

BC-5000 Field Calibration Procedure (55 AMP)

CF1_FIELDCAL_BC5000 Revised 03/28/2022

INTRODUCTION:

The BC-5000 will perform C1 battery capacity testing of 12 and 24-volt lead acid, nickel cadmium, and lithium ion aircraft batteries. Capacity test amperage setting range is 10 to 55 Amps in one-amp (1A) steps.

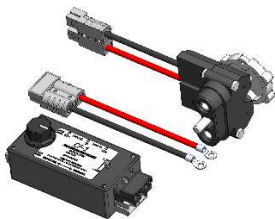
SCOPE:

This document provides instructions on performing the annual yearly calibration of the BC-5000. The calibration procedure consists of the following categories:

- Verify timing accuracy (450Hz).
- Calibrate the End Point Voltage (EPV) at 10.00 Volts.
- Calibrate the End Point Voltage (EPV) at 20.00 Volts.
- Calibrate the 10 and 55A load current calibration points.

CALIBRATION EQUIPMENT NEEDED:

1. CF-1 (P/N 4170) Field Calibration Fixture (Available from www.AdvancedPowerProducts.com).
2. A 24-volt 25Ahr or greater fully charged battery (if using the CF-1) or an adjustable 0-24Vdc @ 60A low output ripple DC power supply. (Note: Two 12-volt batteries can be connected in series for 24-volts).
3. Battery adaptor P/N 4161-60 or P/N 4161-70
4. A calibrated DMM 5½ digit or greater with frequency measurement. (for 450 Hz measurement)
5. Calibrated current shunt if not using CF-1. (Recommended value 100mv/100A).
6. Anti-static wrist strap.



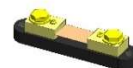
P/N 4170, P/N 4161-60, P/N 4161-70



24V Battery or 0-24VDC Power Supply



Calibrated DMM



Current Shunt



Anti-Static Wrist Band

PROCEDURE:

INITIAL SETUP:

1. Photocopy the Calibration Work Sheet on page 8.
2. Attach anti-static wrist strap to chrome fan guard and your wrist.
3. Remove the 8 Philips head cover screws. Remove the BC-5000 cover.
4. Use P/N 4161-70 or 4161-60 to connect to the 24-volt battery.
5. Connect the BC-5000 GRAY dc cord connector to the 4161-60 or 4161-70 GRAY connector.

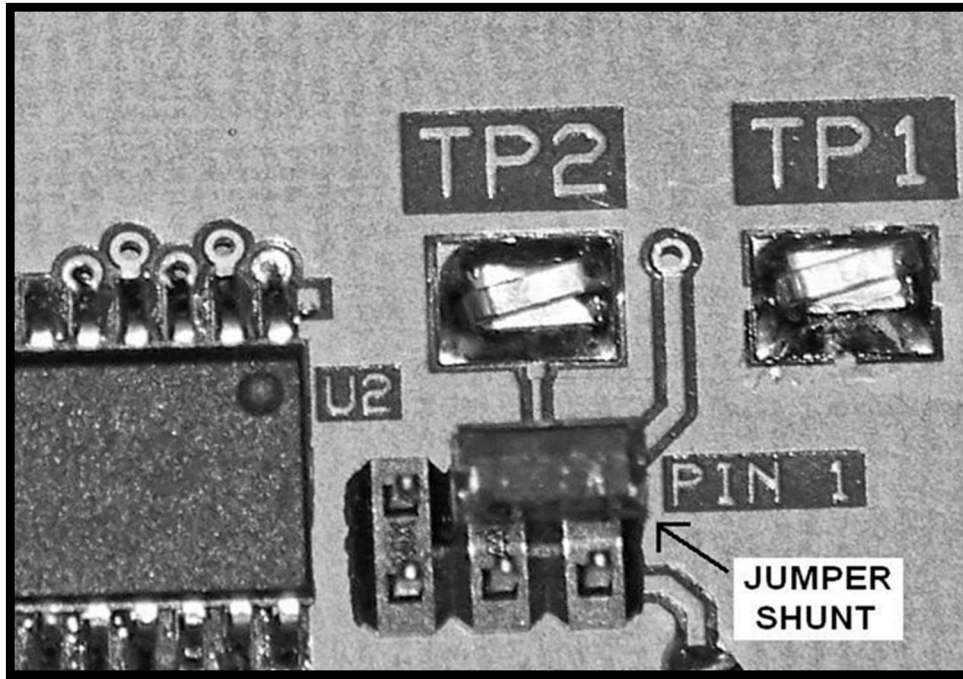


Figure 1

VERIFY TIMING ACCURACY:

1. Set the DMM to measure frequency. Remove the shorting jumper from the BC-5000 display pcb. See Figure 1.
2. Use shielded test probe wires or twist non-shielded probe wires together to maximize measurement accuracy.
3. Connect DMM (COM) lead to TP1 on the display circuit board. See Figure 1 for the location of TP1 and TP2.
4. Connect DMM V+ lead to TP2 on the display circuit board. See Figure 2
5. Set the BC-5000 power switch to the ON position.
6. After the sign on message the BC-5000 will display "Code:".
7. The UP and DOWN buttons will increase or decrease the digit's number value. The NEXT button will advance to the next digit. Using the UP, DOWN, and NEXT buttons, enter the access code 1234. After all four code numbers are entered, Press NEXT.
8. The unit will display "CAL VOLTS". Press the UP button 2 times. The BC-5000 will now display "CHK 450Hz". Press NEXT.
9. Verify the DMM frequency reading is 449.8 Hz to 450.2 Hz (450 Hz \pm 0.2 Hz).

10. Write the Frequency measurement reading into the calibration work sheet. (450 Hz) If the frequency is not 449.8 Hz to 450.2 Hz, the BC-5000 must be serviced. Push NEXT.
11. Set the BC-5000 POWER switch to the OFF position.
12. Remove the DMM test leads from TP1 and TP2.
13. Unplug the BC-5000 GRAY dc connector from the 4161-60 or 4161-70 GRAY connector.

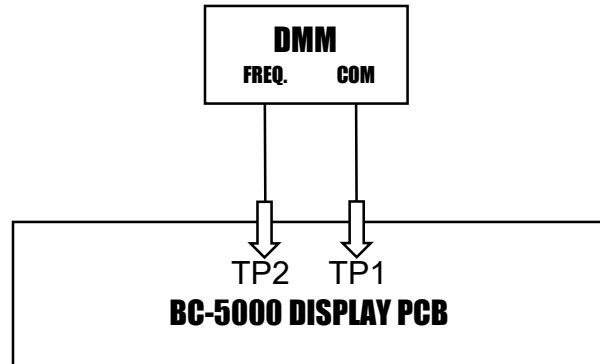


Figure 2

ADJUST 10.00- and 20.00-VOLT CUTOFF (EPV)

Using the CF-1:

1. Connect the CF-1 GRAY connector labeled BATTERY to the 4161-60 or 4161-70 GRAY connector. See Figure 3.
2. Set DMM to read DC volts 0 to 200V scale or auto range.
3. Plug the BC-5000 GRAY connector into the CF-1 BLACK connector. See Figure 3.
4. Connect DMM COM lead to the BLACK V- test point on the CF-1.
5. Connect DMM V+ lead to the RED V1+ test point on the CF-1.
6. Set the CF-1 voltage selection toggle switch to the 10V setting.
7. Adjust the CF-1 voltage adjustment knob until the DMM voltage reading from the CF-1 is 10.00-volts (+/- 0.010 volts).
8. Set the BC-5000 POWER switch to the ON position. After the sign on message the BC-5000 will display "Code":
9. Enter the access code 1234 using the UP, DOWN, and NEXT buttons. Pressing the UP or DOWN button will increase or decrease the digit's number value. Pressing the NEXT button will advance to the next digit. Press NEXT after all 4 code numbers are entered.
10. The BC-5000 will display "CAL Volts? 10", press NEXT. The BC-5000 will now display the voltage reading on the right and the word "ADJUST".
11. Use the UP and DOWN buttons to adjust the BC-5000 display to read 10.00-volts matching the DMM 10.00-volt reading. Press NEXT to save the calibration data. Wait for the word "SAVED" to appear then disappear.
12. Write the DMM voltage reading into the calibration work sheet. (10-volt cutoff)
13. Set the CF-1 toggle switch to the 20-volt position. Turn the CF-1 voltage adjustment knob to obtain a DMM voltage reading of 20 volts (+/- 0.010).

14. The BC-5000 is displaying "CAL VOLTS". Press NEXT. The BC-5000 is now displaying CAL Volts? 10. Press the UP button to change the 10 to 20 volts. The BC-5000 will display "CAL Volts? 20", press NEXT. The BC-5000 will display the voltage on the right and the word "ADJUST".
15. Use the UP and DOWN buttons to adjust the BC-5000 display to read 20.00-volts matching the DMM 20.00-volt reading. Press NEXT to save the calibration data. Wait for the word "SAVED" to appear then disappear.
16. Write the DMM Voltage reading into the calibration work sheet. (20-volt cutoff) Set the BC-5000 POWER switch to the OFF position.
17. Unplug the BC-5000 GRAY connector from the CF-1 Black connector.

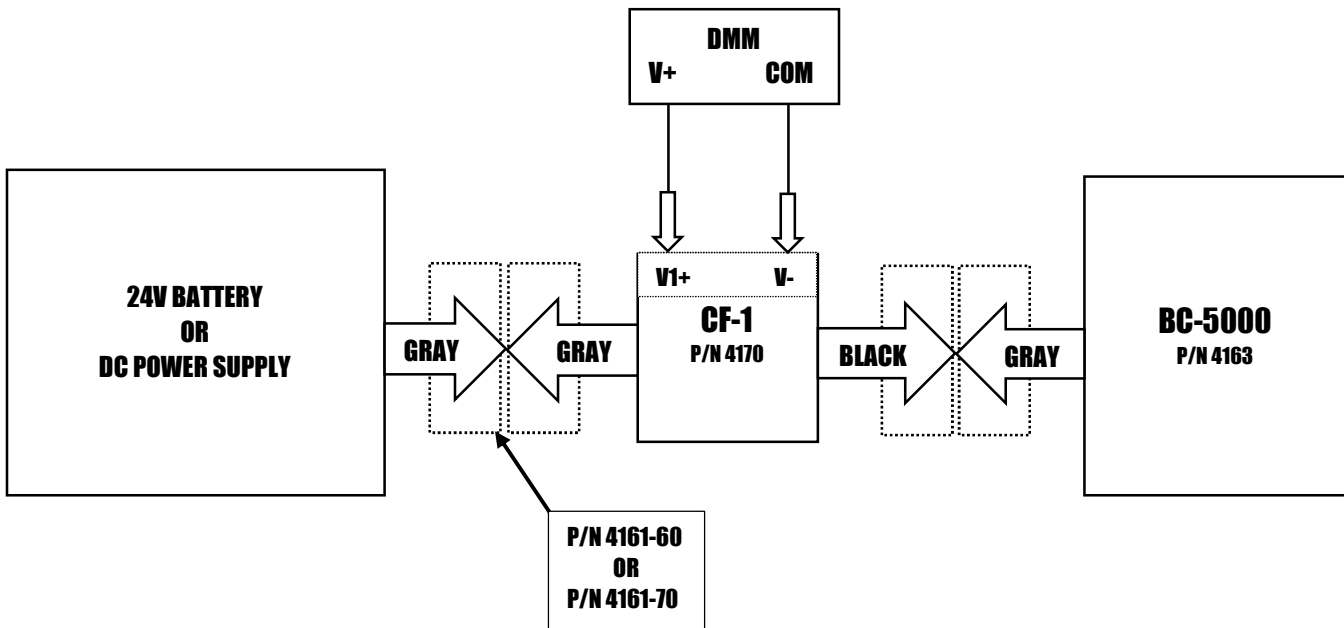


Figure 3

ADJUST 10.00- and 20.00-VOLT CUTOFF (EPV)

Using Adjustable 0-24-volt DC Power Supply:

1. Set DMM to read DC volts 0 to 200V scale or auto ranging. Connect the DMM to read the 0-24-volt DC power supply output.
2. Connect the battery adaptor P/N 4161-60 to the 0-24-volt DC power supply DC output. The P/N 4161-60 RED lead to power supply V+ and BLACK lead to GND. Plug the BC-5000 GRAY connector into the GRAY connector of the P/N 4161-60. See Figure 4
3. Turn the power supply on and adjust the output voltage so the DMM reads 10-volts (+/- 0.010 volts).
4. Set the BC-5000 POWER switch to the ON position.
5. Enter the access code 1234 using the UP, DOWN, and NEXT buttons. Pressing the UP or DOWN button will increase or decrease the digit's number value. Pressing the NEXT button will advance to the next digit. Press NEXT after all 4 code numbers are entered.
6. The BC-5000 is displaying: "CAL VOLTS". Press NEXT.

7. The BC-5000 will display "CAL Volts? 10", press NEXT. The BC-5000 will now display the voltage reading on the right and the word "ADJUST".
8. Use the UP and DOWN buttons to make the BC-5000 display read 10.00-volts matching the DMM reading. Press NEXT to save the calibration data. Wait for the word "SAVED" to appear then disappear.
9. Write the DMM voltage reading into the calibration work sheet. (10-volt cutoff)
10. Adjust the DC power supply output so the DMM reads 20-volts (+/- 0.010 volts).
11. The BC-5000 is displaying CAL VOLTS. Press NEXT.
12. The BC-5000 will display CAL VOLTS? 10. Press the UP button to change to CAL VOLTS? 20. Press NEXT. The BC-5000 will display the voltage on the right and the word "ADJUST".
13. Use the UP and DOWN buttons to make the BC-5000 display read 20.00-volts matching the DMM reading. Press NEXT to save the calibration data. Wait for the word "SAVED" to appear then disappear.
14. Write the DMM Voltage reading into the calibration work sheet. (20-volt cutoff)
15. Turn the DC power supply off and disconnect the BC-5000 GRAY connector from the GRAY P/N 4161-60 connector.

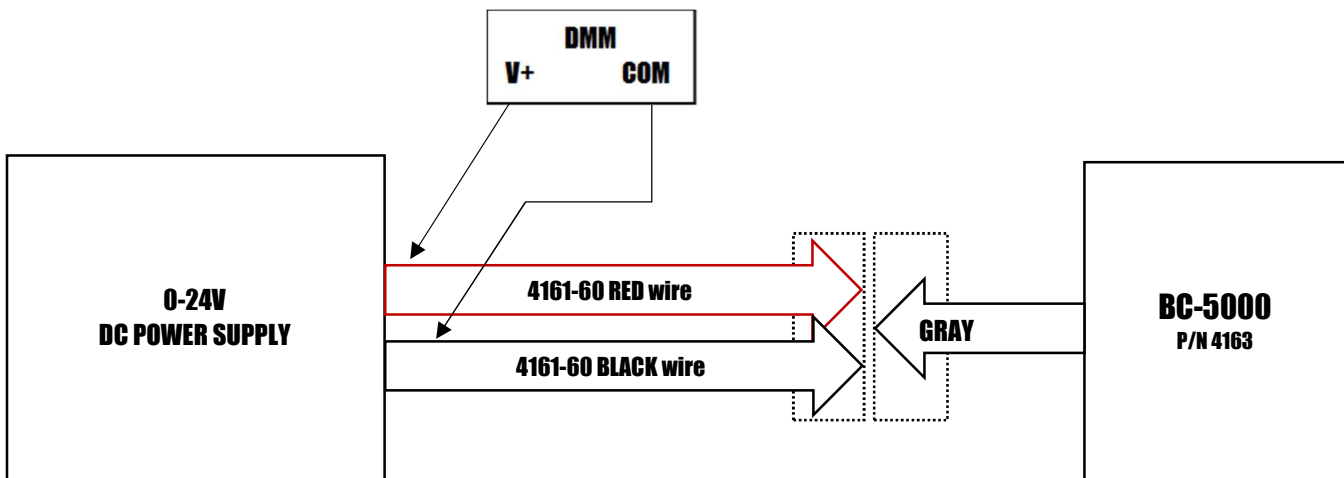


Figure 4

CALIBRATE AMPS SETUP:

Using the CF-1:

1. Plug the BC-5000 GRAY connector into the CF-1 GRAY connector labeled TESTER. Connect the DMM mv+ lead to the CF-1 V2+ RED test point. See figure 5.
2. Connect the CF-1 GRAY connector labeled BATTERY to the 24-volt battery or the 24-volt 60 Amp DC power supply.
3. Set the DMM to read dc millivolts.

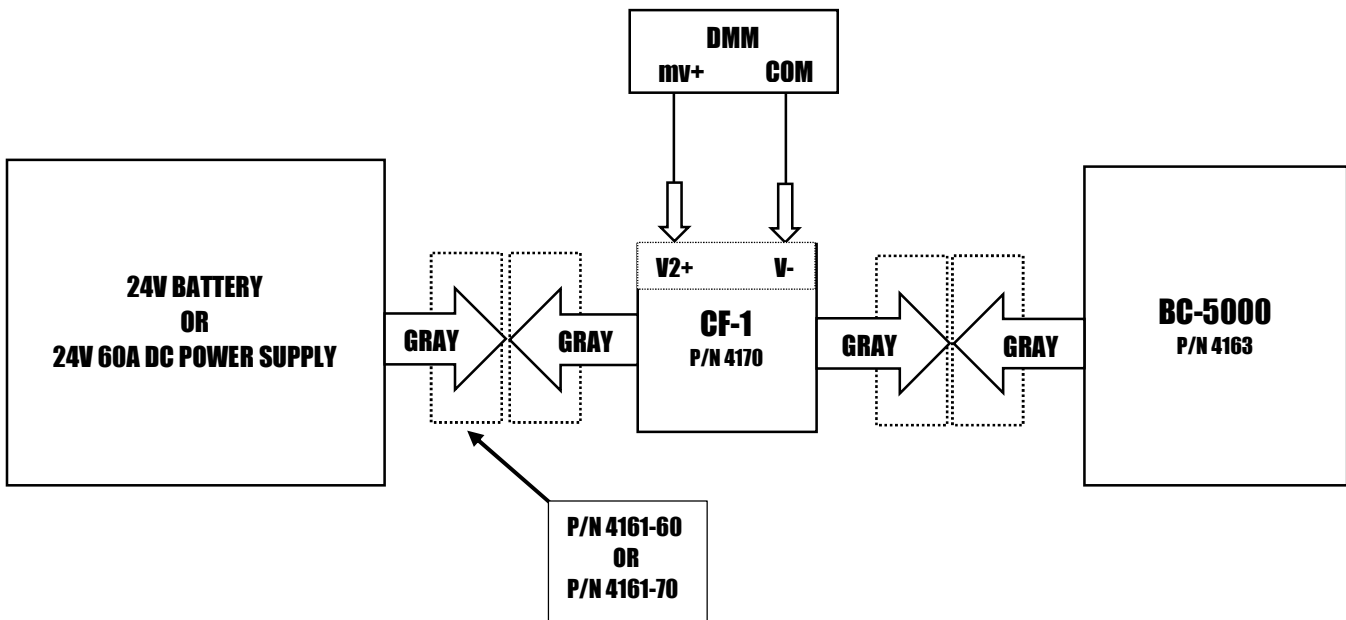


Figure 5

4. The CF-1 internal current shunt value is 100mv@100Amps. The resistance value is 0.001 Ohms. A BC-5000 load current signal between V2+ and V- test points of the CF-1 will be:

$$10.0 \text{ Amps} = 10.0 \text{ mv} \quad 55.0 \text{ Amps} = 55.0 \text{ mv}$$

If a non-CF-1 shunt is used, the shunt should be connected between the 24-volt battery or power supply negative connection and the BC-5000 GRAY connector negative terminal. See Figure 6.

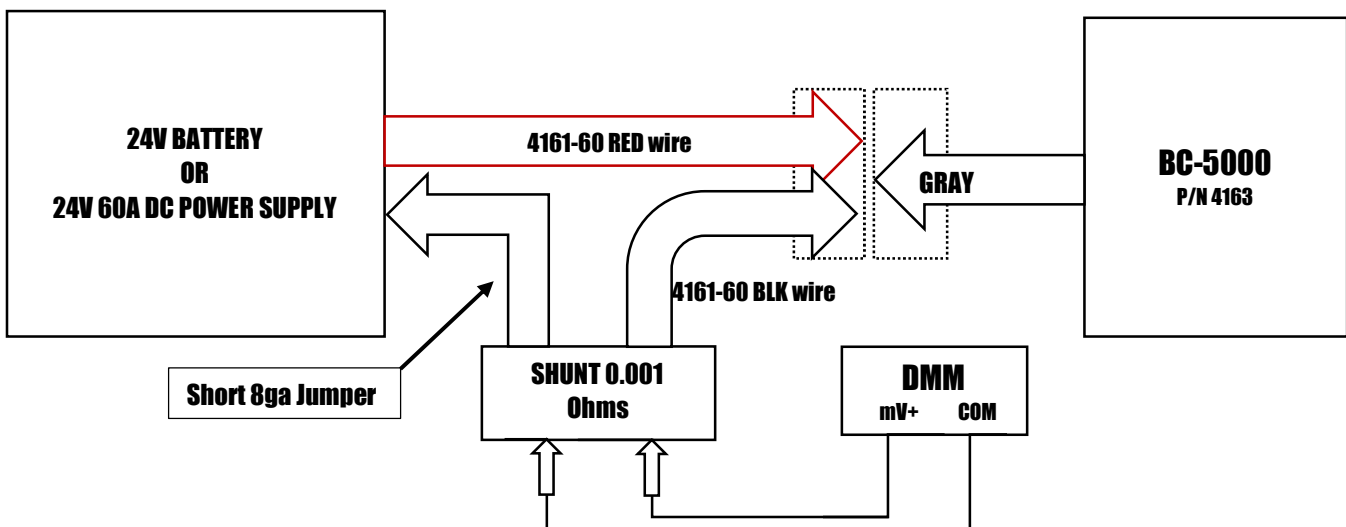


Figure 6

CALIBRATE 10- and 55-AMP POINTS:

1. Set the BC-5000 POWER switch to the ON position.
2. After the BC-5000 boot message, the BC-5000 will display CODE:
3. Enter the access code 1234 using the UP, DOWN, and NEXT buttons. Pressing the UP or DOWN button will increase or decrease the digit's number value. Pressing the NEXT button will advance to the next digit. Press NEXT after all 4 code numbers are entered.
4. With the CAL VOLTS displayed, press the UP button.
5. The BC-5000 will now display CAL AMPS. Press NEXT
6. Volts? 12 will be displayed. Press the UP button to display Volts? 24. Press NEXT.
7. The BC-5000 will display Amps: 10. Press NEXT.
8. The BC-5000 cooling fan will start. Wait 30 seconds before calibrating.
9. Press the UP or DOWN button to obtain a DMM reading of 9.98 to 10.02 mV (10.00 mV \pm 0.002 mV). Allow a few seconds for the reading to settle.
10. Write the mV reading into the calibration work sheet. (10.0 Amp calibration)
11. Press NEXT to save the calibration data into memory. Wait for the word "SAVED" to appear then disappear.
12. Press the UP button to select Amps: 55
13. Press NEXT to start the amps calibration process. Wait 30 seconds before adjusting amps.
14. Press the UP or DOWN button to obtain a DMM reading of 54.89 to 55.11 mV (55.00 mV \pm 0.11 mV). Allow a few seconds for the reading to settle.
15. Write the mV reading into the calibration work sheet. (55 Amp calibration) Press NEXT to save the calibration data into memory. Wait for the word "SAVED" to appear then disappear.
16. Set the BC-5000 POWER switch to the OFF position.

FINALIZATION:

1. Locate the BC-5000 display circuit board located on the inside of the front panel and REINSTALL the plastic jumper shunt across pins 1 & 3. See Figure 1.
2. Set the BC-5000 POWER switch to the ON position. After sign on message, the BC-5000 will display "Volts? ". The unit is ready for use.
3. Set the BC-5000 power switch to the OFF position.
4. Disconnect the BC-5000 DC cord GRAY connector from the CF-1 or power supply.
5. Disconnect the CF-1 or the current shunt from the 24-volt battery or the DC power supply.
6. Write the calibration due dates of all equipment used in work sheet. Attach a photo copy of the calibration certificates of all the equipment used in this procedure to the work sheet.
7. Write the BC-5000 serial number in work sheet.
8. Sign and date the calibration work sheet.
9. Install the BC-5000 cover and reattach with the 8 Philips head screws.
Remove the anti-static wrist band.

CALIBRATION NOTES:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

CALIBRATION WORK SHEET

RECORDS - BC-5000 S/N _____

Item name	Measured value	Specification	Pass	Fail
450 Hz		449.8 - 450.2 Hz		
10.00 Volt cutoff		9.90 - 10.10 Volts		
20.00 Volt cutoff		19.80 - 20.20 Volts		
10.0 Amp calibration		9.98 to 10.02 mV		
55.0 Amp calibration		54.890 to 55.110 mV		

Digital Multi Meter used to measure 450 Hz calibration expiration date: ___/___/_____

Digital Multi Meter used to calibrate Voltage and Amperage calibration expiration date: ___/___/_____

Attach a photocopy of the calibration certificates of all the equipment used to in this procedure to this work sheet.

BC-5000 Calibration performed as specified by:

_____ Date: ___/___/_____