



The AC/DC UPS and the power supplies with battery charger of the range MODUSV 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.

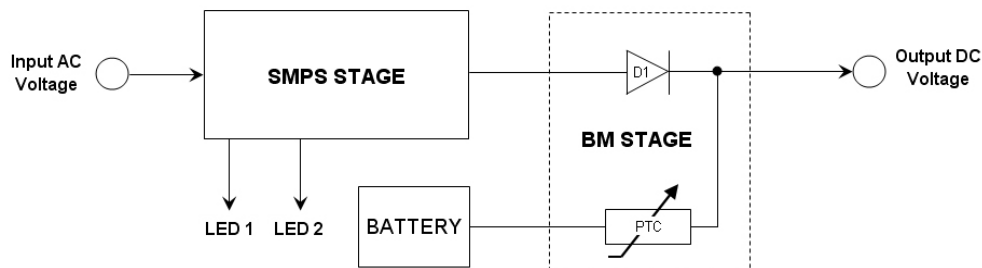
3 versions are proposed:

- **MDL:** Power supply with battery in parallel.
- **MDS:** version with battery management.
- **MDM:** version with battery management and remote control.

## MDL version datasheet

Input	230 Vac +/- 15 %	50/60Hz
Output	13,8 Vdc 5A , or 27,6 Vdc 3A	
Type of pb hermetic battery	7Ah / 12VDC or 24VDC	
Service condition	Continious	
Signalling operation	Led	
Operation temperature	-10°C + 40°C	
Relative humidity	5 ÷ 90 %	
Plastic case	ABS+PC UL-V0	
Case colour	Grey RAL 7035	
Safety standard	EN60950 – 2006/95/ECC 89/336	
Standard EMC	EN55022/B – EN55024	

This version is simplified versions of the range MODUSV: 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  $P_{MAX}$  (up to short-circuit).

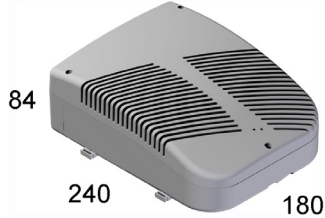

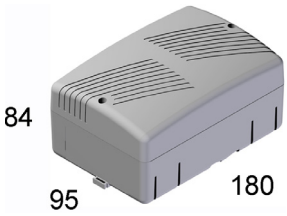
The **BM** stage is a simple passive network that connects the battery to the main output, during the power-fail operation mode, by using a polyswitch. During the normal operation mode, a diode connects the power supply to the output and to the battery, charging it with a two-step algorithm :

- **Constant current:** the current is constant and the voltage rises slowly up to  $V_{BLK}$ . 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  $V_{FLT}$  and the current falls up to a few mA.



## MDL version – Standard products

Models	Input (Vac)	Output (Vdc)	Current (A)	Capacity (Ah)	Note	Dimensions ( mm )
MDL/0500.12	230	13,8	5	7	*	 <p>84 240 180</p>
MDLB/0500.12	230	13,8	5	7	**	
MDL/0300.24	230	27,6	3	14	*	 <p>84 335 180</p>
MDLB/0300.24	230	27,6	3	14	**	
MDB/CASE12V	CASE FOR THE AUTONOMY EXTENSION FOR THE 12 V MODEL *					 <p>84 95 180</p>
MDB/12V7AH	CASE FOR THE AUTONOMY EXTENSION FOR THE 12 V MODEL **					

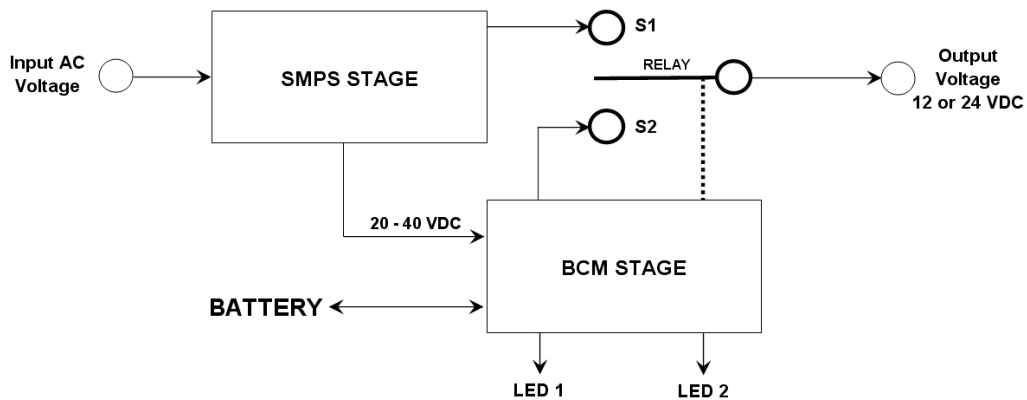
NOTE: \* WITHOUT 12 V - 7 Ah BATTERY \*\* WITH 12 V - 7 Ah BATTERY

## MDS version datasheet

Input	100 à 240 Vac ± 15 %. 50 / 60 Hz
Output	12 Vdc – 5 A or 24 Vdc – 3 A
Type de batterie au plomb étanche	7 Ah / 12 Vdc or 24 Vdc
Service condition	Continuous
Signalling operation	Led
Operation temperature	-10°C + 40°C
Relative humidity	5 ÷ 90 %
Plastic case	ABS+PC UL-V0
Case colour	Grey RAL 7035
Safety Standard	EN60950 – 2006/95/ECC 89/336
Standard EMC	EN55022/B – EN55024

UPS with output in continuous current. This version is characterized by two main stages:

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



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  $P_{MAX}$  (up to short-circuit).

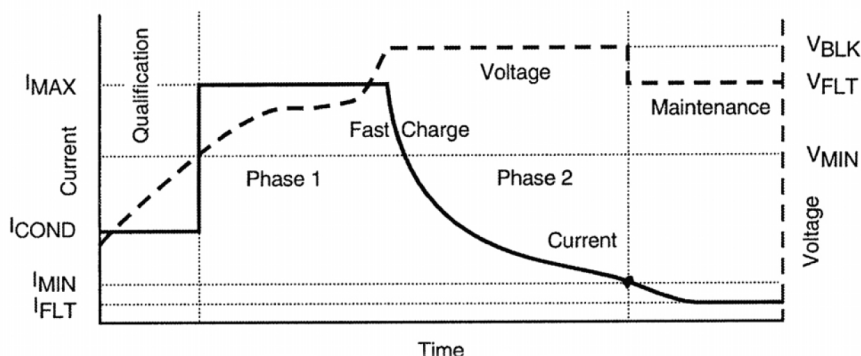
The **BCM** stage controls the battery during the charge phase and during the power-fail condition, charging it with a two-step algorithm. This algorithm is controlled by a DC/DC converter and a power MOSFET.

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  $V_{FLT} + 0,25V$  across the battery and observes  $I_{SNS}$ . If  $I_{SNS}$  does not rise to at least  $I_{COND}$  within a time-out period (e.g. the cell has failed short), the BCM enters the Fault State.

If test 1 passes, the BCM then regulates current to  $I_{COND} = I_{MAX}/5$  and observes  $V_{CELL}$  ( $V_{BAT} - V_{SNS}$ ). If  $V_{CELL}$  does not rise at least  $V_{FLT}$  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  $V_{BLK}$  until the charging current drops below  $I_{MIN}$ .
- Maintenance: the charging voltage is regulated at  $V_{FLT}$  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.

## MDM version

This version is identical to the version 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

## MDS and MDM versions – Standard products

Models	Input (Vac)	Output (Vdc)	Current (A)	Capacity (Ah)	Note	Remote control	Dimensions ( mm )
MDS/0500.12	100-240	12	5	7	*	No	
MDM/0500.12	100-240	12	5	7	*	Yes	
MDSB/0500.12	100-240	12	5	7	**	No	
MDMB/0500.12	100-240	12	5	7	**	Yes	
MDS/0300.24	100-240	24	3	14	*	No	
MDM/0300.24	100-240	24	3	14	*	Yes	
MDSB/0300.24	100-240	24	3	14	**	No	
MDMB/0300.24	100-240	24	3	14	**	Yes	
MDB/CASE12V	CASE FOR THE AUTONOMY EXTENSION FOR THE 12 V MODEL *						
MDB/12V7AH	CASE FOR THE AUTONOMY EXTENSION FOR THE 12 V MODEL **						

NOTE: \* WITHOUT 12 V - 7 Ah BATTERY \*\* WITH 12 V - 7 Ah BATTERY

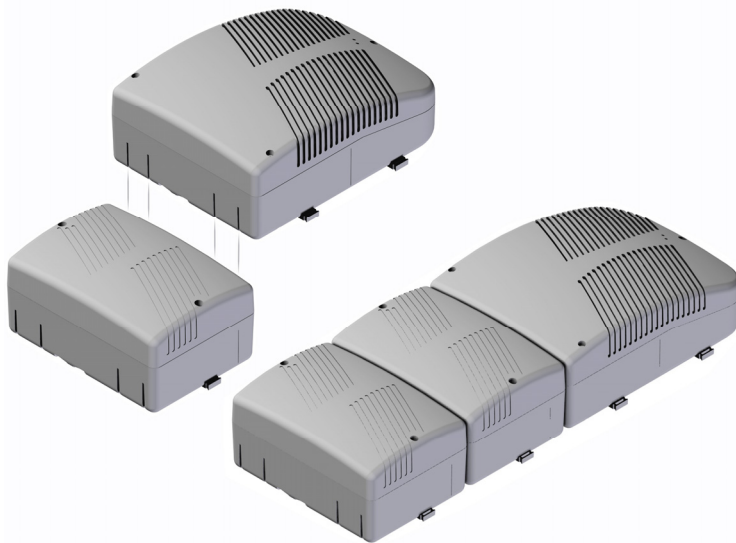
### Case mounting and connections

**MODUSV** has been developed for the Din-Rail mounting but also for the frame mounting. In this case a fixing set composed of dowels and screws is provided. What regards the wall mounting, 6 mounting holes are foreseen. For a correct mounting it's sufficient to use 4 holes : 2 on the upper part of the case and 2 on the lower one. The choice is the one of the installer.

**MODUSV** has been developed to give the opportunity to the installers to realize professional and reliable connections. Several connections are possible and this on several faces of the case.



### Installation of supplementary batteries in order to increase the autonomy



A case in plastic UL-VO containing 1 battery 12 V 7 Ah has been developed to enable the connection to the main case, the one containing MODUSV, of 1 or more batteries in order to increase the autonomy during the power-fail operation mode.



*All specifications are subject to change without notice  
 Technische Änderungen vorbehalten*

*Nous nous réservons le droit de modifier les caractéristiques techniques sans préavis*

*Ci riserviamo il diritto di modificare le caratteristiche tecniche senza preavviso*

*Nos permitimos de modifica las características técnicas sin preaviso*