the electric drive

WW 4.0, WW 7.5, WW 10.0

Manual

Version 2.5 - June 2019

WaterWorld
It Butlan 9
8621DV Heeg
The Netherlands

INTRODUCTION

Congratulations on your purchase. We are pleased that you have chosen a WaterWorld drive.

WaterWorld engines are designed and produced with the utmost care. Everything is aimed at providing you with a safe, reliable, environmentally and user-friendly engine for you to enjoy.

We do everything we can to continuously improve WaterWorld engines. If you have comments about the design or its use, we would greatly appreciate it if you would inform us about it. You'll find the contact details on the back of this manual.

We recommend you read this manual carefully so that you can install and use the engine correctly. We wish you lots of fun!

The WaterWorld team

Contents

1. Introduction

How to use this manual

This manual contains important information for the safe use of WaterWorld electric engines. Maintenance and possible troubleshooting measures are also covered in this manual.

It is imperative that every person who installs this system, as well as anyone using the engine, familiarises themselves with the manual and carefully follows and carries out the warnings and safety instructions contained in this manual.

Installation and maintenance of the WaterWorld engines must be carried out by specialised and competent installers who comply with the relevant laws and regulations in combination with the safety aspects mentioned in this manual.

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

Warnings and symbols

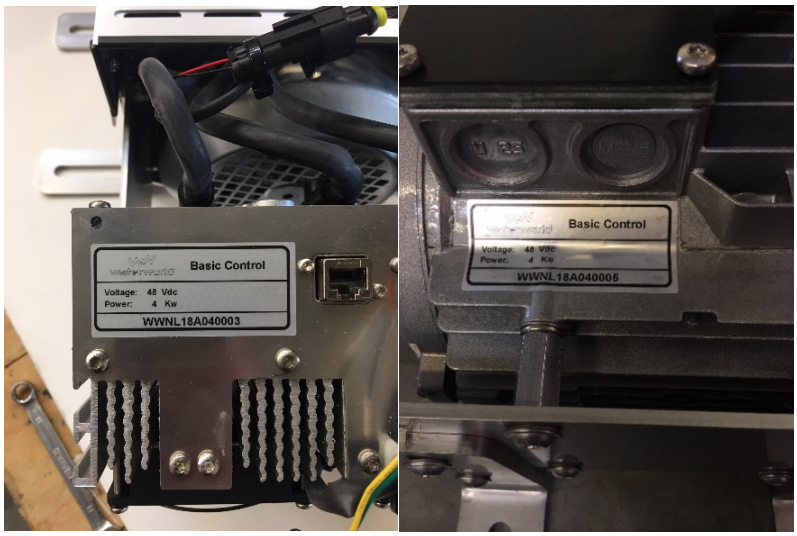
DANGER A warning indicates the risk of possible injury to the user/installer or potential damage if the user or installer does respond to the warning.

CAUTION!
Special data, offered and prohibited with regard to damage prevention

ATTENTION!
Indications that require attention and must be followed.

Serial numbers

You will find the identification label with the serial number on the top of the engine controller and on the side of the engine block.



The manufacturer, model number and unique serial number of the engine or controller are displayed here.

ATTENTION!
Never remove the identification labels and/or other stickers on the engine.

2. Quick guide

1. Read the manual. We try to provide you with as complete a manual as possible. This also includes points that aren't specific to the engine, but about the entire boat, the propeller and the batteries. **However, every installation is customised and the system must be installed by a professional**.

2. Check whether you have received everything that is included in the delivery order. Arrange everything clearly and compare it with the list starting on page 12 of this manual and your packing slip. If you have any questions, contact De Stille Boot.

3. Before you start connecting anything, read the safety instructions on pages 8 to 11.
Always connect according to the connection diagram on page 15.

4. Prepare the boat to install the system in a clean and dry environment. The following steps should be considered: If these are not in order then something will have to be done to get the engine into use.

- No permanent bilge water where the engine is installed.
- Good protection against flooding of the boat such as a properly functioning bilge pump in the right place in the boat.
- When installing the components, also consider leaks or condensation from above. For that reason, a component may have to be placed somewhere else or covered from above.
- Ensure good ventilation of the relevant room or spaces so that moisture can evaporate and disappear from the room.
- WaterWorld has developed a highly efficient engine that needs air cooling and therefore does not require a water cooling system. It is of great importance that sufficient cold air can enter and warm air can be removed.
- Is the propeller shaft system running smoothly? A heavy-running propeller shaft system will cause the following problems:
- Higher consumption, which means you can sail less
- Engine overheating
- Slower response when accelerating
- Wasted power, the engine will start with surplus power

5. Have you made the right choice of screws? See our advice on page 30 for this subject.

6. Will all components be accessible so that everything can be reached for maintenance?

7. The battery pack is heavy, ensure good weight distribution in the boat. Make sure that the batteries are accessible for maintenance at the battery points, the cabling and in some cases for filling distilled water.

8. Choose the right cabling thickness, look for the cable choice on page 21 as well. Ensure that cable lengths are not unnecessarily long where this can be prevented.

3. Safety

General guidelines

- The engine must operate at the specified voltage. This is 48 Volt nominal. Minimum voltage 42 Volt, maximum voltage 60 Volt.
- The engine is intended solely for boats. The manufacturer cannot be held liable for use in any other way and the warranty will be invalid in those cases.
- Keep the electronics away from any water.
- A repair may only be carried out by an authorised installer, assigned by WaterWorld.
- Use only original or recommended WaterWorld accessories and spare parts.
- If the drive needs to be repaired, only original parts may be used as a replacement. The use of other parts can lead to serious injury or damage.
- The batteries may only be replaced by an authorised installer.
- The user must regularly ensure that the engine is functioning correctly. The manufacturer is not liable for any damage as a result of the engine malfunctioning.
- The supplier, or WaterWorld, the seller or the manufacturer accepts no liability for any damage to the buyer, or all possible claims by third parties as a result of (the use of) the engine, direct or indirect and/or consequential damage, environmental damage, business and immaterial damage, or incorrect advice, unless the damage is due to gross negligence on the part of the supplier.
- Before use, you must take into account the legislation in the country in question, or at the location where the engine is situated. The buyer is hereby responsible for complying with all, whether or not legal, precautions at the location where the engine is to be used, regardless of whether the engine is operational at that time. This also includes measures for fire safety, as well as providing safety for others in the vicinity of the engine.
- The manufacturer reserves the right and authority afforded to them under European law. Imitation or counterfeiting of the device is expressly not permitted.

Safety features of the engine

CAUTION!

Your WaterWorld engine is equipped with various safety features:

- Protection against excessively high temperature in engine and controller: the engine will regulate power if the electronics detect high temperatures.
- Fuse controller: a fuse is installed in all + cables on the system, different for each engine model.
- External fuse wiring: this prevents fire/overheating or overloading of the system. This external fuse is not included in the standard scope of delivery, but must be added.
- Main switch: this should always be switched off when you leave the boat or when working on the system
- Protection against battery overload: if your batteries are running low, the engine will automatically reduce the power, allowing you to sail for a longer duration and find a safe harbour at low speed.
- Ignition lock: allows you to switch off the system if there is a potential hazard. Always switch it off when there are swimmers around the boat.
- Display: this shows you the remaining sailing time, so that you can plan your trip enabling you to reach the destination. The display also warns against too high or too low battery voltage. The warning for a too low voltage also occurs with an audible signal and with an indication on the screen
- Cables carrying voltage connected to the engine, controller, component or module must be regularly checked for insulation damage.
- If damage is detected in the cables/cords, the device must be taken out of operation immediately until the relevant cable/cord has been replaced.

DANGER!

Safety instructions for the engine

- Follow the instructions in this manual
- Switch off the system immediately at the main switch in the event of overheating, smoke detection, or as soon as you recognise a defect
- The permitted ambient temperature during use must not be lower than -20 degrees Celsius and no higher than 50 degrees Celsius.
- Do not touch the drive shaft, engine and battery parts during or immediately after the cruise.
- Always switch off the system via the main switch during assembly and disassembly work.

Safety instructions for the batteries

DANGER!

- Observe all safety instructions regarding the batteries in the battery manufacturer's manual.
- If the battery is damaged, do not use the WaterWorld system and inform the dealer 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 at hand: If battery acid comes in contact with skin or eyes, rinse immediately with water and seek medical attention.
- Only use charging cables that are suitable for outdoors.
- Always fully unwind the reel from a 230V socket if you use it.
- Avoid strong mechanical forces on the system batteries and cables.
- Remove metal jewellery and watches before starting work on batteries or near batteries and use insulated tools for this.
- Never short-circuit batteries. Ensure that tools and metal objects never touch the battery. This can cause sparks, or even an explosion or fire.
- Use insulated tools when working with batteries.
- When connecting the battery, ensure that the polarity is correct and that the connections are secure.
- Battery terminals must be clean and corrosion-free.
- Do not store batteries in a high-risk area in a box or drawer, such as in an insufficiently ventilated area. The correct ventilation must be ensured when batteries are placed in a box.
- Only connect identical batteries (manufacturer, capacity and age).
- Only connect batteries with the same charging status
- Ensure that battery terminals always make optimum contact with the cable eyes that are connected to it. Avoid stainless steel rings between the battery pole and the connected cable at all times.

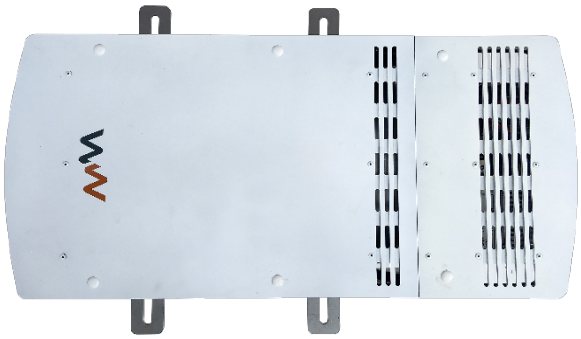
Safety instructions for use

- Read this manual thoroughly.
- The WaterWorld system may only be used by persons who are qualified for this and also physically and mentally suitable.
- Always follow the national rules and regulations of a country.
- Keep the engine and control options out of the reach of children or persons who cannot handle it properly
- Allow the shipyard or installer to explain the operation and safety provisions of the entire system.
- Check the system for mechanical damage before departure.
- Check the condition and operation of all functions of the WaterWorld system at the start of each trip at a low speed.
- Only sail with a system that is in perfect technical condition.
- Make sure that the batteries are sufficiently charged.
- Be familiar with all controls of the WaterWorld system. You must also be able to stop the system quickly if necessary.
- As a boat operator, you are responsible for the safety of the people on board and for all boats and people in your area. Therefore, observe the basic rules of conduct of sailing.
- Particular caution is required when people are in the water, even when sailing at low speed.
- Before you leave, gather information about the area where you are going to sail and take the weather forecasts and sea conditions into account.
- Allow for a sufficient buffer for the required action radius.
- Depending on the size of the boat, make sure that specific safety equipment is available and accessible (life jackets, anchor, paddle, communication tools, etc.)

4. Scope of delivery

The WaterWorld engines come standard with

- Engine mounted in a stainless steel frame



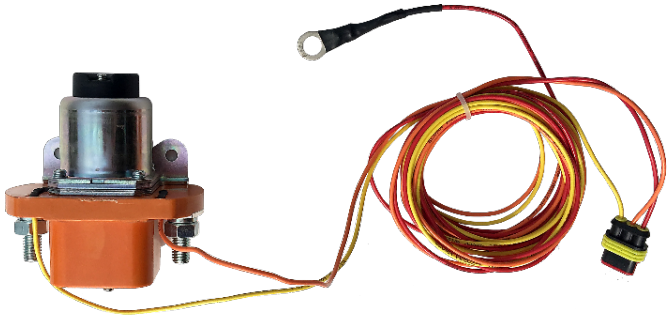
- Thrust bearing integrated in the engine, shaft with a flange to attach a counter flange (not supplied) to fix the propeller shaft (not supplied)

- Controller, mounted in the same frame (can optionally also be supplied separately). Engine and controller are already interconnected by cables

- Engine supports, various ways to attach to the outside of the frame (NOTE! During installation, the supports will be turned over and the engine will hang as opposed to being placed on it (see photo)).

- Power cables 2m. Already connected to the engine controller

- 48 Volt Relay - The amperage depends on the selected engine power



- Digital display with a “splitter” which is connected to the display, the power supply and the measuring shunt

- Shunt for digital display

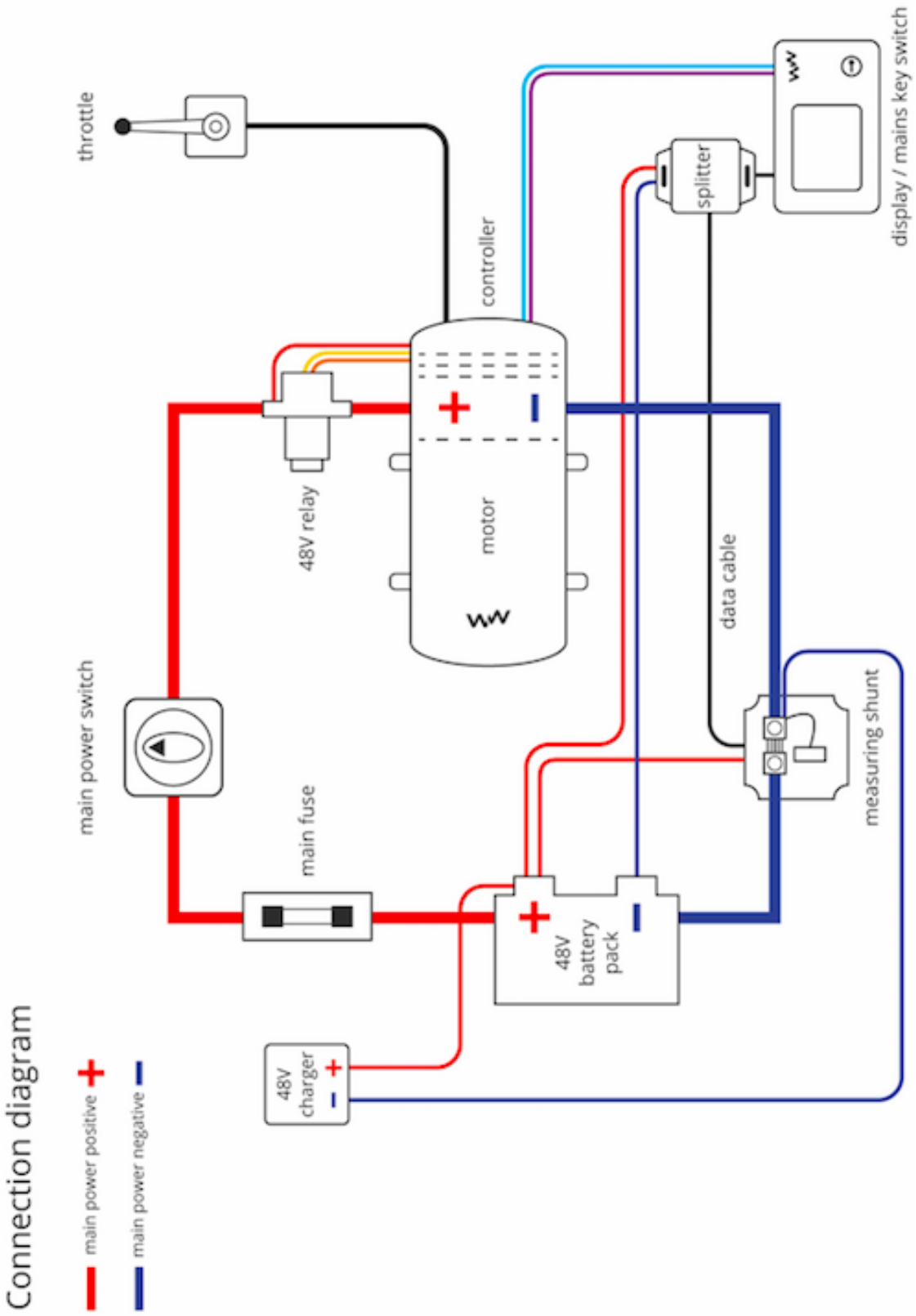
- Throttle with electronic mechanism, cover plate and cabling from throttle to engine controller

- Dashboard with ignition switch

ATTENTION!
Vibration dampers, fuse with fuse holder for in the battery cables, main switch and battery pack with charger are not included in the standard supply.

5. Installation of the system

Connection Diagram



Positioning of the engine

The WaterWorld engine can best be installed using the following step-by-step plan

1. Remove the engine caps and carefully place them in a safe place

2. Mount the engine on a foundation and vibration dampers that are suitable to absorb the pressure from the system and transfer it to the boat.
ATTENTION! If you choose to mount the engine without vibration dampers, it is very important that the engine is very well aligned with the shaft. Even if you use a flexible coupling. In addition, this can lead to extra noise, especially in aluminium boats.

3. **ATTENTION!** Given the weight, the best thing to do is to hoist the 7.5 or 10.0 WW in the boat. In order to do this, turn the supplied lifting eye bolt at the top of the engine, where a thread is provided. You can lift the engine with a hoist and lower it.

4. The side supports on the engine are delivered with the supports facing down. In most cases, they have to be turned around and the motor hangs in the supports, as shown in these two examples:

Rest the side supports on the vibration dampers so that the motor is directly in front of the propeller shaft.

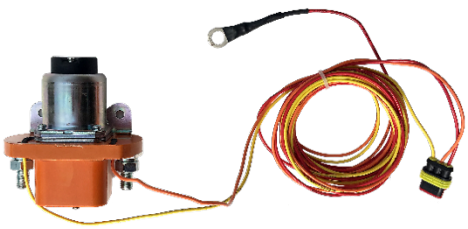
5. Preferably use a flexible rubber coupling between the motor flange and the propeller shaft. This prevents vibration in the boat and compensates for imperfections caused by the quality of the propeller shaft system or the alignment.
ATTENTION! If the propeller shaft is mounted directly on the engine with a rigid connection, the engine must be fully aligned to prevent damage to the electronics and connectors.

6. **ATTENTION!** With a WW 7.5 and 10.0 engine in a heavy ship, or professional use with extensive sailing hours, it is recommended to use an external thrust bearing, so that the rubber engine supports and the thrust lower in the engine are not overloaded in the long run. If in doubt about this, please contact De Stille Boot.

7. The WaterWorld engine controller comes with 2 metres of red and black battery cable already mounted on the engine controller side.

The red cable on the + side is connected to the relay.

Relay



Shunt

8. We recommend and use the following cable thicknesses:

4.0kW 35mm2 cable
7.5kW 50mm2 cable
10.0kW 50mm2 cable

If you plan to use cable lengths longer than 5 metres, you may need a thicker cable. Check this in the diagram on page 22 or contact us in case of doubt.

WARNING!

9. The engine and controller are cooled by fans: two on the back of the controller (visible on the front of the system) and one on the engine. Ensure that free air flow is possible for ventilation. The air is drawn in at the front of the engine box or room and discharged at the rear. If necessary, ventilation grilles must be fitted to allow the supply of fresh air and the removal of warm air.

Waterworld takes no responsibility for loss of performance, damage or other problems due to insufficient ventilation of the system.

10. In the standard version, the engine and controller are combined in one frame, and these components are already interconnected at the factory. So you don't have to do anything for this.

ATTENTION! If you want to mount the controller separately from the engine, this must be done in consultation with WaterWorld by a recognised installer!

Batteries

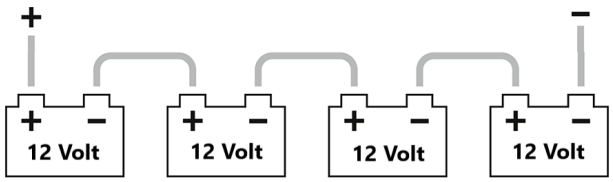
ATTENTION! Ensure that there is never any voltage on the system when installing and mounting the system!

1. The drive operates on 48 volts. Provide a battery pack that is suitable for this application in quality and capacity. Use traction, semi traction - deep cycle, or lithium batteries that meet the specifications. **ATTENTION!** When in doubt about the specifications of lithium batteries, it is advisable to consult WaterWorld. It is possible that the batteries will damage the engine, or vice versa if they are not compatible.

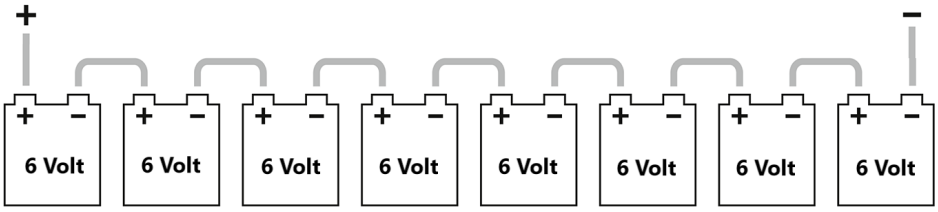
2. Place the batteries in the ship so that:
    a. the weight is evenly distributed and the boat rests neatly on the surface of the water.
    b. the batteries cannot slide into the boat after installation.
    c. the batteries are accessible for connecting the cables and for subsequent maintenance.
    d. the batteries do not get in the way of the daily use of the boat.
    e. Wiring to the engine and the charger is possible without unnecessary cable length.

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

Aansluiten op 12V accu's



Aansluiten op 6V accu's

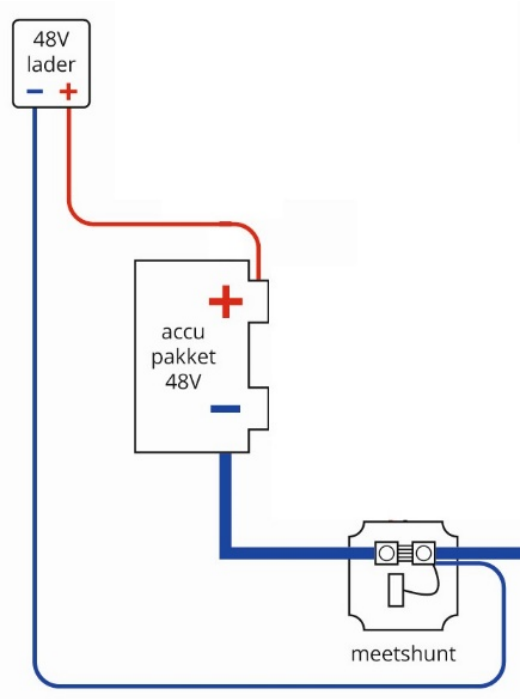


Wait until the system is properly connected before connecting the batteries for the rest of the system.

Select the charger

The charger must be selected for the battery pack and must be suitable in terms of voltage, amperage, type of batteries, use in a boat, etc. When installing the charger, carefully consider the same issues as with the engine and batteries. Moisture, accessibility, cabling, ventilation, etc.

ATTENTION! When connecting the charger, the + must be connected to the batteries and the - to the shunt in such a way that the current can be measured while charging.



Recommended cable thickness

Waterworld 4.0 kW-> up to 4.4 kW power consumption, max. 92 Amps.
A cable thickness of 35 mm² is recommended for a 4.0.

Waterworld 7.5 kW-> up to 8.25 kW power consumption, max. 172 Amps.
A cable thickness of 50 mm² is recommended for a 5.0.

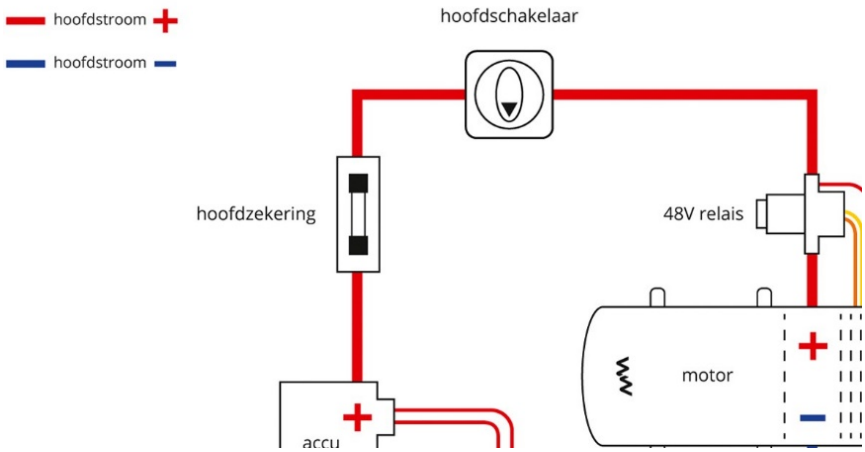
Waterworld 10.0 kW -> power consumption up to 11 kW, max. 230 Amp.
A cable thickness of 50 mm² is recommended for the 10.0.

The above data is based on cable lengths up to and including 5 metres, for further advice refer to the table below for shorter and longer lengths.

Cable length	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m	10 m
Cable thickness				Amperage						
1.5mm²	25A	12A	8A	6A	5A	4A	3A	3A	2,5A	2A
2.5mm²	40A	25A	14A	10A	8A	7A	6A	5A	4,5A	4A
4mm²	64A	34A	22A	17A	13A	11A	9A	8A	7A	6A
6mm²	100A	50A	34A	25A	20A	17A	14A	8A	11A	10A
8mm²	135A	68A	45A	34A	27A	22A	19A	17A	15	13A
10mm²	170A	85A	55A	42A	33A	28A	24A	21A	19A	17A
16mm²	275A	135A	90A	68A	54A	45A	39A	33A	30A	27A
25mm²		210A	140 A	105A	85A	70A	61A	53A	47A	42A
35mm²		300A	200 A	150A	120 A	100 A	85A	75A	65A	60A
50mm²			285 A	210A	170 A	155 A	120A	105A	95A	85A
70mm²				300A	235 A	214 A	170A	150A	133A	
95mm²					305 A	270 A	230A	203A		

Main power switch

Mount the main power switch in an easily accessible place in the (red) + cable between the engine controller and the batteries, so that the system can be easily disconnected from the batteries in case of an emergency or maintenance.



DANGER!

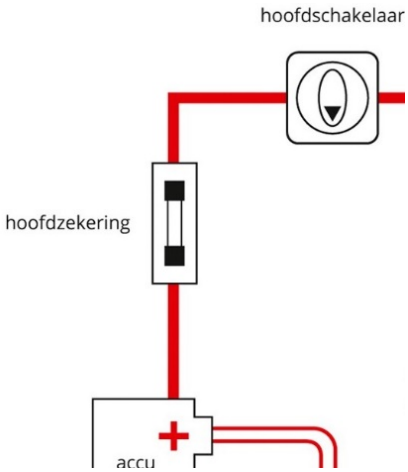
Make sure the main power switch, once installed, is always OFF ("0" or "off") when working on the components and when disconnecting and connecting power cables.

Main fuse

Mount the main fuse between the main power switch and the + pole of the batteries, as close to the battery as possible, preferably in the battery compartment. Make sure that this main fuse is inside the boat, but remains visible by opening a hatch. The capacity of the fuse in amperes should be approximately 1.6 x as large as the maximum amperes of the engine (see specifications).

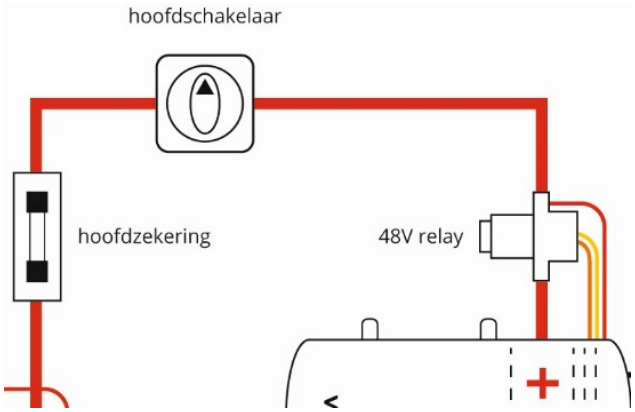
You can immediately order an ANL fuse holder + ANL fuse with the motor. We provide the following values:

WaterWorld 4 kW - 160A fuse WaterWorld 7.5 kW - 250A fuse
WaterWorld 10 kW - 325A fuse



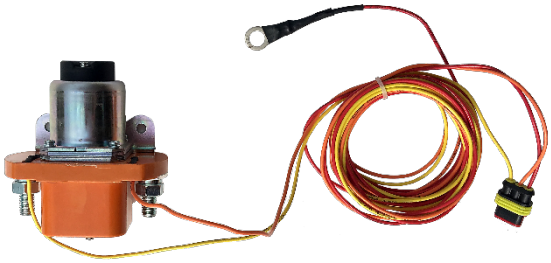
The relay

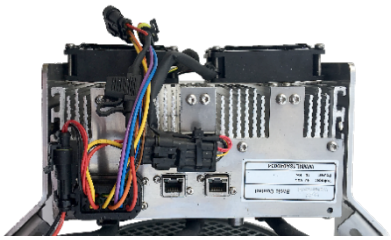
Mount the supplied relay in the (red) + cable, between the engine and the main power switch.



The loose red wire with M8 eye goes on the bolt of the relay on the battery side. Ensure a good connection of this common thread, a bad connection can lead to malfunctions when starting the engine.

The relay has a 3-wire plug, which is connected to the socket on the motor controller. This has the same colour threads and only fits one way.





The shunt

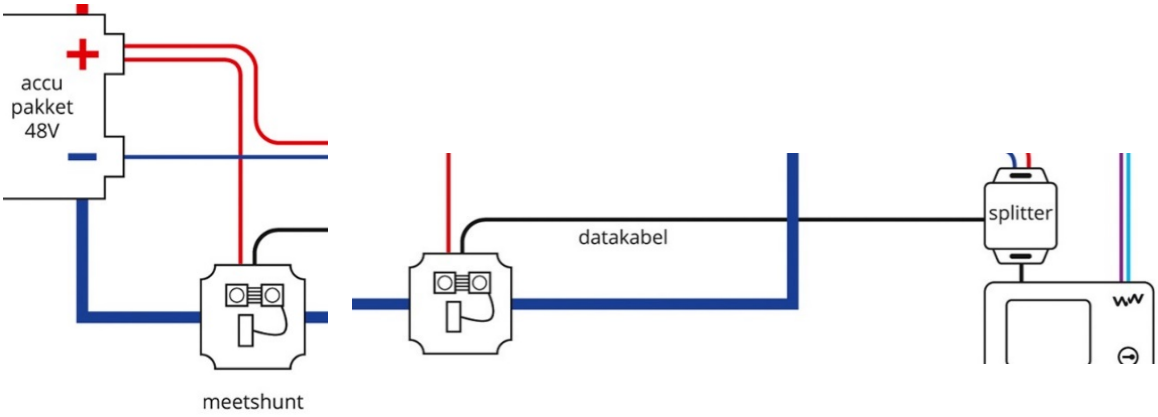
This measurement shunt is part of the display and ensures engine power, the remaining sailing time and other data about the batteries related to your WaterWorld engine are displayed correctly.

Mount the shunt in the black minus cable directly from the engine controller in a suitable location in the engine compartment, or battery compartment. The standard supplied cable length for the ground cable from the controller is 2 metres. This can be shortened to the appropriate length.

<- Minus cable to battery pack
(shunt displays the word BATTERY)

<- Minus cable to motor
(shunt displays the word OUT)

<- The thin red wire is connected to the Plus + of the battery pack.
The display measures the voltage of the batteries



The Display

1. Mount the display in the appropriate location. This must be clearly visible to the driver of the boat.

2. A splitter is supplied with the display.
   ATTENTION!
   Two versions of this splitter are possible:
   A splitter that says: SPLITTER 6–35 VDC
   This is only suitable for connecting to an external 12V battery or to a 48-volt to 12-volt DC-DC converter. Never connect this directly to the 48-volt battery pack.

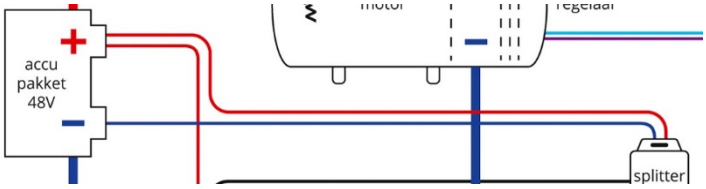
   A splitter that says: SPLITTER HV 15-75VDC
   This is only suitable for direct connection to the 48-volt battery pack.

   If in doubt, contact De Stille Boot.

   This splitter must be connected to:
   - the display via the round 4-pin connector
   - the + (red) and - (black) of the main battery pack (48V), or of a 12-volt power supply. ATTENTION! It is important that the display also receives power when the main switch is off. Otherwise you will not see the correct battery capacity.
   - the included shunt (loose black cable with telephone connector)

3. Mount the splitter inside the boat, for example in the steering column, near the display.

4. Option 1 - With a splitter with HV 15-75VDC Connect the power cable from the splitter to the - and + of the battery pack (48V).



Option 2 - With a splitter with 6–35 VDC Connect the power cable from the splitter to the - and + of a 12V battery, or a 48/12 converter.

5. Then connect the splitter to the shunt using the supplied data cable.

The throttle

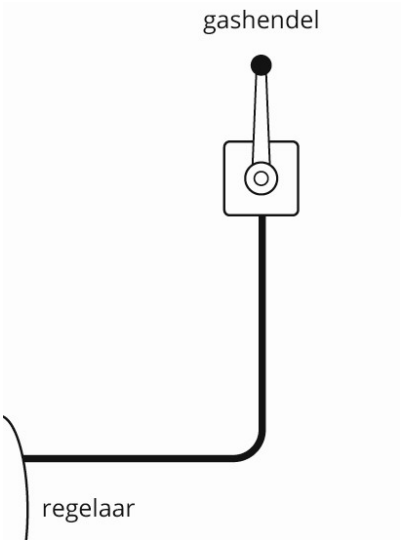
1. Mount the throttle in the appropriate location, easily accessible for the driver.

WARNING:
Make sure that the throttle is mounted in such a way that crew members on the boat can't easily bump into it, resulting in a sudden deviation or sailing faster!

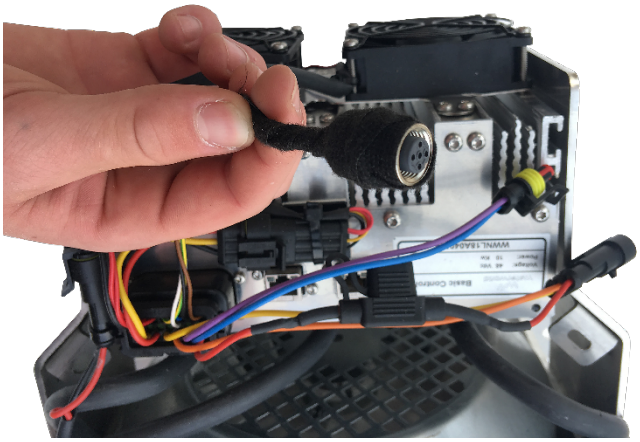
2. Mount the throttle grip so that the throttle grip is in the neutral position.

ATTENTION! The throttle control is set as follows as standard: by moving the handle clockwise, the boat moves forward, and by moving it counter clockwise, it moves backwards. This is the correct position when the starboard lever is mounted against the steering console. If you want to use the lever differently, the phase cables can be reversed.
View the separate appendix in the back of this manual AND contact us for instructions.

3. Connect the throttle control to the engine controller by attaching the supplied cable to the engine controller.



Connecting the throttle to the engine controller is done by connecting the round data cable to the rear of the throttle and to the engine controller, on its socket.



Setting the display

The display is largely set in advance before being delivered to the installer.
The standard properties are set correctly and the correct settings are chosen for your engine and, if possible, the battery pack.

However, these settings may still have to be updated. You can find the correct information about this in the appendices at the back of this manual. If you cannot resolve it, you can contact us.

Testing and operating

To check how the system is operating after installation you can go through the following steps:

- Check whether the batteries are sufficiently charged by measuring using a multimeter on the poles of the battery pack. The total voltage must be at least 48 volts, but around 52 volts is to be expected.
- Check if the display is on. You can also see the voltage in the display, does this correspond to what you measured?
- Check whether the contact in the dashboard is switched off
- Check if the throttle lever is in the neutral position
- Turn the main switch to "on" or I
- Turn the key switch clockwise to turn on the system
- Gently press a little bit of acceleration and check the engine does its job correctly both forwards and reverse

- Check whether the display shows a yellow bar with amps during the throttle
- Return the throttle lever to the neutral position
- Switch the ignition off
- Now connect the shore power cable
- Check if the charger starts and whether it gives the correct signals. Consult the charger's manual
- Check whether the display shows a blue bar during a charge
- Check whether the voltage of the battery pack goes to the specified charging voltage. Consult the manual of the batteries.
- Preferably fully charge the battery pack for the first trip and to adjust the display.
- Go on a test run and check everything visually.

6. Operating the engine

Switch on and sail out

1. **ATTENTION!** First disconnect the shore power connection
2. Check whether the ignition in the dashboard is switched off
3. Check if the throttle lever is in the neutral position
4. Ensure that there is free space to sail away, or that the boat is properly secured to test the system
5. Turn the main switch to "on" or I
6. Turn the key switch clockwise to turn on the system
7. Check if the display switches on and gives the correct information
8. Gently give a little acceleration
9. Check that the throttle lever works correctly in the neutral, forward and reverse position

Explanation of the display

When you turn on the engine, the WaterWorld logo appears first and then the basic screen will be displayed. Screen 1 shows the following data

... h time you can still sail calculated on the basis of the battery capacity and how much engine power is used. If the display is set correctly and the boat is in use, the time will be indicated in hours and minutes.

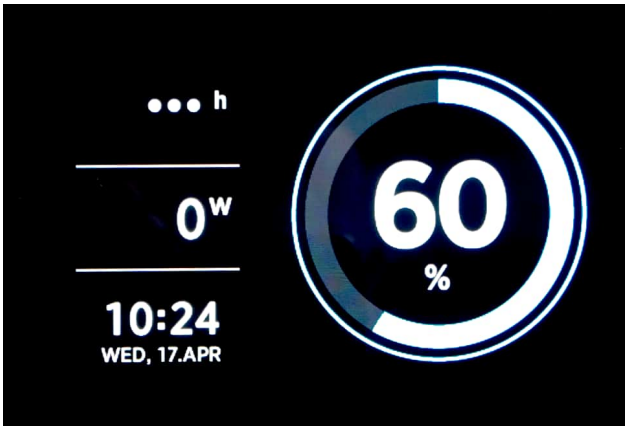
0 W this is the capacity that you accelerate with

for a 4kW motor max 4000W

for a 7.5kW motor max 7500W

for a 10kW motor max 10000W

60% is the percentage of available energy, the full 100% to 0% can be used.

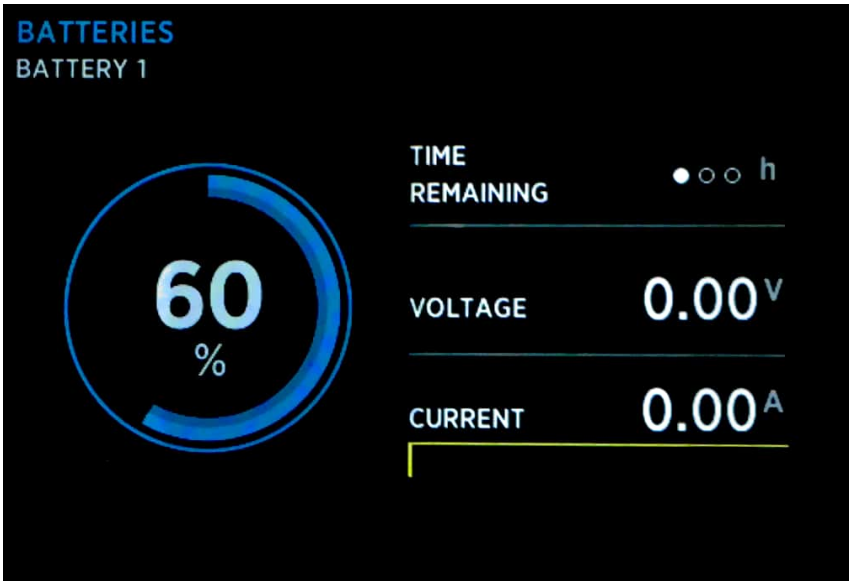


In the second screen the following is added:

Voltage - This is the voltage on the electric sailing battery pack. That is always rated at 48 volts and will show up to 55 volts in full condition without having to sail. If you are sailing and the engine loads the battery pack then this can fall to around 43 volts.

Current - Here you can see how much power you use in amps, for example 50 amps.
Suppose the voltage is 50 Volt then that would mean that you give 2500 Watt power, which is the equivalent to 2.5 kW (kilowatt)

You will also see 2500W in the first screen explained above.



While sailing we recommend that you regularly consult the basic screen, so that you know how much% the battery has and how long you can sail.

ATTENTION! The remaining sailing time depends on the state of charge of the battery and the position of the throttle at that time. If you accelerate more, the remaining sailing time will decrease, if you reduce acceleration it will increase again. This response takes a few seconds on the display.

ATTENTION! If the batteries are at low capacity, it will of course appear on the display. The indicated capacity turns red, followed by an audio signal. In addition, the engine is set so that it regulates the maximum power again with little capacity. This means you can sail less quickly, but longer, to get home or ashore safely.

Arrive and moor

- Make sure that the throttle lever is in the neutral position when docking
- Turn the system off using the ignition switch
- Turn off the main power switch
- Connect the shore power and check the charger is functioning properly

7. MAINTENANCE AND SERVICE

Checks during the sailing season

Give your WaterWorld engine and the energy system regular attention during the sailing season. We recommend you pay attention to the following points:

- Make sure that the space at the bottom of the ship under the engine remains dry, so that the engine and controller cannot be flooded or excessive moisture can infiltrate. It is advisable to install an automatic bilge pump at the deepest point of the boat, and to regularly check that it's operating correctly.
- Keep the motor and controller as well as the other components of the system clean and dry. You can clean it using a slightly damp cloth. Do not use water to clean the system.
- Always keep your system connected to shore power if you are not sailing. This way you can prevent batteries from discharging. The charger will automatically stop when the batteries are full. When activating the charger, always check whether it is switched on.

ATTENTION! Before carrying out checks or cleaning, always switch off the system using the main power switch.

Checks to be carried out by you or your supplier

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

- Proper control over all components.
- Possible moisture problems, corrosion between ignition connectors, battery terminals or plugs. Preventive application of contact spray and lubricating battery posts.
- Grease the shaft from the engine block
- The tightness of all pole clamps and plugs
- All bolts and nuts are properly tightened.
- Possible damage to cables and parts.
- The condition and the correct voltage of all batteries

  In use:
  If you have a multimeter, check the voltage of the batteries per battery by setting the meter to voltage on the + and - pole of a battery while the engine is running. There should not be a difference between the batteries that is greater than 0.1 Volt. If this is the case, you can contact your shipyard.
  Not in use
  After charging, measure the batteries individually again and check whether there is not too much difference between them. Consult based on the specifications of your battery or by asking your supplier if the voltage is high enough.

- Possible imbalance in the motor/propeller shaft system.
- The correct display settings.

Winter storage

During and after winter storage, the same recommended checks as mentioned under 6.1 and 6.2 apply. Pay particular attention to the charge on the battery. If a power point is present on your boat during winter storage, leave the shore power connected. Your charger switches on and off automatically when needed. If your boat does not have a charging point, put it away with fully charged batteries and remove the main fuse or disconnect the + cable from the batteries.

8. Technical specifications

Engine specifications

Model	WW 2.5	WW 4.0	WW 7.5	WW 10.0
Max. used capacity (S1)	2.75 kW	4.4 kW	8.25 kW	11 kW
Torque (Nm)	18	27	53	66
Nom. revs/min.	1350	1450	1350	1450
Voltage	48 V			
Maximum amp (Ampères)	57	92	172	230
Type	Asynchronous			
Sensor	Sensorless			
Weight (kg.)	39	39	76	76
IP rating motor	IP 65			
IP rating regulator	IP 65			

Electric motor

Type: M132Mc-43
Tension: 3 X 34 Vac @ 50 Hz
RPM: 1350/1450 RPM (depending on engine type)
Max speed: 1500 RPM Insulation class: F (155 degrees)
Thermal protection: PTY84-130 C
Outgoing Axis: 38MM
Cooling: Air, fan on ash

Engine controller

Tension : 48V
Max temp: 70 degrees
Cooling: Air, 2 times fan.

Throttle lever

Type: Water World Basic control.
Control: double, hall sensor determined forward/backward. Increased speed goes with potentiometer 60 or 80 degrees. Always a double check, no hall sensor active means neutral.

Relay

Tension : 48V
Current maximum continuous: 200A/400A (depending on engine type)
Type: DC

Display

Power supply via splitter: from 48 Volt battery pack

Inspections

CE Confirmation of Declaration issued 28-09-2018

Electromagnetic Compatibility Test Report - Quick Scan test results of a Electro motor for a boat, model

BIE18800, BIE18810 Rev 1.02 and Rev 1.01 (ref print BIE17000 17010)

Dimensions

In the appendices at the end of this manual you will find the dimensional drawings of the different models of WaterWorld engines.

On www.destilleboot.nl/waterworld/waterworldservice you will find the drawings and also 3D files.

Propeller advice

4.0 kW and a boat that sails slower than 11 km/h
- 12 x 8 3-blade screw

4.0 kW engine and a boat that sails faster than 11 km/h
- 12 x 8 4-blade screw

7.5 kW engine and a boat that sails less than 10km/h
- 14 x 9 3-blade screw
- 13 x 10 3-blade screw

7.5 kW engine and a boat that sails faster than 10 km/h
- 14 x 9 4-blade screw
- 13 x 10 4-blade screw
- 15 x 8 4-blade screw
- 15 x 9 3-blade screw

10 kW engine and a boat that sails slower than 10 km/h
-14 x 10 3-blade screw
-15 x 9 3-blade screw

10 kW engine and a boat that sails faster than 12 km/h
- 14 x 10 4-blade screw (only applies to lighter boats)
- 14 x 10 3-blade screw
- 15 x 9 3-blade screw
- 15 x 9 4-blade screw (only applies to lighter boats)
- 16 x 8 3-blade screw (only applies to lighter boats)

9. Faults and malfunctions

Error codes related to faults

The engine controller is able to display error codes on the left RJ-45 CAN connector (the two inputs on the top of the controller where you can connect a network cable). A 1-second orange blink always occurs, even if there are no errors. If the engine controller gives an error, the 1-second flash is followed by 1 or more short flashes of 200 ms. The number of short flashes indicates which error it is.

Number of short flashes	Error	Description
0	No error	Only the 1-second flash can be seen, the system works properly
1	Voltage too low error	The controller measures a voltage below 46 Volts (minimum start-up ok voltage) or has measured a voltage below this
2	Voltage too high error	The controller measures or has measured a higher voltage than the settings allow (70V = max voltage)
3	Throttle lever error	The controller detects a problem in the signal from the throttle, usually a bad connection in the cabling
4	Engine temp. error	The temperature sensor in the engine block is above 130 degrees
5	Blocked engine	The measured speed is less than 70% of the expected speed and less than 500 revs
6	Speed too low	The measured speed is less than 85% of the expected speed at maximum power
7	Insufficient torque	The measured speed is equal to the expected speed, but the amperage is at less than 80% at maximum power

Malfunctions

Below we will deal with some of the problems that could occur.

My engine quickly drops in power.

- The engine controller may adjust the power because your battery pack is too weak. Check the remaining percentage on the display combined with the voltage while the engine is running. If the voltage drops below 43 volts then the engine will switch off automatically.
- Or is the cooling insufficient. If the engine gets too hot, there is a good chance that you will use the wrong screw.

Engine vibrates and makes a lot of noise

The engine may not be aligned correctly with the propeller shaft.

My transmission is noisy.

Your transmission may not be aligned correctly.

My engine does not have enough power.

There may be something in the propeller or it is out of balance.

If the propeller shaft can be turned very lightly by hand and this problem is already present immediately after installation, a heavier propeller can probably be selected.

I have lost my key.
Always provide a spare key. So have one made if you have lost one.

10. Warranty

Warranty period

The statutory warranty is 24 months and includes all components of the WaterWorld system. The warranty period starts from the day of delivery of the WaterWorld system to the end customer.
For WaterWorld systems that are - also temporarily - used for business purposes, an adjusted warranty period of one year after delivery of the product to the end customer applies.
In all cases, the right to warranty is no longer valid after six months following the discovery of the defect.

Warranty Conditions

WaterWorld Electronics BV guarantees a WaterWorld system end user that the product is free from material and manufacturing defects during the warranty period. WaterWorld will take over the costs for the end user to resolve any material or processing error.
This cost transfer does not apply to all additional costs that arise from a warranty case or to all other financial losses incurred (e.g. costs for towing, telecommunications, meals, accommodation, lost use, loss of time, etc.).
Water World Electronics BV decides whether defective parts are repaired or replaced. Distributors and dealers who carry out repair work on WaterWorld engines are not authorised to issue legally binding statements for Water World Electronics.
Worn/deteriorated parts and routine maintenance work are excluded from the warranty. Cables and mounting materials are also excluded from the warranty.

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

- The warranty was not submitted in accordance with the regulations (see under warranty procedure).
- The product has not been treated in accordance with the regulations.
- The safety, usage and maintenance instructions of the manual have not been observed.
- Prescribed maintenance has not been carried out or documented.
- The product is damaged by external influences, an accident or where the defect is not attributable to WaterWorld in any other way.
- The WaterWorld system has been converted, modified or equipped in some way with components or accessories that are not part of the equipment explicitly approved or recommended by WaterWorld.
- Prior maintenance or repair work was not carried out by companies authorised by WaterWorld or no original spare parts were used, unless the end user can prove that the facts that gave the right to refuse the guarantee did not influence the development of the error.

Warranty procedure

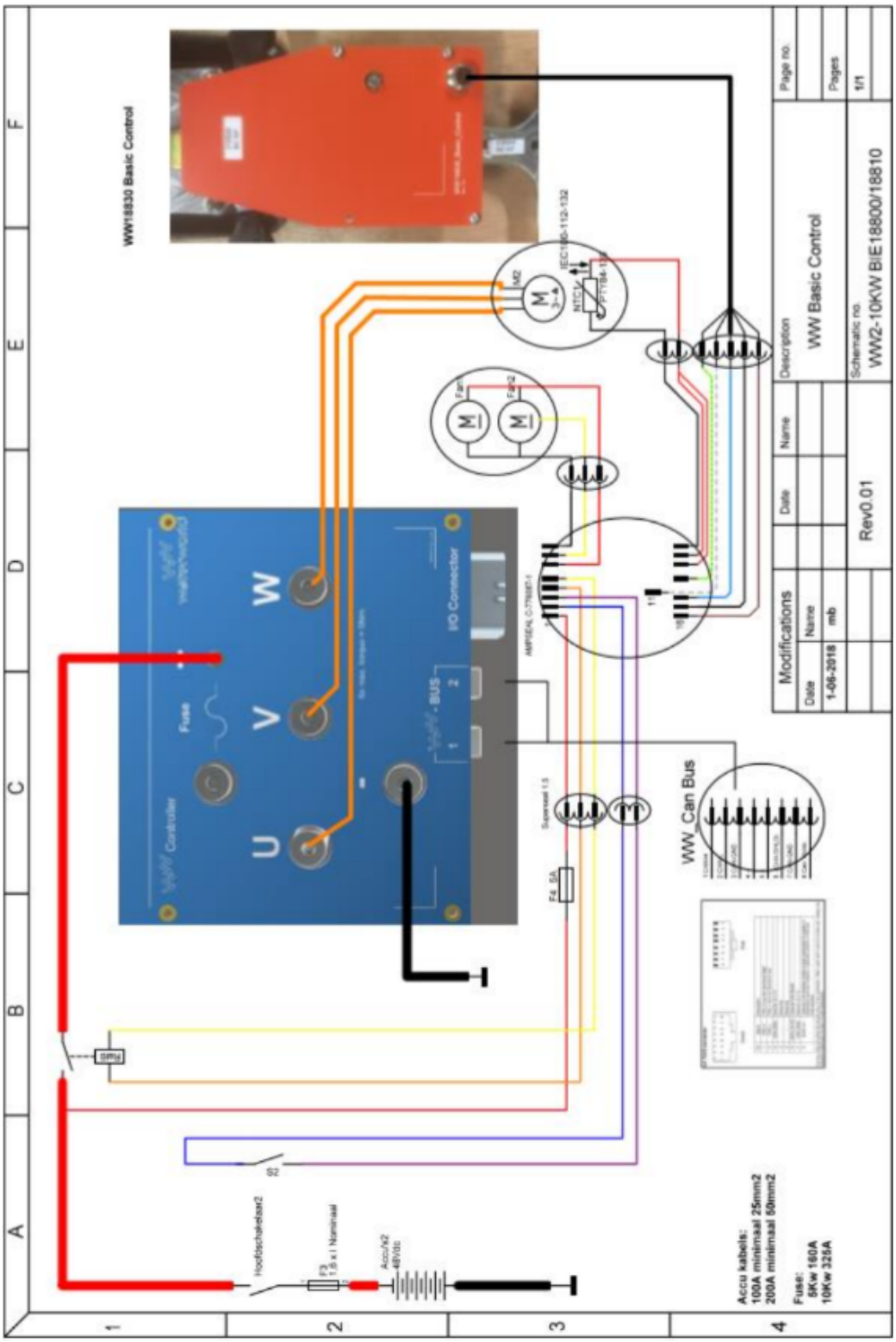
The observance of the warranty procedure described below is a condition for claiming warranty.

- Contact your WaterWorld supplier in case of a complaint. Assign you an RMA number.
- Keep your purchase invoice handy, the supplier needs it to check where and when your WaterWorld system was purchased.
  ATTENTION! Your purchase receipt or invoice is your guarantee certificate. Save this carefully after the purchase!
- Also have the engine's serial numbers at hand if not already stated on the purchase invoice.
- Send or give a good description of the complaint, the circumstances under which it occurs and all relevant information that can help your supplier assess the nature and seriousness of the issue. If necessary and if possible, take photos of the system that can assist with this.

- The supplier may ask you to first carry out a number of checks on the system in order to better assess the issue.
- When transporting products to the WaterWorld supplier, be aware that incorrect transport is not covered by warranty.

11. Appendices

Electrical diagram



Declaration of conformity

Water World Electronics B.V.
Weerdijk 14
8375 AX Oldemarkt
The Netherlands

VAT: NL855223200B01
CoC: 63409259

CE Declaration of Conformity

Type:

Engine W.W.E. fully electric and hybrid.
BIE17000 and BIE18800 / 18810 and BIE17000
Certificate issued by manufacturer

EN 61000-6-3 (2007) + Al (2011) + AC (2012)
EN 61000-6-2 (2005) + AC (2005)
EN 55016-2-3 (2010) + Al (2010) + A2 (2014) + Cl (2013)
EN 55022/55011
EN-IEC 61000-4-3 (2006) +A1 (2008) + A2 (2010)
EN-IEC 61000-4-2 (2009)
EN 60335-1 (2012), section 19.11.4.1 till 19.11.4.6 4

Chapter 9 electrical installations section: 2B, 2C, 2D, 2E, 2F, 2G.
Chapter 9 elektrische installaties article 9.21.

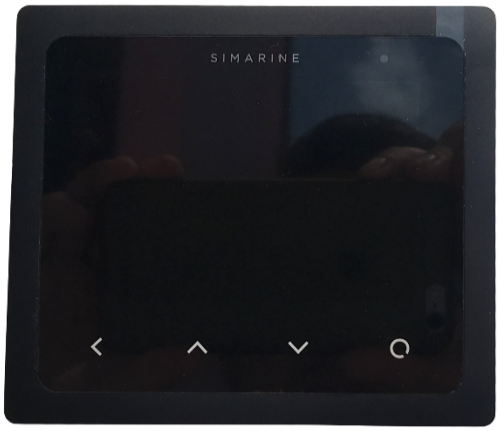
The product in question meets the above standards

Date: 28-09-2018.
On behalf of the Executive board: Sebastiaan Strampel and Mario Bor.

Set up Simarine display

The steps below assume that all settings for the screen still have to be made. Updates to the software may cause your screen to display options or settings other than those described below. If this causes problems, please contact us for the correct up-to-date information.

To operate the display and enter the menu, use the touch buttons below the screen ->



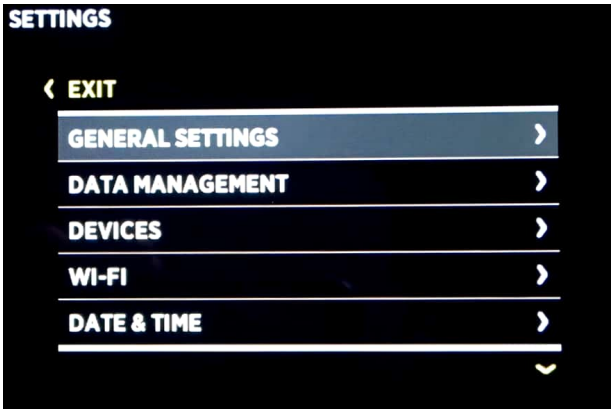
<Step back, step up in the menu structure

^ Up through the different screens, up in the menu

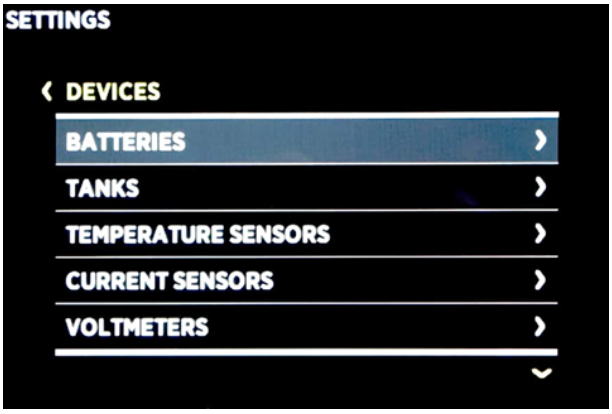
ˇ Up through the different screens, up in the menu

O Confirm an option, a step deeper in the menu

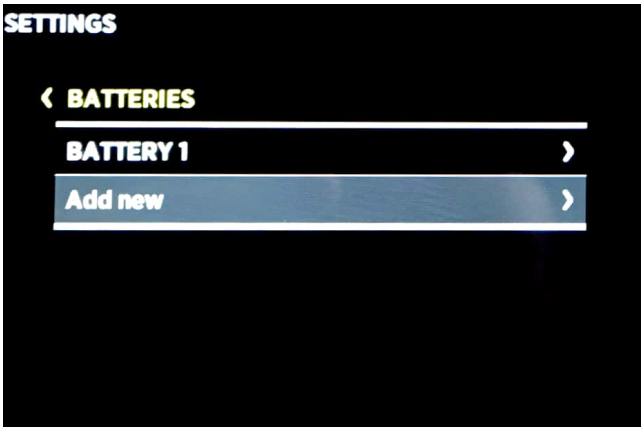
To get to the settings screen, press the circle at the bottom right and you will see this screen ->



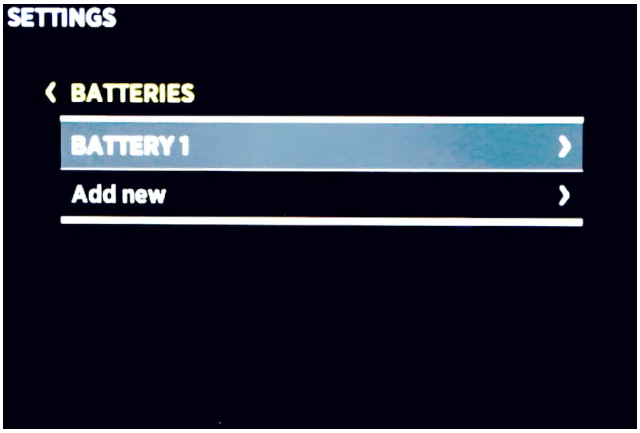
In this screen go three steps down to Settings -> Devices
Press the circle and this screen will appear



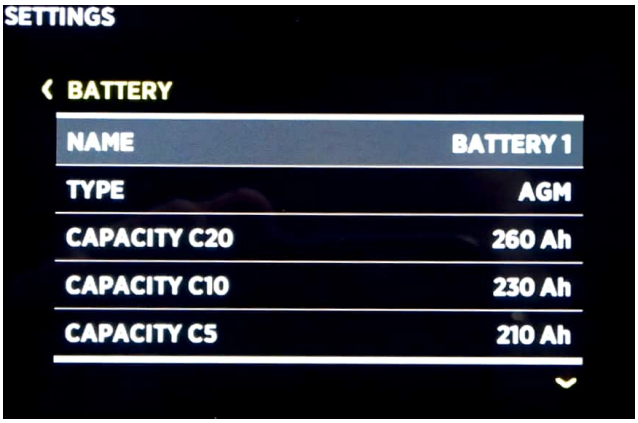
The grey bar is set on Batteries. Press the circle again to enter this menu.
Then you will see the option Add new, or if a battery has already been set, the options BATTERY 1 and Add new.



To give the battery bank the correct settings, the grey bar must be on Battery 1, and you can enter those settings by pressing the circle.



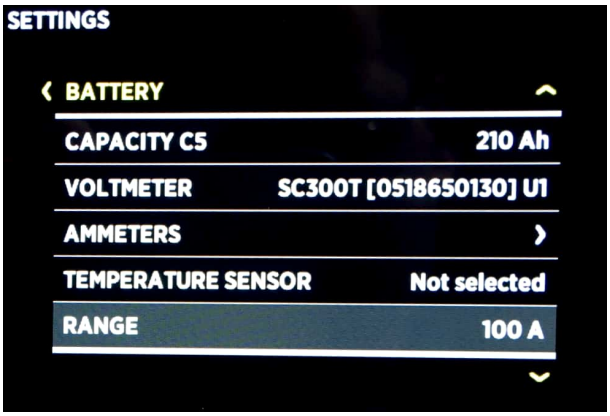
The following settings can be adjusted in this menu



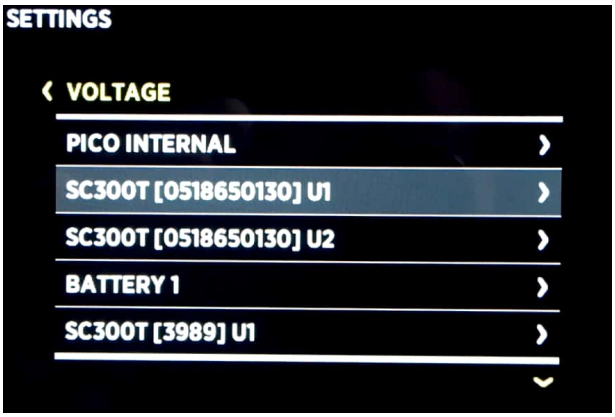
NAME -> optional change, not necessary for correct operation

TYPE -> set the relevant type of battery, this is important for a correct display
Consult the installer or supplier if necessary.

CAPACITY -> C20 must be entered for correct operation. If the manufacturer gives the C10 and C5 as its values and they are known, they can optionally also be entered.



VOLTMETER -> if it hasn't already been filled in, press the circle button and then Add new ->



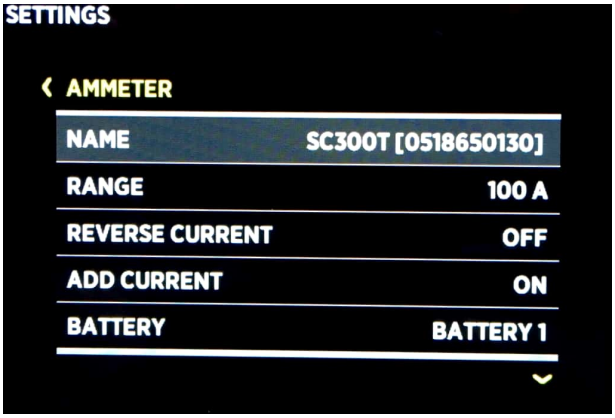
add and then choose SC300T […… ..] U1

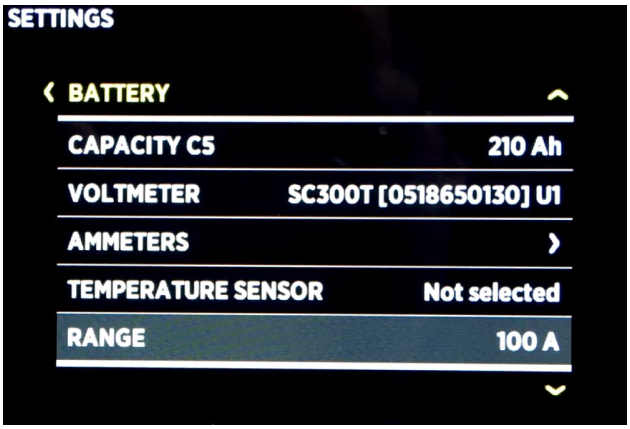
Add AMMETERS -> and choose the only one the system offers. SC300T [….]
The values within AMMETER must be set as follows:

NAME -> standard name of the shunt, does not need to be adjusted for correct operation
RANGE -> power scale that shows how many amperes the motor picks up, correct values:

- WaterWorld 4.0 -> 100A
- WaterWorld 7.5 -> 175A
- WaterWorld 10.0 -> 230A

REVERSECURRENT -> do not change unless the shunt is installed incorrectly
ADD CURRENT -> not applicable
BATTERY -> BATTERY 1





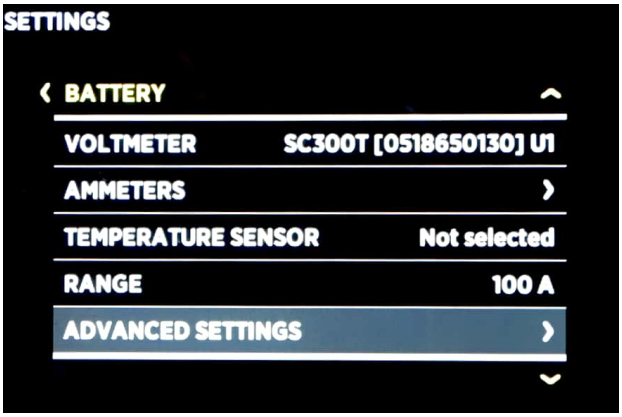
TEMPERATURE SENSOR -> not selected
This can be left open unless the supplied temperature sensor is to be used.

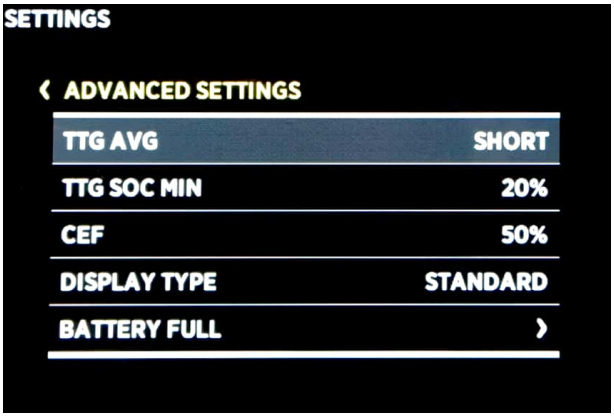
RANGE -> This setting has nothing to do with capacity, but is about how many amps the motor can request and how this is shown in the yellow bar in this screen [CURRENT]:

The correct value is:

WaterWorld 4.0 -> 100A
WaterWorld 7.5 -> 175A
WaterWorld 10.0 -> 230A

ADVANCED SETTINGS ->





TTG AVG -> This is set to average by default, but this setting must be set to short
Meaning: the speed at which the remaining sailing time is adjusted while sailing

TTG SOC MIN -> 20% means that the calculations assume that 20% power must remain in the batteries. This is an acceptable value with good lead and AGM batteries. If you want to stay on the safe side, select 25%. If you use lithium batteries, choose 0%.

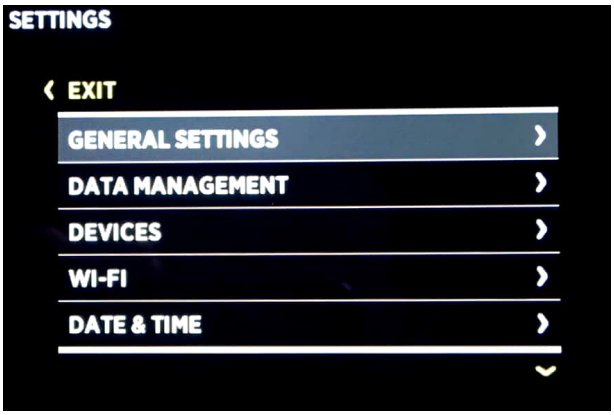
CEF -> This must be set to 100%

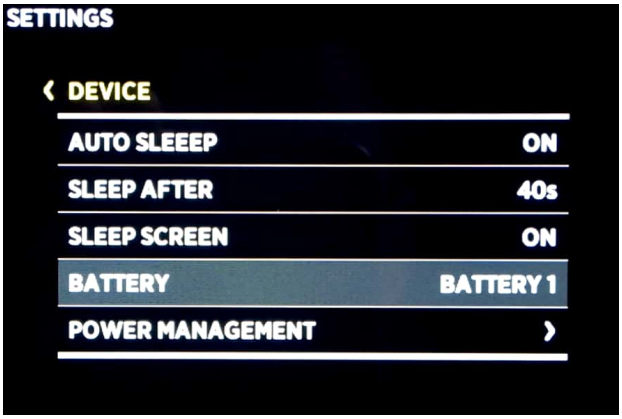
DISPLAY TYPE -> STANDARD this is correct

The setting of the battery and measuring shunt has now been completed correctly.

Setting the correct home screen

SETTINGS -> GENERAL SETTINGS -> DEVICE -> BATTERY 1





Updating Display

For some improvements to the display you may have to install an update

This can be done via the app that you can install on your tablet or smartphone, in the case of our special software this can only be done via an Android device.

If this update is recommended or preferred, we will send you a .APK file via WeTransfer. If you open this file on the device you wish to install the app on, the link will open the file and the app will be installed automatically.

The name of the app is ePico.

Connect via Wi-Fi with username and password

The default username and password are based on the serial number of your display. This serial number can be found in three ways:

- On the back of the screen
- On the side of the package
- In the menu> PICO SETTINGS> SYSTEM> System Info.

Example: if the serial number is 12345678 Then **the SSID (username)**: Pico5678

And the password: pico1234 (NOTE only lowercase letters)

The software on the screen is updated in the following steps:
1. Install the app on an Android phone or tablet as indicated above.
2. If the Wi-Fi function is switched off on the screen, switch it on. This is on by default and is therefore not necessary in most cases.
3. On your Android device, go to the Wi-Fi settings and connect to the PICO network. See above for username and password.
4. Then start the PICO app on your smartphone.
5. The app shows: "Status: SIMARINE device is connected".
6. Press the button Live view
7. The app now often indicates that more recent software is available, and if so, indicate that you want to install it. Other:
8. Press SETTINGS in the top right and then the bottom option: Firmware upgrade the screen in the boat then enters the upgrade mode.
9. Press the right round button on the PICO screen to confirm that you want to install the Firmware upgrade. This is also clearly indicated on the screen.
10. Wait until the screen indicates that the installation is ready.
11. Once this is the case, the system will reboot itself and is ready for use again.

Update is complete

Emergency display screen

If you have a malfunction that prevents normal connection to the screen, you can also try to update in the following way:

1. Disconnect the display from the power
2. Reconnect the screen and wait until the WaterWorld logo appears
3. As soon as the logo is visible, quickly hold down the < button (far left of the four buttons at the bottom)
4. A number of dots will appear under the logo and then Firmware upgrade mode will appear
5. Connect your phone or tablet to the PICO Wi-Fi network
6. Start the app
7. The app shows: "Status: SIMARINE device is not connected" now press the "connect" button
8. The app shows a pop-up with the text: Firmware upgrade version….
9. Press the "Upgrade" button and wait until the process is complete
10. The screen will restart and the update will be complete

Exchange engine controller

TAKE NOTE: This should only be done by your installer

1. Set the main switch to 0. Turn the ignition switch in the dashboard to ON → the display may not turn on. Turn the ignition switch to OFF again. You now know for sure that there is no voltage on the motor controller.
2. Disassemble the controller cover cap with two torx screws on the side or at the top depending on version.
3. Remove the orange plug on the engine controller (system known from Internet and telephone cable)
4. Remove the plug connection from the cooling fans
5. Loosen the two nuts (key 13) on the side through several turns and carefully pull the controller up. (Illustration 1)

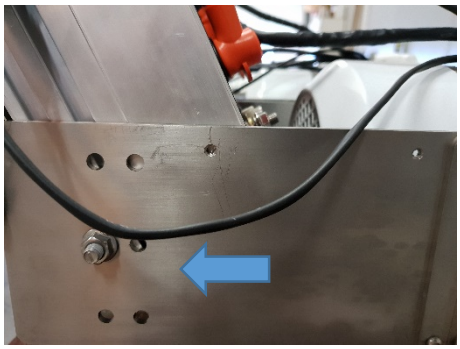


Image 1

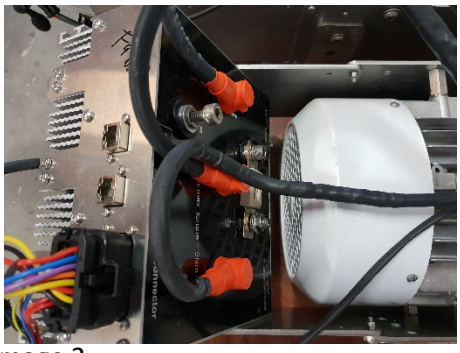


Image 2

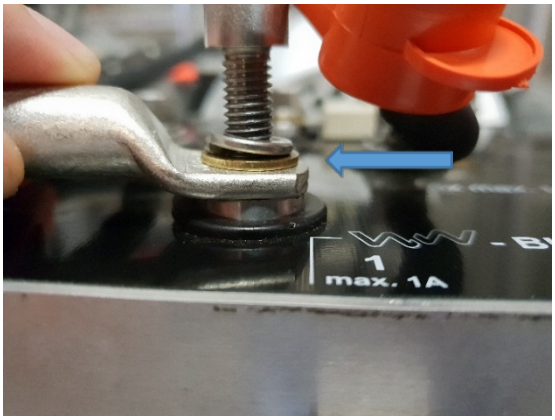
Tilt the controller so that you can easily reach the connections. ATTENTION: disconnect any cables that have traction! (Illustration 2).

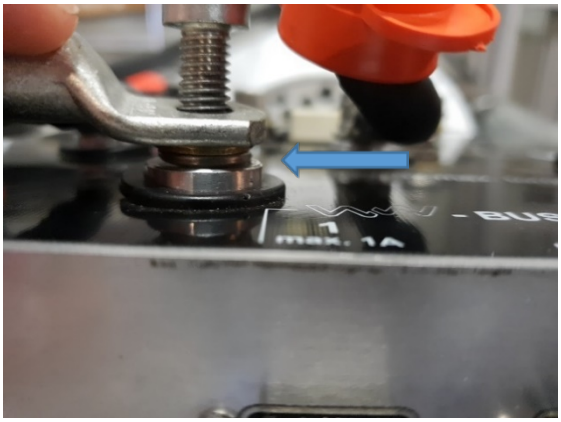
6. Loosen the plus cable (red, key 13). If necessary, fix the cable lug with a pair of pliers to prevent damage to the ceramic ANL fuse.
7. Unscrew the - cable (black, Allen key).
8. Mark the 3 black cables U, V, and W so that you know the order. Unscrew the cables after marking.

Positioning the new controller.

Important for all connections: always attach the cable directly to the connection, always put the rings above, never below the connection!

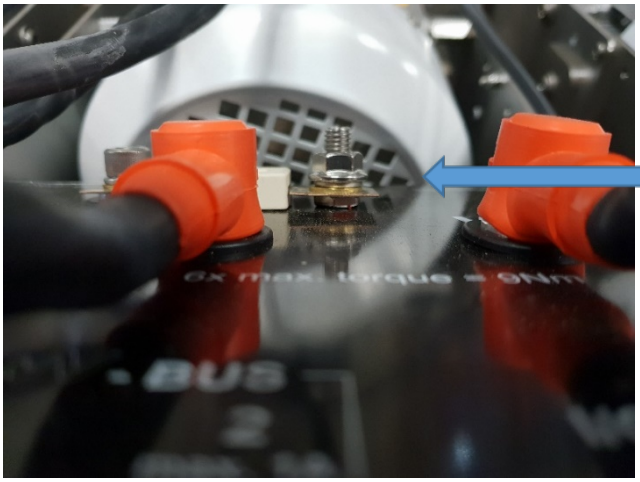
Mount the insulation caps over the cable lugs and bolts!





CORRECT ⟵ WRONG

Change the fuse on the controller. Loosen the bolts and place the fuse from the "old" controller. **All bolts must be tightened to 9NM. Tightening other than the specification can cause serious damage!**



Fuse

1. Slide the controller into the frame, tilt the controller upwards so that you can attach the cables. (Illustration 2)
2. Place the phase cables, place the marked cables on the connections U, V and W. Place the cable directly on the pole, put the ring on top, and tighten the bolt to 9NM.
3. With the plus pole and the minus pole you need to do the same, you also turn it on at 9 NM.
4. Lower the controller into the frame and tighten the side screws (key 13).
5. Plug the orange cable (known from the Internet and telephone cable) into the engine controller. There are two equal connections on the engine controller, no matter which one you use.
6. Turn the main switch to ON, set the ignition switch to ON and see if the fans on the controller start to run.
7. Finally, do a test run and attach the cover to the controller.

Note the serial number of the controller and pass it on to the customer and distributor