

## **LNC-2000 Launch Control Module**

### **Installation and Operating Instructions**

#### **Adjustable RPM Limiter & Timing Retard Controller**

#### **For GM LSx Series Engines**



**PN: L460145297**

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### Parts List

#	Part number	Description
1	LNC-2000	LPE Launch Controller
1	XX03975-0003	72" trigger wire harness ( <i>part of PN LNC-2000</i> )
2		Hook & loop tape, 3.5" length
4	AV16037	Self-tapping screw
3	L450080000	Transient voltage suppression (TVS) diode kit
1	L950050000	LPE technician's screwdriver
2	L920180000	LPE bumper sticker & sponsor decal
1		Instructions

### Optional Items

• 3 bar MAP sensor	12223861
• Additional transient voltage suppression (TVS) diode kit	L450080000
• STOV-004 MPH activated switch	L460340004
• CTAP-001 Clutch and Throttle activation position switch	L460190108
• CTAP Plug-And-Play harness for Corvette, Camaro & CTS-V	L480370108
• Throttle position sensor signal harness	CE105454
• Red 12 vdc LED with 30 cm leads	L450120000
• Sealed 40 amp heavy duty relay kit	L450100000
• Hella solid state relay, 30 amp	H41773001
• Red LED lighted paddle toggle switch, 20 amp	DC-7600500
• Weatherpack connector kit, universal (not keyed)	L480320000
• RPM-003 RPM activated switch	L460160000
• NCC-002 Nitrous Control Center EFI kit (sensors and harnesses included)	L460200000
• NCC-002 Nitrous Control Center (controller only)	L460240000
• LPE microswitch kit	L480330000
• Activation wire mating connectors and terminals	
• Connector, AMP Mate-N-Lock, Female 1-pos	571-14803490
• Connector, AMP Mate-N-Lock, Male 1-pos	571-14803510
• Connector, AMP Mate-N-Lock Pin, 24-18 AWG	571-606181
• Connector, AMP Mate-N-Lock Socket, 24-18 AWG	571-606171
• Toggle switch	CLT-V1D1BC0B

**Note: The LNC-2000 receives power and ground from the coil pack connectors. The +12V and ground activation wires are not power and ground for the controller.**

## Specifications:

- Custom molded high temperature glass filled Nylon 6 enclosure with direct access to the controller settings without requiring removal of a cover or access panel
- 40 MHz 16-bit automotive qualified processor with eight channel Enhanced Time Module
- Each coil drive circuit has a dedicated timer to keep the timing accurate over the full RPM range
- Independent coil drive provides Sequential Ignition Kill when RPM limiting is active
- Reverse battery protection
- Both of the activation inputs have active clamps and optical isolation to suppress electrical noise from external solenoids (such as trans brake and line lock)
- Digital noise filtering to isolate the LNC from unwanted electrical signals
- Separate RPM x100, RPM x1000, Max Retard and Rate switches for easy setting adjustments
- RPM limiter activation point can be adjusted from 1,500 to 9,900 RPM in 100 RPM increments
- Both **Ground Activation** and **+12 Volt Activation** inputs are provided for RPM limit activation
- Timing retard capability with up to 15 degrees of timing retard authority
- Dedicated timing retard trigger input wire (for nitrous activation or other timing retard activation).
- GM 3 bar manifold air pressure (MAP) sensor connector for boost based timing retard function
- Analog input for timing retard control from external modules:
  - Accepts analog voltage signal from NCC-001 & NCC-002 nitrous controllers to allow progressive timing retard
  - Interfaces with Davis Technologies traction control module
- Analog voltage output wire for sending timing retard information to data acquisition systems (EFILive, HPTuners, DashDAQ, etc.)
- True plug-and-play coil pack connection design for ease of installation and removal
- Fully encapsulated (potted) construction for added durability
- One year warranty (from date of purchase).

### LNC-2000 description:

Sometimes referred to as a 2-step or launch controller, the LNC-2000 adjustable RPM limiter and timing retard controller can be used to provide consistent launch RPM off the line in drag racing and other standing start racing applications. In turbocharged applications the LNC-2000 can also be used to retard the timing in order to build more boost at the line.

The LNC-2000 can also be used as an adjustable individual cylinder RPM limiter, providing reliable and fast acting spark based engine RPM limit control. This is especially useful in vehicles that have auxiliary fuel control systems where it is not possible to make sure that both the factory ECM/PCM and the auxiliary systems both turn off fuel at exactly the same time. If the two don't completely cut fuel at the same time you will run lean when the one system cuts off the injectors (but not the other), risking severe engine damage.

The Timing Retard capabilities of the LNC-2000 can be used to retard timing by up to 15 degrees. For nitrous oxide applications the timing retard can be activated using the dedicated timing retard activation input to the LNC-2000. This dedicated timing retard activation input can be activated using clutch or accelerator pedal position via a micro switch or the Lingenfelter CTAP-001 clutch and throttle activation position switch (PN: L460190108). The LNC-2000's timing retard activation input can also be activated via a +12v activation signal from a nitrous controller, such as the Lingenfelter NCC-001 or NCC-002. In turbocharged and supercharged engines the amount of retard can be controlled by the boost level using the 3 bar MAP sensor input. The LNC-2000 can also be used to retard the timing at the line to build boost in turbocharged vehicle applications (with or without the launch control RPM active). The Timing Retard function can be used by itself or while the Launch Control RPM limit function is active.

**Please note - although launch controllers like the LNC-2000 are often referred to as 2-step controllers, they are not true 2-step controllers. A true 2-step controller, such as the LNC-003, has a high and a low RPM limit function with a switch of some type enabling one setting or the other. The LNC-2000 only has one RPM limit setting so if you are using the LNC-2000 as a launch control RPM limiter, you will need to use the factory ECM/PCM as the engine maximum RPM limiter (engine speed governor).**

### WARNINGS:

**The RPM limiter function of the LNC-2000 acts by disabling spark to individual cylinders and not fuel like most production RPM limiters so the 2-Step/Launch Control function is not meant for use on the street or for use on cars equipped with catalytic converters. The 2-Step/Launch Control function of the LNC-2000 is only for use at the race track on race vehicles not equipped with catalysts. Failure to follow these precautions can result in premature catalyst failure.**

**DO NOT operate the engine with the LNC-2000 RPM limit active for extended periods of time. Due to the raw fuel in the exhaust when the RPM limit is active, a risk of backfiring exists if you do so.**

**DO NOT** place in direct exposure to exhaust manifolds, turbocharger turbine housings or other underhood items that are high temperature heat sources (radiated heat sources). The warranty does not cover damage due to melted enclosures or wiring due to improper installation.

**Do NOT** submerge Controller in liquid or directly wash unit with liquid of any type! The switches on the LNC-2000 are sealed but are NOT rated for high pressure wash, use caution if power washing near the LNC-2000 controller

## Switches and indicator lights:

### Red (Power) LED:

- Comes on solid on start-up (power on)
- When active RPM is reached, red LED will blink (even if activation wire is not triggered)

### Green (Activation) LED:

- slow blink rate (4 Hz) for Launch Activation only
- medium blink rate (8 Hz) for Retard Activation only
- fast blink rate (16 Hz) for both launch and retard inputs on



### Settings:

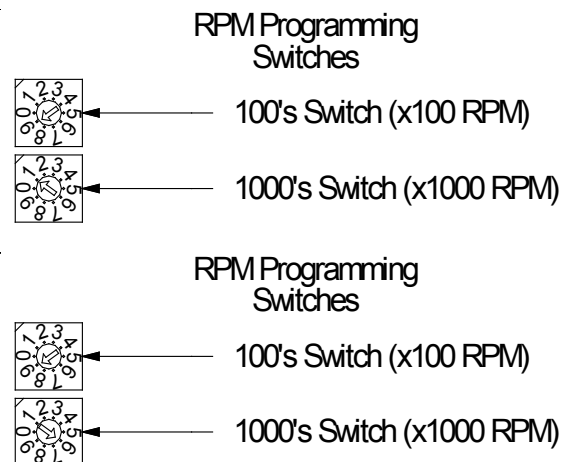
- Controlled by two (2) ten position switches (**RPM**) and two (2) sixteen position switches (**Timing**)
  - Two (2) ten position switches for selecting hundreds of RPM (x100) and thousands of RPM (x1000)
  - Two (2) sixteen position switches for selecting **Max Retard** and timing retard **Rate/Linear Mode\***

### Notes:

- The LNC-2000 RPM limiter function will not trigger at RPM levels below 1500 RPM
- The LNC-2000 timing retard function will not retard timing below 1000 RPM
- **Changes to the switch point settings (RPM, Max Retard, Rate) must be done with the ignition off**
  - The switch positions are only read on start up

### Example settings:

- 1900 RPM activation point for launch control
  - Upper (x100) RPM switch on position 9
  - Lower (x1000) RPM switch on position 1
- 6900 RPM activation point for RPM limiter
  - Upper (x100) RPM switch on position 9
  - Lower (x1000) RPM switch on position 6



\* Linear Mode is activated using setting “F” on the timing rate dial.

### Installation:

- Make sure the ignition is off before beginning installation.
- You can mount the LNC-2000 using the supplied hook and loop tape or the supplied self tapping screws.
- Do NOT mount the LNC-2000 directly on top of the engine or near the exhaust manifolds due to heat concerns.
- Do NOT mount the LNC-2000 in the line of site of high temperature objects such as exhaust manifolds, turbine housings etc. If needed, put a heat shield in between the heat source and the module to protect the plastic case and the wiring.
- Do NOT install within 6" of nitrous solenoids or other devices with strong magnetic fields.
- If you have relocated coil packs, do not run the high voltage spark plug wires alongside the low voltage coil pack wires. Keep the wires as far apart as possible and, if they do have to intersect, have them intersect at right angles.
- Disconnect the pack connectors on each side of the engine and then plug the LNC-2000 wiring harnesses in between on each side. It does not matter which bank of cylinders each side of the LNC-2000 harness connects to.
- The only wiring that is required is for the trigger wire(s) depending on how you want to enable the device. See pages 12 to 28 for specific wiring diagrams. While we have tried to cover most configurations, many different possible wiring methods exist, too many for us to list them all. Check some of the GM, LS1, Corvette, GTO and other forums for discussions on other wiring methods.



The possible 2-step trigger/activation connection methods are:

- ground activation wire (green) - connect this wire to a source that supplies a ground path when you want the LNC-2000 to become active
- +12 volt activation wire (yellow) - connect this wire to a source that supplies +12 volts when you want the LNC-2000 to become active (i.e. brake light switch, line-lock solenoid)
- switch connected in between the ground activation wire and the +12 volt activation wire (green wire connected to yellow wire through a switch, usually a momentary switch)
- ground activation wire connected to +12 volt activation wire (green connected to yellow) for standard RPM limiter operation (LNC-2000 always active)
- Set the desired RPM switch activation point using the two ten position rotary switches for the 1000 RPM increment (x1000) and the 100 RPM increment (x100).

- If you are using the timing retard feature, do one of the following:
  - Connect a +12 vdc trigger wire from a +12 vdc output source (such as the Nitrous WOT switch signal or a output signal from a nitrous controller) to the orange Retard Activation wire on the LNC-2000. This will allow the +12V retard activation signal to force the retard to the maximum retard setting on the LNC-2000.
  - Connect the LNC-2000 MAP sensor input to the MAP sensor. This allows for the timing retard to be based on the boost seen by the MAP sensor.
  - Install the optional female connector (PN: L480320000) to the analog out signal from another control device (nitrous controller, traction control module, etc...). Connect the female connector to the linear signal connector from the LNC-2000. This allows for the timing retard ramp to be controlled by an external control device when the LNC-2000 is in Linear Mode.

## Launch Control/2-Step Features

The independent coil drive of the LNC-2000 provides sequential ignition kill when RPM limiting is active. The desired RPM limiting is set as shown on page 4. The activation for the Launch Control/2-Step function is controlled by the ground (green) or +12 volt (yellow) activation wires.

If you are triggering off of the clutch switch, the 2-step will trigger each time you depress the clutch pedal. This can be used to provide an ignition cut/torque cut on each gear change to potentially allow for faster shifts/faster clutch engagement.

If you do not want the 2-step to trigger when you engage the clutch pedal once you are moving then you will need to install a momentary switch or use the Lingenfelter MPH activated switch (STOV-004). With the MPH activated switch you can set at what MPH you want the 2-Step activation to be disabled. Refer to pages 13 to 17 for wiring diagrams that demonstrates how the STOV-004 should be connected to the LNC-2000.

## Timing Retard Features

Up to 15 degrees of timing retard can be applied. The amount of retard is adjusted with the **Max Retard** dial and the retard rate is adjusted with the **Rate** dial. The timing retard function can be triggered three ways:

- Retard activation wire - orange wire to be connected to a 12 volt DC activation trigger switch
- MAP sensor input connection - to be connected to a GM 3 bar MAP sensor
- MAP sensor input connection - to be connected to a nitrous controller, traction control module, or other external devices.

For either trigger method, ignition retard is only active when the engine RPM is above 1,000 RPM. MAP sensor based retard is only active if a MAP sensor is connected to the MAP sensor input. The LNC-2000 checks for this by checking if a voltage signal is present on the purple signal wire **on power up**. If the orange wire is connected (and powered by a +12 volt source) while a MAP sensor is also connected then the timing retard will go to the maximum retard value set with the **Max Retard** dial. The Retard may be activated while the RPM Limiter is active.

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### Setting The Spark Timing Retard Value

The spark retard amount is set with the **Max Retard** dial on the box. The settings are as follows:

Position	Degrees
0.....	0
1.....	1
2.....	2
3.....	3
4.....	4
5.....	5
6.....	6
7.....	7
8.....	8
9.....	9
A.....	10
B.....	11
C.....	12
D.....	13
E.....	14
F.....	15



### Setting The Spark Retard Rate

The spark retard rate is set with the **Rate** switch on the box. The settings are as follows:

• **Retard build time settings 0 – 7.** Hold and Wait retard, must power unit down after activation to reset build timer. Retard goes on/off with activation but build timer does NOT reset. Good for drag strip with nitrous.

Position	Rate
0.....	Retard is immediate.
1.....	0.2 second (retard build time)
2.....	0.4 second
3.....	0.6 second
4.....	0.8 second
5.....	1.0 second
6.....	2.0 seconds
7.....	3.0 seconds

• **Retard build time settings 8 – E.** Retard and build timer will reset any time the activation signal is removed and re-applied.

Position	Rate
8.....	0.2 second (retard build time)
9.....	0.4 second
A.....	0.6 second
B.....	0.8 second
C.....	1.0 second
D.....	2.0 seconds
E.....	3.0 seconds
F.....	Linear Mode



## Retard Rate settings when using MAP sensor input:

Position	Rate
0.....	0.2 degrees/psi
1.....	0.4 degrees/psi
2.....	0.6 degree/psi
3.....	0.8 degree/psi
4.....	1.0 degree/psi
5.....	1.2 degree/psi
6.....	1.4 degree/psi
7.....	1.6 degree/psi
8.....	1.8 degree/psi
9.....	2.0 degree/psi
A.....	2.2 degree/psi
B.....	2.4 degree/psi
C.....	2.6 degree/psi
D.....	2.8 degree/psi
E.....	3.0 degree/psi
F.....	N/A (Linear Mode)

### Time based retard mode

The retard **Rate** setting controls how quickly the controller goes to the amount of timing retard set with the **Max Retard** switch. For example, if you have the **Max Retard** switch set to 10 degrees and you have the **Rate** switch set to 1 second, after 0.5 seconds you will have 5 degrees of retard and it will take one second to build up to the full 10 degrees of retard.

### Boost retard mode

When using the MAP sensor input, the **Rate** setting controls how many degrees of retard per pound (psi) of boost and the **Max Retard** setting controls the maximum number of degrees retard to allow. For example, if you have the controller set to 10 degrees with the **Max Retard** switch (position A) and the **Rate** switch set to 3 degrees per pound of boost (position E), then at 1 psi of boost you would have 3 degrees of retard, at 2 psi of boost you would have 6 degrees of retard, at 3 psi you would have 9 degrees of retard but at 4 psi you would only have 10 degrees of retard because you have the maximum setting with the **Max Retard** switch set to 10.

When using boost based timing retard the orange retard activation input wire will force the retard to the maximum retard level setting on the **Max Retard** switch no matter what the boost level is. This allows you to use the orange trigger wire to retard timing at the line in order to build boost and then still use the boost based timing retard as you go down the track.

### Timing retard notes:

- When the LNC-2000 is powered up with no MAP sensor installed it will default to Time Based Retard mode.
- When the LNC-2000 is powered up with a MAP sensor installed it will switch to Boost Retard mode. The sensor signal **MUST** be present on power up for the LNC-2000 to enter this mode. The “Max Retard” dial will still set the Maximum amount of retard allowed. The “Rate” dial will control the degrees of retard applied for each psi of boost applied to the MAP Sensor.

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### Timing retard analog input (Linear Mode)

The timing retard analog input mode (linear mode) is a new feature for the LNC line of products. Linear mode allows the user to input a voltage which will correspond to the amount of timing retard that will be activated. This input voltage can be provided by many different external devices, including nitrous controllers (such as the LPE NCC-002 nitrous controller) or via custom wiring configurations. The LNC-2000's linear mode recognizes voltage ranges of 0.2-4.8 volts. At 0.2 volts and below the timing retard is set to 0 degrees while at 4.8 volts the LNC is at full timing retard of 15 degrees. The maximum retard setting still dictates the maximum amount of timing that can be taken out; however, it does not change the scaling of the linear mode. For example, if you want to retard the timing 8 degrees maximum, you would need to set the Max Retard dial to "8". It would take 2.65 volts of input in order to reach 8 degrees of timing retard. Any voltage past that point will not cause the LNC to further retard the timing since the maximum set value is 8 degrees. Linear mode on the LNC-2000 is activated by setting the "Rate" dial to setting "F". The linear (purple) signal wire is the voltage input wire and should be connected to a voltage output source. The linear (black) ground wire should be hooked up to a vehicle ground source. These wires are part of the MAP sensor electrical connector. When the **Rate** switch is in the "F" position, the LNC enters linear mode regardless of whether the MAP sensor is connected or not. When you activate the orange +12V Retard Activation wire it will override linear mode and go into Max Retard mode. There are 3.26 degrees of timing retard per volt.

### Timing retard analog output

The LNC-2000 provides an analog voltage output that indicates the amount of timing retard that is being applied. The gray analog output wire provides a linear 0 to 3 volt DC output with 0 volts indicating 0 degrees of timing retard and 3 volts indicating 15 degrees of timing retard. This voltage value can be logged with EFILive, HPTuners, DashDAQ or other devices to allow you to determine how much timing you really had while going down the track.

**Note** - because the LNC-2000 modifies the ignition timing after the PCM or ECM, the factory computer is not aware of the changed timing so it will not display the modified timing value in a scan tool.

### Timing retard return ramp rate

When the timing retard is disabled, the LNC-2000 returns to the stock timing using the ramp rate of 0.5 degrees per cylinder firing event until it is back to 0 retard.

For example, at 6000 rpm you have 400 firing events per second so each event is 0.0025 seconds apart. If you had the maximum retard of 15 degrees activated and then disabled the timing retard, it would take 0.0375 seconds to return to 0 retard (full timing). At 1500 rpm you have 100 firing events per second so each event is 0.01 seconds apart and it would take 0.15 seconds to return to full timing if you were at 15 degrees of timing retard.

Degree	Voltage
0	0.0
1	0.2
2	0.4
3	0.6
4	0.8
5	1.0
6	1.2
7	1.4
8	1.6
9	1.8
10	2.0
11	2.2
12	2.4
13	2.6
14	2.8
15	3.0

### Additional Notes

#### Important Information regarding spark plug wires and spark plugs:

You must use noise suppression ignition wires AND resistor type spark plugs with this Controller. The LNC-2000 controller contains High Frequency Digital Electronics and will NOT function correctly without Noise Suppression Wires or resistor type spark plugs!

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### Note about manual transmission clutch switch/position sensor on GM vehicles:

- On manual transmission vehicle applications please note that most GM vehicles have two switches on the clutch pedal. One is the cruise control disable switch at the top of the travel and the other is the neutral safety/starter enable clutch switch at the bottom of the travel. In testing LPE has found that the upper clutch switch (cruise control switch) has erratic output and causes improper operation of the LNC. For this reason, the lower clutch switch is the switch that should be used to trigger the LNC. The problem, however, is that the lower clutch switch is powered by a circuit that is only energized while the vehicle is cranking. For the LNC to work with the lower clutch switch, a relay must be added before the switch in order for the switch to be powered while the vehicle is running. Refer to the clutch switch wiring diagram on page 12 for instructions on how to modify the circuit correctly. Another alternative is to mount a separate microswitch to the pedal assembly and activate from that. LPE offers a microswitch kit, PN L480330000.
- On many newer vehicles GM has replaced the two clutch position switches with a single clutch pedal position (CPP) sensor with an analog 0-5 volt output that provides the ECM with clutch pedal position information over the entire pedal travel. This sensor is similar to a throttle position sensor except that the output of this sensor is from high to low. Because it is not a switched (ON/OFF) type output, the CPP sensor can't be used to trigger the LNC or a relay directly. LPE has developed the CTAP-001 module (PN L460190108) that can read the CPP sensor and provides a user adjustable switched output based on the clutch pedal position. Vehicles with the CPP sensor include the 2008-2016 Corvette, 2010-2016 Camaro and 2009-2015 CTS-V.

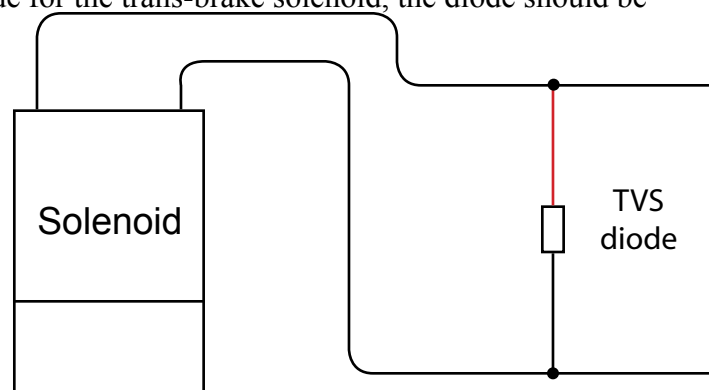
### Nitrous, line-lock, trans-brake and other solenoid usage warning:

LPE has found that these solenoids can cause fly-back voltage levels at times in excess of 600 volts. These voltage levels have the potential to damage sensitive electronics including the LNC-2000, the PCM/ECM and other modules in the vehicle. LPE has developed a transient voltage suppression (TVS) diode kit (PN L450080000) for use with line-lock solenoids, trans-brake solenoids and other aftermarket automotive solenoids of this type. The TVS diode is a special kind of diode used to suppress voltage spikes. LPE recommends the use of our TVS diode on all vehicles that have a line lock or trans-brake. This kit comes with three TVS diodes, enough for most common installations. If you have a vehicle with multiple solenoids we recommend obtaining additional TVS diodes for those solenoids.

Install the TVS diode across the solenoid wires as close to the solenoid as possible. Polarity does not matter (Red and Black wires can go to either solenoid wire). If there is no accessible ground terminal to connect the diode to, such as the case with a trans-brake solenoid, the diode should be connected to the nearest ground source. In the case of the diode for the trans-brake solenoid, the diode should be connected to the transmission case as it will provide a ground path.

LPE recommends using TVS diodes on:

- Nitrous solenoids
- Nitrous purge solenoids
- Fuel solenoids
- Line-lock solenoids
- Trans-brake solenoids



**Example wiring diagrams:**

The following pages show examples of how the LNC-2000 can be wired in different vehicle applications. There are also examples of how to connect the LNC-2000 to several popular nitrous controllers, as well as the Davis Technologies traction control modules. Many other possible installation methods exist.

**WARNING:** Splicing the Clutch Pedal Position (CPP) Switch signal wire is required for vehicles that are equipped with a Clutch Pedal Position Switch. For vehicles equipped with a Clutch Pedal Position Sensor, **DO NOT CUT** the signal wire. Vehicles equipped with CPP sensors include 2008-2016 Corvettes, 2009-2015 Cadillac CTS-V and 2010-2016 Camaros.

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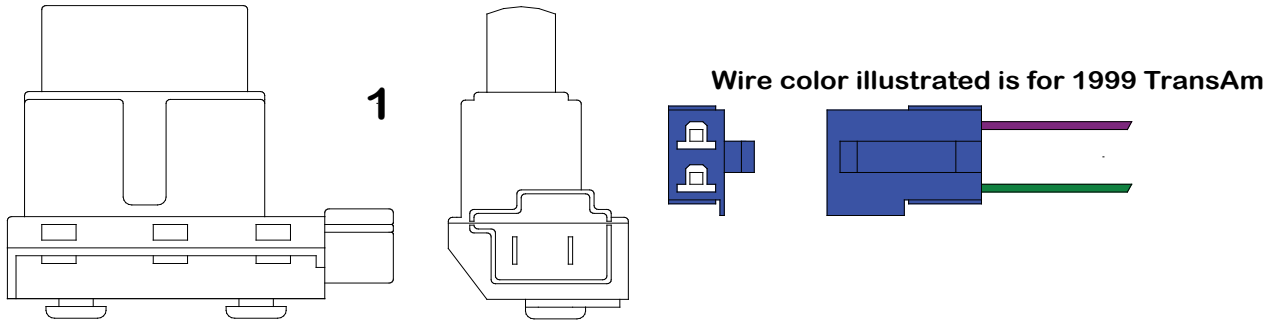
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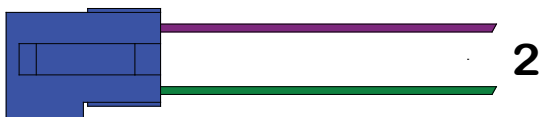
### 1998-2002 F-Body and 1997-2007 Corvette Factory Clutch Switch Diagram

**WARNING:** Splicing the Clutch Pedal Position Switch signal wire is required for vehicles that are equipped with a Clutch Pedal Position Switch. For vehicles equipped with a Clutch Pedal Position Sensor, DO NOT CUT the signal wire. Vehicles equipped with CPP sensors include: 2008+ Corvette, 2010+ Camaro & 2009-2015 CTS-V.

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

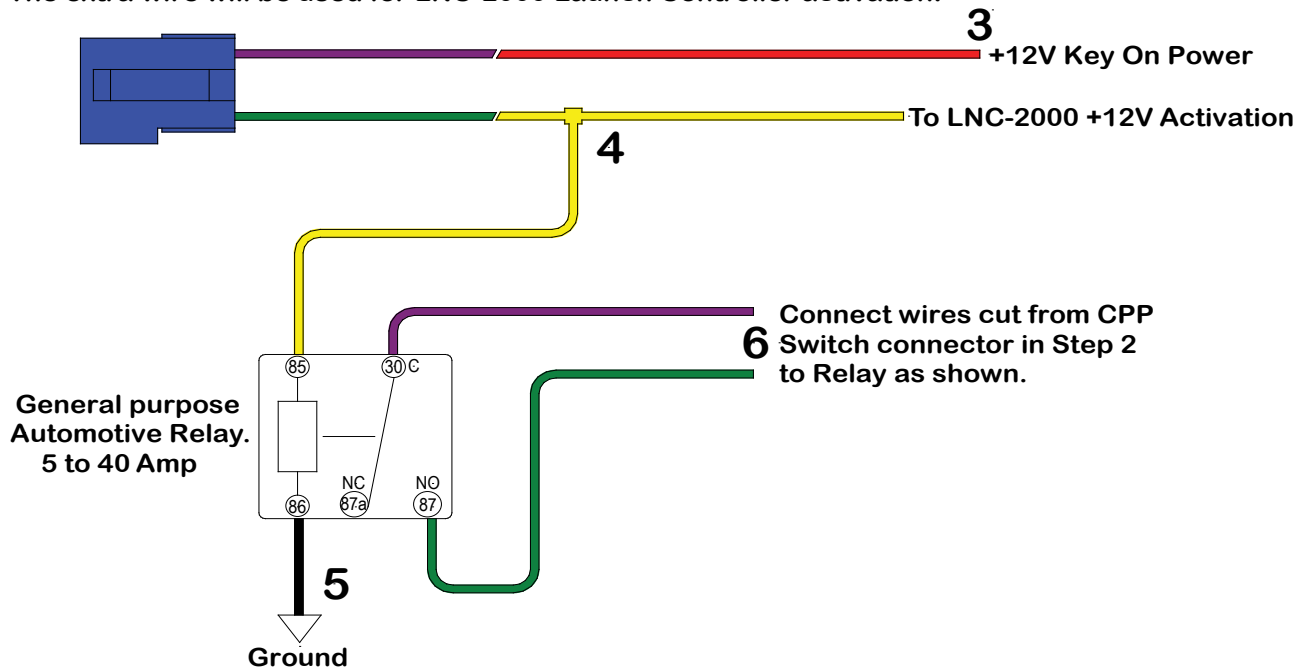


- 2 - Cut wires approx. 3" back from connector.



- 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 LNC-2000 Launch Controller activation.



- 5 - Connect terminal #86 on Relay to Ground.

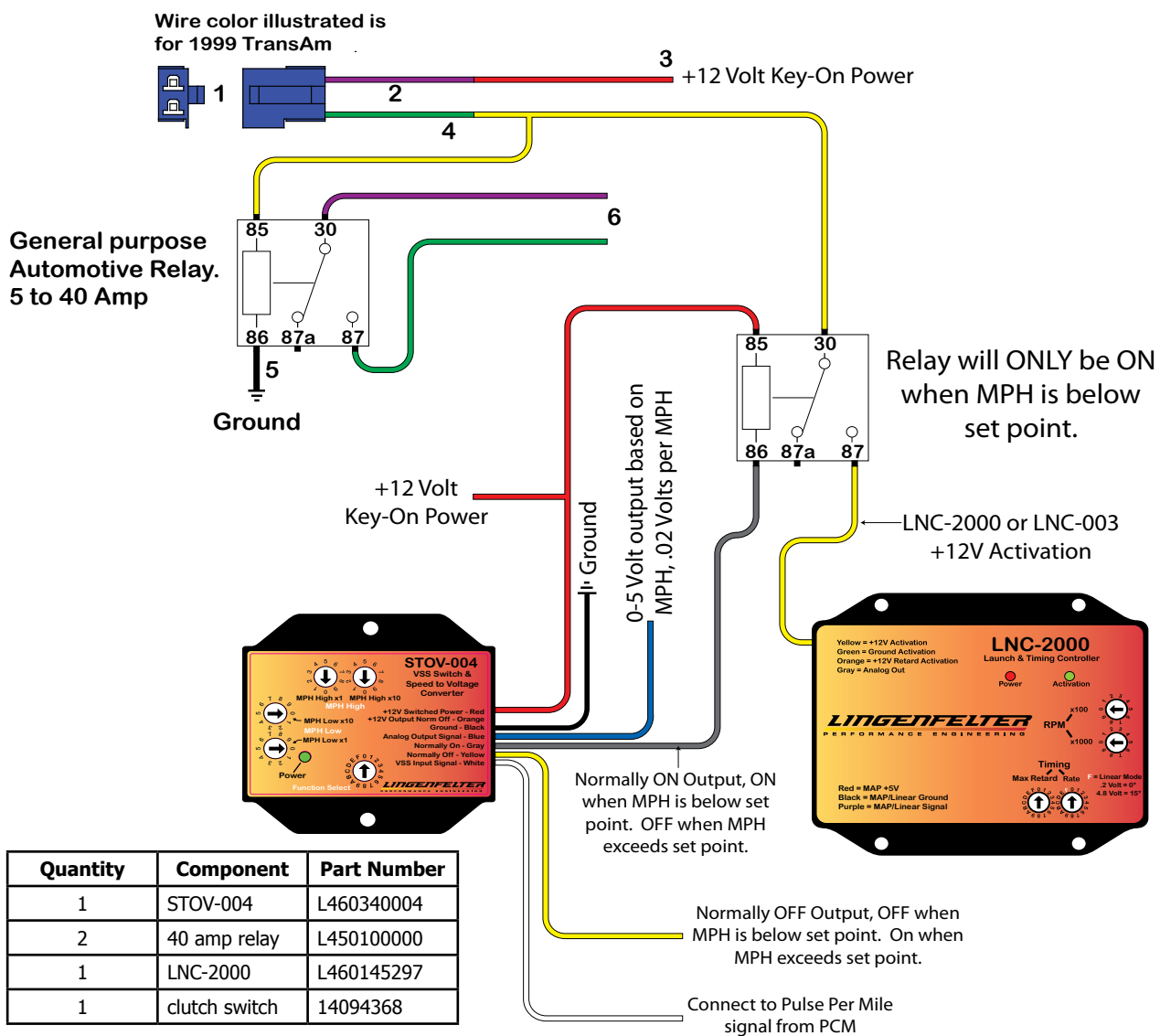
- 6 - Connect wires cut from CPP Switch connector to Terminals #30 and #87 as shown. Pin #87 is a normally open (NO) terminal.

Wire color may vary for model/year.

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

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

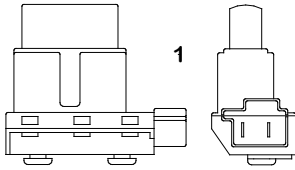
- 1 - Locate the CPP (Clutch Pedal Position) Switch and unplug the 2-wire connector.
- 2 - Cut wires approx. 3" back from connector.
- 3 - Find +12 volt Key On power source and connect to one wire of the CPP connector.
- 4 - Splice two wires onto the remaining CPP connector wire and connect one wire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



# LINGENFELTER

## PERFORMANCE ENGINEERING

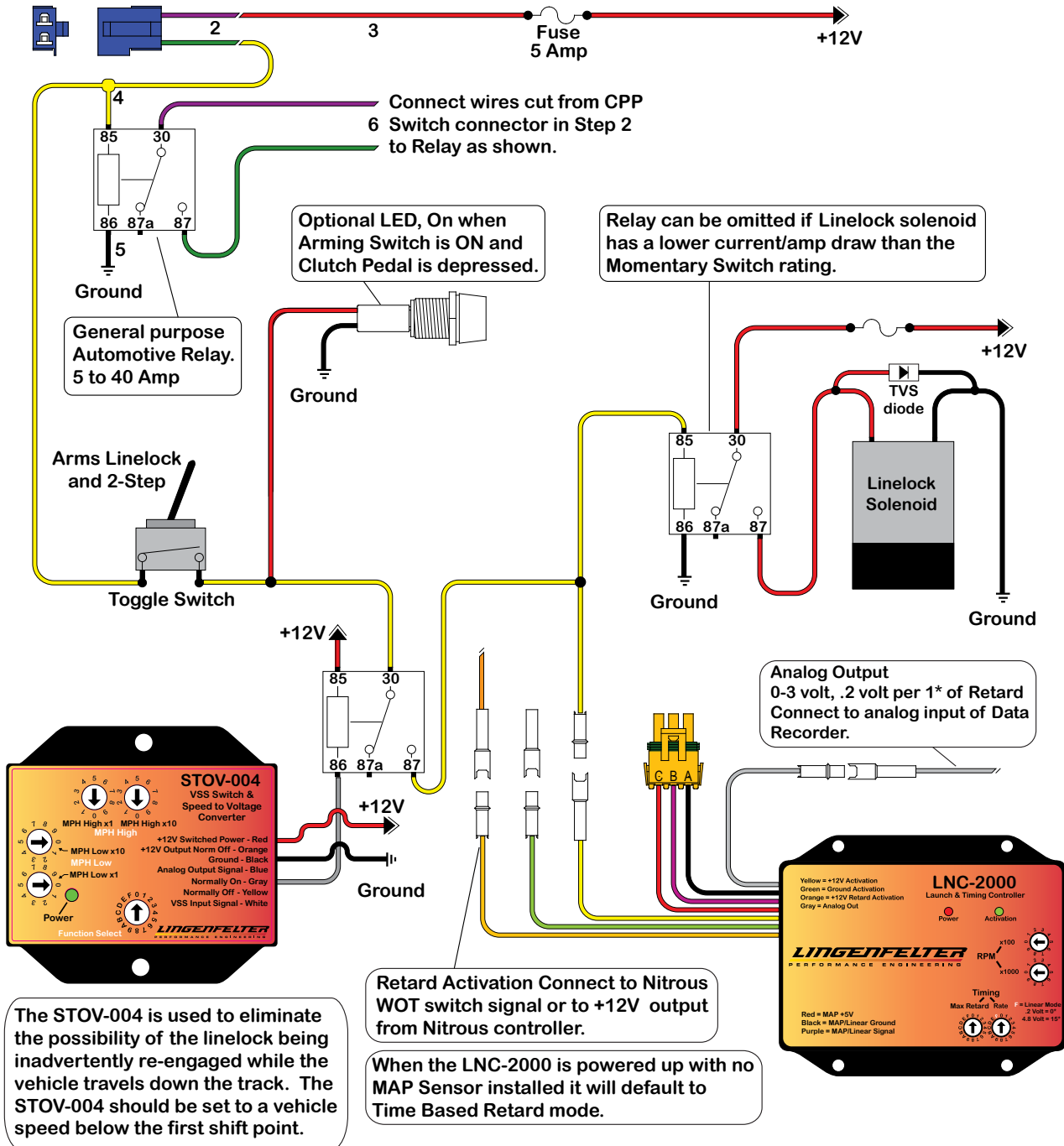
### Manual Transmission with Linelock



Wire color illustrated is for 1999 TransAm

Use this wiring configuration to simultaneously activate the 2-step feature and linelock using the Clutch Switch and the STOV-004 MPH activated switch. The STOV-004 should be set so that after the vehicle launches from the line, the 2-step feature and linelock are disabled.

- 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 LNC-2000 Launch Controller activation.
- 5 - Connect terminal #86 on Relay to Ground.
- 6 - Connect wires cut from CPP Switch connector to Terminals #30 and #87 as shown.



Quantity	Component	Part Number	Quantity	Component	Part Number
1	STOV-004	L460340004	1	toggle switch	CLT-V1D1BC0B
1	LNC-2000	L460145297	2	40 amp relay	L450100000
1	clutch switch	14094368	1	TVS diode	L450080000

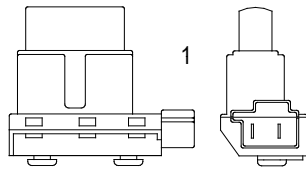
# LINGENFELTER

## PERFORMANCE ENGINEERING

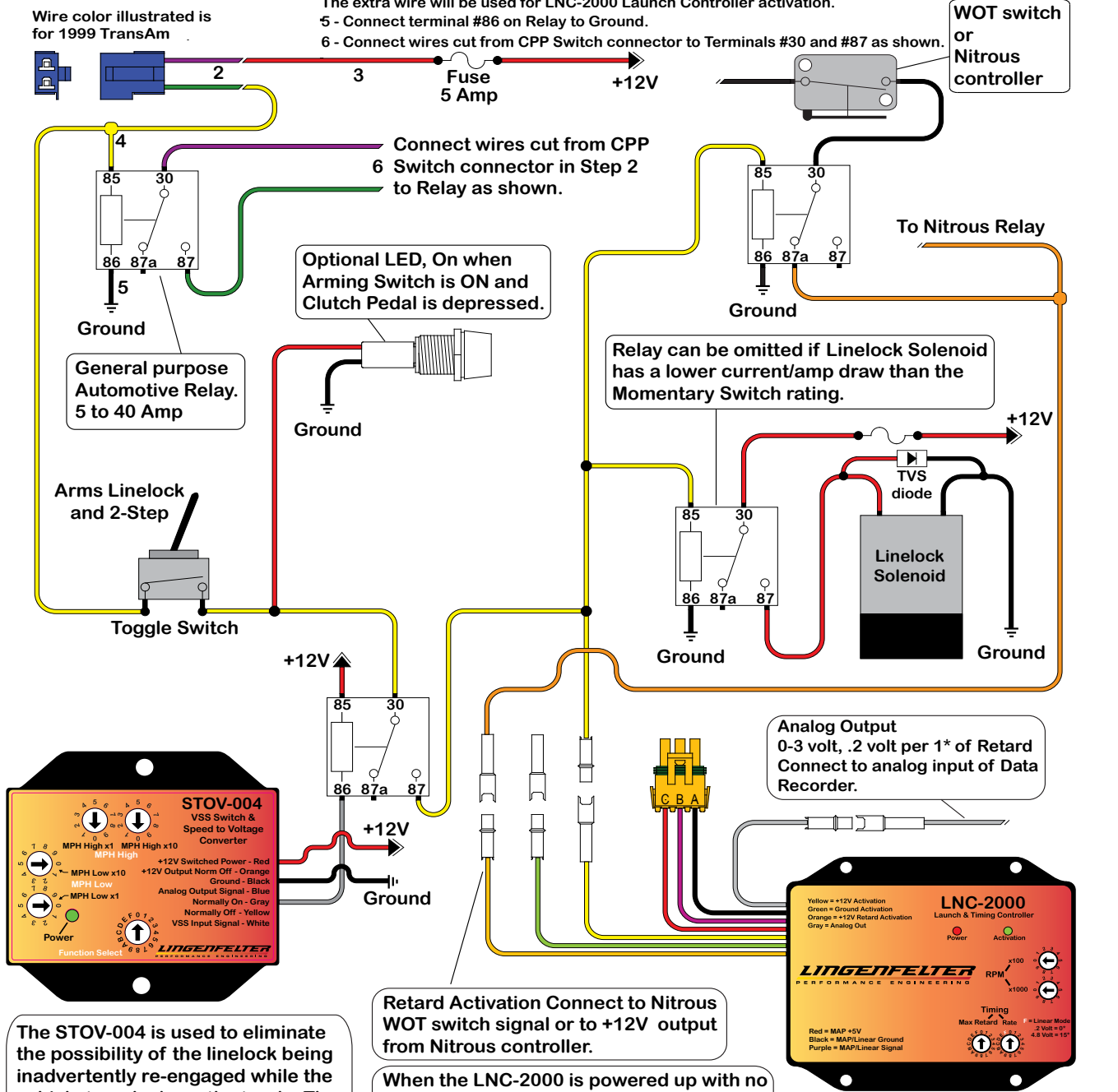
### Manual Transmission with Linelock & Nitrous

Use this wiring configuration to simultaneously activate the 2-step feature and linelock using the Clutch Switch and the STOV-004 MPH activated switch. The STOV-004 should be set so that after the vehicle launches from the line, the 2-step feature and linelock gets disabled while the nitrous is enabled and is controlled by a WOT switch.

- 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.
- 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 illustrated is for 1999 TransAm



The STOV-004 is used to eliminate the possibility of the linelock being inadvertently re-engaged while the vehicle travels down the track. The STOV-004 should be set to a vehicle speed below the first shift point.

Retard Activation Connect to Nitrous WOT switch signal or to +12V output from Nitrous controller.

When the LNC-2000 is powered up with no MAP Sensor installed it will default to Time Based Retard mode.

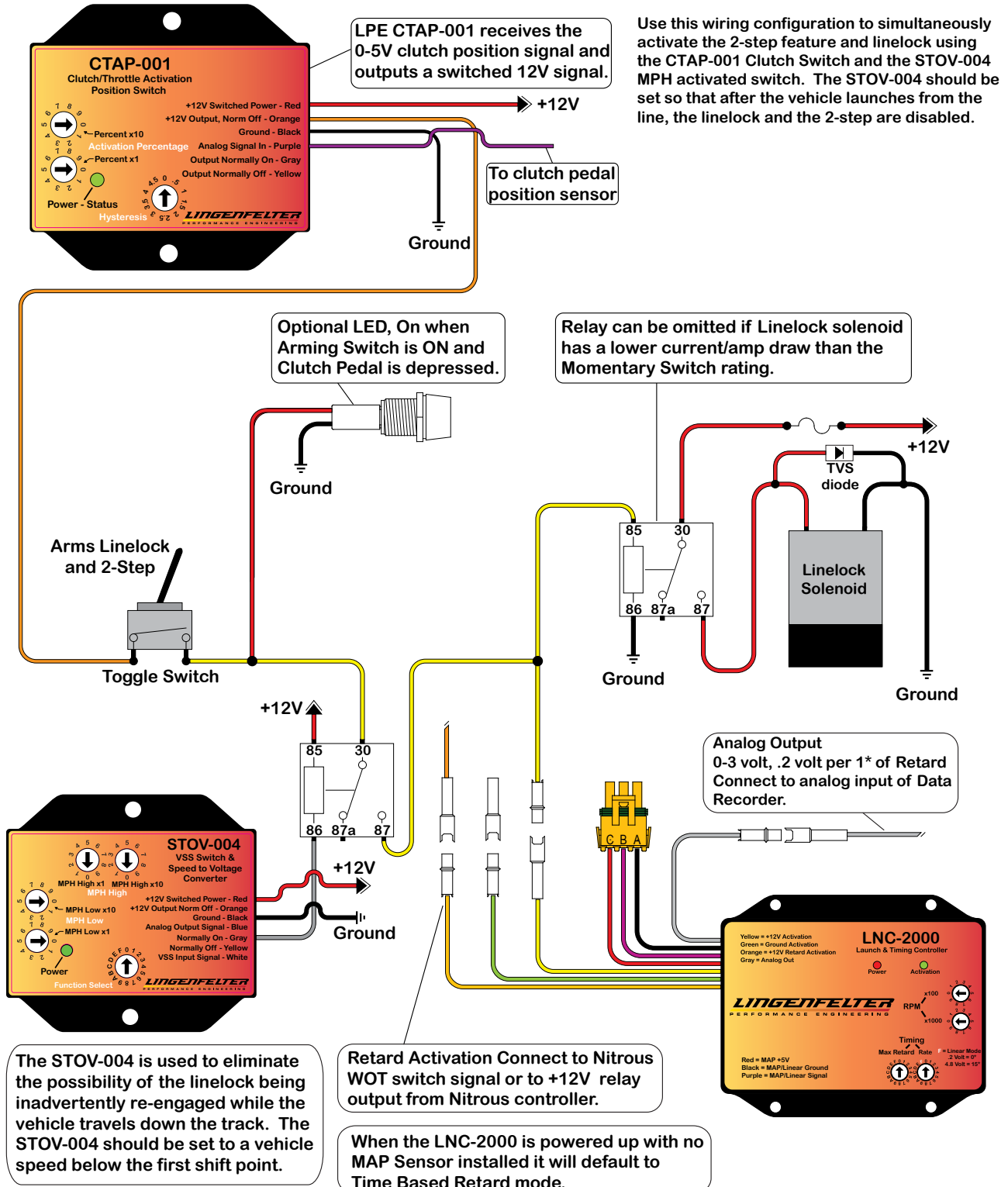
Quantity	Component	Part Number	Quantity	Component	Part Number
1	STOV-004	L460340004	1	toggle switch	CLT-V1D1BCOB
1	LNC-2000	L460145297	3	40 amp relay	L450100000
1	clutch switch	14094368	1	microswitch	L480330000
1	TVS diode	L450080000			



# LINGENFELTER

PERFORMANCE ENGINEERING

## Manual Transmission with Linelock Newer vehicles with clutch pedal position (CPP) sensor.



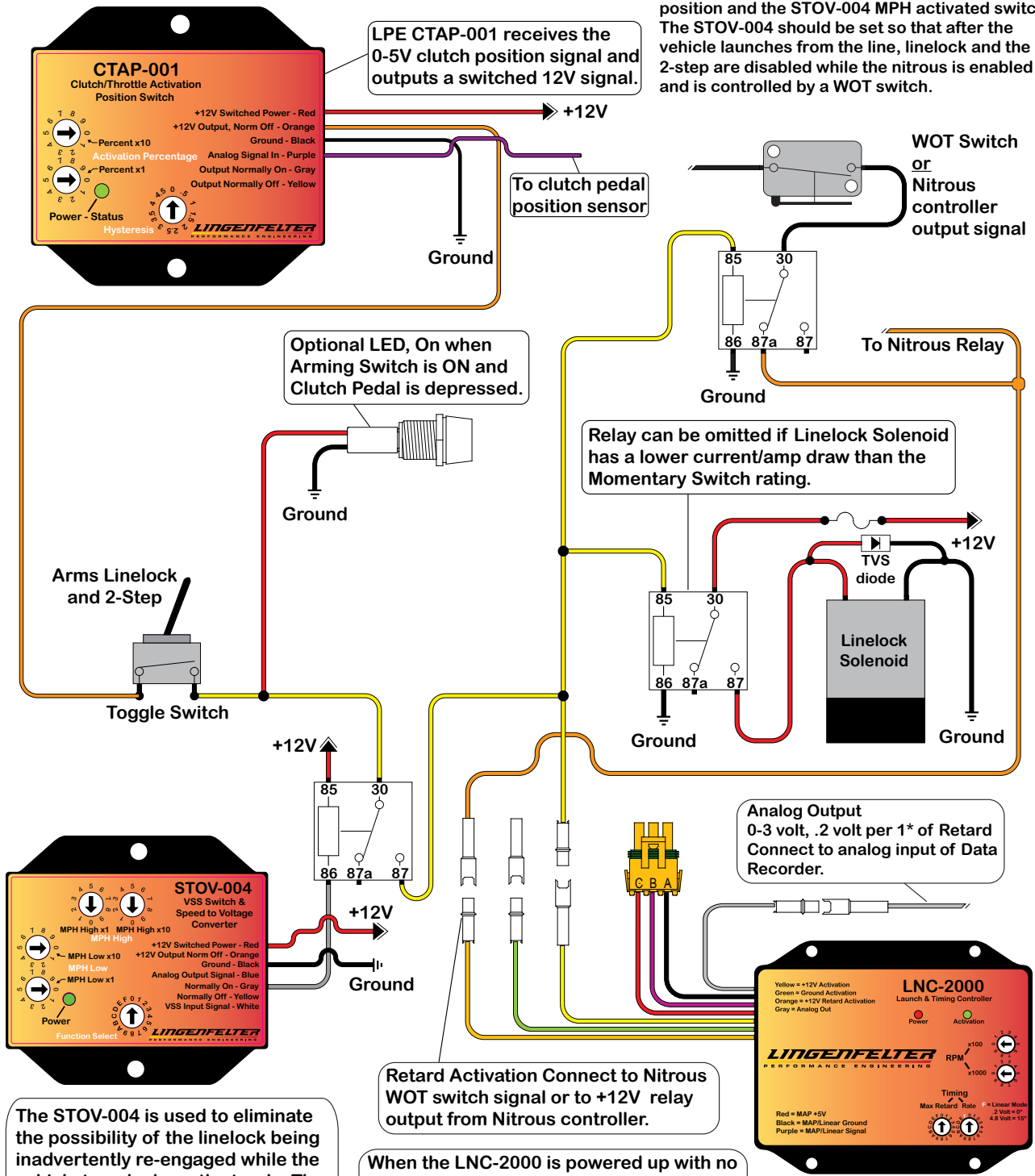
Quantity	Component	Part Number	Quantity	Component	Part Number
1	STOV-004	L460340004	1	toggle switch	14094368
1	LNC-2000	L460145297	2	40 amp relay	L450100000
1	CTAP-001	L460190108	1	TVS diode	L450080000

# LINGENFELTER

PERFORMANCE ENGINEERING

## Manual Transmission with Linelock & Nitrous Newer vehicles with clutch pedal position (CPP) sensor.

Use this wiring configuration to simultaneously activate the 2-step feature and linelock via clutch position and the STOV-004 MPH activated switch. The STOV-004 should be set so that after the vehicle launches from the line, linelock and the 2-step are disabled while the nitrous is enabled and is controlled by a WOT switch.

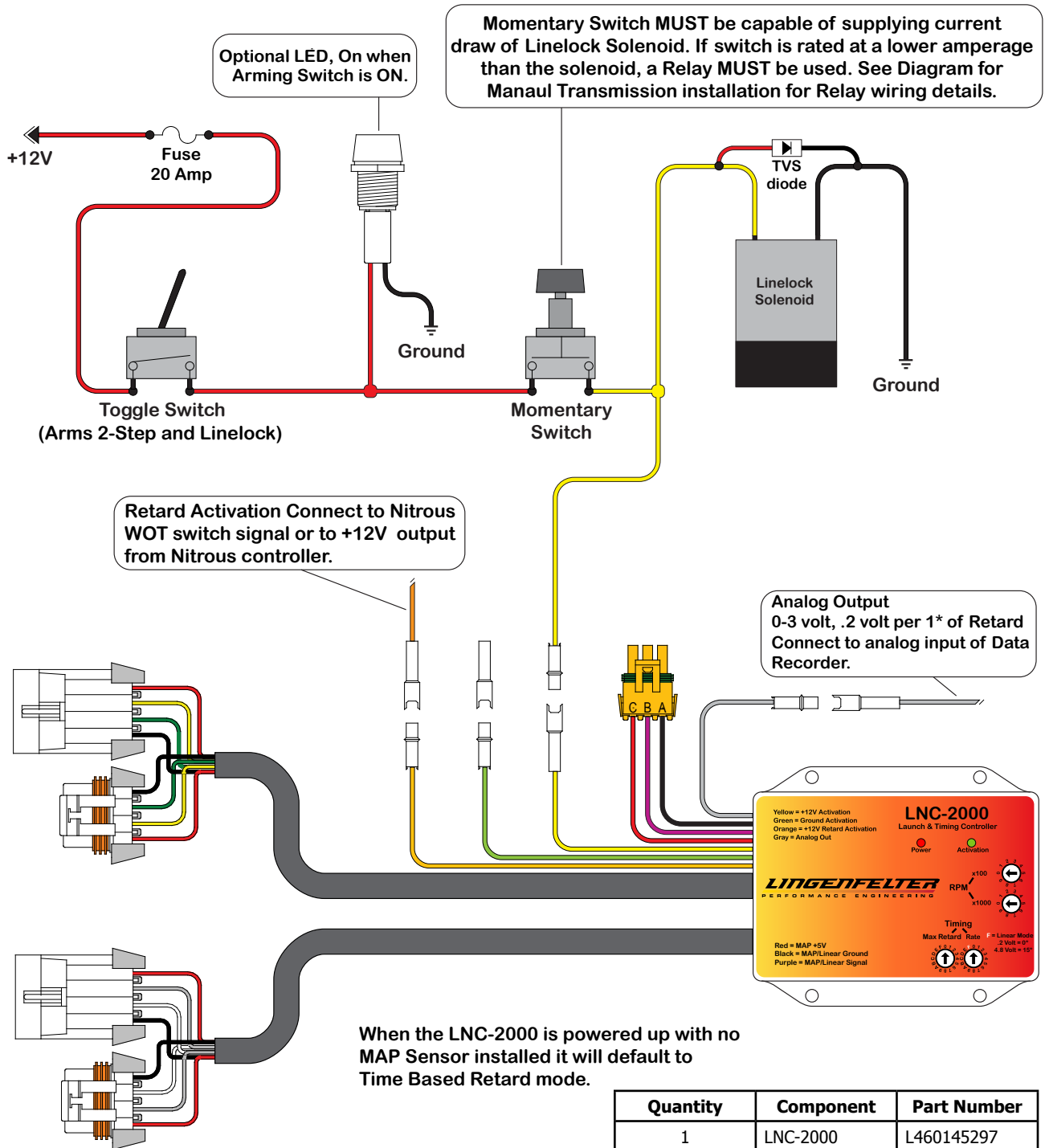


The STOV-004 is used to eliminate the possibility of the linelock being inadvertently re-engaged while the vehicle travels down the track. The STOV-004 should be set to a vehicle speed below the first shift point.

Quantity	Component	Part Number	Quantity	Component	Part Number
1	STOV-004	L460340004	3	40 amp relay	L450100000
1	LNC-2000	L460145297	1	microswitch	L480330000
1	CTAP-001	L460190108	1	toggle switch	CLT-V1D1BC0B
1	TVS diode	L450080000			

## Automatic Transmission with Linelock

Use this configuration to activate Linelock and the 2-step function using a momentary push-button switch. Once the toggle switch is flipped ON and the momentary switch is pressed, Linelock and the 2-step function will be activated. When the push button is released, Linelock and the 2-step function will be deactivated.

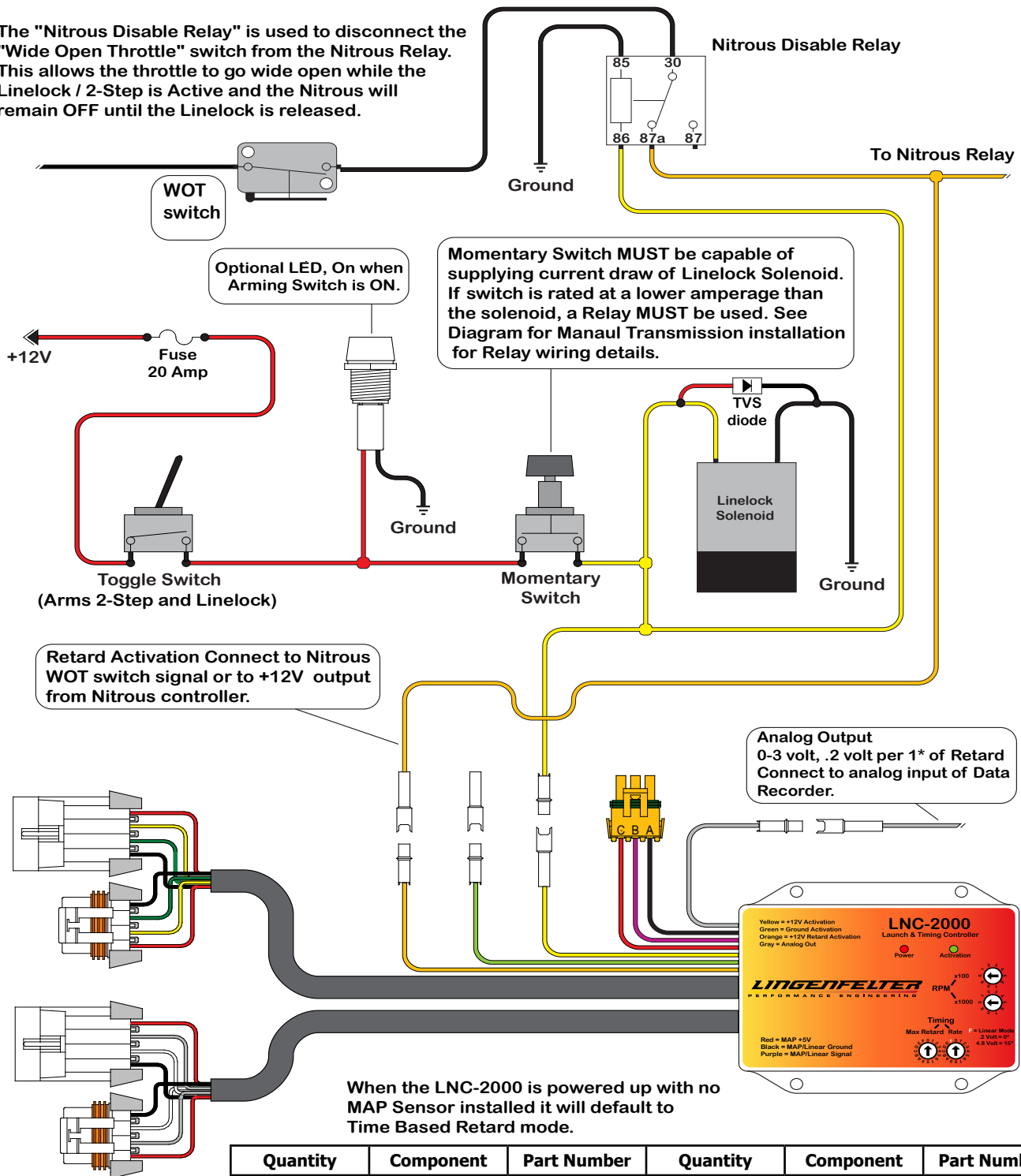


Quantity	Component	Part Number
1	LNC-2000	L460145297
1	toggle switch	CLT-V1D1BC0B
1	TVS diode	L450080000

### Automatic Transmission with Linelock & Nitrous

Use this configuration to activate Linelock and the 2-step function using a momentary push-button switch. Once the toggle switch is flipped ON and the momentary switch is pressed, Linelock and the 2-step function will be activated and the nitrous will be disabled. When the push button is released, Linelock and the 2-step function will be deactivated and the nitrous will be enabled.

The "Nitrous Disable Relay" is used to disconnect the "Wide Open Throttle" switch from the Nitrous Relay. This allows the throttle to go wide open while the Linelock / 2-Step is Active and the Nitrous will remain OFF until the Linelock is released.



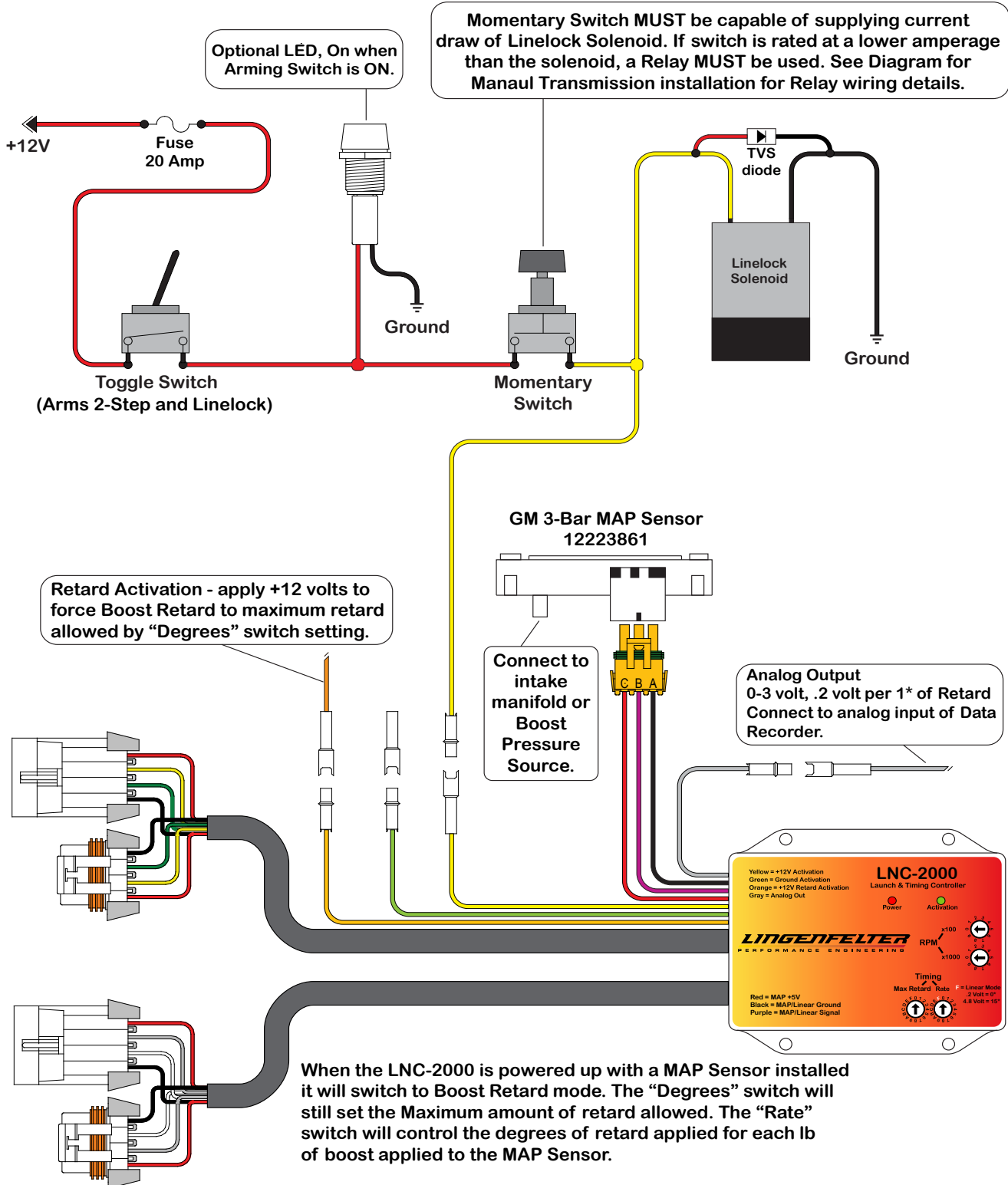
Quantity	Component	Part Number	Quantity	Component	Part Number
1	LNC-2000	L460145297	1	40 amp relay	L450100000
1	toggle switch	CLT-V1D1BC0B	1	microswitch	L480330000
1	TVS diode	L450080000			

# LINGENFELTER

PERFORMANCE ENGINEERING

## Automatic Transmission with Linelock & Boost Retard

Use this configuration to activate Linelock and the 2-step function using a momentary push-button switch. Once the toggle switch is flipped ON and the momentary switch is pressed, Linelock and the 2-step function will be activated. When the push button is released, Linelock and the 2-step function will be deactivated. Since the LNC-2000 is connected to the MAP sensor, the LNC-2000 will be in Boost Retard Mode.



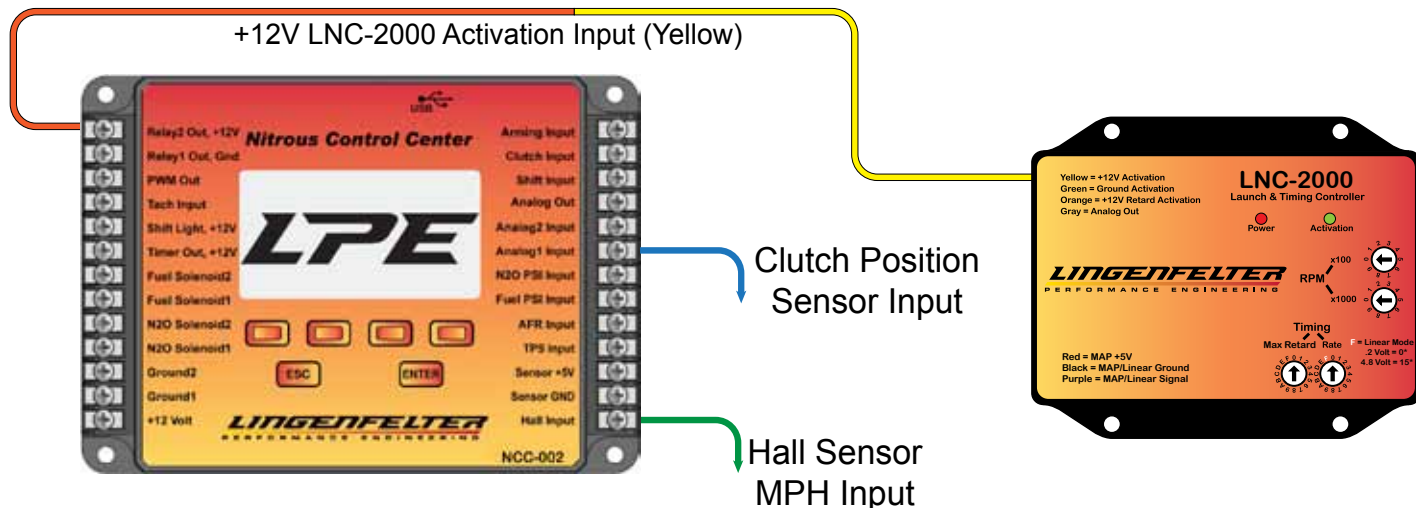
Quantity	Component	Part Number	Quantity	Component	Part Number
1	LNC-2000	L460145297	1	TVS diode	L450080000
1	toggle switch	CLT-V1D1BC0B			

# LINGENFELTER

PERFORMANCE ENGINEERING

## LNC-2000 Receiving +12V Activation Input from the Lingenfelter NCC-001 or NCC-002 Nitrous Control Center

Use this configuration to allow the NCC-001 or NCC-002 to activate or deactivate the LNC-2000's 2-step feature based on the vehicle speed and/or clutch.

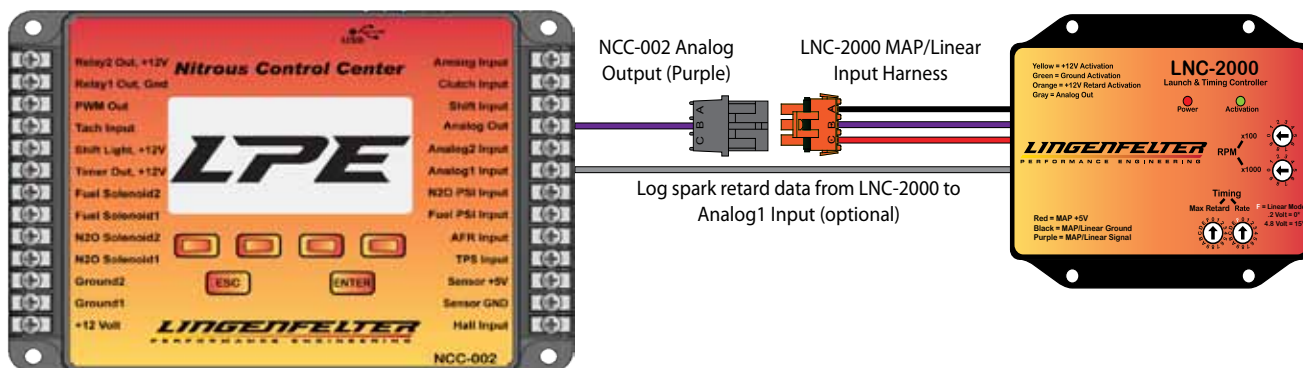


## Progressive Nitrous Timing Retard

To allow a nitrous or other controller to control the amount of timing retard:

- Set the LNC-2000 to Linear Mode (F on the Rate dial)
- Set the maximum desired timing retard with the Max Retard Setting on the LNC-2000
- Connect the analog output from your controller to the LNC MAP/Linear Input harness connector (using the universal WeatherPak connector kit, PN L480320000)
- This allows the nitrous or other external controller to control the amount of timing retard while still allowing the LNC-2000 to limit the timing retard to the user set Max Retard setting.

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

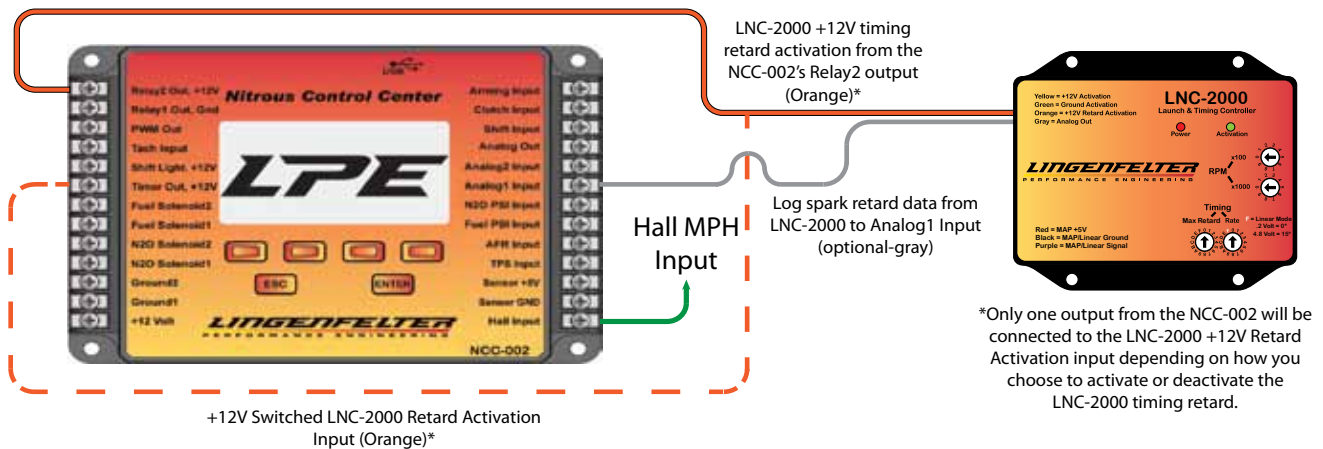


## LNC-2000 Timing Retard Activation

To allow a nitrous or other controller to control the activation of timing retard:

- Set the maximum desired timing retard with the Max Retard Setting on the LNC-2000
- Set the LNC-2000 to Time-Based Retard Mode (any setting other than F on the Rate)
  - Set the Ramp rate dial to your desired timing retard ramp rate
- If using the NCC-001 or NCC-002
  - Connect the +12V Relay2 Out from the NCC-001 or NCC-002 to the orange +12V Retard Activation input on the LNC-2000 (can also use Timer Out if desired)
  - Program the Relay2 output on the NCC to activate the timing retard based on nitrous percentage, RPM and/or what ever other variables you desire
- If using most other nitrous controllers you will need to use the Timer or similar output

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



### LNC-2000 Receiving +12V Retard Activation Input from the NLR Systems NMS-1000



The "NMS-1000 Nitrous Management System" name and "NLR" logo is property of NLR, LLC.

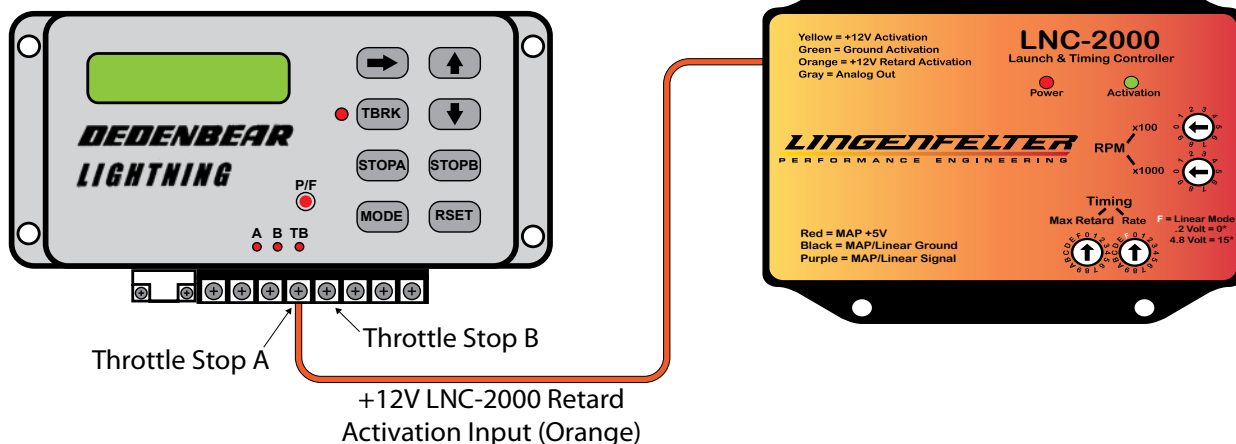
### LNC-2000 Timing Retard Activation (Cont...)

#### LNC-2000 Receiving +12V Retard Activation Input from the Dedenbear Lightning Delay Box

Use this wiring configuration to allow a Dedenbear Lightning (L1 or L2) or Command Center 3 (CC-3) Delay Box to control the +12V retard activation for the LNC-2000.

- The +12V retard activation (orange) wire can be connected to either the Throttle Stop A or Throttle Stop B output on the Dedenbear Delay Box.
- The output from the delay box should be configured for two timers with the first timer being set to zero and the second timer being set to the point in time where timing should no longer be pulled.
- It is important to note that the location of the Throttle Stop A and Throttle Stop B terminals on the terminal barrier strip is different depending on the Dedenbear Delay Box model that you are using. Refer to your delay box installation instructions for the location of these terminals.

The Dedenbear Lightning Delay Box is property of Dedenbear Products Inc.





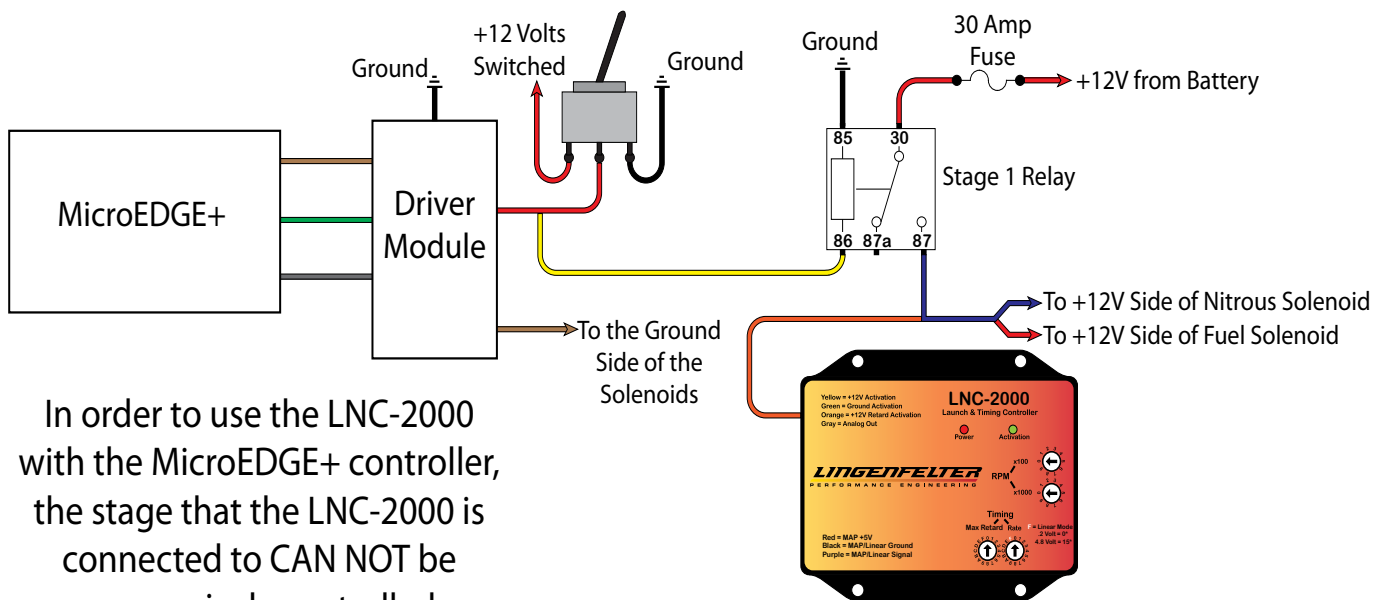
## LNC-2000 Timing Retard Activation (Cont...)

LNC-2000 Receiving +12V Retard Activation Input from the Nitrous Express MAXIMIZER 4



The "Maximizer 4" name and logo, as well as the "NX" name and logo, are property of Nitrous Express Inc.

## LNC-2000 Receiving +12V Retard Activation Input from the Harris Speed Works MicroEDGE+ (Using a Single Nitrous Stage)



In order to use the LNC-2000 with the MicroEDGE+ controller, the stage that the LNC-2000 is connected to CAN NOT be progressively controlled.

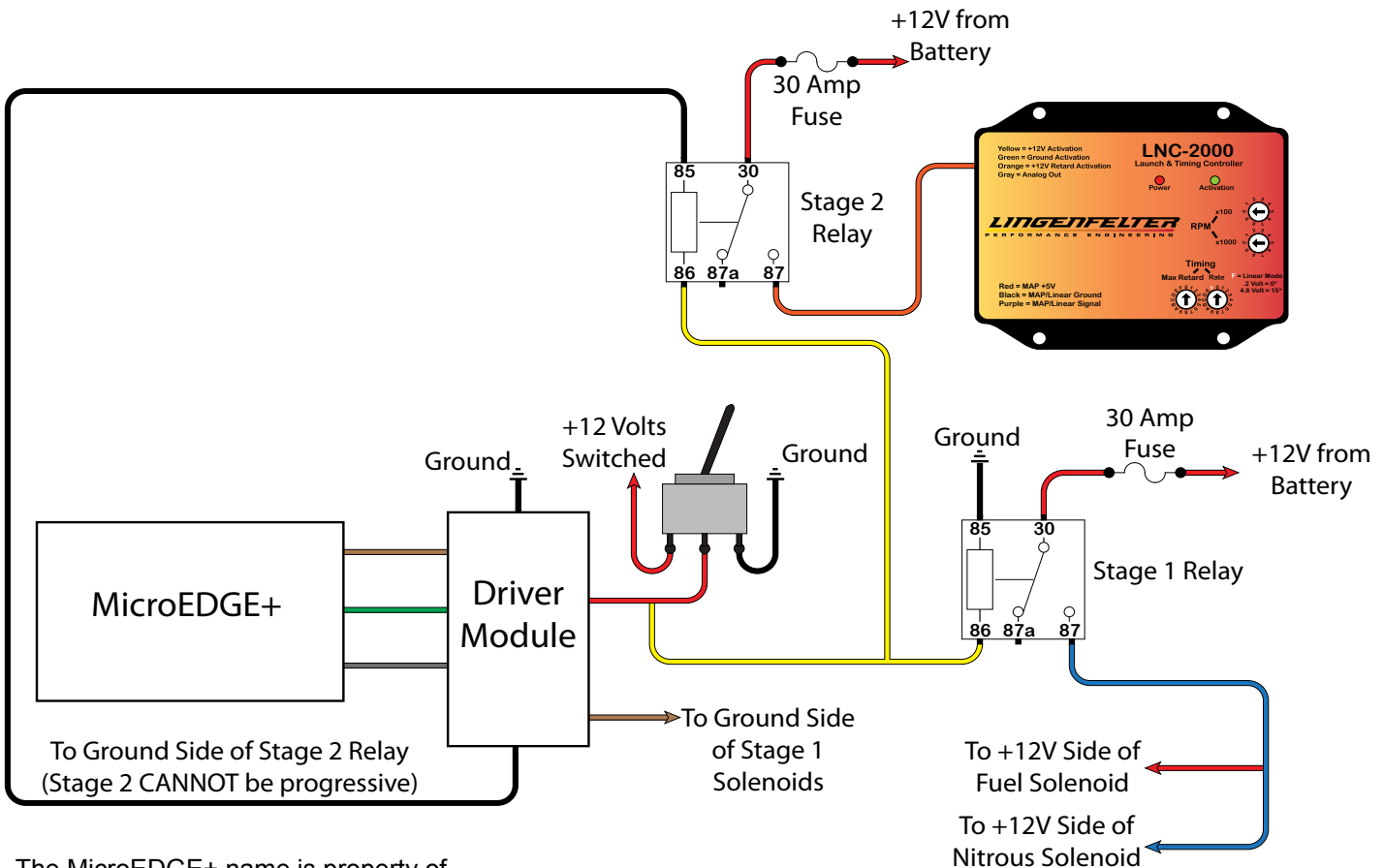
The MicroEDGE+ name is property of Harris Speed Works Inc.

Quantity	Component	Part Number
1	LNC-2000	L460145297
1	toggle switch	CLT-V1D1BC0B
1	40 amp relay	L450100000

### Connecting the Lingenfelter LNC-2000 to a Secondary Stage on the Harris Speed Works MicroEDGE+ Progressive Nitrous Controller

- In this configuration, the second stage of nitrous is replaced with the LNC-2000. The second stage must NOT be progressively controlled.
- Set both stages to the same settings if you want the LNC-2000 timing retard to trigger when the nitrous triggers. If you want the timing retard to activate earlier or later, set the second stage to come in earlier or later than the first stage on the controller.
- Use a relay to swap the output (ground/power activation swap)
- **This setup can be used for any progressive 2-stage nitrous controller that does not have a timing retard activation output.**

#### LNC-2000 Receiving +12V Retard Activation Input from the Harris Speed Works MicroEDGE+ (Using Two Nitrous Stages)

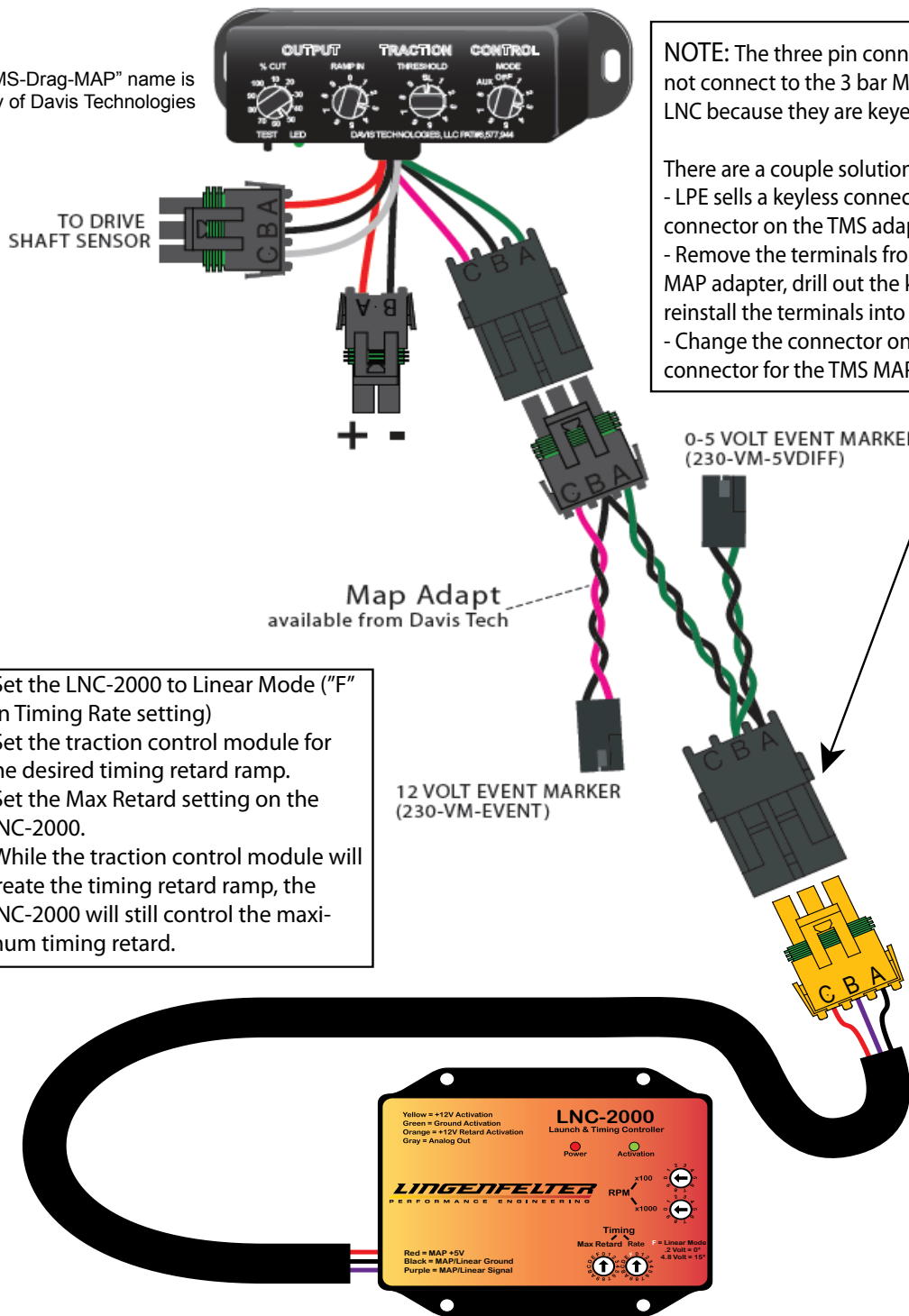


The MicroEDGE+ name is property of Harris Speed Works Inc.

Quantity	Component	Part Number
1	LNC-2000	L460145297
1	toggle switch	CLT-V1D1BC0B
2	40 amp relay	L450100000

## LNC-2000 Receiving 0-5V Timing Retard Input from a Davis Technologies TMS-Drag-MAP Series Traction Control Module (With the MAP Adapter)

The "TMS-Drag-MAP" name is property of Davis Technologies

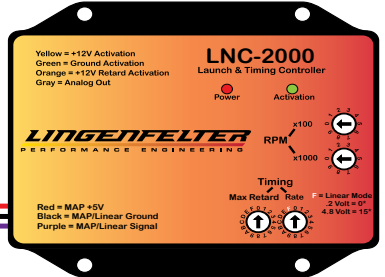


NOTE: The three pin connector on the TMS adapter will not connect to the 3 bar MAP sensor connector on the LNC because they are keyed differently.

There are a couple solutions:

- LPE sells a keyless connector kit to replace the stock connector on the TMS adapter (PN: L480320000).
- Remove the terminals from the connector on the TMS MAP adapter, drill out the keys in the connector, and then reinstall the terminals into the connector.
- Change the connector on the LNC-2000 to the mating connector for the TMS MAP adapter (part # 12015793)

- Set the LNC-2000 to Linear Mode ("F" on Timing Rate setting)
- Set the traction control module for the desired timing retard ramp.
- Set the Max Retard setting on the LNC-2000.
- While the traction control module will create the timing retard ramp, the LNC-2000 will still control the maximum timing retard.

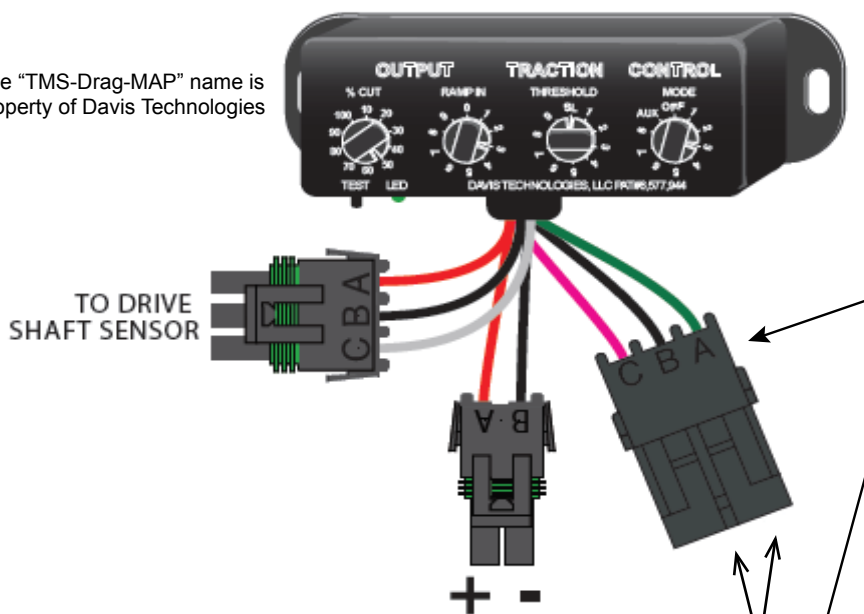


# LINGENFELTER

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## LNC-2000 Receiving 0-5V Timing Retard Input from a Davis Technologies TMS-Drag-MAP Series Traction Control Module (Without the MAP Adapter)

The "TMS-Drag-MAP" name is property of Davis Technologies



### IMPORTANT:

The three pin connector on the TMS will not connect to the 3 bar MAP sensor connector on the LNC because they are keyed differently.

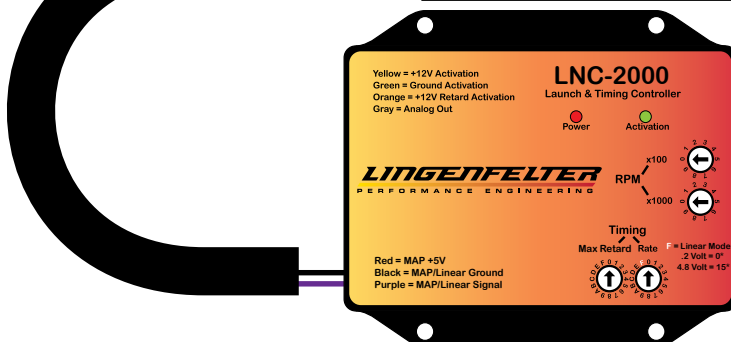
The black and green wires on the TMS or the purple and black wires on the LNC also need to be swapped so that the black wire on the TMS goes to the black wire on the LNC and the green wire on the TMS goes to the purple wire on the LNC.

**Do not** connect the red +5 Volt wire from the LNC to the TMS.

There are a couple solutions:

- LPE sells a keyless connector kit to replace the stock connector on the TMS (PN: L480320000).
- Remove the terminals from the connector on the TMS, drill out the keys in the connector, and then reinstall the terminals into the connector.
- Change the connector on the LNC-2000 to the mating connector for the TMS (Part # 12015793)

-Set the LNC-2000 to Linear Mode ("F" on Timing Rate setting)  
-Set the traction control module for the desired timing retard ramp.  
-Set the Max Retard setting on the LNC-2000.  
-While the traction control module will create the timing retard ramp, the LNC-2000 will still control the maximum timing retard.



# LINGENFELTER

PERFORMANCE ENGINEERING

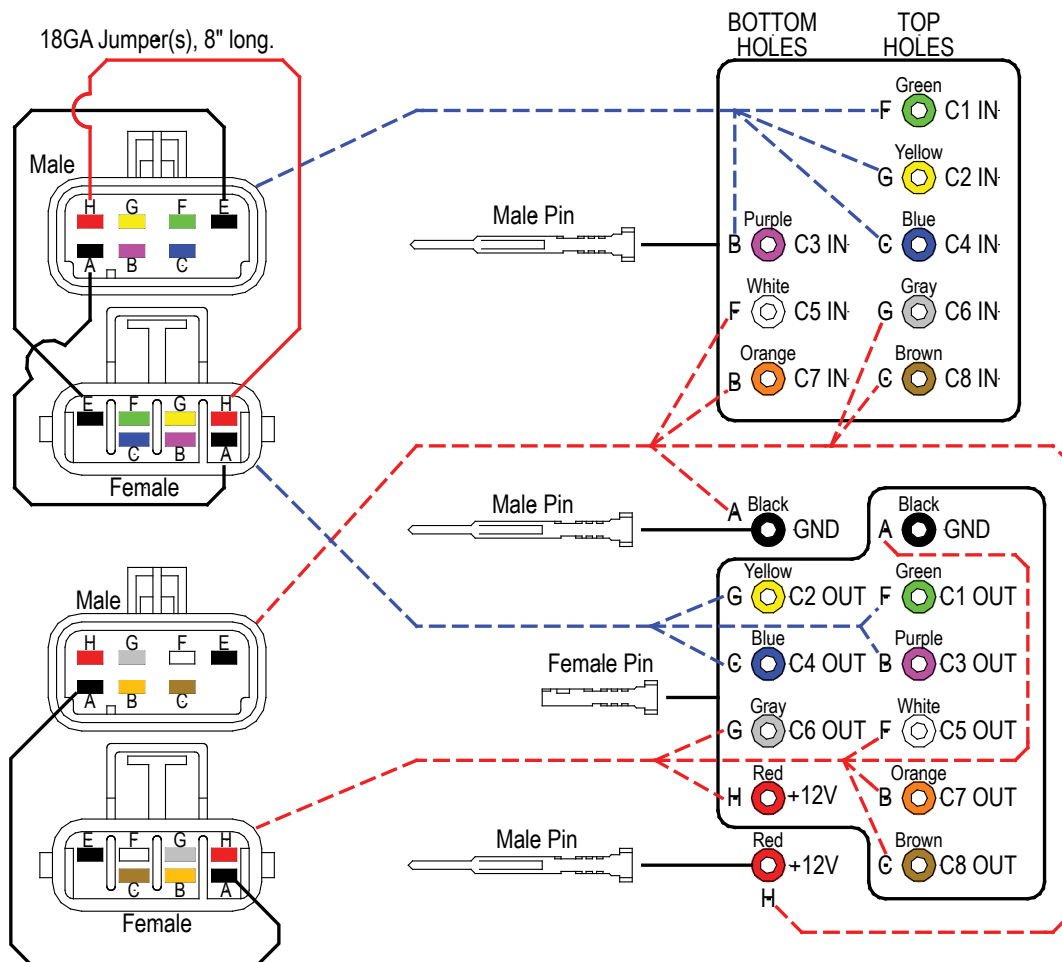
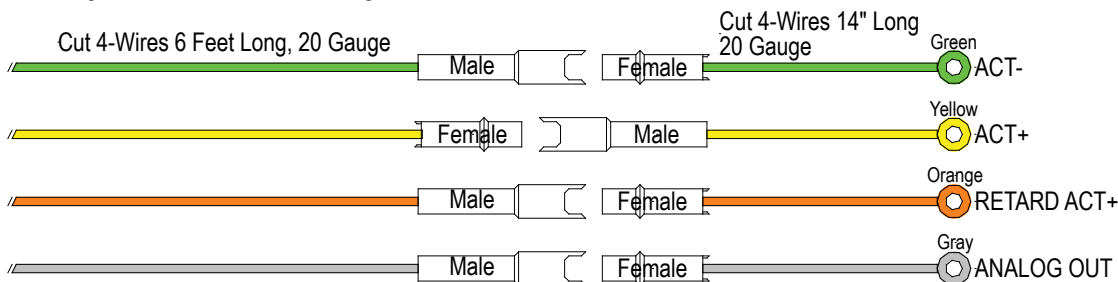
## LNC-2000 Wiring Diagram

Harness #1

Harness #2

Cut harness wires 50" in length.  
Finished trim length = 48"  
20 Gauge, Red and Black are 18Gauge

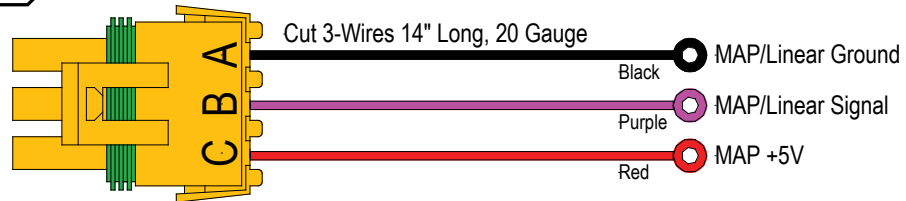
Cut Wire Loom 42" Long



**Table 1**

**LNC-2000 Connector Harness\***

Pin	Function
A	Signal Ground
B	Ignition 2/7 Control
C	Ignition 4/5 Control
E	Ignition Control Low Reference Bank 1/2
F	Ignition 3/6 Control
G	Ignition 1/8 Control
H	Ignition 1 Voltage



\*Connector banks are interchangeable

## Vehicle applications:

The LNC-2000 is designed for use on all known GM LS series engine applications (LS1, LS6, LS2, LS7, LS3, LQ4, L76, L92 and other Gen III and IV GM V8 applications along with other GM V8 engines using the same ignition coil system) including the following vehicles:

- 1997-2004 C5 Corvette
- 2005-2013 C6 Corvette (including Z06)
- 1998-2002 LS1 V8 equipped Camaro and Firebird
- 2004-2006 Pontiac GTO
- 2008-2009 Pontiac G8 with the L76 or the LS3 engine
- 2004-2007 Cadillac CTS-V
- 1999-2013 GM CK trucks (Tahoe, Yukon, Escalade, H2, Sierra, Silverado, Avalanche) with the 4.8, 5.3, 6.0 and 6.2L Gen III and IV V8 engines (will not work on 305 & 350 Vortec engines)
- 2003-2006 Chevrolet SSR
- 2006-2009 Trailblazer SS and other S/T body trucks with the 4.8, 5.3 and 6.0L Gen III & IV GM V8 engines
- CK trucks with 8.1L V8 engines (L19) with individual coil ignitions
- 2010-2015 Camaro SS
- front wheel drive 5.3L LS4 Gen IV V8 equipped cars (Impala SS, Grand Prix & Monte Carlo)

The LNC-2000 should also function with these products but has not yet been tested with them:

- aftermarket coils for the LS series engines (such as the MSD coils) used with GM ECM/PCM.
- aftermarket engine management systems and ignition systems (Accel, BigStuff3, Motec, FAST, MSD, etc.) that run the production GM coils.

**NOTE** - for the 2009-2013 ZR1 Corvette (LS9 engine), the 2009-2015 Cadillac CTS-V (LSA engine) and the 2012-2015 ZL1 Camaro (LSA engine) along with the GMPP LS9 and LSA crate engines we recommend that you use the LNC-2001. The LNC-2001 has the same features as the LNC-2000 but it is designed specifically for the LSA and LS9 coil pack connectors.

The LNC-2000 will NOT work with other individual coil ignition systems like those found on the GM Northstar or Ecotec engines or on the Ford modular V8 and the Chrysler Hemi V8.

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

[http://www.lingenfelter.com/forum\\_lingenfelter/index.php](http://www.lingenfelter.com/forum_lingenfelter/index.php)

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**When contacting LPE please have the following information available:**

1. **Year, make and model of the vehicle**
2. **Description of when the problem is occurring**
3. **Overall behavior of the vehicle**
4. **Any aftermarket electrical products installed (coils, spark plug wires, spark plugs, etc.)**
5. **How you have it wired/activated**
6. **The settings on your LNC (RPM, Max Retard, Rate)**

## Troubleshooting:

- Intermittent misfire or other erratic vehicle operation.
  - Have someone monitor the LED's on the LNC and note what they are doing when the problem occurs. Try changing the RPM settings on the LNC. Does the problem still occur and, if so, at the same RPM?
  - Disconnect the activation input and retest (leaving the LNC connected to the coil packs)
    - Does the problem still occur?
      - If no, the problem is likely coming from the activation input.
        - Check for an erratic activation signal or electrical noise on the activation input. Are you using a microswitch or momentary switch? Bypass this device to confirm that it isn't giving you erratic activation signals. Are you using a mechanical relay in a high vibration/acceleration environment? If so, try switching to a solid state relay.
      - If yes, disconnect the LNC from the vehicle completely and test again.
        - If the problem still occurs, it is not related to the LNC.
        - If the problem goes away, re-install the LNC and test the following:
          - Re-route the LNC wiring harness away from the spark plug wires and/or ignition coils.
          - Make sure the wires are not run in parallel with electrical wiring including fuel injector harness wires or nitrous solenoid wires.
          - Mount the LNC in a different location.
          - If you are using aftermarket spark plug wires, try changing back to the stock spark plug wires or a different brand of spark plug wires. Make sure you are using noise suppression spark plug wires.
          - If you are using aftermarket/non OEM spark plugs, confirm that they are really a resistor type plug.
  - No power LED on LNC/no vehicle start up
    - Try disconnecting everything and plugging it all back in - you may have corroded or loose connections. Inspect all connectors and wires for damage and wear.
  - LNC is active all of the time
    - Have someone check the LED's to see what they do when the LNC activates.
    - Make sure that the LNC ground activation wire is not connected to an "always on" ground. This connection is not a module ground but an activation ground.
    - Make sure you don't have the yellow and green activation wires connected to each other - this will cause the LNC to always be active.
  - Timing retard not working
    - NOTE - the timing retard will NOT show up on a scan tool as the ECM or PCM is not aware of the timing retard.
    - Make sure engine RPM is greater than 1000 RPM (timing retard is not active below 1000 RPM)
    - Check what the LED's on the LNC are doing when the timing retard should become active
    - Check your timing with a timing light with the retard active and not active
    - Check what the LNC thinks the amount of timing retard is using a volt meter on the gray analog out wire. Does it agree with your settings?

# LINGENFELTER

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

## NOTICES:

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.

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

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

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

## DISCLAIMER:

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

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

[http://www.lingenfelter.com/forum\\_lingenfelter/index.php](http://www.lingenfelter.com/forum_lingenfelter/index.php)

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## Limited Warranty:

LPE warrants the Lingenfelter LNC-2000 Launch Control Module to be free from defects in material and workmanship under normal use and if properly installed for a period of one year from date of purchase. If the module is found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of LPE. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall LPE be liable for special or consequential damages.

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L460145297 LNC-2000 installation instructions v2.7.indd