The capacitor in Unit A is connected in series with the ignition coils, so whether it is charging or discharging, all its current must pass through the distributor. This is why the arc-suppression circuit of Unit B is used; any arcing voltages that may occur during capacitor charging (due to brush jumping, a broken lead, etc.) are absorbed by C_2, R_1, and R_2, while any arcing tendency during discharging (firing) is taken care of by R_1.

2) Regulator/Rectifier (H1-E)

The faster that the AC generator rotates, the faster that the lines of magnetic flux cut through the stator coils, and due to this the higher the voltage that is generated. If the generator output is sent to the load circuits under these conditions, when the engine is turning at high rpm the battery would overcharge, light bulbs would burn out, and there would be various other electrical problems. To avoid this, a device is installed to always keep the generator voltage below a certain level, and this device is the regulator.

Permanent magnets are used in the generator rotor, and for this reason the magnetic flux itself can not be controlled, so in this motorcycle the generated voltage is controlled directly with a Silicon Voltage Regulator (SVR) that uses transistors, diodes, and special-purpose semiconductors to form an electronic relay. For physical strength and to best withstand ambient conditions, the regulator is sealed and can not be disassembled, but this is no disadvantage since the regulator is electronic and contains no moving parts to wear, and therefore never needs adjustment or parts replacement.

Besides holding the generated voltage down to a maximum of 15 ~ 16 volts, the regulator also rectifies the generator voltage and provides a DC output directly, thus eliminating the need for a separate rectifier. The rectifier performs full-wave rectification (that is, it changes both halves of the AC cycle to DC in order to obtain a smoother DC output) with silicon diodes in a bridge circuit (see Fig. 391, page 102), based on the principle that the diodes will conduct from the – side to the + side only, and not in the opposite direction. In the rare cases when a diode does go bad, the condition of the diode can be confirmed easily since it will then conduct in both directions, or sometimes not conduct at all in either direction.

(1) Rectification when A is +, B is –

On the half cycle of the AC voltage when the AC generator is at the polarity shown in Fig. 468, current from the generator goes from the B side of the generator toward the BCR (Bi-Controlled Rectifier). A very small portion of the current flows through the BCR out the gate lead (G) and through diode D_2. This current "gates" or turns on the BCR instantly so current can then flow through the BCR and in the direction of arrow 2 to ground. From ground, the current flows up into the negative terminal of the battery to charge it, then through diode D_1, through a rectifier diode (arrow 5), and back to the generator at side A.

Diode D_1 is not actually a part of the rectifier circuit. This diode is used to allow charging current to go through the battery, but to stop any current from flowing in the opposite direction out of the battery and through R_1 and R_2 to discharge the battery while the engine is running slowly or is stopped.

When the battery is well charged and the engine is running slowly or is stopped, or any time the battery voltage is higher than generator voltage, the battery voltage bucks the generator voltage and the charging current described above (and likewise that described in the following paragraph) will not flow into the battery.

(2) Rectification when A is–, B is +

On the half cycle when the generator is at the polarity shown in Fig. 469, current from the generator flows from the generator from side A, through a rectifier diode (arrow 1) and to ground.

Ignition Circuit

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