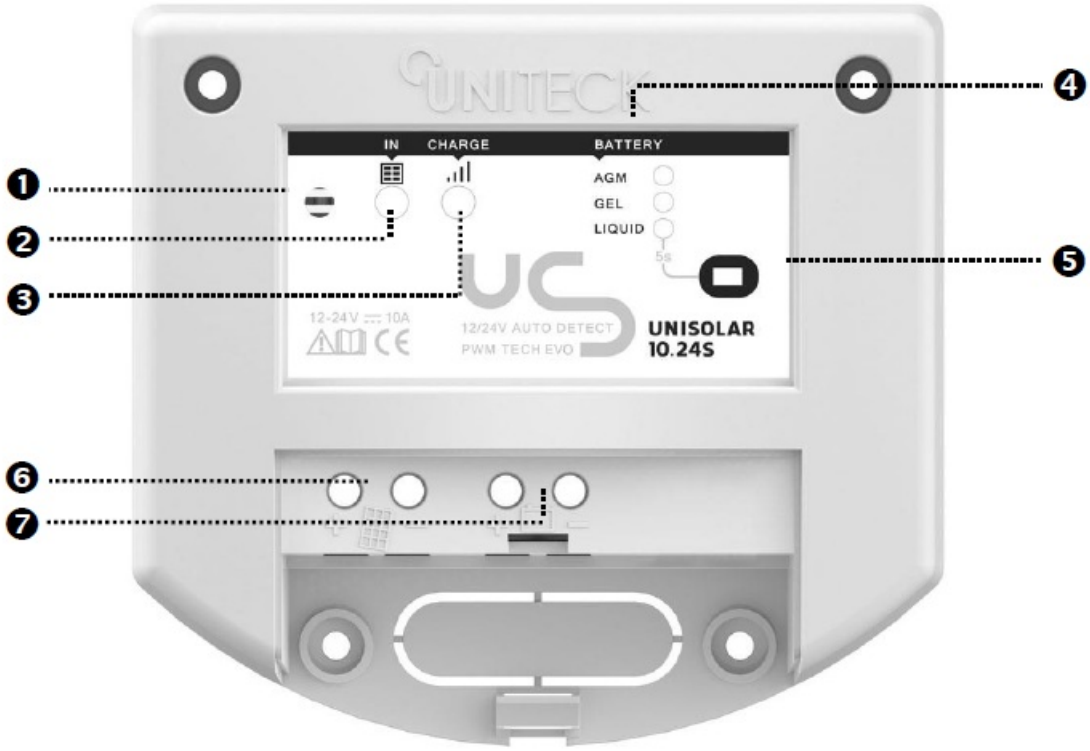
UNITECK UNISOLAR 10.24S PWM Solar Charge Controller Instruction Manual

Contents

UNITECK UNISOLAR 10.24S PWM Solar Charge Controller

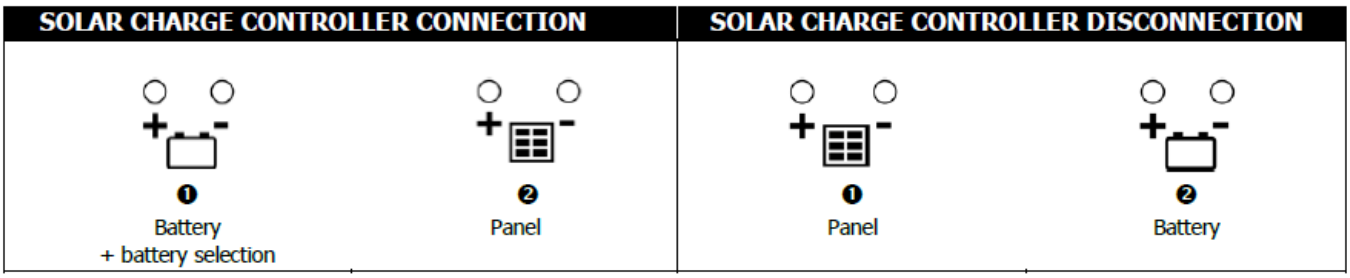
QUICK START



1. **External temperature sensor**
    - Solar energy (photovoltaic panel):
    - Steady light, panel does supply current
    - Blinking light, panel overvoltage
2. **Battery status:**

- **Blinking green:** Full battery
- **Green:** charging
- **Red:** battery deeply discharged

3. **Battery selection:**
    - **AGM:** sealed lead-acid battery, maintenance-free, VRLA…
    - **Gel:** Gel cell battery
    - **Liquid:** liquid electrolyte battery (with plug)
4. **Command button/switch:**
    - **Battery selection:** push 5 seconds -then selection 1 sec.
5. Solar panel connection (Voc<50V)
6. Battery connection (12V ou 24V)



Dear customer, thank you for purchasing one of our Uniteck products. Please read all the instructions carefully and thoroughly before using the product.

UNISOLAR 10.24S / 20.24S
Unisolar is a solar charge controller for autonomous photovoltaic system.
Through its integrated microprocessor, Unisolar regulates the charging current coming from the panel towards the battery depending on:

- the ambient temperature (temperature sensor integrated)
- the charge level of the battery (ALGOTECK load curve)
- the battery's technology (Gel/Liquid/AGM)

With its PWM technology, it ensures an optimal charge quality of 12V or 24V batteries. It extends their lifespan and optimizes the output of your solar installation. Unisolar perfectly recharges any lead-acid batteries up to 100%:

- Liquid electrolyte
- Gel-cell (GEL)
- AGM (maintenance-free)

INSTALLATION

FIXING
Unisolar has been designed for an indoor use. It incorporates an external temperature sensor which adjusts the load voltage according to the ambient temperature for an optimal load (refer to the protection part for more details). Installing it near the battery is recommended. Fixing the solar charge controller can be made:

- On a solid, stable and dry appropriate flat surface, thanks to 4 screws (not provided)

For a complete integration of your solar charge controller in your environment, Unisolar 10.24S and 20.24S give you the possibility to pass the wiring through a partition wall.

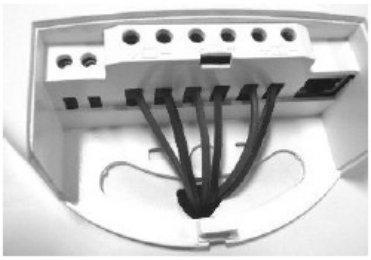
- **Standard wiring**

Cables go out via the 2 orifices of the cover

❶ Break the 2 caps of the cover with pliers

❷ Close the cover by pushing from the bottom to the top

- **Bulkhead adapter wiring**

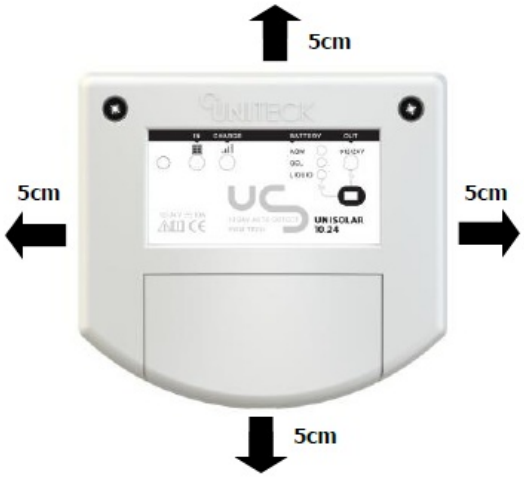


Cables go through the wall

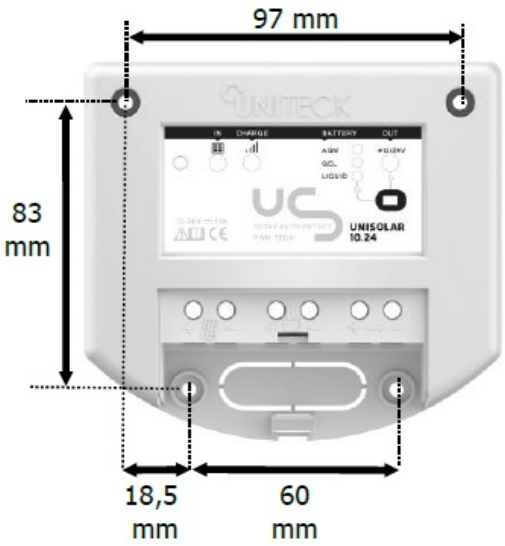
❶ Break the cap of

❷ Close the cover by pushing from the bottom to the top

To provide the required air circulation for cooling the solar charge controller, let a 5 cm free space (minimum) all around the product.



- **Wall mounting**



❶ Fix directly the Unisolar to your wall, using 4 screws (not provided)

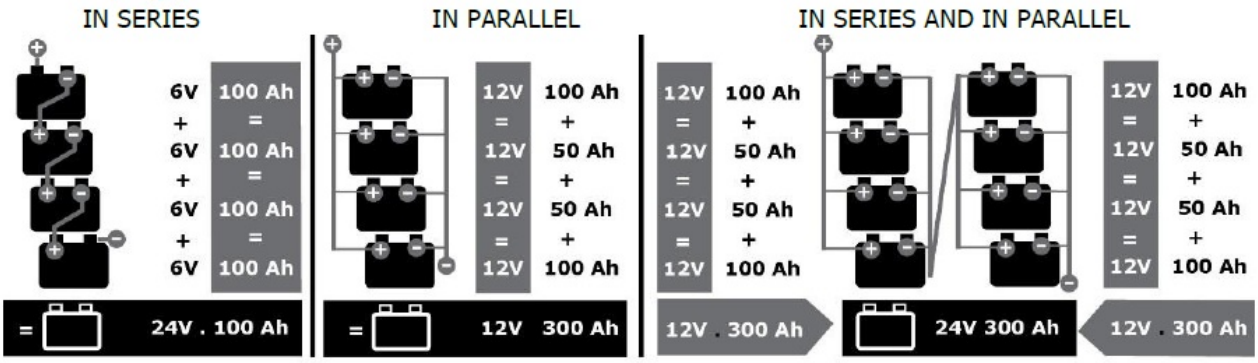
CONTROL BEFORE CONNECTION

Before connection, please consult the following element:

- **BATTERY**

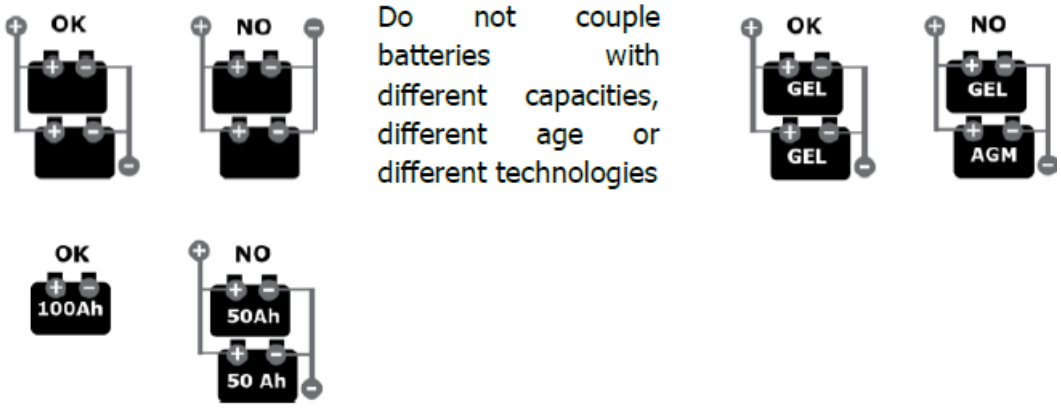
  Unisolar has an automatic voltage detection. For its correct functioning, please check:

  - If the battery voltage is higher than 6V (required voltage for the startup of the solar charge controller)
  - For 24V batteries, that the voltage is not lower than 18V.
  - For flooded batteries, check the electrolyte level. If necessary, complete before charging.
  - For coupling, proceed as follows:



Tips:

- In case of parallel connection, favour diagonal wiring for a standardization of the charge/discharge Prefer a high-capacity battery to 2 small connected in parallel, for equal capacity.

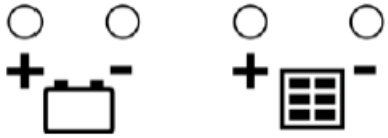


- **PHOTOVOLTAIC PANEL**

  Check that the photovoltaic panel's power does not exceed the power rating of the solar charge controller. Do

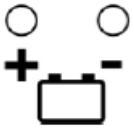
not connect solar panels whose voltage is higher than 50V.

CONNECTION
Connect each component to the symbols added next to each relay (cables not included).

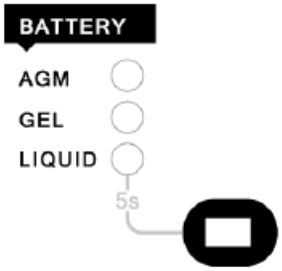


Please follow the connection order in accordance with the polarities. In case of non-compliance, your solar charge controller as well as your battery may be damaged.

1. Connect your battery to the solar charge controller (+ and -) Battery indicator lights on.

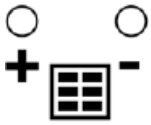


2. **Select your battery technology:**



- Press and hold the switch for 5 seconds, the active light flickers
- Select your battery's technology by pressing the button
  - **Liquid:** Open lead/acid liquid battery
  - **Gel:** Gel battery
  - **AGM:** Lead battery (maintenance-free), AGM…
- To confirm your selection, wait for 5 secondes. The light becomes fixed again. Unisolar memorises your last setup.

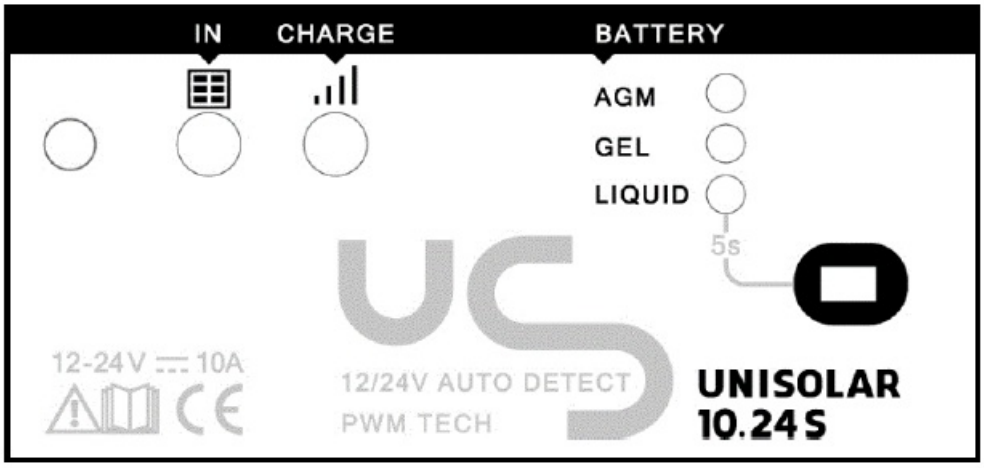
3. Connect your photovoltaic panel to the solar charge controller (+ and -).



In case of disconnection, follow the opposite order.
NB: Grounding of the solar charge controller is not necessary. If you do want ground your installation, always do it on the positive cables.

FUNCTIONNING

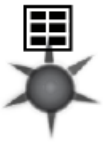
CONTROL PANEL



PHOTOVOLTAIC PANEL DISPLAY

Green

Steady green:
Photovoltaic panel generates electricity



Green +Flash

Blinking green:
Batterty in overvoltage

BATTERY CHARGE DISPLAY

Green

Steady green :
Charging

Green + Flash

Blinking green :
Battery charged

Orange

Steady orange:
Battery discharged

Tip: reduce or switch off your consumers.

Red

Steady red:
Battery deeply discharged

Tip: Imperatively switch off your consumers until the light becomes green again.

CHARGING PROCESS

STEPS OF THE BATTERY CHARGE SYSTEM

Charging is done in 6 steps:

- **Test**

  The testing the battery determines on a daily basis the state of health and load of your battery and determines the stages and the levels of charge necessary for the maintenance of your battery.
- **Boost**

  The charge is in full-strenght load: the Unisolar uses 100% of the energy coming from the solar panel, until the voltage reaches the boost or the equalisation voltage. The battery is then 80% charged.
- **Egalisation**

  During 2 hours, Unisolar releases a voltage that is constant and regulated. More the battery is charged, more the current decreases (battery nearly full).

  NB: This stage does not occur with Gel batteries. (see: charge curve regulation depending on the battery technology). Indeed, if this stage occurs with this type of battery, there might be a risk of explosion.
- **Recondition**

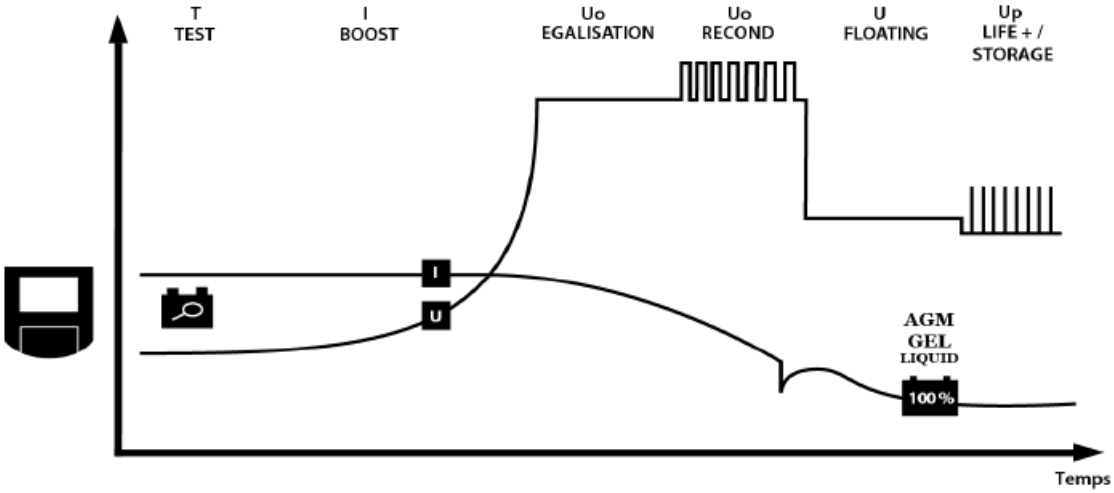
Admixture of the battery to avoid any phenomenon of sulfatation and of stratification (only liquid battery)

- **Floating 100%**

  The battery charge is complete. The Green “charge” light begins to blink. Unisolar continues to release a very low current to compensate battery self-discharge.

- **Life +**

  Compensation of the natural auto discharge of the battery with impulse loads for a longer lifespan of the battery.



Voltage level	Gel	AGM	Liquid
	|	|	|
Boost	14,2 V	14,4 V	14,5 V
Absorption	-	14,4V	14,5V
Egalisation	-	-	14,8V
Floating	13,9V	13,9V	13,9V

NB: the Voltage levels above are adjusted by the conditions ALGOTECK.

CHARGE CURVE REGULATION DEPENDING ON THE BATTERY TECHNOLOGY

To perfectly recharge all lead acid batteries, Unisolar adapts its load curve according to the ” battery’s technology” previously selected:

- **“Liquid” Battery Mode:**

  Liquid electrolyte batteries require higher loads to avoid any stratification of the electrolyte. Stratification is a non-homogenous blend of the electrolyte. Acid is concentrated at the bottom and the water at the top (due to its lower density). This phenomenon leads to freezing risks or oxidation of the plates. To avoid this, Unisolar makes (in a liquid batteries mode) an equalisation charge that mixes the electrolyte, which is essential to preserve the lifespan of your battery.

- **“AGM” Battery Mode/ “GEL” Battery Mode :**

  Lead batteries (AGM or GEL) require a precise control of the charge voltage to avoid bleeding phenomenons. Bleeding is an electrochemical reaction that leads to the release of oxygen and hydrogen gases inside the battery when the battery voltage reaches a point named “gasification voltage”. This voltage changes according to the type of the batteries (AGM or GEL). Depending on the selected mode, Unisolar releases a voltage level adapted to the technology of your battery for a recharge up to 100%.

Regulation by external/outside temperature

Chimical characteristics of the battery vary depending on the ambient temperature. With its external temperature sensor, Unisolar adapts its charge voltage precisely in relation with the reference temperature of 25°C, of +/- 30mV (+/-60mV – 24V by °C), which avoids overloads and under loads.

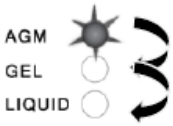
INTEGRATED PROTECTIONS

For a safe use, Unisolar has several protections that preserve the solar charge controller, the battery and the consumers in output:

-  Panel polarity reversal protection,
- Protection against panel short-circuits,
- Protection against reversed current: prevents reversed current towards the solarpanel during the night.
-  Battery polarity reversal protection,
-  Thermal protection.

ANOMALIES, CAUSES, REMEDIES

Error message		Causes	Solution
No light switch on		The solar charge controller need s the battery voltage to be higher than 6V to be able to start when connecting the battery	Check the battery voltage, recha rge it if necessary.
		Battery polarity reversal	Check connections
		Battery connection problem (cab les, terminals…)	
		Defective battery	Replace your battery, following t he disconnection and connection order (see installatio n and connection)
		Solar panel disconnected, not pr operly connected, or short circuit	Check connections (polarity and connection)
	Panel light turned off while sun is present	Normal functionning: The panel voltage is lower than t he battery voltage or too low sun shine.	The panel gets its charge back a s soon as the panel voltage is hi gher than the battery voltage.
		One or several cells of your pan el are hidden.	Check if your panel is clean and make sure none of the cells are hidden.
	Blinking panel light (green)	Battery overvoltage	Disconnect the solar panel, then make sure the battery is not in a overvoltage state or that the volt age of your battery coupling doe s not exceed the voltage accepted by the solar charge co ntroller (12V/24V)
	Orange charge light	Battery discharged	Usual charge, light turns green a s soon as the battery is charged.

Error message		Causes	Solution
 Red	Red charge light. Consumers are cut (12 /24V light off).	Battery deeply discharged.	Usual behaviour: Light turns gre en as soon as the battery is char ged.
	Battery lights: – AGM, – Gel – Liquid Blinking simultaneously	Thermal protection: internal solar charge controller temperature ex ceeds 85°C. Solar charge controller in a prote ction state. Charge and consumers are cut	Wait the end of the cooling- off p eriod (<75°C) Control the source of the overheating (mounting loc ation, other heat sources). Provi de an adequate ventilation to th e solar charge controller As soon as the solar charge controller gets back to its normal functionning temperature, it will r estart automatically.

WARNINGS ADVICE

- Unisolar is designed to be exclusively used with photovoltaic systems and lead acid batteries with liquid electrolyte, gel cells (Gel) or sealed AGM.
- Do not attempt under any circumstances to charge other batteries than acid-lead batteries (non-rechargeable batteries for example).
- Use Unisolar in a well-ventilated area, sheltered from rain, humidity, dust and condensation.
- Follow the manufacturer’s instructions and safety procedures of the battery. In case of doubt, consult your retailer or installer.
- Batteries can produce flammable gas. Avoid flames, sparks.
- During battery maintenance (except GEL), there is a risk of acid leaks: protect yourself.
- Never short circuit + and – of the battery or cables: risk of explosion or fire.
- Maintenance: check the wiring and all connections at least once a year.
- All tasks must be realised in compliance with the country regulations in force regarding electricity.
- This device is not designed to be used by people (including children) whose physical, sensory or mental abilities are reduced, nor by people lacking of experience or knowledge unless they have benefited of supervision or prior instructions concerning the use of the device given by a person responsible for their safety.
- Please keep an eye on children to ensure that they do not play with the device.

PICTOGRAMS

Device conform to applicable European Union directives

For indoor use, do not expose to the rain

Caution! Before using, read the instruction manual utilisation

Caution explosive gases, avoid sparking and naked flames.

Product under selective collection- Do not throw it in a household waste.

Choose a sheltered local with adequate ventilation or especially equipped.

IP43 Protected against foreign bodies larger than 1 mm and against projections of water from all directions.

TECHNICAL SPECIFICATIONS

	Unisolar 10/24S	Unisolar 20/24S
SYSTEM		
Battery voltage	12V (6 – 2V elements) 24V (12 – 2V elements)	
Nominal charging current	10A	20A
Compatible panel – maximum output power – recommended ltage	150W-12V batt 300W-24V batt 17/19V-12V batt. 34/38V-24V b att.	300W-12V batt 600W-24V batt. 17/19V-12V batt. 34/38V-24V batt.
Technology	PWM	PWM
Protection rating	IP43	IP43
Maximum cable section	6 mm²	6 mm²
SOLAR CHARGE CONTROLLER		
Voltage selection (12/24V)	Automatic detection	
Battery type selection	Yes	Yes
Recommanded battery capacity	10 to 150Ah	10 to 300 Ah
Temperature Compensation	Yes	Yes
Panel overvoltageprotection	Yes	Yes
MECANICAL CHARACTERISTICS		
Dimensions (LxHXW)	120x110x42	120x110x42
Poids	200g	200g
Functionning temperature	-35°C > +55°C	
Storage temperature	-35°C > +80°C	

COMPLIANCE STATEMENT
UNITECK testifies that the solar charge controllers described in this manual : UNISOLAR 10.24S / 20.24S are manufactured in compliance with the following European directives :

- **Low voltage directive:** 2006/95/CE from 12/12/06.
- **EMC directive:** 2004/108/CE from 15/12/2004- 03/05/1989.

It complies to the harmonised standards:

- EN 60335-2-29 & EN 55014-1/ EN 55014-2 – EN61000-3-2 – EN61000-3-3 – EN62233

CE-date of tagging: january 2013.

01/01/2013
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France
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WARRANTY

Warranty covers any defect, manufacturing defects for 1 year from the date of its purchase (parts and labour).
Warranty does not cover:

- normal wear of parts (Ex.: cables, etc.).
- panel-module/battery voltage errors, incidents due to inappropriate use, fall, disassembly or any damages due to transport.

In case of failure, return the product to your distributor by attaching:

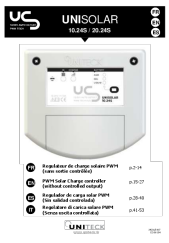
- the dated proof of purchase (receipt, bill…)
- explanatory note of the failure

Caution: Our after-sales service does not accept carriage forward/ collected returns.

After the warranty, our after-sales service ensures repairs after acceptance of a quotation.
After-sales service contact :
Uniteck- 1 Avenue de Rome
Zae Via Europa – bâtiment Cassis
34350 Vendres -France
E-mail: sav@uniteck.fr
Fax: +33 (0)4 88 04 72 20

www.uniteck.fr

Documents / Resources

	UNITECK UNISOLAR 10.24S PWM Solar Charge Controller [pdf] Instruction Manual UNISOLAR 10.24S PWM Solar Charge Controller, UNISOLAR 10.24S, PWM Solar Charge Controller, Charge Controller

References

- Fabricant Français
- Fabricant Français