

Power Solutions

# Ensuring Seamless Growth



Battery Charger

# POWER+ BATTERY CHARGER

POWER+ Battery Charger provides quiet, reliable and adjustable DC power to battery/load. The Battery Charger gives DC output, the input source being Single/Three Phase AC supply only. The load is isolated from any spikes, surges or dips.

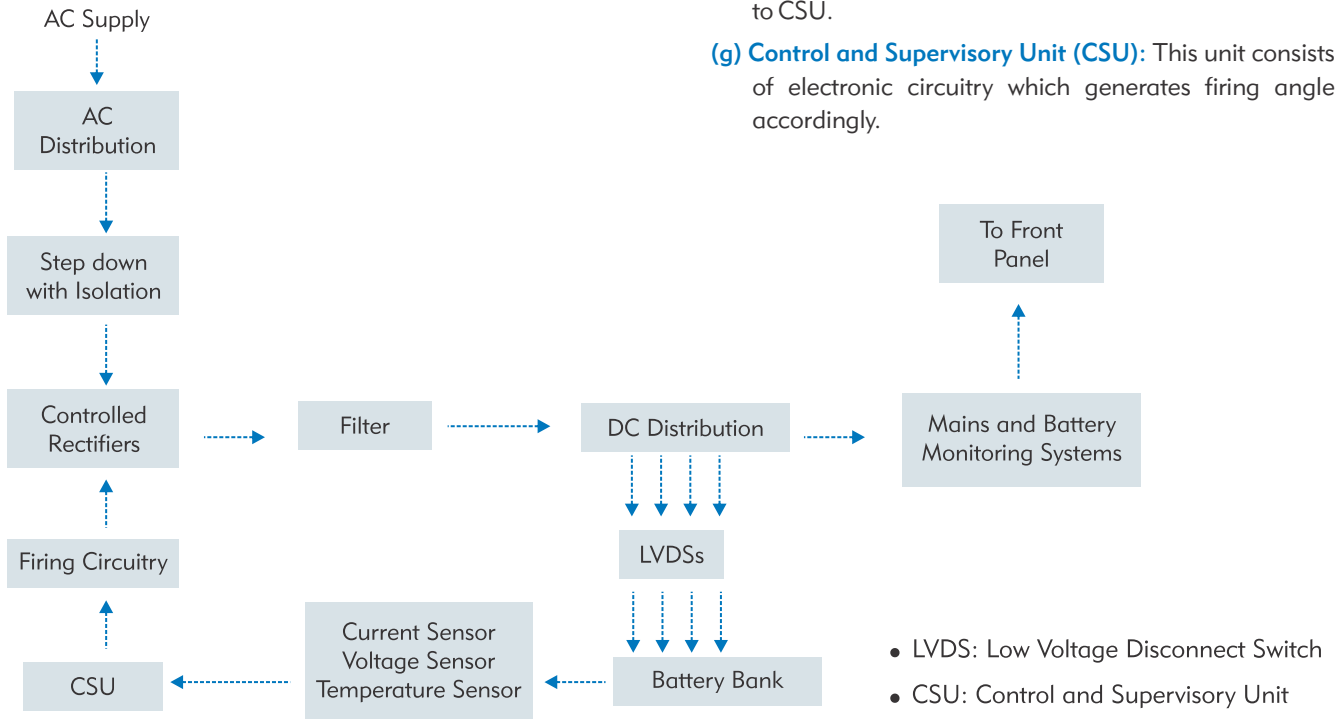
Battery Charger is simply a rectifier, which converts AC to DC. To effect rectification, one of the following method must be selected:

- By rotating a converter, i.e. an AC motor driving a DC generator
- By thermionic tube rectifier
- By semiconductor rectifier
- Rectification by semiconductor devices offers several advantages over Rotating and Thermoionic Devices. There are two types of semiconductor rectifiers:
  - Diode Version Battery Charger
  - SCR Version Battery Charger

## DIODE VERSION BATTERY CHARGER

- These chargers use diode as the rectifying device.

## INTERNAL BLOCK DIAGRAM



## SCR VERSION BATTERY CHARGER

- Chargers using SCR are known as Phase Controlled Rectifiers. Its basic function is to convert AC input into controlled DC output. The basic principle of the Phase Controlled Rectifier is to control the point at which SCR are allowed to conduct during each AC cycle. Single/Three Phase fully controlled rectifiers give best utility factor, less ripple factor and more efficiency.

- (a) **AC Distribution:** It consists of a HRC Fuse, AC MCCB and a Single Phase Preventor.
- (b) **Isolation and Step down:** This unit consists of simple step down transformer.
- (c) **Controlled Rectifier:** Fully controlled rectifier circuit consists of six thyristors that convert AC power to controlled DC power.
- (d) **Filter:** This network suppresses (choke) AC component from the DC power.
- (e) **DC Distribution:** It consists of
  - DC MCCB (optional)
  - HRC Fuses
  - Bus bar
- (f) **Sensors:** This block converts 4-20 mA and 0-5 VDC to actual voltage, current and temperature and then feeds to CSU.
- (g) **Control and Supervisory Unit (CSU):** This unit consists of electronic circuitry which generates firing angle accordingly.

## SCR VERSION CHARGERS V/S DIODE VERSION CHARGERS

S.No.	Description	SCR Version	Diode Version
1.	Technology	Thyristor-based phase controlled technique	Simple uncontrolled rectifier using diode
2.	Regulation	±1%	Poor regulation (±10-12%)
3.	Settings	By using simple potentiometer for phase control	Using heavy duty rotary switch for ON load tap changer
4.	Reactor	Electronic current limit	Heavy duty reactor required for current limit
5.	Transformer	Mains transformer without any taps required	Mains transformer required with different taps to control voltage and current
6.	Over charge	Batteries are charged till the max. limit	Often battery gets over charged
7.	Soft start facility	Easy, as when charger is ON, DC voltage is built up softly (not immediately)	Critical
8.	Battery current limit	Provided by controlling the firing angle	Not provided
9.	Constant Voltage	DC voltage constant	Through rotary switch but not exact DC value
10.	Efficiency	Comparatively high	Low
11.	Weight	Light Weight	More weight than SCR version

## CONFIGURATIONS

- Float Charger (FC)
- Float cum Boost Charger with voltage dropping diodes/voltage regulator (FCBC)
- Float and Boost Charger (FC & BC)
- Dual Float cum Boost Charger (DFCBC)
- Redundant float or float cum boost charger
- Application/customer specification configuration
- Rating
  - Voltage: 12 V, 24 V, 48 V, 110 V, 220 V or any custom made
  - Current: Up to 2000 A for 24 VDC/up to 1000 A for 48 VDC/up to 700 A for 110 VDC/up to 500 A for 220 VDC

## SALIENT FEATURES

- Fully automatic electronic SCR controlled
- Soft start feature to minimize inrush current to battery when charger is re-energized
- Dropper diode regulator in load path for specific applications
- In general, the system conforms to IEC 146 and IS-4540 standards
- Battery path current limiting
- Output short circuit proof
- Automatic float boost change over
- Operation under reverse input phase sequence
- Built-in digitally controlled automatic regulation circuit
- Insulation class for magnetic as per IS standard

- 7 tank-processed powder-coated painting shades
- Powder coated paint as per IS Standards

## APPLICATIONS

- Telecom/Infocom power supply
- Power generating plants
- Railway utilities
- Process industries
- Switchgear protection
- Substation batteries
- DG set batteries
- Traction chargers for all types of battery-operated material handling equipments like fork-lift trucks, platform trucks, pallets, triggers, stackers, etc.

## TECHNICAL SPECIFICATIONS

AC input voltage	As specified by customer with $\pm 10\%$ tolerance (1 ph or 3 ph 3 wire / 4 wire, 50Hz $\pm 5\%$ )
DC output voltage	12 V/24 V/48 V/110 V/220 V/as per customer requirement
Regulation	$\pm 1\%$ , digitally controlled
Current limit	105% continuous of rated load, digitally controlled
Ripple content	< 2% rms (standard), 1% optional
Charger efficiency	> 85% for Three Phase input > 75% for Single Phase input
Protections**	Battery U/V & O/V   Battery over charge & over load   Short circuit Bridge protection fast acting fuses   Surge suppresser   AC & DC circuit protections   Filter capacitor fuse   Battery input fuses
Cooling	Natural (or) Forced
Ambient temperature of operation	0-50°C or as per customer requirement
Cabinet	Free standing steel cabinet 1.6/2.0 mm Gauge sheet steel or as per customer requirement IP protection as per customer requirement
** Provided as per customer requirement	

In the interest of continuous product improvement, all specification are subject to change without notice.

RS Power Systems Pvt. Ltd.