

# Electric System Voltage

## 600 Series

*Models: R2600HRT (RB59) & E3600HRT (CB39)*

### CONSOLE POWER - CHECKING THE 5.5VDC AND THE 14VDC

(See 600 Series Wiring Diagram)

The 5.5VDC and 14VDC are the voltages that power the LED display, software, and logic circuits on the console. These voltages come from the lower control board on the 7-pin connector and are delivered to the console via the multi-conductor cable. The voltages need to be present at the harness connector on the console (while pedaling a minimum 15-20 RPM). The 5.5VDC voltage should be between 5.4 and 7.0VDC and the 14VDC voltage should be between 13.9 and 16.0VDC. If the voltages are missing or improper, check the console cable and check for the voltages at the lower control board. If the voltages are not present at the lower board, 1st remove the 7-pin connector from the lower board and check for the voltages directly at the lower control board. If the voltages are still missing, check the voltage output from the generator (see generator check next step).

### MAIN POWER SOURCE - CHECKING THE 3 PHASE GENERATOR

(See 600 Series Wiring Diagram)

The generator is the source of all electrical power and braking resistance in the bike or trainer. To check the generator, check for AC voltage at the 3 pin connector at terminals R, S, & T on the lower board OR at the in-line connector between the generator and the lower board. The generator/flywheel needs to be spinning at virtually any minimal speed for this test. If it is more convenient, the voltage can be tested at the connector with the connector removed from the lower board. Measure the voltage across any 2 pins of the connector and again across any other 2 pins. The voltage should be the same regardless of which 2 pins (phases) are being tested. Correct voltage should be at least 15VAC at 15RPM. The voltage will vary with the speed of the generator. (see voltage table below). If the generator is outputting the correct voltage, yet the 5.5VDC or 14VDC is missing (at the lower board), replace the lower control board.

### GENERATOR VOLTAGE AND SPEED

|         |        |
|---------|--------|
| 15 VAC  | 15 RPM |
| 58 VAC  | 50 RPM |
| 70 VAC  | 60 RPM |
| 95 VAC  | 80 RPM |
| 107 VAC | 90 RPM |

NOTE: These voltages are approximate and are derived from random testing

# *Electric System Detail* continued

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### **RESISTANCE CONTROL - CHECKING THE D/A VOLTAGE** (See 600 Series Wiring Diagram)

The D/A (D to A; Digital to Analog) voltage is a low level DC voltage originating in the console. The voltage is derived from a numeric (digital) value that correlates to (brake resistance) levels L1 through L16. The voltage level controls the amount of magnetic resistance/load that is applied to the generator/flywheel. The D/A voltage is sent from the console to the lower board on pin "D/A" of the 7-pin connector. The voltage should range from 0 - 3.5 VDC, depending on the resistance level expected. If this voltage is not present with minimal RPM of the flywheel proceed as follows:

1. Check 5.5VDC and 14VDC at lower board. (see Checking The 5VDC and 14VDC above)
2. Check the generator voltage. (see Checking the 3 Phase Generator above)
3. Examine and/or replace the console and/or cable.

### **ADJUSTING/CALIBRATING RESISTANCE LEVEL** (Offset)

Each resistance level has a digital value associated with it. This value can be viewed and adjusted in the engineering mode of the operating console (See Engineering Guide, subgroup ENG4). This number correlates to the amount of resistance at each user level (L1 through L16). The number can be adjusted (offset) by +/- 1-150. However, any adjustment made to one level applies to the entire range of resistance levels. i.e. If you change the value for L5 all levels will be changed by the same amount. The "offset" number will appear in the TIME window. To adjust this number use the TIME UP and DOWN buttons. TO SAVE CHANGES press and hold the WEIGHT UP and WEIGHT DOWN buttons for about 3 seconds or until the number stops flashing.

### **CHECKING THE BRAKING RESISTOR AND CORRESPONDING ELECTRICAL VALUES**

The Braking Resistor is the electrical load imposed on the generator to create drag/resistance thus making the generator easier or harder to turn. (see CHECKING THE D/A VOLTAGE)

The Braking Resistor is the very large aluminum resistor mounted on the frame of the bike or trainer in close proximity to the lower control board. The Braking Resistor is connected to the lower control board via the 2 conductor connector labeled B1 & B2. Controlled by the lower board, from the D/A voltage, the amount of current that passes through this resistor determines the amount of magnetic resistance/load applied to the generator/flywheel thus making it easier or harder to turn. The values associated with this resistor are as follows:

WITH THE CONNECTOR REMOVED from lower control board (no flywheel motion required) the resistance across the 2 wires should be 10 Ohms.

WITH THE CONNECTOR IN PLACE (connected) on the lower control board and the flywheel spinning at virtually any minimal speed the voltage across B1 & B2 should be 0 - 32 VDC, depending on the resistance level setting on the console. (Refer to braking resistance/voltage chart below)

NOTE: If this connector is not properly connected, or if either of the two resistor wires are cut or broken, there will be NO braking resistance on bike.

# *Electric System Detail* *continued*

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### **VOLTAGE/CURRENT CHART FOR BRAKING RESISTOR WHILE PEDALING @ 50 RPM**

| RESISTANCE<br>LEVEL | VOLTAGE FROM<br>CONSOLE (D/A) | VOLTAGE ACROSS<br>RESISTOR (B1-B2) | RESISTOR CURRENT<br>(AMPS) |
|---------------------|-------------------------------|------------------------------------|----------------------------|
| L1                  | 0.07                          | 0.0                                | 0.0                        |
| L2                  | 0.32                          | 2.5                                | 0.3                        |
| L3                  | 0.47                          | 4.3                                | 0.5                        |
| L4                  | 0.73                          | 6.5                                | 0.7                        |
| L5                  | 0.98                          | 9.0                                | 0.9                        |
| L6                  | 1.22                          | 10.6                               | 1.1                        |
| L7                  | 1.43                          | 13.0                               | 1.4                        |
| L8                  | 1.63                          | 15.0                               | 1.6                        |
| L9                  | 1.83                          | 16.5                               | 1.8                        |
| L10                 | 2.00                          | 19.0                               | 1.9                        |
| L11                 | 2.20                          | 21.0                               | 2.1                        |
| L12                 | 2.38                          | 23.0                               | 2.4                        |
| L13                 | 2.57                          | 25.0                               | 2.6                        |
| L14                 | 2.77                          | 27.0                               | 2.8                        |
| L15                 | 2.96                          | 29.0                               | 3.0                        |
| L16                 | 3.18                          | 31.0                               | 3.2                        |

# *Electric System Detail* continued

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### **CHECKING SPEED, CALORIES AND DISTANCE READINGS**

RPMs, SPEED, WATTS, CALORIES, or DISTANCE READINGS INACCURATE OR MISSING. IF ALL OF THESE VARIABLES ARE MISSING (when pedaling) the console is probably not getting the RPM signal. (See RPM & HEART RATE TEST FUNCTION in Engineering Guide - Subgroup Eng4.) Look beyond the console at the wiring harness, lower board, or generator.

RPMs, SPEED, WATTS, CALORIES and DISTANCE readings all originate with the RPM signal which comes from the lower control board on pin "RPM" of the 7-pin connector. (see electrical diagram) This signal compares to the RPM signal on other ellipticals and goes up to the console for calculating time and distance. The signal is necessary for the console to determine any speed or distance related variable.

The Signal is a (5 volt) square wave variable frequency which is derived from the frequency/speed of the (3 phase) generator. i.e. The speed of the generator determines the pulse frequency (speed) of this signal. (NOTE This signal can be difficult to accurately check with a multimeter because it is a varying pulse rate NOT a variable voltage. Basically, if you get any DC voltage readings between 1.5 and 5 volts, the signal is probably reliable, but not guaranteed.)

IF ANY (but not all) OF THESE VARIABLES ARE PRESENT (when pedaling) the wiring is good and the console needs to be replaced.