Zutronic
by ENERGY SERVICE

# TITANIUM PLUS 1R-SCR

## DC POWER SUPPLY SYSTEMS

DC UPS - 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.

## APPLICATIONS

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

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.

## 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**

Zutronic® by ENERGY SERVICE

# DATA SHEET

| | 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)<br>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<br>(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

Zutronic
by ENERGY SERVICE




## 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

## 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

## 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

## 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

## 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.

## AC/DC - THYRISTOR

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

## 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.

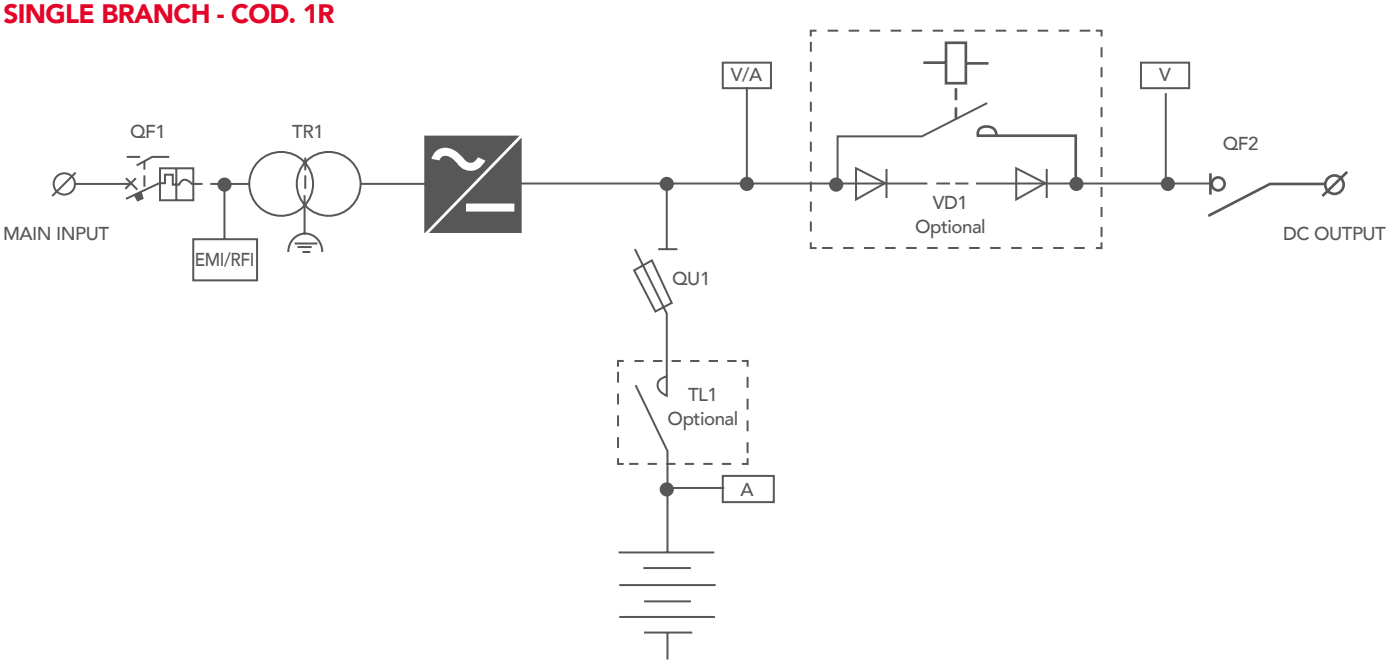
FROM HMI you can:

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.

## BASIC SINGLE-LINE DIAGRAM
## SINGLE BRANCH - COD. 1R




## OPTIONS

- Battery MCB with cont.aux reported on HMI
- Output MCB with cont.aux reported on HMI
- Dropped diodes
- Load side- static DC/DC converter
- Battery End discharge power contactor
- Comunication - protocol IEC61850 - server
- Comunication - protocol SNMP - server
- Comunication - IoT
- Comunication - protocol CANOPEN – SLAVE 485
- Comunication - MODBUS RTU 485 - SLAVE
- Comunication - protocol PROFINET-SLAVE-TCPIP
- Comunication - protocol ETHERNETIP
- Departur from battery-Timed- CEI 0-16
- Battery Reverse Polarity Control Unit
- Manual Bypass for Battery End Discharge Power Contactor - cod.20-104
- Protection degree up to IP54 (for external)
- Special RAL colors for cabinet
- Block diode on DC output
- Operating temperature up to 55 °C
- Cables input from above
- Internal light and heaters
- Output Distribution
- Discharge resistor for battery test - is inserted during the battery test to impart a discharge current of appropriate value to the batteries

Zutronic®
by ENERGY SERVICE

Zutronic®
A BRAND OF ENERGY SERVICE S.r.l.

Via Gaetano Donizetti, 109/111 - 24030 Brembate Di Sopra (BG) - ITALY
Geller Business Centre - D2 Building

Phone **+39 035 4379962** - Fax **+39 035 592935**
sales@zutronic.it - **www.zutronic.it**

ISO9001:2015
BUREAU VERITAS
Certification

Leaflet TITANIUM PLUS 1R – SCR-EN_REV 01 - 11.2020 - Subject to changes in the product, to information, subject to errors and omissions.