

RDAT SERIES

Power Management Instruments

**BATTERY CHARGER /
DC RECTIFIER**



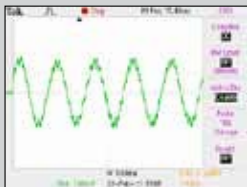
BATTERY CHARGER / DC RECTIFIER

RDA / RDAT AUTOMATION TYPE SERIES

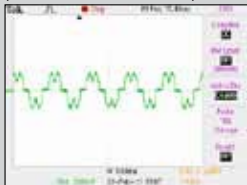


The rectifier is SCR controlled AC/DC rectifier with input isolation transformer and with automatic constant voltage and constant current ability. It comes with 6 Pulse or 12 pulse design options depending on user requirements. The advantages of employing 12 pulse rectifier in industrial UPS systems are to have lower THDi (<10%) and higher pf at input (>0.9) as well as to secure redundancy since 12 pulse rectifiers are designed with one delta and one star connected transformers, so the unit itself behaves as two redundant rectifiers by its nature. Output current, battery current, boost and Float Charge Voltages are adjustable on the user-friendly control panel. Detailed alarm indicators help you to monitor all alarms from the front panel and monitor the auxiliary contacts from the MIMIC diagram. On LCD panel, all key parameters can be set, and real time base events and failures can be tracked remotely via RS 232 / RS 485 port or Modbus.

12 PULSE RECTIFIER CURRENT WAVE



6 PULSE RECTIFIER CURRENT WAVE (DELTA-DELTA CONNECTION)

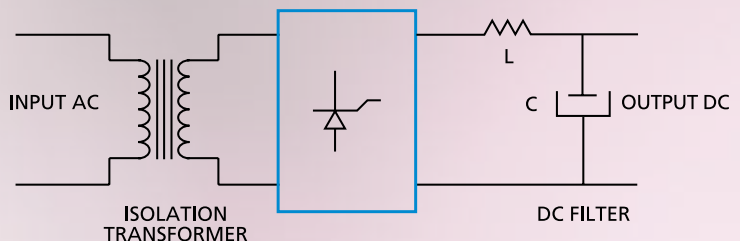


6 PULSE RECTIFIER CURRENT WAVE (DELTA-STAR CONNECTION)



HIGH PROTECTION

FULLY CONTROLLED THYRISTOR RECTIFIER MODULE



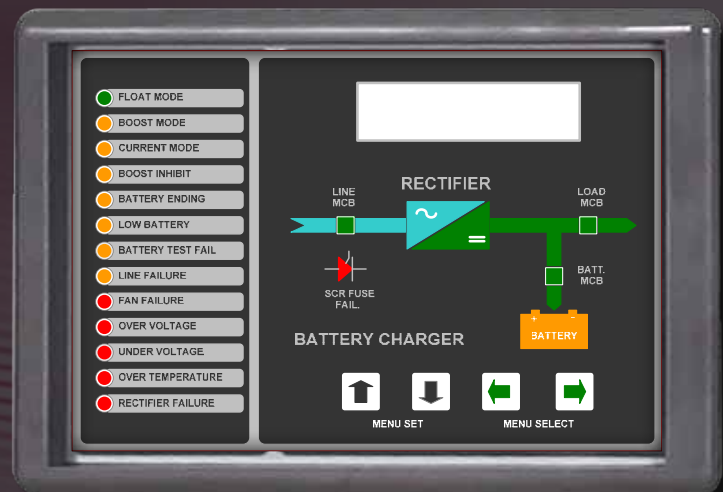
COMPLETE ISOLATION

CESS DC Chargers are fully isolated since an isolation transformer is placed in between the input and output and because the DC current is controlled by a DC current module. Therefore, the load is always safe even at high input voltage and congested mains conditions. In addition, the failure risk is minimized as semi-conductors are used for the rectifier. Standard L-C filters at the output maintain safe charging of the battery groups.

STANDART FEATURES

- Adjustable Timer for Boost Charging
- Adjustable Boost and Float Charge Voltages
- Automatic Boost Charge Selection according to boost / float current set value
- Adjustable Rectifier Output Current and Battery Charge Current
- LCD Display for DC Load / Battery Voltage , DC Load / Battery Current , Input AC Voltage / Line Current / Frequency
- Event History for all Electrical values and failures
- Automatic and Manuel Battery Test
- Boost inhibit facility for interlock redundant application
- Output Filter Inductor and DC Longlife Capacitor
- Electronic Over / Under Voltage, Over Current and Short Circuit Protections
- Isolated Output by Input Transformer and output halleffect current module
- Parallel Redundant Operation
- Boost and Float dropper control output for Ni-Cd and Lead Acid Battery
- Input Filter and input surge Voltage protection
- Internal Over Temperature protection
- Temperature Compensation for Battery
- Low Battery Indication and Alarm contacts
- Rectifier Failure Indication and Alarm contacts
- Rectifier Over Voltage Indication and Alarm contacts
- Over Temperature Indication and Alarm contacts
- Line Failure Indication and Alarm contacts
- Input MCB Indication and Alarm contacts

- Load MCB Indication and Alarm contacts
- Battery MCB Indication and Alarm contacts
- Earth Fault Indication and Alarm contacts
- Reverse Battery Connection Protection
- Reset Button
- RS- 232 communication



OPTIONS

- RS 485 / Modbus communication
- Silicon Dropper Module For Load Output (Load voltage output $\pm 5\%$)
- Rectifier and Battery Group with the same cabinet
- LVD Deep Discharge Battery Protection contactor

PROTECTIONS

The input and output of the charger are protected against improper use and line disturbances electronically. Input and output can be switched by circuit breakers individually. It has self-protection against over temperature. The alarm contacts can be used for external system in the case of any anomaly. The output is fully isolated from the AC line input. The Charger has a modular design to provide service and maintenance simplicity.

PARALLEL/SERIAL CONNECTION

The Charger has a modular design to provide service and maintenance simplicity. The outputs of the Battery Chargers can be connected in parallel or in series based on the requirement (N+1).

DC Ripple < 1%

Input and output are protected with MCBs and all settings like boost charge, floating charge and battery charge current can be adjusted via front panel touch pad digitally. DC output is filtered by L/C, so DC ripple at full load always lower than 1% to increase battery life. All rectifiers have standards low-battery and rectifier failure alarm.

WIDE RANGE OF USE

DC chargers are ideal for transformer energy distribution centers, gas oil energy distribution centers, natural gas energy distribution centers, mining industry security and lighting, building automation systems and for special telecommunication applications.

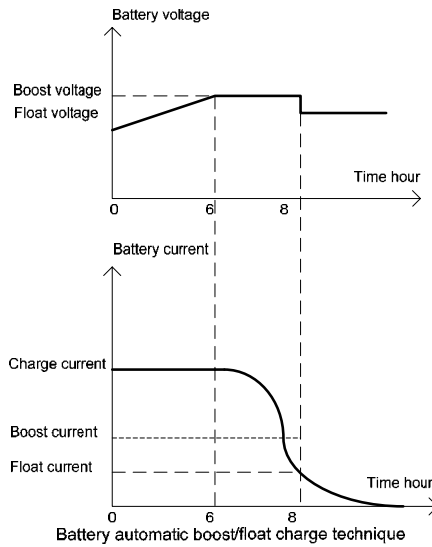
BOOST INHIBIT FUNCTION

Boost Inhibit Function is necessarily employed when two DC Chargers with two battery groups operate in a parallel redundant mode. In parallel operation, if two rectifiers start boost-charging at the same time there is danger the load would be damaged by overvoltage. So, the principle idea of Inhibit facility is to block any one of the two chargers feeding the load in Boost mode when the other rectifier is charging the batteries in Boost mode; so the system prevents applying overvoltage to the load. This function is primarily handled by a powerful communication between two rectifiers and the use of contactors

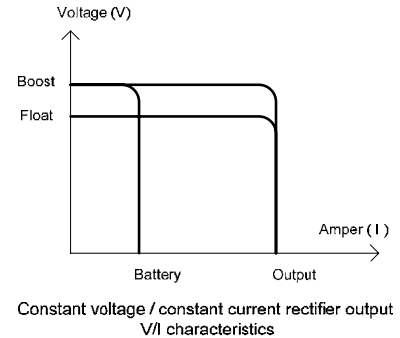
AUTOMATIC BOOST

Automatic boost charge can also be selected on menu. The automatic boost menu has the options for selecting the boost and float current based on battery capacity. Suitable float and boost currents of the battery are set before selecting the automatic boost option. After the set-up, the automatic boost function will monitor the battery current and select boost or float option by referring to the set values. If the charging current is higher than the set boost current, the system will select boost and if the charging current is lower than the set float current the system will select float option. In case of low battery alarm, the automatic boost will select boost option until the battery charging current reaches to the set float value.

BATTERY CHARGING CHARACTERISTICS



Ideal and safe charging of batteries is sustained by setting boost and float charge currents. In this way unnecessary boost conditions and deformation of batteries at changing load currents are prevented.



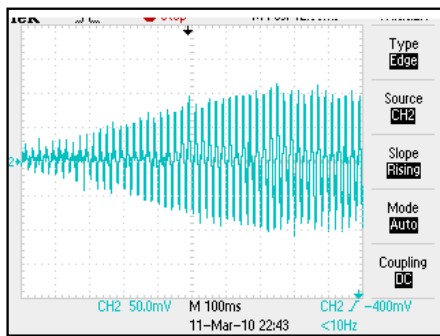
Ideal output characteristic via fast micro-processor control

BATTERY TEST FUNCTION

Battery test function tests the total battery voltage according to the set program and gives information back to the user. When battery test starts the charging voltage is set to desired test voltage for a period of time and microprocessor analyze the information. If the battery voltage is below the test voltage then Battery Fail Alarm turns ON and charger returns

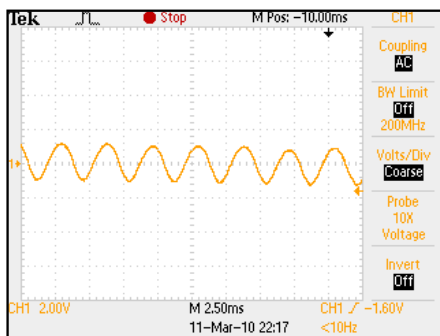
back to float voltage. If the battery voltage is low this event is recorded to event log for future monitoring and service. The test intervals can be set from the front panel and user interface. This function allows the user to monitor the battery status and enhance battery life it with necessary actions.

PRODUCT PERFORMANCE



Soft Start Feature

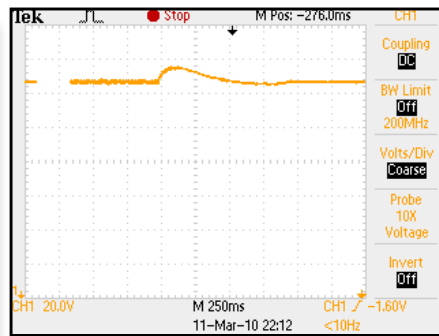
- ▶ No inrush current at start up



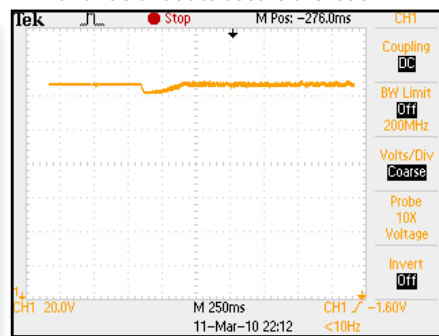
AC Ripple at full load < 1 %

- ▶ Battery life is extended significantly via low ripple voltage due to low heat

DYNAMIC RESPONSE

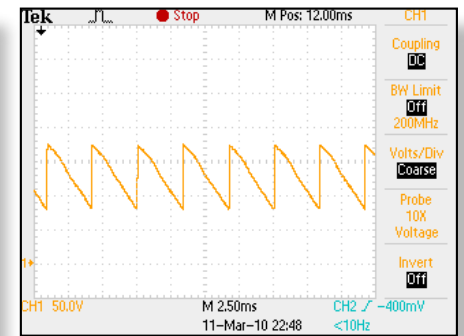


- ▶ In sudden load changes dynamic response is 300 msec without overshoot or undershoot to secure the load



- ▶ With this capability rectifier can be used as a power supply even without battery safely with DC Loads

MICROPROCESSOR CONTROL



Fully microprocessor controlled rectifier

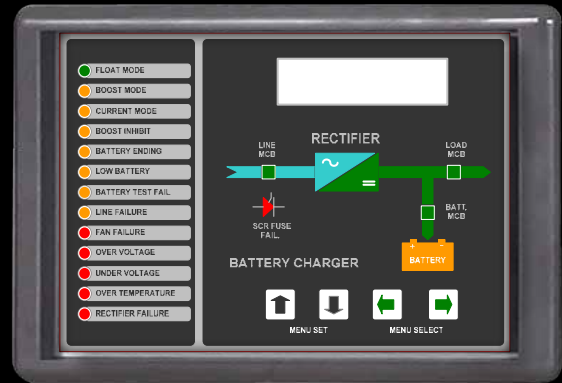
- ▶ Thyristor angle is adjusted with load change
- ▶ 1/2 Load: Phase angle shortened
- ▶ Full Load: Phase angle at max



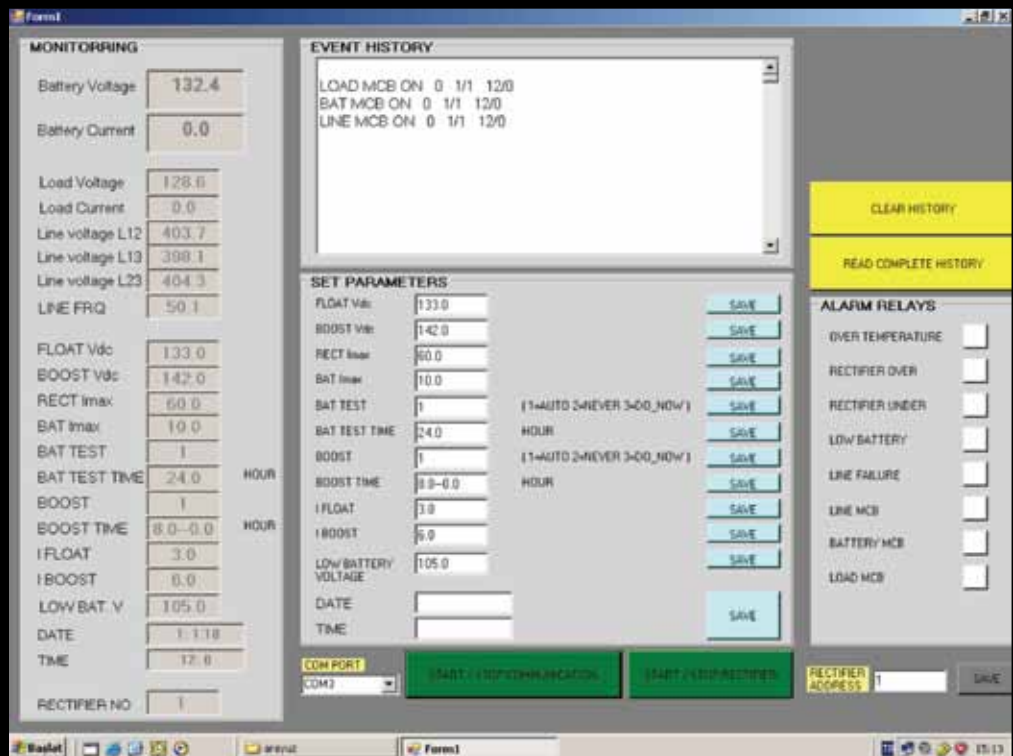
RECTIFIER FRONT PANEL SCREENSHOT

REMOTE MONITORING

On both LCD panel and communication interface, all key parameters can be set and real time base events and failures can be tracked. In parallel operation multiple rectifiers can be controlled by the help of same communication interface. The communication is executed via RS232 / RS485 port or Modbus protocols.



RECTIFIER COMMUNICATION INTERFACE



GENERAL		
Model	Monophase Input	Threephase Input
Topology	6 Pulse Thyristor controlled AC/DC Rectifier with input isolation transformer Optional 12 Pulse Thyristor controlled AC/DC Rectifier with input isolation transformer	
INPUT		
Nominal Voltage	110 VAC / 115VAC /208 VAC / 220 VAC / 230 VAC / 240 VAC ±15%	190 VAC / 200 VAC /380 VAC / 400 VAC / 415 / 480 VAC ±15%
Nominal Frequency	50 / 60 Hz ±5%	
Power Factor	>0.8 Inductive (>0.9 with 12 Pulse Rectifier)	
Transformer	Galvanically isolated	
ITHD	<30% (standard); <10% (with 12 Pulse Rectifier)	
Input Protection	Thermic-Magnetic Over Current Protection, Over Voltage Protection, Phase Sequence Free Operation (3 Phase), Soft Start	
OUTPUT		
Floating Output Voltage	12/24 VDC±1% / 48 VDC±1% / 110 VDC±1% / 220 VDC ±1%	
Output Voltage Adjustment	12/24VDC output: 10VDC to 30VDC, 48VDC output: 48VDC to 60VDC, 110VDC output: 110VDC to 160VDC, 220VDC output: 220VDC to 300VDC	
Output Current Adjustment	0-100% of Nominal Output Current	
Battery Charge Current Adjustment	0-100% of Nominal Output Current	
Boost Charge Voltage	100% to 120% of Floating Output Voltage	
Boost voltage (V/C)	2,4 lead acid battery 1,60 NiCd Battery	
Float voltage (V/C)	2,23 lead acid battery 1,40 NiCd battery	
Nominal Output Current	Available upto 1200 Amp (12 Pulse over 400 Amp)	
Maximum Output Current	100% of nominal output current	
Output Ripple	1% RMS AC of Output Voltage	
Dynamic Response (w/out battery group)	±5% of Output Voltage (25% load change at 50% load)	
Dynamic Response (with battery group)	±2% of Output Voltage (100% load change)	
Battery Charging Principle	Constant Current/ Constant Voltage	
Output Protection	Short Circuit Protection, Over Voltage Protection, Reverse Voltage Protection Short Circuit, Overvoltage protection, MCB and Phase Sequence Protection	
Battery Protection	L-C filters, Overcurrent Electronic protection, Over Voltage Protection and Thermic Fuse	
GENERAL		
Boost Timer	0 – 99.9 hours adjustable	
Cooling	Forced fans with smart fan controlling system	
Isolation Voltage	2500VAC input/chassis and output/chassis	
Efficiency at full load	>90%	>92%
MTBF	100,000 Hrs. (w/out battery group)	
Operating Temperature	-10 / + 40 °C	
Protection Level	IP20 (Standard); IP54 (Optional)	
Enclosure Material	Mild Steel, Zinc-phosphate coated; 100 µm electrostatic paint; 1.5 mm thickness	

Cable Entry	Front Bottom
Access to Batteries	Batteries and rectifier in the same cabinet with front access (optional)
Relative Humidity	5% to 90% non condensing
Circuit Breakers	Thermic – magnetic circuit breakers for Input, Battery and Load (up to 100A)
Silicon Dropper	Available on request (For load output)
Reset Button	Used for re-operation in case of failure of the system. (Without disconnecting the load from battery group)
Boost inhibit	Interlock application inhibits one of the rectifiers for boost operation in parallel redundant mode

DISPLAY PANEL

Front Panel Measured Values	LCD Display for Load Output Voltage / Current , Battery Output Voltage / Current and Line Voltage / Line Current / Frequency
Front Panel Indicators	Float mode, Boost mode, Current mode, Boost inhibit, Battery ending, Low battery, Battery test failure, Line failure, Fan failure, Over voltage, Under voltage, Over temperature, Rectifier failure, SCR fuse failure (LED indication), Line MCB (LED indication), Load MCB (LED indication), Battery MCB (LED indication)
Front Panel Set Menu	Boost charge voltage, Float charge voltage, Low battery voltage , Battery test , Charger output current, Battery charge current, Battery automatic boost current and float current, Auto & Manual boost selection, Manual boost time, LED test and On - OFF.
Event History	Last 250 events recorded and displayed on front panel and on PC via RS 485
Time and Date	Adjustable

ALARM CONTACTS

Charger Failure	Open or closed free contacts
Low Battery	Open or closed free contacts
Rectifier over voltage	Open or closed free contacts
Over temperature	Open or closed free contacts
Line Failure	Open or closed free contacts
Load MCB	Open or closed free contacts
Battery MCB	Open or closed free contacts
Line MCB	Open or closed free contacts

ENVIRONMENT

Operating Temperature	-10 / +40 °C
Relative Humidity	5 - 90 %
Operating Altitude	Max. 2000 Mt.
Noise Level	Max. 60 db
Electrical Standards	EN 50091-1 (Security) / EN 50091-2 (EMC)

COMMUNICATION & PARALLELING

Communication	RS 232 / RS 485 - Timer Setting, Boost Voltage Setting, Float Voltage Setting ,Output current setting, battery current setting , automatic boost setting and Reset buttons.
Paralleling	N+1 Parallel Redundant (No need for extra kit for paralleling)



Power Management Instruments

GROUP COMPANIES

Ortadođu Elektronik Sanayi Ltd. Őti.
Karmet Makina Elektronik Tasarım A.S.
PMI Elektrik Sistemleri Dis Tic. Ltd. Sti

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