Owner's Manual

thrustems

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1. Introductory Notes and Disclaimer

Thank you for selecting a ThrustEMS stern thruster. We started the ThrustEMS project with one clear objective in mind. That is, to design the ultimate Electric Maneuvering System (hence the abbreviation).

Correct installation and operation of the thruster is essential for the optimal and safe usage of the ThrustEMS product range. These instructions are supplementary to the Owner's Manual and refer to the installation of stern thursters.

Please make sure that you are well aware of the parts and of the functioning of the thruster and adhere to the instructions here and in the Owner's Manual.

Please consult with the Owner's Manual for a more detailed explanation of electric motor and electrical wiring installation, thruster panel functions, maintanenance tips, trouble shooting and warranty.

Symbols Used

The following symbols will accompany the written instructions:

Indicates a warning against risks of personal injury and / or serious damage to equipment.

Indicates information which will assist you in gaining the optimum benefit from your thruster and enable you to care more effectively for your thruster.

Disclaimer

This manual is to be used by adequately qualified personnel who are familiar with the technical details in the installation manual (e.g. reading a wiring diagram) and thoroughly understand the opretaion and safety requirements of the thruster. The instructions in this manual are not exhaustive and are to be used only as a supplementary guidance to suitably trained personnel. Thus, Elprom EMS assumes no liability for any inaccuracies or omissions it may contain.

In addition, the information in this manual is up-to-date at the time of printing. Yet, it may be subject to change without notice especially due to our desire to constantly improve and develop our product range. Therefore, Elprom EMS assumes no liability for any discrepancies between the actual product and the manual.

CE Approvals

To obtain CE approval certificates please contact Elprom EMS.

Precautionary and Safety Notices

Crew members' safety measures must always be observed when installing and operating the thruster.

DC Motor Related

- The DC motor as well as all electrical components must be kept away from water at all times.
- The electric motor generates carbon dust as well as heat so that we recommend installation in a well-ventilated compartment which is not used for storage.
- Although all ThrustEMS thrusters are equipped with a thermal switch, it is advisable not to place flammable objects in the electric motor compartment due to the high temperatures that may be generated.
- To avoid overheating of the DC motor operation time must not exceed the maximum time specified.

Electrical

- The ThrustEMS product range utilizes powerful DC motors. It is highly advisable to use a decent cable size and batteries with high cranking capacity to feed the thruster (see corresponding chapter). Using cable size and battery of a size smaller than recommended may compromise performance and lead to serious overheating.
- Always switch off the power prior to installation. In the case of maintenance or when the equipment is not used for long periods, disconnect the battery wires and switch off the main current.

General

- ThrustEMS electric thrusters are "on load" starting devices, so they must be operated only when immersed in water. Running the thruster out of the water can cause severe damages to the electric motor and other thruster components and thus render the warranty invalid.
- The thrusters should not be operated in the vicinity of swimmers due to the significant suction being generated.
- Compatibility of the whole system is only guaranteed when ThrustEMS spare parts and accessories are used.
- Never interfere with any moving parts, nor touch the the electric motor when in operation.

2. Positioning of the stern tunnel

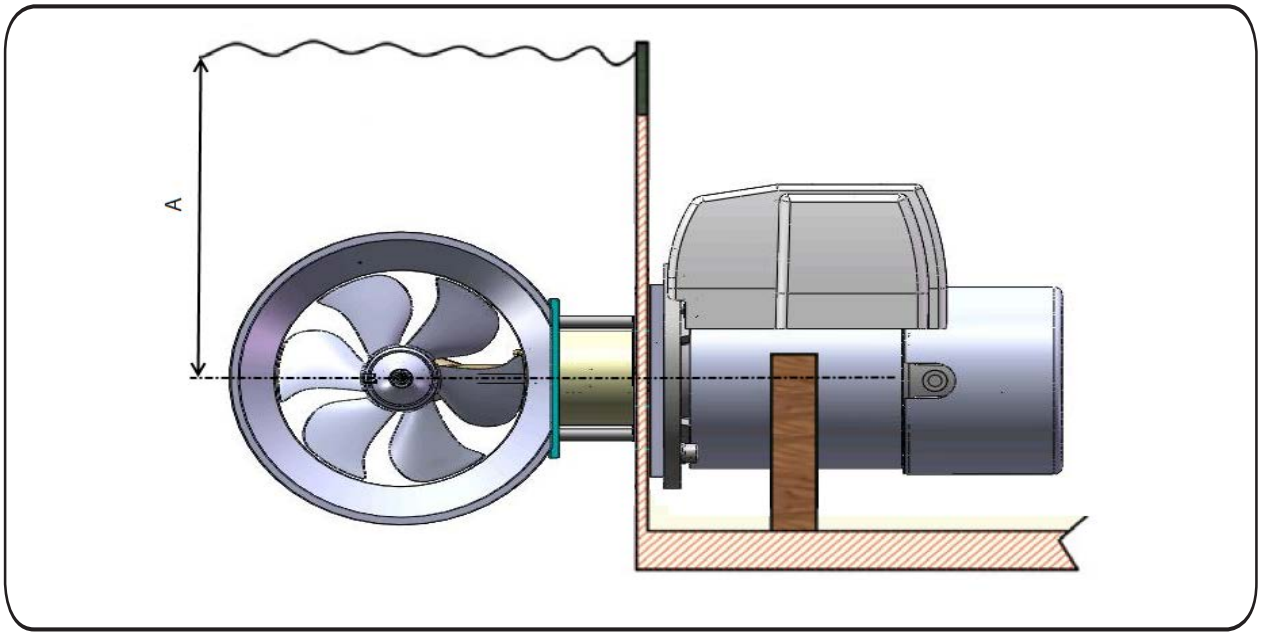


Figure 1

- Refer to Figure 1 to help determine the location for the stern thruster. Allow for a minimum distance from waterline (A) for each thruster model as suggested in Table 1.

⚠ Before you make any cut-outs in the transom, please consider the following.

▷ Make sure that the water flow from the thruster is not obstructed by stern drive, trim tabs or other moving parts as this will reduce the thrust significantly. The propeller tunnel may be positioned off centre on the transom if required by space restrictions.

▷ Make sure the propeller tunnel does not interfere with the engine's exhaust outlet pipe or allow exhaust to be sucked into the tunnel. The efficiency is reduced considerably if exhaust comes into the tunnel.

▷ Make sure that it is possible to install the motor support which is part of the stern installation kit. Such a device is necessary to reduce stress on the thruster components and tunnel/ transom.

Note: The drawings here provide a general overview of ThrustEMS stern thruster range and its components. Differences may exist between models (e.g. twin propeller system) or arise due to product innovation (e.g. difference in stern tunnel type).

Table 1

Stern Thruster Model		A
Standard Series	Performance Series	(mm)
TS30 12V/125S	TP30 12V/125S	188
TS40 12V/125S	TP40 12V/125S	188
TS55 12V/150S	TP55 12V/150S	225
TS60 12V/150T	TP60 12V/150T	225
TS60 12V/185S	TP60 12V/185S	278
TS80 12V,24V/185S	TP80 12V,24V/185S	278
TS90 12V,24V/185T	TP90 12V,24V/185T	278
TS100 12V,24V/185T	TP100 12V,24V/185T	278
TS120 24V/185T	TP120 24V/185T	278
TS125 24V/250S	TP125 24V/250S	375
TS150 24V/250S	TP150 24V/250S	375
TS175 24V/250S	TP175 24V/250S	375
TS200 24V/250S	TP200 24V/250S	375
TS230 24V/300S	TP230 24V/300S	450
TS265 24V/300S	TP265 24V/300S	450

3. Installation of stern thruster

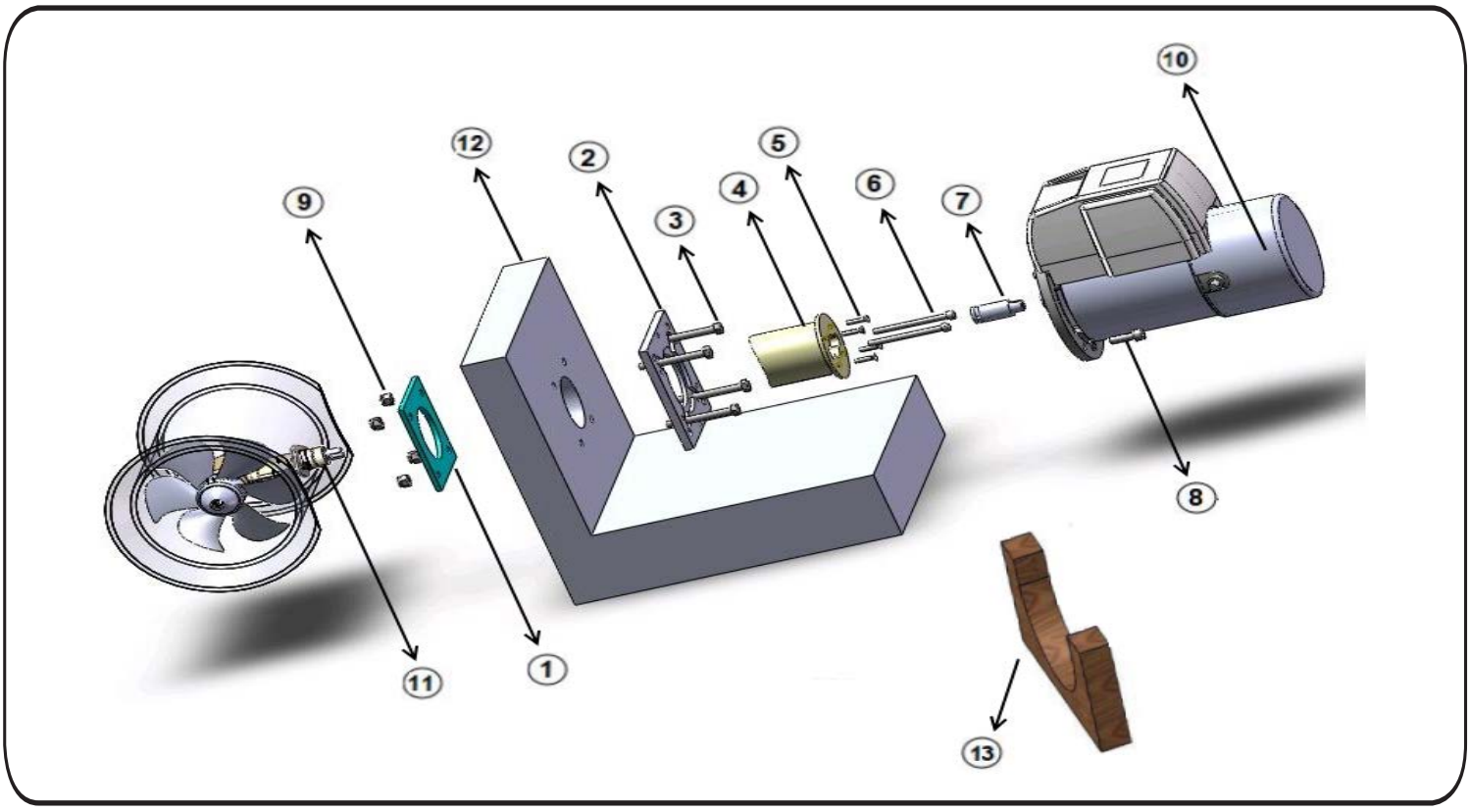


Figure 2

All wet parts in the tunnel must be covered with bottom coating. Please ensure that the installation has no leaks when the boat is set afloat. Do not paint the zinc anode or its contact area.

1. Once the position is determined, hold the propeller tunnel horizontally on the outside of the transom (12) and mark the cut-out for the bracket (4) and the holes for the attachment bolts (3). Use the support plate (1) as a template. Cut the hole for the bracket (4), in the transom, and drill the holes for the bolts (3).

2. Seal the cut-out section and the bolt holes with two-component primer or equivalent sealer to prevent water from entering into the transom.

3. Join bracket (4) to bracket (2) using bolts (5).

4. Carefully apply suitable marine sealant on the joined brackets from step 3. above and support plate (1). Note that the support plate (1) comes with a number of O-rings. Guide the joined brackets, from within, through the transom.

5. Apply sealant to support plate (1) and bolts (3). Place the plate on the outside of the transom. Fit the attachment bolts (3), from within the transom, through the joined brackets from step 3. above and transom. Hence, support plate (1) is on the outside of the transom and the joined brackets from step step 3. are on the inside of the transom. Fasten the bolts thoroughly using lock-nuts (9).

6. Buff the propeller tunnel's interior and exterior and clean well with degreaser. Paint the tunnel with primer and antifouling paint.

7. Carefully apply sealant to the gear housing (11) before fitting the gear housing to the joined brackets. It is advisable to put sealant wherever leakage might occur to prevent any kind of leakage.

8. Guide the gear housing from within the tunnel through the hole. Please note that no propeller(s) should be fitted during this process.

9. Guide the two attatchment bolts (6), from within the transom, through the joined brackets and fasten gear housing and propeller tunnel to the transom.

10. Mount the metal coupling (7) to the shaft of the gearleg (11).

11. Fit the motor (10) to bracket (2) and screw the units together using bolts (8) which are supplied with washers. Component (13) is used to support the weight of the motor and to reduce tension on the transom and metal bracket. Make sure you place support (13) under the motor body, but do not place it under the fan guard of the motor.

4. Fitting the Propeller - All Models

Note: All propellers are spline driven.

- For Standard and Performance Series 30 and 40 kgf (TS30, TS40 and TP30, TP40):

  Assemble propeller in the following order: washer, propeller, washer and nut-lock onto propeller shaft (see Figure 3).

  The anode is already installed!

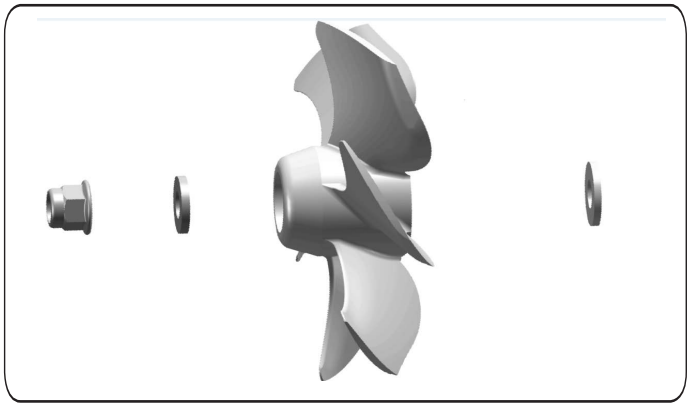


Figure 3

- For Standard and Performance Series 55, 60 and 80 kgf (TS55, TS60, TS80,TP55, TP60 and TP80):

  Assemble anode kit and propeller in the following order: propeller, washer, nut-lock, anode and anode screw onto propeller shaft (see Figure 4).

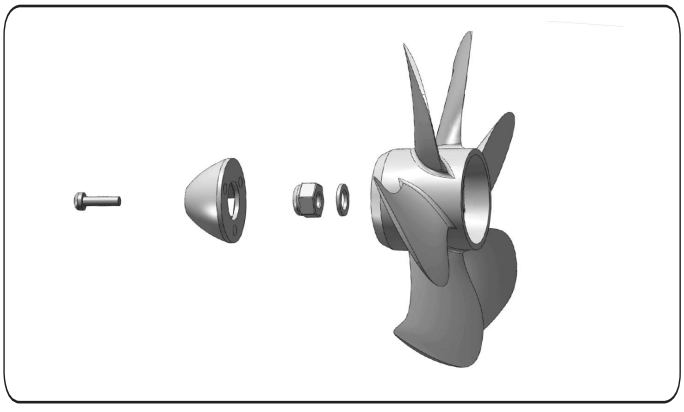


Figure 4

- For Standard and Performance Series 60 (twin prop), 90, 100, 120 kgf (TS60, TS90, TS100, TS120, TP60, TP90, TP100 and TP120):

  Assemble anode kit and propeller in the following order: washer, propeller, washer, nut-lock, anode and anode screw from one side and propeller, washer, nut-lock, anode and anode screw from the other side (see Figure 5).

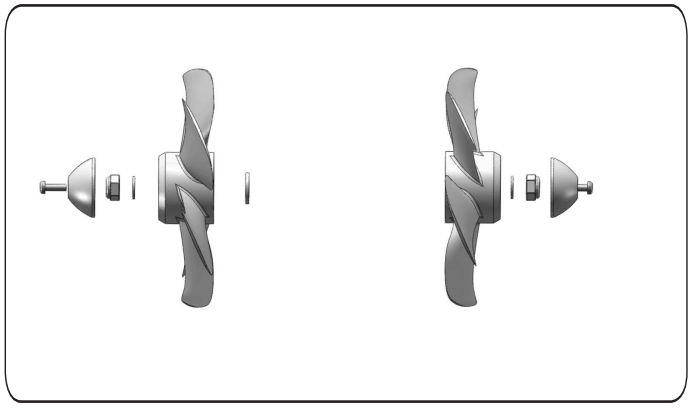


Figure 5

- Make sure the propeller is centred in the tunnel and that propeller can rotate freely (Figure 6).

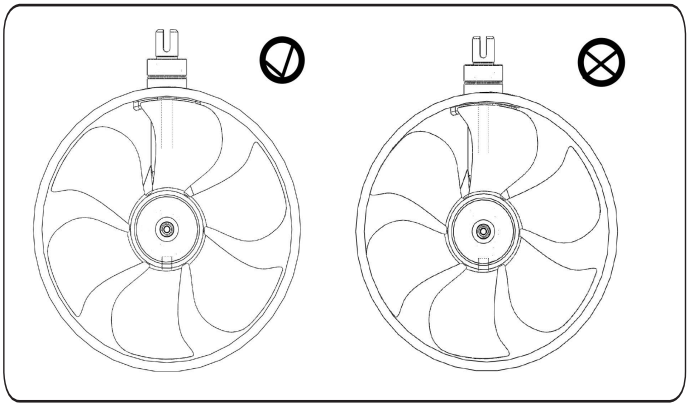


Figure 6

5. Electrical Wiring Installation

- As shown on Figure 7, the positive cable from the battery must be connected to the motor where the “+” sign is indicated. The negative cable from the battery must be connected to the motor where the “-” sign is indicated.

Note: When needed, approprite crimp fittings must be used to suit the motor terminal ends.

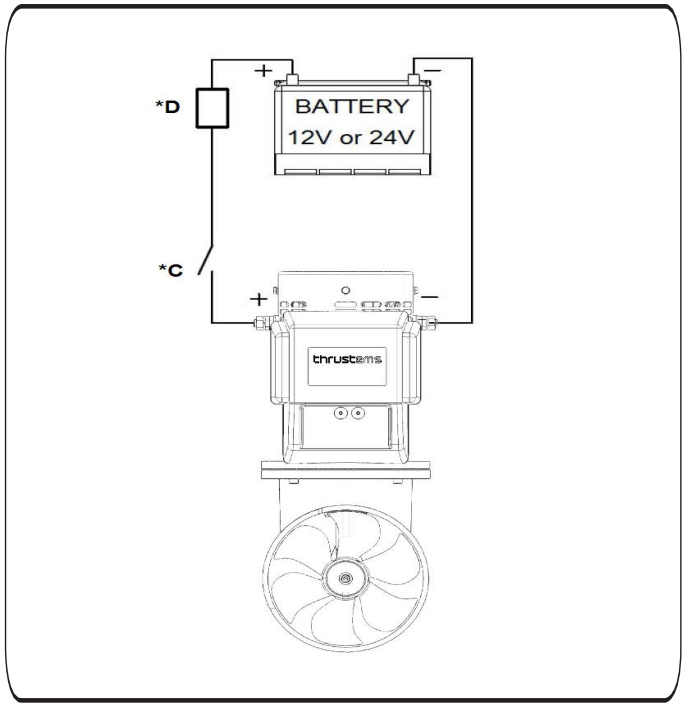


Figure 7

- To prevent loose connections, the terminals to the motor must be fastened tightly using two spanners. One will hold the inner nut, while the other will tighten the outer nut (Figure 8).

- We recommend the installation of a main switch in the main positive lead (denoted by *C in Figure 7) which will allow the power to the thruster to be turned off when not on board or in emergencies. This should be installed in an accessible place as close as possible to the energy source.

- It is also advisable to install a fuse in the positive lead (denoted by *D in Figure 7) to protect against short circuiting of the main cables. The fuse should of the “slow blow” type and sized to take the amperage draw of Standard Series thrusters for at least 5 minutes and of Performance Series Thrusters for about 12 minutes. Select only high-quality fuses to ensure less voltage drop.

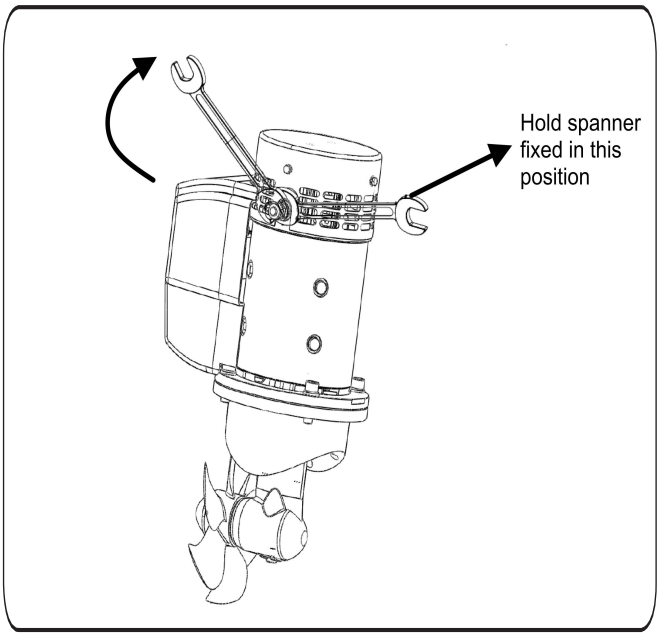


Figure 8

- Pease refer to the tables on the next two pages to see recommended batteries and cable sizes and lengths. These represent only rough guidelines. Entrust skilled personnel for the ultimate choice of batteries and cables. In general, avoid a voltage drop of more than 10% when selecting the correct size and length of the cable.

Measure the shortest and most direct route possible between the battery (batteries) and the electric motor. Allow for both “positive” and “negative” cables.

Excessive voltage drop will lead to premature wearing of thruster solenoid and brushes of the DC motor. Please pay attention to the quality, capacity and condition of the thruster batteries as well as cable connections.

ThrustEMS control panels operate with voltage input of 10.5 28 DC. Make sure the supplied voltage to the thruster is higher than 10.5 at all times.

5. Electrical Wiring Installation

Standard Stern Series Battery & Cable Chart

Model Size	System Voltage	Nominal current draw	Min. battery CCA	Rec. fuse	Cross section (mm2)	<7m total + & -		7-14m total + & -		15-21m total + & -		22-28m total + & -		28-35m total + & -		36-45m total + & -	
						Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.
TS30 12V/125S	12V	250A	DIN:200 SAE: 380 EN: 330	ANL 150	mm2	35	50	50	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95
TS40 12V/125S	12V	304A	DIN:300 SAE: 570 EN: 520	ANL 250	mm2	35	50	70	95	95	120	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120
TS55 12V/150S	12V	380A	DIN:350 SAE: 665 EN: 600	ANL 325	mm2	50	50	70	95	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TS60 12V/150T	12V	380A	DIN:350 SAE: 665 EN: 600	ANL 325	mm2	50	50	70	95	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TS60 12V/185S	12V	375A	DIN:350 SAE: 665 EN: 600	ANL 325	mm2	50	50	70	95	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TS80 12V/185S	12V	550A	DIN: 550 SAE: 1045 EN: 940	ANL 400	mm2	70	70	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120	NA		
TS80 24V/185S	24V	272A	DIN:300 SAE:570 EN: 520	ANL 250	mm2	35	35	35	50	50	70	70	95	95	120	120	2 x 95
TS90 12V/185T	12V	650A	DIN: 700 SAE: 1330 EN: 1170	ANL 500	mm2	70	70	95	120	120	2 x 95	2 x 95	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TS90 24V/185T	24V	320A	DIN:400 SAE: 760 EN: 680	ANL 250	mm2	50	50	50	70	70	95	95	120	120	2 x 95	2 x 95	2 x 120
TS100 12V/185T	12V	731A	DIN: 750 SAE: 1425 EN: 1320	ANL 500	mm2	95	95	2 x 70	2 x 95	2 x 120	NA						
TS100 24V/185T	24V	347A	DIN:400 SAE: 760 EN: 680	ANL 325	mm2	50	50	50	70	70	95	95	120	120	2 x 70	2 x 95	2 x 120
TS120 24V/185T	24V	519A	DIN: 550 SAE: 1045 EN: 940	ANL 400	mm2	70	70	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120	NA		
TS125 24V/250S	24V	320A	DIN:400 SAE: 760 EN: 680	ANL 250	mm2	50	50	50	70	70	95	95	120	120	2 x 95	2 x 95	2 x 120
TS150 24V/250S	24V	347A	DIN:400 SAE: 760 EN: 680	ANL 325	mm2	50	50	50	70	70	95	95	120	120	2 x 70	2 x 95	2 x 120
TS175 24V/250S	24V	519A	DIN: 550 SAE: 1045 EN: 940	ANL 400	mm2	70	70	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120	NA		
TS200 24V/250S	24V	620A	DIN: 700 SAE: 1330 EN: 1170	ANL 500	mm2	70	70	95	120	120	2 x 95	2 x 95	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TS230 24V/300S	24V	620A	DIN: 700 SAE: 1330 EN: 1170	ANL 500	mm2	70	70	95	120	120	2 x 95	2 x 95	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TS265 24V/300S	24V	750A	DIN: 750 SAE: 1425 EN: 1320	ANL 500	mm2	95	95	2 x 70	2 x 95	2 x 120	NA						

5. Electrical Wiring Installation

Performance Stern Series Battery & Cable Chart

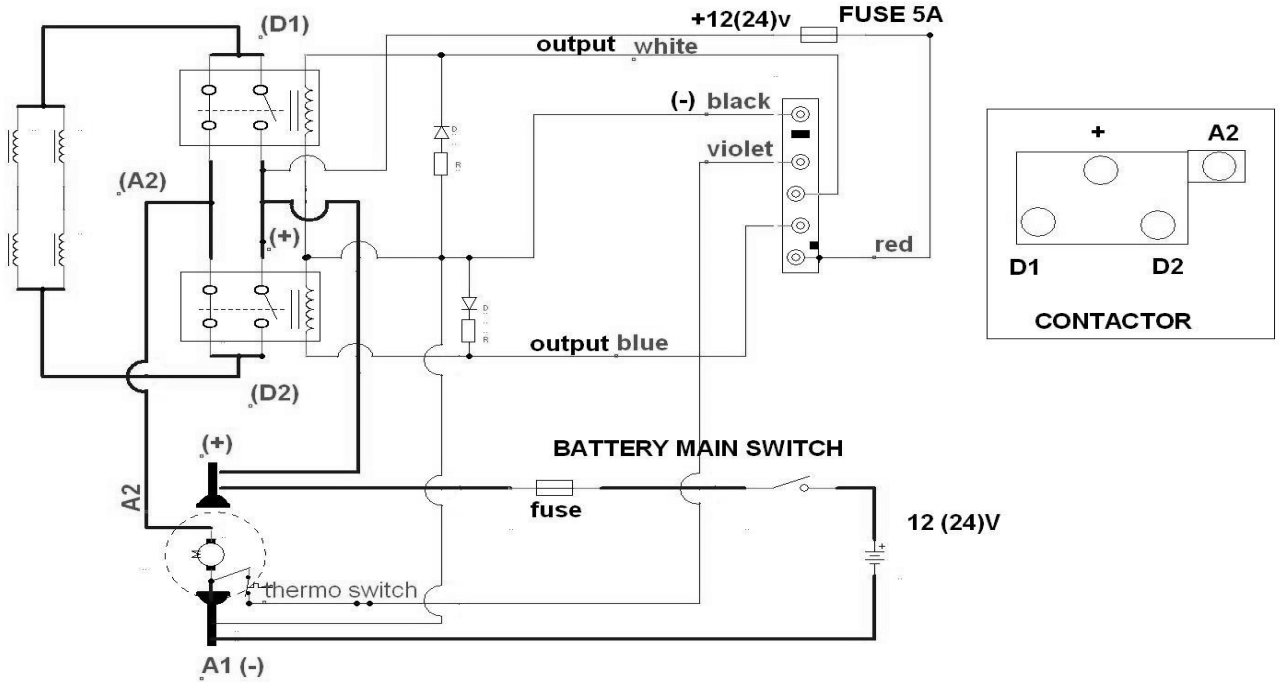
Model Size	System Voltage	Nominal current draw	Min. battery CCA	Rec. fuse	Cross section (mm2)	<7m total + & -		7-14m total + & -		15-21m total + & -		22-28m total + & -		28-35m total + & -		36-45m total + & -	
						Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.
TP30 12V/125S	12V	235A	DIN:200 SAE: 380 EN: 330	ANL 150	mm2	35	50	50	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95
TP40 12V/125S	12V	304A	DIN:300 SAE: 570 EN: 520	ANL 250	mm2	35	50	70	95	95	120	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120
TP55 12V/150S	12V	375A	DIN:350 SAE: 665 EN: 600	ANL 325	mm2	50	50	70	95	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TP60 12V/150T	12V	375A	DIN:350 SAE: 665 EN: 600	ANL 325	mm2	50	50	70	95	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TP60 12V/185S	12V	375A	DIN:350 SAE: 665 EN: 600	ANL 325	mm2	50	50	70	95	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120
TP80 12V/185S	12V	520A	DIN: 550 SAE: 1045 EN: 940	ANL 400	mm2	70	70	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120	NA		
TP80 24V/185S	24V	240A	DIN:200 SAE: 380 EN: 330	ANL 150	mm2	35	50	50	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95
TP90 12V/185T	12V	520A	DIN: 550 SAE: 1045 EN: 940	ANL 400	mm2	70	70	120	2 x 70	2 x 95	2 x 95	2 x 120	2 x 120	2 x 120	NA		
TP90 24V/185T	24V	240A	DIN:200 SAE: 380 EN: 330	ANL 150	mm2	35	50	50	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95
TP100 12V/185T	12V	720A	DIN: 750 SAE: 1425 EN: 1320	ANL 500	mm2	95	95	2 x 70	2 x 95	2 x 120	NA						
TP100 24V/185T	24V	347A	DIN:400 SAE: 760 EN: 680	ANL 325	mm2	50	50	50	70	70	95	95	120	120	2 x 70	2 x 95	2 x 95
TP120 24V/185T	24V	500A	DIN:560 SAE: 1330 EN: 940	ANL 400	mm2	70	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120
TP125 24V/250S	24V	240A	DIN:200 SAE: 380 EN: 330	ANL 150	mm2	35	50	50	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95
TP150 24V/250S	24V	347A	DIN:400 SAE: 760 EN: 680	ANL 325	mm2	50	50	50	70	70	95	95	120	120	2 x 70	2 x 95	2 x 95
TP175 24V/250S	24V	500A	DIN:560 SAE: 1330 EN: 940	ANL 400	mm2	70	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120
TP200 24V/250S	24V	755A	DIN: 750 SAE: 1425 EN: 1320	ANL 500	mm2	95	95	2 x 70	2 x 95	2 x 120	NA						
TP230 24V/300S	24V	500A	DIN:560 SAE: 1330 EN: 940	ANL 400	mm2	70	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120
TP265 24V/300S	24V	755A	DIN: 750 SAE: 1425 EN: 1320	ANL 500	mm2	95	95	2 x 70	2 x 95	2 x 120	NA						

6. Electrical Wiring Diagram

- Each thruster motor is provided with a temperature safety switch. If the temperature of the motor becomes excessively high, the electric motor will be disengaged automatically.

- However, in emergency situations, the thruster can still be activated (after every time lapse of 3 seconds) in a pulsating fashion. This will require first the release of the directional switch.

- If the Thruster is activated directly thereafter, it will operate during 3 seconds maximum, after which the temperature safety switch will disengage the thruster again. By releasing and engaging the directional switch again, the thruster will be operative for another 3 seconds. And so on and so forth.



Pin configuration of 5 pole connector:
Pin1: RED = Positive voltage for control panel
Pin2: BLUE = Output 1 to solenoid
Pin3: WHITE = Output 2 to solenoid
Pin4: VIOLET = Thermal Overrun Switch (on Motor)
Pin5: BLACK = Ground

6. Maintenance

General

- When performing the annual on-land thruster service, check and fasten the two bolts holding the gearleg to the motor bracket.
- Remove and clean the gearleg and propeller. Remember to grease the propeller shaft and paint both gearleg and propeller with antifouling at the start of the season. Be careful not to paint sealing surfaces and propeller shafts.
- Check drive pin and replace if needed.
- Replace the zinc anode if necessary.
- Replace the zinc anode if necessary.
- To remove carbon dust, vacuum or blow out the motor grid on top with compressed air.
- Make sure the thruster compartment is clean and dry.

Electrical

- Ensure all electrical connections on the thruster motor, panel and battery are clean and well tightened.
- Check for wear and tear of the electrical wires and replace if needed.
- The voltage at the motor while running the thruster plays a decisive role when determining actual thrust. Therefore, check the voltage level of the batteries as the optimal functioning of the thruster motor and the thruster itself is dependent on the battery.
- The carbon brushes must be checked at least once a year. Check the carbon brushes of the DC motor for wear and tear by measuring the length.

7. Trouble Shooting

Electric motor does not operate:

- Ensure battery main switch is in “ON” position.
- Check whether the main fuse has burnt out.
- Check for disconnected or damaged cables.
- Check whether there is something blocking the propeller.

The electric motor operates, but there is no thrust:

- Check whether the propellers in the tunnel are loose or damaged (i.e. missing blade/s). Re-fasten or replace the propeller if needed.
- Check the drive pin is broken. Remove the four bolts holding the motor to the motor bracket, drive out old pin and replace with a new one.
- Remove the motor and check whether the gearleg functions properly. Manually turn the driveshaft to feel if the gears are engaging and turning the propeller shaft. In the unlikely case of a failure of the gearleg, we advise to get a replacement gearleg from ThrustEMS to ensure compatibility with the other components of your thruster system.

Wrong direction of thrust:

- Change contactor wires on motor solenoid as shown on Figure 19, section 4.2 Control Panel Connections.

The thruster does not start or operates in one direction only:

- The no-load voltage at the thruster between the main minus input (A1 on motor) and main plus point should be 12.7 for a 12 system and 25.4 for a 24 system. If below 12.3 / 24.6 , your batteries are worn out and not in a good state and must be recharged or replaced.
- Check motor brush springs are located properly. Brushes should have a good contact with the commutator.
- Check the voltage at the thruster while you are trying to run it (you may want to keep the main engine running to ensure batteries are being re-charged). For a 12 system, if the voltage is less than 10.5 the control panel will switch on, but the thruster will not be operated. For a 24 system, the thruster will operate at voltage even less than 21 , yet its performance will be quite poor. Correct the reason for this low voltage which might be due to main battery cable sizes and connections, battery capacity and condition, fuse burnt out or main power switch being tripped.

Control panel does not illuminate:

- Try to switch it on by holding power button for one second and then pressing it again within 6 seconds to activate it permanently (child protection function).
- Check whether battery is connected. Then ensure main switch is in “ON” position and that fuse has not burnt out.
- Check control panel connections.
- Operating the thruster for a long time period might have tripped the thermal switch. Wait for approximately 20 minutes for the DC motor to cool down on itself and reset.

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