INSTRUCTION MANUAL

AUTO CHARGE 20/20

AUTOMATIC BATTERY CHARGER

MODEL #: 091-216-20/20

INPUT: 120 Volt, 50/60 Hz, 8.5 Amps

CHARGER OUTPUT: 20 Amps
BATTERY SAVER OUTPUT: 20 Amps

scan using your mobile device for more information

File: IM_091-216-2020_reva.indd
Rev: A
Revised By: MFG
Date: 12-10-2013

3 YEAR WARRANTY

170 Cherry Avenue
West Sayville, NY 11796
www.kussmaul.com

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IMPORTANT SAFETY INSTRUCTIONS

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 undercharging 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

The Auto Charge 20/20 is an intergrated charger with Battery Saver Low Ripple. Designed for installation on vehicles with a single battery system. The charger completely operates automatically and stops charging the batteries when they are fully charged. There is no trickle charge and therefore no danger of overcharging and water boil-off.
The Battery Saver output provides uninterrupted power to accessory loads whenever the vehicle is connected to AC power. This complete package simplifes installation and improves system relialility due to parasitic loads. These loads will be connected to the battery when the vehicle is in use but are removed automatically when shore power is supplied and are then powered by the Battery Saver.
Ammeters are provided to indicate Charger and Battery Saver output currents.
The charger is also ruggedized to withstand the shock and vibration encountered by vehicle mounted equipment.

FEATURES

I. AUTO CHARGE 20/20 BATTERY CHARGER

- Electronic control
- Automatic current-limit
- Intergrated Battery Saver Low Ripple
- Battery Saver Low Ripple output ATC fuse protected
- Front ammeter indicators
- LED status indicators
- Dual cooling fans
- Reverse polarity protected
- AC input circuit breaker protection

II. CHARGE CONTROLS

The Auto Charge 20/20 contains a precision voltage controller to maintain the battery's charge. The output voltage is line and load regulated to maintain constant output voltage. Using high-frequency switching technology, the output terminal voltage is compared to a reference voltage, any error detected is then used to control the charger output at the desired level. There is no "trickle charge" stage 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 20/20 is automatically current-limited. The current-limit feature limits the output current to 20 amperes when charging a deeply discharged battery, or if the starter cranks the engine while charging. The current-limit circuit thus eliminates the need for an ignition interlock circuit.

IV. BATTERY SAVER LOW RIPPLE (BSLR)

The BSLR is a DC power supply with a load transfer function. Accessories connected to the BSLR output are powered by the vehicle's battery when AC shore power is not available. When shore power is applied the accessory loads are automatically transfered from the vehicle battery to the BSLR. The uninterrupted transfer to the BSLR then provides low ripple DC to accessory loads. Utilizing the BSLR further protects the vehicle battery from discharging and ensures battery charger power is available to maintain vehicle batteries. The BSLR is unique in that there is no interruption of power to accessory loads during power transfers. This feature makes the BSLR ideal for Mobile Data Terminal (MDT) or other vehicle accessories.

V. BATTERY SAVER LOW RIPPLE (BSLR) OUTPUT ATC FUSE PROTECTED

The BSLR output ATC fuse is common to the BSLR and the vehicle battery. Do not exceed the BSLR output rating. Always manage loads to rated specifications.

VI. FRONT PANEL AMMETERS

Dual front panel ammeters are provided to indicate charger and Battery Saver output currents.

VII. LED STATUS INDICATORS

1. **AC ON**: Indicates that AC input voltage is present.
2. **REVERSE POLARITY**: Indicates battery polarity is incorrect

VIII. COOLING FAN

The 20/20 is fan cooled and automatically adjusts depending on output current or internal component temperature. Two fans circulate air from the rear panel and exhaust through the top cover. The rear panel fan blows air in and the top cover fan blows air out. When the load current increases or the internal component temperature increases, the fan speed increases to allow increased air circulation.

IX. REVERSE POLARITY PROTECTED

Incorrect vehicle battery polarity will disable charger startup.

X. AC INPUT CIRCUIT BREAKER PROTECTION

The AC input is fuse protected with a resettable circuit breaker, which protects from excessive input current.

OPERATION

I. BATTERY CHARGER OUTPUT

1. A discharged battery is recharged to roughly 90% or until the current tapers down to less than 2 amps. The output voltage never exceeds the float voltage, which is regulated from 0 to 20 amps (current-limit).

2. The charger will continue to charge the battery until the voltage at the battery reaches float voltage level.

II. BATTERY SAVER LOW RIPPLE OUTPUT (BSLR)

1. The BSLR eliminates power glitches or interruptions during power transfers. When power is tranferred from the vehicle battery to shore power or shore power to vehicle battery, power to accessory loads remains uninterrupted.

WIRING

I. BATTERY CHARGER WIRING INSTRUCTIONS

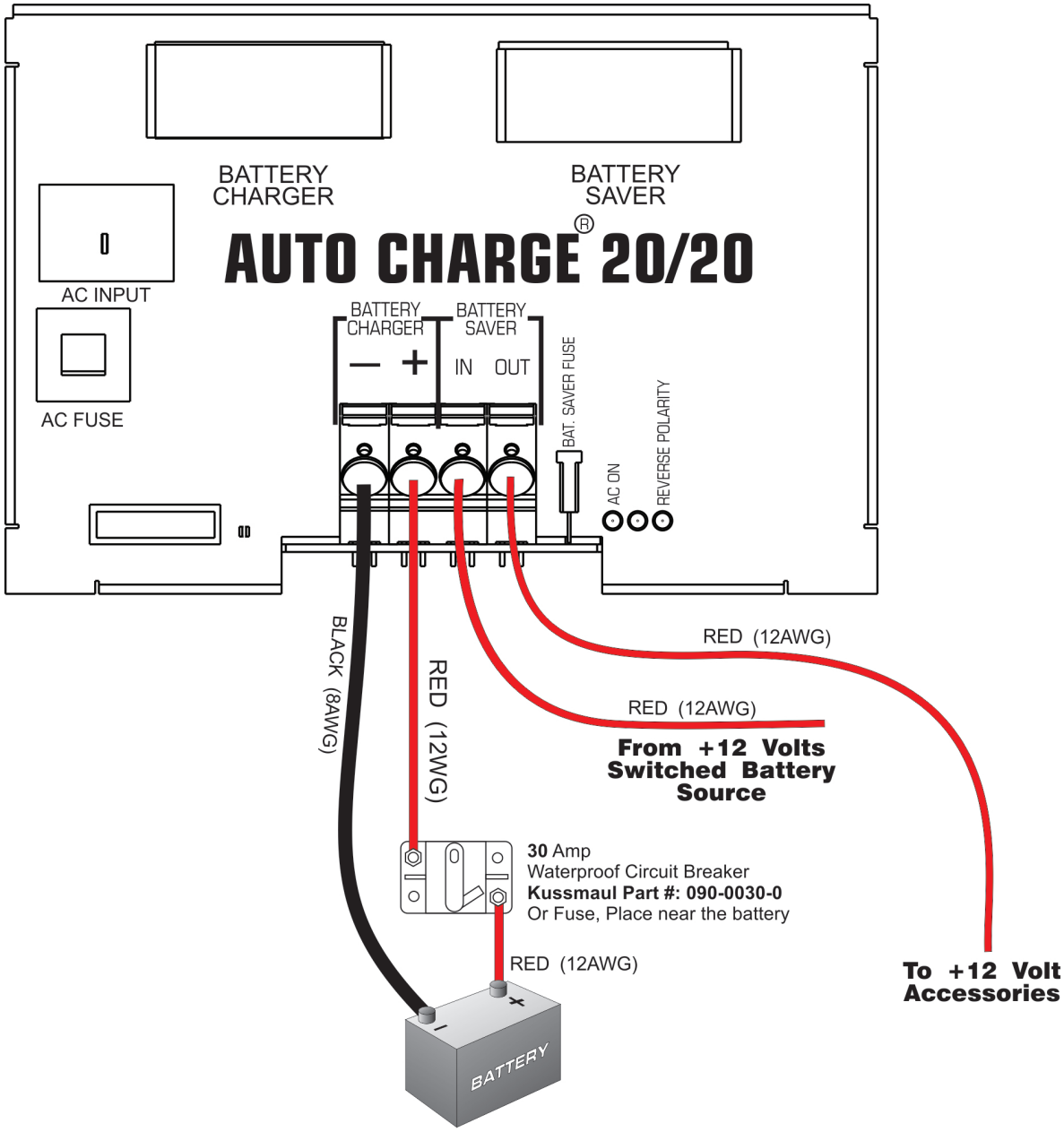
1. Refer to Installation Wiring Diagram.
2. Refer to Wiring Specifications to determine the recommended wire size and maximum lengths. Using a smaller gauge may cause overheating of the terminal. Additional information is available upon request if longer, larger wiring is required.
3. Both the battery charger's and battery saver's negative terminals must be connected to battery negative or chassis ground.
4. Double check all wiring before applying AC power to input terminal.
5. Apply AC power (shore power) and observe that the charger and BSLR are operating. When the AC power is applied, AC ON LED indicator will illuminate.
6. Verify that the battery voltage appears at the charger output terminals.

II. WIRING SPECIFICATIONS

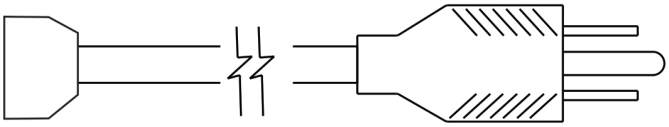
Length of Wire to Battery (feet)	0 - 5	< 5 - 10	< 10 - 20*
Wire # Gauge (AWG) BATTERY CHARGER - / + BATTERY SAVER IN / OUT	 8 / 12 12 / 12	 8 / 12 12 / 12	 6 / 10 10 / 10
* Consult factory if length of wire to battery is longer than 20 feet			

INSTALLATION WIRING DIAGRAM

I. Wiring Diagram shown is for a 10 foot installation



AC Connections shall comply with UL recommendations, NEC, or NFPA standards



3' IEC Power Cord, 16/3AWG, Supplied with unit

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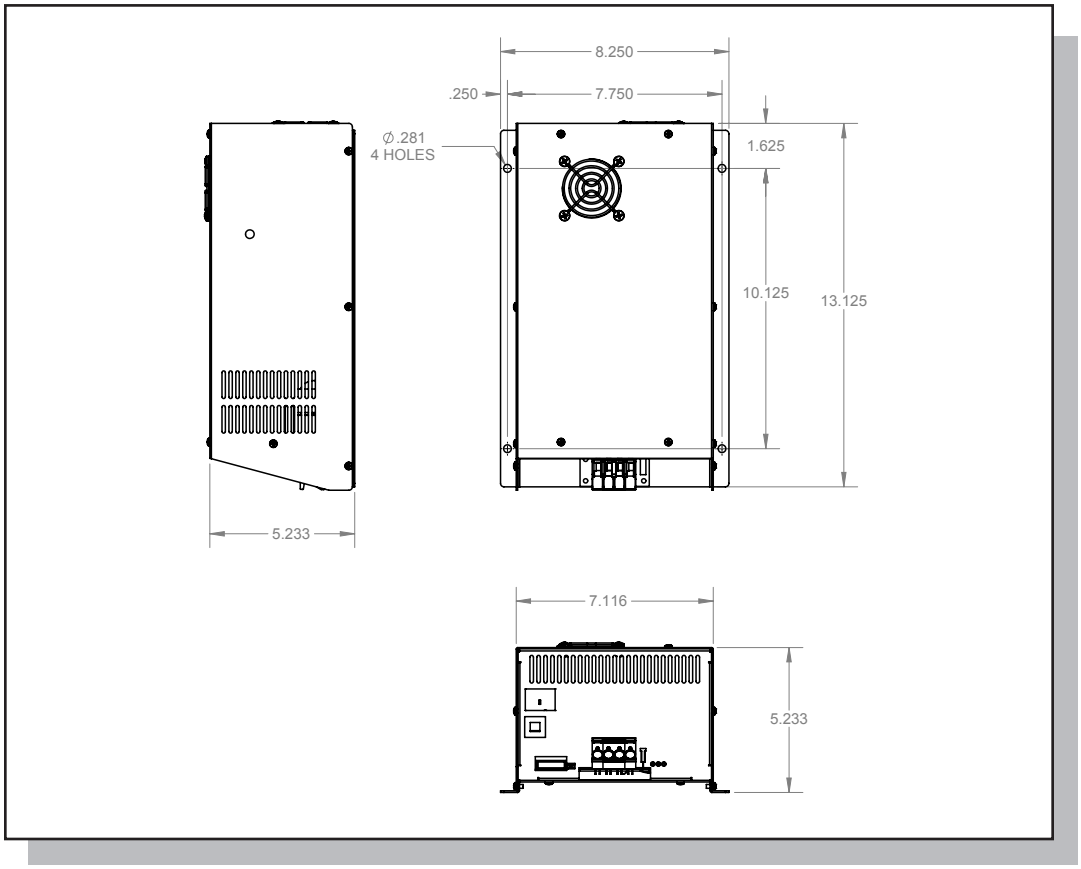
SPECIFICATIONS

Input Power: 120 VAC, 50/60 Hz, 8.5 Amps
Input Fuse: 10 Amp, resettable, circuit breaker
Battery Saver Low Ripple Output Fuse: 20 Amp, ATC fuse, 091-FUS0257020
Battery Charger Output Power: 12 volts DC, 20 amperes max
Battery Saver Low Ripple Output Power: 14.0 volts DC, 20 amperes max
LED Status Indicators: AC On, Reverse Polarity
Hardware Pack Provided: (1) 3-ft IEC cord
Charger Indicators: Front Panel Ammeters
Output Waterproof Circuit Breaker (Optional): 30 Amperes, P/N: 090-0030-0
Weight: 13 pounds

OUTLINE DRAWING



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INSTALLATION RECORD

DATE INSTALLED _____

INSTALLED BY _____

VEHICLE IDENTIFICATION _____

VEHICLE OWNER _____

WARRANTY POLICY

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.

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