

Arrow Shark TS760-Marine Onboard E-Starter

Owner's Manual



The TS760-Marine Onboard E-Starter is the result of years of experience that Arrow Shark has achieved with RC boat onboard electric starters for gas engines. The TS760-Marine will work with virtually all brands and versions of RC marine engines that are available on the market today. These include Arrow Shark, Zenoah (and clones), CY, RCMK and Quickdraw, and with all formats of side exhaust, rear exhaust, twin inline or counter-rotation models.

The TS760-Marine is powered by an OEM 760 series high-torque and high-rpm electric motor with an 11.1 or 14.8 volt LIPO battery (not included). It has the torque and power to start up to 60cc gas inline engines. A clever design of gearbox seal retains grease inside the casing to protect the gears from overheating and wear for reliability and longer life.

The TS760A-Marine comes with the R-One remote device which allows you to start your gas engine by a single click on the third channel of your transmitter. The R-One is designed to be fully water-proof and will continue to function even when sinking underwater, so there is no worry that the device will be damaged with splashes of water. It has a drain hole so any water that does get in can quickly flow out. Also, the R-One will provide a 6V power supply from the E-Starter LIPO for your radio system, avoiding the need for a separate Rx/servo battery. Simply turn on the power switch of the R-One and your receiver and servos will be powered from the LIPO battery.

Important Notes

#1: Never suddenly stop your engine from high speed as this will damage the one-way bearing in the TS760-Marine kit. Ideally, install the TS760-Marine on an engine fitted with a clutch. When you are ready to stop your engine, close the throttle gently to bring the engine down to idle speed and then shut it off. (Recommend to use kill switch)

#2: Use a 3S (11.1V) LIPO battery pack for single cylinder engines, or a 4S (14.8V) for twin inline engines. If your single cylinder engine has a high compression and a 3S LIPO does not provide enough power to start it, change to a 4S pack.

#3: Do not use a LIPO pack larger than 4S (14.8Volt) on the R-One as any higher voltage LIPO battery will cause damage.

#4: When starting a cold twin cylinder engine with the TS760-Marine, we recommend first starting on one cylinder by removing the spark plug from the second cylinder. Let the engine run for 30 seconds on the single cylinder to warm up, stop the engine and replace the spark plug for the second cylinder, and then re-start the engine on both cylinders.

#5: The R-One will supply 6V power from the E-Starter LIPO for your radio system.

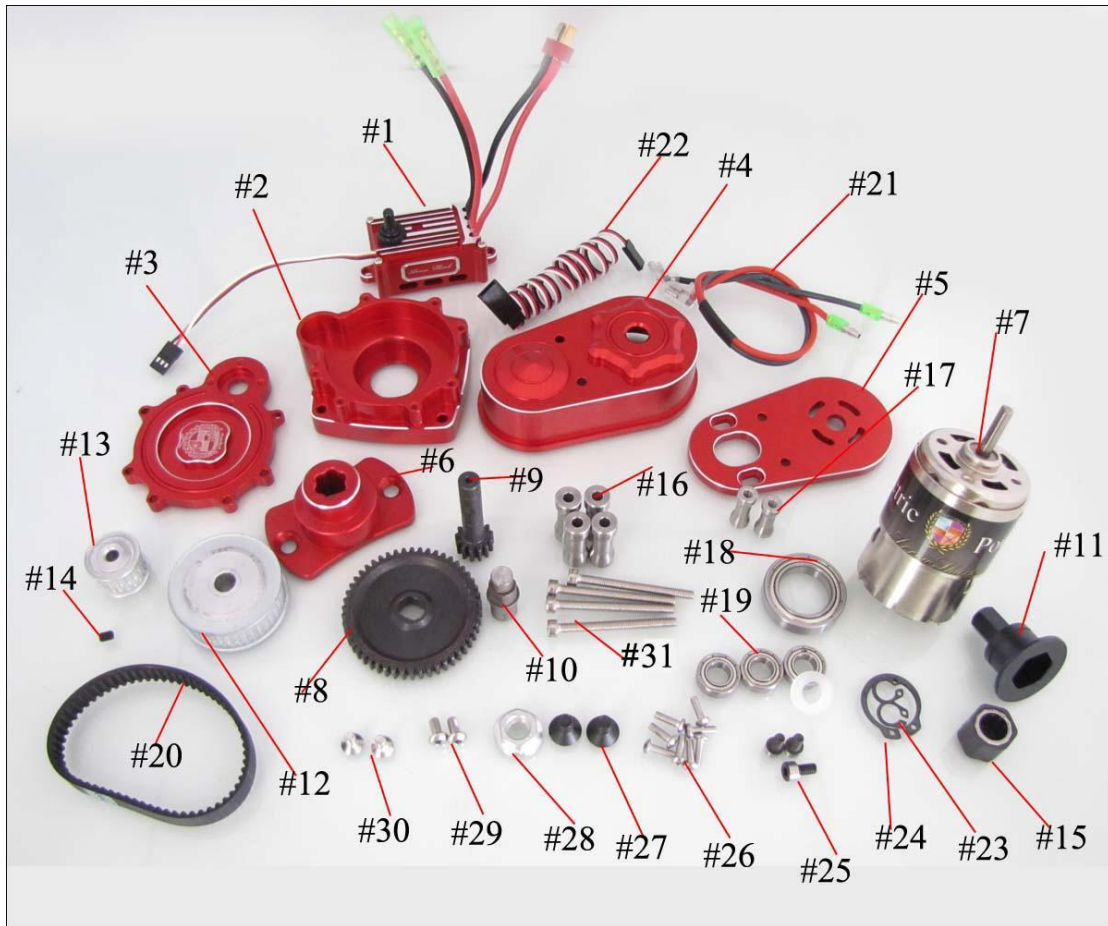
You do not need a separate battery for that. Simply turn on the power switch of the R-One and your receiver and servos will be powered from the LIPO battery.

#6: If the engine does not start within three seconds, turn off the third channel switch and pause before trying again.

Why only three seconds operation each time?

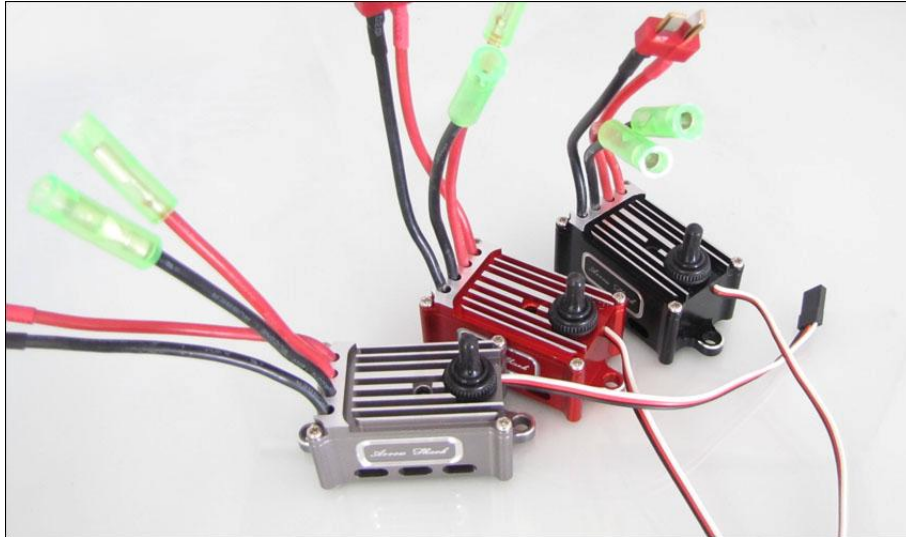
The peak electric current from the battery to the motor is achieved in those first few seconds of operation. That delivers the maximum torque and rpm of the motor. After three seconds, the motor's power reduces slightly. Pausing after three seconds if the engine hasn't started means that, when you try again, you will once more have maximum power for the starter system. If the engine is warm, you will only need one second of starter operation to start the engine.

Parts List



Part Number	Description	Part Number	Description
#1	R-One Remote Device	#16	Stainless Steel Stands x 4
#2	Billet Gear Box	#17	Stainless Steel Cover Standsx2
#3	Billet Gear Box Cover	#18	Main Bearing
#4	Billet Belt Wheel Cover	#19	16x8 Bearing x 3
#5	Billet Belt Wheel Plate	#20	Drive Belt
#6	Billet Flywheel Adaptor	#21	Motor Power Wire
#7	760 Series High-Rev Motor	#22	Receiver Extension Cord
#8	50T Harden Gear	#23	D8 Clip
#9	13T Shaft Gear	#24	D20 Clip
#10	Hardened Center Shaft	#25	M4x8 Bolts x 3
#11	Hardened Drive Shaft	#26	M3x10 Bolts x 11
#12	Main Belt Wheel	#27	M6x6 Bolts x 2
#13	Motor Belt Wheel	#28	Crankshaft Nut
#14	M4 Hex Nut	#29	M4x10 Bolts x 2
#15	One Way Bearing & Adaptor	#30	M4x6 Bolts x 2
		#31	M4x40 Bolts x 4

R-One Remote Device Set Up



Transmitter Set Up

In order to use the R-One remote device correctly for your TS760-Marine kit, you will first need to set up the third channel on your transmitter correctly. Please follow the instructions below for the correct setting.

“Left Forward” Setting



Go to the “End Point Adjustment” (EPA) in your transmitter, and select the Third Channel. Adjust the “Left Forward” to the top percentage available in your transmitter - usually 100% or 120%. This will determine the RPM for the electric motor in the E-Starter kit when you click on the third channel switch to start your engine. If you feel the RPM is too high, you can set it at lower percentage such as 80% or 90% to obtain the optimum RPM to start your engine.

“Right Forward” Setting



After you set the “Left Forward” correctly for the Third Channel on the “End Point Adjustment”, then click on the third channel switch to move the radio to the “Right Forward” setting. Adjust that to 0% which will enable you to turn off the R-One device when your gas engine is started. If this rate is set at any higher than 0%, when you turn off the third channel switch the electric motor will spin counter-rotation which is not needed for your starter system.

Before you connect the LIPO battery to the R-One device, make sure the Third Channel setting is at the “Turn Off” position which should be at 0% of the “Right Forward” EPA setting. Otherwise, when you turn on the power switch of the R-One device, the electric motor will start running and you might not be ready for engine starting at that moment.

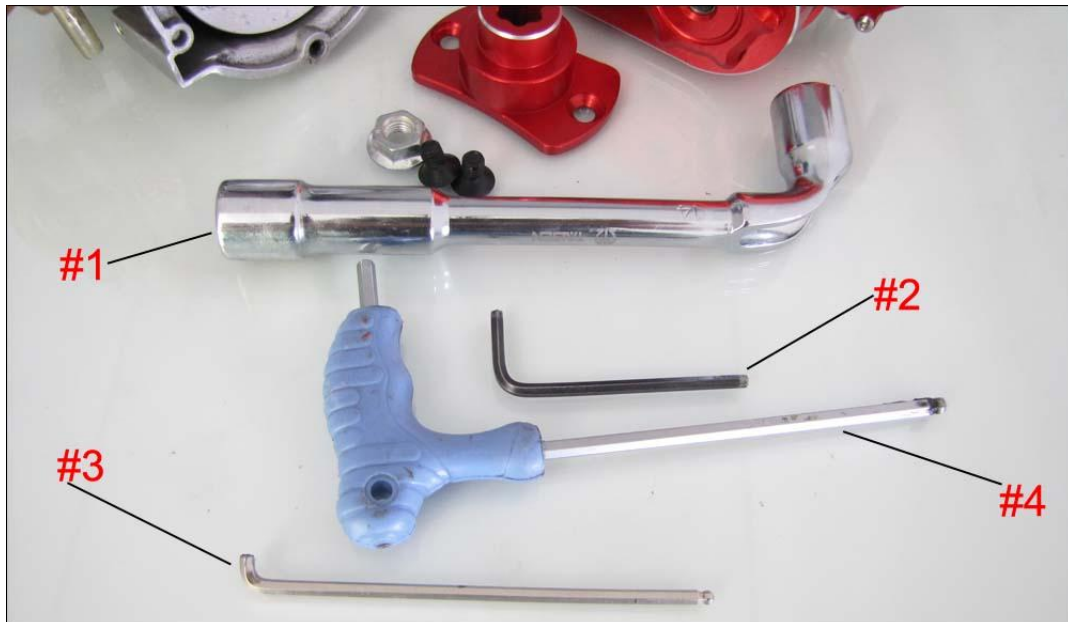
Note: If you use the R-one on a counter-rotation engine, then set the “Left Forward” at 0% and “Right Forward” at 120%.

Installation of the TS760-Marine



The TS760-Marine Onboard E-Starter is the result of years of experience that Arrow Shark has achieved with RC boat onboard electric starters for gas engines. The TS760-Marine will work with virtually all brands and versions of RC marine engines that are available on the market today. These include Arrow Shark, Zenoah (and clones), CY, RCMK and Quickdraw, and with all formats of side exhaust, rear exhaust, twin inline or counter-rotation models.

Tools Required



#1: 14mm Wrench

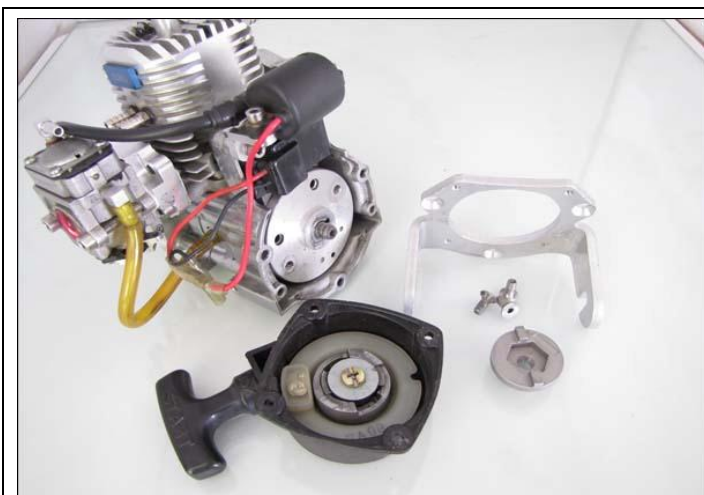
#2: 3mm Socket Hex Wrench

#3: 4mm Socket Hex Wrench (Short Head)

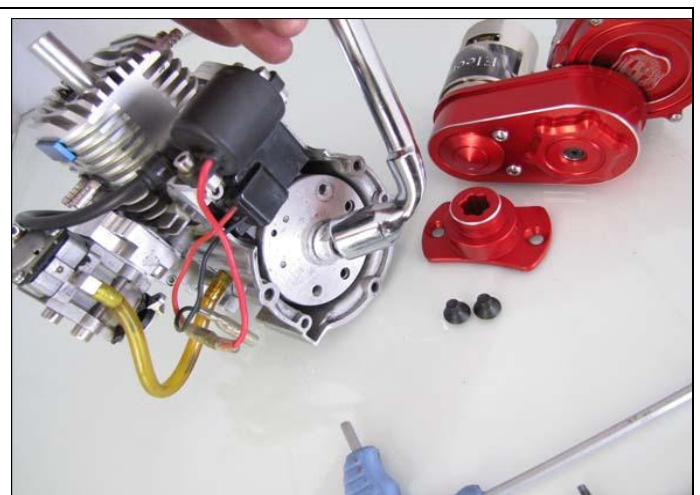
#4: 5mm Socket Hex Wrench

#5: Piston Stopper.

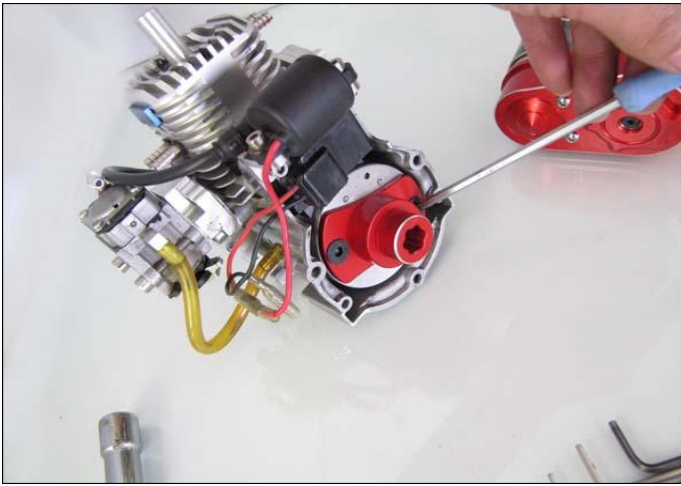
The engine in the below diagram is a standard Zenoah G290PUM



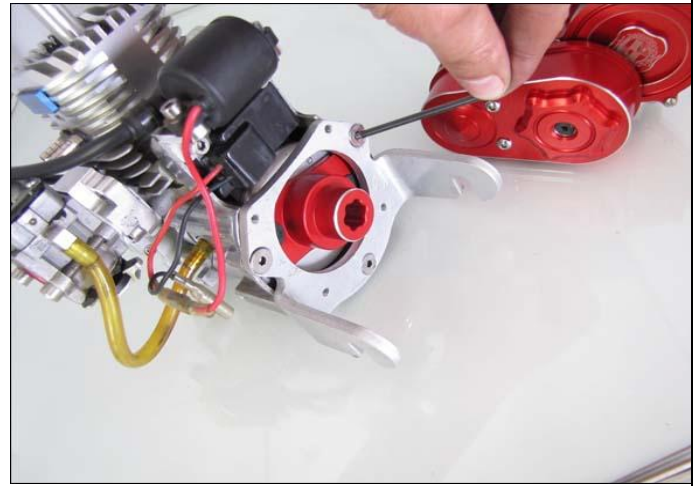
#1: Insert a piston stopper into the cylinder head, then disassemble the pull starter, back engine mount and starter pulley.



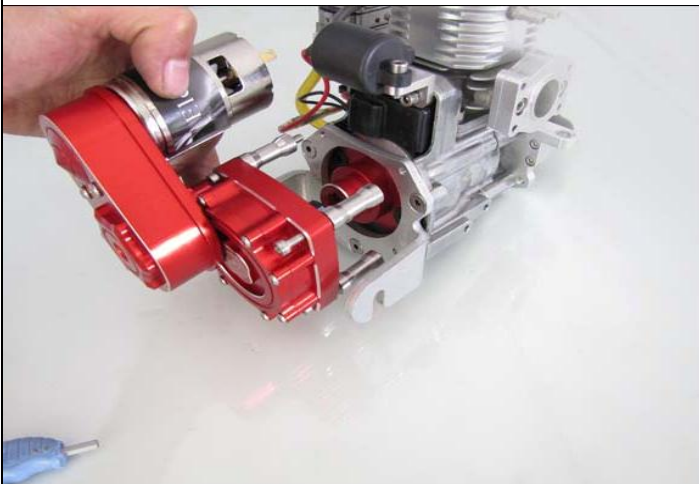
#2: Screw the crankshaft nut (part#28) onto the crankshaft and tighten it with 14mm wrench.



#3: Install the billet flywheel adaptor (Part#6) onto flywheel and tighten it with supplied bolts (Part#27).



#4: Install the back engine mount back on with its original bolts.



#5: Match the 4 bolts on TS760-Marine Kit onto the 4 pull starter installation thread holes.



This bolt must use short head hex wrench to tighten

#6: Tighten the 4 bolts by using a short head 4mm hex wrench to complete the installation.

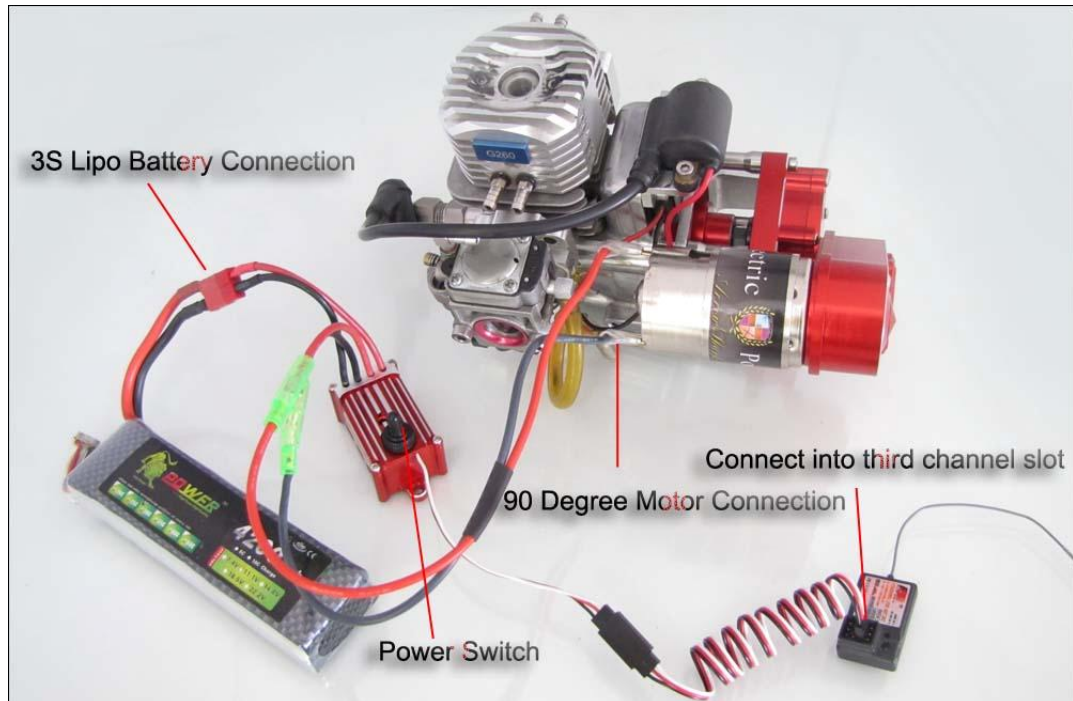


Carburetor Side installation completed!



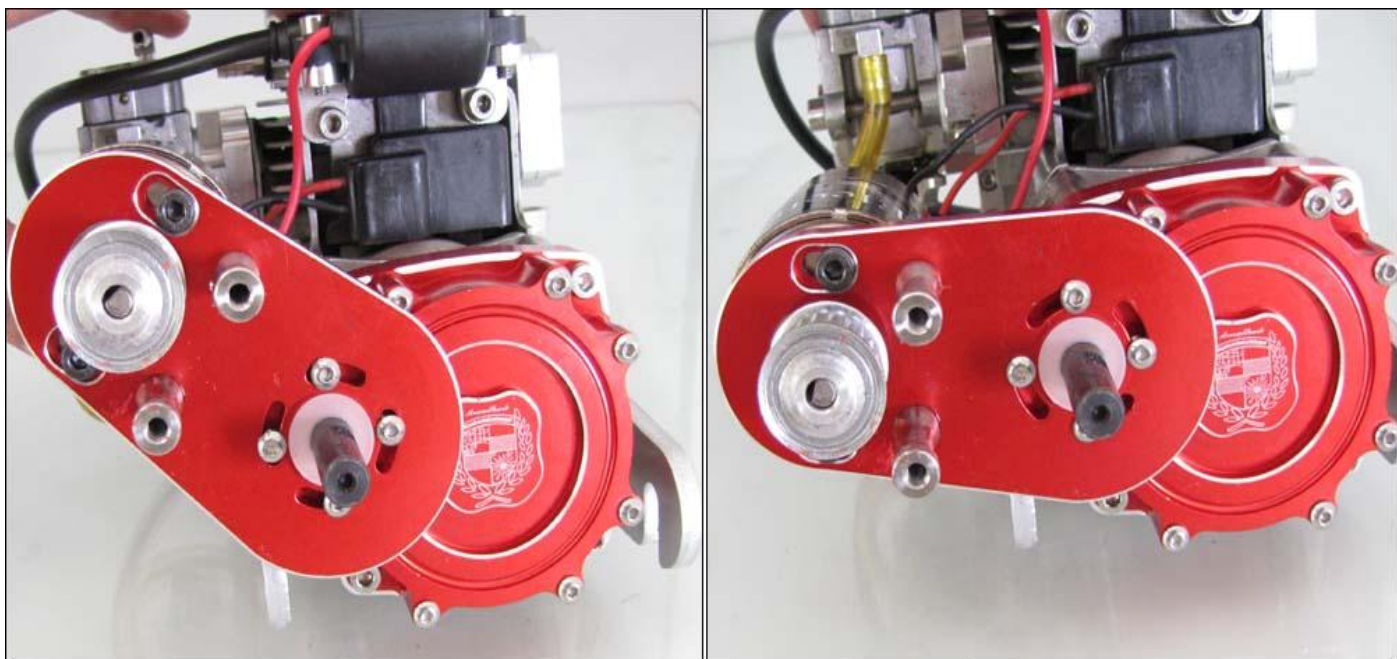
If required, you can rotate the TS760-Marine Kit 90 degrees and install it on the exhaust side as pictured above.

Wiring Connection Diagram



You need to provide a Three Channel Transmitter and a Three Channel Receiver for the R-One remote device; any FM or 2.4GHz radio will work. Connect the receiver wire from the R-One device extension cord into the third channel slot in your receiver.

Electric Motor Position Adjustment



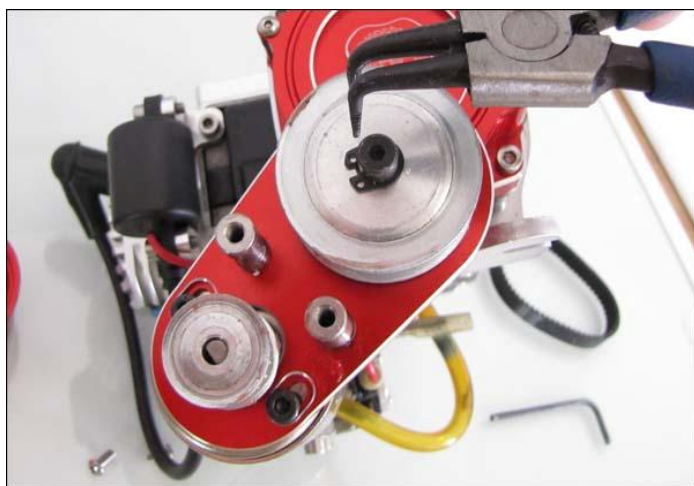
Adjusting Steps



#1: Unscrew the belt wheel cover.



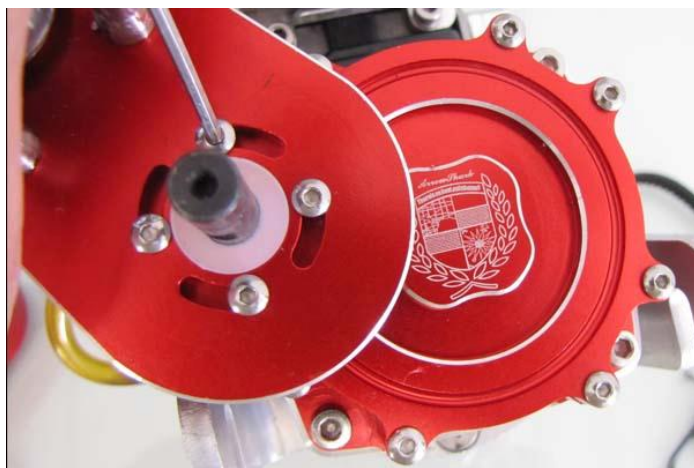
#2: Loosen the motor bolts, and take out the belt.



#3: Release the clip from the gear shaft.



#4: Unscrew the bolt from the main belt wheel.



#5: Take out the belt wheel, and loosen the 4 bolts as shown in the picture above.



#6: Now you can adjust the motor position by rotating the plate. When positioned as required, tighten the 4 bolts and re-install everything.

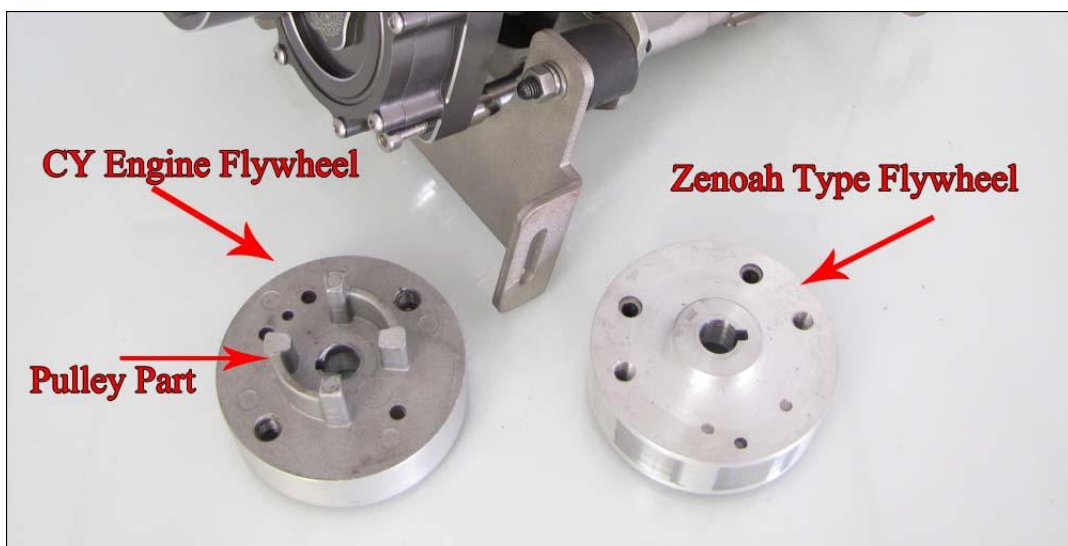
Note: The four adjusting bolts were not factory-installed with loctite but, after you set your preferred position, apply a little loctite on each bolt for added security.

Installation of TS760-Marine to CY engine



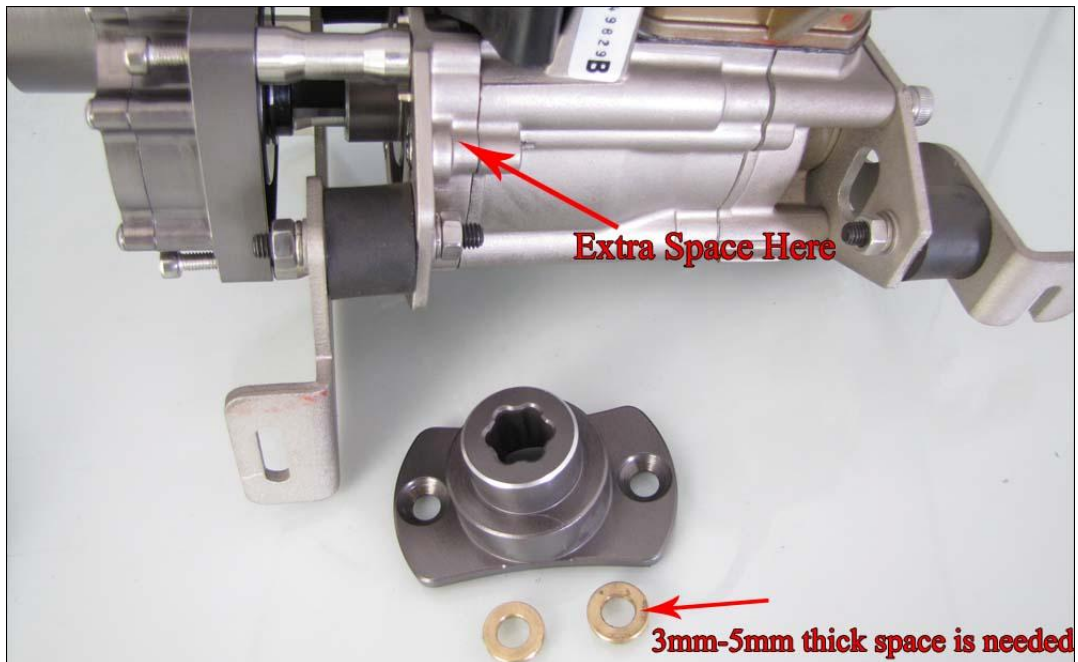
Although the TS760-Marine Onboard E-starter could directly bolt on to most brands of marine gas engines that available in the market, to install it on a CY engine there are a couple of modifications required for correct installation.

Flywheel Modification



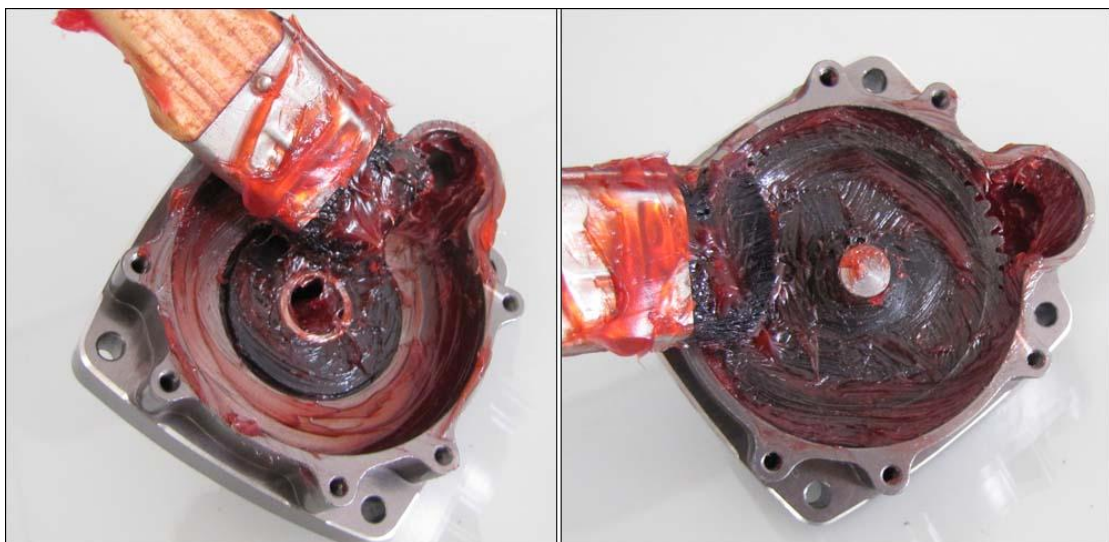
The flywheel from the CY engine is different from a standard Zenoah-type flywheel as it has a built-in starter pulley. Therefore you will need to either machine out the pulley area, or just simply upgrade your flywheel to the Zenoah type.

Spacers



There is extra space built-in on the CY back engine mount; therefore you will need to provide two 3mm-5mm thick spacer washers for the flywheel adaptor. Install these between the flywheel and the flywheel adaptor in order to enable proper engagement for the drive shaft and adaptor.

Lubrication



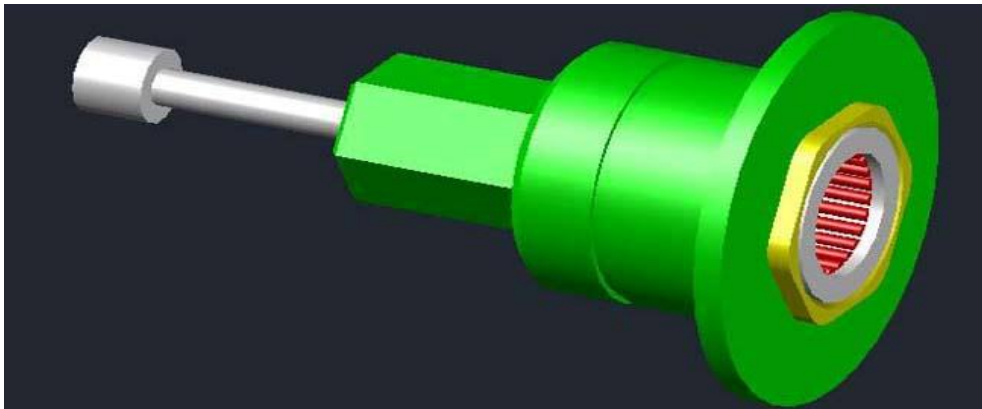
The TS760-Marine is designed with a built-in gear box that retains grease for durable gear performance. Please check and re-grease the main gears and the one-way bearing every 15-20 hours of TS760-Marine operation.

Oiling the belt



The belt in the TS760-Marine needs to be oiled in order to reduce drag with the stainless steel cover stands, you need to check that every time you use the kit, just simply open the cover, and make sure the belt surface is wet with oil, any two or four stoke oil will work, however, the thicker oil the better.

Changing the One-Way Bearing



Even though the one-way bearing in the TS760-Marine has been heavily tested during our product approval procedure, you might still need to replace it with a new one after extended use. To do this, you need to insert a 3 - 3.5mm diameter steel rod into the center drive shaft as shown in the above picture. Then gently use a hammer to hit on the steel rod until the one-way bearing adaptor comes out. Install a new bearing; we have spare bearings and adaptors for sale from our website.

Performance Tips

Starting a Cold Engine

After all the wire connections have been correctly set up, you are ready to start your engine. Before doing so, ensure the low and high speed mixture needles are adjusted to the factory recommendation from your engine manufacturer. Then you will need to close the choke on your carburetor and press the primer bulb to pump the gas up from the tank. Once you see the gas flowing into the carburetor, press on the third channel switch on your transmitter for no more than 3 seconds. If you then hear the engine starting to fire, open the choke and press the power switch one more time – your engine should start.

When starting a warm engine, you don't need to close the choke; just simply press on the power switch for less than 3 seconds and the engine will start.

Trouble Shooting

If gas has been flowing into the engine yet it does not start, it might have flooded with too much gas inside. If this happens, remove the spark plug and hold a rag over the spark plug hole. Turn on the starter for 5 to 10 seconds to pump out the extra gas from inside the cylinder. Then re-install the spark plug and try again.

If your single cylinder engine has a high compression and a 3S LIPO does not provide enough power to start it, change to a 4S pack.



Thanks for choosing an Arrow Shark Product; we hope the ease and convenience of our Arrow Shark TS760-Marine kit will bring a higher level of enjoyment to your experience on RC gas boats!

www.arrowshark.com