



BIOSUN
85W

INSTALLATION AND MAINTENANCE MANUAL





We thank you for choosing BIOSUN.
Our equipment has been designed to give you reliable and safe operation for many years to come.
The BIOSUN terminals have been designed for speed and ease of installation.
Their design also makes them easy to maintain.
Read these instructions carefully in order to optimize the operation of your device.

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A. TECHNICAL CHARACTERISTICS

BIOSUN RANGE	UNIT	BIOSUN 85
FUNCTIONAL CHARACTERISTICS		
Flow rate	l/h	500
Number of hours of production per day	h	4
Volume produced per day	m ³	2
Standalone operating time	day	3
Draw-off	-	Manual push valve, automatic closing
Volume meter	-	Electronic with reset control
UV reactor ON/OFF switch	-	Yes, with integrated LED
WATER SUPPLY		
Connection	-	¼" BSP
Supply type	-	Network under pressure, 1,5 bars
Max. pressure	bar	3
FILTERING		
Filtering media	-	Zeolite
filter volume	l	7
filtering threshold	µm	<10
backwashing	-	With manual handle
cartridge size (optional)	inch	10
Filter cartridge type (optional)	-	10µm, activated carbon
UV REACTOR		
UV lamp power	W	14
UV power delivered	W	4.6
UV operating light	-	Yes
Dose delivered	mJ/cm ²	40
Ballast	-	Electronic (24VDC)
Supply voltage	Vdc	24
Average life expectancy for one stop/start per day	year	1
FRAME		
Dimensions	mm	1400 x 600 x 400
Material	-	Fiberglass + polyester complex: special for outdoor use
PHOTOVOLTAIC POWER SUPPLY		
Panel size (unit)	mm	1200 x 600
Number of solar panels	-	1
Panel power	W	85
Panel voltage	V	12
Panel attachment	-	Integrated to the frame
Number of batteries	-	1
Battery type	-	70Ah(C100), 60Ah(C20), 12V
OPTION WITHOUT PHOTOVOLTAIC PANEL		
Recommended spare parts list to be provided by the customer		
Solar panel	-	1
Number of batteries	-	1
Battery type	-	70Ah(C100), 60Ah(C20), 12V
Controller	-	According to panel model specified by the customer
Converter	-	24Vdc 50W



B. SAFETY WARNINGS



- Switch off the device 10 minutes before any intervention to let the lamps cool down.
- **Stop the system in the event of a prolonged stop of the water flow**



- **Never expose yourself to the radiation of the ultraviolet lamps when lit.** This may cause severe injuries or burns and may even lead to loss of eyesight.
- When the lamps are running, **do not take the lamps of the reactor out or remove the protection covers**



- When dismantling UV lamp or quartz tube, it is necessary to wear **protection gloves** not to let fingerprints that could affect the UV emissions quality



- Do not use the reactor if the **power supply wire is worn or damaged**. In this case it should be replaced.
- To avoid electric short-circuits, **do not place the electric wires or the reactor in the pool water** or in any other maintenance or cleaning fluid.
- Do not perform electrical measurement on ballast output (risk of overvoltage)
- Never disconnect solar panels during the charge

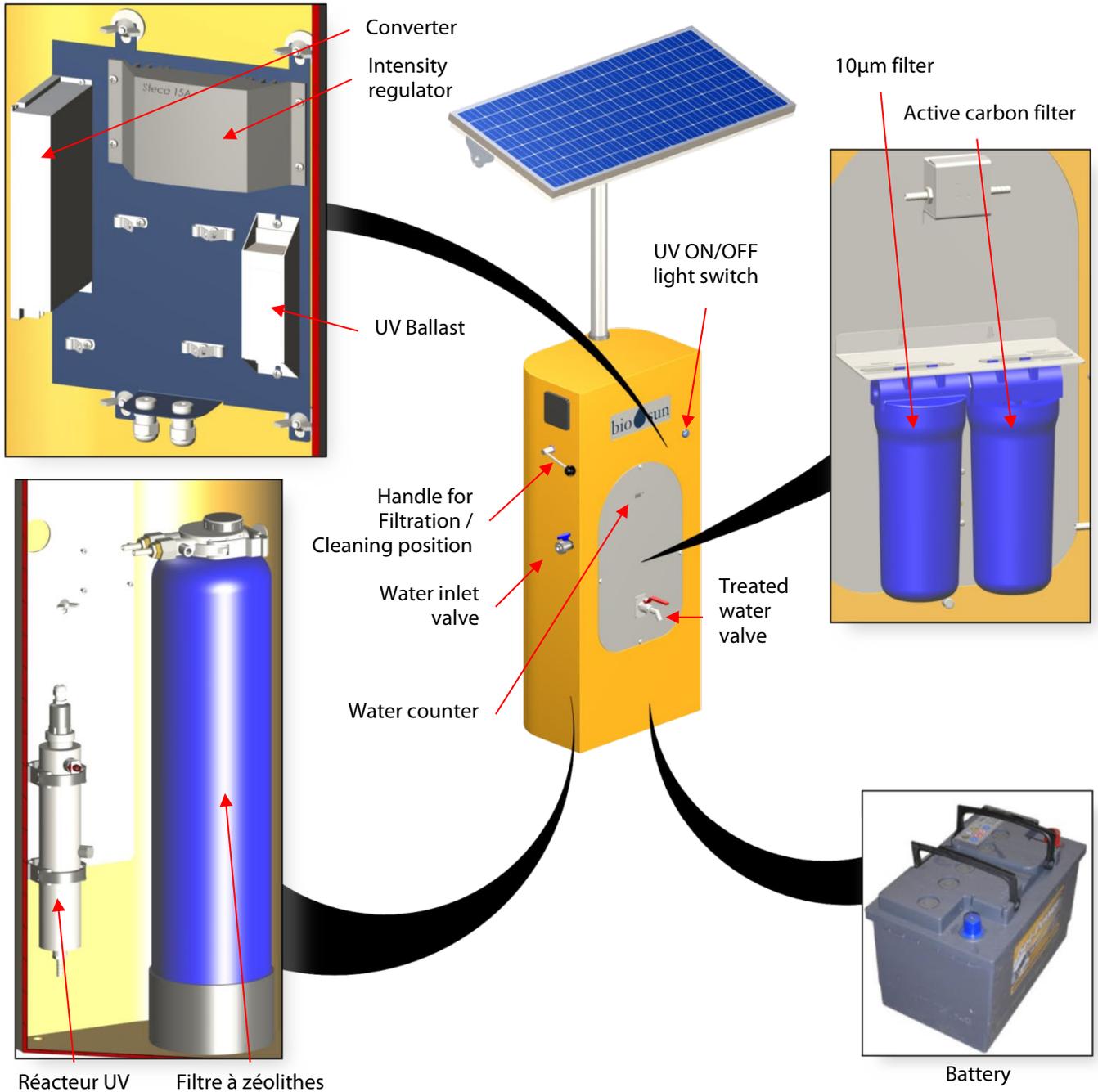


- Never unscrew the quartz tube sealing nut **when the reactor is on load** as the quartz tube could be blown out of the reactor with force and injure you.
- In case of a microleakage, the reactor must be isolated and drained to perform maintenance as soon as possible.
- Do not use the BIO-UV reactor for any other use than that for which it was designed.



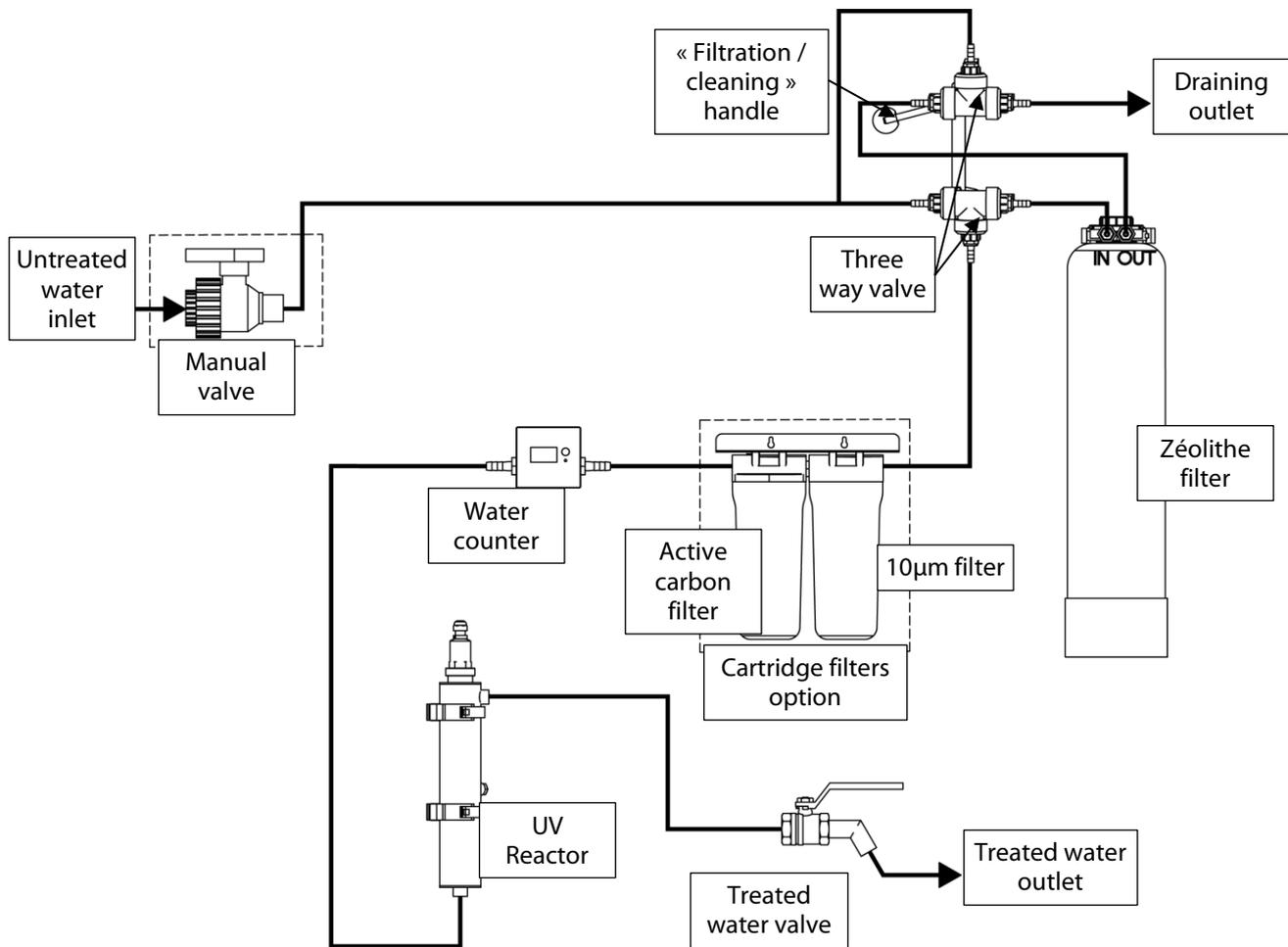
C. BIOSUN TERMINAL DESCRIPTION

1. Overview





2. Hydraulic diagram





D. INSTALLATION GUIDE

1. Foreword



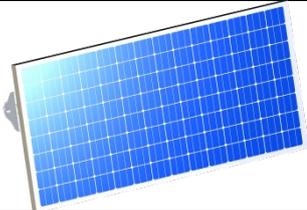
Read all the instructions in this manual before switching on the reactor.



IMPORTANT: BIOSUN 85 is designed to be connected to a network under a pressure between 1,5 bar (minimum) and 3 bars (maximum)

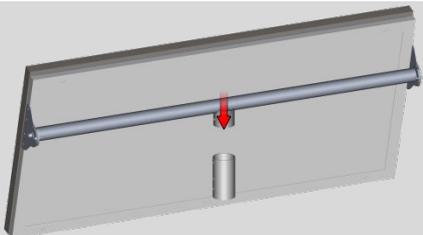
If the operating pressure is lower than 1,5 bar, the BIOSUN 340 model must be used

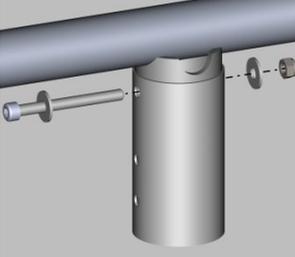
2. Detail of provided elements

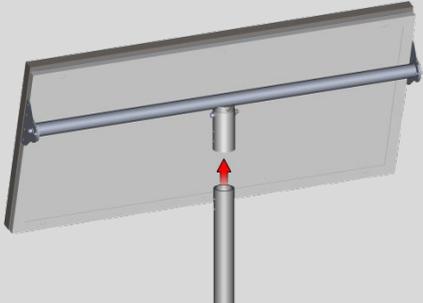
	
BIOSUN terminal	1 12V Battery
	
Solar panel provided with a cable for terminal / solar panels connection (Do not reduce length)	1 Connection tube
	
1 solar panel mast	3 M8x80 screws
	
3 M8 nuts	6 M8 washers
	
Switch key	Anti-theft wrench
	
Supply valve	Teflon roll

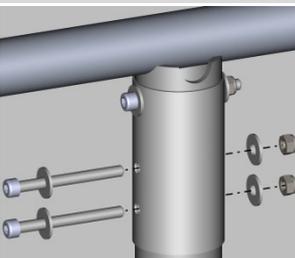


3. Mounting of photovoltaic panel on the mast

1  Introduce the cable of the photovoltaic panel into the support then into the connection tube
Mount the connection tube on the panel support

2  Mount the set of screw-nut-washer to assemble the tube and the support

3  Introduce the cable of the photovoltaic panel into the mast
Insert the mast into the connection tube

4  Mount two sets of screw-nut-washer to assemble the tube and the mast.

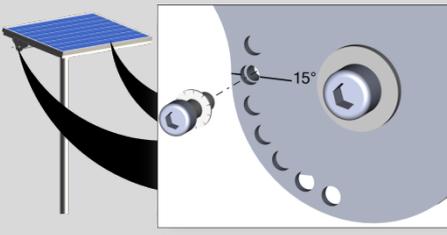
5  Adjust the angle of the photovoltaic panel (see table below): generally the angle is set to 15°

Table for adjusting the solar panel tilt angle

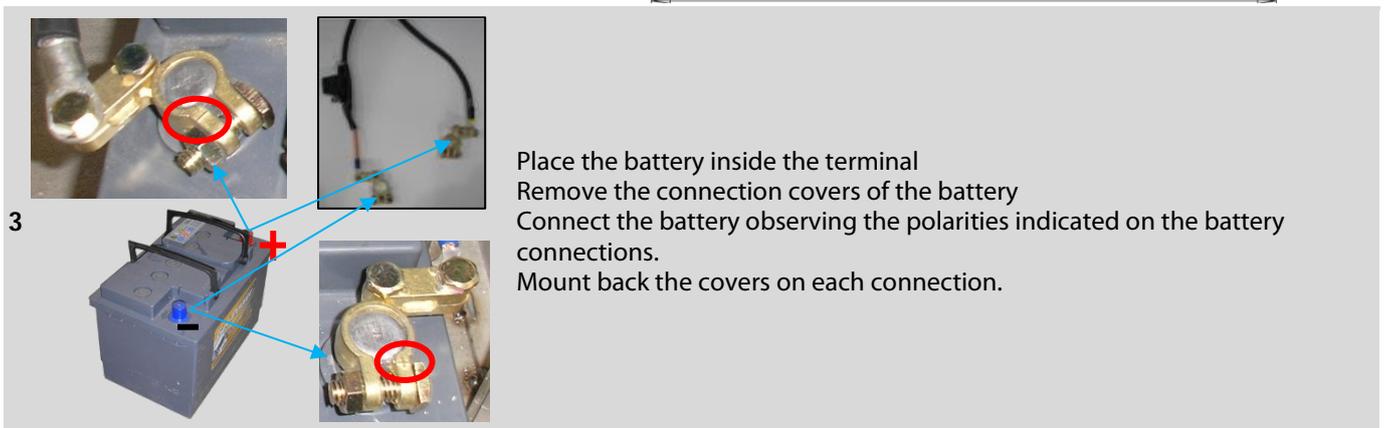
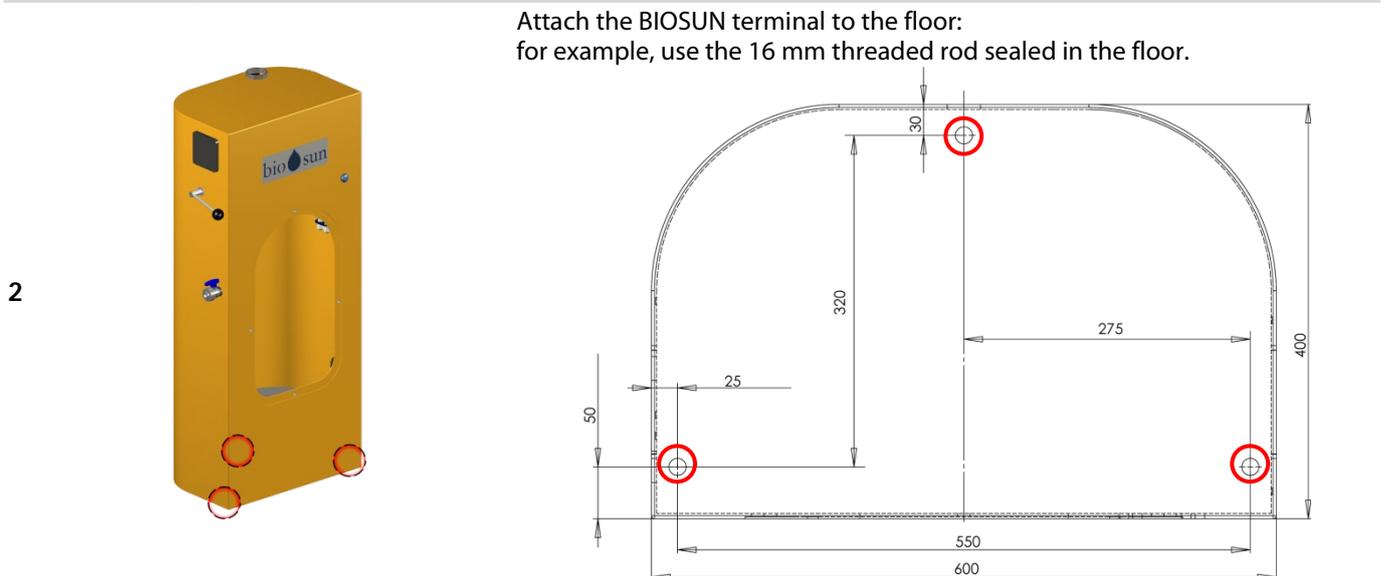
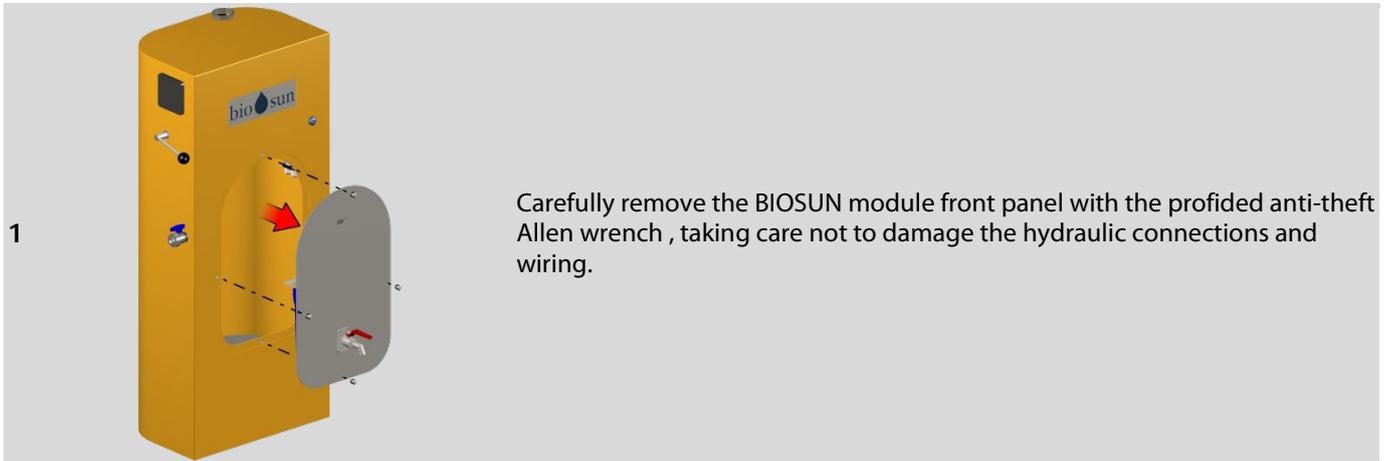
LATITUDE	TILT ANGLE
Latitude < 20°	15°
20° < latitude < 35°	Latitude + 10°
Latitude > 35°	Latitude + 15°

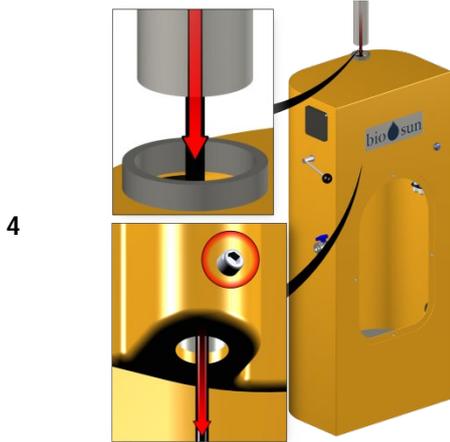
The minimum tilt angle value of 15° provides for "self-cleaning" of the photovoltaic panel and limits the risk of residual moisture.



4. Instruction to mount the BIOSUN 85 terminal

Before starting the installation of the BIOSUN terminal, a concrete foundation must be provided corresponding to the dimensions of the terminal (see template below)

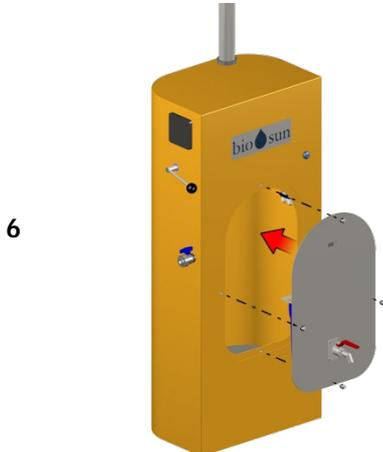




Insert the photovoltaic panel cable through the terminal then mount the mast of the photovoltaic panel.
Once the mast is fully inserted to the stop, tight the screw inside the terminal to lock the mast in position.



Plug the solar panels connectors to the supply connectors inside the BIOSUN terminal (male/female connectors)



Refit the BIOSUN terminal front panel



Connect water supply on the manual valve placed on terminal side.
In any case, a ½ BSP threaded fitting will be required to connect a pipe.



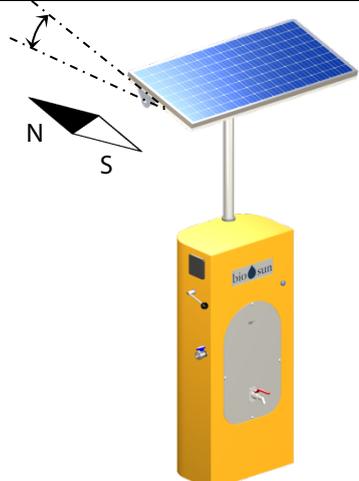
5. Mounting the solar panel mast on the ground (optional)



- Make sure the base and the solar panel are facing south (SUD)
- Attach mast base to ground or roof terrace: Use a 16mm threaded bolt



E. INSTRUCTIONS FOR THE FIRST COMMOSSIONING OF THE BIOSUN 85 TERMINAL

 Check orientation of the solar panel to the SOUTH		
LATITUDE	TILT ANGLE	
Latitude < 20°	15°	
20° < latitude < 35°	Latitude + 10°	
Latitude > 35°	Latitude + 15°	
<p>The minimum tilt angle value of 15° provides for "self-cleaning" of the photovoltaic panel and limits the risk of residual moisture.</p>		

 <p>Charge the batteries with the solar panels for 3 days of sunshine: do not use the terminal.</p>	
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 <p>Proceed to « VACCINATION » of piping :</p> <ul style="list-style-type: none"> • Open the valve to discharge about 20 liters then close again • Proceed to filter backwash (see paragraph G.1.Backwashing the filter, page 14) • Make flow water with chlorine through the whole circuit. • Open slightly the treated water valve to let water flow during 10mn 	
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F. INSTRUCTIONS TO USE THE BIOSUN 85 TERMINAL



IMPORTANT

- **USE A CLEAN DRUM:** must be suitable to store drinking water and must be regularly cleaned
- STORE THE DRUM IN A PLACE AS SHELTERED FROM LIGHT AND EXTREME TEMPERATURES AS POSSIBLE
- CONSUME THE STORED WATER DURING THE DAY.

1. Production

- The terminal should **not operate for more than 10 hours a day**, i.e. when set to the "ON" position with the blue LED light lit (see below).
- The terminal produces 2000 liters or 540 gallons a day: This production ensures the correct operation of the batteries and the terminal's standalone operating time of 3 days.
- The BIOSUN 85 terminal should be set to the ON position for the entire planned production time: do not switch the BIOSUN 85 terminal on or off according to the flow.
- If the BIOSUN 85 terminal's flow drops very significantly, the filter should be backwashed (see G.1. Backwashing the filter, page 14).

2. Start-up the terminal

1 Switch ON the BLUE button : it should light on

Set the volume to zero:

- 2
- Open the valve to make the water flow and thus turn on the water counter
 - Press RESET for 5 seconds on the water counter

3 Before using the BIOSUN terminal, wait for 5 minutes tha UV lamps is warmed then let flow and discard about 1 liter of water

4 The BIOSUN terminal is ready for production



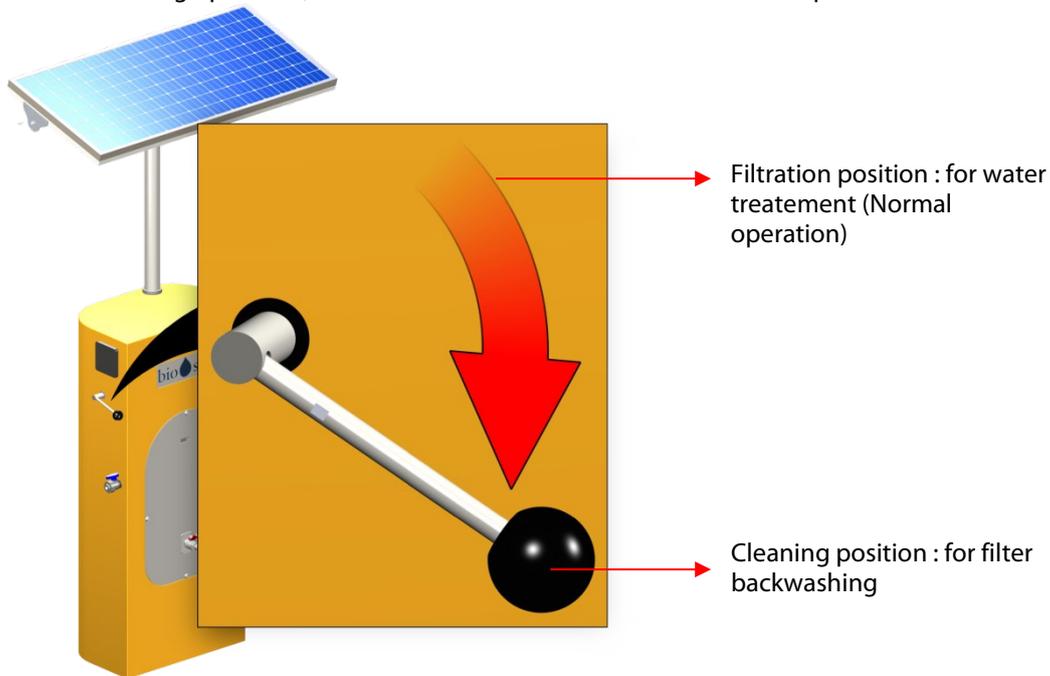
- The daily production should be monitored using the water counter, so as not to exceed a production of 2 m³ of water per day.
- It is important to use the BIOSUN terminal on a regular basis. If the terminal has not been used for several days, a disinfection rinse is required (see G.3. Preventive disinfection).



G. INSTRUCTIONS FOR SERVICING OF THE BIOSUN 85 TERMINAL

1. Backwashing the filter

It is recommended that a filter backwashing operation be performed once a week as a preventive measure. When the flow rate of BIOSUN terminal decreases, this means that the filter is clogged: A filter backwashing operation should be carried out. During operation, the two valves should be set to the "filtered" position.



To backwash, lower the handle to the "Cleaning" position for a few seconds until water comes out clear. During this operation, the water exits through the drain hole at the rear of the terminal.

2. Solar panel cleanliness

Regularly, make sure that the solar panels remain clean.





3. Preventive disinfection

Once a year, the terminal must be vaccinated:

- Make some bleach flow through the terminal inlet and let the water run until it smells of chlorine.
- Leave to act for 2 hours.
- Drain the circuit and rinse twice.

4. Functional check of the photovoltaic power supply

The solar charging regulator consists on the following components:

1. Information LED
2. 4 LEDs indicating the charging status (red, yellow, green 1 and green 2)
3. Junction box for connecting the solar panel
4. Junction box for connecting the battery
5. Junction box for connecting the electrical components



LED displays

LED	State	Meaning
Information LED	Green comes on	Normal operating mode
	Red flashing	Error status (see "Errors and resolution")
Red LED	Flashes quickly	Battery discharged, charging state <40%. Charging is disconnected if the decrease in the charging state is more significant.
	Flashing	Charging disconnection, charging state <30%
Yellow LED	Comes on	Battery charge low, charging state <50%
	Flashing	Re-engagement threshold not reached after charging disconnection, state of charge between 40% and 50%
1 st green LED	Comes on	Battery normal, charging state >50%
2 nd green LED	Comes on	Battery fully charged, charging state >80%
	Flashes quickly	Battery fully charged, charging regulation enabled (charging current decreases)



H. PROCEDURE FOR LAP, QUARTZ SLEEVE OR SEALS REPLACEMENT

These operations should be done at least once a year and:

- At each replacement of lamp (**once a year**), quartz sleeve or seal
- To check/clean the quartz sleeve

1  The terminal must be **POWERED OFF**, with the **WATER SUPPLY CLOSED** and **DRAINED** (treated water valve open).

2  Remove the front plate to access inside of the terminal

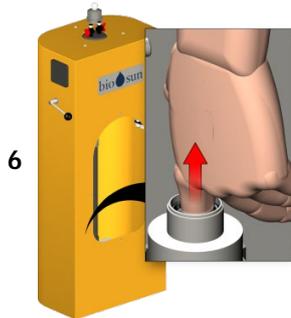
3  Unscrew the gland to release the lamp cable
Remove the reactor cover

4  **Grasp** the 4-pin connector and pull the lamp gently upwards.
When the lamp has been withdrawn by a few centimeters, **remove** the connector, grasp the socket and **disengage** the lamp from the quartz sleeve remaining well aligned with the axis.

 Carry out this operation **carefully** without touching the glass of the lamp with the hands

 Do not let the lamp fall into the quartz sleeve, it could break off into the quartz sleeve and damage the quartz

5  Unscrew the stainless steel nut.
Remove the flat washer.



Remove carefully the quartz sleeve :

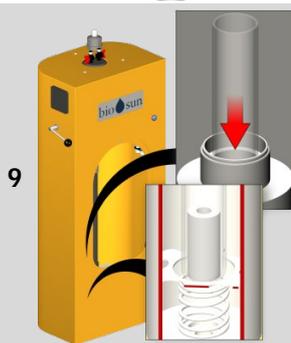
Insert a thumb or finger in the sleeve and withdraw it gently until the seal comes free from its housing, while remaining well aligned with the axis.



Take hold of the quartz sleeve and extract it fully, making sure that you keep it **ABSOLUTELY** well aligned with the axis.

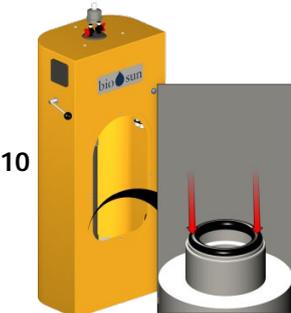


Clean the quartz sleeve with acid or white vinegar or replace it if necessary.



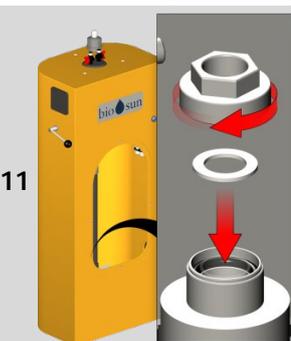
Make sure the tubular sleeve is in place at the bottom of the quartz sleeve

While remaining well aligned with the axis, introduce the clean quartz sleeve into the reactor to its guide at the bottom of the reactor.
With your finger inside the sleeve position the quartz into the spring seat at the bottom of the reactor. The quartz should be slightly out.
If the quartz is correctly positioned in the seat, flexibility can be felt by pressing on it (spring effect).



Replace the o-ring :
(Mount a new seal at each lamp replacement)

- Apply water and soap on the seal,
- Position it around the quartz sleeve,
- Fully push it into its location with the finger or the flat washer (do not use tools).



Replace the flat washer.

Screw back normally the stainless steel nut with hand

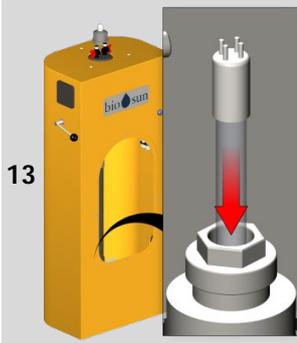


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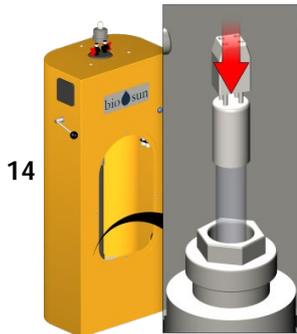
Put the installation back in pressure **before** the reassembly of the lamp and **check that there is no leakage in the quartz sleeve.**

13



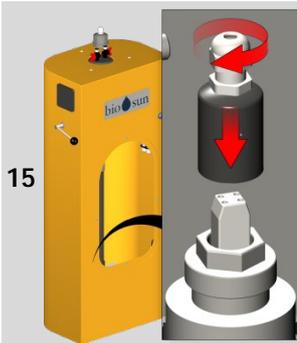
Take hold of the new lamp taking care not to place your fingers outside the cap. (if you do, clean the lamp with a soft cloth and some methylated spirits).
Insert carefully to the three quarters of the new lamp into the quartz sleeve.

14



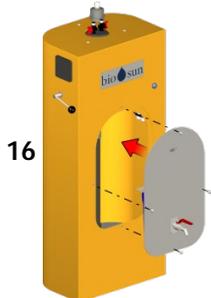
After engaging the lamp to the three quarters, **plug** again the connectos on the lamp. **Do not force** (there is a way to plug it).
Engage fully the lamp into the quartz sleeve.

15



Mount the cover.
Fully push the cable and tight the gland.

16



Mount the front cover on the terminal

17



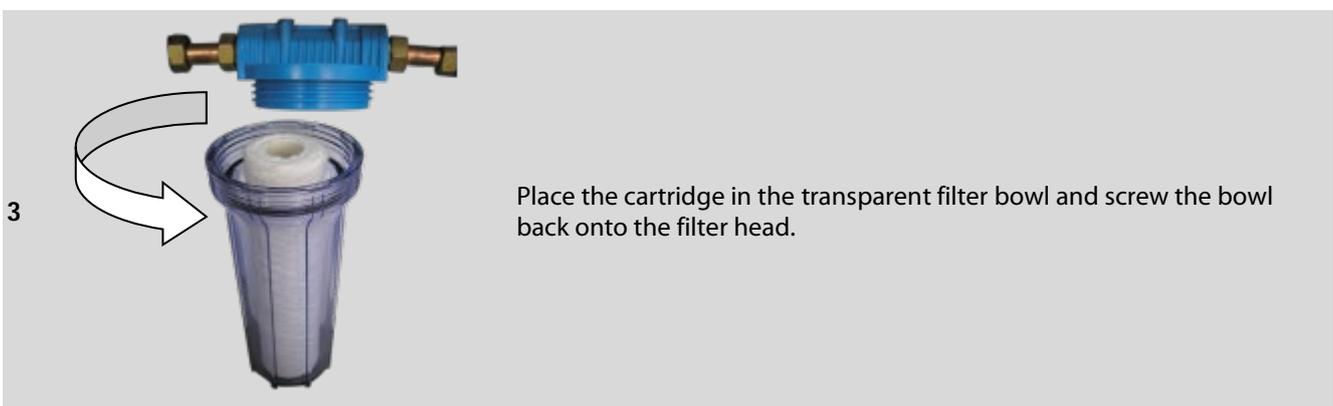
The device is ready for operation.



I. REPLACEMENT OF THE FILTER CARTRIDGES (OPTION)

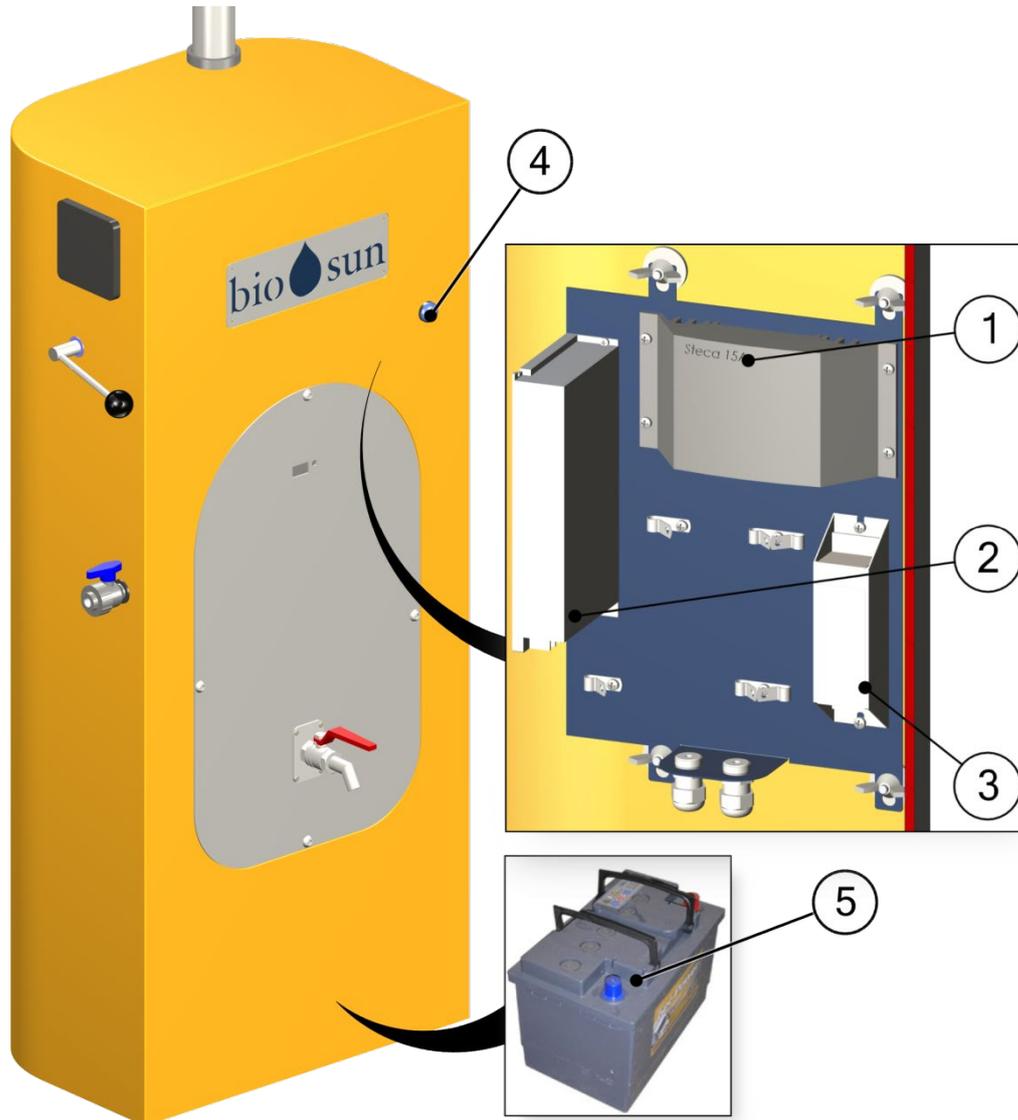


Replace the cartridge.
Do not invert the cartridges !





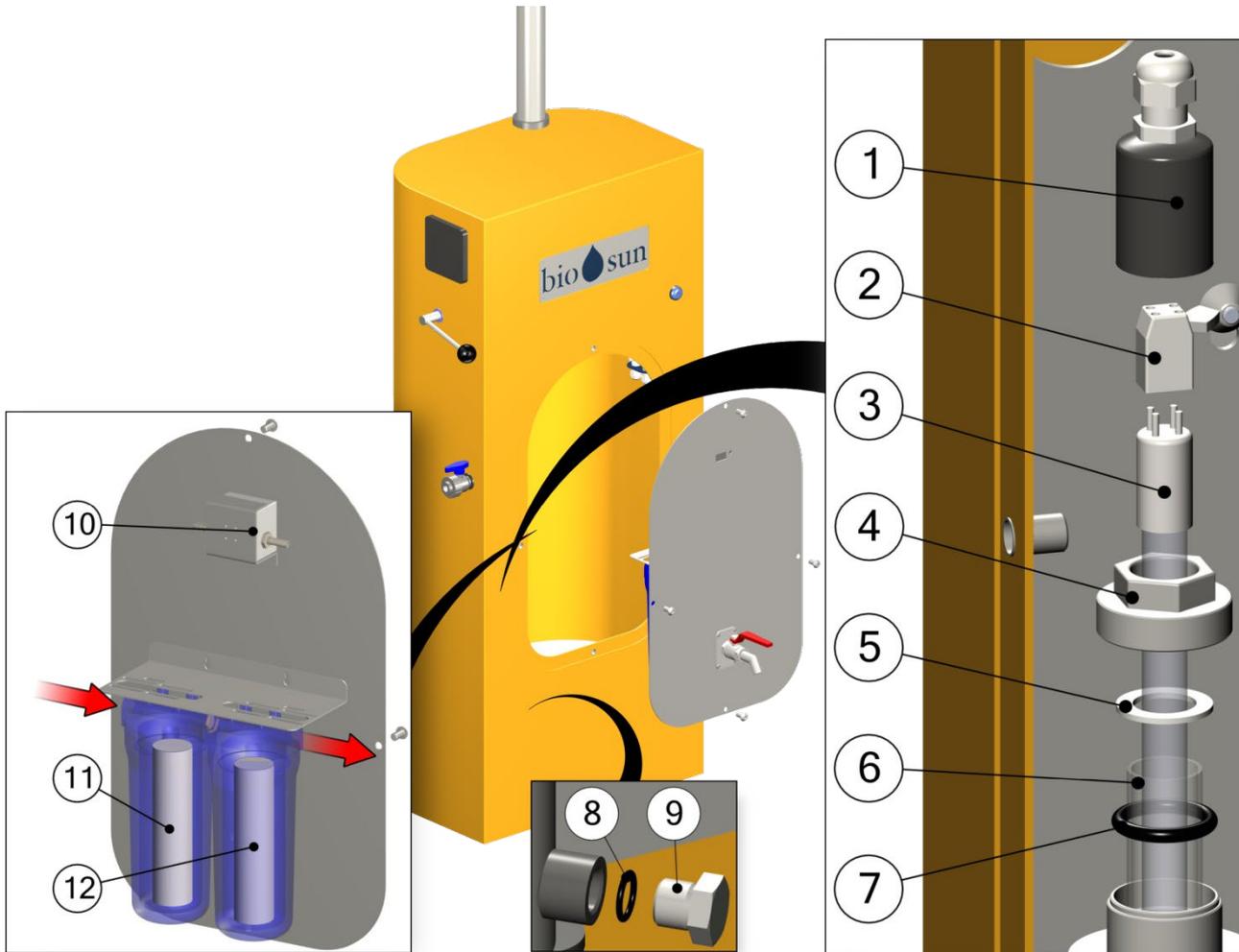
K. ELECTRICAL DESCRIPTION



TAG	DESIGNATION	REFERENCES	QUANTITY
1	Photovoltaic power supply 15A	ELE006460	1
2	Converter 12VDC/24VDC	ELE006461	1
3	Ballast	BAL005248	1
4	On/Off lamp button	ELE006352	1
	NO Contact	ELE000275	1
	Blue light	ELE006353	1
5	Battery	ELE006462	1



L. BLOWN UP VIEW



TAG	DESIGNATION	REFERENCE
1	Nut protection	VIS004279
2	Lamp socket	ELE002603
3	Lamp	LPE004432
4	Sealing nut	USI004134
5	Protection washer	PIE000659
6	Quartz sleeve d25	QUA000016
7	O ring d25	JTS000100
8	O ring d10	JTS000230
9	Draining plug	ACC000410
10	Water counter	ELE006480
11	Filtering cartridge 10µm	CAR004467
12	Filtering cartridge with active carbon	CAR004468



M. ERRORS AND REMEDIAL ACTION: REGULATOR

Error	Cause	Remedial action
No display	Battery voltage too low	Precharge the battery
	Blowing of the external fuse in the battery connecting cable	Replace the external fuse
	The battery is not connected	Connect the battery observing the polarities the right way round
	Battery connection polarities reversed	
	Faulty battery	1.Disconnect all the connections 2.Re-connect the (new) battery with the polarities the right way round 3.Reconnect the solar panel and electrical components
Information LED flashing red	Charging interrupted due to the charging current being too high	Charging continues automatically when the charging current has reached an authorized level again
Electrical components cannot operate or are inhibited for a short period + Information LED flashing red	The output of the electrical components is disconnected due to high current consumption	¶ Decrease the current consumption and disconnect or unplug the electrical components if necessary. ¶ Check the electrical components.
	The output of the electrical components is disconnected due to a short-circuit at this level.	1. Disconnect the electrical components. 2. Eliminate the short-circuit cause. 3. Reconnect the electrical components.
	The output of the electrical components is disconnected due to overheating of the solar charging regulator.	The output of electrical components reconnects automatically when the solar charging regulator has cooled down. ¶ Improve the air flow for cooling. ¶ Prevent any influence from other heat sources. ¶ Check the operating terms and the installation site.
Consumer operation not possible + Information LED flashing red + The battery red LED light flashes	The output of the electrical components is disconnected due to the battery voltage being too low.	The output of electrical components reconnects automatically as soon as the battery voltage reaches the threshold value. ¶ Precharge the battery. ¶ Fit any electrical components connected directly to the battery with a system providing protection against deep discharges. ¶ Check the battery and replace it if necessary.
Electrical components cannot operate + info LED flashes red + 2nd LED flashes green	The output of the electrical components is disconnected due to the battery voltage being too high.	The output of electrical components reconnects automatically when the battery voltage reaches an authorized level.
	Faulty grounding.	¶ Check the grounding.
	No voltage limitation for external charging sources.	¶ Check the external charging sources. ¶ Disconnect any external charging sources, if applicable.
Electrical components cannot operate + Green information LED	Faulty consumer or faulty installation.	¶ Connect the consumer correctly. ¶ Replace the consumer.
The battery is not charged	The solar panel is not connected	¶ Connect the solar panel
	Solar panel connection polarity reversed	¶ Re-connect the solar panel with the polarities the right way round
	Solar panel input short-circuited	¶ Eliminate the short-circuit cause
	Solar panel voltage incorrect	¶ Use the solar panel with the required voltage
	Faulty solar panel	¶ Replace the solar panel
The battery display jumps quickly	High pulse current	¶ Adjust the absorbed current to the battery's capacity
	Faulty battery	¶ Replace the battery
The terminal's flow rate decreases	Filter clogged	The filter should be backwashed (see page 14) With the cartridge filter option: if filter backwashing does not solve the problem, the filter cartridges must then be renewed or cleaned if they are cleanable.



<p>The front panel blue light does not come on</p>	<p>Problem on regulator, UV lamp or ballast power supply</p>	<p>Check the battery charging light</p> 
		<p>Make sure that the voltage across the DC/DC converter terminals is 24V +/- 1V. ¶ If the voltage is too low, refer to the next question. ¶ If the battery is charged, replace the UV lamp ¶ If replacing the UV lamp does not solve the problem, then replace the ballast.</p>
<p>The converter output voltage is low: it must be 24 V +/- 1V</p>	<p>Bad wiring</p>	<p>Check the wiring; all connectors must be properly tightened.</p>
	<p>Battery charging in progress</p>	<p>Check the battery charging level: If it is low (red LED), then let the battery charge without using the BIOSUN terminal until the battery charging indicator is green.</p>
	<p>Converter out of order</p>	<p>If the two previous operations have no effect, the converter must then be replaced.</p>



N. FREQUENTLY ASKED QUESTIONS

Questions	Answers
Operating characteristics	
What are the technical reasons for limiting use to 4 hours a day?	Because after 4 hours, the batteries are too discharged, and the BIO-SUN terminal operation can no longer be ensured for the following days (as it is calculated on the basis of statistics depending on sunshine). The service life of the batteries would also be significantly penalized.
Motor-drive pump feeding? Under what conditions, terminal tank pressurized?	The desired information are shown in the BIO-SUN 85 column, for the pressurized supply model: . Supply type - 1.5 bar pressurized system . Maximum pressure: 3 bars.
Is a timer used to program the terminal for a battery life of 3 days with a daily use of 4 hours?	No.
What is the difference between BIO-SUN 85 and BIO-SUN 340?	The BIO-SUN 85 terminal does not have a built-in pump and is fitted with one solar panel (for pressure feed) and one battery. The BIO-SUN 340 terminal has a built-in pump and is fitted with four solar panels and two batteries.
And what about the number of production hours: 4hours/day mentioned in the catalogue. Can the unit be used for 8 hours in one day assuming that it will then only have a battery operating time of two days instead of three days?	No, the terminal must be used under the defined conditions.
How much sunlight time is needed to fully charge the battery?	3 days, which is why, on commissioning, the BIO-SUN should not be used for 3 days.
After 2m3 of water treated in a day, does the UV lamp go off to mean that the water is no longer drinkable? Or does the battery stop working after 4 hours of operation?	It's manual, the volume meter acts as a control. There is no automation: it's intentional.
Should the battery be used until discharged to ensure it has a longer service life?	Absolutely not.
Can BIO-SUN units be used directly on the normal power grid (220V)?	The battery supply is 12 V. As the principle of the BIO-SUN is standalone operation, it cannot be connected to the normal power grid (220V).
UV reactor	
What is the service life of the UV lamp?	The UV lamp should be replaced once a year.
Water supply	
Where is the outlet for evacuating the dirty water?	At the rear of the terminal.
Maximum permitted turbidity	about 5 NTU.
in the event of high turbidity: what is the recommended treatment upstream?	Filtering possibly with coagulation/flocculation, but this really depends on the water qualities, and there is no absolute rule.
Filtering	
How long does the zeolite filter guarantee last?	There's no guarantee on the media itself On the filter body itself = terminal guarantee, in other words for one year.
In what case is the activated carbon filter recommended?	this serves to reduce organic matter, pesticides and heavy metals.
Is there a signalling/indication/alarm system? For example, to confirm that the water coming out is well purified or to indicate when the cartridges/filters need replacing.	There is no signalling/indication/alarm system on our cartridge filters (for example, carbon filter): the filter cartridges should be replaced every 3 months or so Zeolite washable filter: guaranteed for 1 year, service life 5 years.
How long does it take to filter 20 gallons of water?	The water treatment is instantaneous, and the maximum flow rate is 500 liters/hour.
How do you replace the cartridges and filters?	By unscrewing them.
And what if the water entering the unit (tap or river water) has a certain taste (bleach/other)?	In this case, choose the cartridge filter option as this is what the activated carbon is intended for.
Water quality	
What if the water entering the unit is acidic, which is often the case in the mining sector in RDC?	BIO-SUN's primary objective is to make water bacteriologically safe. However, BIO-SUN does not address acidity issues.



O. WARRANTY TERMS

The terms of guarantee for the equipment in the BIO-UV range are as follows:

- **2 years** for all components with the exception of the UV lamp (consumable).

Exclusions:

The electrical components are not guaranteed against overvoltage or lightning strikes.

Modification and addition of components in the electrical cabinets

Use of spare parts that do not originate from BIO-UV

Non-compliance with the installation instructions

Reactor having been operated without being full

Non-compliance with the operating and maintenance instructions.



Note: the housing, the quartz sleeve and the lamp are not guaranteed against breakage.

- **Faulty parts must be sent back to BIO-UV** with details of the **type** and the **equipment serial number**. BIO-UV will replace them after carrying out a technical survey.
- **The cost of shipping will be shared** between the retailer and BIO-UV.
- **The guarantee** takes effect on the day of the installation of the equipment: this date must be communicated to BIO-UV by sending the guarantee validation by post or by fax.



Note: If the guarantee validation is not sent back in the month following purchase of the equipment, BIO-UV will take the date of effect of the guarantee as being the month and the year the equipment was manufactured.

- **If the installation rules and instructions for use are not complied with**, BIO-UV cannot be held liable and the guarantee cannot be invoked.

The BIO-UV team, at your service.

Company **BIO-UV SA**
850, Avenue Louis Médard
34400 LUNEL France

Phone : +33 4 99 13 39 11

www.bio-uv.com

Email : info@bio-uv.com



ANNEX 1: Clearance dimensions, Blown up view, Designation



ANNEX 2: Electrical diagrams