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## Operator's Manual Version 1.9

# Electric Solar Outboard Motor System 2HP24V "plug & go"

***NO PETROL – NO GRID CONNECTION  
NO LICENSE – NO REGISTRATION  
NO MAINTENANCE – NO POLLUTION***



Dear Customer

Congratulations! You purchased a high quality product with exceptional performance. To ensure this for many years, we kindly ask you to read this document carefully and familiarize yourself with the motor before using it.

This manual has been compiled to help you install and operate your all4solar outboard motor system with safety and pleasure. It contains details about the motor, the solar panel and the batteries as well as for all equipment supplied and information on its installation, operation and maintenance.

Please note, that incorrect installation and operation can cause severe damages or injuries and will void any warranty from the supplier.

We wish you a lot of pleasure with this unique „green power“ system.

Your all4solar - Team

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Please note the following information in this handbook and report these, as well as any change of ownership to all4solar ([service@all4solar.com.au](mailto:service@all4solar.com.au)) within 4 weeks of purchase to register for full warranty entitlement.

- ◆ Owner: .....
- ◆ Phone/Email: .....
- ◆ Date of purchase: .....
- ◆ Dealer/point of sales: .....
- ◆ Serial number motor: .....
- ◆ Type:  24 V tiller 86 lbs
- ◆ Main use:  saltwater  freshwater

Check the actual status of any used motor before purchase – send an email to [service@all4solar.com.au](mailto:service@all4solar.com.au) indicating the serial or order number.

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## 1) Hazard communication

Before operating your motor you have to carefully read and understand this operator's manual, even installation and operation of the system is simple.

As you read this manual, please note the hazard warnings which alert you to safety precautions related to unsafe conditions or operating procedures. We have included these warnings because we are concerned about your safety.

### 1.1 Hazard signs



#### **DANGER**

Calls attention to immediate hazards that **WILL** result in severe personal injury or death.



#### **WARNING**

Identifies hazards or unsafe practices that **COULD** result in severe personal injury or death.



#### **CAUTION**

Indicates hazards or unsafe practices that **COULD** result in minor personal injury or product or property damage.



#### **INFO**

Indicates important information for a safe and easy operation or highlights special circumstances.

For any third party equipment not supplied by all4solar read the operations and instructions manual as well as the safety recommendations of those suppliers.

If at any point you do not understand this documentation or explanations seem unclear, do not proceed the installation or operation prior to contacting your aquawatt dealer!

### 1.2 Unpacking



#### **WARNING**

Do not leave any small parts unattended as small children and animals could drown.

If any part of the system is damaged, do not install or operate. Contact your aquawatt dealer and do not connect or use the system.

### **Parts supplied (depends on type of order)**

1 outboard trolling motor 24 V / 1150 W output / 1250 W input  
1 propeller, stick and nut  
1 folding solar panel 24 V / 90 W including carry bag and solar controller  
2 lead acid batteries 12 V / 50 Ah (or lithium power pack)  
1 main switch & fuse (60 A)  
Cables with plugs attached

## **1.3 Eligibility of the boat**



### **WARNING**

Only install your motor to boats where the installation of a motor is allowed and which can carry the weight of the motor, the batteries and if installed on the boat, the solar system.

Motor weight	11 kg
Solar panel weight	9 kg (incl. controller)
Batteries weight	35 kg lead acid (incl. main switch / fuse) / app. 12 kg for 1 KWh lithium

Shipping weight approx. 64 kg

- ◆ Do not start your motor unless the motor is safely installed on the boat.
- ◆ Do not operate the motor out of the water, as the rotating propeller could cause severe injuries or damage.
- ◆ The propeller needs to be at least 10 cm under water when operated.
- ◆ Place the batteries at a position, that balances the boat under cover. Do not expose battery cables switch and fuse to salt water.
- ◆ Fix the batteries with suitable straps to the hull.
- ◆ Do not expose the control box of the motor, the batteries, the switch or the solar panel and charge controller to salt water.

Even no license or registration is needed to operate this motor in Australia, always ensure safe operation and carry the necessary safety gear. Even this motor is able to move quite heavy boats, it is not suitable to be used as main propulsion system on open waters, in stormy conditions or for boats over 500 kg of weight.

Always check the battery charge level before traveling.

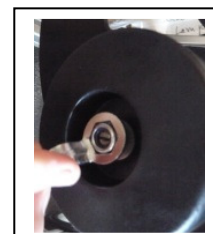
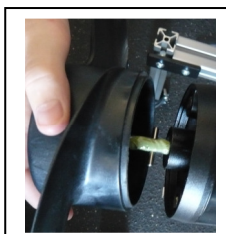
## **1.4 Preparation of material**

To install and operate this system you do not need any tools or equipment.

Check, if all material is supplied (see 1.2)

Fix the propeller to the outboard motor.

- Fix the stick trough the hole in the shaft
- Put lots of marine grease to the shaft
- Put the propeller on the shaft to the stick

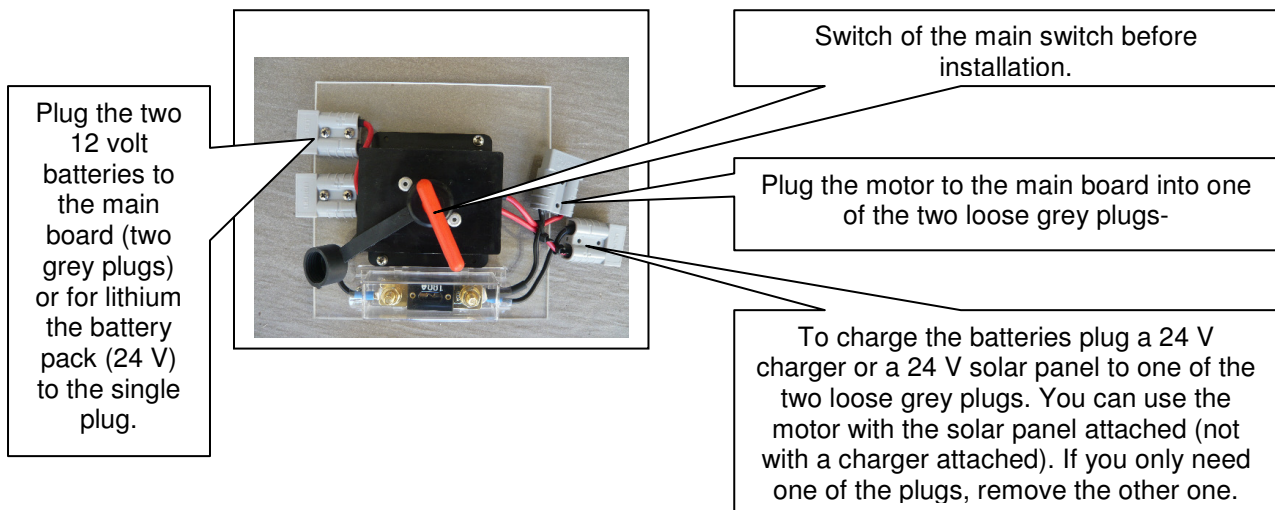


- Fix the propeller with the nut



## WARNING

The incorrect connection of plugs can cause short circuits, injuries and damages to the system. Do not expose the batteries, main switch / fuse and plugs to water.

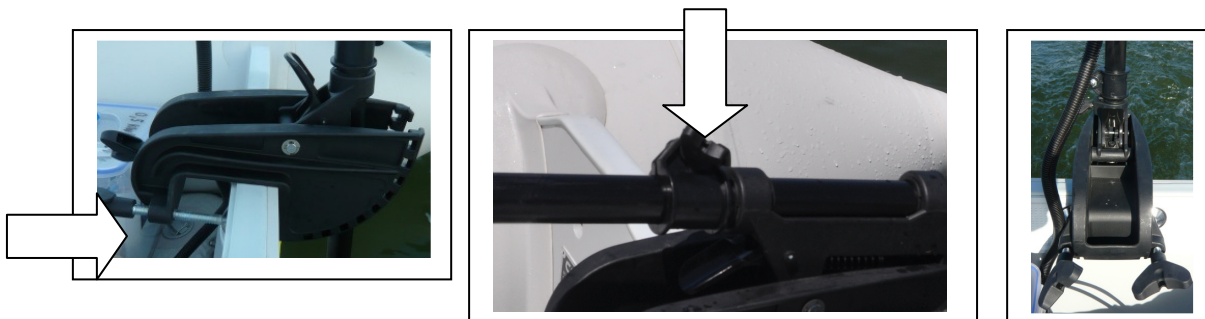


**IMPORTANT:** If the lead acid batteries are delivered directly from a third party supplier, the cables with the grey plug are not fixed to the battery poles. You then need to fix the lugs to the poles with a 6 mm screw. The RED cable to positive (+) and the BLACK cable to negative (-).

## 2) Installation on the boat

### 2.1 Installation to the transom

Place the motor with the mounting bracket to the middle of the transom top. If the motor is used on the side of the boat, note that this could result in dangerous movements of the hull. Fix the clamp bolts. Do not over tighten. **Spray with metal parts with silicon on a regular bases.**



Adjust the height and the resistance to turn the motor with the two screws fixed to the shaft. Do not over tighten to avoid damage to the fiberglass shaft.

If any problem shows with the correct installation, you need to contact an authorized specialist. To fix the motor to the transom, tighten the clamp bolts. Do not overtighten!



## INFORMATION

Secure the motor to the hull with a cable to the mounting bracket to prevent loss during installation or de-installation process.

## 2.1 Electric power supply



### CAUTION

The motor may only be connected to onboard power systems and accessories of 24 volts which comply with the CE / ISO standard.

Between the battery and the solar panel / motor a main 50 A switch and a 100 Amp fuse (suitable for 24 volts DC ) has to be installed.

- ◆ The cables and plugs are suitable to be used for 50 A / 24 Volts or 5 A/ 25 Volts. The use of other cables will void the warranty.
- ◆ The operator has to have access to the main / emergency switch at all times!
- ◆ The motor is supplied with 50 A plugs. All connections have to be mounted at a dry place under deck / covered against rain and sea water.
- ◆ The maximum battery idle voltage may not be higher than 28.5 volts DC.
- ◆ The minimum battery voltage 22 volts DC.

Operation is only allowed with a battery power supply. The direct supply from solar panels (other than the supplied ones), generators or battery charges can damage the system. If the battery is charged by a battery charger, the motor should be disconnected from the main board.

Only use battery chargers and equipment, suitable for the use in the marine environment. The safe installation and operation is not part of this manual.

For the installation and operation of the included solar power system see section 3.

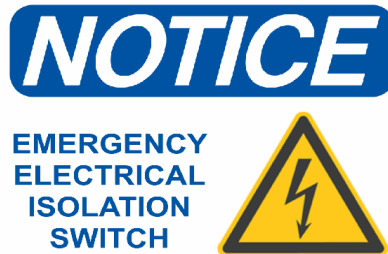
Always secure batteries to the hull with suitable straps.



(Picture for demonstration only)

## 2.2 Safety sticker

The following safety sticker is recommended to be fixed to the system close to the main switch. The operator is responsible for a safe installation, operation and proper indication of any dangerous parts.



## 2.3 Warranty information operation / installation

Incorrect installation, use of unsuitable accessories or variations in voltage voids the warranty.

Electrolysis is the decomposition of metals exposed to an electric current. When your boat is connected to a shore power AC electrical system, it is also connected to an earth ground circuit. This can cause an electrolytic current which causes the decomposition of all submerge metal. The manufacturer's warranty does not cover corrosion. Check the system periodically.

## 3) Installation of the solar power system

### 3.1) Solar panels installation

The supplied solar panels are suitable for outdoor use. If exposed to salt water, wash down with fresh water. If installed to a boat, protect screws and other metal parts from corrosion. Do not expose the charger at the back of the panel to water. Keep all connections dry.

#### COMPONENTS

- ◆ Folding solar panel kit / 2 x 12 volts panels
- ◆ Charge controller 24 V / 10 A attached to the solar panel
- ◆ Cable and plug (or clamps)
- ◆ Bag to store the panel

#### INSTALLATION

- ◆ Locate a clear area free from any over hanging obstructions
- ◆ Remove solar panel kit from the transport bag
- ◆ Unclip the two latches on the side of the unit and fold panels outward. Extend the two steel - stands to their maximum length and lock in position.
- ◆ Place solar panel kit in position to face the sun.
- ◆ To obtain maximum output it is suggested that the panels are regularly repositioned to track the sun's movement throughout the day.
- ◆ If mounted on a boat, make sure, the panels are securely fixed and not directly exposed to sea water.

- ◆ Fully extend the cable fixed to the main board and connect to the solarpanel with the black plug.



The solarpanel produces electricity as soon as there is light shining on the panels. So only connect to the main switch, if the batteries are installed as per instructions.

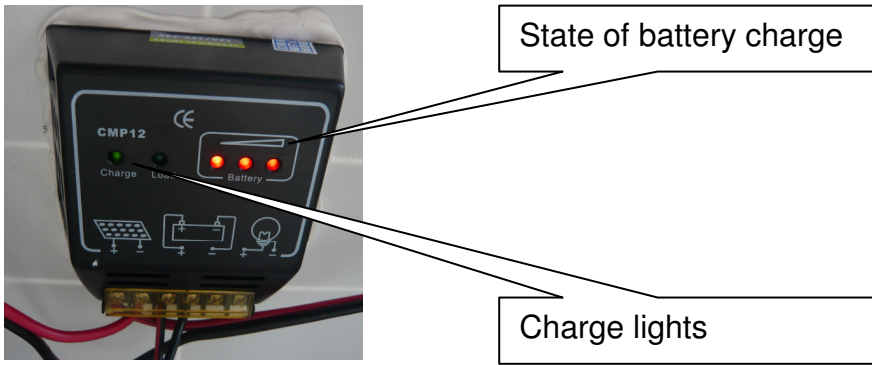
### 3.2) Operate solar system

#### OPERATION

- ◆ Green light on the charge controller indicates that the battery is fully charged.
- ◆ Yellow light on the charge controller indicates that the battery is being charged.
- ◆ Red charge light on the charge controller indicates that the battery is under charged.
- ◆ The three red lights on the right indicate the charge state of the battery.
- ◆ The red lights also light, when no battery or charge is connected to the solar panel.
- ◆ The charge controller ensures that a steady charge is supplied to the battery and protects the battery from overcharge.
- ◆ At night, there is no need to disconnect the solar panel from the batteries.
- ◆ The Load – light is not used, as no load should be directly connected to the charge controller.

#### NOTE

- ◆ It is normal during operation for both the green & yellow lights to flash. This is due to the output changing with the conditions.
- ◆ Do not connect other solar panels to the charge controller.
- ◆ Dust & dirt should be swept off the panel surface using a soft, wet cloth to wipe the panel surface. It is recommended that any bird droppings are removed as soon as possible as well as salt water, as this could lead to corrosion.
- ◆ If the lead is extended this can result in a loss of voltage and insufficient power transferred from the solar panels to charge the battery.
- ◆ Solar panel is waterproof, the charge controller is not waterproof and should not be exposed to rain. If installed outside, always make sure, the controller is on the dry side.
- ◆ To charge single 12 volt batteries the wiring of the solar panels to the controller have to be changed from serial to parallel. Please note that changes to the supplied products can void the warranty.



Connections: + solar 24 C / - solar 24 V / + battery 24 V / - battery 24 V / (load +/- 24 V)

### 3.3) Display & switches

The motor controller box is equipped with an LED – battery indicator.



If the green lights are all of, the motor should not be used to avoid under charge of the batteries (below 20.5 V). Even we use deep cycle batteries, the life of the batteries can be extend by not undercharge too often. **IMPORTANT:** For lithium batteries the indicator shows high charge until batteries are down to 25% and then drop quickly. Always start with fully charged batteries and calculate power consumption for the trip.

If not used, unplug the motor from the main board.

The main battery switch disconnects motor and solar panel from the batteries.

### 3.4) Battery



The batteries are equipped with cables and grey 50 A plugs which connect them with the main board. The batteries can be plugged to any of the two plugs. If other batteries are used, make sure, you connect the red cable to the positive connection and the black cable to the negative connection. Voltage not to exceed 24 Volts nominal.

We supply two batteries. The batteries are connected in series (2 x 12 V = 24 V). If more batteries need to be connected to the system, make sure, that only 24 V DC is suitable to operate this system. Operation at 12 volts is possible, but lowers the power output and the battery level will not be indicated correctly.



#### WARNING

- ◆ The batteries need to be installed upright.
- ◆ Always fix the batteries to the hull before operating the boat.
- ◆ Do not operate, if the batteries are empty (see 3.3).
- ◆ Batteries and connections should be protected from water.
- ◆ The batteries do not need any maintenance, but should be kept charged at all times. If the batteries are undercharged, they should be recharged immediately.

## 4) Area of operation

The 2HP24V trolling motor is suitable to move small boats. Do not use this system on open waters or in stormy conditions or as main propulsion system for larger boats. Always have paddles in the boat.

After the use in salt water, we recommend to flush the motor with fresh water. Please note, that corrosion is not covered by the warranty.

Never run the motor outside the water or if parts are dismantled.

If the boat is moored, the motor should always be lifted out of the water and set in the direction where wind and waves head to. If not operated for a few days, store the motor off the boat in a dry place.



### ATTENTION

The motor should only be used in clear water which is not colder than 10 degrees Celsius and not warmer than 30 degrees Celsius. Variations of these limits can result in damage to the motor.

## 5) Operate the all4solar outboard motor



### DANGER

As boat operator you are fully responsible for the security of all passengers on board as well as to any other water craft, swimmers or animals within your area of operation.

You have to be aware of all rules & regulations for operating a water craft. The detailed knowledge of this operator's manual and the instructions for the boat and all equipment is a very important part of your responsibility.

A swimming person cannot avoid very quickly even if a boat runs at low speed. Therefore you have to switch off the motor if a person is close to your boat.

**ANY CONTACT WITH A MOVING VESSEL, THE PROPELLER OR ANY OTHER PART OF THE MOTOR OR THE BOAT CAN LEAD TO SEVERE INJURY.**



Always equip your boat with suitable safety gear

## 5.1) Turn-on procedure

- ◆ Turn-on the battery main switch
- ◆ The battery charge indicator LED should light up
- ◆ Turn tiller handle to the position “1 forward” or “1 reverse”



The tiller handle can be moved in and out and the controller head can be moved up and down for an ideal position for the operator.

Always fix the controller head with the Knobs on the side.

## 5.2) Drive forward

To accelerate turn the hands throttle or move the engine control slowly. The motor operates at the highest efficiency at maximum speed (5). Do not switch directly from full speed forward to reverse. First switch to neutral (0).

## 5.3) Reverse

Reverse only, if necessary. Make sure, the lever to swing the motor upwards and downwards is securely fixed to the bracket. Do not switch directly from forward to reverse. Only use position 1 for slow reversing.



Changing gears at high speeds or sudden stop can cause heavy damage or injury!

## 5.4) Trim the motor

### CAUTION

Raise or lower the engine with care to avoid damage to the composite tube (shaft).

The angle of the motor can be adjusted by pushing the lever towards the shaft.



### WARNING

Raise or lower only with motor switched off. The outboard motor has to be moved very slowly. The person to move the motor has to be in a stable position. Do not push on the controller side or to the tiller handle. Always hold the shaft on both sides of the bracket.

Always operate carefully in unknown or shallow waters. When the motor touches ground, stop the engine immediately. Ground contact can result in severe damage to the propeller and the boat.

***The length of the shaft under the bracket should not be longer than the part over the bracket to avoid breaking of the shaft tube!***

## 5.5) Main fuse

The connection from the battery to the motor and the solar system is secured by a 100 A fuse which is installed parallel to the main switch on the main board.

Before replacing check the cause for the switch to disconnect.

## 5.6) Swimming & passengers



### WARNING

Prior to swimming of the boat, always switch off the motor and disconnect the motor. Do not leave children or untrained passengers in the boat without attendance.

While swimming close to the boat or while loading or unloading procedure any connection to a battery charger has to be disconnected.

All passengers should know the position and function of the emergency switch as well as the basic safety rules. Small children should always wear personal floating devices / life jackets.

## 6) Maintenance & inspection

The boat operator is fully responsible for the safety check and the maintenance of the motor, the boat and all equipment and accessories.

Make sure that all installations are in good condition prior to starting for a trip. Ensure the batteries have adequate charge for the distance planned to travel including reserve.

Periodical maintenance and inspection as well as treatment and operation according to this manual reduce problems and minimize of costs. This guarantees a long and reliable operation of your motor and solar system.

### 6.1) Service, spare parts

As owner of this outboard motor you should be aware of all recommended maintenance and repair instructions.

Always use genuine spareparts.

The prescribed services will ensure that any costly repair is unlikely to be needed.

## 6.2) Service chart

Schedule	by Operator	By operator with genuine parts	by manufacturer
After each trip	Flush the motor with fresh water if used in salt water / use silicon spray or rust converter if corroded		
	Store the motor with the propeller downwards		
	Check the propeller & turn by hand	Replace propeller if damaged	
Every 3 months	Check the electric cables & switches for damage or corrosion Remove propeller and grease the propeller shaft / clean from rust	Replace plugs / connectors	Replace internal sensors, switches, cables
	Lubricate all moving parts or protect corroded parts		
Mechanical repairs		Basic maintenance & replacements of mechanical parts	Repair after mechanical damage or overheat
Electrical repairs			Any repair on electric motor, controller, sensors, display, internal switches or cabling

In case other spare parts are needed or the motor has any damage, send an email with a digital photo to [info@all4solar.com.au](mailto:info@all4solar.com.au) indicating the motor number, name of the owner and the parts needed or damaged.

## 7) Boat transport & trailering

When transported on a trailer, always dismantle the motor from the transom.

## 8) Warranty

Your solar motor, the batteries and the solar system are backed by a 1 year warranty for workmanship and material for non commercial use. The warranty does not cover any damaged which result from faulty handling, operating or maintenance. The following points will void the warranty:

- 1) Operation or maintenance differing from the information and instructions in this manual or any other manufacturer's documentation.
- 2) Preparation and participation in competitions or races or any form of competition.
- 3) Water damages to the motor, the solar controller, main switch or batteries.
- 4) Damages caused by collision, accidents, contact with any solid materials.
- 5) Capsize of the boat or drowning the motor into the water.
- 6) Grow of any kind of marine organism on the motor surface.
- 7) Incorrect use of the motor or use on unsuitable boats.

- 8) Normal aging process.
- 9) If serviced by none authorized or specialized workshop.
- 10) Damage by corrosion.
- 11) Batter damage by undercharge, charged by unsuitable charger.

The warranty does not include wear parts such as: Anode, propeller, splint pins, plugs and rubber parts. The warranty only covers the motor, the batteries and the solar panel. It does not cover damaged to the boat or and accessories, battery charger, trailer or any kind of equipment.

Transport to all4solar is to be paid by customer. The redelivery to the customer is paid by all4solar, if warranty applies.

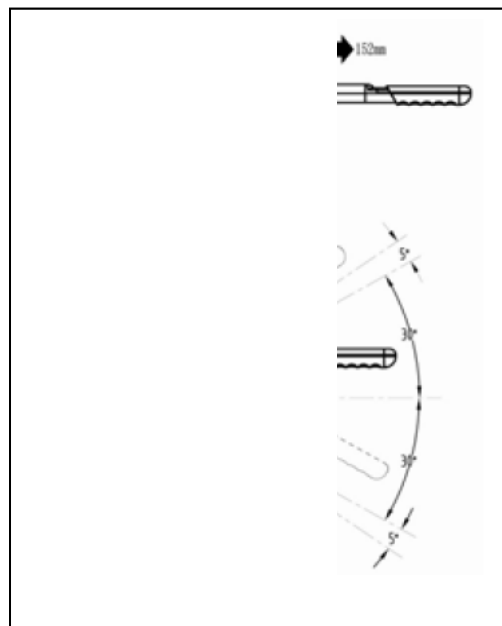
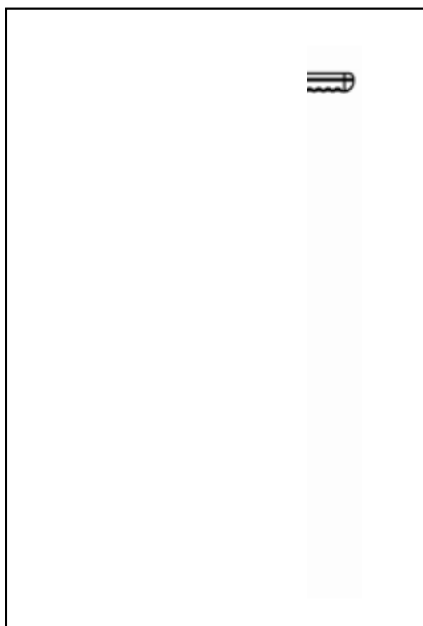
All4solar cannot be held liable for any damage or injury caused by the use of this motor.

## 9) Technical data



### 9.1 Motor

Shaft length: 40' / 100 cm (can be cut down to 50 cm)  
 Motor weight: 11 kg  
 Motor output: 1150 watts / 24 volts DC  
*Produced to RoHS/CE – standards* low voltage



### 9.2 Batteries (lead acid)

Deep cycle batteries 2 x 12 V nominal  
 Max. charge voltage 28.6 V  
 Max. charge current 20 A  
 Max. discharge current 100 A  
 Max. capacity 50 Ah  
 Weight 2 x 16.5 kg  
*Produced to RoHS/CE - standards*

### Lithium (optional)

8 cell batteries  
 29 V  
 0.5 C  
 1.2 C  
 12 kg / KWH

## 9.3 Solar system

### **Specifications Solarpanels (two 12 V panels in series / Aluminium frame / 3 mm glass)**

Maximum output (Pmax)	90 W
Voltage at pmax	36 V
Current at pmax	2.5 A
Open circuit voltage	43.2 V
Short circuit current	2.7 A

Specifications based on 24 C / 1000 W / m2

Weight of folding panel	10 kg (without bag/cables) 11 kg with bag/cables
Dimensions	610 x 534 x 70 mm (folded) 610 x 1080 x 35 mm (unfolded)

**Produced to RoHS/CE - standards**

### **Specifications controller**

Maximum input voltage	24 V nominal / 45 V open circuit
Output voltage	21 V – 28.6 V
Max. current	12 A

**Produced to RoHS/CE - standards**

## 9.4 Energy consumption

Operation time 1.2 KW - motor at 24 C with new lead acid batteries. Lithium batteries of the same capacity allow upto 50% more output.

Power	Battery 24 V 2 x 50Ah 33 kg (1.2 KW h)	Solar panel connected 90 W power
100 % - 1.2 KW	30 min.	35 min.
80 % - 1.0 KW	40 min.	50 min.
60 % - 0.75 KW	55 min.	70 min.
40 % - 0.60 KW	70 min.	85 min.

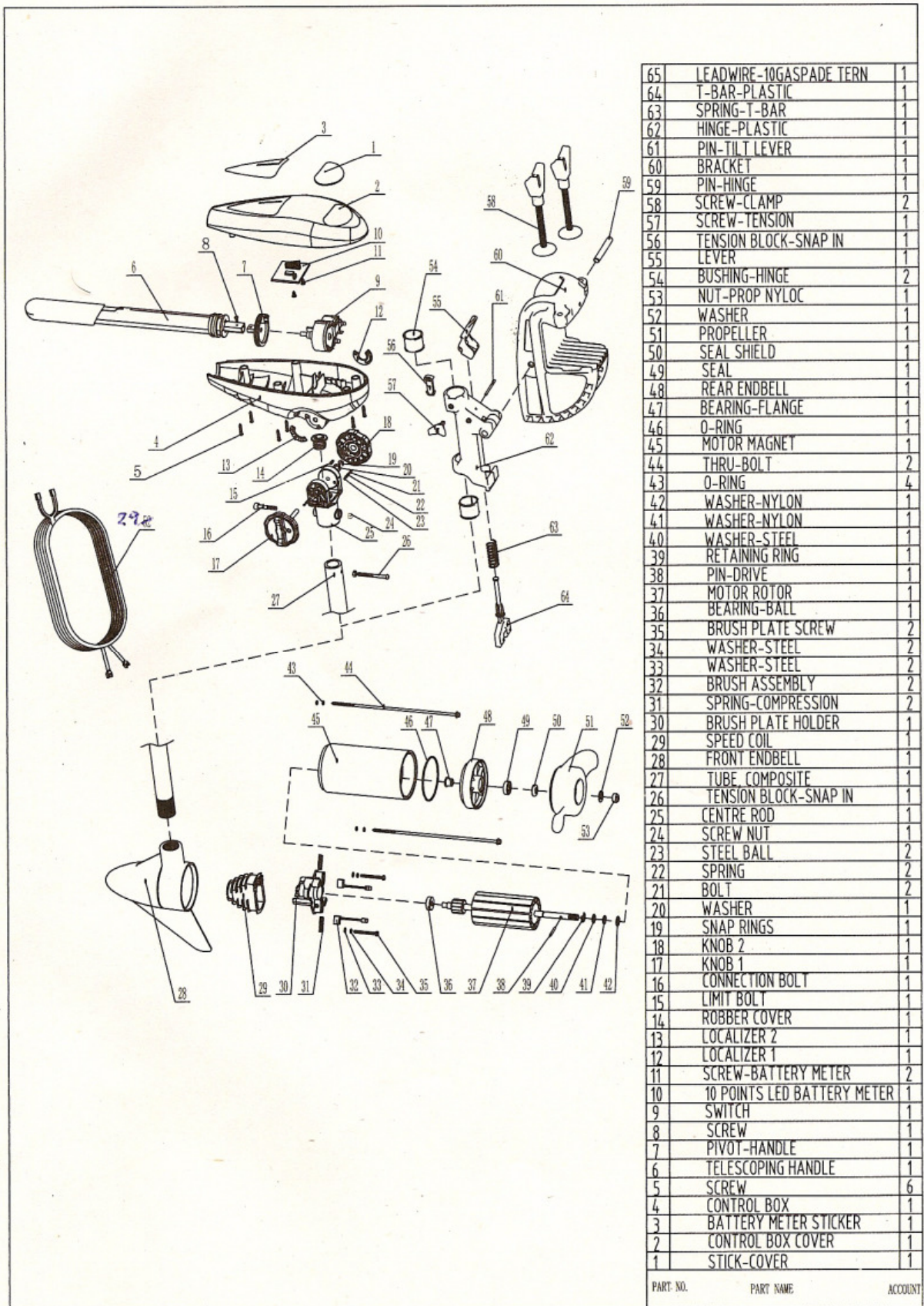
Please note, that above figures are indications only and can vary according to the various conditions, battery charge level, temperature and solar radiation.

## 10) Spare parts

Please contact all4solar, if any spare parts needed: [info@all4solar.com.au](mailto:info@all4solar.com.au)

### Main parts

- 1 x motor (see details on next page)
- 1 x solar panel & charger
- 2 x battery
- 1 x board with switch & fuse



65	LEADWIRE-10GASPADE TERN	1
64	T-BAR-PLASTIC	1
63	SPRING-T-BAR	1
62	HINGE-PLASTIC	1
61	PIN-TILT LEVER	1
60	BRACKET	1
59	PIN-HINGE	1
58	SCREW-CLAMP	2
57	SCREW-TENSION	1
56	TENSION BLOCK-SNAP IN	1
55	LEVER	1
54	BUSHING-HINGE	2
53	NUT-PROP NYLOC	1
52	WASHER	1
51	PROPELLER	1
50	SEAL SHIELD	1
49	SEAL	1
48	REAR ENDBELL	1
47	BEARING-FLANGE	1
46	O-RING	1
45	MOTOR MAGNET	1
44	THRU-BOLT	2
43	O-RING	4
42	WASHER-NYLON	1
41	WASHER-NYLON	1
40	WASHER-STEEL	1
39	RETAINING RING	1
38	PIN-DRIVE	1
37	MOTOR ROTOR	1
36	BEARING-BALL	1
35	BRUSH PLATE SCREW	2
34	WASHER-STEEL	2
33	WASHER-STEEL	2
32	BRUSH ASSEMBLY	2
31	SPRING-COMPRESSION	2
30	BRUSH PLATE HOLDER	1
29	SPEED COIL	1
28	FRONT ENDBELL	1
27	TUBE, COMPOSITE	1
26	TENSION BLOCK-SNAP IN	1
25	CENTRE ROD	1
24	SCREW NUT	1
23	STEEL BALL	2
22	SPRING	2
21	BOLT	2
20	WASHER	1
19	SNAP RINGS	1
18	KNOB 2	1
17	KNOB 1	1
16	CONNECTION BOLT	1
15	LIMIT BOLT	1
14	ROBBER COVER	1
13	LOCALIZER 2	1
12	LOCALIZER 1	1
11	SCREW-BATTERY METER	2
10	10 POINTS LED BATTERY METER	1
9	SWITCH	1
8	SCREW	1
7	PIVOT-HANDLE	1
6	TELESCOPING HANDLE	1
5	SCREW	6
4	CONTROL BOX	1
3	BATTERY METER STICKER	1
2	CONTROL BOX COVER	1
1	STICK-COVER	1

PART. NO. PART NAME ACCOUNT