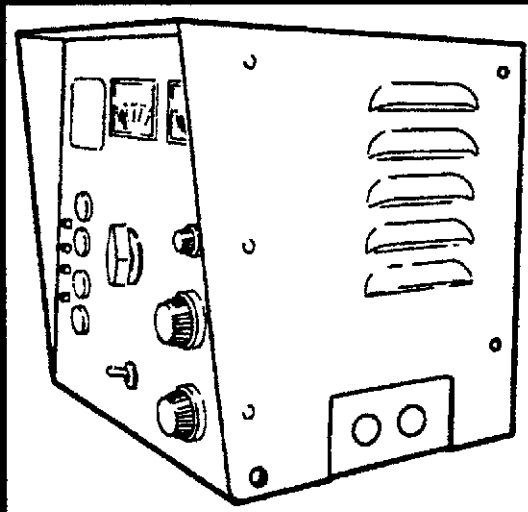


# Operator's Manual

## 12 and 24 Volt Battery Charger



**Models**  
305-0812, 305-0813, 305-0814, 305-0815

# Safety Precautions

This manual includes the following symbols to indicate potentially dangerous conditions to the operator or equipment. Read the manual carefully and know when these conditions exist. Then take the necessary steps to protect personnel and the equipment.

**▲ DANGER** *This symbol warns of immediate hazards that will result in severe personal injury or death.*

**▲ WARNING** *This symbol refers to a hazard or unsafe practice that can result in severe personal injury or death.*

**▲ CAUTION** *This symbol refers to a hazard or unsafe practice that can result in personal injury or product or property damage.*

## IMPORTANT SAFETY INSTRUCTIONS

1. Save these instructions. This manual contains important safety and operating instructions.
2. Working in the vicinity of a battery is dangerous. Batteries generate explosive gasses during normal battery operation. For this reason, it is of utmost importance that each time before using the battery charger, you read all instructions and cautionary markings on the battery charger, the battery, and the generator set.
3. To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment that is used in the vicinity of the battery. Review and follow all cautionary markings on these products.
4. CAUTION - To reduce risk of injury, only use the battery charger to charge rechargeable batteries. Other types of batteries (such as dry cell batteries) can burst, causing personal injury and property damage.
5. Never smoke or allow an open spark, arcing equipment or flame in the vicinity of the battery or generator set.
6. Do not expose the battery charger to rain, snow or other precipitation.
7. Never charge a frozen battery.
8. Use of an attachment not recommended or sold by the battery charger manufacturer can result in a risk of fire, electric shock, or personal injury.
9. Do not operate the battery charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service technician.
10. Do not disassemble the battery charger; take it to a qualified service technician when service or repair is required. Incorrectly reassembly can result in a risk of electric shock or fire.
11. To reduce the risk of electrical shock, disconnect the battery charger from AC power before performing any maintenance or cleaning. Turning off controls does NOT reduce this risk.
12. If it is necessary to remove the battery from the generator set battery tray to charge, always remove the grounded (-) terminal from the battery first. Make sure that all switches on the generator set control panel are off in order to prevent an arc.
13. Study all battery manufacturer's specific precautions, such as removing or not removing cell caps while charging and recommended rates of charge.
14. Do not use the battery charger unless the battery voltage matches the output voltage rating of the charger. Refer to the generator set operator's manual to determine the voltage of the battery.
15. Never place the charger directly above or below the battery; gases or fluids from the battery can corrode and damage the charger. Locate the charger as far away from the battery as practical.
16. Do not operate the battery charger in a closed-in area or restrict ventilation in any way.
17. Grounding Instructions: This battery charger should be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor should be run with circuit conductors and connected to an equipment-grounding terminal or lead on the battery charger. Connections to the battery charger must comply with all local codes and ordinances.

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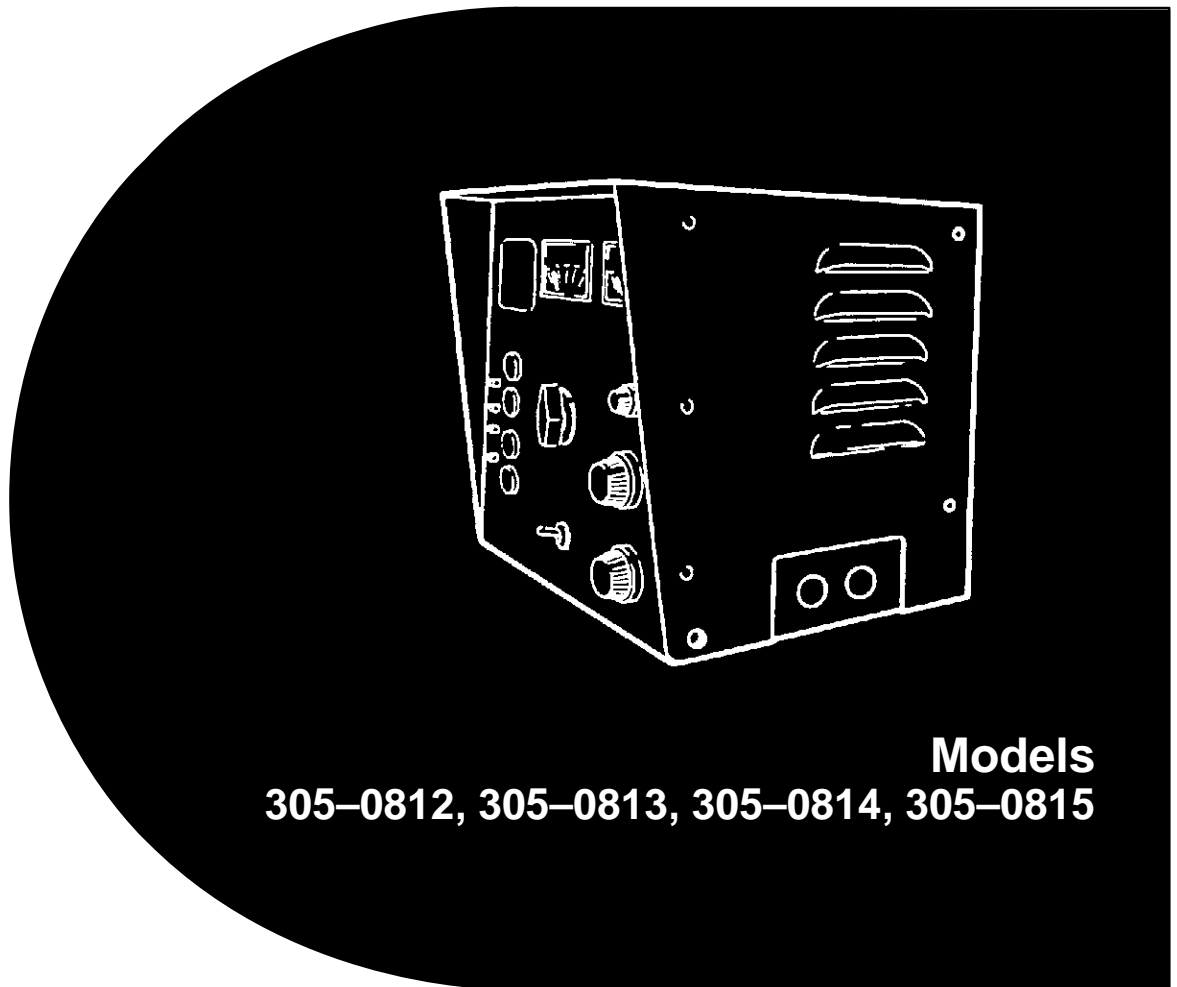
**⚠ WARNING**

***INCORRECT SERVICE OR REPLACEMENT OF PARTS CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE QUALIFIED TO PERFORM ANY SERVICE.***



# Operator's Manual

## 12 and 24 Volt Battery Charger



**Models**  
**305-0812, 305-0813, 305-0814, 305-0815**

# Operation

## DESCRIPTION

All controls, meters, indicators and fuses are accessible from the front panel of the battery charger (Figure 1). In addition to these external components, three sets of alarm relay contacts are also available.

If the battery voltage rises above an adjustable maximum voltage level or drops below an adjustable minimum voltage level for 90 seconds, a corresponding (High Bat. or Low Bat.) red alarm LED is lit and a corresponding set of form C relay contacts is activated.

If the AC input voltage fails, a red AC Failure LED is lit and a corresponding set of form C relay contacts is activated.

## Controls

**Power On/Off switch:** Controls both AC and DC power circuits.

**Equalize Charge Timer:** When this timer is set, the charger's DC output voltage is increased (to an adjustable level) until the timer expires (up to 12 hours). To use this timer, turn the indicator past 2 and then set the desired time.

**Equalize Voltage adjustment potentiometer:** Used to adjust the (factory-set) equalize voltage. The equalize voltage is the higher of the two charge voltages.

**Float Voltage adjustment potentiometer:** Used to adjust the (factory-set) float voltage. The float voltage is the lower of the two charge voltages.

**High Alarm adjustment potentiometer:** Used to adjust the (factory-set) maximum battery (High Bat.) alarm voltage.

**Low Alarm adjustment potentiometer:** Used to adjust the (factory-set) minimum battery (Low Bat.) alarm voltage.

The high and low alarm and float and equalize voltage adjustments are set at the factory. Adjustment procedures are described under *Adjustments*.

## Meters

**DC Ammeter:** Indicates the charger output current. It is normal for the ammeter indicator to jump between 0 and 2 amperes when the battery is at its float voltage.

**DC Voltmeter:** Indicates the voltage at the battery.

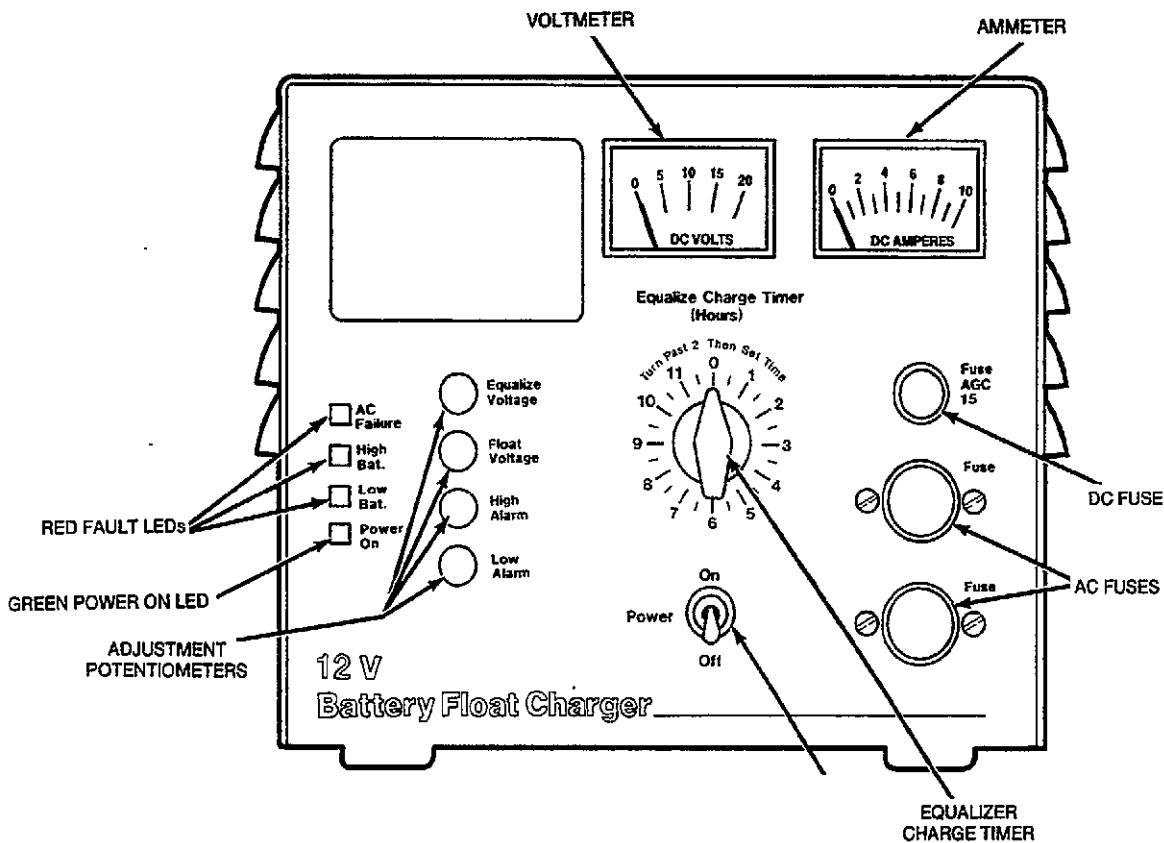


FIGURE 1. BATTERY CHARGER

C-1119

## LED Indicator Lamps

**Power On LED:** This green LED indicates that there is AC power to the charger.

**High Bat LED:** This red LED indicates that battery voltage has exceeded a pre-set maximum level.

**Low Bat LED:** This red LED indicates that battery voltage has fallen below a pre-set minimum level.

**AC Failure LED:** This red LED indicates that there is no AC power to the charger.

If a red LED is illuminated, refer to the *Troubleshooting* section.

## Fuses

**DC output fuse:** 15 Amp AGC

**AC input fuses:** The AC fuse rating and type (FNQ or KTK) is indicated on the front panel, next to the corresponding fuse holder.

When replacing blown fuses, be sure to use a fuse of the same rating and type. Do not use fuses with a higher rating.

## Alarm Contacts

Three sets of (form C) alarm relay contacts (corresponding to the three red fault LEDs) are also available. These contacts can be wired by the installer to activate other audible or visual alarms.

Under normal operating conditions, the Low Bat and AC Fail relays are energized and the High Bat relay is de-energized. In response to a Low Bat or AC Fail condition, the appropriate normally energized relay (Low Bat or AC Fail) drops out. In response to a High Bat condition, the normally de-energized High Bat relay is energized.

The alarm contacts are rated for 4 amperes at 120 VAC or 30 VDC.

## BATTERY CHARGING

This battery charger is intended for use in a permanently wired, industrial application. Installation and service are to be performed only by technically qualified personnel.

**Power On - Float Charge:** Turn the power switch to ON to charge the connected battery to the float voltage. The charger's electronic sensor checks the battery voltage. If the battery voltage is below the reference level, the charger supplies charging current to the battery. As the battery approaches a pre-set full charge voltage, charging current automatically tapers to zero.

The charger can be powered on a continuous basis to maintain the battery in a fully charged condition.

**Equalize Charge Timer:** For faster charging or to equalize the battery's cells, a higher charging voltage is obtained by switching on the equalize charge timer. Turning on the timer raises the charger output voltage for the selected time interval (up to 12 hours). At the end of the timed charging period, the charger automatically switches back to the float voltage.

To use this timer, turn the indicator past 2 and then set the desired time.

Most lead-acid battery manufacturers recommend equalize charging each month. Use the equalize charge timer to equalize float charged lead-acid batteries at intervals recommended by the battery manufacturer. Nickel-cadmium batteries do not require equalize charging.

## ADJUSTMENTS

### Battery Charger Float and Equalize Voltages

The float and equalize voltages are set at the correct values at the factory and should not require adjustment. However, if the battery shows signs of being overcharged or undercharged, these voltages can be adjusted. A high specific gravity, bubbling of electrolyte, and loss of water indicate a high charge voltage. A low specific gravity indicates a low charge voltage.

To change the float voltage, a fully charged battery, a hydrometer, a small screwdriver, and an accurate voltmeter (0.5% accuracy) are needed. Use the following procedures to adjust the float voltage:

1. Turn the battery charger power switch to Off. Turn the operation selector for the generator set to STOP and disconnect the starting battery (negative [-] lead first). The selector switch is located on the generator set control panel.

**▲WARNING** *Ignition of explosive battery gases can cause severe personal injury. Do not smoke or cause any spark, arc, or flame while servicing batteries.*

2. Connect the fully charged battery to the charger (negative [-] lead last) and verify the charge condition with the hydrometer. A fully charged lead-acid battery will have a specific gravity of 1.260 at 77°F (25°C).

**▲WARNING** *Battery electrolyte can cause severe eye damage and burns to the skin. Wear goggles, rubber gloves and a protective apron when working with batteries.*

3. Connect the voltmeter directly to the battery terminals. Turn the charger power switch to On, and measure the voltage.
4. Compare the voltage reading with the float value shown in Table 1. If the voltage is above or below the recommended float voltage, adjust as specified in step 5. If the voltage is correct, proceed to step 6.

**TABLE 1. FLOAT/EQUALIZE VOLTAGES**

Lead-Acid Batteries		
Battery Voltage	*Float Voltage	Equalize Voltage
12	13.3	14.4
24	26.6	28.8
Nickel-Cadmium Batteries Float Voltage Charge Per Cell		
1.38 to 1.45		
Example: Float charge for 10 cell battery should be 13.8 to 14.5 volts.		
*Voltages shown are for ambient temperatures of 50°F (10°C) to 85°F (30°C). Reduce float voltage by 1% for every 9°F (5°C) above 85°F (29°C). Increase float voltage by 1% for every 9°F (5°C) below 50°F (10°C).		

5. Remove the plastic plug that covers the float adjustment potentiometer. Use a small screwdriver to turn the float adjustment potentiometer counterclockwise to decrease the float voltage and clockwise to increase the float voltage. Adjust in small steps and wait five minutes for the voltage to stabilize before making additional adjustments.
6. After the float adjustment is completed, set the equalize timer to equalize charge the battery and wait until the charger current falls below 5 amperes.
7. Compare the voltage reading with the equalize value shown in Table 1. If the voltage is above or below the recommended equalize voltage, adjust as specified in step 8. If the voltage is correct, proceed to step 9.
8. Remove the plastic plug that covers the equalize adjustment potentiometer. Use a small screwdriver to turn the equalize adjustment potentiometer counterclockwise to decrease the equalize voltage and clockwise to increase the equalize voltage. Adjust in small steps and wait five minutes for the voltage to stabilize before making additional adjustments.

9. When adjustments are complete, turn the charger power switch to Off and replace the plastic plugs.
10. Disconnect the voltmeter from the battery terminals and disconnect the test battery from the charger (negative [-] lead first).

**⚠ WARNING** Ignition of explosive battery gases can cause severe personal injury. Do not smoke or cause any spark, arc, or flame while servicing batteries.

11. Reconnect the generator set starting battery (negative [-] lead last) and place the operation selector switch in the Remote position. Turn the charger power switch to On and reset the equalizer timer to zero for float charging.

### Alarm Relay Settings

If the battery voltage rises above the High alarm setting or drops below the Low alarm setting for 90 seconds, the corresponding (High or Low) battery alarm LED is lit and a corresponding (optional) set of form C relay contacts is activated.

The high and low alarm adjustments are set at the factory. The ranges and factory settings are:

#### 12-volt charger-

9 VDC to 13 VDC (Low Alarm)  
Factory Setting: 12.5 VDC

14 VDC to 19 VDC (High Alarm)  
Factory Setting: 14.5 VDC

#### 24-volt charger-

18 VDC to 25 VDC (Low Alarm)  
Factory Setting: 25 VDC

27 VDC to 36 VDC (High Alarm)  
Factory Setting: 29 VDC

1. Remove the plastic plugs that cover the adjustment potentiometers.
2. Use a small screwdriver to turn the High Alarm or Low Alarm adjustment potentiometers on the charger panel counterclockwise to decrease the alarm voltage and clockwise to increase the alarm voltage.

The graduations on the adjustment potentiometers are approximate.

3. When finished, replace the plastic plugs.



# Troubleshooting

The following procedures (Table 2) describe preliminary troubleshooting checks. If the trouble persists, call a service representative.

**⚠ WARNING** Voltages within the charging system present an electrical shock hazard that can cause severe personal injury or death. Disconnect all sources of AC and DC power from the battery charger before servicing.

**⚠ WARNING** Ignition of explosive battery gases can cause severe personal injury. Do not smoke or cause any spark, arc, or flame while servicing batteries.

**TABLE 2. TROUBLESHOOTING PROCEDURES**

TROUBLE	POSSIBLE CAUSE	CORRECTIVE ACTION
No DC Output.	<ol style="list-style-type: none"> <li>1. Blown DC fuse.</li> <li>2. Blown AC fuse(s). (AC Failure LED will be lit)</li> <li>3. No AC input. (AC Failure LED will be lit)</li> <li>4. Charger failure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Correct possible overload and replace fuse - use fuse of same type and rating.</li> <li>2. Replace fuse(s) - use fuse(s) of same type and rating.</li> <li>3. Call a service representative.</li> <li>4. Call a service representative.</li> </ol>
Low DC Output.	<ol style="list-style-type: none"> <li>1. Incorrectly set float or equalize voltages. (Low Bat. LED may be lit)</li> <li>2. Faulty battery. (Low Bat. LED may be lit)</li> <li>3. Charger failure. (Low Bat. LED may be lit)</li> </ol>	<ol style="list-style-type: none"> <li>1. Refer to voltage adjustment procedures.</li> <li>2. Replace battery - procedure is described below.</li> <li>3. Call a service representative.</li> </ol>
High DC Output.	<ol style="list-style-type: none"> <li>1. Incorrectly set float or equalize voltages. (High Bat. LED may be lit)</li> <li>2. Charger failure. (High Bat. LED may be lit)</li> </ol>	<ol style="list-style-type: none"> <li>1. Refer to voltage adjustment procedures.</li> <li>2. Call a service representative.</li> </ol>
Float or Equalize Charge Rate Only.	<ol style="list-style-type: none"> <li>1. Defective equalize timer.</li> <li>2. Defective Regulator.</li> </ol>	<ol style="list-style-type: none"> <li>1. Call a service representative.</li> <li>2. Call a service representative.</li> </ol>

## Battery Replacement

**⚠ WARNING** Ignition of explosive battery gases can cause severe personal injury. Do not smoke or cause any spark, arc, or flame while servicing batteries.

1. Turn the battery charger power switch to Off. Turn the operation selector for the generator set to STOP and disconnect the starting battery (negative [-] lead

first). The selector switch is located on the generator set control panel.

2. Connect the replacement starting battery (negative [-] lead last) and place the operation selector switch in the Remote position. Turn the charger power switch to On. If the battery is fully charged and equalize charging is not required, set the equalizer timer to zero for float charging.





**Cummins Power Generation**  
1400 73rd Avenue N.E.  
Minneapolis, MN 55432  
1-800-888-6266  
763-574-5000 International Use  
Fax: 763-528-7229

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