Performance IntelliSUPPLY

USER GUIDE

Microprocessor Controlled Multi-Stage 12V/14V/16V
Automatic Power Supply and Battery Charger
P/N PSC15 / PSC30 / PSC60

Sleek On-Board Design / Remote LCD Display
Three Mode Operation / XS Flex Output Leads / 120V & 230V AC Input

XS Power *Intelli*SUPPLY User Guide

About XS Power

XS Power designs and manufactures custom charging solutions for street rods, racing applications, and the mobile audio industry. These products include high performance batteries, chargers, and related accessories.

Trademarks

Disclaimer

The following conventions are used in this guide.

⚠ WARNING

Warnings identify conditions that could result in personal injury or loss of life.

⚠ CAUTION

Cautions identify conditions or practices that could result in damage to the charger or battery.

***Important*:** These notes describe an important item that you must pay attention to.

Contents

Important Safety Instructions

General Safety Precautions

⚠ **WARNING:** Before installing and using the charger, read all instructions and cautionary markings on the charger, the batteries, and all appropriate sections of this guide.

1) Do not expose the *Intelli*SUPPLY to rain, snow, spray, or bilge water. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the charger in a zero-clearance compartment. Overheating may result.

2) The *Intelli*SUPPLY is designed to be permanently connected to your AC and DC electrical systems.

3) The *Intelli*SUPPLY is designed to charge 12V, 14V and 16V lead-acid batteries of all types. Do not attempt to use with batteries of other voltages

4) Never use chargers at a location where there is danger of gas or dust explosions.

5) Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.

6) Do not disassemble the *Intelli*SUPPLY. Attempting to service the unit yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.

7) Do not open the *Intelli*SUPPLY. There are no user serviceable parts inside the unit. For service see the Returns policy in the back of this guide.

8) The charger must be provided with an equipment-grounding conductor connected to the AC input ground.

9) To reduce the risk of electrical shock, disconnect both AC and DC power from the charger before attempting any maintenance or cleaning or working on any circuits connected to the charger. Turning off controls will not reduce this risk.

10) Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.

11) Be sure AC and DC cords are not pinched or otherwise damaged by hoods, doors, or other moving engine components.

12) Never attempt to charge a frozen battery.

13) **Fuse Holder:** Contains a 10A fuse in case of overload.

14) **AC Cord:** Grounded 3-pin 110V cord for use with grounded outlets only.

15) **Battery Clamps and Cord:** Allow for connection to the battery.

Features of the XS Power *Intelli*SUPPLY

The *Intelli*SUPPLY is an advanced power supply unit and battery charger designed specifically for high performance lead-acid batteries. This power supply/charger uses MOSFET rectifier technology with an advanced microprocessor control board to create a battery charger and power supply that can rapidly and safely recharge 12V, 14V and 16V flooded, maintenance free, deep cycle, gel-cell, and AGM (Absorbed Glass Mat) batteries in several sizes. The wireless remote and digital display makes the *Intelli*SUPPLY very easy to use.

Multi-Stage Charging
At the heart of the technology in the XS Power *Intelli*SUPPLY are the three distinct charging stages and DC power output. During the first stage, called "Bulk" charging, the charger will regulate the current the voltage is allowed to float. During this stage, 80% of the battery's capacity is restored.

When the battery's cell voltage comes up to the correct level, the second stage called "Absorption" charging is engaged. During this stage the voltage is fixed according to the battery type and voltage switches on the front panel and the current is allowed to float. The battery is brought to 100% during this stage and the cells are equalized.

The third stage is float charging. During this stage the voltage and current are reduced to a level that will maintain the battery indefinitely.

Several microprocessors are used to tightly control the entire process. This is the same technique that battery manufacturers recommend and use in the production of new batteries and it is the fastest and safest technique for battery charging.

Compatible With All Lead-Acid Type Batteries
Lead-acid batteries have different charging requirements based on their specific design. Flooded and maintenance free batteries require a higher voltage per cell than do sealed valve regulated types such as AGM and gel-cell batteries. Overcharging will reduce the life of any battery as sealed valve regulated batteries are especially sensitive to high charging voltages and overcharging. Some sealed valve regulated batteries are more sensitive to overcharging than others. If in doubt as to which battery setting to use for your application, contact the manufacturer of the battery being charged. Overcharging an AGM or gel-cell battery will cause permanent damage.

Power Supply Mode
Along with charging batteries, the XS Power PSC Chargers can operate as Power Supplies. When this mode is selected, the Charger will maintain a constant output voltage and current. Power Supply mode is to be used for audio display boards and can be used as test bench power supplies. Power Supply Mode should not be used to charge AGM Batteries.

Desulfation Mode
At the end of a battery's life, or in the event that a battery has sat uncharged for an elongated amount of time, It can become sulfated. This would reduce the capacity and performance of the battery. The PSC Chargers have the ability to recondition a battery that has sulfated. Through a complex charging cycle and microprocessor controlled pulsed output, the PSC charger can break down the sulfated crystals inside the battery which cause the lack in performance. Using this mode on older batteries once every few months is advisable to prolong battery life.

Remote Control/ Display
A remotely mounted display will show the status of the charging functions of the PSC models. This feature will allow the user to control power on/off. The remote will display important charger and battery information such as voltage, charge rate, mode, fault, and status of the battery being charged.

Voltage Monitoring
The battery's terminal voltage is measured every five minutes by the on-board microprocessors and this information is analyzed in addition to the elapsed time to dynamically control the Battery Charger for optimum charging performance.

Automatic Computer Analysis/Auto Shutdown
The microprocessors will analyze the battery when connected. If the battery's voltage is below 4V or the battery will not come up to the correct voltage in a ten-hour period the charger will automatically shut off.

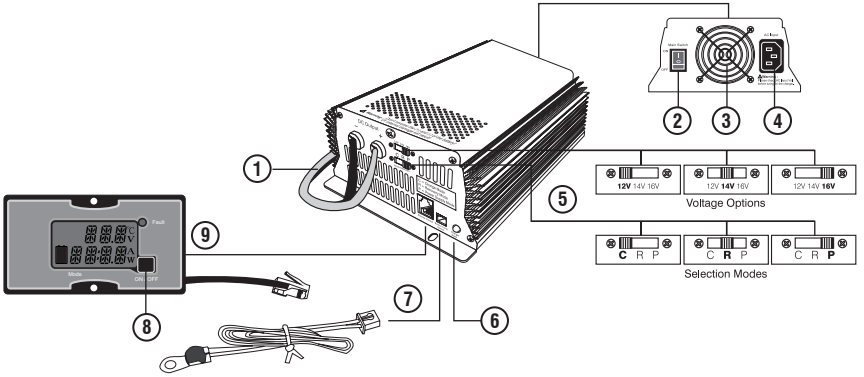
UL Approved Battery Cables
Six feet of durable battery cables are provided that are resistant to cuts and abrasion. The copper plated battery clamps are compact and custom designed easy connections. All clamp connections are soldered for maximum current flow.

Internal Cooling Fan
A cooling fan automatically operates during charging to keep the transformer and other internal components at a constant safe temperature.

Front and Rear Panel Switches and Indicators

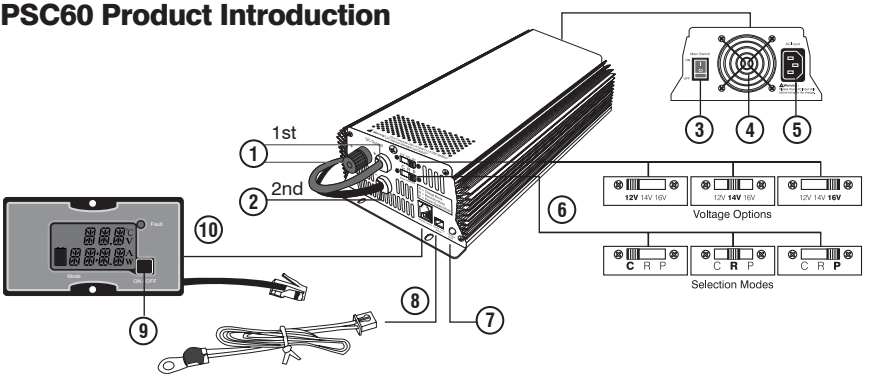
PSC15 / PSC30 Product Introduction

⚠ **WARNING:** Before installing and using the PSC unit, read all instructions and cautionary markings on the unit, the batteries, and all appropriate sections of this guide.



1- DC Output(+Red / - Black) **2-** Main On/Off Switch **3-** Unit Cooling Fan **4-** AC Input **5-** Mode/Voltage Selection **6-** Charging Status **7-** Battery Temperature Sensor(note1) **8-** Remote Power Switch(note2) **9-** LCD Remote Control

PSC60 Product Introduction



1- DC Output(+Red-Primary[1st] / Secondary[2nd]) **2-** DC Output(- Black) **3-** Main On/Off Switch **4-** Unit Cooling Fan **5-** AC Input **6-** Mode/Voltage Selection **7-** Charging Status **8-** Battery Temperature Sensor(note1) **9-** Remote Power Switch(note2) **10-** LCD Remote Control

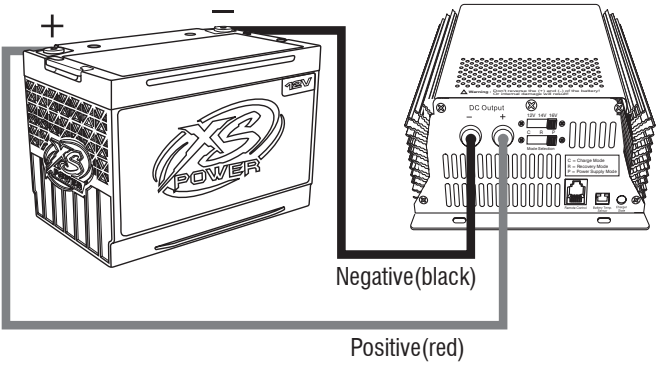
⚠ **WARNING: Don't reverse the (+) and (–) of the battery! Or internal damage will result!**

Note 1: Battery Temp. Sensor: To detect the battery temp. While charging, please connect the wire sensor to the battery Negative (-) terminal.
Note 2: The remote power switch of the remote control just cuts out the output. If you want to turn off the charger completely, please switch off main switch of charger body.

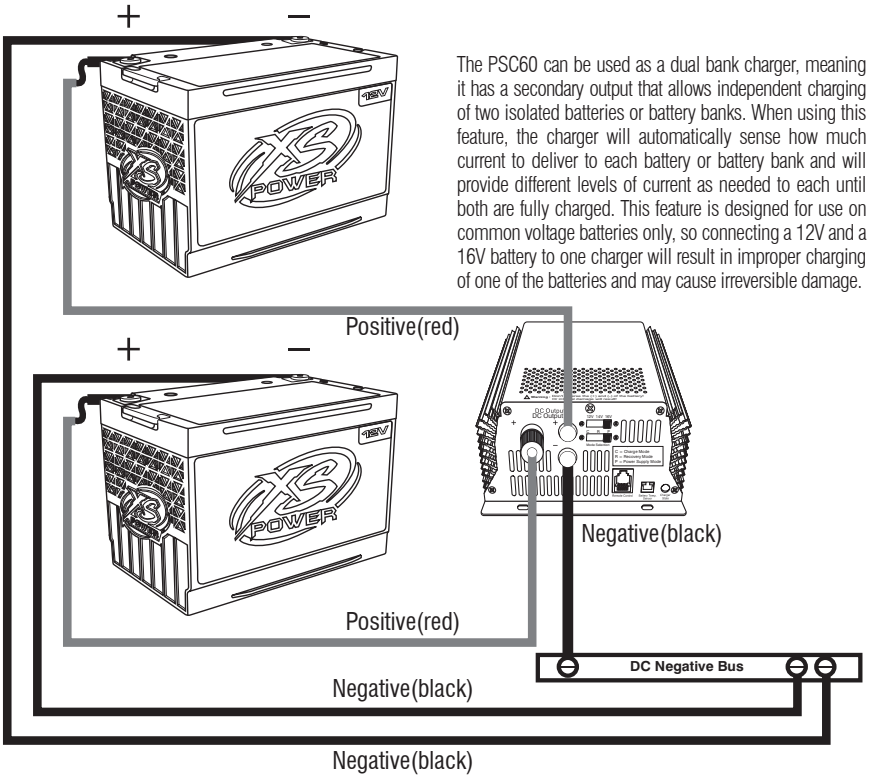
Installation Diagram

⚠ IMPORTANT: Before charging, read the instructions. Disconnect the PSC unit before making or breaking the connections to the battery.

PSC15 / PSC30



PSC60



The PSC60 can be used as a dual bank charger, meaning it has a secondary output that allows independent charging of two isolated batteries or battery banks. When using this feature, the charger will automatically sense how much current to deliver to each battery or battery bank and will provide different levels of current as needed to each until both are fully charged. This feature is designed for use on common voltage batteries only, so connecting a 12V and a 16V battery to one charger will result in improper charging of one of the batteries and may cause irreversible damage.

Installation Location: Physical Requirements

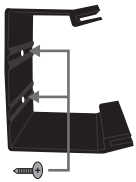
Requirements For Installation

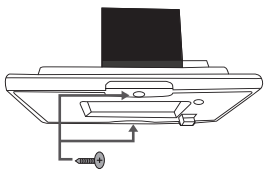
⚠ IMPORTANT: This product is best mounted in a Horizontal position. If the unit is mounted in a vertical position, the cooling fan must be at the bottom of the unit.

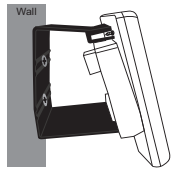
CONDITION	DESCRIPTION
Clean	Do not expose the charger to metal filings or any other form of conductive contamination. The presence of conductive contamination can cause damage and void your warranty.
Cool	For best performance, the ambient air temperature should be between 5°F (-15°C) and 113°F (45°C)- the cooler the better. At higher ambient temperatures, the output current will be automatically reduced to protect the charger from high internal temperatures.
Dry	The unit is intended for use in a dry location. Do not allow water or other fluids to drip or splash on the charger. Do not mount the charger in an area subject to rain, spray or splashing bilge water.
Safe	Working in the vicinity of lead-acid batteries is dangerous. Batteries generate explosive gases during normal operation. It is safest not to install electrical equipment in these areas.
Ventilated	Allow at least 4 inches (10 cm) of clearance around all sides of the charger for air flow. Ensure that the ventilation openings on the unit are not obstructed. If mounting in a compartment, ventilate the compartment with louvres or cut-outs to prevent overheating.
Close to AC Junction Box	Avoid the use of extended wire lengths if possible.
Close to Batteries	Avoid excessive cable lengths and use the recommended wire lengths and sizes. Undersized or overly long cables may affect charging accuracy.

LCD Display Mounting Bracket


FRONT VIEW

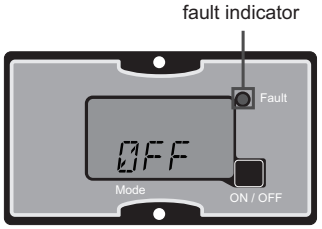

SIDE VIEW

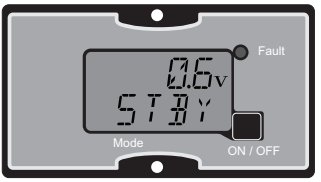

TOP VIEW

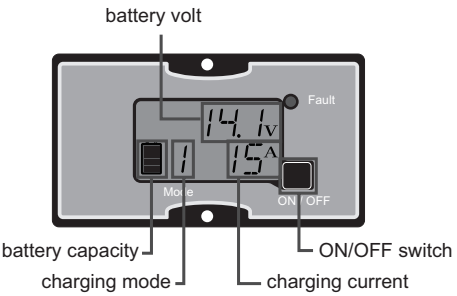


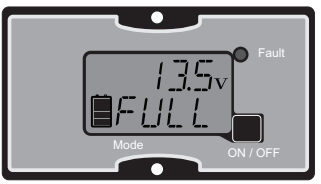
SIDE VIEW

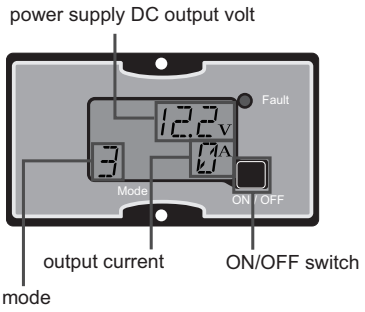
LCD Remote Display

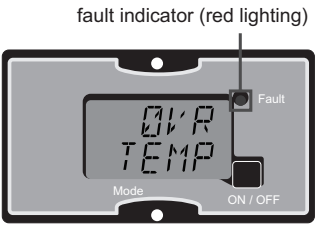


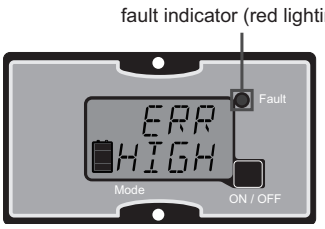












Charging Lead-Acid Batteries

⚠ WARNING: Before you start to charge batteries read the "Important Safety Instructions" on page (1) and take all safety precautions when working with batteries.

The *Intelli*SUPPLY has been designed to provide fully automatic recharge of 12V, 14V and 16V AGM and gel-cell batteries.

To charge your 12V, 14V or 16V battery:

1) If possible, disconnect all loads from the battery, by removing battery cables, opening a disconnect switch, or switching loads off.

⚠ **CAUTION!**

*Although this is best, in a racing environment this may not be possible. Supplemental loads such as an electric water pump or cooling fans may be operated while charging during stage one. Please note though that supplimental loads will reduce the amount of amperage available to the battery. The charger detects that a battery is fully charged when its charging current drops below a preset limit in a specific elapsed time. The presence of electrical loads on the battery will interfere with this process. Therefore when the charger is in stage two-absorption charging it is necessary for the battery to be isolated from loads. The Intelli*CHARGER *is in stage-two when the charge rate is declining.*

2) Select the correct battery voltage.

3) Connect the red positive (+) clip of the charger cables to the positive (+) terminal of the vehicle battery.

4) Connect the black negative (–) clip of the charger cables to a solid chassis ground. If this is not possible, connect it to the negative (–) battery terminal.

5) Flip the power switch on the front panel to ON.

   The microprocessors will analyze the battery and then after a short delay, the charging status LED indicator will turn red beginning the three-stage charging sequence.

⚠ **CAUTION:** Do not change the voltage type during charging. Use the correct battery type at all times.

   During stage one-bulk charging, the amperage will begin at 20A. During stage two-absorption charging, the amperage will start to fall to zero as the battery comes up to 100%. When the charging process is complete, the charging staus LED indicator will turn green. The cooling fan inside the charger will stop and the battery can be left in this state indefinitely.

*Note that the charger will automatically restart the charging sequence if the charge current rises above a factory preset threshold.

6) When complete, flip the power switch to OFF.

7) Remove the black negative (–) clip and the red positive (+) clip from the vehicle's battery terminals.

PSC15 Specifications

MODEL	PSC15								
INPUT									
Voltage Range	120VAC (90~130VAC)								
Frequency Range	45~65Hz								
Efficiency	>=85%								
Power Factor	0.5 at full load (±5%)								
Input Socket	IEC plug								
OUTPUT									
Mode Selection	Charge Mode			Recovery Mode			Power Supply Mode		
Voltage Selection	12V	14V	16V	12V	14V	16V	12V	14V	16V
Bulk Stage	14.4V	16.8V	19.2V	/	/	/	14.4V	16.8V	19.2V
Absorption Stage	14.4V	16.8V	19.2V	14.4V	16.8V	19.2V	14.4V	16.8V	19.2V
Float Stage(2A Max)	13.56V	15.82V	18.08V	13.56V	15.82V	18.08V	14.4V	16.8V	19.2V
Max Current	15A								
Continuous Current	15A								
PROTECTION									
Over Temperature	131° ± 9°F / 55° ± 5°C								
Overload	YES								
Output Short Circuit	YES								
Microprocessor Check	YES								
ENVIRONMENT									
Working Temperature	5° ~ 113°F / -15° ~ 45°C								
Working Humidity	20 ~ 90% RH Non-Condensing								
Storage Temperature	-22° ~ 149°F / -30° ~ 65°C								
Storage Humidity	10 ~ 95% RH								
Temp Coefficient	±0.09%° (32° ~ 122°F) / ±0.05%° (0° ~ 50°C)								
FEATURES									
Remote Control	YES								

SIZE	SAE	METRIC
Dimension (LxWxH)	8.4 x 5.6 x 2.85 in	213 x 142 x 72 mm
Weight	4.2lbs	1.9kgs

**The above spec. ±0.5V for 12V spec.; Amp. ±10% is acceptable.
⚠ Note: Specifications subject to change without notice.

PSC30 Specifications

MODEL	PSC30								
INPUT									
Voltage Range	100~240VAC								
Frequency Range	45 ~ 65Hz								
Efficiency	>=85%								
Power Factor	1.0 at full load (±5%)								
Input Socket	IEC plug								
OUTPUT									
Mode Selection	Charge Mode			Recovery Mode			Power Supply Mode		
Voltage Selection	12V	14V	16V	12V	14V	16V	12V	14V	16V
Bulk Stage	14.4V	16.8V	19.2V	/	/	/	14.4V	16.8V	19.2V
Absorption Stage	14.4V	16.8V	19.2V	14.4V	16.8V	19.2V	14.4V	16.8V	19.2V
Float Stage(2A Max)	13.56V	15.82V	18.08V	13.56V	15.82V	18.08V	14.4V	16.8V	19.2V
Max Current	30A								
Continuous Current	30A								
PROTECTION									
Over Temperature (F)	131° ± 9°F / 55° ± 5°C								
Overload	YES								
Output Short Circuit	YES								
Microprocessor Check	YES								
ENVIRONMENT									
Working Temperature	5° ~ 113°F / -15° ~ 45°C								
Working Humidity	21 ~ 90% RH Non-Condensing								
Storage Temperature	-22° ~ 149°F / -30° ~ 65°C								
Storage Humidity	10 ~ 95% RH								
Temp Coefficient	±0.09%° (32° ~ 122°F) / ±0.05%° (0° ~ 50°C)								
FEATURES									
Remote Control	YES								
SIZE	**SAE**					**METRIC**			
Dimension (LxWxH)	9.9 x 5.6 x 2.85 in					252 x 142 x 72 mm			
Weight	5.5lbs					2.5kgs			

**The above spec. ±0.5V for 12V spec.; Amp. ±10% is acceptable.
⚠ Note: Specifications subject to change without notice.

PSC60 Specifications

MODEL	PSC60								
INPUT									
Voltage Range	100~240VAC								
Frequency Range	45 ~ 65Hz								
Efficiency	>=85%								
Power Factor	1.0 at full load (±5%)								
Input Socket	IEC plug								
OUTPUT									
Mode Selection	Charge Mode			Recovery Mode			Power Supply Mode		
Voltage Selection	12V	14V	16V	12V	14V	16V	12V	14V	16V
Bulk Stage	14.4V	16.8V	19.2V	/	/	/	14.4V	16.8V	19.2V
Absorption Stage	14.4V	16.8V	19.2V	14.4V	16.8V	19.2V	14.4V	16.8V	19.2V
Float Stage(2A Max)	13.56V	15.82V	18.08V	13.56V	15.82V	18.08V	14.4V	16.8V	19.2V
Max Current	60A(12V) / 50A(14V) / 50A(16V)								
Continuous Current	60A(12V) / 50A(14V) / 50A(16V)								
PROTECTION									
Over Temperature	131° ± 9°F / 55° ± 5°C								
Overload	YES								
Output Short Circuit	YES								
Microprocessor Check	YES								
ENVIRONMENT									
Working Temperature	5° ~ 113°F / -15° ~ 45°C								
Working Humidity	22 ~ 90% RH Non-Condensing								
Storage Temperature	-22° ~ 149°F / -30° ~ 65°C								
Storage Humidity	10 ~ 95% RH								
Temp Coefficient	±0.09%° (32° ~ 122°F) / ±0.05%° (0° ~ 50°C)								
FEATURES									
Remote Control	YES								
SIZE	**SAE**					**METRIC**			
Dimension (LxWxH)	13.2 x 5.6 x 2.85 in					335 x 142 x 72 mm			
Weight	7.2lbs					3.5kgs			

**The above spec. ±0.5V for 12V spec.; Amp. ±10% is acceptable.
⚠ Note: Specifications subject to change without notice.

Precautions Working With Lead-Acid Batteries

Follow all instructions published by the battery manufacturer and the manufacturer of the equipment in which the battery is installed.

1) Make sure the area around the battery is well ventilated.

2) Never smoke or allow a spark or flame near the battery(ies).

3) Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and thereby cause an explosion.

4) Remove all metal items, like rings, bracelets, and watches when working with lead-acid batteries. Lead-acid batteries produce a short circuit current high enough to cause a severe burn.

5) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

6) Wear complete eye protection and clothing protection. Avoid touching eyes while working near batteries.

7) If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.

8) If you need to remove a battery, always remove the ground terminal from the battery first. Make sure all accessories are off to minimize the potential of a spark.

9) Someone should be in the range of your voice or close enough to come to your aid when working with a lead-acid battery.

10) Do not attempt to remove the vent covers on sealed lead-acid batteries such as the XS Power 16V AGM battery. Sealed batteries operate on a slight positive cell pressure. Venting this pressure will ruin the battery.

Troubleshooting

Chapter 3 will help you identify and remedy the common problems than can occur with the *Intelli*SUPPLY. Please read this chapter before calling Customer Service. If you cannot solve the problem with the *Intelli*SUPPLY, record the information asked for on "Information About Your System" on the back page and then call Customer Service.

⚠ WARNING: Electric shock hazard

Do not disassemble the *Intelli*SUPPLY. The *Intelli*SUPPLY does not contain any internal user-serviceable parts and attempting to service the unit yourself could result in electrical shock or burn.

- **Power light does not come on when the power switch is flipped ON:**
  - Check fuse.
  - Check cord and input power.
- **Voltage LED will not illuminate for 12V, 14V or 16V:**
  - The battery is not connected.
  - The battery is below 2.0V.
- **Charge rate does not come up to the selected charge rate initially:**
  - The battery charger has already moved into stage two charging.
  - Input voltage is below 120VAC.
  - The battery may be defective and resisting the charge current.
- **"Fault" indicator is illuminated:**
  - This illuminates when the charger over heats or encounters high battery voltage situations.

*To reset the fault caused by over heating, allow the inverter to cool and reduce the load reduce the load if continuous operation is required.

*To reset a high battery voltage fault, please check the battery voltage specifications again.

Appendix A
Specifications

Important: PSC15(15A), PSC30(30A), PSC60(60A) Output – Three amperage output models to choose from and isolated outputs for powering any size load. Specifications are subject to change without notice.

Physical Specifications

- Dimensions ..... PSC15 - 8.4" L x 5.6" W x 2.8" H
  PSC30 - 9.9" L x 5.6" W x 2.8" H
  PSC60 - 13.2" L x 5.6" W x 2.8" H

- Weight ..... PSC15 - 4.2 lbs (1.9 kg)
  PSC30 - 5.5 lbs (2.5 kg)
  PSC30 - 7.7 lbs (3.5 kg)

- AC Input Connections ..... 5.0' (1.5 m) AWG 16

- DC Output Connections ..... 6.0' (1.8 m) AWG 10

Electrical Specifications

	12V	14V	16V
- Absorption Voltage	14.40 VDC	16.80 VDC	19.20 VDC
- Float Voltage at no Load	13.56 VDC	15.82 VDC	18.08 VDC
- Maximum Output Voltage ...	14.40 VDC	16.80 VDC	19.20 VDC
- Power Supply Voltage	14.40 VDC	16.80 VDC	19.20 VDC

AC Input Specifications

- AC Input Voltage .....PSC15 - 120VAC (100~130VAC)
  PSC30 - 100~240VAC
  PSC60 - 100~240VAC

- AC Input Current ..... PSC15 - 6.3A RMS fuse protected
  PSC30 - 10A RMS fuse protected
  PSC60 - 20A RMS fuse protected

Appendix B
Battery Charging

Appendix B describes battery charging in more detail.

The *Intelli*SUPPLY charges batteries in a sequence known as multi-stage charging. The charging voltage delivered to the battery depends on the battery's depth of discharge.

The three automatic stages are:

- Stage One - Bulk
- Stage Two - Absorption/Equalization
- Stage Three - Float

Bulk Charge

In the first stage, known as "bulk" charging, the *Intelli*SUPPLY delivers its full-rated output current. This constant current is delivered to the batteries until the battery voltage approaches its absorption voltage, either 2.5V per cell or 2.375V per cell depending on battery type selected. The bulk charge stage restores about 75% of the battery's charge and this stage completes very quickly unless the battery is deeply discharged. During this stage the charge rate current on the ammeter should close to the charge rate selected on the front panel switch.

Absorption/Equalize Charge

During the second stage, known as "absorption" charging, the charging voltage is held constant near the gassing voltage, and the charging current is allowed to diminish as the battery comes up to 100% charge. Complex algorithms considering the time, voltage level, and charging current determine when the charger exits this mode and goes to stage three, float charging. The length of time of this mode depends on the battery and is not fixed.

Float Charge

The third stage, called "Float" charging is a maintenance mode in which the output voltage of the charger is reduced to a lower level, typically about 2.26 V per cell to maintain the battery's charge without losing electrolyte through gassing. In the float mode, the charger will initiate a new charge cycle if:

- AC power is disconnected and reconnected
- The current demand on the *Intelli*SUPPLY exceeds the battery recharge current setting.

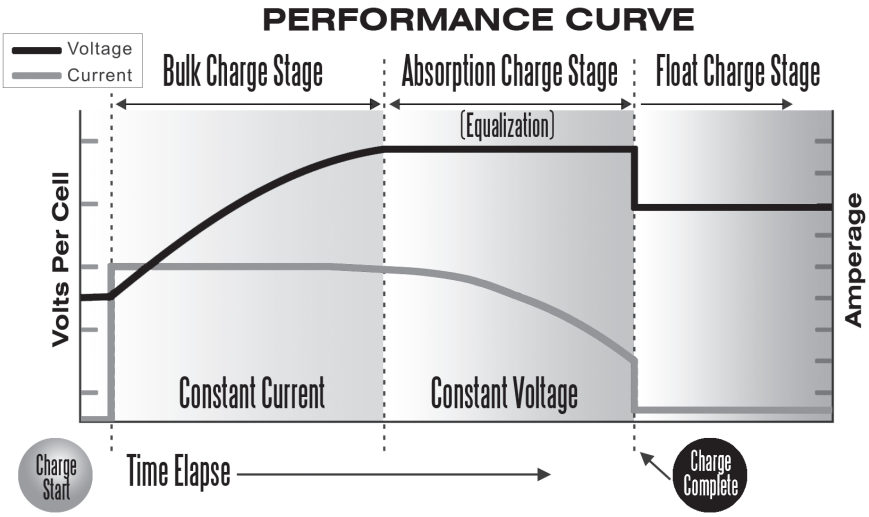


Figure B-1 Three-stage charging profile

FAQ's

Can I change the clamps on the charger with quick disconnects?

Yes. We recommend soldering all electrical connections where possible.

Can I run my electric water pump and cooling fan while charging?

Yes, with a word of caution, but there are two issues. First, the charger will only provide 15A max(PSC15), 30A max(PSC30) or 60A max(PSC60) charge current. Any amperage being consumed by extra electrical loads (ie. electric water pumps, etc.) will take away from the amperage available for battery charging and the battery charge time will be increased. In addition, the battery charger monitors the battery voltage and time to determine when the battery is at 100% charge. Extra electrical loads on the system will give the charger false information and therefore will prevent the charger from properly completing stage two.

Second, some electrical items can be damaged by high voltages. Data loggers, computers, and other items may lose data or be seriously damaged if subjected to the 19.0~20.0VDC of charging voltage. We do not recommend retrieving this information while charging. If in doubt about a particular component, consult with its manufacturer concerning its maximum input voltage.

⚠ **CAUTION:** Data loggers, computers of all sorts, and light bulbs may be damaged by the 19.0~20.0VDC of input voltage during charging. Do not operate these items while charging. We recommend disconnecting the battery from the system while charging.

Can I run this charger from a portable generator?

Yes with a word of caution. Since the output of the battery charger is directly proportional with the input voltage, we recommend portable generators with automatic voltage regulation. The *Intelli*SUPPLY is calibrated at the factory assuming 120VAC, 60Hz. Deviations from this voltage will cause deviations in the output voltage and overall performance.

How many batteries can I recharge at one time with the *Intelli*SUPPLY?

This depends on the size of the batteries. All batteries in the bank must be of the same type and size. In addition, the *Intelli*SUPPLY is expecting the battery bank to be at full charge in ten hours or less. Therefore the size of the batteries and their depth of discharge will play a role in the answer here. Given they were all XS Power 16V AGM batteries with a size of 45Ah at 100% discharged, you can charge up to four in parallel in ten hours.

Calculating External Battery Charging Time

Charging time will depend on the amp-hour capacity of your battery and on how deeply it is discharged. The following equation calculates an approximate charging time:

$$\text{Charging Time} = \frac{\text{CAP} \times \text{DOD}}{\text{CC} \times 80\%}$$ where:

Charging Time = Battery recharge time in hours
CAP = Battery capacity in amp-hours

DOD = Battery depth of discharge in percent.
A fully discharged battery has 100% DOD.

CC = Charge current. The rated current output of the charger in amps.

80% = Typical charging efficiency for lead-acid batteries.

Example:

An XS Power 16V AGM battery rated at 100 amp-hours is 40% discharged, that is, it has a DOD = 40%. Charging time with an *Intelli*SUPPLY 15A unit is calculated as follows:

$$\text{Charging time} = \frac{100\text{Ah} \times 40\%}{15\text{A} \times 80\%} = 3.3 \text{ hours}$$