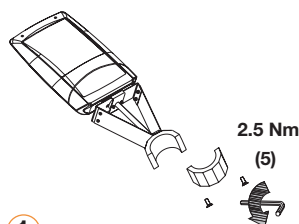


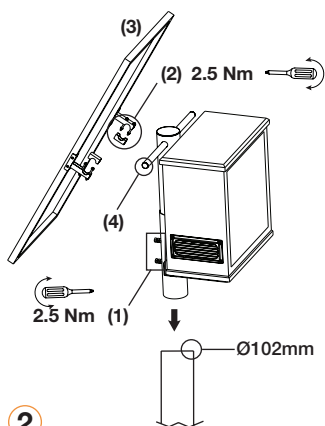
Deva-Stud-Challenge Solar

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Stud Solar installation of the fitting	Pag. 3
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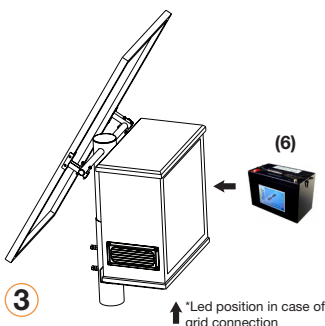
DEVA SOLAR Installation of the fitting



1



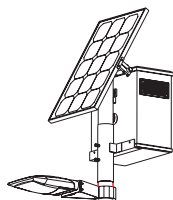
2



3

*Grid connection: Pag.6

Electronic circuit board pre-installed and factory set (for programming modes see pag.6-7)



To facilitate the installation Mareco Luce recommends to connect the luminaire and the pole-top to the pole first, and then to fix the pole to the ground.

Untighten the screws (5) of the semicollar. Insert the cable through the hole in the pole and let it come out from the top of the pole (in case the pole is not provided by Mareco Luce confirm to the manufacturer the technical specifications required). Position the luminaire at a height of 6,5mts (ground height). Tighten the screws (5) of the semicollar. Max screw strength 2.5Nm

Position the pole top without the solar panel on the top of the pole. Orient the pole top with respect to the sun. Insert the cable of the luminaire into the battery box previously positioned. Secure the pole top to the pole by tightening the screws (1), once the pole top is oriented with respect to the sun. Loosen the screws (2) of the semicollars of the panel. Position the panel (3) on the brackets (4) of the pole top, and tighten the screws (2) of the semicollars.

Open the door of the battery box by using the key (included). Place the battery (6) inside the battery box paying attention to position it correctly on the brackets. Close the door of the battery box by using the key (included)

Connecting process of the luminaire

Tighten the 4 poles cable of the luminaire to the M16 cable gland and connect it as follows:

- Clamp mark L1 + cable red/white
- Clamp mark L1 - cable green/white
- Clamp mark L2 + cable white
- Clamp mark L2 - cable blue/white

Connecting process to the grid (if present)

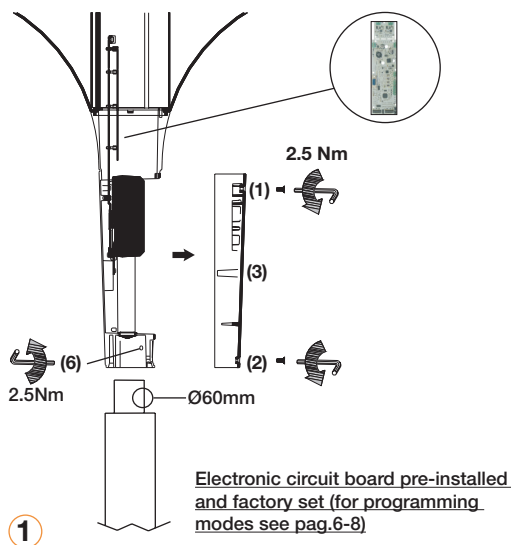
Tighten the mains cable coming from the pole to the M20 cable gland, and connect it as follows:

- Clamp mark F phase wire
- Clamp mark N neutral wire
- Clamp mark T ground cable

Connect all the cables, then tighten the cable glands, and eventually close the grey watertight box placed inside the battery box

Movement sensor: Deva Solar 16W is pre-set for the connection of the remote sensor through a terminal block placed inside the electrical compartment. The sensor must be in "clean contact" with a supply voltage between 12VDC and 17VDC

STUD SOLAR Installation of the fitting

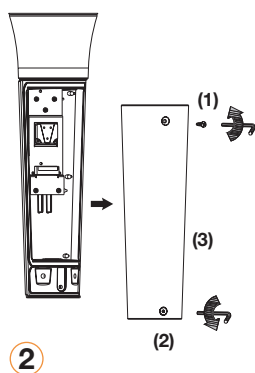


Stud Solar 1

Stud Solar 2

*Grid connection: Pag. 7

Untighten the screw (1)
 Loosen the screw (2)
 Remove the gear-tray cover (3)
 Insert Stud Solar 1 or Stud Solar 2 into the pole by tightening the dowels (6) (2,5 Nm strength)
 Place the battery (5) (included) into the compartment by placing the connectors in the correct position (see pic.1).
 Reposition the gear-tray cover (3)
 Tighten the screws (1 and 2)

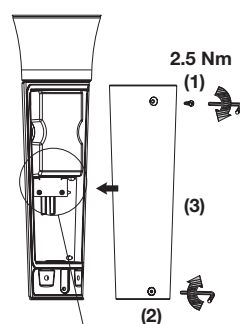
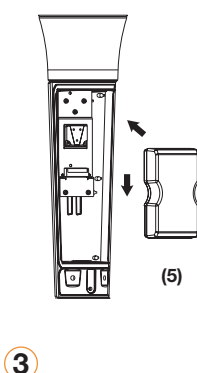


Connection of main supply cable (if available)

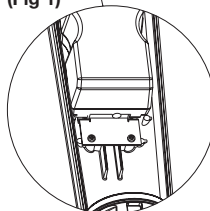
The main supply cable coming out of the pole must be connected as follows:

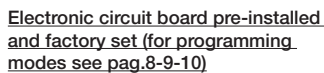
Clamp mark F Live wire
 Clamp mark N Neutral wire
 Clamp mark T Ground wire

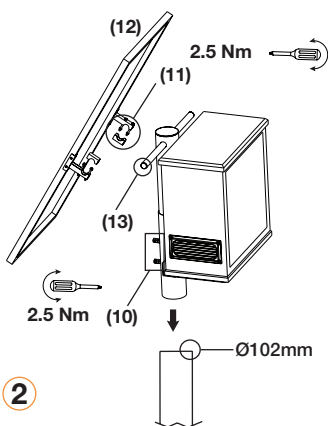
Movement sensor: Stud Solar 1/2 is pre-set for the connection of the remote sensor through a terminal block placed inside the electrical compartment. The sensor must be in "clean contact" with a supply voltage between 12VDC and 17VDC



(Fig 1)







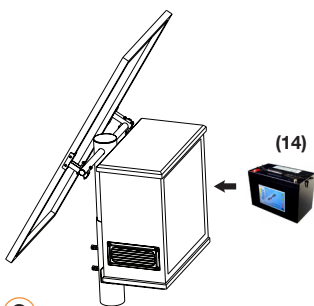
2

To facilitate the installation Mareco Luce recommends to connect the luminaire and the pole-top to the pole first, and then to fix the pole to the ground.

Untighten the screws (1a and 1b) and remove the **DX** (2) part of the luminaire. Insert the supply cable of the luminaires (8) through the cable tray (5) of the pole (9), and let it come out from the top of the pole (in case the pole is not provided by Mareco Luce confirm to the manufacturer the technical specifications required). Fix the **SX** part of the luminaire (6) to the pole (9) by tightening the screws (3SX) to the threaded inserts (7). Fix the **DX** part of the luminaire (2) to the pole (9) by tightening the screws (3DX). Fix the **DX** part of the luminaire (2) to the **SX** part of the luminaire (6) by tightening the screws (1a and 1b).

WARNING:

the luminaires 1x60W, 2x30W, 1x90W have n°2 supply cables; connect these two supply cables together first, then connect them to the terminal block

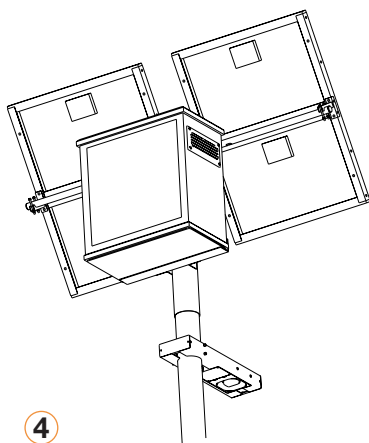


3

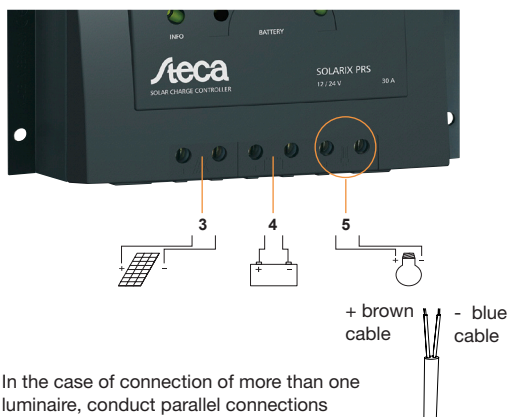
Position the pole top without the solar panels on the top of the pole. Orient the pole top with respect to the sun. Insert the cable of the luminaire into the battery box previously positioned. Secure the pole top to the pole by tightening the screws (10), once the pole top is oriented with respect to the sun. Loosen the screws (11) of the semicollars of the panel. Position the panel (12) on the brackets (13) of the pole top, and tighten the screws (11) of the semicollars. Open the door of the battery box by using the key (included). Place the battery (14) inside the battery box paying attention to position it correctly on the brackets. Close the door of the battery box by using the key (included).

Connecting process of the luminaires

- + brown cable
- blue cable



4



In the case of connection of more than one luminaire, conduct parallel connections (blue/blue, brown/brown)

Electronic circuit board (ECB) Deva Solar

Factory standard programming:

SMART MODE operating mode with on at sunset for 8 hours and a battery duration of 5 nights; the luminosity for the grid connection is set at 100% and the time for the movement sensor is set to 2 minutes.

NORMAL

In this mode the luminosity of the LEDs is fixed at a constant 50% (175mA). Everything is dependent on the panel: if the battery is recharged with the same quantity of energy it consumed the previous night, then the system is in energy balance and will guarantee light every night, otherwise, it will use the battery's energy reserve until it runs out (the battery will shut off when only 20% storage remains).

The possible running modes are:

- on at sunset for 8 hours
- on at sunset for 10 hours
- on at sunset for 4 hours, then shutting off internal LED ring and reducing outer ring to 50%, then 2 hours before sunrise back to 100%*
- on from sunset to sunrise*

Grid connection: the switch over occurs when the battery is no longer capable of supplying the LEDs the fixed current (175mA). It is possible to set the dip switch for 100% and if/when the system connects to the grid the LEDs run at 100% of their nominal power (350mA). A coloured LED signals that the product is connected to the grid.

Movement sensor: from sunset to sunrise the system will be on with the LEDs running at 25%, until the sensor detects movement, from that moment the whole fitting will be on at 100% (NORMAL mode); using the dip switches it is possible to select the duration of the increased luminosity: 1,2, or 3 minutes.

SMART

In this mode the luminosity of the LEDs is variable. Priority is given to battery charge; this calculated each night based on the energy transferred from the panel. The energy to be supplied to the LEDs is determined based on an algorithm which is divided by the nightly duration and the operating mode (in this case SMART). If the panel manages to recharge the battery with the same quantity of energy it consumed the previous night, then the system is in energy balance and will guarantee light every night, otherwise, it will use the battery's energy reserve until it runs out (the battery will shut off when only 20% storage remains).

The possible running modes are:

- on at sunset for 8 hours
- on at sunset for 10 hours
- on at sunset for 4 hours, then shutting off internal LED ring and reducing outer ring to 50%, then 2 hours before sunrise back to 100%*
- on from sunset to sunrise*

Grid connection: the switch over occurs when the battery is no longer capable of running the LEDs at 50% luminosity. It is possible to set the dip switch for 100% and if/when the system connects to the grid the LEDs run at 100% of their nominal power (350mA). A coloured LED signals that the product is connected to the grid.

Movement sensor: from sunset to sunrise the system will be on with the LEDs running at 25%, until the sensor detects movement, from that moment the whole fitting will be on at full luminosity. Using the dip switches it is possible to select the duration of the increased luminosity: 1,2, or 3 minutes.

*The running modes "sunset to sunrise" and "4hrs from sunset – 2hrs from sunrise" will be operative after 3 days and 3 nights; before this time has passed the system will function for "8hrs from sunset".

Electronic circuit board (ECB) Stud Solar

Factory standard programming:

SMART MODE operating mode with on at sunset for 8 hours and a battery duration of 3 nights (the luminosity for the grid connection is set at 100% and the time for the movement sensor is set to 2 minutes).

NORMAL

In this mode the luminosity of the LEDs is fixed at a constant 50% (175mA). Everything is dependent on the panel: if the battery is recharged with the same quantity of energy it consumed the previous night, then the system is in energy balance and will guarantee light every night, otherwise, it will use the battery's energy reserve until it runs out (the battery will shut off when only 20% storage remains).

The possible running modes are:

- on at sunset for 8 hours
- on at sunset for 10 hours
- on at sunset for 4 hours, then shutting off internal LED ring and reducing outer ring to 50%, then 2 hours before sunrise back to 100%*
- on from sunset to sunrise*

Grid connection: the switch over occurs when the battery is no longer capable of supplying the LEDs the fixed current (175mA). It is possible to set the dip switch for 100% and if/when the system connects to the grid the LEDs run at 100% of their nominal power (350mA). A coloured LED signals that the product is connected to the grid.

Movement sensor: from sunset to sunrise the system will be on with the outer LED ring running at 50%, until the sensor detects movement, from that moment the whole fitting will be on at 50% (NORMAL mode); using the dip switches it is possible to select the duration of the increased luminosity: 1,2, or 3 minutes.

SMART

In this mode the luminosity of the LEDs is variable. Priority is given to battery charge; this calculated each night based on the energy transferred from the panel. The energy to be supplied to the LEDs is determined based on an algorithm which is divided by the nightly duration and the operating mode (in this case SMART). If the panel manages to recharge the battery with the same quantity of energy it consumed the previous night, then the system is in energy balance and will guarantee light every night, otherwise, it will use the battery's energy reserve until it runs out (the battery will shut off when only 20% storage remains).

The possible running modes are:

- on at sunset for 8 hours
- on at sunset for 10 hours
- on at sunset for 4 hours, then shutting off internal LED ring and reducing outer ring to 50%, then 2 hours before sunrise back to 100%*
- on from sunset to sunrise*

Grid connection: the switch over occurs when the battery is no longer capable of running the LEDs at 50% luminosity. It is possible to set the dip switch for 100% and if/when the system connects to the grid the LEDs run at 100% of their nominal power (350mA).

A coloured LED signals that the product is connected to the grid.

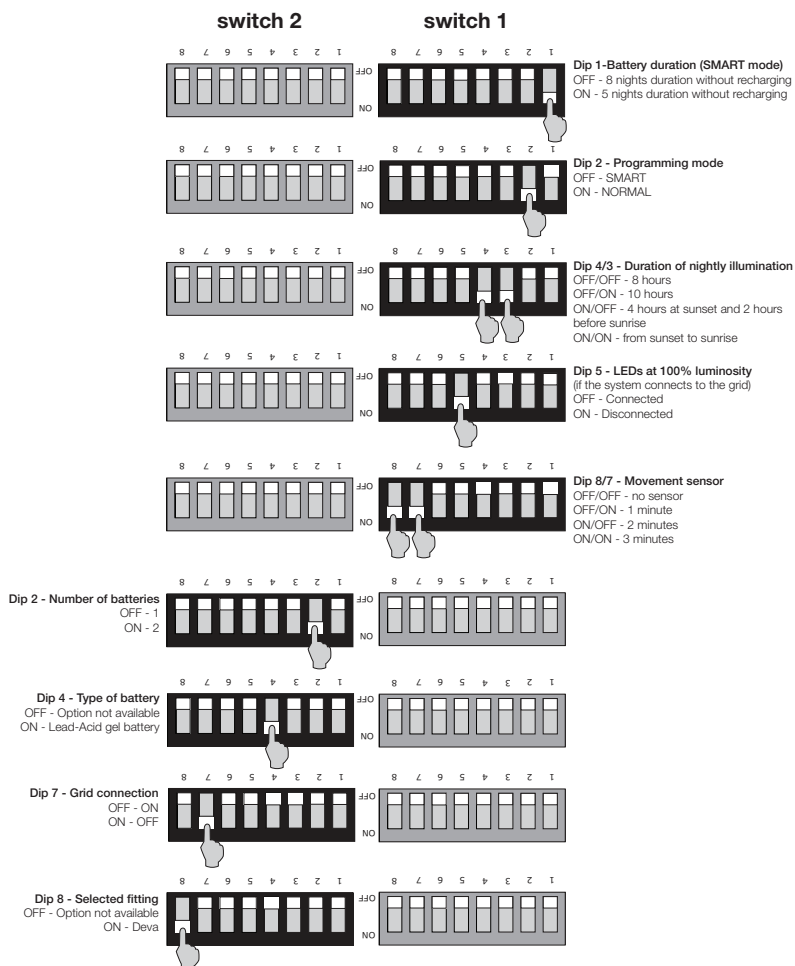
Movement sensor: from sunset to sunrise the system will be on with the outer LED ring running at 50%, until the sensor detects movement, from that moment the whole fitting will be on at full luminosity. Using the dip switches it is possible to select the duration of the increased luminosity: 1,2, or 3 minutes.

*The running modes "sunset to sunrise" and "4hrs from sunset – 2hrs from sunrise" will be operative after 3 days and 3 nights; before this time has passed the system will function for "8hrs from sunset".

Programming Deva Solar

Factory standard programming:

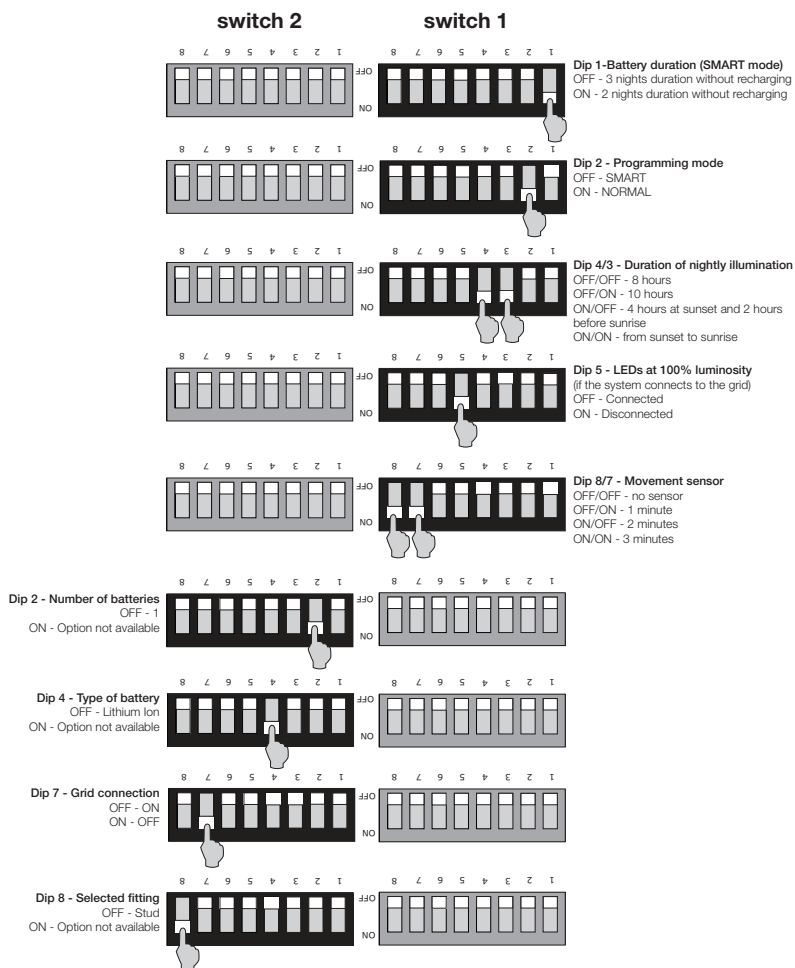
SMART operating mode with on at sunset for 8 hours and a battery duration of 5 or 8 nights; the luminosity for the grid connection is not set at 100% and the time for the movement sensor is set to 2 minutes.



Programming Stud Solar

Factory standard programming:

SMART operating mode with on at sunset for 8 hours and a battery duration of 2 or 3 nights; the luminosity for the grid connection is not set at 100% and the time for the movement sensor is set to 2 minutes.



Electronic circuit board (ECB) Deva Solar and Stud Solar

ECB warnings

Led1

Power supply to electronic circuit is ok (from either the panel or the battery).

By removing either the panel wire or the battery wire it is possible to verify from where the power is being supplied.

Led 2

This is the LED which is the closest to the dip switches. It indicates how things are working.

1 flash: power supplied from the panel is too low to charge,

but not low enough to allow product to "light up"

2 flashes: battery charging and searching for MPPT

3 flashes: LEDs on, in other words, light hitting panel is low

that LEDs are instructed to switch on.

If the battery has insufficient charge to switch to light up the product, the ECB remains in this operating mode up until the end of the pre-set light-up time (which can be set up via dip switch).

4 flashes: LEDs off as per settings

Continuous flashing: Diagnostic mode

Led 3

Placed in the middle of the ECB, this gives additional input for diagnostics.

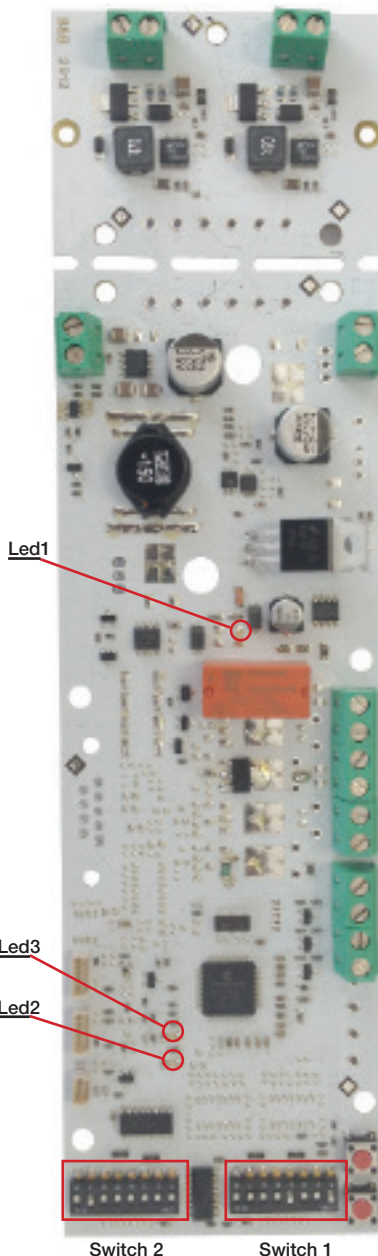
1 flash: LED diagnostic mode, with LEDs off, use the button to switch them on.

2 flashes: Motor diagnostic mode

3 flashes: LED diagnostic mode, with LEDs on and power supply below the maximum.

6 flashes: LED diagnostic mode, with LEDs on and power supply above 80%.

Led2 and Led3 on at the same time means the ECB is resetting (has a 2 second duration). The ECB is in this mode when it either switches the LEDs on or if you hold both buttons down for 2 seconds.



Electronic circuit board of Challenge Solar



Max. module input short circuit current at 50°C	15 A
Max. load output current at 50°C	15 A
System voltage	12 V
Ambient temperature allowed	-25°C / +50°C
Max. voltage of Solar panel	47 V DC
Temperature compensation	-4mV/K/Cell
Battery fuse	30 A

The electronic circuit board:

- monitors the state of charge of the batteries.
- controls the charging process
- controls the connection/disconnection of the luminaires

A battery charging algorithm protects the battery from harmful states. Activation of the three deep discharge functions (LVW, LVD and LVR) is dependent upon the state of charge (SOC). The switching thresholds lie within the corresponding voltage window in accordance with the discharge or charging current.

The electronic circuit board consists of the following components:

1. Info LED
2. 4 LEDs for displaying the state of charge (red, yellow, green1 and green 2)
3. Terminal block for connecting the solar panel
4. Terminal block for connecting the battery
5. Terminal block for connection the luminaires

	Factory settings	Controller settings
Battery system	12 V GEL	DIP 1 - OFF
SOC Factor	16 mV/A	DIP 2 - ON / DIP 3 - OFF
Night light	8 h*	8*
FLOAT	13,8 V	3
BOOST	14,4 V	4
EQUAL	14,7 V	3
LVD	11 V	1
LVR	12,4 V	5

* The only parameter that can be modified:

- 0 OFF
- 1-8 Working hours
- 9 From sunset to sunrise

Electronic circuit board Challenge solar – Operating status LED indicators

LED displays		
LED	Status	Meaning
Info LED	illuminates green	Normal operation
	Flashing red	Indicates a fault (see "Faults and remedies")
Red LED	Flashing quickly	Battery state of charge $\geq 30\%$ $< 40\%$
	Flashing	Activation of deep-discharge protection state of charge $< 30\%$
Yellow LED	Illuminates	Battery state of charge $\geq 40\%$ $< 50\%$
	Flashing	Re-activation level of deep-discharge protection (50%) not yet reached. Battery state of charge $\geq 40\%$ $< 50\%$
1. Green LED	Illuminates	Battery state of charge $\geq 50\%$ $< 80\%$
2. Green LED	Illuminates	Battery state of charge $\geq 80\%$ $< 100\%$
	Flashing quickly	Battery state of charge =100%; charge regulation active with holding current

Connection

1st step: connect the luminaires.

Connect the L+ (brown) luminaire cable to the correct pole, then connect the L- (blue) luminaire cable to the correct pole. In the case of connection of more than one luminaire, conduct parallel connection.

2nd step: connect the battery connections.

Operation

The electronic circuit board immediately begins operation once the battery is connected or the external fuse is inserted. The display shows the current operating mode.

It is factory programmed for an 8 hours operation; to change the setting follow the instructions of PA RC100 controller.

The 5 minutes On/Off delay has been set to avoid that the luminaires switch on/off if the panels are temporarily illuminated/obscured

Protection functions

The following integrated protection functions of the electronic circuit board ensure that the battery is handled as gently as possible.

These protection functions are part of the basic function of the electronic circuit board:

- Overcharge protection
- Deep discharge protection
- Battery undervoltage protection
- Solar panel reverse current protection

The following installation faults do not destroy the circuit board. After having corrected the fault, the device will continue to operate regularly:

- Protection from solar panel short circuits/incorrect solar panel polarity *
- Protection from short circuits at the luminaires output, or excessive luminaires current
- Protection from battery connection with incorrect polarity
- Protection from solar panel overcurrent
- Protection from luminaires overtemperature
- Protection from overvoltage at the luminaires output

*the reversal -polarity protection of the solar panel in a 24V system is only provided up to an open-circuit voltage of 35V.

Faults and remedies Challenge Solar

Fault	Cause	Remedy
Info LED flashing red	Charging interrupted due to excessive charging current	- Charging automatically continues as soon as the charging current lies back to the permissible range
Luminaires cannot be operating or just for a while + info LED flashing red	Luminaires output is switched off due to battery overvoltage	- Check the luminaires
	Luminaires output is switched off due to an output short circuit	- Disconnect the luminaires - Correct the cause of the short circuit - Reconnect the luminaires
	Luminaires output is switched off due to overheating of the electronic circuit board	The luminaires output automatically switches on again once the electronic circuit board has cooled down - Improve the cooling air circulation - remove any other heat sources - Check the conditions of use and the mounting location
Luminaires cannot be operating + info LED flashing red + battery LED flashing red	Luminaires output is switched off due to too low battery voltage	The luminaires output automatically switches on again once the battery voltage lies back within the permissible range - Pre-charge the battery - Equip the luminaires directly connected to the battery with deep discharge protection - Check the battery and replace it if necessary
Luminaires cannot be operating + info LED flashing red + 2 nd LED flashing green	Luminaires output is switched off due to excessive battery voltage	The luminaires output automatically switches on again once the battery voltage lies back within the permissible range
	External charging source is not voltage-limited	- Check the external charging source
Luminaires cannot be operating + info LED illuminates green	Defective luminaires or installation mistake	- Connect the luminaires correctly
		- Replace the luminaires
Battery is not charged	Solar panel not connected	- Connect the solar panel
	Solar panel connected with incorrect polarity	- Connect the solar panel with the correct polarity
	Short circuit at solar panel input	- Correct the cause of the short circuit
	Incorrect solar panel voltage	- Use a solar panel with the specified voltage
	Solar panel defective	- Replace the solar panel
Battery display jumps quickly	Large pulse current	Adjust the current consumption to match the battery capacity
	Battery is defective	Replace the battery
No Display	Battery voltage too low	- Pre-charge the battery
	The external fuse in the battery connection cable has blown.	- Replace the external fuse
	Battery is not connected	- Unclamp all connections - Connect a (new) battery with the correct polarity - Reconnect the solar panel and the luminaires
	Battery is connected with the wrong polarity	
	Battery is defective	

Cleaning the panel

- The accumulation of dirt on the transparent cover of the panel reduces the efficiency.
- The frequency of the cleaning depends directly on how quickly dirt is accumulated.
- We recommend to clean the panels 2 times per year.
- Cleaning should be carried out while panel is cool, either in early morning or in late evening.
- Cleaning consists in washing the panels with water and gentle detergents (non-abrasive) by taking care to avoid strong chemicals.
- Do not use high-pressure hoses.
- After washing, dry the panels by using a non-abrasive cloth.

WARNING: Do not remove the panels for cleaning



Flammable



Toxic



Harmful



Corrosive



Dangerous for the environment



Explosive

Do not use harsh chemical products



WARNINGS & WASTE DISPOSAL



IT IS FORBIDDEN TO MODIFY THE FITTING WITHOUT AUTHORISATION

- Any tampering of the luminaire will render the warrantee void, and may render the product dangerous.
- The installation and programming of the product conducted by qualified personnel.
- Compliance of these instructions is necessary to ensure the proper functioning of the single product and of the whole installation.
- The safety of this product is guaranteed only with the appropriate use of these installation instructions which must be retained.
- In case of problems, please contact the manufacturer.
- For maximum efficiency, install the product in direct sunlight.
- Avoid installation in shadowed areas (e.g. under trees, or too close to buildings).
- It is necessary to clean the solar panel periodically.
- Mareco Luce is not liable for any damage to third parties caused by an improper product installation. The product must be installed according to the supplied installation instructions.

For all the solar luminaires is required a periodical maintenance including the following steps:

- To clean the solar panel to remove the possible dirt that might have settled on the panel
- To check the tightening of the screws that hold the different parts
- To check that the internal components as battery and electronic components do not show signs of significant rust and oxidation. Otherwise it is necessary to check if there is any water infiltration.
- To check the cable glands
- To check that the cables are connected securely
- To check the terminals corrosion
- In case of damaged components, they must be replaced before the luminaire can be restarted. Use only original spare parts

Cautions

- Keep the battery away from fire, flames and sparks
- Check periodically the charging process
- Pay attention to the possible development of sparks
- Pay attention to the risk of electrocution

Fault behaviours

The electronic circuit board while operating is dangerous in the following situations:

- It does not appear to function at all.
- It is visibly damaged, or the connected cables are visibly damaged.
- Emission of smoke or fluid penetration.
- It has loose parts

In the abovementioned cases, disconnect the electronic circuit board from the solar panel and from the battery immediately.

- The electronic circuit board may only be connected to the luminaires and to the battery by trained personnel and in accordance with the applicable regulations.
- Follow the installation and operating instructions for all components of the PV system.
- Ensure that no cables are damaged.



The European Directive 2002/95/CE on the restriction of use of hazardous substances in electrical and electronic equipments (RAEE) outlines the following:

- Luminaires shall not be treated as normal urban waste
- Obsolete light fittings must be disposed with at authorised waste disposal stations or delivered to the distributor when purchasing the replacement
- The symbol of the bin with an "X" is placed on the products as a reminder that these products must not be treated as normal urban waste.
- Failure to adhere to this directive can be punished by law.

47032 Bertinoro (FC) Italia
Via S.Croce, 121 (z.i)

tel. +39 0543 4687
fax +39 0543 449051

info@marecoluce.it
marecoluce.it



mareco LUCE