

Raptor 60 Assembly Manual

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1-1

Upper Frame Assembly

BAG A

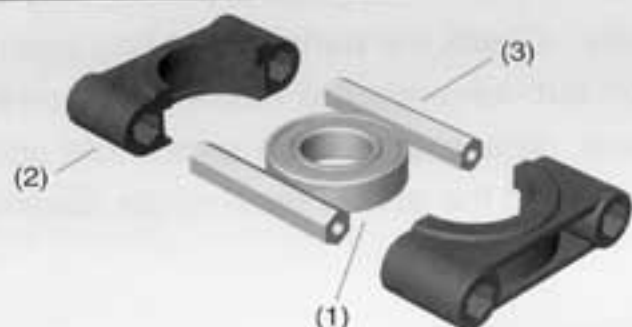
No.	Material No.	Description	Qty	No.	Material No.	Description	Qty
1	HMC3-8B	M3x8 Socket Screw	2	7	BK0393	Pitch Frame Cross Member	1
2	HMC3-10B	M3x10 Socket Screw	4	8	BK0394	Pitch Frame Cross Member Nut	2
3	HSA3-22	M3x22 Button Head Socket Screw	2	9	1-1-2	Pinion Gear Subassembly	1
4	BK0087	d3xD8x1.4 Washer	4	10	1-1-1	Upper BRG Subassembly	1
5	BK0375	Metal Upper Frame	2	11	1-1-3	Pitch Guide L Subassembly	1
6	BK0391	Frame Spacer M	2	12	1-1-4	Pitch Guide R Subassembly	1

Assemble the upper main frames by starting with the two Upper Metal Frames. The Upper BRG Subassembly and Clutch/Pinion Gear Subassembly must be assembled first according to Figure 1-1-1 and 1-1-2. Also insert three hex-shape frame spacers into the plastic Pitch Guide according to Figure 1-1-3 and 1-1-4. Then attach the finished subassemblies to the Upper Metal Frames. Note that the two button head bolts (No. 3) are inserted and remain loose until later when they are used to secure the Body Fitting Pins in Step 1-3. Locate Hex Wrenches in BAG K which you will use in assembly.



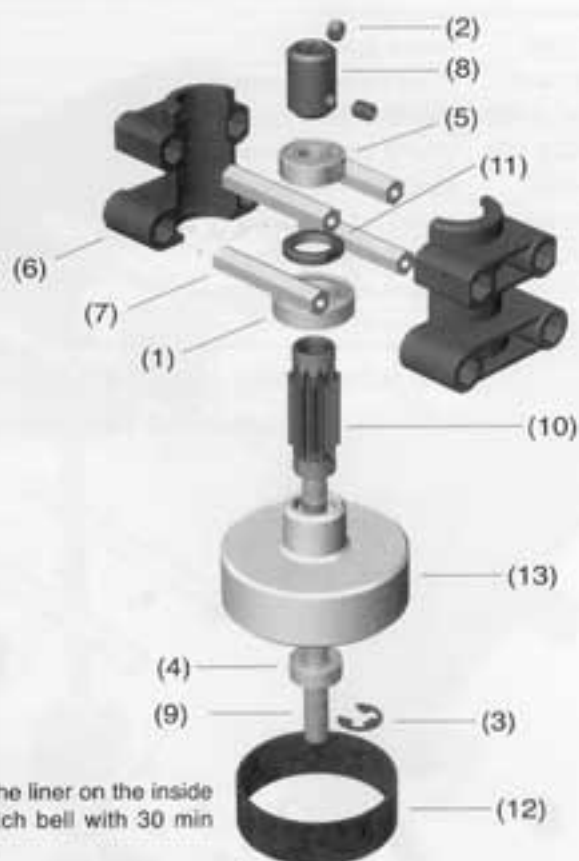
1-1-1 Upper BRG Subassembly

No.	Material No.	Description	Qty
1	HMV6901Z	d12xD24x6 BRG	1
2	BK0386	Upper BRG Case	2
3	BK0391	Frame Spacer M	2

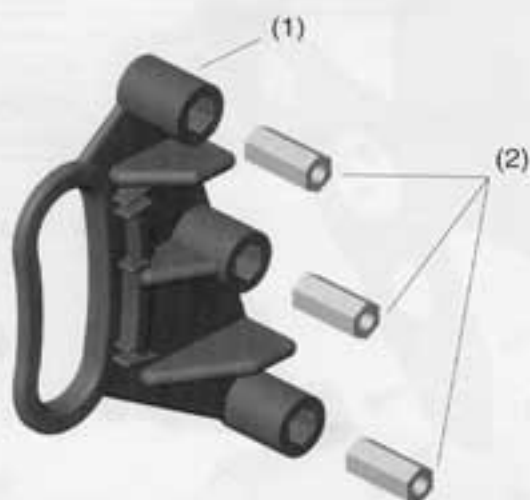


1-1-2 Pinion Gear Subassembly

No.	Material No.	Description	Qty
1	HMV6800	d10xD19x5 BRG	1
2	HME4-5B	M4x5 Set Screw	2
3	HMS8	M5x8 E Ring	1
4	HMV1360Z	d6xD13x5 BRG	1
5	HMV696Z	d6xD15x5 BRG	1
6	BK0388	Clutch BRG Case	2
7	BK0391	Frame Spacer M	4
8	BK0045	Starter Coupling	1
9	BK0361	Starter Shaft	1
10	BK0355	Drive Pinion	1
11	BK0355	Pinion Gear Nut	1
12	BK0354	Clutch Liner	1
13	BK0353	Clutch Bell	1



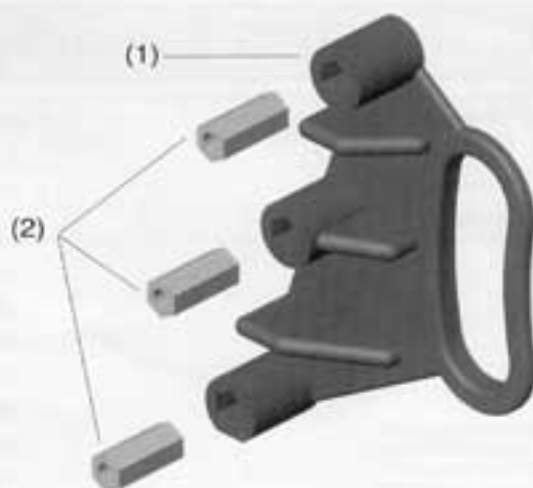
1-1-3 Pitch Guide L Subassembly



No.	Material No.	Description	Qty
1	BK0384	Pitch Guide Collar L	1
2	BK0392	Frame Spacer S	3

1-1-4 Pitch Guide R Subassembly

No.	Material No.	Description	Qty
1	BK0385	Pitch Guide Collar R	1
2	BK0392	Frame Spacer S	3



1-2

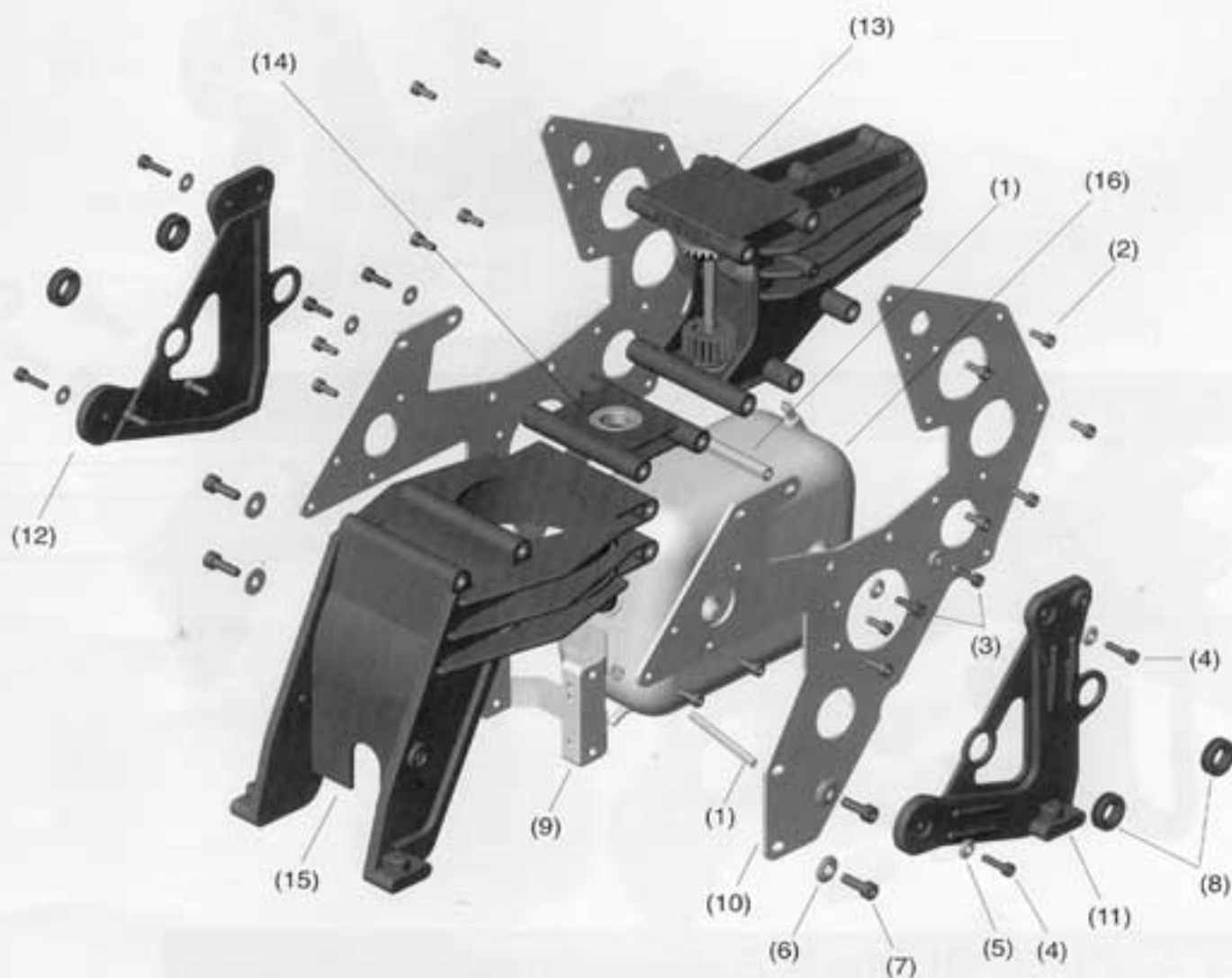
Lower Frame Assembly

BAG B

No.	Material No.	Description	Qty
1	BK0390	Frame Spacer L	2
2	HMC3-8B	M3x8 Socket Screw	18
3	HMC3-10B	M3x10 Socket Screw	4
4	HMC3-12B	M3x12 Socket Screw	4
5	BK0087	d3xD8x1.4 Washer	8
6	BK0435	d4xD11x1.7 Washer	4
7	HMC4-12B	M4x12 Socket Screw	4
8	BK0274	Tank Rubber Grommets	4
9	BK0349	Engine Mount	1

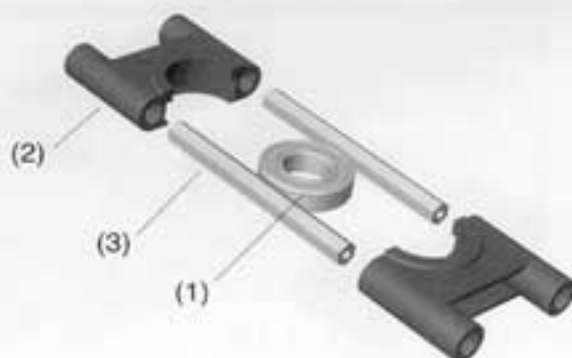
No.	Material No.	Description	Qty
10	BK0376	Lower Metal Frame	2
11	BK0380	Rear Frame L	1
12	BK0381	Rear Frame R	1
13	1-2-2	Tail Drive Unit Subassembly	1
14	1-2-1	Lower BRG Subassembly	1
15	1-2-3	Cooling Fan Casing Subassembly	1
16	1-2-4	Fuel Tank Subassembly	1

Please complete the subassembly steps 1-2-1 through 1-2-4 first. Then attach the subassemblies to the two Lower Metal Frames. Note that the Lower BRG Subassembly is installed upside-down.



1-2-1 Lower BRG Subassembly

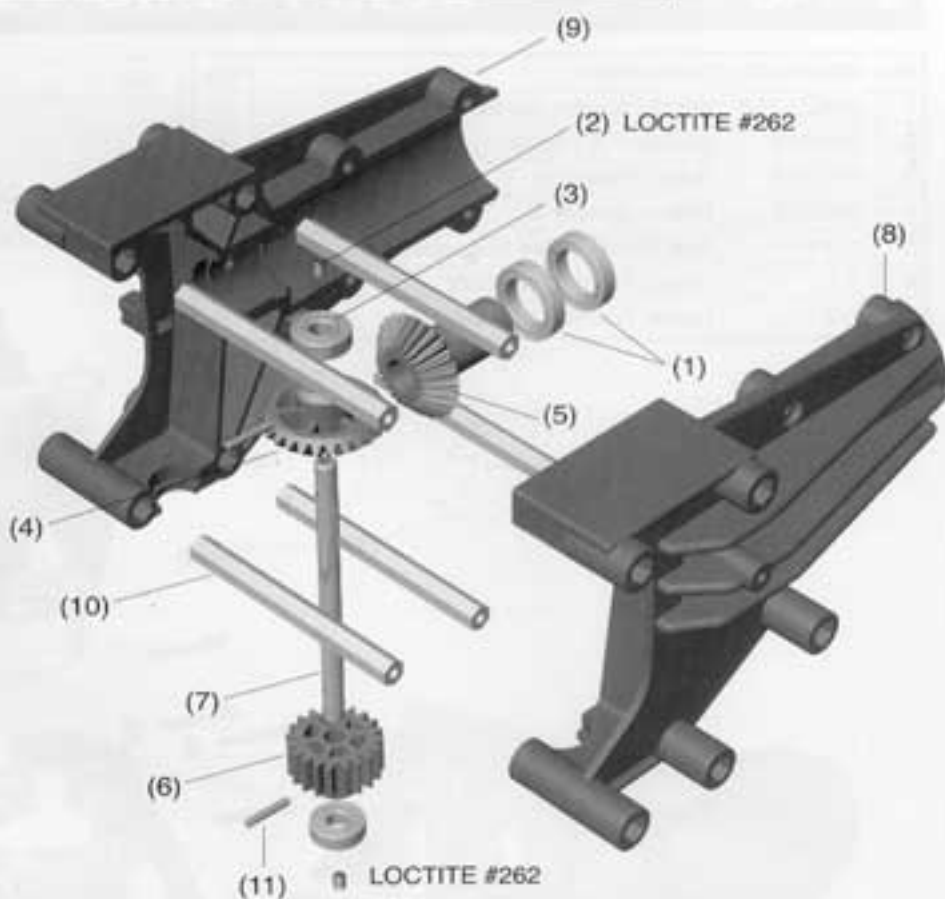
No.	Material No.	Description	Qty
1	HMV6901Z	d12xD24x6 BRG	1
2	BK0387	Lower BRG Case	2
3	BK0390	Frame Spacer L	2



1-2-2 Tail Drive Unit Subassembly

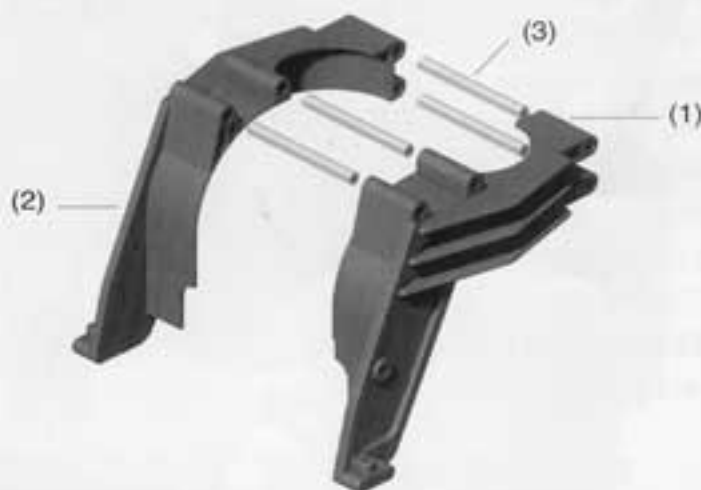
No.	Material No.	Description	Qty
1	HMV6701ZZ	d12xD18x4 BRG	2
2	HME3-4B	M3x4 Set Screw	2
3	HMV1350ZZ	d5xD13x4 BRG	2
4	BK0362	Tail Drive Bevel Gear A	1
5	BK0363	Tail Drive Bevel Gear B	1
6	BK0364	Tail Drive Pinion	1
7	BK0365	Tail Drive Gear Shaft	1
8	BK0382	Tail Boom Bracket L	1
9	BK0383	Tail Boom Bracket R	1
10	BK0390	Frame Spacer L	5
11	BK0414	Pin 2x12	2

Install BK0364 and BK0362 onto BK0365 Tail Gear Drive Shaft. Then insert the two Pins and secure them with two M3x4 Set Screws. Add a tiny drop of Locktite on the set screw thread before inserting them. Always use a very small amount of Locktite liquid on the thread, otherwise it may be nearly impossible to remove the set screws in the future for servicing. Install the four ball bearings and the hex shaped Frame Spacers according to the drawing.



1-2-3 Cooling Fan Casing Subassembly

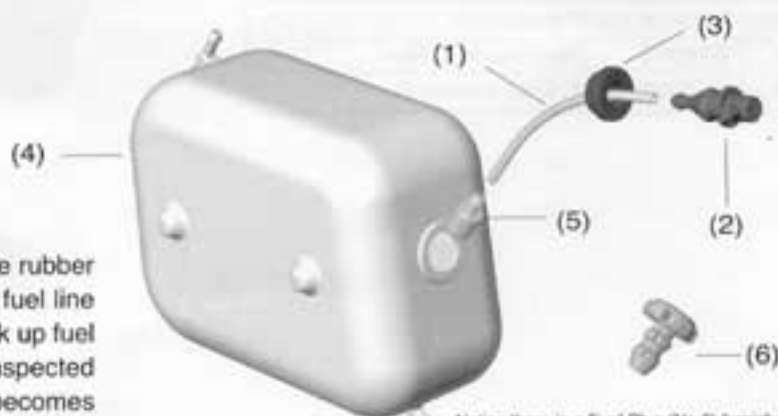
No.	Material No.	Description	Qty
1	BK0378	Fan Casing L	1
2	BK0379	Fan Casing R	1
3	BK0390	Frame Spacer L	4



1-2-4 Fuel Tank Subassembly

No.	Material No.	Description	Qty
1	BB0373	Silicon Tube(L=80)	1
2	BV0355	Fuel Nipple	1
3	BK0062	Fuel Tank Stopper	1
4	BK0402	Fuel Tank	1
5	BE1867	Clunk Weight	1
6	BK0445	Fuel Plug	1

Install the silicone fuel line to the Fuel Nipple. Then add the rubber fuel tank stopper and the clunk weight. The stock silicone fuel line is very soft and thin and is designed to allow the clunk to pick up fuel easily during 3-D aerobatics. The pickup line should be inspected and replaced if necessary every month, otherwise when it becomes soggy it can break off. A thicker silicone line may use substituted but make sure the clunk will reach the bottom when moving the fuel tank to different orientations.



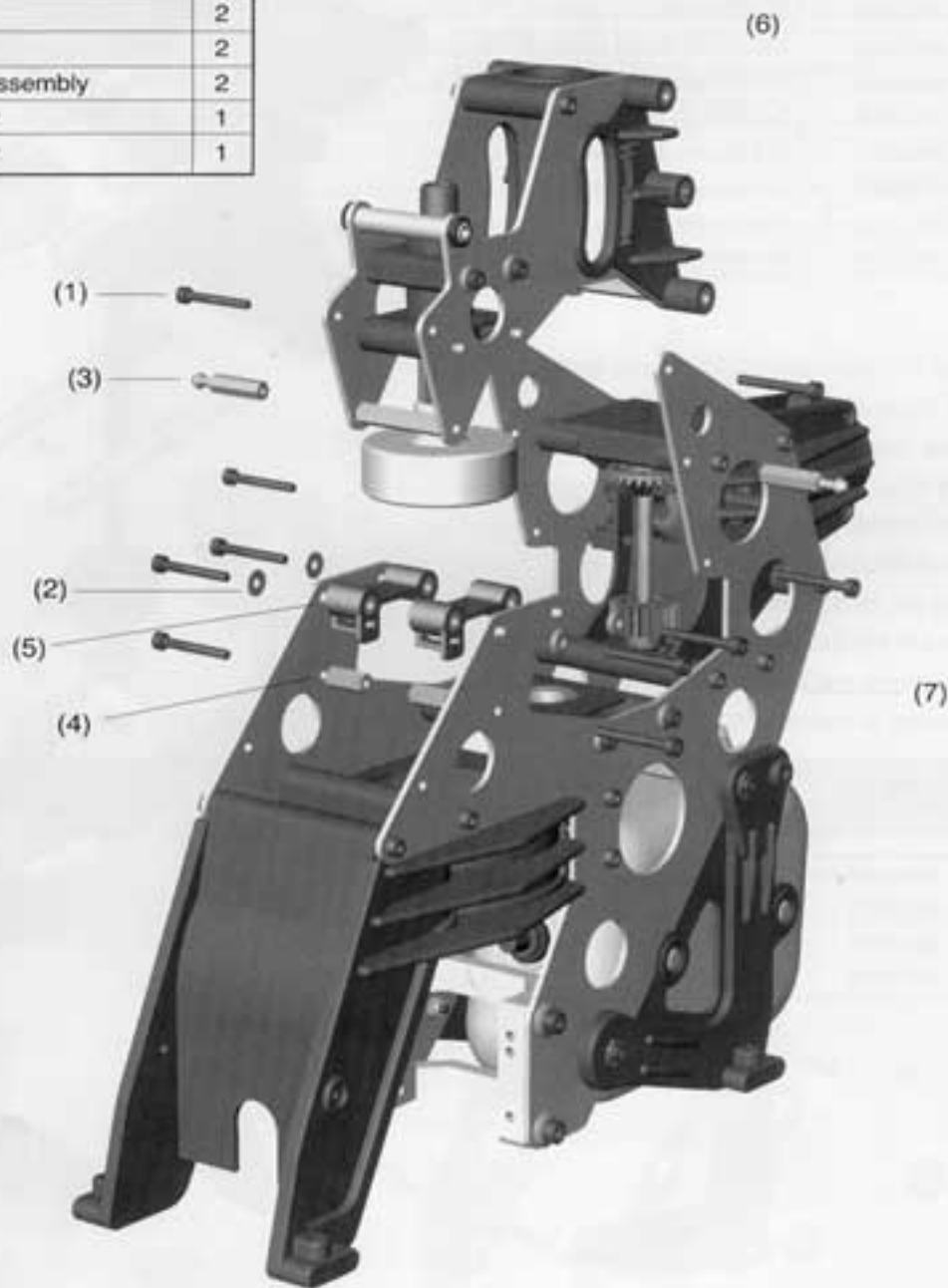
Notice there is a Fuel Plug (No.6) furnished for your convenience. You may want to install a three way manifold to simplify the fueling process.

1-3

Main Frame Assembly

BAG C

No.	Material No.	Description	Qty
1	HMC3-25B	M3x25 Socket Screw	10
2	BK0087	d3xD8x1.4 Washer	4
3	BK0103	Body Fitting Pin	2
4	BK0392	Frame Spacer S	2
5	1-3-1	Rod Guide Collar Subassembly	2
6	1-1	Upper Frame Assembly	1
7	1-2	Lower Frame Assembly	1

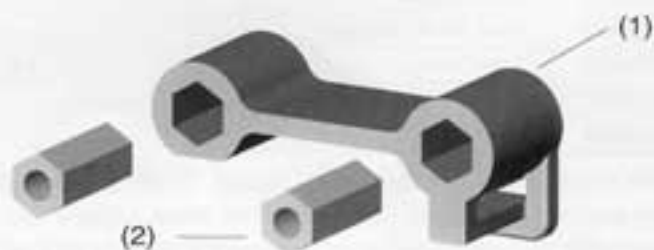


Insert two hex Frame Spacers S into the plastic Rod Guide Collars (1-3-1). Then join the Upper Frame Assembly to the Lower Frame Assembly according to the drawing.

Do not forget to install the four taper washers (2) under the bolts for the Rod Guide Collars. The two Body Pins (BK0103) will be used to secure the canopy in the future.

1-3-1 Rod Guide Collar Subassembly

No.	Material No.	Description	Qty
1	BK0389	Rod Guide Collar	1
2	BK0392	Frame Spacer S	2

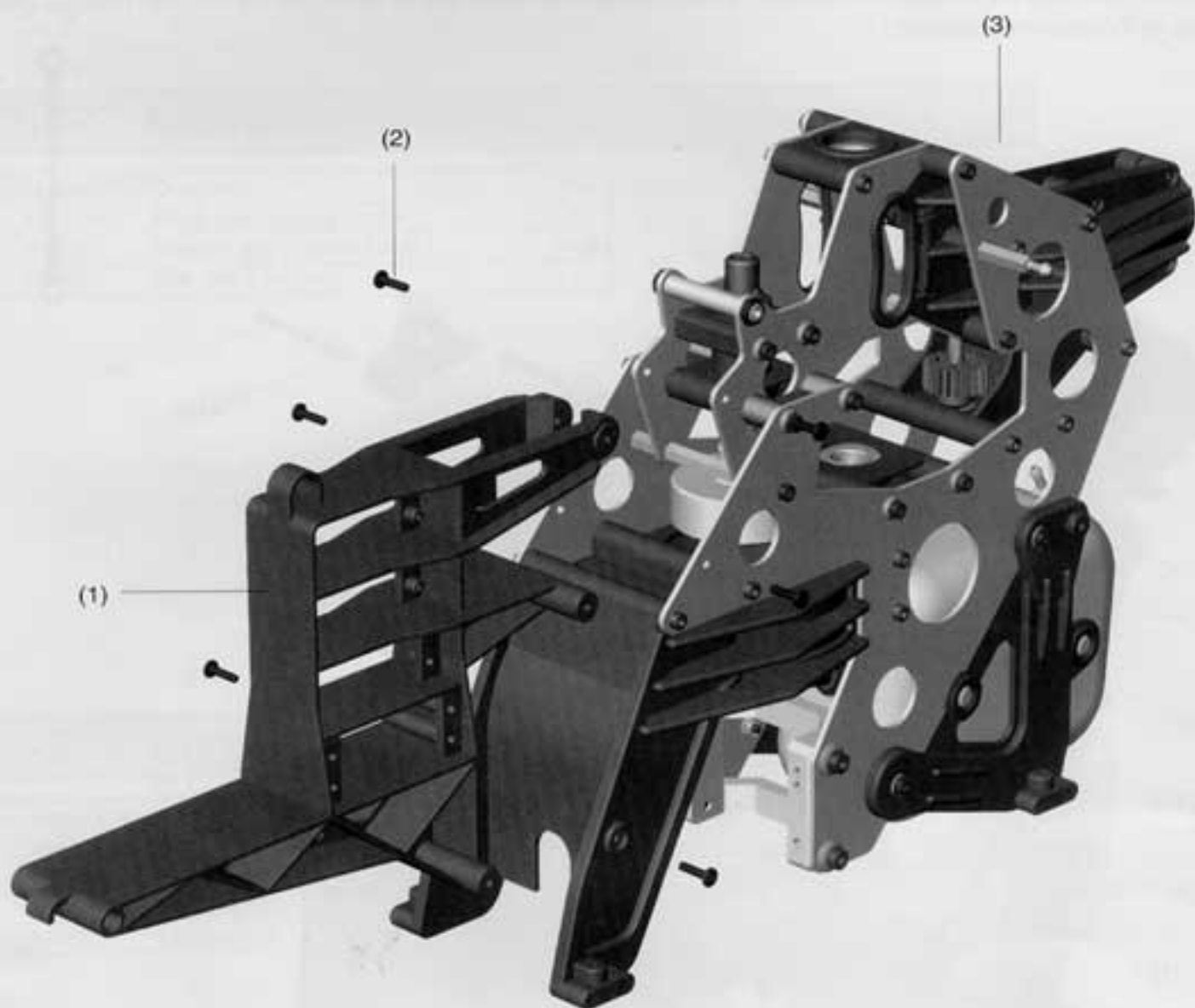


1-4

Installation of Servo Frame BAG D

No.	Material No.	Description	Qty
1	BK0377	Servo Frame	1
2	HSE3-12B	M3x12 Self-Tapping Screw	6
3	1-3	Main Frame Assembly	1

Install the one-piece servo frame using six self-tapping screws.

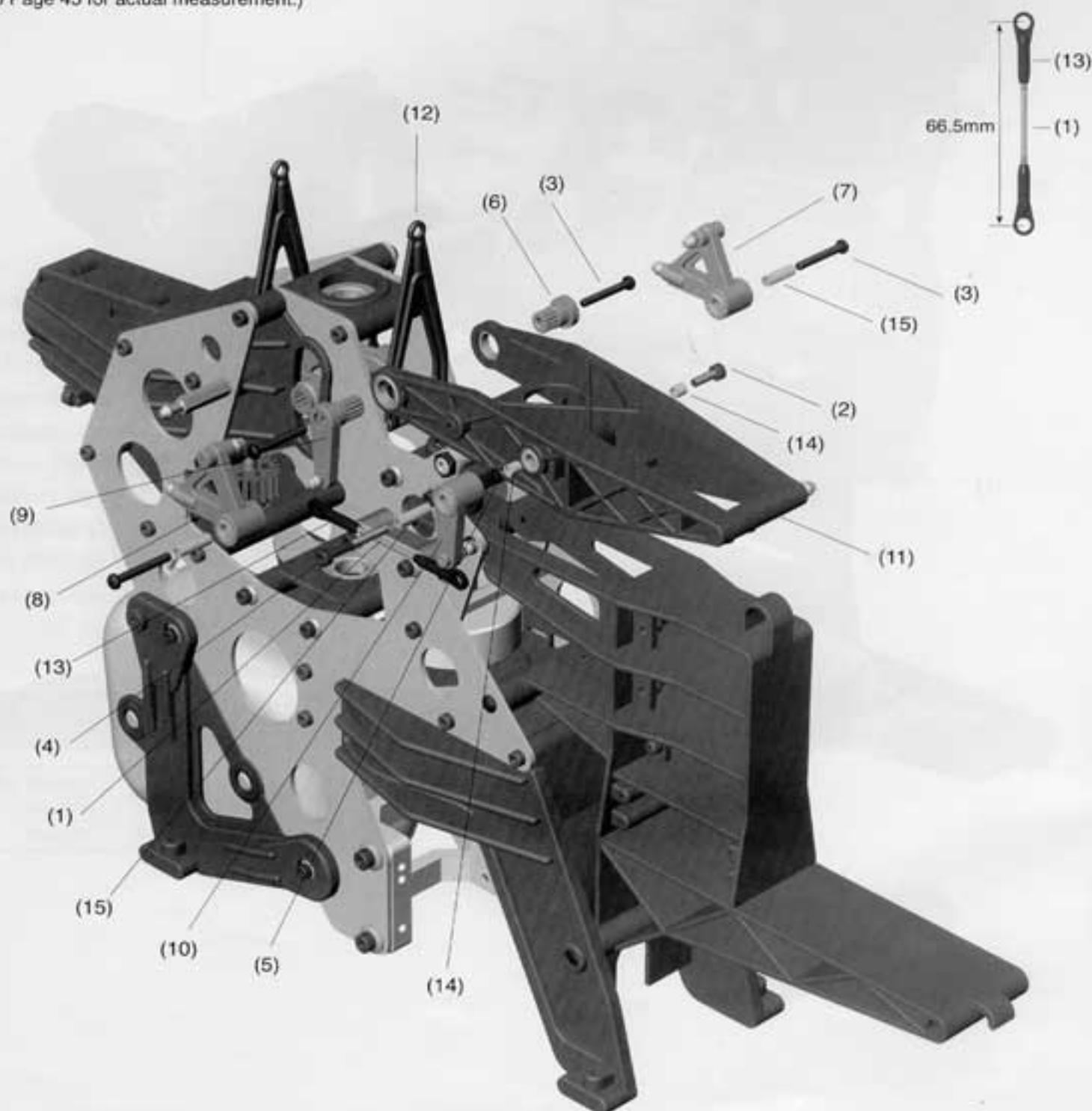


1-5

Installation of Pitch Frame BAG E

No.	Material No.	Description	Qty	No.	Material No.	Description	Qty
1	BK0093	2x46 Link Rod	1	9	1-5-2	Elevator Parallel Lever Subassembly	1
2	HMC3-10B	M3x10 Socket Screw	1	10	1-5-3	Elevator Control Lever Subassembly	1
3	HMJ3-20N	M3x20 Self-Tapping Screw	4	11	1-5-4	Pitch Control Frame Subassembly	1
4	HMC3-25B	M3x25 Socket Screw	1	12	1-5-5	Elevator Control Arm Subassembly	1
5	BK0088	d3xD5x0.5 Washer	1	13	BK0086	Ball Link 4.8x20	2
6	BK0020	Elevator Arm Shaft	1	14	BK0407	Collar d3xD4x4.5	2
7	1-5-1	Aileron Lever L Subassembly	1	15	BK0410	Collar d3xD4x13	3
8	1-5-1	Aileron Lever R Subassembly	1				

Please complete subassemblies 1-5-1 through 1-5-5 first, then add them to the Main Frame. Insert the completed Elevator Control Arm Subassembly in between the Upper Metal Sideframes first. Then fit the plastic Pitch Control Frame Subassembly. Next insert Items No. 6 Elevator Arm Shaft and No. 9 Elevator Parallel Lever Subassembly. Then secure the plastic Pitch Control Frame using No. 2 Socket Screw and No. 14 Collar on the left side and then No. 14 Collar, No. 5 Washer, No. 10 Pitch Control Subassembly, No. 15 Collar and No. 4 Socket Screw for the right side. Adjust the two bolts (No. 2 and No. 4) so the Pitch Control Frame can rock freely but without excessive play. Finally, add the two plastic Aileron Levers and the 66.5 mm pushrod. (Refer to Page 45 for actual measurement.)

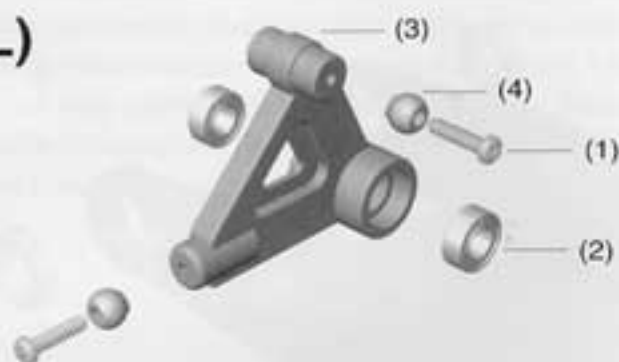


1-5-1 Aileron Lever Subassembly

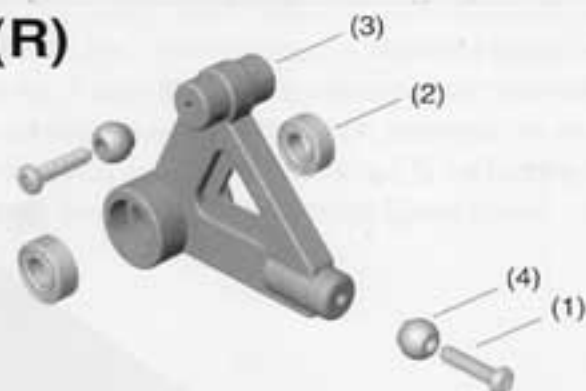
No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	2
2	HMV840ZZ	d4xD8x3 BRG	2
3	BK0340	Aileron Control Arm	1
4	BK0075	Link Ball 4.8	2

No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	2
2	HMV840ZZ	d4xD8x3 BRG	2
3	BK0340	Aileron Control Arm	1
4	BK0075	Link Ball 4.8	2

(L)

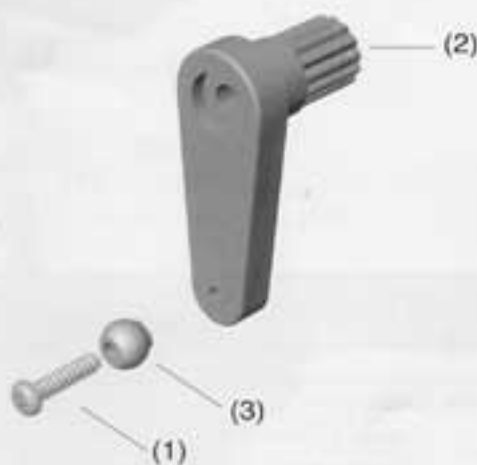


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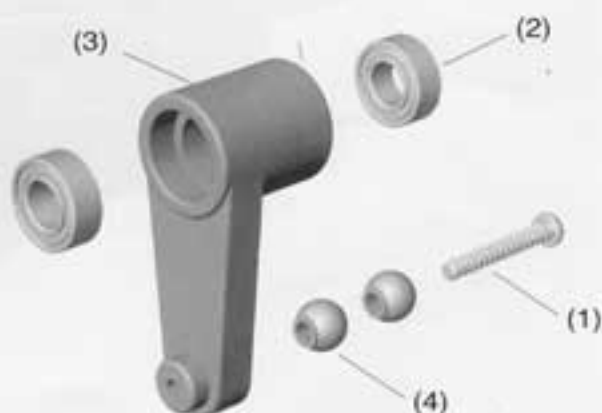
1-5-2 Elevator Parallel Lever Subassembly

No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	1
2	BK0337	Elevator Arm Parallel Lever	1
3	BK0075	Link Ball 4.8	1



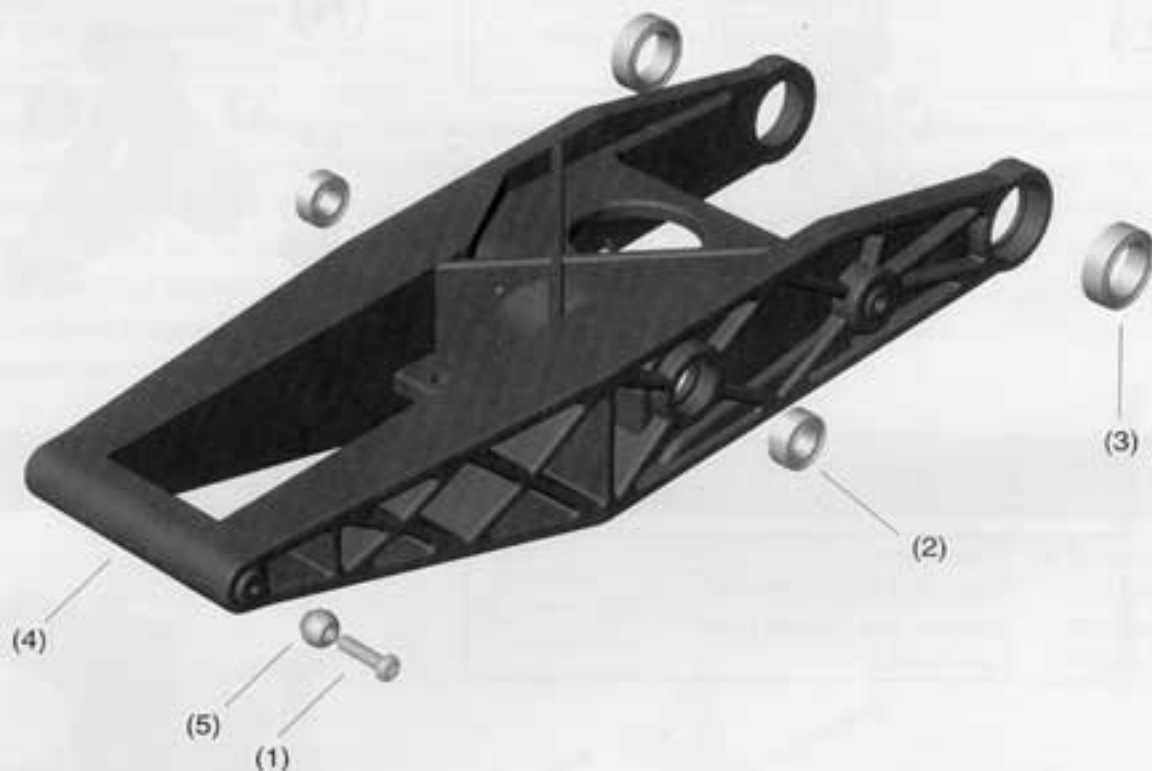
1-5-3 Elevator Control Lever Subassembly

No.	Material No.	Description	Qty
1	HMJ2-14N	M2x14 Self-Tapping Screw	1
2	HMV840ZZ	d4xD8x3 BRG	2
3	BK0338	Elevator Control Lever	1
4	BK0075	Link Ball 4.8	2



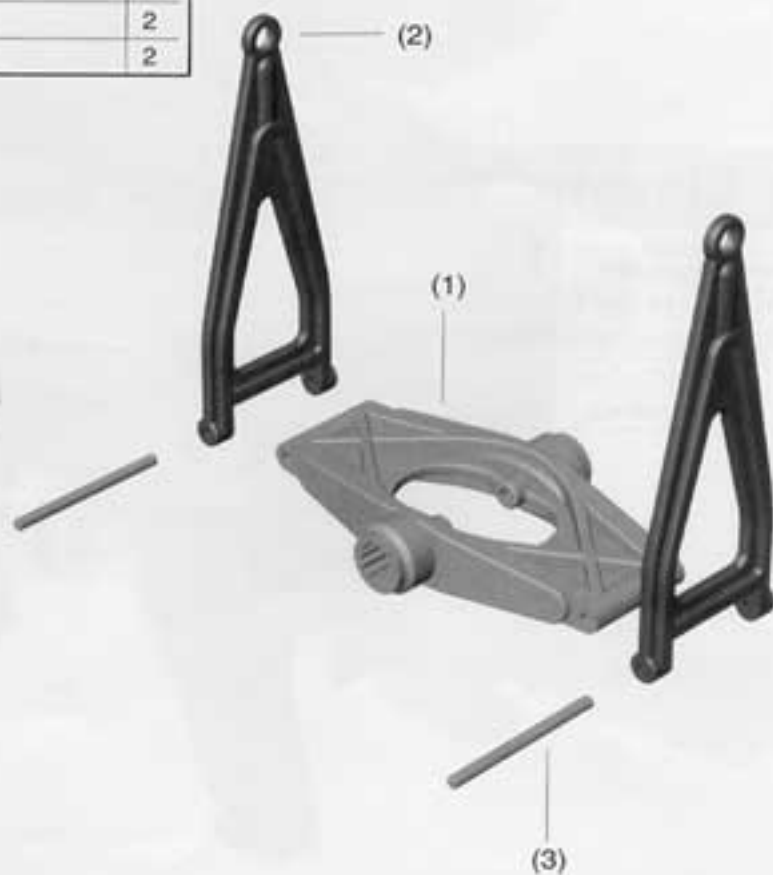
1-5-4 Pitch Control Frame Subassembly

No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	1
2	HMV840ZZ	d4xD8x3 BRG	2
3	HMV1280	d8xD12x3.5 BRG	2
4	BK0336	Pitch Frame	1
5	BK0075	Link Ball 4.8	1



1-5-5 Elevator Control Arm Subassembly

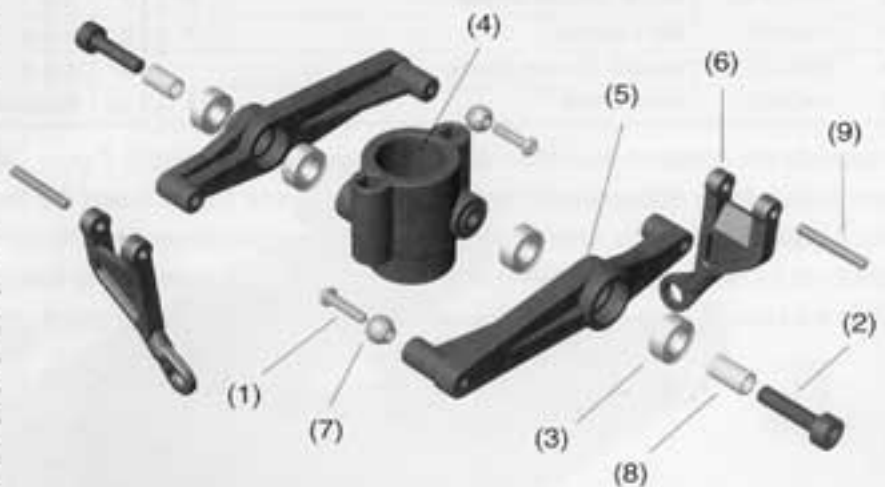
No.	Material No.	Description	Qty
1	BK0339	Elevator Control Arm	1
2	BK0335	Elevator Arm Link	2
3	BK0413	Pin 2x29	2



1-6-1 Wash Out Subassembly

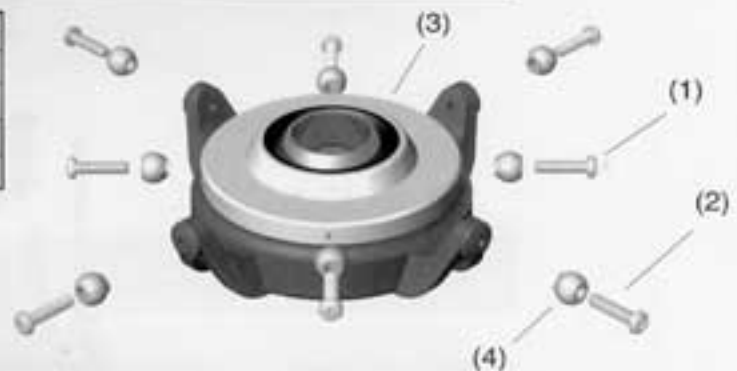
No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	2
2	HMC3-12B	M3x12 Socket Screw	2
3	HMV840ZZ	d4xD8x3 BRG	4
4	BK0341	Wash Out Base	1
5	BK0342	Flybar Control Lever	2
6	BK0343	Wash Out Link	2
7	BK0075	Link Ball 4.8	2
8	BK0409	Collar d3xD4x7	2
9	BK0412	Pin 2x14.5	2

Insert the pin into the Washout Link. If the link is tight on the mixing arm, then gently squeeze the Link at the pin position with a pliers while the Link is attached to the Arm. This will make the hole in the Link slightly bigger. You may want to add just a tiny drop of Locktite on the inside and outside of BK0409 Collar which will help give a completely slop free control system. Do not let the Locktite seep into the bearing. Adjust the tightness of the M3x12 bolts so the mixing arms can move freely but without wobble or ratcheting the ball bearings.



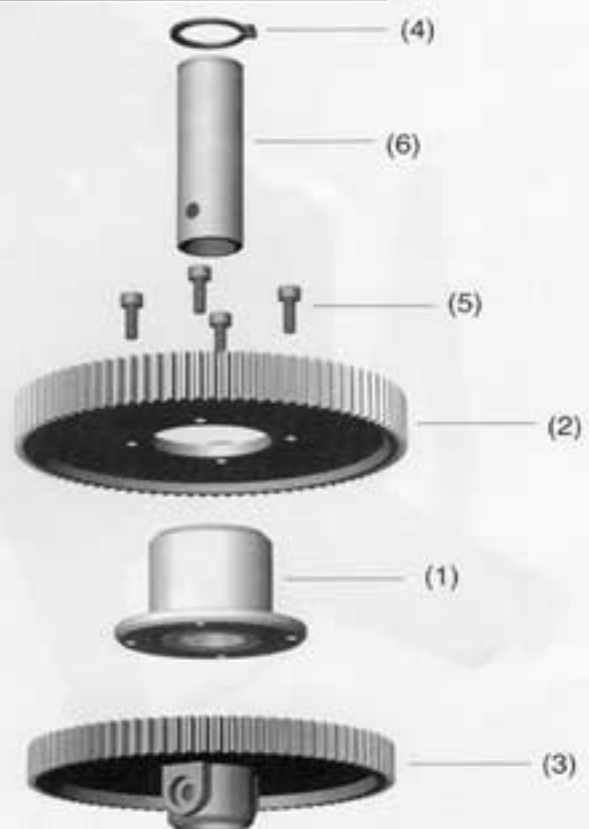
1-6-2 Swash Plate Subassembly

No.	Material No.	Description	Qty
1	HMF2-8N	M2x8 Philip Machine Screw	4
2	HMJ2-8N	M2x8 Self-Tapping Screw	4
3	BV0421	Swash Plate	1
4	BK0075	Link Ball 4.8	8



1-6-3 Main Gear Subassembly

No.	Material No.	Description	Qty
1	BV0368	Auto Rotation Clutch	1
2	BK0420	Main Spur Gear 93	1
3	BK0357	Tail Drive Spur Gear 83	1
4	HMQ16	Retaining Ring	1
5	HMC3-8B	M3x8 Socket Screw	4
6	BK0359	One Way Clutch Shaft	1



No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	8
2	BK0292	2.3x24 Link Rod	2
3	HMC3-10B	M3x10 Socket Screw	2
4	HMC3-18B	M3x18 Socket Screw	2
5	BK0088	d3xD5x0.5 Washer	2
6	HMC4-10B	M4x10 Socket Screw	2
7	BK0435	d4xD11x1.7 Washer	2
8	HMV694ZZ	d4xD11x4 BRG	4
9	HME4-3B	M4x3 Set Screw	2
10	HME4-5B	M4x5 Set Screw	2
11	HMV840ZZ	d4xD8x3 BRG	4
12	HMV1680	d8xD16x5 BRG	4
13	HMX0816	d8x16x5 Thrust Bearing	2
14	BK0408	Collar d3xD4x5.5	2
15	BK0410	Collar d3xD4x13	2
16	BK0319	Main Rotor Pitch Housing	2
17	BK0320	Flybar Control Arm	2

No.	Material No.	Description	Qty
18	BK0321	Main Rotor Hub	1
19	BK0322	Flybar Seesaw Hub	1
20	BK0323	Flybar Arm Bushing	2
21	BK0324	Mixing Lever	2
22	BK0325	Thrust Collar	2
23	BK0326	Spindle	1
24	BK0434	Flybar Rod	1
25	BK0328	Flap Damper	2
26	BK0329	Pin	2
27	BK0330	Main Rotor Hub Pin	1
28	BK0344	Flybar Control Rod	2
29	BK0432	Flybar Paddle	2
30	BK0406	Paddle Root	2
31	BK0416	Paddle Stopper	2
32	BK0075	Link Ball 4.8	8
33	BK0086	Ball Link 4.8x20	4

Start the assembly by inserting No. 27 Main Rotor Hub Pin into the No. 18 Main Rotor Hub, then add the two No. 25 Flap Dampers. Push the No. 23 Feathering Spindle into the dampers and the rotor hub. Add No. 28 Flybar Control Rod. Install No. 32 Link Ball on the Main Rotor Pitch Housing using a No. 1 Screw. Next install two No. 12 bearings into the Main Rotor Pitch Housing followed by No. 22 Thrust Collar and No. 13 Thrust Bearings. When installing the Thrust Bearing, please note the two metal discs for the thrust bearing have different inner hole sizes. Find out the inner hole size by sliding them one at a time onto the feathering spindle. The disc with the "larger" inner hole will be placed closer to the main rotor hub. The disc with the smaller inner hole should be placed outboard, means closer to the main rotor blade. This is critical. Slide both finished Main Rotor Pitch Housing onto the feathering spindle and the secure with two M4x10 bolts and washers according to the drawing. Make two pushrods for controlling blade pitch. The distance of 42 mm is measured between the center of two pushrod holes.

Flybar Control Paddle/Seesaw Assembly:

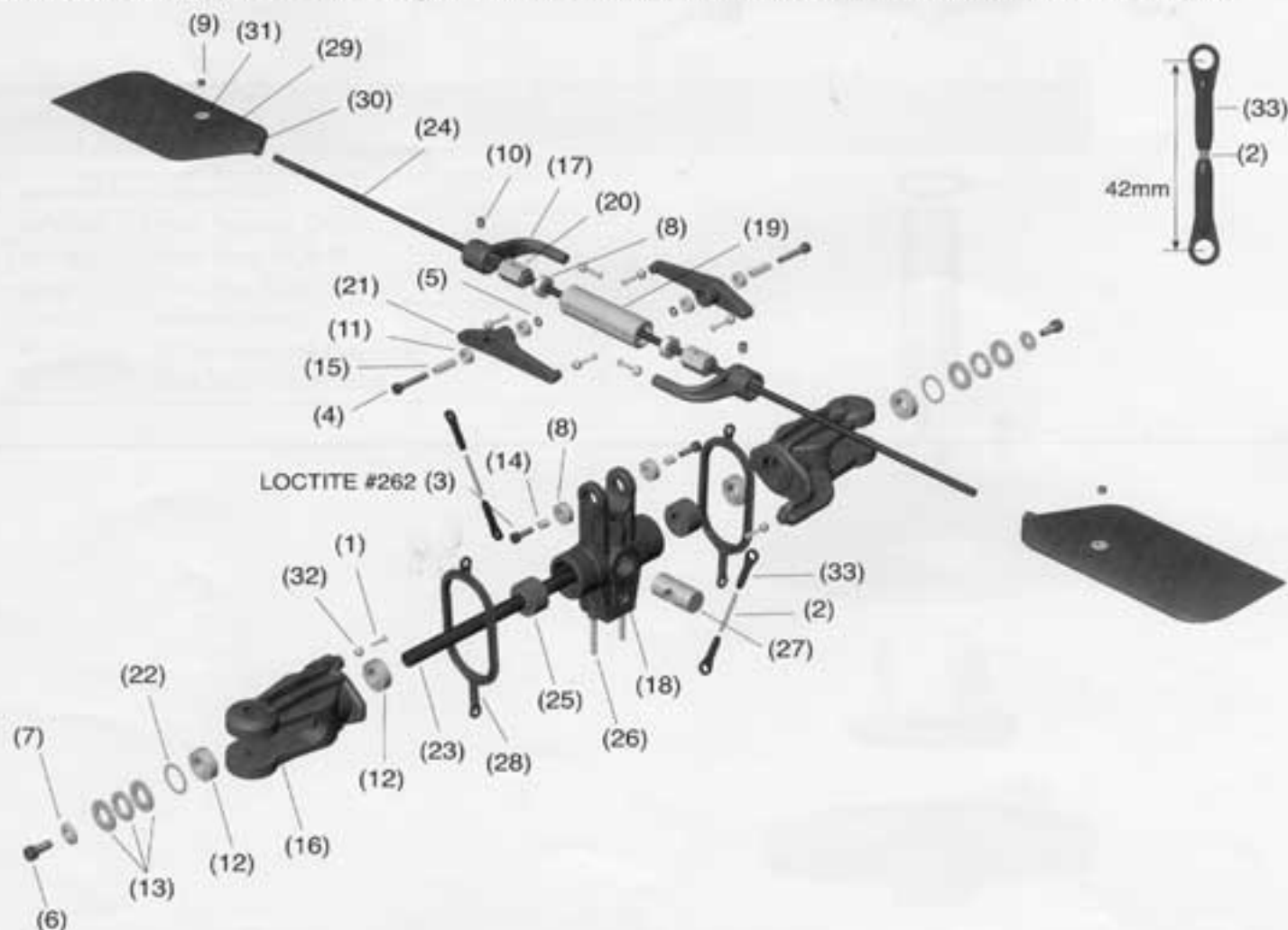
Begin by attaching six No. 32 Link Balls to the No. 17 Control Arms and No. 21 Mixing Levers using No. 1 Screws.

Slide No. 8 BRG, No. 20 Flybar Arm Bushing and No. 17 Control Arm onto the No. 24 Flybar Rod. From the other end of the Flybar Rod, slide on the No. 19 Seesaw Hub and the other No. 8, 20, and 17. Make sure the Flybar has equal length protruding from each side of the Seesaw Hub, then install and tighten the No. 10 M4x5 set screws.

Add the paddles. Make sure the two paddles and the two flybar control arms are all parallel. Lock the paddles with No. 9 Set Screws.

Assemble and install the No. 21 Mixing Levers and No. 11 Bearings according to the drawing using No. 35 Collars, No. 4 Bolts and No. 5 Washers. You may want to add a tiny drop of Locktite on the inside and outside of No. 35 Collar so it will stay with the inside surface of the ball bearing. Be careful do not let the Locktite seep into the bearings.

Attach the Seesaw Hub of the Control Paddle Assembly to the Main Rotor Head with No. 3 Bolts, No. 34 Bushings, and No. 8 Bearings. Locktite the bolts.



No.	Material No.	Description	Qty	No.	Material No.	Description	Qty
1	HMM3B	M3 Locknut	4	9	BK0400	Stabilizer Fin	1
2	HSE3-12B	M3x12 Self-Tapping Screw	2	10	BK0401	Stabilizer Fin Bracket	1
3	HMC3-14B	M3x14 Socket Screw	2	11	BK0404	Tail Rotor Blade	2
4	HMC3-30B	M3x30 Socket Screw	2	12	BV0423	Tail Drive Shaft BRG	1
5	BK0348	Tail Control Rod B	1	13	BV0367	Tail Drive Shaft	1
6	BK043D	Tail Boom	1	14	3-1-1	Tail Transmission Subassembly	1
7	BK0403	Rod Guide	3	15	BK0086	Ball Link 4.8x20	1
8	BK0399	Vertical Fin	1				

Assemble the Tail Transmission Subassembly according to 3-1-1 first. But do not close the two halves of the transmission tightly. You will do this when you are ready to install the gearbox onto the tail boom.

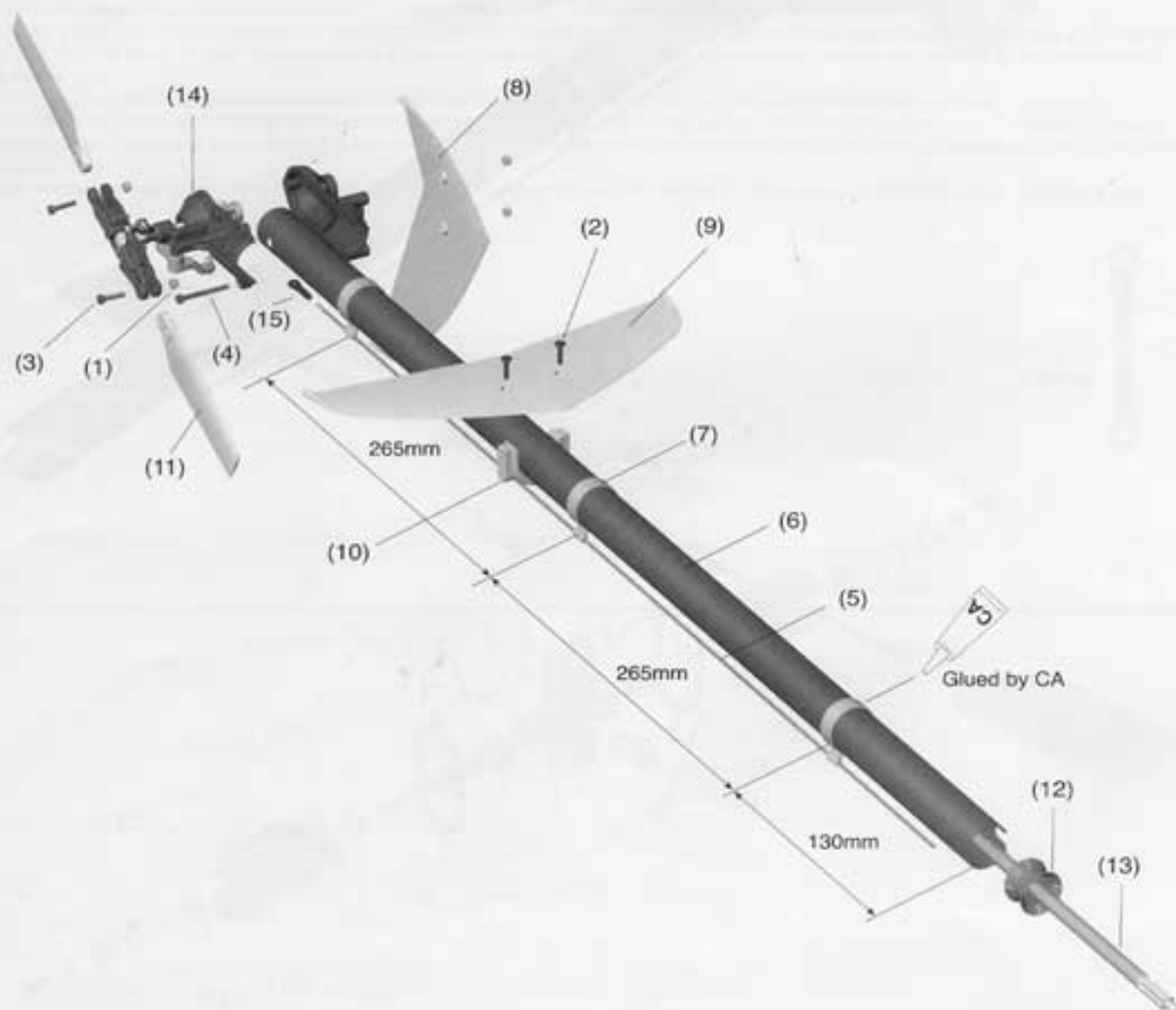
When installing the Tail Transmission make sure the housings match the hole on the tail boom. Tighten the five 3 mm bolts. Add the No 8 Vertical Fin and lock nuts.

Insert the No. 13 Drive Shaft into the tail boom. Make sure the No. 12 Tail Drive Shaft Bearing slides through the tail boom. This Bearing should be close to the center of the drive shaft

but it is not important exactly where it is. Slide three No. 7 Rod Guides onto the tail boom. Do not glue them onto the tail boom yet. Add a tiny drop of CA glue to the pushrod guide after you finish building the entire helicopter. Before adding glue, make sure the tail pushrod is hooked up to the servo and the rod travels in a straight line and moves very smoothly.

Add the No. 9 Stabilizer Fin and No. 10 Bracket now.

Add the No. 11 Tail Rotor Blades using No. 3 Bolts and No. 1 Locking Nuts.



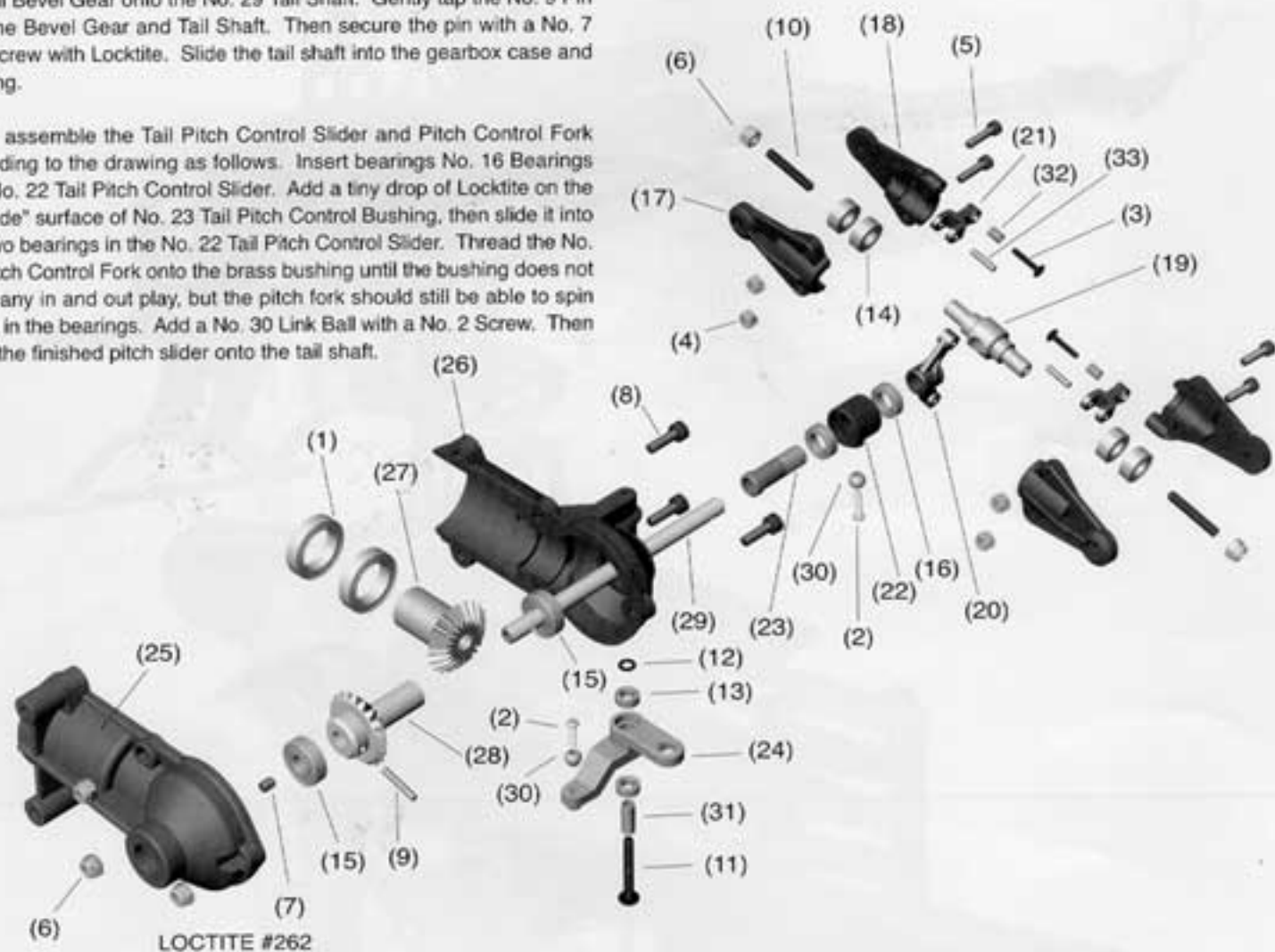
3-1-1 Tail Transmission Subassembly

No.	Material No.	Description	Qty
1	HMV6701Z	d12xD18 BRG	2
2	HMJ2-8N	M2x8 Self-Tapping Screw	2
3	HSE2-10B	M2x10 Self-Tapping Screw	2
4	HMM26B	M2.6 Locknut	4
5	HMC26-10B	M2.6x10 Socket Screw	4
6	HMM3B	M3 Locknut	5
7	HME3-4B	M3x4 Set Screw	1
8	HMC3-10B	M3x10 Socket Screw	3
9	BK0414	Pin 2x12	1
10	HME3-18B	M3x18 Set Screw	2
11	HMJ3-20N	M3x20 Self-Tapping Screw	1
12	BK0088	d3xD5x0.5 Washer	1
13	HMV740ZZ	d4xD7x2.5 BRG	2
14	HM1050	d5xD10x4 BRG	4
15	HMV1350	d5xD13x4 BRG	2
16	HMV1060	d6xD10x3 BRG	2
17	BK0302-1	Tail Pitch Housing A	2

No.	Material No.	Description	Qty
18	BK0303-1	Tail Pitch Housing B	2
19	BK0307	Tail Rotor Hub	1
20	BK0025	Tail Pitch Control Fork	1
21	BK0026	Tail Pitch Control Link	2
22	BK0027	Tail Pitch Control Slider	1
23	BK0345	Tail Pitch Control Slide Bushing	1
24	BK0346	Tail Pitch Control Lever	1
25	BK0370	Tail Case L	1
26	BK0371	Tail Case R	1
27	BK0372	Tail Input Bevel Gear	1
28	BK0373	Tail Output Bevel Gear	1
29	BK0374	Tail Shaft	1
30	BK0075	Link Ball 4.8	2
31	BK0076	Collar d3xD4x10	1
32	BK0082	Collar d2xD3x4	2
33	BK0083	Pin 2x9	2

Install bearings No. 1 and 15 into the No. 25/26 Tail Cases. Install No. 28 Tail Bevel Gear onto the No. 29 Tail Shaft. Gently tap the No. 9 Pin into the Bevel Gear and Tail Shaft. Then secure the pin with a No. 7 Set Screw with Locktite. Slide the tail shaft into the gearbox case and bearing.

Next, assemble the Tail Pitch Control Slider and Pitch Control Fork according to the drawing as follows. Insert bearings No. 16 Bearings into No. 22 Tail Pitch Control Slider. Add a tiny drop of Locktite on the "outside" surface of No. 23 Tail Pitch Control Bushing, then slide it into the two bearings in the No. 22 Tail Pitch Control Slider. Thread the No. 20 Pitch Control Fork onto the brass bushing until the bushing does not have any in and out play, but the pitch fork should still be able to spin freely in the bearings. Add a No. 30 Link Ball with a No. 2 Screw. Then slide the finished pitch slider onto the tail shaft.



Now assemble the Tail Blade Grip System. First install the No. 19 Tail Rotor Hub onto the No. 29 Tail Rotor Shaft. The hub will be almost flush with the end of the tail rotor shaft. Secure the hub to the shaft by using two No. 10 M3x18 set screws. Add a tiny drop of Locktite on the set screw before threading them into the hub. If too much Locktite is use then it will be impossible to remove the set screws for service in the future. A tiny drop of Locktite is sufficient to prevent them from vibrating out. Put a tiny drop of Locktite on the inside surface of No. 14 Bearings. Then slide two No. 14 bearings onto each end of the tail rotor hub. Add the No. 6 3mm locknut. Do not over tighten the two locknuts because that may break the No. 10 set screw.

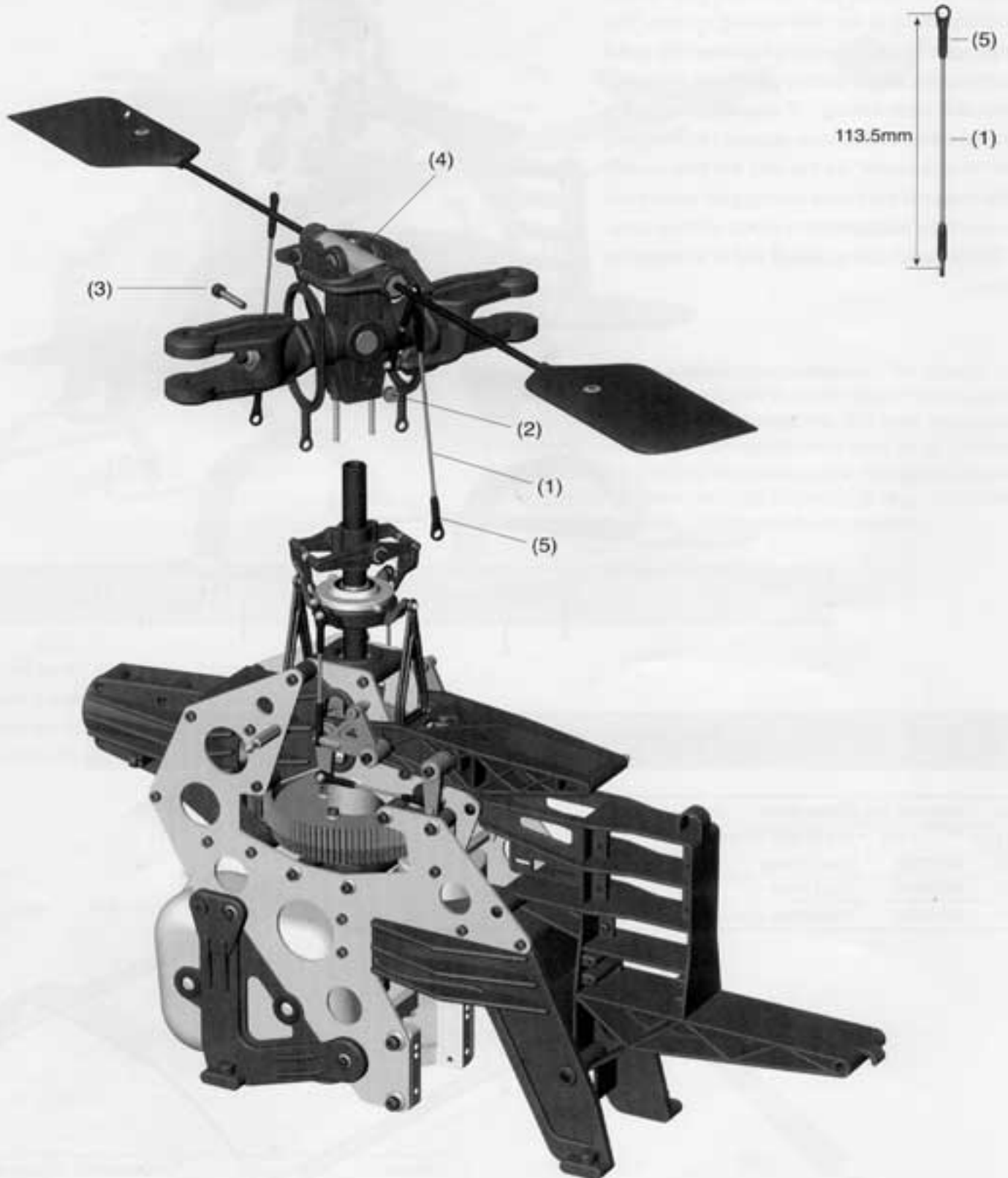
Now add the two piece plastic No. 17/18 Tail Pitch Housings. Install No. 21 Tail Pitch Control Links, No. 32 Collars, and No. 3 Screws according to the drawing. Attach the Tail Pitch Control Links to the Pitch Fork using the small pins, No. 33. Install the No. 24 Tail Pitch Control Lever as shown with No. 11 Screw, No. 31 Bushing, and No. 12 Washer, with two No. 12 Bearings. Attach a No. 30 Link Ball with a No. 2 Screw. Upon finishing Step 3-1-1, make sure there is no extra parts left on your workbench.

4-1

Installation of Rotor Head BAG I

No.	Material No.	Description	Qty
1	BK0318	2.3x95 Link Rod	2
2	HMM4B	M4 Locknut	1
3	HMC4-25B	M4x25 Socket Screw	1
4	2-1	Rotor Head Assembly	1
5	BK0086	Ball Link 4.8x20	4

Congratulation, we are almost done. Install the finished main rotor head onto the 12 mm rotor main shaft. Secure it with a No. 3 M4x25 socket bolt and No. 2 4 mm locknut. Make up two 113.5 mm long pushrods and attach them to the Bell-Hiller mixing arm.



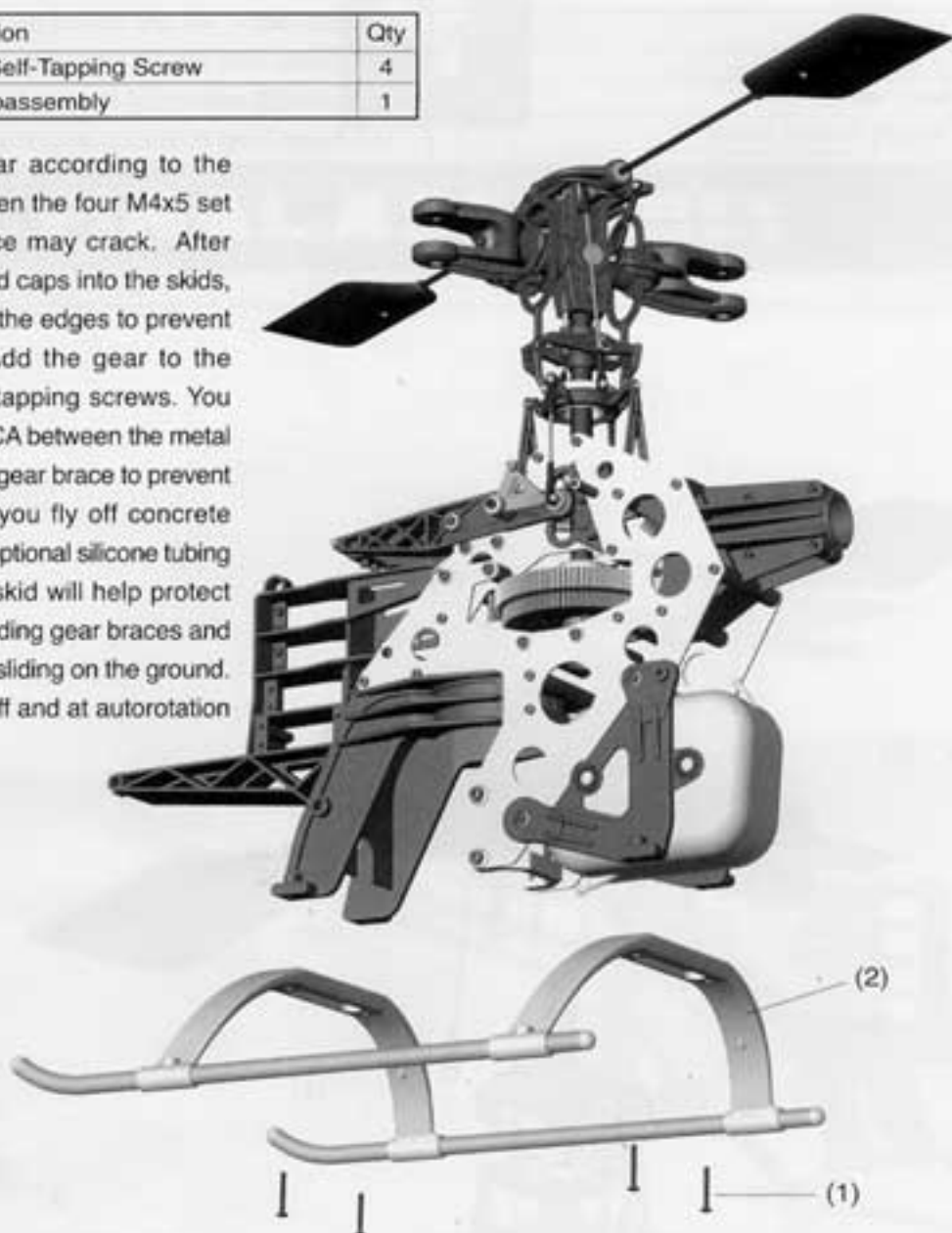
4-2

Installation of Landing Skid

No.	Material No.	Description	Qty
1	HMJ3-20N	M3x20 Self-Tapping Screw	4
2	4-2-1	Skid Subassembly	1

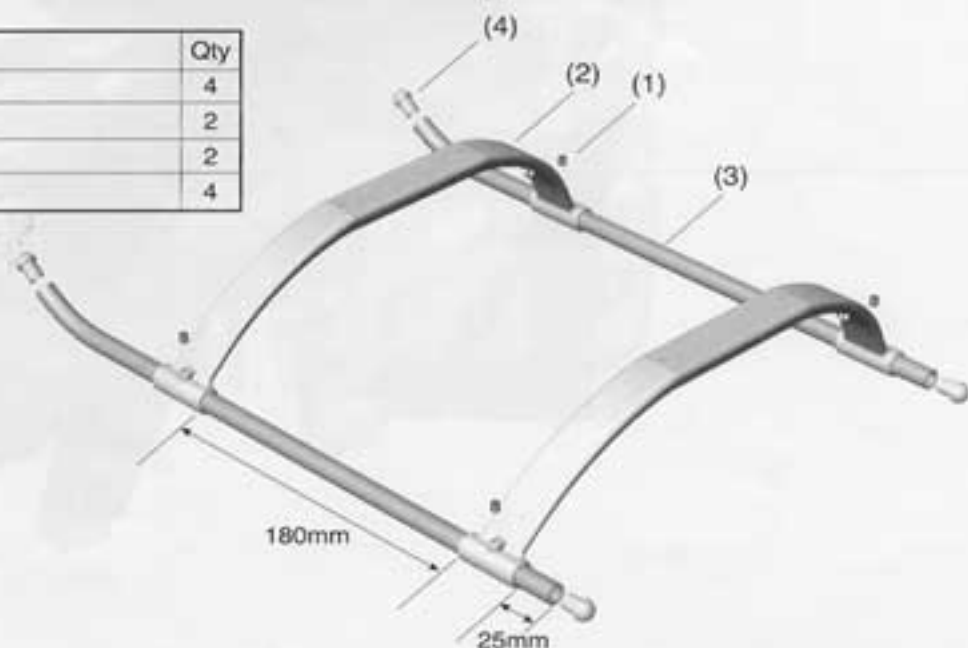
Make up the landing gear according to the drawing. Do not over tighten the four M4x5 set screws or the plastic brace may crack. After inserting the four plastic end caps into the skids, add some CA glue around the edges to prevent them from falling out. Add the gear to the helicopter using four self-tapping screws. You may want to add a drop of CA between the metal skid and the plastic landing gear brace to prevent the skid from turning. If you fly off concrete surface, then adding some optional silicone tubing or "skid stoppers" on the skid will help protect the bottom of the plastic landing gear braces and prevent the helicopter from sliding on the ground.

This is useful during takeoff and at autorotation time.



4-2-1 Skid Subassembly

No.	Material No.	Description	Qty
1	HME4-5B	M4x5 Set Screw	4
2	BK0397	Skid Brace	2
3	BK0276	Skid Pipe	2
4	BK0398	Skid Pipe End Cap	4

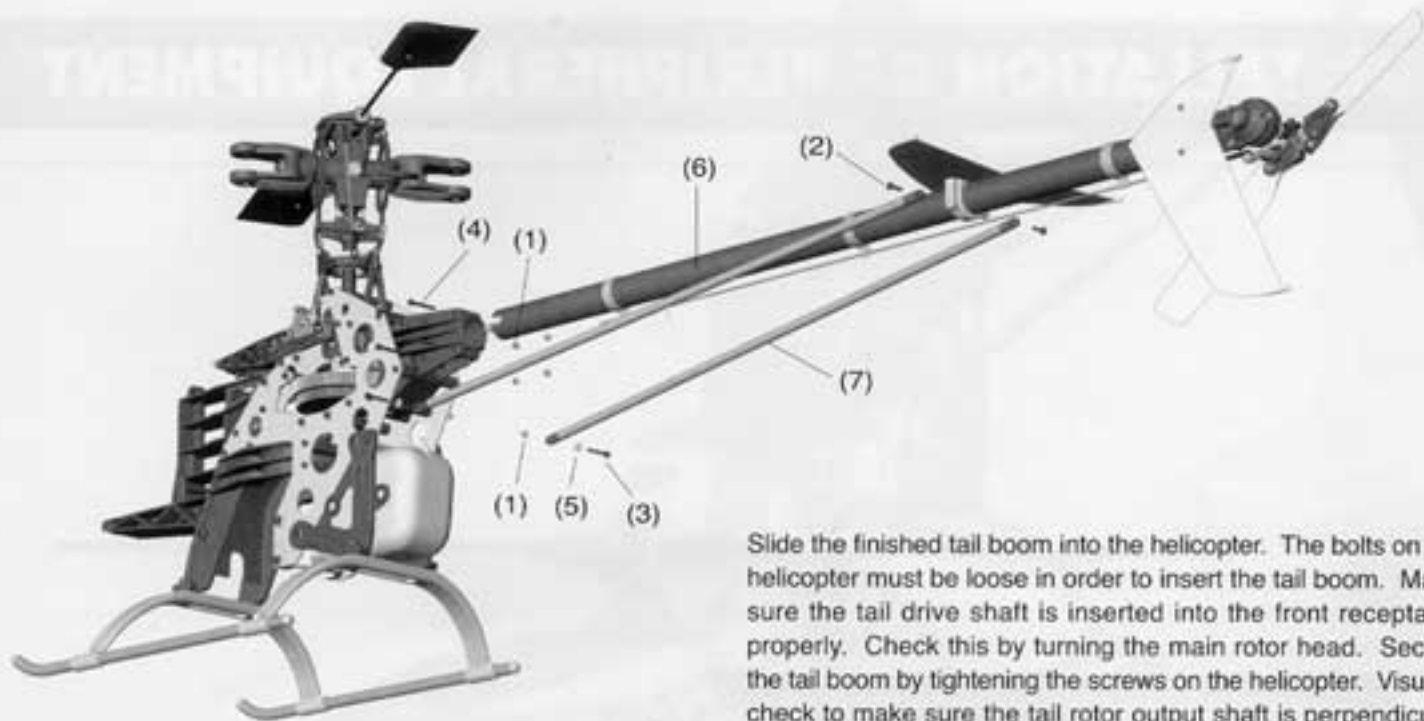


4-3

Installation of Tail Assembly

No.	Material No.	Description	Qty
1	HMM3B	M3 Locknut	6
2	HSE3-12B	M3x12 Self-Tapping Screw	2
3	HMC3-20B	M3x20 Socket Screw	2
4	HMC3-25B	M3x25 Socket Screw	4

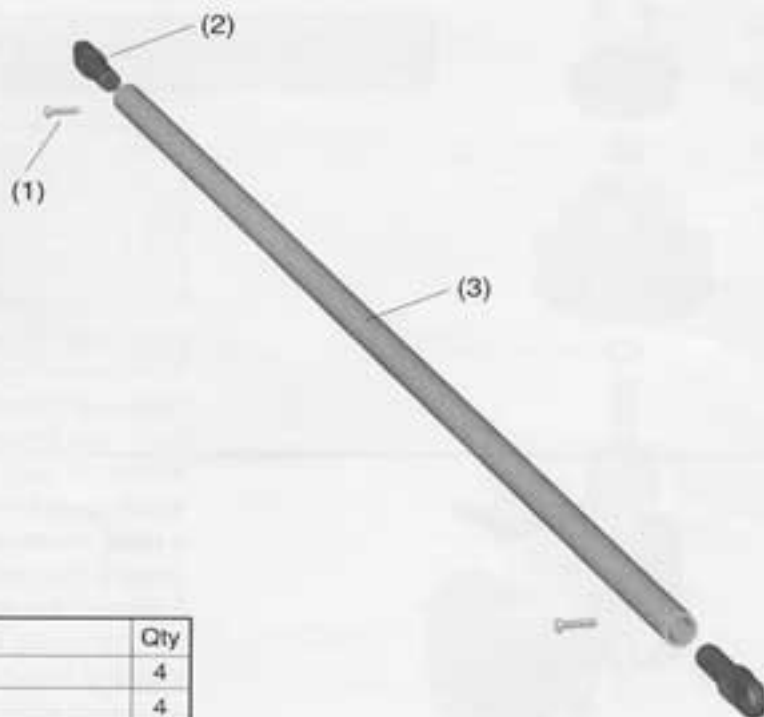
No.	Material No.	Description	Qty
5	BK0087	d3xD8x1.4 Washer	2
6	3-1	Tail Assembly	1
7	4-3-1	Tail Support Subassembly	2



Slide the finished tail boom into the helicopter. The bolts on the helicopter must be loose in order to insert the tail boom. Make sure the tail drive shaft is inserted into the front receptacle properly. Check this by turning the main rotor head. Secure the tail boom by tightening the screws on the helicopter. Visually check to make sure the tail rotor output shaft is perpendicular to the main rotor shaft. Add the tail boom supports.

4-3-1 Tail Support Subassembly

Secure the two plastic ends to the aluminum tube with slow CA or epoxy glue and the two 2 mm self tap screws, making sure the two plastic ends are perpendicular to each other.



No.	Material No.	Description	Qty
1	HMJ2-8N	M2x8 Self-Tapping Screw	4
2	BK0447	Tail Support Rod End	4
3	BK0396	Tail Support Rod	2

5-1

Installation of Engine

BAG J

No.	Material No.	Description	Qty
1	5-1-1	Engine Subassembly	1
2	HMC4-18B	M4x18 Socket Screw	4
3	BN1639	Muffler	1

No.	Material No.	Description	Qty
4	HMC4-42B	M4x42 Muffler Bolt	2
5	HMT4B	SPRING WASHER	2

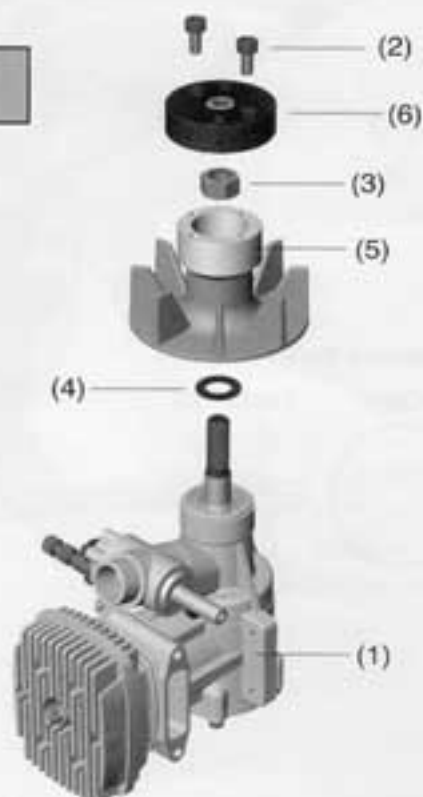
Insert the engine into the sideframes, then add the muffler.



5-1-1 Engine Subassembly

No.	Material No.	Description	Qty
1	*****	Heli Engine .60-.70	1
2	HMC4-8B	M4x8 Socket Screw	2
3	*****	Nut (Comes with Heli Engine)	1
4	HMO10	d9.5xD16x1 Washer	1
5	BV0380	Cooling Fan	1
6	BV0381	Clutch	1

The aluminum cooling fan hub is threaded. Place the washer that came with your engine onto the engine crankshaft first. Then screw the fan hub onto the engine. Add a tiny drop of Loctite on the engine nut. Do not use too much otherwise the nut will be impossible to remove later on. Tighten the engine nut using a socket head wrench while grabbing the plastic fan with a towel. The nut should be tightened securely, but do not over torque it because you may damage the plastic fan, or the plastic fan may come apart from the aluminum fan hub. For 50-size or bigger engines, we do not recommend using a piston locking tool on the glow plug hole because that may damage the engine. Attach the No. 6 Steel Clutch, to the fan hub.

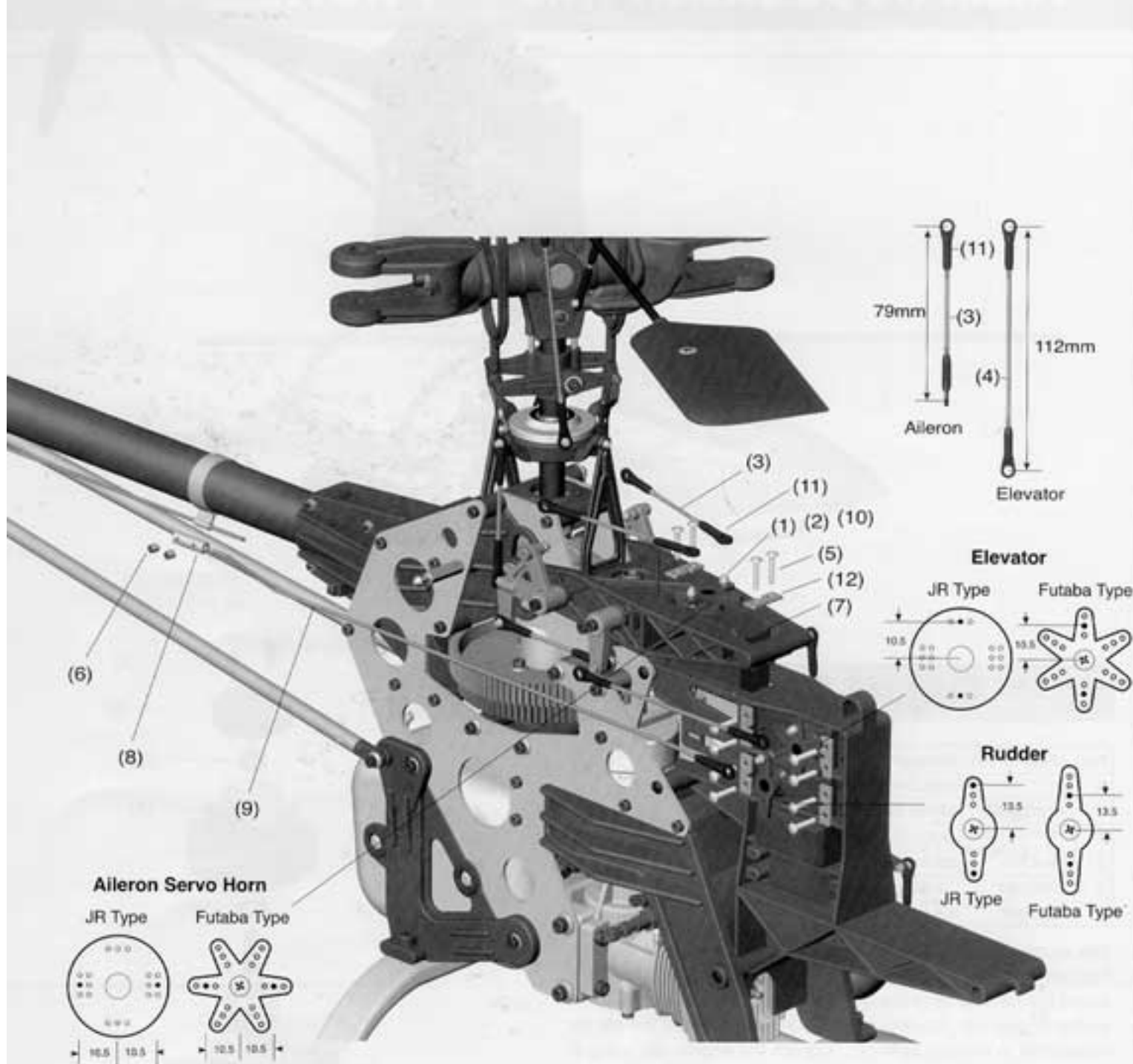


5-2

Installation of Servo-Part 1 BAG J

No.	Material No.	Description	Qty	No.	Material No.	Description	Qty
1	HML2	M2 Nut	4	7	*****	Servo	5
2	HMF2-8N	M2x8 Philip Machine Screw	4	8	BK0105	Rod Joint	1
3	BK0436	2.3x55 Link Rod	2	9	BK0347	Tail Control Rod A	1
4	BK0438	2.3x88 Link Rod	1	10	BK0075	Link Ball 4.8	4
5	HSE2614N	2.6x14 Self Tapping Screw	12	11	BK0086	Ball Link 4.8x20	7
6	HME4-5B	M4x5 Set Screw	2	12	BK0104	Servo Mounting Plate	6

Install the servos and make up the pushrods according to the drawings. The distance between the steel ball and the center of servo arm are shown in the drawing. Use them as a guide. These distances are used in conjunction with the servo travels set to 100% for all the channels in the transmitter. Fine tune them to suit your personal flying style.



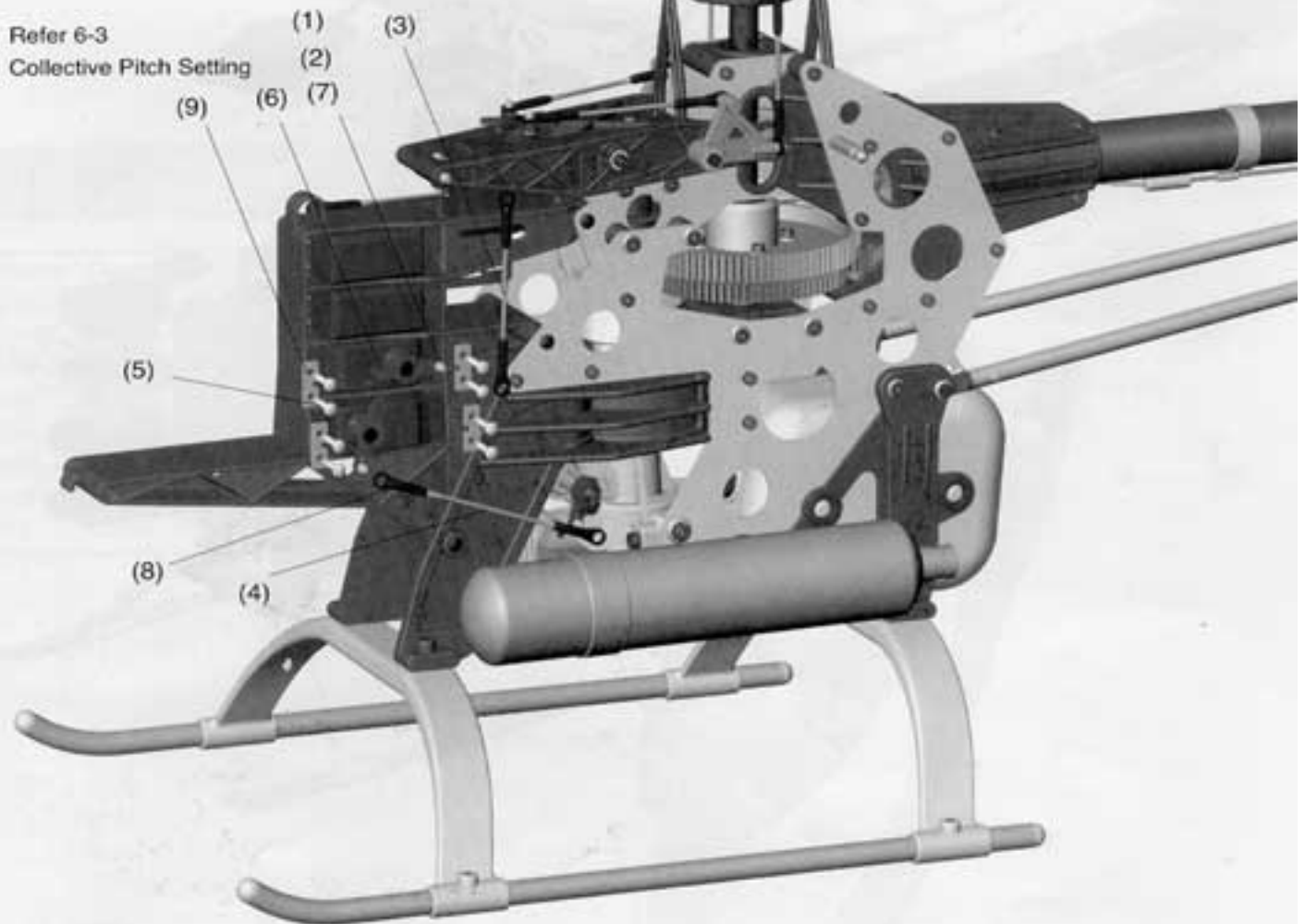
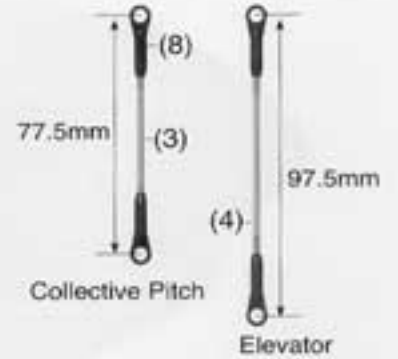
5-3

Installation of Servo-Part 2 BAG J

No.	Material No.	Description	Qty
1	HML2	M2 Nut	3
2	HMF2-8N	M2x8 Philip Machine Screw	3
3	BK0436	2.3x55 Link Rod	1
4	BK0095	2.3x76 Link Rod	1
5	HSE2614N	2.6x14 Self-Tapping Screw	8

No.	Material No.	Description	Qty
6	*****	Servo	2
7	BK0075	Link Ball 4.8	3
8	BK0086	Ball Link 4.8x20	4
9	BK0104	Servo Mounting Plate	4

Make up the throttle and collective control pushrods according to the drawing. Use the outermost hole on the throttle control arm. Attach the steel ball on the throttle servo arm at approximately the same distance as the steel ball on the throttle arm.



5-4

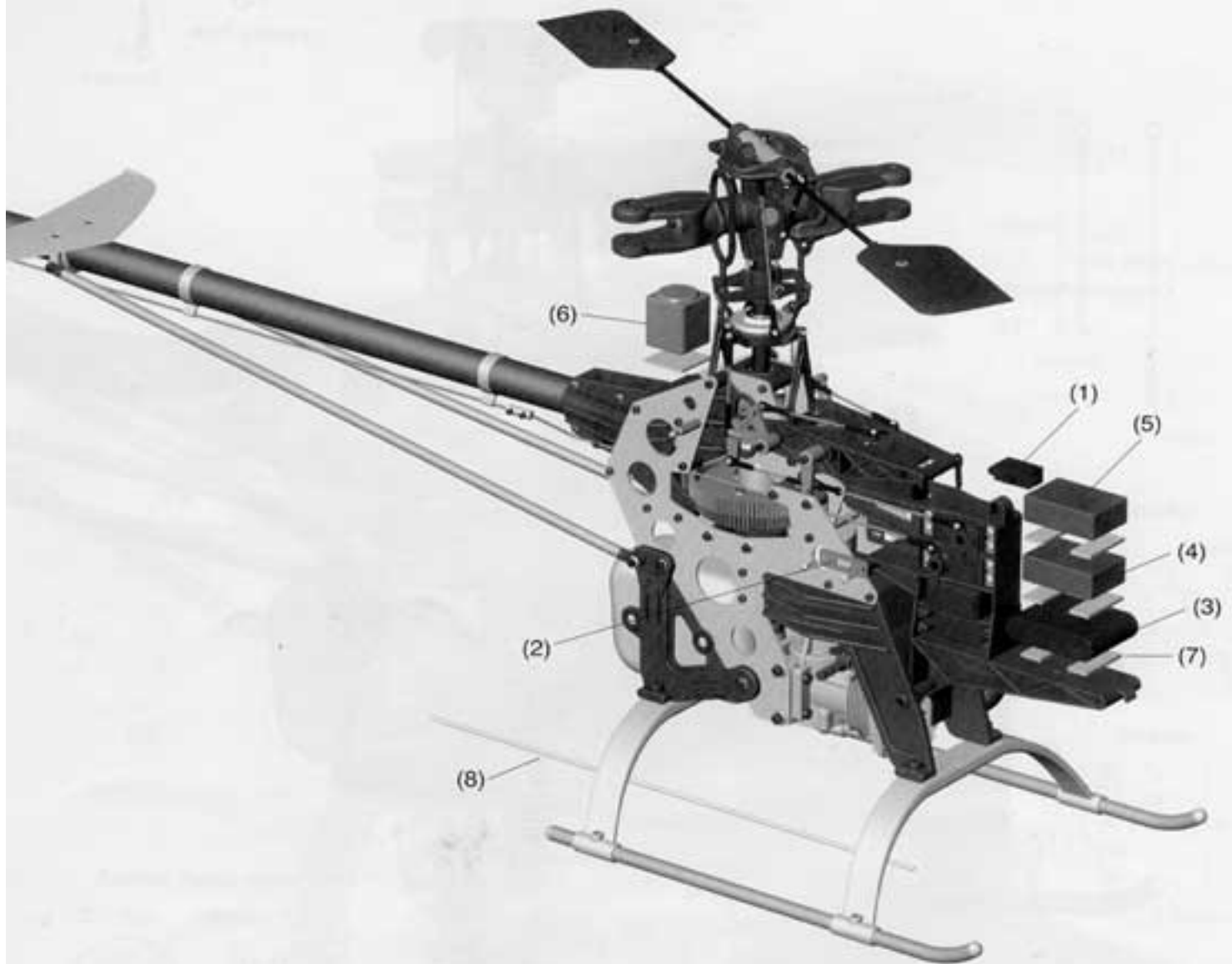
Installation of Receiver & Gyro

BAG K

No.	Material No.	Description	Qty
1	*****	Switch JRTtype	1
2	*****	Switich Plate	1
3	*****	Battery(Recommend 1200mA)	1
4	*****	Reciever	1

No.	Material No.	Description	Qty
5	*****	Gyro AMP	1
6	*****	Gyro	1
7	BK0106	Two Touch Tape	2
8	BE1052	Antenna Pipe	1

Install the receiver and receiver battery. Even though the receiver and battery can be attached to the helicopter tray using double sided foam tape, but it is better to wrap the receiver and battery separately using half inch or 10 mm thick foam. Then secure them to the tray using six to eight rubberbands.



No.	Material No.	Description	Qty
1	5-5-1	Body Subassembly	1

Carefully cut out the transparent canopy (windshield) using a scissors. The best scissors to use are the ones designed to cut RC car bodies.

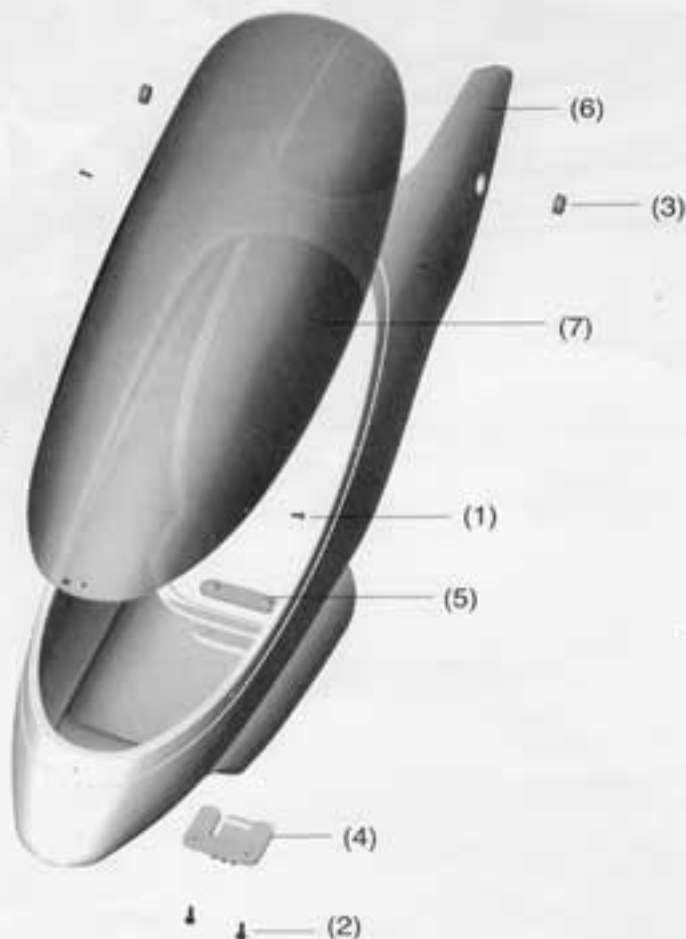
Install the canopy to the body using six small screws. Drill small holes in the canopy and body for the holes. Drill two more holes for the rubber grommets.

Refer to color box and apply the decals.



5-5-1 Body Subassembly

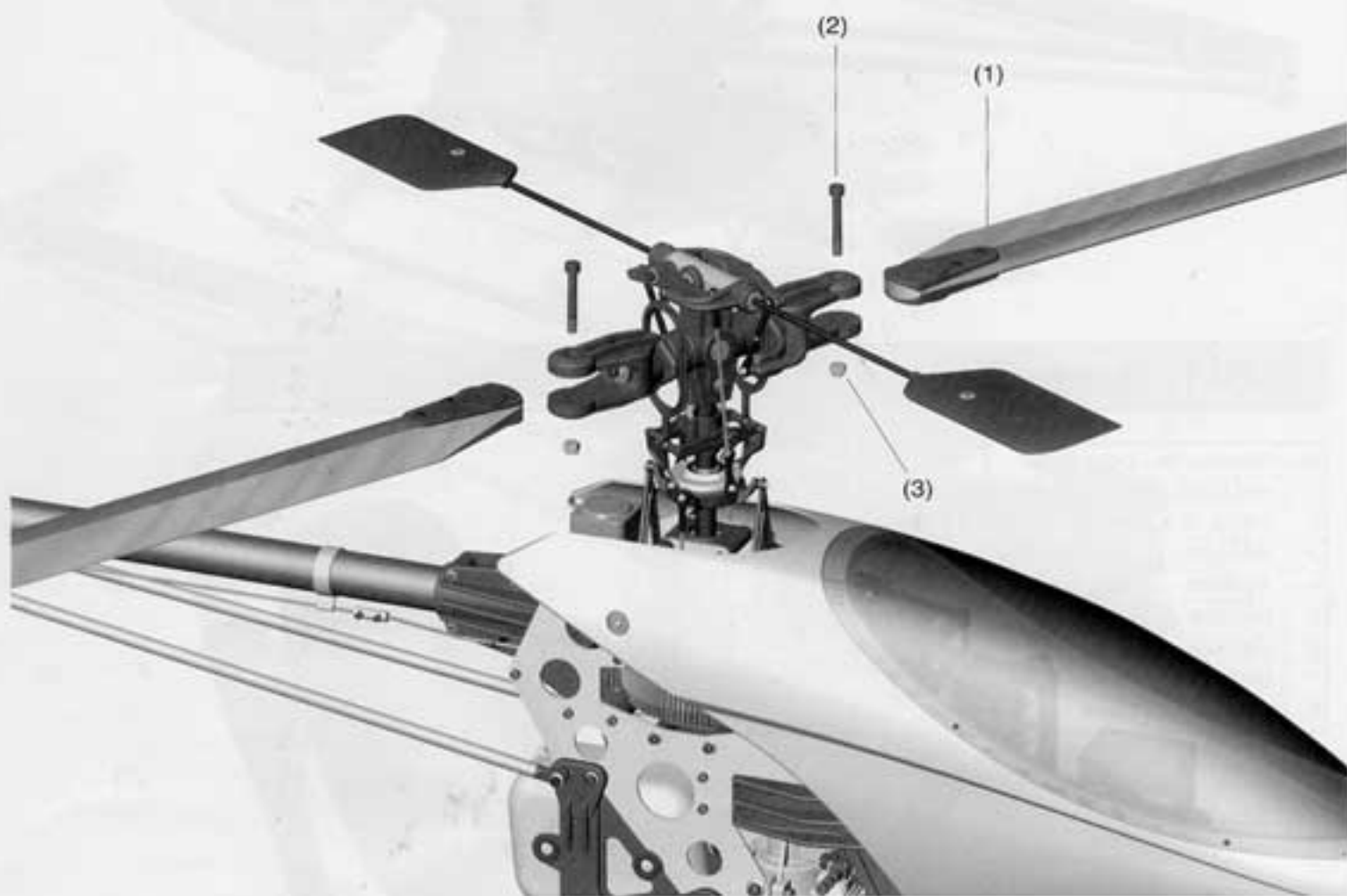
No.	Material No.	Description	Qty
1	HMJ2-6B	M2x6 Self-Tapping Screw	6
2	HSE3-12B	M3x12 Self-Tapping Screw	2
3	BK0102	d3xD6x11Grommet	2
4	BK0098	Body Clip A	1
5	BK0099	Body Clip B	1
6	BK0429	Body	1
7	BK0428	Canopy	1
8	JV0010	Decal	1



5-6

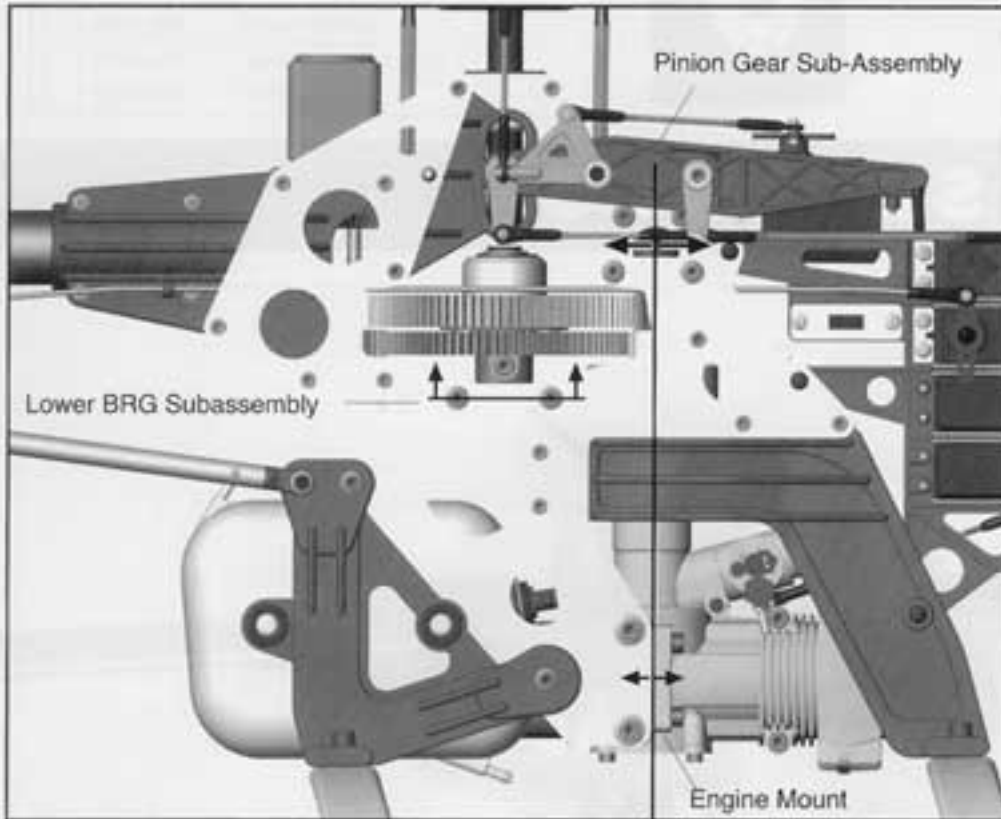
Installation of Rotor Blade BAG M

No.	Material No.	Description	Qty
1	BV0383	Main Rotor	2
2	BK0446	M5x35 Rotor Bolt	2
3	HMM5Z	M5 Locknut	2



6-1

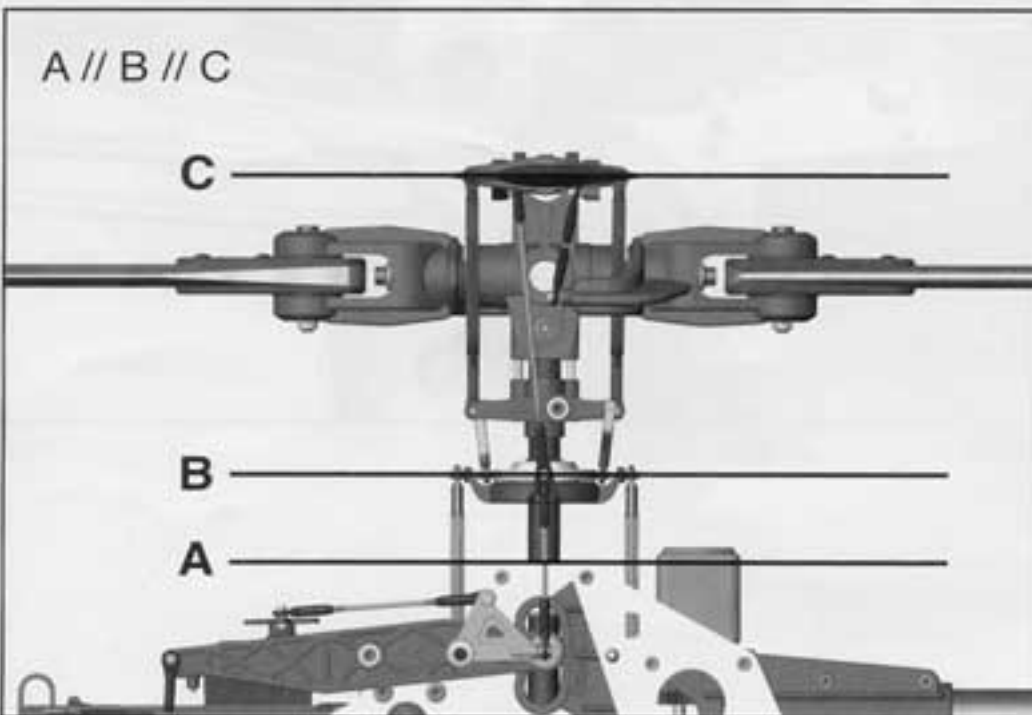
Setting up Gear Backlash



Adjust the Lower BRG Sub-Assembly up-and-down, Pinion Gear Subassembly side-to-side and Engine Mount side-to-side until the gears mesh smoothly and turn freely with a minimum of backlash.

6-2

Setting up of Stabilizer Blade



Always make sure the surface of the flybar, flybar paddles, swashplate, and top of metal frame are parallel.

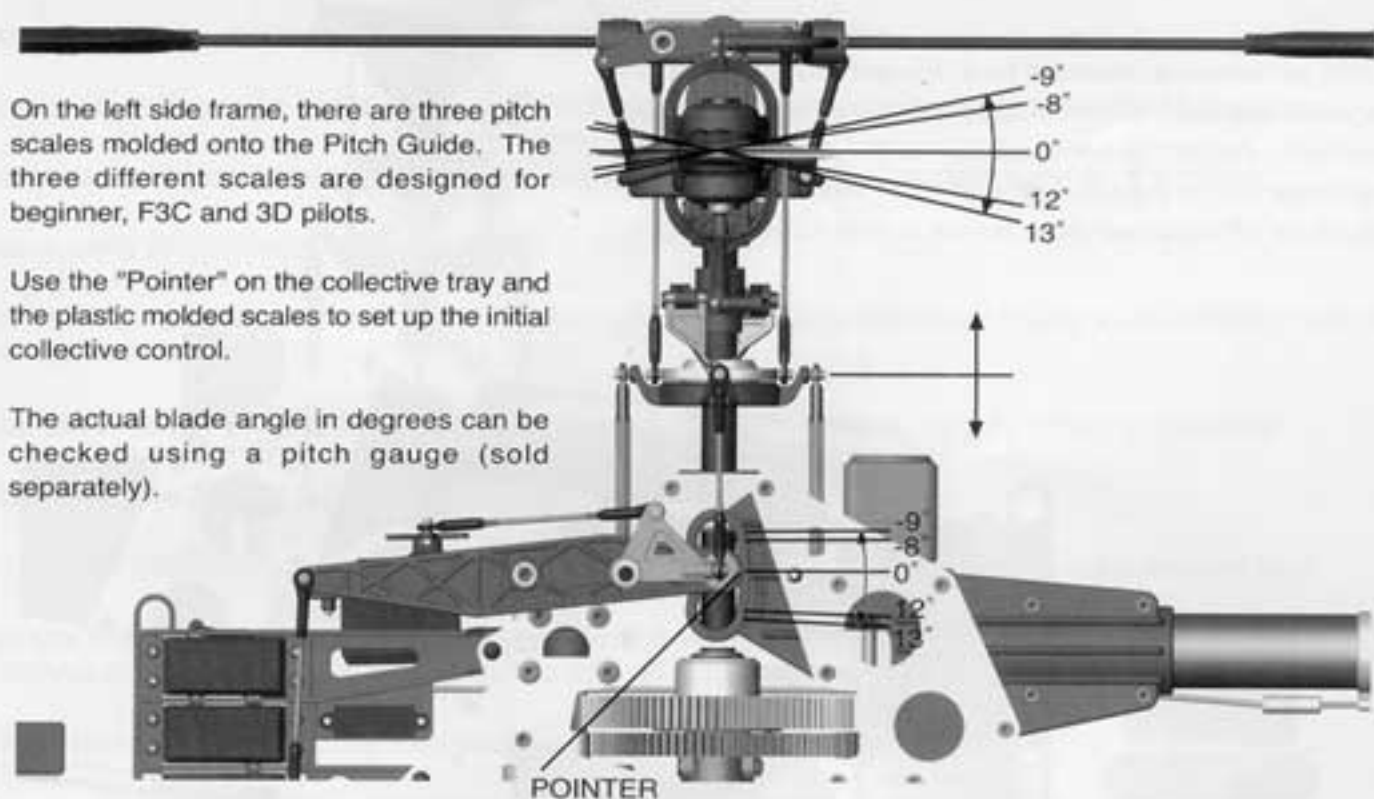
6-3

Setting up of Blade Pitch Angle

On the left side frame, there are three pitch scales molded onto the Pitch Guide. The three different scales are designed for beginner, F3C and 3D pilots.

Use the "Pointer" on the collective tray and the plastic molded scales to set up the initial collective control.

The actual blade angle in degrees can be checked using a pitch gauge (sold separately).

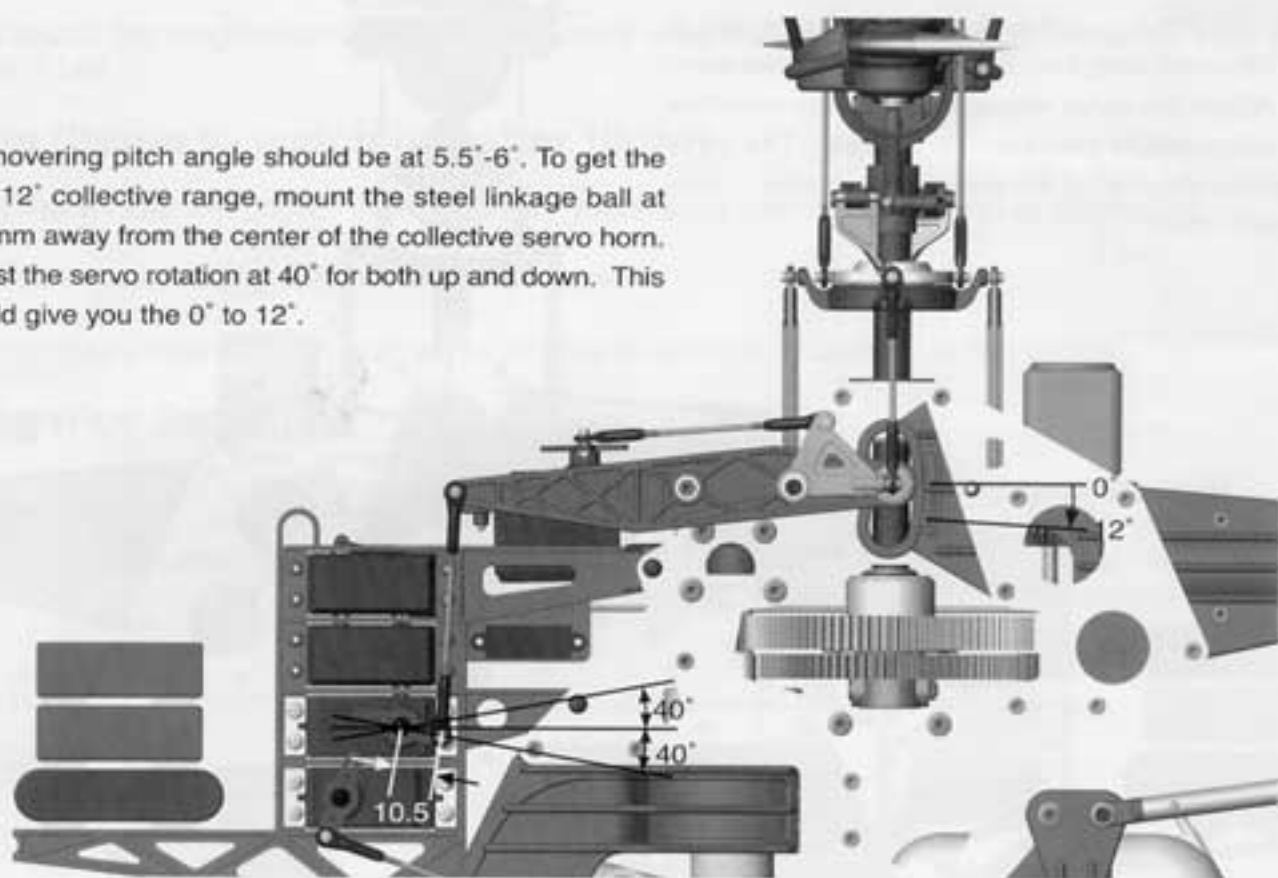


Note: Recommended rotor speed at 1500 rpm for hover and 1750 rpm for idle-up aerobatics.

6-3-1

Collective Travel for Beginner

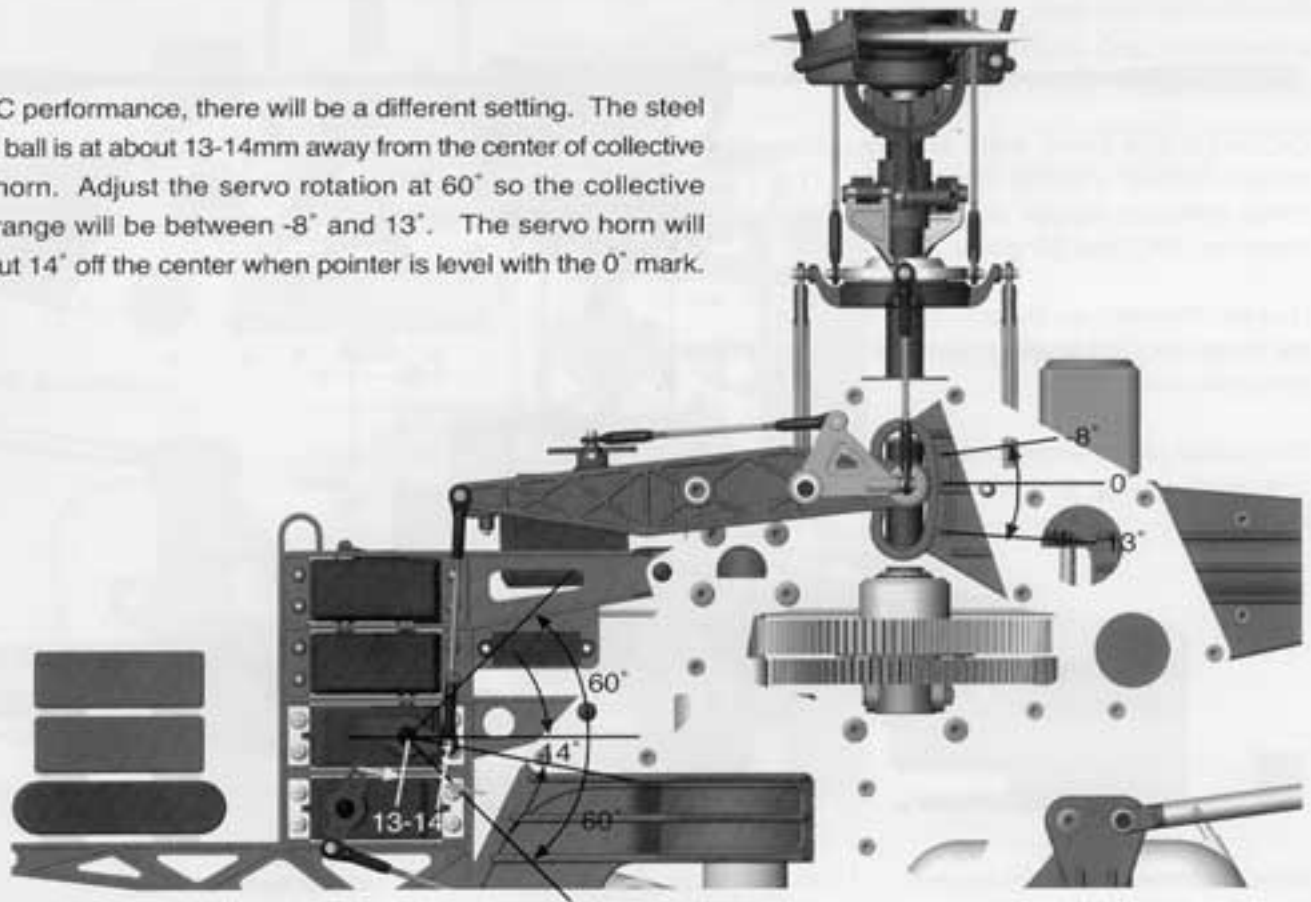
The hovering pitch angle should be at 5.5°-6°. To get the 0° to 12° collective range, mount the steel linkage ball at 10.5mm away from the center of the collective servo horn. Adjust the servo rotation at 40° for both up and down. This should give you the 0° to 12°.



6-3-2

Collective Travel for F3C

For F3C performance, there will be a different setting. The steel linkage ball is at about 13-14mm away from the center of collective servo horn. Adjust the servo rotation at 60° so the collective travel range will be between -8° and 13° . The servo horn will be about 14° off the center when pointer is level with the 0° mark.



6-3-3

Collective Travel for 3D

For 3D hot-dog flights, the steel linkage ball is also at about 13-14mm away from the center of collective servo horn. Adjust the servo rotates at 60° so the collective travel range will be between -10° and 13° . The servo horn will be about 9° off the center when pointer is level with the 0° mark.

