



## **CORS-AIR M 25 Y / Black Devil**

### **INTRODUCTION**

Thank you for choosing our engine the CORS-AIR M 25 Y/Black Devil.

Your engine has many superior features that have been developed, tested and introduced by JPX Italia over the few years this engine has been used in the ultralight industry. The high quality Cors-Air M25Y/Black Devil is the most copied engine of its kind in the World. Fly with confidence, you own the superior original.

We invite you to spend some time reading this manual, which will let you discover all the features of your engine. Advice on maintenance and operation will help you to have a reliable engine and to preserve your investment providing you years of reliable use. Furthermore, we invite you to deliver this manual together with the engine should you decide to sell it, so it can be useful for the next owner as well. The manufacturer and the resellers are ready to answer your questions and if necessary to solve every problem because **THE SAFTEY OF YOURSELF AND OTHERS IS THE MOST IMPORTANT THING FOR US.**

Welcome to the Cors-Air World!

### **IDENTIFICATION OF THE OWNER**

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**Owner**

---

**Address**

---

**Engine serial number**

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**Reseller**

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**Address**

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**Owner's signature**

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**Reseller's signature and stamp**

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**Date of sale**

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## IMPORTANT NOTES

Do NOT try to start the engine without the propeller. Severe engine damage can occur.

NEVER start the engine with people near propeller or the sides. The breakage of a propeller can cause severe injury even several meters away.

Do NOT start the engine with loose bolts or parts. Personal injury can occur from flying parts. Additionally, this can cause the detachment of the propeller, the elongation of the propeller holes, damage to the electric starter and the rupture of the rubber mounts.

Never run the engine without the air filter. Dirt and dust can enter the engine via the unprotected air intake resulting in poor engine performance and engine damage.

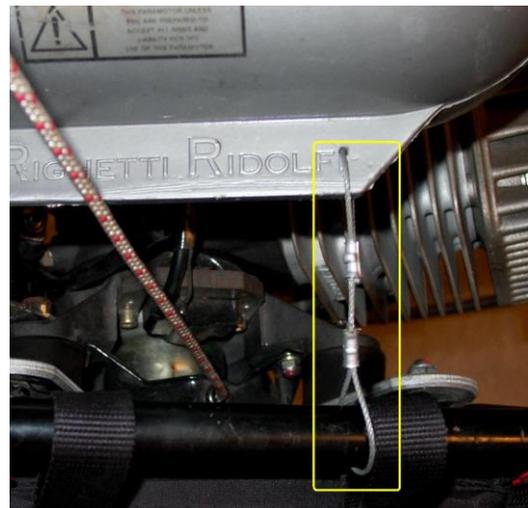
Do NOT keep engine at peak rpm after the take off except when absolutely necessary and for emergencies (obstacles or sudden wind).

We advise installing small security cables from the frame to the following components to further secure them in the event of their dislodging:

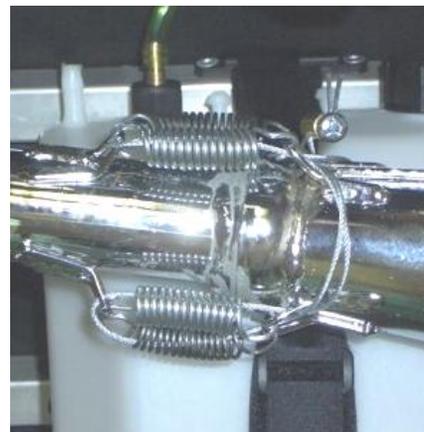
- A. Top of the tuned exhaust pipe and through the tuned exhaust mounting springs Muffler



- B. Air filter



Additionally, for older non-swivel exhaust springs, or to dampen excessive exhaust vibrations we recommend doubling the springs connecting the tuned exhaust to the exhaust.



If you use a large propeller, engine cooling is reduced at higher speeds. It is advisable to use a CHT / EGT gauge and probe to monitor engine temperature during operation.

Periodically remove, inspect and balance the propeller. An unbalanced propeller, even slightly, creates micro-vibrations which are not felt by the pilot, but can lead to premature engine wear and breakages.

A spinning propeller has significant mass and a considerable amount of inertia. When changing speeds, do NOT rapidly vary the throttle speed up and down, but instead use a steady rhythm to increase or decrease the engine. Rapid speed changes can cause wear to the reduction pulley bearings, engine and belt in addition to possibly deforming the mounting holes of the propeller.

Once you have properly tuned your engine, do NOT modify it unless you will be flying in a location that is significantly different in altitude, climate or temperature from your typical location.

Do NOT fly in bad weather conditions, you'll fly the day after. REMEMBER: FLIGHT IS FOR FUN, NOT FOR RISKING YOUR LIFE! HAVE A GOOD FLIGHT AND ENJOY YOURSELF.

## **PREFLIGHT / POSTFLIGHT SAFETY CHECK**

**IMPORTANT!:** BEFORE FLYING CHECK ALWAYS EVERY PART OF YOUR CRAFT FROM ENGINE TO FRAME.

Check the following components and their condition:

- Electric wires
- Leaks from fuel hoses and fuel tanks
- Carburetor and engine's crankcase
- Propeller is not damaged or loose
- Exhaust pipe for cracks
- Muffler mounts and condition
- Frame is not bent or broken
- Rubber mounts are not cracked
- Reduction belt is not loose
- Safety wire is securely holding components
- All bolts / fasteners are tight
- Safety netting
- Harness and bindings.

## **ASSEMBLY:**

The CORS-AIR M 25 Y engine can be installed on a sturdy frame by using 4 rubber mounts of 40 mm between the back flange and the engine mount. It is suggested to install also the 5<sup>th</sup> rubber mount (20x30), fixing it in the proper hole located under the reduction flange through an angular square. This additional mount will help to distribute the vibrations of the engine evenly across the frame.

To attach the propeller, use only bolts of class 10/8 (100 Kg) and make sure that they are long enough to pass through the redactor pulley. Tighten the 6 bolts M8 in a cross, at 1.5 Kg.m.(15Nm). Re-check the torque of all mounting bolts after the first hour of engine use.

To connect the fuel tank to the carburetor, use a fuel hoses with the proper length (no greater than 7.2cm times the max fuel consumption per hour. For example: if the engine consumes a maximum 11 liters/hour). The length of the fuel line must not be more than 79 cm. ( $11 \times 7.2 = 79.2$  cm)

It is advisable to install a manual primer bulb to get the fuel to the carburetor before for starting. This device will allow the fuel to arrive to the carburetor.

## OPERATION

### FUEL / MIXING

Your engine requires a mixture of gas and a 2-cycle oil as a coolant / lubricant during operation. (DO NOT USE MIXTURE ALREADY DONE AT PETROL PUMPS).

Use only premium gas for cars 98 octane or AVGAS 100LL together with good quality synthetic oil.

Do NOT mix AVGAS and auto gas, nor use them in alternating sequence. It is advisable to select 1 type of gas and stick with this type for the remainder of the engine use.

The recommended mixture is 2% or (50 to 1), or in very hot climates uses a 2.2% ratio (40:1).

When preparing the mixture, inspect the fuel container for contaminants such as dirt or water.

First add the measured amount of oil to an approved gas container, then add the fuel to the container and mix thoroughly.

#### **Note: Fuel Filters and Check Valves**

##### **Recommendation**

A high quality fuel filter will prevent contaminants from reaching the engine. The best filter is the small cone shaped one with the brass core, available in lawn mower stores or motorcycle stores. Fuel filters should be installed in a vertical position allowing air to be purged during fuel flow.

##### **Recommendation: Check Valve this applies to ALL engines.**

It is strongly suggested that all fuel systems have a check valve installed that will keep the fuel running back into the tank. The check valve is best positioned at the end of the fuel pickup line in the fuel tank. Otherwise a less effective position between the carburetor and fuel filter can be used.

### RUNNING-IN

All CORS-AIR engines, before being delivered, are subject to a severe quality check in order to verify if all components are functioning correctly, but a further engine running-in will be required. A proper running-in will prolong engine life. Due to the high quality of the internal parts used on the Black Devil, the engine is considered properly run-in around 20 hours of operation.

**Note:** Be sure to tune your engine properly before running-in. See **Tuning Your Carburetor** section below.

The recommended run-in is below using a tachometer and a CHT gauge.

- 1) Find a suitable location away from obstructions, people, etc.
- 2) Place a thick rubber carpet under your craft to avoid stones or other objects from coming into contact with the propeller. Be sure to secure your paramotor as you will be running the engine for long durations at high RMPS.
- 3) Start the engine and let it warm up at idle (CHT 200 F / 93.33 C)
- 4) Increase the RPMs to 2500 for 5 minutes.
- 5) Increase RPMs to 3000/3500 rpm for 15 minutes,
- 6) Increase RPMs to 4000 rpm for 15 minutes.
- 7) Switch off the engine and check for loose nuts or bolts and confirm every component is ok. BE CAREFUL NOT TO TOUCH HOT PARTS (POWER UNIT AND EXHAUST PIPE).
- 8) Start the engine and repeat the above process 1-5 stepping up the RPMs to 4000 rpm, but run at 4000 rpm for 5 minutes instead of 15.
- 9) Accelerate to 4500 rpm for 15 minutes.

When flying during the run-in period, vary the power often for a proper piston ring setting.

During the first 10 hours, do NOT subject the engine to extreme load and speed.

Use care during normal use to avoid excessive loads (ex. tandems with passengers, running the engine at its maximum) as engine damage can result.

ALWAYS inspect your craft before and after every flight, for loose parts or damage.

Keep the engine head clean of any oil and dirt to ensure maximum cooling.

## TUNING YOUR CARBURETOR

A properly tuned engine idles and accelerates smoothly, does not smoke heavily and runs at 20- 60 RPM below maximum RPM.

Your Black Devil engine comes tuned with the factory default carburetor setting:

LO 1/2 to 3/4 turns counterclockwise open from fully seated and

HI 1 1/2 to 2 turns counterclockwise open from fully seated.

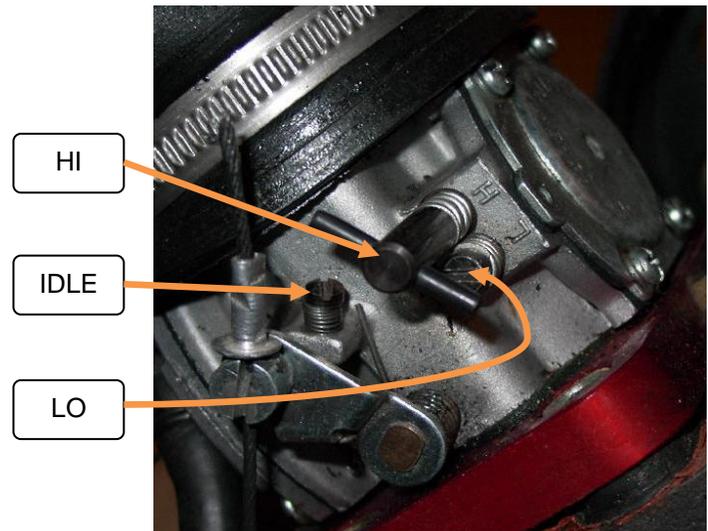
However, you should always double-check the settings to prevent engine damage from occurring. Make a note of how many turns clockwise you must turn both LO and HI screws from their current position for them to be fully closed and use this as a reference. Additionally, you may need to tune your engine based on your flying zone and weather.

When tuning your engine, we recommend using a tachometer and a CHT / EGH gauge to determine the maximum RPM settings your engine is delivering along with the heat being generated. However, it is possible to tune a carburetor less precisely by using the spark plug color as a guide.

To properly tune your carburetor, the engine must be warmed up to the normal operating temperature. It is perfectly normal that a cold engine will NOT respond to the throttle. If you adjust the LO on a cold engine in order to take the throttle, when warm, the engine will vibrate excessively.

Adjustments should be made in 1/8 diameter turns of the LO and HI screws.

Turning the LO / HI screws to counterclockwise will add more fuel to the air / richen the mix  
Turning the LO / HI screws clockwise will lessen the fuel to air / lean the mix.



### Tuning your LO setting and adjusting the idle speed

1. Start your engine (See STARTING YOUR ENGINE GENERAL TIPS) and allow it to warm up for approximately 5 minutes. If you have installed a CHT the cylinder head temperature will be near 200 F / 93.33 C.
2. Adjust the idle speed to the appropriate level by turning the idle screw counterclockwise to lower or clockwise to raise the idle speed. The idle speed for a 45 inch propeller is approximately 2,250 RPM; a 48 inch propeller is approximately 2,000 - 2,100 RPM.  
NOTE: A too high idle will generate too much thrust. A lower RPM can cause stalling or rough idle. It is always safer to set a higher idle RPM, since while descending with a low idle the engine can stop!

Once the idle RPM has been set, we should proceed with the LO screw setting.

3. Once the engine is sufficiently warmed, firmly secure the paramotor and quickly squeeze the throttle to about 1/3 of travel.

If the engine hesitates to respond to the throttle, your LO screw is not opened enough thus your LO circuit mixture is LEAN. In this case, you will have to open the LO screw a little, by turning counterclockwise until the engine responds to throttle input.

If during acceleration, the engine starts shaking, it points to a too rich LO mixture and conversely, you will have to lean the LO slightly by closing the LO screw, turning the screw clockwise.

4. Check and adjust the idle speed to the appropriate level after setting the LO setting.

### Tuning your HI (no TACH)

#### Please read this section thoroughly to prevent engine damage from occurring

When tuning the HI, the ideal mixture is reached when the insulator of the spark plug is coffee brown without carbon deposits. A black sooty plug means the engine is too rich, and white/grey plug means the engine is too lean. You can see better the color of the spark plug by keeping the engine for 20 seconds at maximum speed and switching it off suddenly without letting it slow down. Once you have found the perfect mixture do not change it unless you change flight place or climate conditions, since register screws can be damaged by continuous adjustments.

1. Firmly secure your paramotor and squeeze the throttle to its maximum.
2. Hold for 20 seconds, then immediately hit the kill switch.
3. Remove and inspect the spark plug for its condition.

If the color is black with carbon deposits, the mixture is too rich, therefore turn the HI screw clockwise 1/8 of a turn and repeat the test.

If the spark plug is grey/white, the mixture is lean, therefore tune the HI screw counterclockwise 1/8 of a turn and repeat the test.

**REMEMBER THAT IF THE MIXTURE IS TOO LEAN, THE PISTON CAN SEIZE.**

Black / sooty=RICH

Coffee brown / no soot= Optimum

Gray / White=LEAN



### Tuning your HI (with TACH and CHT)

**Note:** Engine should be warmed with idle speed properly set.

To properly tune your carburetor, a target goal of 20 – 60rpms less than the maximum rpm is correct. To do this you must first determine the max RPM your engine is capable of. It is important to note that finding the maximum rpm will briefly run the engine to the lean side. Caution should be used to not run your engine lean for more than a few seconds otherwise engine damage can occur.

After securing the paramotor, open the throttle to full power and maintain.

1. Turn the HI screw to the left or right until the maximum RPM is reached. Once the suspected maximum rpm is found, just a slight clockwise turn of the HI screw should cause a significant RPM drop. This means the lean side of the mixture has been achieved. IMMEDIATELY open the screw counterclockwise to return to the maximum rpm to prevent the engine from overheating!
2. Continue turning the HI screw counterclockwise till you notice 20 to 60 RPM drop below the maximum RPM setting. In this position the carburetor will be perfectly tuned slightly on the rich (safe) side.
3. Next, close the throttle and recheck the idle and the LO screw adjustment. If the carburetor was tuned properly, the idle will return to the normal setting described above.

### Four Cycling:

Some carburetors are prone to four cycling, which means that both HI and LO screws are partially active at the same time. This will not harm the engine but it will reduce power, and the engine will start shaking slightly. If however, the rough operation continues above 4,500 RPMs while adding power, the mixture is too rich. It is safer to lean the LO setting while holding the throttle in this range. If instead of the LO screw, we close the HI screw (for the same result), we will end up with a lean mixture on the high RPM side

which can result in engine damage. Remember, even a slightly leaner mixture on the low RPM side is safer than on the high RPM side. 2-cycle engines should not be run in idle position for long periods of time as there is less lubrication and the fuel mixture burns less clean resulting in fouled spark plugs.

When flying in idle for long periods of time, it is advisable to open the throttle from time to time to "clear" the engine.

## **STARTING YOUR ENGINE      GENERAL TIPS.**

Your Black Devil engine should be very easy to start with 2-3 pulls if primed correctly. Excessive pulls typically mean the engine was not primed correctly, or something is wrong.

Before starting, some general carburetor settings should be verified. When in doubt return to the factory default settings (See **Tuning Your Carburetor**).

Make sure the starter rope does NOT rub against the grommet of the hand starter housing, or other engine and frame components. The pull cord should be free and clear of all obstructions and be allowed to travel smoothly in the pulley.

### **STARTING SEQUENCE.**

#### **1) Priming the Carburetor**

Press the relief when using one of the below methods to prime your carburetor.

##### ***Blow Tube:***

When using a blow tube to prime your carburetor press in and hold the relief valve on the side of the carburetor (air silencer side) and blow into the gas tank vent hose until you see the gas reach the carburetor through the clear fuel supply hose. Once gas reaches the inlet for the carburetor, continue blowing for 1 second to prime the engine. Wait 15 seconds then secure the paramotor in preparation to start.

##### ***Using a small Primer Bulb***

If you have the small primer bulb, you will have to learn how much to prime. The Black Devil uses a very unique priming system that injects the fuel directly in the venturi. This is good and bad and all depends if you get the feel of how much to prime, and you should be careful not to introduce bubbles into the fuel mixture entering the carburetor. Gently squeezing the bulb is better than a quick pumping action.

Once you bring the fuel to the carburetor, squeeze the primer bulb only once and then try to start the engine.

If it does not fire on the third revolution, try priming the carburetor again. Hold the relief valve again and gently squeeze the small primer bulb a second time.

Try starting the engine again.

**Note:** Some paramotors have a large primer bulb connected between the fuel tank and the carburetor. Use extra caution when priming with a large bulb as a greater amount of fuel will be introduced resulting into a flooded carburetor



## **2) Starting the Engine:**

Check your surroundings and verify the area is clear. Securely grasp the paramotor frame near where the engine mounts to the frame in your free hand. Check to see that the throttle is in the idle only position and then start the engine using a smooth full stroke when pulling. If it does not start on the first or second pull stop, prime 1 second and try restarting the engine.

## **3) Engine Starts / Warm-up and Fine Tuning.**

Warm the engine to its normal operating temperature before flying and fine tune if required (See **Tuning Your Carburetor**).

## **BLACK DEVIL ENGINE TROUBLESHOOTING:**

Most starting and operating issues can easily be traced down to either a problem with fuel system, or with the electrical system. When diagnosing problems begin with the most simple and move to more complex issues such as: Is the correct amount of fuel reaching the carburetor? Is there enough spark to cause the engine to turn over? Below is a brief list of items to check based on easiest and most common, to the more difficult,

### **THE ENGINE DOES NOT START**

- ✓ Switch is on, Master switch is on (if applicable)
- ✓ Fuel reaches the carburetor / engine primed properly
- ✓ Battery is fully charged (if applicable)
- ✓ Good spark plug / connection
- ✓ Idle speed set too low (2400 RPMs recommended)
- ✓ Belt is tight
- ✓ Auto Decompressor clean and closed
- ✓ Carburetor is clean / adjusted properly
- ✓ Carburetor pop off pressure is incorrectly set

Additional information concerning these systems is discussed below or is found, or throughout this manual under the appropriate topic. Not all areas are discussed in full and may require some mechanical background to check and diagnose.

### ***Electrical***

- ✓ Switch on-off
- ✓ Cable of the spark plug is connected and secure
- ✓ Kill switch wire is in good condition and improperly grounded with the frame
- ✓ Spark plug is in good condition, clean, and gapped properly. Remove and inspect / replace
- ✓ Battery is fully charged, and all electrical connections are secured
- ✓ Insufficient spark. Remove spark plug from the cylinder. Plug the spark plug wire back on to the spark plug. While holding the plug by the wire, place the electrode near the metal part of the frame @ 1/8 -1/4" away and have an assistance try starting the motor. Note the strength of the spark across the gap between the electrode and the frame. You should have a blue spark.
- ✓ Coil wire is loose / faulty or grounded Check the coil grounding wire from the coil to make sure it is not touching metal.
- ✓ Coil gap is improperly set (set to 0,35-0,4 mm)

## **Fuel**

- ✓ Fuel arrives correctly from the tank to the carburetor. Check supply lines to ensure fuel is making it to the carburetor intake. (See **Starting Sequence**.)
- ✓ Flooded engine (See **Flooded Engine**)
- ✓ Carburetor is properly tuned (See **Tuning Your Carburetor**)
- ✓ Dirty or stuck automatic decompressor valve (See **Decompressor Stuck / Dirty**)
- ✓ Vapor Lock in fuel system (See **Fuel System Vapor Locks**)
- ✓ Carburetor pop off pressure set improperly (See **Adjusting the Carburetor Pop Off Pressure**)

## **Flooded Engine**

A common mistake is to prime too much fuel into the carburetor, or flood the engine with fuel.

To determine if the engine is flooded remove the spark plug and inspect for a wet plug. The plug should have some fuel, but will not be saturated. There is a fine line between too much and just enough fuel. If fuel is reaching the plug, do not introduce more fuel by priming or squeezing the throttle.

**Note:** Do not squeeze the throttle during the starting sequence as in the event the engine does fire, it could rapidly accelerate causing injury.

If the engine was heavily flooded, you will have to remove the spark plug and dry it. Also you will need to clear the cylinder of excess fuel. Remove the spark plug, rotate the propeller by hand a few times and allow the engine to sit for a few minutes to evaporate some fuel in the combustion chamber.

Reassemble and try starting the engine again.

## **Decompressor Stuck / Dirty** Automatic Decompressors by Alex Varv:

How to check if the decompressor is stuck partially open.

### **Symptoms:**

- a) You will notice that in time you need more and more pulls to start the engine.
- b) Often, before the engine starts, you may hear popping noises in the exhaust.

### **Remedy**

- 1) Remove the hose clamp on the vacuum line attached to the nipple of the decompressor.
- 2) Remove the decompressor using a 15mm thin walled long socket that will fit on the body of the decompressor. Do NOT try to remove the decompressor by the nipple as all you achieve will be a broken nipple. Do NOT lose the brass washer on the decompressor.
- 3) Spray WD 40 or a suitable carburetor cleaner with a straw in every orifice you see. Spray inside the small hole of the nipple (watch your eyes!!!). Alternately you may use carburetor cleaner and an air-compressor to remove debris.
- 4) Move the valve (mushroom) in and out, until it travels free.
- 5) To check if you cleaned correctly, attach a hose to the nipple and apply suction. The valve should close. Release the suction and the valve should open.
- 6) To install, apply some gasket dressing on the threads (Permatex Form a Gasket 2B) and let it become tacky then re-install the decompressor. Torque it to exactly 1,9 KgMeter.
- 7) Re-attach the vacuum hose and install the hose clamp. **Note:** Over tightening may result in crossing the threads and you will have to install a helicoil in the cylinder head or replace the head.

## **Mechanical**

- ✓ **Loose Belt** (See **ADJUSTING THE REDUCTION BELT DRIVE TENSION**)

If you find your engine is difficult to start after a few hours of operation (3 hours or more) a slipping reduction belt can be the cause. Instructions for checking and adjusting belt tension are found in **MAINTENANCE** section.

### **THE ENGINE DOES NOT HOLD IDLE SPEED OR HAS AN IRREGULAR SPEED**

- ✓ Dirty or incorrectly adjusted carburetor. Clean and adjust the carburetor (see **Tuning Your Carburetor**)
- ✓ Belt tension loose. (See **ADJUSTING THE REDUCTION BELT DRIVE TENSION**)
- ✓ Partial Vapor Lock (See **Fuel system Vapor Locks**)
- ✓ Reed Petals do not close properly . Remove the reed valve petals and hold up to a light. You should not see any light past the petal seating area. Adjust or replace if damaged.

### **THE ENGINE CANNOT REACH MAXIMUM SPEED**

- ✓ Check cable pulling throttle fully open.
- ✓ Check the spark plug; is it's worn, change it with one of the same brand and same heat range.
- ✓ Partial Vapor Lock (See **Fuel system Vapor Locks**)
- ✓ Check that there is no dirt in the carburetor or tank-filter nor restrictions in the fuel line due to too tight curves, or air bubbles.
- ✓ Dirty cylinder head. In case the head is dismantled to be decarboned, change both the head gasket and the cylinder base gasket.

### **ENGINE RUNS LEAN REGARDLESS OF CARBURETOR ADJUSTMENT** by Alex Varv

If you find your engine is running hot despite turning the HI and LO screws toward the rich side, this is likely caused by a dirty carburetor filter. Contaminants in the filter prevent enough fuel mixing with the air forcing a lean condition. To reach these filters, you will need to remove and disassemble the carburetor. (See the Walbro Carburetor Manual)

**NOTE:** The round screen is on the fuel pump side.

1. In order to clean the carburetor you should remove all the membranes, HI and LO screws, needle valve etc.
2. Use a high quality carburetor cleaner with the supplied straw attached to the can. Spray in the opposite direction of the fuel flow pushing the contaminants out the fuel inlet port. Aim the straw into the needle valve seat and spray toward the round screen. This way, you will remove the lint and debris. If you spray on the screen directly, you will push the lint further into the needle valve seat.
3. Spray into the HI screw orifice and look into the venturi to see if you have cleaner going through.
4. Do the same with the 3 primary pick-up holes under the half-moon shaped plate in the metering chamber.
5. Once per year, all carburetor membranes should be replaced and the carburetor thoroughly cleaned.

### **ADDITIONAL FUEL SYSTEM TROUBLESHOOTING**

**Fuel System Vapor Locks**, by Alex Varv.

A vapor lock is basically an air pocket/bubble restricting the fuel from reaching the carburetor. The carburetor pulls via a vacuum fuel from the supply tank. This air pocket prevents the flow of fuel.

#### **Diagnosing Vapor Locks.**

The easiest way to determine if you have a vapor lock is to inspect the fuel lines. Do you see air in the fuel hose?

Typical causes include:

- a) Vapor lock caused by a bad fitting inside the tank. Namely, the fuel pick up line is not secured well to the brass nipple.

- b) Vapor lock in the fuel line especially in the areas that the fuel line makes a loop. Fuel will flow smoothly and evenly with a straight path to the carburetor from the fuel tank. Additional bends / loops will only impede the fuel from being drawn to the carburetor.
- d) Vapor lock caused by a T line for the small primer bulb. T lines should NOT be put on the main fuel line. If you have a small primer bulb, the bulb should draw fuel directly from the tank.
- e) Vapor lock caused by a partially stuck open needle valve after the motor is shut down. Some fuel siphons back to the tank after engine shut down. An in-tank fuel filter with a check valve will help prevent this from happening. In addition, the needle valve must be tight in its seat
- f) Vapor lock caused by inappropriate securing of the fuel line. Excessive vibrations in the fuel line may cause the gas to evaporate in the line and cause a vapor lock.
- g) Vapor lock caused by a too big fuel filter or fuel filter is improperly installed (horizontal). Fuel filters should be installed in a vertical position

### Adjusting the carburetor Pop Off Pressure by Alex Varv

Many carburetor problems can be attributed directly to an incorrect pop-off pressure.

In order to function properly, any membrane carburetor needs a well set pop-off pressure.

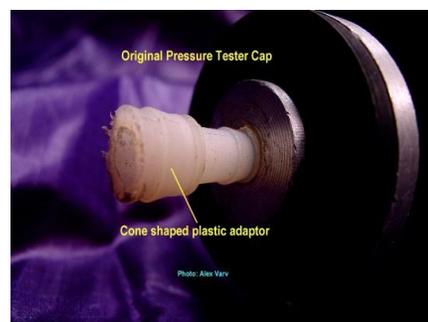
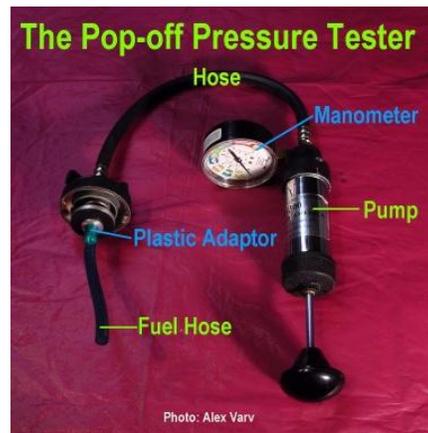
The pop-off pressure is the pressure at which the needle valve will open thus letting the fuel to enter the metering chamber. HI and LO screws do control the mixture of fuel and air, but if the pop-off pressure is also a key factor. Set too high, it can lead to fuel starvation especially at high RPM. Such a situation will cause engine overheating and possibly lead to an engine seizure. Set too low, the carburetor will have a flooding tendency especially at low and mid RPM. It can also cause difficulties in restarting a warm engine.

The pop off pressure can greatly vary between each manufactured carburetor.

The Cors-Air engine works best with the pressure not between 10 and 11psi. This value is just a general guide. Altitude, temperature and other specific factors (airbox or air filter) can affect carburetor performance. However the above values will satisfy the average pilot.

A simple but very accurate gauge can be constructed using an automotive cooling system pressure tester found in most automotive supply stores. Additionally, some stores allow renting of pressure testers that can easily be fitted with a small piece of fuel hose to make a connection to the carburetor.

To build your pressure tester you simply need to add a plastic adaptor and a short length of fuel hose to connect the pressure tester to the carburetor.

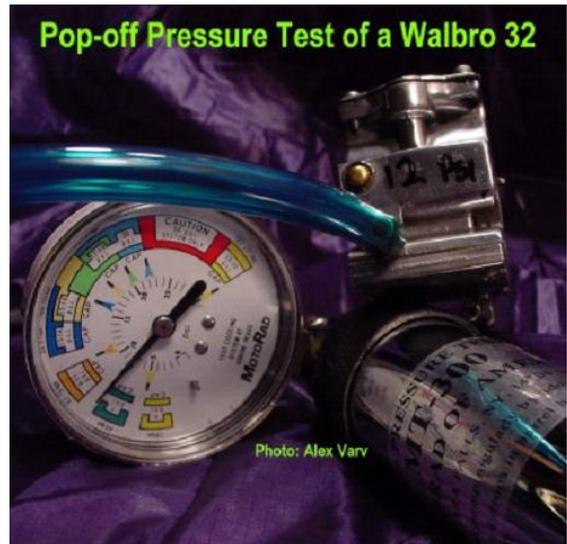


The plastic adaptor is conical and was sealed in the cap with Loctite.

### Pop-off pressure testing

Before testing we must make sure that the carburetor is "wet" inside. If it was overhauled, before testing, it will need to have fuel added inside otherwise the pressure value will not be accurate.

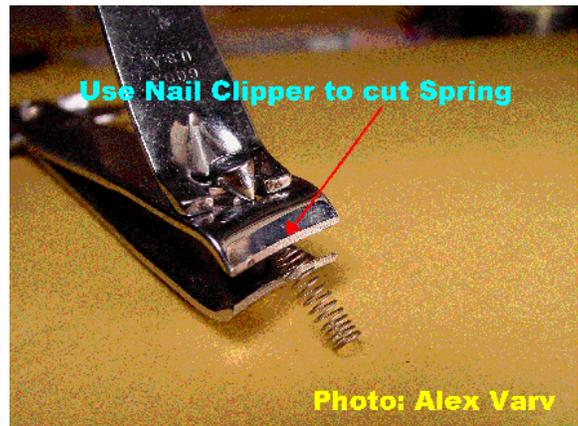
- 1) Prime the carburetor before testing.
- 2) Connect fuel hose to the fuel inlet of the carburetor.
- 3) Start pumping until 8 Psi of pressure is achieved.
- 4) Stop pumping and verify the pressure holds at this level. If the pressure holds, the needle valve closed tight as expected. This photo shows a Walbro connected to the tester holding at 8psi and the hose connected to the inlet side of the carburetor.
- 5) Next, increase pressure slowly until a sudden drop is noticed. This means that the needle valve opened. The value at which it opened is the pop-off pressure. Note: The needle valve when opening will bleed off pressure till the valve closes again and the pressure stabilizes.



### Decreasing the pop-off pressure

If the pop off pressure is too high, we need to weaken the spring used to regulate the pressure. As Walbro repair kits do not contain a spring, we can achieve the same affect by shortening the spring by cutting off one turn at a time. This is a very delicate operation and as the operator will see, removing only one turn can make a big difference. After this first "adjustment" the spring needs to be reinstalled, the carburetor assembled and a new pop-off pressure measurement performed.

If the pressure is still too high, we can cut another turn.



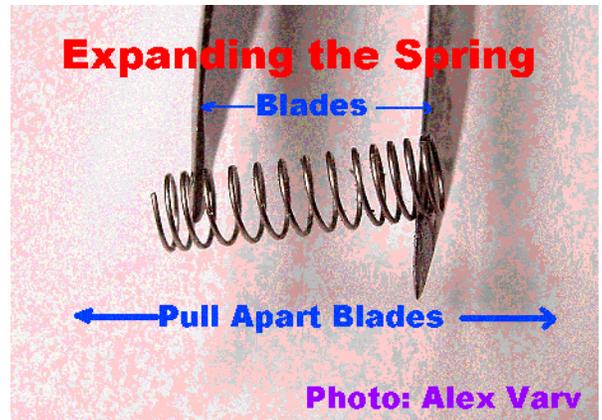
**Note:** Ideally we should have different tensioned springs. However if done carefully the above method will be satisfactory.

### Increasing a too low pop off pressure

In order to increase the pressure we need to use a stronger spring or very carefully expand the existing one. This operation needs to be done in very small increments; otherwise you will end up with a very high pressure.

- 1) Remove the spring and mark its length on a ruler or use calipers to determine its current length.
- 2) Gently expand the spring by grasping at both ends and pulling the spring longer.

Use caution as it is better to err on the short side then to make the spring too long. Expanding and then cutting the spring a few times will weaken it and you will end up with an erratically working carburetor. If possible, different springs, giving different pop-off pressures should be used till a suitable pressure is found.



## MAINTENANCE AND PARTS

### Checking the Engine / Preventive Maintenance

The following preventive maintenance will ensure long life for your Black Devil engine. Please follow the specifications in this manual when doing maintenance.

#### Every 20 hours:

- Check the spark plug condition and gap (0.7 mm)
- Clean the air-filter, the carburetor filter placed at the end of the fuel pipe, and the filter of the fuel tank
- Check the torque of every bolt
- Tighten head nuts (in cross order) with a Torque Wrench at 2.2 Kg.meter (22Nm)
- Check the reduction belt tension and belt condition
- Check fuel lines
- Check the wiring
- Check that the cord of the starter for wears and tracking
- Grease the link-sphere between the manifold and the exhaust pipe with lubricating copper-grease suitable for high temperature (up to 1100°). If you can't find it on the market, please ask your dealer.

#### Every 50 hours

- Repeat the 20 hours maintenance adding:
- Check the torque of the engine's crankcase nuts
- Change spark plugs
- Change the petals of the reed valve
- Check the reduction belt and the play of the pulley and change them if needed
- Check the conditions of the starter gears (version with electric start)
- Once a year (independently from flight hours) change the carburetor diaphragm.

**Note:** It is advisable to keep records of all maintenance in an engine log book.

## ADJUSTING THE REDUCTION BELT DRIVE TENSION

Maintaining proper belt tension is important for prolonged belt life, ease of starting, getting the most power from your engine, and good engine operation.

All belt driven engines (that use the poly "V" belt) need a belt readjustment after a few hours.

If the belt slips, the engine will be very hard to start as the additional torque the propeller causes is used to increase the compression of fuel.

After 2-3 adjustments the belt settles and will be maintenance free for many, many hours.

A belt which is "over tensioned" can do permanent damage to the bearings inside of the pulley hubs and drive shaft. Therefore we strongly suggest you carefully follow these instructions.

Remember "these are Fine adjustments" and we suggest you do NOT rotate the cam any more than 1 mm per adjustment. After each adjustment you can try to start the engine and check the result. If the engine does not start, it usually means the belt is still too loose and is slipping - in this case repeat the operation by tensioning the belt another 1 mm. Consider that if the belt slips a little, but the engine still starts fine, then the tension is correct. Belt tension always increases automatically when the engine is running because of thermal expansion in the pulleys. Once you have found the correct tension, do not adjust it any further. In case of doubts please contact your paramotor dealer or JPX Italia.

To adjust the belt:

1. Before adjusting the belt take a felt pen or marker and make a small mark on the cam shaft and on the front of the reduction plate. This will be your Zero mark or starting point. From here you will be able to clearly see how much you move the eccentric tensioning cam in relation to the reduction plate.

2. Loosen the safety bolt located high up behind the reduction mounting plate and the side bolt. Once these are loose, you can turn the cam with an 27 mm size wrench - careful to observe the 1 mm increments.
3. Once you have finished turning the cam re-tighten the safety bolts. First tighten the back bolt by keeping firm hold on the cam with the 27mm wrench, and then the side bolt.
4. Check the belt tension and try starting the motor.
5. Repeat if needed, but do NOT over-tighten the belt.

### **IGNITION COIL / HANDWHEEL** (Hand Start engines only)

In case the coil and or the hand wheel must be changed, you are required to return the engine to your dealer or to a trained Cors-Air repairman. This operation can appear simple at first sight, but if performed incorrectly can alter the engine timing affecting performance and cause damage to the engine.

Timing setting distance between the coil and the flywheel magnet is 0,35 to 0,40 mm.

Note: the smaller the gap the stronger the spark will be, but too small a gap, a you run a risk that small magnetic particles can get between the armature of the ignition coil and the flywheel magnets. This may cause a NO SPARK situation and an engine out.

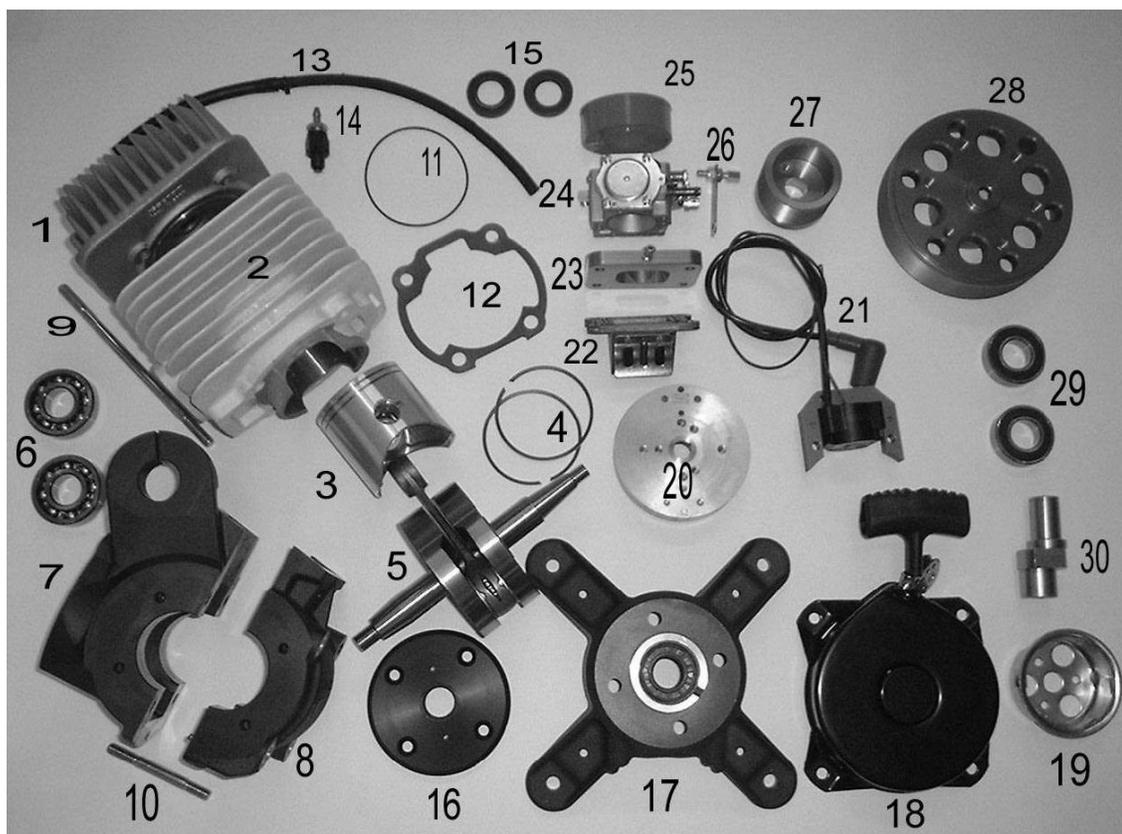
### **STORAGE OF THE ENGINE**

To properly store / winterize you Cors-Air engine:

1. Empty the fuel tank, including the fuel lines and the carburetor
2. Disassemble the battery (version with electric start)
3. Unscrew the spark plug and pour into the hole a teaspoon of oil for engines, then re-install the spark plug, but keep the spark plug wire disconnected.
4. Rotate the propeller slowly by hand for 2 or 3 times completely.
5. Remove the propeller and store horizontally in a controlled environment.
6. Loosen the reduction belt
7. Plug the hole of the exhaust pipe
8. Cover everything with a blanket and put it in a dry place
9. Once a month charge the battery and turn the pinion of the drive shaft turn by hand 2 or 3 times completely.

For more technical information, please visit [www.aerocorsair.com](http://www.aerocorsair.com) "The Inventions Page" where pilots from all around the world published articles on maintenance, improvements and safety issues. There you will find more extensive information that can be included in this Owner's Manual.

## CORS-AIR M 25 Y PARTS



- 1) HEAD
- 2) CYLINDER
- 3) PISTON complete with PISTON-PIN and LOCK
- 4) PISTON RINGS (N° pcs. 2 together with the piston)
- 5) DRIVE SHAFT COMPLETE with CONNECTING ROD
- 6) BEARING OF DRIVE SHAFT (n° pcs. 2)
- 7) HALF-CRANKCASE
- 8) HALF-CRANKCASE
- 9) TIE-ROD HEAD/CYLINDER (n° pcs. 4)
- 10) CRANKCASE STUD (n° Pcs.4)
- 11) GASKET OF THE HEAD
- 12) GASKET OF THE CYLINDER BED
- 13) JOINT DECOMPRESSOR with VALVE
- 14) DECOMPRESSOR
- 15) SEAL-RING OF DRIVE SHAFT (n° pcs. 2)
- 16) COVER OF BACK SUPPORT BASE
- 17) BACK SUPPORT BASE
- 18) STARTER
- 19) COUPLER FOR STARTER
- 20) HANDWHEEL
- 21) COIL
- 22) REED VALVE
- 23) FLANGE FOR CARBURETTOR BED

- 24) CARBURETTOR
- 25) FLANGE AIR FILTER
- 26) ADJUSTER FOR ACCELERATOR WIRE
- 27) \* PINION (50 or 52.2 mm)
- 28) \* PULLEY (115 or 130 mm)
- 29) BEARING OF REDUCTION PULLEY (n° pcs. 2)
- 30) CAM OF THE PULLEY

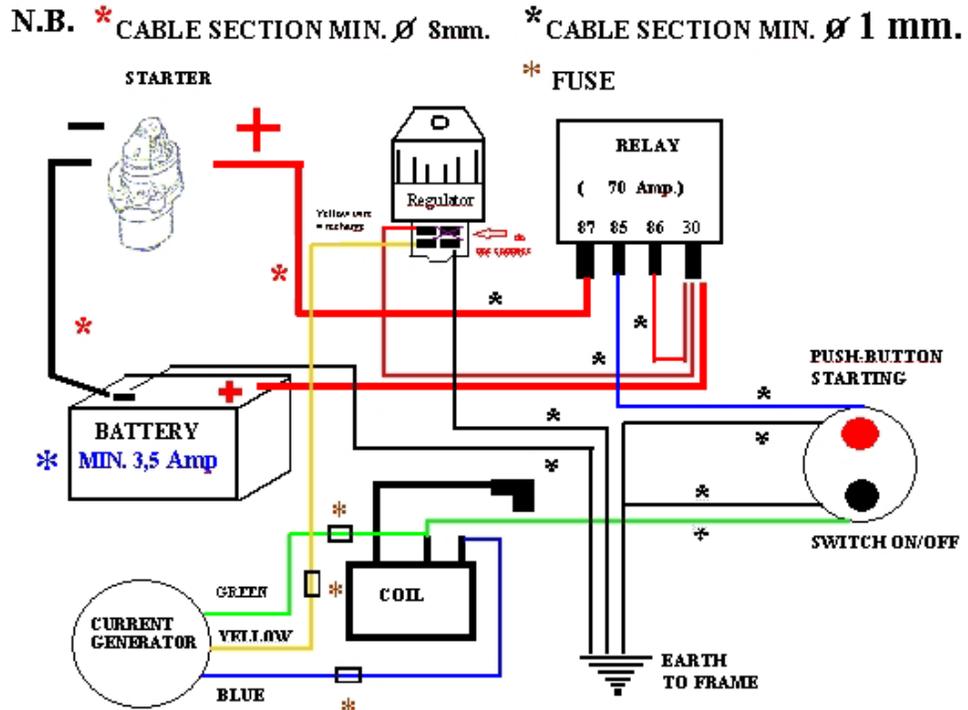
**Note:** BOLTS AND NUTS ARE NOT MENTIONED SINCE THEY ARE INCLUDED IN THE PACKAGE OF THE SPARE PARTS.  
\* FOR THE PIECES MARKED WITH AN ASTERISK PLEASE SPECIFY SIZE.

**CORS-AIR M 25 Y ELECTRIC STARTER PARTS**



- 31) DRIVE SHAFT complete with CONNECTING ROD
- 32) ELECTRIC STARTER
- 33) FLANGE FOR ELECTRIC STARTER
- 34) COVER OF BACK SUPPORT BASE
- 35) IGNITION
- 36) CHARGE REGULATOR
- 37) COIL
- 38) CROWN WHEEL complete with PINION

**ELECTRICAL SCHEMATIC** (Electric Start only)



## CORS-AIR M 25 Y / BLACK DEVIL SPECIFICATIONS

The Company reserves the right to make technical and aesthetic changes without notice in order to improve the quality of the product.

### TECHNICAL FEATURES

Cycle 2 strokes  
 Total displacement 172,5 c.c.  
 Bore 65 mm. Stroke 52 mm.  
 Compression ratio 11:1  
 Peak rpm 7.500 rpm  
 Cooling by air  
 Piston composed of light alloy with 2 piston ring of cast iron S10 Chromium plated  
 Cylinder Nickasil Coated lining  
 Head of die-casted light alloy with high percentage of silicon  
 Crankcase molten in alloy G –Al Si 9 UNI 3051  
 Connecting rod of steel 18 Ni Cr Mo 5 forged and copper- plated with rolls fit for high speed  
 Carburetor diaphragm  
 Feeding reed valve with 4 petals on the crankcase  
 Electronic ignition type CDI (electric version) type TCI (manual version)  
 Regulation of spark advance 18° at 7000rpm  
 Spark plug NGK B9ES  
 Reduction with belt Poly-V from 1 to 2.2 to 1 to 2.6  
 Cylinder head temperature max 200°C / 392°F  
 Fuel mixture of premium petrol 98 octane OR AVGAS 100LL and oil at 2%  
 Oil synthetic top-quality oil for 2-strokes engines  
 Expenditure from 2,5 to 4,5 liter/hour depending from the load and the speed  
 Fixing to the frame 5 rubber anti-vibration mounts  
 Rotation counterclockwise in front of the propeller

### MAIN TORQUES

	<b>Kg, M</b>	<b>(NM)</b>
DECOMPRESSOR (only hand start version)	2.0	20
NUTS TO FIX THE HEAD	2.2	22
NUTS TO FIX HALF-CRANKCASE	2.5	25
BOLTS TO FIX THE BACK FLANGE TO THE CRANKCASE	2.0	20
NUTS TO FIX THE PINION TO THE FRONT PART OF THE DRIVE SHAFT	4.5	45
NUTS TO FIX BACK PART OF DRIVE SHAFT TO IGNITION HANDWHEEL (manual version)	3.5	35
NUTS TO FIX BACK PART OF DRIVE SHAFT TO IGNITION HANDWHEEL (electric version)	1.2	12
GAP BETWEEN COIL AND HANDWHEEL	0.4mm	

### EGT PLACEMENT:

The EGT probe must be installed from 80 to 100 mm maximum from the piston. Keep in mind that the piston is already 45 mm away from the manifold where your exhaust bolts to the cylinder head. From the beginning of the manifold, measure out 45mm (@1.75 inches) and install you EGT probe into the center of the exhaust pipe. Do not allow the probe to contact the opposite side to ensure a correct temperature reading. Follow the probe manufactures installation instructions.

## **WARRANTY**

CORS-AIR engines are manufactured with top-quality material; therefore the warranty is valid for the engine and also JPX ITALY accessories.

### **DURATION OF WARRANTY**

1 YEAR beginning from the date of sell or exit from JPX ITALY Warranty includes spare parts and labor, transport excluded.

### **WARRANTY IS VOID IN THE FOLLOWING SITUATIONS:**

- Alterations to the engine not approved by JPX Italia.
- Wear & tear of components of the engine due to the instructions within the product manual not being adhered to.
- Accidental falls or dropping of the engine or its components.
- Overheating and seizure of the engine due to prolonged high speed running of the engine, running with excessive loads, running with inadequate loads, running with insufficient oil in the petrol, an incorrectly tuned carburetor, or running with petrol only (oil mixture omitted).
- The presence of dirt, sand or foreign bodies in the carburetor of the engine.
- Corrosion through bad storage of the engine or inadequate preparation for storage of the engine.
- Running the engine without an air-filter fitted to the carburetor.
- Miss-assembly of engine parts or components not assembled by JPX Italia but by the manufacturer of the paramotor or by the end user, supplied disassembled for packing and transport purposes.
- Corrosion of the engine or components emanating from stone chips or any other impact or abnormal stress damage.
- Work other than the maintenance set out in the product manual having been carried out on the engine by anyone other than JPX Italia or official dealers.
- Incidental or consequential loss or damage.
- Service bulletins from JPX Italia not having been adhered to.
- Engine used for racing.

**JPX ITALY AND ITS RESELLERS REMAIN AT YOUR DISPOSAL FOREVERY INFORMATION AND ADVICE ABOUT THE USE OF THE ENGINE.**

This document was revised and edited by Michael Altman.  
Special thanks go to the following resources: JPX ITALIA, Alex Varv