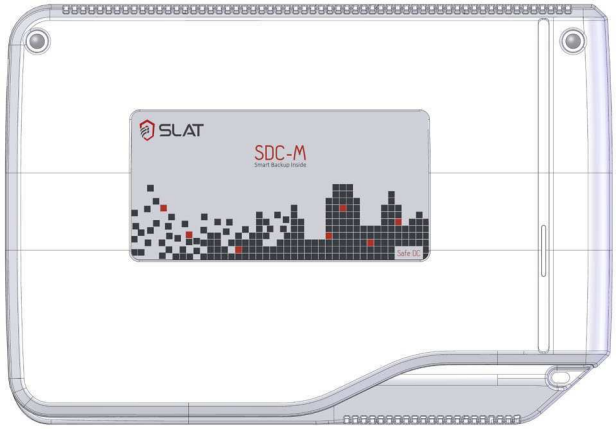
Safe DC SDC-M

Micro-UPS DC



SDC-M 12 V-24 V-48 V

BOX2

RS

Modbus / BACnet MS/TP

EN Operating Instructions

MAN160005 | Ba | 2021.04

1. Safety

These operating instructions contain all the instructions to follow in order to install, commission and operate the **SDC-M** Uninterruptible Power Supply. It is recommended to follow them very carefully to ensure an optimum functioning of the product.
It is vital to read the Safety Precautions before installing or operating this product.

Safety Precautions:

SDC-M is a Micro-UPS DC designed to be connected to the public 110 V / 240 V mains network. It must not be installed outdoors. It ensures continuity of service for equipment in case of power failure. The lithium - ion backup function is integrated into the product.

- An easily accessible two-pole circuit-breaker must be provided upstream.
- To avoid any risk of electric shock, all **INTERVENTIONS** must be carried out with the equipment **SWITCHED OFF** (upstream two-pole circuit-breaker open).
- Interventions with the equipment switched on are authorized only when it is impossible to switch the equipment off. The operation must only be performed by qualified personnel.
- During installation, connect the ground wire first and disconnect it last when dismantling.
- The equipment is only designed to be fixed to a wall or to be used in an enclosure with restricted access (IP30 control cabinet), and to be installed on a concrete surface or any other non-combustible surface.
- The product can be installed horizontally or vertically.
- Sufficient convection must be guaranteed (minimum top and bottom clearance space 30 mm).
- The wires must be dimensioned and protected according to the maximum input/output current (≥ 0,15 mm^2).
- Observe the thermal and mechanical limits.
- For prolonged storage or disconnection, switch off the mains then press the stop button back-up function. (see on Figure 4.3 in chapter 4.4: Disconnect backup push-button)
- The backup is maintenance-free. Do not open it.

2. Directives and environment and public health protection

The SLAT company and its product comply with directives and are committed to protecting the environment and public health.

SLAT manufactures all its products in accordance with RoHS and WEEE environmental directives.

SLAT products are qualified by CE. The CE mark dates back to 2011.

CE

3. General information

3.1 The company

To meet its customers' requirements more effectively:

- SLAT has been designing and manufacturing all its products in accordance with the ISO 14001 standard v15.
- SLAT recycles its products at the end of their life cycle, by means of its recycling program. (For end-of-life recycling, the backup can easily be removed by qualified professionals independent from SLAT.)

3.2 Purpose of the document

The operating instructions provide the information necessary for the positioning, the connection, the configuration and the operation of the **SDC-M** equipment.

Theses instructions are also available in PDF format in MySlat at www.slat.com.

3.3 Related documentation

The following documents are associated with these operating instructions:

- Installation manual
- Commercial brochure
- Datasheet

This documentation is available at www.slat.com.

3.4 Intended audience

The operations described in this document should be performed only by authorized trained staff.

3.5 Indicator labels

This document comprises three types of important notices.
The type of notice informs you of the potential consequences in the case of non-compliance with the instructions.
These consequences are not exhaustive and are sorted in order of ascending risk:

IMPORTANT REMARK!

Contains additional information. Non-compliance will not cause damage to equipment or personal injuries.

CAUTION!

Equipment and goods can be seriously damaged or people seriously injured if the precautions for use are not followed.

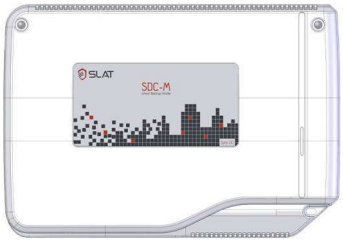
DANGER!

Non-compliance may result in serious injury or death.

4. The product

4.1 Description

Micro-UPS with lead and cadmium-free "Smart Backup Inside" with very long service life.



SDC-M are communicating Micro **UPS** (**U**ninterruptible **P**ower **S**upply) of the Safe DC range dedicated to Smart Building applications. They ensure the continuity of service of the equipment they supply and maintain communication with the supervisor in the event of a power failure.

Main functions

- Keeps control of the Smart Building in case of a power failure or glitch.
- Filters electromagnetic disturbances.
- Avoids the reporting of false alarms to the supervisor due to network glitches.
- Delivers a constant voltage to equipment.
- For the BOX2 55 W version the output voltage can be adjusted using a potentiometer.
- Choice of configuration in either Modbus or BACnet MS/TP via the website www.slat.com.

Built-in functions

- Operates in power-saving mode when the backup is charged.
- Micro stealth mode with controllable operational maintenance.
- Indicates the % of remaining autonomy.
- 2 SDC-M can be configured (not for 48V) in parallel without accessories for an increase in power, in backup duration or a 100% redundancy.
- Provides selectivity of electrical protections of the equipment.

Benefits of the SDC-M range

- Ultra-compact / Plug and Play, parallel configuration without accessories.
- Performs self-diagnostic and that of its environment.
- Lead-free, cadmium-free backup, 100% recyclable.
- Service life of more than 10 years.

4.2 Operating principle

When the network is operating, the emergency power supply SDC-M stores energy and continuously powers the load.
When the mains fail, the built-in emergency supply continues to provide power to the load.
in the event of a complete discharge, the recharging time to 100% of the backup will in any case be less than 20 hours of mains presence.

4.3 Schematic diagram

The visual below shows the product diagram when installed:

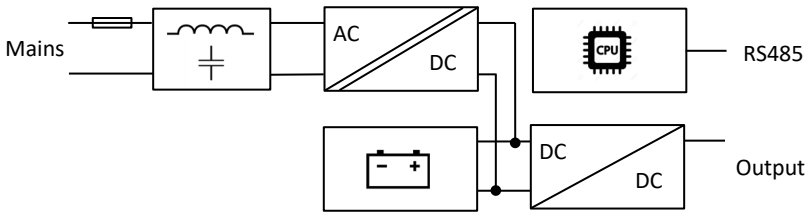


Figure 4.1: Schematic diagram

4.4 Product view

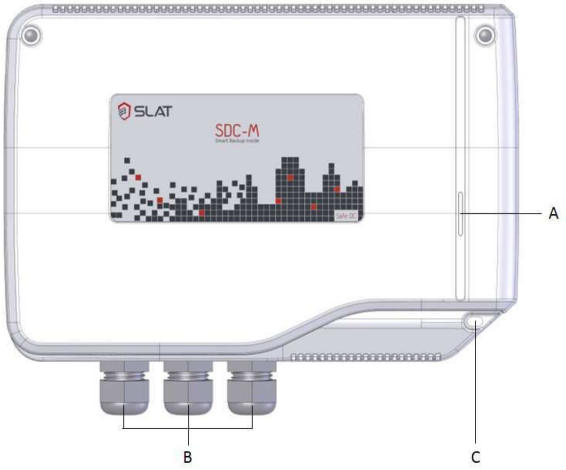


Figure 4.2: Front view

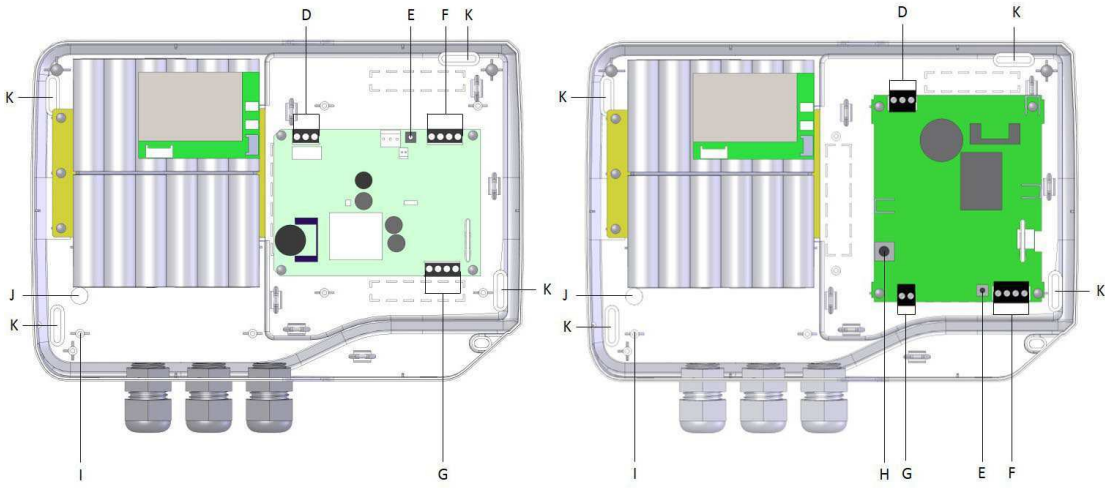


Figure 4.3: Interior view (left 30 W; right 55 W)

	Name	Use
A	Status light (LED)	The light indicates the product status (see chapter 8.1).
B	Cable gland	The cable glands can be used to pass the cables to the inside of the product.
C	Security seal hole	Hole for installing a security seal on the box
D	Mains input	Mains input
E	Disconnect backup push button	The push button is used to switch off the power supply once the mains power is cut.
F	RS485 communication + alarm report	Communication uses an RS485 serial connection and the Modbus or BACnet MS/TP protocol to retrieve detailed product information (see chapter 8.2.2). The alarm report output is an open collector dry contact that indicates whether there is a fault on the product (see chapter 8.2).
G	Output	User voltage output
H	Output voltage adjustment potentiometer	The potentiometer (for the 55 W version) allows to adjust the user output voltage (see Table 10.7).
I	Tamper switch well	The well can be used to install the box opening and tamper detection switch (optional).
J	Tamper switch screw hole	The hole is intended for the tamper detection screw (optional).
K	Fixation holes	Holes to fix the product to the wall.

Table 4.1: Elements on the product faces

4.5 Available references

The list of available product references is to be found at www.slat.com.

The references are designed as follows:

SDC- M 12V 3 D BOX2 RS
① ② ③ ④ ⑤ ⑥ ⑦

	Meaning
1	Range name
2	Application type
3	Output voltage [12 V / 24 V / 48 V DC]
4	Power range [2 → 30 W; 3 → 55 W]
5	Backup type [D, G] (see Table 5.1)
6	Box type
7	Type of communication port

Table 4.2: Meaning of the references

4.6 Scope of delivery

The product is delivered with three cable glands, three rubber grommets and its installation manual.

4.7 Associated products

A setup cable is available with the following reference:

A **SETUP KIT SAFE DC RS**

A cover opening and tamper detection kit (switch and screw) is available with the following reference:

A **SWITCH BOX PROTECTION**

5. Energy storage

5.1 Available storage option

SLAT products are combined with batteries or backup systems. They are used as emergency supplies in the event the mains voltage disappears. The available autonomy then depends on the capacity of the built-in backup.

In the **SDC-M** the backup system is already built-in (Smart Backup Inside). According to the need, the product is fitted with different backups. For the BOX2 version of the SDC-M, four backup packs are available:

Backup D	Backup G
20 Wh	80 Wh

Table 5.1: Backup options

5.2 Technology

The technology behind the SDC-M backup is Lithium-Iron-Phosphate ($LiFePO_4$). $LiFePO_4$ has the best safety characteristics of any Lithium storage system (see Figure 5.1). This includes better resistance to impacts and extreme temperatures.

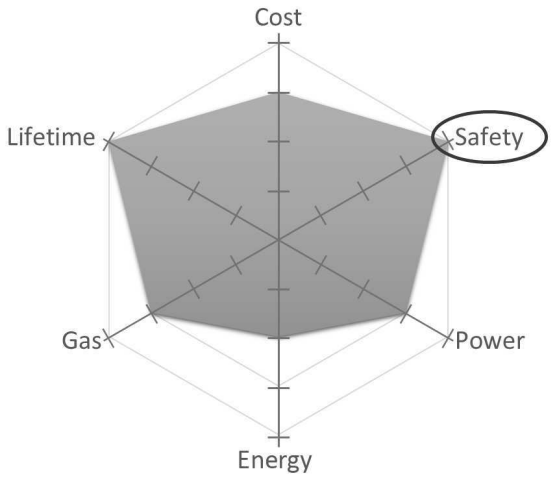


Figure 5.1: LiFePO4 characteristics

All SDC-M backups have the following characteristics:

- Lithium-Iron-Phosphate technology ($LiFePO_4$)
- No risk of thermal runaway
- Storage: 9 months without recharging
- 10 year service life @ 25°C
- Lead-free, cadmium-free, 100% recyclable

5.3 Autonomy curves

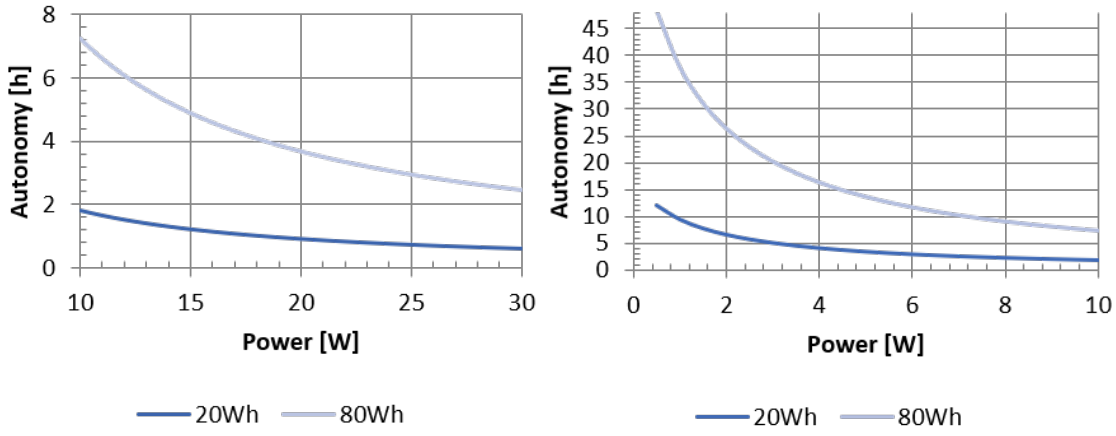


Figure 5.2: Autonomy curves [30 W]

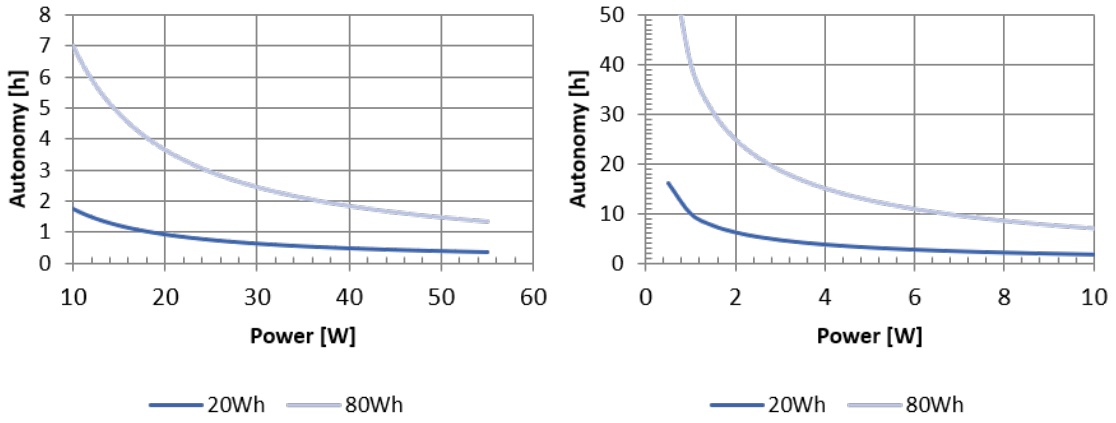


Figure 5.3: Autonomy curves [55 W]

5.4 Autonomy duration

	Backup D	Backup G
Operating power	**Autonomy expressed in hours and minutes**	
5 W	3h23	13h35
7 W	2h32	10h08
10 W	1h48	7h15
15 W	1h13	4h53
20 W	0h55	3h40
25 W	0h44	2h56
30 W	0h36	2h27

Table 5.2: Autonomy vs Power vs used Backup [30 W]

	Backup D	Backup G
Operating power	**Autonomy expressed in hours and minutes**	
5 W	3h10	12h40
7 W	2h24	9h36
10 W	1h46	7h02
15 W	1h13	4h49
20 W	0h55	3h40
25 W	0h44	2h56
30 W	0h37	2h27
35 W	0h32	2h06
40 W	0h28	1h50
45 W	0h25	1h39
50 W	0h22	1h28
55 W	0h20	1h20

Table 5.3: Autonomy vs Power vs used Backup [55 W]

5.5 Self-discharge

The self-discharge current for the SDC-M is:

- 70 mA for 30 W
- 60 mA for 55 W

6. Installation

6.1 Positioning / Installation on support

The product must be installed according to the EN 62368-1 standards.

The product is installed and wired with the cover off. The cover must be removed by first unscrewing the two cover retaining screws (see Figure 4.2) with a screwdriver (captive screws).

Cable routing selection and preparation:

The intended wiring/cable routing must be considered before the product is secured to its installation location. Cables can be routed either from underneath the unit or from the rear (see Figure 6.1, Figure 6.3 and Figure 6.4), depending on how the cables exit the wall. The installation is different depending on the cable configuration.

CAUTION!

To avoid breaking the box, remove the pre-cut knockouts for cable entry using a screwdriver placed according to the indications and arrows in the corresponding figure!

CAUTION!

To avoid damaging the battery or the board, remove the pre-cut knockouts for cable entry from the inside out!

- Routing from below
  If the cables arrive from underneath the box, use the three cable routing holes in the bottom of the box. The BOX2 unit features pre-cut knockouts for cable entry. To open these entries, use a screwdriver to knock them out from the inside out. Position the screwdriver and apply pressure in the bottom of the groove, as shown by the arrows in Figure 6.1.

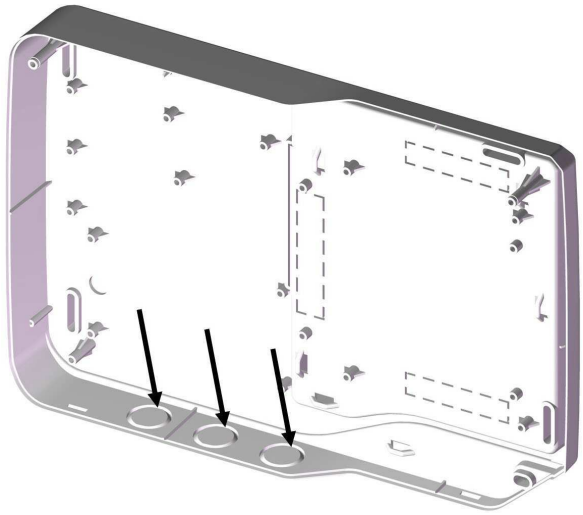


Figure 6.1: Routing cables from below

Once the holes have been opened, the three cable glands or the rubber grommets supplied with the box can be installed. Figure 6.2 shows how the cable glands are to be positioned once installed.

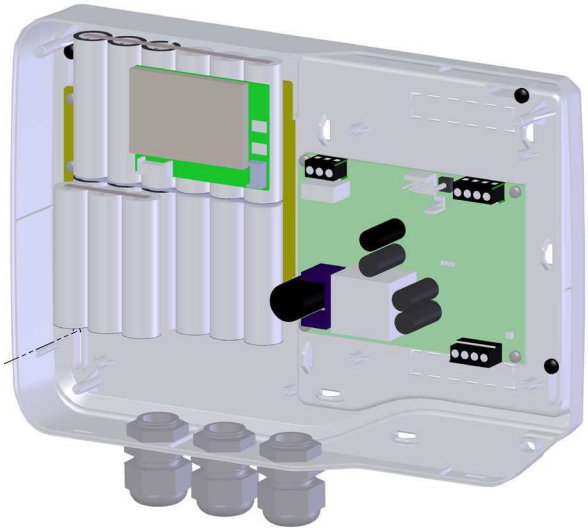


Figure 6.2: Cable gland installation

- Routing from the rear

  If the cables enter the box from the rear, use the cable routing openings provided on the back of the box. The BOX2 unit features pre-cut knockouts for cable entry. To open these entries, use a screwdriver to knock them out from the inside out. Position the screwdriver and apply pressure in the groove towards the centre of the product, as shown by the arrows in Figure 6.3 and Figure 6.4.

  - 30 W board

    If the unit is equipped with a 30 W board, the two pre-cut openings (upper and lower) in the back of the box must be removed (see Figure 6.3).

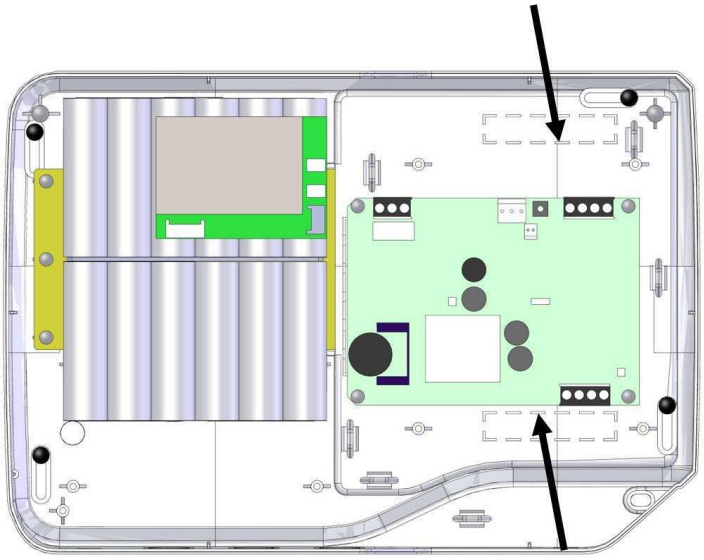


Figure 6.3: Cable entry from the rear [30 W]

- 55 W board
  If the unit is equipped with a 55 W board, the two pre-cut openings (upper and left) in the back of the box must be removed (see Figure 6.4).

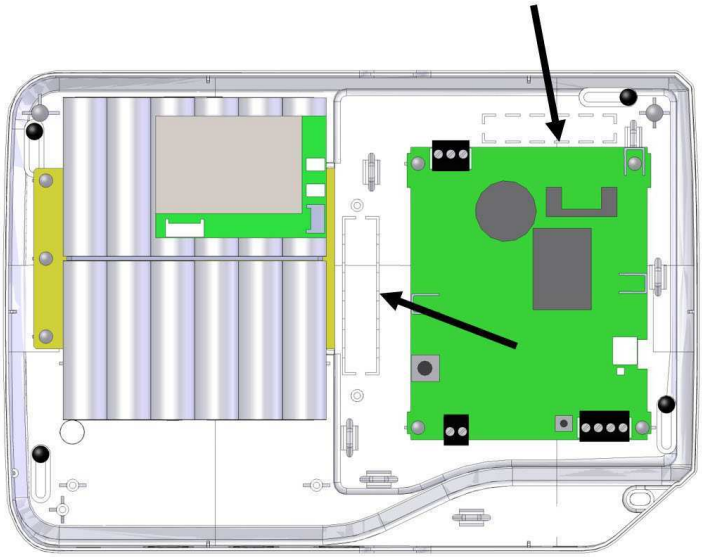


Figure 6.4: Cable entry from the rear [55 W]

The unit can be installed on its location once the cable routing holes have been opened.

Assembly instructions

The BOX2 is designed to be fastened to a wall or to be used in a restricted access location. If the cables are to enter the box from the rear, route the cables through the openings at the back when fastening the box to the wall. Secure the box to the wall using 4 screws, as shown in Figure 6.5.

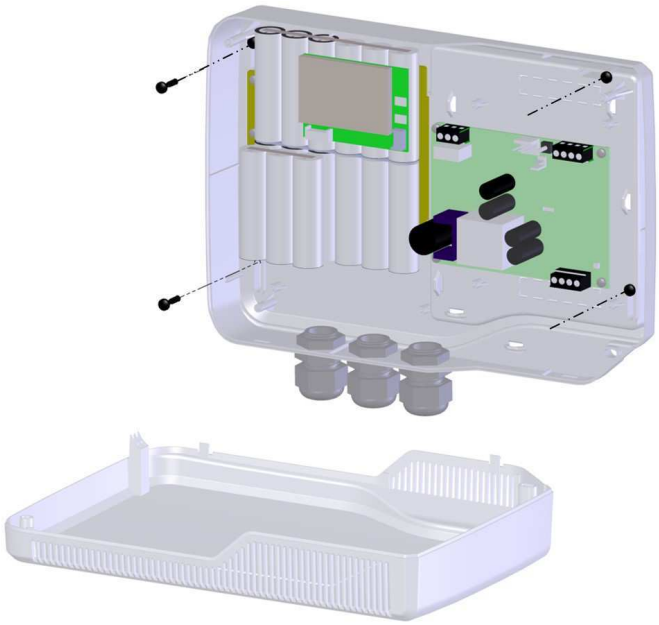


Figure 6.5: Screw mounting

Figure 6.6 shows how the box must be positioned on the wall once assembled.

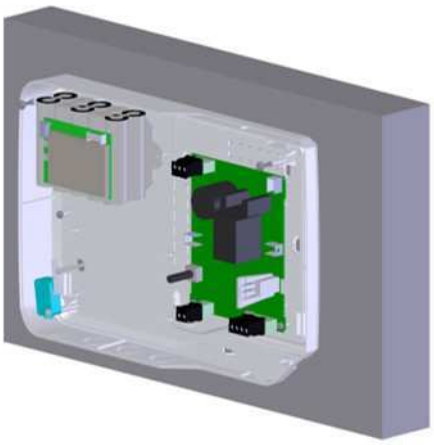


Figure 6.6: Wall mounting

Two protective devices are available to ensure product security. The unit can be sealed with a security seal to detect unauthorised opening of the cover (see Figure 4.2).

A tamper detection switch option is also available (see chapter 4.7). This switch informs the supervisor in the event the unit is torn from the wall or the cover is opened. It can be mounted in the lower left-hand corner using the designated well and pre-cut hole (see Figure 4.3).

6.2 Connection

6.2.1 Connection specifications

Mains		0.75 mm² … 2.5 mm²
User output		0.75 mm² … 2.5 mm²
Communication/ alarm report		0.2 mm² … 2.5 mm²
Length to be stripped		7 mm
Tightening torque		0.5 Nm … 0.6 Nm
Connections	30 W	Screw terminals
	55 W	Plug-in connectors

Table 6.1: Connection specifications

DANGER!

The wire sectional area must be chosen according to the operating current.

6.2.2 Wiring

Before doing the wiring, the cable routing has to be chosen and prepared during the installation step (chapter 6.1).

Routing from behind
The cables pass through the entries on the back of the product which have been knocked out beforehand (see Figure 6.3 and Figure 6.4).

Routing from below
The cables pass through the cable glands or rubber grommets mounted on the product beforehand (see Figure 6.2; only one cable per cable gland).

After installing the product on its support, the wiring must be carried out. In this way the emergency power supply (the product) is connected with the application, the control point and the mains.
Indications have been placed on the board (next to, above or below the connectors) to indicate the name of the signal / wire so as to facilitate connection. Furthermore, a label with information regarding the wiring has been attached on the cover's underside.

Wiring of the 30 W board

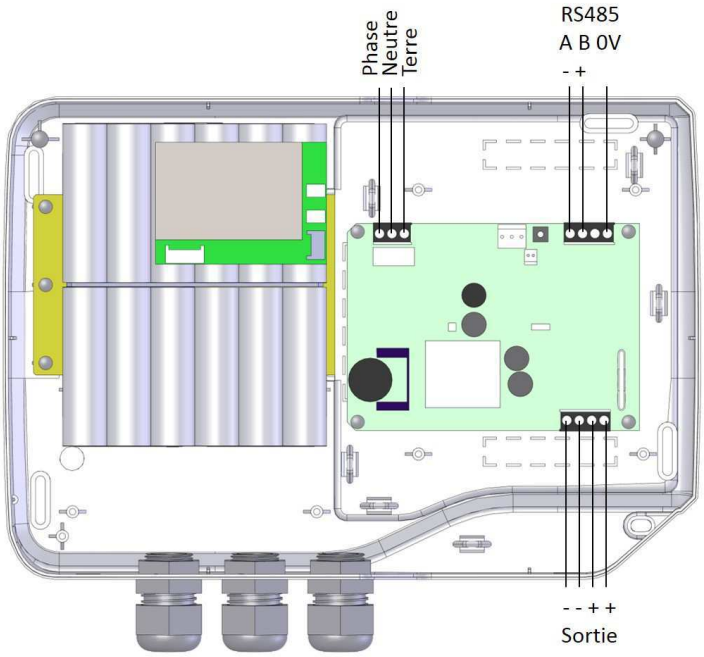


Figure 6.7: Wiring [30 W]

Wiring methods

All the wires are attached to the product using a screw terminal (see Figure 6.7). They have to be connected following the information indicated on the figure above, using a regular screwdriver.

CAUTION!

To avoid breaking the screw terminal, comply with the screw tightening torque indicated in Table 6.1.

CAUTION!

To avoid wiring mistakes, make a careful note of the positioning of the screw terminals and their respective indications.

Connection

DANGER!

To connect the wires, the application must be switched off. The upstream circuit-breaker of the application must be open!

The wires are connected according to the following steps:

1. Connect the emergency power supply to the application
   The product is connected to the application by the four-point screw terminal located on the bottom right. The initial output voltage is set to the rated value

2. Connect the RS485 communication cable and the alarm report contacts
   The four-point screw terminal located on the top right provides the connection to an external PLC or computer.
   - To allow RS485 communication the wires must be connected to the **A**, **B** and **0V** contacts.
   - To connect the alarm report, the wire must be connected to the 3rd contact (with the indication on the pc-board "FAULT").

3. Connect the power supply to the mains
   Connect the following three wires to the three-point screw terminal (top left) respecting their position.
   - Ground wire
   - Neutral wire
   - Line wire

DANGER!

Before connecting the power supply to the mains, the ground wire must be connected!

After connecting the ground wire, the neutral and line wires can be connected.

Once the connections have been made, the upstream circuit-breaker can be closed. To complete the installation, the LED status must be verified to be green.

Wiring of the 55 W board

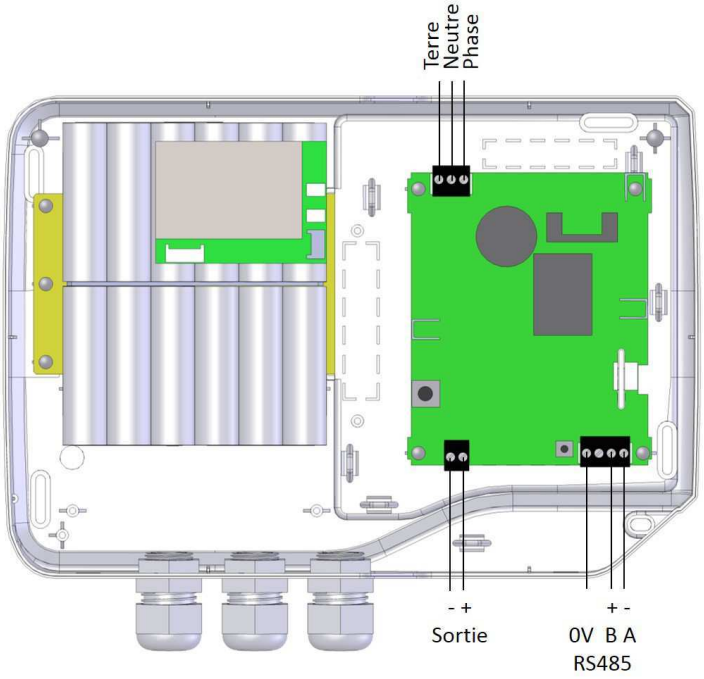


Figure 6.8: Wiring [55 W]

Wiring methods

All the wires are attached to the product using a plug-in connector (see Figure 6.8). This makes it possible to carry out the wiring in two different ways:

1. Connect the wires directly to the product
   Connect the wires according to the information indicated on the figure above, using a regular screwdriver.

CAUTION!

To avoid breaking the connector, comply with the screw tightening torque indicated in Table 6.1.

2. Connect the wires to the unplugged connectors and then connect them to the product.
   Pull the connectors to remove them from the product. Connect the wires according to the information indicated on the figure above, using a regular screwdriver. Put the connectors back on the product.

CAUTION!

To avoid wiring mistakes, make a careful note of the positioning of the connectors and their respective indications.

Connection

DANGER!

To connect the wires, the application must be switched off. The upstream circuit-breaker of the application must be open!

The wires are connected according to the following steps:

1. Connect the emergency power supply to the application
   The product is connected to the application by the two-point connector (bottom left). The initial output voltage is set to the rated value.

2. Connect the RS485 communication cable and the alarm report contacts
   The four-point connector (bottom right) provides the connection to an external PLC or computer.
   - To allow RS485 communication the wires must be connected to the **A**, **B** and **0V** contacts.
   - To connect the alarm report, the wire must be connected to the 3rd contact (with the indication on the pc-board “FAULT”).

3. Connect the power supply to the mains
   Connect the following three wires to the three-point connector (top left) respecting their position:
   - Ground wire
   - Neutral wire
   - Line wire

DANGER!

Before connecting the power supply to the mains, the ground wire must be connected!

After connecting the ground wire, the neutral and line wires can be connected.

Once the connections have been made, the upstream circuit-breaker can be closed. To complete the installation, the LED status must be verified to be green.

7. Commissioning

Before starting to commission the power supply, check that the LED is green. This means the product is connected properly and ready to function.

7.1 Hardware configuration

Powering up / Start-up

For the BOX2 55 W version the output voltage can be adjusted using a potentiometer. The voltage adjustment dial is factory-set to have an output voltage of U_n.
Adjust the dial to the required value to compensate for losses due to the wire length.

7.2 Software configuration

The basic communication protocol is Modbus It can be configured in BACnet MS/TP using the configuration software with the help of an optional setup cable (see chapter 4.7).

The communication parameters can be configured via the RS485 serial connection. SLAT provides a software that allows simple configuration of these parameters. This software is available for download at www.slat.com .

The configuration software also makes it possible to choose to use the power supply in energy saving mode (ECO) and in stealth mode.

The ECO Mode, once it is activated, allows the improvement of the power supply's efficiency's at low load (<20% of I_{max}) while ensuring an autonomy percentage. This one can be chosen during the configuration. The ECO Mode is factory set with a threshold of 80% of the available autonomy (see Figure 7.1).

The Stealth Mode allows the supervisor, using a Modbus or BACnet order, to disconnect the product to relieve the mains. The product reconnects himself automatically once the remaining backup autonomy reaches the guaranteed percentage chosen by the user during the configuration step.

7.2.1 First configuration

Figure 7.1 and the following paragraph explain how to set up the communication and the mode in which it is used. To set up the product, it must be powered up and connected to the PC via the RS485 serial connection.

The configurator is available in three languages (French, English, German). The default language is French. It can be changed using the menu "langue" (language) in the top on the left.

By default, the product is factory pre-set. These settings are shown in Figure 7.1.

To start the configuration, first the serial port, that the SDC-M is connected to, has to be chosen.

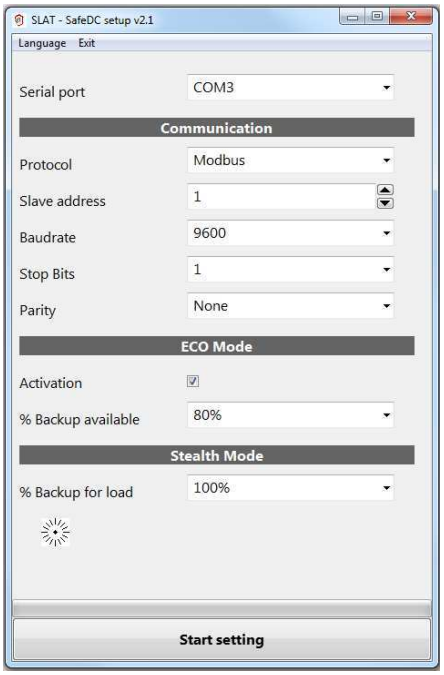


Figure 7.1: Configurator

Communication:

1. Choose the communication protocol (Modbus or BACnet MS/TP).
2. Choose the product's slave address, address 1 to 254 for the Modbus or for the BACnet.
3. Choose the communication speed from the available values:
   9600 bauds / 19200 bauds / 38400 bauds / 57600 bauds / 115200 bauds
4. Choose the number of stop bits: 1 or 2
5. Choose the parity: None / Even / Odd

ECO Mode

Choose that the ECO Mode should be active by checking the box. If the ECO Mode is activated, choose the percentage of the Backup autonomy, which has to be available for the user: 50% / 60% / 70% / 80%

Stealth Mode

Choose the percentage Backup for load, which is the guaranteed autonomy time once the Stealth Mode is used: 25% / 50% / 75% / 100% (100% of Backup for load means the Stealth Mode is not activated.)

7.2.2 Subsequent configurations

If you need to change the configuration after the first configuration, you must reset the product parameters. To do that, follow this procedure:

- The mains power must be present.
- Press the disconnect backup push button for 10 seconds (see Figure 4.3) to return to the factory configuration (the status LED changes temporarily its colour) and then reconfigure the product following the steps described above (chapter 7.2.1).

8. Operation

During use, it is possible to interact with the product. There are two types of communication - local report and/or remote report.

8.1 Local report on product

LED status

The product communicates its status via a state LED on the front. Figure 4.2 in chapter 4.4 indicates the position of this LED on the product. The LED indicates the different statuses of the product by its colour and state. The table explains the meanings of each status.

Colour		Mode
Green	steady	Normal mode
	slow flashing	Eco mode or Stealth mode
Orange	slow flashing	Backup mode
	fast flashing	Installation fault
		Overcurrent, short circuit
		Low output voltage (product overloaded)
		Power supply temperature too high
		No mains (outside specified power supply range)
		End of backup imminent
Red	steady	UPS to be changed
		If no output voltage
		If power supply out of order (charger fault)
		Backup fault
		Emergency supply undervoltage
		Emergency supply overvoltage

Table 8.1: LED status

8.2 Remote report

8.2.1 Alarm reports

An open collector dry contact exists for the alarm report. It gives an indication that a fault is present on the product. If there are no faults, the contact remains closed. In the event of a fault, the contact opens.

Fault contact specifications:

- Max voltage 60 V DC / max current 1.1 A
- Signal:
  “mains fault” or “backup fault” or “output overload” or “output short-circuit” or “charger fault” or “pre-alarm end of autonomy”

8.2.2 Communication

When using the product, it is possible to communicate with it from a distance using the incorporated communication system. The serial connection makes it possible to:

- retrieve information remotely,
- have more details about the types of faults,
- communicate analogue values (operating voltages and currents, remaining backup percentage, internal temperature, autonomy),
- configure the power supply.

The product communicates its information on an RS485 serial connection via the Modbus or BACnet MS/TP protocol. The protocol activated by default is Modbus. It can be configured using a software SLAT makes available at www.slat.com . The information and explanations on how to configure the product are described in chapter 7.2.

Modbus protocol

The information available via the Modbus protocol is organized as follows:

16-bit input variables (input register) accessible only in read mode (modbus function code 4):

Name	Modbus address	Model		Conversion of analogue / digital values
Software Revision	0	Software version		
U_{out}	1	Output voltage		U_{out}[V] = U_{out}[bit]/64
I_{out}	2	Output current		I_{out}[A] = I_{out}[bit]/320
Reserve	3			
Reserve	4			
Autonomy	5	Remaining autonomy percentage		
Temperature	6	Internal temperature	Until firmware version 970	T[°C] = (1801-T[bit])/5.337
			From firmware version 971	T[°C] (direct reading)
Default*	7	Fault variable		For details of the faults see Table 8.3

Table 8.2: Modbus input register

* Description of the "Fault" variable		
Bit	**Type of fault**	**Decimal value**
15	*Reserve*	32768
14	*Reserve*	16384
13	Pre-alarm end of autonomy	8192
12	Backup fault	4096
11	Charger fault	2048
10	Mains fault	1024
9	Output overload	512
8	Output short-circuit	256
7	Temperature too high	128
0 - 6	*Reserve*	-

Table 8.3: Description of the "Fault" variable

16-bit output variables (holding register) accessible for read (modbus function code 3) / write (modbus function code 6):

Name	Modbus address	Model
Product Serial Number LSB	0	Card Serial Number
Product Serial Number MSB	1	
Stealth Mode	2	Variable making it possible to activate the stealth mode to reduce the network load while guaranteeing minimum autonomy (once the guaranteed autonomy is reached, it automatically returns to 0) If 1: Stealth Mode in progress If 0: Normal functioning

Table 8.4: Modbus holding register

BACnet MS/TP protocol

The information available via the BACnet MS/TP protocol is organized as follows:

Property	Remark / Value	RW
Object_Identifier	device, default instance: 9540 + Network-Address	RW-E
Object_Name	Max. 40 Bytes, “SDC-M” default	RW-E
Object_Type	DEVICE (8)	R
System_Status	OPERATIONAL (0)	R
Vendor_Name	“SLAT”	R
Vendor_Identifier	954	R
Model_Name	“SDC-M”	R
Firmware_Revision	“0.975”	R
Application_Software_Version	“1.0”	R
Protocol_Version	1	R
Protocol_Revision	12	R
Protocol_Services_Supported	read-property, write-property, who-has, who-is, device-communication control	R
Protocol_Object_Types_Supported	DEVICE, BINARY_OUTPUT, BINARY_INPUT, GROUP, ANALOG_VALUE	R
Object_List [9]	device, analog-value 1 …7	R
Max_APDU_Length_Accepted	480	R
Segmentation_Supported	NO_SEGMENTATION (3)	R
APDU_Timeout	3000	R
Number_Of_APDU_Retries	3	R
Device_Address_Binding	-	R
Database_Revision	0	R
Serial Number	Serial number	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.5: BACnet MS/TP variables

Analog Value Object 1		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 1	R
Object_Name	“Vout”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Output Voltage"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	Volts (124)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.6: Analog Value Object 1

Analog Value Object 2		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 2	R
Object_Name	“Iout”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Output current"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	Amperes (2)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.7: Analog Value Object 2

Analog Value Object 3		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 3	R
Object_Name	“Vbatt”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Battery Voltage"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	Volts (124)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.8: Analog Value Object 3

Analog Value Object 4		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 4	R
Object_Name	“Ibatt”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Battery current"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	Amperes (2)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.9: Analog Value Object 4

Analog Value Object 5		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 5	R
Object_Name	“Temperature”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Internal temperature"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	Degree Celsius (62)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.10: Analog Value Object 5

Analog Value Object 6		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 6	R
Object_Name	“Fault”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Fault register"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	No units (95)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.11: Analog Value Object 6

Analog Value Object 7		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 7	R
Object_Name	“Gauge”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Remaining autonomy"	R
Present_Value	default 0	R
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	No units (95)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.12: Analog Value Object 7

Analog Value Object 8		
Property	**Remark / Value**	**RW**
Object_Identifier	analog-value 9	R
Object_Name	“StealthMode”	R
Object_Type	ANALOG_VALUE (2)	R
Description	"Set to relieve the mains power"	R
Present_Value	Stealth Mode On 1 – Stealth Mode Off 0	RW
Status_Flags	IN_ALARM: 0	R
	FAULT: 0	
	OVERRIDDEN: 0	
	OUT_OF_SERVICE: 0	
Event_State	NORMAL (0)	R
Out_Of_Service	FALSE (0)	R
Units	No units (95)	R
R: Read Property, W: Write Property, -E: Storage in EEPROM / Flash		

Table 8.13: Analog Value Object 10

9. Maintenance and troubleshooting

Maintenance

The product has been designed to function for a long period of time without requiring maintenance. To ensure the best level of service, it is essential to install it in a dry dust-free location, or to provide for cleaning and maintenance operations.

IMPORTANT REMARK!

Maintenance must only be performed by qualified personnel.

For a proper functioning of the product, it is necessary to ensure that the ventilation grilles are dust-free.

Troubleshooting

During installation, commissioning or use, unexpected situations may arise. In the event of a problem, the table below can be consulted. It contains a list of possible problems with their corresponding causes and solutions.

Problem	Fault via communication	Cause	Solution
The product does not start; the UPS DC status LED remains off.	No communication	The mains voltage is not connected or is not present.	Check if the mains voltage is connected properly.
		The mains voltage fuse is not connected or is not present.	Product replacement.
The UPS DC status LED is orange + flashes quickly and there is no voltage at the output.	Output short-circuit	Output overload or short-circuit.	Disconnect the load from the output until the load is less than the maximum output current (see Table 10.6 and Table 10.7).
The UPS DC status LED is red; the output voltage is OK.	Backup fault	Backup malfunction; the backup is disconnected or has failed.	Product replacement.
	Backup fault	Charger malfunction.	The charger has failed. Product replacement.
	Charger fault		
The UPS DC status LED is orange + flashes quickly and the output voltage is less than the normal value.	Output overload	There is a slight overload.	Lower the output load until the current is less than the maximum output value (see Table 10.6 and Table 10.7).
The UPS DC status LED is orange + flashes quickly, and the output voltage is OK.	Temperature too high	Temperature is too high because the ambient temperature does not fulfil the conditions specified in Table 10.11.	Cool the installation.
		The air intake is blocked.	Clean the blocked air intake.
The UPS DC status LED is green and there is no communication.	No communication	Unsatisfactory communication connection.	See connection details chapter 6.2.2 (Figure 6.7 and Figure 6.8).
	No communication	Unsatisfactory communication configuration.	Use the communication configuration software to enter the right parameters.

Table 9.1: Problems, causes and solutions

For additional technical assistance, contact the SLAT hotline +33 4 78 66 63 70.

For an RMA request (authorization to return goods), refer to chapter 11.2.

No equipment may be returned without prior issuance of an RMA number.

10. Technical data

10.1 Electrical characteristics

10.1.1 Electric power supply characteristics

Mains input		
AC network voltage		99 V … 264 V
DC network voltage		140 V ... 375 V
Frequency		45 Hz … 65 Hz
Class		1
Inrush current		limited by CTN
Neutral system		TT, TN, IT
Primary short-circuit protection		Short-circuit on the primary power supply by a slow-blow fuse on the phase.
Characteristics of built-in fuse		2.5 A (slow-blow, internal)
Shock wave protection		Differential mode by varistor and filter
Primary current @ 99 V	30 W	0.8
	55 W	1.5 A
Primary current @ 264V	30 W	0.3
	55 W	0.38 A
Circuit breaker to be provided upstream		Curve C or D (recommended rating 2 A)

Table 10.1: Mains input electrical characteristics

Current behaviour for 30 W:

Inrush current at start-up

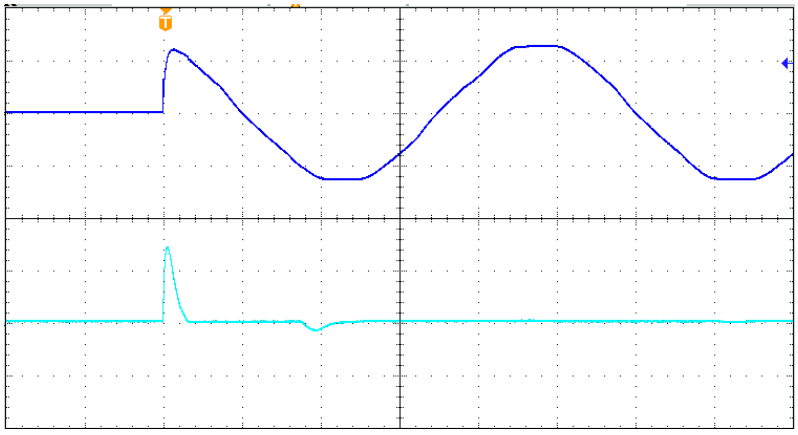


Figure 10.1: Oscillogram - inrush current [30 W]

Test conditions	
Input voltage	240 V AC
Output current and voltage	12 V DC; no load
Ambient temperature	+20°C
Description of the diagram	
Upper curve	Input voltage (250 V / DIV)
Lower curve	Input current (20 A / DIV)
Time scale	4 ms / DIV

Table 10.2: Description of the oscillogram - inrush current [30 W]

Start-up sequencing

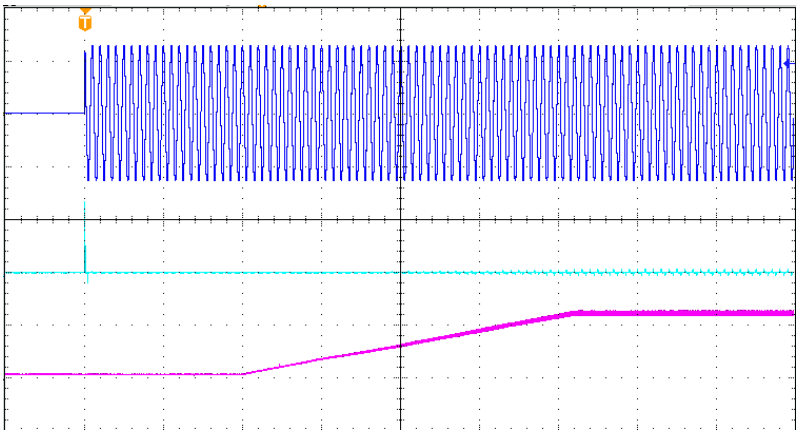


Figure 10.2: Oscillogram - starting behaviour [30 W]

Test conditions	
Input voltage	240 V AC
Output current and voltage	12 V DC; 2.5 A
Ambient temperature	+20°C
Description of the diagram	
Upper curve	Input voltage (250 V / DIV)
Medium curve	Input current (20 A / DIV)
Lower curve	Output voltage (10 V / DIV)
Time scale	200 ms / DIV

Table 10.3: Description of the oscillogram - starting behaviour [30 W]

Current behaviour for 55 W:

Inrush current at start-up

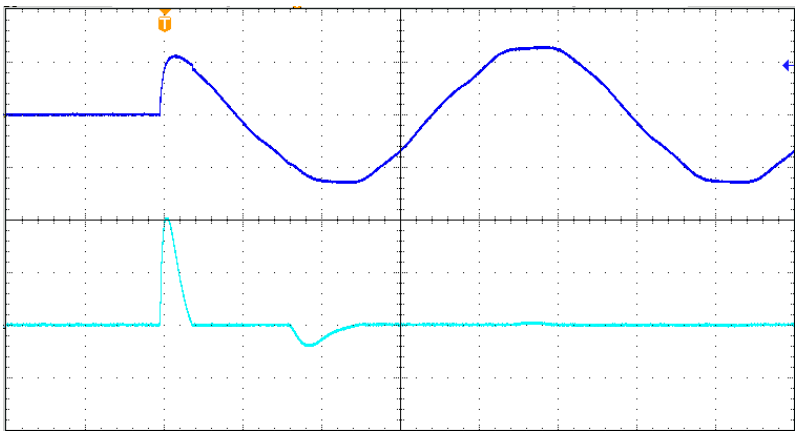


Figure 10.3: Oscillogram - inrush current [55 W]

Test conditions	
Input voltage	240 V AC
Output current and voltage	12 V DC; no load
Ambient temperature	+20°C
Description of the diagram	
Upper curve	Input voltage (250 V / DIV)
Lower curve	Input current (20 A / DIV)
Time scale	4 ms / DIV

Table 10.4: Description of the oscillogram - inrush current [55 W]

Start-up sequencing

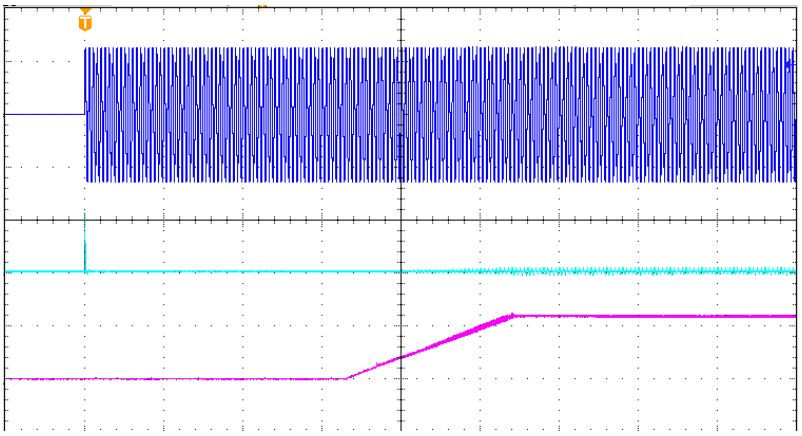


Figure 10.4: Oscillogram - starting behaviour [55 W]

Test conditions	
Input voltage	240 V AC
Output current and voltage	12 V DC; 4.5 A
Ambient temperature	+20°C
Description of the diagram	
Upper curve	Input voltage (250 V / DIV)
Medium curve	Input current (20 A / DIV)
Lower curve	Output voltage (10 V / DIV)
Time scale	400 ms / DIV

Table 10.5: Description of the oscillogram - starting behaviour [55 W]

10.1.2 Electrical output characteristics

For 30 W

Output		
Two user outputs	constant DC voltage	
Rated voltage U_n	12 V	24 V
Rated output current I_n	2.5 A	1.25 A
Permissible peak currents	5 A / 3.5 ms	2.5 A / 2 ms
	12.5 A / 1.6 ms	6.25 A / 0.5 ms
Voltage precision	1%	
Available output power	30 W	
Power limitation	from P_{max} to P_{max}+10% for output voltage > 6 V	
HF ripple peak-peak (20 MHz-50 Ω)	< 4% of U_n	
Effective LF ripple	< 0.5% of U_n	
Static and dynamic regulation characteristics	< 5 % of U_n for cumulative variations of the mains and the load (from 10 to 90%)	
Protection	electronic (no fuse)	
η @ 20% of use load	90%	
η @ 75% of use load	93%	
η @ 100% of use load	92%	
Protection against output short-circuit	by power supply cut with cyclical restart	
Protection against surges in user output	deregulation or connection error, by cut-off with cyclical restart if output voltage > U_n + 10%	
Short-circuit if	U_{output} < 6 V or I > 30 A	

Table 10.6: Electrical output characteristics [30 W]

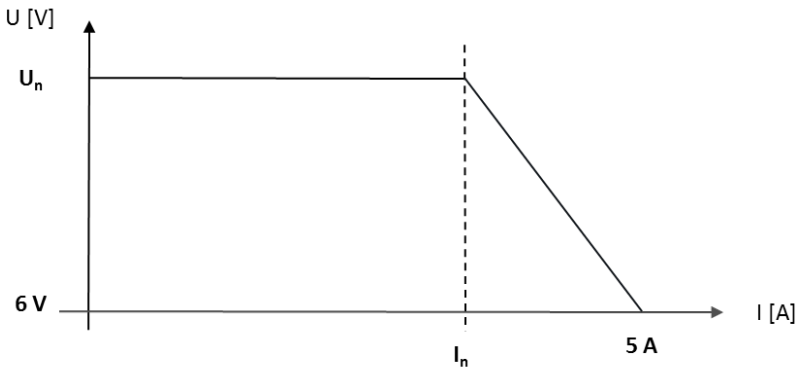


Figure 10.5: Output voltage vs User current [30 W]

For 55 W

Output			
One user output	constant DC voltage		
Rated voltage U_n	12 V	24 V	48 V
Rated output current I_n	4.6 A	2.3 A	1.15 A
Permissible peak currents	9 A / 12 ms	4.6 A / 8 ms	2.3 A / 3.8 ms
	23 A / 4 ms	11 A / 1.6 ms	5.5 A / 1.1 ms
Voltage precision	1%		
Available output power	55 W		
Adjustment by potentiometer	-8% … +13%		
Power limitation	from P_{max} to P_{max}+10% for output voltage > 6 V		
HF ripple peak-peak (20 MHz-50 Ω)	< 4% of U_n		
Effective LF ripple	< 0.5% of U_n		
Static and dynamic regulation characteristics	< 5 % of U_n for cumulative variations of the mains and the load (from 10 to 90%)		
Protection	electronic (no fuse)		
η @ 20% of use load	90%		
η @ 75% of use load	93%		
η @ 100% of use load	92%		
Protection against output short-circuit	by power supply cut with cyclical restart		
Protection against surges in user output	deregulation or connection error, by cut-off with cyclical restart if output voltage > U_n + 10%		
Short-circuit if	U_{output} < 6 V or I > 30 A		

Table 10.7: Electrical output characteristics [55 W]

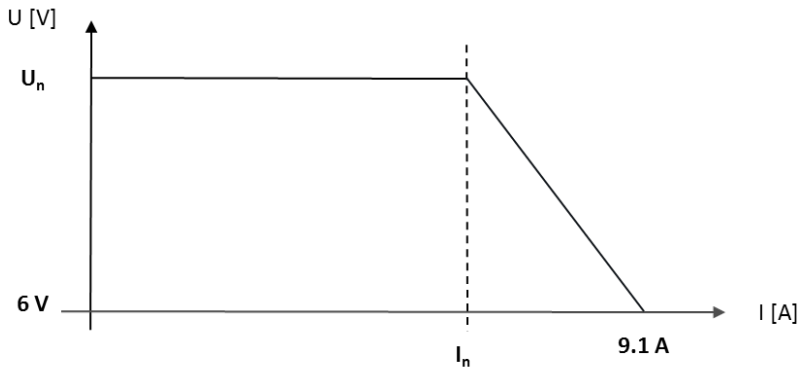


Figure 10.6: Output voltage vs User current [55 W]

10.1.3 Functional characteristics

A user output permanently supplies a constant voltage (12 V DC, 24 V DC or 48 V DC) to the equipment which has to be powered. In the event of a current break, the built-in backup maintains the electrical power supply of the equipment connected to the UPS for the duration defined when the SDC-M was chosen.

An asynchronous RS485 serial connection retrieves the information remotely and communicates the analogue values (voltages and load current, backup, autonomy, internal electronic temperature)

The basic communication protocol is Modbus The configuration software supplied on the web site www.slat.com, makes it possible via an RS485 cable to choose the BACnet MS/TP protocol, to configure the communication parameters and to choose the functioning mode.
An open collector dry contact for the alarm report (60 V DC/1.1 A) and a status LED on the front panel are also available.

The Stealth Mode function makes it possible to shed load from the network while guaranteeing backup autonomy.

10.1.4 Peak current

The figures and tables below show the maximum peak current duration in ms for an output voltage > 80% U_n.

For 30 W

	12 V	24 V	48 V
I/I_n	Time [ms]		
5	1.5	1	1.8
3	2	1.2	2.5
2	3.5	2	4
1.5	7	6	8
1.2	30	20	40
1.1	100000	100000	100000

Table 10.8: Overload capacity [30 W]

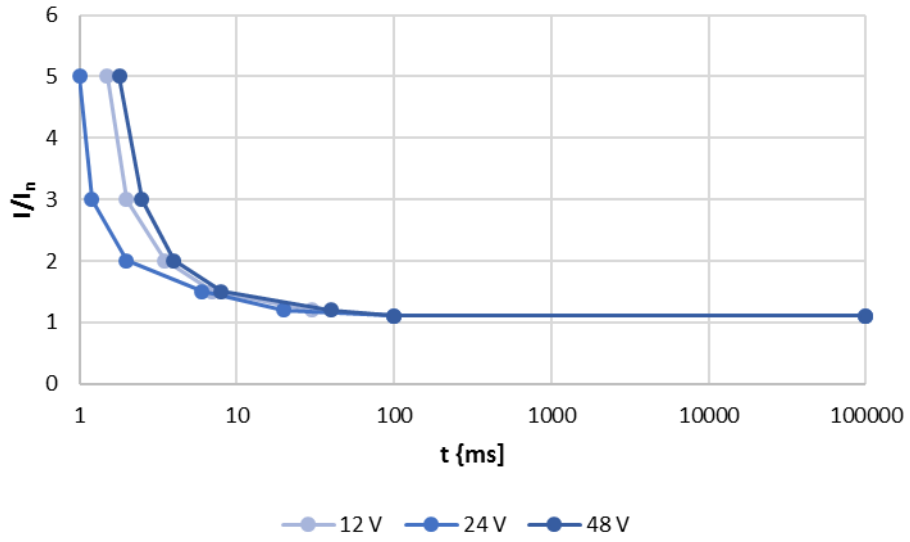


Figure 10.7: Overload capacity curve [30 W]

For 55 W

	12 V	24 V	48 V
I/I_n	Time [ms]		
5	4	1.6	1.1
3	7	3.7	2.1
2	12	8	3.8
1.5	22	12	7
1.2	60	40	30
1.1	100000	100000	100000

Table 10.9: Overload capacity [55 W]

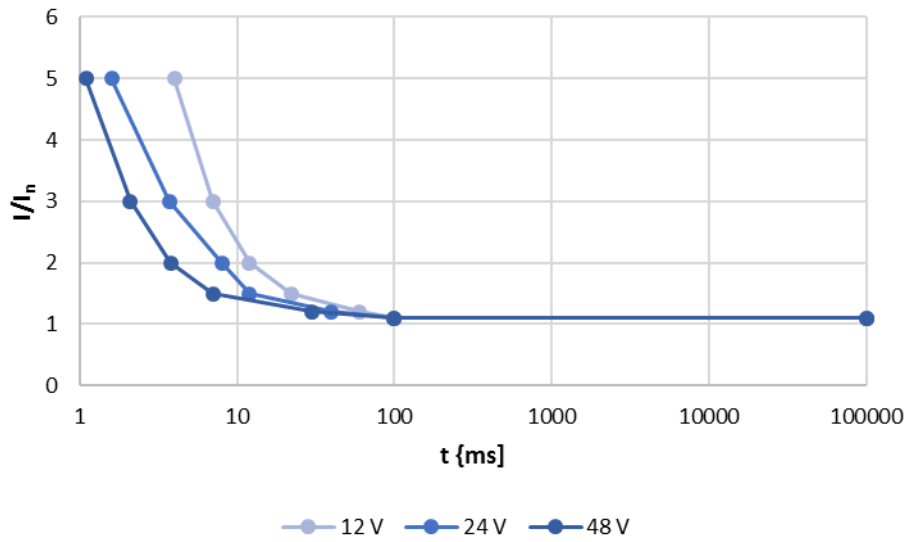


Figure 10.8: Overload capacity curve [55 W]

10.2 Mechanical characteristics

Mechanical specifications		
Envelope		Aluminium
Protection rating		IP30 (fixed to wall)
Size		W 285 x H 198 x D 61 mm
Weight	30 W	0.9 kg (backup D) / 1.1 kg (backup E) / 1.5 kg (backup G)
	55 W	1.0 kg (backup D) / 1.2 kg (backup E) / 1.6 kg (backup G)
Installation		Box to be fixed to a wall

Table 10.10: Mechanical specifications

10.3 Environmental specifications

Environmental specifications		
Storage temperature		-25 … +60°C
Operating temperature	at 100% load	-5 … +55°C
	at 75% load	-5 … +60°C
Relative humidity	in storage	10 … 95%
	operating	20 … 95%
Altitude	Above 2,000 m, the temperature decreases by 5% every 1,000 m.	

Table 10.11: Environmental specifications

10.4 Standards

The product is designed to meet with LV and EMC directives (immunity and emission). It complies with the following standards.

10.4.1 Safety standards

Section	Standard number	Title/Content
LVD Safety	EN 62368-1 (2020)	Audio/video, information and communication technology equipment - Part 1: Safety requirements.

Table 10.12: Safety standards

10.4.2 EMC standards

Section	Standard number	Title/Content
Immunity	EN 61000-6-1 (March 2007)	Immunity for residential, commercial and light-industrial environments (generic standard)
Immunity	EN 61000-6-2 (January 2006)	Immunity standard for industrial environments (generic standard)
Emissions	EN 61000-3-2 (August 2006) (class A)	Limits for harmonic current emissions (equipment input current <= 16 A per phase)
Emissions	EN 61000-6-3 (March 2007)	Emission standard for residential, commercial and light-industrial environments (generic standard)
Emissions	EN 61000-6-4 (March 2007)	Emission standard for industrial environments (generic standard)
Emissions	EN 55032 (2015) (class B)	Electromagnetic compatibility of multimedia equipment

Table 10.13: EMC standards

11. Warranty and Product Returns

11.1 Warranty

The equipment is guaranteed for three years from the date of delivery (ex-works). It is strictly limited to reimbursement or replacement (at our discretion and without compensation of any sort) of parts recognized as faulty by our services, following the return of the product to our premises at the buyer's expense. The replacement or repair of equipment is possible only on our premises. In order to allow our customers to benefit from the latest technical improvements, SLAT reserves the right to make all necessary modifications to its products.

11.2 Product Returns

11.2.1 Product under warranty

For the maintenance of your products under warranty, SLAT offer the best solution to facilitate your repairs and minimize lead times:

- Contact the Customer Service department using the form available on our web site www.slat.com , taking care to fill in all the required fields.
- The RMA form will be processed and sent back by the SLAT account manager.
- After receiving your RMA form, return two copies with your product(s), one INSIDE the package and the other on the OUTSIDE of the package for warehouse identification purposes, thereby guaranteeing traceability of your product.
- The repaired or replaced product(s) will be returned within a maximum of 15 business days.

11.2.2 Product not under warranty

SLAT offers 2 solutions for maintenance of its products:

QUICK AND EASY: Personal replacement of the equipment

It is not necessary to send the equipment back to SLAT.

Order the maintenance cards at the applicable price. The reception will take place within one week. Contact the SLAT Sales Department for advice by completing the contact form (available at www.slat.com).

The new cards are guaranteed for 1 year.

Product repair by SLAT

Contact Customer Service at service.client@slat.fr, making sure to provide all of the following information:

- Last name/First Name
- Company / Complete Address / Phone / Email
- Exact model of the product (indicated on the product label) / SLAT reference (indicated on the product label, code number) / Serial No. / Quantity / Problems(s) encountered (describe the faults encountered with the product)

The form to request the RMA number is also available at www.slat.com.

The account manager will send the RMA form by email together with a quote according to the relevant product range.

After receiving your RMA form, return two copies with your product(s), one INSIDE the package and the other on the OUTSIDE of the package for warehouse identification purposes, thereby guaranteeing traceability of your product. The repairs will be made only after the receipt of the accepted quote together with the repair order form. If the quote is rejected, please return it to service.client@slat.fr marked "refused" and specify whether the equipment should be destroyed or returned in its existing condition (in this case a charge of €150 will be invoiced for handling costs).

The repaired or replaced product(s) will be returned within a maximum of 15 business days. A new 3 month warranty is attributed to the relevant product.

Conditions: Authorization to return products is issued by SLAT.

An RMA number is assigned to each product to be returned. Each RMA number is valid for 30 days.

No equipment may be returned without prior issuance of an RMA number.

SLAT

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