

# *Arrow Shark*

TS760-Marine Electric Starter

## *Owner Manual*

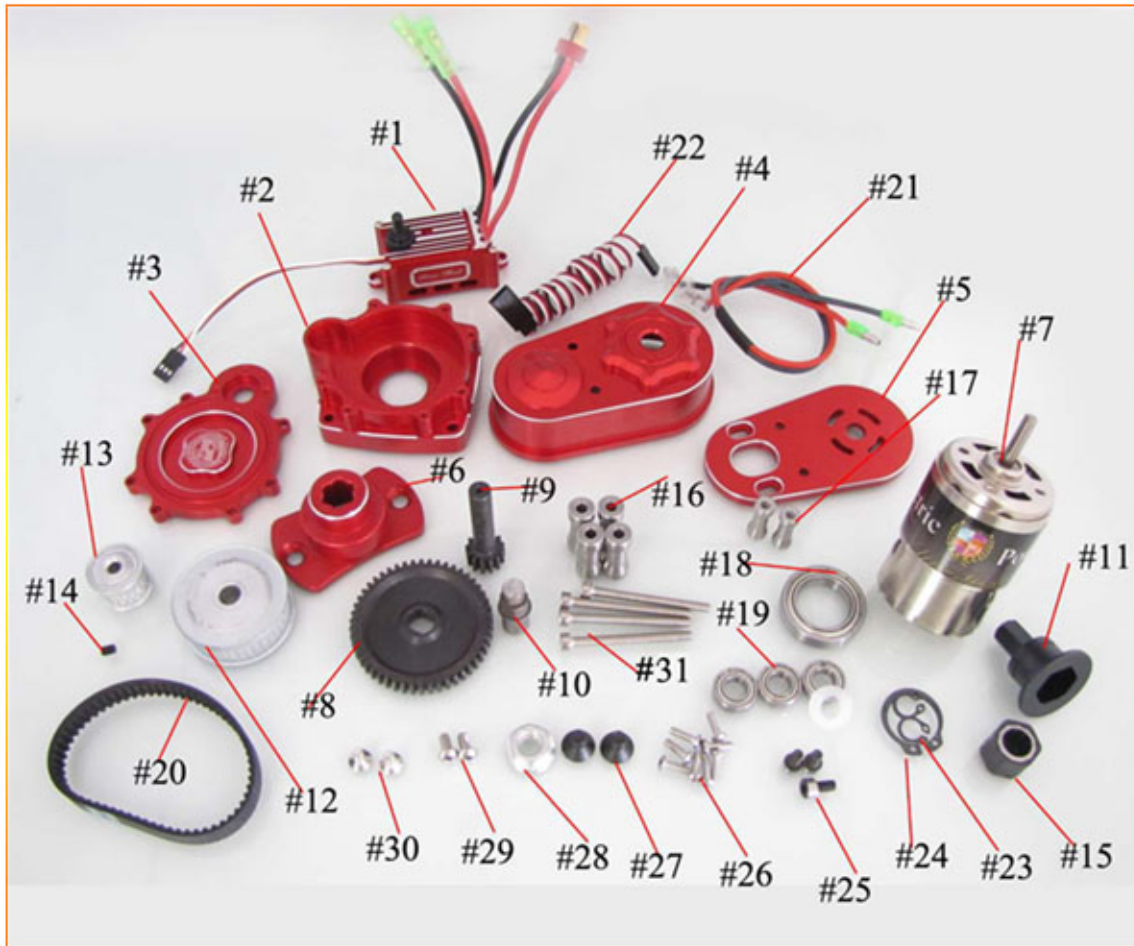
*One Click to Start Your Gas Engine!*



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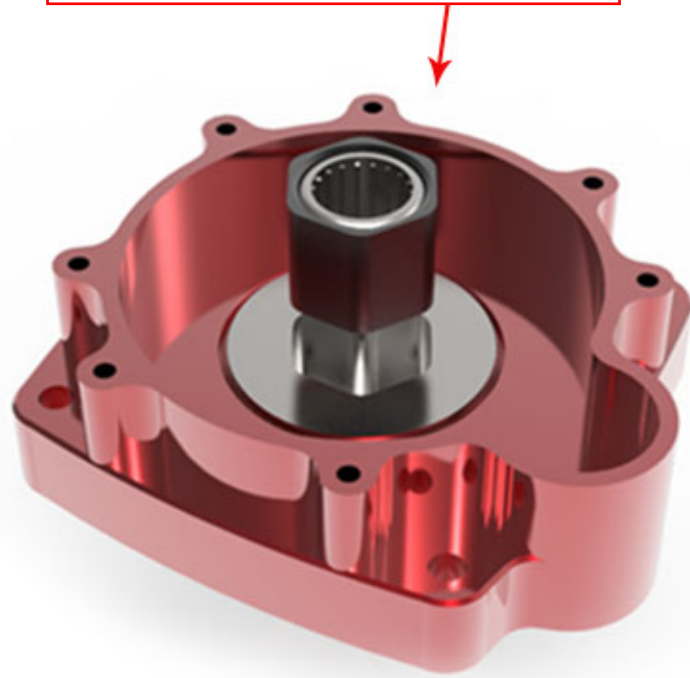
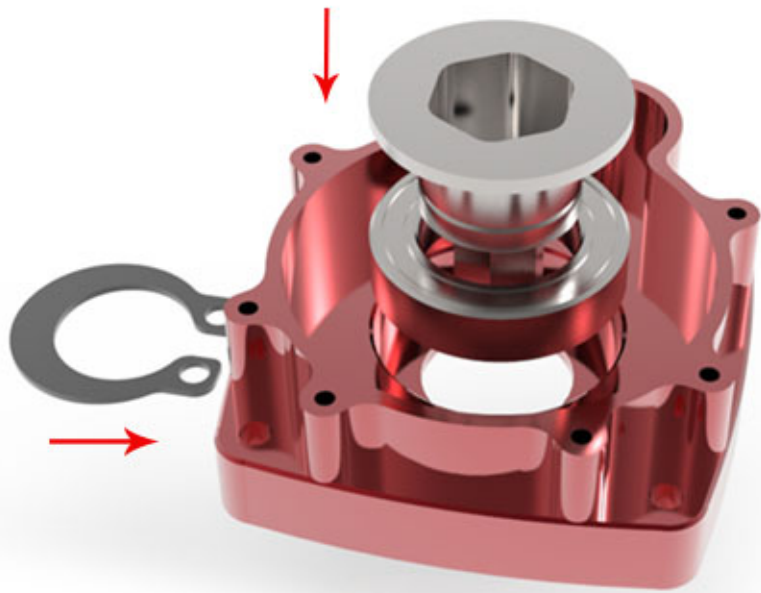
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## Part List



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

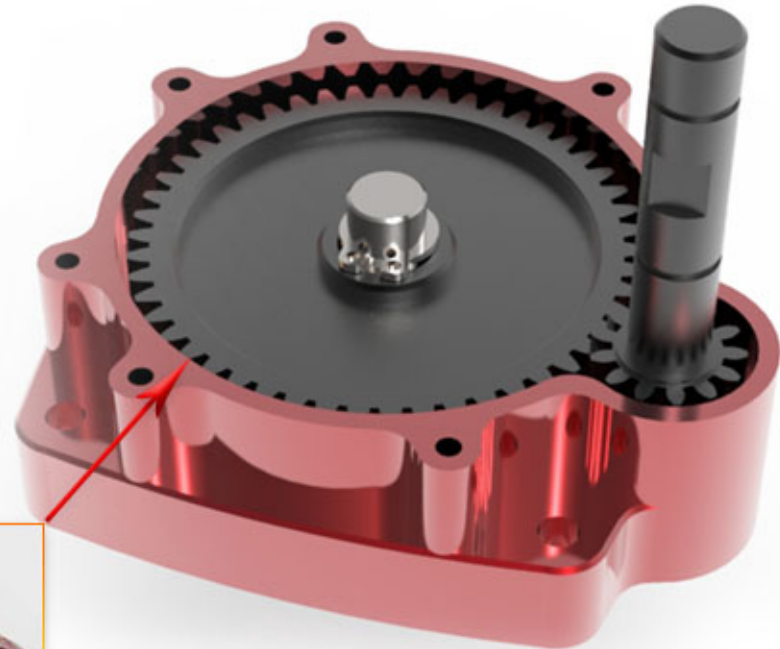
Insert the one-way bearing into the Hexagon input on the harden drive shaft, make sure the one-way bearing is greased.

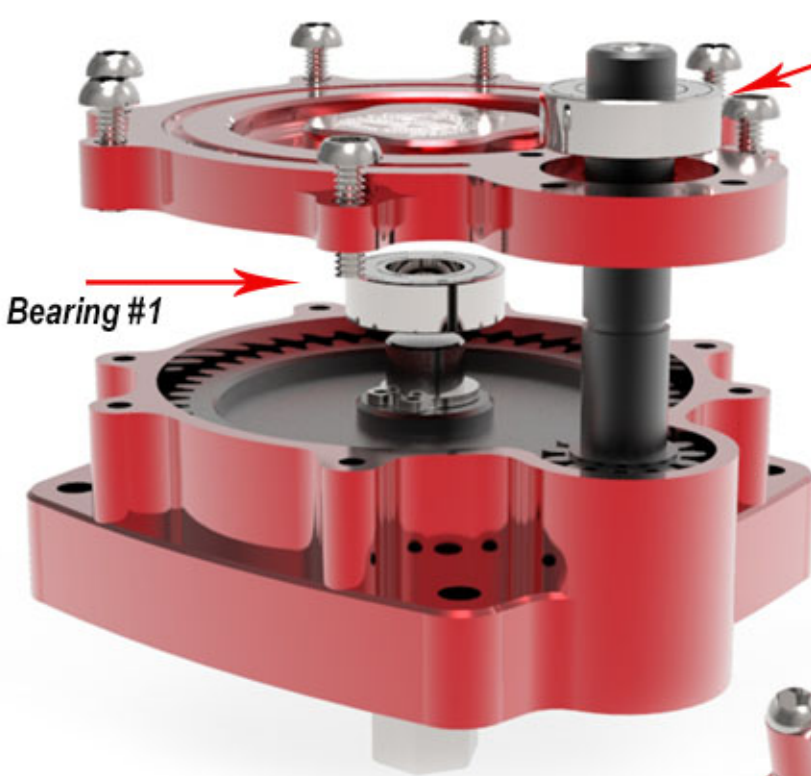


Insert the main bearing into the gear box and install the harden drive shaft through the bearing and secure it with the clip from the bottom.



Insert the harden center shaft into the 50T gear, and secure it with clip via the groove on the end on the shaft, apply some grease around the inside gear box wall, and both 50T and 13T gears for the proper lubrication during operation, then, match the 13T gear shaft into the gear box with 50T gear.

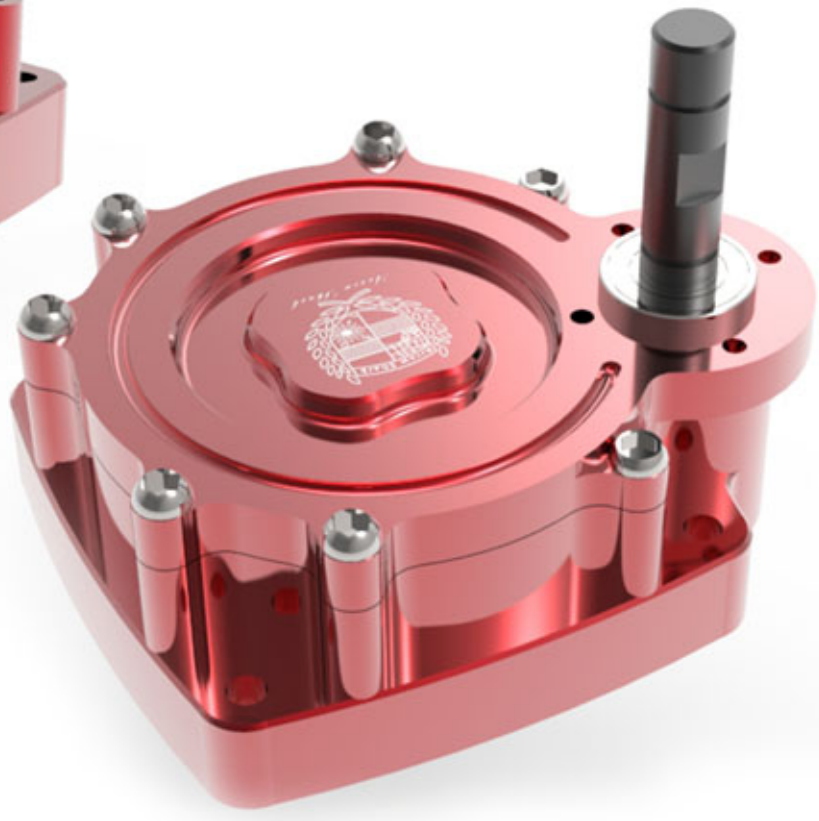




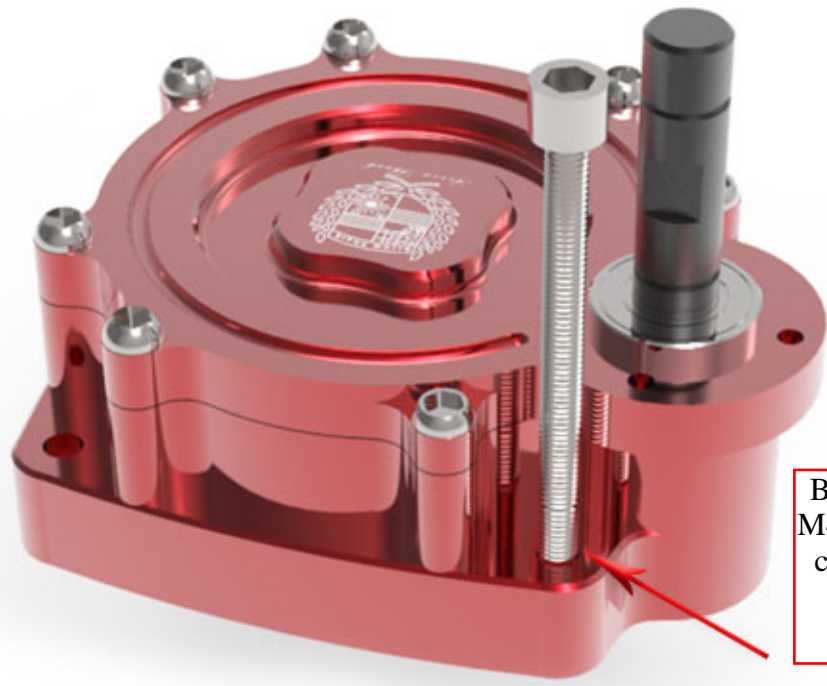
**Bearing #2**

There are two bearings should be installed onto the gear box cover, one on the top, the other one on the bottom of the cover, as show in the left side picture.

**Bearing #1**

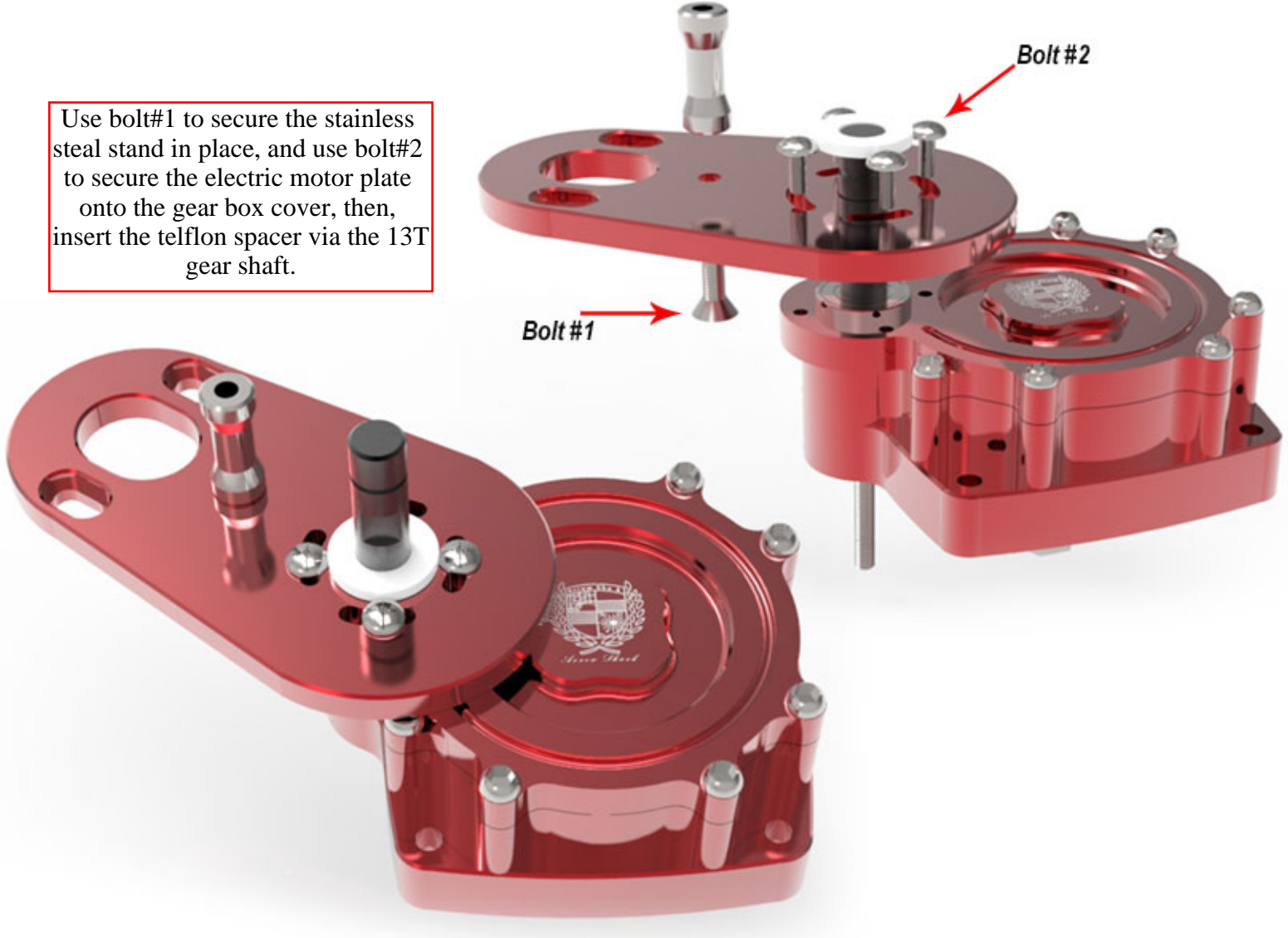


Secure the cover onto the gear box with 7 of M3 bolts as shown in the right side picture.

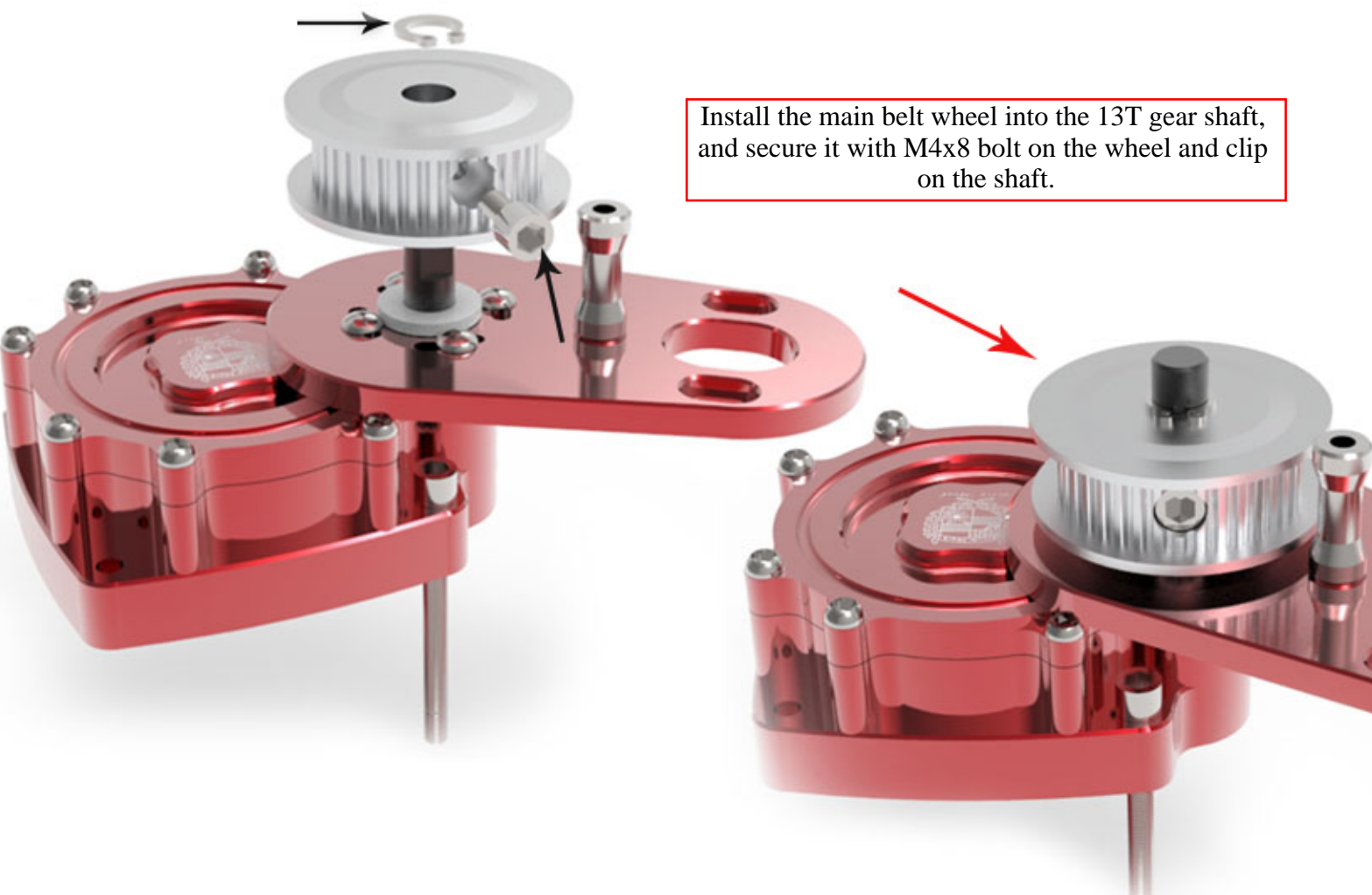


Before go on to the next step, insert one M4x40 installation bolt via the lower right corner hole on the gear box, this step is very important, as there is no way to install this bolt from next step on.

Use bolt#1 to secure the stainless steel stand in place, and use bolt#2 to secure the electric motor plate onto the gear box cover, then, insert the teflon spacer via the 13T gear shaft.



Install the main belt wheel into the 13T gear shaft, and secure it with M4x8 bolt on the wheel and clip on the shaft.



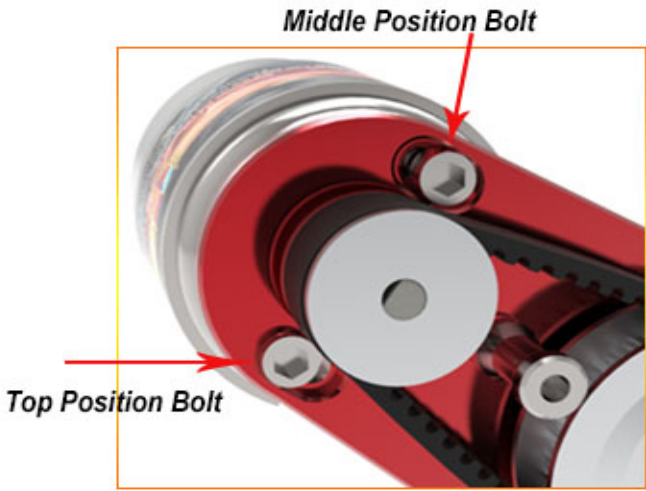


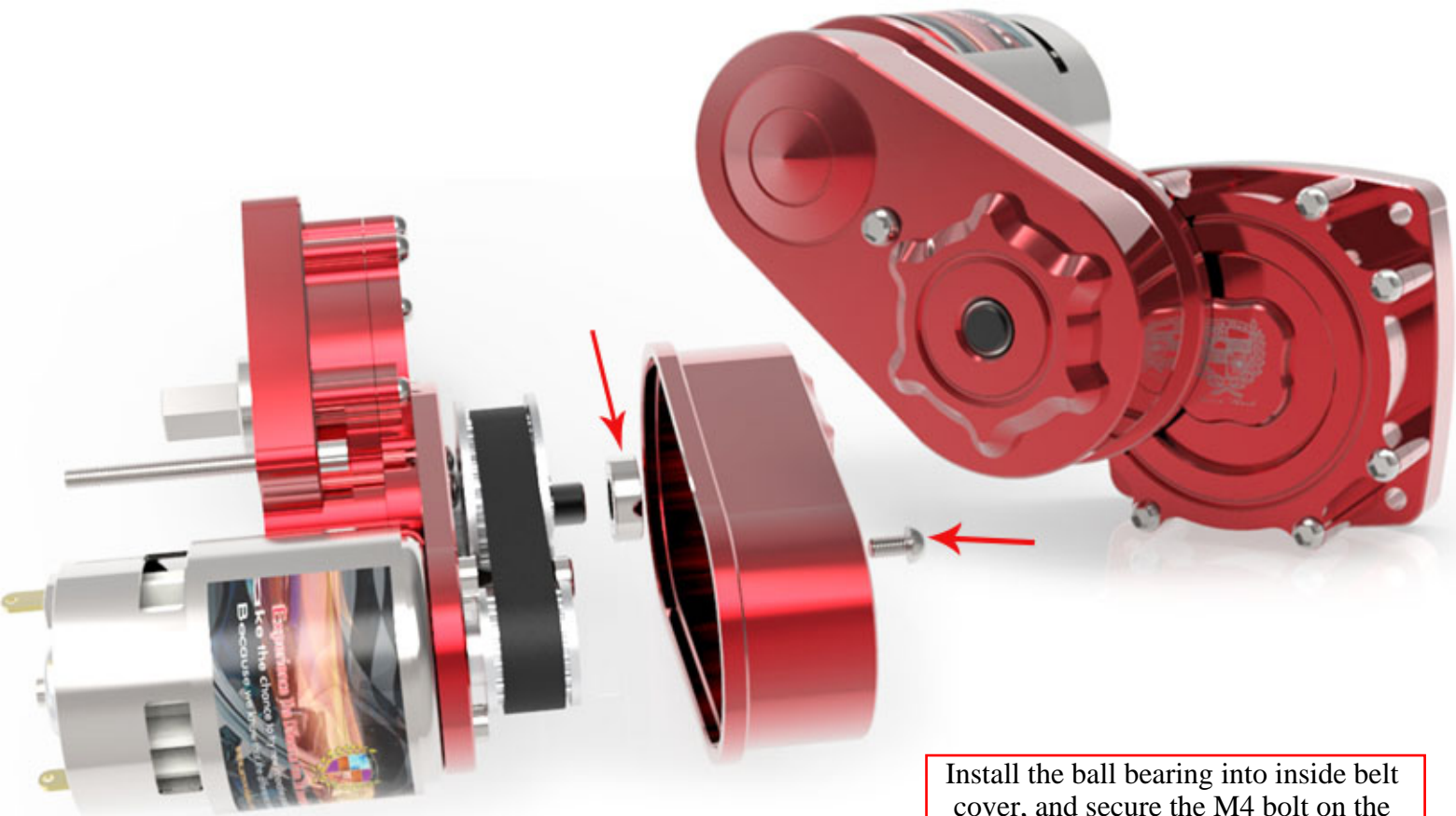
Install the 760 Hi-Rev motor onto the billet plate and secure it with M4x8 bolts in place, but do not tighten it at this time, install the motor belt wheel onto the 760 motor shaft and tighten it with M4 hex nut.

**Note:** In order to set the belt tension correctly, the two M4x8 electric motor secure bolts must have one in top position, the other one in the middle position, the belt tension must be set at loose condition to minimize the resistance and maximize the performance from electric motor.

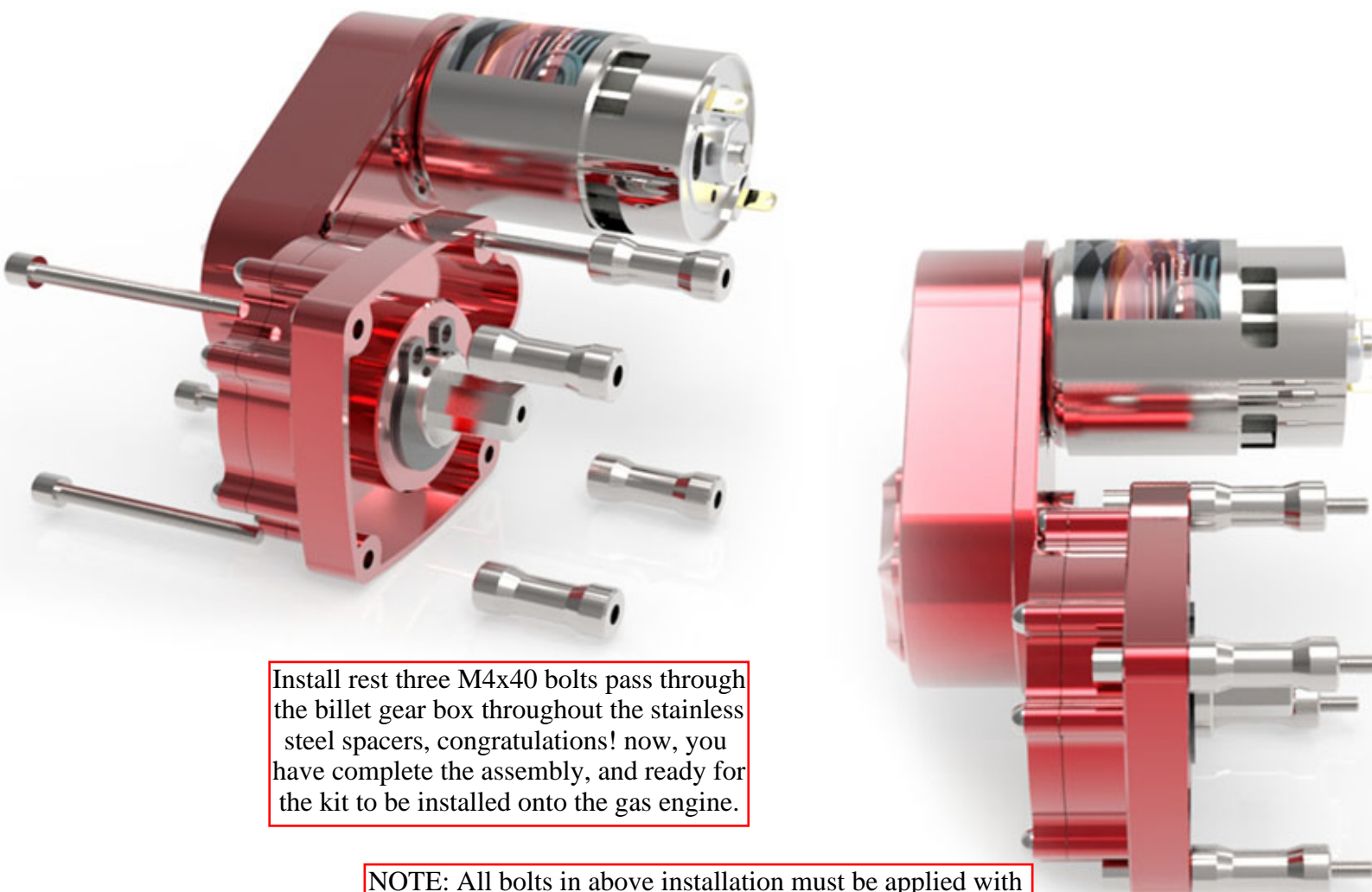


Install the drive belt onto the belt wheels and adjust the belt tension, then, tighten the two M4x8 bolts to hold the electric motor firmly in place.





Install the ball bearing into inside belt cover, and secure the M4 bolt on the stainless steel stand to hold the drive belt cover firmly in place.



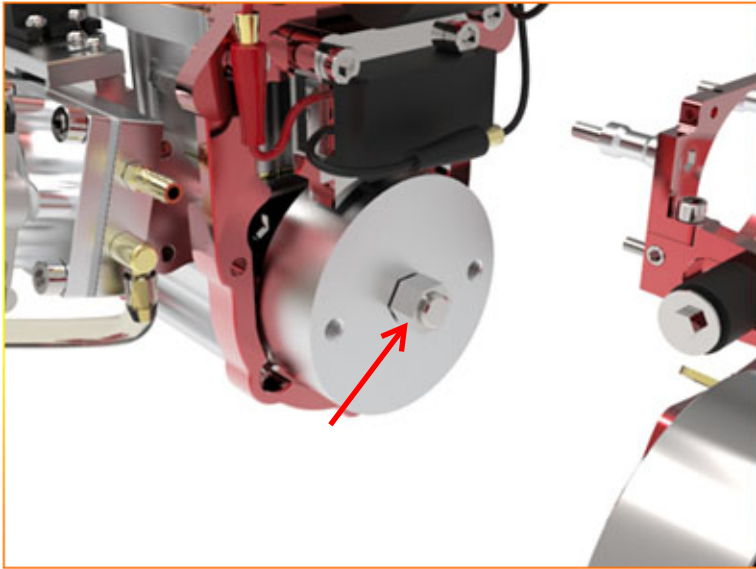
Install rest three M4x40 bolts pass through the billet gear box throughout the stainless steel spacers, congratulations! now, you have complete the assembly, and ready for the kit to be installed onto the gas engine.

NOTE: All bolts in above installation must be applied with mid strength loctite for proper securing during operation.

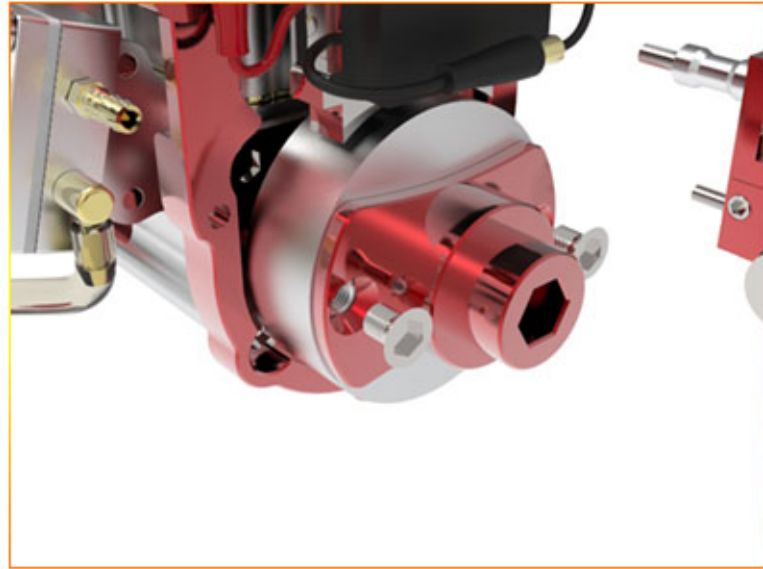


## Install TS760-Marine to X-30 Marine Engine

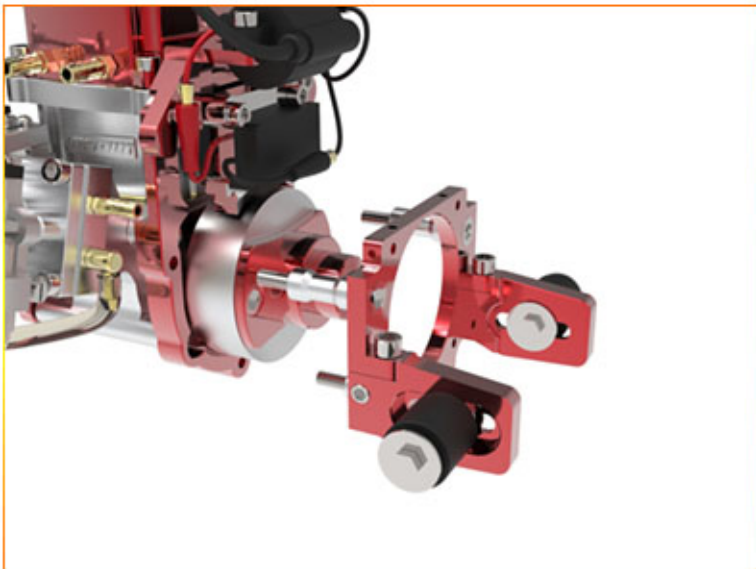
Before install TS760-Marine to your gas engine, you will first need to take off the pull starter off your engine, insert a piston stopper into the cylinder head, then disassemble the pull starter, back engine mount and starter pulley, now, you are ready for the next step.



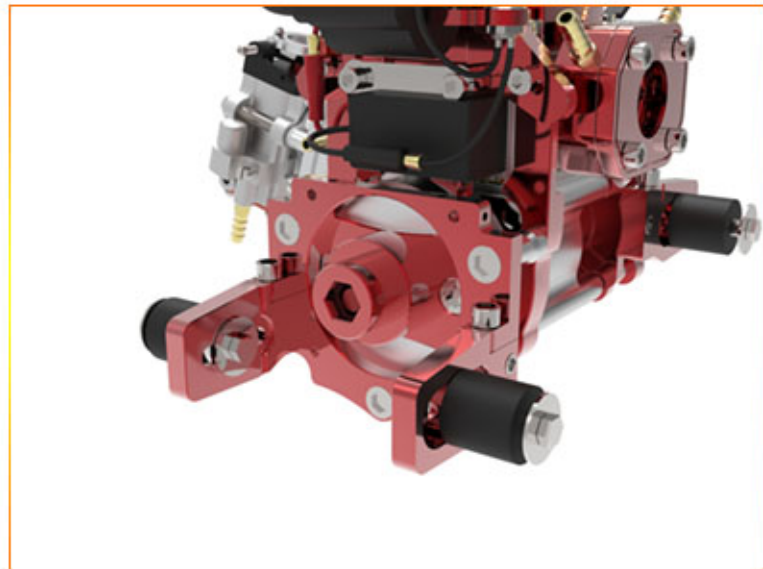
Screw the crankshaft nut (part#28) onto the crankshaft and tighten it with 14mm wrench.



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

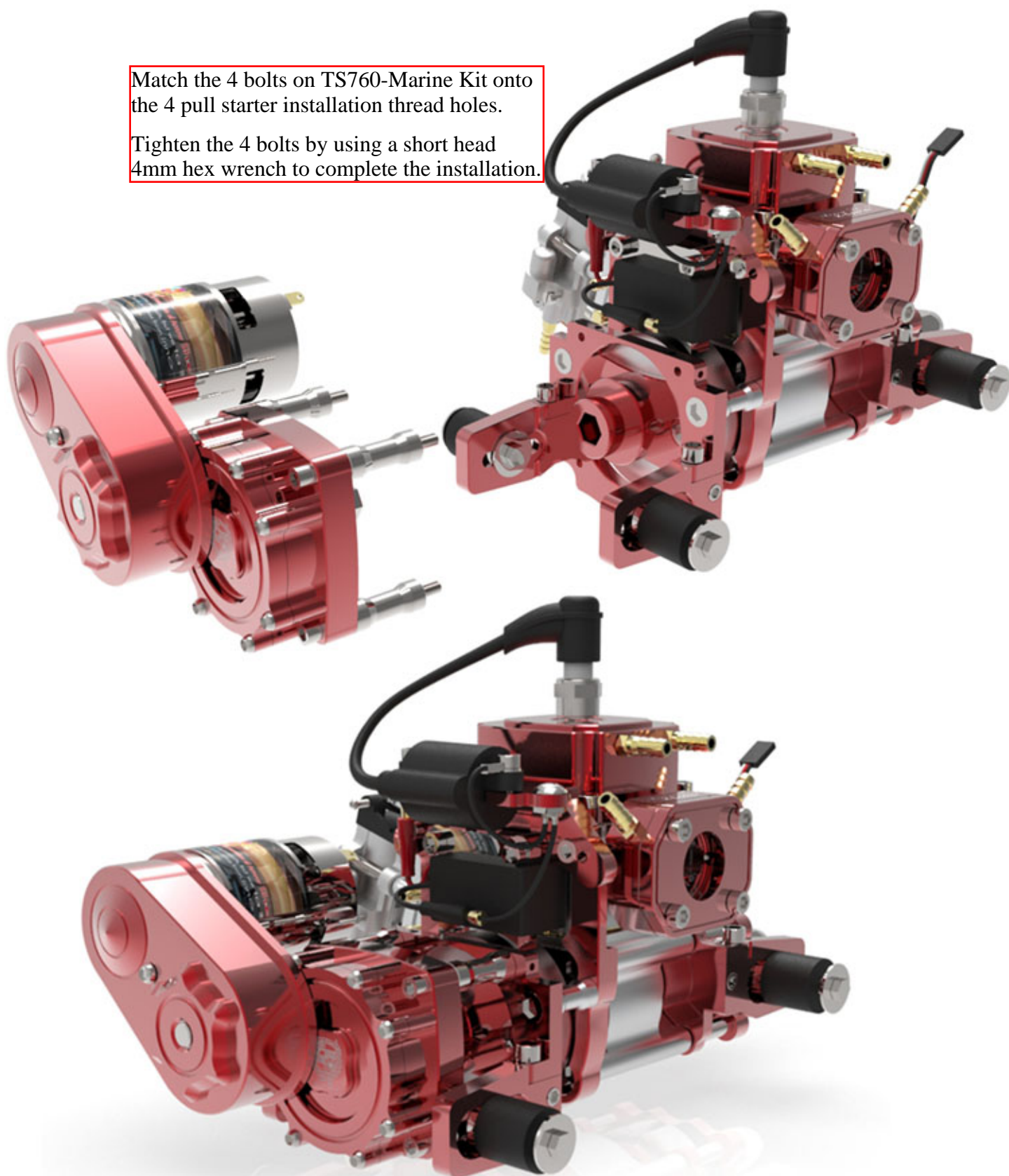


Install the back engine mount back on with its original bolts.



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

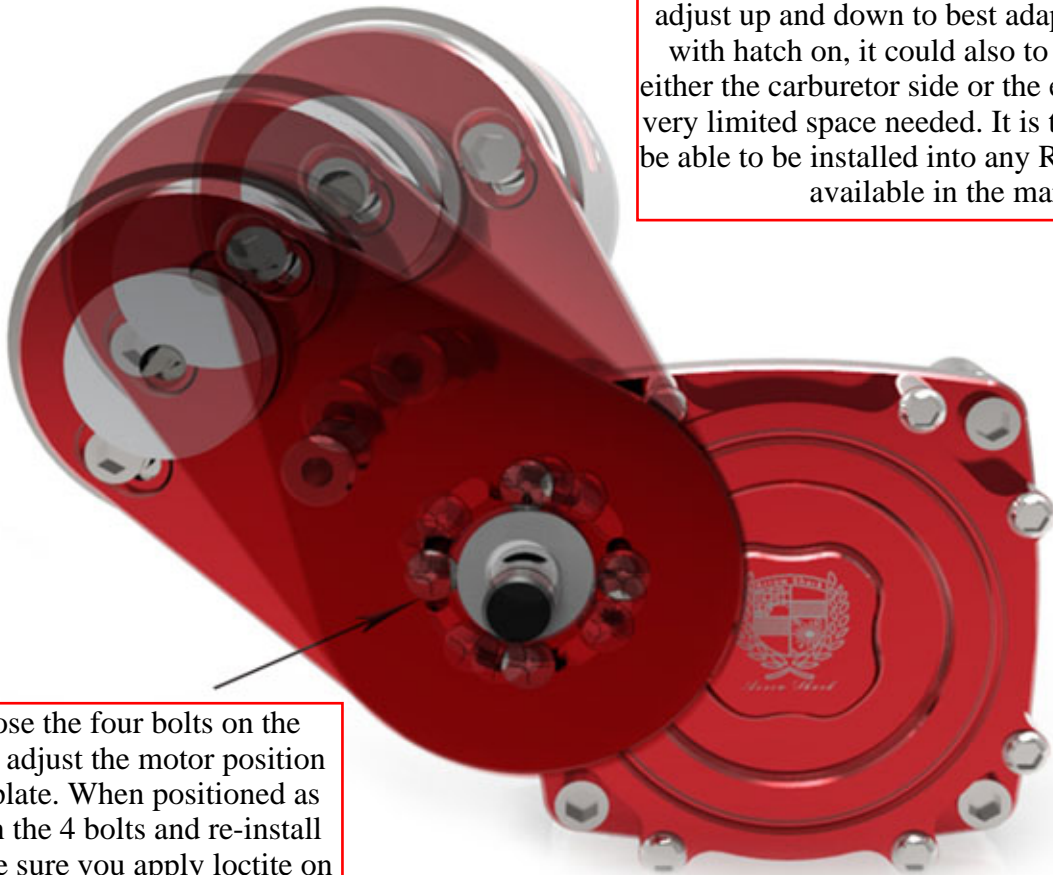
Tighten the 4 bolts by using a short head 4mm hex wrench to complete the installation.



*Installation Completed!*

# Electric Motor Position Adjustment

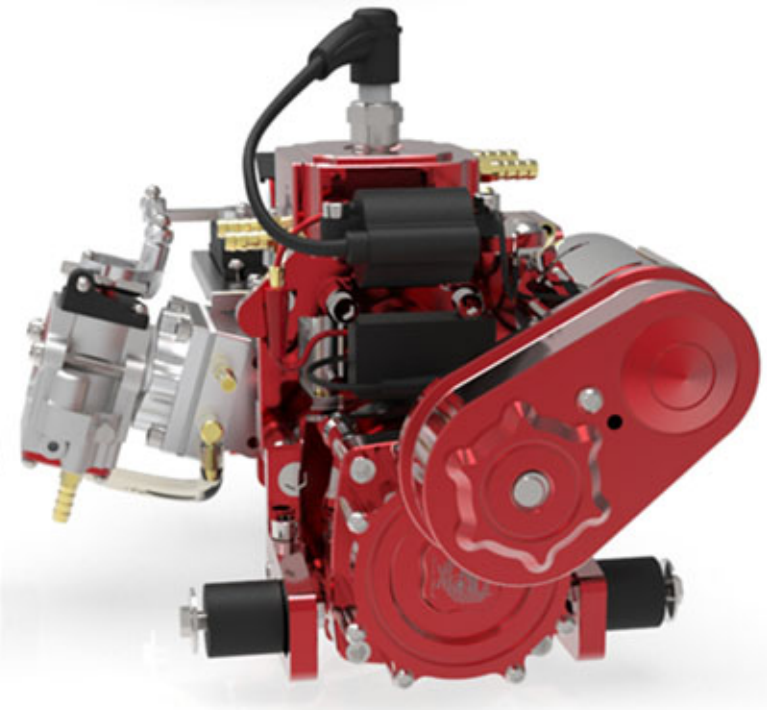
The electric motor position on the TS760-Marine is designed to be fully adjustable; it could be adjust up and down to best adapt into your hull with hatch on, it could also to be installed on either the carburetor side or the exhaust side with very limited space needed. It is therefore likely to be able to be installed into any RC gas boat that is available in the market.



Just simply loose the four bolts on the motor plate, and adjust the motor position by rotating the plate. When positioned as required, tighten the 4 bolts and re-install everything. Make sure you apply loctite on these four bolts when you tighten it back.

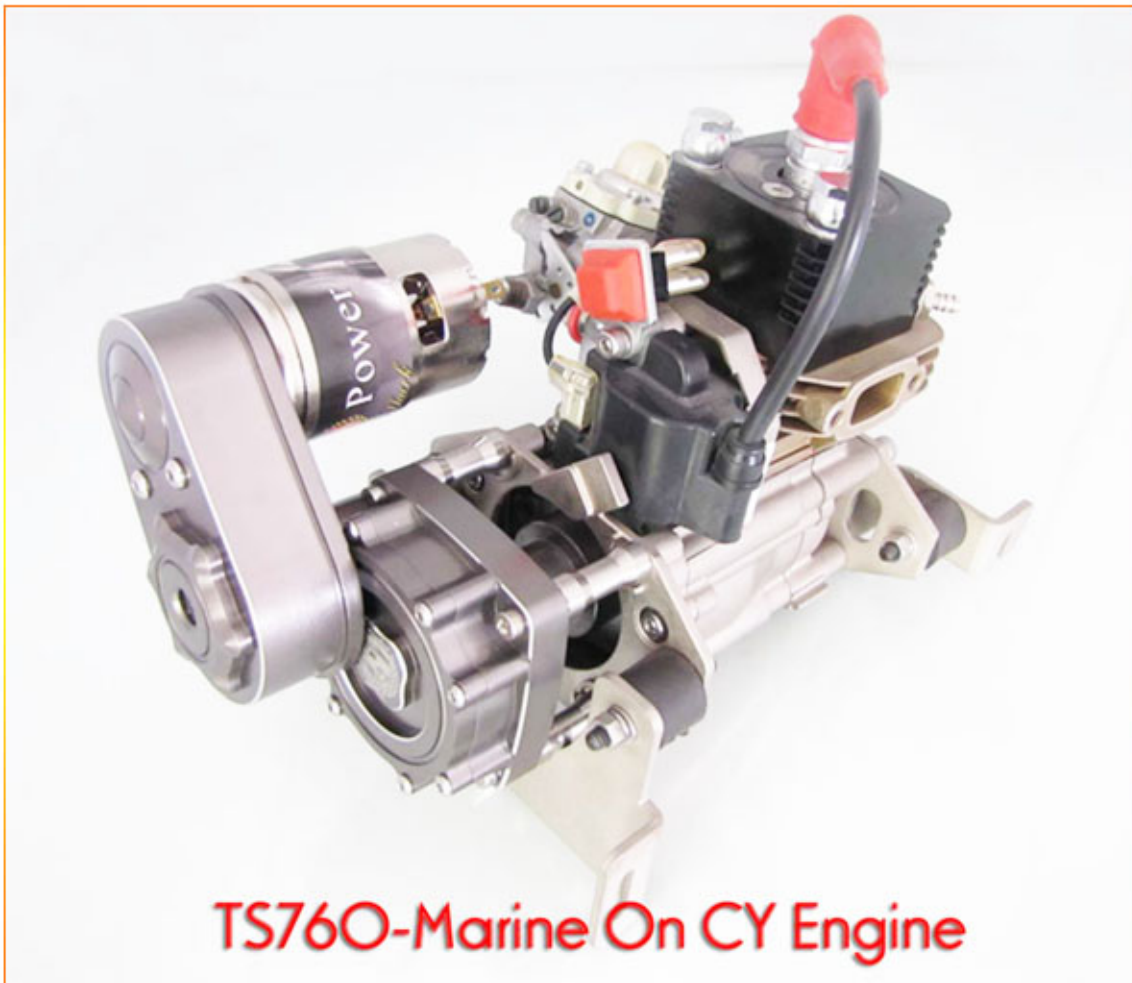


*Carburetor Side Installation*

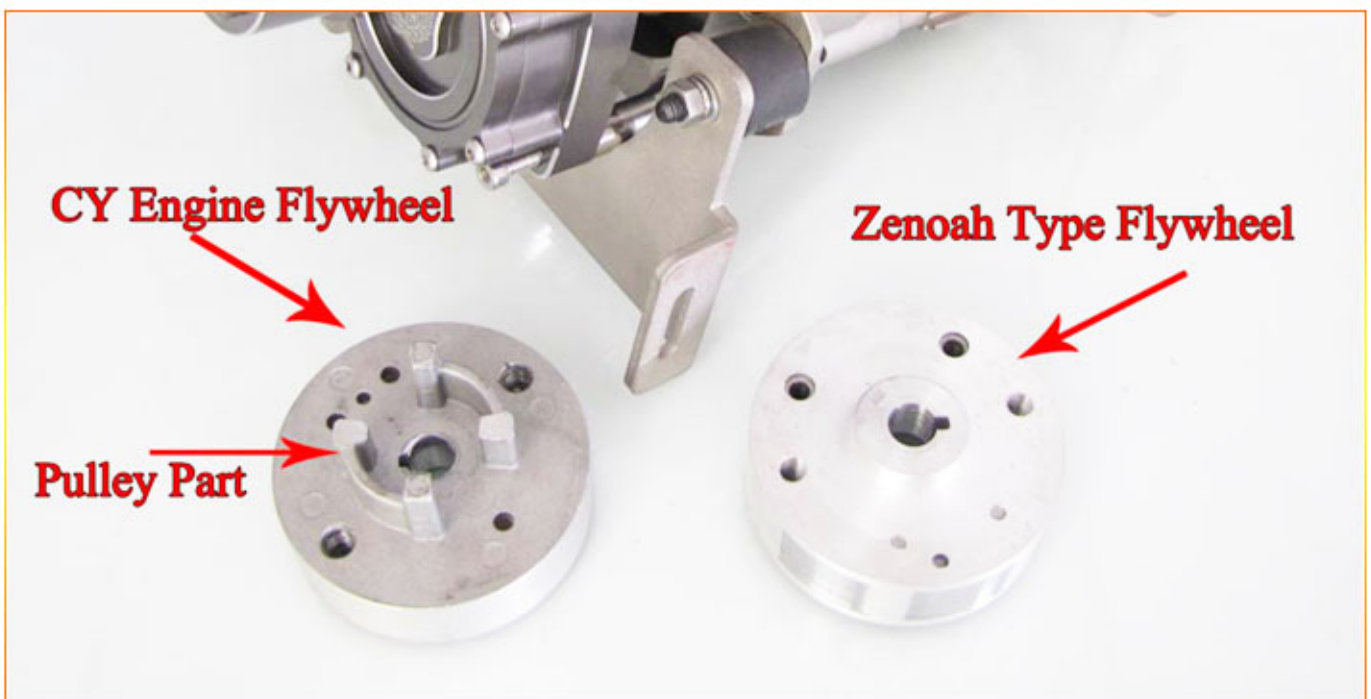


*Exhaust Side Installation*

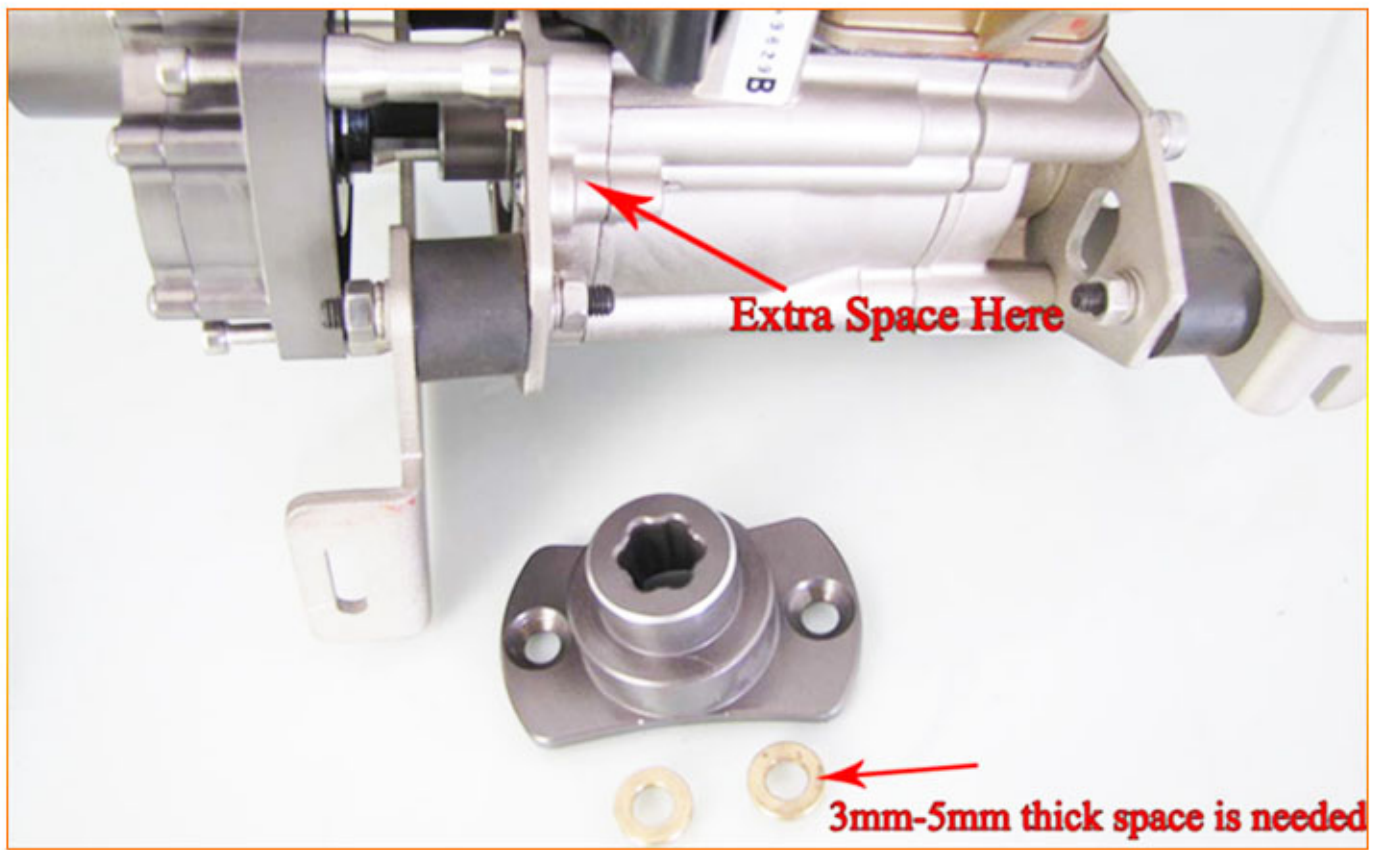
## CY Marine Engine Installation Tips



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.



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 machine out the pulley area for the proper installation, you can not use Zenoah flywheel instead as the timing is different between these two brands, with Zenoah flywheel installed, you will not able to start your engine.



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.

## Power Connections

*R-One Remote Device*

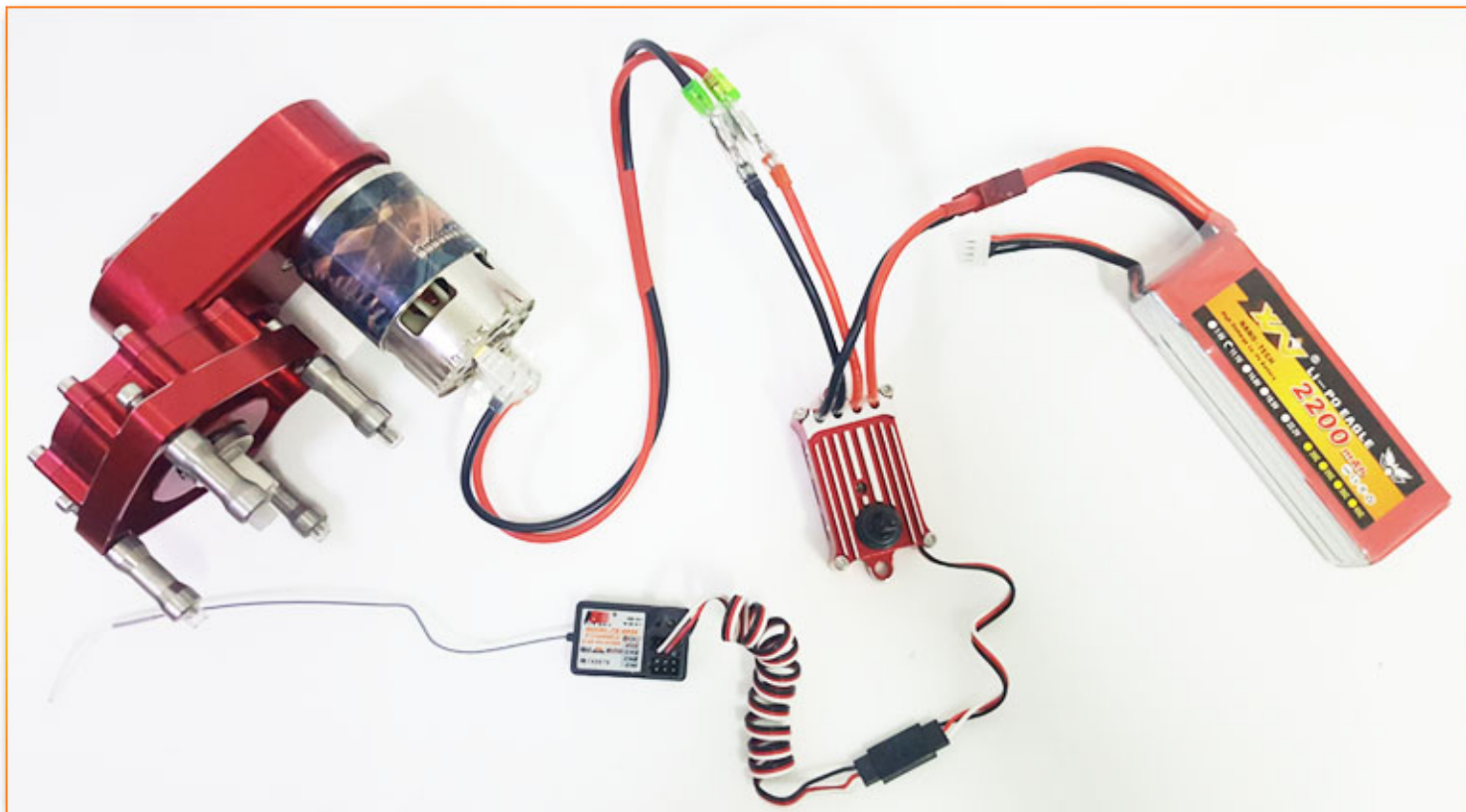


*Servo Remote Control Switch*

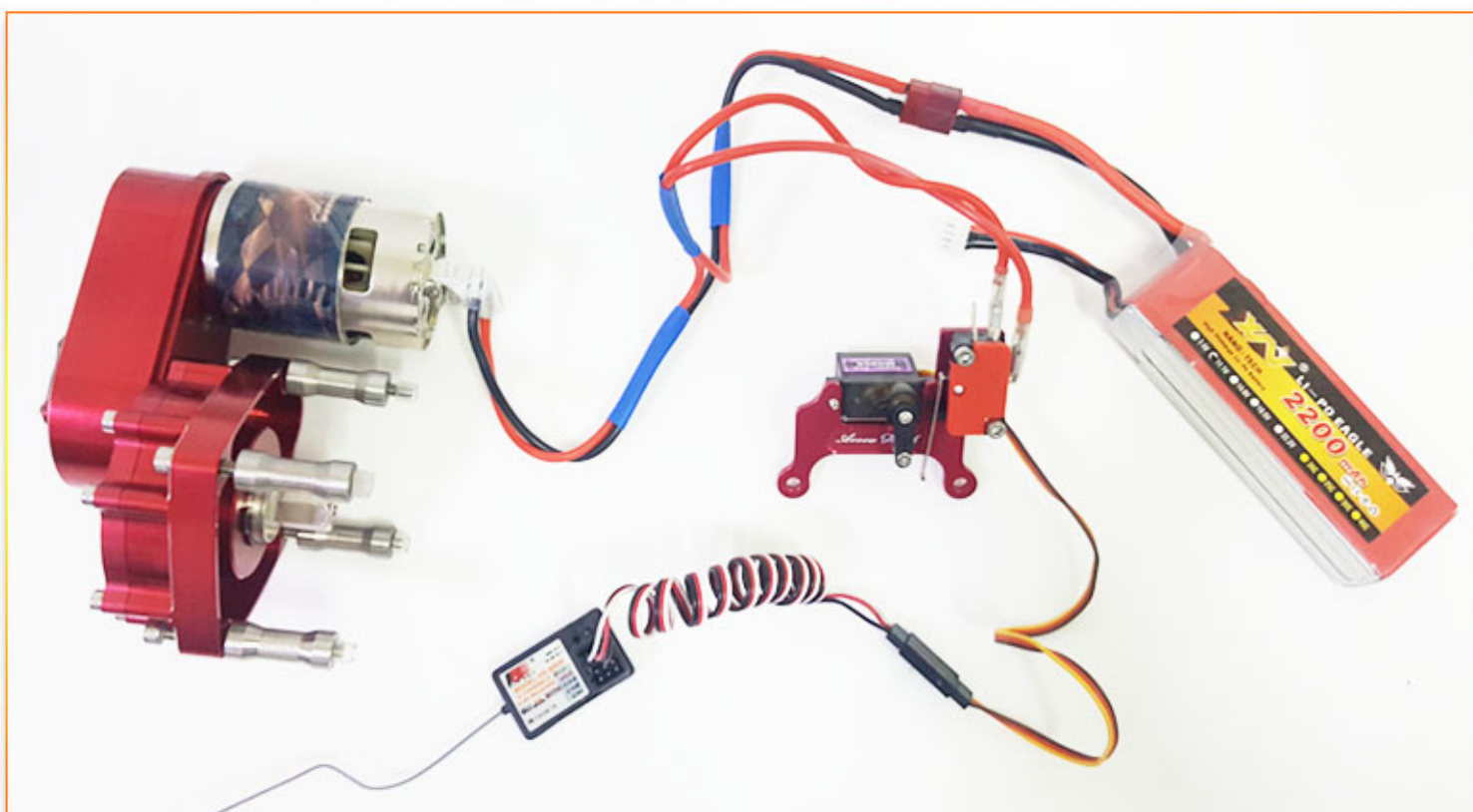


The TS760A-Marine comes with optional power switch of R-One control device or Servo remote switch which allows you to start your gas engine with a single click on the third channel of your transmitter. The R-One will supply 5.2V power from the E-Starter LIPO for your radio system. You do not need a separate 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. The Servo remote switch allow you to use up to 5S LIPO battery for the higher compression engine while the R-one Device only accept the LIPO batter up to 3S, therefore, we recommend to use the R-one control device for the gas marine engine up to 30cc with 3S LIPO battery, for over 30cc or twin inline engine, please use servo remote switch with 4S battery to run it.

## R-One Remote Device Power Connection

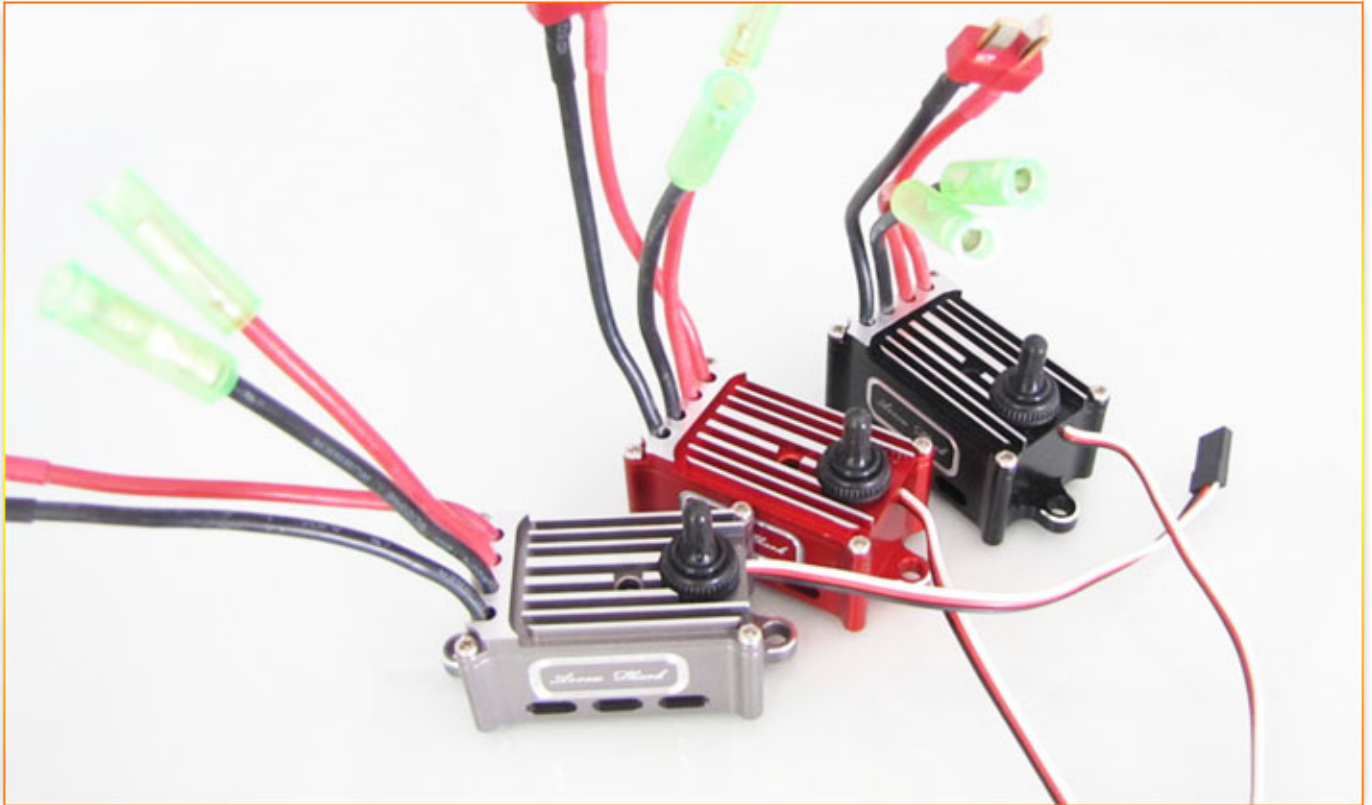


## Servo Remote Control Switch Power Connection



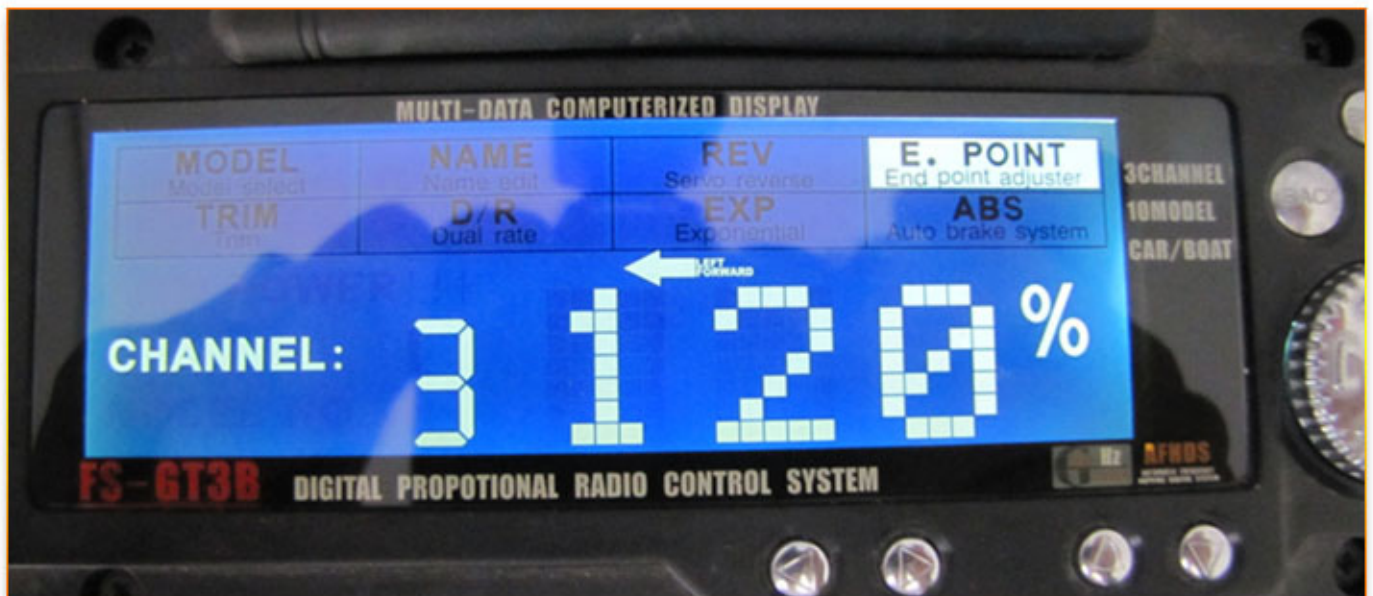
You need to provide a Three Channel Transmitter and a Three Channel Receiver for the R-One remote device or servo remote control switch to work properly, any FM or 2.4GHz radio will work. Connect the receiver wire from the R-One device or servo control switch extension cord into the third channel slot in your receiver. please make sure DO NOT use any LIPO battery over 3S on R-one device, it might burn it! and only use the LIPO batteries with dean connection only!

## Transmitter Set Up



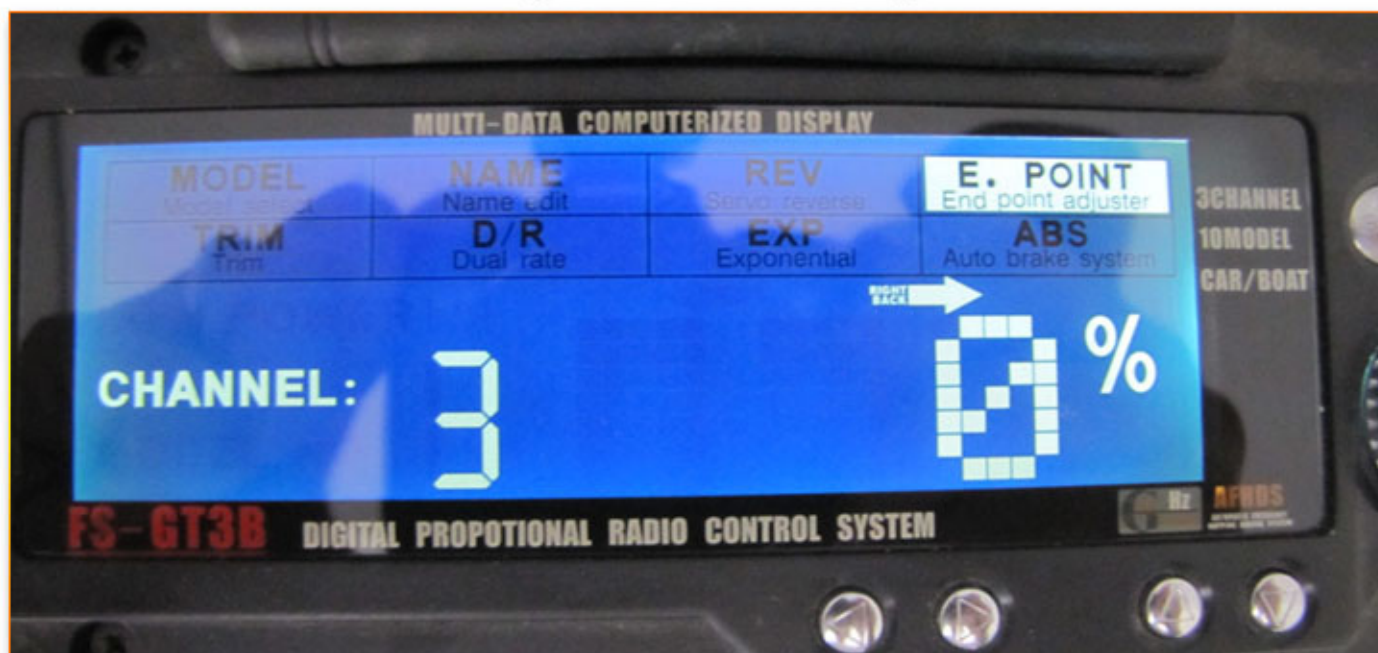
In order to use the R-One remote device correctly for your TS760-Marine kit, you will first need to set up the third channel on your transmitter correctly. Please follow the instructions below for the correct setting.

### “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



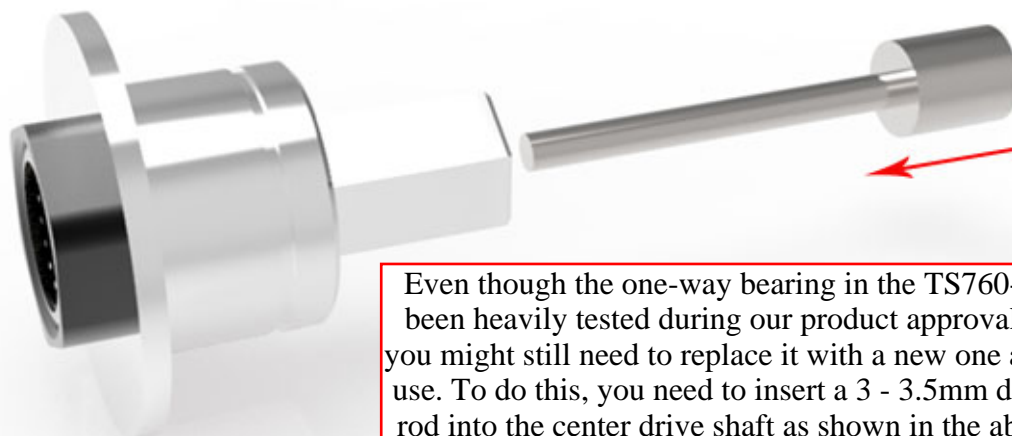
After you set the "Left Forward" correctly for the Third Channel on the "End Point Adjustment", then click on the third channel switch to move the radio to the "Right Forward" setting. Adjust that to 0% which will enable you to turn off the R-One device when your gas engine is started. If this rate is 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.

### Attention

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%.

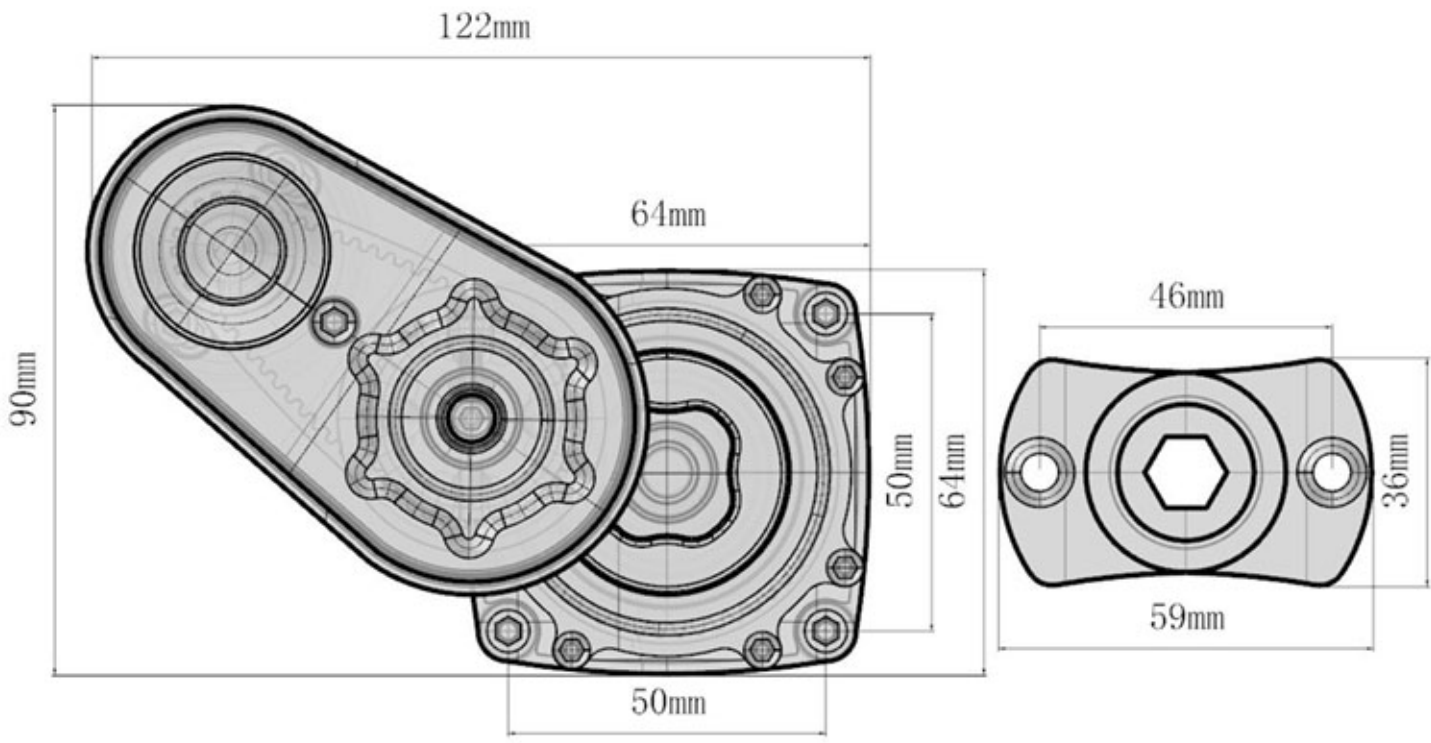
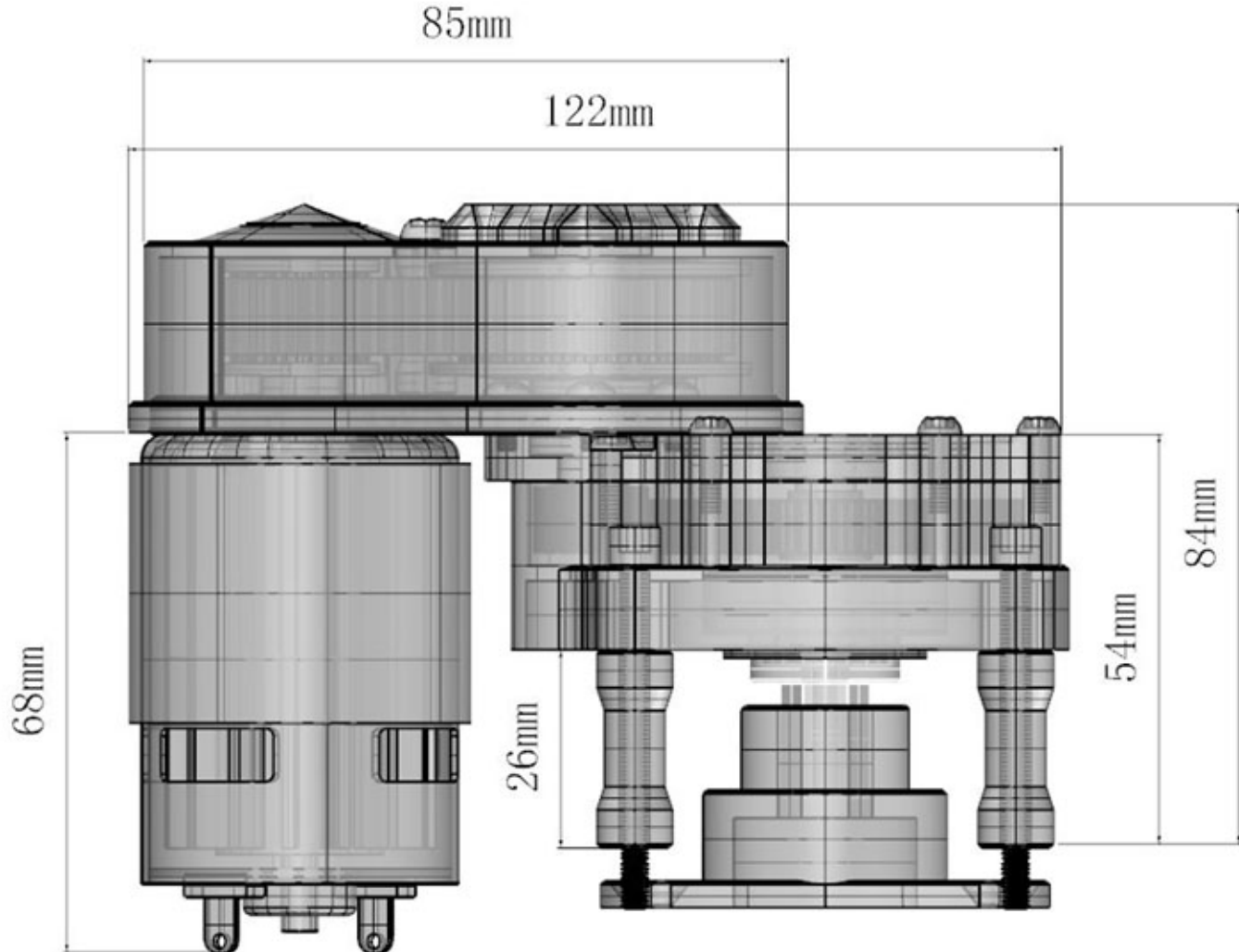
### Changing the One-Way Bearing



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;



# DIMENSION

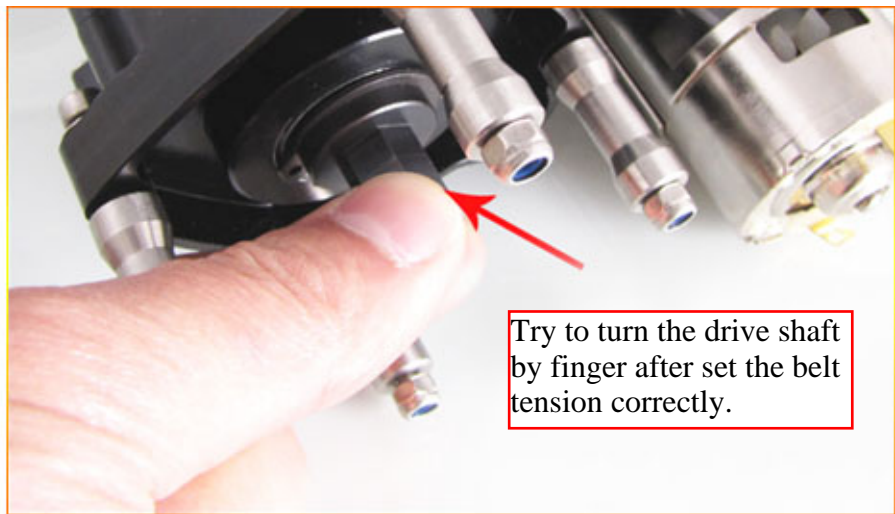
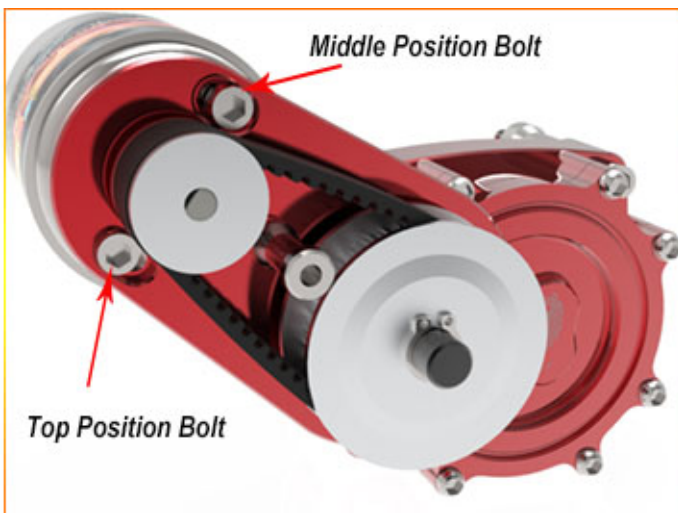


# Important Performance Tips

## Battery

Recommend to use a 3S (11.1V) 35C LIPO 3300mAh battery pack for single cylinder engines with R-One Device, or a 4S (14.8V) up to 50C for twin inline engines with servo control switch. 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, but only go with servo control switch, never use any larger than 3S LIPO and over 40C continue discharge rate on R-One device as it might cause damage. And only use the LIPO battery that comes with dean connection.

## Drive Belt Tension Adjustment



The correct drive belt tension is very critical for the TS760-Marine to performance properly, sometime after you finish the maintenance and install the electric motor back, the installation bolts for the electric motor could be tighten in wrong position which will make the drive belt too tight and cause the electric motor hard to bring the system to run, the set the belt tension correctly, the electric motor securing bolts should be one tighten at top position of the bolt slot, the other one at middle position, if both bolts at top position, then, the electric motor might smoke and lack of power to start your gas engine.

When the belt tension sets correctly, before install it to the gas engine, connect the electric motor with battery and test run it for 20 second to evenly distribute the grease inside the gear box, then, stop the power, and now, you should be able to turn the drive shaft by finger, if not, the belt still too tight, loose it further.

## Third Channel Switch Control

Sometime when you connect the battery to R-One device and turn on the switch on R-One, the TS760-Marine starter will start to run right away, even thought you haven't ready to turn on the switch on third channel of the transmitter.

This happening is because every time when you turn on your transmitter, the third channel switch is always on "left foward" position which is the "on" position for your starter kit, that is why, as soon as you connect the battery to R-One, the electric motor starts to run.

Solution: Before you connect the LIPO battery to R-one, turn on your transmitter first, and press on the third channel switch once that will switch it to "right forward" which is "off" position for the starter kit, then, connect the LIPO battery to R-One, this will solve the issue.

## Starting a Single Cylinder Engine with TS760-Marine

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.

### 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.

## Starting a Twin Inline Engine with TS760-Marine

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.

When starting a warm twin cylinder engine, you can start both cylinders at same time.

## Trouble Shooting

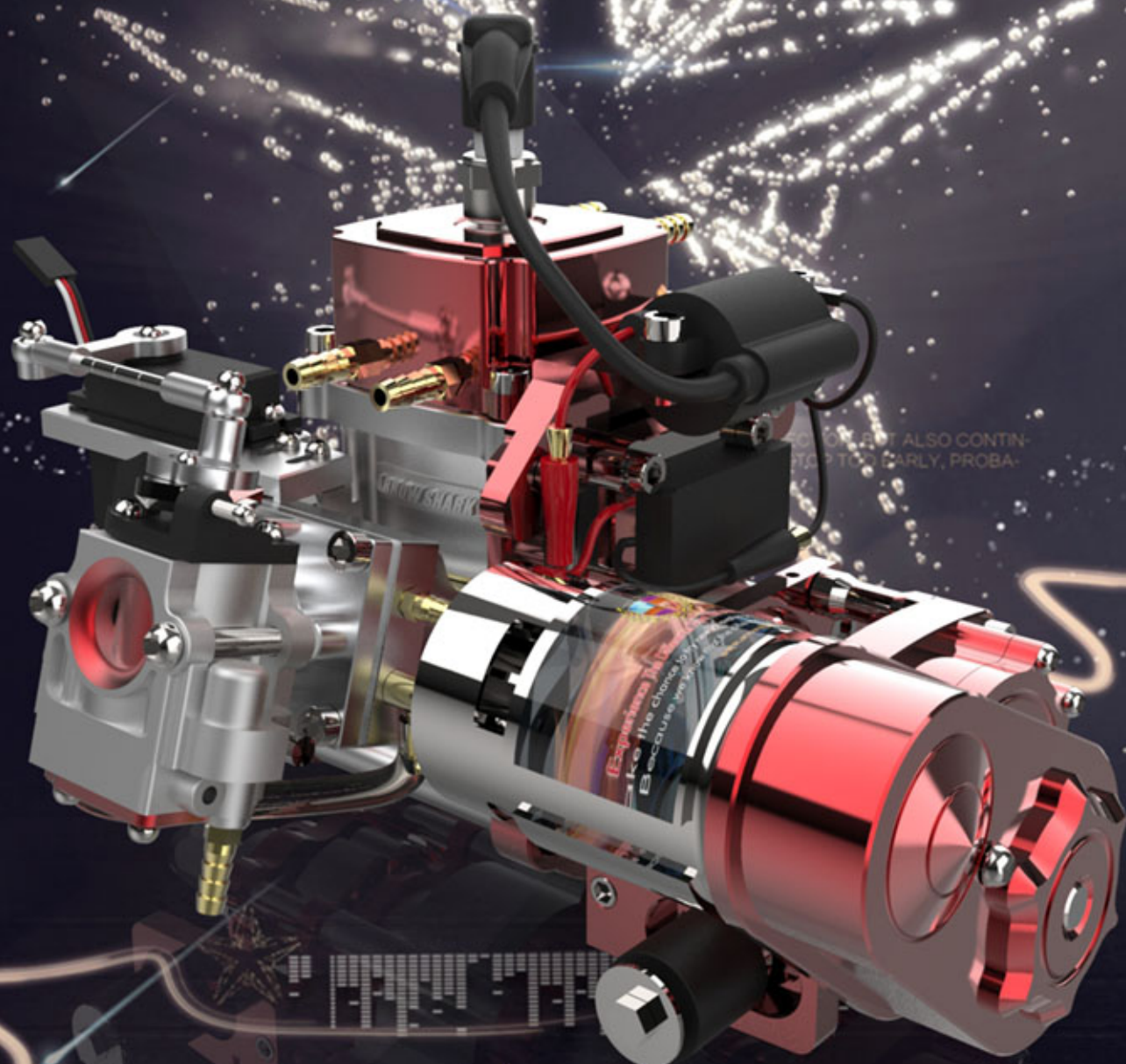
If gas has been flowing into the engine yet it does not start, it might have flooded with too much gas inside. If this happens, remove the spark plug and hold a rag over the spark plug hole. Turn on the starter for 5 to 10 seconds to pump out the extra gas from inside the cylinder. Then re-install the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



***TS760-Marine***

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!

*There is no Best, only Better!*



*Arrow Shark*  
RC Marine CLUB

