

RDA / RDAT SERIES

Power Management Instruments

BATTERY CHARGER / DC RECTIFIER



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RDA / RDAT AUTOMATION TYPE SERIES

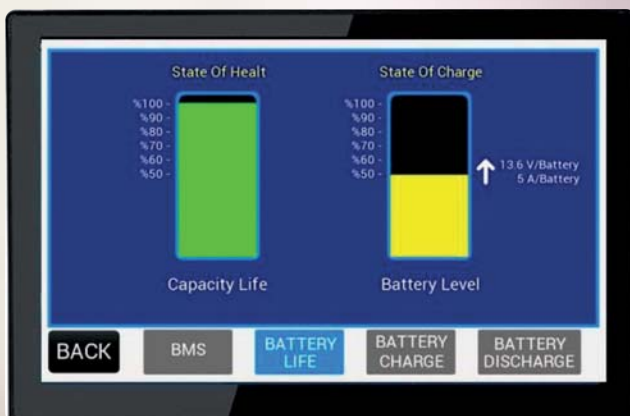
FULLY CONTROLLED THYRISTOR / IGBT RECTIFIER MODULE



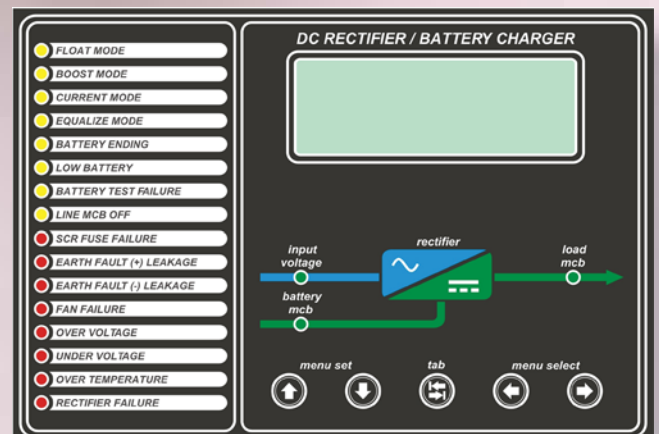
PMI Battery Charger is Thyristor/IGBT controlled, fully digital, static AC/DC rectifier with constant voltage / constant current characteristic. Galvanic isolation is provided with input transformer. Battery Charger is Scada ready through free contacts and communication features (Modbus protocol; RS-485 or TCP/IP port).

PMI Battery Chargers are widely used in different industries such as Power Generation, Power Distribution, Power Transmission, Manufacturing, Transportation, Mining, Oil & Gas with different applications such as Alarm, Control, Signal and Supply of DC Breakers in Power Plants, Substations, Switchgears, Railways and Offshore Plants

7" TOUCH PANEL LCD SCREEN



FRONT PANEL WITH LCD SCREEN



STANDARD FEATURES

- 6 Pulse Thyristor Controlled (3 Phase) / IGBT Controlled
- Input Transformer for Galvanic Isolation
- Front Panel with LCD Screen (2 Lines), LED Indication and MIMIC diagram
- Digital Metering on LCD including, Input Voltage and Current (for 1 Phase), Battery Voltage and Current, Load Voltage, Charger Output Current
- Redundant Supply for LCD
- Separate Battery Charge Current and Output Current Adjustment via Current Transformer
- Output LC Filter
- Transient Surge Protection (via Varistor)
- Input MCB with Auxiliary Contacts
- Load and Battery MCB (up to 60A) with Auxiliary Contacts
- Load and Battery NH Fuse (higher than 60A) with Auxiliary Contacts
- Forced Ventilation with Smart Fan
- Event History up to 250 Events
- 8 Free Contacts
- Automatic Online Battery Performance Test
- Automatic and Manual Boost Function

OPTIONAL FEATURES

- 12 Pulse (3 Phase), THDi \leq 10%, (PF) \geq 0.85 Inductive
- 12 Pulse (3 Phase) with Active Harmonic Elimination, THDi \leq 5%, (PF) \geq 0.95 Inductive
- LCD Screen (4 Lines)
- Digital Metering on LCD Input Current (for 3 Phase)
- Analogue AC or DC Voltmeter and Ammeter
- Dropper Diodes
- LVD (Battery deep discharge protection contactor)
- SCR Fuse (Semiconductor Fast Fuse)
- Transient Surge Protection (via Surge Arrester)
- Input, Load and Battery MCCB
- Front Access Industrial Enclosure
- Battery and Battery Charger Inside Same Enclosure
- Natural Ventilation
- Custom IP Protection
- Custom Paint
- Enclosure Heater and Lighting
- Internal or External Distribution
- Forced/Active Load Sharing in Parallel Configuration
- Battery Temperature Compensation
- 8 Free Contacts (Configurable via Communication interface)
- Communication (PC Remote, Modbus, SNMP, Profibus, DNP 3.0 via RS 232, RS 485 or Ethernet TCP/IP ports)
- 7" Touch Panel LCD Screen

CONTROL PANEL

The control panel of the battery charger is user friendly and consist of LCD screen, LED indications, MIMIC diagram and push buttons.

Removing the control panel due to a failure or any dysfunction of the control panel do not stop the operation of the battery charger.

Control panel supply is redundant. In case of an interruption of input AC voltage, battery charger control panel (LCD screen, LED indications, MIMIC diagram) keeps operating. In case of a total power loss, memory of the settings is kept and upon restoration of the mains power supply battery charger keeps operating based on the previously adjusted parameters.

HIGH PROTECTION

FULLY CONTROLLED THYRISTOR / IGBT RECTIFIER MODULE

COMPLETE ISOLATION

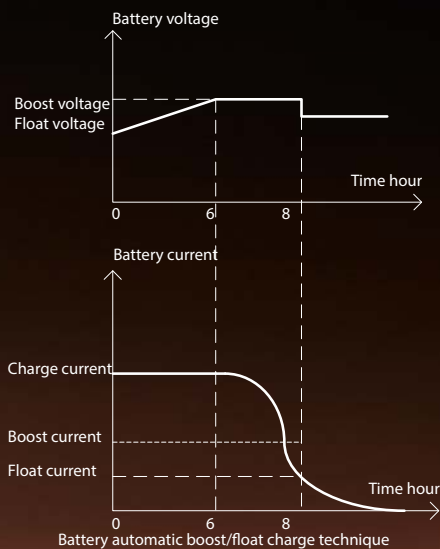
PMI DC Chargers are fully isolated since an isolation transformer is placed in between the input and output and because the DC current is controlled by a DC current module. Therefore, the load is always safe even at high input voltage and congested mains conditions. In addition, the failure risk is minimized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



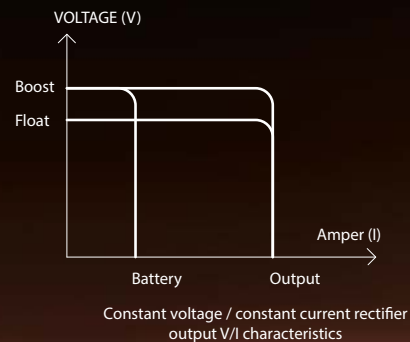
AUTOMATIC BOOST

The auto boost charge function is provided to charge battery automatically either in float charge or boost charge mode according to the battery status. By this function, battery is charged in optimum duration after discharge without need to intervene manually after each discharge. The automatic boost charge function checks battery charge current to detect battery discharge status. The user is able to set float and boost charge reference currents of the battery. Automatic boost function monitors the battery charge current and select boost or float charge by referring to these reference values. If the charging current is higher than reference boost current, battery charger shall make boost charge automatically and if the charging current is lower than reference float current the system shall make float charge automatically. All parameters for auto boost charge is adjustable from front panel.

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 microprocessor control

PARALLELING

The Charger has a modular design to provide service and maintenance simplicity. The outputs of the Battery Chargers can be connected in parallel. The parallel system can be active load sharing or hot-standby. Besides this, parallel system can be placed in one unit industrial cabin as seen from the picture on the right side or they can be placed in separate cabins based on the requirement.

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.

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. 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.





Compact/Standard Enclosure

Front Access Industrial Enclosure



INTELLIGENT BATTERY TEST FUNCTION

Battery capacity and battery connection between battery and battery charger is checked by battery test function. This test is done online while battery is connected and battery charger is operating in normal conditions.

During the test, battery capacity is tested based on 3 parameters:

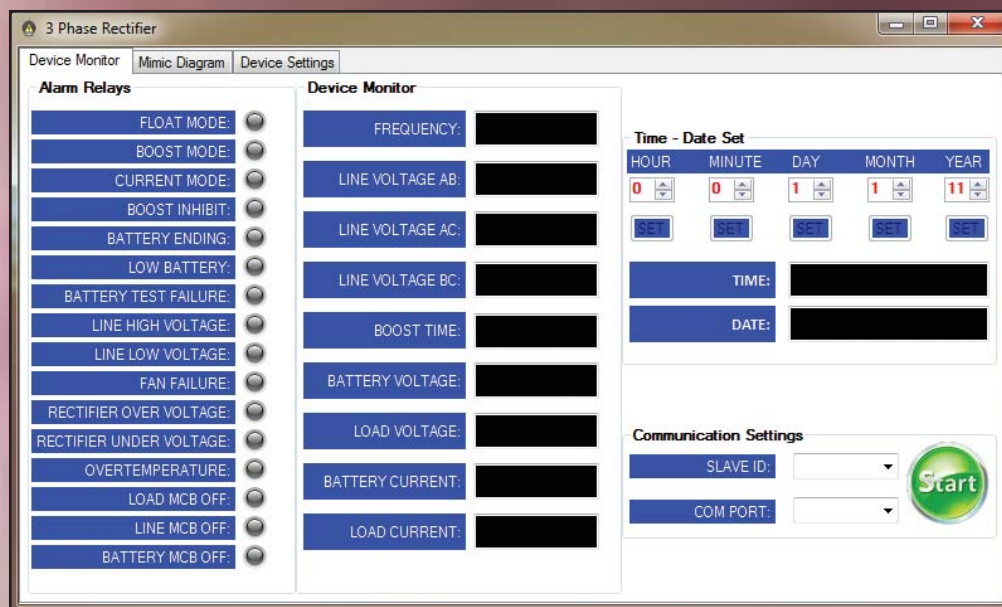
- Discharge current
- Minimum voltage (voltage level that is assumed as battery discharged)
- Autonomy time

The operator is able to adjust battery discharge current (expected load current for test), expected autonomy time and the final/minimum voltage of the battery. Based on this set up, load is fed through the battery during this autonomy time. If battery voltage falls to minimum voltage value before autonomy time run out, the battery test result is failed and battery test failed LED will be ON. If not, the battery test will be considered as successful.

Battery test function can be activated manually or automatically. Automatic battery test periods are adjustable from the front panel.



RECTIFIER COMMUNICATION INTERFACE



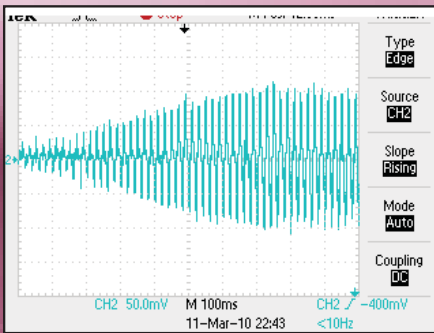
REMOTE MONITORING

All information related to the battery charger is accessible through communication software. Measurements, alarms / warning situations and the status of the product in real time is monitored and settings are available to change. Communication function allows operator to use all functions that is available on the control panel including battery charger OFF/ON.

Communication options are Modbus, Profibus, SNMP, DNP 3.0, TCP/IP via RS 232, RS 485 and ethernet ports

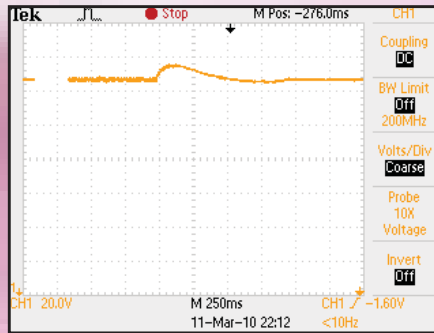
PRODUCT PERFORMANCE

SOFT START FEATURE



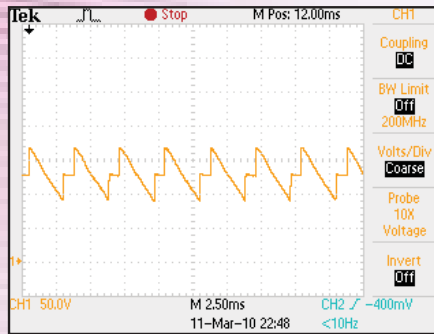
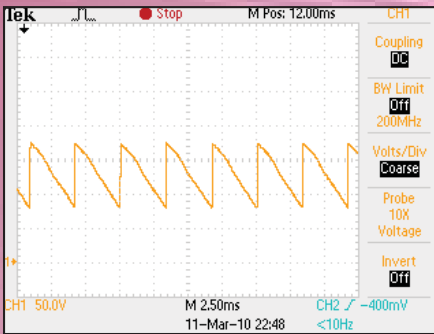
- ▶ No inrush current at start up

DYNAMIC RESPONSE



- ▶ In sudden load changes dynamic response time is <50msec with voltage variation +/-5%

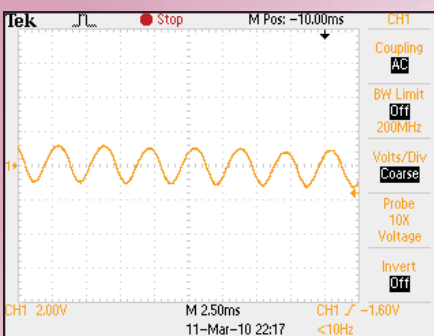
MICROPROCESSOR CONTROL



Fully microprocessor controlled rectifier

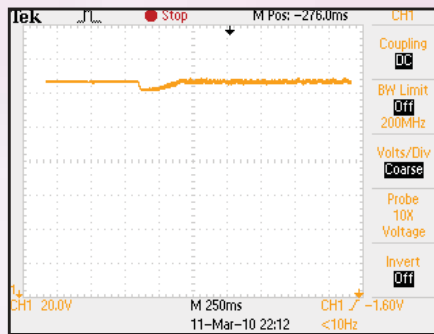
- ▶ Thyristor / IGBT angle is adjusted with load change
- ▶ 1/2 Load: Phase angle shortened
- ▶ Full Load: Phase angle at max

AC RIPPLE AT FULL LOAD



AC Ripple at full load < 1 %

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



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

DC CHARGER: TECHNICAL SPECIFICATIONS

GENERAL		
Model	Intrare monofazica	Intrare trifazata standard
Topology	6 Pulsuri (pentru varianta trifazata) Thyristor Controlled / IGBT Controlled AC/DC Redresor cu transformator de izolatie pe intrare Optional: 12 Pulsuri (pentru varianta trifazata) Thyristor Controlled AC/DC Redresor cu transformator de izolatie pe intrare	
INTRARE		
Tensiune nominala	110 VAC / 115VAC /208 VAC / 220 VAC / 415 / 230 VAC / 240 VAC ±15%	190 VAC / 200 VAC /380 VAC / 400 VAC / 480 VAC ±15%
Frecventa nominala	50 / 60 Hz ±5%	
Cosφ (pentru trifazat)	>0.8 Inductiv (6 Pulsuri) >0.85 Inductiv (12 Pulsuri) >0.95 Inductiv (12 Pulsuri cu eliminare activa a armonicilor) / aproape de 1.0 (prin control cu IGBT)	
Transformer THDi (For 3 Phase) Input Protection	Izolatie galvanica <30% (6 Pulsuri) <10% (12 Pulsuri) <5% (12 Pulse cu eliminare activa a armonicilor) Protectie magneto-termica la suprasarcina, Protectie la supratensiune, Functionare indiferent de succesiunea fazelor (doar pentr varianta cu 6 Pulsuri), Soft Start	
IESIRE		
Tensiune nominala	12 VDC / 24 VDC / 48 VDC / 110 VDC/125 VDC / 220 VDC	
Fama tensiunii de iesire	24VDC iesire: 10VDC la 30VDC, 48VDC iesire: 48VDC la 60VDC, 110VDC iesire: 110VDC la 160VDC, 125VDC iesire: 110 la 160 VDC, 220VDC iesire: 220VDC la 300VDC	
Curent iesire	0-100% din curentul nominal de iesire	
Reglaje		
Reglajul tensiunii de incarcare a bateriei	24VDC iesire: 10VDC la 30VDC, 48VDC iesire: 48VDC la 60VDC, 110VDC iesire: 110VDC la 160VDC, 125VDC iesire: 110 la 160 VDC 220VDC iesire: 220VDC la 300VDC	
Tensiune incarcare Boost	100% la 120% din tensiunea in regim Float	
Tensiunea Boost (V/C)	2,4V la baterii VRLA / 1,60V la baterii NiCd (In functie de tipul/marca bateriei)	
Tensiunea Float (V/C)	2.23V la baterii VRLA / 1,40V la baterii NiCd (In functie de tipul/marca bateriei)	
Variatia tensiunii de iesire	±1% (Variatie mai mica se poate oferi la cerere)	
Toleranta		
Curent nominal de iesire	Disponibil pana la 1000A (12 Pulsuri peste 400A)	
Curent maxim de iesire	100% din curentul nominal	
DC Ripplu*	<1% RMS AC din tensiunea de iesire	
Raspuns dinamic si variatia tensiunii	<50msec, <+/-5% (for 10% - 100%, 100% - 10% variatie sarcina)	
Principiu de incarcare	Curent constant / Tensiune constanta	
Protectii pe iesire	Scurtcircuit, Supratensiune, MCB sau sigurante NH (in functie de valoarea curentului) Filtre L-C, Suprasarcina si Supratensiune	
Protectii baterie		
GENERAL		
Temporizator Boost	0 – 99.9 ore ajustabil	
Racire	Vantilatoare "smart" cu turatie variabila (Racire naturala optional)	
Izolatie	2500VAC intrare/sasiu si iesire/sasiu	
Randament sarcina maxima	>80% - 85% (In functie de tip)	>85% - 90% (In functie de tip)
MTBF	150,000 Ore	

* Bateria trebuie conectată la încărcător. Capacitatea bateriei trebuie să fie de cel puțin 5 ori mai mare decât puterea nominală a încărcătorului

Temperatura de functionare	-10 / + 40 °C (Disponibil si pentru o gama mai mare de temperaturi, la cerere)
Grad protectie	IP20 (Standard); IP31 / IP42 / IP54 (Optional)
Material carcasa	Otel, Acoperire Zinc-Phosphat; 100 µm vopsea electrostaticat; grosime tabla 1.5 mm
Acces cabluri	Prin partea de jos; Optional prin partea de sus
Batteries	Bateriile si redresorul in acelasi cabinet cu acces frontal (optional)
Umiditate relativa	5% to 90% fara condens
Intrerupatoare	Intrerupatoare magneto-termice pentru Intrare, Baterie si Sarcina (standard pana la 60A; optional peste 60A)
Modul Dropper	Disponibil la cerere (Pentru iesirea pe sarcina)
Buton Reset	Folosit pentru reponire în caz de defecțiune a sistemului. (Fără a deconecta sarcina de la grupul de baterii)
Anulare Boost	Aplicația de interblocare opreste unul dintre redresoare din funcționarea in regim Boost în operarea paralel redundanta (opțional)

DISPLAY PANEL

Masuratori afisate	LCD Display pentru Tensiune retea / Frecventa / Curent (Standard la monofazat, Optional la trifazat), Tensiune / Curent iesire, Tensiune pe iesire, Valori masurate pe iesire, Curent, Stare baterie si mod incarcare (Optional - disponibil pe LCD de 7 inci)
Indicatii panou frontal	Mod Float, Mod Boost, Mod Curent, Mod Egalizare, Baterie descarcata, Baterie aproape descarcata, Test baterie esuat, Defect linie, Defect ventilator, Supratensiune, Subtensiune, Supratemperatura, Defect redresor, Defect SCR, Retea disponibila, MCB Sarcina si baterie
Setari din panou frontal	Tensiune incarcare Float, Tensiune incarcare Boost, Tensiune incarcare egalizare, Curent incarcare baterie, Curent total iesire, Alarma tensiune baterie scazuta, Scurgere la impamantare Alarma curent (disponibil doar la LCD cu 4 linii), Sfarsit autonomie baterie, Parametrii test baterie, Parametrii incarcare Auto Boost, Parola
Istoric evenimente	Ultimele 250 de evenimente înregistrate și afișate pe panoul frontal și pe PC prin comunicare
Timp si data	Ajustabile
CONTACTE ALARMA*	(NO sau NC)

Baterie scazuta, Intrare Normala / Defect, Defect redresor, Supratemperatura, Supratensiune, MCB Sarcina MCB ON/OFF, MCB Baterie ON / OFF, Defect la impamantare

CONDITII DE MEDIU

Temperatura operare	-10 / +40 °C
Umiditate relativa	5 - 90 %
Altitudine	Max. 2000 Mt.
Nivel zgomot	Max. 60 db
Standarde electrice	IEC 60146-1-1 / EN 50091-1 (Securitate) / EN 50091-2 (EMC)

COMUNICATII SI PARALELARE

Comunicatii (Optional)	RS 485/RS 232/Porturi Ethernet, Control PC de la distanta, Modbus, Profibus, SNMP, DNP 3.0 Protocoale si optiuni TCP/IP
Paralelare (Optional)	Funcționarea redundanță a încărcătoarelor in paralel cu opțiunea de partajare a sarcinii (activă).

*Limitată la 8 contacte libere de potential, lista de alarme poate fi modificată prin alocarea diferitelor alarme din lista „Indicatoarele panoului frontal” prin soft-ul de comunicare la PC

Notă: Valorile menționate mai sus sunt reprezentative pentru produsele standard. Valorile personalizate de producție se pot schimba.



Power Management Instruments

GROUP COMPANIES

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