



200 TAE Installation Manual

Issue C

LEWMAR®

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INTRODUCTION

The thrust force created by a Lewmar Bow Thruster will cause a considerable suction on one side of the vessel and turbulence on the other.

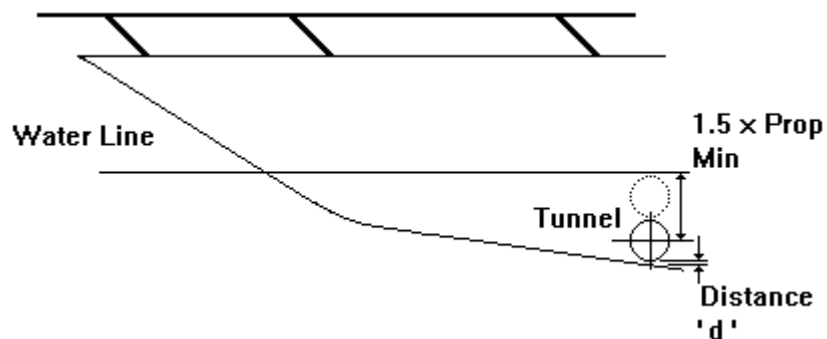
Care should be taken to ensure that there are no swimmers or divers in the vicinity of the vessel when the Thruster is operated. Also check that there is no visible floating rope, mooring lines, or timber etc, which could possibly be ingested into the Thruster tunnel potentially damaging the Thruster unit.

The effectiveness of the bow Thruster is largely dependant on the following.

- The position of the installation within the hull.
- The installation of the Thruster unit within the tunnel.
- The tunnel dimensions and form at the tunnel ends.

The position of the installation within the hull.

The tunnel should be installed as far forward as possible. The centre line of the tunnel must be a minimum of $1.5 \times$ propeller diameter below the water line.



If the distance from the lower edge of the tunnel to the bottom of the hull (distance 'd') is too little, the thrust efficiency is reduced due to the formation of circular currents under the vessel.

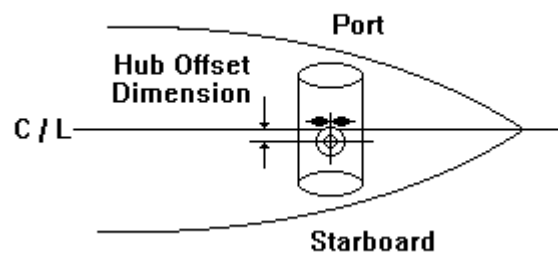
For tunnel tubes longer than $3 \times$ propeller diameter, the distance from the lower edge of the tunnel to the bottom of the hull (' d ') must be at least $0.25 \times$ propeller diameter.

For tunnels shorter than $3 \times$ propeller diameter, the distance (' d ') must be at least $0.5 \times$ propeller diameter.

INTRODUCTION

The installation of the Thruster unit within the tunnel.

The Thruster hub must be offset to one side of the vessel. This will bring the propeller closer to the centre line of the vessel. Thus generating an even thrust to both port and starboard. Please refer to installation instructions for dimensions.

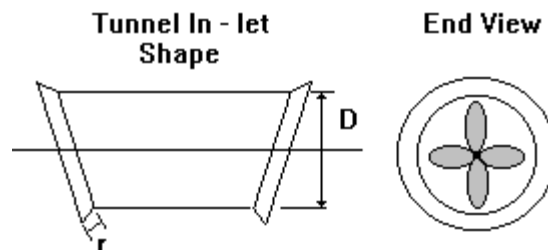


The tunnel dimensions and form at the tunnel ends.

Tunnel Induction inlet shape.

Create a conical radius around the tunnel diameter. This creates a favourable inlet and outlet condition for the water, and a break point for the water jet flow to help eliminate flow losses.

Conical radius (' r ') should be 0.1 to 1.5 larger than the tunnel diameter.

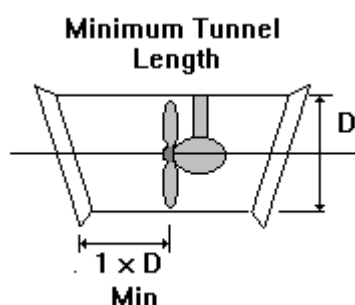


INTRODUCTION

Minimum Tunnel Length

The optimum length for the tunnel is at least 1.0 and if possible 1.5 to 2.0 diameters from the closest induction point of the propeller.

For tunnel lengths which are overall longer than 6.0 times the propeller diameter the flow efficiency due to frictional losses in the pipe will decrease significantly.



For Nominal thrust performance to be achieved, the voltage drop through the battery supply, connectors and cables (ensure that the correct size cables are installed) must be kept to a minimum.

The running time must not exceed a period of sixty seconds continuously.

There will be a considerable heat will be generated in the electrical system, ie motor, contactor and cables. After prolonged use, the Thruster electrical system should be allowed to cool down to ambient temperature, before further operation of the Thruster system.

Noise considerations.

Because of the considerable power generated by a Lewmar Bow Thruster and the construction of most vessels there will be noise generated.

It is also possible that the noise level will differ depending on the direction of thrust. Adhering to the installation instructions stated earlier will reduce the amount of noise generated.

CORROSION

Sea water is both corrosive and conductive, so care should be taken to protect the underwater components of the Thruster.

Under no circumstances should any equipment be electrically connected to the Thruster.

The Thruster must not be used as an earth return and it should be noted that most hydraulic hoses contain wire braid reinforcement and are therefore conductive. Consequently, the Thruster, hydraulic valves, hydraulic pump and the prime mover which drives the pump may be inadvertently electrically connected. For this reason, it should be ascertained that all equipment connected by the hydraulics hoses have insulated returns or the hoses contain insulated sections (eg small lengths of Kevlar reinforced hose).

It will be necessary to fit sacrificial anodes. Consult a cathodic protection specialist, follow specialists recommendations on materials, fitting of anodes and electrical checks. The anodes are usually fitted inside the propeller shroud and are in strip form. It is vital that they are electrically bonded to the metal of the Thruster by their fixing bolts. It is the responsibility of the owner / builder of the boat to ensure that adequate and effective anodic protection is in place.

The underwater part of the Thruster must be anti - fouled and a primer compatible with the anti - fouling should be applied first. It is essential that the primer and the anti - fouling paint is compatible with the Thruster materials.

In the case of a vertically retracting Thruster, it is essential that no paint is applied to the stainless retracting leg.

Retracting and swing Thrusters should **not** be left in the " Down " position when not in use.

The inboard components of the Thruster are normally supplied unpainted, and these should not be painted. Certain hydraulic components, such as pipe / hose fittings, and the bodies of some control valves, motors and pumps are made of mild steel and it is recommended that these are painted after all hydraulic connections have been finally made and tested.

THRUSTER ASSEMBLY

The GRP / Alloy tube will be supplied pre drilled ready for mounting the Thruster unit. The centre-line of the pre-drilled hole should be offset by 37.0 mm from the centre-line of the vessel when fitted. This is to allow the mid point of the Thruster hub to be aligned with the vessel centre-line. If the Thruster is not on the centre line of the vessel the Thruster will be noticeably more efficient on one side.

Remove the propeller from the hub assembly, by releasing the Nyloc nut and drawing the propeller from the drive shaft.

Offer the Thruster hub unit into the tunnel tube, and position the hub into the bottom of the saddle plate location spigot. Ensure that the 'O' Ring is in place and has not been damaged. Check the correct orientation of the Thruster, so that the centre point of the Thruster hub matches the centre point of the Thruster tube.

The mating surfaces of the Thruster hub flange and saddle interface plate should be cleaned and prepared for sealing. The hub and saddle should be set down on the gasket provided and sealed using a suitable sealing compound. Bolt the Thruster hub to the saddle plate, pulling the surfaces together with the 8 off M6 cap screws provided. The two extended M6 cap screws are fitted in the athwart ship plane. Remove any excess sealing compound that may foul the propeller shaft seals.

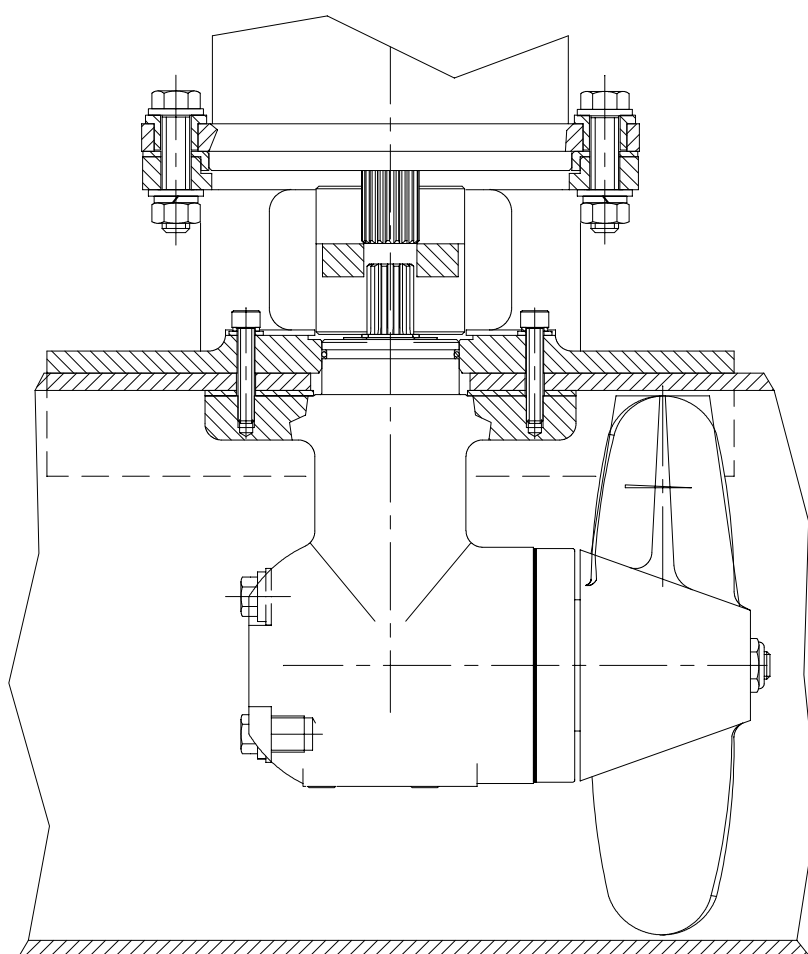
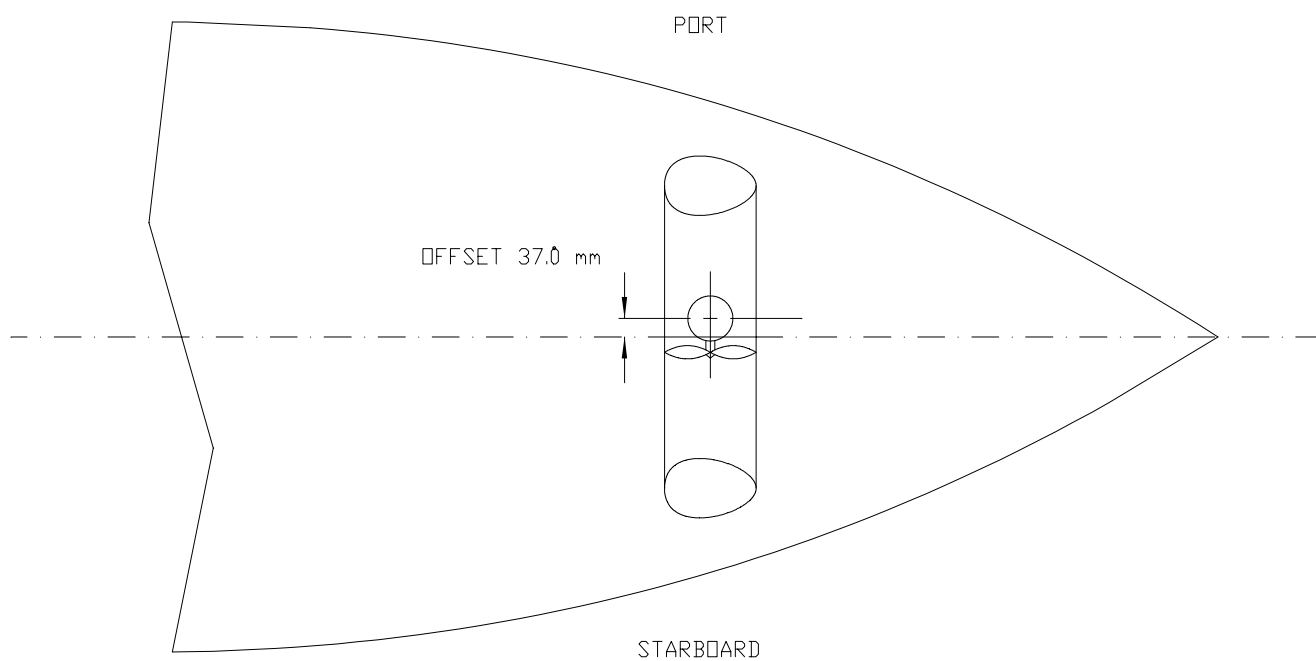
NOTE. The Thruster assembly / Electric motor should be installed at an angle NOT exceeding 45 degrees from the vertical plane.

Refit the propeller, using the Nyloc nut.

Position the complete drive coupling on to the Thruster input shaft, ensuring that the flexible element is fitted inside coupling. Locate the electric motor splined shaft in the top of the drive coupling and bolt down to the saddle interface plate. Ensure that the allen screws of the coupling halves have been tightened.

Ensure the D.C power is isolated from the Thruster circuit. Connect the main battery cables to the motor terminals, connect the thermal trip wires and control circuit as per Drawing 58400158, and insulate as necessary.

INSTALLATION OFFSET DIMENSION 200TAE



ELECTRICAL INSTALLATION

Please read in conjunction with Drawing number 58400158

Ensure the main and control voltage is 24 volt D.C.

Recommended battery capacity is 380 amp / hour for Thruster. (If in doubt contact your battery supplier).

If more than one battery, use batteries of the same type and voltage capacity.

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

The main motor supply cables are to be of a minimum of 95 mm squared or larger. The cable run from the battery supply to the Thruster and back should not exceed 23 m (75 ft) (eg batteries 11.5 m 37.5 ft from the Thruster). This is to ensure that the voltage drop from the supply is less than 10%.

A main switch / circuit breaker and fuse (shipyard supply) must be fitted into the positive power line.

We recommend a slow blow type fuse rated to 450 amps. The fuse will protect the D.C. motor from current overload and the vessel electrical system against any short circuits.

Ensure that the areas where the battery supply and D.C. electric motor are to be positioned within the vessel, are dry with good ventilation.

There must be separate power supplies for the motor and the control circuit.

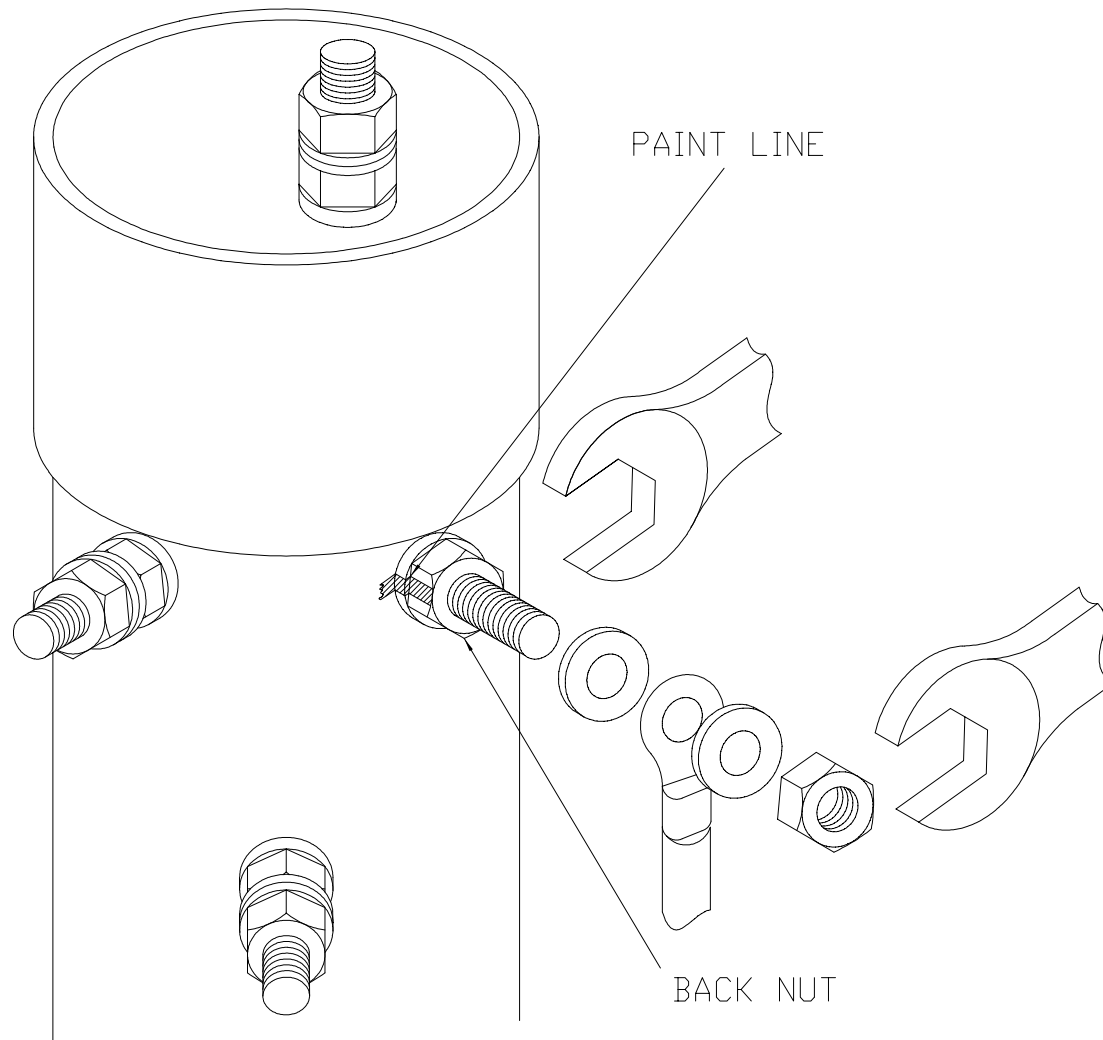
WARNING DO NOT EARTH THE THRUSTER AS THIS MAY CAUSE CORROSION.

WARNING INSTALLATION OF BARS OR GRIDS ACROSS TUNNEL ENTRANCE WILL HAVE A DETRIMENTAL EFFECT ON THRUSTER PERFORMANCE.

ISSUE	DATE / NAME	MOD No.
A	24.07.96 G.B.-S	N/A

ELECTRIC MOTOR INSTALLATION

WARRANTY NOTE



WARNING: WHEN WIRING THE ELECTRIC MOTOR INTO THE SHIP'S ELECTRICAL SYSTEM THE FOLLOWING CAUTION MUST BE TAKEN.

WHEN TIGHTENING THE FRONT NUT HOLD THE BACK NUT WITH A SEPERATE WRENCH TO MAKE SURE THE BACK NUT DOES NOT TURN. IF THE BACK NUT TURNS, SERIOUS DAMAGE WILL OCCUR, VOIDING LEWMAR'S WARRANTY ON THE ELECTRIC MOTOR. A PAINT LINE IS LOCATED ON BACK NUT TO CHECK FOR MOVEMENT.

THRUSTER MOTOR INSTALLATION DATA

DRN	G.B.-S	DRG. No	WSD0717	LEWMAR
DATE	24.07.96			

OPERATION

Switch on (enable) the system by pressing the main On / Off latching switch (green), the switch will then be illuminated.

(The system will be live until the On / Off switch is unlatched by re-pressing this switch or the main power is removed).

The D.C. electric bow Thruster motor is controlled by the joystick, or port / starboard switch operation. To move the bow to starboard, position the joystick to starboard or press the starboard switch, the Thruster will begin thrusting to port.

To move the bow to port, move the joystick to port or press the port switch, the Thruster will now thrust to starboard.

When changing direction eg from port to starboard, return the joystick to the centre and pause for approximately 1.5 second before thrusting in the opposite direction. If the Thruster is operated by means of switches, pause for approximately 1.5 second before thrusting in the opposite direction.

This is to allow the electric motor to come to a rest before rotating in the other direction, thus reducing the strain on the Thruster hub gears.

After completion of all Thruster operations, press the On / Off latched switch, to turn off (disable) the Thruster system, the illuminated switch will extinguish.

If the Thruster is not to be used for a period of time, or the vessel moored, switch the system off at the main circuit breaker.

WARNING The Thruster must only be run whilst submerged under water, damage may occur if it is run in free air.

TROUBLE SHOOTING

Electric motor is not operative.

Check main circuit breaker is on, reset or replace if the circuit breaker is blown.

Check the control circuit fuse is not blown, replace if necessary. In the above cases when the On / Off switch is operated the switch will not illuminate.

If power is available to the motor but the propeller will not turn check the Propeller is not fouled / obstructed with rope / timber.

Electric motor runs, but propeller is not rotating.

Check the shear coupling of the propeller has not sheared / slipped caused by ingestion of foreign matter into the tunnel tube i.e. timber, rope.

Replace shear coupling, by removing the Nyloc propeller nut, and the propeller. The inner bush will slide from the propeller shaft with the propeller, but may have separated from the rubber outer. Remove all broken / damaged shear coupling and replace with new. Lightly grease new shear coupling, and press into existing propeller hub.

Taking care not to tear off the drive lobe.

TROUBLE SHOOTING

Electric motor rotates with little power and at a slow speed.

Battery has insufficient charge.
Check battery voltage is 22 Volts minimum at the motor.
Charge or replace batteries.

Poor electrical connections e.g. due to poor installation, or corrosion over a period of time.

Disconnect electrical connections, clean (replace if necessary) and reconnect, protect with grease.

Extreme low temperatures decrease battery capacity, warm the ambient local area of the batteries.

Propeller fouled or obstructed by rope, fishing line, e.t.c. remove obstructions.

Poor contact to the carbon brushes in the D.C. motor, replace brushes or motor.

Thruster operates with excessive noise / vibration and in one direction, the thrust has noticeably become less powerful.

Propeller damaged due to rope / timber hitting the propeller.
Remove propeller, check that propeller shaft has not been damaged / bent, check seal.

Motor to drive shaft coupling loose.
Check and tighten Allen bolts. Lock Allen bolts with a suitable thread sealant.

Sea water in the hub. Check and replace seals as required.

MAINTENANCE

In general very little maintenance of the Thruster is required.

The oil in the gearbox (hub) of the unit should be changed annually. There is both a filler and a drain provided for this purpose.

The oil level should be filled up to the level of the filling hole.

The oil capacity required is approximately 100 ml of one of the following oils or an equivalent.

CASTROL	EPX 80W / 90
MOBILUBE	HD 80W / 90
SHELL SPIRAX	HD 80W / 90

CATHODIC PROTECTION SYSTEM

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

(Refer to Corrosion data sheet 023)

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 stop the corrosion of the Thruster hub and propeller, failure to change the anodes will cause serious damage to your Thruster.

TECHNICAL DATA

Electric Motor

Type	:Reversible D.C. motor
Voltage	:24 Volt D.C
Rated current	:400 amps
Motor rating	:8 KW (nominal)

System Rating, 1 Minute per hour at 400 amps.

Transmission

Gears	:Spiral Bevel gear type
Lubrication	:Oil bath, approx 150 ml
Oil types	:CASTROL EPX 80W/90
	:MOBILUBE HD 80W/90
	:SHELL SPIRAX HD 80W/90
	or equivalent.

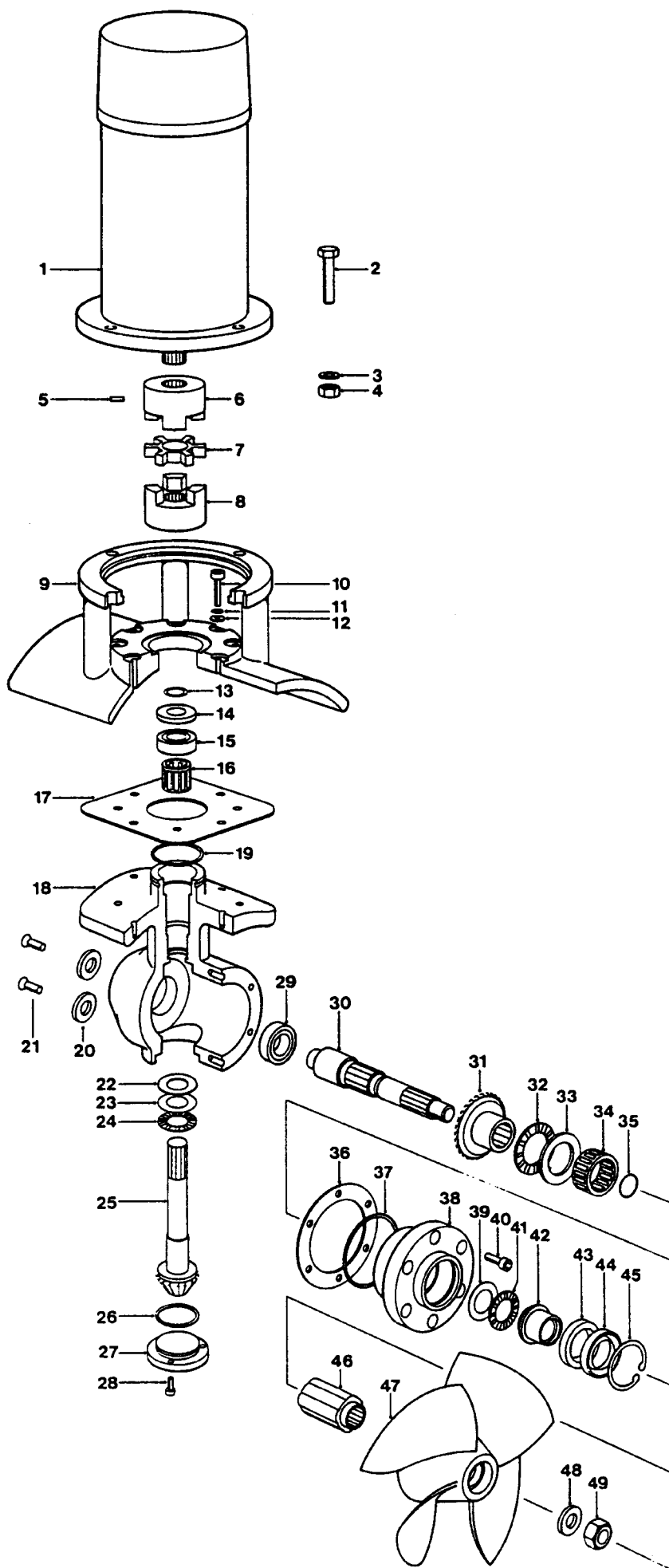
Housing	:Aluminium LM 25
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Propeller

Diameter	:194 mm (7.63")
No. of blades	:4
Material	:Aluminium LM 25

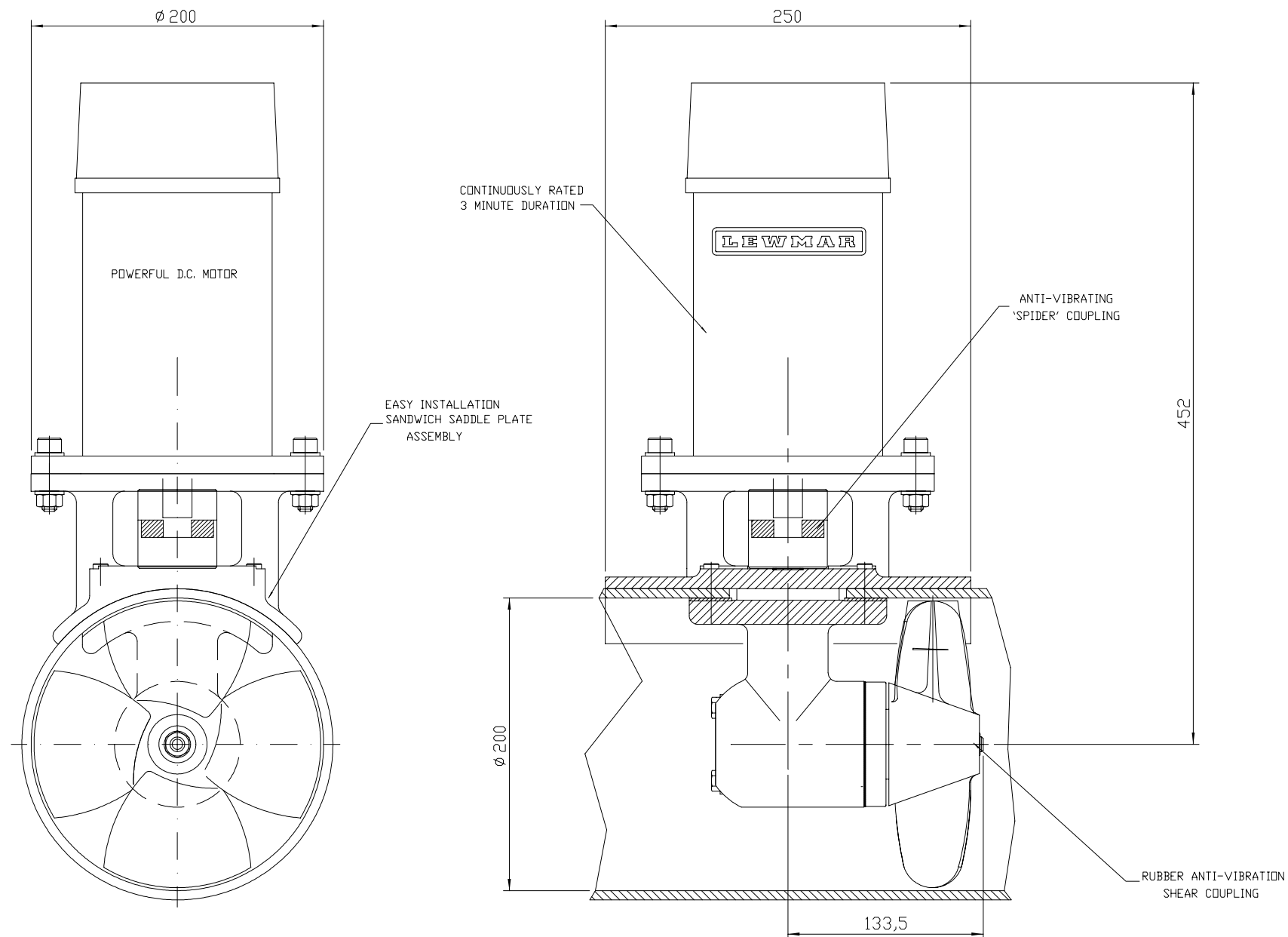
Control Circuit

Control fuse	:10 amp
Contactor Current	:3 amps per contactor
Control circuit wire	:1.5 mm squared



LEWMAR®

<u>ITEM NO</u>	<u>PART NO</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	58000150	Motor Assembly	1
1a	55000966	Insulating Washer	1
2	B6691	M10 X 45 hex head bolt	4
2a	B9659	Top Hat Insulating Washer	4
3	B1232	M10 Spring Washer	4
3a	B1208	M10 Washer	8
4	B1017	M10 Std Hex Nut	4
5	B0637	M6 X 20 Grub Screw	1
6	55000823	Motor Coupling	1
7	B9054	Coupling Element	1
8	55000822	Thruster Coupling	1
9	55000694	Saddle	1
10a	B0827	M6 X 35 Skt head screw	6
10b	B0746	M6 x 50 Skt head screw	2
11	B1230	M6 Spring washer	8
12	B1209	M6 Form C flat washer	8
13	B7788	Circlip	1
14	55000909	Top Hat Washer	1
14a	55000908	Bearing Washer	1
15	B9123	Journal Bearing (Input Shaft)	1
16	B9126	Needle Roller Bearing (Input Shaft)	1
17	55000747	Rubber Seal	1
18	55000746	Thruster Hub	1
19	B3738	Hub/Saddle Interface 'O' Ring	1
20	B7142	Dowty Washer 1/4in S/S	2
28a,40a	B2419	M6 x 1 1/2D Helicoil Insert	9
21	B9898	¼ BSP Plug A4	2
22	55000692	Shim	As Req.
23,39a	55000689	Shim	As Req.
24,41	B9128	Thrust Bearing (Input Shaft)	2
25	55000680	Input Gear Shaft	1
26	B3727	Inspection Cover 'O' Ring	1
27	55000745	Inspection Cover	1
28	B10670	M6 x 10 Skt head screw	3
29	B9124	Journal Bearing (Prop Shaft)	1
30,31	55000910	Propeller Shaft & Gear	1
32	B9127	Thrust Bearing (Prop Shaft)	1
33	B9133	Thrust Washer (Prop Shaft)	1
34	B9125	Needle Roller Bearing (Prop Shaft)	1
35	B8979	Propeller Shaft 'O' Ring	1
36a	55000687	Shim	As Req.
36b	55000688	Shim	As Req.
37	B8978	End Cap 'O' Ring	1
38	55000683	End Cap	1
39	B9134	Thrust Washer (Prop Shaft)	1
40	B0680-A4	M6 x 20 Skt head screw	6
42	55000743	Seal Sleeve	1
43,44	B6254	Propeller Shaft Seal	2
45	B7786	Circlip	1
46	B9055	Drive Bush	1
47	55000756	4 – Blade Propeller	1
48	55000757	Propeller Nut Washer	1
49	B1082	Nyloc Propeller Nut	1
***	58000111	Complete Hub Assembly	1

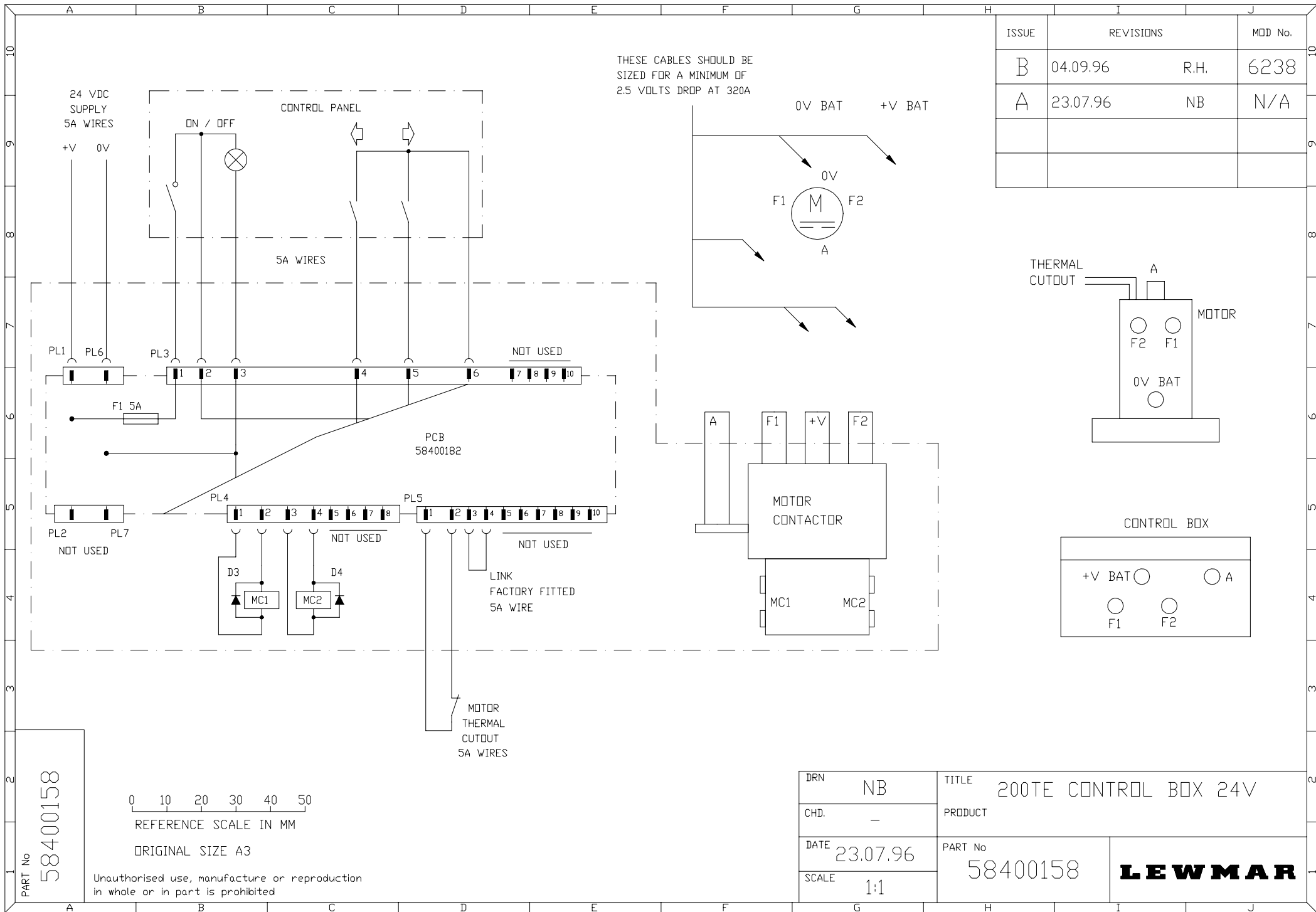


200TAE24V 10HP TUNNEL THUSTER

DRN	L.MOORE.
DATE	24.04.95

DRG. No
WSD0587

LEWMAR



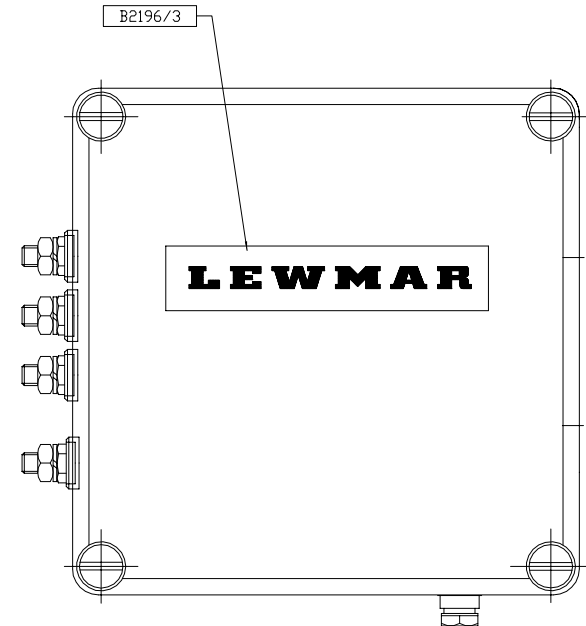
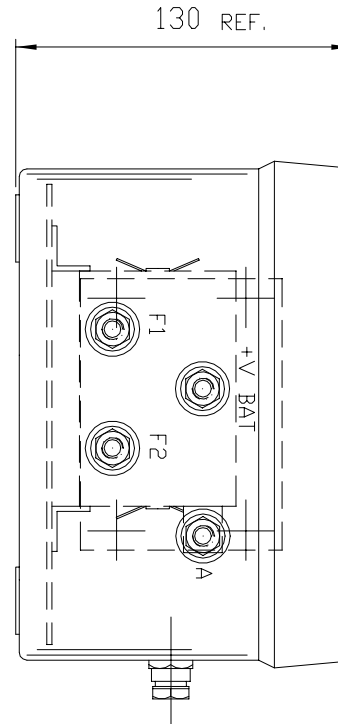
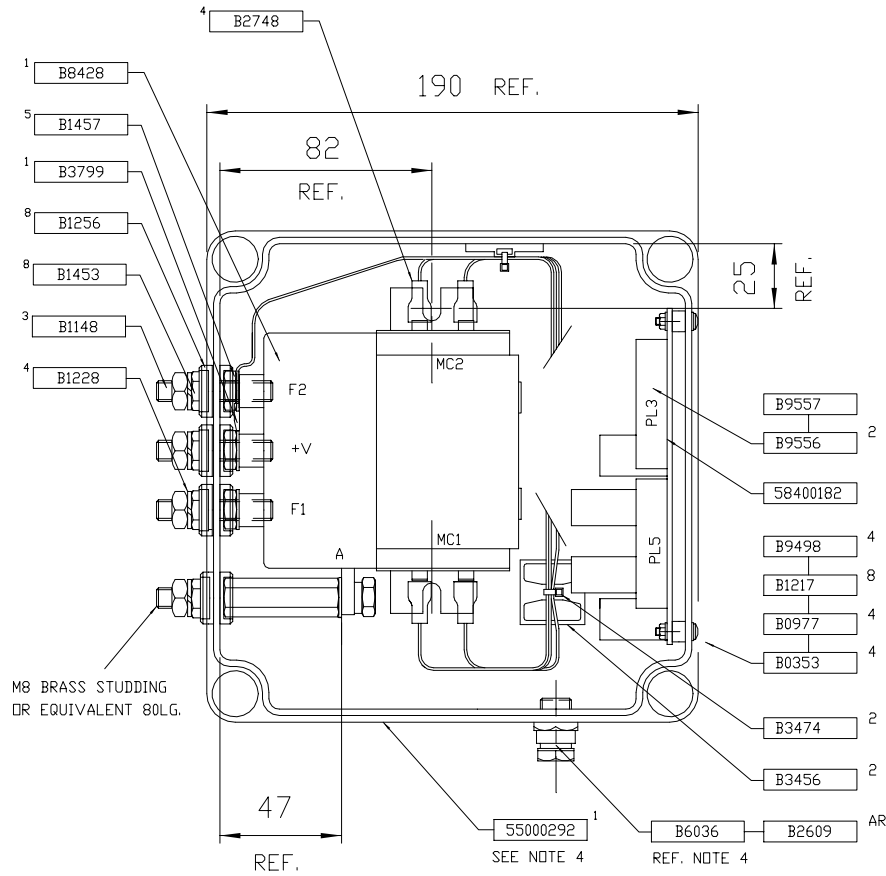
ISSUE	REVISIONS		MOD No.
B	04.09.96	R.H.	6238
A	23.07.96	NB	N/A

DRN	NB		TITLE	200TE CONTROL BOX 24V	
CHD.	-		PRODUCT		
DATE	23.07.96		PART No	58400158	LEWMAR
SCALE	1:1				

FIRST ANGLE PROJECTION

REMOVE ALL BURRS AND SHARP EDGES

ISSUE	REVISIONS		MOD No.
B	04.09.96	R.H.	6238
A	23.07.96	NB	N/A



NOTES

1. FOR WIRING DETAILS SEE SHT 1
2. REFERENCE PART NUMBER (TO AID IDENTIFICATION AT LEWMAR) TO BE MARKED ON UNDERSIDE OF CONTROL BOX.
3. 4 OFF B3153 B1228 & B1453 TO BE SUPPLIED LOOSE IN SELF SEAL PLASTIC BAG B1891 & PACKED WITH CONTROL BOX
4. 55000292 ON ASSY TAP 11.4 DIA. HOLE 1/4" UNF FOR B6036

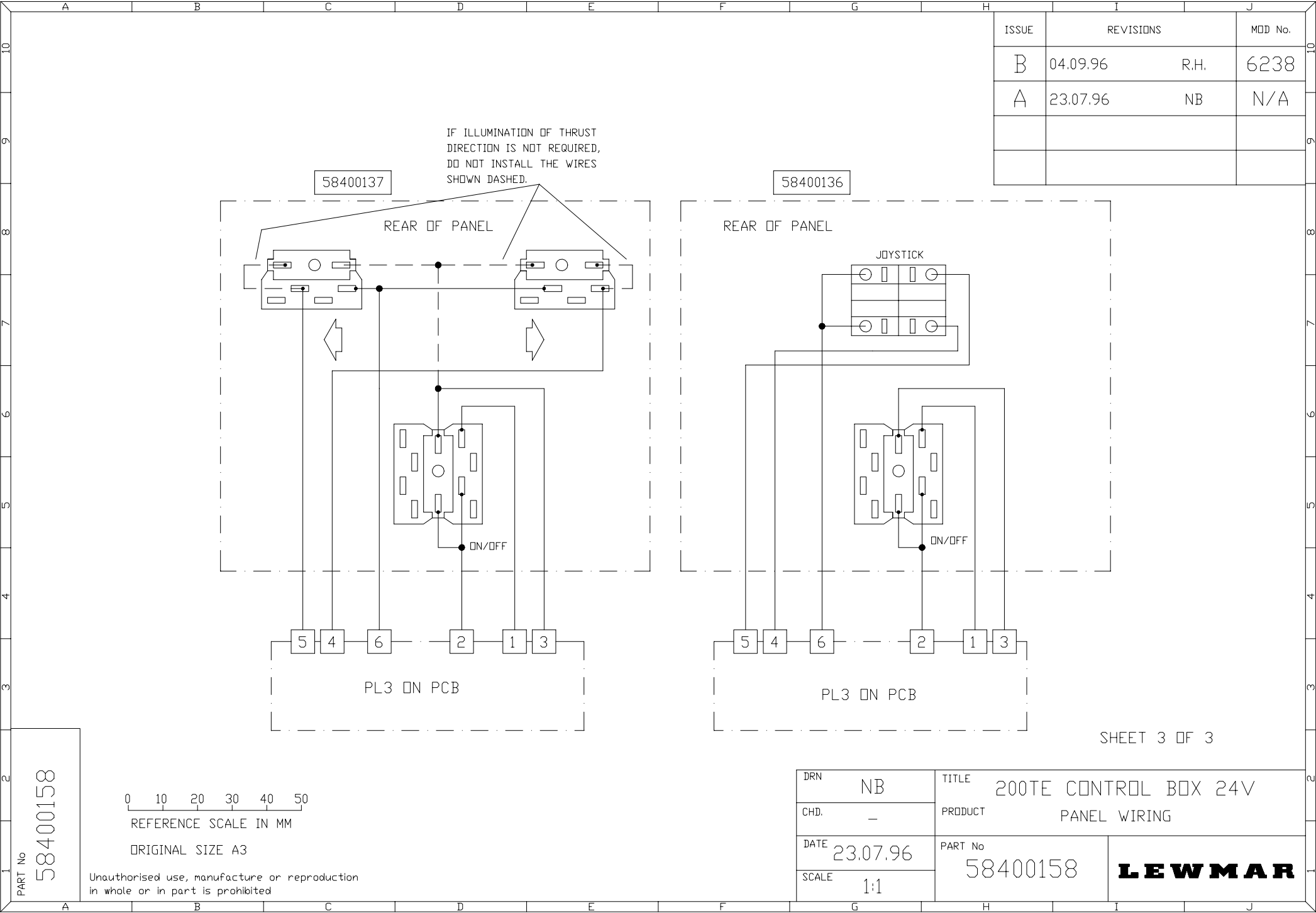
SHEET NO. 2 OF 3

PART No
584001580 10 20 30 40 50
REFERENCE SCALE IN MM

ORIGINAL SIZE A1

Unauthorised use, manufacture or reproduction
in whole or in part is prohibited

MATERIAL	TOLERANCES (UNLESS STATED)	DRN	NB	TITLE PRODUCT	200TE CONTROL BOX 24V	
		CHD	-			
FINISH	ALL DIMENSIONS IN MM	DATE	23.07.96	PART No	58400158	
		SCALE	1:1		LEWMAR	



LEWMAR LIMITED WARRANTY

Lewmar warrants its products in normal usage to be free of defects in materials and workmanship for a period of three years from date of purchase by the original purchaser, subject to the conditions, limitations and exceptions listed below. Any part, 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 repair or replacement of the goods or parts defective in materials or workmanship.
- ii Determination of the suitability of the material for the use contemplated by the buyer is the sole responsibility of the buyer and Lewmar shall have no responsibility in connection with such suitability.
- iii Lewmar shall not be liable in any way for:
 - a Failures, loss or damage due to use of products in applications for which they are not intended.
 - b Failures, loss or damage due to corrosion, ultra violet degradation, wear and tear or improper installation.
 - c Failures, loss or damage due to incorrect maintenance.
 - d Failures, loss or damage due to conditions that exceed the product's performance specifications.
- iv Product subject to warranty claim must be returned to Lewmar for examination unless otherwise agreed by Lewmar in writing.
- v Lewmar shall not be responsible for shipping charges nor installation labour associated with any warranty claim.
- 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 for marine purposes. Buyers intending to use them for any other purpose should seek advice from Lewmar, and Lewmar shall be under no liability arising from use, which Lewmar has not approved.

B EXCEPTIONS

Warranty is limited to a period of one year from the date of purchase in the case of the following:

- Bow thrusters
- Electric motors and 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 indirect or consequential loss including (without limitation) any loss of anticipated profits, damage to reputation or goodwill, loss of expected future business, damages, costs or expenses payable to any third party or any other indirect losses.
 - Any damage to yachts or equipment.
 - Death or personal Injury (unless caused by Lewmar's negligence).
 - b Lewmar grants no warranties regarding the fitness for purpose, use, nature or satisfactory quality of the goods.
- ii Where the laws of the country do not permit a warranty to be excluded, then such warranty, if permitted by that country's law, shall be limited to a period of one year.

LEWMAR CONTACT DETAILS

LEWMAR SALES OFFICES

Lewmar UK/Rest of World

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