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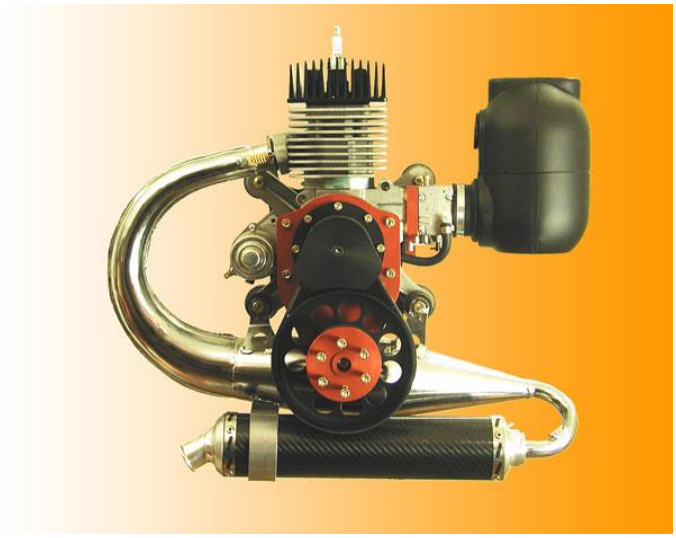
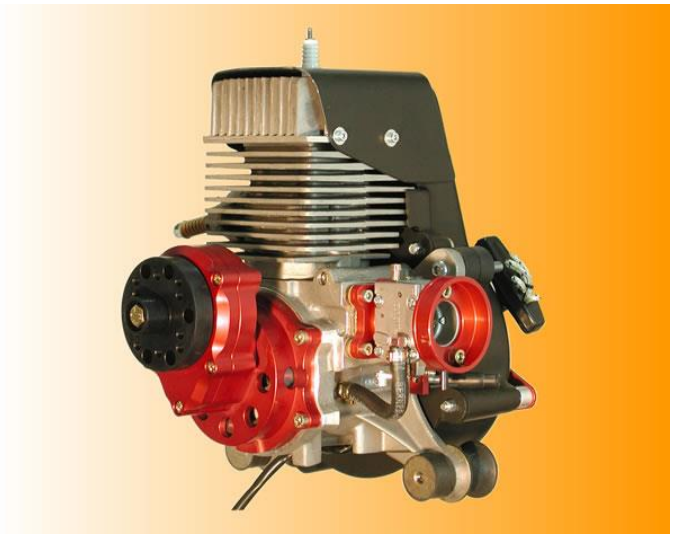
Owner's manual professional

Last update, October 2007





Model: Vittorazi Easy100

Model: Vittorazi Fly100evo

All the indications writes in the charts of this manual will be underlined with the green color for the model Easy100 and with the red color for the Fly100evo.

Index

1.0 Introduction

Congratulations for having chosen a fine engine product Vittorazi.
Before passing to the installation of the motor, read this manual carefully.
With this manual we will try to give our knowledge to your service, teaching how to use motor, providing you the necessary information for installation and maintenance, besides we will indicate you the situations of danger, with our due suggestions to be able to avoid them. When you will 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 the engines Vittorazi are tested before the delivery.
If just one parts of the manual won't be completely understood or in the case which the manual won't be clear or exhaustive, for uncertainties, questions, to analyze or to resolve a problem with our help, we invites you to directly contact the authorized dealer or directly the Vittorazi.
You include in the claim the serial number XXXX of the motor that you find under the system carburetor, some photos if you think will be 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 relationship to the model in production without incurring in some obligation.
The reliability, the performances and the duration of your motor will also depend from your knowledge and the way of using it.

During this manual will be underlined: in the red panel the situations that can lead you to a serious danger; in the blue panel, suggestions or advice that have not to be underestimated.

Attention, danger, risk

Advice, suggestion, notice

In the present photos/picture of this manual:

the arrows of green color *will have generic indications specified in the inherent paragraphs;*
the arrows of blue color *will indicate to add lock tight medium strength;*
the arrows of brown color *will indicate to add some grease;*
the arrows of black color *will indicate to add sealing paste, resistant to high temperatures (up to 500-600°C).*

2.0 Warning

- ***It needs to be conscious 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 to it, not to fly above a crowd of people, inhabited centers, zones that have difficult or void landings, not to fly above zones of water or where is possible to drown. It always needs to have in mind that the motor can go off or breakup, therefore to consider a possible landing of emergency for every situation.***

- ***This manual describes the motor. For its installation, use and control, you 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 on the groud the motor 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 not lead damage to anybody. In any moment the motor is running (testing on the ground, take-off, landing) watch out that nobody draws 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.***

- ***Not use the motor that has not followed a correct maintenance or not correctly been used in the time or if you know that is not under perfect conditions.***

- ***The use of not original spare-part and not recognized by the 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 not original parts or not recognized, modified or that have had an improper use.***

- ***Changes not authorized to the motor, to the reduction, to the propellers can reduce safety and reliability of the aircraft. In the 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 you avoid to use or to turn 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.***

- ***Do 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 has not been calculated. In few second there is risk of explosion of the motor.***

3.0 Installation engine components

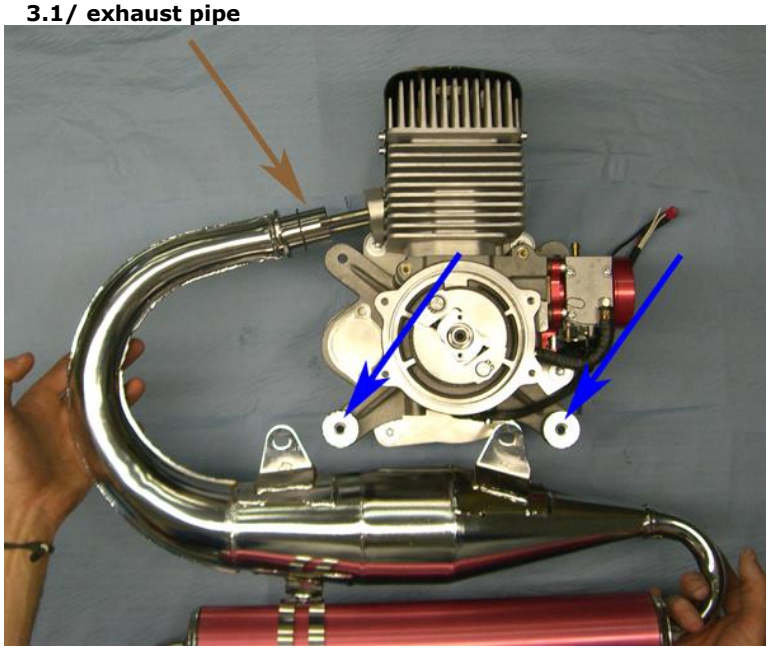
The paragraph installation of the components, is reserved to the manufactire affirmed of ultralight (paramotor, trike or hanglider), gifted in the meantime of qualified personnel in the mechanical, electronic and aeronautical sector.
The exhaust, the rubber mountings, the filter air-box, ignition coil and spark-plug, electric parts, tank and pipes of the gasoline, throttle control and propeller are not assembled from the factory. Following our suggestions will be possible in few minutes to reach the assemblage of the engine. You will have to be sure before starting the motor that every bolts has correctly been tightened.

3.1 Exhaust pipe

The exhaust pipe must be assembled as in the photo 3.1, with addition of lock tight of medium strenght (bolts 8mm, blue arrows) and grease (zone of the manifold, brown arrow) as denoted.

Attention in the positioning of the motor in the cage of your aircarft. The gases of the exhaust of high temperature that come out from the pipe of the silencer, don't have to encounter in their direction tank, net of protection, pipes of gasoline or other objects for at least 30-40cm.

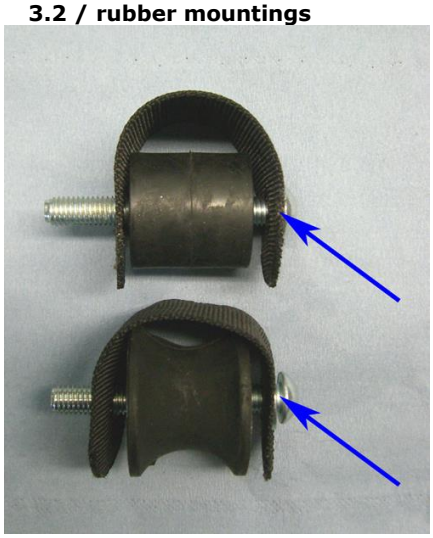
3.1/ exhaust pipe



3.2 Rubber mountings

With a pliers, fix well the threads of the rubber mountings. Attention not damage the rubber mounting in the phase of assemblage. Don't wash the rubber montings with solvents or thinner that attack the rubber; shortly time the rubber mountings could lose their elastic property and to break down. Add lock tight of medium strenght as denoted in the picture 3.2 (blue arrows). Is possible to add to the rubber mountings, straps or safety cables as denoted in the picture 3.2.

3.2 / rubber mountings



3.3 Air-box

The filter air-box must have fixed to the carburetor through the band in endowment and it must have anchored (to the cage, like the picture 3.3) to avoid the rotation on itself.

Rotating on itself the filter arrives to bump the propeller in the model Easy100. In the model Easy100 the safety cable is fundamental to avoid a breakup of the propeller or the filter air-box. In the model Fly100evo we advise to fix equally the filter to avoid the rotation and for an improvement of safety of the system.

3.3 / safety cable

3.4 Ignition coil and spark-plug

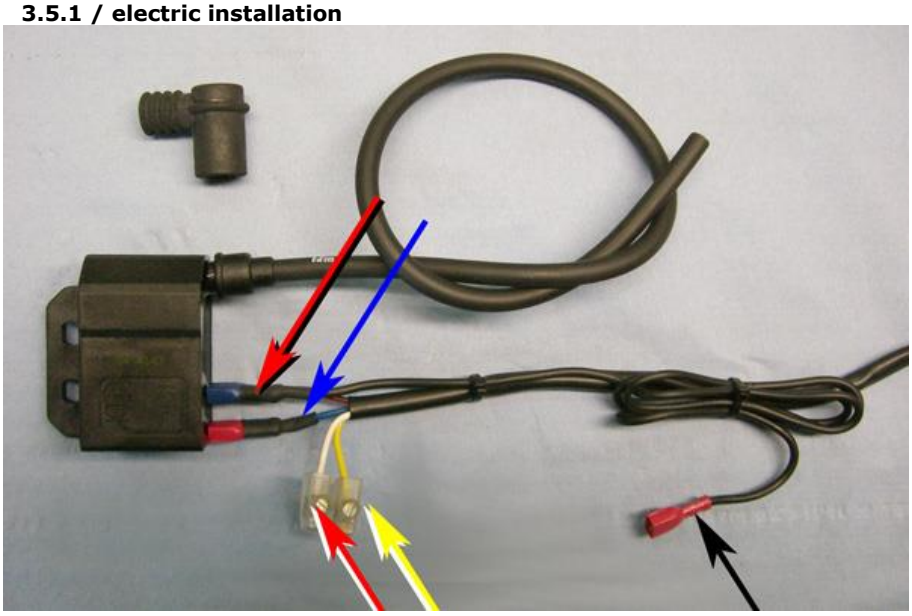
Screw the spark-plug on your motor, with a tight of 25-30 Nm.
Position the ignition coil on the cage, possibly in a plain surface where is possible insert (behind) sponge or rubber to reduce the harmful vibrations and far from the heat.
Before fixing the ignition coil, be sure that it can be reached by the plugs coming from the motor and at the same time the main cable can reach the spark-plug.
Check the plugs (connectors) are well blocked to every cable, with a good resistance to the traction of the cable. Cut the part of the main cable in excess and screw the cap against the cable, up to possible. Help yourself if necessary with a pliers (gently).

3.5 Electric installation

3.5.1 electric installation, version pull starting.

Simply connect the electric plant as illustrated by the picture 3.5.1.

3.5.1 / electric installation



- Red-black cable + black cable; superior position, as denoted in picture.
- Blue cable; inferior position, as denoted in picture.
- Black cable goes to the button of turning off (then it returns to the earth).
- White-yellow and white-red cables; exit for the recharge of the battery, in the version pull starting, isolate these two cables as in the picture.

3.5.2 electric installation, version pull+electric or electric starting.

The installation of the igniction coil and the connection of the cables coming from the motor follows the same plant of the version pull starting picture 3.5.1.
In the two following pages, are suitable the information and the plant to perform a correct installation of the additional components in the electric version.
For this type of installation, is necessary a good knowledge of electronics.

1. GENERAL SPECIFICATIONS

1.1 NAME	:	FLYWHEEL MAGNETO
1.2 OUR PART NO.	:	560141

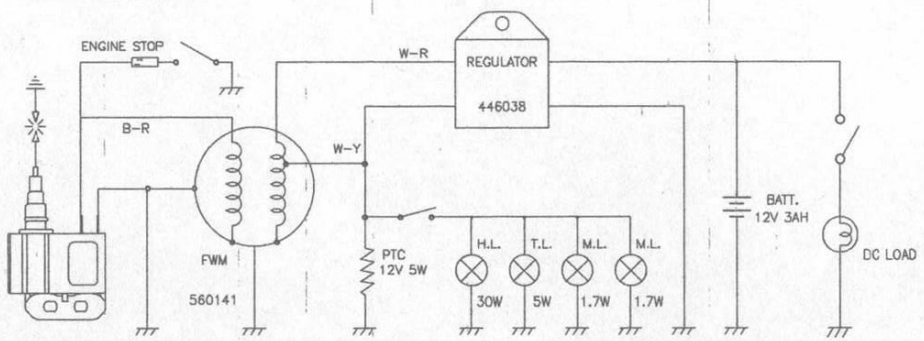
2. MECHANICAL SPECIFICATIONS

2.0 DIRECTION OF ROTATION	:	CLOCKWISE (VIEWED FROM SMALLER TAPER SIDE)
2.1 RANGE OF REVOLUTION	:	500 rpm 9000 rpm
2.2 GUARANTEED REVOLUTIONS	:	THE DEFORMATION OF OUTSIDE DIAMETER MUST BE 0.05 MAX UNDER 14000 rpm TEST FOR 3 MINUTES
2.3 LIMIT OF UMBALLANCE	:	BY STATIC BALLANCE 10 g cm OR LESS WITHOUT IRON RING
2.4 MOMENT OF INERTIA	:	12 Kg cm² (WITHOUT IRON RING)
2.5 TOTAL WEIGHT	:	1.400 Kg
STATOR	:	0.440 Kg
ROTOR	:	0.950 Kg
2.6 AIR GAP	:	BETWEEN STATOR AND ROTOR 0.45 mm MIN
2.7 SURFACE TREATMENT	:	YELLOW ELECTROPLATED COATING OF ZINC (Tmin GUARANTEED = 150° C)

3. ELECTRICAL SPECIFICATIONS

3.0 IGNITION METHOD	:	CDIg SYSTEM (THYRISTOR)
3.1 NUMBER OF SPARKS	:	2 SPARKS PER REVOLUTION AT 180°
3.2 CDI SYSTEM PART NO.	:	512054

4. ACTUAL CIRCUIT



UNIT & COIL ASSY
512054

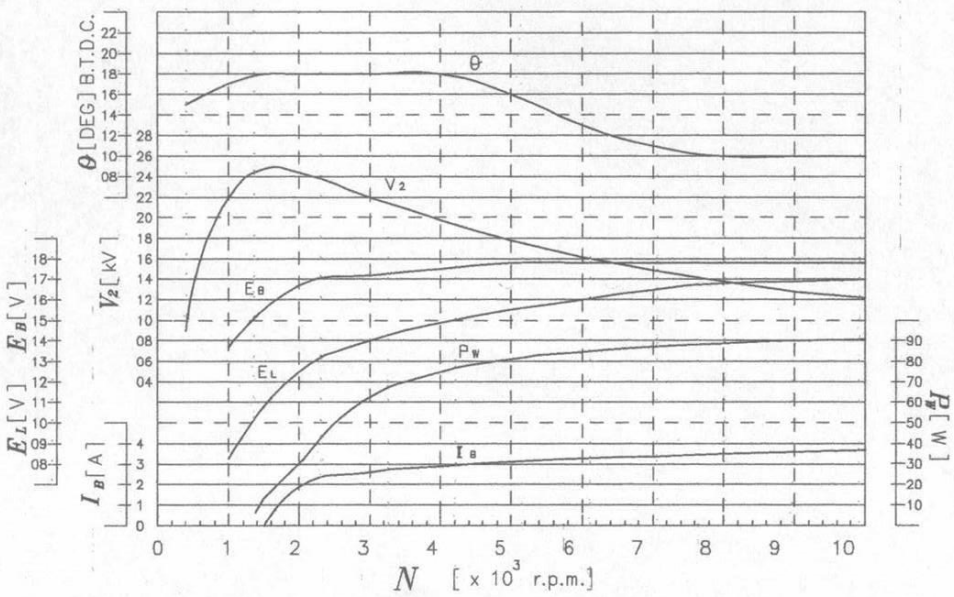
IMPORTANT: GROUND WIRE FROM FLYWHEEL (BLUE WIRE) MUST GO DIRECTLY TO THE C.D.I. UNIT

RESISTANCE VALUE OF COILS (AT 20 ° C)

MEASURING PLACE	RESISTANCE VALUE (OHM)
B-R/EARTH	254 ±20 %
W-Y/EARTH	0.4 ±20%
W-R/EARTH	0.6 ±20%

HANDLING PRECAUTIONS FOR FLYWHEEL

1. NO USE OF HAMMER WHEN MOUNTING OR REMOVING FROM THE ENGINE.
2. USE ONLY THE SPECIFIED PULLER WHEN REMOVING FROM THE ENGINE.
3. EVERY KIND OF IMPACT MUST NEVER BE APPLIED: THE FERRITE SEGMENTS MAY BE DAMAGED.



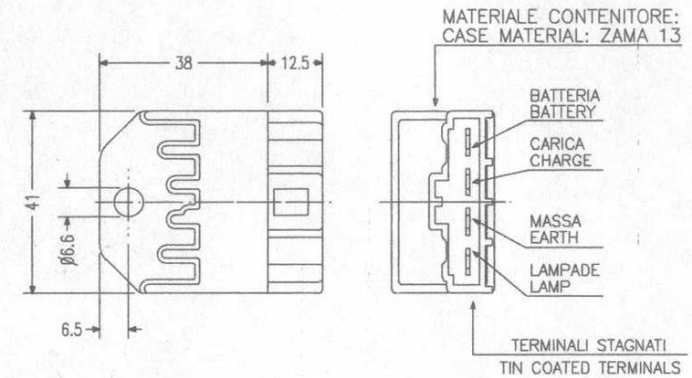
MEANING OF MARKS

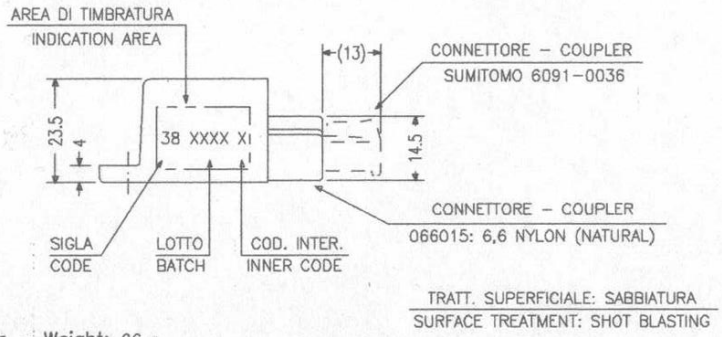
Pw : SUPPLIED POWER
: IGNITION TIMING (ANGLE OF KEYWAY CENTER VS. MOUNTING CENTER OF STATOR)
N : r.p.m.
Vo : SECONDARY VOLTAGE 50pF LOADED
Eʟ : LIGHTING VOLTAGE (NO REGULATION, FULL BATTERY)
Eʙ : CHARGING VOLTAGE (NO REGULATION, NIGHT CIRCUIT)
Iʙ : CHARGING CURRENT

H.L.: HEAD LAMP
T.L.: TAIL LAMP
M.L.: METER LAMP

NOTE: THE CORE OF THE STATOR MUST BE AT EARTH POTENTIAL WITH THE ENGINE.

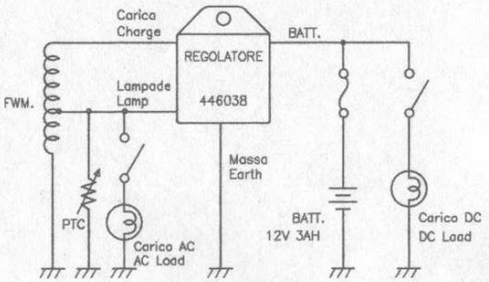
A.0 Dimensioni – Outline Dimensions



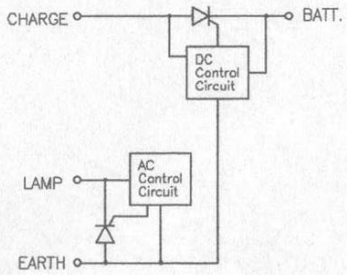


B.0 Peso – Weight: 96 g

C.0 Schema collegamenti – Connecting Diagram



D.0 Circuito – Circuit



1.0 Modello – Model: 446038

2.0 Specifiche elettriche – Electrical Specifications

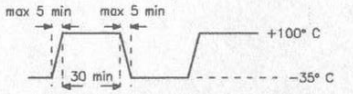
2.1 Limiti di Funzionamento – Maximum Ratings

Caratteristiche – Items	Simbolo Mark	Valore–Rating	Unit	Condizioni – Conditions
Temperatura di Immagazzinamento Storage Temperature	T_{stg}	–30 +90	° C	
Temperatura di Funzionamento Operating Temperature	T_a	–10 +70	° C	
Temperatura di Giunzione SCR Junction Temperature	T_J	Max. 125	° C	
Corrente in Uscita (AC, DC Totale) Output Current (AC, DC Total)	I_{out}	Max. 9	A ave	Non Ventilato – No Wind Ta = 40° C
Massima Corrente Regolata (AC) Max. Regulate Current (AC)	$I_{reg\ (AC)}$	Max. 10	A ave	Tj ≤ 125° C Tc ≤ 90° C
Massima Corrente Regolata (DC) Max. Regulate Current (DC)	$I_{reg\ (DC)}$	Max. 8	A ave	Tj ≤ 125° C Tc ≤ 90° C

2.2 Caratteristiche Elettriche – Electrical Characteristics

Tensione Regolata (AC) Regulate Voltage (AC)	$V_{reg\ (AC)}$	13.2 ± 0.5	Vrms	Batteria carica, Circuito Notturno full BATT. Night Circuit 5000 rpm, Ta= 25° C
Tensione Regolata (DC) Regulate Voltage (DC)	$V_{reg\ (DC)}$	14.5 ± 0.5	Vave	Batteria carica, Circuito Diurno full BATT. Day Circuit 5000 rpm, Ta= 25° C
Coefficiente di Temperatura (AC) Temperature Coefficiency (AC)	Vreg (AC)	Max. ±8	mV/° C	Batteria carica, Circuito Notturno Full BATT. Night Circuit 5000 rpm –20° C Ta 60° C
Coefficiente di Temperatura (DC) Temperature Coefficiency (DC)	Vreg (DC)	Max. ±12	mV/° C	Batteria carica Circuito Diurno Full BATT. Day Circuit 5000 rpm –20° C Ta 60° C
Corrente di Leakage Leak Current	Ir	Max. 0.4	mA	Tra terminale della batteria e massa, 25V DC BATT. terminal to EARTH term., DC 25V
Resistenza di Isolamento Insulating Resistance	Rins	Max. 100	M	Megaohmmetro a 500V, Contenitore con ciascun terminale At 500V Megger, Case to each terminal

3.0 Affidabilita' – Reliability

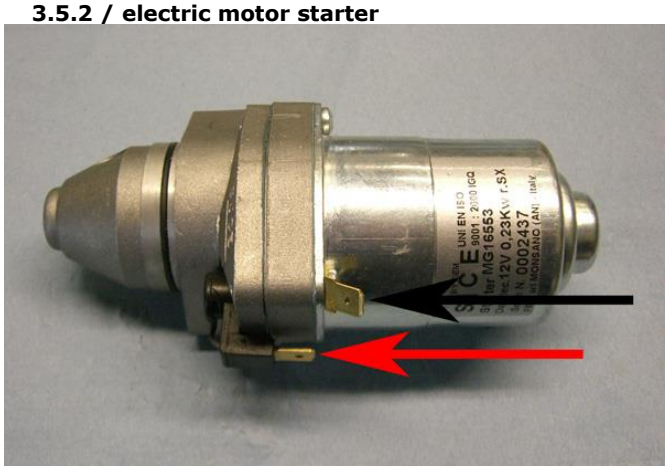
Cicli di Shock Termico Shock Temperature Cycling		No. 100 Cicli Senza Anomalie Normal Working After 100 cycles

The regulator of voltage is in endowment with the version pull+electric or electric starting.

Battery 12Volts, 3 Amperes in plumb (it is not included).
We recommend the use of the battery YUASA Super MF-Pafecta YTX4L-BS had already been using for years to start our motors.

Don't use other types of batteries (Ni-cd, Ni-Mh, Alkaline, Li-ion, Li-po or others) that are not in plumb, with possible risk of explosion of the battery, due to a not conforming recharge.

3.5.2 / electric motor starter



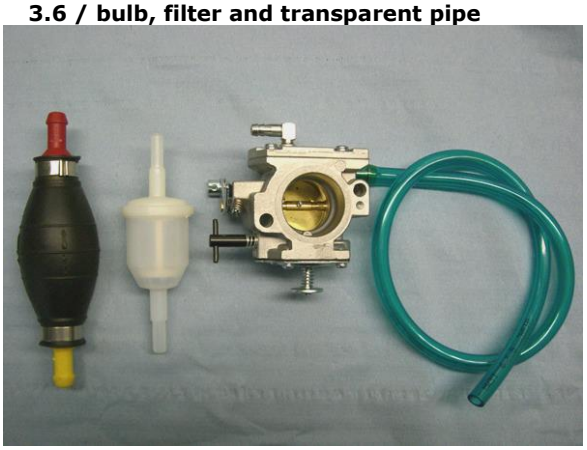
Black arrow: negative or earth
Red arrow: positive

3.6 Gasoline tank and pipe

The tank of the gasoline must have fixed among 50 to 70 cms below the level of the carburetor. The depression carburettor used is set and adjusted with this value. Altering this value, will be gotten different operations and carburation of the motor. In the case which this value is not respected, directly contact the Vittorazi.
After having mounted the tank of gasoline, the primer bulb, the filter of gasoline (obligatory the use of the filter), stop all junction from the tank up to the entry carburetor with safety bands so that every connection is strong and watertight. Use special pipes that are resistant to the unleaded gasoline. Bind the pipeline to the cage not to allow movements not desired.

Use (in proximity of the carburettor entry) a transparent pipe. This will be helpfull: when you will bring, through the primer bulb, the gasoline from the tank up to the entry carburetor; when the motor is running, if from the connections of the pipeline or from carburetor is inhaled air, you will clearly see the passage of bubbles. In this case must be checked soon the junctions of the pipeline or the carburetor.

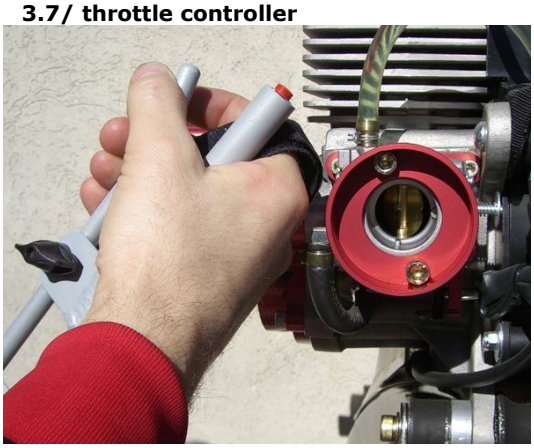
3.6 / bulb, filter and transparent pipe



3.7 Throttle controller

Be sure that the throttle steel cable has a good sliding on the metallic curve adjacent to the carburetor and that the butterfly of the carburetor on every release of the controller returns completely to the initial position. This check is facilitated, without the airbox filter, see the picture 3.7. Effect the same test of release with the controller in different positions.

3.7/ throttle controller



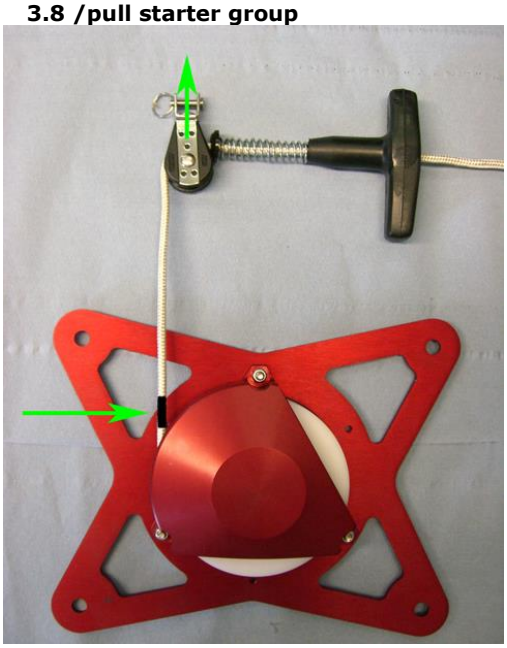
3.8 Pull starter Easy100 o Fly100evo

The rope of the starter that goes out from the structure of wrapping, passes in the little-pulley fixed to the cage and is stopped with a knot to the handle or to the hookup for the foot starter. Rotating the structure of the model Easy100, will be 3 possible directions every 120°. Instead the structure of the model Fly100evo has 6 possible directions every 60°.

In the starter Easy100 or Fly100evo the rope is marked with a pen. This sign points out the correct quantity of rope that has to remain in the pulley of wrapping, with the relative spooling force. Once passed the rope in the little-pulley of the cage, it will be enough to position the sign in proximity of the exit of starter, as denoted in the picture 3.8. Now stop the handle with a knot and cut the part of rope in excess.

In the starter of the Fly100evo (it is not necessary in the model Easy100) to avoid breakups of the components of starter group (pulley of wrapping, hooks or rope) we advise to insert a soft spring that absorbs the inverse hit given by the turning off of the motor, as denoted in the figure 3.8

3.8 /pull starter group



3.9 Choice of the propeller

Vittorazi has studied propellers and reduction ratio to achieve the best efficiency, silentness and autonomy, in accord with the motors products.
The range of propellers includes diameters from 100 to 130cm, clockwise rotation and counterclockwise rotation, both in wood or in composite carbon. For every propeller is adopted a specific reduction ratio.
We advise to purchase the propeller togheter with the motor Vittorazi, because will be guaranteed the operation of the system.
The use of a not conform propeller or the use of a propeller Vittorazi united to a wrong reduction ratio, leads immediately end of the warranty, see paragraph 12.3.

3.10 Accessories

It is possible to install a tachometer (with setting of the double spark for every turn of the crankshaft), so you will be able to compare in every moment the performances of the motor. We point out that the maximum turning (optimal in traction with the propeller) is 9.500 RPM for the model Easy100 and Fly100evo.
We advise to install a probe of temperature for the spark-plug. It will be possible to compare in every moment the maximum or least temperatures.
Temperatures min/max Easy100: 80°/210° C
Temperatures min/max Fly100: 80° / 200° C

4.0 Get ready for the use

4.1 Propeller mounting

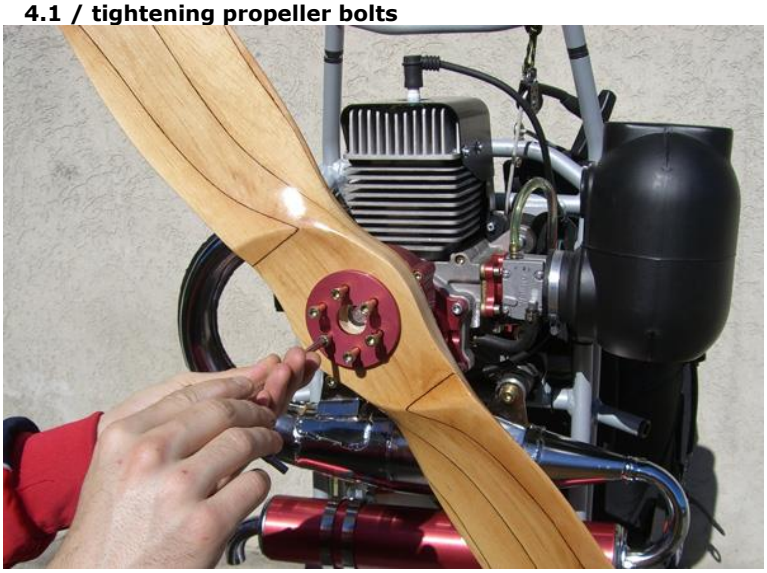
Be sure to possess a suitable and guaranteed propeller by Vittorazi for your motor.

Attention: the propeller can be mounted in two opposite position in comparison to the reduction drive, which only one is correct. Ask to the authorized dealer or to the instructor, if you are not certain for the assemblage of the propeller.

Model Easy100: rotation propeller clockwise, considering the back view (same view of the picture 4.1).
Model Fly100evo: rotation propeller counterclockwise, considering the back view.

Push the propeller against the reduction drive, untill to insert it completely. Now gently screw the bolts up to the end. Be sure that the bolt are proper for the propeller, therefore the threads of the bolts are inserted at least 10mm in the hub. Now to tighten the bolts of the propeller trying to get the same pressure on every point, picture 4.1.
Not do exaggerate with the pressure on the bolts, there is a risk to crush the propeller, if in wood.
Have a maximum pressure of 4 -5 Nm, if the propeller is in composite carbon.
Propeller in wood: once tightened the propeller, it is opportune to check that the pich of the two blades is identical. If there is a considerable variation among the two blades, this difference can be compensated through the pressure of the bolts.
If you don't know this method of balancing, ask to an authorized instructor or dealer.
Check the tightening of the wood propeller every 3 hours of flight and repeat the balancing.

4.1 / tightening propeller bolts



In the case of a broken propeller, we invite you to purchase from a Vittorazi dealer, the same propeller for measure and profile, guaranteed from the factory.
It will be enough to remember measure, material of the propeller and model of the motor.
The use of a not conform propeller or the use of a propeller Vittorazi united to a wrong reduction ratio, brings immediately end of the warranty, see paragraph 12.3

4.2 Fuel

The motor that you are going to use is a two strokes engine. It requires for the lubrication an established percentage of oil/gasoline. When at the gas pump, always choose gasoline unleaded 95 octanes.
The percentages will be pointed out in the following paragraphs, "break-in" 4.5 and "normal operation" chapter 5.

> The gasoline is an extremely inflammable and explosive substance. When you prepare or in every moment you are close to the fuel (gasoline and oil), not smoke, not provoke sparks or flames. Never fill the tank of your aircraft when the motor is running. Position the tank of the fuel before starting the motor at least 10 meters.

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 for the transport gasoline, filter and funnel, is perfectly always clean.
We advise only oil of good quality certified and full synthetic (no oil semi-synthetic, no mineral oil).
We recommend the use of the following types of oil, already tested with success on our motors: ***Motul 600, Castrol TTS, Valvoline Racing 2T***.
Avoid mixtures prepared by the gas pump. A mixture had been prepared from 2-4 weeks and left in a tank could separate (oil and gasoline), loosing the characteristics of lubrication even if shaked before the use. Avoid to prepare a big quantity of mixture, when you are already conscious to use only a part of it. Avoid use plastic tanks and consider it as containers to transport, not left to deposit the mixture for days in the plastic tanks. We dissuade the addition of liquids that increase the number of octanes. Problems to the motor owed to a lack of oil in the gasoline or for a wrong mix of oil or for lack of cleaning of the gasoline, are not recognized in warranty. See paragraph 12.3.

4.3 Starting and turning off

In the first starting of the engine and every time the gasoline piper remains without fuel (tank, pipe, primer bulb and carburetor), will need to fill the circuit before starting the motor. To do that, it is necessary make pressure on the primer bulb of the gasoline and at the same time, with care on the valve of the carburetor (indicated with the number 6 in the following picture 4.5) up to the filling of the pipeline. It will be easy to see through a transparent pipeline the gasoline that enters into the carburetor. *For a good starting of the engine when the circuit is empty or the motor is cold, need to enter just a few of gasoline in the carburetor*. This small quantity of gasoline, will work as starter/choke to the motor. Attention if the quantity of gasoline that you push with the pomp to the carburetor is excessive, there is the risks to flood the motor, even then to damage the pull starting.
The best starting of the motor Vittorazi is gotten without throttle or with a minimum of throttle. If the circuit of fuel is on pressure and the motor is warm, it won't be necessary to make pressure on the primer bulb and valve.

Always watch out for the propeller during the starting and for whom could be nearby. Many accidents happen before going to flight. On every test or warm-up, we suggest to always wear the paramotor on your shoulder, to fast the harness, then to turn on the engine with the pull or electric starter, ready however with the killing button to stop the motor in every moment.
Important: often verify that the killing button is working. Sometimes the killing buttons can get jammed or during the time can stop working.

4.4 Warm-up

You softly get throttle in the first 30 seconds allowing to stabilize the carburetor and the motor. Now you increase the number of turns (thin to 1/4 around of throttle) and let warm-up the motor for 2-3 minutes to this constant speed. Finally get the motor for some second (15-20 seconds) at full throttle. Now your motor is ready to the flight. These 3 minutes of warm-up also have to be dedicated, thanks to your attention, to understand if the motor has some anomalous behaviors, if there are unexpected vibrations or noises not desired.

4.5 Carburetor adjustment

4.5.1 A simple and fast control

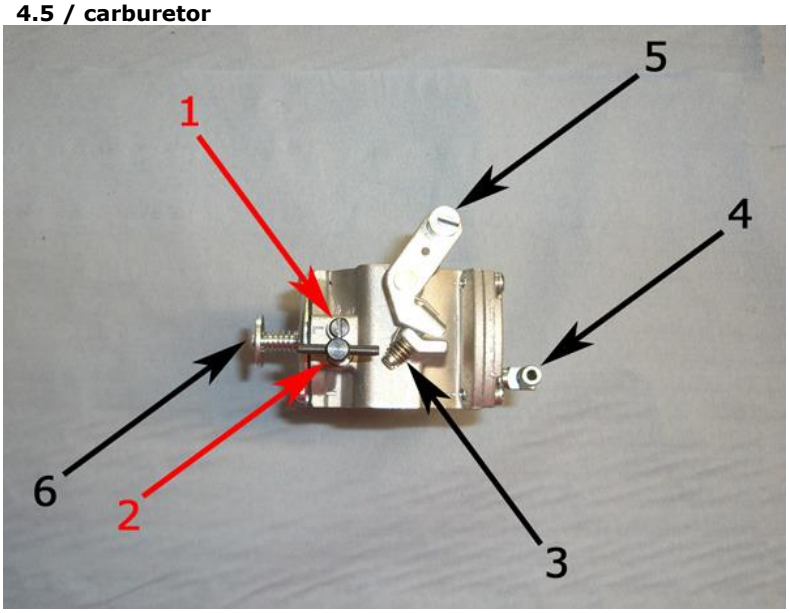
Don't have any experience or affinity with the motors?
Don’t worry, you follow step by step what we tell you in this paragraph.
From years our ambition is to furnish a simple product and accessible to everybody, trying to get simple and effective solutions for who doesn't have experience of adjustement of motor.
When you receive the motor, it has already pass a test of 15 minutes in the thrust-bench of the factory, verifying the operation, the assemblage and the optimal carburetor setting.

Chart 4.5

Carburetor setting	**Vittorazi Easy100**	**Vittorazi Fly100evo**
Screw L	from 1/4 to 1/3 of turn	from 1/4 to 1/3 of turn
Screw H	from 1 turn to 1+1/4 of turn	from 1 turn to 1+1/4 of turn
Idle RPM	2.500-2.700 RPM	2.000-2.200 RPM

In the chart 4.5 are suitable the regulations L and H of the motor in the standard positions. These regulations guarantee the modularity of the motor, the operating temperature and the correct lubrication of all the organs of the motor.

4.5 / 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. Lever of butterfly
6. Valve for the first filling of the carburetor

If you choose to verify the carburetor setting proceed in this way: close completely the screw L and H and then exactly open them with the standard setting. Remember: a strong pressure (tightening) on these screws can irremediably damage the carburetor.

A simple verification of the carburation can be effected, following these indications. After having started the motor in safety and warmed-up for some minutes (see paragraph for starting and warm-up) can be done in the ground a control of the carburation.
- The motor has to maintain a constant idle and not to have the tendency to go off or to flood.
- When you pull the throttle fastly from the idle rpm, the motor has to immediately answer without going off or a lack of power.
- Simulating a cruise flight (about 1/4 or 1/3 of throttle), the motor will have to answer with a regular thrust, smooth and not with hiccups or jumps of power.
- With max speed or max number of rpm (full throttle), the thrust has to be constant.

Attention: if the carburation of the motor (the quantity of gasoline that arrive to the motor) is poor, therefore the opening of the screw is lower in comparison to the indications of the chart, will probably occur breakups as seizures, overheatings, fusions of the piston, precocious usury of the components.
Problems to the motor owed to a lack of oil in the gasoline or a wrong mix oil-gasoline, impurity in the fuel or a not correct carburation, are not recognized by the warranty. See paragraph warranty 12.3.

A check of the carburation can be made, analysing the color of the electrode of the spark. 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 carburation it is correct.
- If the electrode is grey or clear the carburation is poor and you have to immediately seek the cause, with the help of an authorized dealer/instructor.
- If the electrode is dark brown color or black the carburization is rich.

Watch out for the regulation of the screw H, because if this is too closed in comparison to suitable values, you could have damages to the motor. Any damage will occur if the carburation of the screw H is too opened (rich). In the doubt, therefore, is everytimes better to have a carburation rich for the screw H.

4.5.2 Carburation. Only skilled person.

All values of carburation pointed out in the charts (screw L and H), give the guaranteed references for the operation of the motor.
The conditions atmospheric or environmental where the motor is used, can be very differents in comparison where we have established these references; could need a setting out of the norm. In every case before effecting a change aks to an authorized dealer Vittorazi or directly to the Vittorazi.
We'll speak now, how to get the best carburation the motor when change altitude, atmospheric pressure, temperature and damp. Changing the conditions meteo or the zone, the motor could have different behaviors. We will analyze how the motor behaves and how we can regulate it in these occasions.

The regulation or screw L (Low) adjust the passage of gasoline from the least up to the middle speed (2.000-7.000 RPM, about 1/3 of throttle).
The regulation or screw H (High) adjust the passage of gasoline from the middle speed up to full speed (7.000-9.500 RPM, from 1/3 to full throttle).

We have realized this carburetor/motor, in the way that most of the necessary variations of carburation, can be performed with the regulation Low.
We invite you to never have the value of the screw High under the indicated value (1 turn), that we consider the least value of operation for the engine.

Some signals to understand that the carburation is poor:
- the motor doesn't have a good starting when it is cold.
- after having warm up it for some minutes, if you get the throttle fastly from the idle rpm, the motor doesn't immediately answer, with lack of power, it seems to go off.
- the idle of the motor is irregular.

What to do in this case?

Open counterclockwise some degrees (5-10°) the screw Low and to retry.

Some signals to understand that the carburization is rich:

- the motor cold or warm start well.
- simulating a cruise flight (about 1/4 or 1/3 of throttle), the motor doesn't respond with a regular and smooth thrust but with hiccups or jumps of power.
- the idle of the motor is low, the motor seems to go off
- after 1 minute idling, the motor is flood or seems to go off.

What to do in this case?

Screw clockwise some degrees (5-10°) the screw Low and to retry

You remember that these regulations are very sensitive, that must be position or altered with care. A rotation of 1/40th of turn (9°) it is enough to change the carburation.

We shortly say that, the carburation of the motor changes by the presence of oxygen in the air. When the atmospheric pressure is high, then the molecules of the air are compressed; in this case the presence of oxygen is great with constant volume (and contrary). When the presence of oxygen (constant volume) is great, need to compensate the ratio gasoline/oxygen, opening the regulation of the carburation and giving more fuel to the engine.

If the presence of oxygen is low (constant volume), can be compensated closing the regulation.
Obviously only in the case which the motor doesn’t show a right behaviour, these indications can be kept in mind and apply changes to the carburation.

Some examples of high presence of oxygen: low temperatures 0-10°, sea level, low damp.
Some examples of low presence of oxygen: temperature of 30-40°, altitude or mountain 1000-2000m, strong damp.

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 uses with attention in the first 7 - 8 hours of the break-in (25 - 30 liters).
For the period of break-in, we indicate to move the screw High to a value of 1 turn+1/4 (rotation counterclockwise for 1/4 of turn) and to increase the quantity of oil in the fuel up to the values pointed out by the chart 4.6.1. After 10 liters of break-in the screw High could be closed with precision of 1/8 or 1/4 of turn, only if the motor doesn't have smooth or regular disbursement, as suitable in the following paragraph. From our experience we allow to say, this will be the only time when you will have to touch the screw High. Whenever the carburation will have a variation, it will be enough to modfy the position of the screw Low. In these period of break-in, thanks to your intervention on the screw H and to the increase of oil in the fuel, the motor will enjoy of a good lubrication and of a lower temperature in comparison to the norm. The performances of the motor won't be optimal with these regulations, but you will get a good break-in and a guarantee of duration for the organs of the motor. The first starting of the motor must be made to the ground (on shoulder), warm up for some minutes and pay attention to anomalous behaviors or noises. We recommend to conclude in one day the first two phases of the break-in. Now follow the indications of the chart 4.6.2.

Chart 4.6.1

BREAK-IN	**Vittorazi Easy100**	**Vittorazi Fly100evo**
Screw H	1+1/4 of turn	1 +1/4 of turn
First liter	5.0% or 20:1	4.0% or 25:1
From 2 to 30 liters	4.0% or 25:1	3.0% or 33:1

Chart 4.6.2

First liter of fuel	The first phase is effected to the ground, it will last around 15 minutes with a liter of fuel. Alternate least, middle speed. No max speed. Pass to the following phase, not leaving cool the motor completely.
From the second to the 10th liter of fuel	Effect flights or tests on the ground of max 15 minutes. Don't use the motor at the same speed for long time, an gradual acceleration and a release is preferable. General check for bolts components.
From 10th to the 30th liter of fuel	If necessary close 1/8 or 1/4 of turn the scew High. Always with caution also flights of 30 mins. Maintain the same percentage of oil pointed out in chart 4.6.1. Repeat the controls.

5.0 Normal operation

5.1 Discovering new horizons

At the end of the 30 liters of break-in the screw High could be in the position from 1 to 1+1/4 of turn and the percentage of oil decreased up to the values of the chart below 5.1
We advise to replace the spark-plug (with the same type and gradation) at the end of the break-in, because the quantity of fuel and oil in excess, could have decreases notably the duration of it.

Chart 5.1

NORMAL OPERATION	**Vittorazi Easy100**	**Vittorazi Fly100evo**
Screw H	from 1 turn to 1+1/4 of turn	from 1 turn to 1+1/4 of turn
Oil	3.2-3.3% or 30:1	2.5% or 40:1
Max speed	9.300-9.500 RPM	9.300-9.500 RPM

Now the time of break-in is passed and the motor is ready to have hours and hours of flight. Have a good fun.

6.0 Specification and technical data

Chart 6.0

Model Vittorazi Easy100	*Model Vittorazi Fly100evo*
Displacement: 98.2 cc	**Displacement:** 98.2 cc
Stroke: 50.0mm	**Stroke:** 50.0mm
Bore: Ø 50.0 mm	**Bore:** Ø 50.0 mm
Piston: 2 rings, HQ graphite protect.	**Piston:** 2 rings, HQ graphite protect.
Power: 18 hp at 9.500 RPM	**Power:** 18 hp at 9.500 RPM
Reduction drive: Ratio min 1/3.8 max 1/3.3. Diretta trasmission Poly V belt. No clutch centrifugal.	**Reduction drive:** helical gear drive Ratio 1/3.3 – 1/3.65 – 1/4 Clutch centrifugal, adjustable
Max speed: 9.400-9.600 RPM	**Max speed:** 9.400-9.600 RPM
Thrust: 58 kg with prop 125cm Pilot up to 90-100kg	**Thrust:** 58 kg with prop 125cm Pilot up to 90-100kg
EGT: 550° C	**EGT:** 550° C
CHT: 180° C; max 210°C	**CHT:** 170° C; max 200°C
Spark-plug: NGK BR10ES	**Spark-plug:** NGK BR9ES
Consumption: 3.0 - 3.5. lt/h at 30kg of thrust	**Consumption:** 3.0 - 3.5. lt/h at 30kg of thrust
Weight: 11 kg, pull starter version 12 kg, electric starter version 13 kg, pull+elect starter version	**Weight:** 12 kg, pull starter version 12.5 kg, electric starter version 13 kg, pull+elect starter version
Propeller rotation: counterclock	**Propeller rotation:** clock

7.0 Maintenance

The maintenance of the components, is reserved to an authorized shop or dealer Vittorazi, gifted in the meantime of qualified personnel in the mechanical, electronic and aeronautical sector.
If don't have competences or you are not certain of doing, limit to know well the manual and to effect the suitable controls. Not risked you in any reparation that could make become the motor dangerous.
The interventions of regular maintenance during the period of warranty must have the relative invoice sent forth by the dealer.
The interventions of maintenance made from a workshop or from a personnel not authorized and not competent, will bring immediatley term of the warranty.

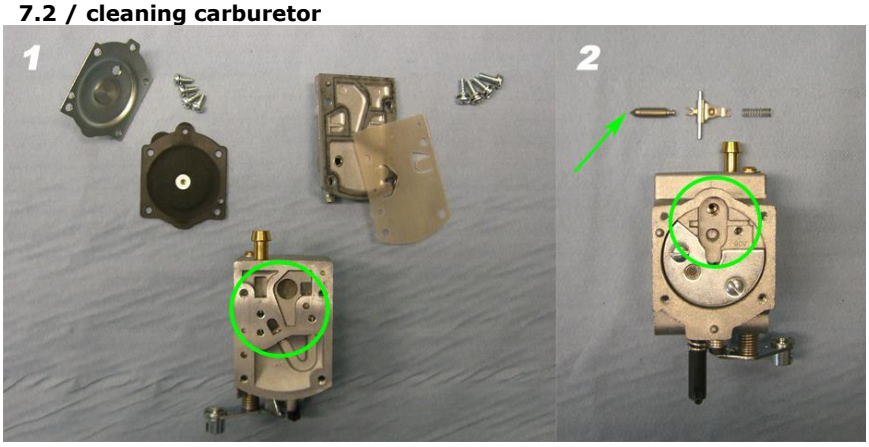
7.1 Ignition coil and spark-plug

The electronic parts of the motor can be checked more hardly in the terms of wear and tear. The spark-plug can last years or to stop working after some minutes (if the shrewdness are not followed).
We advise: not to leave the motor idling for some minutes and accordingly to flood it.
We advise: to correctly have the procedures of starting, in fact when the spark-plug receives too gasoline from the carburetor, it stops temporarily working or sometimes definitely.
We advise to replace the spark-plug every 25 hours of use, so you will always have a good coverage of operation.
The optimal distance of operation among the two electrodes of the spark-plug is of 0.80 mms. Use a filler to establish this measure.
When the spark-plug of the motor will be replaced, we recommend to purchase the same identical type and gradation: - the motor Easy100 uses a spark-plug NGK BR10ES
- the motor Fly100evo uses a spark-plug NGK BR9ES
The ignition coil can stop its function for a not conforming electric installation, for an electric shock, for a bump, for the presence of strong and continuous vibrations or too much heat.

7.2 Check and cleaning carburetor

Our suggestion is to check every 25 hours of use, the cleaning of the carburetor getting off the two sides of the carburetor, figure 1.
Clean the carburettor case blowing (gently with pneumatics) in the zone pointed out by the circle and removing every small residue, figure 1-2.
Before getting off the carburetor analyzed well how the components are mounted. Effect these operations with appropriate tools and in a perfectly clean bench or table.
Also the conditions of the membranes of the carburetor can be verified, show in figure 1.
The substitution of the membranes (possible to purchase a kit that includes all the membranes and the gaskets carburetor) must be done after 100 hours of use or once for year.
After some months the membranes of an unused motor can become stiff to contact with the gasoline or can bend in the normal use, losing their peculiarity to oscillate and to pump, not guaranteeing the correct operation of the carburetor/motor.

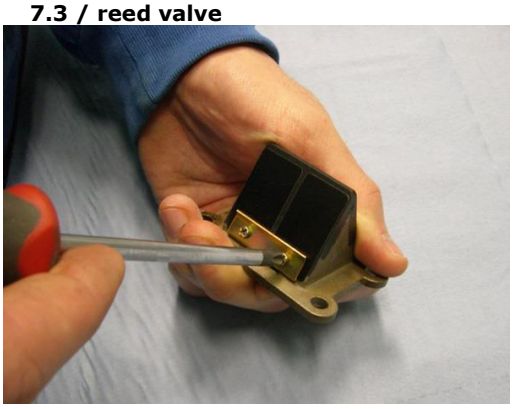
7.2 / cleaning carburetor



7.3 Reed valve

The control of the reed valve can be effected after 25 hours of use therefore at the same time of the carburetor cleaning. It will be enough to get off the plate that contains the reed valve and to check that the petals are not broken or splintery. The substitution of the petals is suggested at about 100 hours of use.
When the substitution will be done, watch out for to position of the petals that will have to be adherent to the surface of support. We also recommend every 100 hours to replace the gaskets of the reed valve that become stiff after time in contact with the fuel.

7.3 / reed valve



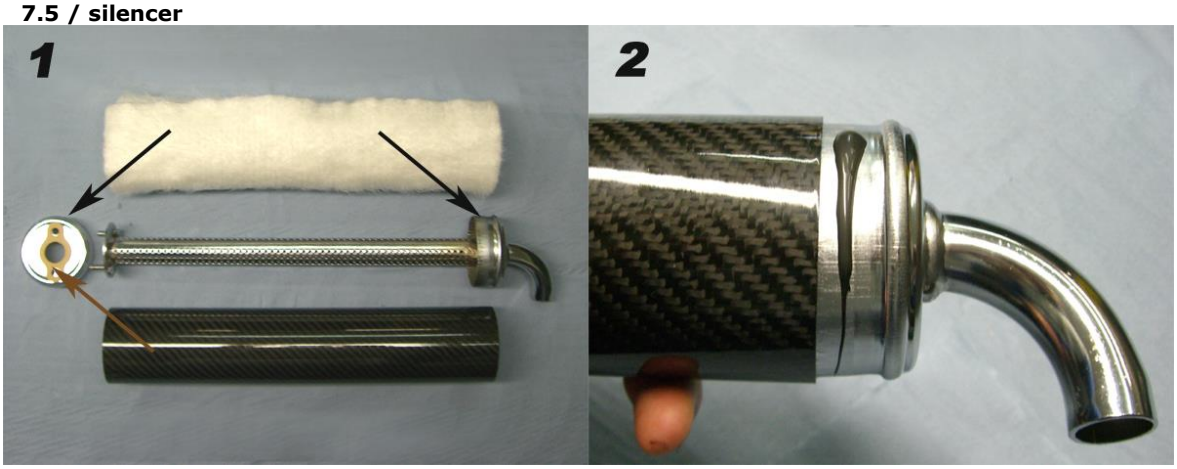
7.4 Gaskets

We advise to replace all the gaskets of tight after 100 hours of use of the motor: gasket cylinder, carburetor, reed valve and silencer. Equally the o-ring: exhaust, cylinder head. In the case the motor is not used for long period, we suggest to verify the situation of the gaskets in contact with the gasoline and if necessary to replace them.

7.5 Silencer

The substitution of the soundproofing material of the silencer is recommended every 25 hours of operation. Once replaced the soundproofing material you will find again the same noise that the engine had when the motor was new. Separate the silencer from the exhaust pipe, proceed getting off first the band of support in steel, then the 2 nuts that unite the silencer to the muffler. Now remove the two rivets that fix the silencer. Change now the soundproofing material worn out, cleaning the covers that seal the silencer and continue to the assemblage of the new soundproofing material. Add as denoted in the figure 7.5.1 and 7.5.2 a sealing paste, resistant to high temperatures on the points of junction, fix two new rivets in the original position, change the gasket silencer-muffler.
You now proceed bashful for the assemblage of the silencer. It will be possible to purchase soundproofing material from the Vittorazi / dealer Vittorazi. If the soundproofing material is purchased in a spare parts shop for car/motorbikes, you don't exceed with the quantity of soundproofing material, the effect after few hours will be contrary to the desired one. We recommend to cut out a square of the same dimensions of the material just replaced.

7.5 / silencer



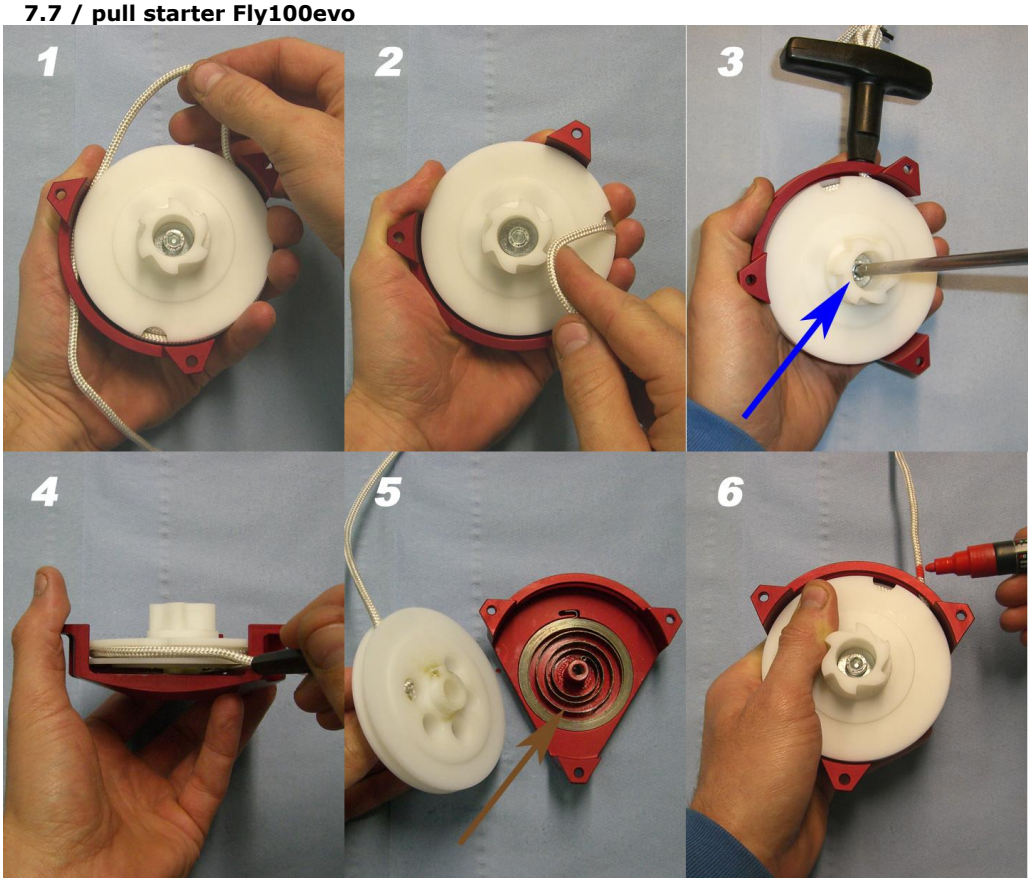
7.6 Rubber mountings

We advise to inspect at the end of every use of the motor the conditions of the rubber mountings. In the case which one of these presents a crack or a detachment of the rubber, immediately replace it. Reached the 100 hours, replaces the rubber mountings of the motor (4pc) and the exhaust system (2pz). For a correct installation of the new rubber mountings, you compare the paragraph 3.2.

7.7 Pull starter Fly100evo

A first control of the components of the pull starter is recommended to 25 hours.
Just removed the manual starting from the plate, the hooks/splines will be visible.
Verify the conditions and the slide of the hooks, lifting them with a finger. In every case add some oil (for rusted bolts) on the pivots of sliding.
The manual starting: as first operation loosen the knot that stop the handle of starting and unthread the rope from the eyelet drives, suitable in figure 1.
Now positioning the rope in the hollow of the pulley as shown in figure 2, rotate the pulley of wrapping clockwise, to lose the tension given by the spooling spring.
Unscrew the central bolt of 6mm, figure 3.
Lift the pulley with the help of a small screwdriver holding back the spooling spring that is found under the pulley, figure 4 (you will avoid to go out this spring). If for distraction or accident the spooling spring escapes, can be rearranged (provided of patience) manually in the original position.
In the figure 5, freed the pulley, is shown the spooling spring.
Assemblage: add grease to the spooling spring and the pivot where slides the pulley, then insert the pulley in the pivot drives.
Tight the screw of 6 mms, inserting lock-tight of medium resistance (if the washer creates attrition with the pulley, turn upside-down the washer).
Position the rope in the hollow as in figure 2; turn the rope in the pulley wrapping, up to fill it.
Always maintaining the rope in the hollow, rotating counterclockwise unitill the origin of the tension of the spooling spring begin; from this position rotate counterclockwise the pulley of two complete turns, then maintain this position (hold the pulley) and return to insert the rope in the eyelet drive, as in figure 1.
Finally always holding the pulley mark the rope with a pen in the adjacent zone the structure, picture 6. Once made the sign, free the pulley and you can leave also the rope reenters in the wrapping.
If necessary, for the remainder installation returned to the indications of the paragraph 3.8

7.7 / pull starter Fly100evo



7.8 Pull starter Easy100

Progress in analogous way to the model Fly100evo. Then loosen the knot, rotate the pulley to lose the tension of the spooling spring. Unscrew the central bolt, remove the cover, the two cammes and their springs, then with the help of a small screwdriver to hold back the spooling spring and remove the pulley. Add some grease to the spring, to the pivot, the cammes. You remember the sequence and the position of all the components of the starter. Once assembled pulley, cammes, springs and cover, you insert the screw and verify the sliding of the system. You load through the pulley, the spooling spring of 2 exact turns, inserts the rope in the eyelet and marks the rope. Check the wear of the aluminium toothed gear, shown in figure 7.8

7.8 / pull starter Easy100

7.9 Electric starter

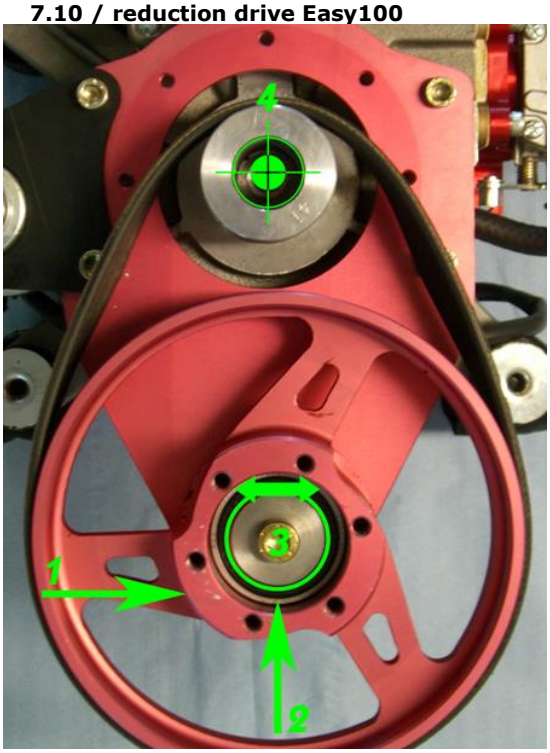
The electric starter engine could wear the brushes or the components of mechanical transmission. Will be supplied in both the cases the spare parts to regenerate the motor.

7.10 Reduction drive Easy100

The reduction Easy100 has been projected with an additional bearing to the pinion (smaller pulley) to assure that the traction of the belt cannot harm the inside bearings of crankshaft; attention what just says, it doesn't implicate that it is possible to bring a strong tension to the belt.
We now consider how to make maintenance to the reduction gear.
Loosen the screw of 8mm that is on the side of the plate (1), then the back screw that the stops the eccentric (2), subsequently to remove tension from the belt, making to rotate the eccentric counterclockwise by the screw of 8mm superior (3). Now we can remove the 5 screws of 5mm that fix the pinion cover (4) and extract this last.
The ordinary maintenance of the reduction gear consist: cleaning if necessary the two pulleys (small and big) and the belt with belt spray cleaner, verify the conditions of the two bearings of the big pulley and of the bearing of the pinion, the condition of usury of the belt (lasted average of 100-150 hours).
A last important shrewdness consists in the measurement of the housing where lodges the bearing of the pinion. In origin the measure of the center is of 22.00mm. When this diameter, cause rubbing will reach or overcome the measure 22.20mm, it will need to replace the pinion (of the same dimension, branded on the frontal part 40/41/42/43/44/45 mms). From our experience, the measurement of the center of the bearing must have effected every 25 hours.
The assemblage of the system reduction must be done, following the inverse sequence, therefore: insert the pinion cover (4), stop the relative screws of 5 mms, give tension to the belt through the central screw in clockwise sense (3), stop the eccentric with the side and back screw (2-1).

The tension of the belt transmitted through the central bolt of 8mm (3), doesn't have to be excessive.
To avoid this drawback use a torque wrench regulated to 9-10 Nm making rotate the eccentric in clockwise sense. Attention: check before that the eccentric is free in its rotation.

7.10 / reduction drive Easy100



7.11 Reduction drive Fly100evo

Effect a first inspection of the reduction drive Fly100evo after 50 hours of normal use, replacing 20cc of oil and verifying the conditions of the bearings and oilseals.
Reaches 100 hours, replace the oilseals, the four bearings and the oil of reduction drive; ask for these components (special parts, difficult to find) to a dealer Vittorazi.
In the case which occurred anomalies of the reduction before 100 hours as strong noises or vibrations, licking of oil, scarce fluency of the propeller, gives possibility of intervention to an experienced and qualified personnel of Vittorazi.

A propeller not perfectly balanced, or a propeller that has received an hits or breakups, must not be used. An use prolonged in the time involves a serious usury (then the breakup) of the bearings of the reduction, possible breakups of the reduction case or other components of the motor. A not balanced propeller transmits vibrations to the motor, so screws and nuts lose draught in few second.

We go to dismount the reduction drive Fly100evo now.
We will call "main reduction case" and "cover reduction case", respectively the element Left and Right of the figure 3.

We start from the pulling of the cover reduction gear. Unscrew the 5 bolts of 5mms that compose the reduction case, insert up to end of the thread four grub screws of 5x15mms in the same thread, sees then figure 1. Attention the reduction contains oil, therefore try to work in plain as in the figures.
Now notice that the cover reduction case is threaded of 6mms. You insert 4 screws of 6x40mms. Now screwing, you will already have pulled out the cover reduction case, see figure 2 and 3. Remove the four grub screws of 5mms, that have developed their function now, so to protect the thread of 5mm of the main reduction case.
We pass now to get off the system pinion-drum from the main reduction case.
Before remove the oil from the body reduction gear, even allowing to drain it for about ten minutes. Then serving of a lathe or of a tool for stud of 10mm, stop the gear pinion through the shaft of 10mm (never tighten the gear).
Now using the puller multi-function of Vittorazi, grab the drum throught the holes and unscrew (sense counterclockwise), as indicated in figure 4.
You can unscrew the pinion, the drum, release the relative oilseal and bearing as in figure 5.
Extract the bearings from the housing, use mallet and puller for close housing.

The second step is the dismounting of the group hub propeller-crown. Stop the crown of the reduction gear in a clamp with jaws in aluminum, unscrew the central bolt of the hub of 8mm. Now to insert a bolt of 8x50mm up to the end of the thread, then install as in figure 7 the puller. Using the puller multi-function Vittorazi, remove the hub. It will be easy to remove the crown, oilseal and bearing now.

You'll improves the assemblage and the extraction of the bearing heating the case of reduction up to 70-80° C. We advise to add lock-tight medium resistance, for buckles and bearings, only around the two bearings that drive the propeller (secondary gear or crown), figure 8.
You watch out: clean the bearings, the housing of the bearings with thinner and you don't allow the lock-tight to arrive on the spheres of the bearings.
Add grease on the lips of the oilseal, figure 6 and 9.

Once effected the substitution of bearings and oilseals, follow bashful the sequence for the assemblage.

Assemblage system pinion-drum: the rotation of the motor continually tightens the thread pinion-drum, therefore is not recommended add lock-tight or to exceed with the initial tightening.
Assemblage system crown-hub: position on the clamp as in precedence pointed out. To easily insert the hub will need to heat up to a temperature of 200°C, figure 10. Not forget the key-hole tang. Tighten the bolt of 8mm of the hub.

Now add 20cc of oil with a graduated syringe, figure 11. We recommend Roloil Syncat 320.
To simplify the assemblage main-cover reduction case, add grease on the o-ring and put it on the edge. Now go with the cover reduction case on the vertical of the main reduction case and make pressure on hub (if necessary to use a rubber mallet or hammer) up to close the whole. While you are closing the reduction you have care that the o-ring doesn't go out of the edge, therefore if necessary use a small screwdriver, figure 12.

7.11 / reduction drive Fly100evo

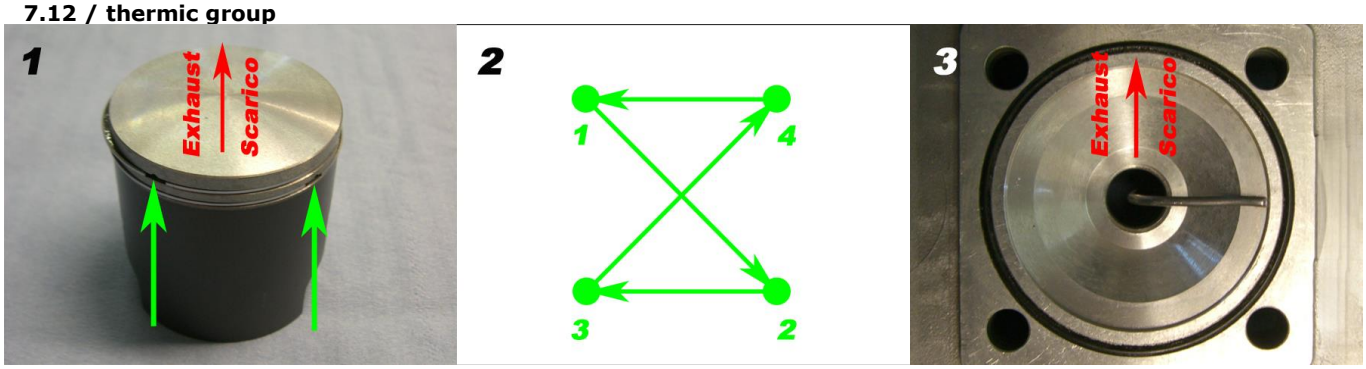
The substitution of the clutch must be performs when the least diameter of the lining is inferior to 71.0 mms. Founding on our tests, we have verified that a first measurement can be effected to 100 hours, then following every 25 hours.
The extraction of the clucth is facilitated with the multi-function Vittorazi, figure 13.
Removed the clucth by the crank-shaft, loosen the two side grub screws, release the two springs and finally remove the two seeger. Replace two new masses. Now insert the spring as to the end, bring the grub screws in contact with the springs, then screw one and half turn of pressure. Add to the grub screws lock tight of medium resistance.
The position of both the grub screws must be verifies, measuring with a caliber the depth of 9.5 mms, from the external profile of the mass up to the term of the hollow of the grub screws.

7.12 Piston, cylinder, head

The thermic group of the motor 2 strokes is very simple to get off and to reassemble in comparison of a motor 4 strokes.
We imply that your motor has already effected 100 hours, therefore the moment has come to intervene on these components.

Removing the nuts in head of 8mm, can be lifted first the head and then the cylinder, leaving the piston free.
You will find the piston, the head, the spark-plug and the port of exhaust with soot due to the combustion. Cover well with paper the cranshaft, so to prevent that any component can amiss fall inside.
Remove one of the two locker from the side of the piston and push the pin up to be able to remove the piston.
Before take off the piston rings, then with light sand paper eliminated the residual soot by the topside of the piston, from the housings of the piston rings. Also remove the residues from the head and from the exhaust port.
Now wash well these components, in a container (metallic if possible) with thinner and blow with pneumatics.
We advise to replace after 100 hours the piston rings, the roller bearing of the piston, the gaskets of the cylinder, head and exhaust o-rings.
Before the assemblage to grease (if possible, with the same oil used to have the mix) the pin, roller bearing, the piston, the reed of the cylinder.
When the gasket of cylinder (bottom) is replaced, be sure to get one of the same thickness (0.2 / 0.3 / 0.5 mms, the possible measures) and apply some grease.
Only in the case which the cylinder or the crank-case will be replaced, the measurement of the "squish" will be necessary.
Now mount the roller bearing, piston and pin. The two pins for the piston rings must remains in the opposite side of the exhaust port, as indicated in the figure 1.
Insert the cylinder contemporarily making pressure on the two piston rings. Add grease to the o-ring of the head (will be simpler the assemblage) and insert the head.
Progress first gently screwing the nuts of the head, following with a normal pressure, as the suitable order in the figure 2.
With a torque wrench, tight the nuts with 16-18 Nm, always following the same X order of the figure 2.

7.12 / thermic group



The correct measure of "squish" is fundamental for the operation of the motor.
The control of the "squish" or least distance between piston and head, is effected using a piece of tin, section 2mm. Manually bend it to form an L (around 2-2.5 cms), as suitable in the figure 3.
Only after having tightened the head with the indicated values, insert the tin through the hole of the spurk-plug, touching the reed of the cylinder.
The measurement of the "squish" must be done on the same direction of the piston pin (axle of rotation of the crankshaft or 90° to the direction exhaust-carburetor) as pointed out by the arrows in figure 3.
Now make manually rotate the crankshaft, thin to get the crushing of the tin. Measure with a centesimal caliber the thinnest part of the tin and compare it with the chart below.
In the case which the "squish" didn't result in tolerance, increase or decrease the thickness of the cylinder gasket up to get the necessary result.

Chart 7.12

Tolerance	**Vittorazi Easy100**	**Vittorazi Fly100evo**
Squish	from 1.20 to 1.30 mms	from 1.00 to 1.10 mms

7.13 Flywheel and ignition timing

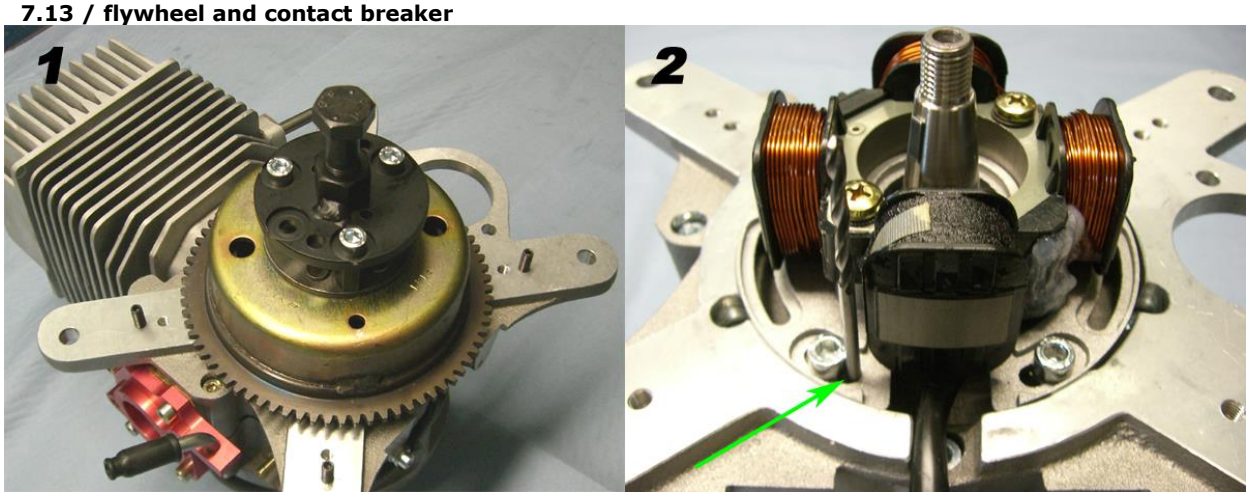
The ignition flywheel can be pull out from the crankshaft just by the use of the puller multi-function Vittorazi. Apply it as in figure 1, then tight the central screw. The extraction can be improved with a single hit of hammer on the central screw of the puller, when the system is under pressure.
The flywheel is united for conic connection to the crankshaft; the position is determined by the key-hole tang, therefore the flywheel doesn't determine the timing of ignition (fixed).
Contrarily the position of the contact breaker group, can be varied.
The point of reference for the position of the contact breaker is determined by the space that is between the head of the screw of 5mm and the term of the relative eyelet.
The screw of reference is indicated in the picture (left and below), the measured space has to remain is on the right considering the screw, as suitable in figure 2.
This operation must have effected using a calibrated pole or a drill of the suitable measure of the chart 7.13.
This method just shown is simple and effective, can be exceeded if you have a strobo lamp for ignition timing control.

Chart 7.13

Ignition timing	**Vittorazi Easy100**	**Vittorazi Fly100evo**
Distance screw-eyelet	1.7 mm	3.5 mm
Degrees of advance	6-7° at 9.000 RPM	8.5-9.5° at 9.000 RPM

If the ignition timing is verified with a strobo tool and the number of degrees of advance doesn't correspond to the reference of chart, we remember that for every degree corresponds a movement of 0.70mm in the space screw-eyelet.
Attention: this setting has a notable influence on the functionality of the motor. A deliberate or accidental variation of the advance can lead to the breakup of the motor and a consequent risk for the safety of the pilot.

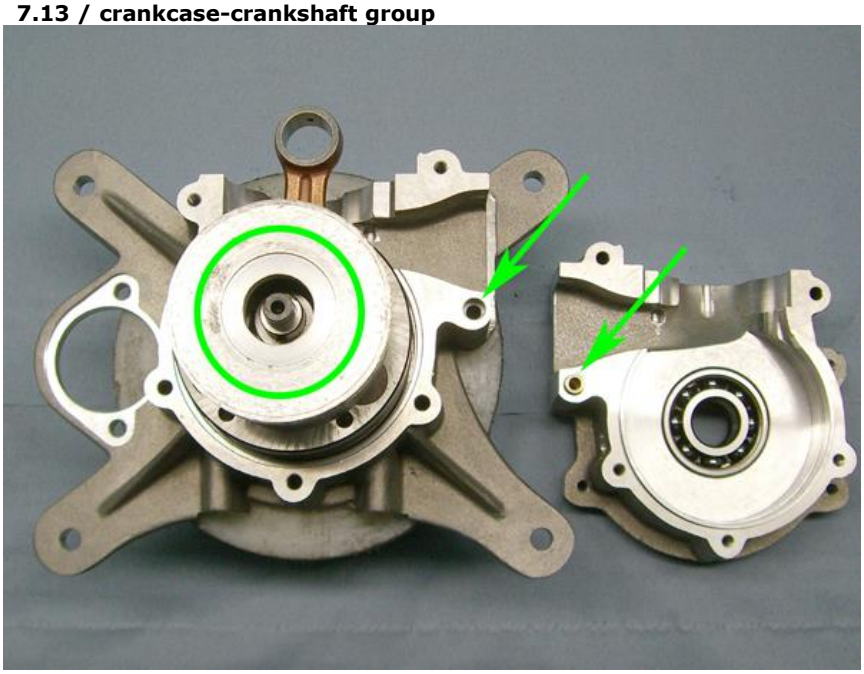
7.13 / flywheel and contact breaker



7.14 Crankshaft, crankcase, bearings

After pulled flywheel, pinion or clutch, removed the bolts of crankcase, is possible to open the block crankshaft-case. Use a rubber mallet/hammer or an hydraulic press to let go out the crankshaft.
The substitution of the oilseals is suitable at 100 hours of use, the bearings at 200 hours.
At 200 hours will be possible also effect a measurement of the crankshaft and a verification of the roller bearing.
We advise to insert the bearings, heating first the crankcase up to a temperature of 70-80° C.
Grease the lips of the oilseals, grease the bearings and the roller bearing contained in the rod.
To simplify the assemblage of the crankshaft-crankcase will be possible cold the shaft to a temperature close 0° C.
The pressure to insert the crankshaft must not be on the axle, there is the risk to fold up the crankshaft, but using a specific buffer as shown in figure 7.14.
Closing the crankcase add some sealing paste for plain (resistant to unleaded gasoline). Once stretched the paste, avoid that it becomes solid before the closing. Attention to the plug for the alignment of the crankcase in figure 7.14. Tighten all the screws of the case with 6-6.5 Nm.

7.13 / crankcase-crankshaft group



8.0 Chart of maintenance

Chart 8.0

	Before and after use	**Every 25 hours**	**Every 100 hours**
Breakups, leak of oil, worn out parts	*Checkup*		
Screws and nuts	*Checkup*		
Sliding throttle	*Checkup*		
Killing off button	*Checkup*		
Engine idle	*Checkup*		
Rubber mountings	*Checkup*		
Carburation by the spark-plug colour		*Checkup*	
Carburetor		*Checkup and cleaning*	
Pull starter system		*General check and lubrification hooks*	*Substitution rope, pulley, hooks*
Carburetor membranes		*Checkup*	*To 100 hours or 1 year, substitution*
Reed valve		*Checkup*	*Substitution*
Soundproofing material silencer		*Optional substitution*	*Necessary substitution*
O-ring exhaust		*Substitution*	
Spark-plug		*Substitution*	
Gaskets			*Substitution*
Piston ring			*Substitution*
Piston			*Cleaning soot and measure*
Roller bearing			*Substitution*
O-ring head			*Substitution*
Head			*Cleaning soot*
Oilseal crankcase			*Substitution*
Bearing crankshaft			*To 200 hours substitution*
Crankshaft			*To 200 hours measurement*
Easy100			
Belt Easy100		*Cleaning and tension*	*Substitution*
Bearing reduction Easy100			*Substitution*
Pinion Easy100		*Measurement*	
Fly100evo			
Oil reduction		*To 50 hours substitution*	
Oilseals reduction			*Substitution*
Bearings reduction			*Substitution*
Masses of clutch			*Measurement*

9.0 Tightening torque and special tools

Chart 9.0

Nuts head of 8mms	**16-18 Nm**
Nut flywheel or clutch of 10mms	**50-55 Nm**
Screws crankcase of 5mms	**6-6.5 Nm**
Spark-plug	**25-30 Nm**
Stud cylinder of 8mms	**16-18 Nm**
Stud exhaust of 7mms	**10-12 Nm**
Drum and pinion Fly100evo	**45-50 Nm**
Belt tension Easy100	**9-10 Nm**
Screws or nuts of 4mm	**2.5-3 Nm**
Screws or nuts of 5mm	**6-6.5 Nm**
Screws or nuts of 6mm	**9-10 Nm**
Screws or nuts of 8mm	**25-27 Nm**
Screws carbon propeller of 6mms	**4-5 Nm**

1 Kgm=9.81 Nm

Tools of measurement

Centesimal caliper
Feeler from 0.05 to 1.00 mms
Torque wrench scale 2-10 Nm. Scale 8-60 Nm
Stroboscopic tester and centesimal comparator
Measurer of pressure: scale 0 to 1.0 Bar
Graduated syringe: capacity 20-30mls
Electronic tester

Special tools

Puller multi-function Vittorazi: flywheel, clutch, propeller hub, wrench drum-pinion.
Studs clamp of 7 and 8mms
Piston block plug
Puller bearings for closed housing: shaft 10mms and 15mms
Cut strip and crimp tool
Oil can
Riveter

10.0 Spare parts

Ask to a Vittorazi dealer for the request of the spare-parts. If a dealer is not present in your zone or country, you can contact the nearest dealer Vittorazi (or directly the factory).
In enclosure with this manual you will find the spare-part list of the Vittorazi Motors. If you won't receive the list, you can find it in our site web or writing a request to our e-mail address.
The factory will guarantee immediate availability of the spare-parts.
You avoid the use of no original parts and not recognized by Vittorazi, can make the motor dangerous and immediately leads term to the validity of the warranty. Vittorazi doesn't accept any warranty for that motor used with no original parts or not recognized, modified or that have had an improper use.

11.0 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	Get off the spark-plug and the carburetor. Make turn the motor with the starting or handly. Dry the spark-plug.
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 killing off button is linked to earth	Check operation of the button, the cables, wirings.
The electric plant	Check there are no cables or wiring worn out or open. Check the correct installation.
The ignition coil or the contact breaker has a problem	Replace it

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

Wrong carburation	Restore the standard carburation
The motor has received too much gasoline for a wrong procedure of starting	Get off the spark-plug and the carburetor. Make turn the motor with the starting or handly. Dry the spark-plug.
The motor has received too much gasoline for a wrong carburation. The spark-plug is wet.	As suitable above. Restore the standard carburetion.
The reed valve is worn out	Replace the petals
Aspiration of air from the junctions	Control and substitution where necessary of the gaskets, o-ring or oilseals.
Aspiration or exhaust pipe clogged	Check the passage of airbox, exhaust pipe and silencer.
Carburetor problem	Get off and inspect

The motor starts well but the power is irregular or low

The propeller adopted is not certified from Vittorazi	Substitution
The spark-plug is worn out or defective	Substitution
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 plant	Check there are no cables or wiring worn out or open. Check the correct installation.
The ignition coil or the contact breaker has a problem	Replace it
Wrong carburation	Restore the standard carburation
The reed valve is worn out	Replace the petals
Aspiration of air from the junctions	Control and substitution where necessary of the gaskets, o-ring or oilseals.
Intake or exhaust pipe clogged	Check the passage of airbox, exhaust pipe and silencer.
Carburetor problem	Get off and inspect
The gasoline in the tank is aged, there is water or other liquids, it is dirty	Void the tank and replace it
The gasoline in the tank has a wrong percentage of oil	Void the tank and replace it
Aspiration of air from the circuit tank-bulb-filter-carburetor	Check the junctions or replace the aged pipeline or bulb
Dirty gasoline filter	Replace it
Carburetor membranes worn out	Replace it
Too much soot in the head	Clean it
Problem to the cylinder or piston	Replace it
Model Fly100evo: clutch worn out	Replace the masses of the clutch

Overheating

The propeller adopted is not certified from Vittorazi	Substitution
The gasoline in the tank has a wrong percentage of oil	Void the tank and replace it
Wrong carburation	Restore the standard carburation
Aspiration of air from the junctions	Control and substitution where necessary of the gaskets, o-ring or oilseals.

Vibrations

Propeller breakup	Small lesions: reparation allowed only for experienced person. Otherwise substitution.
Components' breakup (es. muffler, bearings, bracket)	Check the motor. Don't use the motor up to the problem has not been identified and resolved.
Rubber mounting breakup	Replace it

Noisiness

Propeller breakup	Small lesions: reparation allowed only for experienced person. Otherwise substitution..
Components' breakup (es. muffler, bearings, bracket)	Check the motor. Don't use the motor up to the problem has not been identified and resolved.
Soundproofing material worn out	Replace it
Gasket connection exhaust/silencer	Replace it
Model Easy100: belt dirty, low tension or worn out	Cleaning, right tension or replace it
Model Fly100evo: lack of oil in the reduction drive	Replace oilseals and 20cc of oil
Model Fly100evo: bearings or gearings worn out	Replace it
Model Fly100evo: clutch worn out	Replace mass of the clutch

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	Substitution
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 plant	Check there are no cables or wiring worn out or open. Check the correct installation.
The ignition coil or the contact breaker has a problem	Replace it
Overheating	See section above: overheating
Carburetor problem	Get off and inspect

Strongly smokiness from the silencer

The gasoline in the tank has a wrong percentage of oil	Void the tank and replace it
Wrong carburation	Restore the standard carburation
Soundproofing material worn out	Replace it

Leaking of oil

Connection cylinder to exhust 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
Reduction drive Fly100evo	Replace oilseals
Crankcase, oilseals, o-rings or gaskets	Dismount, clean the plains, replace the worn out components, add sealing paste where necessary.

12.0 Warranty

12.1 Registration of the warranty

It is important that the dealer/ultralight manufacture compiles completely the coupon of warranty (you find the coupon to the following paragraph 12.4) and sends it to the factory of Vittorazi Motors responsible of the warranty, within 60 days from the date of the selling/shipping of the motor.
The "coupon of warranty" needs to identify name and address of the owner, as well as model and serial number of the product, date of purchase, name and address of the dealer.
The dealer/ultralight manufacture have to furnish a copy of the "coupon of warranty" to the client, immediately after having compiled the coupon. This coupon represents the only form of identification of the product from the factory and therefore you will have to preserve it for possible future use.
If the product needs interventions of maintenance covered by the warranty, the daeler could ask you to show the copy "coupon of warranty" to verify the date of purchase.
The client has to verify that the dealer/ultralight manufacture immediately compiles the coupon of warranty and dispatches the copy to the manufacturer.

12.2 Limited warranty

We warrant that every new engine Vittorazi, will be free from defects of materials and workmanship, with the condition that the client purchases the product from dealer/ultralight manufacture that is authorized from Vittorazi to sell this product.
To guarantee the best safety and reliability of the motor, every motor before being delivered is submitted to a test of verification, a simulation of flight made on the thrust-bench of about 15 minutes.
The present warranty remains in vigor for a period of (1) one year to elapse from the date of purchase.
Accordingly to the present warranty, every claim must have effected delivering the product to inspect to an authorized dealer Vittorazi Motors to effect the reparation of the product.
If the client is not able to deliver the product to an authorized dealer, you can contact nearby another center of assistance or dealer Vittorazi Motors or directly contact the factory. Will be therefore responsibility of such center of assistance to program the inspection and the reparation of the product, with the condition that such service is covered by the warranty.
If the client has to send the engine or one or more components to be inspected or repair, the shipping have to be charged from the client and prepaid.
The owner has to show the copy of the "bill or invoice of purchase" and attach the copy of the "coupon of warranty".
If one of the aforesaid documents were not available, the buyer have to show at least the original document of sale.
Accordingly with the present warranty, the obligations of the factory, will be limited to the reparation of the defective component or to the substitution of one or more components, or what will be necessary to every malfunction that cames from the defects of material or workmanship covered by the warranty.
The present warranty doesn't cover reparations, substitution of components or performance of services after the expiring date of the warranty.

12.3 Warranty coverage

The purpose of this chapter is to avoid some of the misunderstandings most frequent, respect to the coverage by the guarantee.
We remember before: any responsibility can be imputed to the manufacture or to the dealer of the motor for every problem or damage direct to person/thngs/animals found during the whole life of the motor. We remember that this product is not certified, is dedicated to experimental aircrafts and that in any moment can break or to stop working.
For any adversities caused by the motor, the manufacture or distributor is not responsible of such action, then the direct or indirect damages are not indemnified caused to person/things/animals.
Following are described some types of services not covered by the warranty. For any question toward the coverage of the warranty, contact the authorized dealer or directly the factory, that can distribute further information.
All the parts replaced as defective or not conform, during the interventions of warranty, will become property of the Vittorazi Motors.
The present guarantee covers the damages of the motor caused from: component defective for shape or material, for project not conforming to the indicated use, not correct assemblage from the factory.
All the cost of transport owed to interventions of warranty for motor or parts of component will be charged to the client.

Are not covered by guarantee the damages caused from:
- normal worn parts.
- use of spare part not original
- neglect, lack of maintenance, accidents, abnormal operation, improper installation or maintenance, other causes that can influence the performances of the motor.
- an improper use or from maltreatment of the motor.
- wrong regulations or setting, omission of generic controls, missed cleaning of the carburetor, filter gasoline, tank and of the system of fueling.
- use of accessories or component not suggested for this motor.
- alteration or removal of the components.
- a reparation effected from an incompetent mechanic or from a center of assistance Vittorazi not authorized.
- the missed execution with regular intervals, of the procedures of maintenance specified as suitable in this manual (chapter 8)
- not exhaustive or wrong installation of the motor on any aircraft.
- change to the motor not authorized by the Vittorazi Motors.
- further interventions of maintenance required by the client besides the warranty.

It is excluded by the warranty the seizure piston-cylinder or the breakup of the piston (possible consequential damages as cylinder, head, crankshaft, bearings) because referable to the following cases under listed:
- use of gasoline without lubricating or wrong percentage of mix gasoline/oil.
- operation with fuels, liquid, lubricating don't adapt to be used with the product.
- not conforming gasoline (water's presence, additive, impurity) or preserved for long time.
- lack of maintenance or missed cleaning of the carburetor.
- wrong carburation, therefore ignoring the indications of the manual.
- aspiration 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 the motor with a wrong combination propeller/reduction ratio.
- other causes already writed in the preceding list.

Are not covered by warranty or from reimbursement the damages caused:
- to persons/things/animals caused by the generic use of the motor.

- to persons/things/animals caused by a collision with the propeller or any part detached by the motor.
- to the cage, component of the aircraft or to the propeller caused by the collision with any part detached by the motor.
- spent of recovery, of consignment, telephone or rental of any type, drawbacks or losses of time or other indirect damages.

12.4 Warranty coupon

The warranty coupon must be delivers from the dealer to the factory within 60 days through fax, e-mail or ordinary mail. The client must receive one copy of the warranty coupon and attached 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/manufacture *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 protected file papery and computer, will be treated entirely reserved by the Vittorazi Motors in the full respect of the legislative decree 196 of June 30th 2003 on the protection of the privacy data.

13.0 Contact

For questions, claims if you have doubts or problems with the operation of the motor, not hesitate to directly contact us to our directions under listed. We remain all the times to your disposition.

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Website: www.vittorazi.com