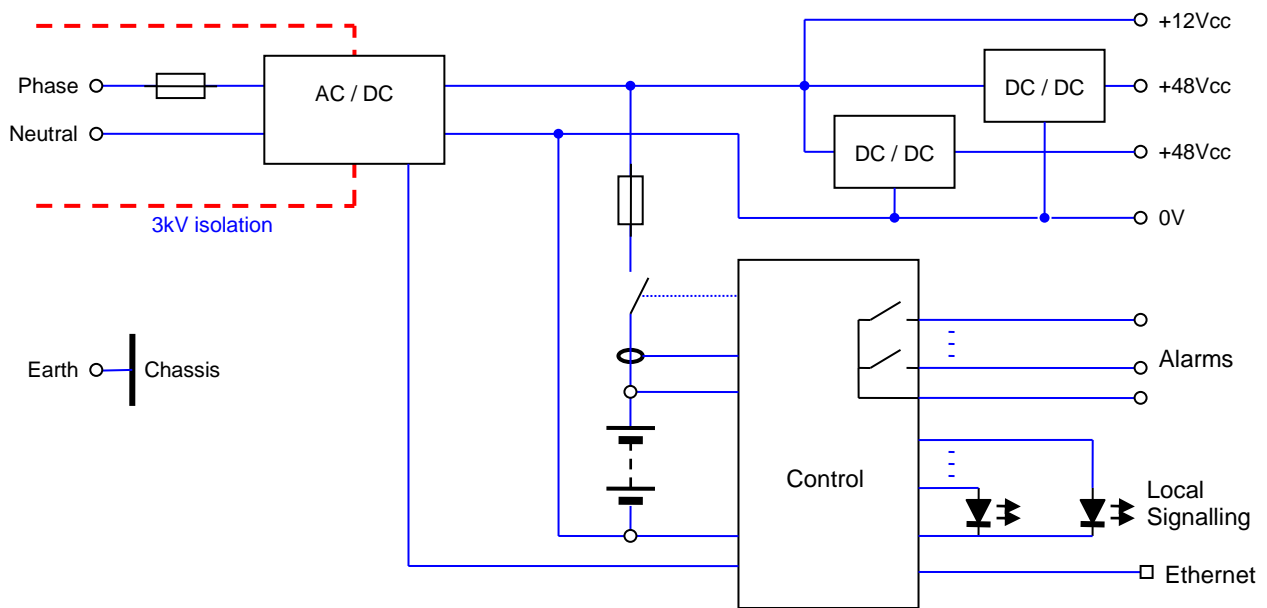




- Full operation without need of battery
- Two independent 48Vdc outputs for switching and control
- Local monitoring with 8 LEDs
- Remote monitoring with 4 alarm relays
- Monitoring and configuration via Ethernet
- Embedded WEB server
- Battery capacity test without heat dissipation

## DESCRIPTION

UPS-DC system for load break switches and reclosers with motorized operation



### Charger-Rectifier

In normal operation, the charger-rectifier supplies the permanent consumption of the installation and keeps the battery charged at nominal floating voltage. When main power fails, the battery keeps the output voltage. When main power comes, the rectifier-charger automatically returns to its initial condition. In this state, the product is able to fully charge the battery (in around 14 hours, if battery is fully discharged) while supplying the permanent consumption of the loads. No manual actuation (local or remote) is needed throughout this process.

When there is no battery but AC input voltage is connected, the rectifier-charger is able to perform, at least, one automated cutting element with the rest of equipment connected, including remote control and communications equipment.

If for some reason, the batteries are disconnected (flat batteries, etc), a reconnection can be forced locally even when there is no AC power on the input. If cutting-off conditions persist, the equipment will go off again.

When there is no battery, the output voltage is the floating voltage.

The layout of the different elements of the equipment allows its easy monitoring and replacement. Maintenance is simple, not requiring to remove parts of the equipment, for example, to change fuses.

The 12Vdc and 48Vdc outputs are floating, ungrounded.

The equipment includes the following features:

- Possibility of configuration parameters..
- Provides uninterrupted power, in case of no mains voltage, until the end of backup time (low voltage).
- Charges the battery and keeps its voltage and current, whatever is the use within the margins specified for each battery type.
- Maintains output voltage and current within the permitted tolerances, protecting the equipment against over-voltage, over-current or micro-cuts, and supplying power according to the required quality.
- Tests the correct operation of the battery

### **Configuration**

The basic configuration of the equipment is done via Ethernet, with standard computer media, without the use of proprietary applications, and without need of measuring devices.

We consider as basic configuration, settings change such as floating voltage, voltage step for each ° C of temperature, charging voltage, etc.

Each parameter ranges are wide enough to cover all the casuistry of batteries that may exist in the market.

### **Battery Charging**

The charger-rectifier keeps the battery always in the range of voltages and currents indicated by the manufacturer thereof, having, at least, the following features:

- When the battery reaches the value set as discharge limit (for undervoltage, configurable and defined for each type of battery by the manufacturer), it will disconnect from the loads to prevent deep discharge.
- When the voltage applied to the battery exceeds the set value of maximum voltage (configurable), a non-urgent alarm is given and the rectifier-charger disconnects the battery.
- When the voltage that is applied to the load exceeds the set values of overvoltage or undervoltage (settable), a non-urgent alarm is given.
- The charge will be at constant voltage (programmable and defined for each battery type), in order to reduce the total charging time.
- When the battery is fully charged, the charger will keep the battery in floating mode by applying the necessary floating voltage (programmable) as indicated by the manufacturer.
- The floating voltage is adjusted according to the compensation of temperature specified by the manufacturer of the batteries, which can be parameterized (mV / ° C). The temperature sensor is integral with the battery.
- The charger limits the maximum charging current of the battery, so that it never exceeds the value set by the manufacturer of the battery manufacturer, which is programmable for the different capacities and / or limitations of the batteries specified by each manufacturer.

### **Battery Test**

The product has a system that checks periodically and automatically the status of the batteries.

This test always begins from the floating mode of the charger-rectifier. If the battery is not in float mode, an internal timer will be activated. If the battery does not reach the floating state (with AC voltage on the input) after 48 hours, the system will consider the battery as damaged.

The battery test is made, at least, to a depth of discharge of 40%. It measures the changes in the battery voltage during the test run. If the voltage drops to a minimum threshold (configurable), the system will consider the battery as defective (failed test) and will give a fault alarm. In order to give more reliability to this test, the number of attempts is programmable. However, the duration of the test is limited in time, after which the result will be processed.

**INPUT AC**

Input voltage	230Vac
Voltage range	-20%...+15%
Frequency range	47 ... 63Hz
Inrush current	< 12A
Power Factor	> 0.6

**OUTPUT DC**

	<b>1</b>	<b>2</b>	<b>3</b>	
Nominal output voltage	13.6	48	48	V
Maximum continuous current (Io)	15.7	3.2	0.83	A
Maximum peak current (10s)	26	5.2	0.83	A
Line Regulation	0.1	0.1	0.1	%
Output Regulation	8.5(*)...18 (*)	±1	±1	V
Ripple	50	100	100	mVpp
Noise (20MHz BW)	100	200	200	mVpp
Total output power (Po)	150W			
Total output peak power (Po)	250W			

(\*) Battery low cut off voltage

**CHARGER**

Battery Type	Sealed Lead-Acid
Nominal battery voltage	12V
Battery Capacity	38Ah
Maximum charging current	15.7A (adjustable)
Battery consumption in stand-by	< 0.5mA

**ENVIRONMENTAL**

Storage temperature	-40 ... 85 °C
Operating temperature	-25 ... 60 °C
Cooling	Self convection
Environmental requirements	RoHS according to Directive 2002/95/EC

Tests	Levels to apply	Conditions	Acceptance criteria
Moist heat	Temperature: 40° C Moisture: 93% Duration of test: 4 days (accelerated aging)	Equipment connected	Criteria A
Dry heat	Type of Test: it is defined at the time of Temperature: 60° C Duration of test: 16 hours	Equipment connected	Criteria A
Temperature variation	Cold temperature: -20° C Warm temperature: 60° C Transition time: 2 minutes 5 cycles of 3h each	Equipment connected	Criteria A
Vibration	According to UNE EN 60 870-2-2 Table 3 Class Bm. Frequency range and severity: From 2Hz to 9 Hz: constant displacement = 3mm (peak) From 9Hz to 200Hz: constant acceleration = 10m/s <sup>2</sup> From 200Hz to 500Hz: constant acceleration = 15m/s <sup>2</sup> Test direction: 3 axes	Equipment connected	Criteria A
	According to ETSI EN 300 019-2-2 Public Transportation: Environmental Class 2.3 Random	Equipment disconnected, installed in cabinet and packed for shipment	Criteria B

Fall	According to ETSI EN 300 019-2-2 Public Transportation: Environmental Class 2.3 (Characteristic severity; <20kg)	Equipment disconnected, installed in cabinet and packed for shipment	Criteria B
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## EMC

### Emissions

Conducted radioelectric emissions on power terminals:

UNE EN 55 022 Class A for 48Vdc terminals

UNE EN 55 022 Class B for AC input power terminals

Radiated radioelectric emissions:

UNE EN 55 022 Class B. Measurements made at 3 m of distance between the antenna and the equipment with limits conversion.

### Inmunity

TEST	NORM	PORT	SEVERITY	CONDITIONS	CRIT.
Magnetic field	IEC61000-4-8	X/Y/Z Axis	100A/m	50/60Hz 1minute	A
		X/Y/Z Axis	1000A/m	50/60Hz 1...3s	A
Radiated high-frequency	IEC61000-4-3	X/Y/Z Axis	30V/m	80M - 1GHz M. 80% 1kHz	A
Conducted RF	IEC61000-4-6	Input	10V	0.15-80MHz M. 80% 1kHz	A
		Output	10V	0.15-80MHz M. 80% 1kHz	A
		Signal	10V	0.15-80MHz M. 80% 1kHz	A
Electrostatic discharge	IEC61000-4-2	Case	±15kV	Air	A
		Case	±8kV	Contact	A
Fast transients	IEC61000-4-4	AC Input	±4kV	Tr/Th: 5/50 ns	B
		Output	±500V	Tr/Th: 5/50 ns	B
		Signal	±2kV	Tr/Th: 5/50 ns	B
Surges	IEC61000-4-5	AC Input diff.	±2kV	Tr/Th: 1.2/50µs	B
		AC Input comm.	±4kV	Tr/Th: 1.2/50µs	B
		Output diff	-	-	B
		Output comm.	±500V	Tr/Th: 1.2/50µs	B
		Signals diff	±1kV	Tr/Th: 1.2/50µs	B
		Signals comm.	±2kV	Tr/Th: 1.2/50µs	B
Magnetic field	IEC61000-4-10		100Am		A
Voltage DIPS/SAGS	IEC61000-4-11	AC Input	70%	10ms (zero crossing)	B
		AC Input	40%	0.1s (zero crossing)	B
		AC Input	5%	5s (zero crossing)	B
		AC Input	0%	4s (zero crossing)	B
Ring wave	IEC61000-4-12	AC Input	2kV Entre líneas 4kV Línea-tierra		A
		Output and signals	2kV Entre líneas 4kV Línea-tierra		A
Harmonics	IEC61000-4-13	AC Input	Clase 2		A

## ISOLATION

Method: Equipment disconnected from the mains, grounded, and with each group of terminals shortcircuited together. E/S groups formed by:

- AC power terminals
- DC power terminals
- Ethernet and alarms

### Isolation Resistance

> 10Mohm to ± 500VDC between each group and ground. Reading made 5 seconds after applying power.

Note: The test is performed at the beginning and at the end. The difference between the two measurements is <20%.

#### **Dielectric Strength**

Voltage is applied for 1 minute with no disruptive discharge or change in the insulation resistance.

- AC Terminal = 3kVac / 50Hz between active parts and mass (\*) and 10 surge pulses ( $\pm 5\text{kV } 1,2 / 50\mu\text{s}$ )
  - DC Terminal = 2,5kVac / 50Hz and 10 surge pulses ( $5\text{kV } 1,2 / 50\mu\text{s}$ ) 5 on each polarity
  - Ethernet and alarms terminals = 1kVac / 50Hz and 10 surge pulses ( $2\text{kV } 1,2 / 50\mu\text{s}$ ) 5 on each polarity
- This test is performed by applying voltage to all points: ground, output/s Vdc, rest of signals ... shorcircuited to each other (for groups) with the power input AC grounded.*

(\*) Mass is considered as a metal foil applied on the exterior of the equipment connected to the metal parts of the enclosure.

#### **Isolation to voltage pulses**

- $\pm 5\text{ kV}$  in Common Mode. between each group and earth, with all the remaining groups bonded shorted
- $\pm 1\text{ kV}$  in differential mode between terminals of each group

#### **MECHANICAL**

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UPS Size

265.5 x 115 x 90.2 mm

## PROTECTIONS

The charger-rectifier is protected against:

- Overloads by current limiting.
- Overloads on the battery by accessible fuse.
- Input overcurrents due to failure of equipment or input overvoltage, by accessible fuse on the frontal.
- Reverse battery polarity.

## CONTROL

### Remote control

Alarms dry contacts of a potential free relay:

Alarm	Cause	Logic	Remarks
Mains failure	-Voltage out of range -No voltage	Contact closed: Mains failure	Alarm timed
Urgent failure	-Battery failure -Internal failure of equipment - Failures involving battery or load disconnect	Contact closed: If urgent failure	
Non-urgent failure	-Battery voltage above its maximum value -Output voltage out of range -Other	Contact closed: If non-urgent failure	
Out of battery	-The battery has reached the minimum voltage	Contact closed: End of battery life reached	It is activated some time before the battery disconnection

### Local control

The charger has LEDs to give the following local indications related to the power supply system:

- Equipment running
- Input voltage out of range or without mains
- Battery discharge
- Charger-rectifier related problem
- Battery related problem (replacement is recommended )
- Battery test
- Current charging mode (floating, fast)
- Output voltage out of range

## Settings

Basic configuration of the equipment is made via Ethernet port. The following parameters can be set:

- Floating voltage
- Voltage step per ° C of temperature
- Constant charging voltage
- Maximum charging current
- Floating current
- Maximum time at constant voltage
- Battery disconnect: minimum voltage
- Battery disconnect: maximum voltage
- Battery disconnect: minimum voltage for immediate disconnection
- Battery test: time between tests
- Battery test: limit voltage to consider test as failed
- Battery test: battery capacity discharge
- Battery test: time limit for each test attempt
- Battery test: number of retries
- Output voltage 1: minimum value
- Output voltage 1: maximum value
- Output voltage 2: minimum value
- Output voltage 2: maximum value
- Output voltage 3: minimum value
- Overload: number of connection retries
- Overload: time between retries

## Communications

Communications are performed over the Ethernet.

The system has the following characteristics:

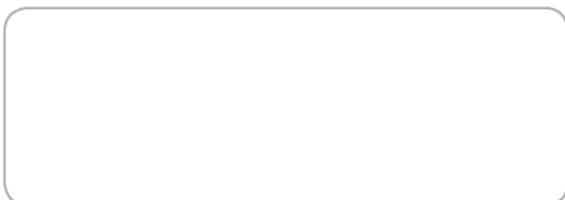
- Compatibility with IPv4
- Includes Web services: 2-3 basic services (to upload / download configuration and firmware ...)
- User authentication through Web user and pass
- LDAP user authentication
- Consultation / modification of firmware, alarms and remote setting from Web page

Coming soon:

- Host DHCP dynamic setting protocol
- Clock synchronization using SNTP
- Automatic IP addressing

In addition to the features listed above, the system has a pushbutton in the frontal (placed behind a drill) that allows the equipment to start up with a given fixed IP address. To do this, it is necessary to press the pushbutton while the computer boots.

## Available from:



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