INSTALLATION INSTRUCTIONS

4-STAGE RETARD CONTROL
PART NO. 678

Your Mallory HYFIRE® 678 Control has a number of built-in features that make it easier to use. These instructions tell how to use these built-in features.

First, 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 (mode7) 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 a retard stage) at a specific RPM. See Example 2 and Example 3.

RPM Limiters:

The 678 Control has two 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 starting line limiter. When selected, it overrides RPM1 (the main engine protection RPM limiter). See Example 4.

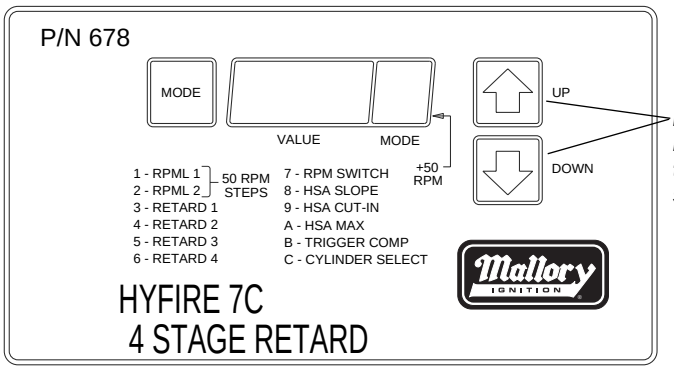
High Speed Timing Retards:

RET1, RET2, RET3, RET4 (Modes 3, 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 overrides 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 5.

NOTE: When you apply 12 volts to RPM2, RET1, RET2, RET3, or RET4, 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.

FIGURE 1



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

Push either of these buttons to change the value of the selected mode.

Additional Functions:

The 678 Controller 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.

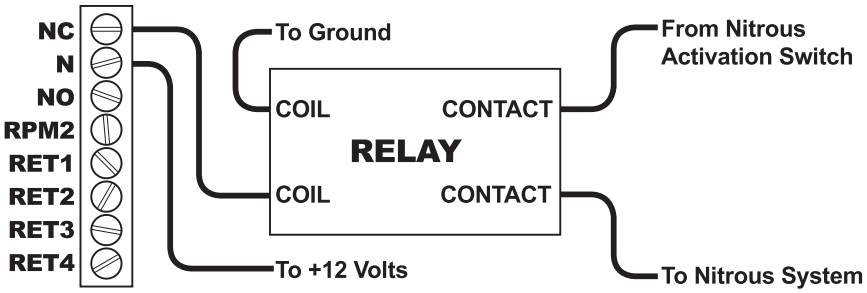
For example, say that your engine has the torque peak at 6500 RPM, and you want to add some timing after this. You might want to start adding timing after 7000 RPM, so this becomes your cut-in speed. If you then want 2 degrees additional timing at 8000 RPM, then the slope would be set for 2 degrees per 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 6 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.

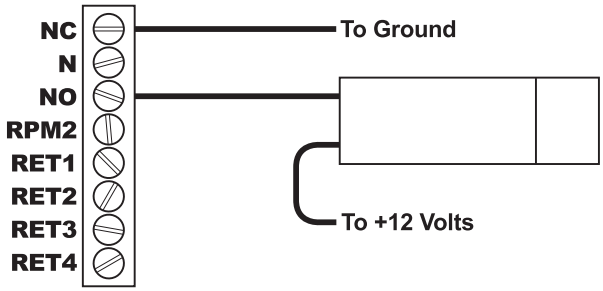
Number of Cylinders Selection

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.

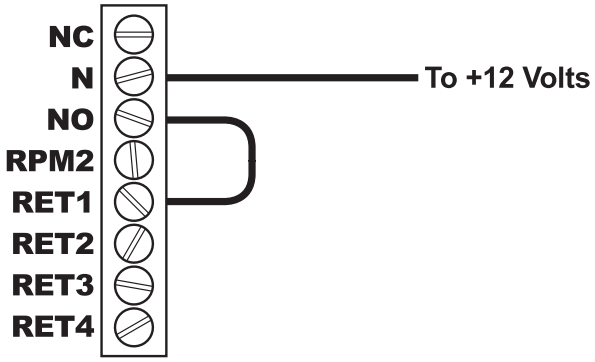


RELAYóUse a relay if you are switching more than 3-5 amps.

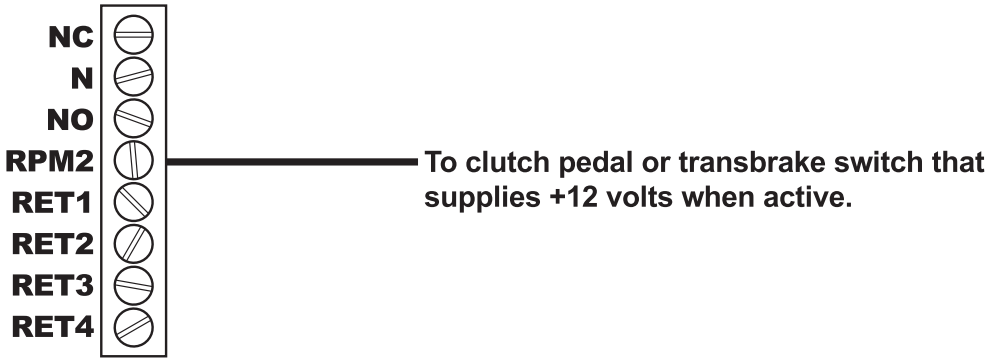
EXAMPLE 1: Using the RPM switch (Mode 7) to turn OFF a nitrous system at a particular RPM.



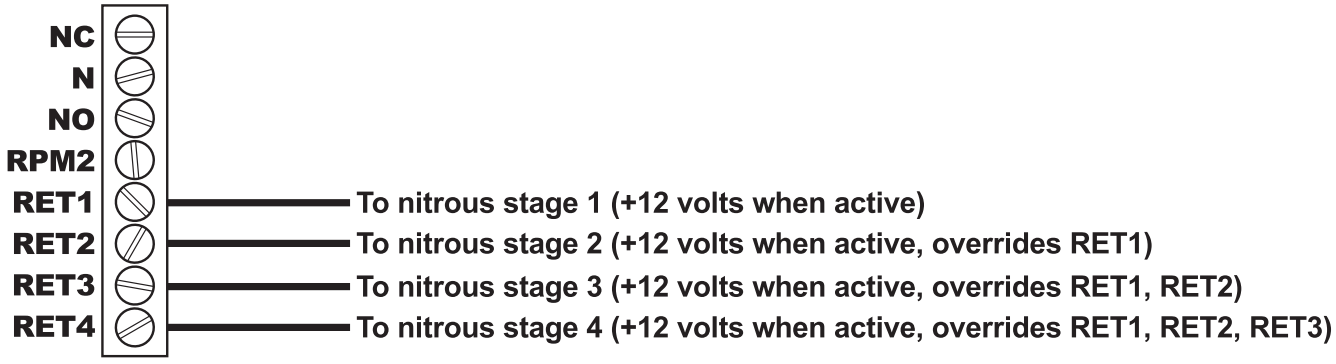
EXAMPLE 2: Using the RPM switch (Mode 7) to turn ON a shift light.



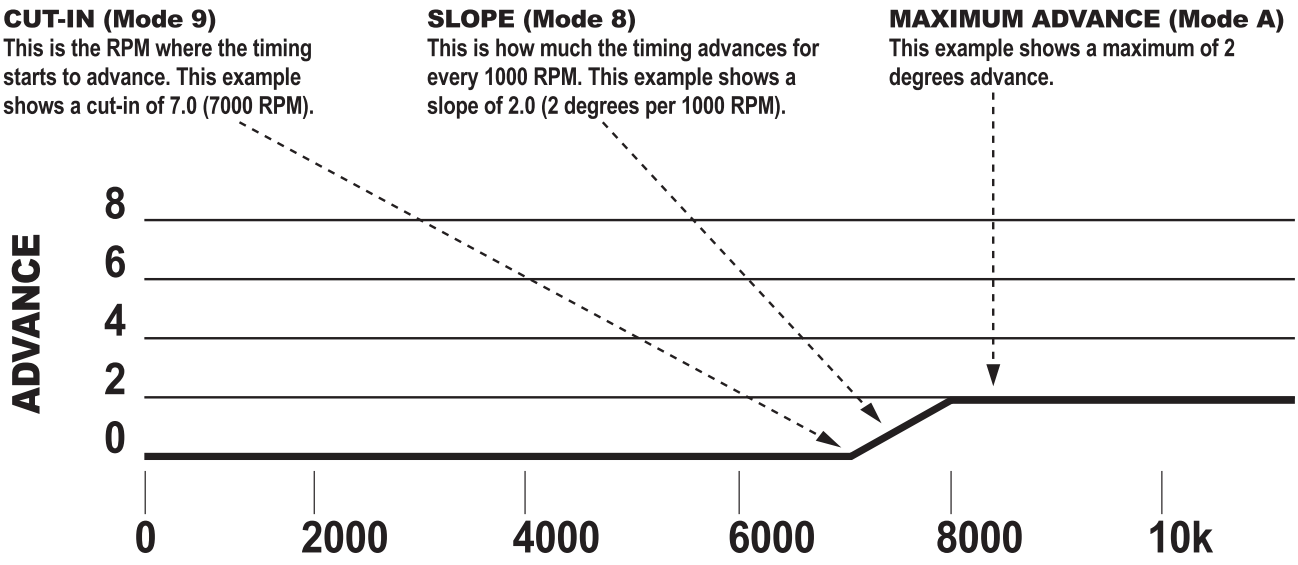
EXAMPLE 3: Using the RPM switch to activate a retard stage at a particular RPM.



EXAMPLE 4: Staging RPM Limiter (Mode 2).



EXAMPLE 5: Using the high-speed timing retard function with a 3-stage nitrous system.



EXAMPLE 6: High Speed Advance Curve (Modes 8 and 9).

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