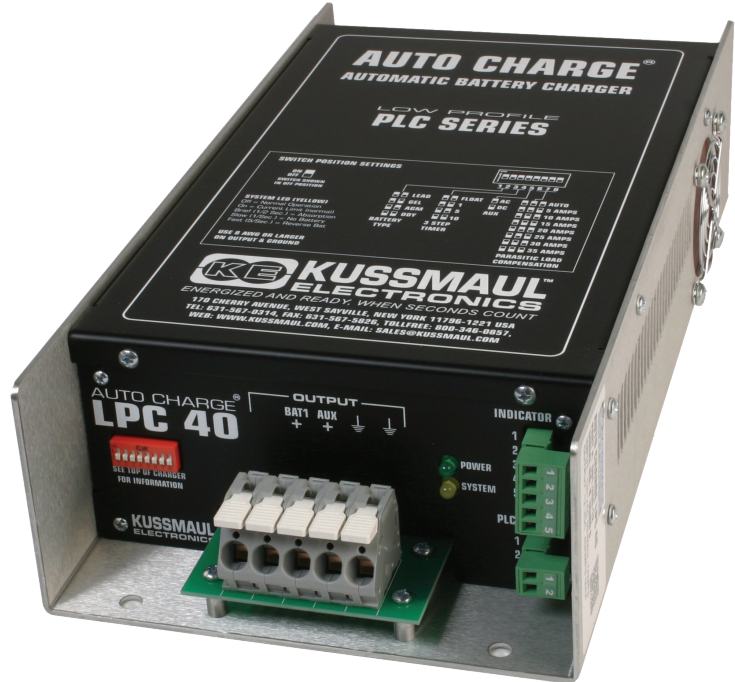
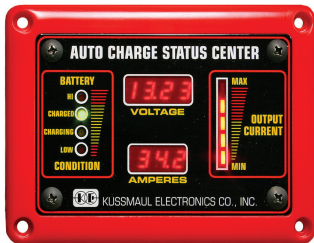
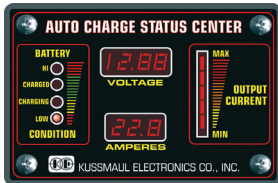


# LPC 40

## LOW PROFILE CHARGER WITH PLC AUTOMATIC SINGLE OUTPUT BATTERY CHARGER

Unit supplied with one of these displays



**MODEL # : 091-200-12**

**INPUT: 120 Volt, 50/60 Hz, 5 Amps**

**OUTPUT: 40 Amps**

File: IM\_091-200-12\_gen2\_REVA  
Rev: A  
Revised By: PSS/JRN  
Date: 07-13-17

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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 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

---

The LPC 40, with Parasitic Load Compensation (PLC) is a low profile, microprocessor controlled, completely automatic, single channel battery charger designed for vehicles with a single battery system. This latest generation of LPC charger improves upon user selectable functions and most importantly, parasitic loads. The LPC charger is also designed to withstand the shock and vibration encountered by vehicle mounted equipment.

## FEATURES

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### I. LPC 40 with PLC BATTERY CHARGER

- Automatic current limiting
- Voltage regulated output
- Remote battery charge/condition indicator display
- Accommodates Lead-Acid, Gelled Electrolyte, AGM and Odyssey® battery types
- Configurable for 3-Step or Float Charging
- Selectable 1, 5 or 10 hour Safety Timer while in 3-Step mode
- Adjustable Parasitic Load Compensation (5-35 amperes)
- Power "ON" LED indicator
- System Status indicator
- Internal cooling fan

### II. CHARGE CONTROLS & ELECTRONIC REMOTE SENSING

The LPC 40, with PLC contains a precision voltage controller to maintain the battery's charge. The output terminal is voltage regulated, and internal circuitry provides for constant power during loaded situations. 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" 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 LPC 40, with PLC, contains an automatic current limit. The current limit feature limits the output current to 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 SELECTOR SWITCH (LEAD-ACID, GEL-CELL, AGM, or ODYSSEY®)

DIP switches are used to select between various battery chemistries.

## V. AUX OUTPUT

The output terminal strip provides an additional output to accommodate 12 volt accessories, such as Kussmaul's 12 VDC air pump. The AUX output works in conjunction with a front panel mounted DIP switch. For normal operation, the DIP switch should be left in AC mode, which means that the aux accessory works only when shoreline power is supplied to the charger. With the switch in DC mode, the aux accessory will operate when AC power is ON or OFF. If AC power is off, the aux output operates from the vehicle's batteries.

## VI. LED STATUS INDICATORS

- a. **POWER:** Green LED, indicates AC power is applied.
- b. **SYSTEM:** See specifications page for description of system status.

## VII. COOLING FAN

The LPC 40 is fan cooled and automatically cycles on and off depending on output current. When the fan is on, air is circulated and exhausted through the right side. The fan cycles briefly when power is applied in order to verify that it is functioning.

## VIII. PLC - PARASITIC LOAD COMPENSATION

This new feature is especially designed to meet the heavy duty requirements of emergency vehicles. Most emergency vehicles have many parasitic loads on their systems (flash lights, gas detectors, computers, monitoring systems and other items) that can trick a standard 3-step charger into overcharging the batteries. Parasitic load compensation allows you to input the total number of parasitic load amps on the vehicle. The charger will then shift the absorption stage set-point so the battery voltage will drop to the float voltage when the desired current is reached. In short the parasitic loads are invisible to the charger. This will lead to a longer battery life and no overcharging or overheating.

# OPERATION

---

## I. BATTERY TYPE SELECTION SWITCHES

Switches "1" and "2" should be used to match the battery chemistry. Units are shipped with all switched down (default setting). Switches can be set as follows:

- Lead-Acid - Both switches down (off) - factory default setting
- Gelled Electrolyte (Gel-Cell) - Switch "1" down (off) and Switch "2" up (on)
- AGM - Switch "1" up (on) and Switch "2" down (off)
- Odyssey® - Both switches up (on)

**NOTE: See specifications for battery selector switch absorption and float voltage settings.**

## II. FLOAT / 3-STEP CHARGE MODE SELECTION SWITCHES

Switches “3” and “4” should be set for the desired charging method and 3-step safety timer period. The safety timer period begins when AC power is applied to the charger. The absorption phase of 3-step charging terminates when the safety timer expires, or when the PLC threshold setting is reached. If no PLC settings are set, the threshold is 5.0 Amps. The charger then switches to, and remains in, float mode while AC power is applied.

Float Charge Only - Both switches down (off) - factory default setting

3-Step with 1 Hour Safety Timer - Switch “3” down (off) and Switch “4” up (on)

3-Step with 5 Hour Safety Timer - Switch “3” up (on) and Switch “4” down (off)

3-Step with 10 Hour Safety Timer - Both switches up (on)

## III. AUX OUTPUT

Switch “5” controls the Aux output operating mode.

AC – Switch “5” down (off) - factory default setting.

DC – Switch “5” up (on).

In AC mode, the Aux accessories will operate only when AC power is applied to the battery charger. In DC mode, the Aux accessories will operate when the AC power is on or off. The Aux accessory is powered by the charger while AC power is applied to the charger and from the vehicle’s battery when no AC power is applied.

## IV. PARASITIC LOAD COMPENSATION SWITCHES (3-Step mode only)

Switches 6, 7 and 8 should be set to match the parasitic load on battery 1 (especially any AUX output load). These switches control the point at which the charger will terminate the absorption phase of the 3-step charging cycle. The possible settings are 5, 10, 15, 20, 25, 30, or 35 amperes. If there are no parasitic loads, then set these three switches to the down (off) position. This is the factory default setting (AUTO).

## V. REMOTE BATTERY CHARGE CONDITION INDICATOR (Standard equipment)

This remote indicator shows the charge condition of the battery in 10 levels from “LOW CHARGE” to “FULLY CHARGED”. This device indicates a defective battery when the 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 its terminals, the bar graph may move down 1 or 2 levels. This does not indicate a defective battery. To avoid this, either reduce constant load draws or consider an external Battery Saver. Please contact Kussmul Electronics for further details.

# WIRING

## I. BATTERY CHARGER WIRING INSTRUCTIONS

1. Refer to Installation Wiring Diagram I and II.
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 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. A minimum of 9 volts is required to start the charger.

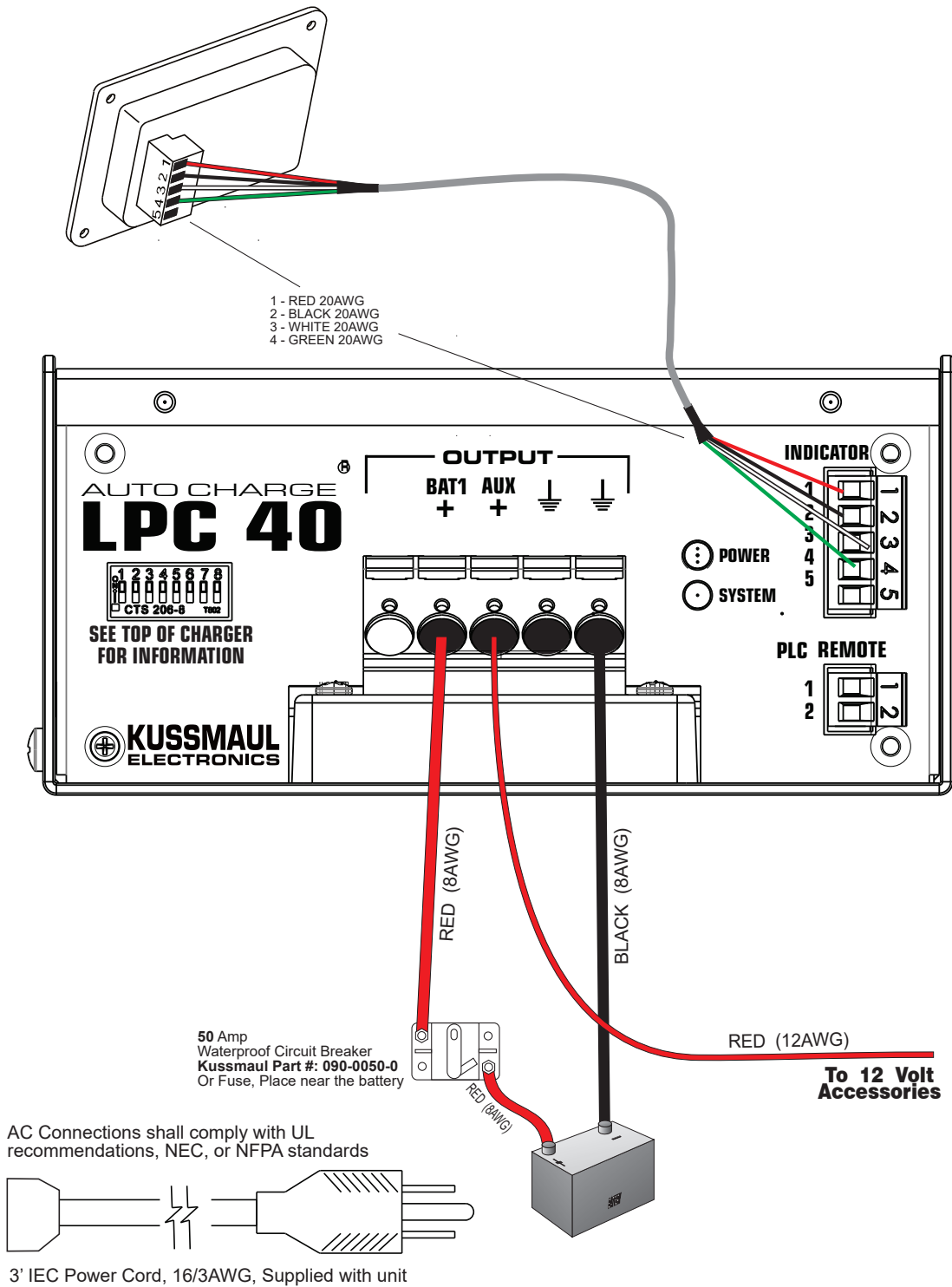
## II. WIRING SPECIFICATIONS

Length of Wire to Battery (feet)	0 - 5			5 - 10**			10 - 20*		
Battery Charger Connections	V. BAT +	AUX +	COM -	V. BAT +	AUX +	COM -	V. BAT +	AUX +	COM -
Wire # Gauge (awg)	8	12	8	8	12	8	6	12	6
Wire Ferrule Used	091-TERFER812	091-TERFEG1212	091-TERFER812	091-TERFER812	091-TERFEG1212	091-TERFER812	091-TERFEB612	091-TERFEG1212	091-TERFEB612
* 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. FOR BAR GRAPH DISPLAY, 091-200-IND OR DELUXE STATUS CENTER, 091-194-IND

Wiring Diagram shown is for a 10 foot installation



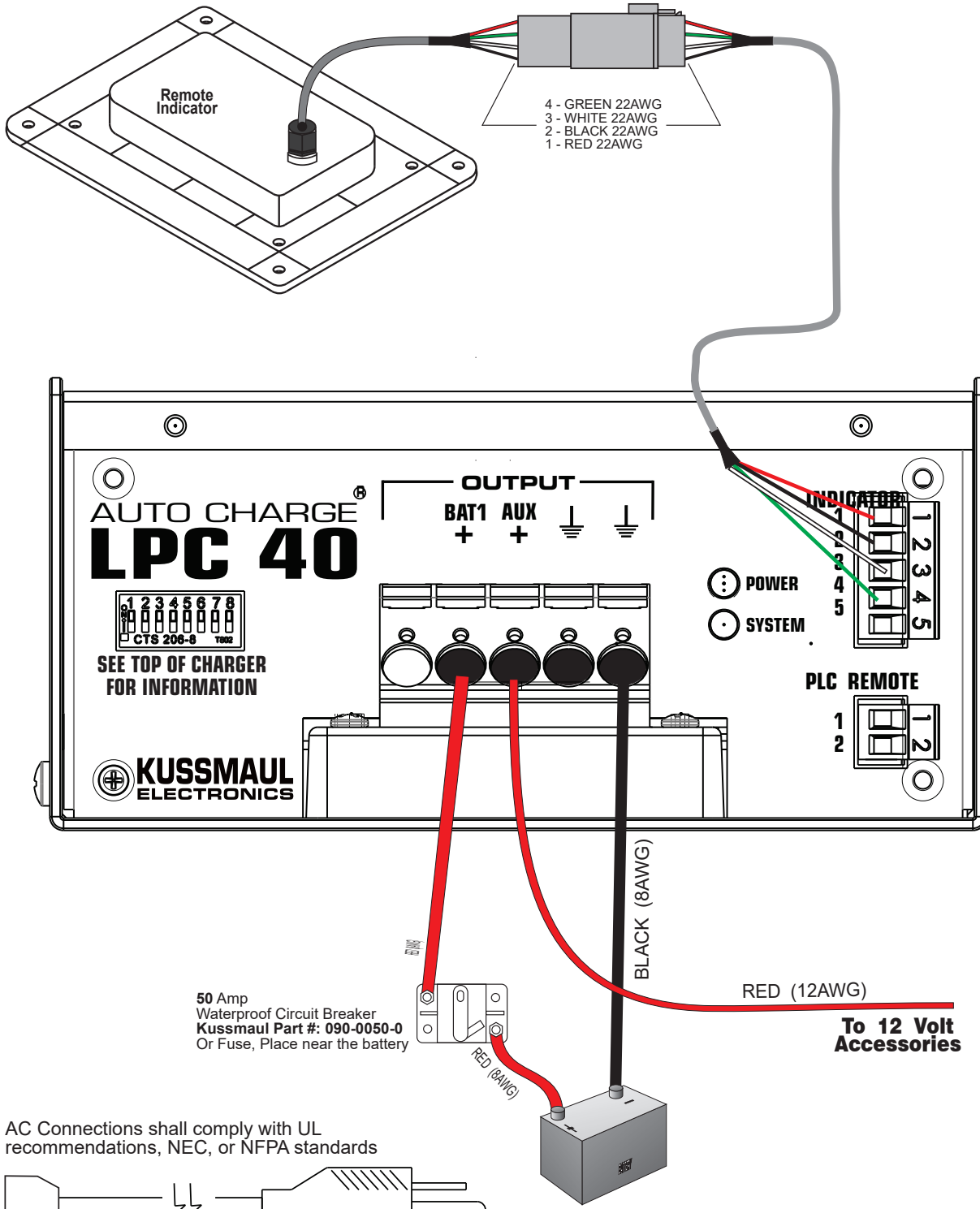
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## II. FOR WATERTIGHT DELUXE STATUS CENTER, 091-194-IND-WT-XX

Wiring Diagram shown is for a 10 foot installation



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

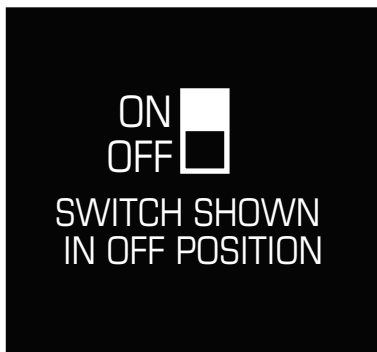
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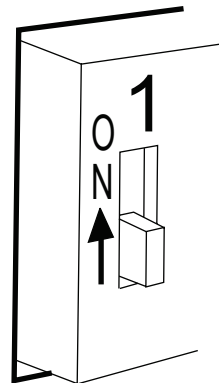
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# DIP SWITCH SETTINGS



Legend on front panel of charger



This is what the dip switch should look like when setting it to the legend on the front panel of the charger.

1		2		3		4		5		6		7		8	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>LEAD</b>		<b>FLOAT</b>		<b>AC</b>		<b>AUTO</b>									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>GEL</b>		<b>1</b>		<b>DC</b>		<b>5 AMPS</b>									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AGM</b>		<b>5</b>		<b>AUX</b>		<b>10 AMPS</b>									
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ODY</b>		<b>10</b>				<b>15 AMPS</b>									
<b>BATTERY TYPE</b>		<b>3 STEP TIMER</b>				<b>20 AMPS</b>									
						<b>25 AMPS</b>									
						<b>30 AMPS</b>									
						<b>35 AMPS</b>									
						<b>PARASITIC LOAD COMPENSATION</b>									

# SPECIFICATIONS

**Input Power:** 100-130 Volts, 50/60 Hz, 6 Amperes Max

**Input Fuse:** (2) - 8 amp, fast acting, 5X20mm

**Output Power:** 12 Volts DC, 40 Amperes Max

**Operating Temperature Range:** -25°C to 50°C

**Aux Output:** 12 Volts, 15 Amperes Max, internally closed

**Battery Selector Switch:**

Battery Type	Float VDC +/- 1%	Absorption VDC +/- 1%
Lead-Acid	13.25	14.00
Gelled Electrolyte	13.50	14.25
AGM	13.50	14.40
Odyssey ®	13.60	14.70

**Output Connector Type:** Spring clamp; Tooless Termination

**LED Status Indicators:**

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

**System:** Yellow LED:

Fast Flash (5 times per Second) indicates battery reverse polarity

Slow Flash (once per second) indicates no battery is connected

Solid On indicates charger is in current limit (normal operation)

Solid Off indicates (normal operation)

Brief Flash (once every 2 seconds) indicates 3-step boost mode operation

**Hardware Pack Provided:** (1) 3-ft IEC cord

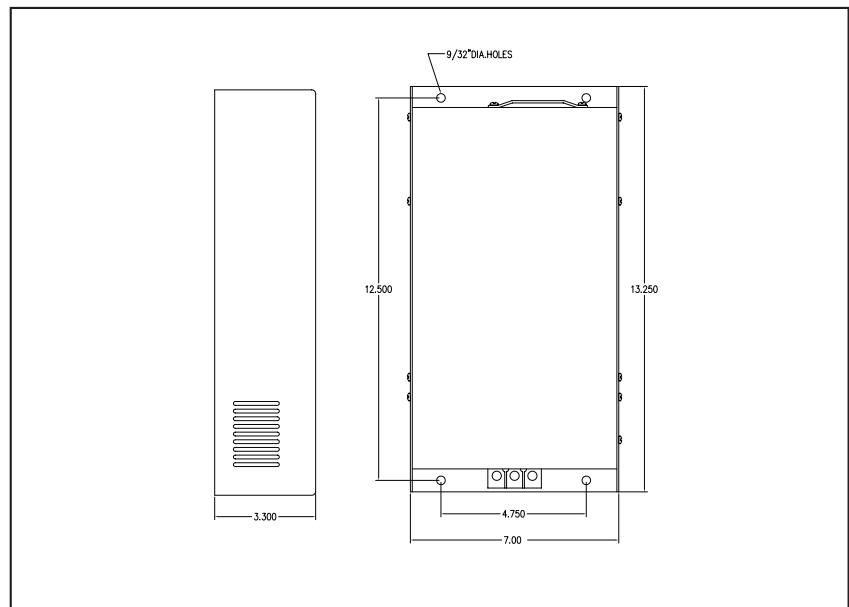
**Charger Indicators Options:** Remote Bar Graph Display, Deluxe Status Center or Waterproof Status Center

**Output Waterproof Circuit Breaker (Recommended):** 50 Amperes, PN 090-0050-0

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

**Weight:** 7 pounds

# OUTLINE DRAWING



# OPTIONAL ACCESSORIES

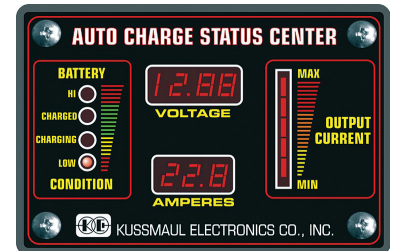
## I. BAR GRAPH DISPLAY, MODEL #: 091-200-IND

- 10-Segment LED display indicate the “state of charge” and the general condition of the batteries



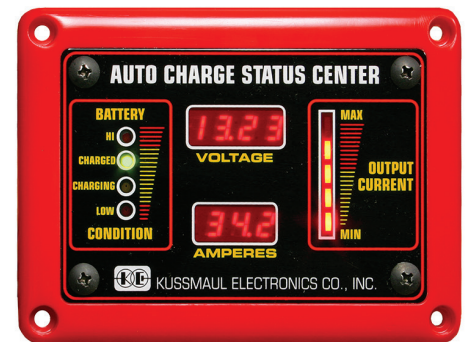
## II. DELUXE STATUS CENTER, MODEL #: 091-194-IND

- Indicator has a digital voltage and ampere display
- 5 segment bar graph display indicates output current
- 4 LED's to show the condition of the batteries



## III. WATERTIGHT DELUXE STATUS CENTER, MODEL #: 091-194-IND-WT-XX

- Indicator has digital voltage and ampere display
- 5 segment bar graph display indicates output current
- 4 LED's to show the condition of the batteries
- Indicator is housed in a watertight bezel
- Bezel is available in 6 different colors, Red, White, Blue, Yellow, Gray, and Black
- Specify color choice when ordering



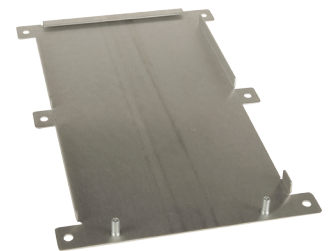
## IV. 50 AMP WATERPROOF CIRCUIT BREAKER, MODEL #: 090-0050-0

- Combines switching and circuit breaker function
- Compact size and surface mount configuration
- Protects high amperage circuits
- Latch arms resets breaker after overload
- Cannot be held in ON position if short remains on circuit
- Waterproof - Ideal for truck applications



## V. E-Z SLIDE MOUNTING PLATE, MODEL #: 091-200-EZM

- Locking mounting system
- Ease the installation and the removal of larger sized chargers that are in harder to access areas, such as under seats



# INSTALLATION RECORD

---

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.

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