

Installation Instructions

For Electric Propulsion Systems
Thoosa 7000, Thoosa 9000, Thoosa 12000
Ver. 1.04

Installation Instructions

48 - 72VDC Electric Propulsion Systems

Thank you for purchasing your Electric Propulsion System for your boat from **NGC Marine Products, Inc.** The quality and reliability of the systems will give you years of peak performance with a minimum of maintenance.

Before Installing

Important Note: Even though 48-72VDC is not considered capable of causing death by electrocution, there are certain precautions to be taken when working and operating a system powered by high capacity batteries. Make absolutely sure that no conductive object, such as wires, cables, tools and other instruments made of metal or conductive material, touch both terminals of any battery or battery combinations at the same time. If necessary, cover opposite terminal(s) when working on a particular battery terminal. Failure to follow these guidelines, could lead to situations where severe injury would result. High capacity batteries are capable of delivering a tremendous amount of electrical current, which can cause serious burns, explosions and/or fire.

Touching bare battery terminals will cause a tingle or shock, although not lethal, the reaction to this sensation can cause indirect injuries.

If you are not comfortable with working on electrical systems, please contact a certified marine electrical installation technician.

Unpacking the System

Before proceeding with the installation, make sure that all parts are included ready to install.

The system should consist of:

Motor Assembly w/ standard 4 bolt shaft coupler for 30mm console shaft.

Mounting Rails

Controller

Key Lock (with cable)

Charger/DC-DC converter cable (if applicable)

Throttle w/ mounting hardware (depending on type). Throttle must be selected and ordered separately. The controller must be set up to match the throttle. With cable.

And if ordered, optional Battery Monitor. With cable.

If any part(s) are missing, please notify us as soon as possible.

Tools needed

All fasteners are metric. Most of the assembly can be accomplished with a set of Allen wrenches 3mm – 10mm, socket set or wrenches 10mm – 17mm, misc.

screwdrivers and tools for wire and cable work, including a heater for heat shrink tubing.

Installation

Always connect the batteries LAST. Batteries should be installed in such a way that they maintain the balance of the boat and as low as possible to make sure that the center of effort for the boat is not raised.

Since the location of the motor assembly is given, find a location for the controller that is close to the motor and still in a fairly dry and well-ventilated position.

Motor Assembly.

Attach the mounting rails as shown in the picture (Step 1). There is a little bit of play in the mounting rail slots, but the final alignment should be performed with the motor mount adjustments. Before selecting motor mounts, measure the distance that the propeller shaft is below (typical) the mounting level for the rails. The distance from the center of the motor coupling to the bottom of the rails is about 3.5". Find the approximate height of the engine mounts to use as 3.5" minus the distance measured for the propeller shaft level. Allow for some length for adjustment. Since all installations are different, the mounts are not included with the system.

Before attempting to align the motor assembly with the propeller shaft, make sure that the propeller shaft is suspended or otherwise supported in a position representing the best possible alignment of the shaft within the stuffing box and cutless bearing, or similar depending on type of installation.

Next step is to determine the location of the mounts such that the two flanges meet.

The mounts are installed and the motor assembly is placed such that the motor side coupling meets the prop shaft side coupling and the adjustments of the mounts are used to position the motor assembly such that both halves rotate perfectly if the bolts are installed. When this is accomplished, the bolts can be installed. Make sure that the propeller shaft coupling is secured to the shaft with several setscrews or better with screws and a pin through the coupling and shaft. Final fine-tuning can take place when the controller and batteries have been installed.

Controller

Remove the Controller cover (use a 3mm Allen wrench), the Controller mounting holes are indicated in the picture as 1, 2, 3 and 4.

Select a suitable spot close to the motor assembly to mount the Controller. A good place is a solid surface such as at least 1/2" wood or a similar surface such as fiberglass. The Controller should be in a place that is dry and with space around it for sufficient ventilation and so it does not get direct heat from motor.

The mounting surface can be vertical, horizontal or even at an angle. A vertical mounting will give the best circulation of air through the controller. Next cut the motor cables and attach lugs to the motor end. The cables should be as short as possible, but allow for some length to twist the cables into what is referred to as a “twisted pair”. Attach the motor cables to the terminals inside the controller. Then attach the cables to the motor. Depending on circumstances and location the battery cables can be attached to the terminal block first. An AWG 2 marine grade (or Boat Cable) will fit through the cable glands. For longer distances than 6 – 8’, heavier cable should be used. This means that the heavier cable will cover most of the distance, but the entry to the controller can only be AWG2. This is to minimize watts losses as well as voltage drop between controller and motor terminals. Voltage drop will lower the performance of the motor. The same is true for the battery cables.

Batteries

Please use sealed batteries, such as GEL or AGM type batteries, not only can they handle the charge and discharge cycling much better than flooded cell, they are also maintenance free and because they are sealed, there are no emissions of explosive gasses. Storage is also easier, they can places in any position, except for up side down.

It may take some time and consideration to find the ideal spot for the batteries. The more batteries installed, the harder it is. Make sure the balance of the boat is maintained. Place them in a position as low as possible in the boat and evenly distributed around the centerline. As an example, if the electric propulsion system replaces a diesel, the motor, controller and batteries weigh the same as the engine they replace, the entire system will usually fit into the original engine compartment. Example: A Thoosa 9000 powered by four 8G4D batteries replacing a Yanmar 3GM30 diesel.

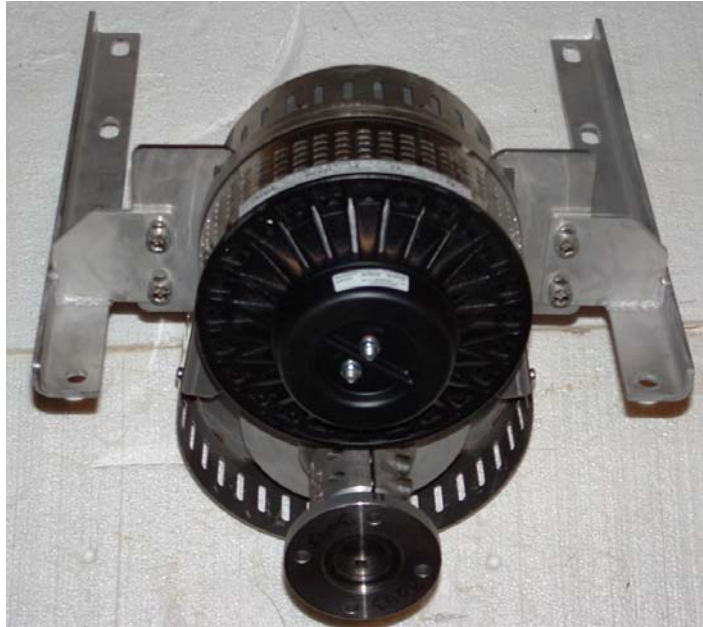
Place the batteries in such a way that the Main Negative and Main Positive terminals are located close together and that the jumpers that connect the remaining terminals are as short as possible. This can be a little bit of a puzzle, but it is worth the effort. Also keep the cables between the battery bank and the controller running close together in parallel. Cable ties could be used, as necessary. This keeps emissions of electrical disturbance to a minimum; a slight twist can pretty much eliminate it.

Cable preparation and installation.

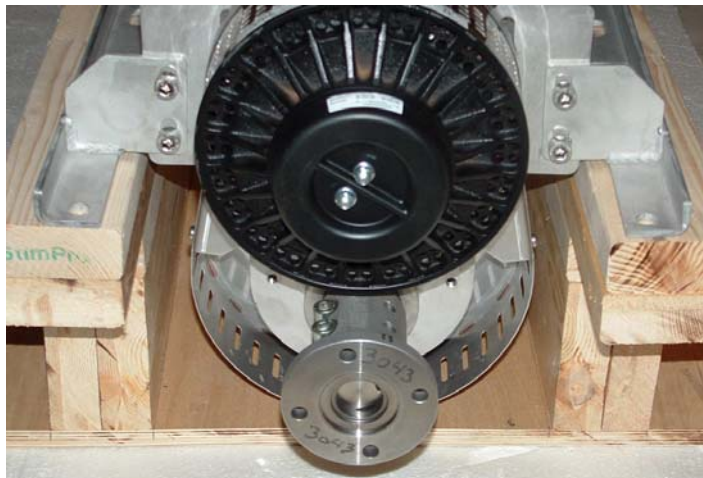
All cable terminations should be finished with either a suitable ring lug or a ferule. The lugs should have heat shrink tubing covering the barrel of the lug plus 1 – 2 inches of the cable end. Special conductive grease may be used to minimize corrosion, if deemed necessary.

Installation Quick Guide

Step 1. Mount the Rails



Step 2. Place assembly in Position (Mounts should already be placed)

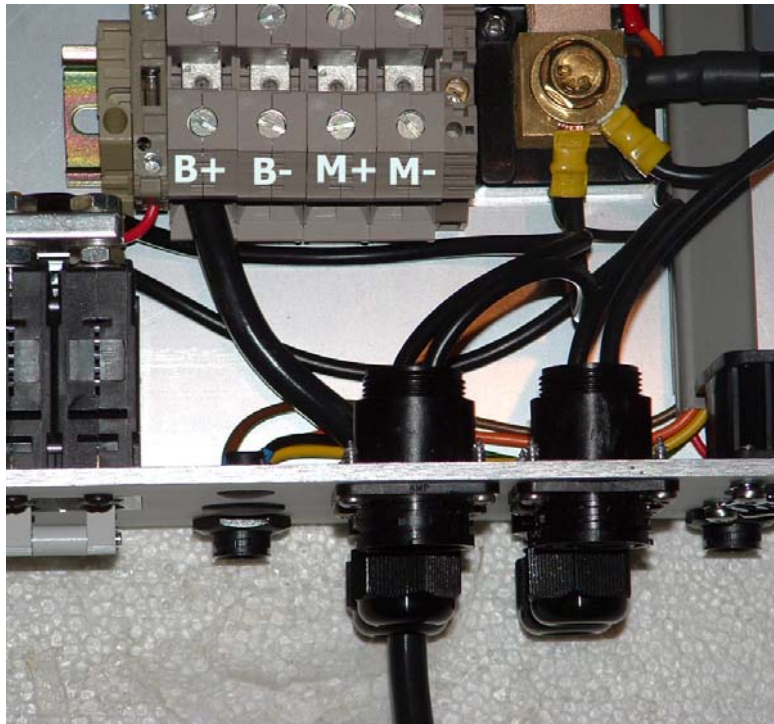


Step 3. Prepare controller. Remove cover (Thoosa 7000 & 9000)



Step 4. Connect Cables



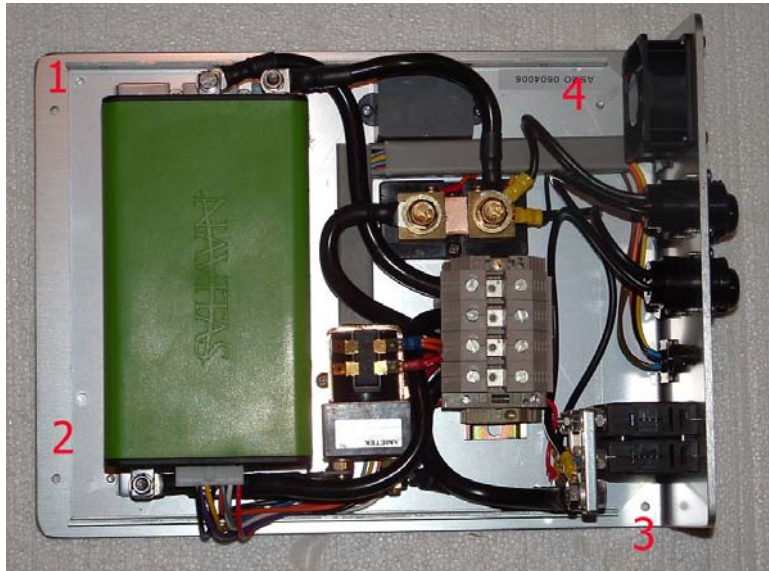


B+ : Battery PLUS
B- : Battery MINUS
M+ : Motor Terminal PLUS
M- : Motor Terminal MINUS

Step 5. Motor Terminals

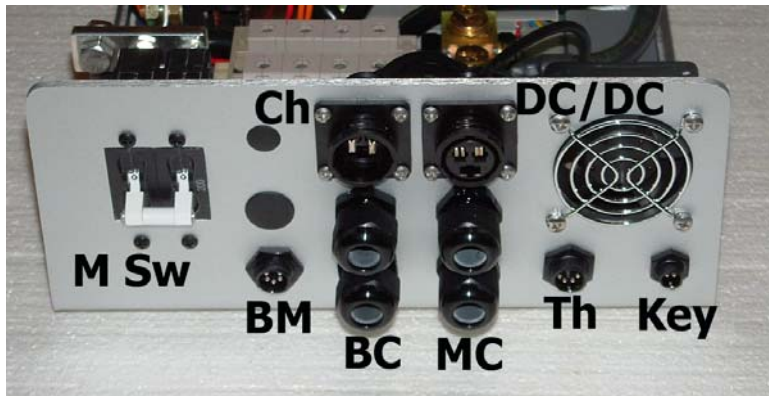


Step 6. Mount Controller



Use the chassis holes indicated by numbers 1 – 4, please do not over tighten, such that the rubber feet get compressed.

Step 7. Controller Inputs and Outputs



M Sw:	Main Power Switch (Circuit Breaker)
BM :	Battery Monitor (Link 10)
BC :	Battery Cable Glands
MC :	Motor Cable Glands
Th :	Throttle Connector
Key :	Key Lock Connector
Ch :	Charger plug, please use the included cables
DC/DC :	Attachment for DC/DC converter, please use included cables.

Step 8. Mount Throttle (see separate instructions), Key Switch and Battery Monitor (see Link 10 Manual).

Step 9. Happy Sailing form NGC Marine Products, Inc

Additional Notes:

These instructions cover the installation of single motor systems (one motor per propeller shaft), including dual systems for catamarans with a system places in each of the two hulls.

For the TWIN* system, that will always involve a generator-battery combination power source and an assortment of additional power devices, the instructions will typically be unique for each installation and cannot be prepared before an order has been placed. The installation for the Thoosa system itself is similar to the above instructions. These systems may also require additional instrumentation beyond what is mentioned above.

***TWIN systems are equipped with two motors driving a single shaft.**