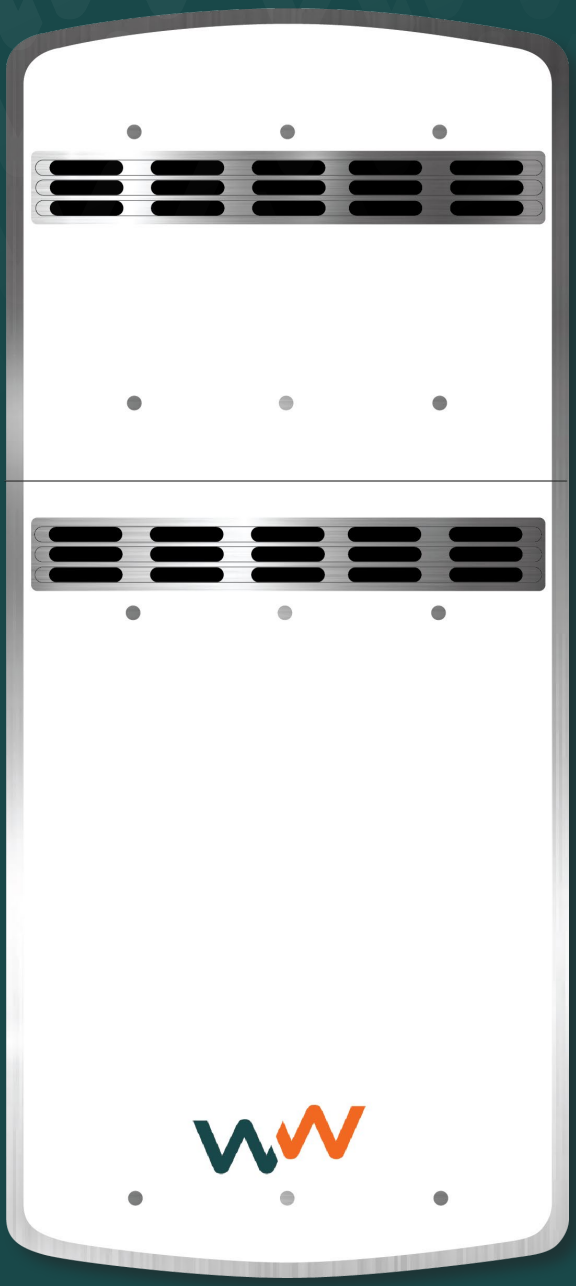
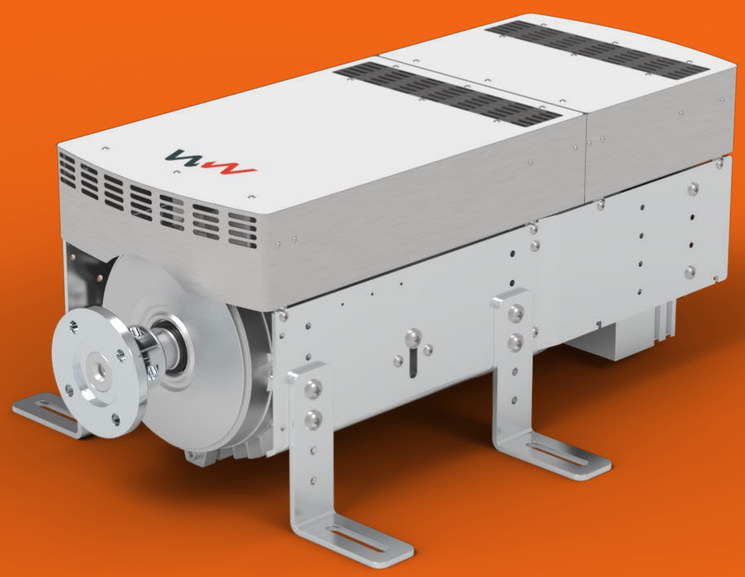


MANUAL

Installation of the inboard
engines of Waterworld



Dear reader,

Congratulations on your purchase! We are delighted that you have chosen a WaterWorld propulsion system.

The WaterWorld engines are designed and produced with the utmost care. Everything is focused on providing you with a safe, reliable, environmentally friendly, and user-friendly propulsion system that you can enjoy using.

We strive to continually improve WaterWorld propulsion systems. If you have any comments about the design or use of the system, we would greatly appreciate it if you could inform us. The contact details can be found on the back of this manual.

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

The WaterWorld team

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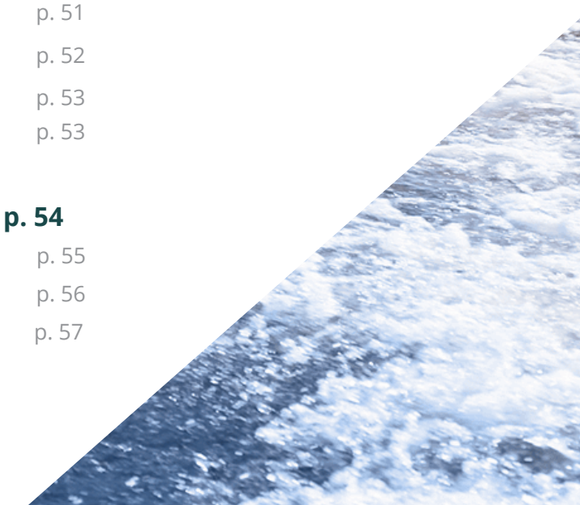
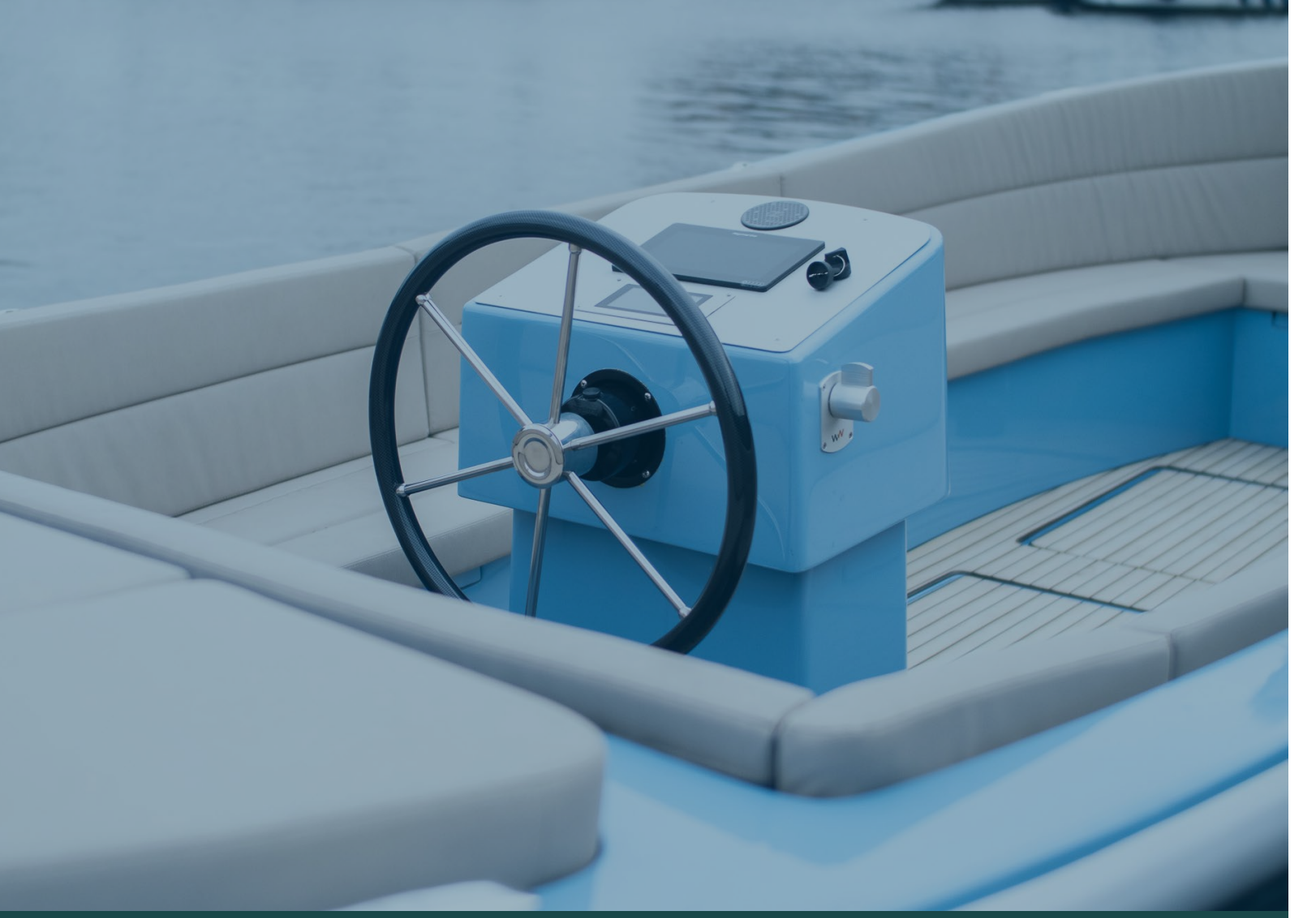




1. INTRODUCTION

Use of this manual

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

It is imperative that anyone installing this system, as well as anyone operating the motor, familiarizes themselves with the manual and meticulously follows the warnings and safety instructions outlined in this document.

Installation and maintenance of WaterWorld engines should be carried out by specialized and skilled installers who comply with applicable laws and regulations, in conjunction with the safety considerations mentioned in this manual.

Keep this manual with your system in a safe and easily accessible place!

Warnings and symbols

DANGER

A warning indicates the risk of potential injury to the user/ installer or substantial material damage if the user or installer does not avoid this risk.

WARNING!

Special information, respective instructions, and prohibitions regarding damage prevention.

CAUTION!

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

Serial numbers

You can find the identification label with the serial number on the top of the motor controller and on the side of the motor. It contains the manufacturer, model number, and the unique serial number of the motor or controller. The serial number starts with the letters WW.

Engine block

Motor controller

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

2. PRE-INSTALLATION CHECKLIST

Step-by-step guide for installation

Installation step-by-step guide

1. **Read the manual thoroughly.**
   We provide you with a comprehensive manual, including points that do not only concern the WaterWorld Inboard motor but also the entire boat, the propeller, and the batteries. However, each installation is unique and should be carried out by a qualified professional.

2. **Check if you have received everything included in the delivery.**
   Arrange everything neatly and compare it with the list in Chapter 4 of this manual and your packing slip. If you have any questions, contact your supplier immediately.

3. **Prepare the boat for installing the system in a clean and dry environment.**
   If the following points are not in order, something must be done before installation.

   - No permanent bilge water where the motor is installed.
   - Good protection against the boat flooding, such as a well-functioning bilge pump in the right place in the boat.
   - When placing the components, also consider leakage or condensation moisture from above. A component may need to be placed elsewhere or covered from above for this reason.
   - Ensure good ventilation in the relevant space or spaces so that moisture can evaporate and leave the area. “Airflow” is crucial here.
   - WaterWorld has developed a very efficient motor that requires sufficient air cooling. It is essential, however, that enough cold air can enter, and warm air can be expelled.
   - A smoothly running and well-aligned propeller shaft system. A heavy-running propeller shaft system will cause the following problems:
     - Higher consumption, resulting in less sailing time
     - Engine overheating
     - Slower response when accelerating
     - Less controlled acceleration, the motor will start with too much power once it has enough force

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

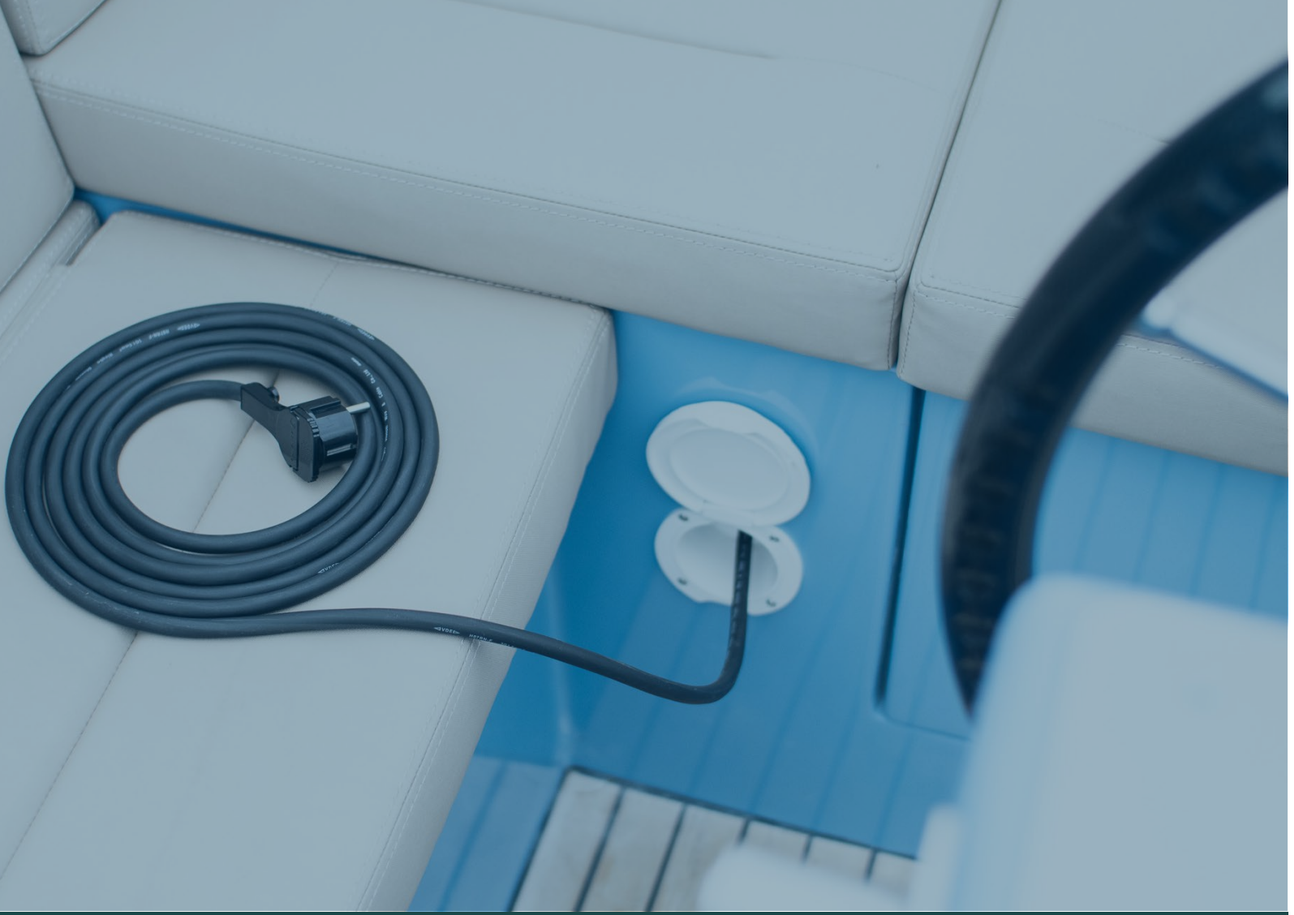
5. **Check the accessibility of the components.**
   Ensure that all components remain accessible for service.

6. **Ensure proper weight distribution in the boat.**
   The (lead-)battery pack is heavy; ensure proper weight distribution in the boat. Make sure the batteries are accessible for service to the battery terminals, wiring, and in the case of wet batteries, filling with distilled water.

7. **Choose the correct cable thickness.**
   Refer to page 27 for the correct cable choice. Ensure that cable lengths are not unnecessarily long where possible. For the equal discharge of potentially multiple batteries, it is important that the lengths of the cables from the main positive pole and the main negative pole are the same.

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

9. **Start the installation.**



3. SAFETY

General guidelines

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

- Adhere to local laws and regulations and the required qualification certificates.
- Disregarding the instructions can result in injury and material damage. Water World Electronics cannot be held liable for damage arising from actions conflicting with this manual.
- The propulsion system must operate at the prescribed voltage..
  - In the default 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. In this setting, the minimum is 37 volts, see page 25.
- The system is exclusively intended for propelling boats. The manufacturer cannot be held liable for any other use, and the warranty is void in all cases.
- Keep the electronics away from water.
- Installation and repair must only be carried out by an authorized installer designated by WaterWorld.
- Use only original or recommended WaterWorld accessories and/or spare parts.
- If the propulsion system needs to be repaired, only original replacement parts should be used. The use of non-standard parts may result in serious injury or damage and void further warranty.
- Replacing the batteries should only be done by an authorized installer.
- The user is responsible for regularly ensuring the proper operation of the propulsion system and the batteries. The manufacturer is not liable for any damage resulting from the incorrect functioning of the propulsion system.
- The supplier, whether it's WaterWorld, the seller, or the manufacturer, accepts no liability for any damage to the buyer, or any possible claims from third parties resulting from (the use of) the propulsion system, whether direct or indirect, consequential, environmental, auditory, business, or immaterial damage, or incorrect advice, unless the damage is due to gross negligence or negligence on the part of the supplier.
- Before use, you must consider the legislation in the respective country, either at the location where the propulsion system is located. The buyer is hereby responsible for complying with all, if any, legal precautions at the location where the propulsion system is used, regardless of whether the propulsion system is operational at that time. This includes measures for fire safety, as well as ensuring the safety of others in the vicinity of the propulsion system.
- The manufacturer reserves the rights and powers granted to it under European law. Imitation or counterfeiting of the device is explicitly not allowed.
- For different battery packs, such as lithium batteries, it is recommended to contact your supplier beforehand.
- Do not perform independent repair work on the WaterWorld system.
- Do not wear jewelry or loose clothing near the driveshaft or propeller. Tie back long hair.
- Never touch severed, torn cables, or visibly damaged components.
- Do not lift the WaterWorld system alone and use a suitable lifting device.
- Check while sailing that the risk of the propeller hitting the bottom is ruled out.

Safety features of the propulsion system

WARNING!

Your WaterWorld propulsion system is equipped with various safety features:

- Protection against high temperatures in the motor and controller: the motor will reduce power if the electronics detect excessively high temperatures.
- Controller fuse: there is a fuse on the motor controller, varying according to motor power.
- 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 it must be installed.

- Main switch: always switch off when leaving the boat or when working on the system. This main switch is not included in the standard delivery but must be installed. Consult your supplier for the correct main switch based on the applied current.
- Protection against battery overload: if your batteries are about to run out, the motor will automatically reduce power, allowing you to sail longer and seek a safe harbor at a low speed.
- Ignition switch: used to disable the system in case of danger. Always switch it off when there are swimmers around the boat.
- Display: continuously shows you the remaining sailing time so you can plan your journey to reach your destination. Additionally, the display warns against too high or too low battery voltage. The warning for low voltage is accompanied by an audible signal and displayed on the screen.
- Voltage-carrying cables connecting the motor, controller, and other components must be regularly checked for damage or breakage and for correct, secure attachment.
- The cable shoes of voltage-carrying cables connecting the motor, controller, and other components must be equipped with terminal covers, which also cover the battery terminals.
- If damage or a break in the cables/cords is identified, the motor must be immediately taken out of service until the respective cable/cord is replaced.

Safety instructions for the propulsion system

DANGER!

Follow the instructions in this manual.

- Switch off the system immediately using the main switch in case of overheating, smoke development, or when you detect a malfunction.
- The allowed ambient temperature during use must 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 using the main switch during assembly and disassembly work.
- Do not perform maintenance or cleaning work on the propeller or driveshaft while the system is turned on.

Safety instructions for the batteries

DANGER!

Follow all safety instructions regarding the used batteries in the battery manufacturer's manual.

- Do not use the WaterWorld system if the battery is damaged and inform the supplier or system installer.
- Do not store flammable objects near the battery.
- Never smoke and avoid sparks or flames near the batteries
- Ensure you have enough water on hand; if battery acid comes into contact with the skin or eyes, rinse immediately with water and seek medical assistance.
- Use only charging cables that are suitable for outdoor use..
- Always fully unroll the reel from a 230 Volt power outlet if you are using it.
- Avoid strong mechanical forces on the batteries and cables of the system.
- Remove metal jewelry and watches before starting work on batteries or in the vicinity of batteries, and always use insulated tools for this.
- Never short-circuit batteries. Ensure that tools and metal objects never come into contact with the battery, as this can cause sparks, or even an explosion or fire.
- When connecting the battery, pay attention to the correct polarity and ensure well-connected, secure attachment of the connections.
- Never reverse the polarity.
- When connecting the batteries, make sure to first connect the red positive cable and then the black negative cable.
- When disconnecting the batteries, make sure to first disconnect the black negative cable and then the red positive cable.
- Battery terminals must be clean, free of corrosion, and covered with terminal caps.
- Do not place batteries in an inadequately ventilated space. When placing batteries in a locker, proper ventilation must be provided.
- Connect only identical batteries (type, capacity, age).
- Connect only batteries with identical state of charge.
- Ensure that battery terminals always make optimal contact with the cable eyes to which they are connected.
- Do not connect other consumers (e.g., fish finders, lights, radios, etc.) to the same battery bank that powers the motors.
- As soon as one battery fails, we recommend replacing the remaining batteries as well.
- Always switch off the system using the main switch during work on batteries.

CAUTION! Always prevent stainless steel washers from being between the battery post and the connected cable.

More information about the batteries can be found in the manual 48-6500 and 48/35 charger at www.ww-el.com.

Safety instructions for use

Read this manual thoroughly.

- The WaterWorld system may only be used by qualified individuals who are also physically and mentally fit.
- Always adhere to the national regulations and rules of a country.
- Keep the propulsion system and controls out of the reach of children or individuals who may not handle them properly.
- Have the operation and safety regulations of the entire system explained to you 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 journey at low speed.
- Only operate a system that is in technically perfect condition.
- Ensure that the batteries are sufficiently charged.
- Make sure you are familiar with all controls of the WaterWorld system. You should also be able to stop the system quickly if necessary.
- As the operator of the boat, you are responsible for the safety of the people on board and for all boats and individuals in your vicinity. Therefore, observe the basic rules of boating.
- Particular caution is required when there are people in the water, even when driving at low speeds.
- Gather information about the area where you will be sailing before departure and consider the weather forecasts and sea conditions.
- Ensure that you are familiar with the area where you will be sailing before departure because the range indicated by the onboard computer does not account for wind, currents, and sailing direction.
- Plan sufficient buffer for the required range..
- Depending on the size of the boat, ensure that specific safety equipment is available and accessible (life jackets, anchor, paddle, communication devices, etc.).
- Be cautious of people in the water.

4. DELIVERY CONTENTS

Contents of the WaterWorld Package

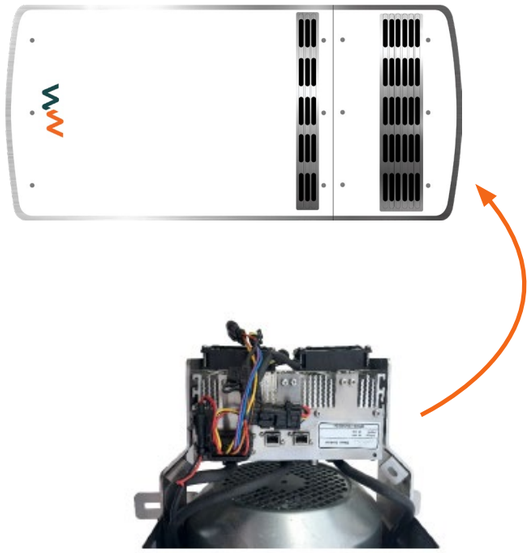
Contents of the WaterWorld Package

The WaterWorld motors are delivered with the following standard components:

Motor
Mounted in a stainless steel frame

Propeller thrust bearing
Integrated into the motor, the shaft has a flange for attaching a counter-flange (not included) to secure the propeller shaft (not included). In the image, you can see the flange. It should only be removed, if necessary, using a pulley puller.
Never hit the flange with a hammer!

In case of continuous operation at 10 kW or 20 kW, it is recommended to use an external thrust bearing

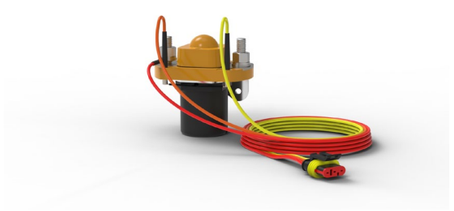


Controller
Attached in the same frame (can also be optionally delivered separately). The motor and controller are already internally connected by cables.

Motor mounts
Adjustable attachment to the outer side of the frame.

NOTE! During installation, the supports will be reversed, and the motor will hang in the supports instead of standing on them.

Power cables
From 0.5 meters (positive) and 1.0 meters (negative), already connected to the motor controller.



48 Volt Relay
The amperage depends on the selected motor power.

Digital display
Plus RJ45 data cable (3 meters).

Throttle
Throttle, and RJ45 data cable (3 meters), and a gateway (**from 2022**, the gateway is no longer needed).

Dashboard with ignition switch.
Ignition switch with a 3-meter cable (easily extendable if necessary).

Load resistors.
From 2022 (software version ≥ 1.31), two end resistors are included in the delivery. You place the end resistors in the remaining open data ports. It doesn't matter which ones they are, all data components can be connected in series to each other.

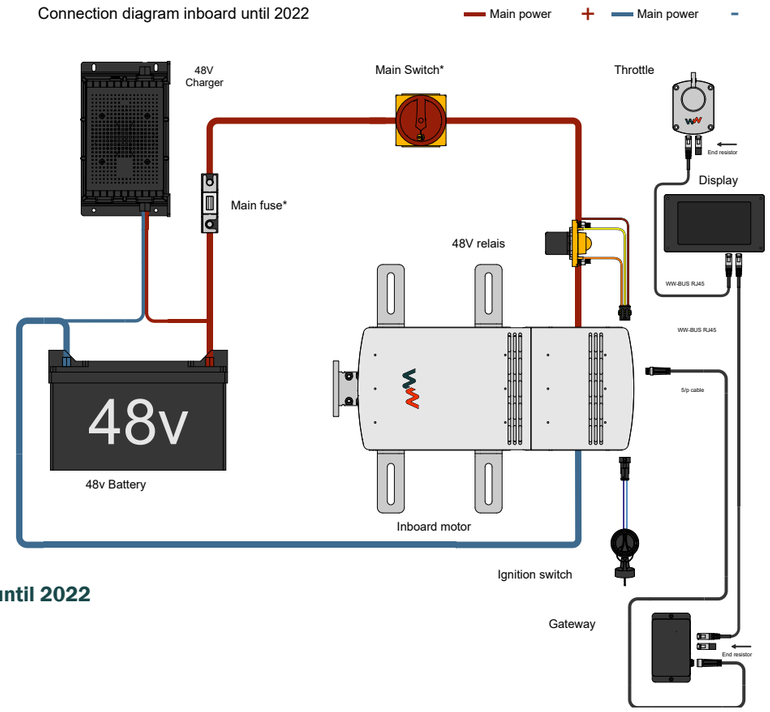
See example connection diagram at the bottom of page 23.

If your component bears a sticker similar to the one shown on the left in the picture, it indicates that it has an integrated end resistor. These devices were manufactured before 2022.

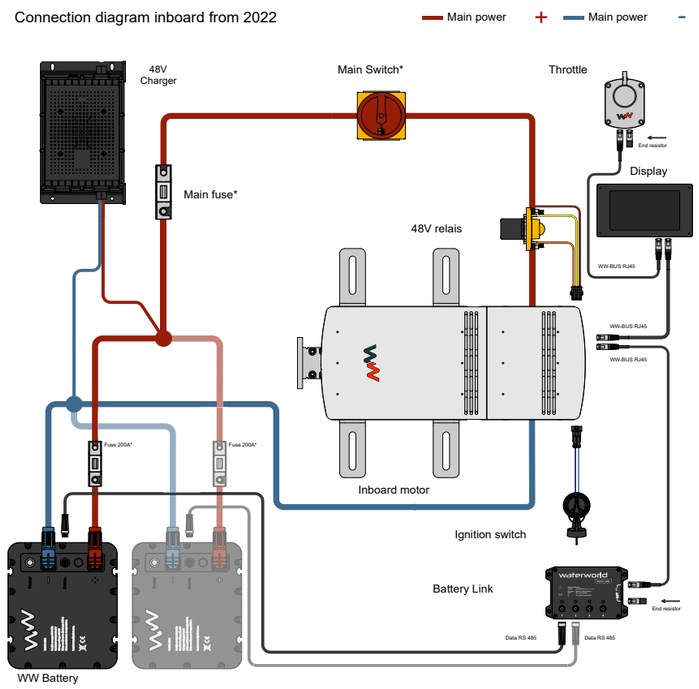
CAUTION! Not included in the standard scope of delivery are vibration dampers, fuse with fuse holder for the battery cables, main switch, and battery pack with charger. From 2022, WaterWorld supplies its own lithium batteries. Contact WaterWorld or your supplier and inquire about the possibilities.

5. INSTALLATION OF THE SYSTEM

Connection Diagram



System until 2022



System from 2022 (software version ≥1.31)

Placement of the motor

• Ensure that you stand stably when attaching your propulsion.

• Mount the motor only on land. Mounting the motor in the water may result in material damage.

• Do not lift the WaterWorld system alone, and use a suitable lifting device.

• Connect the throttle and batteries only after mounting the propulsion system on the boat.

• Drilling holes in the hull of the boat can potentially weaken the hull structure. This should be compensated for by adding extra crossbeams, frames, or other reinforcements.

• Depending on the hull structure, a sufficiently large backing plate may be needed between the hull and the locking nuts inside the boat. Ensure that the boat's hull is stable enough to withstand the drive unit and the resulting propulsive forces.

Applying antifouling to the motor is not allowed.
Remove the motor covers from the motor and carefully place them in a safe location.
The WaterWorld propulsion system is best installed using the following step-by-step plan:

1. Mount the motor on a foundation and vibration dampers that are suitable for absorbing and transferring the thrust of the system to the boat.

2. Preferably, use a flexible coupling between the motor flange and the propeller shaft. This prevents

WARNING! If you choose to mount the motor without vibration dampers, it is crucial that the motor is very well aligned with the shaft, even if you use a flexible coupling. Additionally, this may lead to extra noise, especially in aluminum boats.

CAUTION! Due to the weight, it is best to hoist the WW 7.5 or WW 10.0 into the boat. For this purpose, you can rotate the included lifting eye, as shown in the image, also located at the top of the motor where threaded holes are provided. You can use a hoist to lift and lower the motor using this eye.

WARNING! Do not lift the WaterWorld system alone, and use a suitable lifting device.

3. The side supports on the motor are supplied with the supports pointing downward. In most cases, these should be reversed, and the motor will hang in the supports as shown in these two examples:

4. vibrations in the boat and compensates for imperfections caused by the quality of the propeller shaft system or the alignment.

WARNING! If the propeller shaft is directly mounted on the motor with a rigid connection, the motor must be very well aligned to prevent damage to the electronics and connectors. Never hit the propeller shaft with a hammer, as this can damage the bearings in your motor! Use a puller for removing the propeller.

WARNING! For a WW 7.5, WW 10.0, or WW 20.0 motor in a heavy boat or for professional use with many sailing hours, it is recommended to use an external thrust bearing. This ensures that the rubber motor mounts and the thrust bearing in the motor are not excessively loaded over time. If you have any doubts, please contact your supplier.

5. The motor controller of WaterWorld comes with a red and black battery cable already attached to the motor controller side. The red cable on the positive side is connected to the relay.
We recommend and use the following cable thicknesses:

6.
- 4.0kW: 35mm2 cable
- 7.5kW: 50mm2 cable
- 10.0kW: 70mm2 cable
- 20.0kW: 90-120mm2 cable

You can find more information about cable thickness on page 27 of this manual.

7. If you are going to use cable lengths longer than 5 meters, we recommend using thicker wiring. The motor and controller are cooled by fans: two or four units at the back of the controller, depending on the motor power (visible at the front of the system), and one on the motor. Ensure that there is free airflow to dissipate heat. The air is drawn in at the front of the motor housing or compartment and expelled at the rear. If necessary, ventilation grilles should be mounted at the top on the side to allow for the intake of fresh air and the exhaust of warm air.

WARNING! WaterWorld assumes no responsibility for performance loss, damage, or other issues due to inadequate system ventilation.

WARNING!

8. In the standard configuration, the motor and controller are mounted in a single frame, and these components are already connected to each other from the factory. You don't need to do anything about it. If there isn't enough space for the controller directly behind the motor, or if batteries are placed above the motor, you can mount the controller separately in another location on the boat. To do this, it can be removed from the frame, and the rear part of the frame can also be removed on both sides. The phase cables may be extended by a maximum of 50% from the factory length. Always consult an expert for this.

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

Batteries

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

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

   WARNING! In case of 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 mutually compatible.

2. Place the batteries in the boat in such a way that:

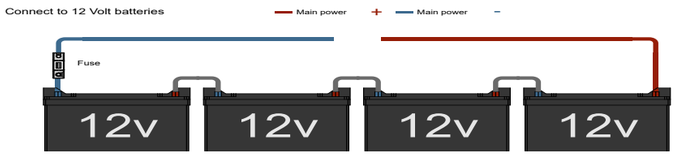
   a. the weight is evenly distributed, and the boat sits level on the waterline
   b. the batteries cannot slide within the boat after installation
   c. the batteries are accessible for connecting cables and for future servicing
   d. the batteries do not obstruct daily use of the boat

   wiring to the motor and the charger is feasible without unnecessary cable length

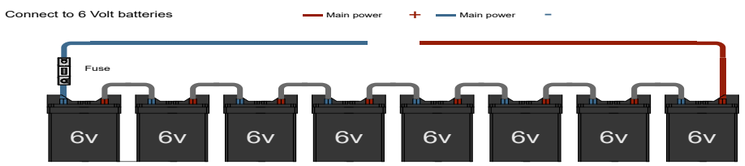
3. Check the individual voltage of each battery and ensure that they are within 0.1 Volt of each other before interconnecting the batteries. If this is not the case, all batteries should be individually fully charged first.

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

Connect to 12 Volt batteries



Connect to 6 Volt batteries



WARNING! Wait with connecting the batteries to the rest of the system until everything is connected and has been tested for any short circuits.

Battery charger

The battery charger must be selected based on 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, carefully consider the same factors as with the motor and batteries. Moisture, accessibility, wiring, ventilation, etc.

Recommended cable thicknesses

Waterworld 4.0: up to 4.4 kW power consumption, max. 92 Amperes.
For a 4.0, a cable thickness of 35 mm² is recommended.

Waterworld 7.5: up to 8.25 kW power consumption, max. 172 Amperes.
For a 7.5, a cable thickness of 50 mm² is recommended.

Waterworld 10.0: up to 11 kW power consumption, max. 230 Amperes.
For the 10.0, a cable thickness of 70mm² is recommended.

WaterWorld 20.0: up to 22 kW power consumption, max 450 Amperes.
For the 15.0, a cable thickness of 95-120 mm² is recommended.

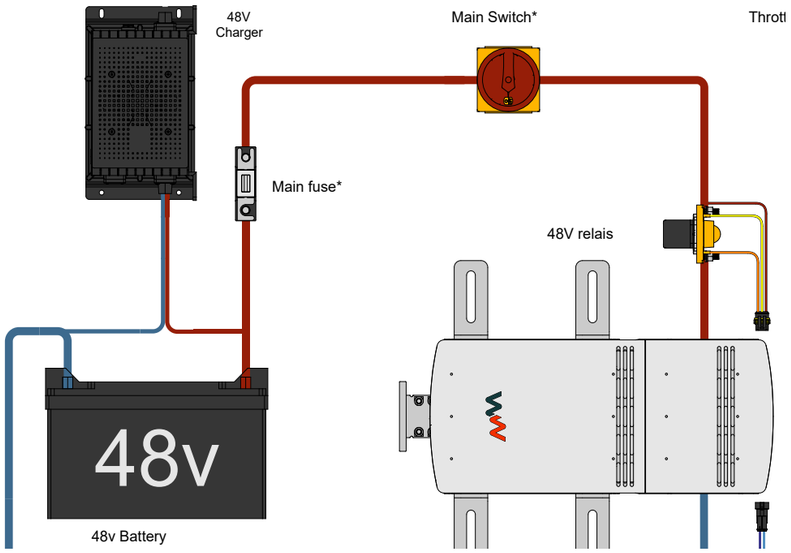
The above data is based on cable lengths up to 5 meters. For further advice on shorter and longer lengths, consult the table below.

Cable Diameter	Cable Section	L(+) + L(-) up to 5 meters	L(+) + L(-) up to 10 meters	L(+) + L(-) up to 15 meters	L(+) + L(-) up to 20 meters
mm	mm²	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 correct cable thickness, consideration must be given to the voltage loss across the battery cable. This voltage loss should not exceed 0.26 volts, including cable shoe connections. The total length of both the 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 an emergency or for maintenance purposes, the system can be easily disconnected from the batteries.



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

DANGER!

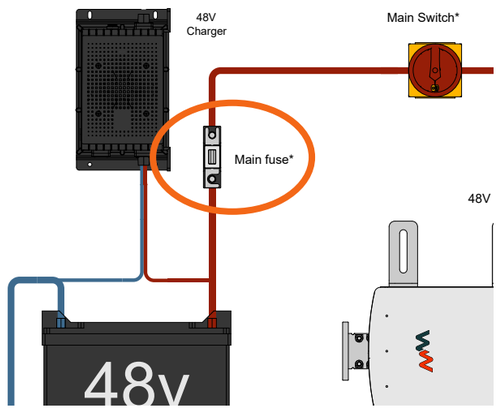
WARNING! The main switch must be turned off during the charging of the batteries.

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 amperage of the motor (see specifications).

You can immediately order an ANL fuse holder and an ANL fuse with the motor. We supply the following values:

WaterWorld 4.0 kW	–	160A fuse
WaterWorld 7.5 kW	–	250A fuse
WaterWorld 10.0 kW	–	325A fuse
WaterWorld 20.0 kW	–	600A fuse

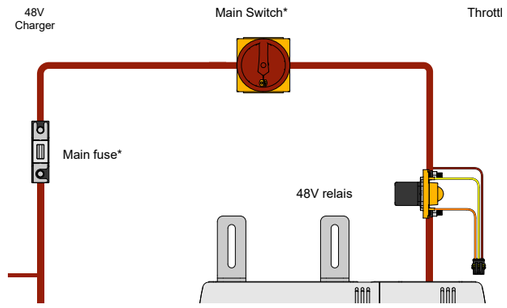


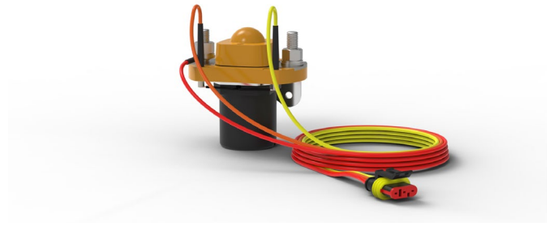
The relay

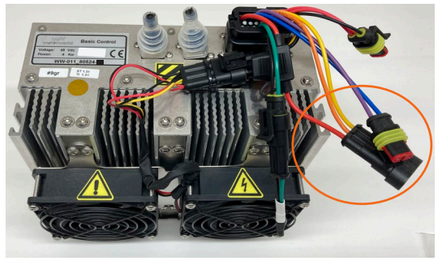
Install the supplied relay in the (red) positive cable, between the motor and the main power switch.

The separate red wire with an M8 eyelet should be connected to the bolt of the relay on the battery side, above the battery cable. Ensure a secure connection for this red wire; a poor connection may result in issues during motor startup.

The relay has a plug with 3 wires, which should be connected to the motor controller using the corresponding connector. The wires have matching colors and fit in only one way.







The throttle lever

1. Install the throttle lever in a suitable location, easily accessible for the driver.

Ensure that the throttle lever is mounted in a way that crew members on the boat cannot easily bump into it, preventing sudden acceleration or increased speed!

WARNING!

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

WARNING! The throttle lever is set as follows by default: moving the lever clockwise makes the boat go forward, moving it counterclockwise makes it go backward. This is the correct orientation when the lever is mounted on the starboard side against the steering console.

When placing the throttle lever on the port side of the steering console, it operates exactly the opposite. Moving the lever counterclockwise makes the boat go forward, and moving it clockwise makes the boat go backward.

To achieve this, the phase cables can be reversed so that the propeller turns in the opposite direction. Additionally, the position of the throttle lever in the display can be adjusted. Refer to the instructions for setting up the display. This should only be done by an authorized dealer or installer. More information on page 31.

The display

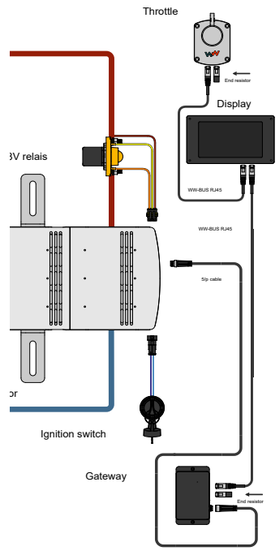
1. Install the display in the appropriate location. It should be clearly visible for the boat's driver.
2. Install the gateway (up to 2022) near the display, preferably in an indoor space, for example, on the inside of a console.
3. Make sure you have the correct side of the display facing up. Otherwise, the display will be upside down.

The ignition switch

Install 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, display, and ignition switch (version up to 2022)

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. Connect the round 5-pin cable from the gateway to the wiring harness on the motor controller.
4. Connect an RJ45 cable from the gateway to the motor controller.
5. Connect the plug from the ignition switch to the connector on the motor controller.



Starting from 2022 with software version ≥ 1.31, only follow steps 1, 2, and 5. Place an end resistor in the remaining contacts.

Setting up the display

To start, tap on the settings icon in the bottom right corner of the screen. Note: after entering each step, press "save" (the floppy disk icon) to save the values! Then, proceed through the various settings:

Battery

Mode: Set here to "Standalone" (unmeasured, set battery capacity) or "CAN" for WaterWorld batteries, connecting a Victron BMV or Smartshunt via VE-direct to WW BatteryLink, or some other brands of lithium batteries (contact your supplier for this).

Low voltage: Set here at which voltage you want to see the "Drive slowly" notification; for lead-acid batteries (flooded, AGM, or Gel), this is usually 44 Volts. Consult with your supplier if needed.

High Voltage: Set the charging voltage for a fully charged battery; refer to the battery specifications. This value is used by the display for indicating a fully charged battery.

Quality: Set the aging percentage here. This information can come from the battery specifications, where an aging per year is indicated, or from a test conducted by your dealer.

C-value: Set the C-ratings of the battery according to specifications; fill in all values!
For lead-acid batteries: If your battery manufacturer provides only a C20 and/or C5 value, then enter the average of C5 and C20 for C10, and fill in half of the C5 value for the C1 value.

Example:
C20 = 400 Ah
C10 = 350 Ah (between C20 and C5)
C5 = 300 Ah
C1 = 150 Ah (50% of C5 value)

For lithium batteries: all values equal to the C1 value.

Control

Mounting side:
1. Right-hand propeller + throttle lever on the right = no adjustments needed
2. Right-hand propeller + throttle lever on the left = display setting + phase cable swap
3. Left-hand propeller + throttle lever on the right = phase cable swap
4. Left-hand propeller + throttle lever on the left = display setting

Reduce power warning
Here you can set the maximum power for a certain number of minutes, after which you will receive an alarm notification and can manually adjust the power. It is also applicable to the WW 20.0, which can temporarily provide up to 20 kW of power, provided the battery pack allows for it. Consult your supplier if necessary.

Display

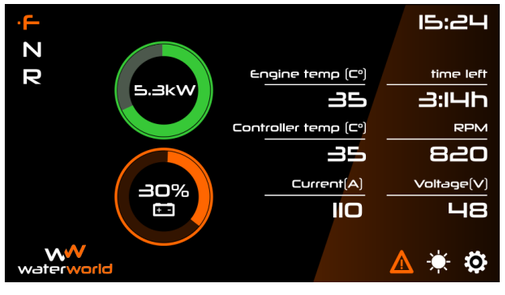
Main screen
Set the screen default to "Basic" or "Advanced." Usually, you choose "Basic" here. You will see all the necessary information for sailing, as shown in the left image below.

In the "Advanced" mode, you get to see more information, as shown in the right image below, which, however, is not all necessary during normal navigation.

Display time
Here, you set the time and the time zone. Note: first set the date and then the time. Under the "Display" section, you determine if the time is visible. Switching between daylight saving time and standard time is automatic.

System information
Here, you can see the software version of the display, the motor controller, and the serial number of the display itself. If there are CAN-communicating batteries connected, you will also find the customer ID here.

Basic screen



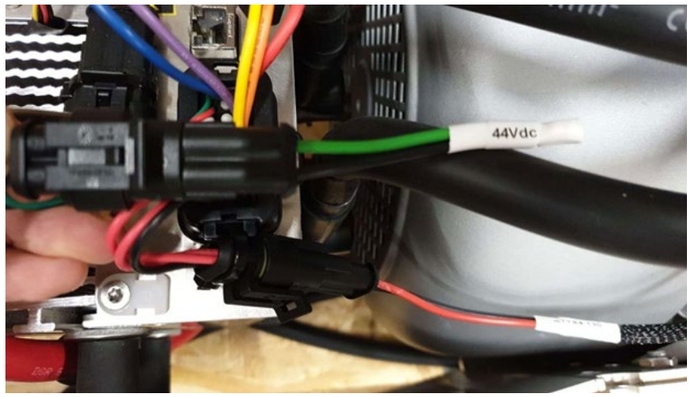
Advanced screen

WARNING! The display has its own backup battery, which should be replaced every 5 years. Ask your supplier for this.

Setting up the controller for different voltages of lithium batteries

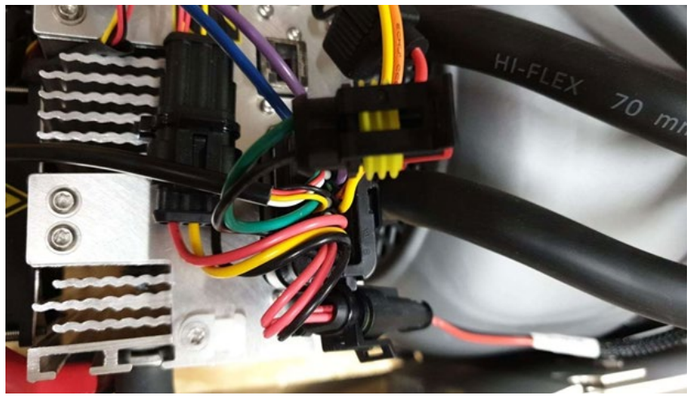
It is possible to use the WaterWorld system with different battery configurations. To do this, a setting on the controller can be modified.

1. If the plug, with green/black cable and indication “44Vdc,” is connected to the counter plug on the controller, then the system is suitable for standard voltages. The “cut-off” voltage, the minimum voltage at which the controller stops working, is then 37 Volts. A warning on the display appears from 39 Volts.



2. If the green/black cable is not connected, then the “cut-off” voltage, the minimum voltage at which the controller stops working, is 42 Volts, and the warning on the display appears at 44 Volts.

WARNING! Many lead-acid batteries go down to a loaded power of 37 Volts.



Setting 1
Suitable for: Full-traction batteries, some AGM, and lithium batteries are suitable for this setting. Consult your battery supplier for more information.

Setting 2
Suitable for: AGM, semi-traction lead-acid batteries, and various lithium batteries.

WARNING! Improper use of this setting can lead to irreversible damage to the battery pack. WaterWorld is not responsible for damage caused by deep discharge.

Testing and Commissioning

To check the operation of the system after installation, you can follow the steps below:

- Check if the batteries are sufficiently charged by measuring the voltage with a multimeter on the poles of the battery pack. The total voltage should be at least 48 Volts, but around 52 Volts can be expected. In the case of lithium batteries, this can sometimes be close to 60 Volts.
- **WARNING! Always check before connecting if all batteries have the same voltage, with a maximum difference of 0.1 Volt.**
- Check if the ignition on the dashboard is in the “off” position.
- Ensure that the throttle lever is in the neutral position. If not, the display will provide a notification.
- Turn the main switch to “on” or “I.
- Turn the ignition key to the right to turn on the system; you should hear a clear click indicating the relay is engaged.
- Check if the display is turned on. In the “Advanced” setting of the display, you can also see the voltage. Does this correspond with what you have measured?
- Gently give a small amount of throttle and check if the engine functions correctly both forward and backward.
- Check if, during the acceleration, the display shows a specific number of kW.
- Return the throttle lever to the neutral position.
- **WARNING! Check the motor and controller temperature on the dashboard. Is it approximately the same as the motor compartment temperature? (The temperature of the motor and controller is usually not exactly the same.)**
- Turn off the ignition.
- Turn off the main switch.
- Now connect the shore power cable.
- Check if the charger activates and if it provides the correct signals. Consult the charger’s manual for guidance.
- After activating the system on the display, check if the battery pack voltage goes to the prescribed charging voltage. Refer to the battery manual for guidance.
- Charge the battery pack preferably to its full capacity for the first voyage and for setting up the display. See the explanation of using the display in chapter 6.
- Take a test run and visually inspect everything, paying close attention to sound and vibrations.
- During the test run, check the number of revolutions (RPM) at full throttle and the maximum engine power at full throttle (kW) to determine if you have the correct propeller.
  - Max RPM: 1400-1500 RPM
  - Max Power: 100% to 110%

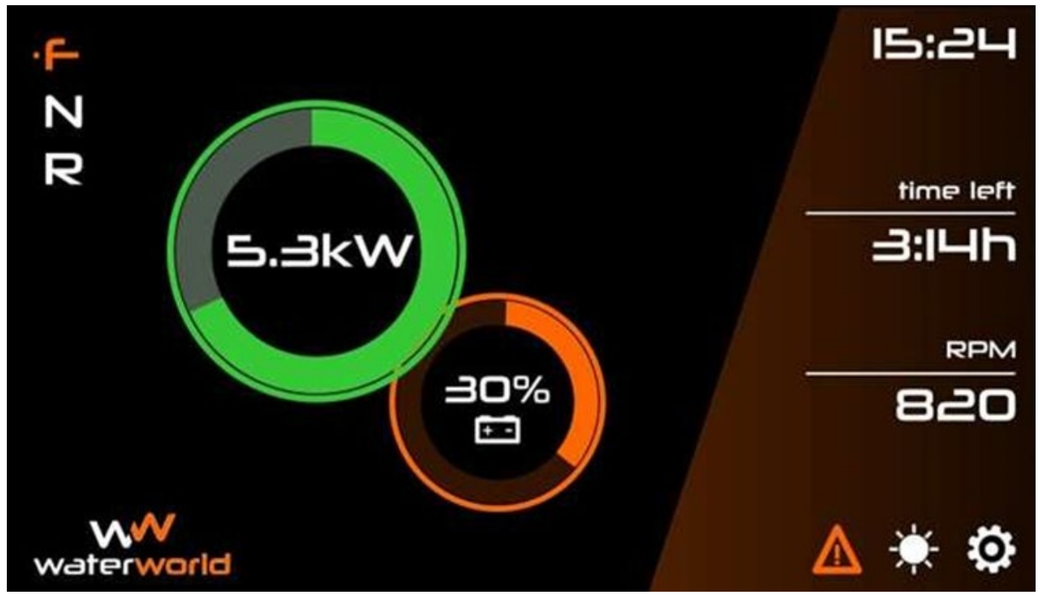
WARNING! If a high RPM with low power is measured, it means that a propeller that is too small has been chosen. Conversely, if there is a low RPM together with high power, it indicates that a propeller that is too large has been selected.

6. OPERATION OF THE ENGINE

Turning on and setting sail

1. **WARNING! First, disconnect the shore power connection.**
2. Check if the ignition on the dashboard is in the “off” position.
3. Check if the throttle lever is in the neutral position.
4. Ensure that you have ample space to set sail or that the boat is securely moored to test the system.
5. Turn the main switch to “on” or “I.”
6. Turn the ignition key to the right to turn on the system. (The relay will switch, and you may hear a “click”).
7. Check if the display turns on and provides the correct information.
8. Gently give a small amount of throttle.
9. Check if the throttle lever operates correctly in neutral, forward, and reverse positions.

Explanation of the display



The letters **F (Forward)**, **N (Neutral)**, and **R (Reverse)** in the top left corner of the screen indicate whether your throttle lever is in forward, neutral, or reverse.

The green circle displays the power drawn from the battery by the system in kilowatts (power lower than 1 kW is indicated in watts). The orange circle shows the indication of the remaining battery capacity (also known as “state of charge”) in percentage.

In “Time left,” you can see the remaining running time in hours and minutes. This is only displayed when the engine is in F (forward) or R (reverse) and power is being used. If the engine is in N (neutral), no value is displayed here. The meter starts from the last saved value. Even upon restarting, the counting begins from the last saved value unless you set it to 100% because the batteries are charged (see instructions below).

RPM displays the engine RPM, which is also the RPM of the propeller.

The **orange warning triangle** indicates the presence of any **error codes**. If an error or malfunction occurs, a pop-up message will appear explaining the meaning of the error code. If it is an error code that allows you to proceed, you can dismiss it. At the bottom of the screen, there will also be an orange warning triangle. Additionally, an acoustic signal will sound, which you can also turn off after reading the message. An overview of error messages can be found in chapter 9.
Door op het zonnetje te tikken kunt u de helderheid van het scherm instellen.

If your battery charger has turned off after charging, and the indication shows a full battery (100%), the motor controller records the higher voltage. At that moment, a battery icon appears at the bottom of the screen. When you click on it, you will be asked if you want to confirm “**Battery full**.” If you click “Yes,” the percentage goes to 100%. This notification does not work with a too low voltage, preventing incorrect resets to fully charged. You only need to perform this reset when the charger has turned off after a charging session, indicating that it has finished charging. During stops without charging, your display will resume where it left off when you turned off the engine.

If charging is still in progress, the battery icon can also appear because, at that moment, a temporarily higher voltage is being recorded. If you click on “**Battery full**” at that time, the “Low voltage” notification will appear faster than usual, along with the indication “Drive slowly.” The battery indicator will then no longer be accurate until you have fully charged the batteries to 100% again. This process happens automatically with WaterWorld batteries or VE-direct.

Arriving and mooring

- Ensure that when you have moored, the throttle is in the neutral position.
- Turn off the system using the ignition key
- Turn off the main power switch. Note: Also, turn off the system using the main switch when swimming around the boat or when carrying out repairs or maintenance on the boat.
- Connect the shore power and check the proper functioning of the battery charger.

7. MAINTENANCE AND SERVICE

Checks during the boating season

Give regular attention to your WaterWorld propulsion and its associated energy system during the boating season. We recommend paying attention to the following points:

- Ensure that the space beneath the ship, under the motor, stays dry, preventing the motor and controller from being submerged or excessive condensation from forming. It is recommended to install an automatic bilge pump at the lowest point of the boat, and regularly check its proper functioning. Verify this before each voyage. If there is water in the boat and the electronics have become wet, dry them and contact your installer. Do not turn on the system in this situation. If excessive condensation occurs in areas where WaterWorld components are installed, it indicates insufficient ventilation, and additional ventilation measures should be taken.

- Keep the motor, controller, and other components of the system clean and dry. You can clean them with a slightly damp cloth. Do not use water to clean the system.

- Keep your system connected to shore power as much as possible when not in use to prevent drained batteries. The battery charger will automatically stop when the batteries are full. However, always check if the battery charger activates when turned on. We recommend disconnecting shore power during thunderstorms.

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

Annual inspections by you or your supplier

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

- Proper functioning of all components.
- Potential moisture issues, corrosion of contacts, battery terminals, and/or connectors. Applying contact spray preventively and potentially applying grease to battery terminals.
- Lubrication of the shaft from the engine block.
- Secure attachment of all terminal clamps and connectors.
- Tightening of all fastening bolts and nuts.
- Potential damage to cables and components.
- The condition and correct voltage of all *batteries.
    - Loaded:
      If you have a multimeter, check the voltage of each battery individually by placing the meter in voltage mode on the positive and negative terminals of one battery while the engine is running. There should be no difference between the batteries greater than 0.1 Volt. If there is, contact your supplier or installer.
    - Unloaded:
      After charging, measure the batteries individually again and once more check for any significant differences between them. Refer to your battery specifications or consult your supplier to ensure the voltage is high enough.

    * Applies to series-connected lead-acid batteries.
- Potential imbalance in the motor/propeller shaft system.
- The correct settings of the display.

Winter Storage

During and after winter storage, the same recommended checks mentioned in the previous inspections apply. Pay special attention to keeping the batteries charged. If there is a power source available for your boat during winter storage, keep the shore power connected. Your charger will automatically turn on and off as needed. It is advisable, however, to have the boat and batteries checked at least twice during winter to ensure the charger is connected and there is sufficient voltage in the batteries.

If there is no charging point available for your boat, store the boat with fully charged lead-acid batteries and disconnect the main positive and negative terminals of the battery pack. Ensure that no load is connected to the battery pack.

For lithium batteries, it is advisable to store the boat for an extended period in the same manner, but with batteries charged to around 50%. This prolongs the lifespan of these batteries.

Use of the engine in saltwater

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

- Properly seal the installation space(s) to prevent saltwater ingress.
- Ensure that these spaces are well-ventilated.
- Regularly inspect all components, especially the contacts, for corrosion.
- Clean thoroughly twice a year.
- Lubricate the shaft with grease.
- Use protective spray, if necessary, for the rest of the engine.

8. TECHNICAL SPECIFICATIONS

Engine Specifications

Model	WW 4.0	WW 7.5	WW 10.0	WW 20.0
Max. Power Consumption (S1)	4.4 kW	8.25 kW	11 kW	22 kW
Max. Rotational Speed (rpm)	1450	1350	1450	1450
Voltage	48 Volt			
Maximum Current (Ampères)	92	172	230	450
Type	Asynchronous			
Sensor	Sensorless			
Weight (kg)	39	76	76	100
IP rating motor	IP 65			
IP rating regelaar	IP 65			

ATTENTION! Current may temporarily be higher during acceleration.

Electric Motor

Voltage:	3 X 34 Vac @ 50 Hz
Rotational speed:	1350 / 1450 RPM (dependent on the motor type)
Max rotational speed:	1500 RPM
Insulation Class:	H (185 °C)
Thermal Protection:	PTY84-130 °C
Maximum temperature:	135 °C
Output shaft:	28MM / 38MM (dependent on the motor type)
Cooling:	Air-cooled, fan on shaft

Motor controller

Voltage:	48 Volt
Maximum temperature:	80 °C
Cooling:	Air, 2 / 4 times fan (depending on the motor type)
Control of the electric motor:	Sensor less

Control Lever

Type:	WaterWorld Basic control.
Controller:	Based on rotation and hall sensors. (WW-017) Potentiometer + hall sensor for additional control and safe operation. (WW-016)
Communication:	CAN

Relay

Voltage:	48V DC
Maximum Continuous Current:	200A / 400A (depending on the motor type)

Display

Power Supply via Motor Controller

At ww-el.com, you will find the drawings and 3D files.

Guidelines for propeller selection

Below is a guideline for choosing a propeller size. The type and brand of the propeller can influence the noise it generates in the boat. For the correct choice, consult an expert in this field. Note: the optimal propeller for an individual boat may vary; every boat is unique.

For a 4.0 kW motor and a boat that travels at speeds slower than 11 km/h.
- 12 x 7 3-blade propeller
- 12 x 8 3-blade propeller

For a 4.0 kW motor and a boat that travels faster than 11 km/h.
- 12 x 8 4-blade propeller

For a 7.5 kW motor and a boat that travels at speeds slower than 10 km/h.
- 14 x 9 3-blade propeller
- 13 x 10 3-blade propeller

For a 7.5 kW motor and a boat that travels faster than 10 km/h.
- 14 x 9 4-blade propeller
- 13 x 10 4-blade propeller
- 15 x 8 4-blade propeller
- 15 x 9 3-blade propeller

For a 10 kW motor and a boat that travels at speeds slower than 10 km/h.
- 14 x 9 3-blade propeller

For a 10 kW motor and a boat that travels faster than 10 km/h.
- 14 x 10 3-blade propeller
- 15 x 9 3-blade propeller
- 14 x 10 4-blade propeller (only for lighter boats)
- 15 x 9 4-blade propeller (only for lighter boats)
- 16 x 8 3-blade propeller (only for lighter boats)

20 kW motor for lower speeds (approximately 11 km/h).
- 14 x 11 3-blade propeller
- 16 x 9 3-blade propeller
- 16 x 9 4-blade propeller
- 15 X 10 4-blade propeller

20 kW motor for higher speeds (approximately 15 km/h).
- 15X 11 3-blade propeller
- 16X 10 4-blade propeller

9. FAULTS AND ISSUES

Error codes for faults

Problems

Error codes for faults

These codes will appear on your display (see also chapter 6 under ‘Explanation of the Display

“Inspect the data in the display regarding temperature, voltage, the smooth operation of the propeller shaft installation, and the proper connection of all wiring for the following error codes. If the problem cannot be resolved, please contact your supplier.

“Voltage too low”
The controller measures a voltage lower than 46 volts (minimum startup voltage) or has a voltage temporarily lower than this measured value.

“Voltage too high”
The controller measures or has measured a higher voltage than the settings allow (70 volts is the maximum voltage).

Throttle lever
The controller detects a problem in the signal from the throttle lever, typically a poor connection in the wiring.

Engine temp.
The temperature sensor in the engine block measures a temperature above 130°C.

Error Codes:

Code	Controller:
E00	Engine_Error_None, no error
E02	Engine_Error_Motor_Hot, Stator over-temperature (engine overheating)
E08	Engine_Error_Motor_Controller_Hot, Circuit board overheating
E11	Engine_Error_Controller_UnderVoltage, Low Voltage
E12	Engine_Error_Controller_OverVoltage, High Voltage
E18	Engine_Error_Controller_Temperature, Communication Error with temperature IC
E30	Engine_Error_Communicaition_CAN, Motor communication error (CAN BUS)
E31	Engine_Error_Communicaition_SPI, Motor communication error (SPI BUS)
E32	Engine_Error_Communicaition_Throttle, Remote throttle control communication error
	Display:
D01	LowVoltageWarning
D02	ReducePowerWarning
	Battery:
B01	Battery, Low temperature
B02	Battery, High temperature
B03	Battery, Low voltage
B04	Battery, High voltage
B05	Battery, High current
B16	Battery, Vendor specific error. This error shows an hexadedimal value starting with 0x
	Throttle:
T01	Put throttle in neutral
T02	Put secondary throttle in neutral

Problems

Below are some issues that may potentially occur.

My engine is losing power quickly

- The engine controller may be reducing the power because your battery pack is almost empty. Check the remaining percentage on the display combined with the voltage while the engine is running. If the voltage drops below 46 volts, the engine will reduce power for that reason. Once the voltage drops below 42 volts, depending on the settings, the engine may completely stop.
- The cooling is insufficient. When the engine becomes too hot, it will also reduce power and eventually stop. The most common causes of this are a stiff propeller shaft and an incorrectly chosen propeller. Refer to the propeller selection table on page 44 for more information.

My engine vibrates and/or makes too much noise.

There can be various causes for this, which you can eliminate one by one:

- the engine is not properly aligned with the propeller shaft
- the engine is mounted too high on the engine foundation
- the flange is not straight or not properly attached to the engine
- the propeller shaft is not perfectly straight and needs to be straightened
- there is damage to the propeller underneath the boat.

My engine has less power

You might have something in the propeller or it may be out of balance.

If the propeller shaft can be easily turned by hand and this issue is present immediately after installation, it is likely that a heavier propeller can be chosen.

WARNING! Make sure to turn off the system before bringing your hands near the propeller shaft!

I have lost my key

Always have a spare key. Therefore, have a duplicate made if you lose one. If you need a new key, please contact your supplier.

10. WARRANTY

Warrenty periods

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

For WaterWorld systems used for commercial purposes, 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 the discovery of any defect.

Warrenty terms en conditions

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 for the end customer to rectify any material or processing defect.

This cost coverage does not apply to all additional costs arising from a warranty issue and does not cover any other financial losses (e.g., towing, cranes, telecommunication, meals, lodging, loss of use, time loss, etc.).

Travel and/or transportation costs will not be reimbursed by Water World Electronics BV.

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

Wear and tear parts and routine maintenance activities 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 is 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 by external influences, an accident, or in any other way where the defect is not attributable to WaterWorld.
- The WaterWorld system has been converted, modified, or equipped with parts or accessories that do not belong to the equipment expressly authorized or recommended by WaterWorld.
- Preventive maintenance or repair work was not carried out by companies authorized by WaterWorld, or original spare parts were not used, unless the customer can demonstrate that the circumstances leading to the refusal of warranty did not affect the occurrence of the defect.

Warrenty procedure

Adhering to the warranty procedure described below is a prerequisite for claiming warranty.

- Contact your WaterWorld supplier in case of a complaint.
- Keep your purchase invoice handy; the supplier will need it to verify where and when your WaterWorld system was purchased.
- **CAUTION!** Your purchase receipt or invoice serves as your warranty certificate. Please keep it carefully after purchase!
- Also, keep the serial number of the engine handy, in case it's not already mentioned on the purchase invoice.
- Send or provide a detailed description of the complaint, the circumstances under which it occurs, and any other relevant information that can assist your supplier in assessing the nature and severity of the complaint. If necessary and possible, take photos of the system and the overall situation that may aid in the evaluation.
- The supplier may ask you to perform a series of checks on the system first to better assess the complaint.
- Please note that incorrect transport of products to the WaterWorld supplier is not covered by the warranty

Disabling the product/recycling

The WaterWorld engines are designed in accordance with the EU Directive 2012/19/EU, which regulates the recycling of electrical and electronic equipment to protect the environment. Disposed electrical and electronic equipment should not be thrown into regular household waste, as harmful substances can then enter the environment, impacting the health of people, animals, and plants. These substances accumulate in the food chain and in the environment. Additionally, valuable raw materials are lost in this way. You can, in accordance with regional regulations, drop off the motor at a collection point. From there, it will be recycled in a professional manner.

ATTACHMENTS

Ray-Link

VE-Link

Declaration of Conformity

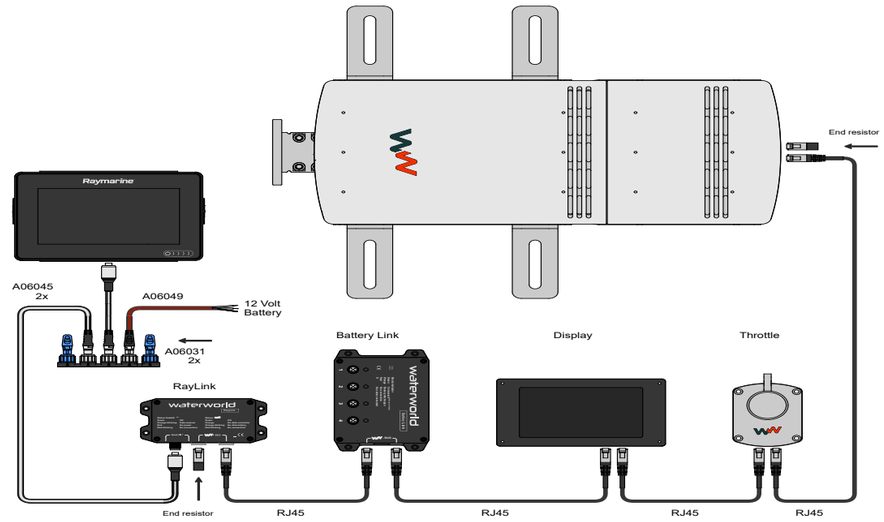
Ray-link

It is possible to connect the WaterWorld system to a Raymarine Axiom+ multifunction display. This can be done using a Ray-link. By installing the Ray-link, the WaterWorld page can be displayed on the Raymarine Axiom+ screen.

To bring up the WaterWorld page, you can select the dashboard via the main page. In the top right corner of the dashboard, there is a button with three horizontal lines stacked vertically. Clicking on it will reveal the option to select the WaterWorld page. This sets the WaterWorld page as the dashboard, provided that the WaterWorld page is installed.

For installing a Ray-link, a Raymarine SeaTalkng Starter Kit, an A06045 cable, and RJ45 cables are required. The Raymarine Axiom+ multifunction display comes with a shorter version of the A06045 cable. The illustration below provides a representation of the cable connections. Place termination resistors in the remaining RJ45 openings.

Connection diagram RayLink



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

VE-link

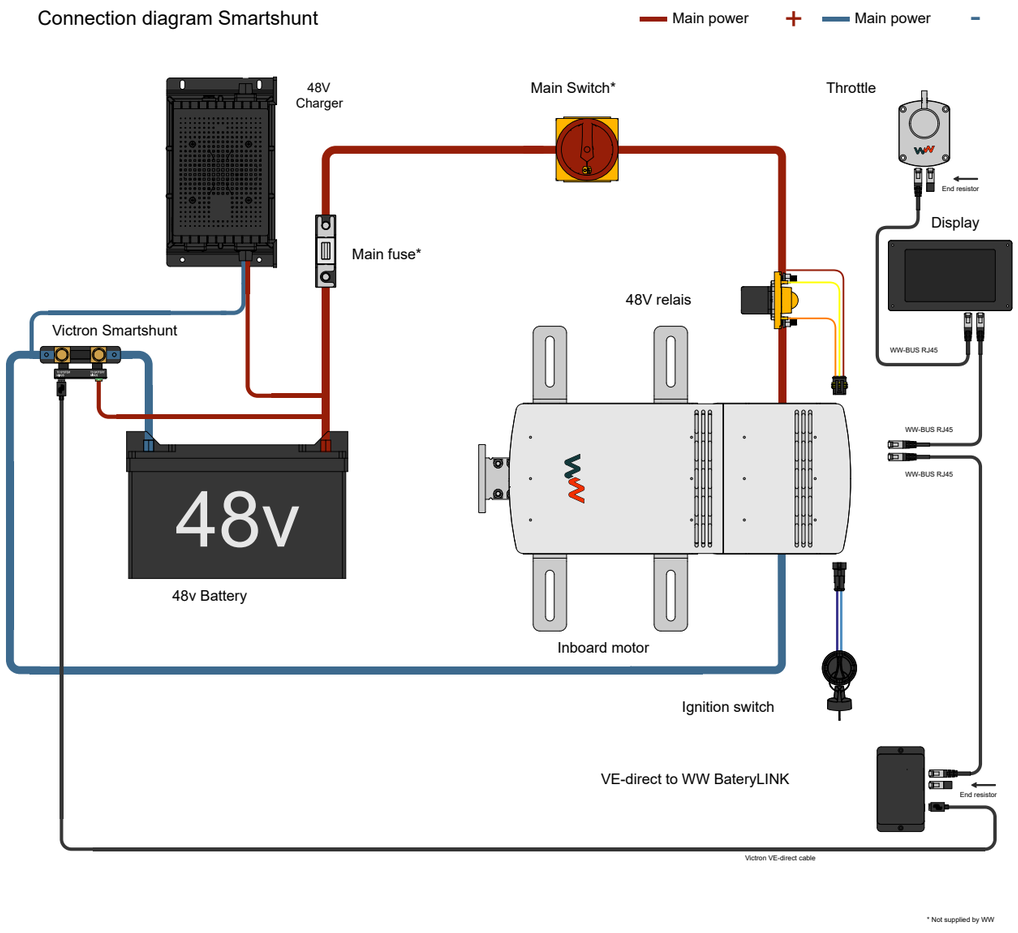
When a WaterWorld system is installed along with a Victron SmartShunt, there is the possibility to connect them. The SmartShunt serves as a battery monitor, measuring battery voltage and current. Based on these measurements, it calculates the battery charge status and remaining time. Additionally, it records historical data such as the deepest discharge, average discharge, etc. By adding a VE-link, all this data can be displayed on the WaterWorld display.

The VE-link has an opening for the VE-direct cable, which should be connected to the SmartShunt. In the remaining openings of the VE-link, RJ45 cables can be inserted to establish a connection with the controller and the display. Refer to the connection diagram below for the correct connections.

After all cables are connected according to the diagram below, a setting in the display needs to be modified to visualize the read data. Go to settings, the gear icon at the bottom right of the screen. Then 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 modification. The information from the SmartShunt will now be displayed on the screen.

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

Connection diagram VE-link



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)
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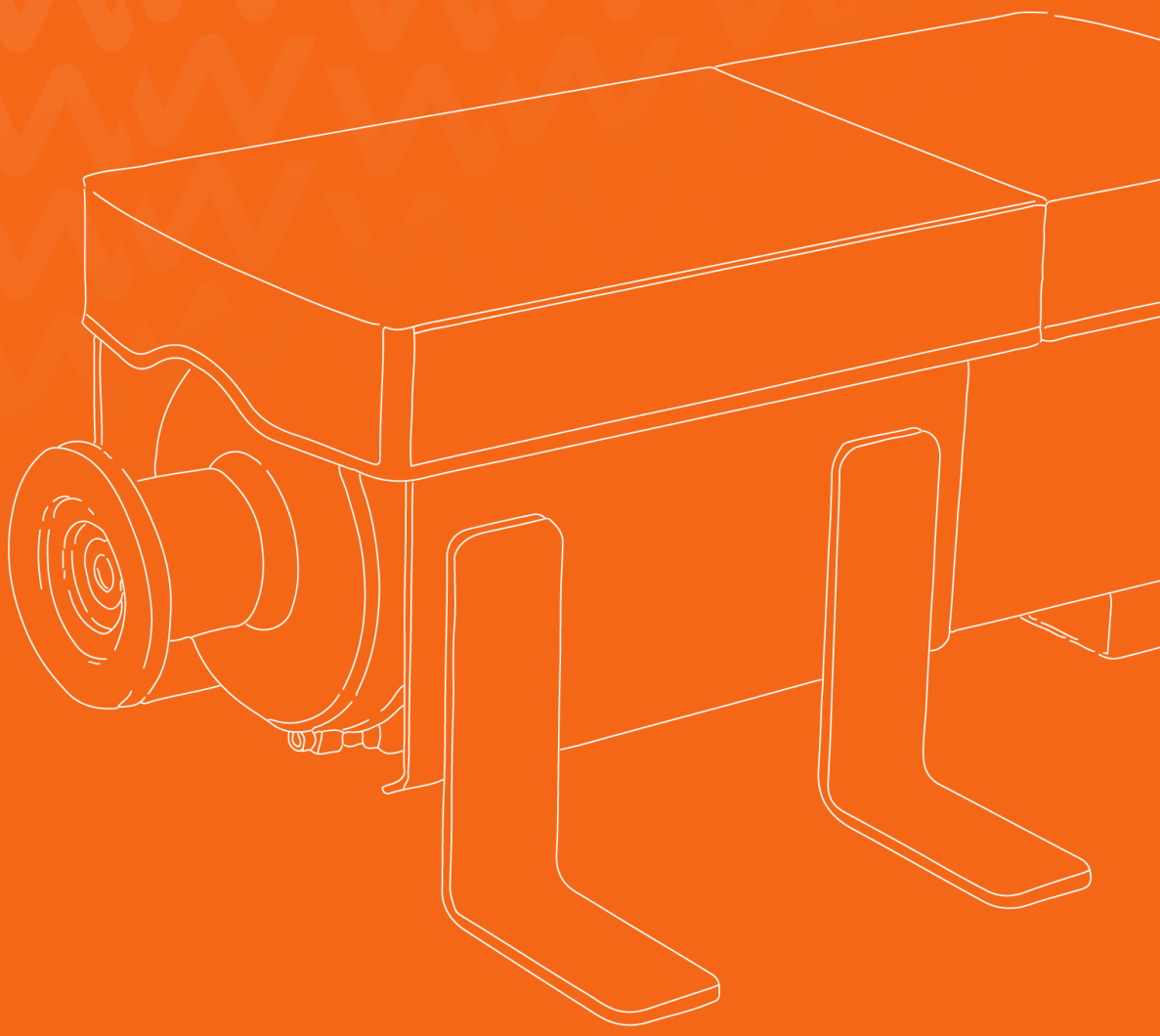

Questions? Feel free to contact us.

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