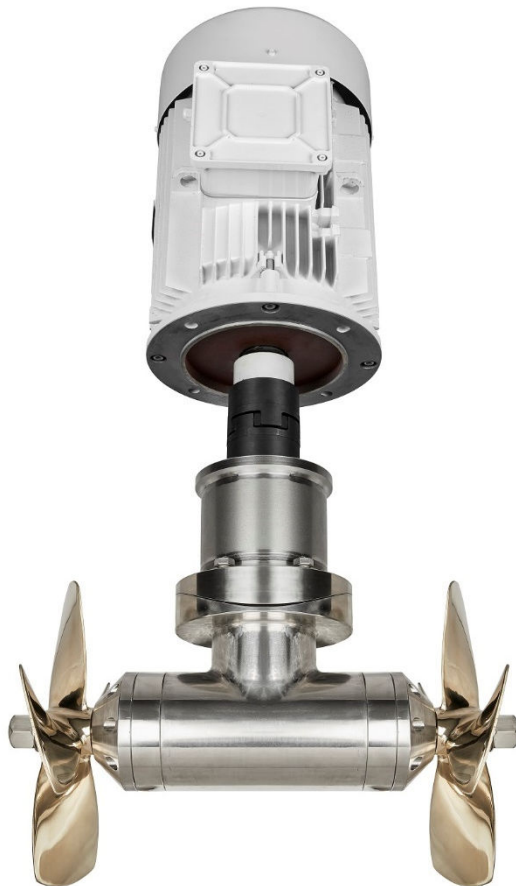




Italwinch electric thruster installation and user's manual

Rev.3

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1.1 INTRODUCTION

Our thruster designed and tested with the most modern technologies and realized with proper materials in order to supply the best maneuverability for heavy duty use. The twin counter rotating propellers specially designed optimize the efficiency and give a final thrust increased of 35% compared to a similar system with same power but single propeller.

Italwinch thruster can be installed both as bow and stern thruster and the motor, according to the models, can be vertical or horizontal. Italwinch thruster is an highly technical product and must be treated as such. The yacht design department and/or shipyard technical office must be consulted before installation. For any yacht requiring official classification, the classification register should also be consulted at the earliest opportunity. Please contact Italwinch for any additional detail.

This manual is integral part of the system. It must be read very carefully before any operation because it contains important technical information for the correct use of the system. Faulty installation and/or use will exclude the system from warranty. For warranty details please refers to our General Sales Conditions delivered to the shipyard. Due to a continuous improvement on the design, Italwinch reserves the right to modify the products here described.

1.2 SAFETY

The tunnel thruster system is supplied in compliance with the technical standards and regulations in force at the time of delivery as well as with the accident prevention standards required for this type of device. Incorrect or improper use of the system may lead to risks and possibly, the danger of serious injury; therefore, it is mandatory to comply with the following general accident prevention rules:

- ✓ The tunnel thruster system must only be installed by qualified, authorized persons. More specifically, interventions concerning the hydraulic and electrical systems must only be performed by properly qualified persons.
- ✓ On receipt of the system, open the packaging and make sure that none of the component parts has been damaged during transport; if there are any damaged parts, inform the carrier immediately. Stored parts must also be checked on a regular basis to ensure that they have not deteriorated in any way and they must be handled using suitable means to prevent them from becoming damaged.
- ✓ The persons responsible for installation, putting into service, use, maintenance and repairs are obliged to read, understand and follow the instructions for use and more specifically, safety regulations.
- ✓ All persons responsible for the maintenance of this system must observe safe working procedures. Italwinch cannot be held liable for personal injury caused through careless use of handheld tools, lifting equipment, electrical instruments or unsuitable maintenance/working methods.
- ✓ Expert authorized staff must be informed of any system operating anomalies immediately.
- ✓ All parts used must be conforming to the technical specified information.
- ✓ Follow the procedures of installation, maintenance and operation eligible.
- ✓ In the event of a system failure, stop the thruster system immediately. Only place the tunnel thruster system in service again after the cause of the failure has been eliminated and after obtaining the relevant authorization from a properly qualified person.

- ✓ Only use the manufacturer's original spare parts when replacing system components. Italwinch cannot be held liable for failure to respect this rule.
- ✓ In the event of changes to safety regulations subsequent to the delivery of the system, the user will be responsible for any adaptations necessary.

1.3 PRODUCTS RANGE

Three phase products range:

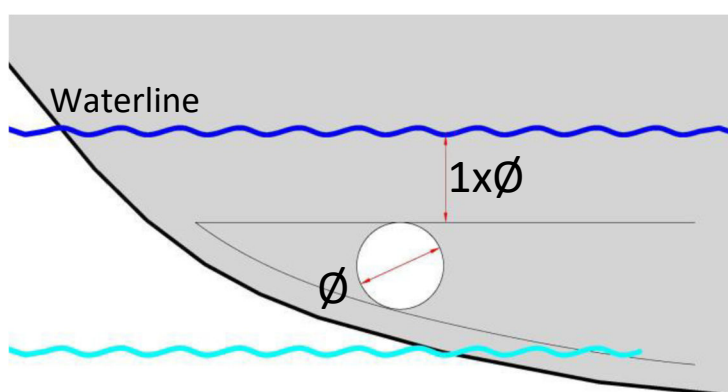
Code	Tunnel Diameter (mm)	Propeller Diameter (mm)	Nr. Propellers (4 blade)	Motor	(Kw)	Thrust (KGF)
IWT_AC015_350	350	340	2	Ac 3ph	15	300
IWT_AC015_350_H	350	340	2	Ac 3ph	15	300
IWT_AC022_350	350	340	2	Ac 3ph	22	450
IWT_AC022_350_H	350	340	2	Ac 3ph	22	450
IWT_AC030_350	350	340	2	Ac 3ph	30	500
IWT_AC030_350_H	350	340	2	Ac 3ph	30	500
IWT_AC030_400	400	388	2	Ac 3ph	30	550
IWT_AC037_400	400	388	2	Ac 3ph	37	600
IWT_AC037_450	450	437	2	Ac 3ph	37	630
IWT_AC045_450	450	437	2	Ac 3ph	45	720
IWT_AC055_500	500	485	2	Ac 3ph	55	960
IWT_AC075_500	500	485	2	Ac 3ph	75	1100
IWT_AC055_550	550	534	2	Ac 3ph	55	1200
IWT_AC075_550	550	534	2	Ac 3ph	75	1300
IWT_AC022_350_1	350	340	1	Ac 3ph	15	300
IWT_AC030_350_1	350	340	1	Ac 3ph	15	300

2.1 TUNNEL POSITION AND LENGHT

For best maneuvering performance of the yacht, the tunnel must be installed as far forward as possible (for bow thruster), to increase the turning moment lever arm around the yacht's natural center of rotation. At the same time the propellers, both for bow and stern thrusters, must be sufficiently submerged to avoid suction of air from the surface and cavitation.

The following rules of thumb should be followed with respect to the location and design of tunnel thrusters.

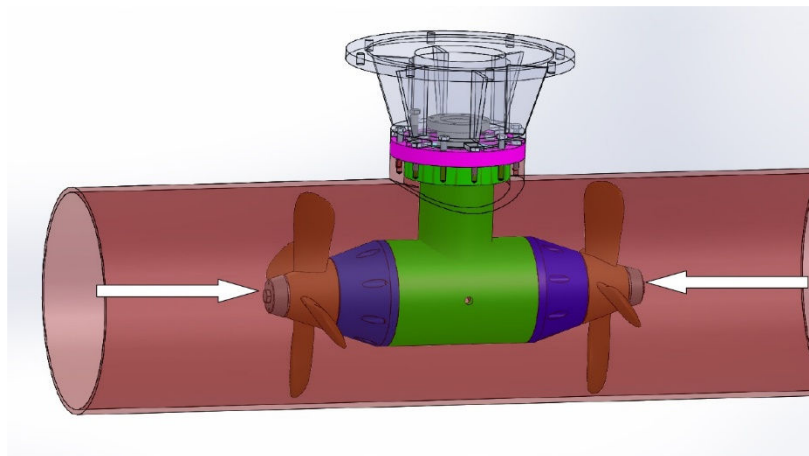
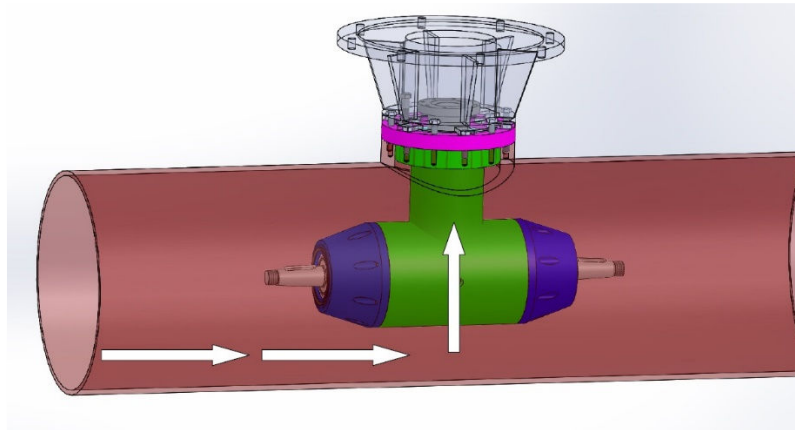
- ✓ The centerline of the tunnel should be a minimum of one duct diameter below the lightest water line.
- ✓ The minimum axial distance from the lower opening edge to the impeller is one duct diameter.
- ✓ The minimum length of the tunnel at centerline is two duct diameters or there is potential for turbulent flow, which also reduces thrust.
- ✓ The hull should be dished downstream of the tunnel opening. The major axis of the dish should be approximately 15 degrees below the horizontal (or follow flow lines) and the angle from the tunnel opening to the edge of the un-dished hull should not exceed 15 degrees (see Figure 9).
- ✓ The radius of the inlet along the hull interface should be 0.05 times the duct diameter.
- ✓ The grill should follow the water streamlines, typically 15 to 20 degrees off the horizontal.
- ✓ The grills themselves should not be flat bar but aerodynamically shaped with rounded leading edges. Grills should take up as little free area as possible. Maximum opening blockage should be 10% to 15%.
- ✓ The axial spacing between the grill and impeller edge should be a minimum of 0.3 times the duct diameter from the impeller.
- ✓ Struts holding the impeller should be faired as much as possible to reduce turbulence, especially when thrusting in a direct where the flow hits the struts before the impeller.
- ✓ Reduce strut cross sectional area as much as possible.
- ✓ Place generous fillets between strut and tunnel wall to reduce vortices.



2.2 GRIDS

Grids at the ends of the tunnel reduce the performance of the thruster indeed. If the installation of grids is required, the number of grid bars must be the minimum as possible; they must be evenly spaced, with section and direction as streamlined as possible for thruster's waterflow and also for hull's waterflow.

2.3 THRUSTER MOUNTING



3.1 THRUSTER CONTROLS SPECIFICATIONS

The bow thruster control system allows you to control the bow and stern thrusters provided by MZ Electronic.

- ✓ Power supply voltage: from 21 to 30 VDC
- ✓ Current absorption: 200mA
- ✓ Possibility to control up to two motors (bow + stern). Each motor can be controlled by up to 4 stations
- ✓ Control with proportional joystick
- ✓ Priority call system between the various stations
- ✓ Inverter alarm signals via acoustic alarm and LED alarm
- ✓ Automatic disabling of the joystick station for prolonged inactivity
- ✓ Protection against power supply polarity reversal
- ✓ Easy installation

JS_01



JS_02



JOYSTICK PANEL	
JS_01	Single joystick kit – proportional control
JS_02	Double joystick kit – proportional control

CONNECTION CABLE	
CC_15	Connection cable 15m
CC_20	Connection cable 20m
CC_30	Connection cable 30m

AC LOGICAL BOX MZ	
LB_AC_01	Box for 1 electric thruster with max 4 control positions
LB_AC_02	Box for 2 electric thrusters with max 4 control positions

INVERTER	
INV_15AC	Inverter for 15KW motor
INV_22AC	Inverter for 22KW motor
INV_30AC	Inverter for 30KW motor
INV_45AC	Inverter for 45KW motor

3.2 THRUSTER CONTROLS INSTALLATION

The product must be used for the purposes described in this manual. Any other use is considered improper use. Tampering with the instrument causes the warranty to be cancelled immediately.



WARNING!

READ THE MANUAL CAREFULLY BEFORE INSTALLING OR USING THE PRODUCT

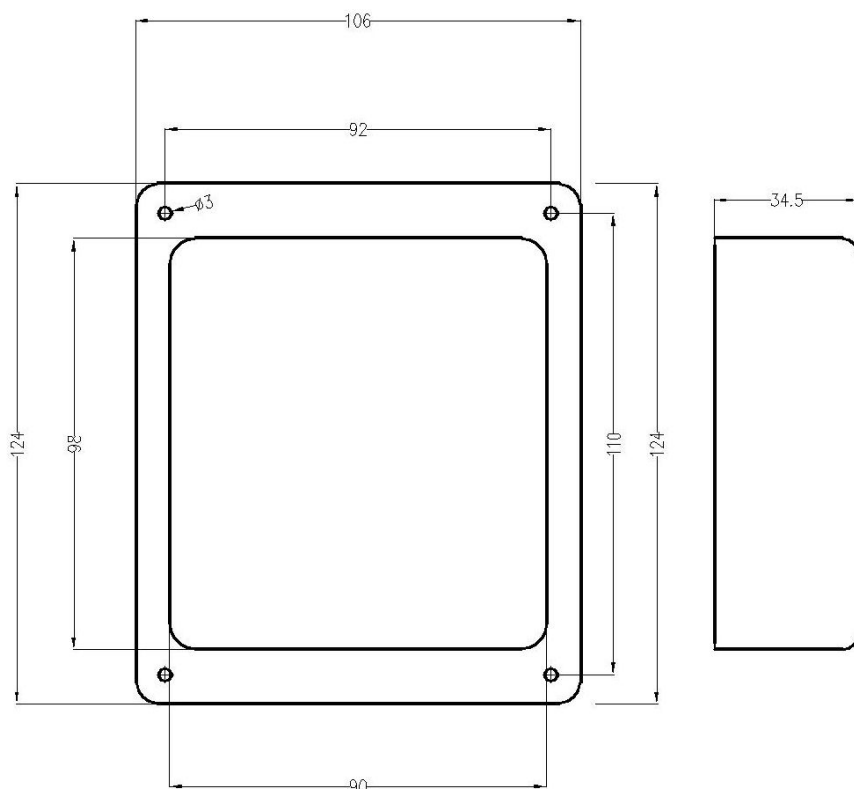
The instrument complies with EMC standards (EN55022) and must be positioned at a distance of:

- 30 cm (~1 Ft) from the compass;
- 50 cm (~1,5 Ft) from radio equipment;
- 2 metres (~6,5 Ft) from radio transmitter devices;
- 2 metres (~6,5 Ft) from radar beam

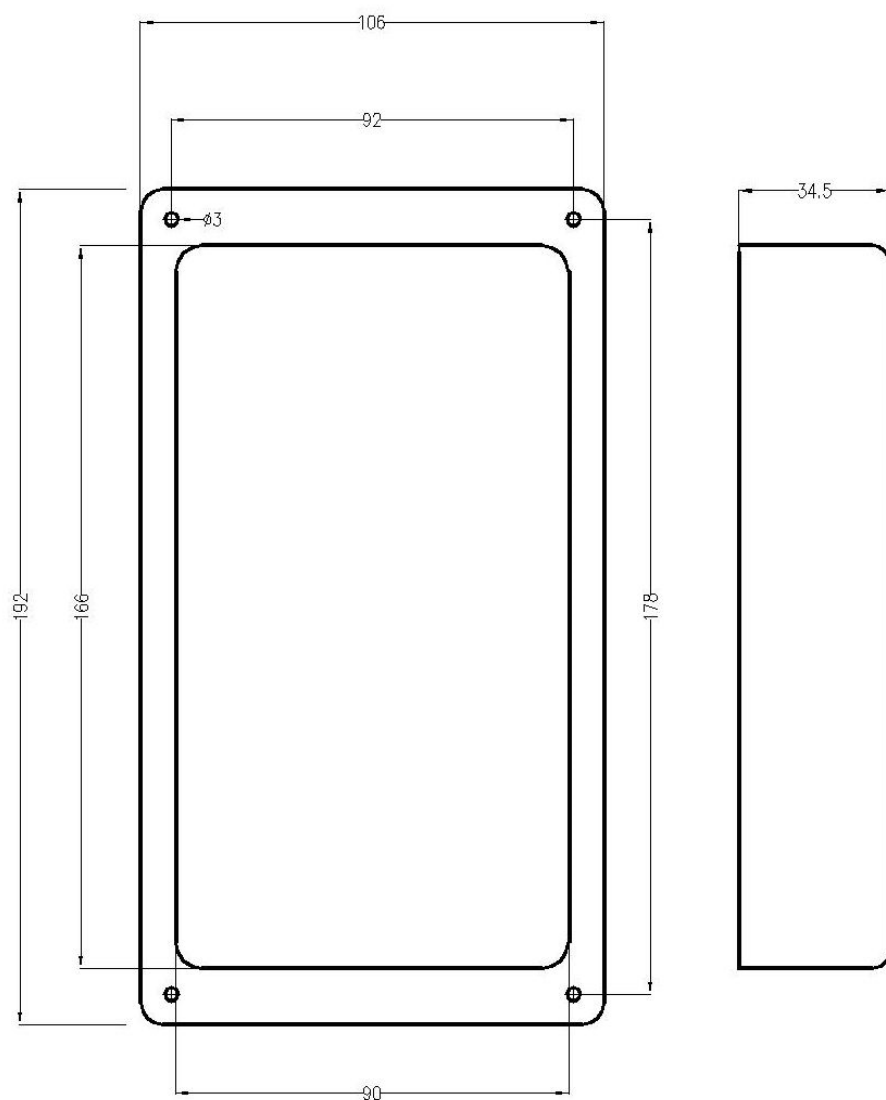
The joystick control must be positioned so that it is easily accessible to the user and must be installed on a flat surface.

The rear part must be protected against water and humidity: there is still a protective gasket that minimizes the probability of water infiltration that could damage the product.

To fix the control joysticks it is first necessary to drill the surface, using the drilling templates shown below. Once inserted in the seat, secure it with four M3 nuts, screwing them on the four corner screws and tighten them firmly.



Drilling for
JS_01



Drilling for
JS_02

WARNING!



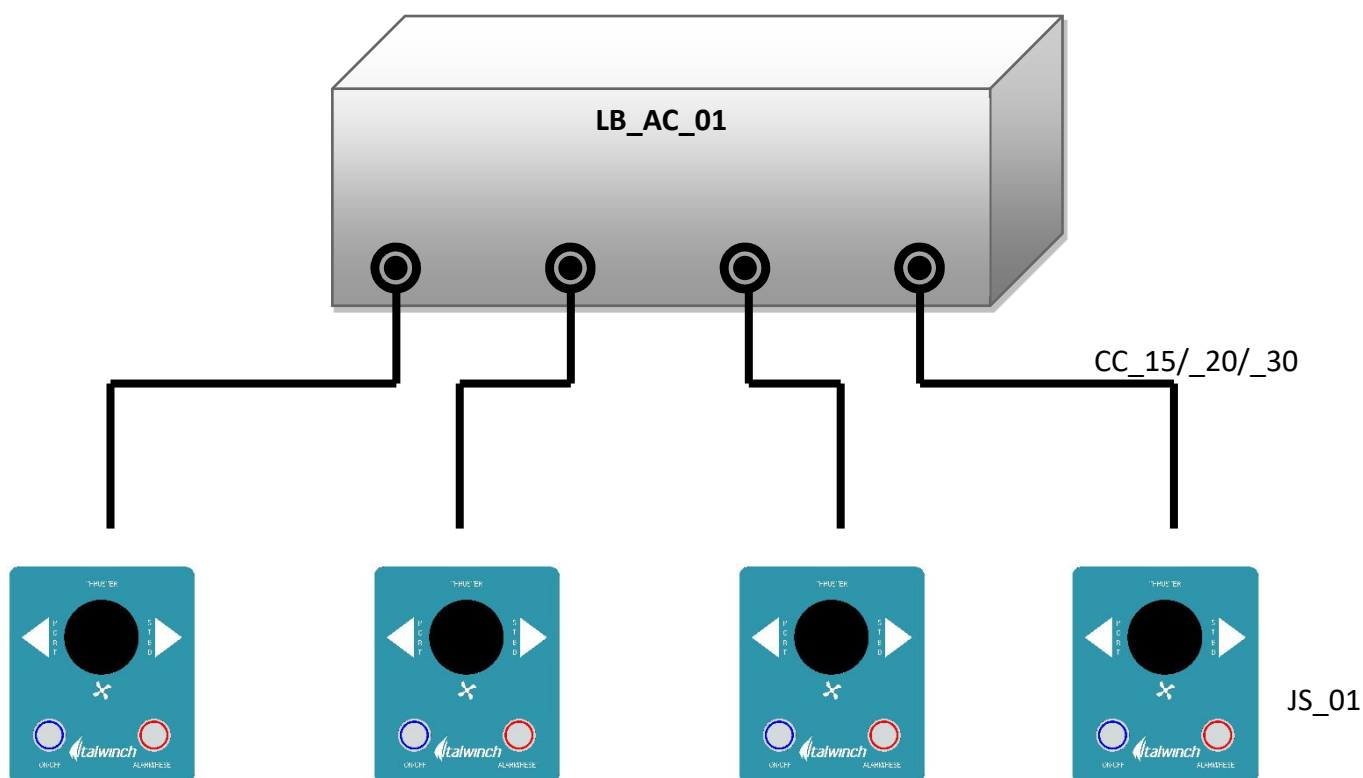
IN ORDER TO MOUNT THE CONTROL BOX LB_AC_01 or LB_AC_02 PLEASE USE ONLY THE MOUNTING BRACKETS AND THE SCREWS SUPPLIED WITH THE PRODUCTS. DON'T DRILL THE PLASTIC CASE.



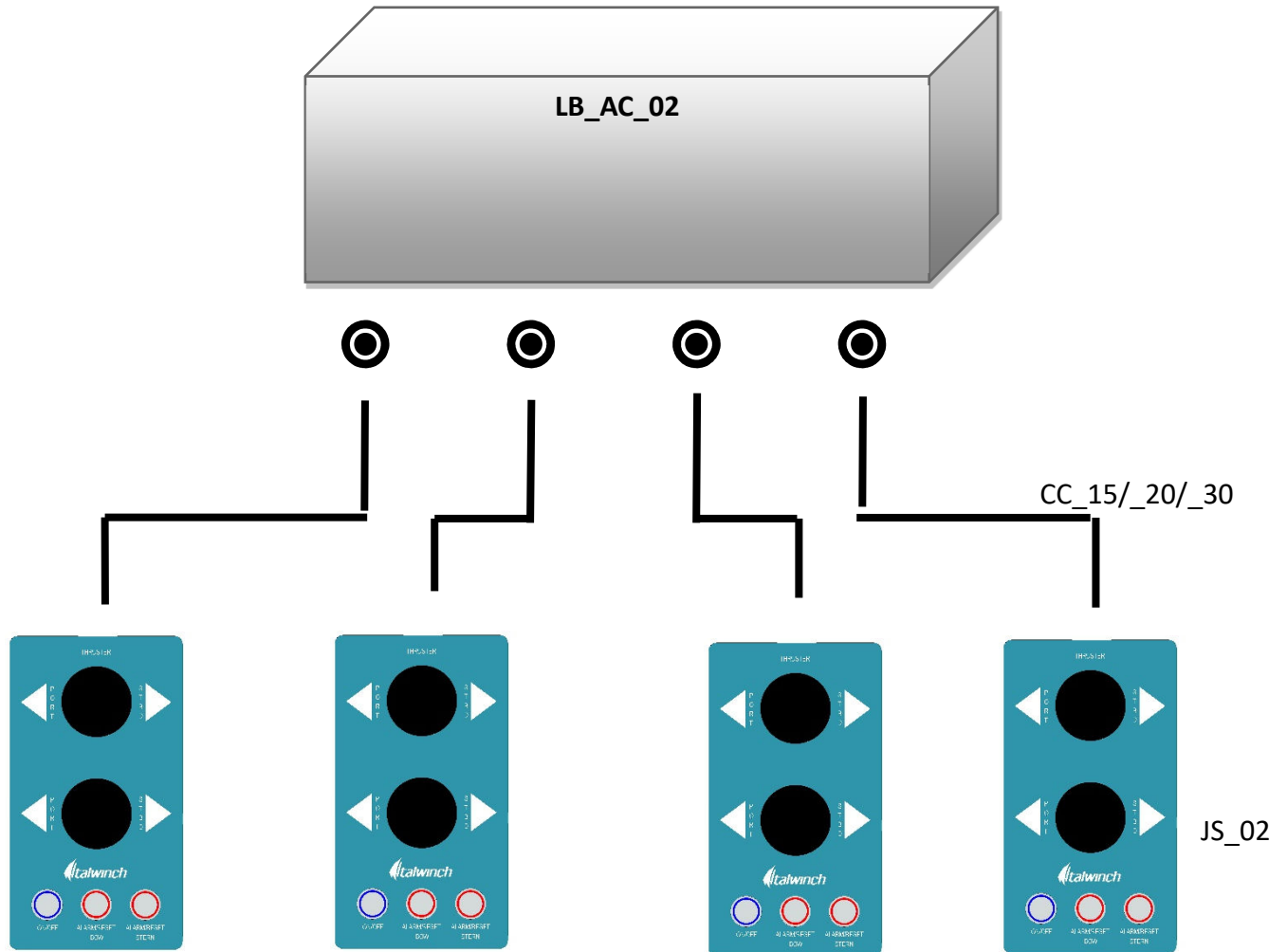
3.3 JOYSTICK CONNECTION TO CONTROL BOX FOR SINGLE/DOUBLE THRUSTER

In order to connect the joystick panels to the control boxes it's possible to use the cables with part number CC_15/_20/_30: insert the plug into the socket placed on the rear side of the joystick and the other plug of the cable in one of the sockets mounted on the plastic box. When the plug is inserted in the socket it's necessary to turn the ring around the plug in order to block the plug and to prevent disconnection.

The LB_AC_01 control box allows you to control **a single thruster** from a maximum of 4 JS_01 stations:

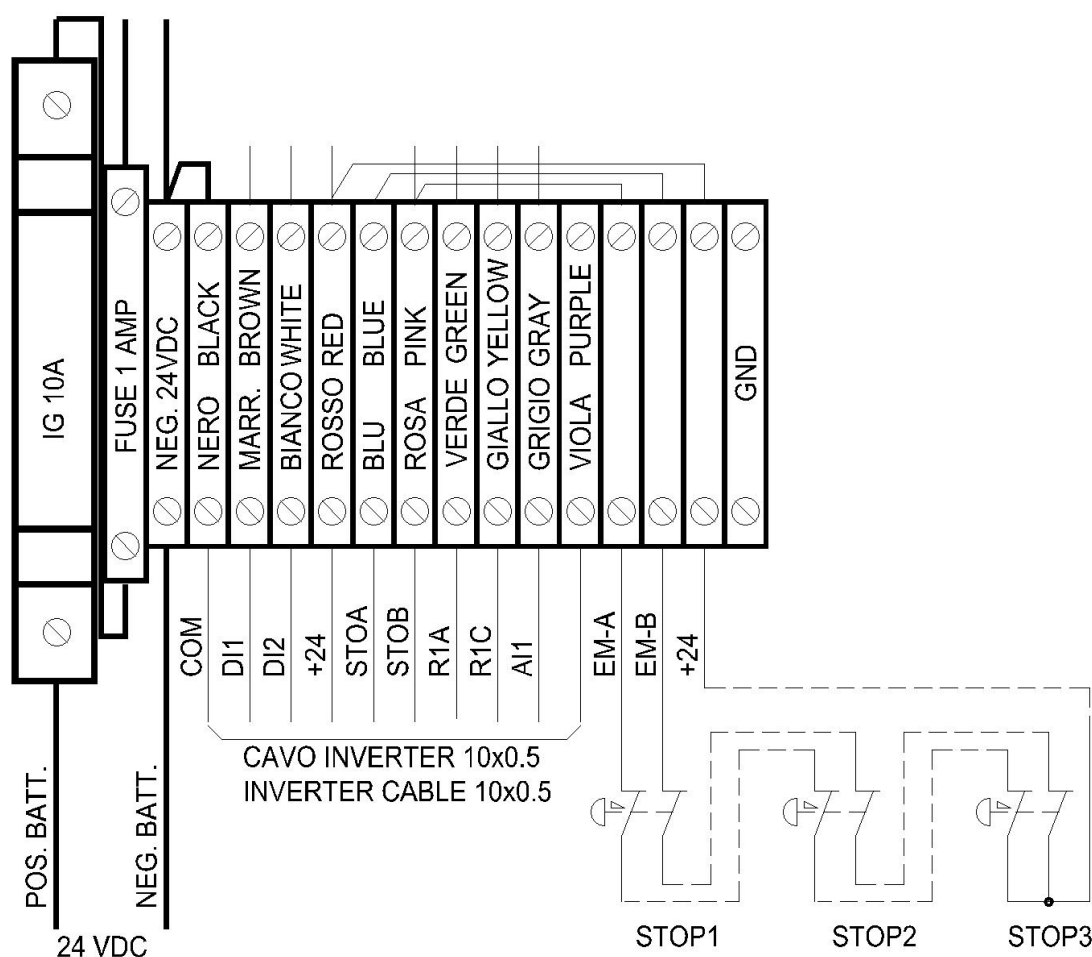


The LB_AC_02 control box allows you to control **two thrusters** from a maximum of 4 JS_02 positions:



3.4 CONNECTION LB-AC-XX TO AC INVERTER

Inside the logic box there is a DIN-rail terminal block that must be used for the connection of the power supply and for the connection with ALTIVAR inverter. The connection to the inverter must be made by using the cable with 10-colored wires that is supplied already connected to the inverter: the colored wires must be inserted in the terminal box in accordance to the following drawing:



In the drawing the name reported on the terminal block inside the inverter are visible: COM, DI1, DI2, +24, STOA, STOB, R1A, R1C, AI1. These are the contacts of the terminal block inside the inverter where the wires are connected. The emergency buttons STOP must be connected in series like in the drawing in order to stop the thruster from two or more different place; in the drawing an example with 3 buttons is shown but it's possible to connect a different number of buttons by following the same logic connection.

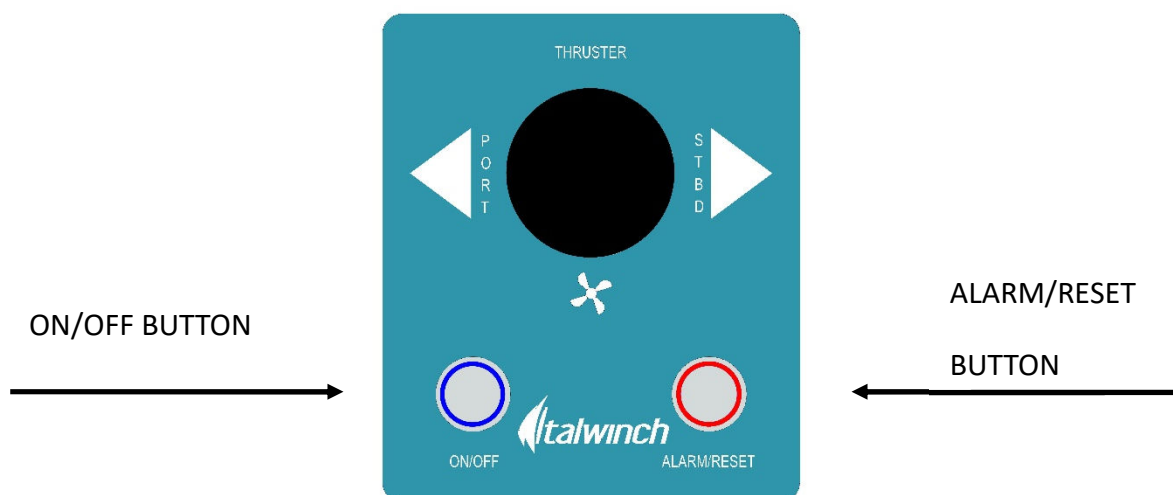


WARNING!

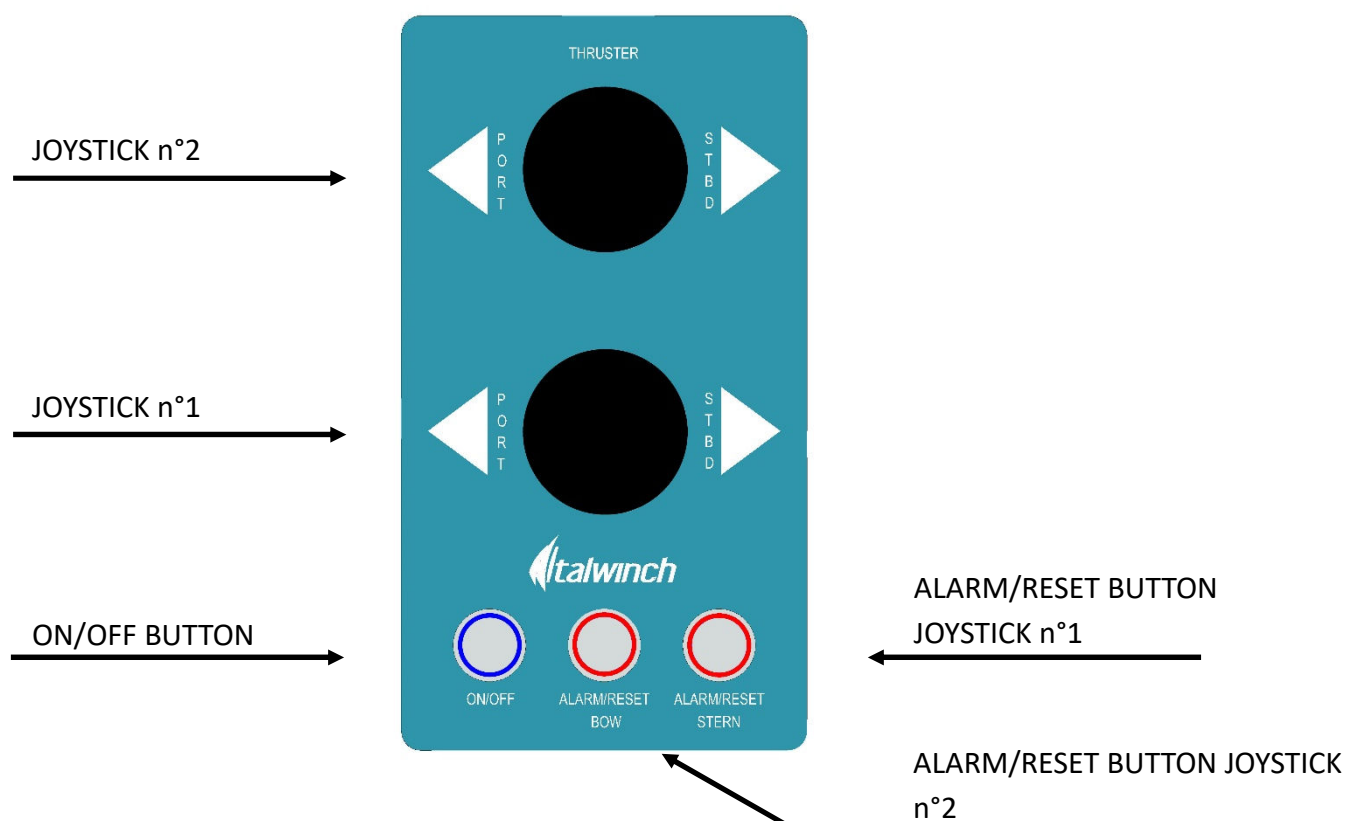
DON'T MOVE AND DON'T DISCONNECT OTHER CABLES INSIDE THE LOGICAL CONTROL BOX.

3.5 FUNCTIONING

The JS_01 joystick station is equipped with a single joystick, an on / off button and an alarm button:



The LB_AC_02 control box allows you to control two thrusters from a maximum of 4 JS_02 positions



When switched on, the LBC_AC_01 or LBC_AC_02 control box scans all the joystick stations connected, by simultaneously lighting the blue and red LEDs on the buttons and emitting a sound signal via the internal buzzer, lasting two seconds. After this initial phase the system enters standby mode, in which all the joystick stations are disabled; in this condition the actuation of the joystick does not activate the thrusters.

To enable a station, you need to press the ON / OFF button until the blue LED lights up; then a beep is emitted, which indicates that the workstation has been enabled and it is therefore possible to release the button.

It is NOT possible to enable a workstation if the joystick is activated or if it is moved to the PORT or STARBOARD position. To enable a position, the joystick must be released and must be therefore in a central position.

When a station is enabled, it can be disabled by pressing the ON / OFF button again; alternatively, the station is automatically disabled if the joystick is not operated for 3 minutes.

A station can only be enabled if the others are not in motion i.e, if all the joysticks are in the rest position: it is therefore not possible to interrupt the maneuvering function in place from a location requesting activation by a different location.

By operating the joystick in the PORT direction or in the STARBOARD direction, a continuous proportional adjustment of the thruster speed is obtained from the standstill motor condition (central position of the joystick) up to the maximum speed condition.

When the direction of movement is changed, from PORT to STARBOARD or vice versa, a delay (interlock) of 2 seconds is introduced, during which the thruster is not activated: this allows to reduce to a minimum the currents generally produced by the motor due to a sudden turnaround

If the joystick is activated when the station is disabled, the red alarm LED is lit to indicate that the joystick is not operating the thruster. When the joystick is released, the red alarm LED is turned off.

3.6 ALARMS AND SIGNALS

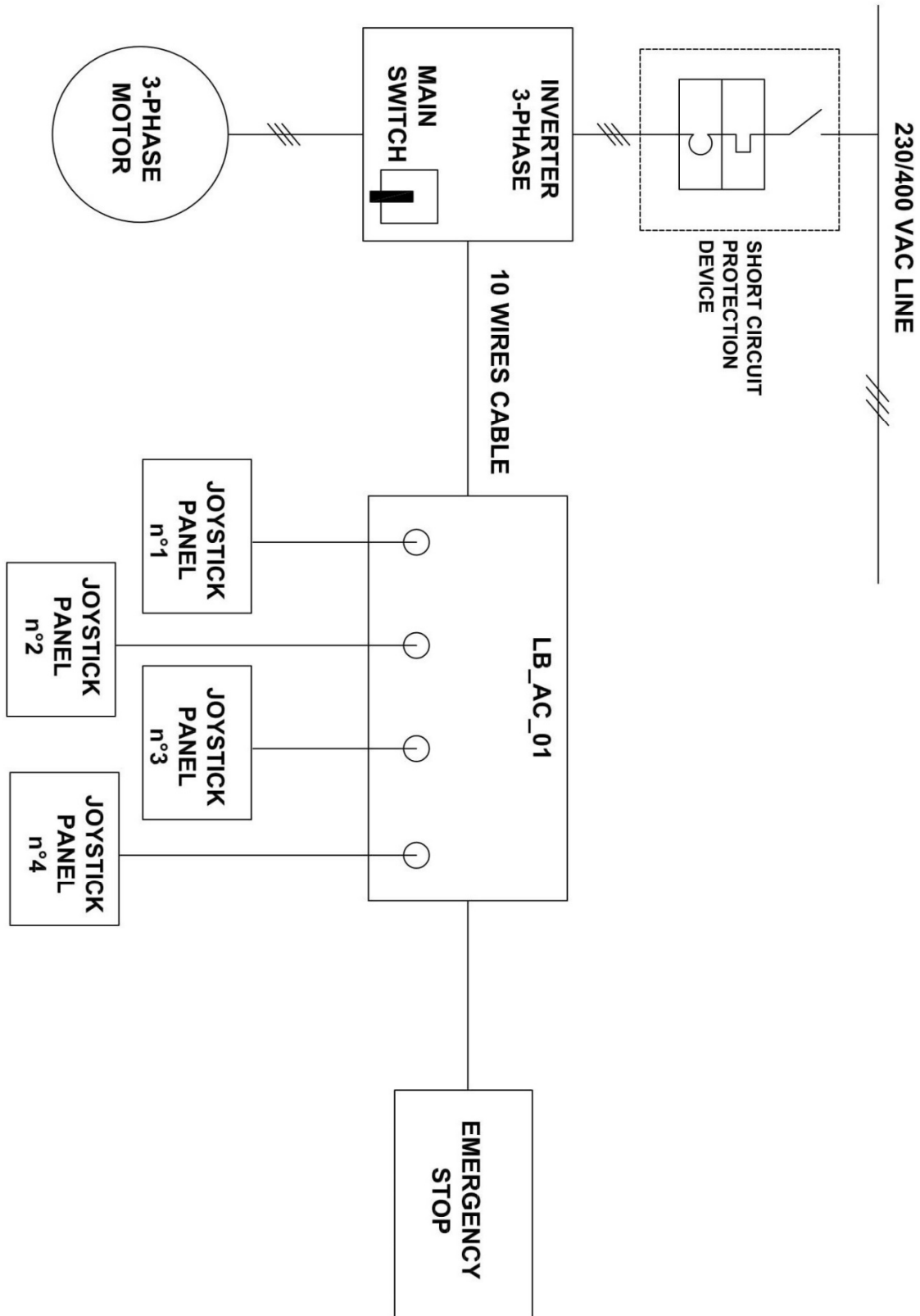
In case of alarm from inverter, inverter switched off, or due to an electrical failure of the inverter, the engine of the propellers is stopped and on all joystick control stations the red alarm LED blinks; an audible alarm is also sent out from the buzzer on the enabled control station.

The enabled joystick station can be recognized by the blue ON / OFF LED turned on.

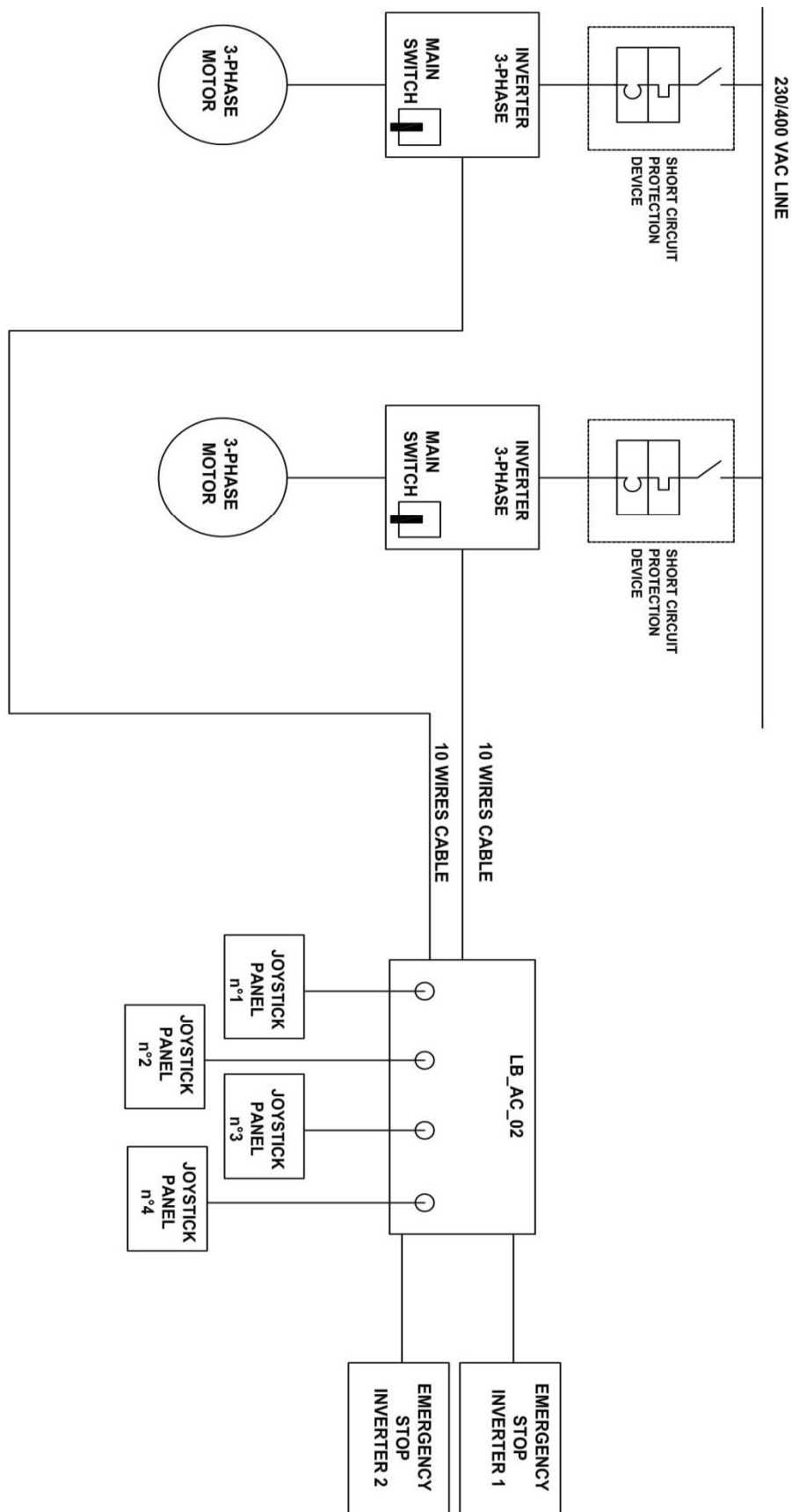
Pressing the ALARM / RESET button of the enabled station, the sound alarm ends, but the red leds of all the stations, even those disabled, continue blinking until the cause of the alarm has been removed; when this cause is removed, the red alarm LED turns off and all the stations are automatically disabled, bringing the system to standby status.

When the system is in alarm it is not possible to enable a control station different from the one enabled when the alarm started: the system therefore remains locked until the cause of the alarm has been removed.

3.7 SINGLE THRUSTER CONNECTION DIAGRAM



3.8 DOUBLE THRUSTER CONNECTION DIAGRAM



4.1 MAINTANANCE

As a part of the seasonal service of your Thruster before every season, always check that:

In Water

- The area around the thruster inside the boat is clean and dry. Ensure there are no signs of water/oil leaks.
- All electrical connections are clean and fastened firmly.
- Ensure that your batteries are in good condition.

Out of Water

- Check the propeller(s) or tunnel for any damage for example impact damage.
- The propeller(s) is fastened securely to the gear leg.
- Check all components of thruster are fastened securely.
- Clean the tunnel and gear leg from marine growth.
- Paint the propeller and gear leg with anti-fouling before every season to keep it clean from sea growth. **(NB: Never paint the anode, sealing or propeller shaft. Ensure paint does not enter the space between the propeller and the gear leg.)**
- Change the anode before every season, or when half the anode has eroded. Always use a sealant or thread glue on the holding screw to ensure that it does not fall off.
- (IF) your product uses an external oil tank, ensure the oil level remains the same.
- (IF) using an Ignition Protected thruster and there is a problem with your motor, please contact your dealer.

5.1 WARRANTY CONDITIONS

MZ Electronic S.r.l. warrants that in normal private pleasure boat usage and with proper maintenance its products will conform with their specification for a period of two years from the date of purchase by the end user, subject to the conditions, limitations and exceptions listed below. Any product which proves to be defective in normal usage during that two-year period, will be repaired or, as determined by MZ Electronic S.r.l., replaced.

CONDITIONS AND LIMITATIONS:

MZ Electronic S.r.l.'s liability shall be limited to repair or replacement of parts of the product which are defective in materials or workmanship.

MZ Electronic S.r.l. shall not be liable in any way for Product failure, or any resulting loss or damage that arises from:

- use of a product in an application for which it was not designed or intended
- corrosion, ultra violet degradation or wear and tear
- a failure to service or maintain the product in accordance with MZ Electronic S.r.l.'s recommendations faulty or deficient installation of the product
- any modification or alteration of the product
- conditions that exceed the product's performance specifications or safe working loads

Product subject to a warranty claim must be returned to the MZ Electronic S.r.l. outlet that supplied the product for examination unless otherwise approved by MZ Electronic S.r.l. in writing.

This warranty does not cover any incidental costs incurred for the investigation, removal, carriage, transport or installation of product.

Service by anyone other than authorized MZ Electronic S.r.l. representatives shall void this warranty.

MZ Electronic S.r.l.'s products are intended for use only in the marine environment. MZ Electronic S.r.l. accepts no liability arising from such other use.

EXCEPTIONS

Cover under this Warranty is limited to a period of one year from the date of purchase by the end user in the case of any of the following products or parts of products:

- Products used in commercial or charter applications

LIABILITY

MZ Electronic S.r.l.'s liability under this warranty shall be to the exclusion of all other warranties or liabilities (to the extent permitted by law). In particular (but without limitation): MZ Electronic S.r.l. shall not be liable for:

- Any loss of anticipated turnover or profit or indirect, consequential or economic loss
- Damages, costs or expenses payable to any third party
- Any damage to yachts or equipment
- Death or personal injury (unless caused by MZ Electronic S.r.l.'s negligence).

This warranty sets out your specific legal rights allowed by MZ Electronic; these may be varied by the laws of different countries. In addition, the purchaser may have other legal rights which vary from country to country.

PROCEDURE

Notice of a claim for service under this warranty shall be made promptly and in writing by the end user to the MZ Electronic S.r.l. outlet that supplied the product or to **MZ Electronic S.r.l. Via Bainsizza 2, 20900 Monza Italy**. Proof of purchase and authorization from MZ Electronic S.r.l. will be required prior to any repairs being attempted.

To be eligible for warranty protection, please either complete the form below at the time of purchase and return it to Mz Electronic. Or fill out the electronic warranty form on our website, www.mzelectronic.it.

Distributed and Manufactured by:

MZ Electronic S.r.l.

info@mzelectronic.it

www.mzelectronic.it

mze
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