

# Octane Dominator 20

Pro/Sport Helicopter



## Instruction Manual



**Hobbies & Helis International**  
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*Think Quick,  
Think Quality!*

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## INTRODUCTION

Congratulations and thank you for the purchase of great product! It is our sole desire for you to enjoy the quality workmanship and performance of any of our helicopters. We believe we have the latest designs and technology incorporated into our model helicopters. Our CNC parts are produced using the best high density materials & anodized using material hardening finishes with the tightest of tolerances. Our new helicopters feature the latest advances in R/C helicopter design. The simple and mechanically superior EMS design (also known as CCPM) ensures a helicopter that will be more responsive and more stable than any other R/C helicopter you have ever flown. In the Gasser, three servos are attached in a push-pull system ensuring precise control. Frames are specially designed with "floating system" engine mounting. This new design eliminates most engine vibrations. The Gasser kit comes in 2 versions: Sport with G-10 composite frames and Pro with carbon fiber composite frames. Each frame is 3mm thick offering the utmost in rigidity and strength. This helicopter features a separately purchased kit allowing the owner to change the helicopter from a belt-powered tail rotor to a torque-tube-drive system. The owner may also purchase the helicopter initially with the torque-tube-drive system. Along with great products, our staffs are RC guys that fly and have hands on experience with total manufacturing & testing of our helicopters. In addition, we stand behind all our products 100% with satisfaction guaranteed. Our kits will be shipped 100% complete and we can assure you that once you fly your helicopter you will love it.

### Little Dominator 20cc

We believe you hold in your hands one of the best helicopters manufactured in the world today. The brand new Little Dominator is the newest version of our Big 26CC Gas Dominator. It has thicker 2.0MM frames and is a powerful machine. This baby delivers amazing power smoothly throughout the entire range of its gas engine. Its functions are very responsive and stable. The Little Dominator Pro version features a fully machined dual-spindle head, metal tail rotor, metal grips, carbon fiber frames, bigger carbon rudder push rod, carbon linkage rods, and carbon fiber boom supports. The Little Dominator Sport version features a G10 fiberglass frame, fully machined metal head, carbon boom supports, carbon rudder push rod, and molded tail blade grips. Our helicopters are carefully designed and tested, and manufactured of the highest quality materials available.

*In a short time, you can be flying.*

We ask that you please read the entire manual before starting the construction of the Little Dominator, and if you have any questions our technical support staff can be reached at

(610) 282-4811 M-F 9-6, S 9-4 Eastern time,  
or by email at [chuck@quickworldwide.com](mailto:chuck@quickworldwide.com).

For the latest information and updates, please visit our website at

[www.quickworldwide.com](http://www.quickworldwide.com)

## CUSTOMER SERVICE

<p><b>Quickworldwide</b> 201 South 3<sup>rd</sup>. St. &amp; 309 N. Coopersburg, PA 18036</p> <p><b>Phone:</b> (610)-282-4811</p> <p><b>Fax:</b> (610)-282-4816</p>	<p><u>Websites:</u> <a href="http://www.hhiheli.com">http://www.hhiheli.com</a> <a href="http://www.quickheli.com">http://www.quickheli.com</a> <a href="http://www.giantscaleplanes.com">http://www.giantscaleplanes.com</a></p> <p><u>E-mail:</u> Jon or chris or <a href="mailto:Irwin@quickworldwide.com">Irwin@quickworldwide.com</a></p>
<p><u>Office Hours:</u></p> <p>Mon – Fri: 8:30 – 6:00 Sat: 8:30 – 4:00 (Eastern Time)</p>	
<p><b>Technical Support Personnel:</b></p> <p>Irwin – <a href="mailto:irwin@quickworldwide.com">irwin@quickworldwide.com</a> Jon – <a href="mailto:jon@quickworldwide.com">jon@quickworldwide.com</a></p>	

## FEATURES

### Little Dominator

- 1. Frame Construction:** Little Dominator frames are made of the highest quality Carbon Fiber or Black G-10. These frames are not only thick and rigid but will provide excellent vibration absorption.
- 2. One-Way Hex Start Shaft System:** The one-way bearing allows the engine to continue to run after the starter motor has been stopped.
- 3. Constant Tail Rotor Drive System:** provides full tail authority during motor off maneuvers.
- 4. Belt Driven/Torque Tube Tail:** Smooth, reliable, and low maintenance.
- 5. High Quality Ball Bearings:** Little Dominator offers high quality ball bearings on all moving parts.
- 6. EMS Collective System:** The EMS Collective design allows ease of setup with fewer moving parts. EMS demonstrates overall design simplicity and represents the future of helicopter technology.
- 7. Heavy-Duty Clutch System:** Based on the same design as our famous heavy-duty clutch upgrade that fits most popular machines, this clutch will give many years of problem free operation.
- 7. Control Linkages:** The control linkages are high quality 2.3mm stainless steel rods with Delrin® acetyl resin ball ends. Pro version comes with 2.5mm carbon rods with CNC threaded ends.
- 8. Floating Engine Mount:** rigid but flexible, will absorb most of vibration.
- 9. Advanced Airfoil Fly-bar Paddles:** These paddles will provide the best flight characteristics for both 3D & Sport flying: Smooth forward flight, with quick response upon demand.
- 10. Rearward facing Engine Design:** This design provides quick access to the SPARK plug and is advantageous for easy engine removal.
- 11. Heavy-Duty Bearing Blocks:** Bearing Blocks are specially designed for this model. They couple to high quality bearings to carry and support all high speed moving operations.

## PRE-ASSEMBLY INFORMATION

### Warning

*The radio-controlled model helicopter contained in this kit is not a toy.* Rather, it is a sophisticated piece of equipment. This product is not recommended for use by children without adult supervision. Radio controlled models such as this is capable of causing both property damage and/or bodily harm to both the operator/assembler and spectators if not properly assembled and operated. Hobbies & Helicopter's assumes no liability for damage that could occur from the mis-assembly and/or use/misuse of this product.

### Academy of Model Aeronautics

We strongly encourage all prospective and current R/C aircraft pilots to join the Academy of Model Aeronautics. The AMA is a non-profit organization that provides services to model aircraft pilots. As an AMA member, you will receive a monthly magazine entitled Model Aviation, as well as a liability insurance plan to cover against possible accident or injury. All AMA charter aircraft clubs require individuals to hold a current AMA sporting license prior to the operation of their model. For further information, please contact AMA at:

#### *Academy of Model Aeronautics*

5161 East Memorial Drive

Muncie, IN 47302-9252

USA

Phone: (317) 287-1256

[www.modelaircraft.org](http://www.modelaircraft.org)

### Before you begin

Quick Helicopter kits are packaged with care and attention to detail. We recommend when you are ready to begin building this model that you examine the kit carefully, inspect the contents of each package, and read and understand these instructions thoroughly before starting assembly. It is suggested that you use the parts box for the small fasteners and hardware, that is now included in our packaging.

# REQUIRED TOOLS

 <p><b>HHI 7332 (4) piece Allen Driver Set</b> HHI 7052 Ball end drivers</p>	 <p><b>MAT 1001</b> Ball link pliers set</p>	 <p><b>HHI 7010</b> Bubble Balancer</p>	
 <p><b>HHI 7005</b> Shaft Checker</p>	 <p>Phillips Screw Driver</p>	 <p>Ball end drivers HHI7050,7051 + ¼ ADAPTER</p>	 <p><b>Pitch Gauge</b> <b>HHI7001</b></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">  <p>Universal Fly bar Lock HHI7040</p> </div>
 <p><b>Metric Ruler</b></p>	 <p><b>Hobby Knife</b></p>	 <p><b>Composite Paddle Guages</b></p>	
 <p><b>Needle Nosed Pliers</b></p>	 <p><b>Scissors</b></p>		

Dremel Tools and sandpaper would be helpful for building.








## HARDWARE & OPTIONAL ACCESSORIES

### GLUES AND THREAD LOCK COMPOUNDS

		
Ca Glue. ...GBG1	JB Weld...JBW8265S	Locktite. ....PT40

### RADIO MOUNTING ACCESSORIES

	
<b>Velcro Pads (VEL1)</b>	Receiver Hold down Straps HHI55** 2 pk \$4.99 (yellow, orange, Pink, Black) HHI55-4 4 pk \$8.99 (2yellow & 2orange or 2Pink & 2Black)
 <b>Wire Ties</b> HHIWT01X	 <b>Spiral Wrap</b> HHI2811 3' Combo Pk (3' small, 3' medium) HHI2812 5' Combo Pk (5' small, 5' medium)
	<b>HHI 2200</b> Receiver Strong Box



## ENGINES, SPARK PLUG, ENGINE KILL SWITCH AND EXHAUST SYSTEM

**ENGINES:** we recommend Zenoah G200PUH



Tuned Pipes  
TK4000

**MUFFLER**



Zimmerman TK 4005-2

**ENGINE KILL SWITCH**



## FUEL SYSTEM



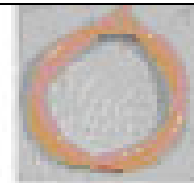
Fuel Filter Part # QUI9002



Tube Ends Part # QUI9001



Mini Cock Straight Part # QUI9



Dubro #505  
Tygon Fuel Tubing



Triangle Joint Part # QUI9

## OTHER HARDWARE & OPTIONAL ACCESSORIES



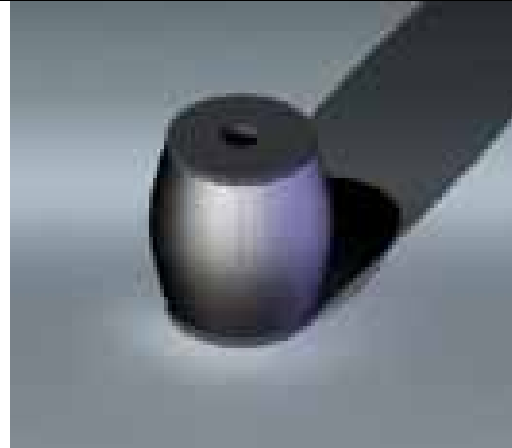
Servo Wheels  
HHI1010B(blue), HHI1010G(GOLD)



60 SIZE SKID STOPS  
HHI 200 AVAILABLE IN COLORS



SERVO ARM SET



HHI 2004B  
LANDING GEAR DAMPENERS



BASE LOAD ANTENNA  
HHI 53\*\*

AVAILABLE IN BLUE, GOLD, PURPLE  
AND IN 40, 50, AND 72 MHz

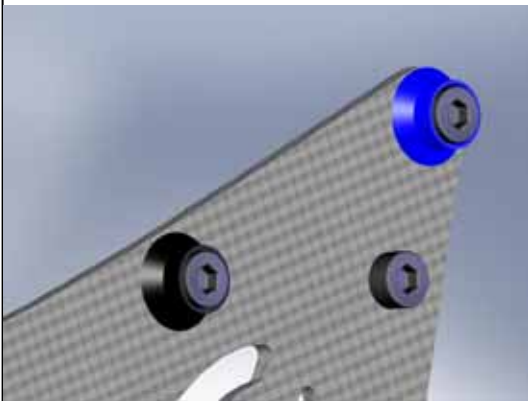
**FINISHING CAPS**

- Adds color and style
- Distributes force across larger surface area

**3mm**

**4mm**

(20 pcs in a package) (8 pcs in a package)



BLACK	HHIM11100B	HHIM11100
BLUE	HHIM11103	HHIM11108
GOLD	HHIM11101	HHIM11106
GREEN	HHIM11100G	---
PURPLE	HHIM11100	HHIM11105
RED	HHIM11100R	---
SILVER	HHIM11100	HHIM11107

## OTHER REQUIREMENTS

### Radios:

Any radio that supports EMS/CCPM Mixing will work fine.

Note: Please consult the instruction for your Gyro for setting the overall travel and limits to ensure proper operation and travel of Tail Pitch Slider.

### Servos:

Any premium, sport, or high quality servo will offer acceptable performance. However, because servos operate all critical functions of the helicopter, they can be the single most important component that contributes to proper function of the helicopter. Due to the nature of EMS collective, we suggest the use of digital servos to enhance and ensure matched servo timing without servo interaction.

### Loctite Warning (CRITICAL):

**This is a general warning about the use of Loctite and its importance. *Loctite must be used anywhere that a metal fastener* i.e. (M2, M3, M4 Cap Head Bolts, Set Screws etc.) *is threaded into a metal part* i.e. (Bearing Blocks, Cross-members, etc.). Failure to use Loctite can result in loosening of critical operating components, loss of control of the model, and can lead to a crash.**

## PART LIST

- In your kit, parts are bagged according to each major assembly and are labeled “Bag 1, Bag 2, etc.” You will note that the heading for each assembly indicates which bag correlates with each assembly.
  - For a good installation, only open up the bags that you need for particular assembly.
  - Please check the parts in that bag against the parts list shown for each assembly as well as each subassembly to make sure there are no missing parts.
  - Small parts such as nuts and bolts can be put into containers or trays to prevent losing parts.
  - Part No. with \*\*\*\*\* means that part is not included in the kit.
  - The colors of drawings and appearances of parts in this manual may look different from the parts you have in the kit.

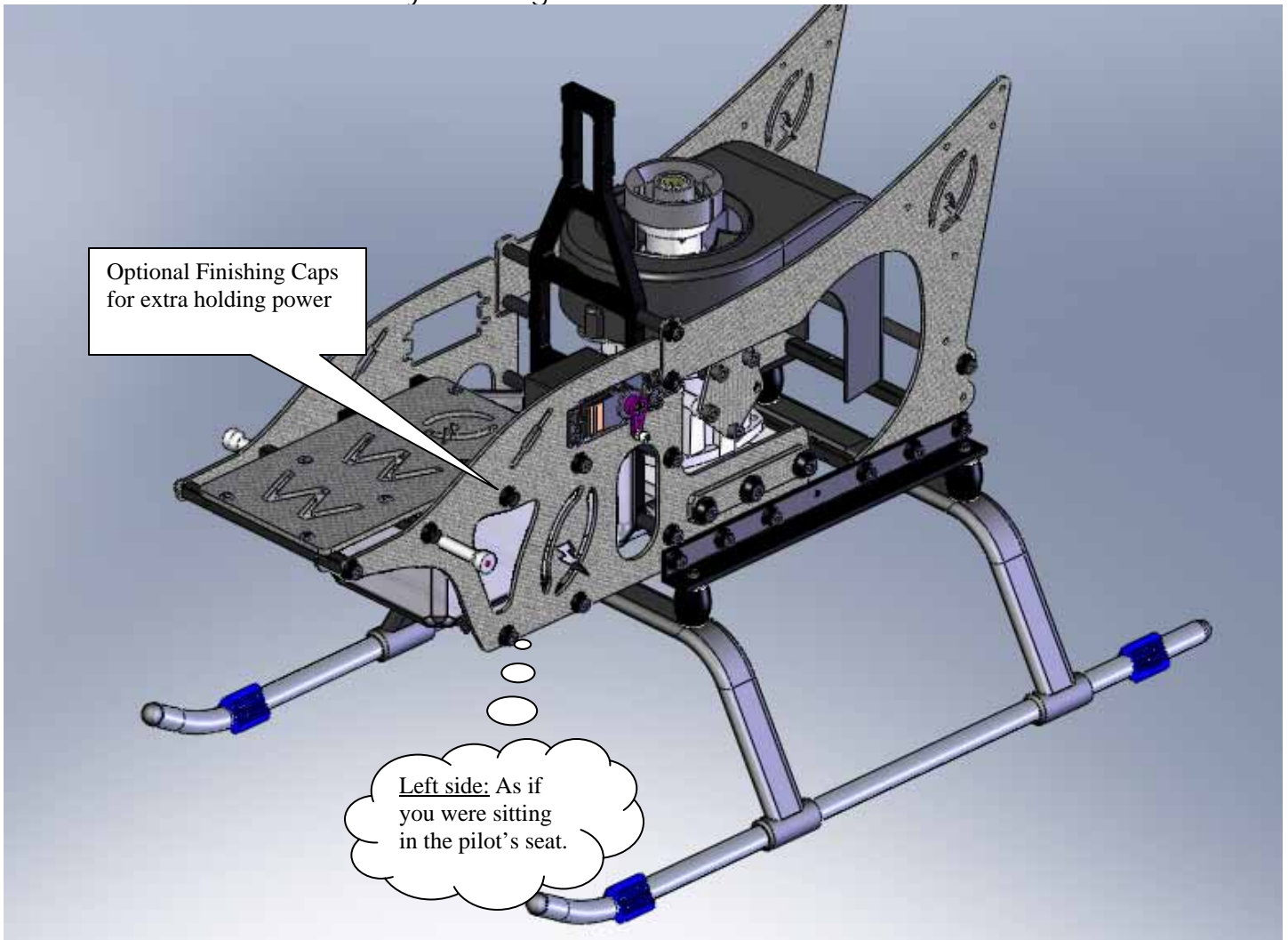
No.	Bag No.	Description	Qty	Check
1	Bag 1	For Upper Frame Assembly	1	
2	Bag 2	For Lower Frame Assembly	1	
3	Bag 3	Landing Gear	1	
4	Bag 4	Driving System	1	
5	Bag 5	For Tail Assembly	1	
6	Bag 6	Control System	1	
7	Bag 7	Head Rotor	1	
8	Bag 8	Linkage	1	
9	Frame	Frame	1	
10	HB	Hardware Bag	1	
11	Loose in Box	Canopy	1	
		Carbon Rudder Push Rod	1	
		Carbon Boom Support	2	
		2.5mm Carbon Linkage Rod	3	
		Tail Timing Belt	1	
		Tail Boom	1	
		Fly bar	1	
		Fuel Tank and Accessories	1	
		Decal Sheet	1	
		Instruction CD	1	
Canopy Template	1			

# Step 1

Read the entire manual to become familiar with the layout of the machine and these instructions. Verify the parts in each bag with the Pick list that came with your kit. Be careful to set up a good work area so parts do not get lost and always reseal the bags when you are finished working or have taken out the parts you plan to install in the current work session.

Secure and organize the tools you need at your work area so they are close by when you need them, you will thank yourself later. Check the assembly table for each section to find the tools and parts you will need before you start.

It is easiest to build the main assembly in the order given here although separate sub assemblies such as the head, washout, swashplate, and tail assemblies can be built at any time and set aside for when you need them for the main assembly. Shown below is the finished Lower frame assembly with engine installed.



## Step 2

Check and layout the parts for the lower frame assembly. The table below shows the parts and tools necessary for this work session. Building this part first will give you a strong base for the entire assembly. It will help to keep your hands free eliminating the need for a third hand.

ITEM NO.	QTY	PART NO.	DESCRIPTION
1	1	QF654	Little Dominator Bulkhead
2	8	QFG018	Frame spacer
3	2	QFG004B_LD	Lower Front Frame Little Dominator
4	2	QFG006LD	Little Dominator Lower Frame
5	2	QF604	Frame Angle
6	4		Fuel Tank Frame Assembly
7	1	QFG015C_LD	Radio Tray Carbon
8	2	QFG014	3X6X100 SQUARE CROSS MEMBER
9	4	QFG009	100MM CROSS MEMBER
10	1	QF501A	Q-50-60-70-90 GAS TANK
11	1		Servo and Throttle arm
12	2	QF328FL	M3x6x28 Short Canopy standoff
13	32	HHI3M08C	DIN912-12 M3x8 SHCS
14	4	HHI3M25C	DIN912-12 M3x25 SHCS
15	6	HHI3MFLN	M3 Flat Locknut
16	8	HHI3M06FH	3mm x 6mm Flathead screws

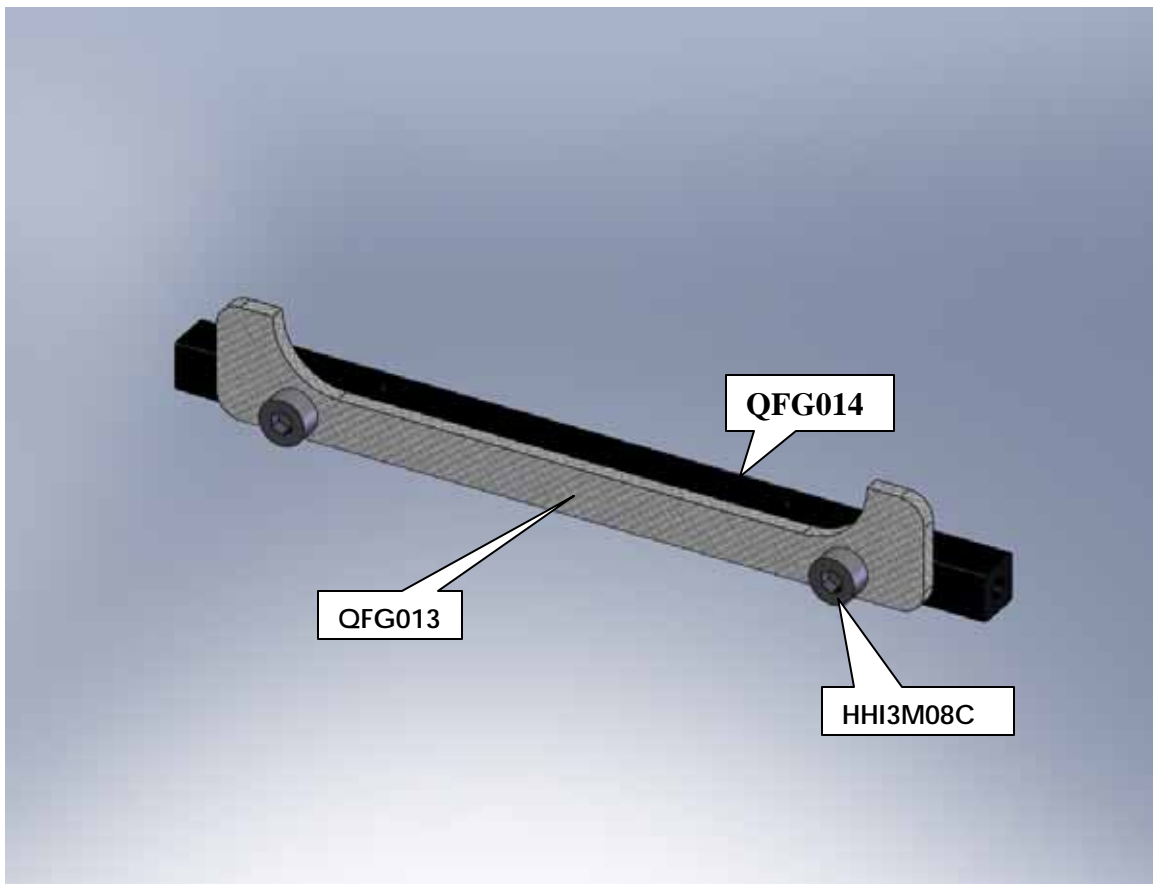
ITEM#	TOOL
1	3mm SHCS Allen Head Driver
2	3mm Nut Driver



## 2-1 FUEL TANK SUB FRAME ASSEMBLY

No.	Part#	Description	QTY
1	QFG014	M3X100 Square Cross	4
2	QFG013	Fuel Tank Sub frame	4
3	HHI3M08C	M3x8 Cap Head Bolt	8

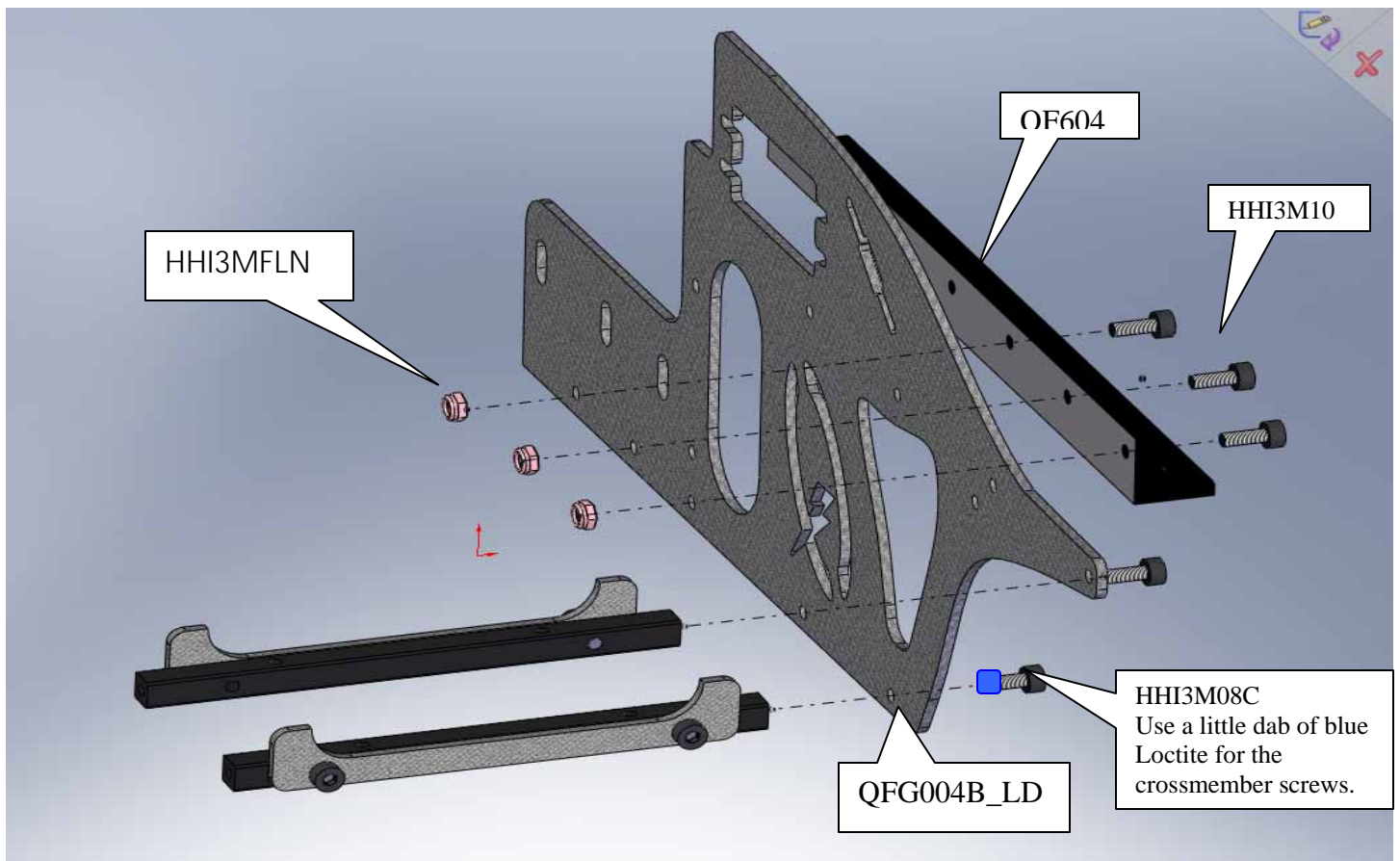
Assemble the frames to the crossmembers with 2-(3mm x 8mm SHCS). [Fuel Tank Frame Assy.avi](#)



Set these aside and proceed to step 3.

## Step 3

Attach the gas tank assemblies to the right lower frame with two 3 x 8mm SHCS as shown below. Be sure to face them away from each other as it will make the area that touches the tank larger and more stable. Use a frame angle or any flat surface to press against the bottom of the crossmembers making them aligned parallel to each other as you tighten them. Now the frame piece will stand up while you work on it. Next attach the frame angle through the first three holes of the frame angle and the last three holes of the frame. Use 3 x 8mm SHCS for the nuts and a 3mm locknut as shown below.

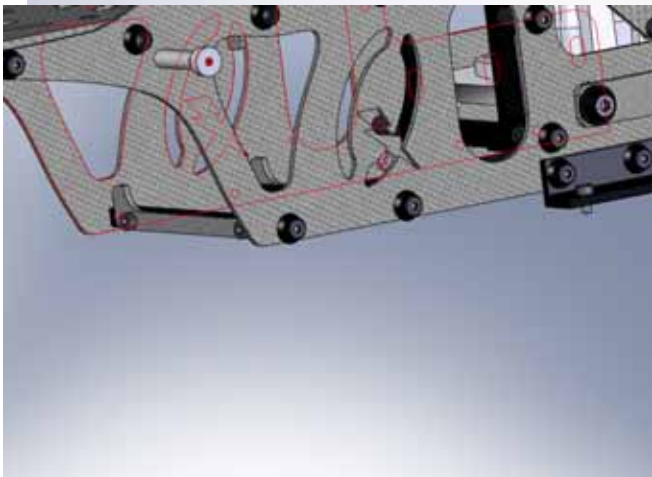
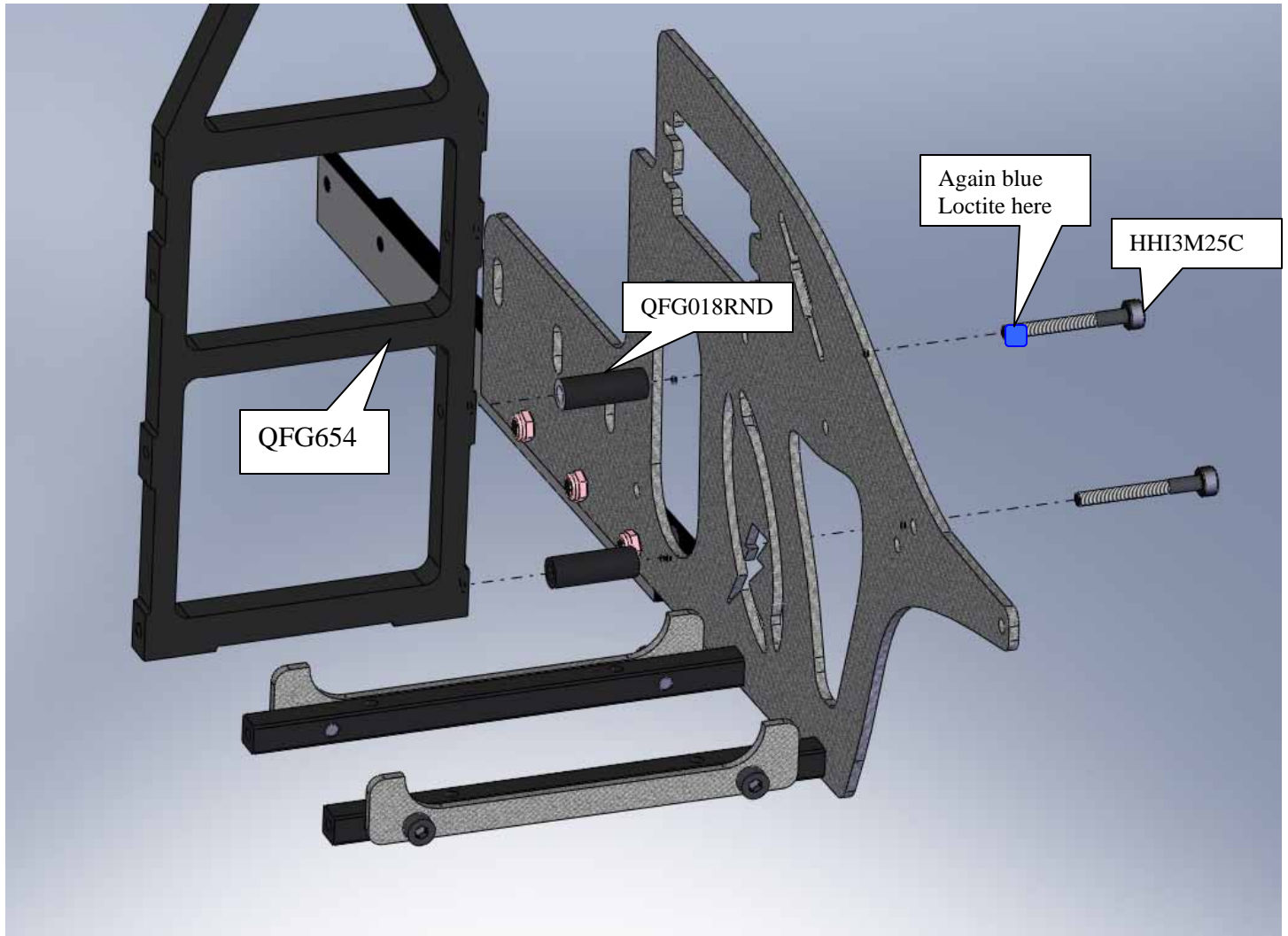


[Lower Frame Assembly\(step 2\).avi](#)

## Step 4

### Attach bulkhead to left side of frame:

Insert 3 x 25 mm screws through holes as shown. Put a standoff QFG018 on each one and thread into bottom two holes of bulkhead.

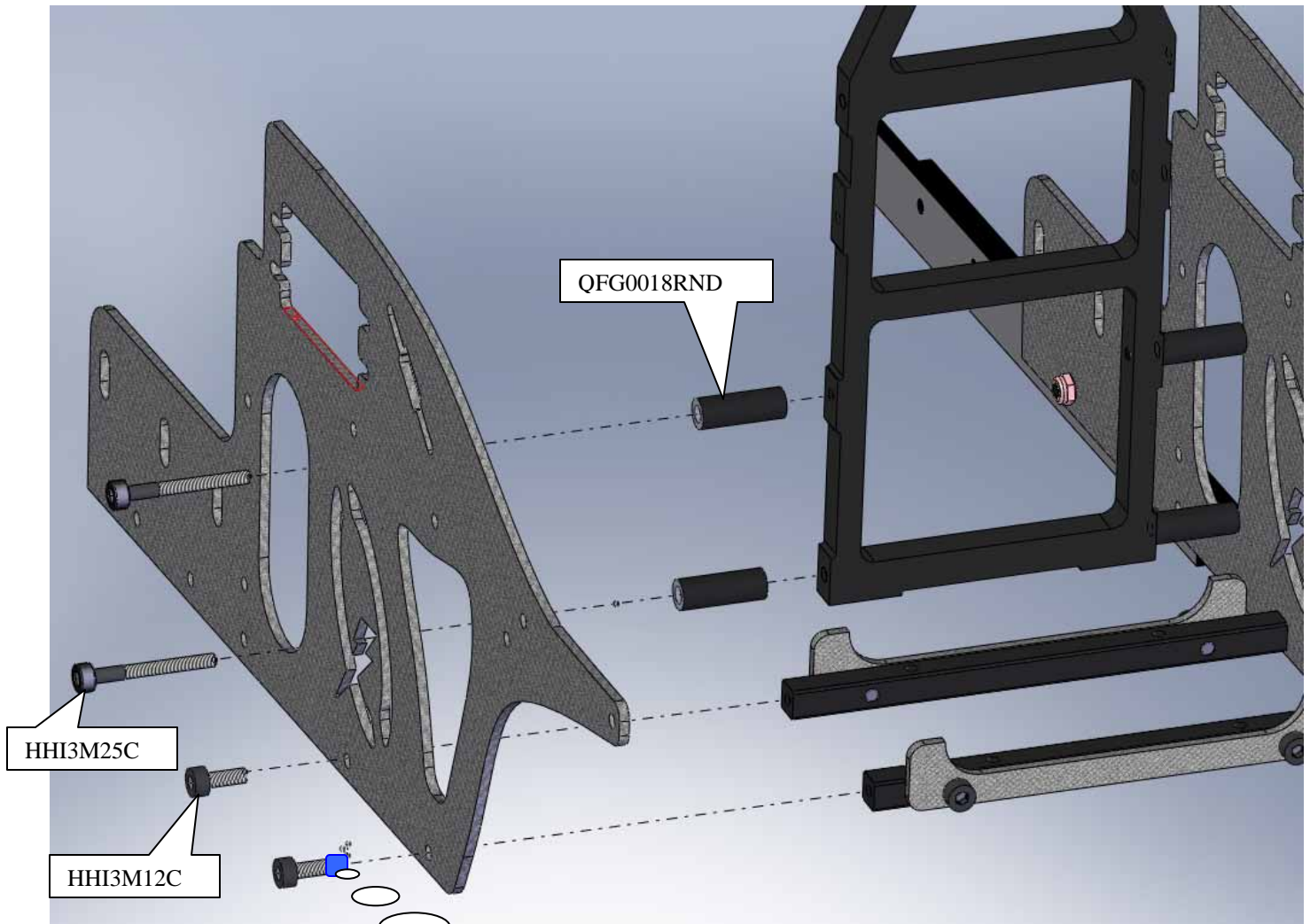


Shown to the left with finishing Caps applied to the frame and frame angle.

## Step 5

### Attach right side of frame:

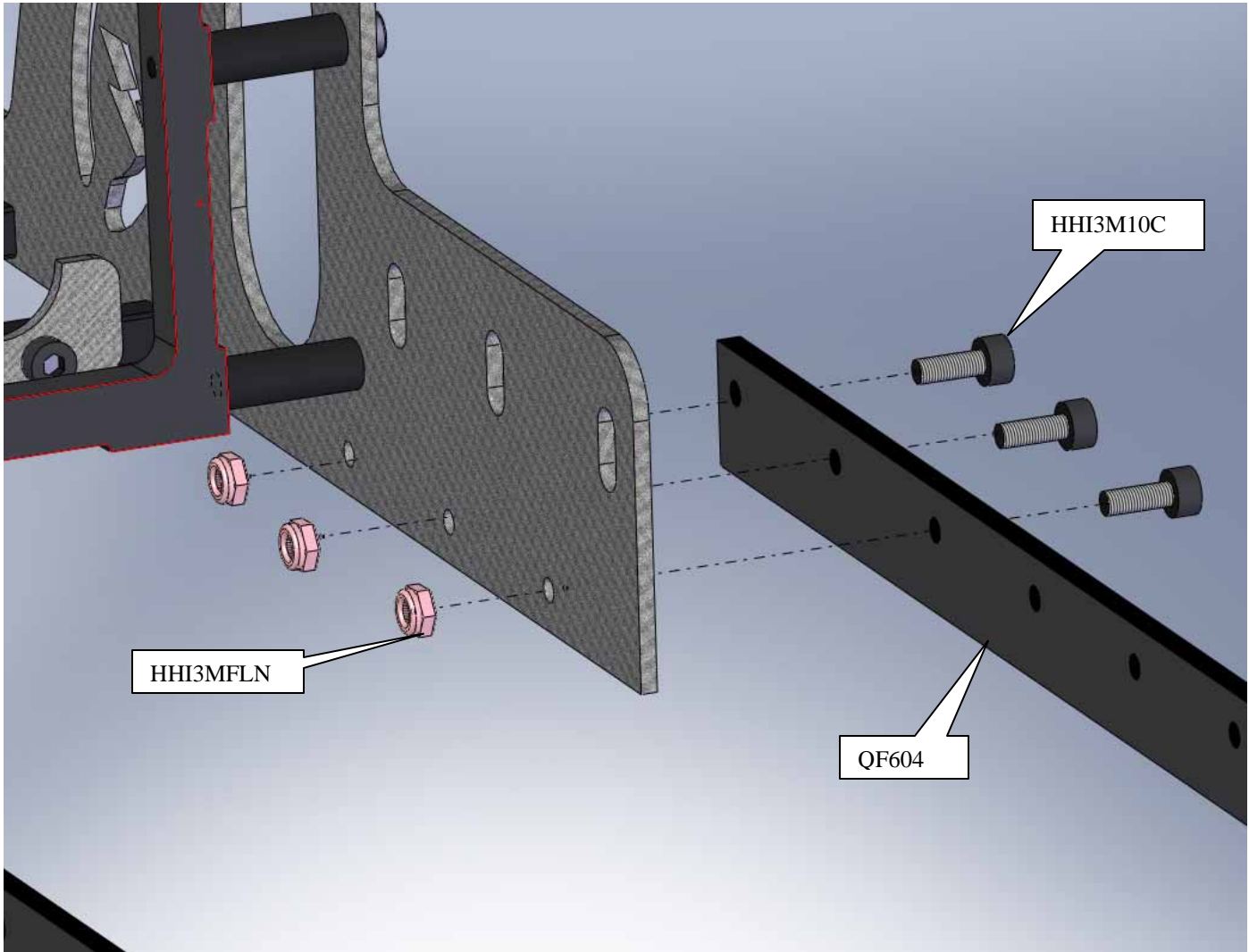
Take right side of frame and insert two 3mm x 25mm screws as shown. Slide on the standoffs and attach to bulkhead. Insert screws for fuel tank sub assemblies and the lower frame will now stand on its own, giving you a solid base from which to build.



## Step 6

### Attach Right Side Frame Angle:

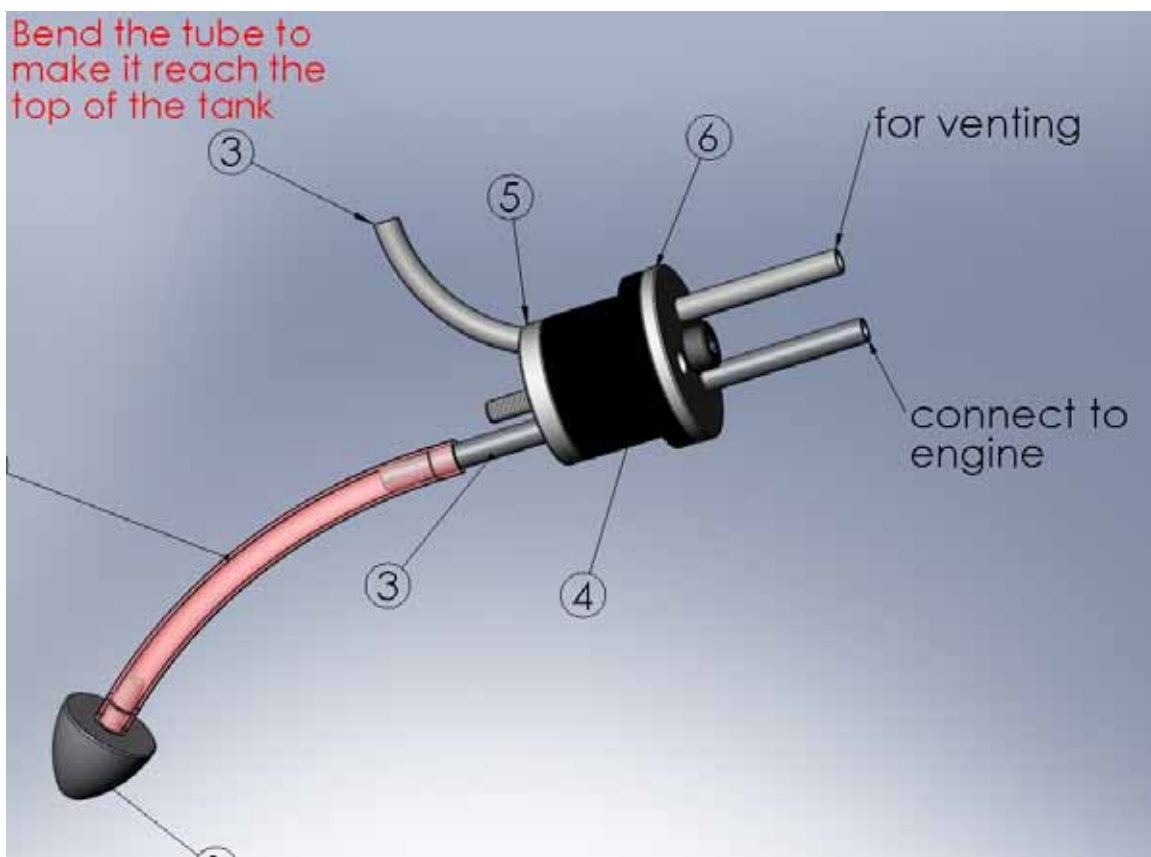
Insert 3mm x 12mm socket head cap screw through third hole in right side frame angle, then through the last bottom hole in the right side front lower frame, then thread into cross member 3. Insert a 3mm x 8 mm SHCS through the holes as shown and assemble with 3 mm flat locknuts.





## 2-2 FUEL TANK ASSEMBLY

No.	Bag#	Description	
1	In box	Tank Clunk	
2	In box	Medium Tygon Hose(gasoline line)	
3	In box	Long Tube	
4	In box	Tank Rubber Plug	
5	In box	Short Tube	
6	In box	Tank Fuel Plug Bottom Flange	
7	In box	Tank Fuel Plug Top Flange	
8	In box	M3x25 Cap Head Bolt	
9		Fuel Tank	

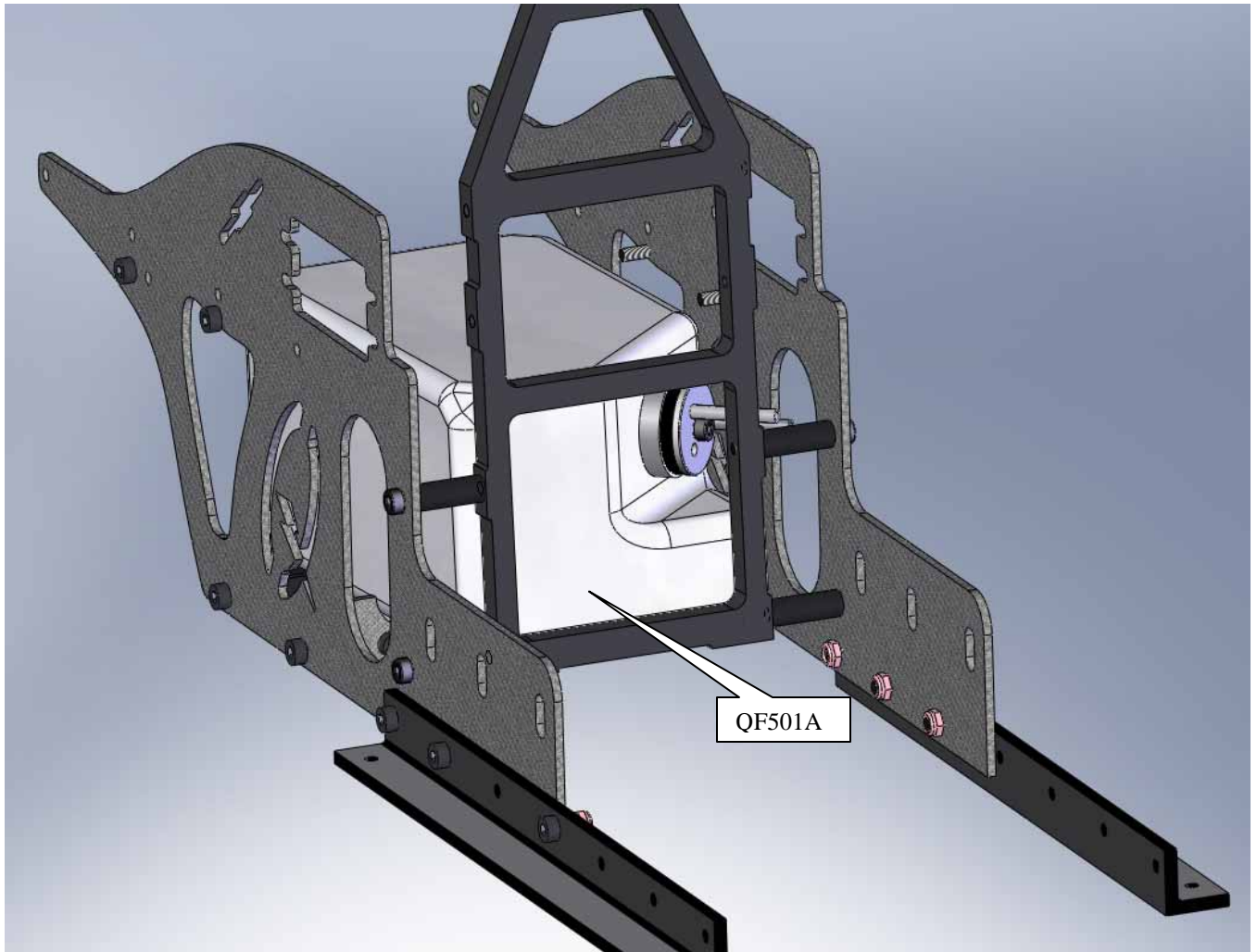


- There are three (2) lines (Aluminum fuel tubing) that need to be constructed for the tank assembly. One line is the fuel pick-up line and requires a length of tubing for gasoline use running from end of alum. The other line is venting line, which should be bent to reach the top of the tank on the inside. You can use the same pick-up line for refueling line by inserting a T connector (Triangle Joint) in the line. Tighten M3x25 Cap Head Bolt but do not tighten too much.
  - Insert the whole construction into the Fuel Tank. Continue tightening M3x25 Cap Head Bolt but do not over tighten or you will ruin rubber stopper!
  - Do not use filter on fuel line to engine.

### Lay Fuel Tank into frame:

Insert fuel tank onto the bottom fuel tank sub assemblies. Frames should be facing away from each other to give them a wider holding area.

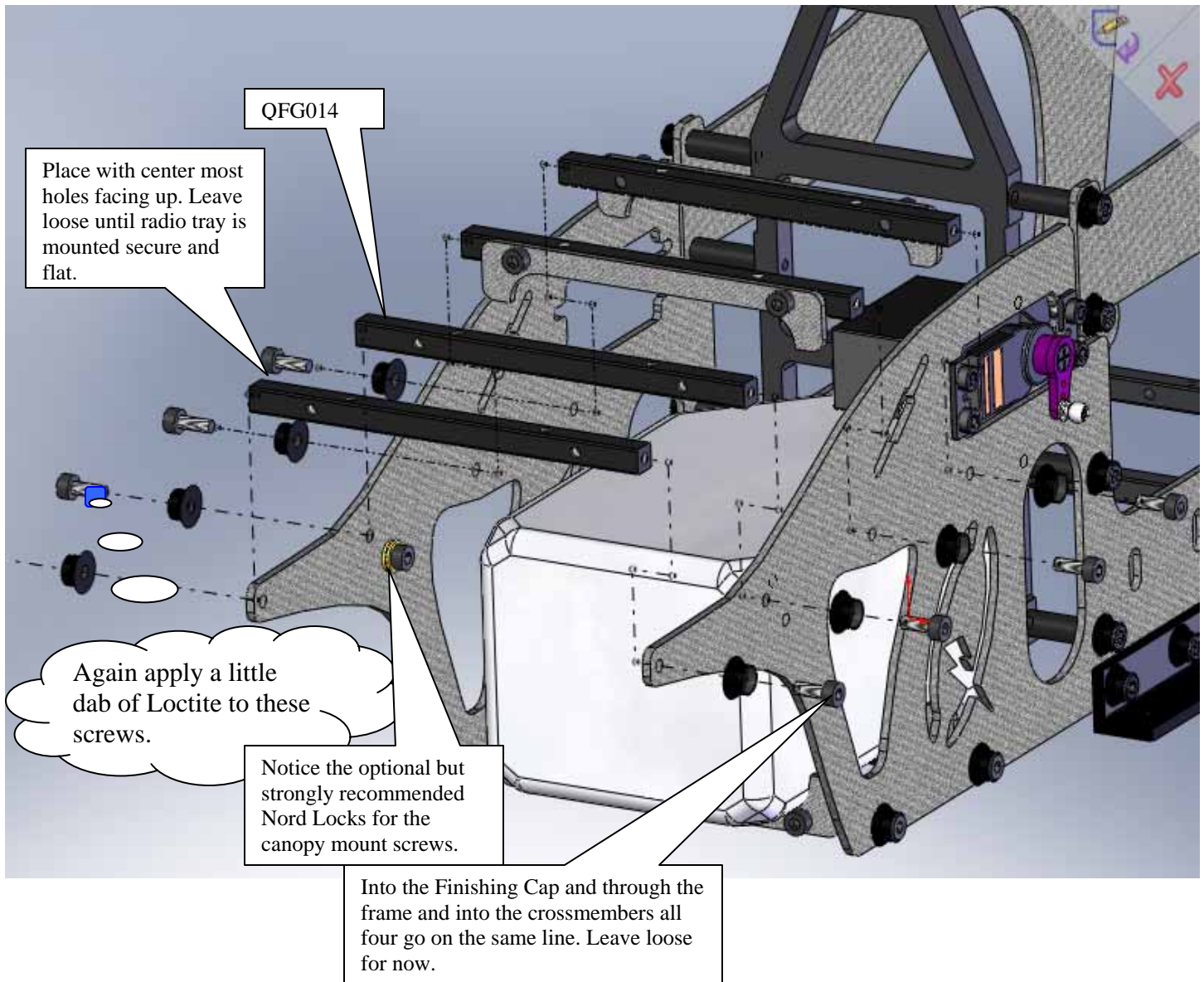
The fuel tank sits in place as shown below:





## Step 7

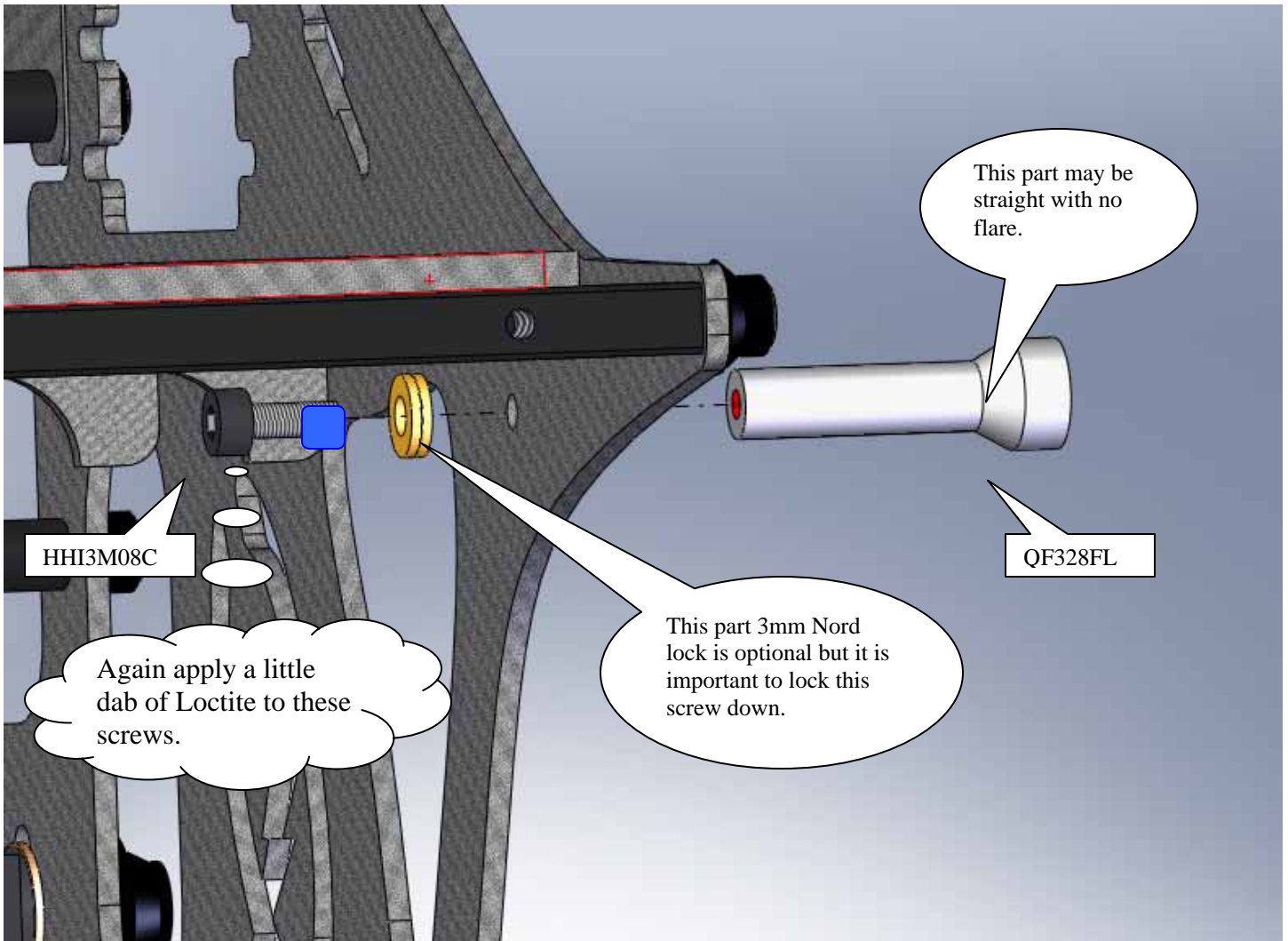
Insert the upper fuel tank sub assemblies with the four 3mm x 8mm screws as shown below. Be patient, it is a tight fit. Leave the screws slightly loose until the radio tray is installed this will ensure that the radio tray lays flat on the four crossmembers and the flathead screws seat nicely. Next install the front two crossmembers along the same line as the tank frame sub assemblies.



## Step 8

### Attach cross members 4 and 5:

Insert a 3mm x 8mm SHCS from the inside of each frame piece to attach the canopy standoffs as shown to the holes directly under the cross member holes.

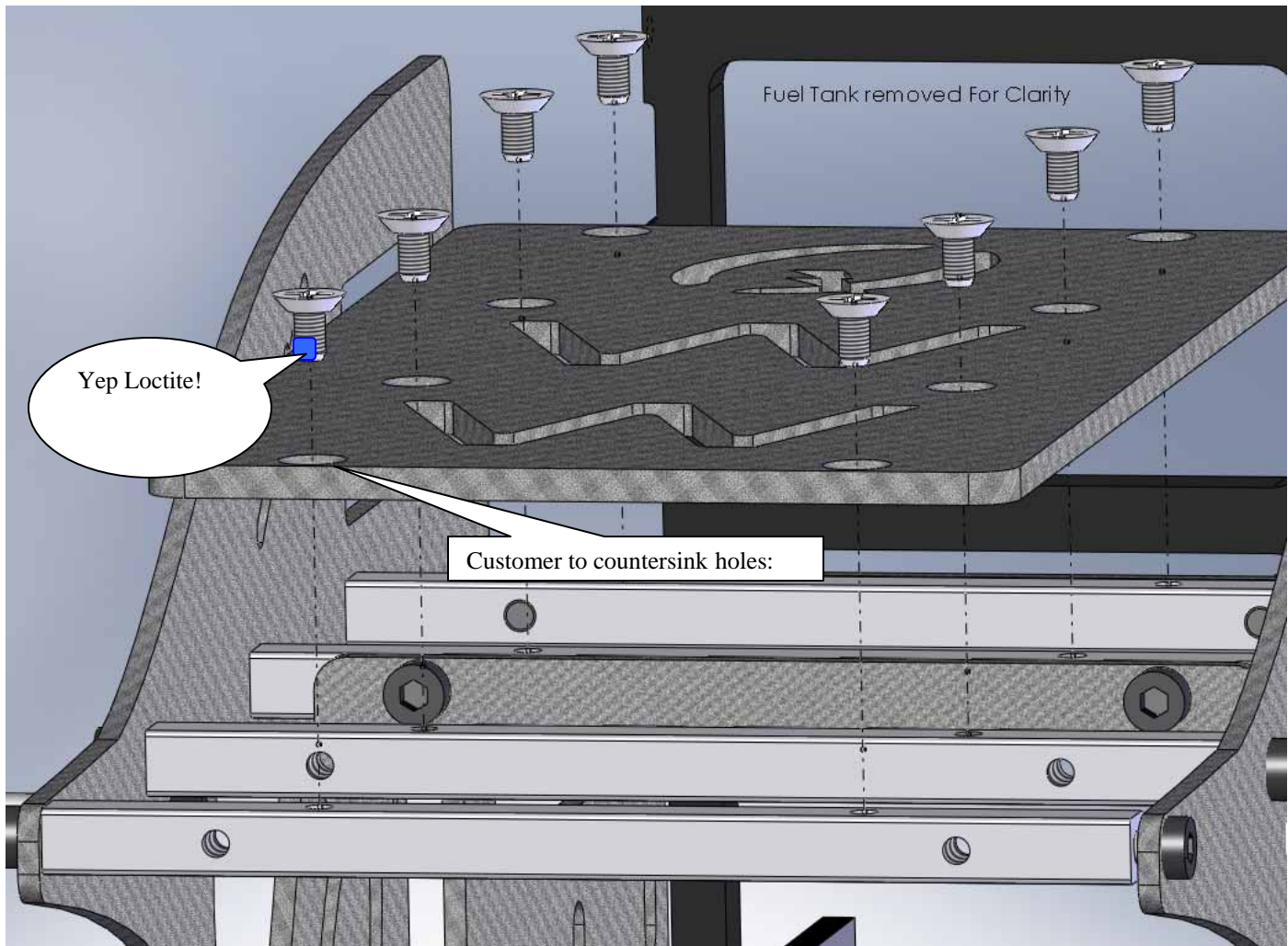


## Step 9

### Install radio tray:

If not already done, you must prepare the radio tray for the flathead screws by beveling the holes with a 45 degree countersink bit. If using a drill press, set it up with the bit lowered to any hole and drill in small increments until you reach the proper depth then set the depth stop on the drill press for the rest of the holes.

Use (8) 3mm x 6mm Phillips flat head screws to install the radio tray to the crossmembers members and upper fuel tank assemblies. Tighten them and then finish tightening the previously left loose crossmembers member screws. The radio tray and tank should be flat and secure now.

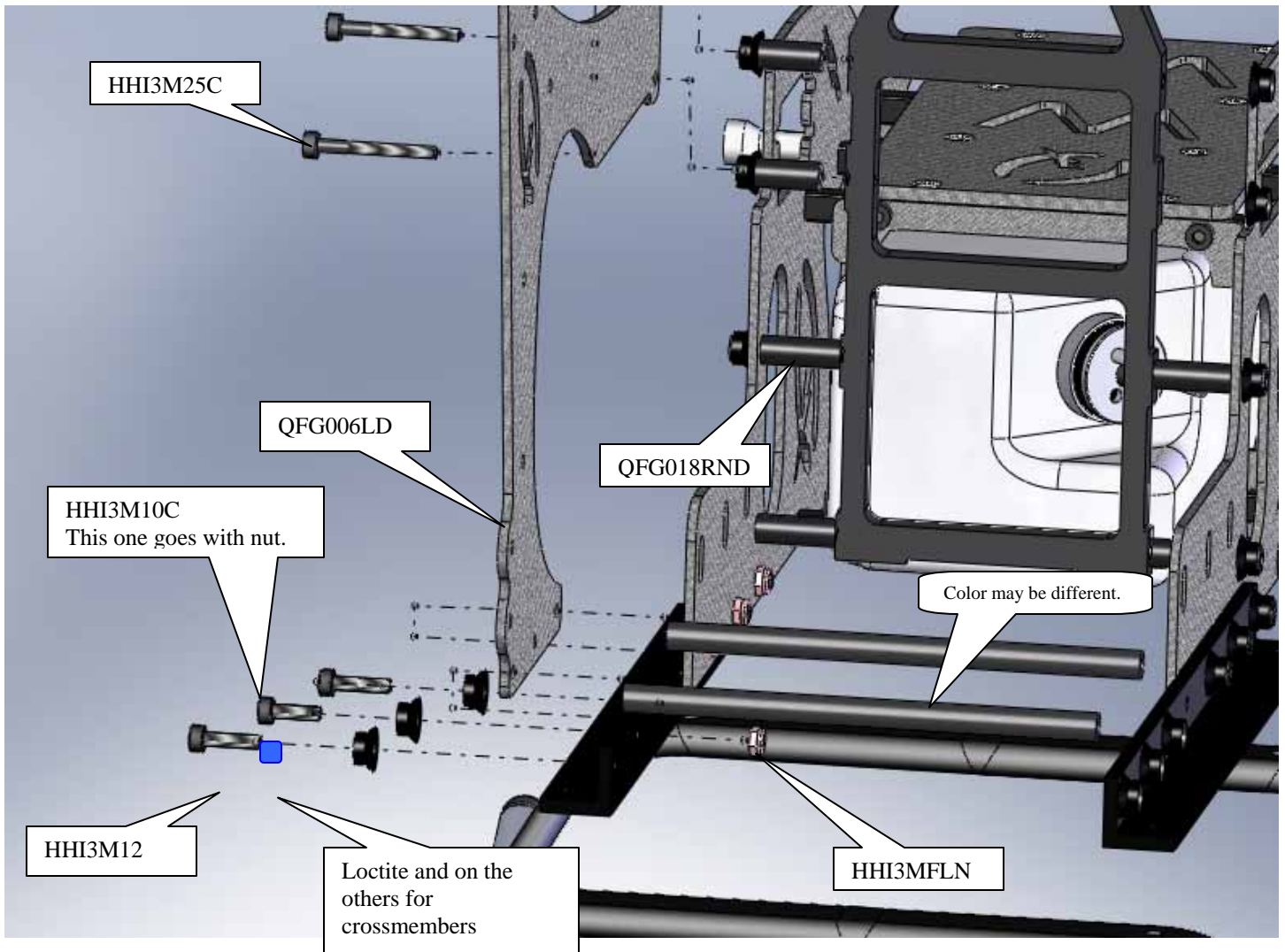




# Step 10

## Attach Left Rear Frame:

Slide the back end of the left rear frame behind the left frame angle. Mount the front of the left rear frame through the holes shown with (2) 3mm x 25mm SHCS. Leave them slightly loose until all screws are in for the piece. Insert (2) 3mm x 8mm SHCS through the back two holes and the frame angle and secure with 3mm flat locknuts. Insert a 3mm x 12mm SHCS through the frame and the frame angle into the cross member. Tighten all screws except the cross member screw.

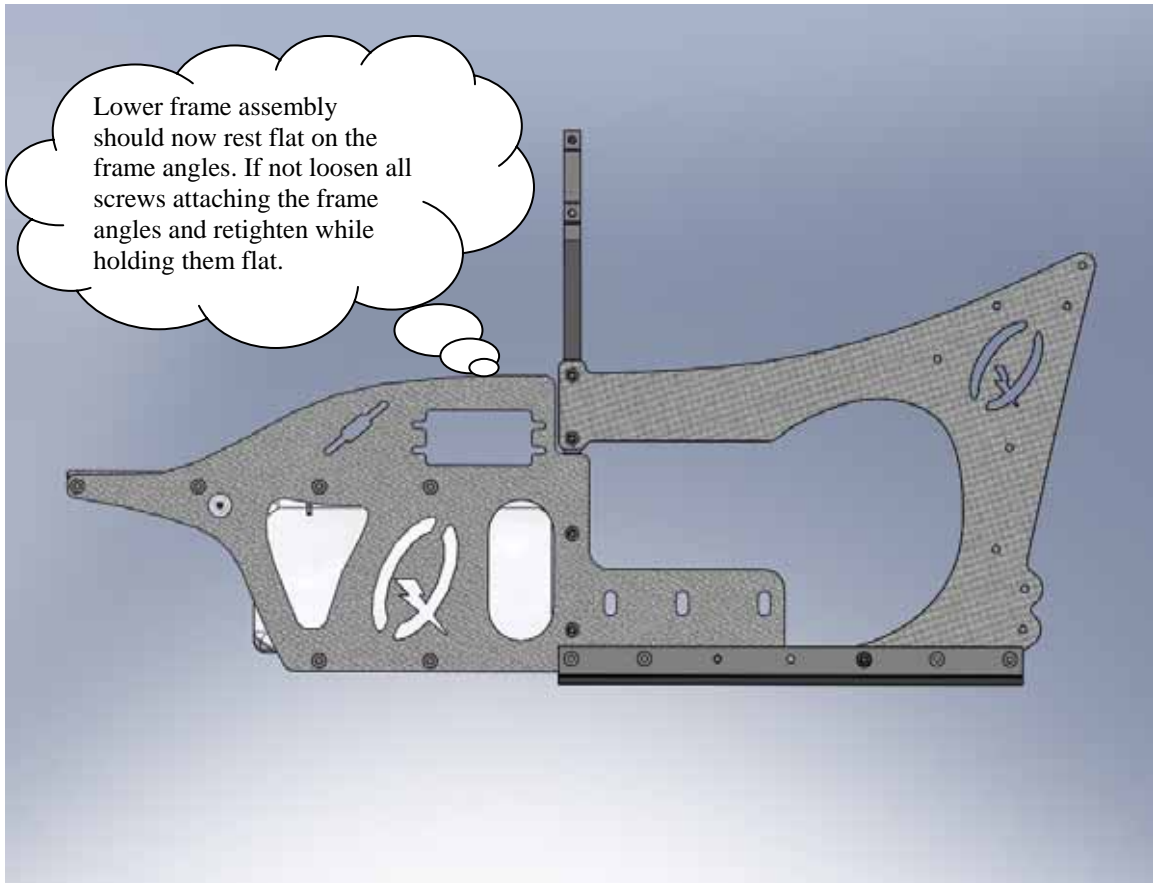


Loctite wherever you see this symbol

## Step 11

### Attach right side rear frame:

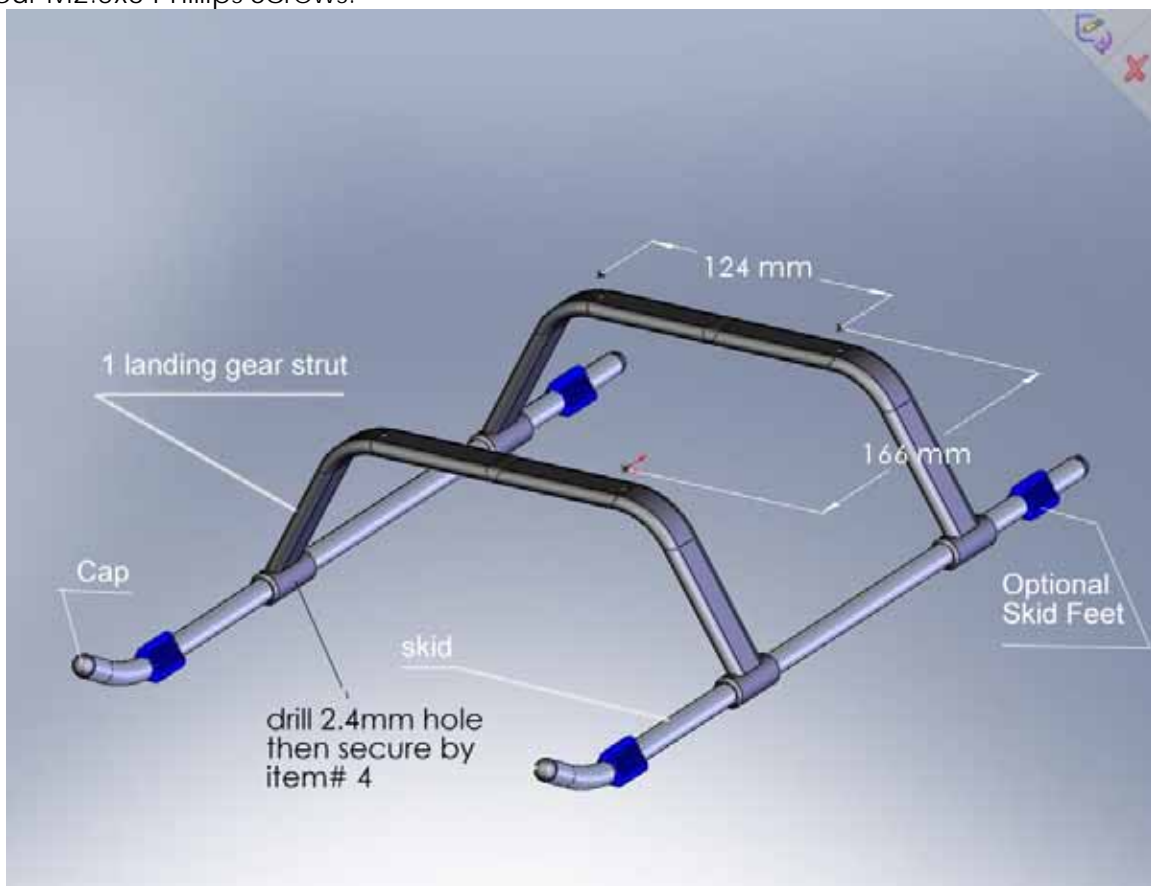
Slide the back end of the right rear frame behind the right frame angle. Mount the front of the right rear frame through the holes shown with (2) 3mm x 25mm SHCS. Leave them slightly loose until all screws are in for the piece. Insert (2) 3mm x 8mm SHCS through the back two holes and the frame angle and secure with 3mm flat locknuts. Insert a 3mm x 12mm SHCS through the frame and the frame angle into the cross member. Tighten all screws and also the left side cross member screw. Below is the view from the left side of the completed frame sections.



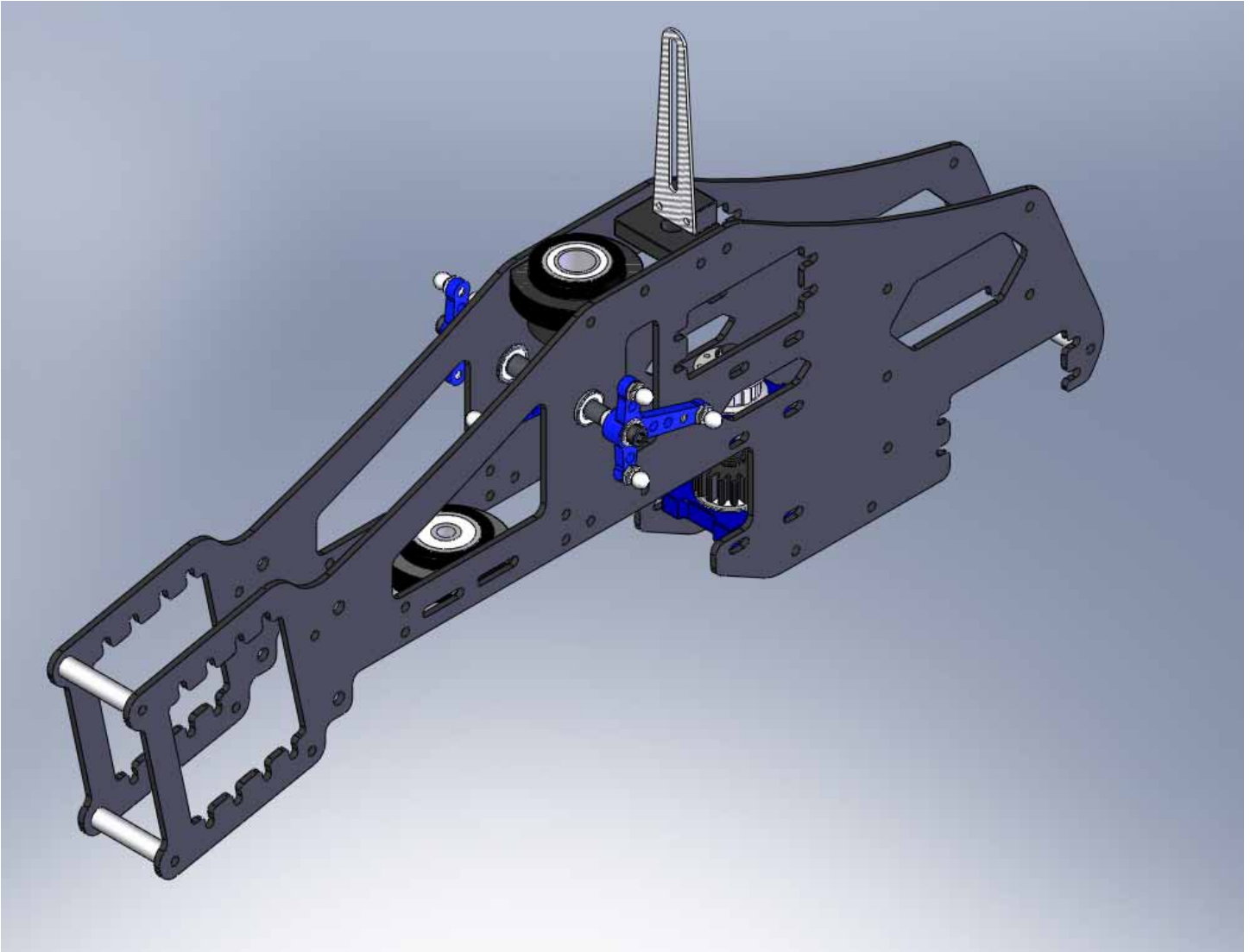
## Assemble and install Landing Gear

No.	Bag#	Description	Qty
1	3	Landing Gear Strut	2
2	3	Landing Gear Skid	2
3	3	Landing Gear End Cap	4
4	3	M2.5x6 Self Taping	4
5	3	M3x14 Cap Head Bolt	4
6	3	M3 Locknut	4
7****		CA Glue	1
8****	4	Optional skid feet	

- Drill 4 holes in the Landing Gear Struts with a 3mm drill bit with a spacing of 92mm
- Install the Landing Gear Skids into the Struts.
- Apply CA Glue into the Landing Gear End Cap then insert them into the Skids.
- Drill four 2.4mm holes into the little rounds on the ends of the Struts then secure them with the four M2.5x6 Phillips Screws.



You may at this time jump ahead if you like to the motor assembly and installation starting on page 48 through to the installation into the lower frame assembly.



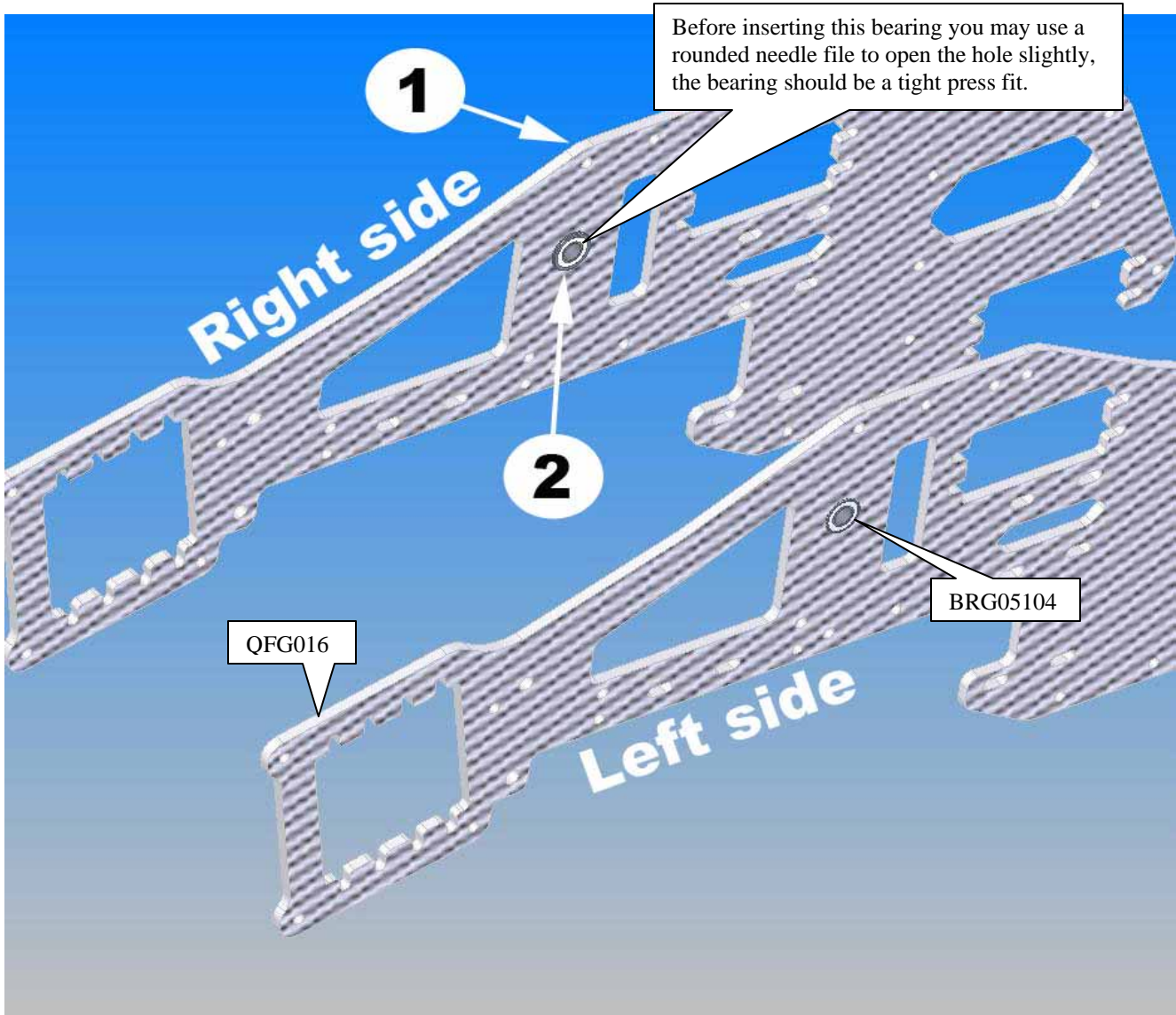
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- No. with \*\*\*\*\* means that part is not included in the kit.
- Colors of the parts in the drawings and appearances of parts may look differently from ones in the kit.



## 1-1 ELEVATOR SHAFT BEARINGS

No.	Bag#	Description	Qty
1	Fram	Upper Frame (from Frame Bag)	2
2	1	5X10X4 Flanged Bearing	2

Note: The holes on the frames are designed for "push-fit" feature. Sometime you may have to sand them a little bit before pushing the bearings in. The bearing flange mates against the inside of the frame.

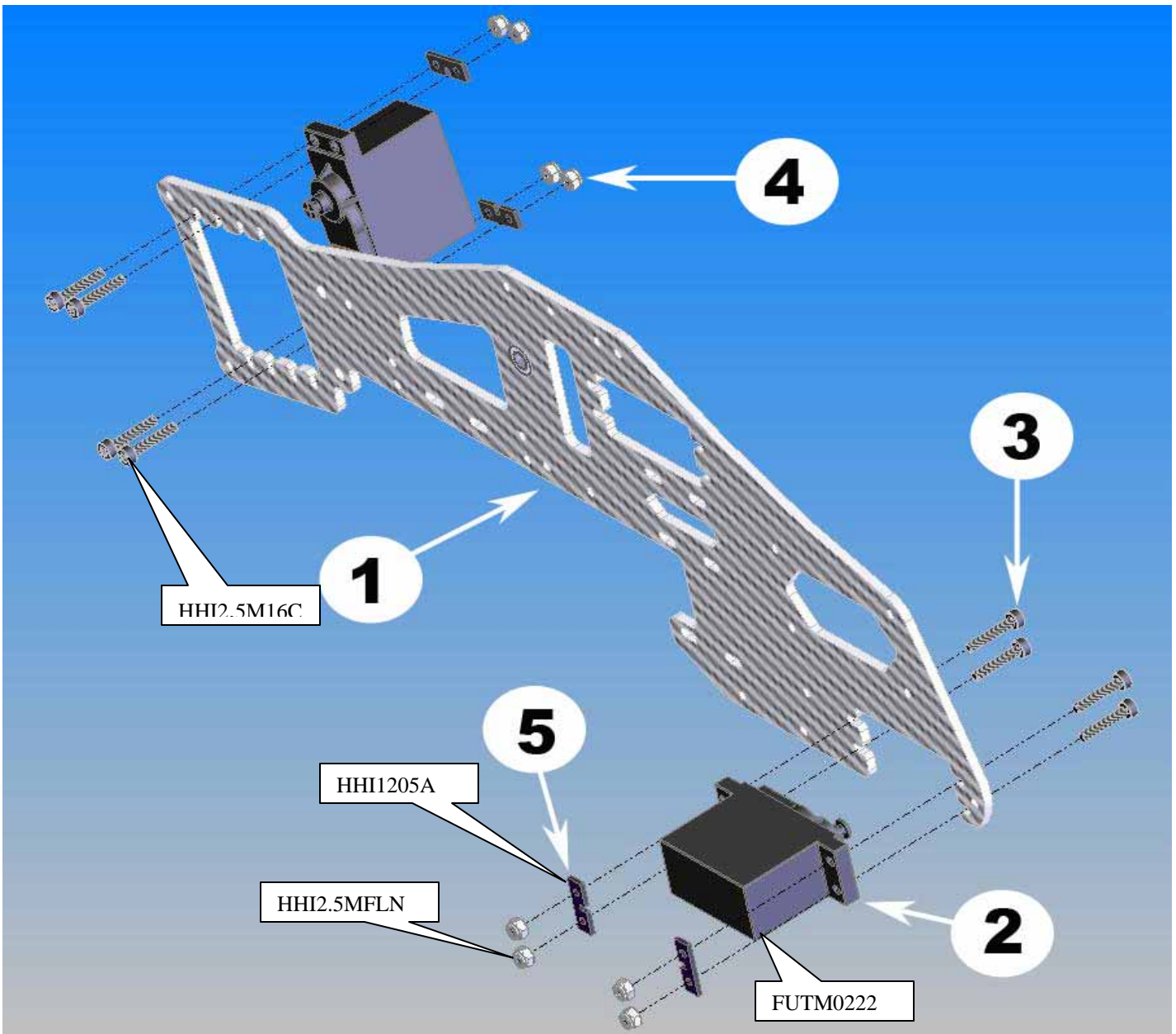


## 1-2 LEFTAILERON & RUDDER SERVO SUBASSEMBLY

No.	Bag#	Description	Qty	
1	Ste1-1	L. Upper Frame Subassembly	1	Remember to apply Loctite for the Screws ( see "Loctite Warning" section )
2****		Servo	2	
3	HB	M2.5x16 Cap Head Bolt	8	
4	HB	M2.5 Locknut	8	
5	HB	Fixing Plate	4	

\*\*\*\* Part No. with \*\*\*\* means that part is not included in the kit.

Note: Be sure to use the rubber grommets and eyelets that are provided by the servo manufacturer.

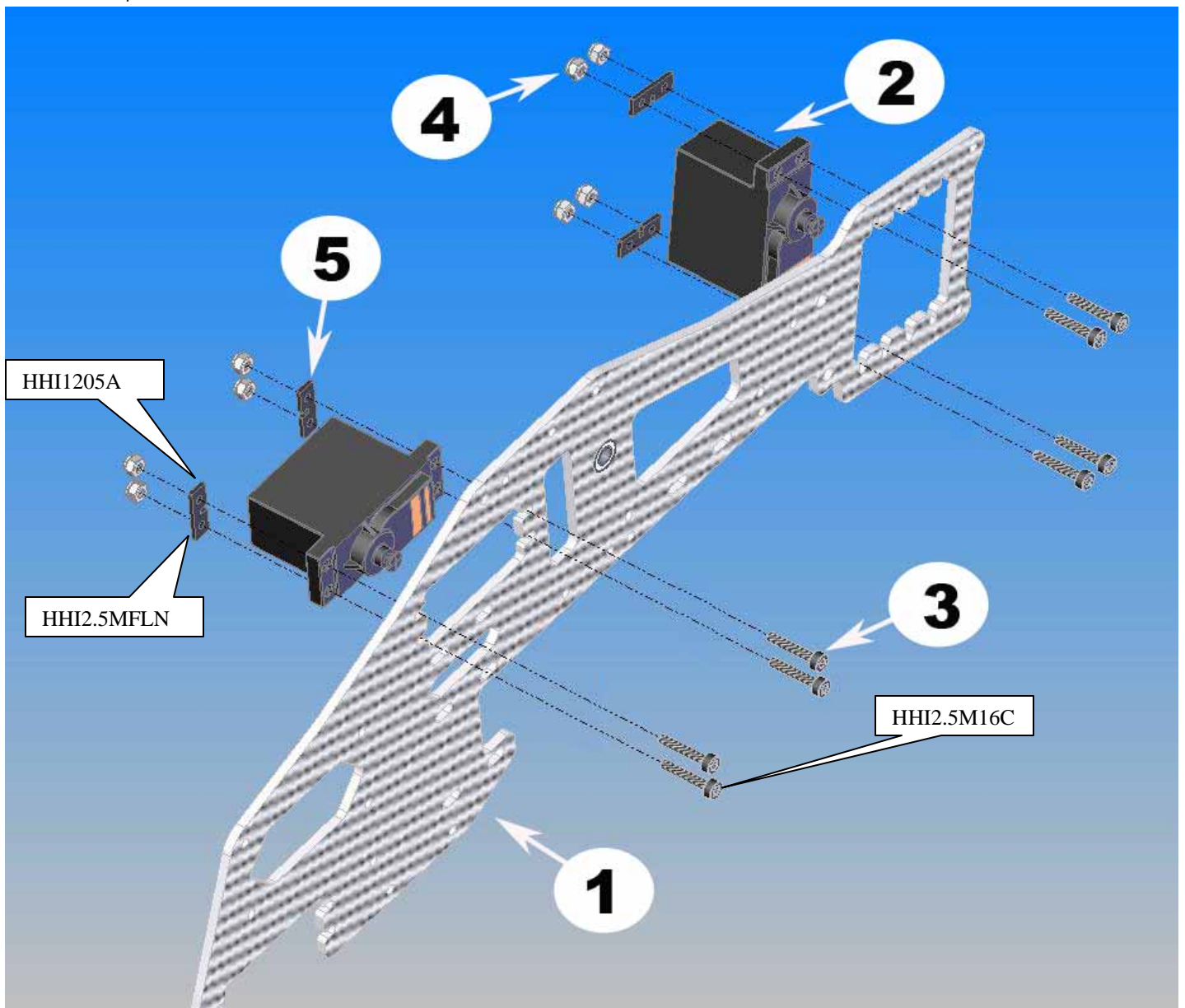


## 1-3 RIGHT AILERON & ELEVATOR SERVO SUBASSEMBLY

No.	Bag#	Description	Qty
1	Step 1	R. Upper Frame Subassembly	1
2***		Servo	2
3	HB	M2.5x16 Cap Head Bolt	8
4	HB	M2.5 Locknut	8
5	HB	Fixing Plate	4

\*\*\*\*\* Part No. with \*\*\*\*\* means that part is not included in the kit.

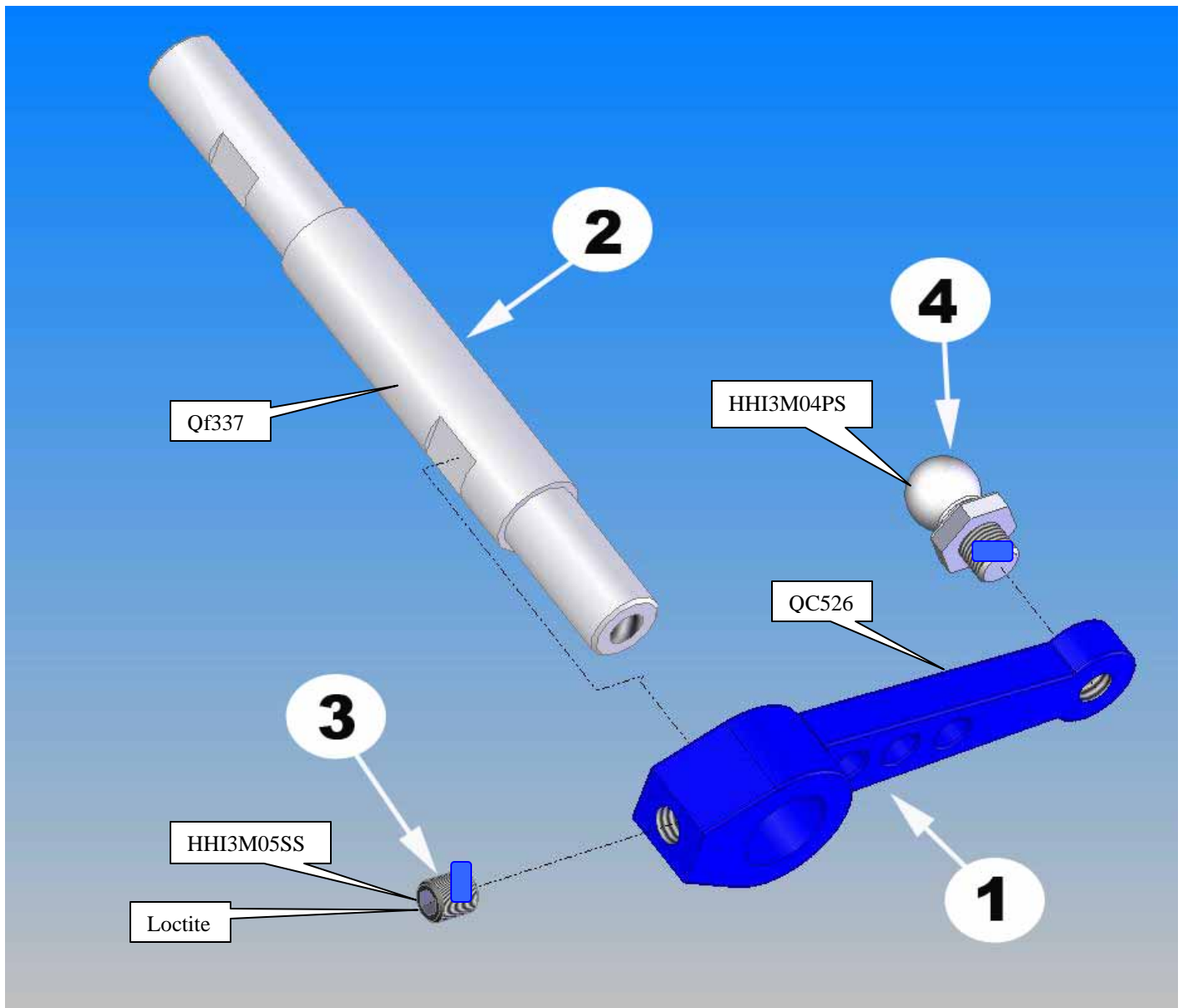
Note: Be sure to use the rubber grommets and brass eyelets that are provided by the servo manufacturer.



## 1-4 INNER ELEVATOR CONTROL ARM SUBASSEMBLY

No.	Bag	Description	Qty	
1	1	Inner elevator control arm	1	Remember to apply Loctite for the Screws ( see "Loctite Warning" section )
2	1	Elevator Control Shaft	1	
3	HB	M3x5 Set Screw	1	
4	HB	M3x4 Pivot Ball Stud	1	

Note: Elevator Control Shaft is designed to fit tightly in M5x11x4 Flange Bearings on the Upper Frames. So before you do the following assembly, check to see if the shaft can go in the bearings or not. If not, use sand paper to sand it down a little, it will come right in.

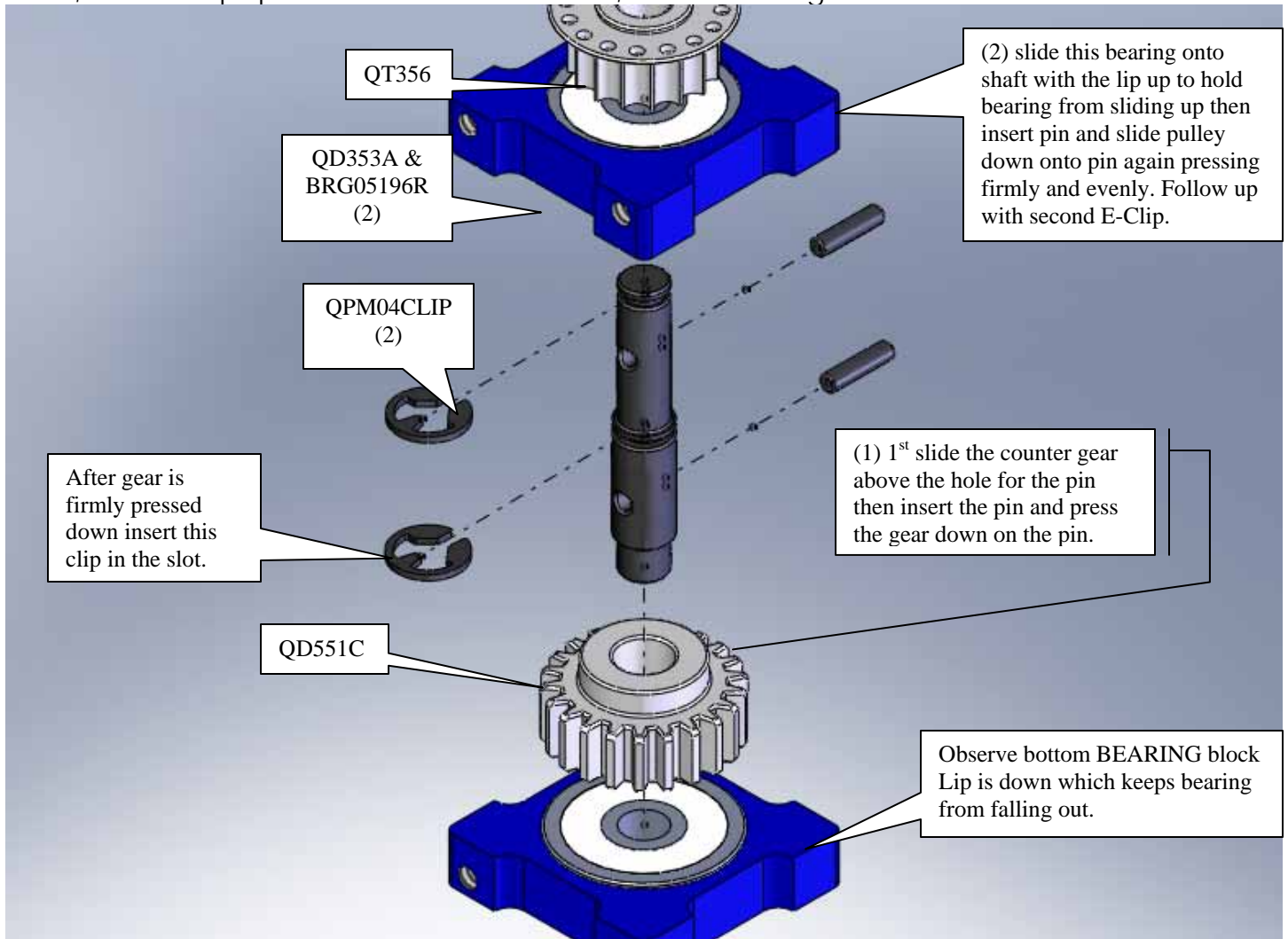




## 1-5 TAIL TRANSMISSION ASSEMBLY

No.	Bag	Description	Qty	
1	1	Counter Gear	1	The Bearing Blocks shown may look differently -Install Counter Gear to Counter Gear Shaft using Counter Gear Lock Pin (No. 3) and M4 E-clip to secure it. Apply JP Weld around the Pin. -Put Counter Gear Bearing Block (the lower) in with the Flange facing down -Install Counter Gear Bearing Block (the upper) with the Flange facing up -Install Pulley Gear (No. 6)
2	1	Counter Gear Shaft	1	
3	1	Counter Gear Lock Pin	1	
4	1	M4 E-clip	1	
5	1	Counter Gear Bearing	2	
6	1	Pulley Gear	1	
7	HB	M3x3 Set Screw	1	
8	*****	JP Weld glue	1	

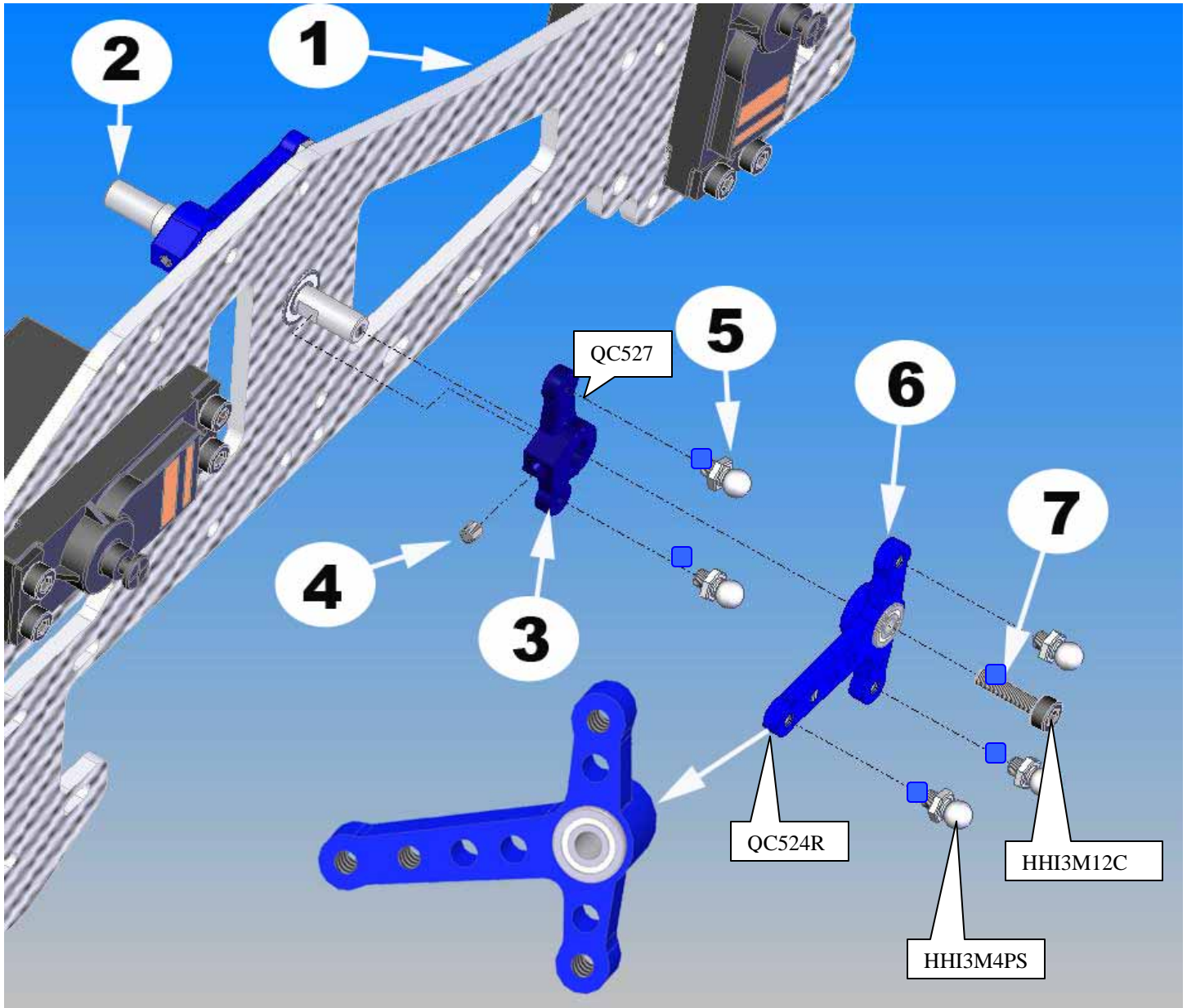
Counter Gear Shaft is designed to fit tightly in bearings on the Bearing Blocks. So before you do the following assembly, check to see if the shaft can go in the bearings or not. If not, use sand paper to sand it down a little, it will come right in.



Note: Counter Gear Bearing Blocks may look differently. Ensure that the Counter Gear Lock Pin is seated all the way down in the slot in the Counter Gear. If it is not seated it will not allow the Bearing Block to go to the proper position and will bind on the Pulley or Gear.

## 1-6 ELEVATOR CONTROL ARM-RIGHT SIDE

No.	Bag#	Description	Qty
1	Step 1-3	R. A&E Arm Subassembly (step 1-3)	1
2	Step 1-4	Inner El. Ctrl. Arm Subassembly	1
3	1	Outer Elevator Control Arm	1
4	HB	M3x5 Set Screw	1
5	HB	M3x4 Pivot Ball Stud	5
6	1	Right Aileron Control Lever	1
7	HB	M3x12 Cap Head Bolt	1

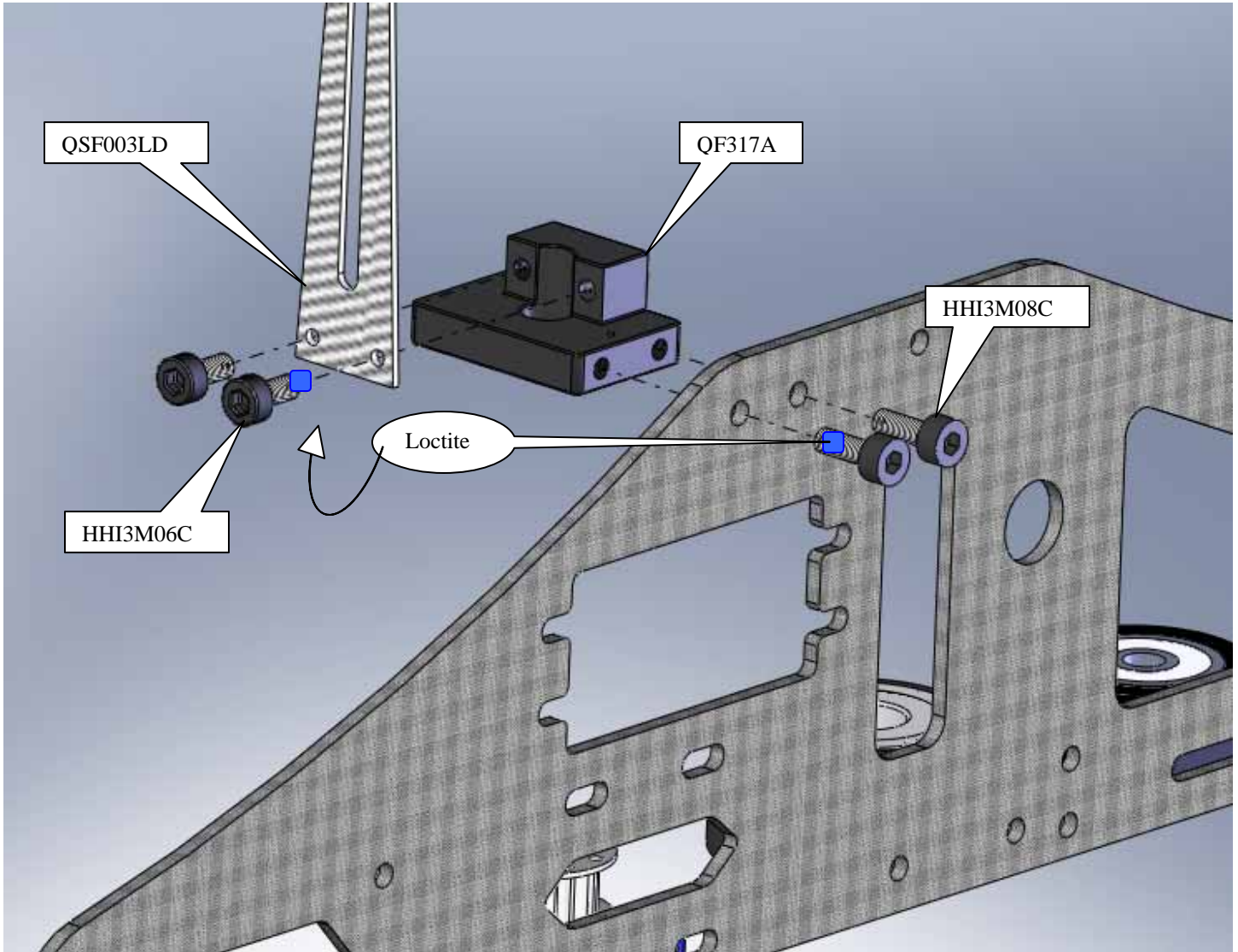


Note: The Elevator Control Shaft is designed to fit tight in the bearings. Sometimes you might have to sand it a little to get it go into the bearings.



## 1-7-B ANTI-ROTATION GUIDE ASSEMBLY *PRO VERSION*

No.	Bag#	Description	QTY
1	Step 1-6	Right Upper Frame Subassembly	1
2	1	Swashplate Anti-Rotation Guide Base	1
3	Frame	Swashplate Anti-Rotation Guide	1
4	HB	M3x8 Cap Head Bolt	2
5	HB	M3x6 Cap Head Bolt	2

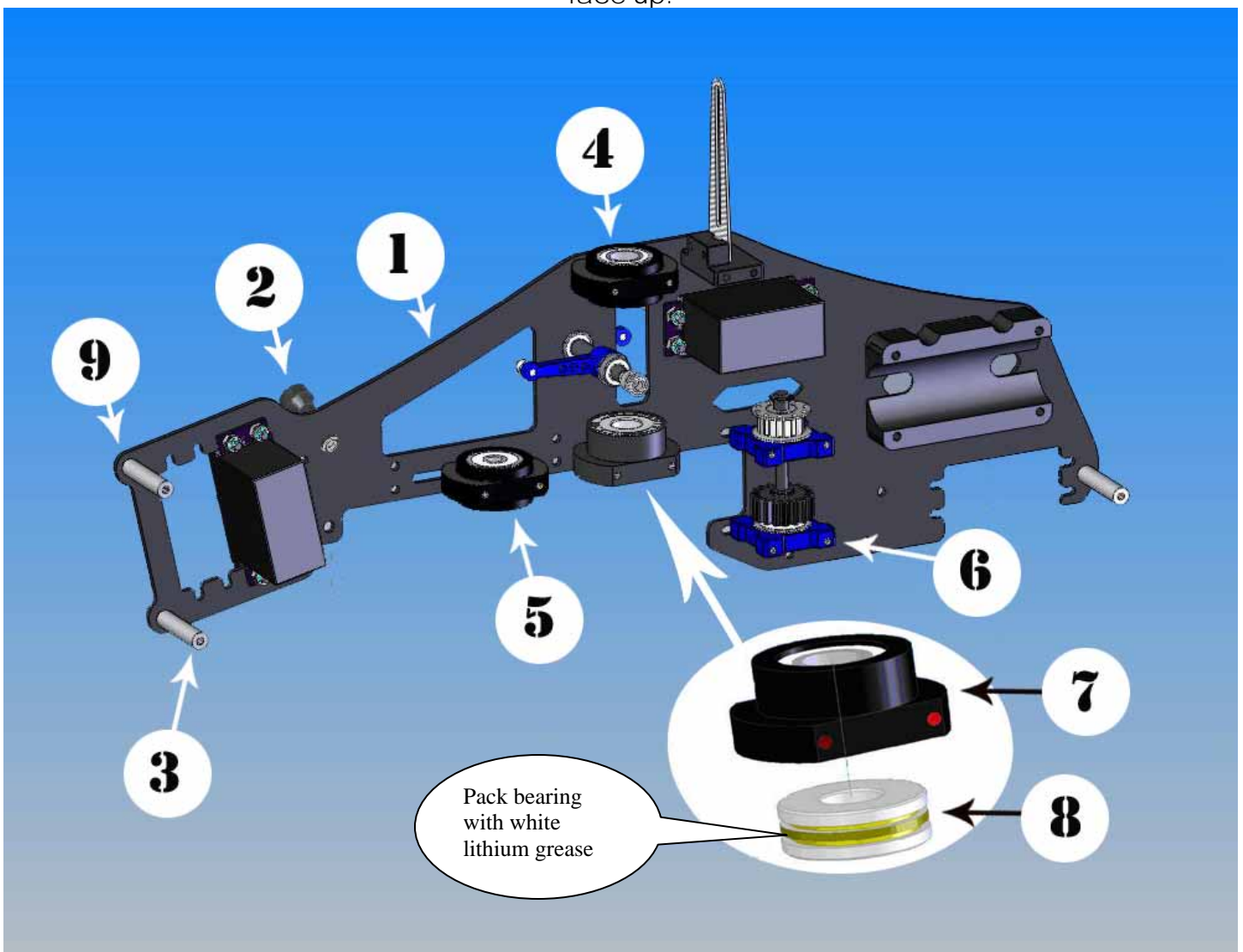


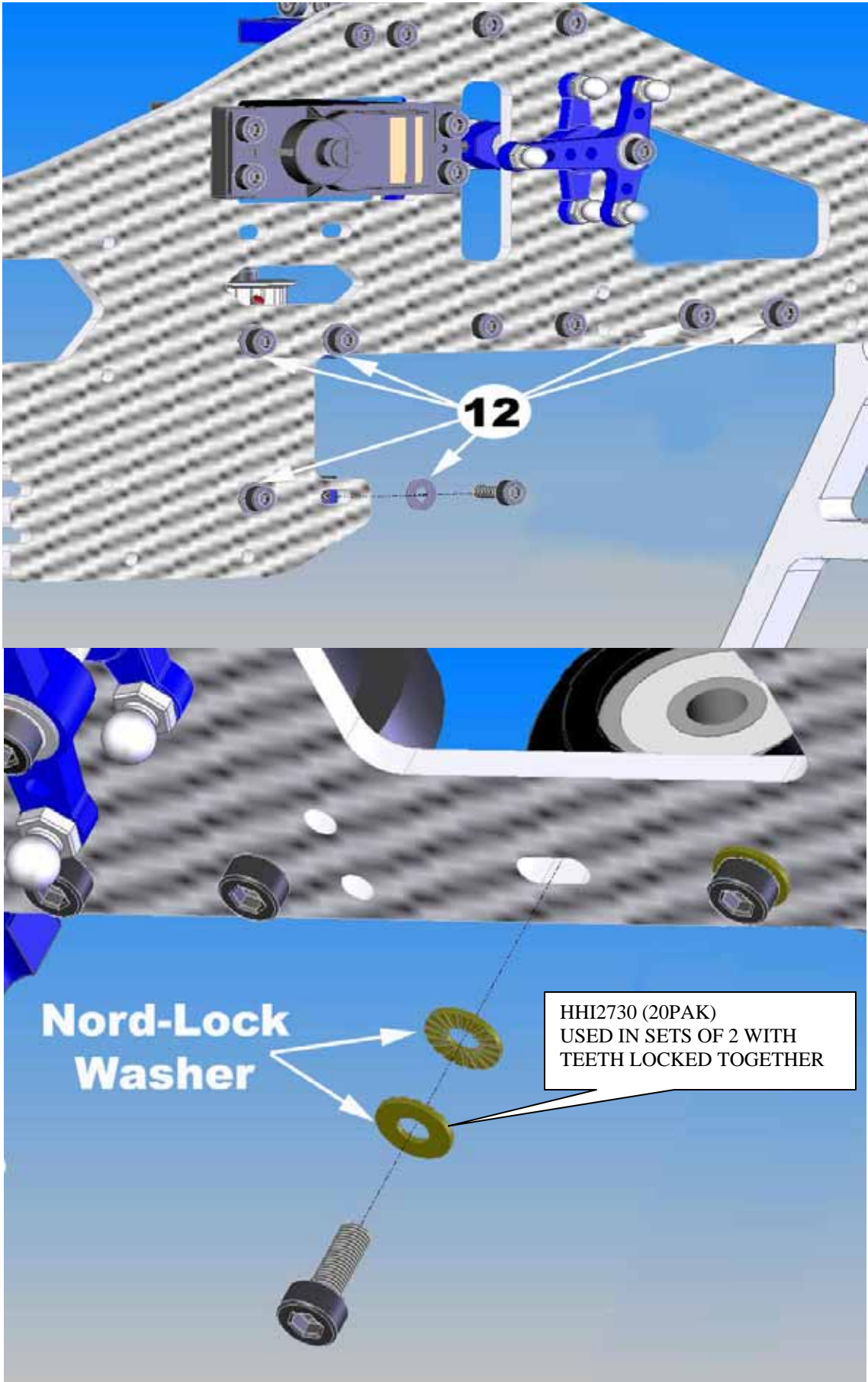
Note: The frame shown is pro version.

## 1-8 RIGHT SIDE ASSEMBLY

No.	Bag#	Description	Qty
1	Step 1-7	Right Upper Frame	1
2	1	Long Canopy Standoff (40mm)	1
3	1	M3x26 Cross Member	3
4	1	Upper Main Shaft Bearing Block	1
5	1	Clutch Bearing Block Assembly	1
6	Step 1-5	Tail Transmission Assembly	1
7	1	Lower Main Shaft Bearing Block	1
8	1	10x24x9 Thrust Bearing	1
9	HB	M3x8 Cap Head Bolt	14
10			
11	HB	M4x10 Cap Head Bolt	2
12	HB	M3x7 Flat Washer	6

Note: Put six M3x7 Flat Washers between the frame and screws when installing Clutch Bearing Block and Tail Transmission. It is recommended to use M3 Nord-Lock Washer for Clutch Bearing Block for stronger holding. If so, use M3x10 Cap Head Bolts instead of M3x8 Cap Head Bolts. See the following drawing. For the Clutch Bearing Block, the side with the smaller bearing should be face up.

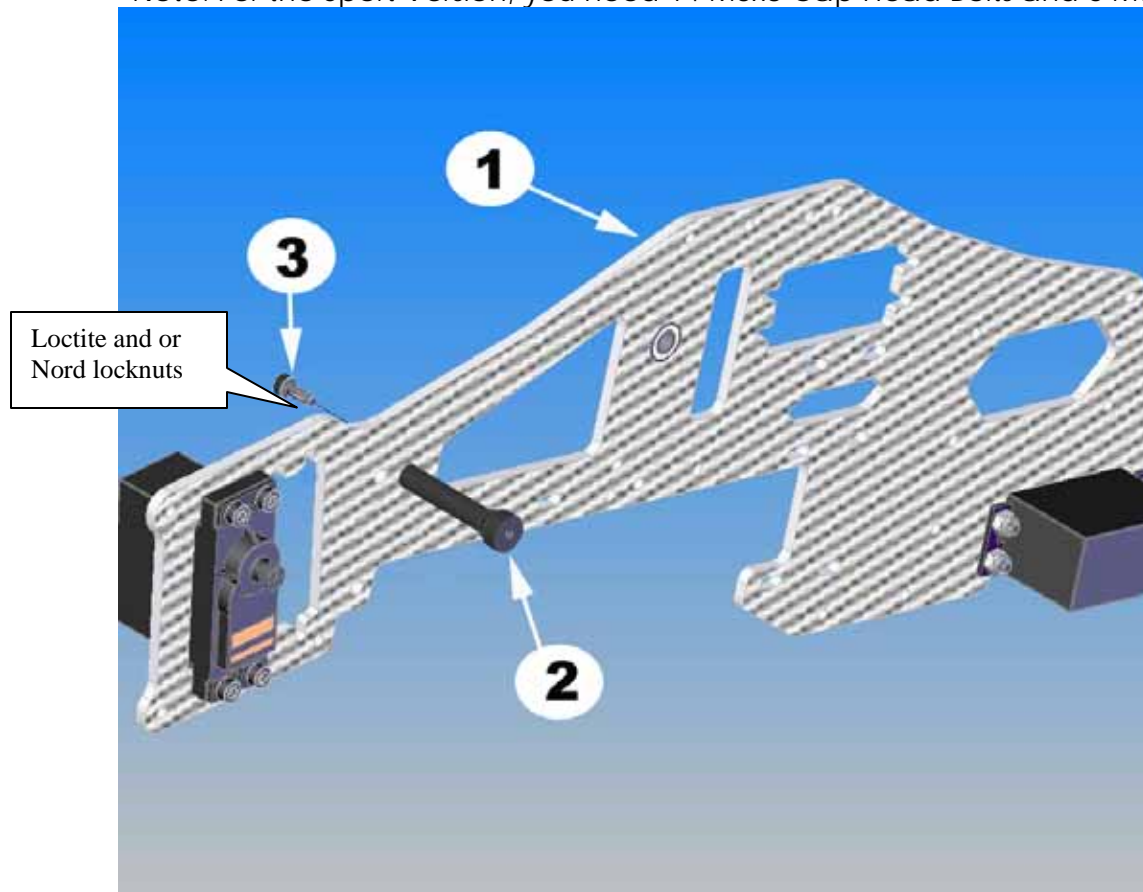




## 1-9 UPPER FRAME INSTALLATION

No.	Bag#	Description	Qty
1	Step 1-2	Left Upper Frame Assembly	1
2	1	Long Canopy Standoff (40mm)	1
3	HB	M3x8 Cap Head Bolt	16*
4	Step 1-8	Right Upper Frame Assembly	1
5	1	Boom Holder	2
6	HB	M3x40 Cap Head Bolt	4
7	HB	M3 Locknut	4*
8	1	Left Aileron Arm Control Lever	1
9	HB	M3x4 Pivot Ball Stud	3
10	HB	M3x5x3 Spacer	1
11	HB	M3x12 Cap Head Bolt	1
12	HB	M4X10 Cap Head Bolt	2
13	HB	M3 x7 Flat Washer	6

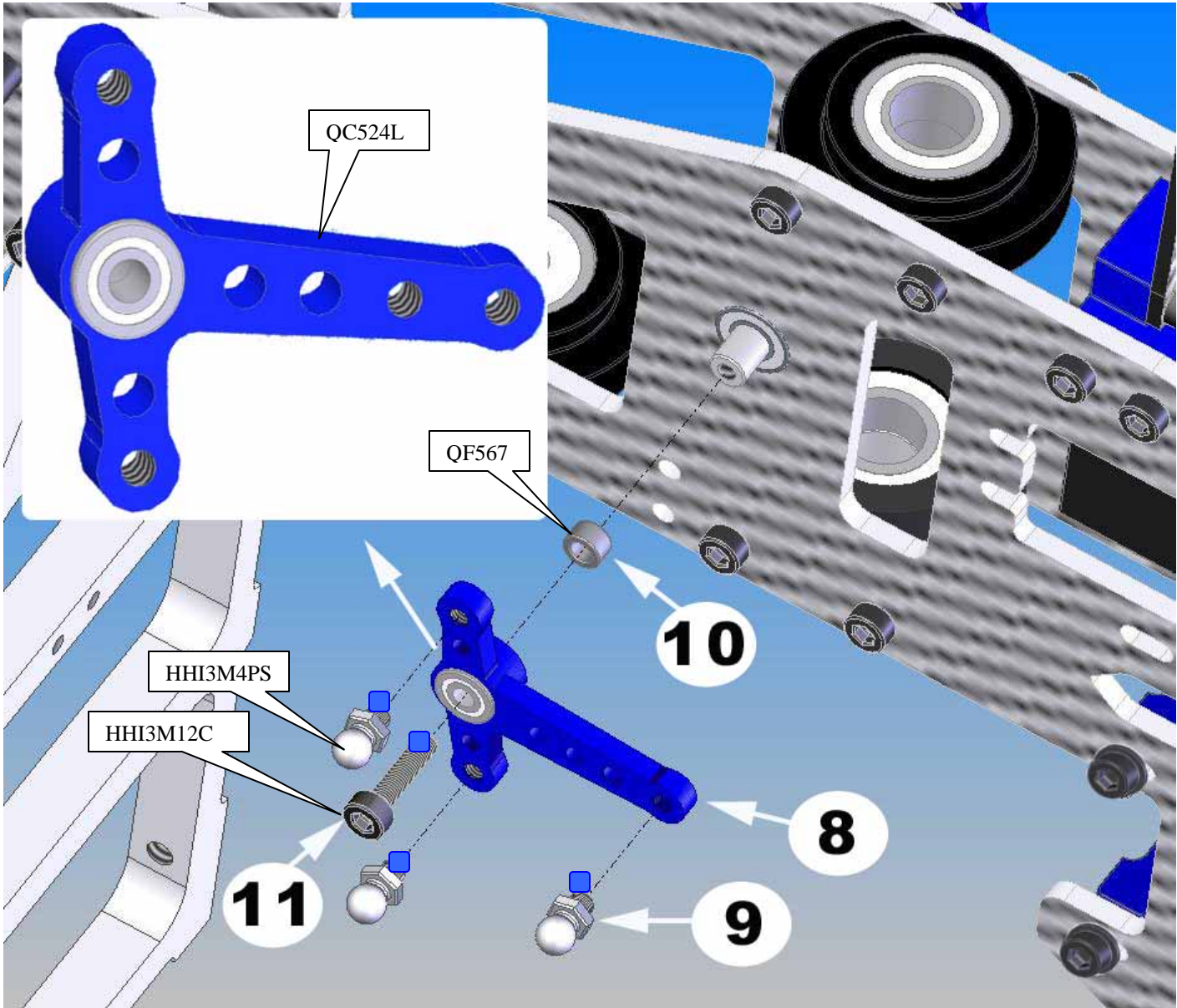
\*Note: For the Sport Version, you need 14 M3x8 Cap Head Bolts and 6 M3 Locknuts.



Attach the right side and left side together using M3x8 Cap Head Bolts, M4x10 Cap Head Bolts, M3x7 Flat Washers, and M3 Locknuts. For the Boom Holder, keep the locknuts loose for installing the Tail later.

Note: You may have to sand the front servo slots on the upper frames a little to make room for servo wires. The Elevator Control Shaft is designed to fit tight in the bearings. Sometime, you might have to sand it a little to get it go into the bearings.

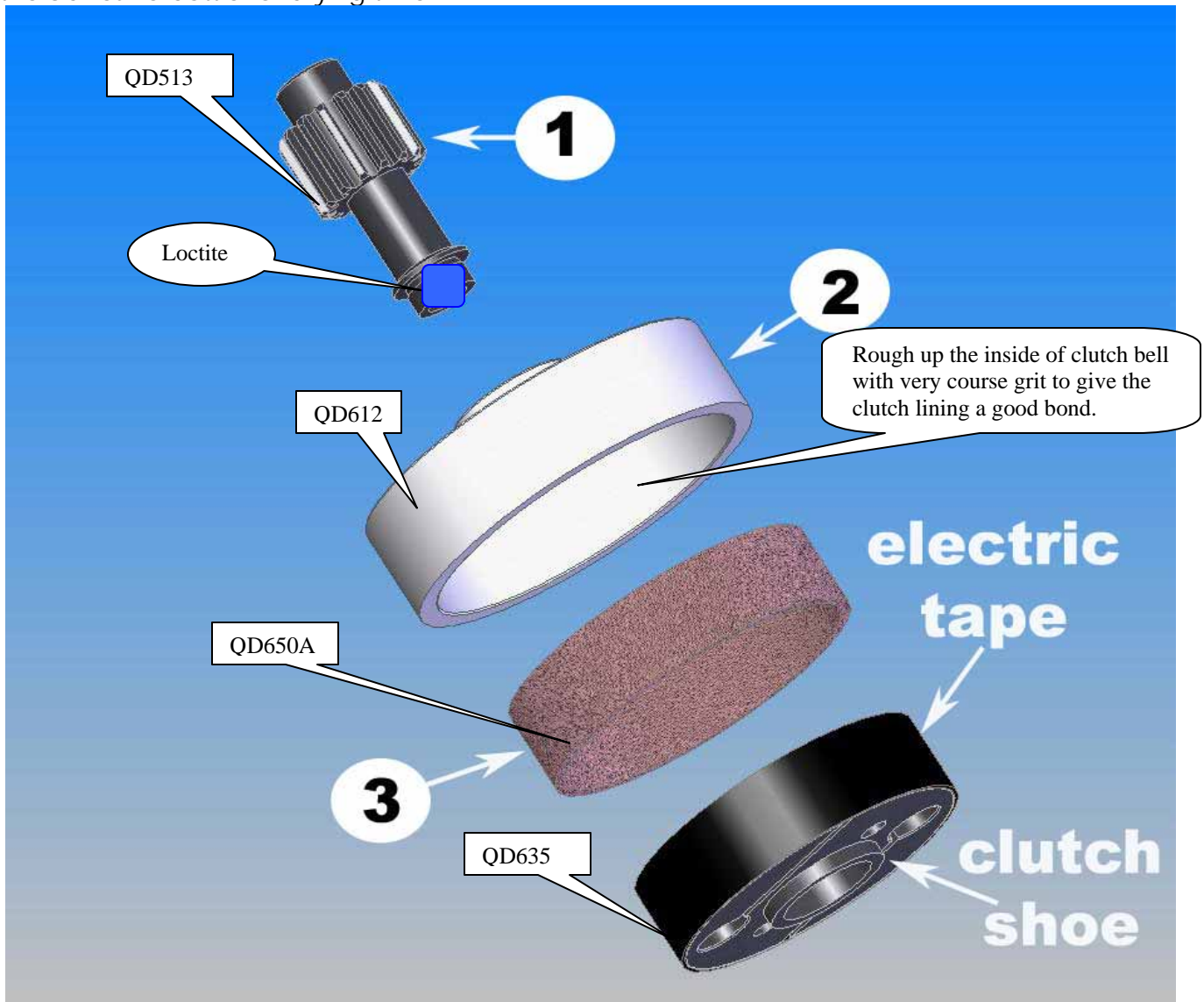




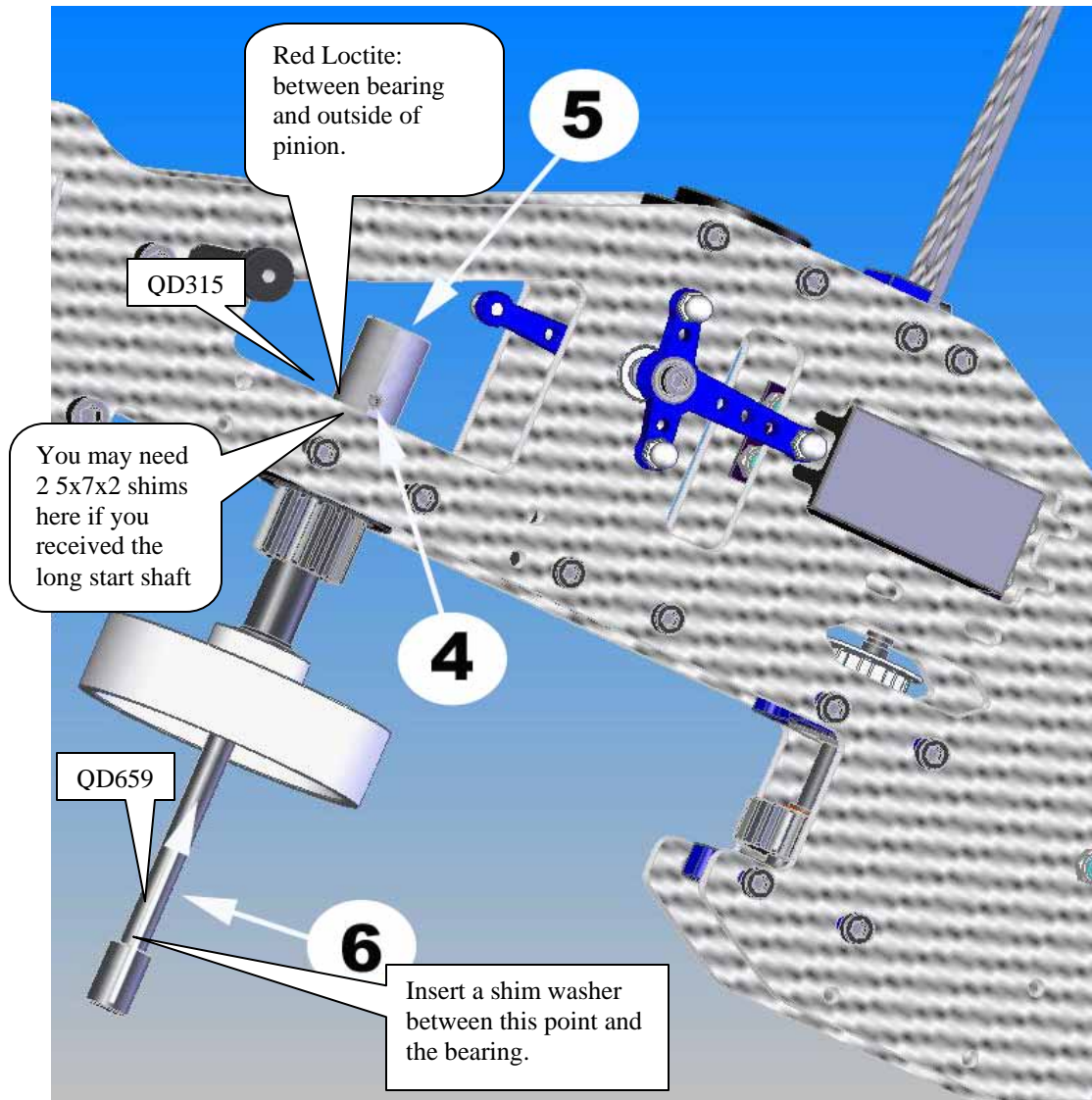
## 1-10 CLUTCH BELL ASSEMBLY

No.	Bag#	Description	Qty	
1	1	Pinion Gear*	1	*The thread portions of some Pinion Gears are a bit too long. This will make pinion touch clutch bell bearing. In this case, just sand down the thread portion a little to ensure the pinion does not touch the clutch bell.
2	1	Clutch Bell	1	
3	1	Clutch Shoe	1	
4	HB	M4x4 Set Screw	1	
5	1	Start Coupler	1	
6	1	Start Shaft	1	
7****		Electronic Tape	1	

Install (1) Clutch Lining into (1) Clutch Bell. **Note:** The recommended adhesives for installing the clutch lining are JB Weld or 10 Min + Epoxy. Prepare the clutch bell by scuffing the interior with an x-acto blade or sand paper. Put the Clutch Lining in the Clutch Bell and mark it for cutting (the length is around 143mm). Cut the Clutch Lining. Apply the adhesive thin and even and finish the installation by inserting and finishing the clutch lining. Trick: Use electric tape wrap around the Clutch Shoe (in bag # 2) one time. Then insert the Clutch Shoe into the Clutch Bell. Clean up any excess adhesive. Let it sit there until the adhesive dry out then take the Clutch Shoe and electric tape off. Check label on the adhesive bottle for drying time.

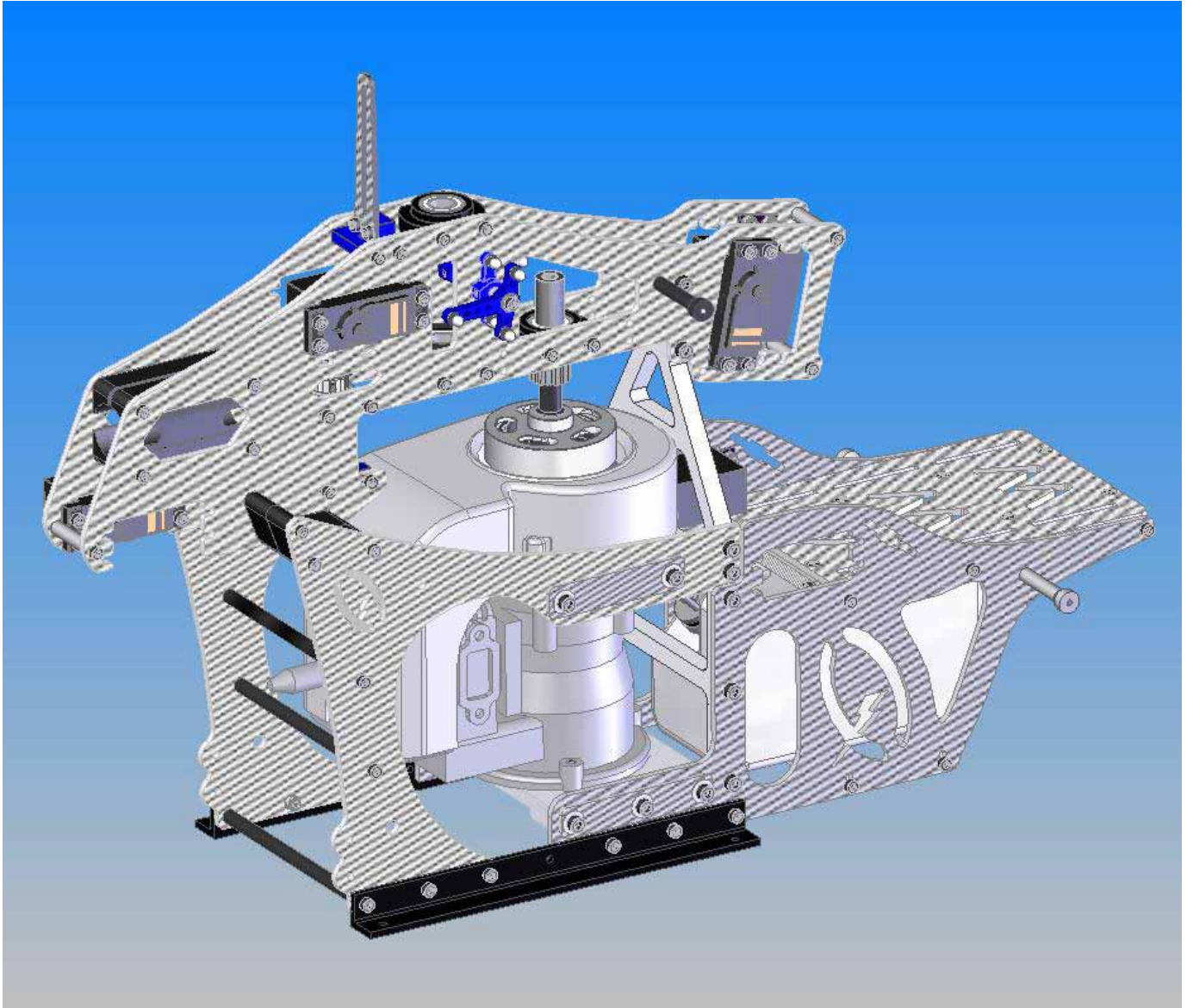






Note: Start Coupler and Start Shaft have to be installed no matter what you choose to use an electric starter or a hand pull starter.

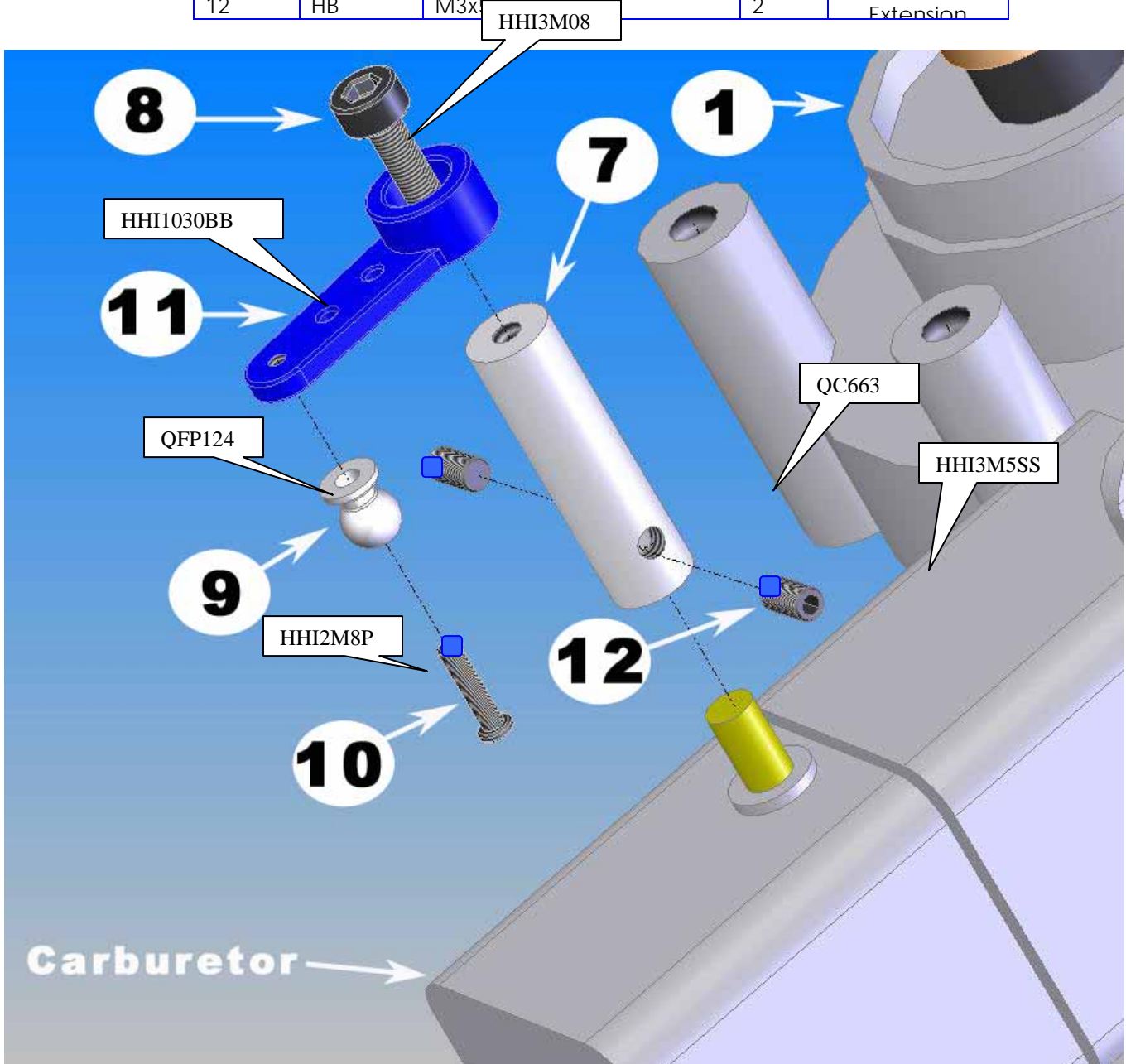
It is very important to use a Dialing Indicator to check the run out of the Clutch Bell. The run out should be no more than 0.004 inch (0.10 mm).



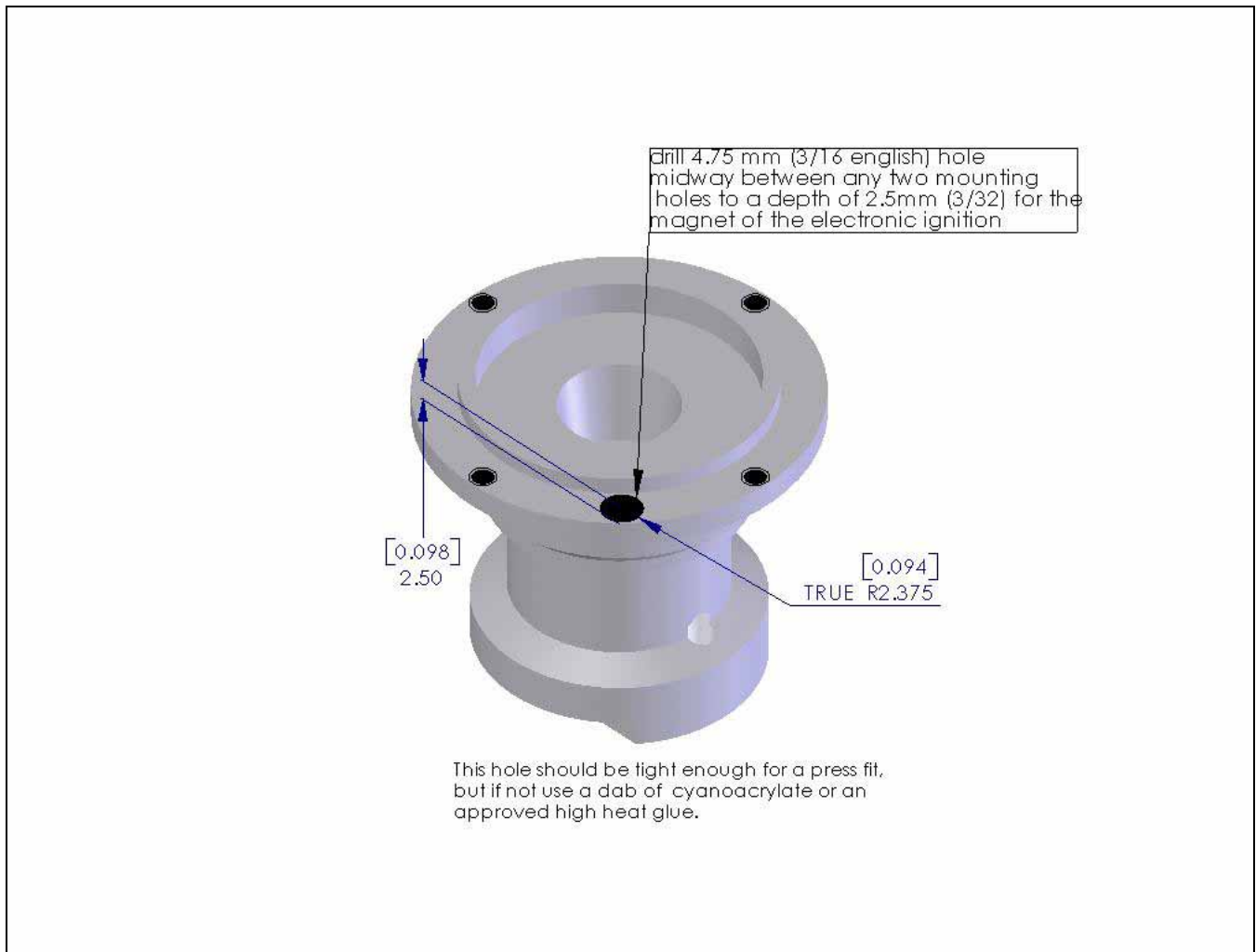
## 2-7 ENGINE PLATES & THROTTLE CONTROL LEVER ASSEMBLY

No.	Bag#	Description	Qty
1****		Engine	1
2	2	Lower Engine Plate	1
3	2	Upper Engine Plate	1
4	HB	M5x14 Flat Head Bolt	7
5	Frame	Fan Shroud Mount	1
6	HB	M3x6 Flat Head Bolt	2
7	2	Throttle Extension	1
8	HB	M3x8 Cap Head Bolt	1
9	HB	Shim Ball	1
10	HB	M2x8 Phillips Screw	1
11	2	Short Half Servo Arm	1
12	HB	M3x	2

Unscrew the Carburetor of the engine, rotate it 180° clockwise, and then screw it again. Now the engine is ready for Throttle Extension



## Magnet Installation for Electronic Ignition

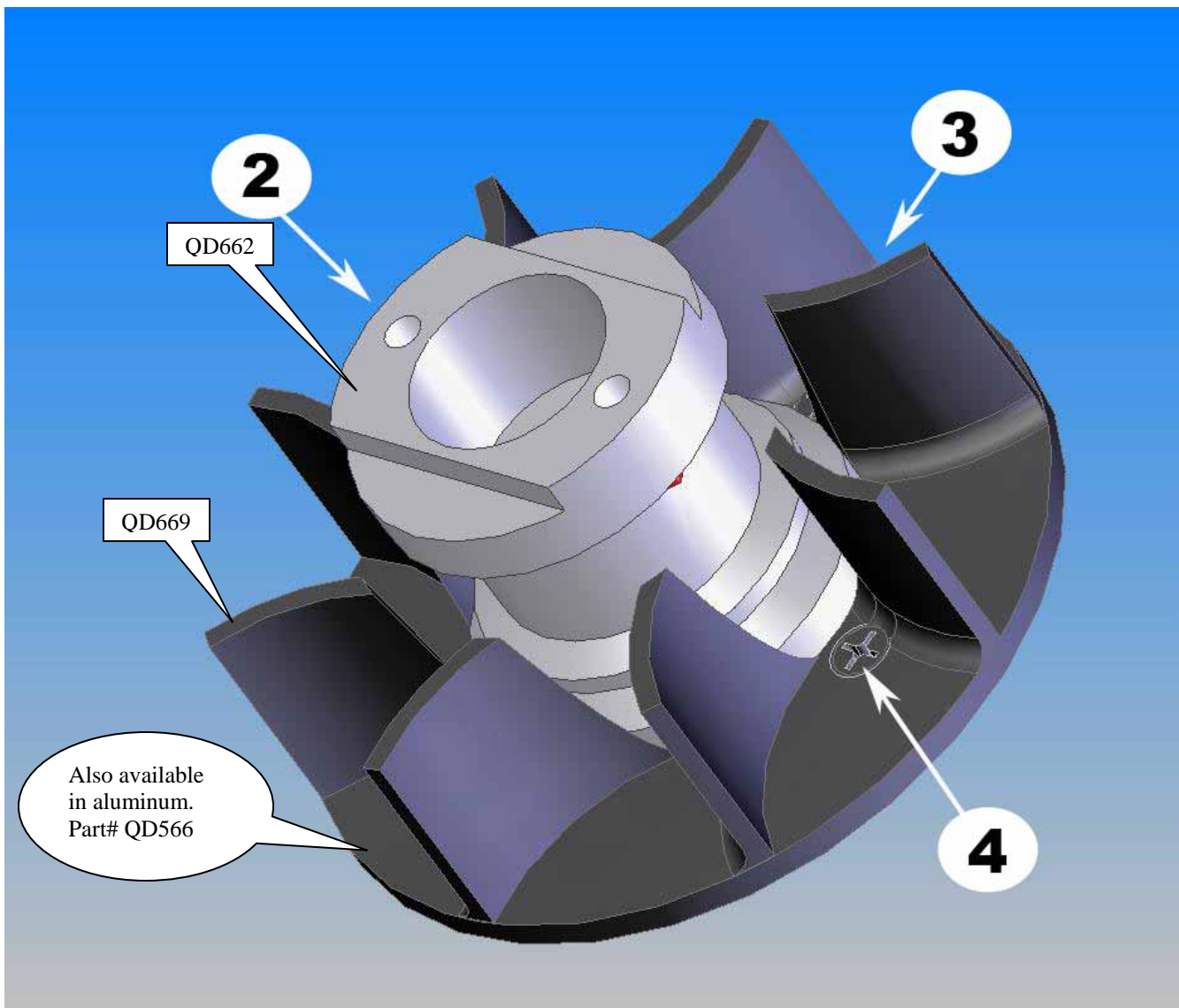


The magnet can protrude slightly from the bottom of the hub but not more than 1mm or 1/16”.



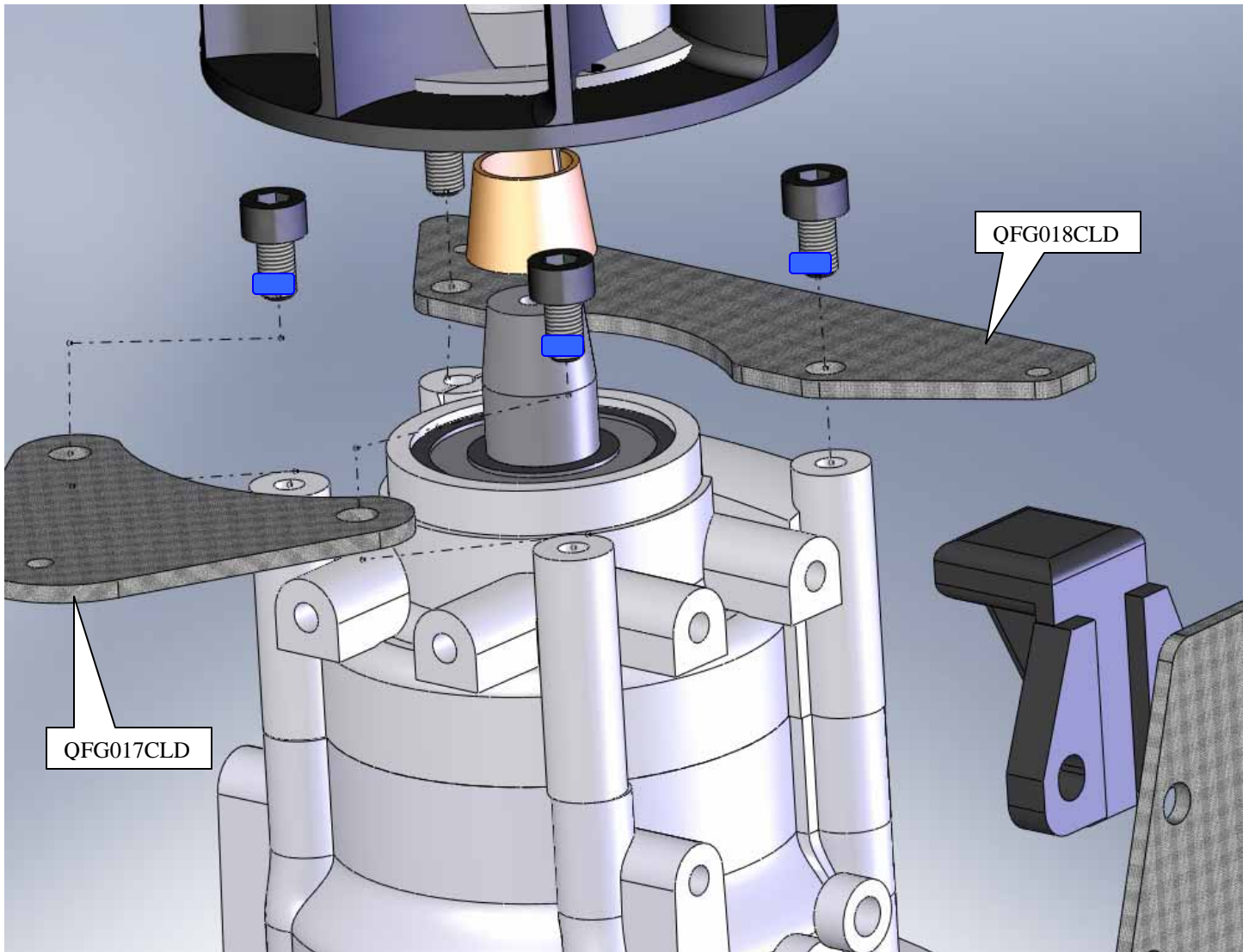
## 2-8 ENGINE ASSEMBLY

No.	Bag#	Description	QTY
1	Step 2-7	Engine	1
2	2	Fan Hub	1
3	2	Cooling Fan	1
4	HB	M3x6 Flat Head Bolt	4
5	2	Clutch	1
6	2	Lower Engine Collet	1
7	2	Upper Engine Collet	1
8	HB	M6x25 Hex Head Bolt (or Socket Cap	1
9	HB	M4x8 Cap Head Bolt	2
10	HB	M6 Nord-Lock Washer	2





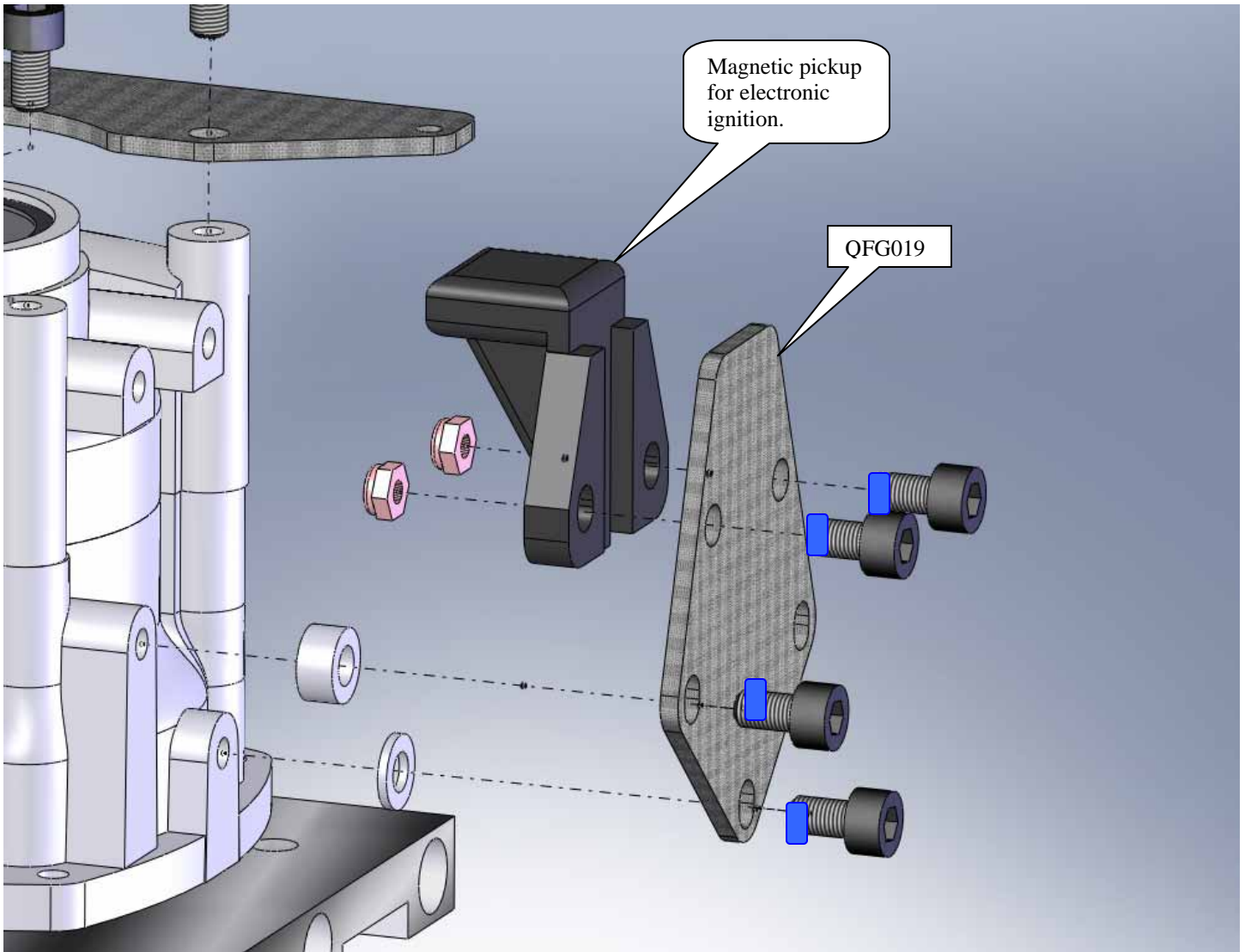
Install the front and rear shrouds as shown below with two 4 x 6mm SHCS.



Note: it is very important to use a Dialing Indicator to check the run out of the Engine Assembly. Most of the vibration problems come from this. The run out should be no more than 0.004 inch (0.10 mm).

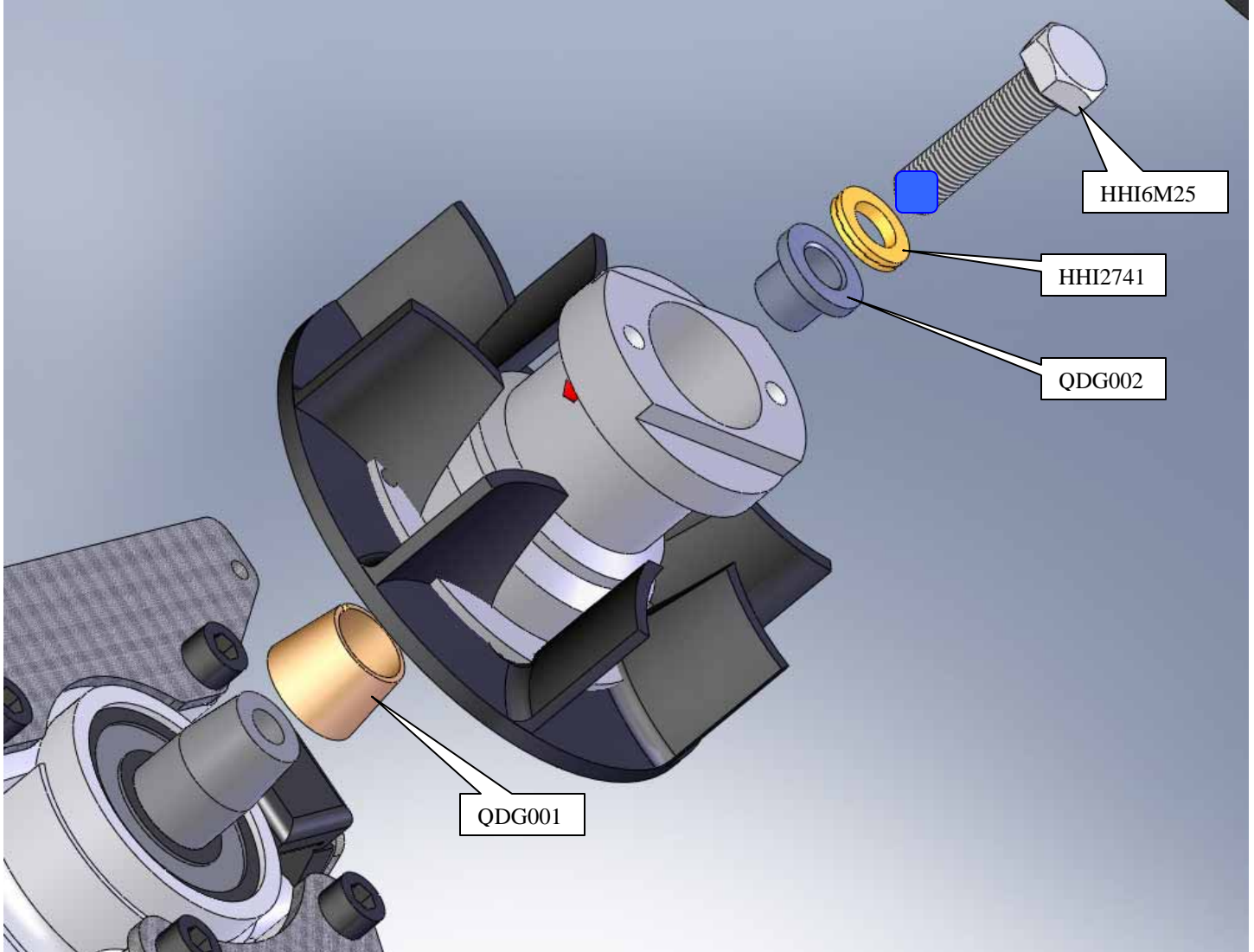
# Sensor Installation

Use the 4 x 6mm screws and the 4mm flat locknuts to attach the sensor to the mount. Before tightening slide the sensor up so it is high in the slots. Next attach the sensor and mount to the engine with the provided spacers as shown below.



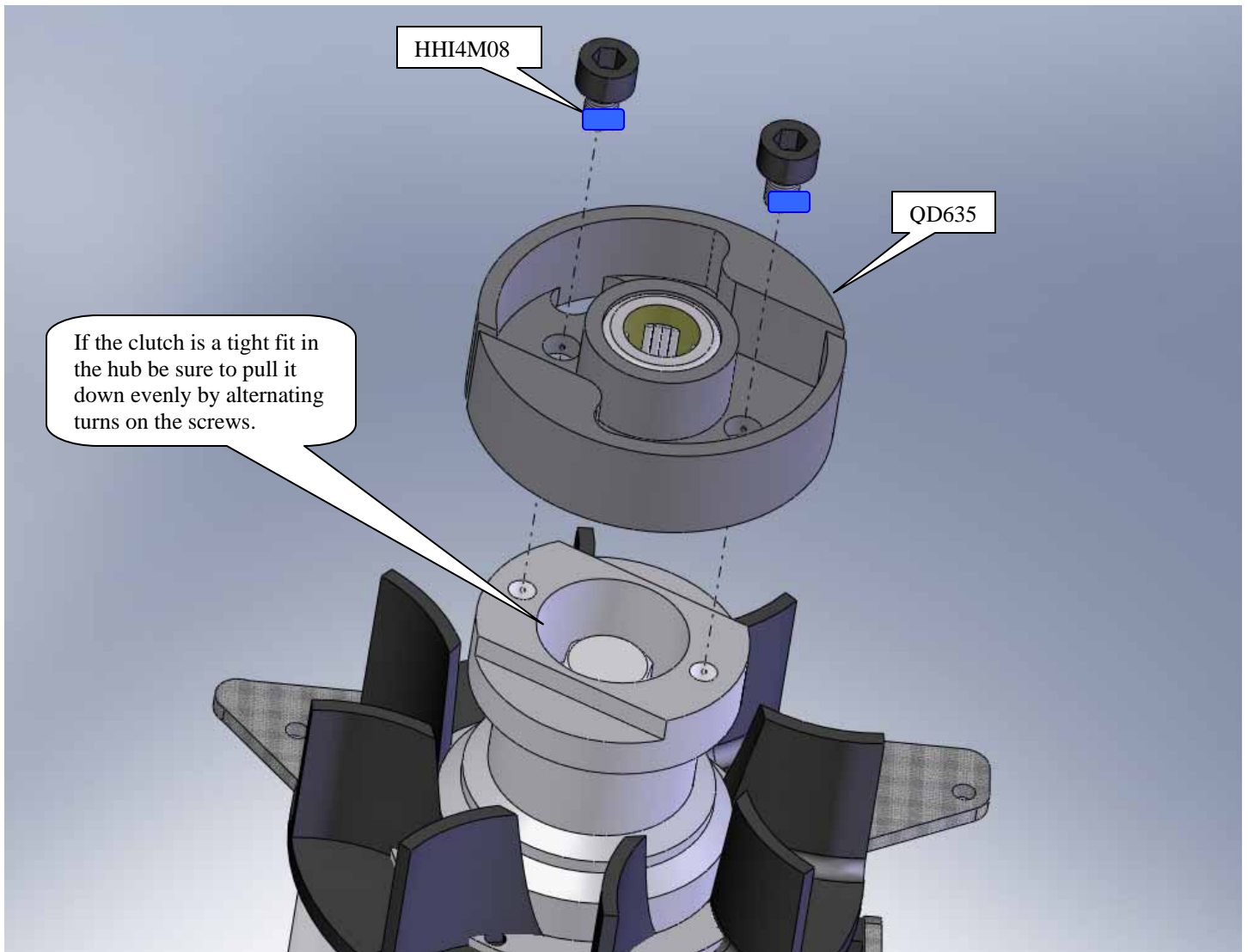
## Mount the fan and Hub

Slip the lower engine collet onto the engine shaft and follow with the hub/fan assembly. Insert the upper engine collet into the hole in the top of the hub. Slide the Nord lock set (Nord lock washers come in matched sets of 2) onto the 6 x 25mm Hex head bolt and insert down through the collets and hub and carefully tighten down.



# Attach Clutch

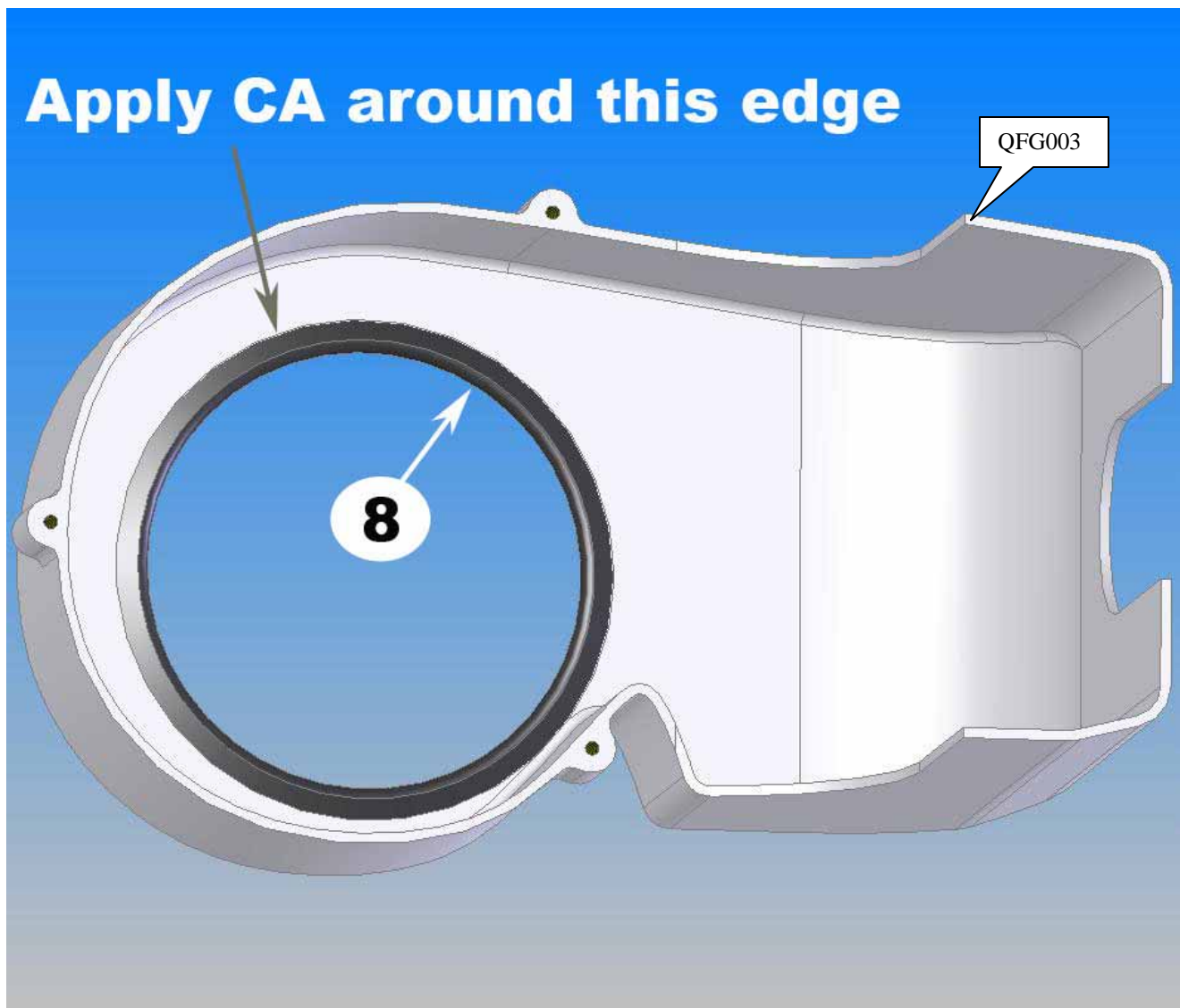
The clutch is attached hollow side up with two 3 x 8mm SHCS.



## 2-9 FAN SHROUD ASSEMBLY

No.	Bag#	Description	Qty
1	Step 2-8	Engine	1
2	In Box	Fan Shroud	1
3	HB	M3x5x1 Spacer	2
4	HB	M2.5x10 Cap Head Bolt	3
5	HB	M3x7 Flat Washer	1
6	HB	M4 Well-nut	10
7	HB	M4 Well-nut Brass Insert	10
8	2	Rubber U Channel	1
9*****		CA Glue	1

Run the Rubber U Channel along the center hole of the Fan Shroud and then apply CA glue onto it.

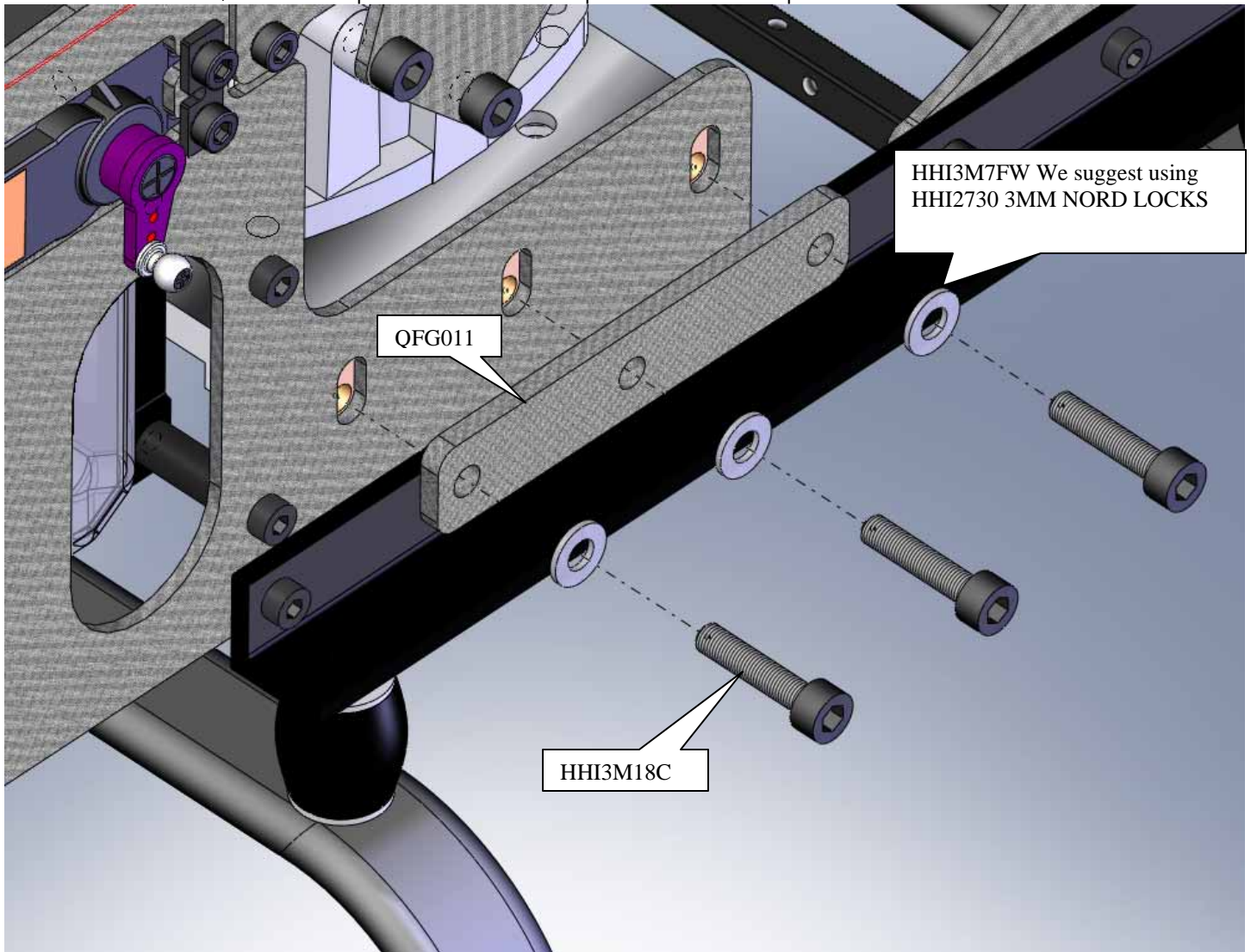




## 2-11 ENGINE INSTALLATION

No.	Bag#	Description	Qty
1	Step 2-10	Step 2-10 Assembly	1
2	Step 2-9	Step 2-9 Assembly	1
3	Frame	Rear Frame	2
4	Frame	Upper Doublers	2
5	Frame	Lower Doublers	2
6	HB	M4x18 Cap Head Bolt	10
7	HB	M4x10 Cap Head Bolt	4
8	HB	M4x10 Flat Washer	14

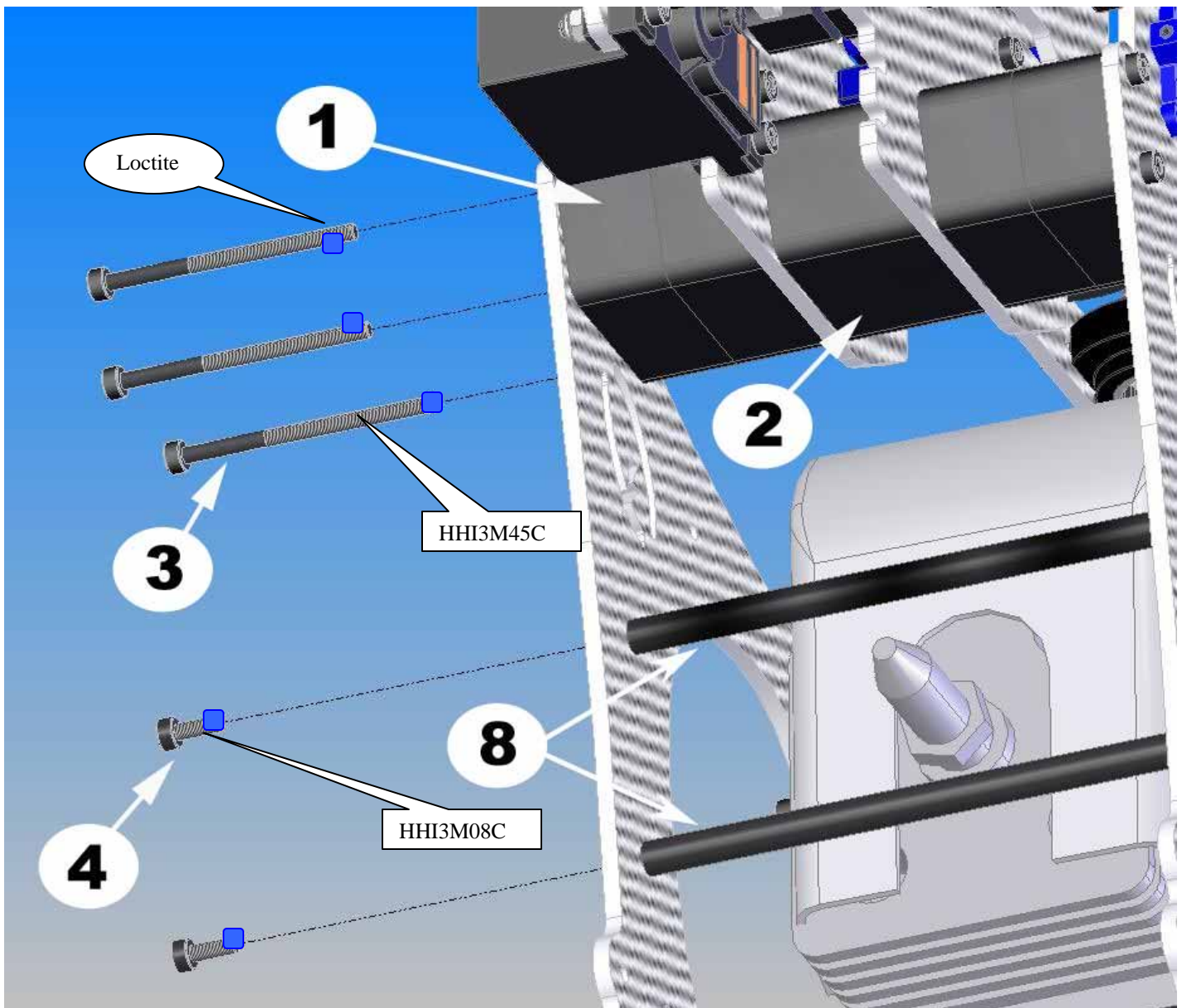
It is recommended to use M4 Finishing Caps and/or M4 Nord-Lock Washers instead of M4x10 Flat Washers. See *"Other Hardware & Optional Accessories"* to make order. If M4 Nord-Lock Washers are used, M4x20 Cap Head Bolts will replace M4x18 Cap Head Bolts

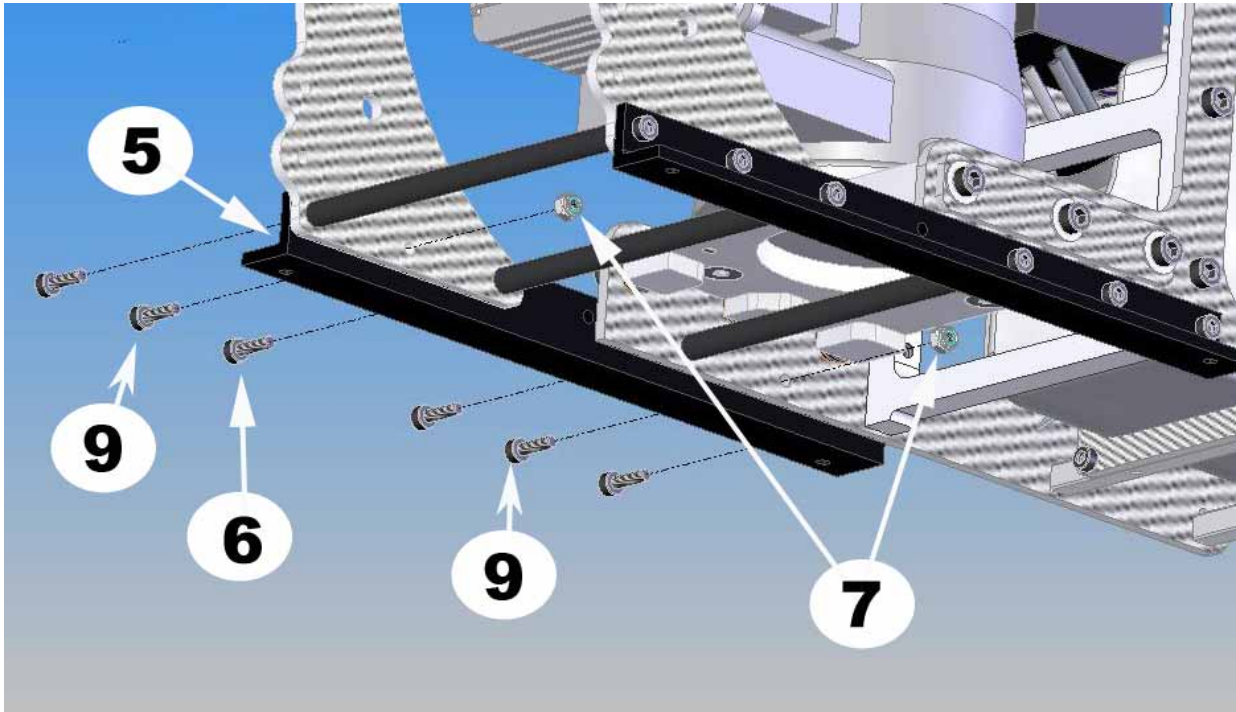


Note: Ensure the Clutch Shoe (including the Clutch Torrington bearing) does not touch the Clutch Bell. The gap between them should be 0.50-1.00mm. Do not over tighten the Well Nuts.

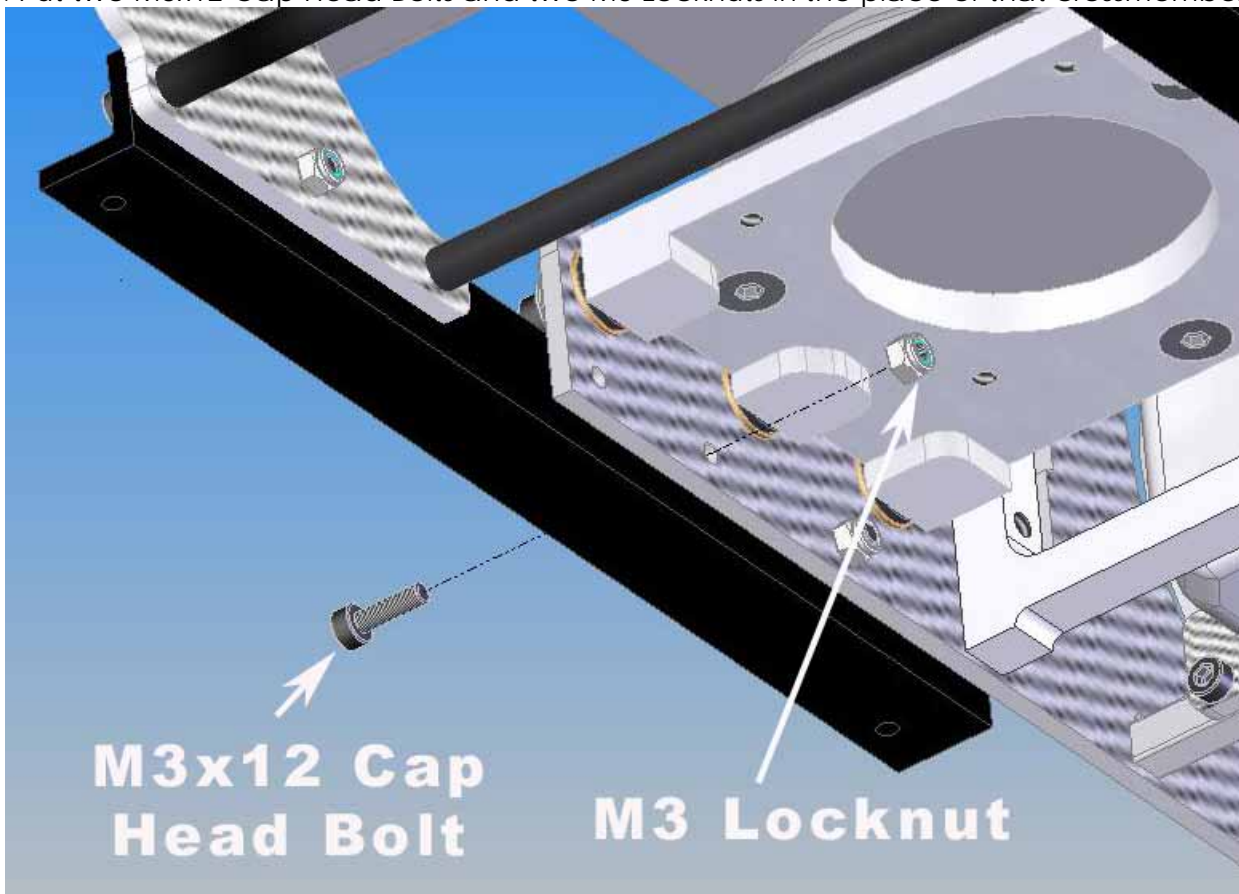
## 2-12 FRAME ANGLE ASSEMBLY

	Bag#	Description	Qty
1	2	Outer Molded Spacer	4
2	2	Inner Molded Cross Member	1
3	HB	M3x45 Cap Head Bolt	6
4	HB	M3x8 Cap Head Bolt	4
5	Frame	Frame Angle	2
6	HB	M3x10 Cap Head Bolt	8
7	HB	M3 Locknut	4
8	2	M3x100 Cross Member	5
9	HB	M3x12 Cap Head Bolt	4





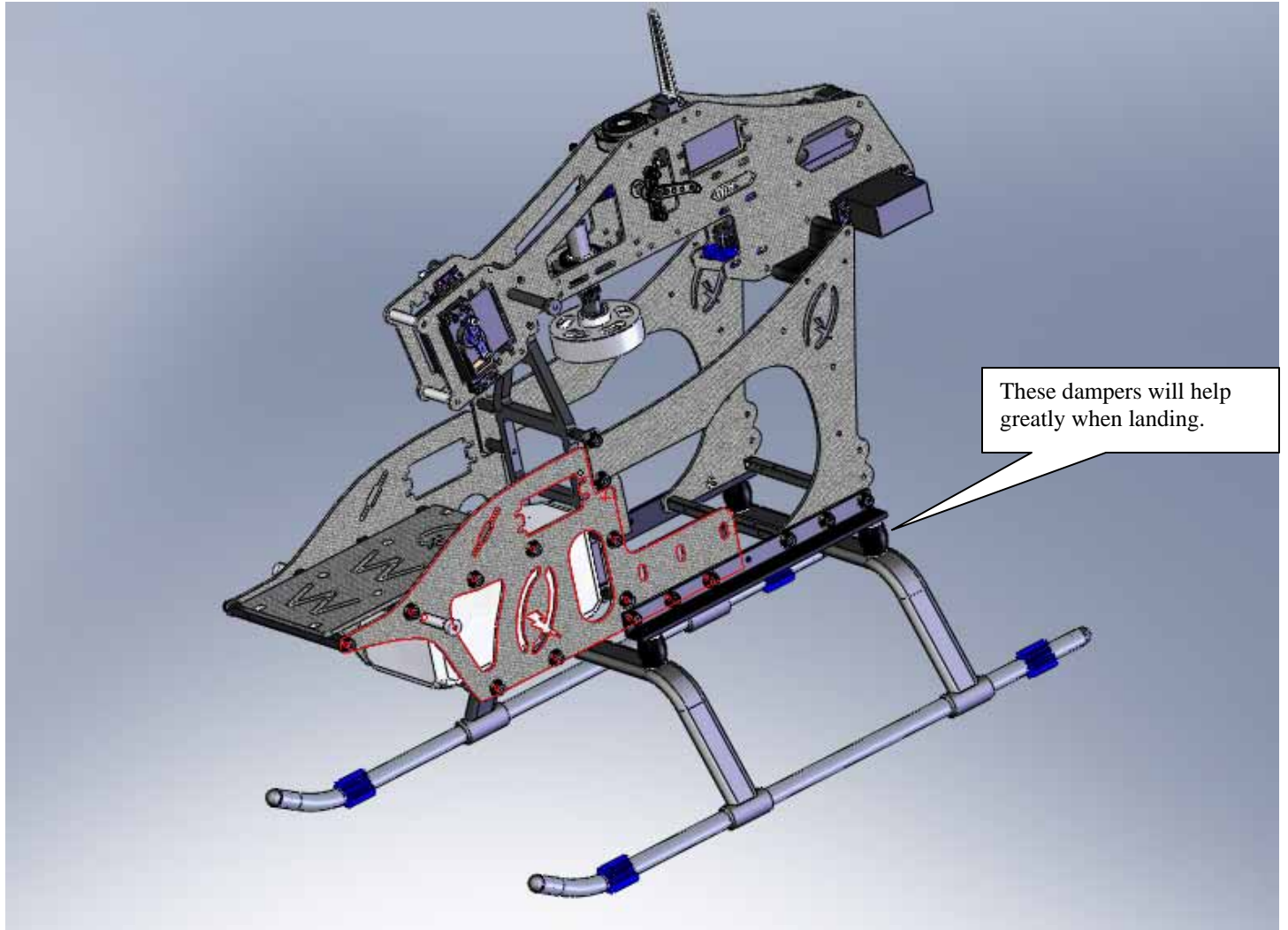
Note: If the pull starter is used, do not install the crossmember which is underneath the engine. Put two M3x12 Cap Head Bolts and two M3 Locknuts in the place of that crossmember.



Put the pull starter back now. You may have to squeeze the pull starter a little to get it in.

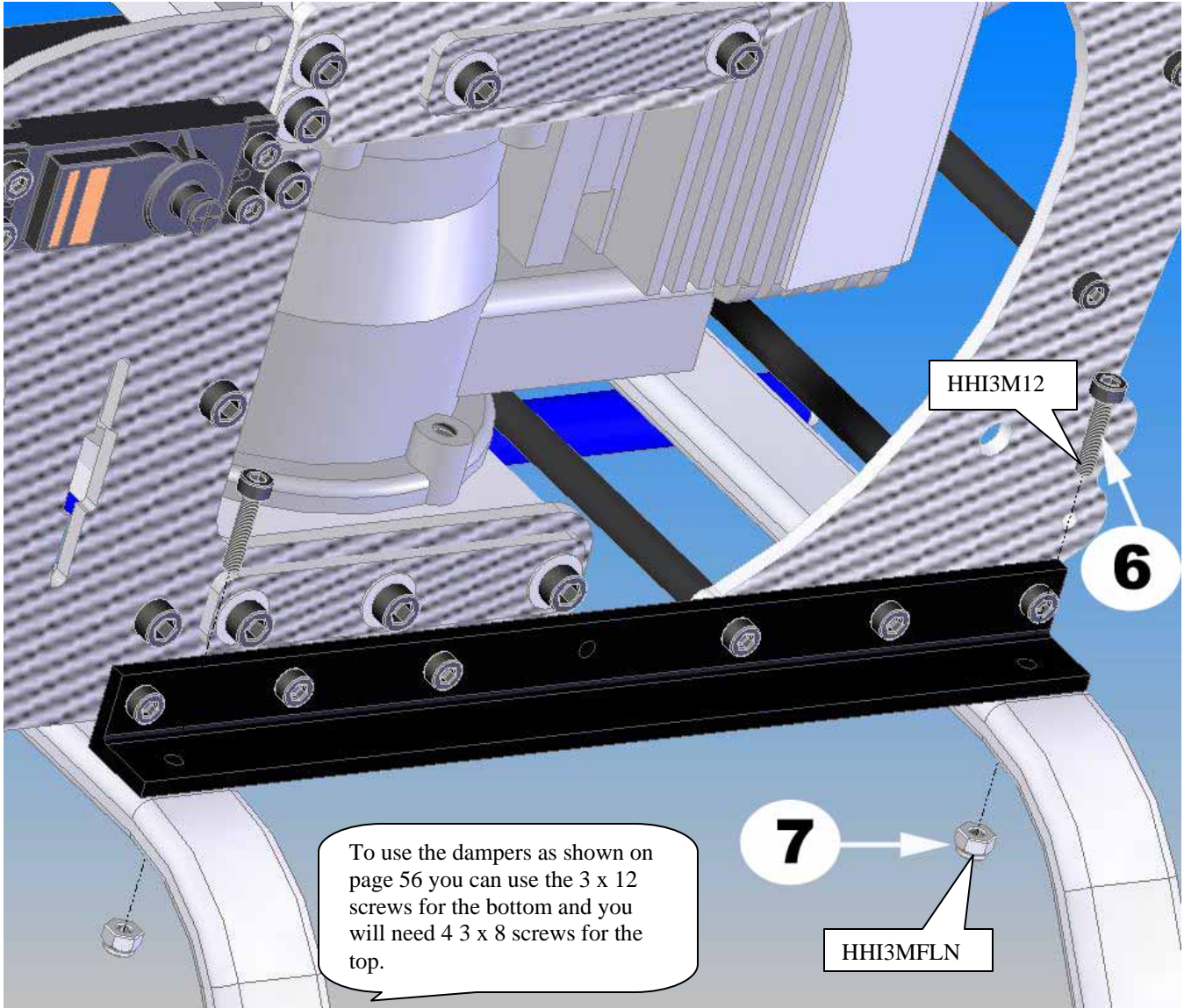


## SECTION 3: LANDING GEAR ASSEMBLY Bag 3

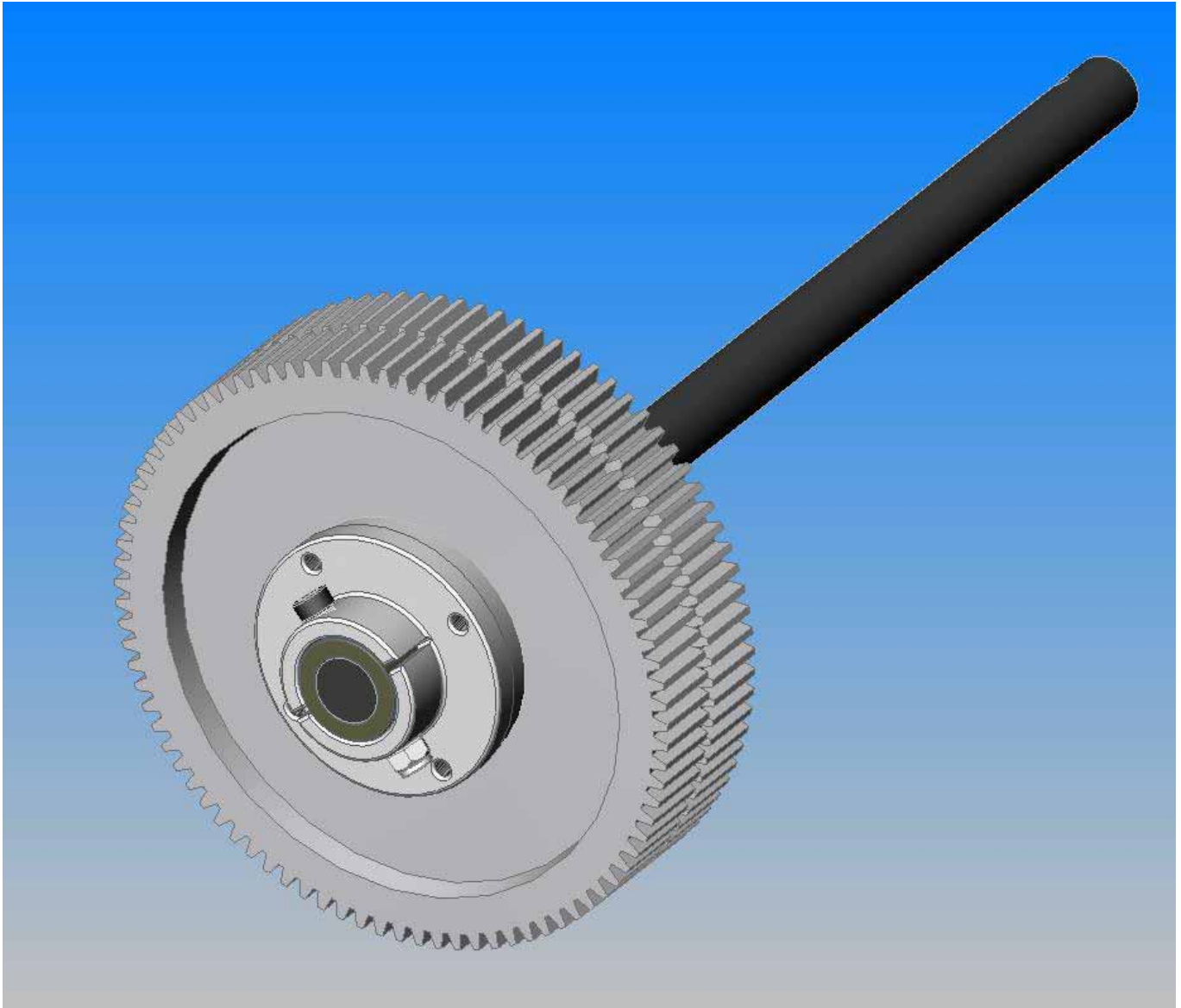


- Install the Main Frames onto the Landing Gear Assembly and secure them with four M3x14 Cap Head Bolts and four M3 Lock Nuts.

Note: It is recommended to use "*Landing Gear Dampener*" to reduce vibration. See "*Other Hardware & Optional Accessories*" to make order. Landing Gear Dampener is installed between the Landing Gear and the Landing Supports.



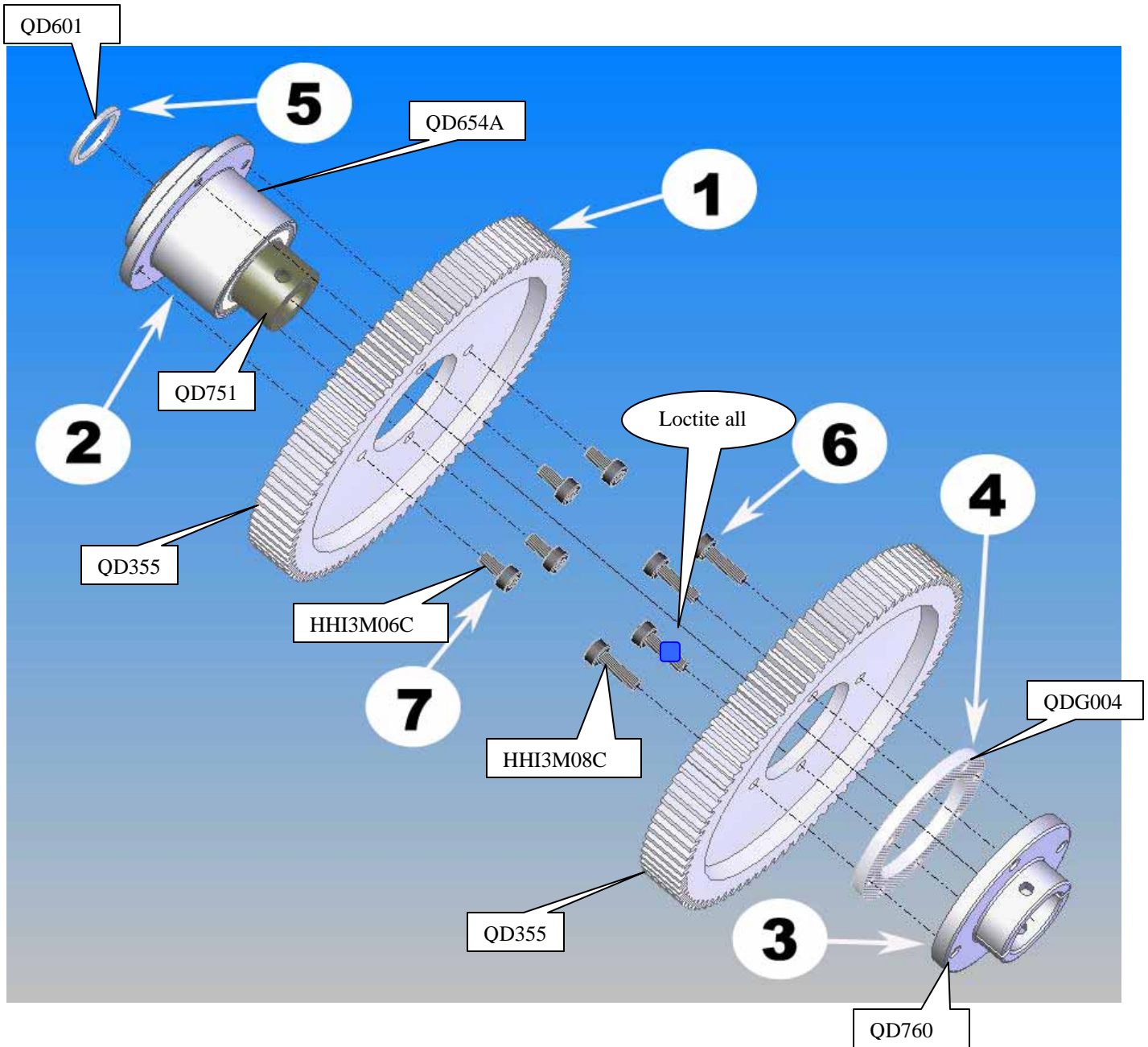




## 4-1 MAIN GEAR ASSEMBLY

NO	Bag#	Description	Qty	No.	Bag	Description	Qty
1	4	88T Main Gear	2	5	4	Auto Hub Ring	1
2	4	Auto-rotation	1		HB	M3x10 Cap Head Bolt	4
3	4	Lower Main	1	7	<b>HB</b>	M3x6 Cap Head Bolt	4
4	4	Main Gear	1				

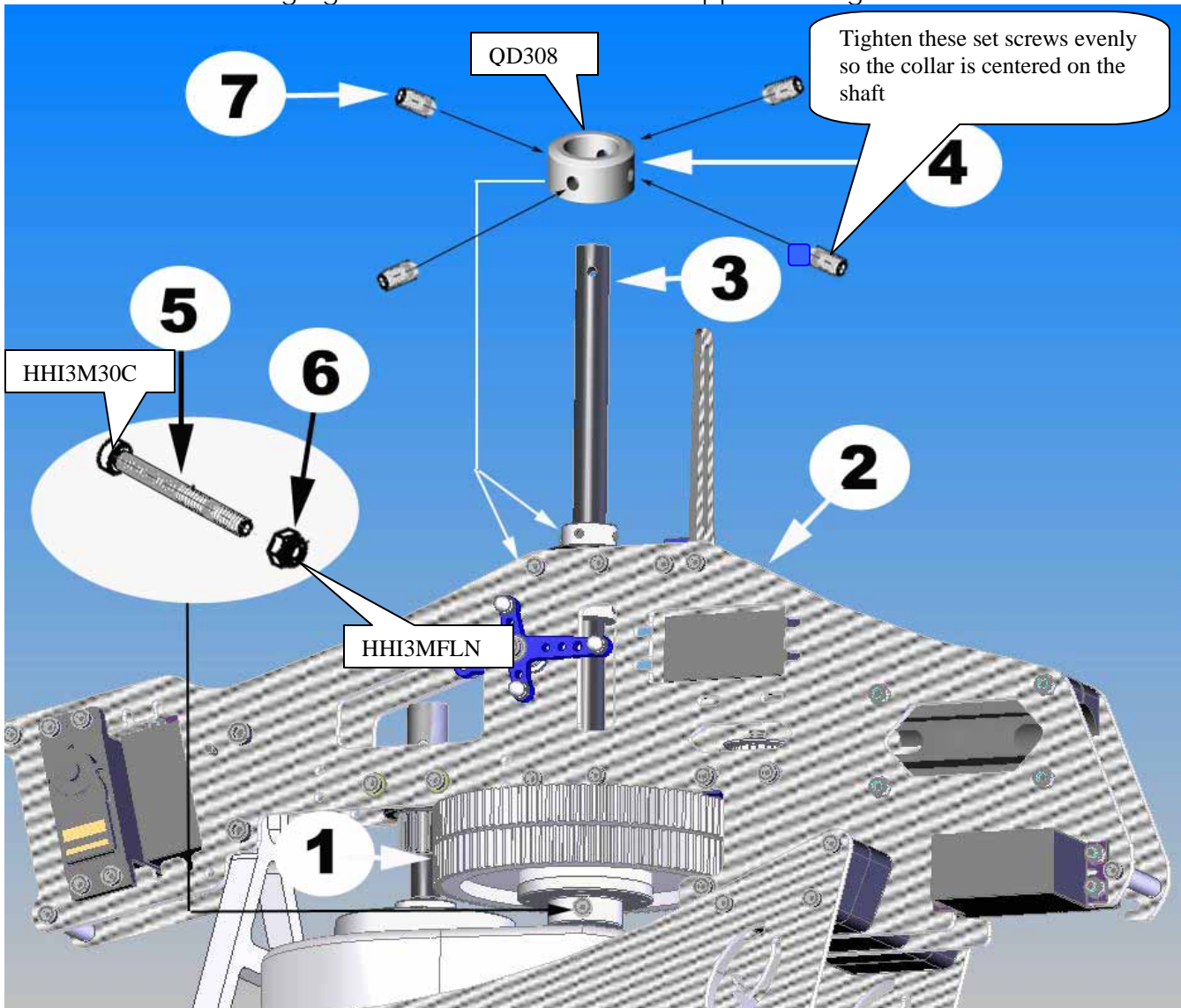
\*Main Gear Spacer may be one piece or stacking up of two pieces of composite material.



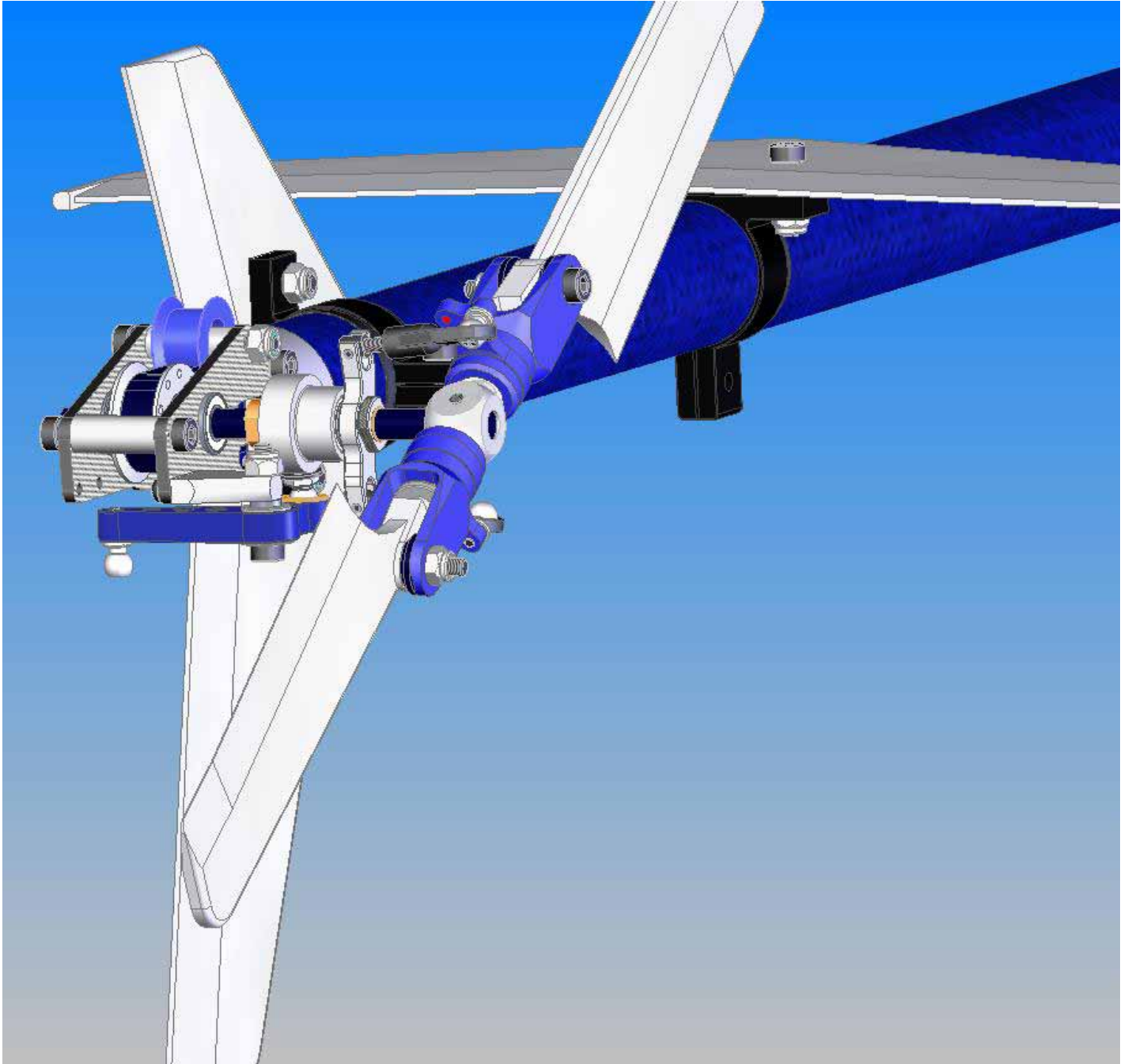
## 4-2 MAIN GEAR INSTALLATION

No.	Bag#	Description	Qty	No.	Bag#	Description	Qty
1	Step 4-1	Main Gear Assembly	1	5	HB	M3x30 Cap Head Bolt	1
2	Step 3	Assembly up to step 3	1	6	HB	M3 Locknut	1
3	4	Main Shaft	1	7	HB	M3X5 Set Screw	8
4	4	Main Shaft Collar	2				

- Bring the Main Gear Assembly in; slide the Main Shaft down through Upper Bearing Block, Main Shaft Collar (make sure the ridge is toward the Upper Bearing Block), and Lower Bearing Block, then secure with one M3x30 Cap Head Bolt and one M3 Locknut. Bring the Main Shaft Collar up until it touches the Upper Bearing Block then secure it with four M3x5 Set Screws.
- Install the other Main Shaft Collar on the Main Shaft then secure with four M3x5 Set Screws. Be sure the ridge goes down and touches the Upper Bearing Block.



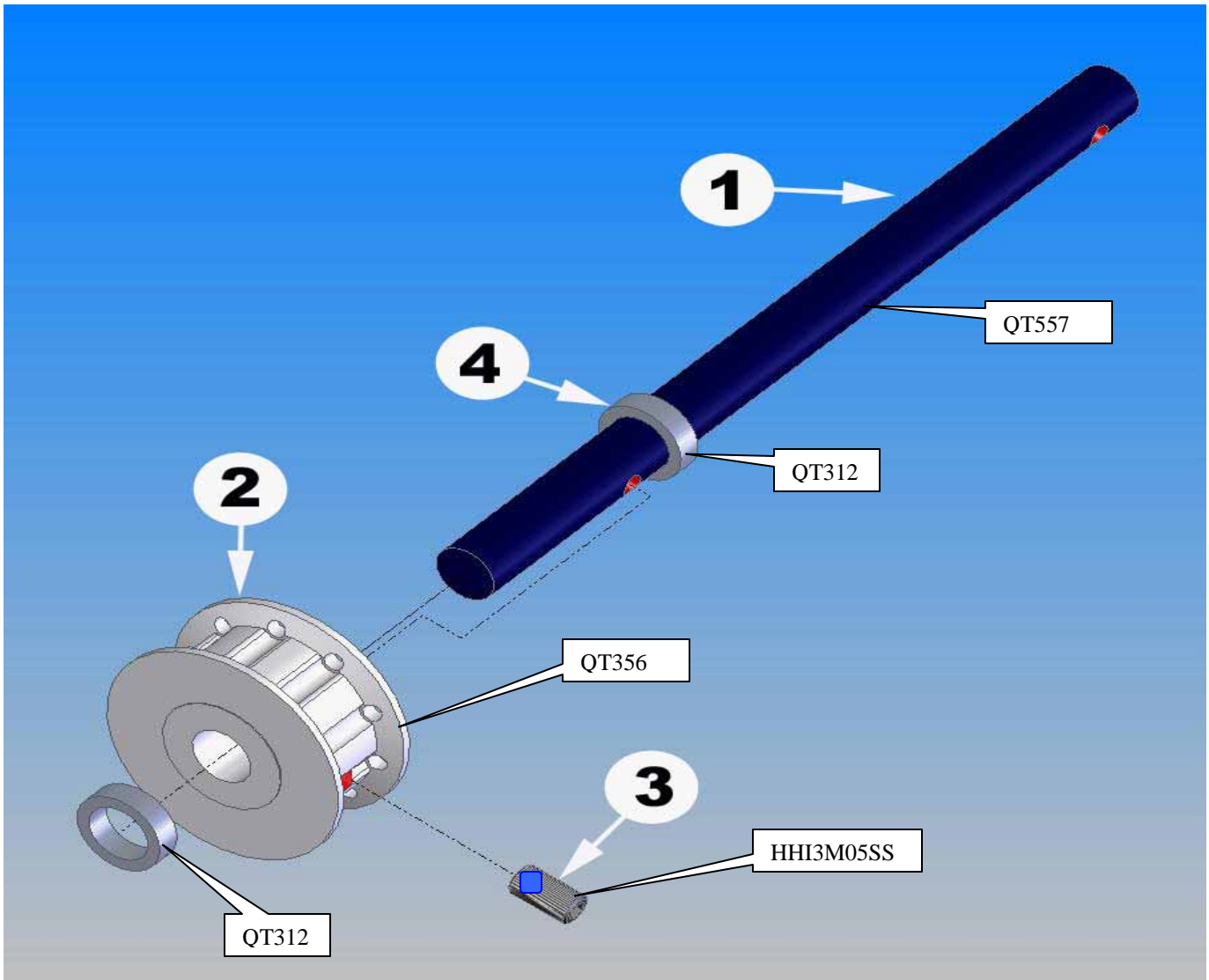
- Check static balancing of the main shaft to make sure it is balanced well.
  - You may have to sand down the holes for the Clutch Bearing Block a little for proper lining between the Main Gear and Pinion Gear.
  - Adjust the Tail Transmission and Start Shaft Bearing Block to get proper gear matches.
- Trick: fold a piece of tablet paper of 20x100mm (1x4 inch) along a long side and then insert it between the gears. Bring the gears together. Tighten the screws on the Tail Transmission/Start Shaft Bearing Block up and take the piece of paper off.





## 5-1 TAIL PULLEY GEAR ASSEMBLY

No.	Bag#	Description	Qty
1	5	Tail Output Shaft	1
2	5	Tail Pulley Gear	1
3	HB	M3x5 Set Screw	1
4	5	M5x7x2 Spacer	2



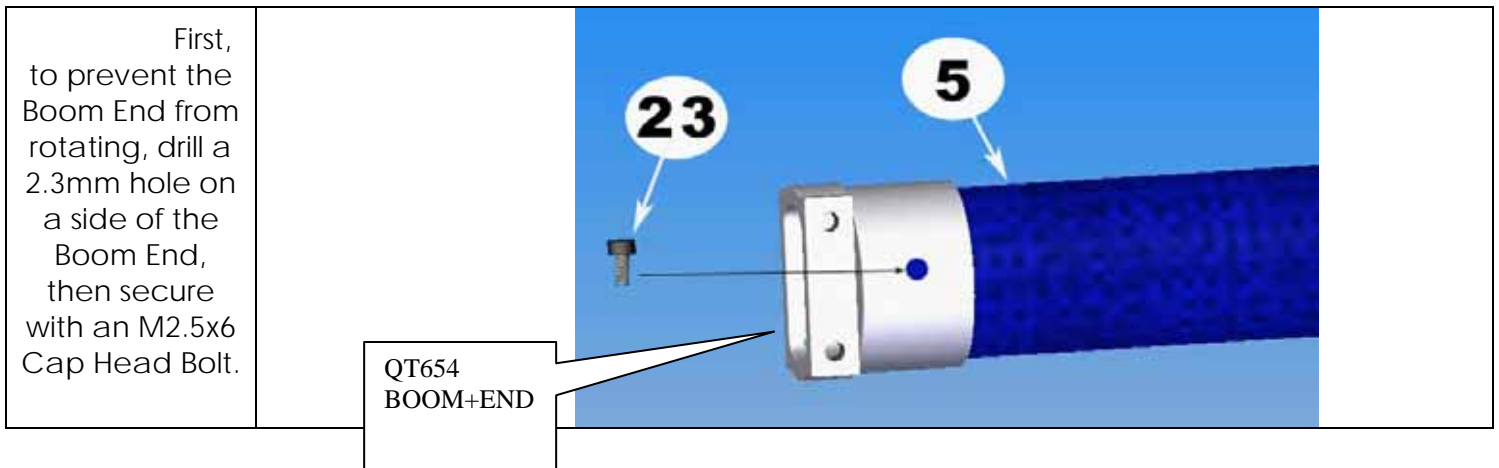


## 5-2 TAIL ROTOR ASSEMBLY

No.	Bag	Description	Qt	N	Bag#	Description	
1	Fra	Tail Case Side Plate	2	13	HB	M3x5x1 Spacer	
2	5	Tail Pitch Lever	1	14	HB	M3x16 Cap Head	
3	5	5X10X4Flange	2	15	HB	M3 Locknut	
4	HB	M2x6 Phillips Screw	2	16	Step 5-	Tail Pulley Gear	
5	In	Tail Boom (in Box)	1	17	HB	M3x7 Pivot Ball Stud	
6	In	Timing Belt (in Box)	1	18	HB	M3x7 Flat Washer	
7	HB	M3x6 Cap Head Bolt	6	19	HB	M3x25 Cap Head	
8	5	Tail Case Cross	1	20	5	Tail Idler	
9	HB	M3x4 Pivot Ball Stud	1	21	5	3x6x5.5 Spacer	
10	8	M2.3 Long Ball Link*	2	22	5	2.3mm Spherical	
11	5	Tail Pitch Slider	1	23	HB	M2.5x6 Cap Head	
12	5	Tail Pitch Control	1				

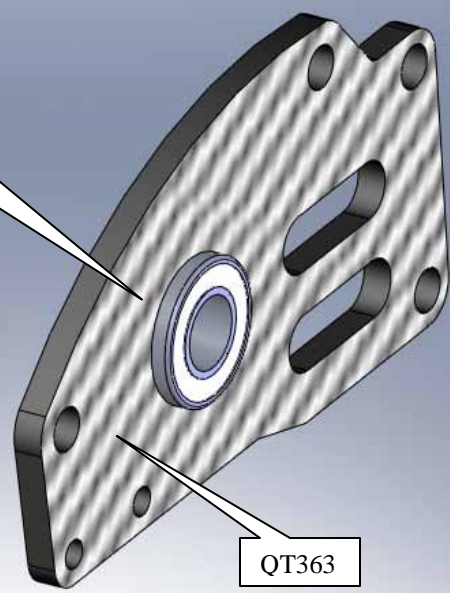
\*Sport version only

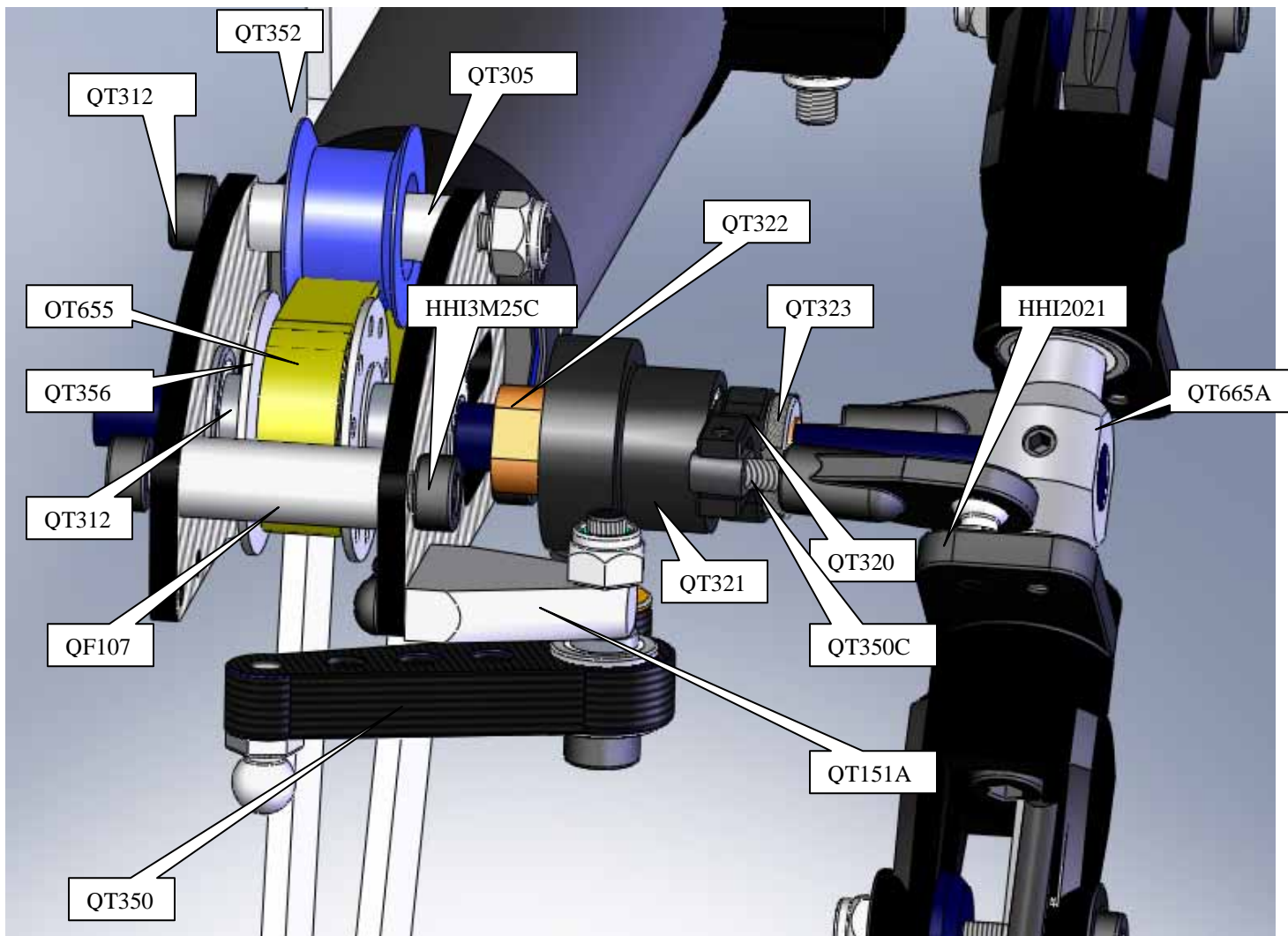
\*\*Pro version only



Install the Bearings into the Tail Case Side Plates. The flanges should be inside. Sometimes, the holes are too tight; you have to sand them a little bit.

Hand sand if necessary. You may use a rounded needle file





Note: Normally you just need one M3x5x1 Spacer between the Tail Pitch Control Lever and Tail Pitch Lever Mount but you may need two of them in some cases (if you do not have enough clearance for the lever.)

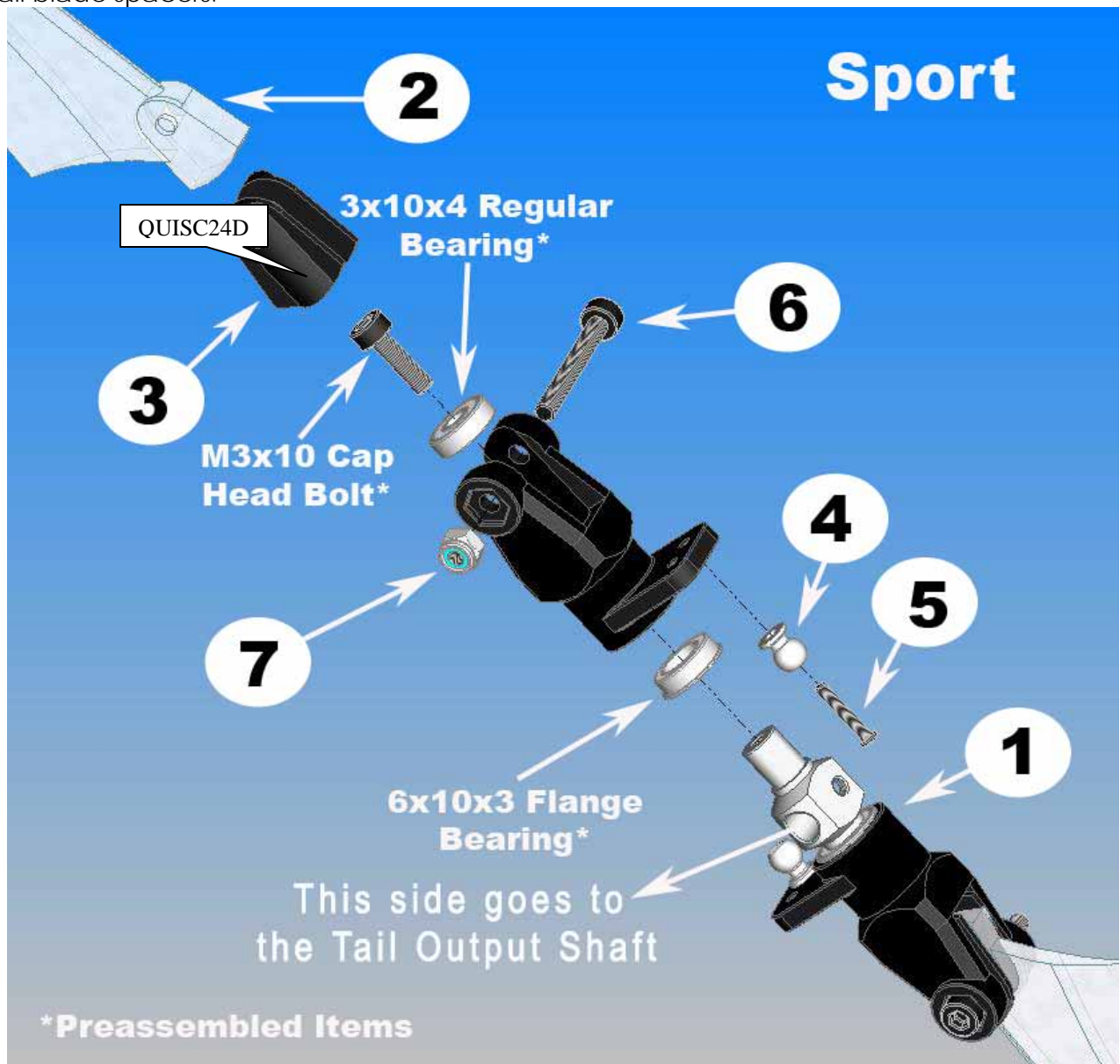
## 5-3 TAIL BLADE ASSEMBLY

No.	Bag#	Description	Qty	N	Bag#	Description	Qt
1	5	Tail Rotor	1	6	HB	M3x22 Cap Head Bolt	2
2	5	Tail Blade	2	7	HB	M3 Locknut	2
3	5	Tail Blade Spacer	4	8	HB	M3x5 Set Screw	2
4	HB	Shim Ball*	2	9	5	Spherical Link Spacer**	2
5	HB	M2x8 Phillips Screw*	2	10	HB	M2x12 Cap Head	2

\*Sport version only

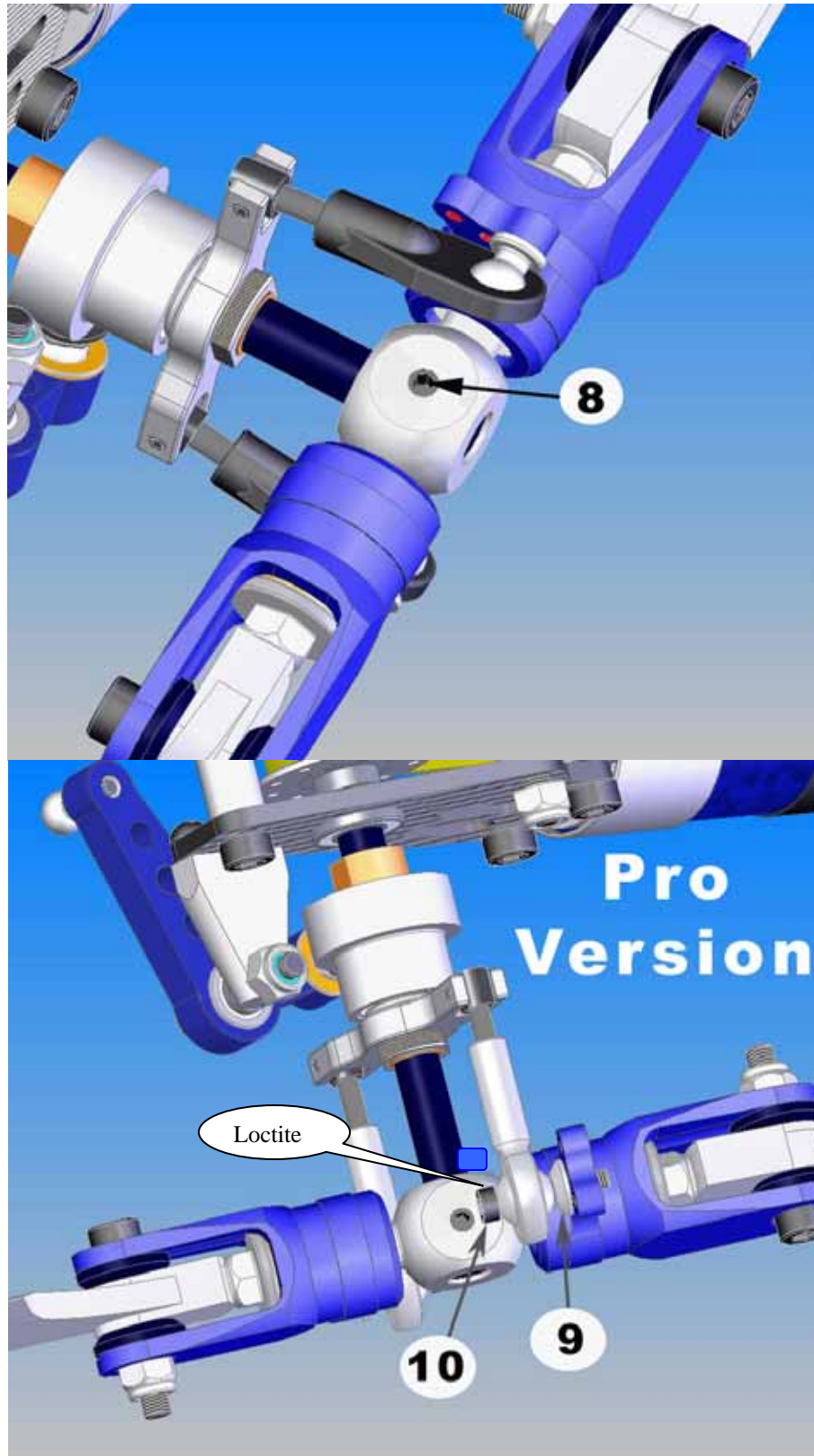
\*\*Pro version only

The Tail Rotor shown may look lightly differently from the one in the kit. Pro version comes with the metal blade grips and tail blade spacers; Sport version comes with the plastic blade grips and tail blade spacers.





Slide the Tail Blade Assembly into the Tail Output Shaft then secure it with two M3x5 Set Screws. Connect the Ball Links to the Shim Balls.

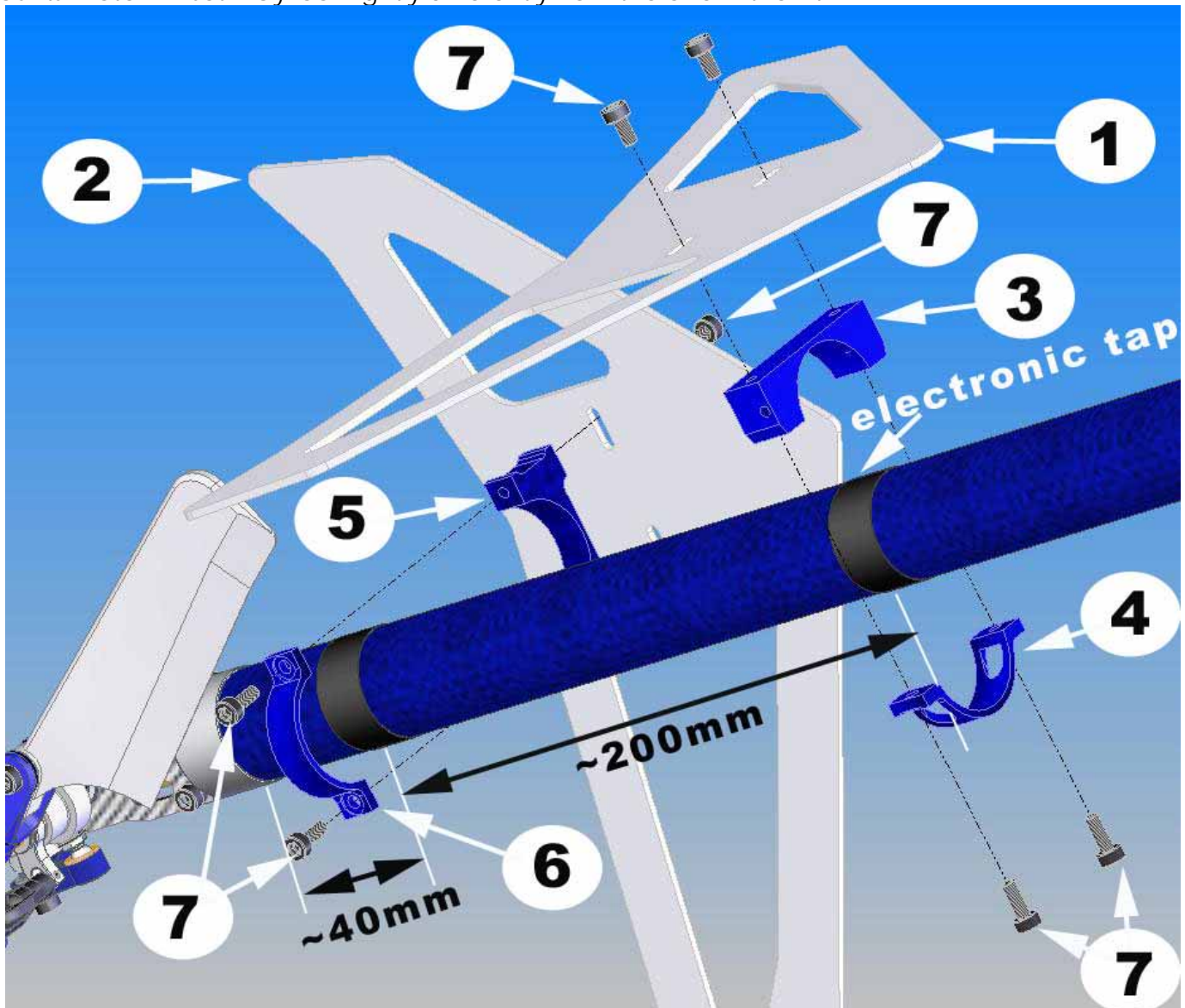


## 5-4 FIN INSTALLATION

No.	Bag#	Description	Qt.
1	5	Horizontal Fin*	1
2	5	Vertical Fin*	1
3	5	Horizontal Fin Mount Part A	1
4	5	Horizontal Fin Mount Part B	1
5	5	Vertical Fin Mount Part A	1
6	5	Vertical Fin Mount Part B	1
7	HB	M3x8 Cap Head Bolt	8
8*****		Electric Tape	1

\*Carbon Fin Set is also available for upgrade.

Wrap electric tape around the boom couple times where you are going to install the fin mounts. Note: Fin set may look lightly differently from the one in the kit.

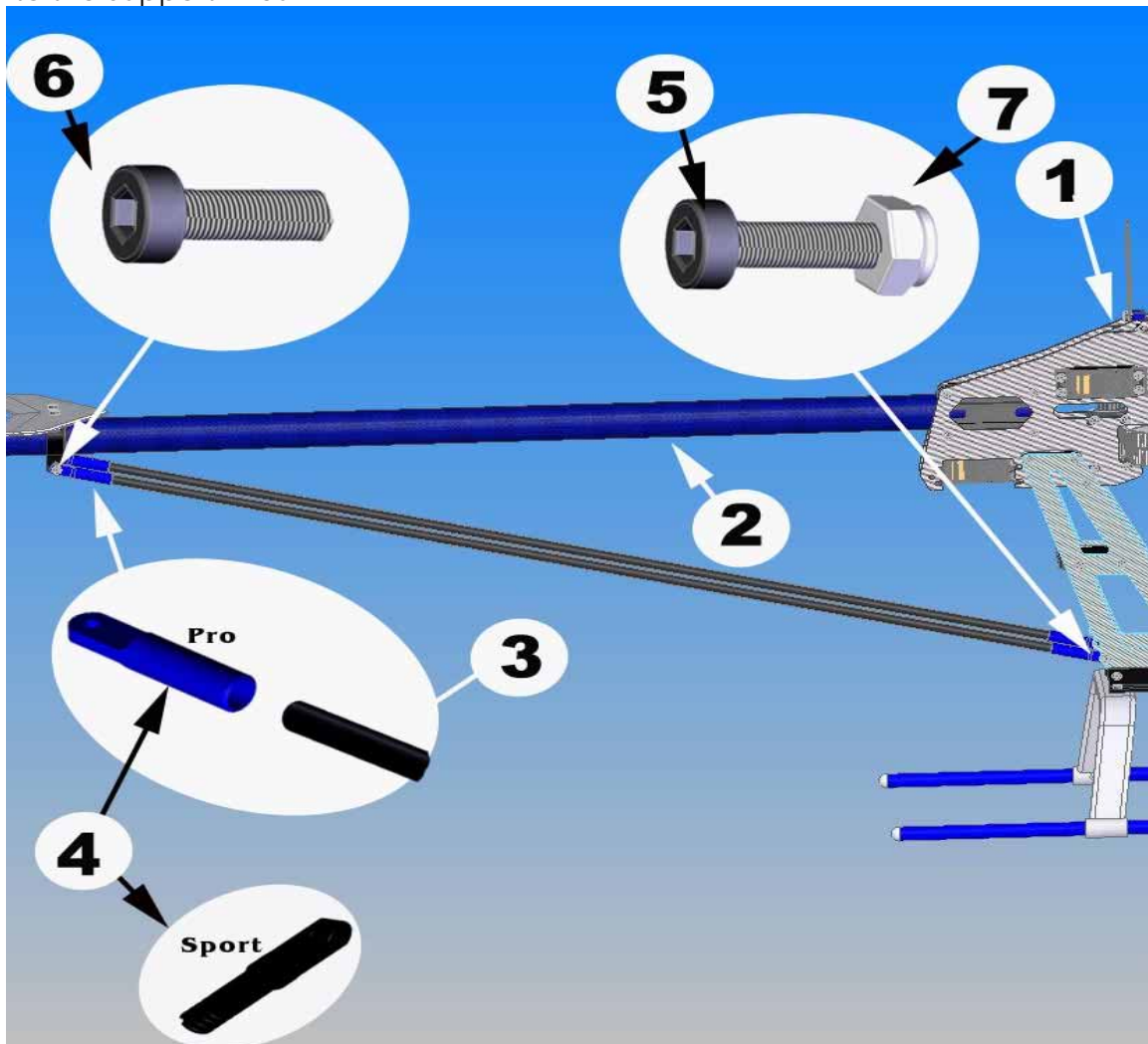


Note: Make sure that the Horizontal Fin is parallel to the ground and the Vertical Fin is perpendicular to the ground when the tail is attached to the helicopter.

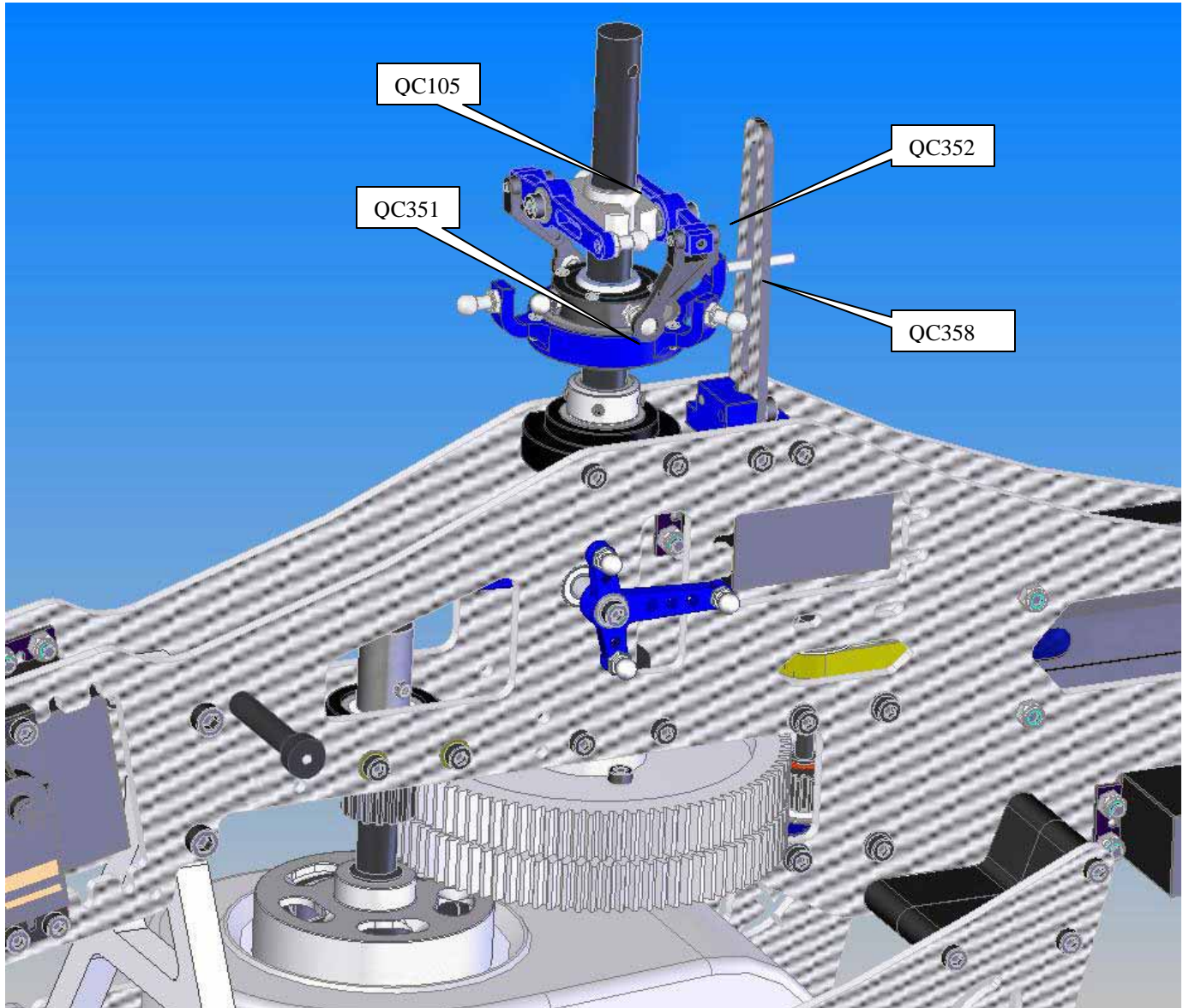
## 5-5 TAIL INSTALLATION

No.	Bag#	Description	Qt.
1		Assembly up to step 4	1
2	Step 5-4	Tail Assembly	1
3	In box	Boom Support Rod	2
4	5	Boom Support End	4
5	HB	M3x12 Cap Head Bolt	2
6	HB	M3x8 Cap Head Bolt	2
7	HB	M3 Locknut	2
8*****		CA Glue	1

- Wrap three or four rounds of electric tape around the end of Boom where the Boom Holders are going to touch it.
- Note for installing the timing belt: Turn the Tail assembly so that the Tail Output Shaft points upward, put the belt onto the Tail Pulley Gear of the Transmission, and then twist the Tail Assembly 90° to the right. The Tail Output Shaft should be parallel to the ground. Make sure the belt not too tight or loose. Tighten the four screws on the boom holders.
- Measure the Boom Support carefully before cutting. It is a good idea if you install one end of the rod first, then make the measure then cut it. Remember apply CA Glue for the rods when installing into the Support Ends.





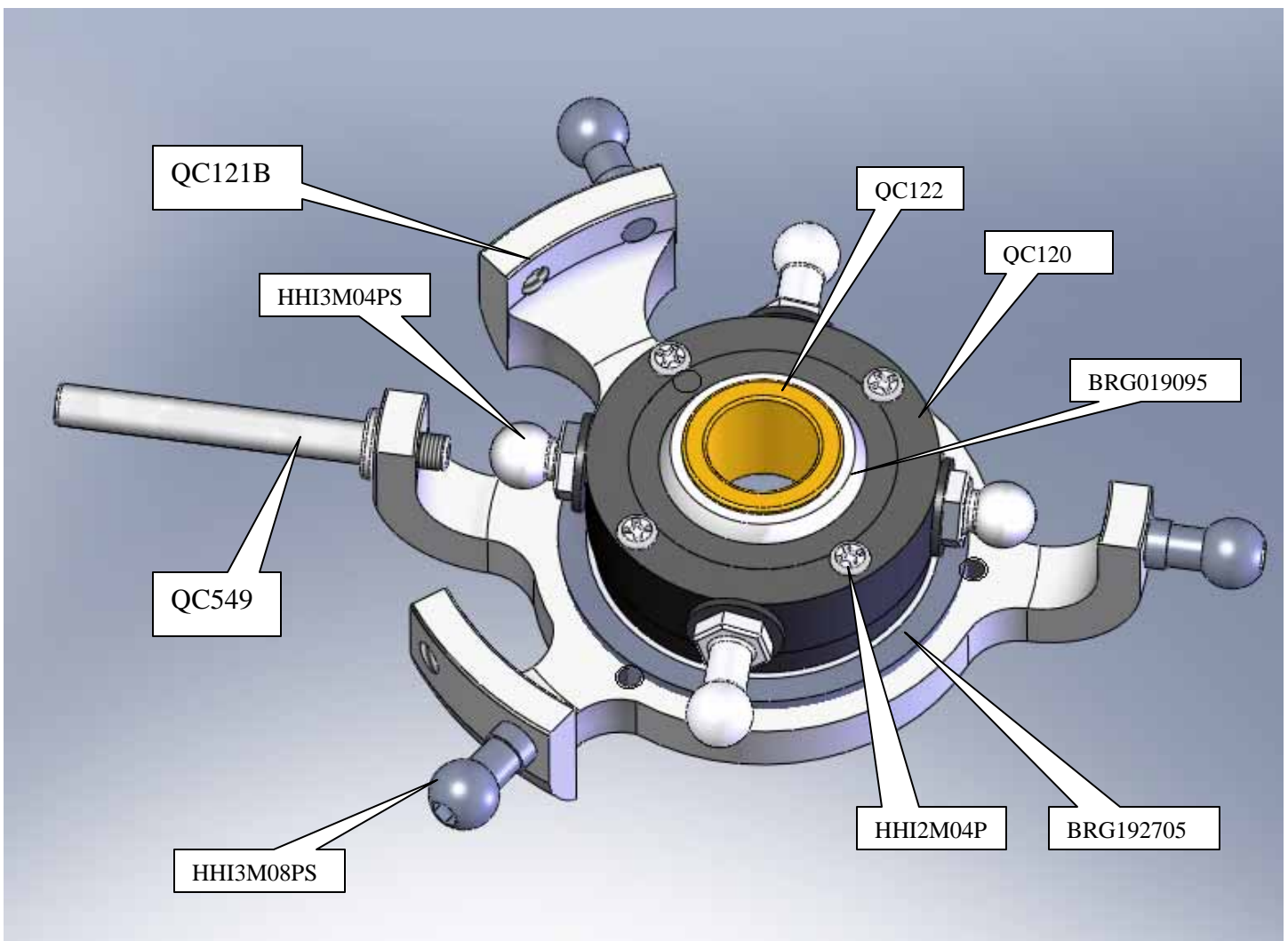


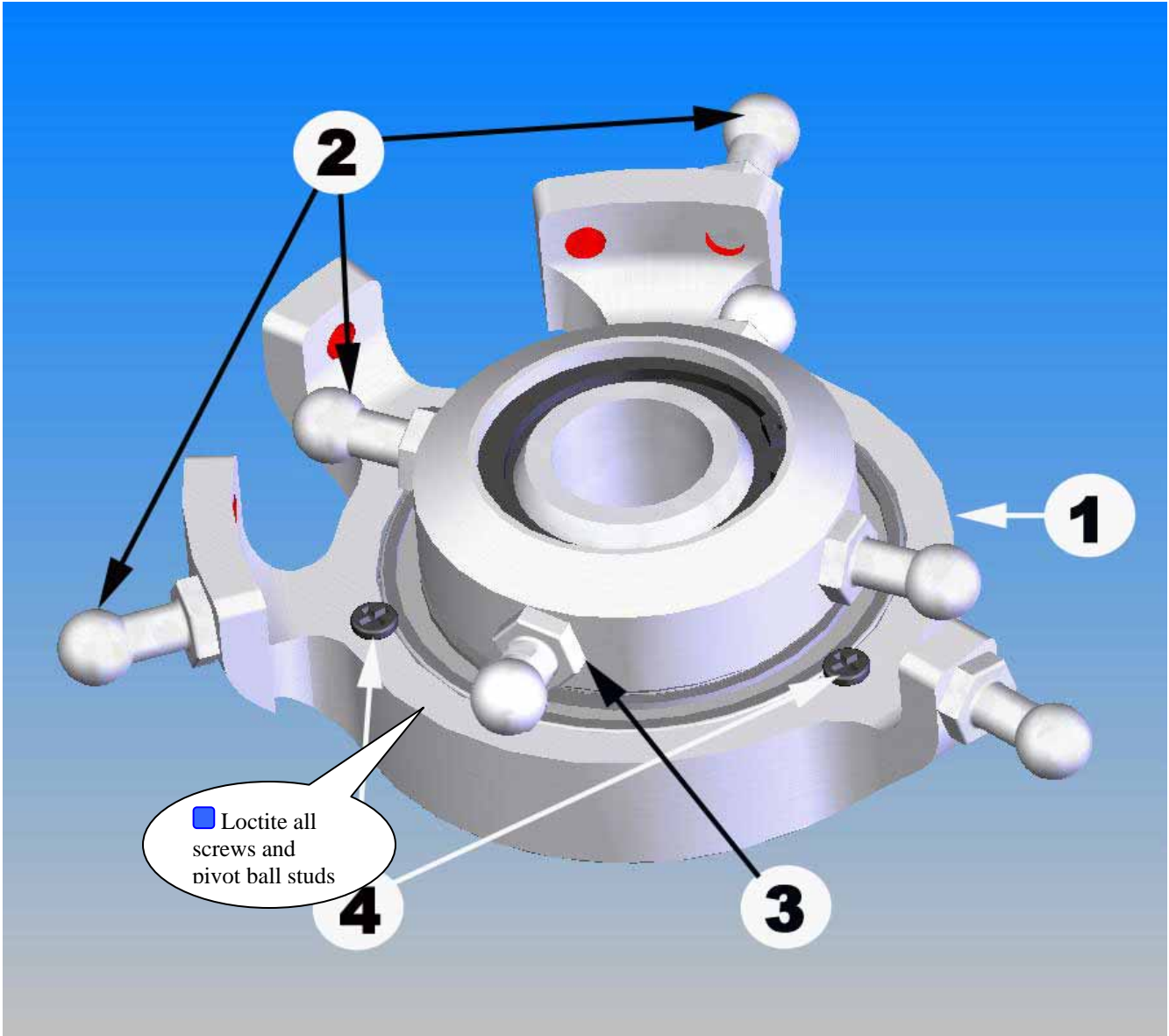


## 6-1 SWASHPLATE ASSEMBLY

No.	Bag#	Description	Qty
1	6	Swashplate	1
2	HB	M3x7Pivot Ball	7
3	HB	M3 x7 Flat	4
4	HB	M2X4 Phillips	7

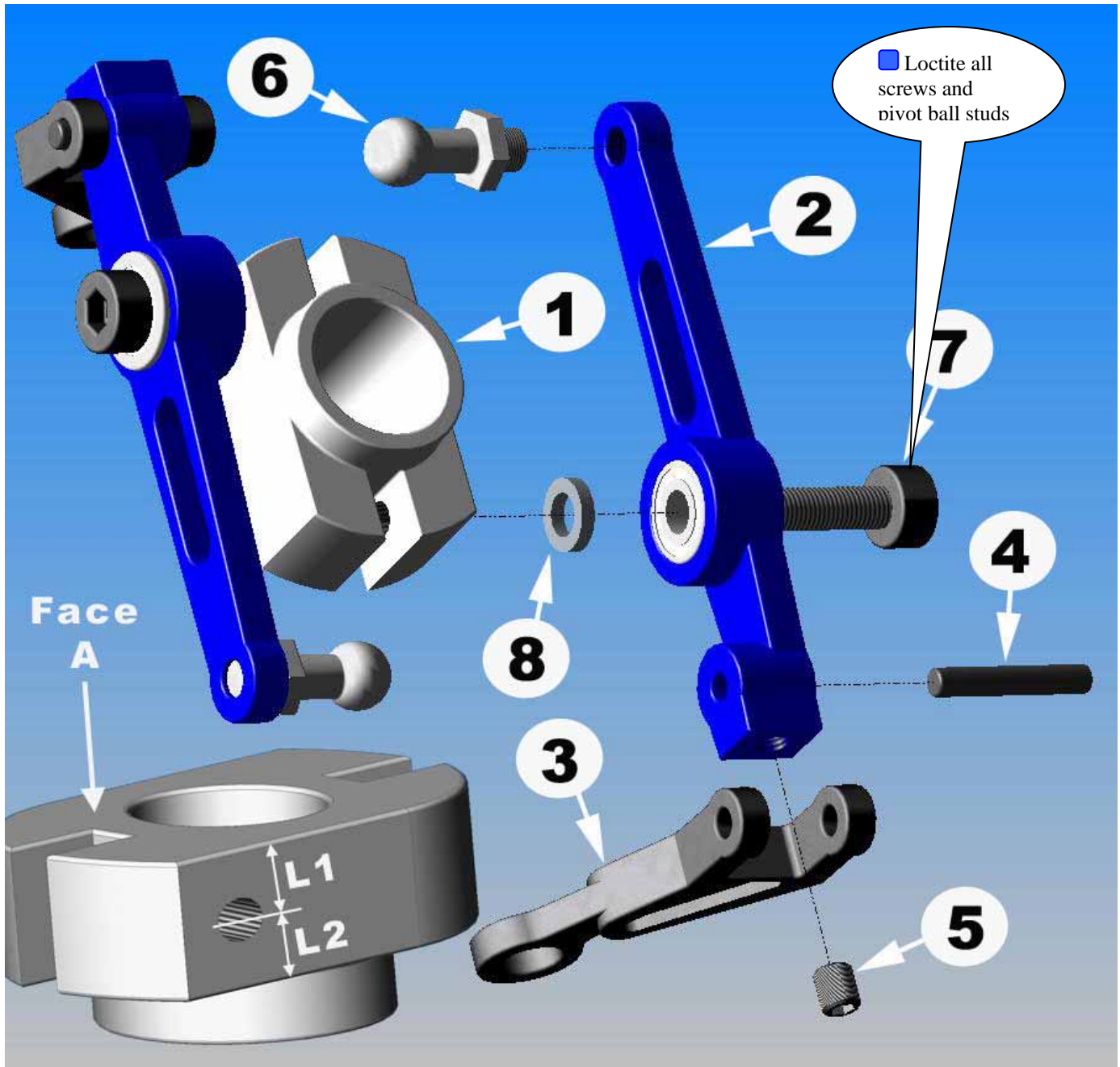
Note: There are some kinds of the Swashplate. One has little M2 Tap holes on the Swashplate (maybe 7, 4, or 3 of them.) The others have no hole on it. Both work the same. If you got the one with holes, just fill them with M2x4 Phillips Screws. If you got the one with no hole, do not worry about Phillips Screws; the Swashplate still works well.





## 6-2 WASHOUT ASSEMBLY

No.	Bag	Description	Q	N	Ba	Description	Qty
1	6	Washout	1	5	HB	M3x5 Set Screw	2
2	6	Washout	2	6	HB	M3x7Pivot Ball Stud	2
3	6	Washout	2	7	HB	M3x12 Cap Head Bolt	2
4	6	Washout	2	8	HB	M3X5X1 Spacer	2

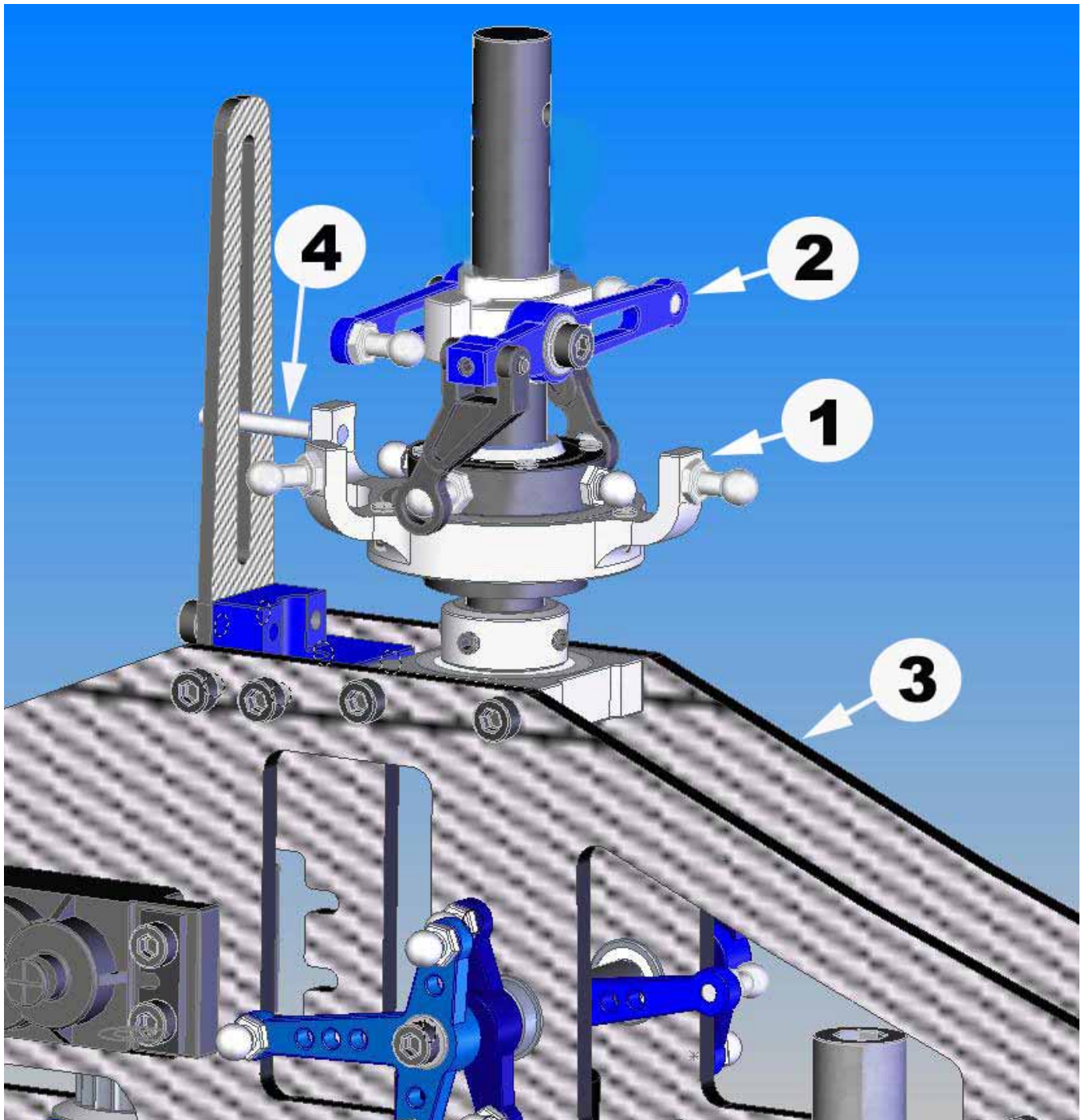


Note: There are some versions of the Washout Base (Item No. 1). All of them work the same but they should be installed appropriately:

- If L1 is shorter or equal to L2, face A should go up.
- If L1 is longer than L2, face A should go down.

## 6-3 CONTROL SYSTEM INSTALLATION

No.	Bag#	Description	Qty
1	Sep	Swashplate	1
2	Step	Washout	1
3	Step	Assembly	1
4	6	Swash Anti-	1



Connect the Washout Links to the 3x7 Pivot Studs on the Swashplate.

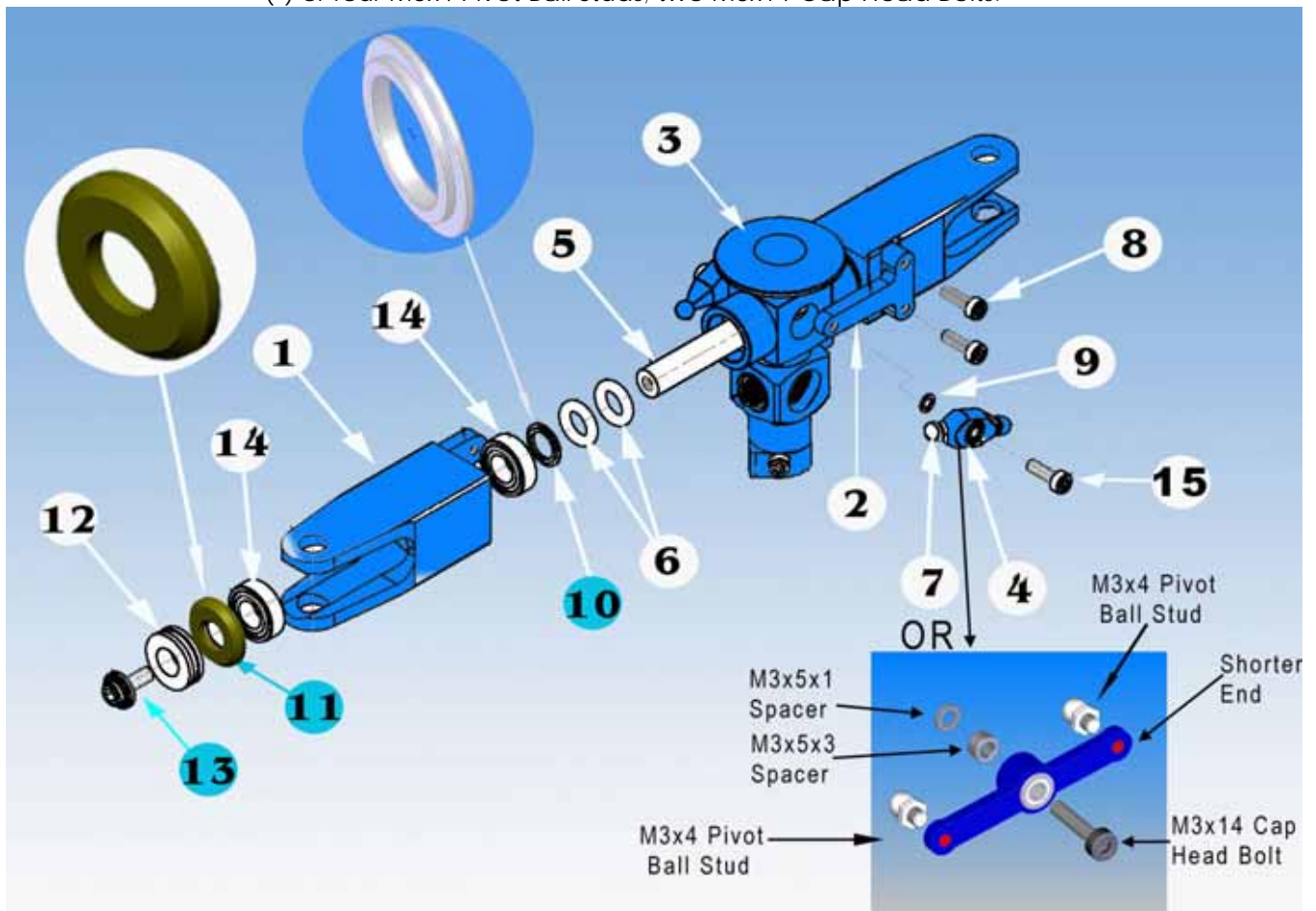


# SECTION 7A: ROTOR HEAD *SPORT VERSION* Bag 7

## 7A-1 MAIN ROTOR HUB ASSEMBLY

No.	Bag#	Description	Qty	No.	Bag#	Description
1	7	Main	2	9	HB	M3X5X3
2	7	Pitch Arm	2	10	7	Head
3	7	Center	1	11	7	Thrust
4	7	Hiller Arm	2	12	7	8x16x5
5	7	Head	1	13	7	M4 Flange
6	7	Dampener	4	14	7	8x16x5
7	HB	M3x7 Pivot	2	15	HB	M3x12
8	HB	M3x10	4			

(\*) or four M3x4 Pivot Ball Studs; two M3x14 Cap Head Bolts.

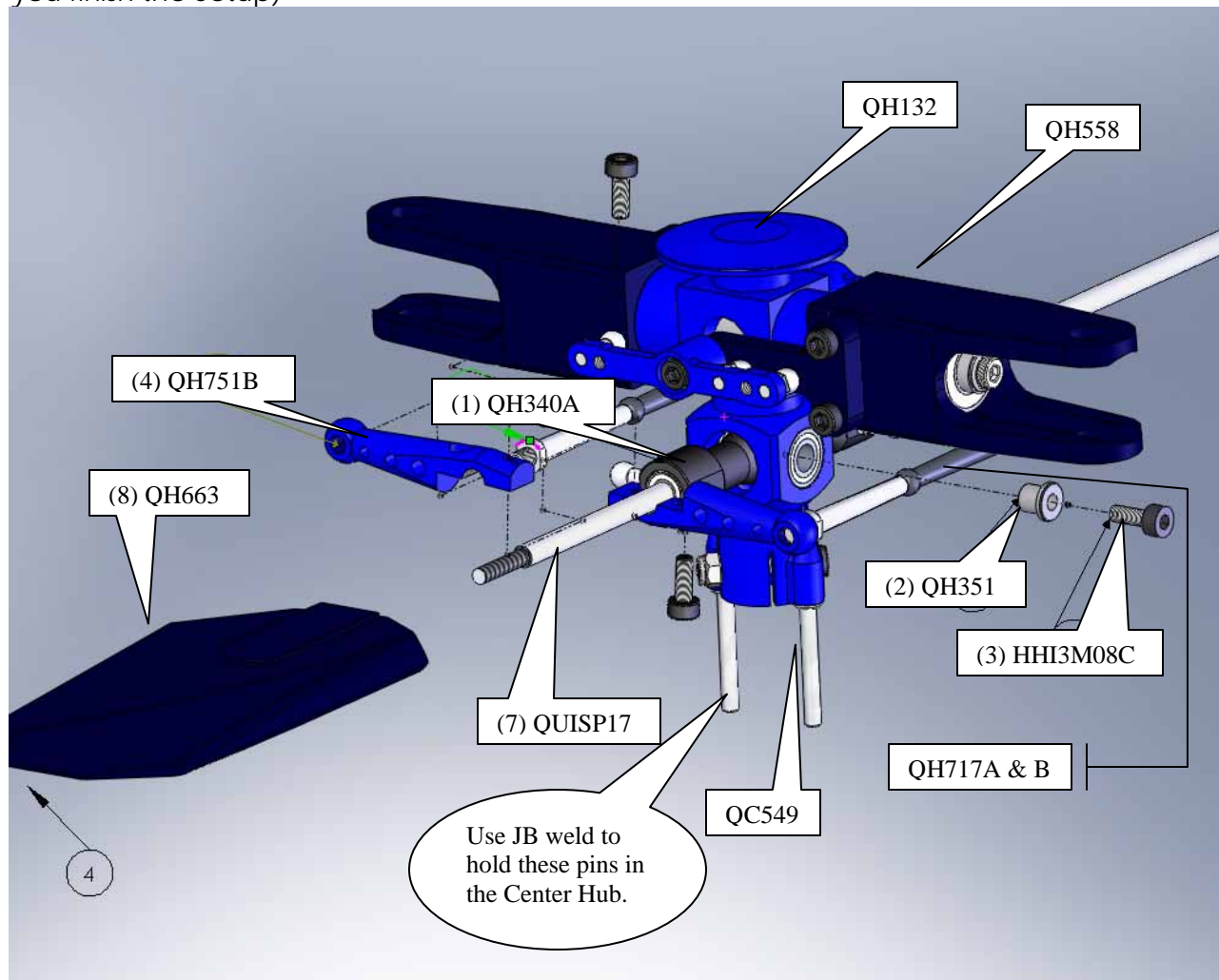


Note: Some Center Hubs are designed for one O-ring each side. If this is your case, use one O-ring each side. The beveled edge of the Thrust Bearing Spacer (No. 11) should be face away from the Center Hub. The flanges of the bearings of the Hiller Arms should face outside. Usually the Thrust Bearing has three parts: two race washers and caged ball bearings. The caged ball bearings will be between two race washers. In some cases, you may get different version of the Thrust Bearing: one race washer, one flat washer, and caged ball bearings in your kit. That is fine; it still works the same. In this case, you need to install the flat washer first (next to Thrust Bearing Spacer-No. 11), then the caged ball bearings, the race washer goes last.

## 7A-2 FLYBAR & SEESAW ASSEMBLY

No.	Bag#	Description	Qty
1	7	Seesaw	1
2	7	Seesaw collar	2
3	HB	M3 x 8 Cap Head Bolt	2
4	7	Fly-Bar Control Arm Base	4
5	7	Fly-Bar Control Arm	2
6	HB	M2.5 x 8mm SHCS	4
7	In box	4mm Flybar	1
8	7	4mm Fly-Bar Paddle	1

- There are two holes in the paddles. For regular setup, use the hole that is further from the letter "Quick" on the paddles.
- Although the drawing does not show the other side of the head, you should repeat the same assembly for that side.
- Fly-bar should be balanced on the Seesaw.
- Connect the Short Ball Ends to the cooperated ball of the Hiller Arms.
- Make sure to apply Epoxy Glue/JP Weld to the thread on Flybar and the Flybar Paddle (after you finish the Setup)

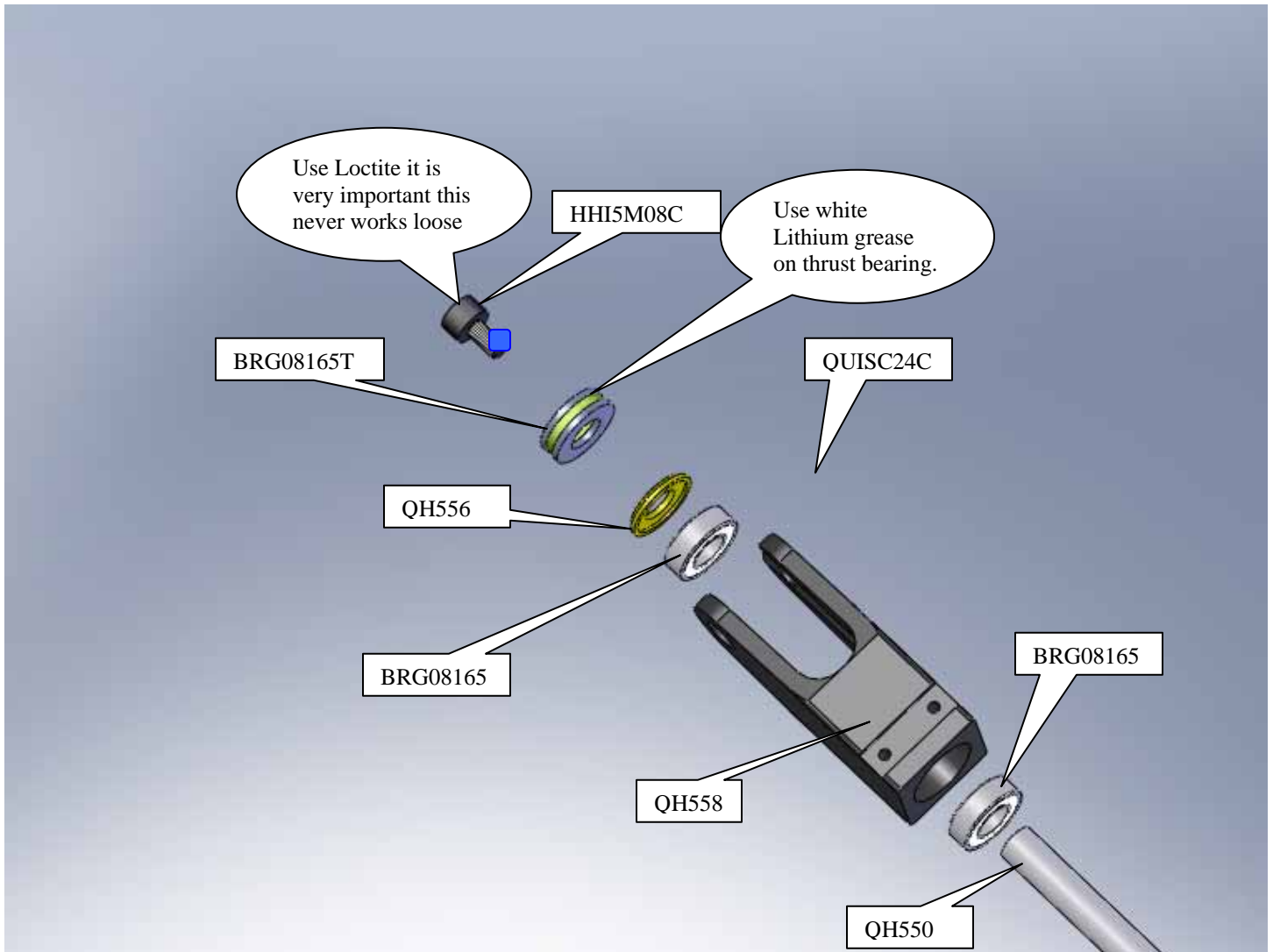


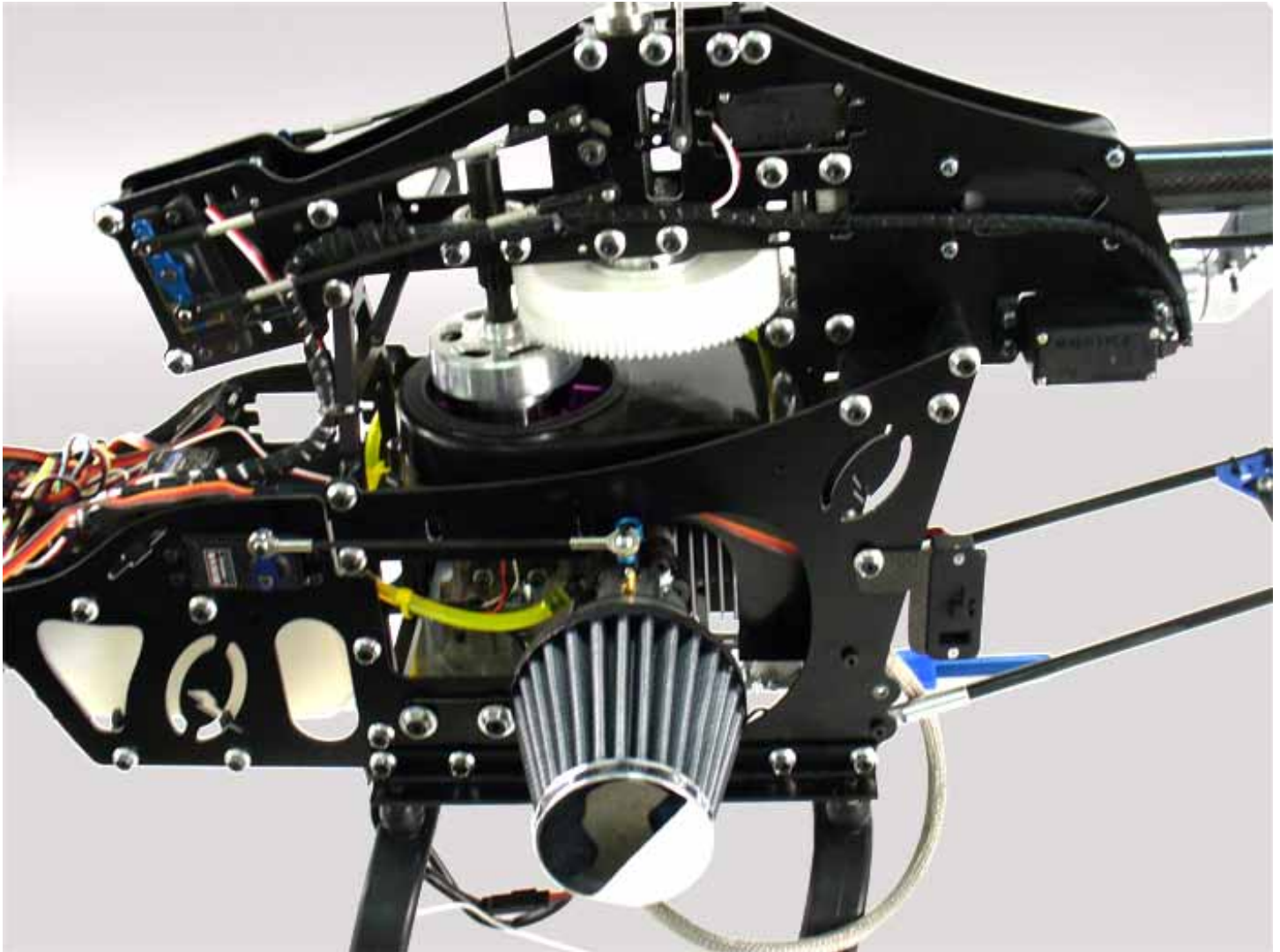
Note: The Center Hub, Main Blade Grips, and Fly bar Control Arm shown may look differently from the ones in the kit.

## 7A-3 ROTOR HEAD INSTALLATION

No.	Bag#	Description	Qty
1	Step	Completed	1
2	Step	Assembly	1
3	HB	M3x22 Cap	1
4	HB	M3 Locknut	1

Install the Head Assembly into the Main Shaft, and then secure it by one M3x22 Cap Head Bolt and one M3 Locknut.



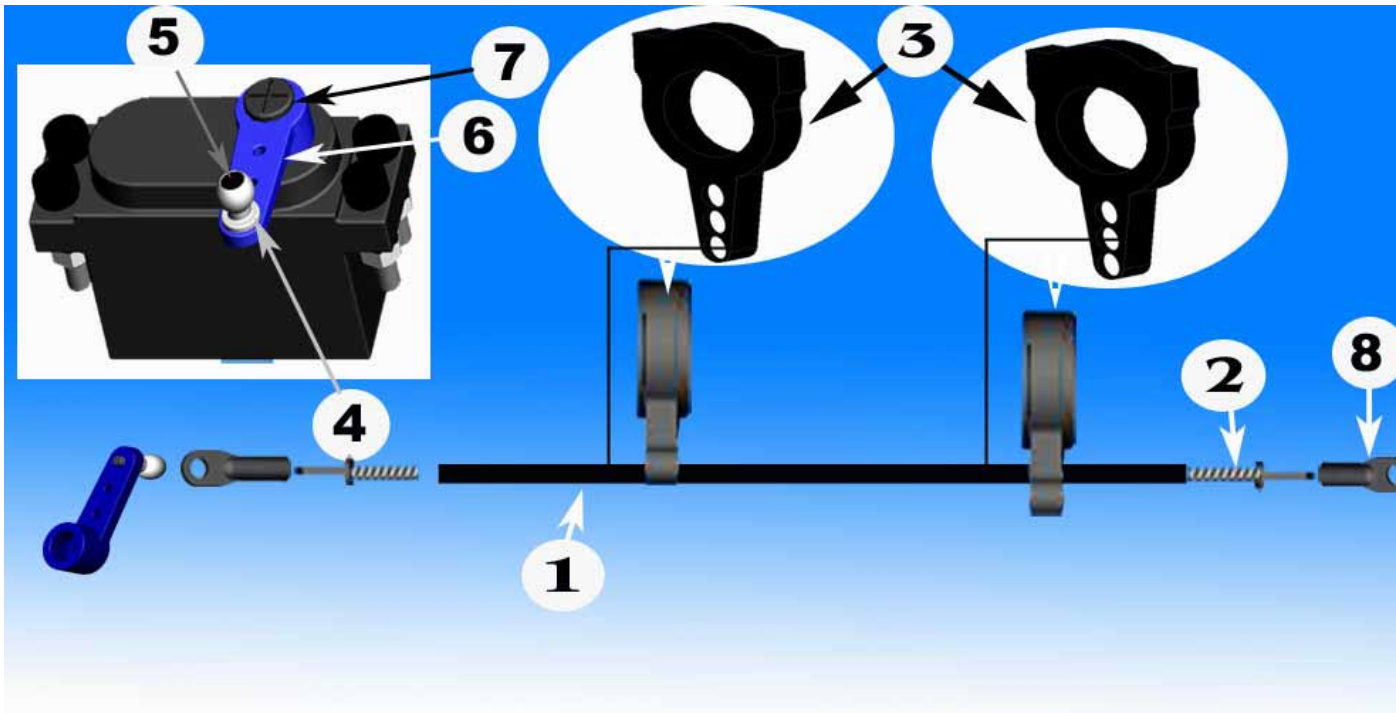




## 8-1 RUDDER PUSH ROD INSTALLATION

No.	Bag#	Description	Qty
1	In	Rudder	1
2	8	Rudder	2
3	8	Pushrod	2
4	HB	Shim Ball	1
5	HB	M2x8	1
6****		Servo Arm	1
7****		M3 Servo	1
8	8	2.3mm	2
9****		CA Glue	1
10****		Electric	1

The diameter of the Pushrod Guide Clamp-on is a little bit bigger than the diameter of the boom. Wrap the Boom with some wraps of electrical tape to keep it from slipping and take over that space.

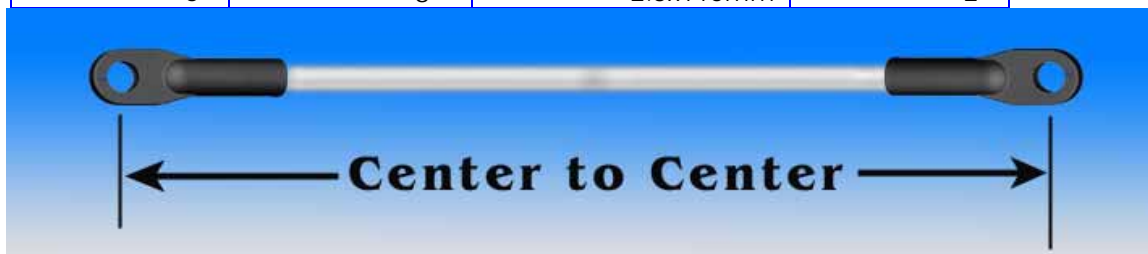


The length of the Rudder Rod measured from center to center should be around 762 mm.



## 8-2A LINKAGE ASSEMBLY SPORT VERSION

No.	Bag#	Description	Qt.
1	8	2.3 Long	28
2	8	2.3x25mm	2
3	8	2.3x45mm	5
4	8	2.3x70mm	2
5	8	2.3x100mm	3
6	8	2.3x115mm	2

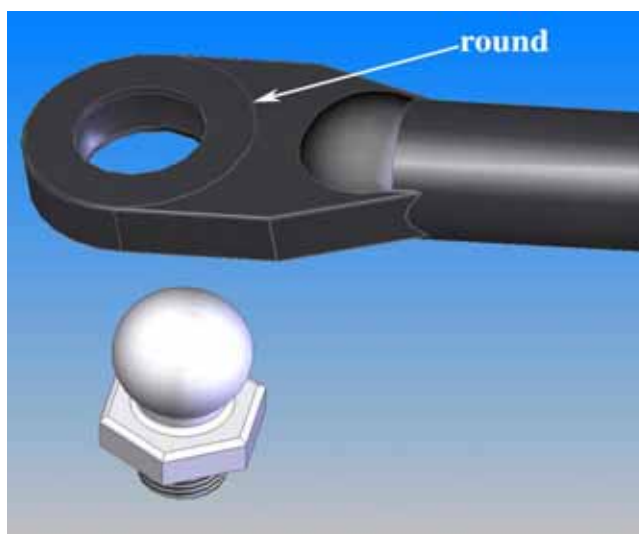


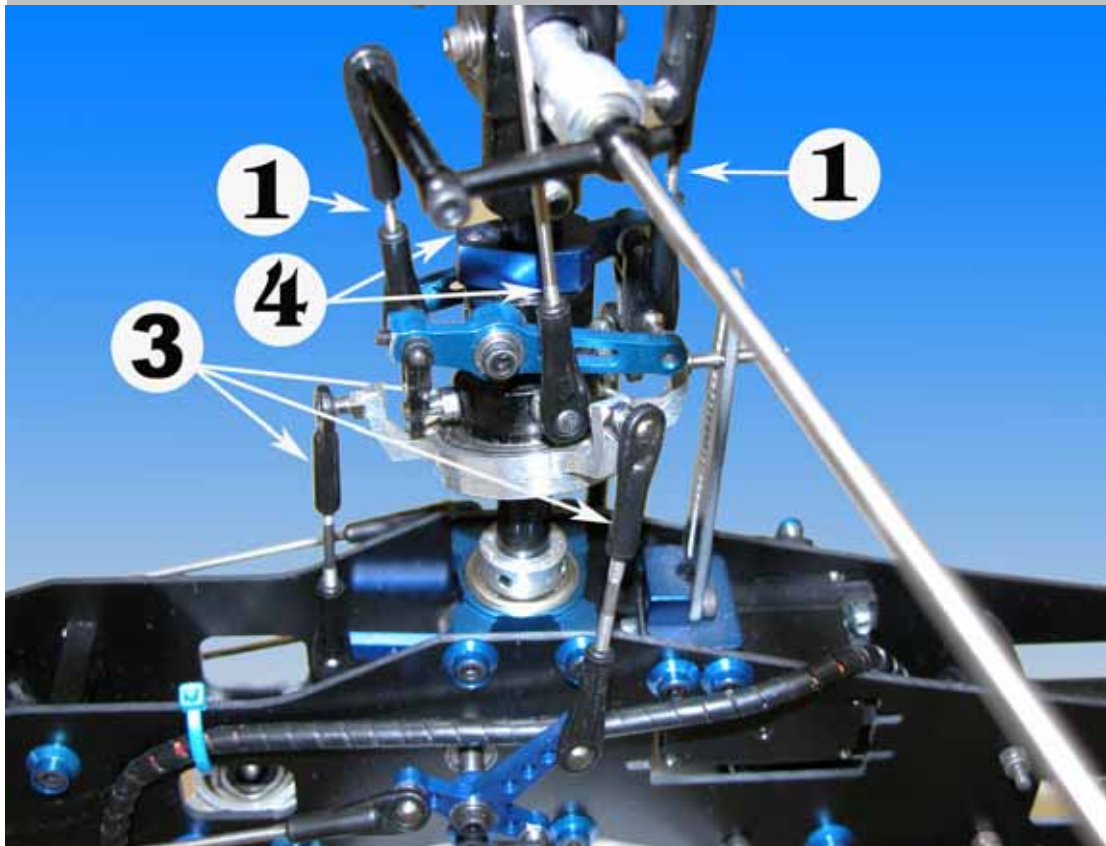
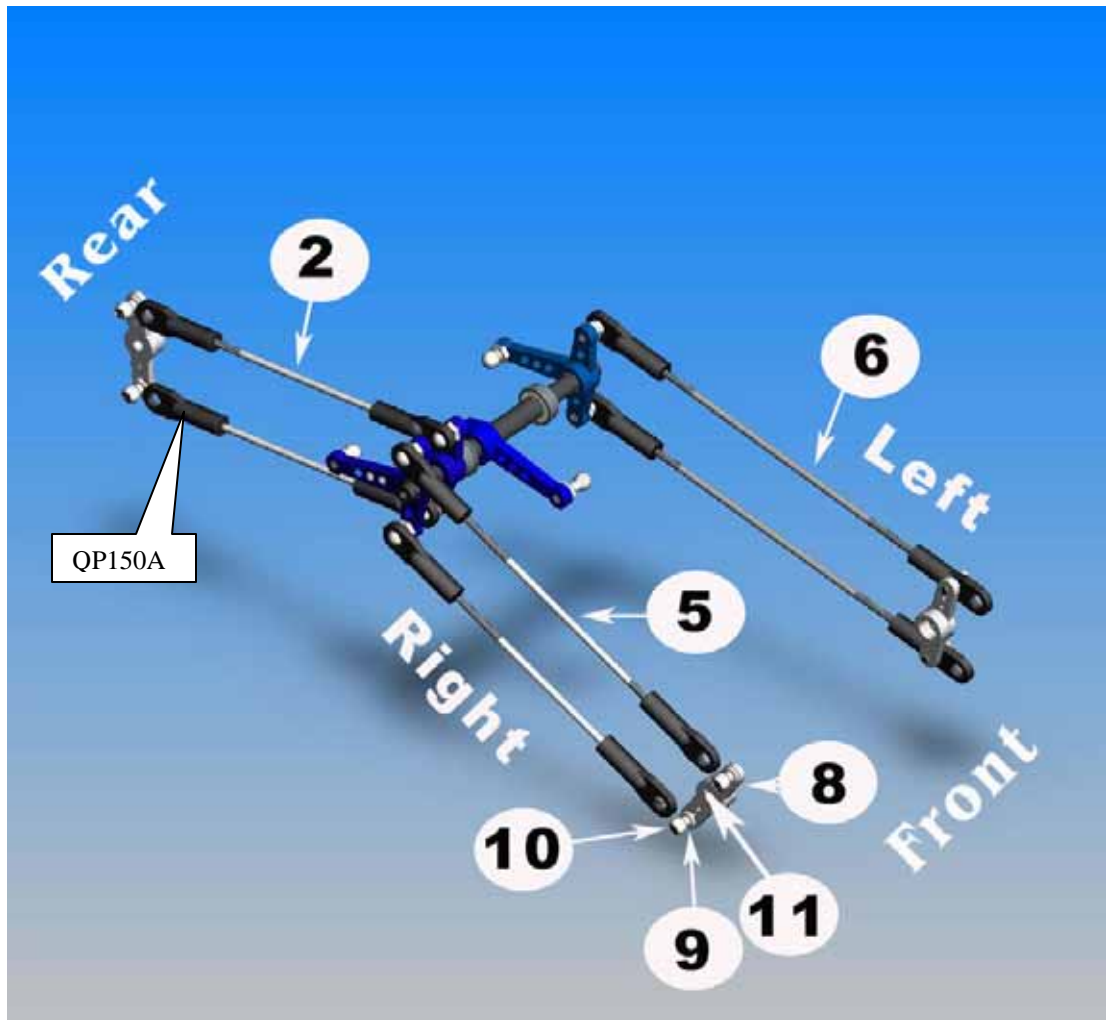
### **Rod Assembly:**

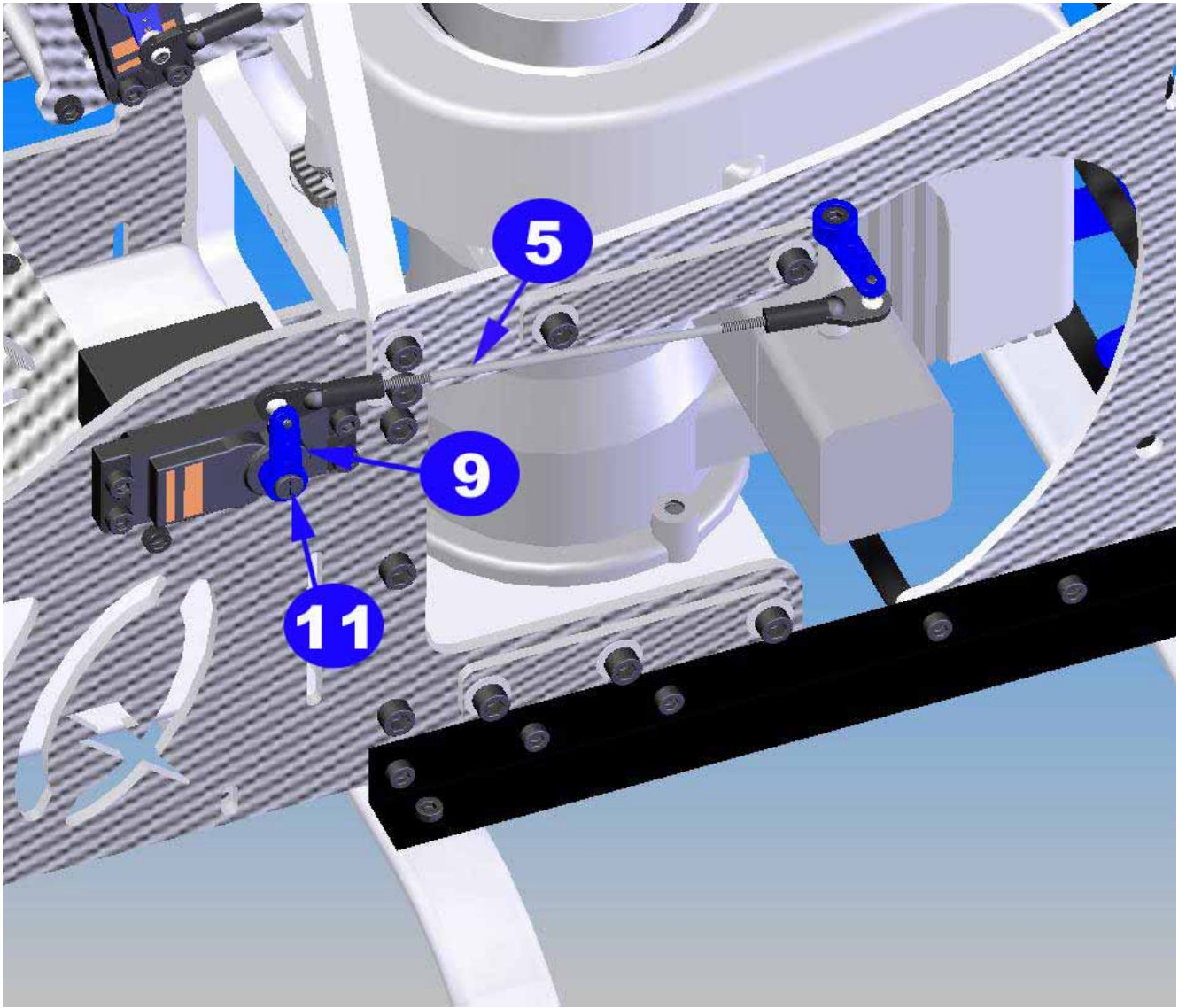
All the Linkages should be assembled with dimensions measured center to center as following:

No.	Bag	Rod	Center	Qty
1		2.3x25mm	47 mm	2
2		2.3x45mm	67 mm	2
3		2.3x45mm	71 mm	3
4		2.3x70mm	88 mm	2
5		2.3x100mm	125	3
6		2.3x115mm	146	2
7*****		Single		1
8*****		Double		3
9	HB	Shim Ball		7
10	HB	M2x8		7
11*****		M3 Servo		4

Note: The lengths of Linkages are used for reference only. Final adjustments will be needed when you do radio setup. Look close to a ball end; you will see one side is different from the other. One has a round marked on it. The other is just plain. When installing a ball link into a pivot ball stud (or a shim ball) the side with a round should face away from a ball stud (or shim ball.)





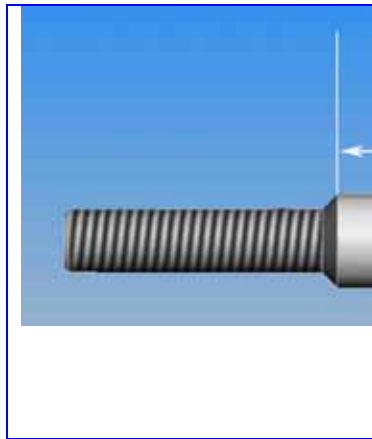




## 8-2B LINKAGE ASSEMBLY PRO VERSION

There are two types of linkage rods you will construct:

- Regular linkage rod: constructed by two ball ends and one metal rod.



No.	Bag#	Description	Qty
1	8	2.3 Long Ball End	22
2	8	2.3 Medium Ball End	10
3	8	2.3 Short Ball End	4
4	8	2.3x10mm Rod	2
5	8	2.3x20mm Rod	2
6	8	2.3x25mm Rod	2
7	8	2.5mm Rod End	24
8	In box	2.5mm Carbon Rod	3
9****		CA glue	1

- Carbon linkage rod: constructed by two ball ends, two rod ends, one carbon rod, and CA glue. This carbon rod should be cut to specific length. In some cases, rod ends should be cut to specific length as well. We will tell you

how to cut them and how long you need.



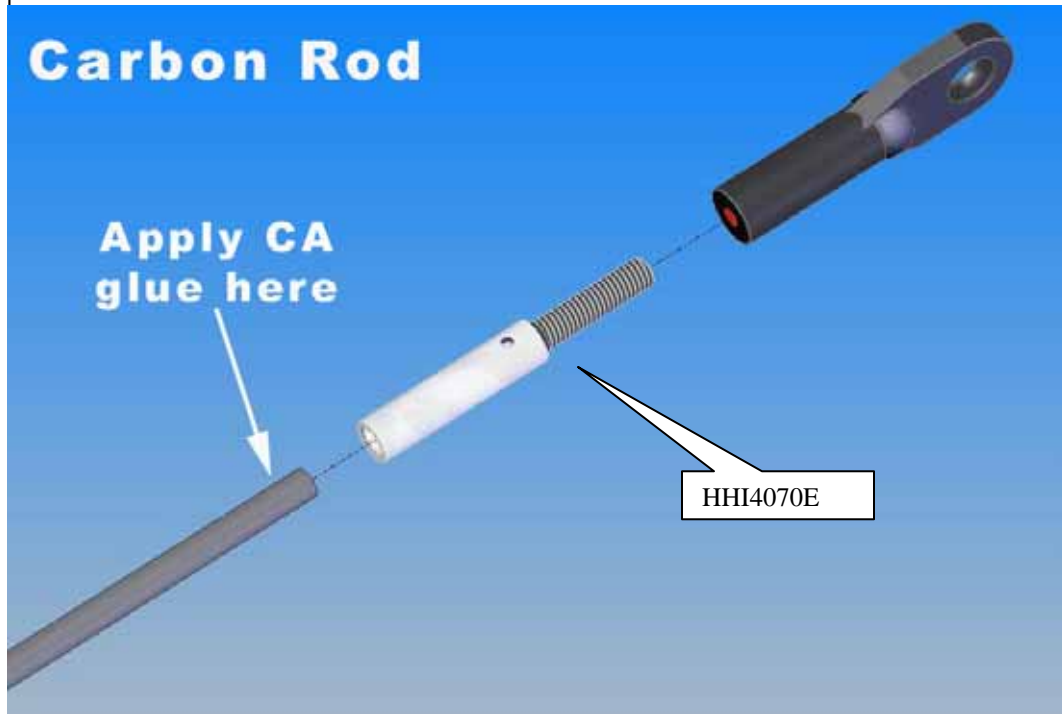
### **Rod Assembly:**

All the Linkages should be assembled with dimensions measured center to center as following:

No.	Bag #	Rod Description	Ball Ends Used	Rod Ends	Center to Center	Qty
1		2.3x10mm Rod	Short Ball End		25 mm	2
2		2.3x20mm Rod	Long Ball End		46 mm	2
3		2.3x25mm Rod	Long Ball End		54 mm	2
4		2.5x25mm Carbon Rod	Medium Ball	Cut to	68 mm	3
5		2.5x43mm Carbon Rod	Long Ball End	Full length	97 mm	2
6		2.5x70mm Carbon Rod	Long Ball End	Full length	124 mm	3
7		2.5x90mm Carbon Rod	Long Ball End	Full length	144 mm	2
8****		Single Servo Arm				2
9****		Double Servo Arm				3
10	HB	Shim Ball				8
11	HB	M2x8 Phillips Screw				8

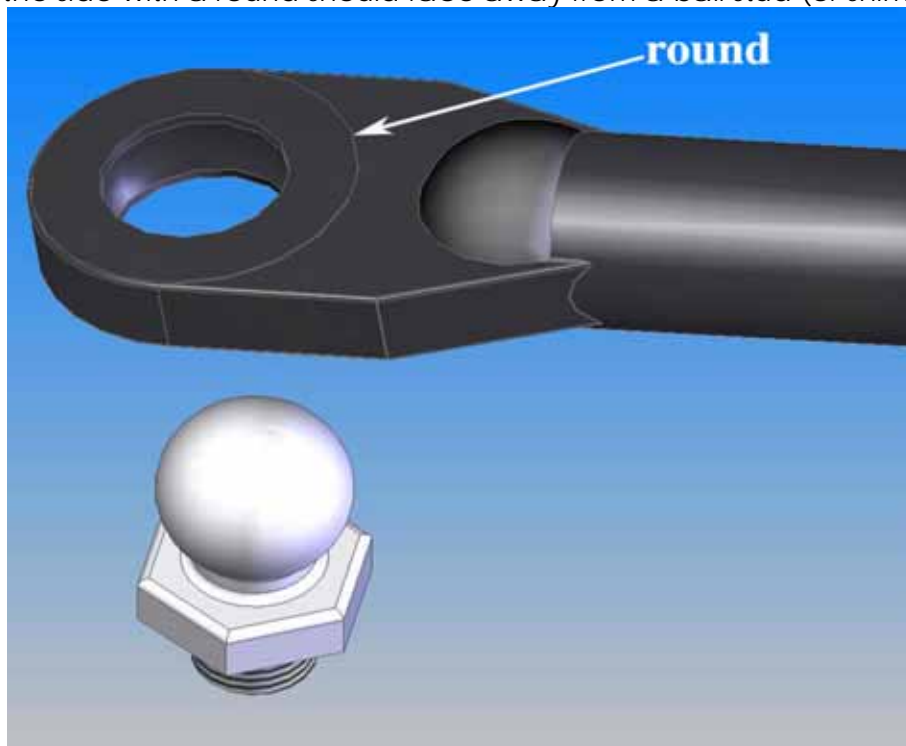
It is recommended to cut a carbon rod and rod end by electronic cutter like Dremel® with thin carbide cut-off wheel but the others may work too. Do not cut it by a scissors, pliers, or wire cutter.

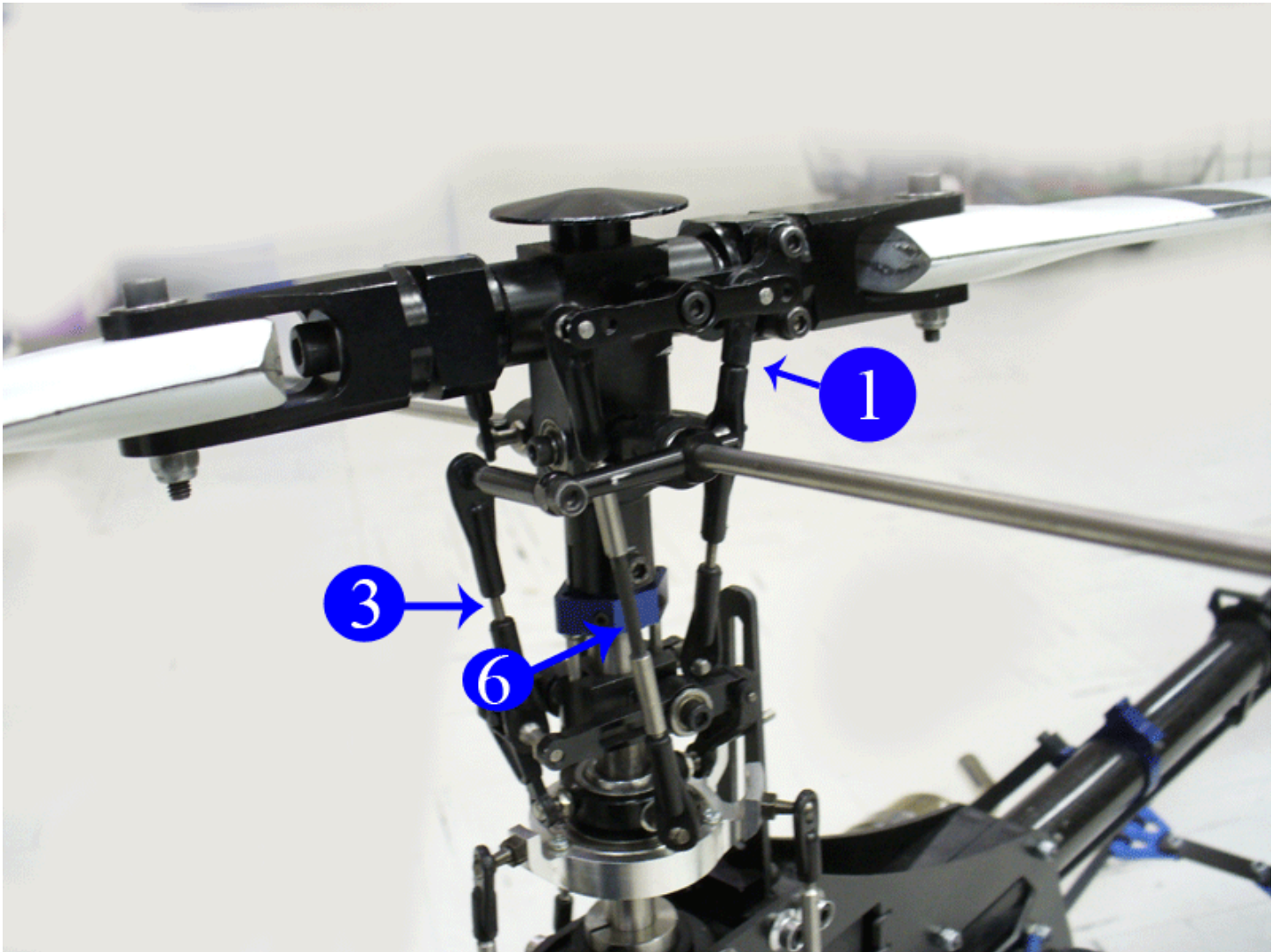
Note: The lengths of Linkages are used for reference only. Final adjustments will be needed when you do radio setup.

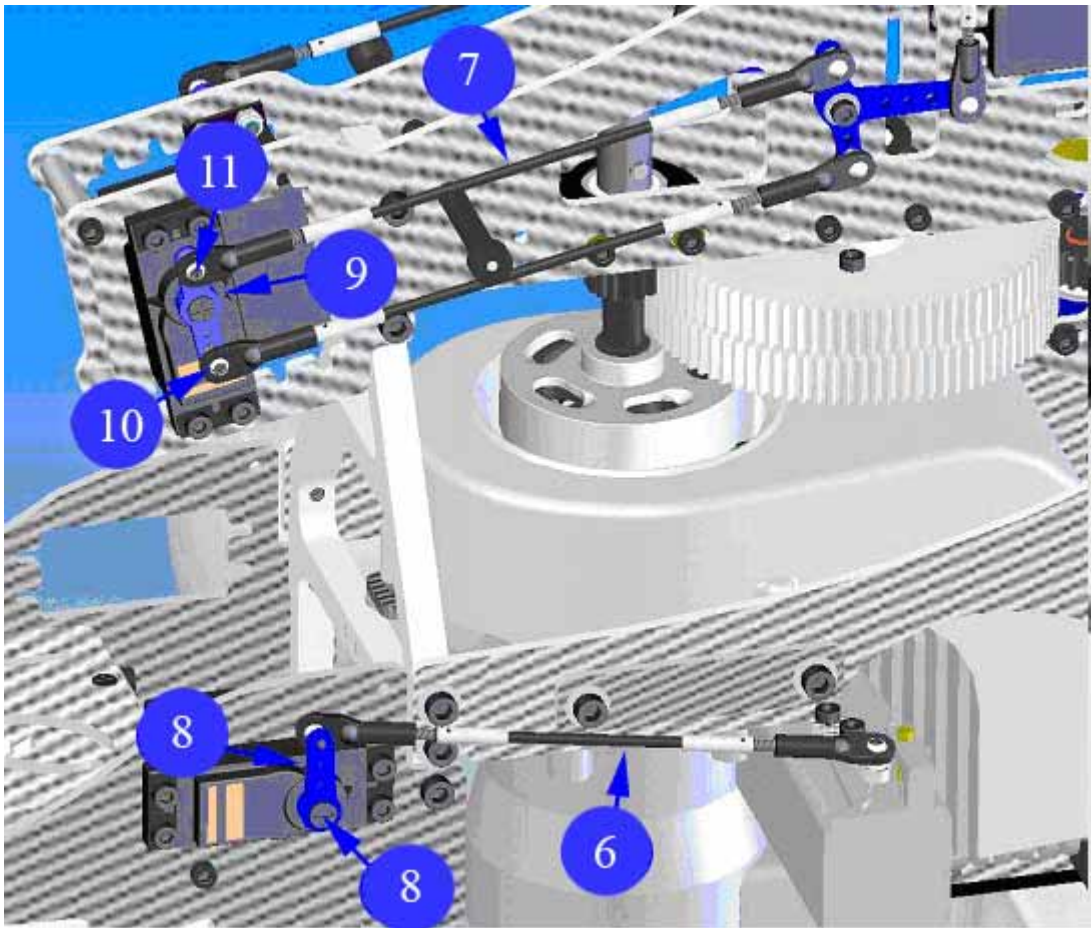


**How to assemble a carbon linkage rod:** First screw Ball End into the Rod End about 7mm. Apply CA glue at the ends of the rod. Insert the rod all the way in the Rod End. Use a piece of cloth to wipe off any excess glue. See instruction on the glue bottle for recommended drying time. If you need to remove the Rod End, heat it gradually then take it out.

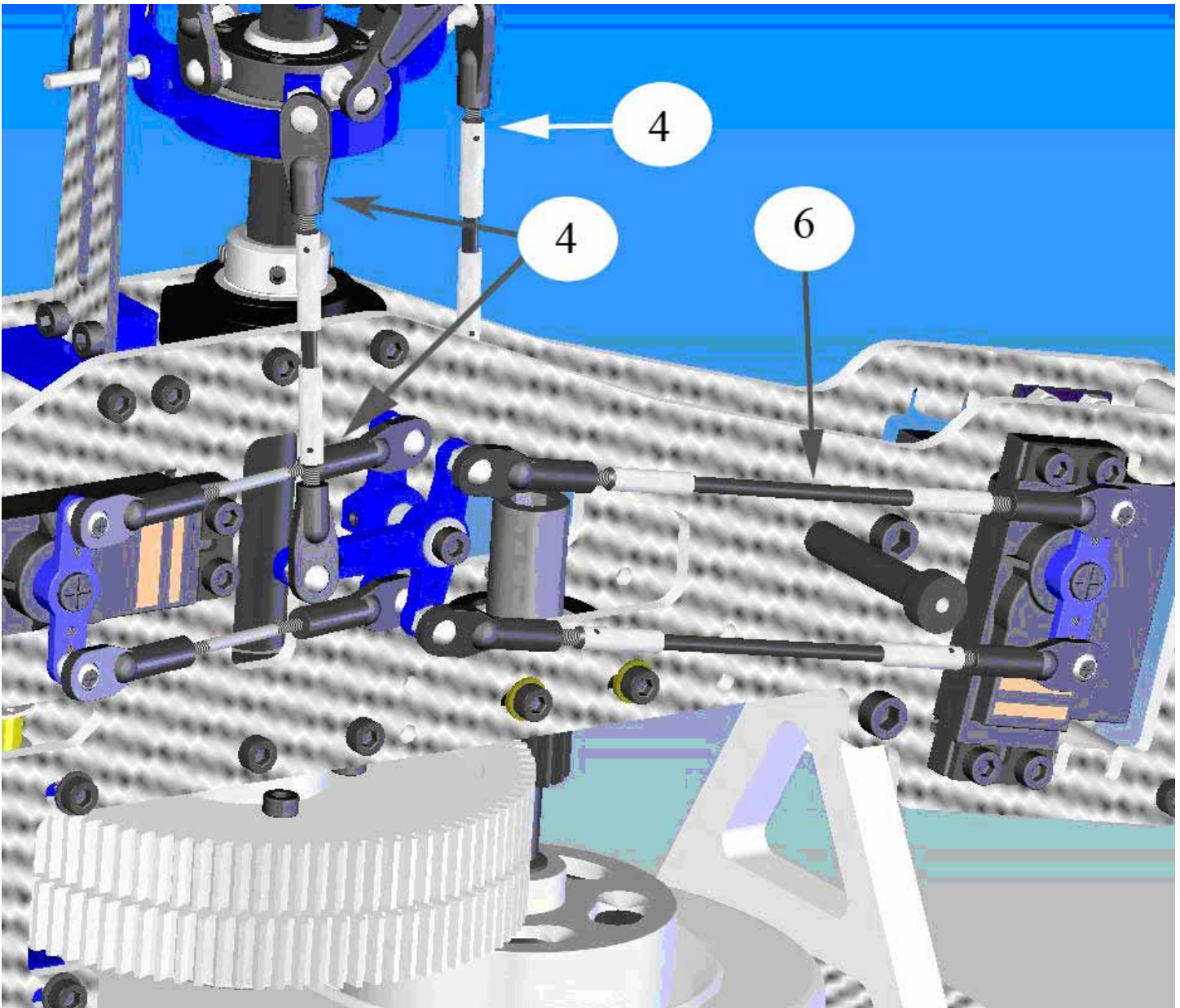
Note: Look close to a ball end; you will see one side is different from the other. One has a round marked on it. The other is just plain. When installing a ball link into a pivot ball stud (or a shim ball) the side with a round should face away from a ball stud (or shim ball.)







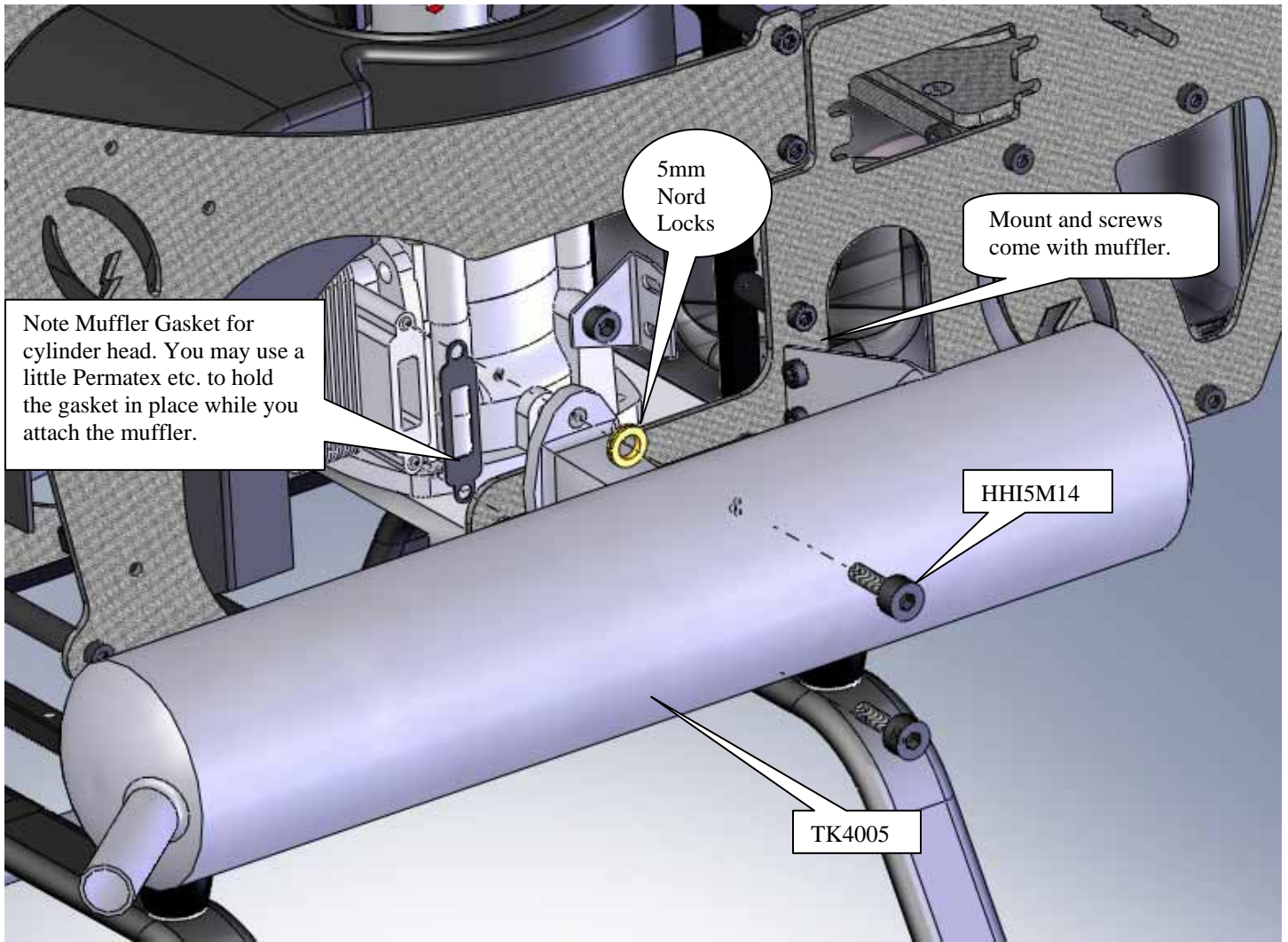




**8-3 MUFFLER INSTALLATION**

No.	Bag#	Description	Qty.
1****		Muffler	1
2****		M5x14	2
3****		Muffler Gasket	1

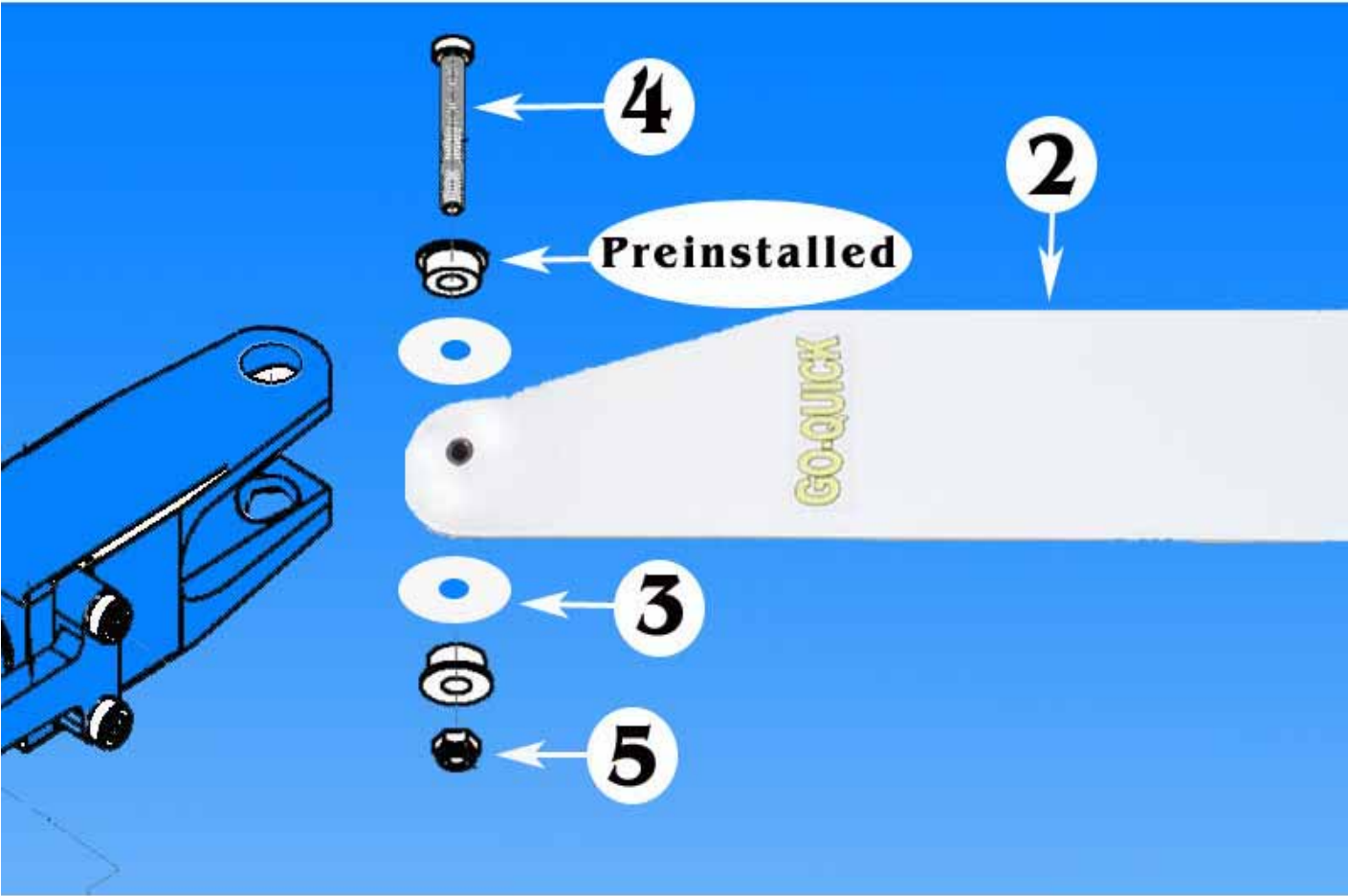
Note: It is very important that Loctite (Red Loctite 626 recommended) is applied on the M5x14 Cap Head Bolts.



Note: Muffler shown is just for illustrated purpose. Other mufflers may be used as well.

### 8-4 MAIN BLADE INSTALLATION

No.	Bag#	Description	Qty
1	Step	Helicopter	1
2****		Main	2
3****		Main	4
4	HB	M4x30	2
5	HB	M4	2

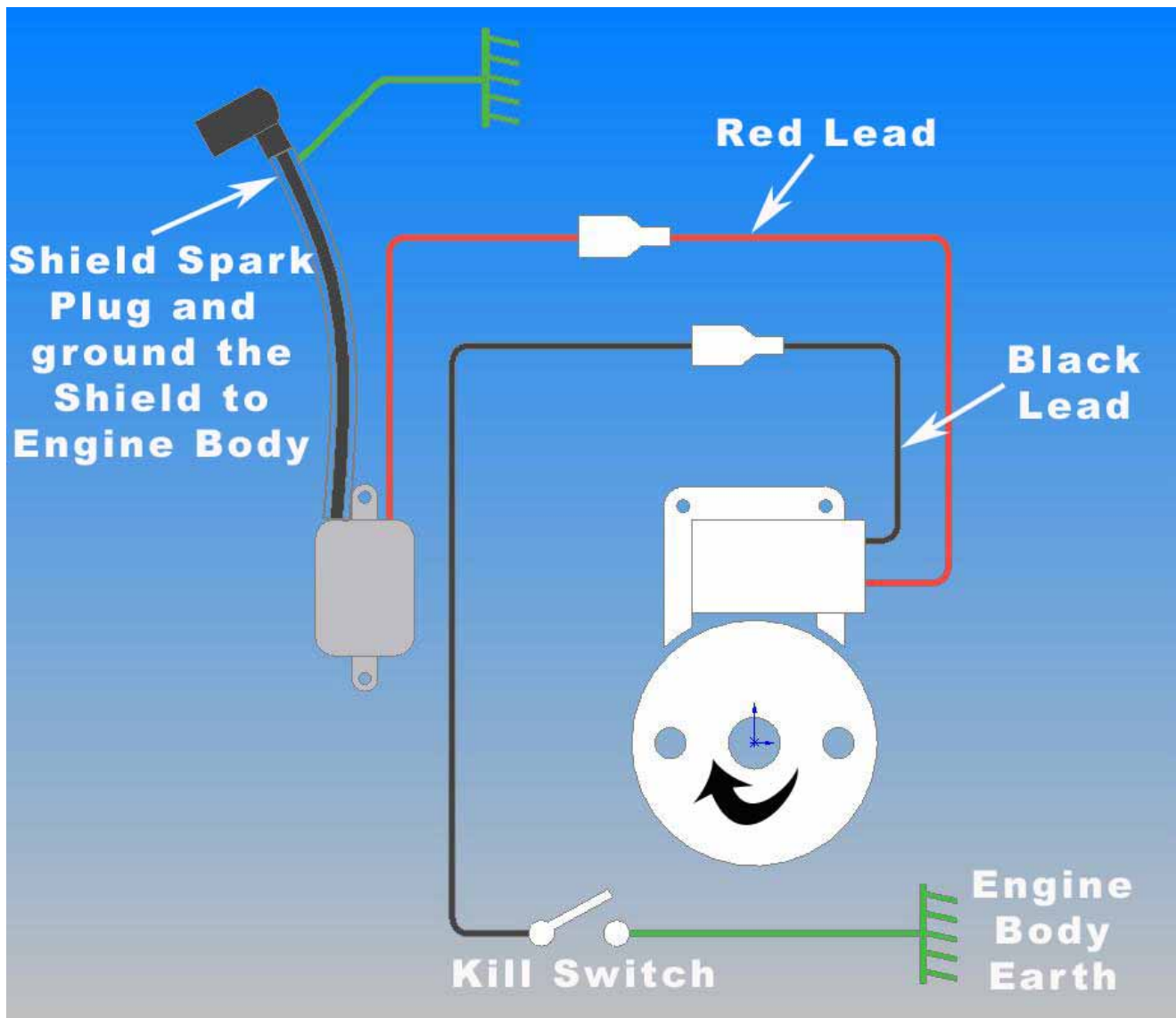


## 8-5 KILL SWITCH & SPARK PLUG SHIELDING

No.	Bag#	Description	Qty
1****		Engine Kill	1
2****		Male	1
3****		Ring	2
4	HB	M4x10	1
5****		Electric	1
6****		Spark Plug	

Install the Engine Kill Switch as following diagram. See drawing in next page to see where to put it on. Cut Electric Wire about 5cm long. Connect one end of the wire to the Male Connector. The Male Connector goes to female connector on the Black Lead of the engine. The other end goes to the Engine Kill Switch. Construct another 15cm long wire with one Ring Connector at one end. This Ring Connector is attached to the Engine Body using M4x10 Cap Head Bolt. The M4 tap hole is located in the left of the helicopter and below the coil of the engine. The other end goes to the Engine Kill Switch.

It is recommended to shield the Spark Plug Cable to reduce interferences. Use a metal net tube (like a layer under TV Cable Cover) to shield it. Then ground the shield to Engine Body using a piece of wire and Ring Connector to the same place where you ground the Engine Kill Switch.

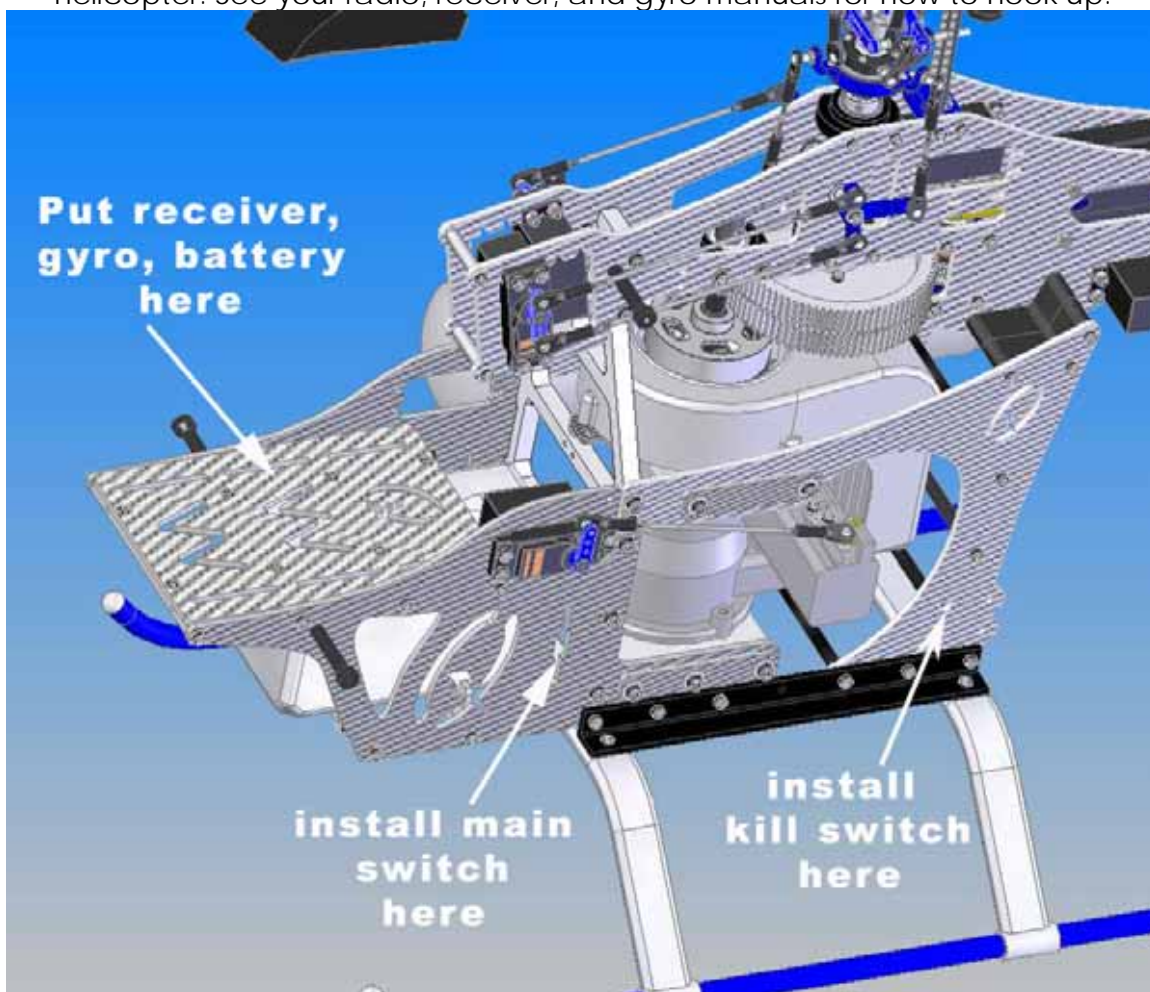




## 8-6 RADIO SETUP

No.	Bag#	Description	Qty
1	Step	Helicopter	1
2	*****	Radio	1
3	*****	Receiver	1
4	*****	Gyro	1
5	*****	Battery for	1

Before setting up the radio, you have to install the receiver, gyro, and batteries for your helicopter. See your radio, receiver, and gyro manuals for how to hook up.



<b>CCPM Helicopter Setup (for all Quick Helicopters)</b>
<b>General</b>

Instead of giving you the exact length of each linkage rod we will explain to you what you are trying to achieve. This is the same for all Quick helicopters. Another thing worth mentioning is that all controls on our helicopters are leading edge controlled. We have three such controls on our helicopter and they are Main blades, Tail blade and flybar control arms. For example the main blade pitch arms should be mounted so they are in front of the blades in the direction of travel, clockwise if you look at the helicopter from above, see picture 4. Your radio manual will be needed during this set up.

## Swashplate

First, set your radio so that all travel values are at 100%. If you have a radio with Swash Mixing set, set those values to 50% (Aileron, Elevator, and Pitch.) Then use servo reversing so that all servos are moving in the right direction. If Pitch operates reversed, change the value in the Swash Mixing from + to -.

**Step 1:** First set your radio up so that all servos are moving in the right direction and adjust all travel values to 100%. If you have a radio with Swash mixing values set those to 50% (Pitch, Aileron and Elevator).

Now center both radio sticks (including "throttle") and center all trim and sub-trim values. When this is done turn your receiver pack on. Now mount the servo arms at a 90° angle towards the linkage rod. In our non push pull helis this will be horizontal. Use the mounting position on the servo arm that will be closest to 90°, not all servos will line up 100% correct. If they are visible off from the 90° position the use the sub-trim function in your radio for fine tuning, do not use regular trim for this, see picture 1.

Now you have a good start and the rest of the setup will become easier.

**Step 2:** Connecting the Swashplate at the right distance. This is done by moving your Pitch (throttle) stick all the way down, see picture 2. When the servos are in this position adjust the length of the linkage rods so the Swashplate is located towards the bottom, but still leaves enough room for left/right (aileron) and front/back (elevator) travel. During such travel, portions of the Swashplate will move below the Swashplate position archived during Pitch full down radio stick position. So make sure you leave enough room for this extra travel, see picture 2 for recommended height. Also make sure that all 3 linkage rods between the servo arms and the Swashplate are the same, so the Swashplate is level. It should not tilt in any direction; unless your right radio stick is moved. If it tilts, and all linkage rods are the same length, then go back to step one and make sure your three servo arms have the same neutral position (horizontal on non push pull helis).

**Step 3:** Connecting the Washout assembly. Connect the fixed length plastic "A" arms to the Swashplate, connect to the two longer pivot studs, if all four are the same length then any two will do. The next step is to adjust the length of the linkage rod between the Washout Arm and the Flybar connection point. Turn your radio and receiver back on and center both sticks. Now adjust the length of the flybar linkage so the washout arms are level (horizontal), see picture 1. Also make sure your flybar arms and flybar-paddles are level (horizontal), when adjusting the linkage. After the length is adjusted make sure that you have free travel in all directions and stick positions. When the Pitch stick is all the way up it should look like picture 3. As you can see there is still plenty of room for aileron and elevator travel. Now adjust the Washout Anti-rotation pin height so the pin is still in the guide slot of the washout base during all travel positions. For the Left/Right Washout Anti-rotation position, line the attachment point of the plastic washout "A" arm on the Swashplate up with flybar linkage connection point. The imaginary line between these points should be vertical.

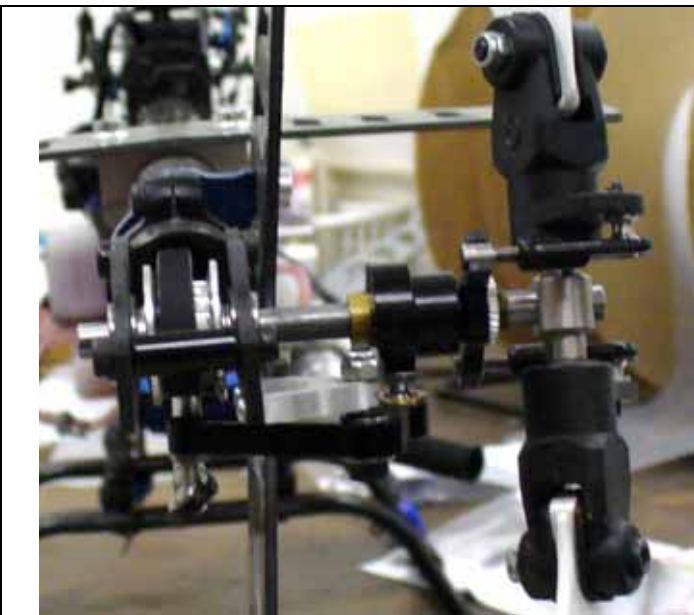
Now you are almost done, only one set of links left, and the length of those links will be depending on your desired setup whether it's Aerobatic or normal flying. Please refer to the Pith travel setup table for this final link length.



Picture 5, Tail Center



Picture 6, Tail Positive Thrust



Picture 7, Tail Negative Thrust



Picture 8, Tail

Pitch Travel Setup		
Collective Position	Normal Flying	Aerobatic
Up (100%)	+10°	+10°
Center (50%)	+5°	+0°
Down (0%)	-3°	-10°

Throttle Curve Setup				
Collective Position	Fuel		Electric (non governor mode)	
	Normal Flying	Aerobatic	Normal Flying	Aerobatic
Up (100%)	100%	100%	85%	85%
Center (50%)	70%	60%	75%	75%
Down (0%)	10%	100%	0%	85%

## Tail

First adjust the servo arm position like you did with the swash, make sure your trim and sub-trim values are centered. Attach the servo arm so it's 90° to the tail pushrod (vertical). Now adjust your two plastic ball ends, for the push rod, so they are screwed on about half way onto the threaded pushrod guide end piece. This will allow you have maximum amount of adjustment available in both directions. Use the outer holes on the tail blade grips for the ball link attachments. When this is done cut the carbon pushrod to a length that will achieve about 3° of positive pith on your tail blades, when the servo is in its neutral (vertical) position. Then glue the two end pieces on to the pushrod with CA glue, don't forget to insert the pushrod guides first.

When this is done you should have 3° of positive tail blade pitch. The tail should spin counter clockwise looking at the right side of the helicopter with the nose to your right and tail to your left. See pictures 5-8.

Note: Please consult the instruction for your Gyro for setting the overall travel and limits to ensure proper operation and travel of Tail Pitch Slider.

## Throttle

The throttle curve will be affected by several conditions; some of them are, motor choice, blades choice, elevation, temperature, helicopter weight and type of helicopter. So in order to explain this I will explain what you are looking for. Your goal is to achieve a constant head speed once the helicopter is airborne. If you ad pitch (climb) you need to ad power (throttle) to compensate for the added resistance a higher blade pitch creates. If during climb your head speed drops, then you need to add throttle to that particular stick position, and reversed if you have an increase in rpm. If during max climb out you experience an increase in head speed then you need to give the blades a higher pitch, do not try to



adjust the max climb rpm by reducing throttle. There are other ways of achieving this by using cyclic mixing, however we will stay away from this for now. Follow the pitch guidelines in the table above, and if you need more pitch at max power because the rpm is increasing, then add pitch. 10° is just a guideline and will work in most setups, but a powerful motor or a light helicopter might need more. For rpm adjustment during anything other than full stick deflection you should use the throttle.

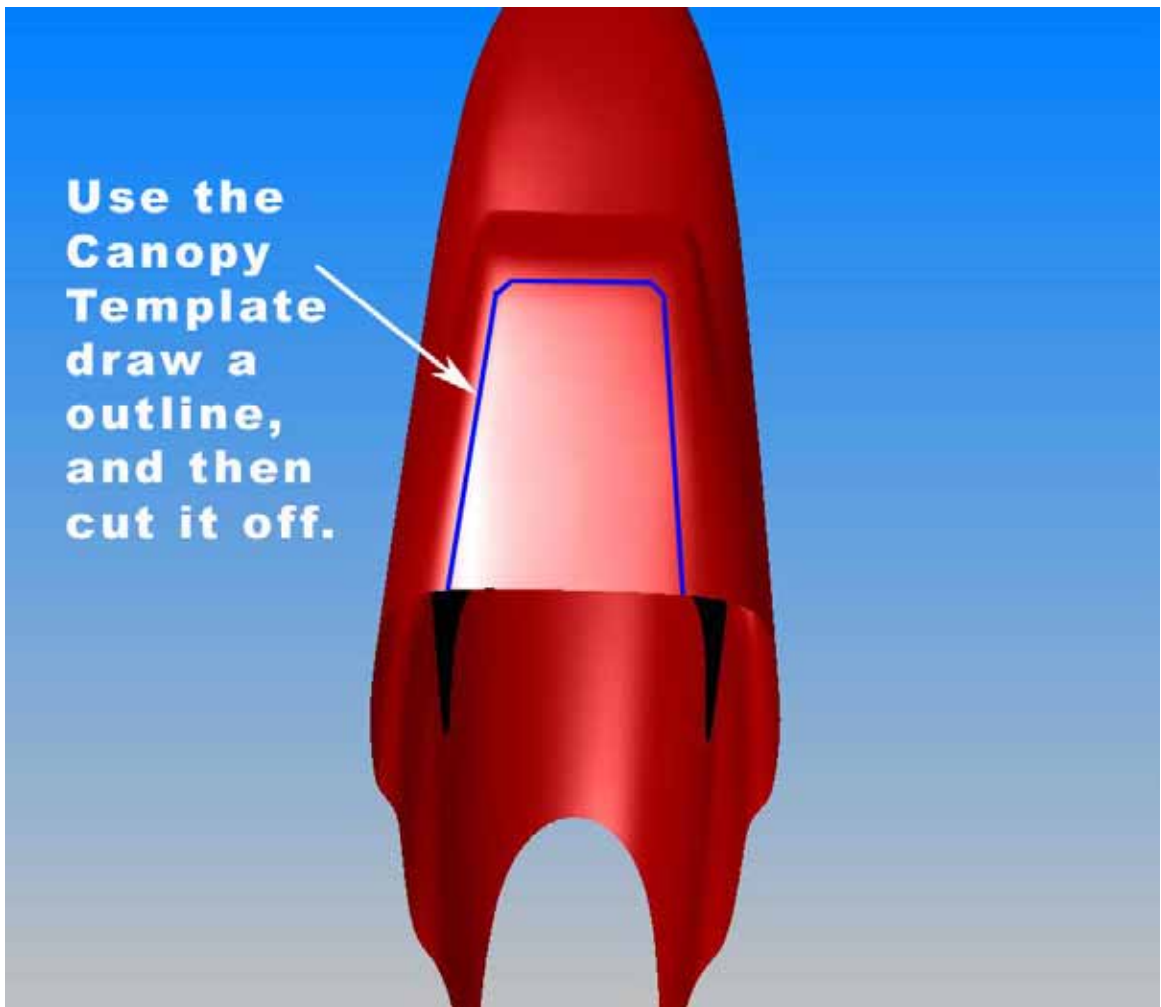
A short recap, adjust throttle to adjust rpm during anything other than full collective. At full collective adjust the pitch. See the Throttle table for general setup.

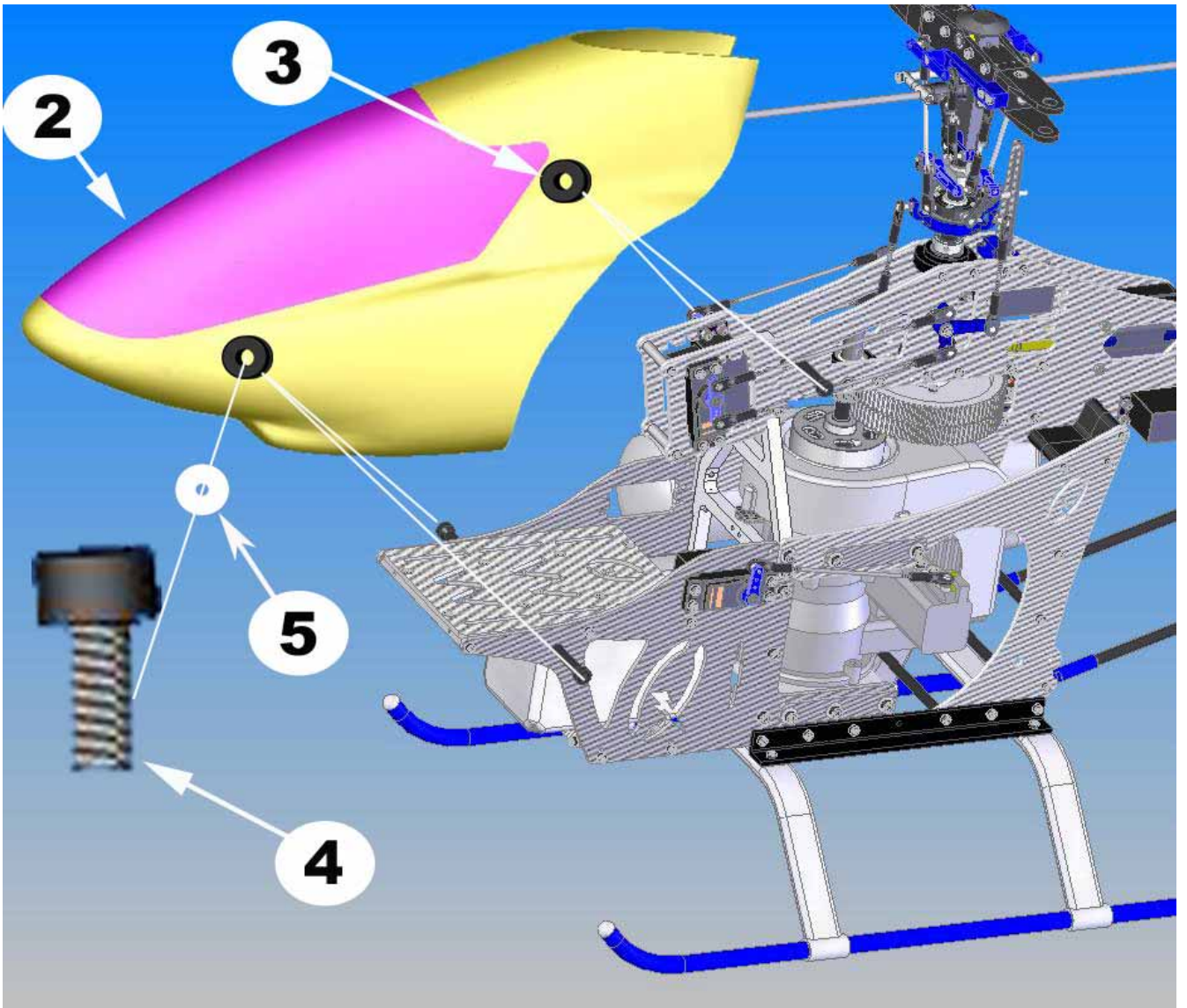
## Final Words

These are guidelines and will get you going but might not be 100% accurate in regards to all helicopters. Especially the throttle curve table should be considered as initial guidelines. As mentioned before it's greatly affected by your equipment. As you become more familiar and proficient with your helicopter you can change the pitch and throttle curves to your flying style.

### 8-7 CANOPY MOUNTING

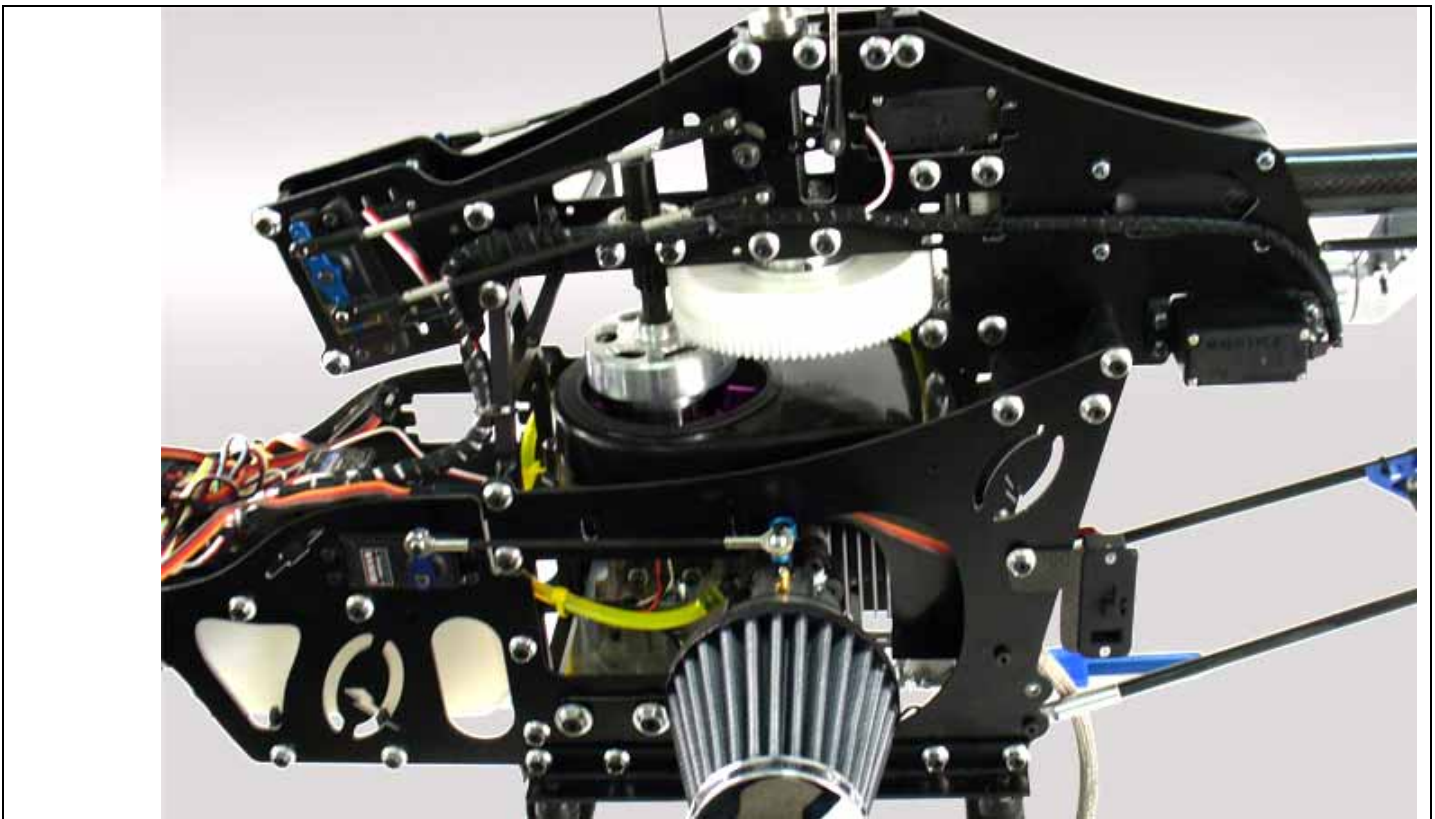
No.	Bag#	Description	Qty	
1		Helicopter	1	Note: Different canopy may be shown. <ul style="list-style-type: none"> <li>Use the template comes in the kit to cut the bottom of the Canopy.</li> <li>Put the Canopy on the helicopter, mark the right positions for 4 holes, and then drill four 5.5mm holes.</li> <li>Install the Canopy Grommets on the Canopy.</li> <li>Secure the Canopy by four M3x13 Flat Washers and four M3x10 Cap Head Bolts.</li> </ul>
2	In	Canopy	1	
3	8	Canopy	4	
4	HB	M3x10 Cap Head Bolt	4	
5	HB	M3x13 Flat Washer	4	





## PRE-FLIGHT CHECKS

- The rotor flybar and shaft must be straight.
- The flybar and control paddles must tilt in the proper direction and operates smoothly throughout the whole range.
- Check the swashplate to make sure it move smoothly and clean.
- When control input are given to tilt the swashplate, make sure no control arms or pushrods are binding.
- Check the two control paddles for level, parallel, and proper direction.
- Make sure the batteries are fully charged and the fuel tank is full.
- Make sure the radio and receiver are on and all controls operate properly before flight.
- There should be no interference of radio signal in your flying zone. Range checks the radio.
- Always grab onto the helicopter main rotor head when turning on the helicopter.



These pictures illustrate how everything should be neatly wired up and strapped down before your helicopters first flights.



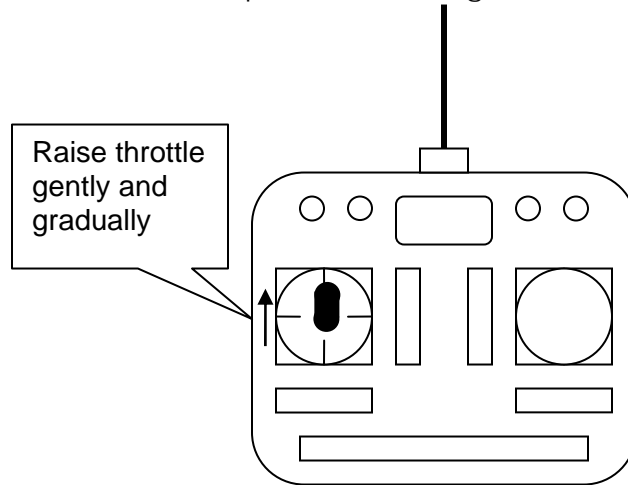
## WARNINGS

- Do not operate helicopters in rainy, windy, or snowy condition.
- Operate helicopter in a safe zone away from crowds, traffic, or distractions.
- Use the proper batteries to prevent damage to the motor and equipment.
- Make sure all the batteries are fully and properly charged and the fuel tank is full.
- Make sure all the controls operate properly before flight.
- The main and tail rotors blades operate at very high speed (rpm); therefore, make sure nothing can come into contact with them while they are spinning.
- Perform a range check on the radio before flying.
- Make sure the transmitter and receiver are turned on before start the engine
- Keep a safe distance when operating a helicopter.
- Do not fly for a long period of time. Take some rests during flights.
- Motors are often very hot after operation. So be careful when handling or touching them immediately after flying.

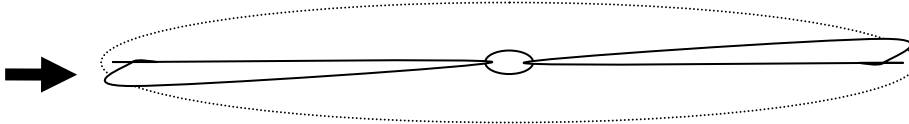
## ADJUSTMENTS

**Tracking Adjustment:** The tips of the main rotor blades should follow the same path when they rotate. We call the main rotor blades are in track.

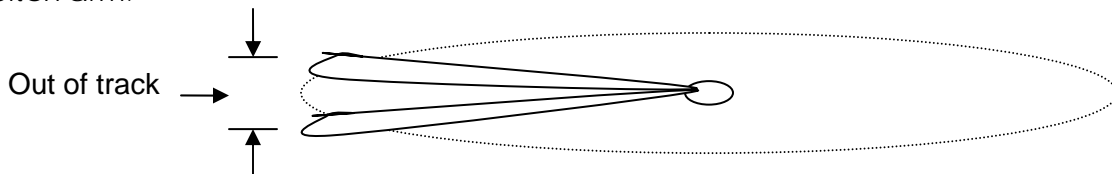
(a) Rev up the motor until the helicopter becomes light on its landing gear.



(b) If the main rotor blades are in track, it's good.



(c) If the blades are out of track, then adjust one of the pushrods that connect to the main rotor blade pitch arm.

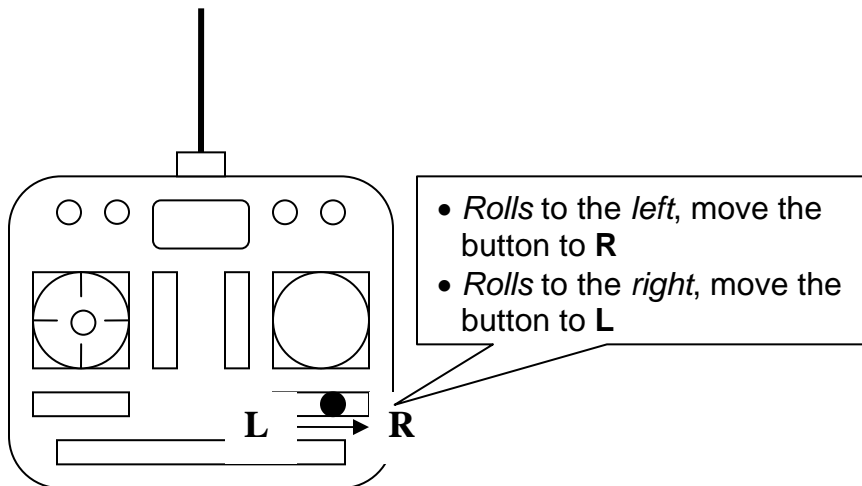


Repeat steps (a) to (c) until the blades are in track.

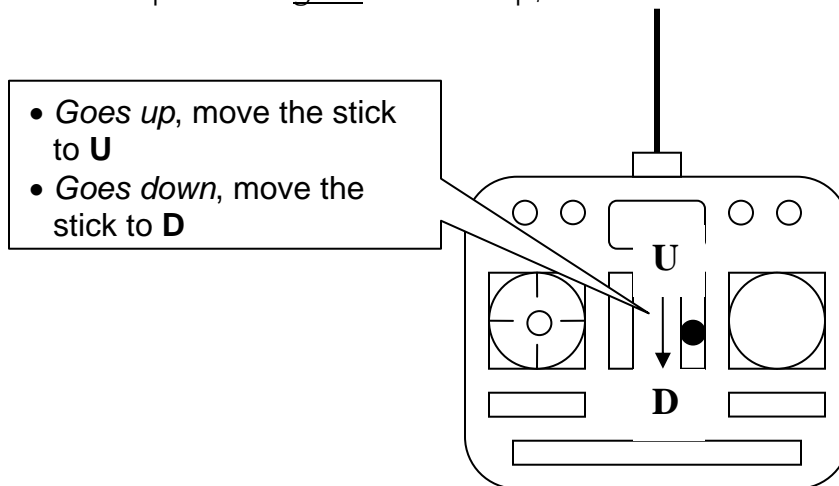
**Trimming:** Most of new built helicopters are unstable. But if you trim your helicopter properly, you will stop it from drifting away or yawing by itself quickly. Followings are instructions for trimming your helicopter.

(a) If the helicopter nose starts to yaw left or right, adjust the tail rotor push rod to compensate. If using a Heading Hold Gyro, do not adjust the trim lever on the radio.

(b) If the helicopter rolls to left or right, then:



(c) If the helicopter nose goes down or up, then:



## HOW TO HOVER

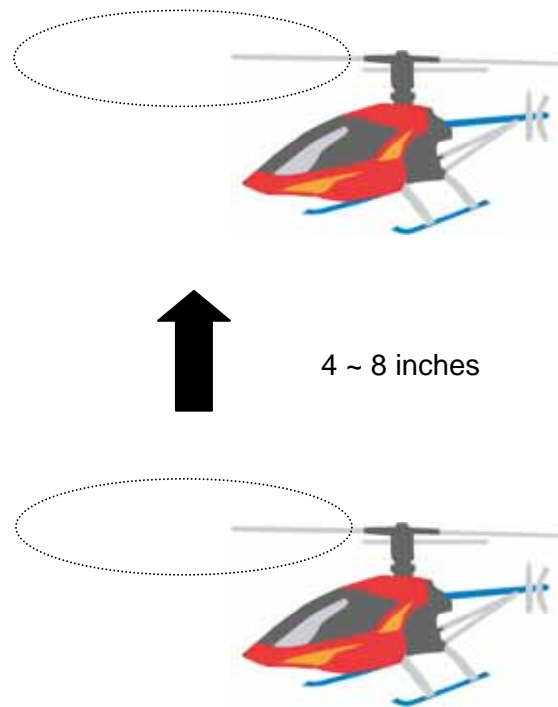
Basic maneuver for a pilot is learning how to hover a helicopter. When the helicopter is floating in a stationary position in the air, we call that hovering. Use the following procedure to practice your hovering:

(a) Make sure everything is clear in the flying zone. Stand at least 30 feet (10 meters) behind the helicopter.

(b) Check the main rotor fore/aft and left/right cyclic to make sure the main rotor is following to your cyclic command before taking off. Make sure the helicopter nose will swing in your desired directions by moving the tail rotor control stick.

(c) Now, increase the throttle/collective gently to lift the helicopter landing gear off the ground to no more than 4 inches (10 cm). At the beginning, it is very difficult for the pilot to keep the helicopter from moving. It will also be difficult to know if the helicopter is in trim or not for a beginner. Keep going on the practice close to ground you will develop your skills.

(d) Keep practicing lifting your helicopter no more than 8 inches (20cm) from the ground until you feel comfortable with control commands. Once you can keep it at one place, then it is time to slowly increase the height a few inches in each flight. Soon, you will be able to hover the helicopter confidently at a few feet high. Beginners should always practice hovering close to ground since in an emergency situation; you can drop the throttle and collective quickly without making any big damage.



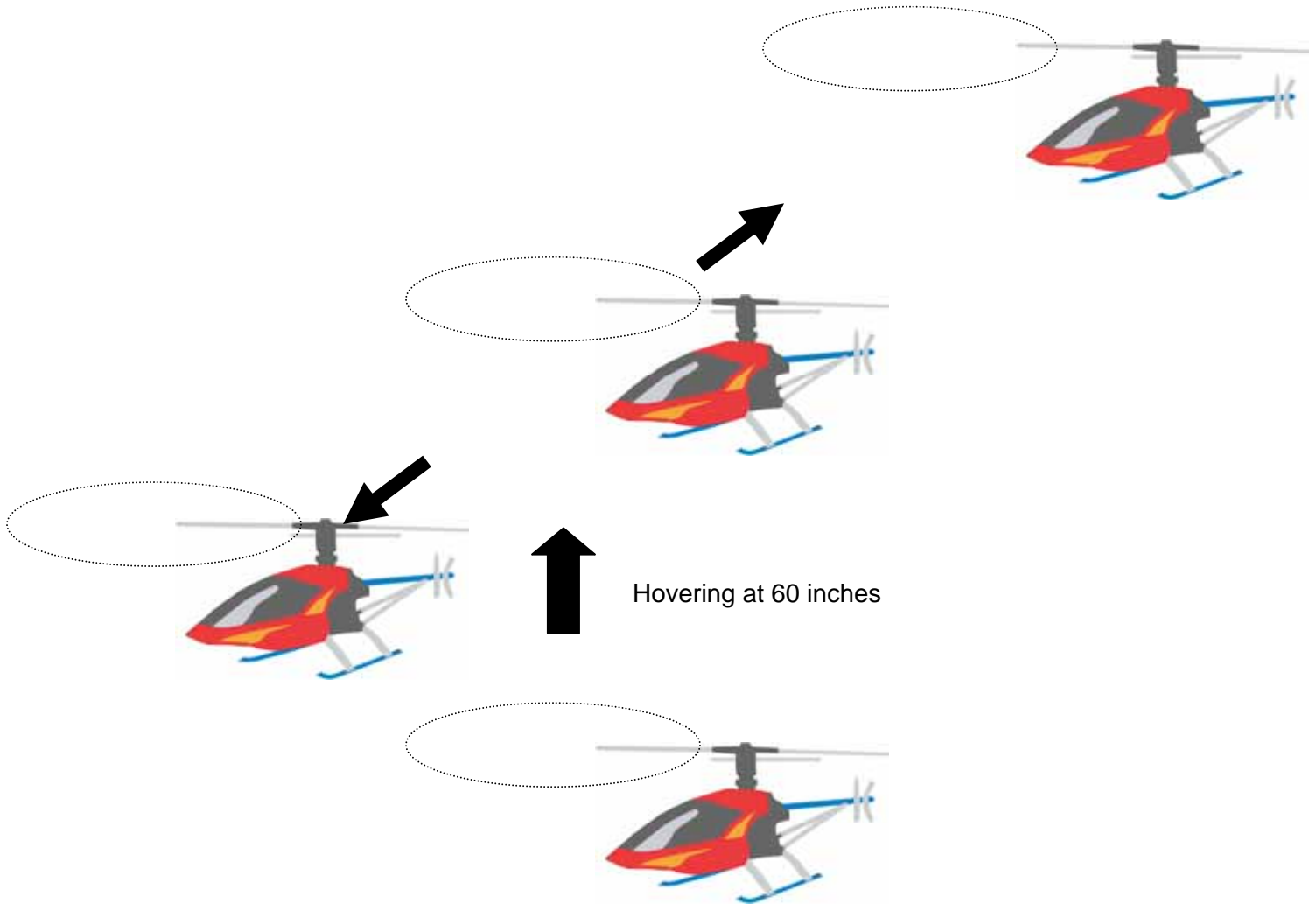
(e) Stand behind the helicopter so you can watch the nose of the helicopter. A left tail rotor command will yaw the helicopter nose to the left, and a right command will yaw to the right. Also, a left cyclic command will cause the helicopter to translate left., Start practice hovering while standing to either side of the model after you can comfortably hover the helicopter at 3 feet (1m) high without drifting. Finally, you need to learn hovering the model from any positions. When you can confidently hover a helicopter at any altitude and at any position, you have mastered most of the fundamental control movements of a helicopter.



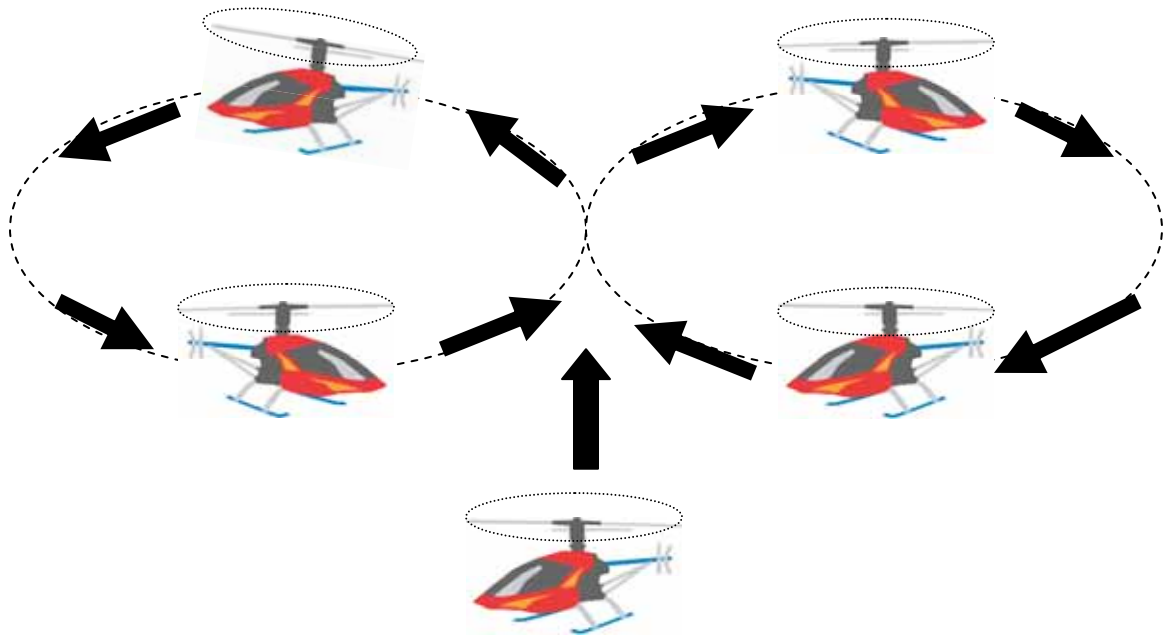
## HOW TO FLY FORWARD

Once you have mastered hovering flight:

(a) Let's begin the exercise of changing positions by practice moving the helicopter to the left or right slowly from 60 inches (1.5 m) above the ground.



(b) Once you have been comfortable with all the movements and controls in the previous step, start using some tail rotor control to make the helicopter point slightly to the left or right as you fly it to the left or right. Keep practicing the figure-eight path as shown below, you will master all basic control movements of a helicopter.



## AFTER FLIGHT CHECKS

After each flight, the helicopter should be thoroughly inspected:

- (a) Unplug the batteries.
- (b) Check every bolt, nut, and screw to make sure none has loosened due to vibration.
- (c) Check every rotating and movable part like head rotor, swashplate, tail rotor, to ensure they still move smoothly and properly.
- (d) Check all movable parts, such as gears, ball links, belt, etc. for unusual wear.
- (e) Clean up the helicopter then lubricate every moving part with oil to ensure a smooth operation in the future.
- (f) Keep the helicopter in a cool and dry place. Avoid storage under direct sun light or near heat.
- (g) Please replace any damaged parts if they are discovered during maintenance.

## WHAT IF THE HELICOPTER CRASHED

Turn off everything and check the helicopter immediately. If any item is damaged, replace the damaged parts to ensure safe operation. Do not try to glue any broken or damaged plastic or carbon parts specially broken rotor blades. The followings are parts that should be inspected right away:

- Main and tail rotor blades.
- Flybar, main shaft, head spindle, and tail output shaft.
- All the gears.
- Tail boom and supports for cracks.
- Vertical and horizontal fins.
- Frames.
- All pushrods.
- Servos, motor, and batteries

## SPECIFICATIONS

Specification	Little Dominator
Main Blades	Quick 700-710 mm (27.6-28 inch)
Tail Blades	95mm (Wide Cord)
Length	w/ canopy ~1280 mm (50 3/8 inch) w/o canopy ~1118 mm (44 inch)
Height	540 mm (21.25 inch)
Fully Equipped Weight	~13lbs (5.9 kg)
Engine	Komatsu Zenoah 26
Fuel	Gasoline
Frame Thickness	2.9-3.15 mm
Spindle	8 mm single/dual spindle
Main Shaft	10 mm
Canopy	Fiberglass HHI8050
Flying	Aerobatic / 3D
Muffler	Customer Choice
Gyro	Customer Choice
Head Speed	1650-1950 rpm

