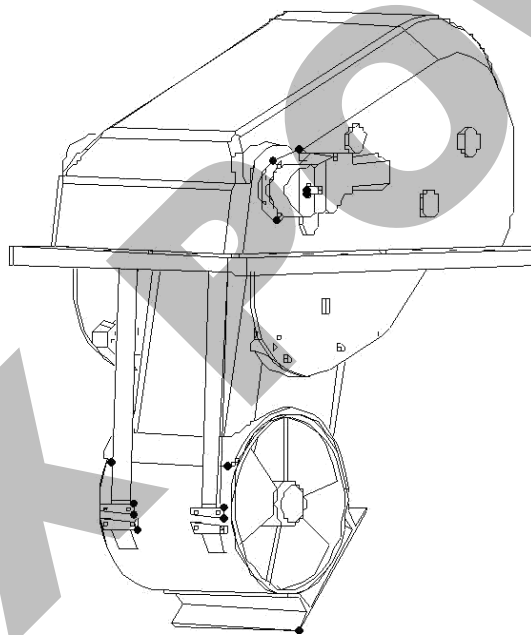


MAX

POWER

CONTROL TO THE MAX

COMPACT RETRACT 48V



MECHANICAL & ELECTRICAL INSTALLATION GUIDE & MAINTENANCE OVERVIEW

INSTALLATION OPERATION MAINTENANCE

Serial No.:

Installation date:

IT IS VERY IMPORTANT TO KEEP THIS MANUAL ON BOARD

To ensure a proper installation, correct usage and long-lasting enjoyment of this equipment, please take time to read this manual thoroughly.

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Your thruster is a highly technical product and should be treated as such. The employment of qualified marine personnel, with bow and stern thruster installation experience is strongly advised. Where possible, the boat manufacturer architects, design departments and/or shipyard should be consulted, prior to installation taking place. For any boat requiring official classification, bodies of approval should also be consulted at the earliest opportunity.

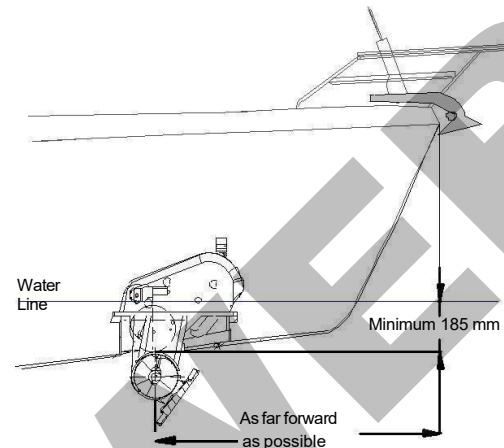
Your thruster should be delivered with the following parts:

Thruster assembly with integrated thrusters motor, up / down motor, motor coupling, leg and propellers	Closing plate support (kit)	Relay box	Control Box
QR code for manual download	25m Control Cable	Control panel	Promotion mat

1. POSITIONING

WARNING: Correct positioning is essential for the correct operation of this unit.

Find the point the farthest forward (or aft), while keeping in mind the space available, given the vessel's fixtures, space and shape ensuring you respect the minimum immersion depth of one full turbine diameter (185 mm).



Always check and make sure that there is enough room to allow for the complete removal of the thruster unit and enough room for the connection of the electric cables.

To install a Compact retract in the stern, make sure that the turbine flow is clear of all obstacles, or select the best possible compromise.

2. DETERMINE THE LOCATION OF THE AUXILIARY EQUIPMENT


A power fuse, of the correct size (*see section 4.3*), must be installed in the positive supply cable, as close as possible to the thruster's battery bank and it must be easily accessible and clearly marked.

A manual battery isolator, of the correct size, should be installed in the positive supply cable, as close as possible to the thruster's battery bank and must be easily accessible and clearly marked

An electrical battery isolator, as supplied by Max Power, should be installed in the positive supply cable, as close as possible to the thruster's battery bank, in order to benefit from all automatic safety features of the electronic control system.

The thruster and its peripherals (control box, relay, isolator) must be installed in a dry and well ventilated area.

The thruster motor terminal busbar should be installed above the waterline.

 Care should be taken to securely fix the opening of the black rubber hose, containing power cables, above the vessel's waterline.

The control panel(s) should be installed as desired at the helm station(s) in a protected and waterproof position.

3. MECHANICAL INSTALLATION

(Please refer to “Build Drawing” at back of this document, see page 18):

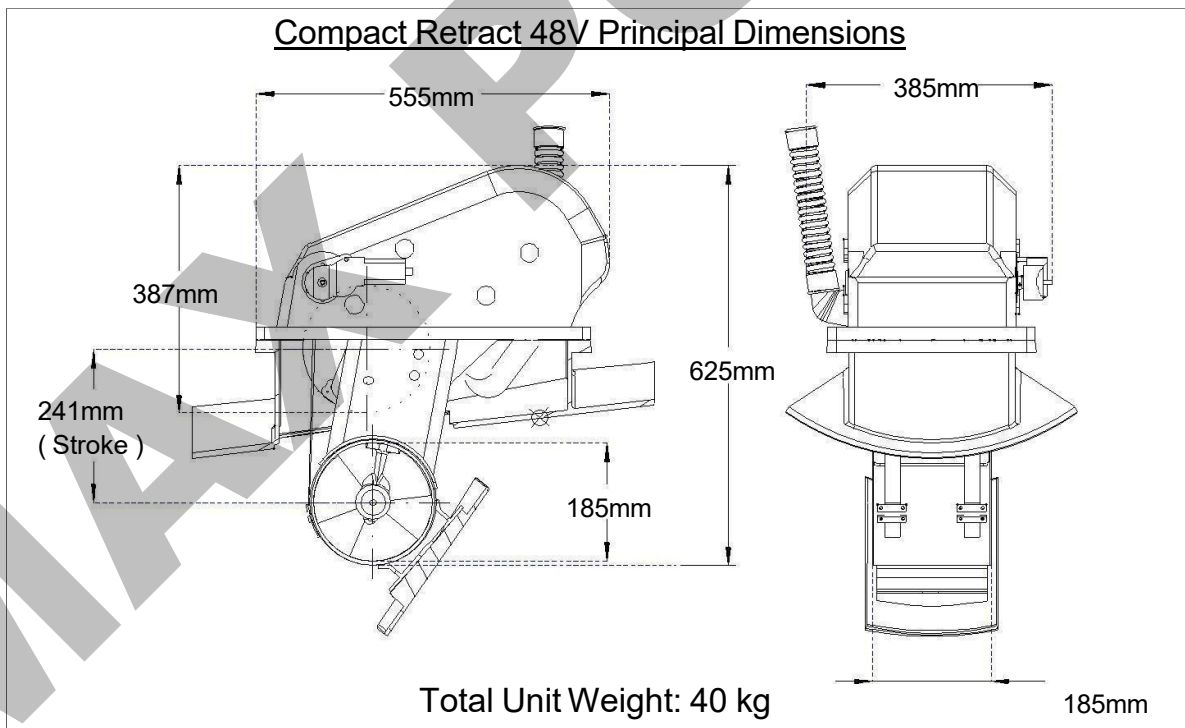
3.1 GENERAL

MAX POWER can supply, either a steel reinforced G.R.P. mounting base or a 5086 aluminum alloy-mounting flange. These bases save considerable shipyard time while assuring solid and precise installation.

- a) For GRP hulls the mounting base should be laminated into the hull. The base supplied is only to help give the initial form; its strength will come from additional lamination (inside and out) added when laminating the hull.
- b) For alloy hulls, the mounting flange should be welded onto the base, which has been fabricated into the hull.

The method and materials used for making the mounting base must be adapted to the particular hull material (laminated wood, GRP, sandwich, aluminum, or steel). Naval Architects, Classification Societies or specialized firms should be consulted.

The thruster(s) mechanical stresses are spread over the hull by the mounting base. Its installation reinforces the hull, if well calculated, but it might be necessary to attach it by gussets to frames and stringers.



When fixing the mounting base, do not forget to take into account the overall dimensions of the Compact Retract.

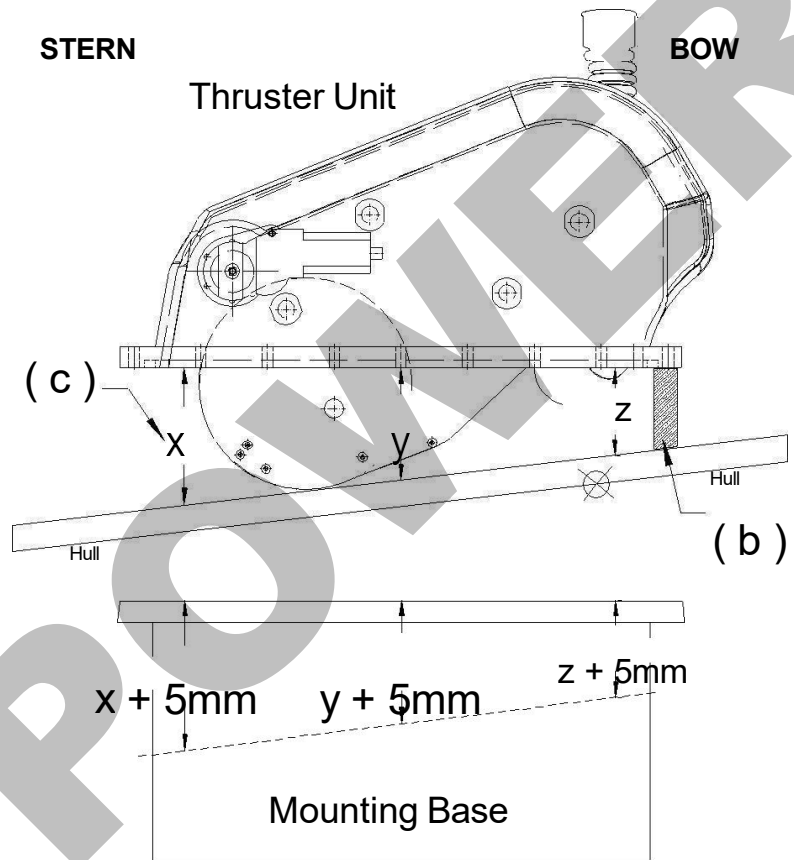
Mind not to step on the up/down motor as it can damage its support flange and pin.

3.2 DETERMINING & MARKING UP POSITION

- a) Remove the counter-mold on the inside of the hull, in area where thruster will be installed, allowing at least 15 cm on the outside of mounting base position for stratifying the mounting base to the hull.
- b) Position the thruster inside

the hull. Cut a piece of wood (length = 121mm – hull thickness) to use as a spacer. Place this spacer between the thruster’s flange and hull. This will give the installation height and position of the unit.

- c) When satisfied with the initial position of the unit, take measurements at various points between the flange and the bottom of the hull. Mark these measurements onto the mounting base to determine the initial shape to which the base should be cut. To allow sufficient tolerance, add 5 mm to all the above measurements to allow for tolerances.

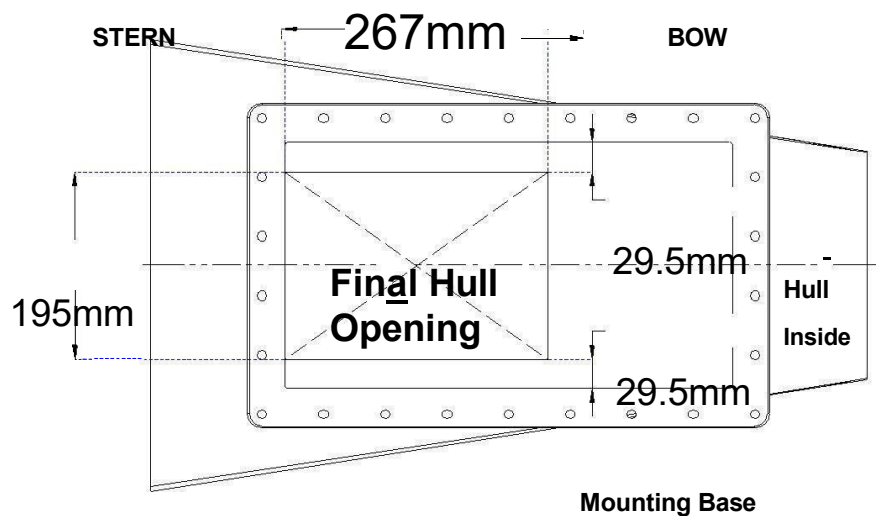


- d) Mark-up the thruster’s initial position on the inside of the hull before removing unit.
- e) The thruster unit can now be removed and once the mounting base has been cut, using the above measurements, the base can be temporarily fixed in place in its marked position.
- f) Place the thruster unit in the temporarily fixed mounting base to verify dimensions.

- g) Once satisfied clearly mark the final position of the inside of the mounting base

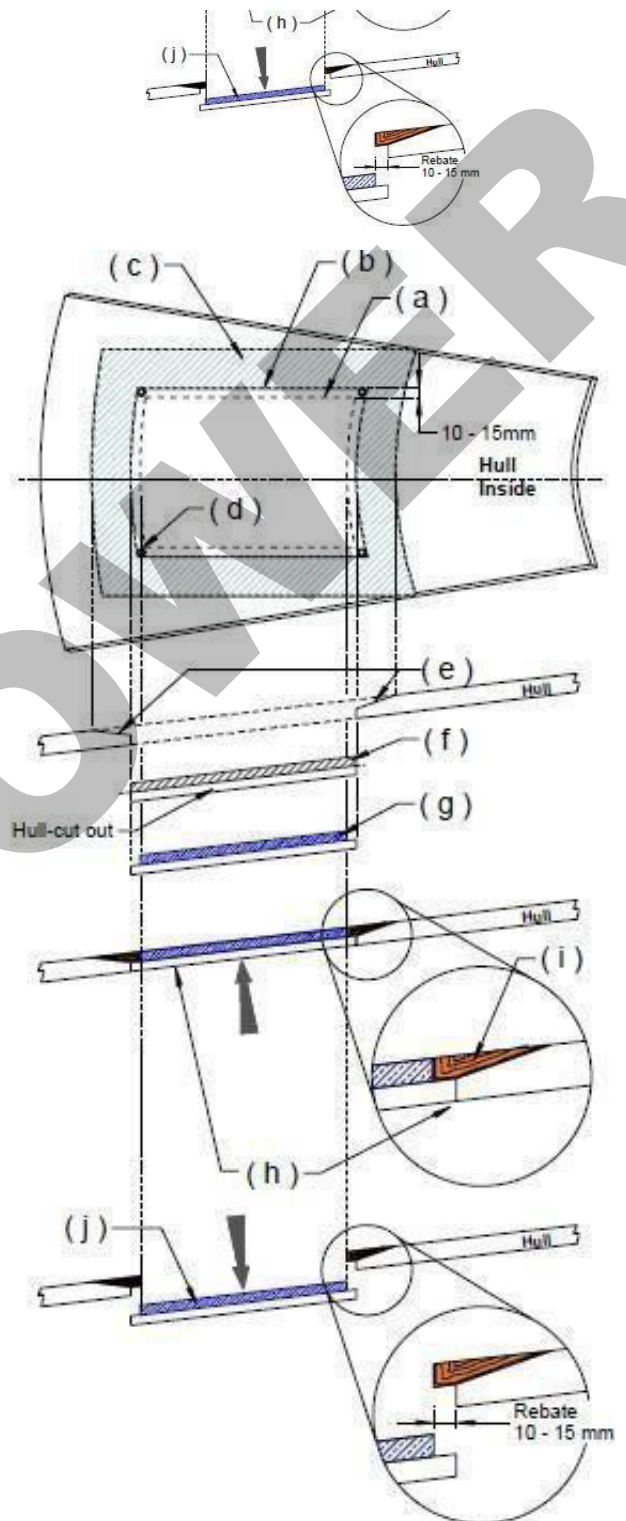
and remove base.

- h) Measure and mark the hull opening using the dimensions noted on the diagram opposite. Also see “Build Drawing”.



3.3 CONSTRUCTION OF THE HULL OPENING AND CLOSING PLATE

- a) Measure & mark the hull opening as mentioned before.
- b) Trace a parallel line, 10 – 15 mm away from marked-up hull opening, to allow for position of rebate.
- c) Trace a parallel line, 100 – 150mm away from marked-up position of rebate, to allow form area to be shaved down to allow for the construction of the rebate.
- d) Drill holes in the corners of lines marking the rebate position and cut out this piece of the hull.
- e) Shave down the marked up area for construction of rebate (see “c” above). Make sure when grading the hull not to exceed $\frac{1}{2}$ the hull thickness.
- f) Shave down hull-cut out to half its original thickness.
- g) Use piece of wood (195 x 267mm) to make male mold for rebate construction. Position & temporarily fix on shaved down hull cut-out, allowing 10-15mm all-around. Make sure all lines are smooth and liberally wax this mold.
- h) Position & secure this in hull opening, making sure outside hull lines are smooth.
- i) Build the rebate, using matt & roving on the inside of the hull. Do not exceed the original thickness and shape of the hull.
- j) Once rebate is set, remove the male plug. Now remove temporarily fixed piece of wood from shaved down hull cut-out and keep the hull cut-out to use as closing plate.



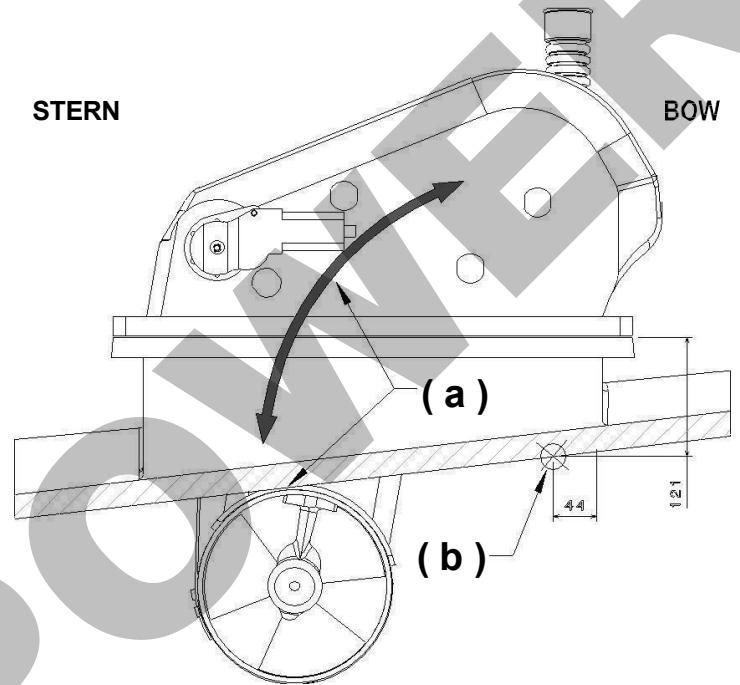
IMPORTANT: The dimensions of the hull cut-out must not exceed the specified limits, and its weight must not exceed 11 kg. If either of these limits is exceeded, MANUAL MODE may be triggered.

3.4 FINAL FITTING OF THE MOUNTING BASE TO HULL

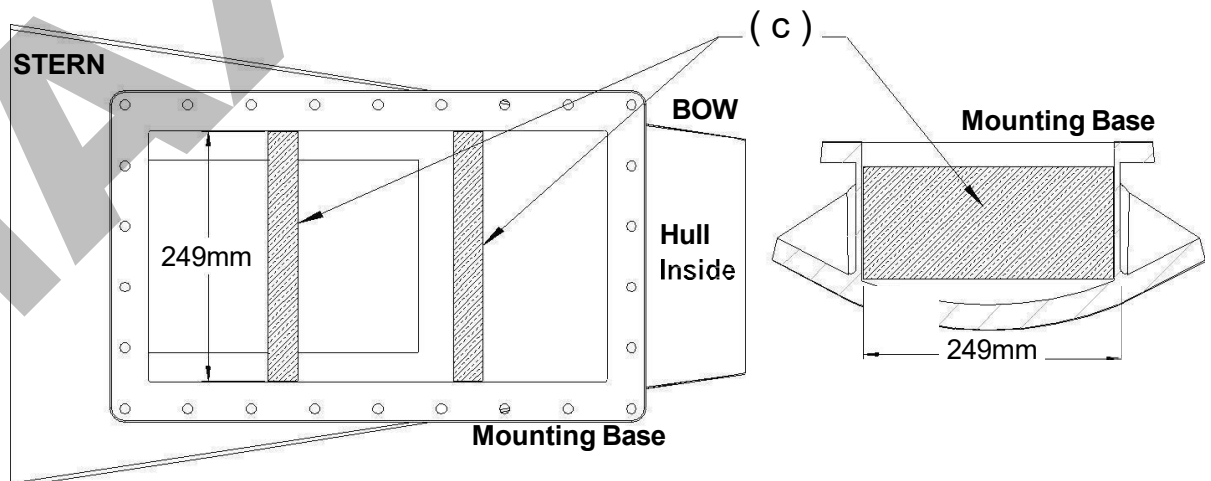


WARNING: Please keep in mind that thruster unit will automatically retract after 10 minutes, when in “Normal Operation Mode”. Thus before doing any work on the turbine, please ensure that thruster is in “Manual Mode”. When in doubt remove fuse in supply of the electronic control box.

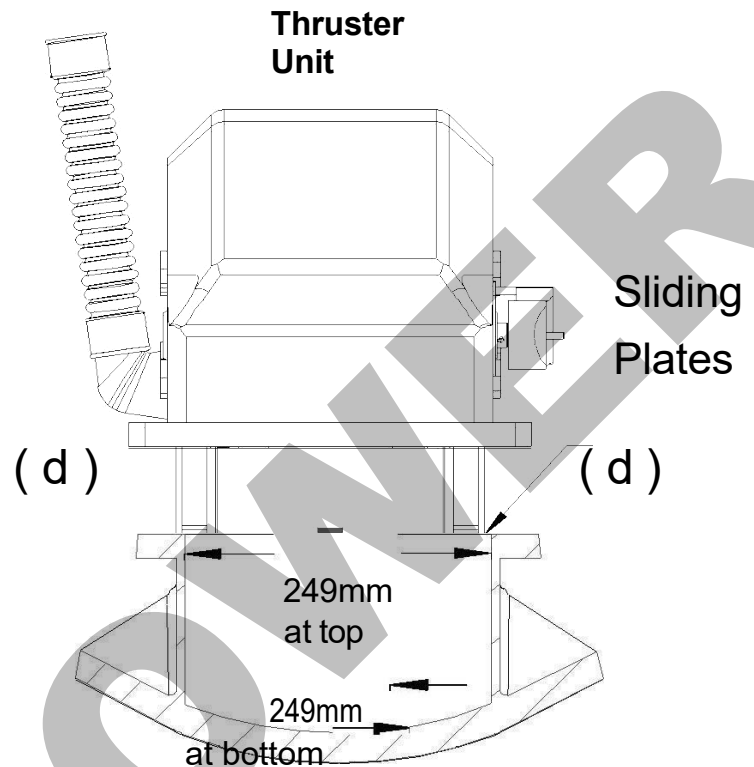
- a) Once the hull opening has been cut and rebate constructed, you need to temporarily fix the mounting base in its marked position. Install the thruster in position, fixing it with four bolts at the corners, raise and lower the unit, making sure that the unit is not being obstructed by anything and that the turbine completely clears the hull when fully down;
- b) **IMPORTANT** verify that the construction point, as shown on “Build Drawing” has been respected.



- c) Once completely satisfied with the position and height of the mounting base, the base can be permanently stratified and fixed into the hull while respecting the inside dimensions of the mounting base. In order to ensure that the mounting base keeps its initial form during the stratification process, one can use some wooden spacers (length = 249 mm) on the inside of the mounting base.



- d) The reason for respecting these dimensions is to avoid the sliding plates becoming wedged into mounting base resulting in the unit being stuck in the down position.
- e) Before fixing the thruster unit onto the mounting base flange it is important to ensure that the top surface of the mounting base flange is perfectly flat to accept the « O » ring seal of the Compact Retract base flange ensuring perfect water tightness.



3.5 FINAL FITTING OF THE THRUSTER UNIT TO THE MOUNTING BASE

- a) Make sure you provide sufficient access underneath the flange to allow for tightening the nuts. If access is not possible, provide a special mounting flange with metric studs or tapped holes. The bolts fixing the thruster onto the mounting flange must be inserted from top to bottom, except for the four bolts on the bow side of the flange, which should be inserted from the bottom to the top.
- b) Final installation of the thruster unit onto the mounting base must be made after thoroughly cleaning and then liberally coating both joint surfaces (thruster base flange and mounting base flange) with good quality marine grease, to ensure “O”-ring seal is compressed flat, evenly, smoothly and squarely when the bolts are tightened.
- c) Under no circumstances should the thruster be glued or bedded down with a marine type mastic/glue such as Sikaflex or other similar product(s).
- d) The flange bolts should be tightened sequentially and in successive passes until the two surfaces touch.

3.6 FITTING OF HULL CLOSING PLATE

Once the thruster unit is permanently bolted onto the mounting base, and once all electrical connections are completed you are now ready to fix the mounting plate to the base of the turbine.

WARNING: Please keep in mind that the thruster unit will automatically retract after 10 minutes, when in 'Normal Operation Mode'. Thus before doing any work on the turbine, please ensure that thruster is in "Manual / Installation Mode". When in doubt remove fuse in supply of the electronic control box.

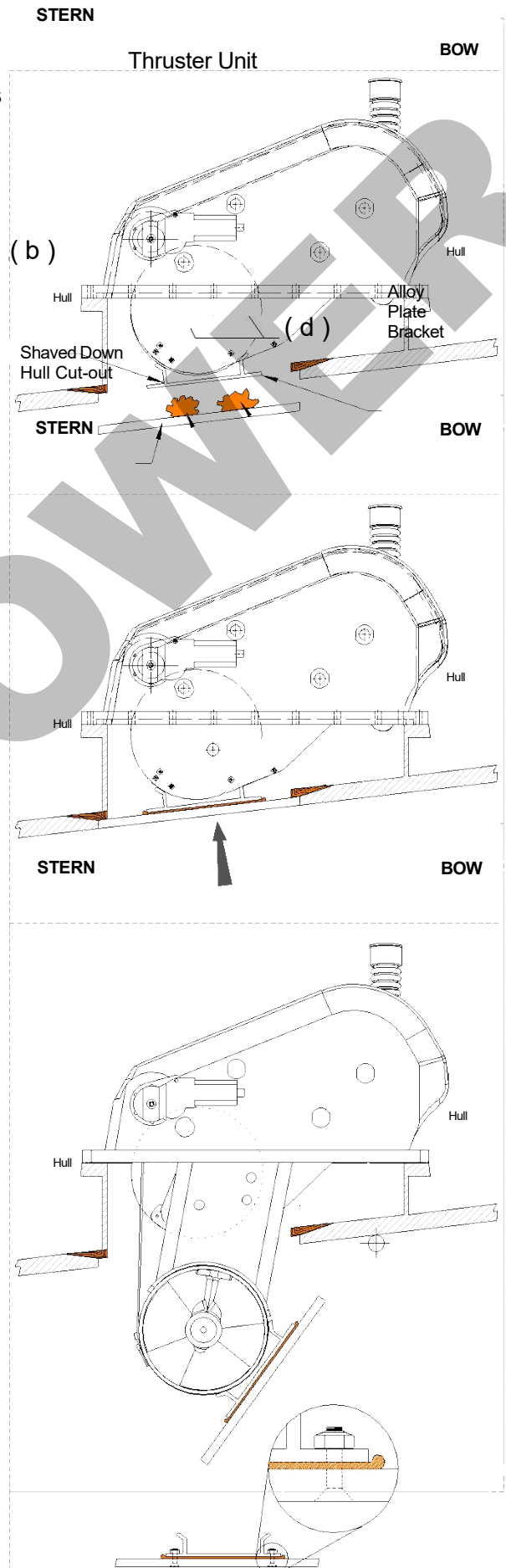
A) Go into 'Installation Mode' (see section 4.4 of this document for more detail on all operation modes) which will automatically lower the turbine and bring it back up, stopping 10mm short of the fully 'Up' position and switch off automatically.

B) Position & center the composite fixing bracket onto the turbine, make sure the bottom of the bracket is parallel to the hull line and mark the position of the four fixing holes on turbine.

C) Go into 'Manual Mode' lower thruster completely and drill these marked holes in turbine, mount the plate onto the turbine using stainless steel bolts with nylon lock nuts. After this is finished raise the thruster completely and switch the unit into 'Installation Mode', the thruster is now ready for the hull closing plate to be fixed.

D) Place a sufficient amount of reinforced fiberglass on the hull closing plate and firmly push the closing plate into its rebate, leaving it close until resin has set.

E) Once dry go into 'Manual Mode', lower unit and remove bracket with closing plate, fill up and finish off any gaps, after which the closing plate should be fixed to the bracket by means off nuts and bolts. You now have your closing plate



3.7 FINAL ADJUSTMENT AND SET-UP OF THRUSTER UNIT



WARNING: Please keep in mind that thruster unit will automatically retract after 10 minutes, when in “Normal Operation Mode”. Thus before doing any work on the turbine, please ensure that thruster is in “Manual Mode”. When in doubt remove fuse in supply of the electronic control box.

- a) With closing plate unit fixed to the turbine, raise and lower the thruster in ‘*Manual Mode*’ to be sure that it is closing tightly into the rebate. Once satisfied make sure that closing straps are tight, if not please adjust at the brackets located on the turbine with thruster in fully down position.
- b) Once satisfied go into ‘*Automatic Setup Mode*’ during which the thruster will automatically find its fully “Up” and fully “Down” position, after which the system will automatically shut itself off.
- c) Check that the hull closing plate shuts tightly into the rebate in the hull and when fully down that the turbine is completely clear of the hull.
- d) The thruster can now be switched “On” normally and one will be able to use the thruster in “Normal Operation Mode”.
- e) During the installation if you find the thruster stops prior to reaching fully “Up” or fully “Down” position and after making sure there is no mechanical problem, one should adjust the trip settings in the electronic control box (see electrical installation page 20 for further detail).
- f) Perform automatic set up as soon as the closing plate is installed and the installation mode has been performed, it is preferred for the boat to be inside the water.

4. ELECTRICAL INSTALLATION

4.1 GENERAL ELECTRICAL INSTALLATION

ATTENTION: An incorrect electrical installation will cause rapid deterioration / failure of the unit.

Excessive voltage drops will cause relay and brush failure. Special attention should be given to the quality, capacity and condition of your batteries, and cable sizes.

REMEMBER: Take care to tighten correctly all electrical connections.

WARNING: Under no circumstances should any inflammable products be stored next to the electrical components of the thruster.

WARNING: It is essential to install a power fuse, manual battery isolator and if possible an electric battery isolator as close as possible to the source of power (thruster battery bank).

The manual battery isolator must be visible, clearly marked & easily accessible.

4.2 CONTROL PANEL INSTALLATION

Control panels should be protected from the natural elements while the thruster is not in use.

Install the control panel(s) in easily accessible positions, without obstructing the main engine and/or steering controls.

When fixing the panel with the stainless steel screws, make sure to install the pre-cut rubber seal, as supplied with the panel, ensuring that it is in the correct position.

IMPORTANT: Only clip-on the face panel/cover when totally finished and satisfied with wiring and positioning of the unit.

Please note that panels are only fully waterproof from the front, if installed correctly.

However, the area behind the dashboard should be kept dry to avoid the risk of oxidation of the cable connector contacts.

For full installation instructions of the control panels please refer to "Installation Guidelines" as supplied with each control panel.

4.3 CONTROL SYSTEM

For the wiring of the **12V electronic control box**, ref. 312951, and of **12V command system**, please refer to the diagrams "*Compact Retract 48V: Electronic Control Box Connections*" and "*Compact Retract 48V: Control Wiring*" page 20.

All wires should be carefully labeled to reduce the chance of error and simplify checking and troubleshooting. Try to use the color scheme as used on the control wiring diagram in order to facilitate future maintenance and troubleshooting.

All wire ends for terminals should be tinned before crimping or inserting into terminal blocks. The wire dimensions should be of the specified dimensions.

Install a double pole breaker/isolator in the supply wiring of the thruster control box on the boats' main electrical switchboard marked BOW THRUSTER: Please keep in mind the voltage drop in cable run from control box to main electrical switchboard. **For CR70 , CR85 and CR100 models, the command circuit (control panel, control box, up/down servomotor) is always 12V powered.**

This breaker/isolator should ideally be supplied from an independent battery bank, to the one used for powering the thruster unit.

The installer must protect the positive supply cable of the thruster control box by means of a fuse (8 A) as indicated in the above mentioned diagrams. The size of the supply wires (red & black) depends on the length of the cable run, the voltage drop in these cables should not exceed 5% of the nominal battery voltage.

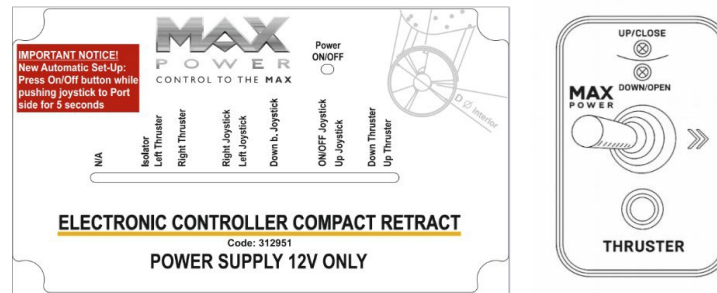
For safety reasons and in order to benefit from all the functions provided by the thruster's electronic controller, an electric battery isolator needs to be installed in the thruster motor's positive supply cable.

It is important to isolate the thruster motor power circuit by means of a battery isolator(manual/electric) after having left port & when the maneuver is finished, after docking.

Please Note: All wiring must be insulated from ground and should be installed in compliance with acceptable standards that require all junctions to be in waterproof boxes equipped with glands. All wiring should be kept outside of bilge's and other habitually wet areas.

IMPORTANT: The control box is not delivered configured to work with the existing installation onboard it is the responsibility of the installer to engage the auto set up mode to the new control box once it is installed, in order for the thruster to operate correctly onboard.

4.3.1 CONTROL PANEL AND THRUSTER CONTROL BOX FUNCTIONS AND MODES OF OPERATION



Control boxes delivered with the above sticker have a new operation software. In this software all operation modes, Manual, Automatic Set Up and Installation can be engaged with the thruster deactivated at any point and they are independent from each other. This means that with the thruster turned off, the user can engage Automatic Set Up mode without having to engage first Manual mode. The time needed to engage each mode has also been changed, the functions are available below:

Note: Before the system can be used in normal operation, you must calibrate the control box by activating the Automatic Set-up Mode (only for installer/ shipyard)

Automatic Set-up Mode: Press On/off button and simultaneously push Joystick port/left for 5 seconds

- Engage Automatic Set-Up mode after the closing plate is installed and with the batteries fully charged.
- This mode is crucial for the correct operation of the thruster as it stores the limit up/down positions of the given installation.

Manual Mode: Press On/off button and simultaneously Up button for 5 seconds

- Engage Manual mode only during installation of the thruster to check if the turbine is making contact with the hull or during maintenance. If this mode is automatically activated during Normal operation of the thruster, then it is caused by one of the following:

1. Battery charge to the thruster's control box drops below 11V, battery needs to be charged or replaced.
2. User tries to deploy/retract the thruster while boat is cruising with speed greater than 4 knots.
3. Debris or obstacles were caught on the turbine of the thruster during operation and is stopping the unit from retracting correctly. If the thruster for some reason engages manual mode (all LEDs flashing and alarm is present), then deploy the thruster until you hear double beep, retract the thruster until you hear double beep and deactivate the thruster. Afterwards when the thruster is activated it will be in Normal operation mode (Automatic Set-up Mode does not need to be engaged, no reset needed). If during Manual mode, the thruster cannot be retracted/deployed and it continues to beep then the turbine or the retract motor needs to be inspected for obstacles or damage.

Installation Mode: Press On/off button and simultaneously Down button for 5 seconds

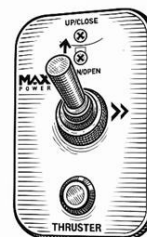
- Engage Installation mode only during installation of a new thruster to properly install the closing plate support. Once Installation mode is finished, it is mandatory for the installer to engage Manual mode, in order to check that the turbine does not come in contact with the hull. As soon as the unit is retracted the installer must engage Automatic Set-up mode to complete the installation.
- The end user does not need to engage this mode at any point.

Normal Operation Mode:D.1 Switching the system "On" or "Off":

- To switch the thruster "ON" by pressing the ON/Off button and simultaneously pushing the Joystick starboard/right for 1 second.
- When switched "ON" the unit will double beep and the "On" and "Up" LED's will light up.
- With the thruster fully retracted, the thruster can be switched "OFF" by pressing the ON/Off button and simultaneously pushing the Joystick starboard/right for 1 second. When switched "OFF" the unit will double beep and all LED's will go out.
- It's only possible to switch off the unit when the thruster in the fully up position.

D.2 "Lowering" & "Raising" Thruster Unit:

- Once the unit has been switched ON as described above, press and hold the joystick "Down" for one second after which the unit will lower automatically to fully down position.
- When thruster is fully down the LED light of the DOWN indication will come on and the buzzer will double beep to indicate that the thruster is deployed and ready to thrust.
- For as long as the thruster is in the down position the buzzer will beep (short) once every three seconds, to remind the user that is deployed. The unit must not be deployed when the yacht is cruising with speeds higher than 4 knots as this may cause damage to the thruster assembly and engage *Manual Mode* to the control box.
- To raise the thruster, press and hold the joystick "Up" for one second after which the unit will retract automatically.
- When thruster is fully up the LED light of the UP indication will come on and the buzzer will double beep to indicate that the thruster is come up and ready to be switched off.
- If thruster meets any abnormal resistance when lowering or raising, the system will automatically go into *Manual Mode* after which the control box will need to be recalibrated by following the instructions advised in pages above.

D.3 Thrusting "Left" & "Right":

- Use joystick to thrust either left or right.
- Please note that it is only possible to thrust left or right when thruster is detected to be fully down (the LED light of the down indication must be on).
- The thruster controller provides a time delay between left and right thrust in order to avoid rapid direction changes, but no delay when thrusting to same side.

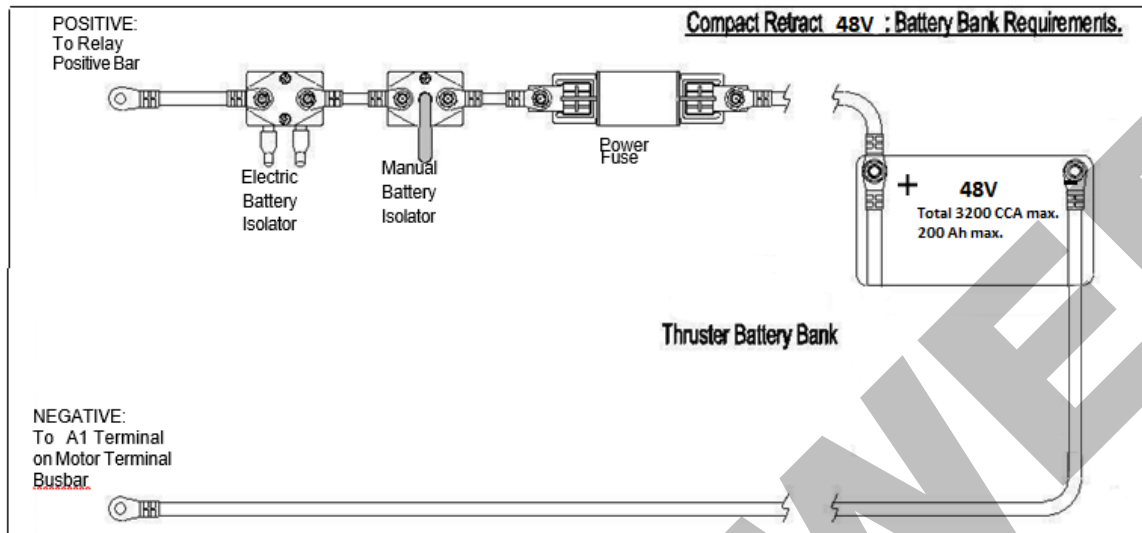
D.4 Overheat Alarm & Shut-Down:

If the heat sensor reaches its critical threshold then the LED's of the On/Off button, "Up" and "Down" indications will alternate flashing following by a short beep every second, after 10 seconds 2 long beeps will be heard and the thruster will retract automatically and deactivate. After the thruster has shut down it will not be possible to switch "On" the system again until the thruster motor has cooled down. Each thruster unit has installed two heat sensors. If the primary heat sensor fails (unit shuts off automatically after activation) then it can be removed and the back-up sensor can be connected instead to the control box (look for two unplugged yellow cables in the below out of which the power supply cables also exit).

D.5 General:

- a) If the thruster unit has not been used for a period of ten minutes the unit will automatically switch off.
- b) If unit is in the "Down" position, the thruster will auto-retract automatically before switching off.
- c) Ten seconds before system automatically switches off the unit will give an audible warning by means of 4 short beeps.
- d) In order to isolate the power circuit of the thruster motor each time the control circuit is switched off, it would be needed to install an electric battery isolator, as advised by Max Power (see "*Control Wiring Diagram*" in the back of this manual for more detail).
- e) If power to control card was removed with system in *normal operation mode* (after correct set-up procedure was followed) and *with* the thruster not fully up, the unit will automatically raise as soon as power to control card is restored. The system can then be switched on normally and will be in *normal operation mode*.
- f) Keep the 12V lead acid battery that supply the control box of the thruster fully charged
- g) Before connecting power to the thruster control box or when raising or lowering the thruster in whatever mode of operation, make sure that all persons are clear of thruster unit, to avoid any human injuries

4.4 BATTERY REQUIREMENTS



When choosing the type of batteries needed for your thruster's battery bank, keep in per that it is the CCA (Cold Cranking Amps) capacity that is the most important and not the Ah (Amp-hour) capacity. This is because thrusters draw high currents, but only for very short periods of time (maximum 3 min.)

Max Power would recommend using Exide, Maxxima 900 type batteries, which have an 800CCA and 50Ah capacity. The CR48V is compatible only with lead acid batteries in case of use lithium supply will cause rapid deterioration of the Max Power equipment (electric motor, relay, control box, transmission, etc) if they are not specified correctly (*please contact Max Power first as such cases can result the void of the warranty*).

If the dedicated batteries are charged by the alternator, the reference of the charge must be taken after the diode-splitting block (if in doubt, consult a marine electrician).

If the batteries or cables are inferior to those recommended, the Compact Retract will not reach its potential thrust. The greater the batteries and cables size, the better the thrust.

Thruster performances are quoted with a minimum 43.2 volts at the motor terminal busbar for the 48V model (thruster running, boat in water).

Nominal amperage consumption during load at 45.6V will be approximately 105A.

IMPORTANT: Replace the battery that supplies the control box if the voltage drops below 11V during up/down thruster movement. The CR thruster and its peripherals are only compatible with lead acid batteries (not Lithium).

4.5 POWER CABLE SECTIONS (BATTERIES TO RELAY)

According to the ISO 10133 standards: *"The length and cross sectional area of conductors in each circuit shall be such that the calculated voltage drop shall not exceed 10% of the nominal battery voltage at any appliance if the circuit is switched on at full load"*.

The cable lengths as given in the table below are the total length of the positive cable measured from battery bank to thruster relay, then the cable from thruster relay to terminal D1 or D2 on thruster's motor terminal busbar plus the negative return cable from terminal A1 on terminal busbar to battery bank. Please refer to the diagram "*Compact Retract, 48v: Power Cable Connections*" in the back of this manual.

Cable Lengths From battery to thruster (+) & back (-)	Compact Retract, 48V	
	mm ²	AWG
5 m (2 x 2.5m)	35 mm ²	2
10 m (2 x 5.0m)	50 mm ²	1
15 m (2 x 7.5m)	70 mm ²	2/0
20 m (2 x 10m)	95 mm ²	3/0

When choosing or calculating the cable size needed for your thruster installation, do not forget to take into account the thermal rating of the conductor insulation which are directly related to the ampacity (current carrying capacity) of the cable. Always try to use cables with the highest thermal insulation rating available or at least 85° - 90°C.

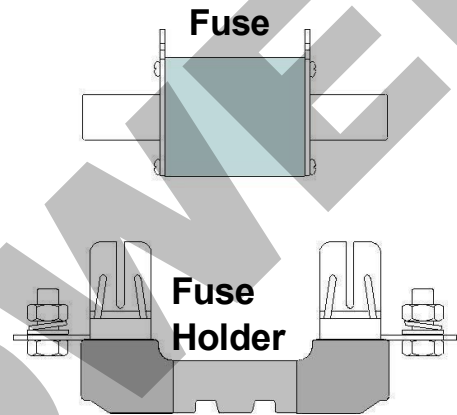
For large diameter cables it may be easier to use two smaller cables instead (in order to allow for a greater flexibility of movement). For example: 2 x 50 mm² instead of 95 mm².

4.6 **POWER FUSE:**

Sizing of fuses for over current protection are a function of the cable sizes in the circuit, not the amperage drawn by the appliance (thruster motor) in the circuit. It is thus not the electrical thruster motor that is protected by the fuse, but the power cables supplying the thruster motor.

Considering the importance of selecting the correct fuse size for your thruster's power circuit and since incorrect sizing can cause nuisance tripping (to small fuse) when thruster is really needed or even fire, if fuse is over sized, it is recommended to use the following fuses and fuse holders as supplied by Max Power:

	Ceramic	ANL
Ampacity	50 A	63 A
Max Power Part Number Fuse	TBA1	TBA2
Max Power Part Number Fuse Holder	35017	636347




4.7 **BATTERY ISOLATOR:**

A manual battery isolator, of the correct size, should be installed in the positive supply cable, as close as possible to the thruster battery bank and should be easily accessible and clearly marked.

An electrical battery isolator, as supplied by Max Power, should also be installed in the positive supply cable, as close as possible to the thruster battery bank, in order to benefit from all automatic safety features of the electronic control system.

5. **OPERATION LIMITATIONS**

 Do not deploy the thruster while boat is cruising with speed higher than 4 knots as it might cause damage to the retract mechanism that will lead to the automatic engagement of MANUAL MODE.

Please note that the main electric motor is a S2-2 min type. This means that the motor can run continuously for 2 minutes (if batteries are charged), after which it must be stopped for a sufficient time to cool down to the ambient temperature.

The Compact Retract should always be used when batteries all fully charged with the engine alternator running. Discharged batteries will damage the motor and the relay.

6. **BASIC MAINTENANCE**

6.1 **GENERAL**

Regularly check that power cable connections are tightened correctly and are in good condition.

If the vessel is to remain out of the water for some time, for example dry storage for winter, the underwater mechanism must be thoroughly rinsed with fresh water and the side plates rails and side bushes must be liberally greased. Inspect and repair the hull closing plate gasket for deterioration or missing pieces, clean also the rebate on the hull. Check and tighten, if necessary, the hull fixing bracket screws. NEVER use acids, chlorine solutions (even at low concentrations) or solvents during cleaning, these products can damage the straps, gaskets or gussets irreparably and thus impair the integrity of the device. A correctly installed retractable thruster should not show any sign of underwater concretions since it is most of the time in the closed position and therefore not exposed to light. It is therefore not necessary and even prohibited to coat the Compact Retract, even partially, with paint or antifouling, as the chemical agents in their composition can harm the integrity of the device. It is also prohibited to use any contact or sharp object that could damage certain vital organs of the device (straps and bellows in particular) to clean the unit. Inspect the condition of the underwater bellow and of the protective clamps on each end, if the bellow or the clamps are damaged then they need to be replaced.

6.2 **CONTROL PANEL**

Control panel(s) should be protected from the natural elements while the thruster is not in use.

The area behind the dashboard should be kept dry at all times to avoid the risk of oxidation of the cable connector contacts.

6.3 **RELAY BOX & ELECTRONIC CONTROL BOX**

Relay box and electronic control box must be kept in dry and ventilated area. The voltage drop to this units must not exceed 5%.

6.4 **BATTERIES**

Check regularly the condition of the batteries used for the thruster and its charging system.

Weak batteries (low voltage) are the most frequent cause of rapid deterioration of the thruster relay and motor. The codes of the command peripherals are control box [312951], up/down motor [315385], Battery isolator [318400], relay box [315384]

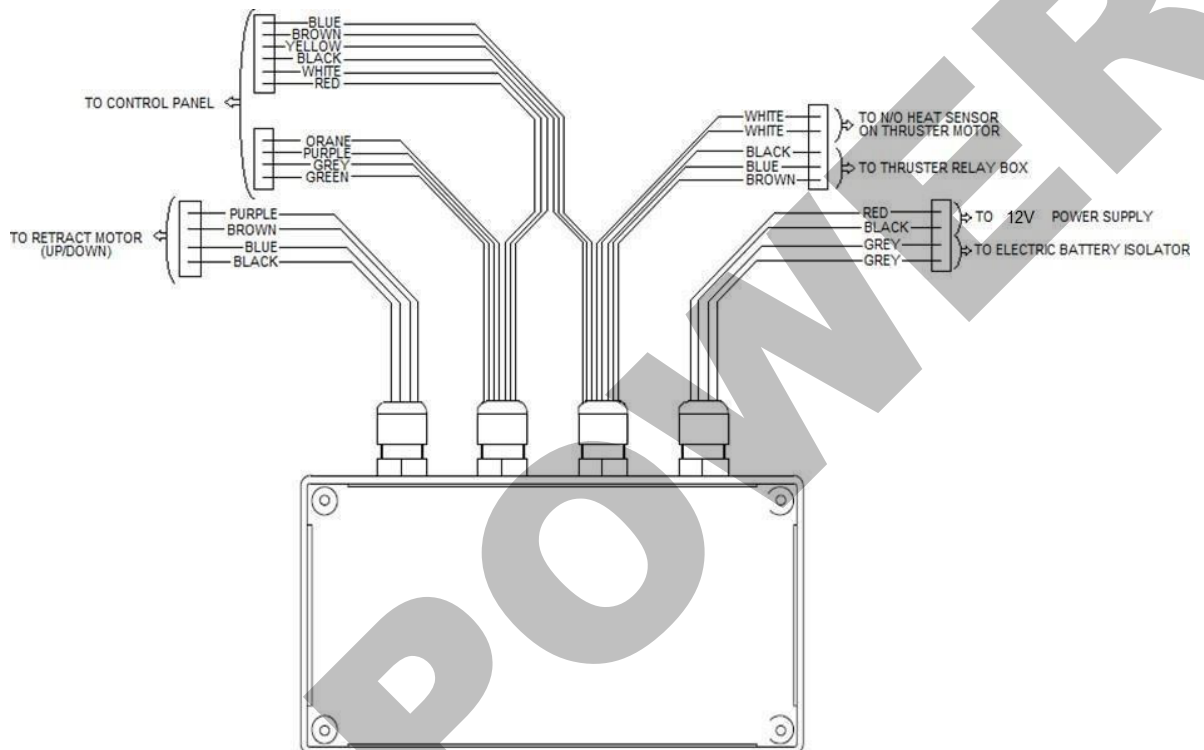
6.5 **COMPOSITE DRIVE LEG**

The composite drive leg is prefilled with oil from the factory, which does not need to be replaced. Due to its composite material the drive leg does not need an anode for protection. When the boat is ashore, check for evidence of fishing line, etc. in the propellers.

For prevention of calcium build up on the drive shafts, which would damage the oil seals, before fitting the propeller(s), cover drive shaft and the oil seals stainless steel cover with silicon grease. This should be done on an annual basis after cleaning of outside of leg. Do not use aggressive solvents as they might damage drive leg seals. Always keep the propellers and tunnel clean.

Please contact your closest Max Power distributor for local service points.

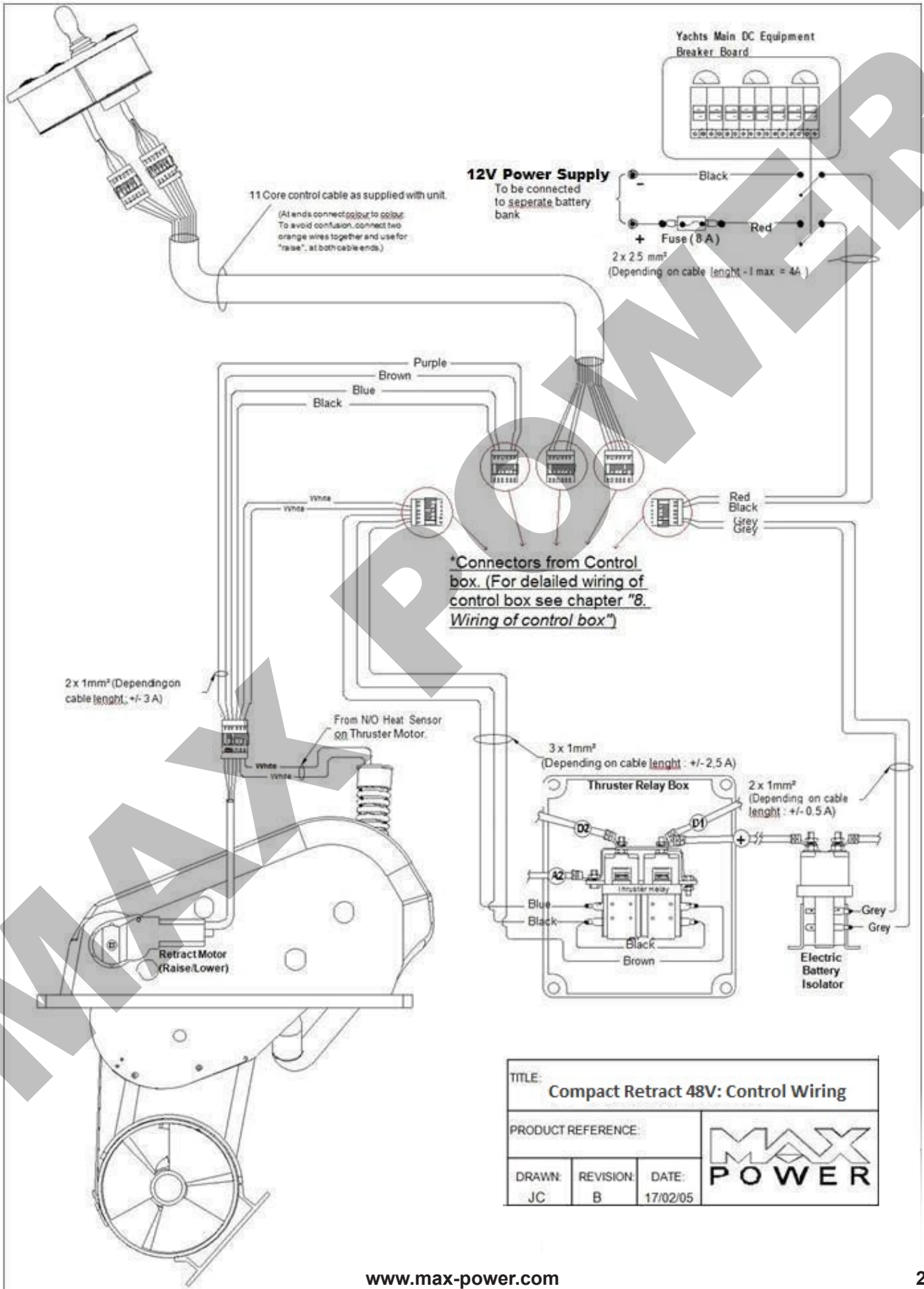
8. WIRING OF CONTROL



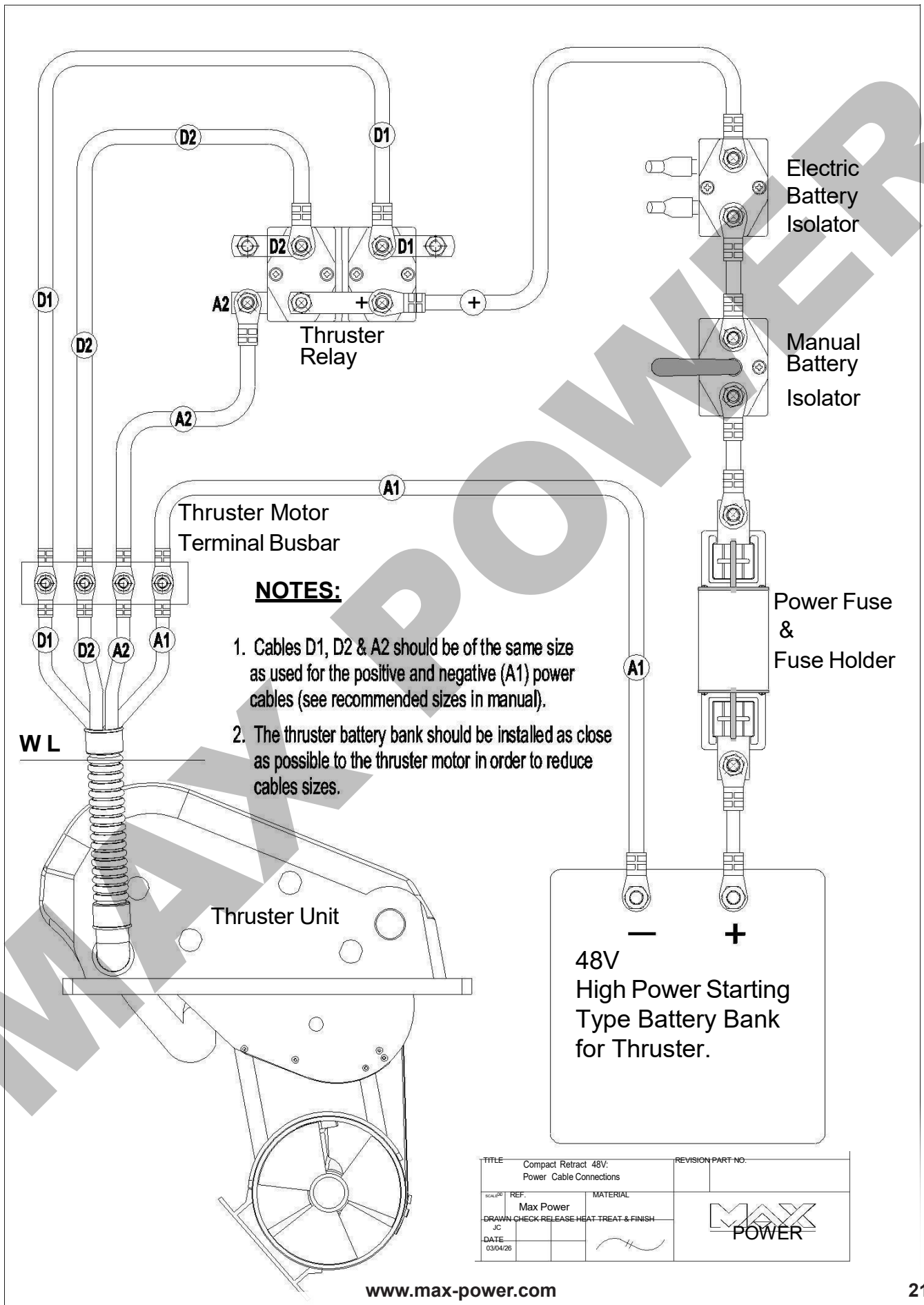
NOTES:

1. The installer must protect the positive supply cable by means of a fuse (slow blow) as indicated. The size of these supply wires (min. 2,5mm² with I_{max} = 15 A) depends on the length of the cable run and the voltage drop in these cables should not exceed 5% of the nominal battery voltage. **For CR70, CR85 and CR100 models the command circuit (control panel, control box, up/down servo motor) is always 12V powered.**
2. Install an electric isolator/switch, in the supply of the thruster control box, on the boats main electrical switch board, marked "Bow Thruster". This breaker or switch should ideally be supplied from a source independent to that used for the thruster. See "Wiring Diagram" for more detail.
3. All units are supplied with 25 meters of 11-core control cable, although only ten wires are needed to connect control box to control panel. In order to avoid confusion when doing wiring, it is recommended to connect together the two orange wires at both control box and control panel ends of the control cable.
4. In comparison with previous versions After 2017 version does not need to configure any torque values from potentiometers on the electronic controller because the calibration of the leg is done automatically from the controller.

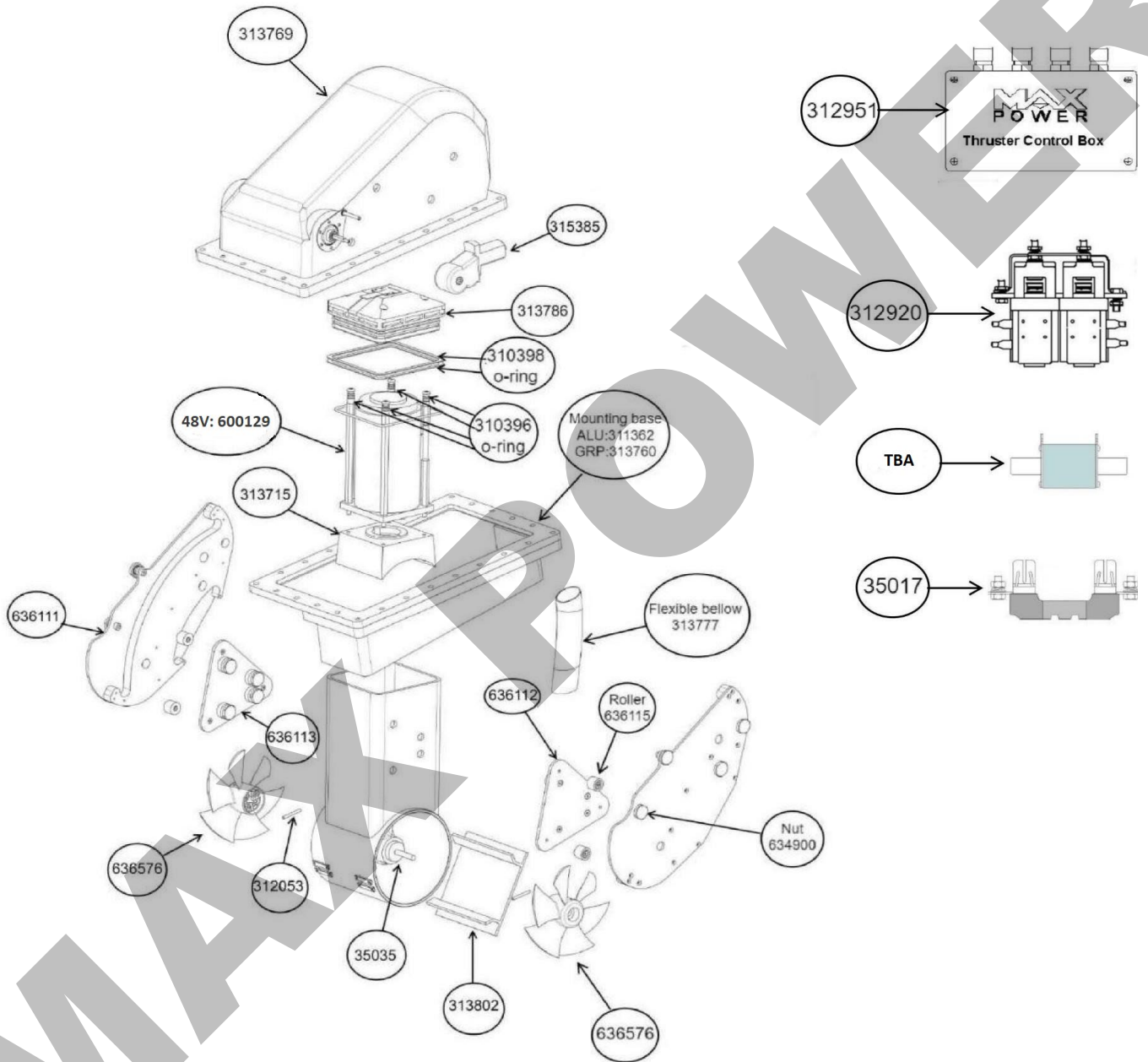
CONTROL WIRING



9. POWER CABLE CONNECTIONS



10. SPARE PARTS DIAGRAM



TROUBLESHOOTING GUIDE

Before contacting your nearest Max Power service station, please check the below troubleshooting guide and our online trouble shooting videos

<https://www.max-power.com/troubleshooting>

<p>The relay is clicking but the motor is not running</p>	<ul style="list-style-type: none"> • Check the motor's power fuse • Check the main battery isolator • Check the internal relay contacts, clean with WD40 or replace the relay if needed • Check battery conditions and connections
<p>Problem with wiring</p>	<ul style="list-style-type: none"> • Wrong wiring due to recent modification in the system • Oxidation or loose connections to the wiring, protect the cable connection from water • Check that the wiring of the command and power supply circuit onboard matches the diagram in the corresponding manual (https://www.max-power.com/). The cables must be matched by colour. • Clean and tighten the connections. If necessary, replace the cables.
<p>Control box signal check</p>	<ul style="list-style-type: none"> • Take the Electronic Controller 312951 and connect it with 12v (volts) power source without turning it on from the joystick. All LEDs on the electronic controller must be turn off. • Press the ON/OFF Button of the Joystick, you should see the "ON/OFF Joystick" LED on the electronic controller light up. • Press the joystick lever left and right and you should see the "Left Joystick" and "Right Joystick" LEDs light up. • Press the UP/DOWN Buttons of the Joystick, you should see the "Up Thruster" LED and the "Down Thruster" LED on the electronic controller light up as indicated in the photos below.
<p>Thruster engages manual mode automatically frequently</p>	<ul style="list-style-type: none"> • Fully charge the battery that supply the control box, if the supply drops below 11v during up/down operation then replace battery • With battery fully charged, unplug heat sensor and perform reset to unit, as soon as manual mode is engaged, press the up button until the unit is fully Up. The unit needs approximately 8 seconds to go from up/down, if the unit achieves it faster the H bridge is damaged and the control box needs to be replaced • Resistance to up/down movement. To verify that the up/down system is functioning correctly, it can also be tested manually. By using an adjustable wrench and removing the up/down motor, you can rotate the mechanism by hand. If there is no resistance during this process, it indicates that the retract motor will need to be replaced. • Do not deploy the thruster while boat is sailing with speed higher than 4 knots. Check dimensions of cut out closing plate

Heat Sensor	If the thruster deactivates automatically then it's probably the heat sensor, unplug the heat sensor and test the thruster (battery to be fully charged)																		
New Up/Down motor does not operate	<p>It has been an update in the up/down motors (Max Power ref.: 315385) used in the Compact Retract Range of thrusters. This update might affect the compatibility of the up/down motor with the control box (Max Power ref.: 312951).</p> <p>Locate and identify:</p> <p>A. The production date of the up/down motor (Max Power ref.: 315385)</p> <p>B. The serial number of the existing control box (Max Power ref.: 312951) onboard. Check the table below to identify if the control box must also be replaced:</p> <table border="1" data-bbox="347 562 802 719"> <thead> <tr> <th>Control Box SN</th> <th>Motor Production Date</th> <th>Control Box</th> </tr> </thead> <tbody> <tr> <td rowspan="2">10465<</td> <td>Before 09.2019</td> <td>ok</td> </tr> <tr> <td>From 09.2019 and after</td> <td>REPLACE</td> </tr> <tr> <td rowspan="2">[10466 - 25219]</td> <td>Before 09.2019</td> <td>ok</td> </tr> <tr> <td>From 09.2019 and after</td> <td>REPLACE</td> </tr> <tr> <td rowspan="2">>25220</td> <td>Before 09.2019</td> <td>ok</td> </tr> <tr> <td>From 09.2019 and after</td> <td>ok</td> </tr> </tbody> </table>	Control Box SN	Motor Production Date	Control Box	10465<	Before 09.2019	ok	From 09.2019 and after	REPLACE	[10466 - 25219]	Before 09.2019	ok	From 09.2019 and after	REPLACE	>25220	Before 09.2019	ok	From 09.2019 and after	ok
Control Box SN	Motor Production Date	Control Box																	
10465<	Before 09.2019	ok																	
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[10466 - 25219]	Before 09.2019	ok																	
	From 09.2019 and after	REPLACE																	
>25220	Before 09.2019	ok																	
	From 09.2019 and after	ok																	
Other	Proceed to manual mode if the problem still exist contact us directly (https://www.max-power.com/contact)																		

Introduction

The purpose of this document is to set out the terms of warranty cover offered in relation to products purchased by the End User from Max Power or its approved network of resellers.

This document will adhere to the following format:

- Section 1 Definitions
- Section 2 Period of Coverage
- Section 3 Warranty Registration
- Section 4 Warranty Terms
- Section 5 Warranty Exclusions
- Section 6 Procedural Guidelines
- Section 7 Service Centers

1) Definitions

Authorized Repair Number – The number given by Max Power on reporting a fault with your thruster

Dealer – An authorized Max Power sales center

End User – The boat supplied with supplied equipment and the owner thereof **Installer** – The authorized center responsible for the installation of your thruster **Manufacturer** – supplier of the equipment under warranty

Pleasure Craft – Vessels used for owner’s personal use that have no commercial use (i.e Charter boats or work boats)

Resellers – Max Power approved distributors and dealers

Serial Number – Number in upper right hand corner of Warranty document

Supplier – The manufacturer (Max Power)

Warranty – The terms and conditions that are covered by the manufacturer

2) Period of Coverage

The equipment manufactured by the Supplier is guaranteed to be free from defective workmanship, components and materials under normal usage conditions for a period of two years from the date of purchase by the End User. This warranty is transferable to subsequent owners of this equipment during the period of coverage. Warranty starts 6 months after the boat is delivered to the dealer.

3) Warranty Registration

Register your purchase now to receive free extended one year warranty coverage. This can be done using one of the following methods (NB. proof of purchase must be included to establish that equipment is still under warranty):

The quickest and easiest method to register your warranty is to send the attached installation check list and warranty registration to the Manufacturer via our online ticketing platform:

<https://www.max-power.com/contact>

Mail in your warranty registration document, please ensure that you make a copy before sending it.

4) Warranty Terms

If the material is used for anything other than for pleasure craft, the guarantee is limited to a six-month period.

Year 1 -All factory testing, diagnosis, repairs and replacements are performed at no charge to the End User.

All parts and up to **two hours** of labor are covered for repairs and replacements conducted in the field.

Year 2, 3 -All factory testing, diagnosis, repairs and replacements are performed at no charge to the End User. This excludes any damage or faults occurring from normal wear and tear on the following items: engine, oil seals, relay contacts (If warranty is registered within the 6-month period following installation).

5) Warranty Exclusions

Damage due to modifications or installation contrary to published specifications

Damage due to contact with a foreign object

Cost of hauling the boat

Damage due to repairs performed by an unauthorized service center

Damage due to lack of normal maintenance services

Damage due to water infiltration or humidity presence in the installation area

Parts replaced due to normal wear and tear, such as seals, pins, screws and heat sensors

Repairs performed without knowledge of manufacturer (please contact dealer to receive Repair Authorization Number)

Tampering of equipment by the End User Cost of travel to and from the job site

Cost of economic loss, including injury to any person, damage to property, loss of income or profit, communication, lodging, inconvenience

Consequential damage due to failure, including those arising from collision with other vessels or object

Use of lithium batteries for the supply of the thruster and its peripherals.

6) Procedural Guidelines

PLEASE VIEW THE TROUBLE SHOOTING LIST TO ASCERTAIN OR SOLVE ORIGIN OF PROBLEM PRIOR TO CONTACTING THE DEALER/INSTALLER

Contact your dealer/installer to report the problem.

If you do not know who this is contact the nearest Max Power distributor

If you are in foreign waters, please contact the nearest Max Power distributor

Ensure you have your serial number and model number to hand (top right hand corner of warranty)

Dealer/Installer will come to site to decipher the cause of the fault

If the cause of fault is due to a manufacturing problem the dealer will contact Max Power to receive Repair Authorization Number.

If the problem is due to an installation error, please contact your installer.

IF POSSIBLE: PLEASE TAKE PHOTOGRAPHS OF THE THRUSTER TO SHOW THE PROBLEM

The warranty as outlined above is only applicable to Max Power manufactured thrusters and optional equipment as used in marine pleasure industry. The supplier holds the exclusive right to test the product and determine whether it is defective