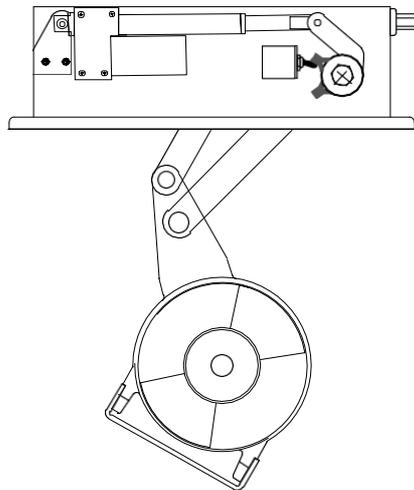


# MAX

P O W E R  
CONTROL TO THE MAX

# MANUAL

## MAX POWER RETRACT R200



FOR \_\_\_\_\_

BUILT BY \_\_\_\_\_

DELIVERED \_\_\_\_\_

***A copy of this manual must remain  
on board for consultation.***

# MAX POWER

## I. INTRODUCTION

### A AFTER SALES SERVICE

ADDRESS                      MAX POWER  
Via Philips 5, 20900 Monza (MI), Italy  
TEL :                         + 39 039 200 1973-936  
FAX :                         + 39 039 2004299

RETRACT SERIAL N°

### IMPORTANT GENERAL INFORMATION

With a constant concern of improving our products, we reserve the right to make changes to this manual without prior notification.

All statistics and explanations within this manual were believed to be correct at the time of printing.

Each RETRACT installation requires a preliminary study of performance and feasibility.

This study covers 4 distinct sub systems:

1. The RETRACT thruster unit,
2. Hydraulic equipment,
3. Electrical equipment,
4. Options

### CHECK LIST FOR THE PROJECT MANAGER

It is very important to carefully read the entire manual before starting the installation.

At the end of the manual, you will find a MAJOR POINT CHECKLIST when you are inspecting the work of your installers. All the points listed must be strictly respected for the proper and safe operation of the RETRACT system.

The RETRACT should be installed by a professional specializing in this type of installation.

Architects, construction shipyards and surveyors should be contacted before installation.

All official bodies or classification experts should be contacted before the installation.

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All mechanical installation must apply with the conditions as laid down in the country of the boats registration.

All electrical installation must apply with the conditions as laid down in the country of the boats registration origin.

All hydraulic installation must apply with the conditions as laid down in the country of the boats registration origin.

### POSITIONING OF THE RETRACT UNIT

IMPORTANT: correct positioning is essential for correct operation.

The difference between the centre of gravity of the submerged surfaces and the centre of gravity of the surfaces exposed to side wind forces results in a rotational torque.

One of the bow thruster's primary functions is to neutralize this torque.

Therefore the distance between the thruster and the yachts extremities must be as LONG as possible.

See installation drawing

The following considerations are essential when determining the position of the RETRACT.

The top of the turbine must be 300 mm below the water line when fully extended. In other words the turbine should be at least one full diameter below the water line.

The mounting-flange should be parallel with the bottom of the hull.

The structural compatibility of the mounting base,

The access needed for installation, and removal of unit,

IMPORTANT make sure that there is enough room to allow for complete removal of the RETRACT unit, and room for the connection of the hydraulic piping, either by the direct coupling of the flexible hoses or by the use of metallic elbow connections.

Sufficient access for all maintenance procedures must be allowed for.

NOTE Always make sure that there is enough room for the manual override system.

**See drawing**

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

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## INSTALLATION OF THE RETRACT UNIT

### CONSTRUCTION OF THE MOUNTING BASE

MAX POWER can supply, as an option, a G.R.P. laminated mounting base, or an aluminium machined mounting-flange. These options allow you to save considerable installation time, and assure precise installation.

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

The thruster's mechanical stresses are spread over the hull by the mounting base. Installation, which should be executed by welding or bonding to the hulls plating, normally reinforces the hull, the mounting base may be attached to frames and stringers as well.

After the mounting base has been made and fitted the RETRACT should be temporarily secured on the flange to check its height its, centering, the accessibility of fittings and the ease of operation for manual override system.

### **GRP HULLS**

The mounting base may be molded into the hull during construction or prefabricated, and then laminated onto the hull later.

### **METAL HULLS**

The mounting base may be constructed with the hull or prefabricated, and then welded onto the hull later.

**IMPORTANT** In both cases, the top surface of the mounting base (or the flange) must be given particular attention and machined perfectly flat in order to accept the O ring seal of the RETRACT base flange and ensure perfect water tightness.

The bolts fixing the RETRACT onto the mounting flange must be inserted from top to bottom. Provide sufficient access underneath the flange to allow for tightening the nuts.

If the access is not possible, provide a special mounting flange with metric 10 mm studs or tapped holes.

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### CONSTRUCTION OF HULL OPENING & CLOSING PLATE

The required hull opening dimensions are  $L = 350 \text{ mm} \times W = 260 \text{ mm}$ .

The longitudinal centre line of the opening coincides with that of the mounting flange but the transversal centre line of the opening is offset by 27 mm to the rear with respect to the transversal centre line of the mounting flange.

The opening is closed by a plate, which may be made from the cut out hull section, or specially fabricated.

This closing plate should bear against a flexible seal fixed to a 30-mm wide rebate. While the hull opening closing plate is being made, the RETRACT must be temporarily secured on the mounting base flange to facilitate correct closing plate fabrication.

The hull plate must be fixed to the supplied aluminum adjustable mounting (which has 4 elongated holes for initial adjustment).

The gasket in the hulls rebate can be made either out of soft cellular neoprene rubber or molded in **soft** SIKAFLEX (or a similar product) to form a flexible seal. Precaution must be taken to ensure that the flexible gasket does not glue the closing plate to the hull while drying. The plate must rest evenly, on the gasket, and with reasonable pressure.

**IMPORTANT** To prevent marine growth inside the casing, it is essential that once the unit is raised, no light is allowed to enter. Therefore the closing plate gasket is **essential** and requires careful and permanent fixation.

### FINAL FITTING OF THE RETRACT UNIT TO THE MOUNTING BASE

**CAUTION** To ensure absolute cleanliness, hydraulic lines and ports must remain plugged until connection to hydraulic system.

Final installation on the mounting base must be made after thoroughly cleaning and then liberally coating both joining surfaces (case and base) with a good quality marine grease. This is so that the O-ring seal is compressed flat, evenly, smoothly and squarely when the bolts are tightened.

**Under no circumstances should the RETRACT be glued or bedded down** with a marine type mastic/glue such as Sikaflex or other similar product.

The flange bolt should be **tightened sequentially** and in successive passes until the two surfaces touch. If desired, a torque wrench can be used and the bolts can be tightened to a torque of 4,0 kg/M. The flange bolts should be metric size 10 mm of stainless steel, and should have a large stainless steel washer placed above a nylon washer. The nylon washers avoid stainless steel contact with the aluminum case. The nuts should be type NYLOCK.

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The 2 lifting lugs provided by MAX POWER, should be put in a small plastic bag, along with the hydraulic pipe plugs, for storage and future use by the ships crew or owner.

### FINAL ADJUSTING OF THE CLOSING PLATE (see drawing)

**Once the thruster is permanently bolted onto the mounting base and has been correctly tightened, reinstall the plate and check it's adjustment.**

## ELECTRIC RAM

The final adjustment of the closing plate is as follows:

Note: To extend and retract the electric ram, use a 24 V battery. Extend and retract by reversing the polarity. During the adjustment procedure, use a 5-amp fuse to protect the electric ram and its motor.

1. Position the 'up' sensor so that the thruster can be fully retracted without mechanical interference. (see diagram Page 20)
2. Position the 'down' sensor so that the thruster can be extended to it's operational position. (see diagram Page 20)
3. Lower and raise the turbine as necessary to adjust the closing plate, so that it fits evenly and squarely in its recess in the hull then tighten its fixation bolts.

CAUTION: The closing plate must rest on the gasket evenly, with a slight pressure so that no upwards movement of the plate is possible even in heavy sea conditions when the hull is subjected to slamming forces.

Care must also be taken to be sure that the Retract is not totally retracted as shown in fig 1 (Page 20) if this were to be the case damage might occur to the turbine.

The final result should be as in Fig 2 (Page20) with flexible seal D slightly compressed. When final adjustment is achieved use locktite or a similar product on the sensor fixation bolts.

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### TRANSMISSION LUBE OIL TANK INSTALLATION

The transmission lube oil tank is no longer used on retract series units

### HYDRAULIC POWER SYSTEM INSTALLATION

**CAUTION:** To ensure absolute cleanliness, hydraulic lines and ports must remain plugged until final connection.

The hydraulic power equipment, such as the oil reservoir/filter, pump and directional valve, should be installed in compliance with the usual rules of accessibility to enable periodic checks and maintenance.

All hydraulic high pressure power circuit piping must comply with high pressure standards (Flexible hose – HP SAE 100 R8 or R9), and have a diameter at least equal to that recommended in order to reduce head loss especially when the installation's layout requires long hose lines. These hoses or pipes should preferably have 1/2" interior diameter; No hose, pipe or fitting in the power circuit should ever have an interior diameter less than 3/8". All power circuit piping must have a service pressure rating of at least 250 bar, with a rupture pressure rating of 1000 bar. Fittings must be of good quality and crimped as per manufacturer's instructions, and pressure tested to at least 600 bar.

All pipes and hoses must be clinically clean when connected to the circuit.

The pump intake hose line (from the reservoir) must be of a quality that is not subject to pinching or crimping due either to vacuum, to an excessively small radius of curvature, or to variations of temperature.

This hose or pipe should always be shorter than 2 meters and preferably have 1" interior diameter but not less than 3/4"ID

**CAUTION:** the oil tank must gravity feed to the pump, it must also be above the water line.

The directional valve must be fitted as close as is convenient to the RETRACT unit, in order to verify the hydraulic gauge. **All piping connected to the RETRACT unit must be of a non-conductive type (not metal braided hose) and at least 50 mm long.**

**The thrusters' motor case drain must return directly to the top of the tank.** With no filters check valves or other drain lines connected to it. Backpressure on the RD (drain line) will cause damage to the hydraulic motor.

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## ELECTRICAL SYSTEM INSTALLATION

### Power Requirements

The control system of the RETRACT requires 15 amps.

NOTE: The voltage of the power system is determined by the vessels battery system and the Electro-pump will have been ordered to suit.

For electro pump models the power systems cable sections must follow these rules  
Length (L) = positive line + negative line. Example: Distance between pump and batteries = 1,50 m, then L = 3 m. (See Drawing)

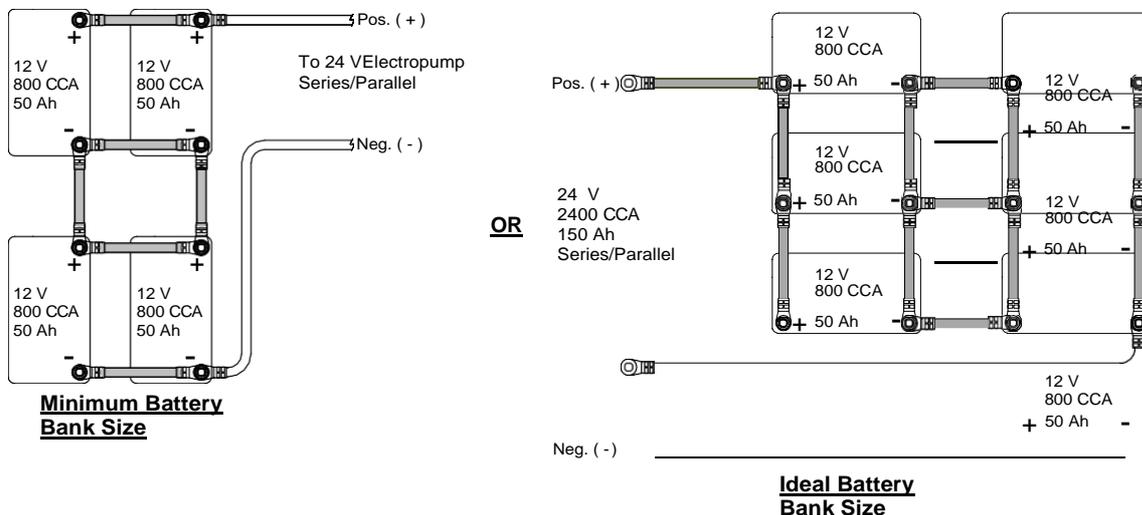
R200/6		R200/8	
L = 1 m	= 70 mm <sup>2</sup>	L = 1 m	= 95 mm <sup>2</sup>
L = 3 m	= 95 mm <sup>2</sup>	L = 3 m	= 120 mm <sup>2</sup>
L = 5 m	= 120 mm <sup>2</sup>	L = 5 m	= 150 mm <sup>2</sup>
L = 10 m	= 150 mm <sup>2</sup>	L = 10 m	= 190 mm <sup>2</sup>

For long cable runs it can be easier to use 2x a smaller section e.g. ;  
For 95mm<sup>2</sup> use 2x50mm<sup>2</sup>

### Battery requirements are for starting or High CCA type and are as follows

R200	
Type of Batteries	Exide, Maxxima 900
Number of Batteries	4 to 6
Type of Connection	Series/Parallel

### R200 Electro pump Battery Requirements



Note the lower the cold cranking capacity of the batteries used the larger the battery bank will need to be.

A battery is considered to be high CCA as from 650CCA for each 60Ah battery

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## 1 – Wiring Installation

Control system wiring: All wires should be carefully labeled to reduce the chance of Error and simplify checking and troubleshooting.

All wires ends for terminals should be tinned before crimping or inserting into terminal blocks.

Power system wiring: The electrical cables should be of the specified dimensions and should be connected directly from the batteries to the fuse(s), power relay (s) and finally to the Electro-pump. The only other equipment that may be added is a battery cut-off switch - if desired. No other equipment should be connected to the RETRACT'S electrical wiring.

The Electro pump is fitted with a high temperature alarm switch. This switch (N O) is fitted as standard and can be used either for a second buzzer or for complete shut down of the unit (via a relay 0.5 AMP max). These options are to be wired in by the shipyard.

Note: the Electro-pump does not have a specific polarity.

**IMPORTANT**: The efficiency of the RETRACT depends on the quality of the electrical installation.

**CAUTION** the Electro-pump must not be installed in a small sealed space. Make sure that there is sufficient supply of cooling air available.

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 bilges and other habitually wetareas.

## 2 - Optional wiring of extra power relays (negative)

- Bipolar electricity option. An extra relay is added on the negative battery wire and is commanded with n° 7 & 8 (same as the positive relay).
- Adjusting the position actuators (see diagram)

Adjust the position actuator UP (H) and the position actuator DOWN (B). This is done by loosening the stainless steel ring and sliding the 2 actuators so that the switch can be engaged in the 2 positions. The black wire must not be removed.

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## CHECKS, TESTS & ADJUSTMENTS

### BEFORE LAUNCHING

**IMPORTANT:** Before the launch, verify that the RETRACT unit inspection top plate has been replaced (if it was removed during installation) and that the entire lower flange bolts have been tightened. Torque for all these bolts to 1,5 kg/m.

**IMPORTANT:** The cathodic protection system on board must provide sufficient protection to the aluminium body of the RETRACT unit against galvanic corrosion or electrolysis. The RETRACT unit must be grounded by connecting a bonding wire to the main cathodic protection system.

#### Filling the hydraulic circuit.

MAX POWER recommends the use of ISO GRADE 15 to 32 hydraulic oils for the power circuit. This oil has already been used by Max Power during the run in tests and consequently the RETRACT motor and piping are already filled with such.

**CAUTION:** Biodegradable and mineral (commonly used) oils are non-compatible and should not be mixed or used together. Mixing them will deteriorate certain hydraulic elements. If you intend to use a biodegradable oil, thoroughly flush the existing mineral oil from the RETRACT unit first with the appropriate oil.

Before carrying out the following tests we recommend disconnecting the supply to the EHP and DCV in the control box.

- Check all fittings for tightness and leaks.
- The transmission is already filled with oil at the time of delivery.
- Check UP / DOWN operation.

*Note: if the up and down system functions the wrong way round, reverse the wires on the ram.*

When all the tests have been completed, reconnect the supply to the EHP and DCV in the control box.

### AFTER LAUNCHING

- Check for water leaks.
- Switch on the system power at the breaker and repeat the UP / DOWN tests.
- Execute a few short left and right maneuvers to fill the circuits and thereby purge the system of all air. After each maneuver, check and fill if necessary, the hydraulic tank. Repeat until the level remains stable.

Do not allow the Electro-pump to run dry.

- Check the thrust direction:
- With the Joystick to the left (port), the vessel should move to port and conversely. If the direction is not correct, inverse to connectors on the hydraulic distributor.

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**The left and right thrust tests must be made under normal conditions of use. In other words that means that the batteries are fully charged and the main engine alternator is running and the batteries are being correctly recharged. (If Electro pump)**

The relief valve has been pre-set in the factory and must not be altered. The pressure can be read on the pressure gauge (10). Important: Close pressure valves after checks.

The pressure reading should correspond to the following chart:

Model	R200/6	200	to	240	bars.
Model	R200/8	230	to	250	bars.

Variations are possible depending upon the installation.

## WARRANTY REQUIREMENT

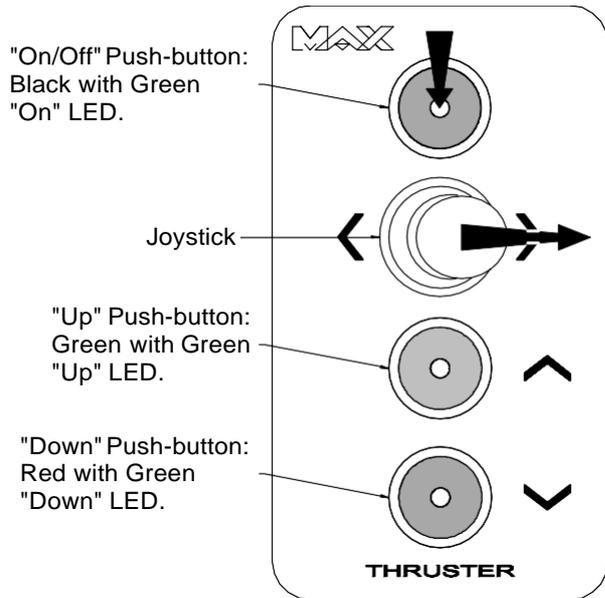
**IMPORTANT:** All Test readings must be filled out on the form provided and sent to Max Power by fax no later than one week after the water tests have been completed so that the Max Power standard warranty is correctly validated. This form is attached at the end of this manual.

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## OPERATION AND USE

### 1) General operation

#### CONTROL PANEL AND THRUSTER CONTROL BOX FUNCTIONS:



#### Control Panel:

To switch "ON" or "OFF" PUSH down the black PUSH-BUTTON, while PUSHING joystick to the right for one second.

To "Lower" or "Raise" press and hold the "Down" or "Up" PUSHBUTTON UNTIL BUZZER in control panel DOUBLE beeps, which indicates UNIT has reached FULLY down or FULLY UP position..

#### Switching System "On" or "Off":

- To switch the THRUSTER "ON" or "OFF" follow the INSTRUCTIONS on the diagram above.
- When switched "ON" the UNIT will DOUBLE beep and the LED's in the black and green PUSH BUTTONS will light UP.
- When switched "OFF" the UNIT will DOUBLE beep and the LED's will go OUT. It's only possible to switch off the UNIT with THRUSTER in the FULLY UP position.

#### "Lowering" & "Raising" THRUSTER Unit:

- Once the UNIT has been switched on, as described above, press and hold the "Down" PUSHBUTTON to lower. The BUZZER will start beeping and the "Down" LED will start to flash as soon as the THRUSTER leaves the UP position.
- If "Down" or "Up" PUSHBUTTON is released before "Down" or "Up" position is detected, the BUZZER will start to beep (short) once every 1/2 second and both "Up" & "Down» LED's will start flashing.
- When THRUSTER is detected to be FULLY down, the "Down" LED comes on and the BUZZER DOUBLE beeps to indicate that THRUSTER is completely down and ready to THRUST.
- As long as the THRUSTER is in the "Down" position the BUZZER will beep (short) once every three seconds, to indicate that THRUSTER is still in the down position.
- To raise THRUSTER, press and hold the "Up" PUSHBUTTON. When THRUSTER is detected to be FULLY UP the "Up" LED comes on and the BUZZER DOUBLE beeps to indicate that THRUSTER is completely UP and ready to be switched off.

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THRUSTING "Left" or "Right":

- a) Use joystick to THRUST either left or right.
- b) Please note that it is only possible to THRUST left or right when THRUSTER is detected to be FULLY down.
- c) 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.

NOTE: Right and left thrust signals will not be sent UNTIL the TURBINE is in a FULLY extended position with the red light ILLUMINATED and the BUZZER on.

Overheat Alarm & SHUT-DOWN:

- ( a ) If the THRUSTER motor overheats the BUZZER will start beeping and the "On" L.E.D. will flashes with one-second intervals UNTIL the motor has cooled down.
- ( b ) DURING this overheat condition one has a total of ten seconds of ACTUAL USE (left & right THRUST) of the thruster, after which it will not be possible to CONTINUE THRUSTING in either direction.
- ( c ) The THRUSTER MUST then be raised by pushing the "Up" PUSH BUTTON. Once THRUSTER is detected to be FULLY UP the system will switch off AUTOMATICALLY.
- ( d ) After this overheat SHUT down it will not be possible to switch "On" the system again UNTIL the THRUSTER motor has cooled down.

General:

- ( a ) If the THRUSTER UNIT is in the "Up" position and has not been USED for a period of ten MINUTES the UNIT will AUTOMATICALLY switch off.  
Before AUTOMATICALLY switching off the UNIT will warn YOU by beeping once followed by a second beep a few seconds later, after which the UNIT switch off.
- ( b ) In order to isolate the power CIRCUIT of the THRUSTER motor each time the control CIRCUIT is switched off one WOULD need to install an electric battery isolator, as advised by Max Power (see "Wiring Diagram" in the back of this MANUAL for more detail).
- ( c ) When electronic control box is powered up and "Up" position detector is not detected, the "Up" L.E.D. will start flashing and the BUZZER will beep once every second.  
The "Up" PUSH-BUTTON SHOULD then be pressed UNTIL UNIT is detected to be FULLY "Up".  
After which the BUZZER will beep twice and the system will be switched off AUTOMATICALLY.

**NEVER LEAVE THE RETRACT DOWN WHEN NOT IN USE**

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### LIMITATIONS:

- The RETRACT must be in the up position (retracted) when sailing. The RETRACT is designed to be used in harbor when maneuvering at low speed and must not be in the down position for speeds above 3 knots.
- Do not use RETRACT in water temperatures below  $-5^{\circ}$  in salt water.
- Estimated maximum overall and intermittent operating times for all the R200 models (before heat accumulation produces too high a temperature in the Electro-pump).

Do not use the RETRACT in a bathing zone.

Continuous operation: 2 min (class S2).

The Electro-pump motor should have approximately a 30 minutes rest period after maximum use. These figures are conservative and for ambient temperatures of 20 degrees C. they are also highly dependent upon the fresh air ventilation of the Electro-pump motor.

For longer service, extra air-cooling of the Electro-pump unit can be installed, such as a forced air-ventilating fan. Also increased battery capacity may need to be provided.

The thruster should always be used in normal manoeuvring conditions with charged batteries and with the main engine's alternator running and charging the batteries, etc...

### MAINTENANCE OF THE RETRACT

#### Regular checks:

1. Lower and raise several times every month
2. Transmission lubricating oil reservoir level.
3. Hydraulic power oil reservoir level.
4. Hydraulic hoses for chaffing and leaks.
5. Condition of the anodes

Control panels, like all external equipment, should be protected from the sun and weather. Clean with a soft cloth and mild detergent solution.

#### Yearly checks boat ashore:

1. Clean the turbine, gearbox and the propellers with a sponge and detergent soap. It is also advisable to remove the top cover plate and clean the interior of the case and rinse well the articulated joints.
2. Clean the surface corrosion and repaint the hydraulic motor.

**IMPORTANT:** If the vessel is to remain out of the water for some time, for example: dry storage for the winter, the top cover plate must be removed and the RETRACT mechanism must be thoroughly rinsed with fresh water, especially the articulated joints. Do not operate below  $0^{\circ}$  C.

3. Replace all anodes

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4. Remove the propellers regularly (use a Hub extractor on the special flange provided) Apply marine type grease to shafts
5. Check and replace if necessary the two-drive leg oil seals. (Bronze drive legs only)

Note: Although identical, the propellers should always be re-installed on the same side as before.

6. Inspect and repair the hull closing plate gasket for deterioration or missing pieces.  
Check and tighten if necessary, the plate fixation bolts.
7. Apply antifouling paint to the closing plate on the outside, on the edges and if desired to the plates inner surface. If you find growth on the unit, this is because your closing plate gasket allows light to enter the enclosure.

**CAUTION:** Do not use antifouling or other copper based paints on the RETRACT turbine.

8. The transmission oil must be changed each year. This is done by opening the vent valve on the rearward side of the retract arm (above the propellers), remove the lower bleed screw (6mm Allen bolt, underneath between the propellers), then allow the oil to drain, refill via the lower bleed screw using 75W90 gearbox oil, when full, close the vent valve and replace the lower bleed screw.  
Never let the oil level in the lub tank descend below the level of the ships waterline.
9. Check the entire hydraulic system hoses and connections for possible chaffing and leaks.
10. Every two years drain the entire hydraulic oil system. Clean and replace filters.
11. Check all bolts for tightness especially on the underwater unit.

## 5 YEARS

### **Complete removal of unit and return to factory.**

1. Replace all submerged flexible hoses
2. Replace all oil seals and check for bearing and shaft wear.
3. Disassembly the unit and re corrosion treated / painted the aluminum body and the hydraulic motor.
4. Replacement of all articulation bushes.
5. Service the complete hydraulic oil system included pump, oil tank, DCV, etc.

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**IMPORTANT**

**PROJECT MANAGER'S  
TEST RESULTS FORM**

**To be filled in and  
faxed to MAX POWER**

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## TEST RESULT FORM (part 1)

This form must be filled in and faxed to MAX POWER within a week after launching so that the MAX POWER standard warranty is validated.

<p><b>MAX POWER</b> Via Philips 5, 20900 Monza</p> <p><b>ITALY</b></p> <p>Tel : (39) 039 0200 1973-936 Fax : (39) 039 039 2004299</p>	<p>From :</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
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Date: .....

REFERENCE: S \_ \_ .R20 \_ . \_ \_ \_ \_

- Shipyard that installed the RETRACT:  
.....
- Name of the Project Manager:  
.....
- Name of the Vessel: .....
- Type & Make of the Vessel:  
.....
- Date of launching:  
.....

Please answer by YES or NO the following questions concerning the installation:

		YES	NO
1	Is the RETRACT mounted parallel with the bottom of the hull ?		
2	Is there enough room for general maintenance of the RETRACT and its auxiliary equipment?		
3	Does the closing plate rest on a gasket?		
4	Is the adjustment of the closing plate done in such a way that no light is allowed to enter?		
5	Are the anodes correctly fitted to the closing plate supports?		
6	Is the lub oil reservoir mounted at a minimum of 1000 mm (39") above the waterline?		
7	Is The RETRACT glued to the mounting base?		
8	Does the Electro pump have adequate cooling and is the oil reservoir mounted above it?		
9	Are the limit switches correctly adjusted?		
10	Are all electrical wires numbered at each end and with their terminals tinned?		

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## TEST RESULT FORM (part 2)

When all the tests have been completed as per the manual, please record the following measurements where applicable.

With the engine(s) running, thruster in the down position, but not running:

1. Record the charging amps of the alternator(s) \* .....  
Amps
2. Record the voltage at the remote control box: ..... Volts
3. Record the voltage at the electric ram ..... Volts
3. Record the voltage at the battery terminals: ..... Volts

With the engine(s) running and the thruster running (either direction) :

1. Record the charging amps of the alternator(s) \* : ..... Amps
2. Record the voltage at the remote control box: ..... Volts
3. Record the voltage at the battery terminals\* : ..... Volts
4. Record the voltage at the electro pump motor\* : ..... Volts
5. Record the amperage at the electro pump motor\* : ..... Amps
6. Record the hydraulic pressure : ..... Bars

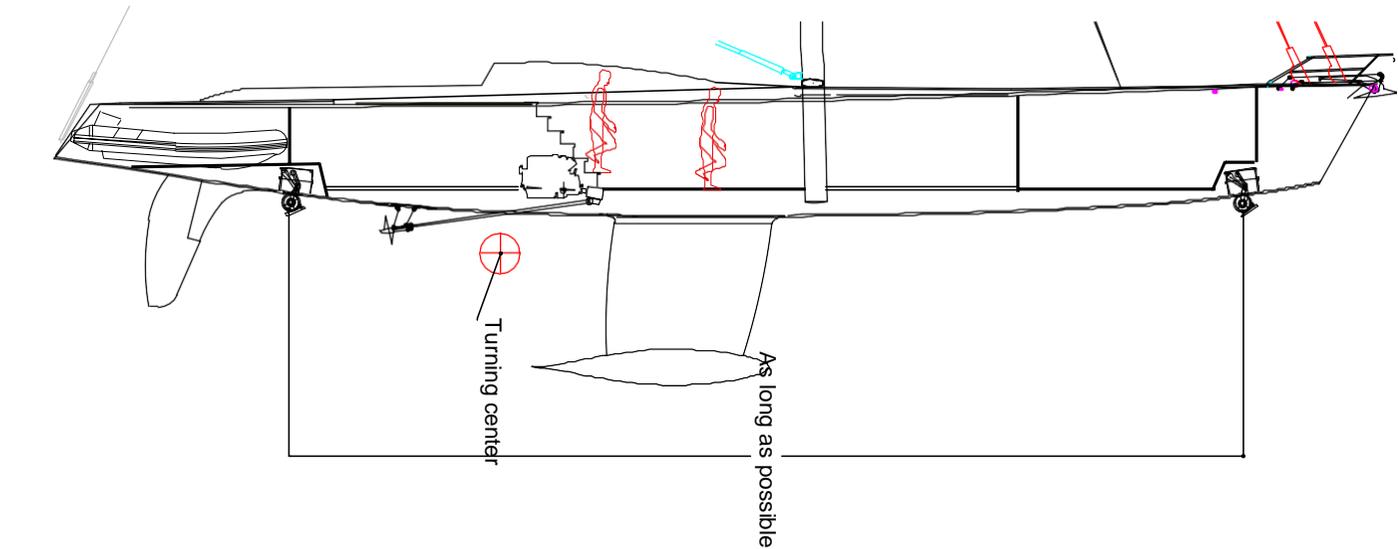
: only when using the Electro-hydraulic unit as drive

DATE OF TESTS: ..... LOCATION: .....

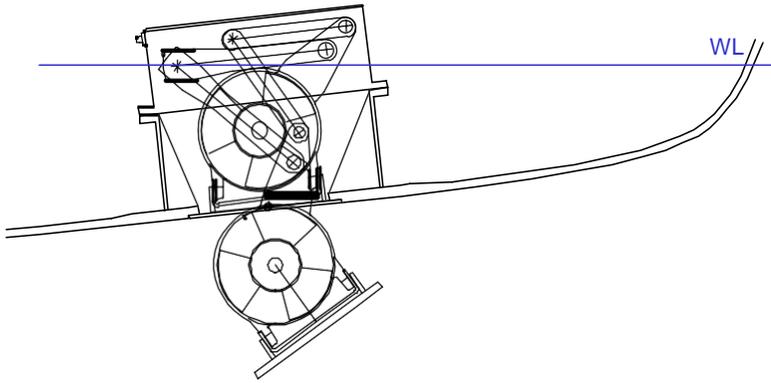
PERSON RESPONSIBLE: .....

SIGNATURE:

3RD ANGLE PROJECTION		REVISION	PART NO.
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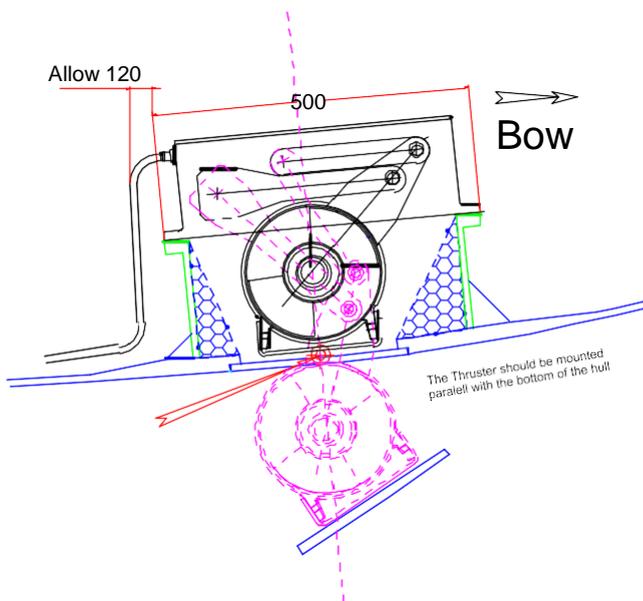
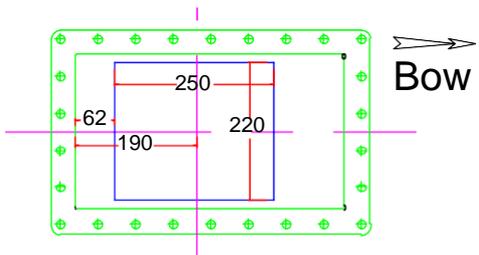


A minimum immersion depth of one full turbine diameter should be respected and the thruster positioned as forward as possible for bow installation or as aft as possible for stern installation  
The unit must be parallel with the bottom of the hull not the waterline!

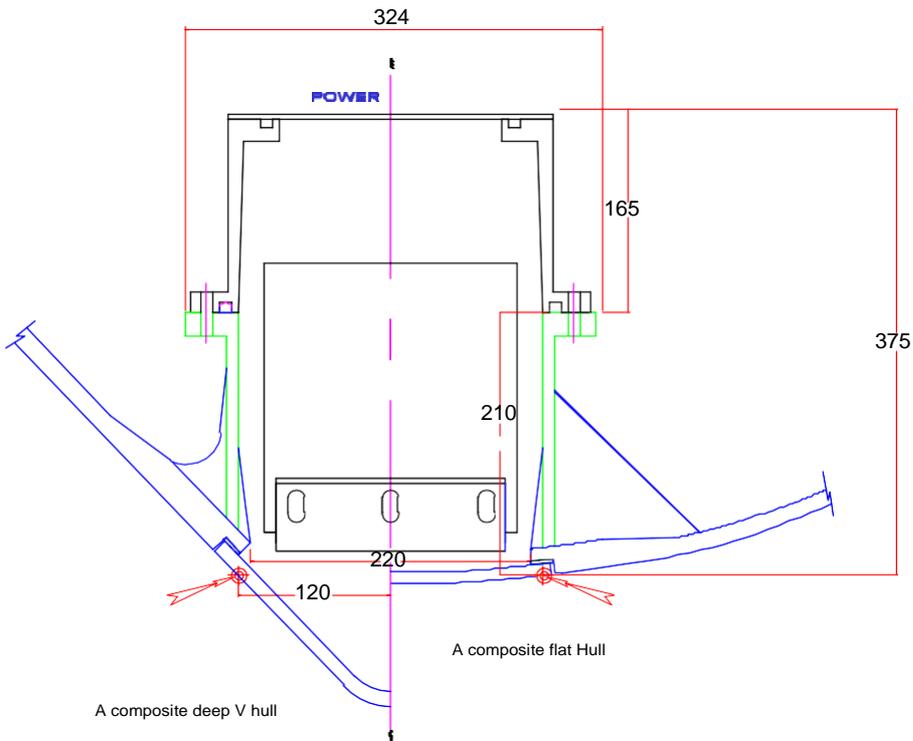


UNLESS OTHERWISE SPECIFIED	TITLE		R200 instalation		REVISION		PART NO.	
	CADD	REF	MATERIAL					
	SCALE	1"						
	DRAW N CHECK RELEASE HEAT TREAT & FINISH							
DATE	DATE	DATE						
	03/05/01							

# MAX POWER

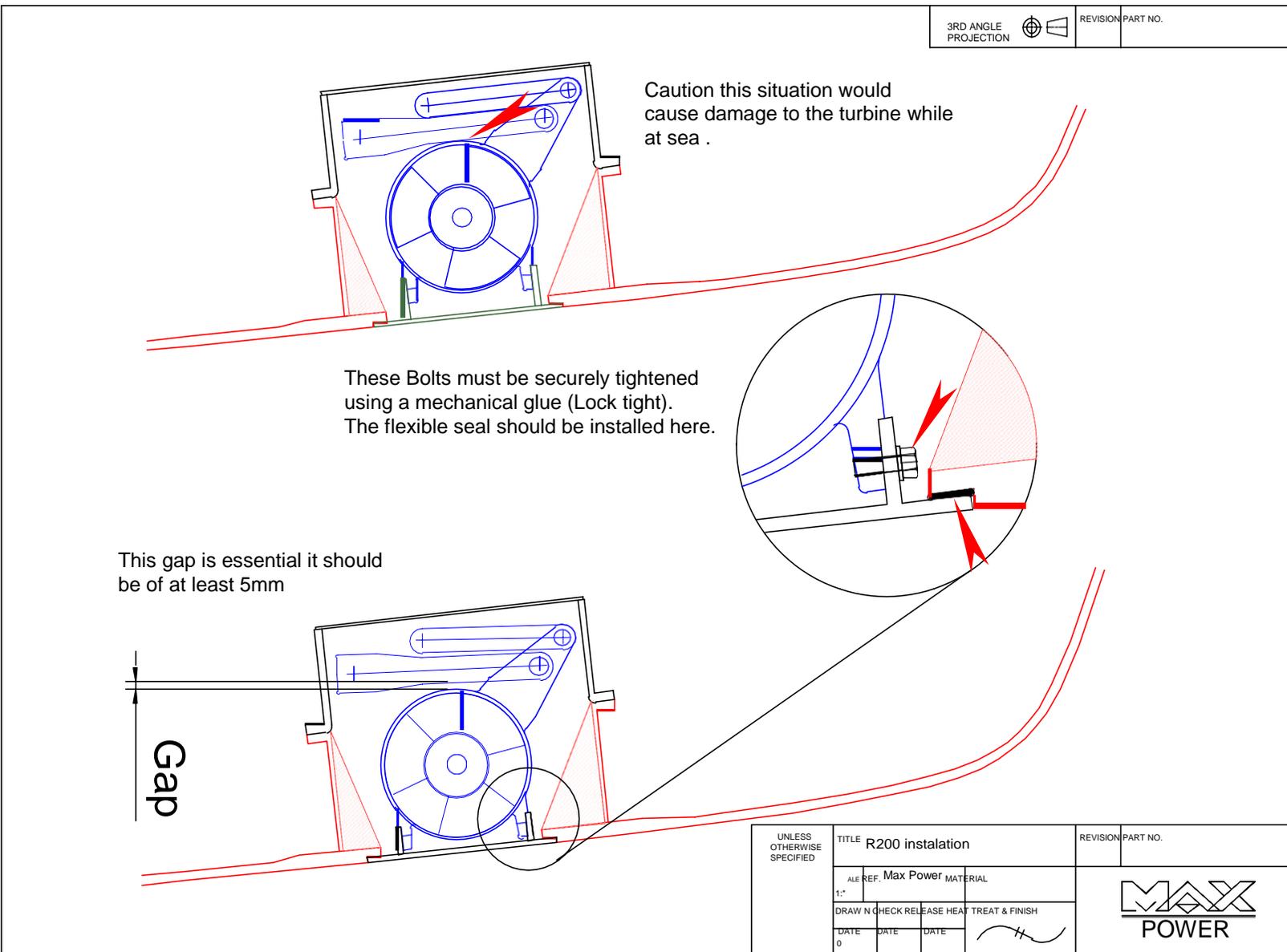


- Mounting base as supplied by MAX POWER
- Hull parts manufactured by ship yard
- Principal dimensions
- Optional flotation foam to reduce loss of buoyancy
- Retract Thruster
- Construction point ( Never changes no matter the hull shape )
- Flexible water seals

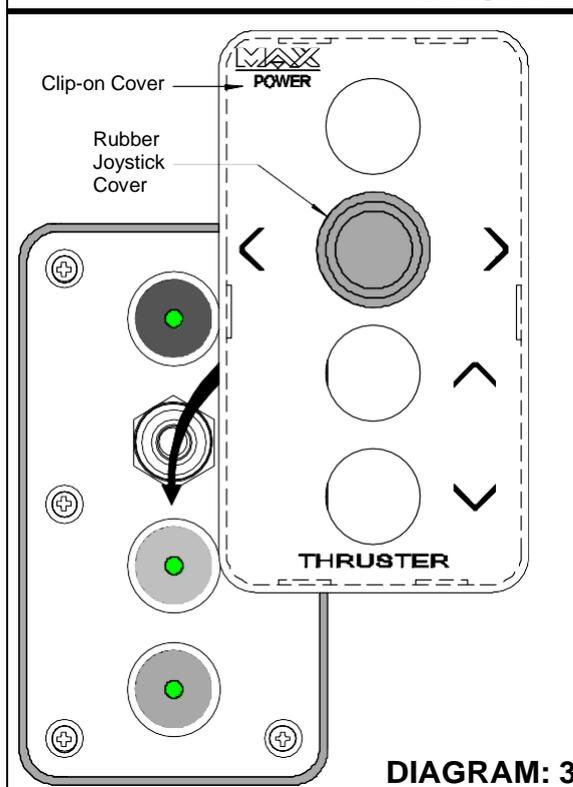
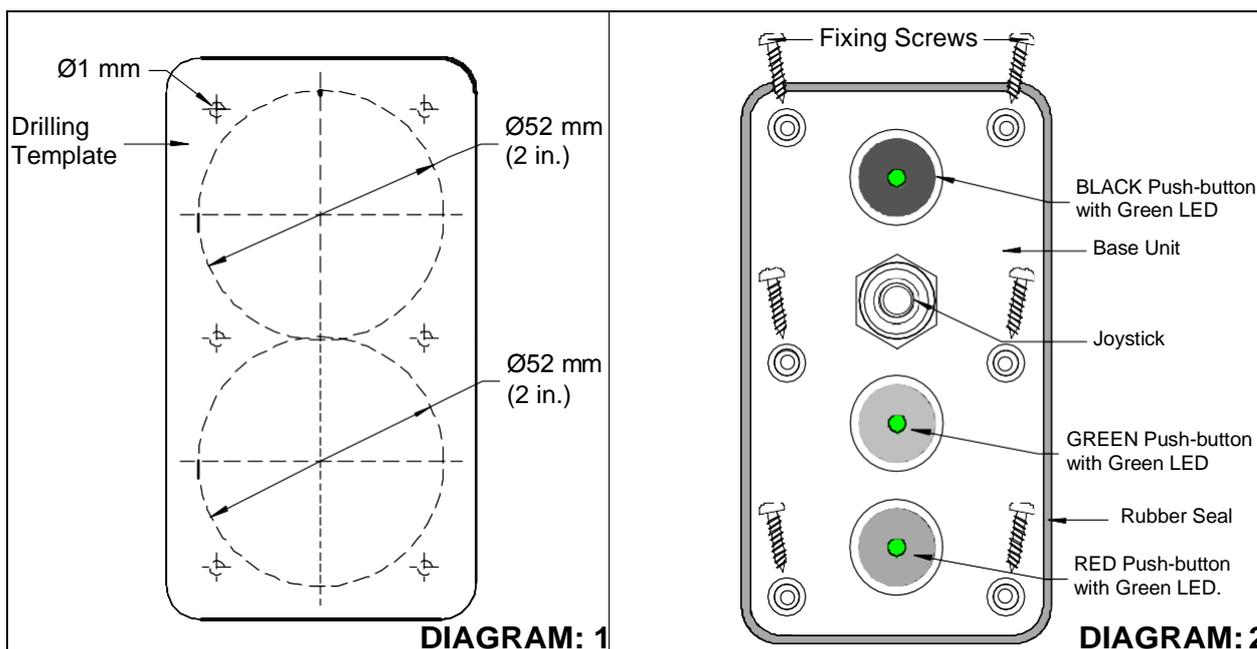


Do not build from these drawings, use those supplied with the unit .

RETRACT R200 PRINCIPAL DIMENSIONS	
	YT Turbo CAD



# MAX POWER



## INSTALLATION GUIDELINES

### Diagram: 1

- 1.1) Stick drilling template in desired mounting position.
- 1.2) Drill the two 52 mm diameter holes using a holesaw.
- 1.3) Place panel in holes and mark the 6 fixing holes.
- 1.4) Remove panel and drill the six 1 mm diameter fixing holes.

### Diagram: 2

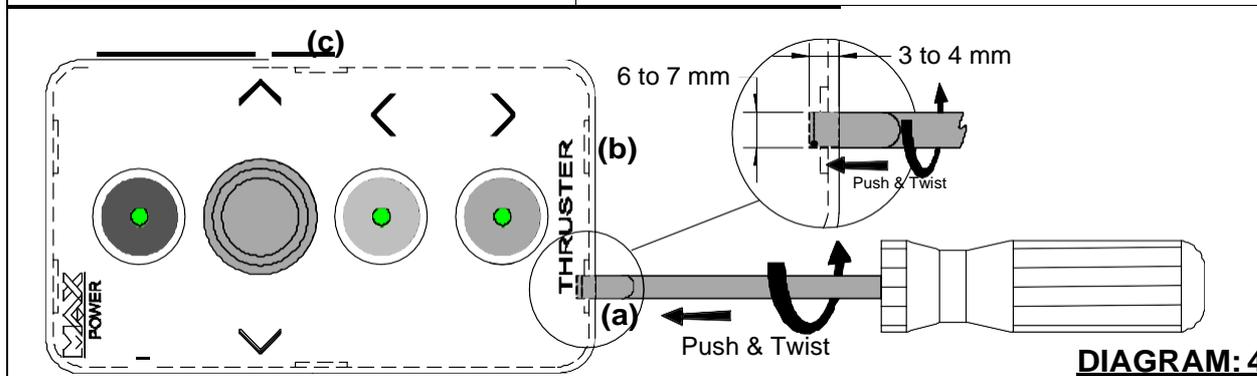
- 2.1) Make sure that rubber seal is placed on the base column.
- 2.2) Wire and/or plug unit to the control circuit.
- 2.3) Position base so that the joystick is to the top and the "Red" button to the bottom.
- 2.4) Fix base unit with the six fixing screws as supplied with unit.

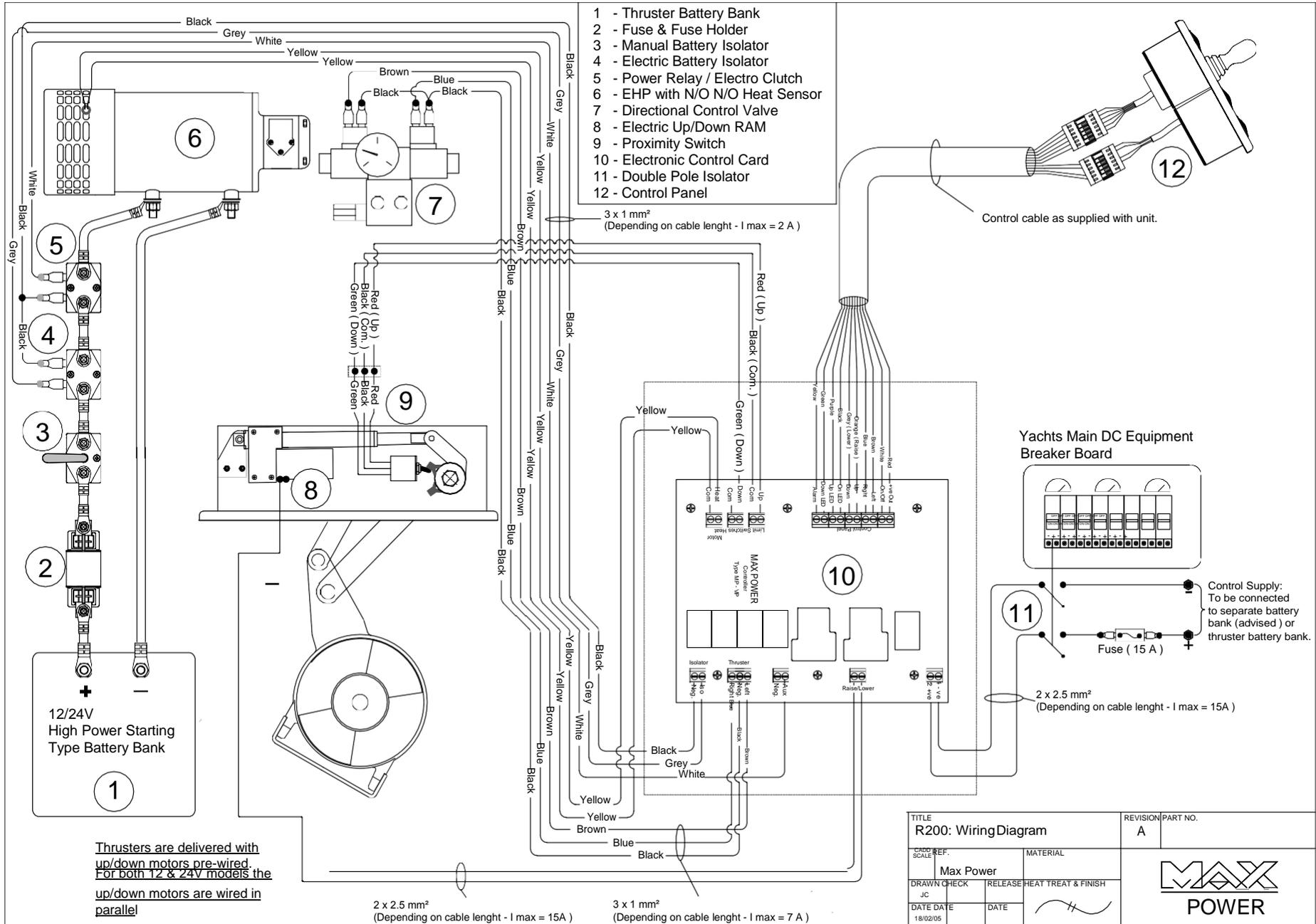
### Diagram: 3

- 3.1) Only when totally finished and satisfied with wiring and positioning of the unit, clip-on the face panel/cover.
- 3.2) Leave rubber joystick cover inserted to clip-on cover when clipping cover into place and push down well once in place.

### Diagram: 4

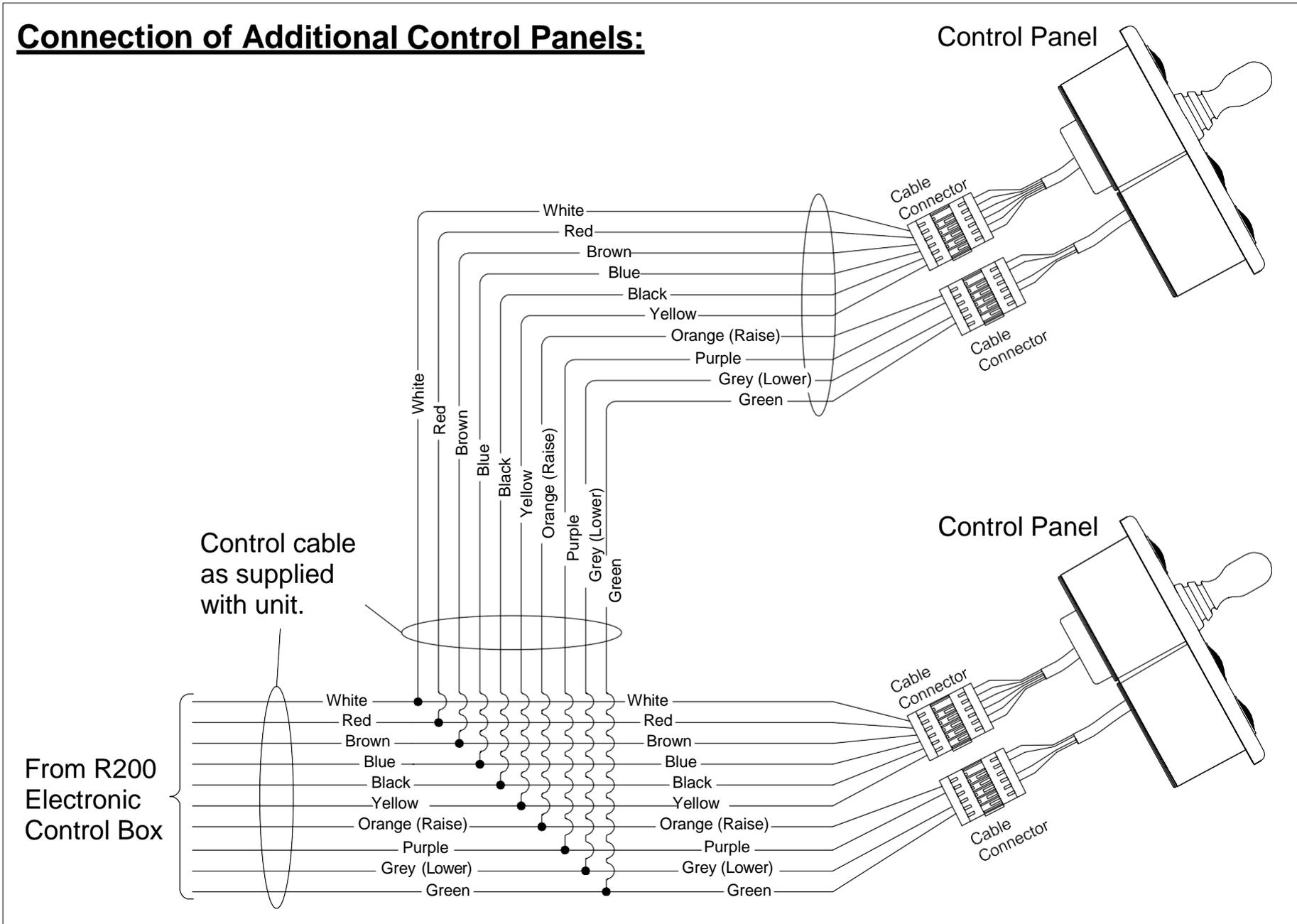
- 4.1) To remove the clip-on cover slide a flat headed screwdriver, with 6 - 7 mm wide tip, between the clip-on cover and the dashboard at position (a), (b) and then (c) and twist the tip slightly. Push in the tip of the screwdriver at least 3 to 4 mm before twisting it.





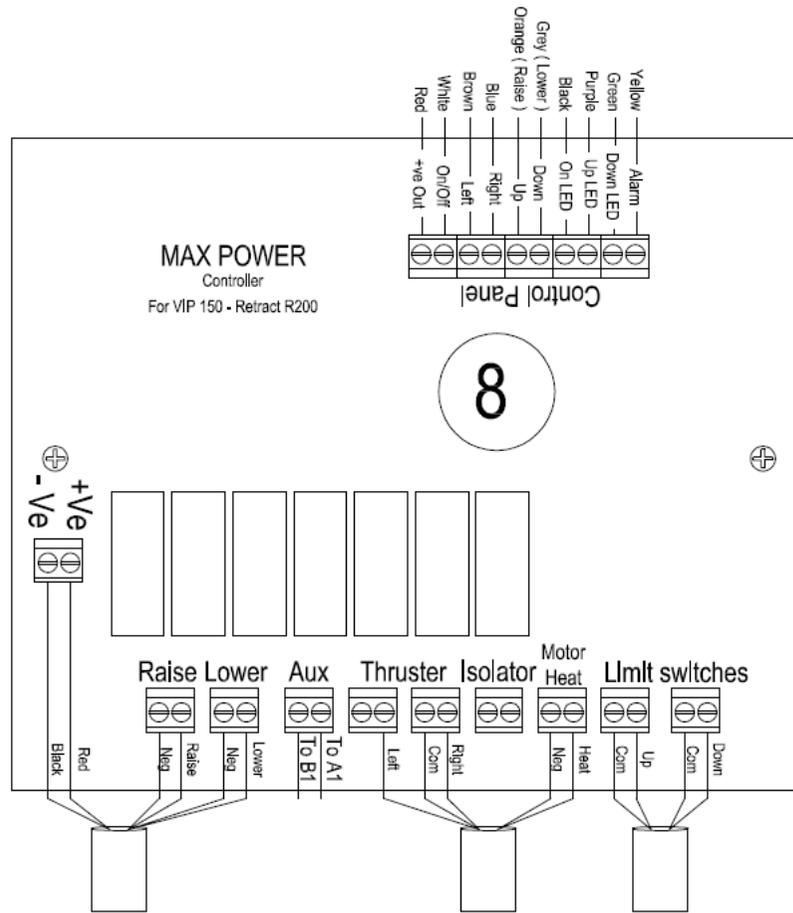
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### Connection of Additional Control Panels:



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**R200 THRUSTER: ELECTRONIC CONTROL BOX CONNECTIONS:**



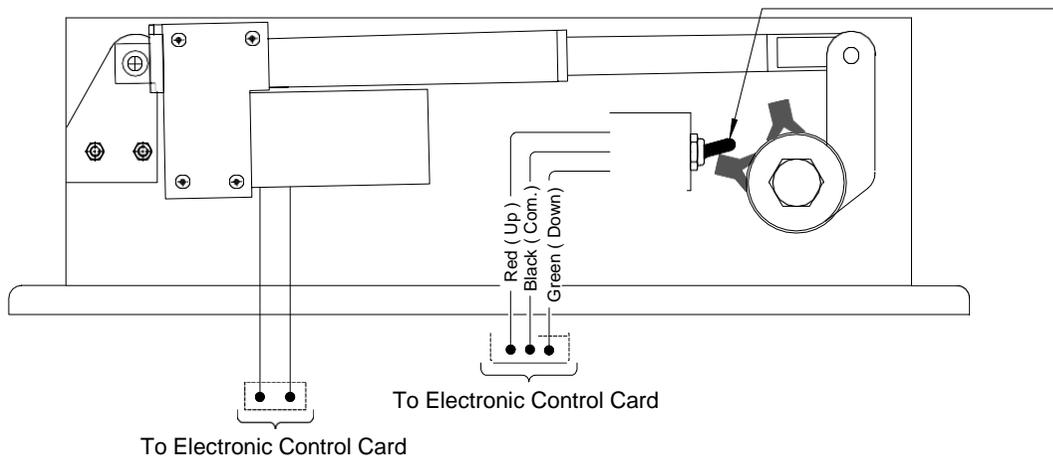
**NOTES:**

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. 2,5mm<sup>2</sup> with I<sub>max</sub> = 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.
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.

MAX POWER

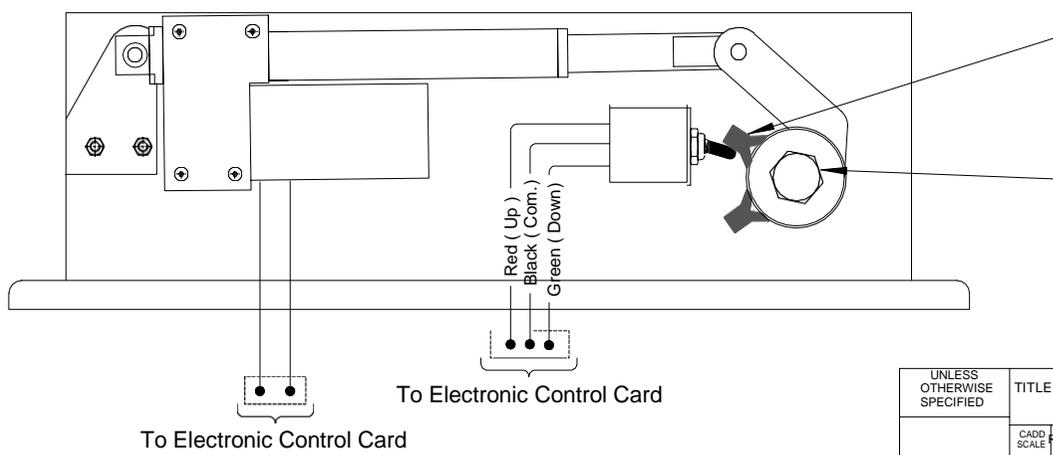
3RD ANGLE PROJECTION		REVISION	PART NO.
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TURBINE IN THE UP POSITION



With the turbine in the up position adjust the position actuator so that it has only just tripped the switched .Use a volt meter to do this operation.

TURBINE IN THE DOWN POSITION



With the turbine in the down position adjust the position actuator so that it has only just tripped the switched .Use a volt meter to do this operation.

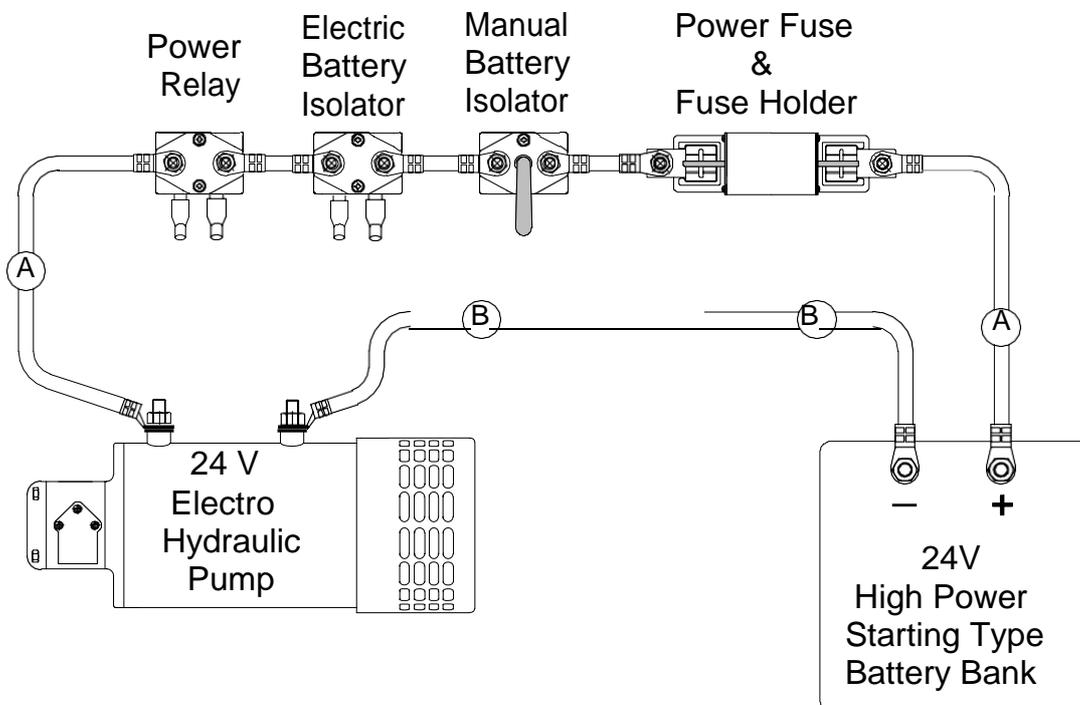
With the ram removed the turbine can be raised using a 24mm wrench

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UNLESS OTHERWISE SPECIFIED	TITLE		R200 instalation		REVISION	PART NO.
	CADD SCALE	REF.	MATERIAL			
	1:"	Max Power				
	DRAWN	CHECK	RELEASE	HEAT TREAT & FINISH		
DATE	DATE	DATE				
03/05/01	18/02/05					

# MAX POWER

## POWER SYSTEM CABLING:

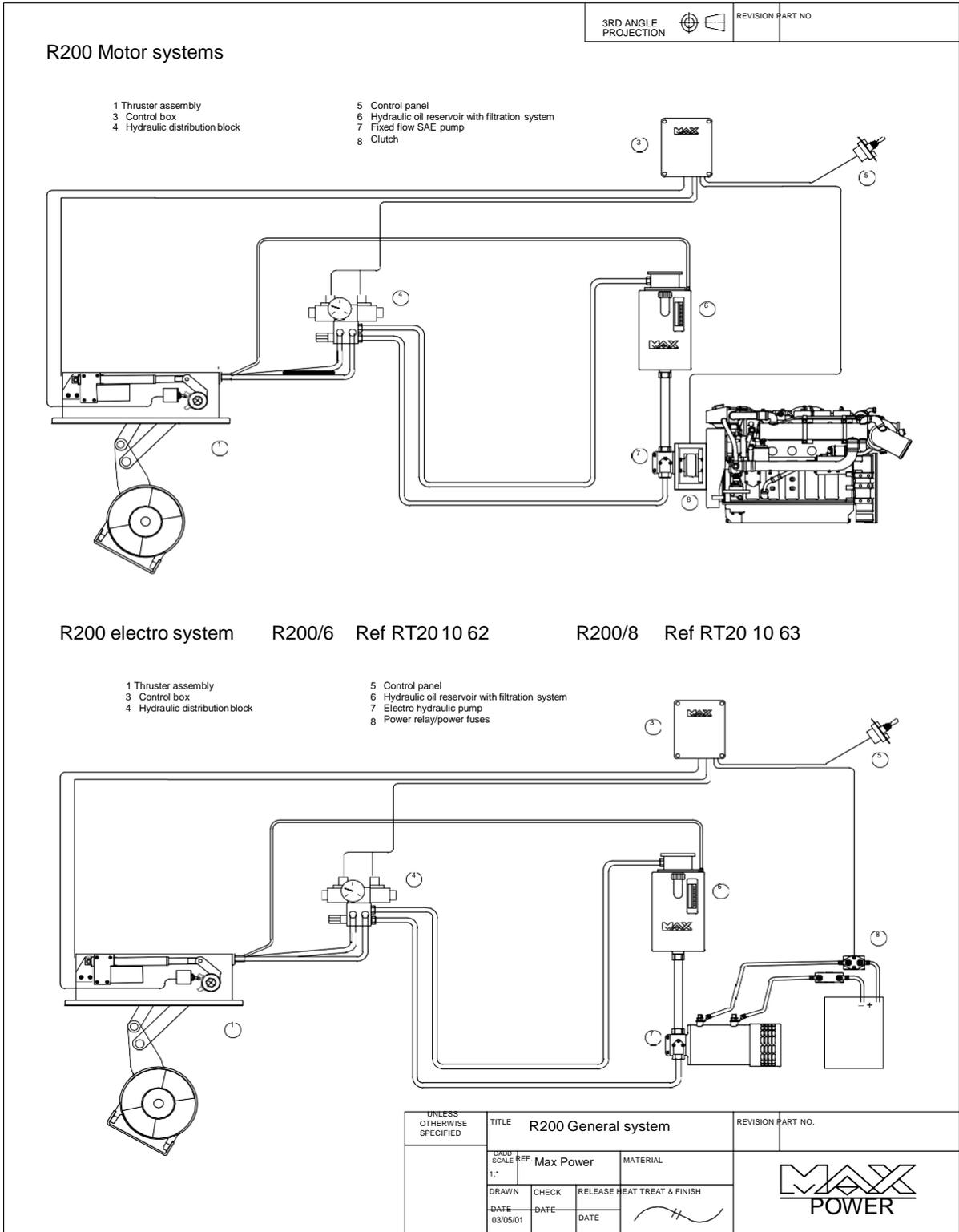


## Cable Sections:

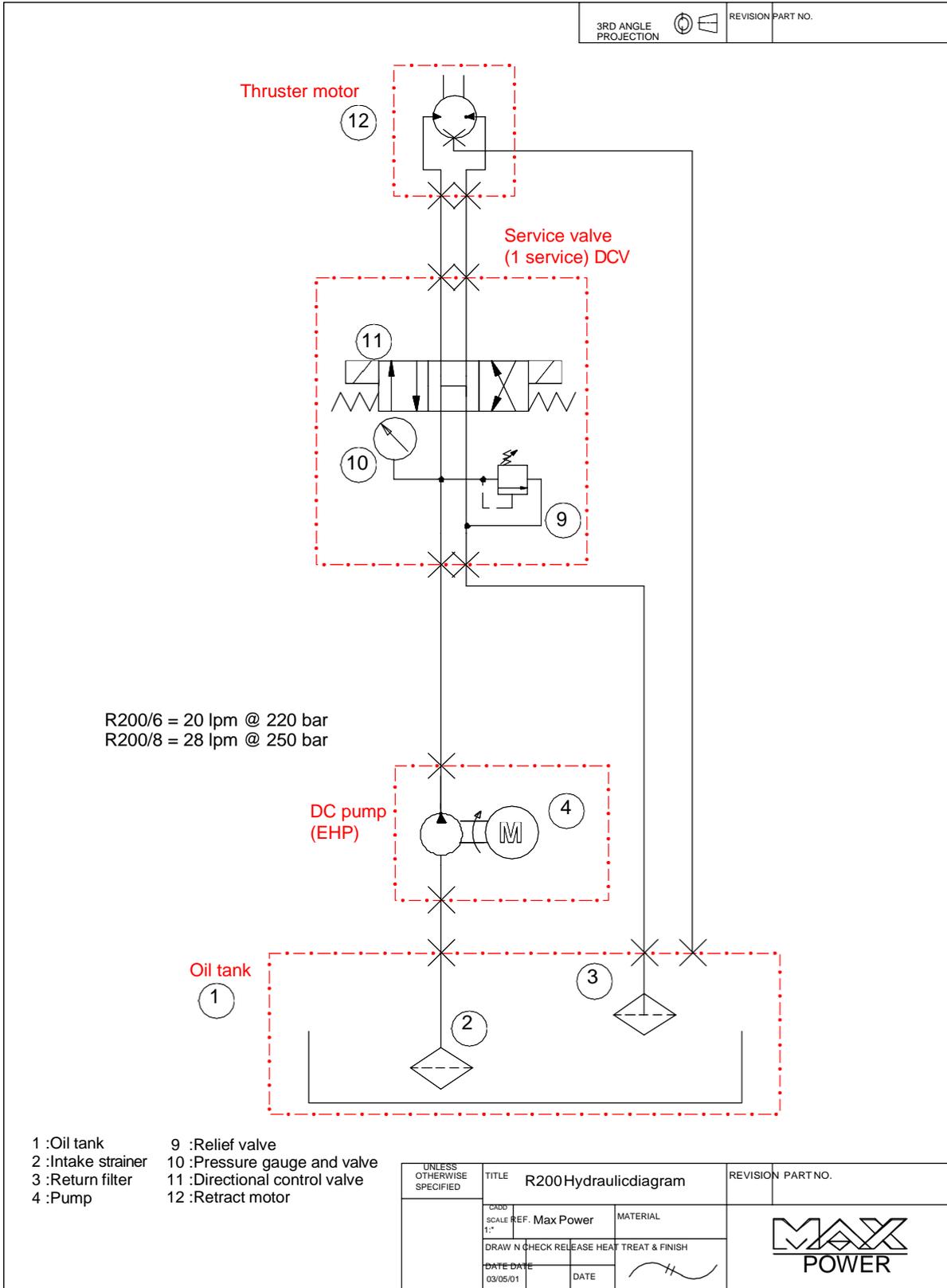
Model R200/6		Model R200/8	
Total length in meters	Cable section in mm <sup>2</sup>	Total length in meters	Cable section in mm <sup>2</sup>
A + B = 1 m	95 mm <sup>2</sup>	A + B = 1 m	95 mm <sup>2</sup>
A + B = 3 m	95 mm <sup>2</sup>	A + B = 3 m	120 mm <sup>2</sup>
A + B = 5 m	120 mm <sup>2</sup>	A + B = 5 m	150 mm <sup>2</sup>
A + B = 10 m	150 mm <sup>2</sup>	A + B = 10 m	185 mm <sup>2</sup>

TITLE Power System Connections & Cable Sections			REVISION/PART NO. For 24 V DC System		
CADD SCALE 1:1"	REF.	MATERIAL			
DRAWN	CHECK	RELEASE HEAT TREAT & FINISH			
DATE 18/02/05	DATE	DATE			
					

# MAX POWER



# MAX POWER



Installation of the hydraulic circuit should be fitted by a hydraulic technician .The hydraulic hoses should be crimp connected , and pressure tested .

**HYDRAULIC HOSES :**

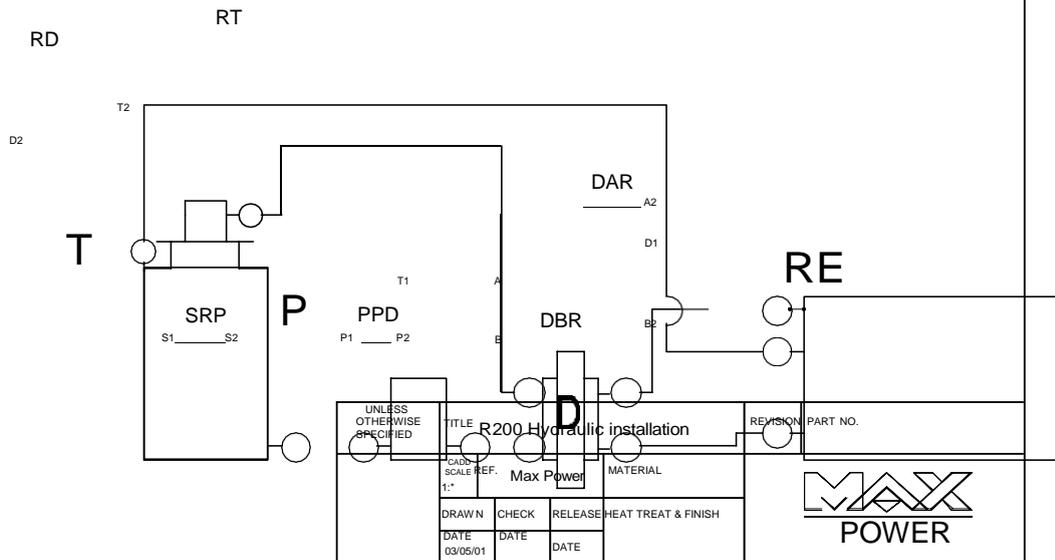
- SRP : Suction hose from oil tank to the pump ;Low Pressure ( L P ) minimum 3/4 " or 1"
- PPD : Supply feeder hose from pump to hydraulic directional valve ; High pressure ( H P ) 1/2 "
- DAR : Supply from hydraulic directional valve to the retract ; HP thermo plastic hose 3/8"
- DBR : Supply from hydraulic directional valve to the retract ; HP thermo plastic hose 3/8"
- RD : Motor drain from retract directly to oil tank ; LP hose minimum 1/4 "
- RT : Return to oil tank ,from the directional valve ; HP hose 1/2"
- G : Supply of lub oil to leg gear housing ; LP hose 8mm

**CONNECTIONS / FITTINGS (As fitted on max power equipment)**

- |  |                              |
|--|------------------------------|
| S1 : Female 3/4" BSP                   | S2 : Female 3/4" BSP         |
| P1 : Female 1/2" BSP                   | P2 : Female 3/8" or 1/2" BSP |
| T1 : Female 3/8" or 1/2" BSP           | T2 : Female 3/4" BSP         |
| A1 : Female 3/8" or 1/2" BSP           | A2 : Male 9/16" jic 37       |
| B1 : Female 3/8" or 1/2" BSP           | B2 : Male 9/16" jic 37       |
| G1 : Male 8mm                          | G2 : Female 1/4" BSP         |
| D1 : Male 8mm ( intentional weak link) | D2 : Male 7/16" jic 37       |

**EQUIPMENT :**

- |                    |                               |
|--------------------|-------------------------------|
| T : Oil tank       | RE : Retract unit R200        |
| P : Hydraulic pump | D : Directional control valve |



UNLESS OTHERWISE SPECIFIED		TITLE R200 Hydraulic installation		REVISION PART NO.	
SCALE REF. 1:"		MATERIAL			
DRAWN	CHECK	RELEASE	HEAT TREAT & FINISH		
DATE 03/05/01	DATE	DATE			

**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 centre

*End User* – The boat supplied with supplied equipment and the owner thereof *Installer* – The authorized centre 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.

3) Warranty Registration

Register your purchase now to receive free extended 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 email or fax:

(Fax: +33 4 92 19 60 61)

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.

## MAX POWER

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

Year 2 -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 3 month period following installation)

### 5) Warranty Exclusions

Damage due to modifications or installation contrary to published specifications

Damage due to electrolysis or galvanic corrosion between the hull and the RETRACT body

Cost of hauling the boat

Damage due to repairs performed by an unauthorized service centre

Damage due to lack of normal maintenance services

Damage due to water

Parts replaced due to normal wear and tear

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

### 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 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**