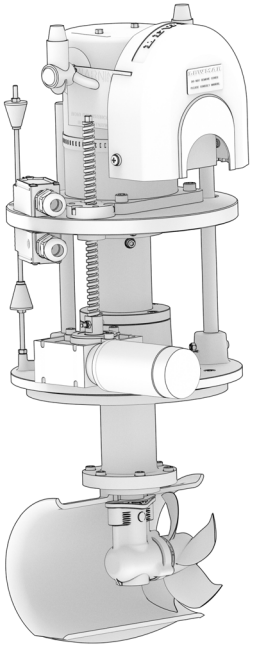
LEWMAR®

125 VRTT Pontoon Thruster

Manual ref 55110293 iss.4



Owner's Installations, Operation & servicing manual

1 - Introduction

Dear Customer,

Thank you for choosing Lewmar. Lewmar products are world renowned for their quality, technical innovation and proven performance. With a Lewmar product 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

CE Approvals

For CE approval certificates contact Lewmar.

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 125VRTT MUST NOT BE USED AT SPEEDS GREATER THAN 5KTS.

2 - Safety Notice

⚠ WARNING!

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.

- 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.
- 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.
- For safety RT to only be supplied with Lewmar ICU or control system.

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.

⚠ 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.

3 - Installation

3.1 Fitting the Thruster

The VRTT Thruster is supplied with the leg raised for ease of installation. Correct installation of the Thruster, associated equipment and the watertight integrity of the vessel is the responsibility of the installer.

3.2 Placement

For Bow installation the thruster should be installed as far forward as possible. When the VRTT is lowered to the Thrust position, the centre line of the hub must be a minimum of 1.5 x propeller diameter below the water line and clear of the hull. The performance of the Thruster is largely due to the power source supplying the Thruster motor. Adequate space should be allowed inside the hull for electric cables and access for service etc. It is also important that the area around the thruster be kept clear of any loose items. It is recommended that if the area is to be used for additional storage that a removable cover or barrier be constructed around the unit to prevent damage to the unit. This area must also be kept dry to avoid damage.

⚠ It is important that nothing can cause jamming of the raise/lower mechanism or damage to the stop switches.

This area must be kept dry while leaving sufficient room to allow the motor and other electrical to breathe. Ideally this area should be ventilated.

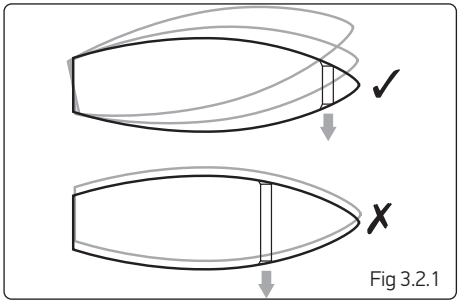


Fig 3.2.1

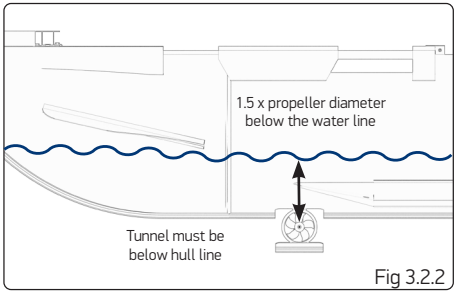


Fig 3.2.2

3.3 - Lower Flange Fitment

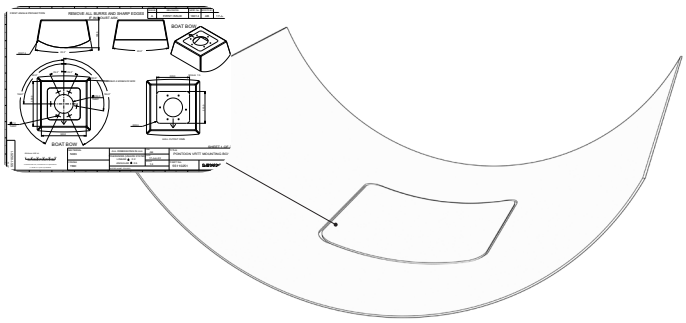


Fig 3.3.1

Cut the marked up hole in the hull.

Map out location and mark door opening,

- See section 13 for setting-out dimension

⚠ Important!: Keep the flange as level as possible when fitting.

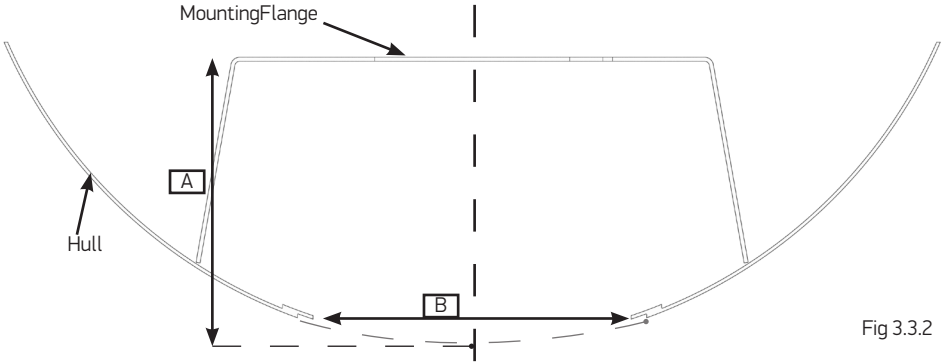


Fig 3.3.2

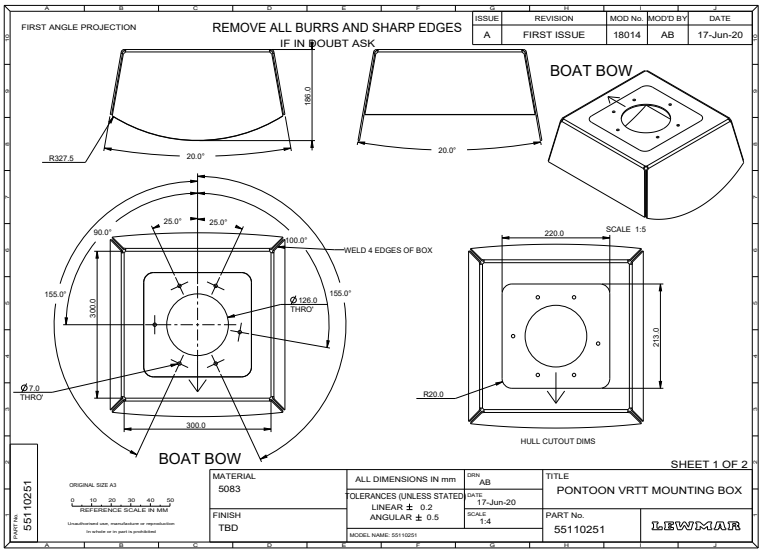
Cut opening piece of hull and prepare area for welding mounting box.

- Height of flange should be +-5mm

Note minimum cut Height!

- Note minimum height, width & depth required for each lower flange. (See Fig 3.3.3)

VRTT MODEL	(A) HEIGHT MM	(B) MINIMUM WIDTH MM	MINIMUM DEPTH MM
125	190	220	



Recommended mounting box shown above. Other shaped mounting plates can be used, but must be to the correct height, and also sealed from below.

3.4 Lifting the unit

The Thruster is heavy so when lifting the Thruster unit from its packing case, ensure that adequate lifting strops are used. The thruster should not be lifted by its actuator assembly or propeller shroud. Extra caution should be used to avoid damaging these parts and the micro switches and control box. When moving the Thruster, ensure that the seating surfaces of the main housing are protected against potential damage.

3.5 Fitting into the hull

The thruster requires a compartment to be constructed within the hull to mount the assembly, with an opening in the bottom of the hull for thruster to be deployed and retract through.

The top of this watertight compartment is to act as the mounting seat for the thruster base plate. This watertight compartment must be designed to take the weight of the thruster, the transfer of thrust to the hull and any additional forces created while the vessel is in motion. It is recommended that this is carried out by a qualified navel architect.

The VRTT Thruster is supplied in the retracted position for ease of transportation. The thruster will need to be lowered once located. The tunnel can then be removed to allow the thruster assembly to be posted down through the top of the hull. The unit is shipped with only 2 bolts holding the tunnel on.

Securing ring should also be removed from the bottom of the thruster.

4 - Fitting

4.1 Place upper VRTT

Assembly on to the lower flange.

1. Lower thruster through hole in mounting box. Ensure 2 orings are in place. Use grease to temporarily hold orings in place while lowering thruster. Line bolt clearance holes.
2. Push on securing ring from underneath, ensuring that 3 orings are used and in place. Apply grease to Oring.
3. Secure retaining ring with 6 bolts from above thruster.

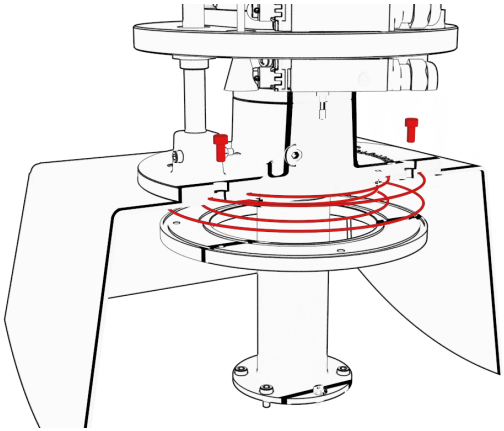


Fig 4.1.1

4. Replace tunnel assembly. Ensure oring is in place
5. Rotate prop if motor shaft doesnt line up with thruster hub
6. Secure tunnel asser

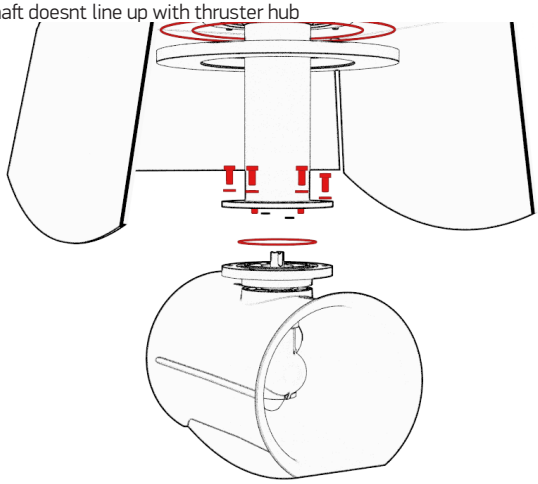


Fig 4.1.2

5 - Adjust Thruster Up-Down Posn

- If the fully up position does not line up with your hull, the limit switch position can be adjusted.
- To raise full retracted position, adjust the top cone upwards
- To lower full extended position, adjust the bottom cone downwards.
- Above and below each cone is a nut. Tighten to 10Nm after adjustment with application of Blue Loctite 243

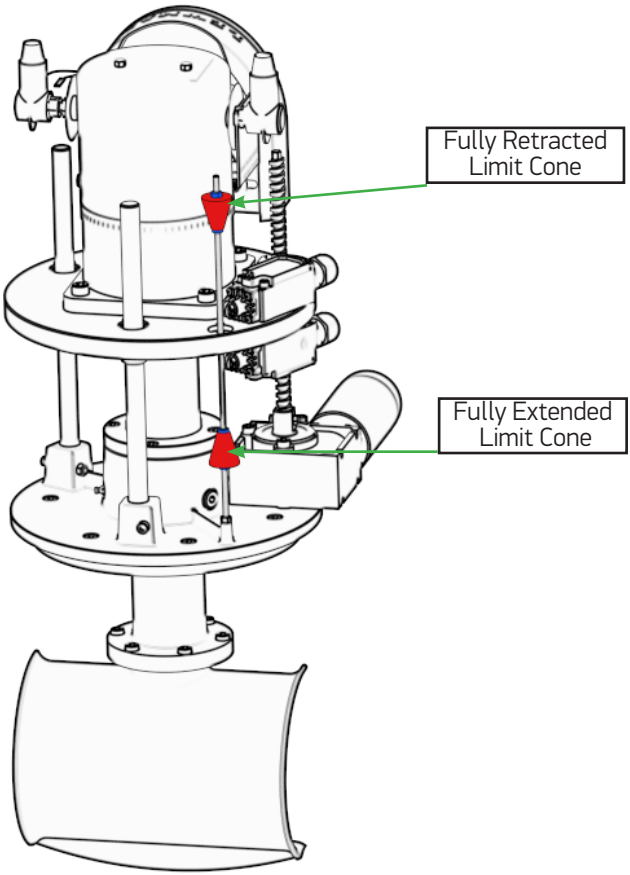


Fig 5.2

6 - Fit ICU and wire to VRTT, power Supply:

Find a suitable location for the ICU. The ICU needs to be in a dry environment and away from the motor, due to electrical noise. The ICU should be located in the vertical plane, as per the arrow on the lid, and within 5 meters of the motor. It is recommended that the ICU not is attached directly to the motor.

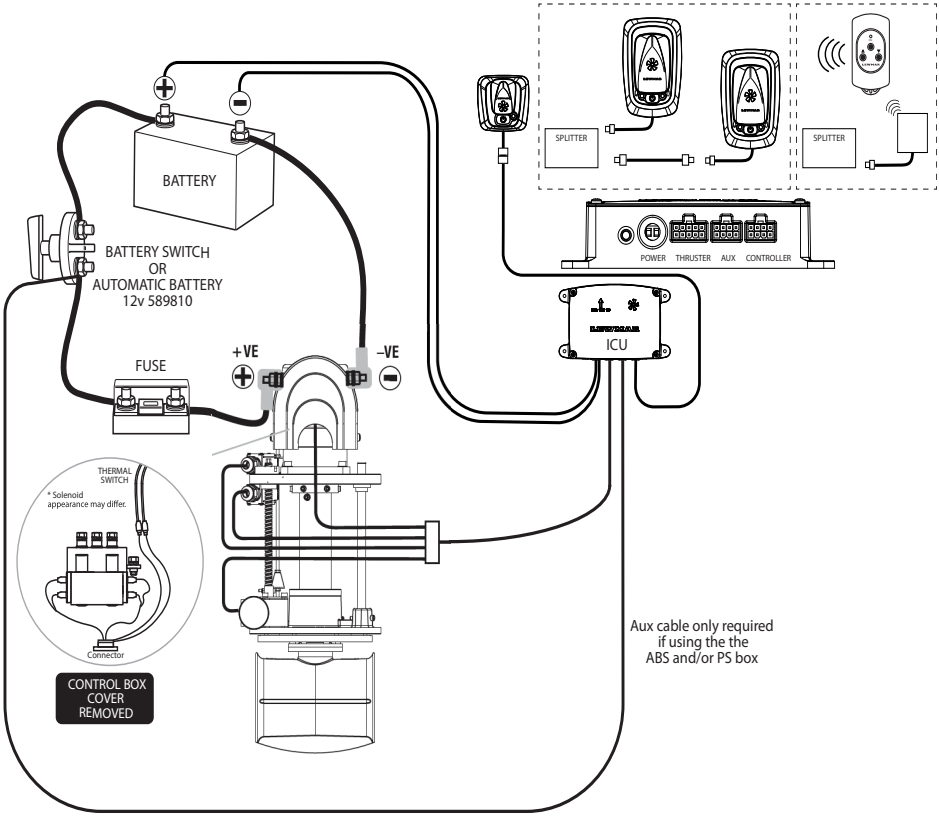
The ICU requires its own battery supply, follow locate electrical law for the installation.

1. The ICU has a 5A circuit breaker.
2. ICU power cable should be rated for 5-amps minimum.

Connect the VRTTs flying lead into the THRUSTER port of the ICU.

Electrical motor installs

- The motor requires its own battery supply. Battery + is marked on the motor. The motor should be wired to the battery with a supply switch and circuit breaker.(Hold battery terminal when tightening nuts)



7 - Installation of electric motor

7.1 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.
- Tighten the bolts to 20 Nm (15 lbs.ft).

⊘ DO NOT overtighten electric motor terminal nuts.

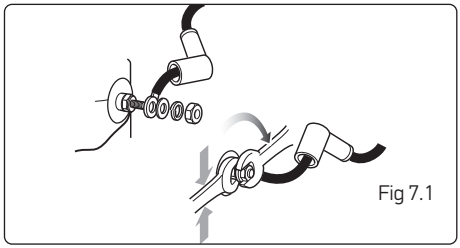


Fig 7.1

7.2 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 7.2.1).
- Live wire exposed! (Fig. 7.2.2). Correct the cable installation to match (Fig 7.2.1).
- Terminal or motor is damaged. Contact Lewmar Limited (Fig 7.2.3).
- Crimp inverted and is touching motor! (Fig 7.24).

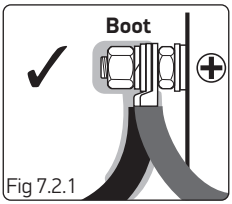


Fig 7.2.1

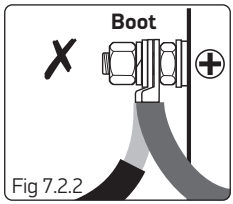


Fig 7.2.2

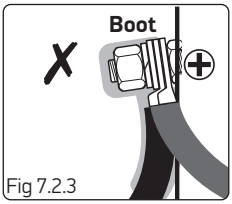


Fig 7.2.3

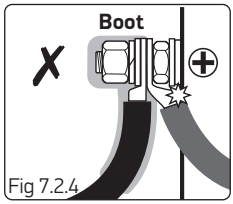


Fig 7.2.4

7.3 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 20 m (66 ft) of cable with a model VRTT125 thruster would need 70 mm² 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 in line 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 RT140. 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 10V for 12V 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.

7.4 Wiring Table

MODEL	VOLTAGE (V)	STATED CURRENT DRAW (A)	CIRCUIT BREAKER (A)	CABLE SIZES (NORME ISO)	
				SECTION (mm^2)	LENGTH (m)
125 VRTT 2.0 kW	12	280	200	70	14

Lewmar recommends cable insulation rated 90°C or higher. It is the responsibility of the installer to confirm current capacity and voltage drop are within the limits as specified by local marine electrical regulations. Cable sizes are for guidelines only, always consult a marine electrician.

7.5 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 7.5.1

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.

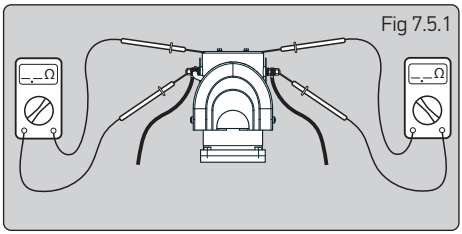


Fig 7.5.1

Test 2. Fig 7.5.2

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 12V is measured, disconnect power immediately and inspect the assembly for faulty installation or damage.

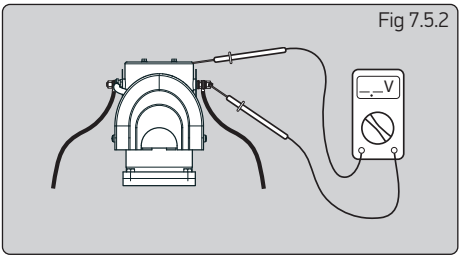


Fig 7.5.2

7.6 Installing control panel - all models

A 63.5 mm (2½") 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).

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.

Fig. 7.6.1

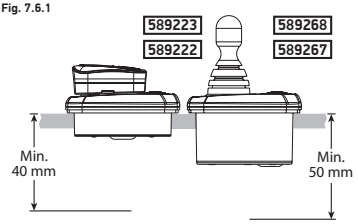
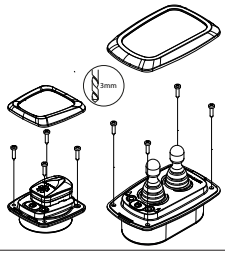
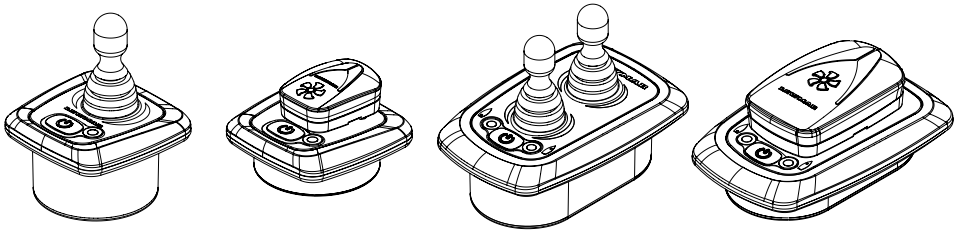


Fig. 7.6.2





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7.7 Final checks

⊘ Check the power is OFF

⚠ The thruster must not be operated unless it is in water.

Check list electrical

- 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..

Operation of electrical unit

- 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.

9 - Operating your thruster

9.1 125 VRTT Operation and safety features

Turning system On/Off

- To turn the system on press and hold the ON button for 1 second. If the system is active the panel LED will Flash green during retracting, LED light will turn solid once deployed
- To turn the system OFF press the ON button once. The system will flash green while retracting then switch off and the LED will turn off.
- If the system is in fault mode (Solid RED LED) Pressing the ON button will turn the system off.

Safety Features

- If the thruster is operated constantly in one direction for more than 3 minutes, the system will enter fault mode. When in fault mode, the control panel LED will turn RED.
- If the system is receiving a PORT/STBD signal when turning the system on, the system will enter fault mode. When in fault mode, the control panel LED will turn RED. This prevents the thruster from unintentionally activating during start-up due to a wiring fault, or a second joystick accidentally being operated.
- If PORT and STBD signals are received simultaneously then the system will stop thrusting.
- The system will automatically power down after 1 minutes of inactivity for VRTT thrusters.
- When changing thrust instantly from PORT to STBD / vice-versa there will be a short delay to allow the propeller to come to rest before acceleration in the opposite direction.
- The thruster motor is fitted with a thermal switch to prevent thruster activation if the motor overheats. If the motor temperature is too high the system will stop operating and the panel LED will FLASH RED. Once the motor returns to a safe temperature the LED will turn GREEN and thruster operation can recommence.
- The system will detect if the battery voltage is low and indicate this by turning the control panel LED AMBER. The is for indication only and will not affect thruster performance.
- If the thruster hits a hard object while deploying, the circuit breaker on the ICU will blow and system will be powered down. When the breaker is reset, and the system powers up, the VRTT will automatically retract back to the home position.
- If the VRTT doesn't reach its limit switch within 15s, depoloyment will stop, and red fault light will come on.

COLOUR	STATUS
Green (Flashing)	RT Thruster Extending / Retracting
Green	System ON
Amber	Low Voltage
Red (Flashing)	Motor High Temperature
Red	Fault
Black	Off / No Power Source / Circuit Breaker Blown

10 - Servicing your thruster

10.1 Service schedule

Before any intervention on the thruster, switch off the device by operating the battery switch or removing the fuse.

Thrusters are more likely to attract 'debris', so it is necessary to regularly check the tunnel.

At the annual boat service:

- Remove any debris from tunnel, propeller and hub.
- If the propeller is damaged or heavily contaminated, replace it, best to be safe.
- Apply grease to exposed thruster seal and shaft.
- Top up centre hub grease through grease nipple.
- 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.

10.2 Changing drive pin

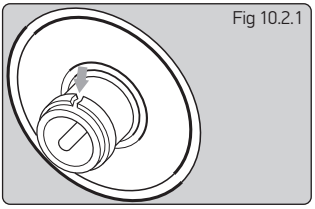


Fig 10.2.1

Cut cable tie on shaft (if fitted)

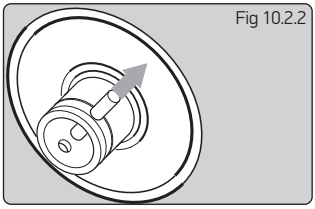


Fig 10.2.2

Punch out pin parts

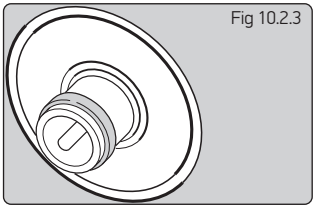


Fig 10.2.3

Tap in new pin and secure with new plastic cable tie

10.3 Final checks - All models

Check list mechanical

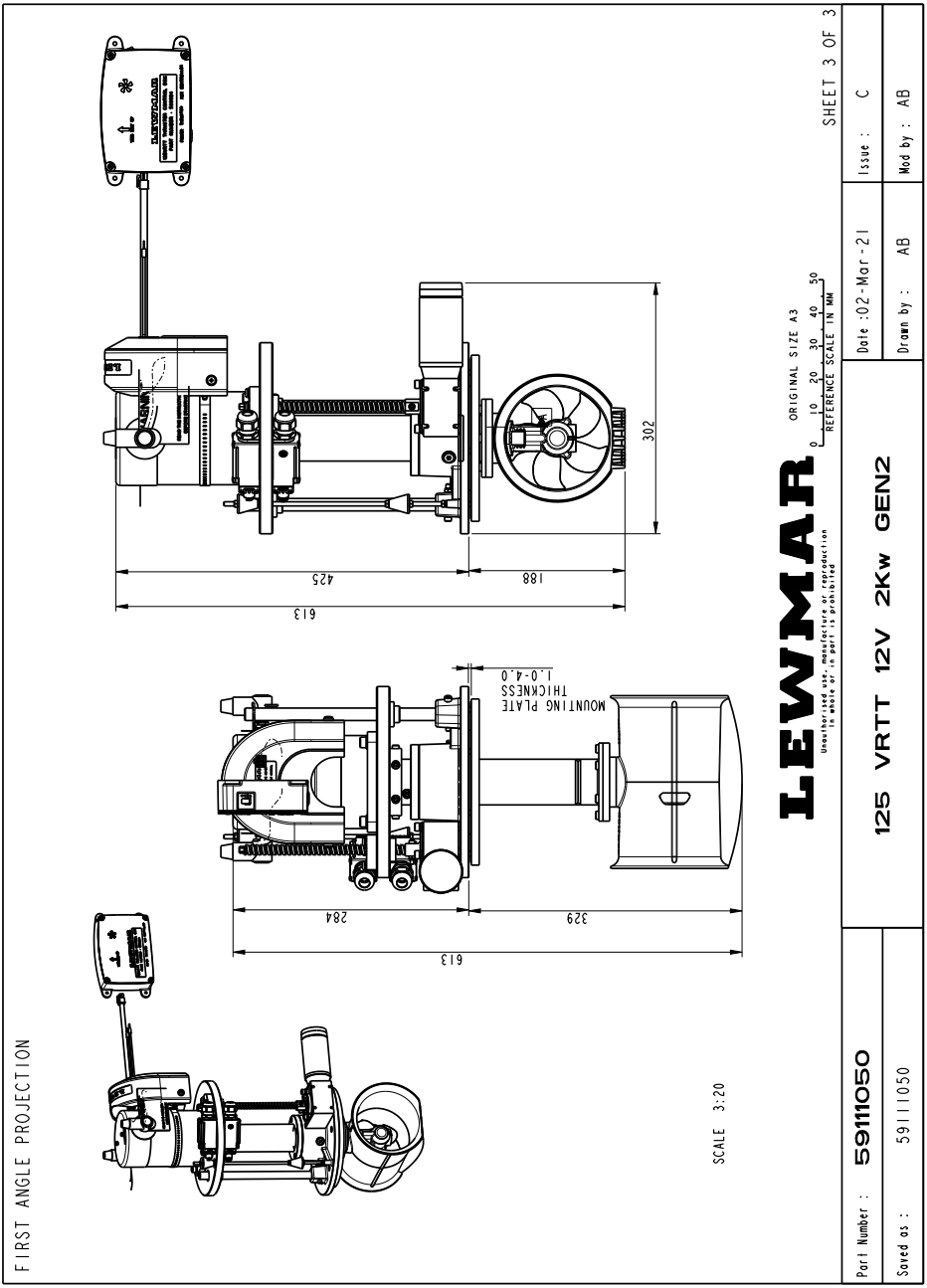
- Check all bolts and nuts are tight.
- Check the propeller/s are correctly installed and the nuts tightened.
- Check the motor control box cover is in place.
- Check the propeller/s can be turned - before working on unit check battery switch is off or remove the fuse.

12 - Fault finding

The system will not turn on?	▸ Check heath LED on ICU, Replace ICU fuse / Reset circuit breaker if not flashing ▸ Check battery cables to ICU
The Panel LED flashes Green then goes to solid red, this means the actuator movement has not been completed in allowed time?	▸ Check down switch when thrusting in both directions ▸ Check wiring to actuator ▸ Check UP and DOWN switches are adjusted correctly
Thrusting in wrong direction?	▸ Change contactor wires on motor solenoid.
Fuse / Circuit Breaker keeps blowing?	▸ Wrong fuse fitted - check rating and replace. ▸ Water too shallow causing excessive load on raise/lower motor. ▸ Obstacle blocking tunnel from retracting.
Poor thrust or thrust in one direction only?	▸ Batteries not large enough or charged, cables not recommended size. Voltage at motor when running should be a minimum 10V. ▸ Blockage in tunnel/propeller jammed with debris, switch off main power, inspect and clear. ▸ Propeller washers fitted wrong. ▸ Check motor brush springs are located properly, brushes should have good contact with the commutator. ▸ Check down switch when thrusting in both directions ▸ Check D1 and D2 terminals are tight
Motor turns but no drive?	⚠ DO NOT continue to run thruster. ▸ Shear pin broken, remove 4 motor bolts, drive out old pin and replace with new pin. ▸ Propeller blades broken. Replace with new.
Thruster noisy and vibrating?	▸ Check propeller is not touching the tunnel wall. ▸ Check hub height is correct.
Motor lowers, then raises (red fault)	⚠ DO NOT continue to run thruster. ▸ Something is blocking tunnel and it is not hitting limit switch in 15s ▸ Check lower limit switch cone position

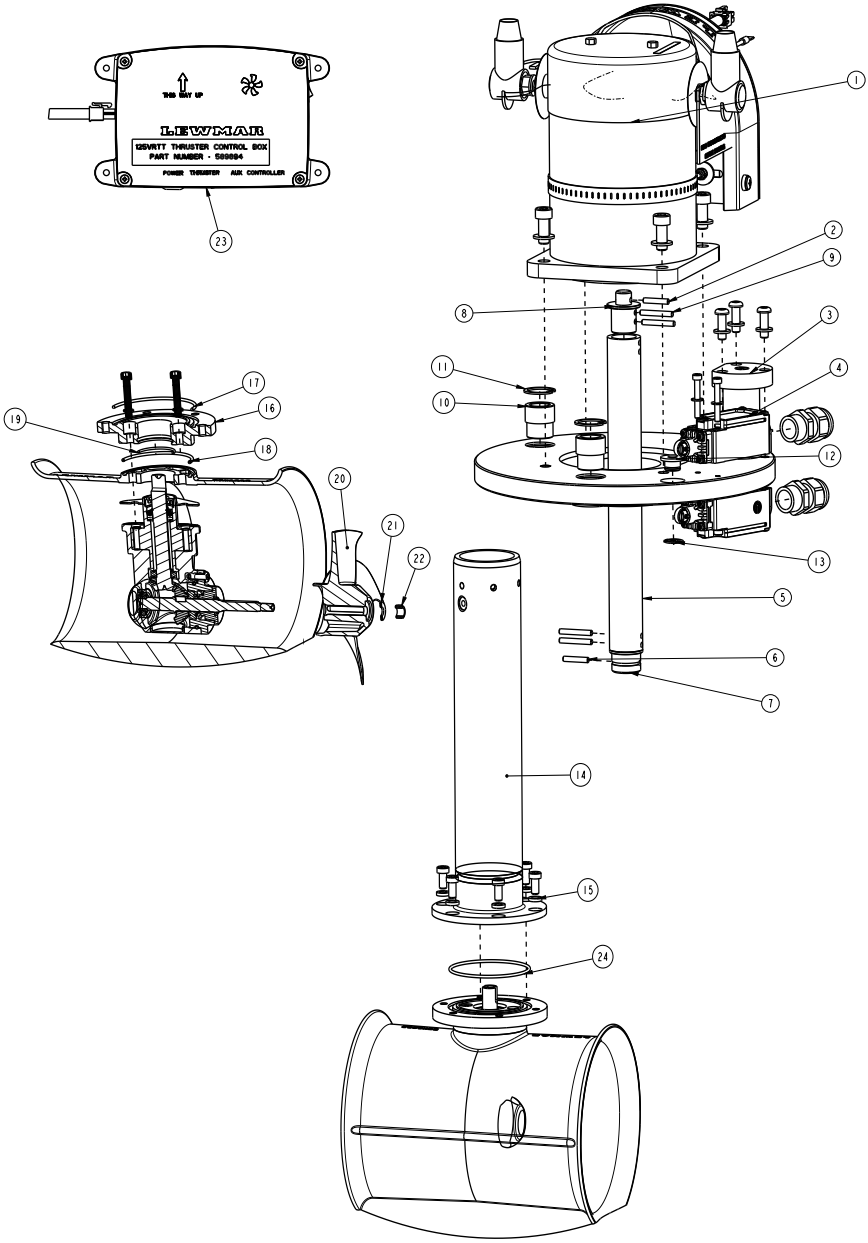
13 - Dimensions

13.1 125 VRTT Specification

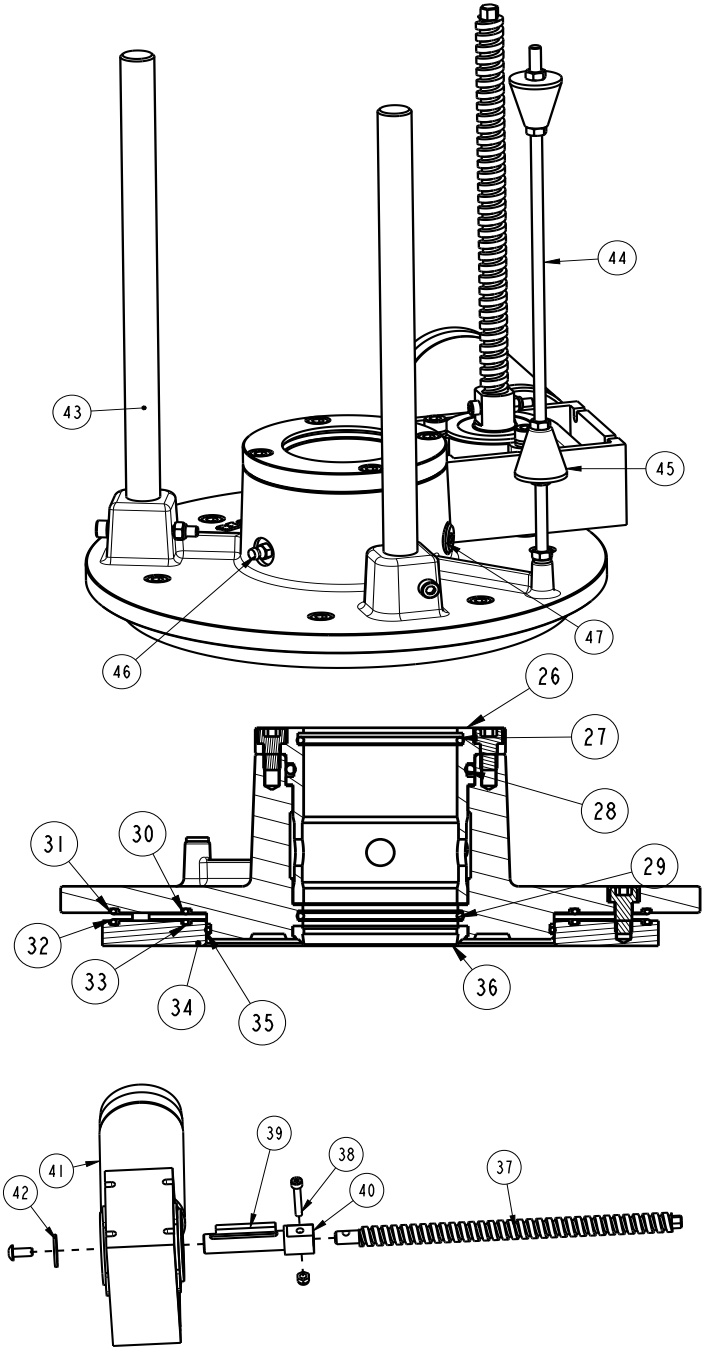


14 - Spare Kits

14.1 125 VRTT Spares



14.2 125 VRTT Spares

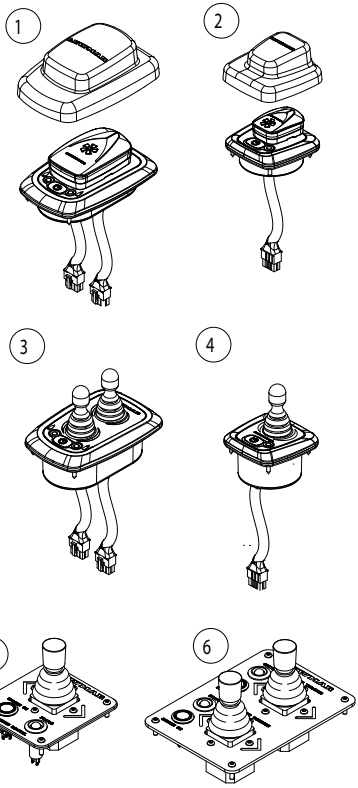


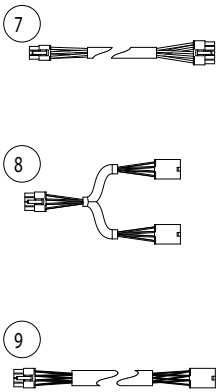
14.3 125 VRTT Spares

PART NO.	DESCRIPTION	ITEMS INCLUDED (QTY)
581110	125 VRTT 2.0 KW 12V	1(1)
589455	125 SPARE PROP	20(1)
589894	125 VRTT GEN 2 ICU	23(1)
589808	GEN2 RT MOTOR LOOM 2M	(1)
589809	GEN2 RT MOTOR LOOM 5M	(0)
56110037	125 VRTT DRIVE SHAFT KIT	7(1), 5(1), 8(1), 9(4), 6(2)
56110038	125 VRTT UPPER BUSHING KIT	10(2), 11(2), 12(1), 13(1)
56110039	125 VRTT LEG FIXING KIT	15(1), 18(1), 19(1), 24(1)
56110040	125 VRTT LOWER LEG SEALING KIT	27(1), 28(1), 29(1), 30(2), 31(2), 35(1), 36(1)

14.4 Accessories Spare Kits

ITEM	PART NO	DESCRIPTION
1	589222	Controller, Dual Pad
2	589223	Controller, Single Pad
3	589267	Controller, Dual Joystick
4	589268	Controller, Single Joystick
5	589845	Controller, Single, Hyd
6	589846	Controller, Dual, Hyd
7	589809	5m RT Motor Loom MX
8	589800	Gen2 Y Loom MX
9	589801	Gen2 AUX 2m Loom MX
	589802	Gen2 AUX 7m Loom MX
	589803	Gen2 AUX 10m Loom MX
	589804	Gen2 AUX 18m Loom MX
	589805	Gen2 AUX 22m Loom MX
	589006	Fuse Holder
	589010	T2 Fuse Holder
	589861	3-button remote (gen2 system)
	589862	5-button remote (gen2 system)
	56110035	RT Installation Nut Holder
	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
	589064	MOTOR SUPPORT BRACKET 185 TT
	589066	MOTOR SUPPORT BRACKET 250 TT
	589096	MOTOR SUPPORT BRACKET 140 TT
	589810	Gen2 ABS 12v
	589830	Gen2 ABS 24v
	589811	Gen2 PS 24v/12v
	589813	Gen2 PS 48v/24v





15 - Warranty

Limited Warranty and Key Terms of Supply by Lewmar

Lewmar warrants that in normal private pleasure boat 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 that 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.
g. Abuse

iv Product subject to a warranty claim must be returned to the Lewmar outlet that supplied the product for examination unless otherwise approved 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 authorized 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
- Hatch & Portlight weather seals
- Products used in "Grand Prix" racing applications
- Products used in commercial or charter applications
- Anchor rodes

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 that supplied the product or to Lewmar Limited at Southmoor Lane, Havant, Hampshire PO9 1JJ, England.

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

WO: _____

Assembly Checked: ☐

Deployment Checked: ☐

Actuator and Switch Adjustment: ☐

ICU Test: ☐

Deploy / Retract Test: ☐

NOTES

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