solenoid2" on the NCC-002. Next, a wire should connect pin 86 to a fused 12 volt source, such as the battery. Finally, use a wire to connect pin 30 on the relay to a reliable ground source.
- Connect the striped tan wire labeled "FUEL SLND 1" to the "Fuel Solenoid1" terminal on the NCC-002 and to Fuel Solenoid 1.
- Connect the striped orange wire labeled "FUEL SLND 2" to the "Fuel Solenoid2" terminal on the NCC-002 and to Fuel Solenoid 2.
- If the user desires to activate the nitrous using engine speed, to data log the RPM, or to control a shift light, connect the striped white wire labeled "TACH INPUT" to the "Tach Input" terminal on the NCC-002 and to a suitable RPM Signal Source. The RPM signal source could be the tachometer output lead of the vehicle, the switched side of the ignition coil (negative side), or the 5 volt RPM reference signal. See [Appendix C: Tables and Diagrams](#) for the location of the tachometer output wiring on some common GM vehicles.
- If the addition of a shift indicator light is desired, connect the solid green wire labeled "SHIFT LIGHT" to the "Shift Light, +12V" terminal on the NCC-002 and to the shift indicator light.



## NCC-002 Controlling Nitrous Solenoids Via Relays



### 3.1.6 NCC-002 Controlling a Bottle Heater

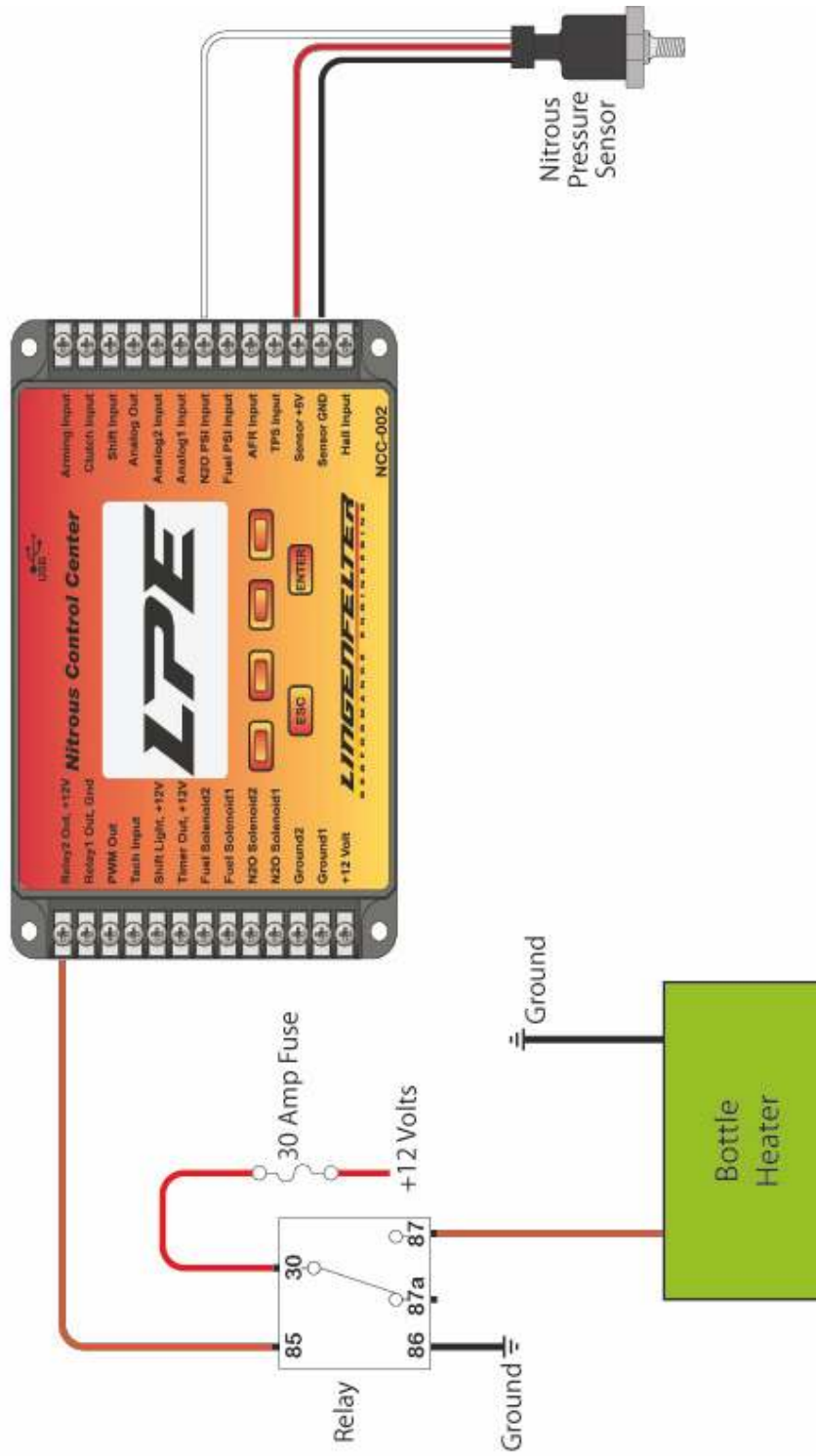
Use this diagram to provide programmable closed loop bottle heater control using the nitrous pressure sensor.

NOTE: Each terminal on the NCC-002 controller is capable of connecting to 2 separate wires at a time. If there are more than two wires going to a single terminal (as may be the case with the sensor ground terminal), splice the incoming wires together. Another option is to purchase a barrier strip adapter that increases the wire capacity of the single terminal.

**WARNING: If the nitrous pressure sensor is located on the tank side of your nitrous bottle valve, the valve can be closed between runs as the sensor can still sense the bottle pressure while it is being heated. If your nitrous pressure sensor is located on the outgoing side of your valve, the valve must stay open anytime the bottle is being heated so that the nitrous pressure sensor can regulate the pressure. Heating the bottle with the pressure sensor on the outgoing side of the valve and the valve shut could potentially cause an extremely dangerous over-pressure condition. Per NHRA rules, the bottle's over-pressure safety disk should be connected to a blow down tube that allows nitrous to be vented out of the vehicle in the event that the safety disk ruptures. Before using the nitrous bottle(s), make sure that they are properly secured to the vehicle. If using a bottle heater, make sure that the bottle heater is properly secured to the bottle and that it lays completely flat around the bottle.**

- Connect the solid red wire labeled "12 VOLT PWR" to the "+12 Volt" terminal on the NCC-002 and to a fused and switched 12 volt DC source.
- Connect the solid black wires labeled "GROUND1" and "GROUND2" to the "Ground1" and "Ground2" terminals on the NCC-002 and to the battery ground stud.
- Connect the solid orange wire labeled "RELAY2 12V" to the "Relay2 Out, +12V" terminal on the NCC-002 and to the bottle heater relay input.
- Connect the output of the relay to the input for the bottle heater. Make sure to follow the bottle heater manufacturer's instructions.
- Using the Nitrous Pressure Sensor Harness, connect the nitrous pressure sensor harness connector to the nitrous pressure sensor. Then, connect the solid white wire labeled "NITROUS" to the "N2O PSI Input" terminal on the NCC-002, the solid red +5 volt wire to the "Sensor +5V" terminal on the NCC-002, and the solid black ground wire to the "Sensor GND" terminal on the NCC-002.
- A temperature switch can also be added for additional protection.
- Program the [Relay2 Out](#) for nitrous pressure control.

# NCC-002 Wired for 2 Stages of Progressive Nitrous and Fuel with Closed Loop Bottle Heater Control



### 3.1.7 NCC-002 Connected to the LPE LNC-2000 Launch Controller

Use this wiring configuration to allow the NCC-002 to output a progressive signal to the LPE LNC-2000 Launch Control Module. This collaboration between the controllers creates progressive spark retard. The optional LNC-2000 then can send spark data back to the NCC-002 where the data is logged. See the [LNC-2000 instructions](#) for more information regarding the wiring and settings of the LNC-2000.

**NOTE:** The female connector that is used to connect the NCC-002 to the LNC-2000, as shown in the wiring diagram below, is not necessary in order to connect the NCC-002 to the LNC-2000. LPE is currently developing an adapter harness that will allow the analog out signal from the NCC-002 to reach the analog input on the LNC-2000 without the need to modify the wiring. Until that adapter harness is released, the LNC-2000 Analog Out wire (purple) should be taken out of the male harness connector and connected to the NCC-002 as described in the instructions below.

**NOTE:** Each terminal on the NCC-002 controller is capable of connecting to 2 separate wires at a time. If there are more than two wires going to a single terminal (as may be the case with the sensor ground terminal), splice the incoming wires together. Another option is to purchase a barrier strip adapter that allows the single terminal to be connected to another barrier strip for increased capacity.

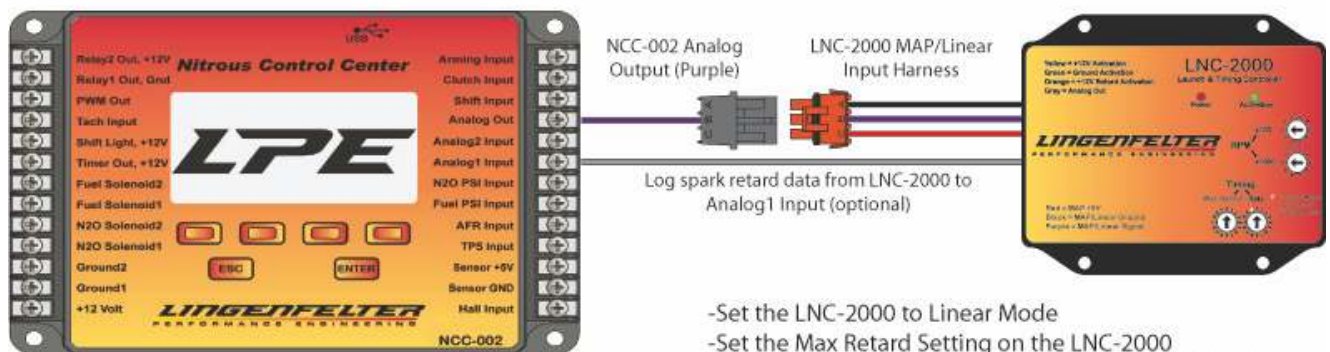
1) If connecting the LNC-2000 to the NCC-002 without an adapter:

- Extract the purple wire from the LNC-2000 male harness connector.
- Splice the solid purple wire (LNC-2000 Analog input) from the LNC-2000 with the solid purple wire labeled "ANALOG OUT" supplied in the NCC-002 wiring harness. Connect the spliced purple wire to the "Analog Out" terminal on the NCC-002 controller
- **Optional:** To log timing retard, connect the solid gray wire (Analog Out) from the LNC-2000 to the "Analog1 Input" terminal on the NCC-002

2) If installing the LPE female harness connector:

- Connect the solid purple wire (Analog Out) from the NCC-002 harness to the B (middle) terminal on the female harness connector.
- Connect the female harness connector to the orange LNC-2000 MAP sensor male connector.
- **Optional:** To log timing retard, connect the solid gray wire (Analog Out) from the LNC-2000 to the "Analog1 Input" terminal on the NCC-002

#### NCC-002 Connected to the Lingenfelter LNC-2000 Launch Control Module for Progressive Timing Retard



- Set the LNC-2000 to Linear Mode
- Set the Max Retard Setting on the LNC-2000
- While the timing retard ramp will be controlled by the NCC-002, the maximum timing retard will still be limited by the LNC-2000 max retard setting.

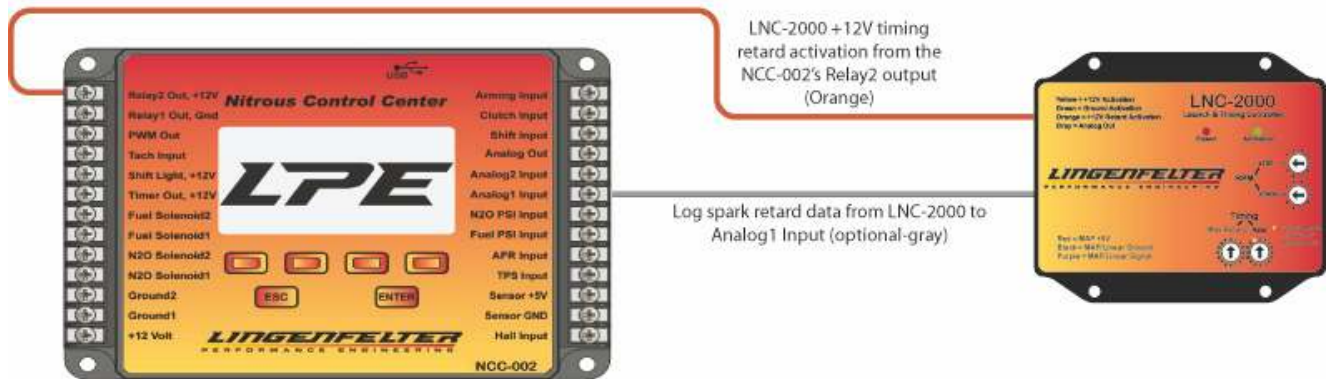
### 3.1.8 NCC-002 Connected to the LNC-2000 for Simple On/Off Control

Use this configuration to allow the NCC-002 to activate or deactivate the LNC-2000 Launch Control Module via +12V relay output. In this configuration, the NCC-002 would act as an activation switch for the LNC-2000, providing the +12V activation for the LNC-2000. The settings on the LNC-2000 would create the timing retard ramp. See the [LNC-2000 instructions](#) for more information regarding the wiring and settings of the LNC-2000.

To connect the NCC-002 to the LNC-2000 in this configuration:

- On one end of the orange wire labeled "RELAY2 12V", crimp a terminal and connect the wire to the Relay2 Out terminal on the NCC-002.
- Connect the other end of the orange wire labeled "RELAY2 12V" to the orange +12V Retard Activation wire from the LNC-2000.
- Select the enabling criteria for the [Relay2 Output](#) on the NCC-002.
- **Optional:** To log timing retard, connect the solid gray wire (Analog Out) from the LNC-2000 to the Analog1 Input terminal on the NCC-002.

#### NCC-002 Providing +12V Retard Activation for the Lingenfelter LNC-2000 Launch Control Module



### 3.1.9 NCC-002 Connected to the Pin on the ECM for EFILive Nitrous Operating System and Fuel Control

This configuration allows the NCC-002 to activate the E85/Nitrous feature of the EFILive custom operating system on E38 and E67 Electronic Control Modules (ECM). This allows the production ECM to control the additional fuel needed for nitrous and to modify the ignition timing based on nitrous activation.

The +12 volt output from Relay 2 is connected to the ECM and the Relay 2 output is activated when nitrous is activated, allowing you to target a different air-fuel ratio (AFR) and ignition timing when Relay 2 is commanded ON. This can be used to provide the fuel for the primary stage of nitrous or for a secondary stage of nitrous. When used as the fuel supply for the nitrous, this eliminates the need for a separate fuel supply system, fuel solenoid(s), and fuel nozzle(s). It also eliminates problems of fuel distribution that can occur with plate-style fuel supply systems in intake manifolds not normally designed to distribute fuel.

**NOTE: The wire colors and pin positions in the following wiring diagram are for GM vehicles equipped with E38/E67 ECM's ONLY. Identify the wires and pins positions of your vehicle's ECM and confirm their individual functions before beginning the modification below.**

- Locate and unlock the ECM connector 1 on both the E38 and E67 ECM's. Pull the lever away from the lock to remove ECM connector 1 from the ECM.
- Expose the wiring going into the connector by disengaging the two (2) tabs on either side of the connector.
- Locate pin 5 on E38 ECM connector 1 (black) or pin 2 on E67 ECM connector 1 (blue). The location of pin 5 for the E38 ECM is shown by the connector end view in the following wiring diagram.
- Using an electrical connector pin removal tool (or equivalent), push on the plug that seals the connector. It should not take much pressure for the plug to fall out.
- Using an electrical connector pin removal tool (or equivalent), remove the black terminal separator. This can be done by gently prying on either end of the black terminal separator, the part of the connector that is inserted into the ECM.
- If the plug is still in the pin position, remove it using an electrical connector pin removal tool (or equivalent).
- Using a crimping tool, crimp a terminal (PN: DK321288) to the end of the solid orange wire labeled "RELAY2 12V". This end of the wire will be inserted into the pin position on the connector.
- Insert the crimped terminal into the back of the connector. The connector **MUST** be oriented the right way so that the open part of the wire slides into a locking tang inside the connector.
- NOTE: You should here a "click" when the wire terminal engages the locking tang. If no audible click is heard, the locking tang is not fully engaged.
- Re-install the black terminal separator onto the connector by lining the separator up to the correct terminals on the connector and pressing down until fully engaged.
- Re-engage the tab on both sides of the connector to re-install the wire enclosure on the back of the connector.
- Plug the connector back into the ECM and push the lever towards the connector to engage the locking mechanism.
- Connect the other end of the solid orange wire labeled "RELAY2 12V" to the "Relay2 Out, +12V" terminal on the NCC-002.
- Program [Relay2 Out](#) based on Nitrous1 or Nitrous2 activation.

**NOTE: for additional instructions and pictures of the installation described above, go to [Installing the EFILive E38 / E67 ECM Ethanol Custom Operating System](#) for the installation instructions written by EFILive.**

## NCC-002 Relay Output Connected to Pin 5 on GM E38 ECM Connector 1 (for EFILive nitrous operating system and fuel control)



### 3.1.10 Connecting the NCC-002 to Throttle Position Sensors on Mechanical and Electrical Throttle Vehicles

The NCC-002 is able to be connected to the Original Equipment Manufacturer (OEM) Throttle Position Sensor (TPS) signal on both mechanical and electronic throttle vehicles. The NCC-002 can also be connected to the Accelerator Pedal Position (APP) signal on most electronic throttle vehicles. The NCC-002 can be connected to a rising or falling 5 volt signal. On most electronic throttles, both a rising and falling signal exists, and the [TPS Setup Menu](#) allows you to program the NCC-002 accordingly.

On electronic throttle applications, LPE generally recommends connecting to the rising voltage signal on the throttle. One reason for using the TPS signal instead of the APP signal is that the throttle can be at a different angle than what the APP is requesting. As an example, during a full throttle shift, the throttle may close despite the accelerator pedal being fully applied.

In some applications, you may want to install a separate TPS to be connected to the NCC-002.

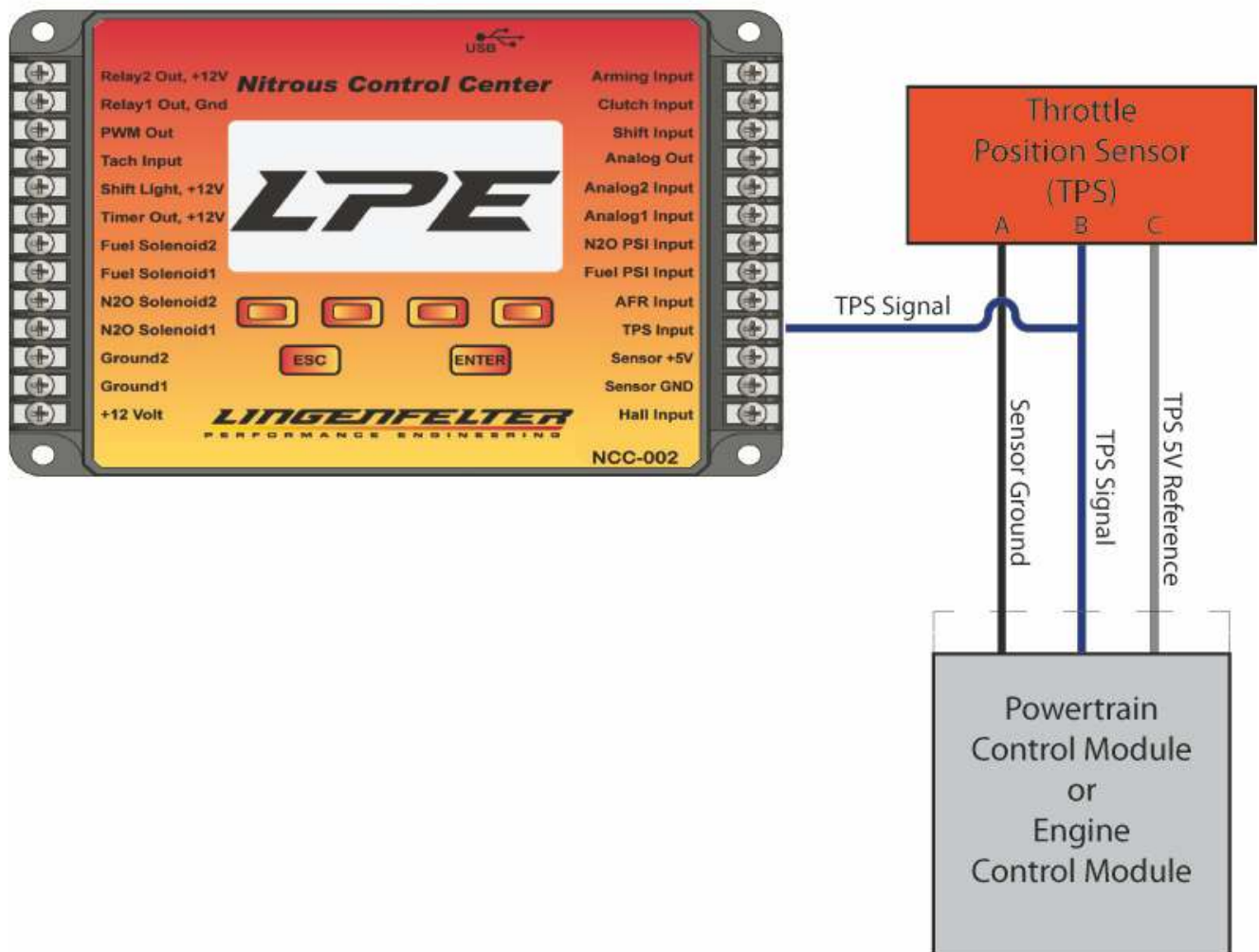
**WARNING: It is very important to maintain the proper sensor signals to the ECM in electronic throttle (also known as "Drive by wire") applications. The ECM closely monitors these signals for safety reasons. Improper wiring could result in a reduced engine power condition, diagnostic codes, or even loss of vehicle control.**

**NOTE: The wire colors and pin positions in the following wiring diagrams may differ from the wiring in your vehicle. Identify the wires of the throttle body sensor harness in your vehicle and confirm their individual functions before beginning one of the modifications below.**

### Obtaining the TPS signal on a vehicle equipped with a mechanical throttle body:

- Locate the Throttle Position Sensor (TPS).
- Disconnect the TPS harness from the TPS and remove the loom from the harness.
- Locate the TPS signal wire. This is the wire that communicates the throttle position to the PCM.
- Splice a wire onto the TPS signal wire.
- Use the labeled wire from the NCC-002 wiring harness or crimp a terminal to the other end of the wire that was spliced into the TPS signal wire in the last step.
- Insert the terminal end of the wire into the "TPS Input" terminal on the NCC-002.
- Re-install the loom back onto the harness
- Re-connect the TPS harness to the TPS.
- Program the [TPS Input](#) on the NCC-002 controller.

## NCC-002 Wired to Recieve TPS Input from a Mechanical Throttle Body

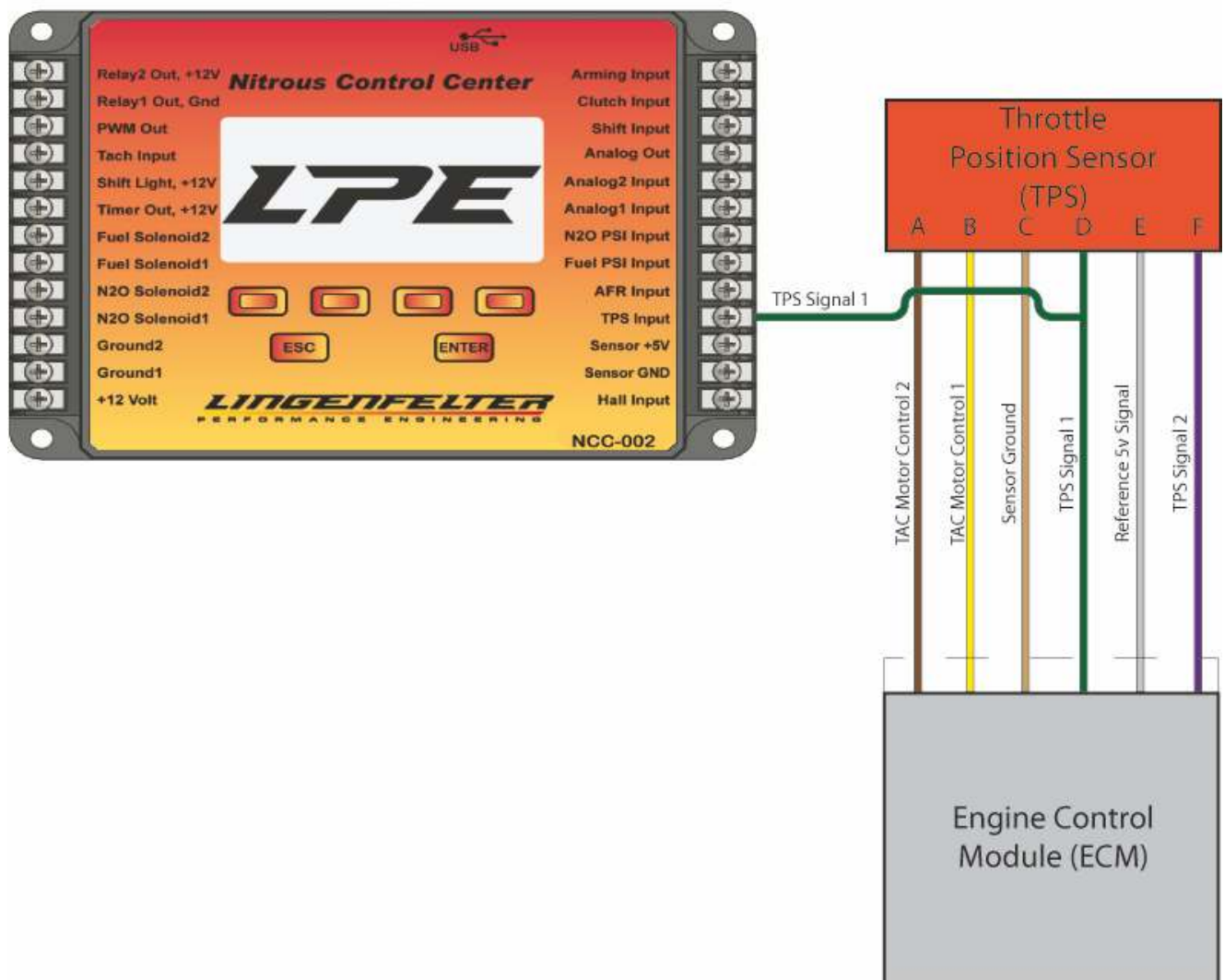




### Obtaining the TPS signal on a vehicle equipped with an electronic throttle body:

- Locate the Throttle Position Sensor (TPS) to the TPS/motor connector.
- Disconnect the TPS harness from the TPS or throttle and remove the loom from the harness.
- Locate the TPS signal wire 1. This is one of the two wires that relay the throttle position signal to the ECM.
- Splice a wire onto the TPS signal wire.
- Use the labeled wire from the NCC-002 wiring harness or crimp a terminal to the other end of the wire that was spliced into the TPS signal wire 1 in the last step.
- Insert the terminal end of the wire into the "TPS Input" terminal on the NCC-002.
- Re-install the loom back onto the harness
- Re-connect the TPS harness to the TPS.
- Program the [TPS Input](#) on the NCC-002 controller.

## NCC-002 Wired to Recieve TPS Input from an Electronic Throttle Body



### 3.1.11 NCC-002 Connected to the Clutch Position Sensor

Use this configuration to enable or disable the nitrous through the NCC-002 by the position of the clutch pedal. By connecting the clutch pedal position (CPP) sensor to the Analog1 input on the NCC-002, the controller will either enable or disable nitrous based on the position of the clutch pedal. Refer to [Analog1 Setup Menu](#) for more information on the clutch option.

With the arming switch enabled and the vehicle at the line, depressing the clutch pedal disables the nitrous, even though the throttle may be above the TPS enable percentage. When the clutch is released, the system is enabled and nitrous can flow. During each gear change, the nitrous will be disabled until the clutch is released again.

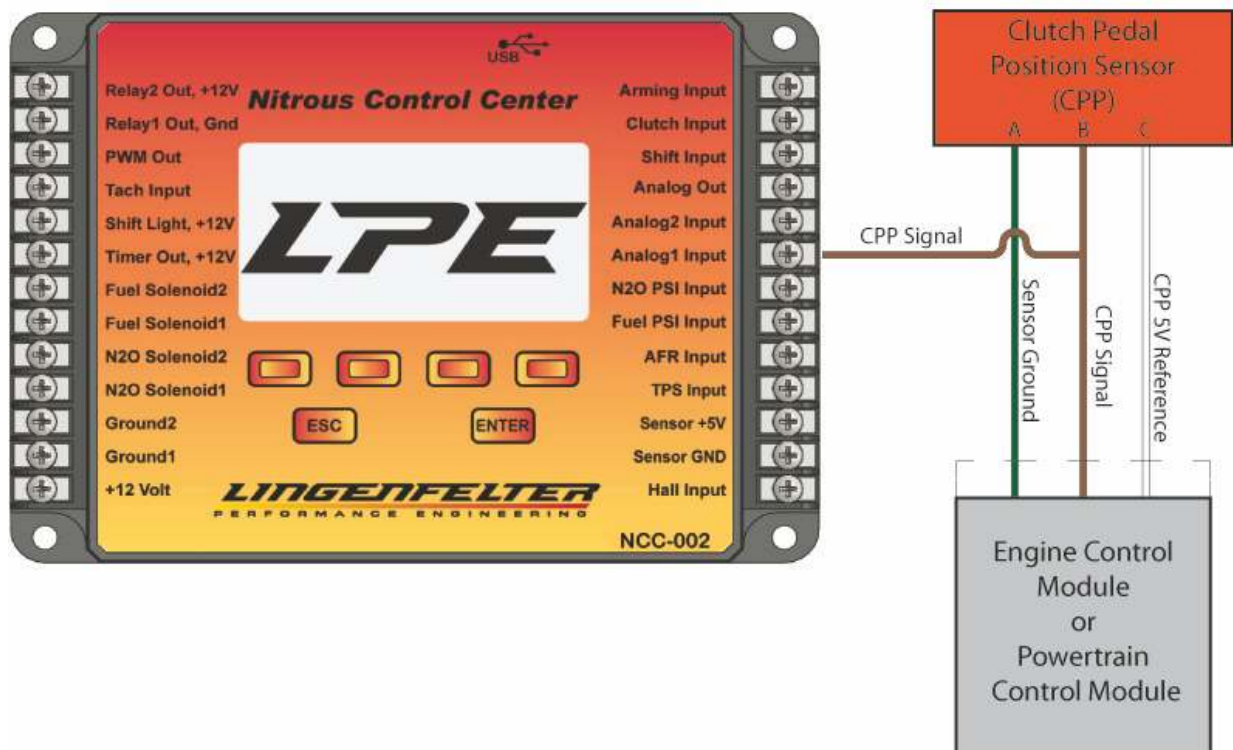
**NOTE: The wire colors and pin positions in the wiring diagrams below may differ from the wiring in your vehicle. Identify the wires of the clutch position sensor harness in your vehicle and confirm their individual functions before beginning one of the modifications below.**

**NOTE: The clutch position sensor and clutch position switch inputs can be used at the same time, allowing the Clutch Input to be used for Line-lock.**

Obtaining the CPP sensor signal on a vehicle equipped with a clutch pedal position sensor:

- Locate the Clutch Pedal Position Sensor (CPP). This sensor is generally mounted to the clutch pedal assembly.
- Remove the loom on ECM Connector.
- Locate the CPP signal wire. This is the wire that communicates the clutch position to the ECM.
- Splice a wire onto the CPP signal wire.
- Use the labeled wire from the NCC-002 wiring harness or crimp a terminal to the other end of the wire that was spliced into the CPP signal wire in the last step.
- Insert the crimped end of the wire into the "Analog1 Input" terminal on the NCC-002.
- Re-install the loom back onto the ECM connector harness.
- Program [Analog1](#) for clutch input.

#### NCC-002 Wired to Recieve Analog Clutch Input from a Clutch Pedal Position Sensor



### 3.1.12 NCC-002 Connected to the Clutch Position Switch

Use this configuration to connect the NCC-002 to a Clutch Pedal Position Switch, line-lock, or trans-brake. The Clutch pedal position switch will be connected to the "Clutch Input" terminal on the NCC-002.

The Clutch Input to the NCC-002 needs to be an open circuit when the clutch is released and either a ground or +12 volt signal when the clutch is engaged (clutch pedal depressed). The +12 volt or ground activation input must be configured through the [input polarity options menu](#) on the NCC-002 controller.

With the arming switch enabled and the vehicle at the line, depressing the clutch pedal disables the nitrous, even though the throttle may be above the TPS enable percentage. When the clutch is released, the system is enabled and nitrous can flow. During each gear change, the nitrous will be disabled until the clutch is released again.

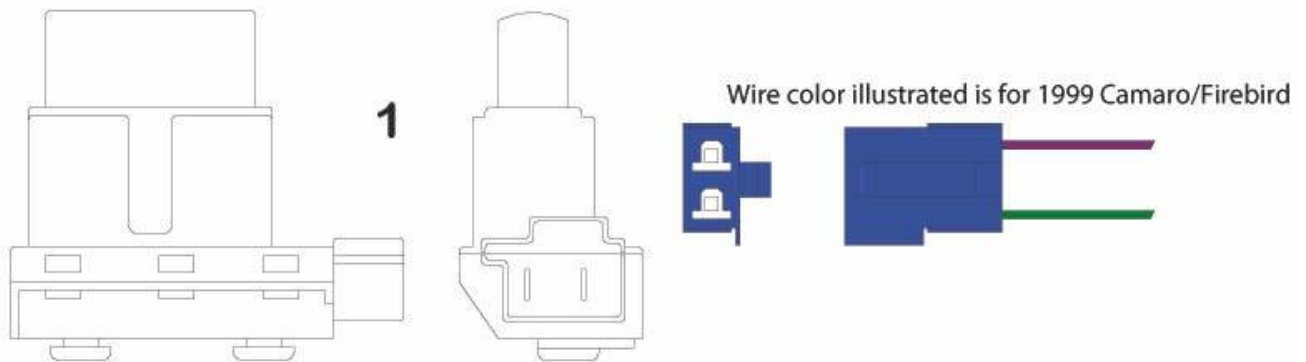
On the 1998-2002 Camaro and Firebird (F-Body) and 1997-2008 Corvette clutch switch, a relay must be added to the circuit to convert the cranking switch position voltage to ignition switched voltage. The use of a relay, as shown in the wiring diagram below, is necessary due to the fact that the clutch pedal position switch is only powered during vehicle start-up. When connecting to the clutch switch, be sure to use the clutch switch at the bottom of the travel. This is the one tied to the static system. Do not use the one at the top of the travel, which is the cruise control disable switch. This switch tends to send erratic signals.

**NOTE: The wire colors and pin positions in the following wiring diagram may differ from the wiring in your vehicle. Identify the wires of the clutch pedal position switch in your vehicle and confirm their individual functions before beginning the modification below.**

- Locate the clutch pedal position switch and unplug the two-wire connector.
- Cut the wires approximately three inches back from the connector
- Locate a +12 volt key-on power source and connect the source to the clutch pedal position switch power wire.
- Use the labeled wire from the NCC-002 wiring harness or crimp a terminal to the one end of the wire for the following step.
- Splice two wires onto the remaining connector wire. One of these wires will go to the "Clutch Input" terminal on the NCC-002 controller while the other wire will be going to pin 85 of a standard automotive relay.
- Program the [Clutch Input Polarity](#) on the NCC-002 controller.

## 1998-2002 F-Body and 1997-2008 Corvette Factory Clutch Switch Diagram

1 - Locate CPP (Clutch Position Switch) and unplug 2-wire connector.

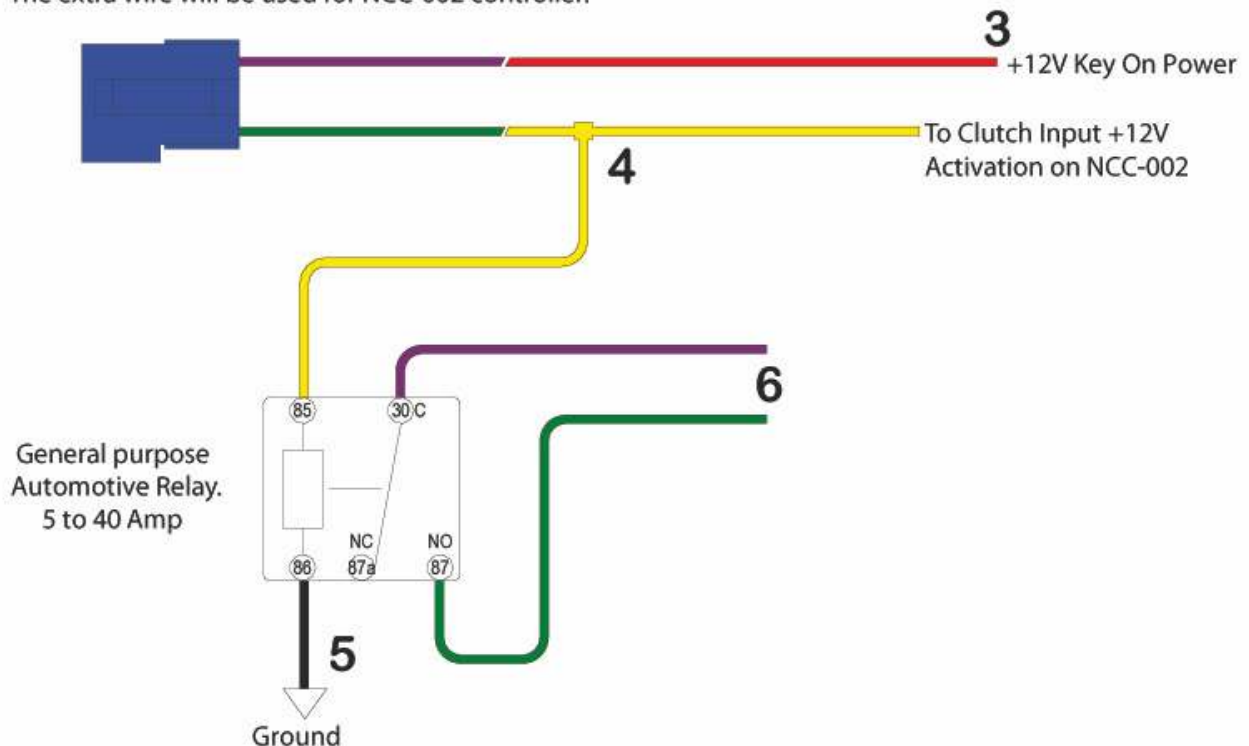


2 - Cut wires approx. 3" back from connector.



3 - Find +12 volt Key On power source and connect to one wire of CPP connector.

4 - Splice two wires onto remaining CPP connector wire and connect one wire to #85 on Relay. The extra wire will be used for NCC-002 controller.



5 - Connect terminal #86 on Relay to Ground.

6 - Connect wires cut from CPP Switch connector to Terminals #30 and #87 as shown. Wire color may vary for model/year.

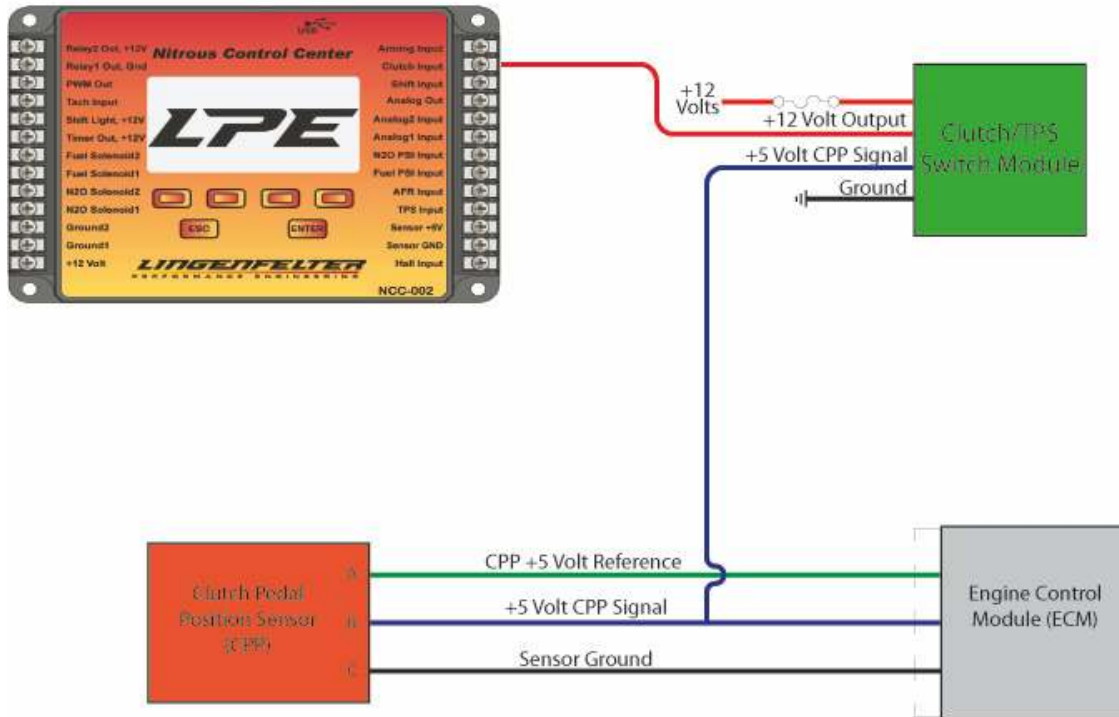
### 3.1.13 Converting a CPP Sensor Signal Into a 12 Volt signal via Conversion Module

Use this configuration if you want the Clutch Input to come from a Clutch Pedal Position (CPP) Sensor. This configuration allows the clutch position signal to be sent to the Clutch Input on the NCC-002, allowing the [Analog1 input](#) feature to be connected to other sensors. This configuration is intended for vehicles equipped with clutch pedal position sensors ONLY. While the clutch pedal position switch puts out a switched 12 volt signal when a certain clutch pedal position is reached, the clutch pedal position sensor puts out a signal that ranges anywhere between 0-5 volts depending on the position of the pedal. Because of this, the signal from the clutch pedal position switch can be sent directly to the Clutch Input on the NCC-002, but the signal from the clutch pedal position sensor cannot. You can either connect the CPP sensor to the Analog1 Input or use a conversion module to connect it to the Clutch Input. In order to use the signal from the clutch pedal position sensor to activate the clutch input, the 0-5 volt signal from the sensor has to be converted into the switched 12 volt signal that the Clutch Input on the NCC-002 is looking for. This conversion can be accomplished through the use of a Clutch/TPS switch signal conversion module. The Clutch/TPS switch signal conversion module receives the 0-5 volt signal from the clutch pedal position sensor and puts out a 0 or 12 volt signal to disable or enable the clutch input on the NCC-002.

**NOTE: While the conversion module that LPE used for this function is no longer available, a new version is currently in development. There are other manufacturers who are currently producing this type of conversion module.**

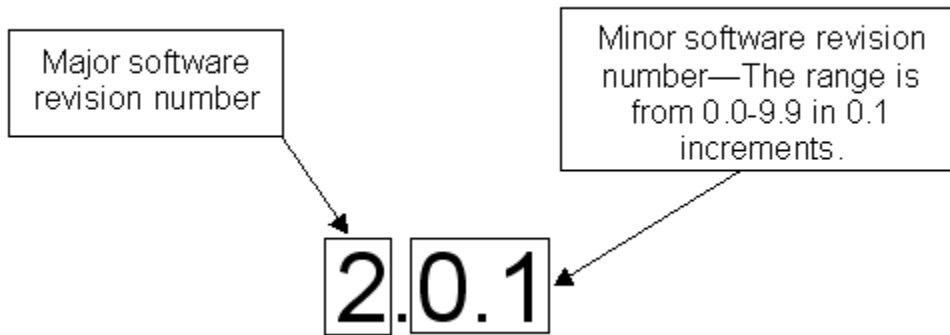
- Locate the Clutch Pedal Position sensor (CPP). This sensor is usually mounted on the clutch pedal assembly.
- Remove the loom from the wires and locate the +5 volt signal wire that connects the CPP to the ECM.
- Mount the Clutch/TPS switch signal conversion module to the vehicle.
- Splice the +5 volt signal input wire from the Clutch/TPS switch signal conversion module to the +5 volt CPP signal wire from the CCP.
- Connect the Clutch/TPS switch signal conversion module ground wire to a reliable ground source.
- Connect the Clutch/TPS switch signal conversion module +12 volt power wire to a fused +12 volt power source
- Connect the Clutch/TPS switch signal conversion module +12 volt output wire to the "Clutch Input" terminal on the NCC-002 Controller.
- Program the conversion module per the manufacturer's specifications.
- Program the [Clutch Input Polarity](#) on the NCC-002 controller.

NCC-002 Wired to Recieve Switched 12 Volt Clutch Position Input Signal from The Clutch Pedal Position Sensor Via External Clutch/TPS Switch Module



## 3.2 Installation of the NCC-002 Software and Firmware

The following sub-sections detail the installation of the NCC-002 PC software required to communicate with the controller, as well as to keep the controller up to date. The program "Nitrous Control Center" allows the user to view data logs, transfer programs to and from the controller, and to create new programs on the computer. The program "NCC Controller Flash Utility" is used to flash updated firmware to the controller. The controller can be connected via USB cable to any computer equipped with Windows XP, Windows Vista, or Windows 7. The current installed software version (or build) number can be viewed through the "[About NCC-002](#)" selection on both the computer program or controller. The first number represents the current major revision number and the last two numbers represent the current minor revision number.

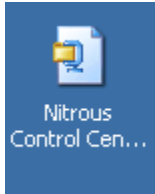


**IMPORTANT:** The computer software and the controller firmware do not have to have to be on the same minor revision number for the controller to operate, but the major revision number **MUST** be the same on both or else the computer and controller will not be able to communicate with each other. This manual was written using version 2.0.7.


### 3.2.1 Installing the NCC-002 Software

The following steps are for the installation of the Nitrous Control Center program. This program allows for the transfer of data and settings between the computer and the controller via a USB cable.

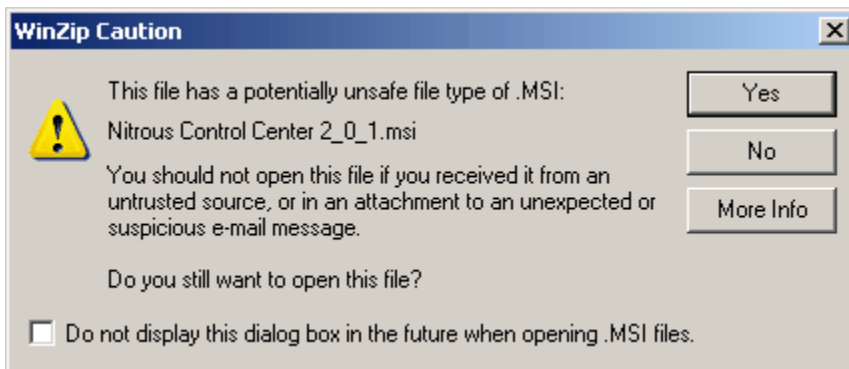
After extracting the NCC-002 software from the LPE-supplied media or downloading the software from the LPE website, save the compressed ZIP file to your computer (the file was saved to the desktop in the illustration below) and open the file by double-clicking on the icon.



Using a Zip file utility, such as WinZip, unzip the compressed file.

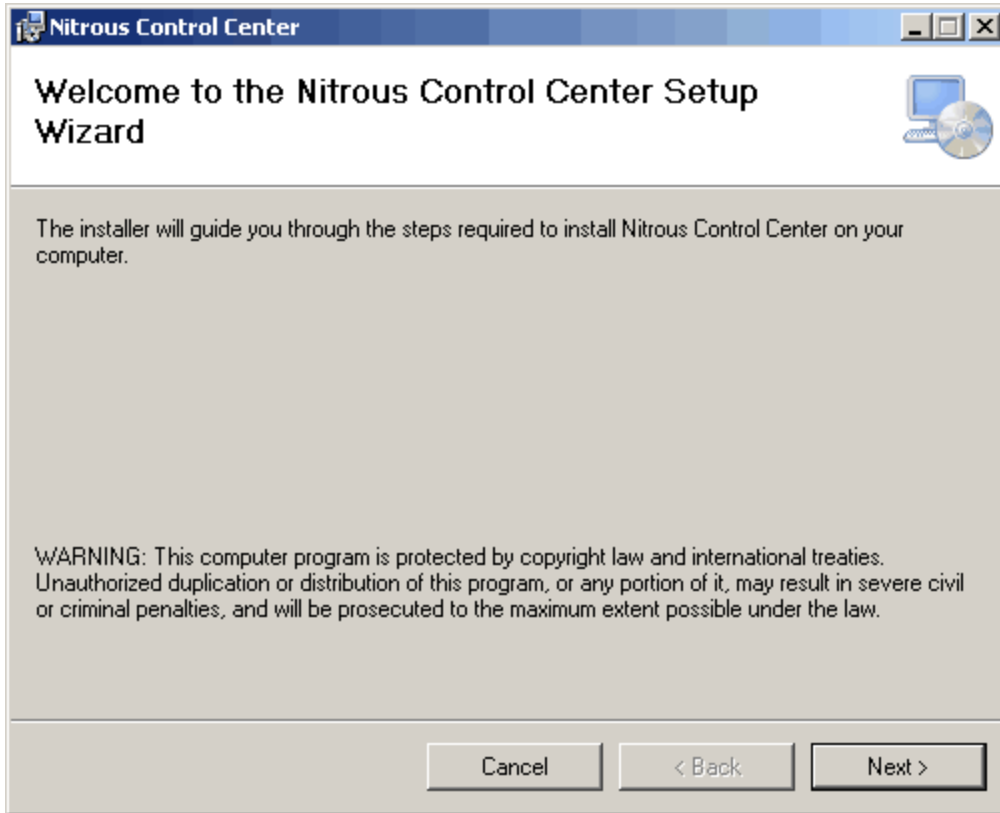
Name	Type	Modified	Size	Ratio	Packed	Path
 Nitrous Control ...	Windows Ins...	5/21/2012 2:53 PM	1,011,200	41%	599,688	

Most windows Zip-file utilities will display a dialog box explaining the risk of opening a .msi file. Click "Yes" on the right side of the dialog box.



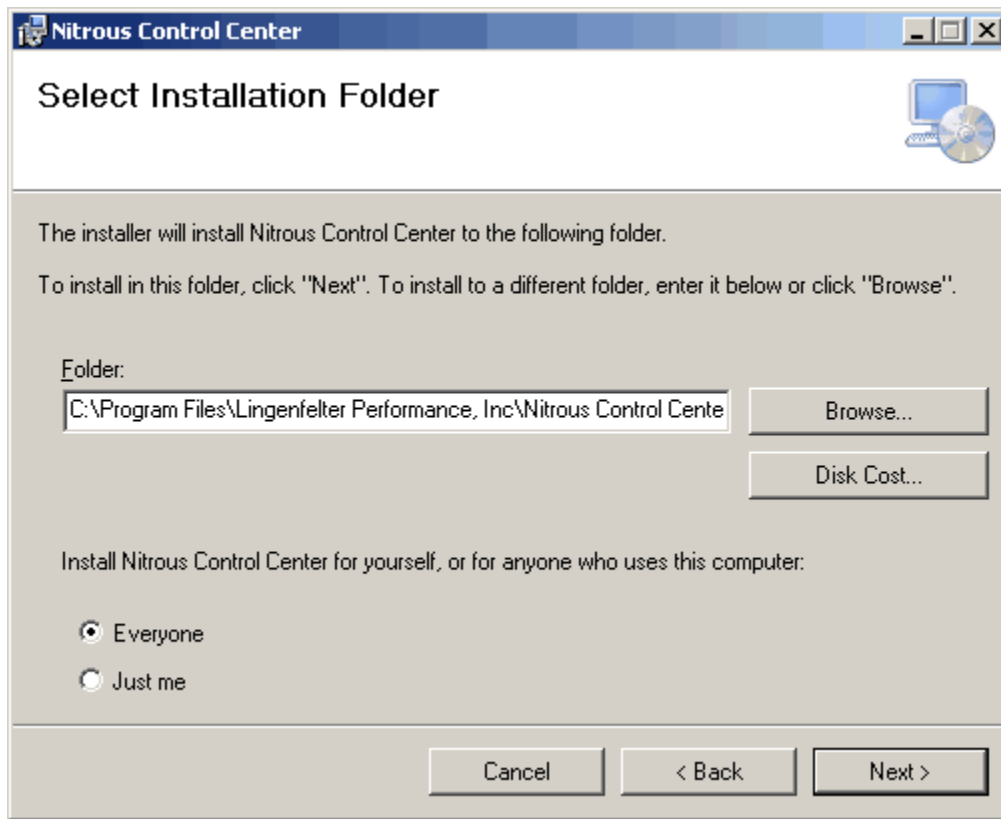


The welcome screen for the Nitrous Control Center Setup Wizard should appear at this time. Click the "Next" button to continue on to installation. Click the "Cancel" button to abort the installation.

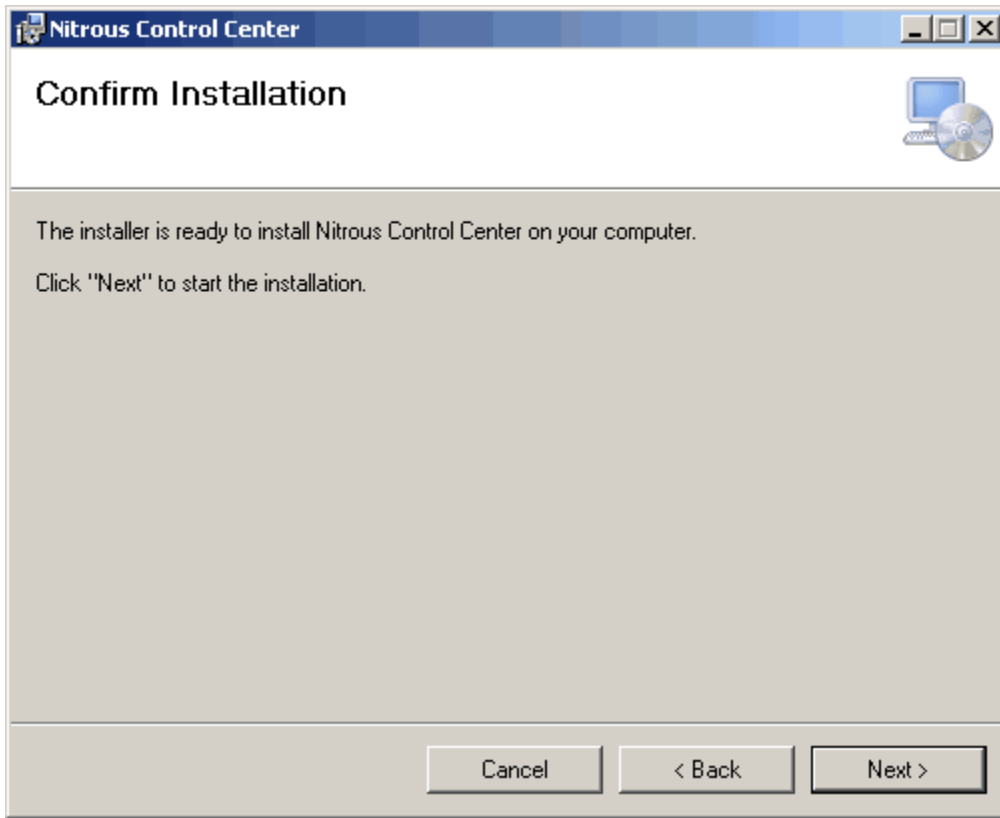


The next screen prompts the user to select a folder to install the NCC-002 software to. In most cases the default location, which is in the program files folder on the C:\ drive, should be sufficient. Click the "Browse" button to select a different location for the software if desired. Click the "Disk Cost" button to display the available disk space on each of the computer's available disk drives, as well as how much disk space will be left on each disk drive if the Nitrous Control Center software is installed. LPE recommends clicking the "Disk Cost" button to verify that there is enough disk space available on the desired drive for installation. The software, at this time, requires roughly 3000 KB of space.

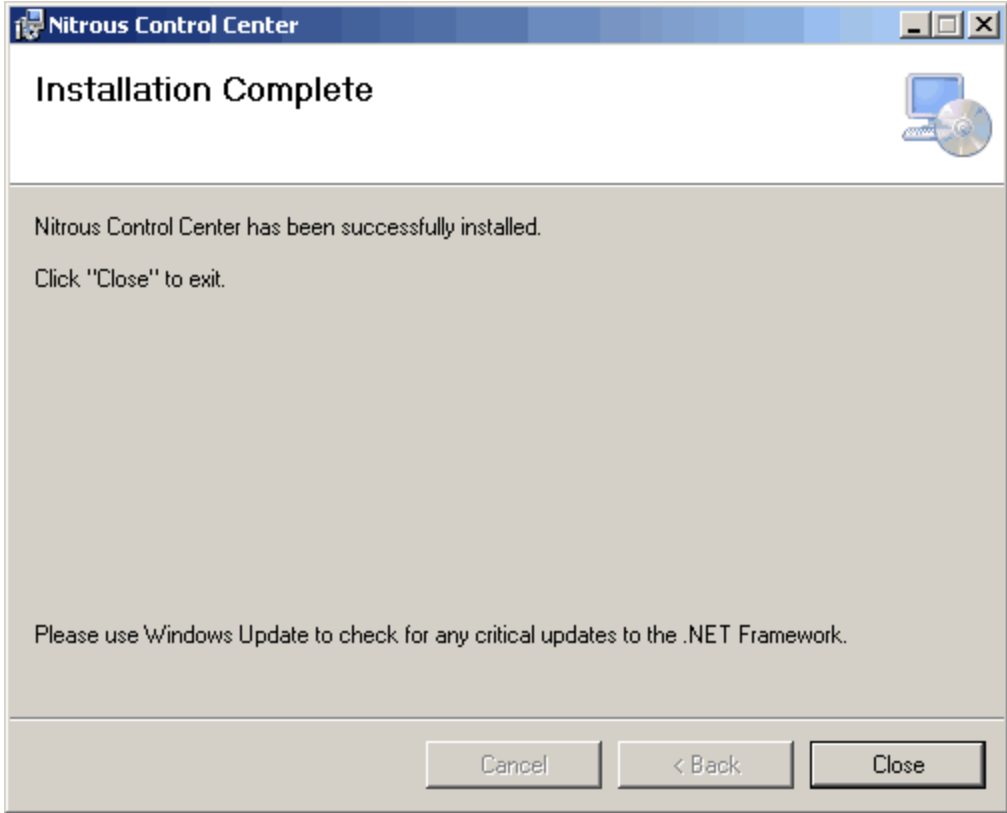
The final option in this dialog box is whether the software is to be installed for all users of the computer, or just the user who installs it. If the user is not sure whether other users will need to use the software, toggle "Everyone" so that other users can use the software if needed. Toggle "Everyone" or "Just me" and click "Next" to move on.



The installation confirmation dialog box will appear next. Click "Next" to begin installation of the NCC-002 software. The "back" button is available if it is necessary to go back to a previous dialog box to change a setting.



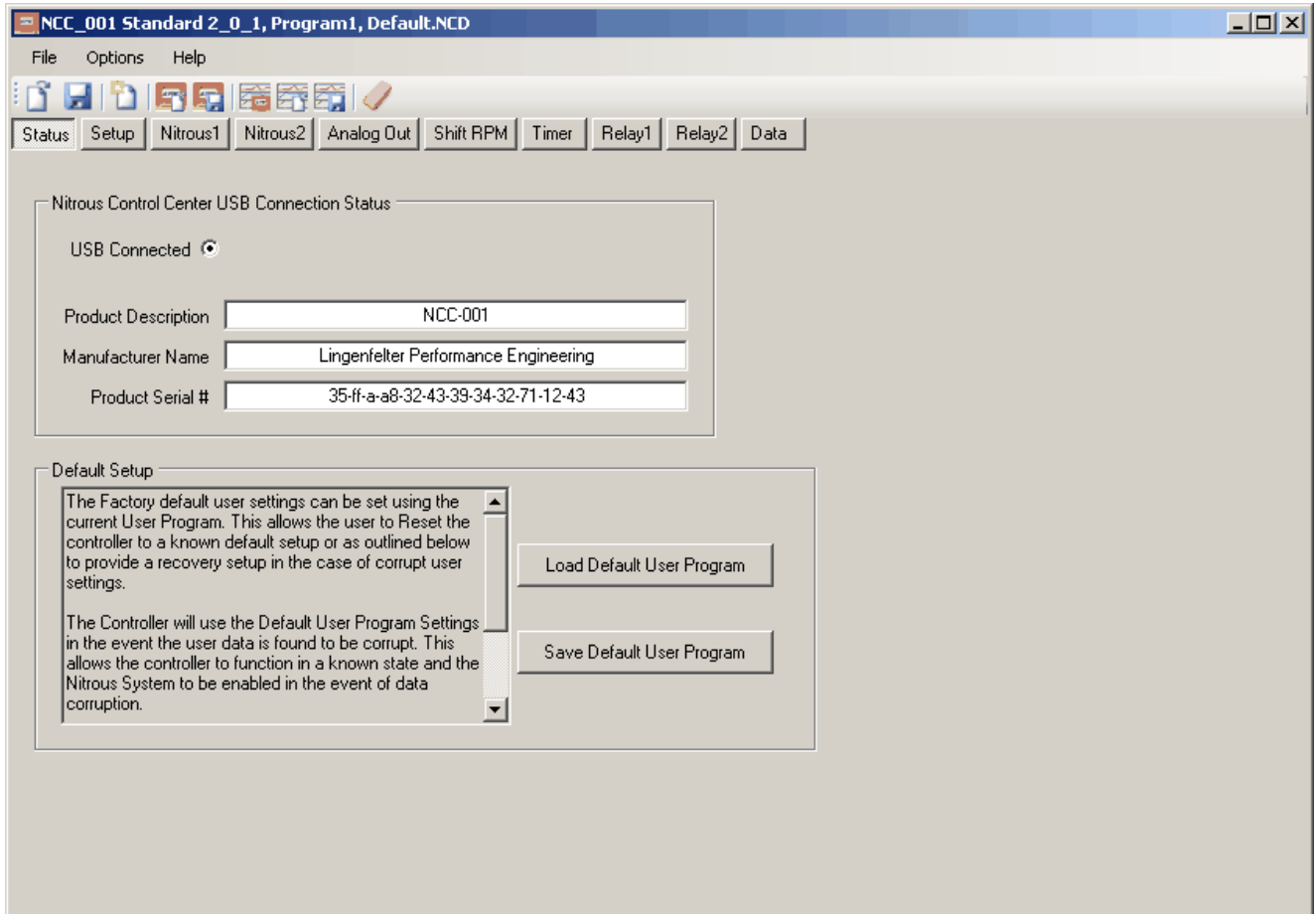
The "Installation Complete" dialog box should appear after a short period of time. Click the "Close" button to exit the installation wizard.



An icon named "Nitrous Control Center" should now appear on the desktop. Double-click on the icon to launch the program.



The NCC-002 program should open to the main screen, as shown below.



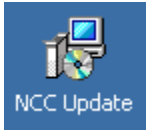
Installation of the Nitrous Control Center software is now complete. To install an update to the NCC-002 software, uninstall the software and repeat the same steps to install the new NCC-002 software.

**NOTE:** Before updating the Nitrous Control Center software, locate the directory folder where your user program files and data logs are saved to verify that they are not located in the Nitrous Control Center program file folder on your C: drive. When updating the software, any files located in the Nitrous Control Center software program file will be erased when the program is uninstalled. The default location that the software will save to is C:/My Documents/Nitrous Control Center/User Program. If you choose to save your user program files and data logs in a different location, make sure that you are not saving in the Nitrous Control Center program file.

### 3.2.2 Installing the NCC-002 Firmware

The following steps are for the installation of the NCC-002 Controller FLASH Utility onto a Windows-based PC. This utility is used to flash updated embedded firmware to the controller itself. It is vital that this utility be used because the NCC-002 controller can only interact with the computer interface if the controller's major software build number matches that of the NCC-002 PC program.

After extracting the NCC Firmware update from the LPE-supplied media or downloading the firmware from the LPE website, double-click on the "NCC Update" icon

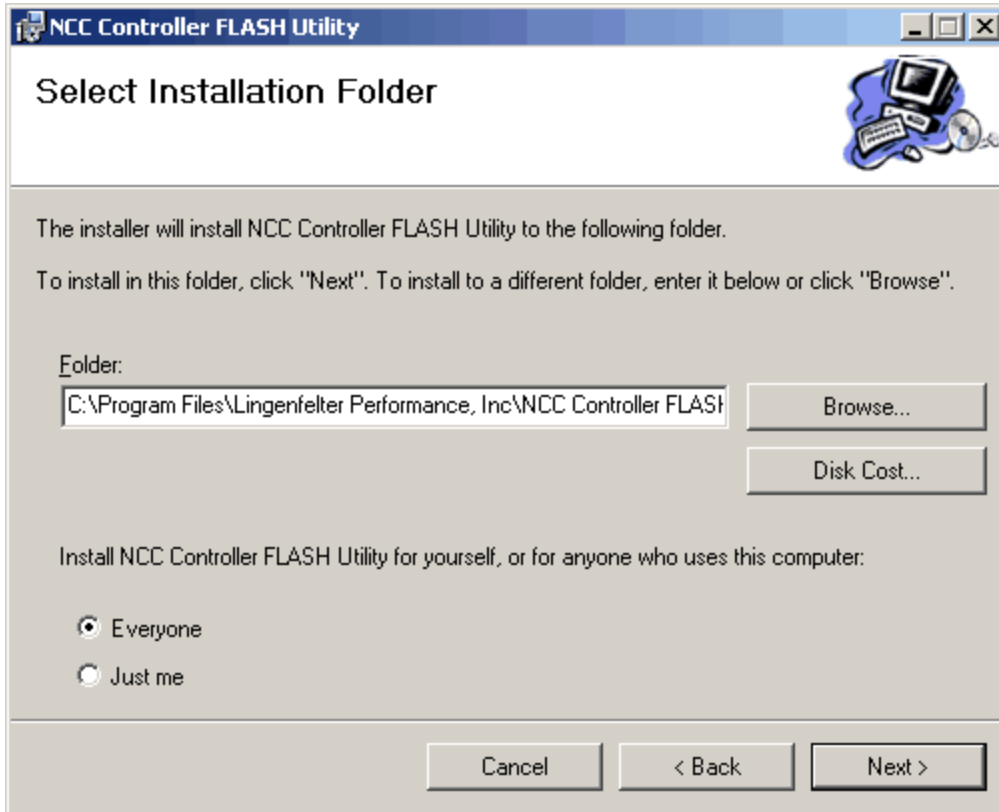


The welcome screen for the NCC Controller FLASH Utility Setup Wizard should appear at this time. Click the "Next" button to continue on to installation. Click the "Cancel" button to abort the installation.

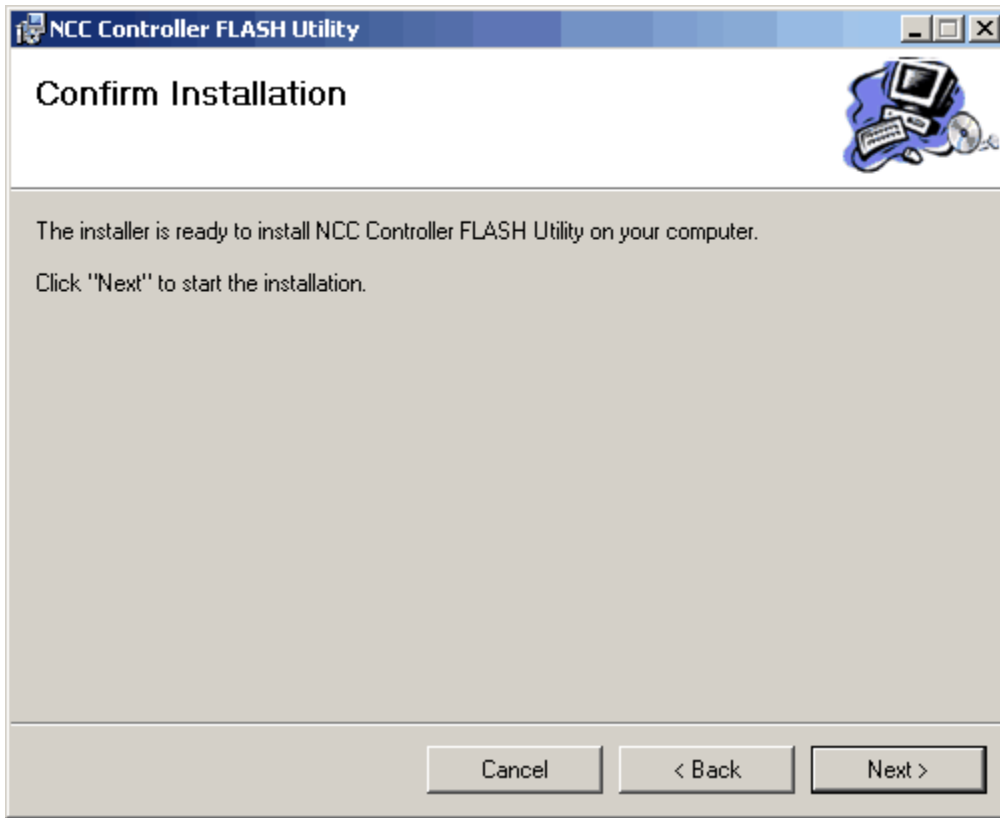


The next screen prompts the user to select a folder to install the NCC Controller FLASH Utility software to. In most cases the default location, which is in the program files folder on the C:\ drive, should be sufficient. Click the "Browse" button to select a different location for the software if desired. Click the "Disk Cost" button to display the available disk space on each of the computer's available disk drives.

The final option in this dialog box is whether the software is to be installed for all users of the computer, or just the user who installs it. If the user is not sure whether other users will need to use the software, toggle "Everyone" so that other users can use the software if needed. Toggle "Everyone" or "Just me" and click "Next" to move on.

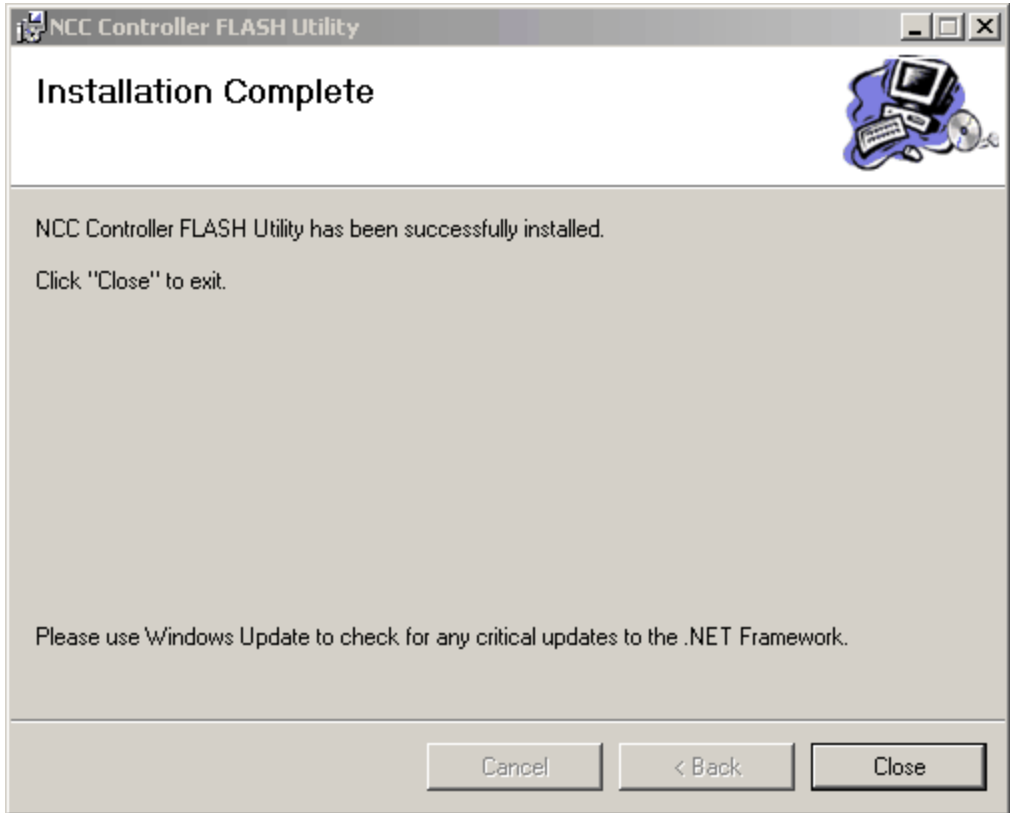


The installation confirmation dialog box will appear next. Click "Next" to begin installation of the NCC Controller FLASH Utility software. The "back" button is available if it is necessary to go back to a previous dialog box to change a setting.





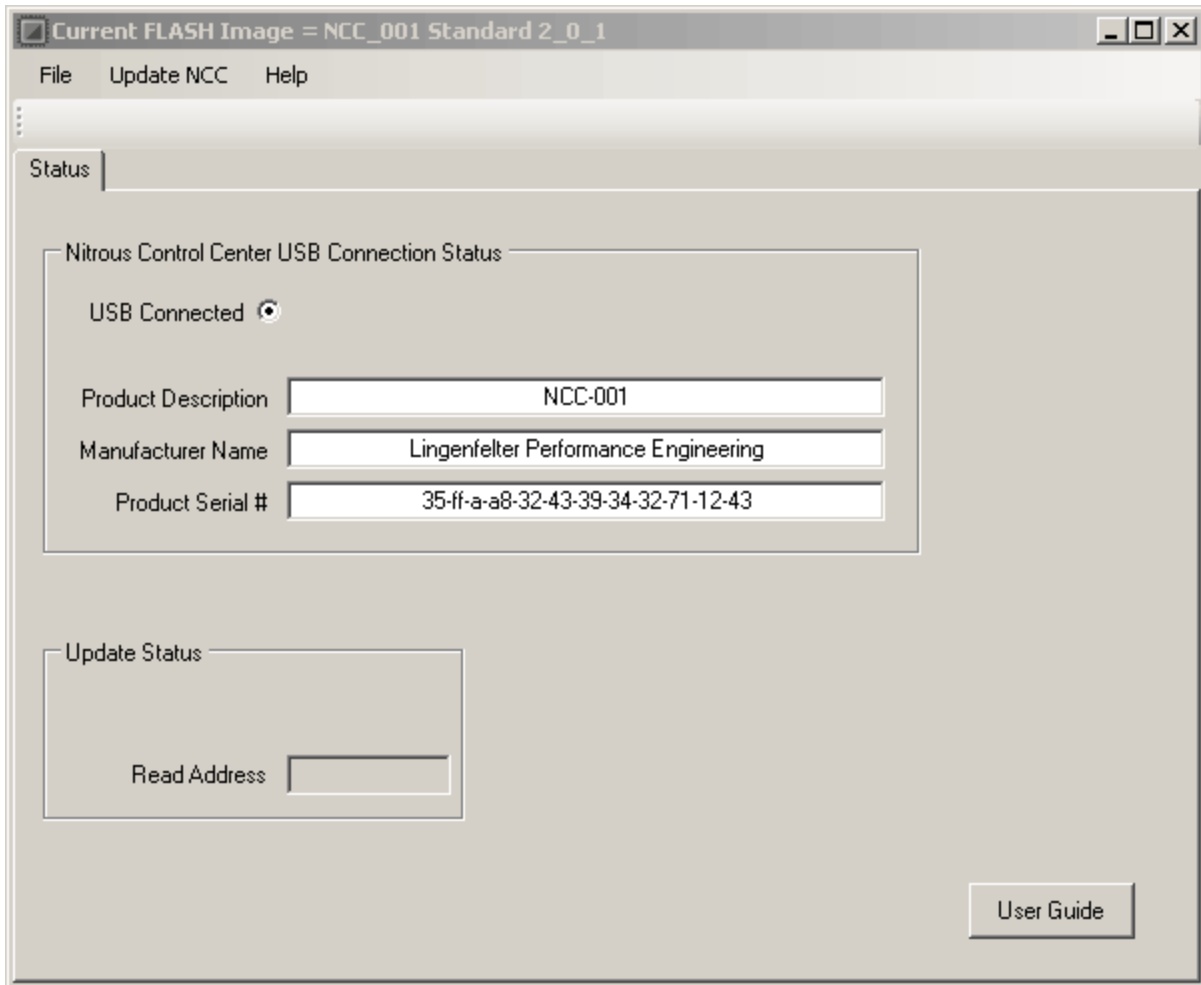
The "Installation Complete" dialog box should appear after a short period of time. Click the "Close" button to exit the installation wizard.



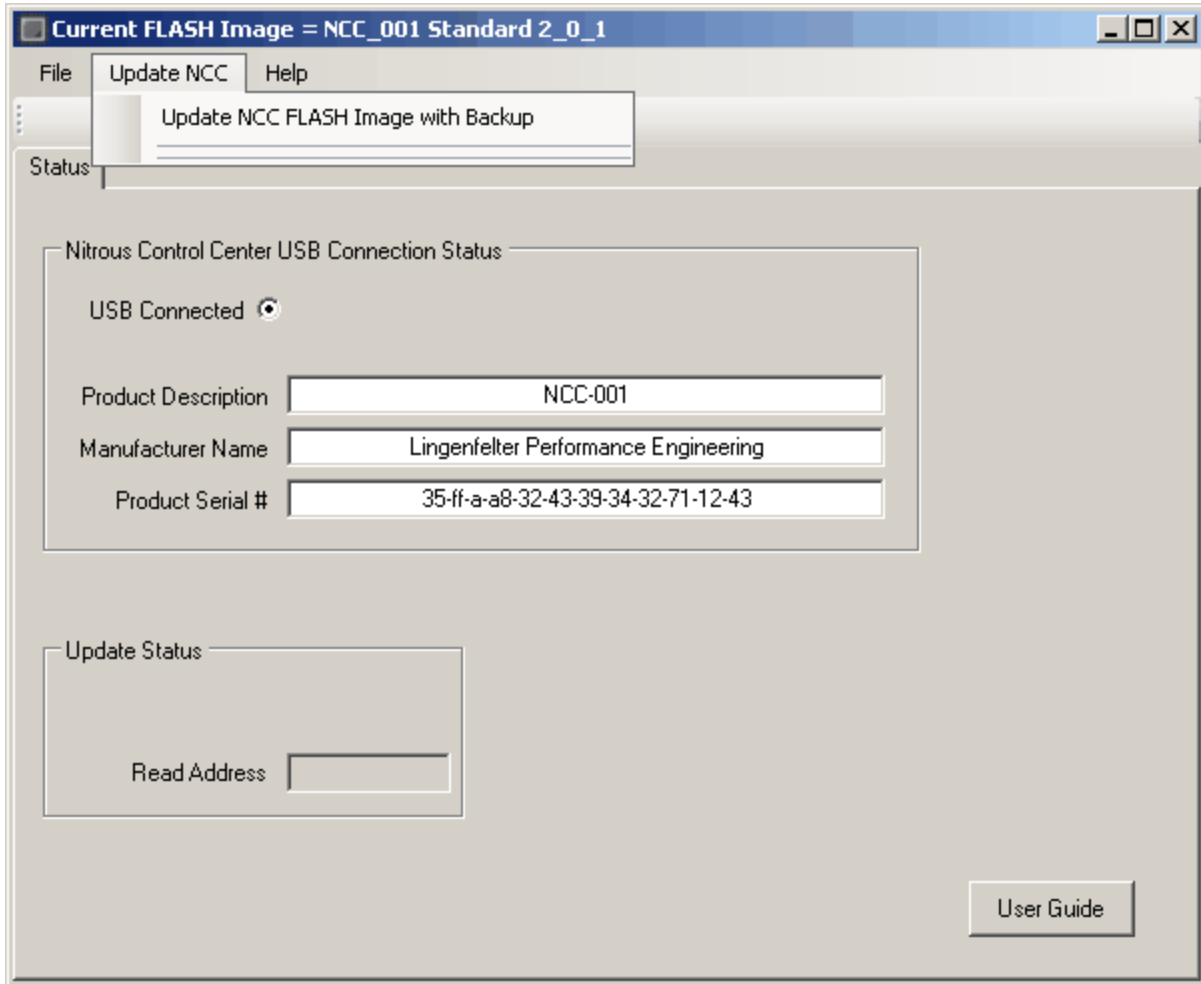
An icon named "NCC Controller FLASH Utility" should now appear on the desktop. Double-click on the icon to launch the program.



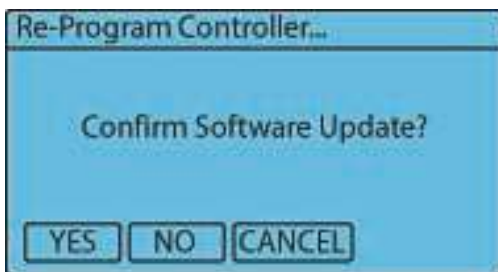
The Main screen of the NCC Controller FLASH Utility should appear. If the Controller is powered ON and is connected to the computer via USB cable, the information inside the "Nitrous Control Center USB Connection Status" dialog box should be filled out, as shown below. If the controller is powered OFF and/or the controller is not connected to the computer, all of the outputs inside of the "Nitrous Control Center USB Connection Status", as well as the "USB Connected" button, will be left blank.



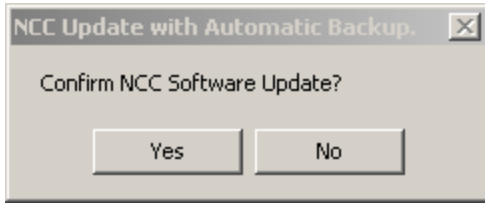
To update the Controller's firmware, click on the "Update NCC" in the menu bar and click on "Update NCC Flash Image with Backup"



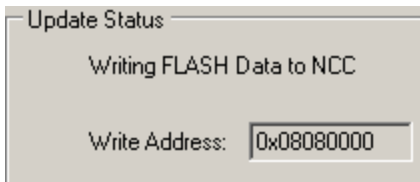
Before the firmware installation can begin, the ["Update Software"](#) option found in the [Global Menu](#) must be selected on the Controller in order for the installation can continue. An error message will appear if the controller is not in update mode.



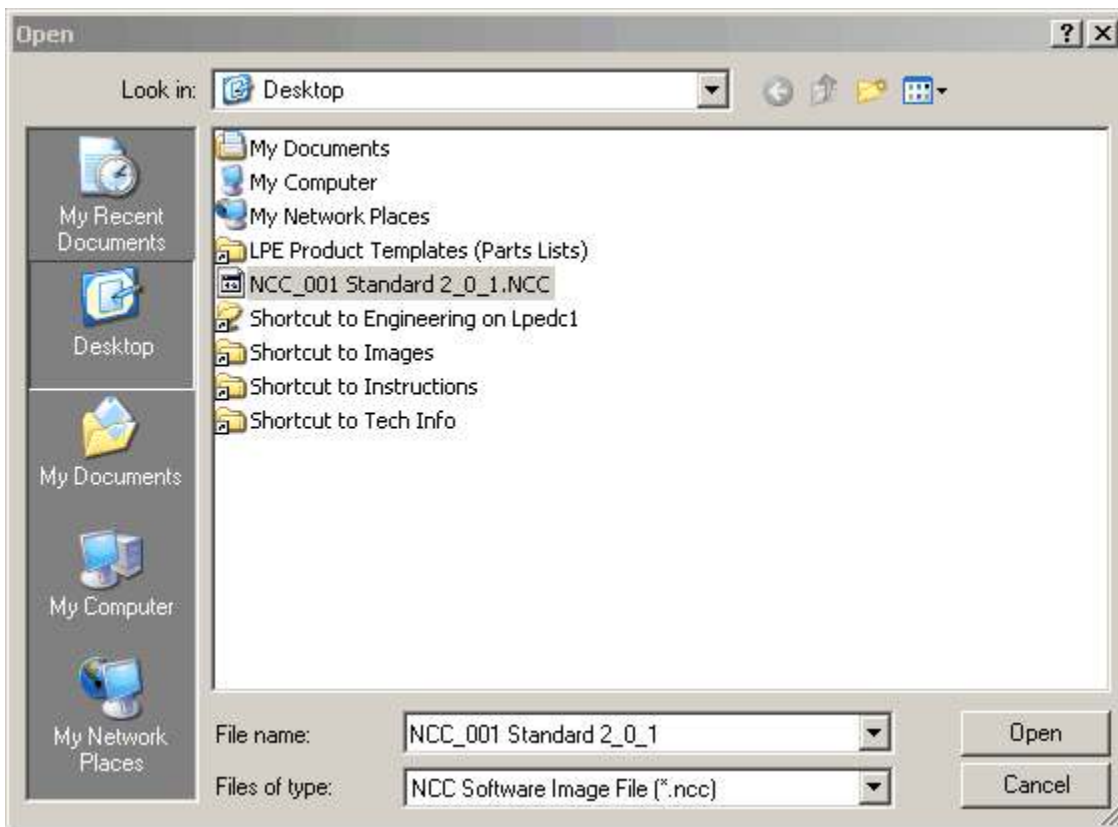
The program will ask you to confirm that you want to update the Controller software. Click yes to continue on to installation.



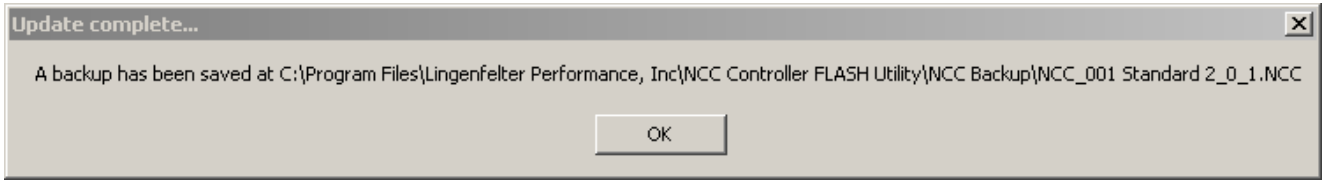
As the flashing of data between the computer and the controller takes place, a series of addresses should appear in the write address dialog box of the Update Status window. During this time, the NCC FLASH utility is reading the flash data from the controller and saving a backup in case the flash that will be sent to the controller in the next step is corrupt.



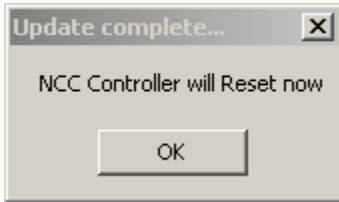
Once the computer has read the flashed data from the NCC-002 controller, the program will ask for the location of the firmware update that is to be installed onto the controller. Locate the directory where the .NCC file is saved, which may be the LPE-supplied media or the directory to which the program was downloaded from the LPE website. The picture below shows the .NCC file located on the desktop. Click on the file and click the "Open" button to confirm your selection.



The NCC Controller FLASH Utility will now flash the firmware update to the controller. The dialog box below shows that installation of the new firmware is complete, as well as the location of the backed-up firmware on the computer. Click "OK" to continue.



The final dialog box lets the user know that the controller will reset to finish the installation of the new firmware. Click "OK" to continue.



**Installation of the firmware for the NCC-002 is now complete.**



# Getting to Know the User Interface

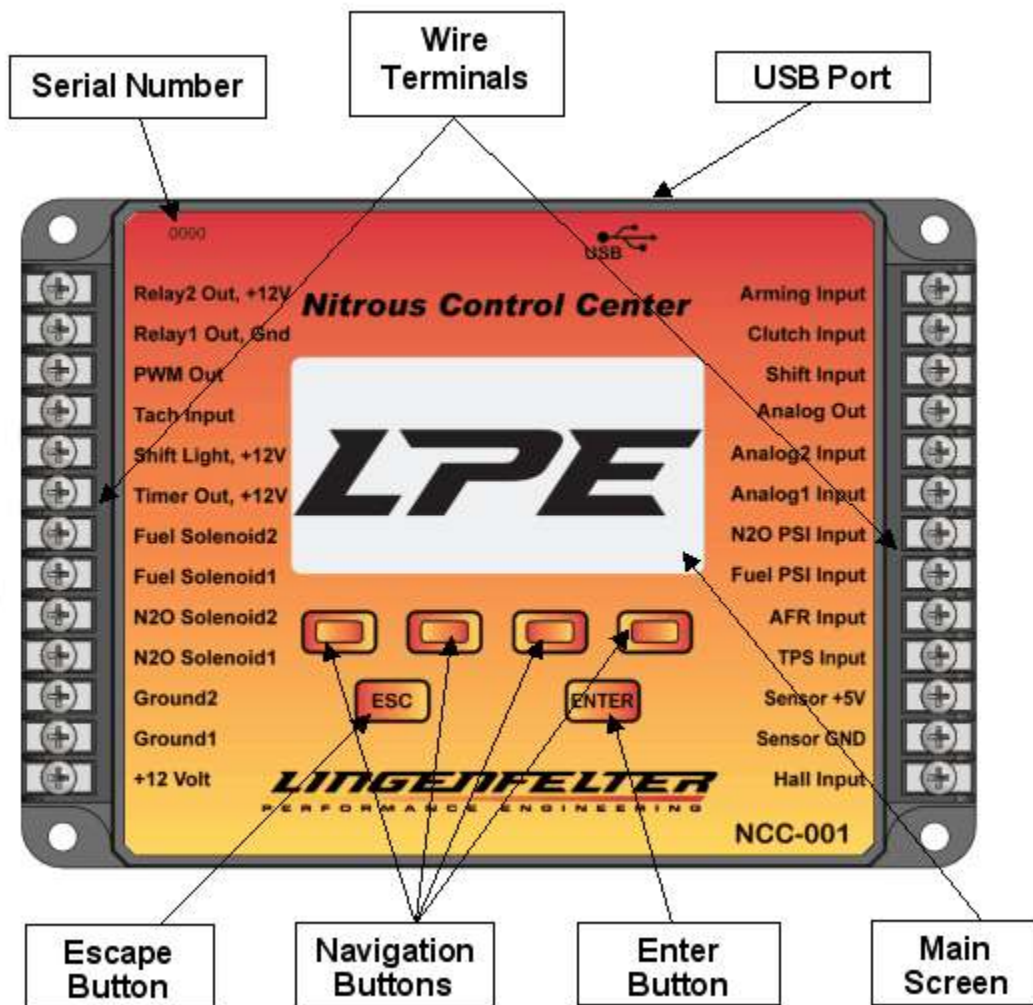
**Part**



## 4 Getting to Know the User Interface

This chapter will introduce the buttons and display on the NCC-002, as well as NCC computer interface. The display may slightly change depending on what options have been enabled on the controller. For example the Analog 1 input that is displayed on the screen as "AN1= 0.00" will change to "CLU= 0.00" if the Analog 1 Input clutch option is enabled.

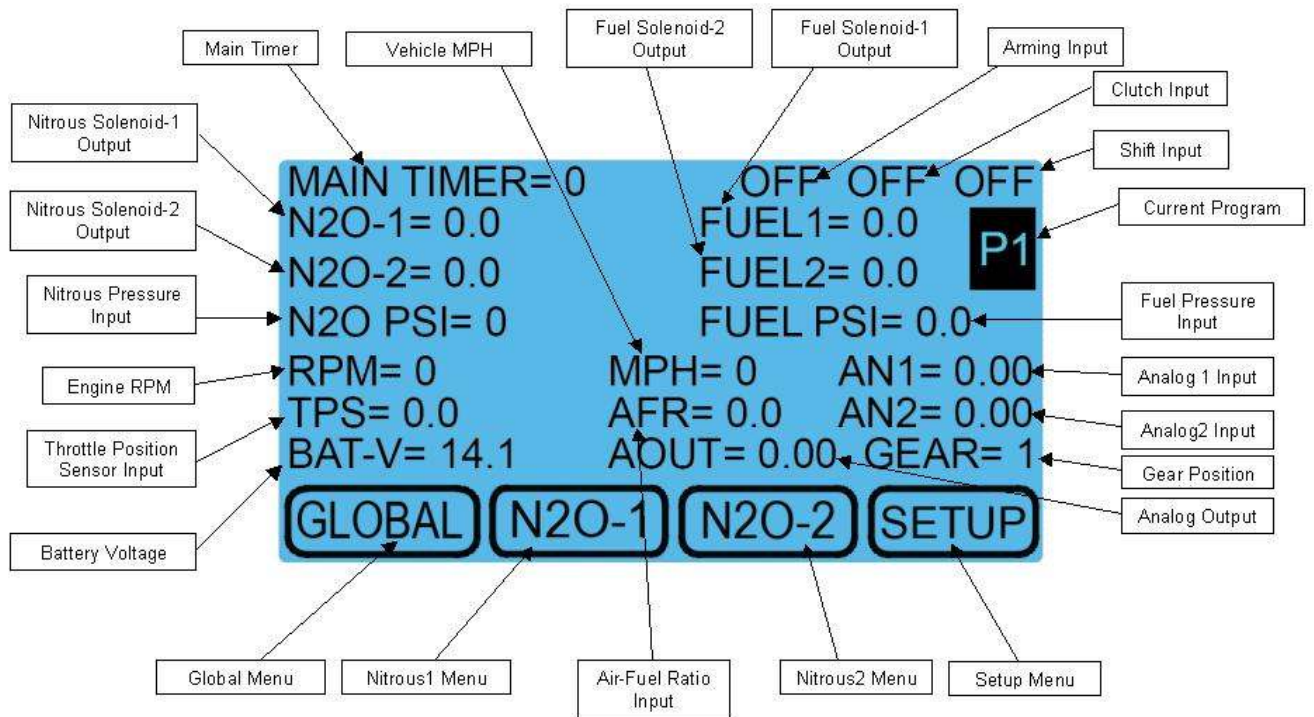
### 4.1 The NCC-002 Controller Interface



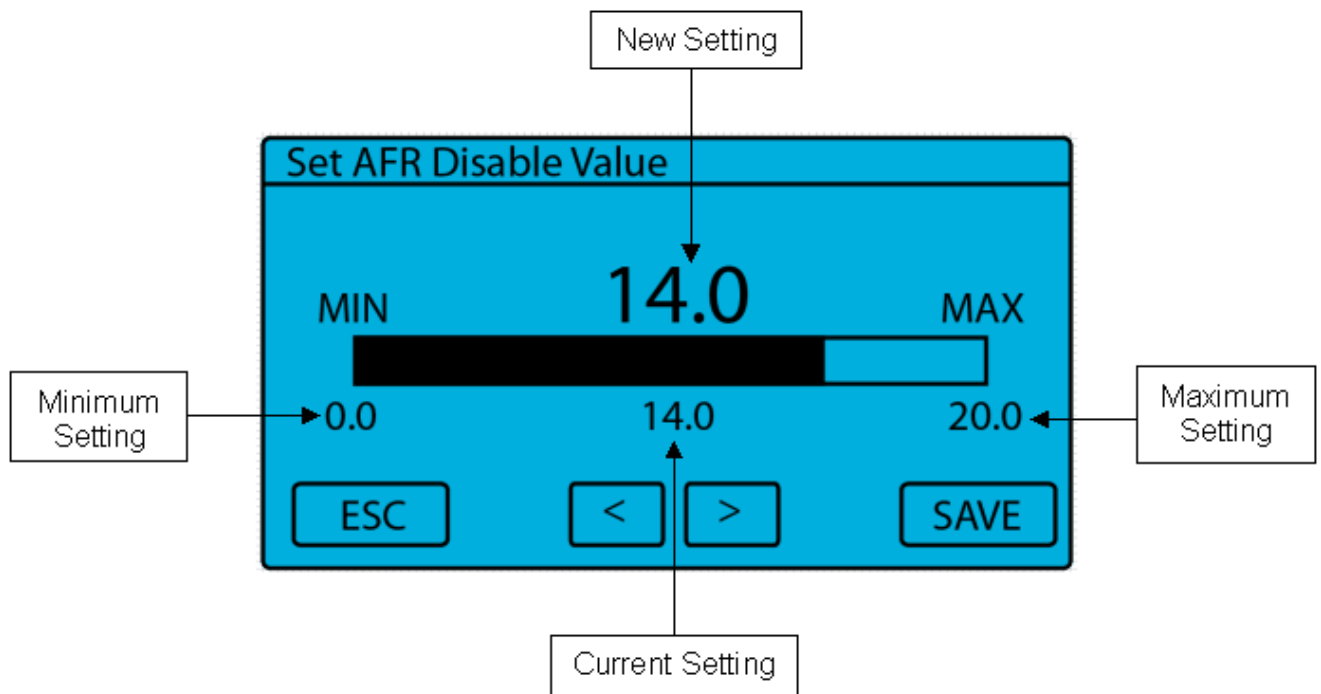


## 4.2 The "Main" And "Settings" Screen

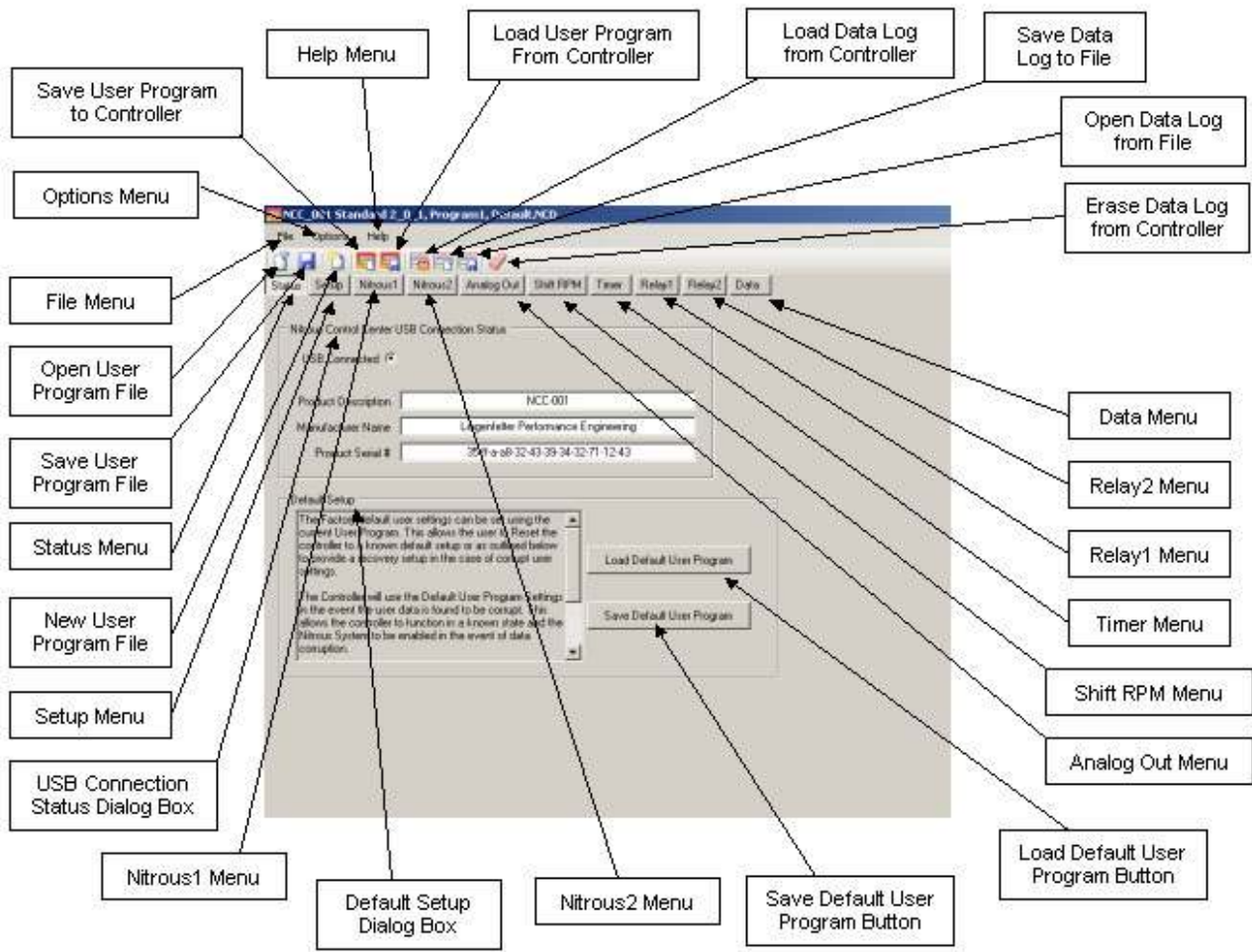
### Main Screen on the NCC-002



### Setting Screens on the NCC-002

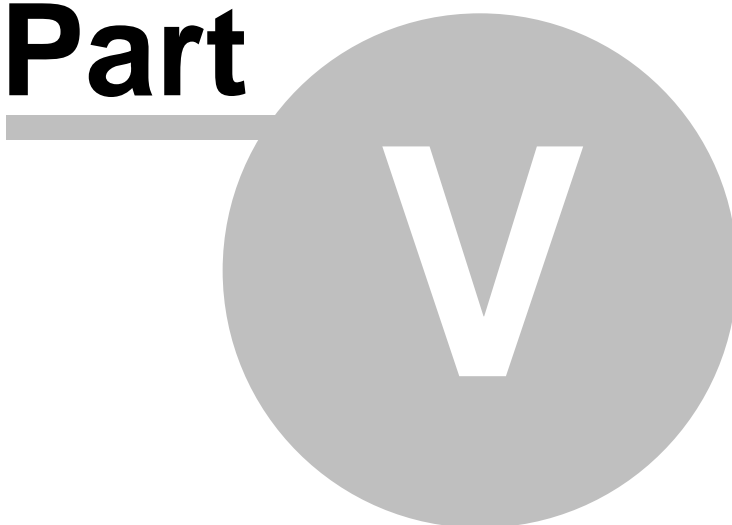


### 4.3 The Computer Interface Status Screen



# Global Menu / Setup-Options

**Part**



## 5 Global Menu / Setup-Options

The Global Menu of the NCC-002 Nitrous Control Center is where all of the global settings are located. The global settings are the settings that apply to all three user-defined programs. The Global menu can be accessed from the Main Screen by pressing the far left navigation button on the controller. The following subsections detail the location and function of each setting in the Global Menu.



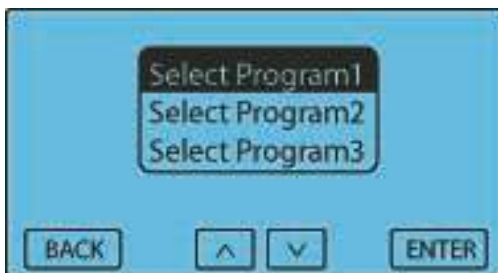
### 5.1 Current Program

There are 3 user-defined data setups available. All user settings will be saved when selecting a new data setup from the list. This way multiple user setups can be stored and recalled at a later time. Example - you have a setup that is working well, but you would like to try a few different settings. You could then select and copy all current setup data to a new setup and make changes without losing the original setup.

#### Access from the Controller:

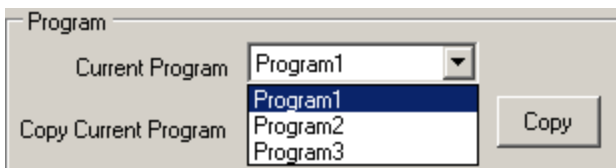
From the [Main screen](#), press the "GLOBAL" button. Press the "ENTER" button to select the Current Program menu. Using the "UP" and "DOWN" arrow buttons select the desired setup and press "ENTER". You will then be prompted to copy the current program to the new setup selected. If you choose "YES" the current setup will be copied to the new setup selected.

**NOTE**—When asked to make a selection from a "Message Box" the default selection will be chosen after 20 seconds.



#### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The current program is found in the "Program" dialog box under the "Options" Tab. Click on the desired program from the pull down menu.



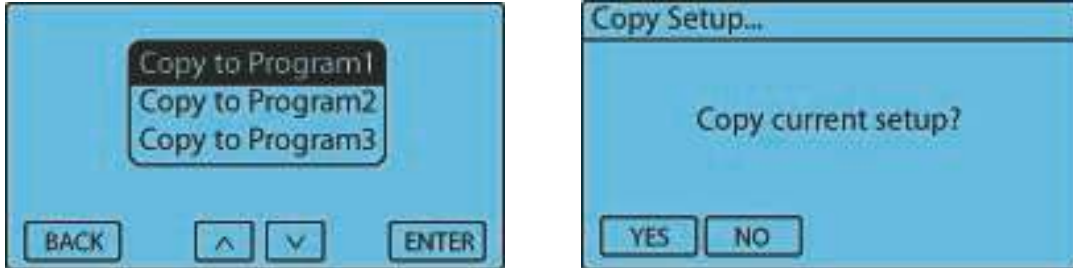
### 5.2 Copy Current Program

The current program may be copied to another program after selecting to which program the current user data is to be copied. If the current program is selected, the request will be ignored.

**Access from the Controller:**

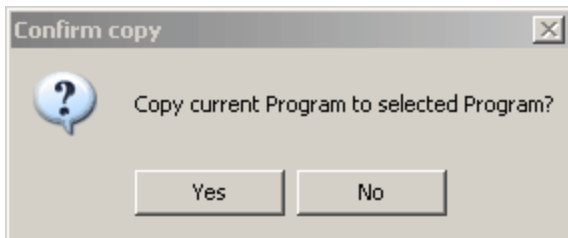
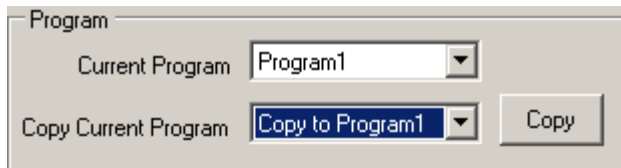
From the [Main screen](#), press the "GLOBAL" button. Press the "ENTER" button to select the Copy Current Program menu. Using the "UP" and "DOWN" arrow buttons select the desired setup to copy the current program to and press "ENTER". Press "YES" to copy the current program or "NO" to abort the operation.

**NOTE**—When asked to make a selection from a "Message Box" the default selection will be chosen after 20 seconds.



**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The copy current program option is found in the "Program" dialog box under the "Options" Tab. Select the desired setup to copy the current program to from the pull-down menu and click the "COPY" button. Click "YES" to copy the current program or "NO" to abort the operation.



### 5.3 Hold & Wait

This setting allows the progressive system to Hold & Wait when one of the activation criteria are removed. Example - the throttle is lifted due to wheel spin. The Hold & Wait feature allows the progressive system to resume at the point where the throttle was lifted. [Resume settings](#) can be used to create a resume ramp. If the Hold & Wait option is disabled and the throttle is lifted, the nitrous and fuel flows will start over at the beginning of the progressive ramp, along with any applicable cycle start delays. The inputs that will activate the Hold & Wait feature are:

- Arming Input
- Clutch Input
- Clutch sensor (Analog1) - If enabled
- TPS Input - If enabled

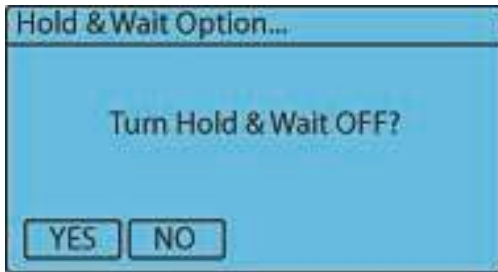
**NOTE**—If this option is "OFF" the progressive system and all timers will reset each time any of the arming criteria are removed.

**Access from the Controller:**

From the [Main screen](#), press the "GLOBAL" button. Press the "DOWN" arrow button repeatedly until the "Hold

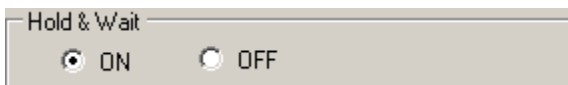
& Wait" menu selection is highlighted and then press the "ENTER" button. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed, no change will be made.

**NOTE**—When asked to make a selection from a "Message Box" the default selection will be chosen after 20 seconds.



**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Hold & Wait" option is found in the "Nitrous Timer Options" dialog box under the "Options" Tab. Click "ON" to enable the Hold & Wait feature or "OFF" to disable the feature.



## 5.4 Main Timer

This setting controls the main timeout period in seconds. This controls the total time elapsed before a system timeout occurs. The Main Timer acts as a safety feature by limiting the total amount of time the solenoids can be on once the system is activated.

When the Hold & Wait option is selected, the timer will continue to count down, even after the activation criteria have been removed. When the Hold & Wait option is not selected and the activation criteria have been removed, the Main timer will reset and start over when the activation criteria are again met.

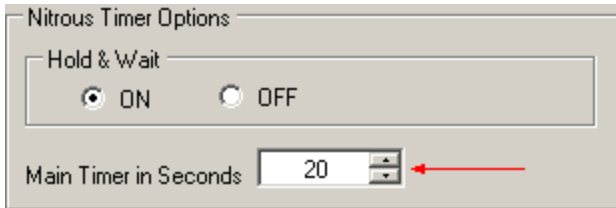
**Access from the Controller:**

From the [Main screen](#) press the "SETUP" button, press the "DOWN" arrow button repeatedly until the "Main Timer" menu selection is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Main Timer" setting is found in the "Nitrous Timer Options" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value from 20-300.



## 5.5 Fuel Trim Option

**WARNING - This setting controls the Fuel Trim. This setting allows the Fuel Percentage to be set to Less than the Nitrous percentage. Use this setting with great caution!**

This setting controls the total Percentage the Fuel may be set less than the Nitrous percentage. Example—a setting of 25 would allow the Fuel percent to be 25% less than the Nitrous percentage. A fuel trim setting of 0% does not allow the fuel to be less than the nitrous in the stage1 or stage2 graphs.

Valid Range is 0% to 100% in 0.1% increments.

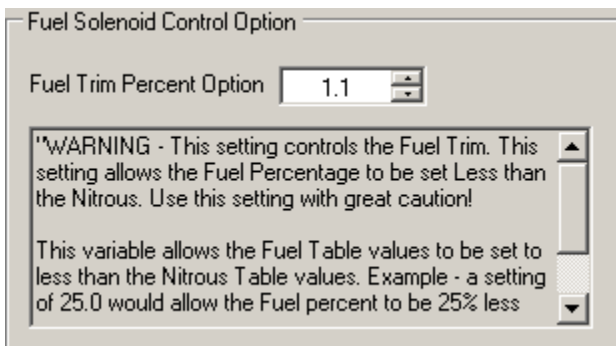
### Access from the Controller:

From the [Main screen](#), press the “GLOBAL” button. Press the “DOWN” arrow button repeatedly until the "Fuel Trim Option" menu selection is highlighted and then press the “ENTER” button. Using the “LEFT” and “RIGHT” arrow buttons adjust the setting. Press the “SAVE” button to accept the new setting or press the “ESC” button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Fuel Trim" setting is found in the "Fuel Solenoid Control Option" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value from 0.0-100.0.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

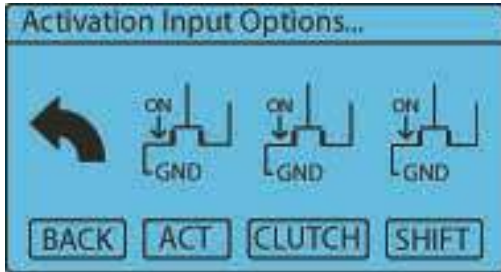
## 5.6 Set Input Polarity

The Input Polarity for the Arming, Clutch, and Shift inputs may be configured for either ground or +12V Arming. This allows the controller to be configured to work with existing wiring or to eliminate the need for relays to

change the Arming polarity. The current input polarity state is displayed and will be updated when changed. This setting is global, so it will remain the same regardless of which program you are currently using.

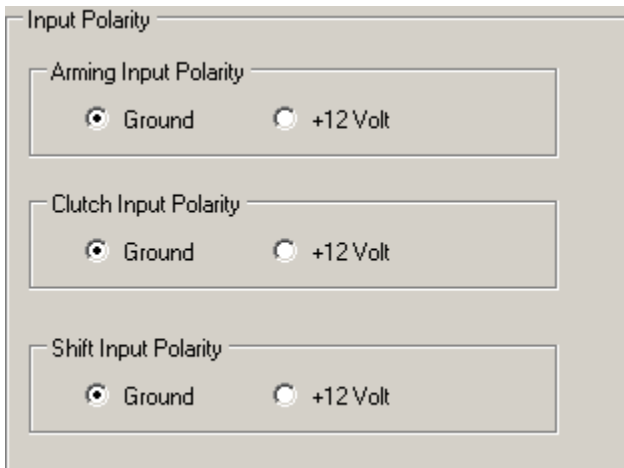
**Access from the Controller:**

From the [Main screen](#), press the “GLOBAL” button. Press the “DOWN” arrow button repeatedly until the "Set Input Polarity" menu selection is highlighted and then press the “ENTER” button. Using the “LEFT” and “RIGHT” arrow buttons adjust the setting. Press the “SAVE” button to accept the new setting or press the “ESC” button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Input Polarity" settings is found in the "Input Polarity" dialog box under the "Options" Tab. Click either the "Ground" or "+12 Volt" button to select the input polarity of each input.



## 5.7 Pulses Per Degrees

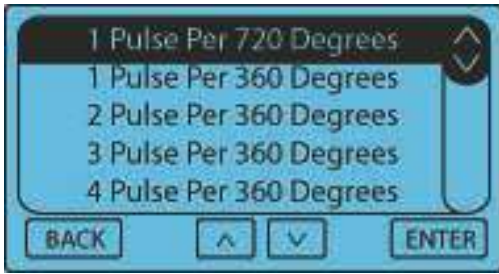
This setting determines the number of tachometer pulses per revolution of the crankshaft. The following list shows the available settings for this input. Refer to [Appendix C: Tables and Diagrams](#) for a table of recommended RPM pulse counts for different applications.

- 1 pulse per 720 degrees (or 0.5 pulse per 360 degrees)
- 1 pulse per 360 degrees
- 2 pulses per 360 degrees
- 3 pulses per 360 degrees
- 4 pulses per 360 degrees
- 5 pulses per 360 degrees
- 6 pulses per 360 degrees

**Access from the Controller:**

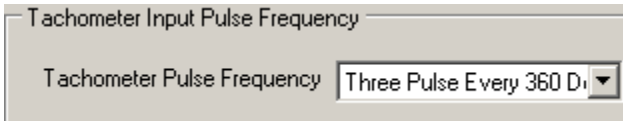
From the [Main screen](#), press the “GLOBAL” button. Press the “DOWN” arrow button repeatedly until the "Pulses Per Degrees" menu selection is highlighted and then press the “ENTER” button. Use the “UP” and “DOWN” arrow buttons to adjust the setting. Press the “ENTER” button to accept the new setting or press the “BACK” button to exit with no change.





**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Tachometer Pulse Frequency" setting is found in the "Tachometer Input Pulse Frequency" dialog box under the "Options" Tab. Click on one of the settings in the scroll-down menu to select the desired pulses per degree setting.

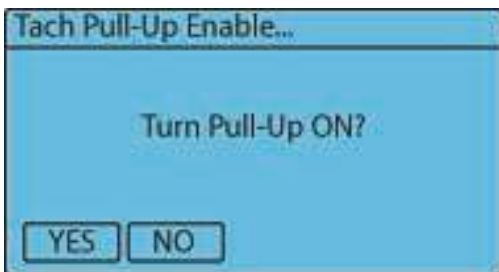


## 5.8 Tachometer Pull-Up

This setting enables or disables a 4.7k Ohm pull-up resistor to +12v on the Tach Input terminal. This option is normally used when connecting to the engine speed signal output from an ECM that is not connected to any other systems or modules in the vehicle. On vehicles that already have this signal connected, a Pull-Up resistor is normally already in the circuit. You DO NOT want to have multiple Pull-Up resistors in the circuit. Vehicles that have a Pull-Up resistor in the instrument cluster (such as the C5 and C6 Corvettes) will want to disable this feature because it will create too much resistance. Vehicles that do not have a pull-up resistor in the instrument panel (such as the 2010-2013 Camaros and 2007-2012 CK trucks) will want to enable this feature.

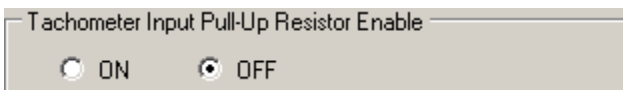
**Access from the Controller:**

From the [Main screen](#), press the "GLOBAL" button. Press the "DOWN" arrow button repeatedly until the "Tach Pull-Up" menu selection is highlighted and then press the "ENTER" button. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed, no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Tachometer Pull-Up" option is found in the "Tachometer Input Pull-Up Resistor Enable" dialog box under the "Options" Tab. Click "ON" to enable the Tachometer Pull-Up Resistor feature or "NO" to disable the feature.



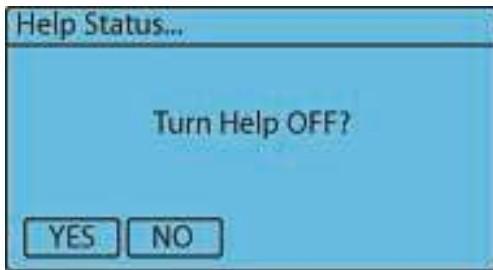
## 5.9 Help Option

Use this setting to turn the Automatic Help feature ON/OFF. When this feature is ON you will be prompted to view Help text for each setting when you are making Menu selections.

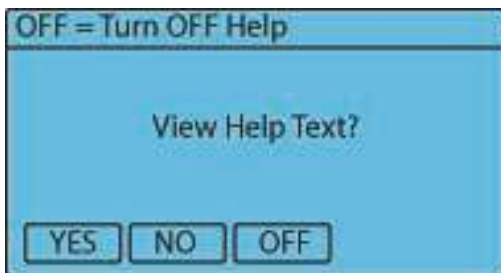
**Access from the Controller:**

From the [Main screen](#), press the "GLOBAL" button. Press the "DOWN" arrow button repeatedly until the "Help" menu selection is highlighted and then press the "ENTER" button. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.

**NOTE** - When asked to make a selection from a "Message Box" the default selection will be chosen after 20 seconds.



**NOTE** - When the Automatic Help feature is ON, there is an option on the help prompt screen that allows the user to disable the feature without going back to the Help Option in the Global menu. When the help prompt screen appears, as shown below, press the "OFF" button to disable the Automatic Help feature.



## 5.10 Factory Reset

Selecting this option will return ALL Settings to the original Factory settings. This option is only available through the NCC-002 controller.

**Access from the Controller:**

From the [Main screen](#), press the "Global" button. press the "DOWN" arrow button repeatedly until the "Factory Reset" menu selection is highlighted and then press the "ENTER" button. Press the "YES", "NO", or "CANCEL" button to change the current selection. If the "NO" or "CANCEL" button is pressed no change will be made.

**NOTE**—When asked to make a selection from a "Message Box" the default selection will be chosen after 20 seconds.



## 5.11 Update Software

Selecting this option will force the controller to enter update mode. You may exit update mode and return to normal operation if a valid software image is present. This option is only available through the NCC-002 controller.

You MUST have a PC/laptop equipped with a USB port and the [proper software](#) installed to update the controller software image.

**Access from the Controller:**

From the [Main screen](#), press the "Global" button. Press the "DOWN" arrow button repeatedly until the "Update Software" menu selection is highlighted and then press the "ENTER" button. Press the "YES", "NO", or "CANCEL" button to change the current selection. If the "NO" or "CANCEL" button is pressed no change will be made.

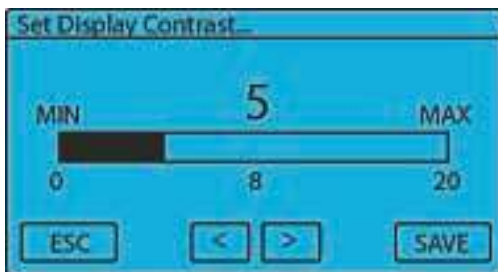


## 5.12 Display Contrast

Use this Setting to adjust the LCD Display contrast. This setting is only available on the NCC-002 controller.

**Access from the Controller:**

From the [Main screen](#), press the "GLOBAL" button. Press the "DOWN" arrow button repeatedly until the "Display Contrast" menu selection is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.

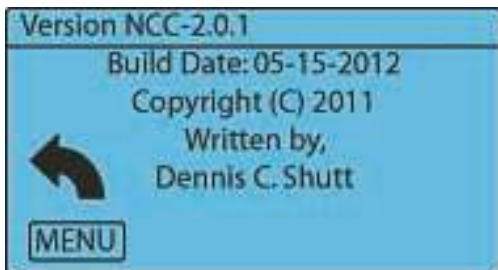


## 5.13 About NCC-002

This selection displays the current firmware version and the software build date.

**Access from the Controller:**

From the [Main screen](#) press the "GLOBAL" button, press the "DOWN" arrow button repeatedly until the "About" menu selection is highlighted and then press the "ENTER" button. Press the "BACK" button to exit.



**Access from the Computer Program:**

From the [Status screen](#), click on the "Help" button in the top toolbar. The current software version will be

displayed at the bottom of the menu.



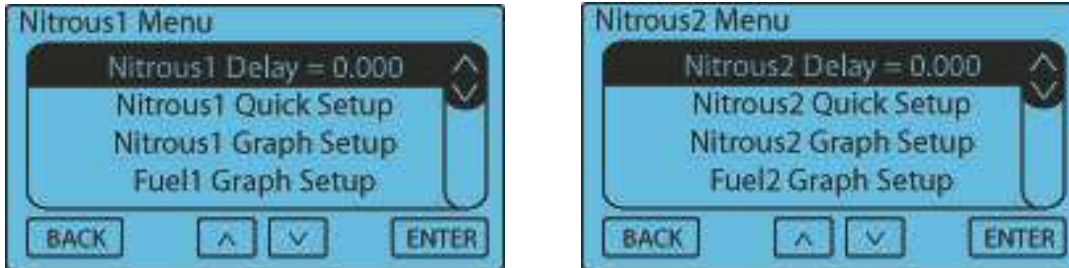
# **Nitrous Menu: Nitrous1 (N2O-1) and Nitrous2 (N2O-2)**

**Part**



## 6 Nitrous Menu: Nitrous1 (N2O-1) and Nitrous2 (N2O-2)

The following options and settings can be found in either the Nitrous1 (N2O-1) or Nitrous2 (N2O-2) menus. The Nitrous1 menu holds the options and settings for the first stage of nitrous while the Nitrous2 menu holds the options and settings for the second stage. For the sake of simplicity, the illustrations in this chapter will show only the Nitrous1 menu, but note that the Nitrous1 and Nitrous2 menus have the exact same options and settings—they just control different nitrous stages.



### 6.1 Nitrous Delay

This setting determines the amount of delay before the respective nitrous stage begins after being activated. The delay applies to the entire stage, which includes nitrous and fuel. A [Fuel Advance](#) can also be used so that the fuel may be started before the nitrous if desired.

The Valid Range is 0.000 to 9.990 seconds in .001 second increments.

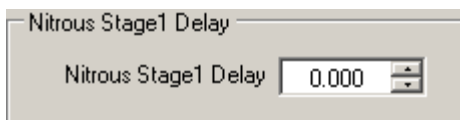
#### Access from the Controller:

From the Main screen press the "NITROUS" button, and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The Nitrous Delay Setting is found in the "Nitrous Stage Delay" dialog box under the "Options" tab. Click the "UP" button, "DOWN" button, or enter a numerical value up to 9.990 to set the nitrous delay.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

### 6.2 Nitrous Quick Setup

#### Quick Setup

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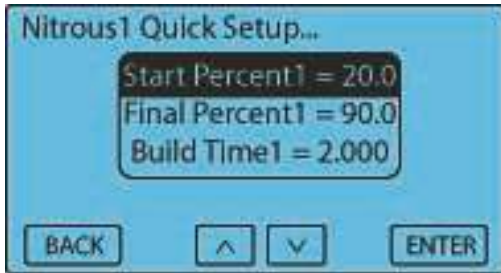
Use this selection to do Quick Progressive setups. This feature allows the Nitrous to be setup using a Start

Percent, Final Percent, and a Build Time. For advanced Nitrous and Fuel ramps use the Nitrous Graph Setup and the Fuel Graph Setup menu selections.

**NOTE**—This selection is provided so that Quick and Easy Nitrous Power Ramps can be created. This selection has limited user adjustment of the power ramp and fuel delivery. Also, Quick Setup will make the fuel graph the same as the nitrous graph. Please see the Nitrous Graph Setup and Fuel Graph Setup menu selections for advanced control.

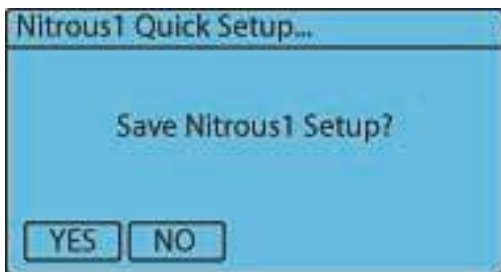
**Access from the Controller:**

From the [Main screen](#), select the stage by pressing the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Quick Setup" menu selection is highlighted and then press the "ENTER" button. Using the "UP" and "DOWN" arrow buttons, select the setting to be changed and hit "ENTER". Adjust the setting and press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



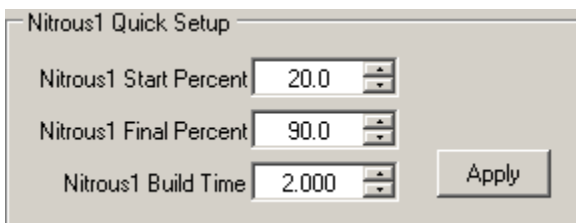
After all settings have been determined press the "BACK" button, press the "YES" button to accept the New Nitrous Power Ramp settings or "NO" to exit without saving the new settings.

When a New Nitrous Power Ramp is saved, the Nitrous and Fuel Tables are updated with the Quick Setup Data.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous Quick Setup" options are found in the "Nitrous Quick Setup" dialog box under the "Nitrous Graph" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown in the different settings below. Press the "APPLY" button to confirm the changes.



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## Start Percent

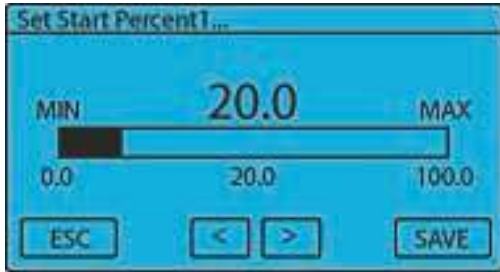
This setting determines the Nitrous Starting percentage. The Start Percent can be less than or greater than the

Final Percent setting. If the Start percent is greater than the Final percent the ramp will progress backwards.

The Valid Range is 0% to 100% in 1% increments.

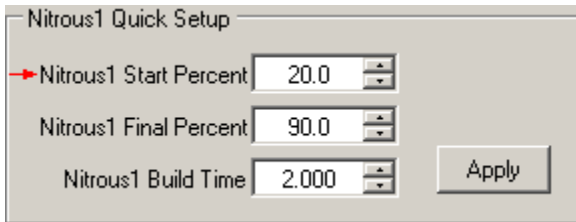
**Access from the Controller:**

From the [Main screen](#), select the stage by pressing the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Quick Setup" menu selection is highlighted and then press the "ENTER" button. Using the "UP" and "DOWN" arrow buttons, select the "Start Percent" setting and hit "ENTER". Adjust the setting and press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous Start Percent" setting is found in the "Nitrous Quick Setup" dialog box under the "Nitrous Graph" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown in the different settings below. Press the "APPLY" button to confirm the changes.



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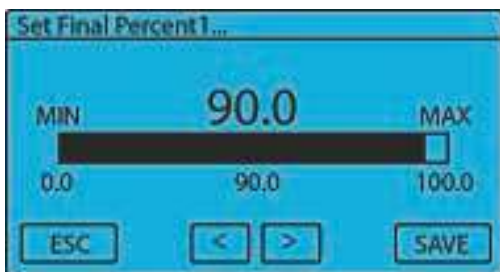
## Final Percent

This setting determines the Nitrous Final percentage. The Final Percent can be less than or greater than the Start Percent setting. If the Start percent is greater than the Final percent the ramp will progress backwards.

The Valid Range is 0% to 100% in 1% increments.

**Access from the Controller:**

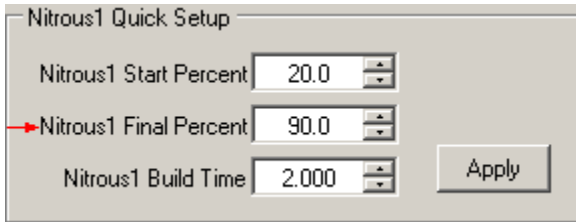
From the [Main screen](#), select the stage by pressing the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Quick Setup" menu selection is highlighted and then press the "ENTER" button. Using the "UP" and "DOWN" arrow buttons, select the "Final Percent" setting and hit "ENTER". Adjust the setting and press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.





**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous Final Percent" setting is found in the "Nitrous Quick Setup" dialog box under the "Nitrous Graph" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown in the different settings below. Press the "APPLY" button to confirm the changes.



**Build Time**

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This setting determines the time it takes for the Nitrous to ramp from the Start Percent to the Final Percent settings. A Short build time will make the Nitrous Power Ramp more aggressive and a longer Build Time will make it less aggressive.

The Valid Range is .200 to 9.900 seconds in .100 second increments.

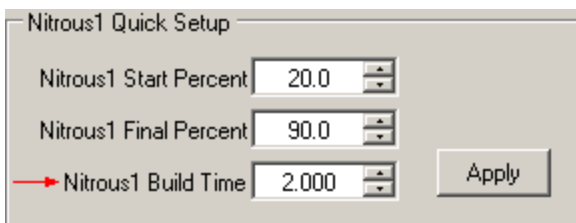
**Access from the Controller:**

From the Main screen, select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button to highlight the "Nitrous Quick Setup" menu selection and then press the "ENTER" button. Use the "UP" and "DOWN" arrow buttons to select the "Build Time" setting and press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons to adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous Build Time" setting is found in the "Nitrous Quick Setup" dialog box under the "Nitrous Graph" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown in the different settings below. Press the "APPLY" button to confirm the changes.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.3 Nitrous Graph Setup

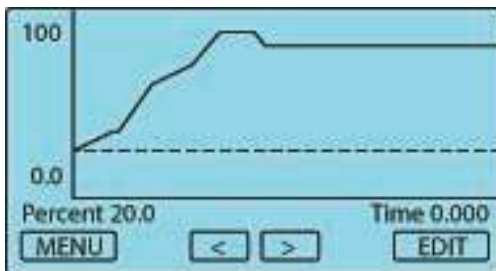
### Nitrous Setup

The Nitrous Percentage can be adjusted for each Pulse during the Progressive Ramp. This is done using a 2-D Graph Editor. Please see basic editing Instructions below. The Fuel Percentage/Ramp can be adjusted independently of the Nitrous (see [Fuel Graph Setup](#)).

#### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Graph Setup" menu selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons to move through the Nitrous Progressive Ramp. To Edit and/or change the Nitrous Progressive Ramp, move the cursor to the position to Edit and press the "EDIT" button. The editing cursor will appear at the position selected. Using the "UP" and "DOWN" arrow buttons adjust the new percentage setting. Press the "ENTER" button to accept the new setting. Use the "LEFT" and "RIGHT" arrow buttons to move to the next set point. Each cursor position represents One pulse of the Nitrous Solenoid. Press the "EDIT" button and adjust the Nitrous Percentage as outlined above. Press "ENTER" to accept the new setting.

**NOTE**—When the two set points are more than one pulse apart the Progressive Ramp will be automatically filled in between the set points.



Press the "MENU" button to Exit and/or Save the new setting(s). From the Menu select Exit and press "ENTER". You will then be prompted to Save the new settings or Exit without saving. After the Nitrous data is saved you will be prompted to copy the Nitrous setup to the Fuel setup.

**NOTE**—There are several selections available when you press the "MENU" button. Please see below for an explanation of each.

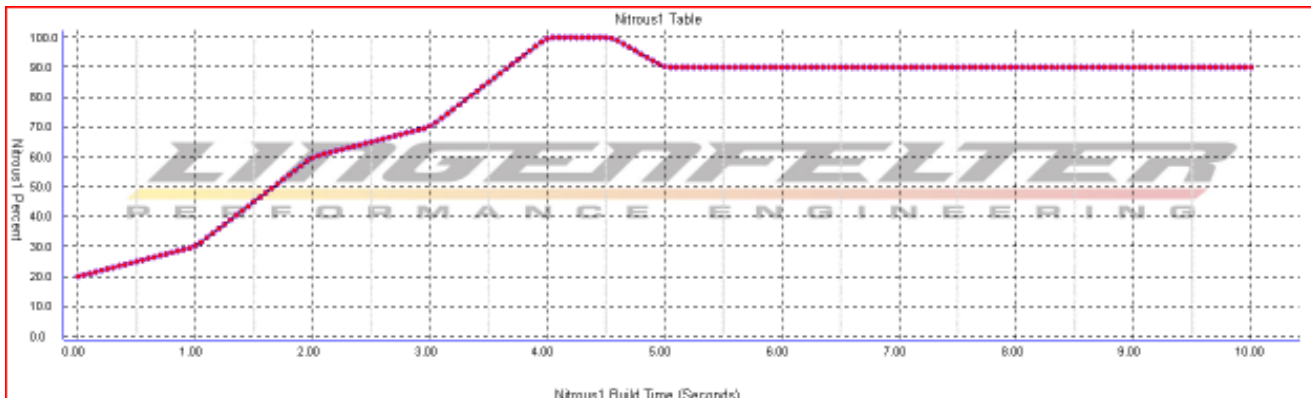
- Edit:** This selection exits the graph editor.
- Clear Edit Points:** This selection will clear any edit points that are set in the Graph Screen. This does NOT change any percentage setting, only the cursor is removed.
- View Old Data:** This selection will display the Progressive Ramp that is stored in memory.
- Restore Old Data:** This selection will restore the Progressive Ramp settings if any editing has been done and NOT saved.
- Zoom In:** This selection will zoom the X-Axis in.
- Zoom Out:** This selection will zoom the X-Axis out.



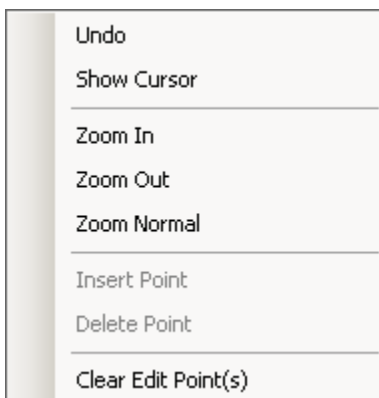
#### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The

Nitrous Graph is displayed under the "Nitrous Graph" Tab. To move a single point, click on it and drag with mouse up or down. You can use the "UP" and "Down" arrow keys to move the data point as well. By pressing CTRL + UP/DOWN keys, you can move the data point in fine precision. To set an Edit point, double click on a data point. An "X" will appear to mark the Edit point. When you select another point with a single click all points between the Edit point and the Highlight point will auto fill as you drag the point. The SHIFT+LEFT/RIGHT keys move the Highlight between data points. Use the scroll wheel and the right button on the mouse to zoom in or out. Single click off from a data point and drag the mouse to move around a zoomed in window. Hit "ESC" to deselect the edit point. You can also single click directly on highlighted Edit point to cancel. Click CTRL-Z to undo.



Right-clicking on the graph will display a menu from which the graph can be manipulated as well, as shown below.



**IMPORTANT**—When Saving a new Nitrous setup, the software will compare the Nitrous percentage settings to the current Fuel percentage settings. If the Fuel percentage for a given pulse is less than the [Nitrous percentage minus the Fuel Trim percentage](#) (See Setup Menu), then the Fuel percentage will automatically be adjusted to Nitrous percentage minus the Fuel Trim percentage. If the Fuel Trim percentage is 0, this will result in the Fuel percentage being greater than or equal to the Nitrous percentage. To allow full control of the Fuel percentage versus Nitrous percentage set the Fuel Trim Option to 100%. Do this with caution as a lean condition can and will result if improper settings are entered!

See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.4 Fuel Graph Setup

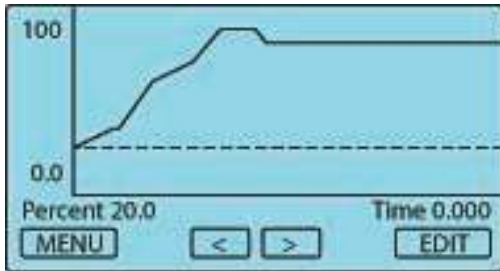
### Fuel Setup

The Fuel Percentage can be adjusted for each Pulse during the Progressive Ramp. This is done using a 2-D Graph Editor. Please see Basic Editing Instructions below. The Fuel Percentage/Ramp can be adjusted independently of the Nitrous (see Nitrous Graph Setup).

### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the Fuel Graph Setup menu selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons to move through the Fuel Progressive Ramp. To Edit and/or change the Fuel Progressive Ramp move the cursor to the position to Edit and press the "EDIT" button. The editing cursor will appear at the position selected. Using the "UP" and "DOWN" arrow buttons adjust the new percentage setting. The Fuel Percentage can NOT be set less than Nitrous Percentage - Fuel Trim (See IMPORTANT note below) unless the [fuel trim option](#) is changed from the default value of 0%. Press the "ENTER" button to accept the new setting. Use the "LEFT" and "RIGHT" arrow buttons to move to the next set point. Each cursor position represents One pulse of the Fuel Solenoid. Press the "EDIT" button and adjust the Fuel Percentage as outlined above. Press "ENTER" to accept the new setting.

**NOTE**—When the two set points are more than one pulse apart the Progressive Ramp will be automatically filled in between the set points.



Press the "MENU" button to Exit and/or Save the new setting(s). From the Menu select Exit and press "ENTER". You will then be prompted to Save the new settings or Exit without saving.

**NOTE**—There are several selections available when you press the "MENU" button. Please see below for an explanation of each.

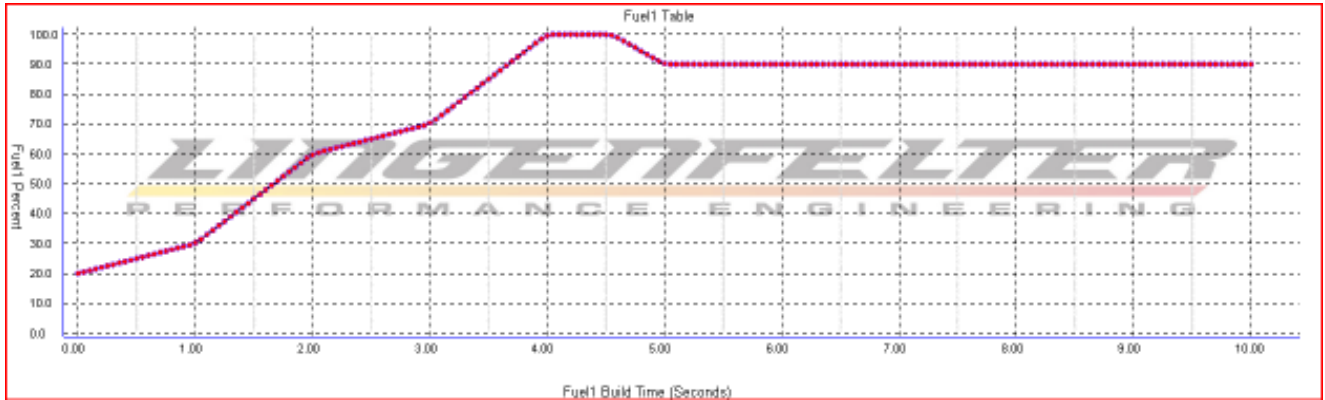
- |                           |  |
|---------------------------|--|
| <b>Exit:</b>              | This selection exits the Graph Editor.   |
| <b>Clear Edit Points:</b> | This selection will clear any Edit Points that are set in the Graph Screen. This does NOT change any Percentage setting, only the Cursor is removed. |
| <b>View Old Data:</b>     | This selection will display the Progressive Ramp that is stored in memory.   |
| <b>Restore Old Data:</b>  | This selection will restore the Progressive Ramp settings if any Editing has been done and NOT Saved.  |
| <b>View Nitrous Data:</b> | This selection will display the current Nitrous setup on the screen.   |
| <b>Copy Nitrous Data:</b> | This selection will copy the current Nitrous setup to the Fuel setup.  |
| <b>Zoom In:</b>           | This selection will Zoom the X-Axis in.  |
| <b>Zoom Out:</b>          | This selection will Zoom the X-Axis out.   |



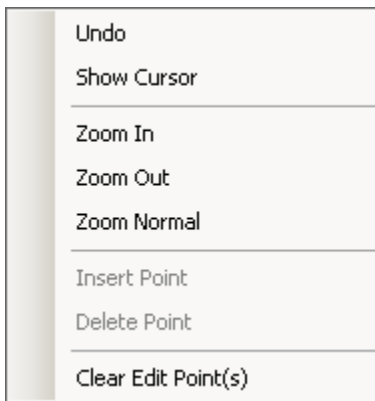
### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The Fuel Graph is displayed under the "Fuel Graph" Tab. To move a single point, click on it and drag with mouse up or down. You can use the "UP" and "Down" arrow keys to move the data point as well. By pressing CTRL + UP/DOWN keys, you can move the data point in fine precision. To set an Edit point, double click on a data point. An "X" will appear to mark the Edit point. When you select another point with a single click all points between the Edit point and the Highlight point will auto fill as you drag the point. The SHIFT+LEFT/RIGHT keys move the Highlight between data points. Use the scroll wheel and the right button on the mouse to zoom in or out. Single click off from a data point and drag the mouse to move around a zoomed in window. Hit "ESC" to deselect the edit point. You can also single click directly on highlighted Edit point to cancel. Click CTRL-Z to undo. Right-

clicking on the graph will display a menu from which the graph can be manipulated as well, as shown below the graph.



Right-clicking on the graph will display a menu from which the graph can be manipulated as well, as shown below.



**IMPORTANT**—When Saving a new Fuel setup, the software will compare the Nitrous Percentage settings to the current Fuel Percentage settings. If the Fuel Percentage for a given pulse is less than the [Nitrous Percentage minus the Fuel Trim percentage](#) (See Setup Menu) the Fuel Percentage will automatically be adjusted to Nitrous Percentage Fuel Trim. To allow full control of the Fuel Percentage versus Nitrous Percentage set the Fuel Trim Option to 100%. Do this with caution as a Lean condition can and will result if improper settings are entered!

See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.5 Nitrous Minimum RPM / Nitrous On RPM

This setting controls the minimum RPM level that the nitrous can be active (the nitrous-enabling RPM).

The valid range is 1,000 to 15,000 RPM in 100 RPM increments.

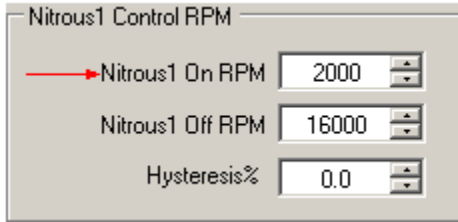
### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Min RPM" setting is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous On RPM" setting is found in the "Nitrous Control RPM" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.6 Nitrous Maximum RPM / Nitrous Off RPM

This setting controls the maximum RPM level that the nitrous is active. Use this setting to disable the nitrous when on the rev limiter.

The valid range is 2,000 to 16,000 RPM in 100 RPM increments.

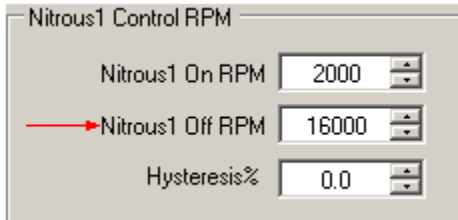
**Access from the Controller:**

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Max RPM" setting is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous Off RPM" setting is found in the "Nitrous Control RPM" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.7 RPM Hysteresis Value / Hysteresis Percentage

This setting allows the user to specify the hysteresis percentage for the maximum and minimum (ON/OFF) RPM nitrous settings. For the minimum (ON) RPM setting, this is the percentage below the set RPM point that will disable nitrous. For the maximum (OFF) RPM setting, this is the percentage below the set RPM point that re-enables the nitrous.

Refer to [Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.

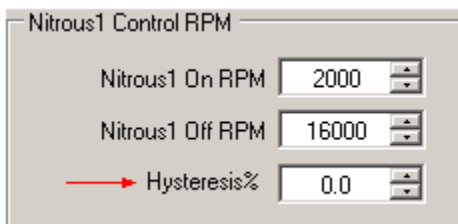
### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O\_1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "RPM Hysteresis %" setting is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Hysteresis %" setting is found in the "Nitrous Control RPM" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

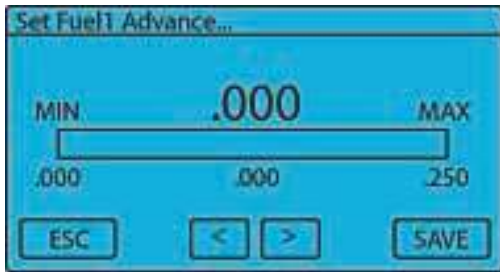
## 6.8 Fuel Advance

This setting allows the fuel to start before the nitrous, therefore confirming that no nitrous flows without fuel present. With the fuel operating at a lower pressure, this allows the proper amount of fuel to be delivered before nitrous can flow. Some systems may not need any advance, while others may need more fuel advance than others.

Valid Range is 0.000 to 0.250 seconds.

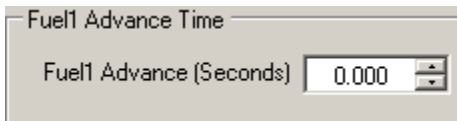
**Access from the Controller:**

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Fuel Advance" menu selection is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Fuel Advance" setting is found in the "Fuel Advance Time" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.9 Nitrous Gear Position

This option allows the nitrous to be initiated by gear position. Example-if the nitrous shift count is set to 3rd gear the nitrous would not start until the system is armed and the vehicle has reached 3rd gear. The Nitrous delay timer will not start until the vehicle is in the selected gear position.

The valid range is integer numbers from 1 to 6.

**Access from the Controller:**

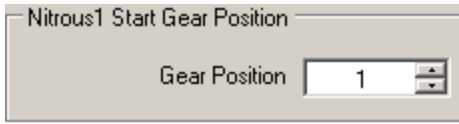
From the [Main screen](#), select the stage by pressing either the "N2O\_1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Nitrous Gear Pos" setting is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Gear Position" setting is found in the "Nitrous Start Gear Position" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.





See [Appendix B: Nitrous & Fuel Operation](#) for more information.

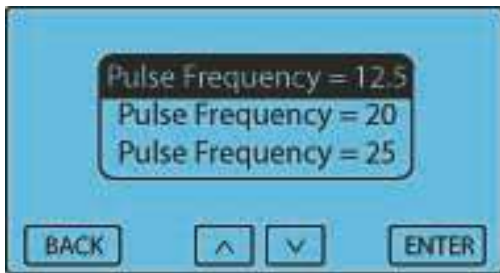
## 6.10 Pulse Frequency

This setting determines the number of times per second that the solenoids pulse. A lower setting generally will provide a more linear power delivery, as well as allow for lower starting percentages to be used. A higher pulse frequency results in more solenoid pulses per second, which is displayed in the graph setup of the Nitrous Control Center software by more data points. The correct setup will be different depending on the type of solenoids and bottle pressure used. Testing is the only way to determine the best frequency for each application. This setting applies to the respective nitrous and fuel solenoids of for each stage.

**NOTE**—When changing the pulse frequency the current Nitrous Setup will be time altered. Be sure to check the Nitrous and Fuel Settings after a Frequency change!

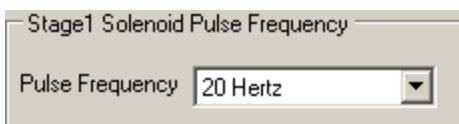
### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button to highlight the Pulse Frequency menu selection and then press the "ENTER" button. Using the "UP" and "DOWN" buttons selected the desired Pulse Frequency setting. Press "ENTER" to select the new setting or press "BACK" to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Pulse Frequency" setting is found in the "Stage Solenoid Pulse Frequency" dialog box under the "Options" Tab. Click on one of the settings in the scroll-down menu to select the desired pulse frequency setting.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.11 Resume Start Percentage

This setting determines the percent at which the Nitrous resumes if the user has to lift the throttle after the nitrous system is active. This setting is only valid if the Hold And Wait option is ON. This setting is used with the Resume Percent Per Pulse setting to build a Resume Ramp. If the Resume Start Percent is greater than the current Nitrous percent, the Resume Ramp is ignored.

Valid Range is 10% to 100% in 1% increments. A setting of 100% disables this feature (no ramp / instant ON).

### Access from the Controller:

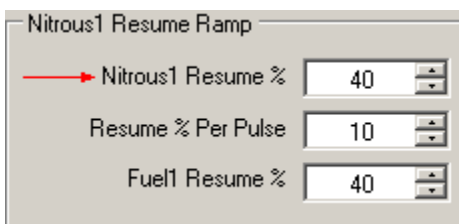
From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the

"DOWN" arrow button repeatedly until the "Resume Start Percent" menu selection is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Nitrous Resume %" setting is found in the "Nitrous Resume Ramp" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

## 6.12 Resume Percent Per Pulse

This setting determines the rate at which the Nitrous Resumes if the user lifts the throttle during Arming. This setting is used with the Resume Start Percent to build a Resume Ramp. This allows the user to adjust how quick the Nitrous comes back on if one of the activation criteria is removed, causing the system to deactivate.

Valid Range is 10% to 50% in 1% increments.

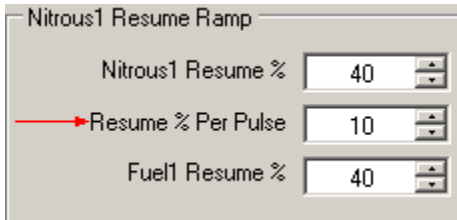
#### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Resume % Per Pulse" menu selection is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Resume % Per Pulse" setting is found in the "Nitrous Resume Ramp" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

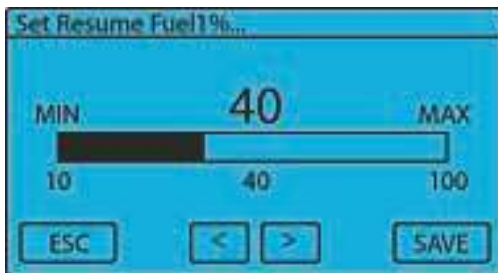
## 6.13 Resume Fuel Percentage

This setting determines the percent at which the fuel resumes if the user has to lift off of the throttle once the system is active. This setting is only valid if the Hold And Wait option is ON. This setting is used with the Resume Percent Per Pulse setting to build a Resume Ramp. If the Resume Fuel Percent is greater than the current Fuel percent, the Resume Ramp is ignored.

Valid Range is 10% to 100% in 1% increments. A setting of 100% disables this feature (no ramp).

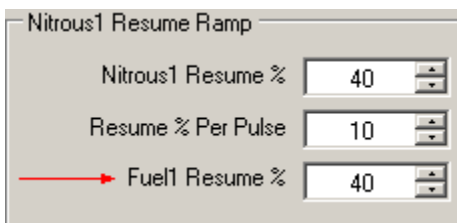
### Access from the Controller:

From the [Main screen](#), select the stage by pressing either the "N2O-1" button or the "N2O-2" button. Press the "DOWN" arrow button repeatedly until the "Resume Fuel %" menu selection is highlighted and then press the "ENTER" button. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), select the stage by pressing either the "Nitrous1" button or the "Nitrous2" button. The "Resume % Per Pulse" setting is found in the "Nitrous Resume Ramp" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.

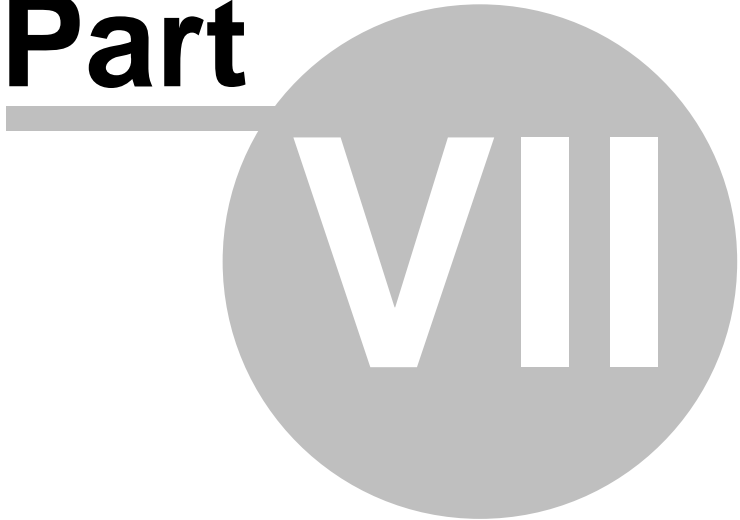


See [Appendix B: Nitrous & Fuel Operation](#) for more information.



# Setup Menu

**Part**



## 7 Setup Menu

The following sub-sections detail the various features and settings located in the Setup Menu on the controller, which can be accessed by pressing the far right navigation button on the NCC-002 controller. Some of these options include using various sensors, vehicle RPM, or vehicle speed to control the arming of the system. Other options in the Setup Menu, such as the Analog Output feature, allow the NCC-002 to control other devices.



### 7.1 Erase Data Log

This setting allows the user to manually erase the last data log from the NCC-002.

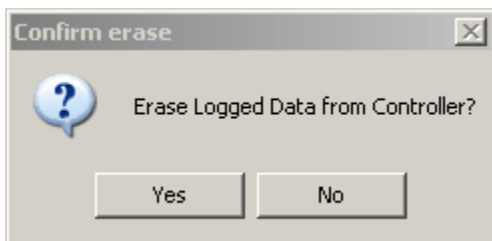
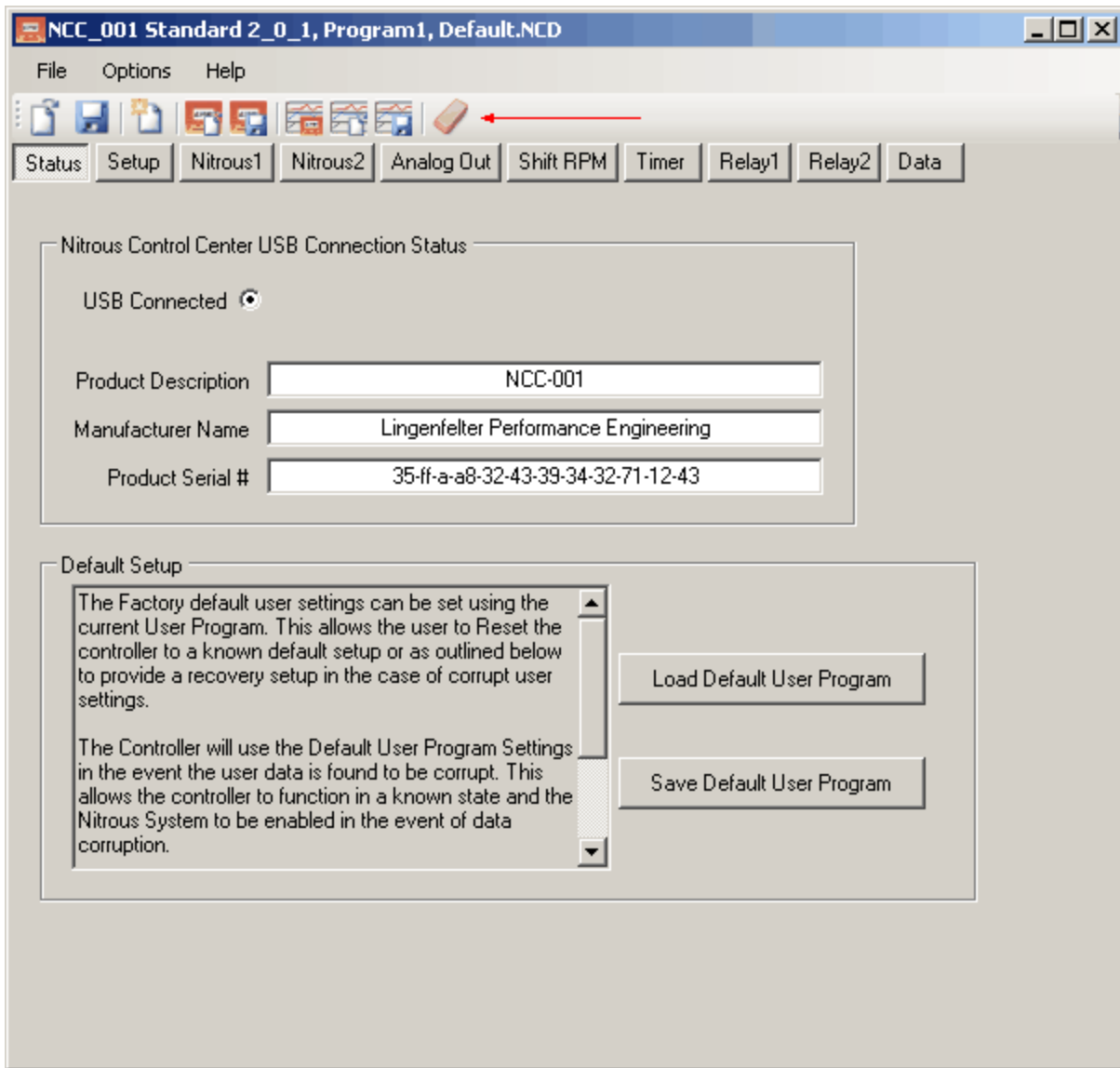
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press "ENTER" to select the "Erase Data Log" menu selection. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed, the data log will not be erased.



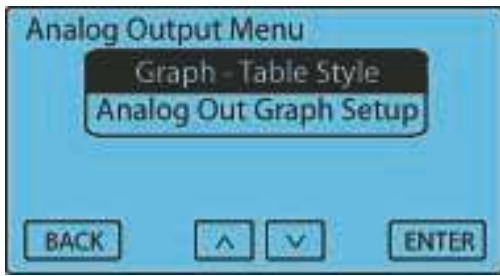
**Access from the Computer Program:**

From the [Status screen](#), click on the Eraser Icon in the toolbar. Click "YES" to erase the data log from the controller or "NO" to abort the operation.



## 7.2 Analog Out Menu

The Analog Out voltage function of the NCC-002 can be used for NCC-002 related data to a data acquisition system or to an ECM for external fuel or spark control, as well as to link to other devices, such as the LPE LNC-2000 Launch Controller (LPE PN:L460145297) to create a progressive timing retard effect. Currently, the analog output voltage signal can be user-defined versus time or proportional to the Nitrous1 graph, Nitrous2 graph, or a combination of both nitrous graphs.



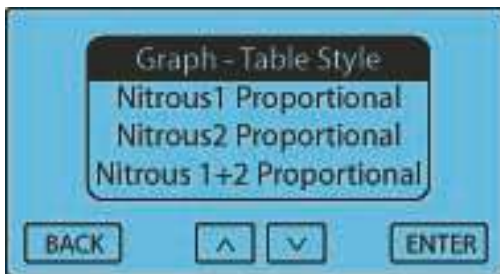
### 7.2.1 Graph Type

This setting allows for the Analog Out voltage to emulate the output of other components. Below are the available settings and their respective descriptions.

Graph-Table Style	The Analog Out signal will follow the Analog Out Graph
Nitrous1 Proportional	The Analog Out signal will follow the Stage 1 Nitrous Graph
Nitrous2 Proportional	The Analog Out signal will follow the Stage 2 Nitrous Graph
Nitrous 1 + 2 Proportional	The Analog Out signal will follow a combination of both Nitrous Stage Graphs

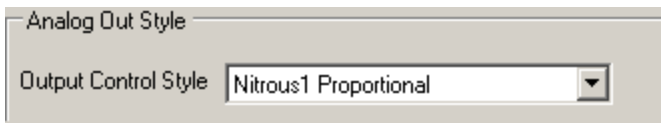
#### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the "Analog Out Menu" is highlighted and then press the "ENTER" button two (2) times. Use the "UP" and "DOWN" arrow buttons to adjust the setting. Press the "ENTER" button to accept the new setting or press the "BACK" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Analog Out" button. The "Output Control Style" setting is found in the "Analog Out Style" dialog box. Click on one of the settings in the scroll-down menu to select the desired pulses per degree setting.



### 7.2.2 Analog Out Graph Setup

The Analog Out Voltage can be adjusted for each Pulse during the Progressive Ramp. This is done using a 2-D Graph Editor. Please see Basic Editing Instructions below. The Analog Out voltage can be used for Data Recording or as an analog Input to a Electronic Fuel Injection controller. When used with some aftermarket EFI systems, the analog output of the NCC-002 can be used to richen the fuel mixture and/or modify the ignition timing.

The valid range for this output is 0.0 to 5.0 volts.

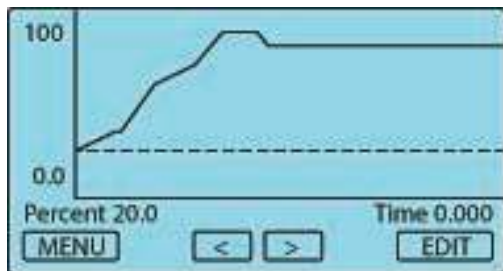
#### Access from the Controller:

From the [Main screen](#) press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the "Analog



Out Menu" selection is highlighted and then press the "ENTER" button. Press the "DOWN" button until the "Analog Out Graph Setup" is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons to move through the Analog Out settings. To Edit and/or change the Analog Out settings move the cursor to the position to Edit and press the "EDIT" button. The editing cursor will appear at the position selected. Using the "UP" and "DOWN" arrow buttons adjust the new setting. Press the "ENTER" button to accept the new setting. Use the "LEFT" and "RIGHT" arrow buttons to move to the next set point. Each cursor position represents One pulse of the Nitrous/Fuel Solenoid. Press the "EDIT" button and adjust the Analog Out voltage as outlined above. Press "ENTER" to accept the new setting.

**NOTE**—When the two set points are more than one pulse apart the Analog Out voltage will be automatically filled in between the set points.



There are several selections available when you press the "MENU" button. Below is the list of available options along with their respective functions.

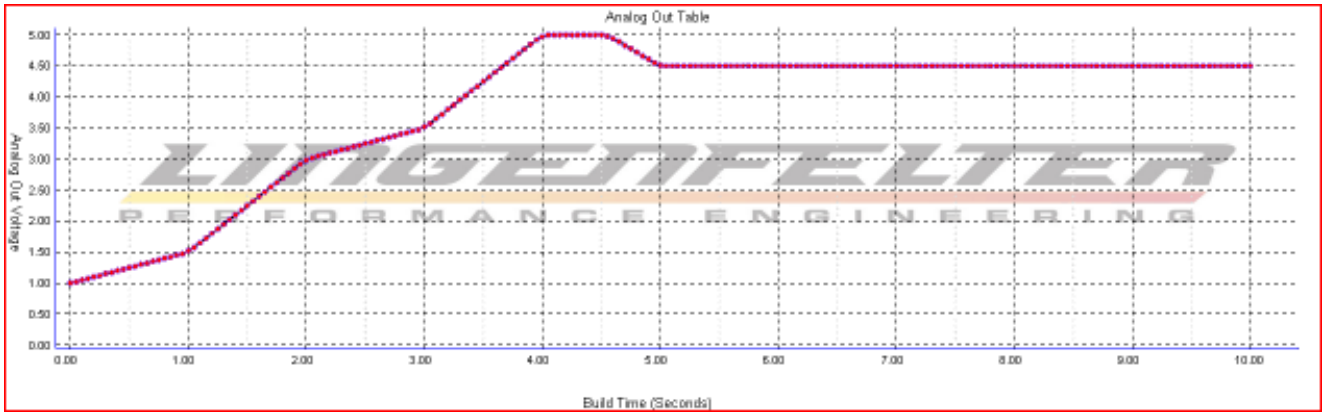
- Exit:** This selection exits the Graph Editor
- Clear Data Points:** This selection will clear any edit points that are set in the Graph Screen. This does NOT change any Percentage setting (only the cursor is removed).
- View Old Data:** This selection will display the Progressive Ramp that is stored in memory.
- Restore Old Data:** This selection will restore the Progressive Ramp settings if any editing has been done, but not saved.
- Zoom In:** This selection will zoom the X-axis in.
- Zoom Out:** This selection will zoom the X-axis out.



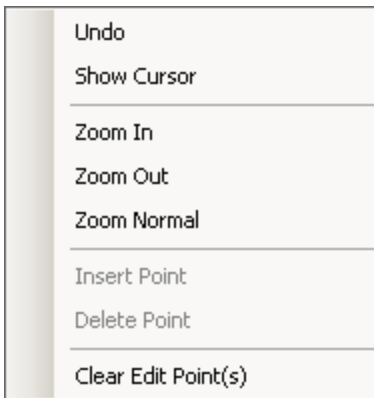
Press the "MENU" button to Exit and/or Save the new setting(s). From the Menu select Exit and press "ENTER". You will then be prompted to Save the new settings or Exit without saving.

#### Access from the Computer Program:

From the [Status screen](#), click on the "Analog Out" button. To move a single point, click on it and drag with mouse up or down. You can use the "UP" and "Down" arrow keys to move the data point as well. By pressing CTRL + UP/DOWN keys, you can move the data point in fine precision. To set an Edit point, double click on a data point. An "X" will appear to mark the Edit point. When you select another point with a single click all points between the Edit point and the Highlight point will auto fill as you drag the point. The SHIFT+LEFT/RIGHT keys move the Highlight between data points. Use the scroll wheel and the right button on the mouse to zoom in or out. Single click off from a data point and drag the mouse to move around a zoomed in window. Hit "ESC" or double click off from data point to cancel selected edit point. You can also single click directly on highlighted Edit point to cancel. Click CTRL-Z to undo.



Right-clicking on the graph will display a menu from which the graph can be manipulated as well, as shown below.



See [Appendix B: Nitrous & Fuel Operation](#) for more information.

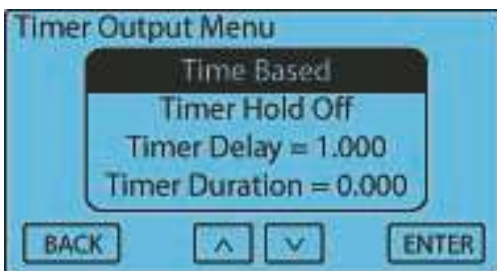
### 7.3 Timer Setup Menu

The Timer Out is a +12 volt output that can be controlled by the NCC-002 based on time or engine RPM.

The following options are available in the "TIMER SETUP" menu. If the Timer Output Option is set to a time based output, the "Timer Delay" and "Timer Duration" settings will appear in the "Timer Output Menu", as shown below. If the Timer Output Option is set to an RPM controlled window switch output, the "Timer On RPM", "Timer Off RPM", and "RPM Hysteresis%" settings will appear in the "Timer Output Menu".

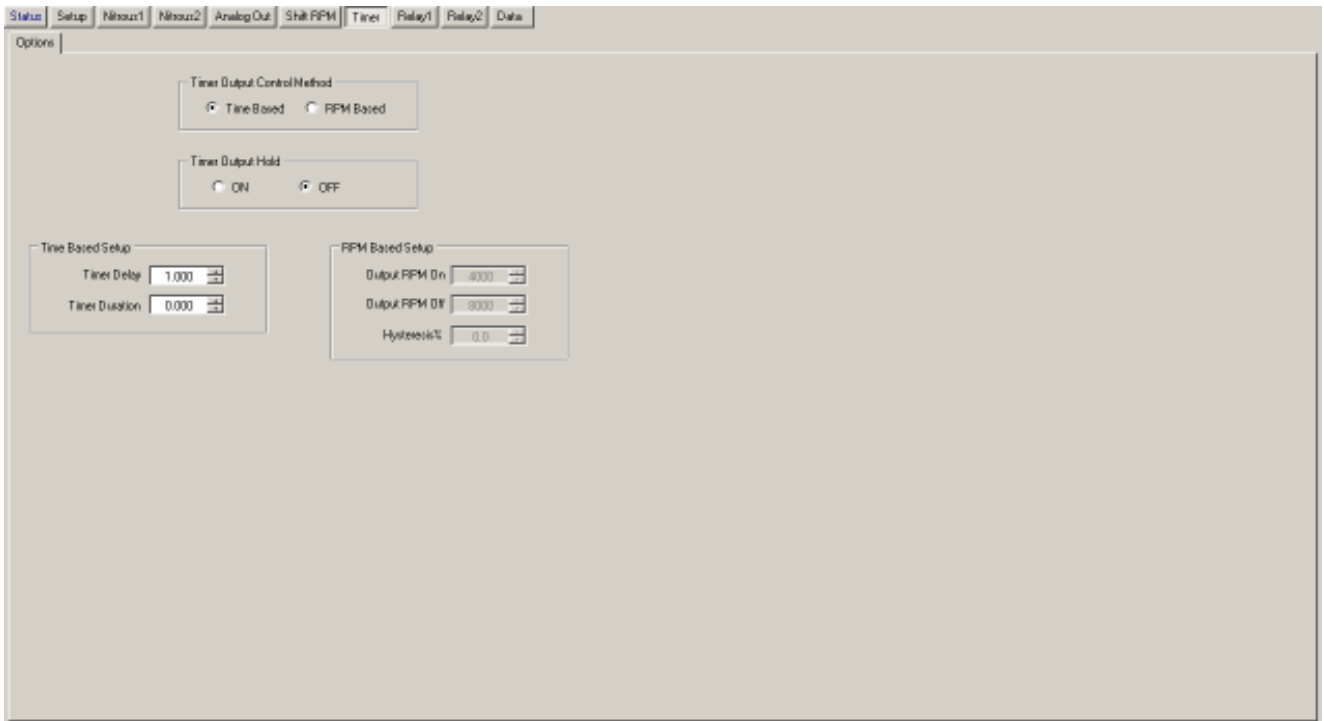
**Access from the Controller:**

From the [Main screen](#), press the "Setup" button. Scroll down until until you find the "Timer Setup Menu" button and press the "ENTER" button.



**Access from the Computer Program:**

From the [Status screen](#), press the "Timer" button.



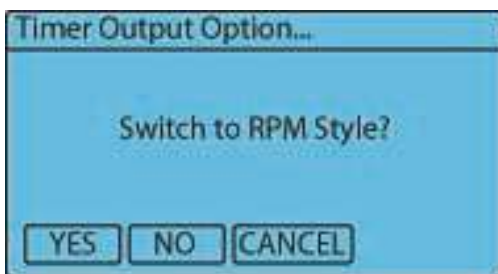
## Timer Output Option

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The Timer Out function can function in either a timed output mode or as an RPM controlled window switch output.

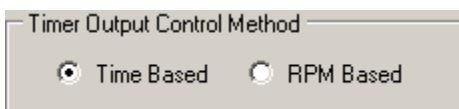
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" until the "Timer Output" menu selection is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Time-Based" option and press either the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), press the "Timer" button. The "Time based" option is found in the "Timer Output Control Method" dialog box under the "Options" Tab. Click "Time Based" to enable the timer-controlled output or "RPM Based" to enable the RPM-controlled output.



## Timer Hold

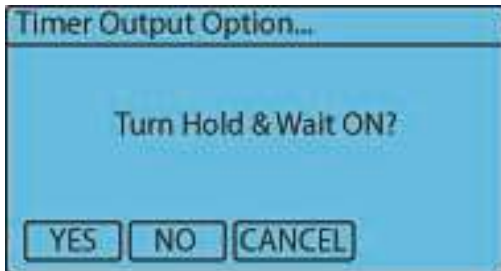
---

This setting determines if the +12V Timer Output remains On when the Arming signal is removed and the Hold & Wait option is also on.

**Access from the Controller:**

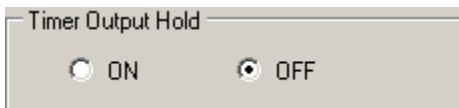
From the [Main screen](#) press the "SETUP" button, press the "DOWN" until the Timer Hold menu selection is highlighted and then press the "ENTER" button. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.

**NOTE**—When asked to make a selection from a "Message Box" the default selection will be chosen after 20 seconds.



**Access from the Computer Program:**

From the [Status screen](#), press the "Timer" button. The "Time Hold" option is found in the "Timer Output Hold" dialog box under the "Options" Tab. Click "ON" to enable the Timer Hold feature or "OFF" to disable the Timer Hold feature.



## Timer Delay

---

This setting controls the amount of Delay before the +12V Timer Output turns on after the nitrous system is activated.

If a setting of 0.000 is entered the Timer Output will turn ON with the First Pulse of the Nitrous Solenoid. This output can NOT be disabled and the user must remove any wires connected to the Output terminal to disable any device connected.

The valid range is 0.000 to 9.990 in .01 second increments.

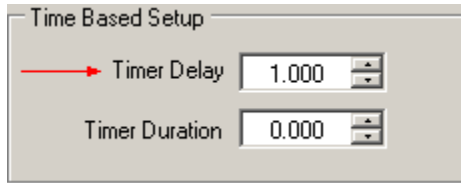
**Access from the Controller:**

From the Main screen press the "SETUP" button and then press the "ENTER" button. Press the "DOWN" button continuously until the "Timer Setup Menu" is selected, then press "ENTER". Press the "DOWN" button continuously until the "Timer Delay" setting is highlighted, then press "ENTER". Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Timer" button. The "Timer Delay" option is found in the "Time Based Setup" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Timer Duration

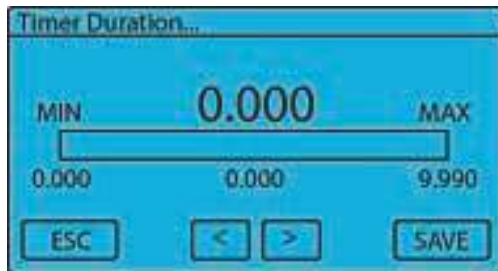
---

This setting controls the amount of time the Timer Out remains "ON" after the delay has expired. A setting of 0 will disable this option and the output will remain "ON" while the system is activated.

The valid range is 0.000-9.990 in .01 second increments.

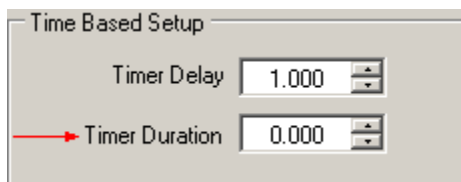
### Access from the Controller:

From the Main screen press the "SETUP" button and then press the "ENTER" button. Press the "DOWN" button continuously until the "Timer Setup Menu" is selected, then press "ENTER". Press the "DOWN" button continuously until the "Timer Duration" setting is highlighted, then press "ENTER". Using the "LEFT" and "RIGHT" arrow buttons, adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Timer" button. The "Timer Duration" option is found in the "Time Based Setup" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Timer RPM Output On

---

This setting controls the RPM at which the timer is activated if the timer is setup as a RPM window switch controlled output. The RPM On setting must be at least 500 RPM's lower than the RPM Off setting.

The valid range is 1000-15500 in 100 RPM increments.

### Access from the Controller:

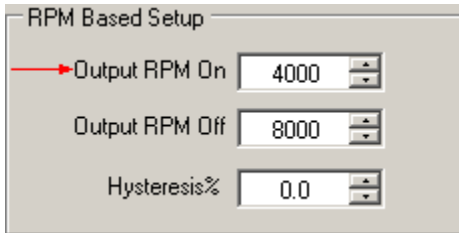
From the Main screen press the "SETUP" button and then press the "ENTER" button. Press the "DOWN"

button continuously until the "Timer Setup Menu" is selected, then press "ENTER". Press the "DOWN" button continuously until the "Timer On RPM" setting is highlighted, then press "ENTER". Using the "LEFT" and "RIGHT" arrow buttons, adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Timer" button. The "Output RPM On" option is found in the "RPM Based Setup" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Timer RPM Output Off

---

This setting controls the RPM at which the timer is deactivated if the timer is setup as a RPM window switch controlled output. The RPM Off setting must be at least 500 RPM's higher than the RPM On setting.

The valid range is 2000-16000 in 100 RPM increments.

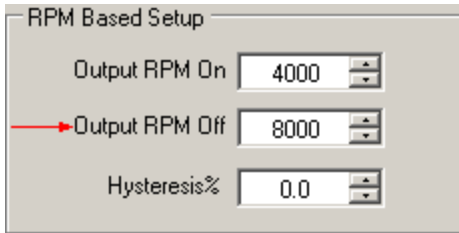
**Access from the Controller:**

From the Main screen press the "SETUP" button and then press the "ENTER" button. Press the "DOWN" button continuously until the "Timer Setup Menu" is selected, then press "ENTER". Press the "DOWN" button continuously until the "Timer Off RPM" setting is highlighted, then press "ENTER". Using the "LEFT" and "RIGHT" arrow buttons, adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Timer" button. The "Output RPM Off" option is found in the "RPM Based Setup" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## RPM Hysteresis Percentage

This setting controls the percentage of hysteresis for the engine RPM if the timer is setup as a RPM window switch controlled output. The hysteresis percentage is based off of the full scale range (16000 RPM). For example, you set the RPM On to 4000 and the RPM Off to 8000. The following chart shows the effect of a 1% hysteresis on those values (1% of 16000 = 160 RPM):

Hysteresis	RPM On Setting = 4000		RPM Off setting = 8000	
0%	ON at 4000 RPM	OFF at 4000 RPM	OFF at 8000 RPM	ON at 8000 RPM
1%	ON at 4000 RPM	OFF at 3840 RPM	OFF at 8000 RPM	ON at 7840 RPM

In the above example with a 0% hysteresis, as the engine RPM rises above 4000 RPM, the Timer Output is turned on. Then, when engine speed exceeds 8000 RPM, the Timer Output is turned off. As the engine RPM drops, the Timer Output is turned on when the engine speed drops below 8000 RPM and is then turned off when the engine speed drops below 4000 RPM. With a 1% hysteresis, the values would be the same when the engine speed is increasing, but as the engine RPM drops, the Timer Output is turned on when the engine speed drops below 7840 RPM and is turned off when the engine speed drops below 3840 RPM.

For more information on hysteresis values, refer to [Appendix D: Glossary of Terms](#).

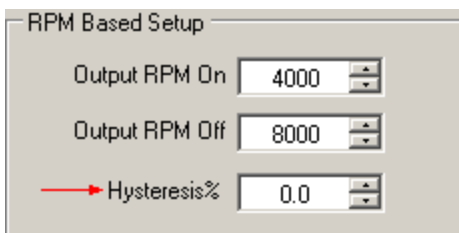
The valid range is 0.0-5.0 in 0.1% increments.

### Access from the Controller:

From the Main screen press the "SETUP" button and then press the "ENTER" button. Press the "DOWN" button continuously until the "Timer Setup Menu" is selected, then press "ENTER". Press the "DOWN" button continuously until the "RPM Hysteresis%" setting is highlighted, then press "ENTER". Using the "LEFT" and "RIGHT" arrow buttons, adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.

### Access from the Computer Program:

From the [Status screen](#), press the "Timer" button. The "Hysteresis%" option is found in the "RPM Based Setup" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## 7.4 Shift Setup Menu

The following options and settings can be found in the Shift Setup Menu.

### Shift RPM

This setting controls the RPM to activate the +12 volt Shift Light output on the NCC-002.

The Valid Range is 1000 to 16000 RPM in 100 RPM increments.

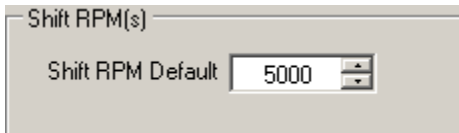
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Shift Setup menu selection is highlighted and then press the "ENTER" button twice. Using the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Shift RPM" button. The "Shift RPM Default" option is found in the "Shift RPM(s)" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## 7.5 Throttle Position Sensor (TPS) Setup Menu

The following options are found in the TPS setup menu, which can be accessed by the "SETUP" button on the main screen of the controller or the TPS Input tab on the Setup screen of the computer software. The TPS accepts rising or falling voltage signals. Note that the Throttle Position Sensor (TPS) and the Accelerator Pedal Position sensor (APP) are NOT the same. While both the TPS and APP sensors function by relaying a voltage to the ECM that translates into the degree of engagement, the measurements and their consequential voltages are not the same. While the NCC-002 can accept either signal, LPE recommends that the NCC-002 be connected to the TPS in most cases.

See [Appendix D: Glossary of Terms](#) for more information on the Throttle Position Sensor.

### TPS Activation Option

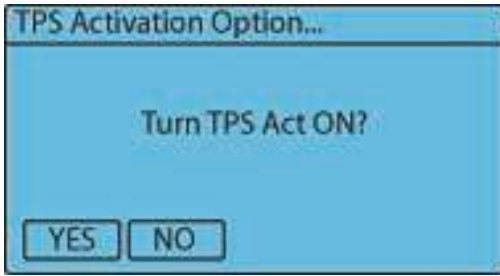
---

The TPS Activation Option allows the throttle position sensor input to control system activation. The Arming Input must be used even if this option is selected.

**Access from the Controller:**

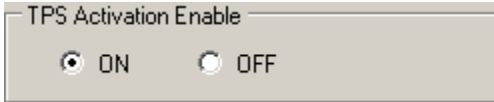
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the TPS Setup Menu selection is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the TPS Arming Option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.





**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "TPS Activation Enable" option is found under the "TPS Input" Tab. Click "ON" to enable the TPS Activation Enable feature or "OFF" to disable the feature.



## Activation Percentage

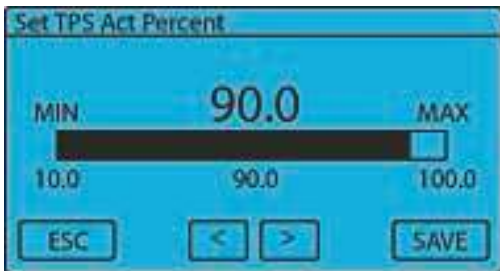
---

The TPS Activation Percentage setting determines the TPS percent at which system activation will occur based on TPS alone (other activating criteria must also be met).

The Valid Range is 10% to 100% in 0.1% increments.

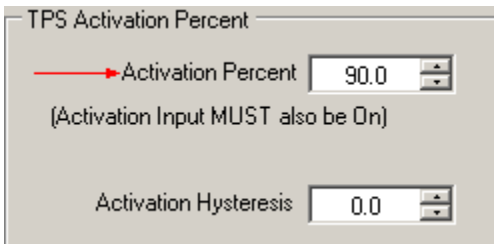
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the TPS Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Activation%" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Activation Percent" setting is found in the "TPS Activation Percent" dialog box under the "TPS Input" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Hysteresis Percentage

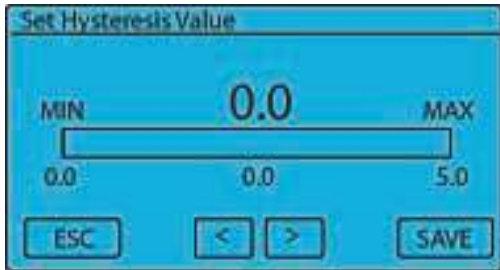
---

This setting determines the TPS Activation Hysteresis Percentage. Refer to [Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.

The Valid range is 0.1% to 5.0% in 0.1% increments (of full scale, 100%).

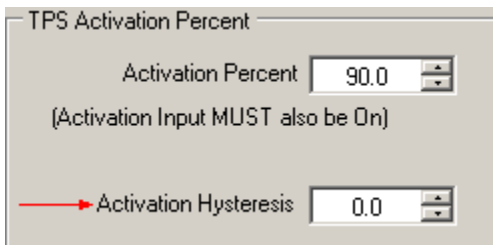
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the TPS Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Hysteresis%" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Activation Hysteresis" setting is found in the "TPS Activation Percent" dialog box under the "TPS Input" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Set TPS Voltage

---

The TPS closed and wide open throttle input values can be set using live data from the TPS Input or these values can be set manually. Due to the fact that the controller is reading live data from the vehicle, this method of determining the TPS voltage settings is not available in the Nitrous Control Center computer software interface. It is important to note that the butterfly valve on most electronic throttle body vehicles is not fully closed when the vehicle is idling. For this reason, the vehicle should not be running when setting the TPS voltage using this method.

NOTE: If you choose to use this method to set your minimum and maximum TPS voltages on a vehicle equipped with an electronic throttle body, it will require the use of an assistant to hold the throttle completely open or closed while setting the voltages on the controller.

**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" button repeatedly until the TPS Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Set TPS Voltage" selection is highlighted and then press the "ENTER" button.

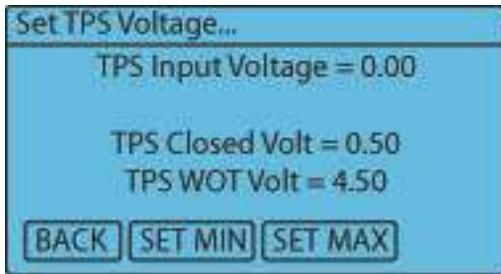
For a vehicle equipped with an electronic throttle body:

1. Remove the vehicle's air duct to expose the butterfly valve in the throttle body
2. With the key in the ignition, turn the key to the ON position, but DO NOT start the vehicle.
3. Have your assistant physically shut the butterfly valve in the throttle body.
4. With the gas pedal completely released, press the "SET MIN" button.

- Next, have your assistant physically hold the throttle body butterfly valve completely open.
- With the gas pedal completely depressed, press the "SET MAX" button.

For a vehicle equipped with a mechanical throttle body:

- With the key in the ignition, turn the key to the ON position, but DO NOT start the vehicle.
- With the gas pedal completely released, press the "SET MIN" button.
- With the gas pedal completely depressed, press the "SET MAX" button.



## Manually Set Closed Throttle TPS Voltage

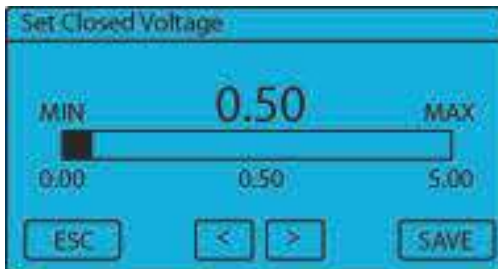
---

This setting allows the user to manually select the voltage with the Throttle Position Sensor in the closed position.

The Valid Range is 0.00 to 5.00 volts in 0.01 volt increments.

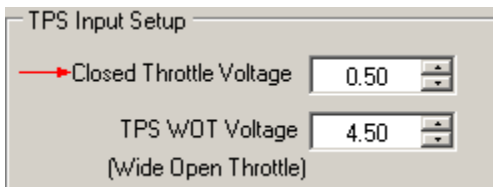
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the TPS Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Manual Set Min Volts" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Closed Throttle Voltage" setting is found in the "TPS Input Setup" dialog box under the "TPS Input" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Manually Set Maximum Wide Open Throttle TPS Voltage

---

This setting allows the user to manually select the voltage with the Throttle Position Sensor in the wide open position.

The Valid Range is 0.00 to 5.00 volts in 0.01 volt increments.

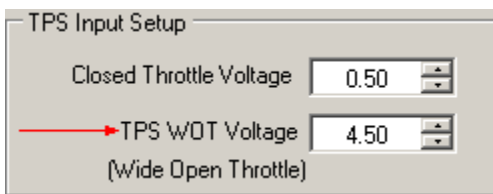
**Access from the Controller:**

From the Main screen, press the "SETUP" button, press the "DOWN" arrow button repeatedly until the TPS Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Manual Set Max Volts" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "TPS WOT Voltage" setting is found in the "TPS Input Setup" dialog box under the "TPS Input" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## 7.6 Analog1 Setup Menu

The Analog Clutch Options and settings are available in the Analog1 Setup Menu. The current input options for Analog1 are OFF or Clutch Position Sensor input.

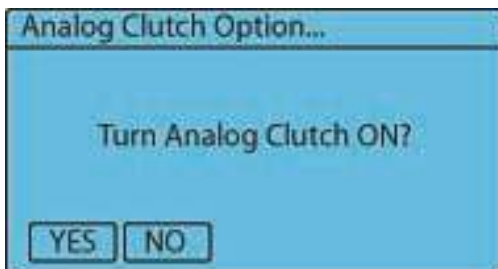
### Analog1 Clutch Option

---

The Analog Clutch Option allows the NCC-002 to read the clutch position sensor on vehicles with a 0-5 volt output clutch position sensor. The clutch, therefore, becomes an activation enabler. Many newer vehicles use a clutch sensor as opposed to the traditional clutch switch. This feature accepts rising or falling input types.

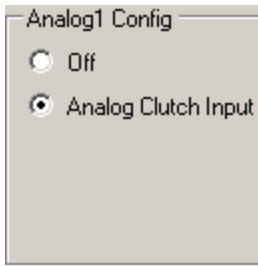
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Analog1 Setup Menu selection is highlighted and then press the "ENTER" button. Once in the Analog1 Setup menu, press the "ENTER" button to select the Analog Clutch option. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Analog Clutch Input" option is found in the "Analog1 Config" dialog box under the "Analog1" Tab. Click "Analog Clutch Input" to enable the Analog Clutch Input feature or "OFF" to disable the feature.



## Analog1 Clutch Activation Percentage

---

This setting allows the user to define at what clutch percentage the clutch arming occurs.

The valid range is 10.0-100.0 percent in 0.1 percent increments.

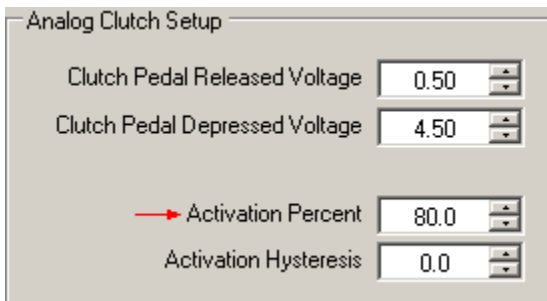
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Analog1 Setup Menu selection is highlighted, and then press the "ENTER" button twice. Press the down arrow until the "Activation%" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Activation Percent" setting is found in the "Analog Clutch Setup" dialog box under the "Analog1" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Analog1 Clutch Activation Hysteresis

---

This setting allows the user to set a hysteresis percentage for the clutch activation percentage. Refer to

[Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.

The valid range is 0.0% to 5.0% in 0.1% increments (of full scale, 100%).

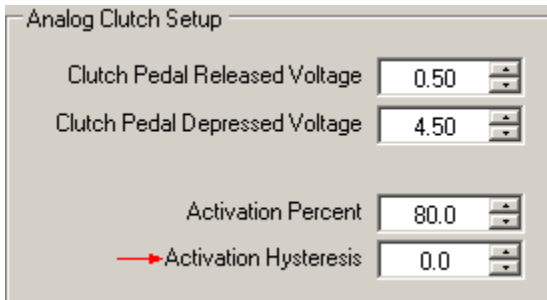
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Analog1 Setup Menu selection is highlighted, and then press the "ENTER" button twice. Press the down arrow until the "Hysteresis%" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Activation Hysteresis" setting is found in the "Analog Clutch Setup" dialog box under the "Analog1" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Calibrate Clutch Pedal Position Sensor Signal

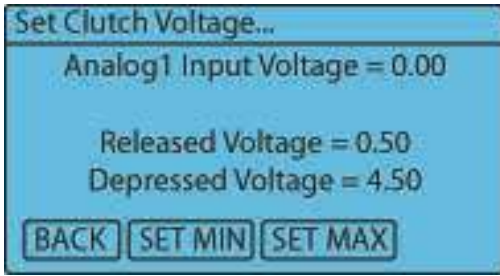
---

This option is only available on the controller and allows the user to set the released and depressed clutch voltages using live data from the vehicle.

The valid range is 0.00-5.00 in 0.01 Volt increments.

**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" button repeatedly until the Analog1 Setup Menu selection is highlighted, and then press the "ENTER" button twice. Press the down arrow until the "Set Clutch Voltage" selection is highlighted and then press the "ENTER" button. With the vehicle powered up and the clutch pedal released, press the "SET MIN" button. Next, fully depress the clutch pedal and press the "SET MAX" button. The clutch voltages that were observed by the controller will be displayed and this should be used to verify correct operation.



**OR**

## **Manually Set Clutch Pedal Released Voltage**

---

This setting allows the user to manually set the input voltage seen by the controller when the clutch pedal is released.

The valid range is 0.00-5.00 in 0.01 volt increments.

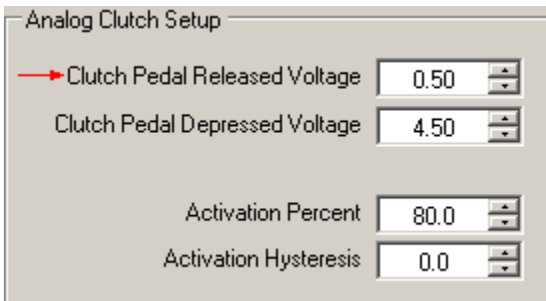
### **Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Analog1 Setup Menu selection is highlighted, and then press the "ENTER" button twice. Press the down arrow until the "Set Released Voltage" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### **Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Clutch Pedal Released Voltage" setting is found in the "Analog Clutch Setup" dialog box under the "Analog1" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## **Manually Set Clutch Pedal Depressed Voltage**

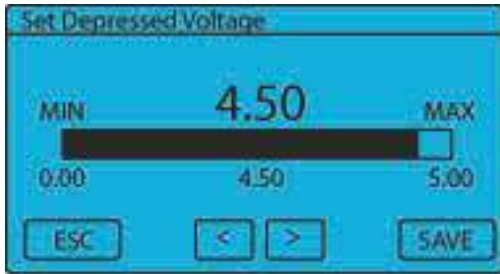
---

This setting allows the user to manually set the input voltage seen by the controller when the clutch pedal is depressed.

The valid range is 0.00-5.00 in 0.01 Volt increments.

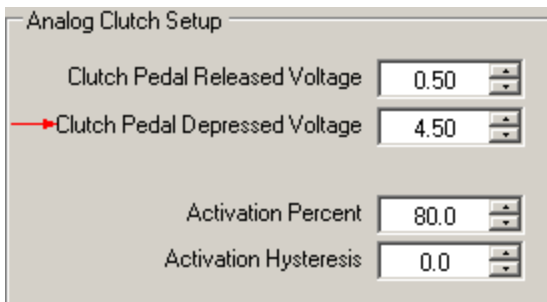
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Analog1 Setup Menu selection is highlighted, and then press the "ENTER" button twice. Press the down arrow until the "Set Depressed Voltage" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Clutch Pedal Depressed Voltage" setting is found in the "Analog Clutch Setup" dialog box under the "Analog1" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



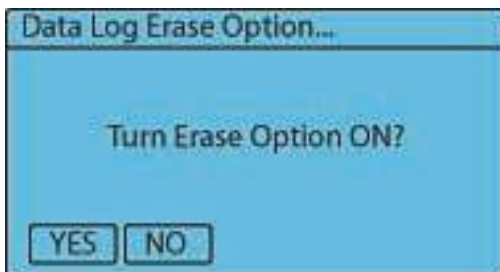
## 7.7 Analog2 Setup Menu

There is currently one setting, Data Log Erase Option, available in the Analog2 Setup Menu.

Activating the Data Log Erase Option allows the Data Log memory to be Erased/Activated by applying a +5V to +12V signal to the Analog2 Input. This option allows you to put a user controlled switch in the vehicle to manually erase the data log.

**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Analog2 Setup Menu selection is highlighted and then press the "ENTER" button. Once in the Analog2 Setup menu, press the "ENTER" button to select the Erase option. Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.

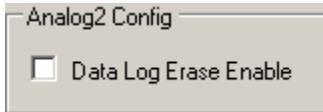


**Access from the Computer Program:**

From the [Status screen](#), press the "SETUP" button. The "Data Log Erase Enable" option is found in the



"Analog2 Config" dialog box under the "Analog2" Tab. Check the box to enable the Data Log Erase Option or un-check the box to disable the option.



## 7.8 AFR Setup Menu

The following options are found in the AFR setup menu, which can be accessed by the "SETUP" button on the main screen of the controller or through the Air-Fuel Ratio tab in the setup menu of the computer software. The Air-Fuel Ratio can be read into the NCC-002 and logged. The AFR signal must be a 0-5 volt linear signal.

This feature can also be used as a safety feature to disable nitrous. By enabling the AFR option, the O2 wideband controller can be used to detect a lean condition. The controller can then disable the nitrous accordingly.

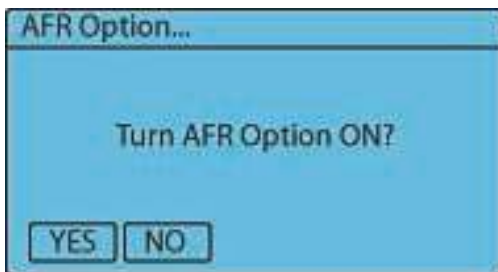
### AFR Option

---

By enabling the AFR option, the 0-5 volt output from an O2 wideband controller can be used to disable the nitrous system if a lean cylinder condition is detected.

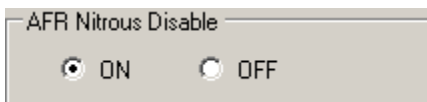
#### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR Setup Menu selection is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "AFR Option", then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



#### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "AFR Nitrous Disable" option is found under the "Air Fuel Ratio" Tab. Click "ON" to disable the AFR Nitrous feature or "OFF" to Enable the feature.



### AFR Nitrous Oxide Disable

---

This setting determines the Air Fuel Ratio at which the nitrous system is disabled due to a lean condition. A setting of 0.0 will disable this feature. This setting is used along with the AFR Delay and AFR Disable Percent settings.

The Valid Range is 0.0 to 20.0 in .1 increments.

#### Access from the Controller:

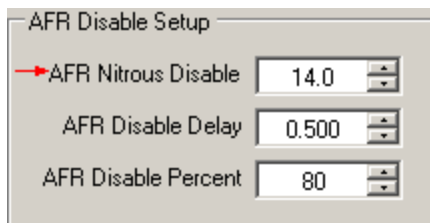
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR

Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR NOX Disable" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Nitrous Disable" setting is found in the "AFR Disable Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



### AFR Nitrous Disable Delay

---

This setting controls the amount of time the Air Fuel Ratio must be above the AFR Disable setting before disabling the nitrous system. This allows the system to filter out short Lean spikes.

The Valid Range is 0.000 to 1.000 Seconds in .01 second increments.

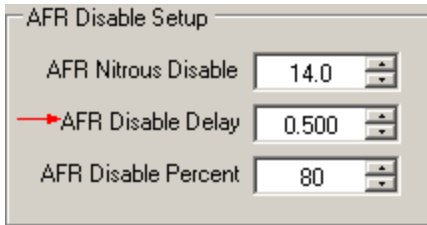
#### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR Disable Delay" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Disable Delay" setting is found in the "AFR Disable Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## AFR Nitrous Disable Percentage

---

This setting determines at what Nitrous Percent (Duty Cycle) the Wideband Disable function is active. When the progressive ramp first begins the system will not be at 100% nitrous. Use this setting to determine at what Nitrous Percent the Wideband Nitrous Disable function becomes active.

Example - When the Nitrous is first armed the air-fuel is 12.8 to 1 and the Wideband Disable Voltage is set to turn off the nitrous if the system is 12 to 1 or above. This setting would allow the Nitrous and fuel to begin flowing and get to an air-fuel ratio that is below the disable setting.

The Valid Range is 10% to 100% in 1% increments.

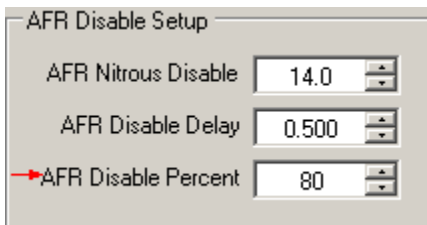
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR Disable %" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Disable Percent" setting is found in the "AFR Disable Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## AFR Minimum Voltage

---

This setting should be set to the voltage that the Wideband controller outputs at the minimum/rich AFR range.

The Valid Range is 0.0 to 5.0 volts in .1 volt increments.

### Access from the Controller:

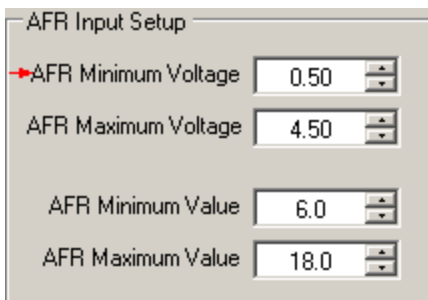
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR

Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR Min Voltage" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Minimum Voltage" setting is found in the "AFR Input Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## AFR Maximum Voltage

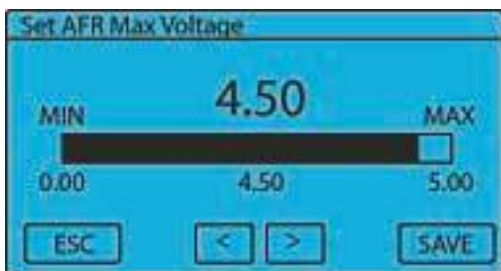
---

This setting should be set to the voltage that the Wideband controller outputs at the maximum/lean AFR range.

The Valid Range is 0.0 to 5.0 volts in .1 volt increments.

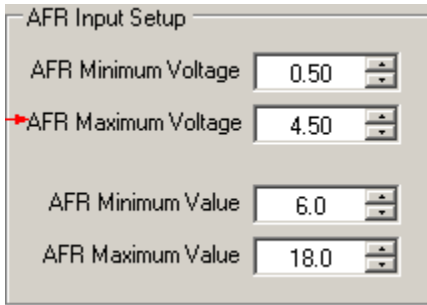
#### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR Max Voltage" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Maximum Voltage" setting is found in the "AFR Input Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## AFR Minimum Value

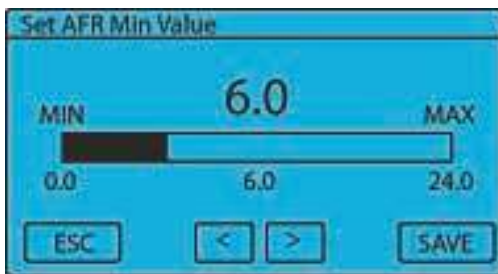
---

This setting should be the Air Fuel Ratio that corresponds to the AFR Minimum voltage.

The Valid Range is 0.0 to 24.0 in .1 increments.

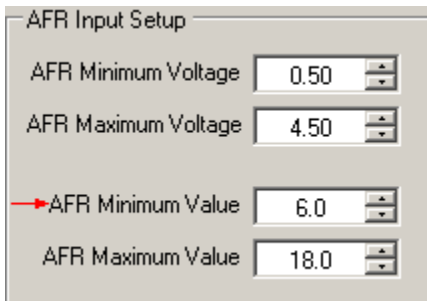
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR Min Value" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Minimum Value" setting is found in the "AFR Input Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## AFR Maximum Value

---

This setting should be the Air Fuel Ratio that corresponds to the AFR Maximum voltage.

The Valid Range is 0.0 to 24.0 in .1 increments.

### Access from the Controller:

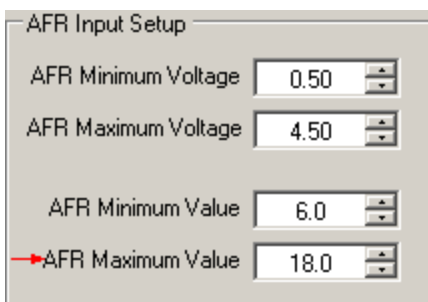
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the AFR

Setup Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "AFR Max Value" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "AFR Maximum Value" setting is found in the "AFR Input Setup" dialog box under the "Air Fuel Ratio" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## 7.9 Relay1 and Relay2 Setup Menus

The Relay1 output is a NCC-002 controlled ground output. The Relay2 output is a NCC-002 controlled +12 volt output.

The following options are found in both the Relay1 and Relay2 setup menus, which can be accessed by the "SETUP" button on the main screen or through the Relay1 and Relay2 buttons in the computer software. The control options found in these menus are used to determine the parameters for enabling either Relay1 or Relay2. Any combination of enabling control options can be used to enable Relay1 and Relay2.

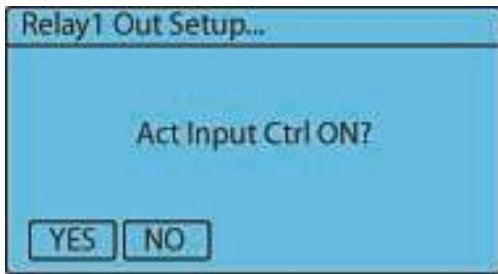
### Arming Input Control Option

---

If this option is enabled, the selected Relay output is controlled by the state of the Arming Input and any other control options that are enabled.

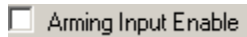
#### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Act Input Ctrl" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Arming Input Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Arming Input Control Option or un-check the box to disable the option.



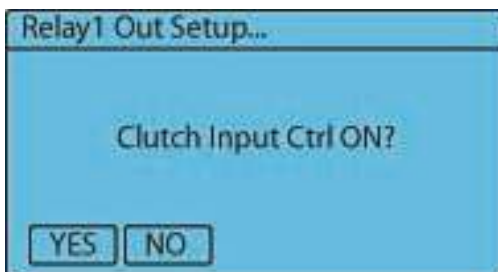
## Clutch Input Control Option

---

If this option is enabled, the selected Relay output is controlled by the state of the Clutch Input and any other control options that are enabled.

**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Clutch Input Ctrl" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Clutch Input Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Clutch Input Control Option or un-check the box to disable the option.



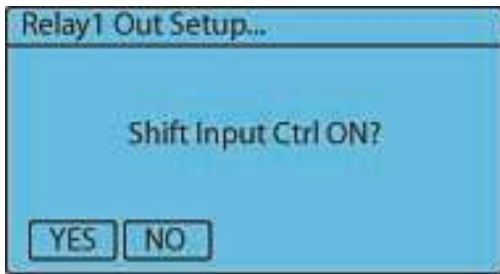
## Shift Input Control Option

---

If this option is enabled, the selected Relay output is controlled by the state of the Shift input and any other control options that are enabled.

**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Shift Input Ctrl" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Shift Input Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Shift Input Control Option or un-check the box to disable the option.



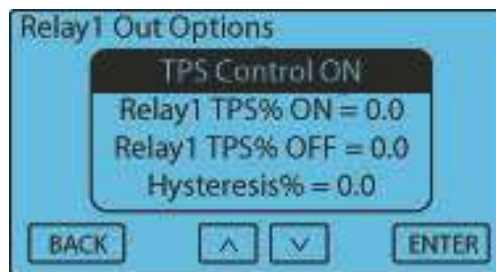
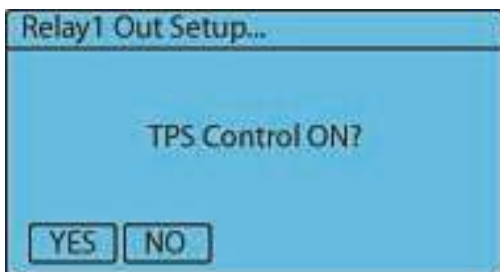
## Throttle Position Sensor (TPS) Percentage Control Option

---

If this option is enabled, the selected Relay output is controlled by TPS input and any other control options that are enabled.

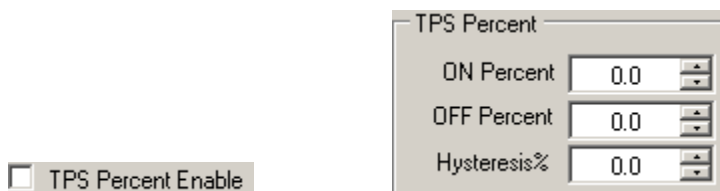
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "TPS Percent Ctrl" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Throttle Input Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Throttle Input Percentage Control Option or un-check the box to disable the option.



## Air-Fuel Ratio (AFR) Control Option

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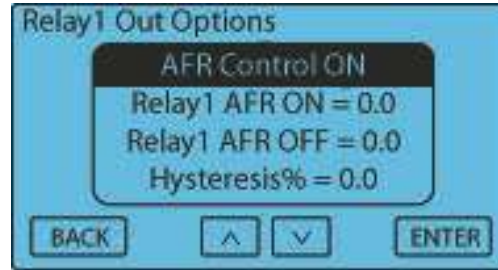
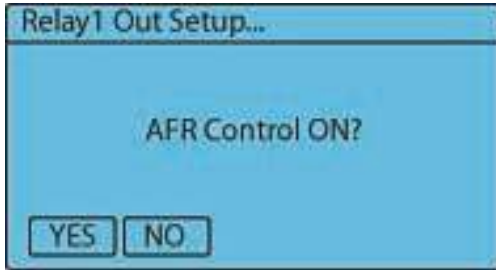
If this option is enabled, the selected Relay output is controlled by AFR input and any other control options that are enabled.

**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired

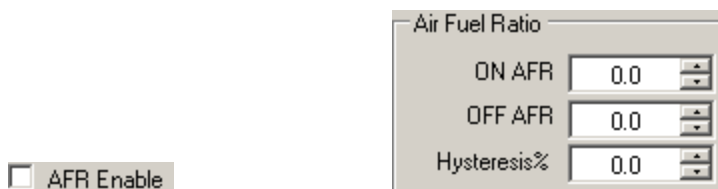


Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "AFR Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "AFR Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the AFR Control Option or un-check the box to disable the option.



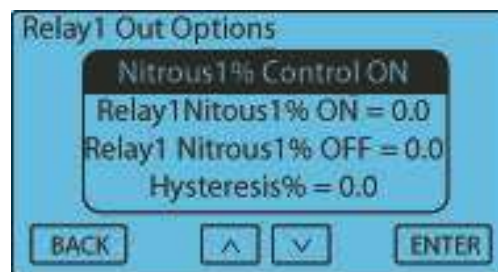
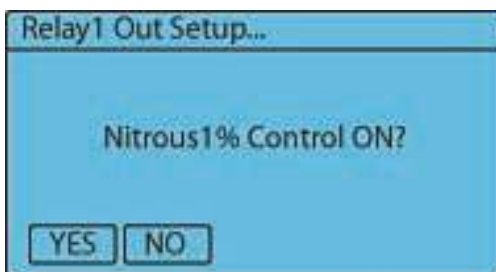
**Nitrous1 Percentage Control Option**

---

If this option is enabled, the selected Relay output is controlled by Nitrous1 duty cycle and any other control options that are enabled.

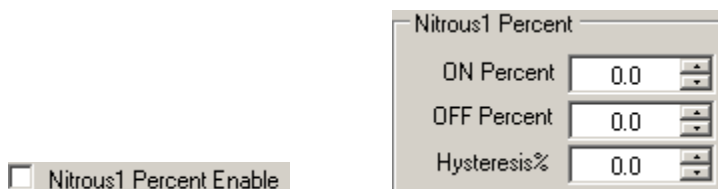
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Nitrous1% Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Nitrous1 Percent Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Nitrous1 Percentage Control Option or un-check the box to disable the option.



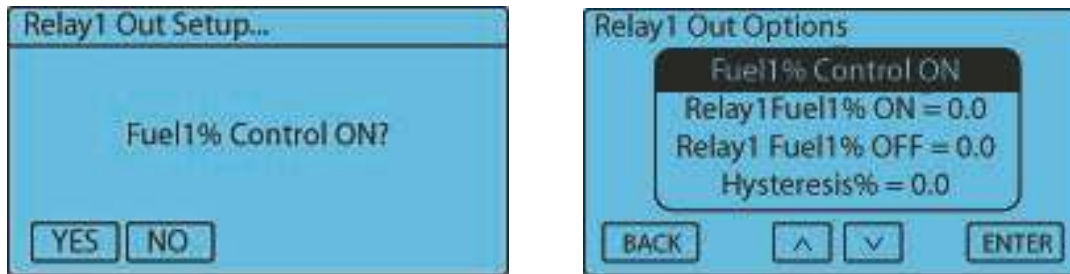
## Fuel1 Percentage Control Option

---

If this option is enabled, the selected Relay output is controlled by Fuel1 duty cycle and any other control options that are enabled.

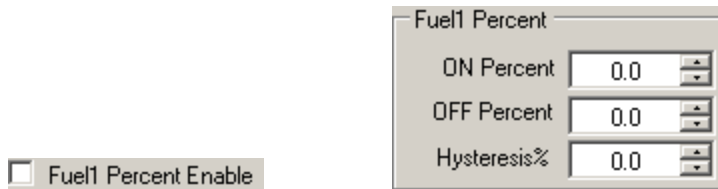
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Fuel1% Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Fuel1 Percent Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Fuel1 Percentage Control Option or un-check the box to disable the option.



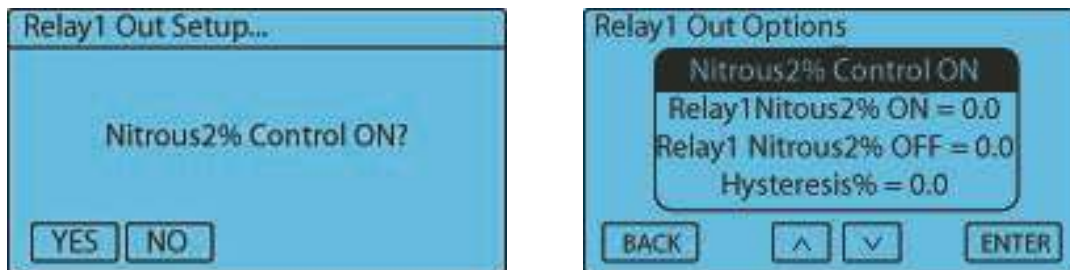
## Nitrous2 Percentage Control Option

---

If this option is enabled, the selected Relay output is controlled by Nitrous2 duty cycle and any other control options that are enabled.

### Access from the Controller:

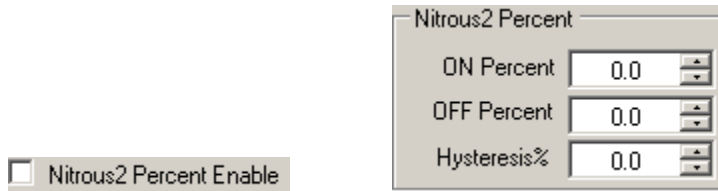
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Nitrous2% Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The

"Nitrous2 Percent Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Nitrous2 Percentage Control Option or un-check the box to disable the option.



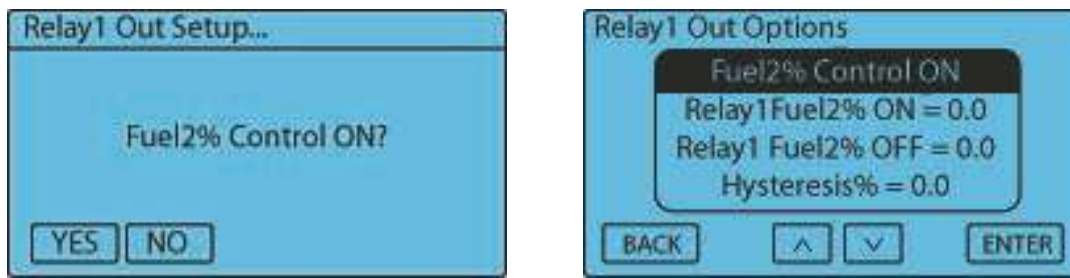
## Fuel2 Percentage Control Option

---

If this option is enabled, the selected Relay output is controlled by Fuel2 duty cycle and any other control options that are enabled.

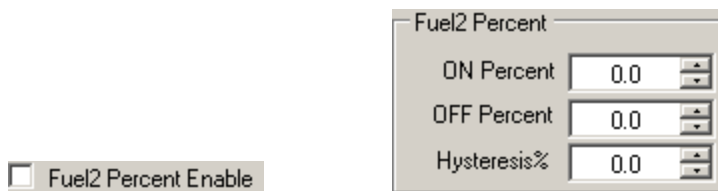
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Fuel2% Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Fuel2 Percent Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Fuel2 Percentage Control Option or un-check the box to disable the option.



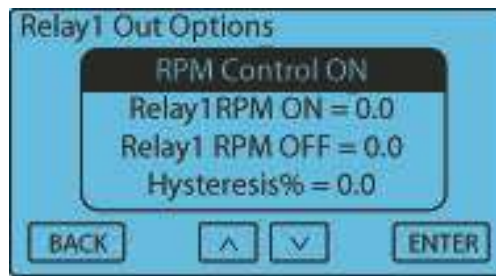
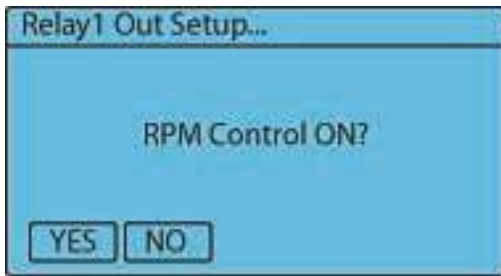
## RPM Control Option

---

If this option is enabled, the selected Relay output is controlled by the engine RPM and any other control options that are enabled.

### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "RPM Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "RPM Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the RPM Control Option or un-check the box to disable the option.



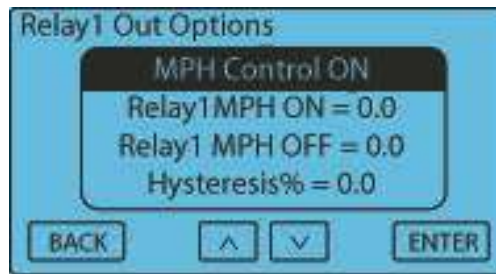
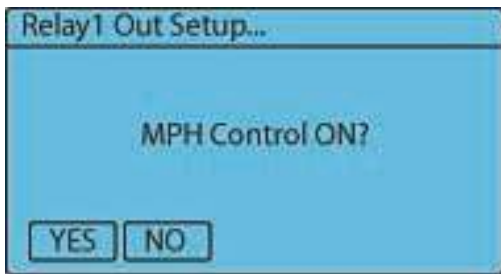
**MPH Control Option**

---

If this option is enabled, the selected Relay output is controlled by the vehicle MPH and any other control options that are enabled.

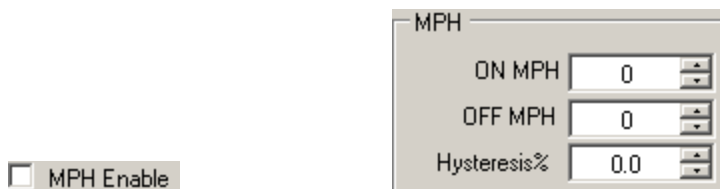
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "MPH Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "MPH Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the MPH Control Option or un-check the box to disable the option.



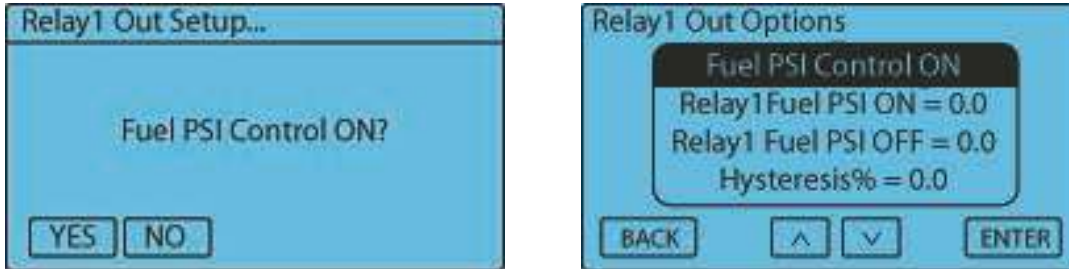
**Fuel Pressure Control Option**

---

If this option is enabled, the selected Relay output is controlled by the Fuel pressure and any other control options that are enabled.

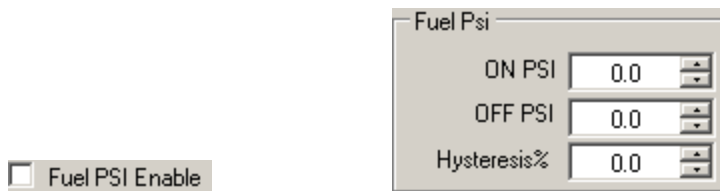
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Fuel PSI Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Fuel PSI Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Fuel Pressure Control Option or un-check the box to disable the option.

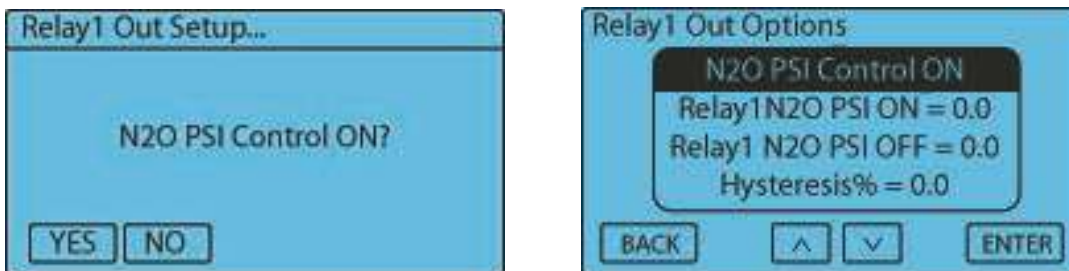


## Nitrous Pressure Control Option

If this option is enabled, the selected Relay output is controlled by the Nitrous pressure and any other control options that are enabled.

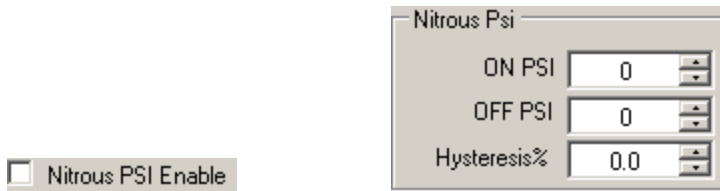
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the desired Relay Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "N2O PSI Control" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), select the relay by pressing either the "Relay1" button or the "Relay2" button. The "Nitrous PSI Enable" option is located in the "Relay Control Options" dialog box. Check the box to enable the Nitrous Pressure Control Option or un-check the box to disable the option.

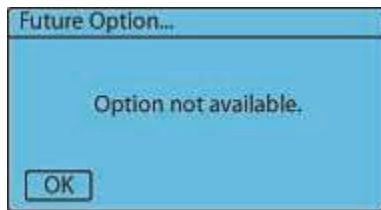


## 7.10 PWM Out Menu

This menu is not currently functional, but will be used in future software builds.

### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the "PWM Out Menu" selection is highlighted and then press the "ENTER" button. This menu is not currently functional, so press "OK" to exit.



## 7.11 Hall Input Menu

The following options are found in the Hall Input Menu, which can be accessed by the "SETUP" button on the main screen or by clicking Hall Input tab in the Setup menu of the computer software. Currently, this input can only be used for vehicle speed signal input.

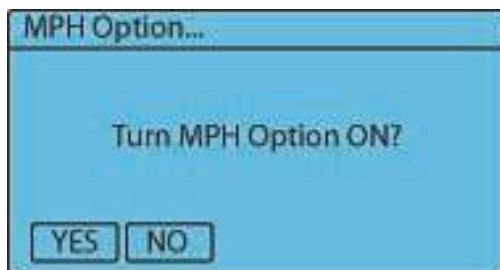
### MPH Option

This option enables the input settings used to configure the Hall Input to monitor vehicle speed. The input signal needs to be a square wave signal or connected to the output of an open drain hall effect sensor. The Pulse Per Mile setting in the ECM must be configured properly for an accurate reading.

The Hall Input has a programmable Pull-Up resistor for use in applications that require a Pull-Up resistor, but do not already have one in the circuit.

### Access from the Controller:

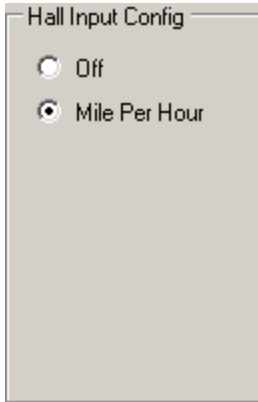
From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Hall Input Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "MPH" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Mile Per Hour" option is found in the "Hall Input Config" dialog box under the "Hall Input" tab. Click "Mile Per Hour" to enable the MPH option or "OFF" to

disable the option. If the Hall Input is turned "ON" in the computer software program, the user will also have the ability to enable either stage of nitrous via the vehicle MPH. In order for the controller to accurately read the vehicle MPH, the Pulse Per Mile setting must be calibrated correctly.



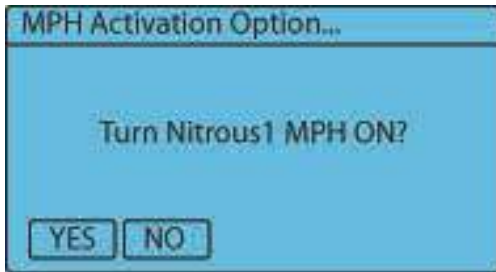
## Nitrous1 and Nitrous2 MPH Activation Option

---

This option allows the user to enable or disable MPH activation control for the Nitrous1 and Nitrous2 Channels.

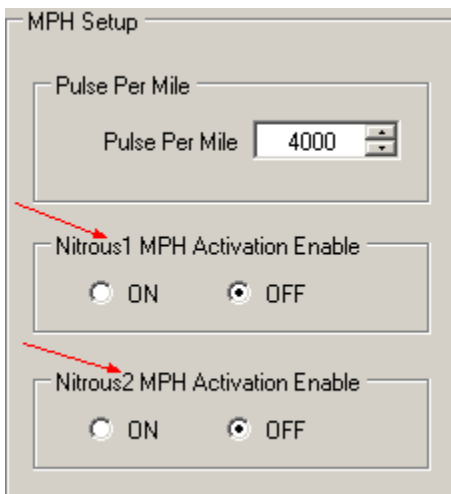
### Access from the Controller:

From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Hall Input Menu is highlighted and then press the "ENTER" button twice. Press the "DOWN" arrow button until either the Nitrous1 or Nitrous2 MPH Activation option is highlighted, then press "ENTER". Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Nitrous1 MPH Activation Enable" and "Nitrous2 MPH Activation Enable" options are found in the "MPH Setup" dialog box under the "Hall Input" tab. Click "ON" to enable the MPH option or "OFF" to disable the option.



## Nitrous1 and Nitrous2 Minimum (ON) MPH Setting

---

This setting dictates the minimum MPH at which either Nitrous1 or Nitrous2 can still be active.

The valid range is 0-255 in 1 MPH increments.

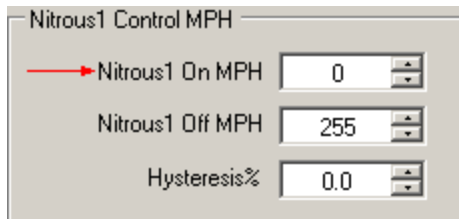
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Hall Input Menu selection is highlighted, and then press the "ENTER" button twice. Press the "DOWN" arrow button until the either the Nitrous1 or Nitrous2 minimum MPH selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press either the "Nitrous1" or "Nitrous2" buttons. The "Nitrous ON MPH" setting is found in the "Nitrous Control MPH" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Nitrous1 and Nitrous2 Maximum (OFF) MPH Setting

---

This setting dictates the maximum MPH at which either Nitrous1 or Nitrous2 is activated.

The valid range is 0-255 in 1 MPH increments.

### Access from the Controller:

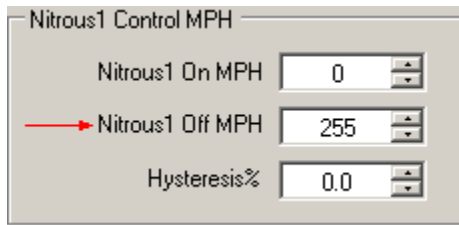
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Hall Input Menu selection is highlighted, and then press the "ENTER" button twice. Press the "DOWN" arrow button until the either the Nitrous1 or Nitrous2 maximum MPH selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.





**Access from the Computer Program:**

From the [Status screen](#), press either the "Nitrous1" or "Nitrous2" buttons. The "Nitrous OFF MPH" setting is found in the "Nitrous Control MPH" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



**Nitrous1 and Nitrous2 MPH Hysteresis Percentage Setting**

---

This setting determines the hysteresis percentage for the activation of both nitrous stages at the minimum and maximum MPH. Refer to [Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.

The valid range is 0.0%-5.0% in 0.1% increments (percentage of full scale, 255 MPH). 1% is 2.55 MPH.

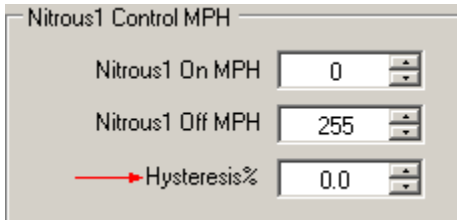
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Hall Input Menu selection is highlighted, and then press the "ENTER" button twice. Press the "DOWN" arrow button until the either the MPH1 or MPH2 hysteresis percentage selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press either the "Nitrous1" or "Nitrous2" buttons. The "Hysteresis" setting is found in the "Nitrous Control MPH" dialog box under the "Options" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Pulse Per Mile Setting (Live Data)

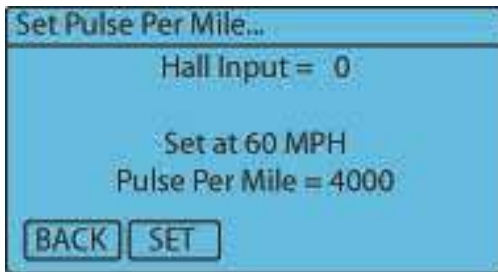
---

This option is only available on the controller and allows the user to set the correct Pulse Per Mile setting for the vehicle using live data from the vehicle.

The valid range is 1000-20000 in 1 Pulse Per Mile (PPM) increments.

### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Hall Input Menu selection is highlighted, and then press the "ENTER" button twice. Press the "DOWN" arrow button until the either the "Pulse Per Mile" selection is highlighted and then press the "ENTER" button. Once the vehicle is going 60 miles per hour, press the "SET" button to accept the new Pulse per mile calibration or press the "BACK" button to exit with no change.



## Manual Pulse Per Mile Setting

---

This setting allows the user to manually set the number of pulses per mile.

The valid range is 1000-20000 in 1 Pulse Per Mile (PPM) increments.

### Access from the Controller:

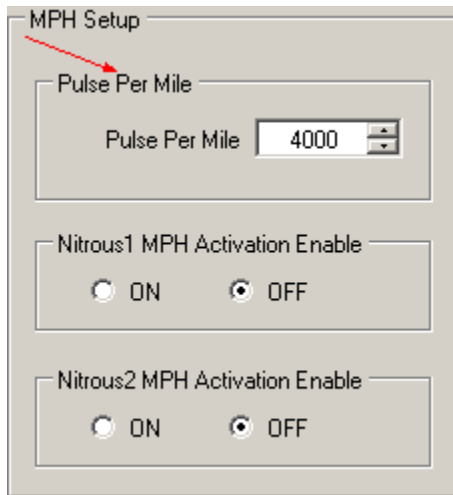
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Hall Input Menu selection is highlighted, and then press the "ENTER" button twice. Press the "DOWN" arrow button until the either the "Manual Pulse Per Mile" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Pulse Per Mile" setting is found in the "MPH Setup" dialog box under the "Hall Input" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in

the valid ranges shown above.

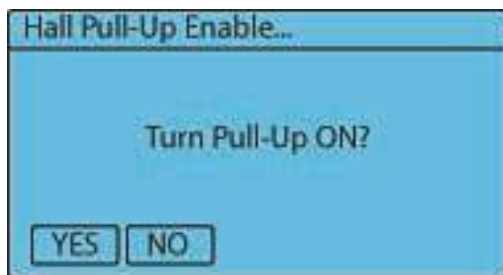


## Hall Pull-Up Option

This option enables or disables a 4.7k Ohm pull-up resistor to +12V on the Hall Input terminal. This option is normally used when connecting to the vehicle speed signal output from an ECM that is not connected to any other systems or modules in the vehicle. On vehicles that already have this signal connected, a Pull-Up resistor is normally already in the circuit. You DO NOT want to have multiple Pull-Up resistors in the circuit.

### Access from the Controller:

From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Hall Input Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Hall Pull-up" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Hall Input Pull-Up Resistor Enable" option is found under the "Hall Input" tab. Click "ON" to enable the Hall Pull-Up resistor feature or "OFF" to disable the feature.



## 7.12 Fuel PSI Menu

The following options are found in the Fuel PSI Menu, which can be accessed by the "SETUP" button on the main screen or by clicking the Fuel Sensor tab in the Setup menu of the computer software. The fuel pressure menu allows the user to data log the fuel pressure in order to disable nitrous when necessary based on the observed fuel pressure. By having fuel pressure input into the NCC-002, you can also use the relay outputs to trigger an auxiliary fuel pump based on the desired fuel pressure.

## Default Sensor Setup Option

---

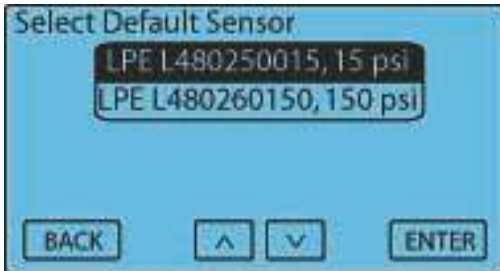
Use this to configure the controller to select the sensor calibration curve. There are two (2) standard sensors available from LPE, both of which are pre-loaded into the NCC-002 firmware. If you don't plan to use one of the LPE sensors, you can manually enter the calibration points. Whatever fuel pressure sensors are chosen for the application, they MUST be 0-5 volt linear output sensors.

### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Default Sensor Setup" option, then the "UP" or "DOWN" button to change the current selection. If the "BACK" button is pressed no change will be made.

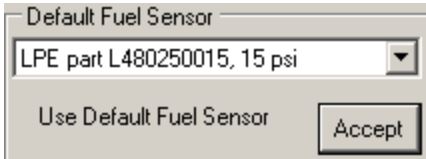
As shown in the screen shot below, the default fuel pressure sensors are:

- L480250015: 0-15 PSI sensor
- L480260150: 0-150 PSI sensor



### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Default Fuel Sensor" setting is found under the "Fuel Sensor" Tab. Click on one of the settings in the scroll-down menu and click "Accept" to select the default fuel sensor setting.



## Fuel Pressure Minimum Voltage

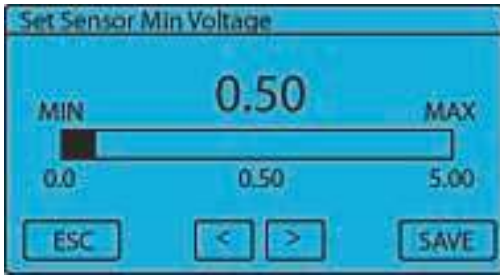
---

This setting should be set to the voltage the Fuel Sensor outputs at the minimum fuel pressure.

The Valid Range is 0.0 to 5.0 volts in .1 volt increments.

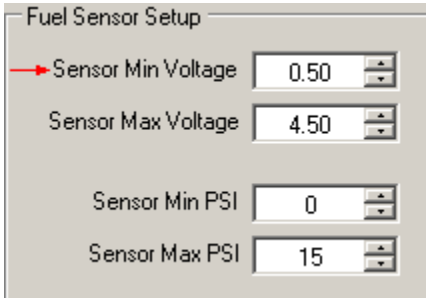
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel PSI Min Volt" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Sensor Min Voltage" option is found in the "Fuel Sensor Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Fuel Pressure Maximum Voltage

---

This setting should be set to the voltage the Fuel Sensor outputs at the maximum fuel pressure.

The Valid Range is 0.0 to 5.0 volts in .1 volt increments.

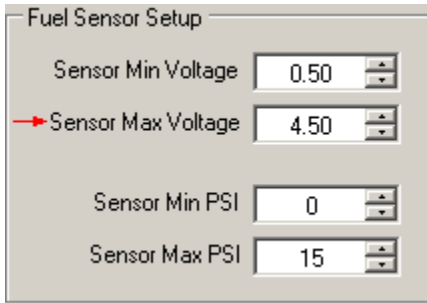
**Access from the Controller:**

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel PSI Max Volt" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Sensor Max Voltage" option is found in the "Fuel Sensor Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Fuel Pressure Minimum Value

---

This setting should be the fuel pressure that corresponds to the fuel sensor minimum voltage.

The Valid Range is 0 to 250 PSI in 1 PSI increments.

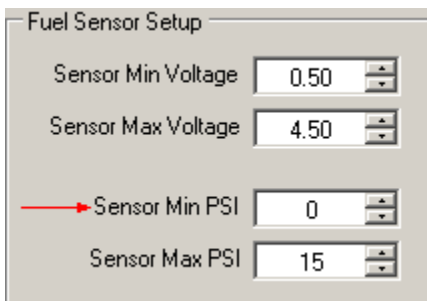
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel PSI Min Value" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Sensor Min PSI" option is found in the "Fuel Sensor Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Fuel Pressure Maximum Value

---

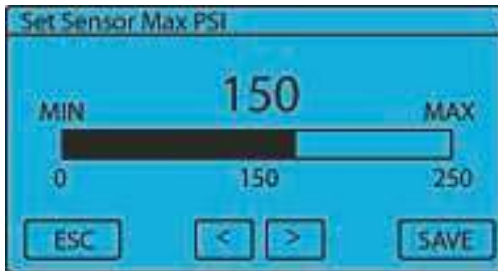
This setting should be the fuel pressure that corresponds to the fuel sensor maximum voltage.

The Valid Range is 0 to 250 PSI in 1 PSI increments.

### Access from the Controller:

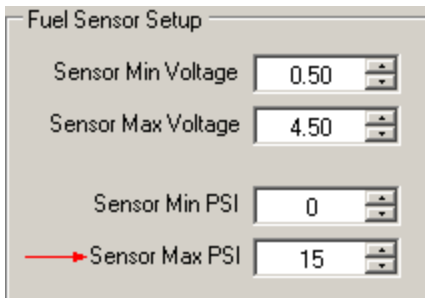
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI

Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel PSI Max Value" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Sensor Max PSI" option is found in the "Fuel Sensor Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



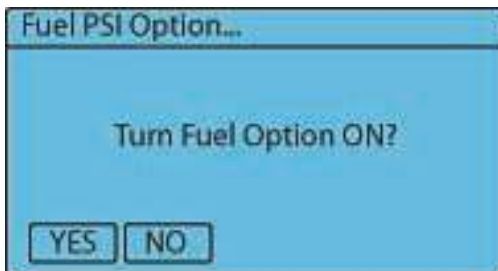
## Fuel Pressure Option / Fuel PSI Nitrous Disable

---

Enabling the Fuel Pressure Option will allow the flow of nitrous to be disabled based on a user defined fuel pressure.

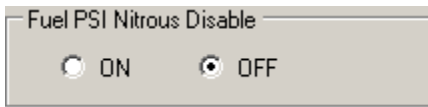
#### Access from the Controller:

From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Fuel PSI Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Fuel PSI" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



#### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Fuel Pressure Nitrous Disable" option is found in the "Fuel PSI Nitrous Disable" dialog box under the "Fuel Sensor" tab. Click to "ON" button to enable the Fuel Pressure Nitrous Disable option or "OFF" to disable the option. If the option is enabled, Click the "UP" and "DOWN" arrow buttons or type in any numeric value to change the settings.



## Fuel PSI Nitrous Oxide Disable

---

This setting determines the fuel pressure at which the nitrous system is disabled. A setting of 0.0 will disable this feature. This setting is used along with the Fuel PSI Delay and Fuel PSI Disable Percent settings.

The Valid Range is 0.0 to 150.0 PSI in .1 PSI increments.

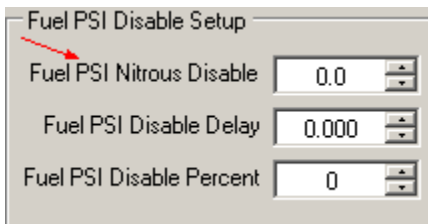
### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel PSI Disable" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Fuel PSI Nitrous Disable" setting is found in the "Fuel PSI Disable Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Fuel PSI Nitrous Disable Delay

---

This setting controls the amount of time the Fuel Pressure must be below the Fuel PSI disable setting before disabling the nitrous system.

The Valid Range is 0.000 to 1.000 Seconds in .01 Second increments.

### Access from the Controller:

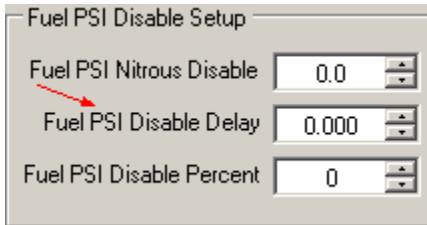
From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel Disable Delay" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.





#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Fuel PSI Disable Delay" setting is found in the "Fuel PSI Disable Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Fuel PSI Nitrous Disable Percentage

---

This setting allows the user to tell the the controller to only disable the nitrous using the fuel pressure disable option if the nitrous is ramped up above the set percentage.

For example- If the Fuel PSI disable percentage setting is set to 60%, the nitrous cannot be disabled by the Fuel PSI option until the nitrous is ramped above 60%, even if the fuel pressure is below the Fuel PSI nitrous disable setting.

The Valid Range is 0% to 100% in 1% increments.

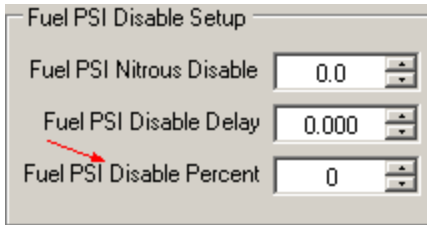
#### Access from the Controller:

From the [Main screen](#), press the "SETUP" button. Press the "DOWN" arrow button repeatedly until the Fuel PSI Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "Fuel Disable %" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Fuel PSI Disable Percent" setting is found in the "Fuel PSI Disable Setup" dialog box under the "Fuel Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## 7.13 Nitrous PSI Menu

The following options are found in the Nitrous PSI Menu, which can be accessed by the "SETUP" button on the main screen or by clicking the Nitrous Sensor tab in the Setup menu of the computer software. This menu allows the user to data log the nitrous pressure. Having this sensor in the system allows you to perform closed loop bottle heater control using one of the NCC-002 relay outputs.

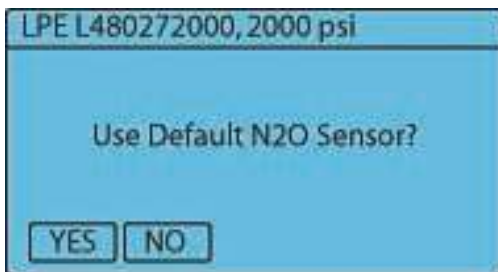
### Default Sensor Setup

---

Use this setting to configure the controller to use the default nitrous pressure sensor. If you are not using the default LPE 0-2000 PSI nitrous pressure sensor (PN: 480272000), the chosen sensor for the application MUST be a 0-5 volt linear output sensor.

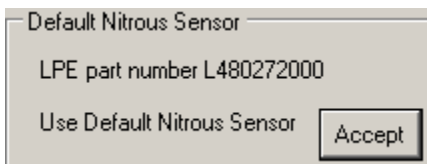
#### Access from the Controller:

From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Nitrous PSI Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Default Sensor Setup" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



#### Access from the Computer Program:

From the [Status screen](#), press the "SETUP" button. The "Default Nitrous Sensor" setting is found under the "Nitrous Sensor" Tab. Click "Accept" to select the default fuel sensor setting.



### Nitrous Pressure Minimum Voltage

---

This setting should be set to the voltage the Nitrous Sensor outputs at the minimum nitrous pressure.

The Valid Range is 0.0 to 5.0 volts in .1 volt increments.

#### Access from the Controller:

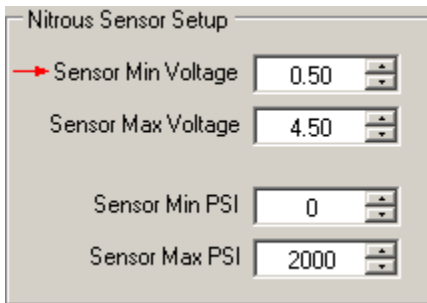
From the Main screen, press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Fuel Psi Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "N2O Psi Min

Volt" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Sensor Min Voltage" option is found in the "Nitrous Sensor Setup" dialog box under the "Nitrous Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Nitrous Pressure Maximum Voltage

---

This setting should be set to the voltage the Nitrous Sensor outputs at the maximum nitrous pressure.

The Valid Range is 0.0 to 5.0 volts in .1 volt increments.

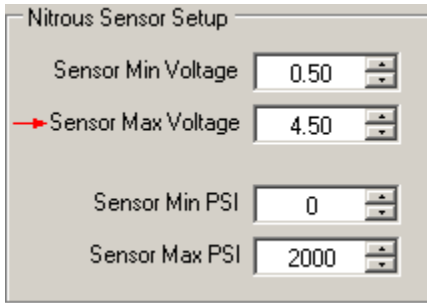
**Access from the Controller:**

From the Main screen, press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Fuel Psi Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "N2O Psi Max Volt" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



**Access from the Computer Program:**

From the [Status screen](#), press the "Setup" button. The "Sensor Max Voltage" option is found in the "Nitrous Sensor Setup" dialog box under the "Nitrous Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Nitrous Pressure Minimum Value

---

This setting should be the nitrous pressure that corresponds to the Nitrous sensor minimum voltage.

The Valid Range is 0 to 2000 psi in 1 psi increments.

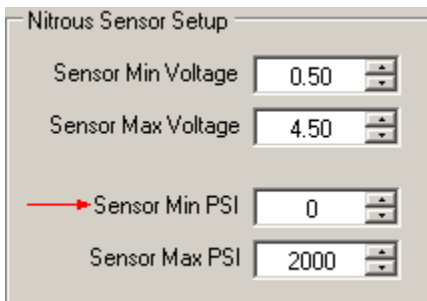
### Access from the Controller:

From the Main screen, press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Fuel Psi Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "N2O Psi Min" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Sensor Min PSI" option is found in the "Nitrous Sensor Setup" dialog box under the "Nitrous Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## Nitrous Pressure Maximum Value

---

This setting should be the nitrous pressure that corresponds to the Nitrous sensor maximum voltage.

The Valid Range is 0 to 2000 psi in 1 psi increments.

### Access from the Controller:

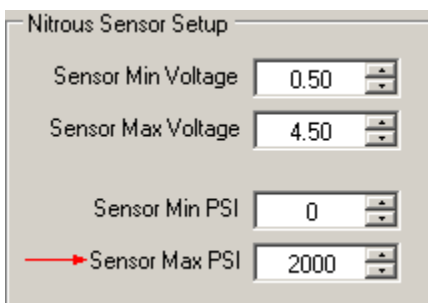
From the Main screen, press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Fuel Psi Menu selection is highlighted, and then press the "ENTER" button. Press the down arrow until the "N2O Psi" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.

Max" selection is highlighted and then press the "ENTER" button. Use the "LEFT" and "RIGHT" arrow buttons adjust the setting. Press the "SAVE" button to accept the new setting or press the "ESC" button to exit with no change.



#### Access from the Computer Program:

From the [Status screen](#), press the "Setup" button. The "Sensor Max PSI" option is found in the "Nitrous Sensor Setup" dialog box under the "Nitrous Sensor" Tab. Click the "UP" and "DOWN" arrow buttons or type in any numeric value in the valid ranges shown above.



## 7.14 Data Log Menu

The following options are found in the Data Log Menu, which can be accessed by the "SETUP" button on the main screen or by clicking the Options tab in the Data menu of the computer software. The settings in this menu allow the controller to log data only after the criteria in the following sub-sections are satisfied. The data log enable parameters are any parameters that, along with the arming input, allow the controller to log data. If no data log enable parameters are selected, the controller will start the data log when the arming switch is activated. Once the data log is activated, the logging of data will continue even if the data log enable parameters fall below their present settings.

### Clutch Enable Option

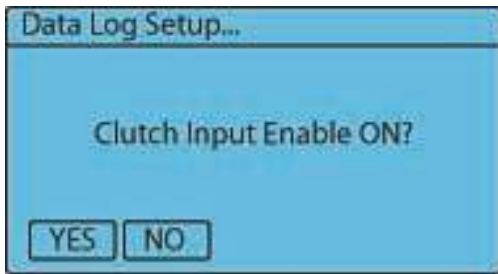
---

Enabling the Clutch Enable Option allows the NCC-002 to log data when the clutch is released after the arming switch and clutch pedal are engaged. In other words, data logging is disabled while the clutch pedal is depressed. When the clutch pedal is released, the data logging feature is enabled. In order to prevent the data log from beginning prematurely, the arming switch should be enabled after the clutch is engaged. Note: This option applies to the Clutch Input signal and not the CPP Sensor on Analog1.

Example - You have already staged and are at the starting line ready to launch. Depress the clutch, engage the arming switch, and the data log feature will engage when the clutch is released.

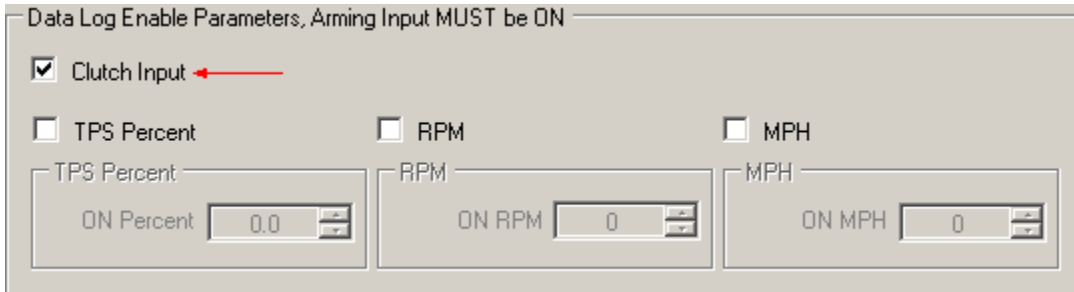
#### Access from the Controller:

From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Data Log Menu is highlighted and then press the "ENTER" button. Press the "ENTER" button to select the "Clutch Enable" option, then the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.



**Access from the Computer Program:**

From the [Status screen](#), press the "Data" button. The "Clutch Input" option is found in the "Data Log Enable Parameters" dialog box under the "Options" Tab.

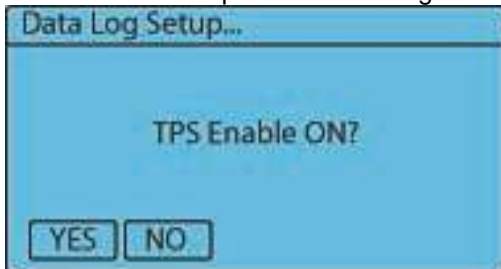


**TPS Enable Option**

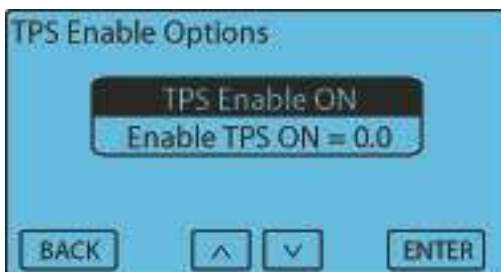
Enabling the TPS Enable Option disables the data log feature of the NCC-002 until the arming input is engaged and the desired TPS setting is achieved.

**Access from the Controller:**

From the Main screen press the "SETUP" button, press the "DOWN" arrow button repeatedly until the Data Log Menu is highlighted and then press the "ENTER" button. Press the "DOWN" arrow button until the "TPS Enable" option is highlighted, then press "ENTER". Press the "YES" or "NO" button to change the current selection. If the "NO" button is pressed no change will be made.

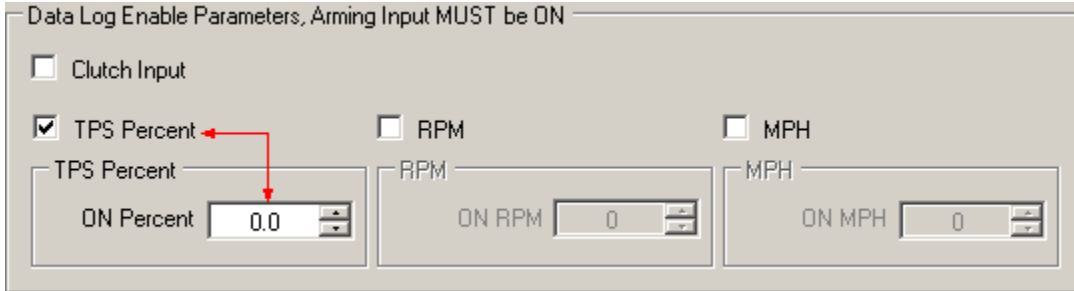


Once the TPS Enable option is enabled, you will be sent back to the Data Log Menu where you can either press the "BACK" button to exit or the "ENTER" button to adjust the TPS Enable Percent and Hysteresis Percent settings. Refer to [Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.



**Access from the Computer Program:**

From the [Status screen](#), press the "Data" button. The "TPS Percent" settings are found in the "Data Log Enable Parameters" dialog box under the "Options" Tab.

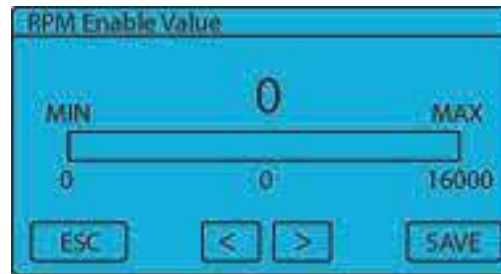


**RPM Enable Option**

Enabling the RPM Enable Option disables the data log feature of the NCC-002 until after the Arming Input is engaged and the desired engine RPM is achieved.

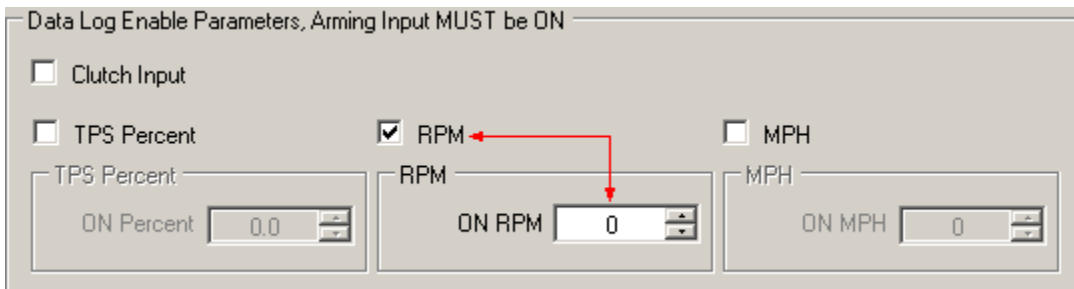


Once the RPM Enable option is enabled, you will be sent back to the Data Log Menu where you can either press the "BACK" button to exit or the "ENTER" button to adjust the RPM Enable Percent and Hysteresis Percent settings. Refer to [Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.



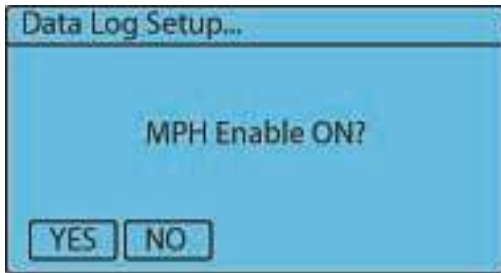
**Access from the Computer Program:**

From the [Status screen](#), press the "Data" button. The "RPM ON" settings are found in the "Data Log Enable Parameters" dialog box under the "Options" Tab.

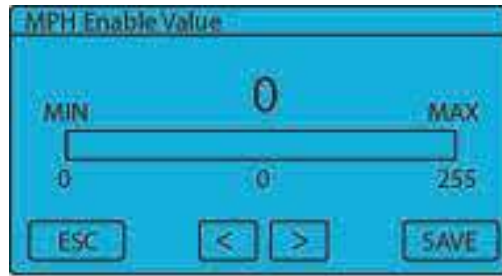
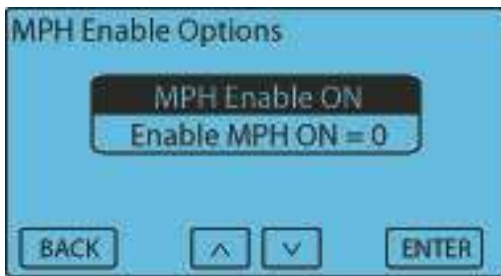


**MPH Enable Option**

Enabling the MPH Enable Option disables the log data feature of the NCC-002 until the Arming Input is engaged and the desired vehicle MPH is achieved.

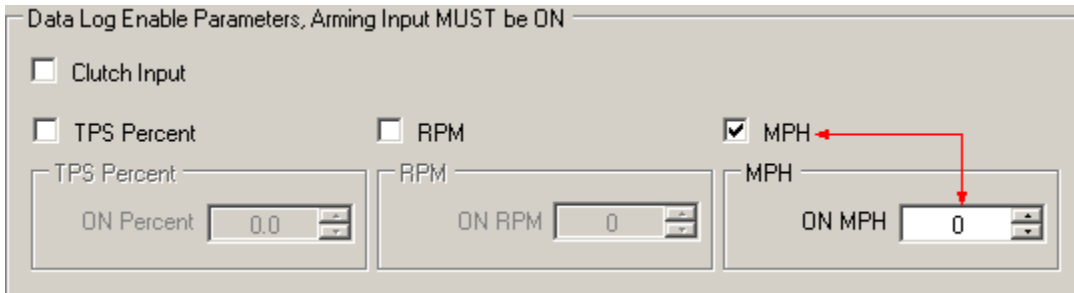


Once the MPH Enable option is enabled, you will be sent back to the Data Log Menu where you can either press the "BACK" button to exit or the "ENTER" button to adjust the MPH Enable Percent and Hysteresis Percent settings. Refer to [Appendix D: Glossary of Terms](#) for an explanation of how a hysteresis works.



**Access from the Computer Program:**

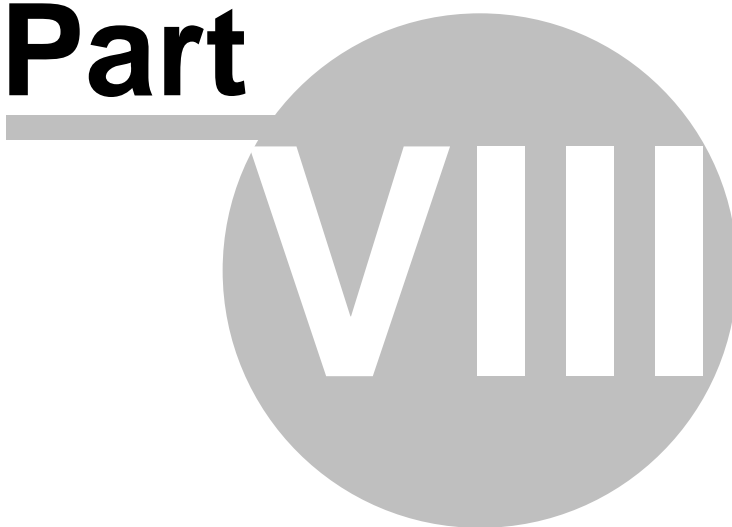
From the [Status screen](#), press the "Data" button. The "MPH ON" settings are found in the "Data Log Enable Parameters" dialog box under the "Options" Tab.





# User Program Files, Data Logs, and Other Software Options

**Part**



## 8 User Program Files, Data Logs, and Other Software Options

The following sub-sections detail the procedures used to transfer data logs and programs between the Nitrous Control Center computer program and the NCC-002 controller. This chapter also explains how to view the data log files that are created by the controller. These options are exclusive to the computer software program, so the controller will not have the following options available. i.e.- The controller cannot ask for saved programs or data logs from the computer.

### 8.1 Managing User-Defined Programs on the Controller and the Computer

The following options allow the user to manage the programs that are saved into memory on the NCC-002 Controller, as well as those on the computer.

#### "Program Start" User Program

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This option allows the user to choose whether the default user program file or the last user program file opens when the computer program first opens.

##### Access from the Computer Program:

From the [Status screen](#), click on the "Options" button in the upper left-hand corner of the window, and then drag your mouse over the "Program Start" button. Finally, click on either the "Load default user program" button or the "Load last user program" button.



#### Open User Program File

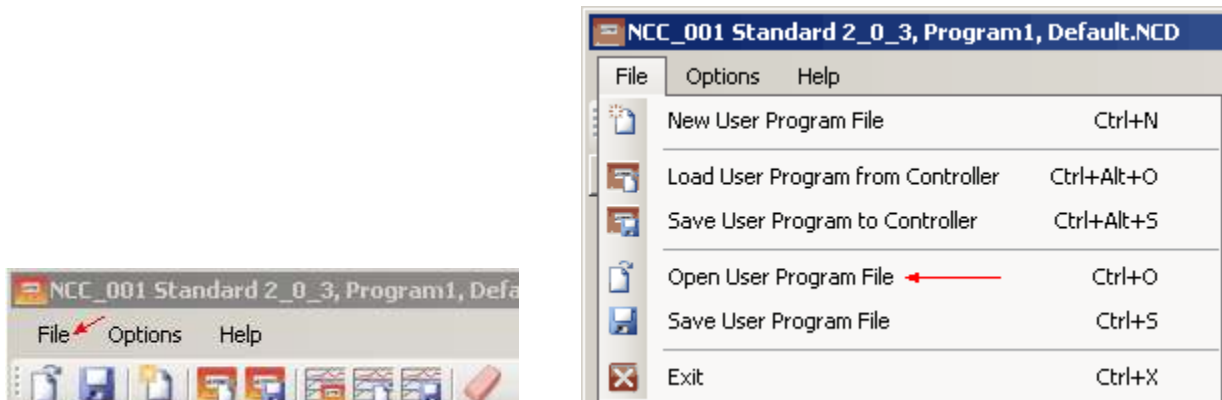
---

This option allows the user to open a saved user program file which can then be modified and/or flashed to the controller.

##### Access from the Computer Program:

There are three (3) ways to open a saved User Program File, denoted below by the bullet points.

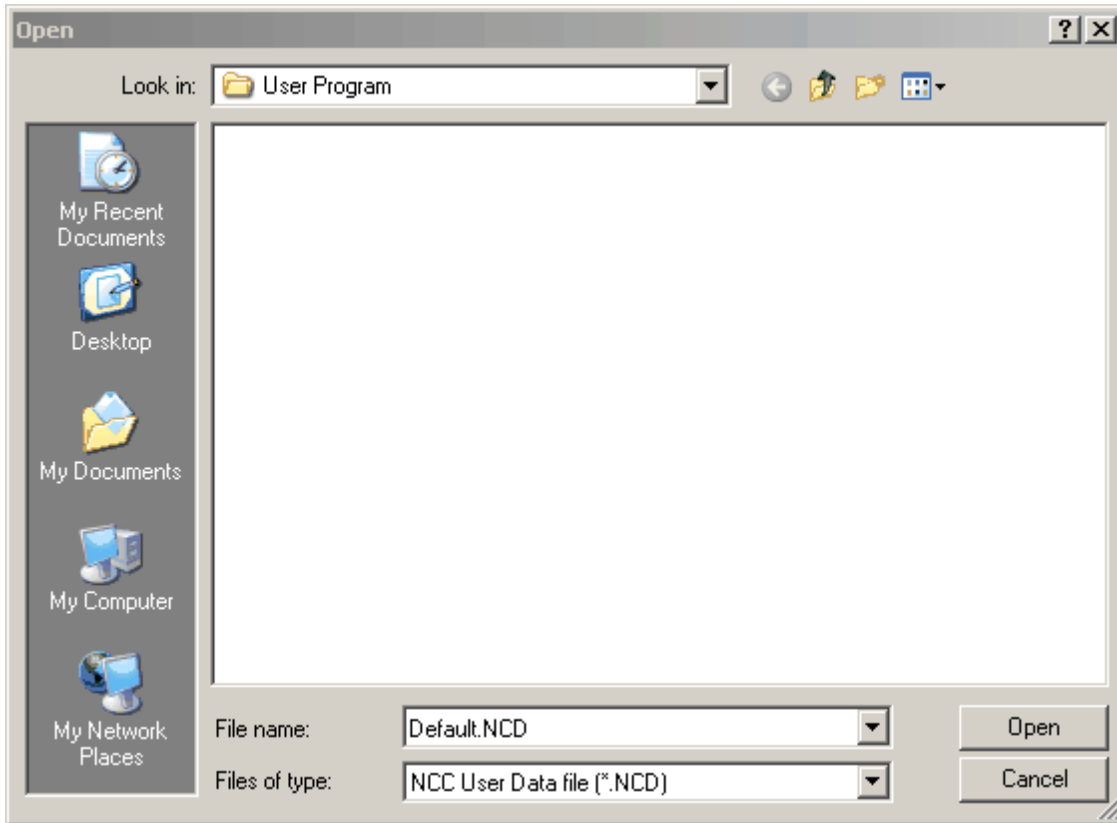
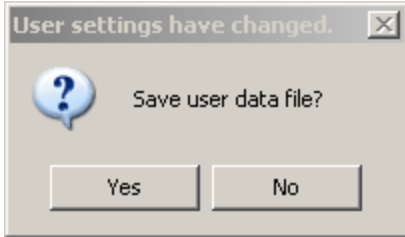
- Press Ctrl+O
- From the [Status screen](#), click on the File button in the upper left-hand corner of the window, then click on the "Open User Program File" button.



- From the [Status screen](#), click on the "Open User Program File" button in the toolbar on the upper left-hand side of the window, as shown below.



Regardless of which method you used to open the "Open User Program File" window, the computer program should display the following window for the user to browse the computer to find the desired user program file (.NCD). Once the user has selected the desired program, click "Open" to open the highlighted user program file or click "Cancel" to terminate the operation. **NOTE:** If you have made changes to the current program and have not saved them, you will be prompted to save the current program.



## Save User Program File

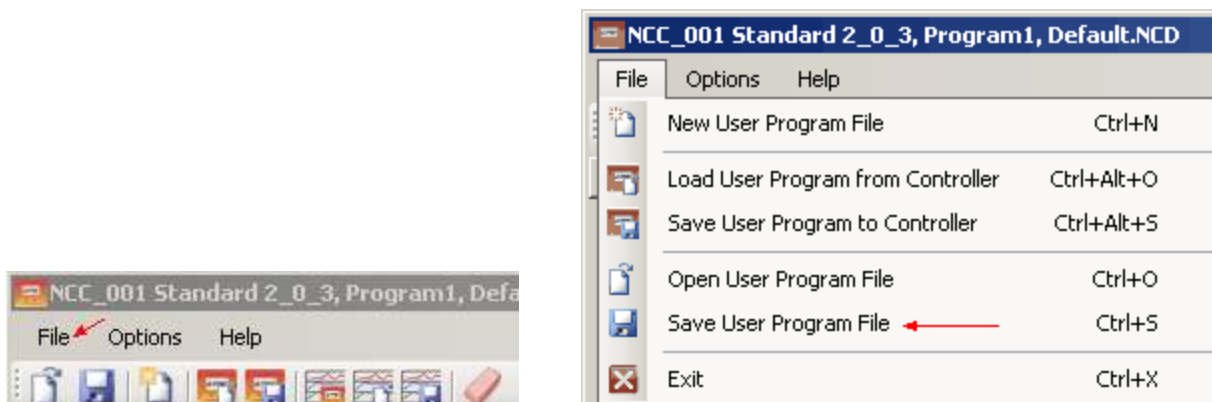
---

This option allows the user to save a user program file to the computer that was either created in the computer program or flashed from the controller.

### Access from the Computer Program:

There are three (3) ways to save a User Program File, denoted below by the bullet points.

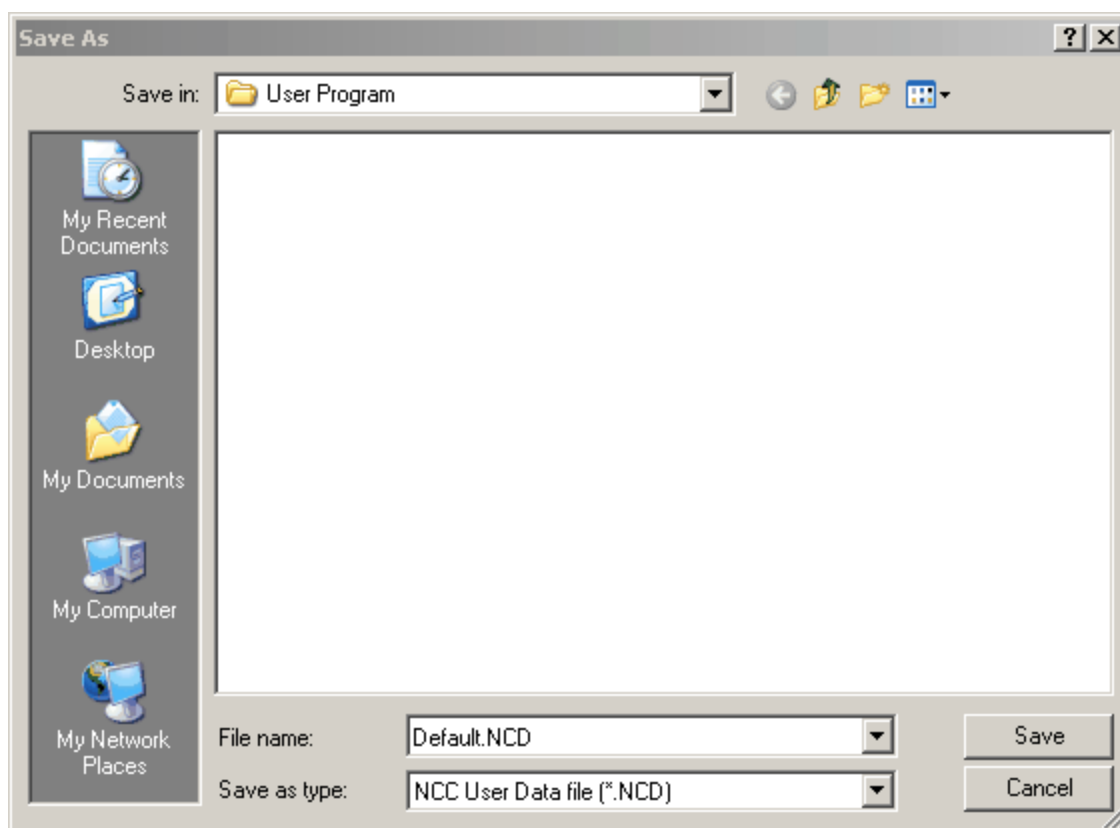
- Press Ctrl+S
- From the [Status screen](#), click on the File button in the upper left-hand corner of the window, then click on the "Save User Program File" button.



- From the [Status screen](#), click on the "Save User Program File" button in the toolbar on the upper left-hand side of the window, as shown below.



Regardless of which method you used to open the "Save User Program File" window, the computer program should display the following window for the user to name the user program file and to select the desired directory location to save it in. Once the user has selected the desired program, click "Save" to save the current user program file or click "Cancel" to terminate the operation.



## New User Program File

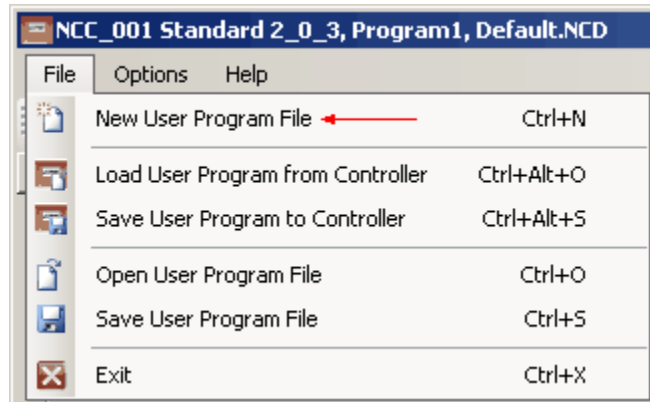
---

This option allows the user to create a new user program file that can be calibrated on the computer and flashed to the controller.

### Access from the Computer Program:

There are three (3) ways to create a new User Program File, denoted below by the bullet points.

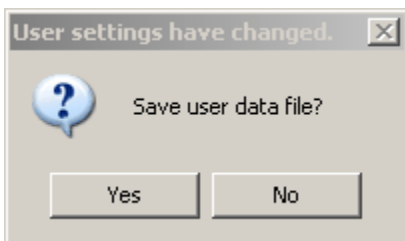
- Press Ctrl+N
- From the [Status screen](#), click on the File button in the upper left-hand corner of the window, then click on the "Save User Program File" button.



- From the [Status screen](#), click on the "Save User Program File" button in the toolbar on the upper left-hand side of the window, as shown below.



**NOTE:** If you have made changes to the current program and have not saved them, you will be prompted to save the current program.



## Load User Program from Controller

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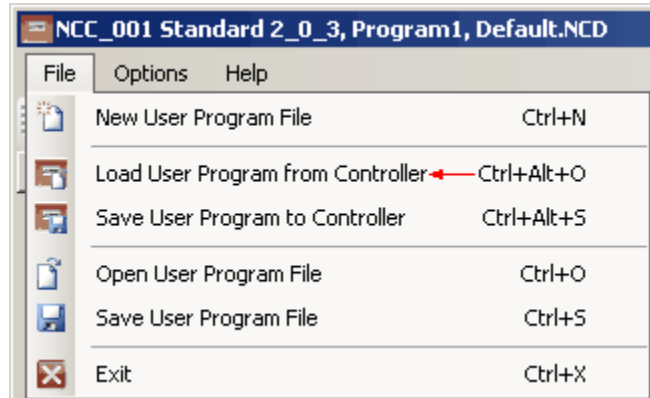
This option allows the user to upload a user program file from the controller so that it can be further modified or backed up. This feature is very important as the memory on the controller is only capable of holding three (3) programs at a time. All other user programs must be backed up by using the Nitrous Control Center software. If the controller already has three existing user programs and the user attempts to flash a fourth user program to

the controller, the new program will replace one of the three user programs already on the controller, which means that the program that was replaced is erased out of the controller's memory. The only way to retrieve and reuse the program is if the program was backed up on the computer.

### Access from the Computer Program:

There are three (3) ways to load a user program from the controller, denoted below by the bullet points.

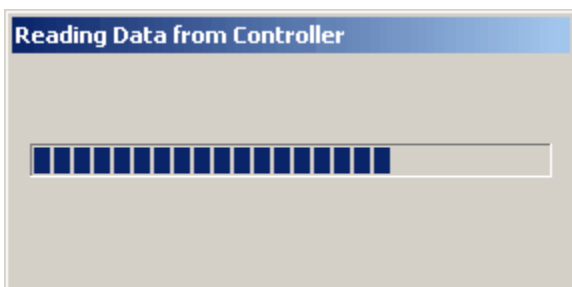
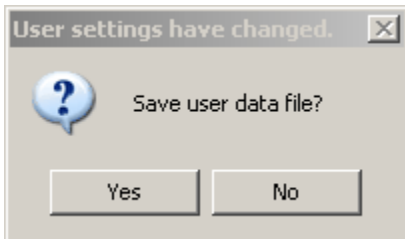
- Press Ctrl+Alt+O
- From the [Status screen](#), click on the File button in the upper left-hand corner of the window, then click on the "Load User Program from Controller" button.



- From the [Status screen](#), click on the "Load User Program from Controller" button in the toolbar on the upper left-hand side of the window, as shown below.



Once the "Load User Program from Controller" button has been pressed, a status window will appear showing the status of the upload, as shown in the illustration below. Once the status window disappears, the upload of the user program is complete it becomes your current user program on the computer software. **NOTE:** Since the uploaded user program becomes the current program, you will be prompted to save any changes to the current program.



## Save User Program to Controller

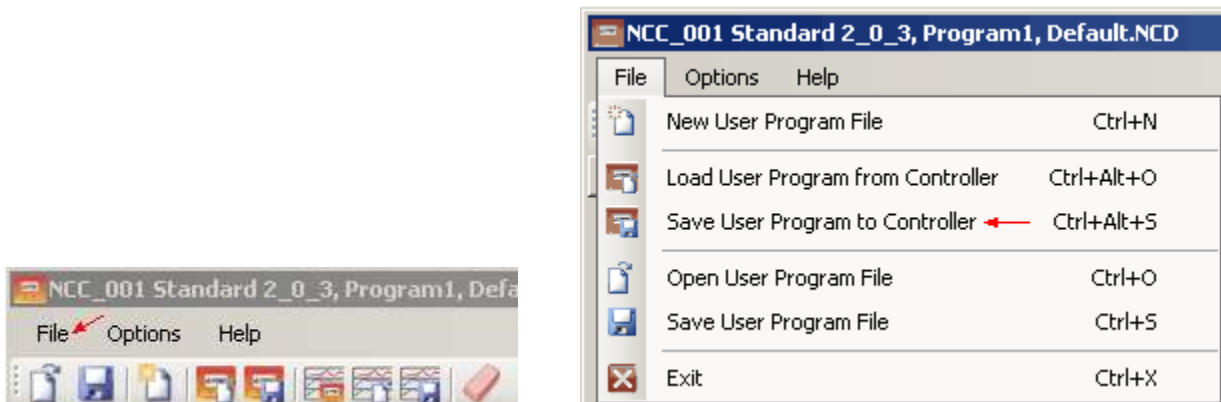
This option allows the user to flash the current user program file, as well as any other saved user program to the controller.

**Warning:** The memory on the controller is only capable of holding one program at a time. This program contains 3 different sets of user defined settings. All other user programs must be backed up by using the Nitrous Control Center software. When you flash a new user program to the controller, the new program will erase the original program and load the new program onto the controller. The only way to retrieve and reuse the program is if the program was backed up on the computer.

### Access from the Computer Program:

There are three (3) ways to save a User Program File to the controller, denoted below by the bullet points.

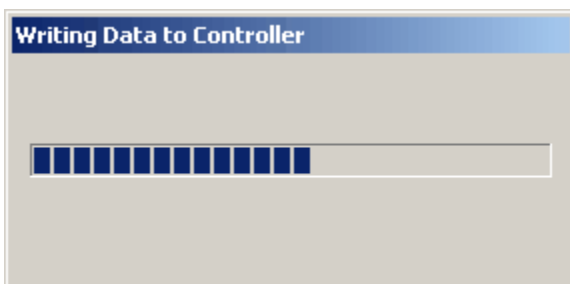
- Press Ctrl+Alt+S
- From the [Status screen](#), click on the File button in the upper left-hand corner of the window, then click on the "Save User Program to Controller" button.



- From the [Status screen](#), click on the "Save User Program to Controller" button in the toolbar on the upper left-hand side of the window, as shown below.



Once the "Save User Program to Controller" button has been pressed, a status window will appear showing the status of the upload, as shown in the illustration below. Once the status window disappears, the flashing of the user program is complete and the flashed user program replaces the current program on the controller.



## 8.2 Managing Data Logs on the Controller and Computer

The following options allow the user to manage and view the data logs that are saved on the computer, as well as the data log saved into memory on the NCC-002 controller.

**Warning:** A new data log can not be created until the existing log is erased. The memory in the NCC-002 controller can only hold one (1) data log at a time, so it is very important to back up prior data logs through the computer software.

### Load Data Log from Controller

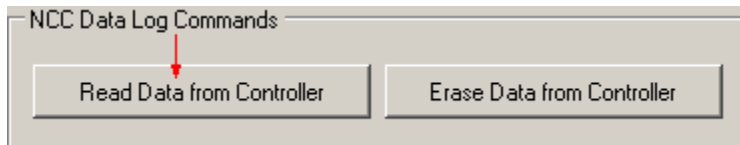
---

This option allows the user to upload a data log from the controller to the computer program where it can be viewed and saved.

#### Access from the Computer Program:

There are two (2) ways to load a data log from the controller, denoted below by the bullet points.

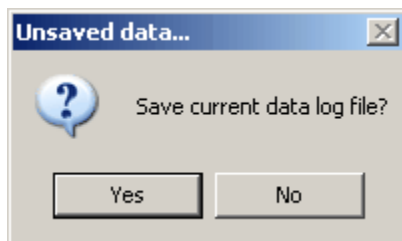
- From the [Status screen](#), press the "DATA" button. The "Read Data from Controller" option is found in the "NCC Data Log Commands" dialog box under the "Options" tab.



- From the [Status screen](#), click on the "Load Data Log from Controller" button in the toolbar on the upper left-hand side of the window, as shown below.

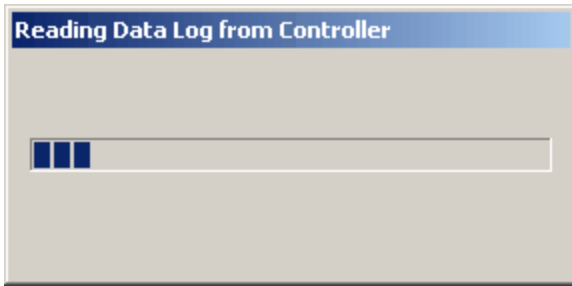


Once either of the "Read Data from Controller" buttons are pressed, a dialog box will appear prompting the user to save any unsaved current data log file to the computer as it would be replaced by the uploaded data log from the controller.

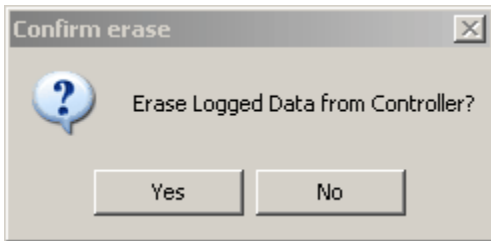


After the current data log is saved or clicking "NO", the status window will pop up to show the progress of the upload.





After the upload is complete, the user will be prompted to erase the data log from the controller, as shown below.



## Open Data Log from File

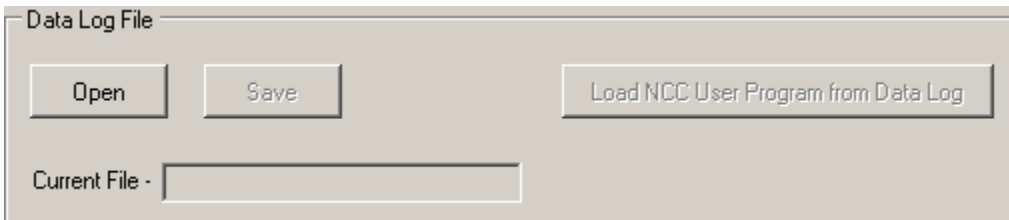
---

This option allows the user to view a data log that is saved on the computer.

### Access from the Computer Program:

There are two (2) ways to open a saved data log, denoted below by the bullet points.

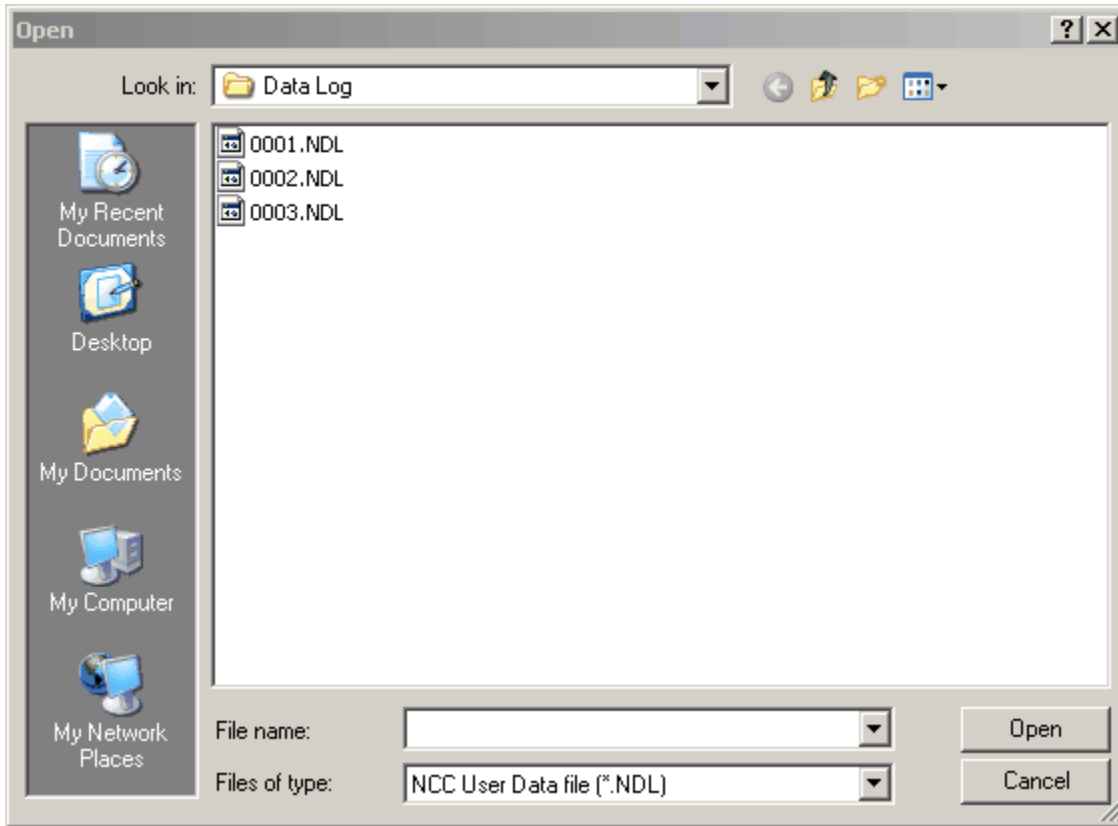
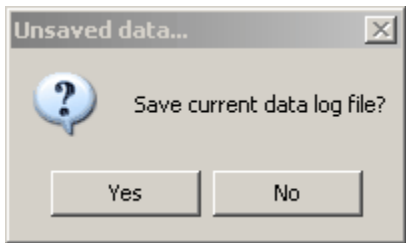
- From the [Status screen](#), press the "DATA" button. The "Open" option is found in the "Data Log File" dialog box under the "Options" tab.



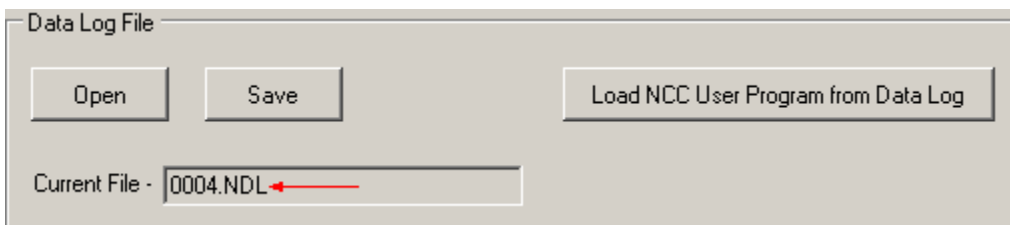
- From the [Status screen](#), click on the "Open Data Log from File" button in the toolbar on the upper left-hand side of the window, as shown below.



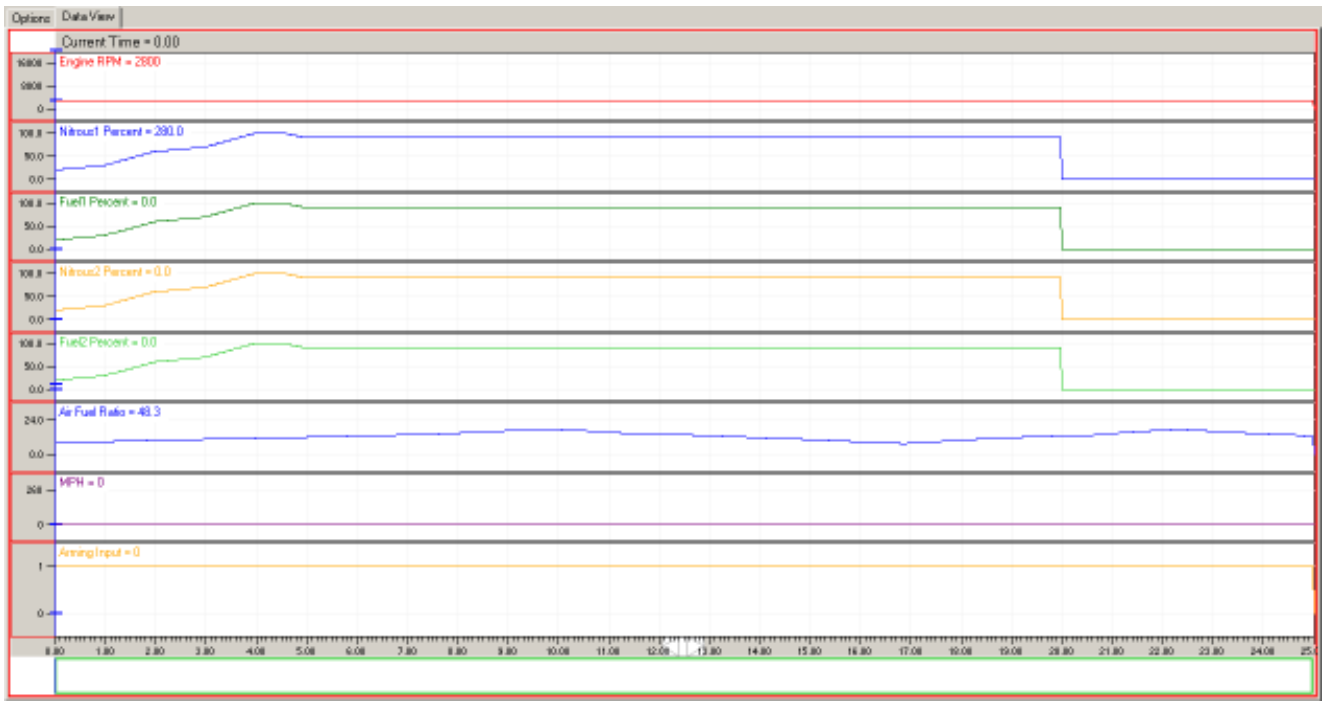
If the user has an unsaved data log currently being viewed on the computer, the computer program will prompt the user to save the data log before opening the saved data log. Then, a windows explorer window will pop up and prompt the user to select the desired file. Once the desired file is selected, click "Open" to open the data log or "Cancel" to terminate the operation.



After the data log is opened, the file name will be displayed in the "Data Log File" dialog box.



The data log can now be viewed under the "Data View" tab.

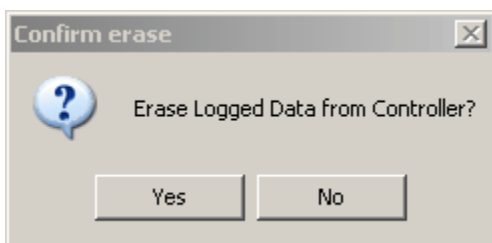
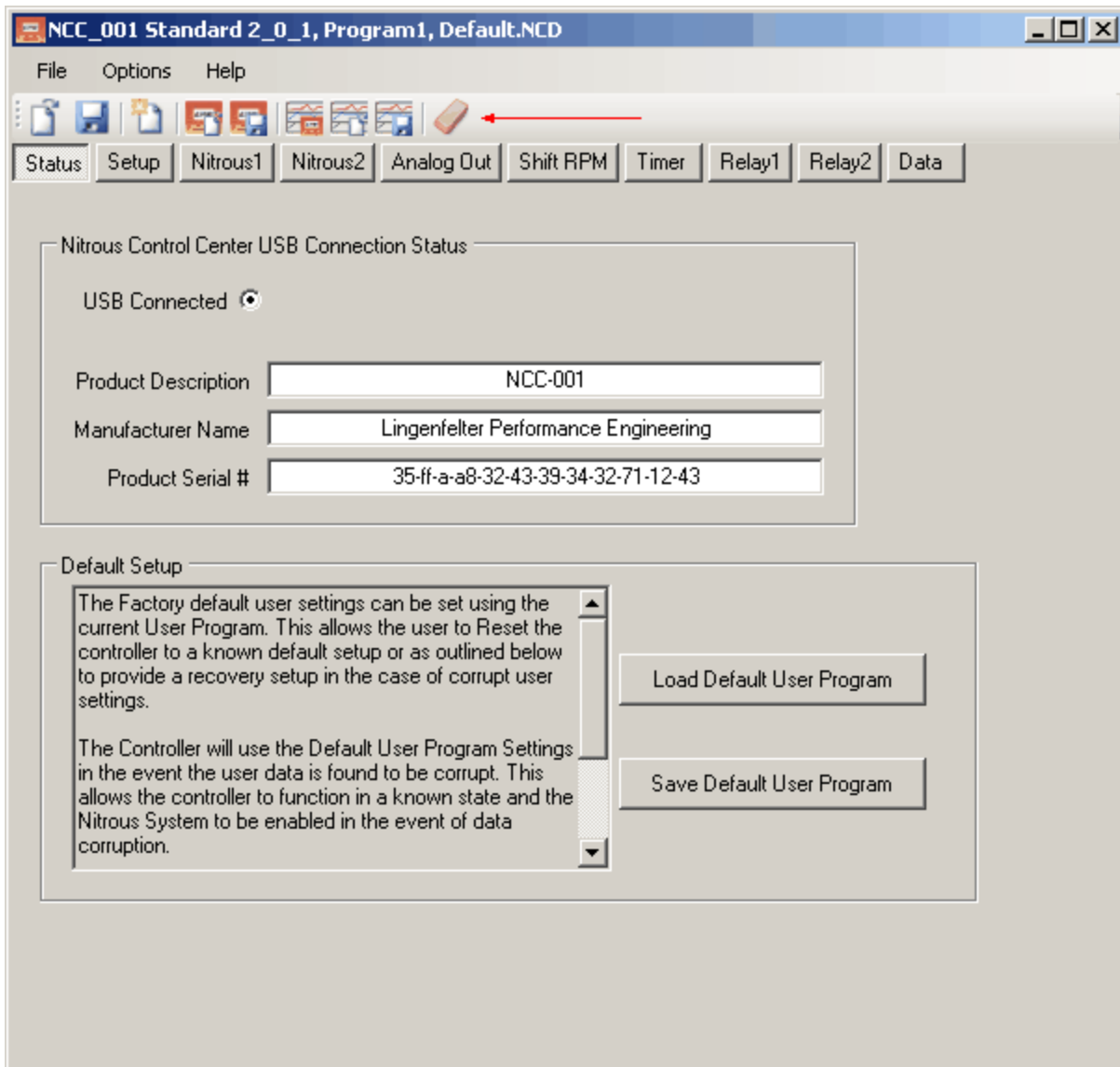


## Erase Data Log from Controller

This option allows the user to erase a data log off of the NCC-002 controller.

### Access from the Computer Program:

From the [Status screen](#), click on the Eraser Icon in the toolbar. Click "YES" to erase the data log from the controller or "NO" to abort the operation.



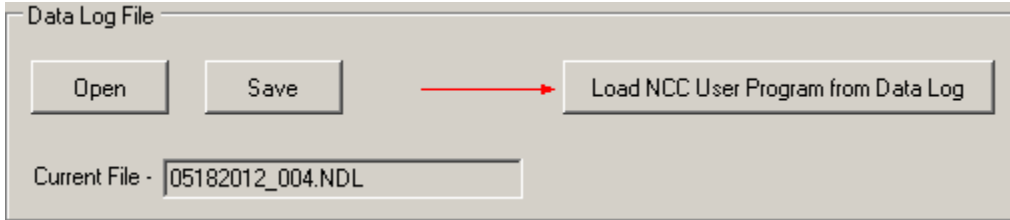
## Load NCC User Program from Data Log

This feature allows the user to extract the settings that were used on the controller when the data was read from the controller. This allows the user to not only be able to view the data log, but to also be able to save the settings that were used on the controller when the data was read to the computer. If the controller settings are changed after the data log took place but before the data log was read to the computer, **the data log user program settings will reflect the controller settings when the data was read from the controller, not when the data was logged.** For this reason, it is crucial that the data log is saved to the computer immediately after the data is logged so that the user program settings truly reflect the settings from when the data log took place, not from when the data log was uploaded to the computer. This feature is especially useful in the event that troubleshooting takes place because it gives the troubleshooter the ability to possibly reproduce the issue. For racers, it allows you to go back to a previous known configuration, as well as to test and compare the logged

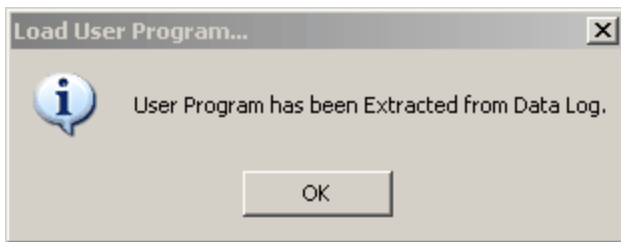
data to the associated NCC-002 settings.

### Access from the Computer Program:

From the [Status screen](#), press the "Data" button. The "Load NCC User Program from Data Log" button is found in the "Data Log File" dialog box under the "Options" Tab.



After Pressing the "Load NCC User Program from Data Log" button, a dialog box will open to confirm that a user program was extracted from the data log.



## 8.3 Viewing Data Logs

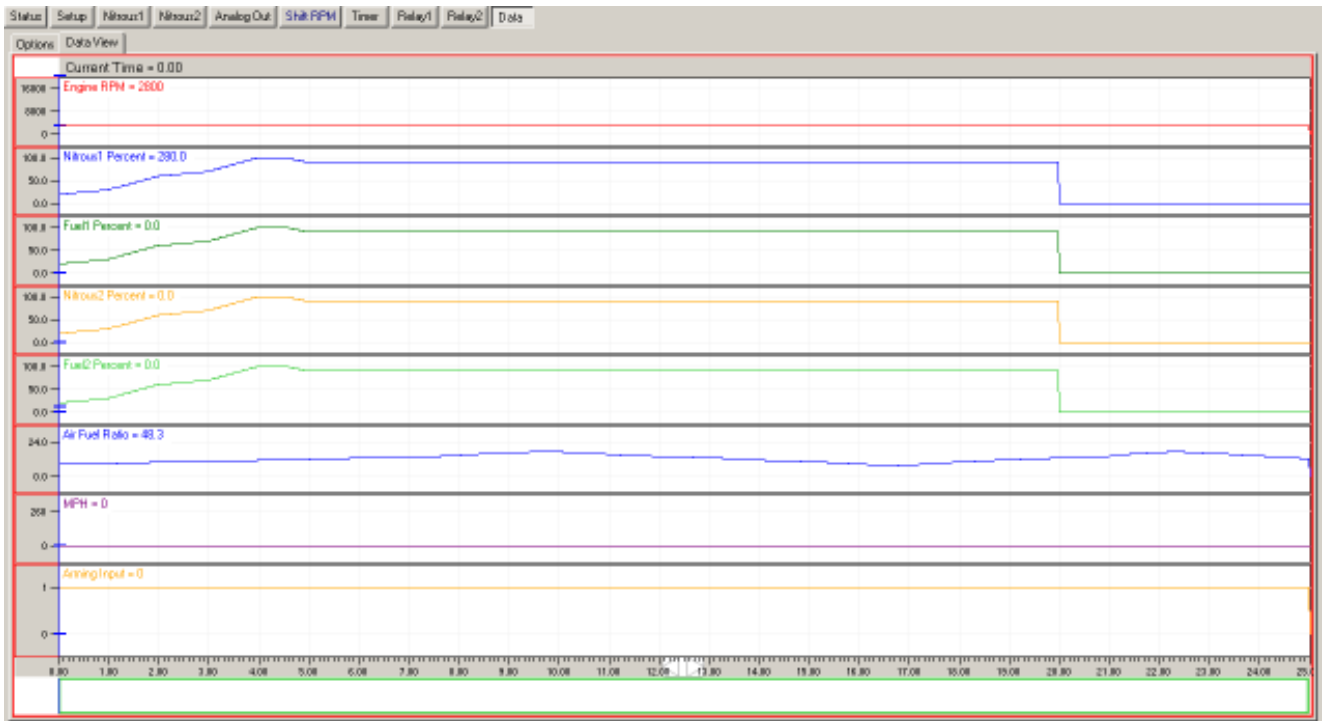
The following sub-sections explain how to view data logs in the "Nitrous Control Center" computer program. The data log chart feature allows the user to view readings of the following variables.

- Hall Input Frequency
- Engine RPM
- Nitrous1 Percentage
- Fuel1 Percentage
- Nitrous2 Percentage
- Fuel2 Percentage
- Analog Out
- TPS Percentage
- TPS Voltage
- Clutch Percentage
- Air-Fuel Ratio
- AFR Input Voltage
- Analog1 Input
- Analog2 Input
- Vehicle MPH
- Fuel PSI
- Nitrous PSI
- Gear Position
- Battery Voltage
- Arming Input
- Clutch Input
- Shift Input
- Timer Output Status
- Shift Light Status
- Relay1 Output Status
- Relay2 Output Status
- Stage1 Activation Status
- Stage2 Activation Status

### The Data Log Chart

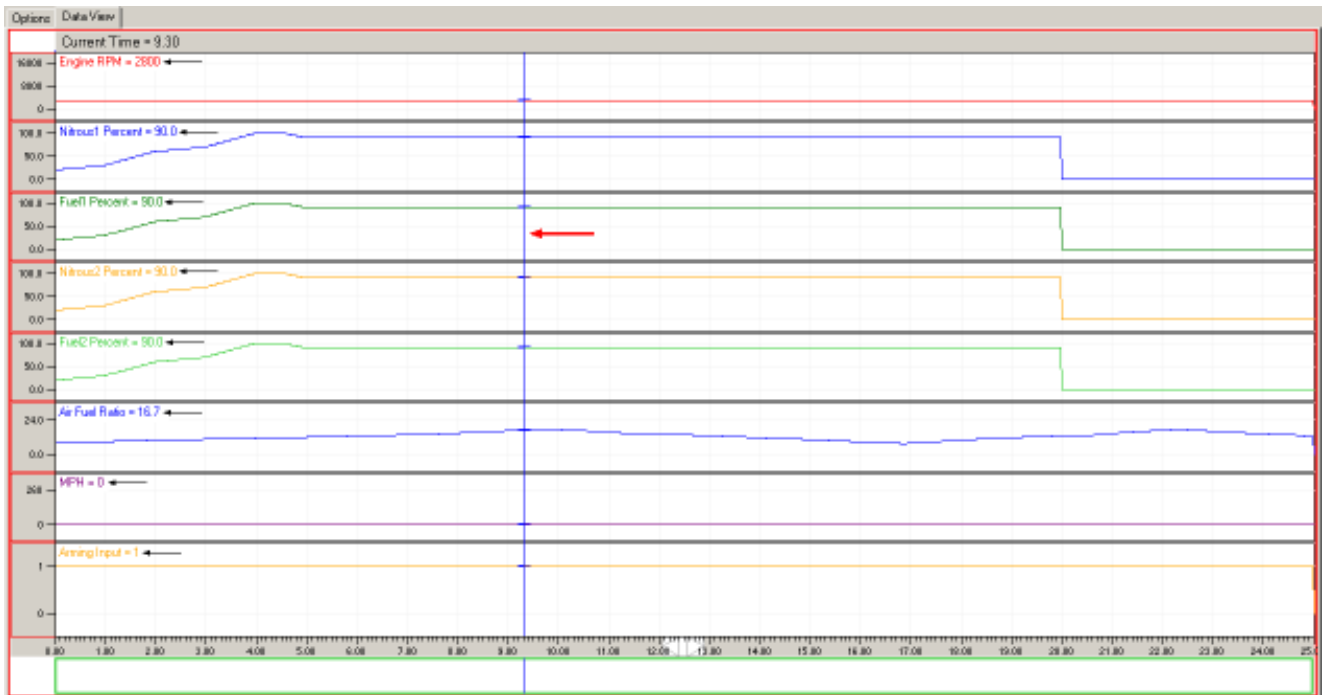
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The NCC-002 has the ability to log several types of data during each pass. Once the data has been loaded from the controller, the data can be viewed in the "Data View" tab by clicking the "Data" button, as shown below.



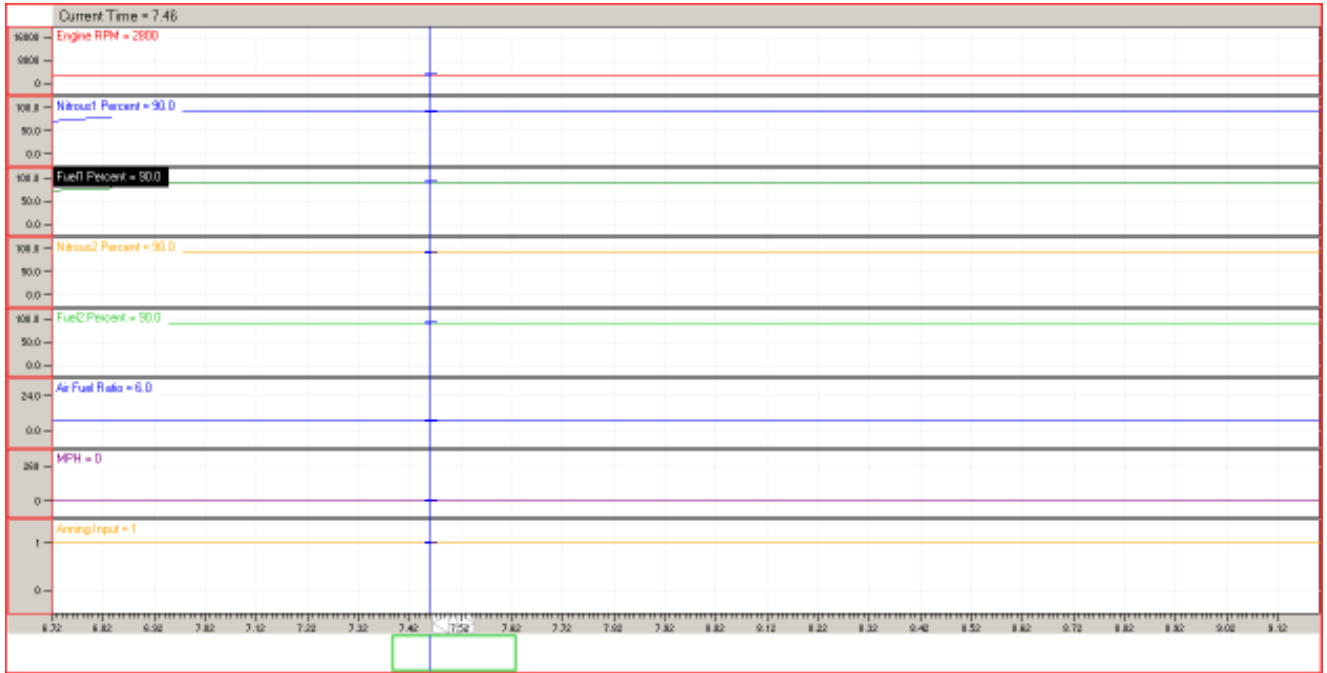
## Viewing Readings on the Data Log Charts

Each individual chart has a label that denotes what the chart is showing, as well as the value of that measurement at a single point on the chart. To view a reading at any point in the chart, simply click and drag the vertical blue bar to any point in time on the chart. The chart will then display the readings of each variable being measured directly beside the label of the variable. In the image below, the variable labels and values are denoted by black arrow while the time cursor line is denoted by a red arrow.



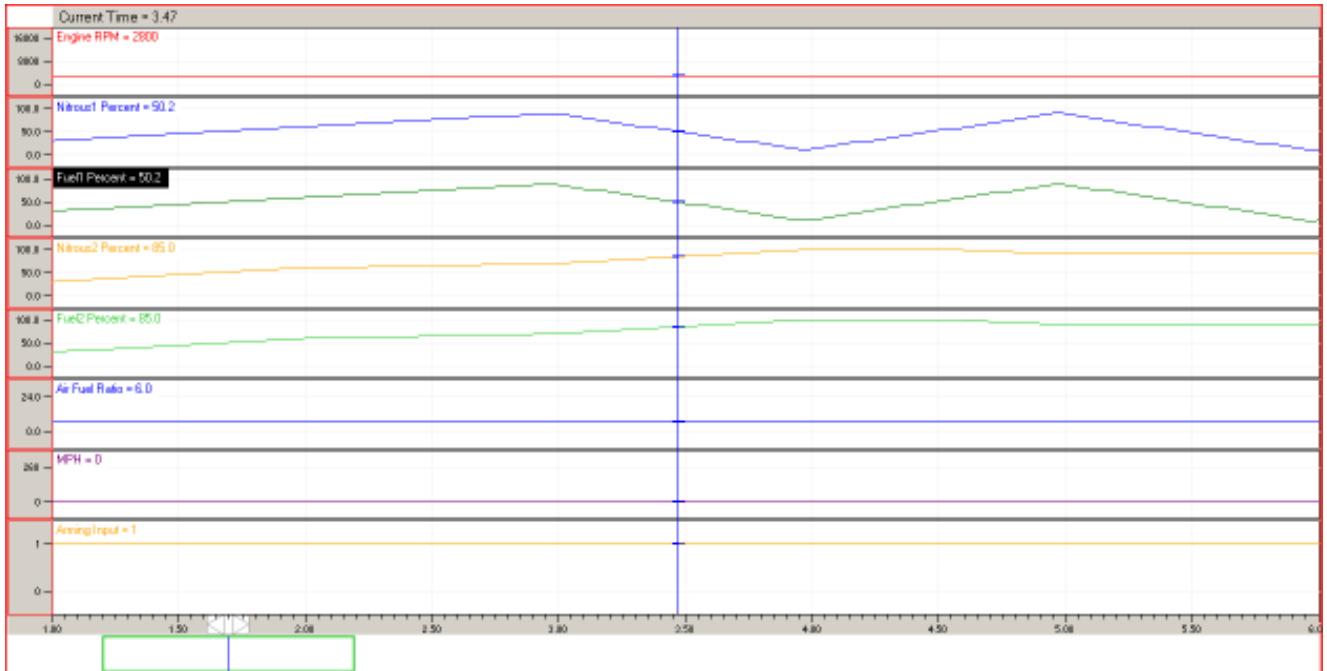
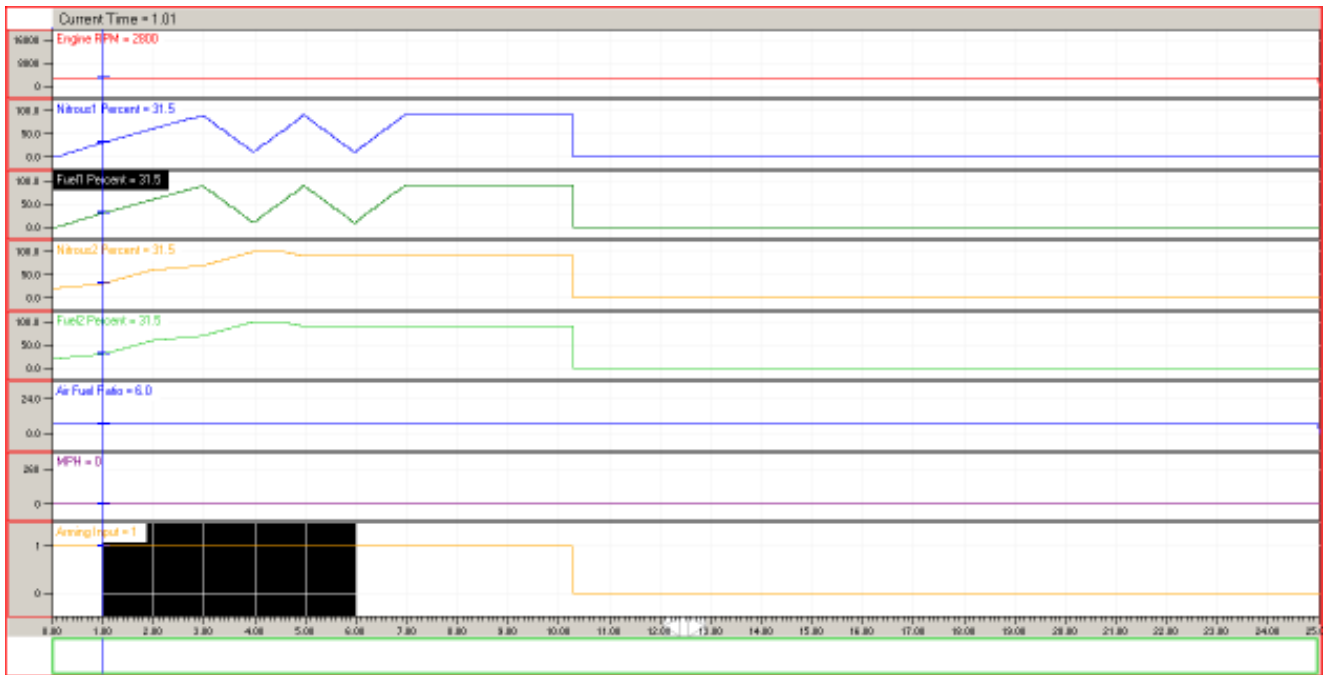
## Zooming the Chart in or out

The chart can be easily zoomed in or out in two (2) ways. To zoom in or out on a specific point in time, simply move the vertical blue line to the time location and use the scroll wheel on your computer mouse to zoom in or out. You can also use the green rectangle below the X-axis by clicking and dragging the ends of the rectangle to zoom the chart. The ends of the green rectangle show the range of the zoomed charts with respect to the full length of the chart, so if the entire time span of the chart is being displayed, the green rectangle will span the entire length of the graph as well. This can be seen in the previous illustration as that chart was zoomed out completely. Notice in the following illustration how the green rectangle and the tick marks on the X-axis show that the chart has been zoomed in.



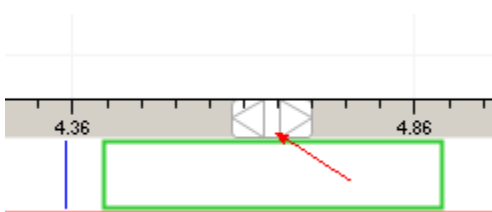
## Viewing a Specific Time Interval

The data log chart can be zoomed to a specific time interval by first placing the vertical blue line on either the beginning or the end time of the desired time interval. Then, double click on the vertical blue line. Your cursor will now be dragging a highlighted region on the chart, as shown in the first picture below. Drag the highlighted region of the chart to the other end of the desired interval and single click to zoom in to the desired interval. The second picture below shows the time interval from 1 second mark to the 6 second mark.



## Scrolling the Chart Along the X-Axis

The data log chart can be scrolled along the X-axis when the chart is zoomed in by clicking and dragging the white bar that moves along the tick marks on the X-axis. The white bar is denoted by the red arrow in the picture below.





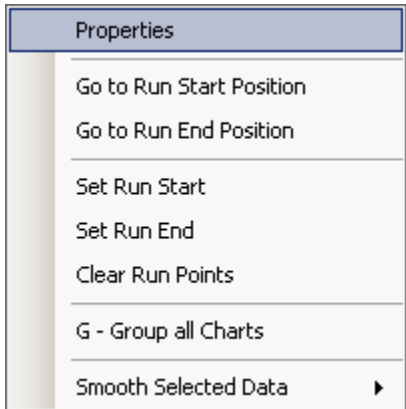
## Selecting Variables to View on the Chart (Chart Properties)

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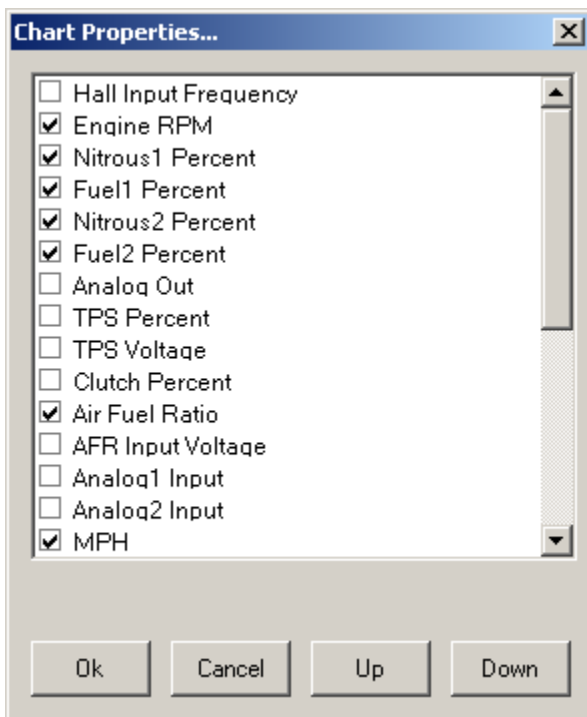
As the bullet points illustrated at the beginning of this section, there are currently 28 variables whose data gets logged by the controller during a run. Any combination of these variables can be displayed at one time by specifying the desired variables in the data view properties dialog box.

### Access from the Computer Program:

While viewing the data log in the "Data View" tab of the computer program, right-click on the charts and then click on the "properties" button.

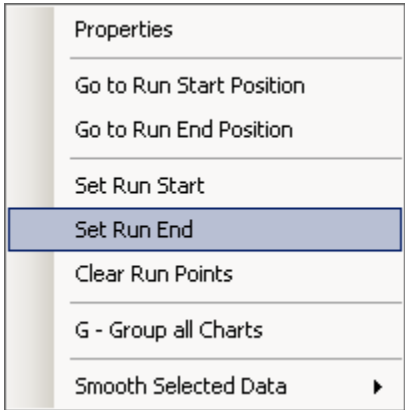
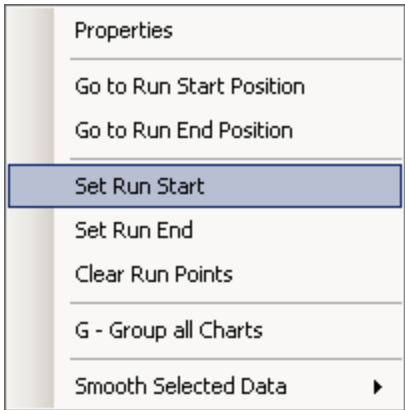


Once in the "chart properties" dialog box, double-click the variables to check or un-check the box. The variables with the checked boxes will be displayed in the "Data View" tab while the un-checked boxes will not.



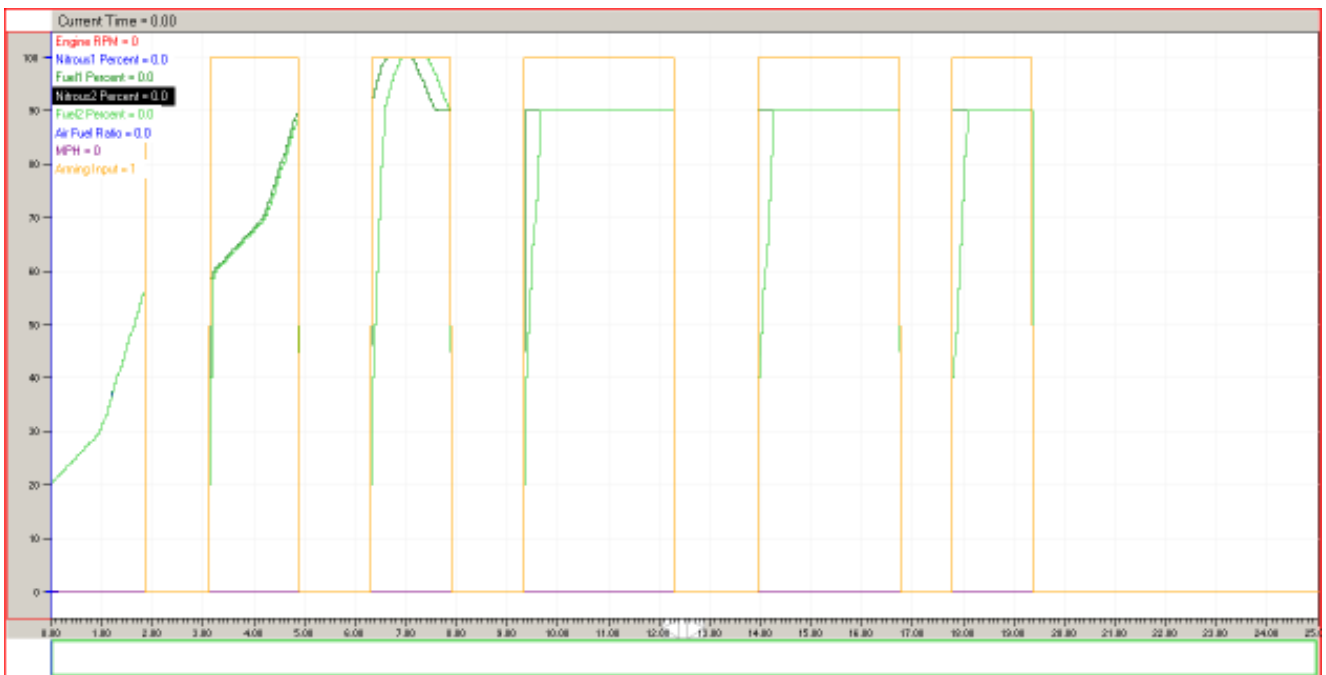
## Setting Start and End Points of the Run

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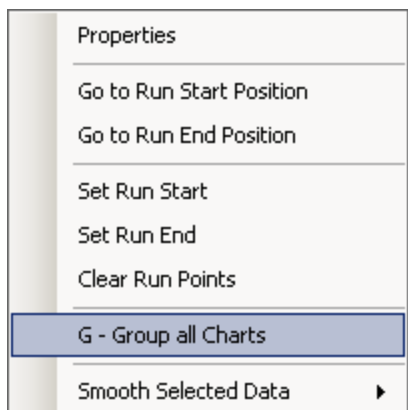
## Grouping Variables into a Single Chart

The default data log chart is a series of individual charts showing each variable that is checked in the chart properties dialog box, but you can also choose to show all of the checked variables on one single chart instead. The chart below shows the variables grouped into a single chart.



Access from the Computer Program:

- Press and hold Ctrl+Alt+G
- While viewing the data log in the "Data View" tab of the computer program, right-click on the charts and then click on the "G-Group All Charts" button.



To toggle the "Group All Charts" option on and off, repeat one of the steps denoted by the bullet points above.

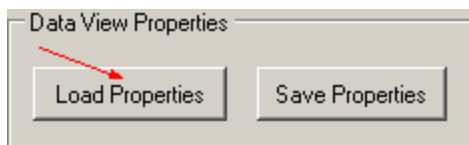
## Loading Data View Properties

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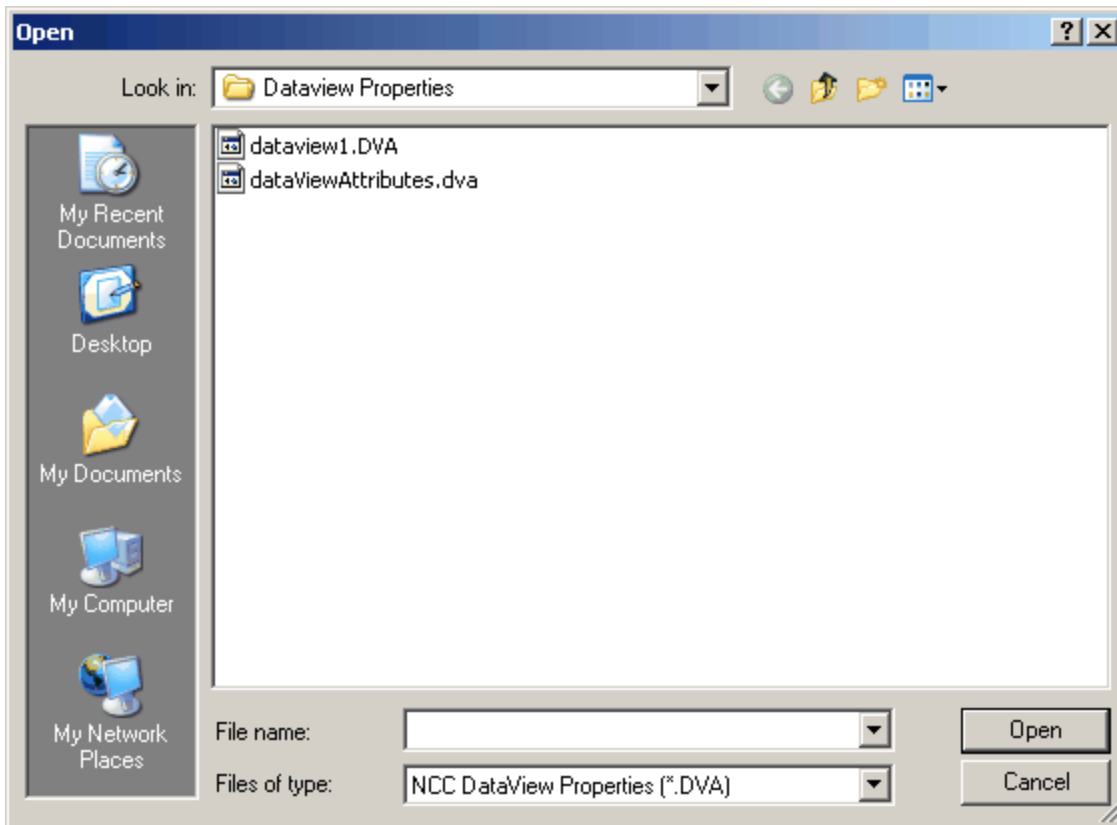
This option allows the user to open a saved data view properties file.

### Access from the Computer Program:

From the [Status screen](#), press the "DATA" button. The "Load Properties" option is found in the "Data View Properties" dialog box under the "Options" tab.



A windows explorer window will pop up and prompt the user to select the desired file. Once the desired file is selected, click "Open" to open the data view properties configuration or "Cancel" to terminate the operation.



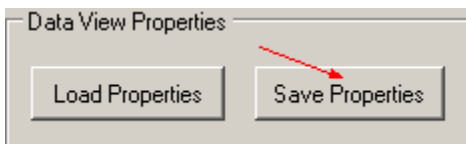
## Saving Data View Properties

---

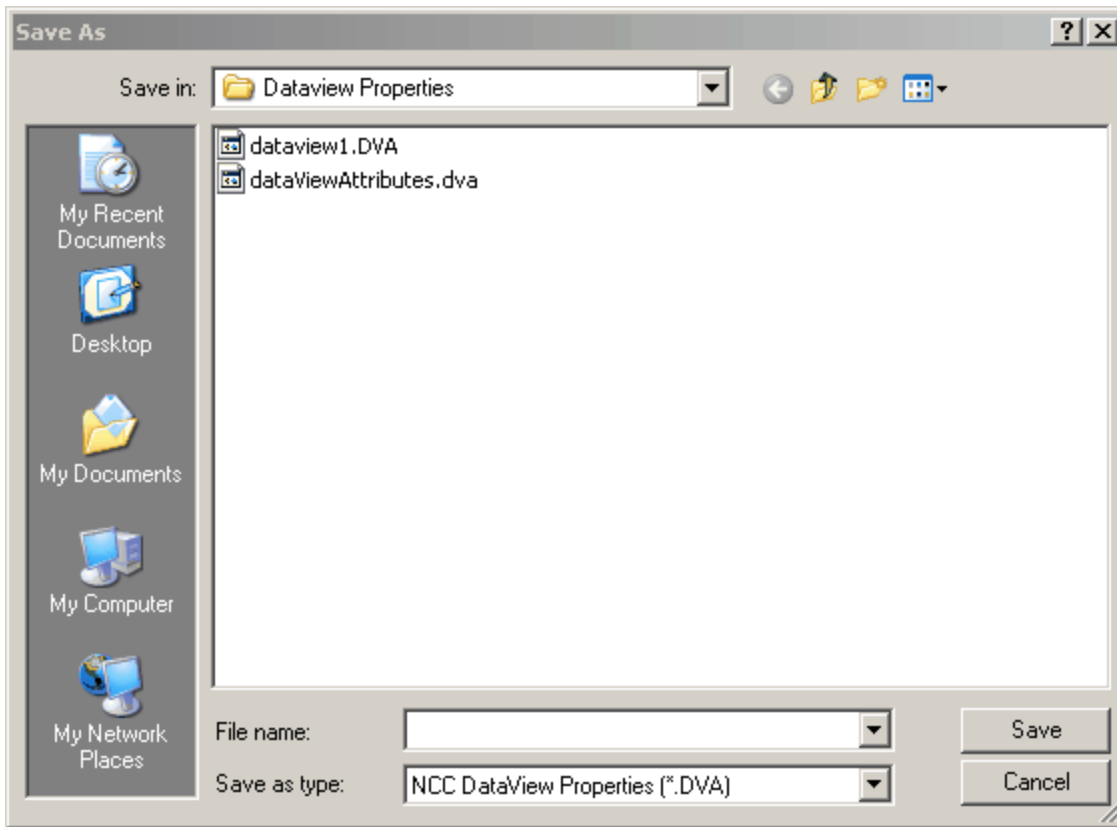
This option allows the user to save the current data view properties.

### Access from the Computer Program:

From the [Status screen](#), press the "DATA" button. The "Save Properties" option is found in the "Data View Properties" dialog box under the "Options" tab.



A windows explorer window will pop up and prompt the user to name and save the current data view properties. Once the desired name is typed in, click "Save" to save the data view properties configuration or "Cancel" to terminate the operation.

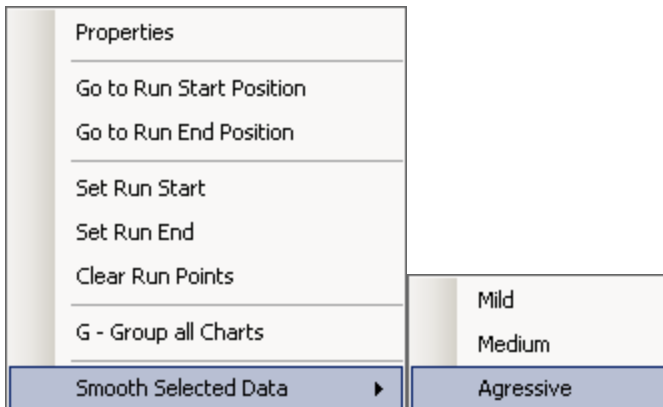


## Smooth Selected Data

This feature can be used to smooth sharp edges on the data view chart. There are three (3) settings for smoothing the data, ranging from mild (which modifies the chart the least) to aggressive (which modifies the chart the most). The graphs can be smoothed further by repeatedly clicking on these buttons. Note that smoothing the data will make the data less accurate in some places.

### Access from the Computer Program:

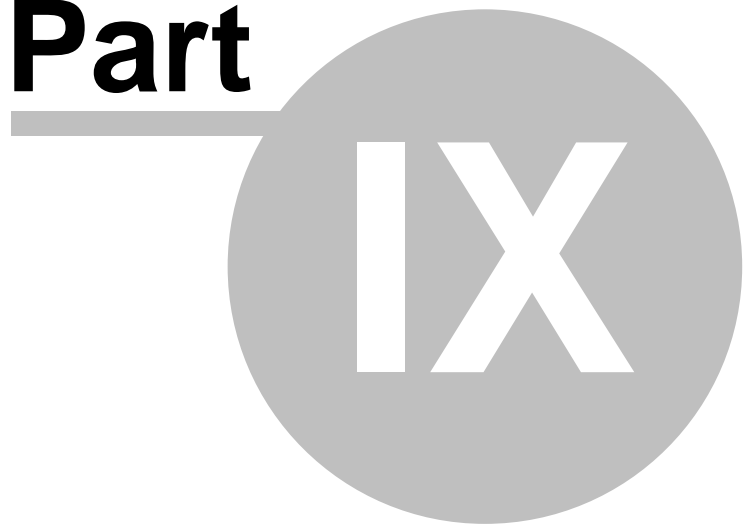
While viewing the data log in the "Data View" tab of the computer program, click on the label of the desired chart, right-click on the chart, and then click on the "Smooth Selected Data" button.





# Appendices

**Part**



## 9 Appendices

The following appendices provide additional information to help clarify which settings to use for your application. A glossary of selected terms can also be found to provide a better understanding of concepts related to the NCC-002 nitrous controller.

### 9.1 Appendix A: Pulse Frequency Detailed Explanation

The Pulse Frequency is the number of times per second (Hertz of Hz) the solenoids are turned ON/OFF. This frequency can be adjusted to one of three values--12.5, 20, and 25 pulses per second.

When the pulse frequency is changed the Nitrous and Fuel Progressive Ramps should be checked. The reason for this is the way the NCC-002 stores the data. For example a setting of 12.5 Hertz generates fewer data points over a given time interval than the 25 Hz setting (12.5 pulses per second vs. 25 pulses per second).

When going from a lower frequency setting to the 25 Hertz frequency setting, the total time in seconds for the Progressive Ramp is decreased. This change in time does NOT effect the Main Timer Timeout period in any way. The last Percentage setting of the Progressive Ramp is used for the remainder on the Main Timer period. See Appendix B for more information.

The best way to learn more about this feature is to change pulse frequency and then use the "Nitrous Graph Setup" to navigate the Progressive Ramp and view the time change per pulse in the Graph Setup screen.



## 9.2 Appendix B: Nitrous and Fuel Operation

**Progressive Ramp**—This adjustability allows the user to tune for rich/lean conditions at different points in the progressive ramp. Multiple precision timers are included to delay the start of nitrous delivery, advance the fuel delivery, and to provide an additional +12 volt output to control external devices. A resume ramp has been included so throttle lift transitions and/or gear change transitions can be controlled.

**Arming**—The system is armed when either a ground or +12V signal is present on the arming terminals. Once armed and all other activation criteria are met, the Main Timer begins counting down and is displayed on the main screen. If the Hold & Wait option is ON the system timers will NOT reset if the activation signal is removed (i.e.- throttle lift). If the Hold & Wait option is OFF the system will reset and start over each time the arming signal is removed and re-applied.

**Nitrous Delay**—If this function is set the nitrous timers will NOT begin until this time delay has expired. Each stage has a separate timer delay setting.

**Fuel Advance**—After the nitrous delay has timed out this setting is checked. If a fuel advance time has been set the fuel solenoids will begin operation before the nitrous solenoids. For example if a lean spike was occurring the system could be programmed to deliver a 80% fuel pulse .050 second before the first nitrous solenoid pulse. It is recommended to check nozzle flow and total volume flow to insure correct fuel delivery.

**Nitrous/Fuel Progressive Ramp**—Once armed and the delay and fuel advance timers have expired, the system will pulse the solenoids as programmed. The nitrous and fuel use independent data to allow greater control. When the end of the progressive ramp is reached the system will use the last percentage in the progressive ramp until the main timer expires. When the main timer has expired, the only way to reset the system is to remove the arming signal.

**NOTE:** It is important to note that the data log, once started, will continue to log data until the 25 seconds is elapsed, even if the Main timer is reset and started again.

**Resume Ramp**—This setting controls the Percentage that the system returns to after a throttle lift on the next Solenoid Pulse. Example-the system is at 80% and the throttle is lifted and re-applied, if the Resume Start Percent was set at 50% the first pulse would be 40%. The Resume Ramp will increase at the rate of the Resume Percent Per Pulse setting until the system returns to the Percentage it was at before the throttle lift. If the Fuel and Analog Out settings are at a higher and/or lower setting they are scaled so they resume at the same rate as the Nitrous Solenoids.

**+12 Volt Timer Output**—If a setting of 0.000 is entered the Timer Output will turn ON with the First Pulse of the Nitrous Solenoid. This output can NOT be disabled and the user must remove any wires connected to the Output terminal to disable any device connected.

## 9.3 Appendix C: Tables and Diagrams

The following Tables and Diagrams have been included to further assist the user with the installation and calibration of the NCC-002 Nitrous Controller.

**TABLE 1: RPM Pulse Counts for various applications**

Pulse/Degree	Pulse/rev	Common Application(s)
1 pulse/ 720 degrees	0.5	Typical 1 cylinder engines & individual coil ignitions such as GM LS coil trigger wire, '99+ V8 Mustang, Suzuki Hayabusa, Kawasaki ZX-14
1 pulse/ 360 degrees	1	Typical 2 cylinder engines & wasted spark coil packs such as Viper/SRT10 coil
2 pulse/ 360 degrees	2	Typical 4 cylinder engines + LS1, LS2 etc.TACH signal
3 pulse/ 360 degrees	3	Typical 6 cylinder engines
4 pulse/ 360 degrees	4	Typical 8 cylinder engines
5 pulse/ 360 degrees	5	Typical 10 cylinder engines
6 pulse/ 360 degrees	6	Typical 12 cylinder engines

**TABLE 2: Common Vehicle ECM/PCM Tachometer Signal Wiring Information**

NOTE: The Tachometer wire on an E38 ECU uses the E38 terminals (PN: 0334680003)

Vehicle	Year(s)	ECM/PCM location	Pin	Wire color	Circuit #
Camaro & Firebird	1996-1997	Connector C1 (Red)	13	White	121
Camaro & Firebird	1998	Connector C2 (Blue)	35	White	121
Camaro & Firebird	1999-2002	Connector C2 (Red)	10	White	121
Camaro	2010-2012	Connector C1 (Black)	48	N/A	N/A
CK Truck	2007-2012	Connector C1 (Black)	48	N/A	N/A
Corvette	1996	Connector C1 (Red)	13	White	121
Corvette	1997-1998	Connector C2 (Blue)	35	White	121
Corvette	1999-2003	Connector C2 (Red)	10	White	121
Corvette	2004	Connector C2 (Green)	10	White	121
Corvette	2005	Connector C1 (Blue)	48	White	121
Corvette	2006-2007	Connector C1 (Black)	48	White	121
CTS-V	2009-2012	Connector C1 (Blue)	25	N/A	N/A

**TABLE 3: Common ECM/PCM Vehicle Speed Wiring Information**

Vehicle	Year	ECM/PCM Connector	Pin	Wire Color	Circuit #
Camaro/Firebird	1996-1997	C2 (Black)	8	Dark Green/ White	817
Camaro/Firebird	1998	C1 (Red)	55	Dark Green/ White	817
Camaro/Firebird	1999-2002	C2 (Red)	50	Dark Green/ White	817
Camaro	2010-2012	C1 (Black)	57	N/A	N/A
CK truck	1999-2002	C2 (Red)	50	Dark Green/ White	817
CK truck	2003-2006	C2 (Green)	50	Dark Green/ White	817
CK truck	2007-2008	C1/X1 (Black)	57	Yellow/Black	1827
CK truck	2009-2012	C1 (Black)	57	N/A	N/A
Corvette	1996	C2 (Black)	8	Dark Green/ White	817
Corvette	1997-1998	C1 (Red)	55	Dark Green/ White	817
Corvette	1999-2003	C2 (Red)	50	Dark Green/ White	817
Corvette	2004	C2 (Green)	50	Dark Green/ White	817
Corvette	2005	C1 (Blue)	21	Dark Green/ White	817
Corvette	2006-2008	C1/X1 (Black)	57	Dark Green/ White	817
CTS-V	2004-2005	C2 (Green)	50	Brown	818
CTS-V	2006-2007	C1 (Blue)	39	Brown	818
CTS-V	2009-2012	C1 (Blue)	39	N/A	N/A
GTO	2004	C2 (Green)	50	Purple/White	5197
GTO	2005-2006	C1 (Blue)	21	Purple/White	5197
SSR	2003-2004	C2 (Green)	50	Dark Green/ White	817
SSR	2005-2006	C1 (Blue)	21	Dark Green/ White	817
Trailblazer SS	2006	C1 (Blue)	21	Dark Green/ White	817
Trailblazer SS	2007-2008	C1/X1 (Blue)	39	Dark Green/ White	817

**TABLE 4: Wire Gauge Selection Chart for a 12 Volt System**

Amps	Watts	3'	5'	7'	10'	15'	20'	25'	30'
1	12	20	20	20	20	20	20	20	20
1.5	18	20	20	20	20	20	20	20	20
2	24	20	20	20	20	20	20	20	20
3	36	20	20	20	20	20	20	20	20
4	48	20	20	20	20	20	20	20	18
5	60	20	20	20	20	20	20	18	18
6	72	20	20	20	20	20	18	18	16
7	84	20	20	20	20	18	18	16	16
8	96	20	20	20	18	18	16	16	16
10	120	20	20	20	18	18	16	16	14
11	132	20	20	20	18	16	16	14	14
12	144	20	20	20	18	16	16	14	14
15	180	20	20	20	18	16	14	12	12
18	216	20	20	18	16	14	14	12	12
20	240	20	20	18	16	14	12	12	10
22	264	20	18	16	14	12	12	10	10

## 9.4 Appendix D: Glossary of Terms

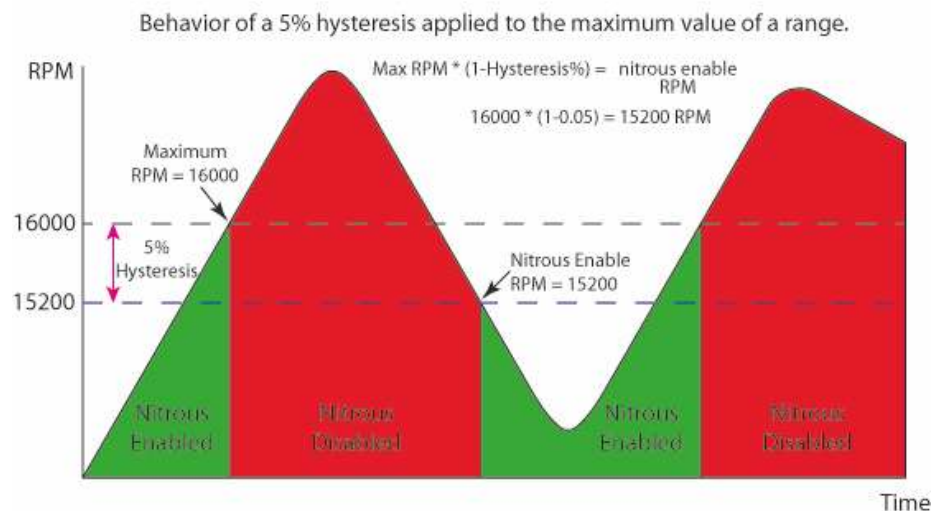
### Air to Fuel Ratio (AFR):

Air to Fuel Ratio (AFR) refers to the ratio of the mass of air and fuel inside an engine at any given time. In theory, the most efficient AFR is where there is only enough air in the engine to completely burn the fuel, also known as the Stoichiometric ratio. For standard gasoline, Stoichiometric ratio is 14.7. In most performance applications, however, the Stoichiometric ratio is rarely targeted during wide open throttle conditions. Maximum power with standard gasoline is usually achieved with an AFR of 12.8-13.0. Because Nitrous Oxide (N<sub>2</sub>O) contains more oxygen than air does, it is able to burn the fuel at a higher temperature, creating higher pressure in the cylinders and ultimately more power. While the added pressure in the combustion chambers increases horsepower, it can also damage the engine if the AFR is not adjusted accordingly. In general, you should run a richer AFR when the nitrous is active.

### Hysteresis:

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. If a thermostat, for example, was to maintain a temperature of exactly 72 degrees, it would most likely overshoot 72 degrees and then undershoot trying to correct itself. Theoretically, this would cause the thermostat to switch on and off for an infinite period of time, exhibiting behavior similar to a sine wave function. As one can imagine, the continual switching of the thermostat would drastically reduce its functional life span. For this reason, thermostats and other devices generally have a built-in hysteresis function that allow them to stay off or on for longer periods of time. In the case of the NCC-002 Nitrous Control Center, the nitrous is enabled by several variables for which a hysteresis can be set. The illustrations below show the behavior of a 5% hysteresis applied to the maximum and minimum RPM activation thresholds for nitrous through the NCC-002.

NOTE: These graphs below are for illustration purposes only. The actual RPM hysteresis value is dependent on the user-defined RPM maximum and minimum values, as well as the user-defined hysteresis percentage.



As the illustration shows, the nitrous enabled condition remains unchanged until the user-defined maximum value is reached. The illustration has a user-defined maximum value set at 16000 RPM. The illustration has a 5% hysteresis, which is shown by the dotted navy line. Once the nitrous is disabled, it will not re-enable until the set point minus the hysteresis is reached.

**Nitrous oxide (N<sub>2</sub>O):**

Nitrous Oxide (N<sub>2</sub>O), or Dinitrogen Monoxide, is a chemical compound that is commonly used in racing applications to increase the power output of an engine. Nitrous oxide is used in internal combustion engine applications to increase the amount of oxygen available in the combustion chamber for burning fuel. The air that we breath in everyday is composed of roughly 78% nitrogen, 21% oxygen, and 1% miscellaneous gases. Nitrous Oxide, on the other hand, is composed of roughly 64% nitrogen and 36% oxygen. Because nitrous oxide has a higher concentration of oxygen than air, more fuel can be injected into the combustion chambers, creating more power output from the engine. Also, nitrous is undergoing a phase change which cools the engine inlet air and increases the charge density, further increasing the amount of oxygen available for combustion.

**Throttle Position Sensor (TPS):**

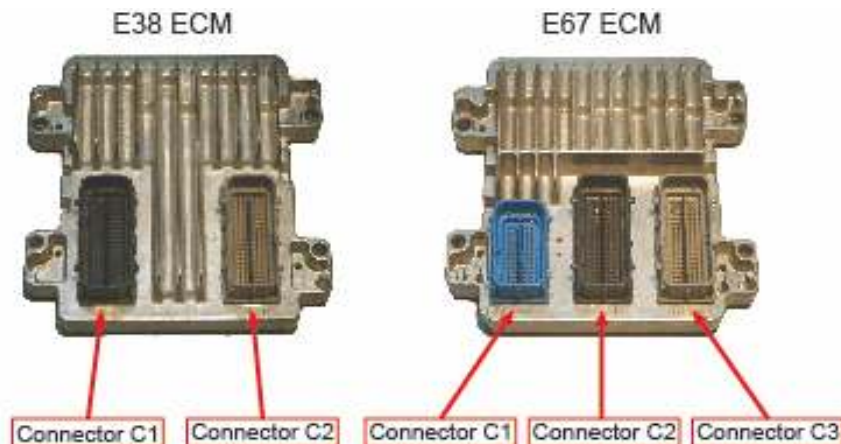
The Throttle Position Sensor (TPS) is the sensor that monitors the position or the angle of the throttle blade. The throttle position sensor sends a signal, usually between 0-5 volts, to the ECM or PCM telling it to what degree the throttle valve is open. Electronic throttle bodies (also known as "drive by wire") generally have two sensors. One of the sensors will output an increasing signal as the throttle opens while the other sensor will output a decreasing signal. This allows the ECM or PCM to compare the two signals to verify that the data is correct.

## 9.5 Appendix E: Enabling ECM Engine Speed Signal Output

On some vehicles (such as the 2010-2013 Camaro, 2007-2013 C/K Trucks, and 2009-2013 CTS-V), the tachometer is not connected to the ECM by a direct tachometer signal wire. Instead, the dash receives the RPM 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 tachometer signal from the ECM to an external device, such as the NCC-002. The following sections explain how to connect a wire to the correct pin on the ECM, as well as how to enable the ECM tachometer output using EFILive Tune v7.5.

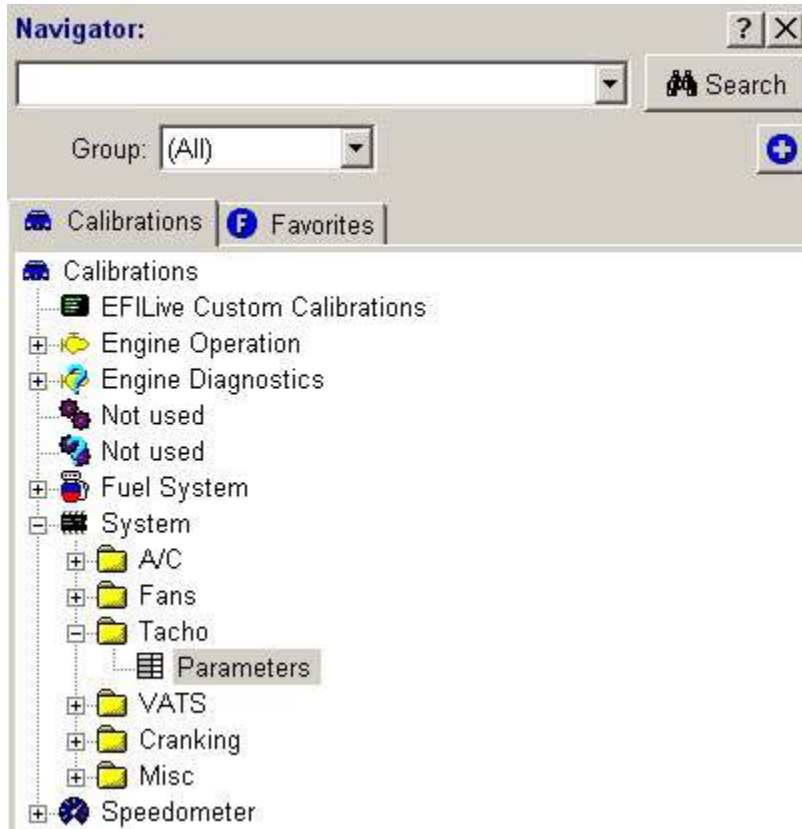
### 9.5.1 Populating the Tachometer signal wire on the ECM (GM E38, E67 ECM's)

1. Determine the correct ECM pin location for the engine speed (tachometer) output signal on your vehicle. A list of tachometer signal pin locations for some GM vehicles has been provided in [Appendix C: Tables and Diagrams](#).
2. Disconnect the ECM connector that houses the tachometer 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 engine speed (tachometer) 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 NCC-002), which will become your tachometer 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 here 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 "Tach Input" terminal on the NCC-002.

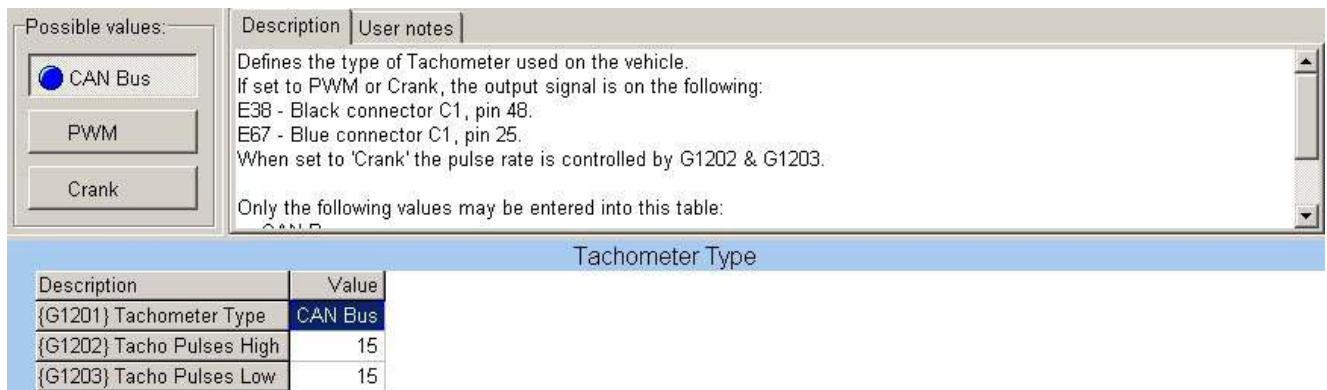


## 9.5.2 Enabling the ECM's tachometer signal output through EFILive Tune v7.5

1. In the "Navigation" window, under the "Calibrations" tab on the left side of the screen, double-click on "System" and then "Tacho" to reach the tachometer 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 CAN Bus, as shown by the blue dot on the depressed 'CAN Bus' button.



3. In the upper part of the same window, click on the 'Crank' button. Pressing this button enables the tachometer signal output from the ECM. There should now be a blue dot on the depressed 'Crank' button, showing that the selection has been changed.



Possible values:

Crank

Description | User notes

Defines the type of Tachometer used on the vehicle.  
 If set to PWM or Crank, the output signal is on the following:  
 E38 - Black connector C1, pin 48.  
 E67 - Blue connector C1, pin 25.  
 When set to 'Crank' the pulse rate is controlled by G1202 & G1203.

Only the following values may be entered into this table:

Tachometer Type	
Description	Value
{G1201} Tachometer Type	Crank
{G1202} Tacho Pulses High	15
{G1203} Tacho Pulses Low	15

4. Save the calibration and then flash the new calibration to the vehicle.
5. Refer to the [Pulses Per Degrees](#) section of these instructions for information on how to calibrate the RPM pulse count on the NCC-002.
6. Since no other device will be connected to the tachometer signal output or the ECM, make sure to enable the pull-up resistor on the NCC-002.

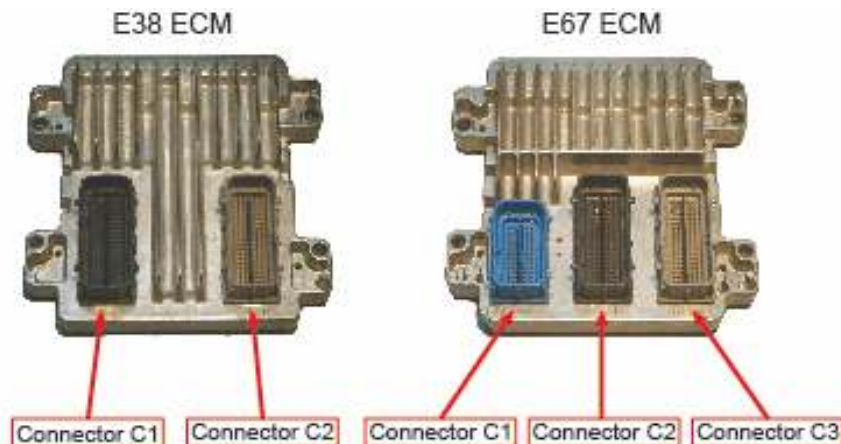
**NOTE: Similar changes will be required if using HP Tuners or any other programming system**

## 9.6 Appendix F: 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 NCC-002. 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.

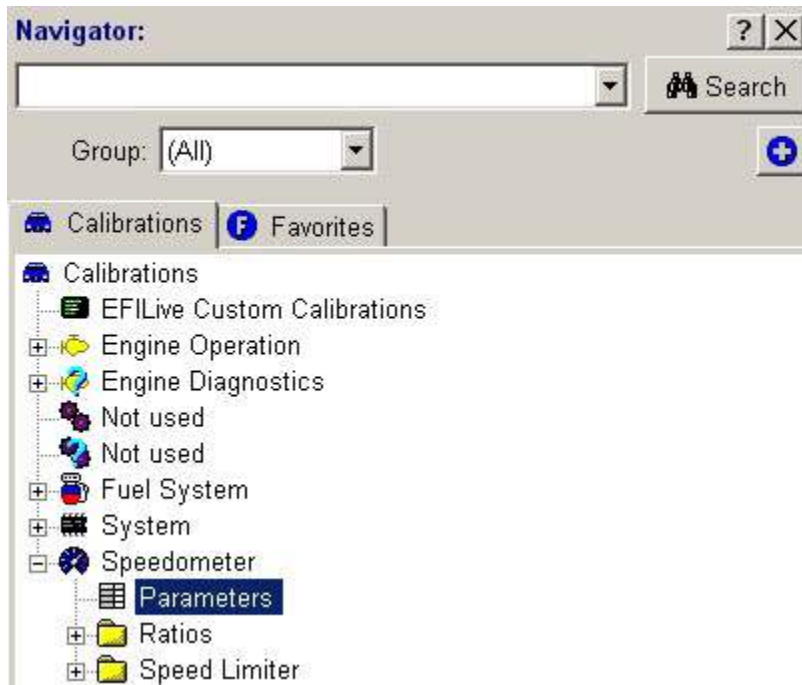
### 9.6.1 Populating the Speedometer signal wire on the ECM (GM E38, E67 ECM's)

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 [Appendix C: Tables and Diagrams](#).
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 NCC-002), 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 here 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 "Hall Input" terminal on the NCC-002.



## 9.6.2 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:

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

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.

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

4. Save the calibration and then flash the new calibration to the vehicle.
5. Refer to the [Hall Input Menu](#) section of these instructions for information on how to calibrate the NCC-002 to correctly read the VSS signal.
6. Since no other device will be connected to the VSS signal output and the ECM, make sure to enable the pull-up resistor on the NCC-002.

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

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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>



Photo by SDW Photography

**The LPE 2010 Camaro pictured above is powered by a 427 CID LSX engine equipped with a LS9 supercharger and two stages of nitrous controlled by a NCC-002. All of the fuel and timing is controlled by the ECM with a custom EFILive nitrous OS that is activated by the NCC-002. This 4200 lbs vehicle retains IRS using a 9.5" LPE differential and produces 1250 rwhp. When equipped with a manual transmission, this vehicle has achieved a best ET of 8.99 at 158 mph. After switching to an automatic transmission this vehicle has achieved a best quarter mile pass of 8.78 at 164.9 MPH.**

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