

# AUTO CHARGE 4000

**AUTOMATIC DUAL OUTPUT BATTERY CHARGER**



**MODEL #: 091-89-12**

**INPUT: 120 Volt, 50/60 Hz, 8 Amps**

**OUTPUT BATTERY CHARGER: 40 Amps**

**OUTPUT BATTERY SAVER: 5 Amps**

File: IM\_091-89-12\_reve.indd  
Rev: E  
Revised By: MFG  
Date: 10-22-2013

**3 YEAR WARRANTY**



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# IMPORTANT SAFETY INSTRUCTIONS

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## I. PERSONAL PRECAUTIONS:

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear complete eye and clothing protection. Avoid touching your eyes while working near a battery.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If battery acid enters the eye, immediately flood eye with cold running water for at least 10 minutes and get medical attention immediately.
5. **NEVER** smoke or allow a spark or flame in the vicinity of the battery or engine.
6. Be extra cautious to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part and cause a fire or an explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery, when shorted, can produce a current sufficient to weld a ring or the like metal causing a severe burn.
8. Use the battery charger for charging gel-cell, AGM and flooded lead-acid batteries only. Do not use the charger for charging dry-cell batteries that are commonly used with home applications. These batteries may burst and cause injury to persons and damage to property.
9. **WARNING – RISK OF EXPLOSIVE GASES:** Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation.

## II. CHARGER PRECAUTIONS:

1. **NEVER** charge a frozen battery.
2. Make sure the cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
3. Do not operate the charger with a damaged cord or plug; replace them immediately.
4. Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged.
5. Do not disassemble the charger. Incorrect reassembly may result in a risk of electric shock and fire.
6. To reduce the risk of electric shock, disconnect the charger from the AC source before attempting any maintenance or cleaning.
7. **LOCATION OF CHARGER:** The charger should be mounted on a wall, vehicle floor, ventilated compartment or other suitable surface as close to the batteries to be charged as possible. Do not block the charger's fan or air intakes. Do not mount the charger directly over the batteries as fumes may cause excessive corrosion. The area should be well ventilated and free from excessive moisture, exhaust manifolds, and battery fumes. For maximum performance, the charger should not be located in an area of extreme high temperature. The charger is not waterproof. Do not mount the charger where there is a possibility of water entering the unit. Evidence of water entry into the charger will void the warranty.
8. **CAUTION:** Do not attempt to increase battery bank capacity by splitting the output of one of the banks with a diode-type battery isolator. The diode isolator lowers the charger voltage and results in under-charging the batteries connected to it. If additional capacity is required it is preferable to add another isolated or parallel battery.

## III. GROUND AND AC POWER CORD CONNECTION:

1. The charger should be grounded via the AC power connection to reduce the risk of electrical shock.
2. The charger must be plugged into or wired to an outlet that is an over-current protected 3 prong outlet. Alternatively, it may be routed through a separate dedicated fuse or circuit breaker on an AC distribution panel with proper earth/safety ground. All wiring shall comply with UL recommendations, NEC or NFPA standards and local ordinances. Never alter the AC cord or plug if provided. Any modification of the cord must only be done by a qualified electrician. Improper cord/outlet connection may result in a risk of electrical shock.
3. Observe color coding of the AC wiring as follows:

Black.....	AC Hot or LINE (fused)
White.....	AC Neutral
Green.....	AC Ground (safety/earth)
4. **CAUTION:** (230 VAC applications only): If AC input is provide from a source consisting of two HOT or LINE leads (phase-to-phase 230 VAC input voltage); an external fuse or circuit breaker must be used to protect both hot leads.

# INTRODUCTION

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The Auto Charge 4000 is a compact, completely automatic, dual channel battery charger designed for vehicles with a dual battery system. The charger is ruggedized to withstand the shock and vibration encountered by vehicle mounted equipment.

## FEATURES

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### I. AUTO CHARGE 4000 BATTERY CHARGER

- Independent charge controls for each battery
- Electronic remote sensing of true battery voltages, eliminates the need for sensing wires
- Automatic current limiting
- Built-in Battery Saver
- Remote dual battery charge/condition indicator
- Power "ON" LED indicator
- Battery Saver overload indicator

### II. CHARGE CONTROLS & ELECTRONIC REMOTE SENSING

The Auto Charge 4000 contains two independent charge controls, one for each battery. Automatic electronic remote sensing measures the true voltage of each battery, eliminating the need for the additional sense wires. The output current of any charger is inherently a series of pulses whose frequency is determined by the power line frequency. Therefore there are brief intervals during which no charging current flows. During this brief interval the Auto Charge 4000 measures and stores the battery voltage. This voltage is compared to a standard and any error is detected and used to control the charger output to the desired level. There is no "trickle charge" and therefore no danger of overcharging and water boil-off.

### III. AUTOMATIC CURRENT LIMITING

When batteries are severely discharged, some battery chargers can be overloaded due to the high charging current required. The Auto Charge 4000 contains an automatic current limit. This current limits the output current to the rated 40 amperes when charging a deeply discharged battery or if the starter cranks the engine while charging. The current limiter thus eliminates the need for an ignition interlock circuit.

## IV. BATTERY SAVER

A 5 ampere Battery Saver is built into the charger. When connected as shown in the installation wiring diagram, loads on the vehicle battery such as radios and rechargeable hand lights are automatically switched to the Battery Saver when power is applied to the charger. The Battery Saver allows more efficient charging by removing these loads. A Battery Saver overload indicator alerts the operator that the Battery Saver load has exceeded 5 amperes.

### WHEN A BATTERY SAVER OVERLOAD OCCURS:

- a. Remove the loads for approximately two minutes
- b. Reduce the load to 5 amperes or less
- c. Reapply the load to the Battery Saver

No fuses are required or provided as the Battery Saver contains an automatic circuit breaker.

## V. BATTERY SAVER CAUTION

**CAUTION:** This battery saver output is a full wave rectified sine wave. The 12.5 volts D.C. has a peak value of approximately 17.5 volts.

It is recommended that the loads are not highly capacitive. A large capacitor on the load terminal will “peak detect” the output and create a voltage of approximately 17 volts. This voltage may be too high for the component connected.

It is suggested that the installer check the output of the battery saver (when operating with A.C. Input) and determine as each load is connected that the voltage does not rise. Any load that creates an increase in voltage should not be connected to the battery saver but rather be connected directly to the battery.

## VI. REMOTE BATTERY CHARGE CONDITION INDICATOR

This remote indicator shows the charge condition of each battery in 10 levels from “LOW CHARGE” to “FULLY CHARGED”. This device indicates a defective battery when a bar graph does not rise to the “FULLY CHARGED” level after an extended period of charging.

Note: If a battery is being charged with an external load of 1.5 to 4 amperes across it’s terminals, the bar graph may move down 1 or 2 levels. This does not indicate a defective battery.

To avoid this, connect all external loads to the Battery Saver terminals.

Loads connected to the Battery Saver will be powered either from the Battery Saver power supply when the A.C. power is “ON”, or they will be connected to battery #1 when the A.C. power is “OFF”.

# WIRING

## I. BATTERY CHARGER WIRING INSTRUCTIONS

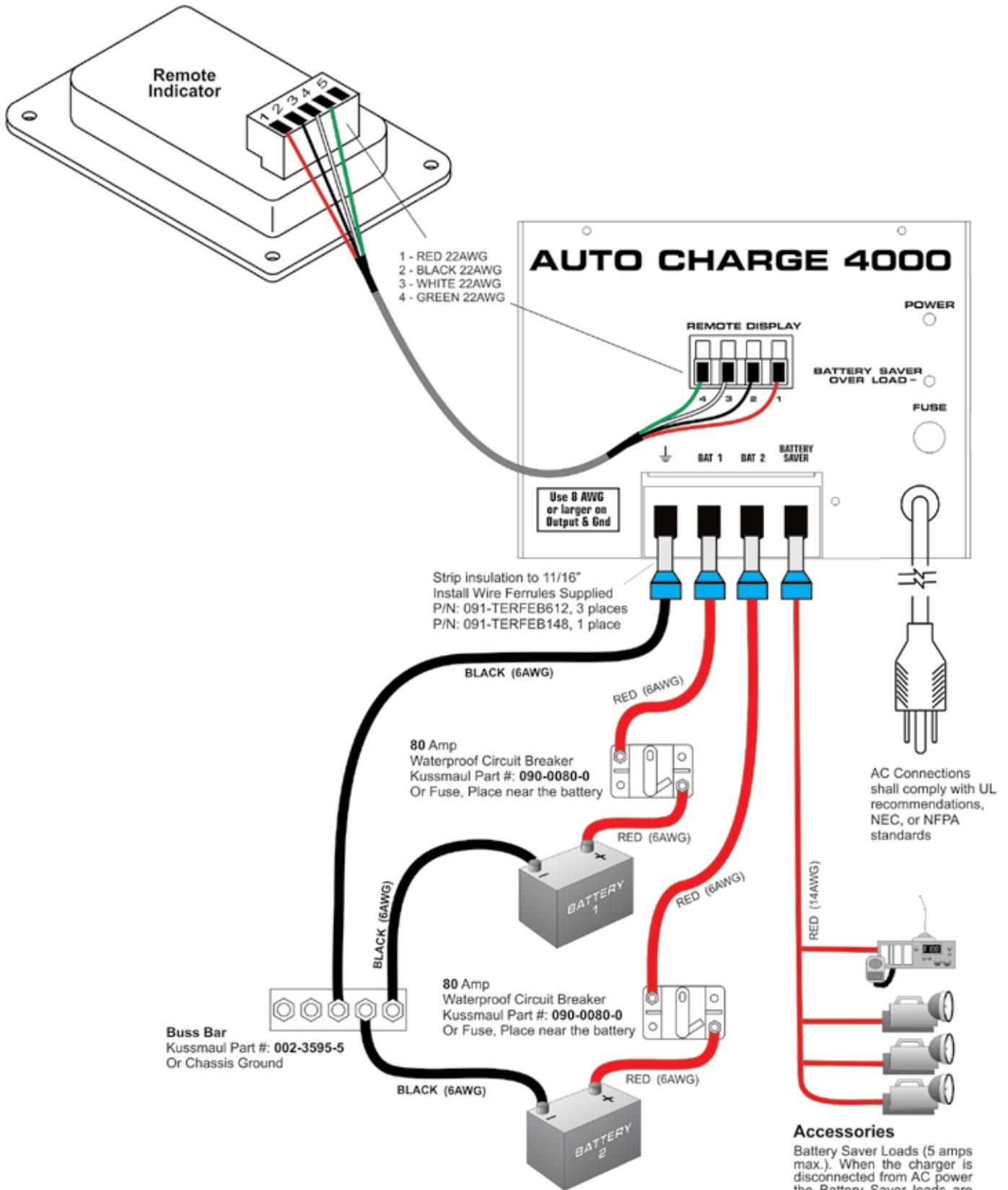
1. Refer to Installation Wiring Diagram.
2. Refer to Wiring Specifications to determine the recommended wire size and maximum lengths. Using a smaller gauge may cause overheating of the terminal. Additional information is available upon request if longer, larger wiring is required.
3. Double check all wiring before applying AC power volts to input terminal.
4. Apply AC power (shoreline power) to input terminal and observe that the charger is operating.
5. Verify that the battery voltage appears at the charger output terminals.

## II. WIRING SPECIFICATIONS

Length of Wire to Battery (feet)	0-5				5 - 10**				10 - 20*			
Battery Charger Connections	COM -	BAT 1+	BAT 2+	B.S. +	COM -	BAT 1+	BAT 2+	B.S. +	COM -	BAT 1+	BAT 2+	B.S. +
Wire # Gauge (awg)	8	8	8	14	6	6	6	14	4	4	4	14
Wire Ferrule Used	091-TERFER812	091-TERFER812	091-TERFER812	091-TERFEB148	091-TERFEB612	091-TERFEB612	091-TERFEB612	091-TERFEB148	none	none	none	091-TERFEB148
* Consult factory if length of wire to battery is longer than 20 feet												
** Supplied with wire terminal hardware for 10 foot installation												

# INSTALLATION WIRING DIAGRAM

## I. WIRING DIAGRAM IS FOR A 10 FOOT INSTALLATION



Please read **Caution Note** on **Page 4** when using high capacitance loads.

## SPECIFICATIONS

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**Input Power:** 120 Volt, 50/60 Hz, 8 Amperes

**Input Fuse:** 15 ampere, fast blow

**Output Power - Bat 1 & Bat 2:** 12 Volts DC, 40 Amperes Max, total both outputs

**Output Power - Battery Saver:** 12 Volts DC, 5 Amperes Max

**Remote Sensing:** Electronic, sense wires not required

**LED Status Indicators:**

**Power:** Red LED, Indicates 120 Volt AC power applied

**Battery Saver Overload:** Yellow LED, Flashing, Indicates Battery Saver load greater than 5 amps

**Charger Indicator:** Remote Dual Bar Graph Display

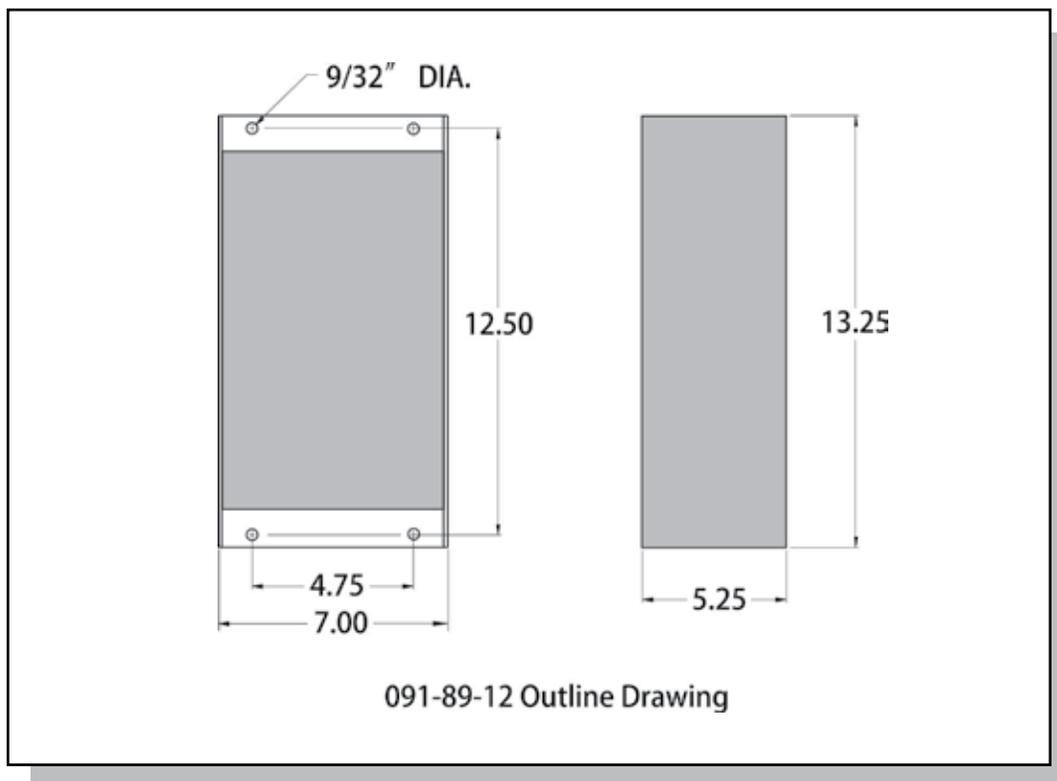
**Output Waterproof Circuit Breaker (Optional):** Bat 1 & Bat 2 - 80 Amperes, P/N: 090-0080-0

**Output Buss Bar (Optional):** 5 Studs, P/N: 002-3595-5

**Weight:** 24 pounds

## OUTLINE DRAWING

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# INSTALLATION RECORD

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DATE INSTALLED \_\_\_\_\_

INSTALLED BY \_\_\_\_\_

VEHICLE IDENTIFICATION \_\_\_\_\_

VEHICLE OWNER \_\_\_\_\_

# WARRANTY POLICY

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All products of Kussmaul Electronics Company Inc. are warranted to be free of defects of material or workmanship. Liability is limited to repairing or replacing at our factory, without charge, any material or defects which become apparent in normal use within 3 years from the date the equipment was shipped. Equipment is to be returned, shipping charges prepaid and will be returned, after repair, shipping charges paid.

Kussmaul Electronics Company, Inc. shall have no liability for damages of any kind to associated equipment arising from the installation and/or use of the Kussmaul Electronics Company, Inc. products. The purchaser, by the acceptance of the equipment, assumes all liability for any damages which may result from its installation, use or misuse, by the purchaser, his or its employees or others.



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