Made in Italy

General Technical Data Sheet

COMPACT - PLATINUM 4.0

DC UPS

Index

DC UPS - INTRODUCTION

This technical data sheet is intended to describe the main characteristics of the stabilized rectifiers of the **COMPACT** series in the update of **PLATINUM 4.0**. These devices are the result of careful research and development carried out by our company, aimed at obtaining maximum reliability and the best performance in the field of direct current emergency power systems. The improvements made allow us today to offer a single system that can be proposed in three different basic electrical configurations with IGBT (chopper) or THYRISTOR conversion technology depending on the required currents.

The **SYSTEM CONTROL** is now based on an expandable Industrial **PLC**, characterized therefore by a very high reliability as well as by a considerable flexibility, it allows to satisfy a greater number of technical needs and consequent applications. This section, which constitutes the "intelligent" heart of our system, is now made in a special drawer located on the inside of the main door of the cabinet and **FULLY REMOVABLE** thanks to the presence of a polarized connector. This solution introduces a very important advantage, in fact it is possible to replace this assembly while hot, with the machine running, without turning off the system. This is possible as the AC / DC conversion units recognize the loss of communication with the drawer and set themselves up in "**AUTOMATIC SAVE MODE**", actually working independently and guaranteeing continuity of operation. Once the drawer has been replaced and the connection re-established, the AC / DC units will return to operate under the automatic control of the PLC, resuming normal and complete operation.

Innovative **B.E.A Battery Efficiency Analysis** function that analyses the battery efficiency curve in the event of a blackout and/or BATTERY TEST, giving an immediate overview of the functionality status.

The HMI (Human Machine Interface) system has also been renewed, which now includes a touch panel, capacitive, 7 ”with excellent visibility characteristics, mechanical resistance to wear and connectivity with the outside world. Finally, a great deal of space was reserved for **REMOTE CONNECTION**, in fact now it is possible to control, parameterize and manage these systems in absolute safety through the INTERNET network thanks to the standard presence of the WEB SERVER function. This has an undoubted advantage that significantly improves the maintenance and technical assistance aspects in critical installations.

Main Features

- Power element: IGBT or THYRISTOR depending on power
- Isolation transformer on AC input line complete with electrostatic shield between primary and secondary
- System control with Industrial PLC
- 7 " touchscreen panel
- Charging curve for AGM - Pb - Ni-Cd battery
- 3 charging levels including manual charging complete with safety timer
- High MTBF and low MTTR
- Easy maintenance with access from the front
- Low residual ripple in output and on batteries (Ripple)
- 4 fully user programmable alarm relays
- Temperature compensation with PT100 sensor and correction coefficient (Vel / ° c) settable by the user
- **Battery Effeciency Analysis**: Battery efficiency analyzer
- Automatic battery test with programmable frequency and

Applications

- Oil & Gas (petrochemical plants, offshore, pipeline)
- Electricity generation (power stations, hydroelectric, transmission, distribution, utilities)
- Transport (Airports, naval, rail)
- Process control (Mining industry, steel mills, paper production, etc.)
- Plants for desalination and water treatment

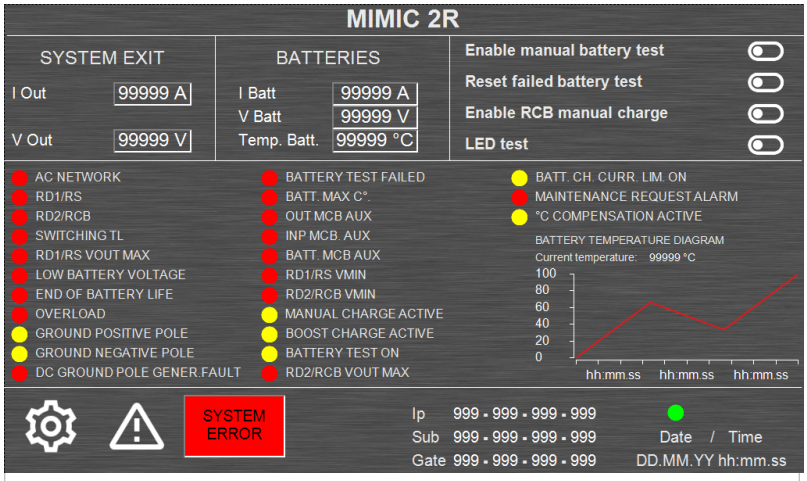
General technical data									
ELECTRICAL DATA									
		IGBT			**THY**				
Output voltage- VDC		24	48	110	24	48	110	220	
Input Voltage	**1 Ph**	230 Vac ± 10%			NOT AVAILABLE				
	3 Ph	400 Vac ± 10%							
Entry Frequency		50 ÷ 60 Hz ± 5%							
Input Voltage - Icc		≤ 10KA RMS (with standard IEC-nominal main input)							
Current Input Distortion	**THD**	≤ 27 (with nominal load)							
Input power factor		≥ 0.80 (With nominal voltage , 100% load)							
I/O isolation		4kV with transformer							
OUTPUT DATA									
Output current	**Input type 1 Ph**	10÷60 Amp							
	Input type 3 Ph	10÷100 Amp			100÷500Amp			10÷250 Amp	
Battery charging voltage	**Floating** (settable from HMI)	2,27 V/cell for VRLA battery type 2,2 ÷ 2,3 V/cell for VLA battery type 1,4 ÷ 1,5 V/cell for Ni-Cd battery type							
	Boost (settable from HMI)	2,4 ÷ 2,45V/cell for VLA battery type 1,5 ÷ 1,65 V/cell for Ni-Cd battery type							
	Manual (settable from HMI)	2,35 V/cell for VRLA battery type 2,7 V/cell for VLA battery type 1,7 V/cell for Ni-Cd battery type							
Current battery charging	(settable from HMI)	1 ÷ In Amp							
Current characteristic		Costant							
Output voltage stability	**(ref.INPUT MAIN VAR.)**	1%							
Output voltage stability	**(ref.LOAD VAR.)**	1%							
Output voltage stability		1%							
Output ripple	**RMS**	1%							
Overload	without battery	100% In (Note 1) or 2 In x 5 mS			100% In (Note 1) <120% per 20 min (Note 2) >150% per 5sec (Note 2)				
ENVIRONMENTAL DATA									
Noise level	**Ref. EN50091**	< 60 dBA (typical value with forced ventilation in operation)							
EMI		EN 61000-6-2 - EN 61000-6-4							
Operating temperature	**°C**	-10……. +40							
Storage temperature	**°C**	-20…….+70							
Relative humidity	**without condensation**	< 95%							
Ventilation (on AC/DC conversion module)		Electronic temperature speed control			Forced				
Altitude	**Mt.sl.m.**	< 1000 (derating according EN62040-3)							
MECHANICAL DATA									
Degree of protection - external	**Ref. IEC 60259**	IP 31 standard - others on request							
Degree of protection - internal	**Ref. IEC 60259**	IP 20 with open front door and additional protections inserted							
Paint		RAL 7035 cabinet RAL 7012 roof and base							
Dimensions (WxDxH) mm		To be defined according to the condition Iout/Autonomy							
IN/OUT cable connections		From the front with cable input from below							
Transportation		Base for handling with forklift							
Installation		From the floor							
Accessibility		Front							
PROTECTIONS									
Input		Automatic Circuit Breacker							
Output		Manual Isolator							
Battery		Fuses							
General		Vout > / Vout< / Max.Temp. / Icc / Incorrect cyclic input							

(Note 1) : with electronic protection in regular operation.
(Note 2) : with electronic protection disabled and/or faulty

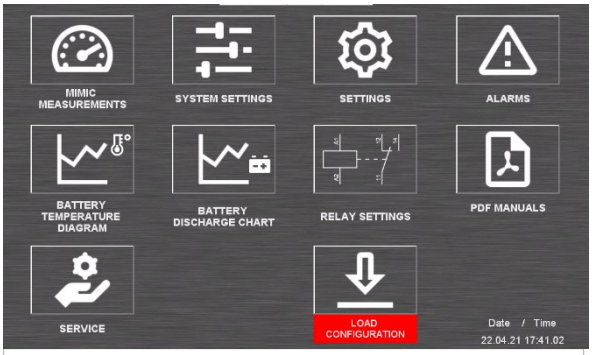
HMI Human Machine Interface

All information regarding the system operating status is available on the 7 ”color touch screen HMI (Human Machine Interface) operator panel with anti-reflective and scratch-resistant glass. The HMI is complete with a MODBUS TCP / IP interface (slave - server) for connection to external centralized control systems that use the same communication protocol, thanks to which the following functions are made available as standard:

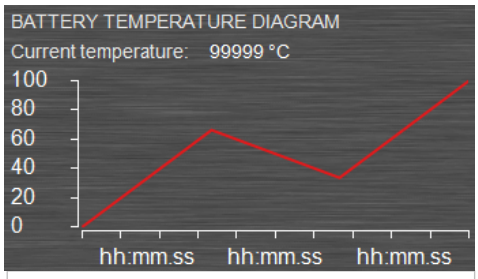
1.1 WEB SERVER: Allows remote control of the system through an INTERNET browser
1.2 WEB MAIL: Allows e-mails to be sent to multiple recipients in case of an abnormal system
1.3 Manuals and Technical Drawings: Allows viewing of these two types of documents directly from HMI for quick and hands-on on-



Home page where you can find all the information about how the system works

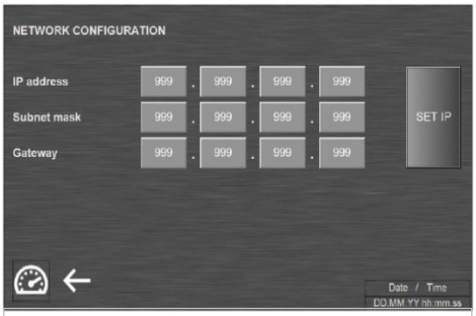


Config. menù from this page you can access the areas of the various sub-menus of the system



BATTERY TEMPERATURE GRAPH
is displayed when the temperature compensation is activated and reports the trend of this parameter

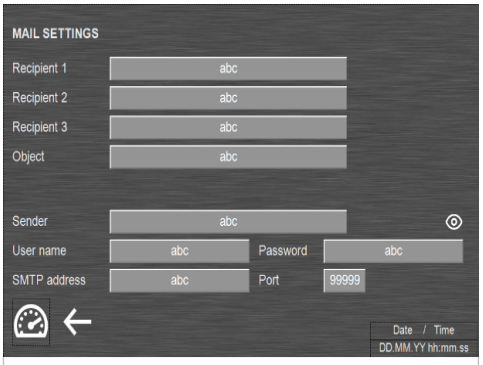
Alarms log from this page you can see the history of alarms . Clear ALARM HISTORY is password protected



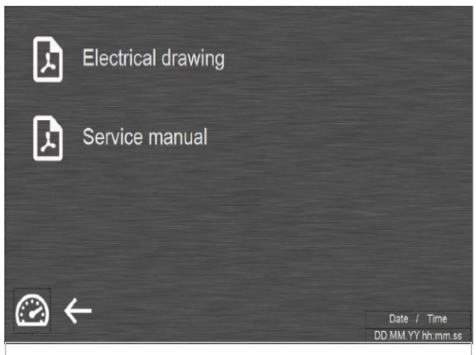
Network Configuration From this section, password-protected access, you can configure the IP parameters of the system's target corporate network.

B.E.A Battery Efficiency Analysis

Analyses the discharge curve of batteries in the event of a blackout, giving an immediate overview of their efficiency status



Mail Setting from this section you can configure the MAIL SERVER function that allows you to receive emails in case of system abnormalities. Each alarm generates an email when the ON state occurs and an on-the-spot alert to the OFF state
You can enter up to three mail recipients

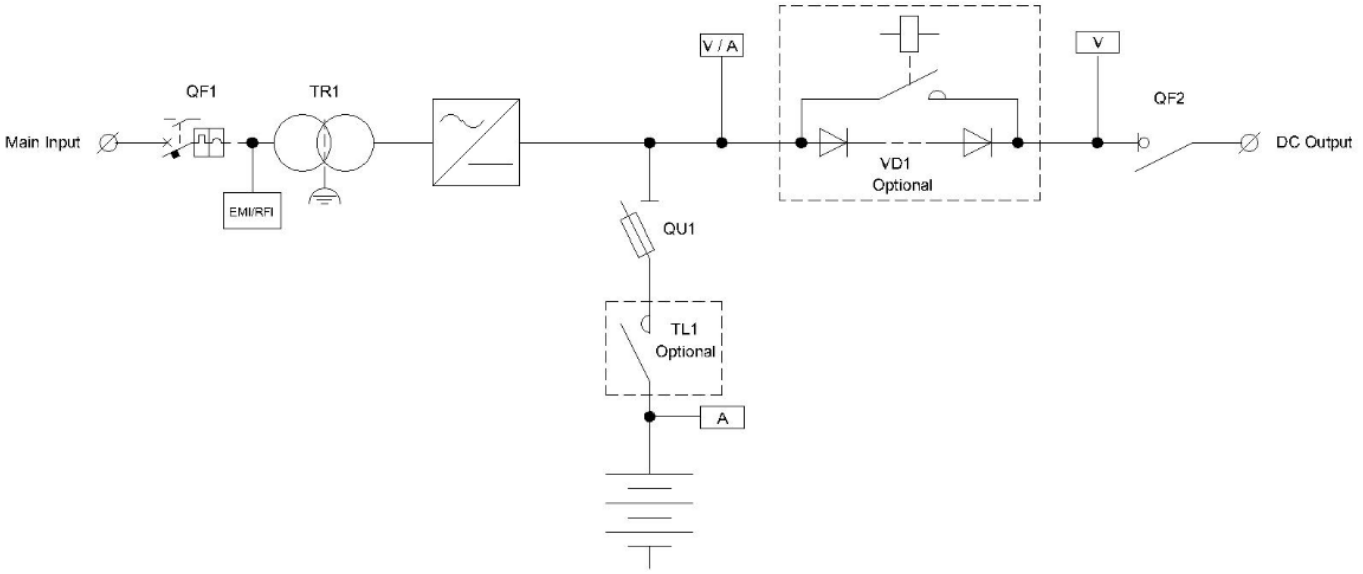


PDF DOCUMETATION from this page you can view on HMI the drawings and the technical manual for a quick and always available consultation

Note: Sample images that may change without warning

Possible configurations

DC UPS - Basic single-line diagram - Single branch - code 1R



Standard Functions

AC MCB with cont.aux.
Floating charge
Boost charge (f)
Manual Charge (f)
Temperature compensation(f)
BATTERY(f) TEST Function
DC EATHED sensor(f)
Relay alarm card (f)
Multilanguage HMI (f)

B.E.A Battery Efficiency Analysis(f)

(f) - See FOCUS on later pages

Signals and Measures

HMI reports

AC main present
AC/DC active
Voltage output rectifier High/Low
Load Floating
Boost Charge (X)
Manual Charge (X)
Active Temperature Compensation(X)
Battery charging current limitation active
Positive pole on the ground
Negative pole on the ground
Output Overload
Battery testing in progress
Battery test failed
Operating from batteries
Low battery voltage
End of battery drain
High battery temperature(X)
AC Input MCB OFF

Measurements on HMI

Output voltage
Output current
Current battery charge
Battery temperature

(X) - HMI-enabled function

Communication (Modbus slave TCP / IP)

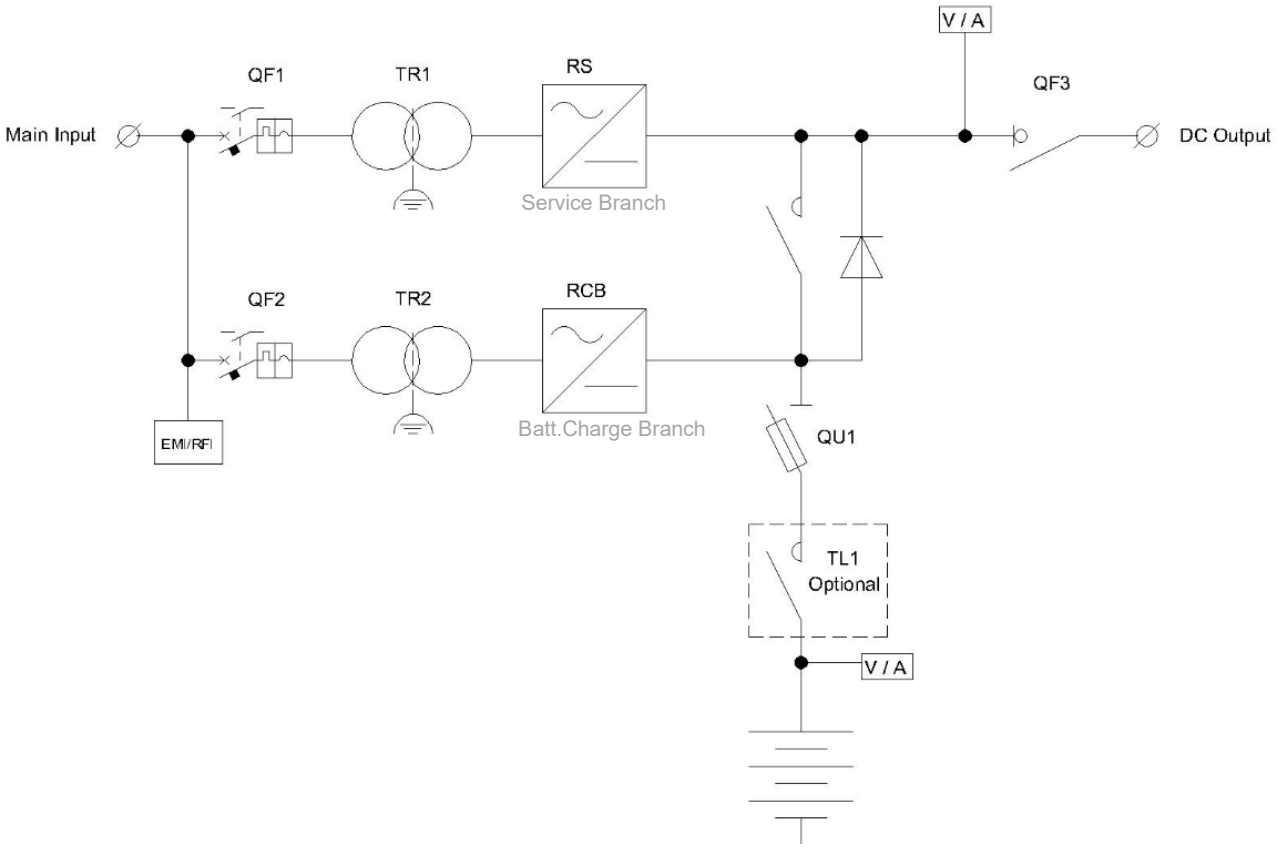
Word individual for electrical parameters:

Output voltage to loads
Output current to loads
Battery recharge current
Battery temperature

DoubleWord alarms:

showing all the signals present on the HMI

DC UPS - Basic single-line diagram - Double branch - code 2R



Standard Functions

AC MCB with cont.aux.

SERVICES BRANCH RS

Normal exercise voltage
Emergency operating voltage(f)

BATTERY CHARGE BRANCH-RCB

Floating charge
Boost charge (f)
Manual Charge (f)
Emergency operating voltage(f)
Temperature compensation(f)
BATTERY TEST Function(f)

System

POWERBOOST Function(f)
Relay alarm card (f)
DC pole sensor to earth
Multilanguage HMI (f)

B.E.A Battery Efficiency Analysis(f)

(f) - See FOCUS on later pages

Reports and Measures

HMI reports

AC main present
AC/DC -RS-active
AC/DC -RCB-active
RS-output voltage High / Low
RCB-output voltage High / Low
RCB-Floating Charge
RCB- Boost Charge(X)
RCB-Manual Charge (X)
Active Temperature Compensation(X)
Battery charging current limitation active
Positive pole on the ground
Negative pole on the ground
Output Overload
Battery testing in progress
Battery test failed
Operating from batteries
Low battery voltage
End of battery drain
High battery temperature(X)
AC Input MCB OFF

Measurements on HMI

Output voltage
Output current
Battery voltage
Current battery charge
Battery temperature

(X) - HMI-enabled function

Communication (Modbus slave TCP / IP)

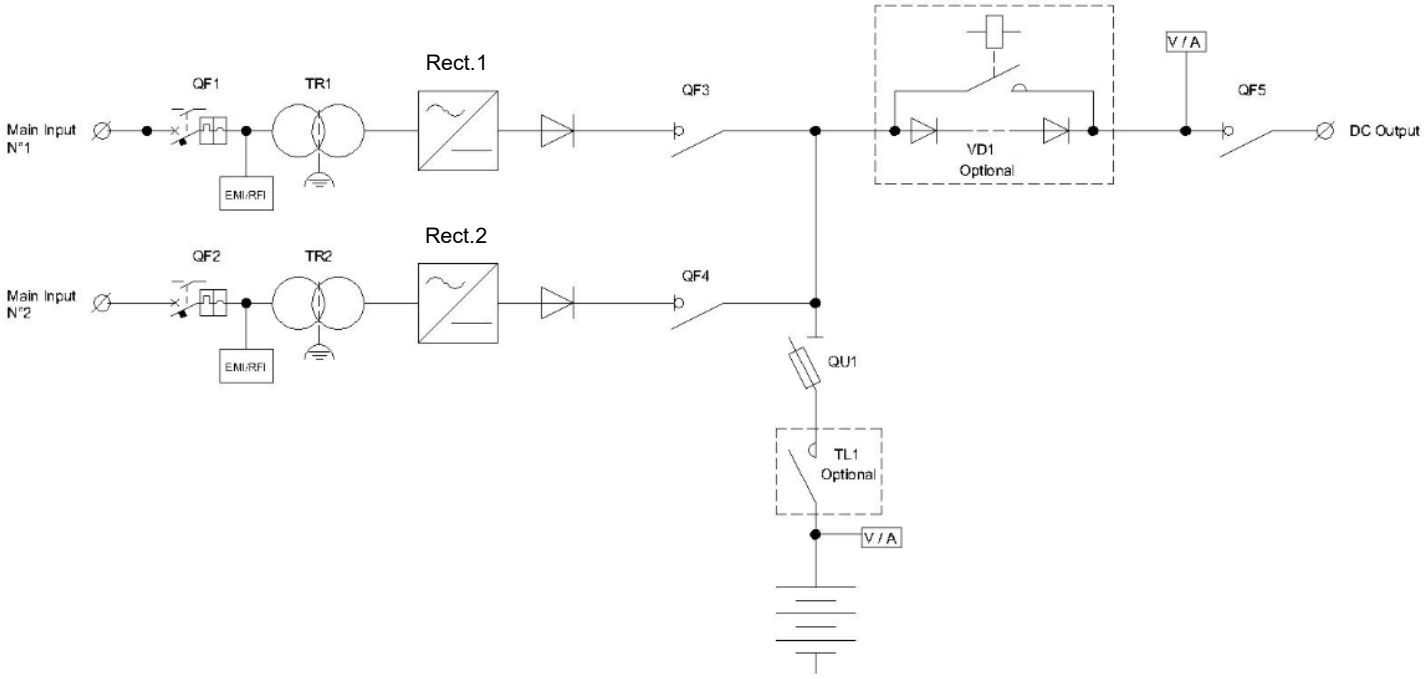
Word individual for electrical parameters:

Output voltage to loads
Output current to loads
Battery voltage
Battery recharge current
Battery temperature

DoubleWord alarms:

showing all the signals present on the HMI

DC UPS - Basic single-line diagram - Double parallel branch - code 2RP



Standard Functions

AC MCB with cont.aux.
Floating charge
Boost charge (f)
Manual Charge (f)
Temperature compensation(f)
BATTERY(f) TEST Function
DC EATHED sensor(f)
Relay alarm card (f)
Multilanguage HMI (f)

B.E.A Battery Efficiency Analysis(f)

(f) - See FOCUS on later pages

Reports and Measures

HMI reports

AC main present
AC/DC -Rect.1-active
AC/DC -Rect.2-active
Load-output voltage High / Low
Battery-output voltage High / Low
Floating Charge
Boost Charge (X)
Manual Charge (X)
Active Temperature Compensation(X)
Battery charging current limitation active
Positive pole on the ground
Negative pole on the ground
Output Overload
Battery testing in progress
Battery test failed
Operating from batteries
Low battery voltage
End of battery drain
High battery temperature(X)
AC Input MCB OFF

Measurements on HMI

Output voltage
Output current
Battery voltage
Current battery charge
Battery temperature

(X) - HMI-enabled function

Communication (Modbus slave TCP / IP)

Word individual for electrical parameters:

Output voltage to loads
Output current to loads
Battery voltage
Battery recharge current
Battery temperature

DoubleWord alarms:

showing all the signals present on the HMI

PRODUCT FOCUS

Floating Charge – (RIF.DIN 41773)

This charging process involves two different phases:
- Phase 1: the current is constant and the voltage increases
- Phase 2: the current decreases and the voltage is constant.

When the recharge current drops below a certain value, the battery is considered charged a floating value, which is the minimum value necessary for the correct maintenance of recharge of the accumulator.

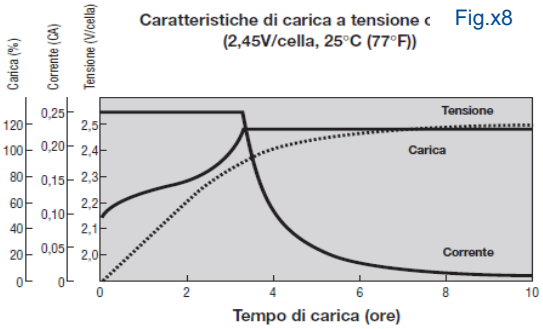


Fig.x8

FROM HMI you can:
Set the Floatt charge voltage
Set the Float charge current

Boost charge (Ref.DIN41772) - Fig.x1

This type of charging is recommended for tubular plate technology and/or NiCd batteries. The system is fully automatic as the charging current required by the batteries is read and this, by means of possible settings, determines the transition from FLOATING to BOOST and vice versa. This type of charge is protected by software security timers (settable from 1 minute up to 24 hours) that automatically disables the feature automatically

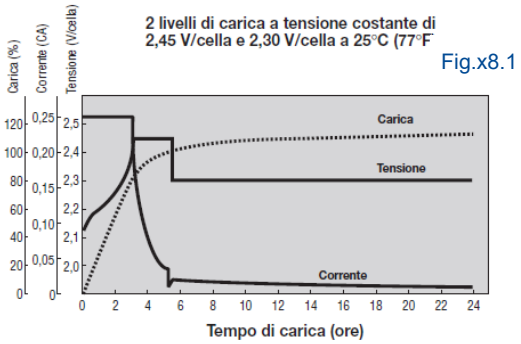


Fig.x8.1

FROM HMI you can:
Set the Boost charge voltage
Set the Ah capacity of the batteries required by the algorithm for proper operation
Set the Boost charge current
Set the security software timerr

Manual charge

This type of charging is recommended for tubular plate technology and/or NiCd batteries.The function activates by push button on HMI only without load
This type of charge is protected by software security timers (settable from 1 minute up to 24 hours) that automatically disables the feature automatically

FROM HMI you can:
Activate and deactivate the function
Set the Manual charge voltage
Set the Manual charge current
Set the security software timer

System Configuration Update

It is possible to update the DCUPS parameters by sending a configuration file from the manufacturer. This file has to be installed on a USB key and it has to be placed on the back of the HMI. The contents will be recognized by the system, which will activate a special button to start the automatic update procedure. This is a safe and very useful function for making adjustments and/or providing assistance in the field without having a data network available. No experienced personnel required

Temperature Compensation

This function allows you to adapt the FLOATING charging voltage according to the ambient temperature in which the batteries operate, whether it is installed inside the rectifier, in a separate cabinet, or in an open shelf located in a technical room. The temperature is measured by means of a PT100 sensor to be positioned near the battery
The correction of the charging voltage occurs in the temperature range 25 - 35 ° C with fixed sampling at 10sec .; the correction acts only if the system is in FLOATING charge. After the temperature of 35 ° C, the correction is blocked at the value reached to allow the battery to be recharged anyway and an alarm is generated / stored on the HMI

FROM HMI you can:
Activate and deactivate the function
Set the correction coefficient (V / el x ° C)
Standard setting = 0.001÷0,010V / cell
Set the number of battery elements required by the algorithm for proper operation

Multi-language HMI

The following languages are currently managed : ITALIAN/ENGLISH/FRENCH/SPANISH/RUSSIAN/PORTUGUESE/GERMAN/DUTCH

Battery test

This function gives a further step of reliability to the system. During the Battery Test, the AC / DC section lowers its output voltage to a safety value, thus forcing the accumulators to deliver energy to the load. At the same time, the trend of the battery discharge curve is monitored and, if this exceeds the set setpoint values, the BATT.FAULT TEST alarm is triggered and the AC / DC section will instantly return to the FLOATING CHARGE value.
The presence of this function is very important to prevent anomalies in the BATTERY circuit that would, on the contrary, be found only during scheduled maintenance operations or in the event of a black-out with consequent loss of load.A second very important aspect that the BATTERY TEST this arrangement consists in reducing the phenomenon of SOLPHATION OF THE PLATES in the accumulators; this occurs when the battery remains in buffer charge for a long time without ever being used and leads to an exponential increase in the value of the internal resistance (Ri) of the accumulator. At this point, the more the Ri increases, the less the battery will be able to circulate current, putting the load at risk. Thanks to the periodic intervention of the AUTOMATIC BATTERY TEST, the exchange of ions between the positive and negative plates is triggered in the accumulator; this drastically reduces the SOLPHATION phenomenon by keeping the battery intact. Fig.x2 shows the trend of the system output voltage, when the BATTERY TEST is running
The function is standard in two ways:

- Automatic: The system tests the battery circuit at a user-programmable frequency.
- Manual: It is possible at any time to carry out the TEST in MANUAL mode

FROM HMI you can:
Activate and deactivate the function
Set the AUT TEST repeat days. in the range 1 to 45 days
Set the battery test duration from 1 minute to 24 hours

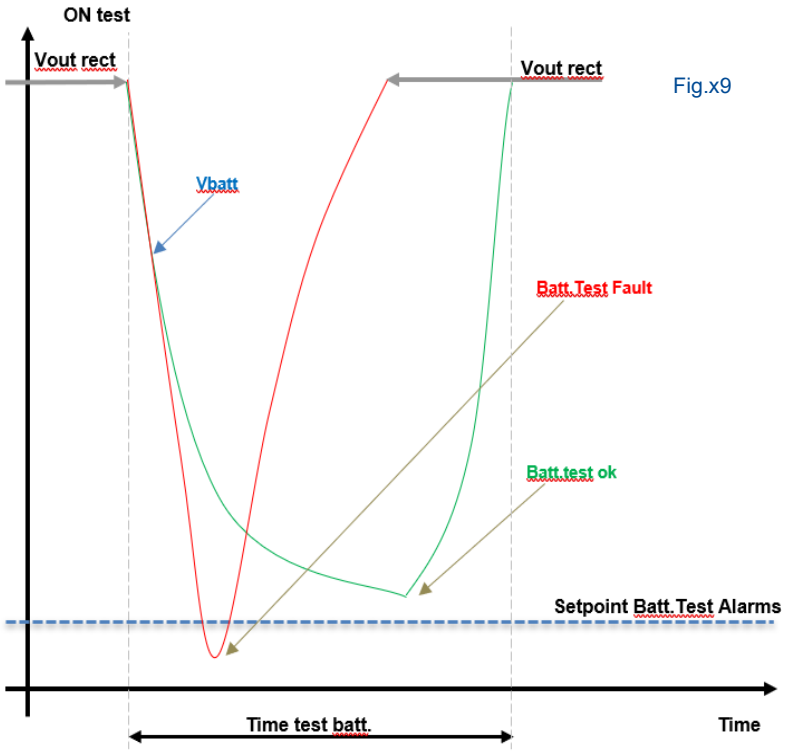


Fig.x9

DC Polarity on the ground sensor
There is a fixed-threshold sensor (about 15mA, referring to the system's output terminals) that detects possible loss of insulation of the output poles and batteries present in the system. This sensor is NOT similar to an ISOLAMENT CONTROL instrument but is provided to give an initial indication of any abnormality. The circuit detects the loss of insulation of the POSITIVE pole or the NEGATIVE pole differentiated .

FROM HMI you can:
Activate and deactivate the function

Emergency Voltage - REVERSIBILITY
Typical function of the 2R configuration. In the event of failure of an
AC / DC section of the system, the remainder automatically goes to a higher voltage value (usually the Vfloating value) to also allow the batteries to be recharged simultaneously.

FROM HMI you can:
Set the EMERGENCY voltage

Alarms relay card
There is a board consisting of 7 alarm relays with SPDT type contact shown on removable and polarized printed circuit terminals. The electrical contacts have a range of 5Amp to 250Vac
There are three fixed alarms respectively:
AC MAINS PRESENCE - wired in positive logic
GENERAL FAILURE - wired in positive logic is configurable from HMI according to the alarm menu present on HMI.
(Default setting provides the cumulative of all alarms present in the selected system configuration)
LOW BATTERY VOLTAGE
While it is possible to configure the remaining 4 from the HMI

FROM HMI you can:
Configure 5 alarms depending on the menu on HMI

POWERBOOST Function
Typical function of the 2R configuration. : In case of overload on RS, the RCB branch automatically intervenes by putting itself in parallel with the load together with the entire battery bank. The device automatically transforms its configuration from DOUBLE BRANCH to SINGLE BRANCH with TWO UNITS IN PARALLEL only for the time that the overload persists; in this condition, the output voltage of the entire system will go to the FLOATING CHARGE voltage value to also allow the simultaneous recharging of the battery bank. It is important to emphasize that both branches must have the same power and the same characteristics. With this type of system in all respects, a "REDUNDANCY AND PARALLEL POWER" configuration is created in order to increase the reliability of the system and ensure a high degree of safety towards the load.

Input Transformer
The power transformer is made with a core of first choice laminations (optional the solution with oriented crystals) and an electrostatic screen between primary and secondary. It produces the reduction of the input voltage to the most appropriate value for the operation of the conversion system and isolation from the network
(4kV) .The transformer is made with class F supports and insulators (155 ° C) while the windings are in electrolytic copper class H double insulation (220 ° C). There is an electrostatic shield connected to earth between primary and secondary.
The transformers comply with the Standard CEI EN 61558-2-4-file 4971 classification CEI 96-7

AC/DC - IGBT - chopper
It consists of a High Frequency regulator in configuration
IGBT STEP-DOWN with PWM technology control.

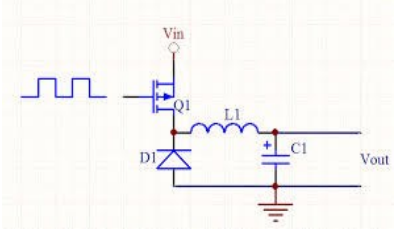


Diagram of the STEP-DOWN configuration with High Frequency control using PWM technique (Pulse Width Modulation).

AC/DC - THYRISTOR
It consists of a rectifier bridge in a fully controlled configuration.

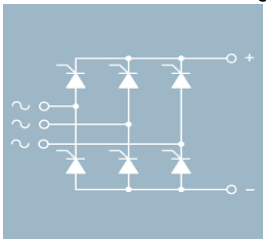


Diagram of FULLY CONTROLLED THYRISTOR BRIDGE

B.E.A - Battery Efficiency Analysis

The calculation of the theoretical discharge curve is based on Peurkuet's Law whose equation has been implemented in a specific algorithm. This law determines how much the capacity Ah of a battery decreases when it is discharged faster than the nominal 20 hours. The measure of the reduction in battery capacity is called the 'Peukert coefficient'.
The higher the Peukert coefficient, the faster the batteries will discharge.
In the appropriate section of the menu (Fig.x10) it is necessary to enter 2 current values and 2 time values from the datasheet of the battery used and the number of strings used in the case of parallel batteries.
Depending on the current absorbed at the DCUPS output, the system calculates the theoretical autonomy that the battery can guarantee.
If the batteries are used, the system will automatically start tracking the discharge curve, the trend of which is displayed on the DCUPS home page.
By pressing on the graph, it is represented in full size (Fig.x10.1).
The function shows the real time trend (red trace) of the battery voltage, the theoretical trend (green trace) of the battery voltage until the end of discharge threshold is reached, the end of discharge voltage (orange trace) and the discharge current applied at that moment (blue trace).
In the example of Fig.x10.1 it is evident that the battery used does not meet the theoretical expectations and therefore is a source of possible problems.
During the real time phase of the survey, the theoretical autonomy data is also displayed and represented in the exact point (blue trace) of reference on the graph (Fig.x10.2).
The system also displays the last stored trend (white trace) in order to immediately make a visual comparison between the real trend and the previous one (Fig.x10.3).

As a further step, the system stores the last 5 traces of all the quantities examined and they are made available for download on a USB key in the form of tabular files. A partial example of this file is shown in (Fig.x10.4) and in it you can see how the values of "v_ref_teor / v_ref_real / v_end_discherge are made available in high resolution (Value /100) thanks to the high accuracy of the measurement produced by the system. With this data it is very easy to reconstruct the trend on a PC and create a database from which to monitor the ageing of the battery.

Automatic activation mode :
When dispensing from batteries
Activation operating mode AUTOMATIC and MANUAL BATTERY TEST

Manual activation mode :
Yes

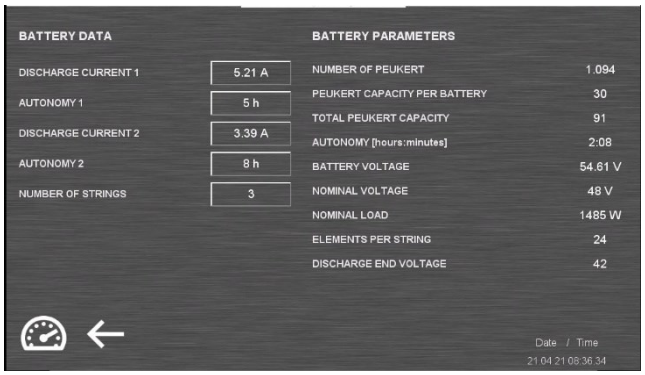


Fig.x10

Fig.x10.1

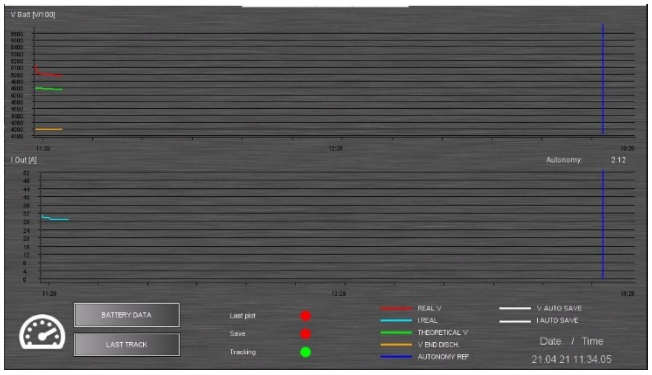


Fig.x10.2

Fig.x10.3

Tag count:			4	
Time is based on:	Coordinated Universal Time (UTC)			
Starttime:			21.04.2021 10:23.46	
Stoptime:			21.04.2021 10:37.36	
No. of samples:		84		
#GA9				
DD.MM.YYYY hh:mm:ss	0.PLC.v_ref_teor	0.PLC.v_ref_real	#.v_end_discharge	0.PLC.I_out
21.04.2021 10:23.46	4800	5114	4200	31
21.04.2021 10:23.57	4799	4965	4200	30
21.04.2021 10:24.06	4799	4902	4200	30
21.04.2021 10:24.16	4798	4878	4200	30
21.04.2021 10:24.26	4797	4882	4200	30
21.04.2021 10:24.36	4796	4894	4200	30
21.04.2021 10:24.46	4796	4906	4200	30
21.04.2021 10:24.56	4795	4909	4200	30
21.04.2021 10:25.06	4794	4917	4200	30
21.04.2021 10:25.16	4793	4917	4200	30
21.04.2021 10:25.26	4793	4921	4200	29
21.04.2021 10:25.36	4792	4921	4200	29
21.04.2021 10:25.46	4791	4925	4200	29
21.04.2021 10:25.56	4791	4925	4200	29
21.04.2021 10:26.06	4790	4925	4200	29
21.04.2021 10:26.16	4789	4925	4200	29
21.04.2021 10:26.26	4788	4929	4200	29
21.04.2021 10:26.36	4788	4929	4200	29
21.04.2021 10:26.46	4787	4929	4200	29
21.04.2021 10:26.56	4786	4929	4200	29
21.04.2021 10:27.06	4786	4929	4200	29

Fig.x10.4

Wiring - cable type - sections and colours

Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3 (cable cross-sections according to power)
Signaling and control cables = FS17 CPR Cca-s3,d1,a3 (sections 1mmq)
Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
FLAT CABLE = Flame Classification FT1,FT2
Data transmission cables = Cavo RJ45 - CAT5 FTP

Standard Colours Used (ref. CEI EN 60204 - 1)

Phase AC = Black
Neutral AC = Blue
Auxiliaries AC = Red
Auxiliaries DC = Grey
Wired external alarms = Orange

Modbus® Protocol - Data Transmission

RJ45 PORT

This standard DC UPS provides TCPIP communication on MODBUS® protocol in SLAVE configuration; the network parameters can be configured by the user (see chapter IP MODIFICATION). To retrieve the data made available by the system, the customer must use a supervision software package that uses the MODBUS® protocol in MASTER configuration; this application will then request the data from our system. For security reasons it is possible to read only and not write the data to the DC UPS.
Our device accepts a maximum of 10 MASTER devices in simultaneous communication
Settings to be used to make the connection to the DC UPS:

MODBUS® function to use = 04 - INPUT REGISTER
Communication port = 502

MODBUS® address table

Address	Tipy	Description	Scaling	Configuration DC UPS	Note
30001	word	Load current	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30002	word	Load Voltage	Not required	2R – 1R – 2RP	Risol.meas.:1Vdc
30003	word	Battery current recharge	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30004	word	Battery Voltage	Not required	2R – 1R – 2RP	Risol.meas.:1Vdc
30005	word	Battery temperature	Not required	2R – 1R – 2RP	Risol.meas.::1°c
30006	word	16 bit alarms		2R – 1R – 2RP	
30007	word	16 bit alarms		2R – 1R – 2RP	
30008*	word	MAIN INPUT 1 :Voltage L1-L2 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30009*	word	MAIN INPUT 1 : Voltage L2-L3 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30010*	word	MAIN INPUT 1: Voltage L3-L1 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30011*	word	MAIN INPUT 1:Current I1 (3Ph – 1Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30012*	word	MAIN INPUT 1:Current I2 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30013*	word	MAIN INPUT 1:Current I3 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30014*	word	MAIN INPUT 1:Hz (3Ph – 1Ph)	Word/10	2R – 1R – 2RP	Risol.meas.:0.xHz
30015*	word	MAIN INPUT 1:Voltage V1(1Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30016*	word	MAIN INPUT 1:Kw (3Ph – 1Ph)	Word/100	2R – 1R – 2RP	Risol.meas.:1Kw
30017*	word	MAIN INPUT 1:Kva (3Ph – 1Ph)	Word/100	2R – 1R – 2RP	Risol.meas.:1Kva
30018*	word	MAIN INPUT 1:Kvar (3Ph – 1Ph)	Word*10	2R – 1R – 2RP	Risol.meas.:1VAr
30019*	word	MAIN INPUT 1:PF (3Ph – 1Ph)	Word/1000	2R – 1R – 2RP	Risol.meas.:0.xxx
30020*	word	MAIN INPUT 2 :Voltage L1-L2 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30021*	word	MAIN INPUT 2 : Voltage L2-L3 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30022*	word	MAIN INPUT 2: Voltage L3-L1 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30023*	word	MAIN INPUT 2:Current I1 (3Ph – 1Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30024*	word	MAIN INPUT 2:Current I2 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30025*	word	MAIN INPUT 2:Current I3 (3Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Amp
30026*	word	MAIN INPUT 2:Hz (3Ph – 1Ph)	Word/10	2R – 1R – 2RP	Risol.meas.:0.xHz
30027*	word	MAIN INPUT 2:Voltage V1(1Ph)	Not required	2R – 1R – 2RP	Risol.meas.:1Vac
30028*	word	MAIN INPUT 2:Kw (3Ph – 1Ph)	Word/100	2R – 1R – 2RP	Risol.meas.:1Kw
30029*	word	MAIN INPUT 2:Kva (3Ph – 1Ph)	Word/100	2R – 1R – 2RP	Risol.meas.:1Kva
30030*	word	MAIN INPUT 2:Kvar (3Ph – 1Ph)	Word*10	2R – 1R – 2RP	Risol.meas.:1VAr
30031*	word	MAIN INPUT 2:PF (3Ph – 1Ph)	Word/1000	2R – 1R – 2RP	Risol.meas.:0.xxx
30032*	word	BACKUP TIME	See note	2R – 1R – 2RP	
30033**	word	BATTERY ANALYSIS GRAPHIC STATUS	0 = Graphic OFF 1 = Graphic ON	2R – 1R – 2RP	
30034**	word	GRAPHIC BATTERY ANALYSIS :THEORETICAL Vref.	Word/100	2R – 1R – 2RP	Risol.meas.:1Vdc
30035**	word	GRAPHIC BATTERY ANALYSIS :REAL Vref.	Word/100	2R – 1R – 2RP	Risol.meas.:1Vdc
30036**	word	BATTERY ANALYSIS GRAPH: Discharge current	Non necessaria	2R – 1R – 2RP	Risol.meas.:1Amp
30037**	word	GRAPHIC BATTERY ANALYSIS :V.end batt.discharge	Word/100	2R – 1R – 2RP	Risol.meas.:1Vdc

*= Available only with OPTIONAL device
(3Ph) = Only in systems with three-phase power supply
(1Ph) = Only in systems with single-phase power supply
(3Ph - 1Ph) = Available with three-phase and single-phase power supply
AVR = Automatic Voltage Regulator : It can be made up of Drop Cell or DC/DC converter on DC output to obtain voltage values different from those needed to recharge the batteries.
*= Value expressed in prime minutes . In the absence of output current the resulting value is 0
**= These parameters are made available to allow the B.E.A. function to be replicated on remote systems (e.g. SCADA)

word	bit	Description	Bit status*	Configuration DC UPS			Note
				1R	2R	2RP	
30006	1	AC OK MAIN STATUS	1	X	X	X	
	2	STATUS RD1/RS OK	1		X	X	
	3	STATUS RD2/RCB OK	1	X	X	X	
	4	TL SWITCHING STATUS	0		X		
	5	STATUS V MAX-LOAD	0	X	X	X	
	6	STATUS V MAX-BATTERIES	0	X	X	X	
	7	LOW.VOLT.BATT STATUS	0	X	X	X	
	8	STATUS END OF AUT.BATT	0	X	X	X	
	9	OVERLOAD STATUS	0	X	X	X	
	10	DC POSITIVE POL.GROUND STATUS	0	X	X	X	
	11	DC NEGATIVE POL.GROUND STATUS	0	X	X	X	
	12	SUMM. POL.GROUND STATUS	0	X	X	X	
	13	BATT. TEST STATUS FAILED	0	X	X	X	
	14	STATUS °C MAX BATT	0	X	X	X	
	15	STATUS AUX MCB.OUT	0	X	X	X	
	16	STATUS AUX MCB.INP.	0	X	X	X	
30007	1	STATUS AUX MCB.BATT.	0	X	X	X	
	2	ETHERNET PLC/HMI ERROR STATUS	0	X	X	X	
	3	STATUS V MIN-LOAD	0	X	X	X	
	4	STATUS V MIN-BATT.	0	X	X	X	
	5	NOT USED					
	6	NOT USED					
	7	NOT USED					
	8	NOT USED					
	9	Error congruence 2 temperature probes					
	10	NOT USED					
	11	NOT USED					
	12	NOT USED					
	13	NOT USED					
	14	NOT USED					
	15	NOT USED					
	16	NOT USED					

PORT RS232 – 422 - 485

The same type of information is available through RS232 serial port (not isolated) on MODBUS RTU protocol.

The serial port configuration is:

ID =1

Baud rate = 9600

Parity= EVEN

Date bits = 8

Stap bits = 1

Optional signal converters, approved by us and definitely working, are available,

to convert to RS422 or RS485 formats.

*= Bit status with system in regular operation

RS= Service Branch

RCB = Battery charge brance

Note : Other types of protocol are available on request

Options

Cod.	Description
20-100	Battery MCB with cont.aux.reported on HMI
20-101	Output MCB with cont.aux.reported on HMI
20-102	Dropped diodes
20-103	Load side- static DC/DC converter
20-104	Battery End discharge power contactor
20-105	Comunication – protocol IEC61850 - server
20-106	Comunication – protocol SNMP - server
20-107	Comunication – IoT
20-108	Comunication – protocol CANOPEN – SLAVE 485
20-109	Comunication – MODBUS RTU 485 - SLAVE
20-109/1	Comunication – protocol PROFINET-SLAVE-TCPIP
20-109/2	Comunication – protocol ETHERNETIP
20-110	Departur from battery-Timed- CEI 0-16
20-111	Battery Reverse Polarity Control Unit
20-112	Manual Bypass for Battery End Discharge Power Contactor - cod.20-104
20-113	Protection degree up to IP54 (for external)
20-114	Special RAL colors for cabinet
20-115	Block diode on DC output
20-116	Operating temperature up to 55 °C
20-117	Cables input from above
20-118	Internal light and heaters
20-119	Output Distribution
20-120	Discharge resistor for battery test - is inserted during the battery test to impart a discharge current of appropriate value to the batteries
20-121	Antiseismic Cabinet
20-122	Temperature signal congruence check between two PT100 probes
20-123	THYRISTOR 12 PULSE

Tests and trials

The system will be tested and calibrated internally and certificates will be issued.

As a minimum, the following tests will be carried out:

- Visual inspection
- Functional check
- Rigidity and insulation test
- Instrument calibration check
- Operational testing to verify compliance with contractual stability and performance values
- Functional test at rated current
- Battery charging current tests

Internal acceptance tests are also carried out on components and/or materials arriving for the order.

Documentation

The entire order will be subject to quality control and quality procedures as per ISO9001 standard.

Included in the scope of supply are all documents necessary and/or required for commissioning and operation such as:

- Contract documents
- Test bulletins
- Certificates of conformity
- Single line diagrams
- Electrical diagrams
- Mechanical layouts
- Instruction manuals
- Start-up procedures

Standards

Rectifier basic standard	:	EN IEC 60146
EMC standard	:	EN IEC 61000-6-2 EN IEC 61000-6-4
Power transformers	:	EN IEC 61558-2-6
Low voltage switchgear	:	CEI EN 61439-1-2 CEI EN 60947-2
Cables	:	CEI UNEL 35716-CEI UNEL35016 CEI EN 50525 EN 50575:2014+A1:2016 (EN 50399/EN 60332-1-2/EN 60754-2)
Cables color	:	CEI EN 60204-1
Cables Alphan.Identif.	:	CEI EN 60445:2018-03
Color Alphan.Identif.	:	CEI EN 60445:2018-03
Protection degree	:	IEC 60529
Mechanical	:	CEI EN 61439-1
Protection devices	:	IEC 60127-1
Contactor	:	IEC 60947-4-1
DC UPS (performance, ruoutine test, requirements)	:	IEC 62040-5-3
Safety	:	IEC EN 50178

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