

.60NX Control Line Evolution® Engine

USER GUIDE



E[®]
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, and serious injury 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. 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.

Additional Safety Precautions and Warnings

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

As the user of this product, you are solely responsible for operating it in a manner that does not endanger yourself and others or result in damage to the product or the property of others.

Always operate your model in open spaces away from full-size vehicles, traffic and people.

Carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.).

Keep all chemicals, small parts and anything electrical out of the reach of children.

Moisture causes damage to electronics. Avoid water exposure to all equipment not specifically designed and protected for this purpose.

Never lick or place any portion of your model in your mouth as it could cause serious injury or even death.

Introduction

Congratulations on your purchase of the newest and one of the most technically advanced 2-stroke model airplane engines in the world. Whether you are new to the sport of model aviation or an experienced flier, you will enjoy the features of the new Evolution® Engines Control Line (CL) Engine.

The Evolution .60NX CL Engine is designed to be the most powerful yet controllable in its class, extremely easy to start and operate, and provide years of enjoyable service. It incorporates many purpose built design features optimized for its use in the precision aerobatics arena; unique porting on cylinder liner for stunt, unique crankcase to support the porting in the liner, optimized combustion chamber design and a relocated needle

valve assembly to fit most everyone's current installations. Add to that the extreme lightweight of this powerhouse and it is a winner from the word go. Every feature is designed to ensure success with your new engine.

This user's guide is intended to provide the basic information to operate and maintain your Evolution CL Engine.

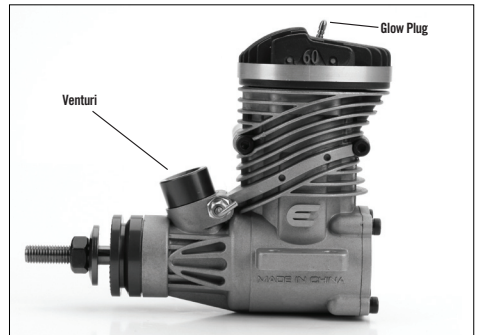
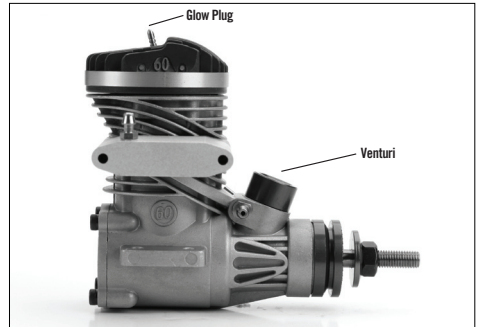
Important: While the Evolution engine is extremely easy to operate, if this is your first experience flying a model airplane, it is highly recommended that you have the help of an experienced modeler during the first few flights. Your local hobby store or flying club can put you in touch with an experienced pilot in your area.

Included Items

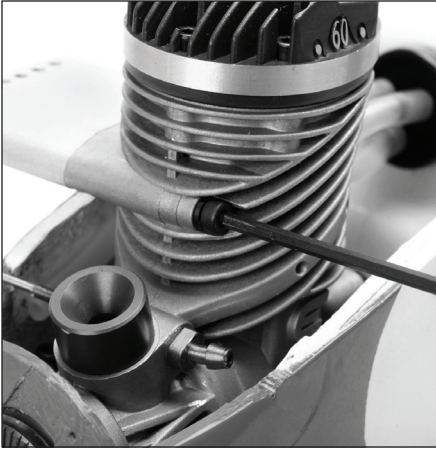
Engine	
Muffler (Standard)	EVO100601
Muffler (Tongue)	EVO060601L
Muffler Screw Gasket Set	EVO100E46A
Glow Plug (2 & 4 Cycle)	EVOGP1
Wrench	
Instructions	
Decal Sheet	

Optional Items

Glow Plug (2 & 4 Cycle)	EVOGP1
Glow Plug Wrench	HAN2510
Manual Fuel Pump	HAN118
Blue Block After Run Oil	EVOX1001
Metered Glow Driver with Ni-Cd	HAN7101
PowerPro™ 12V Starter	HAN161
Fieldmate™ Prebuilt Flight Box	HAN117



Mounting the Engine



Securely tighten all engine mounting screws and re-check tightness before each flying session.

All model airplanes include an engine mount of some type. It is extremely important that the engine be securely mounted to the airplane's engine mount. Follow the instructions included with the airplane for mounting the engine.



WARNING: Before each flying session, check that all engine mounting screws are securely tightened.

Installing the Muffler

Using the included muffler mounting screws and lock washers, attach your choice muffler with the included hex wrench. Be sure the lock washers are placed over the screws and that one gasket is placed between the muffler and the engine. A second gasket is included as a spare. Securely tighten both screws with moderate torque. The exhaust outlet of the muffler can be rotated to allow the exhaust outlet to be repositioned for various applications.

1. Loosen the lock nut on the back of the muffler and then loosen the assembly screw.
2. Rotate the rear half of the muffler to the desired position.
3. Tighten the assembly screw first and then tighten the lock nut.



WARNING: Read and follow all instructions and precautions before use.

Failure to do so could result in product malfunction, damage and injury.



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

NOTICE: Only use this product with parts specified in the product literature.

Note: After five runs, retighten the muffler mounting screws. Heat and vibration from these first few runs can cause the gasket to compress. Once the muffler screws are retightened, they will remain tight and leak-free until the muffler is removed. Also, if you have chosen the tube-style muffler, tighten the muffler thru-bolt at this time as well—loosen the lock nut on the back of the muffler, tighten the thru-bolt via the screwhead at the front of the muffler then retighten the lock nut at the rear.

EVO Team Tip:

One of the many causes of a muffler loosening is the paper gasket material becoming crushed by



The muffler mounting accessory package includes mounting screws (2), lock washers (2), muffler gaskets (2) and an L-wrench.

the muffler mounting to the engine. This leads to the screws actually loosening on their own. The surfaces, engine crankcase mount and muffler mounting face, are machined surfaces, so there should be little, if any, leaks between these two surfaces. We suggest mounting the muffler without the included gasket.

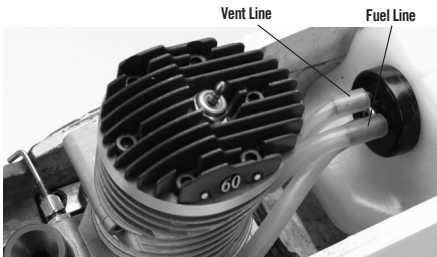
Attaching the Propeller and Spinner



Securely tighten the prop nut using an adjustable wrench.

Attaching the Fuel Lines

Using medium silicone fuel tubing, attach the fuel tank's clunk line to the fuel nipple. This line will supply fuel to the engine. Attach the vent line to the muffler pressure



nipple. This line pressurizes the fuel tank with the muffler pressure, creating consistent fuel flow, regardless of the airplane's attitude.

Starting the Evolution Engine

Fuel

The Evolution engine comes baseline adjusted from the factory. We recommend using high-quality Cool Power Omega or Power Master fuels containing 5 to 10% Nitro. The Evolution engine has been test run using these fuels. If another brand of fuel is used, it may be necessary to slightly adjust the needle valve to compensate for the differences in fuel.

Glow Plug

The Evolution engine comes with a specially designed "Super Plug". The plug's unique shape directs incoming fuel/air mixture away from the plug element. When replacing the plug, be sure to replace it with another Evolution 2–4 stroke Super Plug (EVOGP1).

Starting the Engine

Step 1. Fill the tank with the above-mentioned 5 or 10% fuel.

Step 2. Reattach the fuel lines, making sure the vent and clunk line are attached to the fuel nipple and the muffler pressure nipple.

⚠ CAUTION: Do not attach the glow driver yet.

Step 3. Place your thumb over the venturi and flip the prop counterclockwise through 6–10 complete revolutions, thus priming the engine. Have a helper hold your airplane.

Step 4. Attach the glow driver.

Step 5. Turn the engine over using an electric starter. The engine should fire within seconds of applying the starter.

Step 6. Remove the glow driver.

Step 7. Allow the engine to run for 30 seconds. And then adjust the needle valve for your desired ground rpm. We suggest you set the needle valve so the engine is running at a fast 4-cycle, if you are using the engine for stunt and sport applications.

Note: We have found that the best rpm to start with for this engine is to set the needle so the ground rpm is 8200–8500. This will provide a solid 4-stroking style run with a 2–4 break when needed. Pick the appropriate prop to match the application and airplane. A 5–6 pitch prop at these rpms will yield a 5.2–5.4 second lap time on 65- to 67-foot lines. We recommend as a starting point the mid-sized venturi .181 in (4.6mm) and a 12 x 6 to 13 x 4.5 two-blade propeller.

Why would fuel go “bad”?

The largest portion of the fuel is methanol (alcohol). Methanol is hygroscopic; it attracts moisture. This can cause your fuel to be contaminated with water, which will cause poor engine performance. Additionally, the UV rays in sunlight will eventually break down the nitromethane if the fuel jug is stored in sunlight for long periods of time.

How can you tell when your fuel has gone “bad”?

The first indications will generally be the inability to start the engines at previously run needle-valve settings. Another clue might be that the engine has very poor idle, runs but bogs down tremendously during run up and/or will not attain the same rpms you are used to.

How do I keep my fuel fresh?

If you have the opportunity, look for someone at a flying field on a sunny day who has a jug of fuel that is only 1/4 full. What you may notice is that there are droplets attached to the top and sides of the container. This is the moisture in the air condensing inside the jug because of the greenhouse effect of the semi-translucent plastic jug. The only way to overcome the greenhouse effect is to store your fuel in a metal can.

You can also combat the effects of the moisture in the air by squeezing all the extra air from your fuel container at the end of the day or transferring your fuel into smaller containers as the level of the fuel is reduced in your gallon jug. Many pilots will invest in 1/2-gallon or quart-size containers and only bring that amount of fuel to the field on any given day. This allows their main supply of fuel to stay at home in a controlled storage environment, virtually ensuring problem-free fuel.

How to tell if your glow plug is bad

The glow plugs on the market today are designed to provide good service to the user and may last a long time or a short time, all depending on the way you choose to operate your engine.

Physical indications that you might need to change the glow plug are:

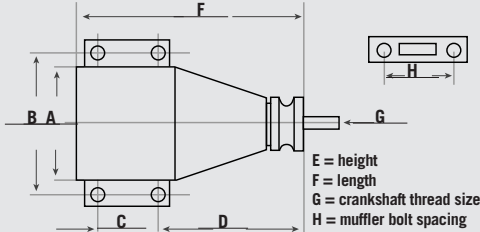
1. Twisted or mangled glow plug element (usually caused by too high a compression ratio).
2. Small “bumps” are attached to the glow plug element. This is generally most noticeable during the break-in process. These are actually tiny pieces of aluminum that have attached to the element and will severely hinder the operation of the glow plug.
3. The glow plug element is no longer shiny but is dull, almost a white powder color. (This just comes with age and is a by-product of the catalytic reaction. The shinier the wire, the better the catalytic reaction can be.)

Operating indications that you need to change your glow plug are:

1. The glow element will not light with a charged glow igniter. This indicates there is a physical short or breakage in the element wire itself.
2. Glow plug lights but the engine will not continue running once the battery is disconnected. (This is usually an indication of the microscopic particles we discussed earlier.)
3. Glow plug lights, engine runs but there is a perceptible loss of rpm at full throttle when the battery is disconnected. This is a typical indication that the white powder residue is building to the point that the catalytic reaction of the glow plug is no longer anywhere close to being optimum.

Evolution Control Line Engine Specifications

Items	Disp (c.i.)	Bore (mm)	Stroke (mm)	Weight (oz)	Crank K (ISO)	Cylinder	Propeller
EVOE0365	.60	24.0	.21.5	12.7	1/4 X 28	ABC	12 x 6 or 13 x 4



Dimensions(mm)	A	B	C	D	E	F	G	H
EVOE0605	36	44	17.5	52.5	94	110	1/4 X 28	37

Troubleshooting Guide

Engine Won't Fire

- Glow starter not charged
 - Charge glow starter
- Glow plug burnt out
 - Replace glow plug
- No fuel is getting to the carburetor
 - Check tank, fuel lines reversed
- The starter is reversed
 - Reverse the polarity on the starter cables

Engine Quits Repeatedly

- Needles need adjusting
 - See adjustment procedure
- Bad or old fuel
 - Replace with fresh fuel
- Worn out glow plug
 - Replace with new EVOGP1 super plug

Engine Runs Inconsistently

- Hole in fuel line
 - Replace fuel line
- Bad or old fuel
 - Replace with fresh fuel

Maintenance

After each flying session:

1. Fully drain the fuel from the tank.
2. Start the engine and run it until the fuel is completely run out of the engine.
3. Try starting the engine three more times or until it will no longer fire. This gets all the fuel out of the engine.

At the end of every flying session, several drops (about 10) of after-run oil (Evolution Engine's Blue Block Rust Inhibitor) should be applied into the venturi and the engine should be flipped over for a few seconds with the starter. This will prevent rust and corrosion.

WARRANTY AND REPAIR POLICY

Warranty Period

Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warranties that the Products purchased (the "Product") will be free from defects in materials and workmanship for a period of 2 year from the date of purchase by the Purchaser.

2 Year Limited Warranty

Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for all warranty claims.

(b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any Product by Purchaser must be approved in writing by Horizon before shipment.

Damage Limits

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product,

you are advised to return this Product immediately in new and unused condition to the place of purchase.

Law: These Terms are governed by Illinois law (without regard to conflict of law principals).

Warranty Services

Questions, Assistance, and Repairs

Your local hobby store and/or place of purchase cannot provide warranty support or repair. 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 Repairs

If this Product needs to be inspected or repaired, please use the Horizon Online Repair 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 Repair Request is available at www.horizonhobby.com <http://www.horizonhobby.com> under the Repairs 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 repair. 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 batteries to Horizon. If you have any issue with a battery, please contact the appropriate Horizon Product Support office.

Warranty Inspection and Repairs

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Repairs

Should your repair not be covered by warranty the repair 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 repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty

repair 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 inspection or repair, you are agreeing to Horizon's Terms and Conditions found on our website under the Repairs tab.

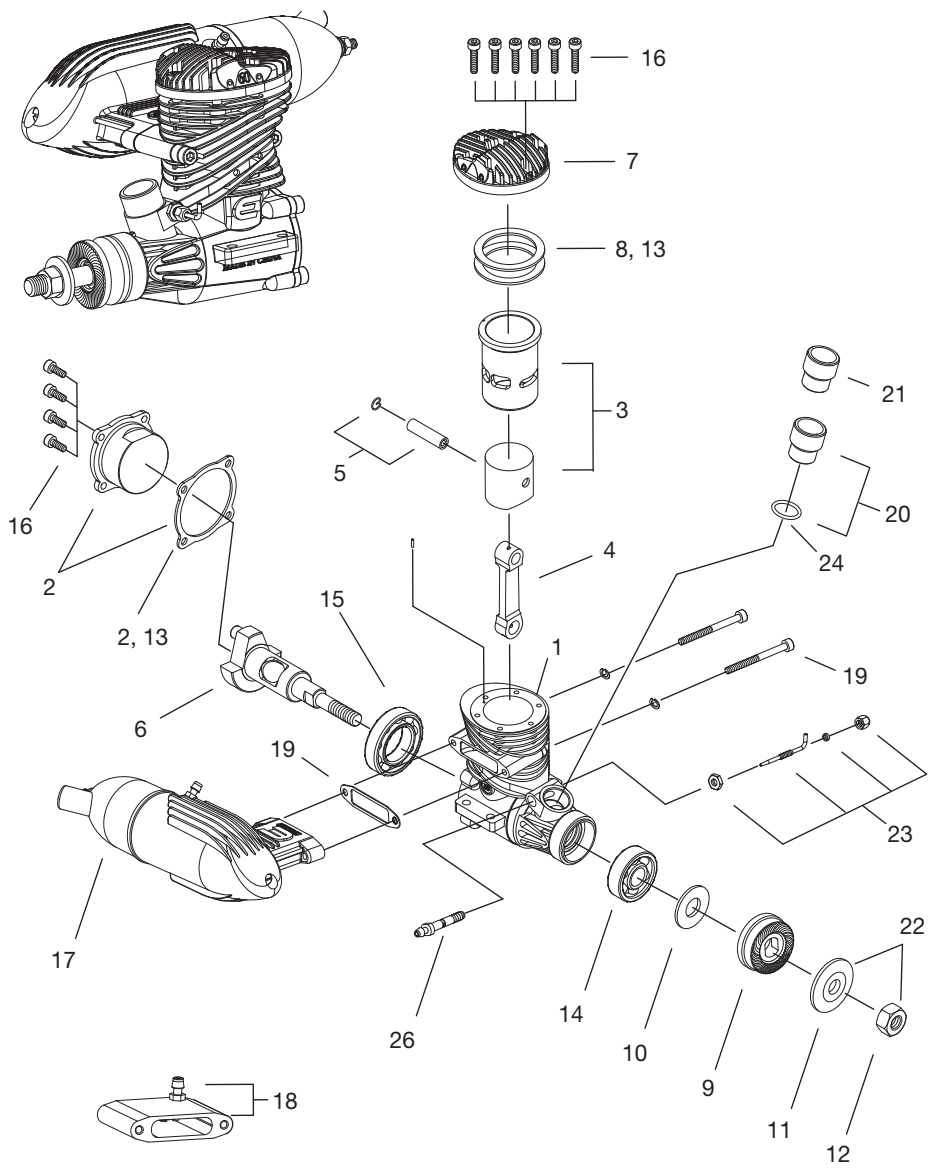
Warranty and Service Contact Information

Country of Purchase	Horizon Hobby	Address	Phone Number / Email Address
United States of America	Horizon Service Center (Electronics and engines)	4105 Fieldstone Rd Champaign, Illinois, 61822 USA	877-504-0233 Online Repair Request: visit www.horizonhobby.com/repairs
	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	Hamburger Str. 10 25335 Elmshorn, Germany	+49 4121 46199 66 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

Parts Contact Information

Country of Purchase	Horizon Hobby	Address	Phone Number / Email Address
United States	Sales	4105 Fieldstone Rd Champaign, Illinois, 61822 USA	800-338-4639 sales@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 Hobby GmbH	Hamburger Str. 10 25335 Elmshorn, Germany	+49 4121 46199 60 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

Parts Diagram



#	Description	Part Number
1	Crankcase	EV0060101L
2	Rear Cover with Gasket	EV0052102
3	Piston & Liner (ABC)	EV0060203L
4	Connecting Rod (Dual Bushing)	EV0052204
5	Wrist Pin with Clips (Teflon®)	EV0052213
6	Crankshaft (1/4 x 28)	EV0060210L
7	Cylinder Head	EV0060103L
8	Cylinder Head Shims	EV0060112
9	Prop Driver	EV0040219
10	Spacer Washer	EV0100219B
11	Prop Washer	EV0100220
12	Prop Nut (1/4 x 28)	EV0100221
13	Gasket Set, Engine	EV0060416
14	Ball Bearing, Front (Rubber Seal)	EV0100109
15	Ball Bearing, Rear (Open Race)	EV0052110
16	Screw Set, Engine	EV0052901
17	Muffler (Standard)	EV0100601
18	Muffler (Tongue Style 46–60)	EV0060601L
19	Muffler Mounting Screw Set with Gasket	EV0100E46A
20	Venturi .197in (5.0mm)	EV0060827L
21	Venturi .181in (4.6mm)	EV0060827L46
22	Propeller Washer & Nut Set : 1/4 x 28	EV0040228
23	Needle Valve Complete Assembly	EV0060830
24	Carburetor Gasket O-Ring Set	EV0052E52B



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