

## Appendix

amendments to manual EOS 100 and EOS 100 Booster (ICI)

status 11.2017

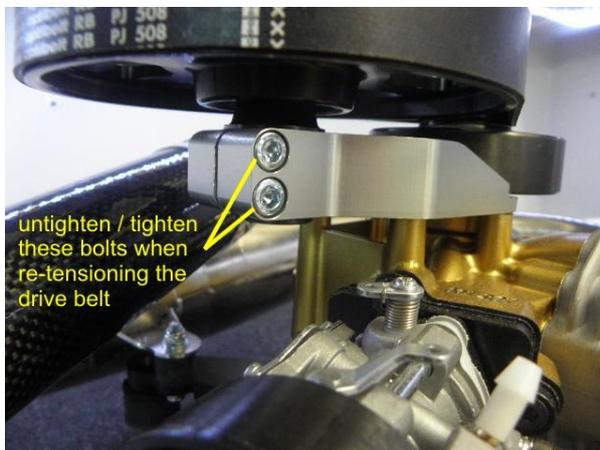
### Drive belt tension

The tension of the belt needs to have proper adjustment. New engines should come with the right setting of the belt tension. However, after some time of engine operation it may and most probably will become necessary to re-adjust the tension.

A too loose tension of the belt will result in slipping and loss of power and thrust in medium and high engine RPM as the propeller is not turning in the same speed as the inducement. You may hear a squeaky noise and in very short time the belt will get damaged and in consequence needs replacement.

A too high tension of the belt will result in increased friction and loss of power and thrust in all engine RPM, engine will not reach max. RPM as it should. Extensive force may react on crank shaft, clutch and drive wheel bearings as well as on drive wheel support bracket what may lead to damages in medium and long term.

Advice how to set the right belt tension;



Untighten the shown bolts, open one after the other in small steps, until you can easily turn the drive wheel eccentric shaft



set your torque wrench to 8-9 NM, use a Inbus type hexagon socket 8mm (metric)



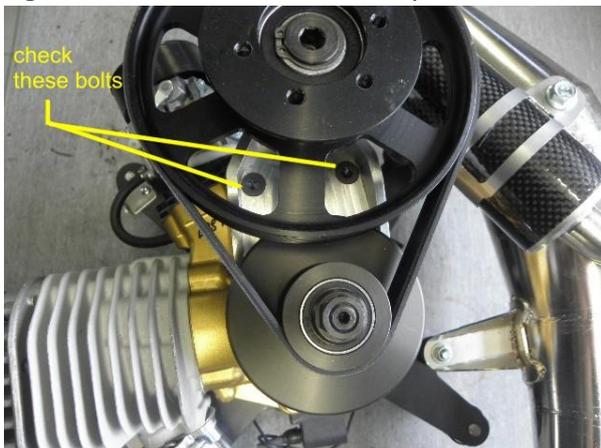
fit Inbus socket into the center bolt of the drive wheel front as shown. Now start to turn slowly in anticlockwise direction (!, never in the other way) until you reach the set torque

Now by holding the wrench / exactly keeping the set torque force start to close the 2 bolts on the drive wheel bracket what you have initially opened to prevent the eccentric shaft to turn back. Now in small steps close the 2 bolts one after the other until tight. We again refer to the bolts' general torque table in the manual.

### Propeller damages

Damages to the propeller, even small ones, caused by stones or other objects whatsoever what may fall into or go through the propeller will generate imbalance resulting in increased vibrations. These vibrations, if not very minor, may cause defects to the engine and engine parts and/or to the whole system. By an expert propeller damages can be repaired and the propeller can be newly balanced. It is strongly recommended therefore to care for a balanced propeller or do a replacement if a repair is not possible or not practicable.

**Important note!** – If you had a propeller stroke and in consequence a broken propeller it is strongly recommended to replace all propeller bolts to new due to the heavy shock loading what may have occurred. Both, an imbalanced propeller in long term and a shock loading after a broken propeller may also damage or brake the bolts connecting the drive wheel bracket with the engine housing. A check of these bolts is imperative and a replacement safety wise recommended (to use only proper 10.9 bolt quality with Torx head, properly tightened acc. to the bolts' torque table and secured with Loctite 243 thread locker!).



## Propeller hub extensions

A hub extension to bring the propeller further back for certain reasons (frame construction, different engine applications, purpose to increase thrust etc.) is seen as a general design change of our engine. Possible influences resulting by the additional prying effect cannot be foreseen and are not tested by EOS engine.

If nevertheless offered by a Paramotor-System supplier, then we advise to follow the operating and maintenance instructions given from this particular System manufacturer.

## Mesh filter in carburetor - necessity for cleaning in a periodic time lapse

After the fuel inlet nipple, placed on the inside of the carburetor at the side where the membrane of the fuel pump is located, there is a fuel mesh filter. Even if you have installed a fuel filter in the fuel lines still dirt can reach this subject additional filter and can block a sufficient fuel flow. Especially additives in the fuel can cause this impurity (f.e. Ethanol). Sometimes it looks like a "jellylike" layer on the mesh filter. This can mostly pass the regular installed fuel filter but getting stuck in this internal very finely woven mesh filter.

Indication for a polluted mesh filter;

- loss of power
- loss of quick acceleration
- engine not reaching max. RPM
- engine reaching lesser and lesser RPM only, at the end running only at idle or stopping totally

**Caution!** - A polluted mesh filter may cause the engine to start running to lean step by step with danger of overheating and melting the piston! We therefore recommend to check the filter at least every 30 hours of engine operation.



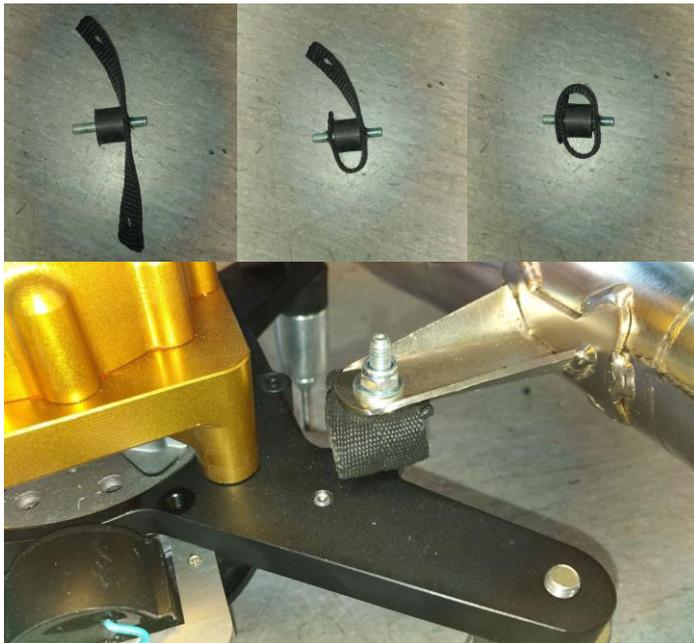
## ICI

Induced controlled ignition; Engines EOS 100 Booster have been upgraded to a new ignition system from productions series June 2017 onward. The new ignition grants for;

- remarkable easier start-up
- less sensitive to flooding
- perfect stable idle run with even lower RPM
- perfect run in all stages of RPM
- increased max. RPM with increased thrust
- easier start up when engine is hot

## Exhaust rubber mounts - safety straps

Extensive vibrations caused f.e. by an unbalanced or wrong propeller may shake the engine and especially the exhaust in a severe way. In consequence the exhaust rubber mounts may get damaged and/or may brake totally. In order that the exhaust cannot get seperated from the engine going into the propeller and/or fall from the sky we have added safety straps to the exhaust rubber mounts.



## Re-torque cylinder head nuts

We recommend to re-tighten the cylinder head nuts after the first 2 hours of engine operation. Open front part of the cooling cover and re-torque nuts with a torque wrench setting 18NM (tighten nuts crosswise).

**Caution!** - Open counter nuts first, remove them totally, re-torque main nuts with 18NM, re-install counter nuts again and also re-torque them with 18NM.



### **Amendment to warranty terms**

Excluded from warranty claim are wear parts such as rubber mounts on main engine bracket, rubber mounts of the exhaust, airbox rubber fitting (junction flange), drive belt, spark plug, gaskets and membranes, starter rope. Disregarding the age and the operation time of the engine.

### **New carburetor on engines EOS 100 Booster ICI**

- from Sept. 15<sup>th</sup> 2017 onward

Alle engine series are equipped now with the type Walbro WB 37 (modified) due to more reliable and stable engine running, with lesser danger for a possible lean run what may end in engine damage (piston failure, burned hole in piston head).

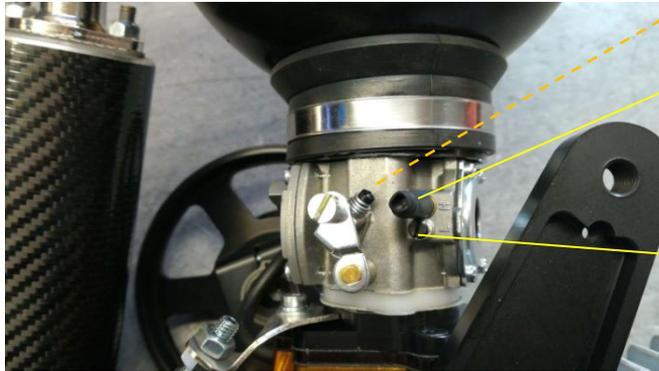
Standart settings:

L jet adjuster screw: 1 ½ turns out (anti clockwise)

H jet adjuster screw: 1 ¼ turns out (anti clockwise)

Pop Off pressure: 11 PSI

Lever distance: 1mm



idle adjuster screw

H jet adjuster screw (sealed with shrink tube or laquer)

L jet adjuster screw

For general understanding:

The engines come pre-adjusted from the factory in Austria with above mentioned standard settings. These are "safe" settings rather on the rich side, for a rich combustion. These resulting in a spark plug picture being on the rather "black" side - please see manual page # 10 (or figure at the end of this chapter) - picture from #14 "best" in direction to left/up/rich. The Austrian factory being on a certain area in a certain altitude MSL (mean sea level), but also in changing conditions of air temperature and humidity. Therefore whenever the engine being operated at another location / in other conditions there is practically need of doing re-adjustments of L jet and H jet screws. As a general rule please note;

- combustion getting richer when;
  - - engine operated in higher altitudes above MSL
  - - engine operated in warmer air temperatures
  - - engine operated in more dry (less humidity) air conditions
- combustion getting leaner when;
  - - engine operated in lower altitudes
  - - engine operated in colder air temperatures
  - - engine operated in more humid air conditions

A slightly to rich engine setting is no problem and safe (spark plug pictures #9-#13 / manual page 10 / figure end of this chapter). A far to rich setting resulting in rough engine run, not reaching max. RPM and has lesser power, dying at idle. Worse start up then normal.

Impurifying the engine, excessive oil may come out from the exhaust. Higher to even excessive fuel consumption. Debris building inside the combustion chamber (piston, head). BUT; no damage to the engine can occur!

CAUTION(!); - In opposite, a to lean setting will lead to a soon or even instant(!) engine overheat and damage (hole in piston head, seizing). All onward pictures #21-#29 / manual page 10 / figure end of this chapter indicate a to lean up to a way to far to lean setting.

We recommend to aim to reach a spark plug appearance as per pictures #11-#14 by adjusting the H jet accordingly!

If you have any problems or doubts for a correct engine setting, go back to the standard H-jet and L-jet setting as above described and consult with an expertised person and/or your dealer!

Please note; - With a wrong setting of the L jet adjuster screw the engine cannot get damaged. However, with a wrong setting of the H jet adjuster screw very quick (only in case to lean)! The setting of the L jet will not influence the spark plug picture!

spark plug pictures - steps from rich to best;

(H jet adjuster screw only!)

- in 5min. turn steps (clockwise) - each of this step will "jump" about over about 4 pictures

spark plug pictures - steps from best to hot / lean;

- in 1min. turn steps (clockwise) - each of this step will "jump" about over 1-2 pictures

CAUTION(!); - do not proceed with 5min. turn steps(!). Do not exceed a 3min. turn clockwise from the optimum spark plug picture towards lean as here already the engines starts to run to hot with danger of damage!

=> turning the jet adjuster screw clockwise will go from rich to lean (H and L)

=> turning the jet adjuster screw anti clockwise will go from lean to rich (H and L)

=> the L jet influencing idle to low/medium RPM combustion

=> the H jet influencing medium to high and full RPM combustion

Remark; - To get indication from the spark plug there is need to run the engine at full power from 3min. constant run onward. Engine runs in low or medium RPM will not considerably change the spark plug picture and/or bring a usable result. But also do not run the engine excessively at full power as 3min. or 3-5min. is enough!

CAUTION(!) - run the engine safely fixed on ground with appropriate distance to the propeller! Or run it on your back only.

If you feel your engine starting and running fine, idles well then stay with the standard factory settings. In case you have problems with idle run, bad acceleration, low power and not reaching max. RPM, seeing a wrong spark plug picture then proceed with adjustments of the L or H jet or both. Also make sure you have a correct setting of the idle adjuster screw!

Remark; - Make sure you have a correct and a from EOS engine recommended propeller installed! A not with the engine matching propeller will never allow a correct engine run!

Make sure you have a correct fuel/oil mix! A too oily mix will not allow a correct engine run.

CAUTION(!) - A too poor oil percentage will make the engine seize! Make sure you have a fresh good working and correct type of spark plug!

For adjustments proceed as follows;

- adjustment of the idle screw

- adjustment of the L jet screw

- adjustment of the H jet screw

starting from the factory settings; L jet adjuster screw 1 ½ turns out (anti clockwise) and H jet adjuster screw 1 ¼ turns out (anti clockwise)

To start the tuning procedure:

After having checked and/or set the jets to standard settings, start and run the engine in low RPM until warm. Check idle run and if needed adjust the idle adjuster screw until you reach a smooth constant running with about 2000 RPM.

1<sup>st</sup> step - L jet

Activate throttle by quickly accelerating the engine and quick releasing the throttle thereafter, watch how it comes back to idle each time ...

... acceleration is fast and even, engine run comes down to idle quick and stays at proper idle	no adjustment needed
... engine run comes down to idle quick but engine kills	to rich setting, turn in clockwise the adjuster screw
... engine run comes down to idle to slow but then stays at idle (and/or idle run is unstable and "dancing"), and acceleration is not fast enough	to lean setting, turn out anti clockwise the adjuster screw (mostly from that point a 5min. turn out anti clockwise then is the right setting)

Make changes of the adjuster screw in 5min. turn steps only and re-try procedure until finding the right setting. There may be need to also re-adjust the idle adjuster screw after having made to big adjustments on the L screw! Both settings have to be balanced together.

2<sup>nd</sup> step - H jet

Go to max RPM / full throttle for 3min. (3-5min.) and afterwards stop the engine. Check the spark plug for color ...

... compare to the sample spark plug pictures below	if matching a picture from #11 - #14 no adjustment needed
... spark plug pictures like #10 or #9 or lower	to rich setting, turn in clockwise the adjuster screw

Make 5min. turn steps (clockwise) - each of this step will "jump" about over about 4 pictures And again ...

Go to max RPM / full throttle for 3min. (3-5min.) and afterwards stop the engine. Check the spark plug for color ...

(see advices written before)

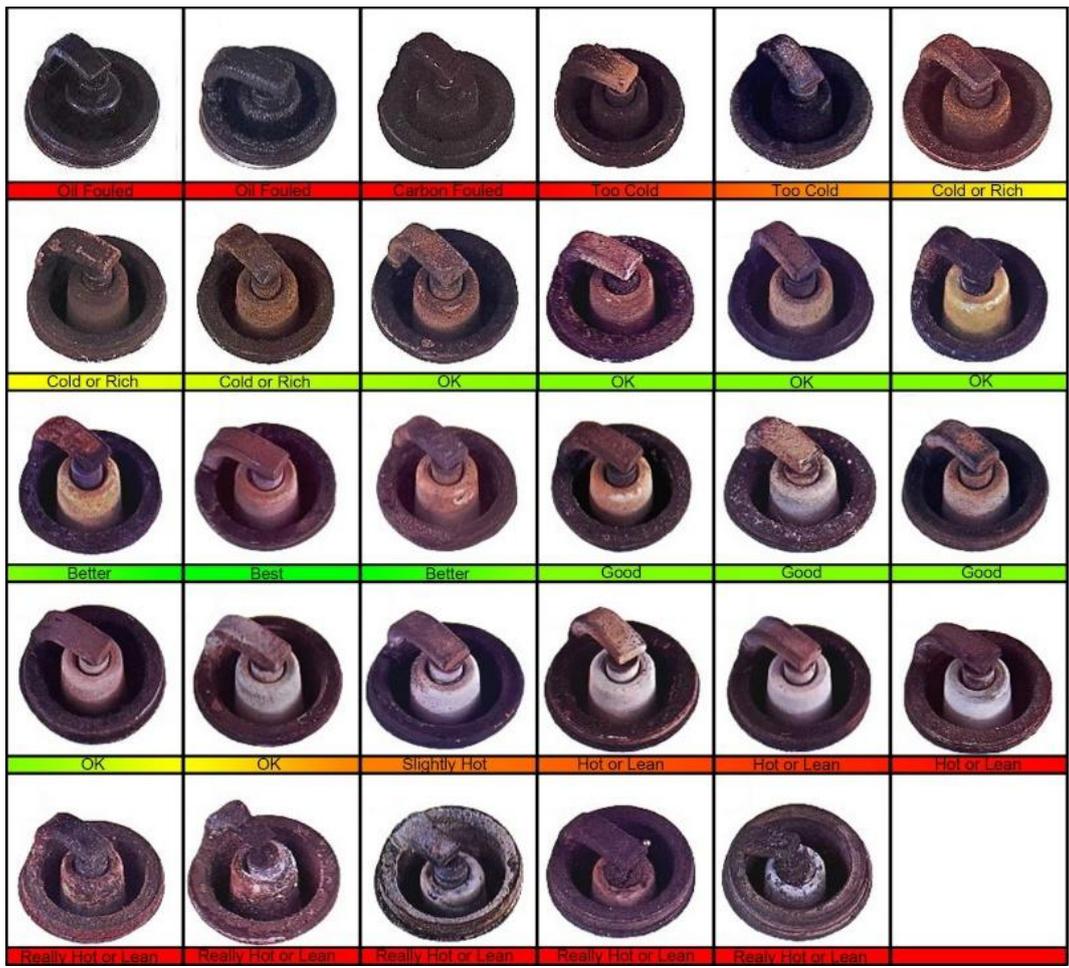
... compare to the sample spark plug pictures below	if matching a picture from #11 - #14 no adjustment needed
... spark plug pictures still "to black"	to rich setting, turn in clockwise the adjuster screw

Continue until you have the perfect result.

Please note; - Starting with the standard setting of the L jet should never show a to lean spark plug picture but good or to rich only. In case nevertheless you see a to lean spark plug picture ...

... compare to the sample spark plug pictures below	if matching a picture #15 to higher, then as a first step turn out anti clockwise the adjuster screw for 5min.
---	--

Continue until you have the perfect result.



first picture up left is #1, last picture down right is #29, "best" is #14