Towards a Greener World

ALFA TECHNOLOGIES

User Guide

HF Battery Chargers

Efficient chargers for 12V/24V/36V/48V Battery

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Specifications

Model	24V,20A	24V,25A	24V,32A	24V,40A
INPUT SUPPLY	180V-270V max	180V-270V max	180V-270V max	180V-270V max
POWER (W) (MAX)	650	825	1050	1350
INPUT CIRCUIT BREAKER / FUSE	6A	6A	MCB-16A	MCB-16A
OUTPUT FUSE (AMP)	30A	30A	25A* 2 NOS	25A* 2 NOS
EFFICIENCY - TYPICAL	87-90%	87-90%	87-90%	87-90%
FLOAT VOLTAGE	27-27.6V	27-27.6V	27-27.6V	27-27.6V
ABSORPTION VOLTAGE	28.8V	28.8V	28.8V	28.8V
EQUALIZATION VOLTAGE	32V	32V	32V	32V
SUITABLE FOR BATTERY	180-250AH	180-250AH	250AH-330AH	250AH-330AH
SIZE (mm)	290 x 160 x 140	290 x 160 x 140	305 x 275 x 150	305 x 275 x 150
WEIGHT (net) (kgs)	7	7	13	13
MOUNTING (mm)	275 x 145	275 x 145	285 x 255	285 x 255

Note: All Voltages have an accuracy of 100mV as measured on a calibrated meter.
Specifications are subject to change for improvements without Notice.

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Specifications

Model	12V,15A	24V,8A	12V,25A	24V,25A	36V,15A	48V,12A
Input Supply	180V min. to 270V max. 50Hz/60Hz					
Power (W) (Max)	250	300	360	700	700	700
Input Fuse (Amp)	2	2	6	6	6	6
Output Fuse (Amp)	20	20	30	30	20	20
Efficiency	Typical - 87 to 90%					
Float Voltage (For LEAD-ACID Battery)	13.5-13.8	27-27.6	13.5-13.8	27-27.6	40.5-41.4	54-55.2
Absorption Voltage (For LEAD-ACID Battery)	14.4	28.8	14.4	28.8	43.2	57.6
Equalization Voltage	-	-	16V	32V	48V	64V
Suitable for Battery-AH	80-180AH	60-120AH	180-250AH	180-250AH	80-180AH	80-150AH
Size (mm)	280x150x80		290x160x140			
Weight (kgs.)	3.5	3.5	7	7	7	7
Mounting (mm)	130 x 260		145 x 275			

Note: All Voltages have an accuracy of ± 100 mV as measured on a calibrated meter.
Other models also available for different batteries.

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Features

- Mircontroller based High Frequency Charger.
- AC Supply Fluctuations Compensated - (180V to 270V AC)
- Lower Gassification & Lower Battery Heating
- Equalization - 5 Hrs.
- Can charge batteries with terminal voltage as low as 0V.
  - Energy efficient as compared to conventional 50Hz chargers.
  - Longer Battery life due to precise voltage & current settings with 3 step Charging Profile.
- Weatherproof unit equivalent to Ip65. (excluding Fan)
- Gives significant size / weight / cost advantage over conventional chargers.
- LEDs to indicate the charging status
- Onboard / Off-board applications.
- Auto Cutoff to Float Mode to maintain full charge

Technology

- Conventional linear battery chargers are very bulky, inefficient electrical devices whereas ALFA battery chargers are light weight sophisticated electronic Device with Switch Mode Technology.

- alfa's Battery Chargers using the Switch Mode "High Frequency" Technology work @ 50,000 Hz (1000 times faster then conventional 50 Hz charger) thus requiring a much smaller power transformer. Due to this the unit becomes very compact, light and efficient. It charges the Battery with internationally accepted 3 step charging profile which is very suitable to improve battery life & also provide longer working hours due to optimized charging.

Protections provided:

- AC Surge protection
- Over - Voltage protection
- Over - load protection
- Inrush current protection
- Short circuit protection
- Reverse polarity protection
- Input & Output Fuse protection

The batteries & other circuits connected to the charger are well protected in abnormal conditions.

Installation:

a) The Battery Charger should be tightly mounted on the 4 mounting holes in order to avoid vibration related problems.

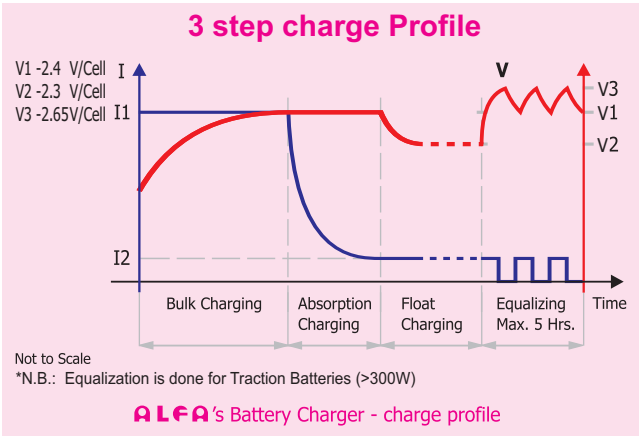
b) The Heat-sink of the Charger should be on the front side & not blocked. Although the Battery Charger has forced cooling it is advisable to provided sufficient air passage eg. In stackers, keep the hood open.

c) The input mains cord should be plugged in single phase, 230V/50Hz supply. Ensure proper EARTHING.

d) The output wires (Red: +ve & Black: -ve) should be properly connected with correct polarity.
Good connector contacts should be ensured for the heavy current to flow.

Indications:

- Red L.E.D.:
  - Continuous ON - Power On / Ready - Indicates Charger is OK & Ready to charge.
  - Blinking - Temperature Limit Exceeded. The unit will automatically lower the charging current & again resume full charging once the unit temperature is normal. (for Chargers above 300W)
- Green L.E.D. : Blinking Charging ● Steady 75% Charged
- Yellow L.E.D. : Float - the Battery is in Float Mode.
- Orange L.E.D. : (for Chargers above 300W)
  - Continuous ON - Equalization mode enabled. (charger will go into equalization phase after charging is over)
  - Blinking - Equalization Phase in progress.



ALFA's Battery Charger - charge profile

Operation:

- When the Charger is connected to 230 VAC Input, the Ready L.E.D. will glow which indicates the Charger is OK & Ready to Start.
- If the battery is not connected...
  all other LEDs will be OFF (***For** Chargers above 300W)
  yellow LEDs (stand-by) is ON (***For** Chargers below 300W)
- **Bulk Charge:** When the Charger is connected to a normally discharged battery, it will first go into bulk charge mode. This is the first phase which delivers constant power to the battery. 75% of the battery is charged in this mode.
- **Gassing / Absorption charge:** After Bulk charging, once the battery has reached 2.4V per cell, the charger enters absorption phase. The voltage is held constant at 2.4V per cell and current drops till the battery is charged completely. Then it cuts-off to float mode.
- **Float Mode Charge:** This is the final phase of 3 step charging. Here the battery is kept at its nominal Float voltage of 2.3V per cell and trickle charged to keep it from self discharge.
- A normal battery generally charges within 8-12 hrs depending on its state of charge.
- **Equalization:** This Charge is used to keep individual cells fully charged. It is advisable to equalize periodically (eg. Once every month) depending on the condition of the battery. This mode should be manually activated by pressing the equalize switch. In this mode the battery is taken to a higher voltage (up to 2.65 V per cell)gradually, in a very controlled manner for a duration of maximum 5 hours.

Maintenance:

- This Battery Charger is maintenance free with plug & play concept.
- It doesn't require any settings.
- No water/dust ingression.
  (Fans / ribs need to be maintained dust free.)
- There are no user serviceable parts.

Precautions to avoid Faulty operation:

- Ensure proper connections with correct polarity on both, the Input & the Output side.
- Output wires should not be tampered. Increasing / decreasing wire length may cause improper charging and/or unnecessary voltage drops & heat generation at the contacts.
- Ensure that the fuses are of correct type & value. Do not replace input fuse while the charger is Powered On to avoid serious shock hazards.
  Refer Specification Chart for Fuse Values on page 1
- **Please clean fans / ribs regularly for trouble - free operation.**
- **Provide proper electrical earthing for preventing shock-hazards.**

If the charger is not functioning properly in spite of the above precautions, it should be returned back for repair.

Warranty is Void if seal is broken.

Trouble Shooting Guide

Problem	Cause / Remedy
Battery doesn't charge at all →	Check LED Status Red & Green Indicates Proper Charging Red & Yellow Indicates Charge complete Only Red indicates Charger OK. Battery not connected
None of the LEDs glow →	Check Mains fuse Ensure proper mains supply 230 V, 50 Hz
BDI doesn't show full charge →	Check “BDI settings” for 100% charge indication. Should be <= 2.4V/cell. Ensure the charge of battery using a hygrometer.
Only Red LED glows & Battery doesn't charge →	Check O/P fuse, Replace if blown If Problem persists check for loose / no connection from charger O/P to Battery.
Red LED Blinks →	The unit is over heated Ensure fans are working Ensure proper air circulation around the unit.

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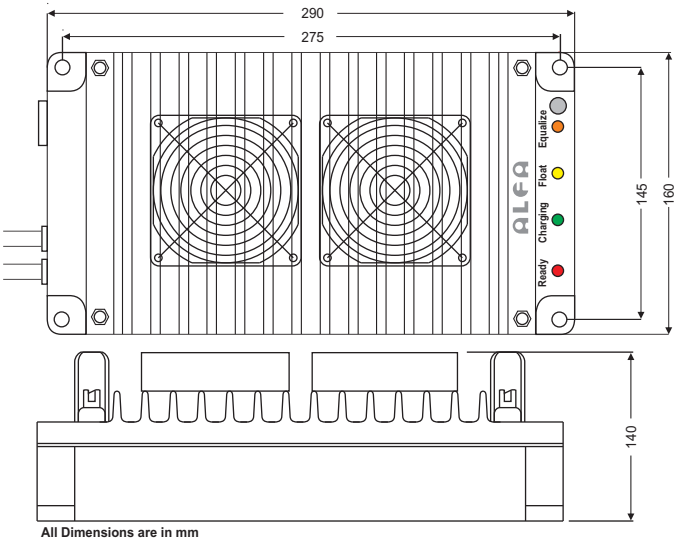
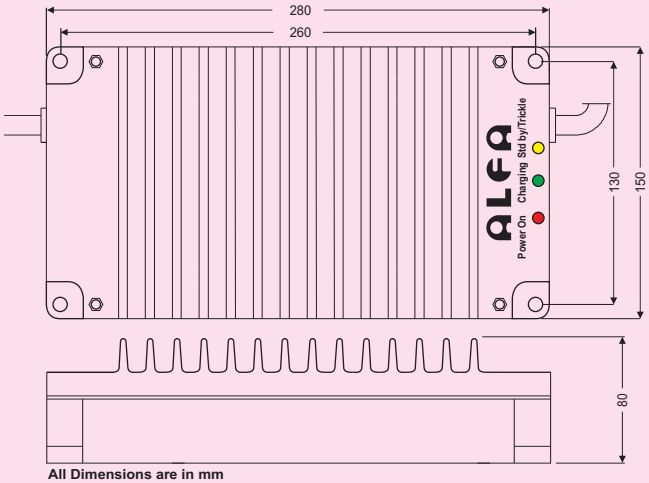


All Dimensions are in mm

Outline of Battery Charger above 300 Watts



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Outline of Battery Charger up to -300 Watts

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Precautions to have a good battery life

Battery Discharge depth and life:
80% discharge produces 100% life.
90% discharge produces roughly 75% life.

What affects the life of battery?

Deep discharges	:	Max. 80% depth
High temperatures	:	Max. 50C in the acid
Overcharging	:	Burns the battery out
Undercharging	:	Sulphates the battery
Maintenance	:	Incorrect acid level, dirt, faults, etc.

When does a battery sulphate?
If it is left uncharged for an unduly long time.
If it is not discharged to 80% every now and again, it gets "sluggish"
If it is not fully charged
If it works at a high temperature
If it is topped up with acid
The above points are the main reason why a battery does not lasts as long as expected. Some of the factors destroy the battery very quickly. Others take slightly longer. However, a common feature of them all is that they can be avoided if you follow these tips of maintaining the battery & Very important - use Proper Battery Chargers.

Battery Topping up

When a battery gases, water disappears and not acid.

This means that the acid concentration increases in the remaining liquid and the plates are no longer covered.
This causes the battery to "die" very quickly. To avoid this, it is necessary to top up with water occasionally, but only with demineralized water.

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A good charger always meets above mentioned norms.

- It never under-charges OR over-charges.
- It does not over heat the battery.
- It causes minimum gas-sification.
- Its energy efficient.

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Battery Charger Test Report

Date: Sr. No.	
Model:	
Boost Charging Power (Watts)	
Boost Charging Voltage (Volts)	
Absorption Charging Voltage (Volts)	
Float Charging Voltage (Volts)	
Equalization Feature Test	
Short Circuit Test	
Final Test - (1 hr @ Full power)	
Over Temperature Feature Test	

Tested by

Approved by

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