



# Tech Bulletin

## # 109

MSD's 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 MSD products you can contact our Customer Support Department at (915) 855-7123.

## ***Secrets to Successfully Using an MSD Magnetic and Non-Magnetic Pickup***

Every ignition system requires a trigger signal to accurately fire and deliver a high voltage spark from the coil. There are several ways this is achieved, from mechanical breaker points to magnetic pickups, optical triggers and other electronic switches which all serve the same function; to accurately trigger the ignition at the correct moment for the ideal spark timing.

MSD incorporates a magnetic pickup in our distributors because of their reliability and accuracy. In fact, most major automotive manufacturers used magnetic pickups in their distributors until the advent of distributorless ignition systems in late model vehicles. (For MSD's Flying Magnet Crank Trigger systems, a non-magnetic pickup is used. This pickup functions in a similar manner as the magnetic pickup which will be explained below.)

This bulletin provides an explanation as to the operation of a magnetic pickup and non-magnetic pickup, their polarity and testing along with a few helpful installation tips.

### ***Theory - How Does It Work?***

The magnetic pickup is actually a wire that is wound around a magnet to create a magnetic field. Whenever this field changes, due to another metal object coming into the field, a voltage is generated. MSD uses this voltage as a trigger signal for the ignition control.

An MSD Distributor incorporates a metal reluctor wheel with eight evenly spaced trigger tabs (six for 6-cylinder engines, four on 4-cylinders). This reluctor is mounted to the distributor shaft (Figure 1). Each time one of these reluctor tabs passes the magnetic pickup, a trigger signal is created which fires the MSD Ignition.

Conversely, an MSD Flying Magnet Crank Trigger system uses a non-magnetic pickup. The pickup consists of a wire that is wound around an iron core rather than a magnet. To create the voltage for the trigger signal, a magnet must pass the pickup rather than a metal post (Figure 2). MSD uses this design because we have the capability to install magnets in a crankshaft mounted wheel and the pickup cannot be triggered by anything other than the magnet so there are no chances of false triggering.

Though these two pickups require different trigger sources, they essentially function in the same manner and share the same wiring and installation tips.

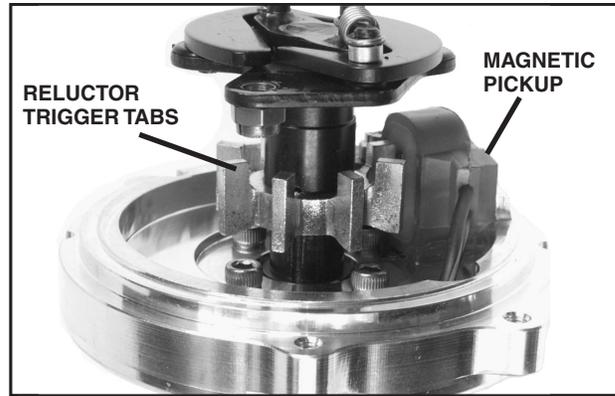


Figure 1 - MSD Pro-Billet Distributor.

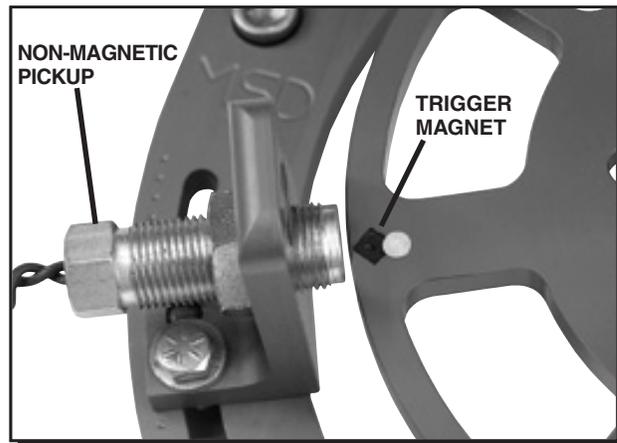


Figure 2 - MSD Flying Magnet Crank Trigger.

## Polarity

These pickups can only be connected one way to operate correctly so it is important to know the polarity of the wires. The magnetic pickup wires of an MSD Ignition Control are twisted together and routed in a separate sleeve with a 2-pin connector. The Violet wire is positive and the Green wire is negative. This harness connects to the distributor pickup or a crank trigger pickup. The chart below shows the polarity of MSD Distributors and other models.

<b>DISTRIBUTOR MAKE</b>	<b>POLARITY +</b>	<b>POLARITY -</b>
<b>MSD</b>	<b>Black/Orange</b>	<b>Black/Violet</b>
<b>CHRYSLER</b>	<b>White/Orange</b>	<b>Black</b>
<b>FORD</b>	<b>Black/Orange</b>	<b>Black/Violet</b>
<b>GM</b>	<b>White</b>	<b>Green</b>
<b>MSD 6' Harness, PN8860</b>	<b>Violet</b>	<b>Green</b>

If you're not sure about the polarity of the pickup you are using, there is a simple test you can perform by checking the engine's timing. Check the timing with the pickup wires connected one way, then swap the wires and check the timing again. You will notice that the timing changes significantly and may appear very erratic. The correct connection depends on the ignition control that is being used.

**Analog:** If you are using an analog controlled MSD Ignition such as a 6A, 6T or 6AL series, SCI series, 7AL series, MSD 8 or 10 or Blaster Ignition, the correct connection is when the timing is **retarded**.

**Digital:** When using an MSD Digital-6 or Digital-7 Plus, or the Programmable Digital-7 Ignition Controls, the correct connection is when the timing is more **advanced**.

## Wiring

Routing the magnetic pickup wires can be very important to your engine's performance. Since the pickups are delivering a voltage signal to trigger the ignition, it is important that the wires are routed away from other wiring, electrical components and spark plug wires. This is especially important in today's performance world with aftermarket EFI systems, electric water pumps and more.

Notice that the pickup wires are twisted around each other in the PN 8860 harness that MSD supplies with the ignition. This helps create a field around the wires for protection and should be done with any other wiring of the pickup. Also try to route the pickup wiring as close to the engine block, frame or chassis of the car. These parts serve as large ground planes so there is less electrical activity near their surface.

Following these guidelines will help ensure the proper trigger signal from your pickups. MSD also offers a special Shielded Harness, PN 8862. This harness features a special ground shield that protects the trigger wires from external interference.

## Testing

You can check the resistance of the MSD pickups as shown below. If the value is out of the specifications given, the pickup is at fault.

