

Installation manual
for a

Thoosa
inboard engine

BEFORE COMMENCING THE
INSTALLATION,
PLEASE READ THIS MANUAL.

ASMO Marine[©]

Index:

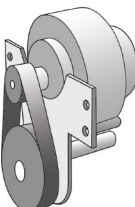
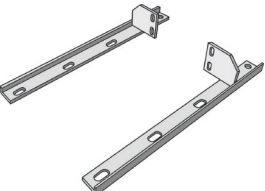

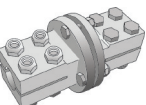
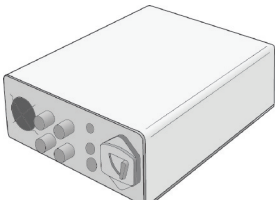
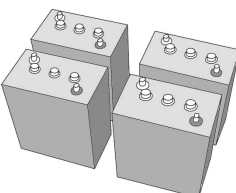
Thank you for choosing an electric inboard system from Asmo Marine.

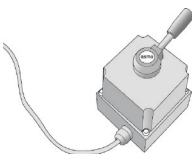

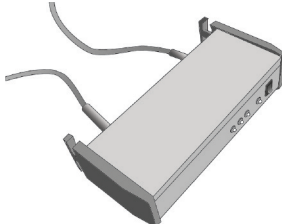
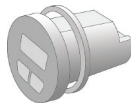
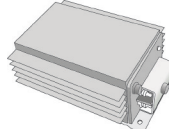
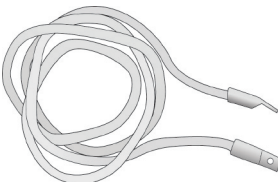
This manual is intended to familiarize you with how to install your Thoosa Inboard system. It is in your own interest to read it carefully and follow the instructions in it exactly. This will help you to avoid operating errors - and the resulting malfunctions.

A proper installation will ensure you the best performance of the motorsystem and a long lifetime.

- Index
- Elements of an inboard system
- Need to know - about the components
- Installation of the mechanical components
- Wiring of the components
- Maintenance
- Illustration of a possible solution

Elements of an electric inboard system:

	Engine and gearing	Included in a basic system delivery.
	Mounting legs	Included in a basic system delivery.
	Engine mounts Please note that you must provide these yourself.	<u>To be ordered separately.</u> This is not required but recommended.
	Shaft clutch	<u>To be ordered separately.</u> It is a necessary element but subject to boat requirements.
	Controller	Included in a basic system delivery.
	Batteries	<u>To be ordered separately.</u> It is a necessary element but subject to boat requirements.

	Throttle	Included in a basic system delivery.
	Key lock	Included in a basic system delivery.
	Charger	<u>To be ordered separately.</u> It is a necessary element but subject to boat requirements.
	Battery monitor	<u>To be ordered separately.</u> This is not required but recommended.
	DC - DC converter	<u>To be ordered separately.</u> This is not required but recommended.
	Cables	<u>To be ordered separately.</u> It is a necessary element but subject to boat requirements.

Need to know - about the components

This is a list of the basic installation information, concerning the installation of the electrical components in the Thoosa engine system.

Motor control box

The control box consists of the motor controller, relays, main switch and prewiring for easy installation.

The control box must be placed in a dry space with air circulation. Do not place the box in a small enclosed or air tight compartment. Lack of cooling reduces the efficiency of the motor controller and so of the whole motor system.

The motor control box must at all time be kept away from water.

Key lock

The key lock can be installed at any place in the boat.

Throttle

The throttle used in Asmo Marine's systems is an infinitely variable forward/reverse Throttle. The throttle is splash proof and can be installed in the boat, where it is most convenient.

Batteries

The size of battery bank is individual. There are two main factors to take into consideration - motoring requirement in terms of speed and cruising range.

- The current (Amps) consumption
The current consumption is subject to the characteristic of the boat (hull, length, displacement), the motor size and the speed when motoring.

- The required cruising time / range
The cruising time is a direct function of the current consumption.

Contact your local dealer, to facilitate calculating the battery size, corresponding to your boat, choice of motor and cruising requirements.

Battery selection

Choose the type of batteries, that correspond to the expected usage.

Starting batteries

Starting battery are good for providing a high current for a short period, but they are not suitable for discharging by more than 35% by regularly use, before recharging. Therefore Starting batteries are not suitable for a Thoosa system.

Semi-traction batteries

Traction batteries can be discharged by 80% on a regularly basis before being recharged, and still remaining a useful lifetime. For private boat owners we recommend semi-traction batteries.

Traction batteries

Traction batteries can be discharged by 80% on a regularly basis before being recharged, and have a considerable longer lifetime than semi-traction batteries (more discharge-charge cycles). As the traction batteries have a much higher purchase price, we recommend only the use of tractions batteries to hire operations with a cyclic operation. Private owners will not be able to benefit for the higher amount of discharge-charge cycles, as the batteries useful lifetime when not being discharge-charged on a daily basis. Therefore the lifetime of traction batteries will be subject to ageing and not discharging cycles.

Lead acid vs. gel batteries

Gel batteries are sealed batteries for additional safety and no maintenance.

The charger

When deciding on the onboard battery charger, there are two main factors to take into consideration

- The voltage of the battery bank
The voltage of the battery charger must correspond to the voltage of the battery bank.

- Charging time
The charging time of the battery bank is equivalent to the current of the charger.

With a battery charger of 15 A and a 150 Ah battery bank, the charging time is approx. for 12 hours for a fully discharged battery bank. Choose the size of the charger in respect to the above factors.

The charger must be placed in a dry space with air circulation.

Accessories

The control box has been prepared for easy installation of the most common used accessories. These accessories are not necessary for running the propulsion system, but eases the everyday life onboard the boat.

Battery monitor

We recommend installing a battery monitor, to keep track of the power situation. The battery monitor has a digital LED display, showing Volts, Amps, Amp-hours and time remaining.

DC-DC converter

Installing a DC-DC converter makes it possible to draw 12 Volt, from a 24 or 48 volt battery bank, for use for other onboard 12 volt applications. When installing a DC-DC converter, an additional battery bank for other onboard 12 Volt applications is no longer necessary.

Installation of the mechanical components:

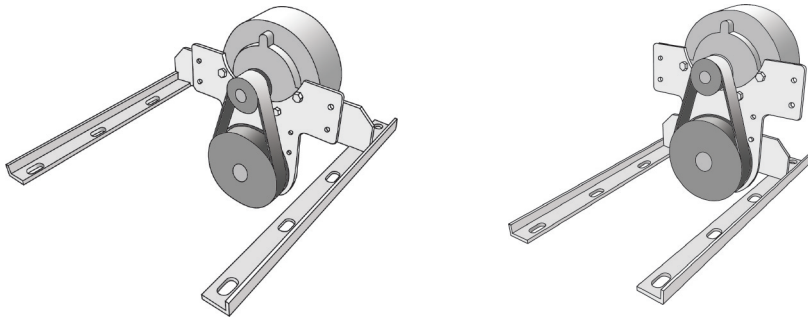
For the installation of the engine, the following four components are used:

- Console with motor and gearing
- Mounting rails
- Shaft clutch
- Engine mounts (recommended but not required)

The installation of the engine is made in three steps.

1. Attaching the mounting rails to the console

The mounting rails can be attached to the console in two positions. Choose the attaching point that fits the foundation of the boat.

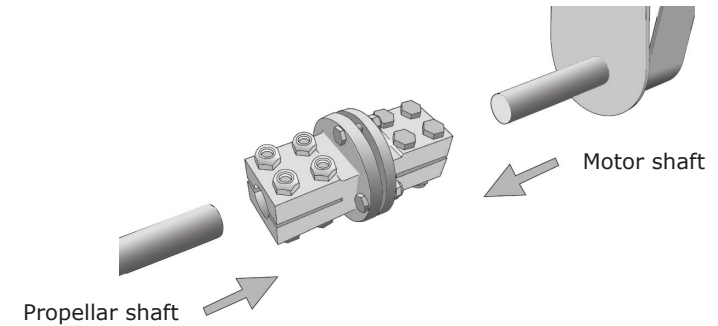


2. Attaching the mounting rails to the foundation

When mounting the console to the foundation, we recommend that rubber mounts are used. These will absorb the vibrations from the propeller, ensuring a quiet operation.

3. Attaching the motor shaft to the propeller shaft

Attach the motor shaft to the propeller shaft using two-shaft clutch. The motor and the propeller shaft must be in line, when making the coupling. The shaft clutch used at the motor shaft is \varnothing 30 mm. The shaft clutch for the propeller shaft depends on the \varnothing of the shaft.



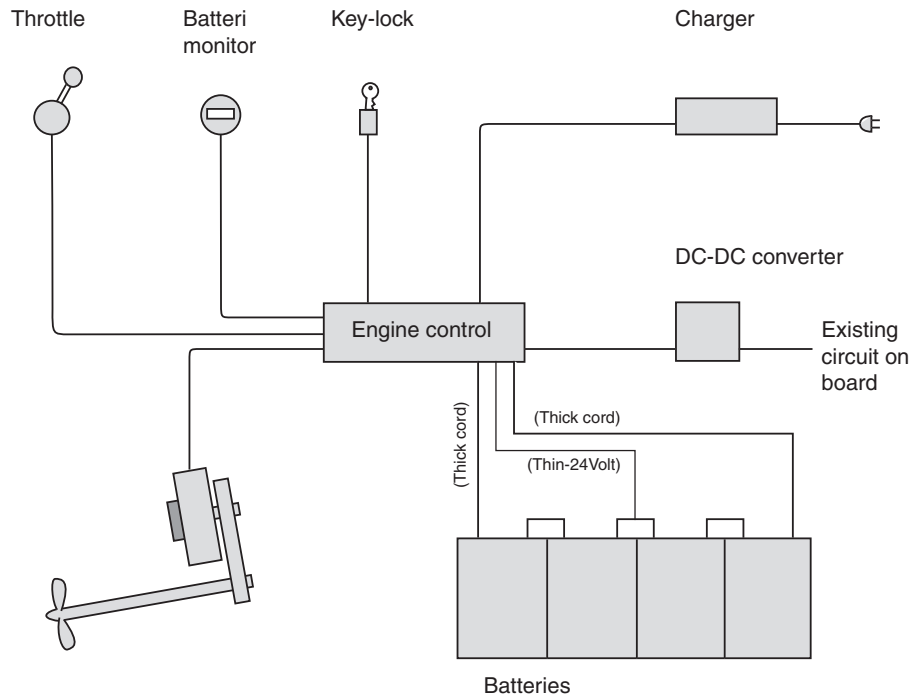
The motor must be installed in a space with air circulation.

If the engine room is smaller than the average space required for the installation of a similar diesel engine, then additional air circulation should be provided, by the installation of a fan.

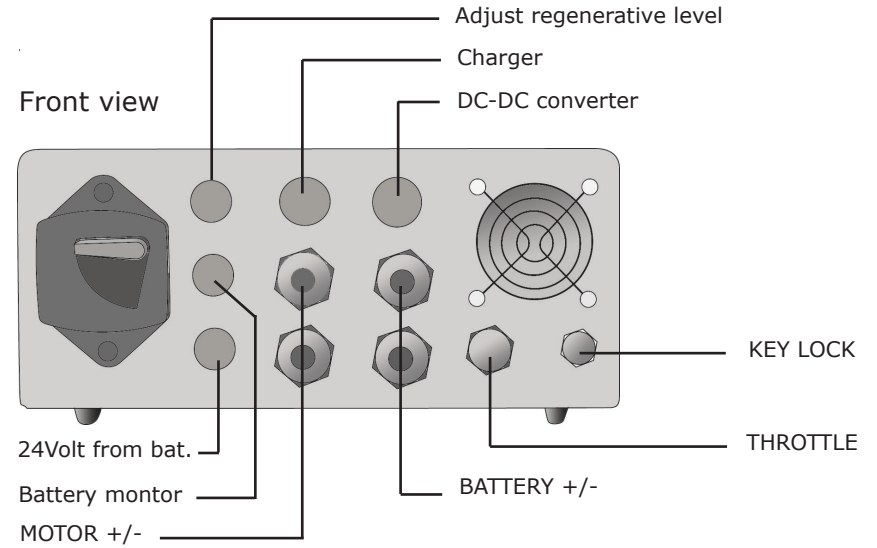
Wiring the components:

Following illustration shows which objects are connected where.

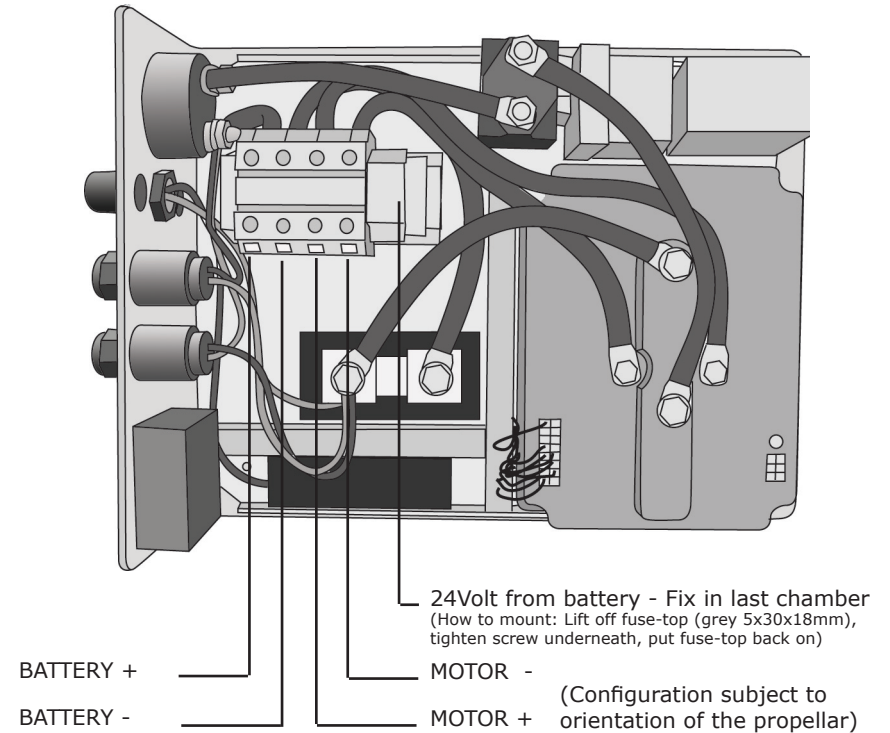
Note: the charger may be connected to the existing circuit on board if this has a land cable.



The motor control box



Top view



Main current cables

The main current cables must have a cross section of 35 mm².

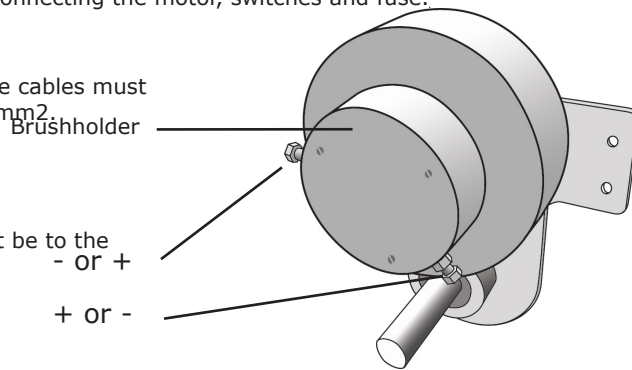
Cable terminals

Use cable terminals when connecting the motor, switches and fuse.

Engine

When wiring the engine, the cables must have a cross section of 35 mm².

The cable connections must be to the screws indicated.



Batteries

When wiring the batteries, the cables must have a cross section of 35 mm².

Key lock

The key lock is connected to the control box, by using the provided cable. Connection is indicated on the illustration on page 11.

Throttle

The throttle is connected to the control box, by using the provided cable. Connection is indicated on the illustration on page 11.

Charger

Connected directly to the batteries. See separate manual.

Battery monitor

Installing the Battery Monitor: See separate manual.

Installing the Prescaler: See separate manual.

Installing the Shunt: See separate manual.

Make sure all other equipment than the batteries are connected to the lead side of the shunt!

DC-DC converter

Connect ` + ` to the batteries.

Connect ` - ` on the lead side of the shunt.

Maintenance:

Please follow below instructions for maintenance, to ensure the

Brushes

The brushes are placed in a brush holder on the back of the motor. The brushes have a lifetime of 5000 hours of normal use.

We recommend, that the brushes are checked upon each sail season.

Replacing the brushes are made in 5 steps (see illu. p.12)

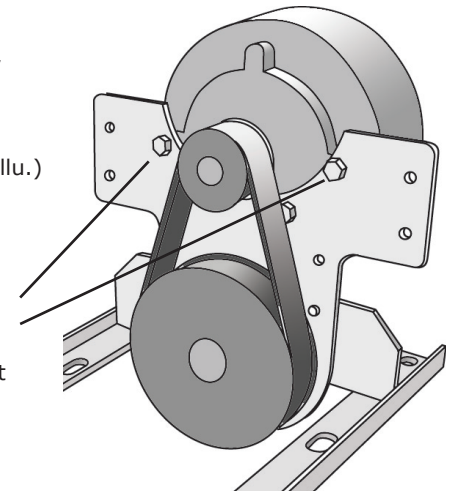
1. Turn the main switch on the control box off.
2. Disconnect the wires to the motor control box (indicated by the +/-).
3. Release the brush holder, by loosening the three screws at the back of the brush holder (see illu.).
4. Insert the new brush holder and tighten the screws.
5. Reconnect the wires to the motor control box.

Belt

The belt used in the reduction gear has a life time of 8000 hours. Nevertheless, we recommend, that the belt is replaced every three years, due to wear and tear from the nautic environment.

Replacing the belt is made in 6 steps (see illu.)

1. Turn the main switch on the control box off.
2. Remove the safety cover.
3. Loosen the screws on the front of the console.
4. Replace the belt.
5. Lift the motor until the belt is tight and fasten the screws.
6. Replace the safety cover.



Batteries

If the batteries are not to be used for a period of 3 months or more, please follow below maintenance instructions. This will secure a long lifetime of your batteries.

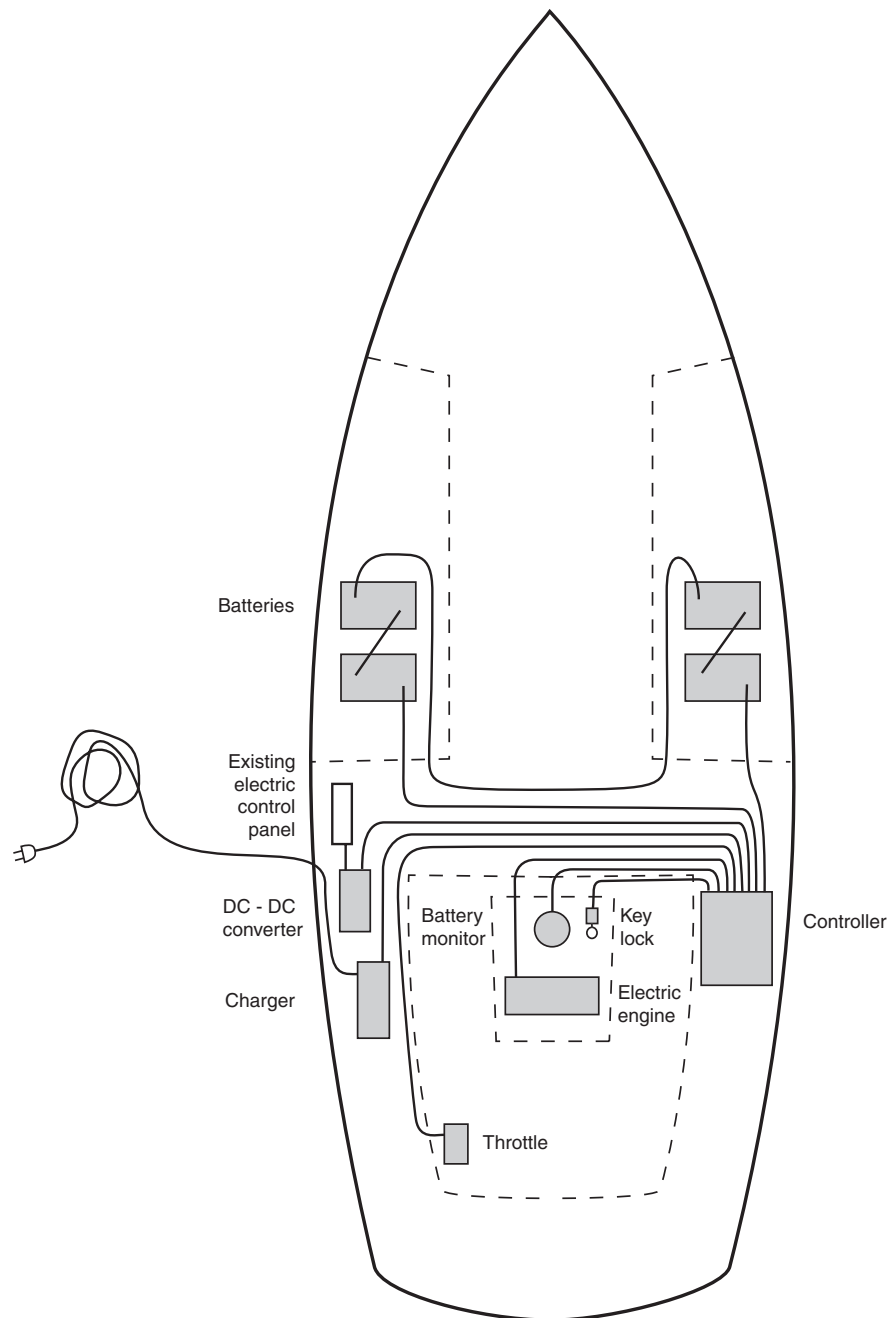
Lead acid batteries

- Add water to the recommended level given by the battery producer
- Make sure all batteries are fully charged
- Disconnect all wires from the batteries

Gel batteries

- Make sure all batteries are fully charged
- Disconnect all wires from the batteries

Illustration of a possible location of the elements:



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