

OPERATING PRINCIPLES START UP MODE

INITIALLY RLY 1 AND RLY 2 IN THE ALTERNATOR REGULATOR ARE DEENERGIZED AS SHOWN. WHEN THE IGNITION SWITCH IS MOVED TO THE RUN POSITION, BATTERY CURRENT FLOWS THRU THE ALTERNATOR FIELD COIL, THRU THE UPPER CONTACTS ON RLY 1, THRU THE BATTERY DISCHARGE INDICATOR LAMP AND/OR THE PARALLEL RESISTOR, THRU THE IGNITION SWITCH, AND THRU THE AMMETER TO THE BATTERY POSITIVE TERMINAL. THIS CURRENT WILL CREATE A MAGNETIC FIELD IN THE ALTERNATOR. THE RESISTOR IN PARALLEL WITH THE BATTERY DISCHARGE INDICATOR LAMP ENABLES THE BATTERY CHARGING PROCESS TO FUNCTION IN THE EVENT THE LAMP FILAMENT IS OPEN.

WHEN THE ENGINE STARTS, THE ALTERNATOR FIELD WILL ROTATE AND INDUCE AN ALTERNATING VOLTAGE IN THE ALTERNATOR STATOR WINDINGS. THE ALTERNATING STATOR VOLTAGE WILL BE CONVERTED TO A POSITIVE VOLTAGE BY THE SIX DIODES IN THE ALTERNATOR AND APPLIED TO THE BATTERY. THE CENTER POINT OF THE STATOR WINDINGS WILL BE AT THE MID POINT OF THE ALTERNATOR OUTPUT VOLTAGE AND RLY 2 WILL ENERGIZE. WITH RLY 2 ENERGIZED, THE FULL BATTERY VOLTAGE WILL BE APPLIED THRU THE UPPER CONTACTS OF RLY 1 TO THE ALTERNATOR FIELD WINDING AND THE ALTERNATOR OUTPUT VOLTAGE WILL RISE. WITH RLY 2 ENERGIZED, BATTERY VOLTAGE WILL ALSO BE APPLIED TO BOTH SIDES OF THE BATTERY DISCHARGE INDICATOR LAMP AND THE LAMP WILL EXTINGUISH.

REGULATE MODE

WITH RLY 2 ENERGIZED AND THE FULL BATTERY VOLTAGE APPLIED TO THE ALTERNATOR FIELD WINDING, THE ALTERNATOR OUTPUT VOLTAGE WILL RISE TOWARD A MAXIMUM. AS THE ALTERNATOR OUTPUT VOLTAGE RISES, THE RESISTOR NETWORK TO THE LEFT OF RLY 1 WILL APPLY A PORTION OF THIS VOLTAGE TO THE COIL OF RLY 1. AT A POINT DETERMINED BY THE RESISTORS, RLY 1 WILL ENERGIZE AND REMOVE THE FULL BATTERY VOLTAGE FROM THE FIELD COIL AND CONNECT THE FIELD COIL TO GROUND VIA THE LOWER CONTACTS OF RLY 1. WITH NO VOLTAGE APPLIED TO THE FIELD COIL, THE ALTERNATOR OUTPUT VOLTAGE WILL FALL. IF THE SAMPLE OF THE BATTERY VOLTAGE COMING TO THE ALTERNATOR REGULATOR VIA THE YELLOW WIRE IS TOO LOW TO KEEP RLY 1 ENERGIZED, RLY 1 WILL DEENERGIZE AND THE FULL BATTERY VOLTAGE WILL AGAIN BE APPLIED TO THE FIELD COIL CAUSING THE ALTERNATOR OUTPUT VOLTAGE TO RISE. THE CYCLE OF RLY 1 OPENING TO RAISE THE ALTERNATOR OUTPUT VOLTAGE AND CLOSING TO REDUCE THE ALTERNATOR OUTPUT VOLTAGE WILL CONTINUE UNTIL THE BATTERY STATE OF CHARGE IS SUFFICIENT TO KEEP RLY 1 ENERGIZED THE MAJORITY OF THE TIME. WHEN THIS STATE IS REACHED, THE AMMETER WILL READ LITTLE OR NO CURRENT FLOWING INTO THE BATTERY.

ALTERNATOR OUTPUT AND AMMETER INDICATIONS

IN ADDITION TO SUPPLYING CURRENT TO BRING THE BATTERY TO A STATE OF FULL CHARGE, THE ALTERNATOR ALSO PROVIDES THE CURRENT REQUIRED BY ALL OF THE EQUIPMENT ON THE ALTERNATOR SIDE OF THE AMMETER. IF THE ALTERNATOR IS UNABLE TO PROVIDE SUFFICIENT CURRENT FOR THIS EQUIPMENT, THE ALTERNATOR OUTPUT VOLTAGE WILL FALL. IF THE ALTERNATOR OUTPUT VOLTAGE FALLS BELOW THE BATTERY VOLTAGE, THE BATTERY WILL TRY TO SUPPLY THE REQUIRED CURRENT THRU THE AMMETER AND THE AMMETER WILL SHOW THAT THE BATTERY IS DISCHARGING.

SOBill@aol.com 26 Mar '02

BATTERY CHARGING SYSTEM (PAGE 2)