ZPS-9160/9230/9320/9415

Charger Power Supply for Car Showroom & Workshop

Operation manual

Keep this manual in a safe place for quick reference at all times.

This manual contains important safety
and operation instructions for correct use of the battery charger.

Read through the manual and pay special attention to the markings
and labels of the charger, battery and equipment connected to the battery system.

Pay special attention to WARNING & PRECAUTIONS used in this manual.

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Warning/ Cautions

WARNING:
Failure to heed this warning may cause injury to persons and damage to Equipment.

CAUTION:
Failure to observe this warning may result in damage to equipment and improper functioning of the Charger.

WARNING:

- *The charger is not designed for any life saving application.*
- *The charger is designed for in-door use. Protect the charger from ingress of water.*
- *The charger is made to charge only properly sized lead acid batteries and Lithium iron phosphate ($LiFePO_4$).*
- *Don't recharging non-rechargeable batteries.*
- *Charging other types of battery or under-sized lead acid batteries may cause fire or explosion.*
- *Install the charger in accordance with all local codes.*
- *Do not use the charger if it has been dropped or damaged.*
- *Do not remove casing of the charger, there is no user -serviceable parts inside.*
- *Do not charge the battery on boats. Remove the battery and charge on shore.*
- *Never attempt to charge a frozen battery.*
- *Never attempt to charge a damaged battery.*
- *Wear protective goggles and turn your face away when connecting or disconnecting the battery.*
- *Never place the charger on top of a battery.*
- *Never smoke, use an open flame, or create sparks near battery or charger during normal charging operation as batteries may give out explosive gas.*
- *Operation as batteries may give out explosive gas.*
- *Do not charge batteries in an enclosure (box-in) due to possible explosion of entrapped explosive gas.*
- *Use of accessory not recommended may cause risk of fire, electric shock.*
- *Disconnect the mains supply before connecting or disconnecting the links to the battery.*
- *If the charger does not work properly or if it has been damaged, unplug all connections.*
- *This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.*
- *Cleaning and user maintenance shall not be made by children without supervision.*
- *Children should be supervised to ensure that they do not play with the appliance.*
- *State that during charging, the battery must be placed in a well-ventilated area.*

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Introduction

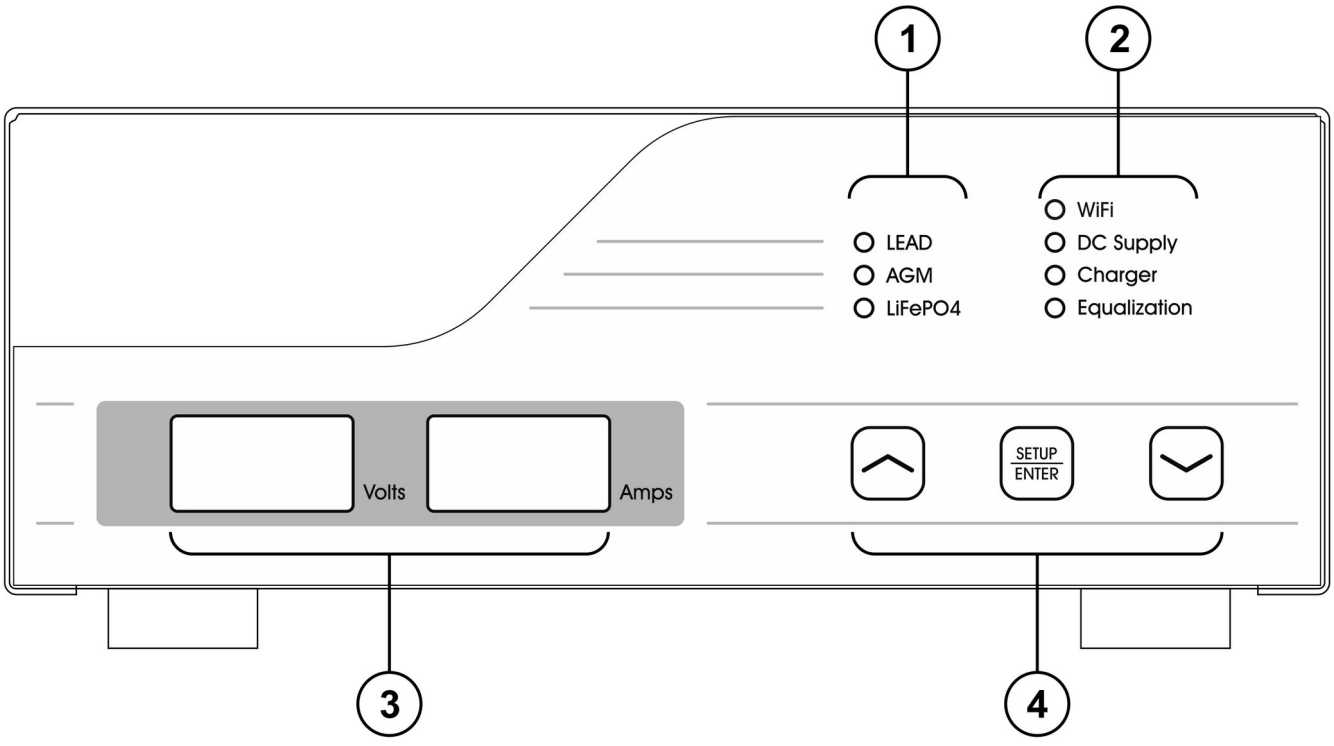
The large number of electronic devices in modern vehicles presents a challenge to the presentations of vehicles in the show room as customers want to view & try out out most of the functions.
The starting battery which is not being charged by the alternator at the same time, will be used up. Normal car charger is not designed for such situation which causes the battery go through charge cycles.

This charger is the solution to discharged starter batteries during showroom demonstrations.

The specially developed dc supply/charger with software prevents unwanted charge & discharge cycles of the starter battery. A safe clean and reliable dc source of power to ensure the battery is maintained in a top condition for continuous professional presentation.
The 60Amp rated power supply mode with adjustable current limit and 12V to 15V voltage range to meet different demands of DC power for different size batteries and frequency of demonstrations.
(remark : 12V to 15V and 60Amp is for ZPS-9160, refer to specification for other models)

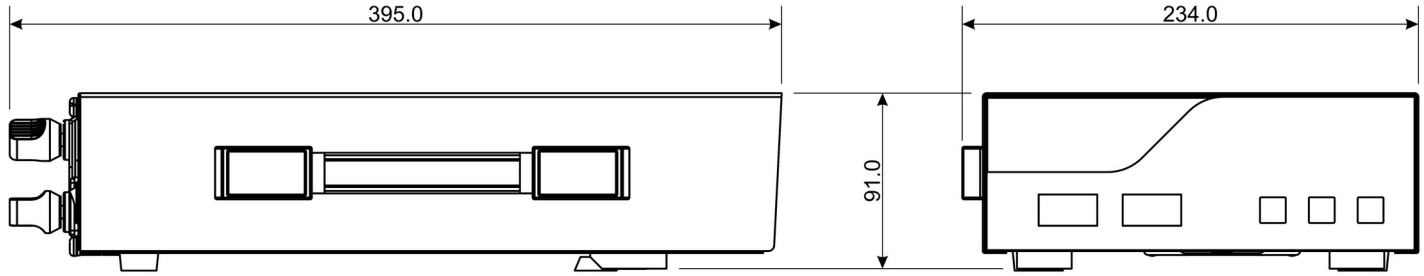
In the Workshop, the charger can be used as a 5 Stage charger with specific charging profiles for Lead ,AGM 2, and $LiFePO_4$ battery types. maximum charging current is adjustable from 5 to 60Amp to provide the optimal charging current level for a wide range of battery sizes.
Power Supply mode is also used during flashing (updating) of the car's computer system.
(remark : 5 to 60Amp is for ZPS-9160, refer to specification for other models)

Indication

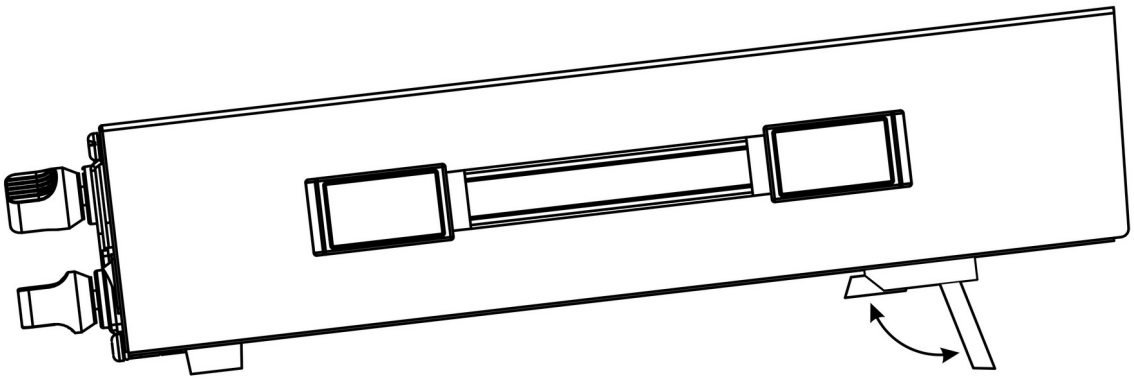


① Indicate Battery type selected
② Indicate WiFi/ DC supply mode/ Charger and Equalization charge on/off status
③ Output Voltage and Current Displays, Display information during setting stages
④ UP/ DOWN and SETUP buttons

Dimension



Foldable stand

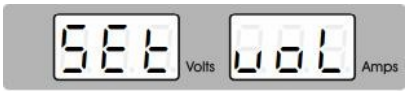
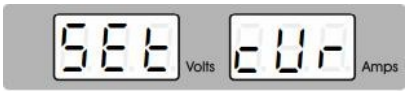
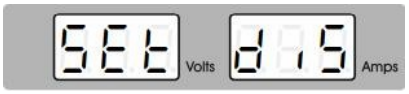
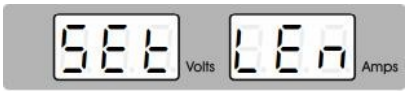
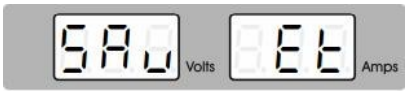
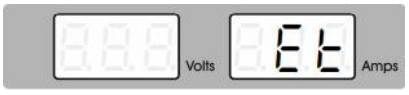


There are two main application modes: the Power Supply Mode mainly for car showroom application, the Charger Mode for workshop.

Power supply mode

The Power Supply Mode is used for Showroom application and flashing (updating) of the car's computer system in workshop. It provides a stable constant voltage (12 to 15V) with up to 60Amp output. The adjusted setting of voltage and current will be retained even after AC mains and output are disconnected allowing an easy daily showroom operation by switching just the mains switch.

Power supply mode features & setting list

Features	Display	Range
Set output voltage		12V to 15V at 0.1V step
Set max. output current limit		0A to 60A
Set display brightness		3 Levels {1, 2, 3}
Set output cable length		0, 2, 3, 5meters 0 means no compensation
Save & exit		
Exit without save		

(remark : 12V to 15V and 60Amp is for ZPS-9160, refer to specification for other models)

Charger Mode

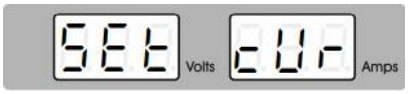
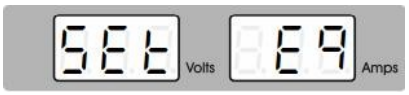
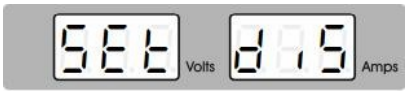
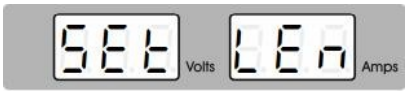
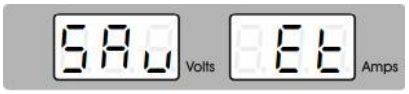
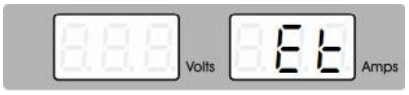
Three types of charging profiles to select : Lead, AGM 2 & $LiFePO_4$.
Only the output current limit can be set between 5-60A at 0.5A step for different battery size.
This feature greatly increases the optimal range of suitable battery capacities.
Always set the output current limit according to the recommendation of the battery manufacturer.
The following table is just for general references.
Lead based batteries require longer full charge time (8-10 hours) with optimal charging current.
$LiFePO_4$ battery can take up more charging current (0.5 -1C) in a shorter time as it solely depends on the design of BMS (battery management system)of the battery.

Table 1: Charge current for suitable battery size

Max. output current	5Amp	10Amp	20Amp	30Amp	60Amp
Lead & AGM 2 Battery	20-50AH	40-100AH	80-200AH	120-300AH	240-600AH
$LiFePO_4$ Battery	10-50AH	10-100AH	20-200AH	60-300AH	120-600AH

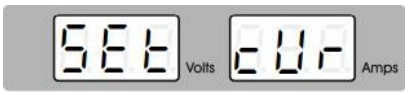
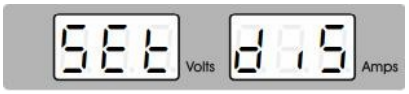
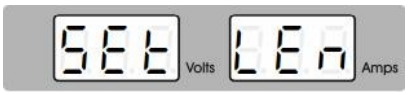
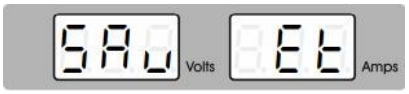
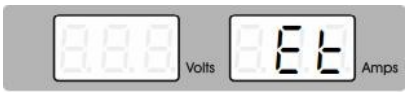
Charger mode charging profiles & setting list

Lead acid battery
Charging profile : Soft Start / Bulk / Absorption / Equalization / Float
Setting list

Features	Display	Range
Set max. output current limit		5A to 60A
Set equalization charge		On / Off (EQ is 16V and 5A. Max. 1hr)
Set display brightness		3 Levels {1, 2, 3}
Set output cable length		0, 2, 3, 5meters 0 means no compensation
Save & exit		
Exit without save		

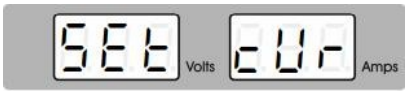
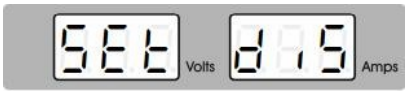
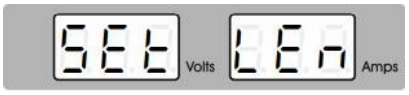
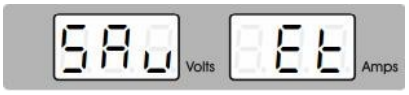
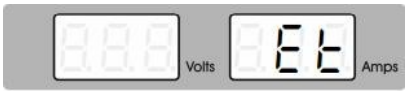
(remark : 5 and 60Amp is for ZPS-9160, refer to specification for other models)

AGM 2 battery
Charging profile : Soft Start / Bulk / Absorption / Float
Setting list

Features	Display	Range
Set max. output current limit		5A to 60A
Set display brightness		3 Levels {1, 2, 3}
Set output cable length		0, 2, 3, 5meters 0 means no compensation
Save & exit		
Exit without save		

(remark : 12V to 15V and 60Amp is for ZPS-9160, refer to specification for other models)

$LiFePO_4$ battery
Charging profile : Soft Start / Bulk / Absorption
Setting list

Features	Display	Range
Set max. output current limit		5A to 60A
Set display brightness		3 Levels {1, 2, 3}
Set output cable length		0, 2, 3, 5meters 0 means no compensation
Save & exit		
Exit without save		

(remark : 12V to 15V and 60Amp is for ZPS-9160, refer to specification for other models)

<u>Equalization charge mode for lead acid battery</u>
This is intentional over-charging is mainly for flood lead acid battery to remove sulfation that formed either due to frequent under charge or inactivity with long period of self discharge. Before setting up of Equalization Charge ,all loads on battery terminals must be removed and battery electrolyte is filled up. EQ charge is set to occur right after Absorption charge for 60 minutes at voltage of 16 V and current is limited to 5 Amp.
Charger will go to Float charge after equalization charge.

(remark : 16V and 5Amp is for ZPS-9160, refer to specification for other models)

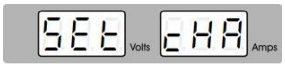
LiFePO$_4$ battery

All LiFePO$_4$ battery banks have built-in BMS (Battery Management System).
The BMS monitors & controls: the safety functions, max charging current, max input voltage and other discharge safety feature of the battery.
Always follow strictly to the warning, precautions and recommended max charging parameters, temperature from the battery manufacturer.
The charging and discharge profile of LiFePO$_4$ is very much different from the lead based batteries.
There is a high possibility of over-discharging the battery because of the stable discharge voltage range (13.2v to 12.8V) for 80% of its capacity, its output voltage is 12.5V even at last 10% battery capacity. There is no need to fully charge up the battery, in fact LiFePO$_4$ battery prefers to be at 80%.
It can take in 0.5 C easily and up to 1C charging for most BMS design.
Do not charge LiFePO$_4$ below zero centigrade.

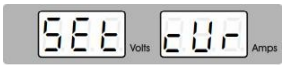
Step by step examples of operation & setting

When unit is powered up, the displays first show the present firmware version then current and voltage depending on the last set Mode of the unit and whether output is connected.

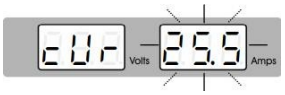
Example 1 : Set maximum charging current limit when unit is in AGM 2 charger mode

i. Press and hold the SETUP ENTER until 

appear.

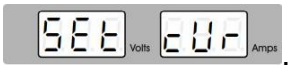
ii. Press the ﹀ and display show 

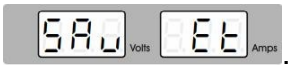
.

iii. Press the SETUP ENTER to enter 

display.

25.5 Amp is the present max., press ﹀ or ﹀ to increase or decrease the value.

iv. Press SETUP ENTER to confirm new current setting,and display change to: 

.
Caution: Setting procedure is not completed and must go through Display Brightness & Output Cable length to confirm at the Save & Exit stage 

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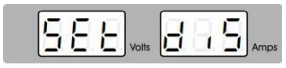
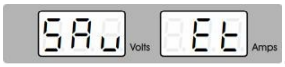
v. Press the ﹀ to scroll through display brightness setting 

& output cable length setting 

to arrive at Save & Exit stage 

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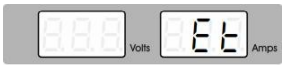
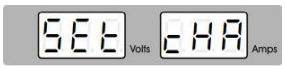
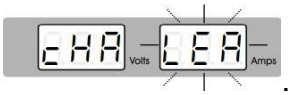
vi. Press SETUP ENTER to confirm and save your new settings.
If you do not want to save any of the new settings, you could go one step further to Exit without save 

and press SETUP ENTER button. Alternatively, you just stop press any button for 30 sec, unit will exit without save.

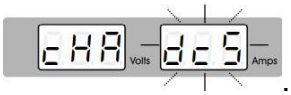
You can change settings of display brightness and output cable length using same procedure like setting the max. current limit.

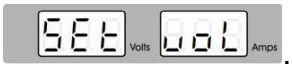
Example 2 : Changing the Application Mode
Change to DC Supply Mode

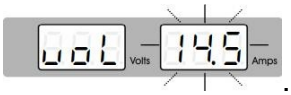
i. Press and hold the SETUP ENTER until  appear.

ii. Press the SETUP ENTER to enter  .

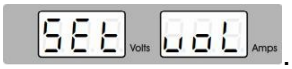
iii. Press ^ or v to cycle: LEAD > AGM 2 > $LiFePO_4$ > DC Supply > LEAD > AGM 2 >…..
Take note of the LEDs on right panel changes with above settings.
Let us select DC Supply application mode.

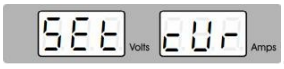
iv. Press SETUP ENTER to confirm at  .

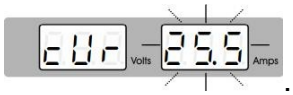
v. Press v and set voltage appears  .

vi. Press the SETUP ENTER to view or change the flashing voltage  .

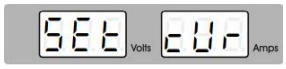
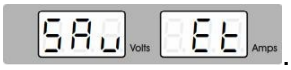
vii. Press ^ v to increase or decrease voltage.

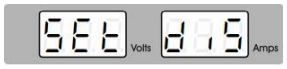
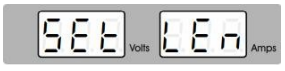
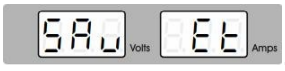
viii. Press SETUP ENTER button to confirm new voltage setting, display becomes  .

ix. Press v to go to Current Setting  .

x. Press the SETUP ENTER to view or change the current setting  .

xi. Press ^ v to increase or decrease current setting.

xii. Press[Menu] button to confirm new current setting, display becomes  .
Caution: Setting procedure is not completed and must go through Display Brigtness & Output Cable length to confirm at the Save & Exit stage  .

xiii. Press the v to scroll through display brightness setting  & output cable length setting  to arrive at Save & Exit stage  .

xiv. Press the SETUP ENTER button to confirm and save your new settings, only the voltage meter will display the set voltage if output is not connected.

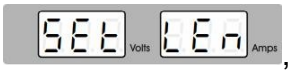
Charging Cable Length Setting

These settings provide compensation for voltage drop across a 8 AWG charging cable of 2 / 3 / 5 charging cables in high current application. The zero setting has no compensation effect.
It is recommend to check on the internet for the appropriate cable size for specific length.

Suggested cable size for different maximum output current

Maximum current	10A	20A	40A	60A
Cable size	16 AWG	12 AWG	10 AWG	8 AWG

Selection Steps:

When Display shows 

,

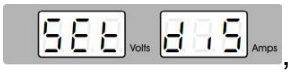
Press SETUP ENTER to enter. Then press ^ v buttons for Displays : {Len} {2} {3} {5} {0} selections.

Press SETUP ENTER button to confirm selection.

Display Brightness Setting

The displays have 3 brightness levels for showroom and workshop environment.
The dim setting is for least distracting in car showroom.

Selection Steps:

When Display shows 

,

Press SETUP ENTER to enter. Then press ^ v buttons for Displays : {Led} {1} {2} {3} selections.

Press SETUP ENTER button to confirm selection.

Installation

The slim casing (82mm) allows it to under most cars in the showroom.
The adjustable stands at the bottom provide easy viewing with 3 brightness setting of display.
The unit can be installed horizontally or vertically.

This charger use low profile design with only 82mm height. This form factor make it is easily to be installed under any type of car within show room environment. The charger allowed to be installed horizontally or vertically.

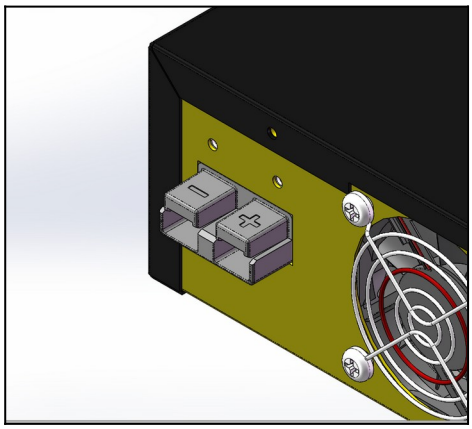
Connect AC Input

This unit supports input range from 100VAC to 240VAC. Please check the AC source rating is within the range before connecting to the mains.

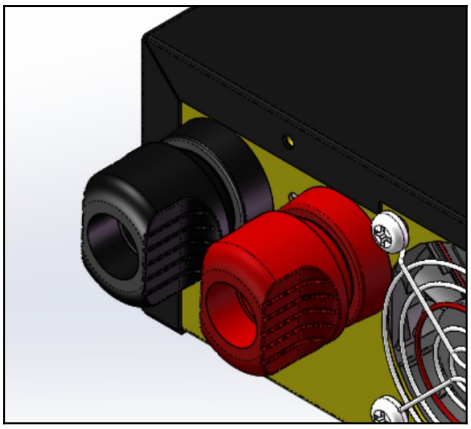
Connect DC output

The charger has 2 different output socket versions. Anderson plug or Traditional terminal. Connect the cable to DC output terminal with compatible terminal.

- Anderson plug



- Traditional terminal



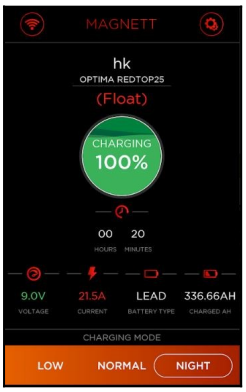
Select correct output cable length

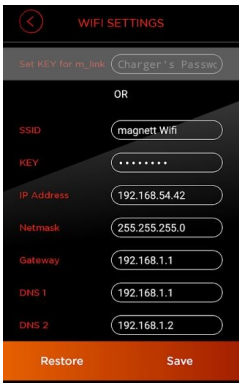
The charger has automatic voltage compensation feature. The value of compensation depends on cable length and output current. To get the best performance on compensation, it allows you to select 3 different length of cables. It can be selected in menu for 2m, 3m or 5m of AWG 8 cables. See section *"Charging Cable Length Setting"* page 9 for more details. The cable with compatible terminal types can be ordered from Manson.

WiFi Connection

The WiFi is always ON. Use Smartphone Apps to connect charger for remote monitoring. The WiFi LED will ON when it is connected smartphone or router.

Smartphone Apps





There are Apps for iOS and Android can be used to monitor Manson ZPS-series Battery Charger. Please go to App Store or Google Play to search “Magnett Charger Monitor” apps.

Download on the App Store

GET IT ON Google Play

Specifications

Model	ZPS-9160	ZPS-9230	ZPS-9320	ZPS-9415
AC input Voltage	110-240VAC 50/60Hz			
AC input Current	<5A @ 230VAC			
No Load Input Current	≤320mA			
Output Voltage				
Lead	Absorption : 14.4V Float : 13.6V	Absorption : 28.8V Float : 27.2V	Absorption : 43.2V Float : 40.8V	Absorption : 57.6V Float : 54.4V
AGM 2	Absorption : 14.7V Float : 13.6V	Absorption : 29.4V Float : 27.2V	Absorption : 44.1V Float : 40.8V	Absorption : 58.8V Float : 54.4V
$LiFePO_4$	Absorption : 14.4V Float : OFF	Absorption : 28.8V Float : OFF	Absorption : 43.2V Float : OFF	Absorption : 57.6V Float : OFF
DC Supply	12V – 15V (0.1V step)	24V – 30V (0.1V step)	36V – 45V (0.1V step)	48V – 60V (0.1V step)
Output current range	5 – 60A	2.5A – 30A	2.5A – 20A	2.5A – 15A
Soft Start Bulk Charge	Half of set current (max. 10A)	Half of set current (max. 5A)	Half of set current (max. 5A)	Half of set current (max. 5A)
Equalization	16V/5A max 60mins	32V/2.5A max 60mins	48V/2.5A max 60mins	64V/2.5A max 60mins
Ripple & Noise (p-p)	100mV			
Optimal Efficiency	85%			
Display	Voltmeter; Ammeter; 6 LEDS indicate battery types; DC supply or charger mode and equalization ON/ OFF			
Protection	System Over Temperature Protection Output Over Voltage Protection Reverse Polarities Protection Output Short Circuit Protection Spark Free connection			
Cooling Method	Thermostatically Controlled Variable Speed Fan (0-full speed)			
Operation Temperature	-10ºC to 50ºC (Maximum output up to 40°C)			
Approval	CE			
Dimension (LxWxH)	395x234x91 mm			
Weight	4.7kg			

* All values are based on the Standard ambient Temperature 25°C and Pressure 0.1Mpa.
* SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE