for instance, have to have a good charging system to continue running and the voltage measured across the battery terminals, while the engine is running and charging, should be 13.5-14 volts. An alternator which is putting out this amount of voltage is what is required, not one that is putting out just 12.1-12.2 volts at maximum rpm.

The practice of using a large capacity 12 volt battery instead of a generator for a competition engine is just not acceptable. The ignition system will have insufficient voltage and, although the engine will run, and run quite well, it will not run as well as when the voltage available is up to 13.5-14 or more across the battery terminals (a battery will hold 12.5 volts fully charged).

Fit a new or rebuilt alternator to the engine and check that the voltage output is as it should be: do **not** simply put a new alternator on to an engine and assume that the voltage output is correct. Check it and note the voltage across the battery with the engine running: check the output of the alternator whenever ignition troubles are experienced and see that the figures still match those originally recorded.

Alternators come in varying sizes and weights and, as lightness is a prerequisite for all racing engines, the smallest and lightest are usually sought for this purpose. Small, lightweight, high output alternators are fitted to many small-engined Japanese cars and some European cars (Citroen 2CV, for instance). All alternators can be slowed down by changing their pulleys for larger diameter ones so that the alternator is turned just sufficiently fast to supply a minimum of 13.5 volts across the battery at idle (however high or low that may be), and maintain a minimum of 13.5-14 volts at the rpm that the power band of the engine starts at.

Ignition switch

The ignition key/switch should always be considered a part of the ignition system because, if the ignition switch fails, it will not send 12 volts consistently to the primary side of the coil and this will show up as a very weak spark (low KV at the plug). Problems that often stem from the ignition switch (loose contacts) include intermittent faults, such as an engine misfire, hard starting (sometimes), no ignition (sometimes) and, eventually, no ignition at all. Vibration can cause the mechanism inside the switch to become loose and make poor electrical contact.

With a voltmeter check that there is 12 volts going to the primary ('+') side of the coil.

High tension current (points type distributor)

With a contact breaker points type ignition system a simple tool that can be used to check the integrity of the spark at the sparkplug is the Gunson. Flashtest. This is an inexpensive tool made of plastic with a direct reading scale. The scale is proportional to the size of the gap and the gap, which the spark must jump, is increased or decreased by opening and closing the arms of the device.

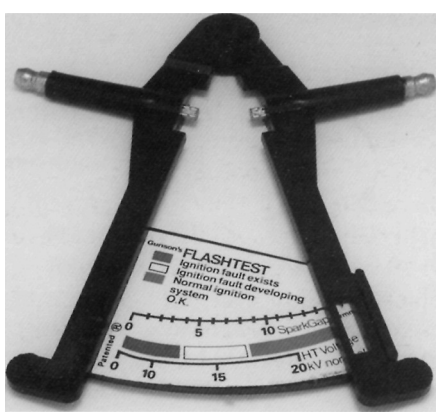
Caution! - Don't use the Flashtest gauge on an electronic ignition system. The module can be irreparably damaged. Use a Gunson Flashtest on points type ignitions only.

The KV available to the sparkplug is read directly off the Flashtest scale. If the KV is in the green part of the scale the ignition is okay, if the KV is in the white or red part of the scale there is something wrong.

To check the high tension (HT) sparkplug wires take the wire off a sparkplug (one at a time) and connect it to a terminal of the gauge, earth the other end of the gauge to the engine. Turn the engine over (sparkplugs out) and see what KV is present. What you will know if the gauge is in the green is that all parts of the ignition system before the end of the plug wire are in good order and the spark is sufficient. This, of course, does not mean that the sparkplugs themselves are okay. Note the KV reading of each plug lead.

High tension current (electronic type distributor)

With electronic ignition, the high tension has to be checked with a more sophisticated meter, such as the Snap-on Tools MT 2700 DIS/KV probe, for example, which can be used to test any ignition system. The meter uses an inductance pick-up which lightly slips over the ignition lead (or coil lead) and the dial on the meter is turned until the light stays on and is then turned the other way until the light starts to flicker. A reading is then taken. This meter does not give a true KV reading, but it does not matter that it doesn't. Essentially a reading of 2-3 KV means that there is a fault, while 8-12KV in the ignition wire means the system is



Gunson 'Flashtest' device is suitable for both points and electronic type Ignition systems.