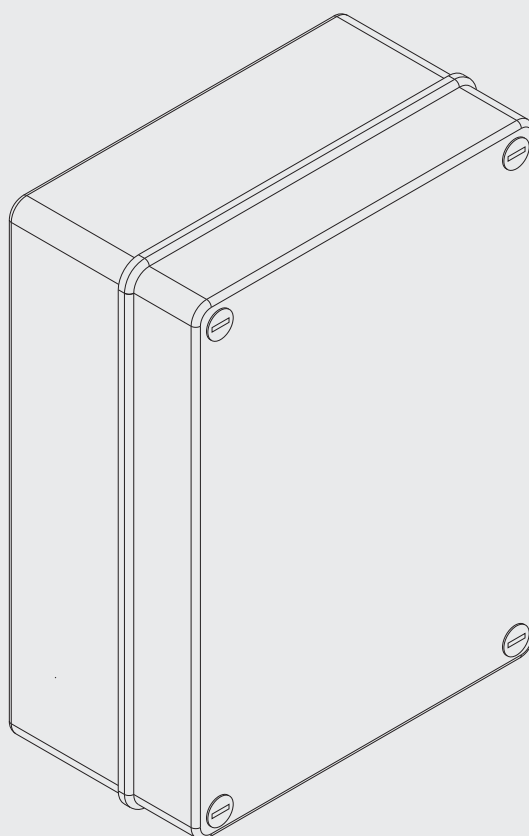
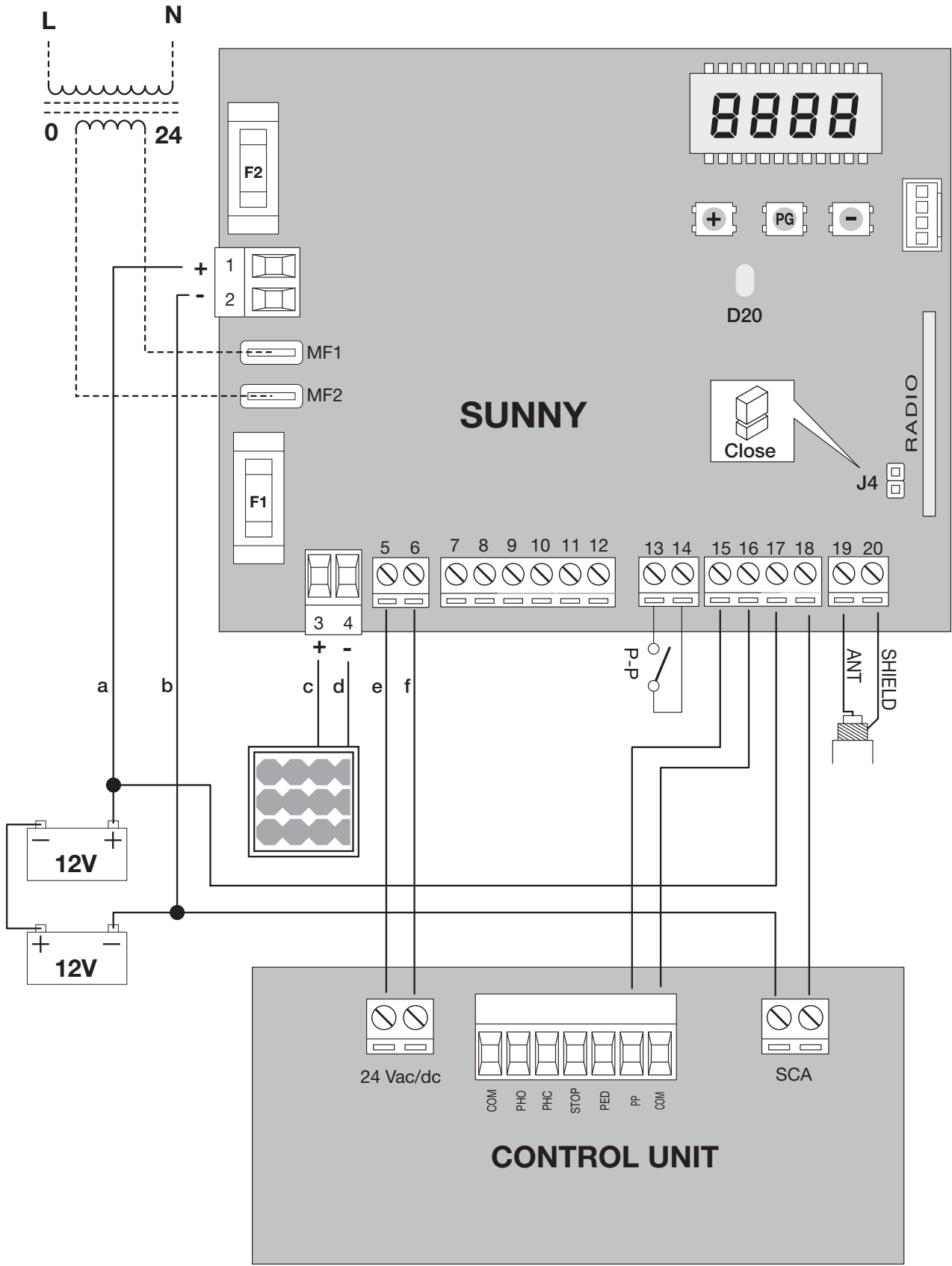


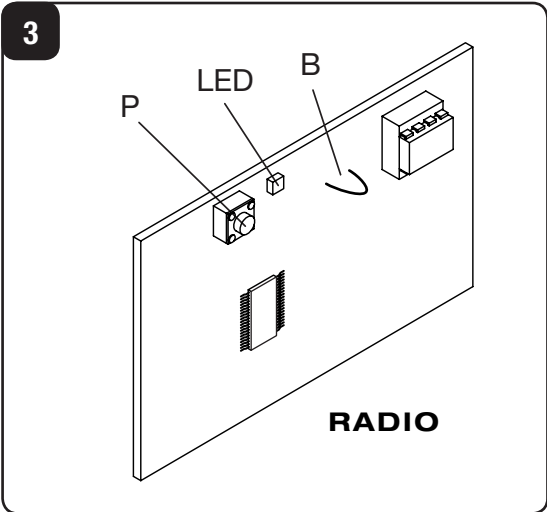
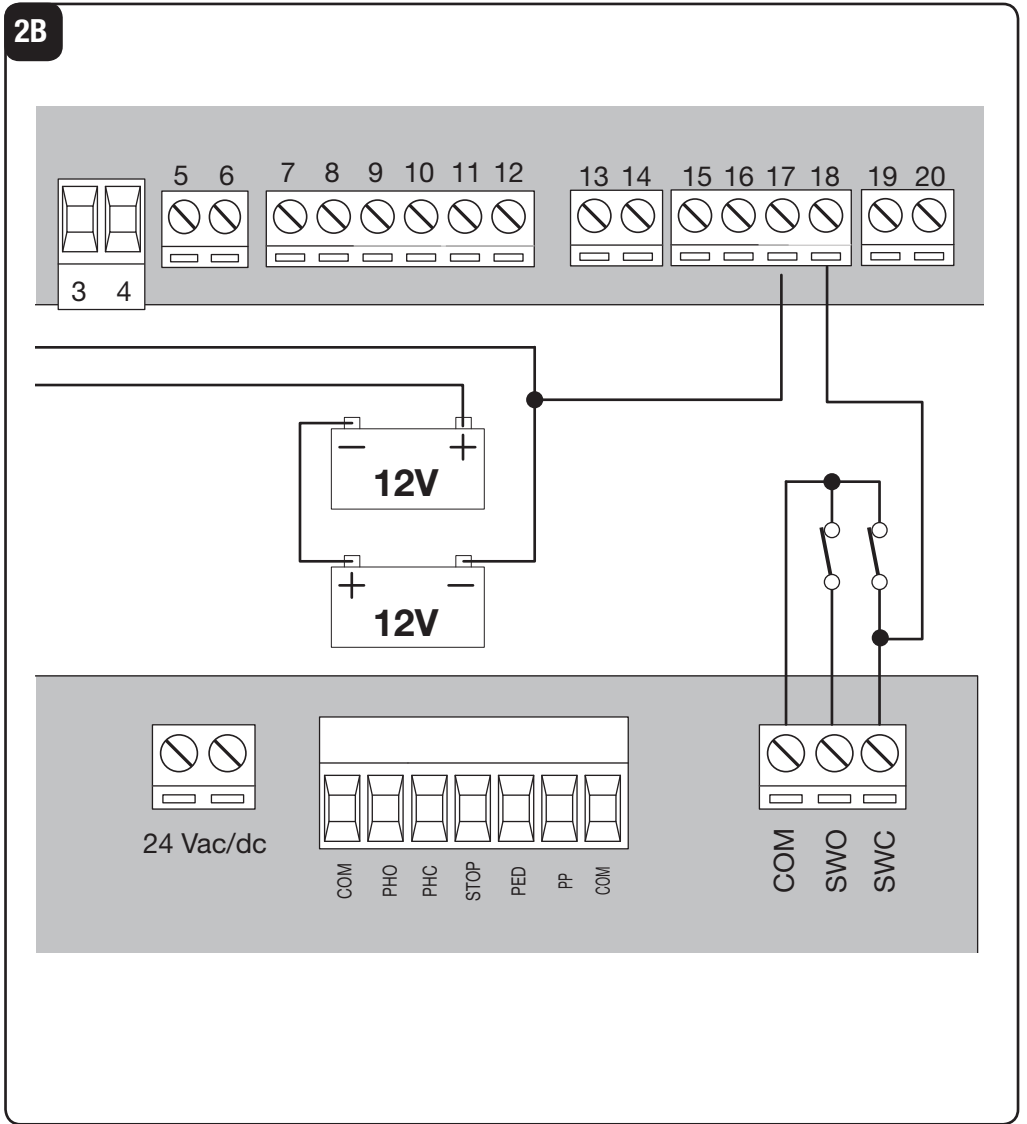
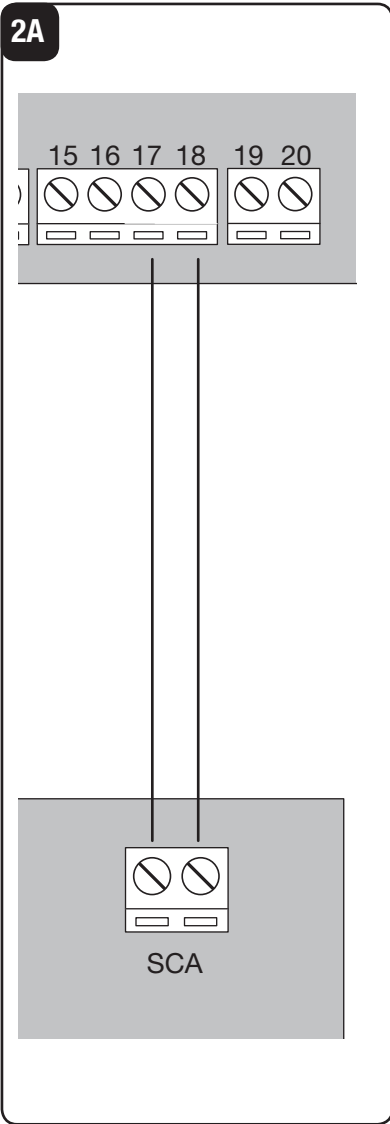
SUNNY

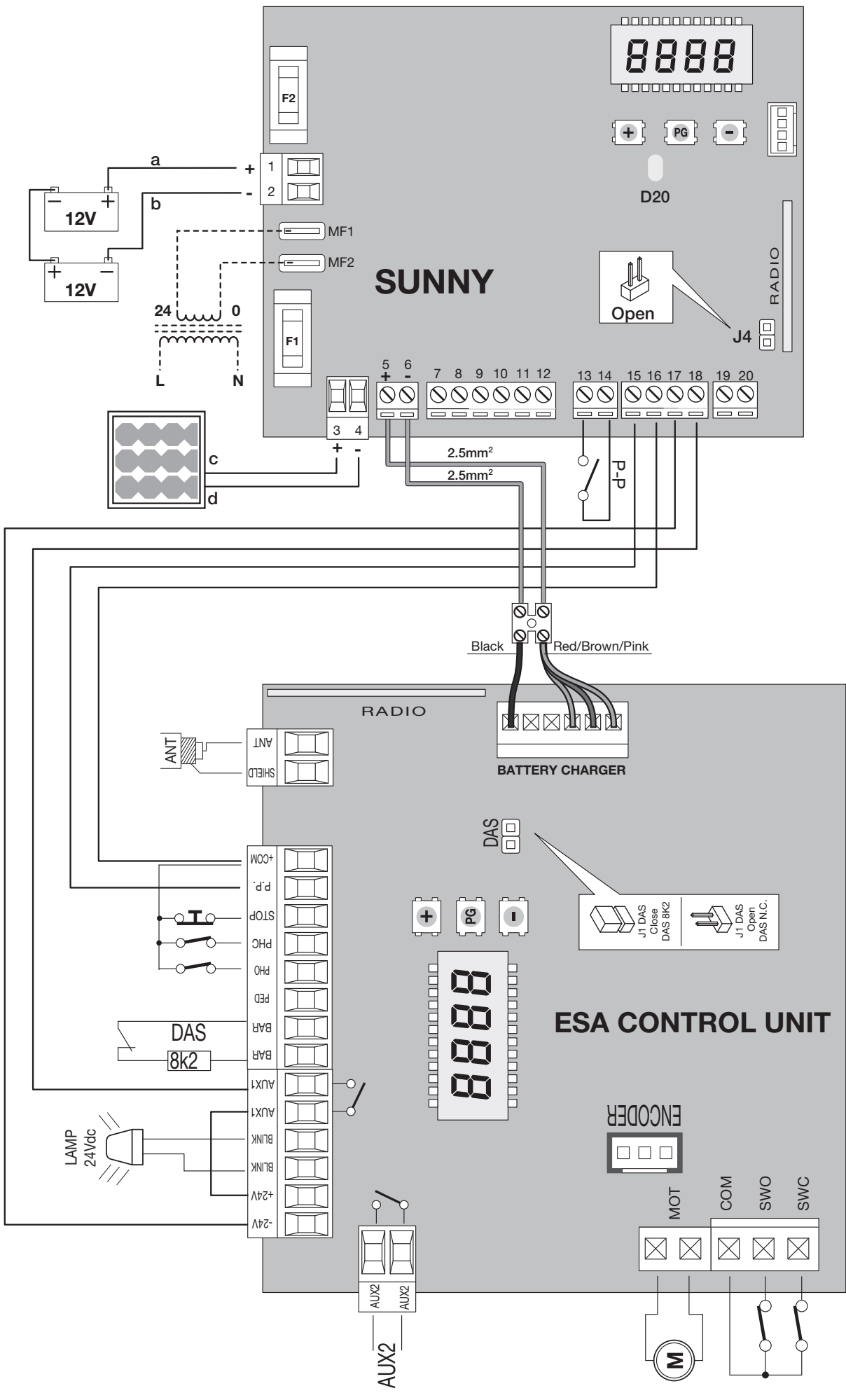


BENINCA[®]
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BATTERY CHARGE CONTROLLER FOR PHOTOVOLTAIC PANEL

SUNNY

DESCRIPTION

SUNNY can be used with **24VDC motor systems only**.

This device has been specially studied and manufactured to be used on automatic systems without mains power supply, by exploiting a photovoltaic panel to charge the related power supply batteries.

This PV device therefore allows for installing automatic systems also in places where there is no mains electric supply.

It can be matched to various types of PV panels and types of batteries.

It is supplied in a kit complete of panel and cell batteries, ready for installation (item. KIT SUN).

WIRE DIAGRAM

The electric connections shown in Fig. 1 are described in the following table:

Terminals	Function	Description
1-2	Input, Battery	Connection input for battery (1:+ / 2:-). The connections marked a and b should be made with a cable featuring a 2.5mm ² square section.
3-4	Input, PV Panel	Input for the connection of the PV panel (3:+ / 4:-). The connections marked c and d should be made with a cable featuring a 2.5mm ² square section. If the device is used in areas with little sun, more than one PV panels can be connected in parallel. In this case, the panels must be of the same type, and the sum of Wp values should not exceed 80 W.
5-6	24VAC/VDC	This voltage is used to supply the control unit in standard installations. The connections marked c and d should be made with a cable featuring a 2.5mm ² square section. Output, 24VAC/VDC max. The system is powered only during operation.
7-8-9-10-11-12	ESA Card	Connection to ESA card. Use the swift connector supplied (Fig.4).
13-14	IN, Step-by-Step	Input, Step-by-Step control (Normally Open contact)
15-16	OUT, Step-by-Step	Output, Step-by-Step. Connect the Step-by-Step input to the control unit. It repeats the status of the IN, Step-by-Step input.
17-18	IN SCA	See "Automation status input" paragraph
19-20	Antenna	Connection of the antenna to the incorporated radio-receiver module 19 ANT: Signal / 20 SHIELD: Screen.
MF1-MF2	Power Supply	In the event of failure or the batteries are completely down, the system can be supplied through two fast-on connectors. Connect 24VAC 45VA minimum, by referring to an external transformer. Note: this input is used for the fast charge of the batteries connected to the terminal board 1,2. It can be used for fully charge batteries before installation.

OPERATION

The SUNNY control unit provides for the charging of batteries through a photovoltaic panel. These batteries supply power to the control unit of the automatic system.

A Step-by-Step control signal, sent to 13/14 input, or a control signal sent by a radio-transmitter, reactivates the control unit. With a presettable delay-time, the unit starts the operation by responding to the Step-by-Step control on 15/16 outputs.

All transmitters can be memorised only in the built-in radio of SUNNY. It is not possible to use radio-receivers included in the control unit. The J4 jumper should be CLOSED.

AUTOMATION STATUS INPUT

IMPORTANT! Read carefully!

Input terminals 17/18 allows the SUNNY control panel to know the automation status: if voltage is present, SUNNY provide power supply to the control panel, if there is no voltage, the TOFF time countdown starts, when TOFF expires, SUNNY cuts off power supply to the control panel, and SLEEP (energy saving) mode starts.

There are four different ways to manage 17/18 input terminals:

- 1) By using a "dry contact" (no tension) SCA output
- 2) By using a powered SCA output
- 3) By using an SWC (closing limit switch)
- 4) With BYPASS mode, that is without power supply interruption (no energy saving)

Dry SCA output*

In this case wire SCA as illustrated in Fig. 1, using batteries to bring a tension to the 17/18 input

Powered SCA output*

In this case wire as illustrated in Fig. 2A, making a direct connection between SCA output and 17/18 input

**In case of any doubt please refer to the control panel manual, if the SCA output is a dry contact, the bulb is connected using the 24V power supply output of the control panel itself, whereas if the SCA has an output tension, the bulb is connected directly to the SCA output.*

Using an SWC (closing limit switch)

If the control panel does not have a SCA output, it is possible to use a SWC limit switch wired as indicated in Fig. 2B

BYPASS mode

Bypass mode is used temporarily to allow SUNNY programming (please see BYPASS mode paragraph), but it is possible to use the SUNNY in continuous BYPASS mode if it is necessary to let the control panel work continuously.

This may be necessary in case of control panels which make an automatic autoset after a power failure (or cut off), in case that panels and batteries are sized to allow uninterrupted power supply to the control panel or if you need to use a 24V powered accessory to activate the automation. In this case the 17/18 terminals do not need to be connected

HOW TO PROGRAMME

The programming of the various functions of the control unit is carried out by using the LCD display on the control unit and presetting the desired values in the programming menus described hereunder.

The Parameter Menu allows to preset a single-function number value, as for an adjustment trimmer.

Other special functions are included in the Parameter and Logics Menus and can vary according to the type of control unit or software review.

USE OF <PG>/<+>/<-> PUSH-BUTTONS

Press the <PG> key to access presetting that can be changed by using + and – keys.

By pressing the <+> key, the Function Menu can be scrolled from bottom to top.

By pressing the <-> key, the Function Menu can be scrolled from top to bottom.

By pressing the <PG> key, access is enabled to any possible presetting to be modified.

The preset values can be changed by pressing <+> and <-> keys.

If the <PG> key is pressed again, the value is programmed and “PRG” is displayed.

See section “Programming Example”.

NOTE:

If <+> and <-> keys are pressed simultaneously from a Function Menu, this allows to return to the upper menu without making any changes.

A pressure of the <-> key with display off equals to a Step-by-Step control signal.

When the card is switched on, the Software version is displayed for around 5 sec.

Keep either key <+> or key <-> pressed to speed up the increase/decrease of values.

After 30 sec wait, the control unit exits the programming mode and switches the display off.

WARNING:

If the D20 LED flashes every 4 seconds, this means that the SUNNY card is in the STAND-BY mode.

To re-activate the card and access programming, press the OK key for at least 4 seconds.

PARAMETERS, LOGICS AND SPECIAL FUNCTIONS I

The single functions available in the control unit are described in the following table.

	MENU	FUNCTION	MIN-MAX-(Default)	MEMO
PARAMETRI	t_{off}	Self-switching off time: after this time has elapsed, if the SCA off status is maintained (control unit powered with motor off), SUNNY cuts off power supply to the control unit.	1-240-(60s)	
	S_{td}	Start Delay: delay between the IN Step-by-Step input and its OUT Step-by-Step response (this delay is required to leave the control unit enough time to switch on and be therefore able to receive the control signal sent by SUNNY). Value expressed in seconds, selectable by 0.5sec steps. 0: immediate response. 15: activation maximum time.	0-15-(2s)	
	t_{ch}	The relay switch time is preset on the OUT Step-by-Step output.	0.1-15-(1s)	

	MENU	FUNCTION
STAT	u_{bAt}	Instantaneous value of battery voltage. E.g.: 24.0V.
	i_{bAt}	Instantaneous value of battery load/supply current. Positive values (+) show load current. Negative values (-) show supplied current. E.g.: -1.1A.
	u_{Phu}	Instantaneous value of PV panel voltage.
	i_{Phu}	Instantaneous value of current supplied by the PV panel.
	$dAYS$	The number of operating days of the system is displayed. Value from 0 to 9999.
	i_{dy}	The daily average value of battery load current is displayed. This value is denominated in Ampère/h.

STAT	7 dy	The average value of battery load current over the last seven days is displayed. This value is denominated in Ampère/h.
	30dy	The average value of battery load current over the last thirty days is displayed. This value is denominated in Ampère/h.

MENU	FUNCTION
RES	RESET of the control unit. CAUTION!: The control unit is reset to default values. If the <PG> button is pressed, the RES wording starts to flash. If the <PG> button is pressed again, the control unit is reset. Note: The transmitter codes of the receiver will not be erased.

FUSES

F1: Protection fuse of the PV panel: 5A automotive.
F2: Protection fuse of the batteries: 7.5A automotive.

BYPASS MODE

The “Bypass” mode is entered by pressing keys + and – simultaneously for at least 5 seconds.
ON: SUNNY keeps the control unit connected to it always on. In this way, parameters and logics of the control unit can be preset, thus avoiding that the control unit enters the SLEEP mode.
N.B.: when the BYPASS mode is ON, the wording “ON” is displayed.
OFF: SUNNY works regularly.

DIAGNOSTICS

on	ON : displayed fixed. This indicates that the control unit is on BYPASS mode allow setting operations.
on	ON: flashing. This indicates that the control unit is powered and during an operation phase.
PP	This indicates the activation status of the PP input or the radio control.

The LED D20 shown in Figure 1 can feature three different status:
Off: the battery is not under charge or the PV panel is not connected.
On: the battery is under charge.
1 flash every 4 seconds: the SUNNY card is in STAND-BY mode. The battery is not under charge and the connected control unit is not powered.

ERROR MESSAGES

In case of malfunctioning, the following messages can be displayed:

lowF Error: overcurrent on battery. Check the correct operation of the connected control unit.
bAtt Check the battery status (disconnected or exhaust)).

HOW TO MEMORISE THE TRANSMITTER CODES

The control unit is equipped with an incorporated three-channel radio module, with 433.92 MHz frequency able to memorize up to 512 rolling-code transmitters or 1 programmable code.

The type of transmitter used can be selected by means of the B jumper:

with jumper closed: rolling-code only.
with jumper open: rolling-code and programmable codes.

To memorise a transmitter code, proceed as follows:

- 1 Press the P button of the radio receiver
- 2 The LED switches on with RED colour for approx. 3 sec.. The LED then switches off and on again.
If the transmitter code is to be memorised on the first channel (Step-by-Step function), press the transmitter key to be stored in memory within 5 seconds.
- 3 If another transmitter code is to be memorised, press the desired key within 5 seconds. Conversely, wait for the receiver to exit the programming mode.

To reset the receiver:

Cut-off power supply, press the P button and, while keeping it pressed, power the system again. The LED lights up with red fixed light. After around 5 seconds, the LED starts flashing, with alternate colours. Release the button. The receiver is reset and all transmitter codes are erased.