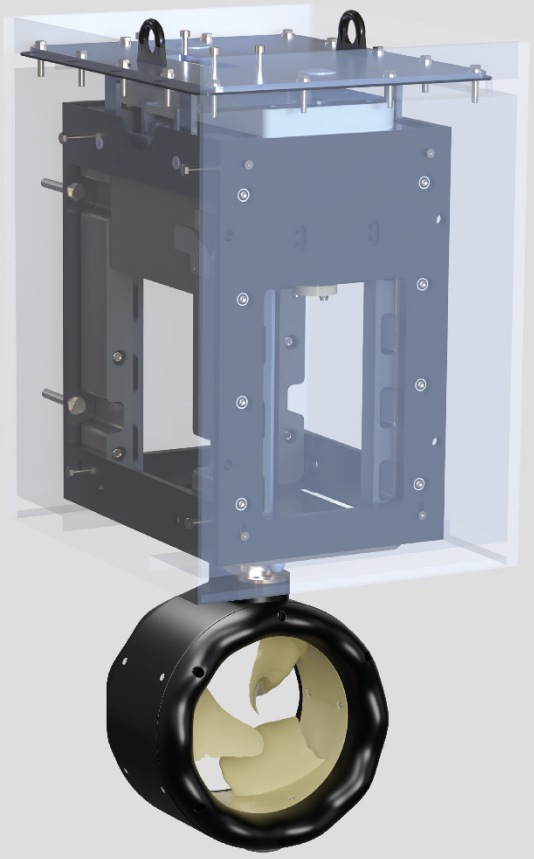
BLUENAV

English version

# Installation guide

## BlueSpin 15kW electric motor



BlueSpin Inhull

BlueSpin Outboard

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# 1. MANUAL INTRODUCTION

## 1.1 About

This manual contains installation instructions for the following motorization systems:

- BlueSpin 15 kW Outboard
- BlueSpin 15 kW Inhull

For practical reasons, it is not possible to include detailed information covering all possible alternatives for installation, operation or maintenance. The drawings and images in this manual are shown for explanatory purposes only.

In the event of differences of interpretation between the multilingual versions of the manual, the French version shall prevail. BlueNav is the sole right owner of the final interpretation of this manual.

The contents of this manual relate strictly to the installation of the BlueSpin system. The integration of the energy system (batteries, Battery Management System, chargers) is independent and described in the manuals supplied by their manufacturers.

In the event of any discrepancy between the products supplied and this manual, or in case of doubt, please visit www.bluenav.com or contact us at support@bluenav.com.

## 1.2 Intellectual Property

BlueNav retains the intellectual property and industrial property rights, including copyrights, patents, logos, diagrams, and drawings, of its products, publications and software.

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# 2. SECURITY

## 2.1 General safety instructions

This manual explains how to install the BlueSpin system in a simple and safe way. However, some specialized knowledge is required for working on or modifying the boat's hull. Call an expert if necessary.

Read the entire manual carefully before installing and operating the system. Failure to follow the instructions may result in serious property damage or personal injury. The BlueSpin system must be installed in accordance with the installation recommendations described in the documents supplied.

BlueNav accepts no responsibility for any damage caused by actions other than those described in this manual. Modifications to the hull of the boat should only be carried out by professional builders and architects. Compliance with local standards and regulations is mandatory.

Please observe the following general safety instructions:

| |
|---|
| The boat on which the BlueSpin system is installed must be stable. |
| The boat must be compatible with the installation and the use of the BlueSpin system, as verified beforehand during project commissioning. |
| To prevent corrosion and ensure lasting waterproofness, consider the hull material and provide the appropriate sealants and fastening materials. |
| Bores and holes in the hull can affect its structure and stability. Provide suitable fastening materials. |
| Use the appropriate lifting equipment to move heavy elements. |

## 2.2 Levels of safety instructions

Safety instructions are scaled at 3 levels. They are categorized according to risk severity if the instructions are not followed.

**DANGER!**

Immediate danger of death or of serious injury.

**WARNING!**

Danger of personal injury or of material damage.

BlueNav accepts no liability for any damage caused by actions not complying with these instructions.

Apart from the safety instructions, additional information is indicated by the following:

**NOTE**

Useful additional information: assembly advice, description of a component, specific recommendation, etc.

# 3. DELIVERED MATERIAL

## 3.1 Contents of delivery

| Element | Quantity | | | |
|---|---|---|---|---|
| | Outboard single-motor | Outboard twin-motor | Inhull single-motor | Inhull twin-motor |
| **Main Elements** | | | | |
| Propulsion Unit with cable harness:<br>- DRV cable<br>- SIG cable<br>- Yellow motor phase cable<br>- Orange motor phase cable<br>- Red motor phase cable<br>- TEMP1 cable<br>- TEMP2 (spare) cable | 1 | 2 | 1 | 2 |
| CCU (Communication and Control Unit) | 1 | 1 | 1 | 1 |
| Command Panel | 1 | 1 | 1 | 1 |
| Power Unit*<br>*Identified "portside" and "starboard" in case of twin-motor setup. | 1 | 2 | 1 | 2 |
| **Wiring** | | | | |
| "CCU Power Supply" cable | 1 | 1 | 1 | 1 |
| "Remote 1" cable | 1 | 1 | 1 | 1 |
| "Remote 2" cable | 0 | 1 | 0 | 1 |
| "PU Power Supply" cable | 1 | 2 | 1 | 2 |
| Green "THR_R" extension cable | 0 | 1 | 0 | 1 |
| White "THR_L" extension cable | 1 | 1 | 1 | 1 |
| Blue "VCU" cable harness<br>- "KILL SWITCH – M" cable x2<br>- "ON/OFF" cable<br>- "ELEC M" cable<br>- "DOCKING" cable<br>- "BUZZER" cable<br>- "JOYSTICK" cable | 1*<br>*Without the "DOCKING" cable | 1 | 1*<br>*Without the "DOCKING" cable | 1 |
| Protective covers for the bulkhead connectors of the Power Unit | 5 | 10 | 5 | 10 |

| | | | | |
|---|---|---|---|---|
| WEIPU SP21 connector for the TEMP1 & TEMP2 cables | 2 | 2 | 2 | 2 |
| Screws | | | | |
| M10 nylon shoulder washers | 4 | 8 | 0 | 0 |
| M4x8 countersunk head screws to fasten the Z bar on the Power Unit | 3 | 6 | 3 | 6 |
| M4x12 countersunk head screws to fasten the aluminum bar on the Power Unit | 3 | 6 | 3 | 6 |
| STS M6x4 A4 – 70 Torx screws for external covers | 16 | 32 | 0 | 0 |
| Accessories | | | | |
| Aluminum bar | 1 | 2 | 1 | 2 |
| Z bar | 2 | 4 | 2 | 4 |
| Centering template | 0 | 0 | 1 | 1 |
| Rear installation template | 1 | 1 | 0 | 0 |
| Side installation template | 1 | 1 | 0 | 0 |
| Watertight seal | 0 | 0 | 1 | 2 |

**NOTE**

Some cables, connectors and screws necessary for the installation are not supplied. To learn more, see p.12.

## 3.2 Storage conditions

If the BlueSpin system is not immediately installed, it must be stored in its transport packaging in a dry, clean and dust-free environment.

Please observe the following criteria:

- Ambient temperature between 5°C and 40°C;
- Relative humidity below 60%;
- No sudden changes in temperature, vibration, gas or corrosive agents;
- Maximum stackable weight on packaging does not exceed 220kg.

**WARNING!**

Always handle and move the BlueSpin vertically in its original packaging.

# 4. NON-DELIVERED MATERIAL REQUIRED

The BlueSpin system is designed to be installed into a boat already equipped with a thermal propulsion system. Due to the many different characteristics of each boat, some of the components required for the installation of the BlueSpin system are not supplied by BlueNav on delivery but must be present on board.

If you have any doubts about the compatibility of the material listed below, please contact BlueNav after-sales service.

## 4.1 DC/DC Converter with Remote entry

The converter is used to transform 48V voltage (from the batteries) into 12V to power the CCU. Each Power Unit in the BlueSpin system is wired to a converter. The CCU is also wired to each converter. See p.34-p.35.

The converter must meet the following requirements:

| Specifications | Value |
|---|---|
| Rated input voltage | 48V |
| Isolated rated output voltage | 12V |
| Output direct current | 30A |
| Remote on/off connector | Present |

Count one converter per Power Unit of the BlueSpin system.

## 4.2 CCU Power supply

A power supply of 12V DC - 1A is required on board to power the CCU. This power supply can be the service battery on board. See p.41 for the wiring procedure.

## 4.3 Multifunctional Display (MFD)

A Multifunctional Display (MFD) is required on board to display the BlueNav application. The BlueNav application is part of the HMI (Human-Machine Interface) that allows the user to steer the BlueSpin system. See p.40 for the wiring procedure.

## 4.4 NMEA 2000® Network

The boat's NMEA 2000® CAN bus network is used to transmit data between devices of different types and from different manufacturers, such as GPS, compass, wind, depth, AIS, speed or motor data. It is pre-existent to the BlueSpin system installation.

The CCU of the BlueSpin system must be wired to the backbone of the NMEA 2000® Network on board to guarantee good data communication. See p.39 for the wiring procedure.

## 4.5 Batteries

The BlueSpin system is an electrical propulsion system. Thus, it is powered by batteries. The batteries must meet the following requirements:

| Specifications | Value |
|---|---|
| Rated voltage | 48V |
| Current type | Direct current |
| Rated current | 300A |
| Discharge capacity | High |

Batteries are wired to the Propulsion Units of the BlueSpin system. Count 300A per motor of the BlueSpin system. See p.37 for the wiring procedure.

**NOTE**

BlueNav can provide advice for choosing batteries. Contact the after-sales service.

## 4.6 Unsupplied screws for mechanical installation.

| Equipment | Quantity | Corresponding Procedure | Outboard | Inhull |
|---|---|---|---|---|
| M10 type screw (INOX 14/A4 316L) | 4 | p.23 (step 5) | X | |
| M8 type screw | 14 | p.25 (step 6) | | X |
| M4 type screw | 3 | p.28 (step 1) | X | X |
| M6 type screw | 2 | p.28 (step 6) | X | X |
| M5 type screw | 2 to 6* | p.30 (step 1) | X | X |
| M5 type screw | 6 | p.30 (step 5) | X | X |

*Depends on the drilling environment.

**WARNING!**

All screws not supplied must be compatible with the mounting environment. In case of doubt, contact BlueNav after-sales service.

## 4.7 Unsupplied cables and connectors for wiring

The table below summarizes the items needed in addition to the hardware supplied, depending on the setup of the BlueSpin system ordered. See the wiring procedures for further details.

| Element | Quantity | | Corresponding Procedure |
|---|---|---|---|
| | Single-motor | Twin-motor | |
| Ethernet cable | 1 | 1 | See p.40 |

| | | | |
|---|---|---|---|
| NMEA 2000® Micro-C cable | 3 | 5 | See p.38 |
| CAN Bus T-connector | 2 | 3 | |
| 120 Ω CAN Bus female termination | 1 | 1 | |
| 120 Ω CAN Bus male termination | 1 | 1 | |
| Cable CAN Bus M12 F/M | 1 | 3 | See p.39 |
| +48V power cable | 1 | 2 | See p.37 |
| -0V power cable | 1 | 2 | |

## 4.8 Required tools for mechanical installation

This list is indicative and non-exhaustive. Additional tools may be required depending on the components not supplied (see p.11) and the specific characteristics of the boat on which the BlueSpin system is installed.

| Tool | Used for | Outboard | Inhull |
|---|---|---|---|
| Lifting table | Move the Propulsion Unit | X | X |
| Wedges | Support the Propulsion Unit during material handling on the lifting table | X | X |
| 8mm Allen wrench | Manually lower the turbine | X | X |
| Torque wrench | Screw with the correct torque | X | X |
| Sealing product* | Seal the holes in the hull | X | X |
| 70mm hole saw | Drill the cable entry in the hull | X | |
| 17mm clamping bush | Tighten the Propulsion Unit screws | X | |
| 17mm torque wrench | Tighten the Propulsion Unit screws | X | |
| 13mm clamping bush | Tighten the screws of the Propulsion Unit covers | X | |
| Phillips screwdriver | Tighten the screws of the Power Unit and of the Command Panel (11.2 and 12.4) | X | X |
| Flat head screwdriver | Unscrew the Junction Box caps. | X | X |

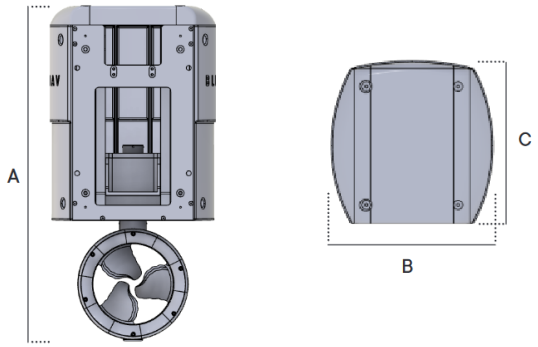
*Depends on the drilling environment.

# 5. TECHNICAL DATA

| | | |
|---|---|---|
| Propulsion Unit rated power<br>*The maximum power and the maximum motor rotation speed depend on the boat-motor-propeller combination. Depending on the use, maximum motor speed may not be reached.* | | 15kW |
| Propulsion Unit thermic outboard equivalent (estimation) | | 25hp |
| Rated voltage | | 48V DC |
| Rated current | | 300A |
| Maximum current | | 350A |
| Maximum motor rotation speed | | 1500rpm |
| Type of motor temperature sensor / Number | | PT1000 / 2 |
| Length of the cable harness coming from the Propulsion Unit (SIG, DRV, TEMP1, TEMP2, yellow motor phase, orange motor phase, red motor phase) | | 2.5m |
| Length of “CCU Power Supply” and “PU Power Supply” cables | | 3m |
| Length of “Remote 1” and “Remote 2” cables | | 6m |
| Length of white “THR_L” and green “THR_R” extension cables | | 2m |
| Weight of the Propulsion Unit | Outboard | 78kg |
| | Inhull | 74,4kg |
| Weight of the CCU | | 1.1kg |
| Weight of the Command Panel | single-motor | 1.1kg |
| | twin-motor | 1.8kg |
| Weight of the Power Unit | | 15,6kg |
| Turbine Protection Index | | IP68 - seawater resistant |
| Command System | | Push buttons<br>Direction joystick<br>Left / Right throttles |

# 6. PRODUCT DIMENSIONS

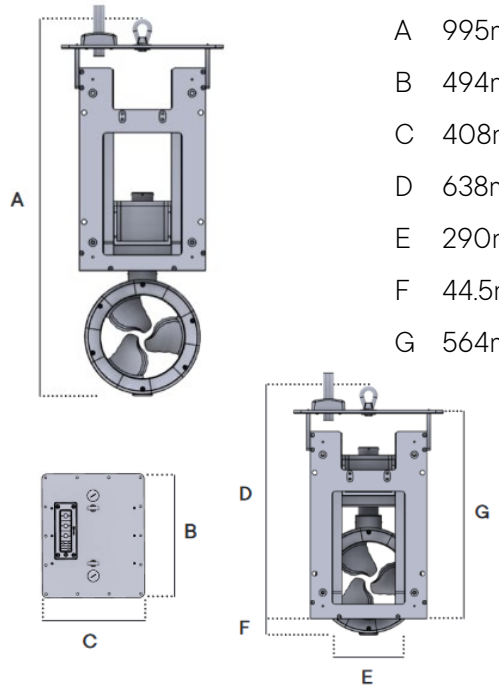
## Dimensions of the Outboard Propulsion Unit




| | |
|---|---|
| A | 921mm |
| B | 465mm |
| C | 448mm |
| D | 565mm |
| E | 290mm |
| F | 44.5mm |

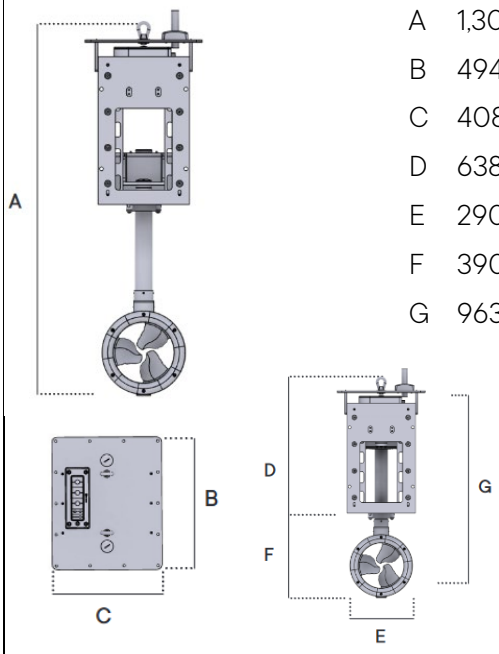
## Dimensions of the Inhull Propulsion Unit

### Classic version



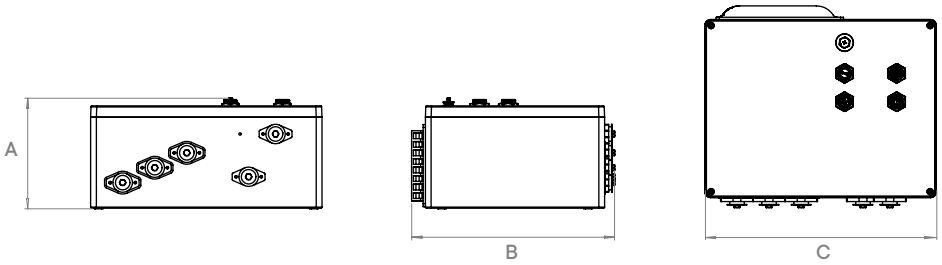

| | |
|---|---|
| A | 995mm |
| B | 494mm |
| C | 408mm |
| D | 638mm |
| E | 290mm |
| F | 44.5mm |
| G | 564mm |

### Extra-long version



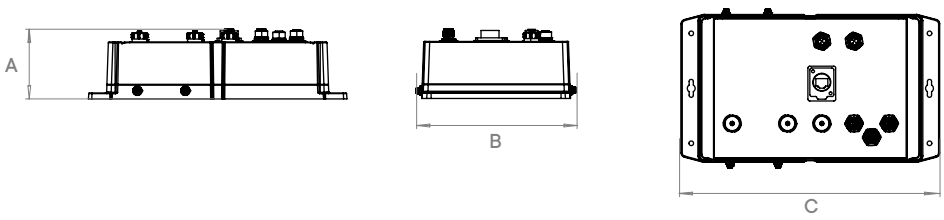

| | |
|---|---|
| A | 1,308mm |
| B | 494mm |
| C | 408mm |
| D | 638mm |
| E | 290mm |
| F | 390mm |
| G | 963mm |

## Dimensions of the Power Unit



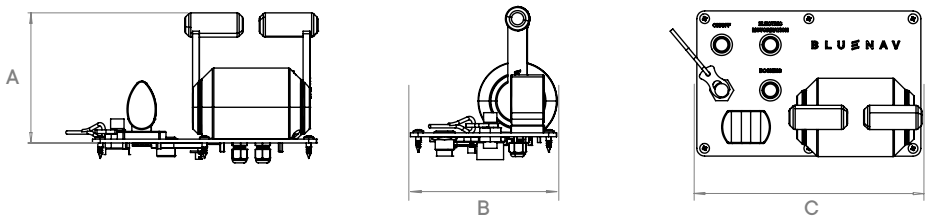

A 200mm
B 360mm
C 404mm

## Dimensions of the CCU




A 80mm
B 161mm
C 280mm

## Dimensions of the Command Panel (twin-motor)




A 135mm
B 150mm
C 230mm

# 7. PRODUCT DESCRIPTION

The BlueSpin system is an electrical propulsion system designed to be used as a secondary motor to hybridize a boat's pre-existing thermic propulsion.

It is available in two models:

- The **Outboard** BlueSpin 15 kW: outboard motor.
  - single-motor version
  - twin-motor version
- The **Inhull** BlueSpin 15 kW: installed within the hull, in a well.
  - single-motor version
  - twin-motor version

The features of the Inhull BlueSpin system are identical to the Outboard BlueSpin system. Only the external aspect and the installation instructions of the Propulsion Unit change.

The two models are equipped with a retractable RIM Drive propeller. When in use, the RIM Drive propeller is lowered through the underside of the Propulsion Unit. After use, the RIM Drive propeller retracts within the Propulsion Unit.

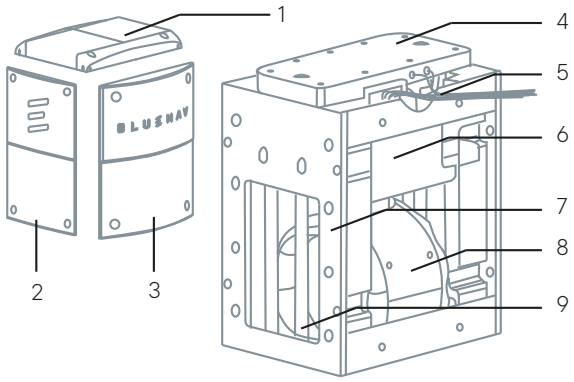
**NOTE**

The diagrams in this installation manual can depict the RIM Drive propeller as lowered (in "using mode") for illustration or explanation purposes only. When the system is delivered, the RIM Drive propeller of the Propulsion Unit is retracted by default.

The BlueSpin system, whether it's an Outboard or an Inhull model, consists of the following components:

| Elements | Quantity | |
|---|---|---|
| | single-motor | twin-motor |
| Propulsion Unit | 1 | 2 |
| Power Unit | 1 | 2 |
| CCU (Communication and Control Unit) | 1 | 1 |
| Command Panel | 1 | 1 |

## 7.1 Outboard Propulsion Unit




1 Upper side cover
2 Rear side cover
3 Lateral side cover
4 Junction box
5 Cable entry
6 Gyration box
7 Chassis
8 RIM Drive propeller
9 Trapezoidal screw

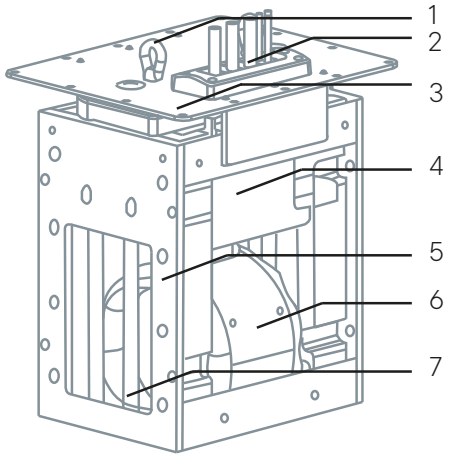
The Outboard Propulsion Unit of the BlueSpin system is designed for an outboard installation, against the hull (see p.21).

The Outboard Propulsion Unit can be screwed on its front side or on one of its lateral sides.

The Outboard Propulsion Unit is equipped with covers. Those covers must be drilled before the installation (see p.22) to create a cable entry.

The Outboard Propulsion Unit is compatible with a 0-14° hull angle.

## 7.2 Inhull Propulsion Unit




1 Lifting eye
2 Watertight cable entry
3 Sealing plate
4 Gyration box
5 Chassis
6 RIM Drive propeller
7 Trapezoidal screw

The Inhull Propulsion Unit of the BlueSpin system is designed to be installed within a well. This well is installed beforehand in the hull (see p.25).

The Inhull Propulsion Unit is equipped with a sealing plate on its upper side. The sealing plate has a cable entry. The sealing plate is equipped with lifting eyes to move the Propulsion Unit.

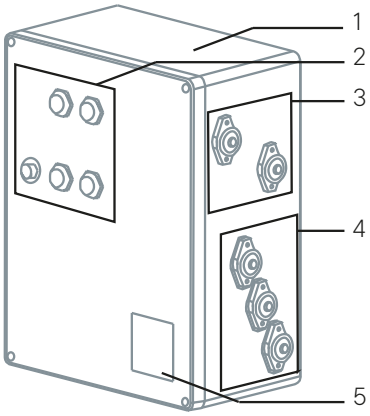
The Inhull Propulsion Unit is available in a classic version and in an extra-long version.

The extra-long version has a longer shaft. See p.15.

**NOTE**

Contact our technical teams for a suitable installation if necessary.

## 7.3 Power Unit

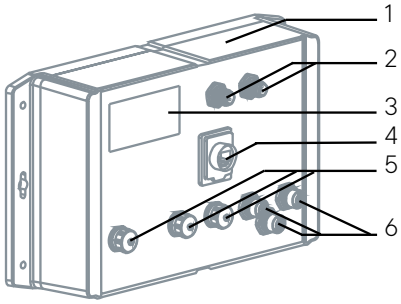



1 Box
2 Command connectors
3 48V DC bulkhead connectors
4 Motor phase bulkhead connectors
5 Number plate

The detailed description of the connectors is given at p.32.

The Power Unit enables the control of the motors within the Propulsion Unit.

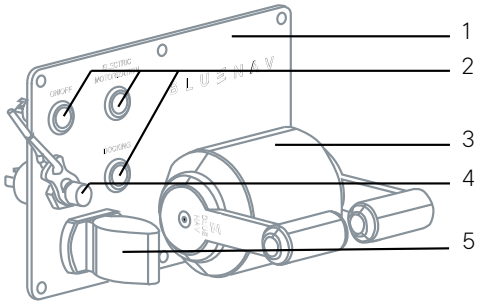
## 7.4 CCU (Communication and Control Unit)




1 Box
2 M12 male connectors
3 Number plate
4 RJ45 female connectors
5 M12 female connectors
6 WEIPU male connectors

The Communication and Control Unit (CCU) is a control system and a communicative gateway. It transmits data through the NMEA 2000® network (see p.11).

## 7.5 Command Panel




1 Panel of the Command Panel
2 Push buttons
3 Throttles
4 Cut-off switch
5 Direction joystick

The Command Panel is used to switch on and activate controls.

The Command Panel is supplied with two cables prewelded on the rear connectors THR_L (identified in white) and THR_R (identified in green). Cable extensions are connected to the prewelded cables to facilitate the wiring with the CCU (see p.41).

In case of a single-motor BlueSpin system, the Command Panel is equipped with a simple throttle.

# 8. MECHANICAL INSTALLATION REQUIREMENTS

## 8.1 General requirements

The precise dimensions of the different elements supplied by BlueNav are available p.15. Make sure that these dimensions are compatible with the installation environment.

For the material that is required but not supplied, see p.11.

Observe the safety instructions to ensure a safe and correct installation of the BlueSpin system. See p.7.

**⚠ DANGER!**

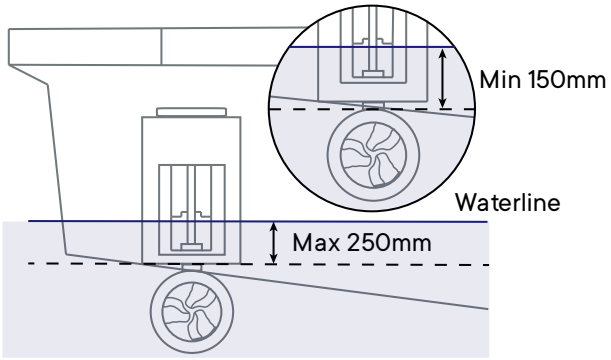
The boat and all its components must be isolated from electrical sources.
The mechanical installation work must be carried out on land only. The boat must be out of water.

**⚠ WARNING!**

The BlueSpin system requires an on-board power supply. Plan the position of the elements of the BlueSpin system so as not to affect sensitive electrical equipment (e.g. radios) or measuring instruments (e.g. compasses). Relocate those devices if necessary.

## 8.2 Position of the Propulsion Unit

The Propulsion Unit of the BlueSpin system is positioned against or within the hull, according to the following requirements:




- The chassis of the Propulsion Unit does not protrude from the hull of the boat;
- The chassis of the Propulsion Unit is immersed underwater at a maximum of 250mm from its lowest point;
- In lowered position, the RIM Drive propeller is completely under the hull and underwater;
- In retracted position, the RIM Drive propeller does not protrude from the hull.

Regarding the Outboard Propulsion Unit, the installation template (Rear or Side) must be placed against the hull to identify the drilling position.

Regarding the Inhull Propulsion Unit, the installation well (see p.25) must comply with these requirements.

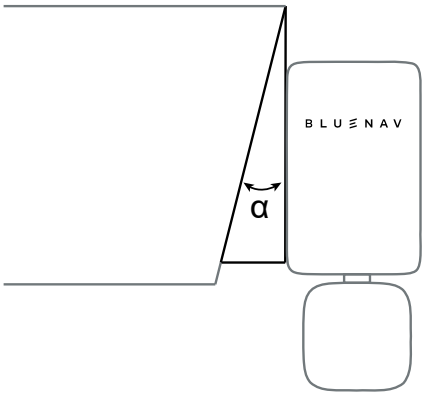
# 9. INSTALLATION OF THE OUTBOARD PROPULSION UNIT

The Outboard Propulsion Unit is installed outboard, against the hull of the boat.

**⚠ WARNING!**

Never let the Propulsion Unit rest on the RIM Drive propeller. Use shims to ensure that the Propulsion Unit rests on its chassis. The RIM Drive propeller must not be subjected to any weight.

## 9.1 Verticality rework



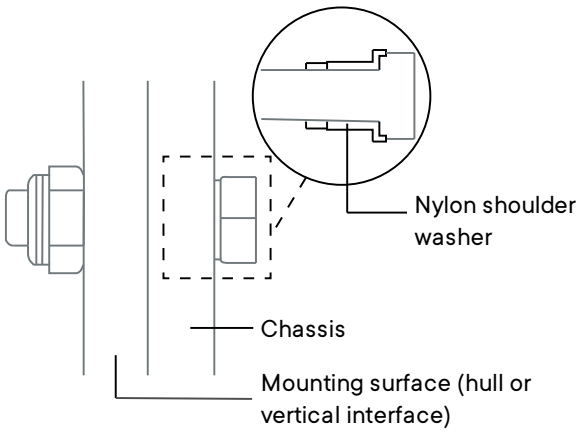

α : vertical recovery angle

The Outboard Propulsion Unit must be mounted on a flat and vertical surface of the hull. The mounting surface should be as vertical as possible.

If the mounting surface is not perpendicular to the waterline, create a wedge so that the chassis can be vertical.

The material of the wedge depends on the mounting environment. If the wedge is made of stainless steel, use M12 nylon shoulder washers between the Propulsion Unit and the wedge to prevent metal-on-metal contact.

## 9.2 Galvanic protection




Galvanic corrosion is a common phenomenon in metallic structures that causes significant damage. This electrochemical reaction occurs when two dissimilar metals come into contact in a conductive environment such as a liquid, a soil or within atmospheric humidity.

The chassis of the Propulsion Unit is made of anodized aluminum. To avoid corrosion, BlueNav supplies nylon shoulder washers for mounting the motors as shown.

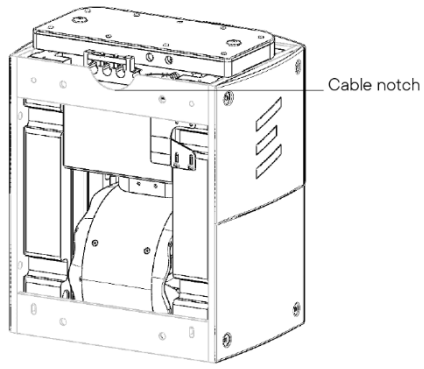
The screws used to secure the chassis are of the following types: M10 INOX 14/A4 316L (see p.12).

**⚠ WARNING!**

If the hull is in a metal other than aluminum, plan a galvanic protection between:

- The hull and the chassis;
- The hull and the screws.

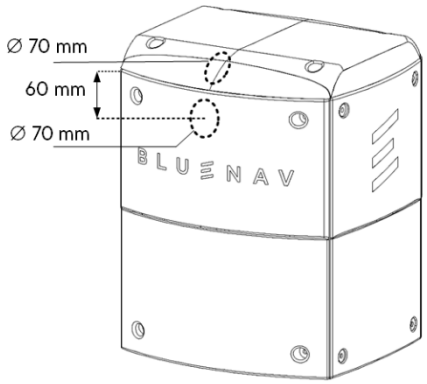
## 9.3 Drilling of the external covers of the Propulsion Unit (cable entry)




The length of the cable harness from the Propulsion Unit is 2.5m. This cable harness is used to wire the Propulsion Unit to its corresponding Power Unit (see p.36).

The Power Unit is installed within the hull of the boat. To wire the BlueSpin system in an Outboard setup, it is necessary to drill the hull of the boat and one of the external covers of the Propulsion Unit.

Each boat has its own specific configuration. The drilling of the cable entry must be considered on a case-by-case basis.




Depending on the mounting environment and on the boat configuration, two possibilities for cover drilling are available:

- Upper side cover drilling;
- Lateral side cover drilling.

The drilling is carried out using a Ø70mm diameter hole saw on the side of the cutout of the chassis for the cable outlet. See p.23.

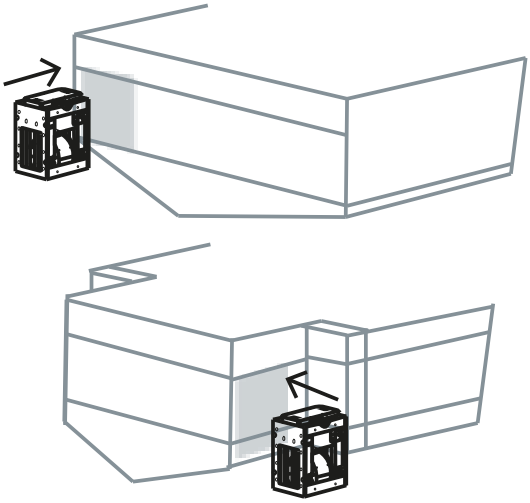
**⚠ WARNING!**

The drilling must meet the following requirements:

- The cable harness must be able to pass through the hull without being twisted;
- It must be possible to seal the cable entry during the installation process.

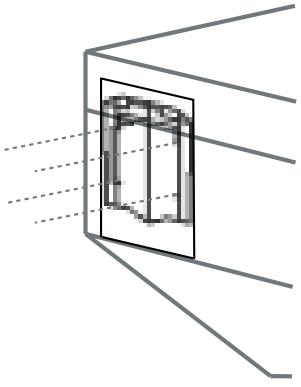
## 9.4 Mounting procedure of the Outboard Propulsion Unit

1. Identify the mounting side (Rear or Side) of the Propulsion Unit depending on the configuration of the boat. The surface on which the mounting side of the Propulsion Unit is mounted must be flat with a tolerance of 2mm/m (see p.21)

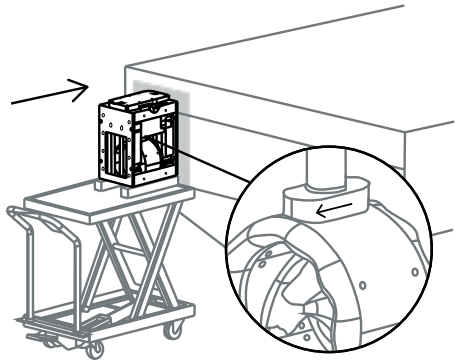


- If the chosen side of the Propulsion Unit is the lateral side, use the “Side” installation template for the next step.
- If the chosen side of the Propulsion Unit is the front side, use the “Rear” installation template for the next step.

2. Using the installation template and a drill, drill 4 holes for M10 screws on the mounting interface (hull or wedge).



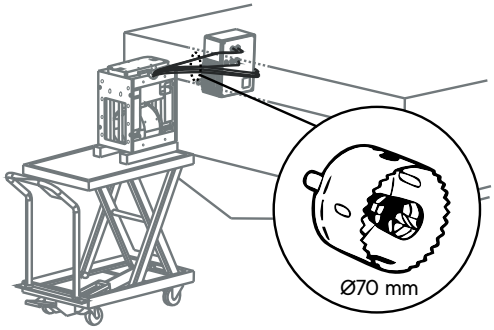
3. Put the Propulsion Unit in front of the mounting interface. Respect the direction of the RIM Drive propeller. The arrow on the baseplate must point backwards.



**⚠ WARNING!**

Never let the Propulsion Unit rest on the RIM Drive propeller. Use shims to ensure that the Propulsion Unit rests on its chassis. The RIM Drive propeller must not be subjected to any weight.

4. Mark the desired cable entry point in the hull (see p.22). Using a Ø70mm hole saw, drill the hull according to this parameter.



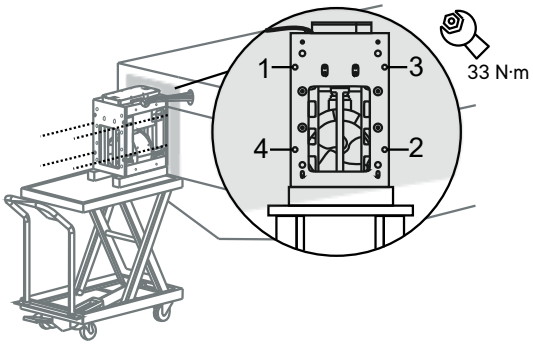

The cable harness can be guided through the hole drilled at this stage or afterwards. All cables must be straight and not twisted.

When making the cable harness go through, put the TEMP1 and TEMP2 cables first, then the yellow, orange and red phase motor cables.

**⚠ WARNING!**

Always seal the cable entry after wiring the Propulsion Unit/Power Unit (see p.36).

5. Using a minimum torque of 33N·m and using M10 screws, screw in the following order.

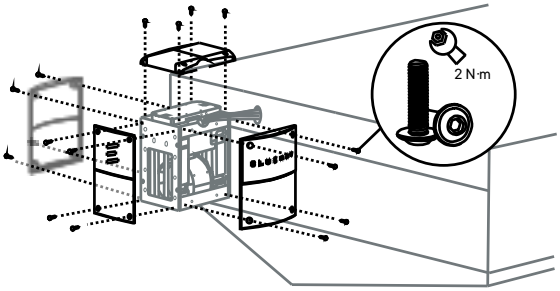



**⚠ WARNING!**

Use only A4 / 316 L stainless steel screws (M10). Adapt the screwing to the mounting surface.

To enable the screwing of the external covers on the chassis, the diameter ∅ of the screws for the mounting side of the Propulsion Unit must not exceed 22mm.

6. Using M6x40 truss head screws and a tightening torque of 2N·m, screw the covers onto the Propulsion Unit.




**⚠ WARNING!**

The covers are in HDPE. Do not over-tighten. This can damage the screw threading.

# 10. INSTALLATION OF THE INHULL PROPULSION UNIT

The Inhull Propulsion Unit is designed to be installed within a well, within the hull of a boat.

The position and dimensions of the well must allow the Inhull Propulsion Unit to comply with the position requirements (see p.20).

## 10.1 Well creation

**⚠ WARNING!**

The creation of the well generates structural modifications of the boat. It must be carried out by professionals only.

The well of the Inhull Propulsion Unit is created beforehand and complies with the structural requirements of the boat. These requirements are discussed beforehand during the project commissioning phase. See the information provided by BlueNav teams at this stage.

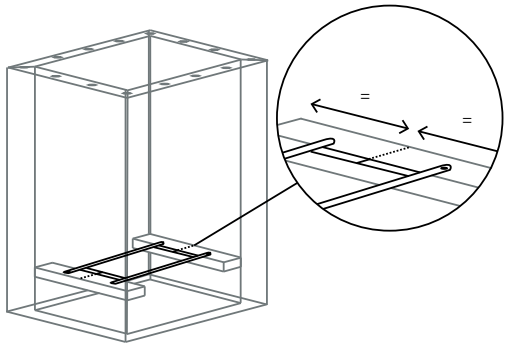
The blueprint for the creation of the well is available in the appendix p.43.

The well of the Inhull Propulsion Unit must:

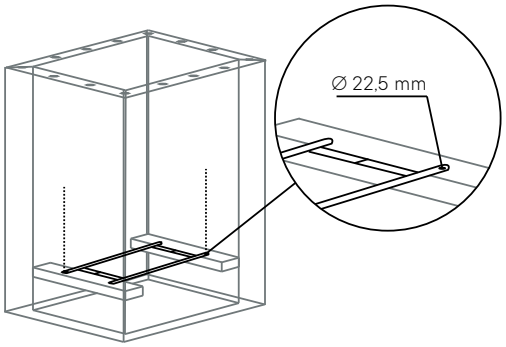
- Comply with the positioning requirements of the Propulsion Unit described in p.20 ;
- Be made in a watertight material;
- Allow the RIM Drive propellers to turn and lower fully when the system is in use.

## 10.2 Mounting procedure of the Inhull Propulsion Unit

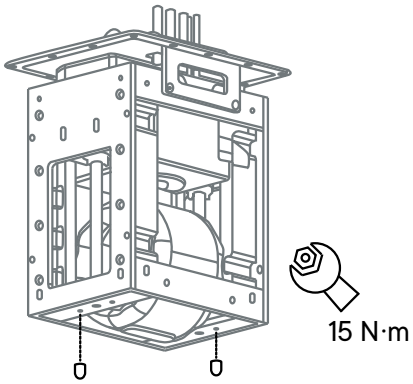
1. Using the centering mark, center the drilling template on the shims of the well.



2. Using the template, mark the 2 drilling locations. Drill a ∅22.5mm hole on each shim.



3. In compliance with the holes drilled on the shims of the well in the previous step, screw the centering pins on using a 20mm open-end wrench (15N·m torque) on the underside of the chassis. The centering pins are available in a kit and are screwed on using M8x25 BTR (Allen) screws.



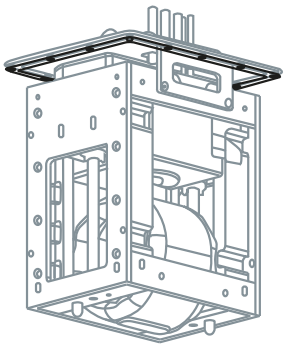

**⚠ WARNING!**

Use the lifting eyes on the sealing plate to handle the Propulsion Unit.

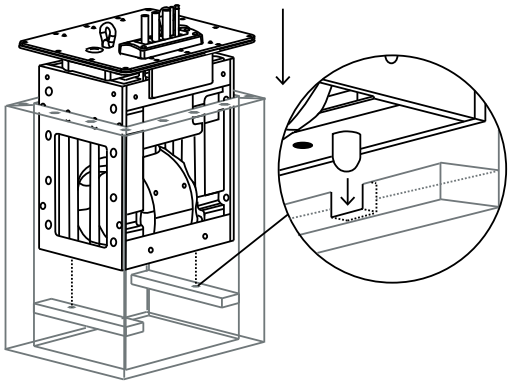
Never let the Propulsion Unit rest on the RIM Drive propeller. Use shims to ensure that the Propulsion Unit rests on its chassis. The RIM Drive propeller must not be subjected to any weight.

When screwing, apply a medium-strength thread-locker (Loctite 243 or equivalent). To facilitate the installation, two pin mounting positions are available on both sides of the chassis.

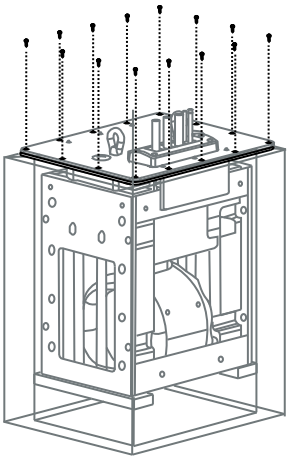
4. Position the flat gasket under the sealing plate of the Propulsion Unit. Line up the holes of the seal with the holes of the sealing plate.



5. Using the lifting eyes, guide the Propulsion Unit down into the well. The centering pins fit in the drilled holes.



6. Screw the sealing plate to the watertight rim of the well with 14 M8 screws. The tightening torque depends on the M8 screws selected and the mounting environment.



**⚠ WARNING!**

Check that the flat gasket is correctly positioned between the sealing plate of the Propulsion Unit and the watertight rim of the well:

- The holes of the gasket must be aligned;
- The gasket must be pressed against the watertight rim of the well.

Incorrect installation is detrimental to motor mounting and sealing.

# 11. INSTALLATION OF THE POWER UNIT

The Power Unit is designed to be installed within the hull of the boat.

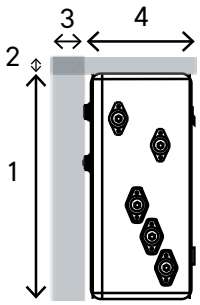
The Power Unit should be installed:

- As close as possible to the corresponding Propulsion Unit to allow wiring (see p.36). The motor power and control cables have a standard length of 2.5m. Check that the chosen location is compatible with this length.
- Dry and sufficiently ventilated to avoid humidity.
- Protected from water splashes.
- Accessible for future maintenance.

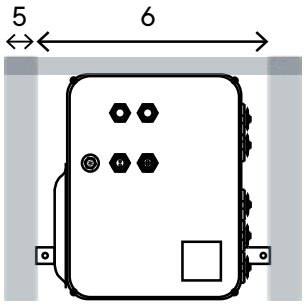
The Power Unit can be installed horizontally or vertically, provided the above requirements are met. However, vertical installation is recommended. The mounting procedure remains identical. See p.28.

## 11.1 Space taken by the Power Unit

During the installation of the Power Unit, comply with the following dimensions:




1 404mm
2 **20mm minimum**
3 **100mm minimum**
4 194mm



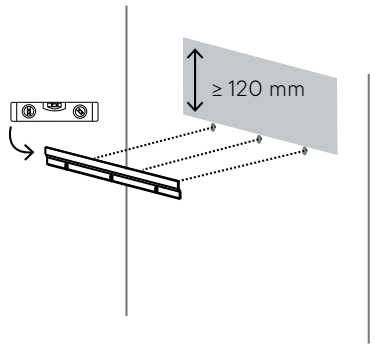

5 **100mm minimum**
6 420mm

**⚠ WARNING!**

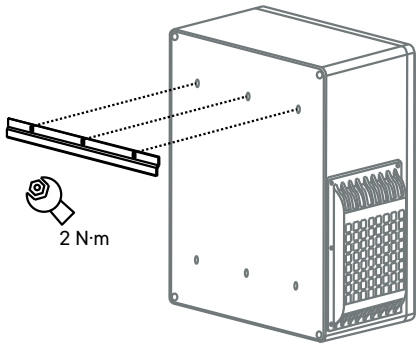
If the BlueSpin system is a twin-motor system, each Power Unit is identified “port side” and “starboard”. **Each Power Unit must be installed on board according to their position identification.** Each Power Unit is wired to its corresponding Propulsion Unit.

## 11.2 Mounting procedure of the Power Unit

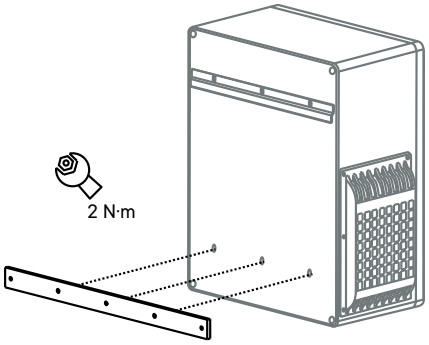
1. Using the level, screw the Z bar horizontally onto the hull. Use screws adapted for the mounting surface. Count 120mm of free space above the Z bar.



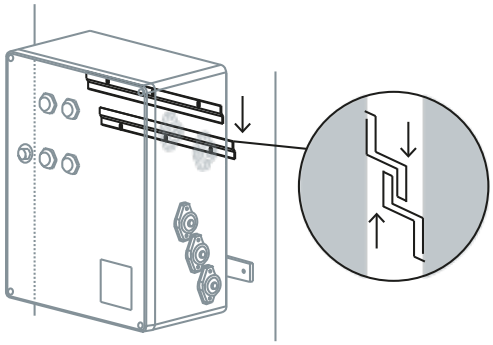

2. Using the 3 M4x8 screws and a 2 N·m torque, screw the Z bar onto the rear side of the Power Unit in the drilled holes.



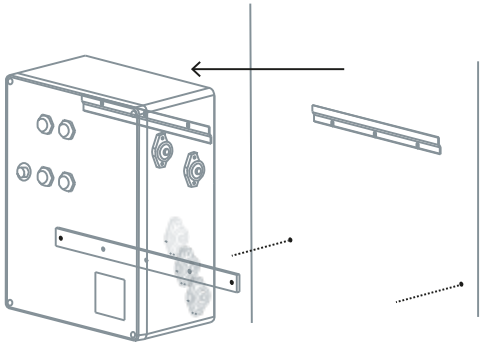

3. Using the 3 M4x12 screws and a 2 N·m torque, screw the aluminum bar onto the rear side of the Power Unit in the drilled holes.



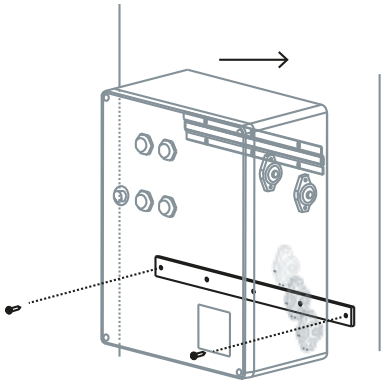

4. Clip the Z bar of the Power Unit onto the Z bar of the mounting surface.



5. Identify the drilling points of the aluminum bar on the mounting surface. Drill ∅6mm screwing holes in diameter.



6. Screw the aluminum bar onto the mounting surface. Use ∅6mm diameter screws adapted for the mounting surface.



# 12. INSTALLATION OF THE COMMAND PANEL AND THE CCU

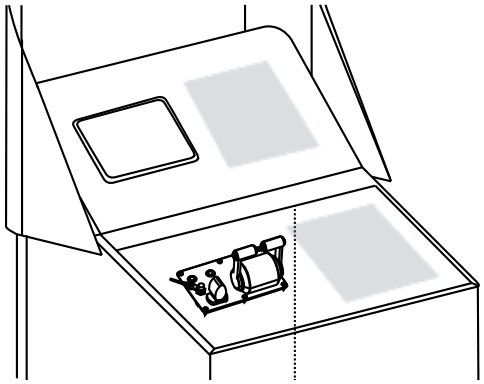
## 12.1 Position of the CCU

The CCU is designed to be wired to a power supply of 12V DC on board. It acts as a gateway between the BlueSpin system, the NMEA 2000® Network on board and the converter. Its position is determined depending on the length of the supplied cables and the unsupplied cables. See p.34 and p.35.

To reduce the risks of electromagnetic interference, install the CCU as far away as possible from motors, generators, PODs or power cables.

Do not place the CCU in contact with a metal plate or compartment.

## 12.2 Position of the Command Panel

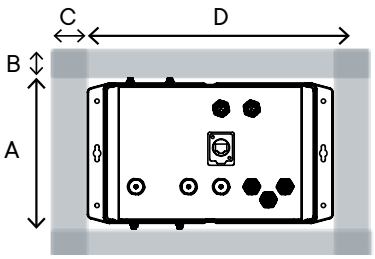


The Command Panel must be installed on the steering station, close to the multifunctional display, as shown.

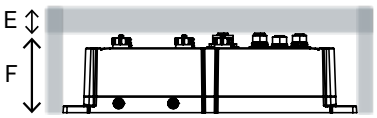
The installation of the Command Panel depends on the length of the cables supplied. Install the Command Panel as close as possible to the CCU.

## 12.3 Space taken by the Command Panel and the CCU

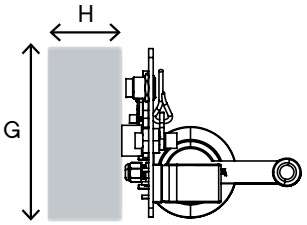
Respect the dimensions below for the installation of the Command Panel and of the CCU.




A 161mm
B **150mm minimum**
C **150mm minimum**
D 280mm



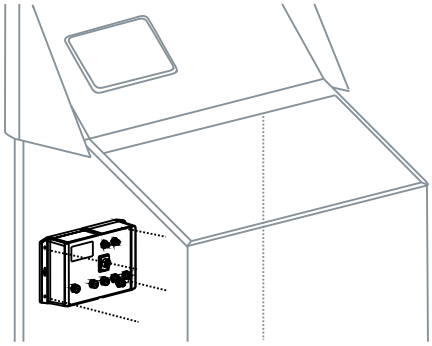

E **50mm minimum**
F 80mm



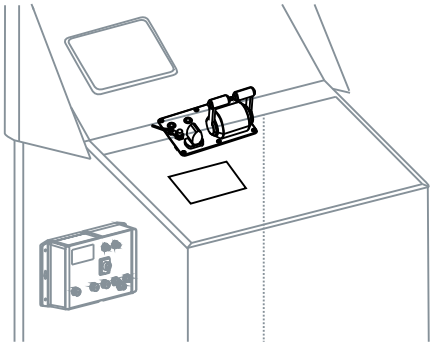

G 150mm
H **80mm minimum**

## 12.4 Mounting procedure of the Command Panel and of the CCU

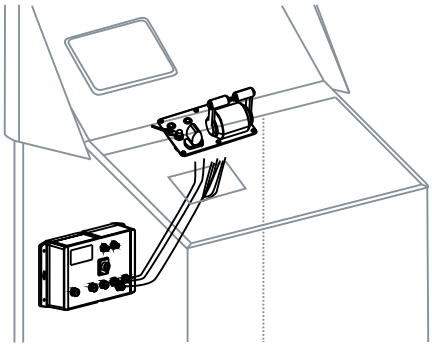
1. Screw the CCU close to the multifunctional display and to the Command Panel. Use M5 screws adapted for the mounting surface. See p.12.



2. On the steering station, drill a suitable cable entry space for the wiring of the Command Panel using the drilling blueprint available in the appendix p.44.



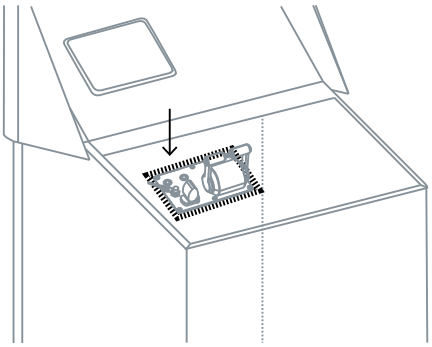
3. Wire the Command Panel and the CCU. See p.41.



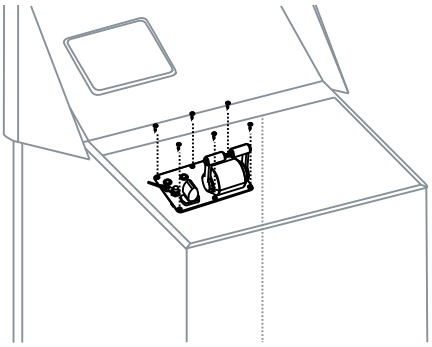
**⚠ WARNING!**

Ensure the wiring is correct before step 4.

4. Once the wiring is done, seal around the panel and screw holes. The product to be used depends on the mounting environment.



5. Screw the panel of the Command Panel. Use M5 screws adapted for the mounting surface. See p.12.



# 13. WIRING

The BlueSpin system is designed to operate with a nominal voltage of 48V DC. The system is supplied ready for wiring:

- On pre-existing components on board: see p.11.
- Between each component of the BlueSpin system.

The cables supplied are identified by a label or a color. See p.9 for a description of the cables supplied.

BlueNav does not supply all the cables, connectors and terminators required for wiring the entire BlueSpin system. This applies to items already owned by the customer or items that require a specific cable length because of the configuration of the boat. See p.12.

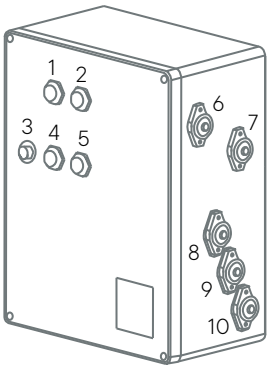
See the overall wiring diagram for a wiring overview (p.34 and p.35).

**DANGER!**

Always work with the power switched off and with suitable electrical protection equipment.
Use a correct size of cables, suitable for marine environments.

## 13.1 Identification of the connectors of the Power Unit

To facilitate the wiring procedures of the Power Unit, see the identification table below.

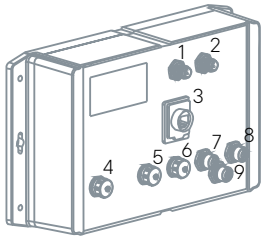



| N° | Name/color of the connector if identified | Name or type of cable | Wired to... | Detailed procedure |
|---|---|---|---|---|
| 1 | ∅ | DRV (supplied) | Propulsion Unit | p.36 |
| 2 | ∅ | SIG (supplied) | Propulsion Unit | p.36 |
| 3 | ∅ | CAN Bus cable (not supplied) | CCU | p.38 |
| 4 | ∅ | PU Power Supply (supplied) | 48/12V – 30A Converter | p.37 |
| 5 | ∅ | TEMP1 (supplied) | Propulsion Unit | p.36 |
| 6 | +48V bulkhead connector | +48V power cable (not supplied) | Batteries | p.37 |
| 7 | -0V bulkhead connector | -0V power cable (not supplied) | Batteries | p.37 |
| 8 | Yellow bulkhead connector | Yellow phase motor cable (supplied) | Propulsion Unit | p.36 |
| 9 | Orange bulkhead connector | Orange phase motor cable (supplied) | Propulsion Unit | p.36 |
| 10 | Red bulkhead connector | Red phase motor cable (supplied) | Propulsion Unit | p.36 |

The details regarding the cables not supplied are available at p.12.

## 13.2 CCU connectors identification

To facilitate the CCU wiring procedures, see the identification table below.

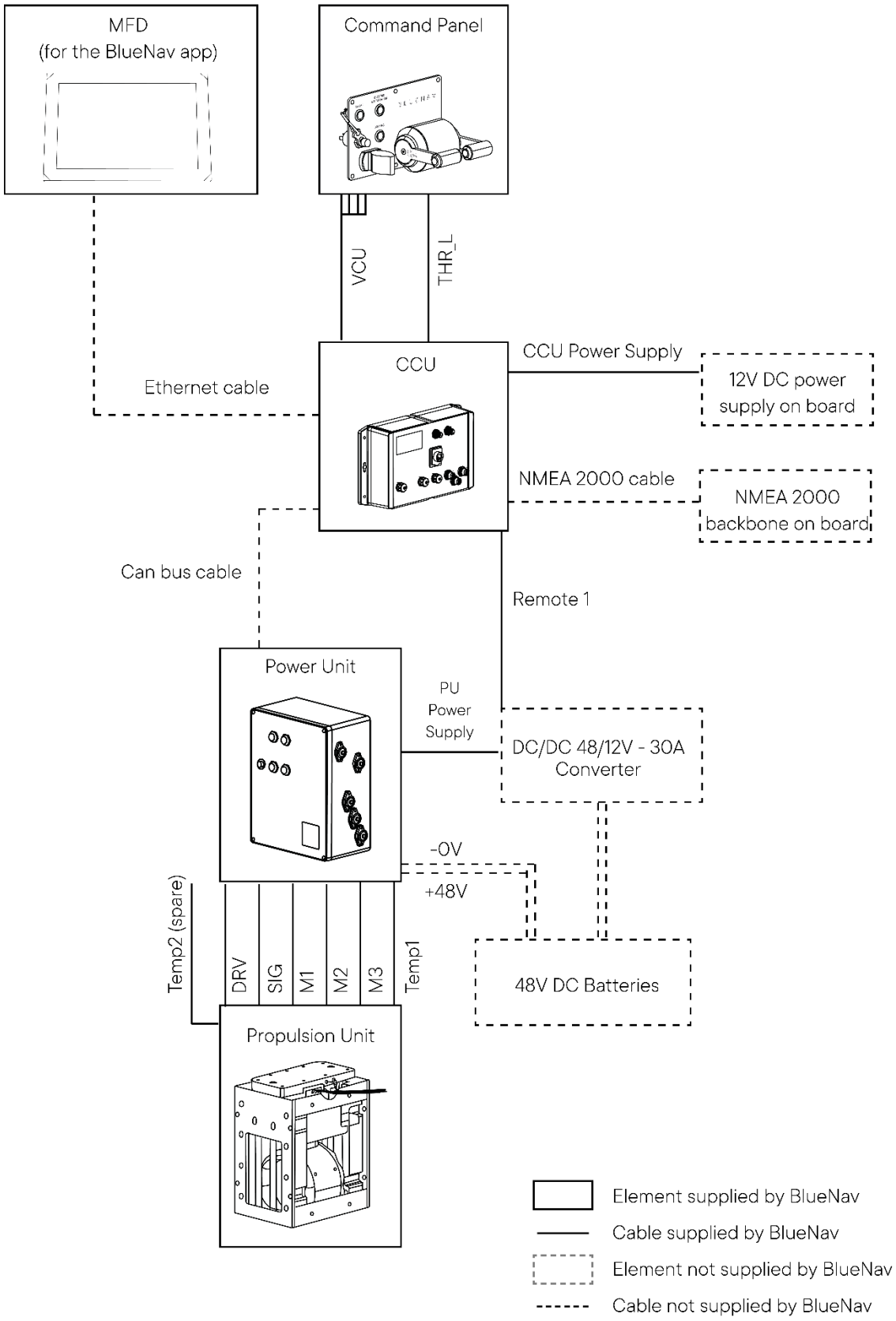



| N° | Name/color of the connector | Name or type of cable | Wired to... | Detailed procedure |
|---|---|---|---|---|
| 1 | NMEA 2000® | NMEA 2000® cable (not supplied) | Backbone of the NMEA 2000® network on board | p.39 |
| 2 | CAN PROP | CAN cable (not supplied) | Power Unit | p.38 |
| 3 | Ethernet | Ethernet cable (not supplied) | Multifunctional Display (MFD) | p.40 |
| 4 | POWER SUPPLY | CCU Power Supply (supplied) | 12V – 1A power supply on board | p.41 |
| 5 | REMOTE 1 | Remote 1 (supplied) | Portside DC/DC 48/12V converter | p.40 |
| 6 | REMOTE 2* | Remote 2 (supplied) | Starboard DC/DC 48/12V converter | p.40 |
| 7 | Green connector* | Green “THR_R” cable extension (supplied) | Command Panel | p.41 |
| 8 | White connector | White “THR_L” cable extension (supplied) | Command Panel | p.41 |
| 9 | Blue connector | Blue “VCU” cable harness (supplied) | Command Panel | p.41 |

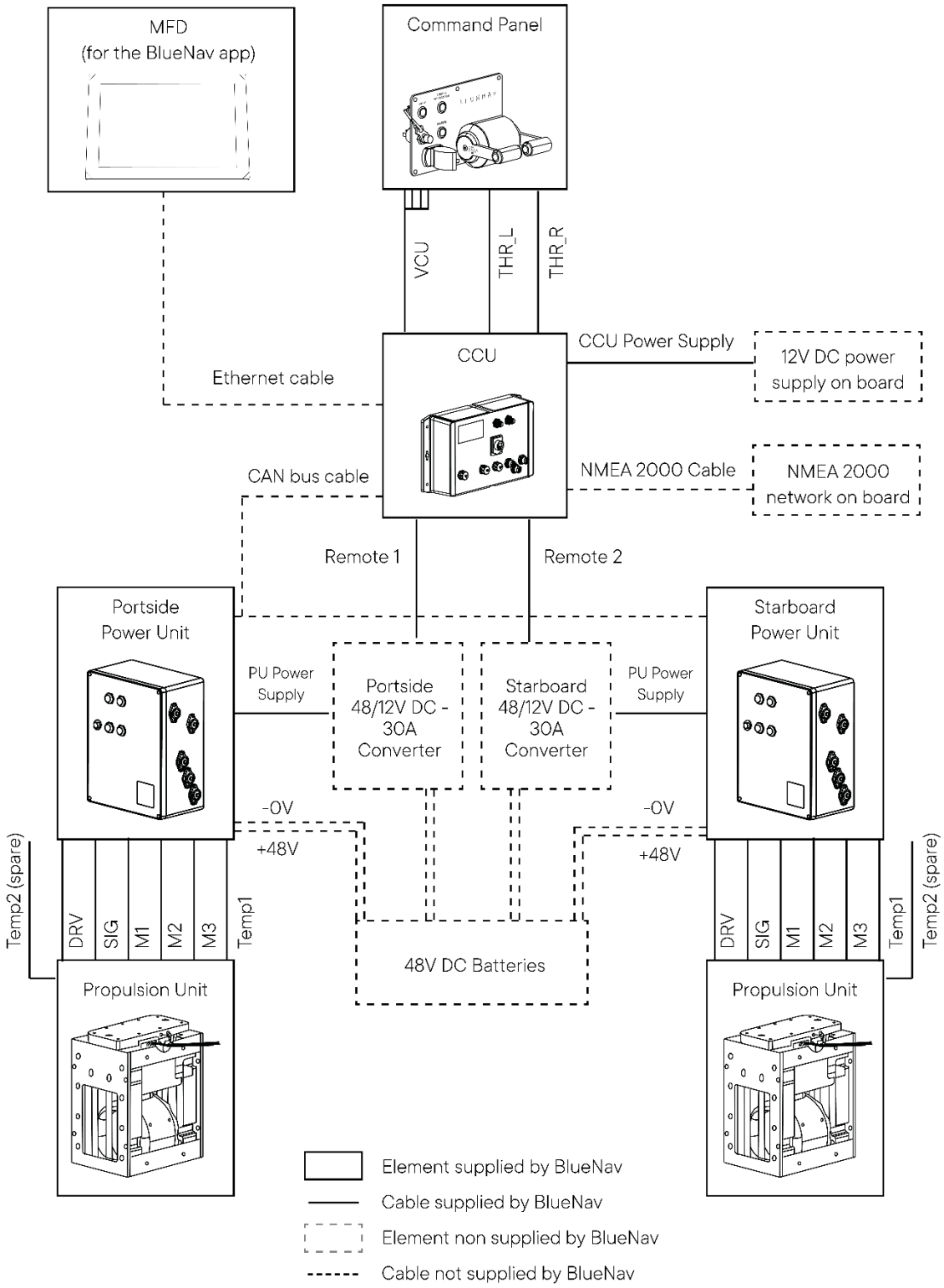
*Not used in single-motor setup.

The details regarding the cables not supplied are available at p.12.

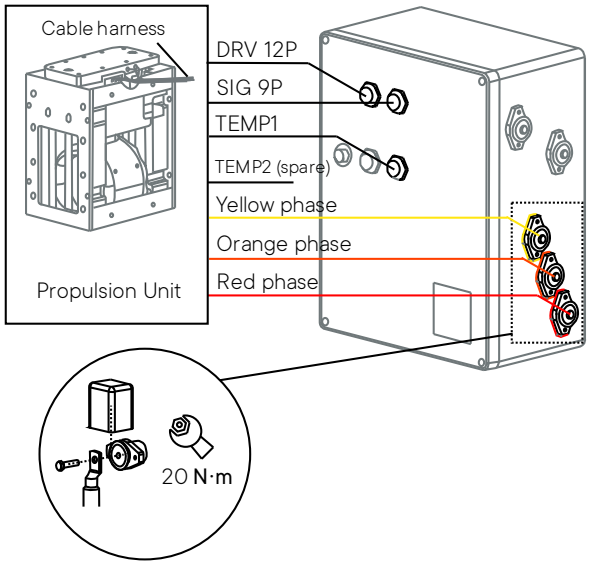
## 13.3 Global wiring of the single-motor BlueSpin system



## 13.4 Global wiring of the twin-motor BlueSpin system



## 13.5 Wiring of the Power Unit / Propulsion Unit




The cables of the Propulsion Unit (2.5m standard length) are supplied by BlueNav. They are ready for wiring.

The location chosen for the mechanical installation of the Propulsion Unit and Power Unit must allow the wiring as shown.

If the BlueSpin system is a twin-motor system, repeat the wiring procedure for the second Propulsion Unit with the corresponding Power Unit.

**⚠ WARNING!**

If the BlueSpin system is a twin-motor system, each Power Unit is identified “port side” and “starboard”. **Each Power Unit must be installed on board according to their position identification.** Each Power Unit is wired to its corresponding Propulsion Unit.

The starboard/portside position of a Propulsion Unit is determined by its wiring to a starboard/portside Propulsion Unit.

### 13.5.1 Temperature sensors wiring (TEMP1 and TEMP2)

The Propulsion Unit is equipped with 2 temperature sensor cables, TEMP1 and TEMP2. Each sensor cable is delivered with its WEIPU connector and its sensor tip.

Only the TEMP1 cable has to be connected. The TEMP2 cable is a spare cable.

### 13.5.2 Motor phase wiring (bulkhead connectors)

The wiring of the yellow, orange and red motor power phases must be respected. It enables a correct forward/reverse throttle direction.

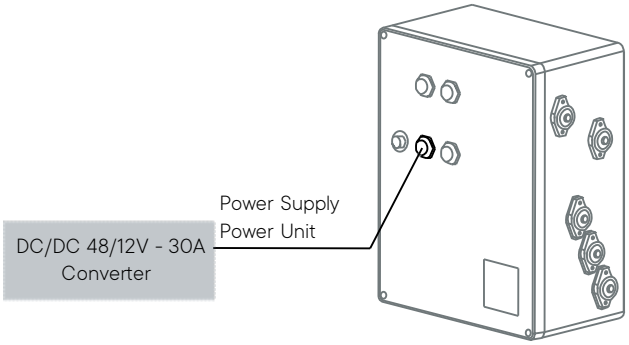
The bulkhead connectors wiring is carried out with the following procedure:

1. Unscrew the truss head screw (M8xM16) on the corresponding bulkhead. Remove the lockwasher.
2. Place the cable end flat on the plain washer.
3. Place the lockwasher flat on the cable end.
4. Screw the truss head screw (M8xM16) to fasten the assemblage using a 5mm Allen wrench and a 20N·m torque.
5. Put one of the caps supplied on the bulkhead connector.

**DANGER!**

To prevent overheating and a fire outbreak, the yellow, orange and red motor phase cables must be wired to the bulkhead terminals in accordance with the specified torque. The washers must be flat.

## 13.6 Power Unit / converter wiring




The 3m “PU Power Supply” cable is supplied by BlueNav.

The location chosen for the mechanical installation of the Power Unit must allow the wiring to its corresponding DC/DC 48V/12V – 30A converter (see p.11).

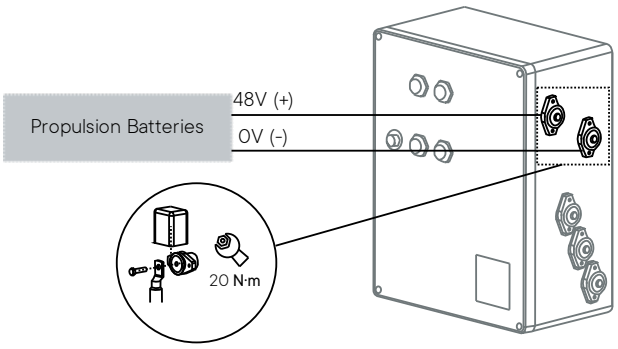
Wire according to the diagram.

**WARNING!**

If the BlueSpin system is a twin-motor system, each Power Unit is identified “port side” and “starboard”. **Each Power Unit must be installed on board according to their position identification.** Each Power Unit is wired to its corresponding Propulsion Unit.

Each Power Unit is wired to its corresponding converter.

## 13.7 Power Unit / batteries wiring




The +48V and -0V power cables for connecting the batteries are not supplied by BlueNav. See p.12.

The client must provide a sufficient cable length, determined by the mechanical installation of the batteries and of the Power Unit in the boat.

Wire according to the diagram.

### 13.7.1 Battery wiring (bulkhead connectors)

The bulkhead connectors wiring is carried out in the following procedure:

1. Unscrew the truss head screw (M8xM16) on the corresponding bulkhead. Remove the lockwasher.
2. Place the cable end flat on the plain washer.
3. Place the lockwasher flat on the cable end.

4. Screw the truss head screw (M8xM16) to fasten the assemblage using a 5mm Allen wrench and a 20N·m torque.
5. Place one of the caps supplied on the bulkhead connector.

**DANGER!**

To prevent overheating and a fire outbreak, the battery power cables must be wired to the bulkhead terminals in accordance with the specified torque. The washers must be flat.

**WARNING!**

The BlueSpin system is designed for 48V DC batteries wiring. Please see the battery documentation for wiring, installation and charging specifications.

## 13.8 Wiring of the Power Unit / CCU (CAN PROPULSION network)

The wiring of the CCU and the Power Unit(s) result in the creation of the CAN PROPULSION network of the BlueSpin system.

### 13.8.1 CAN network definition

A CAN network is a communication serial network allowing several peripherals to exchange data.

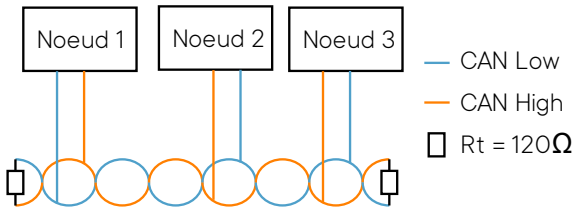



*Figure 1. Linear topology of a CAN network.*

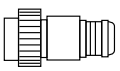
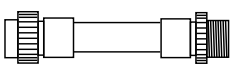
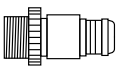
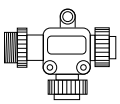
Each peripheral, called a node, is connected to a common path, called a backbone. The backbone is composed of two wires, CAN Low and CAN High, that transmit signals of differential voltage. 120Ω terminations are placed at the ends of the backbone to stabilize the signal and transmit reliable data.

Together, they form a CAN network with a linear topology. This linear topology enables simplified, direct and high-performance communication.

### 13.8.2 CAN PROPULSION network specific to the BlueSpin system

The CAN PROPULSION network of the BlueSpin system connects the CCU and the Power Unit(s). It is created during the installation of the BlueSpin system.

To create the CAN PROPULSION network of the BlueSpin system, the following components are required:

| | | | |
|---|---|---|---|
|  | CAN Bus 120 Ω female termination |  | CAN Bus Cables |
|  | CAN Bus 120 Ω male termination |  | CAN Bus T-connector |

These components are not supplied by BlueNav. See p.12 for required quantities depending on a twin-motor or single-motor setup.

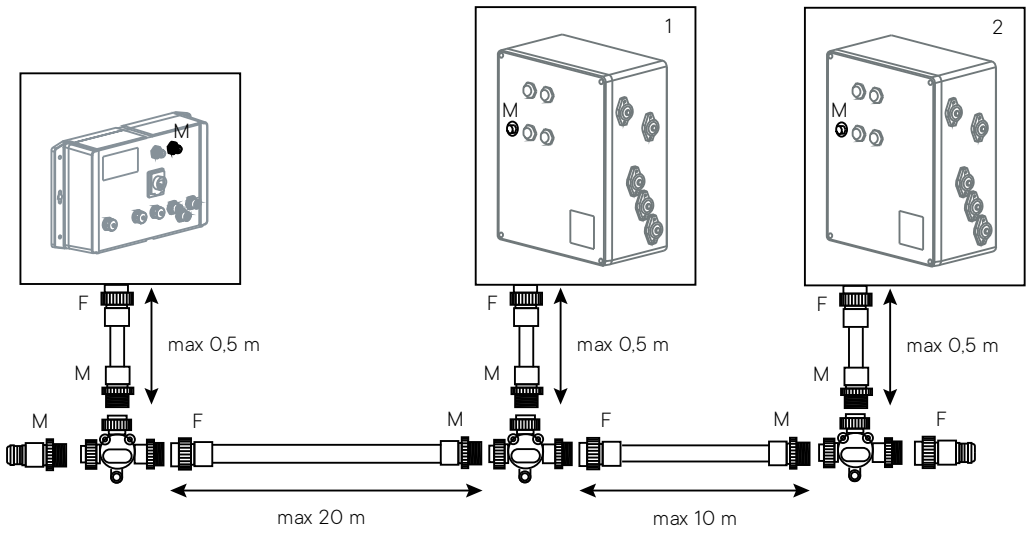
The length of the CAN Bus cables depends on the mechanical installation and the distance between the CCU and the Power Unit(s).

**⚠ WARNING!**

The CAN PROPULSION network of the BlueSpin system relies on a CAN bus protocol. This CAN bus protocol must not be confused with the NMEA 2000® CAN bus network of the boat.

The NMEA 2000® CAN bus network is used to transmit data between devices of different types and from different manufacturers, such as GPS, compass, wind, depth, AIS, speed or motor data. It is set up prior to the BlueSpin system installation. See p.39.

Connect the wiring according to the following diagram:




**⚠ WARNING!**

Each end of the CAN PROPULSION network backbone must be equipped with 120Ω terminators.

**⚠ WARNING!**

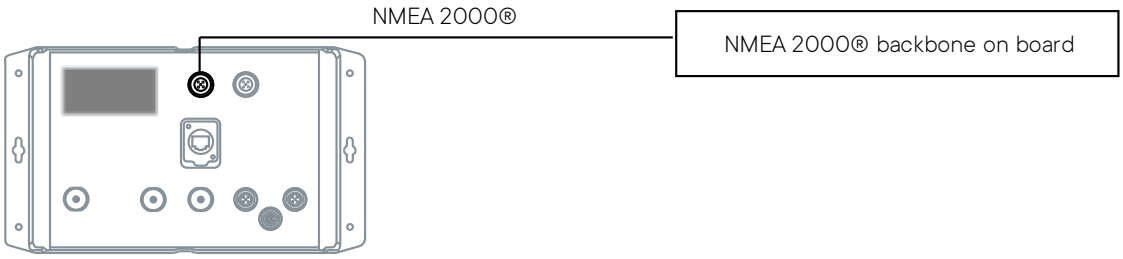
Do not confuse the CAN PROP and NMEA connectors on the CCU. The CAN PROP connector is for wiring the CAN PROPULSION network of the BlueSpin system. The NMEA connector is for wiring the NMEA 2000® CAN bus network (National Marine Electronics Association) of the boat.

## 13.9 CCU / on-board NMEA 2000® network wiring

NMEA 2000® is a plug-and-play communication standard used to connect marine sensors and display devices in boats. This standard applies to CAN bus networks (see p.38). The UCC of the BlueSpin system connects to the backbone of the NMEA 2000® network of the boat to exchange information.

The NMEA 2000® cable is not supplied by BlueNav. It is used to connect the CCU to the NMEA 2000® network on board (see p.11). The client needs a cable length that does not exceed 1m, determined by the configuration of the NMEA 2000® network on board.

Connect the CCU to the backbone of the NMEA 2000® network on board as shown in the following diagram:



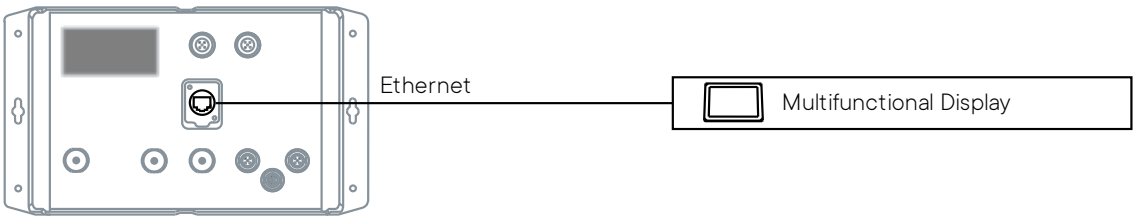

**⚠ WARNING!**

Do not confuse the CAN PROP and NMEA connectors on the CCU. The CAN PROP connector is for wiring the CAN PROPULSION network of the BlueSpin system. The NMEA connector is for wiring the NMEA 2000® CAN bus network (National Marine Electronics Association) of the boat.

## 13.10 CCU / MFD wiring

The Ethernet cable is not supplied by BlueNav. It is used to connect the CCU to the NMEA 2000® network on board (see p.11). For wiring, the client needs a cable length suited to the mechanical installation.

Connect the Ethernet cable on the Ethernet port of the CCU and on the Ethernet port of the MFD as shown in the following diagram:

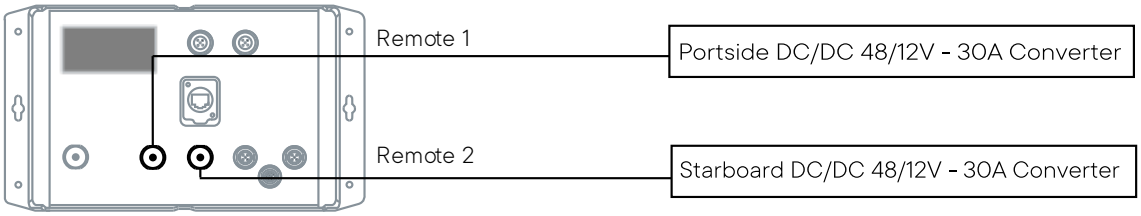



## 13.11 CCU / Converter wiring

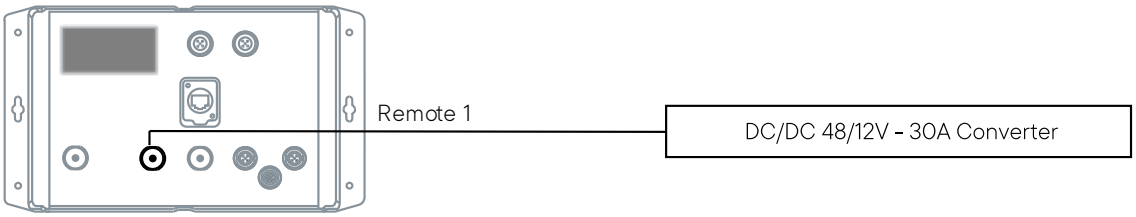
The 6m “Remote 1” cable and “Remote 2” cable (in case of a twin-motor setup) are supplied by BlueNav.

These cables are used to connect the CCU to the converter(s) on board (see p.11).

See the converter documentation to carry out the wiring on its Remote on/off output, as shown in the following diagrams:



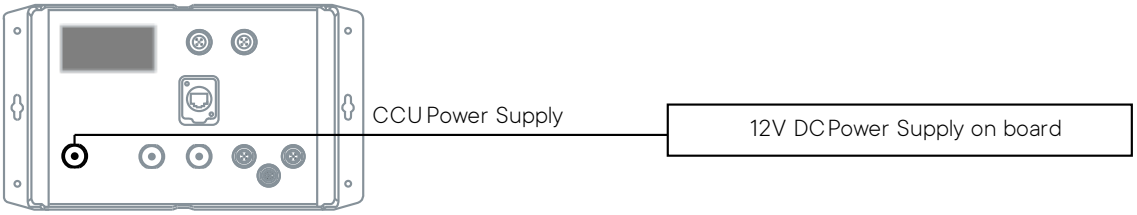

*CCU / converters wiring (twin-motor setup)*




*CCU / converter wiring (single-motor setup)*

## 13.12 CCU / Power supply wiring

The 3m “CCU Power Supply” cable is supplied by BlueNav. It connects the CCU to the 12V DC power supply on board (see p.11), as shown in the following diagram:




**⚠ WARNING!**

The CCU is protected internally by a 1.5A fuse. Use the same fuse for the power supply on board.

## 13.13 CCU / Command Panel wiring

The VCU cable harness (marked blue) and the THR_L and THR_R extension cables (marked white and green respectively) are supplied by BlueNav. Cables coming out of the VCU harness are identified by labels.

Carry out the wiring according to the following diagrams and color identifications:

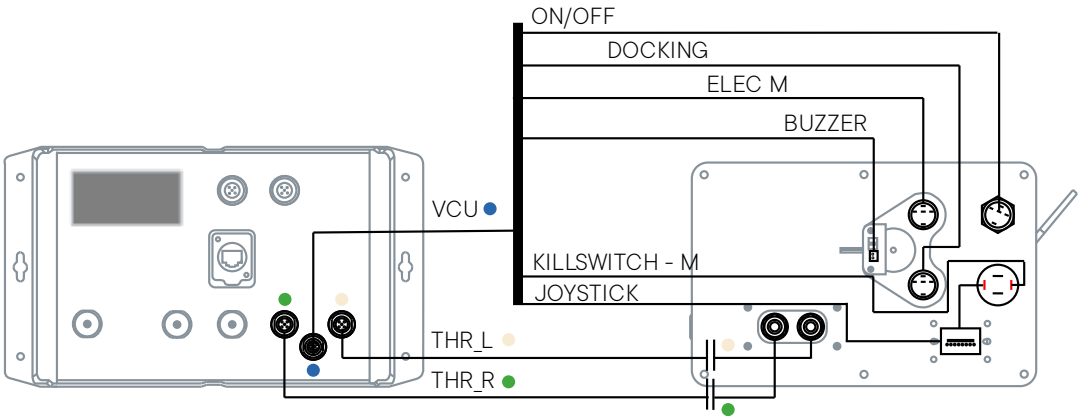



*Figure 2. CCU / Command Panel (twin-motor) wiring.*

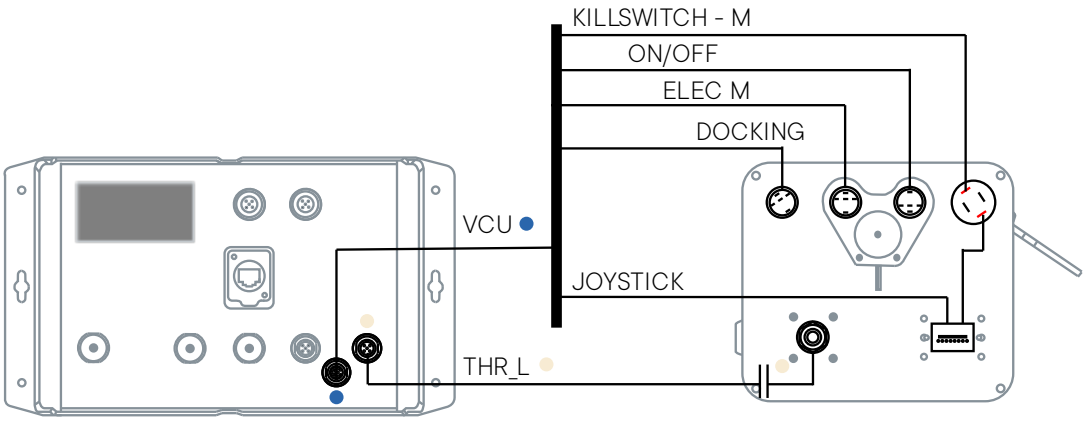
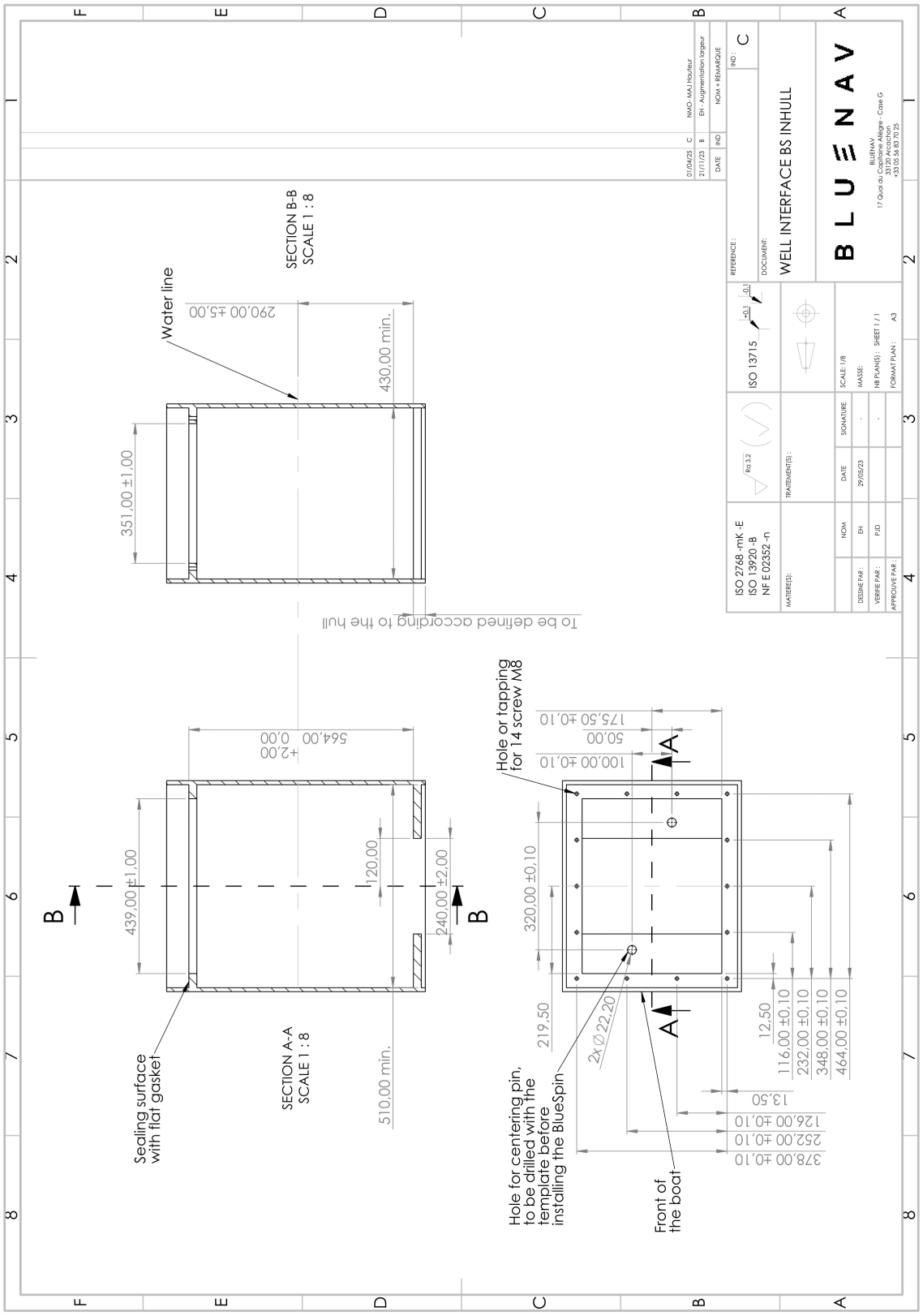


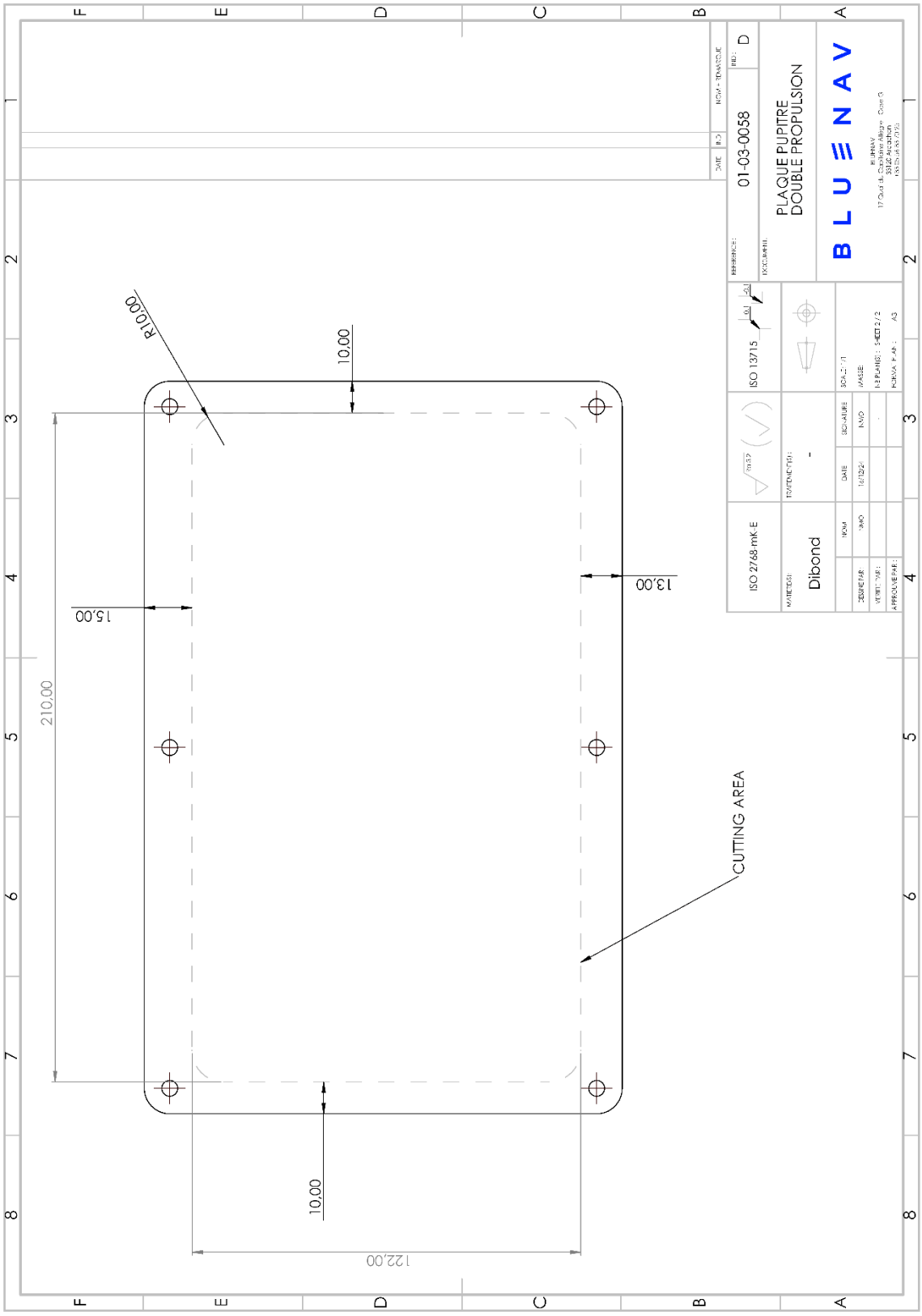

*Figure 3. CCU / Command Panel (single-motor) wiring.*

# 14. APPENDIXES

## 14.1 Well blueprint (Inhull Propulsion Unit)



## 14.2 Drilling blueprint (Command Panel)



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