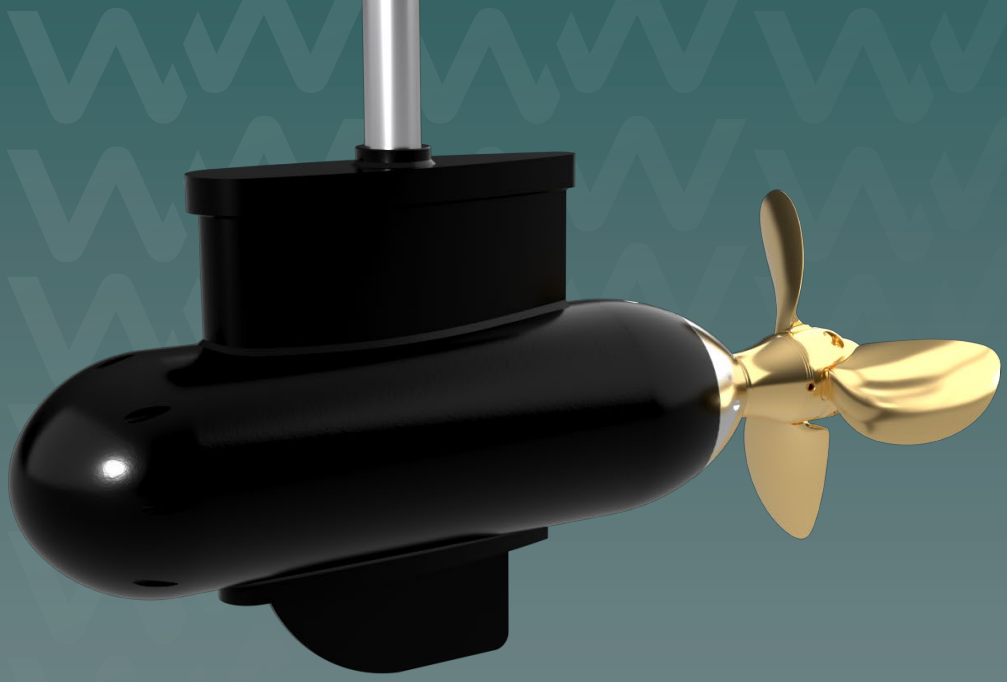

waterworld

electrify your world

MANUAL 2024

Installation of the POD motors by WaterWorld

Dear user,

Congratulations on your purchase! We are delighted that you have chosen WaterWorld's electric propulsion.

WaterWorld POD motors are designed and manufactured with the utmost care, aiming to provide you with a safe, reliable, environmentally friendly, and user-friendly propulsion system. We constantly strive to improve WaterWorld propulsion systems and greatly appreciate any feedback you may have on design or usage. You can find our contact information on the back of this manual.

We recommend that you carefully read through this manual so that you can install and use the propulsion system correctly. We wish you a lot of enjoyment with your WaterWorld propulsion!

Best regards,
The WaterWorld Team

waterworld
electrify your world

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CHAPTER 1
INTRODUCTION

- **Use of this manual**
- **Warning and symbols**
- **Serial numbers**

Use of this manual

This manual contains essential information for the safe use of WaterWorld electric propulsion systems. Both maintenance and troubleshooting are covered in this manual.

It is crucial that anyone responsible for the installation of this system, as well as anyone who will operate the motor, thoroughly studies this manual. It is necessary to closely follow and execute the warnings and safety instructions in this manual.

The installation and maintenance of WaterWorld motors should be carried out by specialized and skilled installers, adhering to applicable laws and regulations, in conjunction with the safety aspects listed in this manual.

Keep this manual with your system in a safe and easily accessible place!
You can download a copy or the latest version at www.waterworldelectronics.com

Warning and symbols

DANGER — A warning indicates that there is a potential risk of injury to the user/installer or significant material damage if the user or installer fails to avoid this risk.

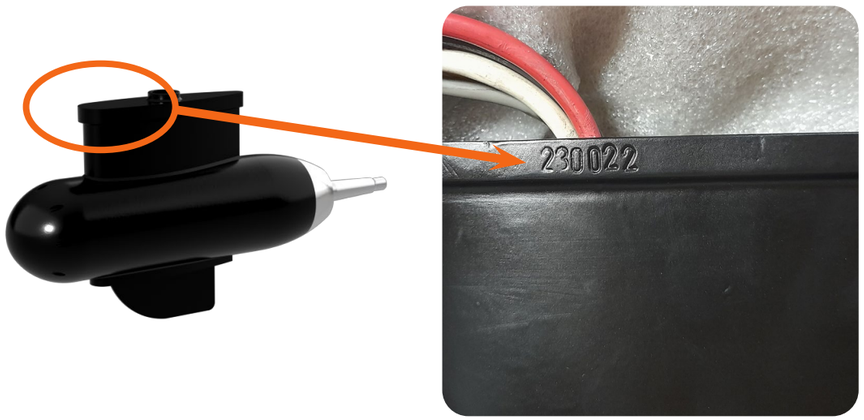
WARNING! — Special information, respective requirements and prohibitions regarding damage prevention.

WARNING! Instructions that require extra attention and must be followed.

Serial numbers

You will find the identification label with the serial number on the top of the motor controller. It indicates the manufacturer, the model number, and the unique serial number of the motor or controller. The serial number starts with the letters WW and is listed after the text ‘Serial:’. Below, there is another text starting with WW (21113085), which is the article number of the motor controller.

The POD has its own serial number. This can be found on the top edge of the fin on the port side of the POD. This number is stamped.



Both numbers should be found on your invoice. This can be important for warranty purposes.

Pod motor

Motor controller

WARNING! Never remove the identification labels and/or other stickers on the motor.

CHAPTER 2
PRE-INSTALLATION CHECKLIST

- **Step-by-step installation guide**

Installation step-by-step guide

1. Read the manual
We aim to provide you with an extremely comprehensive manual. This includes not only aspects related to the WaterWorld POD motor, but also information about the entire boat, the propeller, and the batteries. However, it is important to note that each installation is unique and should be carried out by a skilled person.

2. Check if you have received everything that should be included in the delivery.
Arrange all parts neatly and compare them with the list in Chapter 4 of this manual and the attached packing slip. If you have any questions, please contact your supplier directly for clarification.

3. Prepare the boat to install the system in a clean and dry environment.
If the following aspects do not meet the requirements, they should be addressed before installation.

1. No permanent bilge water at the motor installation location:
Ensure that there is no permanent bilge water present at the location where the motor is to be installed.
2. Effective protection against boat flooding:
Ensure a properly functioning bilge pump is in place in the boat to prevent flooding.
3. Considerations for component placement:
Prevent leakage or condensation moisture from above when placing components. Adjust placement if necessary or cover components from above.
4. Ensure good ventilation:
Provide adequate ventilation in the relevant space(s) to allow moisture to evaporate and ventilate the space. Ensure good “flow-through”.
5. Smooth-running and properly aligned propeller shaft system:
Check if the propeller shaft system runs smoothly and is properly aligned. A stiff-running propeller shaft system can lead to;
Increased fuel consumption, resulting in reduced operating time.
Engine overheating
Slow response to throttle input.
Less controlled throttle; the engine may start with too much power once sufficient force has been built up.
6. Ensure these points are addressed before proceeding with installation.

4. Make the right propeller selection.
Refer to our advice on page 44.

5. Check the accessibility of the components.
Ensure that all components remain accessible for servicing.

6. Ensure proper weight distribution in the boat.
The (lead-)battery pack can be significantly heavy; ensure balanced weight distribution in the boat. Ensure that the batteries are accessible for maintenance of the battery terminals, wiring, and in the case of wet batteries, for topping up with distilled water. For WaterWorld LFP batteries, it is essential that the on/off switch is accessible at all times.

7. Choose the correct cable thickness.
Refer to page 27 for the correct cable selection. Ensure that cable lengths are not unnecessarily long if this can be avoided. To ensure equal discharge of potentially multiple batteries, it is important that the lengths of both the cable from the main positive terminal and the main negative terminal are equal.

8. Read the safety instructions in Chapter 3 before connecting anything.
Then read the section of the manual that pertains to the respective component. Always connect according to the wiring diagram on page 23.

9. Start the installation.

CHAPTER 3
SAFETY

- **General guidelines**
- **Safety features of the propulsion system**
- **Safety instructions for the propulsion system**
- **Safety instructions for the batteries**
- **Safety instructions for usage**

General guidelines

Read and observe the safety and warning instructions in this manual!

- • Adhere to local laws and regulations and the required qualifications.
- Ignoring the instructions may result in injury and material damage. Water World Electronics cannot be held liable for damage resulting from actions contrary to this manual.
- The propulsion system should operate at the prescribed voltage.
  - In the standard setting, this is 48 volts nominal. Minimum 42 volts, maximum 60 volts.
  - **There is a special setting for specific lithium batteries that operate at a lower nominal voltage of 44 volts; at this setting, the minimum is 37 volts. Refer to page ??.**
- The system is intended solely for powering watercraft. The manufacturer cannot be held liable for any other use, and in all cases, the warranty is void.
- Keep the electronics away from water.
- Installation and repairs may only be carried out by an authorized installer designated by WaterWorld.
- Use only original or recommended WaterWorld accessories and/or spare parts.
- Only original replacement parts may be used for repairs to the propulsion system. The use of non-original parts may result in serious injury, damage, and voiding of further warranty.
- Battery replacement must be carried out exclusively by an authorized installer.
- The user should regularly ensure the proper operation of the propulsion system and the batteries. The manufacturer is not liable for any damage resulting from the improper functioning of the propulsion system.
- The supplier, being WaterWorld, the seller, or the manufacturer, do not accept liability for any damage to the buyer, nor for potential claims from third parties arising from (the use of) the propulsion system, directly or indirectly, including consequential damage, environmental damage, hearing damage, business damage, and non-material damage, or incorrect advice, unless the damage is attributable to gross negligence or negligence of the supplier.
- Prior to use, you must consider the legislation in the respective country, both at the location where the propulsion system is located and where it is used. The buyer is responsible for complying with any legal precautions at the location where the propulsion system is used, regardless of whether the propulsion system is operational at that time. This also includes measures relating to fire safety and ensuring the safety of others in the vicinity of the propulsion system.
- The manufacturer reserves all rights and powers arising from European legislation. It is expressly prohibited to imitate or copy the device.
- For non-standard battery packs, except WaterWorld LFP batteries, it is best to contact your supplier beforehand.
- Never attempt to carry out repairs on the WaterWorld system independently.
- Never touch loose, torn, or visibly damaged cables or parts.
- Do not lift the WaterWorld system alone and use suitable lifting equipment.
- During navigation, ensure that the risk of the propeller hitting the bottom is eliminated.

Safety features of the propulsion system

Your WaterWorld electric drive system is equipped with various safety measures:

- Overheating protection for motor and controller:
  The motor adjusts the power output when the electronics detect excessive temperatures.
- Fuse on the controller:
  Depending on the motor power, a fuse is installed on the motor controller.
- External fuse for wiring:
  This prevents fire, overheating, or overloading of the system. CAUTION! This external fuse is not included in the standard delivery but must be installed.
- Main switch:
  Make sure to always turn this off when you leave the boat or when work is being done on the system. This main switch is not included in the standard delivery but must be installed. Consult your supplier for the appropriate main switch regarding the applied current strength.
- Overload protection for batteries:
  If your batteries are nearly empty, the motor will automatically reduce power, allowing you to extend your sailing time and safely reach a harbor at low speed.
- Ignition switch:
  This allows you to turn off the system in case of danger. Always turn it off when there are swimmers around the boat!
- Display:
  This continuously shows the remaining sailing time, allowing you to plan your trip to reach your destination. Additionally, the display warns of excessively high or low battery voltage, with an indication on the screen for low voltage
- Voltage-carrying cables that connect the motor, controller, and other components must be regularly inspected for damage, breaks, and proper, secure attachment.
- The cable shoes of the voltage-carrying cables that connect the motor, controller, and other components must be equipped with pole caps that also cover the battery poles.
- When damage or breakage is detected in the cables/wires, the motor must be immediately shut down and taken out of service until the respective cable/wire is replaced.

WARNING!

Safety instructions for the propulsion system

Follow the instructions in this manual

- Immediately switch off the system via the main switch in case of overheating, smoke development, or if you detect a defect.
- In use, the ambient temperature should not be lower than -20 degrees Celsius and not higher than 50 degrees Celsius.
- Do not touch the driveshaft, motor, and battery components during or immediately after sailing.
- Always switch off the system via the main switch during assembly and disassembly work.
- Do not perform maintenance or cleaning on the propeller or driveshaft while the system is powered on.
- **WARNING! Turn off the engine when there are people near the boat**.

DANGER!

Safety instructions for the batteries

- Adhere to all safety instructions regarding the used batteries as outlined in the battery manufacturer's manual.

DANGER!

- Do not use the WaterWorld system if the battery is damaged, and inform the supplier or installer of the system.
- Do not store flammable objects near the battery.
- Never smoke and avoid sparks or flames near the batteries.
- Make sure you have enough water on hand; if battery acid comes into contact with the skin or eyes, immediately rinse with water and seek medical assistance.
- Only use charging cables suitable for outdoor use.
- Always fully unwind the reel from a 230 Volt power outlet if you are using one.
- Avoid strong mechanical forces on the batteries and system cables.
- Remove metal jewelry and watches before performing work on batteries and always use insulated tools for this purpose.
- Never short-circuit batteries. Ensure that tools and metal objects never come into contact with the battery to prevent sparks, fire, or explosions.
- When connecting the battery, pay attention to the correct polarity and ensure that the connections are securely and firmly attached for good contact.
- Never reverse the polarity.
- When connecting the batteries, first connect the red positive cable and then the black negative cable.
- When disconnecting the batteries, ensure that you first disconnect the black negative cable and then the red positive cable.
- Battery terminals must be clean, free from corrosion, and covered with terminal caps.
- Do not place batteries in poorly ventilated spaces. When placing them in a locker, proper ventilation must be provided.
- Only connect identical batteries (type, capacity, age).
- Only connect batteries with identical state of charge.
- Ensure that battery terminals always make optimal contact with the cable eyes they are connected to.
- Do not connect other consumers (e.g., fish finder, lights, radios, etc.) to the same battery bank used to power the POD.
- In case of battery failure, it is recommended to replace all batteries.
- When working on batteries, always switch off the system using the main switch.

WARNING! Always ensure that there are no stainless steel washers between the battery terminal and the connected cable.

WARNING! More information about the batteries can be found in the manuals 48-6800 and 48/35 charger on www.waterworldelectronics.com

Safety instructions for usage

Read this manual thoroughly.

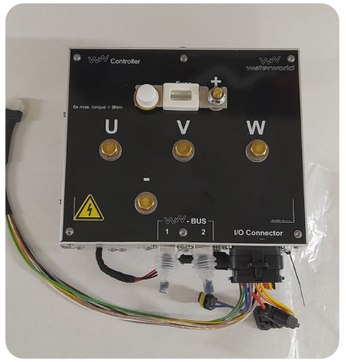
- The WaterWorld system may only be used by individuals who are qualified and both physically and mentally fit.
- Always comply with the national regulations and rules of the respective country.
- Keep the drive and control options out of reach of children or individuals who cannot handle them properly.
- Have the operation and safety regulations of the entire system explained by the shipyard or installer.
- Inspect the system for mechanical damage before departure.
- Check the condition and operation of all functions of the WaterWorld system at the start of each voyage at low speed.
- Sail only with a system that is in perfect technical condition.
- Ensure that the batteries are sufficiently charged.
- Familiarize yourself with all control elements of the WaterWorld system and know how to stop the system quickly if necessary.
- As the boat operator, you are responsible for the safety of the people on board and for all boats and people around you. Therefore, adhere to the basic rules of boating.
- Be extra cautious when there are people in the water, even when sailing at low speed.
- Obtain information about the area where you will be sailing before departure and take into account the weather forecasts and sea conditions.
- Be familiar with the area where you will be sailing, as the range indicated by the onboard computer does not account for wind, current, and sailing direction.
- Plan for a sufficient buffer for the required range.
- Ensure that, depending on the size of the boat, the specific safety equipment is available and accessible (life jackets, anchor, paddle, communication devices, etc.).

DANGER!

CHAPTER 4
DELIVERY CONTENTS

- **Contents of the WaterWorld package**

Contents of the WaterWorld package



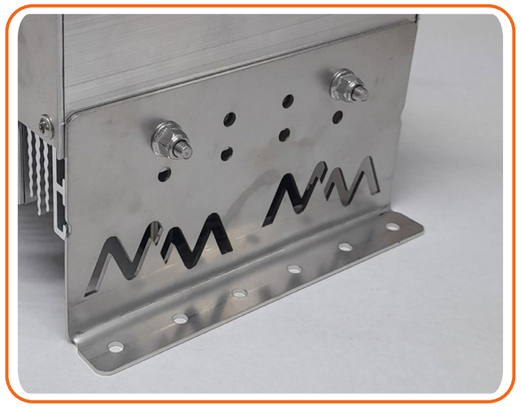
Standard delivery package includes:

- Pod base module
- Motor controller with stainless steel mounting bracket(s)
- Display
- Side-mount throttle lever (top-mount optional, ask your supplier)
- Relay (in the case of the 3.5p, the relay is integrated into the motor controller)
- Ignition switch with 2 keys
- Data cables (included with the separate components)

Not included:

- Main power switch
- Fuses for individual batteries

Mounting brackets for motor controller
Both the 8.0p and 18.0p motor controllers use separate brackets that are attached to either side of the motor controller with the included aluminum strips and stainless steel bolts and nuts.

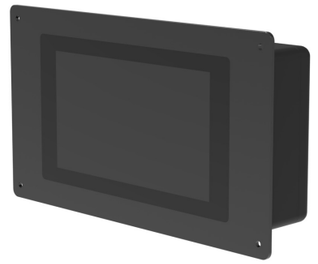


For the 3.5p, a single bracket is used.
This can first be attached to the surface where the motor controller is to be mounted, after which the motor controller
can be hung in it.

Mounting hardware to attach the bracket(s) to the
boat is not included.

Ignition Switch
The ignition switch is supplied with 2 keys and a 3-meter cable (easily extendable if necessary).
Each set of keys is unique.
In case of key loss, it is best to purchase a new ignition switch.
The ignition switch has an IP65 rating.

Digital display
The digital color display with touch functionality is supplied with a 3-meter RJ45 data cable. The display has an IP65 rating. When mounted in an open boat, please note that the display can become very hot in direct sunlight. We recommend covering the display with good ventilation to protect it from weather conditions when the boat is not in use. When mounting in an aluminum console, ensure the console has (natural) ventilation to prevent moisture from entering through the back of the display. Instructions for setting up and reading the display can be found on pages 32/33



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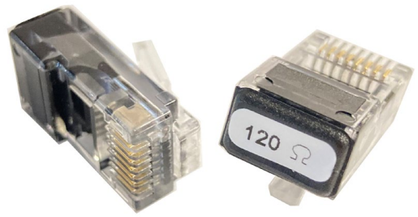
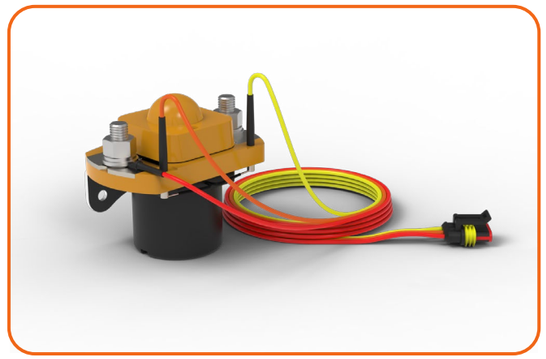
Throttle Lever
The standard delivery includes a side-mount throttle lever with a 1.5m RJ45 data cable.
In the network of a standard pod system, you can install and configure up to 2 throttle levers. For more information, see page XXX



Terminating Resistors
Depending on the type of pod, one (3.5p) or two terminating resistors (8.0p and 18.0p) are included.
Place these terminating resistors in the remaining open data ports. The specific data ports in which you place them are not relevant, as all components can be connected in series. The order in which you do this is also not important. Refer to the example connection diagram at the bottom of page 23 for more information

Relay
The relay is supplied with the 8.0p and 18.0p systems and fits onto the plug with similarly colored wires on the 23- or 35-pin connector. For the 3.5p, the relay is integrated into the motor controller.
The relay should be mounted with the red wire on the battery side. See wiring diagram for more information



Aluminum or Zinc Anode
An aluminum or zinc anode is included with the system. These anodes are required to meet the warranty conditions but are not included with the base module. Depending on the type of water you are sailing in, fresh or saltwater, you can choose either an aluminum or zinc anode, respectively. The anodes are supplied with stainless steel 316 hex bolts and corrosion-resistant ceramic paste.

IMPORTANT!
Not included in the standard delivery are a fuse with fuse holder for the battery cables, main switch, and battery pack with charger. Starting from 2022, WaterWorld produces its own lithium batteries. Please contact WaterWorld or your supplier for more information about the available options.

Mounting kit for steerable POD (optional)

Rudder stock
- Stainless steel 316
- Standard length 800mm
- Thread 3.5p = M30x1,5
  8.0p = M40x1,5
  18.0p = M50x1,5

Adjustment ring and KM round locking nut
- Stainless steel 316
- Thread KM locking nut
  3.5p = M30x1,5
  8.0p = M40x1,5
  18.0p = M50x1,5
-Adjustment ring
  3.5p = 30mm
  8.0p = 40mm
  18.0p = 50mm

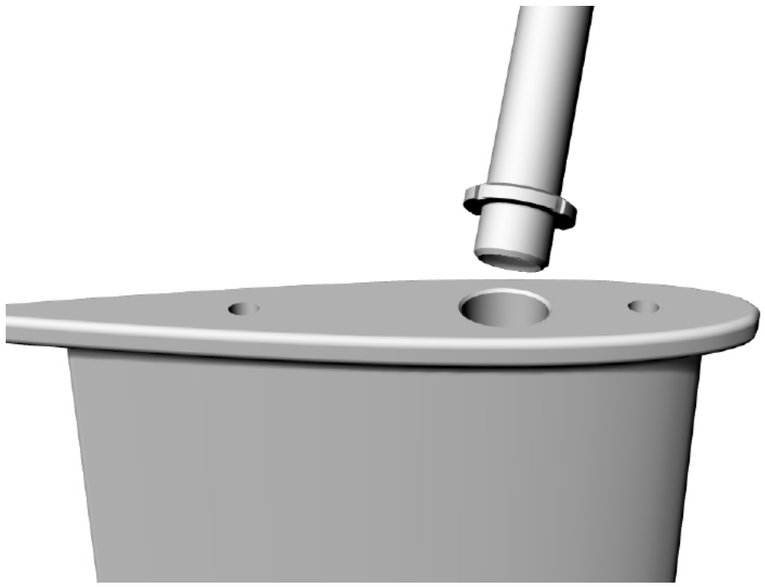
Rudder arm
Ask your supplier about the options.

Mounting kit for fixed POD (optional)

Full thread tube
- Stainless steel 316
- Thread 3.5p = M30x1,5 130mm
  8.0p = M40x1,5 180mm
  18.0p = M50x1,5 220mm
- Bolts 2x
  3.5p = M8x60
  8.0p = M10x60
  18.0p = M14x60
- Ceramic paste

Bonding rudder stock or threaded tube

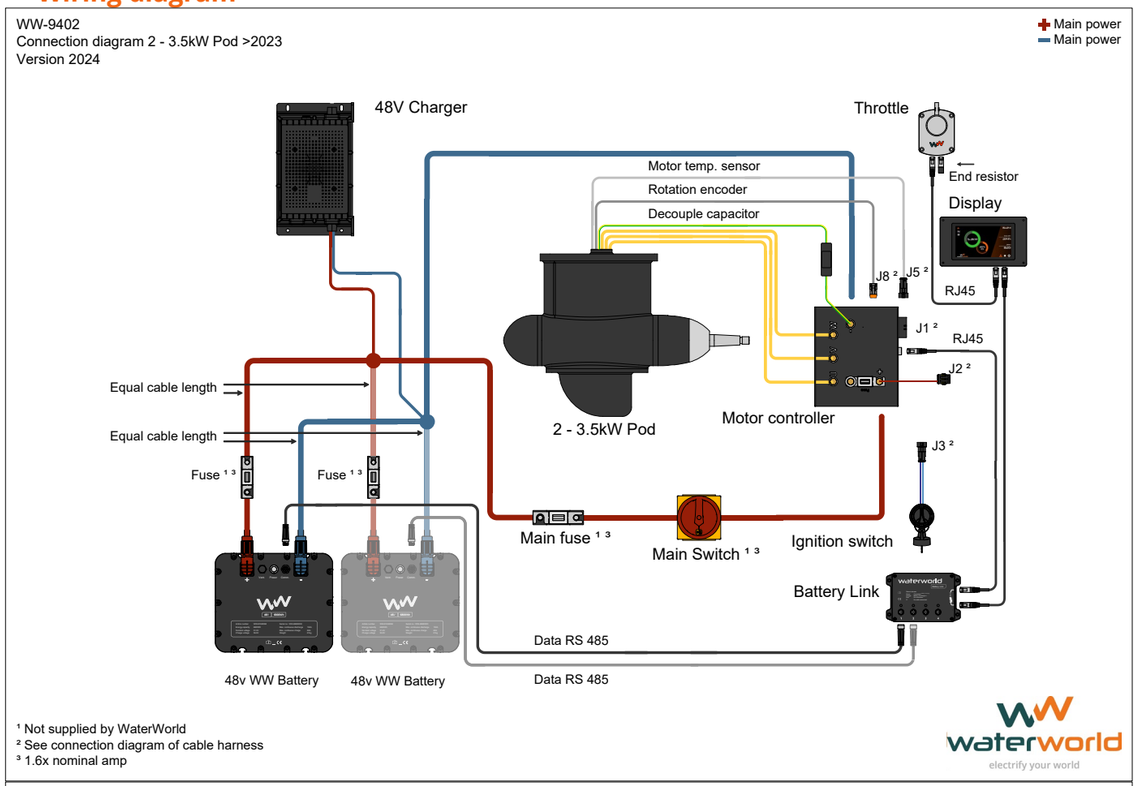
1. Thread the wires coming out of the pod through the rudder stock or the threaded tube.
2. Clean the internal thread of the pod with Loctite SF7064.
3. Clean the external thread of the rudder stock or the threaded tube with Loctite SF7064.
4. Let it evaporate for a few minutes. Avoid contaminating the threads.
5. For the rudder stock, screw the cleaned KM nut onto the thread with Loctite SF7064 until the end of the thread.
6. Apply a continuous line of Loctite 549 manually to the surface of the thread and simultaneously screw the tube as far as possible into the pod.
7. Tighten the KM nut with suitable tools to ensure it is securely fastened and locks the rudder stock.
8. Let it dry for at least 24 hours at room temperature before loading. For the best result, this is 72 hours!

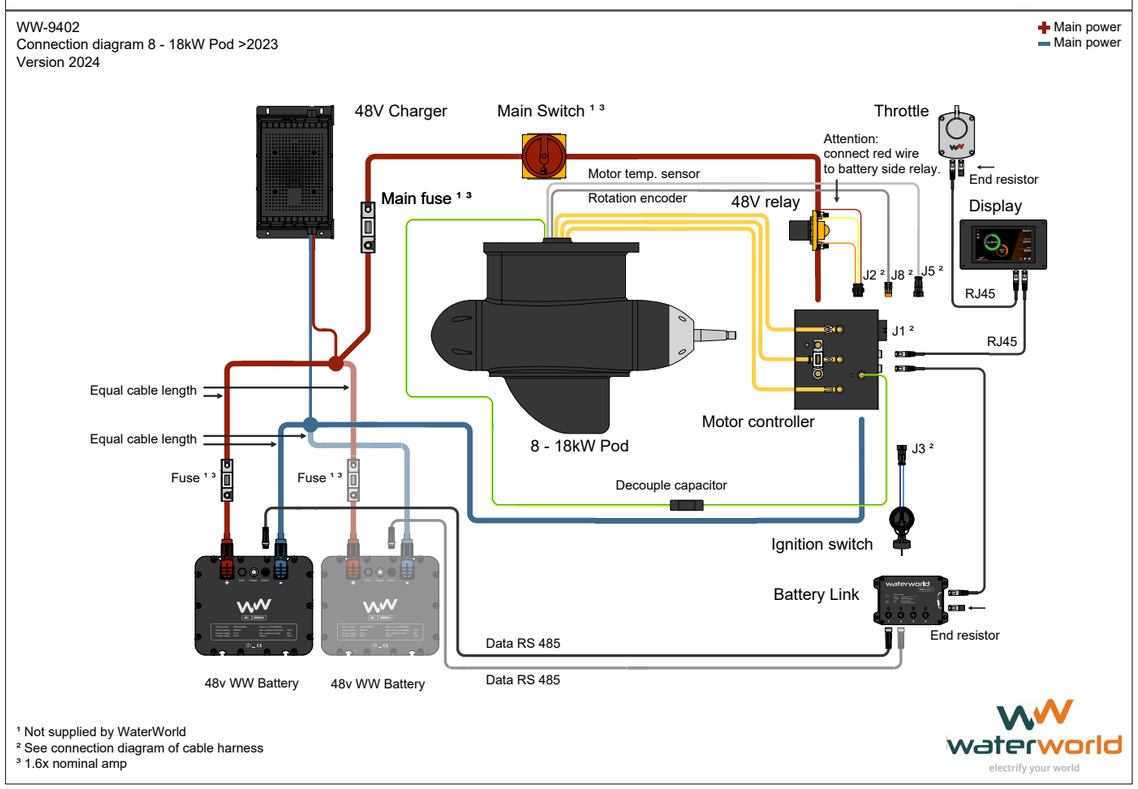


CHAPTER 5
SYSTEM INSTALLATION

- Wiring diagram
- Placement of the POD motor
- Batteries
- Battery charger
- Recommended cable thicknesses
- Main power switch
- Main fuse
- The relay
- The throttle
- The display
- The ignition switch
- Connecting the throttle, display, and ignition switch
- Setting up the display
- Testing and commissioning

Wiring diagram





For the latest version of the wiring diagram, please consult our website:
www.waterworldelectronics.com/downloads

Placement of the POD motor

The pod motor is best installed using the following step-by-step plan:

Step-by-step guide for mounting a steerable setup:

1. Check the requirements of national regulations and legislation for installation.
2. Install a skeg housing in the boat according to the supplier's instructions. Ensure sufficient reinforcement at the location of the skeg housing.
3. Consider using a specialized skeg housing resistant to water pressure for installations below the waterline. Consult your supplier for more information.
4. Optionally lower the rudder stock inside the boat to evenly distribute the pod's force and reduce stress on the skeg housing.
5. Adjust the height of the pod motor using the adjustment ring, which sits on the skeg housing.
6. Before gluing the rudder stock to the pod, ensure the length of the rudder stock is sufficient for mounting and sealing above the waterline. If necessary, shorten the rudder stock.
7. Deburr the edge of the rudder stock to prevent damage to the cables.
8. Optionally: install slide bearings between the skeg housing and the adjustment ring, as well as between the hull and the pod, if needed for specific boat requirements.
9. Ensure the wires coming out of the rudder stock can move freely to prevent wear on the motor cables. Use spiral wrap to protect the cables during rotation of the rudder stock.
10. Ensure the distance between the ship's flat surface and the top of the propeller is 1/3 of the propeller diameter to minimize sound transmission from the propeller to the hull.

Step-by-step guide for mounting a fixed setup:

1. Check the national regulations and legislation for installation.
2. Ensure sufficient reinforcement at the location where the pod motor is attached to the hull. Consult a specialist if you are unsure about this.
3. Mount the pod motor as horizontally as possible.
4. Depending on the model, make 3 holes in the hull according to the specifications on page 22 for the sizes per pod.
5. Attach the pod with a gasket (not supplied by WaterWorld) or sealant against the hull using the two supplied bolts. Tighten the bolts hand-tight. If using sealant, tighten it hand-tight only and tighten again after 24 hours for a proper seal.
6. Tighten the threaded tube with the supplied KM nut. Hand-tighten it; the gasket or sealant should provide the seal.
7. Ensure that the distance between the ship's flat surface and the top of the propeller is typically 1/3 of the propeller diameter to minimize sound transmission from the propeller to the hull.
8. Use a spiral hose to wrap around the threaded tube to prevent moisture from entering the pod through the open threaded tube while allowing ventilation from the pod..
9. Wrap a piece of spiral wrap around the cables in the threaded tube for protection.

Placement of the motor controller

Step-by-step guide for mounting a motor controller:

1. Check the requirements of national regulations and legislation for installation.
2. Preferably choose a location within the cable length from the pod.
3. Ensure that the controller is protected from rain, bilge water, or condensation.
4. Provide sufficient ventilation in the mounting space of the controller.
5. Use the supplied pole caps to protect the power and phase cables from short-circuiting due to contact with tools.
6. Connect the controller according to the diagram on page 25.
7. Check all connections before powering the system. If in doubt, contact your supplier.

The controller is cooled by fans, two or four at the rear, depending on the motor power. Ensure free airflow to dissipate heat. Air is drawn in at the back and blown out. If necessary, install ventilation grilles at the top for fresh air intake and heat dissipation..

WARNING! WaterWorld is not liable for performance loss, damage, or other issues due to insufficient ventilation.

Cable thickness from the collection point (busbar).

WaterWorld recommends and uses the following cable thicknesses:

Waterworld 3.5p:
Up to 3.8kW rated power, max. 80 Amperes.
For this, a cable thickness of 35 mm² is recommended.

Waterworld 8.0p:
Up to 8.8kW rated power, max. 190 Amperes.
For this, a cable thickness of 50 mm² is recommended.

WaterWorld 18.0p:
Up to 19.8kW rated power, max. 430 Amperes.
For this, a cable thickness of 95 mm² is recommended.

The above data is based on cable lengths up to 5 meters. For further advice on shorter and longer lengths, please refer to the table on page 29.

You may extend the phase cables up to 50% longer than factory length. Always consult an expert for this.

WARNING! If you intend to mount the controller externally from the motor, this should be done in consultation with WaterWorld by a certified installer!

WARNING!

Batteries

WARNING! Ensure that there is never any voltage on the system during installation and mounting!

1. The drive operates on 48 volts. Ensure the battery pack used for this application is suitable in quality and capacity. Use traction, semi-traction - deep cycle, or lithium batteries that meet the specifications.

   WARNING! If there is any doubt about the specifications of lithium batteries, it is advisable to consult with WaterWorld. It is possible that the batteries may damage the motor, or vice versa if they are not compatible with each other.

2. Place the batteries in the boat so that:

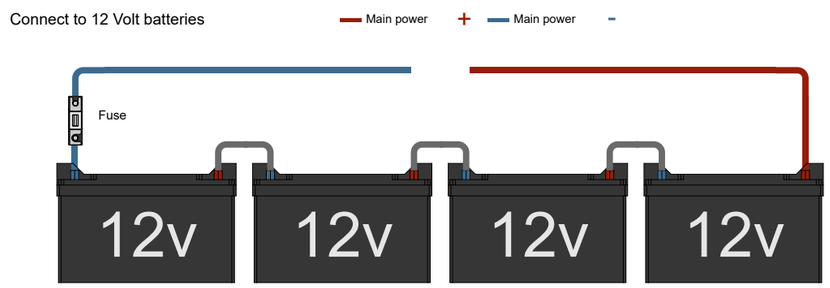
   a. the weight is evenly distributed and the boat sits level on the waterline
   b. the batteries cannot slide after installation
   c. the batteries are accessible for cable connection and future servicing
   d. the batteries do not obstruct daily use of the boat
   e. wiring to the motor and charger is easily achievable without unnecessary cable length.

3. Check the individual voltage of all batteries and ensure they are within 0.1 volts of each other before
   connecting the batteries in parallel. If this is not the case, all batteries must first be fully charged individually

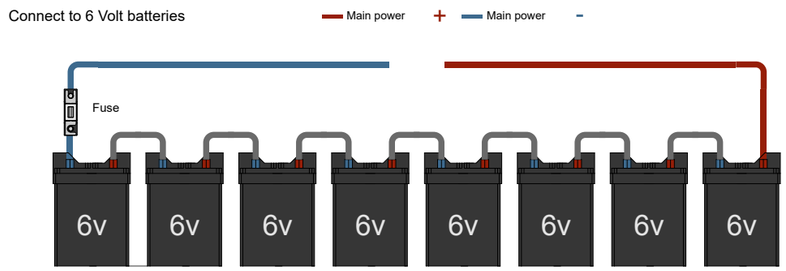
4. Connect the batteries together according to the applicable diagram.
   Below are examples of 4 x 12 Volt batteries in series and 8 x 6 Volt batteries in series.

   WARNING! Also, refer to the manual of the lithium batteries for correct installation.

Connecting to 12 Volt batteries



Connecting to 6 Volt batteries



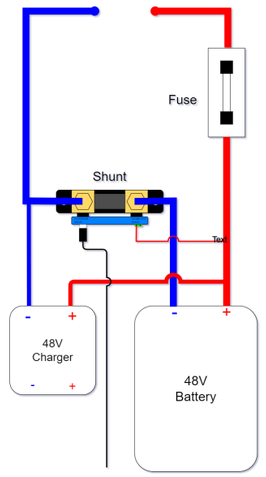
WARNING! Wait to connect the batteries to the rest of the system until everything is connected and tested for shorts.

Battery charger

The battery charger must be chosen according to the battery pack and be suitable in terms of voltage, charging capacity in amperes, battery type, and usage in a boat.

WARNING! When placing the charger, consider the same factors as with the motor and batteries. Moisture, accessibility, wiring, ventilation, etc.

WARNING! If using a WaterWorld battery charger, refer to the charger manual for more information.



Recommended cable thicknesses

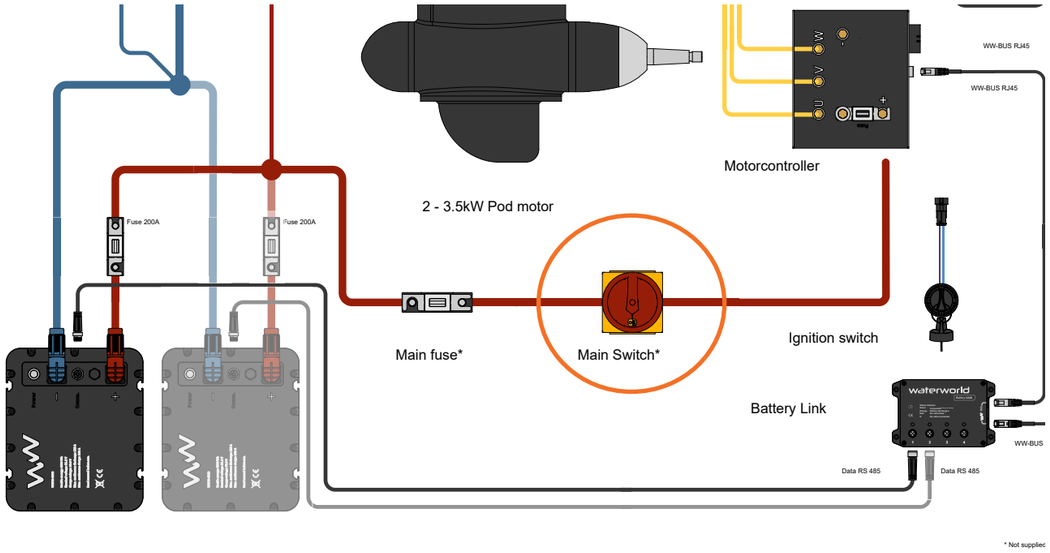
Cable Diameter	Cable Section	L(+) + L(-) up to 5 meter	L(+) + L(-) up to 10 meter	L(+) + L(-) up to 15 meter	L(+) + L(-) up to 20 meter
mm	mm^2	I max A	I max A	I max A	I max A
0.98	0.75	2.3	1.1	0.8	0.6
1.38	1.5	4.5	2.3	1.5	1.1
1.78	2.5	7.5	3.8	2.5	1.9
2.26	4	12	6	4	3
2.76	6	18	9	6	5
3.57	10	30	15	10	8
4.51	16	48	24	16	12
5.64	25	75	38	25	19
6.68	35	105	53	35	26
7.98	50	150	75	50	38
9.44	70	210	105	70	53
11.00	95	285	143	95	71
12.36	120	360	180	120	90

WARNING! When determining the appropriate cable thickness, consideration must be given to the voltage drop across the battery cable. This voltage drop must not exceed 0.26 volts, including cable lug shoes. The total length of both positive and negative pole cables must be taken into account.

Main power switch

Mount the main power switch in a readily accessible location in the (red) positive cable between the motor controller and the batteries, so that in case of emergency or maintenance, the system can be easily disconnected from the batteries.

WARNING! The main power switch is not included in the standard delivery scope..



Ensure that the main power switch is always turned OFF (“0” or “off” position) when working on the components and when disconnecting or connecting power cables, once the system is installed.

DANGER!

WARNING! The main switch should be able to be turned off during battery charging.

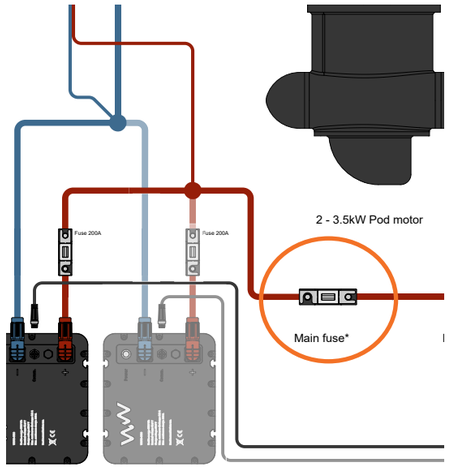
Main fuse

Install the main fuse between the main power switch and the positive terminal of the batteries, as close as possible to the batteries, preferably in the battery compartment. Ensure that this main fuse is located inside the boat but remains visible by opening a hatch. The capacity of the fuse in amperes should be approximately 1.6 times the maximum amperes of the motor (refer to the specifications).

You can also order an ANL fuse holder and an ANL fuse for the motor right away. We provide the following values:

WaterWorld 3.5p	– 160A fuse
WaterWorld 8.0p	– 325A fuse
WaterWorld 18.0p	– 600A fuse

WARNING! The main fuse is not included in the standard delivery scope.

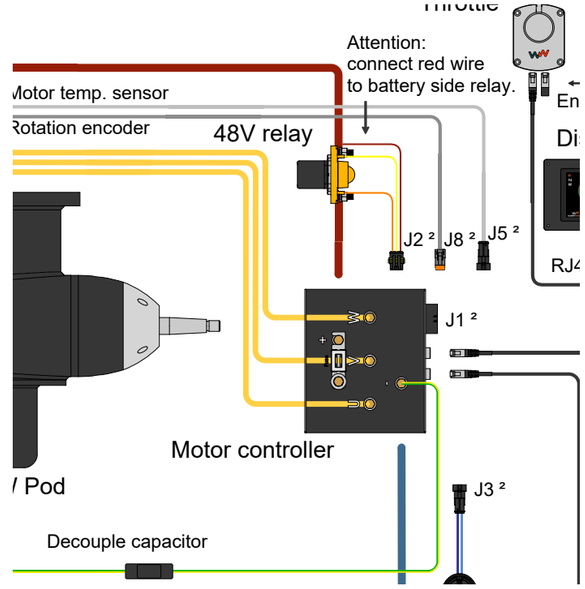


The relay

Mount the supplied relay (in the case of 8.0p and 18.0p) to the (red) positive cable, between the controller and the main power switch.

The loose red wire with M8 eyelet goes onto the bolt of the relay on the battery side, above the battery cable. Ensure a good connection of this red wire; a poor connection can result in malfunctions when starting the motor.

The relay has a plug with 3 wires, which is connected to the motor controller on the contrast plug. These wires have the same colors and only fit in one way.



The throttle

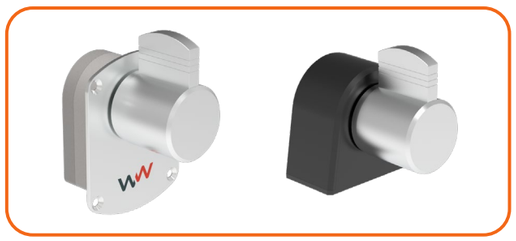
WARNING!

1. Mount the throttle in a suitable location, easily accessible for the driver. Refer to the website for the drawing of the throttle for the correct dimensions.

Ensure that the throttle is mounted in such a way that crew members of the boat cannot easily bump into it,
which could result in sudden acceleration or increased speed!

2. Mount the throttle in such a way that in the neutral position, the throttle lever is vertical.

WARNING! The throttle is set as follows by default: moving the lever clockwise moves the boat forward, while moving it counterclockwise moves it backward. This is the correct configuration when the lever is mounted on the starboard side against the steering console When placing the throttle on the port side of the steering console, the operation of the throttle needs to be adjusted in the display menu. If the propeller rotates in the wrong direction, the motor’s rotation direction should be adjusted. This can be achieved by reversing the phase cables so that the propeller rotates in the opposite direction. Additionally, the position of the throttle in the display can be adjusted. Please refer to the instructions for setting up the display. This adjustment should only be carried out by an authorized dealer or installer. More information can be found on page 31.



Sidemount (standard)

Topmount

The display

Mount the display in the appropriate location. It should be clearly visible for the boat's driver. If it is mounted in an open boat, consider that the display can get very hot in direct sunlight. We recommend covering the display adequately and providing ventilation when the vessel is not in use to protect it from weather conditions. When mounting in an aluminum console, ensure the console has (natural) ventilation to prevent moisture from entering through the back of the display.

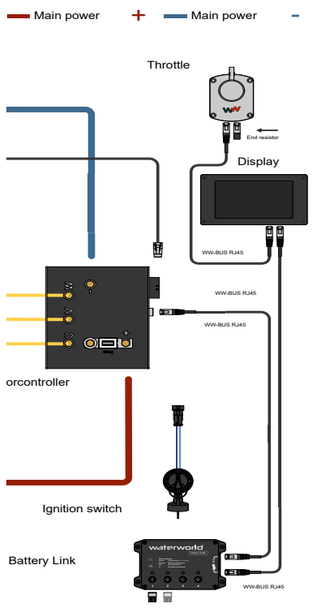
Make sure you have the correct orientation of the display. Otherwise, it will be upside down.

The ignition switch

Mount the ignition switch in the appropriate location, easily accessible for the driver, for example, next to the display or below the throttle lever. The cable can be extended if necessary.

Connecting throttle lever and display

The throttle lever, the display, and any other network components, such as a Batterylink, can be connected in various ways. This can be done using the daisy-chain principle. The order in which the components are connected does not matter, as long as a terminating resistor is applied at the last component. The image next to this text shows an example of a connection diagram, with the corresponding step-by-step plan below.



Example connection plan

Example step-by-step connection plan

1. Connect an RJ45 cable from the throttle lever to the display
2. Connect an RJ45 cable from the display to the motor controller
3. Insert a terminating resistor into the remaining port of the throttle lever.

WARNING!
The terminating resistors are located, in a new delivery, in the RJ45 connectors of the motor controller. Silicone protective covers are placed over the terminating resistors. During the assembly of the boat and the installation of the WaterWorld system, keep these items in place as long as possible. They protect the RJ45 connectors from construction debris.

Setting up the WaterWorld display

To start, tap on the settings icon , at the bottom right corner of the screen. The overview screen will appear. Under 'Settings', changes can be made to the settings. After completing each step, press the "save" icon , to save the values! Then, proceed through the different settings:

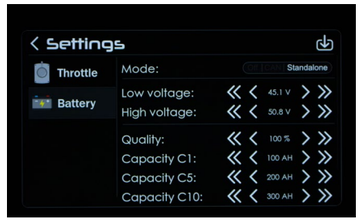
Throttle

To the right of "Throttle", you'll see a "1". When two WaterWorld throttle levers are connected, you'll also see a "2" appear. "Mounting side" indicates which side of the steering console the selected throttle lever is mounted on. You can use this to adjust the mounting side to the right, but it doesn't change the rotation direction of the propeller.

Battery

To the right of "Mode:", you can adjust the setting for the batteries. You can choose from;
- "Off" No battery data is displayed on the screen.
- "CAN" This displays battery information via CAN communication. The measurements from the Batterylink or Smartshunt will be displayed.
- "Standalone" This refers to an unmeasured, set battery capacity. For this, C values must be filled in. Set these C values according to the specifications of the battery. Fill in all values! For lead-acid batteries, if the battery manufacturer only provides a C20 and/or C5 value, then for C10, fill in the average of C5 and C20. For the C1 value, fill in half of the C5 value.

Voorbeeld:
C20 = 400 Ah
C10 = 350 Ah (between 20 en C5)
C5 = 300 Ah
C1 = 150Ah (50% van C5 value)



For lithium batteries: all values equal to the C1 value
With each change, the icon appears in the upper right corner. Click on it when you want to save the changes.

Low Voltage: Set this to the minimum Voltage the batteries can reach. See battery specs for info.
High Voltage: See Startop ask if full.

"Startup ask if full": Receive a notification at startup asking if the battery is fully charged. This is determined by the "High Voltage" setting.

For WaterWorld batteries, you only need to set "CAN," after which the BatteryLink takes care of all communication. You can then also skip the "High and Low Voltage" settings.

Screenlock
By tapping on 'Screenlock' in the menu, the main screen is locked. All buttons disappear, and the screen no longer responds to touches. This function is useful when cleaning the display or when it is exposed to moisture. To disable the lock, the padlock icon on the right side of the screen can be slid all the way up.

Alarm
Under 'Alarm,' all possible warnings and error messages are displayed.

Info
By clicking on the 'Info' icon, more information about the entire system, the display, the throttle lever, and the battery will appear, including version numbers.

Step-by-step explanation for testing and commissioning a WaterWorld electric propulsion system

Step 1: Battery Check
1. Measure battery voltage:
Check if the batteries are sufficiently charged by measuring the voltage across the terminals of the battery pack using a multimeter. The total voltage should be at least 48 volts, but around 52 volts is expected. For lithium batteries, this can go up to nearly 60 volts.

WARNING! Ensure that all batteries have the same voltage. The maximum difference allowed is 0.1 volt.

Step 2: Preparation
1. Turn off ignition:
Ensure that the ignition on the dashboard is turned off.

2. Check throttle lever:
Ensure that the throttle lever is in the neutral position. The display will show a notification if this is not the case.

Step 3: System Activation
4. Turn on main switch:
Turn the main switch to “on” or “I”.

5. Activate ignition:
Turn the ignition switch clockwise to turn on the system. You should hear a clear click from the relay.

6. Check display:

Ensure that the display is on. By clicking on the icon  at the top right of the screen, you can check the voltage. This should match the measured value.

Step 4: Engage Forward
7. Throttle forward:
Gently move the throttle lever one click forward. Check if there is propeller water flow behind the boat.

8. Check RPM and power:
Check on the display if there is an RPM (revolutions per minute) and power (kW) visible.

9. Throttle neutral:
ZReturn the throttle lever to the neutral position.

Step 5: Temperature Check
10. Check temperatures:
Check the motor and controller temperature on the display. The controller temperature is approximately equal to the temperature of the compartment where the controller is mounted. The temperature of the motor will initially be approximately equal to the outside water temperature.

Step 6: Shutdown
11. Turn off ignition:
Turn off the ignition.

12. Turn off main switch:
Turn off the main switch.

Step 7: Connect Shore Power
13. Connect shore power:
Connect the shore power cable.

14. Check charger:
Ensure that the charger activates and provides the correct signals according to the charger manual.

15. Check battery voltage::
CAfter activating the system, check on the display if the battery pack voltage is reaching the prescribed charging voltage. Refer to the battery manual for this information.

Step 8: First Charging
16. Charging the battery pack:
Charge the battery pack fully for the first voyage and for setting up the display. See chapter 6 for instructions on using the display.

Step 9: Conduct Test Run
17. Perform a test run:
Take a test run and visually inspect everything. Pay close attention to sound and vibrations.

18. Check RPM and Power:
During the test run, check the number of revolutions (RPM) and kW at full power to determine if you have the correct propeller. The maximum RPM should be between 1400-1500 RPM and the maximum power between 100% and 110% of the nominal specified power.

WARNING!

- High RPM with low power indicates a propeller that is too small.
- Low RPM with high power indicates a propeller that is too large.

Refer to page 49 for propeller advice.

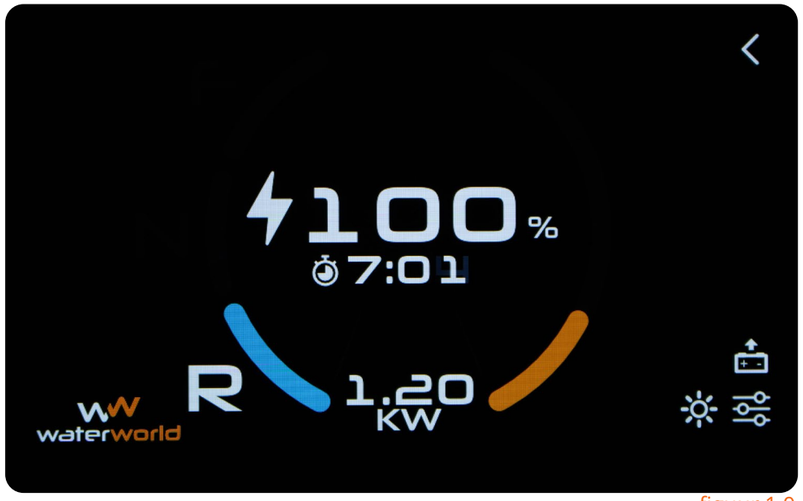
CHAPTER 6
OPERATION OF THE ENGINE

- **Turning on and setting off**
- **Explanation of the display**
- **Arrival and mooring**

Starting and Departure

1. **WARNING! First, disconnect the shore power connection**.
2. Check if the ignition switch of the system is in the “off” position.
3. Ensure that the throttle lever is in the neutral position.
4. Make sure you have enough free space to set off, or that the boat is securely moored to test the system.
5. Turn the main switch to “on” or “I”.
6. Turn the ignition switch clockwise to turn on the system. You may hear a “click” from the activating relay.
7. Check if the display turns on and shows the correct information.
8. Verify if the throttle lever operates correctly in the neutral, forward, and reverse positions.
9. Gently engage the throttle lever forward or backward and apply a little throt.
10. We wish you a safe journey!

Explanation of the display



figuur 1.0

The display provides a clear overview of the key parameters for operating the electric propulsion.
The information on the display in figure 1.0 is as follows:

Battery level: 100% charged.
Time: 7:01. This is the time that can still be sailed with the current consumption, based on the specified battery capacity. When the battery is being charged, you will not see the time.
Direction: The propulsion is in reverse, indicated by the “R” on the left side of the display. “N”is neutral and “F” is forward. The blue radius icon indicates that the throttle lever has instructed the controller to rotate in reverse. This is a so-called “feedback” signal.
Power: The current consumption is 1.18 kW. When the power is less than 1 kW, the display indicates the power in watts. Here, the orange radius icon represents power sent from the throttle lever to the controller. A half circle represents 100% power.

Additionally, there are several icons on the right side of the display.:

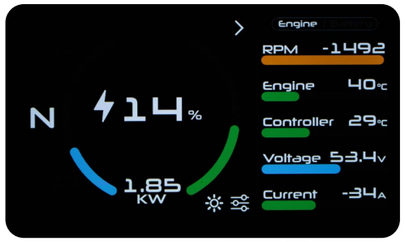
Icons on the Display

- Battery icon: This icon is used when you have entered a standalone battery. It allows the State of Charge (SoC) percentage to be corrected to 100% after the charger has fully charged the battery. Refer to the charger’s user manual for this.

- Sun icon: This allows you to adjust the brightness or illumination of the display.

- Settings icon : This icon provides access to advanced settings or configurations.

- Arrow icon: This allows you to slide in a menu from the right side of the screen that provides information about the engine and, when connected to CAN, the battery(ies).

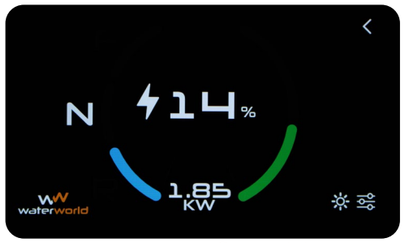


figuur 1.1

By tapping on the arrow icon at the top right of the display, a screen slides in from the right with information about the engine, “Engine”, and possibly the battery, “Battery”, when communicating via CAN
-”RPM”: Engine revolutions per minute
- “Engine”: Engine temperature in degrees Celsius
- “Controller”: Controller temperature in degrees Celsius
- “Voltage”: Bus voltage in Volts
- “Current”: Current drawn in Amperes measured by the controller
- “Phase”: Phase current measured on the bus in Amperes

figuur 1.2

In the bottom right corner of the screen, you can see a little sun (Figure 1.2). By clicking
on it, you can adjust the brightness of the screen.
Next to the sun, there’s the settings icon.



figuur 1.3

In contrast to figure 1.0, in figures 1.1 and 1.3, you see a green radius bar on the right side of the screen instead of an orange one. This indicates that, if your system is capable, it is generating power that is being stored in the battery(ies). In this case, 1.85 kW is the generated power. At this moment, you also don’t see a time because it is “infinite” as long as you are regenerating.

figuur 1.4

When you click on , you will be taken to the screen where you can learn more about;
- “Settings”
- “Screenlock”
- “Alarm”
- “Info”

(Figure 1.4). More about this on page 40.

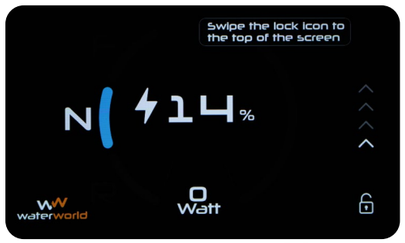


figure 2.0

“Screenlock” (Figure 2.0)
When you press the “Screenshot” icon, you return to the main screen and most icons disappear. You can read the most important data, but the screen cannot be operated. To exit the “screenlock” function, you need to swipe the arrows from bottom to top on the right side of the screen in one smooth motion

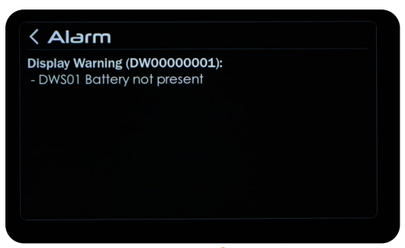


figure 2.1

“Alarm” (Figure 2.1)
In case of a malfunction, a flashing hazard triangle appears at the bottom of the display, orange or red, depending on whether it is a warning or an error.
To see what the error message means, you can tap on ‘Alarm’ in the menu. Refer to chapter 9 for an overview of all warnings and errors.

figure 2.2

“Info” (Figure 2.2 & 2.3)
Under “Info”, you can find all information about;
- “Engine”
- “Display”
- “Throttle”
- “Battery”.

figure 2.3

This information may include;
- Software versions
- Firmware versions
- Hardware versions
- Hardware names

When discussing your system with your supplier, having this screen available is handy.

Arrival and mooring

1. Ensure that after mooring and securing the boat safely, the throttle is in the neutral position.
2. Turn off the system using the ignition switch.
3. Now, switch off the main power switch.

   WARNING! Also turn off the system using the main power switch when swimming around the boat or when repairs or maintenance are being performed on the boat
4. Connect shore power and check the proper operation of the battery charger.

CHAPTER 7
MAINTENANCE AND SERVICE

- **Inspections during the sailing season**
- **Annual inspections by you or your supplier**
- **Winter storage**
- **Use of the engine in saltwater**

Inspections during the sailing season

Regularly pay attention to your WaterWorld propulsion system and its associated energy system, even during the boating season. We besommend focusing on the following points:

- Moisture and Condensation:
Ensure that the area where the motor controller is installed remains free from moisture and condensation. If there is water in the boat and the electronics have gotten wet, dry them off and contact your installer. Do not turn on the system in this situation! Excessive condensation in the areas where WaterWorld components are installed indicates
insufficient ventilation; in that case, provide additional ventilation.

- Motor Cables:
Regularly check the motor cables for wear, especially on the steerable POD.

- Lead-Acid Batteries:
When not sailing, keep your system connected to shore power as much as possible to prevent the batteries from draining. The battery charger will automatically stop when the batteries are full. When turning the system on, check that the battery charger activates. We recommend disconnecting shore power during thunderstorms.

- WaterWorld Batteries or Other Lithium Batteries:
Carefully consult the manual for these batteries for specific instructions and recommendations.

WARNING! Always turn off the main power switch before cleaning or inspecting the system.

Annual inspections by you or your supplier

Preferably, have your system inspected annually by your supplier or installer. They will check the system for the following points:

- Proper Functioning of All Components:
Ensure that all parts are functioning correctly.

- Moisture Problems and Corrosion:
Check for any moisture issues and corrosion on contacts, battery terminals, and/or connectors. Apply contact spray preventively and grease battery terminals if necessary.

- Tightening of Terminal Clamps and Connectors:
Ensure all terminal clamps and connectors are securely fastened.

- Tightened Mounting Bolts and Nuts:
Make sure all mounting bolts and nuts are firmly tightened.

- Damage to Cables and Components:
Inspect for any damage to cables and components.

- Condition and Voltage of All Batteries:
Check the condition and correct voltage of all batteries*.

Under Load:
- If you have a multimeter, check the voltage of each battery by setting the meter to the voltage setting and placing it on the positive and negative terminals of one battery while the motor is running. The difference between the batteries should not exceed 0.1 volts. If it does, contact your supplier or installer.

Without Load:
- After charging, measure the batteries individually again and check that there is no significant difference between them. Refer to your battery specifications or consult your supplier to ensure the voltage is sufficient.

- Imbalance in the Motor/Propeller Shaft System:
Check for any imbalance in the motor or propeller shaft system.

- Correct Settings of the Display:
Ensure the display is correctly set.

*** Note: These checks apply to lead-acid batteries connected in series**.

Winter storage

During and after winter storage, the same recommended checks as in the previous inspections apply.

For lead-acid batteries, it is especially important to ensure that the batteries are charged and remain charged.

- If a power source is available:
If there is a power source available for your boat during winter storage, keep the shore power connected. The charger will automatically turn on and off as needed. However, it is advisable to check the boat and batteries at least twice during the winter to ensure that the charger is connected and that there is still sufficient voltage in the batteries.

- If no power source is available:
If there is no power source available for your boat, make sure the boat is stored with fully charged lead-acid batteries. Then disconnect the main positive and negative terminals of the battery pack to ensure that no device is connected to the battery packs.

Refer to the battery manual for more information about winter storage.

Use of the POD Motor in Salt Water

When using in saltwater, it's important to pay extra attention to the following points:

- Sealing of Enclosures:
Ensure that the enclosure(s) are properly sealed against saltwater.

- Ventilation:
Ensure that these areas are well ventilated.

- Corrosion Inspection:
Regularly inspect all components, especially the contacts, for corrosion.

- Cleaning:
Thoroughly clean the components twice a year.

- POD Inspection:
Inspect the POD for coating damage. Contact your dealer for advice if the coating is damaged.

- Anode Replacement:
Replace the anode promptly when it appears worn. You can order a new anode from your dealer.

CHAPTER 8
TECHNICAL SPECIFICATIONS

- **Motor Specifications**
- **POD MOTOR**
- **Motor Controller**
- **Control Lever**
- **Relay**
- **Display**
- **Propeller Selection Guidelines**

Motor Specifications

Model	3.5p	8.0p	18.0p
Max. absorbed power (S1)	3,8 kW	8,8kW	19,8kW
Nominal speed (rpm)	1450	1450	1450
Voltage	48 Volt	48 Volt	48 Volt
Maximum current (Amperes)	75	172	387
Type	Permanent magneet	Permanent magneet	Permanent magneet
Sensor	Aanwezig	Aanwezig	Aanwezig
Weight (kg)	15	45	96
IP rating POD underwater	IP 9X**	IP 9X**	IP 9X**
IP rating controller	IP 65	IP 65	IP 65

WARNING! Current may temporarily increase during acceleration.

POD motor

Voltage:	3 X 34 Vac @ 50 Hz
Speed:	1450 RPM (depending on motor type)
Max Speed:	1500 RPM
Insulation Class:	H (185 °C)
Thermal Protection:	PTY84-130 °C
Maximum Temperature:	85 °C
Output Shaft:	25 mm, 1:10 tapered
Cooling:	Water-cooled

Motor Controller

Voltage:	48 Volt
Maximum Temperature:	80 °C
Cooling:	Air, Fan 2x for the 85A and 200A / 4x for the 400A controller
Motor Control:	Sensor

Control lever

Type:	WaterWorld CANopen control
Controller:	Based on rotation and hall sensors
	Potentiometer + hall sensor for additional control and safe
Communication:	CANopen

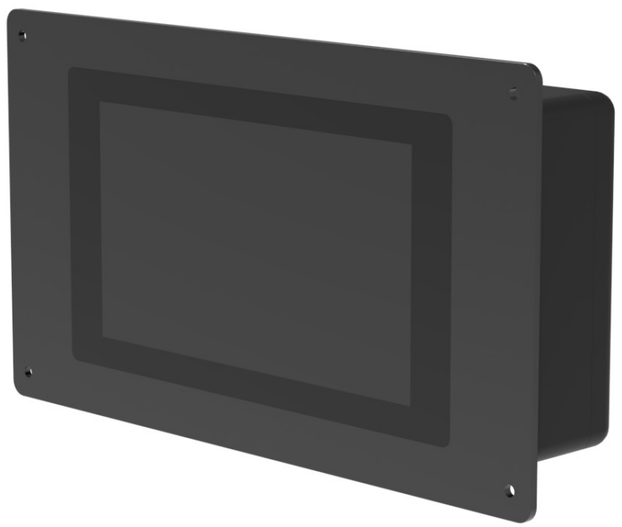
Relay

Voltage:	48V DC
Maximum Continuous Current:	>400A

Display

Power supply via motor controller.

In the attachments of this manual, you will find the dimensional drawings of the various models of WaterWorld motors. You can find the drawings and also 3D files on ww-el.com.



Propeller Selection Guidelines

Below are guidelines for choosing a propeller size. The type and brand of the propeller can influence the sound it produces when rotating. For the correct choice, contact an expert in this field.
Note: The optimal propeller for an individual boat may vary from this, as each boat is different.

3.5p

- 12 x 7 2-blade propeller (<10km/h)
- 12 x 8 2-blade propeller (>10km/h)

8.0p

- 14 x 8 3-blade propeller (<10km/h)
- 14 x 9 3-blade propeller (>10km/h)

18.0p

- 15 x 10 3-blade propeller (<10km/h)
- 15 x 11 3-blade propeller (>10km/h)

CHAPTER 9
FAULTS AND ISSUES

- **Error codes for faults**
- **Warnings**
- **Errors**
- **Problems**

Error codes for faults

In case of malfunctions, a flashing hazard triangle with an exclamation mark appears at the bottom of the display:

- Orange exclamation mark:
This indicates a warning. The system is not functioning properly, but can still be used. Depending on the warning, power may be reduced.

- Flashing red hazard triangle:
This indicates a critical error. The system is currently not functioning correctly.

Viewing Error Messages
- Open the menu and select 'Alarm' to see what the error message means.

Inspection for Error Messages
- Check the data on the display, including temperature, voltage, smooth operation of the propeller shaft, installation, and connections of all wiring.
- Alf the problem cannot be resolved, contact your supplier.

Possible Warnings and Errors
Below are the possible warnings and errors:

Warnings

Engine warning (EW)

Indication	Meaning	Solution
EWS01 No fan feedback	No feedback from fans.	Check the fans and their connections
EWS02 Controller temperature to high	The controller temperature is too high.	Check the fans or reduce the power
EWS03 Controller temperature to high (Limited power)	The controller temperature is too high. (Limited power)	Check the fans or reduce the power
EWS04 Motor temperature to high	The motor temperature is too high.	Check the fans or reduce the power
EWS05 Motor temperature to high (Limited power)	Motor temperature is too high. (Limited power)	Check the fans or reduce the power
EWS06 Phase current to high	Phase current is too high.	Reduce the power
EWS07 Throttle not present or neutral	Throttle absent or neutral.	Connect a throttle to the controller and set the throttle to neutral
EWS08 No valid system parameters loaded	No valid system parameters loaded	Please contact the supplier
EWS09 Position sensor fault (Sensorless drive active)	Position sensor error. Sensorless operation is possible.	Connect the position sensor or replace it. Turn off the controller and then back on again
EWS10 Charging disabled (Position sensor fault)	Battery charging disabled due to position sensor error.	Remedy the position sensor error.
EWS11 Controller temperature sensor read fault	The temperature of the controller cannot be read.	Please contact the supplier.
EWS12 Motor temperature sensor not present	The motor temperature sensor is not connected.	Connect the motor temperature sensors to the controller.
EWSnn Please contact supplier	There is a warning, but the screen has outdated firmware. EWSnn contains the warning number.	Check the warning number with the supplier

Battery Warning (BW)

Indication	Meaning	Solution
BWS01 Temperature to low	Temperature is too low	Use the battery in a warmer environment
BWS02 Temperature to high	Temperature is too high.	
BWS03 Bus voltage to low	Bus voltage is too low.	Charge the battery.
BWS04 Bus voltage to high	Bus voltage is too high.	Stop regeneration (from the motor)?
BWS05 Bus current to high	Bus current is too high.	Reduce power / Reduce number of devices???
BWS16 Vendor specific: 0x<value>	Supplier specific: 0x<value>	

Display warning (DW)

Indication	Meaning	Solution
DWS01 Battery not present	There is no battery present.	Check the communication cable connection with the battery coupling.
DWS02 No valid system parameters loaded	No valid parameters loaded.	Please contact the supplier.
DWS03 Battery voltage to low, drive slowely	The battery voltage is too low, drive (sail) slowly.	Sail slowly.
DWS04 Standalone battery monitor not initialized	Independent battery monitor not installed.	Reset the battery capacity to 100% (button in main menu).

Errors

Engine faults (EF)

Indication	Meaning	Solution
EFS01 Configured motor type not supported	Configured motor type is not supported.	Load new motor parameters via object 0x4005.
EFS02 Configured motor current is too high	Configured motor current is too high.	Load new motor parameters via object 0x4005.
EFS03 Hardware is not supported	Hardware is not supported.	Please contact the supplier.
EFS04 No valid parameters loaded	No valid parameters loaded.	Please contact the supplier.
EFS05 No valid motor parameters loaded	No valid motor parameters loaded.	Load new motor parameters via object 0x4005.
EFS06 Serial not present	Serial is not present.	Please contact the supplier.
EFS07 Controller temperature sensor not present	Controller temperature sensor is not present.	Please contact the supplier.
EFS08 Controller temperature sensor not configured	Controller temperature sensor is not configured.	Please contact the supplier
EFS09 Controller temperature to high (Shutdown)	Controller temperature is too high. (Shutdown)	Let the controller cool down and then try again.
EFS10 Motor temperature sensor not present	Motor temperature sensor is not present.	Connect the motor temperature sensor to the controller.
EFS11 Bus current to high (Shutdown)	Bus current is too high. (Shutdown)	Turn off the controller and then back on again.
EFS12 Bus voltage to low (Shutdown)	Bus voltage is too low. (Shutdown)	Check the battery voltage and then turn off and on the controller.
EFS13 Bus voltage to high (Shutdown)	Bus voltage is too high. (Shutdown)	Check the battery voltage and then turn off and on the controller.
EFS14 Position sensor fault	Position sensor error.	Connect the encoder/hall sensor of the motor to the controller.
EFS15 Parameters config not supported	Parameter configuration is not supported.	Check the settings in the parameter objects.

Throttle fault (TF)

Indication	Meaning	Solution
TFS01 No valid parameters loaded	No valid parameters loaded.	Please contact the supplier.
TFS02 Serial not present	Serial is not present.	Please contact the supplier.
TFS03 Parameters config not supported	Parameter configuration is not supported.	Check the settings in the parameter objects.

Display fault (DF)

Indication	Meaning	Solution
DFS01 No valid parameters loaded	No valid parameters loaded.	Please contact the supplier.
DFS02 Serial not present	Serial is not present.	Please contact the supplier.
DFS03 Engine not present	The engine is not present.	Check if the motor controller is turned on. Verify the communication cable to the motor controller.

Problems

Below are discussed some possible issues and their solutions.

My engine is losing power rapidly:

1. Battery pack nearly empty:
- Check the remaining percentage on the display along with the voltage while the motor is running.
- If the voltage drops below 46 volts, the motor will reduce power.
- Once the voltage drops below 42 volts, depending on the settings, the motor may stop completely.

2. Insufficient cooling:
- If the motor overheats, it will reduce power and eventually stop.
- Common causes include a heavy running propeller shaft or an oversized propeller.
- Also, check if there is any line or rope caught in the propeller.

WARNING! Turn off the system before approaching the propeller shaft!

My motor vibrates and/or makes excessive noise

1. Propeller damage:
- Check for damage to the propeller beneath the boat.

2. Insufficient water flow to the propeller:
- Check for any obstruction in front of the motor that hinders water flow.

My motor has reduced power

1. Propeller issues:
- Check if there is anything stuck in the propeller or if it is unbalanced
- The propeller may be too large.

WARNING! Turn off the system before putting your hands near the propeller shaft!

I have lost my key

- Always have a spare key. Get one made if you have lost one.
- If you need a new key, contact your supplier.

CHAPTER 10
WARRENTY

- **Warranty periods**
- **Warranty terms**
- **Warranty procedure**
- **Decommissioning of the product / recycling**

Warranty periods

The warranty period is 24 months and covers all components of the WaterWorld system. When you have combined a WaterWorld system with WaterWorld lithium battery(ies), the warranty period is 36 months. The warranty period begins from the day of delivery of the WaterWorld system to the end customer.

For WaterWorld systems used commercially, even temporarily, there is a modified warranty period of one year from the delivery of the product to the customer.

In all cases, the right to warranty expires six months after discovery of any defect.

Warranty terms

Water World Electronics BV guarantees the end user of a WaterWorld system that it is free from material and manufacturing defects during the warranty period. WaterWorld will cover the costs to remedy any material or processing defect for the end customer.

This cost coverage does not apply to any incidental expenses arising from a warranty case, nor to any other financial losses (e.g., towing costs, cranes, telecommunications, meals, lodging, loss of use, time loss, etc.).

Travel and/or transportation costs are not reimbursed by WaterWorld Electronics BV.

WaterWorld Electronics BV decides whether defective parts will be repaired or replaced. Distributors and dealers performing repair work on WaterWorld motors do not have the authority to issue legally binding statements on behalf of WaterWorld Electronics.

Wear parts and routine maintenance are excluded from the warranty. Cables and fastening materials are also excluded from the warranty.

Your supplier or WaterWorld has the right to refuse warranty when:

- The warranty claim was not submitted according to the instructions (see warranty procedure).
- The product was not handled according to the instructions.
- The safety, usage, and maintenance instructions from the manual were not followed.
- Prescribed maintenance was not performed or documented..
- The product is damaged due to external influences, an accident, or where the defect is not attributable to WaterWorld in any way.
- The WaterWorld system has been modified, altered, or equipped with parts or accessories that are not explicitly permitted or recommended by WaterWorld.
- Prior servicing or repair work was not carried out by WaterWorld authorized companies or original spare parts were not used, unless the customer can demonstrate that the circumstances leading to the warranty refusal did not affect the occurrence of the defect.

Warranty procedure

Adherence to the warranty procedure described below is a condition for making a warranty claim.

- Contact your WaterWorld supplier in case of a complaint.
- Keep your purchase invoice handy, as the supplier will need it to verify where and when your WaterWorld system was purchased.
- **NOTE! Your purchase receipt or invoice is your proof of warranty. Therefore, keep it safe after purchase**!
- Also, have the serial number of the motor available, if it is not already listed on the purchase invoice.
- Provide a clear description of the complaint, the circumstances under which it occurs, and any other relevant information that can help your supplier assess the nature and severity of the issue. If possible, take photos of the system and the overall situation that may assist.
- Your supplier may ask you to perform additional checks on the system before assessing the complaint thoroughly.
- When transporting products to the WaterWorld supplier, ensure correct handling as incorrect transport is not covered by warranty.

Decommissioning of the product / recycling

The WaterWorld motors are designed in accordance with EU Directive 2012/19/EU. This directive governs the recycling of electrical and electronic equipment to protect the environment. Disposed electrical and electronic equipment should not be thrown away with normal household waste, as it can release harmful substances into the environment, which can affect the health of humans, animals, and plants. These substances accumulate in the food chain and the environment, leading to the loss of valuable resources. In accordance with regional regulations, you can deposit the motor at a collection point where it will be recycled in an environmentally responsible manner

CHAPTER 11
APPENDICES

- Ray-link
- Connection diagram Ray-link
- VE-link
- Connection diagram VE-link
- Declaration of conformity

Ray-link

Integration with Raymarine Axiom+ Multifunction Display

It is possible to connect the WaterWorld system to a Raymarine Axiom+ multifunction display using a WaterWorld Ray-link. Follow the steps below to make the WaterWorld page visible on the screen of the Raymarine Axiom+.

1. Placement of the Ray-link:
Ensure that the Ray-link is installed correctly to make the WaterWorld page available on the Raymarine Axiom+ display.

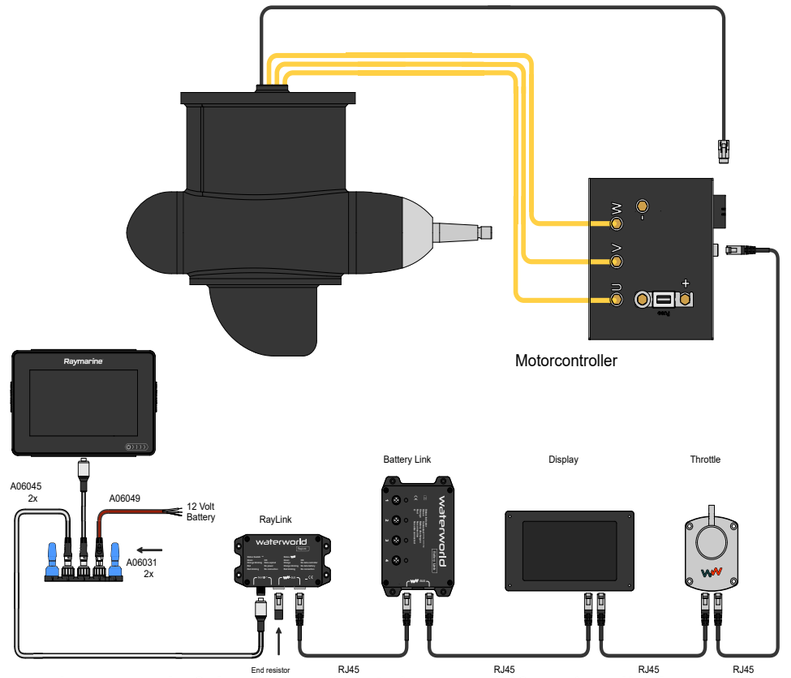
2. Accessing the WaterWorld page:
- From the main page, select the dashboard.
- In the top right corner of the dashboard, you will find a button with three horizontal lines stacked vertically.
- Click on this button to open the option to select the WaterWorld page.
- Choose the WaterWorld page to set it as the main dashboard.
- Note: The WaterWorld page must be installed beforehand. Please inquire with your supplier..

3. Required parts for installation:
- Raymarine SeaTalkng Starter Kit
- A06045-cable
- RJ45-cables
- The Raymarine Axiom+ multifunction display comes with a shorter version of the A06045 cable.

4. Connecting the cables:
- Ensure all cables are connected correctly according to the illustration below.
- Place end resistors in any remaining RJ45 openings.

These steps enable you to integrate and display the WaterWorld page on your Raymarine Axiom+ multifunction display, providing easy access to all relevant information from the WaterWorld system.

Connection diagram 2 - 3.5kW Pod - RayLink



WARNING! Refer to the manual of the Raymarine Axiom+ multifunction display at www.raymarine.com for correct screen installation.

VE-link

Integration with Victron SmartShuntt

When a WaterWorld system is installed and a Victron SmartShunt is used, these systems can be connected via a VE-link. The SmartShunt acts as a battery monitor, measuring battery voltage and current. Based on these measurements, it calculates the battery's state of charge and remaining time. Additionally, it records historical data such as deepest discharge and average discharge. By installing a VE-link, all this data can be displayed on the WaterWorld display.

Installation of the VE-link

1. Connecting the VE-link:
   - The VE-link has an opening for the VE-direct cable. Connect this cable to the SmartShunt.
   - Use RJ45 cables in the remaining openings of the VE-link to establish connections with the controller and the display. Refer to the connection diagram below for correct connections.

2. Display configuration:
   - After all cables are connected according to the diagram, a setting on the display needs to be changed to view the retrieved data..
   - Go to settings by clicking on the gear icon at the bottom right corner of the screen.
   - Click on 'Battery'.
   - Under 'Mode', select the 'CAN' option
   - A floppy disk icon will now appear at the top right of the menu. Click on it to save the adjustment..

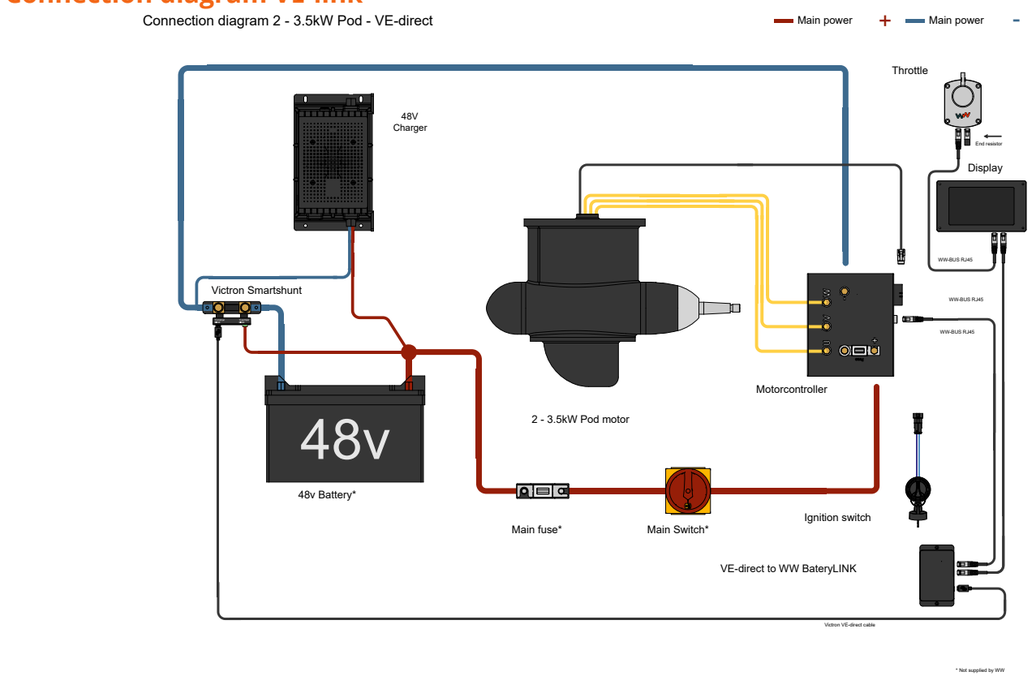
After completing these steps, the information from the SmartShunt will be displayed on the WaterWorld display, providing easy access to all relevant battery data..

Connection diagram

Ensure you follow the correct connections as per the provided connection diagram to ensure proper linkage between the VE-link, the SmartShunt, the controller, and the display.

*** Note: At the time of writing, the VE-link only works with the first generation of Victron SmartShunt.**

Connection diagram VE-link



WARNING! Refer to the manual of the Victron SmartShunt at www.victronenergy.com for mounting and setting up the SmartShunt, and using the VictronConnect app.

Conformiteitsverklaring

waterworld
electric drive systems

EC Declaration of Conformity

Products: WW-001, WW-002, WW-003 (Excl. Simarine), WW-004, WW-005, WW-006, and WW-0065

We hereby confirm that the above-mentioned products adhere to the principal requirements specified in the following legislation:

Directive 2006/42/EC of the European Parliament and of the Council of May 17, 2006 on machinery, and amending Directive 95/16/EC (recast).
Applicable harmonised standards:

- **EN ISO 12100:2010** – Safety of machinery – general principles for design – risk assessment and risk reduction.

Person with responsibility for documentation as per Annex II, item 1, Section A, No. 2:

Name: M. van der Veen (Martijn)
Function: Chief R&D

Directive 2014/30/EU of the European Parliament and of the Council of February 26, 2014 on the harmonisation of the laws of the Member States relating to EMC (recast).
Applicable harmonised standards:

- **EN 61000-6-2 (2005) + AC (2005)** – Electromagnetic Compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments.
- **EN 61000-6-4 (2007) + A1 (2011)** – Electromagnetic Compatibility (EMC) – Part 6-4: Generic standards – Interference emission for class/level A.

ES-TRIN Chapter 10 Electrical installations, Article 10.20 and 10.21 (Before Chapter 9 paragraph 2B, 2C, 2D, 2E, 2F, 2G and Article 9.21).

This statement applies to all examples which were manufactured as per the corresponding production drawings, which are a component of the technical documentation. Date certification EN 61000-6-2:2005, EN 61000-6-4:2007+A1:2011, and ES-TRIN 25-01-2018. Second check EN ISO 12100:2010 executed: 16-01-2019.

Company: WaterWorld Electronics B.V.
Issued by: S. Strampel (Sebastiaan)
Function: Managing Director/Owner

CE

Document No.: 2020005

WaterWorld Electronics
Weerdijk 14 – 8375 AX Oldemarkt
The Netherlands
info@ww-el.com
+31 561 451 636
www.ww-el.com

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electrify your world

Vragen? Neem gerust contact met ons op.

Contactinformatie

Water World Electronics
Weerdijk 14 – 8375 AX Oldemarkt

info@waterworldelectronics.com

Telefoon: +31(0)561 451 636