



**USER'S MANUAL ENGINE
BLACK DEVIL LIGHT
Hand start, electric and clutch version**



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INTRODUCTION

Thank you for choosing our engine the CORS-AIR M 25 Y. We invite you to spend some time reading this manual, which will let you discover all the features of your engine. Advices on maintenance and operation will help you to have a reliable engine and to preserve your investment. Furthermore, we invite you to deliver this manual together with the engine if you 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 YOUR AND THE OTHER PEOPLE'S SAFETY IS THE MOST IMPORTANT THING FOR US.

IDENTIFICATION OF THE OWNER

Owner

Address

Serial number

Reseller

Address

Owner's signature

Reseller's signature and stamp

Date of sale

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

BLACK DEVIL -M25Y

CYCLE	TWO STROKE
TOTAL DISPLACEMENT	172,5 c.c.
BORE	65 mm.
STROKE	52 mm.
COMPRESSION RATIO	11:1
COOLING	BY AIR
PEAK RPM max.	8.000 / 8200 RPM
PISTON	WITH TWO PISTON RINGS
HEAD	IN ALLOY WITH HIGH PERCENTAGE OF SILICONAN HEMISPHERIC COMBUSTION CHAMBER, WITH SQUISH
CRANKCASE	MOLTEN IN G-AL Si 9 UNI 3051 ALLOY SUBSEQUENTLY TREATED AND ANODIZED AGAINST SEA SALT
CONNECTING ROD	IN COPPER PLATED STEEL 18 Ni Cr Mo5 JOINED TO THE DRIVE SHAFT THROUGH VERY PRECISE HIGH SPEED SILVER-PLATED ROLLER BEARINGS
CARBURATOR	DIAPHRAGM
FEEDING	SIX BLADE REED-VALVE SYSTEM CONNECTED TO THE CRANKCASE
ELECTRONIC IGNITION	CDI (ELECTRIC VERSION)
SPARK PLUG	NGK BR9ES OR SIMILAR
SYSTEM	SIX PORT DISTRIBUTION
CYLINDER	IN ALLOY WITH NIKASIL COATING
REDUCTION	WITH POLY V BELT AVAIBLE IN 1:2.2- 1:2.3—1:2.5—1:2.6—1:2,88
CYLINDER HEAD TEMPERATURE	MAX TEMPERATURE 230°C MEASURED UNDER SPARK PLUG EXHAUST GAS TEMPERATURE NOT EXCEEDING 590 C°
ENGINE MOUNTING	BY 5 SHOCK ABSORBING RUBBER MOUNTS
ROTATION	COUNTERCLOCKWISE
DRIVE SHAFT	IN 18 Ni Cr Mo5 WITH 5 THERMIC TREATMENTS ON EVERY COMPONENT
ROLLER BEARINGS	FIT FOR HIGH SPEED CLASS C3
SEAL RING	IN VITON WITH VERY HIGH RESI STANCE AND LONG DURATION
FUEL	MIXTURE 2,2% - 2.5% WITH SYNTHETIC OIL, SUGGESTED BRANDS: MALOSSİ 7.1—WLADOIL K2T—ELF 2T MOTO
OIL	2,2% - 2.5% TOP QUALITY OIL 100/100 SYNTHETIC
ENGINE WEIGHT	HAND START KG 13,7 EXHAUST INCLUDED
	ELECTRIC START KG 14,2 EXHAUST INCLUDED
	HAND START WITH CLUTCH KG 14,4 EXHAUST INCLUDED

MAIN TORQUES

MAIN TORQUES	Kg. m	(Nm)
NUTS TO FIX THE HEAD	2,5	25
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	0,4 mm	

IMPORTANT: remember that the battery of the electric start should be recharged before starting the engine.

In case LiPo batteries are used, detach the recharge wire (yellow) and follow all safety precautions for LiPo batteries use.

ASSEMBLY:

You can install the engine on the frame by using 4 rubber mounts of 40 mm between the back flange and the engine mount.

To attach the propeller use only bolts of class 10/8 (100 Kg) and make sure that their length is enough to exit from the reductor-pulley. Tighten the 6 bolts M8 in a cross, at 1.5 Kg.m.(15Nm). Re-check the torque of the bolts after the first hour of engine's working.

We suggest not to use a variable pitch carbon prop, because the big hub pushes the prop too forward, with possible damages to pulley and bearings.

For the connection between the carburetor and the fuel tank use a proper hose of the right diameter (1,2 times the max. expenditure per hour, that means sending 11 liters/hour). The length of the fuel line must not be more than 80 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 carburettor, protecting in this way the battery.

IMPORTANT NOTES

DO NOT try to start the engine without the propeller.

DO NOT start the engine with loose bolts or parts, since this can cause the detaching of the propeller, the ovalization of the propeller holes, the damage of the electric start and the breakage of the rubber mounts.

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

Verify that there are no damaged electric wires, that there are no leaks from hoses, tank, carburettor or engine's crankcase, that the propeller is not damaged or loose, that the exhaust-pipe has no cracks, that the frame is not bent or broken because of falls, that rubber mounts are not cracked, that the reduction belt is not loose and every bolt is tight. Finally you can start the engine, leaving it to warm up at a speed of 2.200 to 3.000 rpm with head temperature at least 120 °C.

FUEL

Use for the mixture only premium gas for cars 98 octane, together with good-quality, synthetic oil for mixtures at a quantity of 2,2% - 2,5% .(DO NOT USE MIXTURE ALREADY DONE AT PETROL PUMPS). IMPORTANT: with very hot climate and high temperatures use PERCENTAGE 3%.

When you prepare the mixture, make sure that the can has not dirt or water in it, put always the oil first and mix thoroughly.

Never run the engine without the air-filter, because dirt and dust raised by the propeller can damage it.

ADJUSTMENT OF THE CARBURETTOR

The carburettor has two mixture adjustment screws, 1 marked L adjusting low speed and 1 marked H for high speed.

In order to make the adjustment, gently tighten clockwise then unscrew: L screw from 40 to 50 minutes, H screw from 1,30 (one hour and 25 minutes) to 1,35 (one and 35

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CARBURETOR SETTINGS	BLACK DEVIL LIGHT engine (all configurations)
L screw	40 / 50 minutes
H screw	1 hour + 30/40 minutes

These adjustments can be different on the basis of weather conditions and flight altitudes.

Ideal mixture is reached when the insulator of the spark plug is coffee brown; if the colour is black, the mixture is too rich, therefore turn screw H clockwise 1/8 round per time. If the spark plug is grey/white, the mixture is lean, therefore turn screw H and L counterclockwise always 1/8 round per time. If you can't calculate 1/8 round, you can use as an example a watch and turn 5 minutes per time. Remember that if the mixture is too lean, **THE PISTON CAN SEIZE**. You can see better the colour 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.

RUNNING-IN

All CORS-AIR engines, before being delivered, are subject to a severe quality-check, in order to verify if all the components respect the fixed parameters, but a further running-in is anyway necessary. **A GOOD RUNNING-IN WILL PROLONG THE LIFE OF YOUR ENGINE.**

Go to a quiet place, put a thick rubber carpet under your craft to avoid that stones or other things damage the propeller by putting it on earth and let the engine work at a speed of 2500 rpm for 5 minutes, then regulate speed at 3000/3500 rpm for 15 minutes, then at 4000 rpm for other 15 minutes. Switch off the engine and check that there are no loose nuts or bolts and that every component is ok. **BE CAREFUL NOT TO TOUCH HOT PARTS (POWER UNIT AND EXHAUST PIPE).** Start the engine again and take it step by step to 4000 rpm for 5 minutes, then accelerate to 4500 rpm for 15 minutes. During the first 10 hours, do not subject the engine to extreme efforts and speed. Also during normal use excessive loads (ex. tandems with passenger) can force the engine with possible damages to the engine itself. **ALWAYS CHECK** at sight your craft before and after every flight, for loose parts or damage. After each flight, in the version with decompressor, clean the head from possible oil residues. During the run-in period vary the power often for a proper piston ring setting.

MAINTENANCE

AFTER THE FIRST HOUR OF RUNNING, CHECK THE BELT TENSIONING AND IN CASE RE-TENSIONING IT.

AFTER THE FIRST 2 HOURS, TIGHTEN HEAD NUTS (IN CROSS ORDER) WITH A TORQUE WRENCH AT 2.2 Kg.m (22Nm).

AFTER THE FIRST 3 HOURS OF ENGINE RUNNING MAKE A NEW BELT CHECK UP AND IN CASE RETENSIONING IT.

- Every 20 hours:

Check the condition and gap (0.7 mm) of the spark plug

Clean the air-filter, the carburettor filter placed at the end of the fuel pipe and the filter of the fuel tank

Check the torque of every bolt

Check the tension and condition of the reduction belt

Check fuel lines and wiring

Check that the cord of the starter has no abrasions

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 to your dealer.

- Every 50 hours

Same controls of the 20 hours and furthermore:

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 in case of need

Check the conditions of the starter gears (version with electric start)

Once a year (independently from flight hours) change the diaphragm of the carburettor.

N.B. It is advisable to keep records of all maintenance in a log book for the engine. It is also advisable to install an instrument (CHT) to control the head temperature at sight.

TENSION OF THE REDUCTION BELT DRIVE - USE CAUTION

Attention: 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 for you to follow carefully these instructions.

Before adjusting the belt take a felt pen or marker and make a small sign on the cam shaft and on the front of the reduction plate. This is your Zero or start point and from here you will be able to clearly see how much you move the eccentric tensioning cam in relation to the reduction plate. Remember “these are Fine adjustments” and we suggest not to 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 well then 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 more. In case of doubts please contact your paramotor dealer – or CORS-AIR.

To adjust the belt do the following:

Loosen the safety bolt located high up behind the reduction mounting plate and the side bolt. Once these are loosened the you can turn the cam with a n.27 mm size wrench - careful to observe the 1 mm increments. Once you have finished turning the cam remember to re-tighten the safety bolts, first the back bolt, by keeping firm the cam with the wrench, and then the side bolt.

IGNITION (ONLY FOR ENGINE WITH HAND START)

In case the coil and/or the handwheel must be changed, it is compulsory to turn to your dealer or to trained personnel, even if this operation can appear simple at the first sight, since the timing of the engine, if wrong, can change the performance and cause damage to the engine. To check the timing: the distance between the coil and the flywheel magnet is 0,30-0,35 mm.

STORAGE OF THE ENGINE FOR A LONG TIME

In case the engine is not used for a long time, act like this:

Empty the fuel tank, included the fuel lines and the carburetor

Disassemble the battery (version with electric start)

Unscrew the spark plug and pour into the hole a teaspoon of oil for engines, then re-install the spark plug letting the propeller turn slowly by hand for 2 or 3 times completely.

Disassemble the propeller

Loosen the reduction belt

Plug the hole of the exhaust pipe

Cover everything with a blanket and put it in a dry place

Once a month charge the battery and let the pinion of the drive shaft turn by hand 2 or 3 times completely.

WARRANTY

CORS-AIR engines are manufactured with top-quality material, therefore warranty is valid also for their accessories.

Warranty includes spare parts and labour, transport excluded.

For any defective part, please contact your reference authorized dealer or Cors-Air directly, so that you can get proper indications about how to handle it.

DURATION OF WARRANTY

1 YEAR beginning from the date of sell or exit from CORS-AIR

WARRANTY IS VOID IN THE FOLLOWING SITUATIONS:

- Alterations to the engine not approved by Cors-Air.
- 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 (for a wrong tuning of the carburettor) or running with petrol only (oil mixture omitted).
- The presence of dirt, sand or foreign bodies in the carburettor 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 carburettor.
- Miss-assembly of engine parts or components not assembled by Cors-Air but by the manufacturer of the paramotor or by the end user, supplied disassembled for packing and transport purposes, included all electrical or electronic components.
- 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 Cors-Air or official dealers.
- Incidental or consequential loss or damage.
- Service bulletins from Cors-Air not having been adhered to.
- Engine used for racing use.

CORS-AIR AND ITS RESELLERS REMAIN AT YOUR DISPOSAL FOR EVERY INFORMATION AND ADVICE ABOUT THE USE OF THE ENGINE.

TROUBLE SHOOTING

THE ENGINE DOES NOT START

Check:

- switch on-off
- cable of the spark plug
- correct spark plug gap
- all the connections of the electric plant
- that fuel arrives correctly from the tank to the carburettor

FLOODED ENGINE

Dismantle the spark plug and dry it well ; before re-assembling it, let the propeller turn slowly 2/3 times.

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

Clean and adjust the carburettor. Check the reed valve petals are closing completely. Hold the reed up to a light and you should not see any light past the petal seating area.

THE ENGINE CANNOT REACH MAXIMUM SPEED

Check cable pulling throttle fully open.

Check that there is no dirt in the carburettor or tank-filter nor restrictions in the fuel pipe, due to too tight curves, or air bubbles.

Check the spark plug; is it's worn, change it with one of the same brand and same heat range.

In case the head is dismantled to be decarboned, change both the head gasket and the cylinder gasket.

THE DECOMPRESSOR REMAINS BLOCKED

Detach the rubber tube on the decompressor and inject inside 1 or 2 drops of detergent. Detach the spark plug cap and let the prop turn. If this is not enough, disassemble the decompressor with a tube wrench of 15, modified in the external diameter with a lathe. Remove encrustments from the decompressor and by reassembling it, tighten it at 2 Kg/M or 20 Nm with a dynamometric wrench.

SOME FINAL IMPORTANT ADVICE

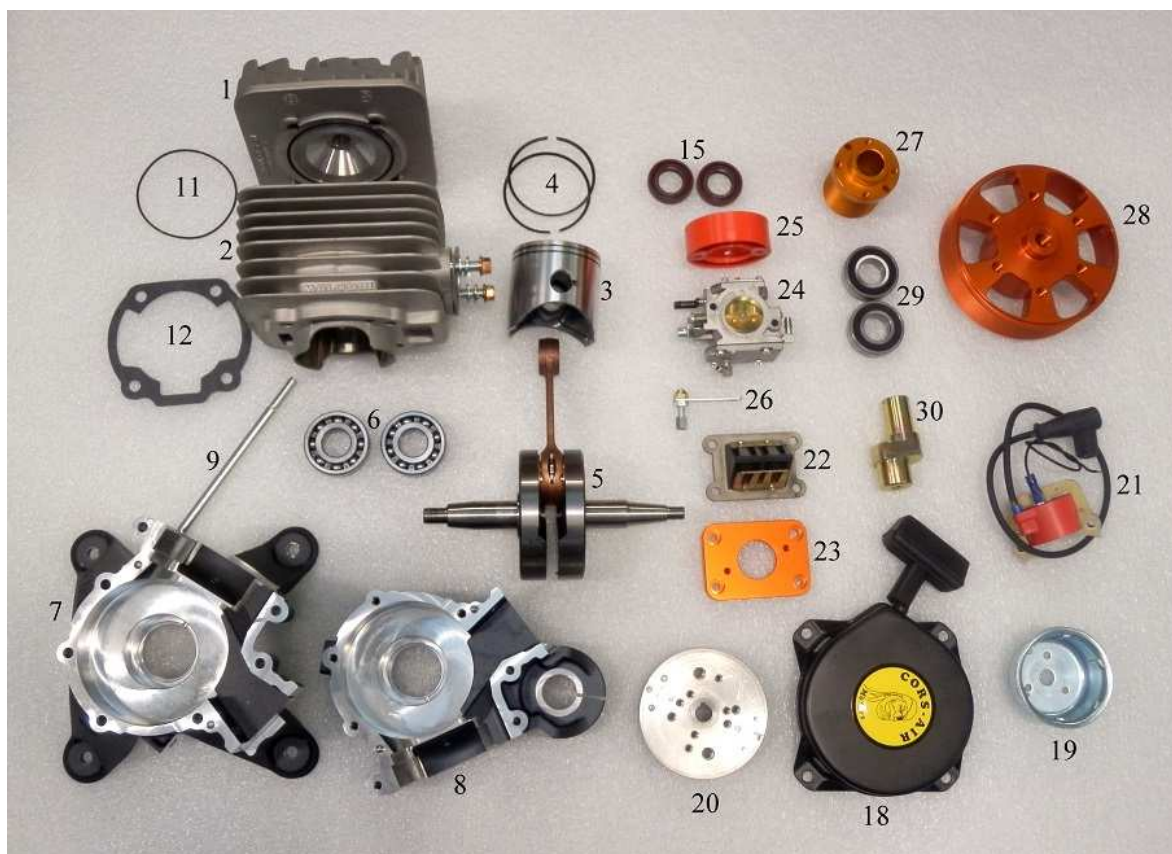
NEVER switch on the engine with people near propeller, or to sides. The **BREAKAGE** of a propeller can cause very severe hurts even several metres away.

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

If you use big propellers, **REMEMBER** that cooling is not perfect flying at high speed, so keep under control the temperature of the engine with proper instruments (CHT). In addition, dismantle the propeller at regular intervals and check that it is perfectly balanced, since an unbalanced propeller, even slightly, creates micro-vibrations which are not felt by the pilot, but can damage seriously parts of the engine with consequent breakages. Please do **NOT** forget that the propeller has mass and a considerable inertial moment, so it's advisable not to vary suddenly the RPM of the engine, both in flight and on the ground. These sharp and violent stresses could cause damages to the reduction, to the engine, to the belt and also possible deformations to the fixing holes of the propeller.

Once you have found the perfect carburation, **DO NOT** modify it unless you change flying place going to much higher or lower altitudes or unless climate and temperature are very different from the ones where you fly usually.

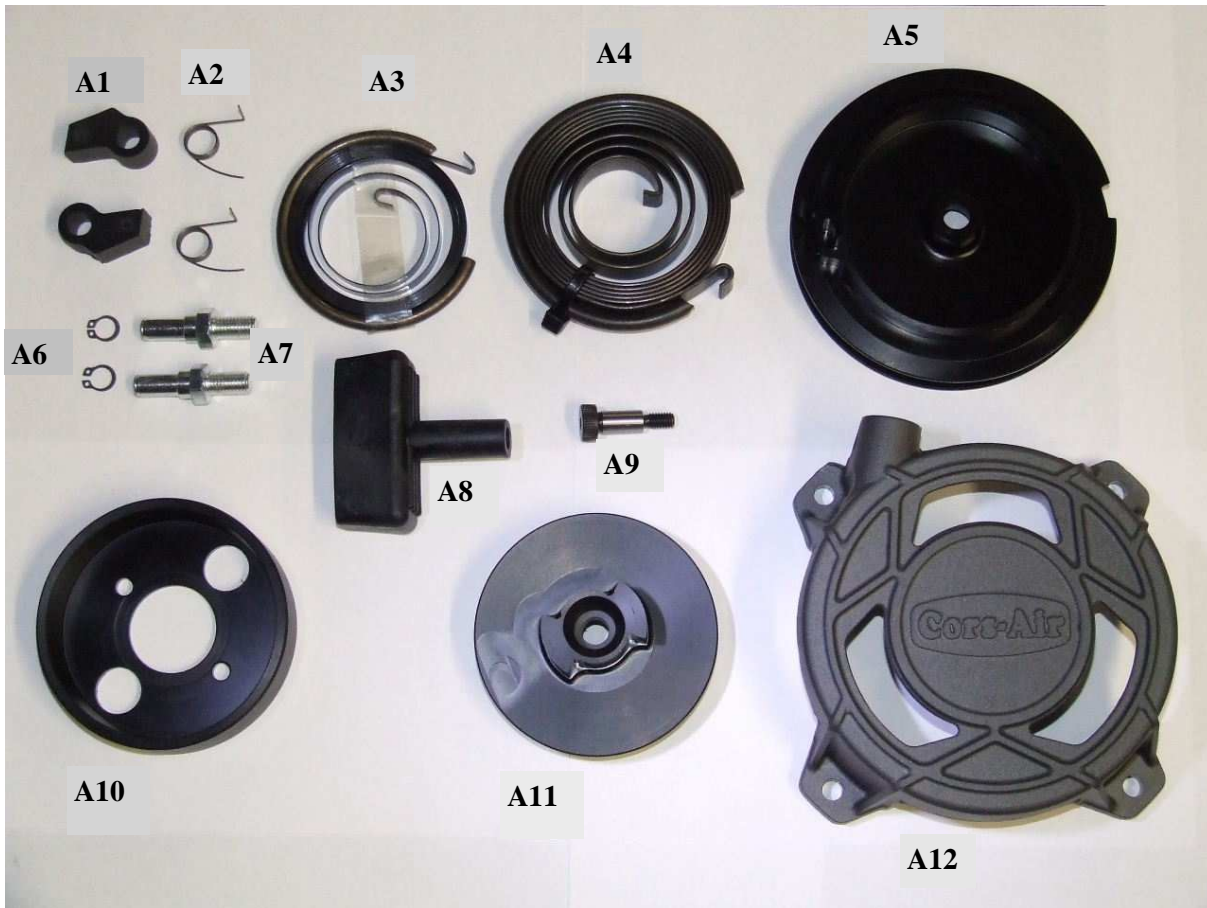
DO NOT FLY in bad weather conditions, you'll fly the day after. **REMEMBER: FLIGHT IS FOR FUN, NOT FOR RISKING YOUR LIFE! HAVE A GOOD FLIGHT AND ENJOY YOURSELF.**



- 1) HEAD
- 2) CYLINDER
- 3) PISTON COMPLETE OF PISTON-PIN AND LOCK
- 4) PISTON RINGS (N° 2 pcs. together with the piston)
- 5) DRIVE SHAFT COMPLETE OF 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

N.B. BOLTS AND NUTS ARE NOT MENTIONED SINCE THEY ARE INCLUDED IN THE PACKAGE OF THE SPARE PARTS.

COMPONENTS FOR RECOIL STARTER AND CLUTCH FOR M25



A1— STARTER DOGS (2 pcs.)
 A2—DOGS SPRING (2 pz.)
 A3—RECOIL SPRING
 A4— BIG SPRING
 A5—STARTER PULLEY
 A6- SEEGER

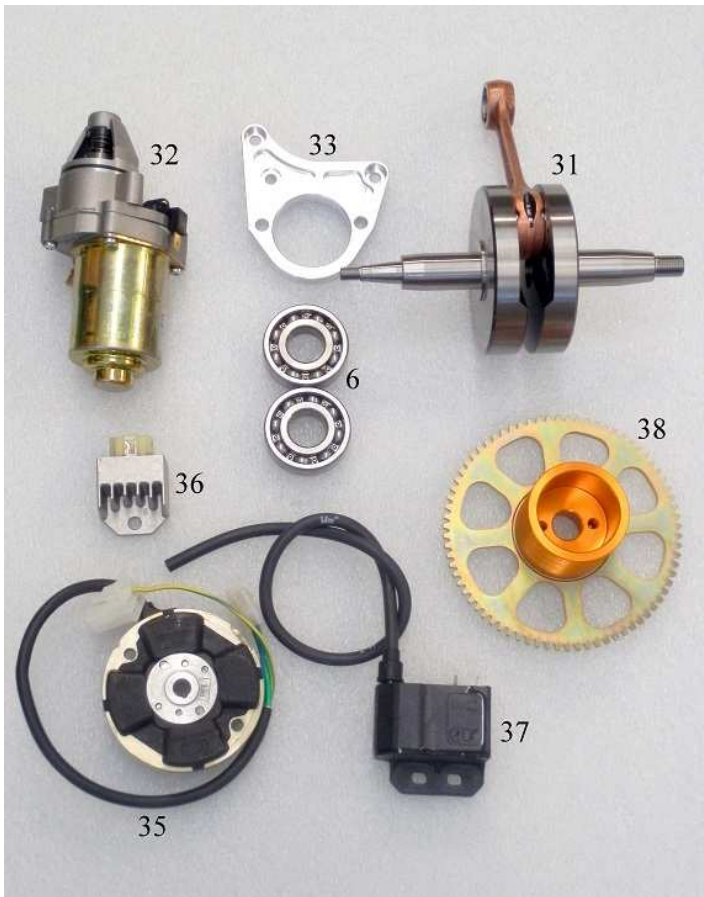
A7- DOGS PIN (2 pz.)
 A8—STARTER HANDLE
 A9—TUGGER BOLT
 A10—SPRINGS BOWL
 A11—TUGGER
 A12—STARTER COVER



F1—CLUTCH
 F2—WASHER
 F3—SEEGER
 F4—BEARINGS

F5—SPACER
 F6—HUB
 F7—CLUTCH BELL

PARTS FOR M25 BLACK DEVIL WITH ELECTRIC START



31) DRIVE SHAFT COMPLETE OF
CONNECTING ROD

32) ELECTRIC STARTER

33) FLANGE FOR ELECTRIC STARTER

34) COVER OF BACK SUPPORT BASE

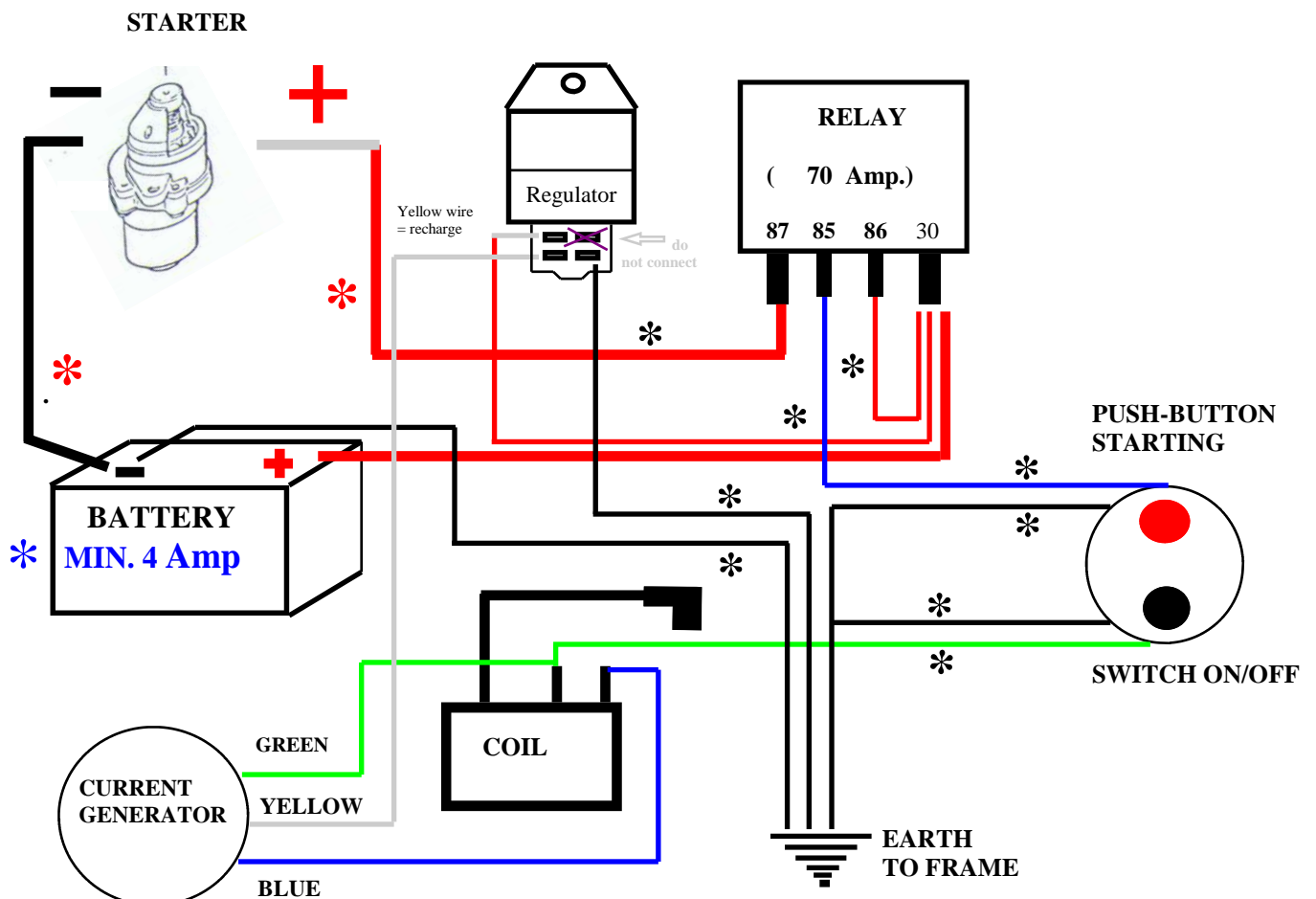
35) IGNITION

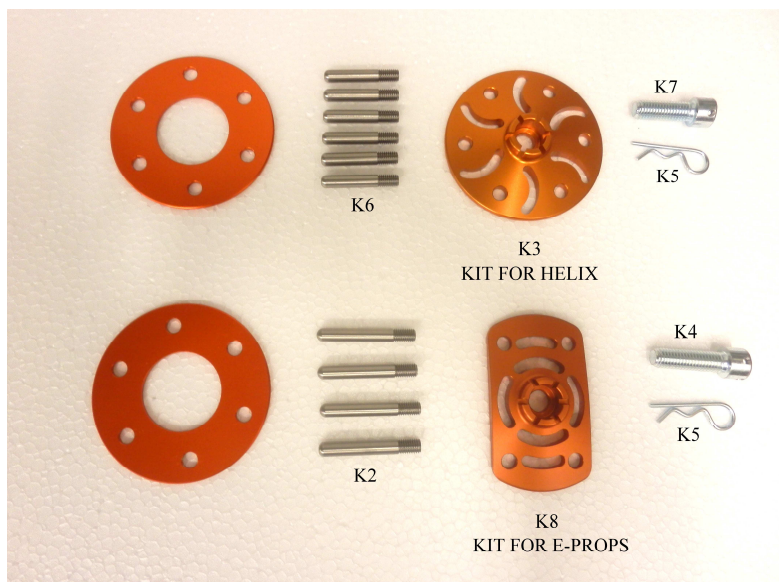
36) CHARGE REGULATOR

37) COIL

38) CROWN WHEEL COMPLETE OF
PINION

N.B. * CABLE SECTION MIN. \varnothing 4 mm. * CABLE SECTION MIN. \varnothing 2 mm.





COMPLETE KIT FOR E-PROPS PROPELLERS

COMPLETE KIT FOR HELIX PROPELLERS

K2 PINS LENGHT 57 MM

K3 PROPELLER DISC FOR HELIX

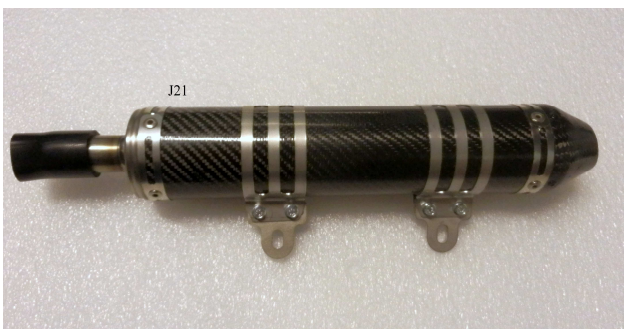
K4 CENTRAL BOLT M12X40

K5 SAFETY CLIP

K6 PINS LENGHT 47 MM

K7 CENTRAL BOLT M12X35

K8 PROPELLER DISK FOR E-PROPS



Carbon silencer for Sport Version. Weight, complete of clamps as in the picture, 850 gr. It gives the engine a deep and pleasant sound.

www.corsairmotors.com

