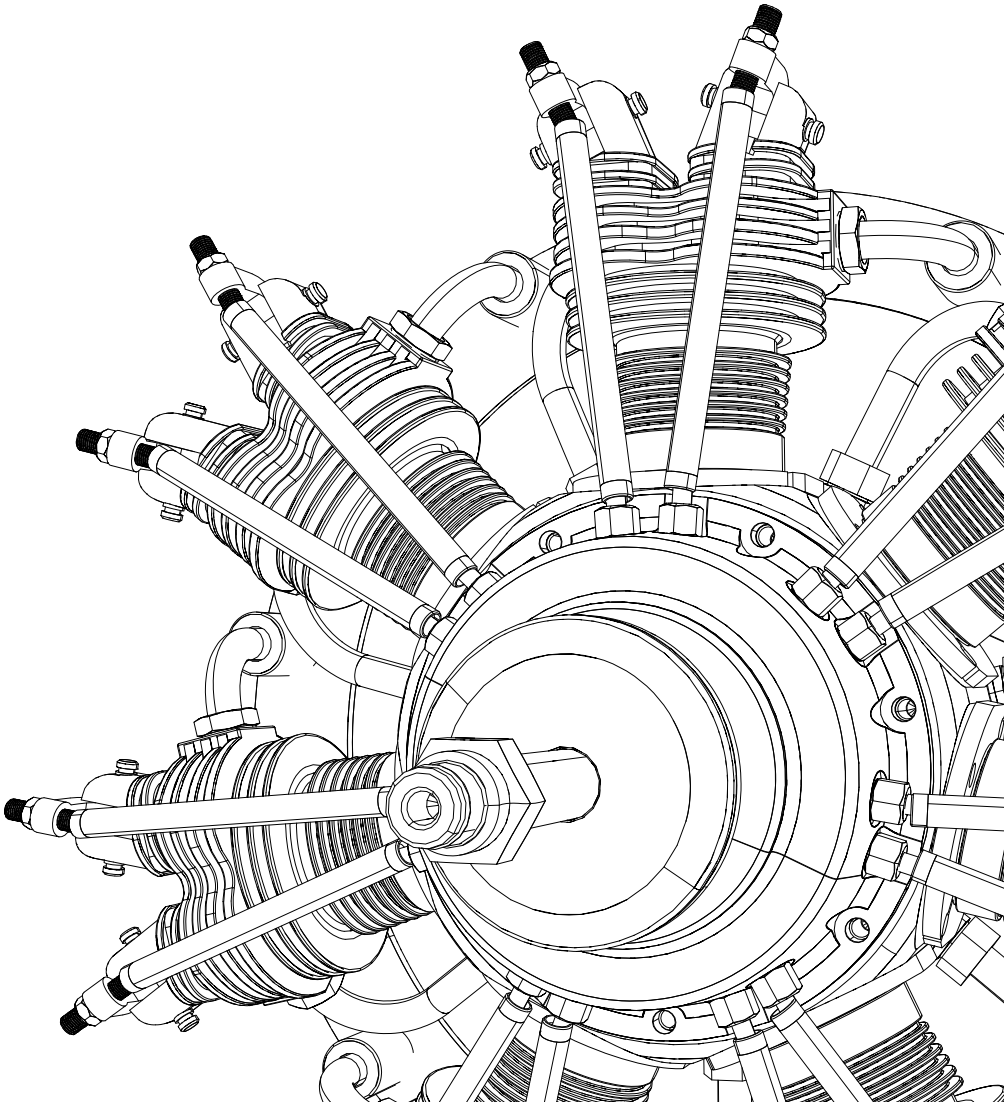
GLOW

E777
E735
E999

Evolution® Radial Glow Engines

EVOLUTION



NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, Inc. For up-to-date product literature, visit horizonhobby.com and click on the support tab for this product.

Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, serious injury or death OR create a high probability of superficial injury.

⚠ **WARNING:** Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product and NOT a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, Inc. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

⚠ **CAUTION:** This product can become extremely hot when in use, which could lead to burns.

Age Recommendation: Not for children under 14 years. This is not a toy.

Safety Warnings

Model engines produce a substantial amount of power, which can create unsafe situations if not used correctly. Always use common sense and observe all safety precautions when operating, handling or performing any procedure involving your engine. Failure to follow safety precautions could result in serious injury and property damage.

- Always ensure spectators, especially children, are at least 30 feet away when running the engine.
- Always ensure that the propeller is securely attached to the engine shaft and all retaining fasteners are tightened properly before EACH flight. Use of blue threadlock to tighten nuts is advisable.
- Always keep small parts out of the reach of children as they can be choking hazards.
- Always secure the airplane before powering the engine.
- Always keep your face and body away from the path of the propeller blades when starting or running your engine.
- Always stand behind the propeller when making carburetor adjustments.
- Always wear safety glasses or goggles when starting and running your engine.
- Always keep your fuel in a safe place away from sparks, heat or anything that can ignite.

- Always ensure the aircraft is secure and will not move once the engine is started.
- Always rebind your transmitter to your receiver(s) after setup and before first flight.
- Always ensure the throttle failsafe is set to low throttle in your transmitter.
- Always perform a range check prior to flight.
- Always cut off the fuel supply (pinch or disconnect the fuel line to the carburetor) or use the throttle linkage to shut off the air in order to stop the engine.
- Never use hands, fingers, or any other body part to stop the propeller.
- Never throw any object into a propeller to stop it.
- Never run the engine in the vicinity of loose small objects, such as gravel or sand, to avoid the propeller uncontrollably throwing such materials.
- Never wear loose clothing or a loose neckstrap when operating your model engine as these items could become entangled in the propeller.
- Never have loose objects such as screwdrivers, pencils, etc. in your pockets when operating your model engine. These could fall into the propeller.
- Never allow fuel to come into contact with eyes or mouth. Gasoline and other fuels used in model engines are poisonous.
- Always ensure gasoline and fuel are stored in a clearly marked container away from the reach of children.

Precautionary Guidelines

- Always mount the engine securely on a bench mount or high-quality engine mount.
- Always use the correct size and pitch of propeller for your engine. Refer to the Propeller Chart in this manual.
- Always confirm proper balance of your propeller prior to installation of the engine. Failure to do so could result in damage to the engine and/or the airframe.
- Always utilize an electric starter when possible to start your engine after checking for hydraulic lock in the cylinders.
- Always discard any propeller that is nicked, scratched, cracked or damaged in any way.
- Always run your model engine in a well-ventilated area. Model engines may produce possibly harmful carbon monoxide fumes.
- Always store your fuel safely in a sealed, water-resistant container.
- Always store fuel in a cool, dry location. Do not allow fuel containers to come in direct contact with concrete, as the fuel may absorb moisture.
- Always responsibly discard fuel if there is condensation and/or water inside the fuel container.
- Never return unused fuel from the fuel tank back into the fuel container.
- Never attempt to repair or modify a propeller beyond its intended use.
- Never handle model engines, mufflers and/or tuned pipes until they have had time to cool. They can become extremely hot when in use.

Introduction

Thank you for purchasing an Evolution® radial engine, one of the finest engines in the marketplace today. Evolution is committed to you having a positive experience and a lifetime of great operation with your new engine.

It is important that you read the engine manual before starting the engine for the first time. Evolution radial engines have different requirements than engines that you may have operated in the past. The manual provides important information for installing the engine, selecting the correct propeller and proper engine break-in procedures.

Engine Specifications

	EVOE735	**EVOE777**	**EVOE999**
cylinders	7	7	9
capacity	2.1 cu in (34.9cc)	4.7 cu in (77cc)	6.0 cu in (99cc)
capacity per cylinder	0.3 cu in (5.0cc)	0.66 cu in (11cc)	0.66 cu in (11cc)
bore	0.71 in (18mm)	0.93 in (23.7mm)	0.93 in (23.7mm)
stroke	0.79 in (20mm)	0.98 in (25mm)	0.98 in (25mm)
power	2.2 hp	4.8 hp	6.0 hp
crankshaft thread size	8 x 1mm	10 x 1mm	10 x 1mm
RPM range	1000–6300	1000–6000	1000–6000
maximum RPM	6700	6300	6300
engine diameter	7.3 in (185mm)	9.1 in (23mm)	10.2 in (26mm)
engine length	6.3 in (159mm)	7.9 in (20 cm)	7.9 in (20 cm)
weight	3.1 lb (1.4 kg)	5.7 lb (2.6 kg)	7.7 lb (3.5 kg)
fuel usage (approx.)	1.0 oz (28 ml)/min	2.2 oz (62 ml)/min	2.8 oz (80 ml)/min
propellers	**2-Blade** 17 x 8, 17 x 10, 17 x 12, 18 x 8	**2-Blade** 22 x 12, 24 x 10 **3-Blade** 22 x 10	**2-Blade** 26 x 10, 24 x 12

Needed to Complete

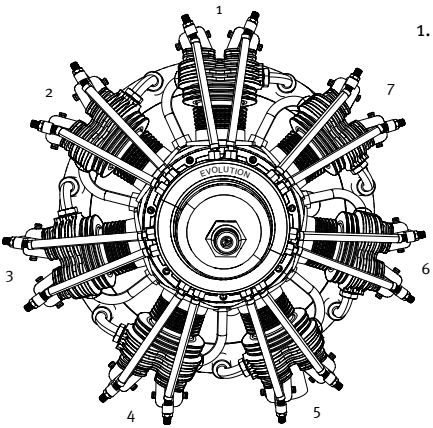
- Propeller
- Fuel line (3mm or 3.5mm ID)
- Engine mounting screws
- Engine baffles
- On-board glow driver (optional)
- Glow driver battery
  (1.2V 6000–9000mAh Ni-MH battery required)

Installing the Engine in the Airframe

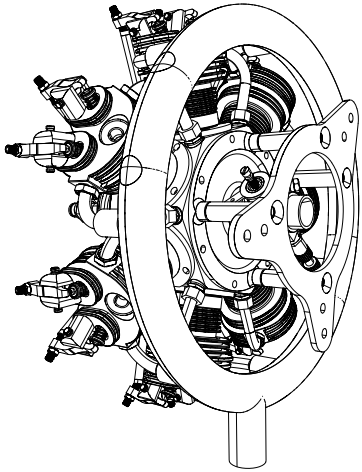
Properly installing the engine to either the airframe or an engine test stand for break-in is crucial to getting the most power and longest life from your engine.

⚠ **WARNING:** Always attach the engine mounting ring to a flat plate surface, such as 6–8mm plywood or carbon fiber plate.

⚠ **WARNING:** Never use a standoff between the firewall and the mounting ring. Vibration between the standoff and the mounting ring will damage the mounting ring and cause the engine to separate from the airframe.



1. Install the engine on the airframe with Cylinder #1 in the top (12:00) position (Cylinder #1 is above the Evolution Engines logo). You can modify this position if you are using the optional collector ring and you want the exhaust to exit the cowl in a specific direction.

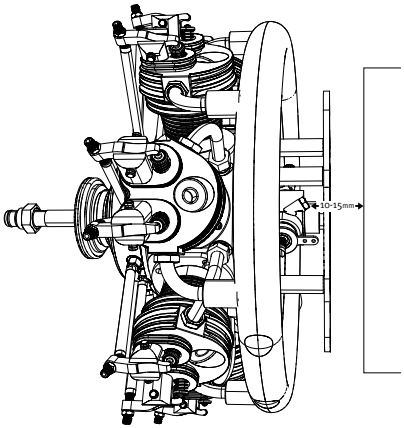


2. Use three steel screws (not included) to attach the engine mounting ring to the firewall. The size of the mounting ring screws will vary depending on the aircraft. Always use the largest size screw that will fit through the mounting ring.

To keep the engine from coming loose in flight:

Firewall with blind nuts installed: Always use split washers between the mounting ring screws and the mounting ring.

Firewall with through bolts installed: Always use nylon locking nuts with bolts through the firewall.



3. Relieve the firewall to make sure there is at least 10–15mm (3/8–5/8 in) separation between the carburetor and the firewall for smooth airflow to the carburetor and to allow adequate movement of the choke plate.

4. Make sure the fuel tank is no farther than 100mm (4 in) from the back of the firewall. The center of the fuel tank should be in line with the carburetor to prevent fuel siphoning.
   - You do not need to use a fuel pump with Evolution radial engines
   - Always use a fuel filter inside the fuel tank
   - We recommend using medium (3mm) or large (3.5mm) inner diameter fuel line
   - Make sure there are no sharp bends in the fuel line between the fuel tank and the engine.
5. Attach the throttle servo linkage to the throttle bellcrank on the engine mounting plate.

Attaching the Included Glow Plug Harness

Your engine includes a 7- or 9-cylinder glow plug harness. Attach the red wired harness to each of the cylinders and run the battery lead to a convenient mounting point for your glow plug connector. We recommend installing the glow plug connector in the cowl or the side of the fuselage. Remove one of the rear crankcase cover bolts. Attach the black wire to the bolt and install the bolt in the crankcase cover.

Keep the overall length of both the red and black glow harness wires as short as possible so the highest possible voltage will reach your glow plugs.

Glow Plug Starting Battery

The starting battery or on-board battery (whichever you prefer) should be a 1.2 V 6000–8000 mAh battery pack. We've had success building a pack of (6) 1300–1600 mAh NiCd (preferred) or NiMh (takes longer to cycle to full capacity) 1.2v battery cells wired in parallel so the total capacity is 7800–9600 mAh. The total draw on 7 glow plugs at 2.2–2.7 amps per plug is 15.4–18.9 amps. With a 7800–9600mAh battery pack, you can expect about 30 minutes of 'on-time'. Once the engine is broken in, you will likely find that the engine idles and runs very well without an on-board battery.

Installing On-Board Glow Drivers

Although Evolution Radial engines run just fine without constant glow heat applied, the use of on-board glow drivers allows for easier engine starting and can ensure adequate heat in the glow plugs at all times. This is particularly important on radial engines where oil collects in the lower cylinders. SonicTronics/McDaniel RC on-board glow systems work very well with Evolution radial engines.

7-cylinder applications: MCD477

9-cylinder applications: MCD479

We recommend installing the glow driver socket on the side of the cowl or fuselage and keeping the battery wires as short as possible. Longer wires between the battery pack and the glow drivers will reduce the amount of glow plug heat.

Attach the ground wire to one of the engine backplate screws or the crankcase.

Engine Cooling Requirements

It is very important to consider adequate cooling inside the airplane cowl. Engines require a cooling airflow exhaust:intake ratio of 3:1 to 5:1. A large open cowl may lead you to believe there is adequate cooling; however, you must make sure air is flowing through the cowl and the cylinder head fins. Achieving the proper ratio typically requires cowl and/or engine baffles to reduce the open intake area.

1. Ensure there is adequate cooling air moving through the cylinder head cooling fins. The intake air tends to move through the path of least resistance (between the cylinders) instead of through the cylinder cooling fins.

2. If necessary, add baffles to the engine to prevent air from moving between the cylinders. Engine baffles force cool air through the cooling fins and greatly reduce the intake area in the front of the cowl.
3. Add cooling baffles to the engine cowl between the top of the cylinder heads and the inside of the cowl. Do not cover the engine exhaust pipe with the baffles. This needs cool air over it to prevent exhaust valve damage.

Propeller Selection

Propeller selection is critical for proper engine operation. You can find recommended propellers and operating RPM ranges in the specification chart. Evolution radial engines have a lower operating RPM range and greater torque within that range that require more blade pitch and increased in-air pitch speed for your airplane.

To increase climbing and acceleration: Increase propeller diameter and decrease blade pitch.

To increase top speed: Decrease propeller diameter and increase blade pitch.

Make sure the propeller is securely mounted to the crankshaft before attempting to start the engine.

1. Remove the wire circlip from the crankshaft in front of the propeller nut.
2. Install the propeller on the crankshaft.
3. Secure the propeller with the hexagonal nut.
4. Securely fasten the circlip on the outside of the hexagonal nut.

⚠ **WARNING:** NEVER start the engine without the circlip securely fastened. Doing so may result in serious injury, as the propeller may become loose once the engine is started.

Fuel Selection

Evolution radial engines only require 6–7% synthetic oil after the break-in process. There is no need to use fuel with nitro content higher than 10%. Adding additional oil to the fuel will reduce the engine RPM. Please refer to the following chart for fuel recommendations.

Depending upon your choice of oil, you may find that the engine feels 'dry' at the end of a flight when using 6–7% oil. If you want, you can use 8–9% oil with any mix of flying fuel.

Tip: Many users combine one gallon of a good quality 15% nitro fuel (with 18% oil content) with a gallon of pure methanol to achieve a 7 1/2% nitro and 9% oil mixture.

	methanol %	**synthectic oil %**	**nitro %**
break-in			
1st hour	90%	10%	0%
2 to 3 hours	92%	8%	0%
flying without nitro			
1st hour	93%	7%	0%
2 to 3 hours	94%	6%	0%
flying with nitro			
1st hour	88%	7%	5%
2 to 3 hours	83%	7%	10%

Engine Break-In Process

A good break-in process is essential to the longevity and performance of your Evolution radial engine. You can complete the break-in process by either mounting the engine on a test stand or on an airframe. If you choose to mount the engine on an airframe, remove the cowl during break-in to ensure adequate cooling.

Specific fuel is required for the break-in process. Please refer to the chart above for the proper fuel. Break-in fuel contains additional oil compared to fuel you will use for everyday flying. The additional oil is critical for cooling and removing break-in debris from the engine.

During break-in, run the engine for 3–4 minutes at a time, allowing the engine to cool between runs. Vary the throttle between idle and ¾ throttle for the first 30 minutes of engine run time.

The engine break-in process will be complete after the first 3 hours of engine run time and you can begin tuning the engine for normal flying.

Checking for a Flooded Cylinder

Because of the nature of radial engines it is not uncommon for the lower cylinders to accumulate excess fuel or oil either in storage or during the priming process. Before beginning the starting process be sure to:

1. Rotate the propeller by hand. During the rotation, if you encounter a point where there is serious resistance to the rotation, STOP. This is an indication of a flooded cylinder and what you are feeling is hydraulic lock. Any further attempts to force the rotation of the engine can result in damage to the cylinder or conrod.
2. If you encountered hydraulic lock, remove the glow plug from the lower two cylinders and the engine should rotate freely. Continue to rotate until all the excess fluid has been removed from the cylinder.
3. Reinstall the glow plug and continue with the starting process.

Starting the Engine

Use a high quality gear oil to lubricate the outer parts of the valve train at the beginning of each flying day.

1. Fill the fuel tank with fuel.
2. Power off or disconnect the glow driver.
3. Make sure the fuel lines are properly connected to the carburetor.
4. Open the throttle to full open. The carburetor barrel should be fully opened.
5. Place the choke lever over the carburetor opening.
6. Rotate the propeller 3 or 4 times until you see fuel moving through the fuel lines.
7. Remove the choke lever from the carburetor opening and move the throttle stick to ¼ throttle.
8. Power on or connect the glow driver battery. Make sure the glow driver battery is fully charged.
9. Start the engine with an electric starter.

Engine Tuning

The break-in settings for the carburetor needles are:

High-speed needle: 2 1/2 turns open

Tip: For the initial break-in, open the high speed needle to 1-1/2 turns before starting.

Low-speed needle: 2 turns open

Use a tachometer (HAN111 or HAN156) to tune the engine based on RPM.

⚠ **WARNING:** Always adjust the carburetor from behind the propeller. Keep all loose items away from the propeller at all times. Never reach over or around the propeller.

1. Start the engine.
2. Move the throttle stick up until the engine is running at approximately 2,000 rpm.
3. If you are using separate exhaust pipes, use a temperature gun to make sure hot exhaust is exiting all engine cylinders. If using a collector ring, make sure that each cylinder is of a similar temperature to the others, indicating that it is running.
4. Move the throttle stick up to full (open) throttle.

   If the engine runs rough or if some cylinders are not operating, the fuel mixture is too rich. Lower the rpm to approximately to 2000 and lean the high speed needle valve by 1/8 of a turn.
5. Repeat Step 4 until the engine is running reliably at full (open) throttle. Proceed with the break-in process described above.

High-Speed Needle Tuning

Once the engine is running reliably at full (open) throttle:

1. Lean the high-speed needle 1–2 clicks at a time.
2. Wait 2–3 seconds for the engine to respond. Radial engines do not respond immediately to tuning changes.
   a. **If there is an increase in RPM:** Lean the high-speed needle an additional 2 clicks and wait for the engine to respond to the tuning change. If there is no increase in RPM after the change, turn the high-speed needle back to its previous position.
   b. **If there is a decrease in RPM:** Richen the high-speed needle 4 clicks and wait for the engine RPM to stabilize.
3. Repeat Step 2 until you determine the maximum RPM with the fuel and propeller you selected.
4. Richen the high-speed needle until the RPM lowers approximately 10% of the maximum RPM (Example: If the maximum is 6,500 RPM, richen the high-speed needle until the RPM drops to 5,900 RPM). Richening the high-speed needle allows the RPM to increase when the airplane is flying. Further adjustments can be made after flying the engine to fine-tune this needle position. This is a safe place to start to avoid overheating and an engine flame-out.

Low-Speed Needle Adjustment

Low-speed needle adjustment controls the fuel/air mixture at idle and the quality of the transition between idle and wide open throttle.

Tip: The use of an on-board glow driver will hide the effects of a poor low-speed needle setting. When you are tuning the low-speed needle, turn the on-board glow driver off and on to check the engine RPM response at idle.

Test

1. Allow the engine to run at idle with the on-board glow driver ON. Observe the engine RPM.
2. Turn the on-board glow driver OFF.

   If the engine RPM immediately drops, the low-speed needle is too rich. Lean the low-speed needle (turn clockwise).

   If the engine continues to run at the same RPM with the on-board glow driver OFF, the low-speed needle setting is close to ideal.

Low-Speed Needle Tuning

1. Adjust the high-speed needle for the current conditions.
2. With the on-board glow system off (if using one) or the glow starting battery disconnected, allow the engine to idle for 10–15 seconds. Rapidly advance the throttle from idle to full open.

   If the engine transitions with no hesitation, the low-speed needle is adjusted perfectly.

   If the engine slowly responds to throttle change and gradually reaches peak RPM, the low-speed needle is too rich. Lean out the low-speed needle (turn clockwise) 1/8 turn and test again.

   If the engine immediately stops running, the low-speed needle is lean. Richen the low-speed needle 1/8 turn and test again.
3. When the low-speed needle is adjusted correctly, check the high-speed needle setting again.
4. When you are satisfied with the needle settings, you should not need to adjust the low-speed needle again. The low-speed needle setting is mechanically controlled and it does not change with atmospheric conditions.

Maintenance

There are a few things you must do to ensure proper operation of your Evolution radial engine.

1. Use a high-quality gear oil to lubricate the outer parts of the valve train at the beginning of each flying day.
2. Use a high-quality, after-run oil such as Evolution Blue Block (EVOX1001 or EVOX1002) at the end of each day's flying. After-run oil protects the inside of the engine from corrosion and un-burnt fuel in the crankcase.

How to Apply Evolution Blue Block After-Run Oil

1. At the end of the flying day, empty the fuel tank.
2. Attach the glow starting battery to the plugs, and, with the engine at the normal starting throttle position, start the engine.
3. With the throttle at idle, allow the engine to die of fuel starvation.
4. With the throttle still at idle, restart the engine and allow it to die. Repeat as necessary until the engine will not start. You have now insured that most all of the un-burnt fuel is out of the engine crankcase.
5. Remove the glow heat.
6. Remove one of the pushrods from the number one cylinder and then remove the cam follower pin. You now have access to the crankcase to insert the after-run oil.
7. Insert 5–10ml of EVO Blue Block After-Run Oil through the cam follower guide.
8. With the throttle wide open and no glow heat applied, rotate the engine with an electric starter, or by hand, through 8–10 revolutions to disperse the oil throughout the engine.
9. Replace the cam follower pin and the pushrod. Leave the throttle wide open. Your engine is now ready for short term storage and awaits its next day at the field.

Evolution Blue Block After-Run Oil has been proven to provide long term protection against corrosion when applied immediately at the end of the flying day. Even waiting overnight before applying after-run oil will greatly increase the chances of corrosion within your engine. Take care of your investment. Please do not believe the claims of the fuel companies that claim “No need to use after-run oil”. They don’t own your engine!

3. Occasionally, you will need to adjust the valves. Adjust the valves the first time after one hour of engine run time. After the first hour, monitor the valve lash and adjust the valves as needed. Adjust the valves when the engine is cool. The lash is set at 0.1mm–0.25mm at the factory.

   Evolution Radial Valve Adjustment Guidelines

   1. Place the engine in a position (on or off your airplane) that allows you easy access to the valves on all the cylinders.
   2. Remove the glow plugs from all the cylinders. It is much easier to determine Top Dead Center (TDC) without the compression caused by installed glow plugs.
   3. Attach a propeller or other turning device (such as a short block of wood with the appropriate hole for the crankshaft) to the crankshaft and tighten it so you can easily rotate the crankshaft throughout this process.
   4. Start with the number 1 cylinder (this should be the upright cylinder above the Evolution logo).
      a. Rotate the crankshaft counter-clockwise and observe the pushrod movement.
      b. Note when you see the exhaust and then the intake pushrod move up to open the valves. This will occur during one rotation of the crankshaft.
      c. When the piston reaches the top of the cylinder during the next rotation, you are at the TDC of the compression/firing stroke.
      d. Position the piston at TDC of the compression/firing stroke. It is helpful to place a short piece of wooden dowel. (Don’t use steel, as you can mar the inner surface of the cylinder.)
   5. Use a feeler gauge to check the valve lash between the rocker arm and the top of the valve.

   a. We recommend setting the valve lash as close to 0.1mm as possible. If the valve lash is between 0.1 and 0.15mm (.004–.006”), you do not need to adjust the valve lash. The settings for the intake and exhaust valves are the same.

   b. Adjust the valves by loosening the locking nut and adjusting the screw until you can just feel the drag of the .1mm (.004”) feeler gauge as you pull it between the valve and rocker arm.

   c. Tighten the locking nut and recheck the valve clearance. Sometimes when tightening the nut, the adjustment will change slightly.

   6. Because the cam gear of our engines is a shared cam gear with all the cylinders and rotates at a 1:5 ratio, there are actually 5 different positions on the cam gear that need to be checked. Repeat step 4 & 5 above four more times to check each of these positions. If you find that the valve lash is smaller, readjust that valve. If it is greater, do not readjust the valve. A little loose is safer than too tight.
   7. Now move onto the next cylinder in an counter-clockwise directions and repeat steps 4 through 6. Do this for all cylinders.

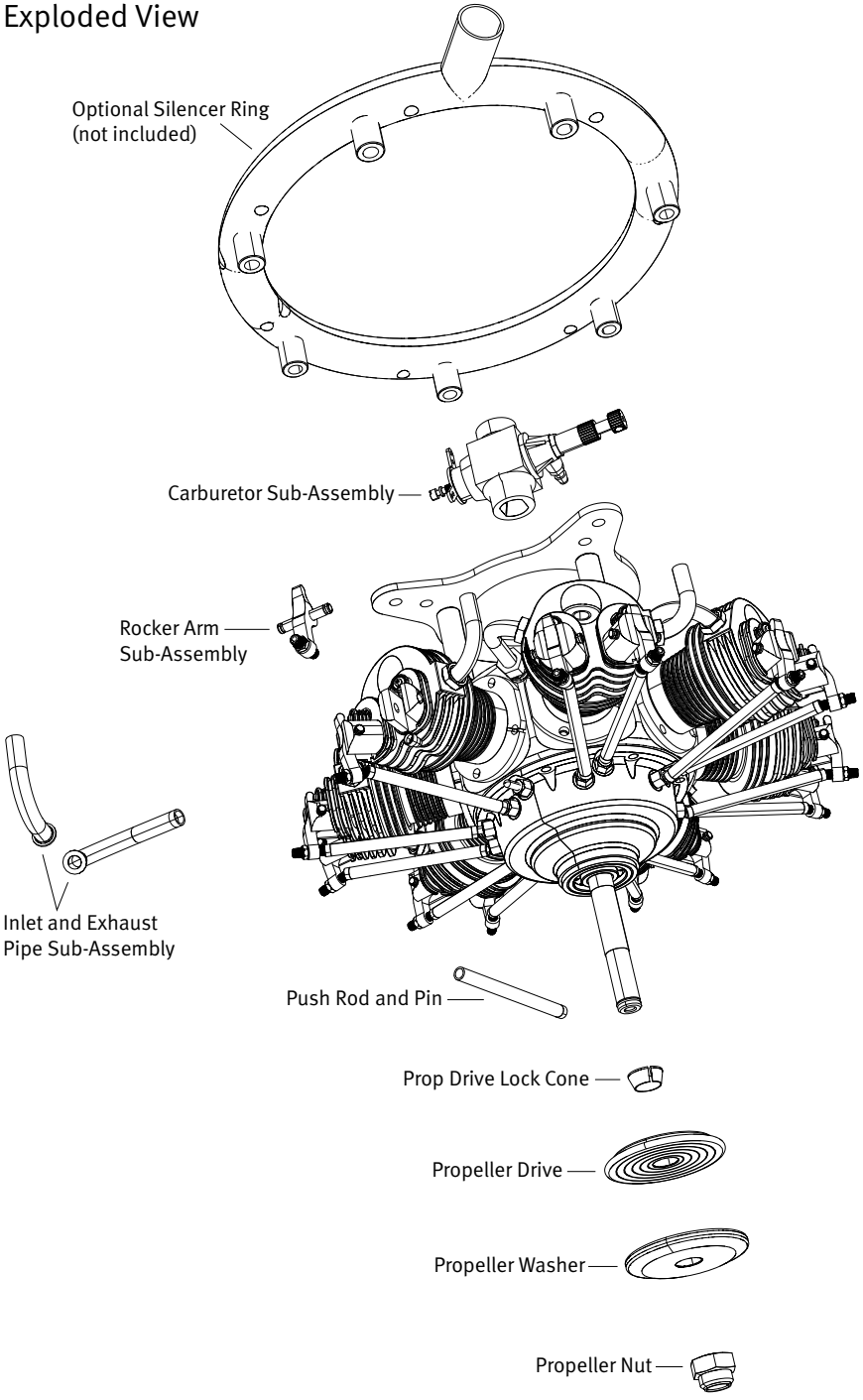
   Congratulations. You have now completed the valve adjustment process. This maintenance should not be required again for another 10 hours of running time.

Replacement Parts

NOTICE: If a repair outside of normal maintenance as noted in the manual is required, you MUST send the engine to an authorized Horizon Service Center for repair. Any repair work performed outside of an authorized Horizon Service Center will void the warranty.

Component Name	**EVOE735**	**EVOE777**	**EVOE999**
Propeller Washer	EVO73501	EVO77701	EVO77701
Propeller Drive	EVO73502	EVO77702	EVO77702
Propeller Nut	EVO73529	EVO77729	EVO77729
Prop Drive Lock Cone	EVO73535	EVO77735	EVO77735
Push Rod and Pin	EVO73516A	EVO77716A	EVO99916A
Rocker Arm Sub-Assembly	EVO73527A	EVO77727A	EVO77727A
Inlet and Exhaust Pipe Sub-Assembly	EVO73534A	EVO77734A	EVO99934A
Carburetor Sub-Assembly	EVO735115	EVO777115A	EVO777115A
Carburetor Rebuild Kit	EVO735115A	EVO777106A	EVO999106A
Silencer Ring	EVO735114	EVO777114	EVO999114
Glow Harness Assembly	EVO735120	EVO777120	EVO999120

Exploded View



1 Year Limited Warranty

What this Warranty Covers

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What is Not Covered

This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, or (v) Products not purchased from an authorized Horizon dealer.

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Law

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Warranty Services

Questions, Assistance, and Services

Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a Product Support representative. You may also find information on our website at www.horizonhobby.com.

Inspection or Services

If this Product needs to be inspected or serviced, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our

facility. An Online Service Request is available at http://www.horizonhobby.com under the Support tab. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

Notice: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

Warranty Requirements

For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Service

Should your service not be covered by warranty service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/Service/Request/.

Contact Information

	Horizon Hobby	Address	Phone Number/Email Address
United States	Horizon Service Center (Electronics and engines)	4105 Fieldstone Rd Champaign, Illinois 61822 USA	877-504-0233 Online Repair Request: www.horizonhobby.com/service
	Horizon Product Support (All other products)	4105 Fieldstone Rd Champaign, Illinois 61822 USA	877-504-0233 productsupport@horizonhobby.com
United Kingdom	Horizon Hobby Limited	Units 1-4 Ployters Rd Staple Tye Harlow, Essex CM18 7NS United Kingdom	+44 (0) 1279 641 097 sales@horizonhobby.co.uk
Germany	Horizon Technischer Service	Christian-Junge-Straße 1 25337 Elmshorn Germany	+49 (0) 4121 2655 100 service@horizonhobby.de
France	Horizon Hobby SAS	14 Rue Gustave Eiffel Zone d'Activité du Réveil Matin 91230 Montgeron	+33 (0) 1 60 47 44 70 infofrance@horizonhobby.com