

# SCHNITZ MOTORSPORTS

## DSC-PRO2, PRO SERIES II IGNITION

### USER MANUAL AND INSTALLATION GUIDE

**IMPORTANT - Read Technical Bulletins at the Back of this Manual**



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## **IMPORTANT**

**Stock Crankshaft Trigger will NOT work with this Controller.**

**Use only DYNA PRO SERIES ® Trigger.**

**Use only a Dual Magnet Rotor for Crankshaft Trigger.**

**Use only .7ohm High Energy Ignition Coils. Part #DC9-1, DC9-2**

**Use only Static Suppression Spark-plug Wires. Part #DW-800**

**An Ignition Tester is available to simulate a running engine, Part #DCS-T01**

**All items listed above are available from Schnitz Racing. 1-219-728-9730**

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It is the purchaser s responsibility to check the state and local laws pertaining to the use of Nitrous Oxide for racing applications. Schnitz Motorsports does not recommend nor condone the use of its products for illegal street racing.

## **Caution**

Follow all recommended safety guidelines from this and other manufacturer installation guidelines. Never install any device, which pulsates nitrous solenoids without a safety solenoid installed. Static suppression ignition wires must be used with this unit! Mount the Ignition Controller as far away from secondary ignition components (ignition coils, ignition wires, etc.) As is physically possible.

**Installation of Schnitz Motorsports products signifies that you have read this document and agree to the terms stated within.**

Software updates are available. Software cost is \$38.95 for all controllers that are more than 90 days old. Original sales receipt will be required for free software updates(controller less than 90 days old).

### **Software Updates:**

**MAXOP Version 6.2 - Re-calibrated Dwell Bias Voltage.**

**MAXOP Version 6.3 - Improved Launch RPM.**

**MAXOP Version 6.4 - Support for Remote Launch RPM Adjust Switch.**

**MAXOP Version 6.5 - Made Shift Delay for 1-2 Shift Adjustable.**

**MAXOP Version 7.0 - Precision Launch RPM Control, Calculated Ignition Retard Display.**

**MAXOP Version 7.1 - Added Support for 1-2-3-4 Automatic Transmission.**

**MAXOP Version 7.2 - Removed Support for Voltage Monitor.**

**MAXOP Version 7.3 - Added Option for Pulsed or 100% Fuel Solenoid Output with Fuel Timer**

**MAXOP Version 7.4 - Made Sequential Shift increment by RPM in Auto modes only.**

# Pro Series II

## Overview

### Description:

The Pro Series II Ignition Controller is a highly integrated Digital Ignition System with innovative features that enable today's racing technology to be utilized to its maximum potential. The system was designed to be simple while maintaining focus on features. This design technique has led to a controller that can be installed in hours not days, provided other operational systems have already been installed or are existing on the motorcycle.

### Features:

#### A - Ignition System

**1** - The controller uses digital circuitry to precisely monitor and control the Inductive Type ignition drivers. This design enables precise and consistent ignition timing control from High Energy Ignition Coils. The High-Energy design ensures ignition performance for today's technology.

**2** Ignition Timing Control is integrated into the controller. A Timing Advance Feature has been added, This Feature can be turned on or off. The amount of Timing Advance as well as Advance RPM Range is fully adjustable. The Ignition Timing can be controlled either direction of Static Timing. You may Retard the Timing more than you advance it. There are three stages and types of timing retard available. The first stage or Initial Retard can range from 0 to 12 degrees. This stage is activated immediately when the Progressive Nitrous Timer System is activated. The second stage was designed with a progressive timer that applies timing control over a period of time. This stage is activated when the Nitrous Delay Timer times out. The second stage of retard can range from 0 to 22 degrees and the Progressive Retard Timer can be programmed from .200 to 9.900 seconds. The third type of Timing Retard is a Start Retard function. The Start Retard can be set from 0 to 30 degrees of Ignition Retard and is Only Active during Initial Engine Startup. This allows high compression engines to start easily and the Timing can be set to a point that will allow the engine to idle correctly. Read Start Retard Programming Section for Important Information.

**IMPORTANT** The first and second stages of retard are added together when used together. Example: 1<sup>st</sup> stage at 4 degrees and 2<sup>nd</sup> stage at 12 degrees would provide a total of 16 degrees of timing retard.

#### B Features based on Engine RPM Control

**1** High RPM, This selection enables the user to program an Upper RPM Limit for the engine. Valid RPM Range is from 3,000 to 16,000 RPM in 100-RPM Increments.

**2** Launch RPM, This selection enables the user to program the RPM at which the engine and/or motorcycle leave starting line with. Applying +12V signal activates this stage of RPM control. Valid RPM Range is from 3,000 to 16,000 RPM in 100-RPM Increments.

**3** Sequential Shift RPM, This selection enables the user to program the RPM at which the Shift Light Output becomes active and/or Auto Shifting can occur. A different RPM can Programmed for each gear, this is Sequential Shifting. The controller sequences through the User Programmed Shift Points. Shift Sequencing begins when the Activation terminal is ON. The Shift Light Output is ON any time engine RPM is above the Shift RPM Setting, and OFF whenever engine RPM falls below the Shift RPM. The Auto-Shift System is very flexible and can be configured for all popular transmission styles. There is an adjustable delay timer built in for the 1-2 shift, this helps to control short shifts due to wheel spin off the line. A built-in and adjustable shift counter keeps track of gear position and engine kill requirements. The shift counter also stops false shifting in top gear position. The shift system can programmed for automatic or manual shifting. The rider can do a manual or Shift Override at any time, even while in auto mode. The shift counter is updated internally when manual shifts occur also.

**Note - The Auto-Shift Function will NOT work with Air over Air Systems as Required for All Pro Classes.**

## C Integrated Progressive Nitrous System and Programmable Digital Timer System

**1** The Progressive Nitrous System enables the user to adjust the NOS power curve for track and/or performance conditions.

**A** NOS Delay Timer, This selection enables the user to program a delay for the Start of NOS. The delay time can be set from 0.000 to 9.999 seconds. This delay Timer also determines when the 2<sup>nd</sup> stage of ignition timing retard begins.

**B** NOS Starting Percent, This selection determines the amount of NOS that is delivered to the engine at the start of Nitrous Injection. By lowering the amount of Nitrous introduced into the engine initially, traction problems can be controlled to match track conditions. Range is from 0% (OFF), 10% to 100% in 1% increments.

**C** NOS Final Percent#1 and Final #2, This selection determines the final amount of Nitrous that will be delivered to the engine. By using Multiple Final Percentages a Dual Ramp can be Created giving much Greater Control of the Nitrous Power Curve. The Nitrous Power can Ramp Up or Down or Both Directions as needed. Range is from 0%(OFF), 10% to 100% in 1% increments for both.

**D** NOS Build Time #1 and #2, This selection allows the user to adjust the amount of time it takes the Nitrous to go from Start Power to Final Power. A short time setting will make the Nitrous Power Curve very aggressive. And a longer setting would make the power curve less aggressive. The 2<sup>nd</sup> Build Time begins after the 1<sup>st</sup> Build Time has Finished. The Second Build Time can be Turned OFF by Setting it to 0.000 or Final % #2 at 0%. Power Build Time ranges from .200 to 9.900 seconds.

**E** - NOS 100% Power Digital Timer, This selection allows the user to select a point when the Nitrous System will go to 100%. By using a Third Timer the NOS can be Programmed to have Triple Power Ramps using 1 Stage of Nitrous. Please refer to the Section on Programming the NOS 100% POWER DELAY for detailed examples.

**F** - NOS Minimum and Maximum Activation RPM, This allows the user to set a RPM Range that the NOS is active in. These settings will shut off the NOS if the engine Bogs or is approaching the Rev Limiter

**G** - NOS Shift Counter, This allows the user to Determine which Gear the Nitrous will Become Active. The NOS Shift Counter is Incremented each time the Sequential Shift Counter is Updated(Shift Light On and Back Off) or the Shift Input is Activated Signaling an Engine Kill Request. All Shifts are Counted after the Activation Terminal has had +12 volts applied, even if the Activation Signal is Removed During Operation(User lets Off Throttle). This Function can be set to OFF and 2<sup>nd</sup> to 6<sup>th</sup> Gear.

**H** - Pulsed or 100% Nitrous Fuel Output Option, This allows the user to tailor the Operation of the Fuel Solenoid Output to enhance fuel delivery characteristics. There is a Timer available for this option for Improved Tuning. Default setting is Fuel Solenoid Output pulsates and NOS Fuel 100% Timer is OFF.

## D Diagnostics

**1** The Diagnostics Menu allows the user to perform various tests on activation circuits and ignition coil output. The Static or Base ignition timing must be set using Diagnostic Mode. When the engine is running the Diagnostic selection automatically becomes a Digital Tachometer. This can be used to check Actual Launch RPM and adjust the settings as needed.

**2** - Enhanced Diagnostics that inform the user of potential problems. These include Crankshaft Trigger problems and Activation Switch Errors. Example - If a Trigger is producing an intermittent signal the Controller will Display an Error message on the screen. The Controller will also display an Error Code if one the Inputs become Erratic (i.e. - If the 2-step or Throttle switch is malfunctioning with the engine running the Controller will Warn the user of this condition and confirm which Input or Switch the Error occurred at.).

**3** - The Battery Voltage Monitor has been removed. This is to improve the controllers resistance to voltage spikes that may occur.

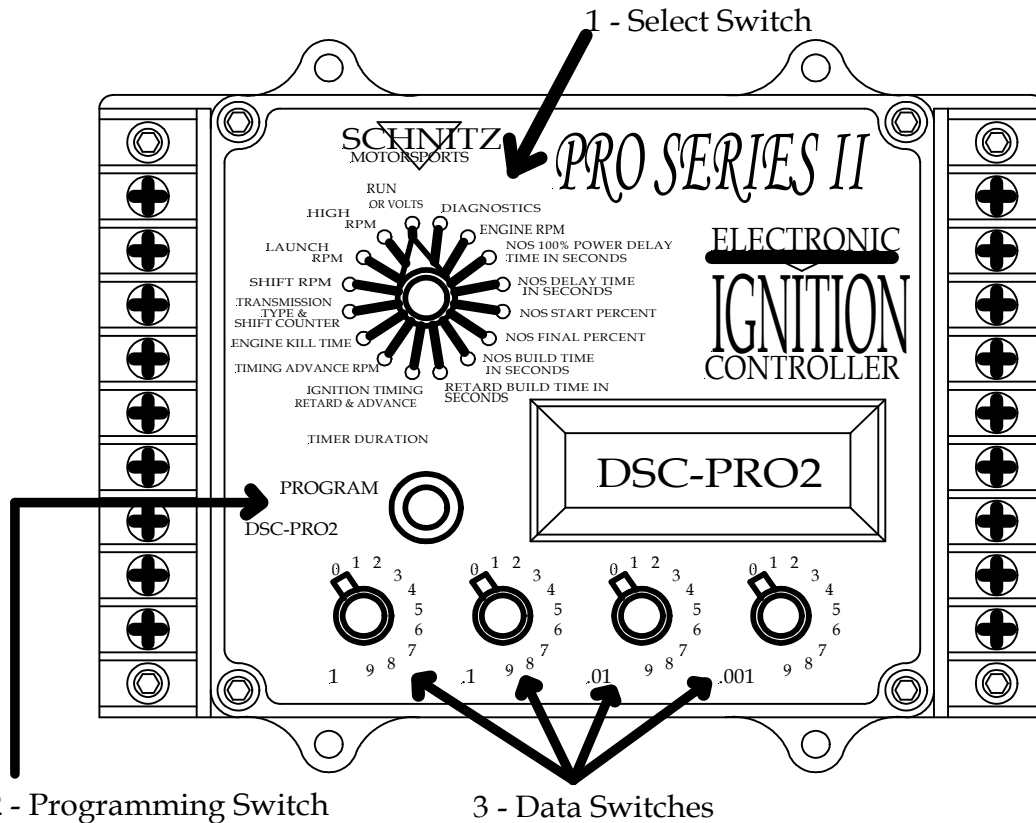
## E - Analog Data Output

**A** - An Analog Output is provided for Data Logging Computers. This Output can be configured to provide information for the Ignition Timing or NOS Percent.

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## 1.0 - The Basics of Setting Controller Parameters



### Switch Descriptions and Functions

- 1 - Switch #1 is the FUNCTION SELECT SWITCH, This switch is used to select which parameter is displayed and also selects that parameter for programming.
- 2 - Switch #2 is the PROGRAM SWITCH, When this switch is pressed down and held for 2-seconds the DATA switches will be read and the settings will be programmed into the controller. If an INVALID setting is read the controller will NOT save the setting and will display an INVALID message on the display.
- 3 - Data Switches #3 are for entering RPM Data, Ignition Retard Data, NOS Control Data, and for selecting various options as described in the following pages.

### Example Programming Sequence

Function Select Switch(#1) set to HIGH RPM (Switch pointing to HIGH RPM)

Data Switch 1 set at 1, .01 at 2, .001 at 5, .001 at 0

Data Switch 1 x 10,000 RPM  
 Data Switch .1 x 1,000 RPM  
 Data Switch .01 x 100 RPM  
 Data Switch .001 is Ignored

Pressing and holding PROGRAM Switch for 2-seconds will set the HIGH RPM at 12,500 RPM.

Please refer to each of the following sections for setting all Functions.

## 1.1 Setting HIGH RPM, Upper RPM Limit

Set SELECT Switch to HIGH RPM.

Example that would set HIGH RPM at 10,400

1 set at	1
.1 set at	0
.01 set at	4
.001 set at	0

Press PROGRAM Button until the display reads PROGRAM. Release the button and the display will now read 10,400. HIGH RPM is now set at 10,400 RPM.

Valid RPM range 3,000 to 16,000 RPM in 100-RPM Increments.  
Setting HIGH RPM to 0 will turn this function off.

## 1.2 - Setting LAUNCH RPM

Set SELECT Switch to LAUNCH RPM.

Example that would set LAUNCH RPM at 7,200

1 set at	0
.1 set at	7
.01 set at	2
.001 set at	0

Press PROGRAM Button until the display reads PROGRAM. Release the button and the display will now read 7,200. LAUNCH RPM is now set at 7,200 RPM.

Valid RPM range 3,000 to 16,000 RPM in 100-RPM Increments.  
Setting LAUNCH RPM to 0 will turn this function off.

## 1.3 Setting ENGINE KILL TIME

Set SELECT Switch to ENGINE KILL TIME

Example that would set ENGINE KILL TIME at 85 milliseconds

1 set at	0
.1 set at	0
.01 set at	8
.001 set at	5

Press the PROGRAM button until the display reads PROGRAM. Display will now read .085 and ENGINE KILL TIME is set at 85 milliseconds. Valid Time range .020 to .120 second in .001 increments.

## 1.4 Setting SHIFT RPM, SHIFT STYLE & SHIFT COUNTER

**NOTE All Shift RPM s MUST BE +/- 1,000 RPM of 1<sup>st</sup> Shift RPM!**

Set SELECT Switch to the SHIFT RPM this is the 1<sup>st</sup> Shift RPM

When a NEW 1<sup>st</sup> Shift RPM is Programmed all Shift RPM s will be set to the 1<sup>st</sup> Shift RPM Setting Automatically.

Example that would set SHIFT RPM at 9,800

1 set at	0
.1 set at	9
.01 set at	8
.001 set at	0

Press PROGRAM Button until the display reads PROGRAM. Release the button and the display will now read 9,800. SHIFT LIGHT RPM is now set at 9,800 RPM. NOTE, IF the 1<sup>st</sup> Shift RPM is Programmed it will take a couple of Seconds to Update the Following Shift RPM s. Valid RPM range 3,000 to 16,000 RPM in 100-RPM Increments.

NOTE: Only the 1<sup>st</sup> SHIFT RPM will be used until the ACTIVATION Terminal is Activated.. This is done with a +12 volt signal. Please refer the next section for more information on the Auto-Shift System and its use.

### **NOTE: Additional Shift RPM s are set as follows.**

Set the SELECT Switch to TRANSMISSION TYPE & SHIFT COUNTER Use the .001 DATA Switch to Select the Desired Shift RPM to Set. You must turn the .001 DATA Switch to #2 to #5 positions to access the Sequential Shift RPM Settings. The Display will show the which Shift Point you have selected. After Selecting the Desired Shift RPM, It can be Programmed by using the Additional DATA Switches as outlined above.

The Auto-Shift is NOT activated until the Activation terminal is armed. Applying +12 volts to the terminal does this. At this time of activation a 1-second timer will begin, NO AUTO SHIFTS will occur until this 1-second timer is done. This prevents sudden shifts due to wheel spin at the initial launch. A shift override may be activated at any time by applying +12V to the SHIFT Terminal. This is done with a shift button. A shift override will be counted by the AUTO-SHIFT shift counter. Ignition KILL for the shifts are controlled automatically by the controller. To use the SHIFT COUNTER with Manual shifting set the SHIFT STYLE as outline below. Auto Shift must be ACTIVATED for SHIFT COUNTER to work even when using MANUAL SHIFT Modes.

SHIFT STYLE options are as follows:

LITE	No AUTO SHIFTING. Engine kill for all shifts. Manual Shift Only.
1-2 LITE	No AUTO SHIFTING. Will NOT kill for 1-2 shift. Manual Shift Only.
1-2-3 LITE	No AUTO SHIFTING. Will NOT kill for 1-2, 2-3 shifts. Manual Shift Only.
1-2-3-4 LITE	No AUTO SHIFTING. Will NOT kill for 1-2, 2-3, 3-4 shifts. Manual Shift Only.
AUTOLITE	No AUTO SHIFTING. Will NOT kill for all shifts. Manual Shift Only.
STANDARD	AUTO SHIFT ON. Will kill for all gears.
1-2 AUTO	AUTO SHIFT ON. Will NOT kill ignition for 1-2 shift.
1-2-3 AUTO	AUTO SHIFT ON. Will NOT kill ignition for 1-2-3 shifts.
1-2-3-4 AUTO	AUTO SHIFT ON. Will NOT kill ignition for 1-2-3-4 shifts.
FUL AUTO	AUTO SHIFT ON. Will NOT kill ignition for all shifts.

NOTE - The shift counter, kill pattern will only increment to the next position by RPM when in Auto modes of operation. When used with an Air over Air system an auto mode must be selected to recognize gear changes by RPM. When in manual modes of operation a Shift-Kill input must be recognized before the shift counter will increment to the next gear position.

To change the SHIFT STYLE setting set the SELECT Switch to SHIFT STYLE & SHIFT COUNTER. Set the .001 DATA switch to 0. Pressing the PROGRAM button at this time will select the next option available. All option may be viewed by pressing the PROGRAM button repeatedly.

SHIFT COUNTER options are as follows:

2-SPEED	No Auto-Shifts after 1 to 2 shift.
3-SPEED	No Auto-Shifts after 2 to 3 shift.
4-SPEED	No Auto-Shifts after 3 to 4 shift.
5-SPEED	No Auto-Shifts after 4 to 5 shift.
6-SPEED	No Auto-Shifts after 5 to 6 shift.

To change the SHIFT COUNTER setting set the SELECT Switch to SHIFT STYLE & SHIFT COUNTER. Set the .001 DATA switch to 1. Pressing the PROGRAM button at this time will select the next option available. All options may be viewed by pressing the PROGRAM button repeatedly.



## 1.5 Setting 1-2 SHIFT DELAY TIMER

Set SELECT Switch to TRANSMISSION TYPE & SHIFT COUNTER

**Note - #.001 Data Switch must be set at 6**

Example that would set 1-2 SHIFT DELAY TIMER to .200 second.

1 set at	0
.1 set at	2
.01 set at	0 - Not Used
.001 set at	6 - Used to Select Shift Delay Function

Press PROGRAM button until the display reads PROGRAM. Display will now read 0.200 and the SHIFT DELAY TIMER is .200 seconds. Valid range is 0.000 to 1.000 second in .100 increments.

## 1.6 Setting IGNITION TIMING, RETARD and ADVANCE

**Note - Initial RETARD and Build RETARD Settings are Added together for Amount of Total Ignition Timing RETARD.**

### Setting INITIAL RETARD

Set SELECT Switch to IGNITION TIMING, RETARD and ADVANCE

**Note - #1 Data Switch must be at 0**

Example that would set INITIAL RETARD to 6 degrees

1 set at	0 - Used to select Timing Option
.1 set at	0 (not used)
.01 set at	0
.001 set at	6

Press PROGRAM button until the display reads PROGRAM. Display will now read INIT 6 and INITIAL RETARD is set to 6 degrees. Valid range 1 to 12 Degrees, 1Degree Increments. Setting to 0 will turn this function/ OFF. NOTE: This retard stage will turn on immediately when the NOS Activation is turned on. (+12volts applied). The ignition retard will remain active until the NOS system resets.

### Setting Ignition Timing BUILD RETARD, 2<sup>nd</sup> Stage of Retard

Set SELECT Switch to IGNITION TIMING, RETARD and ADVANCE

**Note - #1 Data Switch must be set at 1**

Example that would set BUILD RETARD to 14 degrees

1 set at	1 - Used to select Timing Option
.1 set at	0 (not used)
.01 set at	1
.001 set at	4

Press PROGRAM button until the display reads PROGRAM. Display will now read BUILD 14 and BUILD RETARD is set to 14 degrees. Valid range 1 to 22 Degrees, 1 Degree Increments. Setting to 0 will turn this function OFF.

NOTE: This retard stage will turn on when the NOS Delay Timer has timed out and the NOS Solenoids have been turned on. The retard will progressively come on based on the RETARD BUILD TIME setting.

### Viewing TOTAL Amount of Ignition Retard

Set SELECT Switch to IGNITION TIMING, RETARD and ADVANCE

**Note - #1 Data Switch must be set at 2**

At this time the Display will show the Total amount of Ignition Timing Retard that will be applied when the NOS System is Activated.

### Viewing Calculated Ignition Timing Retard - This setting will display the actual Retard Calculated by the MCU when the NOS has been activated.

Set SELECT Switch to IGNITION TIMING, RETARD and ADVANCE

**Note - #1 Data Switch must be turned to 5 to turn Option On.**

This option will remain in effect until power is removed from the controller. The display will show the Current Calculated Retard on the display anytime the NOS is activated regardless of the switch settings.

## Setting START RETARD

Set SELECT Switch to IGNITION TIMING, RETARD and ADVANCE

**Note - #1 Data Switch must be at 4**

Example that would set START RETARD to 12 degrees

1 set at	0 - Used to select Timing Option
.1 set at	0 (not used)
.01 set at	1
.001 set at	2

Press PROGRAM button until the display reads PROGRAM. Display will now read S RET: 12 and START RETARD is set to 12 degrees. Valid range 0 to 30 Degrees, 1Degree Increments. Setting to 0 will turn this function OFF. NOTE: This retard stage is only Active During Engine Starting.

**Caution - If the Engine is Cranking Extremely Slow the Controller can NOT Calculate the proper Start Retard. In this case use the method outline below!**

**Note - If the Start Retard is set to 34 degrees the Ignition will NOT Fire until the opposite side of the 2<sup>nd</sup> Rotor Magnet. Guaranteed 34 Degrees of Start Retard. Please refer to Page 18.**

## Setting Ignition Timing Degrees of ADVANCE

**NOTE - This Setting Does NOT have to be used(Set to 0). The Controller can adjust the Timing either direction(retard or advance) of Static Timing. Please Refer to Next Section regarding Timing Advance RPM Control.**

Set SELECT Switch to IGNITION TIMING

**Note - #1 Data Switch must be set at 3**

Example that would set ADVANCE to 10 degrees

1 set at	3 - Used to select Timing Option
.1 set at	0 (not used)
.01 set at	1
.001 set at	0

Press PROGRAM button until the display reads PROGRAM. Display will now read ADV 10 and Timing ADVANCE is set to 10 degrees. Valid range 0 to 34 Degrees, 1 Degree Increments. Setting to 0 will turn this function OFF.

**Note - The Degrees of Advance will be Added to the Static Timing of the Engine. Example - If the Static Timing is at 25 and Timing Advance Set at 10 the Total Ignition Timing Advance would be 35 Degrees. The RPM at which the Timing Advance works is Fully Programmable and is Explained in the Next Section.**

## 1.7 Setting Ignition TIMING ADVANCE RPM (Advance Curve)

**Note - These Settings along with Degrees of Timing Advance will Determine the Ignition Timing Advance Curve.**

### Setting IGNITION TIMING BEGINNING ADVANCE RPM

Set SELECT Switch to TIMING ADVANCE RPM

**Note - #.001 Data Switch must be set at 0**

**IMPORTANT - The Beginning Advance RPM MUST be at Least 1,000 RPM Lower than the Full Timing Advance RPM. It may be necessary to Set the Full Timing Advance RPM First so the Timing Advance Beginning RPM can be set to the Desired Value.**

Example that would set TIMING ADVANCE Beginning RPM at 1,800 rpm

1 set at	0
.1 set at	1
.01 set at	8
.001 set at	0 - Used to Select Beginning and Full Timing Advance RPM

Press PROGRAM button until the display reads PROGRAM. Display will now read 1,800 and TIMING ADVANCE Beginning RPM is set at 1,800 RPM. Valid RPM range 1,600 to 15,000 RPM in 100-RPM Increments.

## Setting FULL TIMING ADVANCE RPM

Set SELECT Switch to TIMING ADVANCE RPM

Note - #.001 Data Switch must be set at 1

**IMPORTANT - This setting will determine the RPM at which Full Timing Advance is Reached.**

Example that would set FULL TIMING ADVANCE RPM at 4,800 rpm

1 set at 0  
.1 set at 4  
.01 set at 8  
.001 set at 0 - Used to Select Beginning and Full Timing Advance RPM

Press PROGRAM button until the display reads PROGRAM. Display will now read 4,800 and FULL TIMING ADVANCE RPM is set at 4,800 RPM. Valid RPM range 2,600 to 16,000 RPM in 100-RPM Increments.

**IMPORTANT INFORMATION: This setting is used along with DEGREES OF TIMING ADVANCE to adjust the Advance Curve for the ignition timing. The following information can be used to build almost any desired timing curve.**

**CAUTION: Setting the Advance to High can Cause DETONATION which WILL HARM the engine. If you do not know where to set the ignition timing and advance setting then contact YOUR engine builder to obtain basic ignition timing information.**

Formula to Determine Advance Curve:

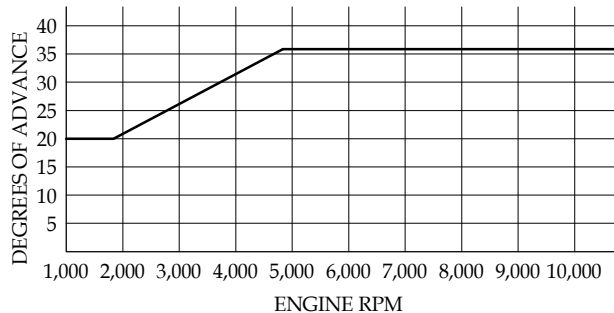
Advance RPM Range = **Full Timing Advance RPM - Timing Advance Beginning RPM**  
RPM for 1 Degree of Advance = Advance RPM Range / **Degrees of Timing Advance**

Degrees of Advance Per 1,000 RPM = 1000 / RPM for 1 Degree

Example: ADVANCE BEGINING RPM = 1,800 rpm  
FULL TIMING ADVANCE RPM = 4,800 rpm  
DEGREES OF TIMING ADVANCE = 16 degrees  
Static Engine Timing = 20 degrees  
Total Timing Advance = 36 degrees

$4,800 - 1,800 = 3,000$  (Advance RPM Range)  
 $3,000 / 16 = 187.5$  (Every 187.5 RPM Increase will Advance Timing 1 Degree)  
 $1000 / 187.5 = 5.35$  (Ignition Timing will Advance 5.35 Degrees every 1,000 RPM)

## Graph of Example Ignition Timing Curve



## 1.8 - Setting RETARD BUILD TIME

Set SELECT Switch to RETARD BUILD TIME IN SECONDS

Example that would set RETARD BUILD TIME at 2.400 seconds

1 set at	2
.1 set at	4
.01 set at	0 (not used)
.001 set at	0 (not used)

Press PROGRAM button until the display reads PROGRAM. Display will now read 2.400 and RETARD BUILD TIME is set at 2.400 seconds. Valid Time Range .200 to 9.900 seconds, .1 second Increments.

Note: This setting determines the Ramp of IGNITION TIMING RETARD. A low setting i.e. (.200) will make the TIMING RETARD very aggressive. A high setting i.e. (9.900) will make the TIMING RETARD gradual.

## 1.9 - Setting NOS 100% POWER DELAY TIME

Set SELECT Switch to NOS 100% POWER DELAY TIME IN SECONDS

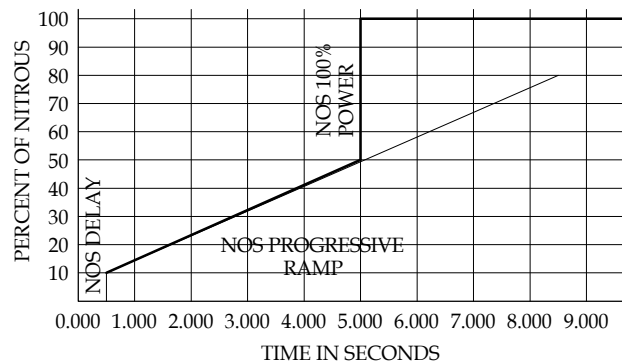
Example that would set NOS 100% POWER DELAY at 4.000 seconds

1 set at	4
.1 set at	0
.01 set at	0
.001 set at	0

Press PROGRAM button until the display reads PROGRAM. Display will now read 4.000 and NOS 100% POWER DELAY is set to 4.000 seconds. Valid range 0.000 to 9.999 seconds in .001 second increments. Setting this to 0.000 turns off the NOS 100% POWER Function OFF.

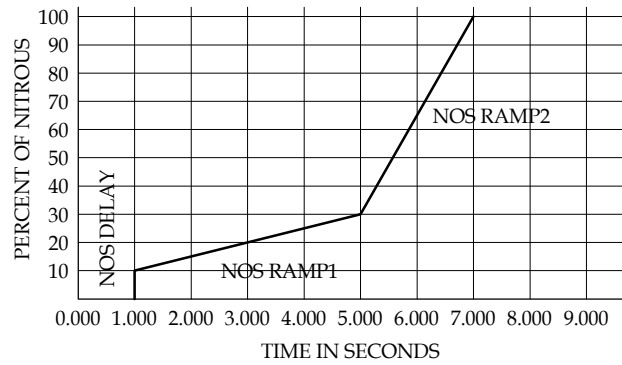
### Example NOS Setups using Progressive and 100% Power Timers

#### Example 1



NOS DELAY TIME = 0.500  
NOS FINAL% #1 = 80%  
NOS FINAL% #2 = OFF (0%)  
NOS BUILD TIME #1 = 8.000  
NOS BUILD TIME #2 = OFF (0.000)  
NOS 100% POWER DELAY = 5.000

## Example 2



NOS DELAY TIME = 1.000  
NOS START% = 10%  
NOS FINAL % #1 = 30%  
NOS FINAL % #2 = 100%  
NOS BUILD TIME #1 = 4.000  
NOS BUILD TIME #2 = 2.000  
NOS 100% POWER DELAY = 0.000(OFF)

### 1.10 Setting NOS DELAY TIMER

Set SELECT Switch to NOS DELAY TIME IN SECONDS

Example that would set NOS DELAY TIME at 1.250 seconds

1 set at	1
.1 set at	2
.01 set at	5
.001 set at	0

Press PROGRAM button until the display reads PROGRAM. Display will now read 1.250 and NOS DELAY TIME is set to 1.250 seconds.

Valid range 0.000 to 9.999 seconds in .001 second increments.

**Note:** This is timer to delay the start of NOS. A time of 0.000 will allow the NOS to start immediately when activated. Also the Ignition Timing BUILD Retard will NOT begin until this Delay Timer has timed out.

### 1.11 Setting the NOS START PERCENT

Set SELECT Switch to NOS START PERCENT

Example that would set NOS START PERCENT at 34%

1 set at	0 (not used)
.1 set at	0
.01 set at	3
.001 set at	4

Press PROGRAM button until the display reads PROGRAM. Display will now read 34% and NOS START PERCENT is set at 34%. Valid Percentage Range 10 to 100% in 1% increments. Setting to 0% will turn NOS OFF even if NOS is Activated.

**Note:** This setting allows the starting POWER developed from the NOS to be controlled for traction and other reasons.

## 1.12 Setting NOS FINAL PERCENT #1

Set SELECT Switch to NOS FINAL PERCENT

Example that would set NOS FINAL PERCENT #1 at 60%

1 set at	0 - Used to Select Final% #1 or Final% #2
1 set at	0
.01 set at	6
.001 set at	0

Press PROGRAM button until the display reads PROGRAM. Display will now read 60% and NOS FINAL PERCENT #1 is set at 60%. Valid Percentage Range 10 to 100%, 1% Increments. Setting to 0% will turn NOS OFF even if NOS is Activated.

## 1.13 Setting NOS FINAL PERCENT #2

Set SELECT Switch to NOS FINAL PERCENT

Example that would set NOS FINAL PERCENT #2 at 100%

1 set at	1 - Used to Select Final% #1 or Final% #2
1 set at	1
.01 set at	0
.001 set at	0

Press PROGRAM button until the display reads PROGRAM. Display will now read 100% and NOS FINAL PERCENT #1 is set at 100%. Valid Percentage Range 10 to 100%, 1% Increments. Setting Final% #2 to 0% will Disable the 2<sup>nd</sup> Nitrous Ramp.

## 1.14 Setting NOS BUILD TIME #1

Set SELECT Switch to NOS BUILD TIME IN SECONDS

**Note:** .001 Data Switch MUST be set at 0 to Set this Function.

Example that would set NOS BUILD TIME #1 at 3.500 seconds

1 set at	3
.1 set at	5
.01 set at	0 (not used)
.001 set at	0 - Not used for Time Setting

Press PROGRAM button until the display reads PROGRAM. Display will now read 3.500 and NOS BUILD TIME #1 is set at 3.500 seconds. Valid Time Range .200 to 9.900 seconds in .1 second Increments.

**Note: This setting determines how fast the NOS goes from START PERCENT to FINAL PERCENT #1. A shorter BUILD TIME will make the NOS Power Curve more Aggressive.**

## 1.15 Setting NOS BUILD TIME #2

Set SELECT Switch to NOS BUILD TIME IN SECONDS

**Note:** .001 Data Switch MUST be set at 1 to Set this Function.

Example that would set NOS BUILD TIME #2 at 2.000 seconds

1 set at	2
.1 set at	0
.01 set at	0 (not used)
.001 set at	1 - Not used for Time Setting

Press PROGRAM button until the display reads PROGRAM. Display will now read 2.000 and NOS BUILD TIME #2 is set at 2.000 seconds. Valid Time Range .200 to 9.900 seconds in .1 second Increments. Setting this Function to 0.000 will Turn OFF the 2<sup>nd</sup> Nitrous Progressive Ramp.

**Note: This setting determines how fast the NOS goes from FINAL PERCENT #1 to FINAL PERCENT #2. A shorter BUILD TIME will make the NOS Power Curve more Aggressive.**

## 1.16 Setting NOS MINIMUM ACTIVATION RPM

Set SELECT Switch to NOS BUILD TIME IN SECONDS

**Note:** .001 Data Switch MUST be set at 2 to Set this Function.

Example that would set NOS MINIMUM ACTVATION RPM at 7,200

1 set at	0
.1 set at	7
.01 set at	2
.001 set at	2 - Not used for RPM Setting

Press PROGRAM Button until the display reads PROGRAM. Release the button and the display will now read 7,200. NOS will now be Disabled when RPM is below 7,200. Valid RPM range 3,000 to 16,000 RPM in 100-RPM Increments.

## 1.17 Setting NOS MAXIMUM ACTIVATION RPM

Set SELECT Switch to NOS BUILD TIME IN SECONDS

**Note:** .001 Data Switch MUST be set at 3 to Set this Function.

Example that would set NOS MAXIMUM ACTVATION RPM at 11,200

1 set at	1
.1 set at	1
.01 set at	2
.001 set at	3 - Not used for RPM Setting

Press PROGRAM Button until the display reads PROGRAM. Release the button and the display will now read 11,200. NOS will now be Disabled when RPM is over 11,200. Valid RPM range 3,000 to 16,000 RPM in 100-RPM Increments.

**Note:** This Setting should be set to RPM that is Lower than the High RPM Setting. This will allow the NOS to turn OFF before the Engine Rev Limiter is active.

## 1.18 Setting NOS SHIFT COUNTER

Set SELECT Switch to NOS BUILD TIME IN SECONDS

**Note:** .001 Data Switch MUST be set at 4 to Set this Function.

The Display will read the Current NOS SHIFT COUNTER position. If the Display Reads **OFF** the NOS SHIFT COUNTER Function is Disabled and will NOT have any effect on the NOS System. If the Display Indicates a Gear Position then the NOS Timers will NOT begin Until the Shift Counter Has Reached the Selected Gear.

To Turn **OFF** or Select the Desired Gear Position Press the PROGRAM Button until the display reads PROGRAM. Release the button and the NOS SHIFT COUNTER will Increment to the next Option.

**Note:** The NOS SHIFT COUNTER must NOT be Set to a Higher Gear Position than the Shift Counter for the Sequential Shift Light Function or the NOS Timers will NOT become Active.

## 1.19 Setting and Using the NOS Fuel Output Options

The NOS Fuel Solenoid Output can be configured to provide better tuning of the Fuel delivery. Below is a list of the possible combinations that can be programmed.

- 1 - Fuel Solenoid is pulsed the same as the Nitrous Solenoid - Factory Default Setting
- 2 - Fuel Solenoid goes to 100% immediately when the Start Percent begins.
- 3 - Fuel Solenoid starts at 100% and begins pulsating after a pre-set time period.
- 4 - Fuel Solenoid starts as normal(pulsating) and goes to 100% after a pre-set time period.

Please refer to section **2.7 - Setting the NOS Fuel Output Option** to Enable or Disable the Fuel 100% Start Option. The NOS Fuel 100% Timer can be used to control the NOS Fuel Solenoid Output as outlined below.

### Setting the NOS Fuel 100% Timer

Set SELECT Switch to NOS BUILD TIME IN SECONDS

**Note:** .001 Data Switch MUST be set at 5 to Set this Function.

Example that would set NOS Fuel 100% Timer at 1.000 seconds

1 set at	1
.1 set at	0
.01 set at	0 (not used)
.001 set at	1 - Not used for Time Setting

Press PROGRAM button until the display reads PROGRAM. Display will now read 1.000 and NOS Fuel 100% Timer is set at 1.000 seconds. Valid Time Range 0.000 to 9.900 seconds in .1 second Increments.

If the Fuel Output Option is set at PULSATE then the Fuel Solenoid will Pulsate with the Nitrous Solenoid until the NOS Fuel 100% Timer has elapsed and it will then go to 100% for the rest of the NOS Cycle.

If the Fuel Output Option is set at 100% then the Fuel Solenoid will Start at 100% and begin pulsating with the Nitrous Solenoid when the NOS Fuel 100% Timer has elapsed.

Setting this Function to 0.000 will Turn OFF the 100% Fuel Timer and the Fuel Solenoid Output will either Pulsate the entire NOS Cycle or the Fuel Output will immediately go to 100% depending on the Setting of the Fuel Output Option in the Diagnostics Menu.



## Section 2, Diagnostics

### 2.0 Description of Diagnostic Functions

The Diagnostics Functions will allow the user to test the output of the ignition coils, static time the ignition system, and test the activation inputs. These functions are only available if NO crankshaft movement has occurred. If the engine is running or has been turned over the diagnostics functions cannot be accessed. When the engine is running this selection automatically displays engine RPM on the display.

### 2.1 Ignition Coil Output Test

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

To perform an ignition coil output test set the .001 switch to 0.  
Press and release the PROGRAM switch. Each coil will be fired one time.

Caution: The ignition coils will produce a high voltage spark. Use appropriate methods for testing.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

### 2.2 Testing the ACTIVATION Input

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

To perform ACTIVATION Input test set the .001 switch to 2.

At this time the DISPLAY will read ACTIVATE. If +12 volts is connected to the ACTIVATION terminal the Display will flash the message ACTIVE. Use this test to verify the ACTIVATION switch(es) on the bike.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

### 2.3 - Testing the CLUTCH Switch Input

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

To perform CLUTCH (2-step) Input test set the .001 switch to 3.

At this time the DISPLAY will read CLUTCH. If +12 volts is connected to the CLUTCH input terminal the Display would flash the message ACTIVE. Use this test to verify clutch/2-step switches on the bike.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

### 2.4 Testing KILL, SHIFT Input

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

To perform Engine Kill, Shift Input test set the .001 switch to 4.

At this time the DISPLAY will read SHIFT. If +12 volts is connected to the SHIFT terminal the Display will flash the message ACTIVE. Use this test to verify the Shift switch.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

## 2.5 Setting Ignition Static Timing

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

To set the Static Timing set the .001 switch to 1.

The display will read one of the following messages.

STATIC - This shows the controller is in Static Timing Mode

FIRE 1,4 - This shows when 1,4 cylinder will fire.

FIRE 2,3 - This shows when 2,3 cylinder will fire.

Note: Never Static Time the engine from the first trigger magnet. Only use the second magnet 90 degrees past the first magnet. Rotate the engine in the same direction as when running. The firing point for the spark is at the point where the display changes to the message FIRE \*, \*.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

**IMPORTANT:** This is the BASE TIMING for the ignition. If you do NOT understand this setting, then contact YOUR engine builder for help.

## 2.6 - STATIC TIMING SHEET - SCHNITZ IGNITIONS

### \*\*\* IMPORTANT INFORMATION \*\*\* SETTING IGNITION STATIC TIMING

1 - INSTALL A DEGREE WHEEL AND LOCATE TOP DEAD CENTER AS OUTLINED WITH THE DEGREE WHEEL INSTRUCTIONS.

IF YOU DO NOT HAVE A DEGREE WHEEL SCHNITZ RACING CARRIES THIS ITEM.

THIS IS THE MOST ACCURATE WAY TO SET THE IGNITION TIMING. IF YOU DO NOT KNOW THE IGNITION TIMING SPECIFICATIONS FOR YOUR ENGINE, CONTACT YOUR ENGINE BUILDER FOR ASSISTANCE.

2 - ENTER DIAGNOSTIC MODE AS OUTLINED IN THE INSTRUCTION MANUAL. SET THE .001 DATA SWITCH TO 1, THIS IS THE STATIC TIMING MODE.

IMPORTANT: NEVER SET IGNITION TIMING BY ANY OTHER METHOD THAN THAT WHICH IS OUTLINED BY THIS INSTRUCTION SHEET.

3 - AT THIS TIME THE DISPLAY SHOULD READ ONE OF THE FOLLOWING.

STATIC - INDICATING STATIC TIMING MODE.

FIRE 1,4 - THIS INDICATES #1,4 TRIGGER IS ACTIVE.

FIRE 2,3 - THIS INDICATES #2,3 TRIGGER IS ACTIVE.

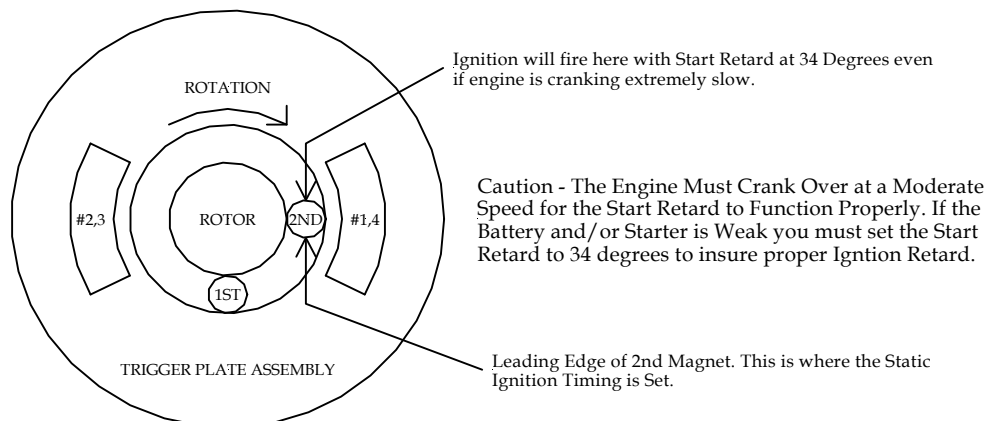
TURN THE ENGINE THE DIRECTION OF NORMAL ROTATION.

NOTE: THERE ARE 2 MAGNETS ON THE TRIGGER ROTOR. THE DISPLAY WILL INDICATE WHEN BOTH OF THESE MAGNETS ARE ALIGNED WITH THE TRIGGER. YOU MUST USE THE SECOND MAGNET, THE SECOND MAGNET IS THE ONE THAT FIRES THE IGNITION COIL.

PLEASE NOTE THAT THE DISPLAY WILL INDICATE THE PRECISE TIME WHEN THE TRIGGER IS ACTIVATED BY THE ROTOR MAGNET. ADJUST THE TRIGGER PLATE OR TRIGGER ASSEMBLY TO OBTAIN THE CORRECT IGNITION TIMING.

#### EXAMPLE SHOWING 1ST AND 2ND TIMING MAGNETS

AT THIS TIME THE DISPLAY WOULD READ: FIRE 1,4



## 2.7 - Setting the NOS Fuel Output Option

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

Set the .001 switch to 5. At this time the display will read one of the following.

PULSATE - This setting indicates that the NOS Fuel Solenoid Output will Pulsate. The Optional NOS Fuel 100% Timer can be used to turn the Fuel Solenoid on to 100% before the NOS Build Time has finished(before the Nitrous Solenoid goes to 100%)

100% - This setting indicates that the NOS Fuel Solenoid will start at 100%. The Optional NOS Fuel 100% Timer can be used to start the Fuel Solenoid Pulsating after a pre-set amount time. It will then be at the same percentage as the Nitrous Solenoid and will go to the same Final Percent as the Nitrous Solenoid.

**NOTE** To toggle between the Options press and release the PROGRAM button.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

## 2.8 Setting the TACH OUTPUT FREQUENCY

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

Set the .001 switch to 6. At this time the display will read one of the following.

TACH X2 - This setting indicates that the TACH OUTPUT will provide 2 output signals per revolution of the engine.

TACH X1 - This setting indicates that the TACH OUTPUT will provide 1 output signal per revolution of the engine.

**NOTE** To toggle between X2 and X1 press and release the PROGRAM button.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

## 2.9- Setting the ANALOG DATA Type

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

Set the .001 switch to 7, At this time the display will read one of the following.

TIMING - This setting indicates that the ANALOG OUTPUT will provide an Analog Voltage that is proportional to the Current Ignition Timing. Refer to Specifications for Output Details.

NOS - This setting indicates that the ANALOG OUTPUT will provide an Analog Voltage that is proportional to the Current NOS Percentage. Refer to Specifications for Output Details.

**NOTE** To toggle between Data Types press and release the PROGRAM button.

To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

## 2.10- Testing the SELECT and DATA Switches

Set the SELECT Switch to DIAGNOSTICS

Press and HOLD the PROGRAM Switch until display reads RELEASE. Release the PROGRAM Switch at this time. The controller is now in the diagnostic mode.

Set the .001 switch to 8. At this time the display will read SWITCH.

To perform the Test, Press and Release the PROGRAM Button. The display will at first show Copyright Information and the Date of Programming. After this these messages the display will show the current states of the Select and Data Switches. The switches may rotated at this time to verify that they are reading correctly. To exit diagnostics turn the .001 switch to 9. Then press and release the PROGRAM switch.

## 2.11- Error Codes Explained and Clearing Error Codes

The Pro-Series II Controller was designed with Self Diagnostics Features. These have been incorporated to Help the User Troubleshoot Wiring and/or Signal Problems. The Error Codes are Numbered and Each Code when Set will be Shown on the Display with a brief Description of the Problem Encountered. All Error Codes will Remain Until Cleared by the User. The Codes are Stored even if the Power is Removed from the Controller.

**IMPORTANT - If an Error Code is Set during Operation the Controller will Still Perform ALL Functions Except for Programming. If the Controller can NOT Calculate Important Parameters needed for Ignition and/or RPM Related Functions Limited Operation will Result. NOS Progressive and Retard Timers are NOT Reset if an Error Occurs. RPM Related Functions will Resume After a Trigger Error if NO other Trigger Errors Occur.**

**NOTE - If an Error Code is Set During Diagnostic Testing(Switch Input Test) follow the Procedure for Clearing the Code. The Code can be Set Inadvertently during Diagnostic Testing.**

### List of Error Codes

**IGX-2001, Crankshaft Trigger 1,4 Sync Error** - This Code indicates that the #1,4 Crankshaft Trigger Signal was Intermittent while the Engine was Running. This Error Code could be caused by a Malfunctioning Trigger Assembly or Faulty Wiring and/or Connections.

**IGX-2002, Crankshaft Trigger 2,3 Sync Error** - This Code indicates that the #2,3 Crankshaft Trigger Signal was Intermittent while the Engine was Running. This Error Code could be caused by a Malfunctioning Trigger Assembly or Faulty Wiring and/or Connections.

**IGX-2003, Clutch Input Erratic** - This Code indicates that the Clutch Input has Went from ON to OFF in a Erratic Pattern Indicating a Faulty Switch and/or Wiring.

**IGX-2004, Activation Input Erratic** - This Code indicates that the Activation Input has Went from ON to OFF in a Erratic Pattern Indicating a Faulty Switch and/or Wiring. This Input is Most Commonly Controlled by a Wide Open Throttle Switch.

**IGX-2005, Shift Input Erratic** - This Code indicates that the Clutch Input has Went from ON to OFF in a Erratic Pattern Indicating a Faulty Switch and/or Wiring. This Error Code can sometimes be set by a Poor Quality Switch such as a Factory Horn Button Used to Activate the Shift Solenoid and Engine Kill. It is Possible for this Code to be set by a malfunctioning Relay Used in the Air Shift System.

### Clearing Error Codes

To Clear Stored Error Codes just Press the Program Button until the Message RELEASE is shown on the Display. At this time the Error Code that was Stored in Memory is Cleared.

**NOTE - Multiple Error Codes are NOT Stored. Only the Most Recent Code is Stored and Displayed**

## Section 3, Wiring Diagrams and Installation Instructions

### 3.0 Overview and Important Installation Instructions

Please read and follow all instructions carefully. It is important that the installation guidelines be followed for maximum performance.

**IMPORTANT - Do NOT mount the controller on rubber bushings. This only increases the vibration of the controller and can cause premature wear to the internal connections. If mounted to panels the panel should be connected to the frame close to and under the controller location.**

Guidelines:

- 1 - If Stock Ignition Switch is used a SEPARATE POWER SOURCE for the NOS System is HIGHLY recommended. Please refer to NOS Instructions.
- 2 - Use a good quality wire of recommended size.
- 3 - Solder all connectors to the wire when professional crimp tools are not available.
- 4 - Use shrink wrap to protect exposed terminals/wires.
- 5 - Install the proper FUSE where required.
- 6 - Use only the Required Ignition components.
- 7 - Use quality switches.
- 8 - Follow other manufacturer guidelines and recommendations when installing related components.
- 9 - NEVER disregard SAFETY and/or CAUTION Warnings!
- 10 - Mount all components correctly.

Related Components Needed for Installation and Operation

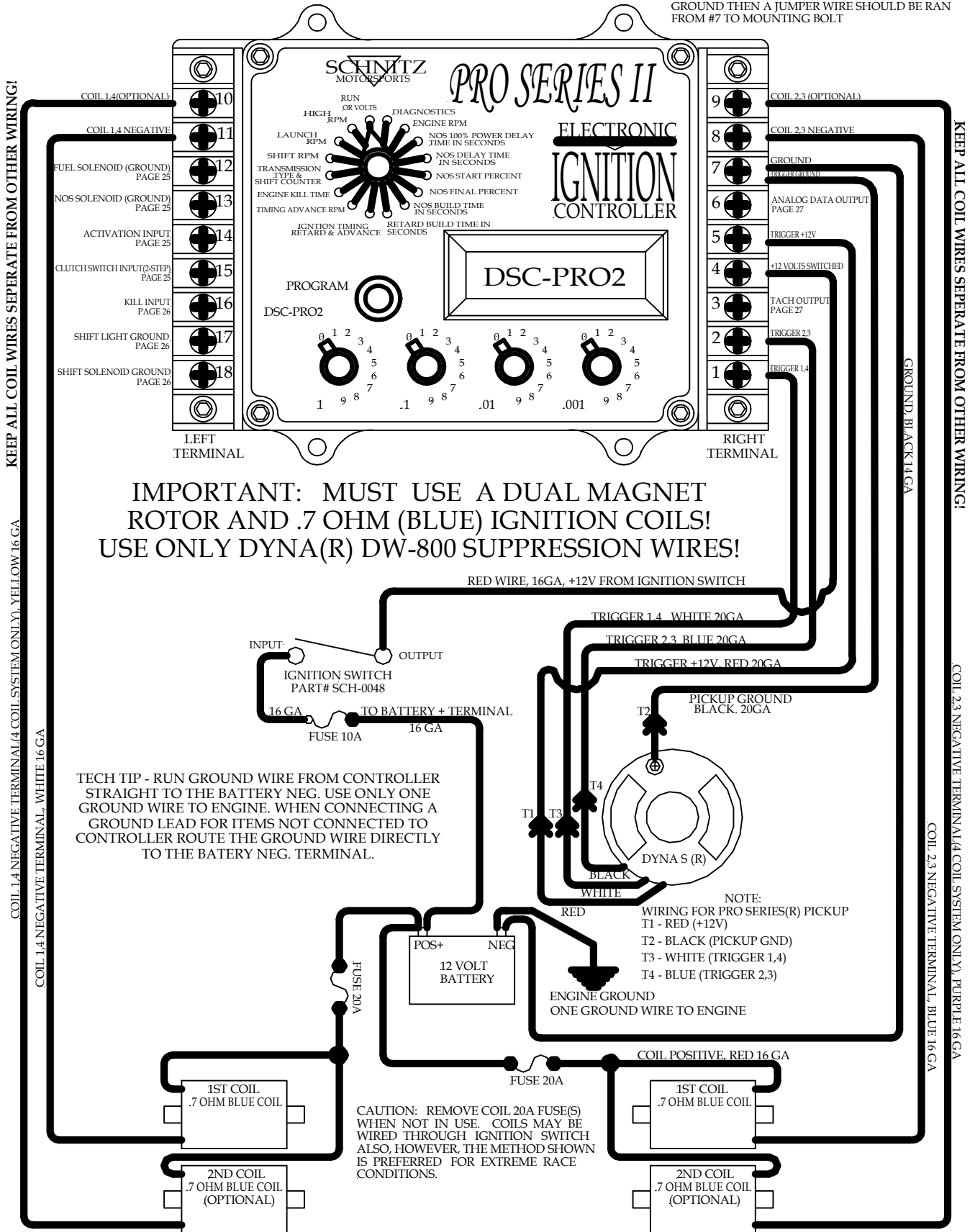
- 1 - Ignition Coils, DYNA (r) .7 ohm blue coils.
- 2 - Static Suppression Ignition Wires ONLY!
- 3 - Crankshaft Trigger, DYNA (s) or PRO SERIES (r)  
(DUAL magnet rotor ONLY!)
- 4 - Nitrous System, Recommended NOS Kit (optional).  
(Use genuine NOS components for best results)
- 5 Throttle with Switch built in. Activation switches as needed.
- 6 - Electric over air shift components (optional).

**IMPORTANT INFORMATION - The Controller will NOT turn on the NOS or SEQUENTIAL-SHIFT Systems if the CLUTCH Input is Active(2-Step is ON). Installation of this Controller Requires a Throttle Switch even if the NOS System is NOT being used. This is to provide an Accurate Activation Signal to the Controller. Activate the Clutch Input(2-step) before opening the throttle all the way to provide the ACTIVATION Signal! Set the LAUNCH RPM to 0,000 (OFF) to Disable the Launch RPM if this Function is NOT Needed.**

### 3.1 - Connecting the Ignition Components

NOTICE: If Installing a 4-Coil System READ PAGE 24

IF CONTROLLER CASE IS NOT MOUNTED ON FRAME GROUND THEN A JUMPER WIRE SHOULD BE RAN FROM #7 TO MOUNTING BOLT



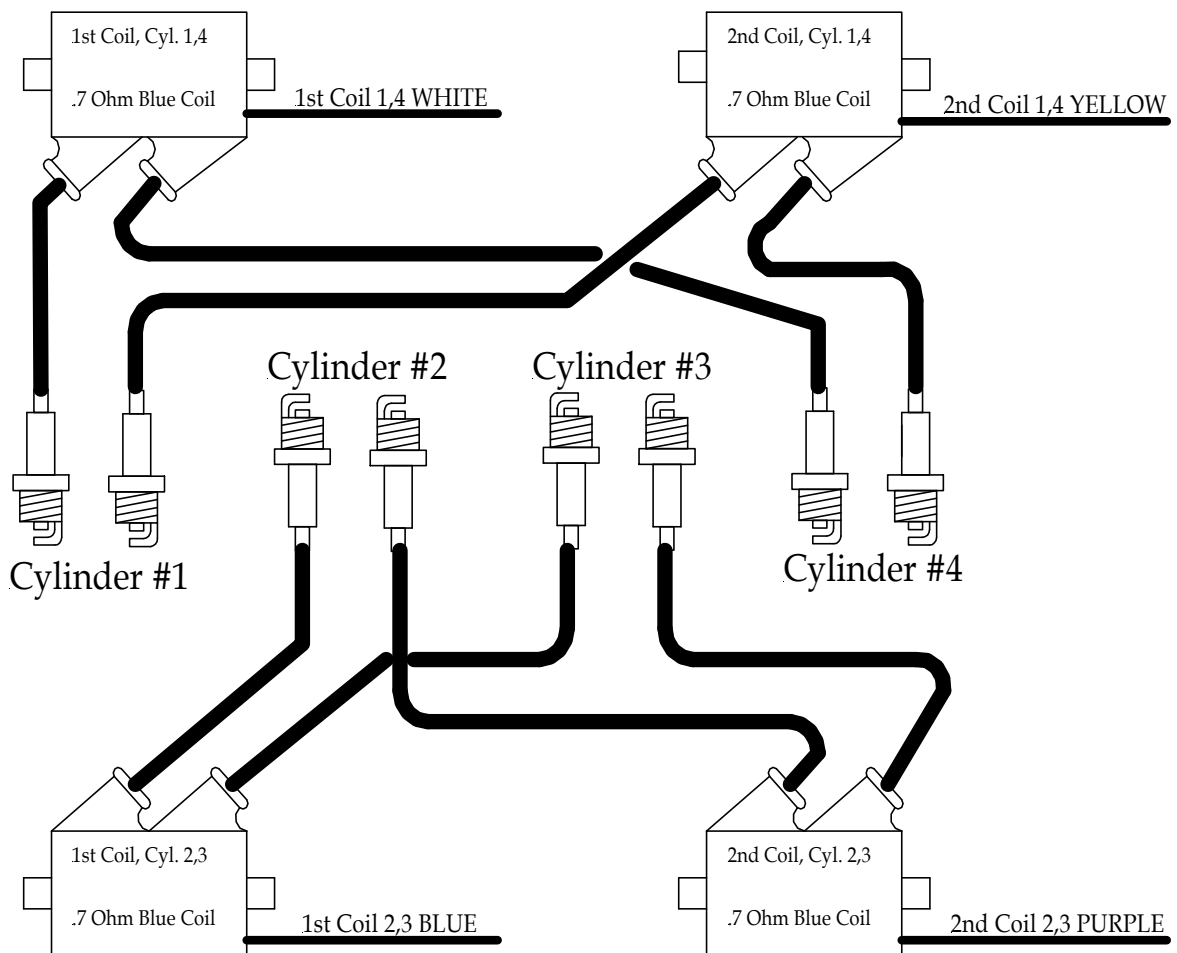
## 3.2 - Special Instructions for 4 Coil Systems

### IMPORTANT

Use Only Carbon Core Ignition Wires  
With a Resistance of 3000 Ohms  
Per Foot Minimum.

On Dual Plug Systems, Never Connect BOTH  
OUTPUTS(Sparkplug Wires) to One Cylinder.  
Example: Do NOT Connect 1st Coil 1,4 Both  
Wires to Cylinder #1.

The CORRECT Way To Wire the Ignition  
Coils is Shown Below.

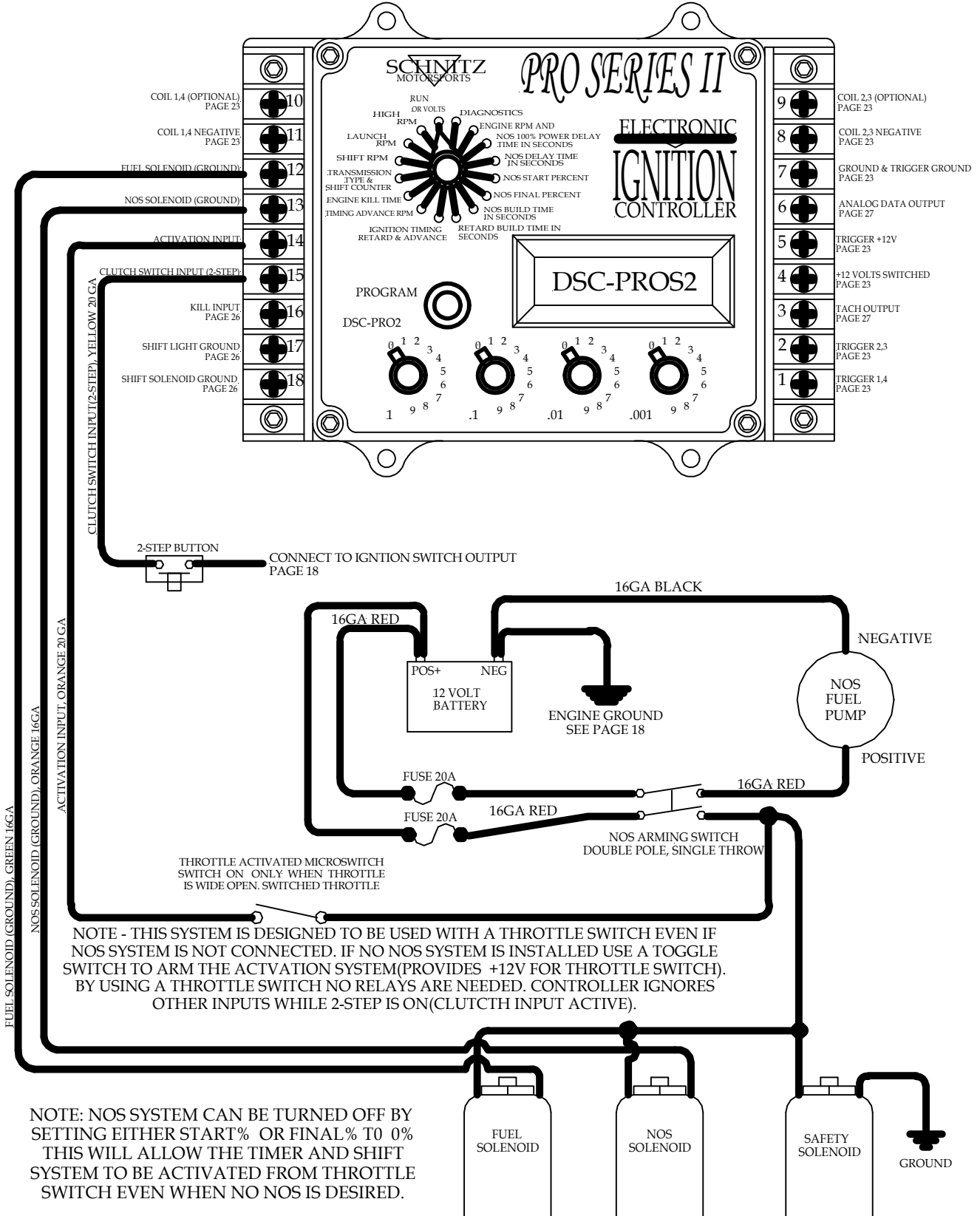




### 3.3 - Connecting the Nitrous Oxide System

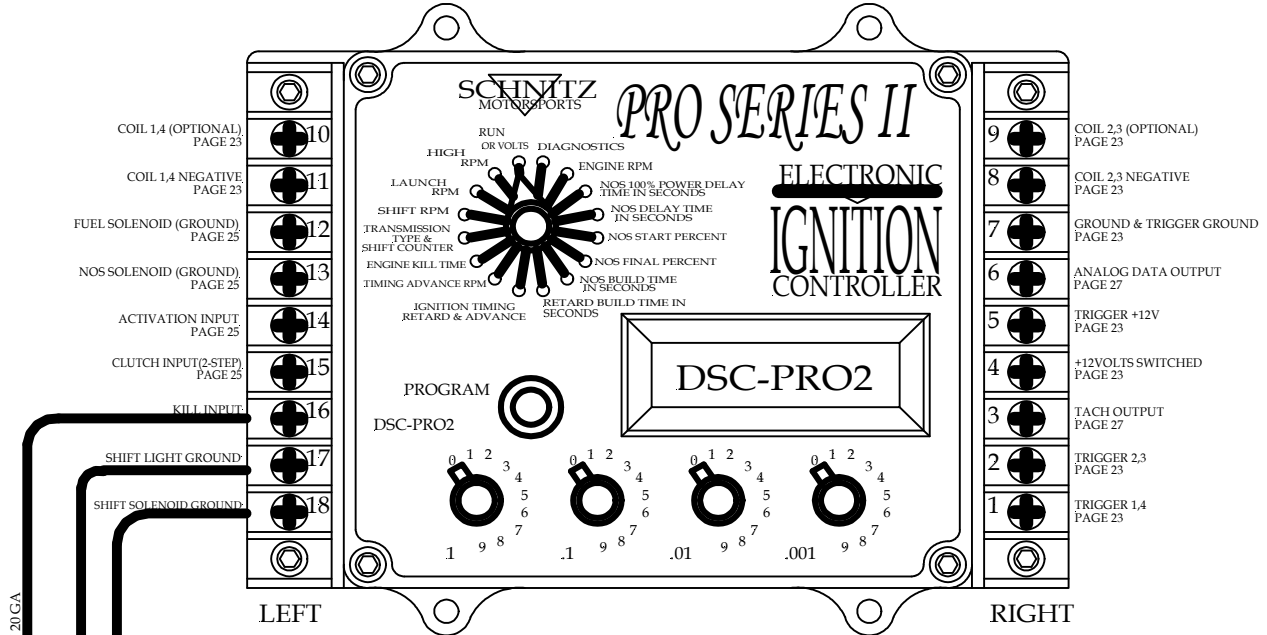
NOTICE: ALL DIODES, CAPACITORS, AND FILTERS FROM PREVIOUS NOS INSTALLATIONS MUST BE REMOVED! FAILURE TO DO SO WILL RESULT IN UNDESIRABLE OPERATION OF THIS CONTROLLER.

NOTE: NOS TIMERS WILL NOT BEGIN UNTIL 2-STEP IS OFF. THIS ALLOWS THE SYSTEM TO OPERATE WITHOUT RELAYS, IF +12 VOLTS IS APPLIED TO THE ACTIVATION TERMINAL WITHOUT THE CLUTCH INPUT ACTIVATED THE NOS, TIMER, AND SHIFT SYSTEMS WILL TURN ON.



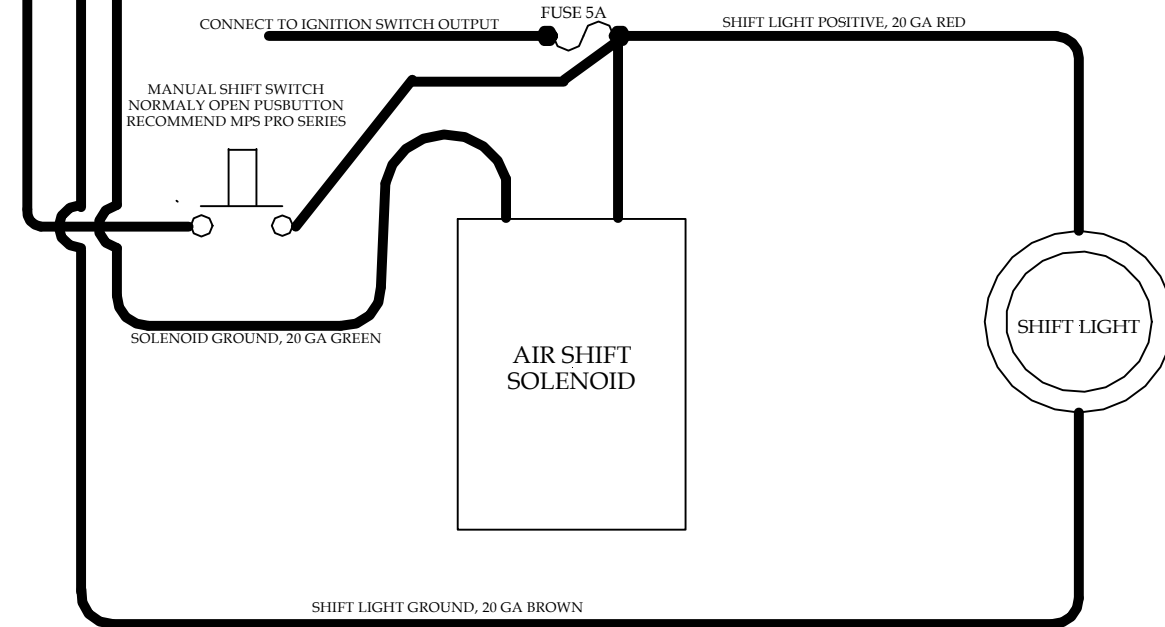
### 3.4 - Connecting the Shift Light, Shift Solenoid

NOTE: TIMERS WILL NOT BEGIN UNTIL 2-STEP IS OFF. THIS ALLOWS THE SYSTEM TO OPERATE WITHOUT RELAYS. IF +12 VOLTS IS APPLIED TO THE ACTIVATION TERMINAL WITHOUT THE CLUTCH INPUT ACTIVATED THE NOS, TIMER, AND SHIFT SYSTEMS WILL TURN ON.



SEE PAGE 24 FOR ACTIVATION INPUT DETAILS

NOTE - THIS SYSTEM IS DESIGNED TO BE USED WITH A THROTTLE SWITCH EVEN IF NOS SYSTEM IS NOT CONNECTED. BY USING A THROTTLE SWITCH NO RELAYS ARE NEEDED. THE CONTROLLER IGNORES OTHER INPUTS WHILE 2-STEP IS ON (CLUTCH INPUT ACTIVE). USE A TOGGLE SWITCH TO ARM THE THROTTLE SWITCH.



SHIFT SOLENOID NOISE SUPPRESSION DIODE IS NOT NEEDED IF SOLENOID IS CONNECTED TO PROPER TERMINAL. IF THE SOLENOID IS CONNECTED DIRECTLY TO SWITCH A NOISE SUPPRESSION DIODE MUST BE USED!

### 3.5- Electrical Specifications

**Power Requirements:** +11V to 14.5V Supply Voltage  
Negative Ground  
Minimum of 8 volts while cranking engine.

**Ignition Current Draw:** 2 amps at 5,000 RPM(Double for Qaud Coils)  
5 amps at 10,000 + RPM(Double for Qaud Coils)

**Maximum Ignition Coil Primary Voltage:** +850 Volts DC, 1,400 Volts AC

**Note:** If Battery Voltage falls below 11 volts the controller will increase the Amperage to the Coils to provide Maximum Spark Energy. The controller will shut off if Battery Voltage continues to drop below 6 volts.

**Activation Input:** +12 volts at 5mA  
**Clutch Input:** +12 volts at 5mA  
**Kill Input:** +12 volts at 5mA

**Note:** All inputs have active clamp circuitry. This suppresses flyback energy from relays and solenoids that are connected in-line with the activation signal.

**NOS Solenoid Output:** 30 Amp Maximum Current Draw for 20seconds.  
Output provides a ground signal for the NOS Solenoid.  
Active Noise Suppression components are internal and NO external filters are needed.

**Fuel Solenoid Output:** 30 Amp Maximum Current Draw for 20seconds.  
Output provides a ground signal for the Fuel Solenoid.  
Active Noise Suppression components are internal and NO external filters are needed.

**Note:** NOS and Fuel Outputs will Turn OFF if the Activation Signal is removed During Operation. The NOS Timers will wait during this period Including the NOS 100% Power Timer.

**Shift Light Output:** 2 Amp Maximum Current Draw, Provides Ground Signal.  
**Warning - Never connect any Relays or Solenoids to this Output. Permanent Damage may Occur to Controller!**

**Shift Solenoid Output:** 2 Amp Maximum Current Draw, Provides Ground Signal.

**Tach Output:** 30mA Maximum Current with 200 Ohm Output Impedance.

**Analog Data Output:** 5mA Maximum Current with 1k Ohm Output Impedance.

Timing Voltage: 1.700 volts = Static Timing  
+.05 volt for each 1 Degree of Advance  
-.05 volt for each 1 Degree of Retard

NOS Voltage: .04 Volt increase for each 1% of NOS

**Note - A Volt Meter can be connected to this terminal to check that the Ignition Retard is coming on. See Diagnostics Menu about setting the Analog Output to Timing Function.**

## Tech Tips

### 4.0 - How to Run without NOS

1 - To disable the NOS system. Program either the Start or Final NOS Percent #1 to 0. The Display will then read OFF when set to Start % or End %. Be SURE to turn OFF the Ignition Retard also. This is done by Setting the Initial and Build Retard Degrees to 0. By setting the NOS and Retard to OFF the user can still activate the Auto-Shift System and operate with no NOS.

2 - Be sure to Set the NOS 100% POWER DELAY Timer to OFF.

### 4.1 - Testing the Auto-Shift System and Some Shift Tech Tips

**Note - An Ignition Tester is available(DCS-T01) that will simulate a running engine and allows testing of all RPM related functions without the Engine Actually Running. The Tester also provides a way of checking the Ignition Output and Coils.**

1 - The Auto-Shift System can be Tested with the Motorcycle Stationary. Remove the Shift Cylinder Linkage from the Shift Shaft. You MUST DO THIS! Verify that there is Air Pressure in the System. Raise the Back Tire off from the ground and support the motorcycle in a safe manner.

2 - Verify that the Desired Shift Style is selected. To help detect engine kill set the Kill Time to .150 Second. Set the Shift RPM to a low Setting i.e.(5,000 RPM). Prepare the Motorcycle for Starting. Make sure Fuel and Oil are OK, Have the Starter Handy. Turn on the Controller and all other Arming Switches needed for Auto-Shift Activation. At this time Twist the Throttle wide open to Arm the Auto-Shift System. If your bike does not use a Throttle switch then use the correct Arming Switch for your application. Be sure to release the throttle and Start the Engine. At this time you can give the throttle a quick twist and verify that the Shift Light and Shift Cylinder work for each gear change. You should be able to hear the Engine Kill when it is needed for the gear change. This is based on the Shift Style Setting. The Controller will RESET the Auto-Shift System after 20 seconds. This is why you must be prepared to run this test.

3 - After testing the System re-connect the Shift Cylinder Linkage, Set the Proper Shift RPM , and Engine Kill Time.

Note - Some tracks are too rough to use the Auto-Shift System. When the rear bounces under acceleration the Engine will Rev Quickly and cause false Shifts to Occur. These will increment the shift counter also. This can cause the Engine Kill sequence to be altered and NOT function properly. Also the Final Shift will NOT be performed because the controller thinks that it has already shifted all the gears.

If you are having trouble with the Auto-Shifter and you are also having a great deal of wheel spin off from the line you will need to correct the wheel spin problem. The controller cannot correct for this type error conditions.

Please Note that if you are Manual shifting and using the shift counter the Counter will Increment when you push the shift button. The Counter will NOT Increment if the Shift Light is on when you push the button and the Engine RPM Does NOT fall below the Next Shift RPM. If you Push the Shift Button before the Shift Light comes on(short shift) the counter will be incremented regardless of the Engine RPM. Even if the Transmission does NOT shift due to wheel spin or other error conditions. The Engine Kill Pattern will follow the Shift Counter.

## Warranty Information

### 5.0 Warranty

Schnitz Motorsports warrants to the original purchaser that the Electronic Ignition Controller shall be free from defects in parts and workmanship under normal use for 90 days from the date of purchase.

Schnitz Motorsports obligation under this warranty is limited to the repair or replacement of any component found to be defective when returned postpaid to Schnitz Motorsports. The Controller must be returned with evidence of place and date of purchase or warranty will be void. The warranty will not apply if the Electronic Ignition Controller has been installed incorrectly, repaired, damaged, or tampered with by misuse, negligence or accident.

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## **Pro-Series “II” Technical Bulletin 2.0, NOS Configuration**

### **Important!**

#### **Fuel Solenoid Behavior with Separate Nitrous and Fuel Solenoid Drivers.**

1 - With the Old Style Progressive Controllers the Nitrous and Fuel Solenoids were Connected together. This method caused the Fuel Solenoid to go to 100% almost immediately after Activation. Even at Low Start Percentages.

2 - When the Solenoids are Connected to Separate Outputs the Fuel Solenoid will Pulse Much Longer and May Create a Lean Condition due to the Extra Fuel Not being delivered to the Engine in beginning of the NOS Progression.

3 - The Fuel Solenoid Output can be programmed to overcome this. See Sections 1.19 and 2.7 for configuring the Fuel Solenoid Output.

#### **Setting the NOS Progressive Timers Properly.**

1 - If the Dual Ramp NOS Feature is NOT being used the Final Percent2 must be set to OFF(0%).

2 - The NOS Build Time2 is Ignored if the Final Percent2 is set to OFF.

3 - The NOS Progressive Timers will NOT Function if the Either the Start or Final Percent1 is set OFF(0%).

4 - The NOS 100% Power Delay Timer will Function even if the Progressive Timers are set to OFF.

#### **Verifying that NOS Solenoid is Opening at Low Percentage Settings.**

1 - All Solenoids have different operating characteristics and this can lead to problems at Low NOS Start Percentages.

2 - Some Solenoids will NOT Open below 20%. At 900psi and higher bottle pressures the Usable Start Percentage may even be Higher depending on the Solenoid.

3 - Always Test the NOS Solenoid to ensure that it operates correctly at the Start Percentage you have Programmed into the Controller. If the Solenoid does NOT Open immediately after Activation a Higher Start Percentage will have to be used.