

Ideas for experimenters

Car Voltage Regulator

This circuit provides solid state control of battery charging. The field winding of the dynamo is initially energized via the ignition light as in a conventional system. Current flowing down the WL lead passes through Q1 to the F lead then to the field coil. Once the engine has started, current from the dynamo passes through D2 to Q1. The ignition light goes out because the WL lead rises in voltage to that of the battery. Current also passes through D5 to the battery. The battery voltage is sensed by IC1, which is wired as a comparator, once the voltage of the non inverting input rises above that of the inverting input (Held at 4.6 volts by D4) the output goes high. Current then flows through D3 and R2 to the base of Q2 turning it on. This then pulls down the base of Q1 turning it off and cutting off the current to the field winding. The output from the dynamo then drops bringing down the battery voltage. This

holds the battery voltage constant. The battery voltage is adjusted by RV1 to approximately 13.5 volts.

Under cold weather starting the battery voltage drops very low. Once the engine has started the internal resistance of the battery is also very low, which would draw excessive current from the dynamo causing possible damage. To limit the current R4 is inserted in the main power lead from the dynamo, the resistance of R4 is chosen so that at maximum current (Typically 20 amps) 0.6 volts is developed across it, this then turns on Q3. When Q3 turns on current flows from the power rail through R2 to the base of Q2 turning it on, which in turn turns off Q1 and cuts off current to the field winding. The output from the dynamo then drops.

No changes have to be made to the existing wiring. The circuit can be housed in an old regulator box, Q1, Q2 and D5 should be mounted on a heat sink.

