



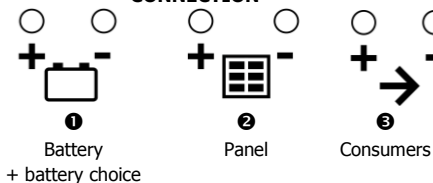
## IMPORTANT



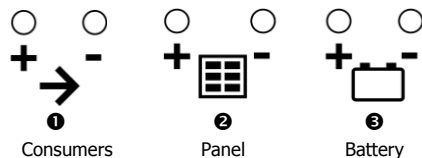
Unisolar has an automatic voltage detection. For its correct functioning, please imperatively follow the connection and disconnection order below.

In case of non-compliance, you may damage your battery as well as your Unisolar charge controller. This damage is not covered by the warranty.

### SOLAR CHARGE CONTROLLER CONNECTION



### SOLAR CHARGE CONTROLLER DISCONNECTION



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

## DESCRIPTION

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 (I<sub>u</sub>U load curve)
- the battery technology (Gel/Liquid/AGM)

With its PWM technology, it ensures an optimal charge quality of your batteries, 12V or 24V. It extends their lifespan and optimizes the output of your solar installation

Unisolar is perfectly recharging any lead-acid batteries up to 100%:

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

With its 2 battery outputs, it can recharge up to 2 batteries simultaneously and independently.

Unisolar 20-24D can also be equipped by a remote display : the UNISOLAR RM (optional).

## 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)
- Or on DIN rail: 35mm with its specific bracket.

For a complete integration of your solar charge controller in your environment, Unisolar 20.24 gives you the possibility to make the wirings via the bulkhead.

### Standard wiring



Cables go out via the 2 orifices of the cover

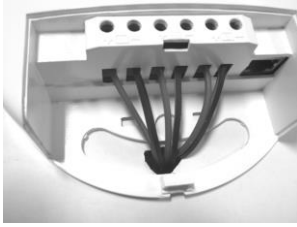


❶ Break the 2 operculums/caps of the cover with a pliers



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

## Bulkhead adapter wiring



Cables go through the bulkhead

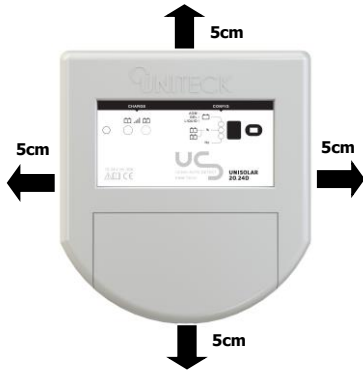


❶ Break the cap

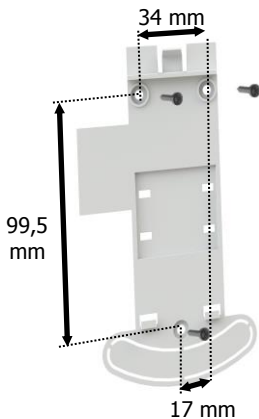


❷ Close the cover by pushing from the bottom to the top

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

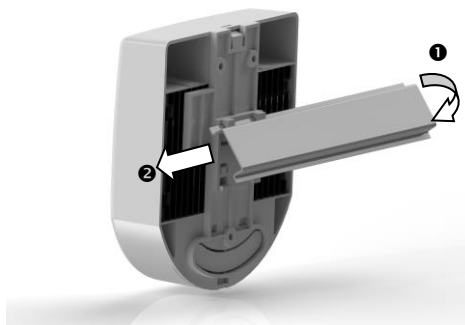


## Unisolar 20-24D: Wall mounting



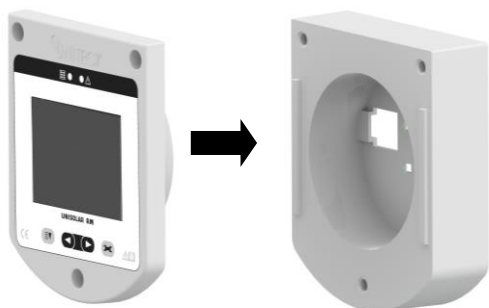
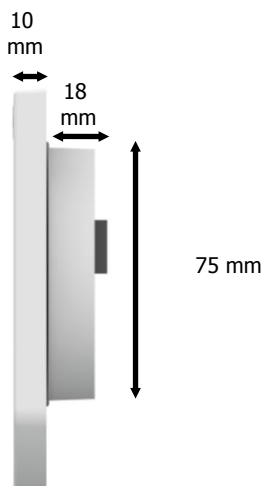
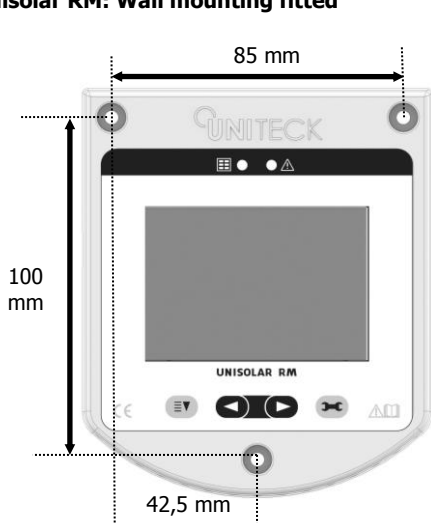
- ❶ Fix the wall mounting using 3 screws (not provided)
- ❷ Clip the Unisolar on the bracket

## Unisolar 20-24D: Din Rail mounting



- 1 Clip the Unisolar on its bracket
- 2 Clip the mounting on the rail and drag it onto the rail where you want it to be

## Unisolar RM: Wall mounting fitted

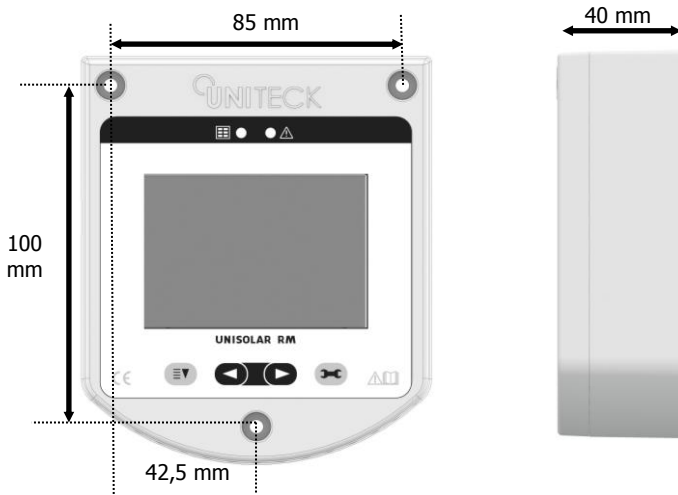


- 1 Remove the back part of the Unisolar



- 2 Fix your Unisolar remote to on the desired place (screws not provided)

## Unisolar RM: Standard wall mounting



- 1 Fix the Unisolar on the desired place (screws not provided)

# INSTALLATION – CONTROL BEFORE CONNECTION

Before connection, please consult the following points:

## BATTERY

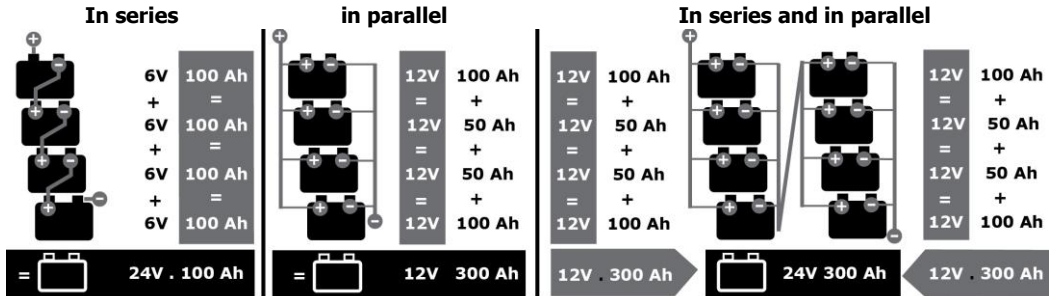
Unisolar has an automatic voltage detection. For its correct functioning, please check:

- That the battery voltage is higher than 6V (required voltage for the start-up of the solar charge controller)

- For 24V batteries, the voltage cannot be lower than 18V.

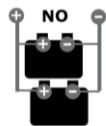
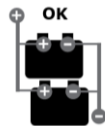
For flooded batteries, check the electrolyte level. If necessary, complete before charging.

To couple, proceed as follows:

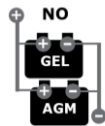
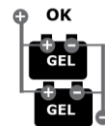


## Few pieces of advice

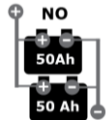
In case of parallel connection, favour diagonal wiring for a standardization of the charge/discharge



Do not couple batteries with different capacities, different ages or different technologies



Prefer a high-capacity battery to 2 small connected in parallel, for equal capacity



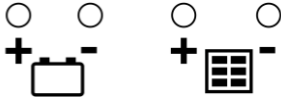
## PHOTOVOLTAIC PANEL

Check that the photovoltaic panel power do not exceed the power rating of the solar charge controller.

Do not connect a solar panel whose voltage is higher than 50V.

## INSTALLATION - CONNECTION

Connect each component to the symbol established for this purpose (cables not included).

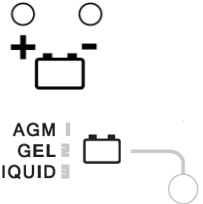


Please follow the order of connection in accordance with the polarities.

In case of non-compliance, your solar charge controller as well as your battery may be damaged.

❶ Connect your battery to the solar charge controller (+ and -)

The battery light is on



❷ Select your battery technology:

- Press the button to activate the "battery choice" mode

The battery light is blinking.

- Re-press 5 seconds the button to enter the menu.

The figure is blinking.

- Press the button to choose the figure corresponding to your battery technology

Figure	Technology
1	AGM : Lead acid batteries, maintenance-free, AGM...
2	GEL : Gel cell batteries
3	LIQUID : Liquid lead/acid batteries (specified open, plug...)

- To confirm your selection, wait for 5 to 7 seconds that the light get back fixed. Unisolar memorises your set up.

❸ Define your « load balancing ». This state permits to divide in % the charge of the solar panel on each battery:

- Press the button to activate the mode. The light is blinking.

- Re-press 5 seconds the button to enter the menu. The figure is blinking.

- Press the button to choose the figure corresponding to the « load balancing » desired.



Figure	Battery 1	Battery 2
0	0%	100%
1	10%	90%
2	20%	80%
3	30%	70%
4	40%	60%
5	50%	50%
6	60%	40%
7	70%	30%
8	80%	20%
9	90%(factory setting)	10%

Unisolar will divide its charge as defined above. Once the battery 1 is fully charged, the additional current will be spread to the battery 2. Unisolar will get back to the original setting as soon as the battery 1 is discharged.

In case that the solar charge controller only detects one battery, the whole charge will go on the latter.

Setting 90% / 10% (factory setting) :

This setting is perfect for camper van and boats. The house battery (battery 1) needs to be recharged to the maximum whereas the starting battery just needs a servicing charge to maintain it charged.

④ Select your pulsation frequency :

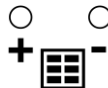
By default, this frequency is set on 25 Hz. If you wish, you can modify this frequency to avoid possible interferences with your others electronic devices which use the same frequency.



- Press the button to activate the mode
- Re-press 5 seconds the button to enter the menu. The figure is blinking.
- Press the button to choose the figure corresponding to the desired frequency

Figure	Frequency
0	25 Hz (factory setting)
1	50 Hz
2	100 Hz

⑤ Connect your photovoltaic panel to the solar charge controller (+ and -)

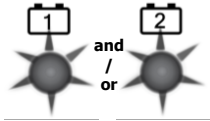
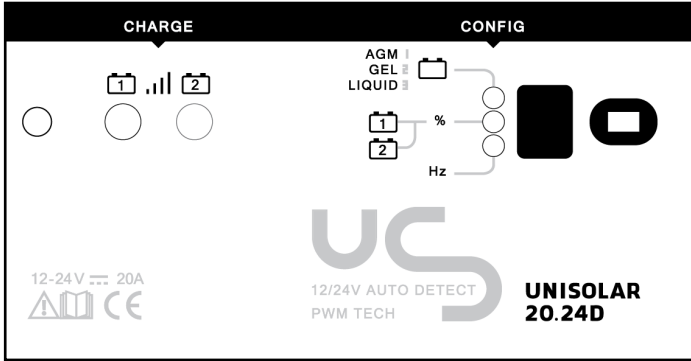


In case of disconnection, follow the opposite order.

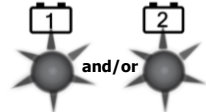
NB : the solar charge controller earth ground is not necessary. If you still want to do an earthing, always do it on the positive cables.



# FUNCTIONING – CONTROL PANEL

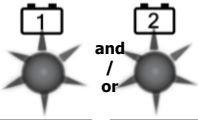


Steady light :  
Battery 1 and/or 2  
charging



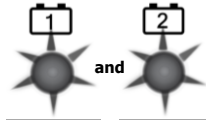
Low blinking light:  
Battery charged

Slow  
flash      Slow  
flash



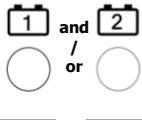
Fast  
blinking      Fast  
blinking

Blinking light every  
second  
The panel does not  
supply current or is  
not properly  
connected



Very fast  
flash      Very fast  
flash

Fast blinking light :  
Panel or battery short  
circuit



Light off  
No battery or  
battery connection  
problem

# IUOU CHARGING PROCESS

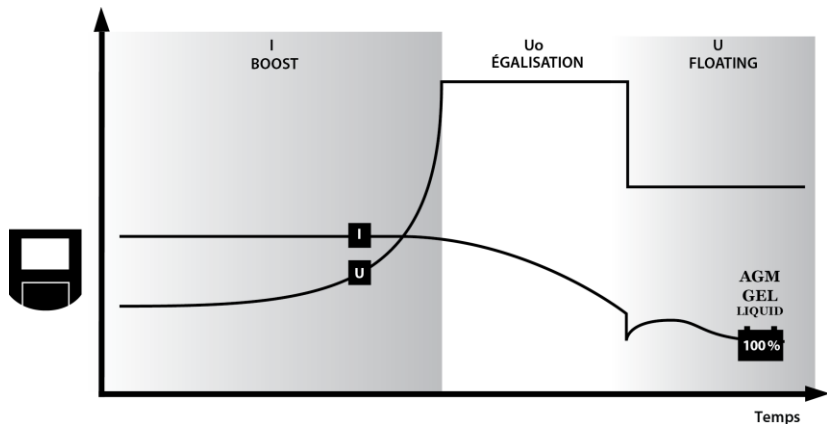
## STAGES OF THE BATTERY CHARGE SYSTEM

The charge is made in 3 stages: Boost, Equalisation, and Floating.

**Boost (I) :** The charge is in a « full-load state » and Unisolar uses 100% of the energy coming from the solar panel, until the voltage reaches the boost/equalisation voltage. The battery is then 80% charged.

**Equalisation (Uo) :** 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 appear with Gel battery. (refer to the part : charge curve regulation depending on the battery technology). Indeed, if this stage is realised to this type of battery, there might be a risk of explosion.

**Floating/ Float charging (U) :** The battery charge is complete. Red light "charge" begins to blink. Unisolar continues to release a very low current to offset the battery self-discharge.



Voltage threshold	Gel	AGM	Liquid
Boost	14,2 V	14,4 V	14,6 V
Equalisation (2H long)	-	14,6V	14,8V
Floating	13,8V	13,8V	13,8V

## CHARGE CURVE REGULATION DEPENDING ON THE BATTERY TECHNOLOGY

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

### "Liquid" Batteries Mode:

Liquid electrolyte batteries require higher loads to avoid the 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 protect the lifespan of your battery.

### "AGM" Batteries Mode/ "GEL" Batteries Mode:

Waterproof batteries (AGM or GEL) require a precise control of the charge voltage to avoid degassing phenomenon. Degassing 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 types 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 temperature

Chemical properties of the battery vary depending on the ambient temperature.

With its external temperature sensor, Unisolar adapts precisely its charge voltage in relation to 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:

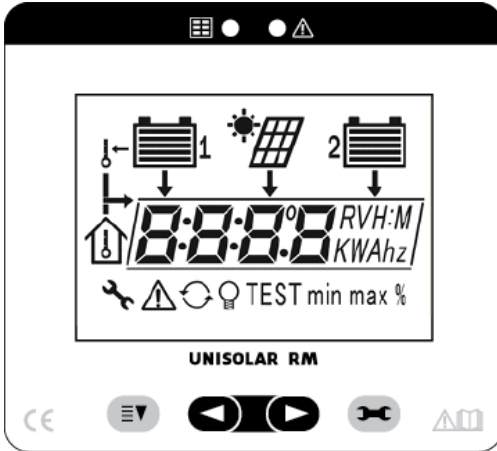


- Panel polarity reversal protection,
- Protection against panel short-circuits,
- Protection against reversed current: prevents reversed current towards the solar panel during the night.




- Battery polarity reversal protection


## REMOTE DISPLAY



The remote display gives a precise monitoring of the performances created by your photovoltaic installation with :

- The voltage released by the solar panel (mini, maxi, immediate)
- The controller output frequency
- The load balancing (battery 1 and 2)
- State of the battery 1 and 2 : immediate voltage / mini / maxi, capacity injected
- temperature and time

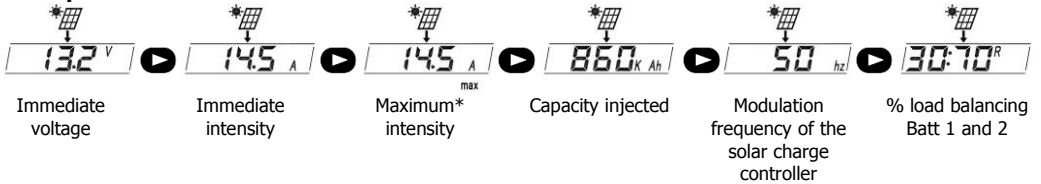
 Menu (solar panel, battery 1 and 2, temperature and time)

 Sub-menu scrolling or changes in value (settings mode)

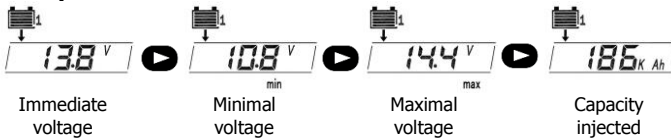
 Settings mode

### MENUS AND SUB-MENU

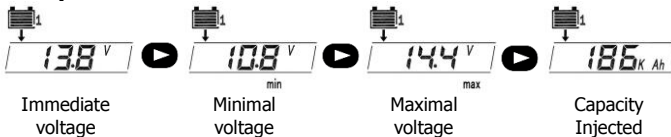
#### Solar panel



#### Battery 1



#### Battery 2



#### Temperature and time



## SETTINGS MODE

### Temperature settings (units)

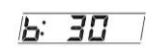


Display in  
degrees Celsius

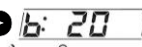


Display in degrees  
Fahrenheit

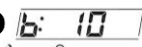
### Display backlighting length



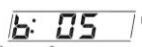
30 seconds



20 seconds



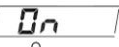
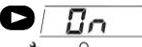
10 seconds



05 seconds



No  
backlighting



Permanent  
backlighting

### Backlighting intensity

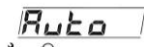


Full  
backlighting



Reduced backlighting  
(recommended)

### Automatic data scrolling

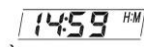


Active



Inactive

### Clock changes (Time)





Changing time

### Clock changes (Minute)



Changing  
minute

	<b>Error message</b>	<b>Causes</b>	<b>Solution</b>
<b>Solar charge controller : Unisolar 20-24D</b>	All lights off	Battery overvoltage	Disconnect the solar panel then check that the battery is not in overvoltage or that your coupling voltage does not exceed the accepted input voltage of the solar charge controller (12V/24V)
		In order to start, while connecting your battery, the solar charge controller needs the battery voltage to be > 6V	Check the battery voltage, recharge it if necessary
		Connection problem (cables, terminals...)	Check connections.
		Defective battery	Replace your battery in the same disconnection / connection order (refer to the installation and connection part)
	The 2 leds batteries are quickly blinking	Short circuit	Check battery and panels connections
	Battery light off	No battery or connection problem	Check battery connections
	LEDs or battery LED are blinking every second	Solar panel not properly connected	Check panel connections
Usual functioning : panel voltage lower than battery voltage		The panel get its charge back as soon as the panel voltage is higher than the battery voltage.	
Usual functioning : no sunshine (ex.: night)		The charge will resume as soon as the light becomes stronger.	

		Hot spot protection of your panel might be activated	Check the cleanliness of your solar panel and make sure none of your cells are hidden
 <p>Panel light off while sun is present</p>	Usual functioning : Panel voltage lower than battery voltage		The panel gets its charge back as soon as the panel voltage is higher than the battery voltage.
	Usual functioning : no sunshine (ex.: night)		The charge will resume as soon as the light becomes stronger.
	One or several cells of your panel are hidden.		Check the property of your solar panel and make sure none of the cells are hidden.
	Battery overvoltage		Disconnect the solar panel then check that the battery is not in overvoltage or your coupling voltage does not exceed the accepted input voltage of the solar charge controller (12V/24V)
	Battery connection problem (cables, terminals...)		Check connections
	Solar panel current exceeds the power rating of the solar charge controller		Make sure the power of the panel/solar module is adapted
	Solar panel disconnected, not connected properly, or short circuit		Check connections (polarity and connection)

## WARNINGS AND PIECES OF ADVICE

- Unisolar is designed/conceived to be exclusively used with photovoltaic systems and lead acid batteries with liquid electrolyte, gel cell (Gel), sealed AGM types.
- 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 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 (frost protection), there is a risk of acid leaks so 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 from 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 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



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.

### IP44

Protected against foreign bodies larger than 1 mm and against splash water from all directions.



# TECHNICAL SPECIFICATIONS

## Unisolar 20/24D

### SYSTEM

Battery voltage	12V (6 - 2V elements) 24V (12 - 2V elements)
Nominal charging current	20A
Compatible panel	
- maximum output power	480W
- maximum voltage	50V
Technology	PWM
Self-consumption	Unisolar 20-24D : 4 mA Unisolar RM : 20mA
Protection rating	IP44
Maximum cable section	6 mm <sup>2</sup>
Remote display connection (meter bus)	8 pin RJ45

### SOLAR CHARGE CONTROLLER

Voltage selection (12/24V)	Automatic detection
Battery type selection	Yes
Recommended battery capacity	10 to 300 Ah
Temperature Compensation	Yes
	-30mV /°C in 12V (25°C ref)
	-60mV /°C in 24V (25°C ref)
Panel overvoltage protection	16V/32V Charging : 15,5V /30V Reconnection : 15V/30V

### UNDER LOAD DISCONNECTION

Low voltage warning	12V/24V
Consumer disconnection	11,1V/22,2V
Consumer resetting	12,6V/25,2V

### MECHANICS CHARACTERISTICS

	Unisolar 20/24D	Unisolar RM
Dimensions apart from DIN Rail	137x150x46,5	110x120x53
(AnxAIxp)		
Weight	350g	300g
Mounting for DIN Rail	Yes	No
Functioning temperature	-35°C > +55°C	-15°C > +40°C
Storage temperature	-35°C > +80°C	-10°C > +40°C

## COMPLIANCE STATEMENT

UNITECK testifies that the solar charge controller described in this manual:

**UNISOLAR 20.24 and UNISOLAR RM** is manufactured in compliance with the following European directives:

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

It complies with 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

Société Uniteck

132 rue Pierre Simon Marquis de Laplace

34500 Béziers

**Yoann Fourmond**

General Manager



## WARRANTY

Warranty does cover any defect, manufacturing flaws 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 uses, fall, disassembly or any damages due to transport.

In case of failure, return the device 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 postage due returns.

After the warranty, our after-sales service ensures repairs after acceptance of a quotation.

After-sales service contact :

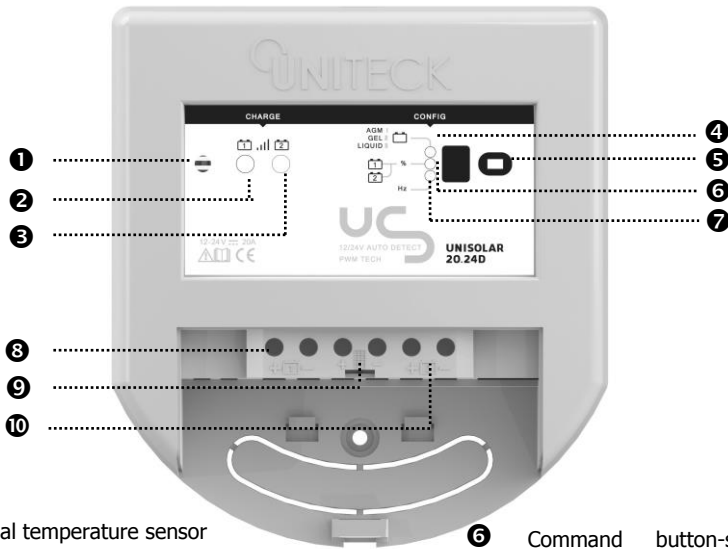
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# FRONT DEVICE - QUICK START



1 External temperature sensor

2 State battery 1 :  
- Blinking red : full battery  
- Red : charging

3 State battery 2 :  
- Blinking red : full battery  
- Red : charging

4 Battery selection settings :  
1= AGM (1): sealed battery, maintenance-free, VRLA..  
2= Gel : gel cell battery  
3= Liquid : liquid electrolyte battery (with plug)

5 Load balancing settings (battery 1 et battery 2) :  
9 = battery 1 (90%), battery 2 (10%) ,  
8 = battery 1 (80%) battery 2 (20%)...

6 Command button-switch battery selection / load balancing / Pulsation frequency. (push 5 sec. - selection 1 sec.)

7 Frequency pulsation settings :  
0 = 25 Hz  
1 = 50 Hz  
2 = 100 Hz

8 Connection battery 1

9 Solar panel connection

10 Connexion battery 2

## SOLAR CHARGE CONTROLLER CONNECTION



1

Battery

+ battery selection



2

Panel



3

Consumers

## SOLAR CHARGE CONTROLLER DISCONNECTION



1

Consumers



2

Panel



1

Battery