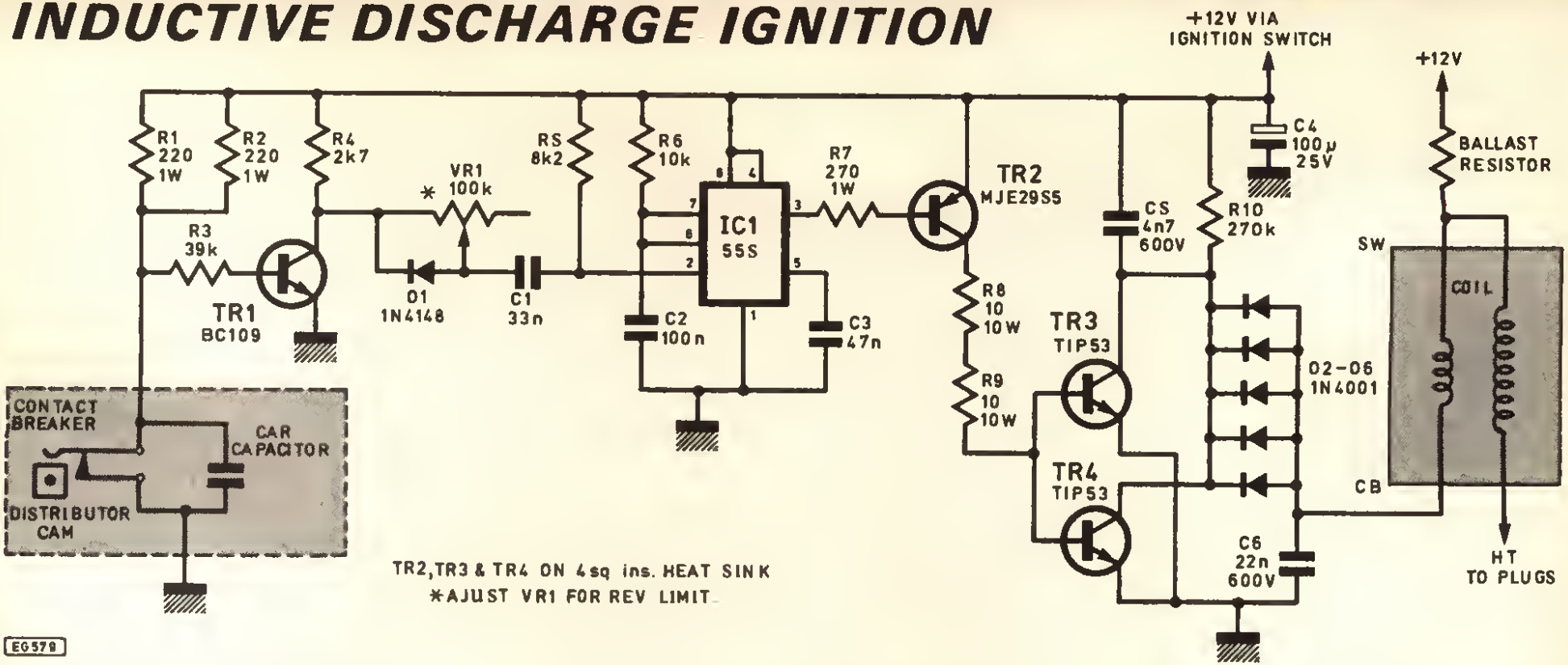
INDUCTIVE DISCHARGE IGNITION



WITHOUT going into the controversy about the advantages of capacitor or inductive discharge ignition versus normal ignition, a circuit for inductive discharge ignition is presented here. It is a points assisted unit in which the coil load of 3·5 amps is removed to a switching transistor. Other features in the circuit are: rev limit, points bounce control, long dwell time, lower RFI than a CDI system.

Most ignition coils have a resistance (including ballast) of about 3·5 ohms and an inductance of some 11mH. A time constant of 3 milliseconds results and some 10 milliseconds are needed for the coil to saturate fully after switch-on. In the circuit presented the coil is switched on for most of the time (long dwell) and is only switched off to fire the plugs for about 1 millisecond. (For very high revs this time can be reduced to 500µs.)

IC1 acts as a 1ms monostable and with its output normally low TR2, TR3 and TR4 are switched on. When triggered IC1 output goes high for 1ms and switches TR2, TR3 and TR4 off for this period to fire the plugs. TR1 acts as an inverter to trigger the monostable and the circuitry around VR1, C1 and D1 act as a rev limiter and point bounce control. When the points open TR1 conducts and C1 is rapidly charged bringing pin 2 of IC1 low momentarily before C1 charges up again. This triggers IC1. When the points close again TR1 stops conducting and C1 discharges slowly through VR1. Points bounce occurs on closing and should a bounce occur a retrigger cannot occur because C1 has not yet fully discharged. Should the time constant of C1, VR1 be set very long then C1 may not have discharged when the next firing pulse is required. A misfire occurs and the revs are limited to the corresponding time constant set by VR1. In practice VR1 should be set at maximum safe engine revs for effective point bounce control.

TR3 and TR4 are high voltage switching transistors. Each can handle 3 amps but gain at this current is low. Parallel operation reduces individual current to a point where gain is higher requiring less base drive.

The circuitry around D2 to D6, C5, C6 is for surge control and to prevent high reverse voltages across TR3 and TR4. Note that C6 has a much lower value than a normal car capacitor and this can be varied to tune the coil for best output using a 'scope. The value shown however is a good average value for most coils.

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