



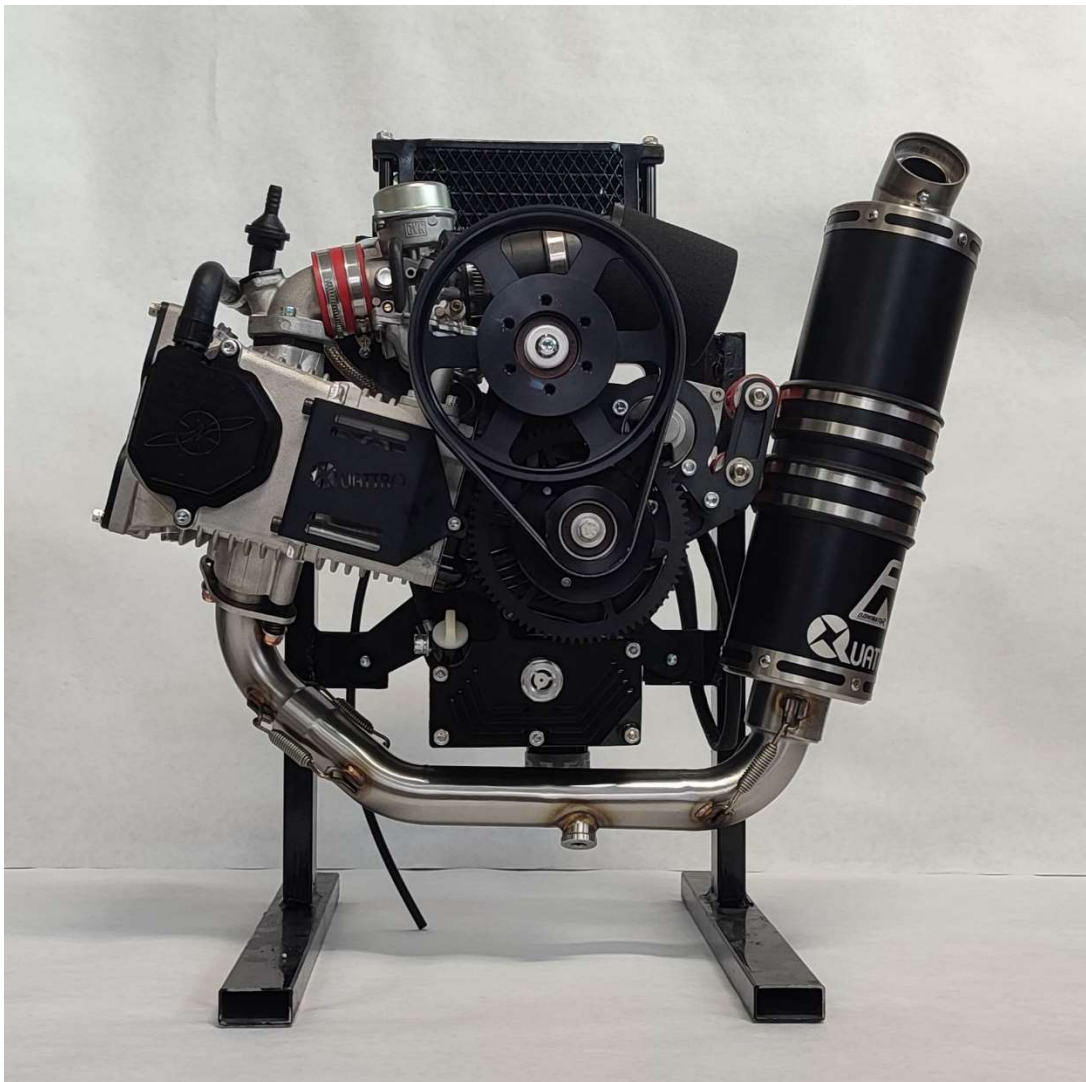
**EOS-ENGINE**  
**Produced By:**  
**R-moto GmbH**  
**Jagerweg 2**  
**9400 Wolfsberg**  
**Austria**



Engine User Manual

Engine No.: \_\_\_\_\_

Date: \_\_\_\_\_





Congratulations to your purchase of EOS Quattro engine, please thoroughly read this owner's manual before proceeding to mount or start your new engine. This engine was developed having most professional engineers engineers involved. Beeing thoroughly l tested by our test pilots. All of our components are of high quality.

We took all cautions necessary to develop this manual as accurate and instructive as possible. All data and procedures in this content are correct at the time of print. However we EOS Engine by R-Moto GmbH keep the right to make specification and detail changes to any part of our equipment, components and manufacturing processes including this manual without recourse.

For the latest version of this manual, please see the download section of our website at [www.eos-engine.com](http://www.eos-engine.com).

This manual covers the component parts of the engine, the mounting, running-in, starting/stopping procedures and offers guidelines on maintenance and proper up-keep of your QUATTRO engine. Whilst we list pre-start checks, this manual is **NOT** a substitute for professional flight training.

We strongly advise that you to seek professional training and obtain a valid license or aviation clearance necessary to fly a QUATTRO engine in your country.

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## Welcome

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Congratulation to your purchase and many happy hours with your new 4 stroke EOS QUATTRO engine, combined with trust, reliability, low noise not to forget accompanied by a very low fuel consumption.

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## Contents

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### Supplied parts

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Your EOS QUATTRO engine is supplied with the following components: Exhaust System, carburetor, air filter, Oil cooler including hoses, wiring, CDI, Ignition coil and voltage regulator for battery and electric starter.

We do not allow the use of other fuel pumps. Warranty claims will be denied using non EOS-certified fuel supply systems!

The EOS QUATTRO electric start or dual start option is delivered with following parts: 1 Starter motor, 1 Starter gear, 1 starter fixture, 1 starter relay and 1 voltage regulator.

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### Engine Instruction

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EOS QUATTRO engine can be supplied either with a manual starter, an electric starter or a dual starter.

The purchase of a clutch system or direct drive system is possible if required. Our engine can be used either for a push or a pull propeller.

We supply a 95W generator and oil cooler.

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### Engine Description

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EOS QUATTRO is our 2nd generation of the EOS 4-stroke engine series. It provides smooth and progressive power having low noise levels and a very low fuel consumption.

EOS QUATTRO engine is a lightweight single cylinder 4-stroke 4 Valve engine including a decompression start system. Our System enables the high compression ratio to be easily pull started by releasing 70% of the compression during cranking. Once started the system automatically disengages.

EOS QUATTRO is a 2-piece full CNC machined alloy crankcase 276cc displacant using 4 valves operated by a chain driven overhead camshaft. The oil system driven by an oil pump supplies constant oil pressure regardless of the oil temperature or RPM.

Our alloy cylinder's high end coating for increased wear resistance and it's precisely balanced crankshaft design includes oversize bearings for long durable use .

Our crankshaft is held by two main bearings. Main drive via a Poly-V 16 ribs belt with an eccentric shaft .

CDI ignition (capacitive discharge) using an integrated variable advance ignition curve.

Float type carburetor (CVK30 JAPAN) including a high flow foam air filter and high quality rubber duct .

EOS Quattro engine cooling is driven by an oil cooler cooling system. Another novelty of EOS Quattro is our injection molded cylinders and cylinder heads. **WARNING:** ignition CDI unit should NEVER be mounted directly on the engine. The oil filtering system, includes an oil filter on an easy removable basis. A clear and transparent glass oil level window easily enables to check the oil level

Our exhaust manifolds are made of Stainless steel for long durability. The manifold is fixed with 2 pressure springs to the cylinder to enhance the best flexibility possible. Our silencers alloy outer shell and inner stainless steel material enhances a long time use, it is mounted with 2 stainless clamps and 2 silicon rubber mounts to provide a flexible



flexible mounted exhaust system.

Every EOS QUATTRO engine runs through pre delivery tests in our factory test department. After tests engines are thoroughly cleaned and for safe and clean transportation delivered WITHOUT engine oil!

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### Applications

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Recommended applications for EOS-ENGINE QUATTRO engines are:

- Paramotor
- Paratrikes
- hangglider trikes
- Small single seat aircraft
- Hovercraft

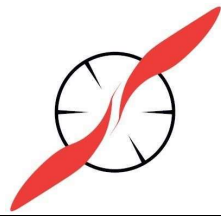
**Please don't use EOS Quattro for acrobatic flight!**

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### Quattro Engine Specification

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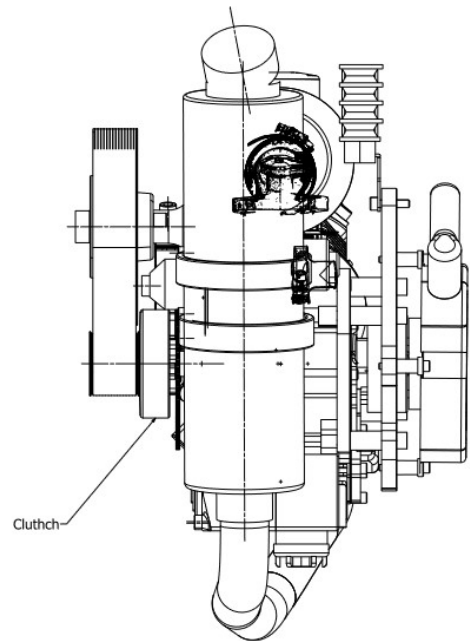
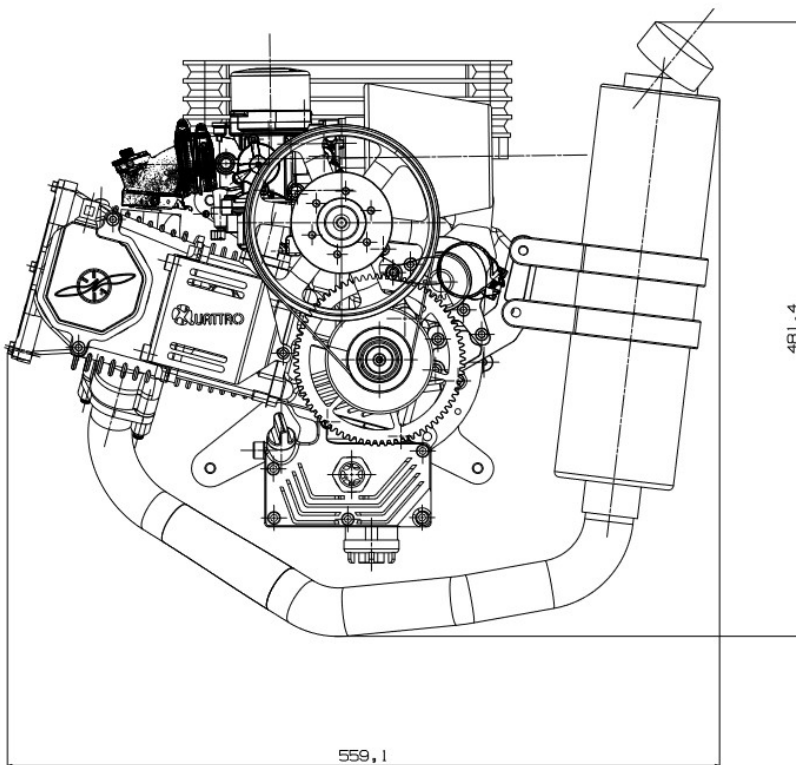
Manufacturer	EOS ENGINE BY R-moto GmbH AUSTRIA
Type	Single cylinder 4 stroke, oil cooled, 4 valve
Displacement	276cc
Bore/Stroke	73x66mm
Crankshaft	2 Bearing C3
Piston	Forged Racing alloy
Oil System	Wet sump with pressure pump and oil filter
Fuel system	CVK float bowl carburetor with acceleration pump
PRSU/Reduction	3.0:1 reduction with poly-V drive 16 rips
Prop Mounting	6 x 50mm M6 screws
Exhaust	Flexible stainless-steel manifold, alloy stainless Silencer with DP Killer
Starter	Manual pull start, Electric start, or Dual start
Ignition System	CDI
Oil Capacity	450cc
Oil Type	Fully Synthetic 10W50 or 10W60 4 stroke motorcycle oil ( (Spec – JASO – MA2 –API –SL)
Mountings	4 x M8 Silicon shock mounts(red)
Spark Plug type	NGK CR8E
Spark Plug Gap	0.60mm
Air filter	High flow foam filter
Oil Filter	Grid filter, no need to change
Drive belt tension	4-6mm Deflection at mid span point with 14Kg force or Frequency App, 380Hz
Valve clearances	0.10mm for inlet and 0,12mm exhaust valves
Fuel Type	95 or higher (Ron) Octane unleaded fuel
Engine Weight	18,2kg. to 19,8kg including all available options
Starter Motor Type	Pre-engaged
Battery (not included)	12v 4ah minimum – Lead Acid or Lead Gel type or
Generator	95W
Power Output at Crankshaft	30,2hp @ 8100 RPM
Thrust Output (static)	>80Kg with 1.30m propeller, measured on the trust test bench w/o cage, at 400m @ 20 degree
Max Power RPM	Limited to 3 minutes
Max Continuous RPM	7200 RPM
Oil Temp	Max 160 ° C Min 55°C
Cyl Head Temp	Max 220 ° C Min 55°C

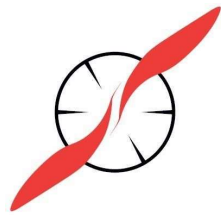


**EOS**  
— ENGINE —

Engine weight	17,2 kg, with dual start and clutch 20,0kg
Consumption	Depending on glider size and take-off weight. 2,2 to 2,8 liter per hour

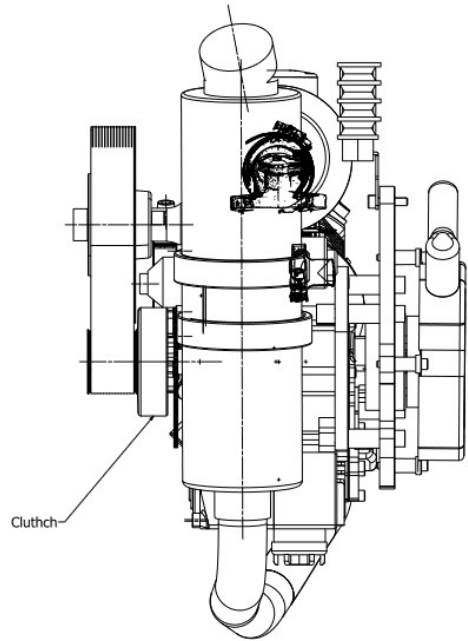
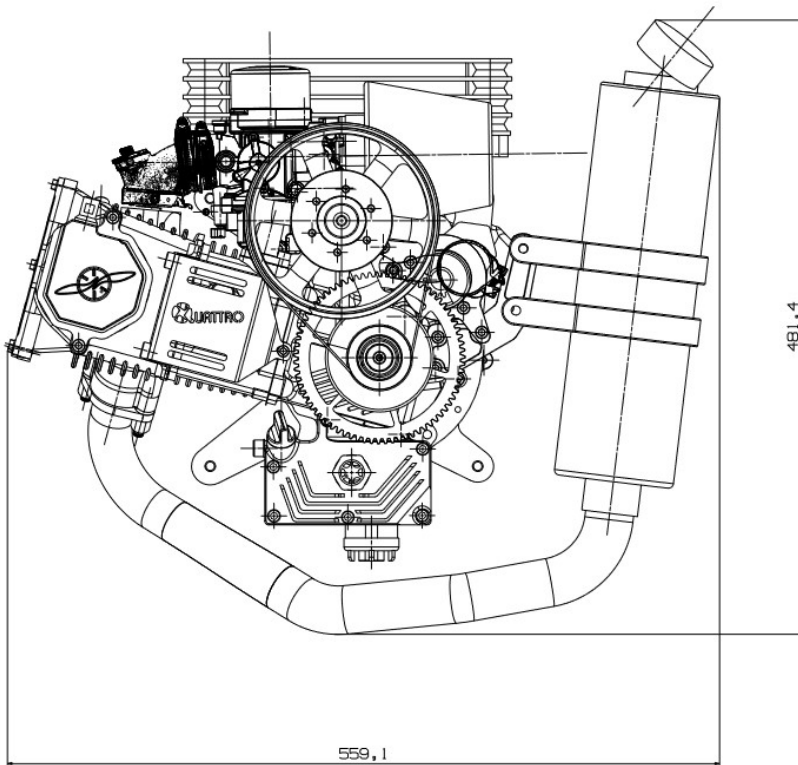
Engine Mounting Schematic / Dimensions



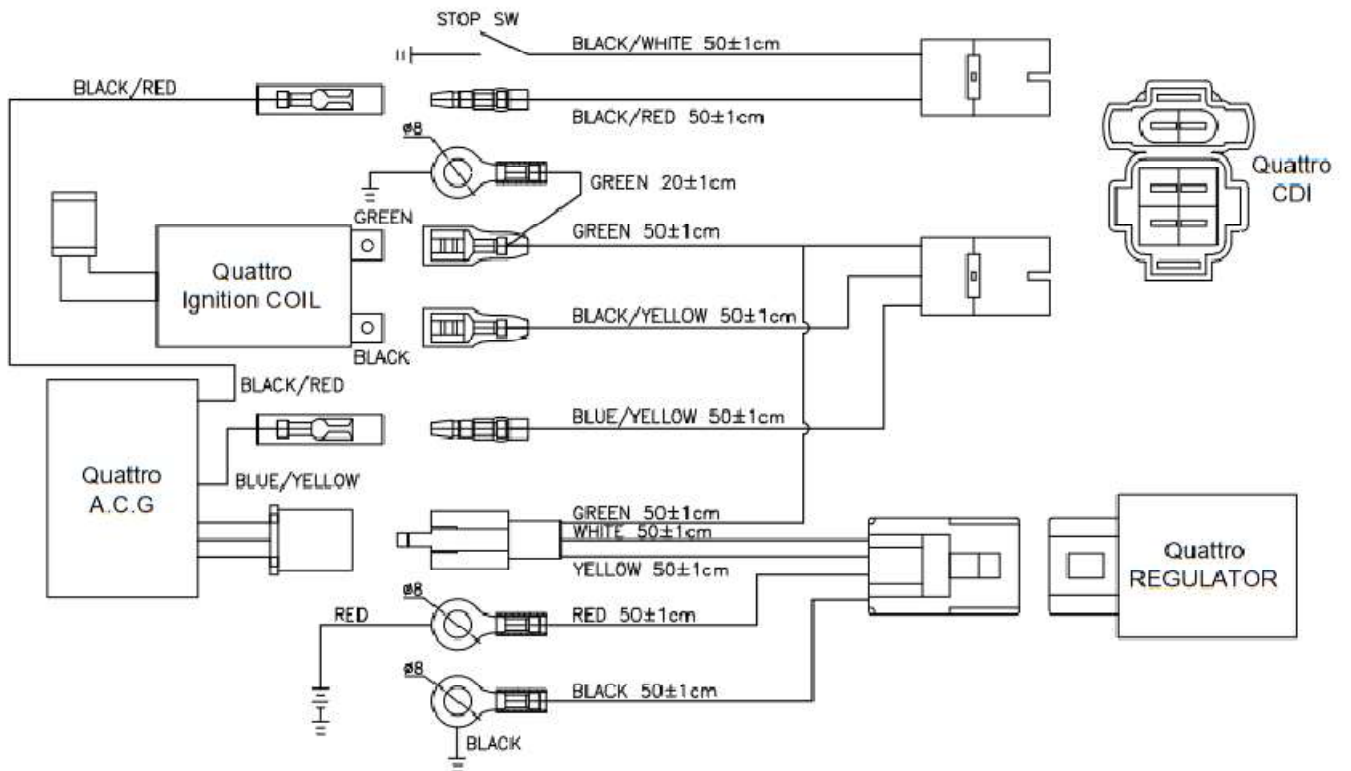


# EOS

— ENGINE —



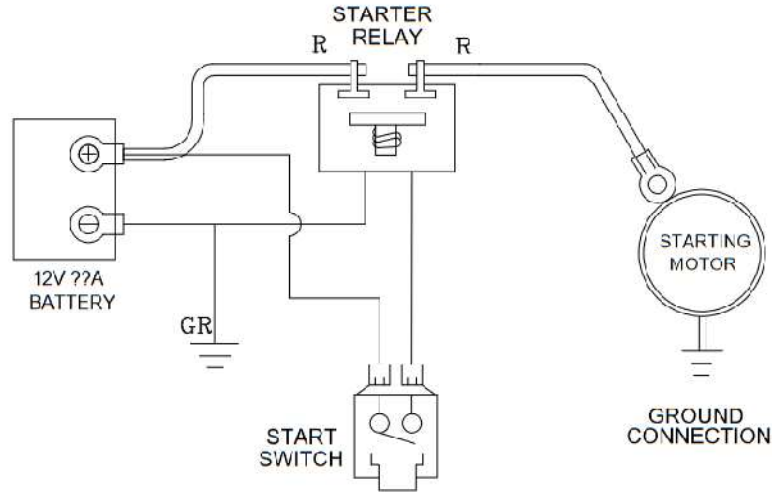
## Wiring Diagram – QUATTRO



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Wiring Diagram Electric starter – QUATTRO

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Quattro Electric Start System Diagram



Please connect all ground wirings to the engine ground contact.  
We recommend using min 6 mm<sup>2</sup> starter cable! Best option are 8mm<sup>2</sup>

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FUEL SUPPLY SYSTEM – QUATTRO

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**Important note!**

EOS QUATTRO engine uses a membrane fuel pump for fuel supply. **WARNING:** only the fuel pump system from EOS works flawlessly. It's unique bypass system enables the correct fuel flow and pressure.

Never use alternative fuel pumps.

**NOTE:** Check the bypass reduction (alloy reduction, red circle) every 100hrs at the latest if it is still clean and in good running condition. Should the bypass reduction be dirty or full of debris it can cause a carburetor overflow.

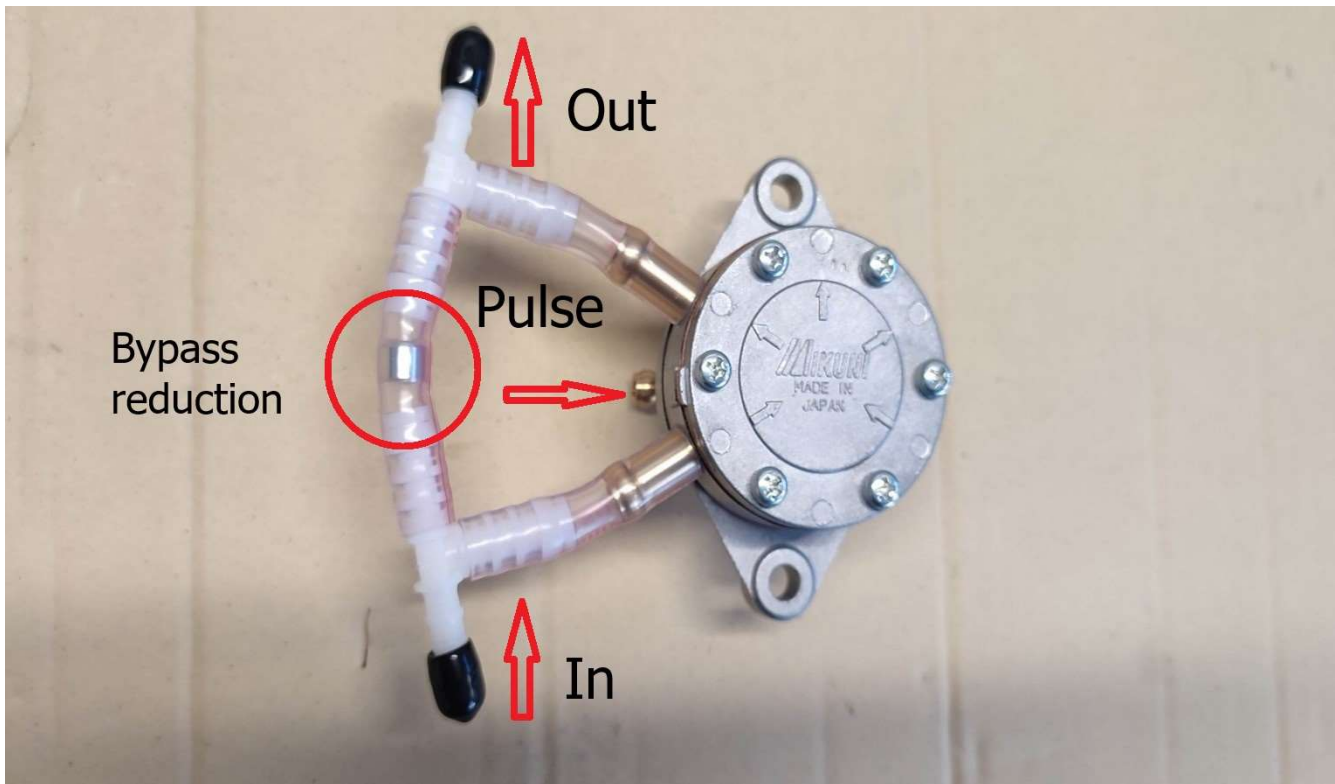


The vacuum hose should not exceed 250mm length measured from the carburetor to the fuel pump (see picture below). engine uses a membrane fuel pump for fuel supply. **WARNING:** only the fuel pump system from EOS work to full satisfaction. It's unique bypass system enables the correct fuel flow and pressure.

Never use alternative fuel pumps.

**NOTE:** Check the bypass reduction (alloy reduction, red circle) every 100hrs at the latest if it is still clean and in good running condition. Should the bypass reduction be dirty or full of debris it can cause a carburetor over flow.

The vacuum hose should not exceed 250mm length measured from the carburetor to the fuel pump (see picture below).



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#### Installation Notes

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EOS QUATTRO engine is provided with a black and white cable exiting the CDI. The Connection of this cable to the kill switch enables to stop the engine. EOS QUATTRO engine is supplied with an additional wiring loom and voltage regulator.

**WARNING:** The engine must be held at idling speed for at least 15 seconds prior to stopping. This procedure allows the internal exhaust components to sufficiently cool down and prevent igniting of fuel in its exhaust during rundown. Failure to do so may result in severe exhaust damage.

The carburetor has a vent tube fixed to the bowl and a return pipe, which must be mounted to the fuel tank. The routing of this return pipe must be arranged so that there is in a constant 'downfall' to the fuel tank with no possibility of fuel 'puddling' in the line. Modification of the fuel breather and return lines in any way will cause carburation problems. This return line can be used for a fuel tank ventilation at the same time.

#### Engine Ventilation

EOS Quattro engine is supplied with a breather pipe and PCV valve to reduce crank case pressure being connected to the engine ventilation cover outlet. You can connect a tube to the PCV valve to reduce blow-by from the engine if required.

#### Fuel Line attachment

The fuel line must be attached to the fuel primer pump between fuel tank and Quattro vacuum fuel pump.

We recommend a 'primer' bulb of some sort upstream of the pump to enable manual filling of the carburetor prior to





starting. Please use fuel lines with 6mm inner diameter.

#### Choke

The CVK carburetor has a choke installed, when your EOS QUATTRO is cold, open the choke and start the engine. If the ambient engine is around 0, you can also pull the throttle for 3 times to get a perfect start.

After the engine is running, close the choke around 20 seconds later.

Please take care! the propeller will start to spin by using the choke!

#### Propeller

We test all engines using E-prop QUATTRO Propeller sizes 120cm to 150cm.

The propeller must be fastened according the propeller manufacturer torque advise.

#### Throttle cable

EOS QUATTRO engines are not supplied with a throttle cable, however it can be ordered as an option. Ensure the throttle slide closes fully in all possible directions using a flexible 'hand' throttle assembly.

The stop button should be placed in a in an easy to reach and use position. Beware that the occasional inadvertent pressing of the stop button during launch is much preferable than failure to reach it in an emergency/aborted take-off.

#### Oil cooling

Always keep your oil cooler clean. Attention: the oil cooler will be very hot after running!

There must be sufficient clearance for the oil cooler to enable air flow. A minimum space of 100mm between harness and oil cooler is required.

#### Exhaust.

Always ensure a minimum distance of 100mm from the exhaust system to your frame or fuel tank. The manifold can be reach very high temperatures.

**WARNING:** do not remove the DB Killer on the Silencer outlet, it will cause lean running and damage your engine.

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### Adjustments - Carburettor Idle Speed

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The Idle speed is adjusted by turning the small screw at the side of the throttle quadrant as shown in the picture.

The idle speed should be 1900- 2100 RPM with clutch, and 2200 to 2400 with direct Clutch (2000rpm opening setting.)

**The end of the black tube from the float chamber has to be connected to the fuel tank.**

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### Adjustments - Exhaust Spring Tension

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EOS Quattro engine exhaust has two T-bolt fasteners at the cylinder, this allows expansion/contraction of the manifold.

These springs are factory pre-set to provide an optimum flexibility of the manifold. In case you need to adjust the spring tension, you should leave a 0,4 – 0,6mm gap between each coil of the spring as shown in the picture above

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### Pre-Start Checks - Warnings

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**Engine Oil Level** - With engine placed on a flat surface the oil level should be between the half way (min) and top (max) mark of the glass oil window.

**Fuel System** - Ensure you have enough fuel for the planned flight.

**Exhaust System** - Ensure exhaust system is secure, check swivel springs at both ends of the manifold and also the condition of the silencer clamps. **DO NOT** tighten T-bolt clamp nylon nuts, these are factory pre-set to provide optimum clamping force, whilst allowing sufficient expansion/contraction of the exhaust assembly (There must be 0,4-0,8 mm) gap between each coil of the springs – see page 8).

**Air Filter / Carburetor** - Ensure that the air filter is in a good running condition, tightened securely and is not soiled or blocked. Check that the securing bracket is in good condition and fastened correctly. Check the condition of the rubber connector (duct) between carburetor and inlet manifold also that both clamps are located correctly.

**Spark Plug HT Lead** – Check that the HT lead cap is fully pushed onto the plug. It is not necessary to remove/check spark plug before each flight. Repeated unnecessary removal of the spark plug cap will cause it to become loose.

**Oil cooler** - Ensure there is no debris on it or on its cover so air can enter the oil cooler easily.

**Throttle Assembly** - Visually check for full throttle travel on the carburetor and ensure throttle closes fully and smoothly.

**Reduction Drive / Propeller** - Check that propeller is free from cracks and chips. Check the six mounting bolts.

**Drive Belt** – Check the Poly-V drive belt for cracks, wear and tension.

**Ground Running** – EOS Quattro ENGINE recommends that you **DO NOT** 'Ground run' the engine. Experience has proven that the **ONLY** safe place to run a paramotor engine is whilst firmly strapped to your back. All pre-flight power checks are best performed whilst wearing your paramotor correctly. This is safer and prevents stones or debris being drawn into the propeller.



Propellers can be very dangerous, **DO NOT** start engine where there is any chance of the propeller coming into contact with the operator or any other person or object.



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## Operation Notes

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Prior to starting your EOS QUATTRO engine, you should always follow the full pre-start check list as shown on page 9.

Ensure propeller cannot contact anything or anyone. Else (In the case of a paramotor, machine must either be 1. Securely strapped to a pilot or 2. Securely fixed to proprietary test rig.) DO NOT start your paramotor unless one of these 2 rules is obeyed.

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## Running-in

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Your EOS QUATTRO engine has been fully tested prior to customer release, but you must adhere to the following procedure to ensure no damage is caused to your engine in the first few critical running hours. After the first 3 running hours change oil and clean oil filter, your engine will be run-in after 10hrs. you must change oil and clean oil filter and check the valve clearance settings after 10hrs. as is shown on the service schedule on page 11. After that follow the service schedule.

During the running-in period (first 10 hours) full power can be used for take-off. Once airborne power should be reduced to a maximum of 75%. Varying the engine RPM during this period is recommended. Running-in on the ground is strongly discouraged.

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## Starting

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Use your manual choke on the CVK carburetor to start your cold EOS QUATTRO engine. Or use the accelerator pump instead by pushing the throttle mechanism 3-5 times

Please pay attention when you open your choke, the engine speed will be higher at choke operation and the propeller will be spinning!

### Starting – Cold Start:

- A) First ensure the carburetor is full of fuel by squeezing the primer bulb
- B) Check throttle is closed fully, after opening and closing to test operation
- C) Open the choke or pump the throttle several times (3-5 times, depending on temperature)
- D) Keep the throttle on idle
- E) Use electric starter or pull starter to start the engine
- F) Once started keep a fast idling speed for at least 60 seconds than close the choke.
- G) Momentarily press stop button to check operation

If the ambient temperature is cold you will need to continue by opening the choke and pump the throttle 3 times.

### Starting – Hot Start:

- A) Keep the throttle on idle or slightly open approx. 5%
- B) Use electric starter or pull starter to start engine




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Service Schedule

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Please adhere to the following service schedule to keep your EOS QUATTRO engine in a perfect running condition – Failure to carry out the necessary action at the selected frequency may cause poor running or more serious problems that may affect warranty

FREQUENCY	ACTION	Done,Date
Before flight and after each use	Check Oil Level	
	Visually check fuel connections	
	Check fixing and rubber mounts	
	Check that throttle returns to fully closed position and full throttle can be obtained, Do not push the throttle to often! The engine will be floated	
	Check propeller leading edge for damage	
	Check all securing nuts/bolt/engine mounts	
After Initial (3hr) 10 hours	Replace engine oil & clean oil filter	
	Check valve clearance	
Every 25 hours	Replace engine oil & clean oil filter	
	Check drive belt tension and wearing	
	Check valve clearance	
Every 50hours	Replace air filter and Spark plug, use EOS Quattro engine filter!! Grease exhaust connection with copper grease	
Every 100 hour or every year	Replace engine ventilation valve	
	Replace engine mounts, Exhaust mounts & Oil cooler mounts	
	Replace drive belt	
	Replace fuel filter	
Every 500 hours (T.B.O.)	Contact EOS ENGINE regarding 'Zero Hour' overhaul or time extension	
		Sign

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Storage Instructions ('Laying Up')

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If you are not using your engine for a longer time (3+ months) we recommend following the notes below to keep your EOS Quattro engine in good running condition.

- 1) Loosen drive belt
- 2) Remove and drain fuel tank
- 3) Drain carburetor float bowl, using the drain screw, squeeze primer bulb and evacuate all fuel from the system and then re-tighten screws, otherwise let your EOS Quattro engine run at idle speed until the engine comes to a stop.

Returning EOS Quattro engine to service after 'Laying Up':

- 1) Drain and renew engine oil, clean oil filter.
- 2) Refuel
- 3) Re-tension drive belt and check wear
- 4) Thoroughly follow pre-flight checks prior to starting your engine.

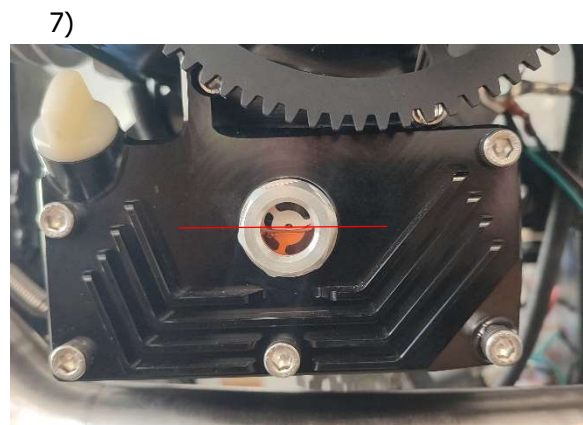
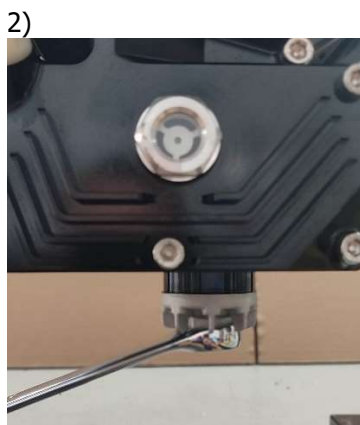
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### Maintenance Procedures – Oil & Filter Change

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Please note that your EOS Quattro engine must be up to normal operating temperature before draining oil.

- 1) The engine should be in an upright position when changing the oil.
- 2) Remove the oil drain plug with a 17mm socket and remove the oil filter.
- 3) Drain all used oil into a suitable container.
- 4) Clean the oil filter using a brake cleaner spray or fluid.
- 5) Install the filter and spring first then install the oil drain plug.
- 6) Tighten oil drain plug with a 17mm socket (do not overtighten) Recommended torque is 35 Nm.
- 7) Carefully fill with fully synthetic 4 stroke motorcycle oil (see Page 2 for recommended oil types) until the oil reaches the middle of the oil level window.
- 8) Run Engine then recheck oil level and fill up oil as necessary.



Ensure oil filter and spring fitted correctly. Incorrect fitting of the filter will result in severe engine damage.

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### Maintenance Procedures – Drive Belt Tensioning

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The ideal drive belt tension is required to prevent slippage. Some slipping (slight chirping noise) at idle speed is quite normal when your engine is adapted with a direct drive. We recommend an optimum belt deflection of 4-6mm (as shown in picture below)

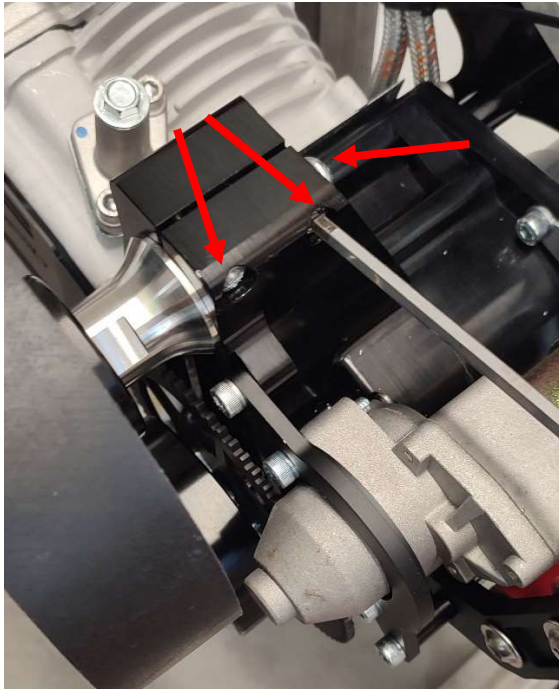
The belt will be pre-tensioned at the factory and must be checked at the first 3hr service.

The drive belt adjustment should be checked before every flight.

The drive belt can be adjusted by loosening the two M6 bolts at the top of the reduction pylon, by turning the eccentric drive belt adjuster, with a 19mm wrench, in clockwise rotation will tighten the belt, anti-clockwise rotation will loosen the belt. After adjustment re-tighten the two M6 bolts and test the belt deflection.



Do not over-tighten belt – This may cause bearing failure and reduction of available thrust.




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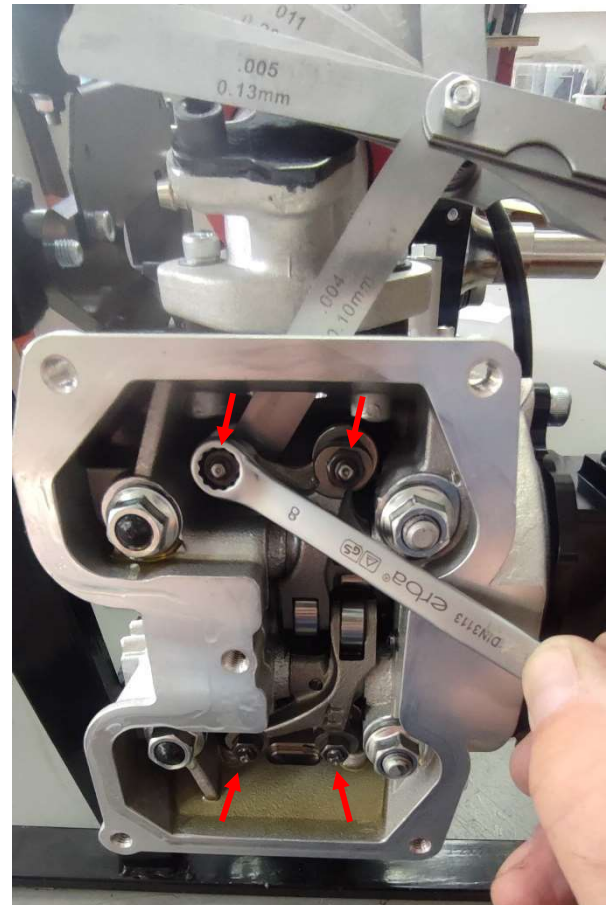
### Maintenance Procedures - Valve Clearance Adjustment

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Remove cam cover and adjustment cover. Rotate the engine until inlet valve (nearest the top of the engine) is fully closed and the cam lobe is 180° from the cam follower. Using a suitable feeler gauge, inserted between the valve top and the cam follower adjusting screw, check and/or adjust by loosening the 9mm lock nut (see specifications on page 2 for valve clearances)

The same procedure is used on the exhaust valve (nearest the exhaust), however, be aware of the easy start actuator positioned on the exhaust cam base circle. Make sure the cam follower is clear of this in order to get a correct measurement.

After adjustment ensure both lock nuts are tightened and re-fit cam cover and adjustment cover.  
Remove any excess oil from the cylinder head.





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## Warranty

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EOS QUATTRO ENGINE offers a 12-month limited parts warranty on all engine components for the purchaser of origin. All warranty claims are return-to-base and can only be carried out by EOS QUATTRO ENGINE AUSTRIA. EOS ENGINE cannot be held responsible for the payment of any delivery/freight charges, including customs duties or taxes. A service history must be assured and provided.

Warranty claims *will not be* accepted in the following cases: -

Damage caused by immersion in water Damage caused through improper use.

Damage caused by failure to carry out proper PRE-FLIGHT CHECKS

Damage caused by neglecting the SERVICE SCHEDULE

Damage caused by physical dropping, falling or shocks to the paramotor or engine Damage caused by starting engine without a propeller properly fitted, damage caused by starting engine with incorrect propeller type

Damage caused by incorrect adjustment of drive belt tension Damage caused by incorrect adjustment of valve clearances Damage caused by the use of incorrect fuel or oil type or grade Damage caused by lack of engine oil, or incorrect fluid level

Damage caused by removing the DB Killer

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Any modification whatsoever to the engine design, without prior written approval from EOS QUATTRO ENGINE will render the manufacturer's warranty complete and void.

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## Disclaimer

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### **DANGER**

This engine, by its design is subject to sudden stoppage! Engine stoppage can result in forced landings. Such forced landings can lead to serious bodily injuries or death.

Never fly an aircraft equipped with this engine at locations, airspeeds, altitudes or other circumstances from which a successful no-power landing cannot be made, after sudden engine stoppage. Aircraft equipped with this engine should only fly in DAYLIGHT VFR conditions.

Paramotors and trikes or small Ultralight aircrafts are not certified or licensed as aircrafts it is the responsibility of the owner/pilot to use their machine in accordance with the rules and regulations set out by the governing body in their designated country or territory. EOS ENGINE will not accept any claims for damages or death caused by misuse of any product manufactured or used by them on their products.

### **WARNING**

This is not a certified aircraft engine. It has not received any safety or durability testing and conforms to no aircraft standards. It is for use in experimental, uncertified aircraft and vehicles only in which an engine failure will not compromise safety issues. User assumes all risk of use and acknowledges by the use that he/she knows the engine is subject to sudden stoppage.

This manual is for operational guidance on the EOS QUATTRO engine only. Use of this engine is entirely at your own risk – Never fly if you are aware of any issues with your equipment, yourself or unhealthy conditions of any sort.

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