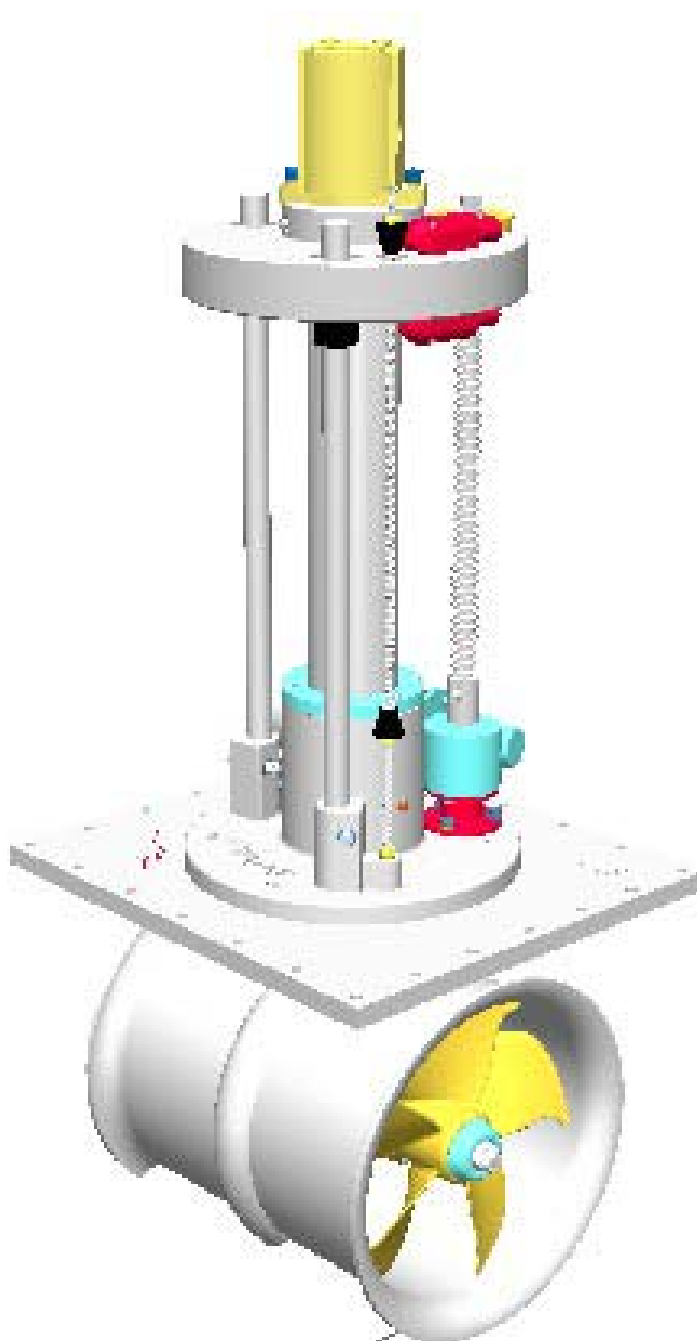


250 & 300 VRTT

Owner's Installation, Operation & Basic Servicing Manual



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1. INTRODUCTION

The Lewmar VRTT Thruster has been designed to give excellent service and a long life providing that it is installed and serviced properly.

This manual provides the information required for the correct installation of your new Lewmar VRTT Thruster

This manual applies to the following thruster models:

- 59127002 – 250 VRTTH (low displacement)
- 59127004 – 250 VRTTH (high displacement)
- 59127100 – 250 VRTTE
- 59137001 – 300 VRTTH (low displacement, aluminium)
- 59137002 – 300 VRTTH (low displacement, bronze)
- 59137003 – 300 VRTTH (high displacement, aluminium)
- 59137004 – 300 VRTTH (high displacement, bronze)

If there is any problem found during installation or use. contact your nearest Lewmar agent or contact us at www.lewmar.com

IMPORTANT:

- **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.**
- **All hull modifications should be carried out by a specialist.**
- **We recommend that a qualified person install the thruster. Faulty installation could place the boat and crew in danger and make the warranty invalid.**
- **Do not use the thruster assembly as an earth point**

2. INSTALLATION

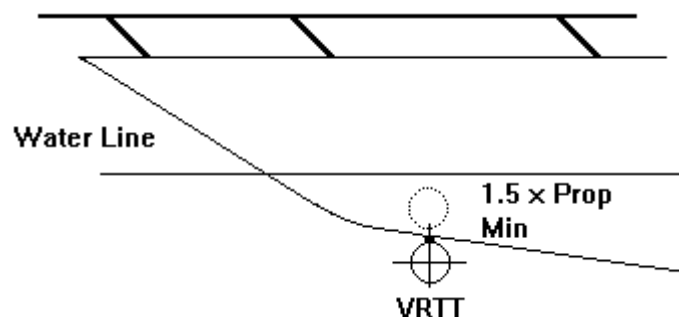
These are guidelines only it is recommended that a professional marine engineer perform the Thruster installation.

2.1 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.

2.1.1 Placement

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 hydraulic hoses, 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 to the electric motors and that they have sufficient room to breath, ideally housed in a ventilated area. If a 250VRTTE is fitted the electric thrust motors will get hot.

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

2.1.2 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 lead screw assembly or propeller shroud. Extra caution should be used to avoid damaging these parts, the micro switches and control box. When moving the Thruster, ensure that the seating surfaces of the main housing are protected against potential damage. The control box is secured to the Thruster for protection during transit. A picture is included in the transport box showing advised lifting method.

2.1.3 Fitting into the hull

The thruster requires a watertight compartment to be constructed within the hull to house the shroud assembly, with an opening in the bottom of the hull for the shroud to be lowered 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.

When planning the Hull piece cut-out and watertight box, it is important that the box gives adequate all-round clearance for the shroud of approx 5-10mm (3/16-3/8"). Once the Thruster seating support has been fabricated and a suitable hole has been cut in the hull, the Thruster can be installed.

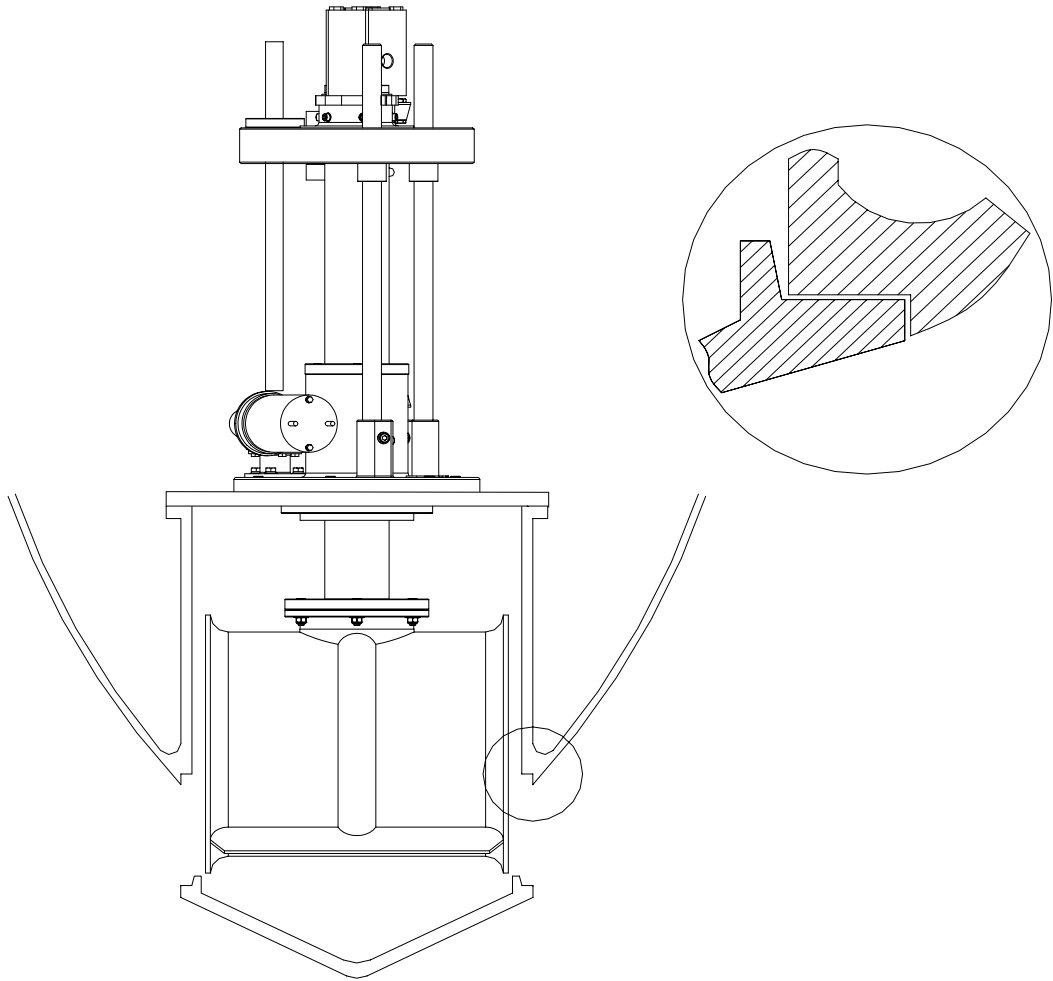
Seat the unit down on a thin gasket of closed cell neoprene or a suitable sealing compound. The base plate is pre-drilled with 8.5mm holes (250 VRTT) or 10.5 holes (300 VRTT) see unit diagrams. It is recommended that stainless steel bolts of property class 70 are used with nuts, plain washers and locking washers. If fitting into an aluminium hull the base plate may be welded to the watertight box. The thruster base plate is corrosion resistant 5083-T6.

The VRTT Thruster is supplied in the retracted position for ease of transportation. The Thruster will need to be lowered once located, to have the hull faring fitted. To lower the Thruster, either energise the raise/lower motor or by using the mechanical lead screw (refer to Manual Raise/Lower section for details).

Usually, the hull piece that has been cut out of the hull would be re-used to provide the Thruster closing plate. This can be attached to the ribs moulded into the tunnel shroud. The raise lower motor can take a hull piece up to 50kg (110lbs). If additional bolts are being used, ensure that the bolt heads do not foul the propeller tips inside the shroud. A landing or register (see diagram below) should be moulded into the hull cut out, to allow the hull closing piece to 'locate' when the Thruster is fully retracted. This is to prevent water flooding

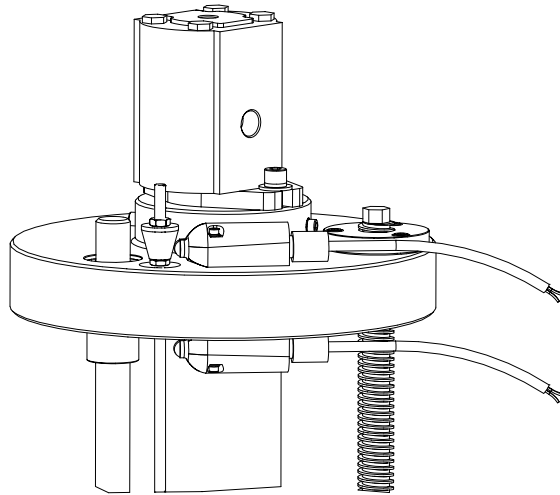
the box at high pressure potentially damaging the gasket/seal and to eliminate load being applied to the Thruster leg when the vessel is pounding at sea.

A sealing gasket is recommended between the closing plate and hull register. This should be of a resilient material that will not cause sticking of the closing plate and undue load on the raise/lower mechanism.



2.1.4 Raise/Lower Setting

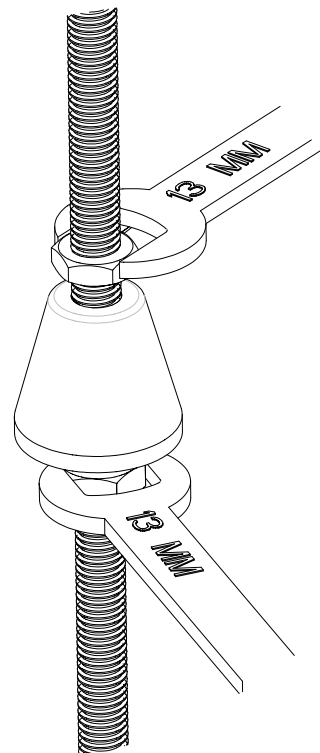
The limit switches are factory set at a pre-determined safe setting and will require adjustment during installation. The Limits switches are activated by the adjustable stops.



The stops can be adjusted by loosening the lock nuts either side of the stop with a 13mm spanner, adjusting and re-tightening sufficient to stay in position but not crush the plastic stop. It is suggested that to guarantee trouble free operation that a thread locking compound (i.e. Loctite 243) is applied to the nuts on final setting.

When raised ensure that the limit switch actually 'makes' when the Thruster is fully retracted or deployed, otherwise power will be left on the Raise/Lower motor applying unnecessary stress to the shroud / closing plate assembly.

When in the lowered position make sure that the top plate does not make contact with the top face of the lower housing. Failure to do this will cause undue loading and prevent the raising of the thruster.



2.1.5 Painting/protection

The Thruster base plate is supplied bare aluminium ready for anti-fouling. There are 6 anodes fitted to the under water area, 2 on the propeller shafts and 4 mounted directly on to the base plate, these must **not** be painted or anti-fouled as this will prevent them from protecting the unit. The underside of the installation plate **must** be treated with an appropriate primer and antifoul/paint as this is part of the corrosion protection system. Hub (bronze or aluminium check version) and propeller may be anti-fouled. Always use the appropriate anti-fouling that is compatible with surface being covered, refer to antifoul/paint manufacturers instructions ensuring a through coverage of all exposed surfaces. The shroud comes pre-gel coated and generally does not need any additional coatings, however this is at the installer's discretion.

Under no circumstance should any paints or anti-fouls be applied to the stainless steel main leg.

NOTE:-

The installation of bars or grids across the tunnel entrance will have an effect on the thruster performance.

They would need to be checked regularly and be removable for maintenance.

Any foreign body that passes through the bars may cause additional damage, as it won't have an easy escape.

2.2 Thruster Main Drive Installation

2.2.1 VRTT Hydraulic

Flow and Pressure requirements

250VRTT - 15kw output	300VRTT - 22.5kw output
(16.8cc Rev Motor) Flow = 53 l/min Pressure = 190 bar (ΔP)	(26cc Rev Motor) Flow = 72 l/min Pressure = 210 bar (ΔP)
(26cc Rev Motor) Flow = 82 l/min Pressure = 122 bar (ΔP)	(30cc Rev Motor) Flow = 82 l/min Pressure = 182 bar (ΔP)

The hydraulic motors are supplied pre-tested with female ports and blanking caps.

Ensure the correct pipe bore sizes/pressure ratings are installed as per hydraulic requirements, refer to a competent hydraulic installer if in doubt.

Hydraulic motor ports 250 & 300 VRTT

A + B = 3/4" BSP

Drain = 1/4" BSP

NOTE: Motor Drain line must be connected

Equipment should be accessible to allow for routine maintenance, oil changes etc. Keep tight bends and hose couplings to a minimum wherever possible. Where hoses pass through bulkheads or near sharp edges, ensure pipe clamps or additional shielding of the hose is undertaken to reduce the risk of chaffing.

Hydraulic units must be checked for stray current along the supply hoses. If found the motor must be fitted with correctly rated and sized insulated hoses. Lewmar cannot accept responsibility for corrosion caused by stray voltage.

When first operating the Thruster, pulse the controller to charge (fill) the hydraulic motor.

2.2.2 VRTT Electric

Ensure the main and control voltage is 24VDC

A suitable Battery switch that can handle the thruster current and a correctly sized fuse and fuse holder should be installed in the positive line. The location should be easily accessible and known to the responsible person on board. The thruster battery switch must be switched off when no one is on board. It is also advisable to switch it off when the thruster is not in use.

Install the battery/s as close as possible to the thruster, thus keeping the main supply cables as short as possible, which will in turn keep the voltage drop to the minimum.

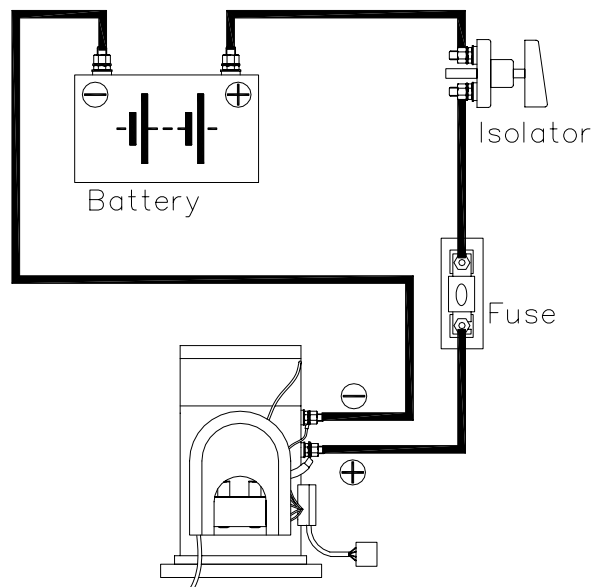
Battery cold crank capacity should be at least equal to the thruster current.

The cables should be terminated with a ring terminal corresponding to the motor studs – 10mm (3/8") It is important that this termination is secure so that the high current is transferred to the efficiently.

The minimum voltage at the motor when running should be 21V

Ensure insulating boots supplied with the unit are correctly fitted.

Note. If very large cables are used, discard supplied boots and fit appropriate sized ones.



Refer to chart below for Cable size depending on run and fuse required.
Lewmar also supply a fuse holder 589006.

Maximum total cable run Battery to Thruster and back					
Cable CSA mm					
35	50	70	95	120	150
9M	12M	21M	28M	36M	45M

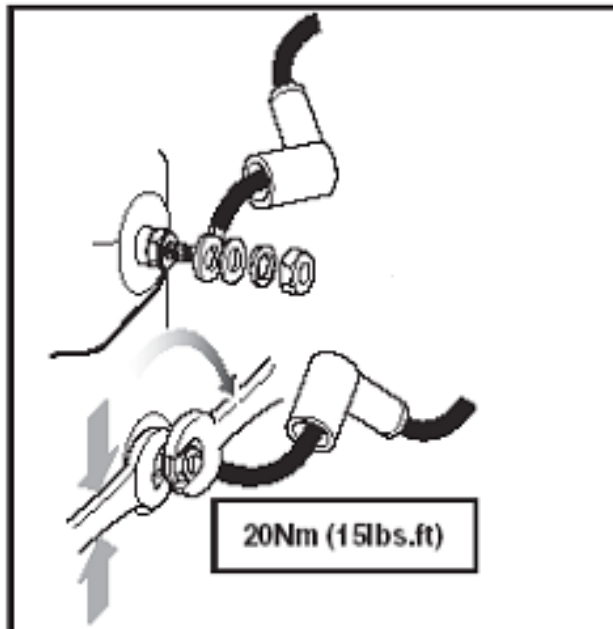
Fuse	Part No.	Current
400A	589010	500

Cable AWG					
2	1	0	00	000	0000
29ft	41ft	52ft	66ft	84ft	105ft

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 batteries and cables will cause loss of performance and may cause dangerous overheating.

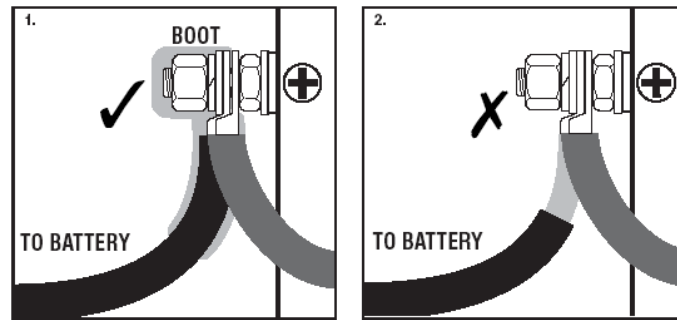
Electric motors spark and run hot. Do not place near flammable or sealed areas

The main battery must not be connected and power must not be switched on until all covers and terminal protectors are correctly fitted.

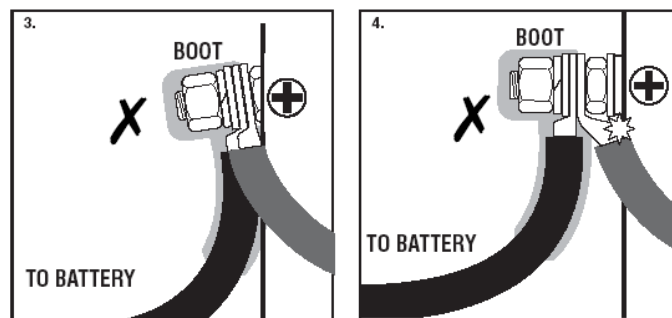


When fitting the power cables to the thruster make sure that the cables are of sufficient length and supported to allow for the vertical movement of the thruster

Incorrect installation of battery cables or damage to connection studs may result in a short to the thruster body. Use the examples on the next page to check for a correct installation on both +V and 0V battery connections.



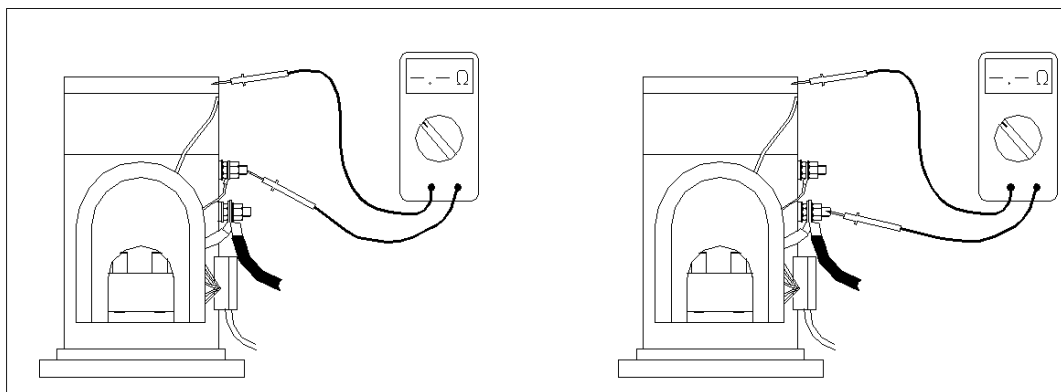
1. Correct installation. Supplied cable boots are used and no bare wires exposed.
2. Live wire exposed! Correct the cable installation to match illustration 1



3. Terminal or motor is damaged. Contact Lewmar Ltd
4. Crimp inverted and is touching motor! Correct the cable installation to match illustration 1

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

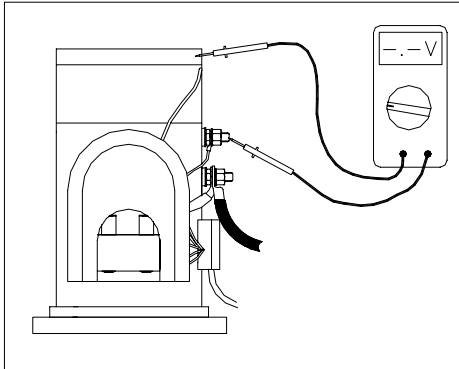


With the negative not connected and the positive cable connected but with the battery switch off or fuse removed. Use a continuity tester to check for a connection between -ve stud and motor body and also between +ve stud and motor body. In both cases the meter should give no connection of electrical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

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

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

Test 2



With the battery applied: Use a voltmeter to test the voltage between the –ve stud and the thruster motor body. If the supply voltage is measured, disconnect power immediately and inspect the assembly for faulty installation or damage.

IMPORTANT:

- **Do not run the thruster out of the water, even for a few seconds, the motor will overspeed by 300% causing damage to the seals etc. and invalidate the warranty**
- **Any foreign object in contact with an operating propeller will cause serious injury or damage and invalidate the warranty.**
- **Thrusters must not be installed in 'wet' areas or areas where splashing is likely, damage to the electric motor may occur.**

2.3 Thruster Electrical Control Installation

The 250/300 VRTT thruster is supplied with a Raise/Lower control box pre-wired to the thruster limit switches, raise/lower motor and main drive motor control (VRTTE only). The operation and factory fitting of the control box and raise/lower assembly is tested prior to shipment.

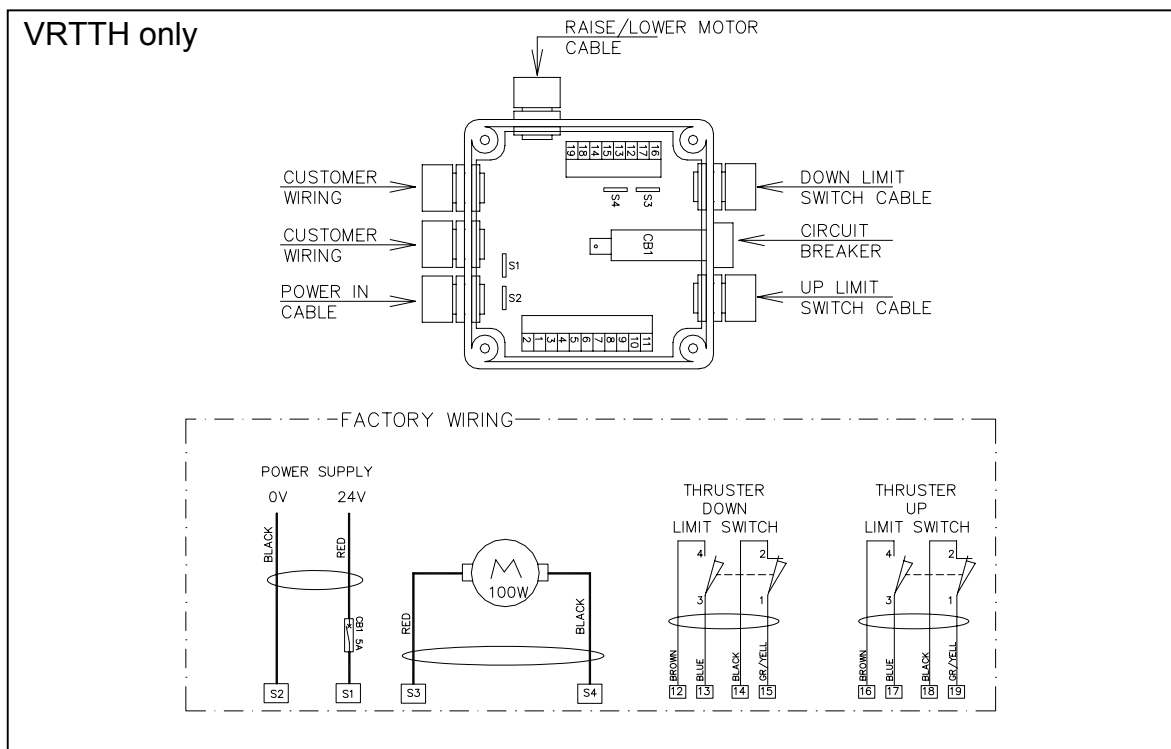
A flying lead is supplied for connection of the power supply to the control box
Input power supply required: 24VDC 5A nominal.

This must be from a separate source to that used by the main drive motor if installing a VRTTE. Note also that the supply must be suitable to handle a dc motor inrush current of 45A for 10mS.

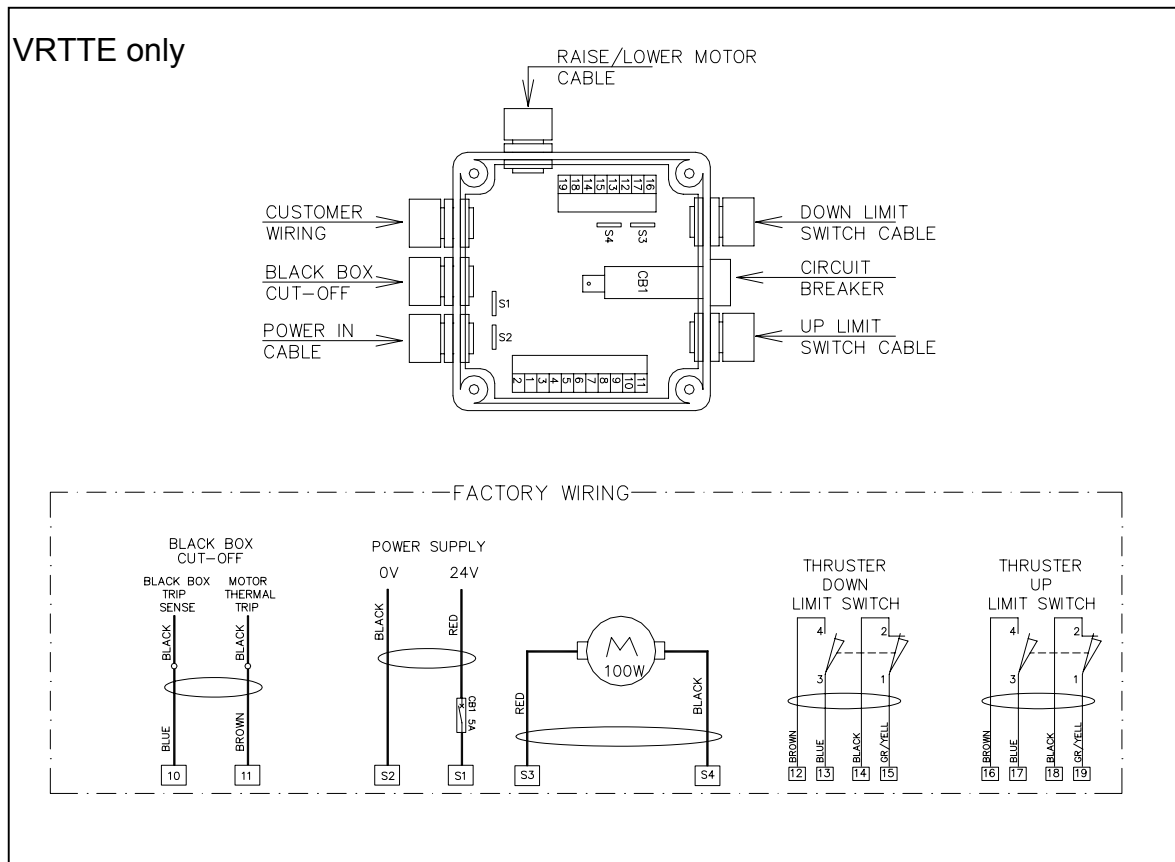
The control box is fitted with a circuit breaker, which is sized specifically such that it will trip if an obstruction is encountered in the raise/lower mechanism during operation.

This control box is supplied with a mounting bracket for ease of installation. The cables that are pre-fitted to the box have an excess of length to aid the installer in finding a suitable location.

Be aware when mounting this box that the cables fitted to the limit switch and drive motor(VRTTE) will require enough play to allow for the raising and lowering of the thruster assembly during normal operation.



VRTTE only



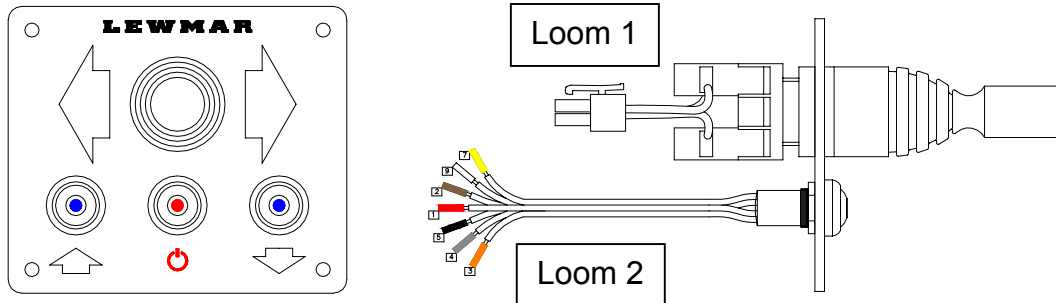
The control connections available for customer installation are as follows

- 1 – Power supply to raise/lower control switches & lamps.
- 2 – Switched (latched) power in to box to enable raise/lower control.
- 3 – Switched (momentary) power signal in to initiate a thruster raise operation.
- 4 – Switched (momentary) power signal in to initiate a thruster lower operation.
- 5 – 0V supply to raise/lower control switches & lamps.
- 6 & 7 – Volt-free contact (5Amax) Closed circuit when the thruster is in the UP position.
- 8 & 9 – Volt-free contact (5Amax) Closed circuit when the thruster is in the DOWN position.
- 10 & 11 - Volt-free contact (5Amax) Closed circuit when the thruster is in the DOWN position. Not available on VRTTE

Note these connections are made to a two part terminal block that can be removed from the PCB to aid connection of wiring.

This control box is for the operation of the thruster raise/lower mechanism only and does not control the hydraulic/electric main thruster drive.

A user interface control panel for controlling the raise/lower mechanism and main thruster drive has been designed by Lewmar Ltd specifically for this thruster and may be ordered separately, part number 58401038:



The panel dimensions are 100mm X 85mm. And is rated IP67 above the panel when installed correctly with the use of a suitable gasket or sealing compound.

The panel is supplied pre-wired with two colour coded looms: Loom 1 for direct interface with the VRTT control box and Loom 2 for either direct interface to the VRTTE main drive motor control (black box) or for hydraulic valve control.

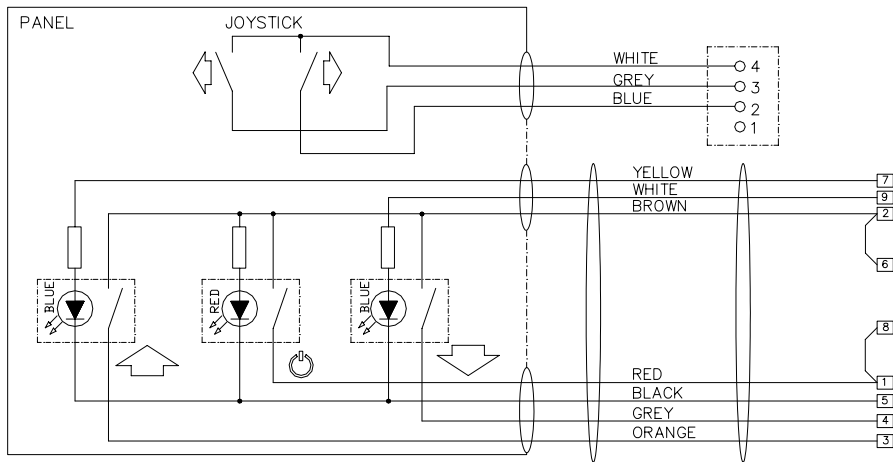
The colour coding is as follows:

Loom 1:

Wire	Description	Control Box Connections
Yellow	Raise Switch Position Indicator	7
White	Lower Switch Position Indicator	9
Brown	On/Off switch / Control Enable	2 & 6
Red	+V Panel Supply	1 & 8
Black	0V Indicator Common	5
Grey	Lower Switch Signal	4
Orange	Raise Switch Signal	3

Loom 2:

Wire	Description	Connector Pin
White	Joystick Switch Common	4
Grey	Thrust to PORT Signal	3
Blue	Thrust to STBD Signal	2

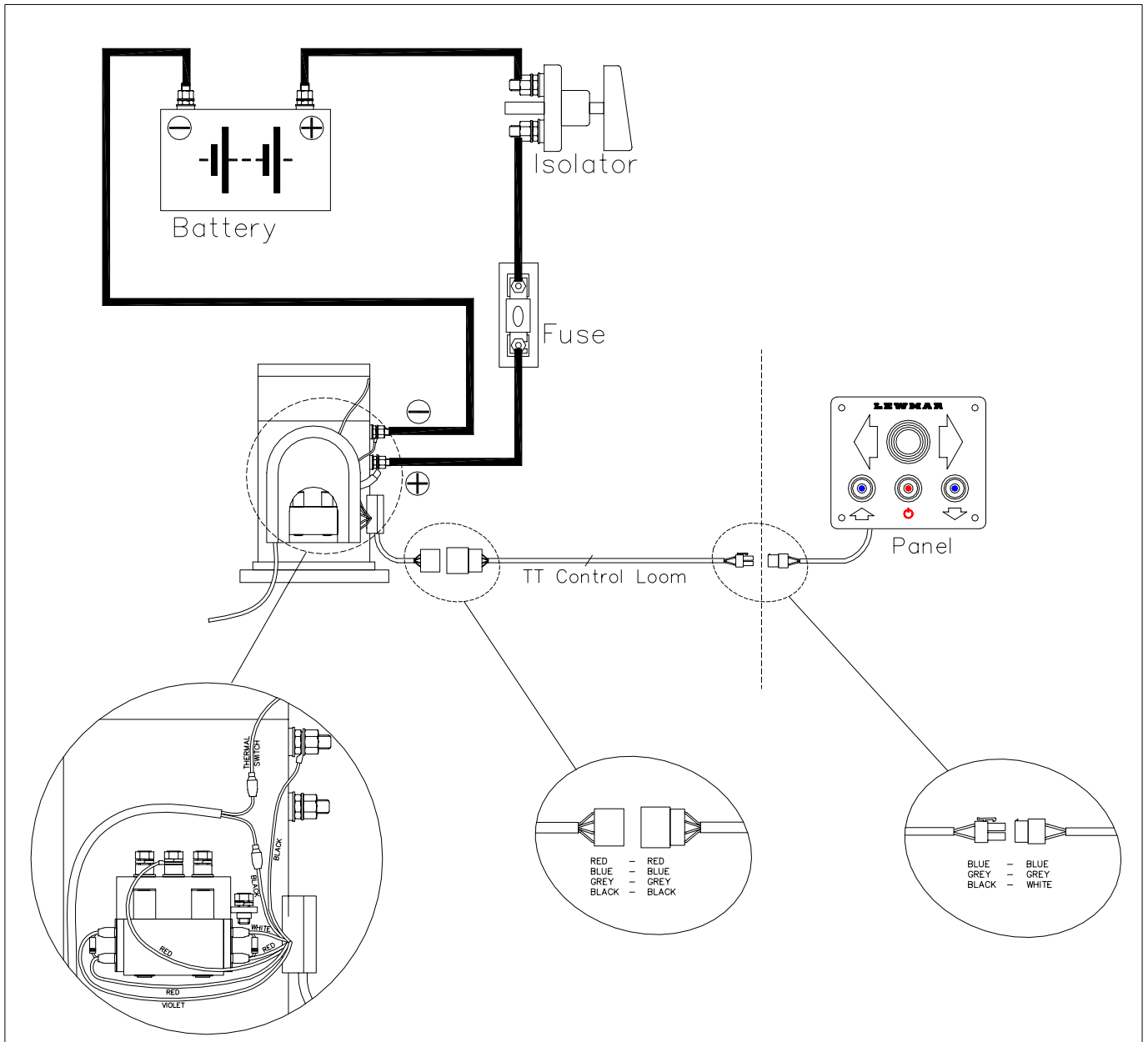


The VRTT control panel is interfaced with the VRTTE main electric drive motor 'Black Box' control unit using standard Lewmar TT thruster control loom connecting cables:

Cable Length	Part Number
2M	589015
7M	589016
10M	589017
14M	589018
18M	589019
22M	589020

Note the VRTTE has additional wiring fitted to the thruster assembly and VRTT control box that is used to disable the main drive control for when the thruster is not in the lowered position.

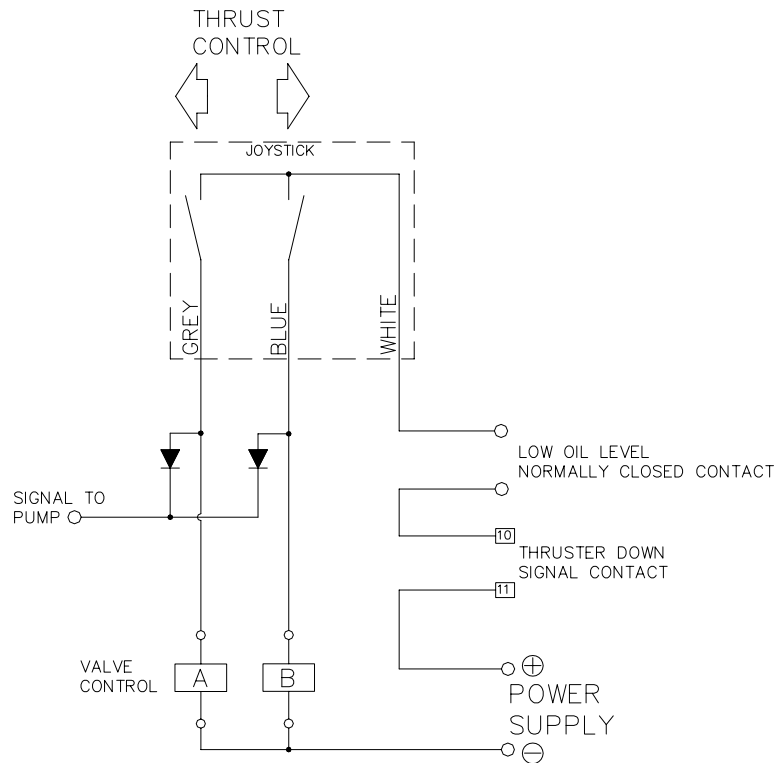
VRTTE Main Drive Control & Power Connections



VRTTH Main thruster drive control:

The switched joystick on the VRTT panel can also be used for valve control on a VRTTH installation.

Note, the connector supplied on loom 1 will have to be discarded.



This is a basic wiring diagram to aid the installer in the basic control of the hydraulic thruster.

These controls must be powered from a separate fused circuit.

As a matter of safety and for the prevention of damage to the thruster, it is necessary that the second thruster-down volt-free contact in the VRTT control box is wired into this circuit to prevent the operation of the main drive motor when the thruster is not in the lowered position.

The volt-free contacts and joystick contacts are suitable to switch 5A

It is also recommended that a hydraulic oil reservoir level switch is included in the circuit to prevent operation of the thruster if there is insufficient oil.

In most cases the VRTTH is integrated into a hydraulic system where there are existing hydraulic controls. If this thruster is part of a complete Lewmar hydraulic/electric system, please refer to the main system manual for piping and wiring information.

For VRTT installations where the VRTT panel is not used, the following wiring

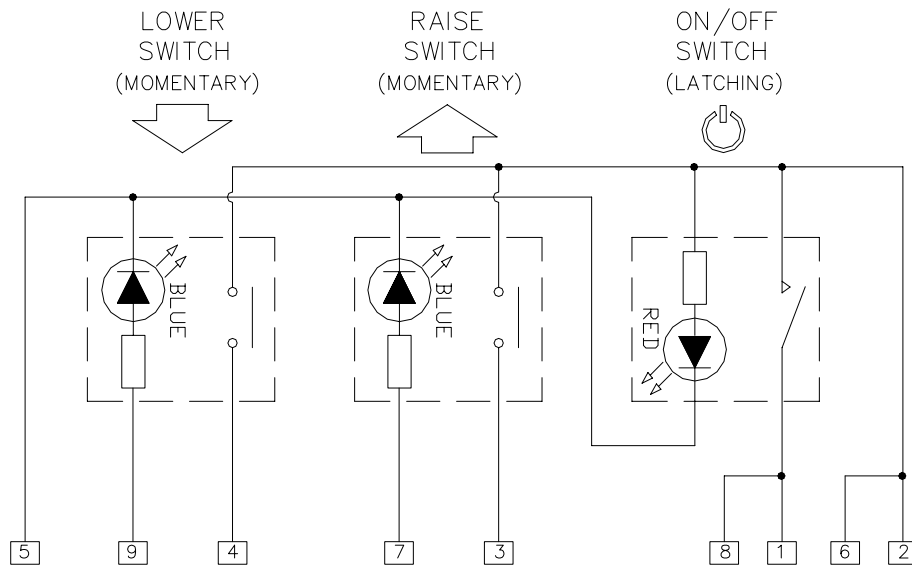
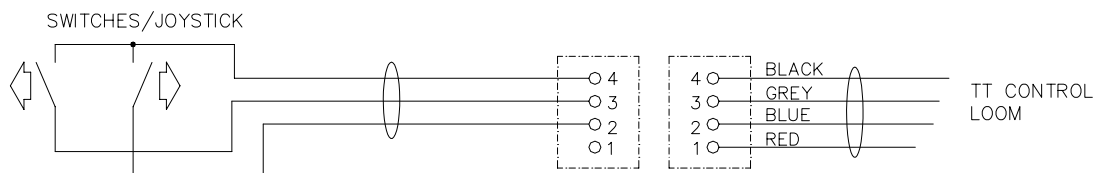


diagram indicates the correct control wiring to the VRTT control box.

The raise and lower switches must be momentary action and the on/off switch a latching action. The circuit shows LED indicators but filament bulbs can be used.

For VRTTH main drive installations without the VRTT panel use the circuit on the previous page as a guide.

For VRTTE main drive installations without the VRTT panel either basic momentary switches or a switched joystick maybe used to interface with the motor controls, see below, alternatively a TT control panel may be used for main drive control only, refer to the TT thruster manual.



3. OPERATION

This section details the operation of the thruster based on the installation of the VRTT panel, if this panel was not used the operation may differ.

The panel consists of three pushbuttons with integral indicators: Thruster-Raise(momentary), Thruster-Lower(momentary) and System On/Off(latching) Also there will be either a switched joystick or pushbuttons for control of actual thrusting.

The operation of these controls is as follows.

System On/Off switch.

When pressed this will enable the operation of the VRTT system, enabling the control box and supplying power to the raise/lower switches. The switch lamp will illuminate (Red) to indicate this, at the same time the raise/lower switches will illuminate to indicate the position of the thruster – raised or lowered.

De-selection of this switch will disable the VRTT control box and hence halt any operation even if the thruster is in mid stroke of raising or lowering.

Raise switch.

Enabled when the On/Off switch is On, a brief push of this switch will cause the thruster to automatically retract if not already fully retracted. The integral switch lamp will illuminate (blue) when the thruster is fully retracted.

Lower switch.

Enabled when the On/Off switch is ON, a brief push of this switch will cause the thruster to automatically deploy if not already fully down. The integral switch lamp will illuminate (blue) when the thruster is fully lowered.

Note the lamp will indicate if the thruster is down whether the On/Off switch is selected or not – **the thruster should always be raised when not in use.**

Only once the thruster is fully lowered will the thrust control joystick or switches be enabled.

If the system on/off lamp is illuminated but neither of the raise or lower switch lamps are lit then the thruster has been halted in mid stroke due to either the system being switched off to early previously or due to an obstruction. It is advisable to check the unit for obstructions before moving the thruster again.

The VRTT control Box features a Circuit breaker that is sized such that any obstructions to the movement of the thruster to retract or deploy will cause the circuit breaker to trip which will remove power from the VRTT control system. The circuit breaker can be reset by pushing the trip button back in, But what ever caused the obstruction must be removed before attempting to switch the system on again.

Note:

- i) As a safety feature if the thruster is in the lowered position and the panel is switched off the down light will stay on, it is dangerous to get underway with the Thruster not in the fully raised position.**
- ii) If power is switched off during the Raise /Lower operation, all lights will go out and the thruster will stop mid-stroke. Switch the system on and press the UP button so that you are certain that the Thruster is parked.**

WARNING

- The Thruster must not be operated whilst the vessel is out of the water as damage may occur.**
- The VRTT has a large surface area and so in the down position the vessels forward or reverse speed should be kept below 2 knots. Failure to keep below 2 knots could damage the unit.**
- Contact with an underwater object will cause damage to the GRP shroud and possible failure of the Thruster.**

4. MAINTENANCE

4.1 Periodic Maintenance

In general very little maintenance of the Thruster is required.

General

- The Thruster should be Lowered and Raised on a regular basis to prevent seizing of the unit leg.

6 Months

- Remove any build up of oil/grease and dirt from the mechanism.
- Wipe clean Raise/Lower Lead Screw, apply a light coat of oil and grease guide bars.
- Check condition of Anodes, if decay is more than 50% then replace (it is advised that all anodes are changed together)

12 Months (to include previous checks)

- Grease Main Bearing Grease Nipple
- Check tightness of Motor Terminals (250VRTTE only)
- Check tightness of Nuts and Bolts, re-tighten to correct torque
And apply locking compound if required (see assembly diagram)
- Check condition of propellers, replace if damaged
- Clean debris from Leg, Shroud.
- Check Shroud for cracks or damage, replace if necessary
- Clean Carbon dust from motor brush gear using a soft brush
And vacuum (250 VRTTE only)

24 - 36 Months (to include previous checks)

- Check Raise/Lower Lead Screw and Manual over-ride bolt for excessive wear, replace if necessary.
- Check condition of Electric Motor Brushes (raise/lower motor all thrusters, 250VRTTE main motor) replace if necessary.

Vessel Storage out of the water

- Hose down external components (Hub, Leg etc) with fresh water and Grease leg. Fully retract the hub unit to prevent damage.

Note

The Thruster hub is a sealed unit and does not require general maintenance, if a problem is found, please contact your nearest Lewmar representative.

Hydraulic system maintenance should be carried out in accordance with the manufacturers instructions. Failure to do this will result in the reduced life of the VRTT hydraulic main drive motor.

4.2 Cathodic Protection System

When the boat is first commissioned it is important that the Anodes are checked frequently at one-month intervals. Check for signs of excessive corrosion. If the Anodes have corroded significantly, renew immediately. If the Anodes/unit shows signs of corrosion shortly after commissioning then it is important that the vessel electrical system is checked for earth leaks, or other electrical faults that are possibly accelerating the corrosion process.

There are 6 anodes fitted to the under water area, 2 on the Propeller shaft and 4 mounted directly on to the base plate

Recommended anode inspection plan.

First six (6) months	- One	(1) month intervals.
Six (6) months to one (1) year	- Three	(3) month intervals.
One (1) year plus	- Six	(6) month intervals.

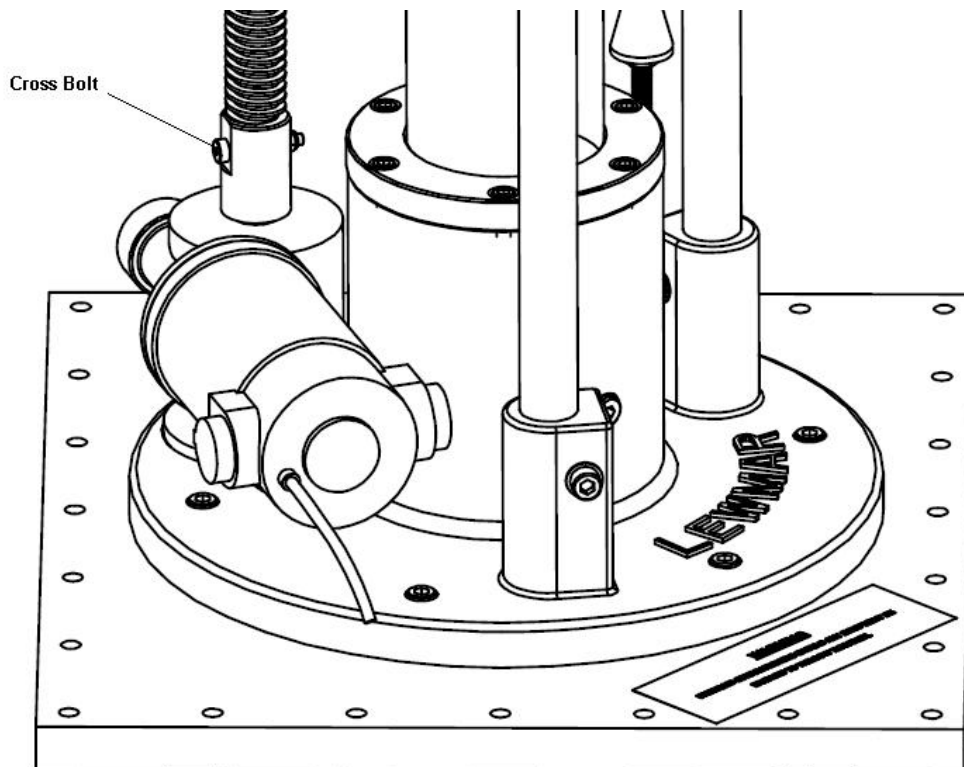
WARNING

- **Anodes are fitted to prevent the corrosion of the Thruster assembly, failure to change the Anodes can cause serious damage to your Thruster.**
- **Aluminium mounting plate should be checked regularly!**
- **The Thruster should not be used as an earth point.**
- **It is always advisable that a cathodic specialist performs a complete check of the vessels protection system.**

4.3 Manual Raise & Lower of Thruster

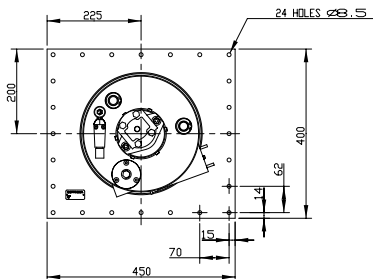
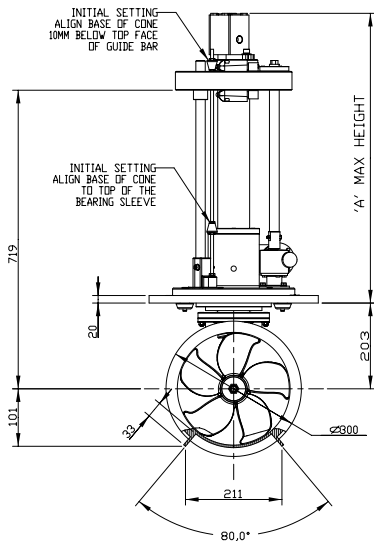
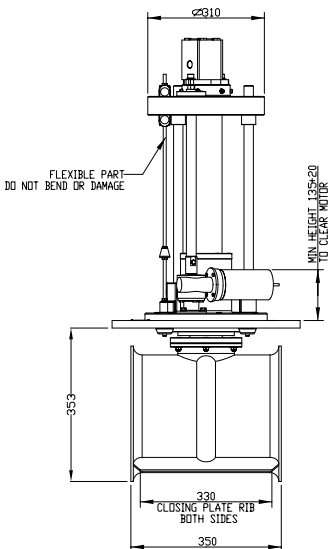
If the Thruster cannot be raised or lowered using Electrical power, it is possible to raise or lower the unit mechanically.

WARNING When lowering manually remove or isolate power to prevent injury.



- 1) Remove 6mm Cross Bolt from the drive assembly of the raise/lower motor using a 8mm spanner and 3mm hex key.
Note: - When re-fitting, do not over tighten.
- 2) Place a suitable 17mm spanner or socket drive onto the top of the leadscrew. Clockwise to raise, Anti-clockwise to lower.
- 3) Turn the leadscrew to raise or lower, taking care not to damage the limit switches at the top and bottom of the stroke.
- 4) The Thruster is lowered under its own weight when the leadscrew is turned; it might be necessary to apply additional force to the top of the thruster to overcome stiction.

250 VRTT

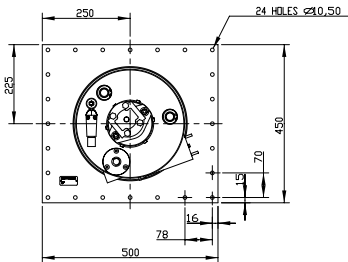
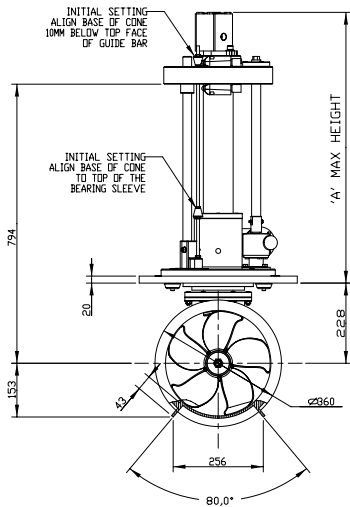
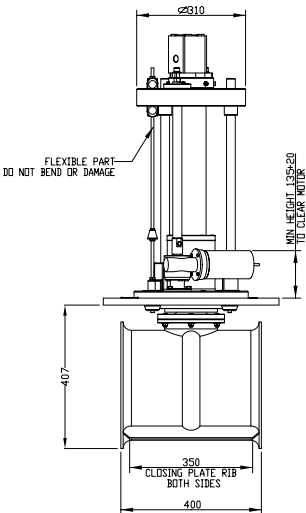


MODEL NO.	DIM 'A'	STROKE
59127002	721	300
59127004	711	300
59127100	886	300

NOTE: VERSION SHOWN IS HYDRAULIC

LEWMAR

300 VRTT



MODEL NO.	DIM 'A'	STROKE
59137001	765	350
59137002	765	350
59137003	751	350
59137004	751	350

LEWMAR

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

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Follow proper safety practices. If in doubt, consult a professional RV technician.