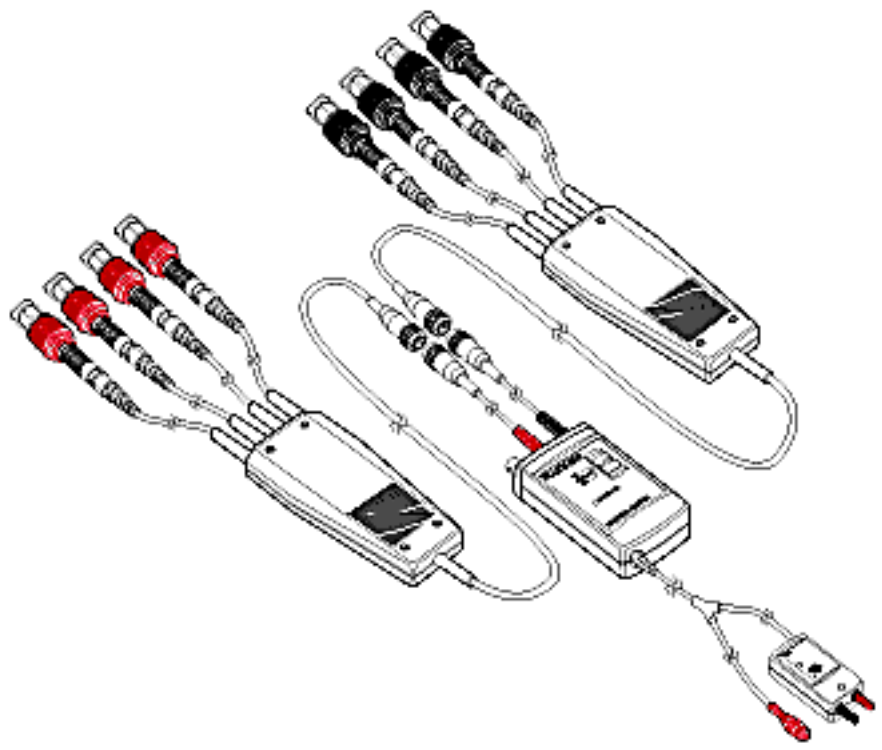


Connecting the DIS90 for Measurement

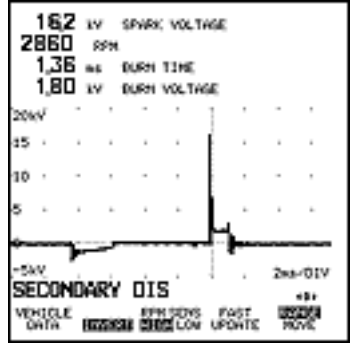


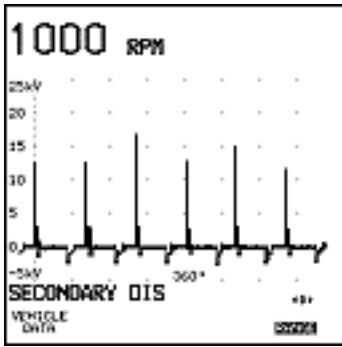
The DIS90 consists of three main components. The ignition adapter box connects to the ScopeMeter. Two sets of secondary pickup sets allow the DIS90 to be used on engines up to eight cylinders.



An easy-to-use menu-driven interface allows fast selection of the desired pattern.

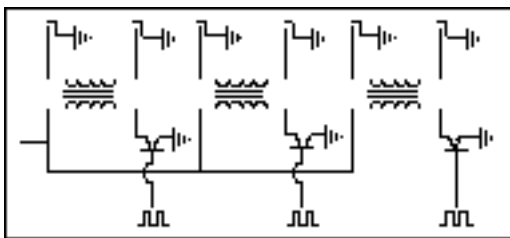
Use the secondary single mode of the Fluke 98 to examine each coil output.





Use the secondary parade mode of the Fluke 98 to quickly compare all cylinders.

1. Connect the DIS90 adapter to the Fluke 98. Use a ground lead to connect the COM input on the small connection unit to a good ground.
2. Connect the round cable plug of the red secondary pickup set and the black secondary pickup set to the ignition adapter box.
3. For the moment, clamp the capacitive secondary pickup (CAP90-2 or PM 9096/101, included with the Fluke 98) on the spark plug lead of cylinder #1, as close as possible to the spark plug.
4. Connect the black secondary pickup clamps to the spark leads with negative polarity and the red secondary pickup clamps to the spark plug leads with positive polarity. With the engine running, you can identify the polarities as follows:
 - Use the black or red secondary pickup and clamp it to a spark plug lead
 - If the Fluke 98 displays upward spark voltage, this pickup is connected to the correct polarity. If a downward spark voltage is displayed, the pickup is connected to the wrong polarity. Use a pickup with the other color for this cylinder.
 - Use the next black or red secondary pickup and repeat until all steps are connected
5. Clamp the remaining pickups on the connecting cable to the ignition adapter unit to insure reliable results (see above).
6. To get a stable picture on the Fluke 98 display, the capacitive secondary pickup (CAP90-2 or PM 9096/101) must be clamped on a spark lead with a negative polarity. If cylinder #1 has a positive polarity, clamp the capacitive secondary pickup on the spark plug lead of a cylinder having negative polarity. This cylinder is then displayed as first cylinder in the parade picture.



How the system works

To properly diagnose a malfunction in a distributorless ignition system it helps to understand how the system works.

As the name DIS implies, there is no distributor used. Each cylinder has only one spark plug, but shares a coil pack with its companion cylinder (cylinders that reach top dead center -- TDC -- at the same time). The cylinder that is at TDC on the compression stroke is referred to as the "event" cylinder, while the cylinder at TDC on the exhaust stroke is the "waste" cylinder. When the coil pack charges, both plugs fire at the same time to complete a series circuit. This is where the term "waste spark" comes from.

To determine which cylinder is the companion, divide the engine's firing order in half. As an example, a firing order of 1 8 4 3 6 5 7 2 would be 1 8 4 3 / 6 5 7 2. 1 and 6 would be paired together, 8 and 5, 4 and 7 and 3 and 2. When one of the cylinders is on its compression stroke, the other is on exhaust.



Current flow, through the primary side of the coil pack, is controlled by a transistor in the ignition module, thus creating a magnetic saturation of the primary. A high-voltage discharge is created, through the secondary coil output terminals, when this transistor opens and drops the induced magnetic field.

Since both plugs fire at the same time, it is not necessary for the module to recognize which cylinder is on the exhaust stroke. Because of lower pressure in the exhaust cylinder (exhaust valve open), the plug on the waste cylinder requires less voltage to produce an arc across the plug gap. Therefore, most of the available voltage is used to fire the plug on the compression cylinder.

In most cases, the current that flows through the ignition module to the primary side of the coil pack is limited to 6 to 9 amps. This is done by modifying the base current of the driver transistor. The module also monitors the last magnetic saturation buildup to determine if the maximum current was attained. If maximum current is attained, the dwell time is shortened to reduce the overall power consumed by the system.