

TECH BULLETIN

ROTOR PHASING

Tech Bulletins are designed to give you a more in depth understanding of the ignition system and its components. If you have any other questions about the subject or our products, you can contact our Customer Support Department at **727.347.9915** or email your questions to **Aerospacecomponents.com**.

Rotor Phasing is defined as the alignment between the rotor tip and the distributor cap terminal when the spark occurs. This position can be very important to your engine's performance. If the alignment is incorrect, the spark will jump to the next closest terminal or another ground resulting in a misfire and loss of power.

On engines with extreme cylinder pressures, such as nitrous and supercharged applications, correct rotor phasing increases in importance. More voltage is required to ionize the plug gap and if the phasing is off, the spark is more apt to find an easier path to ground rather than the correct cap terminal. This may result in severe engine damage.

CHECKING ROTOR PHASING

To check rotor phasing, you'll have to modify a Distributor cap so you can observe the rotor tip with a timing light when the engine is running. Drill a large hole into a cap near a terminal that will allow you an easy view of the terminal (**Figure 1**).

To help see the rotor tip you may want to mark it with white correction fluid. With your modified cap installed, connect the timing light's inductive lead to the corresponding plug wire. Start the engine and run at a steady speed. Shine the timing light in the modified cap and note the relation of the rotor tip and the terminal when the spark jumps (**Figure 2**).

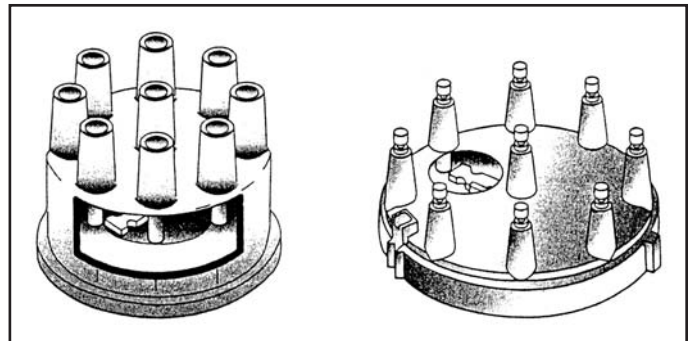


FIGURE 1- EXAMPLES OF MODIFIED DISTRIBUTOR CAPS.

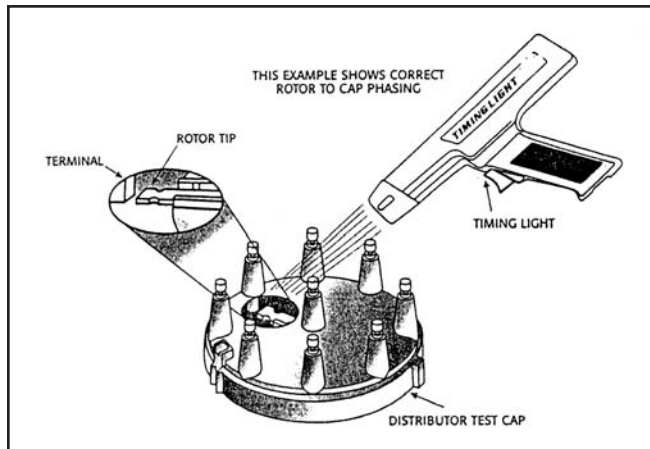


FIGURE 2-DRILL A HOLE IN A CAP TO VIEW THE LOCATION OF THE ROTOR TIP WITH ONE OF THE CAP TERMINALS.

Note: We recommend using a non-dial back timing light for best timing results.

No Vacuum Advance: The rotor tip should line up with the cap Terminal or be on the leading edge of the terminal when the Spark occurs (**Figure 3**). This ensures that the spark is jumping To the correct cylinder at the proper time.

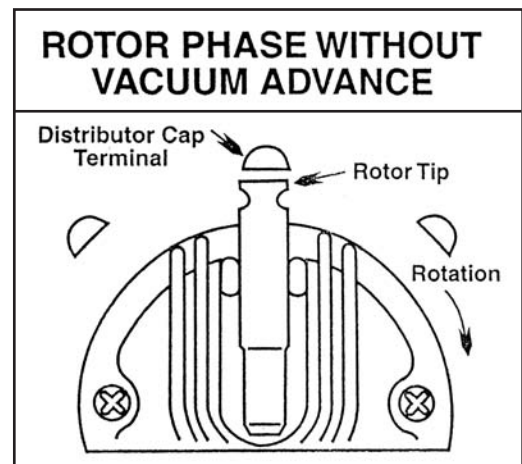


FIGURE 3- THE ROTOR TIP SHOULD ALIGN WITH THE CAP TERMINAL WHEN THE SPARK OCCURS.

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Vacuum Advance: Vacuum advance affects rotor phasing so it should be checked with the vacuum disconnected. On a distributor that turns clockwise, the rotor tip should be at the right or just after the terminal when the spark occurs with the vacuum disconnected and plugged. With the advance connected and the engine at a steady speed off idle, the rotor tip should be just to the left or before the terminal (**Figure 4**).

NOTE: On distributors that turn counterclockwise, these positions will be opposite.

ADJUSTING ROTOR PHASING POINTS AND MAGNETIC PICKUP DISTRIBUTORS

If the rotor phasing is off on your distributor, there are several options to adjust the phasing. The point's plate or pickup needs to be moved or the cap can be repositioned.

CRANK TRIGGER APPLICATIONS

In crank trigger applications, the distributor does not control the ignition timing so adjusting rotor phasing is easy. Simply rotate the distributor housing until the rotor tip is in the correct position.

PHASING AND ELECTRONIC TIMING CONTROLS

When setting the phasing, you also need to take into consideration any timing controls or retard controls. If you are advancing or retarding the timing electronically, you are affecting rotor phasing. In most cases, the timing change will not be enough to affect the phasing, but there are applications to watch. One such application is with multiple stage nitrous systems and retard steps.

High performance nitrous engines undergo extreme increase in cylinder pressures which is why timing is generally removed with each stage of nitrous. If your application pulls out a total of 16° of timing, the rotor tip is going to be past the cap terminal when it fires. On engines with extreme cylinder pressures and high rpm, this could easily cause a misfire or spark scatter, which could result in severe engine damage. It is recommended to divide the total amount of retard and set the phasing at that point.

For example, on an engine that pulls out 16° of timing, you should set the rotor phasing when the timing is 8° retarded. (Figure 5). This way, with no retards activated, the phasing will be 8° advanced, or just in front of the distributor cap terminal (clockwise distributors). Whenever checking the rotor phasing with an electronic timing control, it is important to check it with the retard activated and not activated.

CAP-A-DAPTS

If you have enough room to run a larger cap, you should take advantage of the real estate. A larger cap spaces the terminals farther apart so there is less chance of crossfire or spark scatter occurring.

PREVENTATIVE MAINTENANCE

Taking a little time between races to inspect your ignition system will help prevent minor problems. Periodically check the following

- Visually inspect the cap and rotor for wear of the cap terminals and the rotor tip.
- Look for traces of carbon tracking where spark scatter occurs.
- Visually inspect the plug wires for burns or tears. Also, it is a good idea to periodically check the resistance of the wires.
- Another item you should use is dielectric grease; this helps isolate the spark at the plug wire terminal and cap connection.

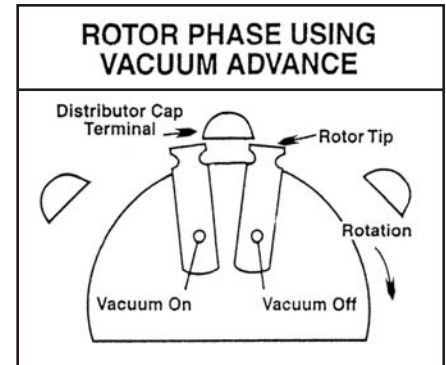


FIGURE 4- DISTRIBUTORS WITH VACUUM ADVANCE NEED TO BE CHECKED WITH THE VACUUM CONNECTED AND DISCONNECTED.

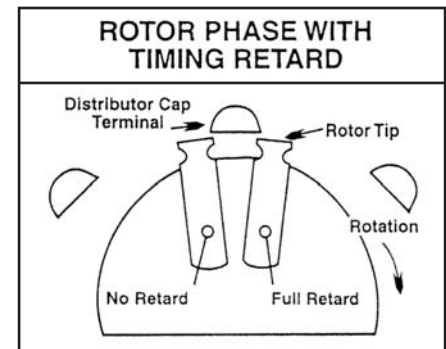


FIGURE 5- WHEN USING A TIMING RETARD COMPENSATE THE ROTOR PHASING.

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BILLET PRO CRANK TRIGGER KIT

IMPORTANT: Read the instructions before attempting the installation.

Parts Included:

1 - Trigger Wheel	2 - Bolts, 5/16" -24 x 1 1/4"
1 - Pickup Holder Assembly	3 - Bolts, 5/16"-18 X 1 1/4"
1 - Trigger Wheel Spacer	3 - 5/16" Washers
1 - Non-Magnetic Pickup Assembly	2 - Bolts, 7/16"-14 x2" Hex
1 - Pickup Base	4 - Spacers
General Wiring Instructions	Tech Bulletin #104

NOTE: On some vehicles the AC-CT Crank Trigger Kit may require slight modifications to accommodate special engine plates, pulley systems, etc.

INSTALLING THE PICKUP AND BRACKET

1. Mount the pickup holder onto the bracket using the two fine thread bolts (*Figure 1*). The pickup base will only install one way, do not try to force the bolts in, and hand tighten the bolts.
2. Install the bracket onto the engine. The bracket may be mounted on either side of the balancer. Be sure to use the correct length bolts and shims in the proper location.
3. Install the pickup and locknut into the holder. Do not tighten the locknut at this time.

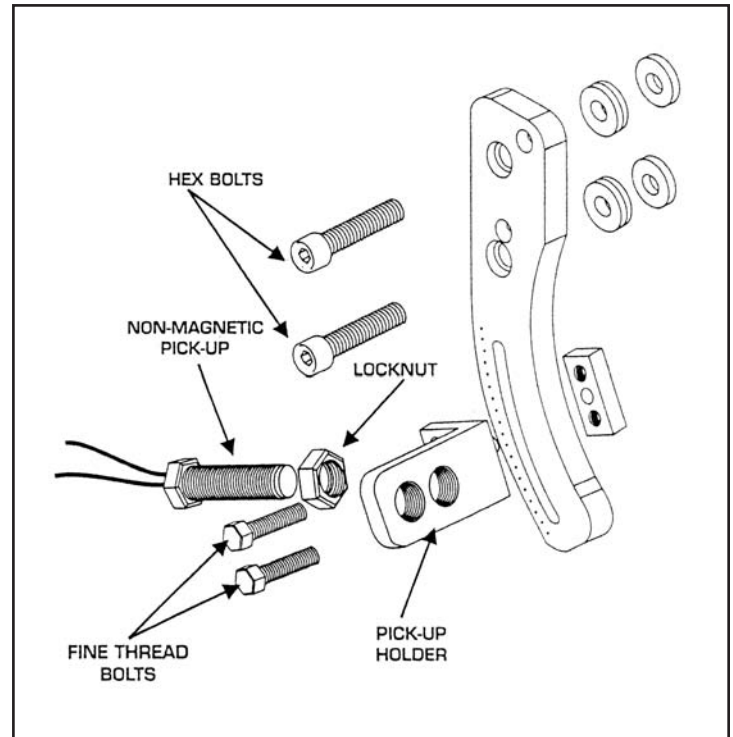


FIGURE 1 PICKUP BRACKET ASSEMBLY

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WIRING

- The following diagrams illustrate how to wire the Crank Trigger to different ignition applications. Before connecting the wires, review the following tips.
- When connecting the non-magnetic pickup, twist the wires slightly (**Figure 2**). This helps Prevent Radio Frequency (RF) Interference.
- Route the wires near the frame or engine. This is because the frame and engine are large ground planes so there is less electrical activity.
- Do not run the pickup wires near the spark plug wires or the wires going from the AC-CT unit to the coil. This could cause erratic signals.
- Always use helically wound spark plug wires.

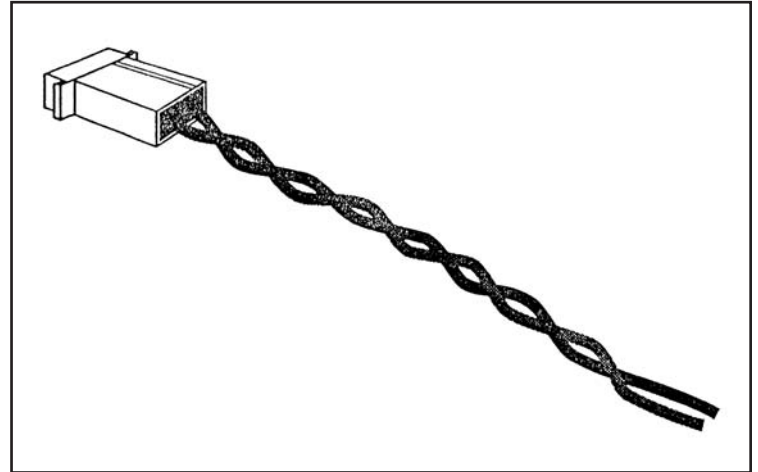
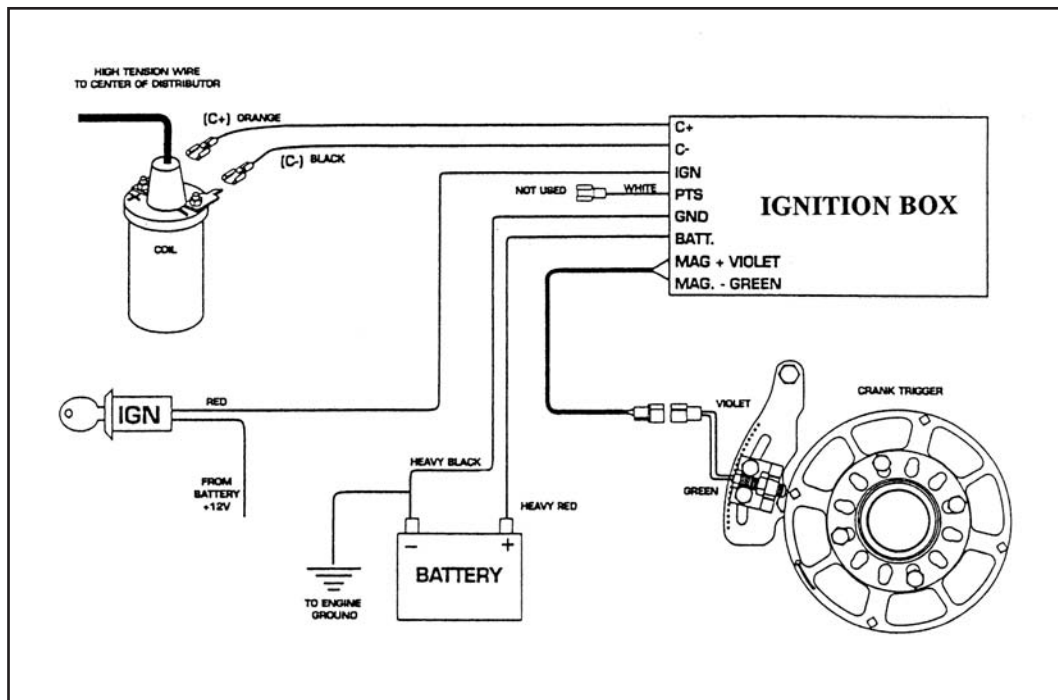
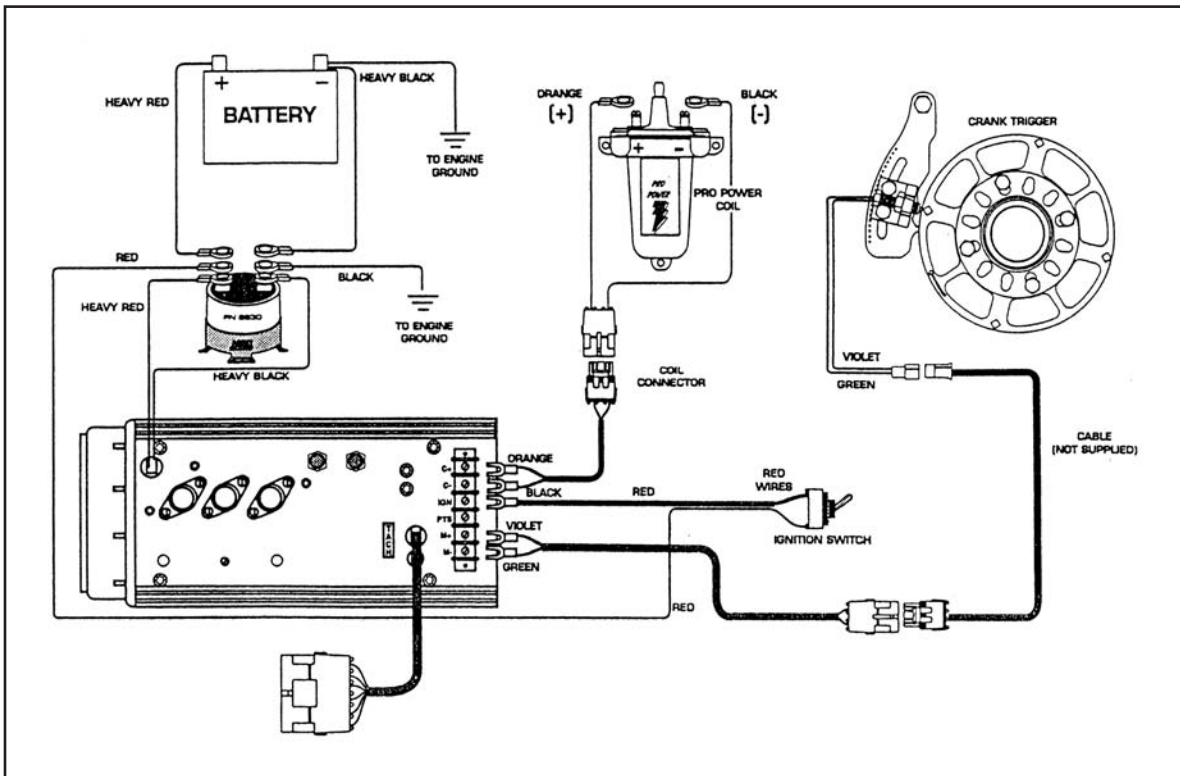
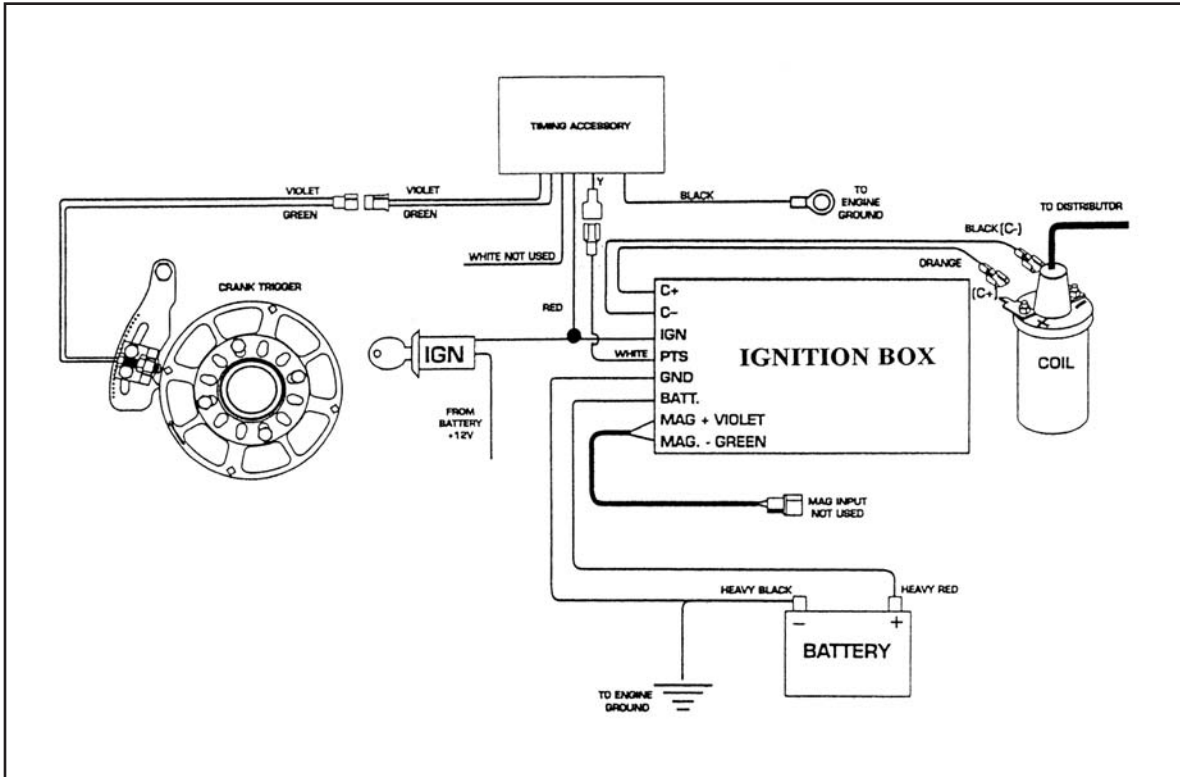


FIGURE 2 WINDING THE PICKUP WIRES.



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BILLET PRO CRANK TRIGGER KIT

SETTING THE PICKUP AIR-GAP

The air-gap between the trigger wheel and the pickup is important to the operation of the crank trigger system, however there is not a measurement that gives you more power or performance. The proper air-gap simply helps produce the best signal available from the trigger wheel.

1. With the pickup brackets and trigger wheel mounted, set the air-gap between the wheel and the pickup to approximately 0.060"-0.80". To adjust the position of the pickup loosen the locknut and screw the pickup into out of the bracket until the correct air-gap is obtained. (**Figure 1**).
2. When the correct air-gap is obtained, tighten the locknut and recheck. Do not over-tighten the locknut.

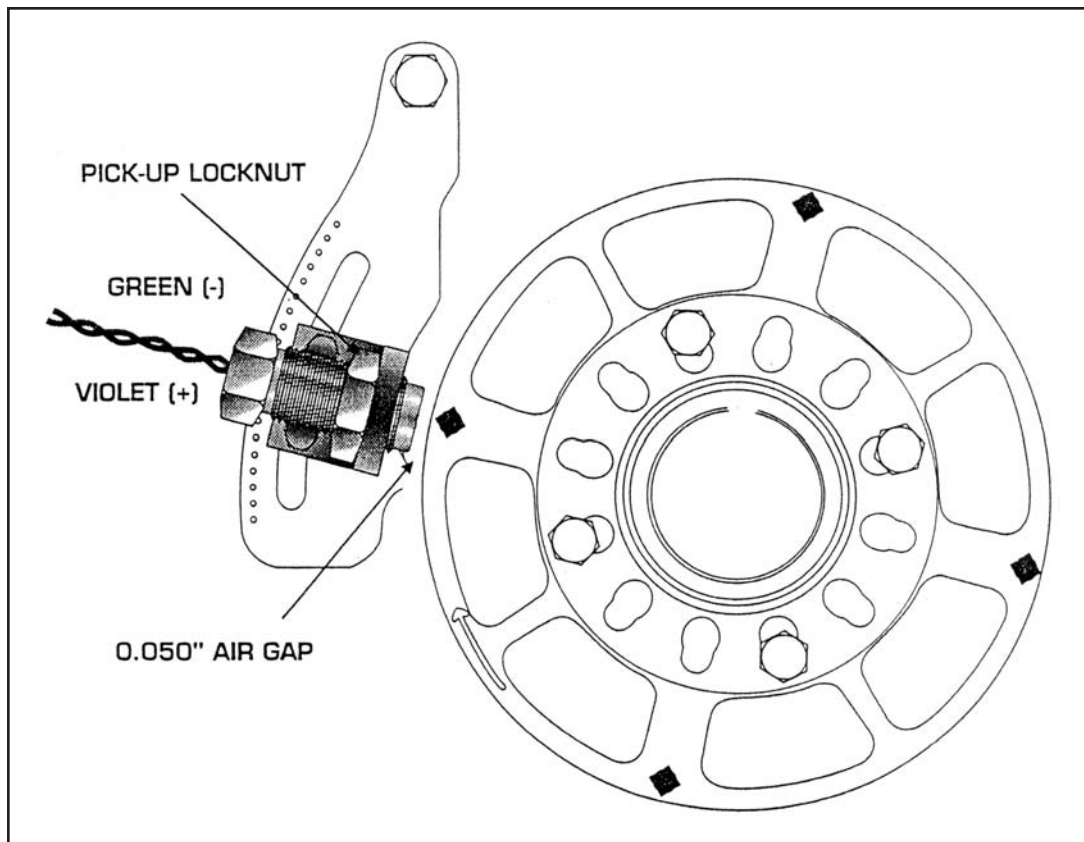


FIGURE 1- SETTING THE AIR-GAP

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INSTALLING THE TRIGGER WHEEL

1. Position the No. 1 cylinder under compression at the desired total timing.
2. Position the trigger wheel onto the harmonic balancer so one of the four magnets lines up with the center of the non-magnetic pickup. Make sure the wheel is mounted so it rotates in the direction of the arrow on the wheel. If necessary, slide the pickup in its mount until it properly lines up with the trigger wheel magnet.
3. Check and make sure the wheel is positioned correctly with the pickup and torque the trigger wheel bolts to 25-30 lb-ft. The pickup should be centered to the edge of the trigger wheel (*Figure 2*). If not, it may be necessary to add or delete shims to the pickup bracket to achieve the proper position.

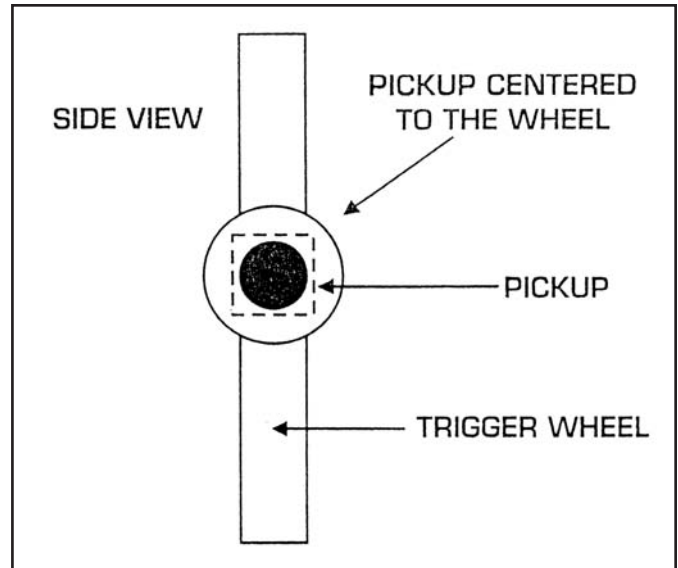


FIGURE 2 PICKUP CENTERED ON THE TRIGGER WHEEL.

SETTING UP THE DISTRIBUTOR

If your distributor is equipped with a centrifugal advance assembly, it must be locked out by welding or bolting the advance mechanism. The distributor has nothing to do with the engine ignition timing when using a crank trigger system. It's function is to distribute the high voltage spark to the spark plugs. To achieve maximum performance from the ignition, the rotor should be properly phased to the distributor cap as explained in the supplied *Tech Bulletin* (#104).

TIMING THE IGNITION SYSTEM

The timing can be adjusted by sliding the pickup holder assembly up or down in the bracket slot. To retard the timing, move the pick up holder assembly in the direction that the crank trigger wheel rotates. To advance the timing, move the pickup holder assembly in the opposite direction of the trigger wheel rotation (*Figure 7*). Check the air-gap whenever the timing is changed.

NOTE: Do not attempt to adjust the timing while the engine is running.

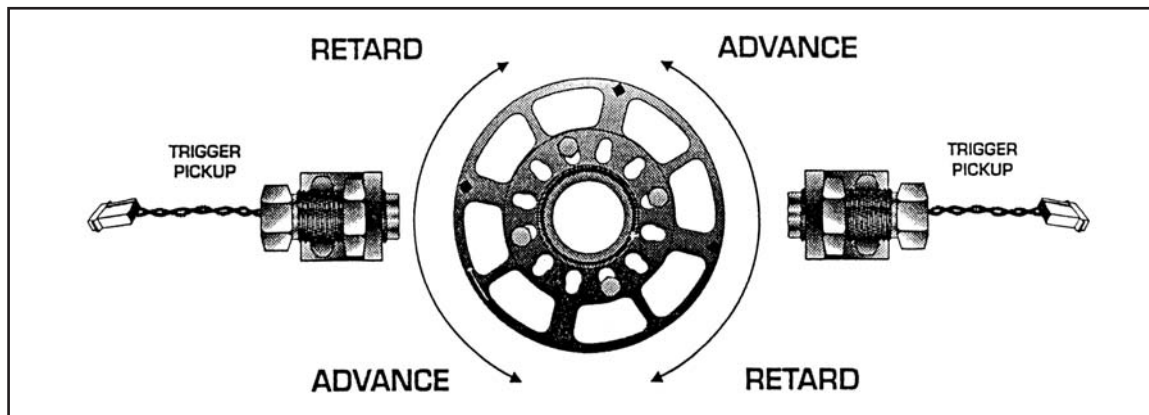


FIGURE 7 ADJUSTING THE TIMING.