BC-7000

CAPACITY TESTER

OPERATIONS MANUAL

COFKO LLC.

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UNPACKING

As you unpack your new BC-7000 battery capacity tester, inspect the tester for signs of shipping damage. If shipping damage is present, stop and contact the shipping company for damage claims information. The box should contain the *BC-7000 tester, operators instruction manual, AC power cord, USB cable, battery disconnect (7017-2), 2 battery adapter cables, and BC Report software*.

IMPORTANT: Save the shipping box and packaging material. They should be used to repack the tester if it needs to be shipped back for warranty or service.

INTRODUCTION

Congratulations on acquiring your new BC-7000 battery capacity tester. The BC-7000 battery capacity tester has been designed to provide the operator with accurate battery capacity testing and ease of operation.

The features of the BC-7000 are:

- Adjustable constant current load in 0.1 Ampere increments from 0.5 Ampere to 15 Ampere.

- Adjustable constant current load in 1.0 Ampere increments from 15 Ampere to 55 Ampere.

- Universal AC power input 85~264Vac 1 PH (47 to 63Hz)

- LCD display.

- 10mv voltage resolution.

- Over temperature protection.

- Audio warning when capacity test is complete or malfunction of the unit.

- USB 2.0 port for PC connection.

- Windows™ XP or Higher compatible **BC Report Utility** software for test data hardcopy print out.

- Real time internal clock with battery backup.

- 1 year warranty.

Before operating your new BC-7000 battery capacity tester, familiarize yourself with this operators manual and the unit.

Questions?

Call: (909) 705-6267 Mon.-Fri.8:00 A.M. to 5:00 P.M. PST or *support@cofko.com*

Thank you,

COFKO

Manual: BC-7000

Revision: C Date: 04/05/13

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History of Revisions

Revision #	Effective Date	Description of Change	Approval By
A	11/11/2010	Initial issue	M.C.
B	10/23/2012	Increase Maximum Operation Altitude from 6000' to 6500'	M.C
B	10/23/2012	Change Description of Box Contents	M.C.
C	04/05/2013	Minimum and Maximum Operation Temperature	M.C.

SAFETY NOTES

Your new BC-7000 battery capacity tester has been designed with operator safety as a function of its design, construction, and operation. Understanding how to safely operate the BC-7000 battery capacity tester is important. Failure to follow the operation and safety guidelines when using the BC-7000 can result in ***personal injury to the operator and damage to the BC-7000.*** Always review the battery manufacturer's battery capacity testing guidelines before testing batteries.

 Look for this symbol to identify Safety and Danger precautions. Be Alert- Your safety is involved! Personal injury or equipment damage can occur if guidelines are not followed.

PRECAUTIONS:

Precautions:

1 **CAUTION:** Aircraft batteries are certified to have a certain minimum capacity for emergency operations in the event of an electrical generator system failure. Never "jump start" an aircraft that has a discharged or "dead" battery.

2 **WARNING: ELECTRIC SHOCK HAZARD.** Do not touch un-insulated portions of the connector or the battery terminals. A possibility of serious electrical shock exists. Do not lay tools or other metal objects on the battery as arcing or explosion could occur. Remove conductive jewelry before working around battery, charger, or test equipment.

3 **CAUTION: ELECTRIC BURN HAZARD.** Do not wear conductive rings, belt buckles, or other jewelry when working with batteries, chargers, or test equipment. Do not lay tools or other metal objects on the battery as arcing and severe burns could occur.

4 **WARNING:** Batteries on charge or discharge produce hydrogen gas, which can explode if ignited. Do not smoke, use an open flame, or cause sparking near a battery. Charge, service or test a battery only in a well ventilated area. The use of exhaust fans may reduce the risk of explosion.

5 **WARNING:** Batteries contain sulfuric acid which will cause burns**. DO NOT TOUCH EYES AFTER TOUCHING BATTERY**. Do not get acid in your eyes, or on your skin, or clothing. In the event of acid in the eyes, flush thoroughly with clean cool water for several minutes. Get professional medical attention. Refer to battery

MSDS for additional information.

6 **WARNING:** Wear proper eye, face and hand protection at all times when working with batteries. Know the location and use of emergency eyewash and shower nearest the battery charging area.

7 **CAUTION:** To prevent damage to the connector, arc burns, or explosion, batteries should never be connected or disconnected while being charged or discharged. Batteries must be connected or disconnected only when the circuit is open. Ensure the aircraft battery switch, external power source, or the charger/analyzer is in the "OFF" position before connecting or disconnecting the battery. Battery terminal protectors should be installed whenever the battery is not connected in the aircraft or to the test equipment.

8 **CAUTION:** Batteries contain hazardous materials. Know the location and proper use of emergency response materials. Refer to battery Material Safety Data Sheet (MSDS) for additional information.

9 **Caution / Warning:** Only constant potential charging may be done on the aircraft. DO NOT constant current charge a battery on the aircraft. There could be a serious risk of injury to personnel and / or damage to the aircraft or aircraft systems due to high voltage and generation of explosive gases when charging constant current.

10 **DANGER:** Never connect or disconnect BC-7000 tester main power connector with the switch on. Connecting or disconnecting the BC-7000 tester with discharge current applied can cause a spark and possible battery explosion.

11 **DANGER:** Never capacity test batteries without first inspecting all battery wires and connection for condition and tightness. Replace all defective wires and bad connections before capacity testing batteries. Defective wiring and bad connections can cause overheating during a capacity test.

12 **DANGER:** never connect the BC-7000 capacity tester to batteries with voltage or capacity currents outside the ratings of the tester. The BC-7000 tester is designed for 12 and 24 volt batteries. Connecting the tester to batteries with different voltages can permanently damage the tester and endanger the operator. Any questions that arise about the battery or tester ratings, email support@cofko.com

13 **DANGER:** never obstruct the BC-7000 tester air intake or hot air exhaust openings. Obstructing either opening can cause the tester to overheat.

BC Report Utility and Real Time Clock Setup

NOTE: The *BC Report Utility* software *MUST be installed on the computer* used to connect to the BC-7000 tester first. *Do not* connect the USB communication cable to the BC-7000 until this is done.

1 Remove the *BC Report Utility* CD from the protective sleeve and place disk into the PC CD drive. The *BC Report Utility* will automatically start installing. (Manual installation can be done with commands: Start\Run\ d:\setup.exe

2 Windows Application Security Warning dialog box may prompt you about installing the *BC Report Utility*. To continue installing the *BC Report Utility*, click on the *INSTALL* button. The installation may take some time as Windows™ installs all the necessary software.

3 When prompted to install the Silicon Labs CP210x USB to UART bridge driver, click the *INSTALL* button to install all needed drivers. (C:\Program Files\Silabs\MCU\CP210x\) Note: The CP210x drivers are on the *BC Report Utility* CD disk.

4 After the *BC Report Utility* software installation is completed, remove the *BC Report Utility* CD disk from the drive and return to the protective sleeve. Now restart the PC .

5 The Windows™ desktop should now contain the *BC Report Utility* program icon. Plug the USB cable supplied with the BC-7000 into a working USB port on the PC with the *BC Report Utility* installed. **Connect the AC power cord to the BC-7000 and set the power switch to the *ON* position.** Now plug the remaining USB cable end into the USB port located on the right side rear of the BC-7000. If the connection is made between the PC and the BC-7000 the PC may respond with an audio sound confirming a device has been found.

6 To run the *BC Report Utility*, place the mouse pointer on the icon and press the left mouse button. This action will start the *BC Report Utility* program and display the program window.

7 Before updating the BC-7000 internal date and clock, check the computer date and time for proper setting and adjust if needed. This is the date and time the BC-7000 will use. Located in the lower middle of the BC-7000 Report window is the SET Date & Time button. To set the BC-7000 Date & Time place the mouse pointer on the Set Date & Time button and click the left mouse button. The status bar located in the lower left corner will display a series of messages showing the communications activity between the BC-7000 and the PC. The first message displayed is *Searching for BC-7000*. Second message is *Setting Date and Time.* And the final message will be *Done.* With the date and time set, the BC-7000 is now ready to test batteries and print test result reports.

8 If any difficulties are experienced with communications between the BC-7000 and the PC, check cable connections first and review *BC Report Utility* installation second. Lastly make sure the PC USB port drivers are installed and working. Review your Windows™ software help menu for guidelines in checking USB ports.

BC-7000 OPERATION

NOTE: Before capacity testing a battery, *review all testing procedures as required by the battery manufacturer*. Failure to do so can result in inaccurate test date.

NOTE: Before capacity testing a battery, <u>*RECHARGE THE BATTERY FOLLOWING THE*</u>

<u>*MANUFACTURERS RECHARGING GUIDELINES*</u>.

NOTE: <u>*Before putting the BC-7000 into service the REAL TIME clock must be set.*</u> See instruction in the *BC Report Utility* section. Failure to do so will result in incorrect printed time on test reports.

1. Make sure the power switch is in the *OFF* position. Connect the AC power cord female end into the power receptacle located in the left rear side of the BC-7000. Connect the male end of the power cord into the AC power outlet. Now connect the *gray* BC-7000 battery connector to the battery to be tested.

DANGER: Never attempt to connect the BC-7000 capacity tester to a battery using anything but the proper connector. *Doing so can damage the tester, battery, or cause injury to the operator*. Capacity testing data will be invalid if incorrect connections are made.

2. Place the *OFF/ON* power switch to the *ON* position. The BC-7000 LCD display will flash tester model and software version.

NOTE: If *Replace Clock Coin Battery* is displayed on screen, remove case top and install new coin battery. Replacement battery number is 3V #*CR2032*. Use *BC Report Utility* software to update date and time after battery

replacement. See **BC Report Utility** Software section for instructions.

3. First select which Mode? CAPACITY or DISCHARGE to 1 Volt. Use the **UP** or **DOWN** button to change you selection. DISCHARGE mode is used to discharge Nickel Cadmium batteries.

4. Push the **NEXT** button. Now select the battery voltage to be tested. Pressing the **DOWN** button will change battery testing voltage to 12 volts.

NOTE: If incorrect battery voltage is selected the BC-7000 display will inform the operator.

5. Push the **NEXT** button . Select the End Point Voltage (EPV) cutoff. The default EPV is 20 volts for 24 volt battery and 10 volts for a 12 volt battery. The BC-7000 allows for EPV adjustment from the default values. For a 24 volt battery the EPV can be lowered to 18 volts. For 12 volt batteries the EPV can be lowered to 9 volts. Check with your battery manufacturer for specified EPV points.

6. Push the **NEXT** button. Select the battery manufacturer C1 (one hour) battery discharge amperage rate. Press the **UP** or **DOWN** buttons. Pressing the **UP** button will increase the discharge amperage rate.

7. Press the **NEXT** button to display the start test menu.

8. To start the test, press the **NEXT** button again. If you wish to stop the test before the End Point Voltage (EPV) is reached, press the **NEXT** button and the BC-7000 will stop testing. ***If testing is stopped before EPV is reached the battery must be recharged following the battery manufacturer's recharge procedures*** before retesting.

9. After pressing the **NEXT** button to start the test, the BC-7000 cooling fan motor will start and the LCD display will show the C1% reading, battery voltage, flash ***TESTING***, and test amperage. *Note: While the BC-7000 is testing or at the conclusion of the test, pressing the **UP** button will display the test run time in minutes. The LCD will display* **TM: 60.2'** *(The symbol ' indicates minutes)*

10. Upon reaching the EPV the BC-7000 test will stop. The cooling fan motor will stop and the audio warning beeper will beep. The display will show C1% battery capacity. Test amperage and Pass or Failed is displayed.

If the ***BC-7000 COOLING FAN MOTOR FAILS TO START*** press the **NEXT** button stopping the test. Place the **OFF/ON** switch to the **OFF** position and return the BC-7000 for service.

"Passing" is based upon a battery capacity of 85% or greater of its C1 rating.

"Failing" is a battery with less than 85% of its C1 rating.

Before returning the battery to service follow the battery manufacturer's recharging procedure.

REMEMBER SAFETY FIRST!

BC-7000 Report Printing

1. **Disconnect the BC-7000 from the test battery**. Place the *OFF/On* power switch to the *OFF* position. Connect the USB cable from the PC to the BC-7000 USB port located in the rear of the tester. Start the PC and run the *BC Report Utility* software located on the Windows™ desktop.

2. With the *BC Report Utility* window active on the desktop, type the battery serial number into the *Battery Serial Number:* box. Make sure the data source is *From BC-7000* by highlighting the indicator circle.

3. Place the mouse cursor on the *Load Data* button and press the left mouse button. The status bar in the lower left corner of the *BC Report Utility* window will display program activity and status messages as data is transferred.

4. To print the report, place the mouse cursor on the Print Report button and press the left mouse button. The Windows™ print preview window will appear showing the report available to print. Place the mouse cursor on the printer icon and press the left mouse button.

 TIP: A paperless report copy can be obtained by using a print driver that will create a PDF file. These drivers are available for sale or freeware and install in the Windows™ printer devices. This report format allows BC-7000 test reports to be sent electronically by means of e-mail attachments .

5. To print a BC-7000 battery test report that has been already down loaded, use the *From Disc* function to print the report. Change the file source *From BC-7000* to *From Disc*. The data file uses the file extension .tdf. The file name is a combination of battery serial number, date, and time and can be found in the Concord file located at C:\Concord\BC-7000. Place the mouse cursor on the *Load* Data button and press the left mouse button. The Open test data file window will open on the desktop**.** Choose the data file that is to be printed by selecting the file with the left mouse button. Click *Open* at the bottom of the window. Place the mouse cursor on the *Print Report* button and press the left mouse button. The Print Preview window will become active on the disk top. To print report, left mouse click the printer icon.

BC-7000 CARE

Your BC-7000 battery capacity tester should be treated as precision test equipment, misuse will shorten its ability to perform accurate battery testing. Some simple guidelines of care will insure years of trouble free operation.

1. Do not drop the BC-7000 or expose it to rough handling.

2. Do not expose the BC-7000 to water or fluids of any kind.

3. Do not operate the BC-7000 in a closed up area.

4. Do not connect the BC-7000 to batteries of improper voltage ratings.

5. Do not operate the BC-7000 with the air intake or exhaust outlet blocked or restricted.

6. Do not carry the BC-7000 by the main power cable.

7. Do not operate the BC-7000 near flammable materials.

8. Do not expose the BC-7000 to direct sunlight during operation.

9. Do not expose the BC- 7000 to any other heat sources.

10. Always call the technical support line for questions on BC-7000 safety and operation.

   PH: (909)705-6267 , E-mail support@cofko.com

REMEMBER SAFETY FIRST!

TECHNICAL DATA

BC-7000 SPECIFICATION:

AC Input Voltage

…………………………………………………………………………… 90~264VAC 1 Phase (47 to 63Hz)

AC Input Current

…………………………………………………………………………… 0.75A @115VAC ; 0.50A @ 230VAC

Maximum Battery Input Voltage

 …………………………………………………………………........ 28.0VDC

Minimum Battery Input Voltage

……………………………………………………………..…........ 9.0VDC

Maximum Operating Altitude[1]

……………………………………………………….................... 6500ft(1828.8m)

End Point Voltage (EPV)[2]

12V Battery EPV

…………………………………………………………….……..... 10VDC IEC

24V Battery EPV

…………………………………………………………….……..... 20VDC IEC

Constant Current Load

…………………………………………….……………………….... 0.5Adc to 15Adc 0.1A steps (+ - 1.5%)

………………………………………………………………………. 15Adc to 55Adc 1A steps (+ - 1%)

Testing Operational Temperature[3]

………………………………………………………………....………..…... 59°F or higher

Operation Temperature Range

……………………………………………………………………….. -20 to 50 Deg. C

Case Length

…………………………………………………………....………….…..…… 12 in(304.8mm)

Case Width

………………………………………………………....………....… 9 in(228.6mm)

Case Height

………………………………………………....……….…..…… 7.5 in(190.5mm)

Weight

………………………………………………………....………..... 10 lbs(4.5kg)

PC Communication Port

……………………………………………………....…………..... USB 2.0

BC REPORT Utility Software

…………………………………………………....……………..…. Windows™ XP or Higher

1. Consult factory for testing above maximum altitude rating.

2. Consult battery manufacturer for End Point Voltage (EPV).

3. Based upon 24 hour battery temperature stabilization in a 59°F or higher environment before testing battery. Consult battery manufacturer for capacity testing at higher or lower temperatures.

BC-7000 LIMITED WARRANTY

STATEMENT OF WARRANTY

COFKO LLC warrants to the original purchaser (end user) of the BC-7000 battery capacity tester that it will be free of defects in workmanship and materials. This warranty is void if COFKO LLC finds that the BC-7000 battery capacity tester has been subjected to improper care, abnormal operation, or modification.

WARRANTY PERIOD:

The warranty period covers the original purchaser (end user) from the date of shipping.

1 Year: Covers each BC-7000 battery capacity tester for workmanship, material, and labor.

TO OBTAIN WARRANTY COVERAGE:

 You are required to notify COFKO LLC, of any defects within the warranty period. Written notification is recommended.

WARRANTY REPAIRS:

If upon inspection COFKO LLC confirms the existence of a defect covered by this warranty, the defect will be corrected by repair or replacement at COFKO LLC option.

WARRANTY COST:

The purchaser must bear the cost of shipping the BC-7000 to COFKO LLC as well as the return shipping cost.

IMPORTANT WARRANTY LIMITATIONS:

1. COFKO LLC will not accept responsibility for repairs made without authorization.

2. COFKO LLC shall not be liable for consequential damages (such as lost business, etc.) caused by a defect or reasonable delay in correcting a defect to the BC-7000 battery capacity tester.

3. COFKO LLC liability under this warranty shall not exceed the cost of correcting the defective BC-7000 battery capacity tester.

4. This written warranty is the only expressed warranty covering the BC-7000 battery capacity tester. All warranties implied by law such as Warranty of Merchantability are limited to the duration of this limited warranty of the BC-7000 battery capacity tester. Check your local legal rights for further rights you may have.

BC-7000 NOTES

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9. _____

10. _____

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RIVERSIDE, CA. 92509
(909) 705-6267
COFKO.COM
support@COFKO.com

CERTIFICATION OF FACTORY CALIBRATION

EQUIPMENT: BATTERY CAPACITY TESTER
MODEL#:   BC-7000

Application :   Automatic battery capacity tester for 12/24
                        volt Lead-Acid aircraft batteries with C1 test
                        ratings between 0.5 to 50 ampere-hour

Specification:
- Universal AC Powered: 85~264vac (47 to 63Hz)
- Operation Voltage Range : 28VDC to 9VDC
- Operator Selected Battery Voltage: 24-12Vdc
- Operator Selected C1 amperage level: 0.5 - 50Adc
- Operator Selected Test Amperage Steps: 0.1Adc steps 0.5A to 15Adc;1Adc steps 15A to 50Adc.
- (16X2) LCD Information Display.
- Displayed Voltage Resolution 10mv
- Cutoff Voltage 12V Battery 10.00Vdc (IEC 60952-1) +/-100mv
- Cutoff Voltage 24V Battery 20.00Vdc (IEC 60952-1) +/-100mv
- Displayed Battery Capacity (C1) Percent %
- Displayed Pass or Fail Battery Condition
- Windows™ Compatible Test Data Print Utility (BC Report Utility)

Notes: Calibrated with NIST traceable equipment.

Test Equipment	Manufacturer:	Model:	Serial#	Control#
Volt Meter #1	HP	3456A	2015A01818	12617
Volt Meter #2	HP	3455A	1622A11888	12618
Frequency Counter	HP	5316A	2632A10545	12693
Shunt	Deltec	WB 100 100	NA.	137317MLQA5

Product: Automatic Battery Capacity Tester
Model: BC-7000
Calibration Due: Once A Year
Shipped Condition: Calibrated within Specified Tolerance _____- Passed
Procedure: CF1_FINALCAL

COFKO LLC. CERTIFIES THAT THE ABOVE LISTED TEST EQUIPMENT MEETS OR EXCEEDS ALL SPECIFIED TOLERANCES. THE TESTER STATED ABOVE HAS BEEN CALIBRATED WITH NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY(NIST) TRACEABLE EQUIPMENT LISTED ABOVE.

DATE MANUFACTURED:____/____/_____   S/N: _____[1]
SIGNATURE:_____

Date of First Use: ____/____/_____   Signature:_____
1. BC-7000 serial number location- ***bottom of case***.