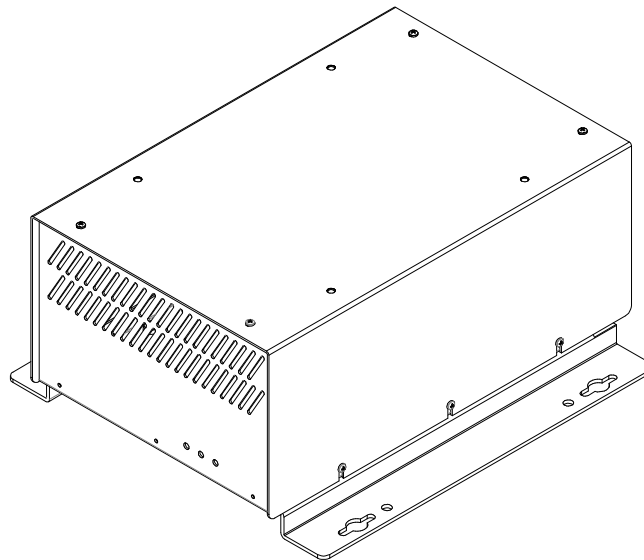
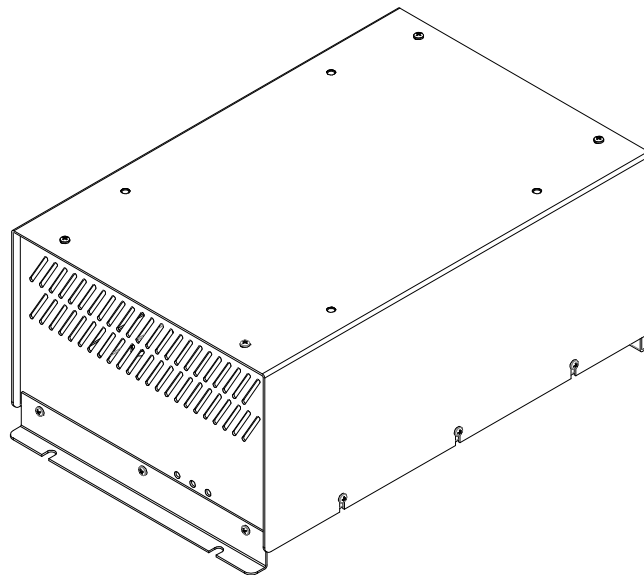


**Max Charger**  
**24Volt 42 Amp**  
**Three Stage Battery Charger**

**Models: SP00155, SPC0182, SPC0184**



**Models: SP00143, SP00180, SP00181, SPC0187**



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## Introduction

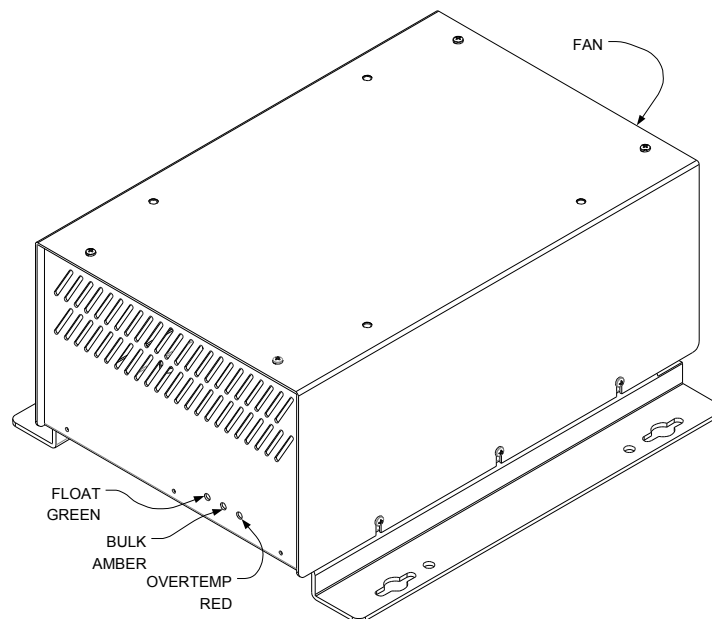
Thank you for purchasing the Vanner Max Battery Charger. We are confident that you will be satisfied with this charger's performance and its many features. With proper installation and care, you can look forward to years of service from this high performance product.

This document will describe the operation, technical specifications, and installation procedures of this product. If you require additional information please contact your dealer, or contact Vanner directly at the phone number or email address shown on the back of this manual.

## 1 General Information

### 1.1 Introduction

The Vanner Max Battery Charger is a high performance three-stage battery charger that has the ability to precisely charge 24VDC battery banks. The Max incorporates advanced battery charging technology, correctly charging batteries automatically at the charger's rated ampere output rather than tapering off like some other battery chargers. This three-stage design keeps batteries in top condition and minimizes battery failure, resulting in maximum battery life.



**F 1 Figure 2.1-1 Vanner Max Illustration**

**1.2 Specifications**

<b>Model Numbers</b>	SP00143, SP00180, SP00181	SP00155	SPC0184	SPC0182	SPC0187
<b>Input</b>	15A at 120VAC $\pm 10\%$ , 60Hz $\pm 10\%$				
<b>Output</b>	42A at 24VDC Nominal, 4AWG cables				
<b>DC Current Draw with no AC voltage applied</b>	30 milliamps	None			30 milliamps
<b>“AC is connected” Output Signal, 4A max</b>	Ground (B-)		+24VDC (B+)		Ground (B-)
<b>Bulk Voltage (Nominal)</b>	28.6VDC			29.8VDC	
<b>Absorption Time</b>	20 Minutes				
<b>Float Voltage (Nominal)</b>	26.6VDC			27.4VDC	
<b>Ambient Temperature</b>	-40 to +105°F (-40 to +40°C)				
<b>Cooling</b>	Forced Air, 100 CFM, 24VDC Fan with front to rear air flow				
<b>Chassis</b>	Steel with durable painted finish				
<b>Weight</b>	35 lbs				
<b>Dimensions</b>	9.85" W x 6.70" H x 15.75" D				

**1.3 Standard Features**

- Fully automatic operation with three-stage battery charging (Bulk, Absorption, and Float)
- Over current protection of AC input and DC output to protect both the charger and the batteries
- Durable steel enclosure
- 3 Status LED's indicating: charging status (green and yellow), over temperature fault (red), and wiring disconnected (blinking green).
- Output signal to indicate that the charger is connected to 120VAC.

## 2 Installation Instructions

These symbols are used to note procedures that if not closely followed could lead to loss of life or damage to equipment or property due to electrocution.



**Electrocution hazard exists**



**Fire hazard exists**



**A potentially dangerous condition**



**Explosive hazard exists**



**Corrosive hazard exists**



**Fault protection devices must be installed between the charger and the battery.** A fault protection device would be any fuse or circuit breaker properly rated for the maximum DC current obtainable. This advisory is in accordance with SAE, NEC and UL, for mobile power applications. Install per applicable codes or within 18" of the battery. Contact Vanner at 1-800-227-6937 or [pwrsales@vanner.com](mailto:pwrsales@vanner.com) if assistance is needed in sizing fault protection devices.



**Caution:** This equipment tends to produce arcs and sparks during installation. To prevent fire or explosion, compartments containing batteries or flammable materials must be properly ventilated. Safety goggles should always be worn when working near batteries

**WARNING: Before installing and using the MAX Charger, be sure to read and save these safety instructions.**

This manual contains important safety and operating instructions for the Vanner MAX Battery Charger

**CAUTION:** Read owners manual BEFORE wiring or powering up.

**CAUTION:** DO NOT cover or obstruct ventilation openings. DO NOT mount in a zero-clearance compartment. Overheating may result.

**WARNING:** Under high ambient temperature / high-power-output conditions some parts of the charger may become hot enough to cause burns. The unit should be installed so that it is not to be contacted by personnel.

**WARNING:** Improper use of this product may result in risk of electrical shock. Both AC and DC voltage sources are terminated inside this equipment.

**Warning:** Battery connections are for disconnect only, NOT for current interruption.

## 2.1 General Precautions



Do not expose the charger to direct water spray or snow.



To reduce the risk of a fire hazard, do not cover or obstruct the ventilation openings.



Do not install the charger in a zero clearance compartment. This may result in overheating or diminished performance.



To avoid the risk of fire, electrical shock, or injury to persons, do not use attachments not recommended or sold by the Vanner Inc.



Vanner recommends that all AC and DC electrical wiring be performed by a licensed electrician or a qualified technician to ensure compliance with all applicable national and local wiring regulations.



To avoid a risk of fire and/or electrical shock, always verify wiring connections are in good electrical condition. All external conductors must use proper wire size to avoid dangerous overheating or diminished performance.



If the charger has been dropped or damaged in any way, do not operate the charger until it has been verified to be safe by a qualified technician.



To reduce the risk of electrical shock, always disconnect the AC and DC connections to the charger before attempting any maintenance. Simply turning the charger off does not prevent electrical shock.



The charger must be properly grounded in accordance with local and national codes and ordinances before operation. For most installations, the negative (ground) conductor should be bonded to the grounding system at one and only one point in the system.



For optimum charger performance, battery temperature should be above 32 degrees Fahrenheit.



Do not disassemble the charger. See the service section of this manual for instructions on obtaining service. Attempting to service the inverter yourself may result in a risk of electrical shock, fire and/or loss of warranty.



To reduce the risk of battery explosion, follow these instructions, the battery manufacturer instructions, and the instructions of the manufacturer of the equipment in which the battery is installed. Working near a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation.

## 2.2 Battery Precautions

1. Always have someone within range of your voice to come to your aid when you work near a lead-acid battery.
2. Have close access to plenty of fresh water and soap in case battery acid contacts skin, clothing, or eyes.
3. Always wear complete eye protection and clothing protection. Avoid touching eyes while working near batteries.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 20 minutes. Get medical attention immediately.
5. NEVER smoke or allow a spark or flame near a battery. Gases produced by batteries are explosive.
6. Be careful when working with metal tools around batteries. Potentials exist for sparks or short-circuit of the battery or other electrical part which could cause an explosion.

## 3 Installation and Checkout



### NOTE

Charger should not be installed in same compartment as batteries where corrosive or explosive gases are present.

### 3.1 Selection of Battery Charger Location

- Charger should be located close to battery. Locate within 3' for optimum performance, but not in the same compartment.
- Charger should be protected from weather. Install in a location that provides protection from direct water spray and dirt.
- Mounting compartment should be well-ventilated and allow adequate air circulation for charger cooling. Allow 2" clearance around entire charger.
- Do not store flammable items near charger. Do not expose charger to corrosive or explosive vapors.

### 3.2 Charger Mounting

- Install the MAX Charger in the horizontal upright position. The charger is furnished with mounting brackets which provide adequate clearance for under chassis airflow. The charger requires under chassis airflow for proper cooling.

### 3.3 Routing and Connecting Battery Charger Output Cables



**WARNING**

Safety goggles should be worn when working with or near batteries

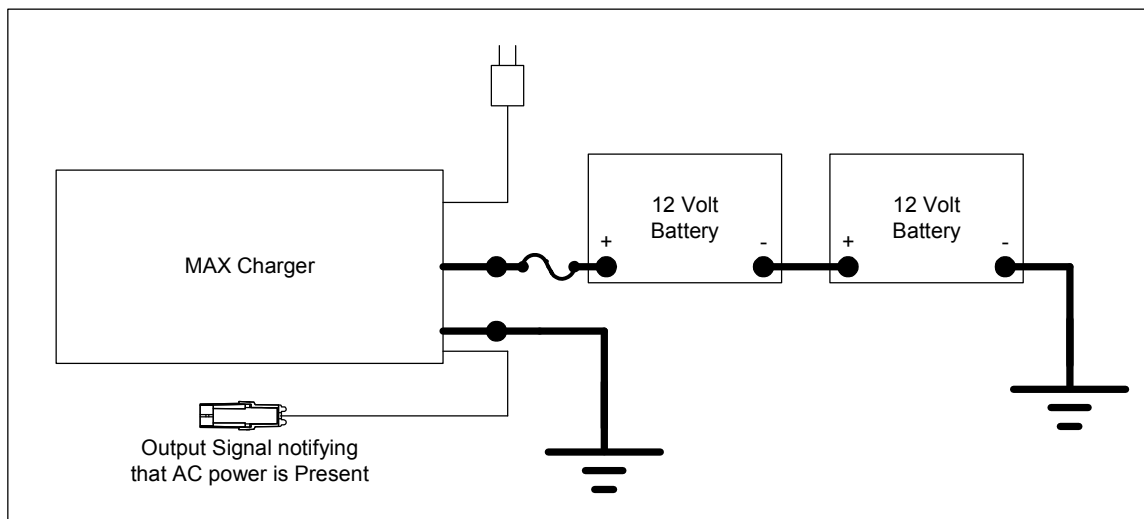


**WARNING**

Battery connections must be able to carry a minimum of 50 amps.

This Charger is designed for 24 VDC applications only. If connected to other than 24V system, damage will result.

1. Connect the Max Charger's RED cable to the battery's positive (+) terminal and the BLACK cable to the Battery's negative (-) terminal.
2. Install a fuse in line with the positive battery source to the charger. Size fuse at an 80Amp minimum to a 150A maximum.
3. Battery cable connections must be clean and secure to minimize electrical resistance for optimum performance.
4. Route and secure charger DC cables away from Hot and Sharp surfaces and components.
5. "AC power is Present" mating connection is a Delphi Weather-Pack 12015791 with terminal selected per the gauge wire required for application.



**F 2 Figure 3.4-1 Max Battery Charger Wiring Diagram**



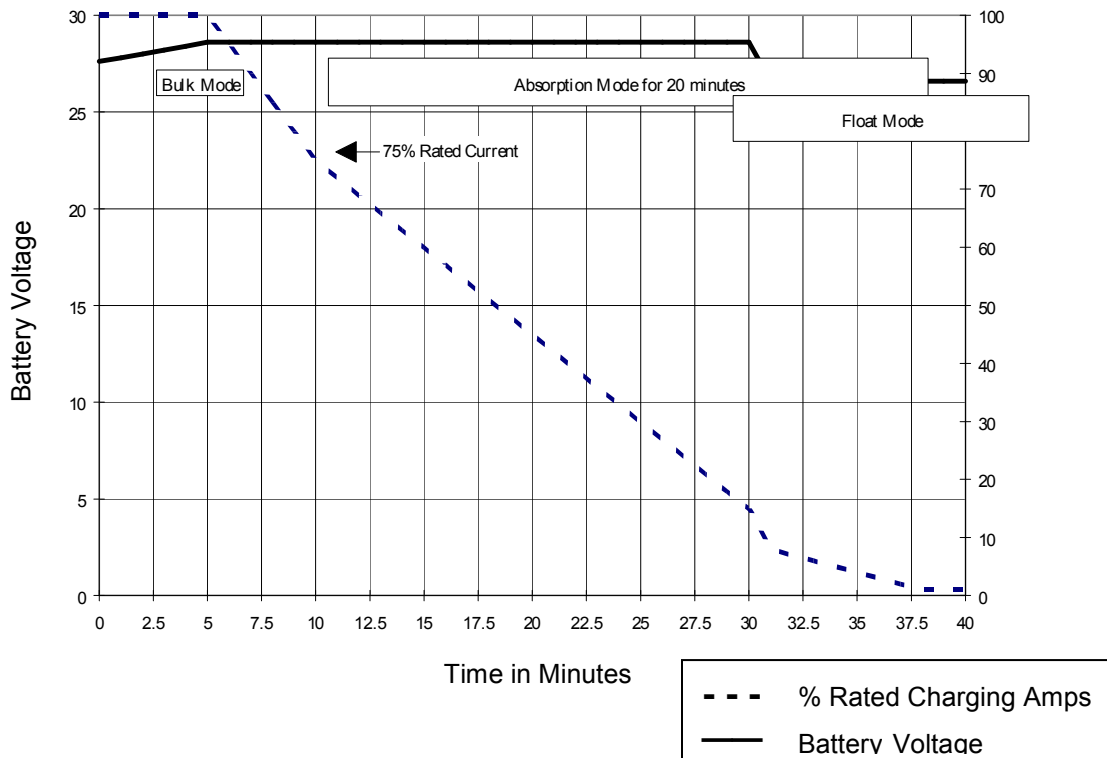
## 4 Battery Charger Operation

### 4.1 Charger ON/OFF Control

1. There is no ON/OFF switch. Turn the charger ON by connecting the AC input line cord to a 15 Amp 120 Volt 60Hz power source. Turn the charger OFF by disconnecting AC power.
2. The charger will not accept AC power above 65Hz or voltage below approx 100 VAC.

### 4.2 Description of the Three Battery Charging Stages

1. Charging begins when the unit receives 120VAC shore power. In Bulk Stage the charger output amps will be at full rated output and battery voltage will rise until battery voltage reaches the models specified voltage. Battery voltage is held by reducing output current as needed. Bulk Stage ends when charger output current is reduced to 75% of rated output. The charger then shifts to Absorption Stage.
2. Absorption Stage holds battery voltage at the stated bulk rate for 20 minutes. Charger output current will vary as needed to hold battery voltage constant. After 20 minutes Absorption Stage ends and Float Stage begins.
3. Float Stage holds the battery voltage at models specified voltage. Charger output current will vary as needed to hold battery voltage constant. Float Stage ends when charger output amps reaches full rated output. (In a normal situation the charger will cycle to Float Stage one time and then remain in Float Stage until disconnected from AC power. **Please note: DC LOADS may cause the charger to reach full output which will cause Bulk Stage to restart. The batteries may be damaged due to overcharging if DC LOADS cause Bulk Stage to restart repeatedly.**)



**F 3 Figure 4.2-1 Vanner Max Three-Stage Battery Charging Graph**

## 5 Operation

### LED Status Indicators for Models SP00143, SP00180, SP00181 and SPC0187

LED	Charger Status
Yellow solid	The charger is ON and is in Bulk Stage or Absorption Stage.
Green solid	The charger is ON and is in Float Stage.
Red solid	The charger is OFF because internal temperature is too high. Shutdown may have been caused by high ambient temperature or by restricted cooling air flow. The charger will automatically restart when internal temperature is acceptable.
Green BLINKING	The charger is OFF. Either 120VAC is disconnected or battery is disconnected.
No LED's	The charger is OFF and is disconnected from both 120VAC and battery.

### LED Status Indicators for Models SP00155, SPC0182 and SPC0184

LED	Charger Status
Yellow solid	The charger is ON and is in Bulk Stage or Absorption Stage.
Green solid	The charger is ON and is in Float Stage.
Red solid	The charger is OFF because internal temperature is too high. Shutdown may have been caused by high ambient temperature or by restricted cooling air flow. The charger will automatically restart when internal temperature is acceptable.
Green Blinking	The charger is OFF. The charger is connected to 120VAC but is disconnected from battery.
No LED's	The charger is OFF because 120VAC is disconnected. (Battery connection status is not defined.)

Notes:

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