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# AC/DC UPS

## for DIN rail mounting



BAT

USV2

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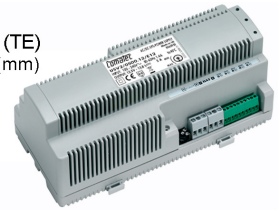
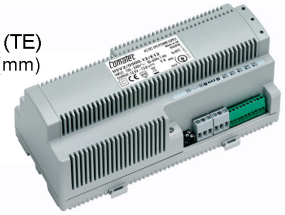
The AC/DC UPS and the power supplies with battery charger of the range USV2 have been particularly developed for the Home Automation Sector, notably for the access control and the security systems. These power supplies are also used in the sectors for which the reliance and the electrical performances have to hold in the time. They are realized in modular cases for the DIN-rail mounting which dimensions respect the DIN directives. This particularity enables the integration of these products in almost all the electrical panels. They are foreseen to operate with a lead-acid battery. The external battery is connected to the product through a clamp.

## Versions available

| Model | Input (Vac) | Output (Vdc) | Current (A) | Capacity (max. Ah) | Modular case (dimensional characteristics) |
|---|---|---|---|---|---|
| **USV2/L/0500.12/E8** | 230 ± 10% | 13,8 ± 3% | 5 | 14 | Case 8M (TE)<br>Dimensions (mm)<br>L 140<br>W 93,0<br>H 66,5  |
| | Switching power supply with double output clamp. One output is dedicated to the load and the other one to the connection of one external battery parallel to the load. Type of battery used: Lead-acid | | | | |
| **USV2/0200.12/E8** | 100 - 240 | 12 ± 3% | 2 | 14 | Case 8M (TE)<br>Dimensions (mm)<br>L 140<br>W 93,0<br>H 66,5  |
| **USV2/0100.24/E8** | 100 - 240 | 24 ± 3% | 1 | 14 | Case 8M (TE)<br>Dimensions (mm)<br>L 140<br>W 93,0<br>H 66,5  |
| | AC/DC UPS with double output clamp. One output is dedicated to the load and the other one to the connection of one external battery. Intelligent management of the operation and loading parameters Type of battery used: Lead-acid | | | | |
| **USV2/0500.12/E12** | 100 - 240 | 12 ± 3% | 5 | 14 | Case 12M (TE)<br>Dimensions (mm)<br>L 210<br>W 93,0<br>H 66,5  |
| **USV2/0300.24/E12** | 100 - 240 | 24 ± 3% | 3 | 14 | Case 12M (TE)<br>Dimensions (mm)<br>L 210<br>W 93,0<br>H 66,5  |
| | AC/DC UPS with double output clamp. One output is dedicated to the load and the other one to the connection of one external battery. Intelligent management of the operation and loading parameters. Auxiliary outputs on clamp for the remote control of the operation parameters.Type of battery used: Lead-acid | | | | |

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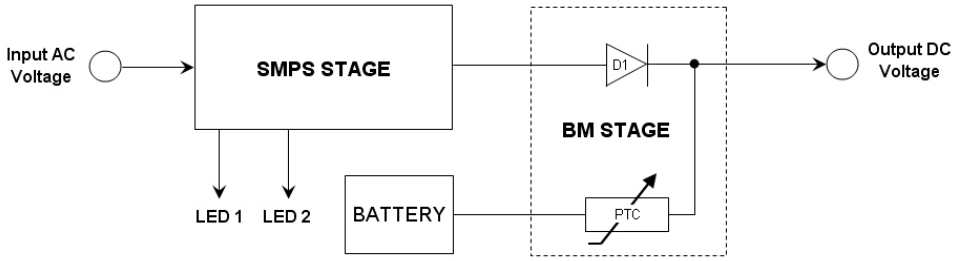
## Main characteristics

| | |
|---|---|
| Safety standard / EMC standard / CE Directives | EN60950 / EN55022B / 2006-95-ECC 89-336 |
| Case for DIN-rail mounting in plastic material | ABS+PC UL-V0 color clear grey RAL 7035 |
| Operation temperature | Continuous service from -10°C to +40°C |
| Relative humidity | 5 ÷ 90 % |
| Signalling operation | Led |

## Technicals characteristics: USV2/L.0500.12/E8

This model is simplified versions of the range USV2: the plug battery is connected in parallel with the output.




The **SMPS** stage is a switching mode power supply equipped with a plug battery in parallel that supplies a permanent output voltage of 13,8Vdc. Regarding this power supply, we use a quasi-resonant Flyback converter that improves emissions behavior and efficiency.
The output regulation is obtained by a voltage and current regulator IC placed in the primary side. It can control both the output voltage and the Maximum Current Control Loops. For I.OUT < I.MAX, the Voltage Loop gets priority; if the supply operates in the over-current protection mode, the Current Loop is active and reduces the output voltage with constant output power PMAX (up to short-circuit).
The **BCM** stage is a simple passive network that connects the battery to the main output, during the power-fail operation mode, by using a polyswitch. During the normal operation mode, a diode connects the power supply to the output and to the battery, charging it with a two-step algorithm :

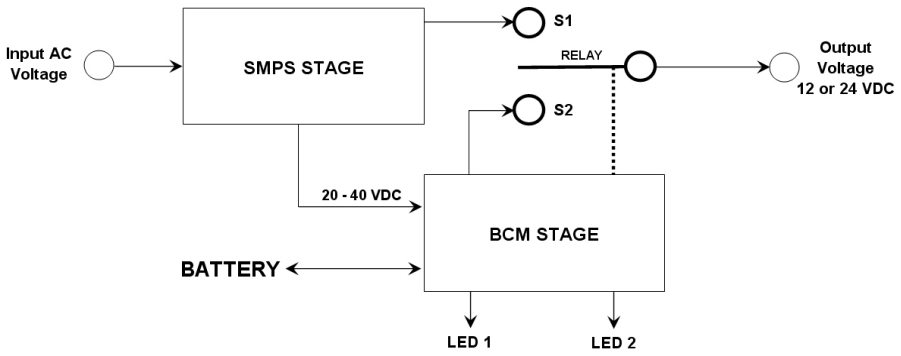
- **Constant current**: the current is constant and the voltage rises slowly up to VBLK. The current value depends on the battery internal impedance and on the load on the main output. For No-load conditions and with a battery full discharged, the current may reach about 600mA.

- **Constant voltage**: the voltage is constant to VFLT and the current falls up to a few mA.

## Technicals characteristics: USV2/0200.12/E8 – USV2/0100.24/E8 – USV2/0500.12/E12 – USV2/0300.24/E12

UPS with output in continuous current. These models are characterized by two main stages:

- **SMPS** :Switching mode power supply
- **BCM** :Battery charger and management



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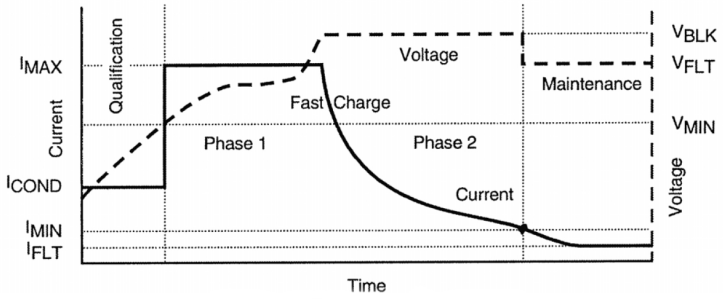
The **SMPS** stage is a switching mode power supply equipped with two outputs. The first that is the main one, supplies a voltage of 12,4Vdc or 24,8Vdc (this depends on the models proposed). The second output is an auxiliary one for the **BCM** stage that supplies a voltage between 20 and 40Vdc, depending on the models proposed. Regarding this power supply, we use a quasi-resonant Flyback converter that improves emissions behavior and efficiency.
The output regulation is obtained by a voltage and current regulator IC placed in the primary side. It can control both the output voltage and the Maximum Current Control Loops. For I.OUT < I.MAX, the Voltage Loop gets priority, if the supply operates in the over-current protection mode, the Current Loop is active and reduces the output voltage with constant output power PMAX (up to short-circuit).
The **BCM** stage controls the battery during the charge phase and during the power-fail condition, charging it with a two-step algorithm. This algorithm is controlled by a DC/DC converter and a power MOSFET.
The **BCM** stage starts a charge cycle when power is applied. This first step is the Pre-charge Qualification. The BCM stage carries out two controls on the battery. In test 1, it regulates the voltage of VFLT + 0,25V across the battery and observes ISNS. If ISNS does not rise to at least ICOND within a time-out period (e.g. the cell has failed short), the BCM enters the Fault State.
If test 1 passes, the BCM than regulates current to I.COND = IMAX/5 and observes V.CELL (V.BAT - V.SNS). If V.CELL does not rise at least VFLT within a time-out period (e.g. the cell has failed short), again the BCM enters the Fault State.
If the second test passes, the BCM begins the charging phase. During the charging, a two-step algorithm is performed, that consists in 3 phases :

- Constant current: the charging current is limited at I.MAX until the cell voltage rises to V.BLK.
- Constant voltage: the charging voltage is regulated at VBLK until the charging current drops below I.MIN.
- Maintenance: the charging voltage is regulated at VFLT and charge current is limited (below I.MIN).




During the power-fail condition, the PMOS is open and the battery is connected to the main output by a relay. The protection of the battery is provided in two different ways:

- A polyswitch protects the battery from short-circuit or overload conditions.
- The Relay Control Circuitry disconnects the battery if the voltage drops below a threshold value.

The two main stages **SMPS** e **BCM** are connected to the main output by a relay with two contacts. When the input power is present, the SMPS output is connected to the main equipment output by the first contact; the battery is disconnected but loaded by the BCM stage. During the power-fail condition, the battery is connected to the main output by a second contact, the SMPS stage is disconnected.

### Models USV2.0500.12.E12 and USV2.0300.24.E12

These models are identical to the ones described above. They have a circuit for the remote control of the function and charge parameters. The signalling outputs are placed on five clamps. Signalling operation condition: Battery in charge, Presence main voltage, Presence output voltage, Low battery voltage and Maintenance charge