



**HYFIRE® VII Series Electronic Ignition
Controls
Instruction Manual
Part#: 667C**



INSTALLATION INSTRUCTIONS

HYFIRE® VIIC PRO CD IGNITION SYSTEM

Part No. 667C

4-12 Cylinder

6 Cylinder Odd-Fire

Notice: This product is legal to sell, distribute or install on vehicles in California. Executive Order D-70-6.

The HYFIRE® VII Pro CD Ignition Controls are not compatible with distributorless systems or positive ground applications. The HYFIRE® VII Ignition System is not designed for marine use.

GENERAL INFORMATION

The RPM limiter in the HYFIRE® VIIC Ignition System is not recommended as an engine speed governor. The use of the RPM limiters is not recommended for applications equipped with a catalytic converter. Similarly, forcing engine RPM past the RPM limiter continuously for long sustained intervals can cause problems resulting from fuel build up in the exhaust system that may adversely affect the application.

Ignition Ballast Resistor / Loom Resistance Wire

The HYFIRE® VIIC Ignition System's performance is not affected by the presence of the factory ignition resistors or ignition ballast resistors in the wire from the ignition switch. It is not necessary to install ignition ballast resistors as specified by the instructions for the particular distributor.

Ignition Coils

The HYFIRE® VIIC Ignition System is designed to work with Mallory PRO-MASTER® Coil Part No. 28880. Avoid using any other type of ignition coil.

Spark Plug Wires

YOU MUST USE suppression type (carbon core, spiral core) spark plug wire. We recommend spiral core ignition wire, such as Mallory PRO SIDEWINDER® Ignition Wire. Suppression type spark plug wires prevent false triggering and the possibility of premature ignition or accessory failures.

DO NOT USE solid core (copper core; stainless steel core) spark plug wire with any electronic ignition system or accessory. Solid core spark plug wire is one cause of electro-magnetic interference (EMI; ignition noise). EMI is one cause of false triggering (preignition; spark scatter) and premature ignition or accessory failures.

Spark Plug Gaps

For street applications, use your engine manufacturer's specifications. For racing applications, start with your engine manufacturer's specifications, then experiment with and closely monitor various gaps to achieve maximum performance.

Electric Welding

Disconnect the HYFIRE® VIIC Ignition System and unplug any distributor harnesses (if possible) before any welding is done on the vehicle.

External RPM Limiters

Mallory RPM Limiter Part Nos. 641-4, 641-6, 641-8, 642, 643 and 644 WILL NOT function with the HYFIRE® VII Ignition Systems.

Mallory PRO TACH® I, IV and IV

The tachometer and shift light will work with the HYFIRE® VII Ignition Systems. However, the RPM limiter WILL NOT function with the HYFIRE® VII Ignition Systems. Turn the LIMIT RPM knob slightly past 11,000 to prevent the RPM limiter from interfering with the tachometer's other functions.

MOUNTING PROCEDURE

Step 1

Disconnect the battery (-) cable to cut power to the system.

Step 2

Select a convenient location to mount the HYFIRE® VII Ignition System. Keep the unit away from hot engine components or extreme heat such as the exhaust system and manifolds. Keep the unit away from moving devices, such as fans, belts and linkages. The location must be dry. Moisture will damage components inside the unit.

Step 3

Mounting to a flat surface with shock mounts

- Hold the unit in its mounting position and center punch the mounting pattern on the mounting surface for drilling mounting holes. Drill mounting holes using a 9/32" drill bit.
- Install the shock mounts into the bottom plate of the unit. Hold the unit in position where it will be mounted.
- From the backside of the mounting surface, insert the washers and the 1/4-20 nylock nuts onto the shock mount studs. Tighten each nut until snug.

WIRING PROCEDURE

Step 1

Ensure that your vehicle is equipped with a ground cable between the engine block and firewall (10 gauge or larger is required). Refer to Figure 1 while performing the following steps.

- Connect the HEAVY RED wire to the 12-volt battery (+) post or battery (+) terminal on the starter solenoid.
- Connect the HEAVY BLACK wire to engine or chassis ground.
- Connect wires between the COIL (+) and (-) terminals.
- Connect 12-volts from ignition switch to the +12V terminal.
- Connect the tach/RPM sensing wire and optional external RPM control to sockets.

Step 2

When wiring the HYFIRE® VIIC Pro CD Ignition System to an electronic ignition or magnetic pickup, refer to Figures 2 and 3, and trace wires for hookup.

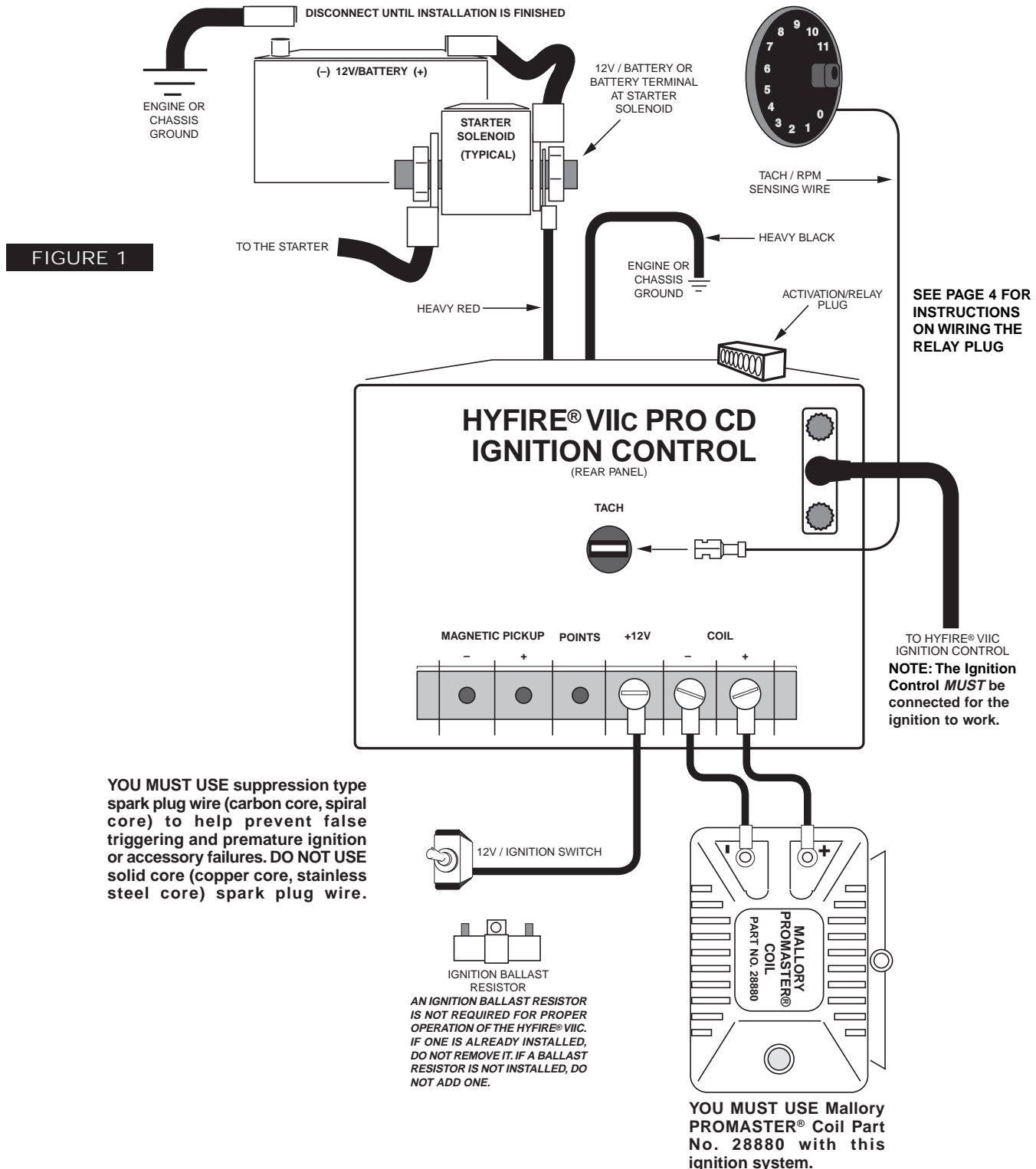


Figure 2

HOOKUP TO A MALLORY UNILITE® IGNITION, MAGNETIC BREAKERLESS IGNITION OR ELECTRONIC ADVANCE IGNITION (THREE WIRE: RED, BROWN, GREEN)

YOU MUST USE suppression type spark plug wire (carbon core, spiral core) to help prevent false triggering and premature ignition or accessory failures. **DO NOT USE** solid core (copper core, stainless steel core) spark plug wire.

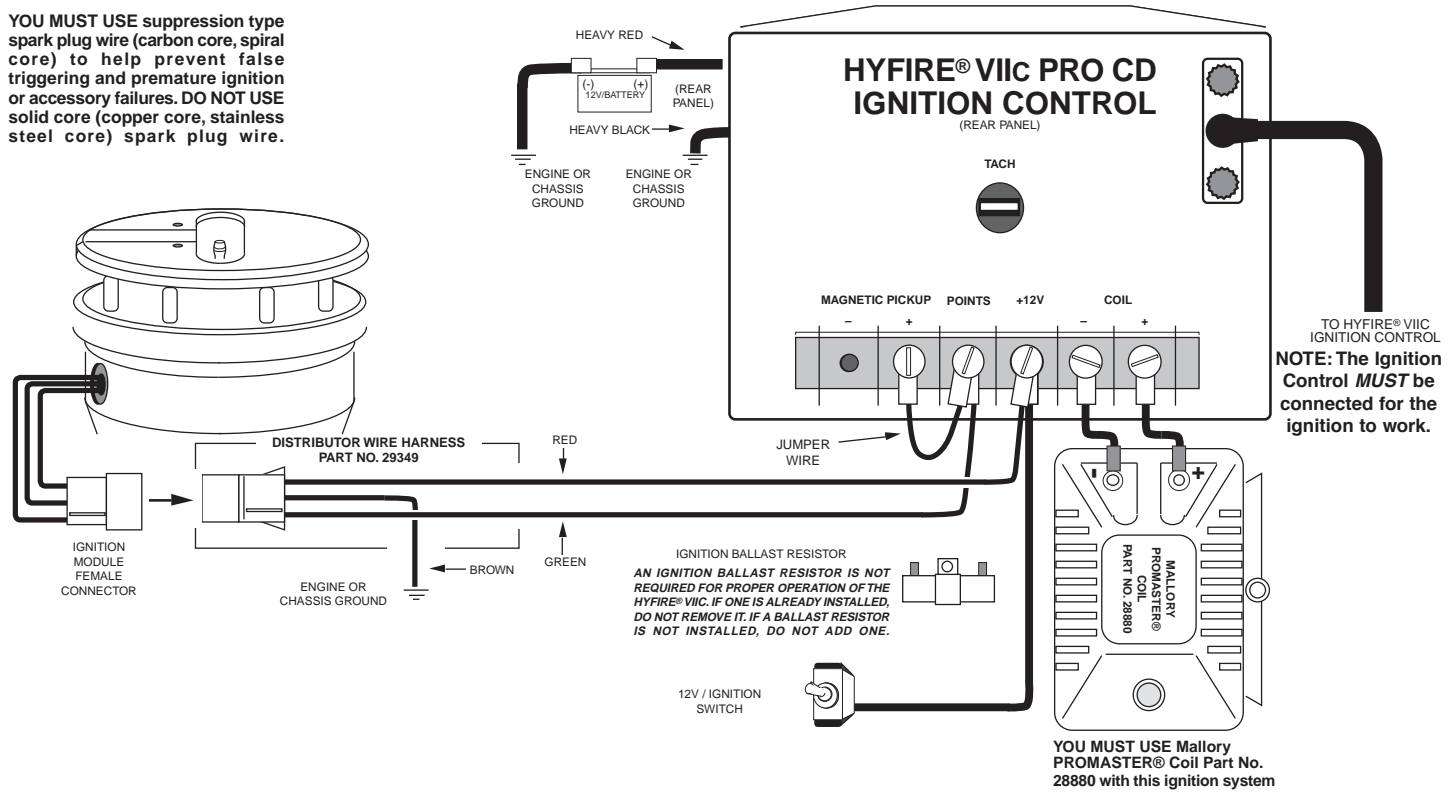
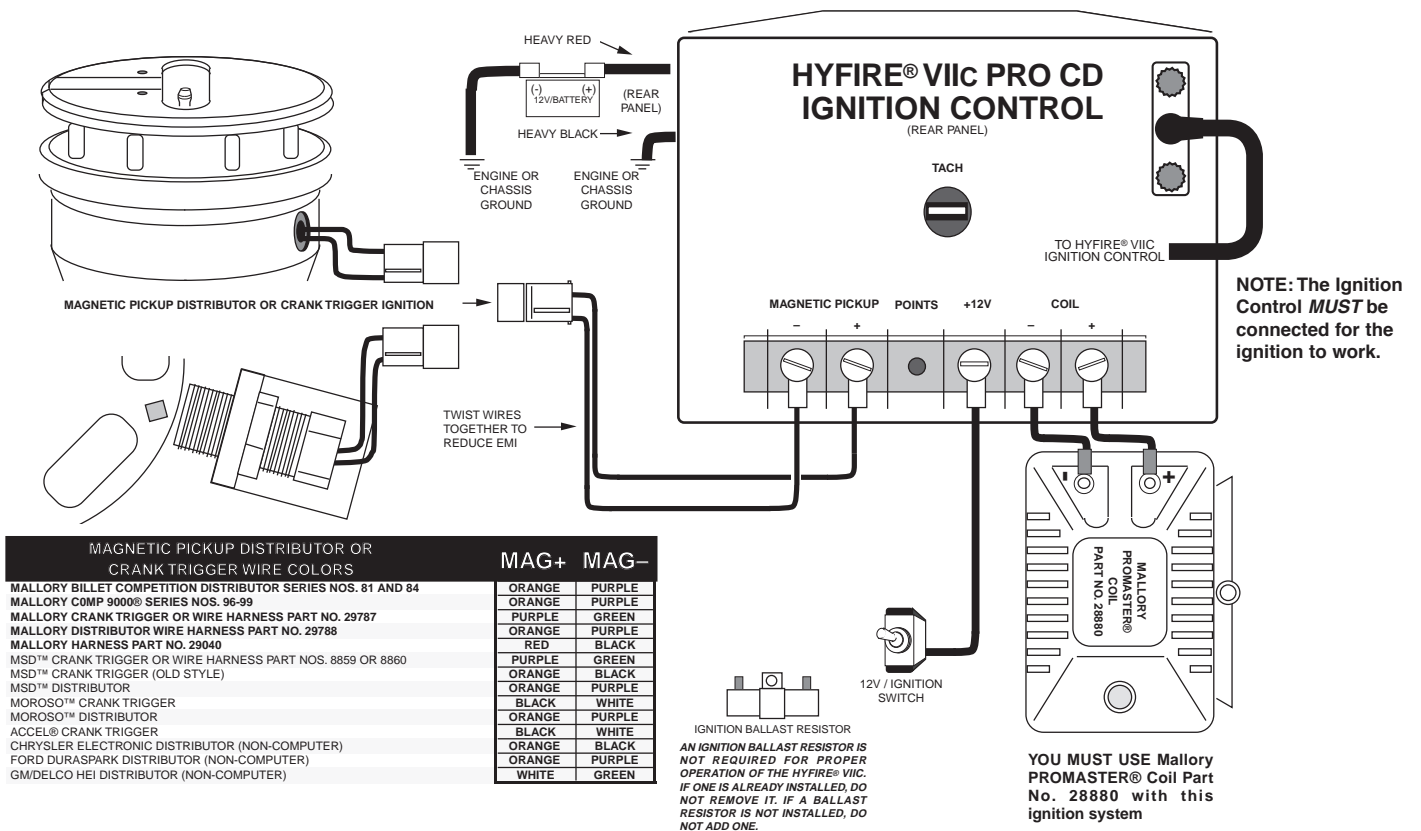


Figure 3

HOOKUP TO A MAGNETIC PICKUP DISTRIBUTOR OR CRANK TRIGGER



USING THE HYFIRE VIIC FEATURES

Your Mallory HYFIRE® 667C has a number of built-in features that make it easier to use. This instruction addition tells how to use these built-in features.

First, take a look at the top of the main unit. You'll see that there is an 8-pin connector beneath the surface. Supplied in the plastic bag that came with your Hyfire is an 8-pin plug that fits this connector. It has screw clamp terminals that accept up to 14 gauge wire. For best results, use stranded, insulated copper wire, rather than solid wire. The plug is made so that it will only fit one way, and has hold down screws at each end.

The connector and mode descriptions are listed below:

RPM switch:

The built-in RPM switch can either turn an electrical load off or on at a selected RPM. See below for more detail.

- NC** This is the RPM switch (mode 7) relay contact that is normally closed. In other words, as long as you haven't reached the point where the RPM switch is active, this contact remains connected to the "common" or "C" terminal. You would use this connection if, for example, you wanted to turn something OFF (such as a nitrous system) when you reached the RPM switch point. See example 1.
- C** This is the common terminal for the RPM switch (mode 7) relay in the main unit. It is connected to the RPM switch, where it will switch the accessory connected to the "NC" terminal OFF, and the accessory connected to the "NO" terminal ON when the RPM switch value is reached. The "C" terminal can be used to switch either to power or ground.
- NO** This is the RPM switch (mode 7) relay contact that is normally open. In other words, as long as you haven't reached the point where the RPM switch is active, this contact isn't connected to the "C" contact. You would use this contact to turn something ON (such as a shift light or an air shifter) at a specific RPM. See example 2 and example 3.

RPM Limiters:

The HYFIRE® 667C has three built-in RPM limiters. Each one has a range of 1000 to 12,800 RPM in 50 RPM steps. On the main display, there is a decimal point on the mode digit. When that decimal point is lit up, the RPM limit is increased by 50 RPM.

RPM1 (Mode 1) This is the RPM limit that is always active if you haven't selected any other RPM limit.

RPM2 (Mode 2) This is an auxiliary RPM limiter that is activated when you apply 12 volts to the "RPM2" terminal on the top-side connector. This could be a burnout limiter. When selected, it over-rides RPM1 (the main engine protection RPM limiter). See example 4.

RPM3 (Mode 3) This is the other auxiliary RPM limiter. It also is activated by 12 volts on the "RPM3" terminal on the top-side connector, and over-rides both RPM2 and RPM1. Use this limit as a staging (starting-line) RPM limiter. See example 5.

High-Speed Timing Retards:

RET1, RET2, RET3 (Modes 4,5,6) These are all high-speed timing retard functions that are activated by 12 volts on the appropriate top-side connector terminal. Each higher stage over-rides the lower stages, which means that you set each stage for exactly the amount of retard you want, rather than adding up each stage to get the actual retard. See example 6.

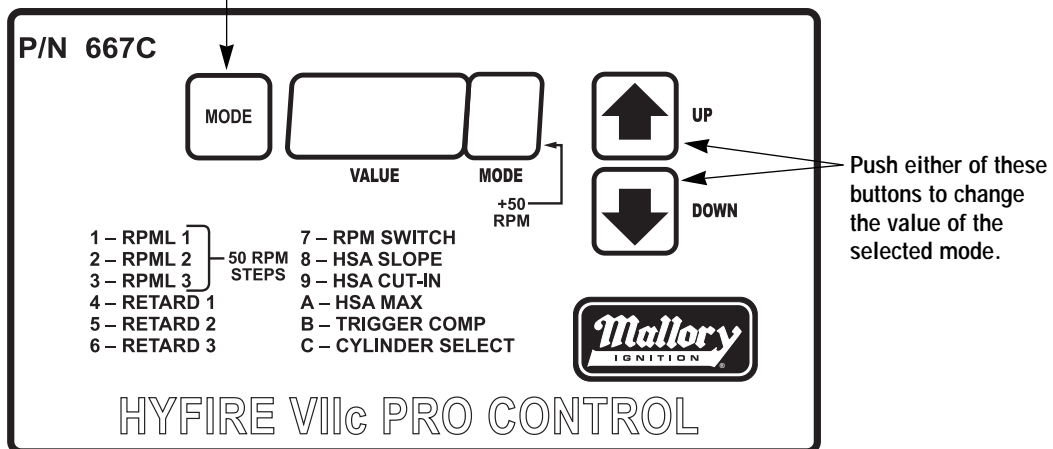
NOTE: When you apply 12 volts to RPM2, RPM3, RET1, RET2, or RET3 the display will switch to show that function. If you have both an auxiliary RPM limit AND a retard selected, the display will show the retard value.

See the accompanying illustrations for some examples of how to use the RPM limiters, the RPM switch, and the timing retard functions.

NOTE: When activating Modes 2, 3, 4, 5, or 6, the display will change to show the active mode. If more than one mode is activated, the higher mode number will be displayed.

Push this button to change the mode

FIGURE 4



NOTE: If any button is held down for more than 1/2 second, the displayed value will change automatically.

Additional Functions:

The HYFIRE® 667C has two more functions that can make the ignition installation and setup work better. One of these is the high-speed advance function. This lets you put small amounts of timing in the engine after the torque peak to pick up a bit of horsepower. There are three things that need to be set up for this: the cut-in RPM (mode 9), the maximum advance (mode A), and the slope (mode 8). The cut-in RPM is the RPM where you want the curve to start working. The slope is how much the timing will advance every 1000 RPM after the cut-in RPM. The maximum advance is the highest amount of advance you want the system to reach.

For example, say that your engine has the torque peak at 6500 RPM, and you want to add some timing after this. You might want to start adding timing after 7000 RPM, so this becomes your cut-in speed. If you then want 2 degrees additional timing at 8000 RPM, then the slope would be set for 2 degrees per 1000 RPM. However, let's say that you don't want more than 2 degrees of advance, so you would set the maximum advance at 2 degrees. See example 7 for more detail.

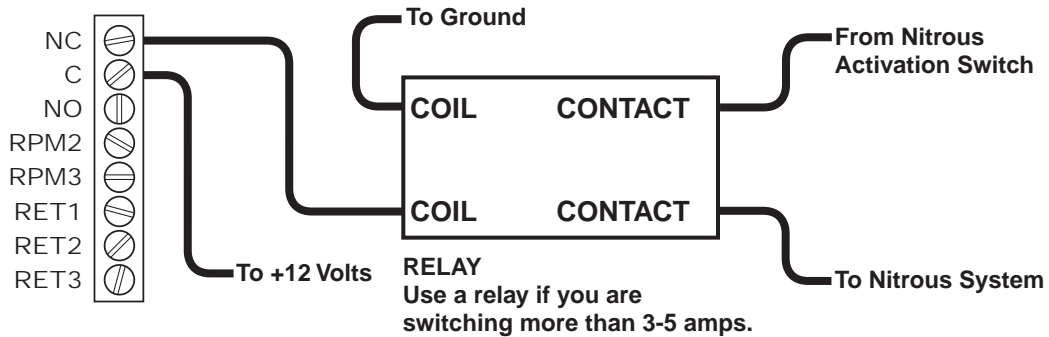
The other additional function available is trigger compensation, which is set when the mode indicator is "b". This lets you compensate for the various delays in ignition timing caused by both electronic and mechanical changes. To set the trigger compensation, set mode 9 to 5000 RPM, and mode 8 to

zero. What this does is tell the system to start the high-speed advance at 5000 RPM, but with a slope of zero, there should be no advance. Once the system is set up this way, watch the timing as the engine revs past 5000 RPM. If the timing does not stay at a steady value (once the 5000 RPM point is reached) then adjust the compensation value until it is as flat as possible. For example, if the timing retards slightly as the RPM goes up, increase the compensation value. If the timing advances slightly as the RPM goes up, decrease the compensation value. **NOTE: This function is only valid for RPM above the high-speed advance cut-in RPM. If you have the high-speed advance cut-in set above the normal operational range of the motor, the compensation function does nothing.**

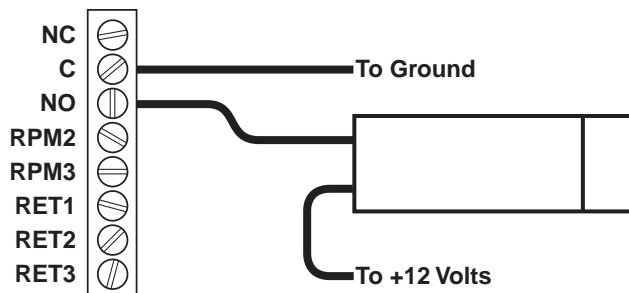
Once the compensation is set, then the high speed advance settings will be accurate. The factory setting should be correct for most types of flying magnet type crank trigger systems, and should not normally need to be adjusted unless you are using a different trigger type.

Number of cylinders selection

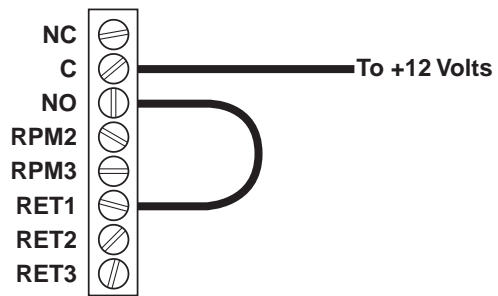
The final mode that can be set is mode "C". This allows you to select 4 through 12 cylinder operation. This ensures that the RPML and the timing are proper for the engine. Mode 6F is special - this is for odd-fire V6 engines ONLY! The cylinder firing spacing should be 45/75 (at the distributor) or 90/150 at the crank.



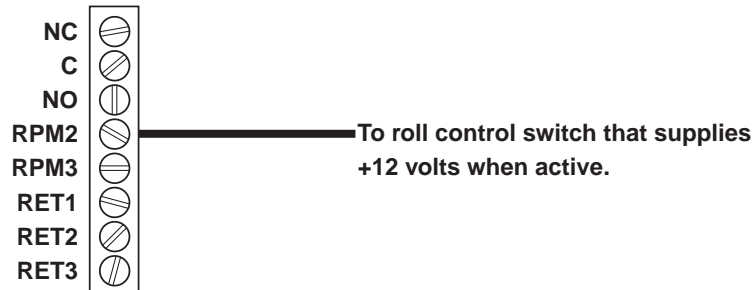
EXAMPLE 1: Using the RPM switch (Mode 7) to turn OFF a nitrous system at a particular RPM.



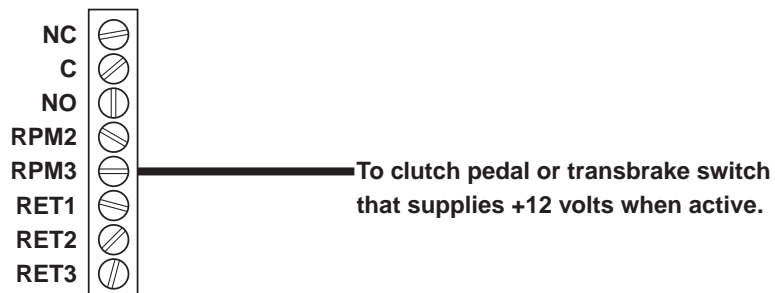
EXAMPLE 2: Using the RPM switch (Mode 7) to turn on a shift light.



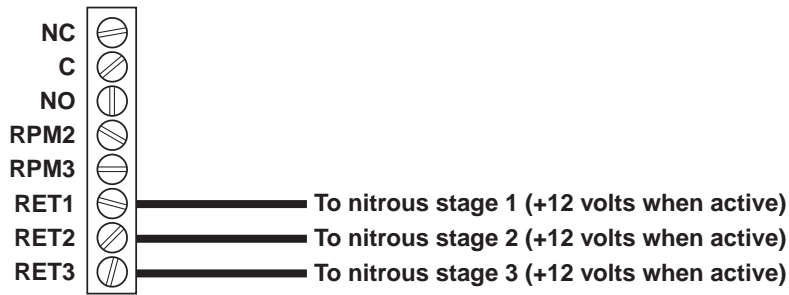
EXAMPLE 3: Using the RPM switch to activate a retard stage at a particular RPM.



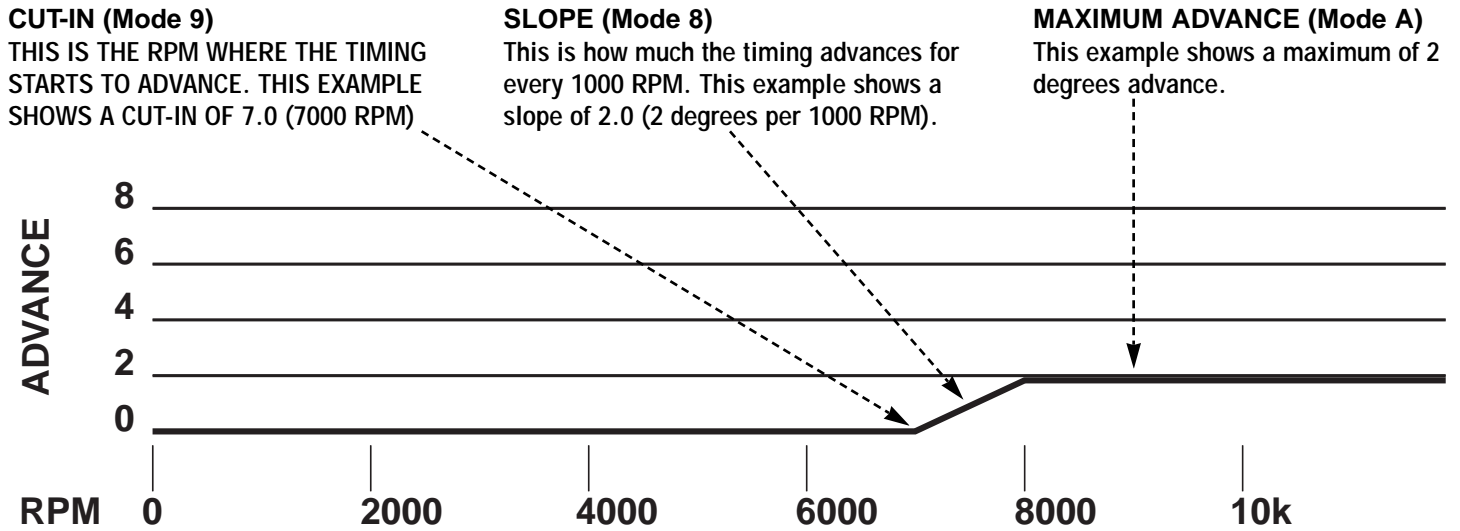
EXAMPLE 4: Burnout RPM Limiter (Mode 2).



EXAMPLE 5: Staging RPM Limiter.



EXAMPLE 6: Using the High-Speed timing retard function with a 3-stage nitrous system.



EXAMPLE 7: High Speed Advance Curve (Modes 8 and 9)

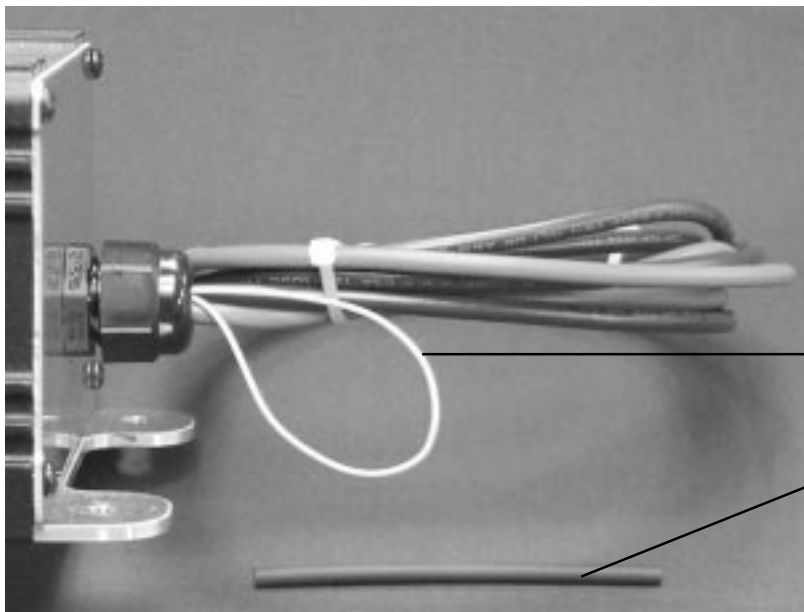


HYFIRE® VIIC AND VIIS IGNITION SYSTEMS

Part One: Start Retard

The Mallory HYFIRE® VIIC AND VIIS Ignition Systems both have a built-in start retard feature. This retard is 20 degrees at 100 RPM, and decreases to 0 degrees at 500 RPM. This is a very useful feature which eases the load on the starter motor when used with vehicles that have crank triggered ignition systems or distributors with locked advances and 30 or more degrees of timing. However, there are applications where the start retard is either not needed or not wanted. For example, motors with radical camshaft profiles, large carbs and timing in the 15 to 25 degree BTDC range (Pro Mod motors, for example) may experience lean-mixture backfiring during startup if the retard feature is active, especially if the temperature is colder than usual.

Current production versions of the HYFIRE® VIIC AND VIIS have a yellow wire loop which comes out of the back of the ignition box. Cutting this loop eliminates the start retard. Earlier versions of the ignition don't have this feature, but the start retard can still be shut off. You must either send your ignition in to our service department for modification, or, if you are attending an NHRA National event, you can bring your ignition to our race support trailer and have it modified.



CUT YELLOW WIRE LOOP TO
ELIMINATE START RETARD

AFTER CUTTING YELLOW WIRE,
USE SHRINK TUBING TO INSULATE
EXPOSED ENDS

Part Two: Function Selection

The instructions for the HYFIRE® VIIC AND VIIS tell the user what each of the different functions do (such as RPM limiters, timing retards, etc.). The instructions do not explain how to activate the functions.

To activate the functions of the HYFIRE® VIIC AND VIIS, you must apply 12 volts to the appropriate terminal. Whether the user has a clutch pedal switch, a shifter button, or uses a timer, the auxiliary RPM limiters and the timing retards need +12 volts to activate them.