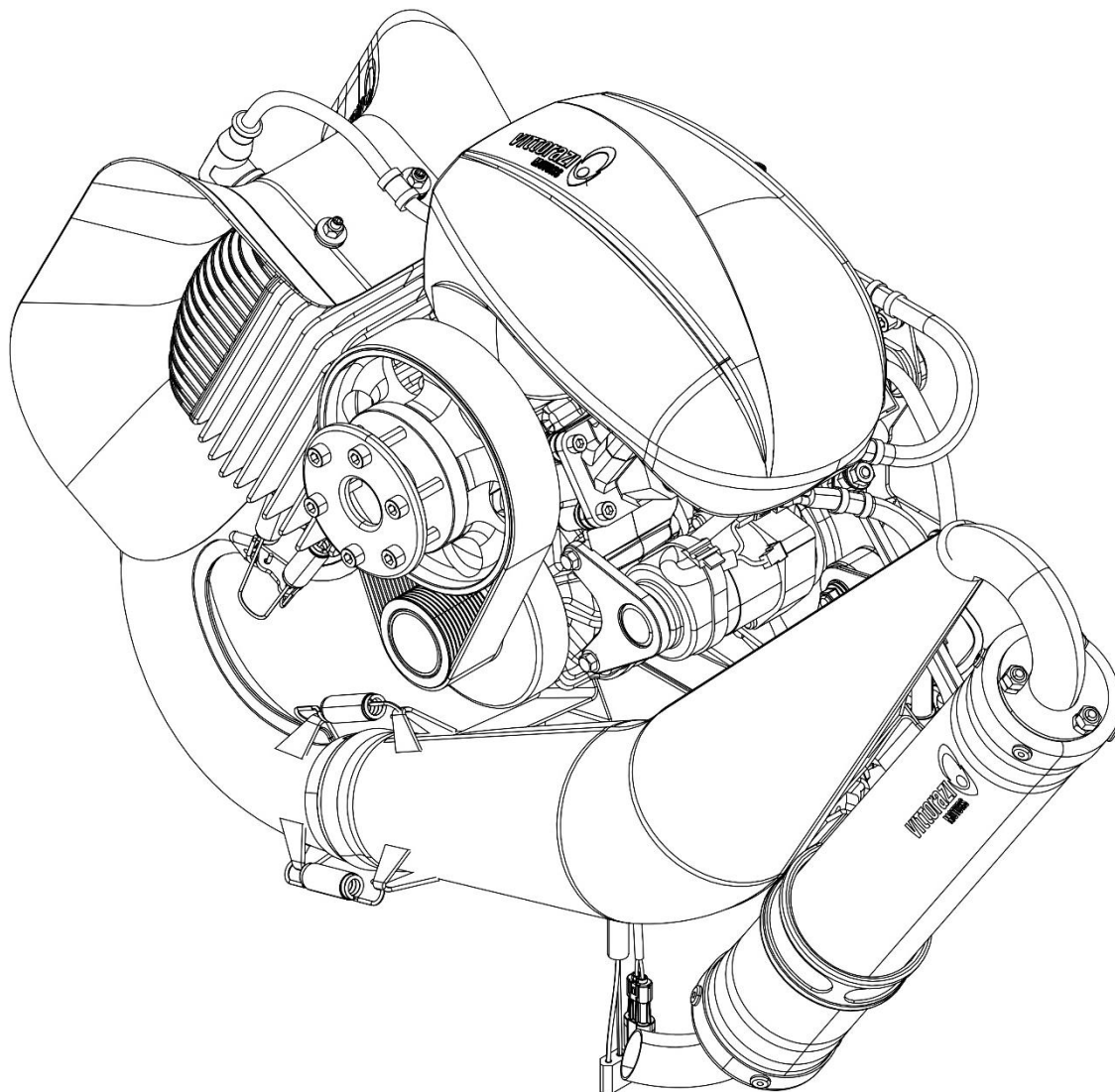


# MOSTER 185 EFI

## Installation manual

Release VI/2024.  
Valid for MY24+ version.





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# 1 Introduction

Congratulations and thanks for being a Vittorazi qualified professional.

This manual is intended as a reference point for aircraft manufactures, dealers and professional people dealing with Vittorazi Motors. Please study this professional manual carefully before starting the installation activity. The purpose of this manual is to provide all the necessary information to the professional in order to allow a proper installation of the engine, carried out autonomously and in total security. The professional manual includes: technical descriptions of the installation phase and reference values.

All the components of Vittorazi Motors are checked and tested in a process of industrial quality control before the assembling. Then by sampling the complete motors are checked to assure the functionality of all the parts through a complete test of twenty minutes on the bench. Note that the reliability, performance and durability of the engine also strongly depend on the correct installation of which you are in charge.

In case you need further explanations, you can contact directly the headquarters of Vittorazi Motors. Please include in the request, the six-digit serial number that identifies the motor (read 3.1 "Preparing for installation") and a photo of the item in question.

Also take into account the availability of Illustrated Parts Catalogue (IPC), manual updates, service bulletins, FAQs, other documents in our official website. The video tutorials are available on the Vittorazi Motors official YouTube channel. Below the links.

IPC, manuals, bulletins, newsletter, warranties, FAQ

<https://www.vittorazi.com/en/services/>



Vittorazi Official YouTube channel: video and free tutorials available

<https://www.youtube.com/user/VITTORAZIMOTORS>



# Reading tips:

**Attention, warning, danger, risk**  
Any situation or condition which may result in a serious danger



**Recommendation, caution, important advice**



## 2 Be careful! Read it completely



### To fly in total safety, you must read the following recommendations:

- This engine is not certified. This engine does not fulfil airworthiness regulations. The products are dedicated to non-certified aircraft and flying as a recreational or sporting activity.
- Final-user must be aware that the engine can stop, break or shut down at any time. Such an event may require an immediate and forced landing in inadequate, congested or impervious areas, with the possibility in the end of causing the death of the pilot or other persons involved.
- The aircraft equipped with this engine must be conducted in full compliance with rules and regulations in force relating to the activity of leisure and sport aviation, with regard to the country in which the operations are carried out.
- Vittorazi Motors and its distributors decline any direct or indirect responsibility related to this kind of activity. By using a new engine, the owner agrees that these terms and conditions have been accepted at the time of purchase of the product.
- The engine is not covered by any liability insurance. The use of the engine automatically determines the assumption of all risks and personal liability for personal injury or damage to third parties resulting from the activity.
- Improper use of the products or improper technical service (in relation to the specifications contained in the user, installation and maintenance manual) will hold harmless the company from any liability for any damage due to the malfunctioning and immediately void the warranty of the product. So, do not use the motor if it has not been properly maintained or if it has not been used correctly over time.
- Vittorazi does not assume any responsibility for those engines that are used with parts that are not original, not approved, modified or that have suffered an improper use. Use of spare parts not original and not recognized by Vittorazi, can make the engine dangerous and will void the warranty.
- Unauthorized modifications to the motor, to the reduction, to the propeller can invalidate the warranty of the motor and can compromise the reliability of the aircraft and its safety. In case it is necessary to intervene, we invite you to contact an authorized dealer Vittorazi.
- Some geographical areas, due to particular weather conditions such as pressure, temperature and humidity can affect the performance of the engine. Before taking off, test the engine on the ground and make sure it does not behave abnormally.

- Always start the engine on a flat and clean surface, without stones or sand. During all phases in which the engine is kept running near the ground (such as heating, take off, landing) it is necessary to maintain a safe distance from the engine. A good safety distance is 100 meters in every direction.



**The following engine speed limits must be respected to avoid engine failures, to keep the warranty valid and to have a correct maintenance scheduling according to the Vittorazi program:**

- Do not keep the engine at full revs for more than 60 seconds.
- Do not keep revs higher than 7.000 RPM during long cruising flights or long climbs. The average power delivered by the engine during a flight should remain below the indicated threshold. Contact the aircraft manufacturer for further clarification.



The temperature limit of CHT is 208° Celsius. Do not persist above this temperature threshold, engine overheating and irreversible damage could occur.



When the CHT exceeds 208°C, the ECU system generates a small engine speed reductions that last a fraction of a second, without compromising the flight dynamics, just to call the pilot's attention. This safety function disappears when the speed is reduced below 7400 rpm.



Exceeding the EGT limit is shown on the display with the word "Temp" flashing in the top right corner. Proceed at reduced power and once on the ground contact your dealer.



LiPo batteries are high-tech products but potentially dangerous to property, animals or people, especially if used improperly or without experience.

## 3 Installation

This section refers to mechanical and electrical installation, so it is reserved for the aircraft manufacturer (paramotor, hang glider, ultralight and others) who has qualified personnel in the mechanical, electrical and aeronautical fields. By following the instructions, it will be possible to assemble the engine correctly.

Please refer further to the aircraft manual for operation, installation, maintenance. A correct and safe operation of the same engine, cannot be guaranteed in other applications, than those approved by the aircraft manufacturer.

Any procedure of installation, maintenance and/or repair of the products must be carried out exclusively with the original Vittorazi parts and tools specified by Vittorazi, in compliance with the specifications contained in the user, installation and/or maintenance manual of the products; to ensure maximum safety and performance of the products, the above-mentioned procedures will be carried out by mechanics with proven experience in the Ultralight aviation or general aviation or with experience gained by Vittorazi professional training courses. Failure to do so, will hold harmless the company from any liability for any damage due to the malfunctioning and immediately void the warranty of the product.

Vittorazi shall not be liable for any damages deriving from the installation of its motors onto aircraft and/or equipment that require airworthiness certifications.

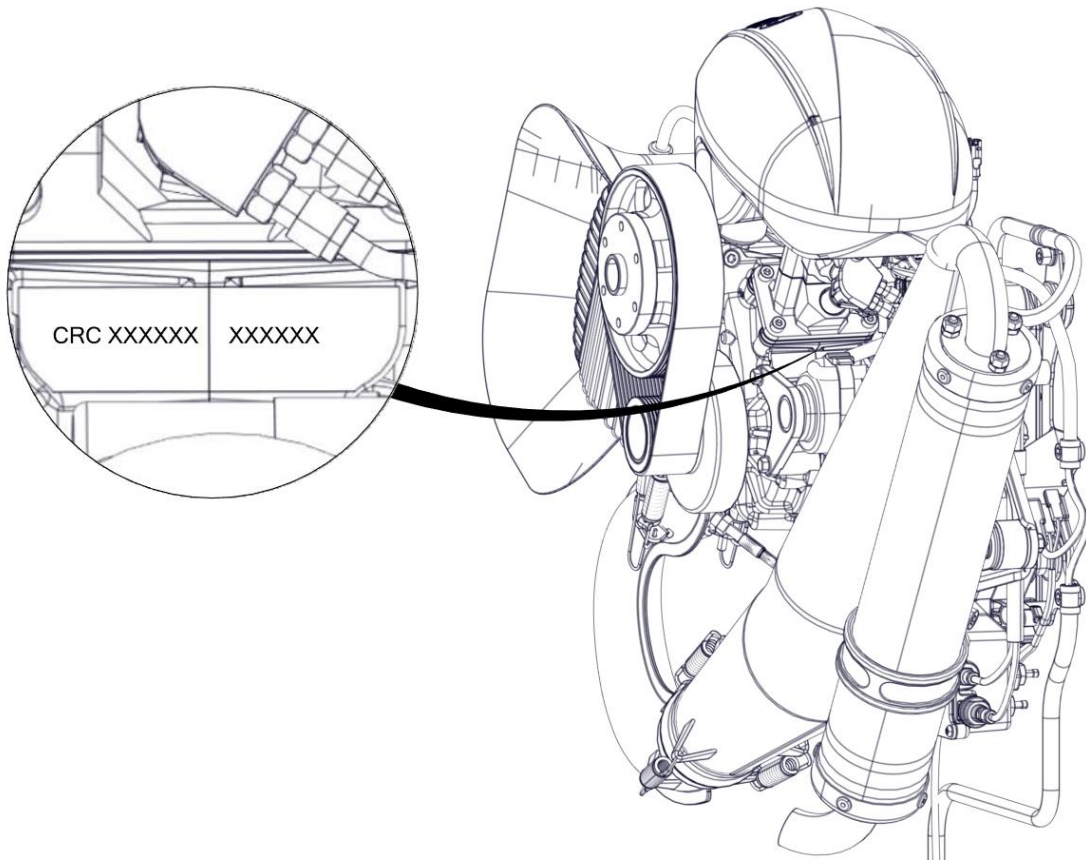
Frame design must give strong consideration to the following sections: 3.2 Supports to the frame, 3.3 Electrical system, 3.4 Battery, 3.6 Fuel system. It is also recommended to carry out the checks described in the relevant paragraph (3.9 Final checks) before starting the engine.



## 3.1 Preparing for installation

On delivery of the engine:

- Check that the six-digit engine serial number on the engine casing matches the number on the packaging box.



Check that there is no damage of any kind related to the transport of the engine.

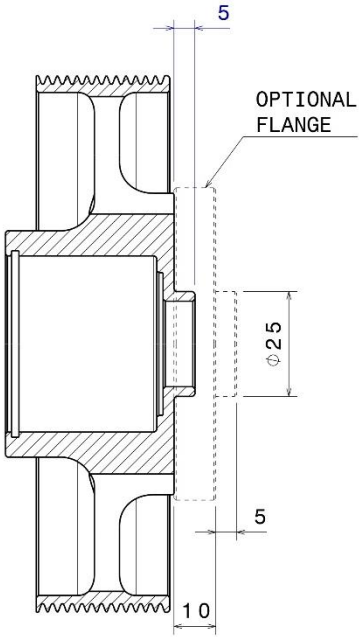
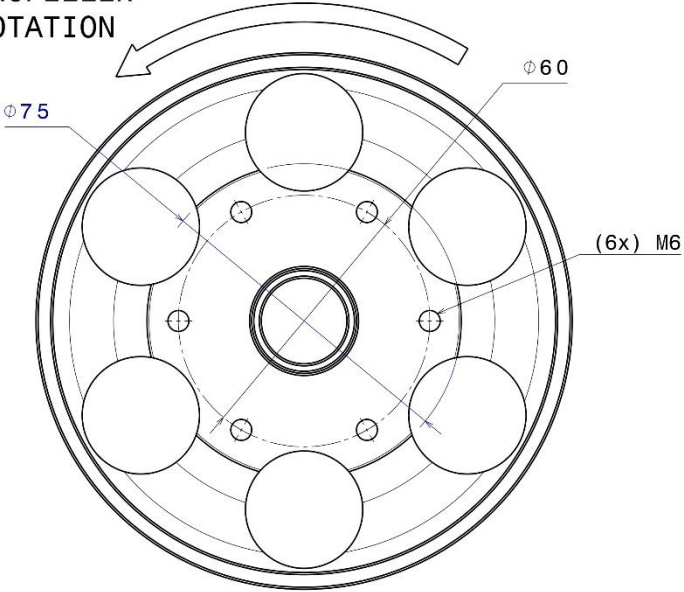


Engine openings are closed by special plugs to prevent the entry of foreign substances and moisture. These should only be removed when necessary for installation.



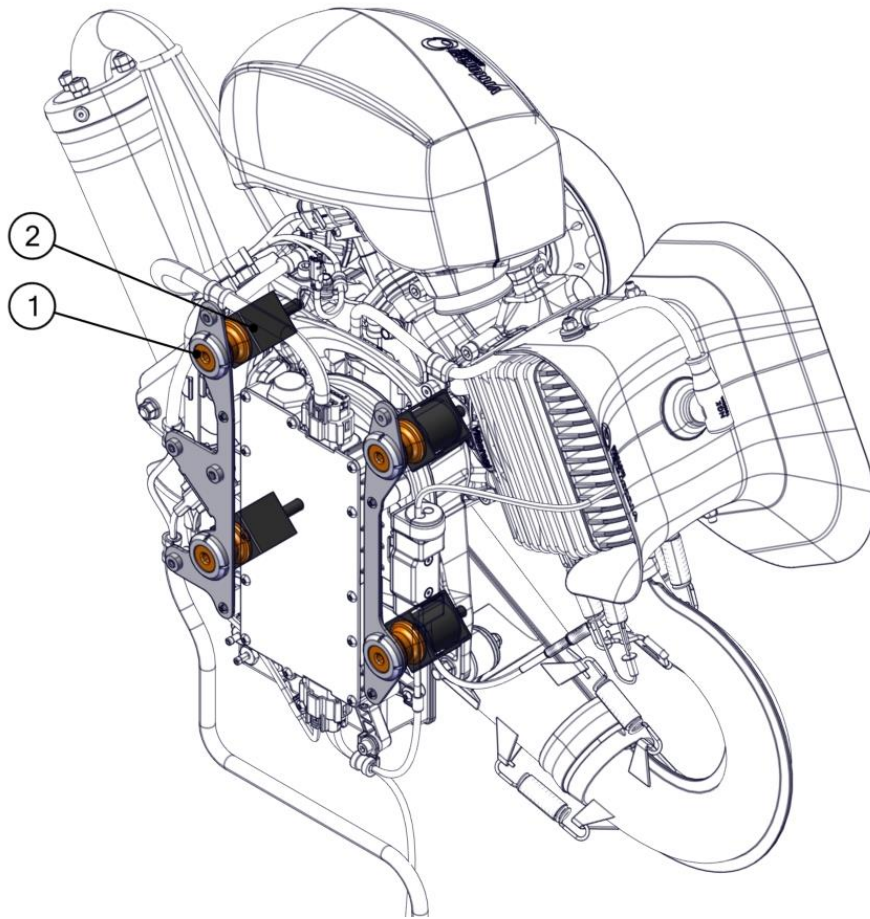
**PROPELLER MOUNTING**

PROPELLER  
ROTATION



## 3.2 Supports to the frame

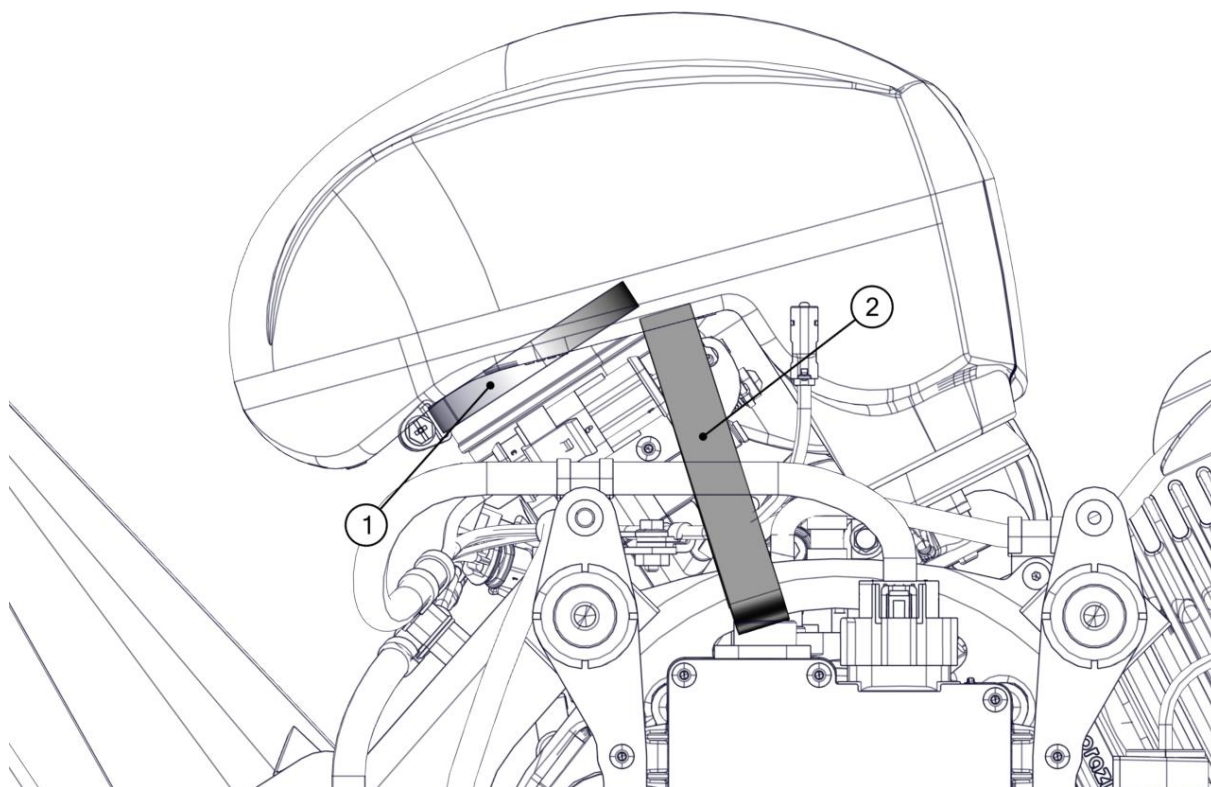
The engine is fixed to the aircraft frame through the 4 spacers (1) that are connected to the 4 dampers (2). Do not replace the dampers (2), as they are designed and approved for this engine. Use M8 screws for fixing, taking care not to rotate and damage the rubber part. The vibration dampers reduce the vibrations transmitted from the engine to the frame. For safety reasons, straps are fitted around the vibration dampers.



The components to be installed, in particular the fuel tank, fuel hoses and the battery, must have a certain distance from the exhaust system as high temperatures are reached during engine operation.



For safety reasons, the engine has the airbox already fitted. It can be removed if necessary, during installation. When reinstalling it, check that the airbox has been fitted correctly, and in particular that the fixing clamp (1) on the sleeve and the safety strap (2) have been securely fastened.





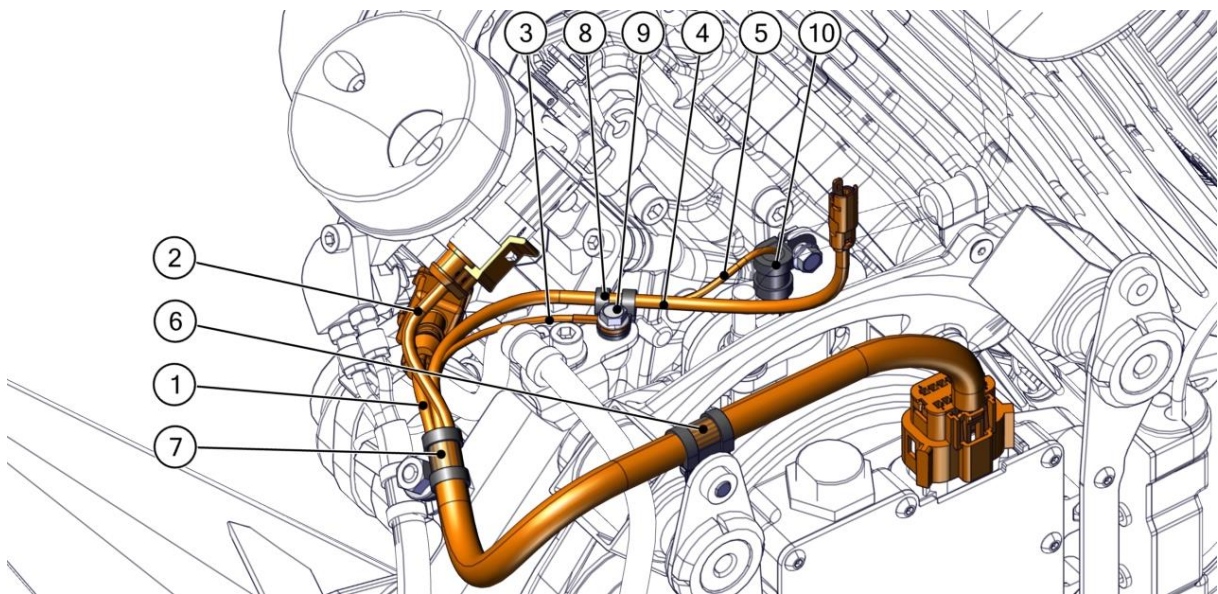
## 3.3 Electrical system

### 3.3.1 Signal wiring

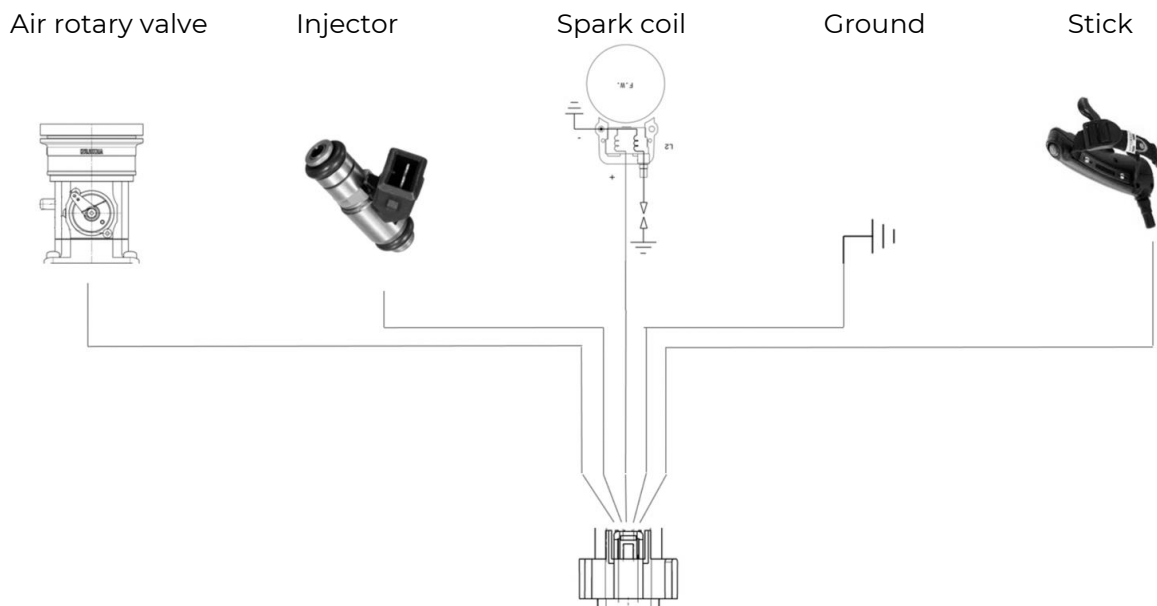


The signal wiring is composed by the injector signal cable (1), the air rotary valve signal cable (2), the ground cable (3), the start/stop button cable (4) and the spark coil signal cable (5).

The signal wires are clamped with an M6 F8 rubberized cable clamp (6) and an M6 F8 rubberized cable clamp (7) that fix the signal cable, an M5 F5 rubberized cable clamp (8) that fix the start/stop button cable (4) and the coil signal cable (5), an M4x12 screw (9) that fix the ground cable (3) and an M5 F6 rubberized cable clamp (10) that fix the spark coil signal cable (5).

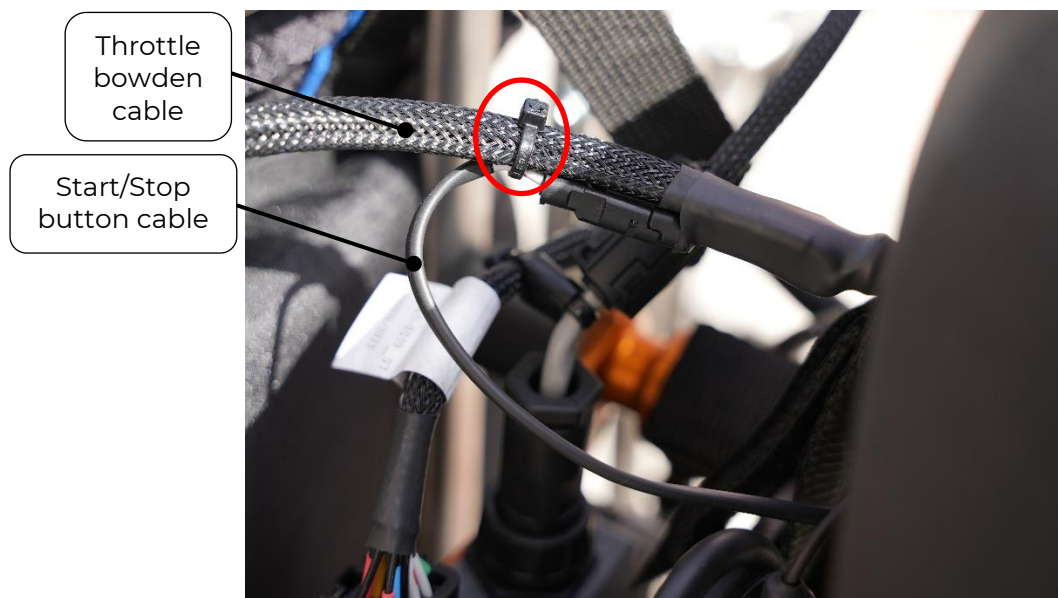


Signal wiring scheme:

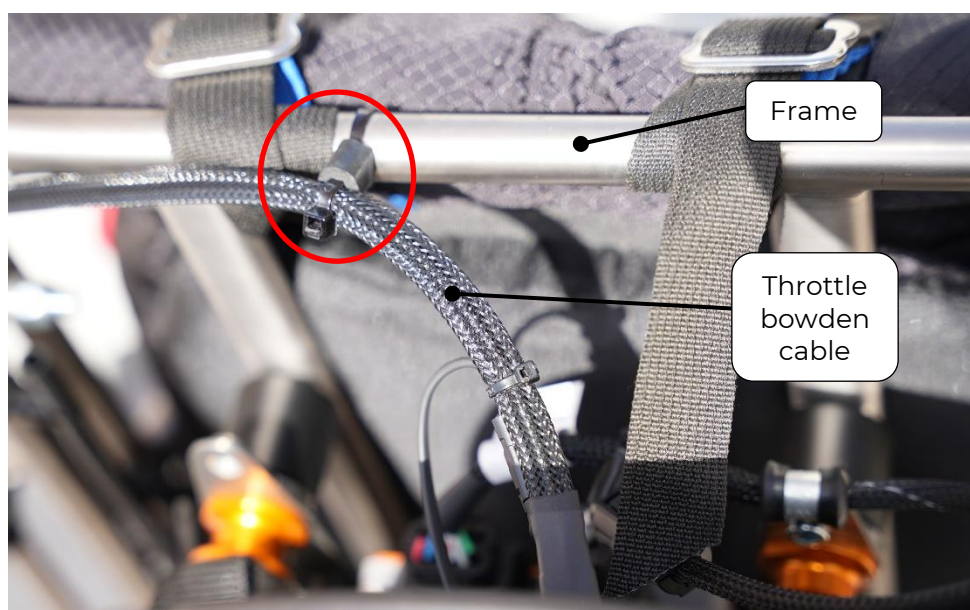




Clamp the start/stop button cable to the throttle bowden cable to block the movement of the start/stop button cable, due to airflow or vibration, that could lead to stress at the connector root or loss of connection.



Clamp the throttle bowden cable to the frame to block the movement of the throttle bowden cable, due to the movement of the throttle, airflow or vibration, that could generate stress on the bowden cable fixing and the root of the start/stop button cable. Position the fastening point at least 20 cm away from the throttle bowden fixing support.

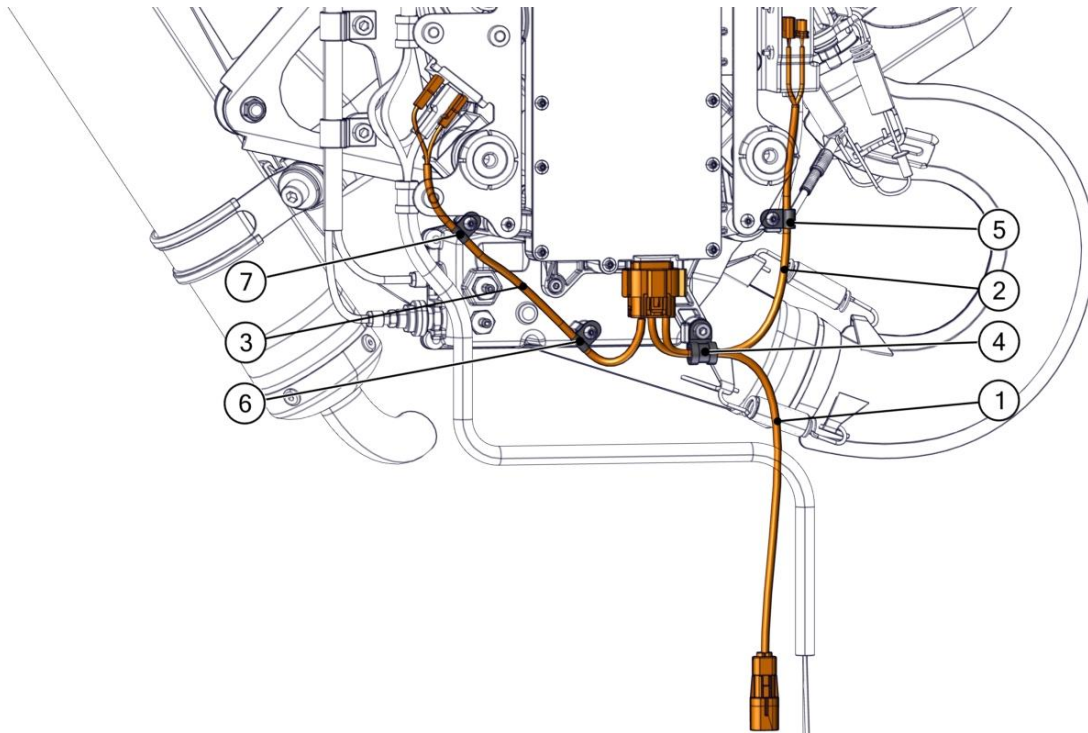


### 3.3.2 Power supply wirings

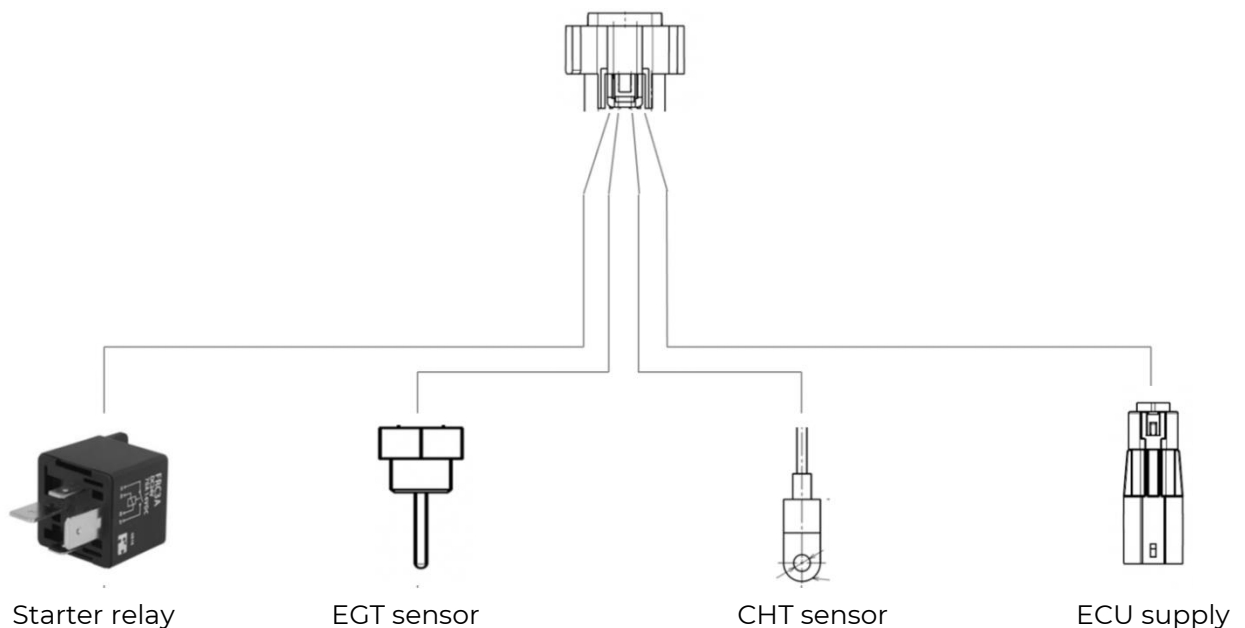


The power supply wiring is composed by the ECU supply cable (1), the EGT and CHT probes cable (2), the starter relay power cable (3).

The power supply wires are clamped with an M5 F6 rubberized cable clamp (4) that fix the ECU supply cable (1) and the EGT and CHT probes cable (2), a plastic cable clamp (5) that fix the EGT and CHT probes cable (2) and two plastic cable clamps (6, 7) that fix the starter relay power cable (3).



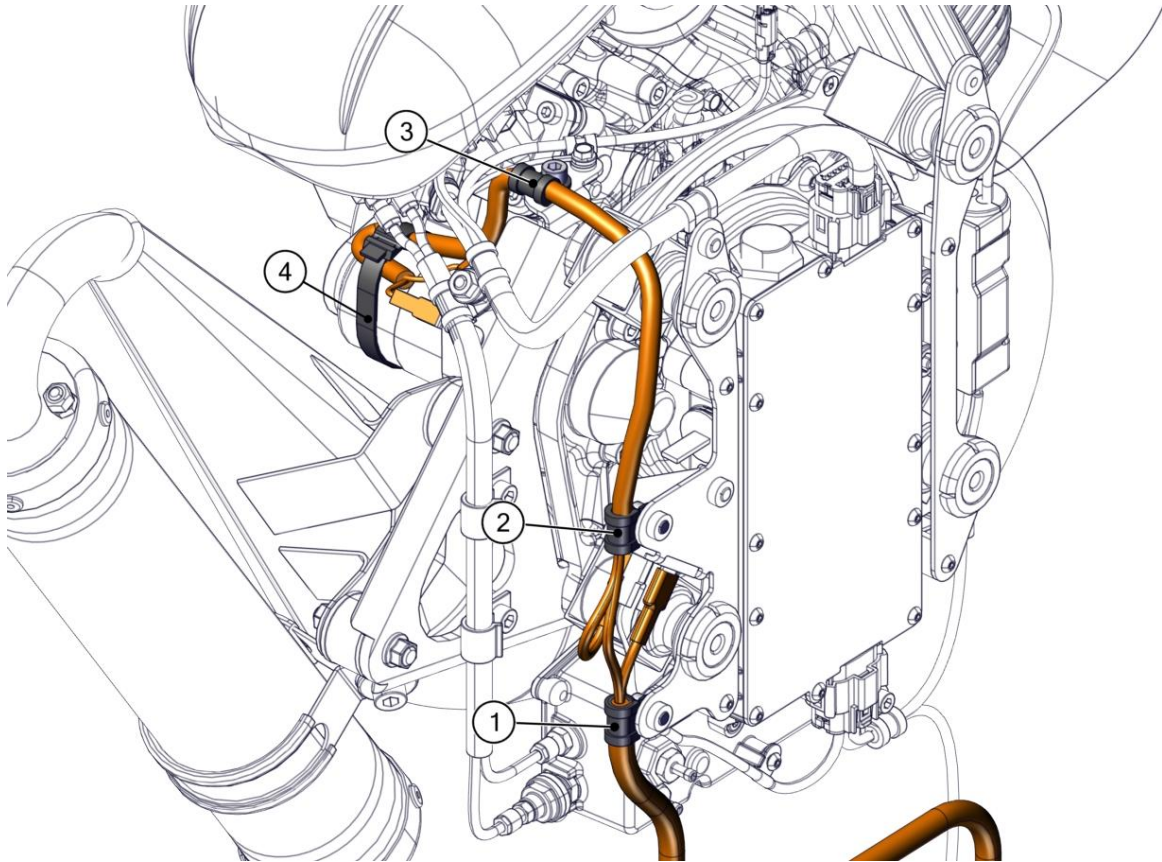
Power supply wiring scheme:



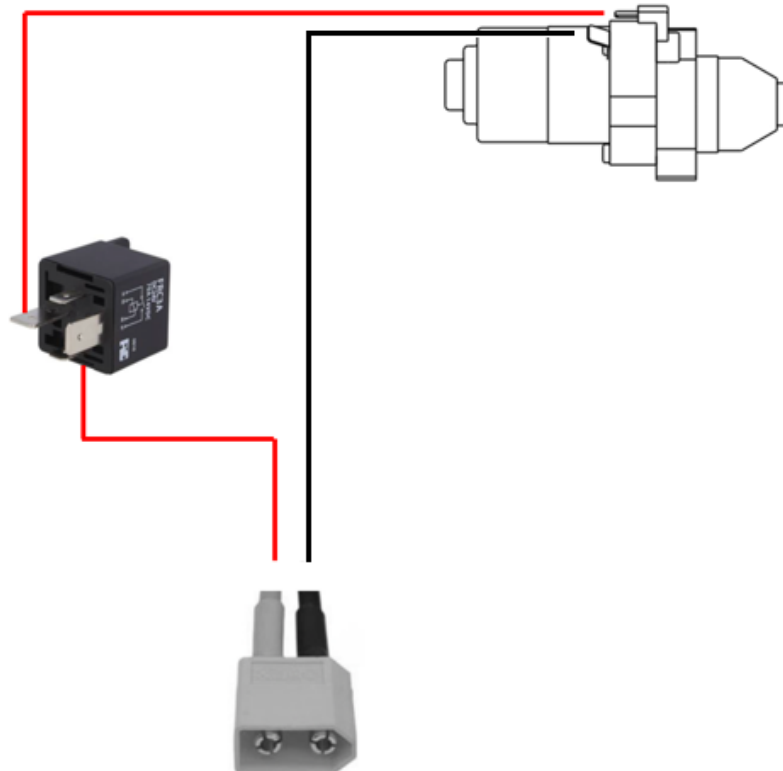


### 3.3.3 Electric starter wiring

The Electric starter wires are clamped with three M6 F8 rubberized cable clamps (1, 2, 3) and a 26-92 mm plastic cable tie (4).



Electric starter wiring scheme:





When the battery XT60 connector is connected, the starter wiring is powered, take care not to cut the cables or create a short circuit.



A 60A fuse (BF1 type) is housed inside the upper battery compartment.

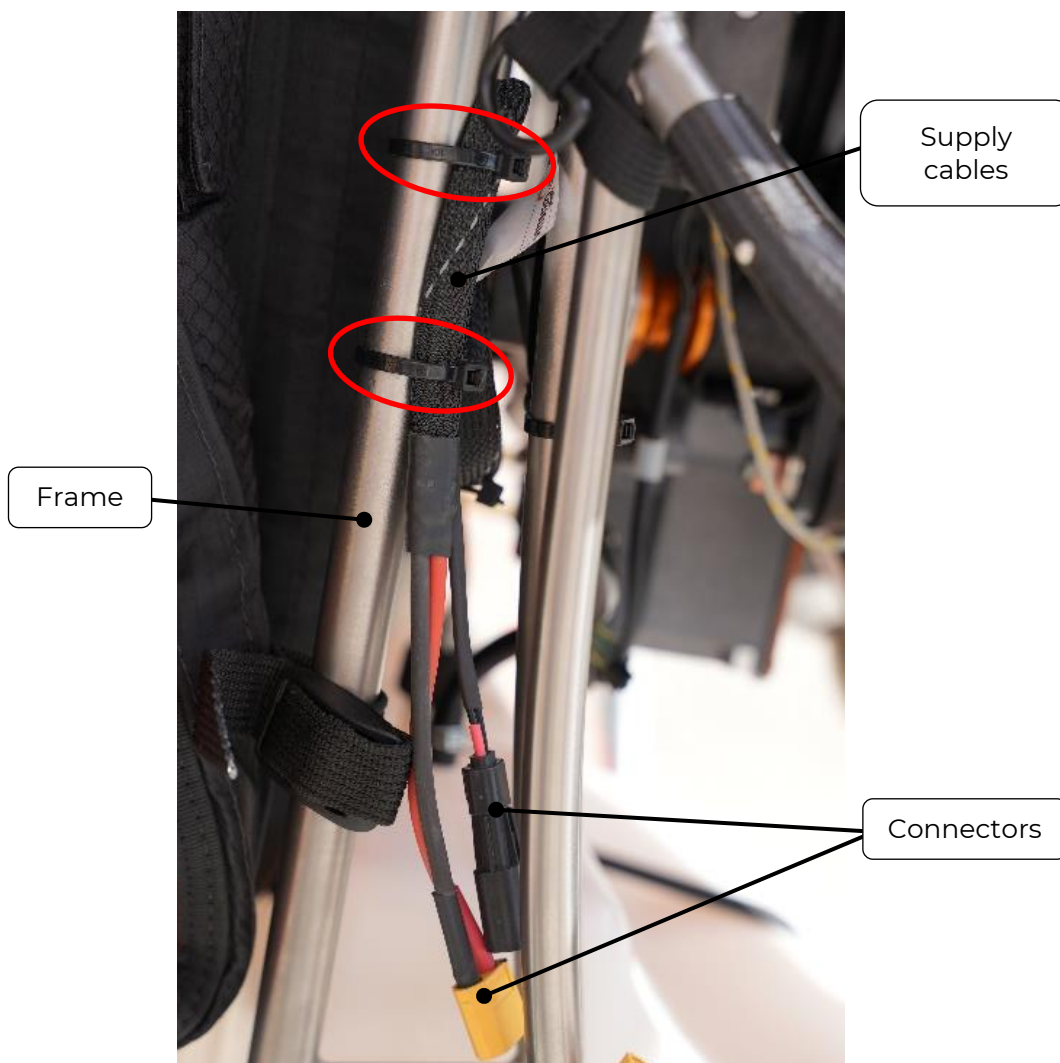
Electric starter:

INPUT	12 V
POWER	0.3 kW

	MOSTER 185 EFI - ELECTRICAL SYSTEM	REV 00
	COMPONENTS ALREADY - ELECTRIC STARTER (M1)	

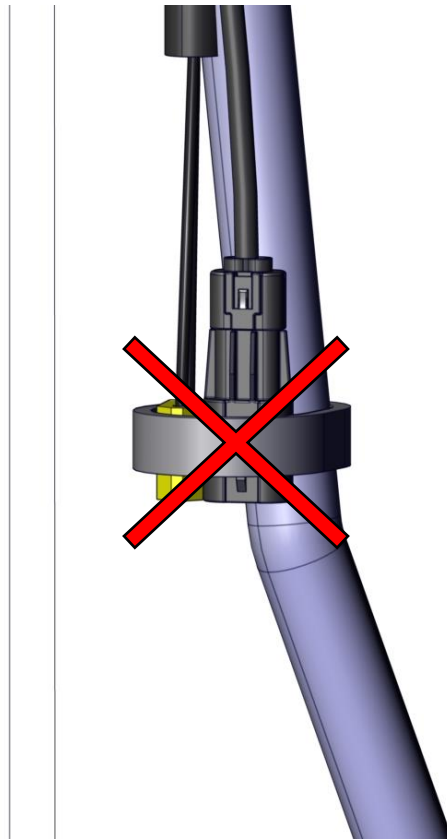


Fix the ECU and the starter power cables to the frame, in an appropriate position to facilitate connection with the battery and to block the movement of the cables, due to airflow or vibration, that could generate stress on the roots of the cables.  
Place the fixing point at about 10 cms from the connectors.





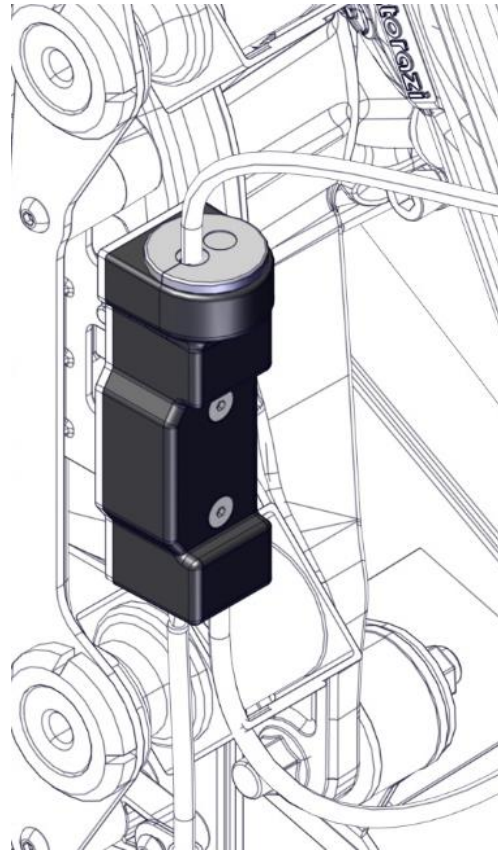
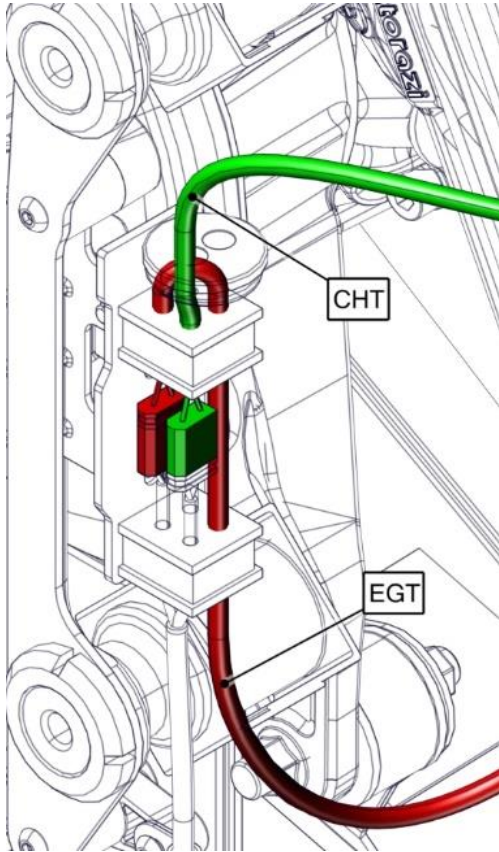
Do not fix the connectors to the frame, this could damage the connectors due to vibration, creating the risk of short-circuiting and/or engine shutdown during flight.



### 3.3.4 EGT and CHT Sensor housing



The cables and connector of EGT and CHT probes are arranged inside the sensors support as shown in the figure.



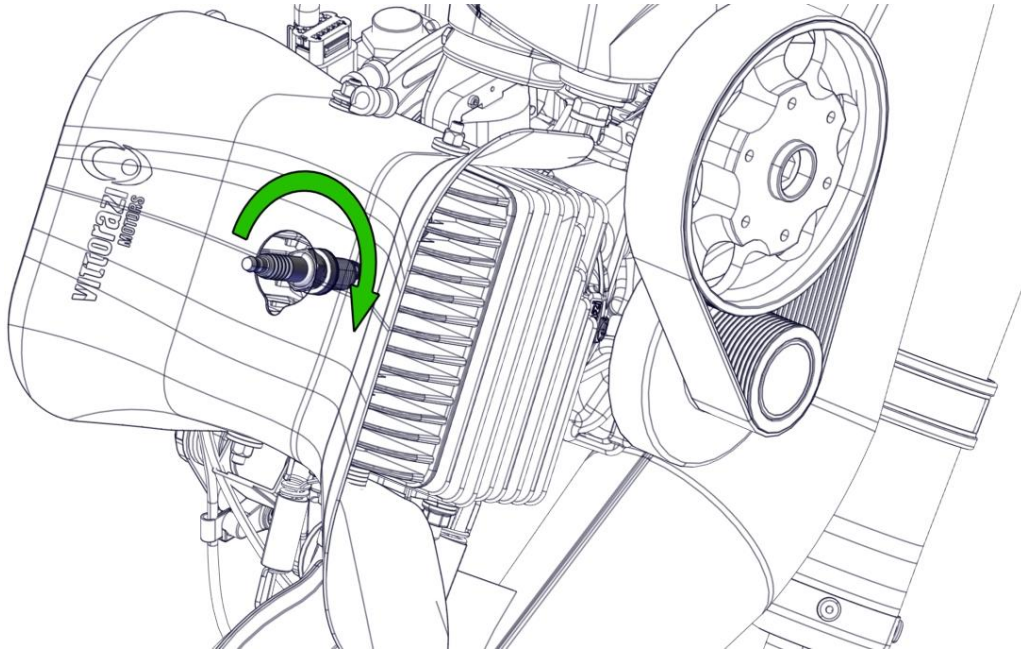


### 3.3.5 Spark plug

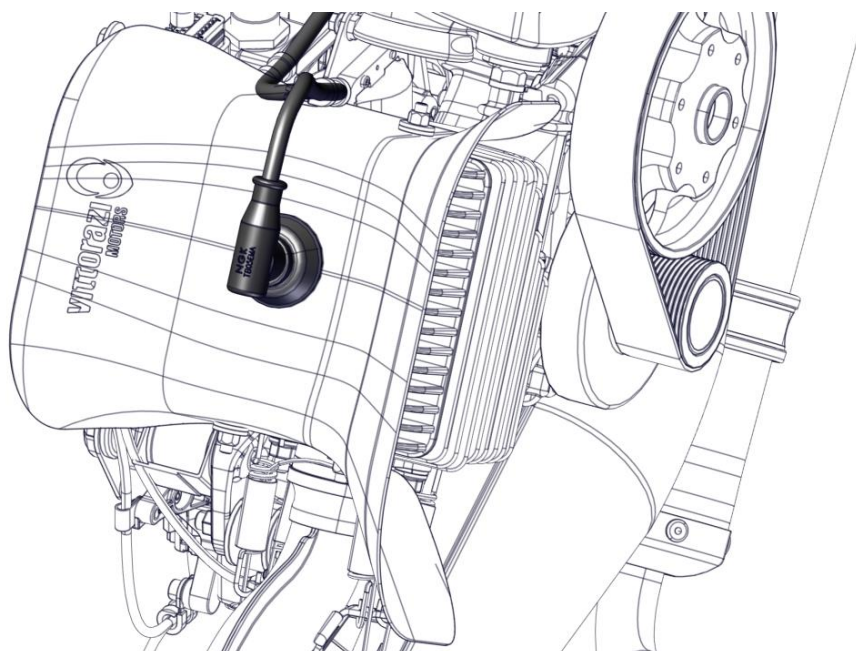


Use only spark plug NGK BR9EIX Iridium (R = resistive spark) (cod. ACC090) and spark plug resistor cap (cod. MI031a).

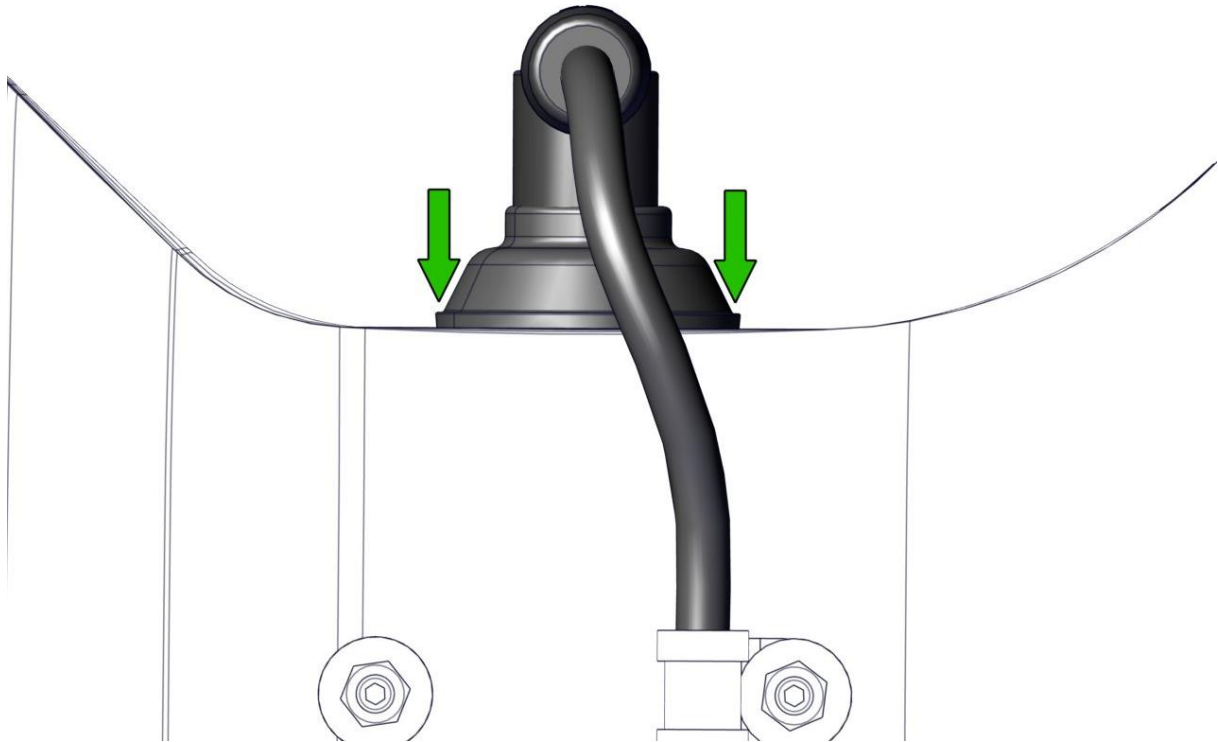
Screw the spark plug into the head and tighten to 25 Nm.



Fully insert the spark plug cap into the spark plug and check that the connection is secure.



Once the spark plug cap is inserted check that the rubber cap is in contact with the cooling shroud.



## 3.4 Battery

The Vittorazi batteries are composed by 4 LiPo cells connected in series, with a capacity of 3300 mAh and a voltage of 14.8 V, contained inside an aluminum box. The electrical circuit is protected by two fuses, a 15 A pico-fuse and a 60 A fuse. There are two cables coming out of the battery: the ECU power cable (SQUBA 3.6 connector) and the starter power cable (XT60 connector).



The battery is turned on and off by the switch located on the top front. When the battery is switched on, a green flashing LED lights up.



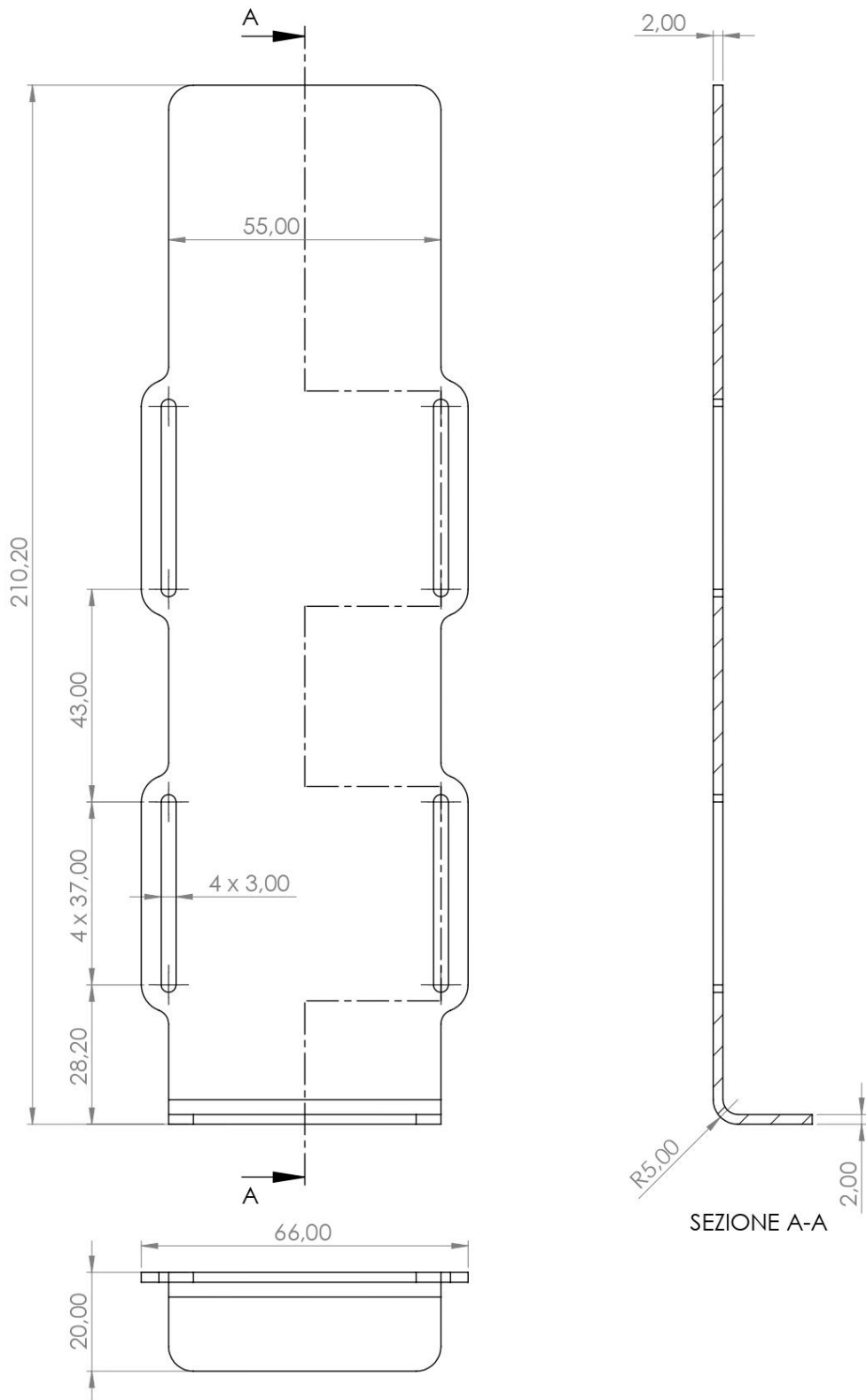
For installation, the PPG frame must be equipped with a battery support that allows the battery to be fixed and secured in place with the Velcro holder provided by Vittorazi.



For safety reasons, the battery must be placed in a position that can be reached safely by the pilot during flight, as far as possible from any source of heat and possible impacts and on the opposite side from the fuel inlet.

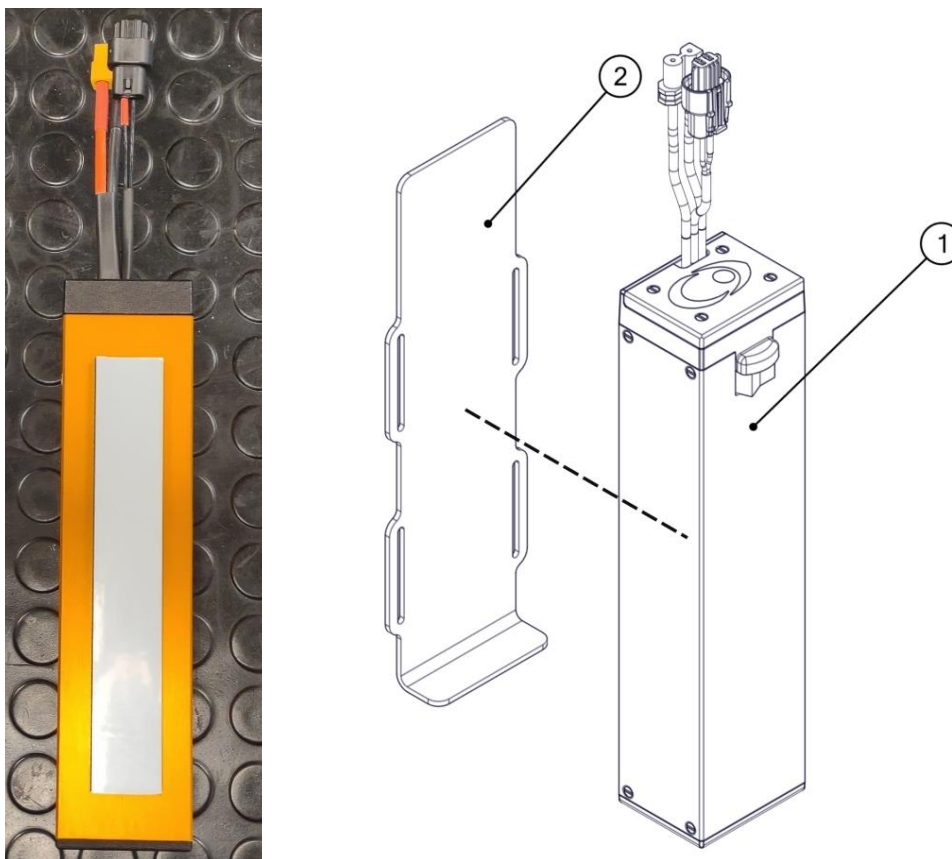


The Velcro holder provided by Vittorazi has been designed to be used with a battery support with the geometry shown in the figure.

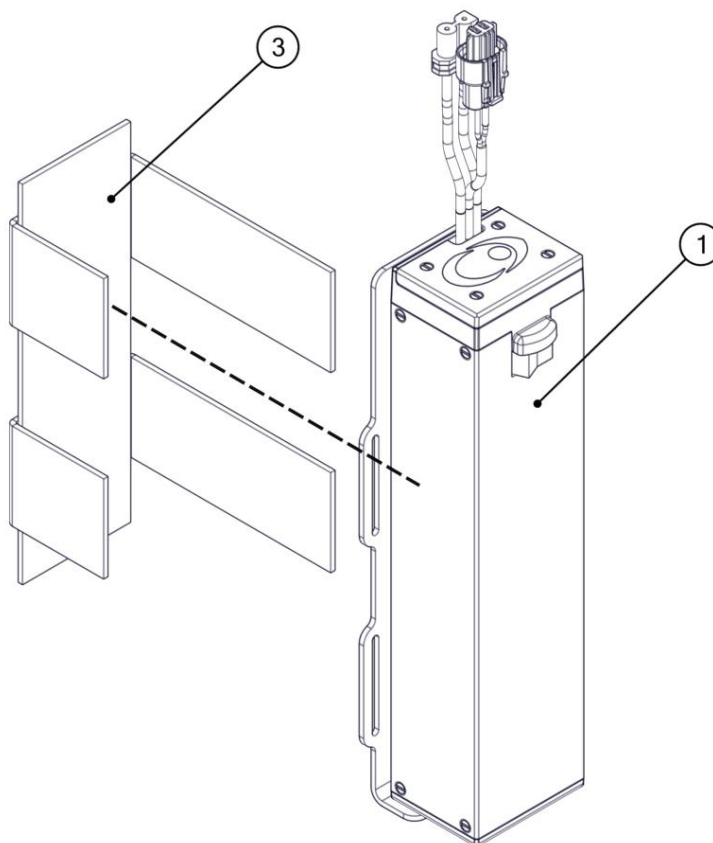


It is important that the battery support does not completely cover the base of the battery to allow air to pass through and liquids to escape in the event of leaks

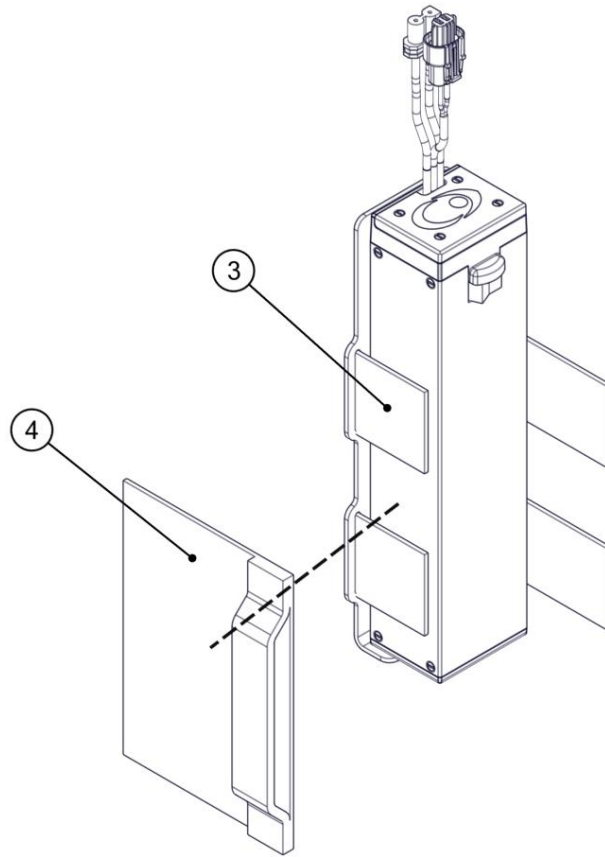
Remove the protective tape from the dual on the back of the battery (1) and attach it to the battery support (2)



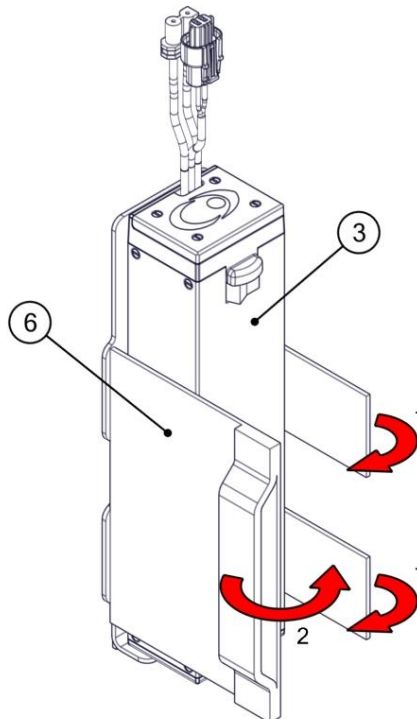
Place the back part of the Velcro holder (3) on the back of the battery support (2).



Attach the front part of the Velcro holder (4).



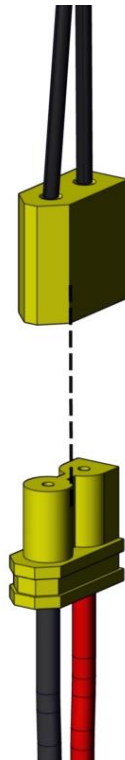
Secure the battery (3) with the Velcro holder (6).



Connect the ECU supply cable (SQUBA 3.6 connector).



Connect the starter supply cable (XT60 connector).



### 3.4.1 Battery warnings



Never put the battery in a pocket, bag or drawer where they can cause a short-circuit. Never lay the battery on electrically conductive surfaces (metal benches, etc.).



Always switch off the battery when refueling.



When a battery suffers an accident, it is mandatory to carry out complete replacement of the battery module.

Before disposing of the damaged battery in the appropriate waste, it is recommended to proceed as follows immediately:

1. Remove the battery from the frame in which it is being used.
2. Place the battery in a safe, open area away from flammable/combustible materials and monitor the battery for at least 30 minutes. Observe for any swelling of the battery and/or an unnatural increase in heat. These are signs of internal damage.
3. Damage to the battery may not be immediately apparent upon visual inspection.
4. Check the battery for short circuits and other damage carefully.



If you accidentally short the battery, it is mandatory to carry out complete replacement of the battery module.

Before disposing of the damaged battery in the appropriate waste, it is recommended to proceed as follows immediately:

1. Remove the battery from the frame in which it is being used.
2. Place the battery in a safe, open area away from flammable/combustible materials and monitor the battery for at least 15 minutes. Observe for any swelling of the battery and/or an unnatural increase in heat. These are signs of internal damage.



When the battery is not used for a long period of time, it is recommended to bring the battery charge to storage voltage (50 ÷ 75 % charge level or two steady and two flashing leds on the battery charger).



Out of respect for the environment, old or damaged LiPo batteries for disposal must be fully discharged before being deposited at the local hazardous waste collection center or returned to the place of purchase. It is recommended that cells be packed with insulating material before discarding them.

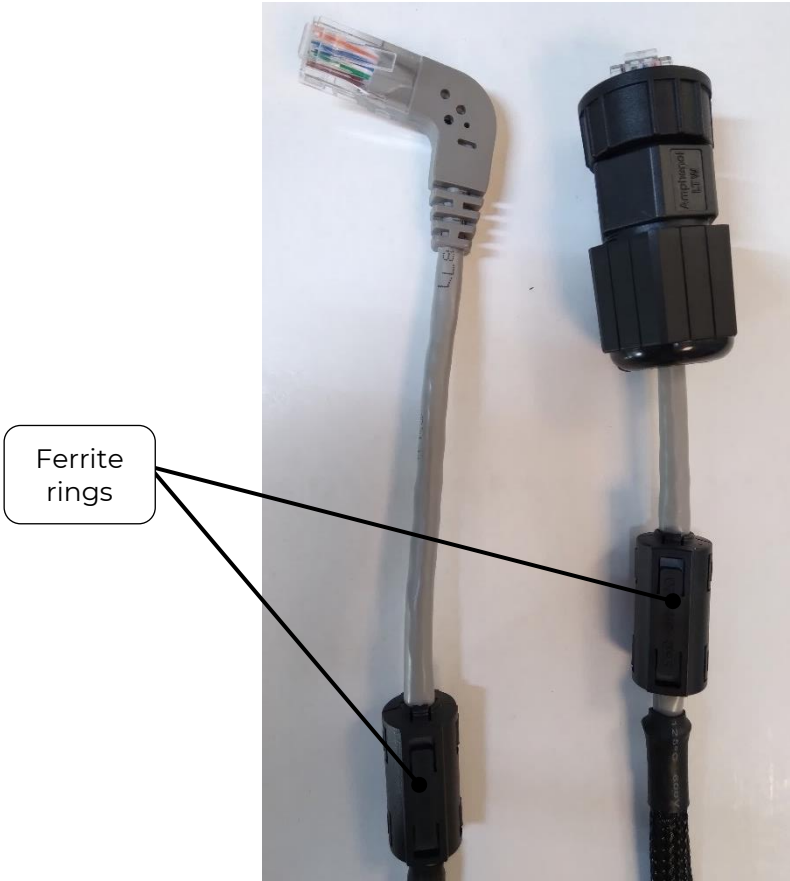


By purchasing these products, the buyer assumes all responsibility for the risks listed below, agreeing not to hold manufacturers, distributors, or retailers in any way responsible for any accidents to property, animals or persons.

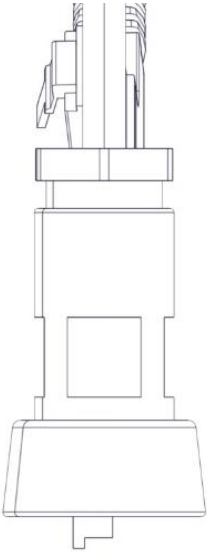
# 3.5 Display



Before installing the RJ-45 cable on the PPG frame, check for the two openable Ferrite Rings placed at its end.

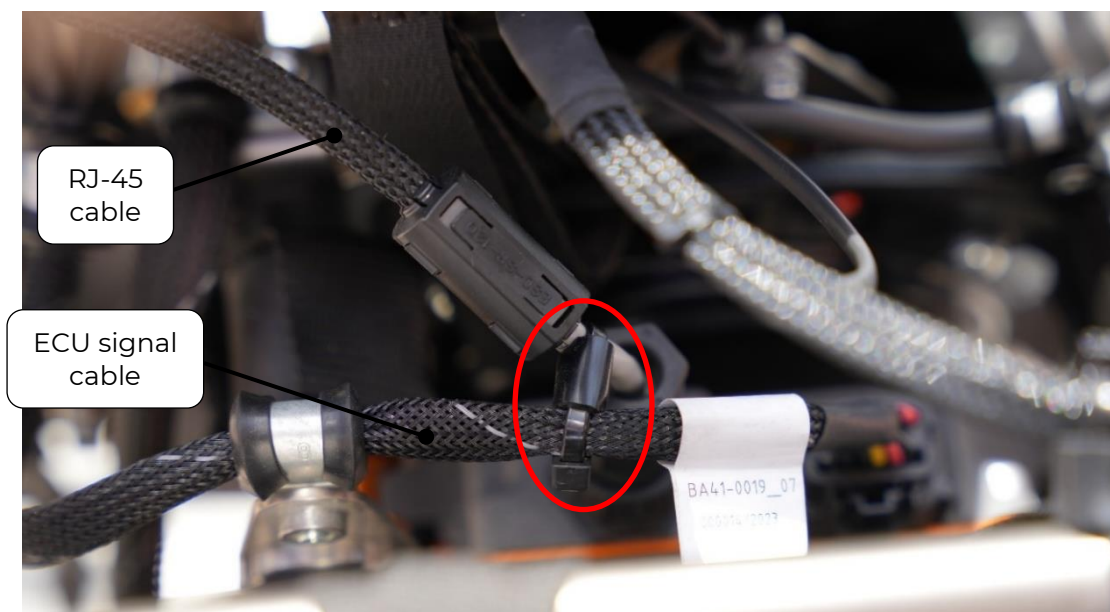


Insert the RJ45 waterproof plug into the ECU socket, screw on the ferrule.





Clamp the RJ-45 cable to the ECU signal cable to block the movement of the RJ-45 cable due to airflow or vibration that could generate stress on the root of the RJ-45 cable.



Fix the RJ-45 cable to the PPG frame to lock it in position, on the side where you consider it to be appropriate to position the display, to prevent any movement of the RJ-45 cable due to airflow or vibration that could generate stress on the root of the RJ-45 cable. Take care to leave a wide bend on the RJ-45 cable between the two fixing points to allow the ECU box to swing around its rubber mounts without pulling the RJ-45 cable.





Place the Velcro display holder supplied by Vittorazi on the PPG frame arm that you consider appropriate.



Bend and tighten the deformable legs of the display support around the PPG frame arm and lock the display support in place by wrapping the deformable legs with the Velcro strap.



Make sure the display holder is securely fixed to the PPG frame arm.

Attach the display on the Velcro display support.

Pass the 90° plug of the RJ-45 cable through the elastic band provided on the display support.



Insert the ferrite ring of the RJ45 cable inside the elastic band provided on the display support.

Ferrite ring  
inside the  
elastic band



Connect the 90° plug of the RJ-45 cable on the display.



## 3.6 Fuel system



The fuel line is controlled by the Fuel Box Unit (FBU), which, through the various signals acquired and processed by the Electronic Control Unit (ECU), is able to regulate the amount of fuel to be injected in each operating condition.

As soon as the ECU is switched on, several checks are performed automatically and the fuel line is filled without the need for manual priming.



The entire fuel system that will be described in the following paragraphs can become very dangerous in case of improper installation. In fact, all the components that make up the system can pose a hazard in the event of a pressurized fuel leak. Extreme care is recommended in operations and to follow instructions scrupulously.

Always keep the fuel hoses and their connections protected with a cap when they are disconnected. Remove the caps only when connecting them.

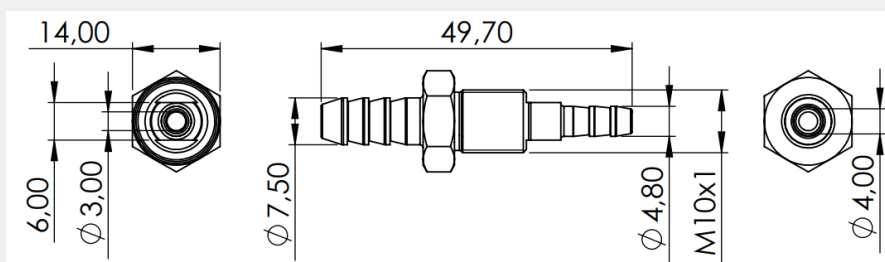
The entry of impurities into the fuel system can impair the functioning of the circuit components and lead to serious hazards.

The use of non-original Vittorazi components can involve severe risks.

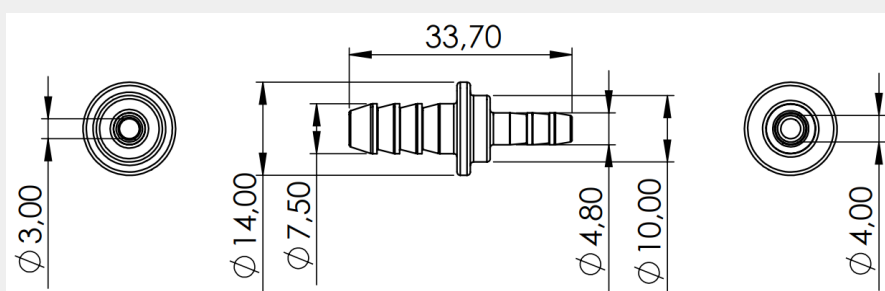
In case of occlusion of a component inside the FBU, it will be necessary to replace the Full Integrated Unit (FIU) and ship the defective one to the Vittorazi headquarters (See maintenance manual chapter 3.5 Full integrated unit (FIU)).



For the installation of the fuel system, the fuel tank must be equipped with two M10 holes on which must be installed the two Vittorazi threaded pass-throughs for the supply and return lines from the FBU.



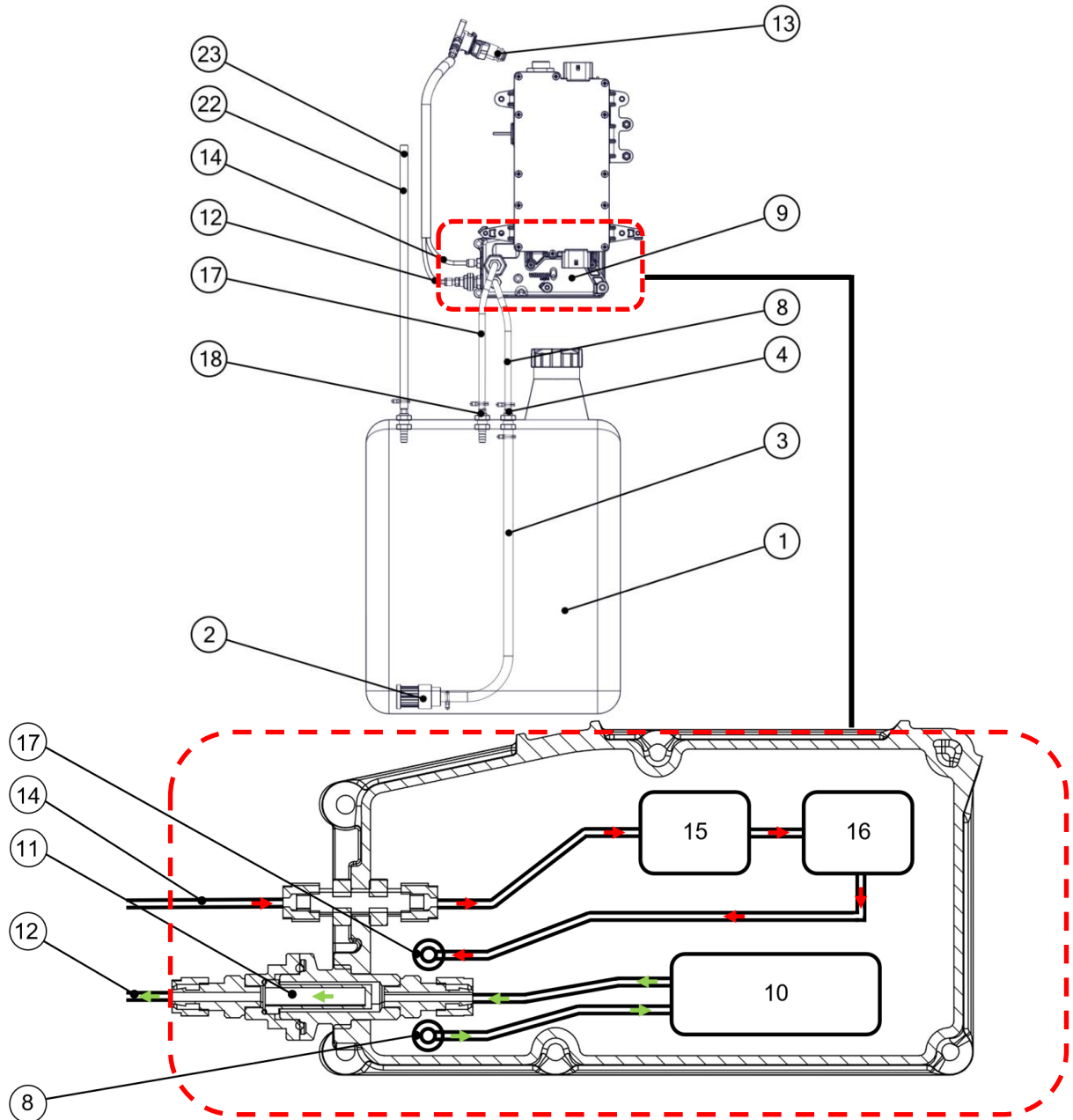
If the tank is equipped with a ring nut connector, the Vittorazi ring nut connector pass-through can be used.



The Vittorazi pass-throughs have been designed specifically for the use of pipes with a smaller diameter than the usual pipes used for the fuel line to minimise the risk of air bubble accumulation along the line.

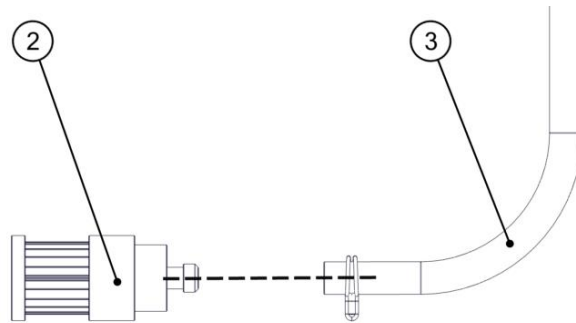
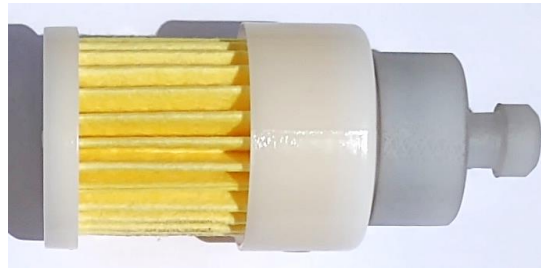
Secure all joints with the tube clips supplied by Vittorazi to prevent leakage and unwanted movement.

The fuel contained inside the fuel tank (1) is filtered by the Vittorazi paper filter (2), flows through the catch tube (3), the Vittorazi pass-through (4) and the FBU supply pipe (8), enters into the FBU (9) passes inside the fuel pump (10), flows through the microfilter (11) and is sent on the injector supply tube (12) to the injector (13). From the injector (13) there is a return line (14) where the fuel goes back into the FBU (9), encounters the pressure sensor (15), the electrovalve (16) and is sent back into the fuel tank (1) through the FBU return pipe (17). On the fuel tank (1) there is a vent pipe (22) with a brass porex filter (23) at its end.



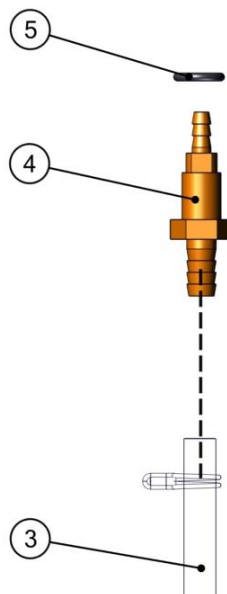
During normal engine operation the electrovalve (16) remains closed, therefore, the injector return line (14) is a static pressurized line. The electrovalve (16) is only opened during the fuel line filling in order to allow the fuel to circulate and remove any air bubbles and in case of overpressure due to fast throttle release.

Prepare a PUR 5.5 x 8.5 mm tube (3) for the internal catch tube of the tank with a Vittorazi paper filter (cod. MI561) (2) at the end.

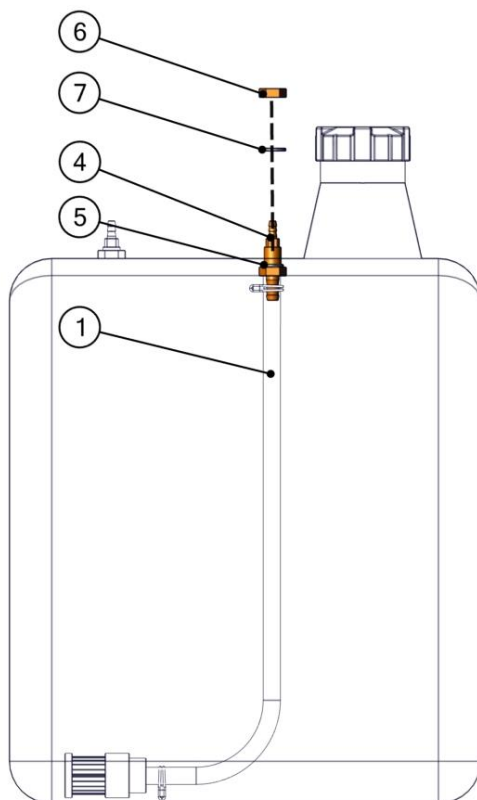


Filters other than the original Vittorazi paper filter can compromise the correct functioning of the EFI system by allowing the passage of impurities contained in the fuel that can occlude the fuel line, the components inside the FBU and/or the injector, causing an irregular functioning of the engine, the engine shutdown during the flight or the fuel leakage due to an excessive overpressure.

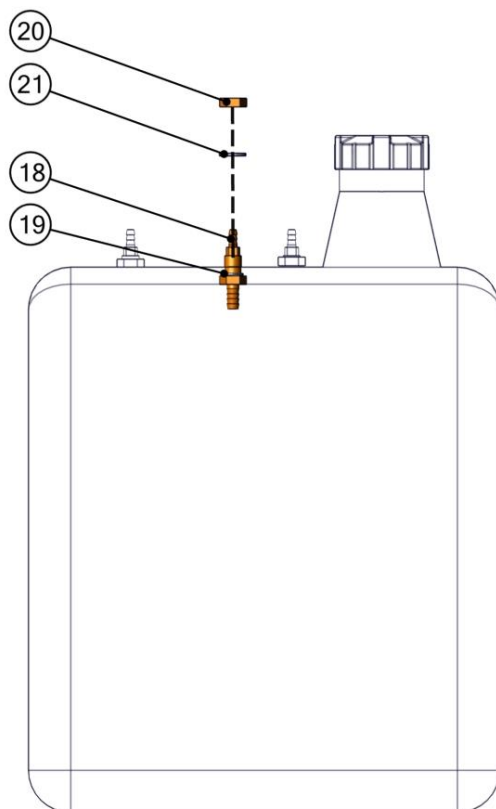
Insert a Vittorazi pass-through (4) on the other extremity of the catch tube (3) and insert the O-ring (5).



Place the catch tube (3) inside the tank and fix the Vittorazi passthrough (4) with O-ring (5) on the tank M10 hole with the M10 nut (6) and the 10x16x1 washer (7) for the supply line.



Insert the second Vittorazi pass-through (18) with Oring (19) on the second M10 hole and fix it with the M10 nut (20) and the 10x16x1 washer (21) for the return line.



Insert the fuel supply pipe (8) and the fuel return pipe (17).



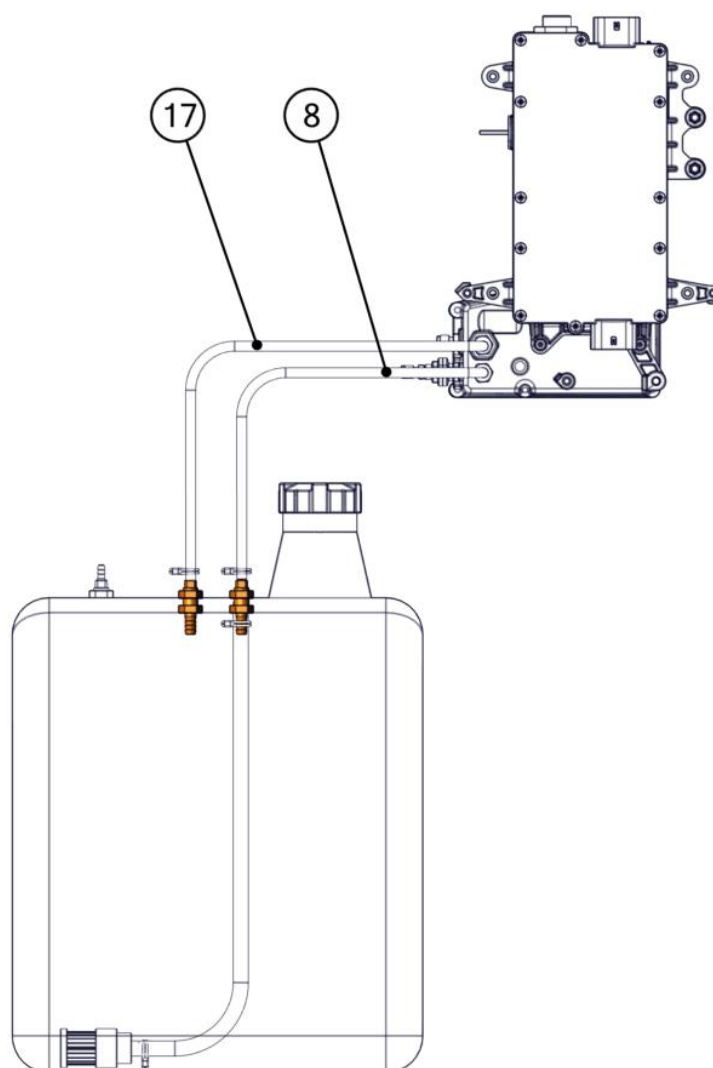


The connection from the tank to the fuel box unit (FBU) must be made with a single direct hose, with an optimal length to minimize pressure drops along the line but without creating any tension or bending of the pipes along the line. Bending on the fuel line can cause the engine shutdown during the flight or fuel leakage due to an excessive overpressure.



Use the transparent 6.4 x 3.2 mm Tygon Saint Gobain LP-1200 tube supplied by Vittorazi for the supply and the return lines. This will allow:

- When the main switch is turned on, to see fuel entering in the FBU.
- With the engine running, to notice possible bubbles due to the air aspiration in the fuel line. In this case, carefully check the pipe connections.



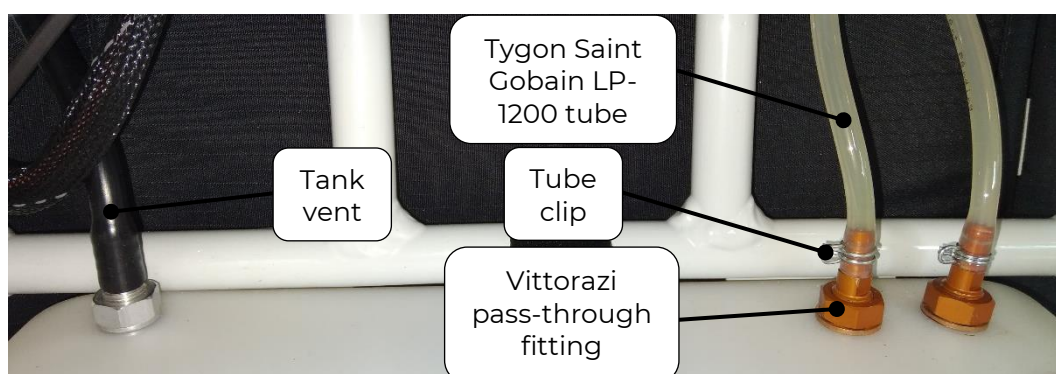
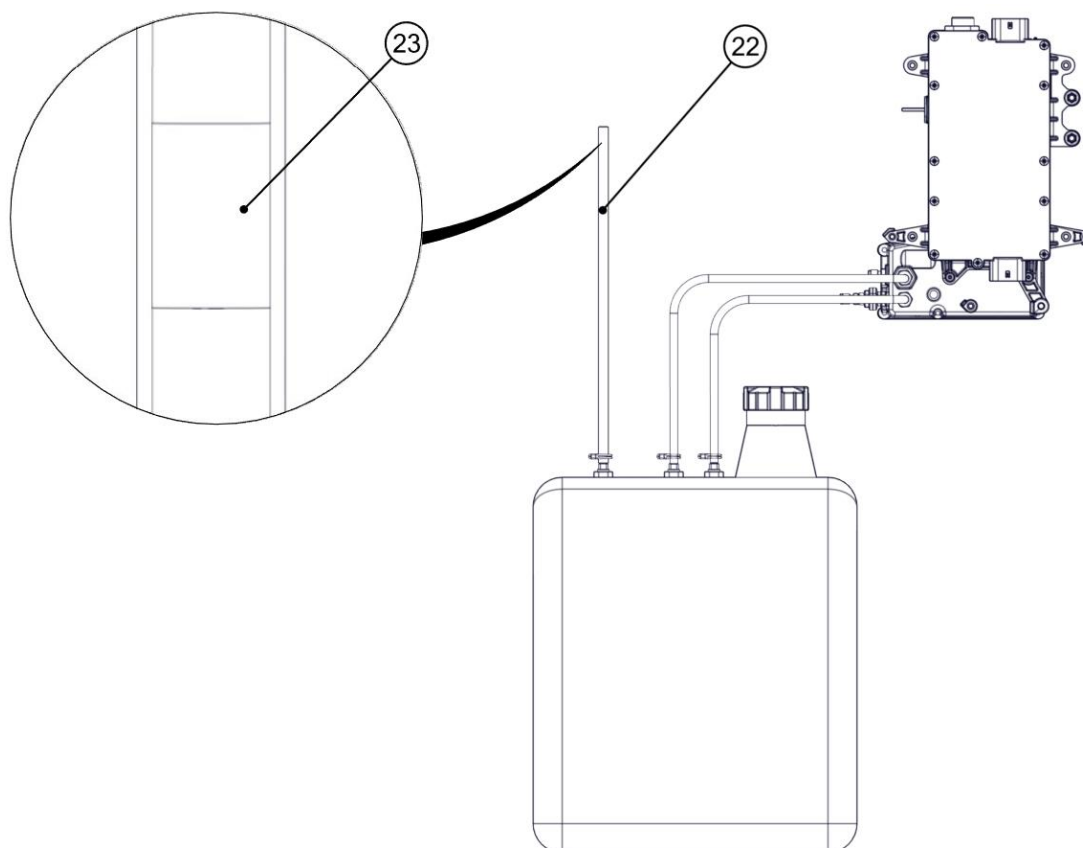




Insert the vent pipe (22) supplied by Vittorazi with its end at about 30 cm from the top level of the tank to avoid pressure variations inside the fuel tank due to changes in altitude or an increase of temperature inside the fuel tank.

Caps equipped with a vent valve are not effective enough to keep the internal pressure of the canister unchanged because they require minimal overpressure to allow air to escape.

Insert the brass porex filter (23) supplied by Vittorazi at the end of the vent pipe (22) to prevent the entry of impurities inside the fuel tank.





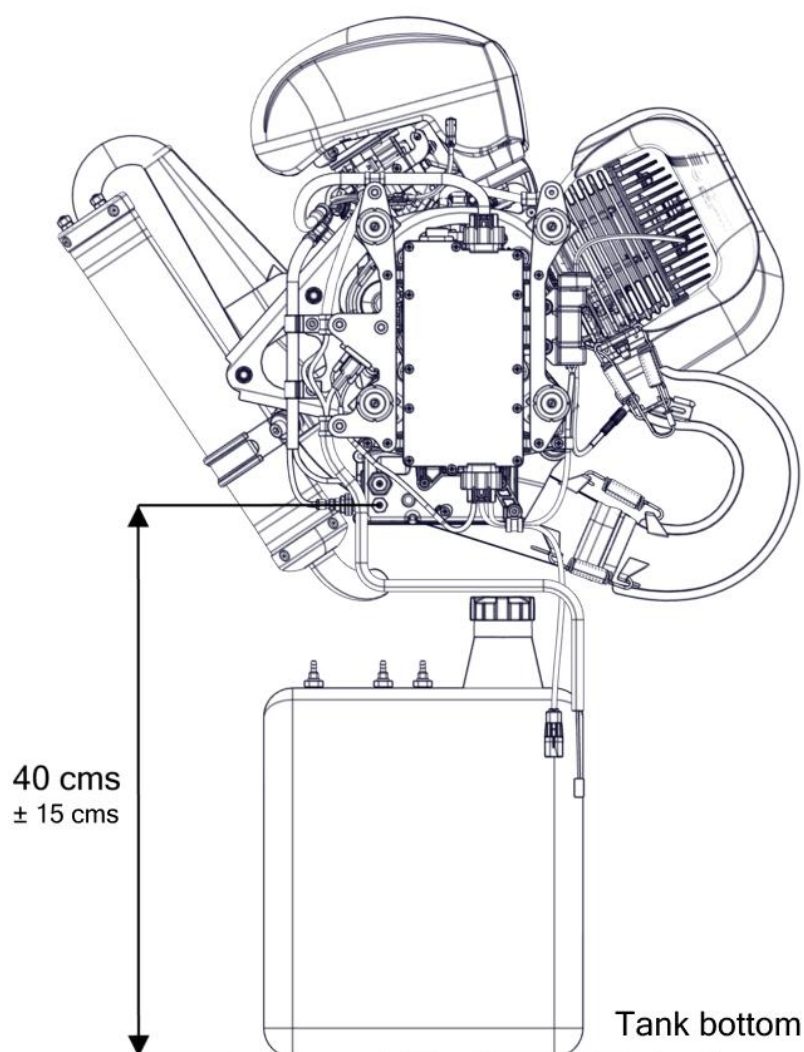
The entire fuel line must be airtight. Entry of air into the line can cause irregular system operation or even the engine shutdown during the flight.



The position of the tank and the configuration of the fuel line could affect the operation of the EFI system and the engine. Vittorazi has performed many validation tests to identify the right configuration and its limits.

The optimal distance between the bottom of the tank and the FBU inlet to ensure proper engine operation is  $40 \pm 15$  cms. A different distance may generate a variation in fuel flow rate, compromising the performance of the EFI system and creating a risk of engine overheating.

In case this value cannot be respected due to particular aircraft geometries, contact Vittorazi directly.

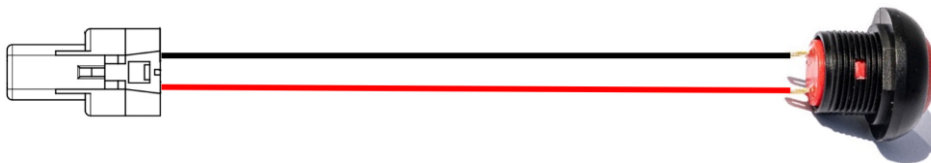


### 3.7 Throttle bowden cable

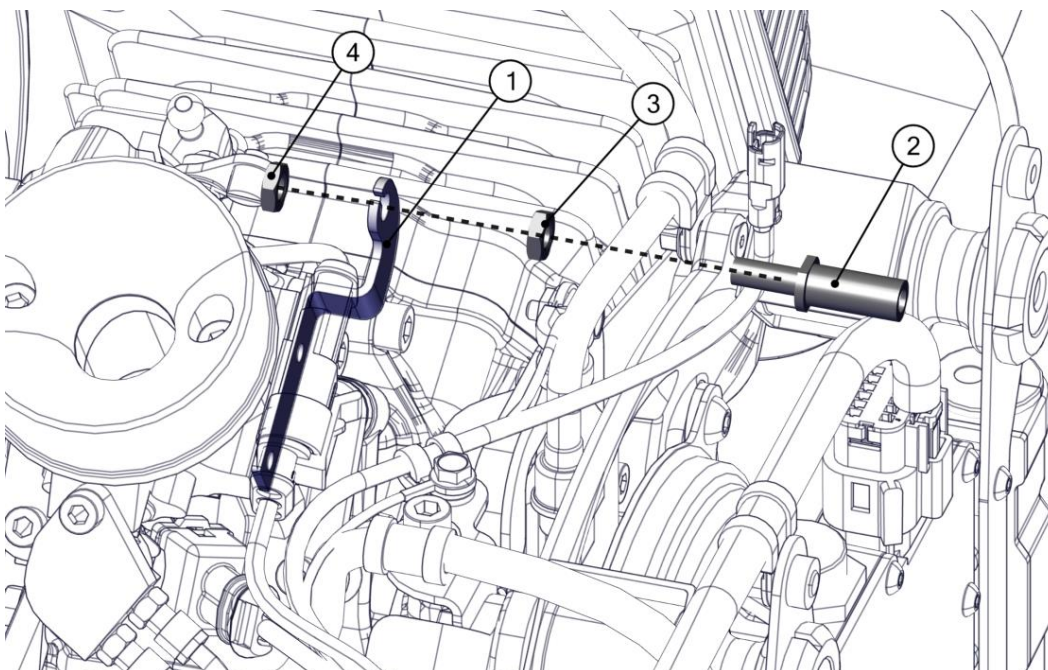
We recommend using the V-Throttle supplied by Vittorazi, which has been designed and tested to ensure proper functioning and safety during use.



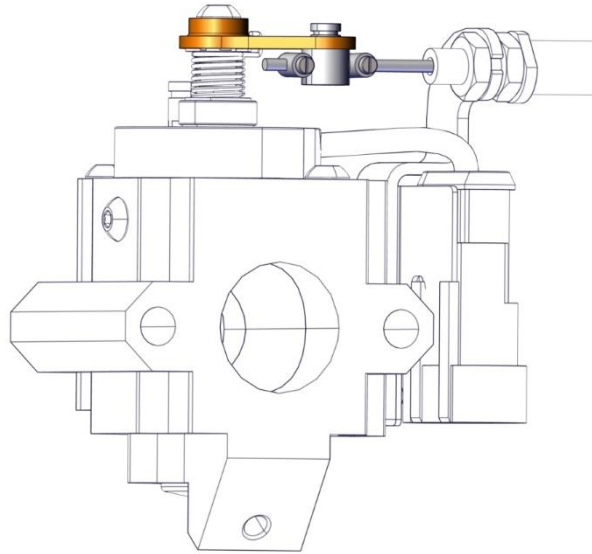
The Start/Stop button of the V-throttle is connected to the bipolar connector through the two wires coming out of the bipolar connector, it does not require a ground connection.



Screw the throttle bowden cable inside the fixing support (1).



Fasten the cable coming out of the fixing support to the air rotary valve lever using 2 nipples as shown in the figure.



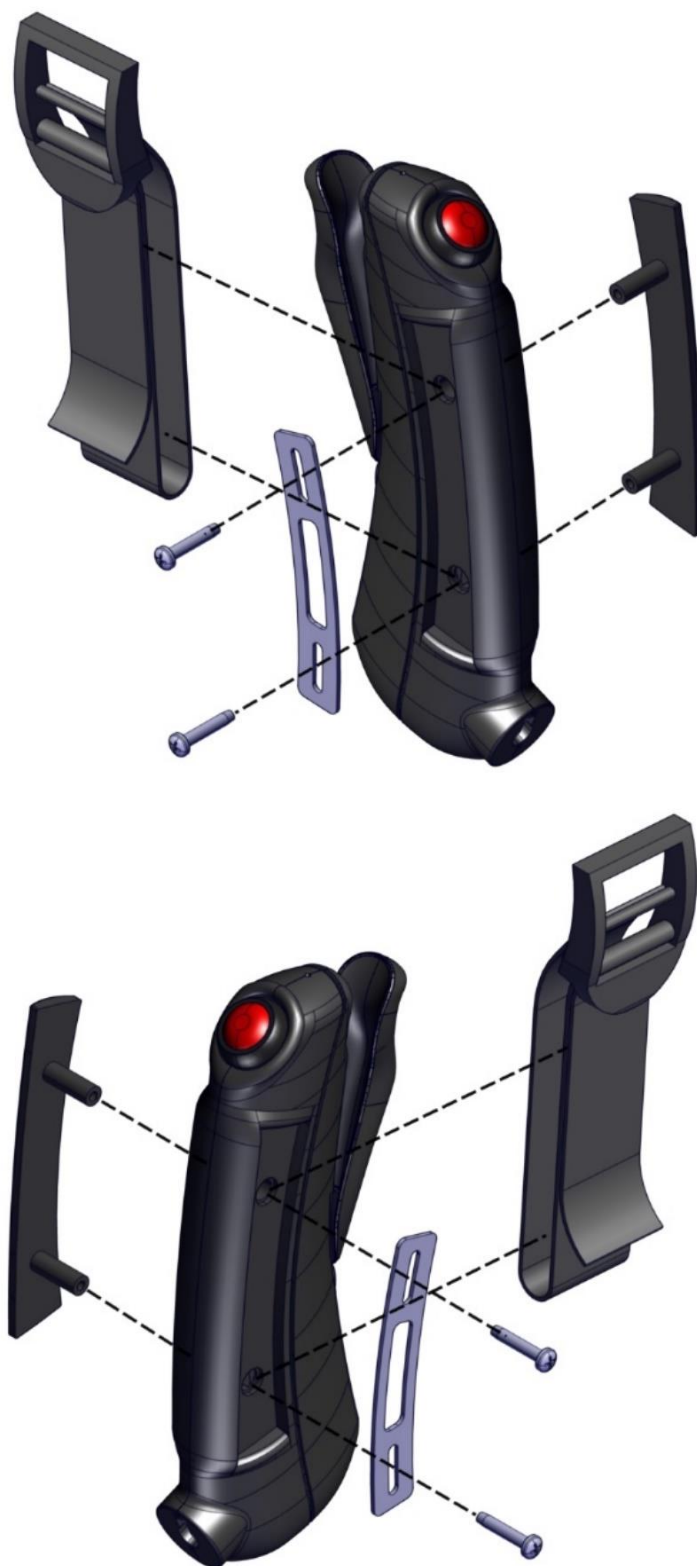
Check carefully:

- the Bowden cable is secured in the screw nipple;
- the full opening of the shutter;
- the sliding of the system;
- the return to the stop position each time the throttle is released.

Connect the start/stop button cable.



The V-Thottle is setted by default in the left-hand configuration, to switch it to the right-hand configuration remove the 2 screws M3x16, the flange and the adjustable strap and reinsert it on the other side



## 3.8 Propeller assembling

Propeller approved:

Reduction	Propeller	Fast acceleration
1/2,68	125 cms (prop. VM-MO185-125-2,68-9-2)	YES
	130 cms (prop. VM-MO185-130-2,68-8-2)	YES
1/2,87	140 cms (prop. H30F 1,40m L-NMM-05-2)	NO



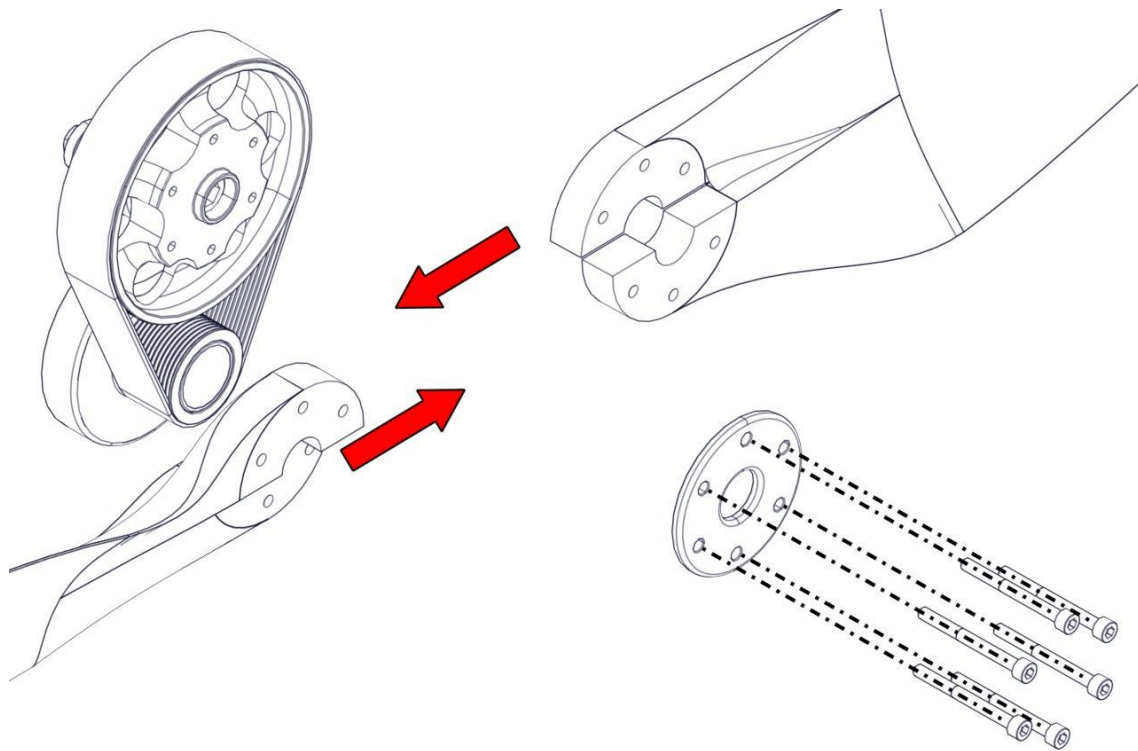
The operation of the Moster 185 EFI engine is determined by the coupling with the correct propeller. All the EFI parameters have been calibrated and optimized with the correct coupling between the engine and the approved propeller.

Failure to achieve this correct coupling can result in a series of serious engine malfunctions, even to the point of endangering the user.

Some examples of what could happen if an incorrect/unapproved propeller is used:

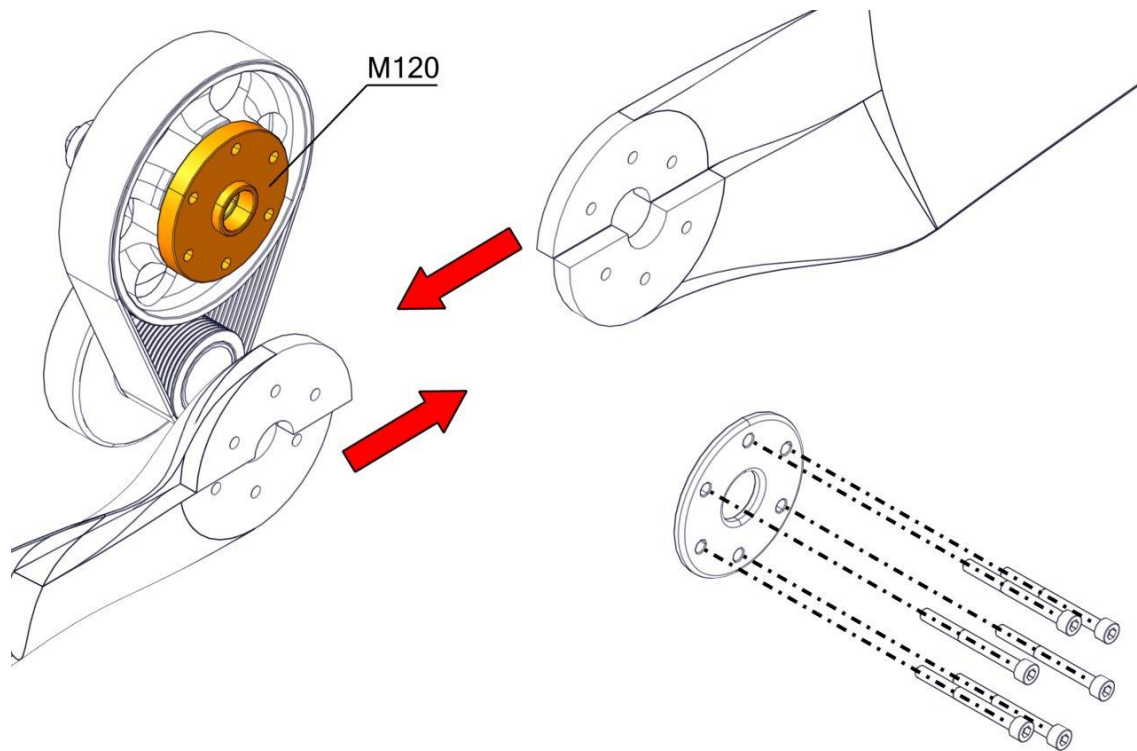
- poor engine power.
- engine acceleration with strong irregularity and instability.
- engine overheating due to incorrect temperature and fuel injection parameters.
- excessive vibrations.
- excessive fuel consumption.
- lack of intervention of EFI system safety devices.

Considering the rear view, the propeller rotation is counter-clockwise. As first operation, couple the two blades in the bayonet recess as shown, then add the screws and the flange. Lastly, place the bottom of the propeller on the reduction hub and tighten the screws progressively until they reach the stop.



Fast acceleration propeller approved from Vittorazi, does not require a spacer between the hub and the propeller.





The extra-cooling profile propeller approved from Vittorazi, needs a spacer between the hub and the propeller. The only spacer authorized for this motor is the one designed and produced by Vittorazi (M120 code in the Illustrated Parts Catalogue). Spacers made with wrong measures or geometries, non-compliant materials, make the engine dangerous and void the warranty.



#### Propeller screws tightening values:

- Carbon-fibre propeller: **10-12 Nm** on each screw M6.

Ask an authorized dealer or the instructor, if you are not sure about the propeller assembling.  
**It is very important to check the tightening of the propeller screws before take-off and after landing.**



Be sure that the screws are suitable to the propeller in use: the thread of the screws is inserted in the hub for at least 12 mms for carbon propellers.



**The use of a propeller not approved from Vittorazi can give rise to serious anomalies and immediately voids the warranty (see also the warranty chapters).**

For Vittorazi the propeller is an integral part of the engine and should not be considered an extra part of the engine. The company has decided to invest in research and study of high-tech solutions, to have an ideal combination engine-propeller in many flight conditions. All approved propellers are designed in collaboration with Vittorazi engineers, with the aim of giving maximum performance and safety. Let's see some features guaranteed in the approved propellers:

- The adequate operation in optimal RPM-Range of engine and propellers.
- The best thrust during take-off and critical flight conditions, optimizing the energy transfer in a disturbed airflow.
- The best fuel consumption in all flight conditions, thanks to the most efficient profile and angle of attack.
- The optimization of the dynamic torque effects and static torque effect, through a lightweight structure and designing low resistance profiles.
- Avoiding resonant frequencies through optimized carbon fiber structure of the propeller and avoiding annoying vibrations along the entire RPM range.
- The correct balancing of the propeller by static and dynamical procedure, combined with a safe and precise mounting by CNC machined holes.
- The reduction of noise thanks to the best profiles and the tip speed below 0,65 Mach.
- Additional design features, as the extra cooling profile to increase the ventilation of the cylinder head temperature (CHT) till the best working temperatures.
- Engine safety and reliability are given by the long endurance tests (200 hours) performed in extreme conditions with the approved propellers, to check if there are any critical issues before the production.



**The engine warranty ends when the propeller, the engine or the aircraft has an accident.**

After a propeller has broken, the engine is no longer safe. The engine must be completely checked by an authorized center in every part of the system before resuming flight activity. This is also necessary for the rest of the aircraft. The statistics lead to the inspection of the following engine components:

- Reduction drive unit (propeller hub, bearings, reduction cases, main propeller shaft gears, screws, others).
- Engine carter case, engine rubber mountings, main screws.
- Exhaust system and silencer unit.
- Injector pipes and electrical wiring.
- Airbox system (airbox, sleeve, safety devices).
- More.

In case of damage of the propeller, replace it immediately with a propeller guaranteed by Vittorazi Motors. Replace in any case all screws of the propeller.

## 3.9 Final checks

Once all components have been installed, the following checks should be carried out:

- All screws tightening applied during the installation process.
- Correct operation of the throttle.
- Pipe connections and no fluid leaks.
- All the electric connections safely wired.
- Correct ignition of the engine by the electric start
- Correct operation of engine instruments (terminal display).
- Engine stop by start/stop switch.

Upon completion of the work, a ground test and then additional flight approval is required to ensure proper operation of the system. For each new model aircraft, a series of test must be performed and documented in appropriate reports after the initial engine installation. The company Vittorazi strongly recommends sending those reports that contain operating data (RPM, temperatures, consumption, etc) for validation.



