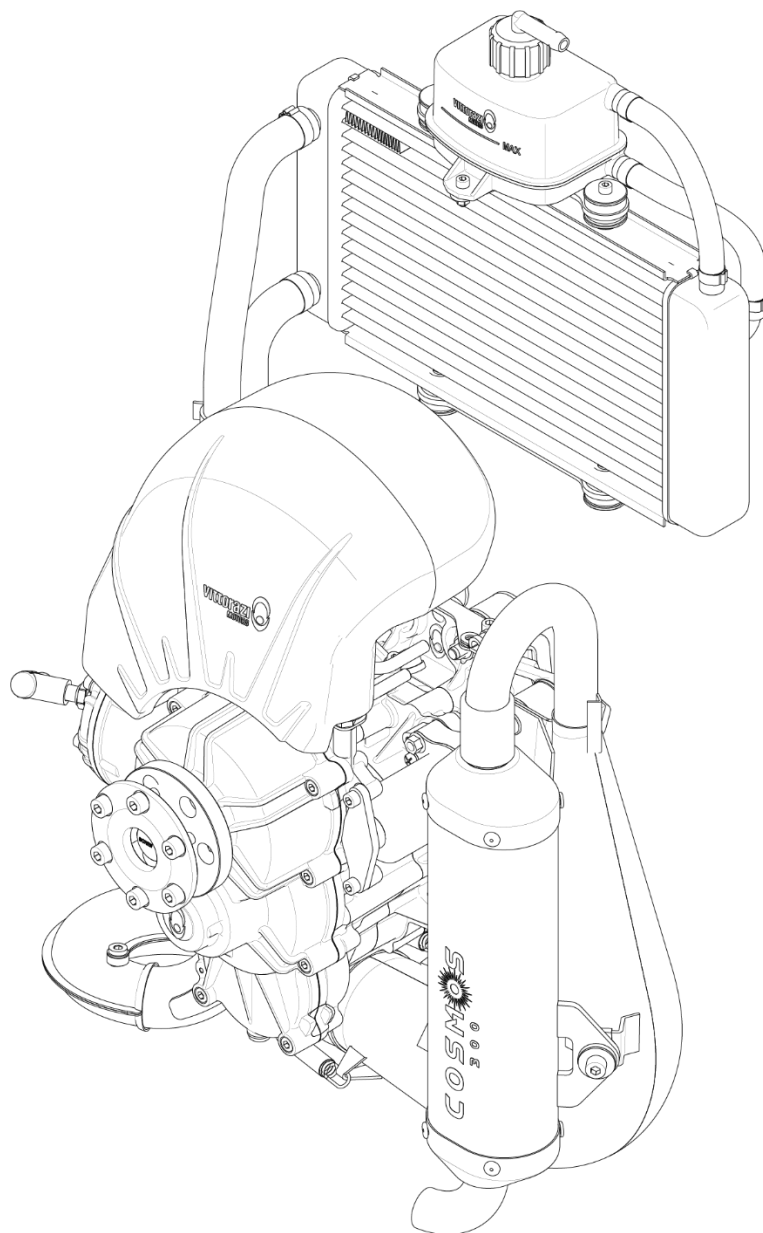


COSMOS 300

Installation manual

release V2/2022



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1 Introduction

Congratulations and thanks for being a Vittorazi qualified professional.

This manual is intended as a point of reference for aircraft manufactures, dealers, 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, danger, risk

Any situation or condition which may result in a serious danger



Recommendation, warning, 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 held 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 6.500 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.



For the proper engine operation, the coolant temperature measured by the head sensor must be within the limits indicated below. In case of a temperature outside the indicated thresholds (Min; Max), contact the aircraft manufacturer.

- Max 90 °C.
- Min 65 °C.



The temperature limit of EGT is 650° Celsius. Do not persist above this temperature threshold, engine overheating and irreversible damage could occur.

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 held harmless the company from any liability for any damage due to the malfunctioning and immediately void the warranty of the product.

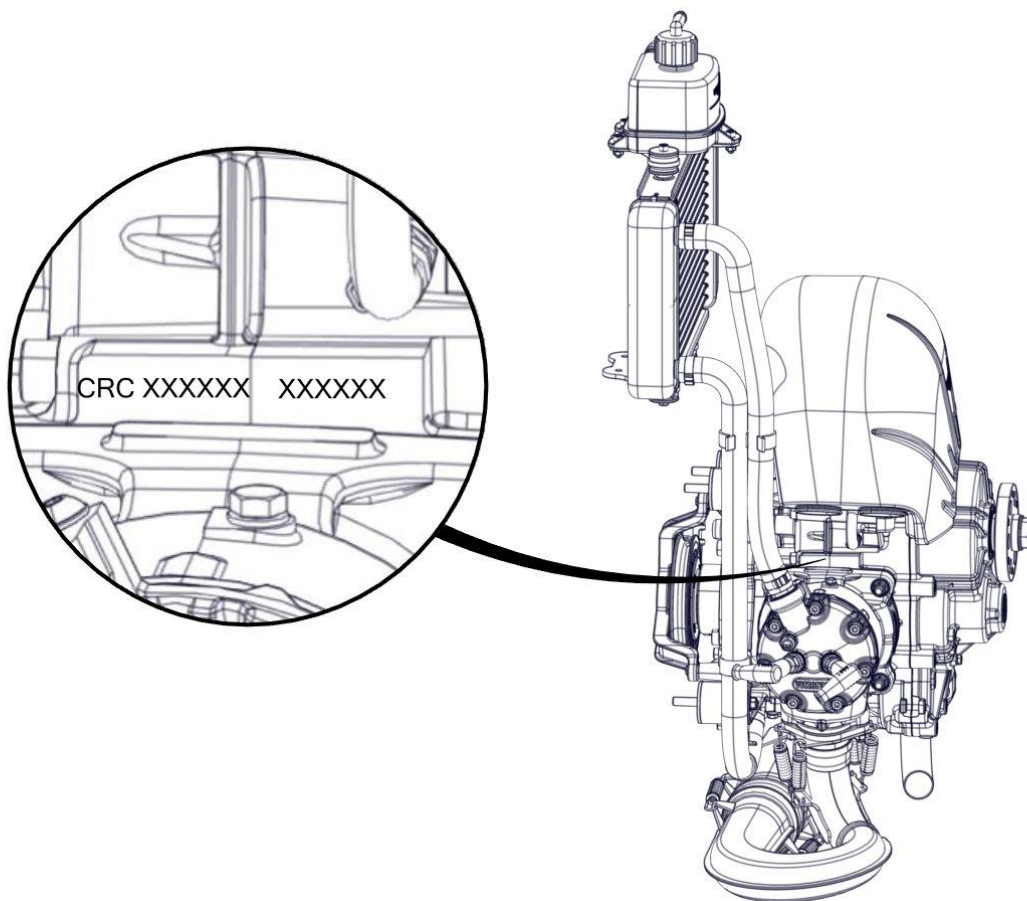
Vittorazi shall not be liable for any damages deriving from the installation of its motors onto aircraft and/or equipment that require airworthiness certifications.

Frame design must give strong consideration to the following sections: 3.2 Supports to the frame, 3.3 Electrical system, 3.4 Fuel system, 3.5 Cooling system. It is also recommended to carry out the checks described in the relevant paragraph (3.12 Final checks) before starting the engine.

3.1 Preparing for installation

On delivery of the engine:

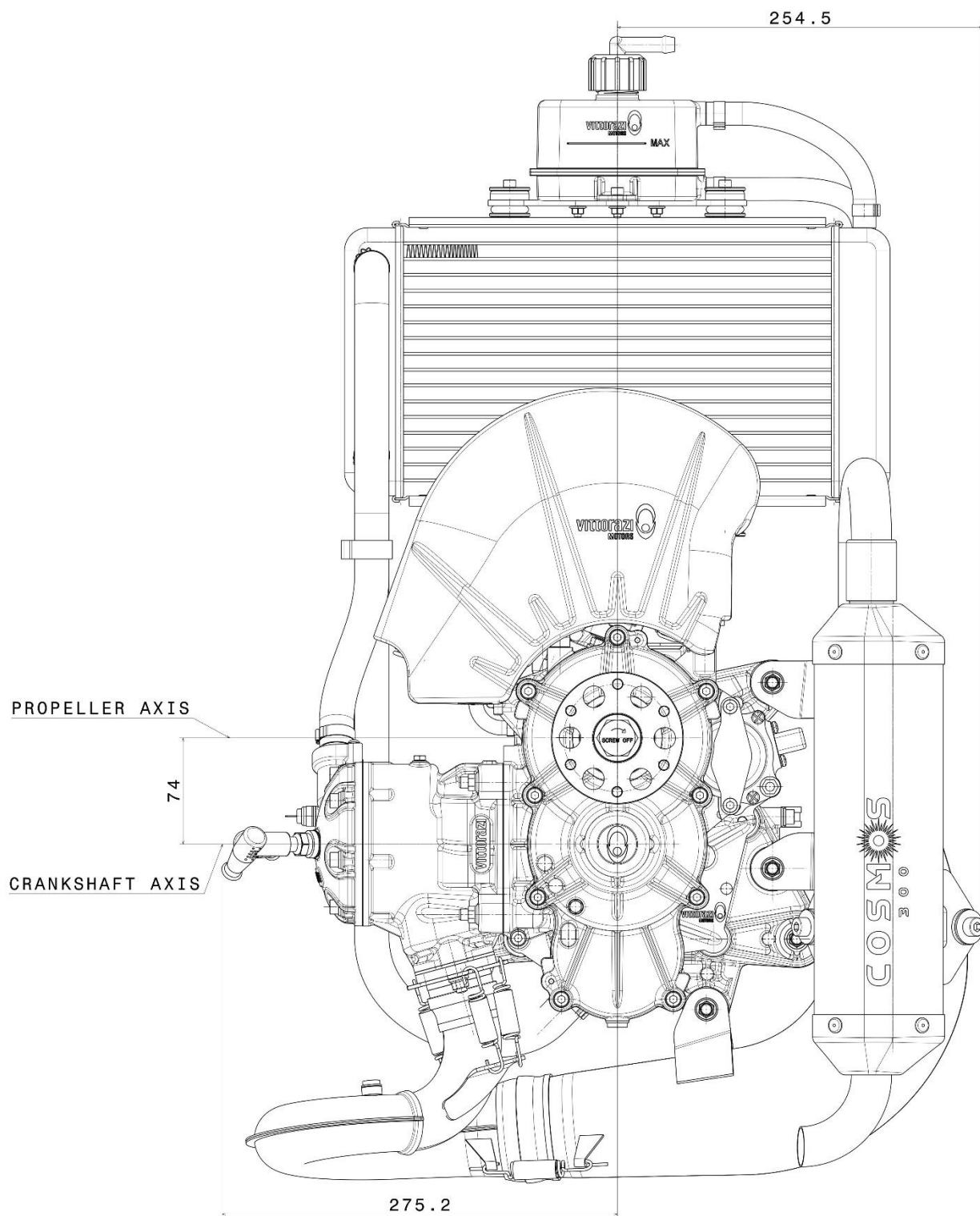
- Check that the six-digit serial number on the engine casing matches the number on the packaging box.

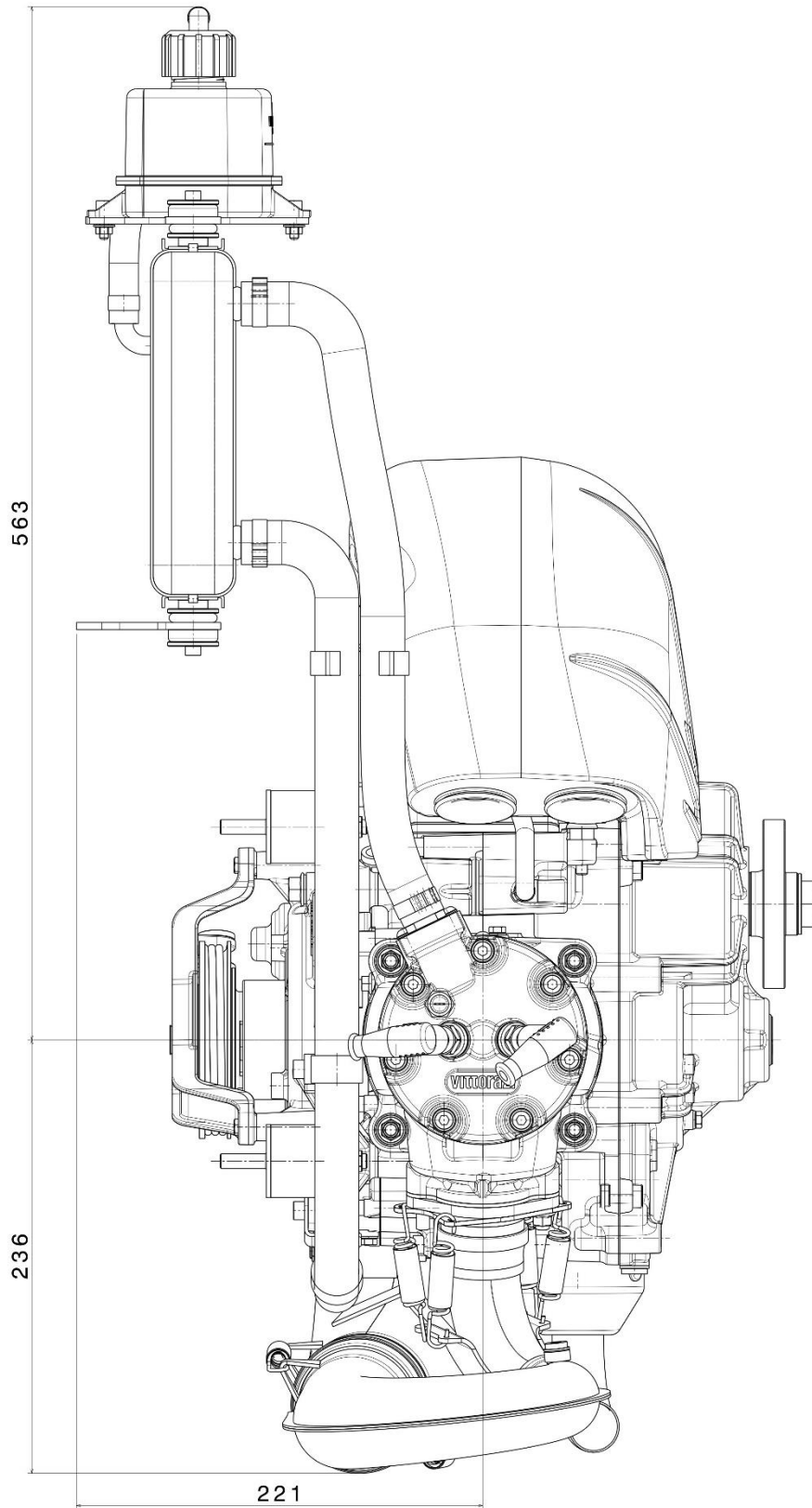


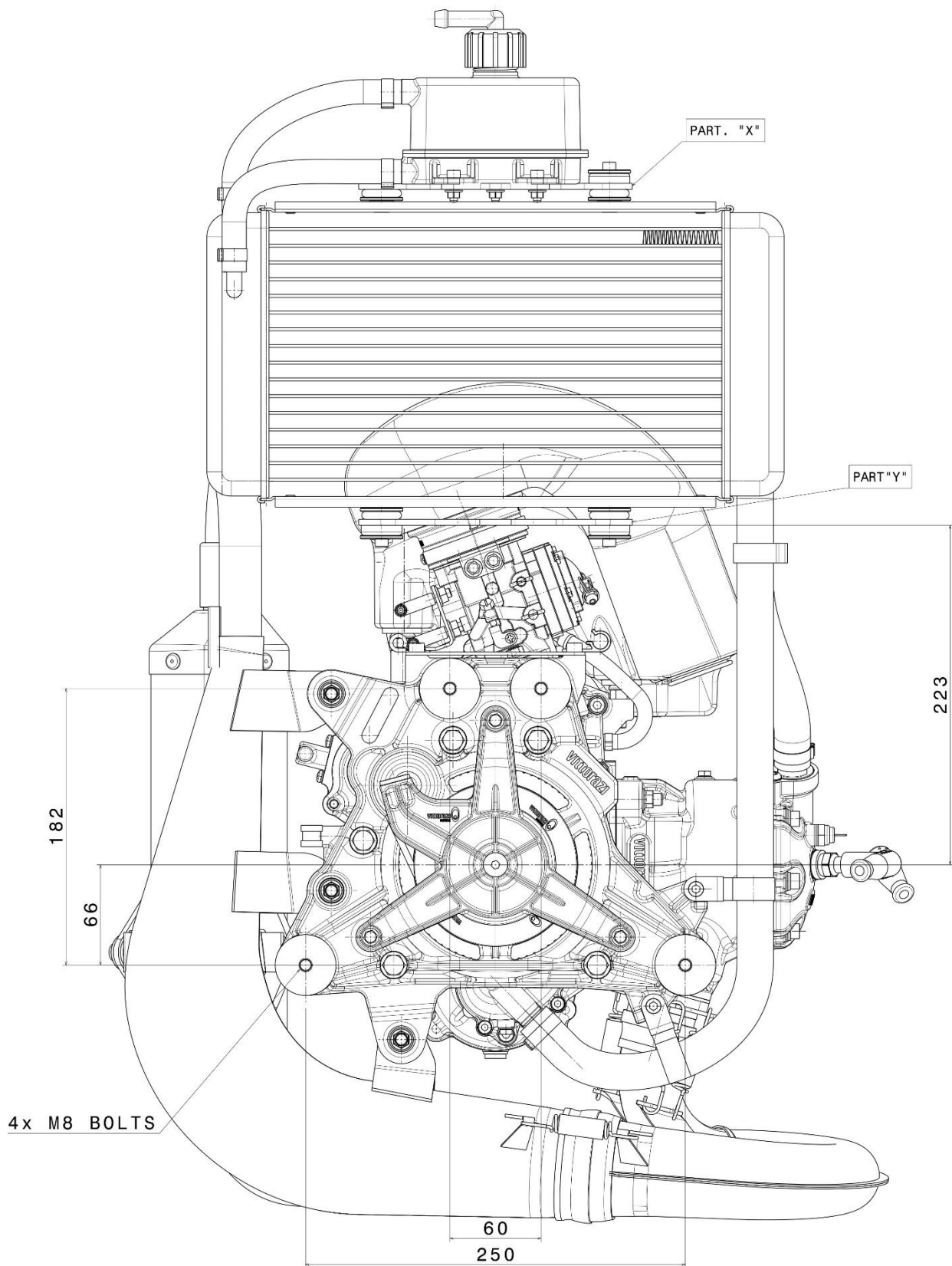
Check that there is no damage of any kind related to the transport of the engine.

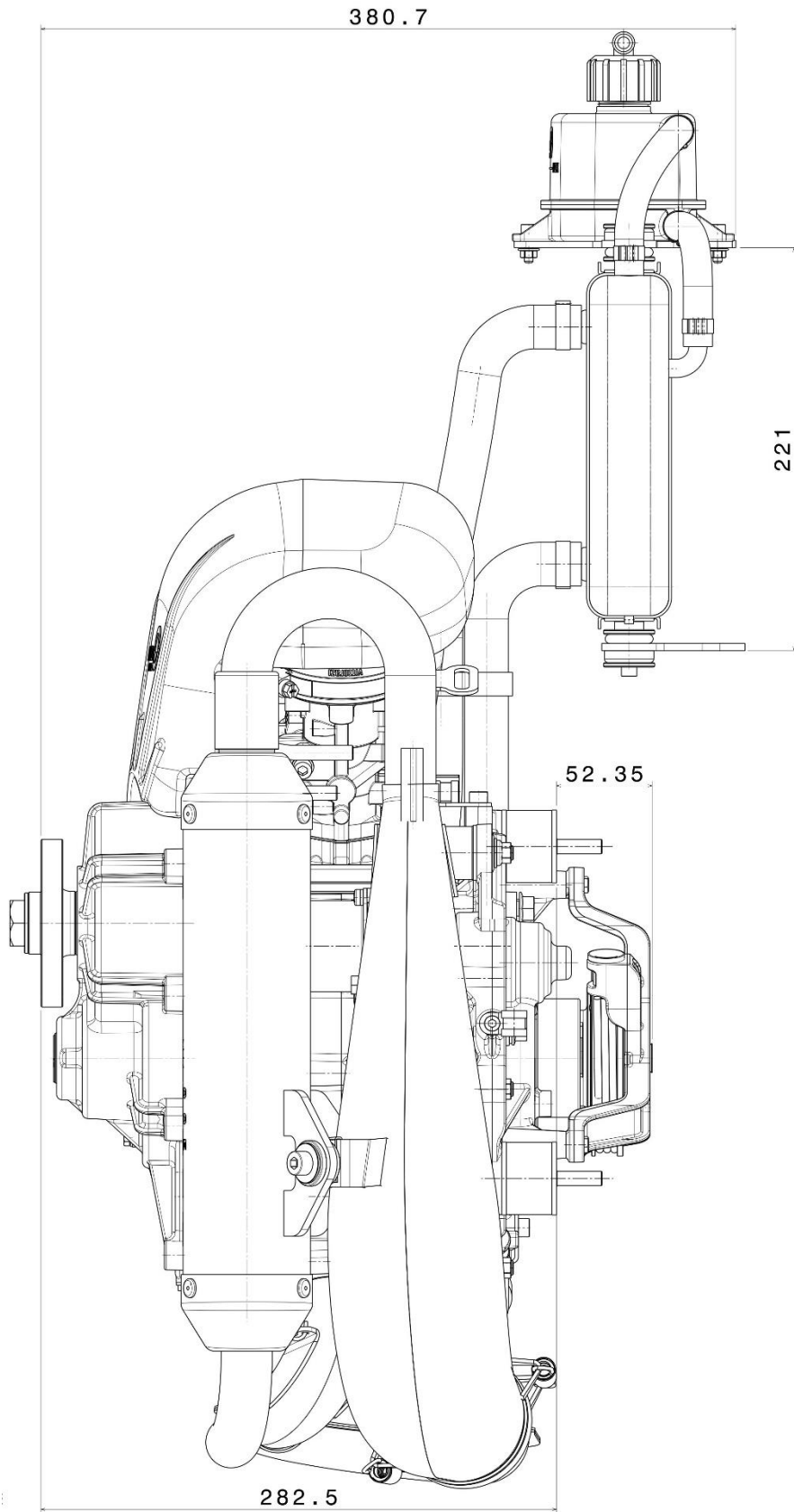


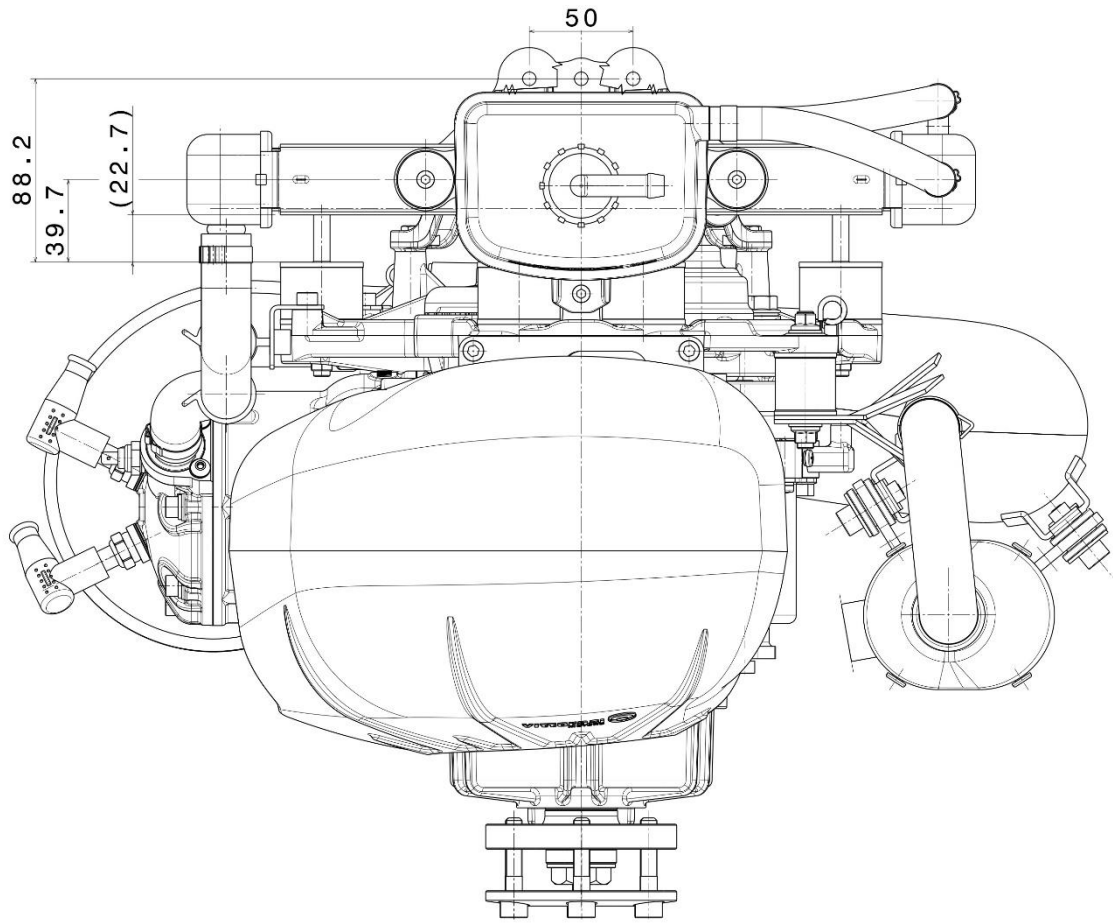
Engine openings are closed by special plugs to prevent the entry of foreign substances and moisture. These should only be removed when necessary, for installation.



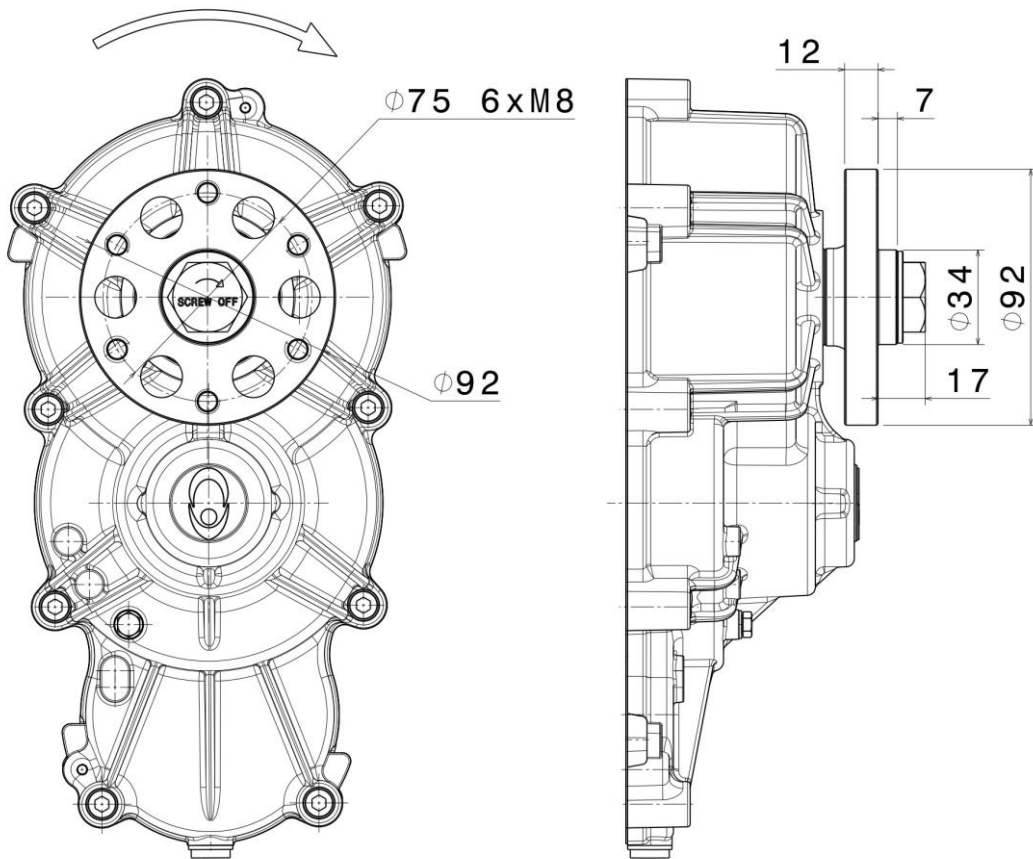






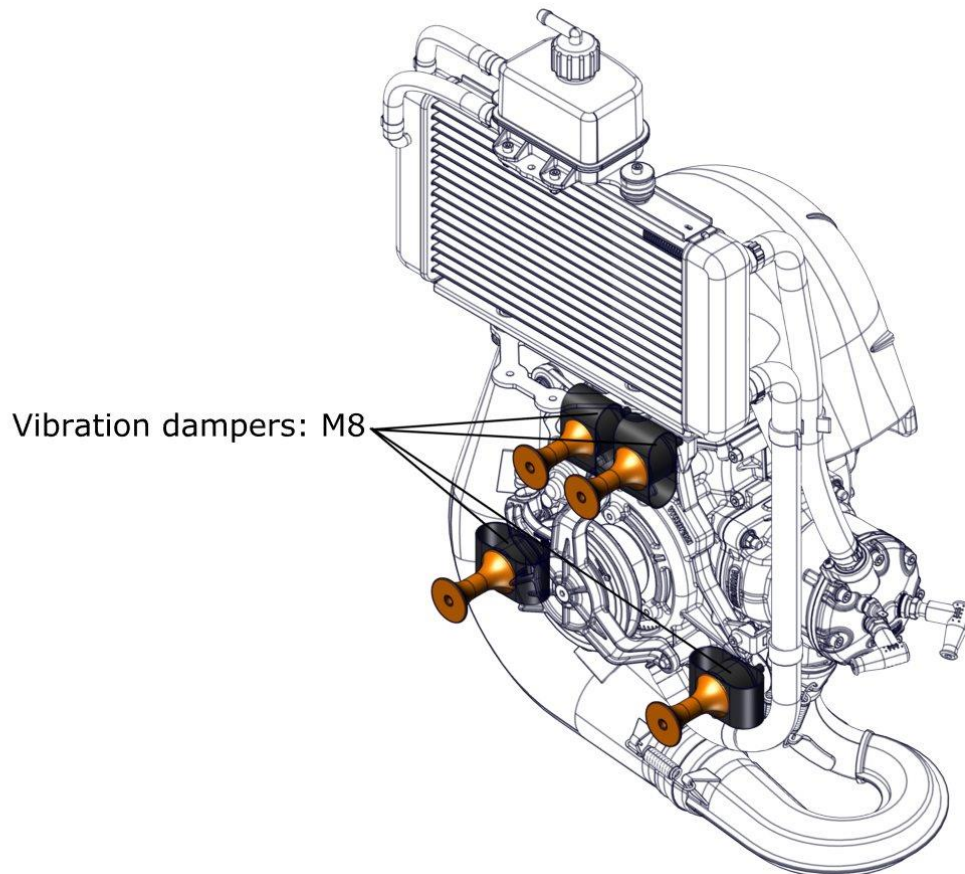


PROPELLER ROTATION



3.2 Supports to the frame

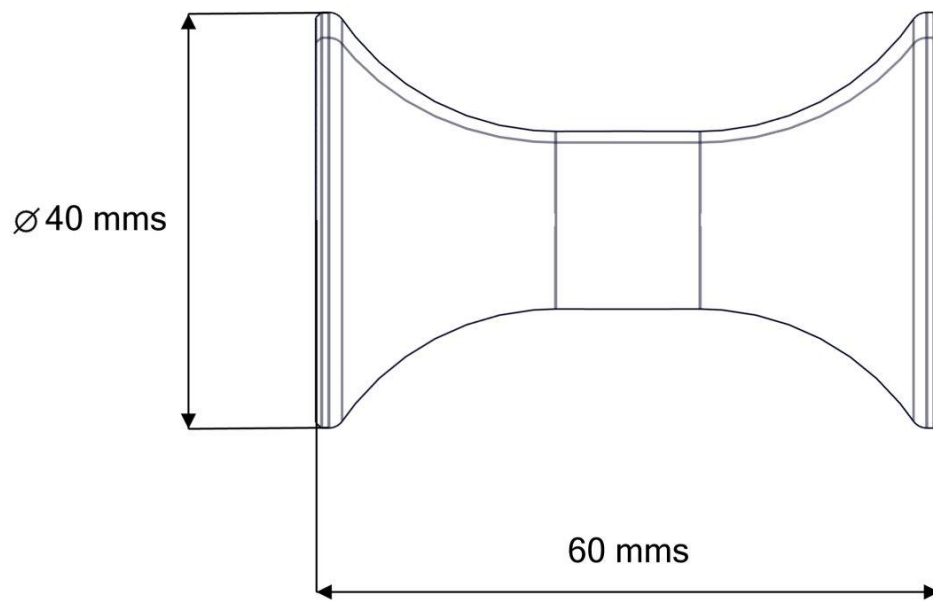
The engine is fixed to the aircraft frame through the 4 dampers. Do not replace the dampers, as they are designed and approved for this engine. Use M8 nuts for fixing, taking care not to rotate and damage the rubber part. The vibration dampers reduce the vibrations transmitted from the engine to the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



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



According to the geometry of the frame, spacers can be used between the motor attachment points and the frame. Vittorazi has a series of aluminum spacers already tested for this engine.



3.3 Electrical system

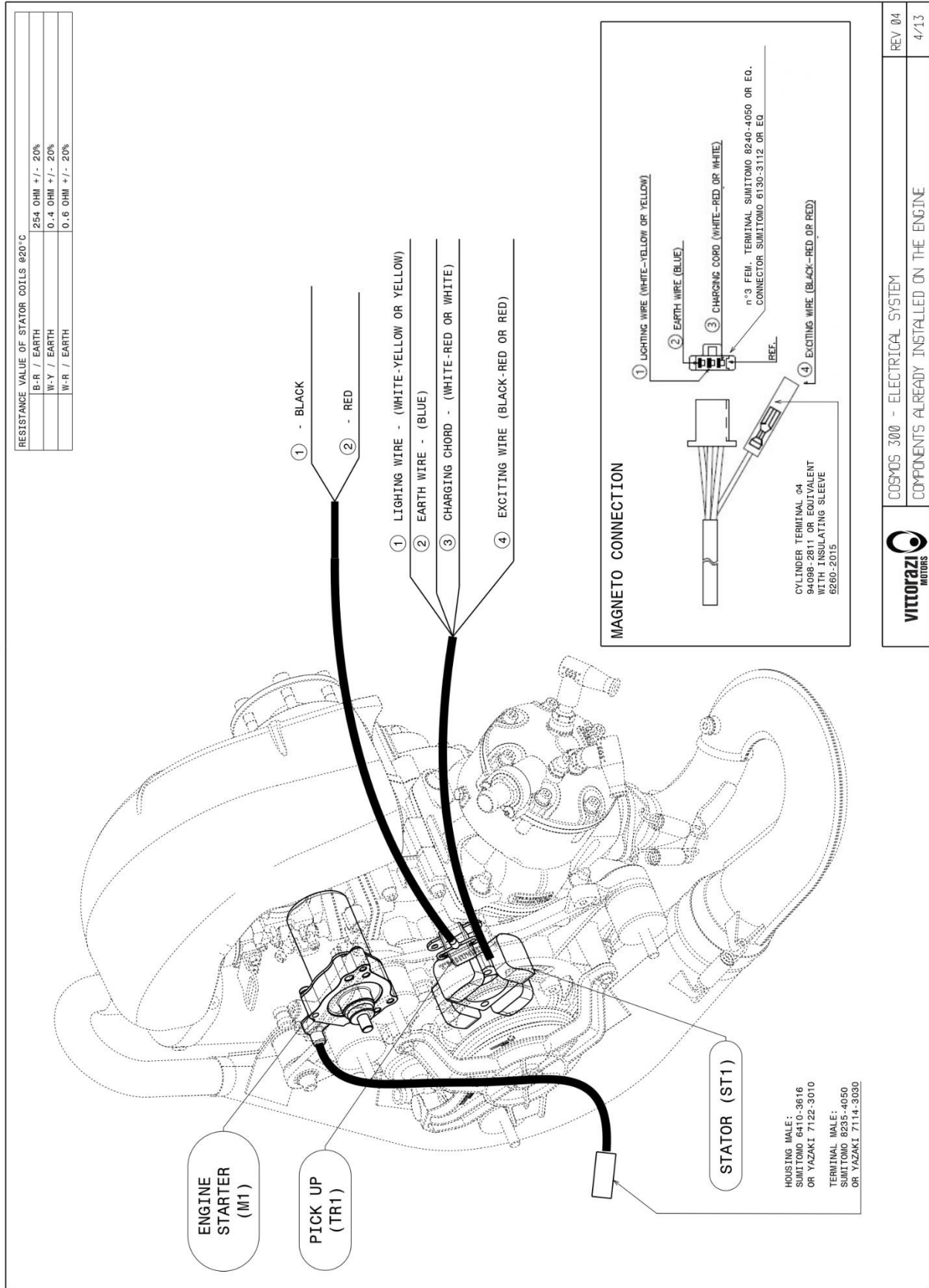
There are the 3 different versions of Cosmos 300:

- **Single Spark, Manual starter;**
- **Single Spark, Dual starter;**
- **Twin Spark, Dual starter.**

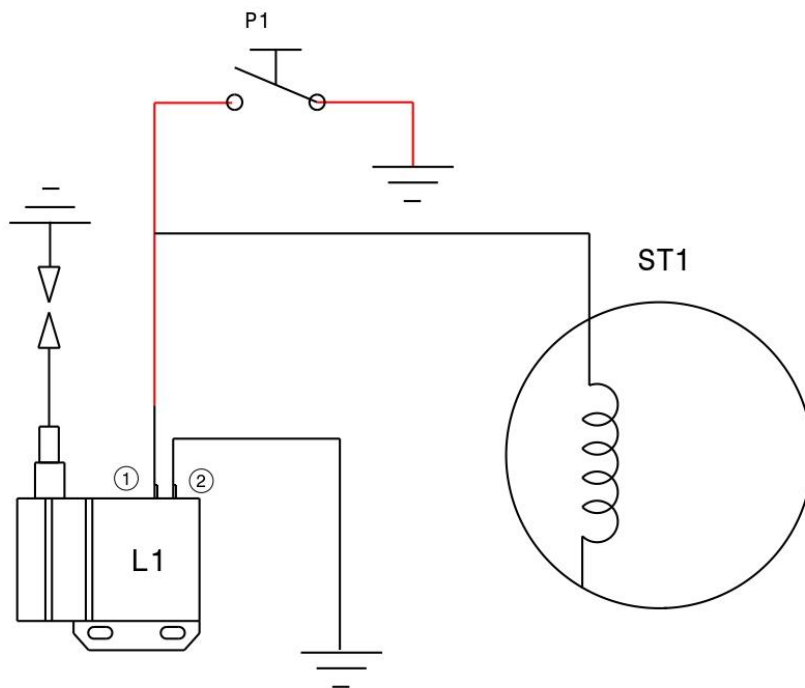
The table below shows which components are installed on each engine version.

Version	Components		
	<i>Stator</i>	<i>Engine starter</i>	<i>Pick up coil</i>
Single Spark, Manual starter	X		
Single Spark, Dual starter	X	X	
Twin Spark, Dual starter	X	X	X



The illustration below shows the position of the electrical components installed on the engine in the Twin Spark, Dual starter version.



Circuit diagram Single Spark, Manual starter



P1	STOP BUTTON
L1	PRIMARY COIL
ST1	STATOR

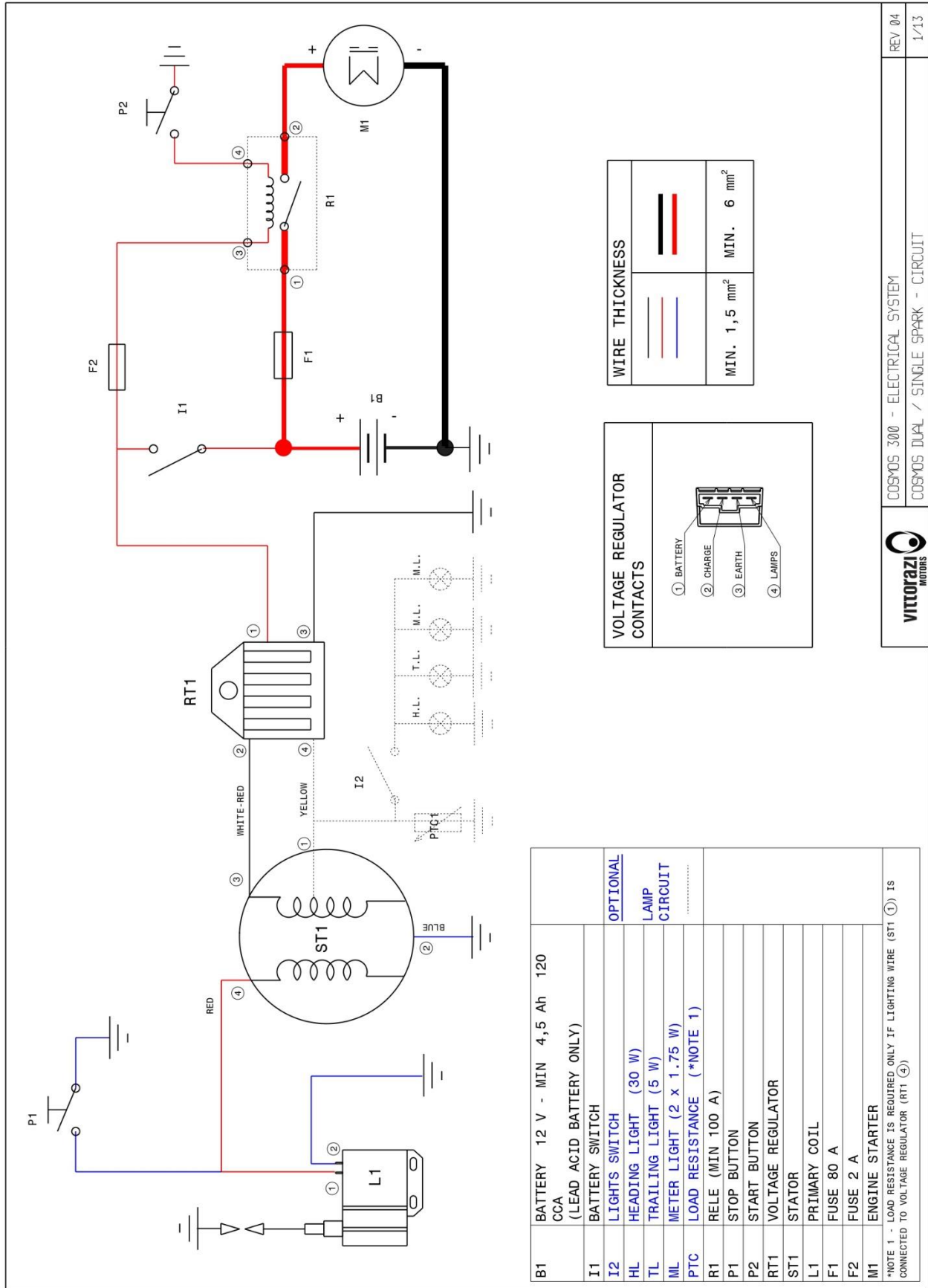
WIRE THICKNESS	
	
MIN. 1,5 mm ²	MIN. 6 mm ²



COSMOS 300 - ELECTRICAL SYSTEM
 COSMOS MANUAL / SINGLE SPARK - CIRCUIT

REV 04
 3/13

Circuit diagram Single Spark, Dual starter

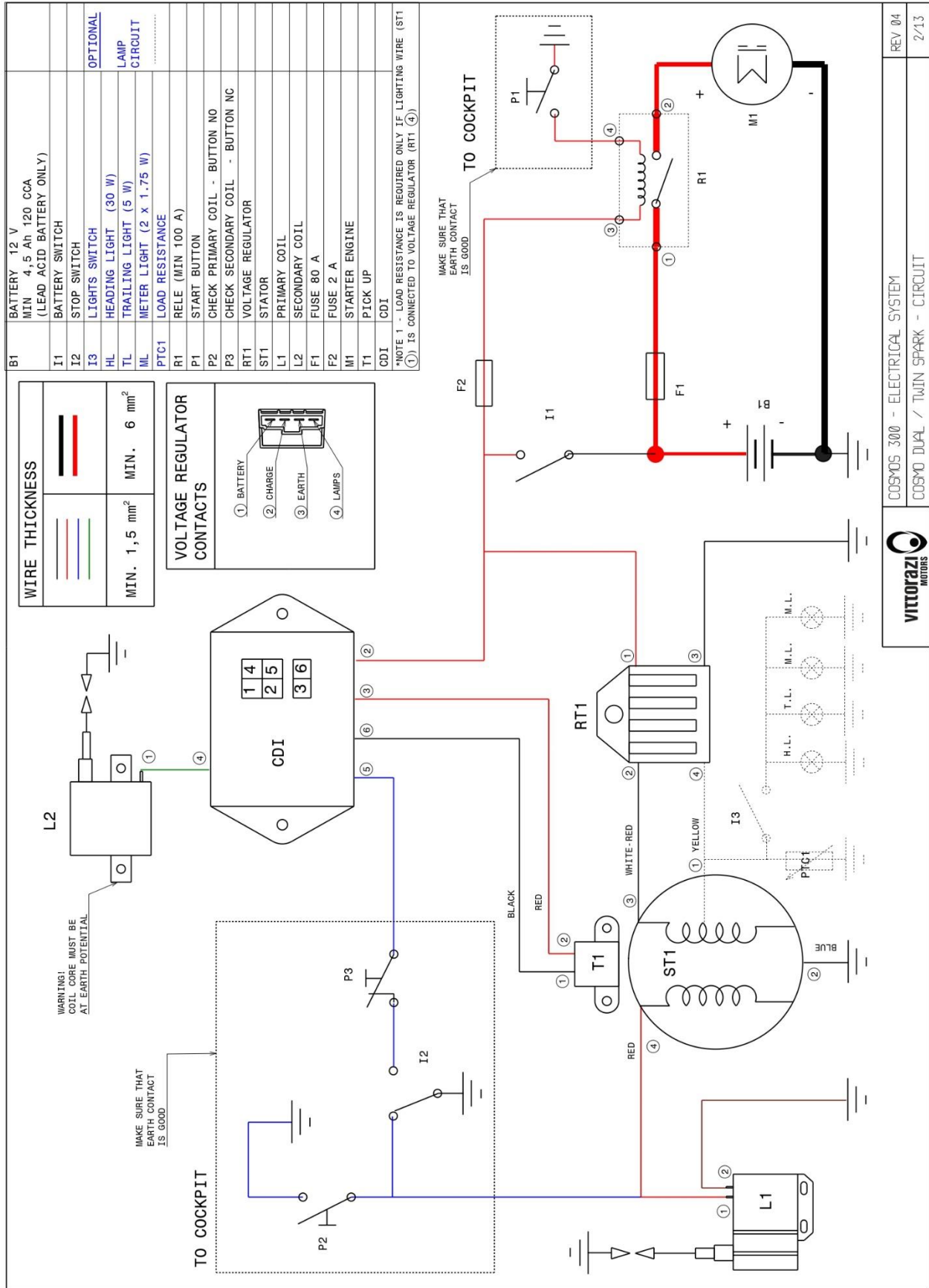


VITTORAZI MOTORS

COSMOS 300 - ELECTRICAL SYSTEM
 COSMOS DUAL / SINGLE SPARK - CIRCUIT

REV 04
 1/13

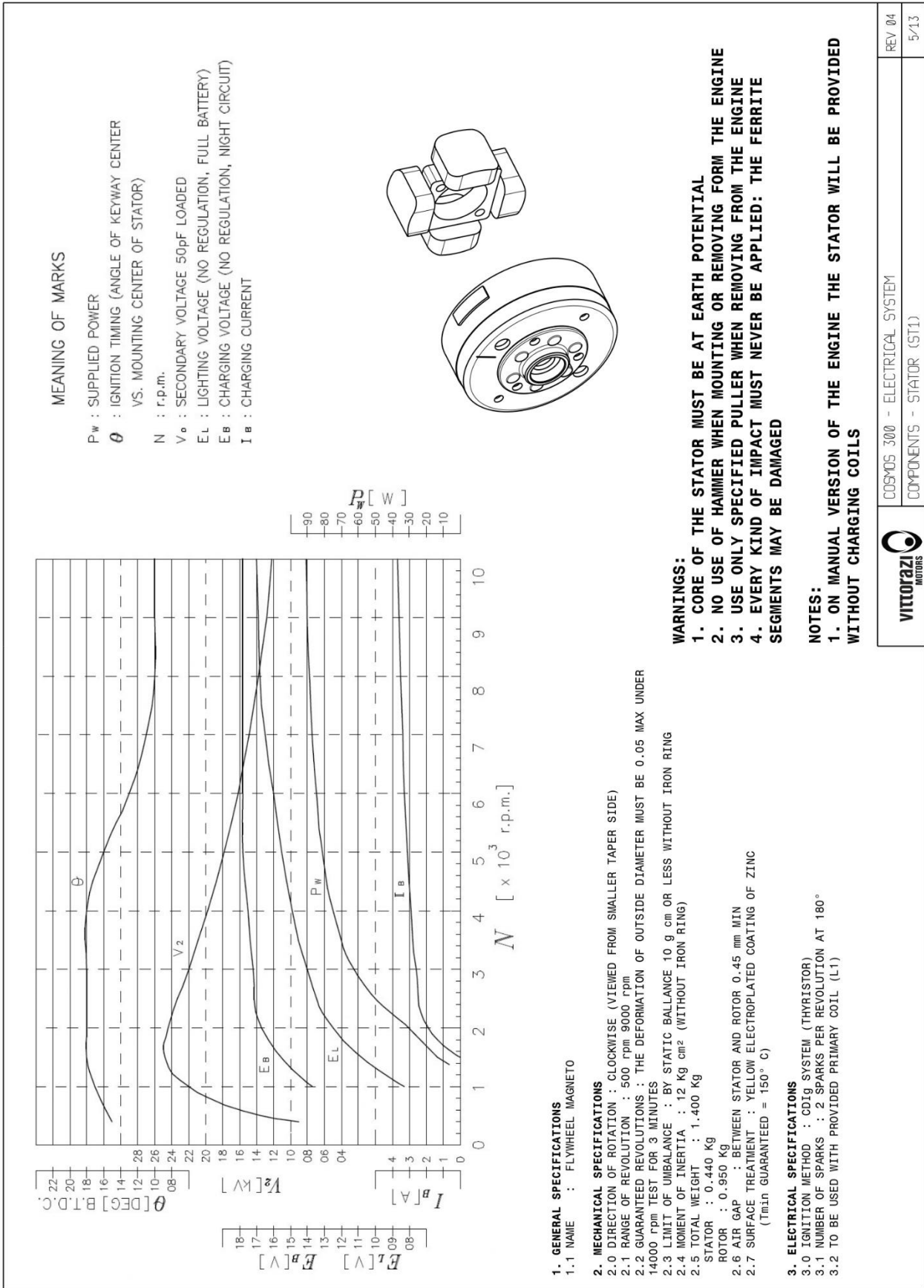
Circuit diagram Twin Spark, Dual starter



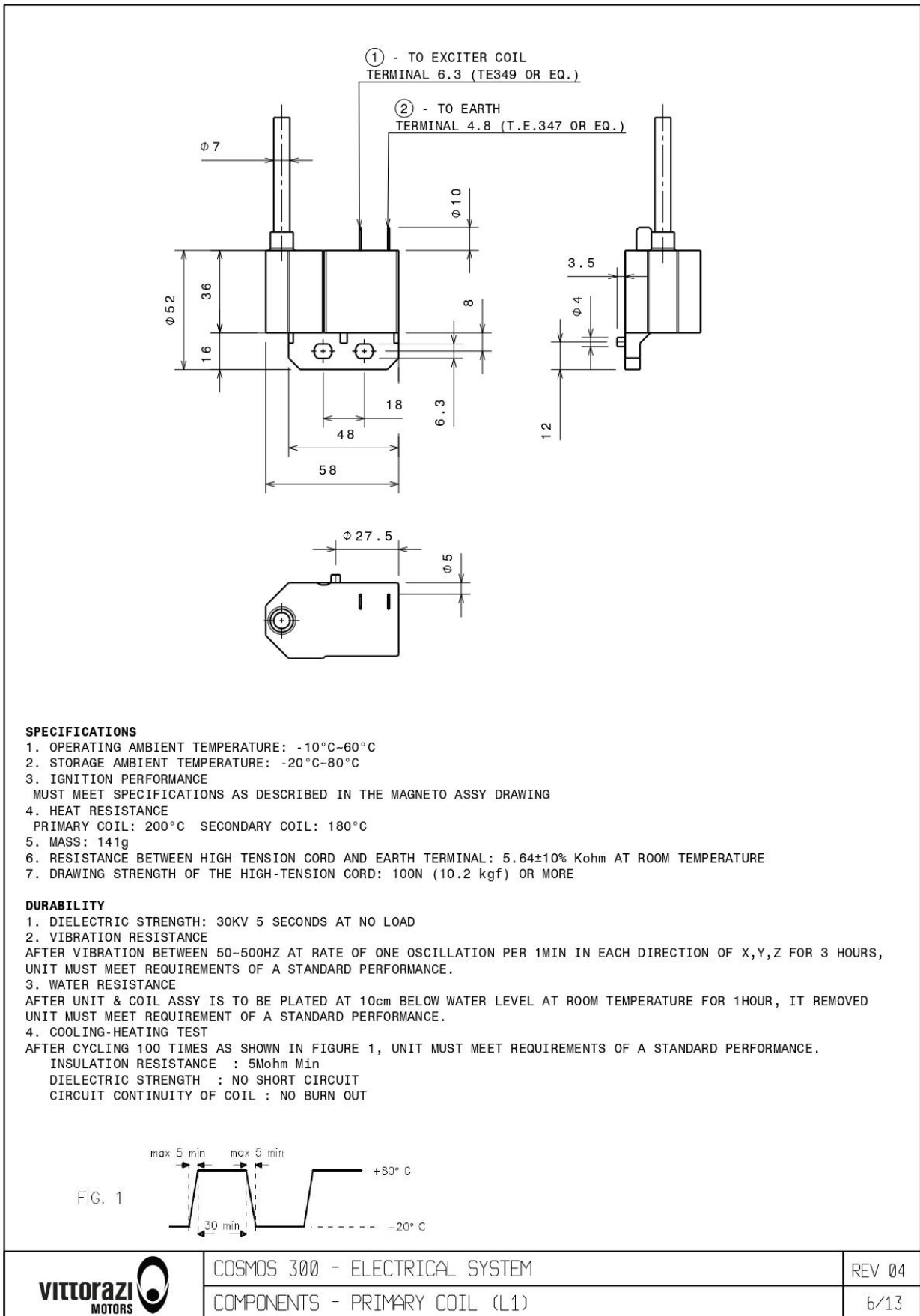
VITTORAZI MOTORS

COSMOS 300 - ELECTRICAL SYSTEM
COSMO DUAL / TWIN SPARK - CIRCUIT

REV 04
2/13



Primary coil.



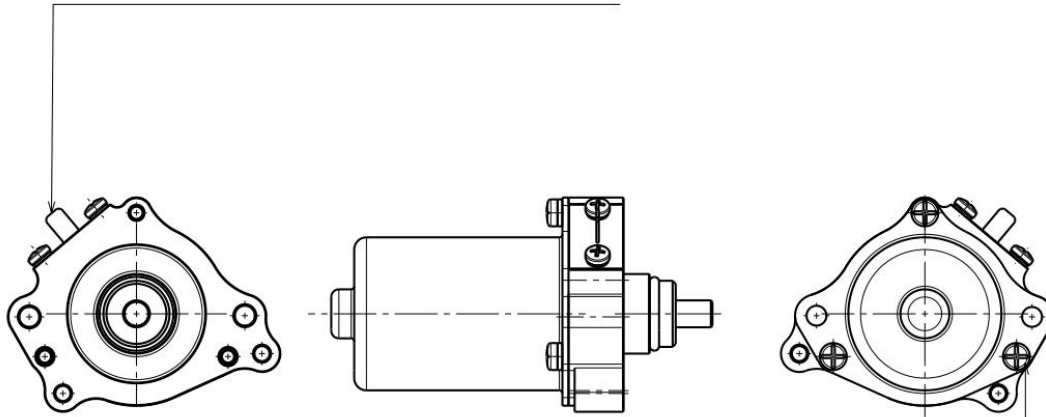
COSMOS 300 - ELECTRICAL SYSTEM
COMPONENTS - PRIMARY COIL (L1)

REV 04
6/13

⊕ POSITIVE - TO RELAIS

IMPORTANT !!!

- ONLY USE PROVIDED CONNECTOR
- WIRE MINIMUM SECTION 6 MMQ



⊖ - NEGATIVE - TO BATTERY

IMPORTANT!!!!

- WIRE MINIMUM SECTION 6 MMQ

RELEVANT INFORMATIONS					
STARTING MOTOR SPEC.		STARTING MOTOR PERFORMANCE			
NOMINAL VOLTAGE	12 V		NO LOAD	LOAD	LOCK
NOMINAL OUTPUT	0.3 kW	VOLTAGE	11.54V	10,32V	5V
RATING TIME	30s	CURRENT	MAX 20A	40A	MAX 180 A
OPERATING TEMPERATURE	-5°C - +80°C				

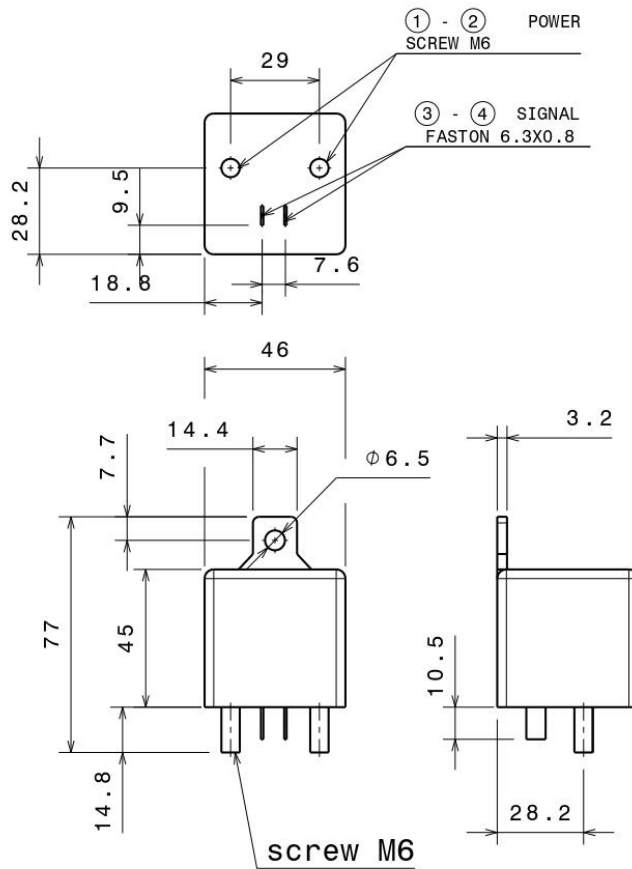


COSMOS 300 - ELECTRICAL SYSTEM
COMPONENTS - ELECTRICAL STARTER

REV 04

11/13

Relay.



RELEVANT INFORMATIONS	
NOMINAL VOLTAGE	12 V
OPERATING VOLTAGE	9-15 V
STORAGE TEMPERATURE	-40 °c / +100°C
OPERATING TEMPERATURE	< 125 °C



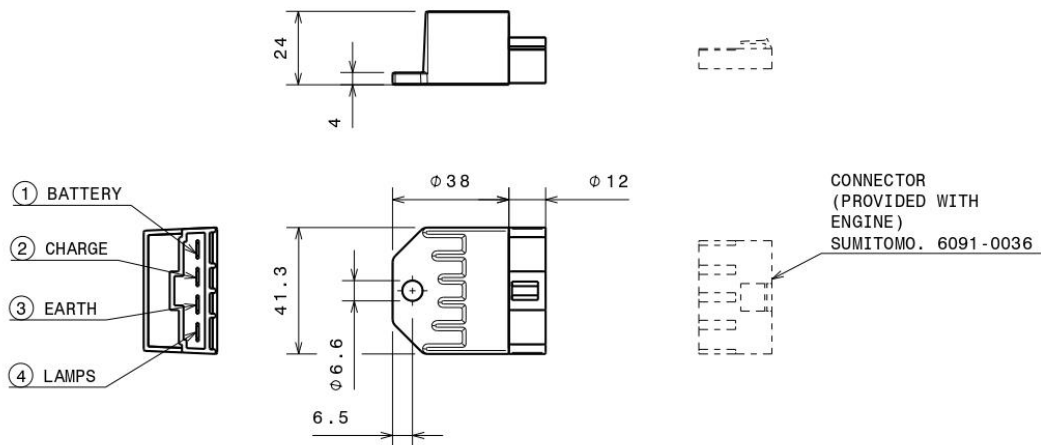
COSMOS 300 - ELECTRICAL SYSTEM

REV 04

COMPONENTS - RELAIS (R1)

10/13

Voltage regulator.



WARNINGS

- VOLTAGE REGULATOR MUST BE DISCONNECT BY BATTERY WHEN ENGINE STOPPED
- WHEN REVERSE CONNECTED TO BATTERY VOLTAGE REGULATOR WILL FAIL
- WHEN VOLTAGE REGULATOR IS USED WITHOUT BATTERY IT WILL FAIL

Maximum Ratings				
Items	Mark	Rating	Unit	Conditions
Insulating Resistance	Rins	Max. 100	OHM	
Storage Temperature	Tstg	-30 +90	°C	
Operating Temperature	To	-10 +70	°C	
SCR Junction Temperature	Tj	Max. 125	°C	
Output Current (AC, DC Total)	Iout	Max. 9	A ave	No Wind - To=40° C
Max. Regulate Current (AC)	Ireg (AC)	Max. 10	A ave	Tj<125° C Tc<90° C
Max. Regulate Current (DC)	Ireg (DC)	Max. 8	A ave	Tj<125° C Tc<90° C
Electrical Characteristics				
Items	Mark	Rating	Unit	Conditions
Regulate Voltage (AC)	Vreg(AC)	13.2 ± 0.5	V rms	full BATT./ Night Circuit/ 5000 rpm, To=25° C
Regulate Voltage (DC)	Vreg (DC)	14.5 ± 0.5	V ave	full BATT./ Day Circuit/ 5000 rpm, To=25° C
Temperature Coefficiency (AC)	vreg (AC)	Max. ±8	mV/°C	full BATT./Night Circuit/ 5000 rpm -20° C To 60° C
Temperature Coefficiency (DC)	vreg (DC)	Max. ±12	mV/°C	full BATT./Day Circuit/ 5000 rpm -20° C To 60° C
Leak Current	Ir	Max. 0.4	mA	BATT. terminal to EARTH term., DC 25V



COSMOS 300 - ELECTRICAL SYSTEM
COMPONENTS - VOLTAGE REGULATORE (RT1)

REV 04

7/13

Additional components for Twin Spark:

- CDI.

SUMITOMO 6189 - 6341

DET A
Scala: 1:1

CONNECTIONS	
1	NOT CONNECTED
2	BATTERY
3	TRIGGER (RED)
4	COIL
5	EARTH
6	TRIGGER (BLACK)

1.0 SPECIFICATIONS

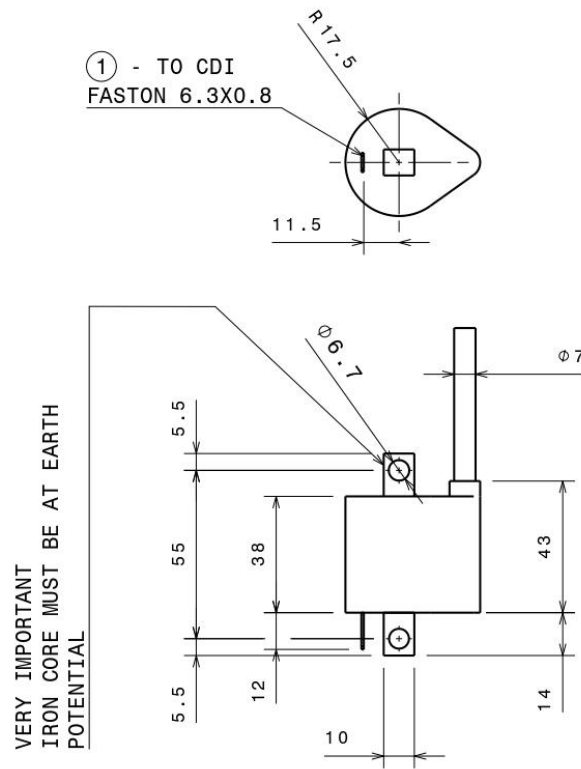
1.1 NAME: DC-CDI (ANALOG)
 1.2 WEIGHT: APPROXIMATE 170g.
 1.3 APPLICABLE REVOLUTION: 220-10000rpm.
 1.4 OPERATING TEMPERATURE: -10-+60° C.
 1.5 STORAGE TEMPERATURE: -20-+80° C.
 1.6 VIBRATION RESISTANCE: 147m/s² (15G). 50-500Hz. 1 MINUTE SWEEP IN DIRECTIONS OF X, Y AND Z FOR EACH 3 HOURS. NO TROUBLE SHALL BE DETECTED IN PERFORMANCE.
 1.7 WATER RESISTANCE: TO BE PLACED AT 10cm BELOW WATER LEVEL AT ROOM TEMPERATURE FOR 1HOUR, AND REMOVED, DRIED NATURALLY AND OPERATE IT. NO TROUBLE SHALL BE DETECTED (WITH CONNECTING WIRE) .
 1.8 THERMAL SHOCK RESISTANCE: CICLING 100 TIMES EXPOSURE OF UNIT IN +80° C CHAMBER FOR 1HOUR IN ORDINAL TEMPERATURE IN -20° C FOR 1HOUR AND OPERATE IT. NO TROUBLE SHALL BE DETECTED.
 1.9 CONDENSER CHARGE VOLTAGE (Vc): 220VMIN. (REV.=500-10000rpm BATT.VOLTAGE=14.5V)
 1.10 DISCHARGING MODE: AC-ARC.
 1.11 CONDENSER CAPACITY (FOR IGNITION): 1.0µF.
 1.12 MINIMUM SPEED FOR OPERATION STARTING AT BROKE OFF FUSE: 510rpm
 1.13 VOLTAGE SUPPLY: 8-16V DC.
 1.14 OUTPUT VOLTAGE AT 20pF: 27kV MIN (REV.=500-8000rpm)

3.0 NOTES

3.1 IGNITION TIMING ALLOWANCE: ±1.0°.
 3.2 ROTOR SPEED ALLOWANCE: ±100rpm.
 3.3 MINIMUM SPEED FOR TRIGGER STARTING: 280rpm (PULSER GAP 1.2mm MAX)
 3.5 CONDITION OF VARIOUS QUALITY
 TEMPERATURE: 20±5° C.
 COUPLED WITH: STANDARD MODEL.
 BATTERY VOLTAGE: 14.5V (DC).
 PULSE AIR GAP: 0.8±0.45mm.

	COSMOS 300 - ELECTRICAL SYSTEM	REV 04
	COMPONENTS - CDI	8/13

- secondary coil.



RELEVANT INFORMATIONS	
RESISTANCE FASTON - CORE	0.6 OHM +/- 10%
RESISTANCE FASTON H.T. CHORD	9.5 KOHM +/- 10%



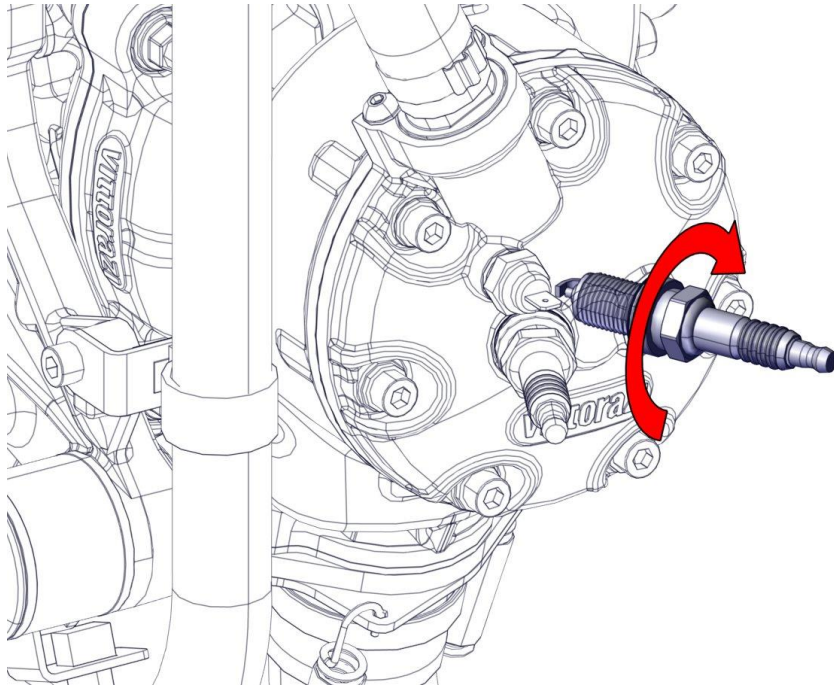
COSMOS 300 - ELECTRICAL SYSTEM
COMPONENTS - SECONDARY COIL (L2)

REV 04

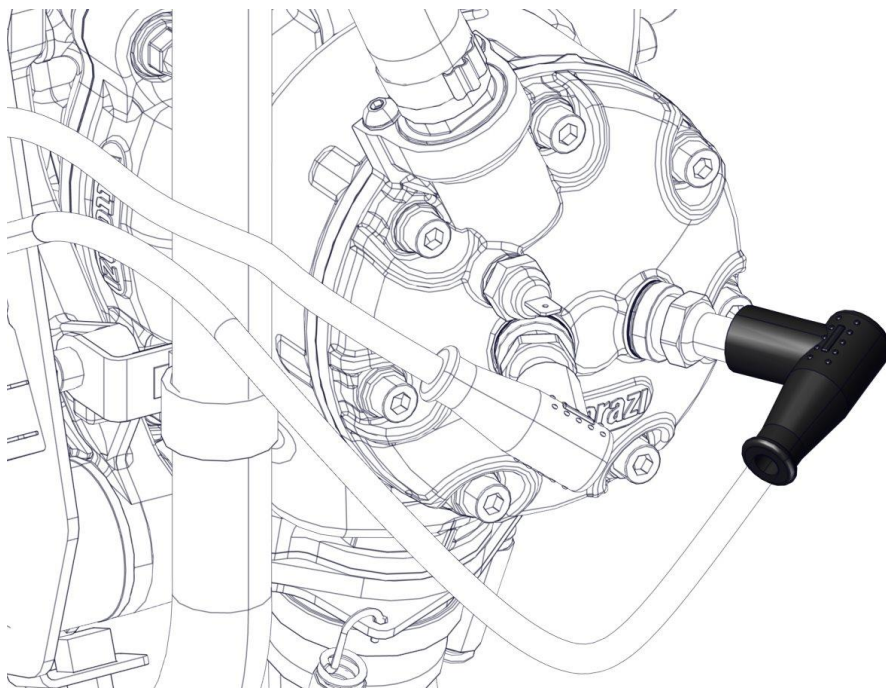
9/13

Coils and spark plugs:

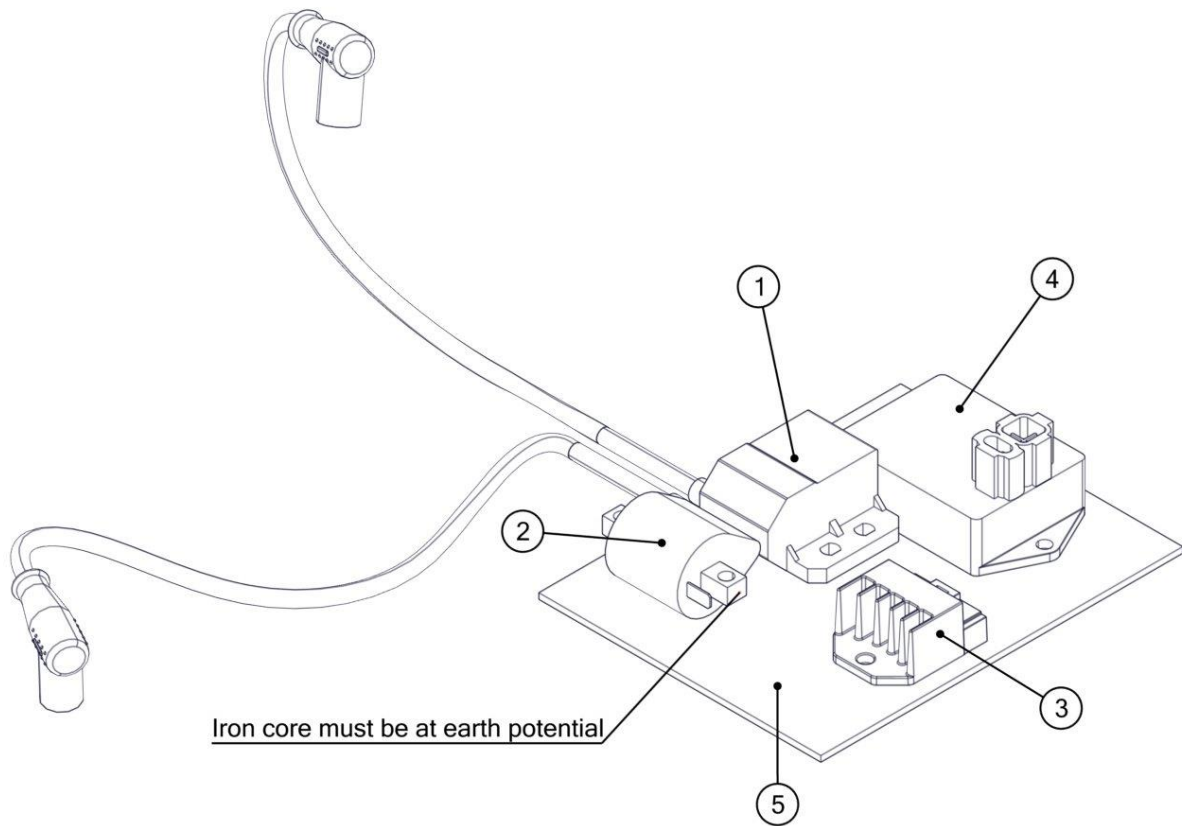
Screw 2 spark plugs into the head and tighten to 25 Nm.



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



Position the ignition coils on the chassis, away from heat sources and, if possible, on a flat surface with rubber in between to reduce transmitted vibration. Before attaching the ignition coils, ensure that the cables are of adequate length even when the engine vibrates and shifts due to acceleration. Check that the connectors are securely locked and offer good cable tensile strength.



Iron core of secondary coil must be at earth potential.

1	Primary coil
2	Secondary coil
3	Voltage regulator
4	CDI
5	Fixing plate



Installation warnings.

- Voltage regulator must have sufficient air cooling: check its position carefully.
- When voltage regulator is used without battery it will fail: connections to battery must be solid, use quality battery.
- When voltage regulator is reverse connected to battery, it will fail.
- The minimum cross-section of the cables that connect the battery to the starter motor must be of 6 mms² and their length must never exceed 600 mms.



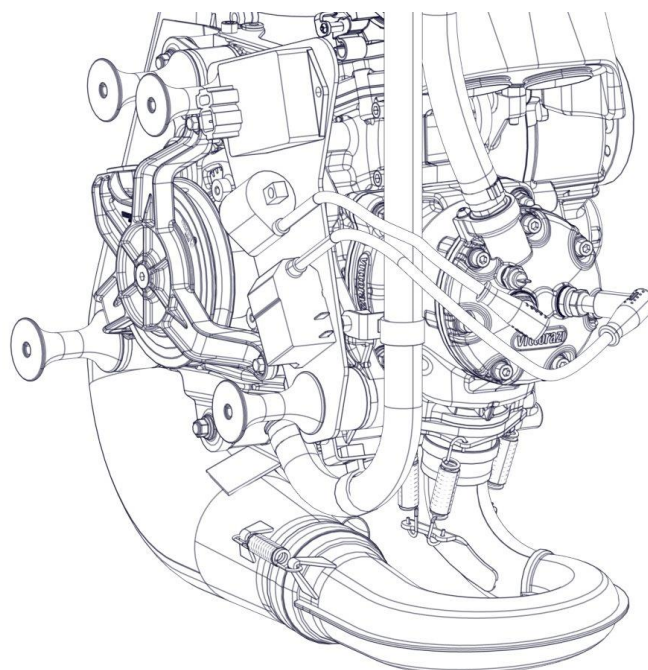
Installation advice.

Place the start button in a position where it is not possible to be pressed accidentally:

- Accidental start of the engine can be a risk for the user and can lead to severe injury.
- Whenever this happens while the engine is revving higher than idle the electric starter may be damaged.

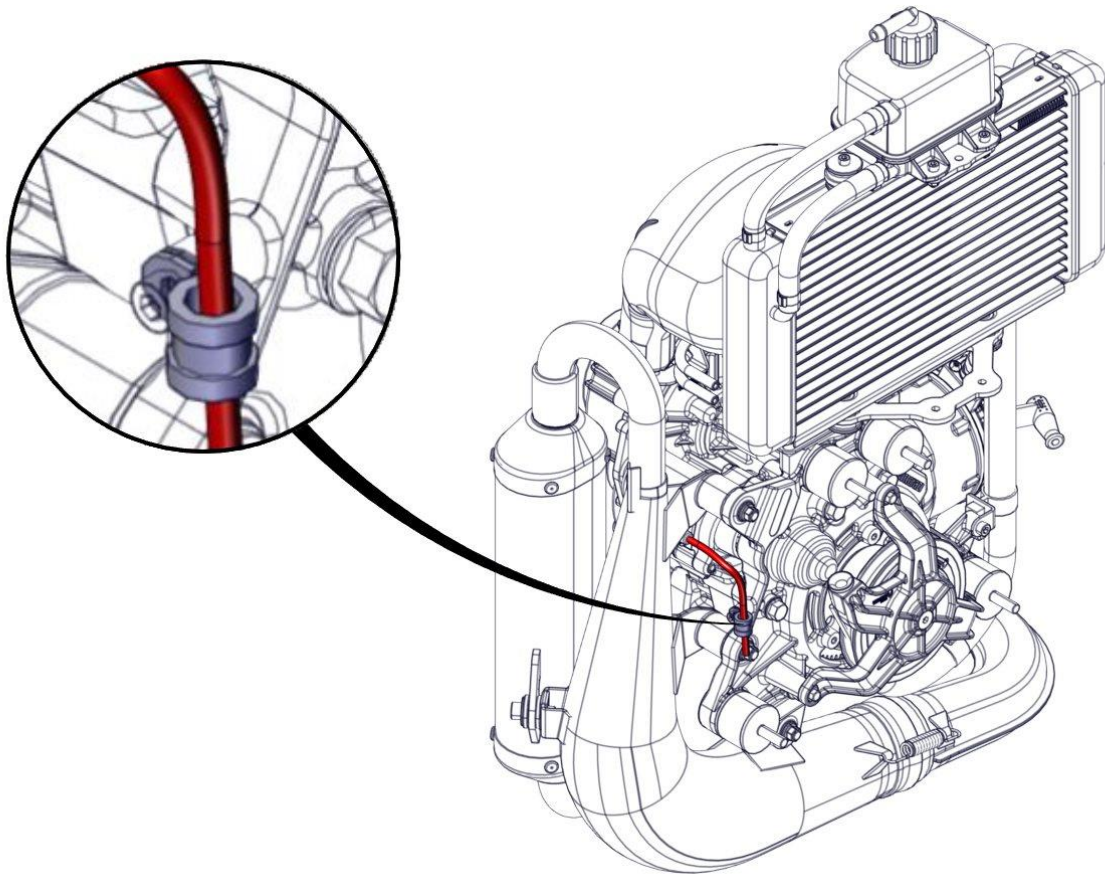
Check that voltage regulator works within regulations limits after installation.

An example of the installation position of the plate with the 2 coils and the CDI is given in the figure.



Electric starter and battery:

The electric starter cable has to be attached to the clamp shown in the figure.



Use a 12 V, 4,5 Ah (min.) lead acid battery only with an inrush current of 120 CCA.



Disconnect battery from the electrical system before recharging; always use a battery charger suitable for the chosen battery to avoid any risk of explosion due to improper charging.

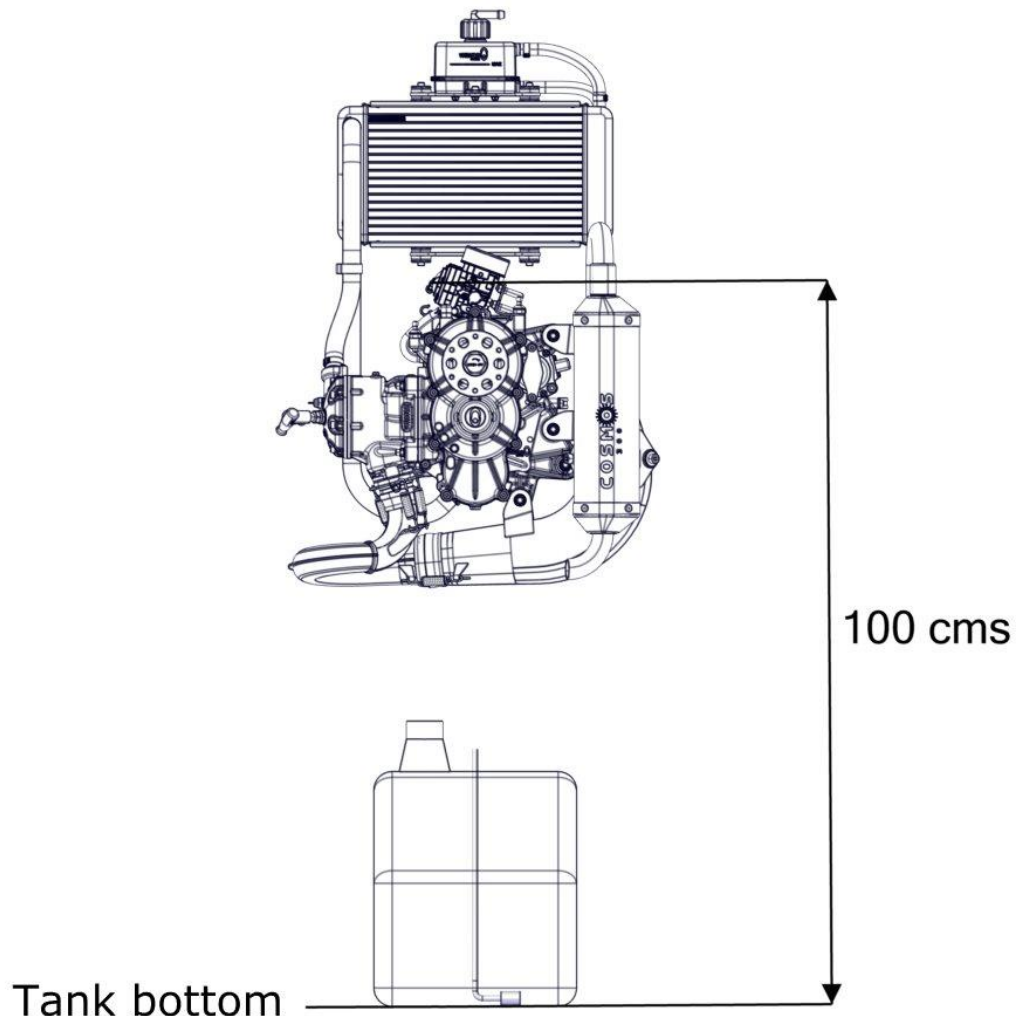
3.4 Fuel system



This engine model uses a diaphragm carburettor. The position of the tank and the configuration of the fuel line affect the operation of the carburettor and the engine. Vittorazi has performed many validation tests to identify the right configuration and its limits.

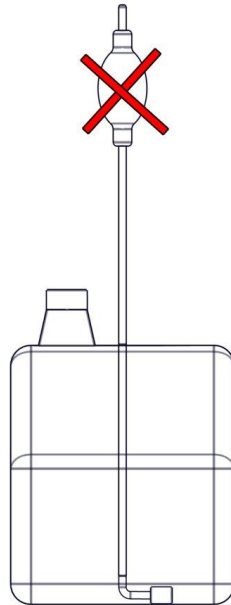


The fuel tank must be positioned properly. The level of the tank bottom must remain at a maximum distance of 100 cms from the carburettor. Larger distance can compromise the carburettor pumping, up to reduce the fuel flow rate, thus leaning the carburation and potentially overheating the engine. By placing the tank in the gap between the indicated maximum distance (100 cms) and zero, it leads to negligible changes in flow rate. In the event that this value is not respected for special aircraft geometries, contact Vittorazi directly.





The connection from the tank to the carburettor must be made with a single direct hose, as short as possible. Do not install primer bulbs or other devices as they may cause a pressure drop and possible air to be sucked into the fuel system. Use suitable hoses that are resistant to fuel mixture.



The entire fuel line (from the catching filter in the tank to the carburettor inlet) must be airtight. Entry of air into the line can cause instability at idle, up to irregular behaviour in steady regime or acceleration.

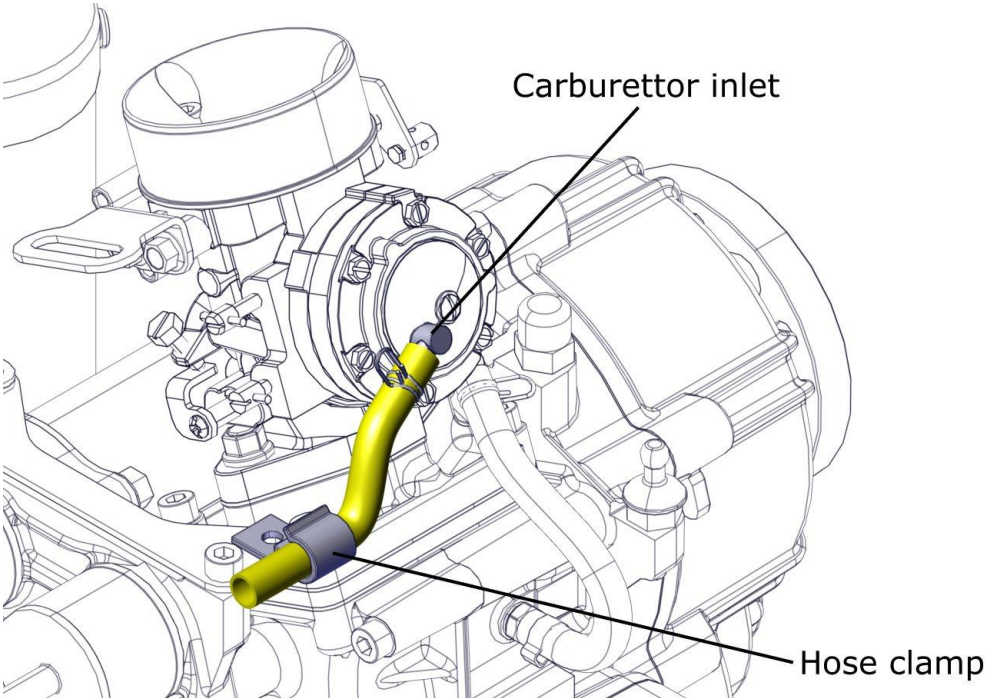


Use a transparent tube to connect the tank to the carburettor. Secure all joints from the tank to the carburettor inlet with safety straps so that each connection is strong and prevent unwanted movement.

This will allow:

- When the engine is started, to see fuel entering the carburettor.
- With the engine running, to notice possible bubbles due to the aspiration of air from the connections of the piping or from the carburettor. In this case, carefully check the pipe connections and the carburettor.

After mounting the petrol tank with internal filter (compulsory), connect the hose from the tank to the carburettor inlet, secure it with the double wire hose clamp and fix it to the hose clamp.



3.5 Cooling system

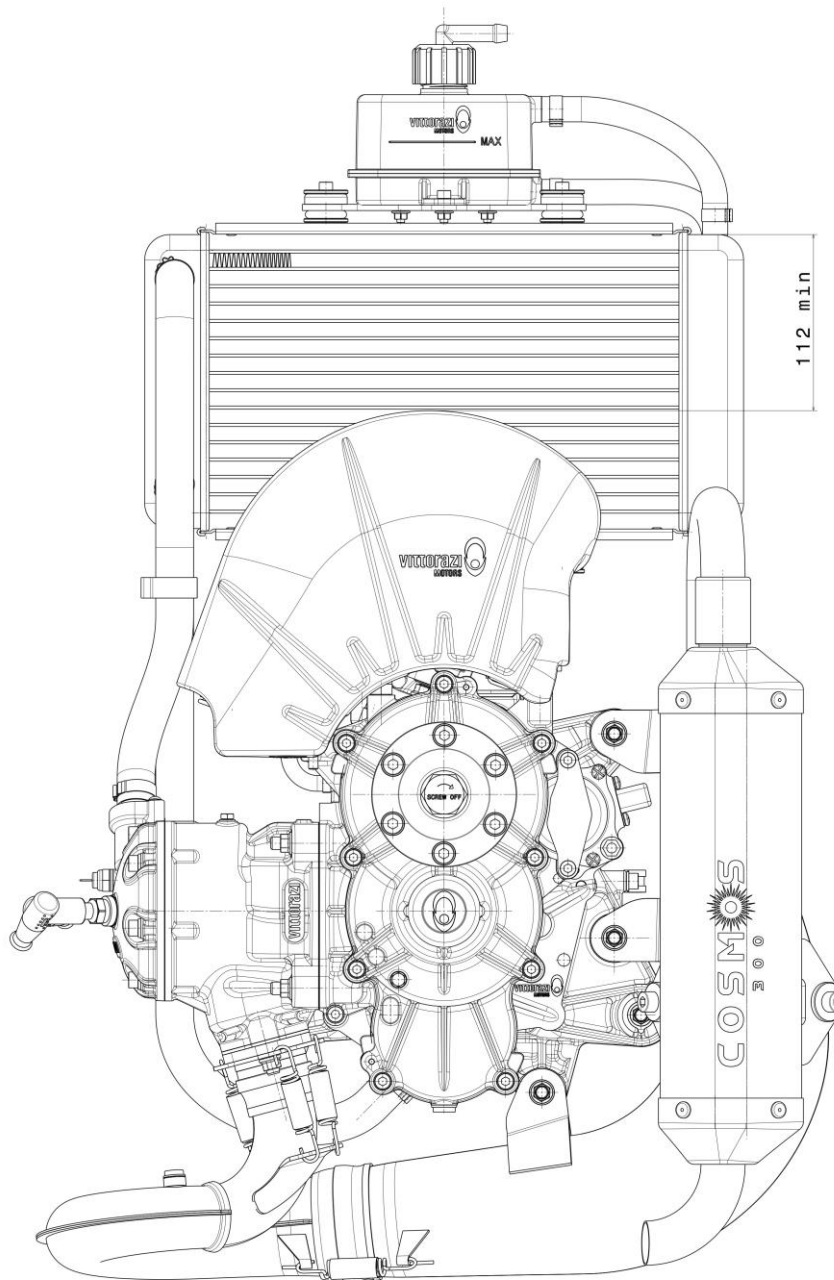
The radiator can be mounted on the frame in two different configurations:

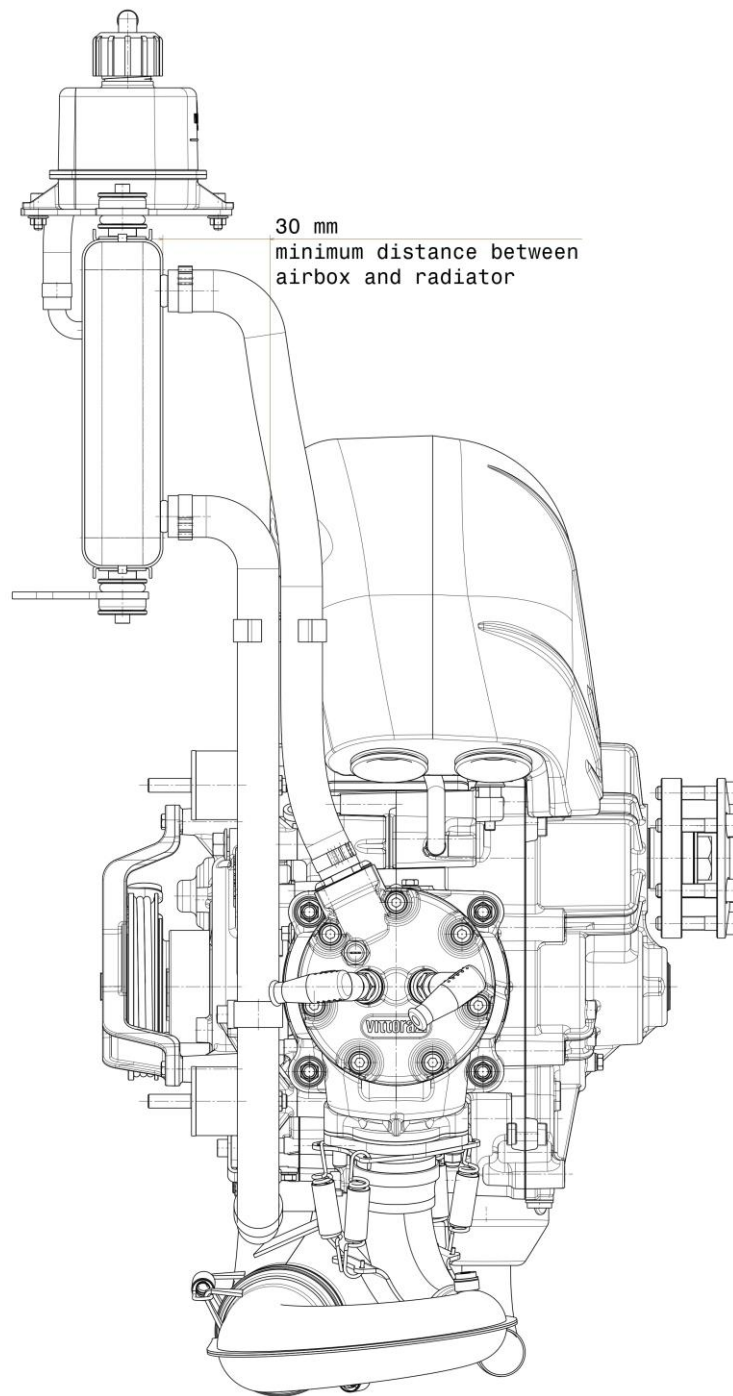
- in a straight position;
- in an inclined position.



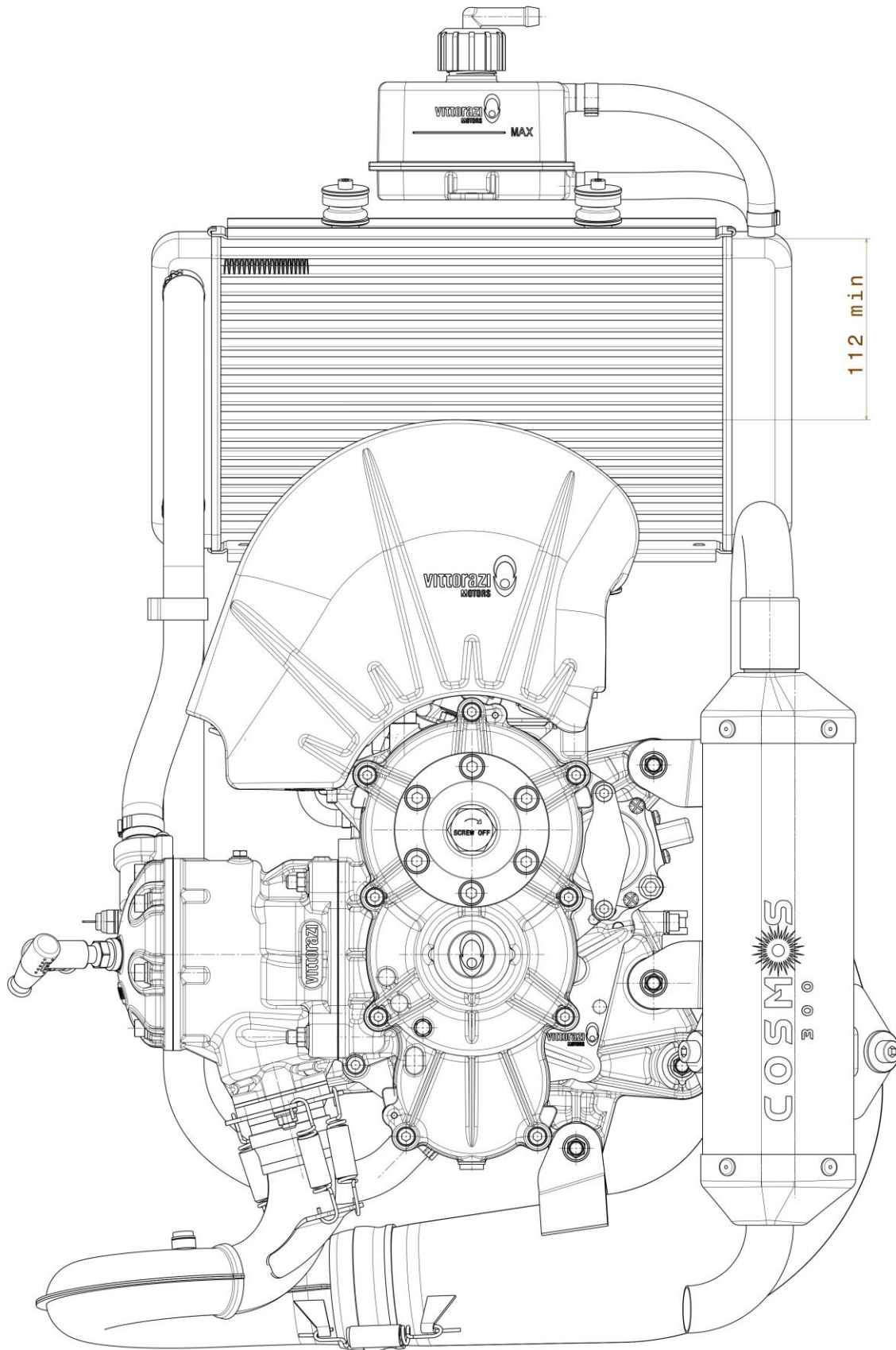
The radiator must be positioned within the parameters indicated in the next drawings. In the case of different installations or outside the required parameters due to the geometry of the aircraft, contact Vittorazi directly.

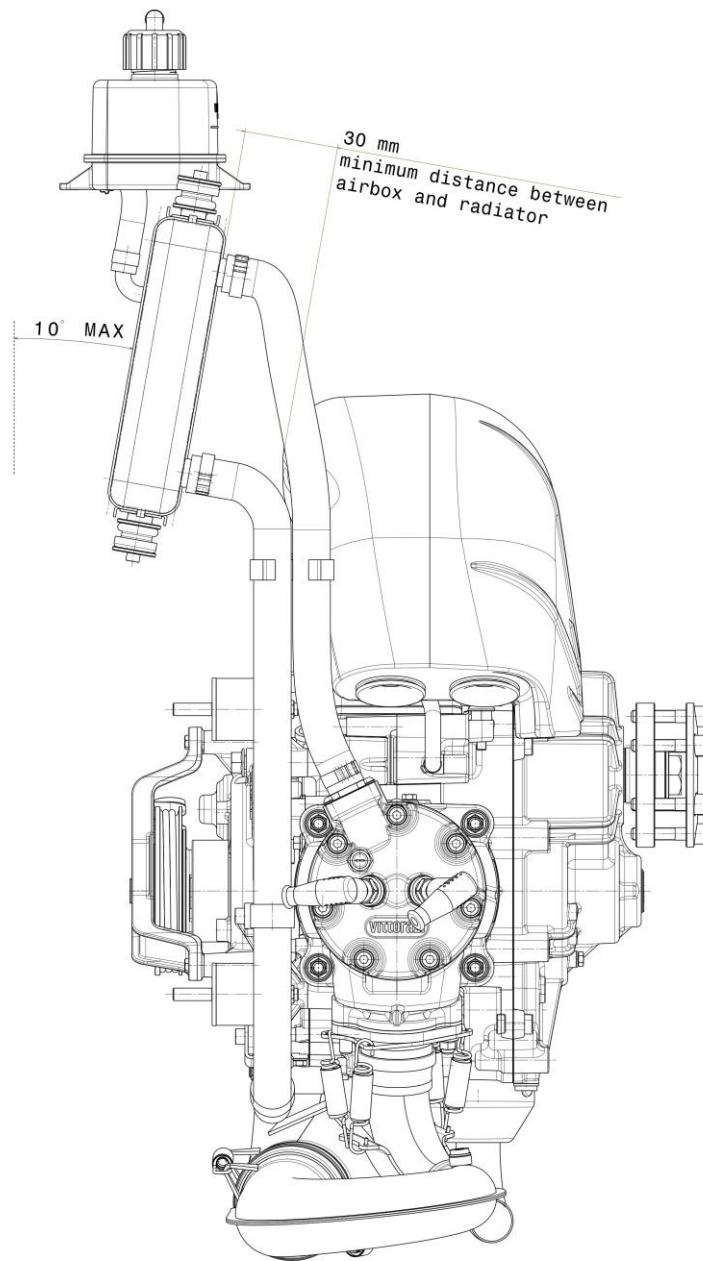
Straight radiator configuration





Inclined radiator configuration

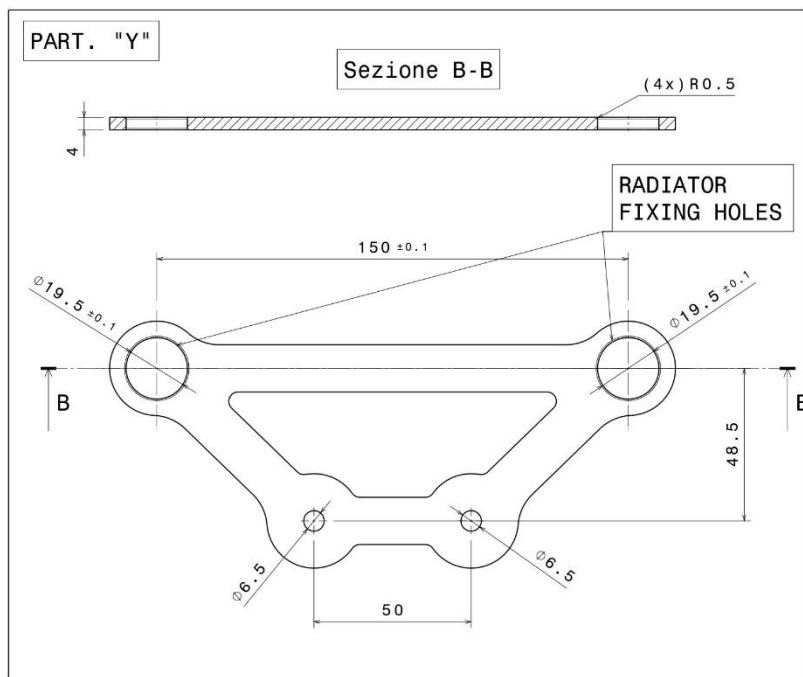
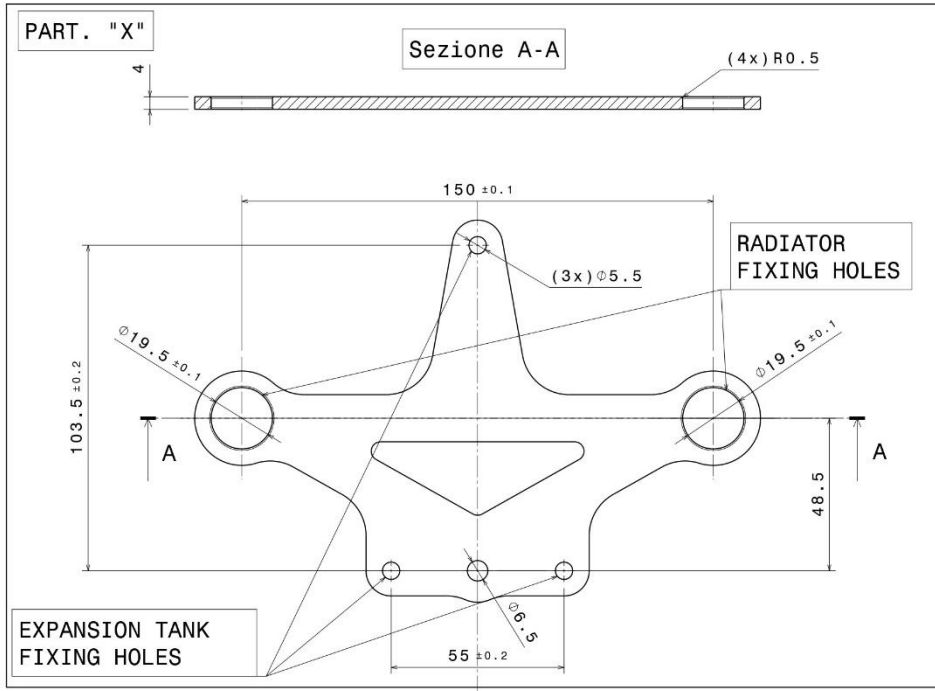




Two brackets are required to fix the radiator to the frame:

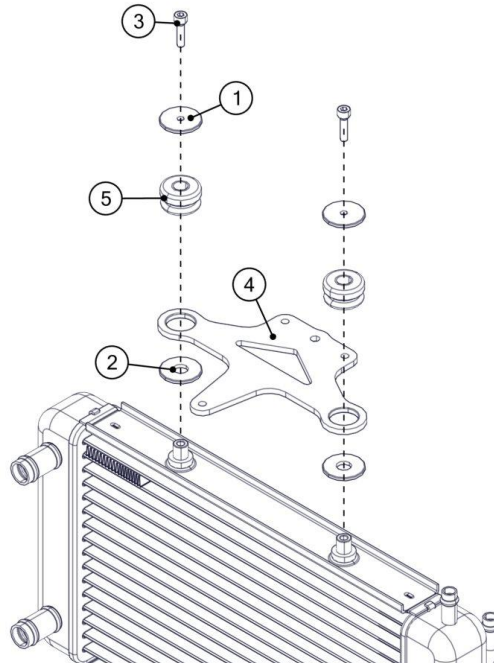
- Upper bracket (between the radiator and the coolant reservoir).
- Lower bracket.

These brackets can be manufactured and integrated into the frame in accordance with the drawings provided.

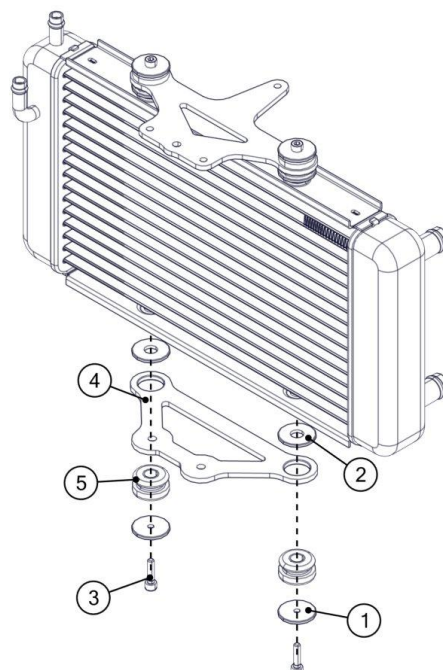


For complete assembly of the radiator, carry out the following steps:

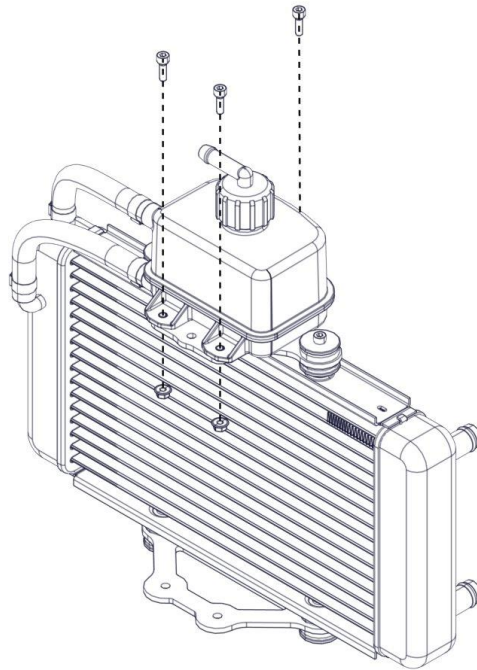
- Connect the 2 vibration dampers (5) to the upper bracket (4).
- Place 2 washers 10x28x2,5 (2) under the vibration dampers (5).
- Place 2 washers 5x28x2,5 (1) on top of the vibration dampers (5).
- Insert 2 Allen screws M5x20 (3) and tighten.



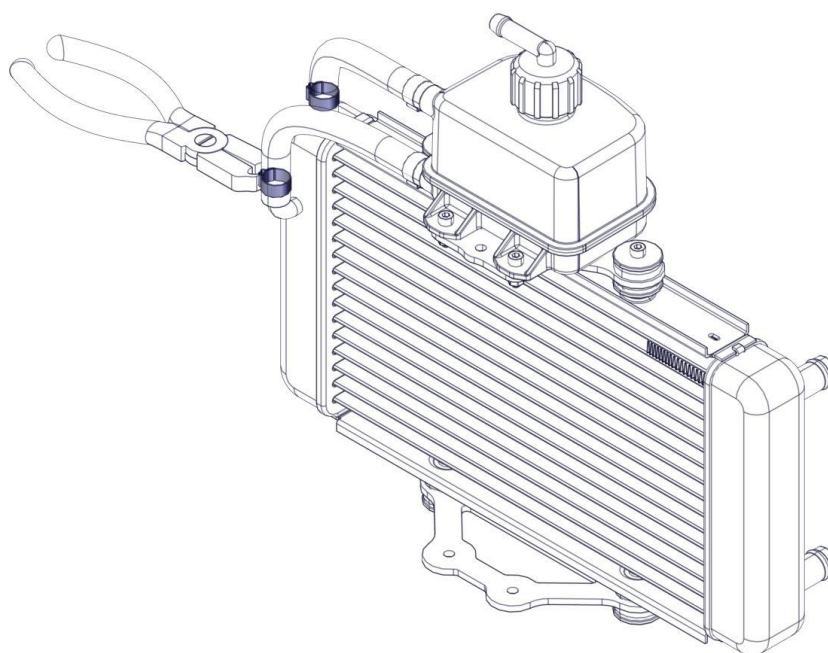
- Connect the 2 vibration dampers (5) to the lower bracket (4).
- Place 2 washers 10x28x2,5 (2) between the vibration dampers (5) and the radiator.
- Place 2 washers 5x28x2,5 (1) under the vibration dampers (5).
- Insert 2 Allen screws M5x16 (3) and tighten.



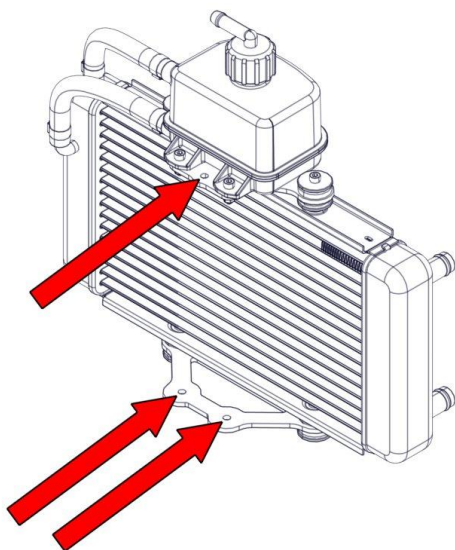
- Place the coolant reservoir with the cap and the 2 hoses on top of the bracket.
- Fix the coolant reservoir with 3 Allen screws M5x16 and 3 nuts, connect the pipes to the radiator.



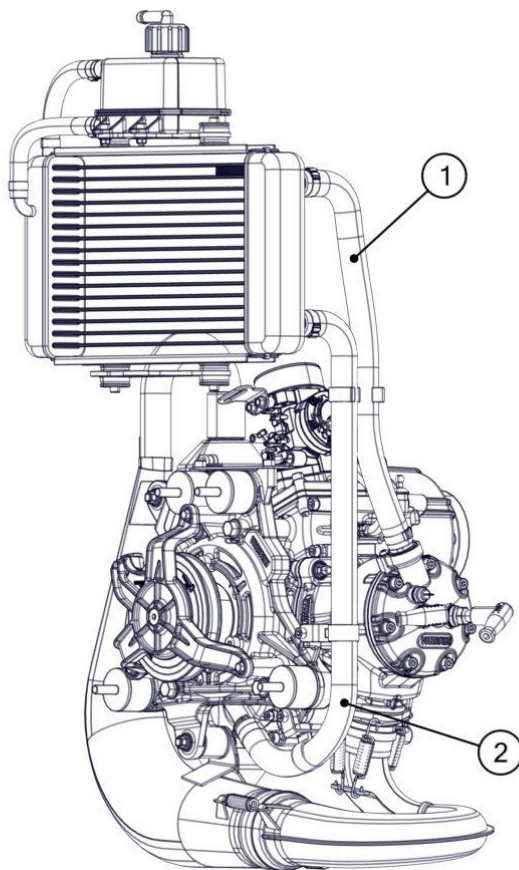
Tighten the supplied pipe clamps with suitable pliers and ensure that the connection is secure.



- Fix both brackets to the frame using the 3 holes provided.



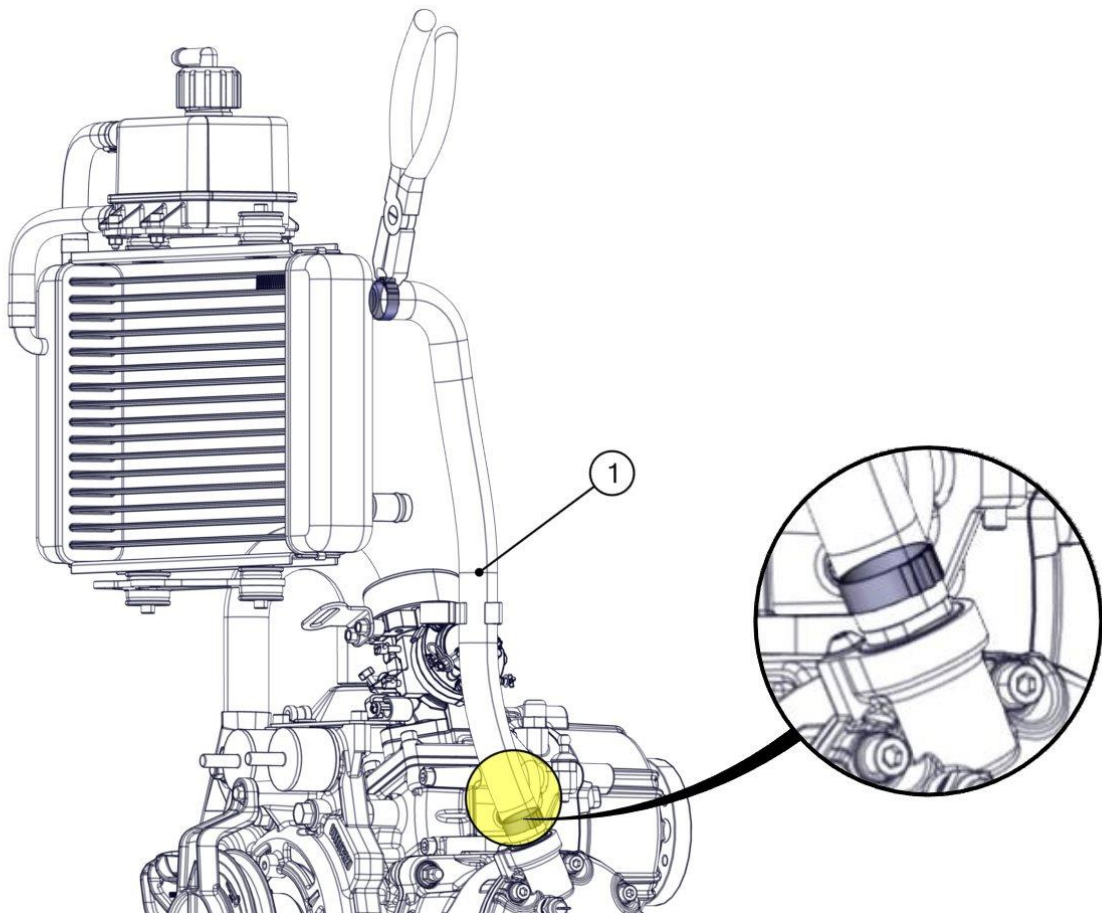
- Once the radiator is in position on the frame, identify the upper (1) and lower (2) hoses.



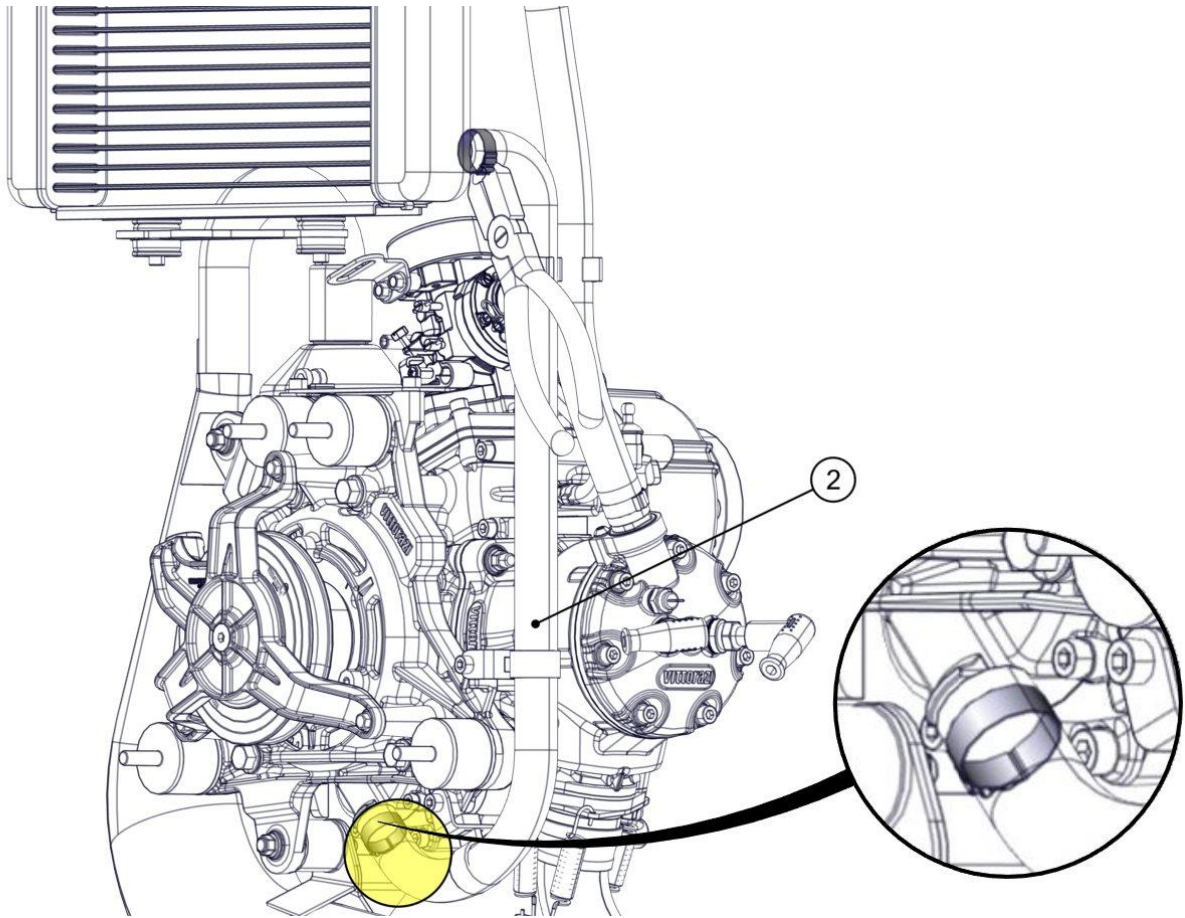


Check the length of the hose from the radiator to the engine head. Then leave an additional 3 cms to the required length at the end of the hose (highlighted in yellow in the figure). This is necessary to prevent the hose from being damaged by vibrations and movements of the engine when it is running and accelerating.

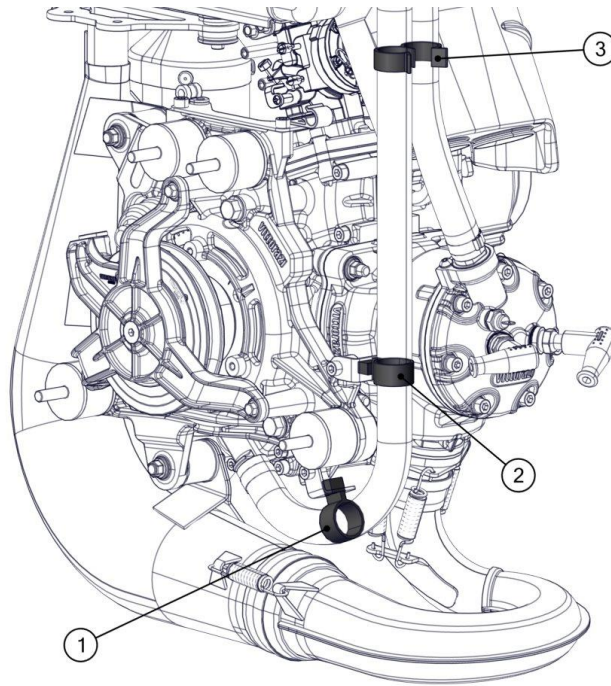
- Temporarily connect the upper (1) hose from the radiator to the engine head.
- Cut the hose, tighten the clamp with suitable pliers and ensure that the connection is secure.



- Temporarily connect the lower (2) hose from the radiator to the water pump.
- Cut the hose and tighten the clamp with suitable pliers and ensure that the connection is secure.

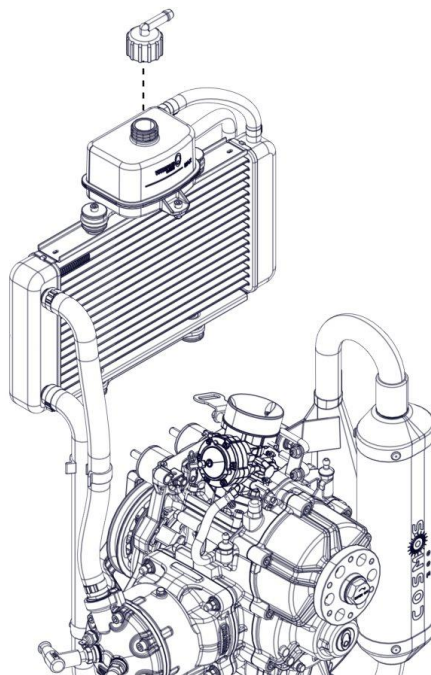


- The clip (1) and the clip (2) are to be installed on the lower hose and fixed to the respective supports on the motor.
- The opening of the clip (2) must be on the side opposite the cylinder.
- The clip (3) is to be positioned between the 2 hoses.



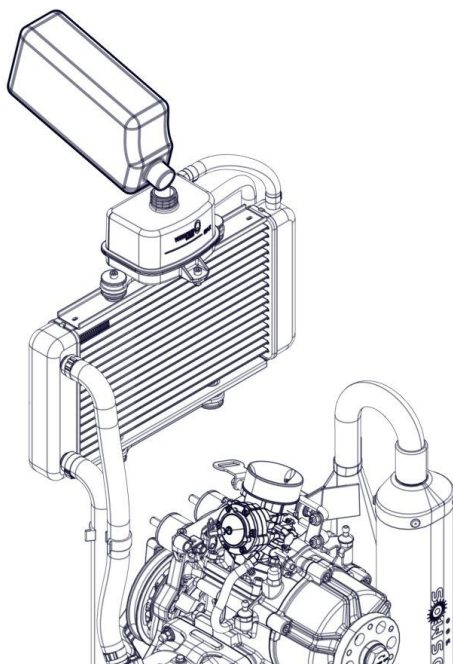
Once the cooling system has been installed, the coolant supplied must be added:

- Remove upper cap from the coolant reservoir.





Insert the coolant (to be diluted with water according to the instructions on the packaging, the coolant must be suitable for use with aluminum components and the operating temperature must be between $-20\text{ }^{\circ}\text{C}$ and $110\text{ }^{\circ}\text{C}$) into the coolant reservoir up to the maximum level.

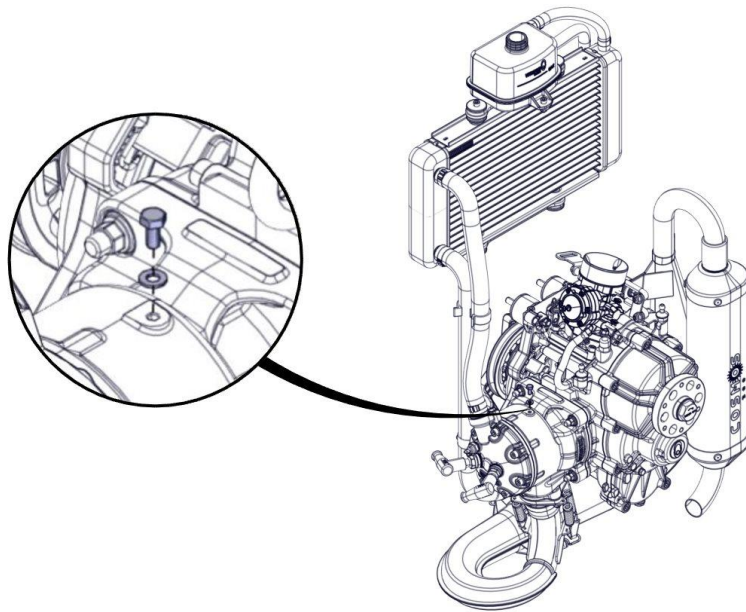


- Remove vent screw with copper seal from the cylinder to allow any air to escape.

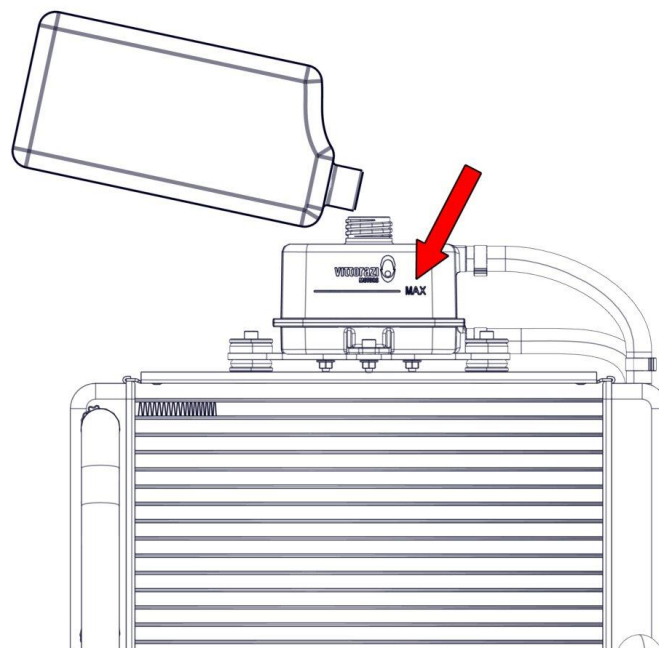


Replace copper seal.

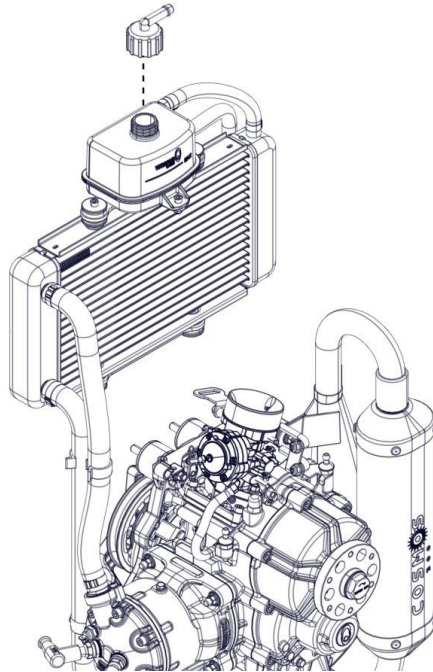
- When a few drops of coolant escape, close with vent screw and copper seal.



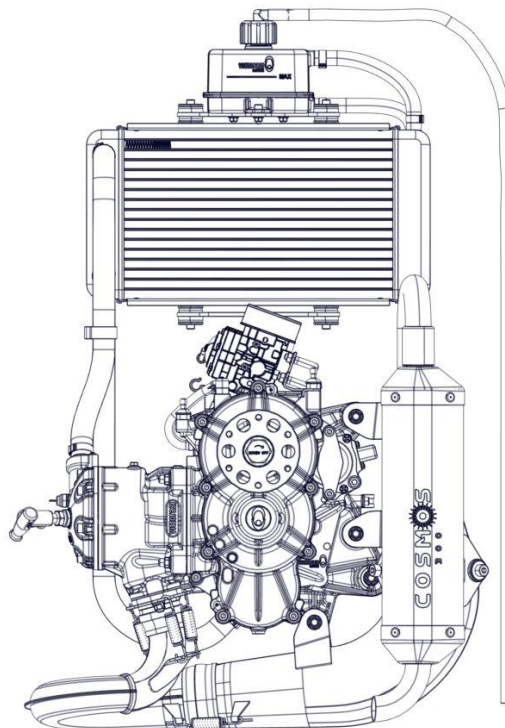
- Fill the coolant reservoir again with coolant up to the maximum level.



- With the coolant reservoir uncapped, start the engine and keep it at idle (the vibrations produced will help any air remaining in the circuit to escape).
- Turn off the engine.
- If the coolant level has dropped add more coolant up to the maximum level.
- Screw upper cap on the coolant reservoir.



- Apply a tube from the tank cap to the bottom of the frame to allow any excess liquid or vapor to vent safely.





Carefully check each hose junction point and ensure that there is no leak.



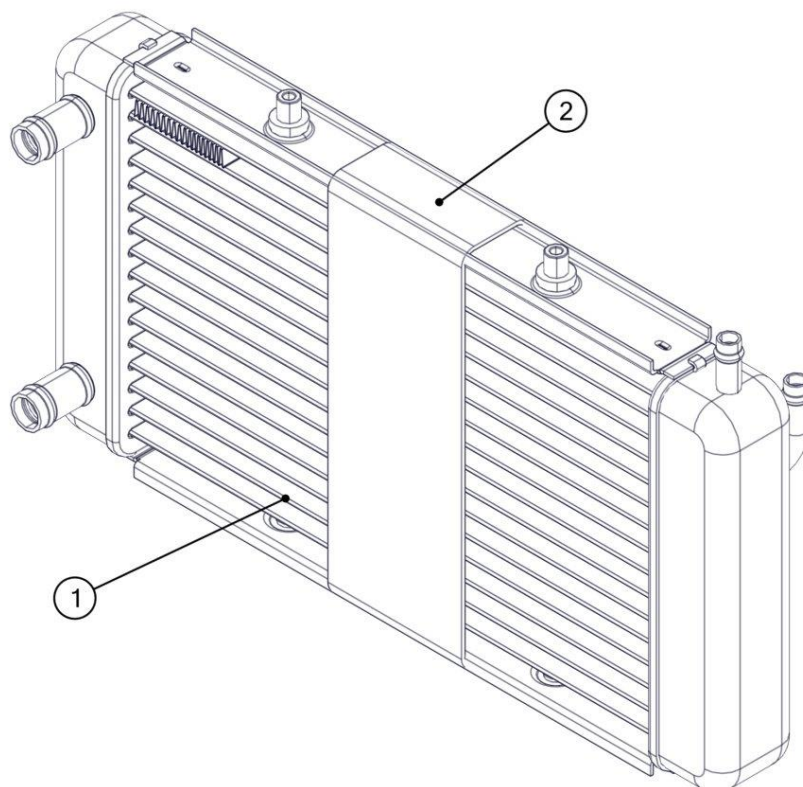
Never start the engine without propeller (3.10 Propeller).

The table shows the coolant temperature limits:

Max.	90 °C
Min.	65 °C



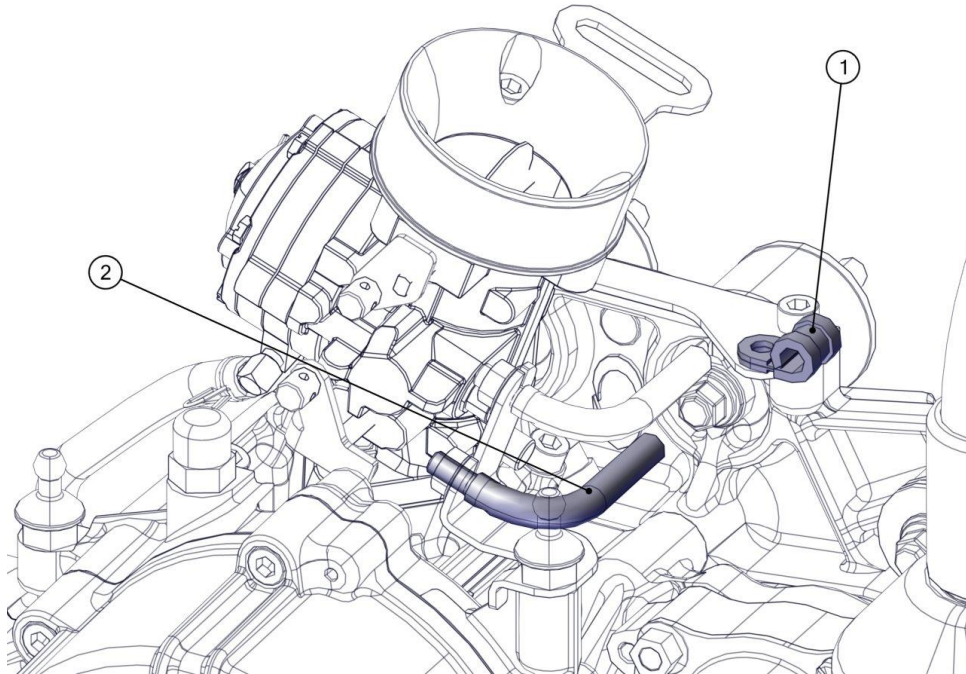
If the outside temperature is below 15 °C, cover the central part of the radiator (1) with the radiator band (2). The radiator band is an available option designed by Vittorazi.



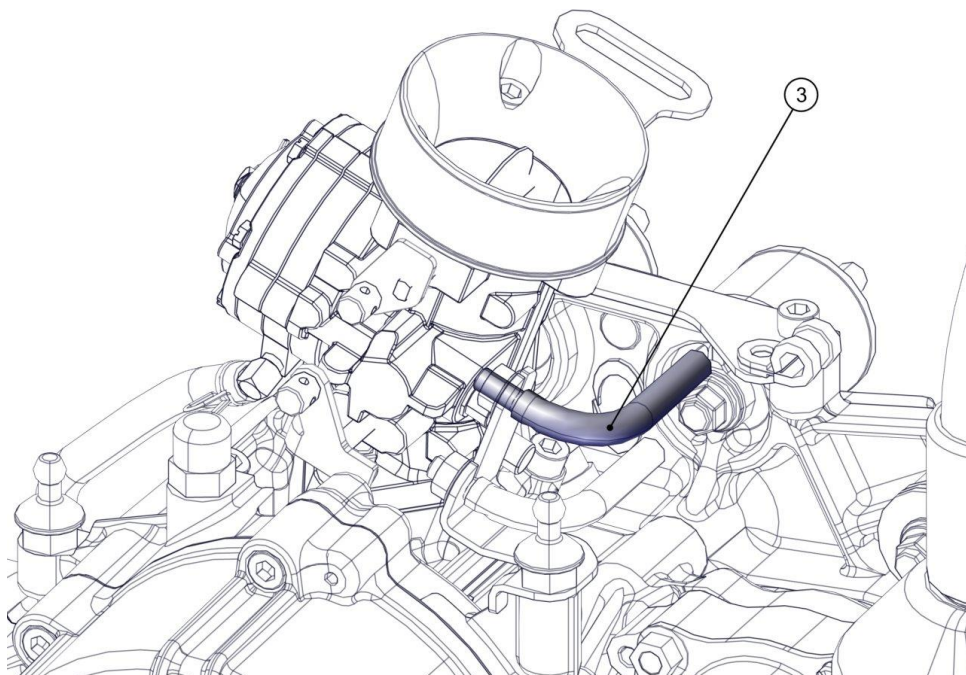
3.6 Bowden carburettor cables

Two Bowden cables have to be connected to the carburettor: one for the throttle control and one for the Choke system.

Screw the accelerator Bowden cable inside the elbow (2) and fix the sheath to the clamp (1) shown in the figure.



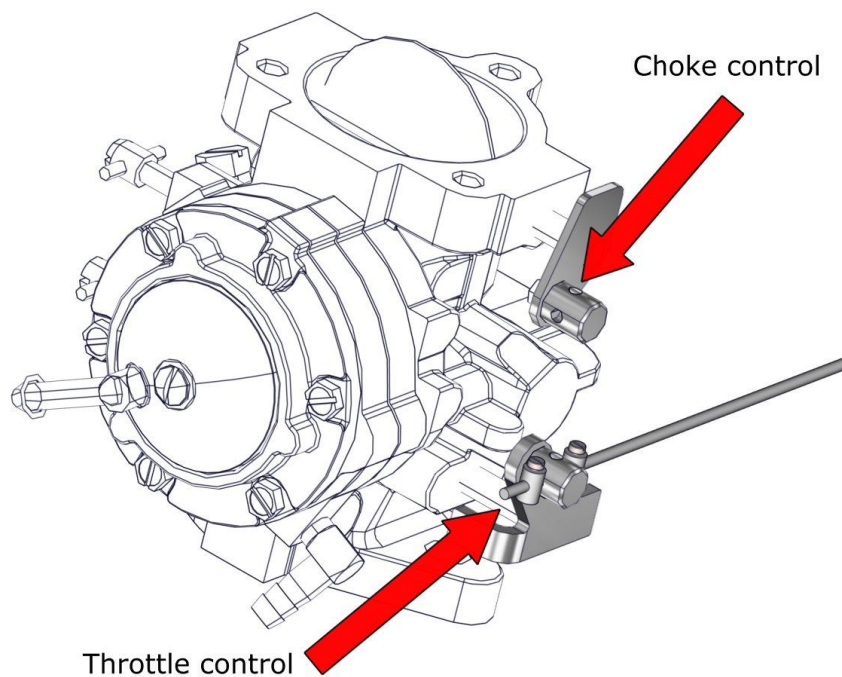
Screw the Choke Bowden cable into the elbow (3).



Then proceed to fasten the 2 cables coming out of the elbows to the carburettor. The connection points are shown in the figure.



Secure the cable using 2 nipples to prevent loosening.



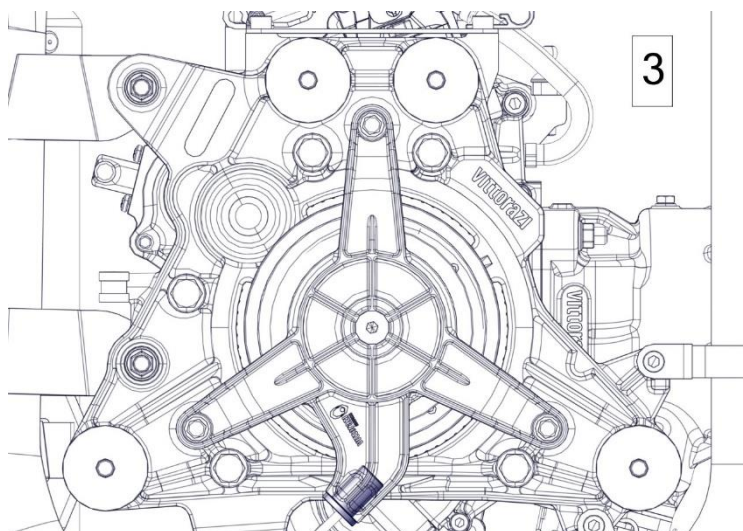
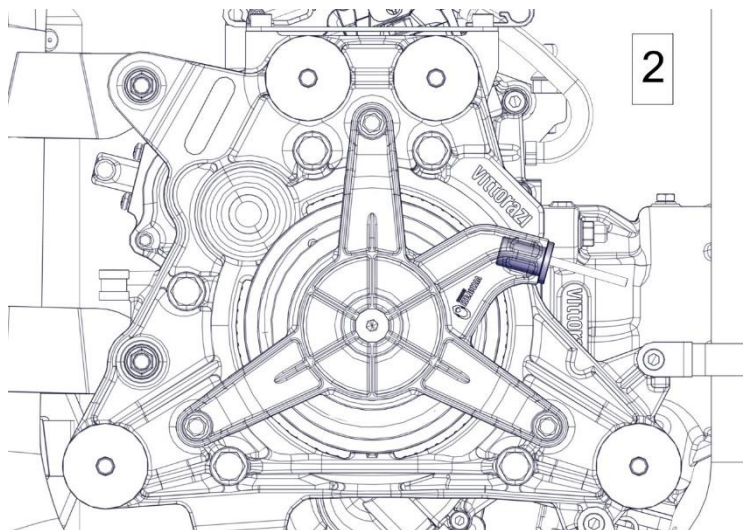
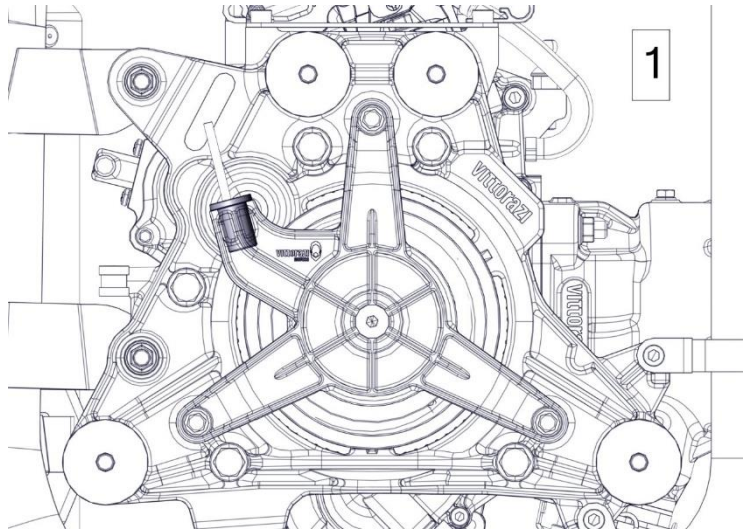
Check carefully:

- 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.

All of these controls should be performed without the airbox to visually check operations. The checks will be repeated again even with the airbox installed.

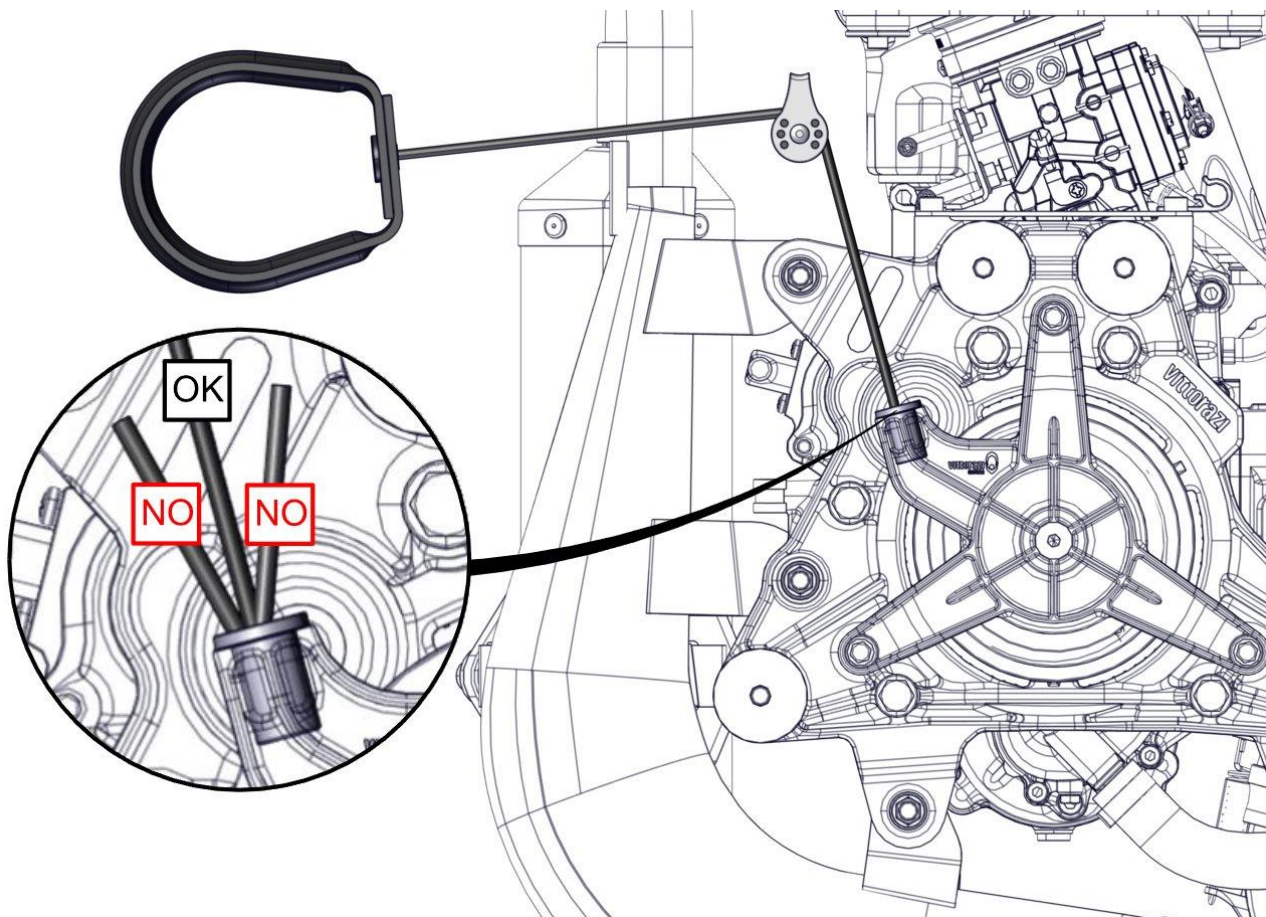
3.7 Manual starter

Depending on the installation's choice, the manual starter can be rotated in 3 different positions (every 120 degrees) to allow for a different position of the handle, through a nautical-type pulley, fixed to the frame in which the rope runs.



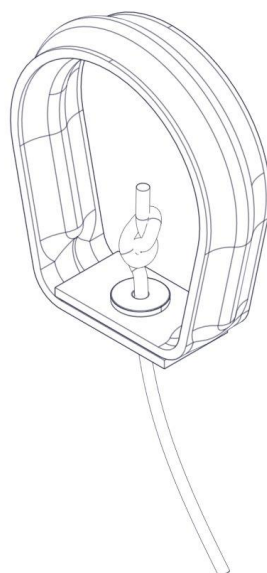
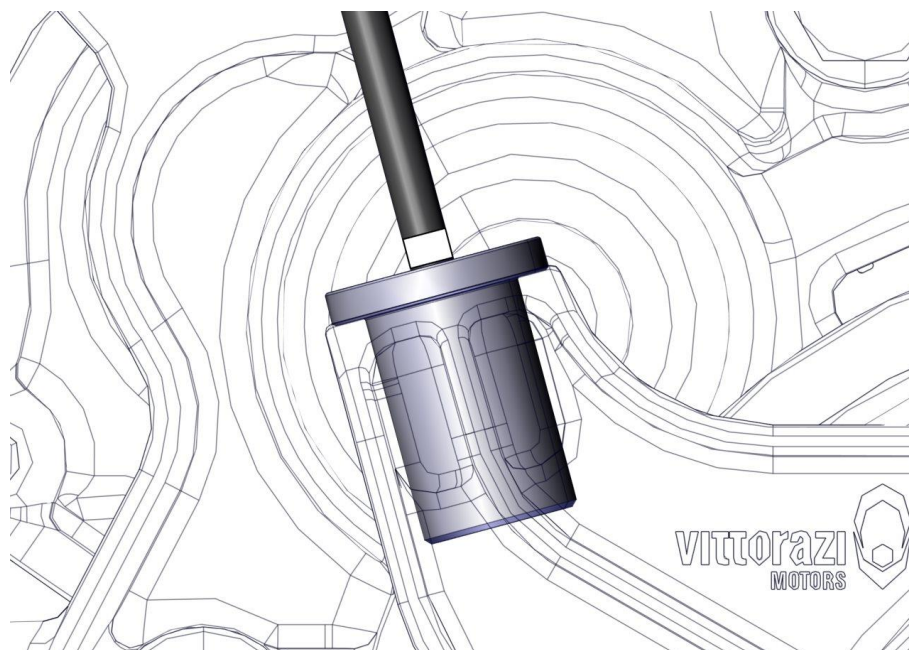


The position of the pulley fixed to the frame allows the rope to come out centred from the bush, to avoid strong friction and premature wear.





Check that the white mark on the rope, is well aligned with starter support bushing. This ensures the correct tension of the starter recoil spring as well as an adequate amount of rope wound in the system. According to the final position, secure the handle with a knot and trim the excess rope at the end.



3.8 Transmission oil filling

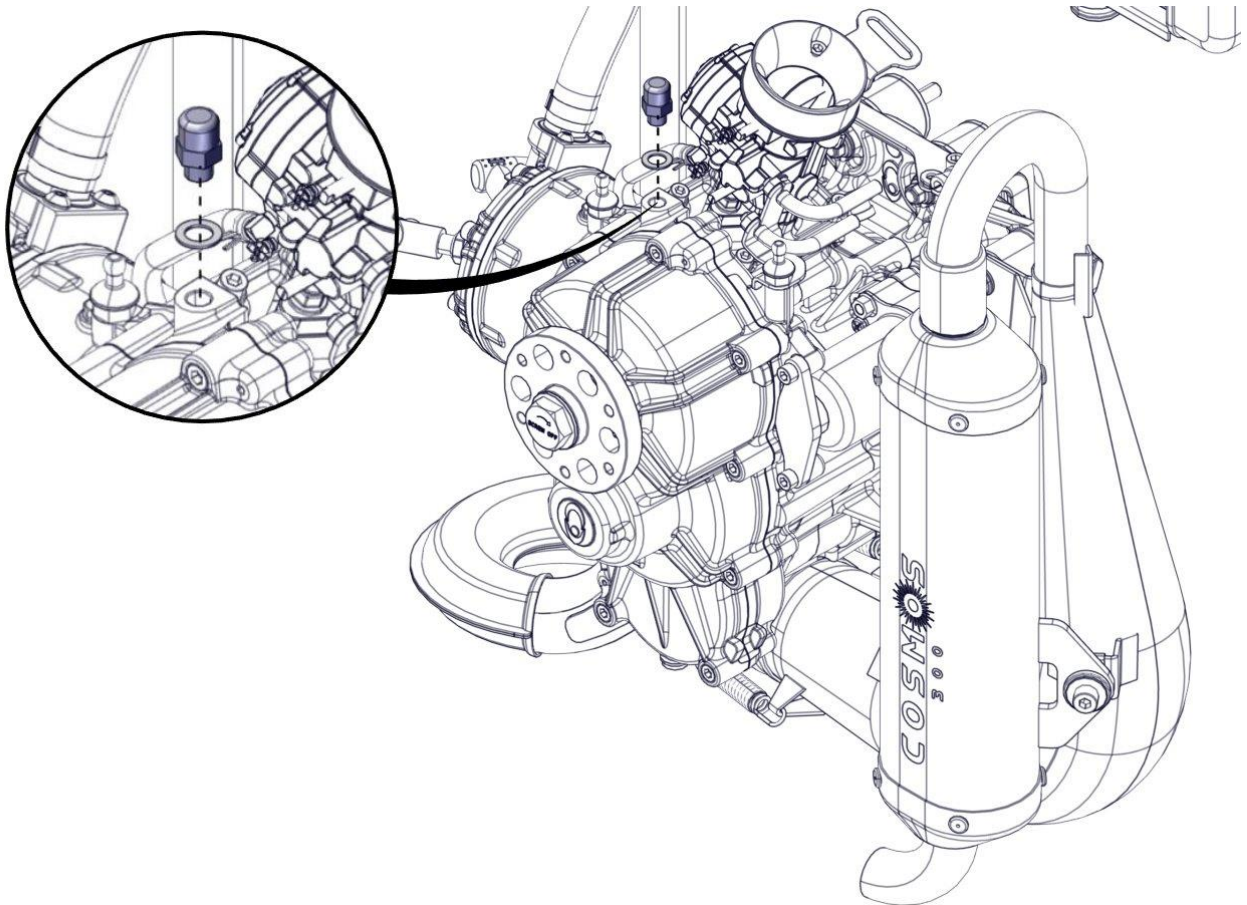


All the oil in the supplied bottle (250 mls) must be introduced into the transmission. The quantity supplied is measured for the reduction drive.

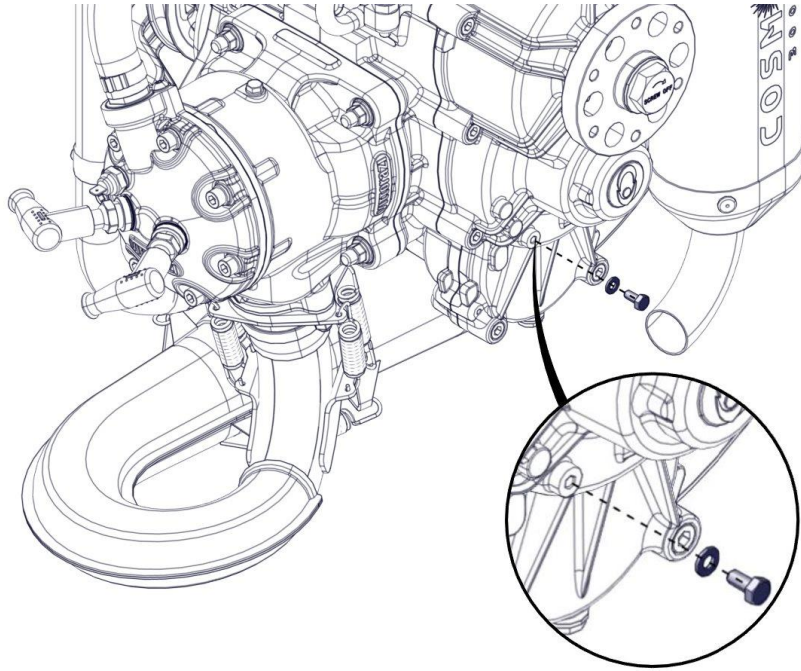
This operation is only possible with the airbox not installed on the engine. Place the engine in a vertical position before filling the transmission with oil.

To properly fill the transmission:

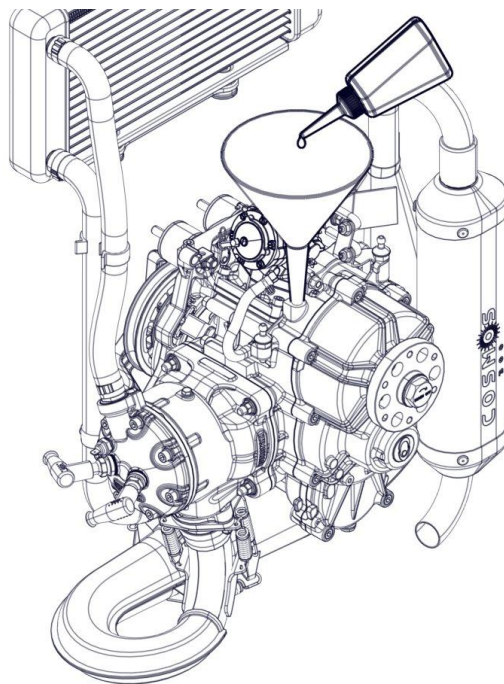
- Remove upper cap with copper seal.



- Remove front screw with copper seal.



- Insert all the oil of the bottle (250 ml). The oil contained is Motul Transoil 10W-40.

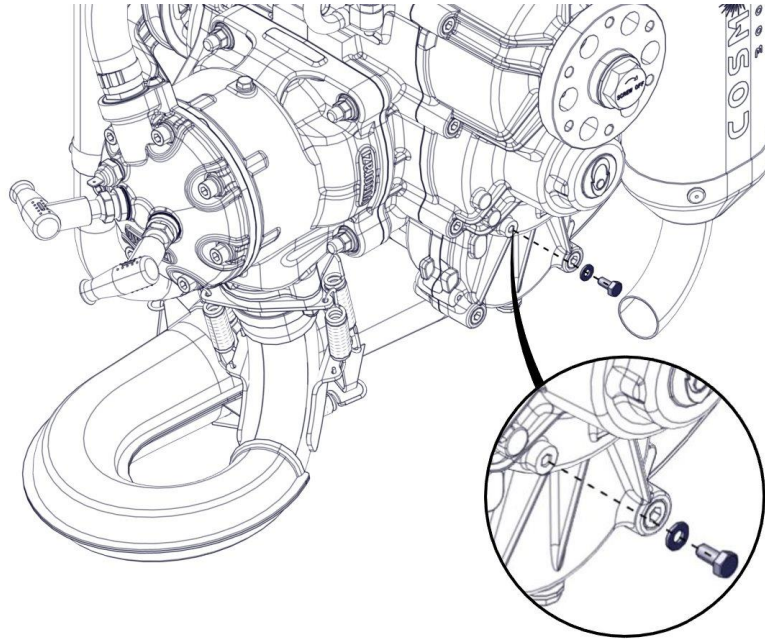


- Wait a few minutes for the oil to settle.
- Check the oil level: if oil is leaking from the front hole, wait until no more oil comes out.

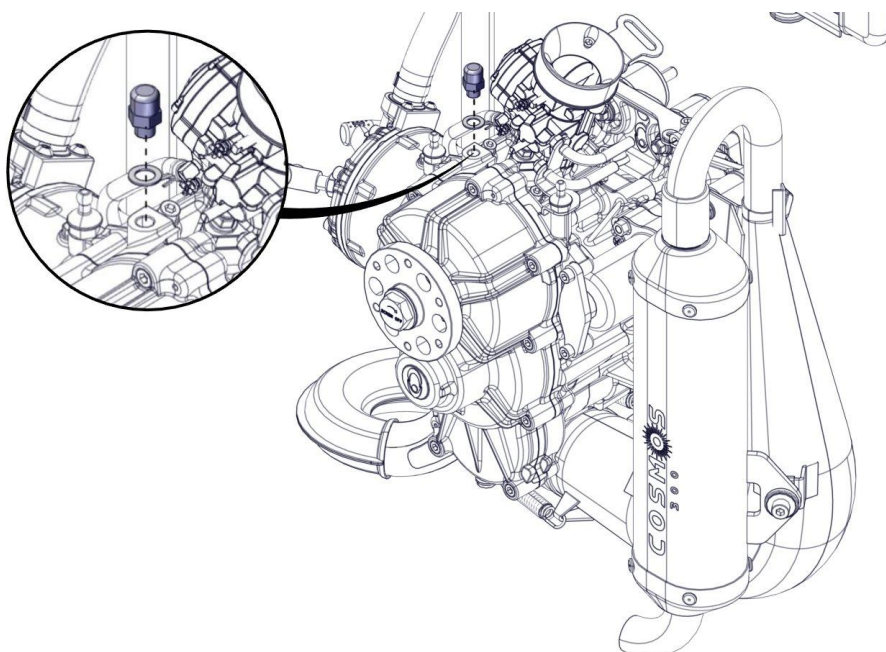


Replace copper seal.

- Insert front screw with copper seal.



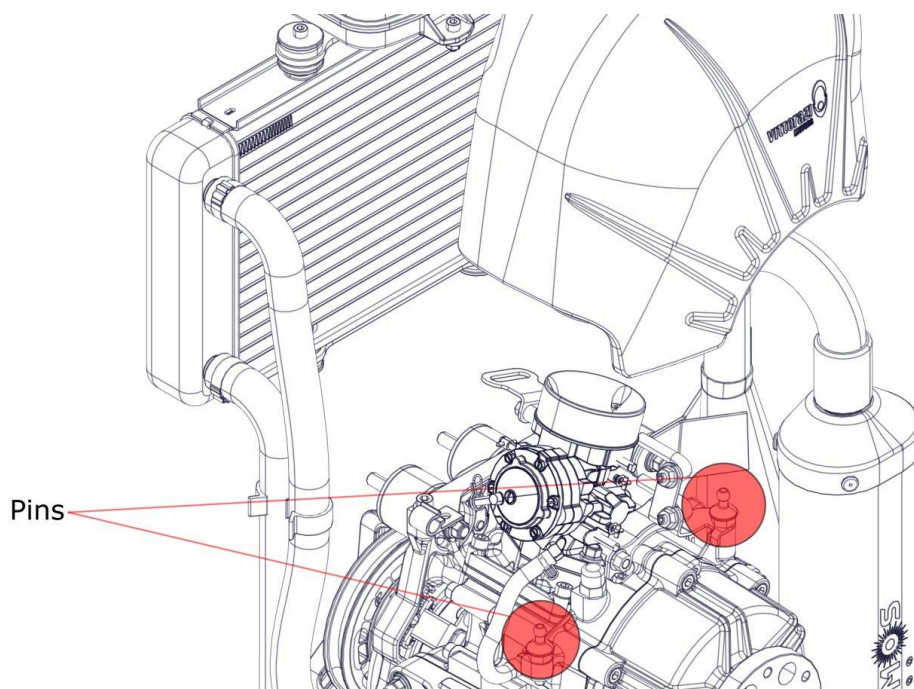
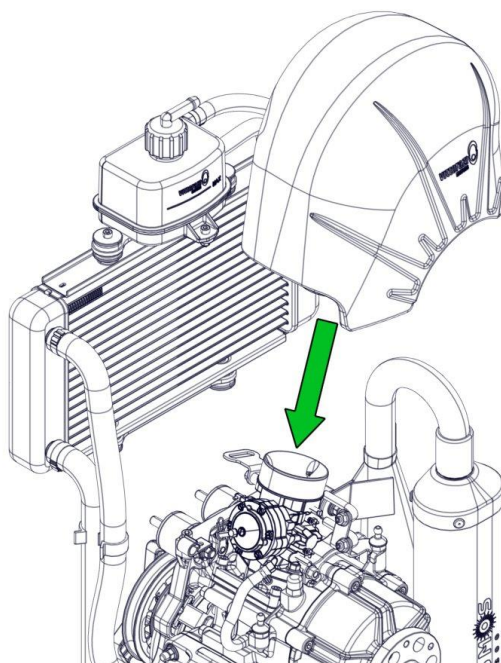
- Insert upper cap with copper seal.



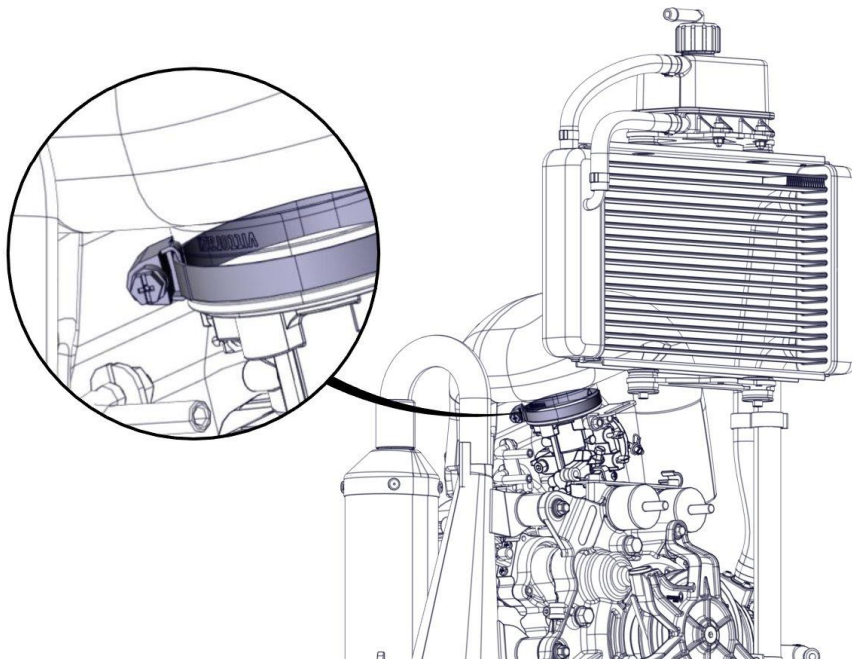
3.9 Airbox

To install the airbox on the engine:

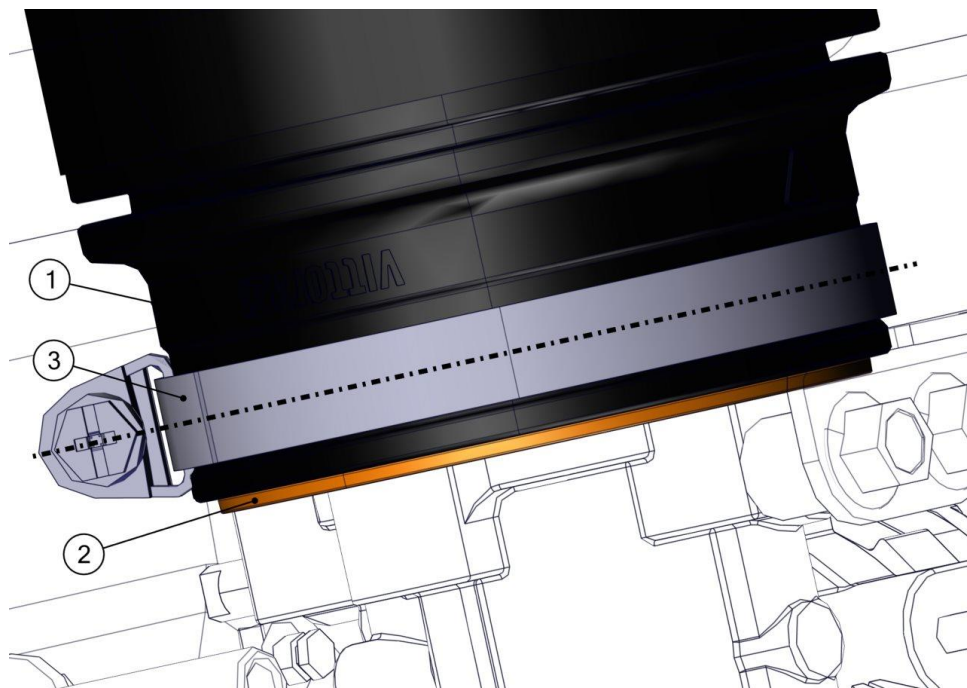
- Connect the airbox sleeve to the carburettor inlet flange and 2 Snaplocks to the pins fixed on the engine.



- Check the position of the fixing clamp and the screw.



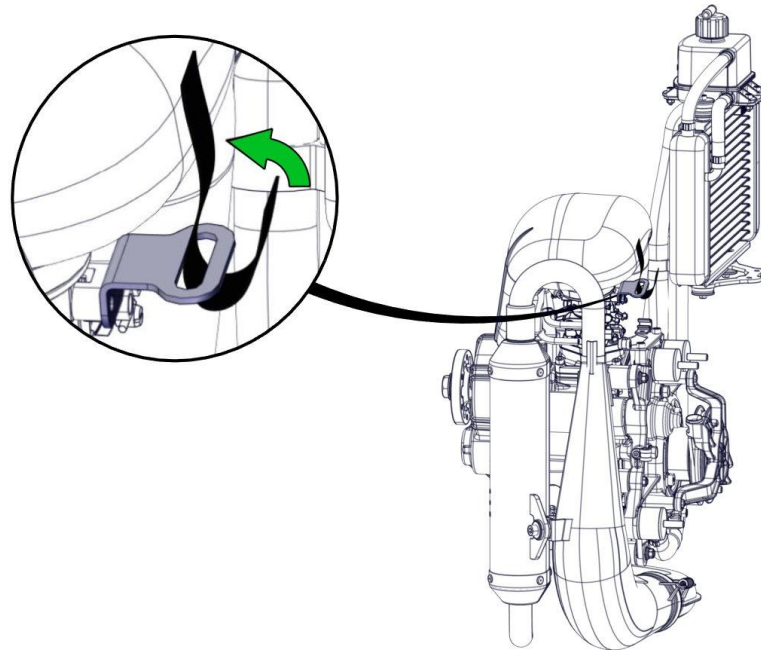
The airbox sleeve (1) must be completely inserted into the airbox connector (2), the fixing clamp (3) correctly inserted on the seat and aligned as in the figure.



- Tighten the fixing clamp by applying 2,5 Nm torque to the screw.



Attach the safety strap to the support bracket behind the airbox, ensuring that the strap is tightened firmly.



After installation, check that there is no relative movement between the rubber sleeve and the airbox connector.

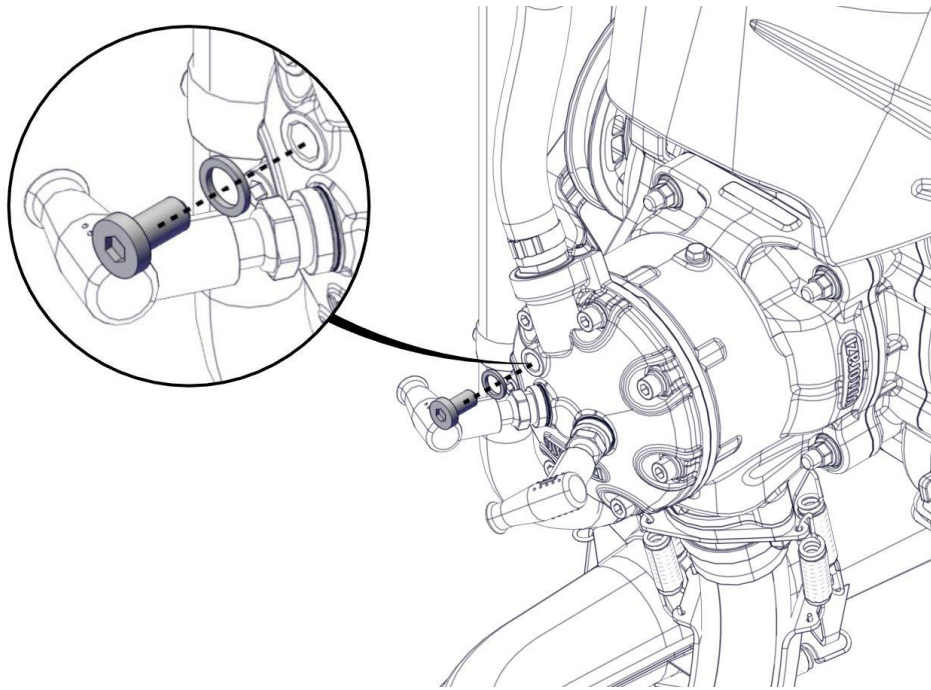
3.10 Propeller

Refer chapter 4.1 “Propeller assembling” in the User manual.

3.11 Instruments and accessories

The following accessories provide important information on engine operation: the tachometer, the water temperature sensor and the EGT sensor. The tachometer is very useful for checking the state of the engine: idle, average and maximum speed are checked by comparing engine specifications.

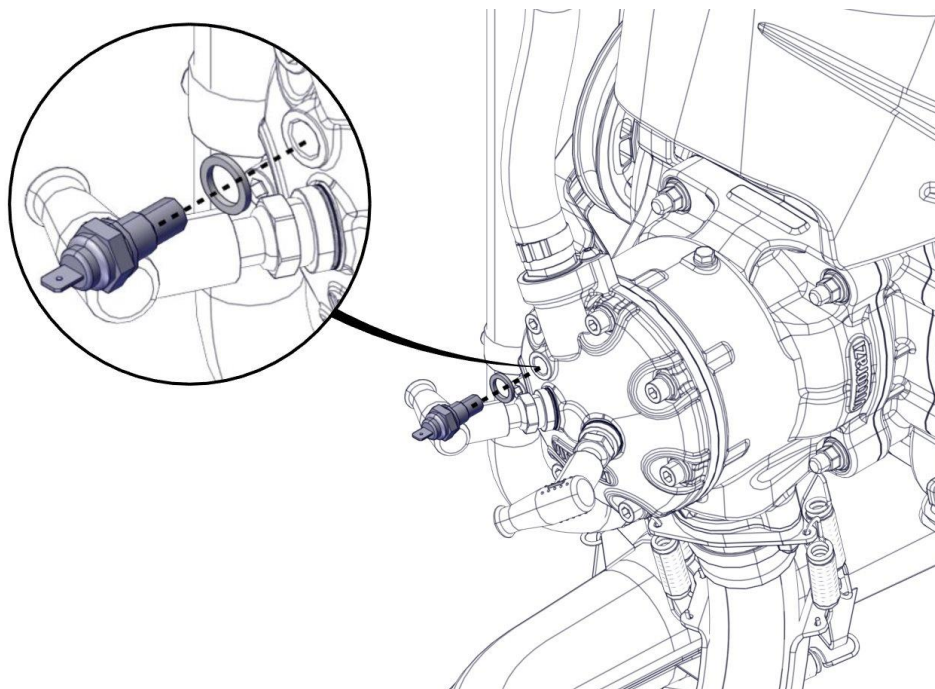
The engine is water-cooled and the temperature sensor is supplied but not installed. Remove cap and copper seal from the engine head.





Replace copper seal.

Screw the temperature sensor (M10x1) with copper seal in the engine head and proceed with electrical connection.



Sensori di Temperatura per Temperatura Aria
per kit di misura della temperatura

Dati Tecnici:
Versione: Termistore
Tensione nominale: da 6V a 24V
Temperatura di funzionamento: da -25°C a +120°C max.
Tempo di risposta: min. 3 minuti dopo la commutazione

Technical Data:

Version: Thermistor
Rated voltage: 6V to 24V
Operating temperature: -25°C to +120°C max.
Temperature response time: 3 minutes minimum after switching on operating current

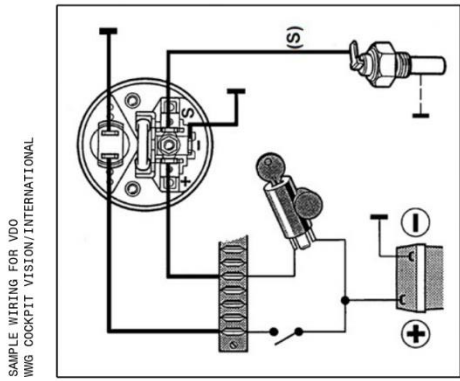
Temperature Sensors for Air Temperature
for temperature gauge kit

The temperature sensor can be used with:
VDO WVG COCKPIT VISION/INTERNATIONAL displays (Simple / Recommended option)
- we suggest item 310-030-002G for 12V applications
VDO SINGLE VTU display (for can CANbus support - Advanced choice) . . ;
- we suggest item A2C383320001 (display) + 2910000484200 (cable).

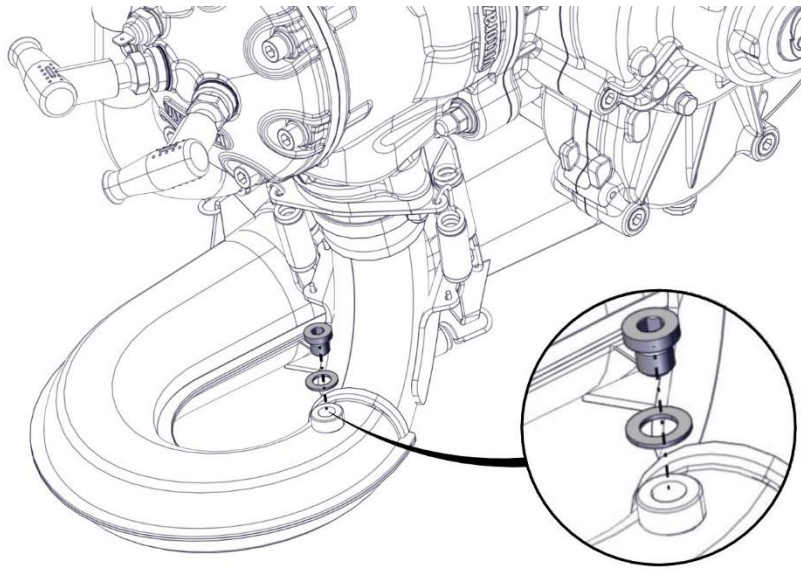
VDO cockpit vision
VDO cockpit international

ved. documento: tabelle delle curve caratteristiche
see file: temperature sensors characteristic curve tables

Filettatura Thread	KT	Operational Value + °C	Valori Operativi Operational Value + °C	Codice d'Ordine Order No.
M10 x 1	13	0 = 1893 ± 102	0 = 1893 ± 102	323-801-008-002D

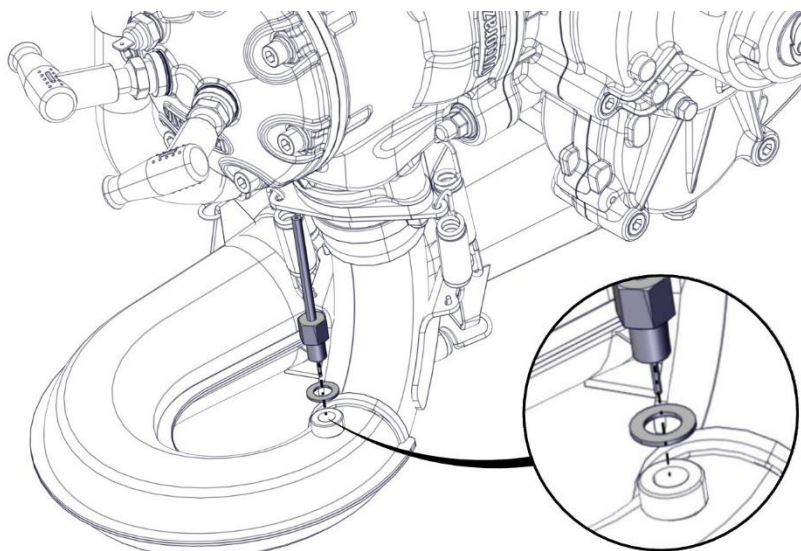


The EGT sensor makes it possible to monitor the temperature of the exhaust gases and thus obtain information on the correct combustion of the engine. Remove cap and copper seal from the exhaust pipe hole.



Replace copper seal.

Screw the EGT sensor (M8x1) with copper seal in the exhaust pipe hole and proceed with the electrical connection.



Refer to chapter 2 for engine limits to be respected (RPM, water temperature, EGT).

3.12 Final checks

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

- All screws tightening applied during the installation process.
- The fluids (transmission oil, coolant) are already inserted and at the right level.
- Correct operation of the throttle and the choke system.
- Pipe connections and no fluid leaks.
- All the electric connections safely wired.
- Correct ignition of the engine by the electric start or by the manual starter.
- Correct operation of engine instruments (tachometer, temperature sensors).
- Engine stop by killing 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.

