

Certified EN 54-4:1997+A1:2002+A2:2006

Installation Manual

GENERAL FEATURES

The Power Supply ALI50EN has been designed to be used as a Power Unit with power backup in Fire Alarm Systems, in conformity with European manufacturer standards CPD 89/106/CEE.

Its mechanical and electrical features make it complying to EN 54-4: 2007 Standard (Fire Alarm detecting and signaling devices. Part 4 : Power supply devices) which includes A1:2002 and A2:2006 updates.

FUNCTIONAL FEATURES

The power supply unit is made by a switching power supply, limited in constant precision current (rectangular limitation), two 12V 17 Ah batteries (not given within) digital and analogical control circuit and micro-controlled supervision circuit.

Power is available on 3 terminal-outputs protected by electronic fuses: A, B and C, for generic loads and one connection BATT (with fuse): for back-up batteries. When a fuse trips, the corresponding LED on control board (see Fig.2, DL1, DL6, DL7, DL8) will turn ON.

Electronic fuses try periodically to restore the power output: if an overload is removed, the power will be available within 10 sec max.

The battery charge occurs at constant current (1A) until the battery voltage reaches its nominal value (27,6 V @ 25°C), with temperature compensation. Maximum current supplied by the unit is 5A, where 4A is for charge and 1A is for recharging the battery.

Four LEDs show the loads current consumption (3 green and one red: DL2, DL3, DL4, DL5)

One LED shows the Mains presence (LED1)

Check of battery efficiency

The power supply periodically carries out the efficiency of the batteries:

At first activation of the power supply, the microprocessor will carry out the test of battery presence after about 20 seconds. If connected, the test will be carried out every 10 minutes whilst in case it is not connected, it will continue carry out the test every 20 seconds showing indication FAILURE.

During normal operation, the battery efficiency is checked by controlling the batteries voltage. If batteries do not manage to maintain an acceptable voltage during test, there will be the indication FAILURE.

A test of the battery internal resistance is carried out within 15 seconds after the battery connection and then repeated every 2,5 hours, at least (in conformity to attachment EN54-4/A2); if the internal resistance is over 1 ohm, there will be a FAILURE indication. With internal resistance failure detected, this test is repeated every 5 minutes at most 5 times, to ensure recovery from spurious failure detection. It will then be necessary to replace the batteries and check that terminals and fuses have a good electrical contact. When the battery is replaced, the user should wait 15 seconds after battery connection, with presence of mains voltage, for the repetition of the test and check if the failure is removed. It is possible repeat the test by pressing the button on the back of front panel display board for more than 2,5 seconds.

A microcontroller system controls various possible anomalies and gives a FAILURE indication in the following conditions:

1. Output Fuses or Battery fuse interruptions
2. Overloaded Battery (> 28V)
3. Low Battery Voltage (< 20,8V)
4. Mains power supply absence and no battery charge
5. Disconnected Battery
6. Internal battery resistance >1 Ω

Failures are displayed on a frontal board; the detailed failure is showed on the internal power supply board.

In order to avoid that a possible failure in the regulator damages the charges or the battery, a protection circuit has been inserted against over-Voltages, made of a SCR and a fuse. A fuse for mains alternated supplying is also present.

In case of failure in the power supply or of mains missing, the logic and control circuits are supplied by batteries.

ELECTRICAL SPECIFICATIONS

Supplying Voltage	230 Vac +10% / -15%
Ac mains frequency	50 Hz sinusoidal
Current consumption by mains	1,1 A max. (full load)
Output Voltage	27,6 Vdc (-15% / +10%)
Minimum output Voltage	20 Vdc at max charge, with mains absence and battery discharged
Switching-off threshold Voltage	20 Vdc
Output current	5 A max. (see Fig.4)
Max current for battery recharge	1 A
Max current for charges ($I_{max.a}$)	4 A
Max current for charges without battery recharging ($I_{max.b}$)	4,5 A
Max current for any output	1,5 A
Minimum current for charges (I_{min})	0 A
Regulations towards mains variations at full charge (+10% / -15%)	Better than 1%
Regulations towards charge variations (0 to 100%)	Better than 1%
Ripple at full charge	1 Vpp (at 195,5 Vac) 30mVpp (at 253 Vac)
Compensation of output Voltage according to temperature	4 mV/ K
Protection against battery polarity inversion	Diode
Recommended batteries: 2 x 12 V in series, 17 Ah housing with inflammability class UL-94-V2 or better	Type:YUASA NP 17-12 or equivalent.
Max current without mains supply	4 A
Alarm threshold of battery internal resistance	1 Ω
Missing mains and failure output relay – dry contacts	25 Vac or 60 Vdc 1A MAX

Tab 1

MECHANICAL SPECIFICATIONS

Size in mm.	width 430; height 375; depth 120
Weight	6,25 Kg
ENVIRONMENTAL SPECIFICATIONS	
Operating temperature	from -5°C to +40°C
Humidity	from 5% to 93% \pm 2 %
cooling	air cooling
Installation site	sheltered from atmospheric agents

Tab 2

FUSES

FUSE1	Fuse of the 230 Vac supplying input (T4 AL 250V). Not replaceable	F4	Electronic Fuse related to output B
F1	Battery fuse (T6,3 AL 250 V)	F3	Electronic Fuse related to output C
F2	Electronic Fuse related to output A		

Tab 3

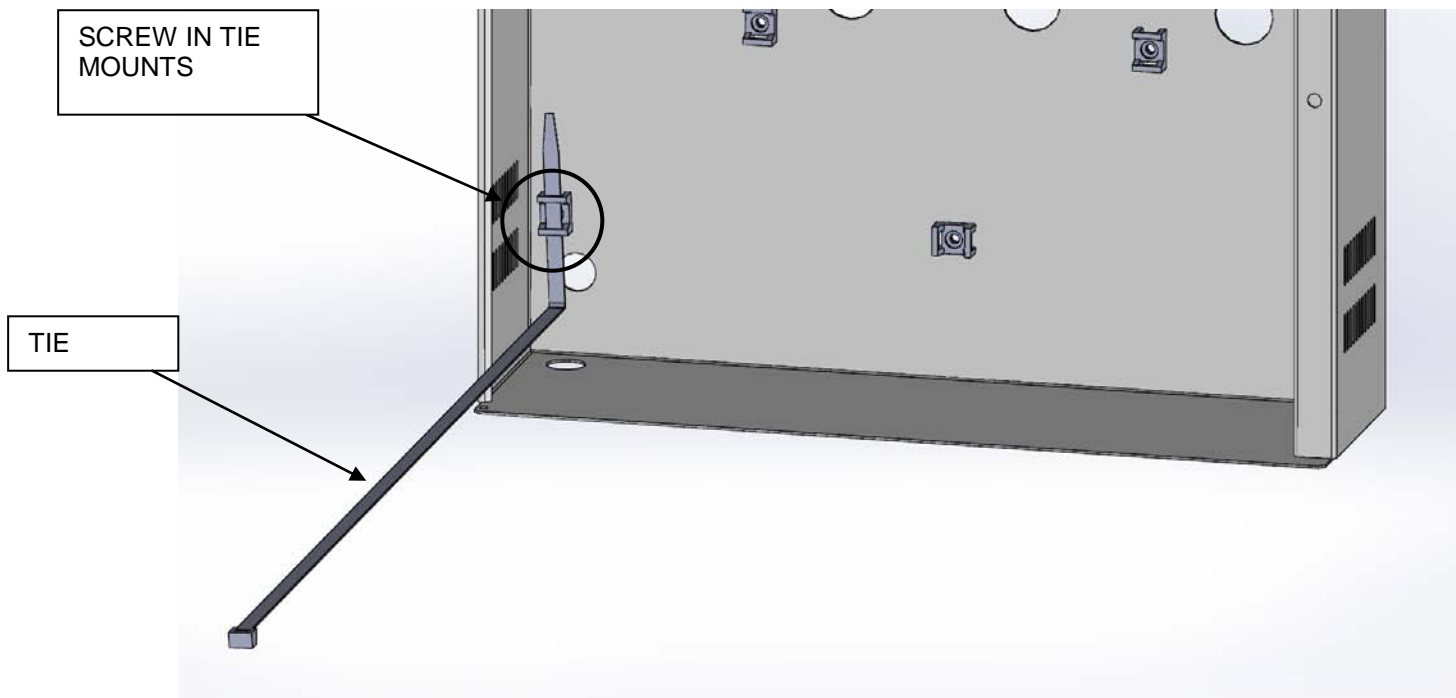
The power supply has been certified using YUASA NP 17-12 batteries**SECURITY INSTRUCTIONS**

1. For mains input and DC outputs + alarms, use separate holes on the bottom of the box to pass the cables. Furthermore, the material of the joint pipe/box must have a flammability class V-1 or better
2. The relay contact "GUASTO" and "RETE" must be connected only to circuits operating with SELV Voltage.
3. For AC supplying, provide a 6A protection bi-pole magneto-dynamic switch, easy to access
4. The wires must have a section of 1,5mm and be equipped with adequate buttonholes where they are subject to pressure contact.
5. The installation of the power supply must be carried out by qualified personnel aware of the security norms EN60950 and concerning power supplies CEI-64-8.

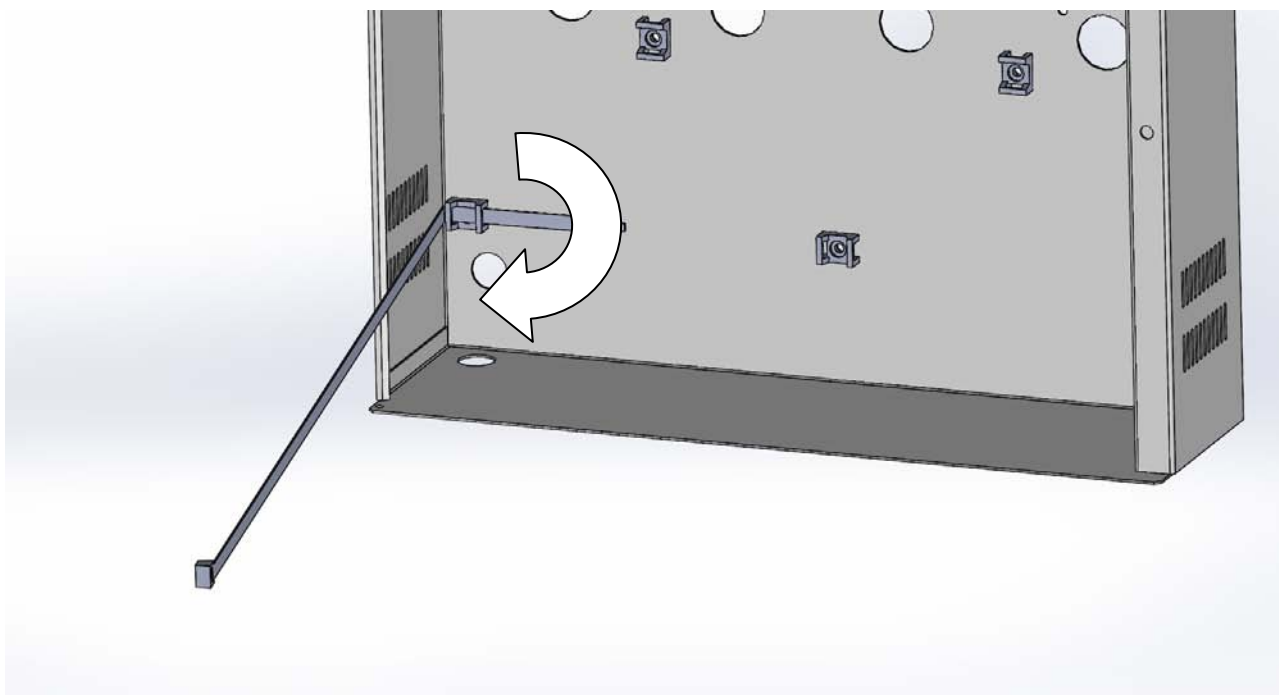
INSTALLATION**Mechanical mounting**

This device has to be mounted on vertical stable walls, suitable to support the power supply, by means of 4 screws with 6mm diameter, for spacers and screws on the 4 holes on the bottom of the box. The battery must be fixed using the strap given within.

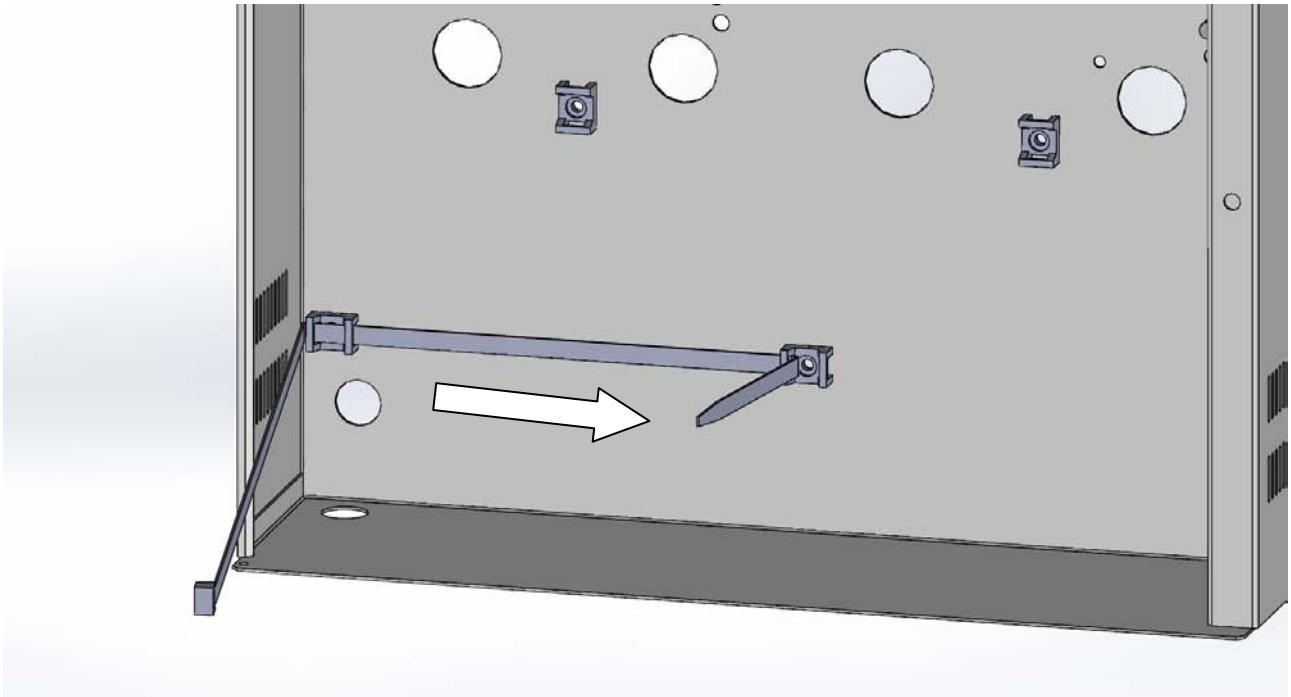
1) Rotate the "screw in tie mounts" in vertical position and insert the tie. Do the same thing on the right side.



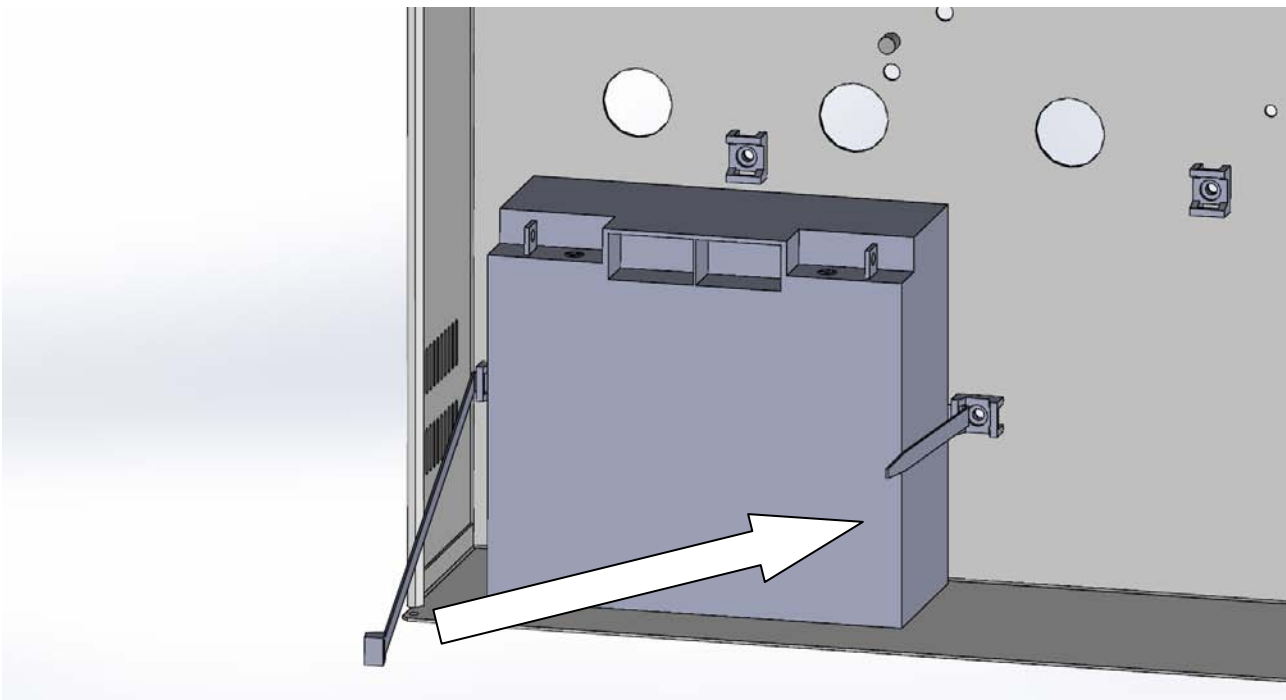
2) Rotate the "screw in tie mounts" in horizontal position. Do the same thing on the right side.



3) Insert the belt in the central "screw in tie mounts". Do the same thing on the right side.



4) Place the battery and then fix the belt. Do the same thing on the right side.



Electrical connection

Connect the power supply unit to the mains 230Vac by use of a differential magneto-thermic bipolar 6A switch (minimum distance between contacts 3mm) aimed to protect the line against possible short circuit and operator against current leakage.

IMPORTANT: use different cables-passes and pipes for ac supplying input (mains 230 Vac) and dc outputs + alarms (SELV) – see Fig. 2

The minimum section recommended for ground connection is 1,5 mm.
For connections refer to Fig. 2. In this figure the following important details are shown:


Output Terminals (Power supply unit)

Output terminal board (power supply)			
BATT +	Positive pole of the battery	B +	Positive output for charge B
BATT -	Negative pole of the battery	B -	Negative output for charge B
A +	Positive output for charge A	C +	Positive output for charge C
A -	Negative output for charge A	C -	Negative output for charge C

Tab 4

Terminal board Alternated Supplying

L connection to mains line (230 Vac)

 Protection ground connection

N connection to neutral

Checks and Adjustments

Control is shown below (VRES1) is adjusted at factory and **must not be altered by the operator.**

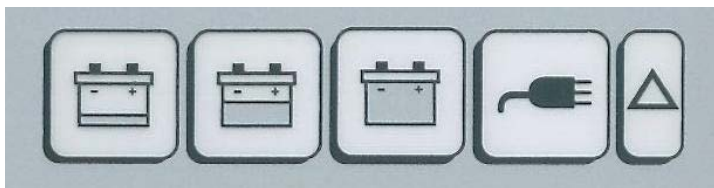
Tampering of this control automatically means the lost of the warranty.

VRES1 - Potentiometer for adjustment of the output Voltage

INDICATION ON THE FRONT PANEL (located on the door of the power supply):

Standard visualization

Fig.1



Battery low or
Battery fuse fault (if flashing)

Battery OK

Battery Overcharged or
Battery resistance high (if flashing)

Mains

Fault

Low battery: battery voltage lower than 20,8 Vdc
battery fuse fault (if flashing)

Battery ok: battery voltage between 20,9 Vdc and 28 Vdc

Overcharged battery: battery voltage over 28 Vdc
Battery resistance high (if flashing)

Mains: presence of 230 Vac mains

Fault : LED of general failure, it is activated in case of:
Absence of 230 Vac mains
Faulty fuse
Loss of battery charge
Low battery
Overcharged battery
Disconnected battery
Battery resistance > 1 ohm

Alternate visualization

Pushing SW2 (Fig. 3) on the display board for less than 2 seconds, the Amp-meter function is activated. The five LEDs bar show, from left to right, the current level supplied to the charges; each LED indicating 1A of current. When the Switch button is pushed again, or after 1 minute, the display go back to the standard visualization.

CONNECTION OF CONTROL BOARD (placed near the power board) Refer to Fig. 2

Relay "MAINS" of mains missing, – Terminals NC, NO, C (operating with SELV Voltages)

Relay output with intervention for missing mains and programmable activation delay

DIP-SWITCH			Delay	EN54-4 Compliant
1	2	3		
OFF	OFF	OFF	25 min	YES (Factory default)
OFF	OFF	ON	15 sec	YES
OFF	ON	OFF	60 sec	YES
OFF	ON	ON	5 min	YES
ON	OFF	OFF	15 min	YES
ON	OFF	ON	60 min	NO
ON	ON	OFF	120 min	NO
ON	ON	ON	240 min	NO

Tab 5

In order to be compliant to the EN54-4 standards, the maximum delay permitted is 30 MINUTES of missing mains. On the contrary the power supply is not compliant to the standards.

Ten seconds after the mains is restored the relays goes back to normal condition.

Relay "FAULT" of failure indication – Terminals NC, NO, C (operating with SELV Voltages)

Output relay failure indication is active for:

- Low battery (voltage lower than 20,8 Vdc)
- Overcharged battery (voltage over 28 Vdc)
- Disconnected battery
- Battery internal resistance > 1 ohm
- Faulty fuse

START UP OF THE SYSTEM

Even if not imperative, the following sequence of connection is suggested:

1. Connect mains and ground to the concerned terminal AC1. Turn ON the AC power. The load LEDs flash and after about 20 seconds the missed battery LED flashes
2. Connect the battery. After 20 seconds the LED switches off
3. Connect the loads: the LEDs, indicating the current supplied, light up

SYSTEM RUNNING

Battery voltage is monitored continuously, if the voltage drops below $V(B)_{low} = 20,8V$, the relay "GUASTO" turns on and the Front panel "Battery Low" lights on.

If the voltage drops below $V(B)_{min} = 19,8V$, the battery is isolated to avoid the deep discharge. After the battery gets unplugged, the battery will be connected to the system if the voltage is higher than 16V.

Battery internal resistance is tested every 2,5 hours, at least. If the resistance is higher than 1 Ohm a warning is raised. The Front Panel LED "Failure" is lighted on, the LED "Overcharged battery" slow flashes and the internal DL1 quick flashes.

Battery Fuse monitoring, in case of fault of the fuse, the LED "Low battery" starts to flash slowly. When the fuse is replaced the signal disappear.

Fuses monitoring, if a fuse became open the LED lights on, when the cause of fault disappears the LED lights off.

Mains monitoring, when the mains is missed, The Front Panel LED "Mains" is lighted off, and the relay "RETE" is activated. When the mains return LED "Mains" is lighted on, and the relay "RETE" is restored.

SERVICING

Periodical programmed servicing must be carried out by qualified personnel in order to prevent the possibility of a malfunctioning of the power supply. It is recommended to carry out servicing every 6 months and to evaluate control panel of the system in order to check possible alarms during tests.

- Check the connections of the 230 Vac supplying lines
- Check the connections of the alarm indication lines and related shields
- Check the battery connections, they have to be well tightened and there must be no oxidation
- Check the output Voltage on the charge (see electrical specifications)

Although the power supply is equipped with a self-diagnosis system carrying out a periodical control of the battery and indicating possible failures, it is suggested to manually check the battery every six months.

- Disconnect the battery and check if the voltage of the power supply is within the values shown.
- After re-connecting the battery, disconnect the primary supplying and check if the battery can maintain the Voltage on the higher 23 Vdc charge. On the contrary, replace battery immediately.
- Check presence of related alarms during tests.

CONTROL BOARD LEDs

The DL1 LED shows the failures:

In case of contemporary presence of more alarms, the LED indication follows the priority shown in the table 6

Priority	DL1	ALARM
1	Slow flashing (1 Hz)	Battery disconnected
2	Quick flashing (4 Hz)	Battery resistance > 1 ohm
3	On fix	Fuse F1 (battery) interrupted
4	Off	None of previous failures

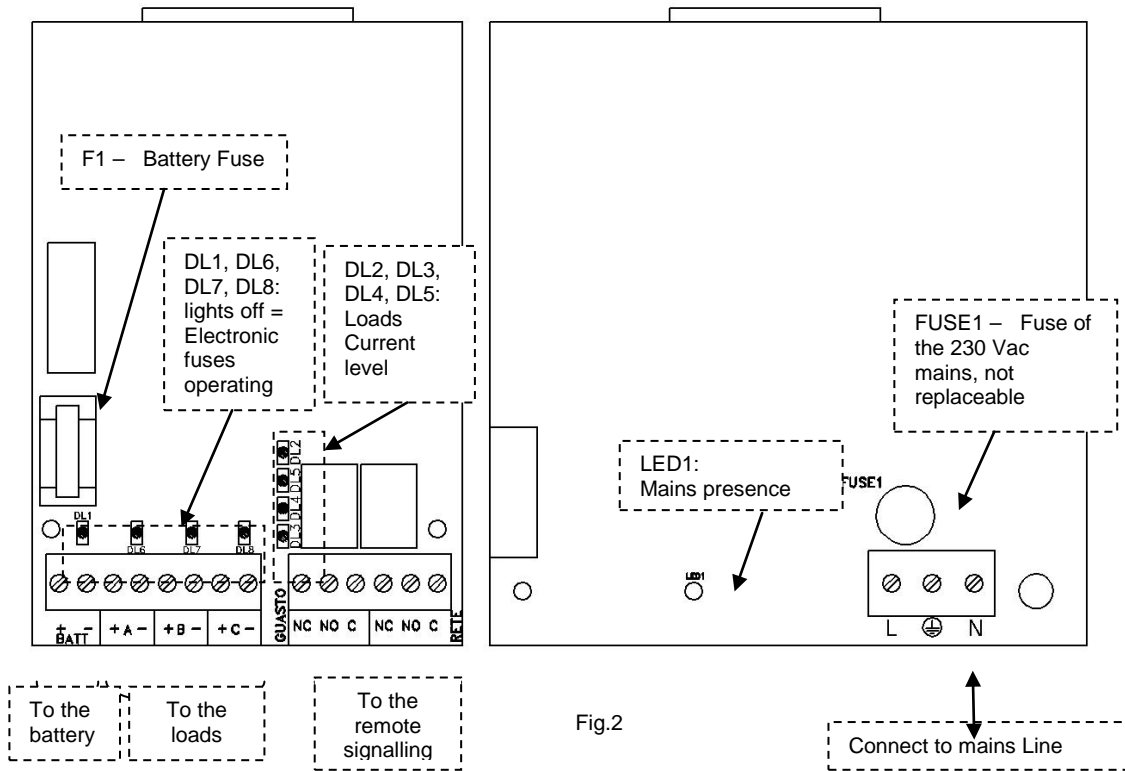
Tab 6

LEDs DL2, DL3, DL4 and DL5 show the current used by the outputs:

Condition	LED Status			
	DL2	DL3	DL4	DL5
$I < 0,3 A$	OFF	OFF	OFF	OFF
$I < 0,625 A$	SLOW FLASH	OFF	OFF	OFF
$0,625 A < I < 1,25A$	ON	OFF	OFF	OFF
$1,25 A < I < 1,875A$	ON	SLOW FLASH	OFF	OFF
$1,875 A < I < 2,5A$	ON	ON	OFF	OFF
$2,5A < I < 3,125 A$	ON	ON	SLOW FLASH	OFF
$3,125 A < I < 3,75A$	ON	ON	ON	OFF
$3,75A < I < 4,375 A$	ON	ON	ON	SLOW FLASH
$4,375 A < I < 5A$	ON	ON	ON	ON
OVERLOAD $I > 5A$	SLOW FLASH	SLOW FLASH	SLOW FLASH	SLOW FLASH

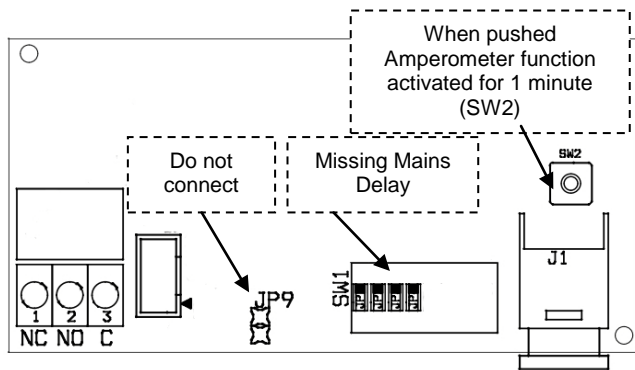
Note: SLOW FLASH = 1 Hz ;

Tab 7

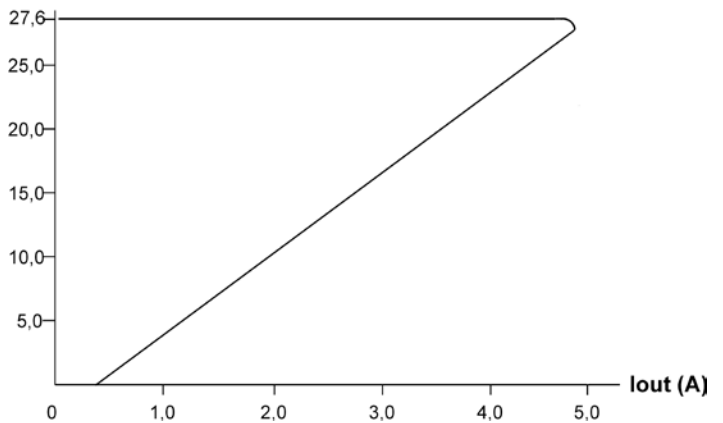


CABLE CONNECTION:

- + - BATT: connect to the backup battery.
- + - A: connect to the load. MAX 1,5A
- + - B: connect to the load. MAX 1,5A
- + - C: connect to the load. MAX 1,5A



Vout (V)



MANUFACTURER DECLARATIONS

The design has been developed according to the internal quality system observing all the rules aimed to reach an adequate design of all the elements of the product. All components of the product have been selected for the expected purposes and their characteristics are assured when the environmental conditions correspond to the conditions required by class 3K5 of EN 60721-3-3:1995

CE
1293
Notifier s.r.l. Via A. Grandi, 22 - 20097 S. Donato Milanese (MI) 15
Dop N.1293 - CPR - 0483
EN 54-4:1997/A2:2006/AC:1999
Power supply equipment for fire detection and fire alarm systems for buildings
ALI50EN



Wasting

This product must be wasted in appropriate wheelie-bin for electric and electronic materials. Do not put in wheelie-bin for other kind of waste.

NOTIFIER ITALIA S.r.l. MILANO - ITALY	Tel. +39 - 02 - 51 897.1 Fax. +39 - 02 - 51 897.30
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