

Arrow Shark
Formula-X Outboard Drive

Owner Manual

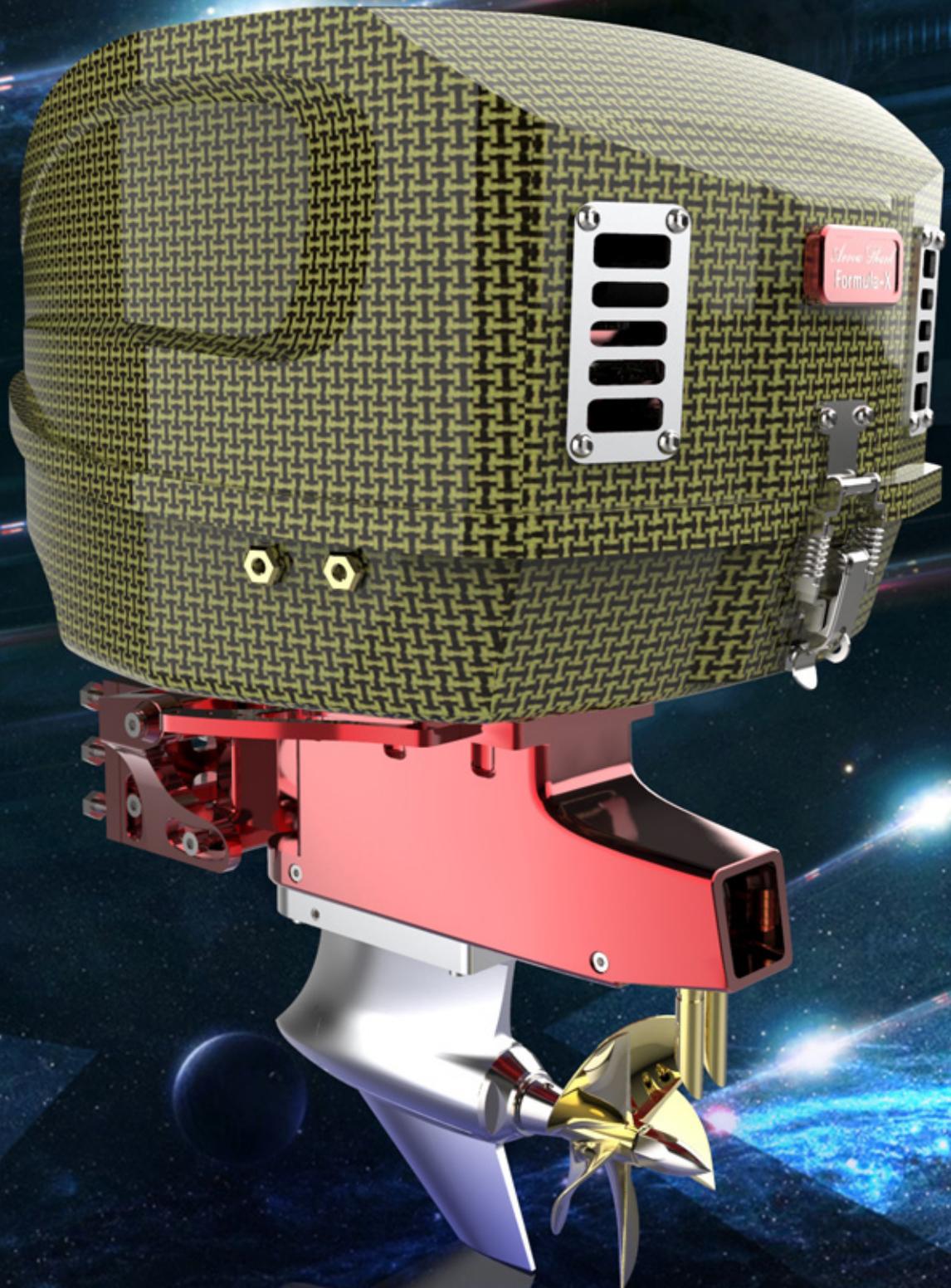
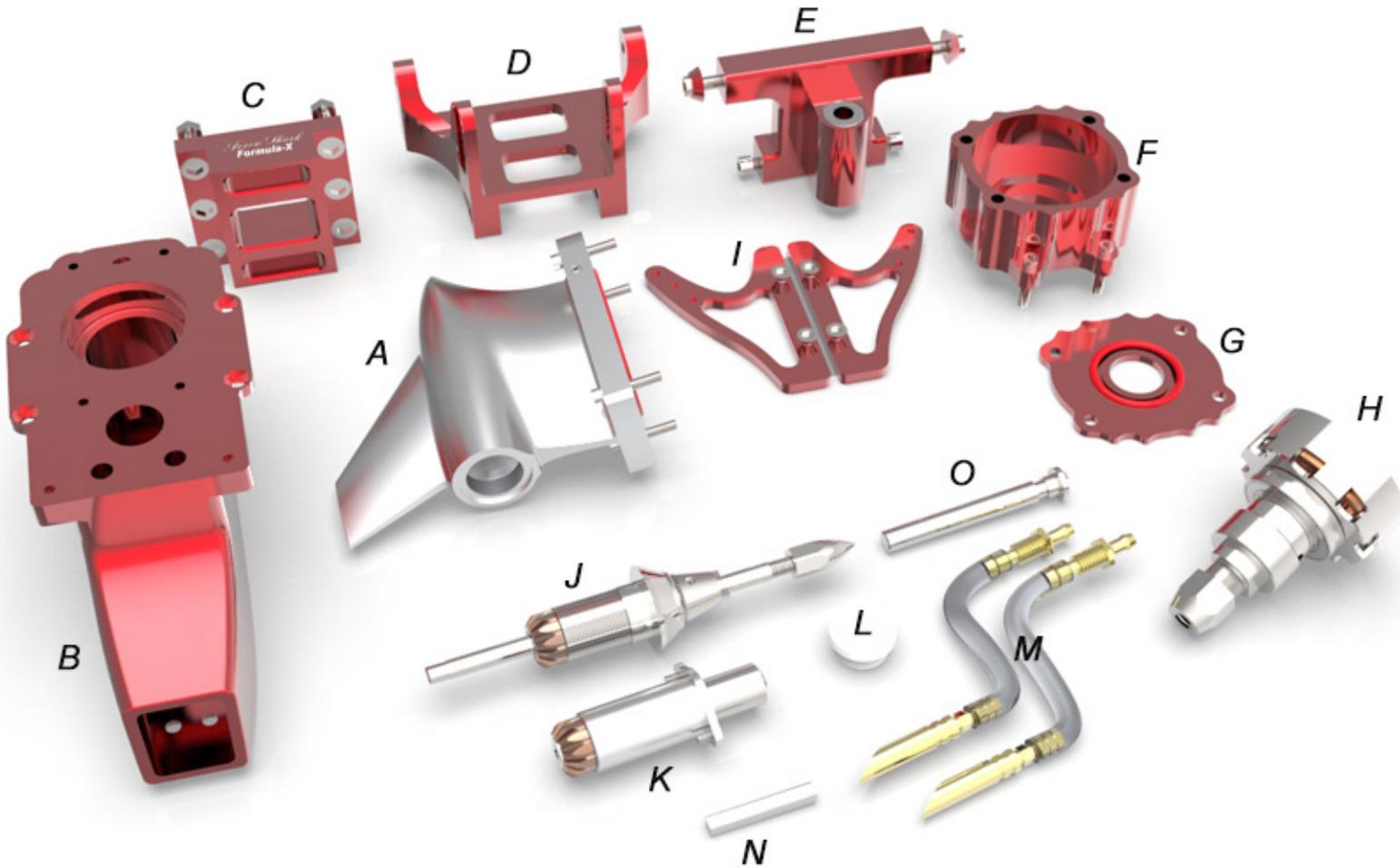


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Formula-X Part List



A: Billet Lower Unit

B: Billet Main Body Assembly

C: Transom Mounting Bracket

D: Quick Release Bracket

E: Pivot Bracket

F: Billet Clutch Housing

G: Clutch Housing Cover

H: Clutch Assembly Kit

I: Billet Steering Arms

J: Propshaft Assembly

K: Middle Barrel Gear Assembly

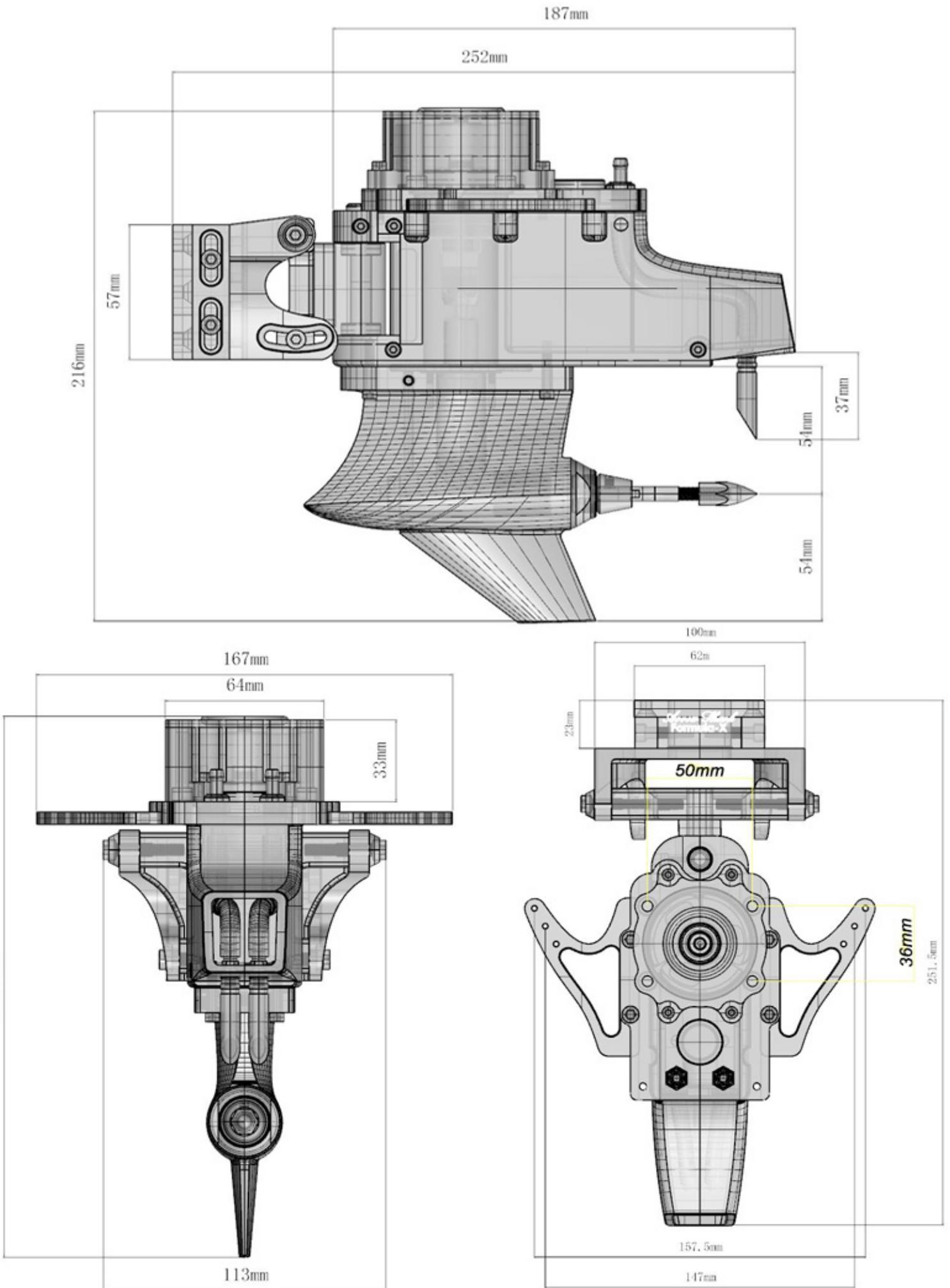
L: Silicone Plug

M: Water In & Out Nipples

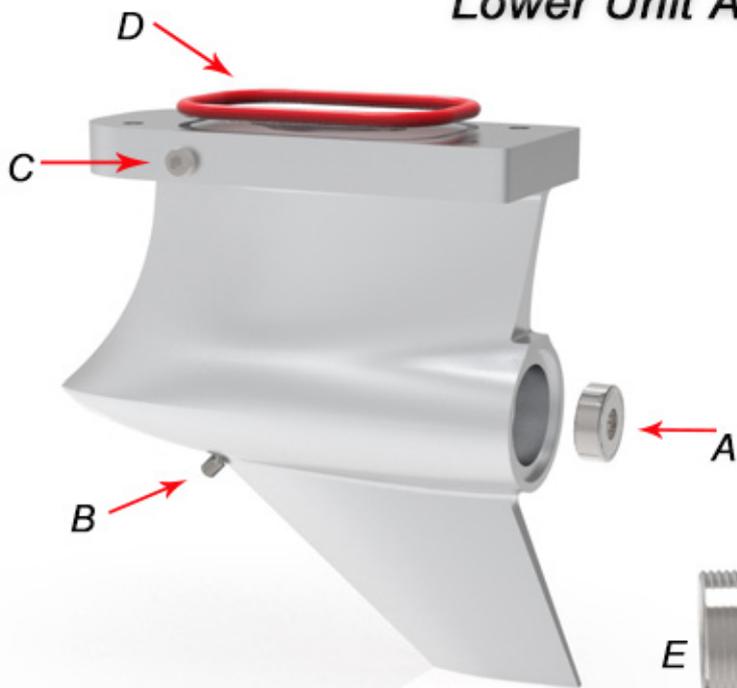
N: Drive Shaft

O: Steel Pivot Pin

Dimension Guide



Lower Unit Assembly

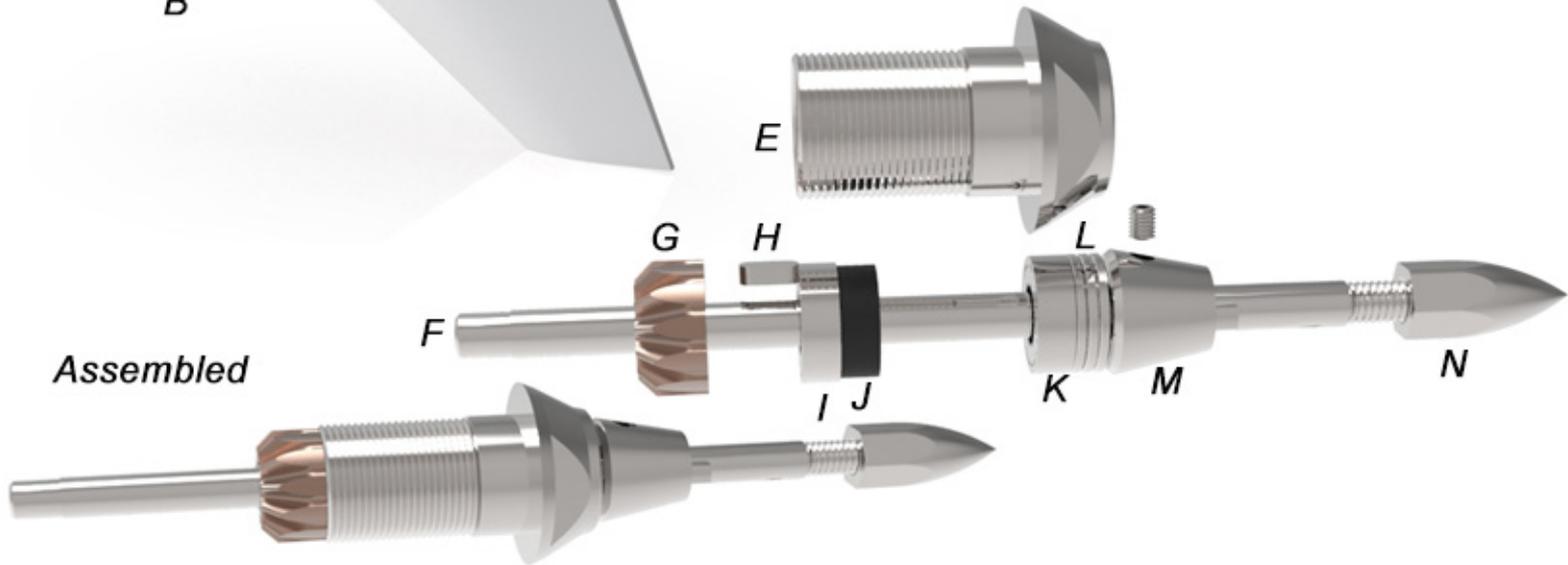


A: Install the propshaft support bearing into the lower unit.

B: Oil outlet seal nut, screw it out to outlet the lubrication oil.

C: Oil inlet seal nut, screw it out to refill the lubrication oil.

D: Install the seal ring into the groove on the top of the lower unit.



E: Propshaft Steel Housing

F: Propshaft

G: Gear

H: Gear Pin

I: Ball Bearing

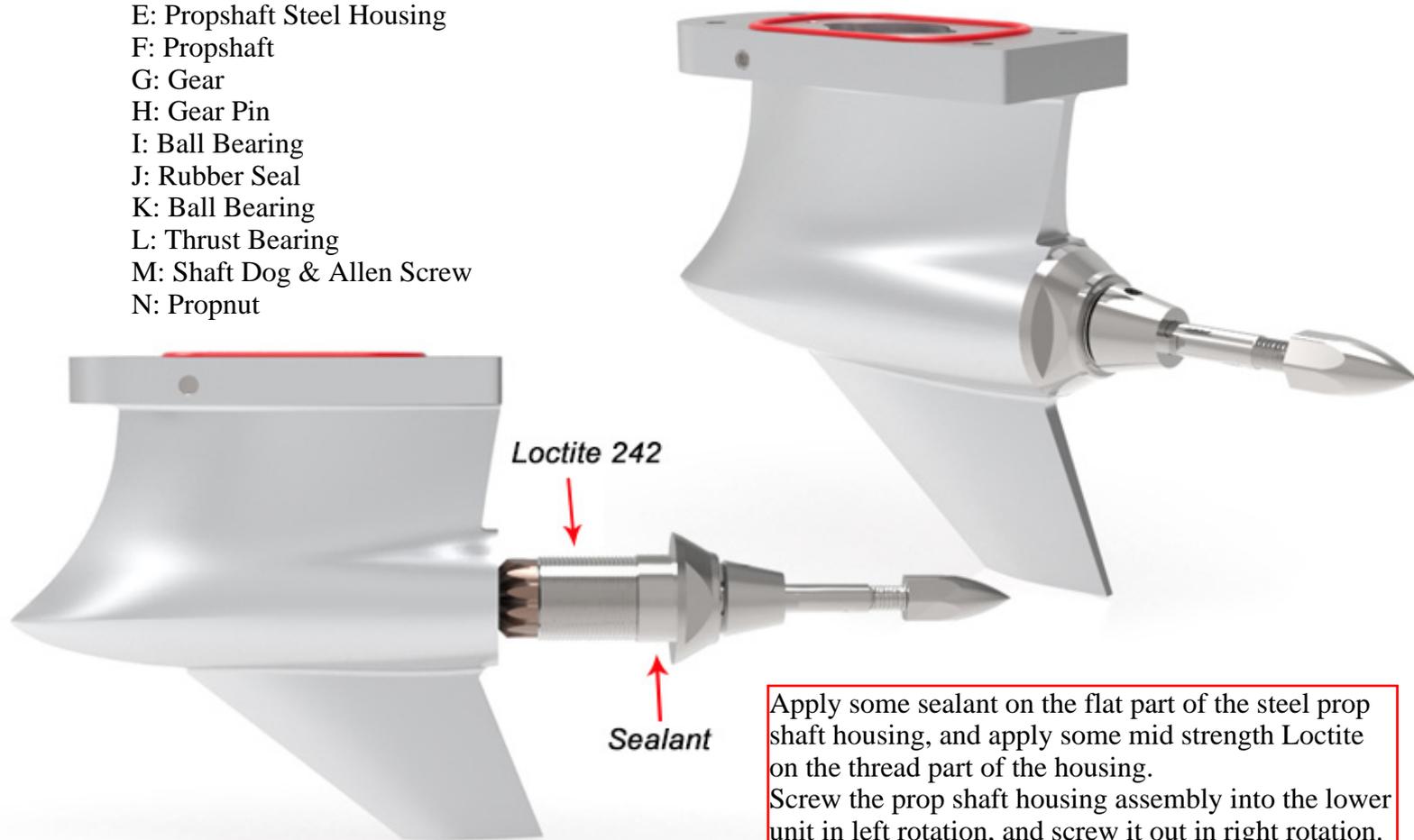
J: Rubber Seal

K: Ball Bearing

L: Thrust Bearing

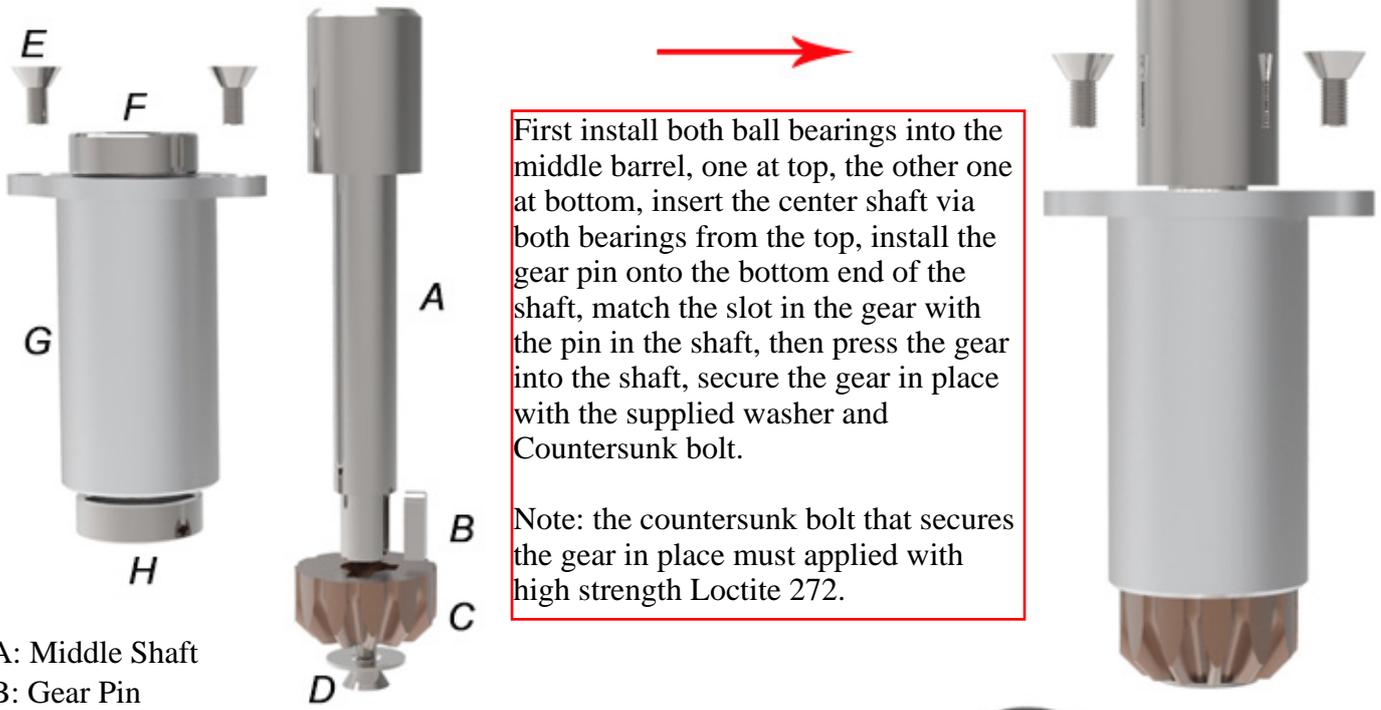
M: Shaft Dog & Allen Screw

N: Propnut



Apply some sealant on the flat part of the steel propshaft housing, and apply some mid strength Loctite on the thread part of the housing. Screw the prop shaft housing assembly into the lower unit in left rotation, and screw it out in right rotation.

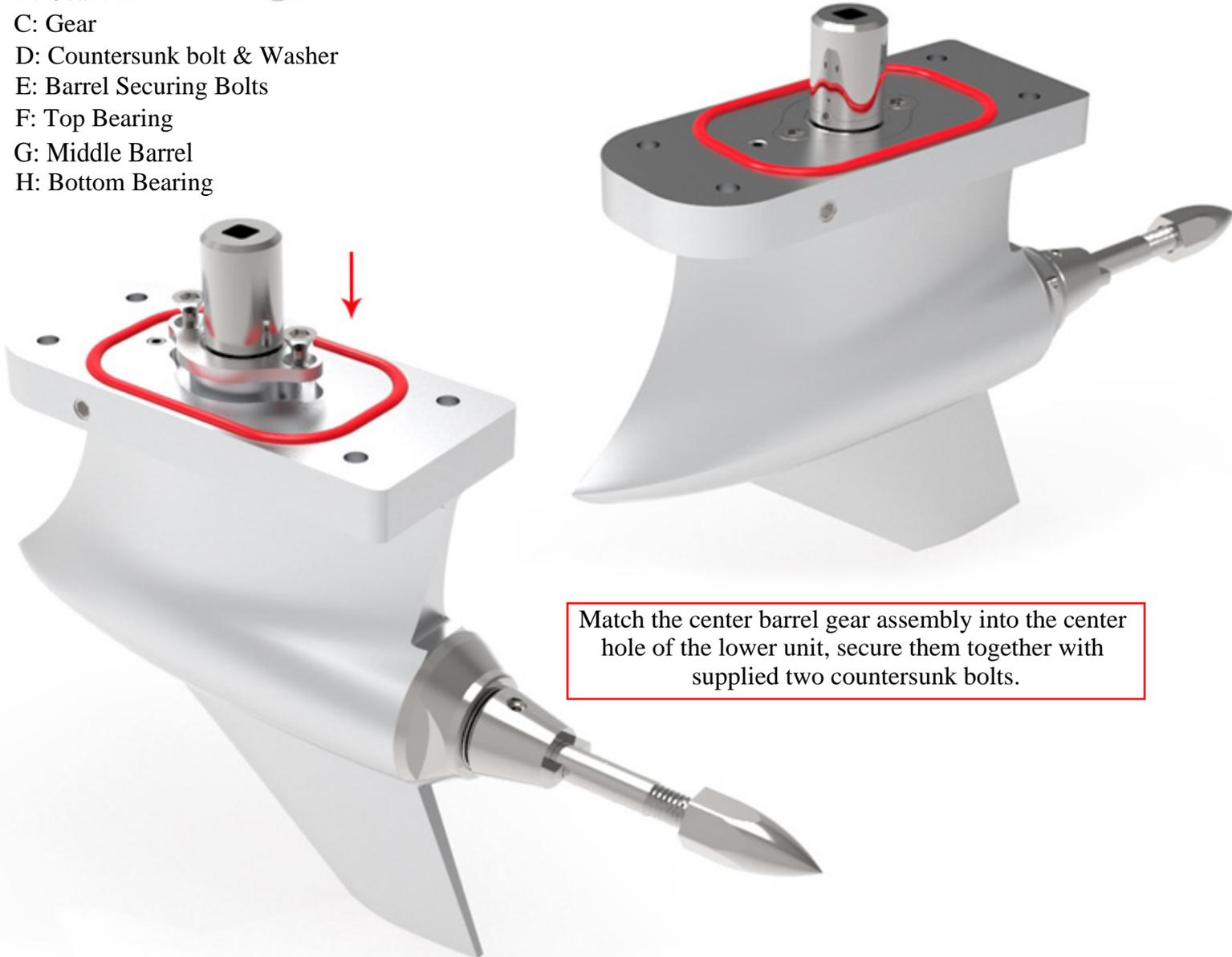
Middle Barrel Gear Assembly



First install both ball bearings into the middle barrel, one at top, the other one at bottom, insert the center shaft via both bearings from the top, install the gear pin onto the bottom end of the shaft, match the slot in the gear with the pin in the shaft, then press the gear into the shaft, secure the gear in place with the supplied washer and Countersunk bolt.

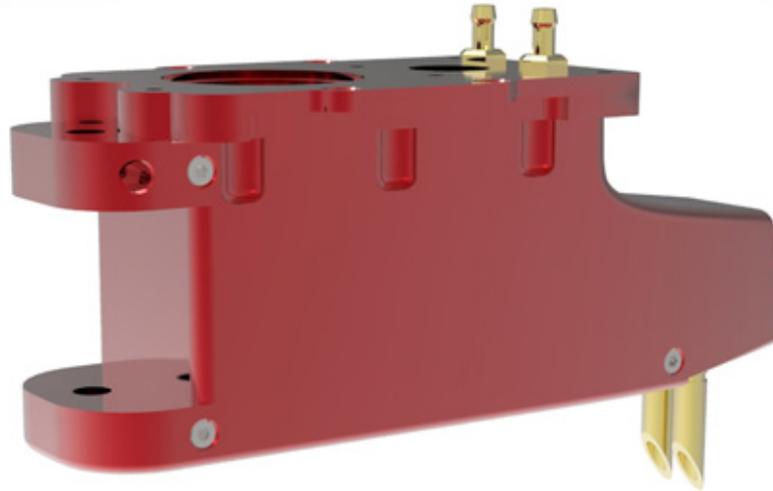
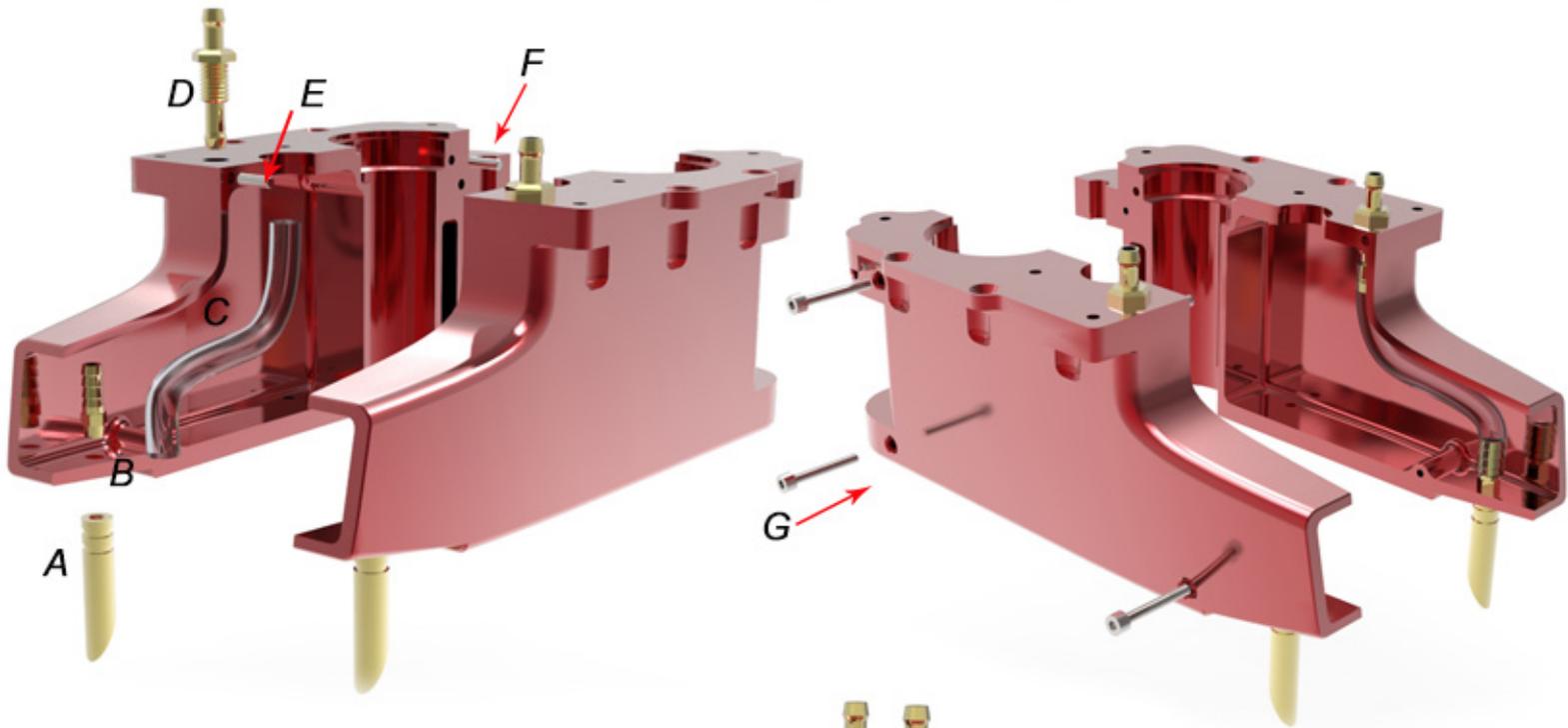
Note: the countersunk bolt that secures the gear in place must applied with high strength Loctite 272.

- A: Middle Shaft
- B: Gear Pin
- C: Gear
- D: Countersunk bolt & Washer
- E: Barrel Securing Bolts
- F: Top Bearing
- G: Middle Barrel
- H: Bottom Bearing



Match the center barrel gear assembly into the center hole of the lower unit, secure them together with supplied two countersunk bolts.

Billet Main Body Assembly

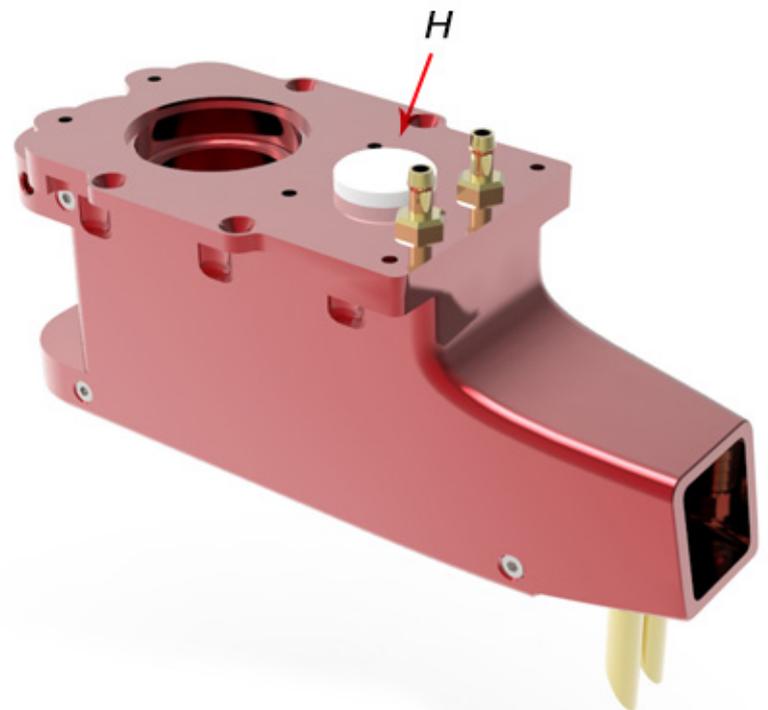


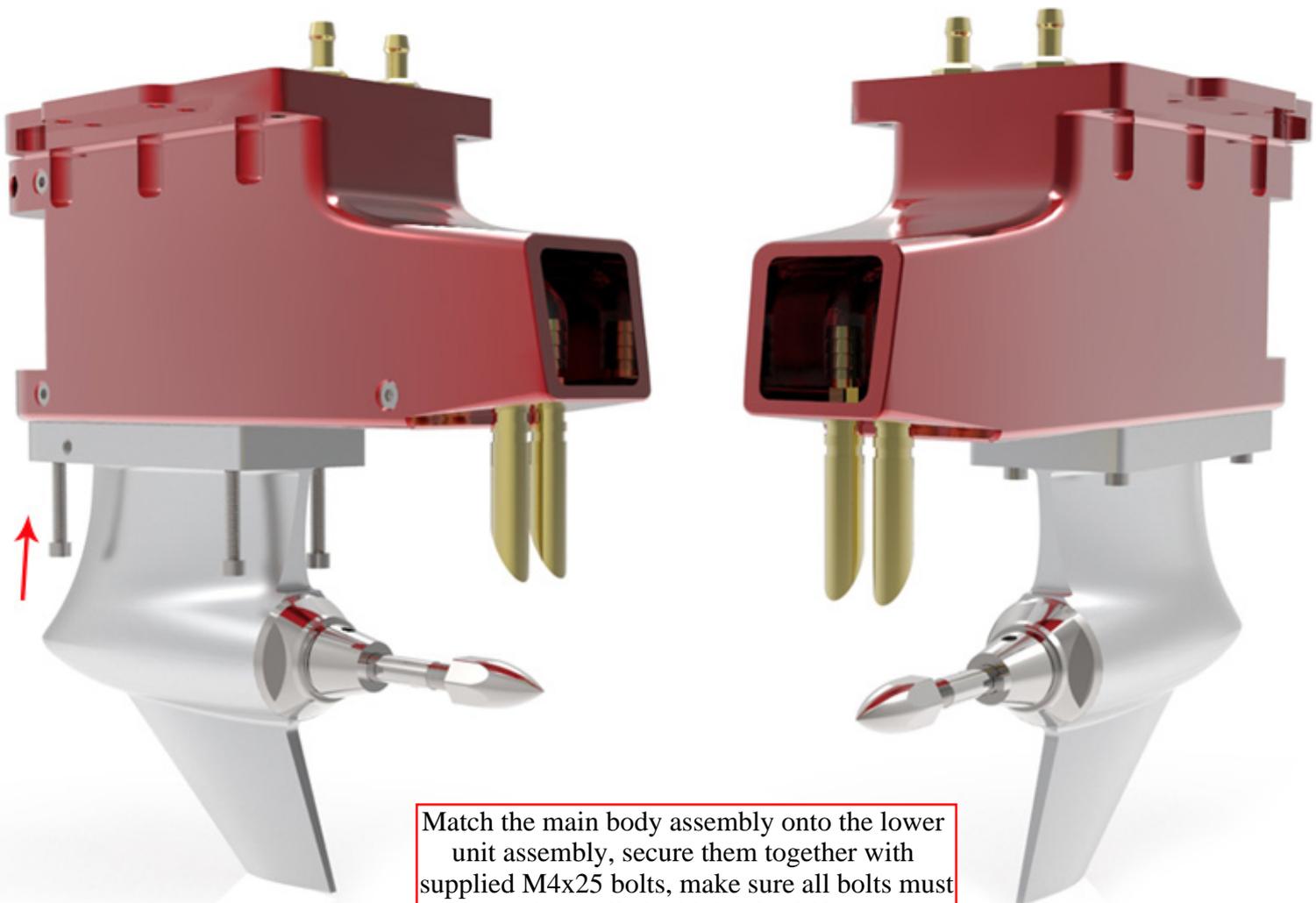
Install both position pins (#E,#F) into either half of main body, place the copper water pick up (#A) at bottom of the tail end main body, screw the water nipple (#B) from inside of main body into the water pick to hold it in place, screw down the water outlet nipple (#D) into the main body from the top, connect the water tube (#C) between the (#B and #D).

Repeat the same procedures to install the water pick up connection for the other half of main body.

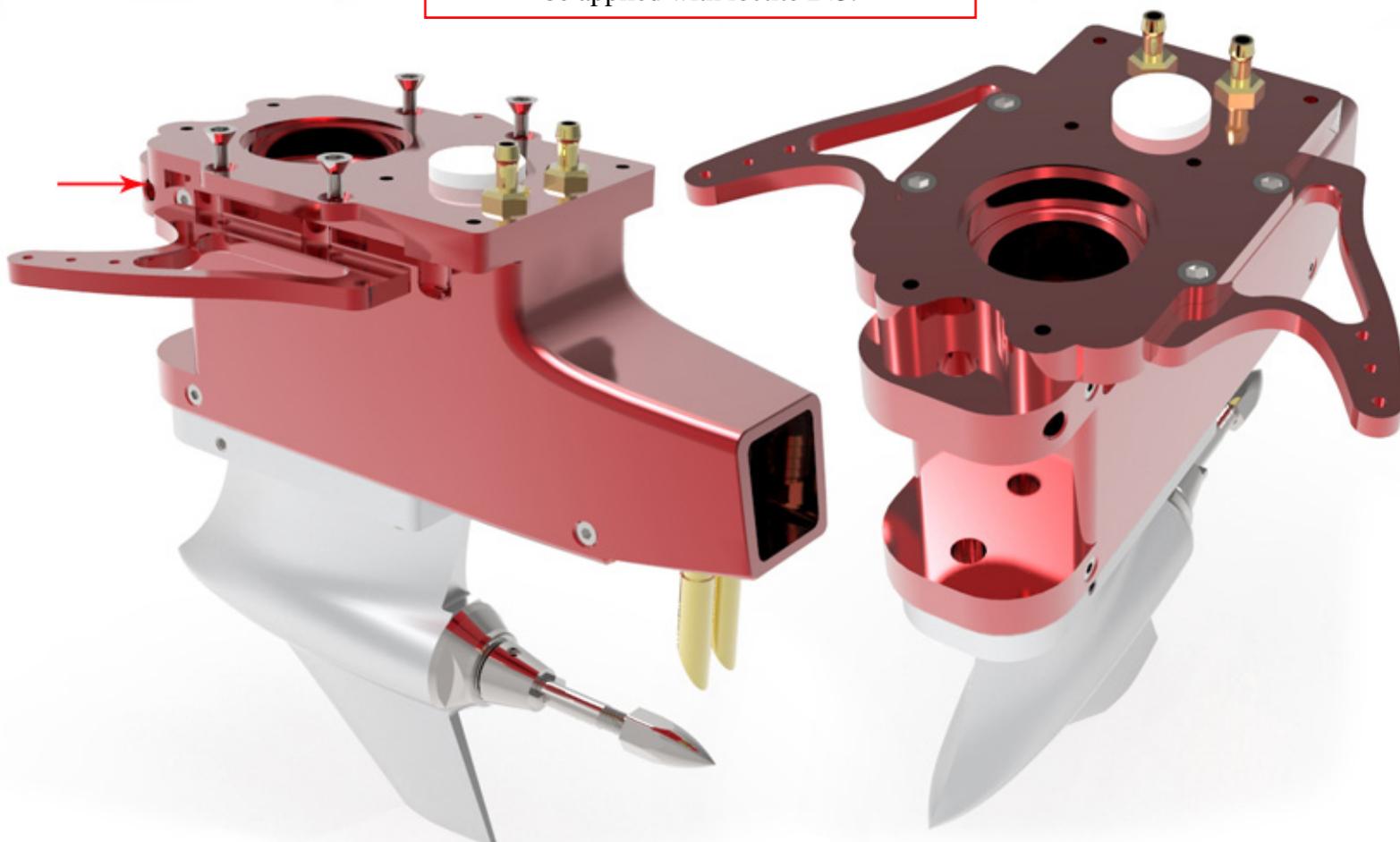
Match the position pins to the pin holes on other half of the main body, secure the two pieces main bodies together with supplied bolts (#G), make sure all bolts have applied with med strength loctite 243.

Install the silicone plug onto the smaller hole on the top of the main body, this hole is designed as transfer port for the exhaust outlet of the executive package set up, when it is not in use, it will be sealed with this silicone plug.





Match the main body assembly onto the lower unit assembly, secure them together with supplied M4x25 bolts, make sure all bolts must be applied with loctite 243.

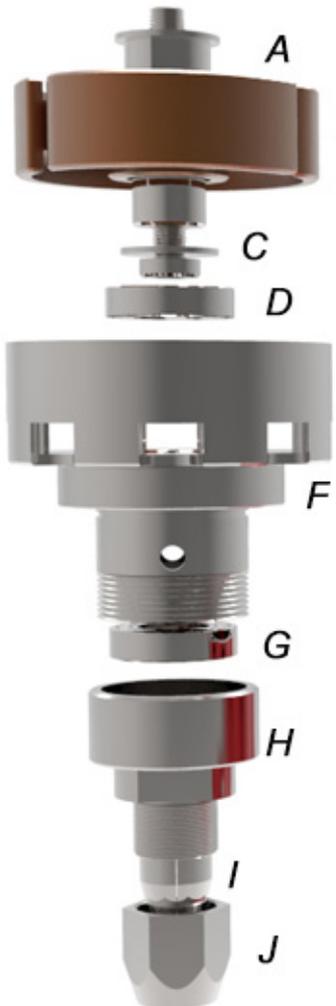
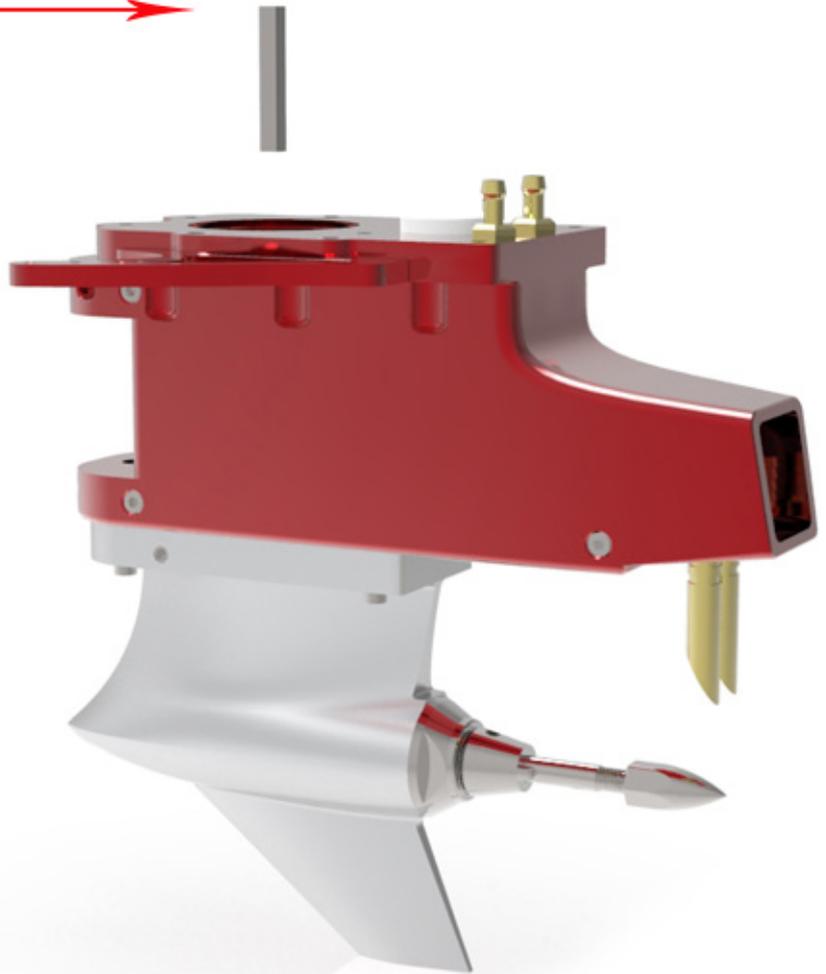


Install the steering arms into the match slots on the both side of the main body, and secure them with the countersunk bolts from the top.

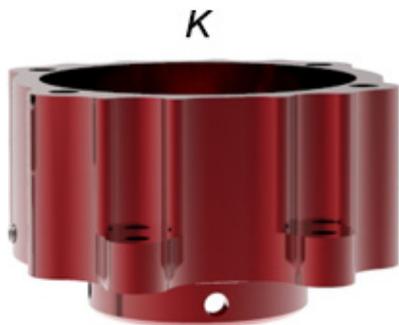
Clutch System Assembly



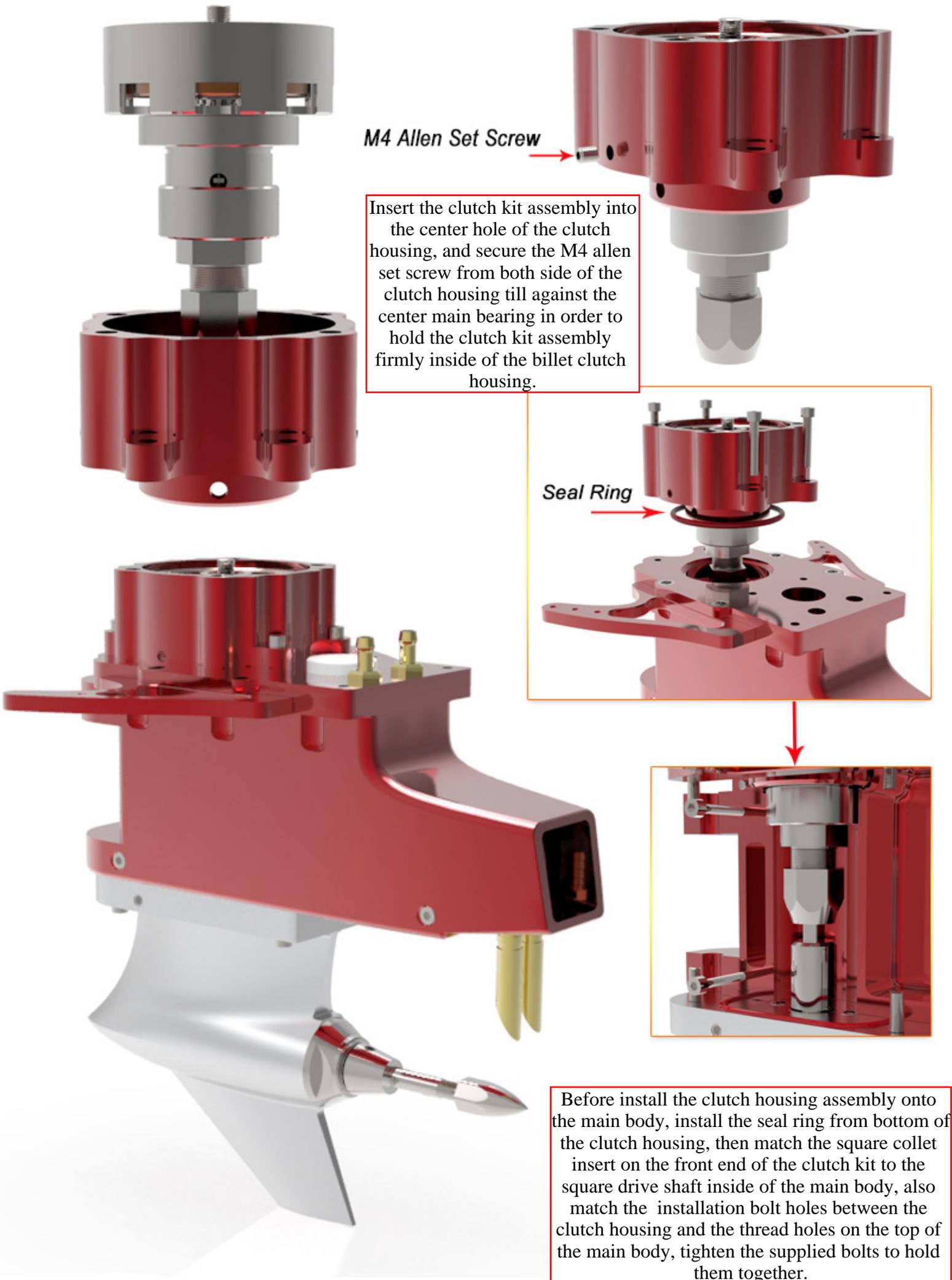
Insert the drive shaft into the 1/4" square shaft fitting hole in the middle shaft.



- A: Center Adaptor Shaft
- B: Clutch Shoe
- C: Center Bolt & Washer
- D: Upper Bearing
- E: Clutch Bell
- F: Center Main Bearing
- G: Lower Bearing
- H: Front Adaptor
- I: Square Collet Inset
- J: Front Cap



- Step#1: Install both upper and lower bearings into the clutch bell.
- Step#2: Install the center main bearing onto the clutch bell and secure it with supplied clip.
- Step#3: Press the center adaptor shaft into the clutch shoe and secure it with supplied clip.
- Step#4: Match the center adaptor shaft along with clutch shoe into the clutch bell pass through both upper and lower bearing.
- Step#5: Insert the installation bolt and washer from the bottom end of the clutch bell.
- Step#6: install the square collet inset into the center hole of the front adaptor, and screw the front cap on.
- Step#7: Screw the front adaptor assembly onto the clutch bell.



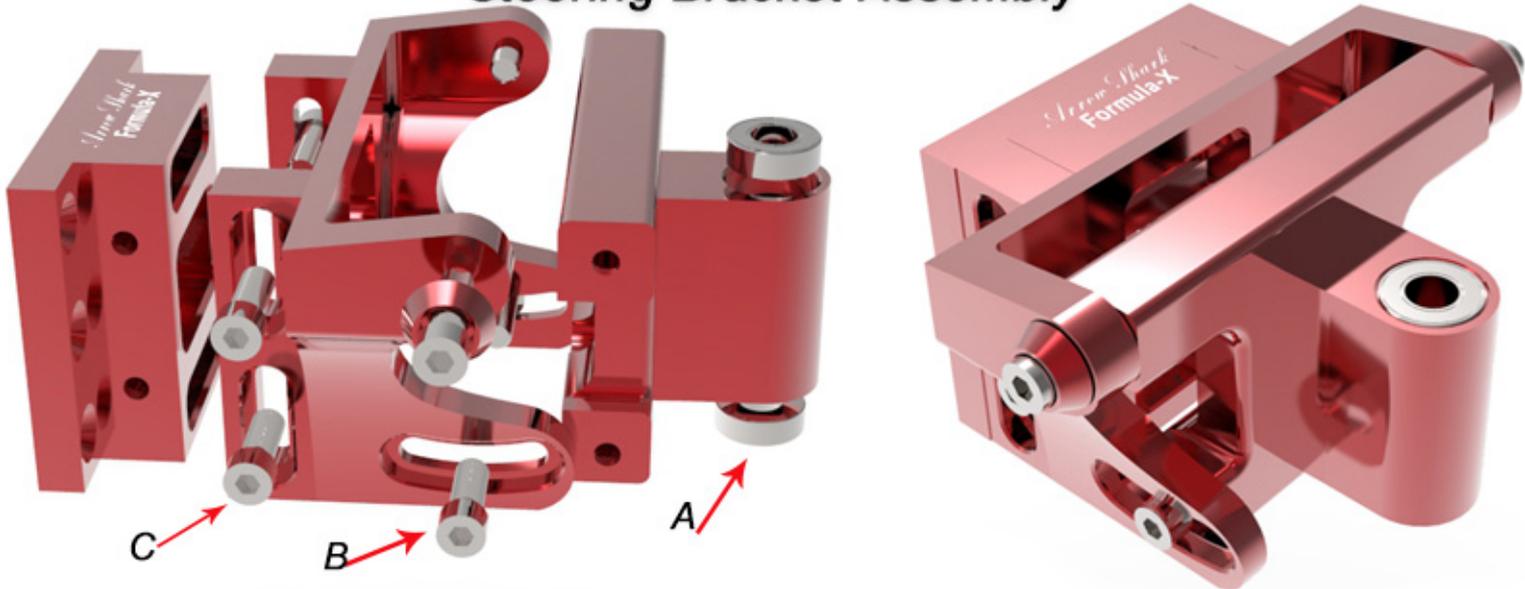
M4 Allen Set Screw

Insert the clutch kit assembly into the center hole of the clutch housing, and secure the M4 allen set screw from both side of the clutch housing till against the center main bearing in order to hold the clutch kit assembly firmly inside of the billet clutch housing.

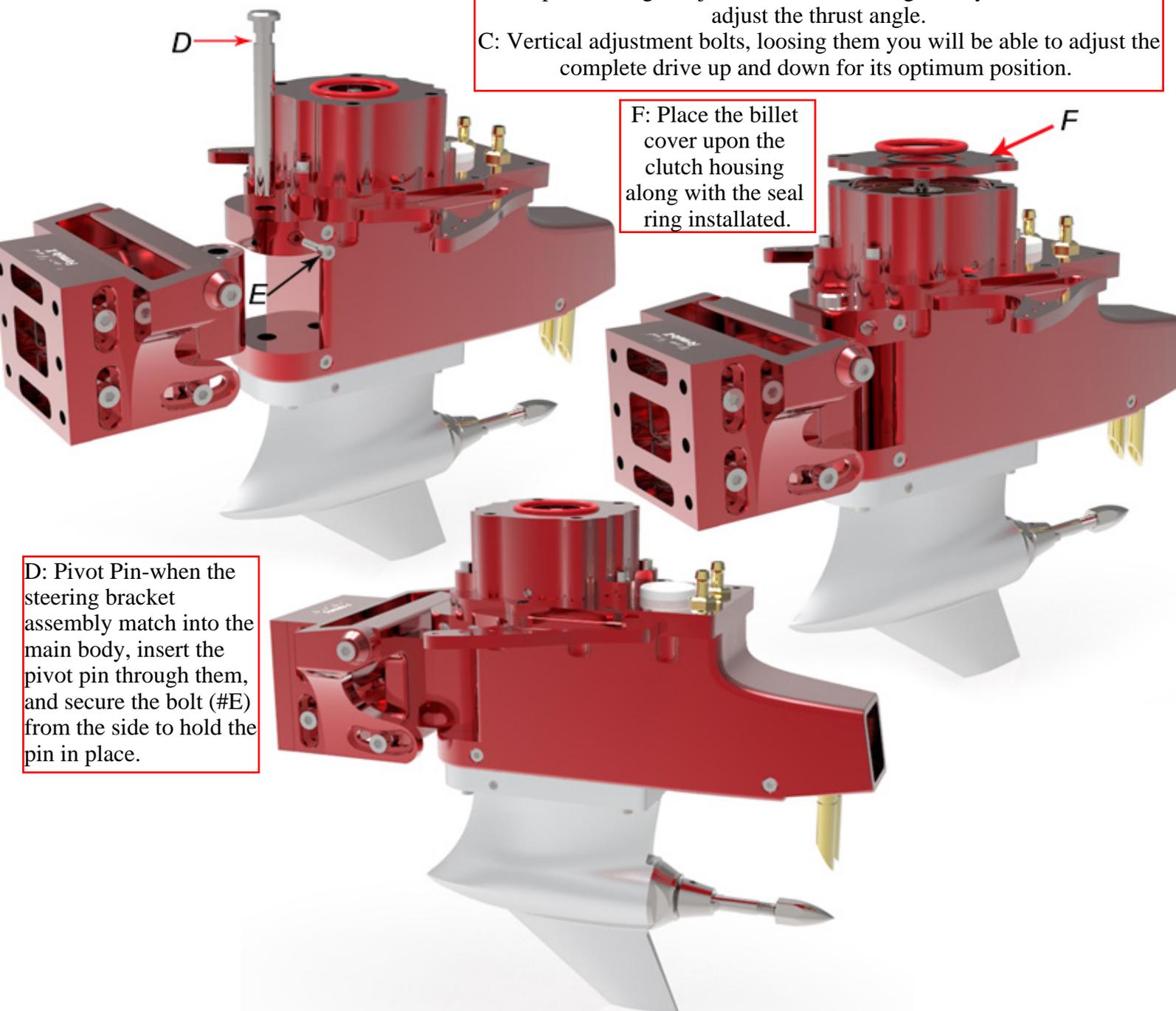
Seal Ring

Before install the clutch housing assembly onto the main body, install the seal ring from bottom of the clutch housing, then match the square collet insert on the front end of the clutch kit to the square drive shaft inside of the main body, also match the installation bolt holes between the clutch housing and the thread holes on the top of the main body, tighten the supplied bolts to hold them together.

Steering Bracket Assembly



A: Steering bearings for smooth steering operation.
 B: Prop thrust angle adjustment bolts, loosening them you will be able to adjust the thrust angle.
 C: Vertical adjustment bolts, loosening them you will be able to adjust the complete drive up and down for its optimum position.



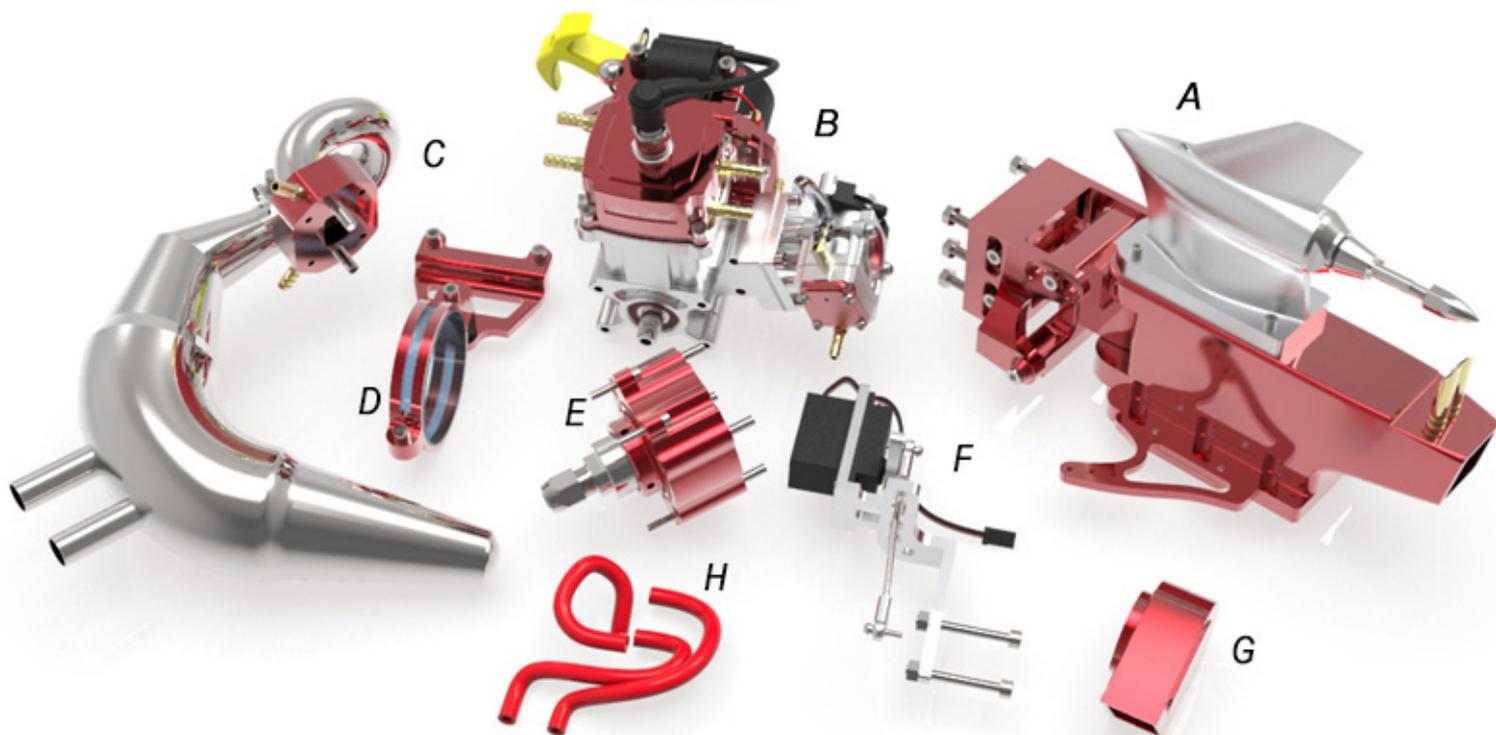
F: Place the billet cover upon the clutch housing along with the seal ring installed.

D: Pivot Pin-when the steering bracket assembly match into the main body, insert the pivot pin through them, and secure the bolt (#E) from the side to hold the pin in place.

Congratulations, The Formula-X Outboard Drive Assembly Is Now Completed!

Instruction of Deluxe Package Set Up

PART LIST



A: Formula-X Outboard Drive Assembly

B: X-30 Marine Engine Assembly

C: Formula-S Outboard Pipe Kit

D: Outboard Pipe Mounting Kit

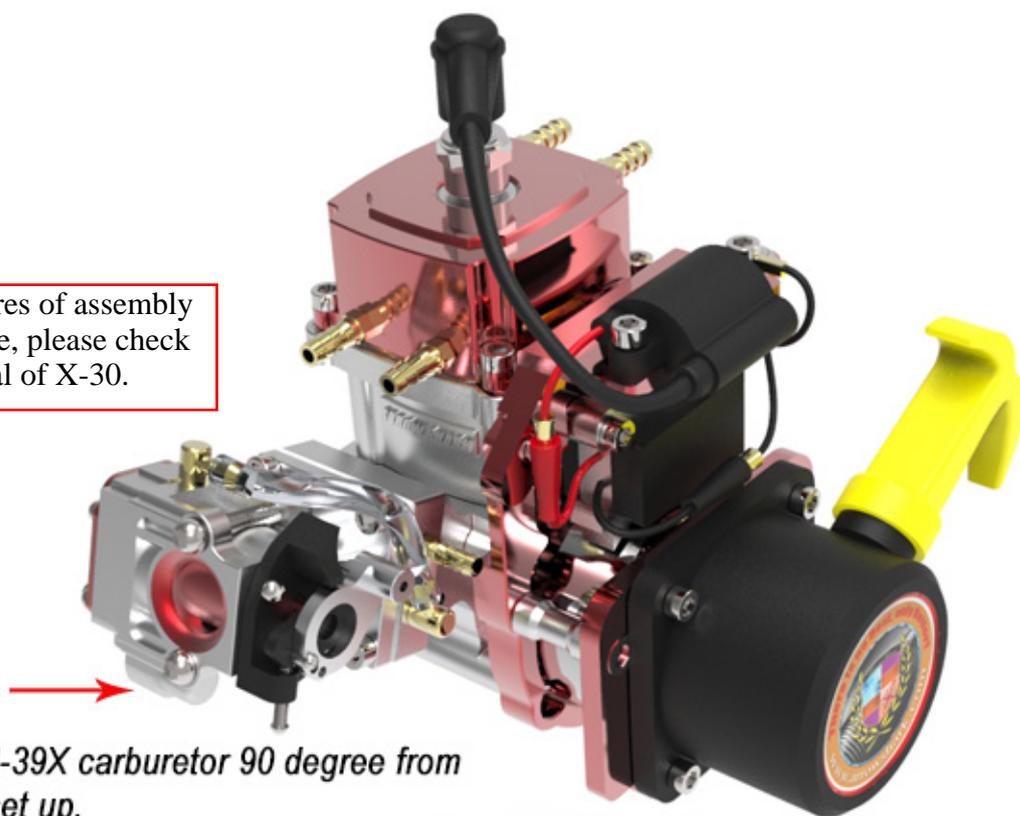
E: Clutch System

F: Throttle Control Kit

G: Billet Carburetor Protector

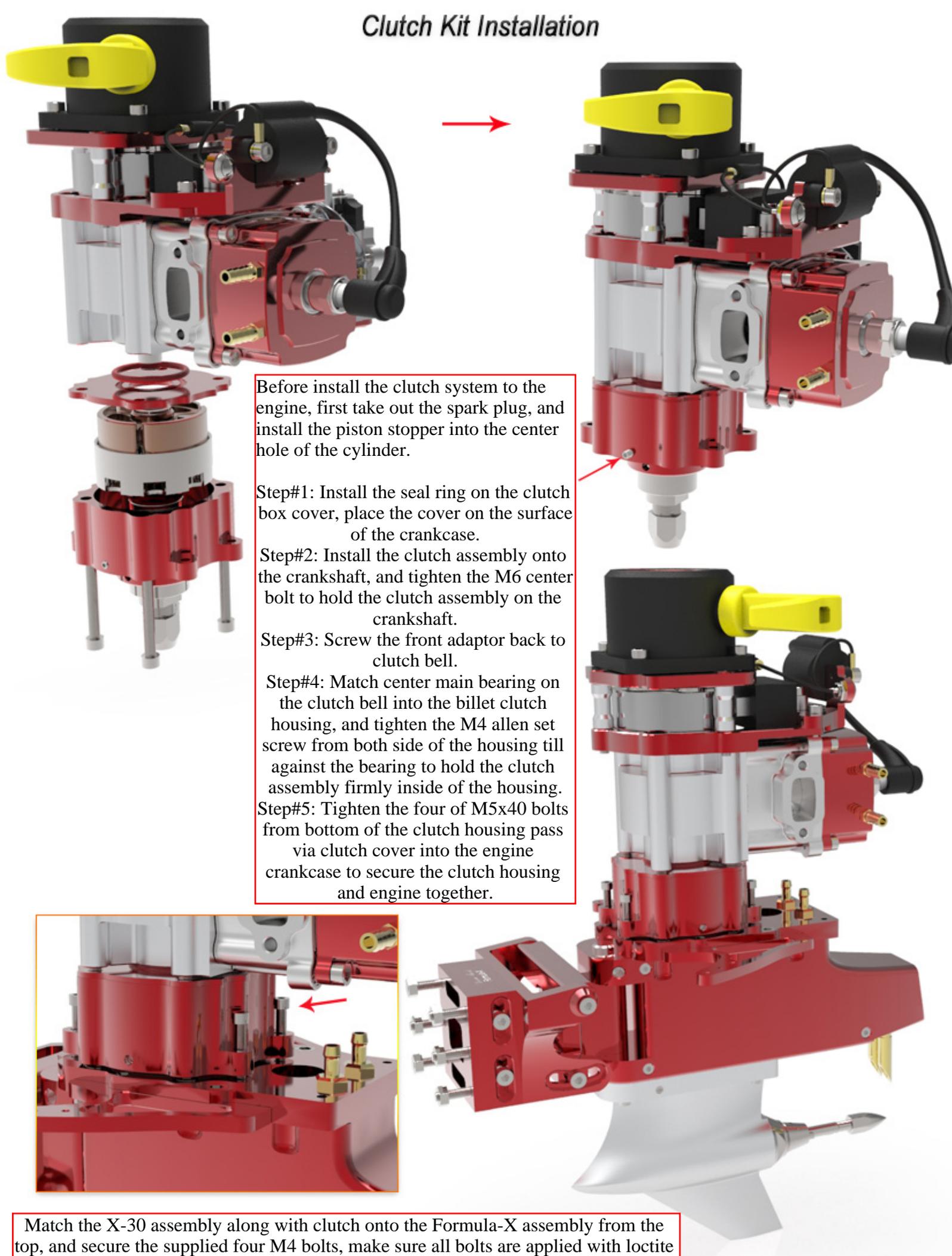
H: Water Cooling Tubes

For the detail procedures of assembly on X-30 marine engine, please check the owner manual of X-30.



Rotate the M-39X carburetor 90 degree from its standard set up.

Clutch Kit Installation



Before install the clutch system to the engine, first take out the spark plug, and install the piston stopper into the center hole of the cylinder.

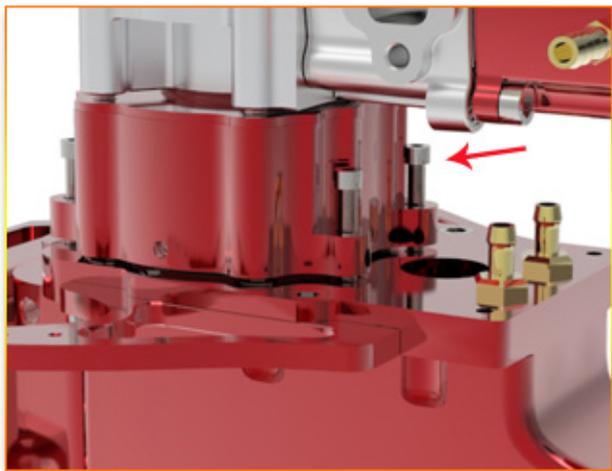
Step#1: Install the seal ring on the clutch box cover, place the cover on the surface of the crankcase.

Step#2: Install the clutch assembly onto the crankshaft, and tighten the M6 center bolt to hold the clutch assembly on the crankshaft.

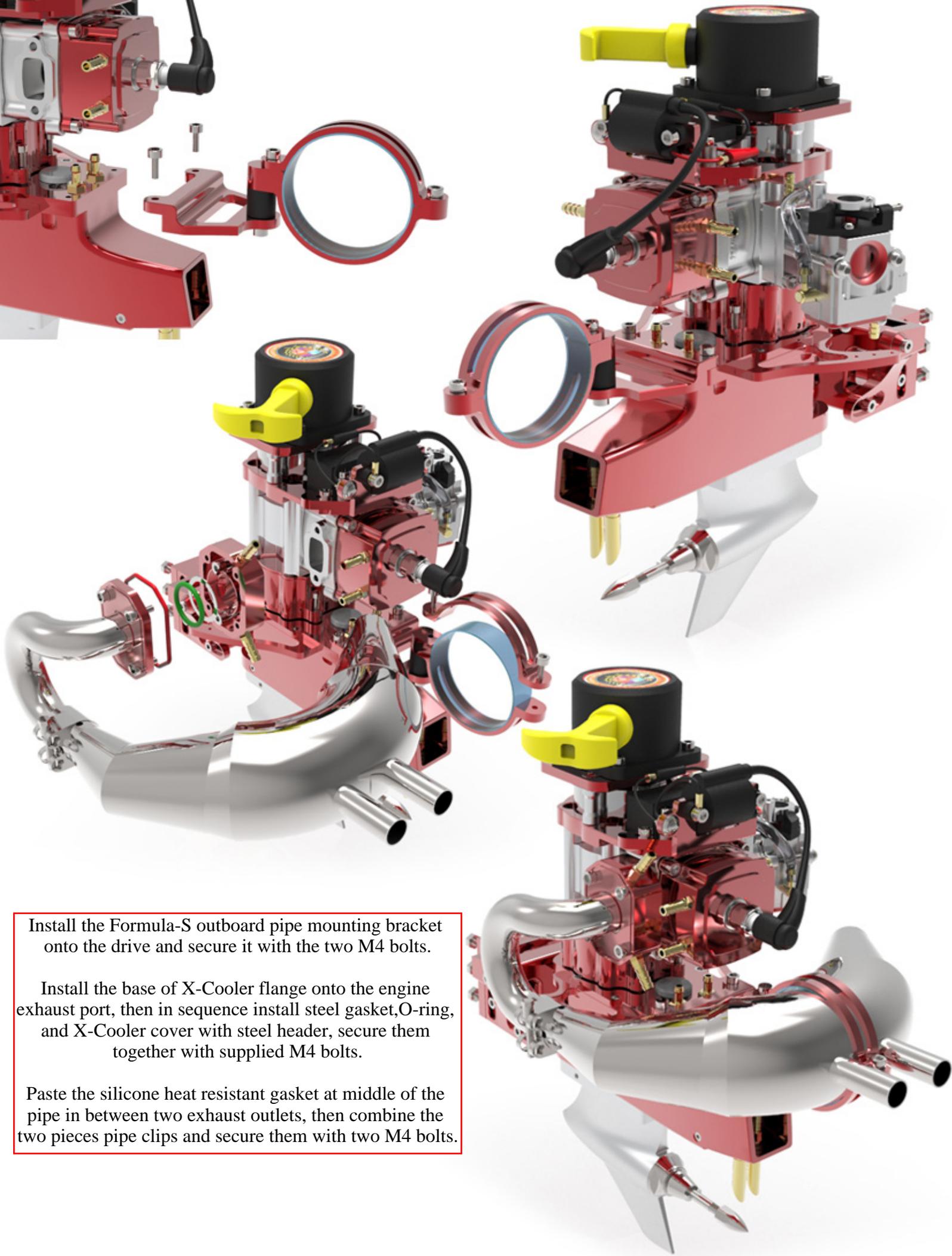
Step#3: Screw the front adaptor back to clutch bell.

Step#4: Match center main bearing on the clutch bell into the billet clutch housing, and tighten the M4 allen set screw from both side of the housing till against the bearing to hold the clutch assembly firmly inside of the housing.

Step#5: Tighten the four of M5x40 bolts from bottom of the clutch housing pass via clutch cover into the engine crankcase to secure the clutch housing and engine together.



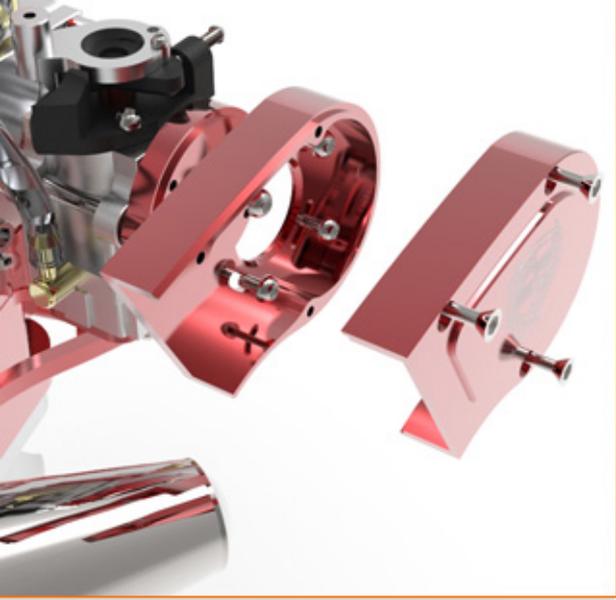
Match the X-30 assembly along with clutch onto the Formula-X assembly from the top, and secure the supplied four M4 bolts, make sure all bolts are applied with loctite 243, you might need to use short head allen spanner for the two bolts at front.



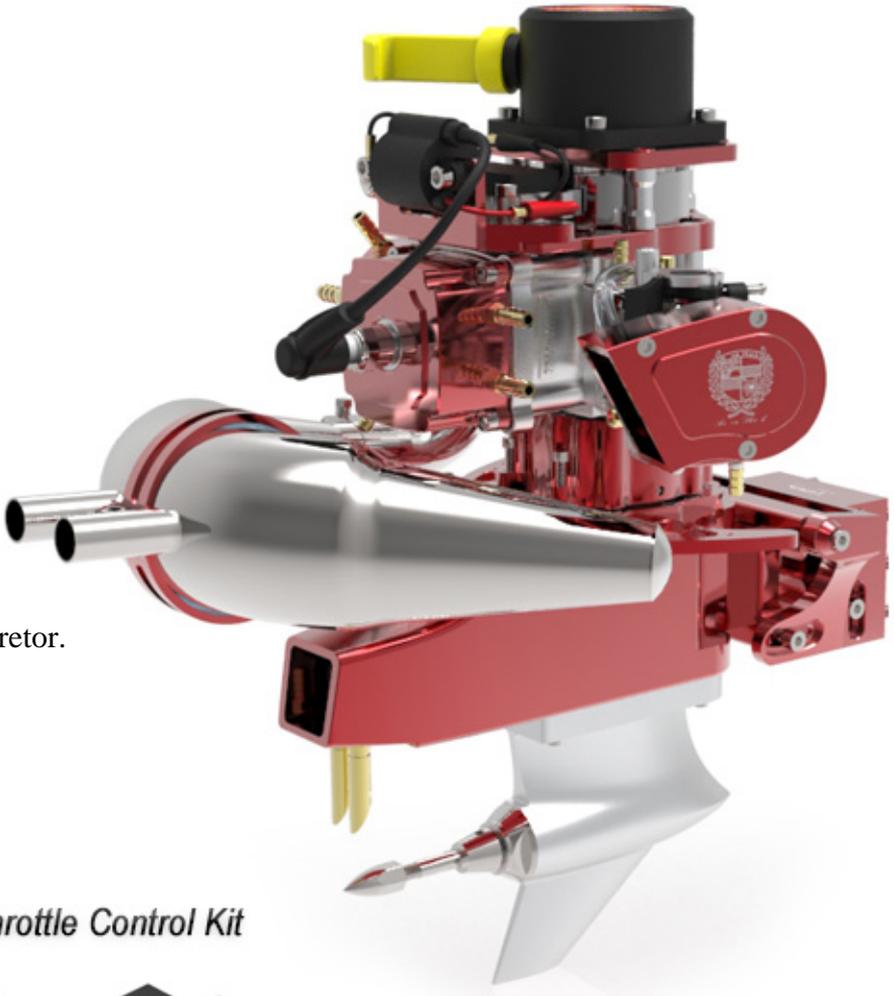
Install the Formula-S outboard pipe mounting bracket onto the drive and secure it with the two M4 bolts.

Install the base of X-Cooler flange onto the engine exhaust port, then in sequence install steel gasket, O-ring, and X-Cooler cover with steel header, secure them together with supplied M4 bolts.

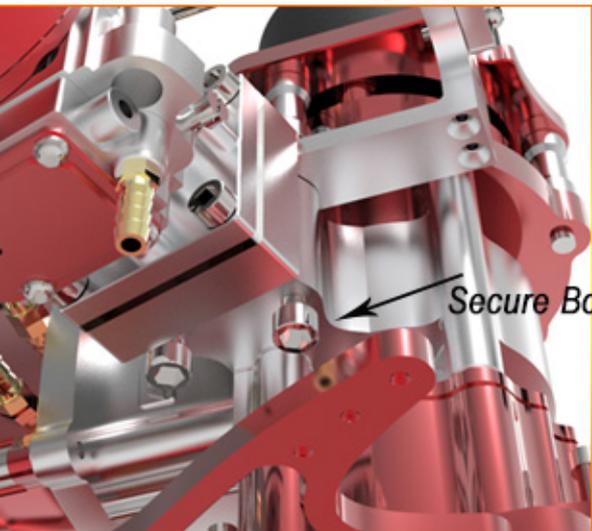
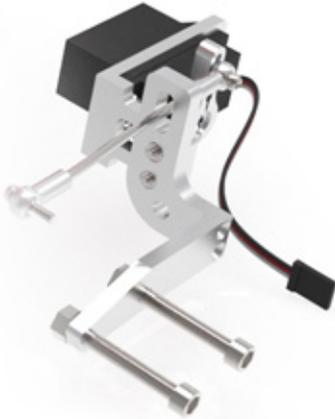
Paste the silicone heat resistant gasket at middle of the pipe in between two exhaust outlets, then combine the two pieces pipe clips and secure them with two M4 bolts.



Install the carburetor protector onto M-39X carburetor.

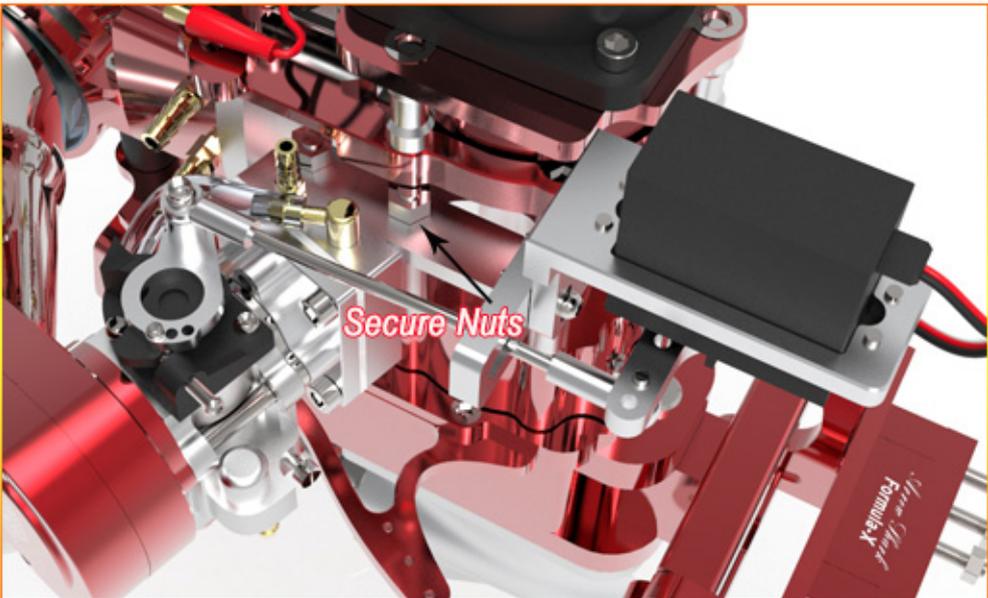


Throttle Control Kit



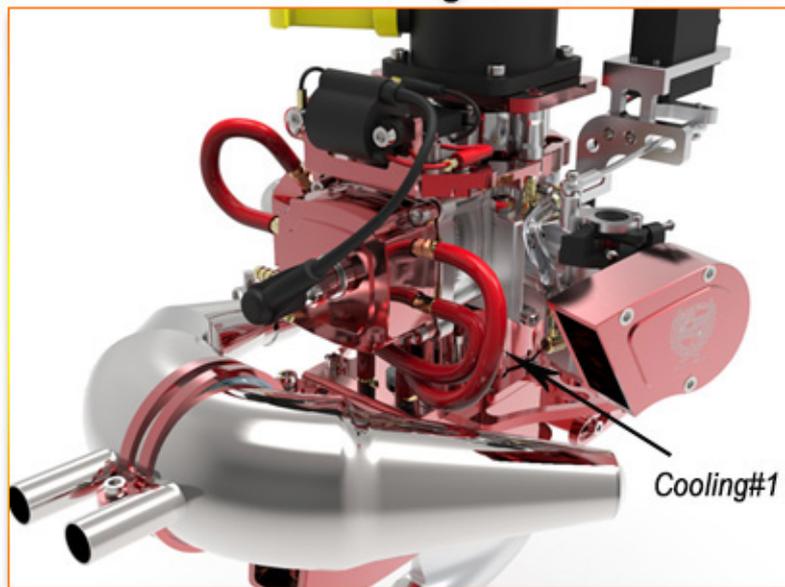
Secure Bolts

- 1: Screw these two M5 bolts from bottom of the crankcase all the way up, before the bolts come out from the other side, place the throttle control mounting bracket on the top side of the crankcase, the two installation holes must match the two bolts from the bottom, now, place one of nut on the mounting bracket, and tighten one bolt from the bottom into the nut till it fully secured, do the same for the other bolt.
- 2: Use the ball joint rod to connect servo arm and the throttle adaptor on the carburetor together.

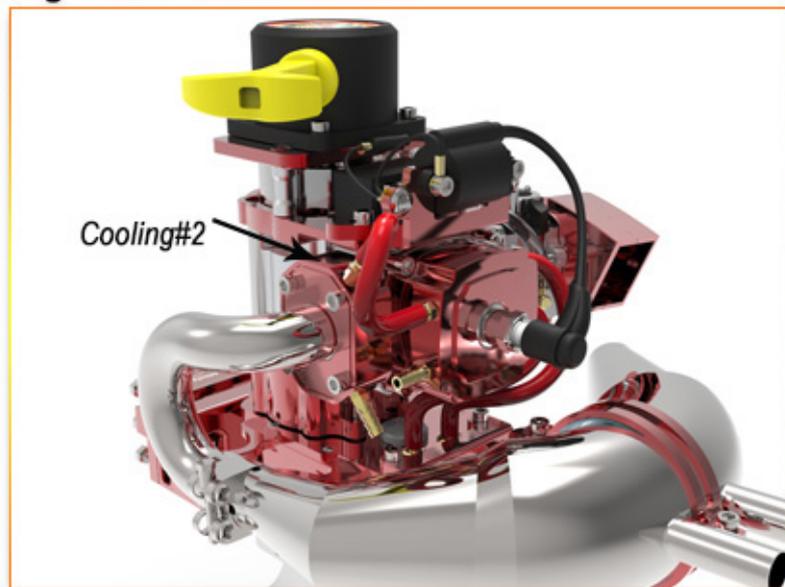


Secure Nuts

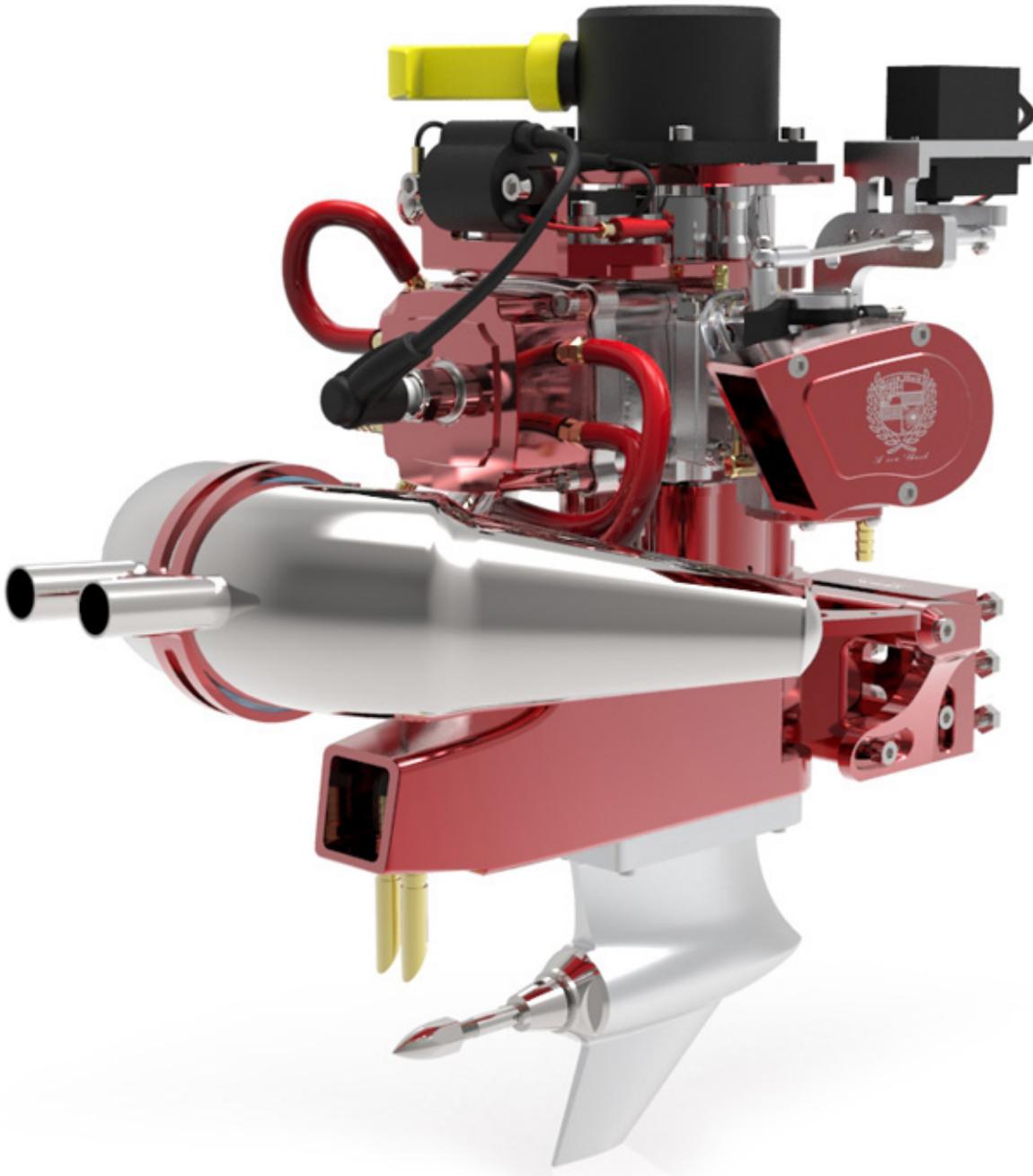
Diagram of Water Cooling Tube Connections



Cooling Line#1: From the two water outlet fittings on the drive to the water inlet nipples on the engine water jacket.

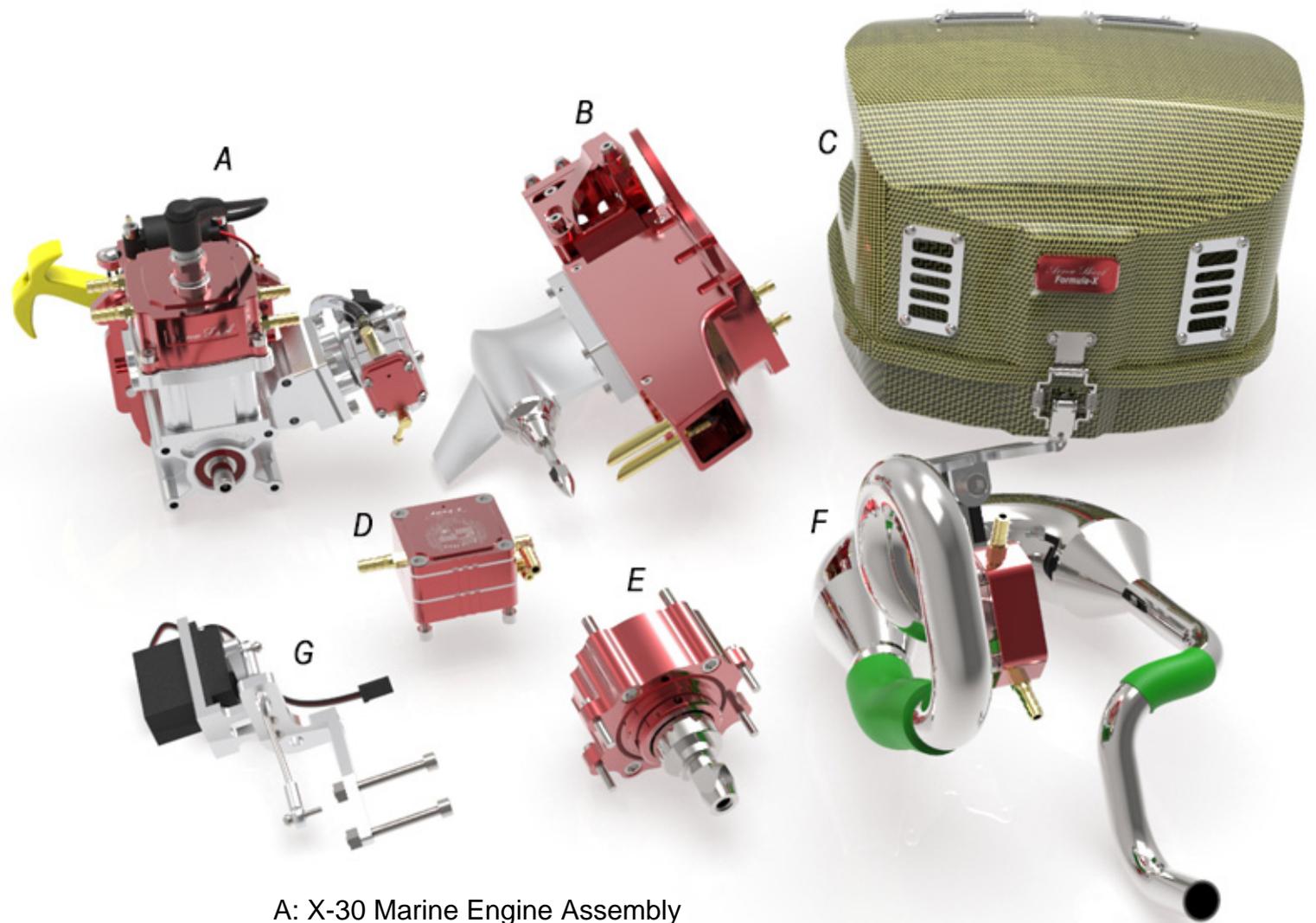


Cooling Line#2: From one of water outlet nipple on engine water jacket to one of water nipple on the flange. leave the other two nipples to outlet the water.



Congratulations, The Deluxe Package Assembly of Formula-X Is Now Completed!

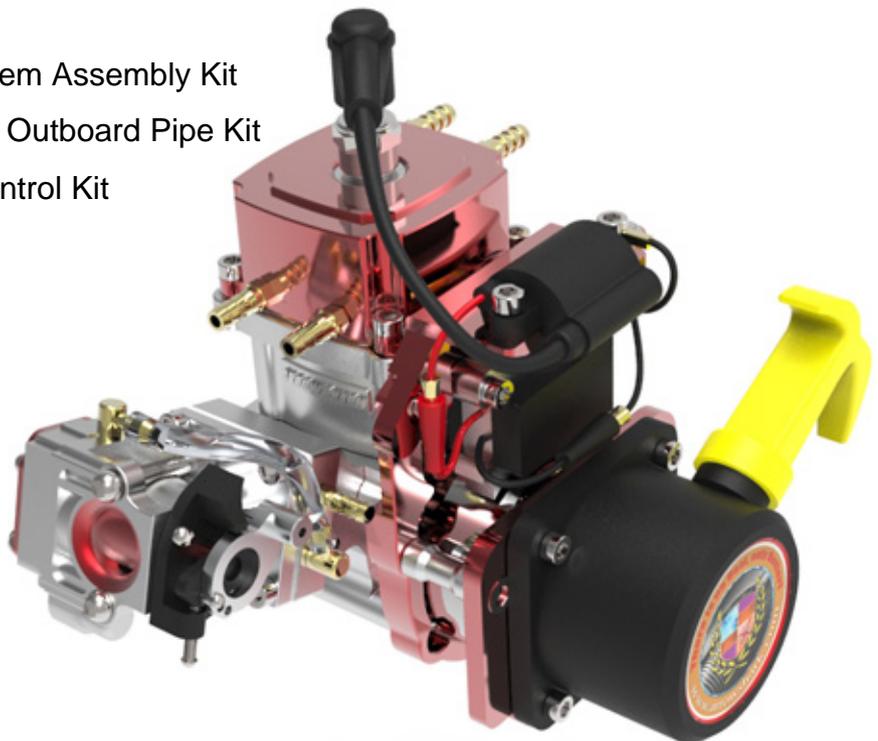
Instruction Of Executive Package Set Up



- A: X-30 Marine Engine Assembly
- B: Formula-X Outboard Drive Assembly
- C: Outboard Cowling Assembly
- D: X-Pump
- E: Clutch System Assembly Kit
- F: Hornet D50 Outboard Pipe Kit
- G: Throttle Control Kit

For the detail procedures of assembly on X-30 marine engine, please check the owner manual of X-30.

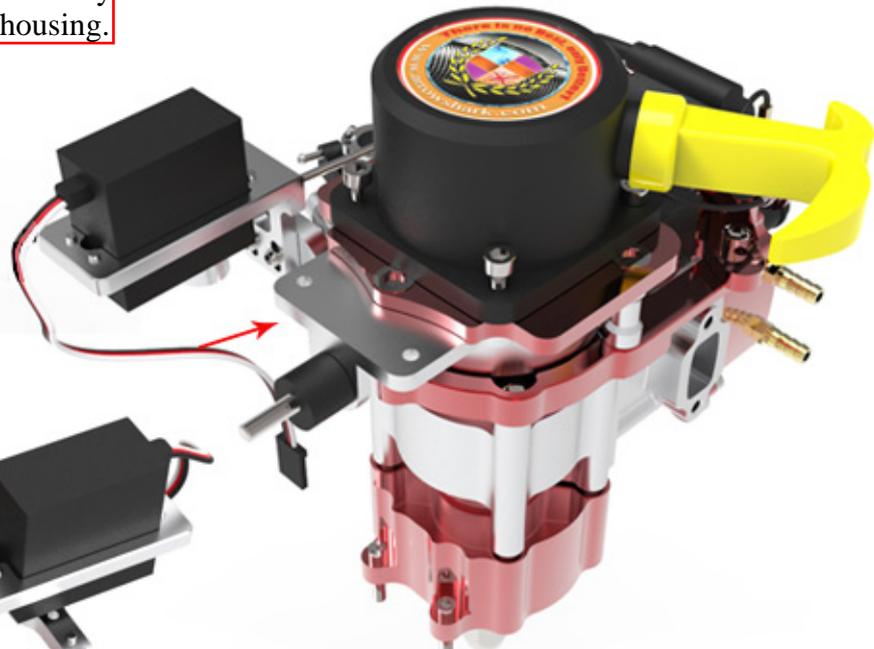
Rotate the M-39X carburetor 90 degree from its standard set up position.



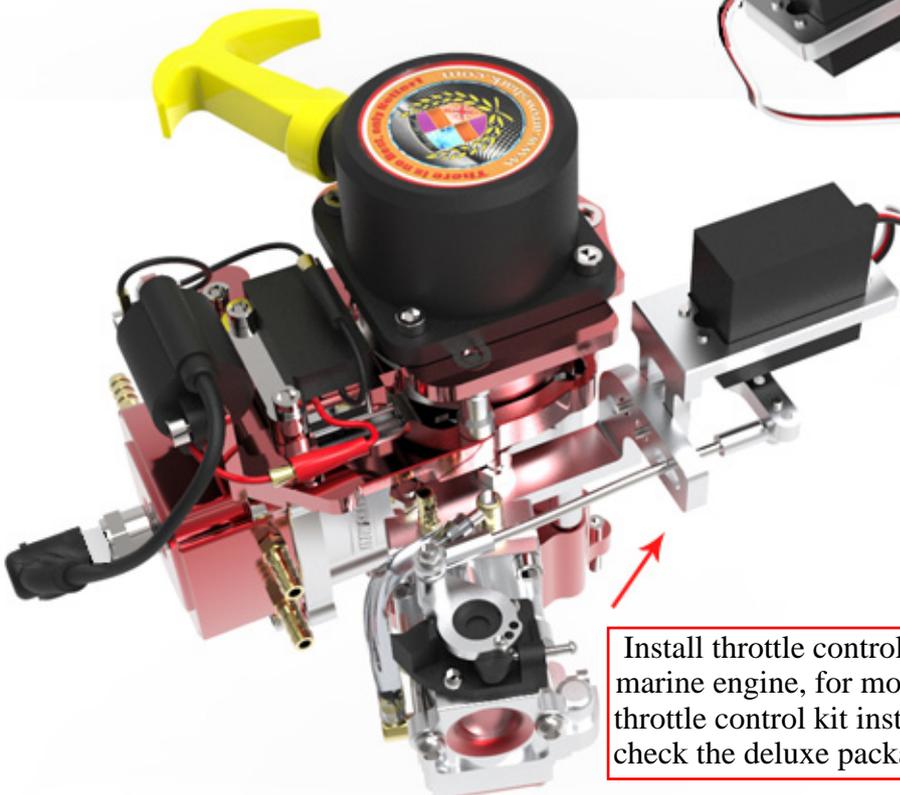
Clutch System Installation



Install the clutch assembly kit onto the crankshaft, tighten the M4 allen set screw from both side of the clutch housing till they against the main bearing on the clutch bell in order to hold the clutch kit firmly inside of clutch housing.



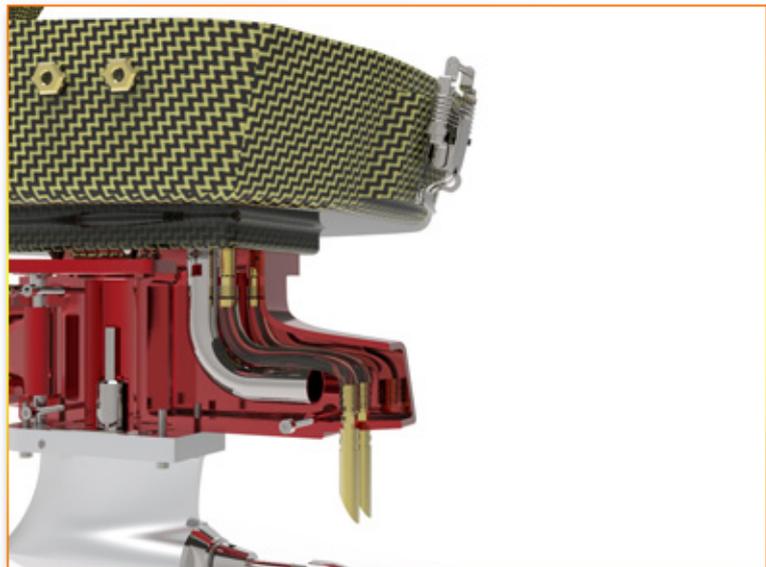
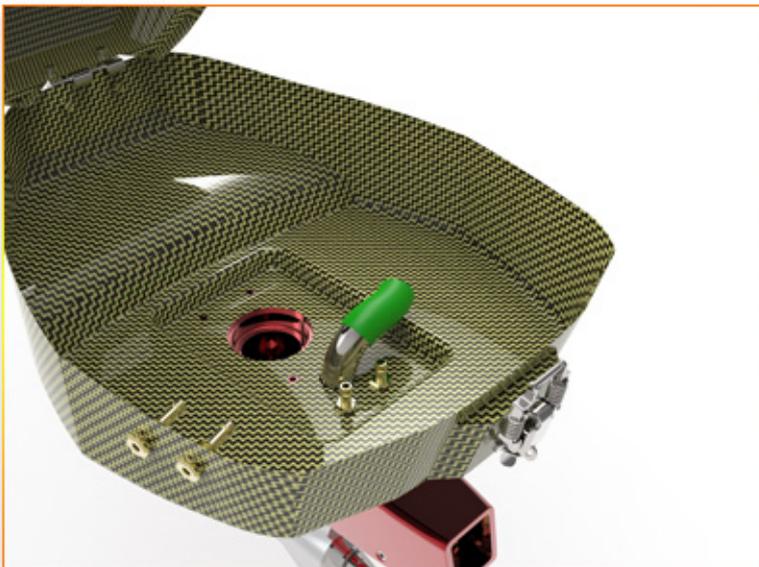
Install the mounting bracket to the pull starter mounting plate, and secure it with longer bolts and nut via the pull starter mounting holes, this mounting bracket is designed to hold both X-Pump and Hornet D50 exhaust system.



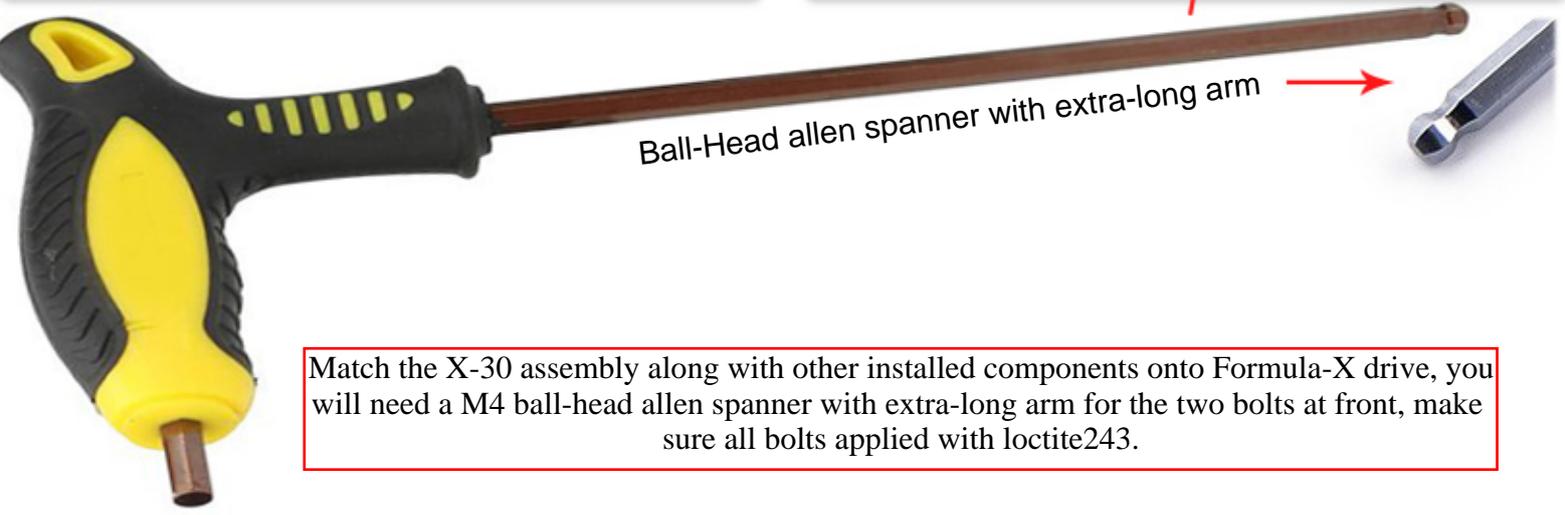
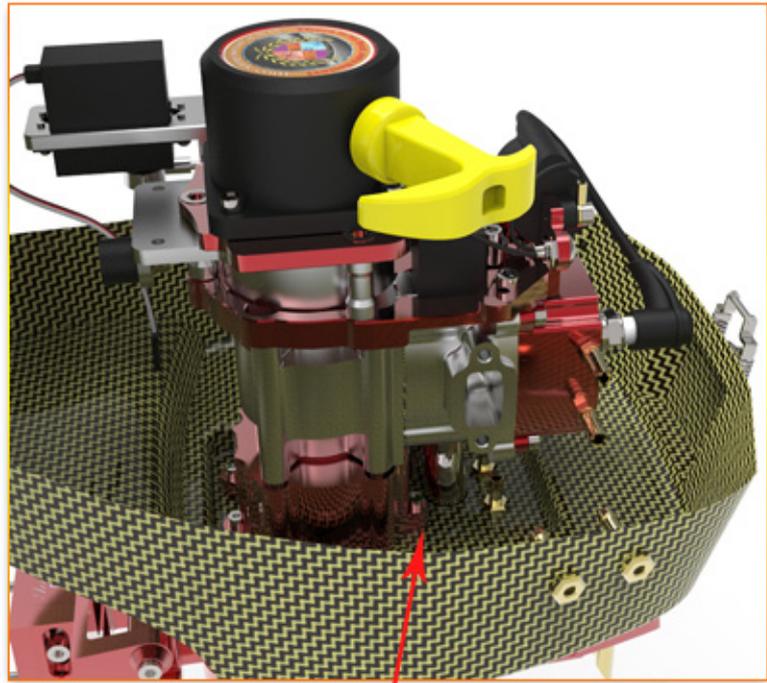
Install throttle control kit onto X-30 marine engine, for more detail on the throttle control kit installation, please check the deluxe package set up page.



Place the cowling assembly onto the drive, match the center holes and mounting holes to the thread holes on the drive.

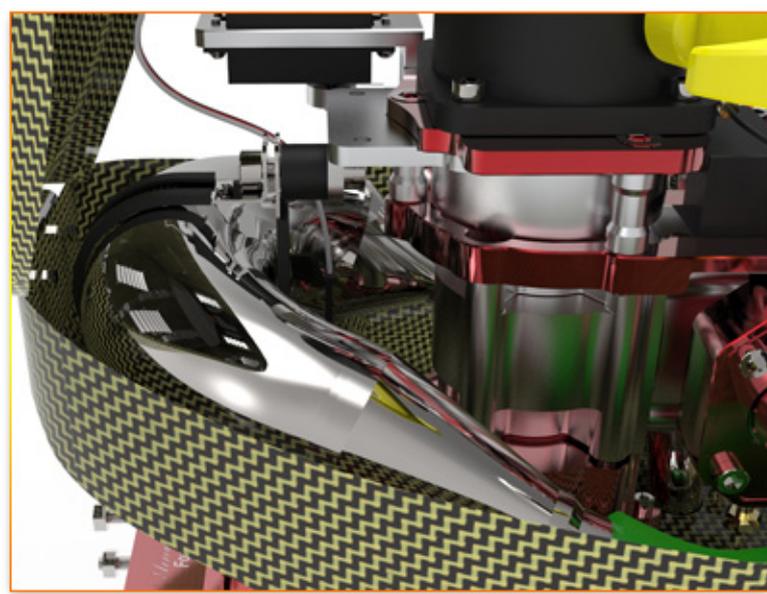
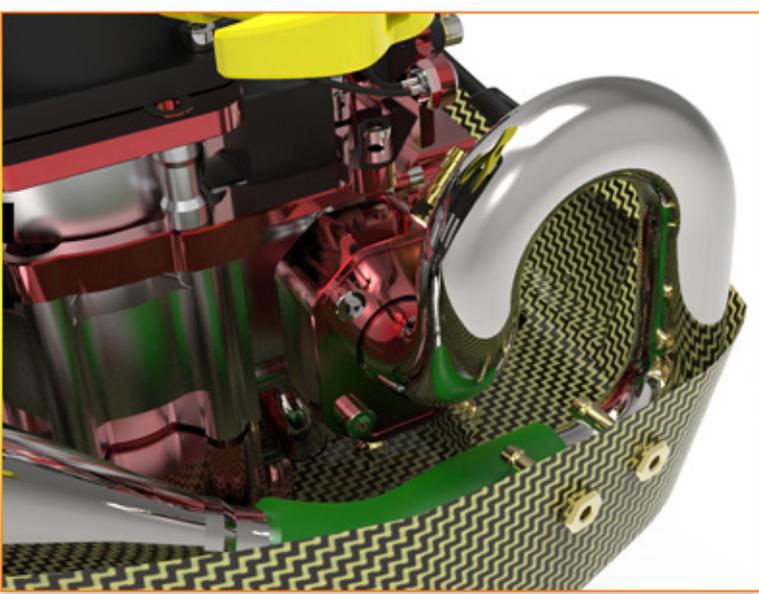


Install the tail section of the Hornet D50 exhaust system into the drive along with the silicone adaptor as shown in above pictures.

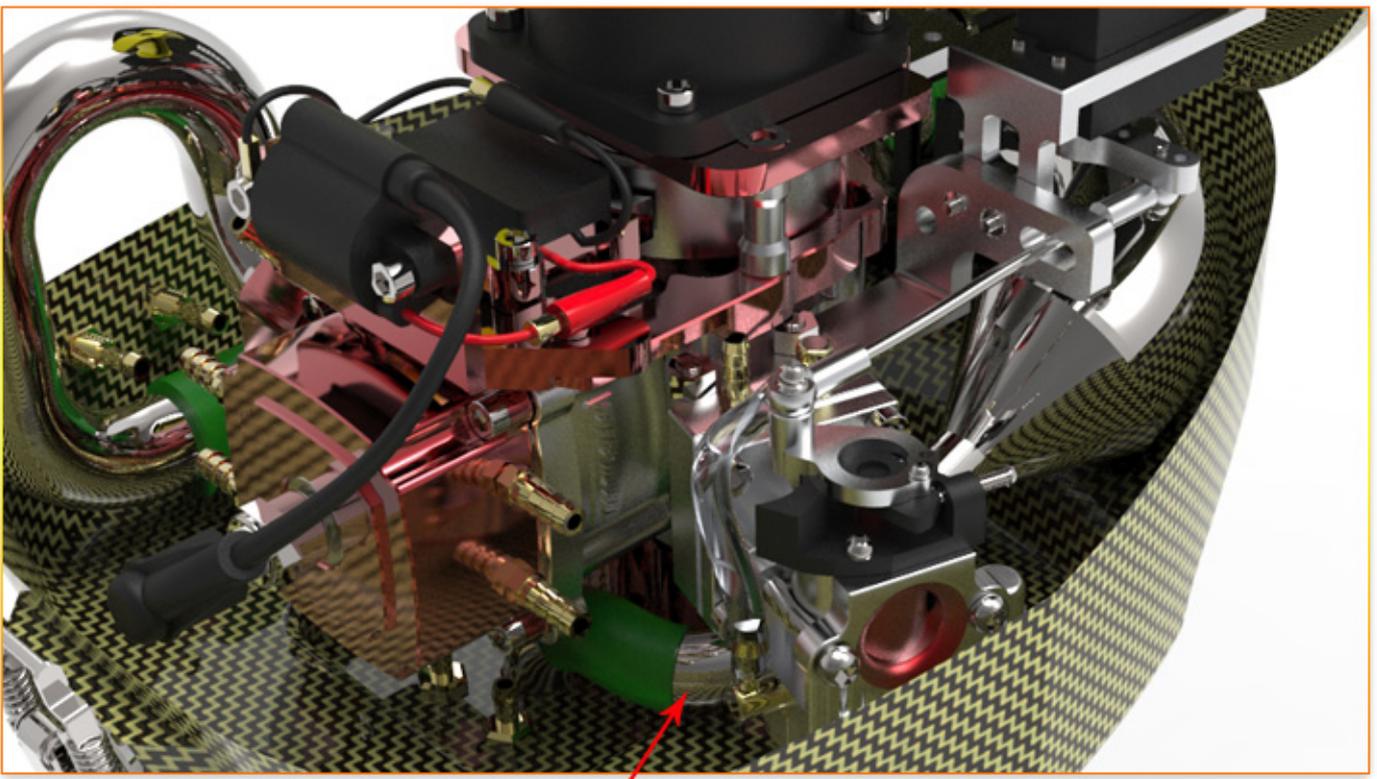


Ball-Head allen spanner with extra-long arm

Match the X-30 assembly along with other installed components onto Formula-X drive, you will need a M4 ball-head allen spanner with extra-long arm for the two bolts at front, make sure all bolts applied with loctite243.

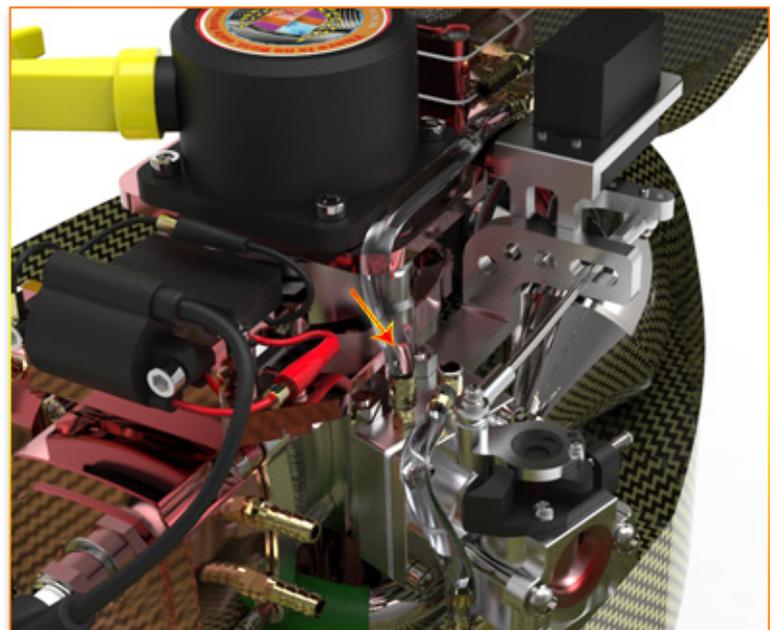


Install the X-Cooler flange onto the engine exhaust port along with custom bent header, secure the exhaust pipe to the mounting bracket at belly section with supplied clip and isolation rubber, connect the pipe to the header with supplied silicone connector.
You can use the same allen spanner with extra-long arm to tighten the bolts on the X-Cooler flange.



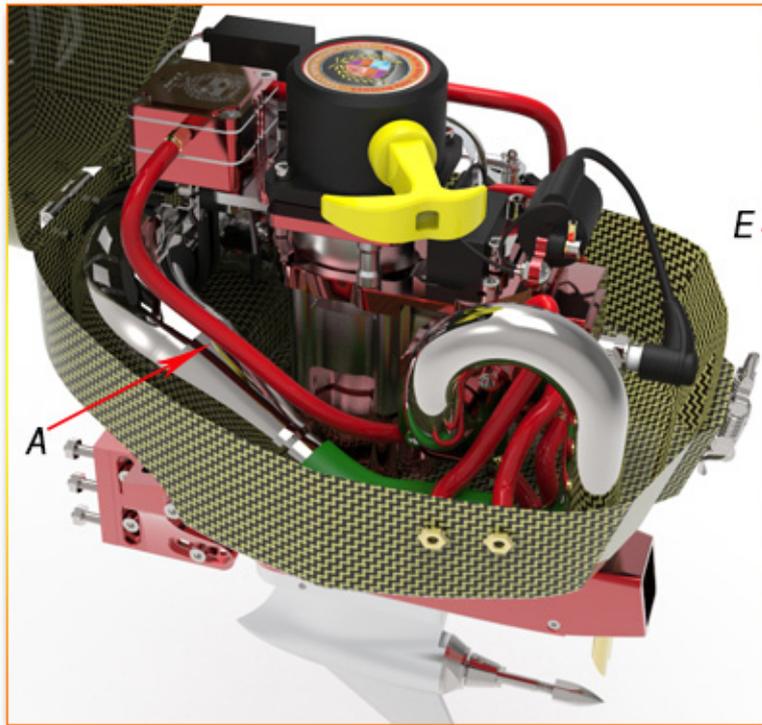
Connect the tip of the pipe to the silicone adaptor that was installed earlier on the drive, and secure it with supplied clip.

X-Pump Installation



Install the X-Pump to the mounting bracket below the pull starter, and tighten the bolts from the bottom of the bracket. connect the air pressure tube from X-Pump to the spare pressure outlet nipple on the X-30 Marine engine.

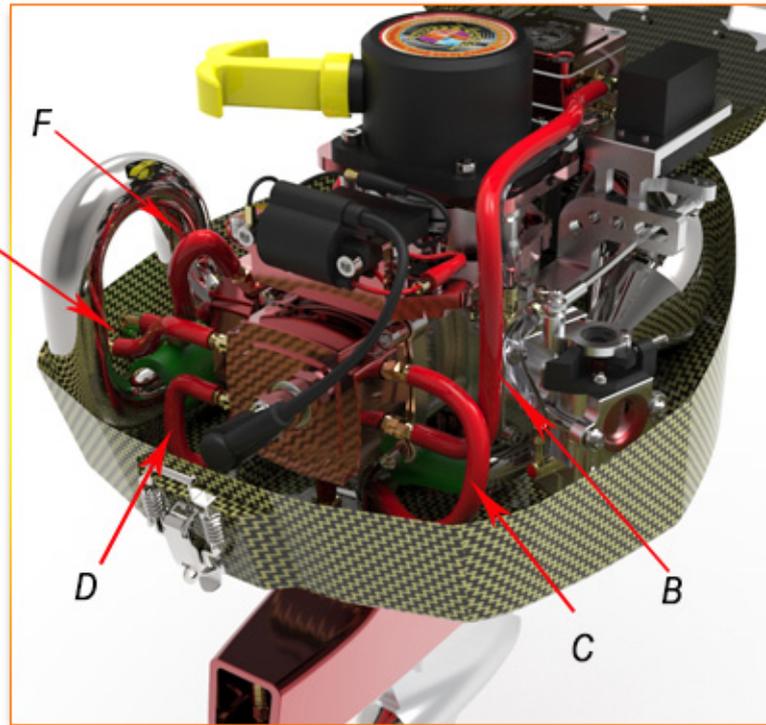
Water Cooling Tubes Connections



A: Water outlet from the water pick up on the drive to the water inlet on the X-Pump.

B: Water outlet from X-Pump to water inlet on engine.

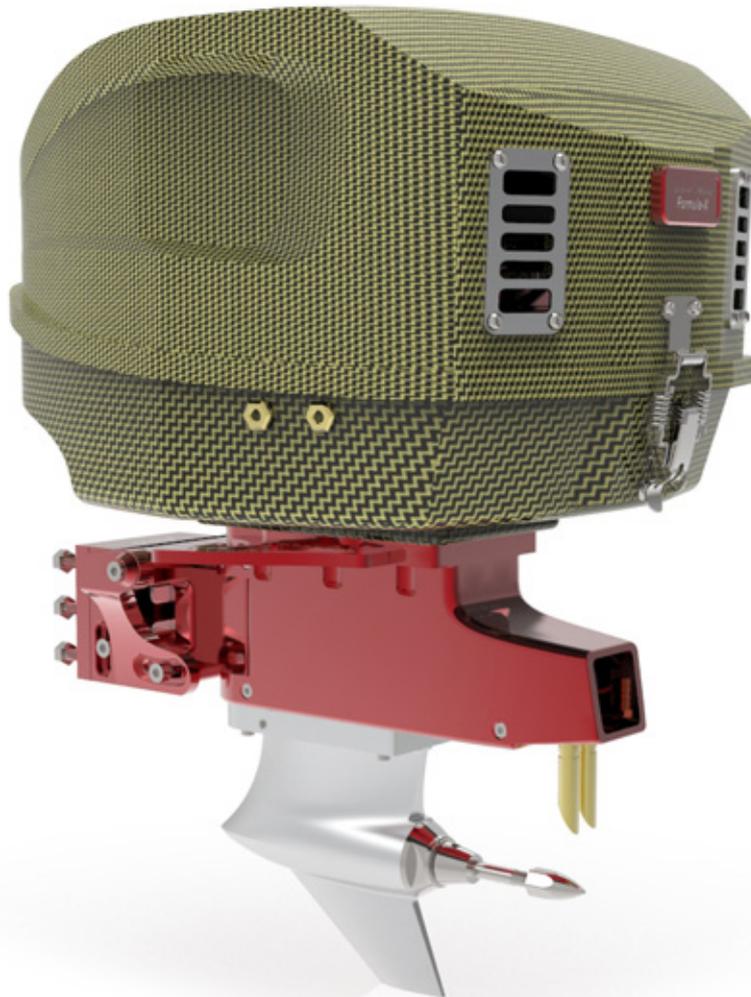
C: Water outlet from the other water pick up on the drive to the water inlet on the engine.



D: Water outlet from engine to water inlet on the X-Cooler flange.

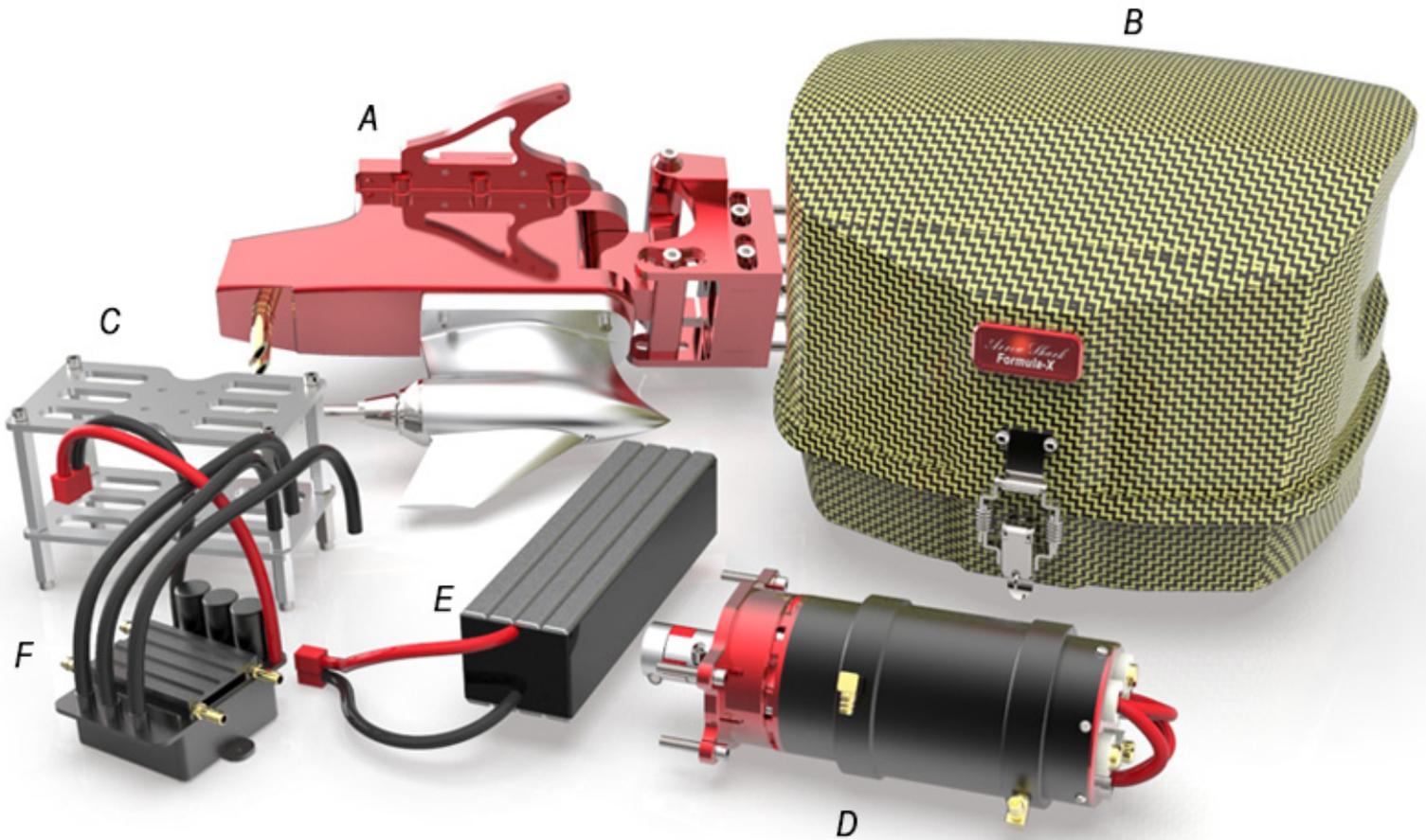
E: Water outlet from engine to water outlet fitting on the cowling.

F: Water Outlet from X-Cooler flange to the other water outlet fitting on the cowling.



Congratulations, The Executive Package assembly Of The Formual-X is now completed!

Instruction of Electric Package Set Up



A: Formula-X Outboard Drive Assembly

B: Outboard Cowling Assembly

C: ESC & Battery Mounting Bracket

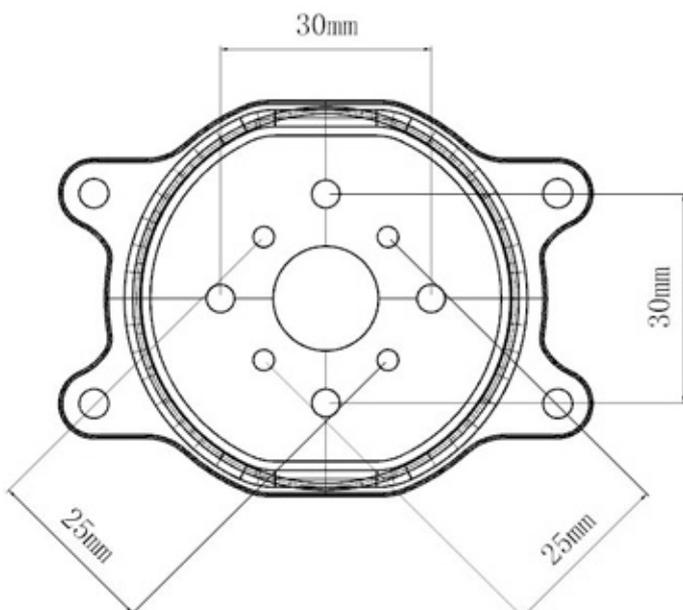
D: Electric Motor & Mounting Assembly

E: LiPO Battery

F: Electric Speed Control

Note: The electric motor, ESC, and battery shown in above picture is for the purpose of demonstration only, it is not including in the Formula-X electric package, therefore, you will need to provide this products by your own, however, for the Formula-X electric set up, we recommend to use 56 series brushless motor, 200A+ water cooling ESC and 6S LIPO battery for the optimum performance.

Electric Motor Mounting Bracket



The electric motor mounting bracket is including in the package, it provides two sets of mounting patterns (25mm and 30mm) to suit different version of brushless motors installation.



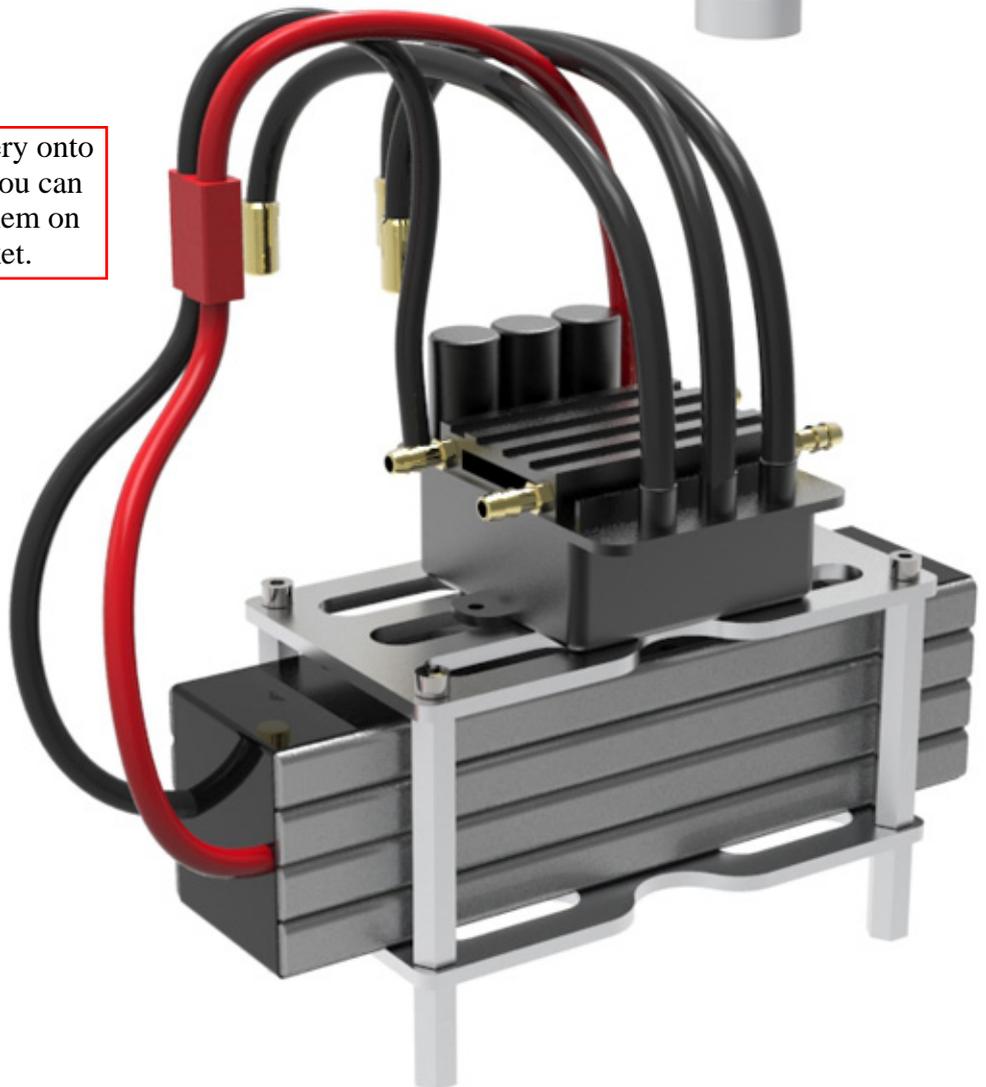
Install the mounting bracket to the electric motor, and tighten the bolts from inside of the bracket.

Install the water sealing ring into the slot at bottom of the bracket.

Install the coupling onto the electric motor drive shaft.

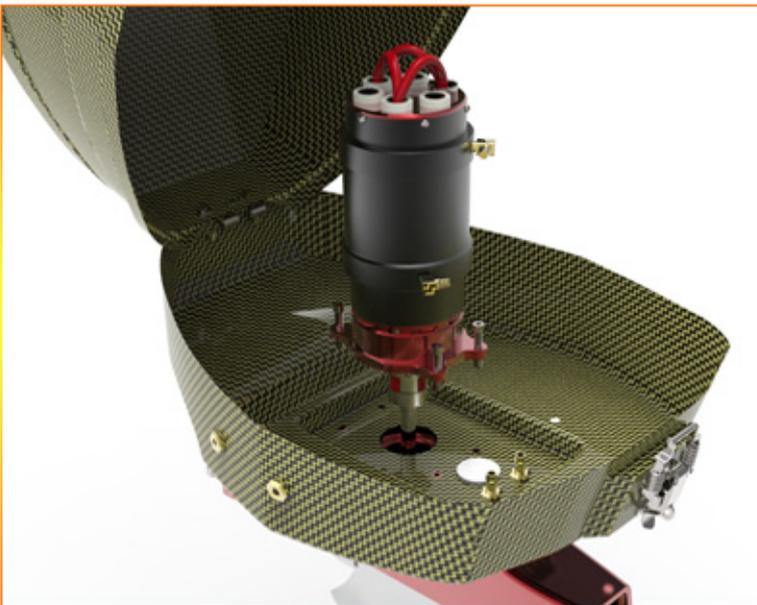


Install the ESC and battery onto the mounting bracket, you can use Zip-Tie to secure them on the mounting bracket.

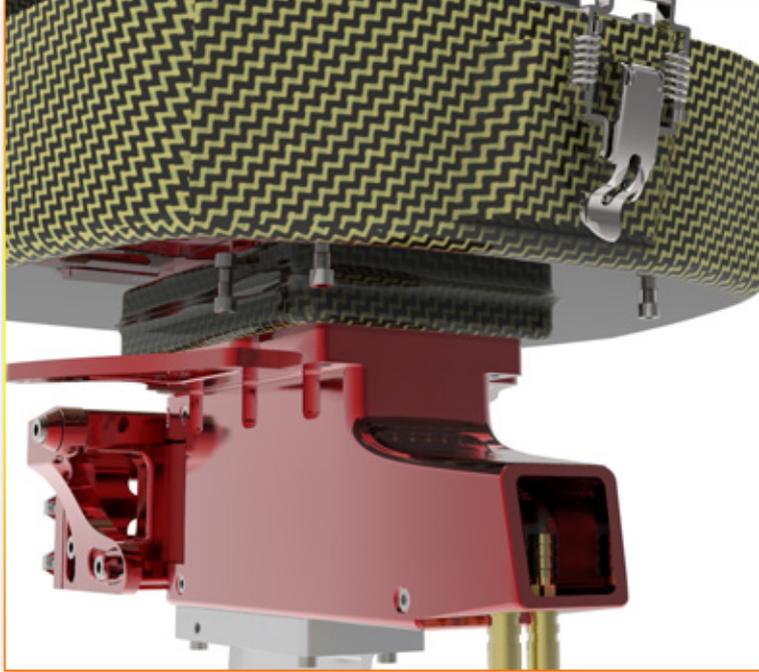
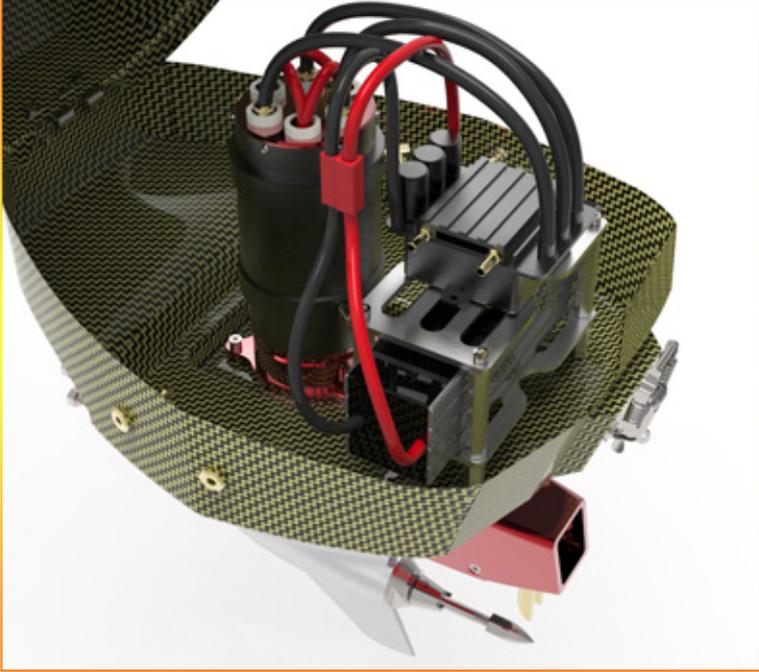




Match the outboard cowling onto Drive, Aligning all mounting holes.

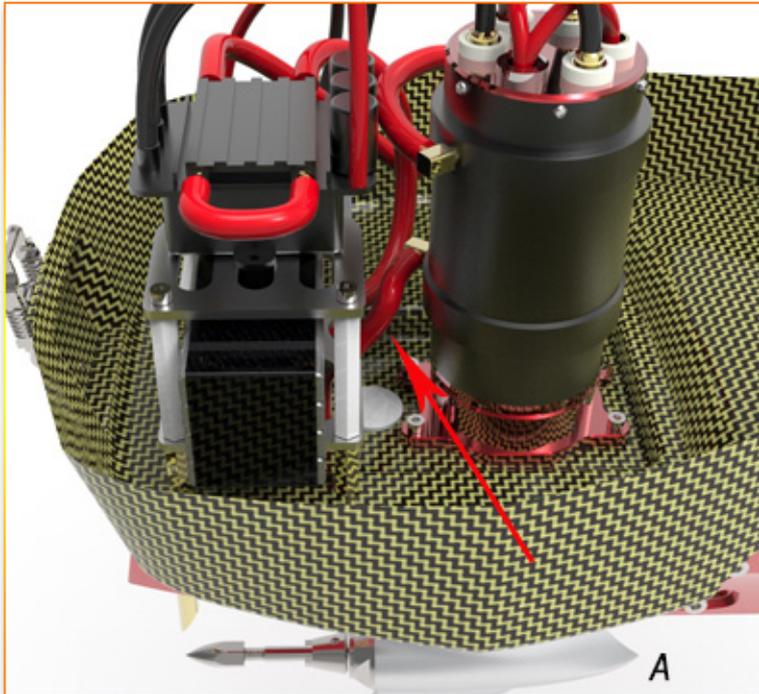
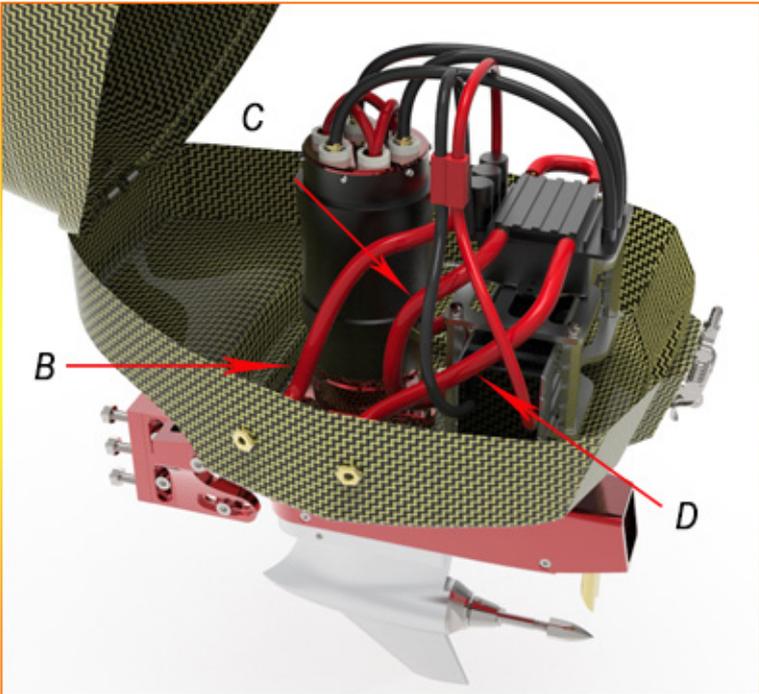


First, install the drive shaft into the coupling, then, insert the drive shaft along with electric motor assembly into the square input on the center barrel shaft, then tighten the bolts to secure the electric motor assembly onto drive.



Install the ESC, LIPO battery and Mounting bracket assembly into the outboard cowling, and secure the bolts from the bottom of the cowling. then connect the wires between electric motor, ESC and LIPO battery.

Diagram of Water Cooling Tube Connections

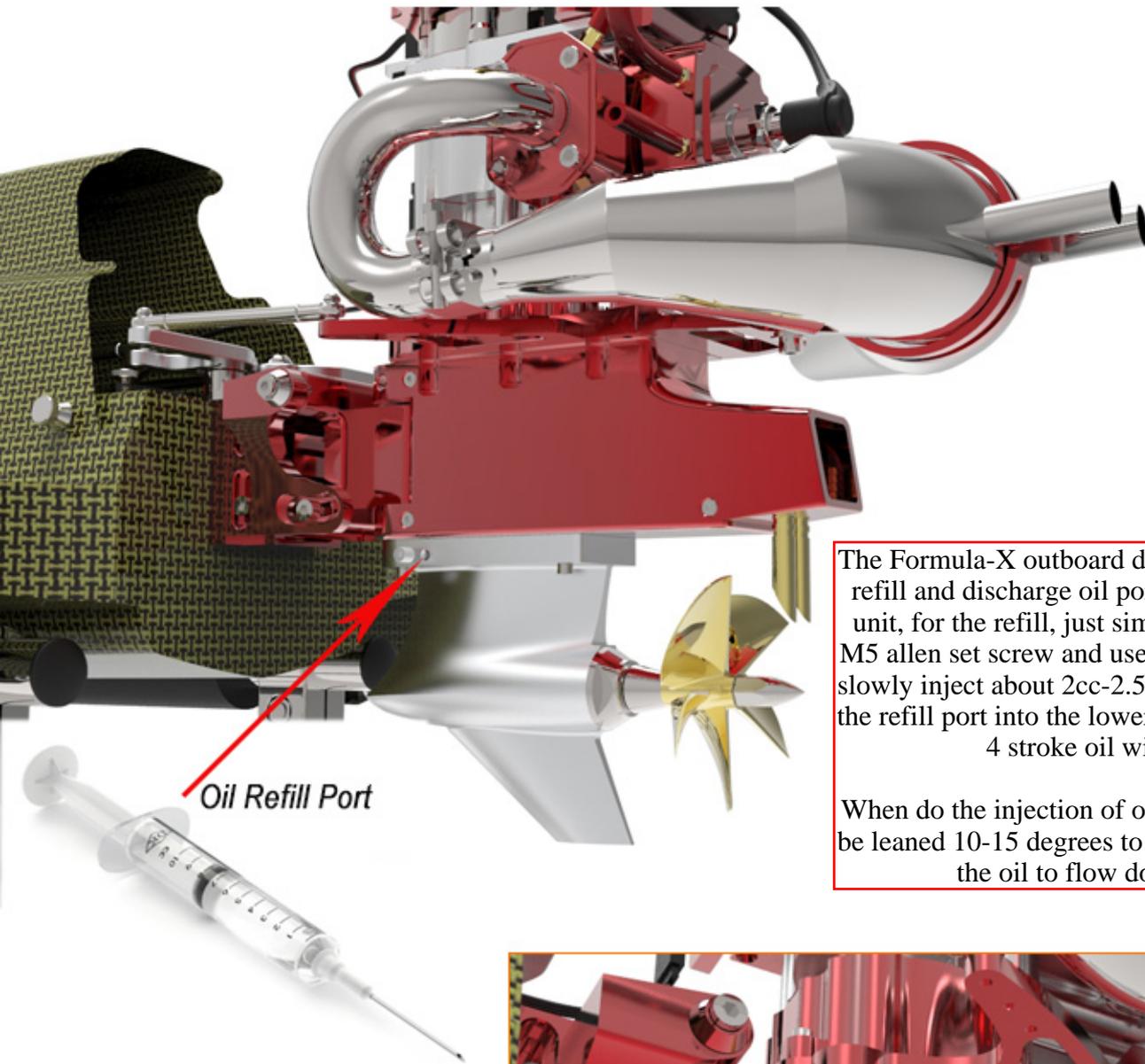


- A: Water outlet from the water pick up in the drive to the water inlet on the electric motor.
- B: Water outlet from electric motor to the water outlet fitting on the cowling.

- C: Water outlet from water pick up in the drive to the water inlet on the ESC
- D: Water outlet from ESC to the water outlet fitting on the cowling.

Congratulations, The Electric Set Up Of Formula-X Assembly Is Now Completed!

Lubrication Oil Refill & Discharge

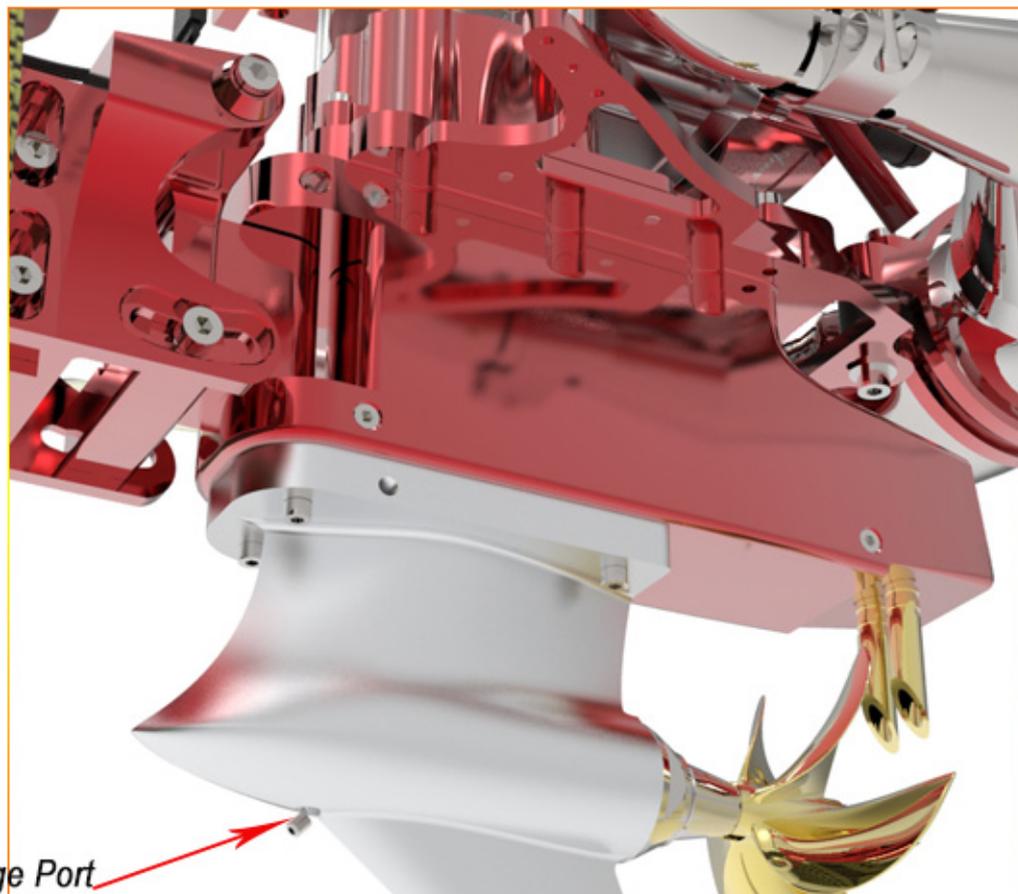


Oil Refill Port

The Formula-X outboard drive equips with both refill and discharge oil ports within the lower unit, for the refill, just simply loosening out the M5 allen set screw and use a small size syringe slowly inject about 2cc-2.5cc lubrication oil via the refill port into the lower unit. any 2 stroke or 4 stroke oil will work.

When do the injection of oil, the drive needs to be leaned 10-15 degrees to one side in order for the oil to flow down easier.

The lubrication oil needs to be refreshed every 10-12 hours of use, when you do the oil exchange, you will need to loosen out both allen set screws from the refill port and discharge port, so the air goes into the drive from the refill port to push the old oil out of the drive faster, and set the prop thrust angle up about 5-10 degrees to make sure there is no old oil leftover inside the lower unit before refilling with fresh oil.



Oil Discharge Port

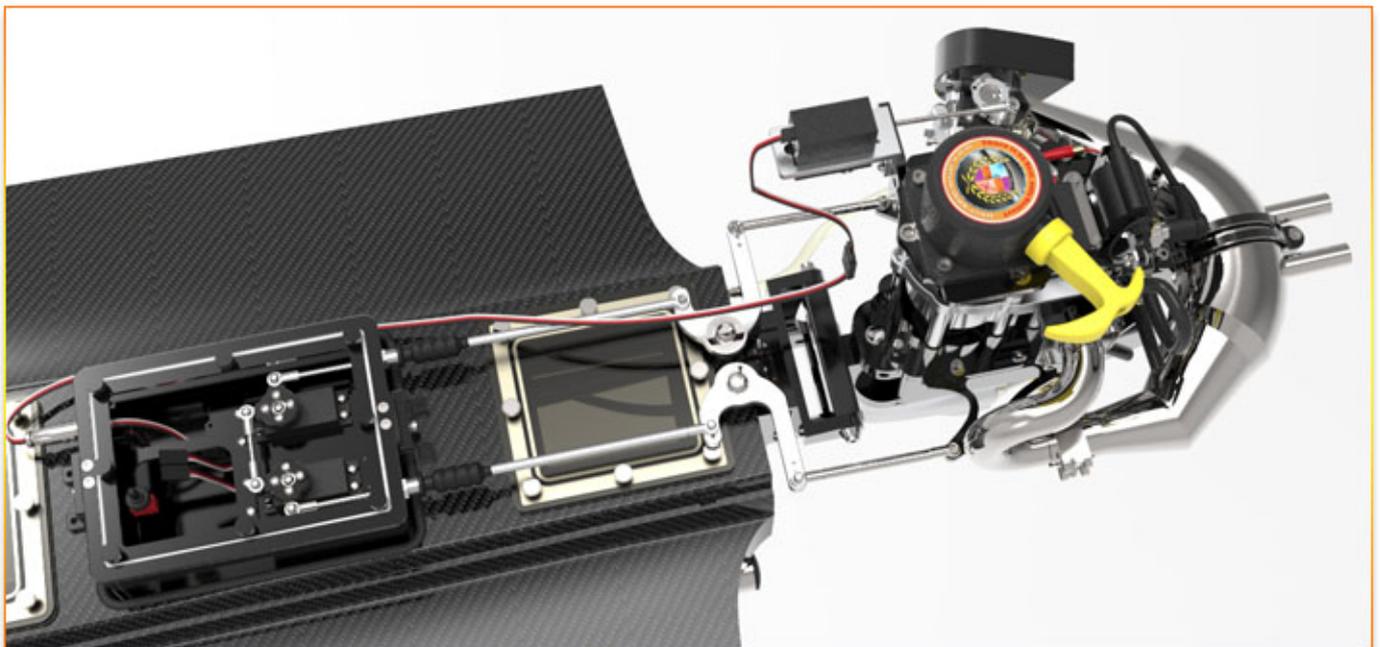
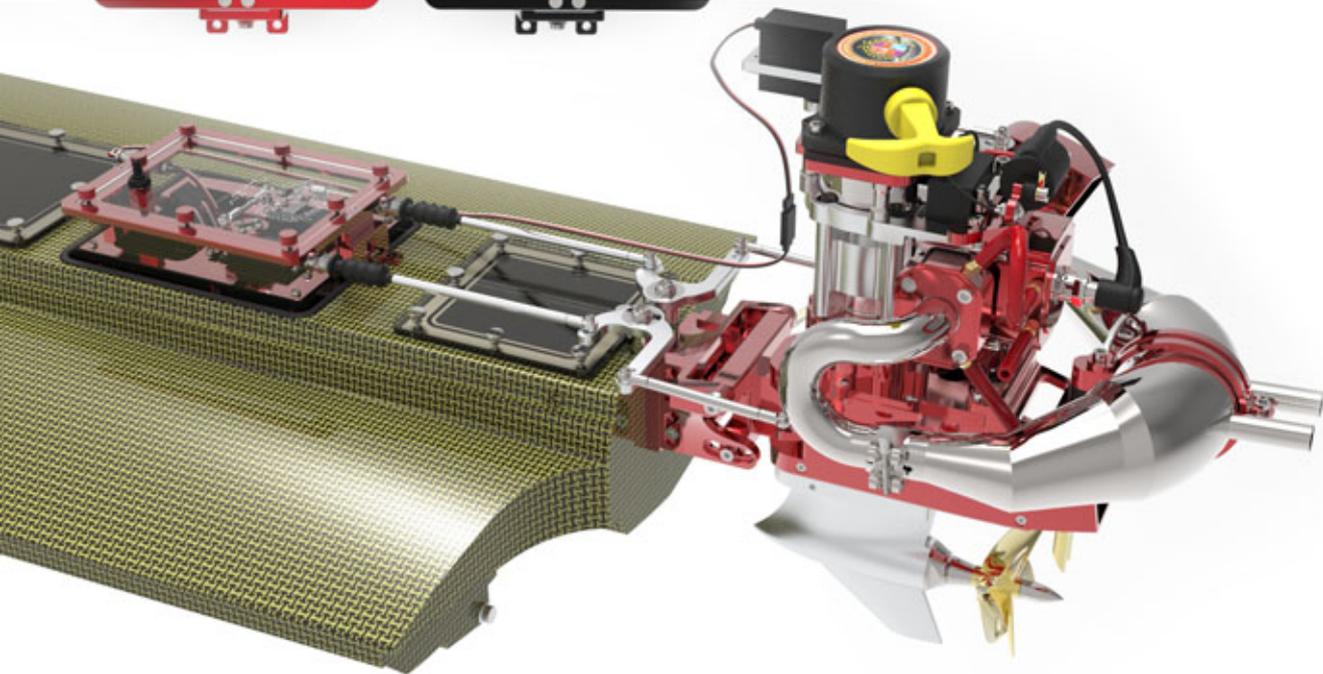
Formula-X Steering Set Up Guide

Arrow Shark offers billet smart servo box along with its accessories for the convenience and professional steering control set up for your F1 Tunnel hull project, we recommend to use two of 30KG metal gear servos for the steering control. You can find these products from our website by simply click on its title below.

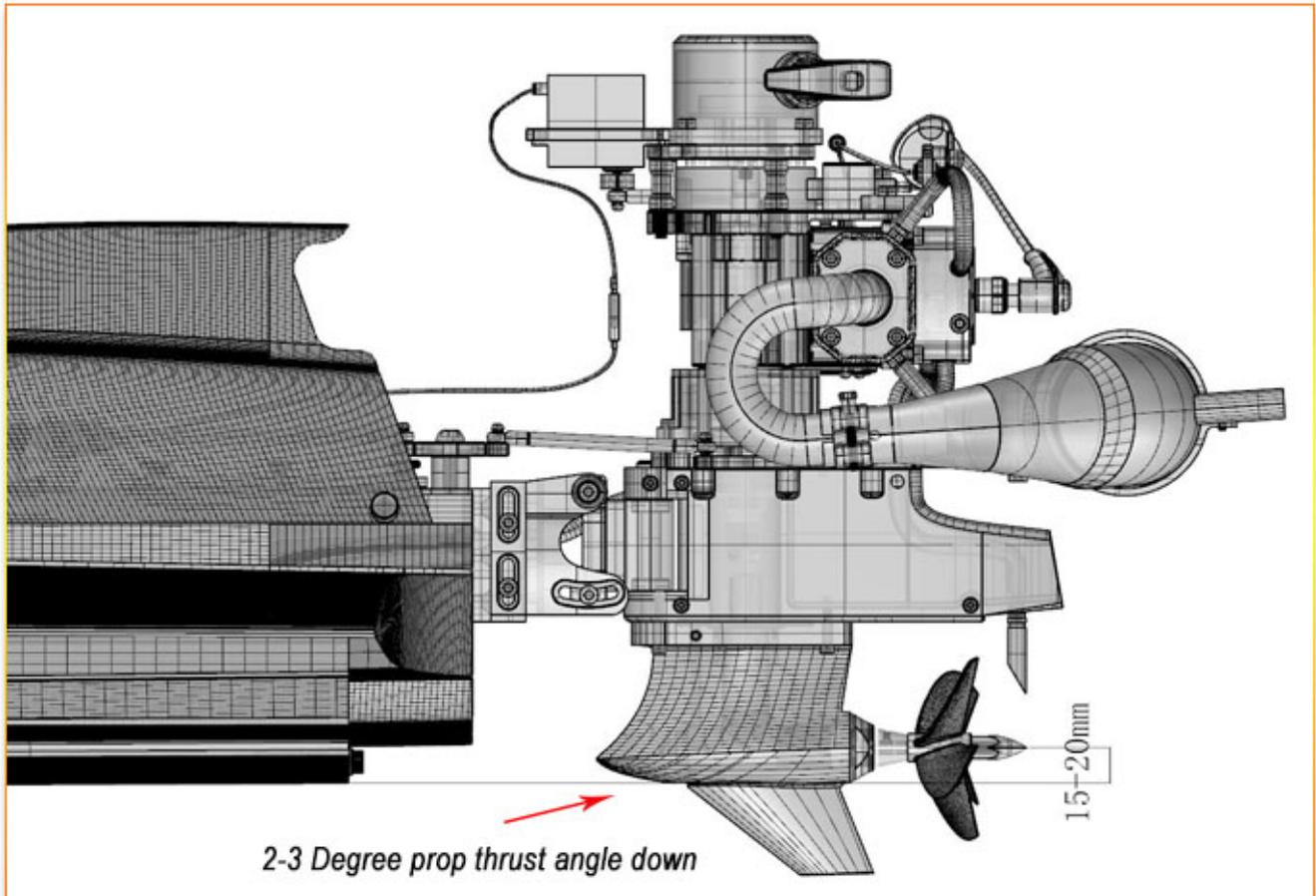
Smart Box-F1



Servos Tie-Bar Kit



Formula-X & Hull Installation Guide



When installing the Formula-X Outboard Drive onto your F1 tunnel hull, it is recommended that the prop shaft centerline be approximately 15 to 20mm above the level of the bottom of the sponsons and set the prop thrust angle about 2-3 degrees down for the optimum performance.

Thanks Once again For Choosing Arrow Shark Products!



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