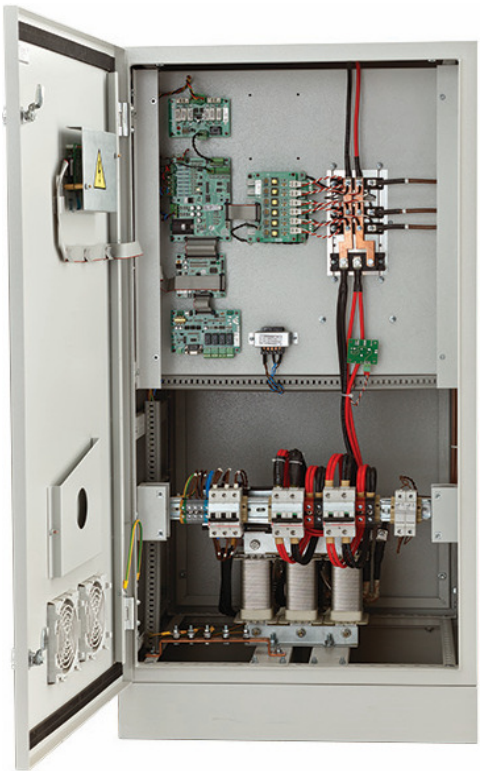
SD / SDi SERIES

RECTIFIER / CHARGER

Product Description

SD1 (1-Phase) & SD3 (3-Phase) Series (AC->DC) Rectifier or (AC-DC-AC) Bi-directional converter, with advanced conversion technology. Built-in with protections, galvanic isolation and DSP control systems, designed and manufactured to convert 1 or 3-Phase AC voltage to pure regulated DC output voltage (12V / 24 V / 48 V / 110 V / 220 V to 720V) as DC Power Supply, DC UPS or Bi-directional converter when operates with industrial battery banks.

It provides power solutions, which is especially important for Industrial, Telecom, ESS and Military applications.



Operating with Battery / ESS:

Operating as a DC UPS: Batteries are automatically tested by the control unit at selectable intervals, e.g. weekly, fortnightly or monthly. A short-time discharge of the battery is made to confirm that all the battery blocks and connecting elements are in good working order. The battery test is performed without any risk to the user, even if the battery is wholly defective.

Operating as Bi-directional converter: Batteries can be charged/discharged by the external supervisory request, according to the power demand on AC grid. In peak demands, the converter will discharge batteries, so the power flow will be from battery to the grid. On the hand, on low demand times, the converter will charge batteries to use in the future demand.

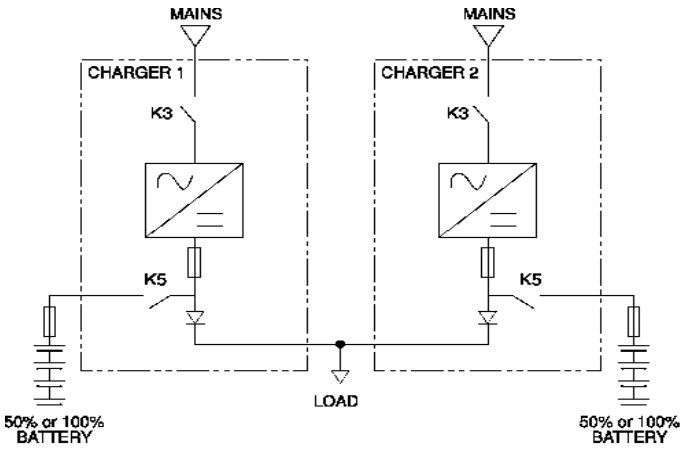
Apart from external management that controls demand, the system can be adjusted to specific profiles for periodic charge / discharge processes.

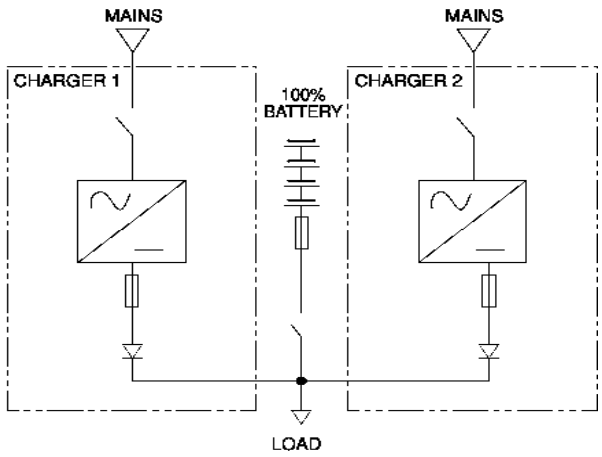
Support Full Customizations

Parallel (dual) operation

The battery charger systems have the capability to be connected in parallel for multi module configurations between units of the same rating.

The parallel connection of battery chargers increases reliability for the DC load.





Complete DC UPS systems in parallel configuration System:

The range is capable of operating in parallel as shown above.

The parallel connection of DC UPS improves reliability through redundancy.

In order to operate in such configuration, each rectifier/charger is equipped with a blocking diode.

The blocking diodes ensure 2 major functions:

- They allow the control of the recharge current of each battery.
- They avoid the connection of fully charged battery to a fully discharged battery. Such a situation would result in a very high current which would be dangerous for the equipment

Common battery connected to 2 Chargers in parallel configuration System:

In this configuration, chargers concur to charge the same battery. The DC load is equally shared between both rectifiers.

In order to ensure a safe operation of such a configuration, each rectifier/charger will be equipped with a blocking diode.

Ambient temperature compensated battery charger:

The rectifier-charger output voltage operates within narrow limits according to the battery manufacturer's technical data. In order to ensure an optimum battery charging, regulation is automatically adjusted to the ambient temperature.

The float voltage and the discharge voltage of the battery are automatically adjusted as a function of the temperature in the battery compartment in order to maximise battery operating life.

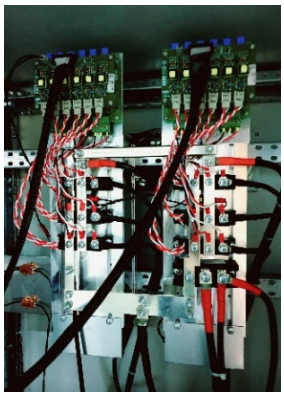
The temperature adjustments are:

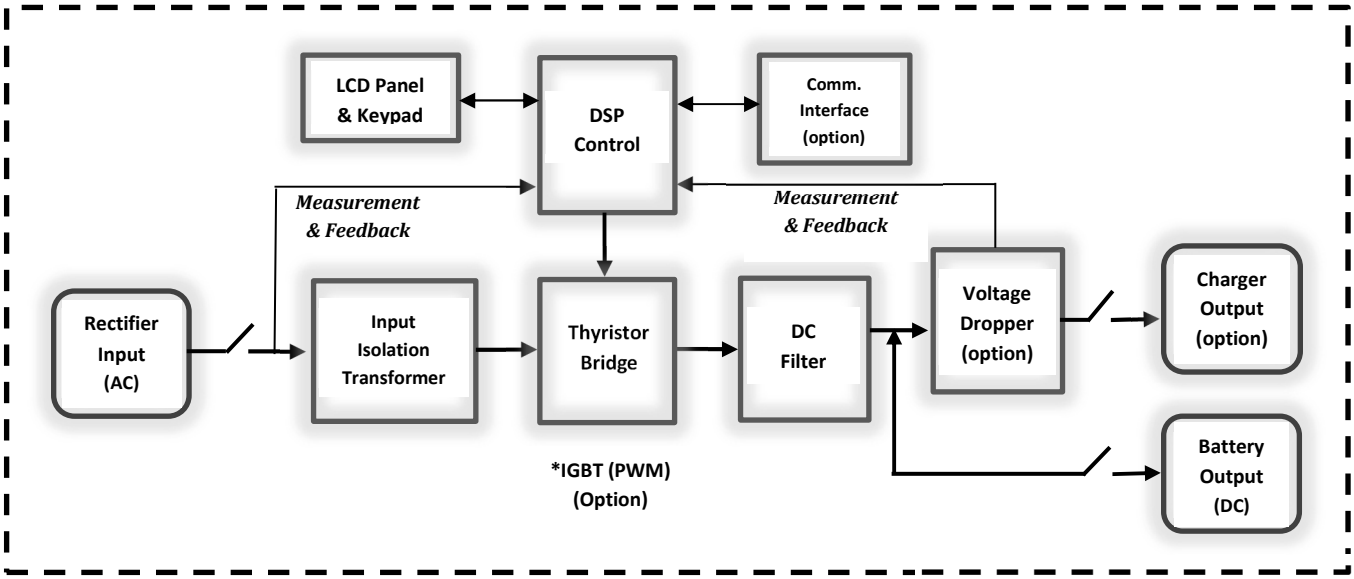
-3 mV/°C/cell for Lead Acid battery

-2 mV/°C/cell for Nickel Cadmium battery

Key Features

- Internal Input isolation transformer
- Full controlled conventional rectifier SD (Thyristor) or SDi (IGBT) with >0.99 PF option
- Smart control and high reliability with DSP (Digital Signal Processor)
- Float charge, equalizing charge and boost charge selections in Automatic and manual charge modes
- Low output voltage ripple, <1% with high stability & reliability
- Programmable current limitation
- Operation as voltage source or current source
- Calibration of measurements from front panel
- Language selection from front panel (English / German / Turkish / Dutch / Portuguese)
- DC Low / High, Line Failure, Over Temperature and Short Circuit protections
- Ability to program all operation parameters (password protected)
- Programable alarm relay contact outputs (4 standard, up to 16 relays as option)
- Monitor and control over RS232 or *Modbus RS485/TCP communication. *Option
- Log records with date and time stamp up the 200 events.
- 2x16 character LCD display & Audible alarm, show measurements, status and alarm messages
- Ability to monitor batteries and battery low alarm, even when the AC input fails (option)





Rectifier / Charger Block Diagram

Options

- Earth leakage monitoring
- Output Voltage Regulation with Voltage Dropper Circuit
- Battery temperature compensation
- IGBT (<5%) or 12 pulse option to limit input current distortion, THDi
- Active parallel (current sharing) operation up to 4 devices
- Easy observation via analog gauges (Input / Output / Battery Voltages / Currents)
- Battery test with adjustable voltage and duration
- Transducers for input / output voltage(s) / current(s) (4-20mA and 0-10V)
- Customizable Enclosure IP protection level (Standard IP 20) & Color Code
- Internal cabinet light and anticondensation heater

Technical Specifications

SPHERE POWER
Powering Life

Model	SD/SDi 1 (Single Phase)	SD/SDi 3 (Three Phase)
INPUT		
Nominal Voltage	110V / 115V / 208V / 220V / 240V (*Other voltages upon request)	3 x 190 / 200 / 380 / 400 / 415 Vac (*Other voltages upon request)
Voltage Tolerance	+/- 10 - 15%	
Nominal frequency	50 or 60 Hz, +/- 6 - 10%	
Transformer	Galvanically isolated	
ITHD	<45-50% Thyristor / <8% IGBT	<8*-30% Thyristor (*12 pulse) / <5% IGBT
Input Protection	Thermic Magnetic Overcurrent protection MCB, Overvoltage protection	
OUTPUT		
Nominal Output Voltage	12 VDC / 24 VDC / 48 VDC / 110 VDC / 220 VDC & Other DC Voltage available	
Output Voltage Adjustment	12/24VDC output: 10VDC to 30VDC, 48VDC output: 40VDC to 60VDC, 110VDC output: 80VDC to 150VDC, 220VDC output: 190VDC to 290VDC	
Output Current Adjustment	0-100% of Nominal Output Current	
Charging Current Adjustment	0-100% of Nominal Output Current	
Boost Charger Voltage	100% to 120% of Floating Output Current	
Boost / Equalise Voltage (VPC)	2.30-2.60V - Lead Acid Battery ; 1.50-1.70V - NiCd Battery	
Float Voltage (VPC)	2.20-2.25V - Lead Acid Battery ; 1,40-1.45V - NiCd Battery	
Nominal Output Current	30A / 60A /100A	30A / 50A / 80A / 100A / 300A / 500A / 1000A ... 10.000A
Max Output Current	100% of nominal output current	
Protection	Soft-start, Short-circuit, Reverse Battery Polarity, Current Limit, Over-voltage Shutdown, AC & DC Surge, Fuse & Thermal	
Filtering	LC Filter	
GENERAL		
Boost Timer	0-99.9 hours adjustable	
Cooling	Forced fans with smart fan controlling system	
Isolation Voltage	1500 or 3000VAC input/chassis and output/chassis	
Enclosure IP level	IP20 (Standard) ; IP54 (Optional)	
Cable Entry	Front, Bottom	
Operation Temperature	0 to 50 degC	
Access to Batteries	Batteries in separate enclosure. Optional design in same enclosure with Rectifier	
Circuit Breakers	Thermic-magnetic circuit breakers for input, Battery and Load	
Reset Button	Used for re-operation in case of failure of the system.	
System Conformance	IEC/EN 61204 ; EN 55011 ; EN 61000-4-2, -3, -4, -5, -6, -11 ; IEC 60146-1-1 ; IEC 62040-1/2	
CONTROL & DISPLAY PANEL		
Measurements	DSP Controller with LCD Display for Load Output Voltage / Current, Battery Output Voltage/ Current and Line Voltage / Line Current / Frequency	
Buttons (Setting / adjustment)	Timer, Boost Voltage duration, Float Voltage, Output Current, Charging Current, Reset and Time & Date settings.	
Dry Contacts (Open / Close)	Mains Failure, DC Voltage High / Low, Rectifier Fail, Over temperature, Output Trip	
Operating Mode	Float / Boost / Equaling (option)	
OPTIONS & ACCESSORIES		
Communication	Standard RS232 communication on real time base for remote monitoring and control. Optional Modbus - RS485 / TCP	
Paralleling	Parallel Redundant (No need for extra kit for paralleling)	
SD/SDi Series 1 & 3 Phase Industrial Battery Charger powered by EPC. Specifications Can change without notice. Datasheet v1.6		