Zutronic®

by ENERGY SERVICE

NEVER WITHOUT POWER

GENERAL CATALOGUE

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ABB

SIEMENS

Schneider Electric

Grid Solutions

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GECOL

ANDRITZ Hydro

enel Green Power

COLAS RAIL ON TRACK FOR THE FUTURE

ALSTOM

VOITH HYDRO POWER GENERATION

REPOWER L'energia che ti serve.

EDF Fenice

eni

Italgen Italcementi Group

FINCANTIERI

Zutronic® is an ENERGY SERVICE SRL brand, specialized in the design and production of custom of AC UPS and DC UPS (also known as Rectifiers Battery Charger) ENERGY SERVICE SRL, founded and headed by Giovanni Tartaglia (who may boast a twenty years experience in this branch), has accomplished hundreds of supplies to important companies to be installed both in Italy and abroad, and it has a valuable technical knowledge, recognized from our Clients and Consulting Societies.

APPLICATIONS

MV ELECTRICAL PANELS AND SUBSTATIONS

ELECTRIC AND HYDROELECTRIC POWERSTATION

TECHNOLOGICAL INSTALLATIONS

MANIFACTURES

TRANSPORTS

OFFICES BUILDINGS

HOSPITALS

Zutronic®

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GENERAL CATALOGUE

INDEX

DC UPS POWER SUPPLY SYSTEMS

AC UPS POWER SUPPLY SYSTEMS

ACCESSORIES

DC-UPS

UNINTERRUPTIBLE SYSTEMS WITH BATTERY CHARGER AC/DC

DIN rail Z-CBD Series

The power supply systems ZUTRONIC Z-CBD series, combined with batteries, can be used to create an uninterruptible supply system.

The battery is connected in parallel to the load to guarantee continuous supply, without interruptions, in case of mains failure

APPLICATIONS

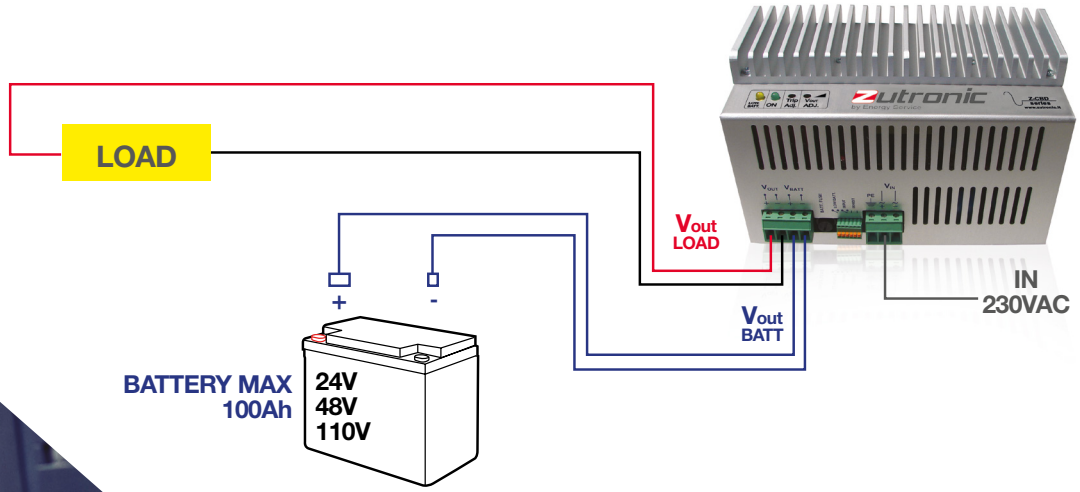
- Auxiliary services of MV electric substations
- PLC industrial automation
- Solenoid valves of hydro power plants
- Fire control units (according to Standard UNI EN 54.4)
- Safety systems

MAIN FEATURES

- Wide voltage range
- Galvanic insulation IN/OUT
- Integrated protection battery fuse (types <500W)
- Internal device for battery disconnection (types<500W)
- Battery efficiency test
- Internal decupling diode (for parallel with other power supply)
- Reverse polarity Vdc output
- Compliance for the UNI EN54.4 Standard (types <500W)

ACCESSORIES

- VRLA batteries (AGM and GEL technology)
- Battery box



MODEL		DC-UPS
GENERAL	BATTERY TYPE	Suitable for sealed lead acid (VRLA) AGM or Gelled type, with supply the load at the same time
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) – single voltage level
	EFFICIENCY AT 10% LOAD	>80%
	HOLD UP TIME V MAINS (100% LOAD)	IN Vac>150W = >80ms IN Vac<150W = >40ms
	INSULATION VOLTAGE	Input/Output/Ground 2KVac – 50Hz 60s – 3KVdc 60s
	ISOLATION RESISTANCE	>100 Mohm
	MTBF	>1.000.000 hours (T amb +25°C) >500.000 hours (T amb +40°C)
	LIFE TIME	>7 years (T amb +25°C)
	PARALLEL/REDUNDANCY OPERATION	Standard
	CURRENT SHARING (PARALLEL MODE OPERATION)	CSA active version (>150W)
	SERIES OPERATION	Std for modules (max voltage 500Vdc)
	NO LOAD OPERATION	Allowed
	COOLING SYSTEM	Natural convection (forced ventilation just for Z751CBD1 e Z1001CBD1), with FCD fan control device
	MECHANICS	Strong anodized aluminium cases with ventilation grids or fans
	PROTECTION DEGREE	IP20
	MOUNTING	DIN 35x15/7,5 rail mounting mm EN50022 Weight 330÷4000 g. (according to power)
OUTPUT	NOMINAL VOLTAGE	12-24-48-110 Vdc
	POWER RANGE	150÷1000W
	RANGE OF SETTING	±10% with setting trimmer
	CORRENT CONTROL	+10% I nom. (+50% short circuit)
	VOLTAGE REGULATION	With variation of: input voltage ±20% = 0,1% load 0÷100% = 0,2% ambient temperature = 0,02%/°C
INPUT	VOLTAGE RANGE	88÷264Vac 48÷62 Hz <500W 115Vac ±20% or 230Vac ±20% >500W
	INRUSH CURRENT	5x I nomin. 50 ms
	POWER FACTOR	Version <150W = 0,7 Version >150W = 0,95
PROTECTIONS	INPUT	Fuse protection
	OUTPUT	Reverse polarity VDC protection
		SCP Short circuit protection
		OVP overvoltage protection
		OVT OVERTEMPERATURE PROTECTION T (from Z151DX): switching off at 90°C internal with automatic restart
AMBIENT	OPERATING AMBIENT TEMPERATURE	-10÷+60°C without "derating" +60÷+70°C, "derating" <2,5% /°C
ALARMS	Types <500W = SPDT contact for "Low battery" on request it can be converted into "Fault"	
	Types ≥500W = SPDT contacts for "Low battery" and "Fault"	

MODEL	POWER	INPUT VOLTAGESVAC	OUTPUT VOLTAGES
Z151CBDZ	150W	88 ÷ 264 VAC wide range PFC (Power Factor Correction)	12(13,8) VDC 24(27,6)VDC 48(55)VDC 110(125)VDC
Z201CBDZ	200W		
Z251CBDZ	250W		
Z301CBDZ	300W		24(27,6)VDC 48(55)VDC 110(125)VDC
Z351CBDZ	350W		
Z501CBD1	500W	115 VAC ±20% range 230 VAC ±20% range PFC (Power Factor Correction)	
Z601CBD1	600W		

MODEL	POWER	DIMENSIONS (mm) Widht x Hight x Depth	WEIGHT (g)	CHARACTERISTICS *STANDARD o OPTIONAL			
				D	CEI-016	F	L
Z151CBDZ	150W	200Lx130Ax110P	1800	*	°	°	°
Z201CBDZ	200W			*	°	°	°
Z251CBDZ	250W			*	°	°	°
Z301CBDZ	300W	200Lx130Ax130P	2500	*	°	°	°
Z351CBDZ	350W			*	°	°	°
Z501CBD1	500W	200Lx185Ax130P	3500	*	°	*	°
Z601CBD1	600W			*	°	*	°

* On request also 750W and 1000W types available

D: Output diode for parallel/redundancycoupling.

CEI 0-16: Battery START FUNCTION.

F: SPDT contact for FAULT allarm (replaces the "low battery" alarm on the < 500W types).

L: Tropicalized versions for marine/hars ambient.

TITANIUM ECO 1R-CH RACK

DC UPS POWER SUPPLY SYSTEMS

SINGLE BRANCH Rectifier - IGBT type

TITANIUM ECO 1R-CH RACK rectifier series belongs to the Single Branch category thus provided with a single AC/DC converter that powers the direct current loads and simultaneously charges a battery. Rackmount 19” execution and combined with vented/sealed Lead Acid and Ni/Cd batteries. An input insulation transformer is present while the AC / DC power converter is of the removable type and made with Chopper IGBT technology, step down, in order to improve the efficiency and contain the ripple at the output. In this way the MTBF is high and MTTR extremely low.

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary

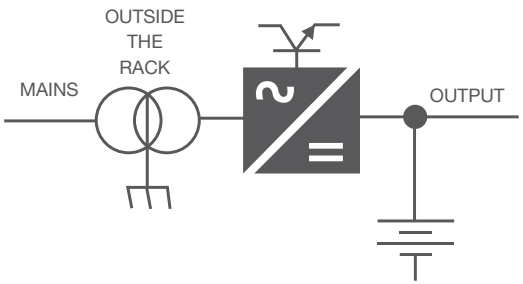
REMOVABLE AC/DC CONVERTERS

Convertitori AC/DC in RACK 19“ asportabili tramite connettori polarizzati per semplificare la sostituzione in caso di guasto (MTTR MOLTO BREVE)

MAIN FEATURES

- An input insulation transformer at mains frequency, with an electrostatic shield (supply separately)
- IGBT Power converter
- Control type: High Frequency PWM
- Digital control Microprocessor
- Charge curve for each type of battery
- Digital control panel with backlit alphanumeric display
- High efficiency and reliability
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test) (OPTIONAL)
- Earth fault sensor with POLE+ and POLE- LED indications (OPTIONAL)
- Field Bus communication available with various protocols (OPTIONAL)
- **Forced cooling (according to the temparature)**

SINGLE-LINE DIAGRAM



ELECTRICAL MEASURES ON LCD

- OUTPUT VOLTAGE
- OUTPUT CURRENT

STATUS MESSAGE

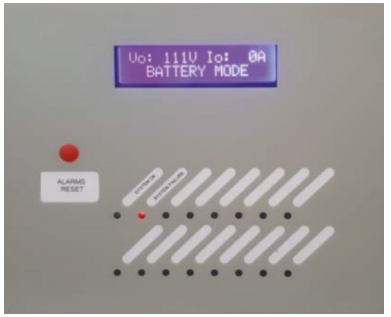
- RECTIFIER ON
- BOOST CHARGE ON (Optional)
- MANUAL CHARGE ON (Optional)
- OUTPUT OVERLOAD
- BATTERY MODE
- LOW VOLT. BATT.
- END BATT. AUT.
- VOUT RECT. MAX

LED INDICATORS

- SYSTEM OK
- SYSTEM FAILURE

MULTIPURPOSE BUTTON

- BUZZER OFF



MODEL		TITANIUM ECO 1R-CH RACK		
GENERAL	BATTERY TYPE	SUITABLE FOR SEALED (VRLA) LEAD ACID - VENTED LEAD ACID - NI/CD		
	CHARGING CHARACTERISTICS	IU (ACCORDING TO DIN 41773)		
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110
	CURRENT RANGE	10 ÷ 60A		
	MAXIMUM POWER (W)	1720	3456	7920
	RIPPLE NOISE (RMS)	≤ 0.5% Vn		
	Vout SETTING RANGE	+/- 5%		
	STABILITY	+/- 1%		
	Vin VARIATION SETTING	+/- 1%		
	LOAD VARIATION SETTING	+/- 1%		
	START-UP TIME	2 sec.		
INPUT	VOLTAGE RANGE	1PH 230Vac+/- 10% or 3PH 400Vac+/- 10%		
	INPUT FREQUENCY	50 ÷ 60 +/-7%		
	EFFICIENCY (Typ.)	≥ 90 %		
	I/O INSULATION	4KV BY TRANSFORMER		
PROTECTIONS	OVERLOAD	"2In x 5mS Shut down per 250mS - restart aut."		
	CURRENT CURVE	COSTANTE		
	OVERVOLTAGE	+ 10% Vn		
	UNDERVOLTAGE	- 50% Vn		
	OVERTEMPERATURE	SHUT DOWN; Automatic restart after temperature reset		
SPDT ALARMS 5A/230Vac	MAINS OK *			
	GENERAL FAULT *			
	LOW VOLTAGE BATTERY			
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 .....+40°C		
	OPERATING HUMIDITY	20 .....90% (NO COND.)		
	STORAGE TEMPERATURE	-20 .....+50°C		
STANDARDS	MARKING	CE		
	DEGREE OF PROTECTION	IEC 60529		
	EMC	EN 61000-6-2 EN 61000-6-4		
	STATIC CONVERTERS	EN 60146-1-2		
DIMENSIONS (LxHxP)mm		RACK 19" 5U 482x221x458		
DEGREE OF PROTECTION		IP20		
COLOUR		RAL 7035		
WEIGHT		15 Kg		

* = Relay normally operating in positive safety

** = handles excluded

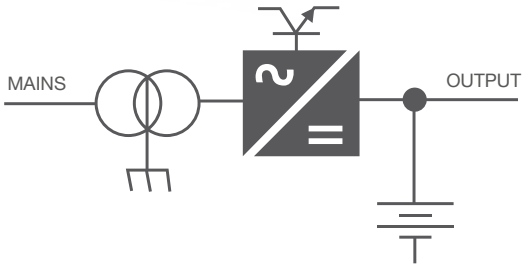
AVAILABLE ACCESSORIES (OPTIONAL)

- uP card for function: AUT/MAN BATTERY TEST
- uP card for function: BOOST & MANUAL CHARGE
- uP card for function: TEMPERATURE COMPENSATION
- External Temp. Probe (3mt. cables max)
- uP card for function: DC EARTHED PROBE (with polarity discrimination +/-)
- END DISCHARGE POWER CONTACTOR

TITANIUM ECO 1R-CH

DC UPS POWER SUPPLY SYSTEMS

SINGLE-LINE DIAGRAM



SINGLE BRANCH Rectifier - IGBT type

TITANIUM ECO 1R-CH rectifier series belongs to the Single Branch category thus provided with a single AC / DC converter that powers the direct current loads and simultaneously charges a battery. They are only available in the version with rack 19" cabinet, combined with vented/sealed Lead Acid and Ni/Cd batteries. An input insulation transformer is present while the AC / DC power converter is of the rack 19" removable type and made with Chopper IGBT technology, step down, in order to improve the efficiency and contain the ripple at the output. In this way the MTBF is high and MTTR extremely low.

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications

REMOVABLE AC/DC CONVERTERS

Rack 19" removable AC/DC converters, using polarized connectors in order to simplify the replacement in case of failure (very short MTTR)

MAIN FEATURES

- An input insulation transformer at power frequency, with an electrostatic shield
- Bridge rectifier Chopper **IGBT ON REMOVABLE UNITS RACK 19"** with connector
- Control type: High Frequency PWM
- Digital control Microprocessor
- Charge curve for each type of battery
- Digital control panel with backlit alphanumeric display
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test for performing a true discharge battery test (Optional)
- Earth fault sensor with POLE+ and POLE- LED indications (optional)
- Field Bus communication available with various protocols (optional)
- Parallel connection ability for redundancy (optional)

ELECTRICAL MEASURES ON LCD

- Output voltage
- Output current

DISPLAY MESSAGES

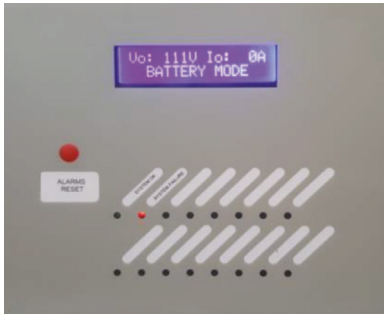
- Rectifiers ON
- Boost charge (opt.)
- Manual charge (opt.)
- Overload
- Rectifiers max Vout
- Battery discharging
- Battery low
- End of battery autonomy

LED INDICATORS

- System OK (green)
- System FAILURE (red)

MULTIPURPOSE BUTTON

- Buzzer OFF



	MODEL	TITANIUM ECO 1R-CH		
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd		
	CHARGING CHARACTERISTICS	IU (according to DIN 41773)		
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110
	CURRENT RANGE	10 ÷60 A		
	MAXIMUM POWER (W)	1440	2880	6600
	RIPPLE NOISE (RMS)	≤ 0.5% Vn		
	Vout SETTING RANGE	+/- 5%		
	STABILITY	+/- 1%		
	Vin VARIATION SETTING	+/- 1%		
	LOAD VARIATION SETTING	+/- 1%		
	START-UP TIME	2 sec.		
INPUT	VOLTAGE RANGE	1Ph 230Vac +/- 10% or 3Ph 400Vac +/- 10%		
	INPUT FREQUENCY	50 ÷ 60 +/-7%		
	EFFICIENCY (Typ.)	≥ 90 %		
	I/O INSULATION	4kV BY TRANSFORMER		
PROTECTIONS	INPUT	MCB		
	BATTERY	Fuses		
	OVERLOAD	2In x 5ms	Shut down duration: 250mS - Automatic restart	
	CURRENT CURVE	CONSTANT		
	OVERVOLTAGE	+ 10% Vn		
	UNDERVOLTAGE	- 50% Vn		
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset		
SPDT ALARMS 8Amp/250Vac	MAINS FAILURE			
	GENERAL FAILURE			
	BATTERY LOW VOLTAGE			
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 .....+40°C		
	OPERATING HUMIDITY	20 .....90% (NO COND.)		
	STORAGE TEMPERATURE	-20 .....+50°C		
STANDARDS	MARKING	CE		
	DEGREE OF PROTECTION	IEC 60529		
	EMC	EN 61000-6-2 EN 61000-6-4		
	STATIC CONVERTERS	EN 60146-1-2		
DEGREE OF PROTECTION (closed door)		IP30		
COLOUR		RAL 7035		

* = Relay normally operating in positive safety

AVAILABLE ACCESSORIES (OPTIONAL):

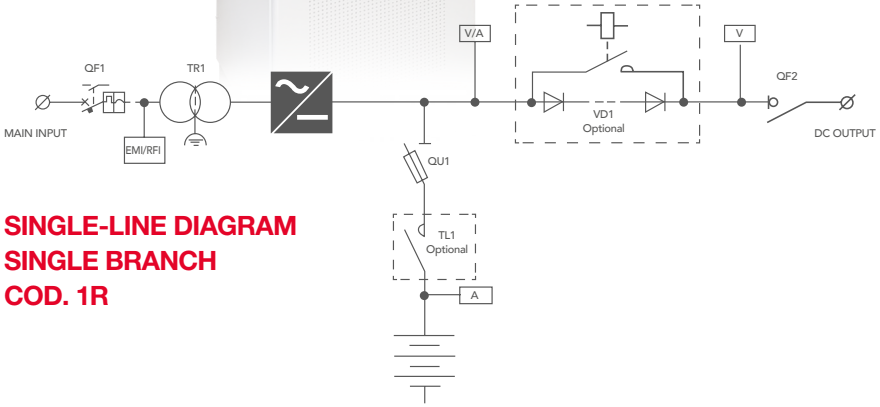
- Automatic circuit breaker on input, output and battery (with or without auxiliary contact and/or opening coil)
- UP board for BOOST CHARGE and MANUAL functions
- UP board for Compensation in temperature function automatically adjusting the charging voltage to the battery temperature + Temperature probe
- BRPCU device; protection against reverse battery polarity. It may be associated with an automatic battery circuit breaker with automatic opening
- Disconnection device for battery discharge end; disconnects the load from the battery to prevent a battery deep discharge and makes the equipment compliant with CEI 0-16 standard
  - Automatic and manual battery test for performing a true discharge battery test
  - Earth fault sensor with POLE+ and POLE- LED indications
  - Parallel connection ability for redundancy
- E.P.O. Device (Emergency Power Off)
- Field Bus communication interface available with different protocols allowing the status transmission
- Distribution; circuit breakers for output line protection

TITANIUM PLUS 1R-CH

DC POWER SUPPLY SYSTEMS

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary



SINGLE-LINE DIAGRAM
SINGLE BRANCH
COD. 1R

SINGLE BRANCH Rectifier - IGBT type

TITANIUM PLUS 1R-CH rectifier series belongs to the Single Branch category thus provided with a single AC / DC converter that powers the direct current loads and simultaneously charges a battery. Cabinet and open frame versions are available, combined with vented/sealed Lead Acid and Ni/Cd batteries. An input insulation transformer is present while the AC / DC power converter is of the removable type and made with Chopper IGBT technology, step down, in order to improve the efficiency and contain the ripple at the output. In this way the MTBF is high and MTTR extremely low.

MAIN FEATURES

- Input insulation transformer at mains frequency, with an electrostatic shield
- Bridge rectifier Chopper **IGBT ON REMOVABLE UNITS**
- Control type: **High frequency PWM**
- System control with industrial **PLC ON REMOVABLE UNITS**
- Charge curve for each type of battery (AGM - GEL - PB - NI-CD) 3 charging levels including manual charging complete with safety timer
- HMI - Digital control panel with touchscreen display 7" with integrated Web server
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test)
- DC polarity on the ground sensor
- MODUBUS TCP/IP communication (slave – server)
- Alarm cards with 3 fixed relays and 4 completely programmable by user
- Temperature compensation with PT100 sensor and correction coefficient (Vel/°C) settable by the user
- **AUTOMATIC SAFE MODE function to ensure continuity of power supply even in case of control failure**

STANDARD FUNCTIONS

- AC mcb with cont. aux.
- Floating charge
- Boost charge
- Manual charge
- Temperature compensation
- BATTERY TEST function
- DC EARTHED sensor
- Relay alarm card

MEASUREMENTS HMI

- Output voltage
- Output current
- Current battery charge
- Battery temperature

SIGNALS AND MEASURES

- AC MAINS-ON
- AC/DC ON
- Voltage output rectifier High
- Voltage output rectifier Low
- Floating charge
- Boost charge (x)
- Manual charge (x)
- Active Temperature Compensation (x)
- Battery charging currrent limitation on
- 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

(x) HMI - enable 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 allarms:

- Showing all the signals present on the HMI

	MODEL	TITANIUM PLUS 1R-CH		
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd		
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) floating, boost and manual charging		
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110
	CURRENT RANGE	10 ÷100 A		
	MAXIMUM POWER (W)	2400	4800	11000
	RIPPLE NOISE (RMS)	1%		
	Vout SETTING RANGE	+/- 5%		
	STABILITY	+/- 1%		
	Vin VARIATION SETTING	+/- 1%		
	LOAD VARIATION SETTING	+/- 1%		
	START-UP TIME	2 sec.		
INPUT	VOLTAGE RANGE	Single-phase 230 Vac +/- 10% or three-phase 400Vac +/- 10%		
	INPUT FREQUENCY	50 ÷ 60 +/-7%		
	EFFICIENCY (Typ.)	≥ 90 %		
	I/O INSULATION	4kV BY TRANSFORMER		
PROTECTIONS	INPUT	circuit breaker		
	BATTERY	Fuses		
	OUTPUT	Switch		
	OVERLOAD	"2In x 5mS, Shut down duration: 250ms - automatic restart"		
	CURRENT CURVE	CONSTANT		
	OVERVOLTAGE	+ 10% Vn		
	UNDERVOLTAGE	- 50% Vn		
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset		
ALARMS	ALARM CARD WITH NO. 3 RELAY SPDT 5A/250VAC	AC MAINS PRESENCE, GENERAL FAILURE, LOW BATTERY VOLTAGE		
	NO. 4 USER PROGRAMMABLE RELAYS VIA HMI PANEL			
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 ……+40°C		
	OPERATING HUMIDITY	< 95% without condensation		
	STORAGE TEMPERATURE	-20 ……+70°C		
	NOISE LEVEL	according to EN50091 < 60 dBA (typical value with forced ventilation in operation)		
STANDARDS	MARKING	CE		
	DEGREE OF PROTECTION	IEC 60529		
	EMC	EN 61000-6-2 EN 61000-6-4		
	TATIC CONVERTERS	EN 60146		
	DC UPS (performance, routine test, requirements)	IEC 62040-5-3		
DEGREE OF PROTECTION		Standard IP31, others on demand		
COLOUR		RAL 7035 cabinet - RAL7012 roof and base		

* = Relay normally operating in positive safety

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 SAFE 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. 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.

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 INSULATION 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

AC/DC - IGBT - CHOPPER

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

FLOATING CHARGE

This recharge has 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 recharging current falls below a certain value, the batteries are considered charged and the cycle is over. In this situation the output goes to the floating value which is the minimum value necessary for correct recharging maintenance battery.

WIRING

- Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3
- Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
- FLAT CABLE = Flame Classification FT1,FT2
- Data transmission cables = Cavo RJ45 - CAT5 FTP

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
- LOW BATTERY VOLTAGE

While it is possible to configure the remaining 4 from the HMI.

FROM HMI you can:

Configure 4 alarms depending on the menu on HMI.

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 insulation 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).

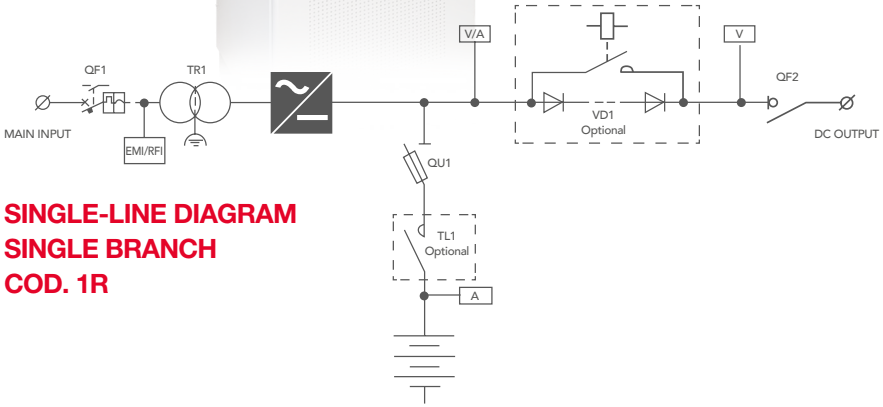
There is an electrostatic shield connected to earth between primary and secondary. The transformers comply with the Standard CEI EN 61558-2-4-file 4971 classification CEI 96-7

TITANIUM PLUS 1R-SCR

DC POWER SUPPLY SYSTEMS

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary



SINGLE-LINE DIAGRAM
SINGLE BRANCH
COD. 1R

SINGLE BRANCH Rectifier - SCR type

TITANIUM PLUS 1R-SCR rectifier series belongs to the Single Branch category thus provided with a single AC / DC converter that powers the direct current loads and simultaneously charges a battery. Cabinet and open frame versions are available, combined with vented/sealed Lead Acid and Ni/Cd batteries. An input insulation transformer is present while the AC / DC power converter is of the removable type and made with SCR full controlled technology, in order to improve the efficiency and contain the ripple at the output.
In this way the MTBF is high and MTTR extremely low.

MAIN FEATURES

- Input insulation transformer at mains frequency, with an electrostatic shield
- **SCR** Power Bridge Rectifier Total-controlled **ON REMOVABLE UNITS**
- Control type: **SCR with phase-cutting regulation**
- System control with industrial **PLC ON REMOVABLE UNITS**
- Charge curve for each type of battery (AGM - GEL - PB - NI-CD) 3 charging levels including manual charging complete with safety timer
- HMI - Digital control panel with touchscreen display 7" with integrated Web server
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test)
- DC polarity on the ground sensor
- MODUBUS TCP/IP communication (slave – server)
- Alarm cards with 3 fixed relays and 4 completely programmable by user
- Temperature compensation with PT100 sensor and correction coefficient (Vel/°C) settable by the user
- **AUTOMATIC SAFE MODE function to ensure continuity of power supply even in case of control failure**

STANDARD FUNCTIONS

- AC mcb with cont. aux.
- Floating charge
- Boost charge
- Manual charge
- Temperature compensation
- BATTERY TEST function
- DC EARTHED sensor
- Relay alarm card

MEASUREMENTS HMI

- Output voltage
- Output current
- Current battery charge
- Battery temperature

SIGNALS AND MEASURES

- AC MAINS-ON
- AC/DC ON
- Voltage output rectifier High
- Voltage output rectifier Low
- Floating charge
- Boost charge (x)
- Manual charge (x)
- Active Temperature Compensation (x)
- Battery charging currrent limitation on
- 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

(x) HMI - enable 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 allarms:

- Showing all the signals present on the HMI

MODEL		TITANIUM PLUS 1R-SCR			
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd			
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) floating, boost and manual charging			
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110	220
	CURRENT RANGE	60 ÷ 500 A			60 ÷ 250 A
	MAXIMUM POWER (W)	12000	24000	55000	55000
	RIPPLE NOISE (RMS)	1%			
	Vout SETTING RANGE	+/- 5%			
	STABILITY	+/- 1%			
	Vin VARIATION SETTING	+/- 1%			
	LOAD VARIATION SETTING	+/- 1%			
	START-UP TIME	10 sec.			
INPUT	VOLTAGE RANGE	three-phase 400Vac ±10%			
	INPUT FREQUENCY	50 ÷ 60 +/-5%			
	EFFICIENCY (Typ.)	≥ 90 %			
	I/O INSULATION	4kV BY TRANSFORMER			
PROTECTIONS	INPUT	circuit breaker			
	BATTERY	Fuses			
	OUTPUT	Switch			
	OVERLOAD	<120% for 20 min., >150% for 5 sec.			
	CURRENT CURVE	CONSTANT			
	OVERVOLTAGE	+ 10% Vn			
	UNDERVOLTAGE	- 50% Vn			
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset			
ALARMS	ALARM CARD WITH NO. 3 RELAY SPDT 5A/250VAC	AC MAINS PRESENCE, GENERAL FAILURE, LOW BATTERY VOLTAGE			
	NO. 4 USER PROGRAMMABLE RELAYS VIA HMI PANEL				
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 .....+40°C			
	OPERATING HUMIDITY	< 95% without condensation			
	STORAGE TEMPERATURE	-20 .....+70°C			
	NOISE LEVEL	according to EN50091 < 60 dBA (typical value with forced ventilation in operation)			
STANDARDS	MARKING	CE			
	DEGREE OF PROTECTION	IEC 60529			
	EMC	EN 61000-6-2 EN 61000-6-4			
	TATIC CONVERTERS	EN 60146			
	DC UPS (performance, routine test, requirements)	IEC 62040-5-3			
DEGREE OF PROTECTION		Standard IP31, others on demand			
COLOUR		RAL 7035 cabinet - RAL7012 roof and base			

* = Relay normally operating in positive safety

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 SAFE 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. 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.

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 INSULATION 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

AC/DC - THYRISTOR

It consists of a rectifier bridge in a fully controlled configuration.

FLOATING CHARGE

This recharge has 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 recharging current falls below a certain value, the batteries are considered charged and the cycle is over. In this situation the output goes to the floating value which is the minimum value necessary for correct recharging maintenance battery.

WIRING

- Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3
- Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
- FLAT CABLE = Flame Classification FT1,FT2
- Data transmission cables = Cavo RJ45 - CAT5 FTP

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
- LOW BATTERY VOLTAGE

While it is possible to configure the remaining 4 from the HMI.

FROM HMI you can:

Configure 4 alarms depending on the menu on HMI.

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 insulation 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).

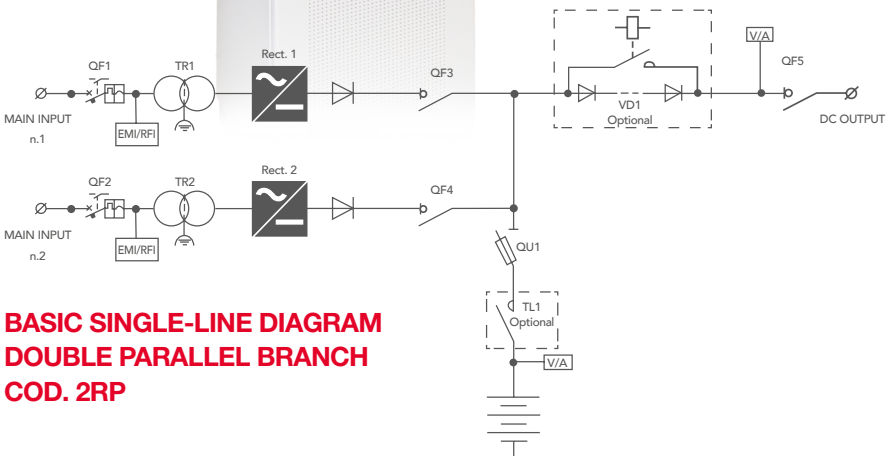
There is an electrostatic shield connected to earth between primary and secondary. The transformers comply with the Standard CEI EN 61558-2-4-file 4971 classification CEI 96-7

TITANIUM PLUS 2RP-CH

DC POWER SUPPLY SYSTEMS

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary



BASIC SINGLE-LINE DIAGRAM
DOUBLE PARALLEL BRANCH
COD. 2RP

DOUBLE BRANCH Rectifier PARALLEL - IGBT type

TITANIUM PLUS 2RP-CH rectifier series belongs to the Double Branch category thus provided with two independent AC/DC converters in redundant (or power), parallel configuration, that supply the current loads and simultaneously charges a battery. They can be combined with vented/sealed (VRLA) Lead Acid and Ni/Cd batteries. An input insulation transformer is present while the AC/DC power converter is of the removable type and made with Chopper IGBT technology, step down, in order to improve the efficiency and contain the ripple at the output.
In this way the MTBF is high and MTTR extremely low.

MAIN FEATURES

- Input insulation transformer at mains frequency, with an electrostatic shield
- Bridge rectifier Chopper **IGBT ON REMOVABLE UNITS**
- Control type: **High frequency PWM**
- System control with industrial **PLC ON REMOVABLE UNITS**
- Charge curve for each type of battery (AGM - GEL - PB - NI-CD) 3 charging levels including manual charging complete with safety timer
- HMI - Digital control panel with touchscreen display 7" with integrated Web server
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test)
- DC polarity on the ground sensor
- MODUBUS TCP/IP communication (slave – server)
- Alarm cards with 3 fixed relays and 4 completely programmable by user
- Temperature compensation with PT100 sensor and correction coefficient (Vel/°C) settable by the user
- **AUTOMATIC SAFE MODE function to ensure continuity of power supply even in case of control failure**

STANDARD FUNCTIONS

- AC mcb with cont. aux. (for each rect.)
- Floating charge
- Boost charge
- Manual charge
- Temperature compensation
- BATTERY TEST function
- DC EARTHED sensor
- Relay alarm card

MEASUREMENTS HMI

- Output voltage
- Output current
- Current battery charge
- Battery temperature

SIGNALS AND MEASURES

- AC MAINS - ON
- AC/DC - RECT.1 - ON
- AC/DC - RECT.2 - ON
- AC/DC load output voltage HIGH/LOW
- Battery load output voltage HIGH/LOW
- Floating charge
- Boost charge (x)
- Manual charge (x)
- Temperature Compensation ON (x)
- Battery charging currrent limitation on
- 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

(x) HMI - enable 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 allarms:

- Showing all the signals present on the HMI

MODEL		TITANIUM PLUS 2RP-CH		
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd		
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) floating, boost and manual charging		
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110
	CURRENT RANGE	2 x 10 ÷100 A		
	MAXIMUM POWER (W)	2 x 2400	2 x 4800	2 x 11000
	RIPPLE NOISE (RMS)	1%		
	Vout SETTING RANGE	+/- 5%		
	STABILITY	+/- 1%		
	Vin VARIATION SETTING	+/- 1%		
	LOAD VARIATION SETTING	+/- 1%		
	START-UP TIME	2 sec.		
INPUT	VOLTAGE RANGE	Single-phase 230 Vac +/- 10% or three-phase 400Vac +/- 10%		
	INPUT FREQUENCY	50 ÷ 60 +/-7%		
	EFFICIENCY (Typ.)	≥ 90 %		
	I/O INSULATION	4kV BY TRANSFORMER		
PROTECTIONS	INPUT (for each rect.)	circuit breaker		
	BATTERY	Fuses		
	OUTPUT	Switch		
	OVERLOAD	"2In x 5mS, Shut down duration: 250ms - automatic restart"		
	CURRENT CURVE	CONSTANT		
	OVERVOLTAGE	+ 10% Vn		
	UNDERVOLTAGE	- 50% Vn		
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset		
ALARMS	ALARM CARD WITH NO. 3 RELAY SPDT 5A/250VAC	AC MAINS PRESENCE, GENERAL FAILURE, LOW BATTERY VOLTAGE		
	NO. 4 USER PROGRAMMABLE RELAYS VIA HMI PANEL			
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 ……+40°C		
	OPERATING HUMIDITY	< 95% without condensation		
	STORAGE TEMPERATURE	-20 ……+70°C		
	NOISE LEVEL	according to EN50091 < 60 dBA (typical value with forced ventilation in operation)		
STANDARDS	MARKING	CE		
	DEGREE OF PROTECTION	IEC 60529		
	EMC	EN 61000-6-2 EN 61000-6-4		
	TATIC CONVERTERS	EN 60146		
	DC UPS (performance, routine test, requirements)	IEC 62040-5-3		
DEGREE OF PROTECTION		Standard IP31, others on demand		
COLOUR		RAL 7035 cabinet - RAL7012 roof and base		

* = Relay normally operating in positive safety

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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 INSULATION 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

AC/DC - IGBT - CHOPPER

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

FLOATING CHARGE

This recharge has 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 recharging current falls below a certain value, the batteries are considered charged and the cycle is over. In this situation the output goes to the floating value which is the minimum value necessary for correct recharging maintenance battery.

WIRING

• Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3
• Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
• FLAT CABLE = Flame Classification FT1,FT2
• Data transmission cables = Cavo RJ45 - CAT5 FTP

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
• LOW BATTERY VOLTAGE
While it is possible to configure the remaining 4 from the HMI.
FROM HMI you can:
Configure 4 alarms depending on the menu on HMI.

INPUT TRANSFORMER

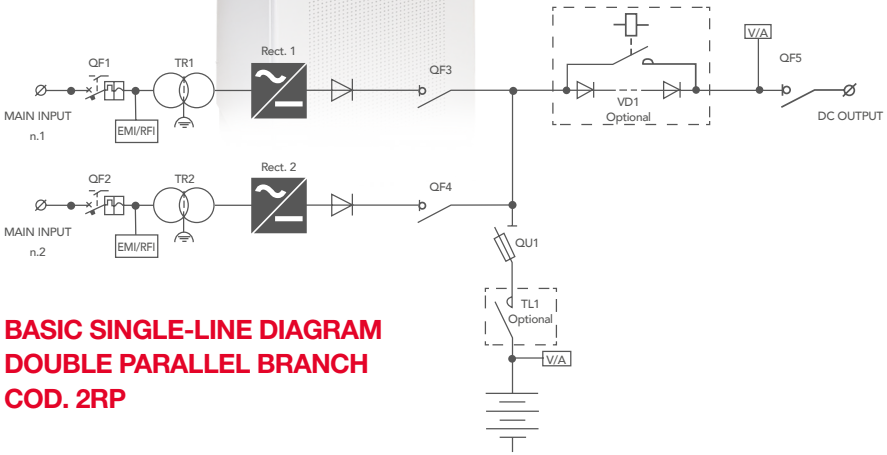
The power transformer is made with a core of first choice laminations (optional the solution with oriented crystals) and an electrostatic screen between primary and secondary. It produces the reduction of the input voltage to the most appropriate value for the operation of the conversion system and insulation 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

TITANIUM PLUS 2RP-SCR

DC POWER SUPPLY SYSTEMS

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary



BASIC SINGLE-LINE DIAGRAM
DOUBLE PARALLEL BRANCH
COD. 2RP

DOUBLE BRANCH Rectifier PARALLEL- SCR type

TITANIUM PLUS 2RP-SCR rectifier series belongs to the Double Branch category thus provided with two independent AC/DC converters in redundant (or power), parallel configuration, that supply the current loads and simultaneously charges a battery. They can be combined with vented/sealed (VRLA) Lead Acid and Ni/Cd batteries. An input insulation transformer is present while the AC /DC power converter is of the removable type and made with Total-controlled SCR technology, in order to improve the efficiency and contain the ripple at the output. In this way the MTBF is high and MTTR extremely low.

MAIN FEATURES

- Input insulation transformer at mains frequency, with an electrostatic shield
- **SCR** Power Bridge Rectifier Total-controlled **ON REMOVABLE UNITS**
- Control type: **SCR with phase-cutting regulation**
- System control with industrial **PLC ON REMOVABLE UNITS**
- Charge curve for each type of battery (AGM - GEL - PB - NI-CD) 3 charging levels including manual charging complete with safety timer
- HMI - Digital control panel with touchscreen display 7" with integrated Web server
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test)
- DC polarity on the ground sensor
- MODUBUS TCP/IP communication (slave – server)
- Alarm cards with 3 fixed relays and 4 completely programmable by user
- Temperature compensation with PT100 sensor and correction coefficient (Vel/°C) settable by the user
- **AUTOMATIC SAFE MODE function to ensure continuity of power supply even in case of control failure**

STANDARD FUNCTIONS

- AC mcb with cont. aux. (for each rect.)
- Floating charge
- Boost charge
- Manual charge
- Temperature compensation
- BATTERY TEST function
- DC EARTHED sensor
- Relay alarm card

MEASUREMENTS HMI

- Output voltage
- Output current
- Current battery charge
- Battery temperature

SIGNALS AND MEASURES

- AC MAINS - ON
- AC/DC - RECT.1 - ON
- AC/DC - RECT.2 - ON
- AC/DC load output voltage HIGH/LOW
- Battery load output voltage HIGH/LOW
- Floating charge
- Boost charge (x)
- Manual charge (x)
- Temperature Compensation ON (x)
- Battery charging currrent limitation on
- 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

(x) HMI - enable 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 allarms:

- Showing all the signals present on the HMI

MODEL		TITANIUM PLUS 2RP-SCR			
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd			
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) floating, boost and manual charging			
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110	220
	CURRENT RANGE	2 x 60 ÷ 500 A			2 x 60 ÷ 250 A
	MAXIMUM POWER (W)	2 x 12000	2 x 24000	2 x 55000	2 x 55000
	RIPPLE NOISE (RMS)	1%			
	Vout SETTING RANGE	+/- 5%			
	STABILITY	+/- 1%			
	Vin VARIATION SETTING	+/- 1%			
	LOAD VARIATION SETTING	+/- 1%			
	START-UP TIME	10 sec.			
INPUT	VOLTAGE RANGE	three-phase 400Vac ±10%			
	INPUT FREQUENCY	50 ÷ 60 +/-5%			
	EFFICIENCY (Typ.)	≥ 90 %			
	I/O INSULATION	4kV BY TRANSFORMER			
PROTECTIONS	INPUT (for each rect.)	circuit breaker			
	BATTERY	Fuses			
	OUTPUT	Switch			
	OVERLOAD	<120% for 20 min., >150% for 5 sec.			
	CURRENT CURVE	CONSTANT			
	OVERVOLTAGE	+ 10% Vn			
	UNDERVOLTAGE	- 50% Vn			
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset			
ALARMS	ALARM CARD WITH NO. 3 RELAY SPDT 5A/250VAC	AC MAINS PRESENCE, GENERAL FAILURE, LOW BATTERY VOLTAGE			
	NO. 4 USER PROGRAMMABLE RELAYS VIA HMI PANEL				
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 ……+40°C			
	OPERATING HUMIDITY	< 95% without condensation			
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	NOISE LEVEL	according to EN50091 < 60 dBA (typical value with forced ventilation in operation)			
STANDARDS	MARKING	CE			
	DEGREE OF PROTECTION	IEC 60529			
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	TATIC CONVERTERS	EN 60146			
	DC UPS (performance, routine test, requirements)	IEC 62040-5-3			
DEGREE OF PROTECTION		Standard IP31, others on demand			
COLOUR		RAL 7035 cabinet - RAL7012 roof and base			

* = Relay normally operating in positive safety

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This is possible as the AC / DC conversion units recognize the loss of communication with the drawer and set themselves up in **"AUTOMATIC SAFE MODE"**, actually working independently and guaranteeing continuity of operation.

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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 INSULATION 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

AC/DC - THYRISTOR

It consists of a rectifier bridge in a fully controlled configuration.

FLOATING CHARGE

This recharge has 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 recharging current falls below a certain value, the batteries are considered charged and the cycle is over. In this situation the output goes to the floating value which is the minimum value necessary for correct recharging maintenance battery.

WIRING

- Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3
- Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
- FLAT CABLE = Flame Classification FT1,FT2
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ALARMS RELAY CARD

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There are three fixed alarms respectively:

- AC MAINS PRESENCE - wired in positive logic
- GENERAL FAILURE - wired in positive logic
- LOW BATTERY VOLTAGE

While it is possible to configure the remaining 4 from the HMI.

FROM HMI you can:

Configure 4 alarms depending on the menu on HMI.

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 insulation 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).

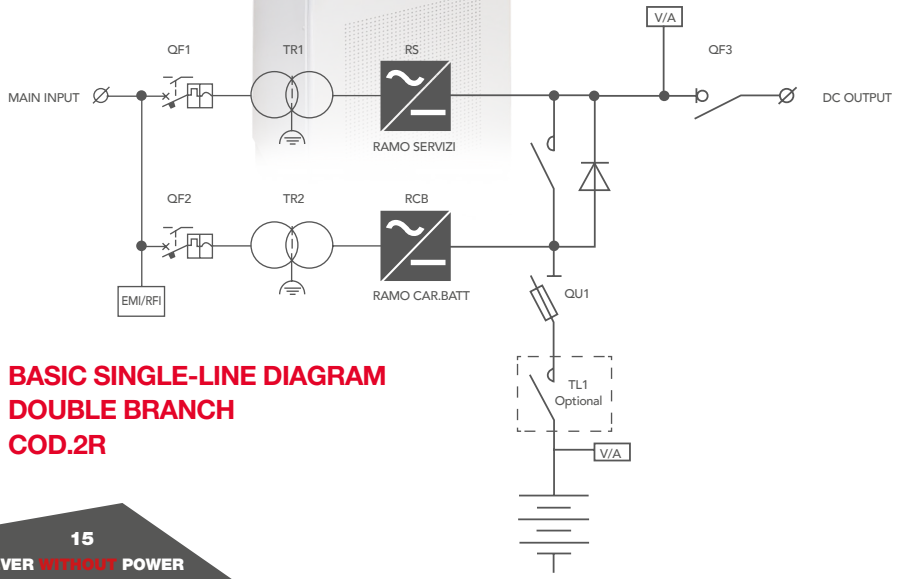
There is an electrostatic shield connected to earth between primary and secondary. The transformers comply with the Standard CEI EN 61558-2-4-file 4971 classification CEI 96-7

TITANIUM PLUS 2R-CH

DC POWER SUPPLY SYSTEMS

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary



BASIC SINGLE-LINE DIAGRAM
DOUBLE BRANCH
COD.2R

DOUBLE BRANCH Rectifier - IGBT type

TITANIUM PLUS 2R-CH rectifier series belongs to the Double Branch category thus provided with two independent AC / DC converters, one powering the direct current loads with stabilized voltage and the other dedicated to the battery charging. Cabinet and open frame versions are available, combined with vented/ sealed Lead Acid and Ni/Cd batteries.
An input insulation transformer for each converter is present while the AC / DC power converter is of the removable type and made with Chopper IGBT technology, step down, in order to improve the efficiency and contain the ripple at the output. In this way the MTBF is high and MTTR extremely low.

MAIN FEATURES

- Input insulation transformer at mains frequency, with an electrostatic shield
- Bridge rectifier Chopper **IGBT ON REMOVABLE UNITS**
- Control type: **High frequency PWM**
- System control with industrial **PLC ON REMOVABLE UNITS**
- Charge curve for each type of battery (AGM - GEL - PB - NI-CD) 3 charging levels including manual charging complete with safety timer
- HMI - Digital control panel with touchscreen display 7" with integrated Web server
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test)
- DC polarity on the ground sensor
- MODUBUS TCP/IP communication (slave – server)
- Alarm cards with 3 fixed relays and 4 completely programmable by user
- Temperature compensation with PT100 sensor and correction coefficient (Vel/°C) settable by the user
- **AUTOMATIC SAFE MODE function to ensure continuity of power supply even in case of control failure**
- **Reversibility of operation between the two branches**
- **POWER BOOST function (parallel of power between the two branches)**

STANDARD FUNCTIONS

- AC mcb with cont. aux.

BATTERY CHARGE BRANCH - RCB

- Floating charge
- Boost charge
- Manual charge
- Emergency operating voltage
- Temperature compensation
- BATTERY TEST function

SERVICE BRANCH - RS

- Normal operating voltage
- Emergency operative voltage

SYSTEM

- Power boost function
- Relay alarm card
- DC EARTHED sensor

MEASUREMENTS HMI

- Output voltage
- Output current
- Battery voltage
- Current battery charge
- Battery temperature

SIGNALS AND MEASURES

- AC MAINS - ON
- AC/DC RS - ON
- AC/DC RCB - ON
- Voltage output rectifier High
- RS output voltage High/Low
- RCB output voltage High/Low
- RCB Floating charge (x)
- RCB Boost charge (x)
- RCB Manual charge (x)
- Temperature Compensation ON (x)
- Battery charging currrent limitation ON (x)
- 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

(x) HMI - enable 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 allarms:

- Showing all the signals present on the HMI

MODEL		TITANIUM PLUS 2R-CH		
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd		
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) floating, boost and manual charging		
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110
	CURRENT RANGE	10 ÷100 A		
	MAXIMUM POWER (W)	2400	4800	11000
	RIPPLE NOISE (RMS)	1%		
	Vout SETTING RANGE	+/- 5%		
	STABILITY	+/- 1%		
	Vin VARIATION SETTING	+/- 1%		
	LOAD VARIATION SETTING	+/- 1%		
	START-UP TIME	2 sec.		
INPUT	VOLTAGE RANGE	Single-phase 230 Vac +/- 10% or three-phase 400Vac +/- 10%		
	INPUT FREQUENCY	50 ÷ 60 +/-7%		
	EFFICIENCY (Typ.)	≥ 90 %		
	I/O INSULATION	4kV BY TRANSFORMER		
PROTECTIONS	INPUT	circuit breaker		
	BATTERY	Fuses		
	OUTPUT	Switch		
	OVERLOAD	“2In x 5mS, Shut down duration: 250ms - automatic restart”		
	CURRENT CURVE	CONSTANT		
	OVERVOLTAGE	+ 10% Vn		
	UNDERVOLTAGE	- 50% Vn		
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset		
ALARMS	ALARM CARD WITH NO. 3 RELAY SPDT 5A/250VAC	AC MAINS PRESENCE, GENERAL FAILURE, LOW BATTERY VOLTAGE		
	NO. 4 USER PROGRAMMABLE RELAYS VIA HMI PANEL			
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 .....+40°C		
	OPERATING HUMIDITY	< 95% without condensation		
	STORAGE TEMPERATURE	-20 .....+70°C		
	NOISE LEVEL	according to EN50091 < 60 dBA (typical value with forced ventilation in operation)		
STANDARDS	MARKING	CE		
	DEGREE OF PROTECTION	IEC 60529		
	EMC	EN 61000-6-2 EN 61000-6-4		
	TATIC CONVERTERS	EN 60146		
	DC UPS (performance, routine test, requirements)	IEC 62040-5-3		
DEGREE OF PROTECTION		Standard IP31, others on demand		
COLOUR		RAL 7035 cabinet - RAL7012 roof and base		

* = Relay normally operating in positive safety

TITANIUM PLUS 2R-CH

DC POWER SUPPLY SYSTEMS

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 SAFE 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. 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.

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 INSULATION 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

AC/DC - IGBT - CHOPPER

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

FLOATING CHARGE

This recharge has 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 recharging current falls below a certain value, the batteries are considered charged and the cycle is over. In this situation the output goes to the floating value which is the minimum value necessary for correct recharging maintenance battery.

WIRING

• Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3
• Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
• FLAT CABLE = Flame Classification FT1,FT2
• Data transmission cables = Cavo RJ45 - CAT5 FTP

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
• LOW BATTERY VOLTAGE
While it is possible to configure the remaining 4 from the HMI.
FROM HMI you can:
Configure 4 alarms depending on the menu on HMI.

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 insulation 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.

POWERBOOST FUNCTION

In case of RS overload, the RCB branch activates automatically connecting itself in parallel with the load and with the entire battery bank. The device automatically turns its configuration from DOUBLE BRANCH to SINGLE BRANCH with TWO UNITS IN PARALLEL, only for the overload status duration; in this condition, the output voltage of the entire system will be set to the "charge conservation" voltage value to allow also the battery bank simultaneous charging.

The function can be permanently activated by the user via the appropriate keys on HMI in the password-protected area. It is important to notice that both the branches must have the same power and the same characteristics.

With this type of system, a configuration of "REDUNDANCY AND PARALLEL of POWER" is obtained in order to increase system reliability and to ensure a high degree of safety towards the load.

REVERSIBILITY OF OPERATION BETWEEN THE TWO BRANCHES

Titanium rectifier series includes two units of AC/DC conversion which work independently when input power is present. The converter "battery branch" charges the battery independently from the load; contemporarily the "system branch" will independently supply the load to a voltage threshold with tolerance ± 1% from the voltage of charge the batteries.

In order to avoid the power interruption to the load in case of failure of the System Branch (RS) or the Battery Branch (RCB) the following solution is performed:

STANDARD OPERATION: during network operation, the two converters operate independently; The Battery Branch charges the battery with voltage dependent on the type of battery provided while the System Branch powers the load with stabilized nominal voltage ± 1%.

BLACKOUT OPERATION: In case of total loss of line or breakdown of both rectifiers, a sequence of operations in order to connect the load directly to the battery (without voltage drops) is activated.

RS FAILURE (System Branch): The System Branch failure activates the automatic and simultaneous switch on the branch battery, thus powering the load and simultaneously charging the battery in buffer. In this case, the voltage at the load is contained in the range Vn + 10% (adjustable).

RCB FAILURE (Battery Branch): in case of battery branch failure the branch battery, the switch to activate the service branch to power the loads and ensurebattery charging with emergency voltage equal to Vn + 10% (adjustable) is automatically activated.

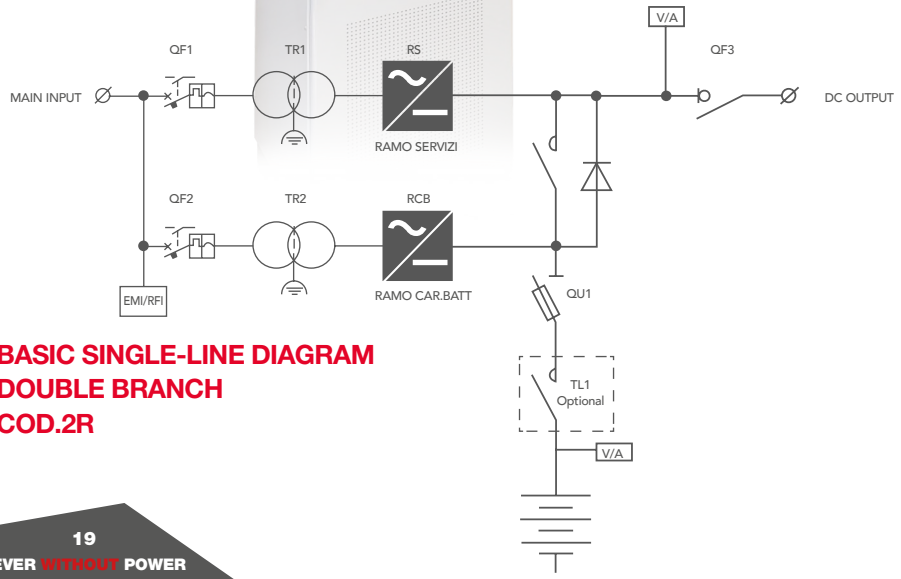
After failure recovery, the system automatically starts to operate again restoring the original function to each of the converters.

TITANIUM PLUS 2R-SCR

DC POWER SUPPLY SYSTEMS

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary



BASIC SINGLE-LINE DIAGRAM
DOUBLE BRANCH
COD.2R

DOUBLE BRANCH Rectifier - SCR type

TITANIUM PLUS 2R-SCR rectifier series belongs to the Double Branch category thus provided with two independent AC/DC converters, one powering the direct current loads with stabilized voltage and the other dedicated to the battery charging. Cabinet and open frame versions are available, combined with vented/sealed Lead Acid and Ni/Cd batteries.

An input insulation transformer for each converter is present while the AC/DC power converter is of the removable type and made with SCR full controlled technology in order to improve the efficiency and contain the ripple at the output. In this way the MTBF is high and MTTR extremely low.

MAIN FEATURES

- Input insulation transformer at mains frequency, with an electrostatic shield
- **SCR** Power Bridge Rectifier Total-controlled **ON REMOVABLE UNITS**
- Control type: **SCR with phase-cutting regulation**
- System control with industrial **PLC ON REMOVABLE UNITS**
- Charge curve for each type of battery (AGM - GEL - PB - NI-CD) 3 charging levels including manual charging complete with safety timer
- HMI - Digital control panel with touchscreen display 7" with integrated Web server
- High efficiency and reliability
- Easy maintenance with access from the front and removable power units
- Extended frequency range accepted as input
- Low residual ripple as output and on batteries (RIPPLE)
- Automatic and manual battery test (performing a true discharge battery test)
- DC polarity on the ground sensor
- MODUBUS TCP/IP communication (slave – server)
- Alarm cards with 3 fixed relays and 4 completely programmable by user
- Temperature compensation with PT100 sensor and correction coefficient (Vel/°C) settable by the user
- **AUTOMATIC SAFE MODE function to ensure continuity of power supply even in case of control failure**
- **Reversibility of operation between the two branches**
- **POWER BOOST function (parallel of power between the two branches)**

STANDARD FUNCTIONS

- AC mcb with cont. aux.

BATTERY CHARGE BRANCH - RCB

- Floating charge
- Boost charge
- Manual charge
- Emergency operating voltage
- Temperature compensation
- BATTERY TEST function

SERVICE BRANCH - RS

- Normal operating voltage
- Emergency operative voltage

SYSTEM

- Power boost function
- Relay alarm card
- DC EARTHED sensor

MEASUREMENTS HMI

- Output voltage
- Output current
- Battery voltage
- Current battery charge
- Battery temperature

SIGNALS AND MEASURES

- AC MAINS - ON
- AC/DC RS - ON
- AC/DC RCB - ON
- Voltage output rectifier High
- RS output voltage High/Low
- RCB output voltage High/Low
- RCB Floating charge (x)
- RCB Boost charge (x)
- RCB Manual charge (x)
- Temperature Compensation ON (x)
- Battery charging currrent limitation ON (x)
- 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

(x) HMI - enable 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 allarms:

- Showing all the signals present on the HMI

MODEL		TITANIUM PLUS 2R-SCR			
GENERAL	BATTERY TYPE	Suitable for Sealed (VRLA) Lead Acid - Vented Lead Acid - Ni/Cd			
	CHARGING CHARACTERISTICS	IU (according to DIN 41773) floating, boost and manual charging			
OUTPUT	NOMINAL VOLTAGE (V)	24	48	110	220
	CURRENT RANGE	60 ÷ 500 A			60 ÷ 250 A
	MAXIMUM POWER (W)	12000	24000	55000	55000
	RIPPLE NOISE (RMS)	1%			
	Vout SETTING RANGE	+/- 5%			
	STABILITY	+/- 1%			
	Vin VARIATION SETTING	+/- 1%			
	LOAD VARIATION SETTING	+/- 1%			
	START-UP TIME	10 sec.			
INPUT	VOLTAGE RANGE	three-phase 400Vac ±10%			
	INPUT FREQUENCY	50 ÷ 60 +/-5%			
	EFFICIENCY (Typ.)	≥ 90 %			
	I/O INSULATION	4kV BY TRANSFORMER			
PROTECTIONS	INPUT	circuit breaker			
	BATTERY	Fuses			
	OUTPUT	Switch			
	OVERLOAD	<120% for 20 min., >150% for 5 sec.			
	CURRENT CURVE	COSTANTE			
	OVERVOLTAGE	+ 10% Vn			
	UNDERVOLTAGE	- 50% Vn			
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset			
ALARMS	ALARM CARD WITH NO. 3 RELAY SPDT 5A/250VAC	AC MAINS PRESENCE, GENERAL FAILURE, LOW BATTERY VOLTAGE			
	NO. 4 USER PROGRAMMABLE RELAYS VIA HMI PANEL				
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 .....+40°C			
	OPERATING HUMIDITY	< 95% without condensation			
	STORAGE TEMPERATURE	-20 .....+70°C			
	NOISE LEVEL	according to EN50091 < 60 dBA (typical value with forced ventilation in operation)			
STANDARDS	MARKING	CE			
	DEGREE OF PROTECTION	IEC 60529			
	EMC	EN 61000-6-2 EN 61000-6-4			
	TATIC CONVERTERS	EN 60146			
	DC UPS (performance, routine test, requirements)	IEC 62040-5-3			
DEGREE OF PROTECTION		Standard IP31, others on demand			
COLOUR		RAL 7035 cabinet - RAL7012 roof and base			

* = Relay normally operating in positive safety

TITANIUM PLUS 2R-SCR

DC POWER SUPPLY SYSTEMS

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 SAFE 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. 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.
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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 INSULATION 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

AC/DC - THYRISTOR

It consists of a rectifier bridge in a fully controlled configuration.

FLOATING CHARGE

This recharge has 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 recharging current falls below a certain value, the batteries are considered charged and the cycle is over. In this situation the output goes to the floating value which is the minimum value necessary for correct recharging maintenance battery.

WIRING

• Power cables AC and DC sections = FS17 CPR Cca-s3,d1,a3
• Signaling and control cables = FRO-HP CPR Cca-s3,d1,a3
• FLAT CABLE = Flame Classification FT1,FT2
• Data transmission cables = Cavo RJ45 - CAT5 FTP

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
• LOW BATTERY VOLTAGE
While it is possible to configure the remaining 4 from the HMI.
FROM HMI you can:
Configure 4 alarms depending on the menu on HMI.

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 insulation 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.

POWERBOOST FUNCTION

In case of RS overload, the RCB branch activates automatically connecting itself in parallel with the load and with the entire battery bank. The device automatically turns its configuration from DOUBLE BRANCH to SINGLE BRANCH with TWO UNITS IN PARALLEL, only for the overload status duration; in this condition, the output voltage of the entire system will be set to the "charge conservation" voltage value to allow also the battery bank simultaneous charging.

The function can be permanently activated by the user via the appropriate keys on HMI in the password-protected area. It is important to notice that both the branches must have the same power and the same characteristics.

With this type of system, a configuration of "REDUNDANCY AND PARALLEL of POWER" is obtained in order to increase system reliability and to ensure a high degree of safety towards the load.

REVERSIBILITY OF OPERATION BETWEEN THE TWO BRANCHES

Titanium rectifier series includes two units of AC/DC conversion which work independently when input power is present. The converter "battery branch" charges the battery independently from the load; contemporarily the "system branch" will independently supply the load to a voltage threshold with tolerance ± 1% from the voltage of charge the batteries.

In order to avoid the power interruption to the load in case of failure of the System Branch (RS) or the Battery Branch (RCB) the following solution is performed:

STANDARD OPERATION: during network operation, the two converters operate independently; The Battery Branch charges the battery with voltage dependent on the type of battery provided while the System Branch powers the load with stabilized nominal voltage ± 1%.

BLACKOUT OPERATION: In case of total loss of line or breakdown of both rectifiers, a sequence of operations in order to connect the load directly to the battery (without voltage drops) is activated.

RS FAILURE (System Branch): The System Branch failure activates the automatic and simultaneous switch on the branch battery, thus powering the load and simultaneously charging the battery in buffer. In this case, the voltage at the load is contained in the range Vn + 10% (adjustable).

RCB FAILURE (Battery Branch): in case of battery branch failure the branch battery, the switch to activate the service branch to power the loads and ensurebattery charging with emergency voltage equal to Vn + 10% (adjustable) is automatically activated.

After failure recovery, the system automatically starts to operate again restoring the original function to each of the converters.

DC-SD

DC POWER SUPPLY SYSTEMS

DC/DC CONVERTERS

DC / DC converters of this class are used to power utilities in DC with constant voltage, when a source having variable performance is provided such as batteries that need charging curves with voltage values not always acceptable by the loads.

APPLICATIONS

- Oil & Gas
- Energy production and distribution
- Process controls
- Transportation
- Safety
- Telecommunications
- Tertiary

PRODUCT PLUS

- Static Converter
- Configuration: STEP-DOWN
- Control Type: High Frequency PWM
- I/O insulation: not insulated
- Pass-through negative pole
- ON/OFF type forced ventilation
- DIN terminal rail blocks for I/O/ALARMS connections

LED INDICATORS

- VDC AUX1 OK
- VDC AUX2 OK
- IGBT pilot signal OK
- Output undervoltage present
- Output overvoltage present
- Overtemperature present
- Selector switch commeand
- Green led ON/OFF

COMMANDS

- Converter selector switch ON/OFF
- Output current

SPECIAL FUNCTIONS AVAILABLE

- LCD device (VOUT & IOUT)
- Output locking diode

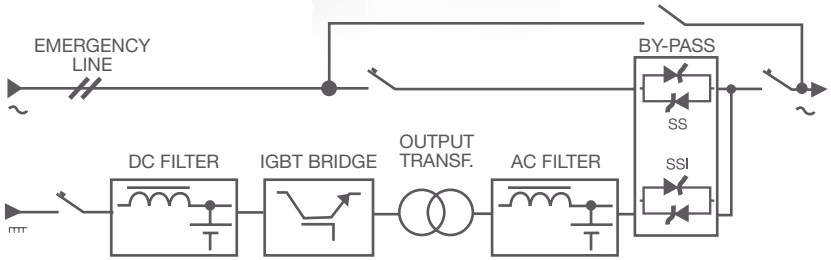
SINGLE-LINE DIAGRAM

MODEL		DC-SD			
OUTPUT	NOMINAL VOLTAGE (V)	12	24	48	110
	CURRENT RANGE	10 ÷ 60 A			
	MAXIMUM POWER (W)	720	1440	2880	66000
	RIPPLE NOISE (RMS)	≤ 0.3% Vn			
	Vout SETTING RANGE	+/- 5%			
	STABILITY	+/- 1%			
	Vin VARIATION SETTING	+/- 1%			
	LOAD VARIATION SETTING	+/- 1%			
	START-UP TIME	2 sec.			
	REDUNDANCY PARALLEL CONF.	Possible with optional block diode			
INPUT	VOLTAGE RANGE	18 ÷ 36	30 ÷ 36	54 ÷ 70	116 ÷ 170
	EFFICIENCY (Typ.)	≥ 90 %			
	DRAW CURRENT (NO LOAD)	~ 0.2 A			
	INRUSH CURRENT (Typ.)	~ 80 A			
PROTECTIONS	OVERLOAD	2In x 5ms Shut down duration: 250mS - Automatic restart			
	CURRENT CURVE	COSTANT			
	OVERVOLTAGE	+ 10% Vn			
	UNDERVOLTAGE	- 50% Vn			
	OVERTEMPERATURE	Shut down; automatic restart after temperature reset			
ALARM FUNCTIONS	REMOTE ON/OFF	YES			
	DC/DC OK	SPDT CONTACT (0.1 A/ 230 Vac)			
	DC/DC Vout MAX/MIN	SPDT CONTACT (0.1 A/ 230 Vac)			
ENVIRONMENTAL DATA	OPERATING TEMPERATURE	-10 .....+40°C			
	OPERATING HUMIDITY	20 .....90% (NO COND.)			
	STORAGE TEMPERATURE	-20 .....+50°C			
ENVIRONMENTAL DATA	MARKING	CE			
	DEGREE OF PROTECTION	IEC 60529			
	EMC	EN 61000-6-2 EN 61000-6-4			
	STATIC CONVERTERS	EN 60146			
	DIMENSION	482*460*220(5U-19")			
DEGREE OF PROTECTION		IP20			
COLOUR		RAL 7035			

DC/AC INVERTERS IRON SERIES

AC POWER SUPPLY SYSTEMS

SINGLE-LINE DIAGRAM



DC/AC SINGLE PHASE OR THREE PHASE OUTPUT

Iron series are Industrial, Heavy Duty Inverters designed to supply critical AC Loads with stabilised continuos voltage.
Products can be easily customized depending on the peculiar Customer request.
Transformer for AC/DC galvanic separation are included Microprocessor control and Digital control panels

APPLICATIONS

- Oil & Gas
- Petrochemical
- Power & Utilities
- Industry
- Hydroelectric and Geothermal plant

PRODUCT PLUS

- Industrial Layout
- Static Conversion
- Microprocessor control
- Digital control panel
- Reduced output THD with not linear load
- IGBT technology bridge (PWM)
- Natural convection cooling
- Easy maintenance/front access
- Insulation: input/output galvanic insulation

MAIN OPTIONS

- Static and manual Switch
- Bypass Transformers and Voltage Regulators
- AC Distribution Panels
- Redundant ventilation
- Communication Port: USB or RS485 or Ethernet TCP/IP with Modbus protocol
- Tropicalization

	MODEL	IRON
INPUT	VOLTAGE	110, 220 Vdc (Other options upon request)
	VOLTAGE RANGE	-20% +40%
	BY-PASS EMERGENCY LINE INPUT VOLTAGE	1Ph 230Vac ±10% or 3Ph 400Vac ±10% (Other options upon request)
	INRUSH CURRENT	<8 In
	PROTECTIONS	Over-voltage, Under-voltage
OUTPUT	VOLTAGE	1Ph 230 Vac - 3Ph 400Vac (Other options upon request)
	FREQUENCY	50 ÷ 60 Hz
	NOMINAL POWER (cosphi=0,8)	1Ph max 25KVA (110Vdc) - 1Ph max 50KVA (220Vdc) 3Ph max 45KVA (110Vdc) - 3Ph max 90KVA (220Vdc)
	STATIC REGULATION	±1%
	DYNAMIC REGULATION	<5% with recovery to 2% in 40 ms
	TOTAL HARMONIC DISTORTION (THD)	≤ 3% with linear load / ≤ 5% with not linear load CF 3:1
	OVERLOAD	110% Pn for 2h - 125% for 10 min - 150% for 10 sec
	PROTECTIONS	Over-voltage, Under-voltage
GENERAL	COOLING METHOD	Natural convection cooling (depending on the powers)
	TEMPERATURE (WORKING)	-10°C + 50°C
	RELATIVE HUMIDITY	≤ 95% a 40°C
	ALTITUDE	≤ 1000 m
	ACOUSTIC NOISE	≤ 60dbA a 1 metro
	EFFICENCY AT FULL LOAD	≥ 88%
	MTBF	140.000 hr A 30 °C
STANDARDS	MARKING	CE
	DEGREE OF PROTECTION	IEC 60529
	EMC	EN 61000-6-2 EN 61000-6-4
	SAFETY	IEC EN 50178
	SEMICONDUCTOR CONVERTORS	EN 60146
DEGREE OF PROTECTION		IP20
COLOUR		RAL 7035 (Other options upon request)

INDUSTRIAL UPS WAVE SERIES

AC POWER SUPPLY SYSTEMS

AC/AC SINGLE PHASE OR THREE PHASE OUTPUT UPS

Wave series are Industrial, Heavy Duty ON-LINE Double Conversion UPS designed to supply critical AC Loads with stabilised continuos voltage.
Products can be easily customized depending on the peculiar Customer request.
Transformer for AC/DC galvanic separation and static and manual By-Pass is included

APPLICATIONS

- Oil & Gas
- Petrochemical
- Power & Utilities
- Industry
- Hydroelectric and Geothermal plant

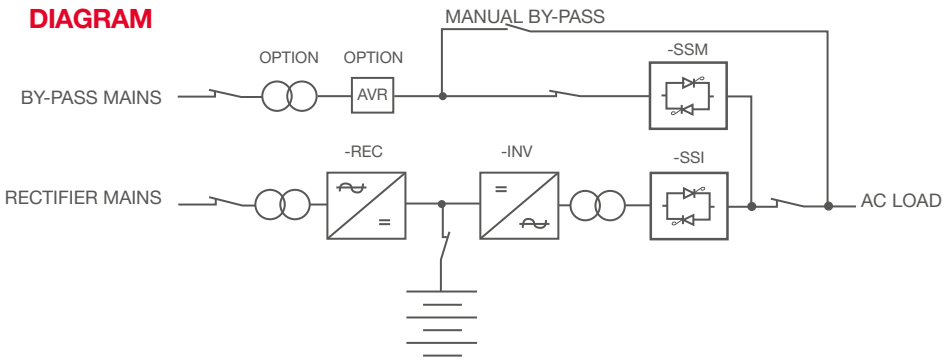
PRODUCT PLUS

- Industrial Layout
- ON_LINE Static Double Conversion
- Microprocessor control
- LCD Multifunctional control panel
- Reduced output THD with not linear load
- IGBT technology bridge (PWM) – (Inverter)
- Battery voltage Temperature compensation
- Easy maintenance/front access
- Insulation: input/output galvanic insulation

MAIN OPTIONS

- 12 Pulse rectifier
- Bypass line isolator
- Transformer for AC/DC galvanic separation
- Bypass Transformers and Voltage Regulators
- AC & DC Distribution Panels
- Redundant ventilation
- Dual Parallel Operation
- Communication Port: USB or RS485 or Ethernet TCP/IP with Modbus protocol

SINGLE-LINE DIAGRAM



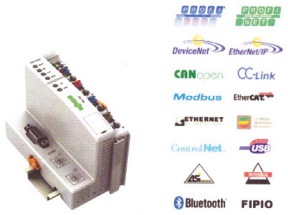
	MODEL	WAVE
AC OUTPUT	OUTPUT VOLTAGE	1Ph 230 Vac / 3Ph 400Vac 50/60 Hz (other options available upon request)
	BY-PASS EMERGENCY LINE INPUT VOLTAGE	1Ph 230Vac ±10% or 3Ph 400Vac ±10% (other options available upon request)
	NOMINAL POWER (COSPHI=0,8)	1Ph max 25KVA (Battery=110Vdc) - 1Ph max 50KVA (Battery=220Vdc) 3Ph max 45KVA (Battery=110Vdc) - 3Ph max 90KVA (Battery=220Vdc)
	STATIC STABILITY	±1%
	DYNAMIC STABILITY	± 5% (load step) with recovery to 2% in 40 ms
	TOTAL HARMONIC DISTORTION (THD)	≤ 2% with linear load / ≤ 5% with not linear load CF 3:1
	OVERLOAD	105% permanent - 125% for 10 min - 150% for 1 min. 200% for 100 ms
	PROTECTIONS	Over-voltage, Under-voltage
AC INPUT	RATED VOLTAGE	3Ph 400Vac 50/60Hz (other options available upon request)
	POWER FACTOR	0,8 @ full load
	THD	≤ 30% tipico
DC LINK	DC VOLTAGE	110Vdc (90-150Vdc) /220Vdc (180-300Vdc)
CONTROL & SIGNALISATION	MICROPROCESSOR	High Performance 8-Bit Microcontroller
	LCD PANEL	Backlit graphic LCD for meters, alarm and status messages
	MIMIC PANEL	Principle block diagram of the UPS with 9 integrated LED
	SIGNALLING LED	Inverter normal, Inverter Fault, Rectifier normal, Rectifier Fault
	VOLT FREE SIGNALLING CONTACTS	AC input supply failure, Rectifier Failure, DC voltage low,/Hi, Battery discharging, Battery disconnected, Inverter failure, Inverter overload, Inverter over temperature, Ac output voltage LOW/HI, Ventilation failure, DC earth fault (option)
GENERAL	COOLING METHOD	Cabinet: Natural - Semiconductor heat sink: Fan assisted
	TEMPERATURE (WORKING)	0°C + 40°C not condensing
	RELATIVE HUMIDITY	≤ 95% a 40°C
	ALTITUDE	≤ 1000 m without derating
	ACOUSTIC NOISE	≤ 65-70dbA at 1 meter
	EFFICENCY AT FULL LOAD	≥ 88%
	MTBF	140.000 hr at 30 °C
	DEGREE OF PROTECTION	IP20 (other options available upon request)
	COLOUR	RAL 7035 (other options available upon request)
	ACCESS	Front Door
STANDARDS	MARKING	CE
	DEGREE OF PROTECTION	IEC 60529
	EMC	EN 61000-6-2 EN 61000-6-4
	SAFETY	IEC EN 50178
	SEMICONDUCTOR CONVERTERS	EN 60146

BATTERY MONITORING UNIT

ACCESSORIES

BM1
Single
Module

Detail of the
Front panel



Optional comunication device
for remote battery status signal
(it doesn't meausures voltage)

In energy continuity systems field, Batteries fulfill a strategic but also vulnerable role. It is not always easy to guarantee the batteries performance control. This is the reason why ZUTRONIC has designed a tool that allows the continous monitoring of both the single battery than of the full branch. BM1 device is furnished with LEDs for immediate location of the faulty battery and of the contacts without power to control remote alarm. It is realized in a handfull shell with DIN Rail (two modules) and can be installed over the batteries, in an electrical cabin or inside the battery box. BM1 devices can be associated to optional interface modules to send remotely the battery working status. The main scope of monitoring system is to prevent faults and to give the oportunity to programme maintenance interventions in advance, avoiding sudden faults that may cause a service loss.

BM1 is thought for 12V batteries that have the same electrical features.

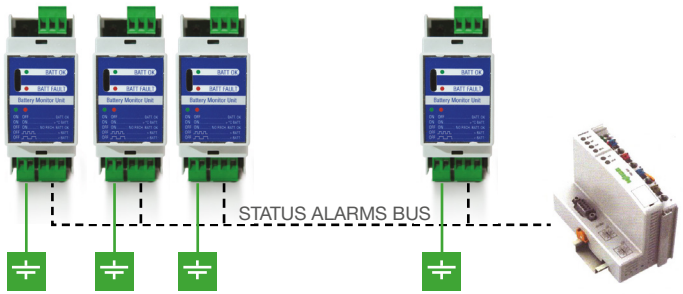
DATA SHEET

NOMINAL INPUT VOLTAGE	12 VDC
INPUT VOLTAGE RANGE	8 ÷ 16 VDC
CURRENT ABSORPTION	19 ÷ 50 mA
CIRCUIT FEEDING	battery
OPERATING TEMPERATURE	0 ÷ 40 °C
RELATIVE HUMIDITY	< 90 % not condensing
TEMPERATURE MEASUREMENT RANGE	0/100° C +/- 1.5°c Resolution: 0.1° C
DEGREE OF PROTECTION	IP20
ELECTRICAL PROTECTIONS	With self-resetting fuse
PROTECTIONS FOR POLARITY INVERSION	Integrate
ALARM THRESHOLDS	12 VDC Vmax*: SET = 14.5 RESET = 13.5 VDC Vmin: SET = 9.5 RESET = 12.5 VDC Vric/rech** SET = 11.5 RESET = 13.0 VDC
FEATURES RELAY CONTACTS	Maximum switchable voltage: 125 Vac 30 Vdc Maximux switchable current: 1 Amp
DIMENSIONS (LXDXH)	Device Type BM1: 36x58x90 2M standard DIN 43880

* Alarm status gets activated when two minutes pass since since battery return into the indicated range.

** If battery remains in this status for 8 hours alam is activated.

TYPICAL OF CONNECTION WITH POSSIBLE REMOTE ALARM REPORT



Easy installation with reduced dimensions, it allows *(event to an unexpert person)* to verify immediatly the battery status identifing the faulty ones

ALARMS REPORTING PANEL

ACCESSORIES

Table version

Guide version

The device is designed for managing four incomes coming from contacts free of power (relay), each is accociated to a LED signal. It is possible to select the type of incoming contact (NO or NC), through internal specific dip-swithc, available for each channel. Further this, each input is equipped with the excitation delay function adjustable by a trimmer, in a range between 0÷300 sec, giving to the device a great flexibility.
On the front panel you may find six LEDs and a button:
- 4 leds in red colour per incoming status
-1 led in green colour per regular working status
-1 led in red colour per general failure
-1 button to switch off acustic alarm and LEDs test

In the terminal boxes are available the contacts (COM-NO-NC) of a relay associated to general failure function, to reporting the status also to other external devices. The four income channel connections are available through a modular terminal box or through a RJ45 jack for a twisted cable category 5 (only for RA-09 version).
RA-09 version requires a 12 Vdc guaranted by an external charger with 230Vac input voltage, provided within the supply. The RA-09 DIN version may accept also a wider range of auxiliar supply.

DATA SHEET		RA-09	RA-09-DIN
SUPPLY VOLTAGE	VAC	230VAC	12VAC[1] 230VAC[2]
	VDC		12VDC[1] 24VDC[1] 48VDC[2] 110VDC[2]
INCOME N.		4	4
INCOME TYPES		N.O. and N.C.	N.O. and N.C.
DELAY IN ADJUSTABLE ACTIVATION		0 ÷ 300 sec.	0 ÷ 300 sec.
DELAY TO DE-EXCITATION		5 sec. - fixed	5 sec. - fixed
OPERATIONAL ELEMENTS		Test LED button and buzzer mute Config. Dip-switch	Pulsante test LED e tacitazione buzzer Dip-switch di configurazione
ALARM OUTPUT FEATURES		LED + Buzzer + Cumulative relay	LED + Buzzer + Cumulative relay
POSITIVE/NEGATIVE CONFIGURABLE CUMULATIVE RELAY		YES	YES
CONNECTION TYPE FOR INCOME/OUTCOME		Clamps and RJ45	Clamps and RJ45
CABIN DIMENSIONS		168*138*48(p) mm	DIN 4M
PROTECTIN DEGREE		IP30	IP20 - box/IP50 - front
CABIN TYPE		Metallic	Plastic / Self-extinguishing
RELAY ELECTRIC FEATURES		CONTACT N.O-C-NC 1 Amp - 24VDC / 0,5 Amp - 110VAC	CONTACT N.O-C-NC 1 Amp - 24VDC / 0,5 Amp - 110VAC
WEIGHT		450 g	120 g
AUXILIARY POWER SUPPLY GIVEN AS STANDARD		YES	NO

[1] Accepts direct feed.

[2] Requires external adaptor (optional).

BATTERIE

ACCESSORIES

Zutronic® has strengthen a solid cohoperation with the main international batteries manufacturers. We may supply technical support for the correct choice and sizing (even with IEEE software), for the several technologies:

- VRLA (Valve Regulated Lead-Acid); commonly know as hermetic Lead-acid Batteries, they are available both in GEL or AGM (Absorbent Glass Mat).
- VENTED; commonly know as open Lead-acid Batteries (Flooded), they are the traditional batteries in an open transparent shell, usually available in single 2V cell and normally installed in dedicated room
- NI-CD; Nichel-cadmium batteries with high performances and very long life for critical applications
- LITHIUM; The most recent technology, particularly suited for storage and cyclic use.

Due on applications and technologies, we may offer metal Rack for batteries sustain, or steel battery boxes fulled with electrical protections and monitoring systems.

FIAMM

Leoch Battery

EnerSys Power/Full Solutions

saft

EXIDE TECHNOLOGIES

HOPPECKE POWER FROM INNOVATION

GAZ

SERVICES

ACCESSORIES

SERVICES OFFERED BY Zutronic

Technologic devices require a special attention during the set in service and long their working on the site. This is the reason why Zutronic company, directly or through local partners, may offer several dedicated services:

PUTTING INTO SERVICE

It is the activity that, performed by a specialized technician following a precise procedure decided by the Company Quality System, verify all the working conditions both of the site and of the machine as well. Then the first start can be performed.

Briefly, the putting into service consists in:

- Verification that all the site installation conditions comply
- Visual verification of all the devices and batteries to identify possible damages
- Verification that the devices are correctly connected to the system
- Verification that the batteries are correctly connected
- Verification that all security legislation have been fullfilled
- Verification that all security devices (upstream and downstream the machine) have been correctly placed
- Verification of the power supply system
- First start of the machine and check of all working parameters
- Test with a real load
- Simulation of power blackout and return
- Eventual test of comunication devices

The advantages of a Putting into service assisted by our technician are:

- Certainty of the proper working of the machine
- Training of the employees that will have in charge the leading of the site
- Longer life of the system
- Customization of the working parameters due to the real needs of the system
- Possibility to extend the warranty

POST SELL ASSISTANCE

Zutronic can offer several level of assistance based on the needs of the final customer and of the system itself. Our contracts offer an efficient protection for all installations type.
Maintenances activities are performed by our specialized technicians or by authorized company of the territory.

Below the services offered:

- Maintenance agreement (with several level of assistance, that can be also multi-annual), for UPS and Rectifiers battery charger
- Warranty extention connected to the maintenance agreement
- Planned test of batteries charge (capacity and efficiency test)
- Training to the employees that will have in charge the leading of the system
- Old batteries substitution and their disposal
- Phone assistance (or directly to the site) by our specialized technician
- Plant survey

The advantages of a maintenance agreement are:

- Reduction of loss of production and system stop costs
- Guaranteed response time
- Technical report for each intervention
- Historical report of all the activities at the site
- Only original spare parts use
- Certified tools use
- Site assistance by specialized and authorized technicians

BATTERIES SUBSTITUTION

Batteries substitution requires a specific knowledge to guarantee the system efficiency and to prevent serious damages due to a wrong connection. You must keep in mind that just putting the wrong polarity can cause an irreversible damage to the power continuity system.

Zutronic is able to subsitute all types of batteries, ensuring the correct return of the service and a correct assitance to old batteries disposal.

Zutronic®

by ENERGY SERVICE

NEVER WITHOUT POWER

GENERAL CATALOGUE

Zutronic®

by ENERGY SERVICE

ISO9001:2015
BUREAU VERITAS Certification

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