

SYNERGY NP

ASSEMBLY INSTRUCTIONS

999-700



DESIGNED IN THE USA BY

A handwritten signature in black ink that reads "Matt Bates". The signature is fluid and cursive, with a distinct script style.

www.synergyc helicopters.com



SYNERGY R/C HELICOPTERS

A Botos Design & Distribution Company

Congratulations on your purchase of the Synergy N7 radio controlled helicopter kit. The Synergy N7 was designed and developed by Botos Design & Distribution Inc.. The design of the Synergy N7 emerged from many years of experience in the hobby including design, research & development, and last but not least as a world class pilot who truly enjoys this wonderful hobby.

This radio controlled helicopter is NOT A TOY. It is a sophisticated piece of equipment, it was designed and intended for hobby use only. If not properly assembled, maintained, and operated, it is capable of causing property damage and bodily harm to both the operator and/or spectators. Botos Design & Distribution Inc., its affiliates, and its authorized distributors assume no liability for damage that could occur from the assembly or use/misuse of this product. If you are new to the hobby we strongly recommend seeking the help and advice from an experienced modeler.

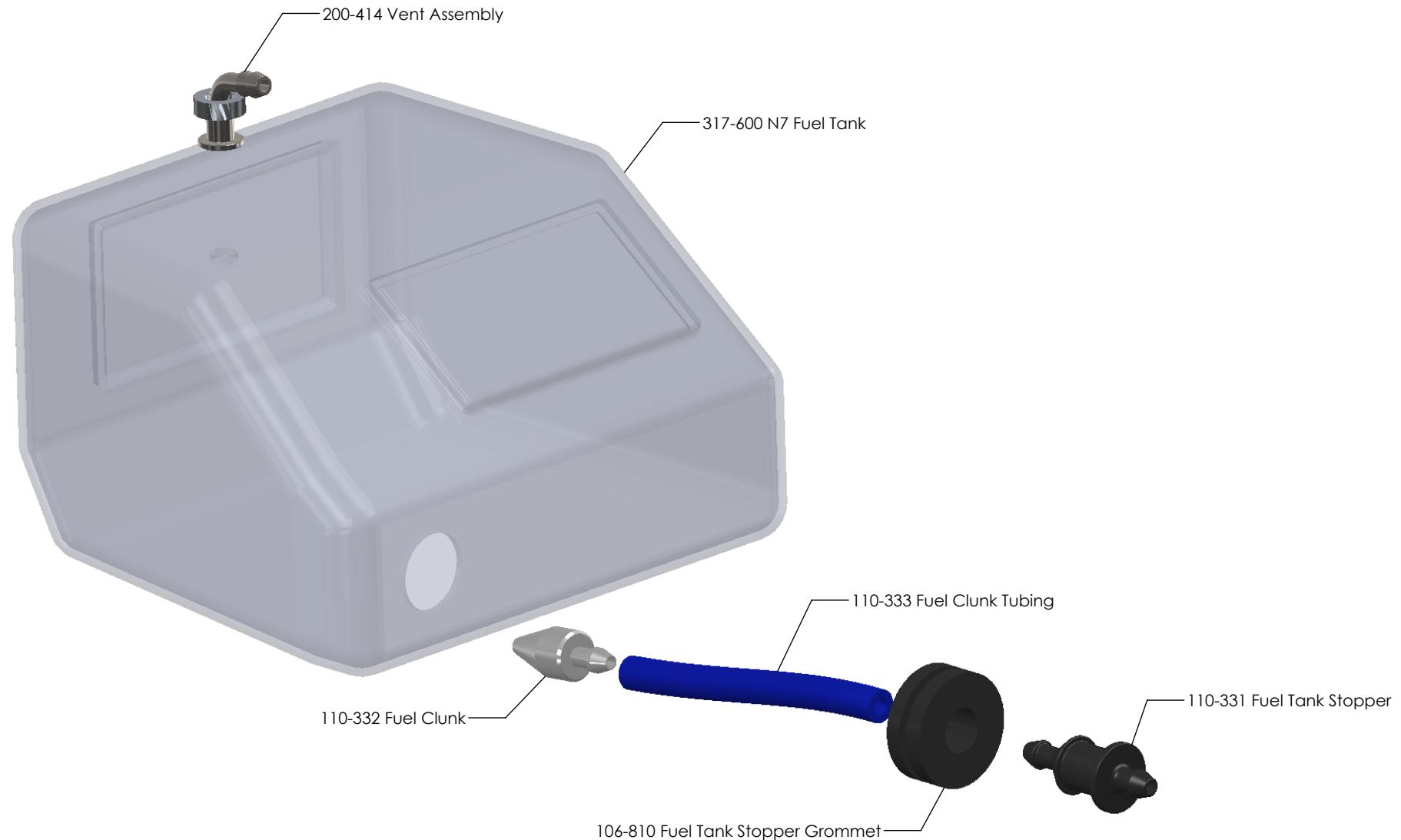
Operating a model helicopter requires a high degree of diligence and skill. If you are new to the hobby, it is best to seek help and guidance from experienced radio controlled helicopter pilots. This will both greatly speed up the learning process and make it much safer for you.

For those pilots who will be operating their Synergy N7 in the United States, we strongly recommend joining the AMA. The AMA is a non-profit organization that provides services to the model aircraft pilots. As an AMA member, you will receive a monthly magazine entitled Model Aviation and most importantly a liability insurance plan to cover against a possible accident or injury. All AMA charter aircraft clubs require individuals to hold a current AMA sporting license prior to operation of their models

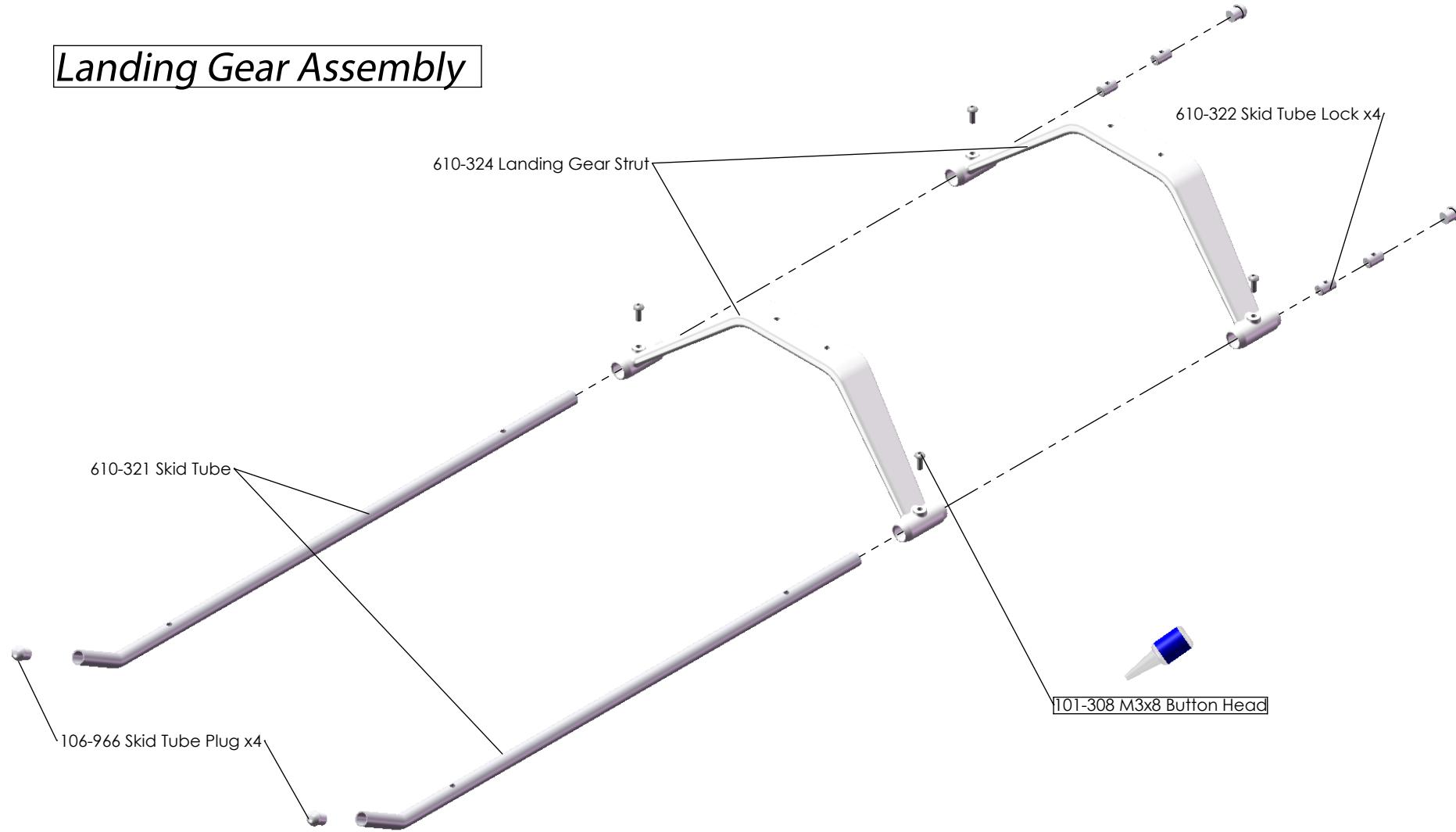
For further information, you can contact the AMA at

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
(317) 287-1256

Fuel Tank Assembly



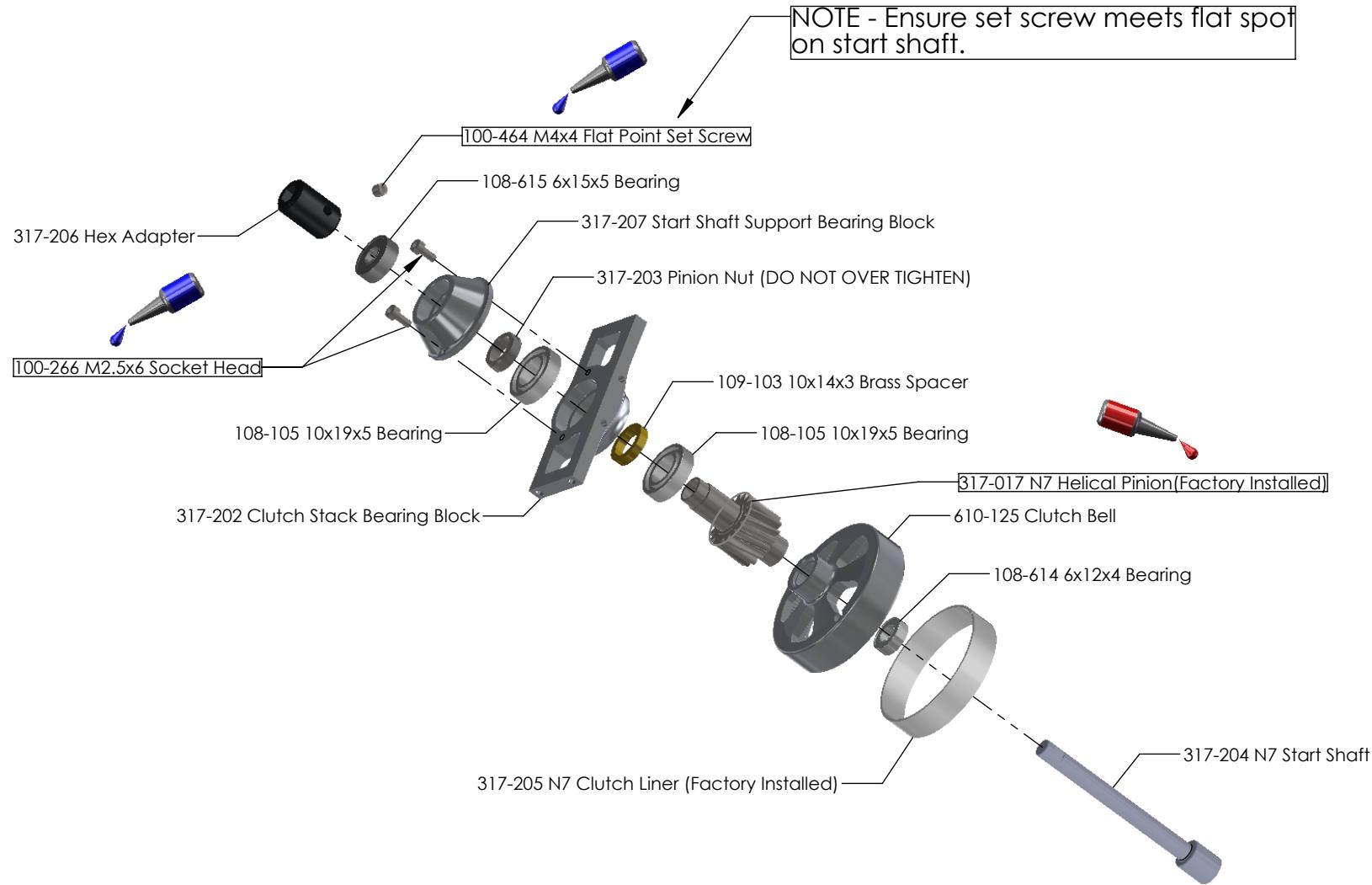
Landing Gear Assembly



Complete Landing Gear



Upper Clutch Stack Assembly

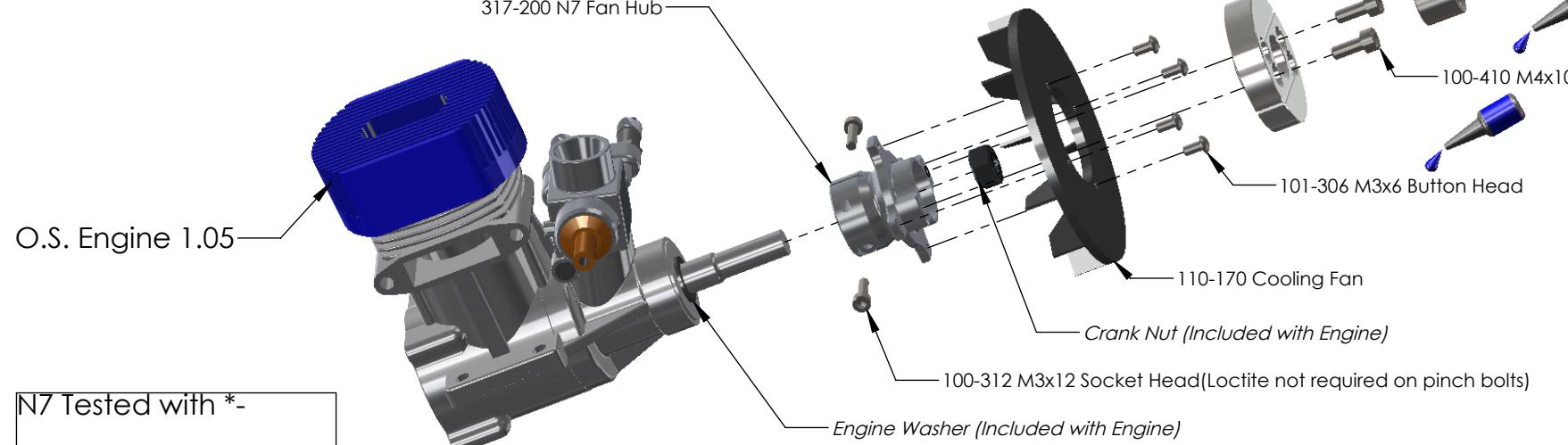


Engine/Clutch Assembly

Fan Hub install note- Important!

1. Slide Fan Hub on to crank shaft then take up end play with engine nut.(engine washer mandatory!)
2. Tighten down pinch bolts evenly.
3. Insert crank locking tool (not included) and finish tightening engine nut. Do not over tighten crank shaft nut, only snug! It is possible to distort fan hub by over tightening.

One-Way Clutch -IMPORTANT!
If operating in temperatures below 50F, remove grease from 10x14x12 One way. Grease will cause the rollers to stick in the outward position.



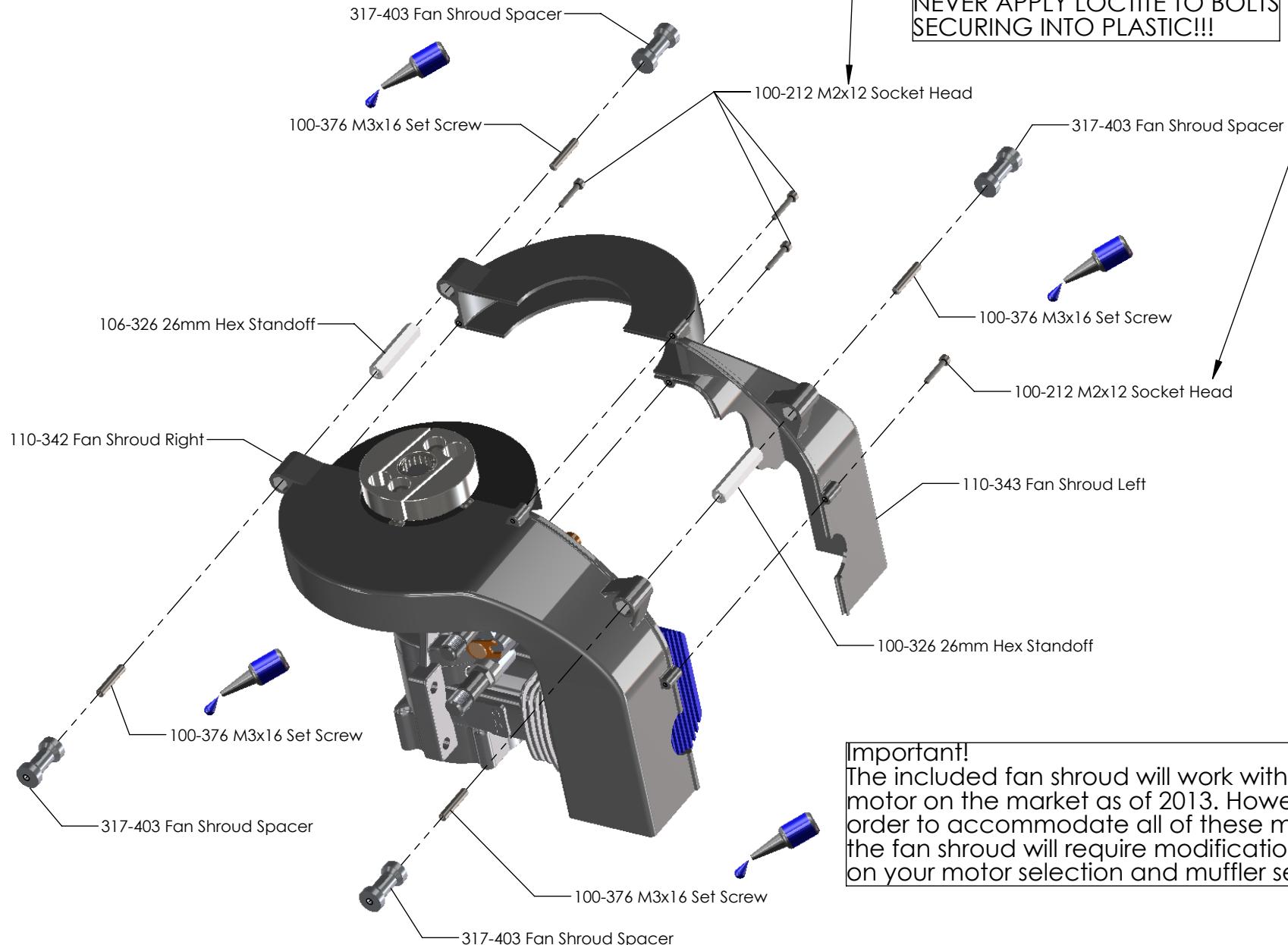
N7 Tested with *-

- OS 1.05
- OS .91 (*multiple versions*)
- YS .91

**Other motors may have high vibration levels or may not run properly. Please use only motors that have been tested by Synergy.*

NOTE - Engine washer must be used for correct spacing!

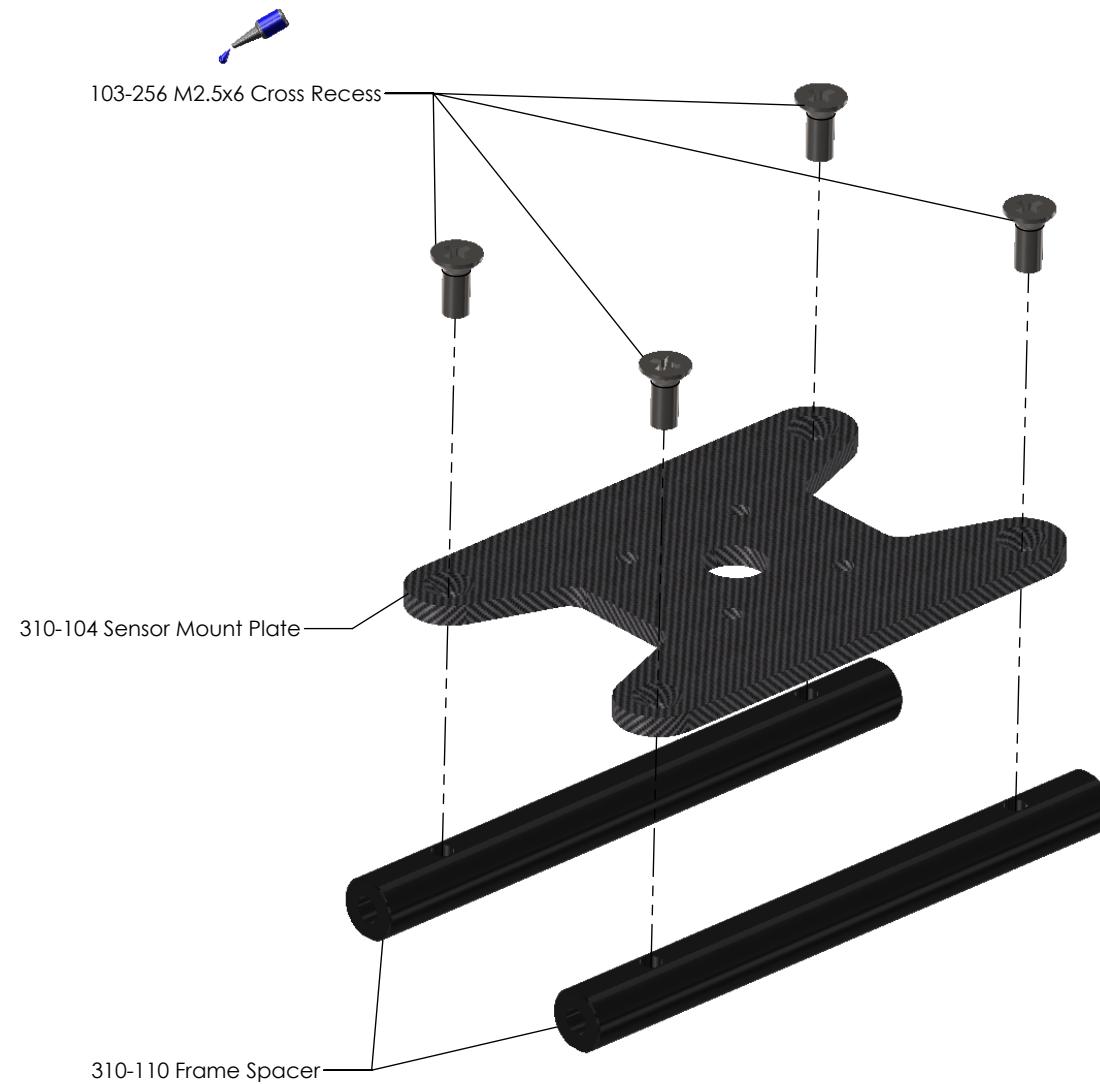
Fan Shroud Installation



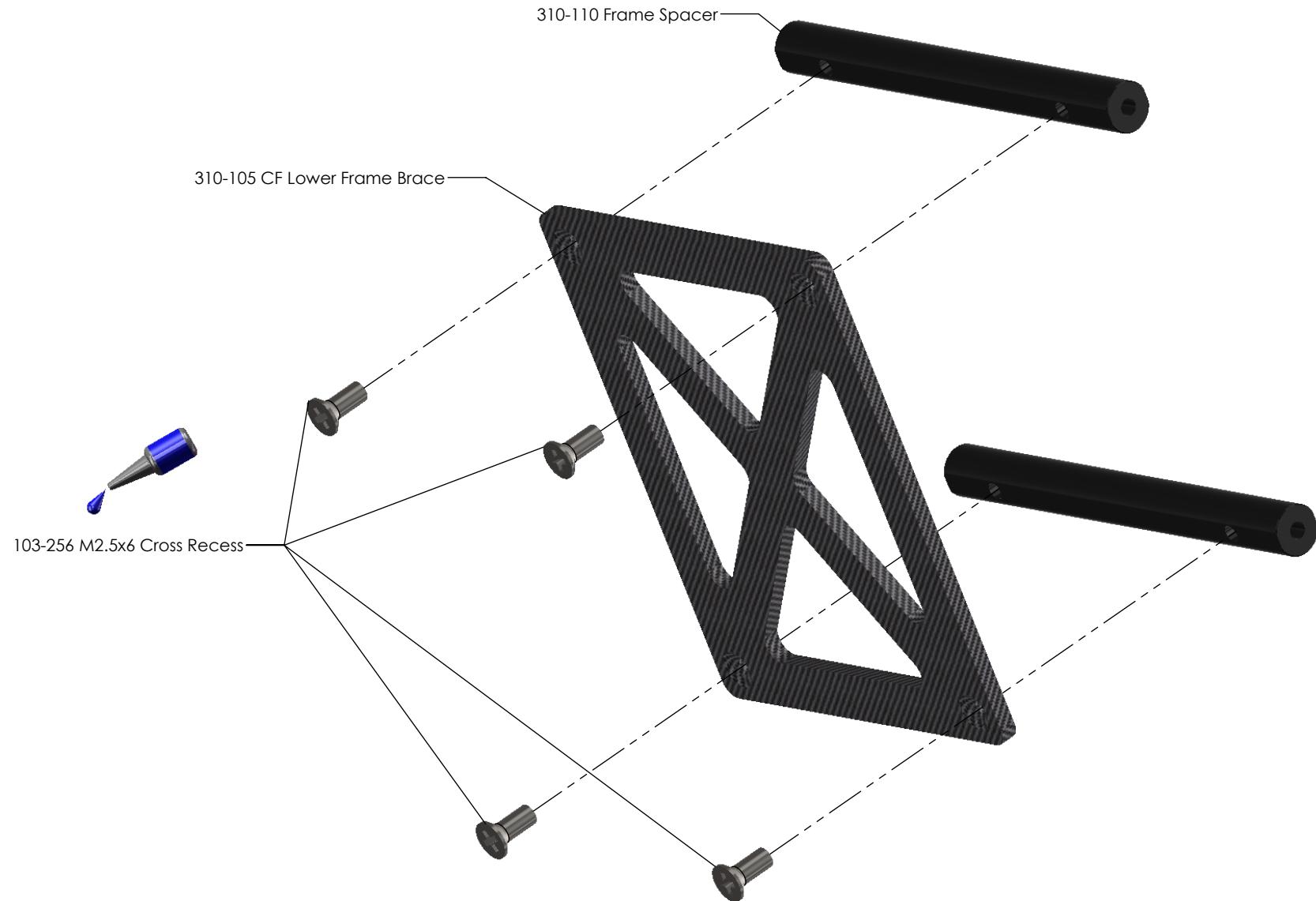
Important!

The included fan shroud will work with every motor on the market as of 2013. However in order to accommodate all of these motors, the fan shroud will require modifications based on your motor selection and muffler selection.

Gyro Mount Plate Assembly

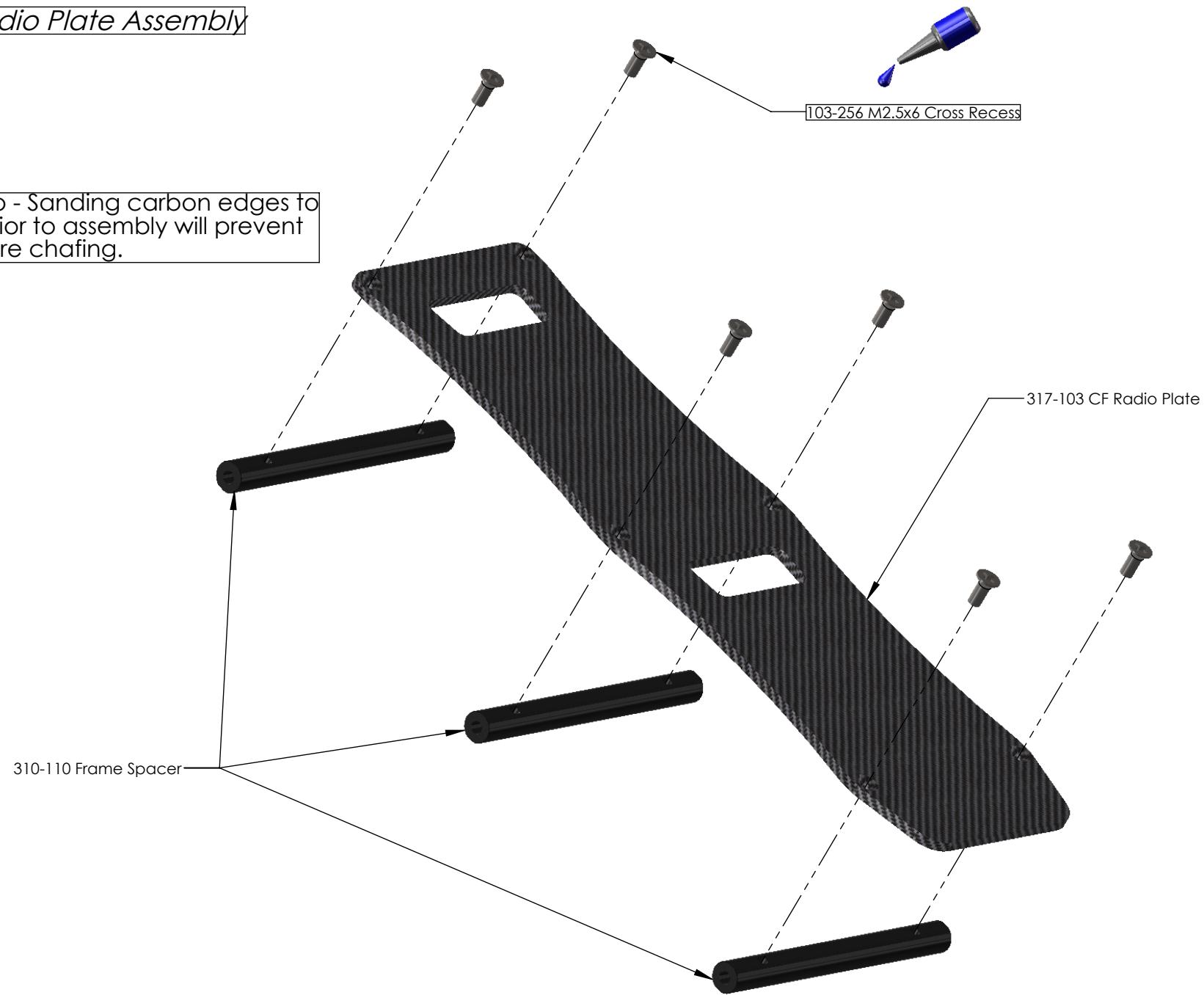


Rear Frame Brace Assembly



Radio Plate Assembly

Tip - Sanding carbon edges prior to assembly will prevent wire chafing.



Main Transmission Assembly

IMPORTANT!

Do not use grease for one way clutch lubrication!
Use light oil such as Triflow.

DO NOT OVER TIGHTEN!



101-308 M3x8 Button Head

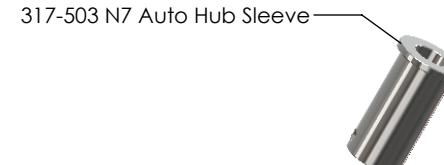
DO NOT OVER TIGHTEN!



103-256 M2.5x6 Cross Recess

320-154 54T Spur Gear

317-500 N7 Spur Gear Hub



317-505 N7 Auto Hub Delrin Shim

108-166 16x22x16 One-Way Bearing, Auto Hub

317-139 139T Helical Main Gear

200-415 N7 Auto Hub Assembly

Includes -

- 317-501 Auto Hub (not sold separately)
- 108-166 16x22x16 One-Way Bearing
- 610-153 N7 Bronze Bushings

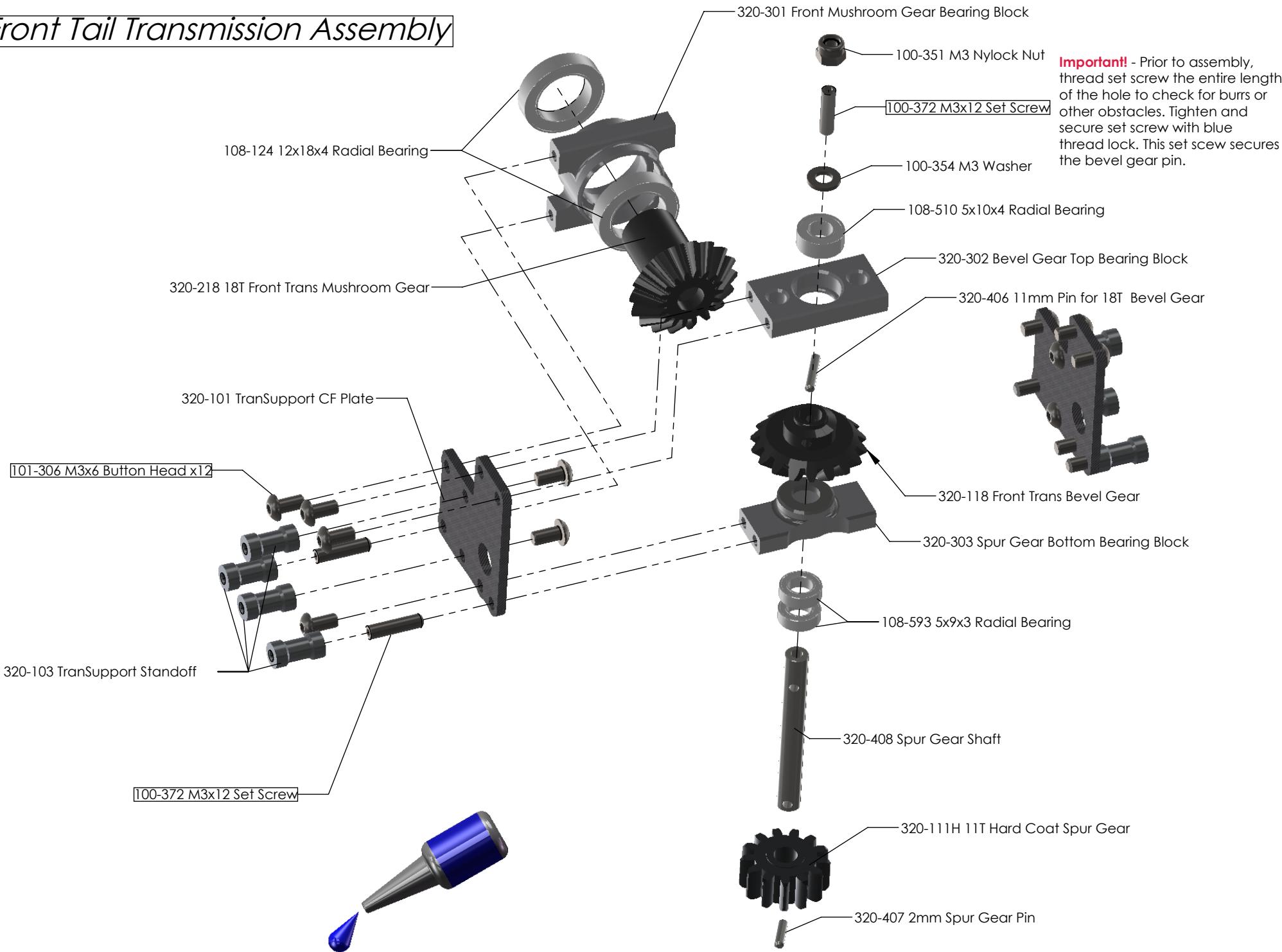


317-502 N7 Bronze Bushing

317-505 N7 Auto Hub Delrin Shim

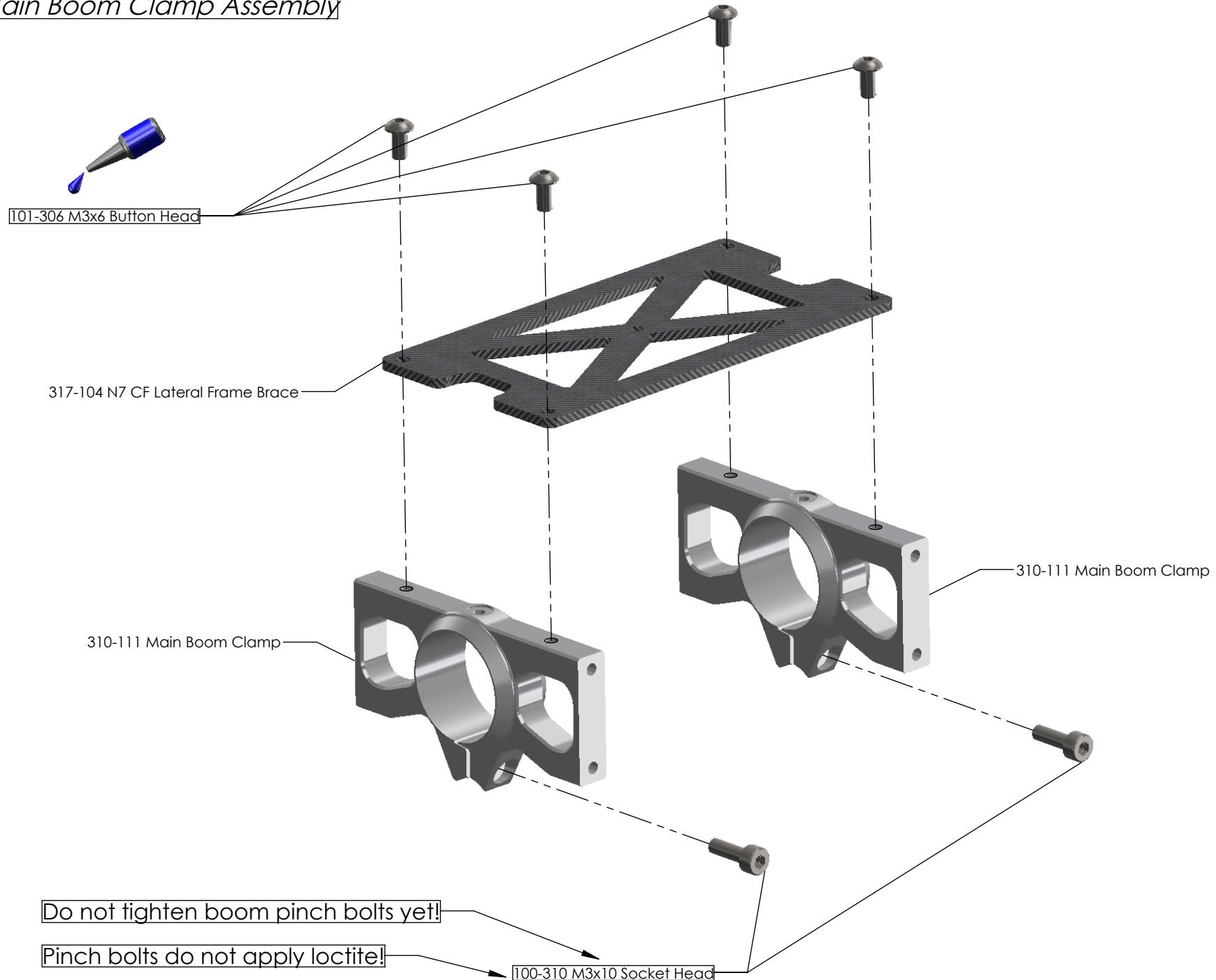
Important - Bronze bushings
must be secured with green
or red loctite!

Front Tail Transmission Assembly

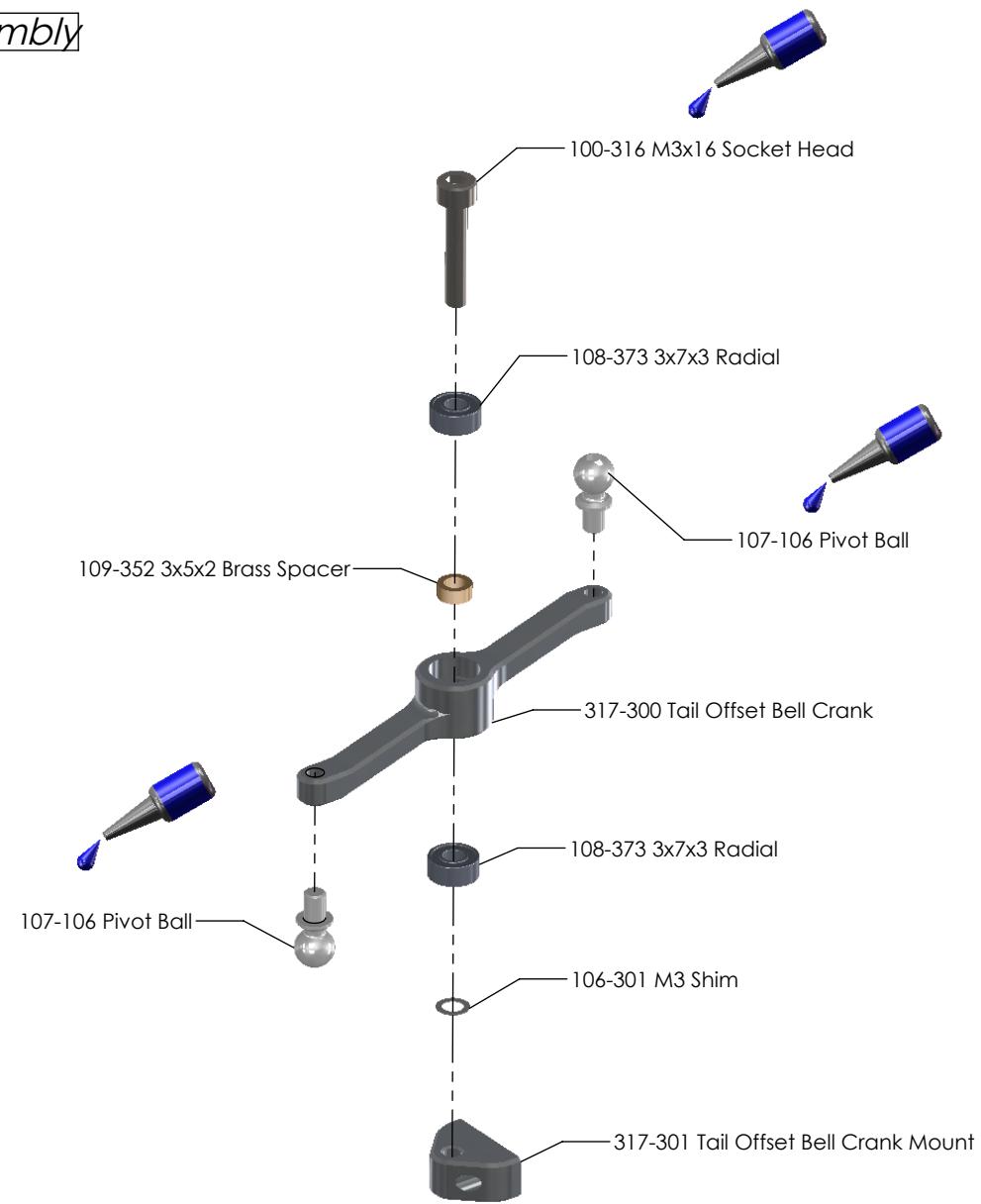


IMPORTANT! - Any screw which is metal to metal needs loctite! Clean oil from bolts and apply blue loctite.

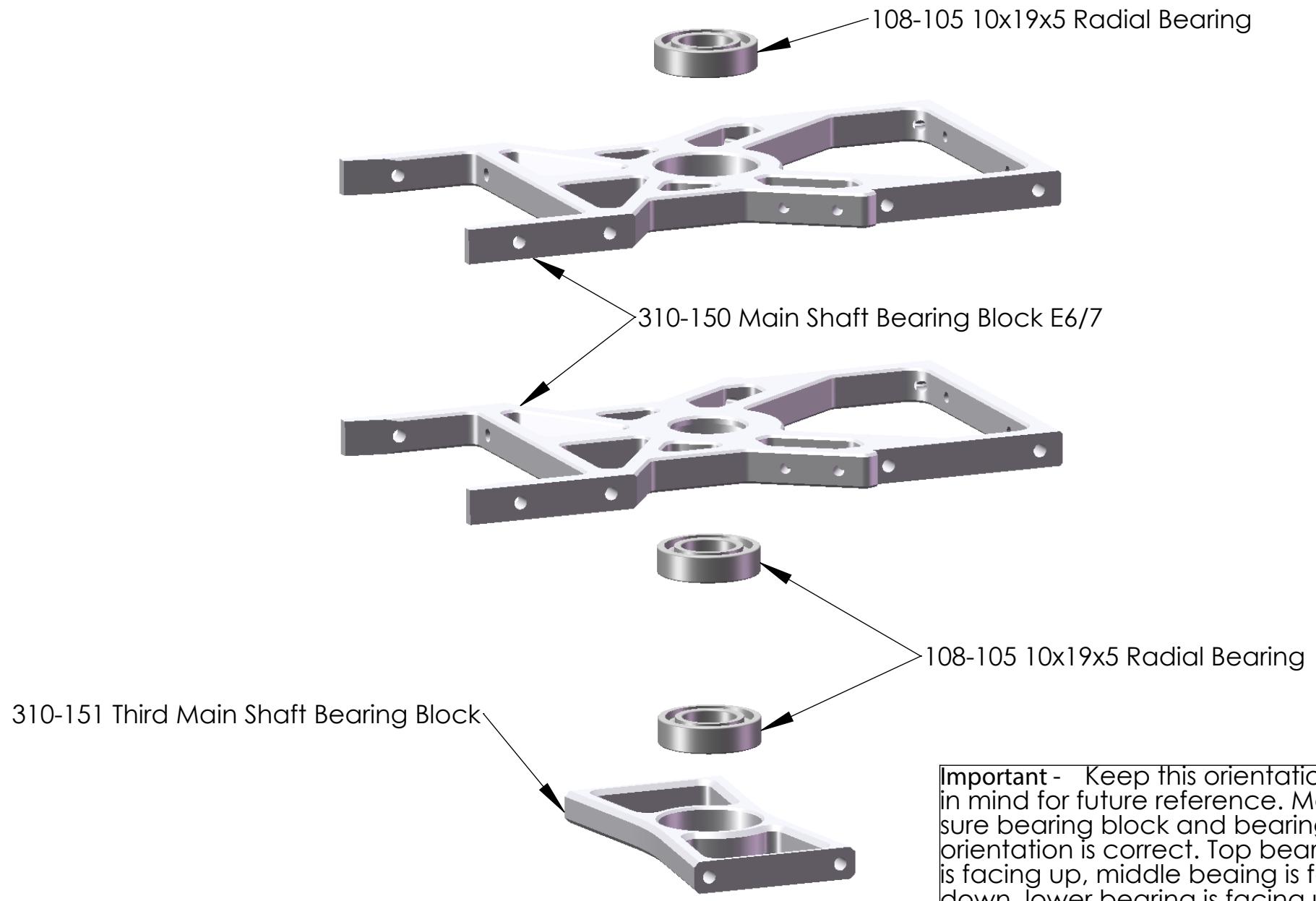
Main Boom Clamp Assembly



Tail Offset Bell Crank Assembly

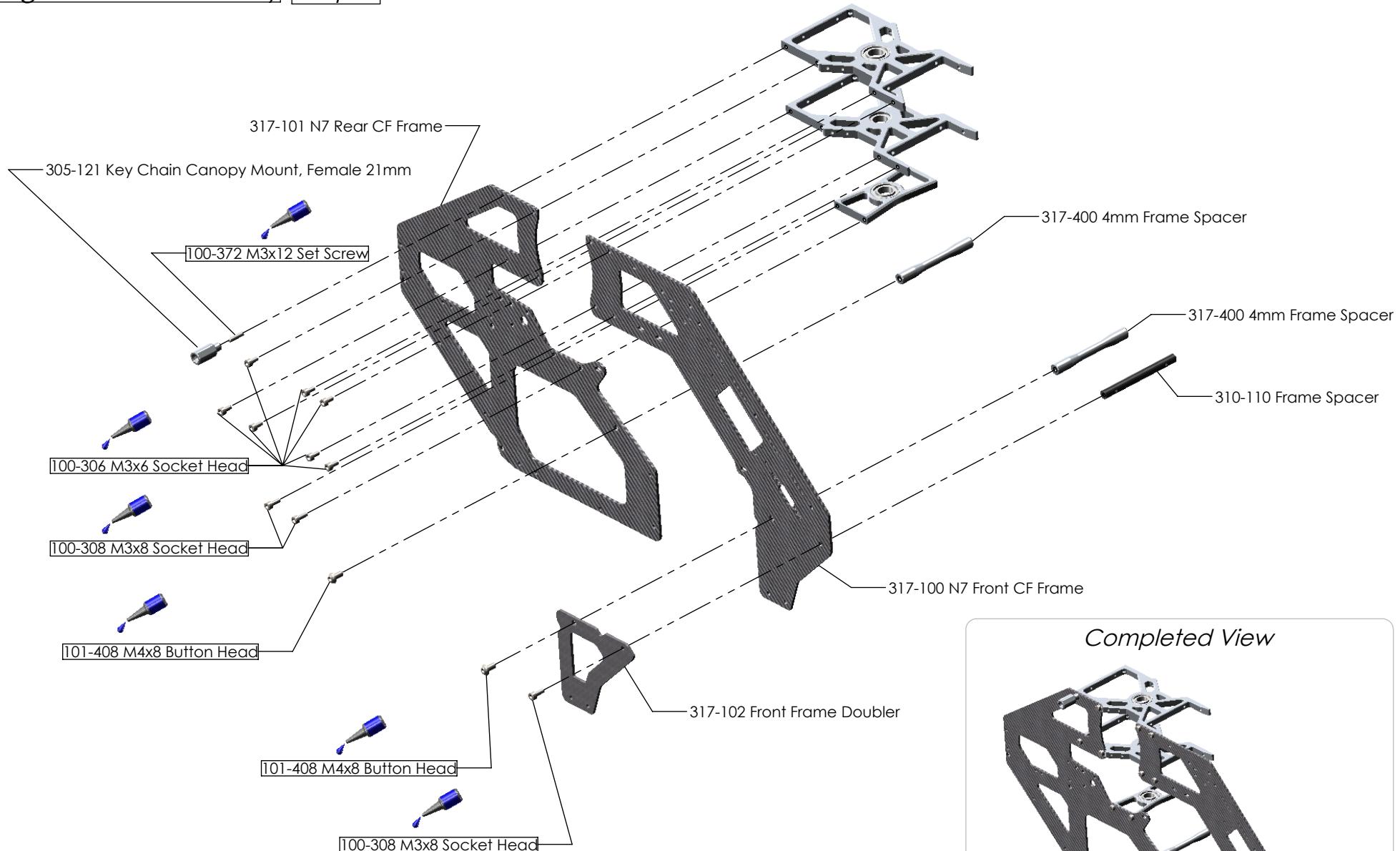


Main Shaft Bearing Blocks



Important - Keep this orientation in mind for future reference. Make sure bearing block and bearing orientation is correct. Top bearing is facing up, middle bearing is facing down, lower bearing is facing up.

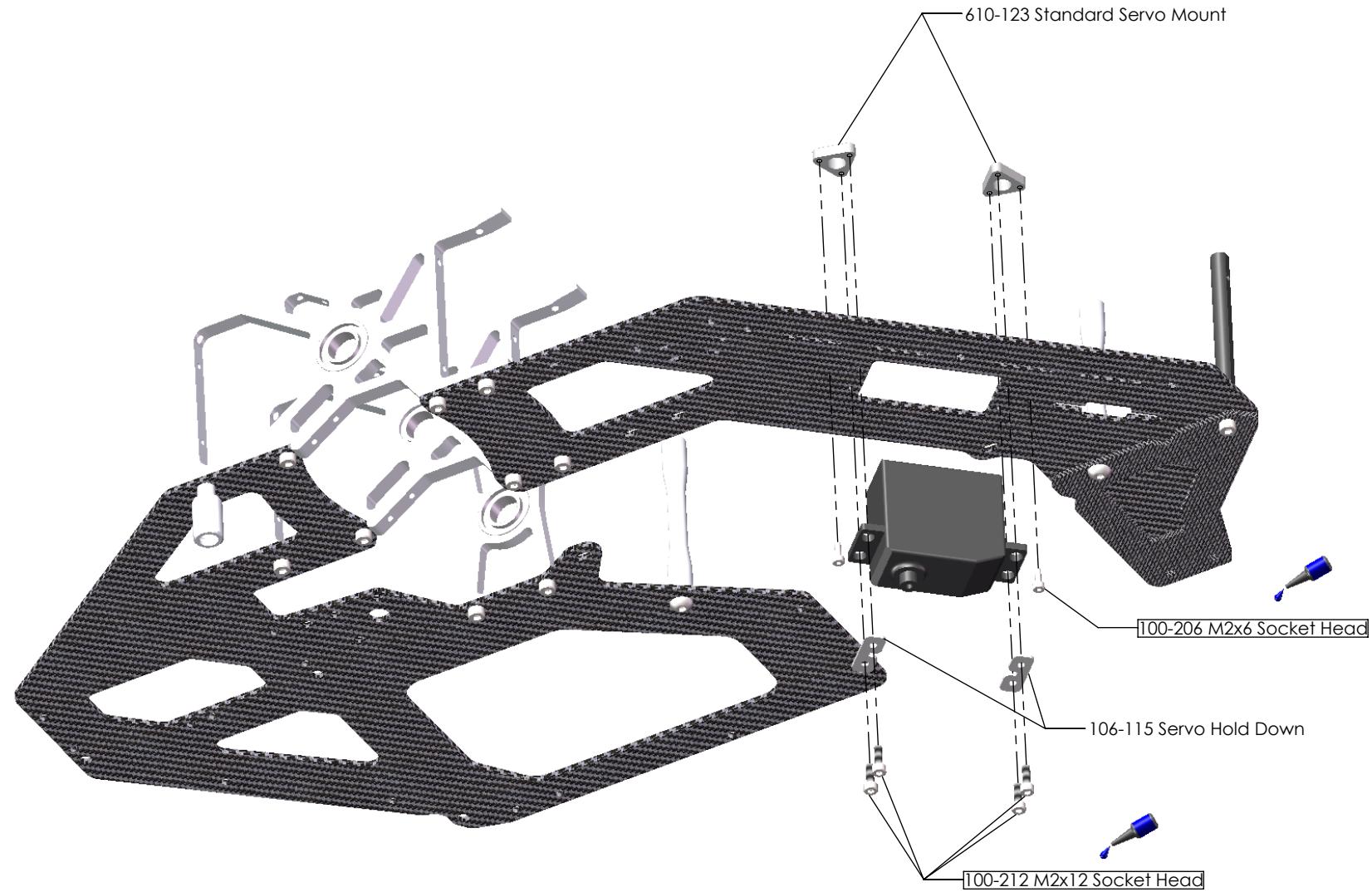
Right Frame Assembly | Step 1



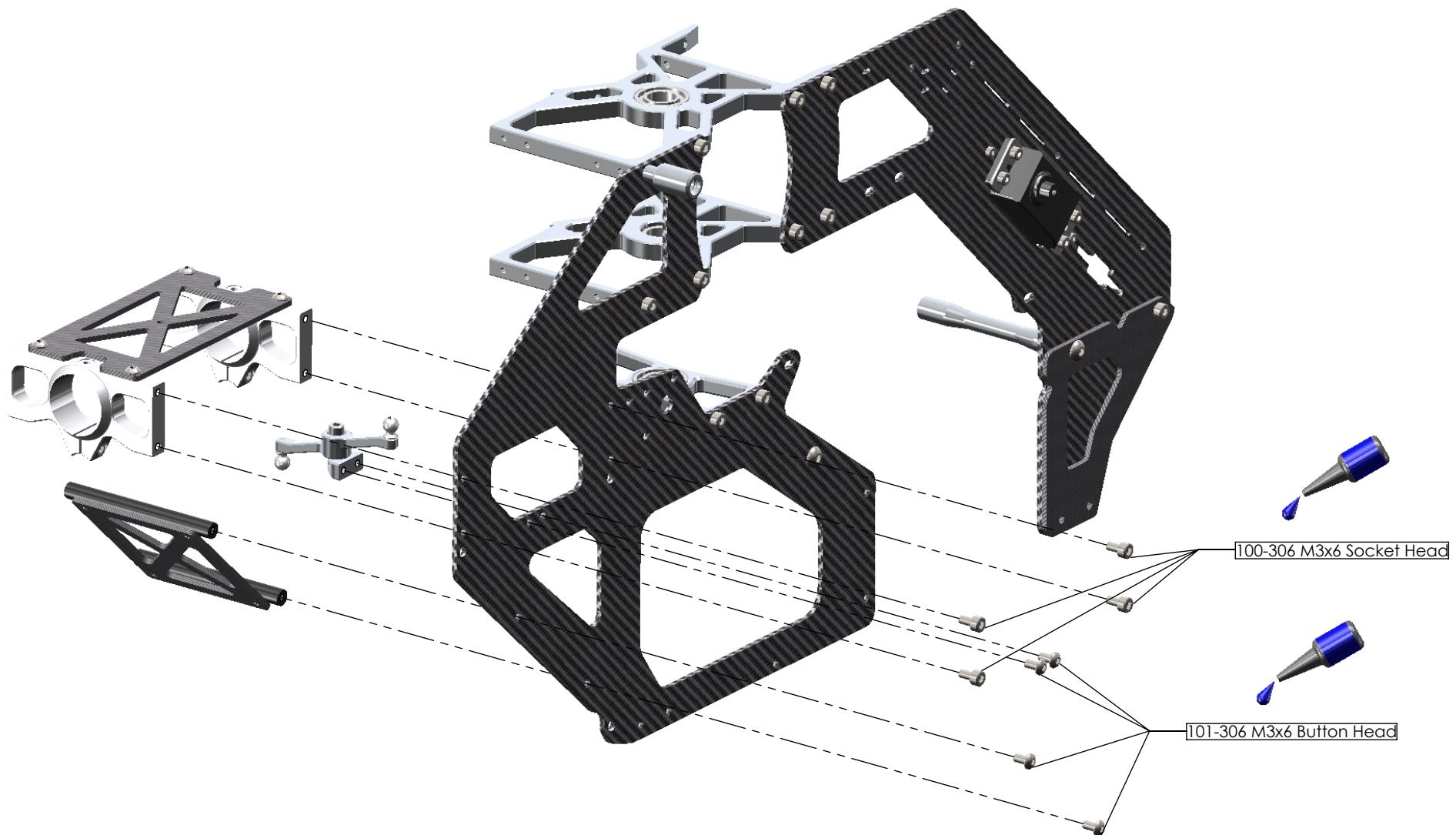
DO NOT FULLY TIGHTEN BOLTS! FRAMES MUST BE SQUARED IN FUTURE STEP!



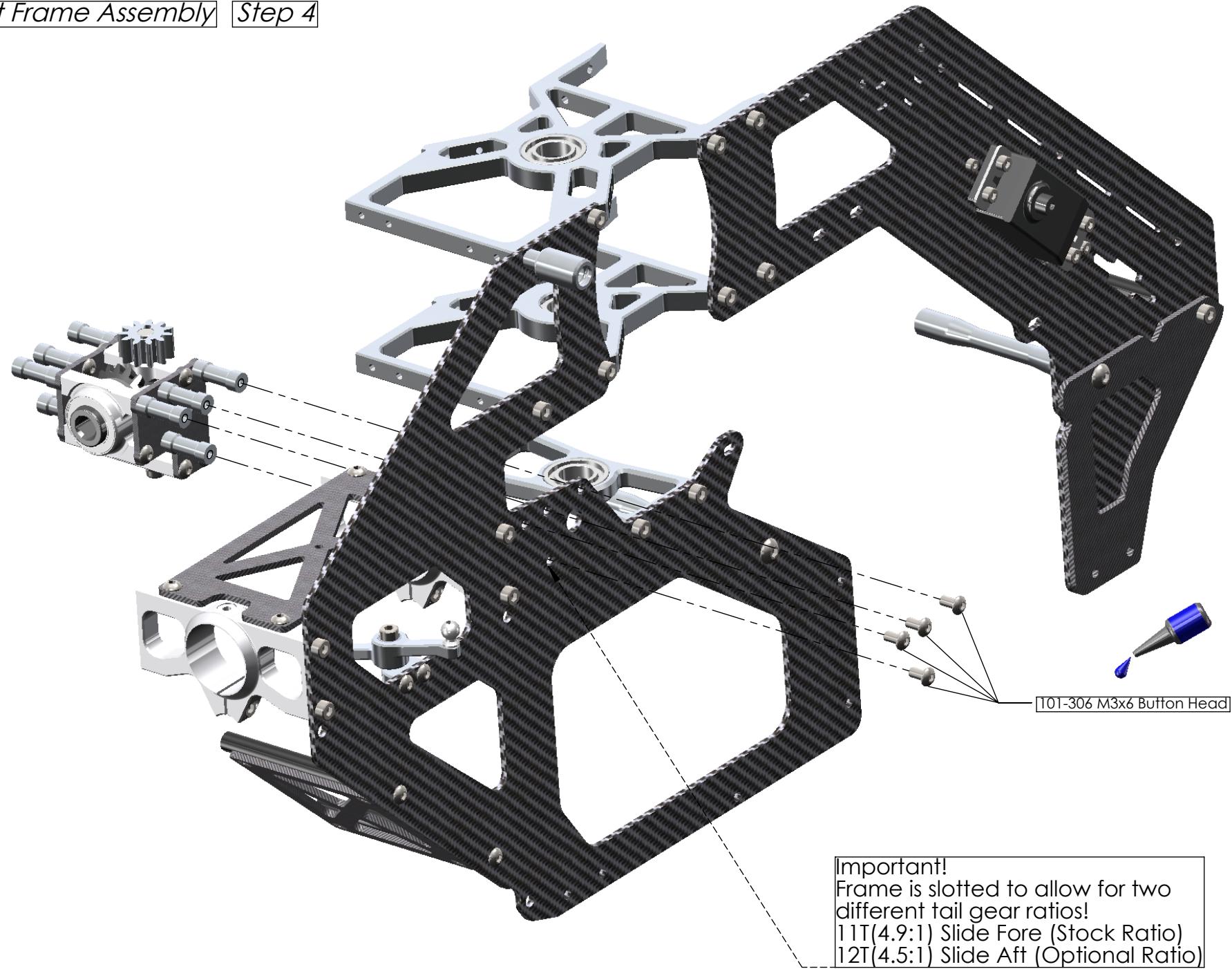
Right Frame Assembly Step 2



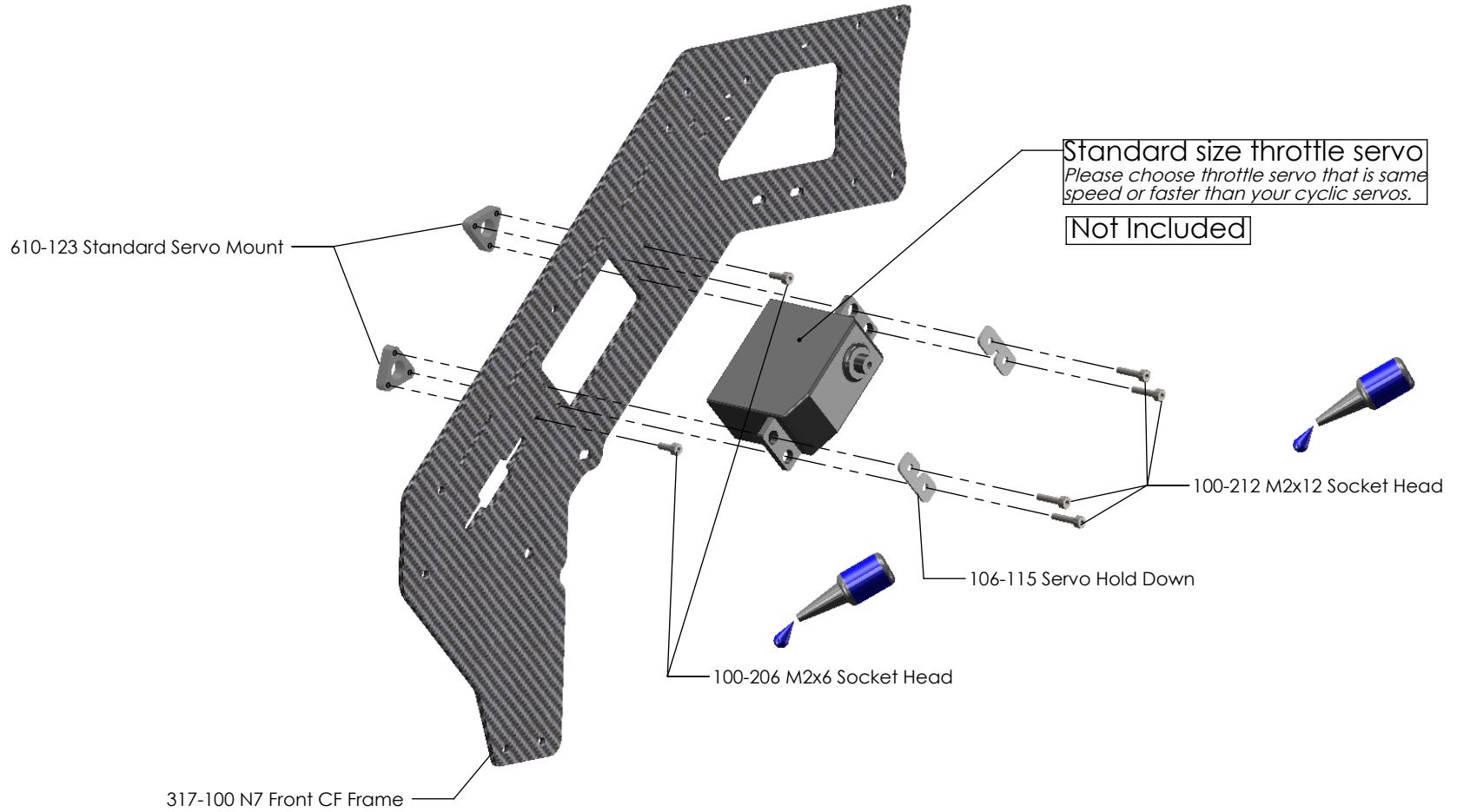
Right Frame Assembly | *Step 3*



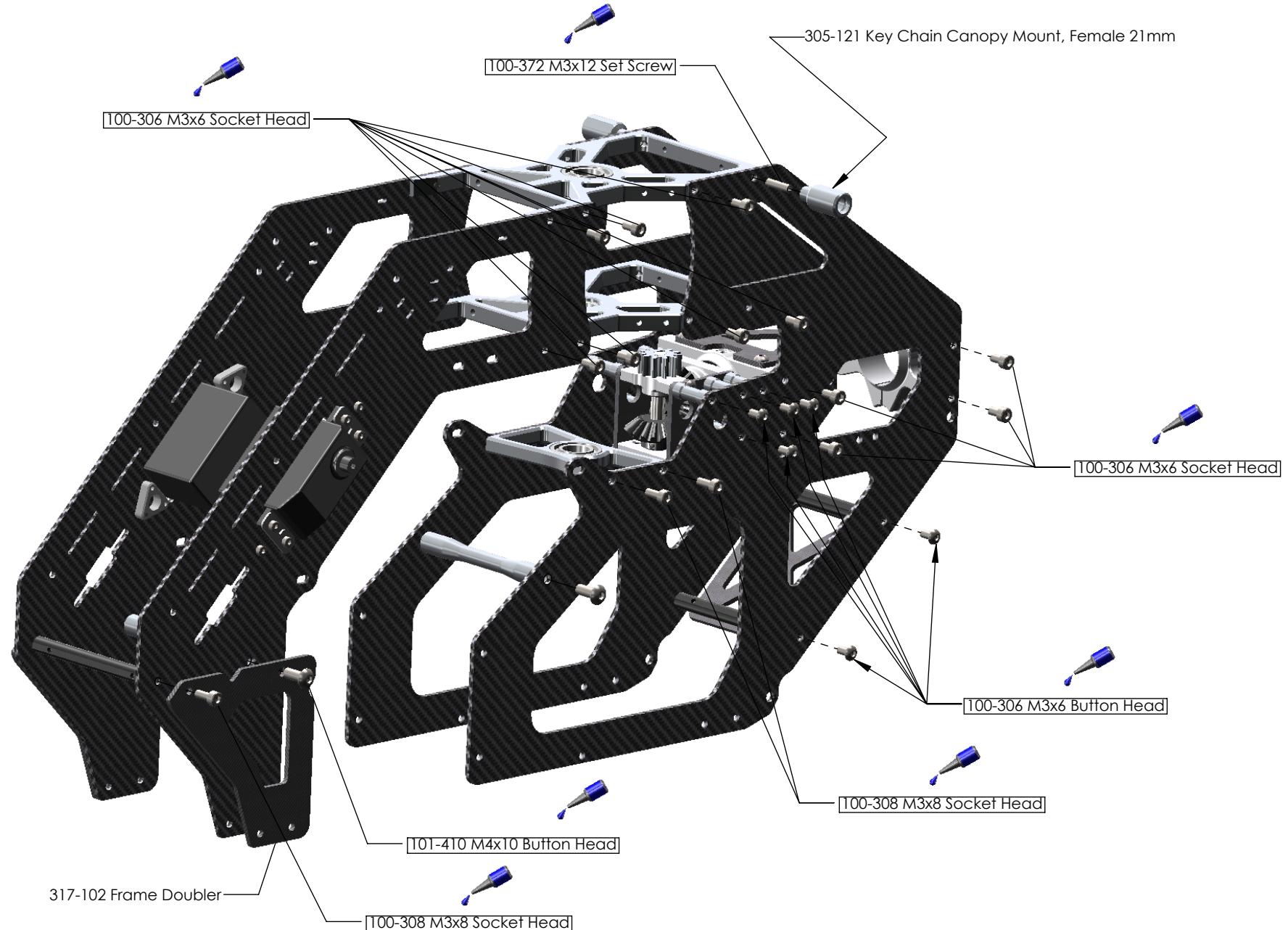
Right Frame Assembly | *Step 4*

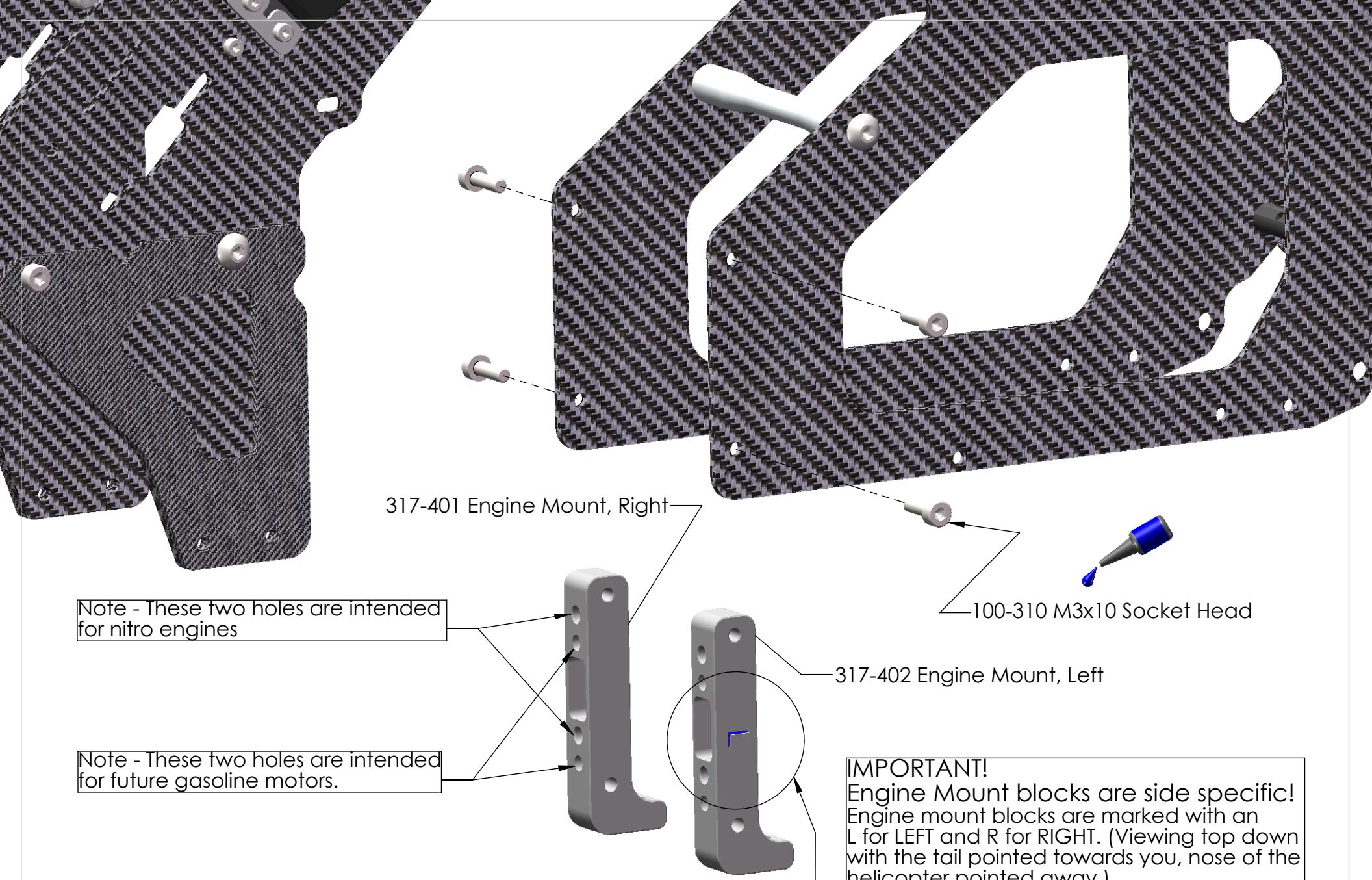


Left Front Frame and Throttle Servo Assembly



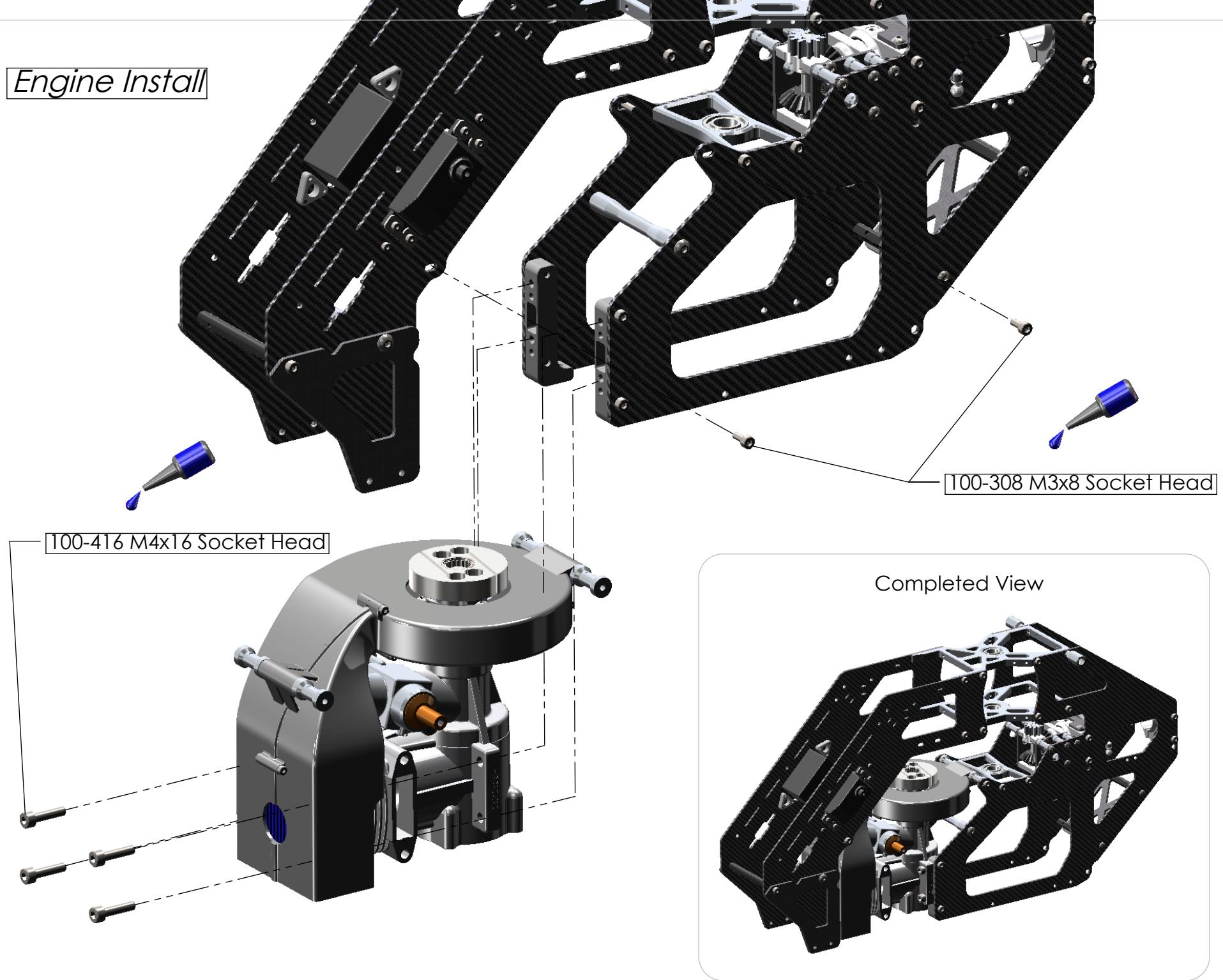
Left Frame Assembly | Step 2

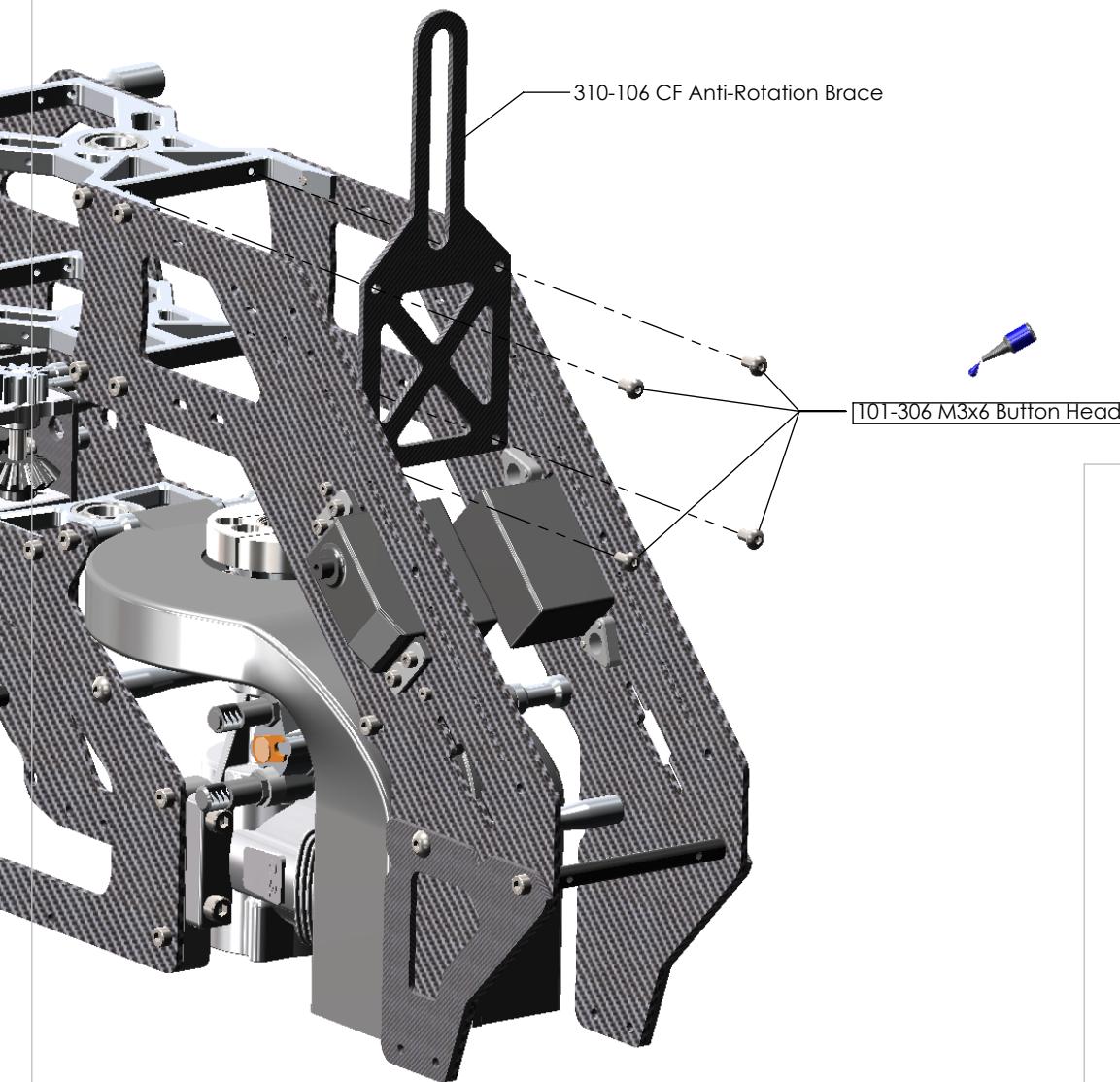




Engine Mounts

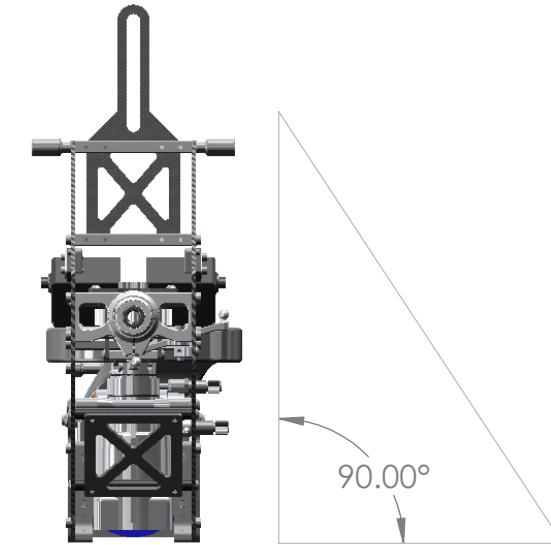
Engine Install



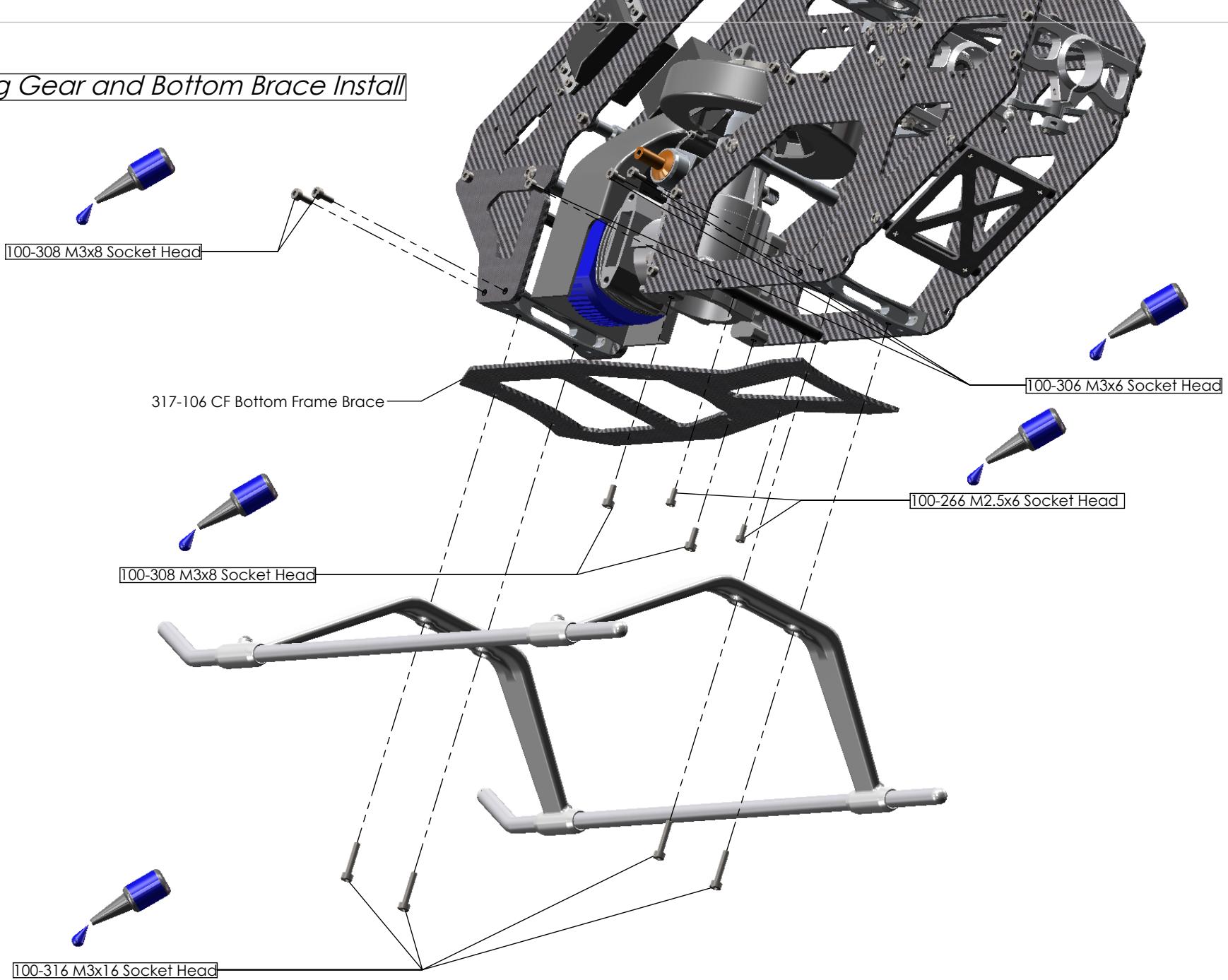


Anti Rotation Frame Brace and Frame Square

Check main frames to ensure they are 90 degrees and tighten all bolts.

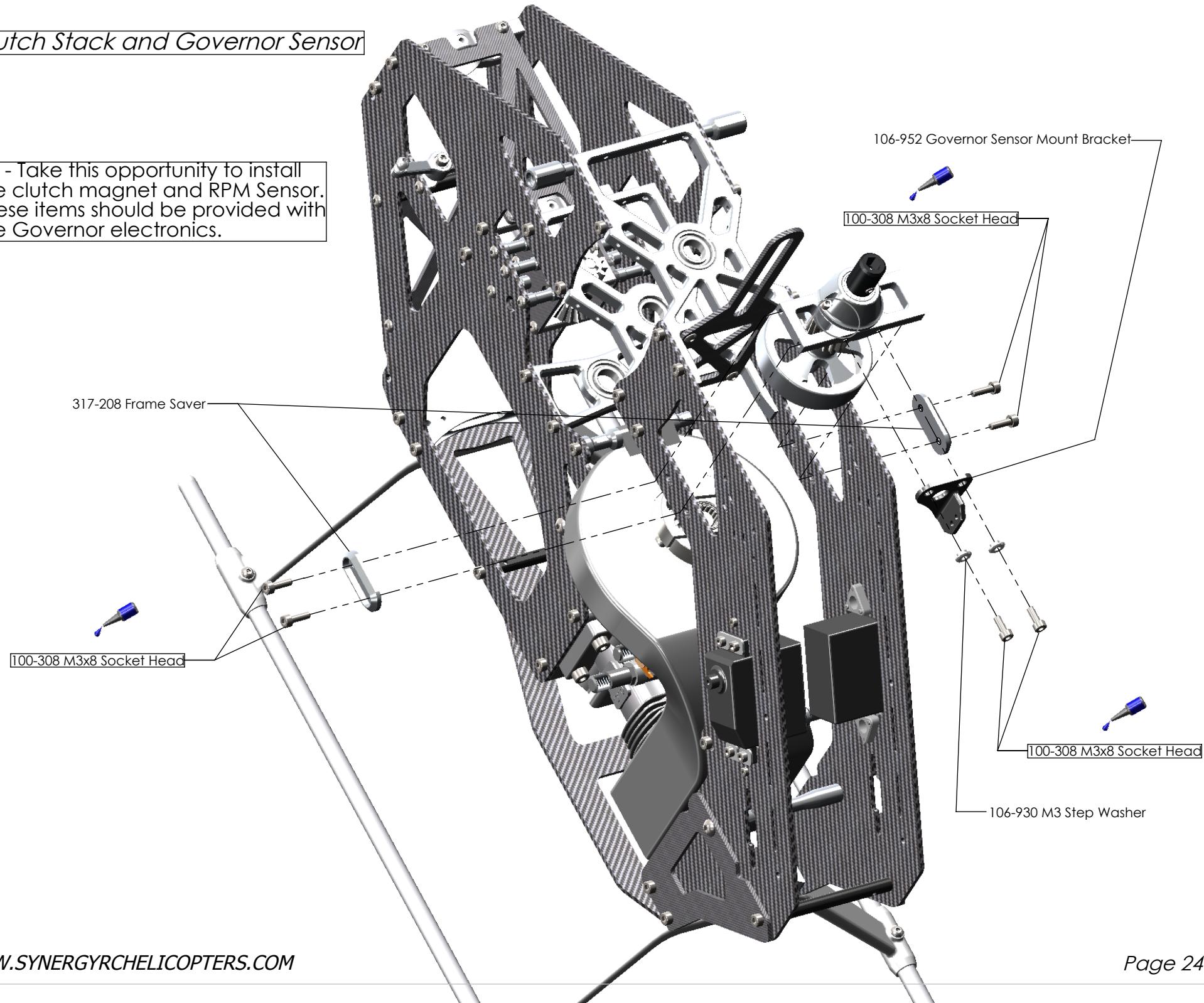


Landing Gear and Bottom Brace Install

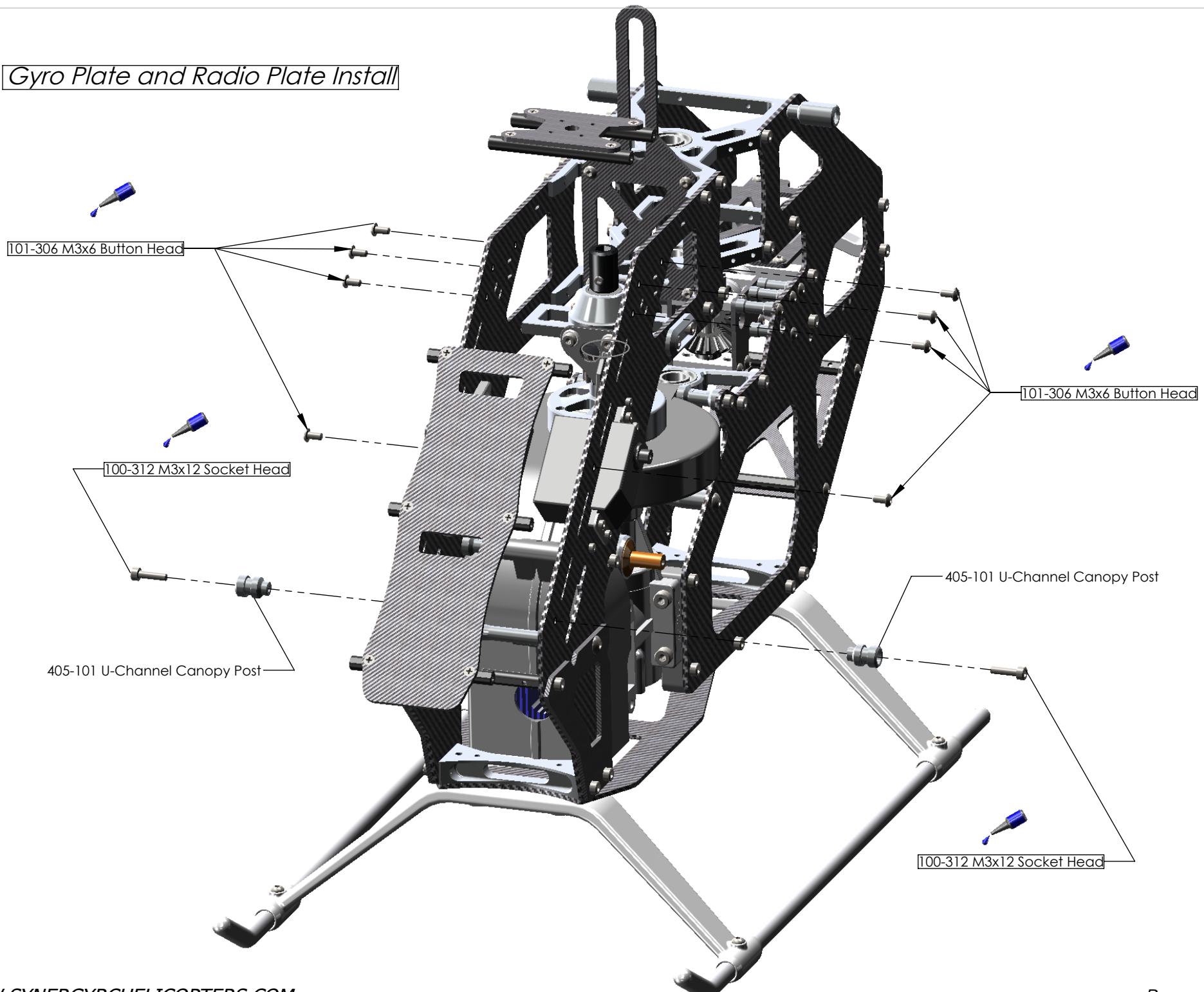


Clutch Stack and Governor Sensor

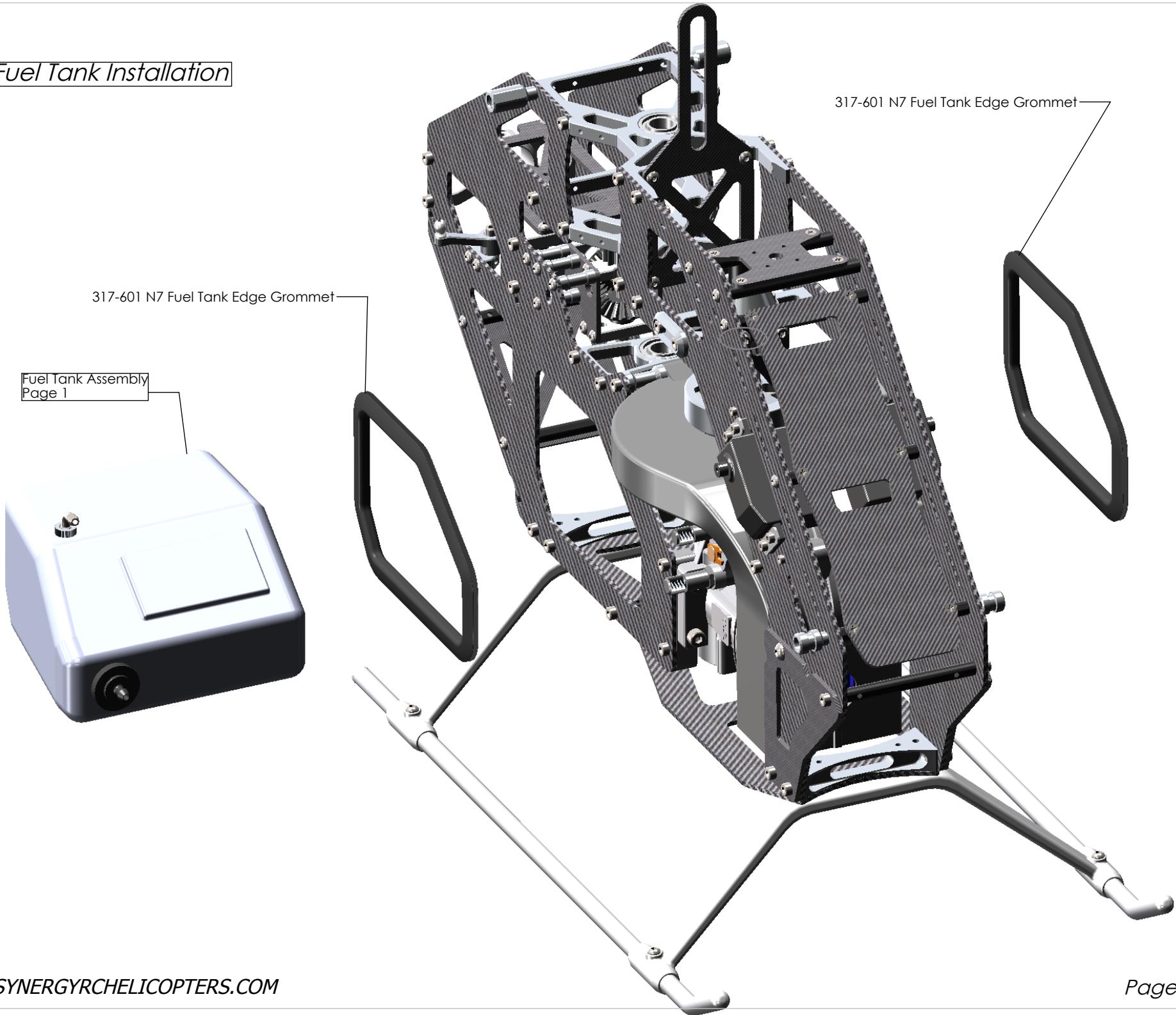
TIP - Take this opportunity to install the clutch magnet and RPM Sensor. These items should be provided with the Governor electronics.



Gyro Plate and Radio Plate Install

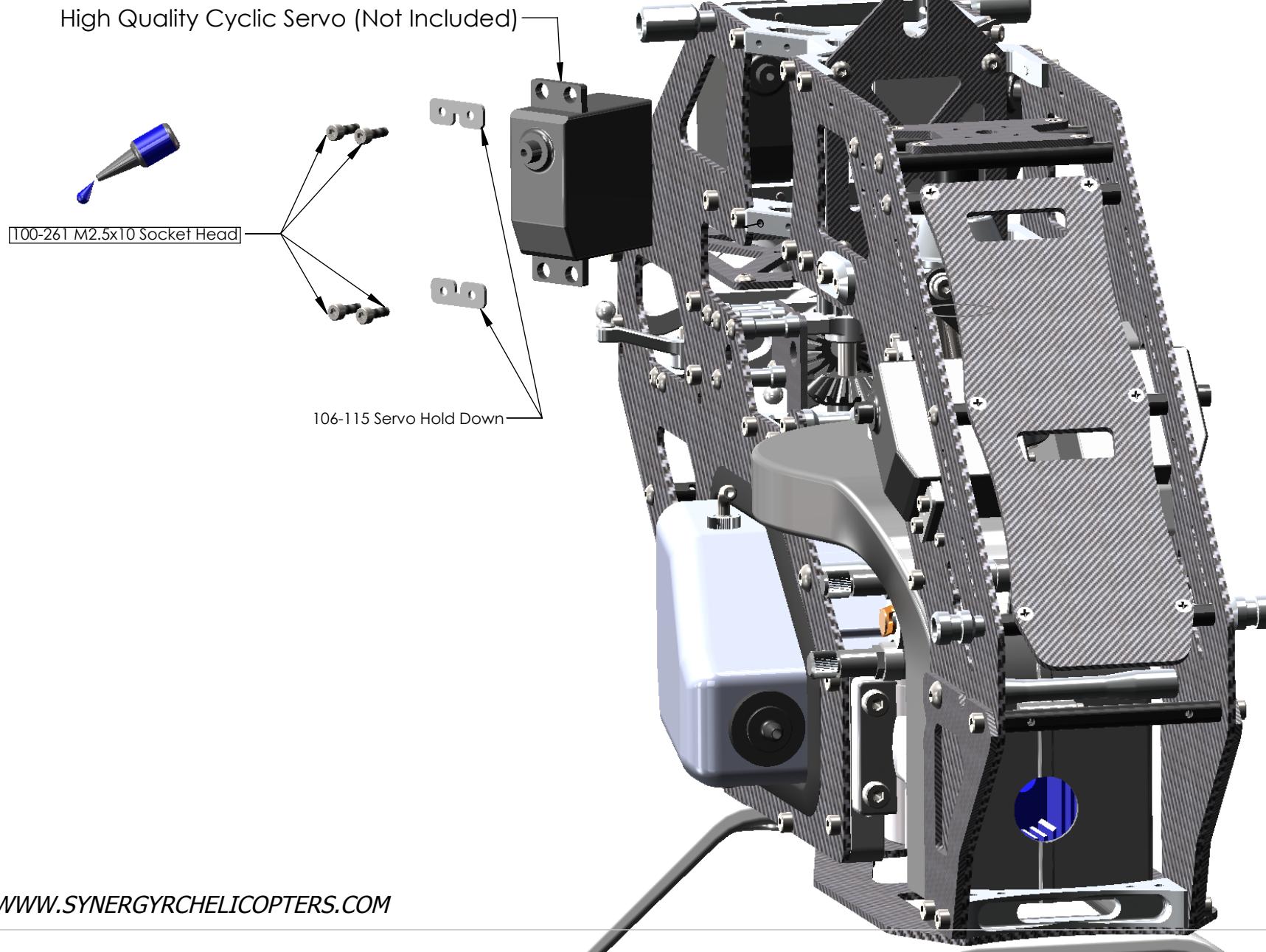


Fuel Tank Installation



Cyclic Servo Installation

Perform this step for all three cyclic servos!



Torque Tube Assembly

Note - Install bearings on torque tube shaft before installing torque tube ends. Bearings will not slide over ends.



108-814 8x14x4 Radial Bearing

Apply RED Loctite to secure bearing to Torque Tube. Do not apply loctite to plastic

320-503 Torque Tube Bearing Housing



320-504 O-Ring



100-210 M2x10 Socket Head

320-500 Torque Tube



320-502 Torque Tube End



100-251 M2 Regular Nut

Important! - Secure Torque Tube end with quality RED Loctite!

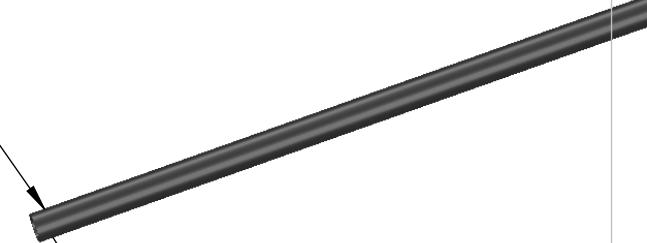
Unequal Bearing Spacing



Tail Control Rod Assembly

Note - Tail push rod ends will slide through tail control guides.

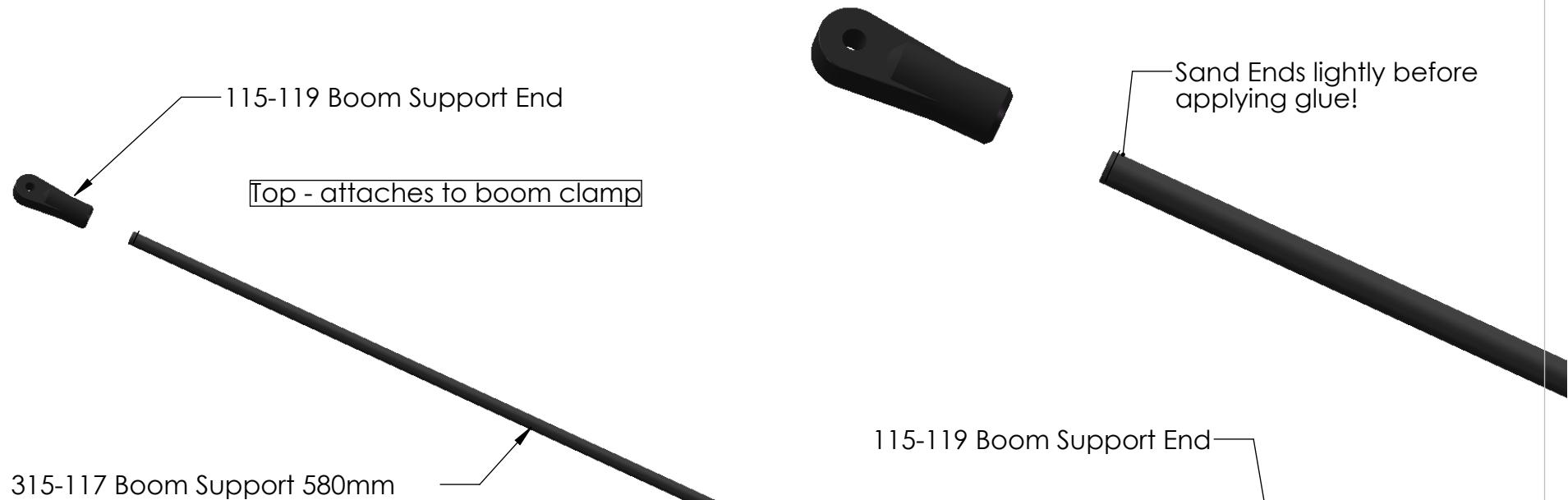
Note - Lightly sand carbon tail control rod prior to securing with JB Weld!



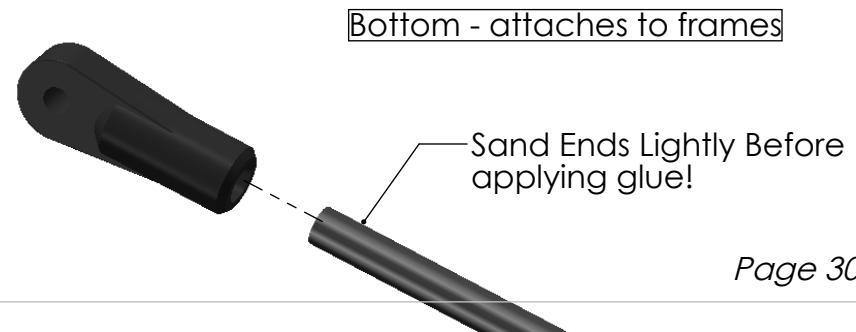
IMPORTANT! - Tail Control Rod End must be secured with high quality glue such as JB Weld. We highly recommend long curing formulas for the best results. Do not use CA for this application! You will encounter failures!



Boom Support Assembly

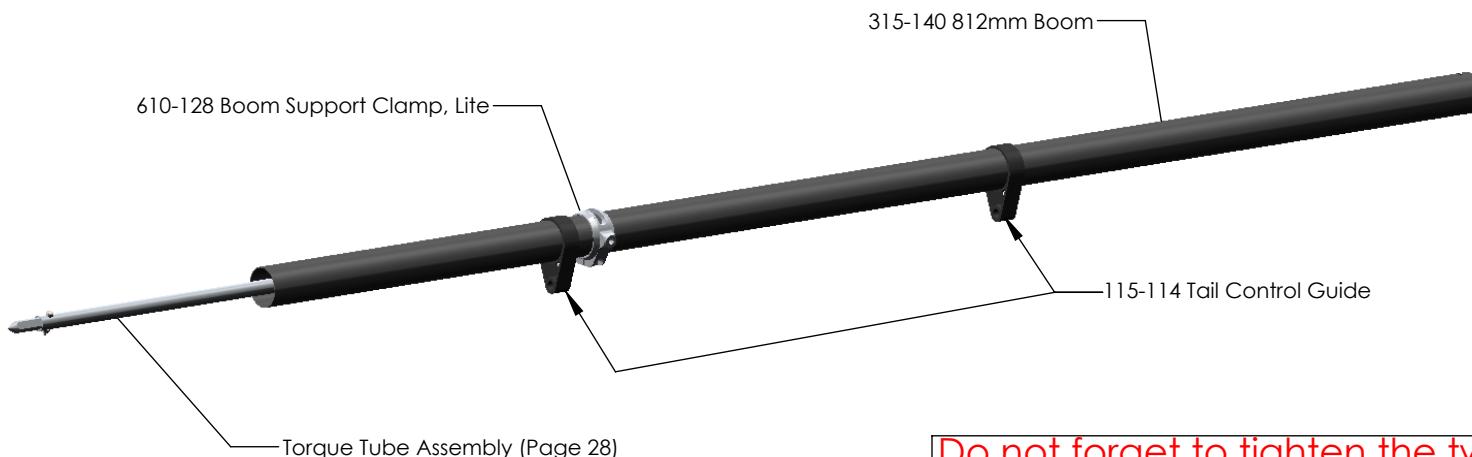


Notes -
1. Use Epoxy or JBWeld
2. Ensure ends are in alignment while glue sets



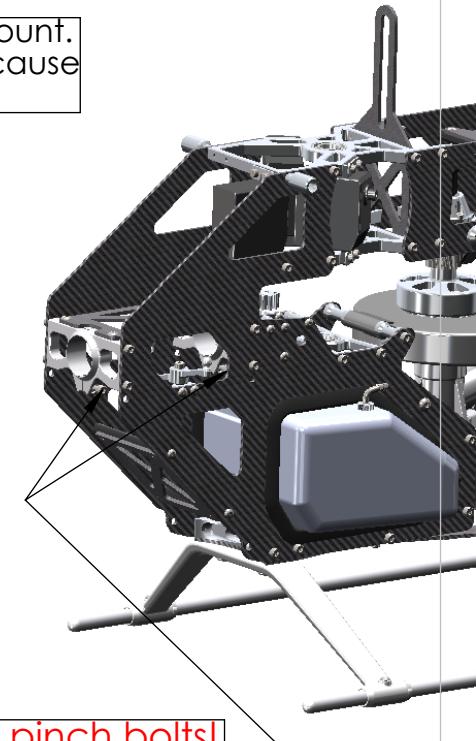
Tail Boom Install

Note - Tail Boom will remain flush with front boom mount.
Do not push tail boom all the way forward! This will cause
improper mesh of the bevel gears.

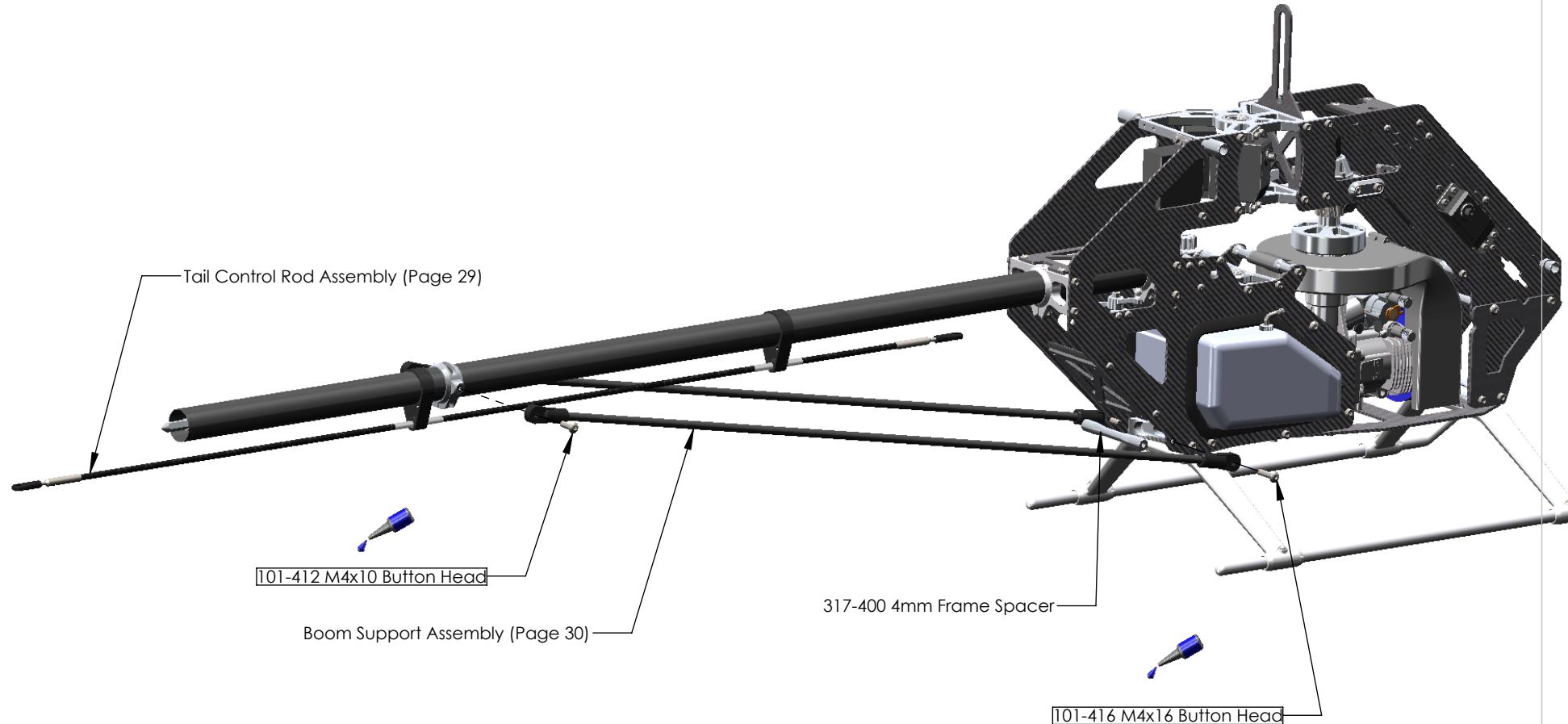


Note - Use silicone based grease for installation of torque tube assembly into the tail boom.

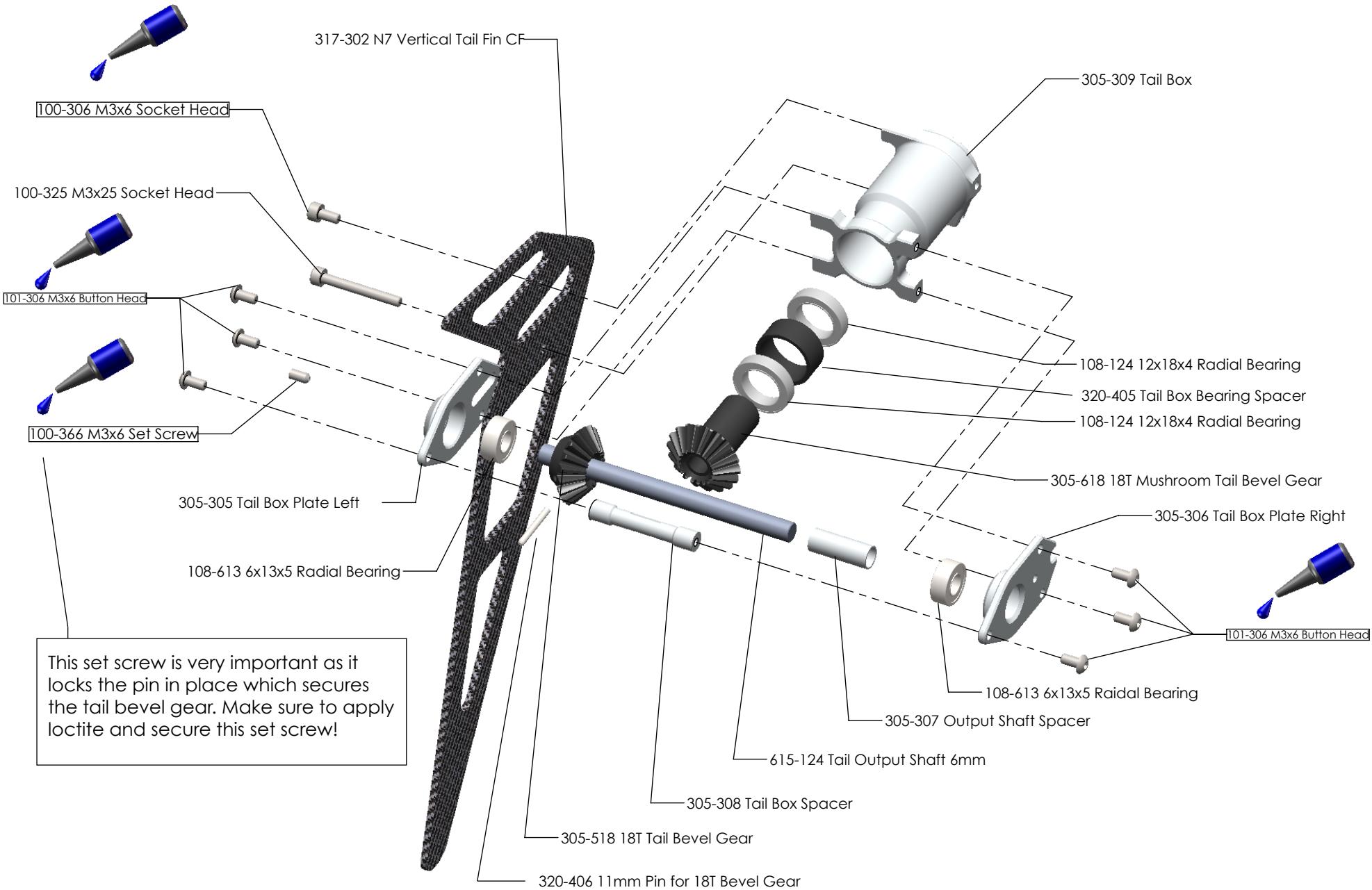
Do not forget to tighten the two pinch bolts!



Tail Control Rod and Boom Support Install

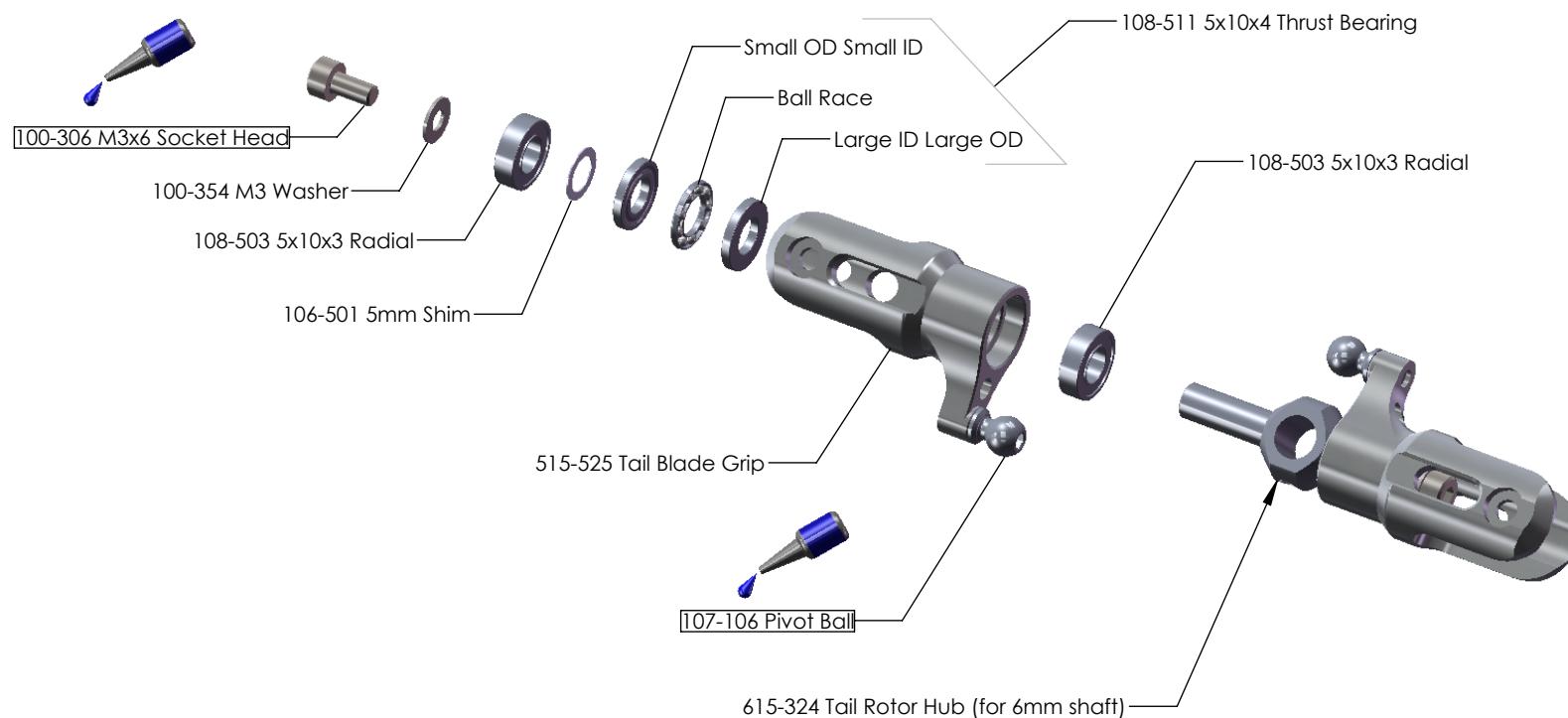


Tail Box Assembly

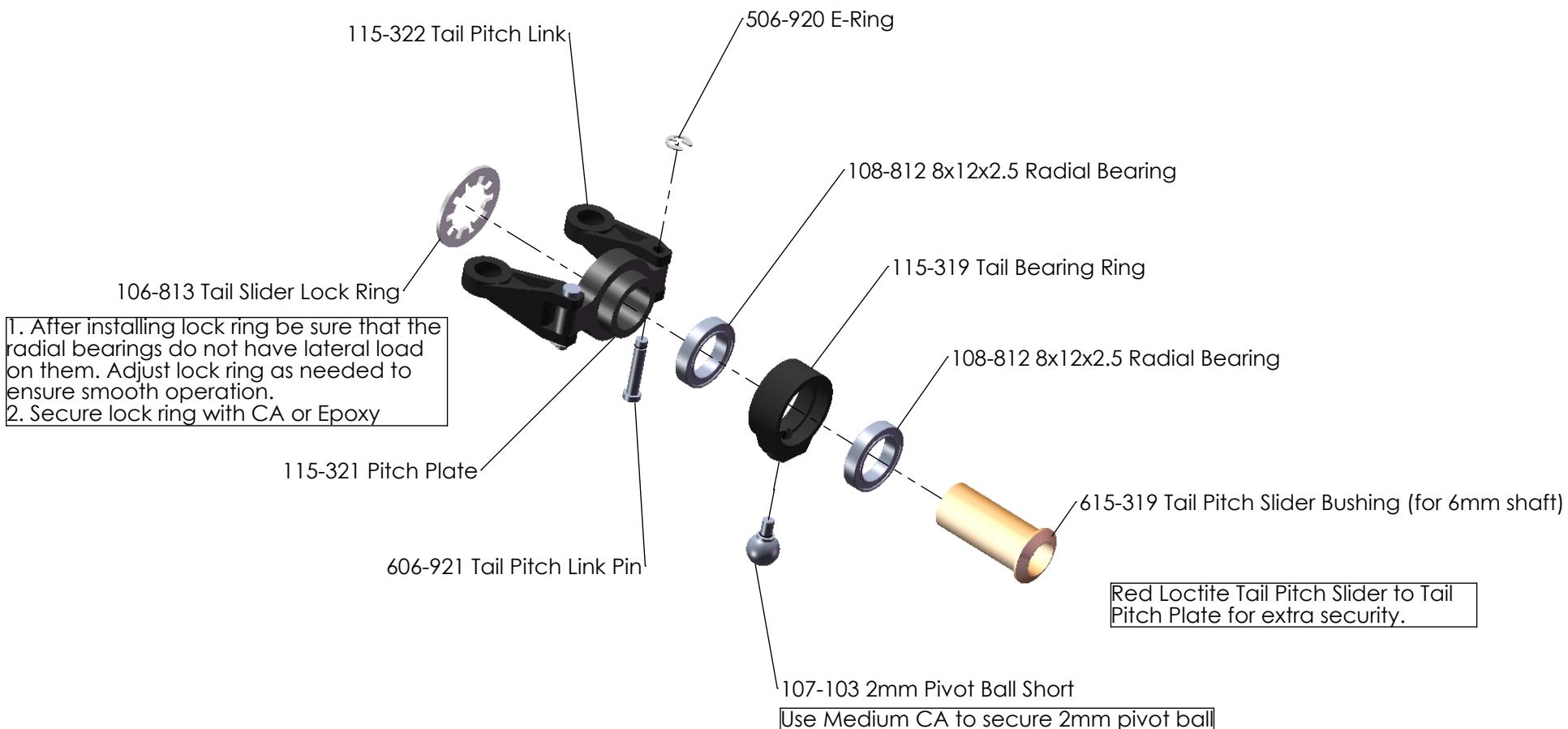


Tail Rotor Hub Assembly

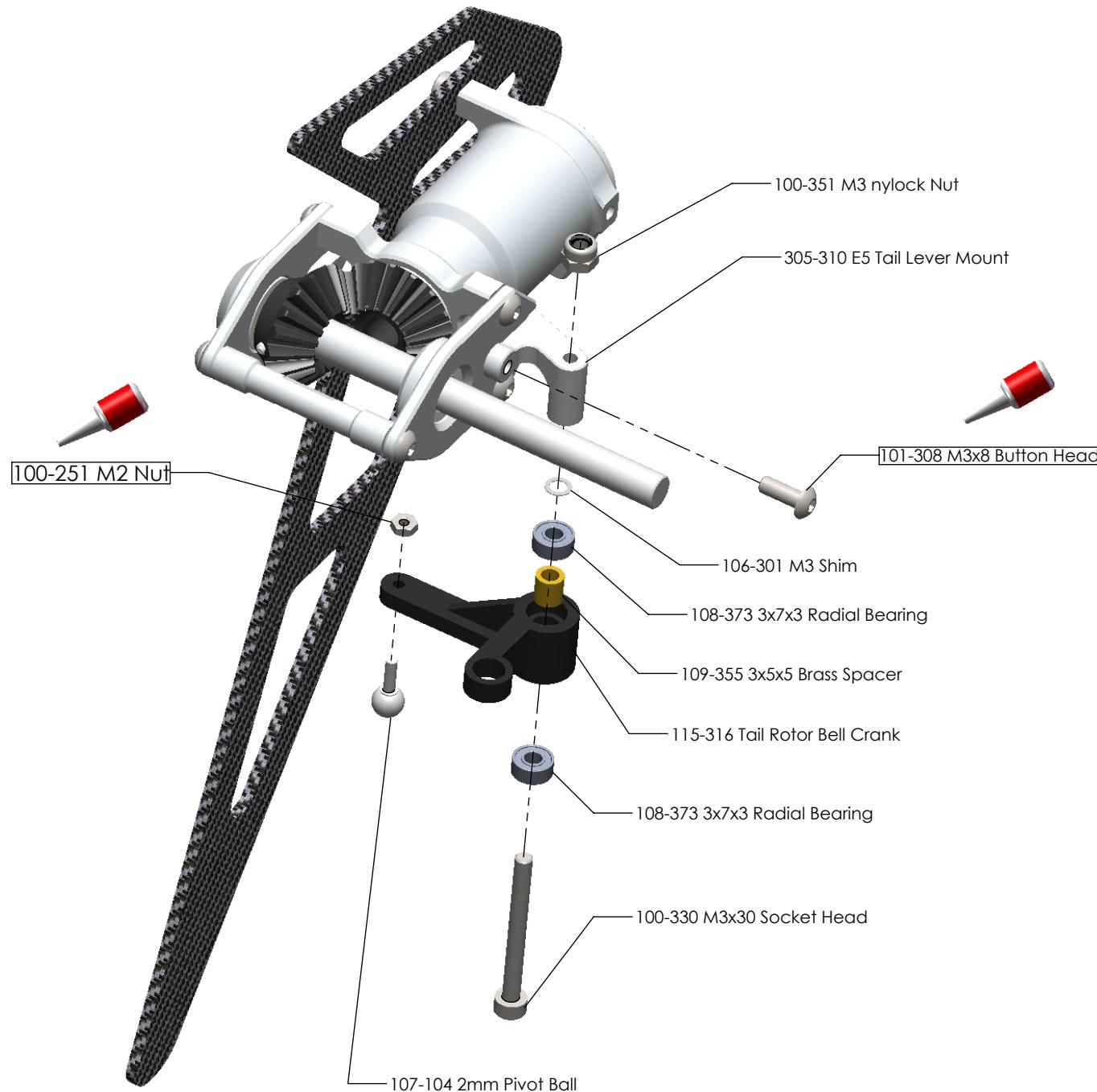
IMPORTANT! - Apply Grease to Thrust Bearing Ball Race



Pitch Slider Assembly



Tail Rotor Bell Crank Assembly



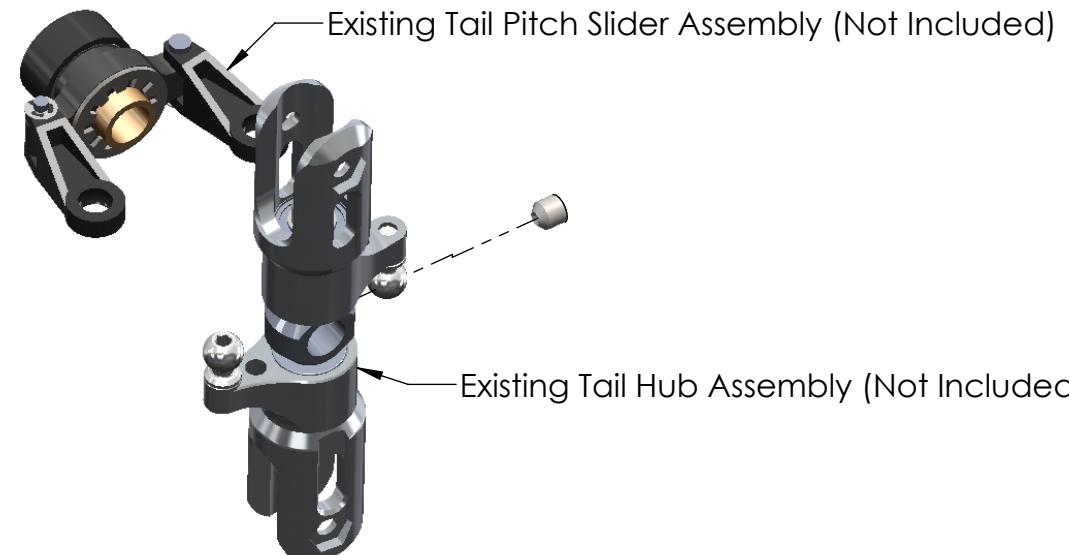
Tail Box Completion



IMPORTANT!!!

Note orientation of tail blade grips. The tail will rotate clockwise. The tail blade grips should lead with the pivot ball at the leading edge of the tail blade. This does not affect the performance off the tail rotor in any way.

Completed Tail Box Assembly



Existing Tail Pitch Slider Assembly (Not Included)

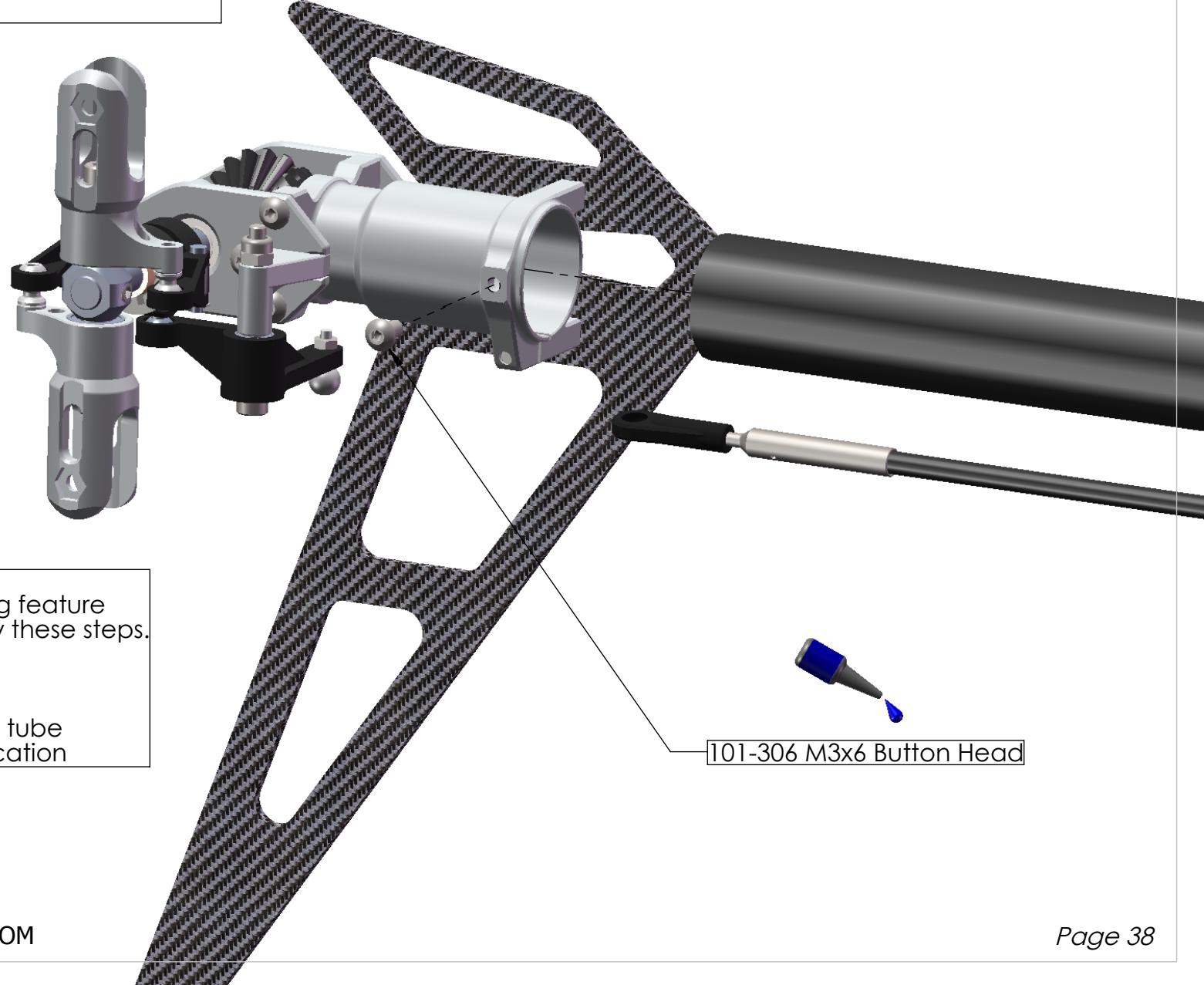
Existing Tail Hub Assembly (Not Included)

IMPORTANT!!!

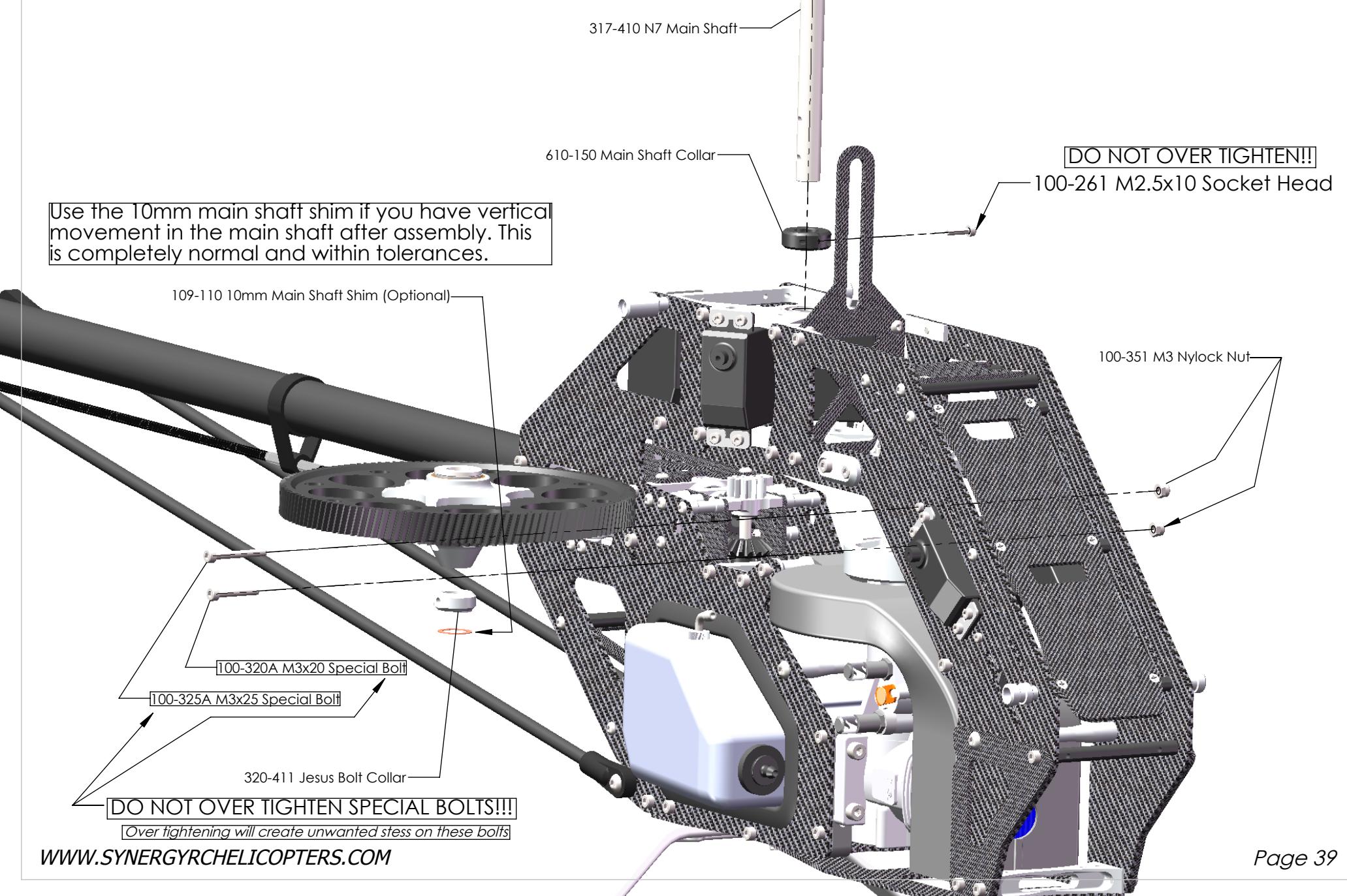
Check left and right tail rotor direction as well as tail gyro correction direction after assembly is completed.

Tail Box Install

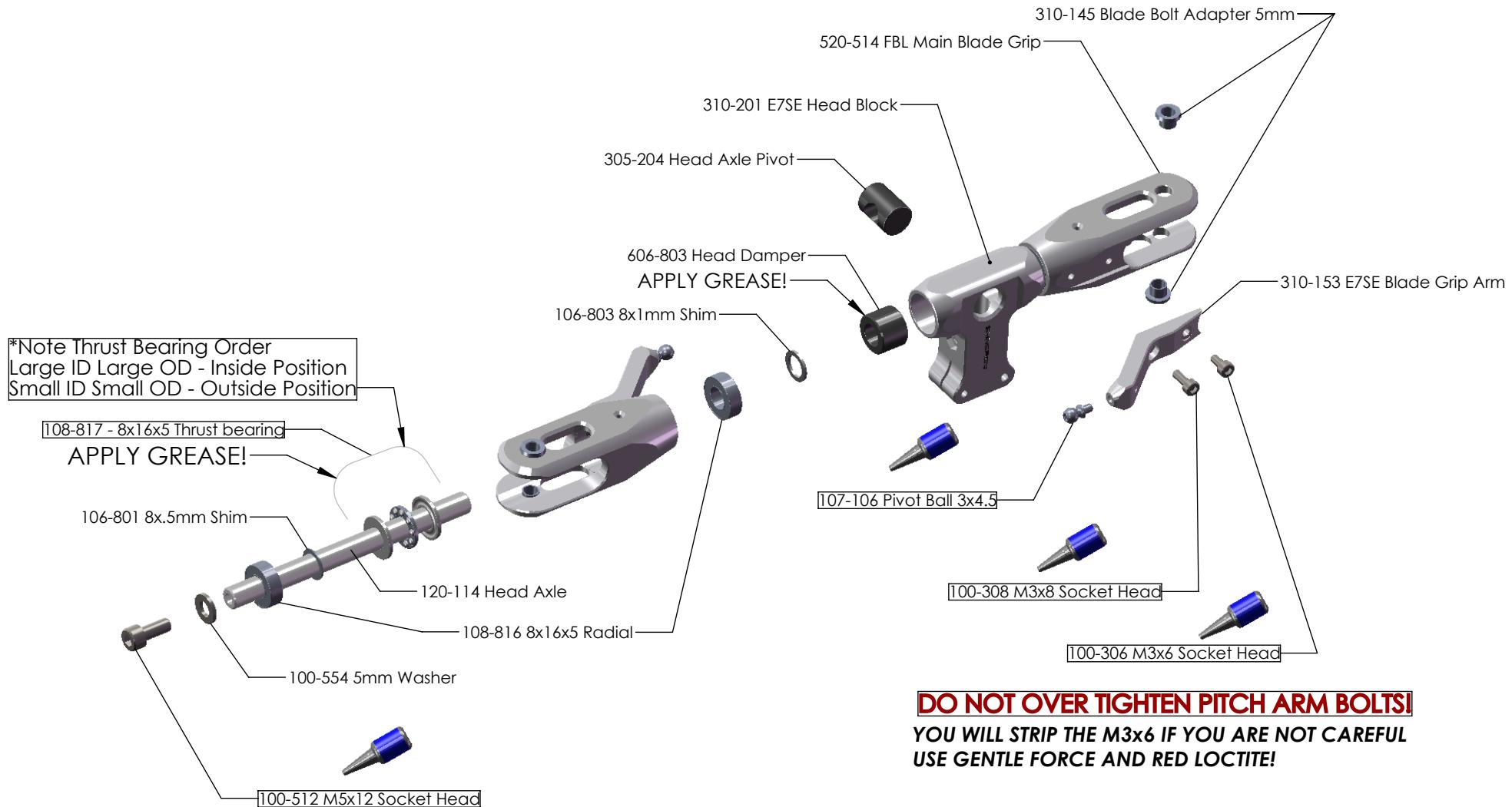
Slide tail box assembly on to tail boom.
Ensure torque tube is aligned with mushroom
bevel gear.



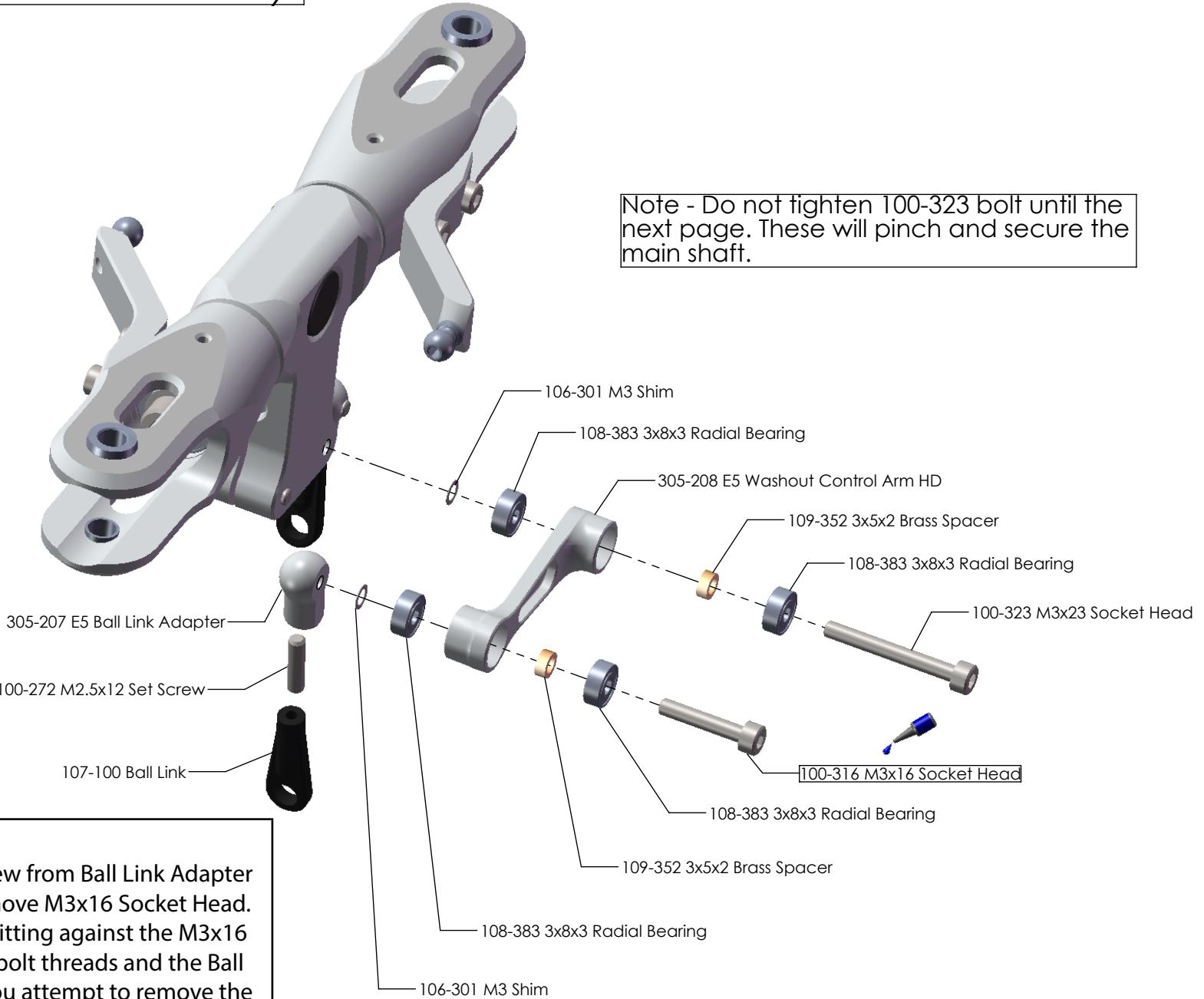
Main Shaft and Transmission Install



Rotor Head Assembly



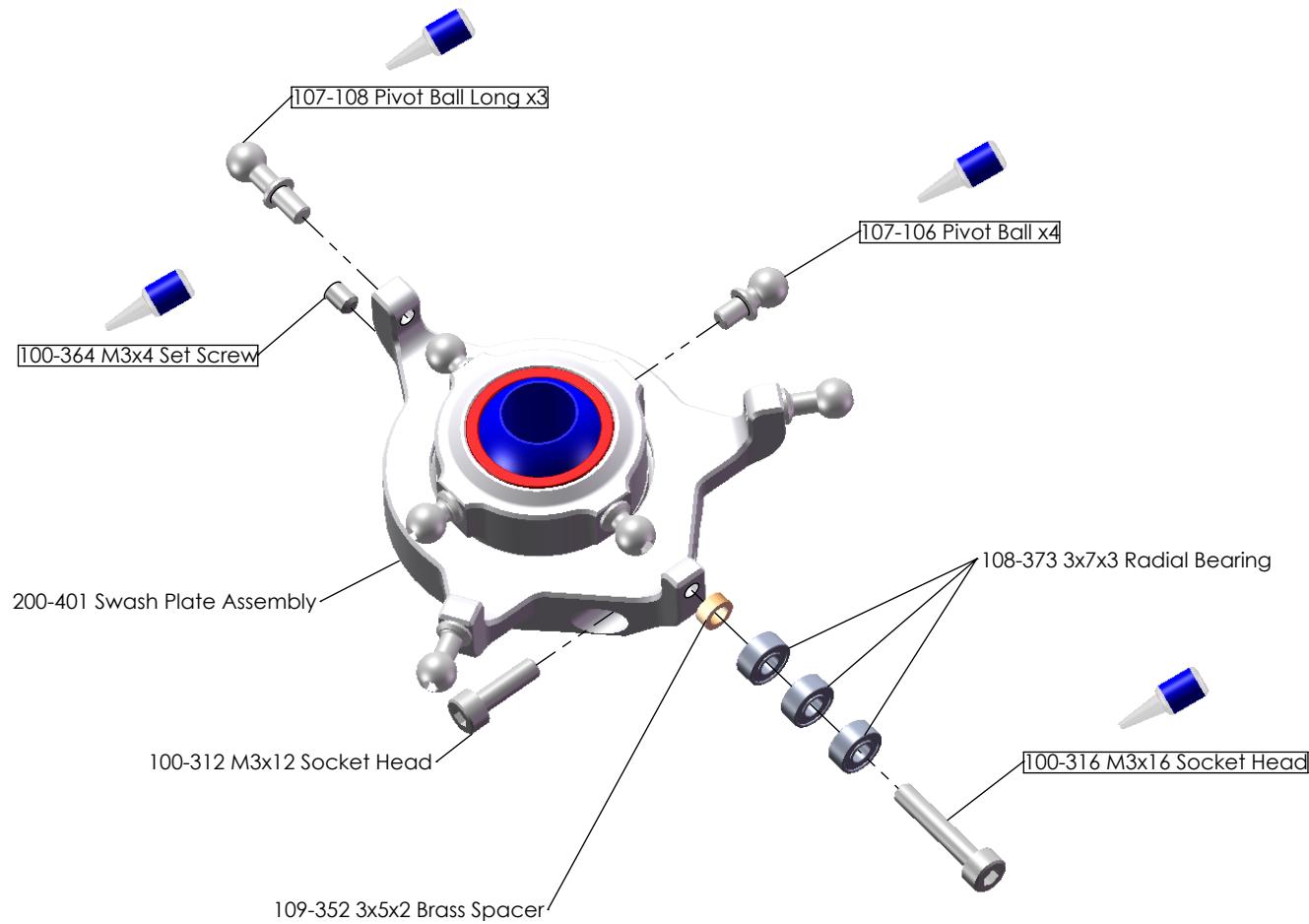
Swash Follower Arm Assembly



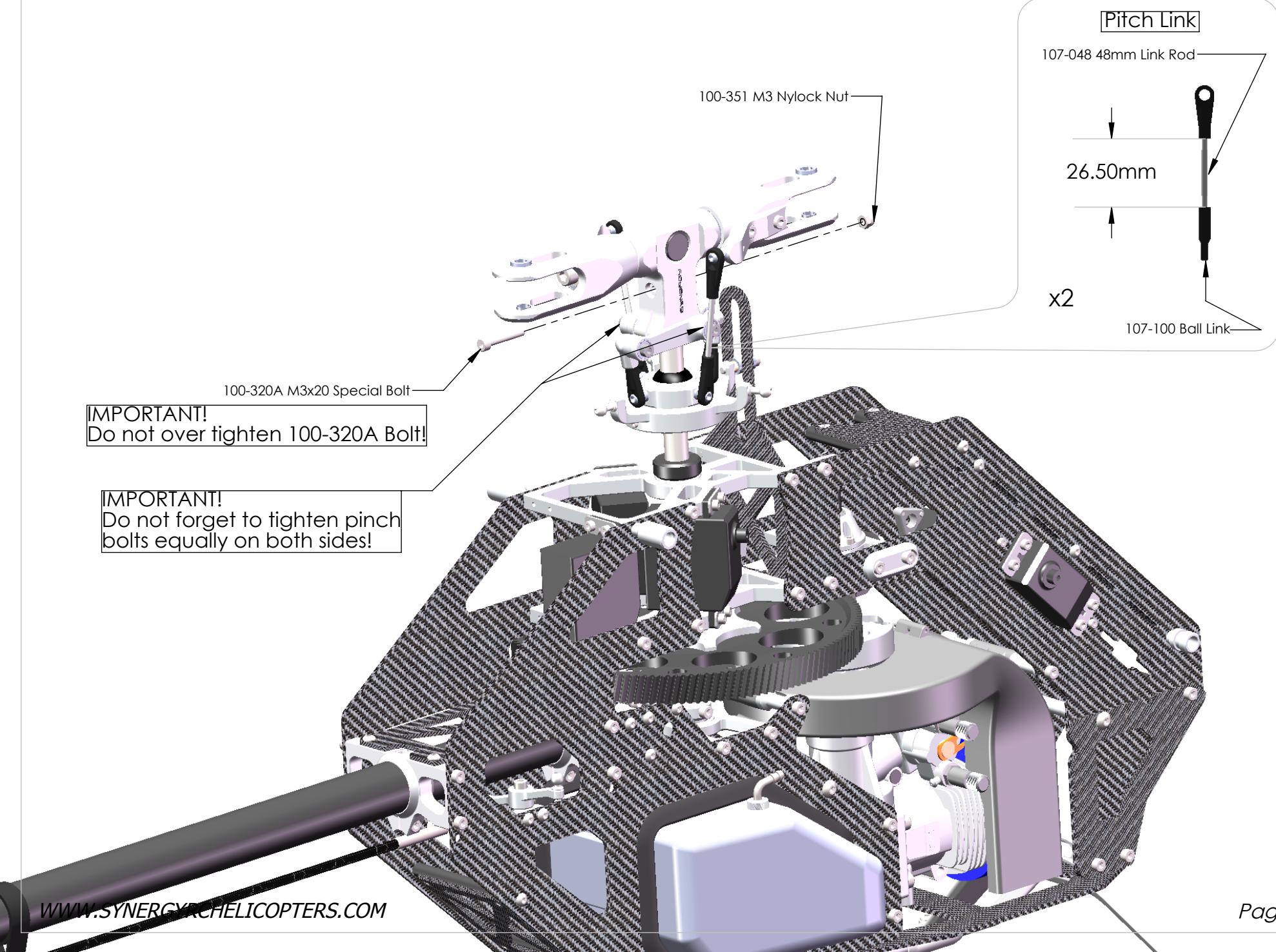
IMPORTANT!

Remove M2.5x12 Set Screw from Ball Link Adapter before attempting to remove M3x16 Socket Head. The M2.5x2 Set Screw is sitting against the M3x16 bolt and will destroy the bolt threads and the Ball Link Adapter threads if you attempt to remove the bolt without first removing the set screw.

Swash Plate Assembly



Rotor Head Install



Pitch Link

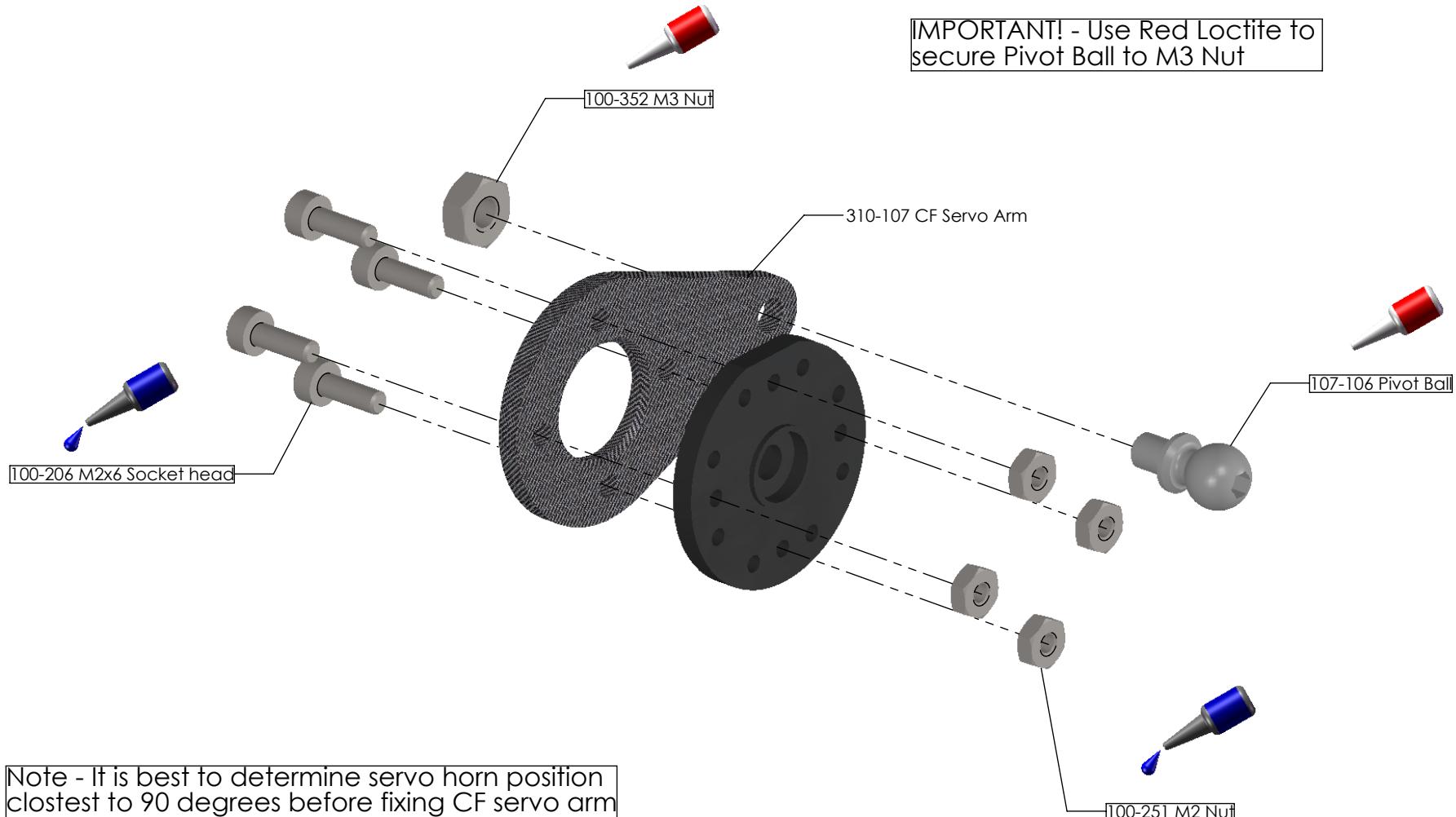
107-048 48mm Link Rod

26.50mm

x2

107-100 Ball Link

Servo Horn Assembly

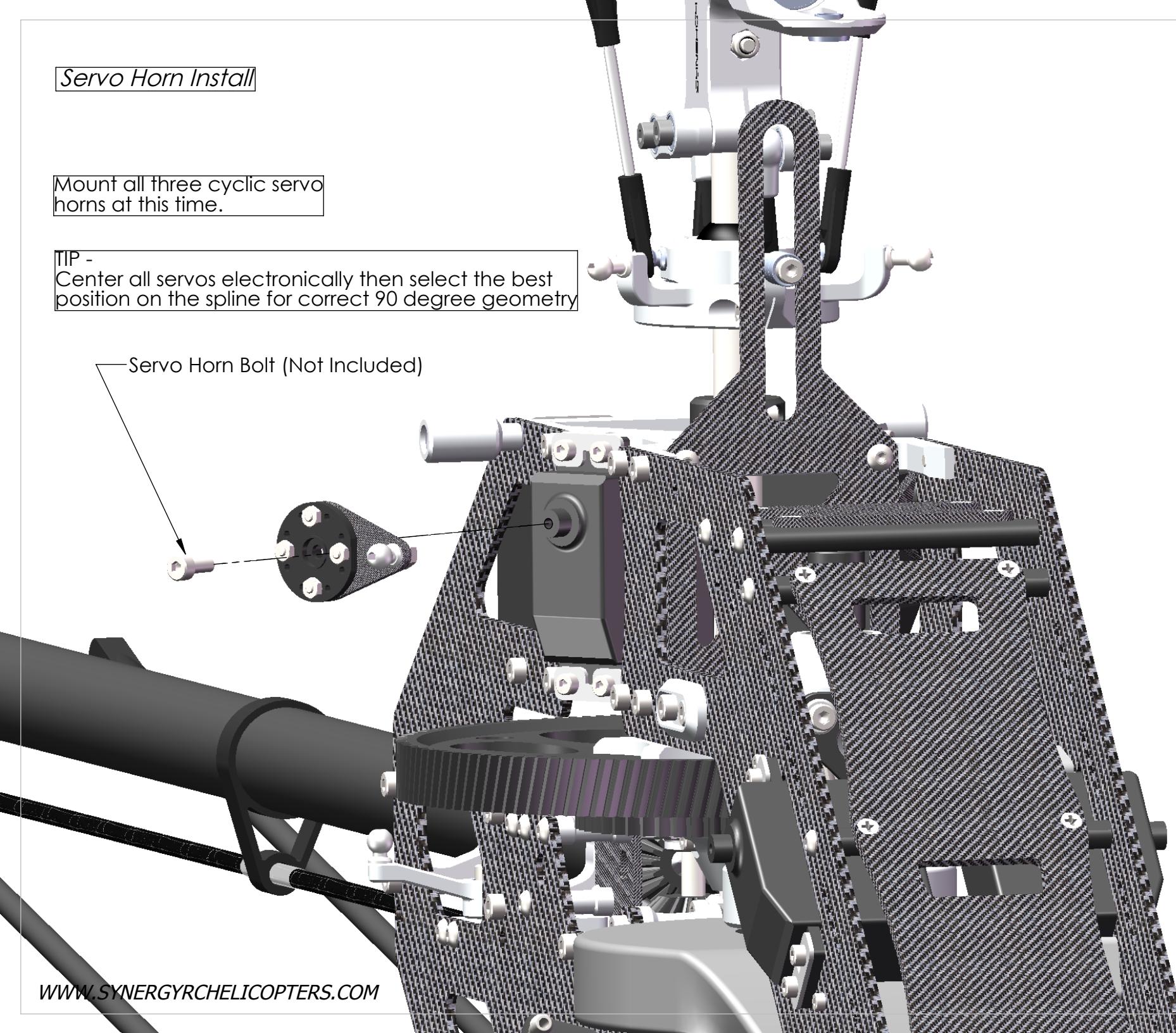


Servo Horn Install

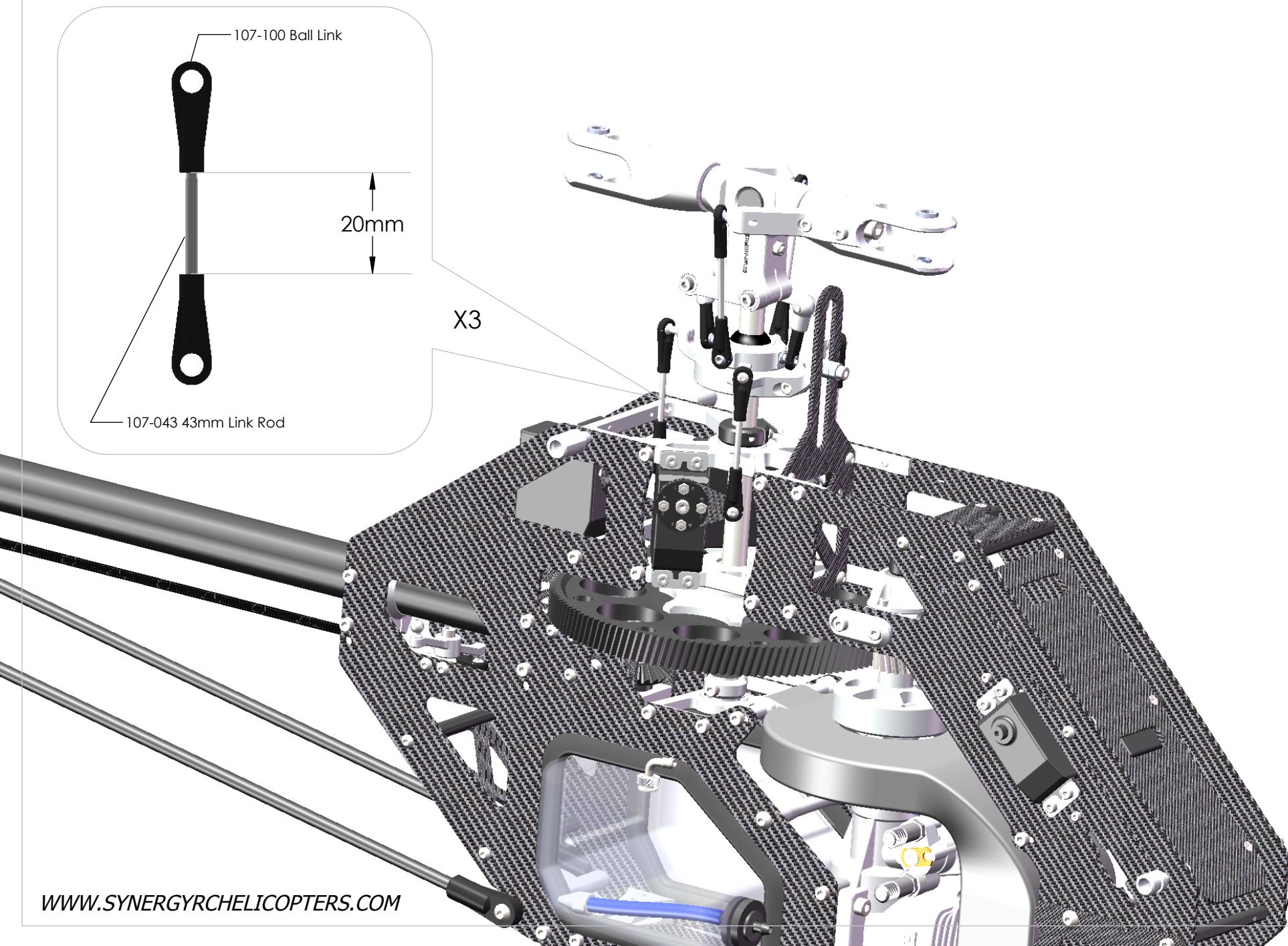
Mount all three cyclic servo horns at this time.

TIP -
Center all servos electronically then select the best position on the spline for correct 90 degree geometry

Servo Horn Bolt (Not Included)

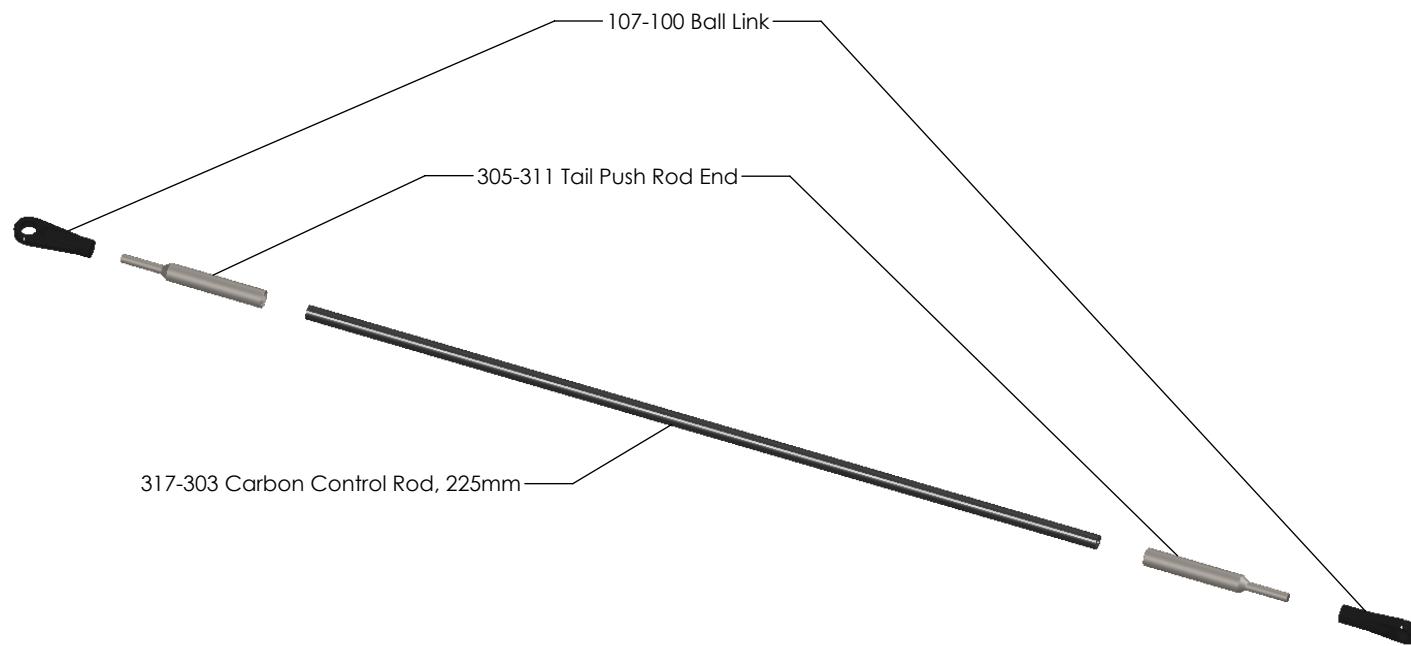


CCPM Linkage



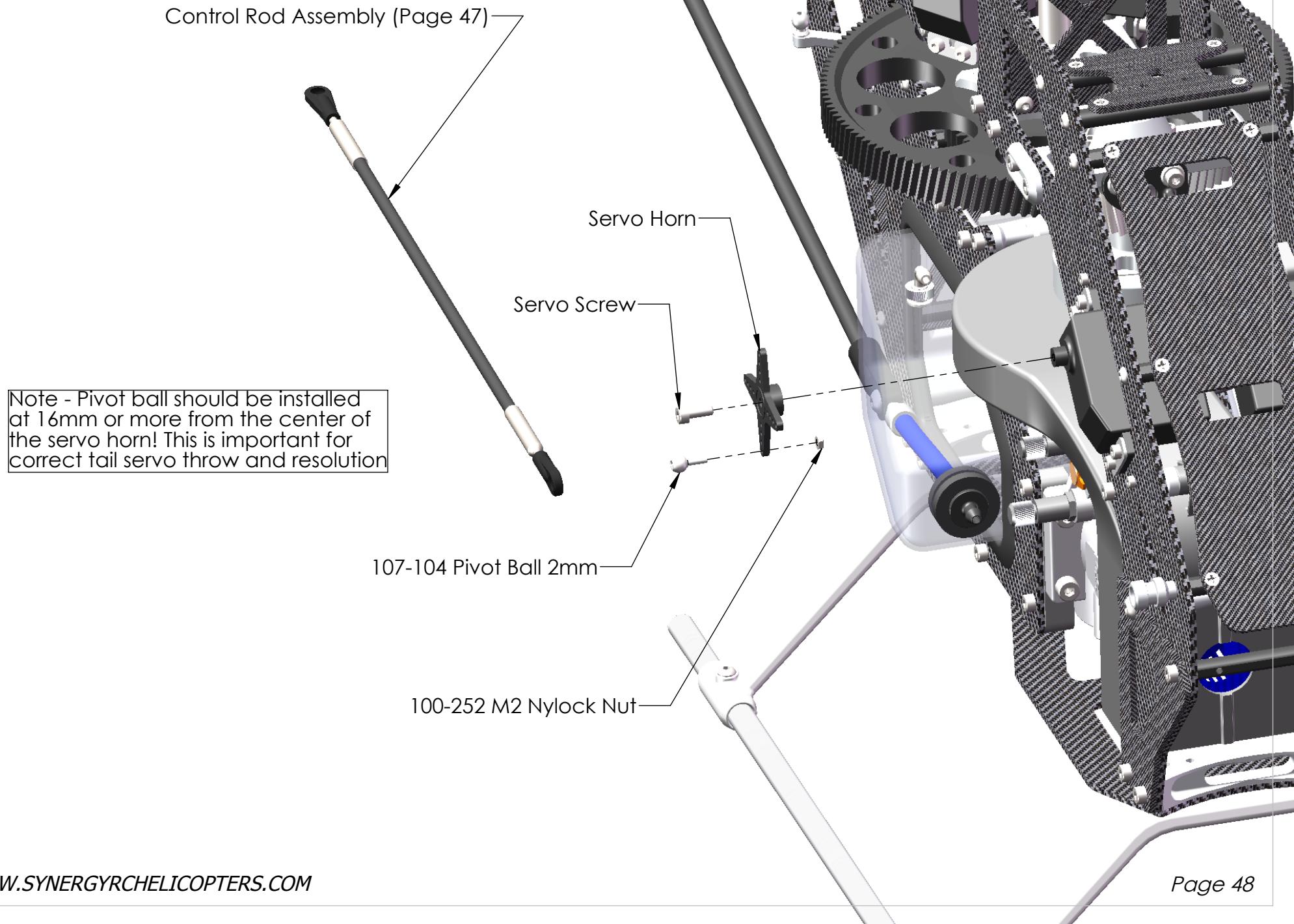
Front Tail Control Rod Assembly

IMPORTANT! - Tail Control Rod End must be secured with high quality glue such as JB Weld. We highly recommend long curing formulas for the best results. Do not use CA for this application! You will encounter failures!



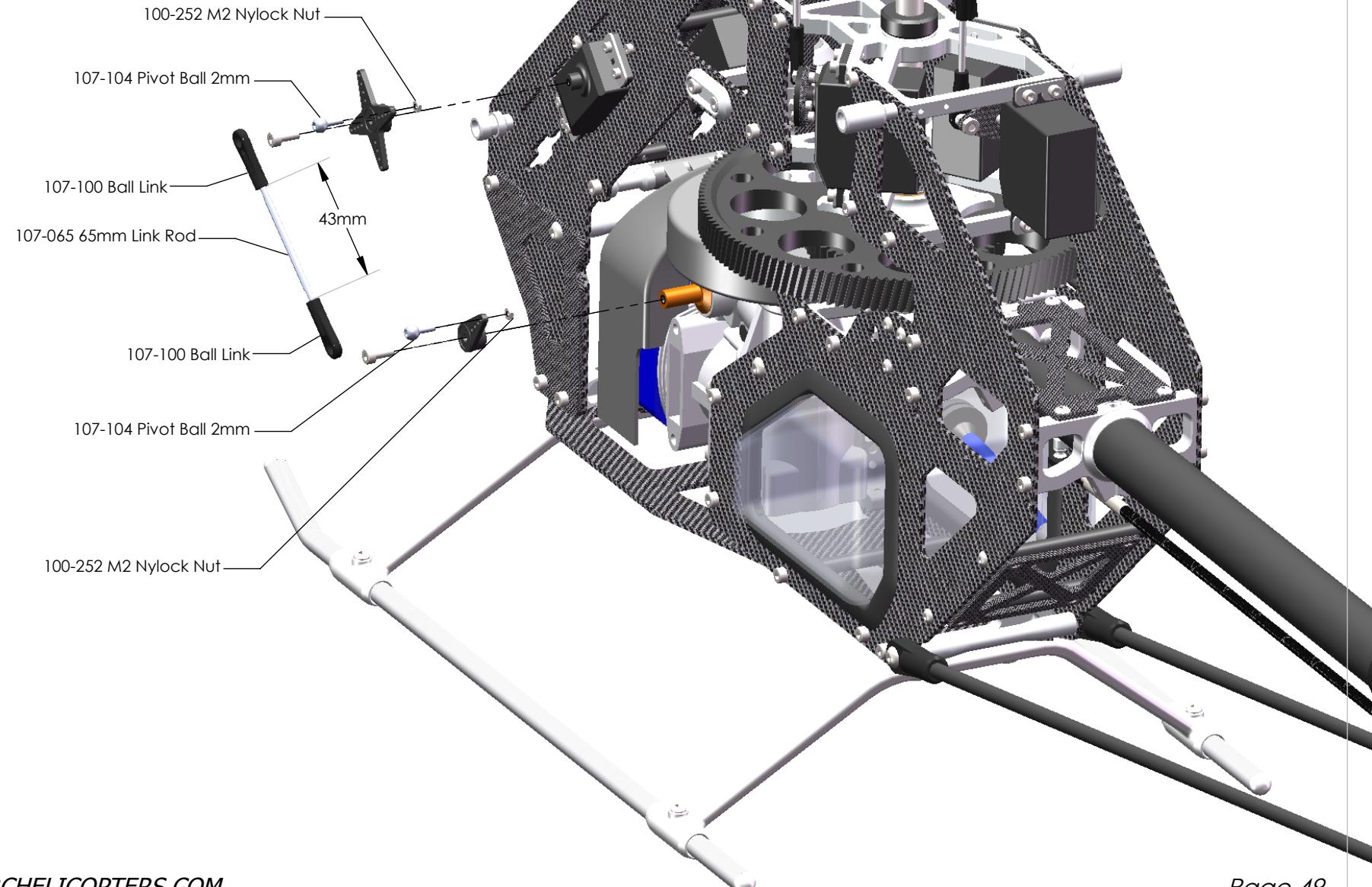
IMPORTANT! - Clean the inside diameter of the tail push rod ends with degreaser before gluing.

Front Tail Control Rod Install

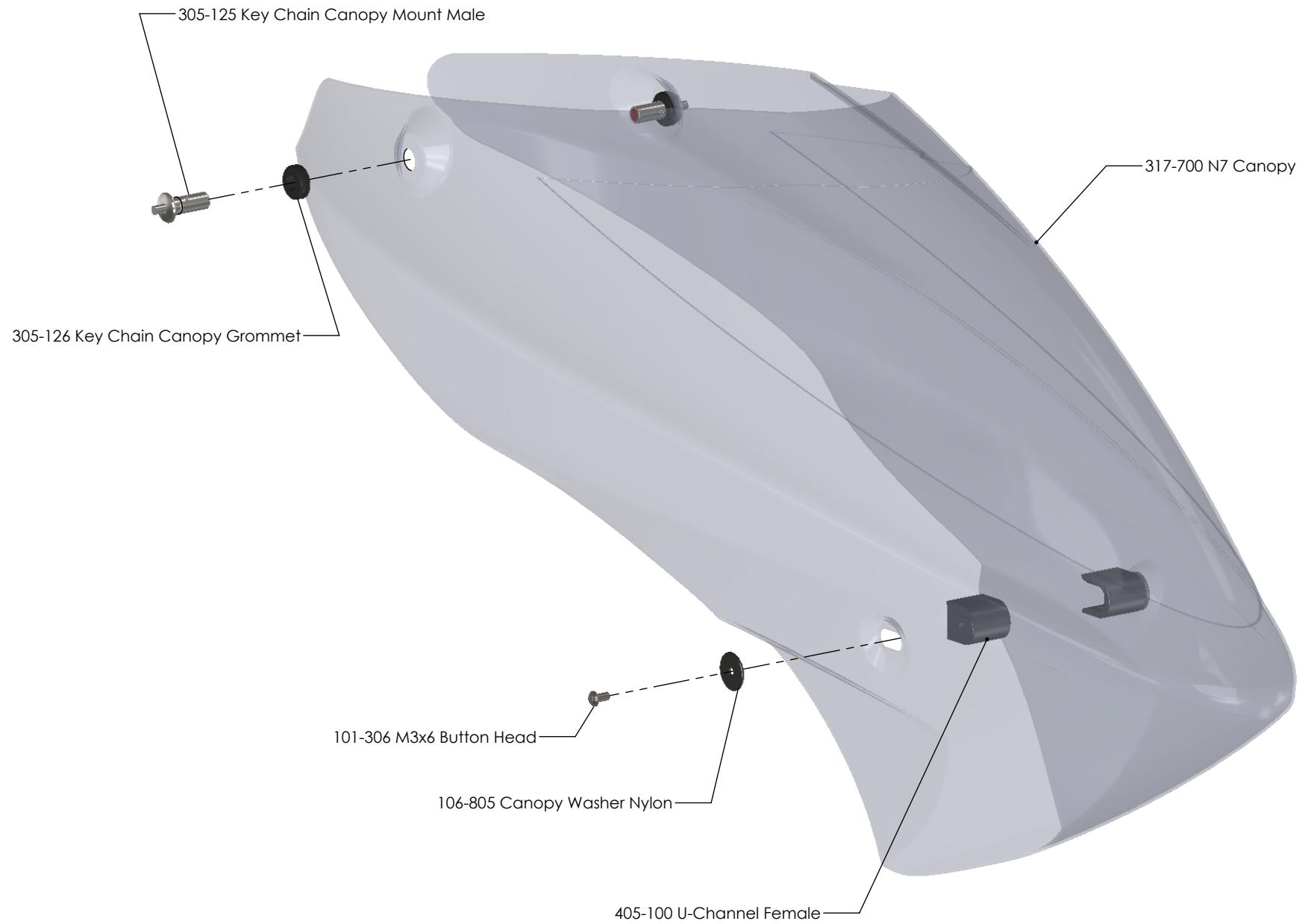


Throttle Linkage

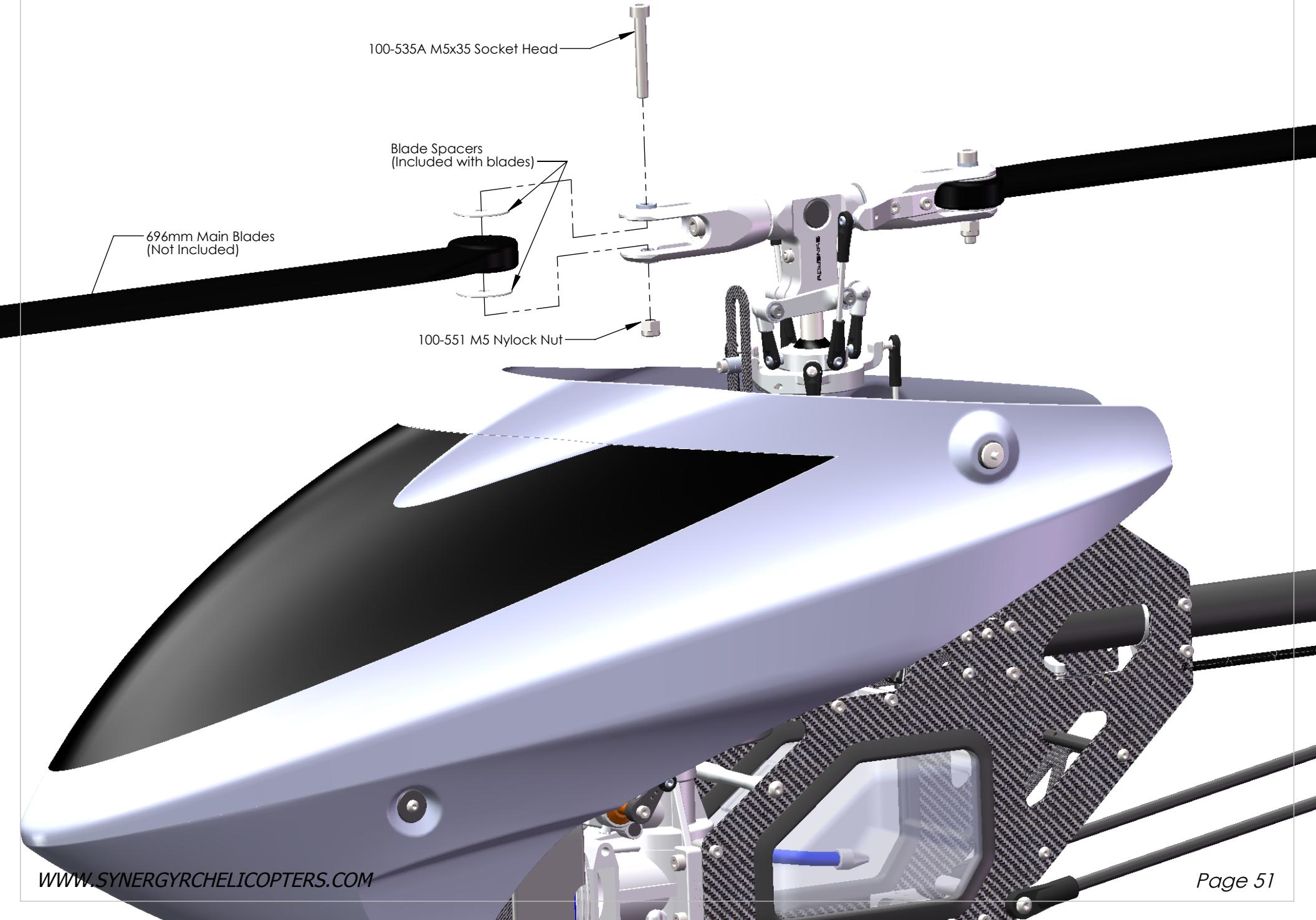
Note- Place 2mm pivot ball at 16mm from center of the plastic horn on both servo and carb barrel.



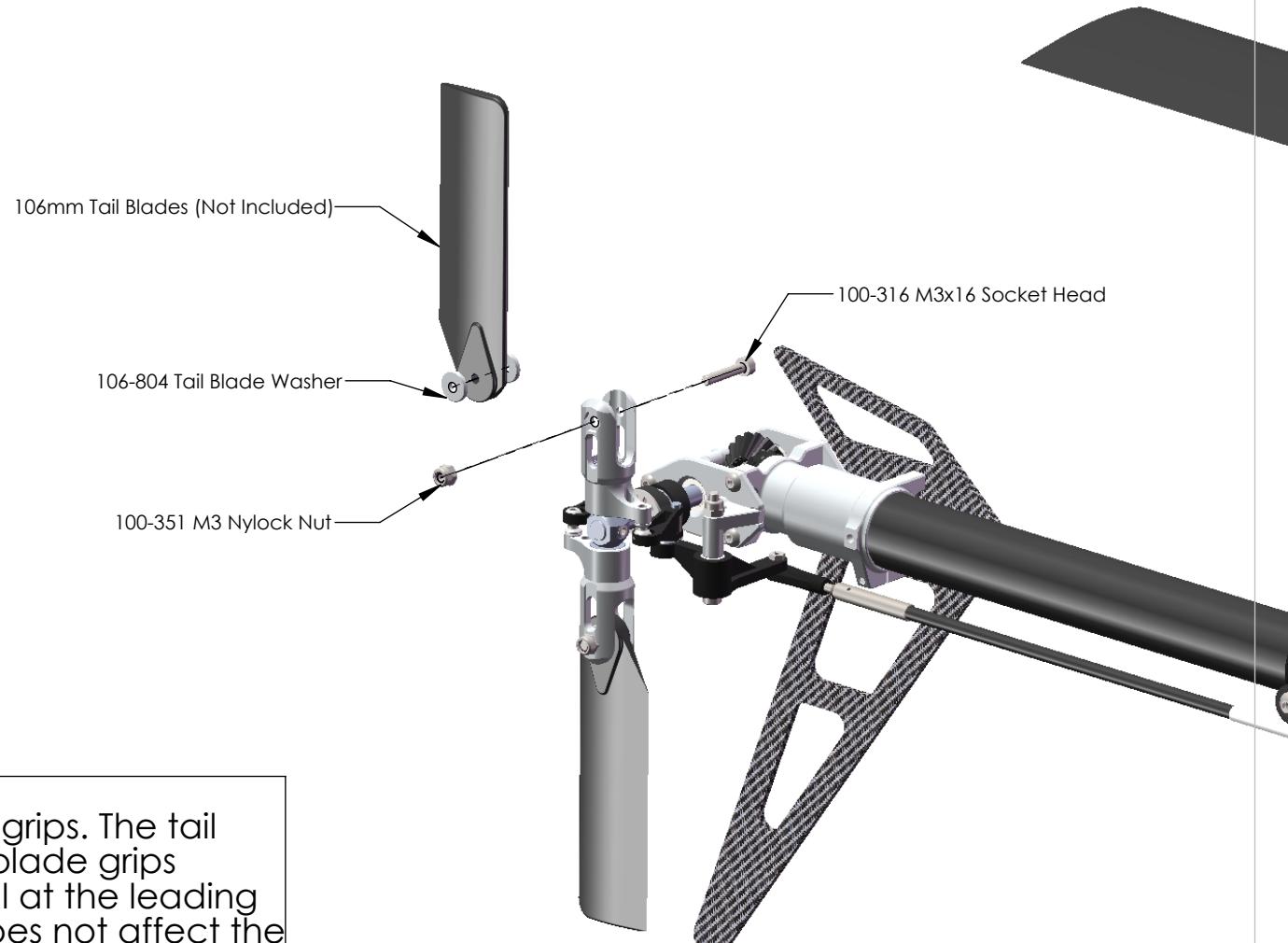
Canopy Assembly



Main Blade Install



Tail Blade Install



IMPORTANT!!!

Note orientation of tail blade grips. The tail will rotate clockwise. The tail blade grips should lead with the pivot ball at the leading edge of the tail blade. This does not affect the performance of the tail rotor in any way.

Measurements

