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# User Manual

*Last Update, June 2014*



***Moster 185  
Classic***



***Moster 185  
Silent***



***Moster 185  
Plus***



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## 1.0 Introduction

Thanks for choosing a Vittorazi engine.

The user manual constitutes an integral part of the motor, it has to be preserved and combined to the motor in case it will be delivered to a new user.

Before installing of the motor, read this manual carefully.

The purpose of this manual is to provide the user with all the information he needs to manage the engine properly by himself and in the safest possible way.

It includes information about the technical aspect, operation, machine stop, maintenance, spare-parts and safety.

If just one parts of the manual is not completely understood or in case the manual is not clear or exhaustive, do not hesitate to contact either the authorized dealer or our factory for any problem or question you might have.

Please include in the claim the serial number XXXX of the motor that you find under the system carburetor, some photos if you think it is necessary.

You find the direct contacts of the factory in the first and in the last page of this manual.

The Vittorazi reserves the right to change in any moment without warning, sketches, specifications, component, details of the motor, in relation to the model in production without incurring in any obligation.

When you receive the motor, it will already have overcome a test of 15 minutes in the factory, verifying the operation of all the components and the operation to every speed.

All Vittorazi engines are tested before the delivery.

The reliability, the performances and the duration of your motor will also depend from your knowledge and the way you use it.

In this manual will be highlighted:

- in the red panel the situations that can lead you to a serious danger;
- in the blue panel, important suggestions or advice that must not be underestimated.



**Attention, danger, risk.**



**Important advice, suggestion**

In the photos/picture of this manual:



**the arrows of green colour** means that the argument in question will be further expanded in the relevant chapter;



**the arrows of blue colour** indicate to add thread locker medium strength;



**the arrows of brown colour** indicate to add some grease;



**the arrows of black colour** indicate to add sealing paste, resistant to high temperatures (up to 500-600°C).

## 2.0 Warning



- ***Be aware that the motor can stop, have a breakup or to go off in any moment. This could lead a crash to the ground or a landing in hostile areas with possible damages/death of the pilot or other people. The ultralight moved by this motor must fly in permitted spaces, it must not fly above a crowd of people, inhabited centers, zones that have difficult or void landings, must not fly above zones of water or where it is possible to drown. Always have in mind that the motor can go off or breakup, therefore consider a possible landing of emergency for every situation.***
- ***This manual describes the motor. For its installation, use and control, compare also the attached user manual of the ultralight: Paramotor, Mosquito or Trike. If used in other applications, cannot be guaranteed the correct operation.***
- ***This motor is not certified. It is not a motor with guarantees or aeronautical certifications. Its construction is destined to experimental and not certified aircrafts.***
- ***Some zones for particular atmospheric conditions as pressure, temperature, damp can bring to a different operation of your motor. Before beginning every flight, you test the motor on the ground and verify that it doesn't have an anomalous behavior.***
- ***Start the engine in a plain surface, free from stones, sand or small parts that could be aspirated by the propeller. Be sure that the flow of air pushed by the propeller doesn't cause damage to anybody. Whenever the motor is running (testing on the ground, take-off, landing) watch out that nobody stands near to the propeller in rotation. A good safety distance is 50 meters for all directions of projection of the propeller and 20 meters for the others directions.***
- ***Do not use the motor that has not followed a correct maintenance or has not correctly been used in the time or if you know that is not under perfect conditions.***
- ***The use of non original spare-part and not recognized by Vittorazi, can make the motor dangerous and immediately hands term to the validity of the warranty. Vittorazi doesn't assume any warranty for that motor that are used with non original parts or not recognized, modified or that have had an improper use.***
- ***Unauthorized changes to the motor, to the reduction, to the propellers can reduce safety and reliability of the aircraft. In case you have to intervene on the motor we invite you to compare this manual with the help of your dealer Vittorazi and follow it as reference.***
- ***Before every use or test, check the conditions of the propeller and the tightening of bolts of the propeller. If the propeller has received a hit and is damaged, avoid using or turning on the motor. This can lead to an explosion of the propeller in rotation or to strong vibrations that will revert in the motor with possible consequent breakups, loss of tightening of the bolts or strong usuries of components.***
- ***Never use the motor without propeller or without reduction drive group. This motor has been projected for a determined and contained number of turns. Without propeller or reduction drive, the motor reaches a number of turns for which it has not been calculated. In a few second there is risk of explosion of the motor.***

### ***3.0 Installation of engine components***

This chapter is reserved to the manufacture, dealer or center assistance Vittorazi. If you are our collaborator, we invite you to write to our e-mail address and ask for the integral version of the manual.

## 4.0 Get ready for the use

### 4.1 Propeller choice and mounting

Make sure you have a suitable and guaranteed propeller by Vittorazi for your motor.



*The use of the propeller Vittorazi guarantees to our motors a perfect operation in every condition of flight. Thanks to the continuous studies, on the test-bench it and to the experiences in flight, we are able to realize propeller able to assure:*

- *absence of vibrations and stability during the time;*
- *best performance of the motor and improve fuel consumption;*
- *reduced noise emissions in relationship to the propeller diameter and to the reduction;*
- *best cooling of the components.*

*Every single motor produced by Vittorazi is tested with its own propeller before the delivery. In case of use of a propeller not recognized by Vittorazi, anomalies of operation not related to the motor may occur, for instance:*

- *components break-ups caused by vibration;*
- *overheating of the thermal group;*
- *excessive noisiness;*
- *excessive fuel consumptions or insufficient thrust;*
- *non-constant power output.*

*The use of a not conform propeller with consequent anomalies already listed above or the use of a right propeller Vittorazi but combined to a wrong reduction ratio, or the use of accessories or components which are not authorized for this engine, immediately voids of the warranty (see chapter 11.3).*

Attention: the propeller can be mounted in two opposite positions compared with the reduction drive. Ask the authorized dealer or the instructor, if you are not sure about the propeller assembling.

In all versions of model Moster185 the propeller rotation is counterclockwise, considering the back view (as per picture 4.1). Push the propeller against the reduction drive, until it is completely inserted. Now gently screw the bolts up to the end. Be sure that the bolts are suitable to the propeller in use, therefore the thread of the bolts is inserted for at least 12mm (for carbon propellers) and 15mm (for wooden propellers) in the hub. Now tighten the bolts of the propeller, trying to apply the same pressure on all points, (picture 4.1). Do not exceed with the pressure on the bolts; you a risk to crush the propeller.



*Maximum pressure to apply:*

- *Carbon propeller: 10-12 N/m on every M6 bolt;*
- *Wooden propeller: 6-7 N/m on every M6 bolt (in accordance with the specifications provided by the propeller manufacturer, based on the type of wood adopted).*

Wooden propeller: once tightened the propeller, it is good to check that the pitch of the two blades is identical. If there is a variation between the two blades, this difference can be compensated through the pressure of the bolts.

If you don't know this method of alignment, ask to an authorized dealer or instructor. Check the tightening of the propeller before every flight.

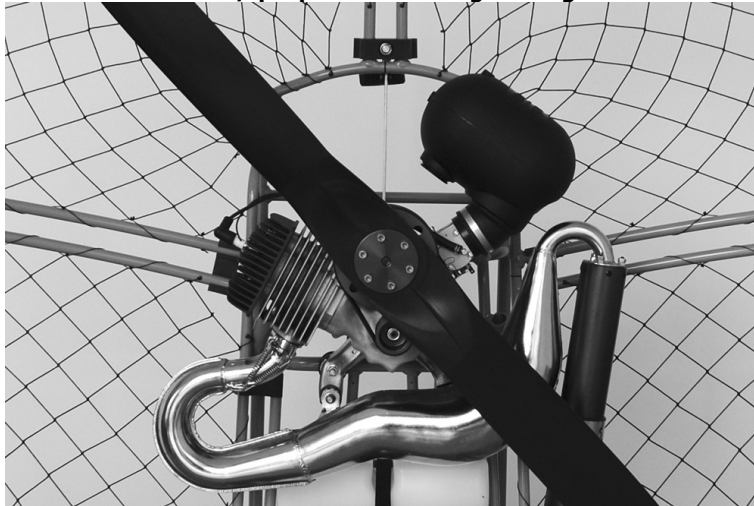
In case of a damaged propeller, we invite you to purchase from a Vittorazi dealer, the same propeller for measure and profile, guaranteed from the factory. You just have to remember the size, material of the propeller and model of the motor



*In the case of propeller impact, it is necessary to verify that all the engine parts have not suffered any damage, paying particular attention to the components listed below:*

- *Reduction pulley and bearings;*
- *Reduction eccentric;*
- *Engine carter, engine carter support and engine rubber mounts.*

#### 4.1 / propeller screw tightening



## 4.2 Fuel

The motor that you are going to use is a two strokes engine. It requires an established percentage of oil/gasoline for the lubrication.

The percentages will be pointed out in the following chapter, ("break-in" 4.6).



*Gasoline is an extremely flammable and explosive substance. When you prepare or in every moment you are close to the fuel (gasoline and oil), do not smoke, do not ignite sparks or flames. Never fill the tank of your aircraft when the motor is running. Take the fuel tank, at least 10 meters away from the engine, before to start it.*

During the operation of decanting, mixing, filling, choose an open place, ventilated, clean and away from dusts, sand, grass and everythings that can obstruct the passage of the gasoline. If possible, while filling the tank of the aircraft, filter the mixture. Be sure that the tank used for the transport of the gasoline, filter and funnel, are perfectly clean.



*When at the gas pump, always choose unleaded gasoline 95 octanes. We suggest to use only oil of good quality certified and full synthetic (no semi-synthetic oil, no mineral oil). We recommend the use of the following types of oil, already tested with success on our motors: **Motul 710.***

Avoid mixtures prepared by the gas pump. A mixture that has been prepared from 2-4 weeks and left in a tank, could separate the oil from the gasoline, losing the characteristics of lubrication even if shaken before the use. Avoid to prepare big quantities of mixture, when you are already conscious to use only a part of it. Avoid using plastic tanks and consider it only as a container to transport the mixture. Do not let the mixture deposit for days in the plastic tanks. We dissuade the addition of liquids that increase the number of octanes.

Problems occurred to the motor due to a lack of oil in the gasoline, or due to a wrong percentage of oil in the mixture, or for lack of cleanliness of the gasoline, immediately void the warranty. (See chapter 11.3).



### **4.3 Starting and turning off**

In the first start-up of the engine and every time the gasoline line (tank, pipe, primer bulb and carburetor) remains without fuel, you will need to fill the circuit before starting the motor. To do that, it is necessary to make pressure on the primer bulb of the gasoline and at the same time, with care, on the valve of the carburetor (indicated with number 6 in the following picture 4.5) up to the filling of the pipeline. It will be easy to see the gasoline that enters into the carburetor through a transparent pipeline. For a good starting of the engine, when the circuit is empty or the motor is cold, you need to enter just a small quantity of gasoline in the carburetor (for about ½ second). This small quantity of gasoline, will work as starter/choke to the motor. Attention: if the quantity of gasoline that you push with the pump into the carburetor, is excessive, there is the risks to flood the motor, and eventually the damage of the pull starter.

The best starting of the Vittorazi motor is gotten without throttle or with a minimum of throttle opening. If the circuit of fuel is under pressure and the motor is warm, it won't be necessary to make pressure on the primer bulb and valve.



*During the start-up phase, always pay maximum attention to the propeller and to those who could be nearby. Many accidents happen before to fly. On every test or warm-up, we suggest to always wear the paramotor on your shoulder, to fasten the harness, take a look around, then to turn on the engine with the pull (or electric) starter, always ready, however, to push the shutdown button, in order to stop the motor in every moment.*

*Important: often verify that the shutdown button is working. Sometimes it may get jammed or can stop working by the time.*

### **4.4 Warm-up**

Gently get throttle in the first 30 seconds allowing to stabilize the carburetor and the motor. Now you increase the number of RPM (up to approximately 1/4 of throttle) and let motor warm-up for 2-3 minutes at this constant speed. Finally get the motor for some second (15-20) at full throttle. Now your motor is ready to the flight.

If you install a temperature sensor CHT: during the warm-up above described, the motor has to reach or overcome a temperature of 120°C.

These 3 minutes of warm-up also have to be dedicated, thanks to your attention, to understand if the motor has some anomalous behavior, if there are unexpected vibrations or undesired noises.

## 4.5 Carburetor adjustment

A simple and fast control. You don't have any experience or affinity with the motors? Don't worry, follow step by step what we tell you in this chapter.

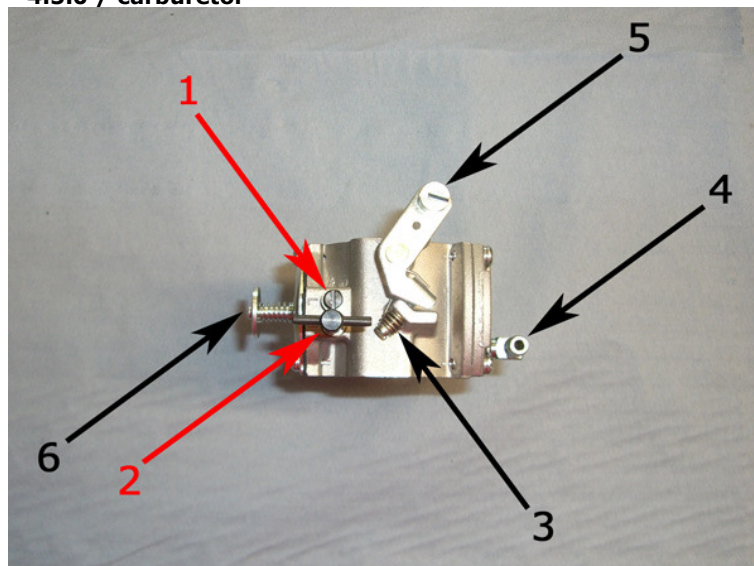
For years, our ambition has been to supply a simple product and accessible to everyone, trying to get simple and effective solutions for those who doesn't have experience of motor's adjustments. When you receive the motor, it has already been tested for 15 minutes in the factory's test-bench, verifying the operation, the assembling and the optimal carburetor setting.

In chart 4.5 are shown the regulations L and H of the motor in the standard positions. These regulations guarantee a perfect stability of the motor, the operating temperature and the correct lubrication to every organs of the motor.

Chart 4.5

CARBURETOR SETTING	Moster 185 (all versions)
Screw L	from 1/4 to 1/3 of turn
Screw H	from 1+1/8 to 1+1/4 of turn (warranty sticker lock)
Idle	2.000-2.200 RPM

4.5.0 / carburetor

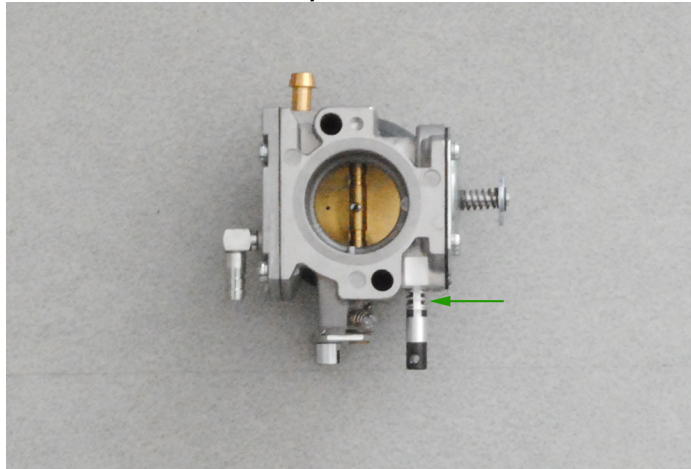


1. Screw L or Low speed
2. Screw H or High speed
3. Screw of the throttle, open the butterfly
4. Pressure plug
5. Butterfly lever
6. Valve for the first filling of the carburetor



For warranty and safety reasons, the screw H of the carburetor has been locked with a warranty sticker lock, (image 4.5.1). The break-up of the warranty sticker lock automatically void the warranty (see chapter 11.3).

#### 4.5.1 / sticker lock



Whenever you choose to verify the carburetor settings, proceed in this way: completely close the screw L and H and then open them exactly with the standard setting, as described on chart 4.5. Remember: a strong pressure (tightening) on these screws can irretrievably damage the carburetor.

Following these guidelines, you can perform a simple check of the carburetion, but only once the engine has been safely alight and heated for few minutes (see chapter 4.3)

:

- The motor has to maintain a constant idle and must not to have the tendency to go off or to flood.
- When you pull the throttle fastly from the idle rpm, the motor immediately has to react without going off or suffering lacks of power.
- Simulating a cruise flight (about 1/4 or 1/3 of throttle), the motor have to react with a regular thrust, smooth and not with hiccups or power jumps.
- At full throttle, the thrust has to be constant and the max speed between 8.000-8.600 RPM.



*Attention: if the carburetion of the motor (the quantity of gasoline that arrives to the motor) is poor, therefore the opening of the screw is lower compared to the indications of the chart, breakups as seizures, overheatings, fusion of the piston, precocious wear of the components will probably occur.*

*Problems to the motor due to a lack of oil in the gasoline or a wrong mixture oil/gasoline, impurity in the fuel or a incorrect carburetion, immediately void the warranty (See chapter warranty 11.3).*

A check of the carburetion can be made, verifying the color of the spark-plug electrode. A first control can be done, at the end of the of break-in period, in the following way:

- If the electrode is brown, the carburetion is correct.
- If the electrode is grey or light, the carburetion is poor and you have to immediately seek the cause, with the help of an authorized dealer/instructor.
- If the electrode is dark brown or black, the carburetion is rich.

Watch out for the regulation of the screw H, because if this is too closed compared to indicated values, you could have damages to the motor. No damage will occur if the carburation of the screw H is too opened (rich). If you have doubts, is always better to have a rich carburation for the screw H.

## 4.6 Break-in

A phase of break-in executed with care, improves the duration and the performances of the motor. The motor must be used with care in the first 5 hours of the break-in (15-20 liters). The first start-up of the motor must be made on the ground (on shoulder), warming up the motor for few minutes and paying attention to anomalous behaviors or noises. We recommend to perform the first phase of the break-in during the same day. Now follow the indications of the chart 4.6 and 4.6.1.

Chart 4.6

<b>BREAK-IN</b>	<b>Vittorazi Moster 185 (all versions)</b>
<b>From 1<sup>st</sup> to 15<sup>th</sup> liter</b>	Oil 3.0% or 33:1
<b>After the 15<sup>th</sup> liter</b>	Oil 2.5% or 40:1

Chart 4.6.1

First phase of break-in	<p>The first phase of the break-in must be effected on the ground, will last around 2 hours: cycle of operation of 15 minutes and following break of about 15 minutes, in which allow the engine to cool. With the help of a RPM tachometer and a chronometer, follow the indications to effect the first sequence:</p> <ul style="list-style-type: none"> <li>- 4000 Rpm -&gt; 4 min, then to idle 1 min</li> <li>- 5000 Rpm -&gt; 3 min, then to idle 1 min</li> <li>- 6000 Rpm -&gt; 2 min, then to idle 1 min</li> <li>- 7000 Rpm -&gt; 1 min, then to idle 1 min</li> <li>- 8000 Rpm -&gt; 30 sec, then stop the motor and leave it cool for 15 minutes.</li> </ul> <p>Repeat the same series described above, for 4 times. At the end of the last series, stop the motor and check the spark-plug. When the engine will be completely cold, make the first tightening of the head nut at 16-17N/m.</p>
Second phase of break-in	<p>Make flights or tests on the ground for a maximum of 30 minutes up to complete 15 liters (about 4h of operation). Don't use the motor at the same speed for long time, a gradual acceleration and deceleration is preferable. General check for bolts and components are listed in the following chapter 4.7.</p>
Regular use	<p>Reduce the percentage of oil to 2.5%. Regular use of the motor. Repeat the following controls up to 10hrs of use.</p>

## 4.7 First check-up



*Here below the list of check-ups that must be effected during the first 10 operating hours.*

*It won't be necessary to repeat these controls after the 10hrs.*

- *tightening of the head nut (16-17N/m) after 2hrs and 10hrs, always when the motor is cold;*
- *check the colour of the spark-plug at the end of the first phase of the break-in;*
- *verify the tension of the belt after 5h and 10h (see chapter 6.8);*
- *the idle stability, between 2.000-2.200 Rpm;*
- *tightening of all the screws, bolts and nuts;*
- *verification of anomalous leakage of oil, grease or gasoline;*
- *verification of the integrity of the rubber-mounting;*

*Before every flight, verify the tightening of the propeller screws.*

## 5.0 Specification and technical data

Chart 5.0

	<b>Moster 185 Classic</b>	<b>Moster 185 Silent</b>	<b>Moster 185 Plus</b>
<b>Cycle</b>	2 strokes	2 strokes	2 strokes
<b>Stroke</b>	54 mm.	54 mm.	54 mm.
<b>Displacement</b>	184,7 cc	184,7 cc	184,7 cc
<b>Bore</b>	Ø 66 mm.	Ø 66 mm.	Ø 66 mm.
<b>Thrust</b>	25hp at 7800 RPM	25hp at 7800 RPM	25hp at 7800 RPM
<b>Cylinder</b>	Single cylinder in aluminium Nicasil chromed	Single cylinder in aluminium Nicasil chromed	Single cylinder in aluminium Nicasil chromed
<b>Piston</b>	HQ, diamond profile, graphite coating, 2 rings chromed	HQ, diamond profile, graphite coating, 2 rings chromed	HQ, diamond profile, graphite coating, 2 rings chromed
<b>Intake</b>	Airbox silencer, Walbro carburetor, reed valve intake	Airbox silencer, Walbro carburetor, reed valve intake	Airbox silencer, Walbro carburetor, reed valve intake
<b>Cooling system</b>	Extraction from propeller	Extraction from propeller	Extraction from propeller
<b>Starter</b>	Manual	Manual	Manual - 3S (Soft Start System)
<b>Clutch</b>	NO	NO	Centrifugal clutch
<b>Reduction</b>	Ratio 1/2.68 - 1/2.71 - 1/2.86	Ratio 1/2.68 - 1/2.71 - 1/2.86	Ratio 1/2.68 - 1/2.86
<b>Ignition coil</b>	Inductive IDI	Inductive IDI	Inductive IDI
<b>Spark plug</b>	BR9ES	BR9ES	BR9ES
<b>Temp. EGT/CHT</b>	EGT 550° - CHT 250°	EGT 550° - CHT 250°	EGT 550° - CHT 250°
<b>Maximum capacity</b>	8300 RPM	8600 RPM	8600 RPM
<b>Optimal capacity</b>	8000 - 8300 RPM	8300 - 8600 RPM	8300 - 8600 RPM
<b>Static thrust</b>	75 kg with 130 cm propeller (70 kg with 122 cm propeller)	75 kg with 130 cm propeller (70 kg with 122 cm propeller)	77 kg with 130 cm propeller (72 kg with 122 cm propeller)
<b>Exhaust pipe</b>	Hand made with carbon fiber silencer	Hand made with carbon fiber silencer	Hand-made with carbon "Db-Killer" silencer
<b>Propeller rotation</b>	Counterclockwise	Counterclockwise	Counterclockwise
<b>Fuel</b>	Unleaded gasoline with 2.5% synthetic oil	Unleaded gasoline with 2.5% synthetic oil	Unleaded gasoline with 2.5% synthetic oil
<b>Consumption</b>	4.3 - 4.7 l/h at 30kg static thrust, propeller of 125cm, 5600 RPM	4.3 - 4.7 l/h at 30kg static thrust, propeller of 125cm, 5600 RPM	3.8 - 4.2 l/h at 30kg static thrust, propeller of 125cm, 5600 RPM
<b>Weight</b>	13,4 kg	13,6 kg	14,2 kg

## **6.0 Maintenance**

This chapter is reserved to the manufacture, dealer or center assistance Vittorazi. If you are our collaborator, we invite you to write to our e-mail address and ask for the integral version of the manual.



## 7.0 Chart of maintenance

Chart 8.0

	<b>Before &amp; after use</b>	<b>Every 25 hours</b>	<b>Every 100 hours</b>
<i>Breakups, leak of oil, worn out parts</i>	<i>Checkup</i>		
<i>Screws and nuts</i>	<i>Checkup</i>		
<i>Sliding throttle</i>	<i>Checkup</i>		
<i>Killing off button</i>	<i>Checkup</i>		
<i>Engine idle</i>	<i>Checkup</i>		
<i>Rubber mountings</i>	<i>Checkup</i>		<i>To 100 hours or 1 year, replacement</i>
<i>Carburetion by the spark-plug colour</i>		<i>Checkup</i>	
<i>Carburetor</i>		<i>Checkup and cleaning</i>	
<i>Carburetor membranes</i>		<i>Checkup</i>	<i>To 100 hours or 1 year, replacement</i>
<i>Air-box</i>		<i>Checkup and cleaning</i>	
<i>Air-box manifold</i>			<i>To 100 hours or 1 year, replacement</i>
<i>Pull starter system</i>		<i>General checkup: rope, toothed wheel, springs and hooks</i>	<i>Toothed wheel. Rope and hooks or new starter complete</i>
<i>Reed valve</i>		<i>Checkup</i>	<i>Substitution</i>
<i>Soundproofing material silencer</i>		<i>Optional replacement</i>	<i>Replacement necessary</i>
<i>Spark-plug</i>		<i>Replacement</i>	
<i>Gaskets</i>			<i>Replacement</i>
<i>Piston rings</i>			<i>Replacement</i>
<i>Piston</i>			<i>Cleaning soot and measure. After 200hrs replacement.</i>
<i>Piston roller bearing</i>			<i>Replacement</i>
<i>O-ring head</i>			<i>Replacement</i>
<i>Head and cylinder</i>			<i>Cleaning soot from the head. Cylinder measure, cleaning exhaust port, decompressor hole</i>
<i>Oilseal carter case</i>			<i>Replacement</i>
<i>Bearing crankshaft</i>			<i>To 200 hrs replacement</i>
<i>Crankshaft</i>			<i>To 200 hours measurement. Roller bearing replacement</i>
<i>Belt</i>		<i>Cleaning and tension</i>	<i>Replacement</i>
<i>Reduction bearing</i>			<i>Replacement</i>
<b>Moster 185 plus</b>			
<i>Centrifugal clutch</i>			<i>To 150 hrs replacement</i>
<i>Reduction pinion bearings</i>			<i>Replacement</i>

## 8.0 Tightening torque and special tools

Chart 9.0

<b>Cylinder head nuts</b>	<b>16-17 Nm</b>
<b>Flywheel nuts</b>	<b>42-45 Nm</b>
<b>Pinion nuts</b>	<b>42-45 Nm</b>
<b>Crankcase screws</b>	<b>10 Nm</b>
<b>Spark-plug</b>	<b>25 Nm</b>
<b>Cylinder studs</b>	<b>20 Nm</b>
<b>Exhaust studs</b>	<b>25 Nm</b>
<b>Exhaust nuts</b>	<b>32 Nm</b>
<b>Engine support screws</b>	<b>15 Nm</b>
<b>Screws or nuts of 4mm</b>	<b>2.5-3 Nm</b>
<b>Screws or nuts of 5mm</b>	<b>6-6.5 Nm</b>
<b>Screws or nuts of 6mm</b>	<b>9-10 Nm</b>
<b>Screws or nuts of 8mm</b>	<b>25-27 Nm</b>
<b>Carburetor flange screws</b>	<b>10 Nm</b>
<b>Carburetor plastic connector screws</b>	<b>0.5-0.6 Nm</b>
<b>Carbon propeller screws of 6mms</b>	<b>10-12 Nm</b>
<b>Wooden propeller screws of 6mms</b>	<b>6-7 Nm</b>

1 Kg/m=9.81 Nm

## 9.0 Spare parts

Ask to a Vittorazi dealer for the spare-parts. If a dealer is not available in your area or country, you can contact the nearest Vittorazi dealer (or directly the factory).

You can download the Vittorazi Motors spare parts list directly from our website.

The manufacturer will ensure immediate availability of spare parts.

The use of non original parts and parts not recognized by Vittorazi, can make the motor dangerous and this immediately voids the warranty. Vittorazi doesn't accept any warranty for those motor used with non original parts, parts not recognized, modified motors or those who have been used improperly.

## 10.0 Frequent asked questions - FAQ

### ***The motor doesn't start and the spark-plug doesn't have sparks***

The spark-plug is worn out or defective	Replace it
The spark-plug is wet from gasoline	Disassemble the spark-plug and the carburetor. Turn the motor with the starting by hand. Dry the spark-plug.
The spark-plug has soot in the electrode	Clean it with an iron brush or replace it.
The spark-plug cap is not properly installed with the cable	Checkup or replace the cap.
The shutdown button is linked to earth	Check operation of the button, the cables, wirings.
The electric system	Make sure that there are no cables or wiring worn out or open. Check the correct installation.
The ignition coil has a problem	Replace it

### ***The motor doesn't start and the spark-plug have sparks***

Wrong carburetion	Restore the standard carburetion
The motor has received too much gasoline for a wrong procedure of starting	Disassemble the spark-plug and the carburetor. Let the motor turn manually with the help the starter. Dry the spark-plug.
The motor has received too much gasoline for a wrong carburetion. The spark-plug is wet.	As said above. Restore the standard carburetion.
The reed valve is worn out	Replace the petals
Aspiration of air from the junctions	Control and replace, where necessary, the gaskets, o-ring or oilseals.
Aspiration or exhaust pipe clogged	Check the conduit of the airbox, exhaust pipe and silencer.
Carburetor problem	Disassemble and inspect

### ***The motor starts well but the power is irregular or low***

The propeller adopted is not certified from Vittorazi	Replacement
The spark-plug is worn out or defective	Replacement
The spark-plug has soot in the electrode	Clean it with an iron brush or replace it.
The the spark-plug cap is not well installed with the cable	Checkup or replace the cap
The electric system	Make sure that there are no cables or wiring worn out or open. Check the correct installation.
The ignition coil has a problem	Replace it
Wrong carburetion	Restore the standard carburetion
The reed valve is worn out	Replace the petals
Aspiration of air from the junctions	Check and replace, where necessary, the gaskets, o-ring or oilseals.
Intake or exhaust pipe clogged	Check the conduit of the airbox, exhaust pipe and silencer.
Carburetor problem	Disassemble and inspect
The gasoline in the tank is aged, there is water or other liquids, it is dirty	Empty the tank and replace the fuel
The gasoline in the tank has a wrong percentage of oil	Empty the tank and replace the fuel
Aspiration of air from the circuit tank-bulb-filter-carburetor	Check the junctions or replace the aged pipeline or bulb
Dirty gasoline filter	Replacement
Carburetor membranes worn out	Replacement
Too much soot in the head	Clean it
Problem to the cylinder or piston	Replacement
Belt dirty, low tension or worn out	Cleaning, right tension or replace it

### ***Overheating***

The propeller adopted is not certified from Vittorazi	Replacement
The gasoline in the tank has a wrong percentage of oil	Empty the tank and replace the fuel
Wrong carburetion	Restore the standard carburetion
Aspiration of air from the junctions	Check and replace, where necessary, the gaskets, o-ring or oilseals.

### ***Vibrations***

Propeller breakup	Small cracks: reparation allowed only for experienced person. Otherwise replacement.
Components' breakup (es. muffler, bearings, bracket)	Check the motor. Don't use the motor until the problem has been identified and resolved.
Rubber mounting breakup	Replacement

### **Noisiness**

Propeller breakup	Small cracks: reparation allowed only for experienced person. Otherwise replacement.
Components' breakup (es. muffler, bearings, bracket)	Check the motor. Don't use the motor until the problem has been identified and resolved.
Soundproofing material worn out	Replacement
Gasket connection exhaust/silencer	Replacement
Belt dirty, low tension or worn out	Cleaning, restore the right tension or replace the belt

### **Sudden turning off**

Aspiration of air from the circuit tank-bulb-filter-carburetor	Check the junctions or replace the aged pipeline or bulb
The spark-plug is worn out or defective	Replacement
The spark-plug has soot in the electrode	Clean it with an iron brush or replace it.
The cap of the spark-plug is not well installed with the cable	Checkup or replace the cap.
The electric system	Make sure that there are no cables or wiring worn out or open. Check the correct installation.
The ignition coil has a problem	Replacement
Overheating	See section above: overheating
Carburetor problem	Disassemble and inspect

### **Strong smokiness from the silencer**

The gasoline in the tank has a wrong percentage of oil	Empty the tank and replace the fuel
Wrong carburetion	Restore the standard carburetion
Soundproofing material worn out	Replacement

### **Leaking of oil**

Connection cylinder to exhaust pipe	Replace the two o-rings
Connection exhaust pipe to silencer	Replace gasket
Silencer	Clean the silencer with thinner, replace the soundproofing, add sealing paste on the junctions
Crankcase, oilseals, o-rings or gaskets	Disassemble, clean the plains, replace the worn out components, add sealing paste, where necessary.

## **11.0 Warranty**

### **11.1 Warranty registration**

It is important that the dealer/manufacturer fill in the "warranty coupon" (can be found in the following chapter 12.4) and sends it to Vittorazi Motors responsible for the warranty, within 60 days from the motor sale/shipping date.

The "warranty coupon" is needed to identify name and address of the motor owner, as well as model and serial number of the product, date of purchase, name and address of the dealer.

The dealer/manufacturer has to give a copy of the "warranty coupon" to the client, immediately after after compiling it. For the factory, this coupon represents the only form of identification of the product and therefore you will have to preserve it for possible future use.

If the product needs interventions of maintenance covered by the warranty, the dealer could ask you to show the copy of the "warranty coupon" to verify the date of purchase. The client has to verify that the dealer/manufacturer immediately fills in the "warranty coupon" and send a copy to the manufacturer.

### **11.2 Warranty limits**

We guarantee that every new engine Vittorazi, will be free from defects of materials and workmanship, provided that client purchases the product from dealer/manufacturer that is authorized from Vittorazi to sell our products.

To guarantee the best engine's safety and reliability, every motor delivered, is previously submitted to a verification test and a simulation of flight, made on the test-bench for about 15 minutes.

This warranty remains in force for a period of 1 (one) year from the date of purchase.

Any warranty claim must be requested to the authorized dealer. It will be then responsibility of such service center to plan the inspection and the reparation of the product, as long as the motor is covered by the warranty.

If the client has to send the engine, or one or more components have to be inspected or repaired, all the shipping costs (and eventual custom duties) will be borne by the client who is also required to make an advance payment.

The owner also has to show the copy of the "proof of purchase" such as the bill or commercial invoice, together with the "warranty coupon".

If one of the abovementioned documents went lost, the customer is required to provide at least one of them.

Accordingly to the present warranty, the obligations of the factory, will be limited to the reparation of the defective component and/or to the replacement of one or more components, or what will be necessary to restore the engine's full functionality.

The present warranty doesn't cover reparations, replacement of components or provision of services after the warranty's expiring date of the.

### **11.3 Warranty coverage**

The purpose of this chapter is to avoid some of the most frequent misunderstandings, concerning warranty coverage.

We remind you that: no responsibility can be attributed to the manufacturer or to the dealer of the motor for every problem or damage caused to people/things/animals during the whole life of the motor. We also remind you that this product is not certified, it is dedicated to experimental aircrafts and that in any moment it can break down or stop working.

For any adversities caused by the motor, the manufacturer or distributor is not responsible of such action, then the direct or indirect damages caused to people/things/animals will not be indemnified.

Some types of services which are not covered by the warranty are hereby described. For any question about the warranty coverage, contact the authorized dealer or directly the factory, that can provide further information.

All the parts replaced, both defective or non-compliant, during the interventions of warranty, will become property of Vittorazi Motors.

This warranty covers the damages of the motor caused by: components which are defective for shape or material, for project not conforming to the indicated use, not correctly assembled from the factory.

All shipping charges due to warranty claims for engines, or engine parts, will be borne by the customer.

The damages caused by the following reasons are not covered by the warranty:

- normal wear of parts;
- use non original spare parts;
- neglect, lack of maintenance, accidents, abnormal operation, improper installation or maintenance, other causes that can influence the performances of the motor;
- improper use or mistreatment of the motor;
- wrong regulations or setting, omission of generic controls, missed cleaning of the carburetor, gasoline filter, tank and of the fuel system;
- use of accessories or component not approved for this motor;
- alteration or removal of the components;
- a reparation effected by a non competent mechanic or by a Vittorazi non-authorized center of assistance;
- failure to perform at regular time intervals, of the maintenance procedures, as specified in this manual (see chapter 8);
- not exhaustive or wrong installation of the motor on any aircraft;
- modifications to the motor which are not authorized by Vittorazi Motors;
- further maintenance interventions, required by the client besides those covered by the warranty

It is excluded by the warranty the seizure piston-cylinder or the breakup of the piston (and possible consequential damages such as cylinder, head, crankshaft, bearings) because referable to the following cases here below listed:

- regardless of the first checks (see chapter 4.7);
- use of gasoline without lubricating or wrong percentage of mix gasoline/oil;
- operation with fuels, liquids, lubricatings which cannot be used with this product;
- non conforming gasoline (presence of water, additives, impurities) or preserved for long time;
- lack of maintenance or bad cleaning of the carburetor;
- wrong carburetion, therefore ignoring the indications of the manual;
- suction of any extraneous parts including sand or dusts;
- use of a propeller not approved by the Vittorazi for the use on this motor;
- use of a damaged propeller or a not balanced propeller;
- use of the motor with a wrong combination propeller/reduction ratio;

- other causes already mentioned in the previous list

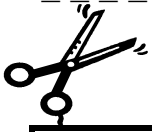
The following damages, are not covered by warranty or compensation:

- to people/things/animals caused by the generic use of the motor;
- to people/things/animals caused by a collision with the propeller or by any part detached by the motor;
- to the cage, components of the aircraft and/or to the propeller caused by the collision with any part detached from the motor;
- costs for recovery, shipments, phone or rental charges of any type, drawbacks or waste of time or other indirect damages.



### 11.4 Warranty coupon

The warranty coupon must be sent from the dealer to the factory within 60 days by fax, e-mail or ordinary mail. The client must receive one copy of the warranty coupon and attach one "bill/invoice of purchase".



#### Warranty coupon

Client name and last name \_\_\_\_\_

Client address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Client e-mail and phone \_\_\_\_\_

Engine model \_\_\_\_\_

Engine serial number \_\_\_\_\_

Date of purchase \_\_\_\_\_

Official stamp of the dealer

Signature of dealer/manufacturer

Signature of the client

\_\_\_\_\_

\_\_\_\_\_

*Signing this form the client confirms that have read, understood and accepted all the terms and the conditions of the warranty. The communicated data, will be recorded on a secured paper and/or electronic file, will be used by Vittorazi Motors®, in compliance with the principles of protection of privacy established by Legislative Decree 196 dated June 30<sup>th</sup> 2003 and other applicable current legislation.*

## **12.0 Contacts**

For any questions, claims, doubts or problems with the operation of the motor, do not hesitate to contact us. We will always be ready to help you.



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**Website:** www.vittorazi.com