DOT MOTORCYCLE CLUB 2010

Wipac Charge Calculations

The permanently connected alternator output (light green wire) is designed to balance the electrical load of the ignition system and LOW lights (Pilot, Speedometer & Tail lamps). During daytime running (i.e. with the lights off), the reduced loading on the alternator would lead to the battery being overcharged, so an alternative load is brought into circuit when the Lights switch is set to OFF.

The clear wire running from terminal 7 of the blue lighting system plug to EARTH includes a resistive element which simulates the presence of the 'low' lighting load, thereby restricting the charge voltage to the required Lights LOW level.

If this resistance wire fails, a suitably rated power resistor (at least 15 watts) can be fitted instead. As proven below, the required value is approximately 3.3 ohms :-

Lights Switch	Minimum Charge*	Total Lamp Current	Total Charge Current	
OFF	**1.0A**	**-**	$C = I_I + 1.0 + I_R$	①
LOW	**1.3A**	**1.8A**	$C = I_I + 1.3 + 1.8$	②
HIGH	**1.0A**	**5.3A**	$2C = I_I + 1.0 + 5.3$	③

Where:-

$\mathbf{I_I}$ = Ignition Current
$\mathbf{I_R}$ = Load Resistor Current
C = Charge Current per set of Coils
$\mathbf{R_L}$ = Load Resistor

***** Minimum Battery Charge Current at 3,000rpm (taken from Wipac service data).

Lamp Current

❶ Pilot = 3W
❷ Speedo = 1.8W
❸ Tail = 2x 3W
❹ Headlight = 24/30W
❺ Stop = 18W

Load Current drawn by Lamps

LOW = ❶ + ❷ + ❸ = 10.8W = **1.8A**
HIGH(Dip) = ❷ + ❸ + ❹ = 31.8W = **5.3A**

Charge & Load Calculations

③ - ② $\mathbf{C} = (2C - C) = (I_I + 6.3) - (I_I + 3.1)$ = **3.2A**④

④ ⇒ ② $\mathbf{I_I} = (C - 3.1) = (3.2 - 3.1)$ = **0.1A** ⑤

④,⑤ ⇒ ① $\mathbf{I_R} = (C - 1.0 - I_I) = (3.2 - 1.0 - 0.1)$ = **2.1A** ⑥

Voltage drop across Germanium Rectifier $\mathbf{V_D} \approx 2\text{x } 0.50V$ = **1.0V** ⑦

$\therefore$ Value of Load Resistor $\mathbf{R_L} \approx \frac{6.0 + V_D}{I_R} = \frac{6.0 + 1.0}{2.1} = \frac{7.0}{2.1}$ = **3.3Ω**