



**40 AMP SMART™ FULLY AUTOMATIC BATTERY CHARGER**  
**INSTRUCTION MANUAL**



Catalog Number BC40EB

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Cat. # BC40EB  
May '07

Form # 90516444  
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**⚠ GENERAL SAFETY WARNINGS AND INSTRUCTIONS FOR ALL APPLIANCES READ ALL INSTRUCTIONS**

**READ ALL INSTRUCTIONS**

**⚠ WARNING:** Read all instructions before operating product. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.

- **AVOID DANGEROUS ENVIRONMENTS:** Don't use appliances in damp or wet locations. Don't use appliances in the rain.
- **KEEP CHILDREN AWAY.** All visitors should be kept at a distance from work area.
- **STORE IDLE APPLIANCES INDOORS.** When not in use, appliances should be stored indoors in dry, and high or locked-up place – out of reach of children.
- **DON'T FORCE APPLIANCE.** It will do the job better and with less likelihood of a risk of injury at the rate for which it was designed.
- **USE RIGHT APPLIANCE.** Do not use the appliance for any job except that for which it is intended.
- **DRESS PROPERLY.** Do not wear loose clothing or jewelry. They can be caught in moving parts. Rubber gloves and substantial, non-skid footwear are recommended when working outdoors. Wear protective hair covering to contain long hair.
- **USE SAFETY GLASSES AND OTHER SAFETY EQUIPMENT.** Use safety goggles or safety glasses with side shields, complying with applicable safety standards and, when needed, a face shield. Also use face or dust mask if operation is dusty. This applies to all persons in the work area. Also use a hard hat, hearing protection, gloves, safety shoes and dust collection systems when specified or required. Safety glasses or the like are available at extra cost at your local dealer or Black & Decker Service Center.
- **DON'T ABUSE CORD.** Never carry appliance by cord or yank it to disconnect from receptacle. Keep cord from heat, oil, and sharp edges.
- **DON'T OVERREACH.** Keep proper footing and balance at all times.
- **DISCONNECT APPLIANCES.** Disconnect the appliance from the power supply when not in use, before servicing, and when changing accessories such as blades and the like.
- **AVOID UNINTENTIONAL STARTING.** Don't carry plugged-in appliance with finger on switch. Be sure switch is off when plugging in.
- **GROUND FAULT CIRCUIT INTERRUPTER (GFCI)** protection should be provided on the circuits or outlets to be used. Receptacles are available having built in GFCI protection and may be used for this measure of safety.
- **USE OF ACCESSORIES AND ATTACHMENTS.** The use of any accessory or attachment not recommended for use with this appliance could be hazardous. Note: Refer to the accessory section of this manual for further details.
- **STAY ALERT.** Watch what you are doing. Use common sense. Do not operate tool when you are tired.
- **CHECK DAMAGED PARTS.** Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service center unless otherwise indicated elsewhere in this instruction manual. Have defective switches replaced by authorized service center. Do not use tool if switch does not turn it on and off.
- **DO NOT OPERATE** portable electric tools near flammable liquids or in gaseous or explosive atmospheres. Motors in these tools normally spark, and the sparks might ignite fumes.
- **OUTDOOR USE EXTENSION CORDS.** When tool is used outdoors, use only extension cords intended for use outdoors and so marked.

Volts	Minimum Gage for Cord Sets			
	Total Length of Cord in Feet			
120V	0-25	26-50	51-100	101-150
	(0-7,6m)	(7,6-15,2m)	(15,2-30,4m)	(30,4-45,7m)
240V	0-50	51-100	101-200	201-300
	(0-15,2m)	(15,2-30,4m)	(30,4-60,9m)	(60,9-91,4m)
<b>Ampere Rating</b>		American Wire Gage		
More Than	Not more Than			
0 -	6	18	16	16
6 -	10	18	16	14
10 -	12	16	16	14
12 -	16	14	12	Not Recommended

- **EXTENSION CORDS.** Make sure your extension cord is in good condition. When using an extension cord, be sure to use one heavy enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage resulting in loss of power and overheating. The following table shows the correct size to use depending on cord length and nameplate ampere rating. If in doubt, use the next heavier gage. The smaller the gage number, the heavier the cord.

## SAFETY GUIDELINES / DEFINITIONS

**⚠ DANGER:** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**⚠ WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**⚠ CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**CAUTION:** Used without the safety alert symbol indicates potentially hazardous situation which, if not avoided, may result in property damage.

**RISK OF UNSAFE OPERATION.** When using tools or equipment, basic safety precautions should always be followed to reduce the risk of personal injury. Improper operation, maintenance or modification of tools or equipment could result in serious injury and property damage. There are certain applications for which tools and equipment are designed. Black & Decker strongly recommends that this product NOT be modified and/or used for any application other than for which it was designed. Read and understand all warnings and operating instructions before using any tool or equipment.

## IMPORTANT SAFETY INSTRUCTIONS

**⚠ WARNING:** This product or its power cord contains lead, a chemical known to the State of California to cause cancer and birth defect or other reproductive harm. Wash hands after handling.

**⚠ WARNING: BURST HAZARD:** Do not use the unit for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage property. Use the unit for charging/boosting a LEAD-ACID battery only. It is not intended to supply power to a low-voltage electrical system other than in a starter-motor application. NEVER EQUALIZE A GEL OR AGM BATTERY, these may burst and cause SERIOUS INJURY and property damage.

**⚠ WARNING: SHOCK HAZARD:**

- If an extension cord is used, make sure that:
  - a) the pins of extension cord are the same number, size and shape as those in the charger,
  - b) the extension cord is properly wired and in good electrical condition,
  - c) the wire size is large enough for the AC rating of the charger as indicated in the table on page 1.
- Do not operate unit with damaged cord or plug; or if the unit has received a sharp blow, been dropped, or otherwise damaged in any way. Do not disassemble the unit; take it to a qualified service technician when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire, and will void warranty.
- Use of an attachment not supplied, recommended or sold by manufacturer specifically for use with this unit may result in a risk of electrical shock and injury to persons.
- NEVER submerge this unit in water; do not expose it to rain, snow or use when wet.
- To reduce risk of electric shock, disconnect the unit from any power source before attempting maintenance or cleaning. Turning off controls without disconnecting will not reduce this risk.

**⚠ WARNING: RISK OF EXPLOSIVE GASES**

• Working in the vicinity of a lead acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of the utmost importance that each time before using the charger you read this manual and follow instructions exactly.

• To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in the vicinity of the battery. Review cautionary markings on these products and on the engine.

• This equipment employs parts (switches, relays, etc.) that produce arcs or sparks. Therefore, if used in a garage or enclosed area, the unit MUST be placed not less than 18 inches above the floor.

• THIS UNIT IS NOT FOR USE BY CHILDREN AND SHOULD ONLY BE OPERATED BY ADULTS.

**⚠ CAUTION: TO REDUCE THE RISK OF INJURY OR PROPERTY DAMAGE:**

- Pull cord by plug rather than cord when disconnecting the 120V AC Charging Adapter from the unit.
- NEVER ATTEMPT TO JUMP-START OR CHARGE A FROZEN BATTERY.
- To recharge this unit, use only the supplied AC Charging Adapter.
- Vehicles that have on-board computerized systems may be damaged if vehicle battery is jump-started. Before jump-starting, read the vehicle's owner's manual to confirm that external-starting assistance is suitable.
- When working with lead acid batteries, always make sure immediate assistance is available in case of accident or emergency.
- Always have protective eyewear when using this product: contact with battery acid may cause blindness

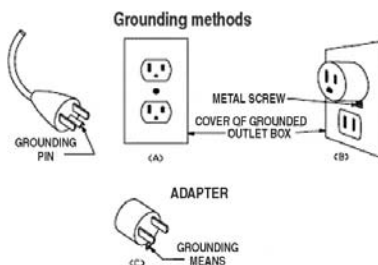
and/or severe burns. Be aware of first aid procedures in case of accidental contact with battery acid.

- Have plenty of fresh water and soap nearby in case battery acid contacts skin.
- If battery acid contacts skin or clothing, wash immediately with soap and water for at least 10 minutes and get medical attention immediately.
- Never smoke or allow a spark or flame in vicinity of vehicle battery, engine or charger.
- Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead acid battery. A lead acid battery can produce a short circuit current high enough to weld a ring, or the like of a metal, causing a severe burn.
- Never allow battery acid to come in contact with this unit.
- Do not operate this unit in a closed area or restrict ventilation in any way.

• **FIRST AID – SKIN:** If battery acid comes in contact with skin, rinse immediately with water, then wash thoroughly with soap and water. If redness, pain, or irritation occurs, seek immediate medical attention.

**EYES:** If battery acid comes in contact with eyes, flush eyes immediately, for a minimum of 15 minutes and seek immediate medical attention.

• **GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS** – Charger should be grounded to reduce risk of electric shock. Charger is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.



**⚠ DANGER – Never alter AC cord or plug provided** – if it will not fit outlet, have proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

### Preparing to Charge

1. Determine voltage of battery to be charged by referring to the vehicle manual.
2. It is necessary to remove battery from vehicle to charge, or to clean terminals, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
3. Clean battery terminals. Do not allow corrosion to come in contact with eyes.
4. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps (maintenance free), carefully follow manufacturer's charging instructions.
5. Study all battery manufacturer's specific precautions, such as removing or not removing cell caps while charging, and recommended rates of charge.
6. Remove battery completely from boat/airplane or any confined area before charging.
7. Make sure the initial charging rate does not exceed battery manufacturer's requirement.

### Charger Location

1. Locate charger as far away from battery as cables permit.
2. NEVER place charger directly above battery being charged; gases from battery will corrode and damage charger.
3. NEVER allow battery acid to drip on charger when reading gravity or filling battery.
4. NEVER operate charger in a closed-in area or restrict ventilation in any way.
5. Marine batteries must be removed and charged on shore.
6. Do not set a battery on top of charger.

### DC Connection Precautions

1. Connect and disconnect DC output clamps only after removing AC cord from electric outlet.
2. Never allow clamps to touch each other.
3. Attach clamps to battery and chassis as indicated in "Battery Installed in Vehicle" steps 5 and 6, and in "Battery Outside of Vehicle" steps 2, 4 and 5.

Follow these steps when the battery is installed in a vehicle. A spark near the battery may cause an explosion.

**⚠ CAUTION: TO REDUCE RISK OF A SPARK NEAR THE BATTERY:**

1. Position AC and DC cords away from hood, door, or moving engine parts.
2. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
3. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.
4. Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see 5. If positive post is grounded to the chassis, see 6.
5. For negative-grounded vehicle, connect POSITIVE (RED) clamp from battery charger to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clamp to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to heavy gauge metal part of the frame or engine block.
6. For positive-grounded vehicle, connect NEGATIVE (BLACK) clamp from battery charger to NEGATIVE (NEG, N, -) ungrounded post of battery. Connect POSITIVE (RED) clamp to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
7. When disconnecting charger, disconnect AC cord, remove clamp from vehicle chassis, and then remove clamp from battery terminal.
8. Do not charge the battery while the engine is operating.
9. See operating instructions for length of charge information.

Follow these steps when the battery has been removed from a vehicle. A spark near the battery may cause an explosion.

1. Check polarity of battery posts. Positive post (marked POS,P, +) usually has a larger diameter than the Negative battery post (marked NEG, N, -).
2. Attach a 24-inch (minimum length) 6 AWG insulated battery cable to the Negative battery post (marked NEG, N, -).
3. Connect the Positive (RED) battery clamp to the Positive battery post (marked POS, P, + or red).
4. Stand as far back from the battery as possible, and do not face battery when making final connection.
5. Carefully connect the NEGATIVE (BLACK) charger clamp to the free end of the battery cable connected to the negative terminal.
6. Set the charge rate to appropriate setting according to battery size.
7. When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.

**Note:** A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use. This unit is NOT designed for such use.

- Check unit periodically for wear and tear. Take to a qualified technician for replacement of worn or defective parts immediately.
- Read and Understand This Instruction Manual Before Using This Unit.

**SAVE THESE INSTRUCTIONS**

**THIS MANUAL CONTAINS IMPORTANT SAFETY AND OPERATING INSTRUCTIONS FOR THE 40 AMP SMART™ BATTERY CHARGER MODEL BC40EB.**

**⚠ WARNING: TO REDUCE THE RISK OF INJURY:**

- Follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use with this unit. Review cautionary markings on these products and on engine.

**INTRODUCTION**

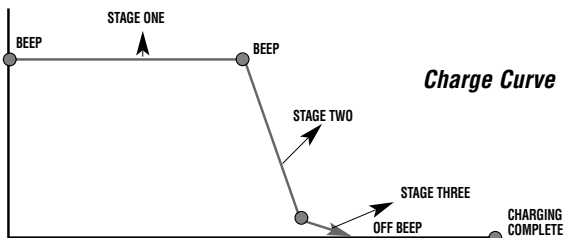
Thank you for selecting the **Black & Decker® 40 Amp Smart™ Battery Charger**. With proper care and use, it will give you years of dependable service. This battery charger has a high charge rate of up to 40 amps, and low charge rate of 4 amps and 110 amps of engine starting power.

Smart™ Battery Chargers feature 3-stage, high-efficiency charging technology, built-in microprocessor control that ensures fast, safe and complete charging of serviceable batteries.

**Stage One** — Rapid Start Charge at 40 amps delivers maximum charging amperage to “wake up” any serviceable 12 volt battery and allows for quick engine starting. When battery reaches a maximum safe predetermined voltage, the charger will automatically signal a “beep” and move into Stage 2 of the charging process.

**Stage Two** — Absorption Charge maintains the maximum possible charge at a constant, safe, predetermined voltage. During this phase, the charging voltage remains constant, while the actual charging current is reduced

to allow for the maximum proper internal chemical energy transfer. At the end of Stage 2, the charger will automatically move into Stage 3 charge mode.



**Stage Three** — Top-Off Charge voltage is automatically maintained and reduced to a predetermined level while current is adjusted for a safe, effective battery charge. At the end of Stage 3, the unit will BEEP signaling the completion of the charging cycle.

The Automatic Float Charge feature is ideal for maintaining a battery. It automatically tops off battery as needed, keeping it fully charged all the time.

## FEATURES

- This unit has four charge rate settings, accessed by the 4/10/20/40 AMP button:
- a) 4 amps: smaller batteries, such as in lawn mowers, snowmobiles, motorcycles, etc.
- b) 10 amps: mid-sized batteries, such as in small cars
- c) 20 amps: automobiles and light trucks
- d) 40 amps: utility vehicles
- 110 amp engine start
- Automatic Temperature Compensation
- Battery type selection
- Digital diagnostics
- Alternator voltage and battery voltage check
- Digital display shows charge rate, operating mode, fault codes and FUL when charged
- 1-minute engine start
- 3-stage high-frequency switch mode automatic rapid charging
- Spark resistant reverse polarity and short circuit protection for user
- Built-in battery reconditioning (desulfate)
- Lightweight, high-efficiency design
- Internal short circuit protection
- Cables and clamps self-stored
- Reverse polarity indication
- Microprocessor control (Digital Smart Control)/High frequency power
- Compensates for low AC from extension cord use
- Equalization function

## Controls and Indicators

### CONTROL PANEL



### DIGITAL READOUT CIRCULATING PATTERN



## Function Buttons (from left to right):

**Battery Type (Step 1)** allows the user to select Wet, Gel or AGM type of battery for efficient and safe charge. Most automotive batteries are Wet batteries. Refer to the battery manufacturer's specifications for battery type.

**4/10/20/40A AMP (Charge Rate Selector) (Step 2)** allows the user to select the charge rate based on battery size. This selection and the actual battery charge rate are monitored by the microprocessor. The charger will stop charging if the rate is too fast or too slow for the battery size or condition.

**110 AMP Engine Start** places the charger in an engine start sequence. This button will not be activated unless the charger is in the 40 amp charge mode; set the 4/10/20/40 amp button to 40 amps first to activate this button.




**Battery Recondition** is an automatic mode that, once started, continues for 24 hours and then stops. A series of electrical pulses breaks the crystalline form of lead sulfate to return these chemicals into useful battery electrolytes. More than 24 hours may be needed to restore. Periodic reconditioning is recommended to maintain a battery's optimum performance. However, if 5 cycles does not improve battery performance, discontinue and recycle the battery.

**Battery Voltage (Alternator Voltage Check)** is a quick check that measures the battery voltage. This check is repeated at various electrical load levels and the tests allow the user to determine if the alternator can keep up with the loads.

INDICATOR:

**Large (.375") 3-Character Digital Display** in the upper left of the control panel indicates the various conditions and/or status codes:

*Status Codes are described in the following chart and on the back of charger.*

	<b>AC POWER INDICATOR</b> - When connected to an AC outlet, digital display shows circulating pattern to indicate power is on. Disconnect charger after use.
<b>FAULT CODES</b>	
<b>F01</b>	<b>INTERNAL SHORTED CELL BATTERY</b> - Cannot be charged. Have battery checked by certified auto service center. <b>EXCESSIVE LOAD ON BATTERY WHILE CHARGING</b> - Check load.
<b>F02</b>	<b>BAD BATTERY CONNECTION</b> - Check battery connection. <b>BATTERY VOLTAGE TOO LOW TO ACCEPT CHARGE</b> - Have battery checked by certified auto service center.
<b>F03</b>	<b>INTERNAL OPEN CELL</b> - Have battery checked by certified auto service center. <b>SULFATED CONDITION</b> - Battery needs to be reconditioned. See manual.
<b>F04</b>	<b>OVERTIME CONDITION</b> - Battery will not accept a charge after 18 hours of continuous charging. Battery may have internal damage. Have battery checked by certified auto center. <b>BATTERY CHARGE RATE IS SET TOO LOW</b> - Set charger to higher charge rate. See manual.
<b>F05</b>	<b>OVERHEATED CONDITION</b> - Disconnect charger and allow to cool for 30 min., check for ample ventilation.
<b>F06</b>	<b>REVERSE POLARITY</b>
<b>F07</b>	<b>ALTERNATOR OUTPUT IS OUT OF TYPICAL OPERATION RANGE</b>
<b>OPERATION CODES</b>	
	<b>BATTERY RECONDITIONING</b> - (The letters DES will display for the first 3 seconds.)
	<b>ALTERNATOR VOLTAGE CHECK</b>
<b>000</b>	<b>CHARGER STANDBY</b>
<b>FUL</b>	<b>BATTERY FULLY CHARGED</b>

### CONTROL PANEL LED INDICATORS:

**WET** — lights when battery type selector is on WET battery type

**GEL** — lights when battery type selector is on GEL battery type

**AGM** — lights when battery type selector is on AGM battery type.

**Float Charge** — lights when automatic charge monitoring is active. This feature allows a battery to maintain its charge over long periods of non-use. If there is any loss of power to the charger once power is restored, charger will automatically return to the default settings. Battery selector type would be "gel".

**Battery Voltage** — lights when battery voltage is displayed.

**Alternator Good** — lights when load or no load checks show the alternator is keeping up with the electrical load.

**Equalize** — a recessed button used to start the equalize process.

### OPERATING INSTRUCTIONS

Ensure that all installation and operating instructions and safety precautions are understood and carefully followed by anyone installing or using the charger. Follow the steps outlined in the "Important Safety Instructions" section of this manual.

## Charge Rate Selection

After charger clamps are correctly connected, plug the charger into a 120 volt AC outlet and the charger will show "000" on the Digital Display, indicating power has been applied. Select the proper charge current rate based on battery size. Press the 4/10/20/40 AMP button and the charger will begin charging at 4 amps. Pressing the 4/10/20/40 AMP button again will advance the charge rate to 10 amps, again to 20 amps, and again to 40 amps. Pressing the switch again will turn OFF the charger output and the display will show "000".

**Note:** The only time the selected charge rate does not display at the full selected rate is when the battery is nearly full and charging at either step two or three. The display will show a reduced charge rate. To return to 4A, press the 4/10/20/40 amp button. When the battery is fully charged, "FUL" shows on the Digital Display.

**⚠ WARNING:** If Digital Display shows "F02", the connection to the battery terminals is bad. Follow the steps outlined in "Important Safety Instructions" at the front of this manual to disconnect, clean battery terminals, then reconnect.

If Digital Display shows "F06", the Red (Positive) and Black (Negative) clamps are incorrectly connected to battery terminals. Follow the steps outlined in "Important Safety Instructions" at the front of this manual to disconnect, then reconnect in correct polarity.

## Charging the Battery

1. Press Battery Type selector until desired battery type LED lights.

**Note:** The default selection is "GEL" type battery.

2. Press 4/10/20/40 AMP button to begin charging at the 4 amp rate; the unit sounds a beep and displays charging current. The charger starts charging at 4 amp rate automatically if 4/10/20/40 AMP button is not pressed within 3 minutes after applying AC power.

If the Display on the charger varies between "F03" and the amp rate, the battery is sulfated and the charger is trying to give it some charge. If after approximately 3 hours the display just shows "F03", then the battery will not charge.

Charger occasionally sounds a beep and displays "0.0" during self-test or charging stage changes.

3. Pressing the 4/10/20/40 AMP button again advances charging rate to 10 amps. Pressing once more advances charging rate to 20 amps, and again to 40 amps. (Pressing the button again will turn OFF the charger output and the Display will show "000".) This selection and actual battery charge rate are monitored by the microprocessor, and the unit will stop charging if the selected rate is too fast or too slow for battery size or condition.

As the battery nears full charge capacity, the unit's output will automatically drop to a lower charge rate.

Pressing the 4/10/20/40 AMP button repeatedly advances to standby mode; the unit sounds a beep, displays "000" and stops charging.

4. The battery charger displays the charge current. To view the battery voltage, press BATTERY VOLTAGE button. The charger will sound a beep and display the battery voltage. Press the BATTERY VOLTAGE button again to return to displaying the charge current.

5. The display shows "FUL" when the battery is fully charged.

6. Follow the steps outlined in "Important Safety Instructions" at the front of this manual to disconnect.

## Automatic Float Charging

Automatic Float Charging is ideal for maintaining a fully charged battery.

1. Keep the AC power and battery connected after battery is fully charged.
2. The charger monitors the battery and tops it off as needed.
3. The Float Charge indicator lights and the display shows charge current when topping off the battery and returns to "FUL" when completed.
4. To view battery voltage, press the Battery Voltage button.

**Note:** Charging can be terminated by pressing the charge rate selector button at any time when unit is charging. After AC power interruption, charging restarts at 4 amp rate automatically and the battery type will default to "GEL".

**⚠ WARNING:** If battery size is not known, charge at the 4 amp rate. DO NOT overcharge batteries.

## Equalizing

Equalizing is the process by which the fluid in each of a battery's cells is equalized. This process occurs after charging is complete.



### **⚠ WARNING: BURST HAZARD:**

- NEVER EQUALIZE A GEL OR AGM BATTERY, these may burst and cause SERIOUS INJURY and property damage.
- Remove or disconnect the vehicle's battery when equalizing.

The frequency which the equalization process needs to be run depends on the use of the battery. The more the battery is used, the more undercharged it becomes; thus the more frequently the battery should be equalized.

1. Do not use this mode on sealed or valve regulated batteries. This mode is only meant for wet (unsealed/vented) batteries.
2. Make sure there are no flammable sources near the recharging sight.
3. Wear safety glasses, gloves and protective clothing.
4. Remove battery from vehicle. Make sure that the battery has good ventilation. The process causes the release of hydrogen and oxygen. An accumulation of these gases presents a real danger of explosion.
5. Open the battery cap, if removable.
6. Fill the battery with distilled water according to the manufacturer's instructions. Since batteries may rapidly bubble while being charged, remember to refill (only with distilled water) after the equalization process is complete and the voltage is back to normal.
7. Follow the steps in the "Charging the Battery" section on page 7 of this manual.
8. Push the Battery Type Selector Switch until "WET" is displayed. (This mode will only work if a WET battery is selected.)
9. Choose the correct charge rate and start charging. You can check the battery voltage by pushing the Battery Voltage button. This will trigger the Battery Voltage indicator.
10. Push the Equalize button at any time and the battery will automatically begin to equalize in 4 amp limited current. Note that in order to push the recessed button you will need a small pin or ballpoint pen.
11. Every hour, the temperature should be checked by touching the battery. If the battery is hot to the touch, stop the charging and allow the battery to cool.
12. The voltage rises, but does not go over 15.3v to 16.2v (2.55-2.7v per cell) depending on ambient temperature, it will automatically adjust.
13. The "WET" LED flashes while the charger is in equalize mode.
14. The digital readout will show "FUL" when the equalization process is complete.

### **Engine Start**

The Engine Start function can supply 110 amps for engine starting.

1. Set the 4/10/20/40 AMPS button to 40 amp mode and immediately press the 110A button switch to activate the Engine Start mode.
2. The digital display will countdown from "999" to "000."
3. When the "000" count is reached and begins flashing on the Display, the vehicle is ready to start.
4. Crank the engine using manufacturer's guidelines, typically in 3 to 5 second bursts. The high current engine starting function requires a resting/cooling period between tries. The charger will switch back to regular charge mode after 5 seconds and will not allow operation in this mode for 4 minutes. Wait 4 to 5 minutes before a second attempt at starting the engine, if needed.
5. During the rest period, the battery is charging at 4 amps. After engine starts, follow the steps outlined in "Important Safety Instructions" at the front of this manual to disconnect.

### **Recondition Mode**

Whenever a lead-acid battery begins to discharge, lead sulfate, an insulator, begins to build up on the battery's internal plates. This reduces the ability of the battery to hold a full charge. When that battery has an immediate charge, most of the lead sulfate is dissolved and the plates are free of this insulation. If a battery remains in a discharged condition over a longer period of time, the lead sulfate changes to a hard crystalline form, making a full charge difficult to achieve. Reconditioning may "save" a sulfated battery.

BATTERY RECONDITION MODE should only be used with 10 Amp Hour (Ah) or larger capacity lead-acid batteries. Charge the battery to be treated for 20 minutes, before using RECONDITION Mode. Observe the Digital Display for any codes. This initial charge will check the battery for shorted cells (F01), open cells (F03) or battery too low to accept a charge (F02), and to ensure the battery can take a charge. If code (F03) is displayed, change to the BATTERY RECONDITION MODE.

Remove or disconnect the vehicle's battery when reconditioning.

1. Make sure the charger is in initiation state with a circulating pattern on the display or in charge OFF mode with "000" on the display. If not, press 4/10/20/40 AMP button repeatedly until "000" shows on the display.

2. Press the Battery Recondition button to start the process.

3. DES appears on the display for 3 seconds, then it changes to three horizontal moving bars.

4. The process takes 24 hours and stops automatically. The display shows "000" when complete.

## **Alternator Check**

### **Part 1**

**No Load** (Turn OFF all vehicle's accessories): The battery must be fully charged before testing the alternator. Run the engine long enough to achieve normal idle speed and verify there is a no-load voltage.

1. Press Alternator Check to start the check.

2. Alternator Good LED will light to indicate the alternator is good, or F07 will display to indicate the alternator is out of typical voltage range.

3. Press Alternator Check again to stop the test.

### **Part 2**

**Under Load** (Accessories ON): Next, load the alternator by turning on as many accessories as possible (except for A/C and DEFROST)

1. Press Alternator Check to start the check.

2. Alternator Good LED will light to indicate the alternator is good, or F07 will display to indicate the alternator is out of typical voltage range.

3. Press Alternator Check again to stop the test.

If the first alternator check indicates a good alternator and the second indicates the alternator is not good, the problem could stem from: loose fan belts, an intermittent diode failure or possibly bad connections between the battery and alternator and/or ground.

**Notes:** BATTERY VOLTAGE button is disabled in Alternator Check mode.

F07 may display because someone has added a number of accessory loads on the charging system, thereby increasing current demand from the alternator. MAKE SURE THAT THE ALTERNATOR IS RATED TO SUPPORT THE APPLICATION.

This check may not be accurate for every make, manufacturer and model of vehicle. Check only 12 volt systems.

## **APPROXIMATE CHARGING TIMES**

The **40 Amp Smart™ Battery Charger** will automatically adjust the charge rate as the battery becomes charged, and stop when the battery is fully charged. Deep cycle batteries may require longer charging time.

For estimates of the time it takes to charge a battery, refer to the following table.

<b>Percent of charge in battery</b>	<b>75%</b>	<b>50%</b>	<b>25%</b>	<b>0%</b>
at 4 amp rate	3.5 HRS	7.0 HRS	10.5 HRS	NR*
at 10 amp rate	1.4 HRS	2.8 HRS	4.2 HRS	5.5 HRS
at 20 amp rate	1.0 HRS	1.5 HRS	2.1 HRS	2.8 HRS
at 40 amp rate	1.0 HRS	1.2 HRS	1.7 HRS	2.2 HRS

\*NR = Not recommended at 4 amps — use a higher charge rate.

The times shown in the table above are approximate and refer to a 50 Ah automotive battery. For example, a 50 Ah (12 volt) battery is discharged (50%). How long should it be charged at the 10 amp rate? See the chart above under "50%" and "at 10 amp rate."

In most cases, battery charging times will vary depending on the size, age and condition of the battery. Smaller batteries should be charged at a lower rate (4 amps) and an extra hour added to charge time.

## **TROUBLESHOOTING**

### **Display Indications/Common Problems/Possible Solutions**

#### **No Functions**

- Check and make sure the charger is plugged into a live 110/120 volt AC outlet.
- Follow the steps outlined in the Operating Instructions section.

### **F01 — Internal Shorted Cell Battery**

If the battery being charged has an internal shorted cell, the F01 will show. We recommend taking your battery to a certified automotive service center for evaluation.

### **F02 — Bad Battery Connection or Battery Voltage Too Low to Accept Charge**

When F02 appears, the most common cause is poor connection to battery.

- Follow the steps outlined in “Important Safety Instructions” at the front of this manual to disconnect AC cord and clamps, clean battery terminal and reconnect.
- If the situation persists, we recommend taking your battery to a certified automotive service center for evaluation.

### **F03 — Sulfate or Unchargeable Battery**

Appears when the battery is highly sulfated and cannot accept normal charge current.

- Follow the steps in “Recondition Mode” to recondition the battery.
- Follow the steps in “Equalizing” to equalize the battery.
- If the situation persists after reconditioning and equalizing, we recommend taking your battery to a certified automotive service center for evaluation.

### **F04 — Overtime Condition**

Appears when charging time exceeds 18 hours. You may be using a charge current rate too low for a large battery. Select higher charge rate to charge the battery.

### **F05 — Overheated Condition**

The ventilation grill that prevents the air from flowing in and out of the charger may be blocked.

- Follow the steps outlined in “Important Safety Instructions” at the front of this manual to disconnect AC cord and clamps, allow the unit to cool for 30 minutes and reconnect.
- Make sure there is ample ventilation before resuming operation.

### **F06 — Reverse Polarity**

The connections to the battery’s positive and negative terminals are incorrect. Follow the steps outlined in “Important Safety Instructions” at the front of this manual to disconnect AC cord and clamps and reconnect to battery with correct polarity.

### **F07 — Alternator Voltage**

Alternator output voltage is out of typical operation range.

### **Charging a Very Cold Battery**

If the battery to be charged is very cold (in temperatures below freezing — 0°C/ 32°F), it cannot accept a high rate of charge. The initial charge rate will be low. The charge rate will increase as the battery warms. Never attempt to charge a frozen battery.

## **CARE AND MAINTENANCE**

With proper care and minimal maintenance, the **40 Amp Smart™ Battery Charger** will provide years of dependable service. For maximum performance, manufacturer recommends:


- After each use, clean the battery charger clamps — be sure to remove any battery fluid that will cause corrosion of the clamps.
- Clean the outside case of the charger with a soft cloth and, if necessary, mild soap solution.
- Do not allow liquid to enter the charger. Do not operate when charger is wet.
- Keep the charger cords loosely coiled during storage to prevent damage to the cords.

### **⚠ WARNINGS:**

- Do not use charger if cords or clamps have been damaged in any way — call Technical Support toll-free at (800) 544-6986.
- There are no user-serviceable parts in this unit.
- Do not open the unit. In the event of malfunction, it must be returned to manufacturer for professional testing and repair. Opening the unit will void the manufacturer’s warranty.

## Accessories

Recommended accessories for use with your tool are available from your local dealer or authorized service center. If you need assistance regarding accessories, please call: **1-800-544-6986**.

 **WARNING:** The use of any accessory not recommended for use with this tool could be hazardous

## SERVICE INFORMATION

All Black & Decker Service Centers are staffed with trained personnel to provide customers with efficient and reliable power tool service. Whether you need technical advice, repair, or genuine factory replacement parts, contact the Black & Decker location nearest you. To find your local service location, refer to the yellow page directory under "Tools—Electric" or call: 1-800-544-6986 or visit [www.blackanddecker.com](http://www.blackanddecker.com).

## FULL FIVE-YEAR HOME USE WARRANTY

Black & Decker (U.S.) Inc. warrants this product for five years against any defects in material or workmanship. The defective product will be replaced or repaired at no charge in either of two ways.

The first, which will result in exchanges only, is to return the product to the retailer from whom it was purchased (provided that the store is a participating retailer). Returns should be made within the time period of the retailer's policy for exchanges (usually 30 to 90 days after the sale). Proof of purchase may be required. Please check with the retailer for their specific return policy regarding returns that are beyond the time set for exchanges.

The second option is to take or send the product (prepaid) to a Black & Decker owned or authorized Service Center for repair or replacement at our option. Proof of purchase may be required. Black & Decker owned and authorized Service Centers are listed under "Tools-Electric" in the yellow pages of the phone directory and on our website [www.blackanddecker.com](http://www.blackanddecker.com).

This warranty does not apply to accessories. This warranty gives you specific legal rights and you may have other rights which vary from state to state or province to province. Should you have any questions, contact the manager of your nearest Black & Decker Service Center. This product is not intended for commercial use.

**FREE WARNING LABEL REPLACEMENT:** If your warning labels become illegible or are missing, call 1-800-544-6986 for a free replacement.

## SPECIFICATIONS

Input: 120V AC 60Hz, 700 watts continuous  
1500 watts engine start

Output: 12 volts DC, 4/10/20/40 amps continuous  
110 amps engine start

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. This limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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