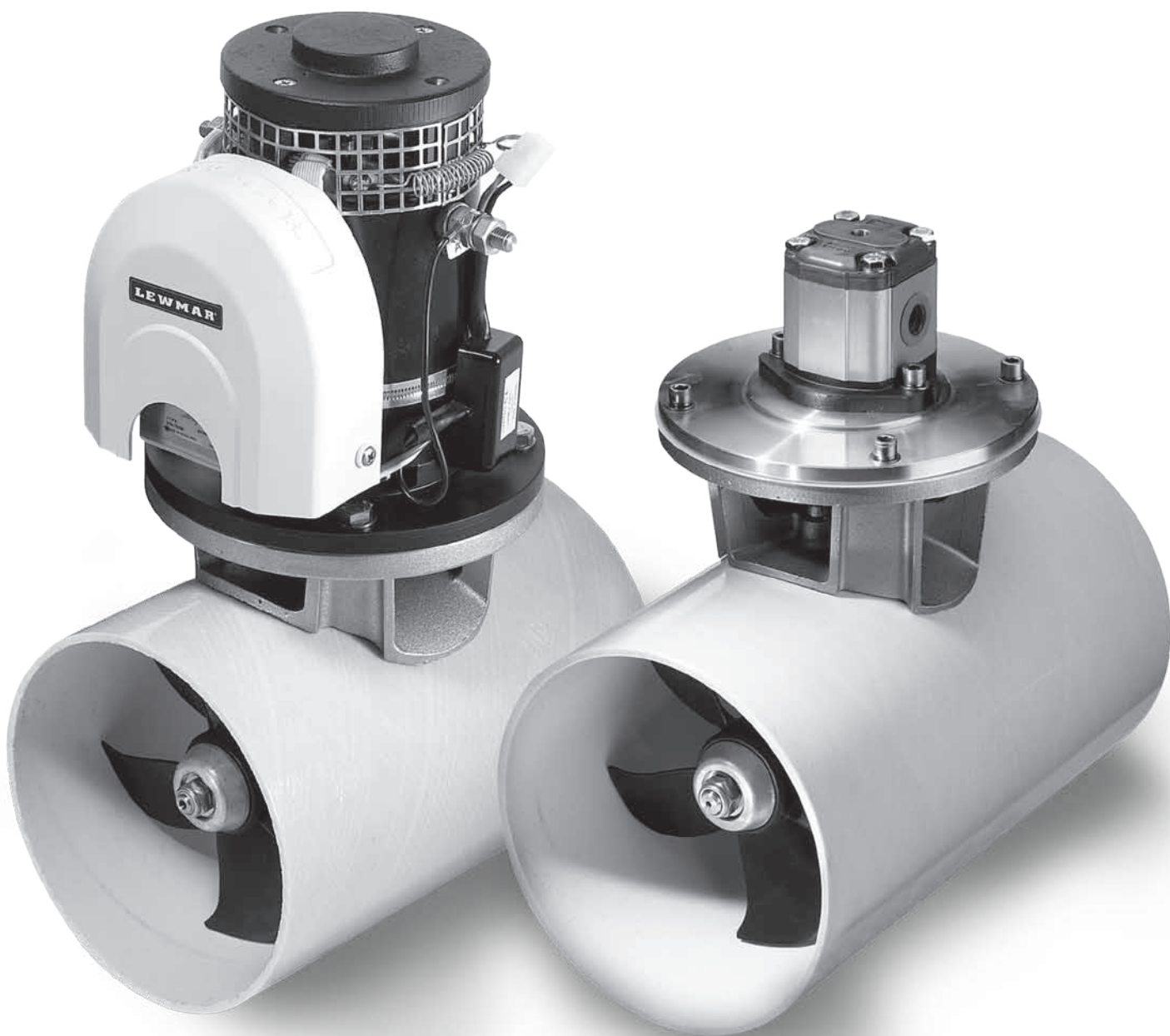


500100 Issue 4

GB

Electric/Hydraulic TT Thruster 140-300

Owner's Installation, Operation &
Basic Servicing Manual



LEWMAR®

www.lewmar.com

Issue 4. Electric/hydraulic TT thruster 140 - 300.

Introduction	4	2.4 Electric motor terminal connections	12
Product support	4	2.5 Battery cable connections	13
Important information about this manual	4	2.6 Correct cable sizes	13
CE Approvals	4	2.7 Electrolytic test	14
Safety notices	4	2.8 Installing control panel - all models	14
General	4	2.9 Final checks	15
Thruster supply	4	3. Operating your thruster	15
Fitting	4	3.1 140TT 2.0 kW	15
Electrical	4	3.2 140TT 2.2 kW to 300TT 15.0 kW operation and safety features	16
1. Installation	5	4. Servicing your thruster	17
1.1 Choosing location	5	4.2 Changing drive pin 140TT or 185TT	17
1.2 Preparing the hole for the tube	5	5. Weight & specifications	18
1.3 Preparing for fitting the thruster	6	5.1 Electric	18
1.4 Installing hub unit and saddle models 140TT & 185TT	7	5.2 Hydraulic	18
1.5 Gearbox position - 185TT only	7	6. Parts list	19
1.6 Propeller assembly - all models	7	6.1 Model 140TT 2.0 kW 12 V	19
1.7 Installing hub unit and saddle models 250TT & 300TT	8	6.2 Model 140TT 2.2 kW 12 V	19
1.8 Electric motor unit support	9	6.3 Model 185TT/H 3.0 to 6.0 kW 12 & 24 V	20
1.9 Installing electric motor unit model 140TT & 185TT	9	6.4 Model 250TT/H 8.0 kW 24 V	21
1.10 Installing electric motor unit model 250TT & 300TT	9	6.5 Model 300TT/H 10.8 to 15.0 kW	22
1.11 Installing hydraulic motor unit model 185TTH to 300TTH	10	6.6 Accessories	23
1.12 Final checks - All models	10	7. Dimensions	24
2. Electrical wiring installation	11	7.1 Electric	24
2.1 Typical electrical layout model 140TT 2.0 kW only	11	7.2 Hydraulic	24
2.2 Typical electrical layout models 140TT 2.2 kW and 185TT	11	8. Fault finding	25
2.3 Typical electrical layout models 250TT & 300TT	12	9. Cutting templates	26
		10. Lewmar limited warranty	27

Introduction

Dear Customer,

Thank you for choosing Lewmar TT Thrusters. Lewmar products are world renowned for their quality, technical innovation and proven performance. With a Lewmar thruster you will be provided with many years of outstanding service.

Product support

Lewmar products are supported by a worldwide network of distributors and Authorised Service Representatives. If you encounter any difficulties with this product, please contact your national distributor, or your local Lewmar dealer. Details are available at:

www.lewmar.com

Important information about this manual

Throughout this manual, you will see safety and product damage warnings. You must follow these warnings carefully to avoid possible injury or damage.

The type of warnings, what they look like, and how they are used in this manual are explained as follows:

Warning!
This is a warning against anything which may cause injury to people if the warning is ignored. You are informed about what you must or must not do in order to reduce the risk of injury to yourself and others.

Safety Symbol
When you see the safety symbol it means: "Do not..."; "Do not do this"; or "Do not let this happen".

CE Approvals

For CE approval certificates contact Lewmar.

To the best of our knowledge, the information in this manual was correct when it went to press. However, Lewmar cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, Lewmar cannot accept liability for any differences between the product and the manual.

Warning! This manual forms part of the product and **MUST BE RETAINED** along with, OR incorporated into, the Owner's Manual for the vessel to which the thruster is fitted.

Safety notices

General

Please ensure that you thoroughly understand the operation and safety requirements of the thruster before commencing the installation. Only persons who are completely familiar with the controls and those who have been fully made aware of the correct use of the thruster should be allowed to use it. If there is any doubt of how to install or operate this unit please seek advice from a suitably qualified engineer.

- Please ensure that you thoroughly understand the operation and safety requirements of the thruster.
- Your thruster should not be operated close to swimmers, as a powerful suction of water is generated when in use.
- The tunnel installation and any hull modifications should only be carried out by a specialist. This manual is based on a GRP tunnel installation.
- We recommend that a qualified person install the thruster. Faulty installation will place the boat and crew in danger and make the warranty invalid.
- It is the unavoidable responsibility of the owner or master or other responsible party to assess the risk of any operation on the vessel.

Thruster supply

- The thruster is securely packed for transit. However all parts should be inspected for signs of damage before installation. If any parts are found to be damaged please contact lewmar.

Fitting

- This equipment must be installed and operated in accordance with the instructions contained in this manual. Failure to do so could result in poor product performance, personal injury and/or damage to your boat.
- Electric thrusters must be located in a dry environment. Should there be a need to install in a damp/wet location then the IP (Ignition Protected) version must be used.
- Electric bow thrusters use powerful electric motors, it is very important that there is sufficient battery capacity and large enough cables for safe operation. Using smaller than recommended battery and cables will cause loss of performance and may cause dangerous overheating.
- Electric motors spark and run hot. Do not place near flammable or sealed areas.
- Main battery must not be connected and power must not be switched on until all covers and terminal protectors are correctly fitted.
- It is very dangerous to run the thruster out of the water, even for a few seconds, the motor will over speed by 300%, causing damage to the motor seals etc. and the propeller will cause serious damage to whatever comes into contact with it. This action will invalidate the warranty.
- Consult the boat manufacturer if you have any doubt about the strength or suitability of the mounting location.

Electrical

- Make sure you have switched off the power before you start installing this product.
- If in doubt about installing electrical equipment please seek advice from a suitably qualified electrical engineer.

1. Installation

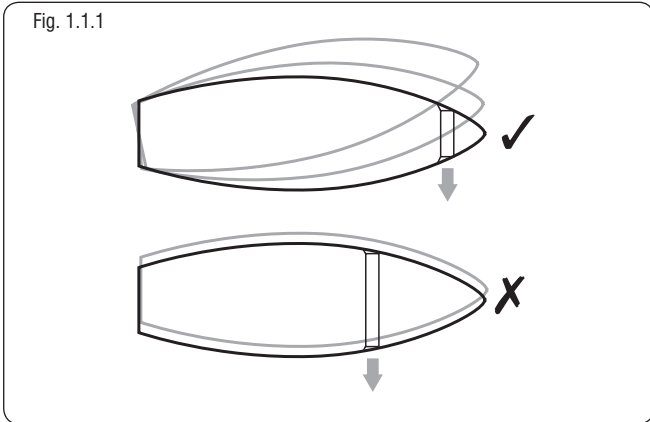
1.1 Choosing location

The actual position of the Thruster will depend on the internal & external construction of the Motor Boat or Sailing Yacht.

\varnothing = Tunnel Diameter.

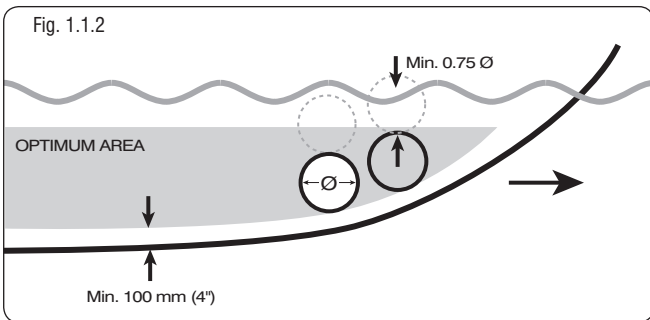
For optimal performance the Thruster should be mounted within the following:

- As far forward as possible (Fig 1.1.1 lever effect).



- 1 x \varnothing below the waterline to prevent air being sucked into the tunnel. (Fig. 1.1.2 0.75 x \varnothing minimum.).
- Minimum suggested tunnel length 2 x \varnothing .

NOTE: Ensure there is sufficient space for the Thruster assembly complete with motor and controls in the boat.



- TT Thruster can be fitted new or as a replacement for an existing thruster (see Fig 1.1.3).

NOTE: Check mounting holes on the saw template.

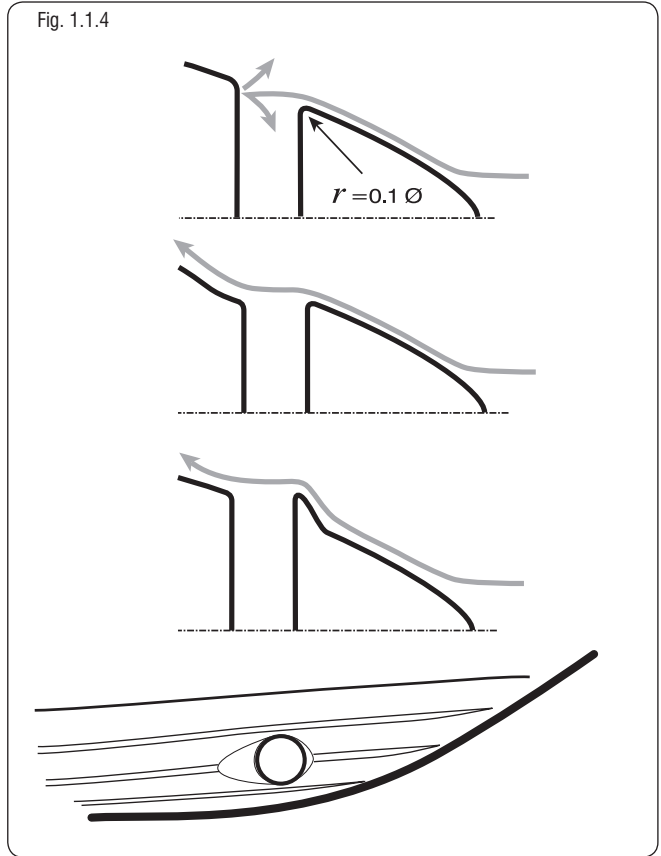
Fig. 1.1.3

Thruster Model (kW)	Thruster I.D. mm (inch)	Wall mm (inch)
140	140 (5 1/2)	4.0 (5/32) - 5.0 (3/16)
185 (3.0 & 4.0)	185 (7 9/32)	4.0 (5/32) - 6.0 (1/4)
185 (5.0 & 6.0)	185 (7 9/32)	6.0 (1/4)
250	250 (9 27/32)	7.5 (9/32)
300	300 (11 13/16)	9.0 (11/32)

⚠ A competent, marine engineer must carry out any work on the hull of your boat.

⊘ The boat MUST be out of the water, levelled and secure in its cradle.

- The recommended tunnel is designed to fit a Lewmar saddle, take the weight of the Thruster and the torque of the motor.
- Fig 1.1.4 - To reduce any potential loss of performance or damage to the propeller the entrance of the tunnel can be altered to improve thrust as well as reduce noise.



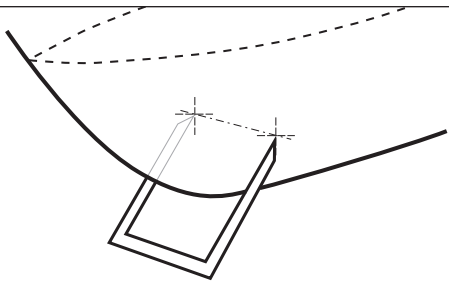
1.2 Preparing the hole for the tube

⚠ This section is for general guidance for GRP boats only. Problems caused by faulty installation of the tunnel are the installers full responsibility. A competent, marine engineer must carry out any work on the hull of your boat.

When you are satisfied the best location for the Thruster unit has been found within the parameters available proceed as follows.

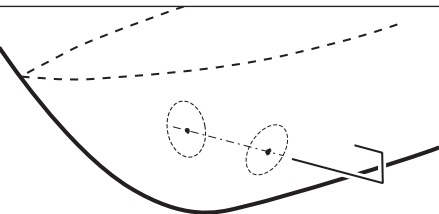
- Fig 1.2.1 - Make a jig to precisely align the drill holes either side of the hull.
- **NOTE: Double check everything before drilling.**
- Drill a pilot hole in both sides of the hull.

Fig. 1.2.1



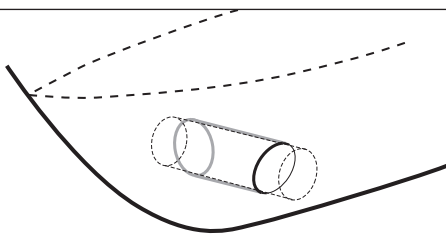
- Drill a pilot hole in both sides of the hull.

Fig. 1.2.2



- Form a wire guide to diameter of the tunnel hole, mark, check and cut.
- Insert tube in the hole, mark and remove excess.

Fig. 1.2.3

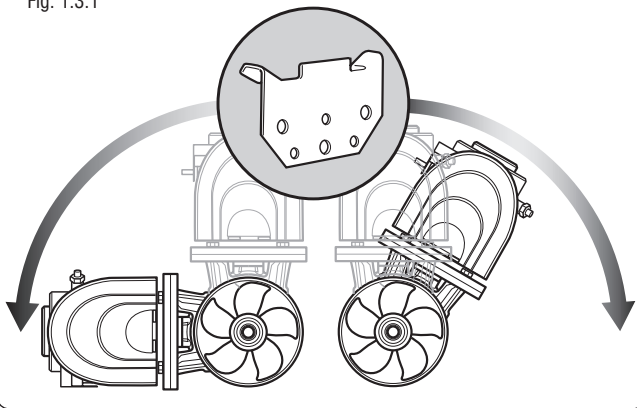


- Grind off gel coat etc. Insert tunnel and fix allowing enough room inside for saddle location on the tunnel.
- Gel coat finished installation and antifoul.

1.3 Preparing for fitting the thruster

- The Thruster can be installed at any angle within 90° from vertical.

Fig. 1.3.1

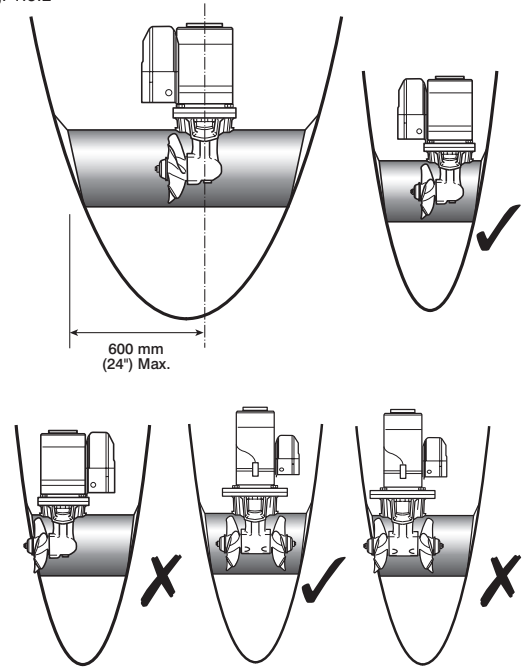


⚠ Electric motors must be supported if installed more than 30° from vertical (Fig 1.8.1).

- Choose position of thruster, ensuring internal room for motor and controls and that the propeller is easily reached from outside.

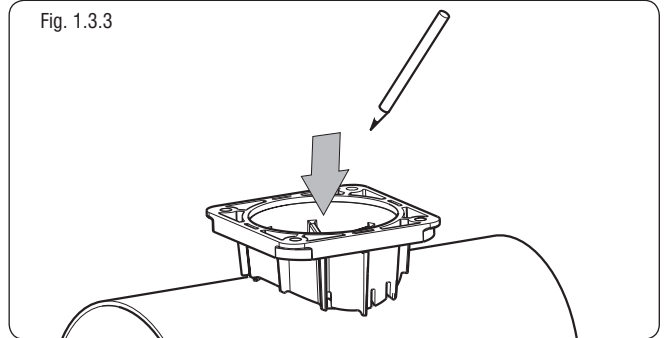
NOTE: Fig 1.3.2 - Normal install is to Port (single propeller unit)

Fig. 1.3.2



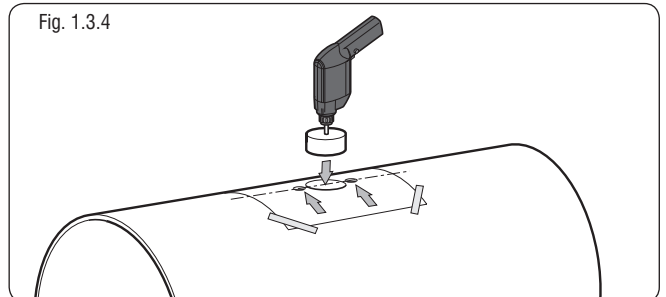
- Place the thruster saddle in the desired position, ensure the fit is firm and free from movement then mark centre.
- To aid installation a kit is available. See Sec 6.6 Accessories.

Fig. 1.3.3



- Position template on centre line, double check everything and drill. Remove all burrs. All the holes must be on the centre line. Poor alignment may affect hub positioning.

Fig. 1.3.4

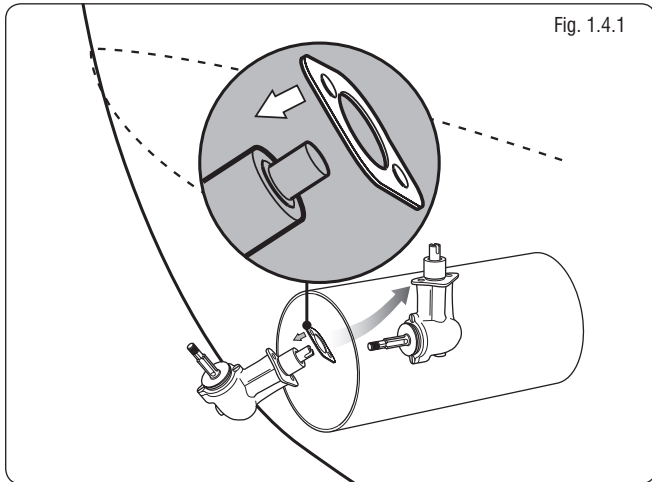


1.4 Installing hub unit and saddle models 140TT & 185TT

NOTE: Illustrations based on 140TT saddle.

- To suit the wiring configuration supplied fit the thruster propeller on the port side.
- Place gasket on hub and locate through centre hole. Sealant can be applied to gasket and flange to aid sealing.

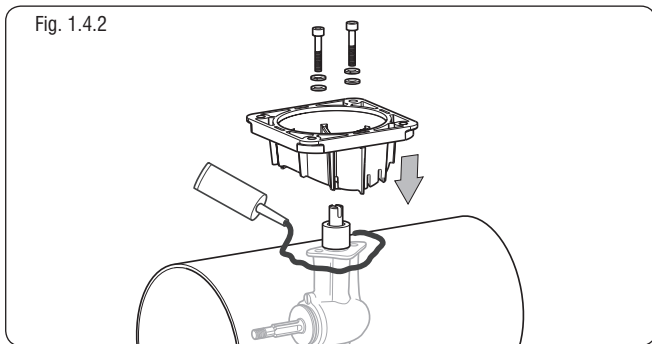
NOTE: To achieve the correct position of the propeller in the tunnel the gasket must be inplace.



NOTE: Poor exterior tunnel surface could cause leakage and noise. Apply sealant to this area as required (Fig. 1.4.2).

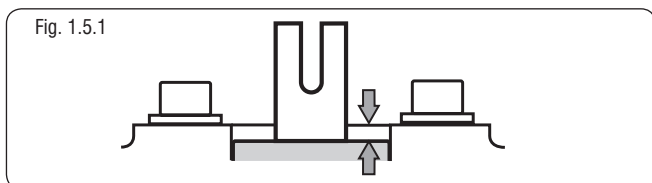
- Apply zinc chromate paste or marine grease to location bore and assemble saddle onto hub (SikaFlex® or similar maybe used to seal saddle in place). Apply Blue Loctite® 243 to bolts and hand tighten along with supplied washers (Fig. 1.4.2).

NOTE: Tighten to full torque within 10 minutes.

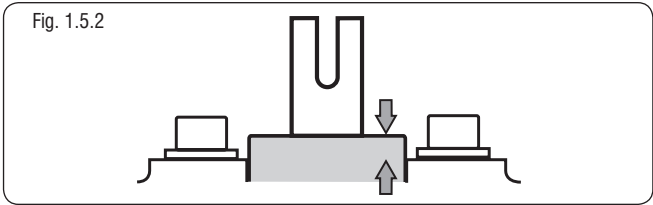


1.5 Gearbox position - 185TT only

- On installation check the position of the gearbox (leg) brass stem in the saddle.



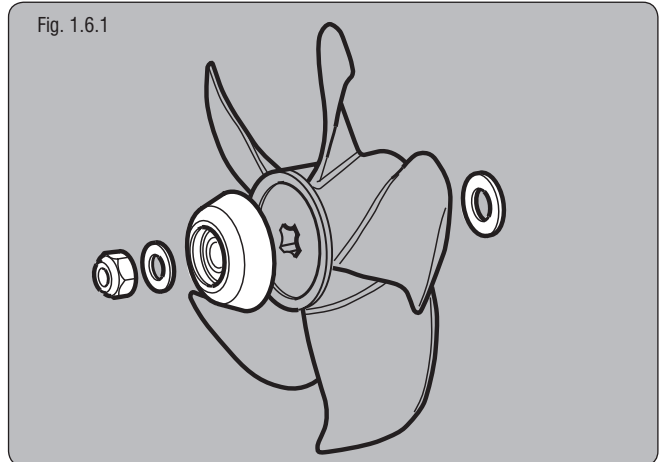
- If it is below 2 mm (1/16”), material must be removed from the tunnel (Fig 1.5.1).



- If it is above 3.5 mm (1/8”), the tunnel should be packed under the saddle (Fig 1.5.2).

1.6 Propeller assembly - all models

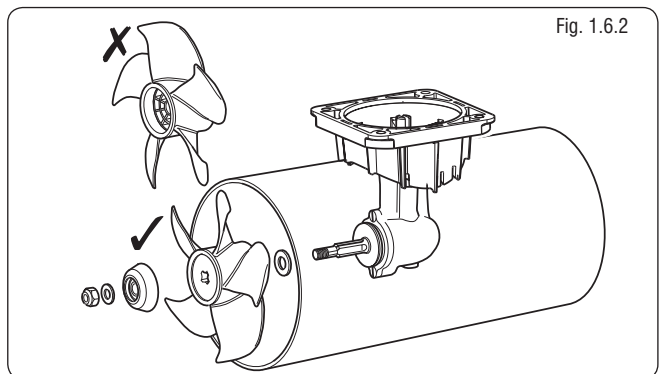
- Check the hub gasket is in place.
- Fig 1.6.1 - Assemble anode kit and propeller in this order: large washer, propeller, anode, small washer and nyloc nut onto propeller shaft.



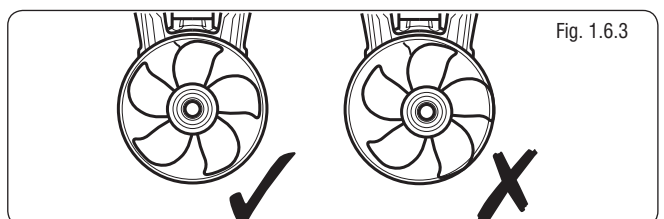
⚠ Check the propeller has been assembled in the correct order.

NOTE: Tighten each bolt alternately a number of times to full torque.

- Fig 1.6.2 - Tighten hub/saddle bolts to 9 Nm (6.6 lbs.ft) for 140 or 21 Nm (15.5 lbs.ft) for 185. Check that propeller is centred and free turning (within 10 minutes of applying Blue Loctite® 243).



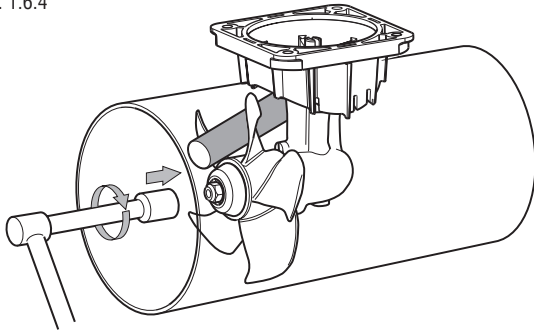
⊘ DO NOT allow propeller to touch tunnel.



⊘ DO NOT antifoul zinc anode.

- Antifoul bronze hub and propeller if desired.

Fig. 1.6.4



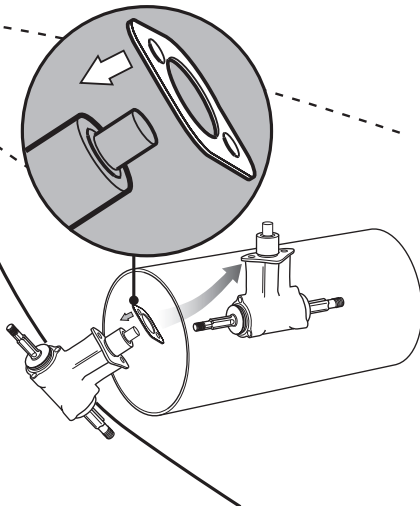
- Tighten propeller nut to 10 Nm (7.4 lbs.ft) for 140 or 15 Nm (11 lbs.ft) for 185, a length of wood placed between propeller blade and tunnel will stop movement.

⊘ DO NOT overtighten propeller nuts.

1.7 Installing hub unit and saddle models 250TT & 300TT

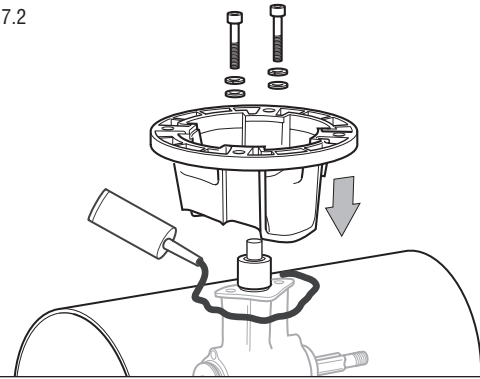
- Place gasket on hub and locate through centre hole. Sealant can be applied to gasket and flange to aid sealing.
NOTE: To achieve the correct position of the propeller in the tunnel the gasket must be in place.

Fig. 1.7.1



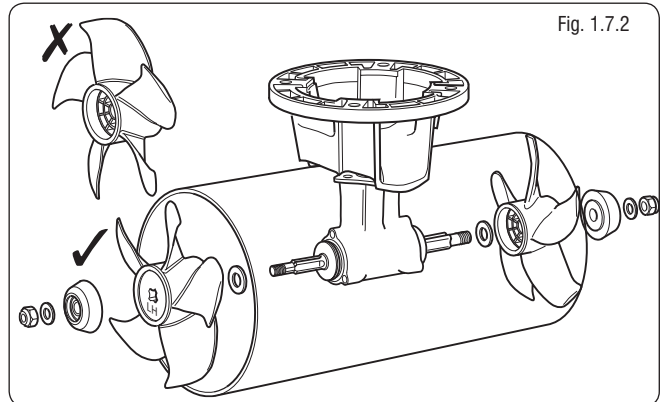
- **NOTE: Poor exterior tunnel surface could cause leakage and noise. Apply sealant to this area as required (Fig 1.7.2).**
- Apply zinc chromate paste or marine grease to location bore and assemble saddle onto hub (SikaFlex® or similar maybe used to seal saddle in place). Apply Blue Loctite® 243 to bolts and hand tighten along with supplied washers (Fig 1.7.2).
NOTE: Tighten to full torque within 10 minutes.
NOTE: Tighten each bolt alternately a number of times to full torque.
- Tighten hub/saddle bolts to 33 Nm (24 lbs.ft) for 250 or 82 Nm (60.5 lbs.ft) for 300. Check that propeller is centred and free turning (within 10 minutes of applying Blue Loctite® 243).

Fig. 1.7.2



- Assemble anode kit and propeller in this order:- large washer, propeller, anode, small washer and nyloc nut onto propeller shaft. To suit the wiring configuration supplied fit the thruster LH propeller on the port side.

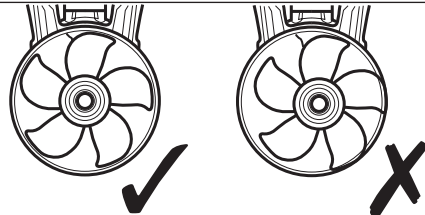
Fig. 1.7.2



⚠ Check the propeller has been assembled correctly (Fig 1.6.1).

⊘ DO NOT allow propeller to touch tunnel.

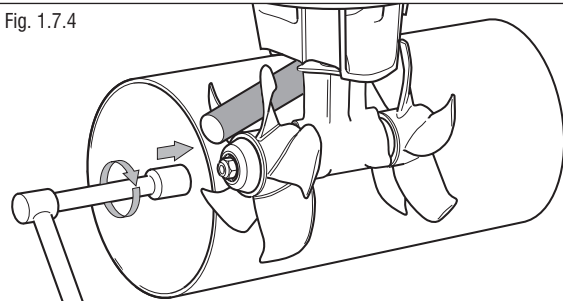
Fig. 1.7.3



⊘ DO NOT antifoul zinc anode.

- Antifoul bronze hub and propeller if desired.

Fig. 1.7.4

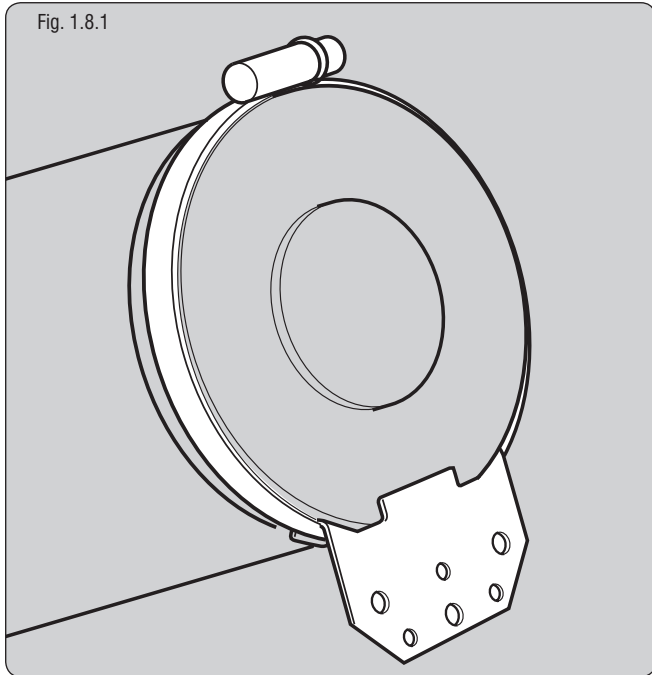


- Tighten propeller nut to 35 Nm (26 lbs.ft), a length of wood placed between propeller blade and tunnel will stop movement.

⊘ DO NOT overtighten propeller nuts.

1.8 Electric motor unit support

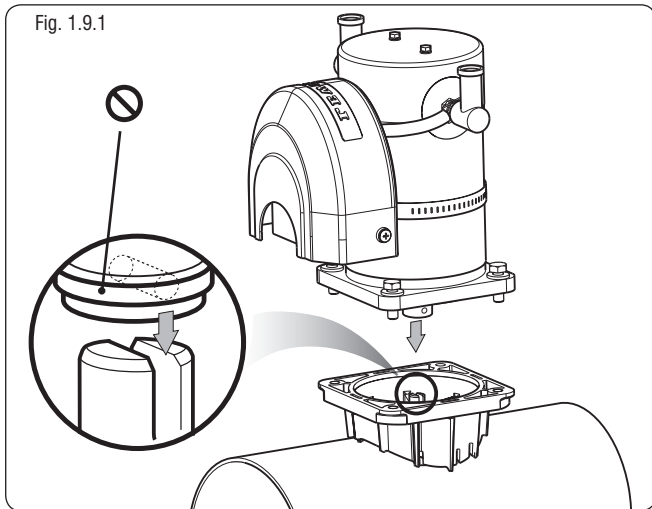
- If the electric motor is installed more than 30° from the vertical it **MUST** be supported and secured to the support with a strap (not supplied) around the main motor unit.



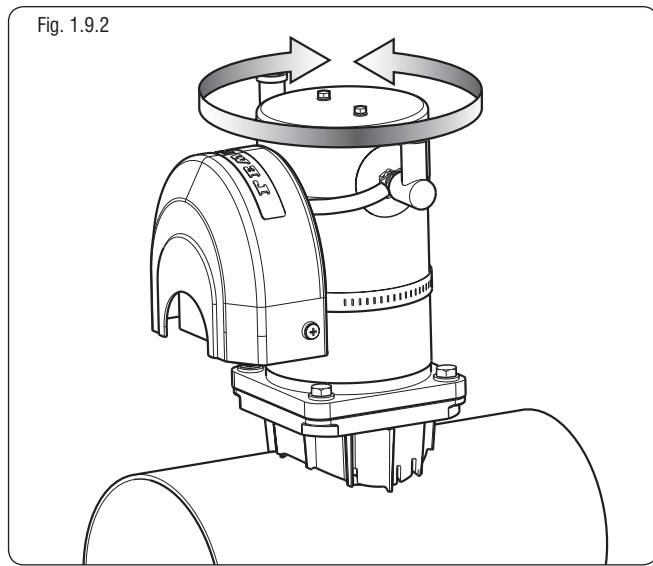
1.9 Installing electric motor unit model 140TT & 185TT

- **NOTE: Illustrations based on 140TT saddle.**
- Align motor drive pin inline with slot in shaft. Apply grease to hub shaft.

⊘ **DO NOT REMOVE** the drive pin plastic retainer tie on the motor drive shaft.



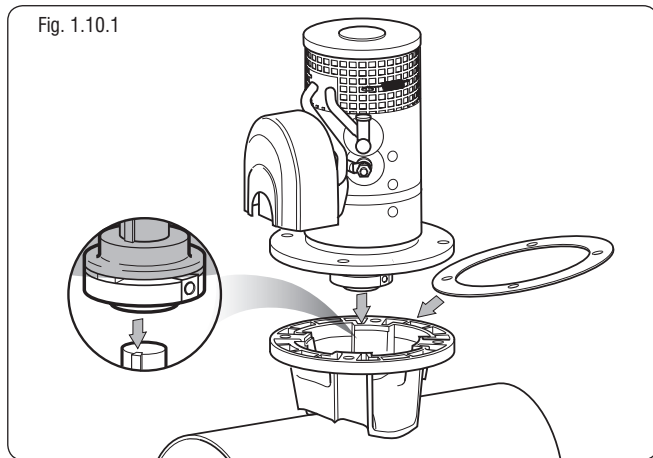
- Slide motor into position and align holes for most suitable installation.
- Bolt motor assembly to saddle and tighten bolts to 20 Nm (15 lbs.ft) for 140 or 35 Nm (25.8 lbs.ft) for 185. Apply Blue Loctite® 243 to all bolts.



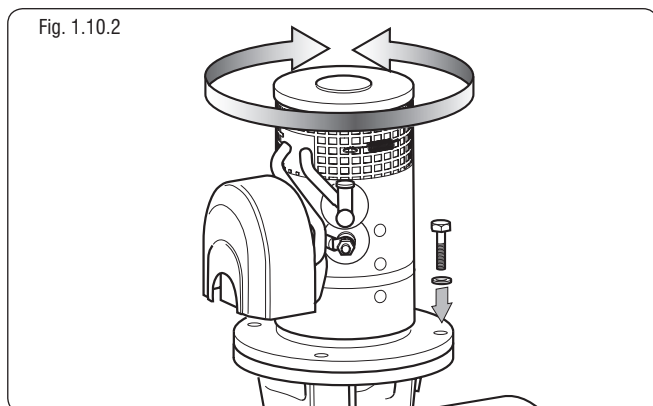
1.10 Installing electric motor unit model 250TT & 300TT

⊘ **Coupling is factory fitted. DO NOT remove.**

- Place insulator in between saddle and motor flange. Line up key to coupling keyway.



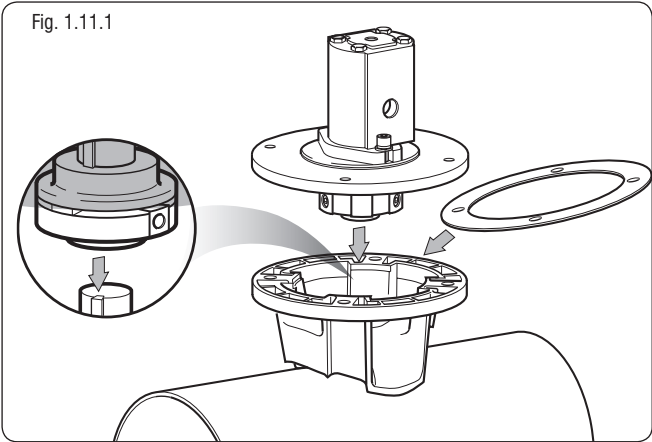
- Remove drive shaft key retaining tie, grease shaft, slide motor into position and align holes for most suitable installation and bolt motor assembly to saddle applying Blue Loctite® 243 to bolts.



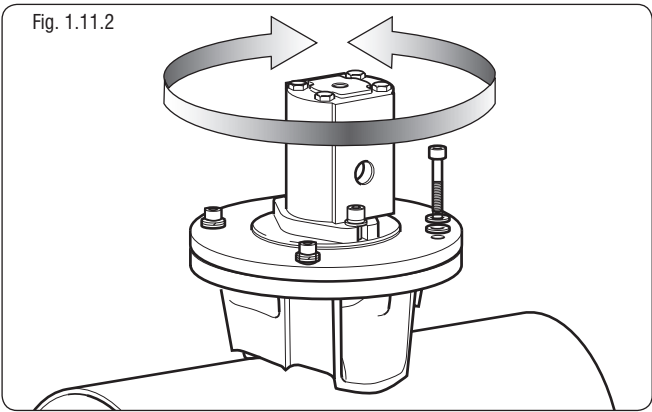
1.11 Installing hydraulic motor unit model 185TTH to 300TTH

⊘ Coupling is factory fitted. DO NOT remove.

- Place insulator in between saddle and motor flange. Line up key to coupling keyway.



- Remove drive shaft key retaining tie, grease shaft, slide motor into position and align holes for most suitable installation and bolt motor assembly to saddle and tighten.



- Motor ports require male/female connectors with correct size hydraulic sealing washers.
 185TT Main ports = 3/8" BSPP.
 Main ports = 3/4" BSPP.
 Drain ports = 1/4" BSPP.
NOTE: It is advisable to fit insulated pipe sections to prevent thruster corrosion.

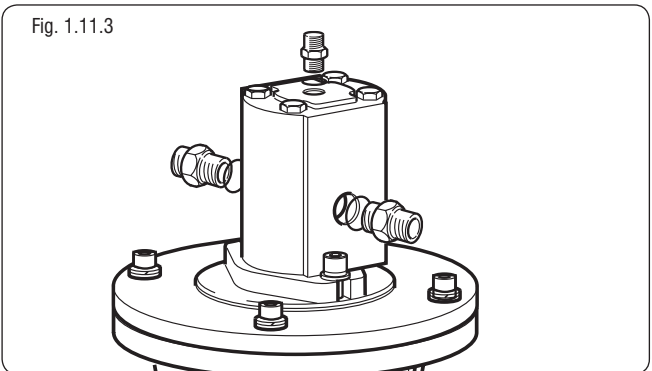


Fig. 1.11.4

Model	Part No.	Max. Output	Motor Disp.	DELTA	Flow	Max. Thrust
185TTH	591820	7 kW	6 cc/rev	210 bar	26 l/min	100 kgf
250TTH	592520	15 kW	26 cc/rev	122 bar	81.5 l/min	200 kgf
250TTH	592521	15 kW	17 cc/rev	190 bar	52.3 l/min	200 kgf
300TTH	593020	22.5 kW	30 cc/rev	182 bar	82.1 l/min	300 kgf
300TTH	593021	22.5 kW	26 cc/rev	210 bar	71.7 l/min	300 kgf

1.12 Final checks - All models

Check list hydraulic

- Check drain line fitted.
- All fittings are tight with seals in place.
- Hydraulic system has been checked and adjusted to correct pressures and flows.

Operation of Hydraulic unit

- Refer to system suppliers instructions.

Check list mechanical

- Check all bolts and nuts are tight.
- Check the propeller/s are correctly installed and the nuts tightened.
- Check the motor control box cover is in place.
- Check the propeller/s can be turned - before working on unit check battery switch is off or remove the fuse.

NOTE: Saddle and motor are firmly seated on the tube.

2. Electrical wiring installation

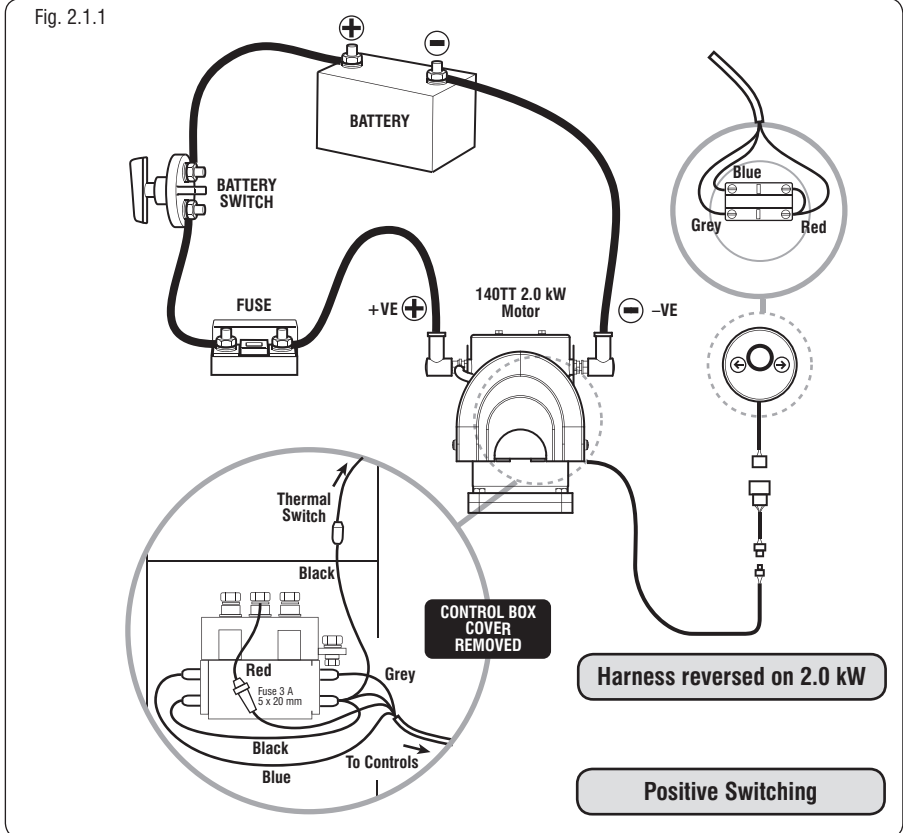
2.1 Typical electrical layout model 140TT 2.0 kW only

- If the thruster operates in an opposite direction to the control panel, swap the grey and blue wire connections on the contactor coils.

NOTE: Automatic battery switch can not be used with this product.

⚠ To satisfy International standards, a suitably sized battery switch should be fitted to the thruster +VE supply. Lewmar recommend this as best practice for safe installations.

Loom Wiring	
Red	+VE
Blue	Thrust port switch
Grey	Thrust starboard switch
Black	Not Used



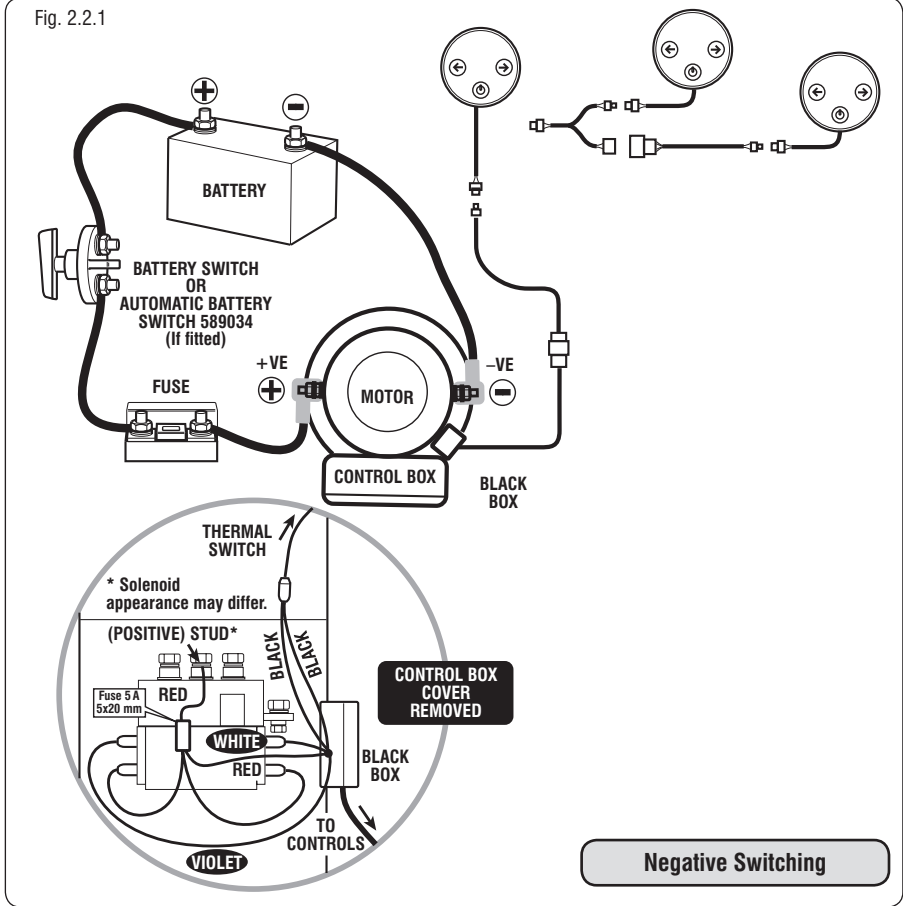
2.2 Typical electrical layout models 140TT 2.2 kW and 185TT

- If the thruster operates in an opposite direction to the control panel, swap the white and violet wire connections on the contactor coils.

NOTE: Automatic switch (if fitted). Main power is switched on when panel is switched on.

⚠ It is vital that the positive battery lead is connected to the positive motor terminal or damage to the electronics will occur.

Loom Wiring	
Red	+VE
Blue	Thrust port switch
Grey	Thrust starboard switch
Black	-VE



2.3 Typical electrical layout models 250TT & 300TT

- If the thruster operates in an opposite direction to the control panel, swap the white and violet wire connections on the contactor coils.

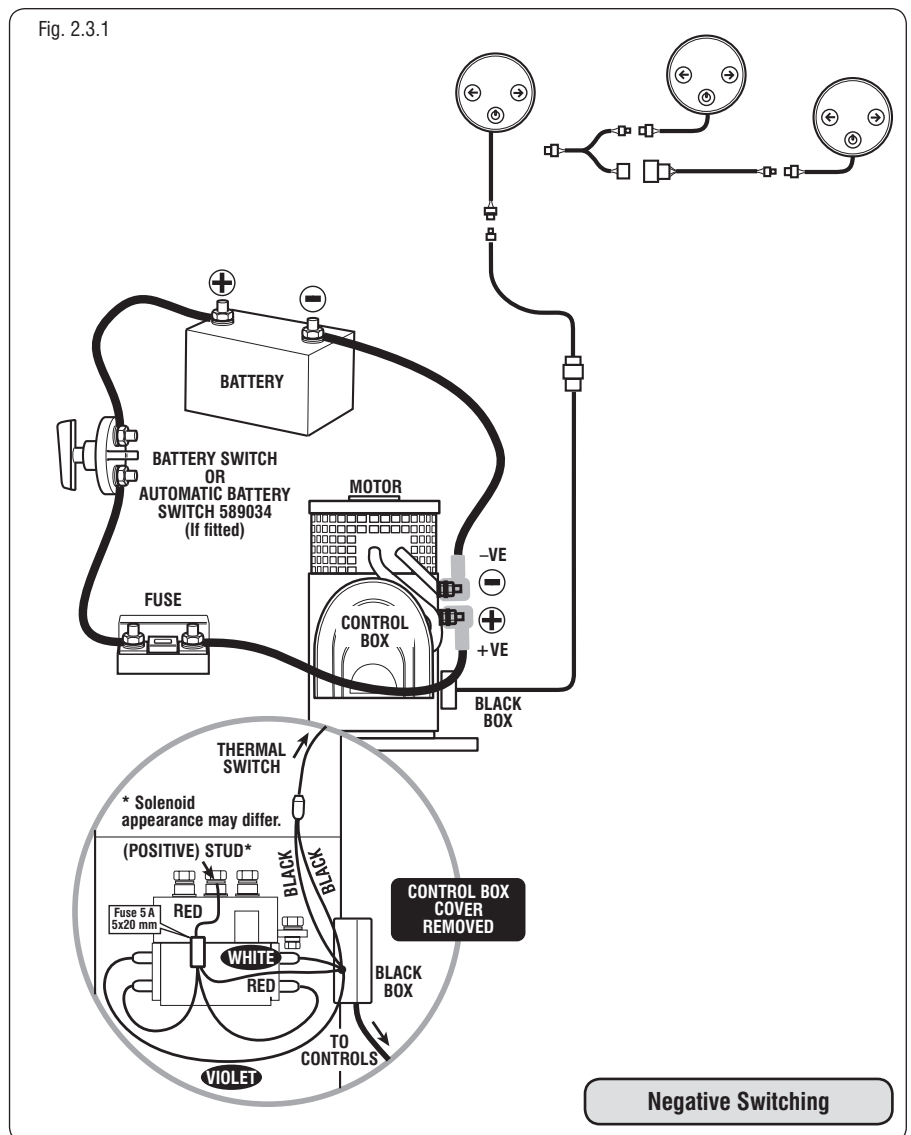
NOTE: Automatic switch (if fitted). Main power is switched on when panel is switched on.

⚠ It is vital that the positive battery lead is connected to the positive motor terminal or damage to the electronics will occur.

Loom Wiring	
Red	+VE
Blue	Thrust port switch
Grey	Thrust starboard switch
Black	-VE

NOTE: For dual thruster controls see stern thruster manual included in sternkit or on www.lewmar.com

Fig. 2.3.1

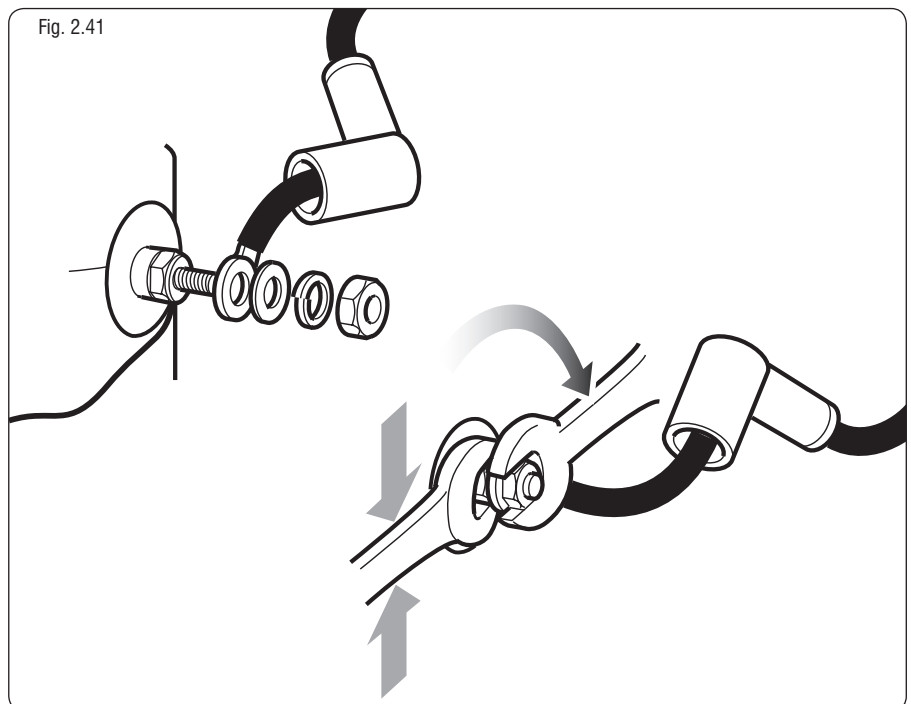


2.4 Electric motor terminal connections

- Terminals must be correctly clamped to motor studs. Use a pair of spanners - the one nearest motor to stop rotation of the stud.
- Spanner sizes are 13 mm for 140TT and 17 mm for 185TT - 300TT. Tighten the bolts to 20 Nm (15 lbs.ft).

⚠ DO NOT overtighten electric motor terminal nuts.

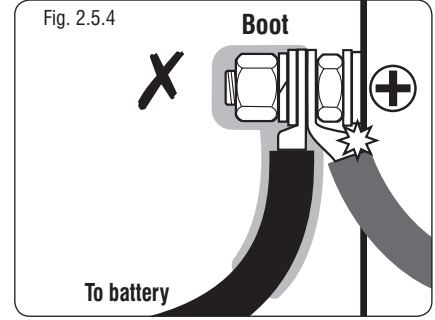
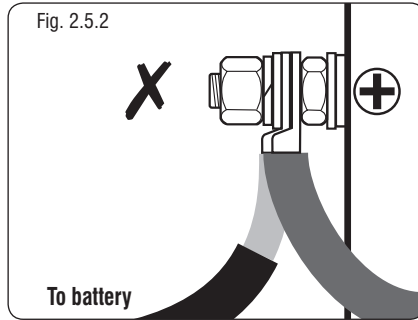
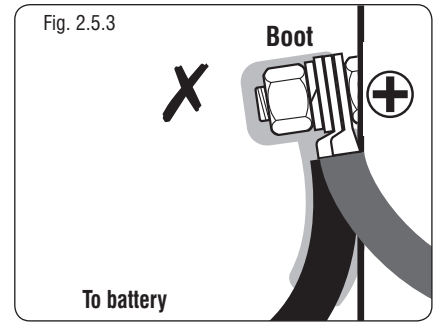
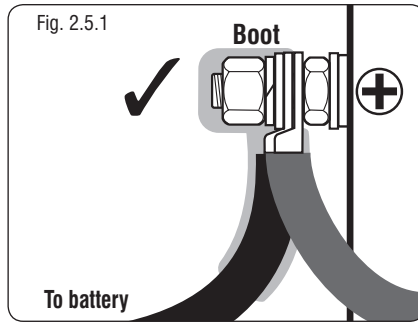
Fig. 2.41



2.5 Battery cable connections

⚠ Incorrect installation of battery cables or damage to connection studs may result in a short to the thruster body. Use the examples above to check for a correct installation on both +V and -V battery connections.

- Correct installation. Supplied cable boots are used and no bare wires exposed (Fig 2.6.1).
- Live wire exposed! (Fig. 2.6.2). Correct the cable installation to match (Fig 2.6.1).
- Terminal or motor is damaged. Contact Lewmar Limited (Fig 2.6.3).
- Crimp inverted and is touching motor! (Fig 2.6.4). Correct the cable installation to match as (Fig 2.6.1).



2.6 Correct cable sizes

NOTE: Cable length is total from battery to thruster and back.

- Example: Measure the total cable run from the battery to thruster and back in metres. Grey area on the table shows a total of 28 m (92 ft) of cable with a model 250 8.0 kW thruster would need 95 mm CSA (000 AWG) cable.
- Battery crank capacity should be at least equal to the thruster current.
- Main power cables should be run from the batteries and must have an inline fuse fitted.

⊘ The installation **MUST** have a battery switch that is switched off whilst the thruster is not in use or the boat is unoccupied.

- The cables should be terminated with a ring terminal corresponding to the motor studs, 8 mm (⁵/₁₆"") for 140TT and 10 mm (³/₈"") for 185TT, 250TT and 300TT. It is important that this termination is secure so that the high current is transferred to the motor efficiently. The minimum voltage at motor when running should be 10 V for 12 V and 21 V for 24 V units.
 - Ensure the insulating boots, supplied with the unit, are correctly fitted.
- NOTE:** If very large cables are used discard supplied boots and fit appropriate sized ones.

CABLE CSA mm - Cable length in metres									
TT Model	Current (A)	25	35	50	70	95	120	150	175
140 2.0 kW-12 V	270	6	10	16	22	-	-	-	-
140 2.2 kW-12 V	280	6	10	15	21	-	-	-	-
185 3.0 kW-12 V	330	6	8	10	15	21	-	-	-
185 3.0 kW-24 V	160	18	22	-	-	-	-	-	-
185 4.0 kW-12 V	470	4	6	8	12	16	21	26	30
185 4.0 kW-24 V	235	12	16	25	33	-	-	-	-
185 5.0 kW-12 V	480	4	6	8	12	16	20	25	29
185 5.0 kW-24 V	240	12	16	24	32	-	-	-	-
185 6.0 kW-12 V	700	-	-	6	8	12	15	21	28
185 6.0 kW-24 V	370	9	12	16	24	32	-	-	-
250 8.0 kW-24 V	500	7	10	12	21	28	36	45	-
250 9.6 kW-48 V	330	-	26	37	50	64	-	-	-
300 10.8 kW-24 V	650	4	6	9	12	16	21	25	30
300 15.0 kW-48 V	420	-	24	35	48	62	-	-	-

CABLE AWG - Cable length in feet									
TT Model	Current (A)	3	2	1	0	00	000	0000	2x0000
140 2.0 kW-12 V	270	20	31	42	53	64	-	-	-
140 2.2 kW-12 V	280	20	30	40	50	60	-	-	-
185 3.0 kW-12 V	330	19	24	30	37	49	62	-	-
185 3.0 kW-24 V	160	63	80	-	-	-	-	-	-
185 4.0 kW-12 V	470	14	18	23	30	38	48	60	-
185 4.0 kW-24 V	235	42	50	68	80	100	-	-	-
185 5.0 kW-12 V	480	14	18	23	29	37	47	59	-
185 5.0 kW-24 V	240	42	50	68	80	100	-	-	-
185 6.0 kW-12 V	700	-	13	16	21	28	35	50	100
185 6.0 kW-24 V	370	-	37	45	60	74	97	-	-
250 8.0 kW-24 V	500	-	32	41	52	66	84	105	-
250 9.6 kW-48 V	330	-	80	98	118	154	-	-	-
300 10.0 kW-24 V	650	-	19	24	31	39	49	65	130
300 15.0 kW-48 V	420	-	74	92	112	148	-	-	-

2.7 Electrolytic test

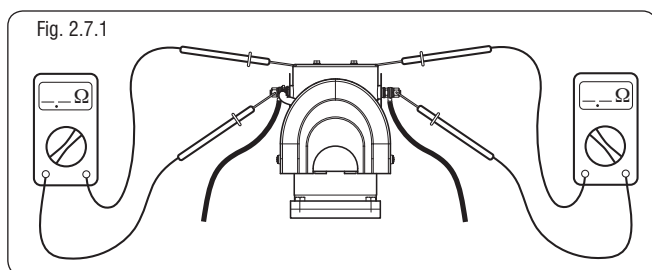
⊘ To prevent electrolytic corrosion or faults, the thruster motor body and assembly **MUST** remain isolated from any power supply or grounds. The installer can check for this using a multimeter in the following ways.

• Test 1. Fig.2.7.1

With the negative not connected and the positive cable connected but with battery switch off or fuse removed. Use a continuity tester to check for a connection between the -VE stud and motor body and also between +VE stud and motor body. In both cases the meter should give no indication of an electrical connection.

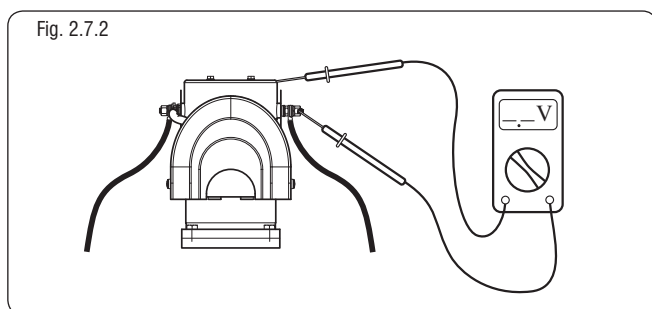
If a connection is measured between the +VE stud and the motor body, check installation for cables or wires touching the assembly or for damage to assembly.

If a connection is measured between the -VE stud and the motor body, remove any bonding straps attached to the assembly and check as before.



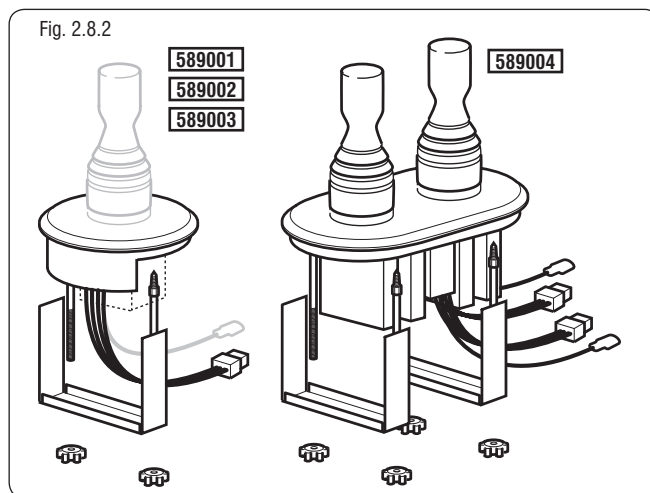
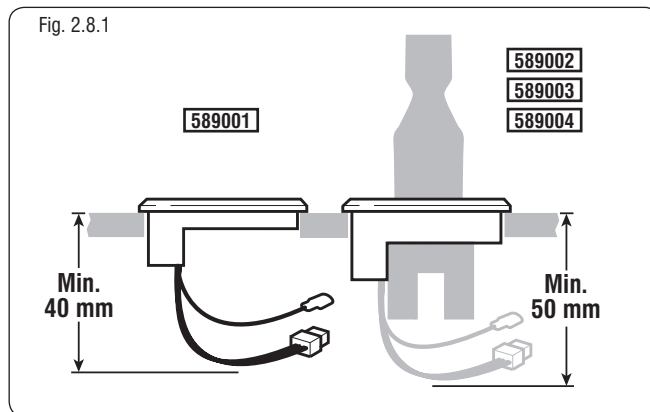
• Test 2. Fig 2.7.2

With the battery applied: Use a voltmeter to test the voltage between the -VE motor stud and the thruster motor body. If the supply voltage (12 V/24 V) is measured, disconnect power immediately and inspect the assembly for faulty installation or damage.

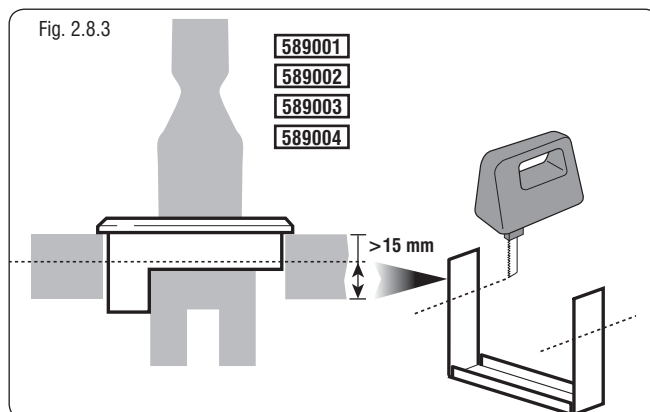


2.8 Installing control panel - all models

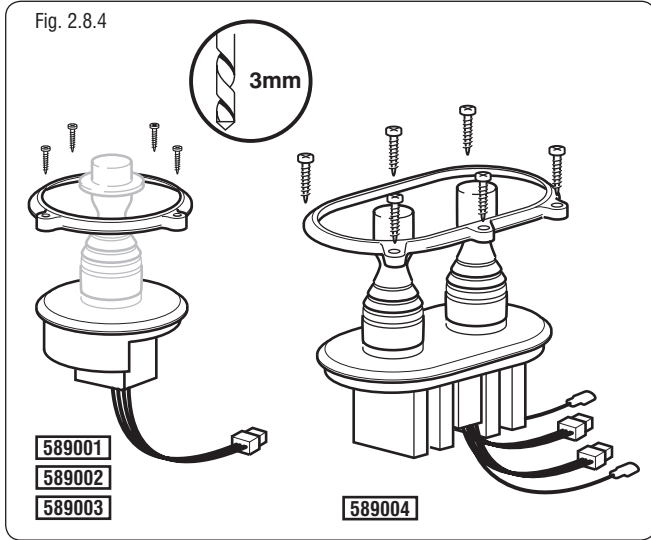
- A 63.5 mm (2 1/2") hole saw is required. Ensure there is sufficient depth for the control panel and access for the switch leads and plug (see saw template).



- The panel has an integral seal and can be clamped from the rear or with the bezel from the top. Trim clamp depending on panel thickness.



- The small plug connects at the panel. If two or more panels are installed use the optional Y connectors (Sec 6.6).
- The auxiliary wire is used to connect an automatic battery switch. Please refer to the units instructions. If automatic battery switch not fitted, disregard auxiliary wire.



2.9 Final checks

Check list electrical

- ⊘ **Check the power is OFF.**
- Check motor connections are tight with rubber boots in place.
- The correct fuse is in place.
- Check all switch wires are connected to correct motor terminal.
Now the cables can be connected to the battery.
- Perform electrical check , Section 2.8.

Operation of electrical unit

- ⚠ **The thruster must not be operated unless it is in water.**
- Ensure batteries are fully charged before switching on the main power.
- When first operating the thruster, make sure you are not close to other vessels.

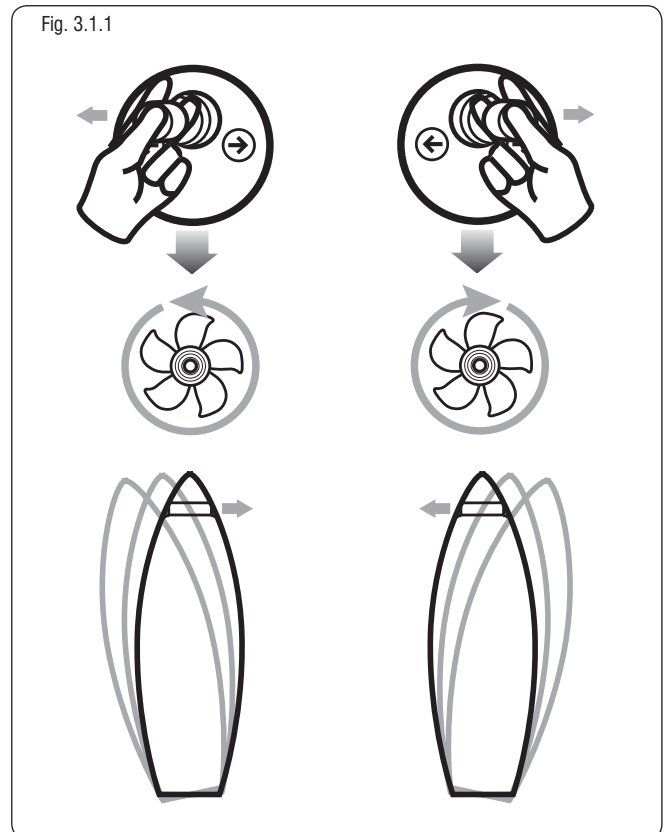
3. Operating your thruster

3.1 140TT 2.0 kW

The thruster can be operated using the Lewmar locking joystick (Part No. 589003) or any water proof momentary two direction switch with a 5 amp rating.

- Switch ON the battery switch.
- Lift the 'top hat' and move the joystick in the desired direction. When the boat movement has been achieved return the joystick to the central position (spring return).

- ⊘ **DO NOT frequently move port to starboard on the joystick in quick succession as this could damage the electric motor.**
- ⚠ **Please ensure that you thoroughly understand the operation and safety requirements of the thruster.**
- ⚠ **Your thruster should not be operated close to swimmers, as a powerful suction of water is generated when in use.**



3.2 140TT 2.2 kW to 300TT 15.0 kW operation and safety features


Safety Features

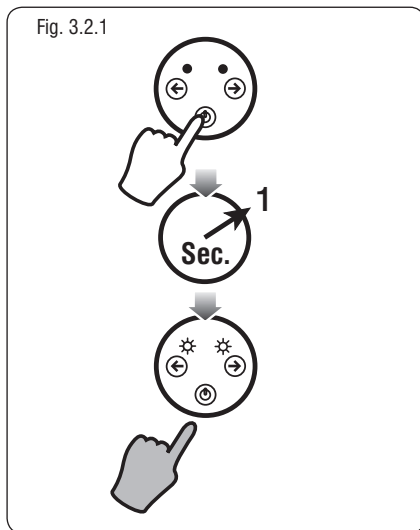
- Lewmar control panel 589001 and 589002.

NOTE: If Thruster is operated constantly for 3 minutes it will power down. Panels will deactivate.

NOTE: Dual Thruster panel has same functions as single.

NOTE: The system is designed to automatically power down after no operation for 20 minutes.

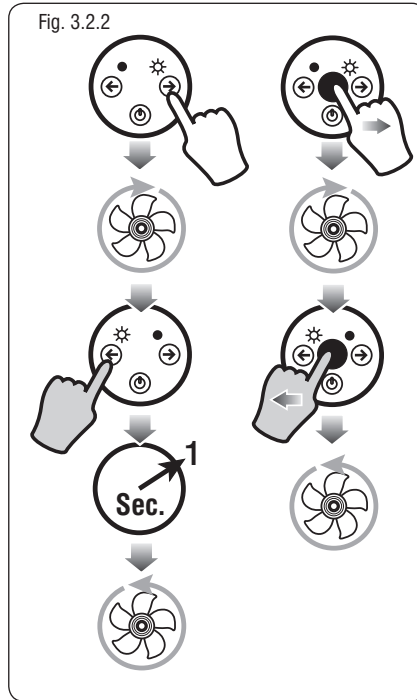
- To activate the control panel press  and hold for 1 second (Fig 3.2.1).



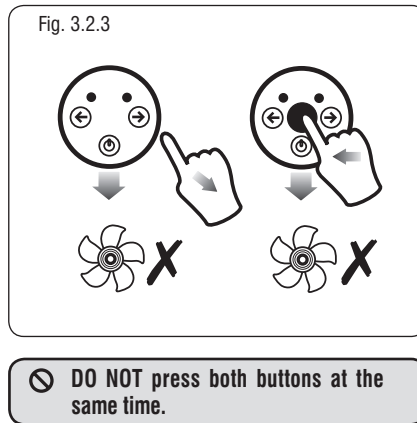
- Changing direction.**

Press the button or move the joystick for the direction you wish to thrust. Press the opposite button or move the joystick to change direction (Fig 3.2.2). After 1 second thruster activates.

NOTE: If thermal cut-out is activated all power to the controls is disabled. Wait for unit to cool down.



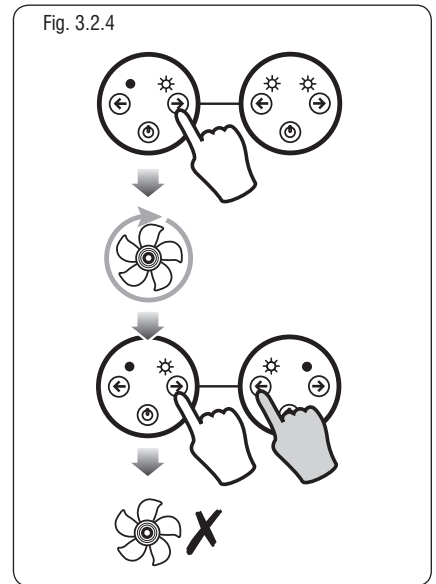
- To cancel either thruster direction stop pressing button or return joystick to central position (Fig 3.2.3).



 **DO NOT** press both buttons at the same time.

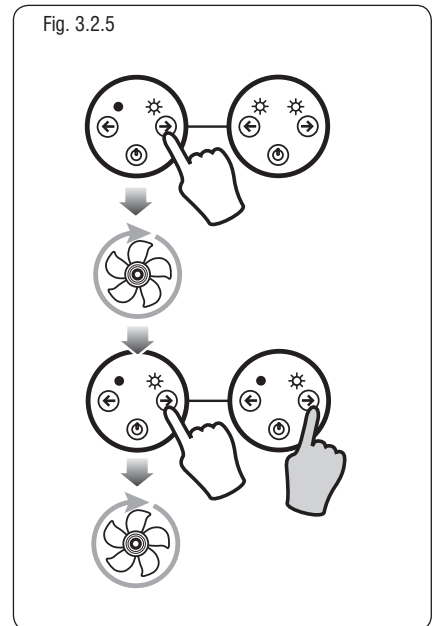
- Additional controller**

Pressing opposite button on a second control panel when thruster is operating will cancel operation of thruster (Fig 3.2.4).



- Additional controller**

Operating same direction button when still in operation on other control panel will have no effect (Fig 3.2.5).



4. Servicing your thruster

4.1 Service schedule

NOTE: Thrusters are more likely to attract ‘debris’, so it is necessary to regularly check the tunnel.

⚠ Before working on unit check battery switch is off or remove the fuse.

New install:

- The anode should be checked after approximately 3-4 months to gauge an appropriate replacement schedule. .

At the annual boat service:

- Remove any debris from tunnel, propeller and hub.
- Replace the anode.
- If the propeller is damaged or heavily contaminated, replace it, best to be safe.
- Apply grease to exposed thruster seal and shaft.
- If hub is removed the tunnel gasket must be replaced.
- Inspect motor, ensure all leads are still tight.
- Check all bolts and nuts are to correct torque.
- Check the motor assembly is dry and that the compartment is water tight.
- Check and clean out thruster compartment.

Electric:

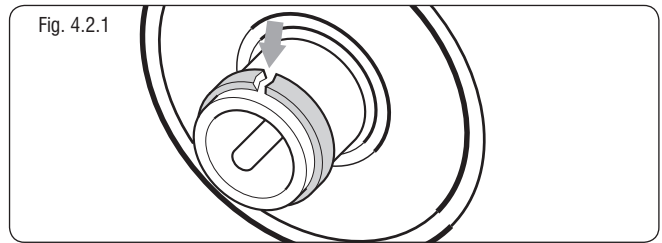
- Inspect electric motor, ensure all leads are still tight.
- Brush out carbon dust from top of electric motor especially on aluminium boats. Recommend qualified electrician.

Hydraulic:

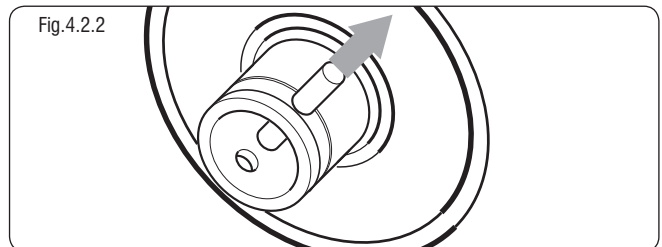
NOTE: Refer to hydraulic system supplier for service requirements.

4.2 Changing drive pin 140TT or 185TT

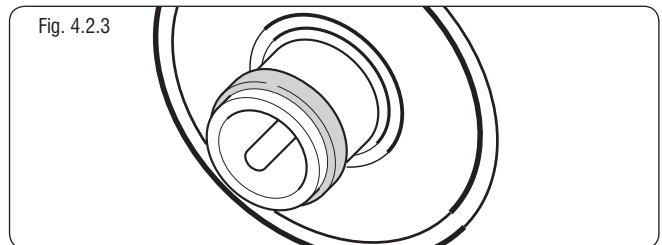
- Cut cable tie on shaft (if fitted).



- Punch out pin parts.



- Tap in new pin and secure with new plastic cable tie.



5. Weight & specifications

5.1 Electric

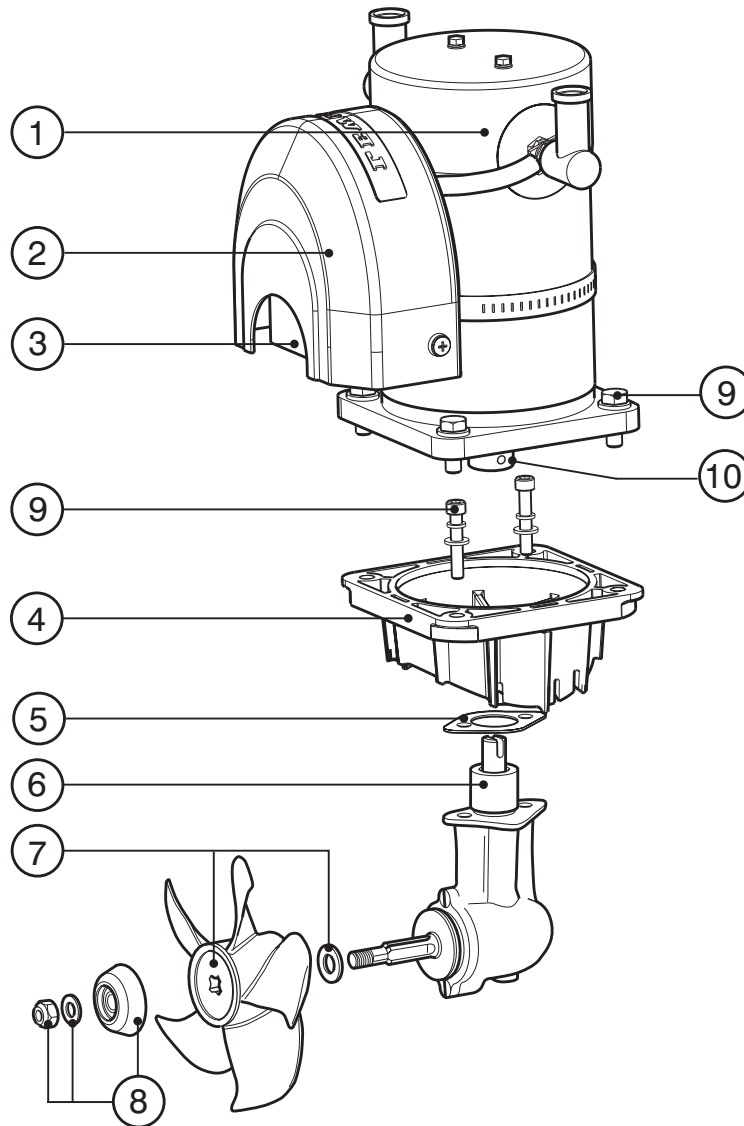
Part Number	Model	Voltage V	Power		Gearbox Material	Tunnel (mm)	Propeller	Thrust		Weight	
			kW	hp				kgf	lbs	kg	lbs
591402	140TT 2.0	12	2.0	2.7	Bronze	140	Single 5 blade	37	81	13	29
591401	140TT 2.2	12	2.2	3.0	Bronze	140	Single 5 blade	42	92	13	29
591801	185TT 3.0	12	3.0	4.0	Bronze	185	Single 5 blade	58	128	20	43
591802	185TT 3.0	24	3.0	4.0	Bronze	185	Single 5 blade	58	128	20	43
591807	185TT 4.0	12	4.0	5.4	Bronze	185	Single 5 blade	65	143	20	43
591808	185TT 4.0	24	4.0	5.4	Bronze	185	Single 5 blade	65	143	20	43
591803	185TT 5.0	12	5.0	6.7	Bronze	185	Single 5 blade	82	180	27	59
581804	185TT 5.0	24	5.0	6.7	Bronze	185	Single 5 blade	82	180	27	59
591805	185TT 6.0	12	6.0	8.0	Bronze	185	Single 5 blade	97	213	27	59
591806	185TT 6.0	24	6.0	8.0	Bronze	185	Single 5 blade	97	213	27	59
591833	185TT 5.0	12 IP	5.0	6.7	Bronze	185	Single 5 Blade	82	180	27	59
591834	185TT 5.0	24 IP	5.0	6.7	Bronze	185	Single 5 Blade	82	180	27	59
591836	185TT 6.0	24 IP	6.0	8.0	Bronze	185	Single 5 Blade	97	213	27	59
592501	250TT 8.0	24	8.0	10.8	Bronze	250	Twin CR 5 Blade	140	308	46	102
592502	250TT 9.6	48	9.6	13.0	Bronze	250	Twin CR 5 Blade	170	374	50	110
592503	250TT 8.0	24	8.0	10.8	Aluminium	250	Twin CR 5 Blade	140	308	46	102
593001	300TT 10.8	24	10.8	14.5	Bronze	300	Twin CR 5 Blade	250	550	65	143
593002	300TT 15.0	48	15.0	20.0	Bronze	300	Twin CR 5 Blade	280	616	68	150
593003	300TT 10.8	24	10.8	14.5	Aluminium	300	Twin CR 5 Blade	250	550	65	143

Part Number	Model	Voltage V	Fuse Amp	Fuse Part Number	Fuse Holder	
					Std - 589006	T2 - 589013
591402	140TT 2.0	12	200	589012	•	•
591401	140TT 2.2	12	200	589012	•	•
591801	185TT 3.0	12	250	589008	•	•
591802	185TT 3.0	24	130	589007	•	•
591807	185TT 4.0	12	400	589010		•
591808	185TT 4.0	24	130	589007	•	•
591803	185TT 5.0	12	400	589010		•
581804	185TT 5.0	24	130	589007	•	•
591805	185TT 6.0	12	500	589011		•
591806	185TT 6.0	24	325	589009	•	•
591833	185TT 5.0	12 IP	400	589010		•
591834	185TT 5.0	24 IP	130	589007	•	•
591836	185TT 6.0	24 IP	325	589009	•	•
592501	250TT 8.0	24	400	589010		•
592502	250TT 9.6	48	250	589008	•	•
592503	250TT 8.0	24	400	589010		•
593001	300TT 10.8	24	500	589011		•
593002	300TT 15.0	48	400	589010		•
593003	300TT 10.8	24	400	589010		•

5.2 Hydraulic

Model	kW	hp	Tunnel (mm)	Propeller/s	Thrust		Weight	
					kgf	lbs	kg	lbs
185TTH	7	10	185	Single 5 Blade	100	220	8	17.5
250TTH	15	20	250	Twin CR 5 Blade	200	240	13	28.5
300TTH	22.5	30	300	Twin CR 5 Blade	300	660	17	37.5

6. Parts list

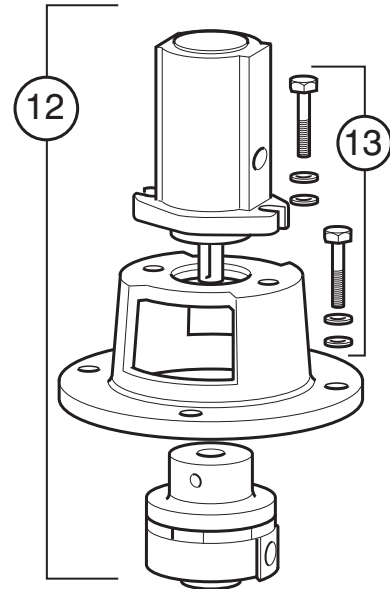
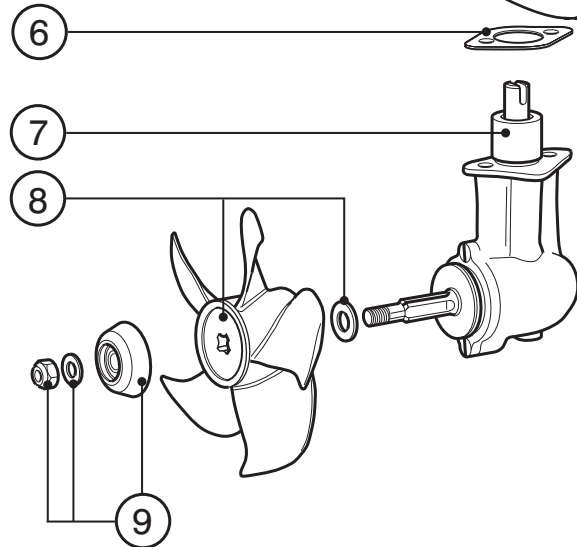
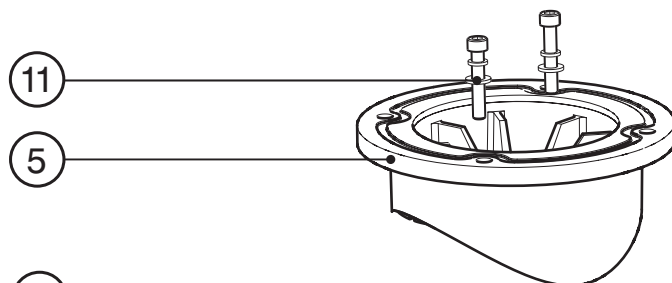
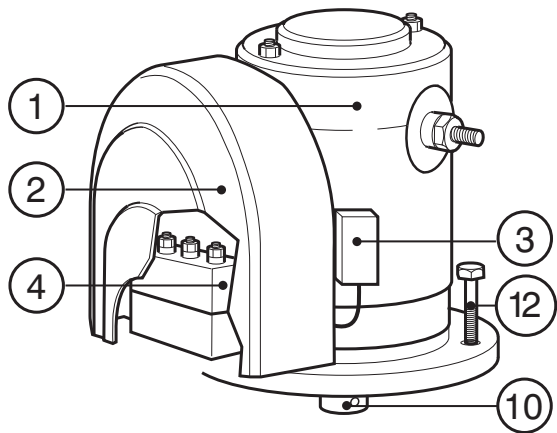


6.1 Model 140TT 2.0 kW 12 V

Item	Part No.	Description
1	581029	Motor Assembly
2	553034	Cover
3	B12526	Solenoid
	559070	Solenoid Loom
4	551052	Mounting Saddle
5	551035	Tunnel gasket
6	581001	Hub assembly
7	589151	Propeller
		Large Washer
8	589150	Propeller anode kit
9	589152	Installation fixing kit
10	559018	Drive pin

6.2 Model 140TT 2.2 kW 12 V

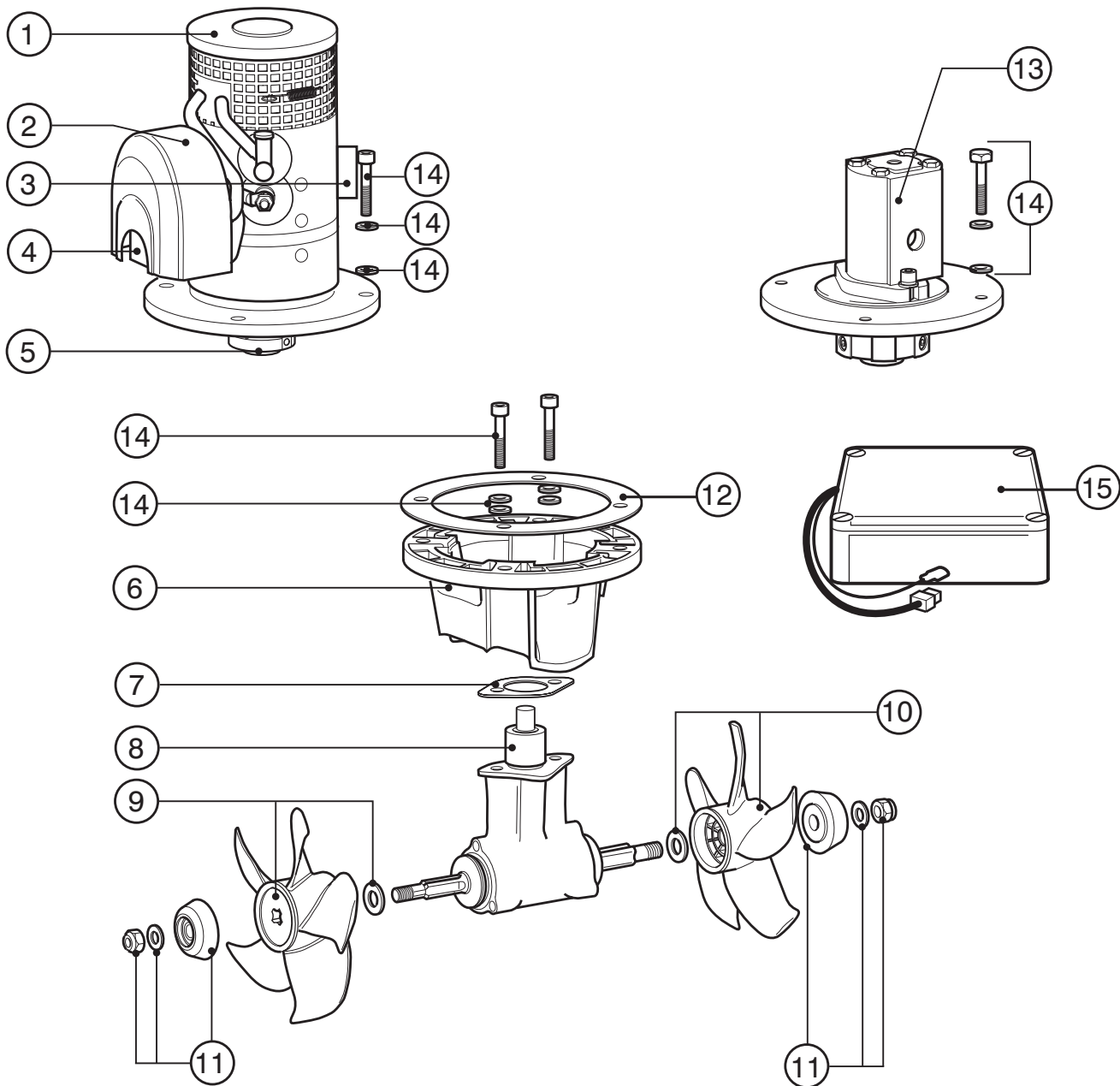
Item	Part No.	Description
1	581026	Motor Assembly
2	553034	Cover
3	B11126	Solenoid
	559003	Black Box
4	551052	Mounting Saddle
5	551035	Tunnel Gasket
6	581001	Hub Assembly
7	589151	Propeller
		Large Washer
8	589150	Propeller Anode Kit
9	589152	Installation Fixings Kit
10	559018	Drive pin



6.3 Model 185TT/H 3.0 to 6.0 kW 12 & 24 V

Item	Part No.	Description	kW	Volts
1	583026	Motor Assembly	3.0	12
	583027	Motor Assembly	3.0	24
	583032	Motor Assembly	4.0	12
	583033	Motor Assembly	4.0	24
	583028	Motor Assembly	5.0	12
	583029	Motor Assembly	5.0	24
	583030	Motor Assembly	6.0	12
	583031	Motor Assembly	6.0	24

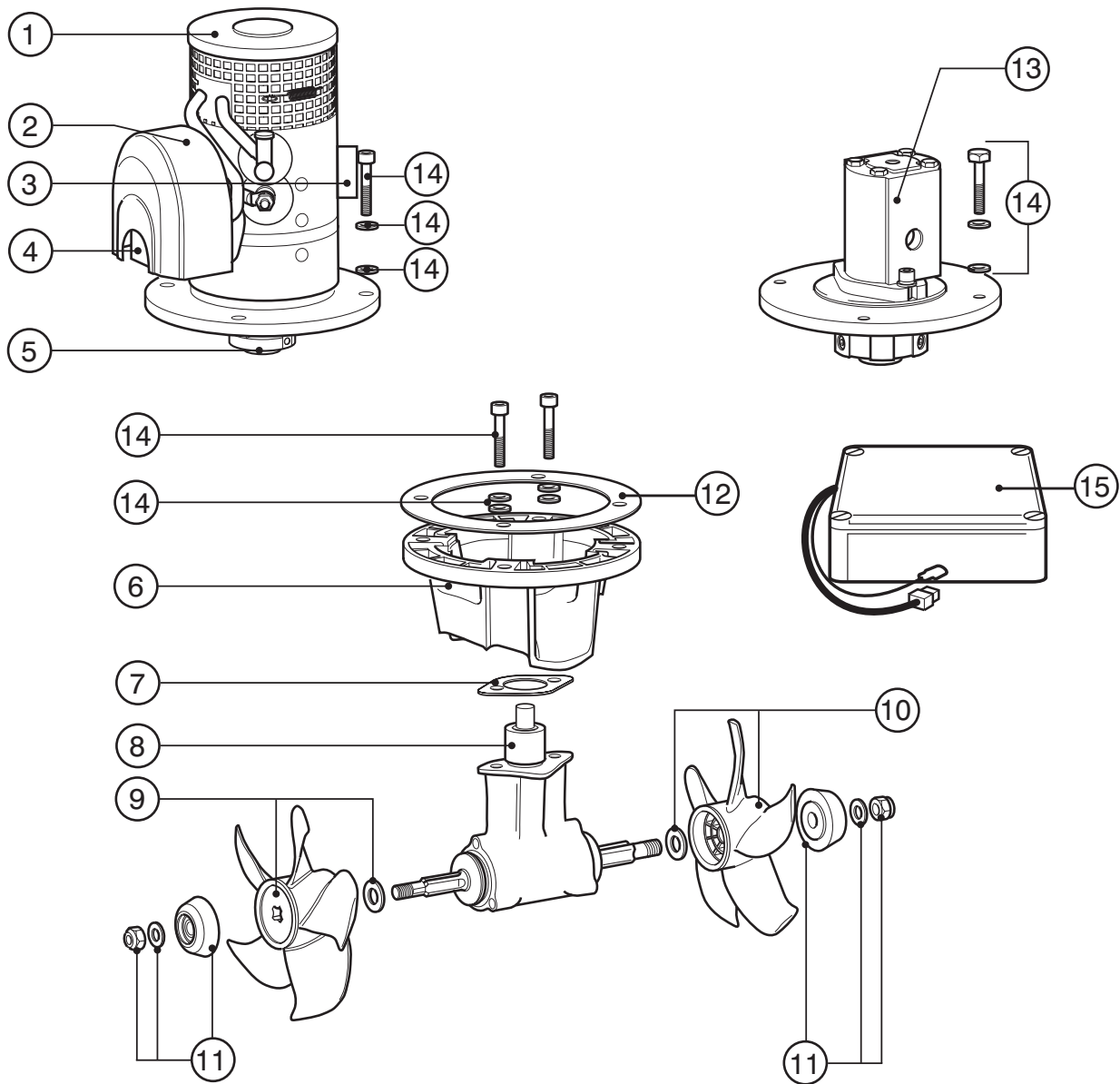
Item	Part No.	Description	kW	Volts
2	553034	Cover	3.0	12-24
	553036	Cover	4.0/5.0	12-24
	555034	Cover	6.0	12
3	559003	Black Box	All	All
	559020	Black Box	6.0	12
4	B11126	Solenoid	3.0	12
	B11127	Solenoid	3.0	24
	B11128	Solenoid	4.0/5.0	12
	B11129	Solenoid	4.0/5.0/6.0	24
	B11130	Solenoid	6.0	12
5	553071	Mounting Saddle	All	All
6	553035	Tunnel Gasket	All	All
7	583001	Hub - 2.2 Ratio	3.0	12-24
	583003	Hub - 1.5 Ratio	4.0-6.0	12-24
8	589351	Propeller	All	All
		Large Washer		
9	589350	Anode Kit	All	All
10	559017	Drive pin	All	All
11	589352	Installation Fixings Kit	3.0	12-24
	589355	Installation Fixings Kit	4.0-6.0	12-24
Hydraulic Only				
12	583040	Hydraulic Motor Assembly	5.0 cc/rev	
	583041	Hydraulic Motor Assembly	6.0 cc/rev	
13	589352	Installation Fixings Kit	All	All



6.4 Model 250TT/H 8.0 kW 24 V

Item	Part No.	Description
1	585026	Motor Assembly 8.0 kW 24 V
	585029	Motor Assembly 9.6 kW 48 V
2	553036	Cover
3	559003	Black Box
4	B11129	Solenoid
5	585014	Coupling
6	555025	Mounting Saddle
7	555035	Tunnel Gasket
8	585002	Hub
9	589551	Right Hand Propeller
		Large Washer

Item	Part No.	Description	
10	589552	Left Hand Propeller	
		Large Washer	
11	589550	Anode Kit	
12	555038	Plastic Washer	
14	589554	Installation Fixings Kit	
		589029	Parallel Switch Box 12/24 V (24 V ONLY)
		589030	Parallel Switch Box 24/48 V (48 V ONLY)
Hydraulic Only			
13	585040	Hydraulic Motor Assembly 26 cc/rev	
	585041	Hydraulic Motor Assembly 16.8 cc/rev	



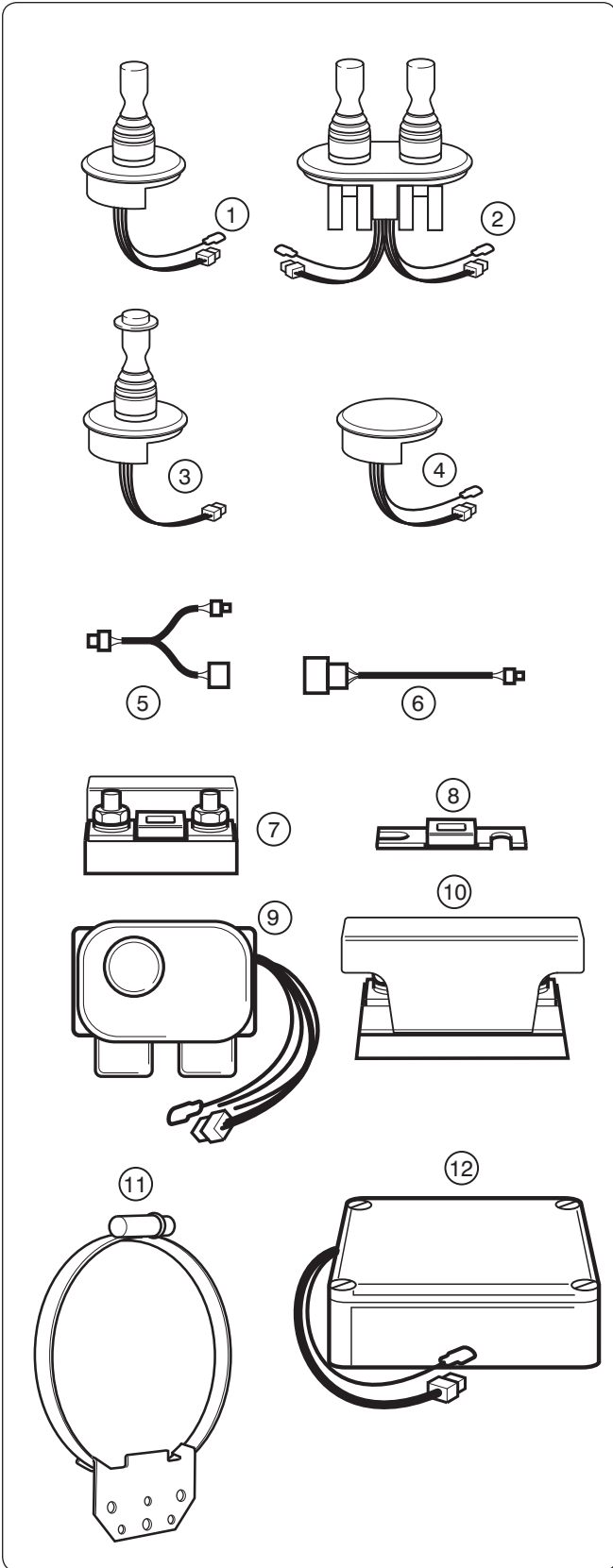
6.5 Model 300TT/H 10.8 to 15.0 kW

Item	Part No.	Description	kW	Volts
1	587026	Motor Assembly	10.8	24
	587027	Motor Assembly	15.0	48
2	555034	Cover	All	All
3	559020	Black Box	All	All
4	B8429	Solenoid	10.8	24
5	585014	Coupling	All	All
6	557025	Mounting Saddle	All	All
7	557035	Tunnel Gasket	All	All
8	587001	Hub	All	All
9	589750	Right Hand Propeller	All	All
		Large Washer		

Item	Part No.	Description	kW	Volts
10	589751	Left Hand Propeller	All	All
		Large Washer		
11	589550	Anode Kit	All	All
12	555038	Plastic Washer	All	All
14	589752	Installation Fixings Kit	All	All
15	589031	300TT 10.8 kW ONLY Heavy Duty Parallel Switch Box 12/24 V	10.8	12-24
	589030	300TT 15.0 kW ONLY Heavy Duty Parallel Switch Box 24/48 V	15.0	24-48
Hydraulic Only				
13	585040	Hydraulic Motor Assembly	30.0 cc/rev	
	585041	Hydraulic Motor Assembly	26.0 cc/rev	
14	589752	Installation Fixings Kit	All	

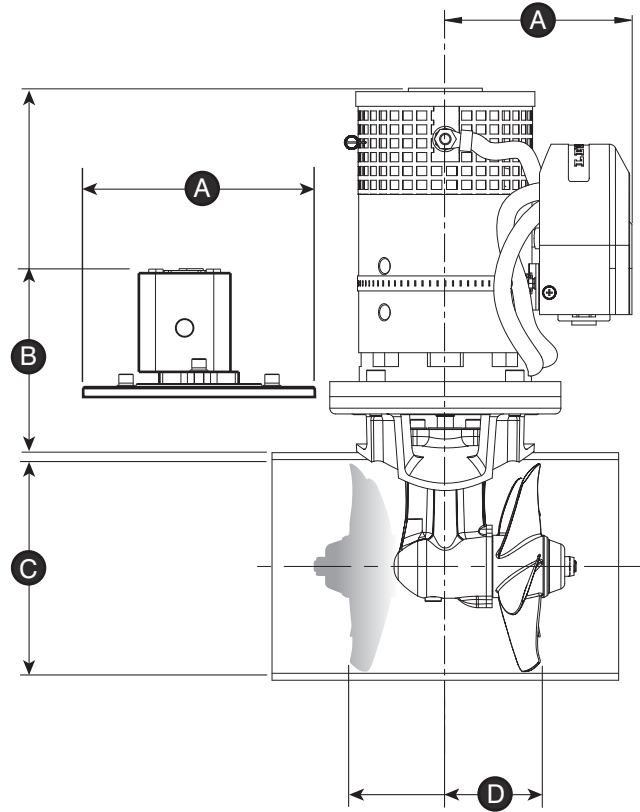
6.6 Accessories

Item	Part No.	Description
1	589002	Single Joystick Panel Controller (NOT 2.0 kW)
2	589004	Double Joystick Controller (NOT 2.0 kW)
3	589003	Locking Single Joystick Controller
4	589001	Touch Panel Controller (NOT 2.0 kW)
5	589025	Y Connector for Dual Controls
6	589016	7 m Control Cable & Connectors
	589017	10 m Control Cable & Connectors
	589018	14 m Control Cable & Connectors
	589019	18 m Control Cable & Connectors
	589020	22 m Control Cable & Connectors
7	589006	Fuse Holder
8	589007	130 A ANL Type Fuse
	589008	250 A ANL Type Fuse
	589009	325 A ANL Type Fuse
	589010	400 A ANL Type Fuse
	589011	500 A ANL Type Fuse
	589012	200 A ANL Type Fuse
9	589034	Automatic Battery Switch (NOT 140TT 2.0 kW)
10	589013	T2 Fuse Holder
11	589064	Motor Support Bracket Kit 185TT
	589066	Motor Support Bracket Kit 250TT
	589065	Motor Support Bracket Kit 300TT
12	589030	Parallel Switch Box 24 - 48 V
	589029	Parallel Switch Box 12 - 24 V
	589031	300TT Only Heavy Duty Parallel Switch Box 12 - 24 V



7. Dimensions

Fig. 7.1.1




7.1 Electric

Model	Voltage	Power	A		B		C		D	
			mm	in	mm	in	mm	in	mm	in
140TT 2.0	12 V	2.0 kW (2.7 hp)	123	4 5/8	235	9 1/4	140	5 1/2	73	2 7/8
140TT 2.2	12 V	2.2 kW (3.0 hp)	123	4 5/8	211	8 5/16	140	5 1/2	73	2 7/8
185TT 3.0	12 V	3.0 kW (4.0 hp)	130	5 1/8	271	10 21/32	185	7 9/32	85	3 11/32
185TT 3.0	24 V	3.0 kW (4.0 hp)	130	5 1/8	271	10 21/32	185	7 9/32	85	3 11/32
185TT 4.0	12 V	4.0 kW (5.4 hp)	148	5 13/16	294	11 9/16	185	7 9/32	85	3 11/32
185TT 4.0	24 V	4.0 kW (5.4 hp)	148	5 13/16	294	11 9/16	185	7 9/32	85	3 11/32
185TT 5.0	12 V	5.0 kW (6.7 hp)	162	6 3/8	316	12 7/16	185	7 9/32	85	3 11/32
185TT 5.0	24 V	5.0 kW (6.7 hp)	162	6 3/8	316	12 7/16	185	7 9/32	85	3 11/32
185TT 6.0	12 V	6.0 kW (8.0 hp)	173	6 13/16	316	12 7/16	185	7 9/32	85	3 11/32
185TT 6.0	24 V	6.0 kW (8.0 hp)	173	6 13/16	316	12 7/16	185	7 9/32	85	3 11/32
250TT 8.0	24 V	8.0 kW (10.8 hp)	165	6 1/2	405	15 15/16	250	9 27/32	238	9 3/8
250TT 9.6	48 V	9.6 kW (13.0 hp)	165	6 1/2	405	15 15/16	250	9 27/32	238	9 3/8
300TT 10.8	24 V	10.8 kW (14.5 hp)	203	8	450	17 23/32	300	11 13/16	320	12 19/32
300TT 15.0	48 V	15.0 kW (20 hp)	203	8	450	17 23/32	300	11 13/16	320	12 19/32

7.2 Hydraulic

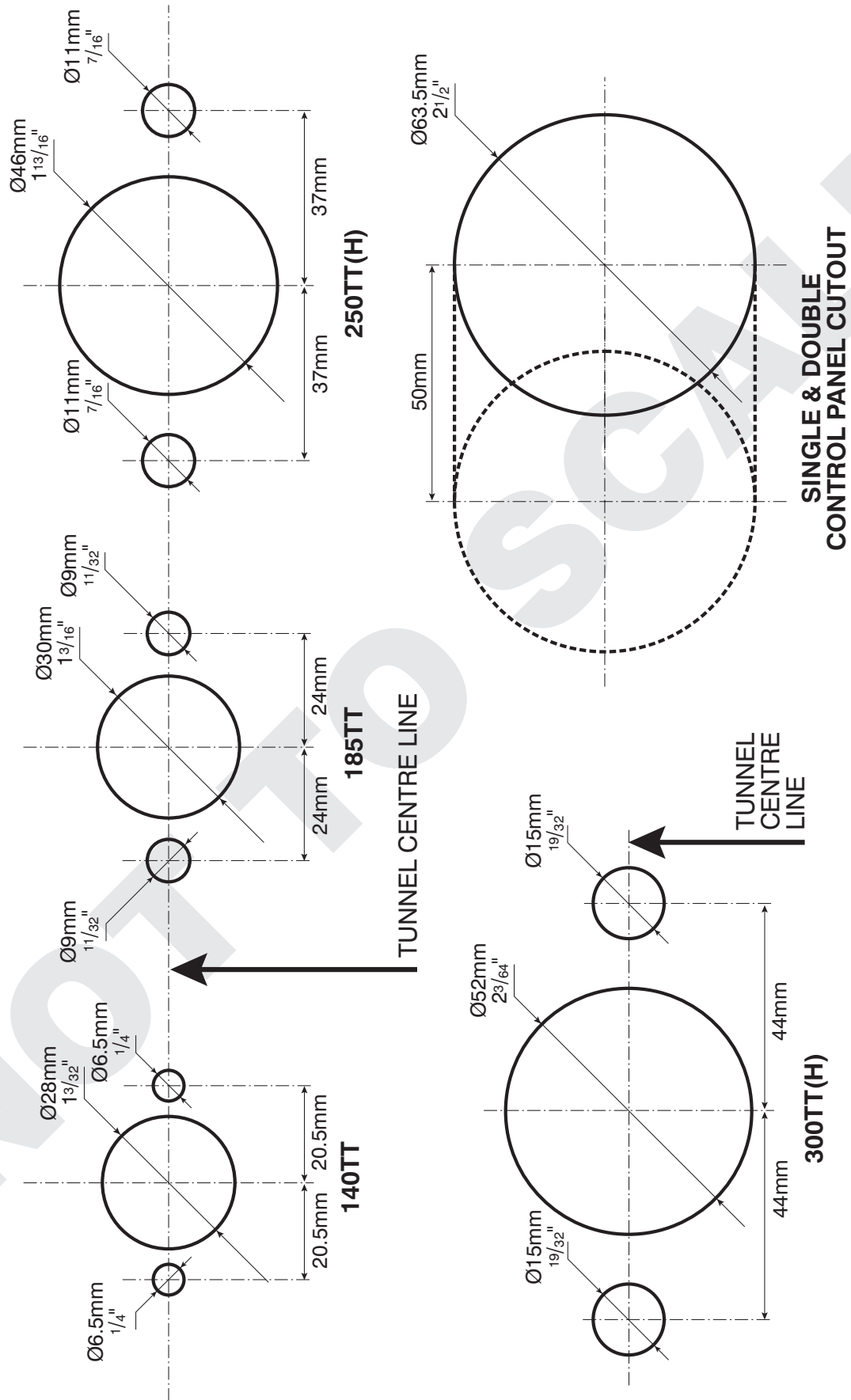
Model	kW	hp	A		B		C		D	
			mm	in	mm	in	mm	in	mm	in
185TTH	7	10	200	7 7/8	202	7 15/16	185	7 9/32	83	3 9/32
250TTH	15	20	258	10 5/32	234	9 7/32	250	9 27/32	238	9 3/8
300TTH	22.5	30	258	10 5/32	256	10 1/16	300	11 13/16	320	12 19/32

8. Fault finding

<p>Fault</p> <ul style="list-style-type: none"> • Thrust in wrong direction? 	<p>Action</p> <ul style="list-style-type: none"> • Change contactor wires on motor solenoid (See section 2.1).
<p>Fault</p> <ul style="list-style-type: none"> • Fuse keeps blowing? 	<p>Action</p> <ul style="list-style-type: none"> • Wrong fuse fitted - check rating and replace. • Propeller restricted or jammed causing excessive load on motor - check and clear. Check that propeller washer is fitted see Section 6.
<p>Fault</p> <ul style="list-style-type: none"> • Control Panel does not illuminate? 	<p>Check</p> <ul style="list-style-type: none"> • Power - Hold  for 1 second. • Battery is connected. • Main switch ON, check fuse. • Control loom connections. • Long operation has tripped thermal switch. Wait 20 minutes for motor to cool and reset. <p>DO NOT attempt to cool motor by any other means.</p>
<p>Fault</p> <ul style="list-style-type: none"> • Control panel illuminates but no thrust? 	<p>Action</p> <ul style="list-style-type: none"> • Are batteries charged? • Check main motor connections are tight.
<p>Fault</p> <ul style="list-style-type: none"> • Poor thrust or thrust in one direction only?? 	<p>Action</p> <ul style="list-style-type: none"> • Batteries not large enough or charged, cables not recommended size. Voltage at motor when running should be a minimum 10 V for 12 V and 21 V for 24 V units. • Blockage in tunnel/propeller jammed with debris, switch off main power, inspect and clear. • Propeller washers fitted wrong. See Sec.1.6 • Check motor brush springs are located properly, brushes should have good contact with the commutator.
<p>Fault</p> <ul style="list-style-type: none"> • 140TT and 185TT ONLY - Motor turns but no drive? 	<p>Action</p> <ul style="list-style-type: none"> • DO NOT continue to run thruster. • Shear pin broken, remove 4 motor bolts, see Sec. 4.2, drive out old pin and replace with new pin. • Propeller blades broken. Replace with new.
<p>Fault</p> <ul style="list-style-type: none"> • Thruster noisy and vibrating? 	<p>Action</p> <ul style="list-style-type: none"> • Check propeller is not touching the tunnel wall. • 140 - 185 models: Check hub height is correct, see section 7.

 If in doubt contact Lewmar.com

9. Cutting templates



10. Lewmar limited warranty

LIMITED WARRANTY and KEY TERMS OF SUPPLY BY LEWMAR

Lewmar warrants that in normal usage and with proper maintenance its products will conform with their specification for a period of three years from the date of purchase by the end user, subject to the conditions, limitations and exceptions listed below. Any product, which proves to be defective in normal usage during that three-year period, will be repaired or, at Lewmar's option, replaced by Lewmar.

A CONDITIONS AND LIMITATIONS

- i Lewmar's liability shall be limited to the repair or replacement of any parts of the product which are defective in materials or workmanship.
- ii Responsibility for the selection of products appropriate for the use intended by the Buyer shall rest solely with the Buyer and Lewmar accepts no responsibility for any such selection.
- iii Lewmar shall not be liable in any way for Product failure, or any resulting loss or damage which arises from:
 - a use of a product in an application for which it was not designed or intended;
 - b. corrosion, ultra violet degradation or wear and tear;
 - c. a failure to service or maintain the product in accordance with Lewmar's recommendations;
 - d. faulty or deficient installation of the product (unless conducted by Lewmar);
 - e. any modification or alteration of the product;
 - f. conditions that exceed the product's performance specifications or safe working loads.
- iv Product subject to a warranty claim must be returned to the Lewmar outlet which supplied the product for examination unless otherwise agreed by Lewmar in writing.
- v This warranty does not cover any incidental costs incurred for the investigation, removal, carriage, transport or installation of product.
- vi Service by anyone other than authorised Lewmar representatives shall void this warranty unless it accords with Lewmar guidelines and standards of workmanship.
- vii Lewmar's products are intended for use only in the marine environment. Buyers intending to use them for any other purpose should seek independent professional advice as to their suitability. Lewmar accepts no liability arising from such other use.

B EXCEPTIONS

Cover under this Warranty is limited to a period of one year from the date of purchase by the end user in the case of any of the following products or parts of products:

- Electric motors and associated electrical equipment
- Electronic controls
- Hydraulic pumps, valves and actuators
- Weather seals
- Products used in "Grand Prix" racing applications

C LIABILITY

- i Lewmar's liability under this warranty shall be to the exclusion of all other warranties or liabilities (to the extent permitted by law). In particular (but without limitation):
 - a Lewmar shall not be liable for:
 - Any loss of anticipated turnover or profit or indirect, consequential or economic loss ;
 - Damages, costs or expenses payable to any third party;
 - Any damage to yachts or equipment;
 - Death or personal Injury (unless caused by Lewmar's negligence).

Some states and countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

- b Lewmar grants no other warranties regarding the fitness for purpose, use, nature or satisfactory quality of the products.
- ii Where applicable law does not permit a statutory or implied warranty to be excluded, then such warranty, if permitted by that state or country's law, shall be limited to a period of one year from the date of purchase by the end user. Some states and countries do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

D PROCEDURE

Notice of a claim for service under this warranty shall be made promptly and in writing by the end user to the Lewmar outlet which supplied the product or to Lewmar at Southmoor Lane, Havant, Hampshire, England PO9 1JJ.

E SEVERANCE CLAUSE

If any clause of this warranty is held by any court or other competent authority to be invalid or unenforceable in whole or in part, the validity of the remaining clauses of this warranty and the remainder of the clause in question shall not be affected.

F OTHER RIGHTS

This warranty gives you specific legal rights, and you may also have other legal rights, which vary, from state to state and country to country.

In the case of European States a Consumer customer (as defined nationally) has legal rights under the applicable national law governing the sale of Consumer Goods; this Warranty does not affect those rights.

G LAW

This warranty shall be governed by and read in accordance with the laws of England or the state or country in which the first end user is domiciled at the time of purchase of the product.

H DISPUTES

Any dispute arising under this warranty may, at the option of the end-user, be referred to alternative dispute resolution under the rules of the British Marine Federation or to the Courts of the State whose law shall govern the warranty or to the Courts of England and Wales.

The British Marine Federation may be contacted at Marine House, Thorpe Lea Road, Egham, England, TW20 8BF



www.lewmar.com

© Copyright 2010 Lewmar Ltd. All rights reserved.

500100