BERGEN

R/C Helicopters

INTREPID

BERGEN GAS & EB

INTREPID GAS and GAS EB

BERGEN

R/C Helicopters

Owners Manual

Assembly Instructions

BERGEN
R/C Helicopters

INTREPID GAS
Table Of Contents

BERGEN
R/C Helicopters

WARNING!

The radio controlled model helicopter built from this kit is not a toy and is not meant for children. It is a flying machine capable of causing property damage and serious bodily harm to both the operator/assembler and/or spectator if not built and operated correctly and responsibly. Rotating components, especially the main rotor blades, are an ever-present danger.

Model helicopters operate differently than model cars and airplanes. Helicopters by their nature are not positively stable, meaning that even if properly assembled and adjusted, helicopters will not recover from an unwanted flight attitude, nor will they hold any particular orientation without constant control inputs from the pilot.

IT IS YOUR EXCLUSIVE RESPONSIBILITY TO PROPERLY BUILD, MAINTAIN AND OPERATE THIS HELICOPTER. Bergen R/C Helicopters has spent considerable time making this product reliable and easy to build, but only the operator can insure that it is safe. Because the safe operation of this helicopter is beyond the control of the Manufacturer and distributor, the owner/operator assumes all risk of use.

Construction Manual

Acknowledgments

Bergen R/C Helicopters wishes to thank the facilities and friends for their continuing support during the development of the Intrepid Helicopter.

Staff

Chris Bergen; Chief Executive Officer
Larry Bergen; Chief Design Engineer and General Manager
Mary Ann Pratt; Marketing Sales and Service
Terri Demeyer; Office Management
Mike Bergen; Programmer, Engineer
Todd Gillesby; Machinist

Bergen R/C Helicopters LLC
1101 Follett Drive
Cassopolis, MI 49031
Voice: (269) 445-2060
Fax: (269) 445-2250
Web: bergenrc.com
Email: bergenrc@frontier.com

BERGEN
R/C Helicopters

Introduction

The first of its kind, interchangeable modular engineered helicopter to accommodate the beginner to a FAI expert…

An idea in 1994 to manufacture an interchangeable, modular helicopter, led to the research and development in 1995. Focusing on quality, engineering details, and price, a prototype was produced. After extensive test flights and fine-tuning, the INTREPID HELICOPTER is now what you see today. The first of its kind, strength combined with simplicity for easy maintenance and flying.

Although beginners can successfully build and fly their INTREPID, the process can be made significantly easier with the help of an experienced modeler and instructor pilot. We recommend that all beginners join the Academy of Model Aeronautics (AMA). The AMA is a non-profit organization that provides services for modelers. The AMA can help you locate a model aircraft club in your area with an instructor pilot (you can also check with your local hobby shop). Membership benefits include a monthly magazine and liability insurance. Many flying clubs require an AMA modeler's license to operate a model on their flying field. For more information on the AMA contact:

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

BERGEN
R/C Helicopters

Consumer Warranty

IMPORTANT! Before building the **INTREPID GAS** Helicopter kit, read and fully understand the following warranty, and review the entire Construction Manual. By building and/or flying this helicopter you indicate your acceptance of the following warranty terms and conditions, and further agree to build and operate this helicopter in safe and responsible manner.

If you find any term or condition unacceptable, or if you feel that this helicopter is just not suited to you, you may return it to your place of purchase in NEW and UNUSED condition within thirty (30) days of the date of purchase for a refund of the purchase price less shipping and handling. Partially assembled kits, and kits with opened parts packs or missing parts can not be returned for a refund.

Warranty:

1. Bergen warrants to the first consumer Purchaser that the INTREPID GAS helicopter substantially conforms to its published description when used as intended as a hobby product, and will be free from defects in materials and workmanship for a period of 90 days after the date of purchase. Bergen R/C will repair or replace (at our option) any defective part, and supply any missing part at no charge to the Purchaser within this period. We make no warranty, express or implied. This warranty does not apply to parts damaged by improper assembly, modification, abnormal service or handling, or crashes.
2. To take advantage of this warranty, the Purchaser must provide proof of purchase, fill out the warranty and inventory sheet, signing and returning it within two weeks of purchase, and ship any defective part (at Purchaser's cost) to Bergen R/C for repair or replacement.
3. It is the responsibility of the Purchaser to properly assemble, maintain and operate this helicopter in accordance with manufacture's instructions, AMA safety codes, local laws and ordinances, and COMMON SENSE. It is also the responsibility of the Purchaser, when operating this helicopter, never to operate it in any way, which might endanger persons or property including the Purchaser. Purchaser is advised to carry appropriate liability insurance such as that commonly provided to modelers by the AMA.
4. **THIS WARRANTY SPECIFICALLY EXCLUDES THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.** The selection of this helicopter for a particular application or use (beyond hobby/entertainment) is the sole responsibility of the Purchaser. Any advice supplied by any representative of Bergen R/C pertaining to any particular application is given freely as an opinion and is not meant to bind Bergen R/C or in any other way modify this warranty.

1. Not withstanding the paragraph above, this warranty is in addition to whatever implied warranties may be granted to the Purchaser by law. To the extent permitted by law, all implied warranties, including the warranties of merchantability and fitness for a particular purpose are limited to a period of (1) year from the date of purchase. Some states do not allow limitations on how long an implied warranty last, so the above limitation may not apply.
2. This warranty shall be the sole and exclusive remedy available to the Purchaser. Correction of defects, in the manner and for the period of time specified above, shall constitute complete fulfillment of all liabilities and responsibilities of Bergen to the Purchaser, and shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise. Bergen R/C shall not be liable for any cost or expenses incurred in; the replacement of any effective or non-conforming parts, and **IN NO EVENT SHALL BERGEN R/C BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES DUE TO THE USE OR INABILITY TO USE THIS PRODUCT**. Bergen R/C shall not be liable, or in any way responsible, for any damages related to modifications, repairs, attempted repairs, or crashes. **IN NO EVENT SHALL BERGEN R/C's OBLIGATIONS TO THE PURCHASER EXCEED THE ORIGINAL PURCHASE PRICE PAID BY THE PURCHASER.**
3. Some states do not allow exclusion of incidental or consequential damages, so the above exclusion may not apply. This warranty gives the Purchaser specific legal rights. The Purchaser may also have other rights, which vary, from state to state.
4. No modification or amendment to this warranty will be effective unless reduced to writing and signed by an authorized representative of Bergen R/C Distributorship.

If you do not understand any aspect of this warranty, you may contact Bergen R/C Helicopters for clarification. **IF YOU DO NOT AGREE WITH ANY ASPECT OF THIS WARRANTY, RETURN THE UNASSEMBLED HELICOPTER TO THE MANUFACTURER FOR A REFUND.**

Bergen R/C Helicopters believes that information contained within its published materials is accurate as of the date of publication, and is not responsible for inadvertent errors or omissions. Bergen R/C reserves the right to make changes and improvements in its products without notice.

With that out of the way, let me say "Welcome!!" ☺ You have joined a group, some call it the Bergen Family, and our goal is to get you up and flying and enjoying your Helicopter.

This manual covers 2 models, The Intrepid Gasser (standard) and the Intrepid Gasser EB (Extended Boom). The differences will be noted as we go along through the manual.

The Photos in this manual can be clicked on and blown up to full screen if you need to see them in greater detail. Of course if you have ANY questions whatsoever, you have numerous resources to help you. Call me, Chris Bergen, at 269-445-2060, e-mail at bergenrc@frontier.com, contact us on bergenrc.com or you can usually find me, and many Bergen owners on http://helifreak.com/.

For updates, hints, tips and new things we're working on, visit the Bergen R/C Forums.

The VERY first thing you should do with your kit is the Inventory. Do the COMPLETE inventory, noting anything that's missing. Though we do try hard to ensure that you get a complete kit, we are human and may make a mistake in putting all the pieces in the box. Notify us immediately of any discrepancies AFTER completing the inventory, we will get what you need out to you immediately. Once you receive all the parts, complete and sign the Warranty Registration sheet and return it to us in the SASE included with your paperwork.

STANDARD GASSER

			BAG 1
1		1574B	LANDING GEAR SET
4	*	5030	3X16M SHCS
6	*	5105	3M LOCK NUTS
2	*	5206	3X8 SELF TAP
2	*		3X16M FHCS
			BAG 2
1		1506	LOWER FRAME (RIGHT)
1		1507	LOWER FRAME (LEFT)
2		1560	SKID BAR
10	*	5090	3X8M FHCS
1		1520	BATTERY TRAY
2		1530	BATTERY TRAY SPACER
4	*	5010	3X8M SHCS
2		2040	MOTOR MOUNT SPACERS
2		1933 or 1934	STANDOFF 24M FOR LEXAN OR 18M STANDOFF FOR FIBERGLASS
2	*	5102	3X12 SS
2	*	5010	3X8 SHCS
			BAG 3
1		1415	FAN ASSEMBLY
	1	1420	GAS FAN
	1	1425	GAS FAN HUB
	3	5010	3X8 SHCS
1		1455	FAN SHROUD
1		1460	FAN SHROUD MOUNT
4	*	5085	5X12M SHCS
3	*	5091	5X12 FHSCS
4	*	5060	4X12M SHCS
4	*	5030	3X16M SHCS
4	*	5105	3M LOCKNUTS
1	*	5130	¼ LOCK WASHER
1	*	5086	6X25M SHCS
2	*	5095	3X4M SET SCREWS
7	*	5065	4X16M SHCS
2	*	5010	3X8M SHCS
1		1470	MOTOR MOUNT BRACKET
2	*	5069	5X65M SHCS
2	*	5110	3M FLAT WASHERS

1		2045	THROTTLE ARM
1		2030	MUFFLER SPACER
3	*	5109	4M FLAT WASHER
1		2036	PULL START ADAPTOR
1	*	5190	SHORT BALL
4	*	5141	3X18M SHCS
4	*	5105	3M LOCKNUTS
8	*	231B	SPECIAL WASHERS
			BAG 4
1		1875	FUEL TANK ASSEMBLY
	1	1880	FUEL TANK
	1	1850	CLUNK
	2	1855	SINGLE END FITTING
	1	1860	DOUBLE END FITTING
	3	1865	FUEL TANK NUTS
	1	1915	FUEL TUBING 24”
			BAG 5
2		1475	UPPER FRAME
4		3034	6X12X4F BEARING
2		1620	COLLECTIVE AXLE
3	*	5055	3X40 SHCS
1		1250	MAIN SHAFT BEARING BLOCK ASSEMBLY
	1	3040	10X19X7 BEARINGS
	1	1255	BEARING BLOCK ONLY
7	*	5050	3X35M SHCS
2	*	5001	3X4M SHCS
10	*	5105	3M LOCK NUT
2	*	5110	3M WASHER
6	*	5010	3X8 SHCS
2		1931	24M CANOPY STANDOFF STEPPED
3		1665	TAIL BOOM CLAMPS
1		280	ELEVATOR CONTROL YOKE ASSEMBLY
	1	280A	ELEVATOR YOKE
	2	280B	ELEVATOR CONTROL YOKE A-ARM
	2	280C	ELEVATOR YOKE ARM PIN
	2	1956	PLASTIC BALL LINKS
	2	5102	3X12M SET SCREW
	2	5095	3X4M SET SCREW
	4	3086	3X7X3F BEARINGS
1		1600	ELEVATOR CONTROL SHAFT LONG

1			1605	ELEVATOR CONTROL SHAFT SHORT
1			1535	RUDDER SERVO MOUNT
1			9010	DELRIN COUPLER
1			9005	OUTPUT SHAFT
1			1210	COUPLER PIN
1	*		5095	3X4 SET SCREWS
1			270	FRONT TRANSMISSION SUPPORT ASSEMBLY
		1	270A	BEARING BLOCK ASSEMBLY
		1	3040	10X19X7 BEARING
		1	270D	BEARING BLOCK ONLY
		1	270E	BEARING BLOCK SUPPORT CRADLE w/bearings
		1	270B	BEARING BLOCK CRADLE W/O BEARING
		2	3056	5X13X4 BEARINGS
		1	5025	3X5M PHILLIPS PANHEAD SCREW
		1	270C	PINION SPACER (BRASS)
1			1745	PINION GEAR
1		*	5094	3X3 SS
				BAG 6
1			1233	MAIN SHAFT ASSEMBLY
		1	1235	MAIN SHAFT
		1	1241	MAIN SHAFT COLLAR
		1	5160	4-40X1/2 AMERICAN BOLT
2			1245	SPLIT MAIN SHAFT COLLAR ASSEMBLY
		2	1246	SPLIT MAIN SHAFT COLLAR
		2	127A	SPECIAL SHCS
5			5170	26M FRAME SPACER
10			5175	29M FRAME SPACERS
10		*	5055	3X40 SHCS
1			1265	AUTO HUB ASSEMBLY
4		*	5010	3X8M SHCS
4		*	5110	3M WASHERS
1			1307	CLUTCH BELL ASSEMBLY 14T
		1	1318	CLUTCHBELL w/lining only
		1	3045	6X19X6 BEARING
		1	1340	14TOOTH PINION GEAR
1			1276	CLUTCH ASSEMBLY
		1	1285	START SHAFT
		1		CLUTCH SHOE
1			1260	START SHAFT BEARING ASSEMBLY
		1	1261	START SHAFT BLOCK ONLY

BERGEN
R/C Helicopters

	2	3045	6X19X6 BEARING
	1	3050	10X19X5 BEARING
1		1286	START SHAFT COLLAR
2	*	5094	3X3 SS
2		1290	DELRIN BUSHING Set
	2	1295	STEEL INSERT
	2	1300	DELRIN BUSHINGS
2	*	5065	4X16M SHCS
4	*	5308	3X8 SPECIAL LOW HEAD CAP SCREWS
1		1270	MAIN GEAR
			BAG 7
1		1185	WASHOUT HUB ASSEMBLY
2		1201	WASHOUT MIXING ARM
4		3086	3X7X3F BEARING
2	*	5140	3X16M SPECIAL SHCS
4	*	5155	3M BRASS WASHER
2		1205	RADIUS LINK
2		1000E	RADIUS LINK PIN
6	*	5190	SHORT BALL
1		1215	SWASH PLATE ASSEMBLY
4	*	5094	3X3 SS
4	*	5195	MEDIUM BALL
			BAG8
2		1616	COLLECTIVE ARM
1		1625	COLLECTIVE BELLCRANK TRIPLE
1		1630	COLLECTIVE BELLCRANK SINGLE
4	*	5200	LONG BALLS
15	*	5010	3X8M SHCS
7	*	5110	3M WASHERS
1		1540	AILERON SERVO MOUNT
2		1641	AILERON BELL CRANK
8		3031	5X8X2.5 FLANGED BEARINGS
12	*	5190	SHORT BALLS
3		1645	CONTROL ARM JAMNUT
2	*	5030	3X16M SHCS
2	*	5001	3X4M SHCS
1		1651	ELEVATOR X CONTROL ARM
1	*	5035	3X20M SHCS
1		1610	ELEVATOR CONTROL ARM
1		1545	GYRO MOUNT

1		1550	BATTERY MONITOR MOUNT
2		1546	GYRO MOUNT BLOCK 3 HOLE
1	*	5090	3X8M FHSCS
			BAG 9
1		1155	SEESAW TUBE
2		1160	SEESAW END CAPS
2		3020	4X10X4 BEARING
2	*	1165	4M WASHER (SPECIAL)
4	*	5095	3X4M SET SCREW
2		1175	FLYBAR CONTROL ARM
2		1183	FLYBAR PADDLE
6	*	5190	SHORT BALL
6	*	5155	3M BRASS WASHER
2		3015	3X10X4 BEARING
2	*	5205	PAN HEAD SCREW
2		1151	BELL MIXER ARM
4		3086	3X7X3F BEARING
2	*	5136	3X12M W/6M SHOULDER SHCS
2	*	5115	3M NUT
1		1106	HEAD BLOCK
2		1111	BLADE GRIP ASSEMBLY
	2	1116	BLADE GRIP W/O BEARING
	4	3005	8X16X5 BEARING
2		3006	8X16X5 THRUST BEARING
2		1126	BLADE GRIP PITCH ARM
1		1131	HEAD AXLE W/SNAP RINGS
2		1136	SOLID DAMPENERS (HARD & SOFT)
2		1140	8MX.015 SHIM DAMPENING WASHER
2		1145	8MX.008 SHIM DAMPENING WASHER
2		1147	8X1M SHIM DAMPENING WASHER
2	*	5151	4X25M SHCS SPECIAL W/18M SHOULDER
2	*	5106	4M LOCK NUT
4	*	5005	3X6M SHCS
2	*	5010	3X8M SHCS
2	*	5030	3X16M SHCS
1	*	5035	3X20M SHCS
2	*	5072	5X16M SHCS
2	*	5111	5X10X2 SPACER WASHER
			BAG 10A
			ASSEMBLY 1

1		232	TAIL ROTOR BLADE GRIPS KIT
2		231-A	BLADE GRIP ASSEMBLY ng)
	4	3054	5X10X4 BEARINGS
	2	231C	BLADE GRIPS W/O BEARINGS
2		3052	5X10X4 THRUST BEARING
		TWIN	
1		1815	TAIL ROTOR MAIN HUB 6M
2		5110	3M FLAT WASHER
2		5005	3X6 SHCS
2		5146	3X19 W/11 SHOULDER SHCS
2		5112	10M OD SPACERS
4		231B	BLADE GRIP SPACERS
2		5105	3M LOCK NUT
1		5094	3X4M SET SCREW
			ASSEMBLY 2
1		240	PITCH BELLCRANK KIT
1		M240B	MAGNUM BELLCRANK ASSEMBLY
	1	240A	DELRIN INSERT
	1	240D	ALUMINUM BELLCRANK ONLY
1		240C	ALUMINUM SPACER
2		3086	3X7X3 FLANGE BEARING
1		5140	3X16 W/6M SHOULDER SHCS
2		5155	3M BRASS WASHER
1		5195	MEDIUM BALL
1		5105	3M LOCKNUT
			ASSEMBLY 3
1		M1960	PITCH SLIDER ASSEMBLY KIT
	1	M1786	PITCH SLIDER HUB
	1	1792	PITCH SLIDER TUBE (NEW)
	1	1793	PITCH SLIDER SPACER (THICK)
	1	1794	PITCH SLIDER SPACER (THIN)
	2	3036	6X10X3 FLANGE BEARING
	1	1801	ALUMINUM PITCH PLATE
	2	5137	5X2M BALL
	2	5076	2X8M SHCS
	2	5120	2M NUT
2		1961	TAIL SPECIAL BALL LINKS
2		1806	PIVOT PLATE ARM EYELET
2		1811	PIVOT PLATE SHOULDER BOLT 4x4
			ASSEMBLY 4

1		M1000	ALUMINUM TAIL ROTOR GEAR BOX ASSEMBLY
	1	M1000A	GEAR BOX ONLY
	1	5094	3X3M SET SCREW
	2	5095	3X4M SET SCREW
	1	M1000B	PITCH ARM BRACKET
	1	M1000F	REPLACEMENT GEAR SET W/OUTPUT SHAFT
		TWIN	
		1000D	OUTPUT SHAFT
	1		BEVEL GEAR
	1		BEAVEL GEAR W/SHAFT
	1	1000E	10M PIN
	1	5095	3X4M SETSCREW
	1	M1000C	ALUMINUM SPACER
	1	3071	10X15X4 FLANGE BEARING
	3	3055	5X13X4 BEARING
	1	1210	12M PIN
	1	1000I	INPUT SHAFT FOR GEAR BOX
	1	M1000J	BRASS SPACER TUBE
	1	5025	3X5 PAN HEAD SCREW
	2	5001	3X4 SHCS
	2	5090	3X8 FLAT HEAD CAP SCREWS
			ASSEMBLY 5
2 PAIR		1665	TAILBOOM CLAMPS
1		1667	HORIZONTAL FIN CLAMP
			MISC BAG
2		109DA	COLLARS FOR TORQUE TUBE DRIVE
1	*	5050	3X35 SHCS
4	*		3X30 SHCS
1		9015	DOGBONE
1		9020	DOGBONE PIN
2	*	5020	3X12 SHCS
4	*	5110	3M WASHERS
7	*	5105	3M LOCKNUTS
2	*	5010	3X8 SHCS
6	*	5094	3X3 SET SCREWS

1		*	5095	3X4 SET SCREWS
2			109A	BEARING CARRIER ASSEMBLY
		2	3090	.375X.625X1.56 BEARING
		2	109C	DELRIN INSERT
		4	109E	O'RINGS
		2	109B	DELRIN CARRIER
4			1945	CANOPY GROMMETS
	4		1946	THUMB SCREWS
1			6015	TAIL ROTOR BLADES
				BAG 10B
1			1170	FLYBAR
1			1676	TAILBOOM 33"
1			2117	ARROW DRIVE SHAFT
2			1879	TIE WRAPS
1			1682	PUSH ROD CARBON FIBER SET
		1	1681	CARBON FIBER ROD
		2	1983	PUSHROD ENDS
		2	1956	BALL LINK 2.5
		2	5105	3M LOCKNUT
		2	5035	3X20M SHCS
1			1709	TAILBOOM SUPPORT SET
		2	1710	TAIL BOOM SUPPORT STRUTS
		4	1715	TAILBOOM SUPPORT STRUT ENDS
1			M1830	HORIZONTALFIN
1			M1835	VERTICAL FIN
				BAG 11
42			1956	BALL LINKS 2.5
10			1947	PLASTIC SERVO MOUNT TABS
2			1985	ELEVATOR LINKAGE 130M
2			1990	ELEVATOR LINKAGE 50M
4			1995	COLLECTIVE LINKAGE 30M
2			2000	COLLECTIVE LINKAGE 50M
2			2005	AILERON LINKAGE 85M
2			2010	SWASH PLATE LINKAGE 40M
2			2020	PITCH LINKAGE 75M
2			2025	FLYBAR LINKAGE SHORT 12M
1			1980	140M THROTTLE LINKAGE
8		*	5137	5X2M BALL
8		*	5207	2X10M PHSMS
16		*	5120	2M NUT

BERGEN
R/C Helicopters

1	1921	CANOPY
1	242	SAMPLE LOCKTITE
1	2049	ZENOAH G26H ENGINE

HARDWARE

1165	2	4M WASHER (SPECIAL)
5001	4	3X4M SHCS
5005	4	3X6M SHCS
5010	37	3X8M SHCS
5020	2	3X12 SHCS
5030	12	3X16M SHCS
5035	2	3X20M SHCS
5050	15	3X35M SHCS
5055	13	3X40 SHCS
5060	4	4X12M SHCS
5065	9	4X16M SHCS
5069	2	5X65M SHCS
5072	2	5X16M SHCS
5085	4	5X12M SHCS
5086	1	6X25M SHCS
5090	11	3X8M FHCS
5091	3	5X12 FHSCS
5093	2	3X16 FHCS
5094	11	3X3 SS
5095	9	3X4M SET SCREWS
5102	2	3X12 SS
5105	37	3M LOCK NUTS
5106	2	4M LOCK NUT
5109	3	4M FLAT WASHER
5110	25	3M FLAT WASHERS
5111	2	5X10X2 SPACER WASHER
5115	2	3M NUT
5120	16	2M NUT
5130	1	¼ LOCK WASHER
5136	2	3X12M W/6M SHOULDER SHCS
5137	8	5X2M BALL
5140	2	3X16M SPECIAL SHCS

BERGEN
R/C Helicopters

	5141	4	3X18M SHCS
	5151	2	4X25M SHCS SPECIAL W/18M SHOULDER
	5155	10	3M BRASS WASHER
	5190	25	SHORT BALL
	5195	4	MEDIUM BALL
	5200	4	LONG BALLS
	5205	2	PAN HEAD SCREW
	5206	2	3X8 SELF TAP
	5207	8	2X10M PHSMS
	5308	4	3X8 SPECIAL LOW HEAD CAP SCREWS
	231B	8	SPECIAL WASHERS

GASSER EB

BAG 1

☐	1		1574B	LANDING GEAR SET
	4	*	5030	3X16 SHCS
	6	*	5105	3M LOCK NUTS
	2	*	5206	3X8 SELF TAP
	2	*		3X16 FHCS

BAG 2

☐	1		1506	LOWER FRAME (RIGHT)
☐	1		1507	LOWER FRAME (LEFT)
☐	2		1560	SKID BAR
	10	*	5090	3X8 FHCS
☐	1		1517	BATTERY TRAY EXTENDED
☐	2		1530	BATTERY TRAY SPACER
	4	*	5010	3X8 SHCS
☐	2		2040	MOTOR MOUNT SPACERS
☐			1933 OR	24M STANDOFF FOR LEXAN OR 13M FOR
	2		1934	FIBERGLASS
	2	*	5102	3X12 SS
	2	*	5010	3X8 SHCS

BAG 3

☐	1		1415	FAN ASSEMBLY
		1	1420	GAS FAN
		1	1425	GAS FAN HUB
		3	5010	3X8 SHCS
☐	1		1455	FAN SHROUD
☐	1		1460	FAN SHROUD MOUNT
	4	*	5085	5X12 SHCS
	3	*	5091	5X12 FHSCS

	4	*	5060	4X12 SHCS
	4	*	5030	3X16 SHCS
	4	*	5105	3M LOCKNUTS
	1	*	5130	¼ LOCK WASHER
	1	*	5086	6X25 SHCS
	2	*	5095	3X4 SET SCREWS
	3	*	5065	4X16 SHCS
	2	*	5010	3X8 SHCS
☐	1		1470	MOTOR MOUNT BRACKET
	2	*	5069	5X65 SHCS
	2	*	5110	3M WASHERS
☐	1		2045	THROTTLE ARM
☐	1		2030	MUFFLER SPACER
	3	*	5109	4M WASHER
☐	1		2036	PULL START ADAPTOR
	1	*	5190	SHORT BALL
	4	*	5141	3X18 SHCS
	4	*	5105	3M LOCKNUTS
	8	*	231B	SPECIAL WASHERS
				BAG 4
☐	1		1875	FUEL TANK ASSEMBLY
		1	1880	FUEL TANK
		1	1850	CLUNK
		2	1855	SINGLE END FITTING
		1	1860	DOUBLE END FITTING
		3	1865	FUEL TANK NUTS
		1	1915	FUEL TUBING 24”
				BAG 5
☐	2		1475	UPPER FRAME
☐	4		3034	6X12X4F BEARING
☐	2		1620	COLLECTIVE AXLE
	3	*	5055	3X40 SHCS
☐	1		1250	MAIN SHAFT BEARING BLOCK ASSEMBLY
		1	3040	10X19X7 BEARINGS
		1	1255	BEARING BLOCK ONLY
	7	*	5050	3X35 SHCS
	2	*	5001	3X4 SHCS
	10	*	5105	3M LOCK NUT
	2	*	5110	3M WASHER
	6	*	5010	3X8 SHCS

☐	2		1931	24M CANOPY STANDOFF STEPPED
☐	3		TWIN 1665	TAIL BOOM CLAMPS
☐	1		280	ELEVATOR CONTROL YOKE ASSEMBLY
		1	280A	ELEVATOR YOKE
		2	280B	ELEVATOR CONTROL YOKE A-ARM
		2	280C	ELEVATOR YOKE ARM PIN
		2	1956	PLASTIC BALL LINKS
		2	5102	3X12 SET SCREW
		2	5095	3X4 SET SCREW
		4	3086	3X7X3F BEARINGS
☐	1		1600	ELEVATOR CONTROL SHAFT LONG
☐	1		1605	ELEVATOR CONTROL SHAFT SHORT
☐	1		1535	RUDDER SERVO MOUNT
	1		9010	DELRIN COUPLER
	1		9005	OUTPUT SHAFT
	1		1210	COUPLER PIN
	1		5095	3X4 SET SCREWS
☐	1		270	FRONT TRANSMISSION SUPPORT ASSEMBLY
		1	270A	BEARING BLOCK ASSEMBLY
		1	3040	10X19X7 BEARING
		1	270D	BEARING BLOCK ONLY
		1	270E	BEARING BLOCK SUPPORT CRADLE
		1	270B	BEARING BLOCK CRADLE W/O BEARING
		2	3056	5X13X4 BEARINGS
		1	5025	3X5 PAN HEADSCREW
		1	270C	PINION SPACER (BRASS)
	1		1745	PINION GEAR
	1	*	5094	3X3 SS
				BAG 6
☐	1		1233	MAIN SHAFT ASSEMBLY
		1	1235	MAIN SHAFT
		1	1241	MAIN SHAFT COLLAR
		1	5160	4-40X1/2 AMERICAN BOLT
☐	5		5170	26M FRAME SPACER
☐	10		5175	29M FRAME SPACERS
	10	*	5055	3X40 SHCS
☐	2		1245	SPLIT COLLAR ASSEMBLY
		2	1246	SPLIT COLLAR
		2	127A	SPECIAL SHCS
☐	1		1265	AUTO HUB ASSEMBLY

	4	*	5010	3X8 SHCS
	4	*	5110	3M WASHERS
☐	1		1306	CLUTCH BELL ASSEMBLY 12T
		1	1318	CLUTCHBELL w/lining only
		1	3045	6X19X6 BEARING
		1	1330	12 TOOTH PINION GEAR
☐	1		1276	CLUTCH ASSEMBLY
		1	1285	START SHAFT
		1		CLUTCH SHOE
☐	1		1260	START SHAFT BEARING ASSEMBLY
		1	1261	START SHAFT BLOCK ONLY
		2	3045	6X19X6 BEARING
		1	3050	10X19X5 BEARING
☐	1		1286	START SHAFT COLLAR
	2	*	5094	3X3 SS
☐	2		1290	DELRIN BUSHING Set
		2	1295	STEEL INSERT
		2	1300	DELRIN BUSHINGS
	2	*	5065	4X16 SHCS
	4	*	5308	3X8 LOW HEAD CAP SCREWS
☐	1		1270	MAIN GEAR
				BAG 7
☐	1		1185	WASHOUT HUB ASSEMBLY
☐	2		1201	WASHOUT MIXING ARM
☐	4		3086	3X7X3F BEARING
	2	*	5140	3X16 SPECIAL SHCS
	4	*	5155	3M BRASS WASHER
☐	2		1205	RADIUS LINK
☐	2		1000E	RADIUS LINK PIN
	6	*	5190	SHORT BALL
☐	1		1215	SWASH PLATE ASSEMBLY
	4	*	5094	3X3 SS
	4	*	5195	MEDIUM BALL
				BAG8
☐	2		1616	COLLECTIVE ARM
☐	1		1625	COLLECTIVE BELLCRANK TRIPLE
☐	1		1630	COLLECTIVE BELLCRANK SINGLE
	2	*	5001	3X4 SHCS
	4	*	5200	LONG BALLS
	15	*	5010	3X8 SHCS

	7	*	5110	3M WASHERS
☐	1		1540	AILERON SERVO MOUNT
☐	2		1641	AILERON BELL CRANK
☐	8		3031	5X8X2.5 FLANGED BEARINGS
	12	*	5190	SHORT BALLS
☐	3		1645	CONTROL ARM JAMNUT
	2	*	5030	3X16 SHCS
☐	1		1651	ELEVATOR X CONTROL ARM
	1	*	5035	3X20 SHCS
☐	1		1610	ELEVATOR CONTROL ARM
☐	1		1545	GYRO MOUNT
☐	1		1550	BATTERY MONITOR MOUNT
☐	2		1546	GYRO MOUNT BLOCK 3 HOLE
	1	*	5090	3X8 FHSCS
				BAG 9
☐	1		1155	SEESAW TUBE
☐	2		1160	SEESAW END CAPS
☐	2		3020	4X10X4 BEARING
	2	*	1165	4M WASHER (SPECIAL)
	4	*	5095	3X4 SET SCREW
☐	2		1175	FLYBAR CONTROL ARM
☐	2		1183	FLYBAR PADDLE
	6	*	5190	SHORT BALL
	6	*	5155	3M BRASS WASHER
☐	2		3015	3X10X4 BEARING
	2	*	5205	PAN HEAD SCREW
☐	2		1151	BELL MIXER ARM
☐	4		3086	3X7X3F BEARING
	2	*	5136	3X12 W/6M SHOULDER SHCS
	2	*	5115	3M NUT
☐	1		1106	HEAD BLOCK
☐	2		1111	BLADE GRIP ASSEMBLY
		2	1116	BLADE GRIP W/O BEARING
		4	3005	8X16X5 BEARING
☐	2		3006	8X16X5 THRUST BEARING
☐	2		1126	BLADE GRIP PITCH ARM
☐	1		1131	HEAD AXLE W/SNAP RINGS
☐	2		1136	SOLID DAMPENERS (HARD & SOFT)
☐	2		1140	8MX.015 SHIM DAMPENING WASHER
☐	2		1145	8MX.008 SHIM DAMPENING WASHER

☐	2		1147	8X1M SHIM DAMPENING WASHER
	2	*	5151	4X25 SHCS SPECIAL W/18M SHOULDER
	2	*	5106	4M LOCK NUT
	4	*	5005	3X6 SHCS
	2	*	5010	3X8 SHCS
	2	*	5030	3X16 SHCS
	1	*	5035	3X20 SHCS
	2	*	5072	5X16 SHCS
	2	*	5111	5X10X2 SPACER WASHER
				BAG 10A
				ASSEMBLY 1
☐	1		232	TAIL ROTOR BLADE GRIPS KIT
	2		231-A	BLADE GRIP ASSEMBLY ng)
		4	3054	5X10X4 BEARINGS
		2	231C	BLADE GRIPS W/O BEARINGS
	2		3052	5X10X4 THRUST BEARING
	1		TWIN 1815	TAIL ROTOR MAIN HUB 6M
	2		5110	3M WASHER
	2		5005	3X6 SHCS
	2		5146	3X19 W/11 SHOULDER SHCS
	2		5112	10M OD SPACERS
	4		231B	BLADE GRIP SPACERS
	2		5105	3M LOCK NUT
	1		5094	3X4 SET SCREW
				ASSEMBLY 2
☐	1		240	PITCH BELLCRANK KIT
	1		240B	BELLCRANK ASSEMBLY
		1	240A	DELRIN INSERT
		1	240D	ALUMINUM BELLCRANK ONLY
	1		240C	ALUMINUM SPACER
	2		3086	3X7X3 FLANGE BEARING
	1		5140	3X16 W/6M SHOULDER SHCS
	2		5155	3M BRASS WASHER
	1		5195	MEDIUM BALL
	1		5105	3M LOCKNUT
				ASSEMBLY 3
☐	1		TWIN 1960	TWIN PITCH SLIDER ASSEMBLY KIT
		1	TWIN 1786	TWIN PITCH SLIDER HUB
		1	TWIN 1792	PITCH SLIDER TUBE (NEW)
		1	TWIN 1793	PITCH SLIDER SPACER (THICK)

	1	TWIN 1794	PITCH SLIDER SPACER (THIN)
	2	3036	6X10X3 FLANGE BEARING
	1	1801	ALUMINUM PITCH PLATE
	2	5137	3/16 BALL W/2M HOLE
	2	5076	2X8 SHCS
	2	5120	2M NUT
☐	2	1961	TAIL SPECIAL BALL LINKS
☐	2	1806	PIVOT PLATE ARM EYELET
☐	2	1811	PIVOT PLATE SHOULDER BOLT 4x4
			ASSEMBLY 4
☐	1	TWIN 1000	HEAVY DUTY GEAR BOX
		TWIN	
	1	1000A	GEAR BOX ONLY
	1	5094	3X3 SET SCREW
	2	5095	3X4 SET SCREW
		TWIN	
	1	1000B	PITCH ARM BRACKET
		TWIN	
	1	1000F	REPLACEMENT GEAR SET W/OUTPUT SHAFT
		TWIN	
		1000D	OUTPUT SHAFT
		TIWN	
	1	1000E	10M PIN
	1	5095	3X4 SETSCREW
		TWIN	
	1	1000C	ALUMINUM SPACER
	1	3098	12X24X4F BEARING
	1	3045	6X19X6 BEARING
	3	3046	6X15X4F BEARING
	1	1210	12M PIN
	1	TIWN 1000I	INPUT SHAFT FOR GEAR BOX
		TWIN	
	1	1000J	BRASS SPACER TUBE
	1	5025	3X5 PAN HEAD SCREW
	2	5001	3X4 SHCS
	2	5090	3X8 FLAT HEAD CAP SCREWS
			ASSEMBLY 5
☐	2 PAIR	TWIN 1665	TAILBOOM CLAMPS
☐	1	TWIN 1667	HORIZONTAL FIN CLAMP
			MISC BAG

BERGEN
R/C Helicopters

☐	4		109DA	COLLARS FOR TORQUE TUBE DRIVE
☐	1		9015	DOGBONE
☐	1		9020	DOGBONE PIN
	1	*	5095	3X4 SET SCREW
	1	*	5050	3X35 SHCS
	4	*		3X30 SHCS
	4	*	5110	3M WASHERS
	2	*	5020	3X12 SHCS
	7	*	5105	3M LOCKNUTS
	2	*	5010	3X8 SHCS
	12	*	5094	3X3 SET SCREWS
	1	*	5095	3X4 SET SCREWS
☐	1		TWIN 109A	BEARING CARRIER ASSEMBLY
		2	3090	.375X.625X1.56 BEARING
		1	TWIN 109B	TWIN BEARING CARRIER
		1	TWIN 109C	SHAFT FOR TWIN BEARING
		2	109E	O'RINGS
☐	4		1945	CANOPY GROMMETS
☐	4		1946	THUMB SCREWS
☐	1		6015	TAIL ROTOR BLADES
				BAG 10B
☐	1		1170	FLYBAR
☐	1		TWIN 110	TAILBOOM 37"
☐	2		2117	ARROW DRIVE SHAFT
☐	2		1879	TIE WRAPS
☐	1		1682	PUSH ROD CARBON FIBER SET
		1	1681	CARBON FIBER ROD
		2	1983	PUSHROD ENDS
		2	1956	BALL LINK 2.5
		2	5105	3M LOCKNUT
		2	5035	3X20 SHCS
☐	1		1830	VERTICAL FIN
☐	1		1835	HORIZONTAL FIN
☐	1		TWIN 1709	TAILBOOM SUPPORT SET
		2	TWIN 1710	TAIL BOOM SUPPORT STRUTS
		4	1715	TAILBOOM SUPPORT STRUT ENDS
				BAG 11
☐	42		1956	BALL LINKS 2.5
☐	10		1947	PLASTIC SERVO MOUNT TABS
☐	2		1985	ELEVATOR LINKAGE 130M

☐	2		1990	ELEVATOR LINKAGE 50M
☐	4		1995	COLLECTIVE LINKAGE 30M
☐	2		2000	COLLECTIVE LINKAGE 50M
☐	2		2005	AILERON LINKAGE 85M
☐	2		2010	SWASH PLATE LINKAGE 40M
☐	2		2020	PITCH LINKAGE 75M
☐	2		2025	FLYBAR LINKAGE SHORT 12M
☐	1		1980	140M THROTTLE LINKAGE
	8	*	5137	3/16 BALL W/2M HOLE
	8	*	5207	2X10 PHSMS
	16	*	5120	2M NUT
	1		1921	CANOPY
	1		242	SAMPLE LOCKTITE
	1		2049	ZENOAH G26H ENGINE

HARDWARE

5102	2	3X12 SS
5130	1	¼ LOCK WASHER
5120	16	2M NUT
5207	8	2X10 PHSMS
5155	10	3M BRASS WASHER
5110	25	3M WASHERS
5105	40	3M LOCK NUT
5115	2	3M NUT
5015	15	3X10 SHCS
5136	2	3X12M W/6M SHOULDER SHCS
5093	2	3X16 FHCS
5030	15	3X16 SHCS
5140	2	3X16 SPECIAL SHCS
5141	4	3X18 SHCS
5035	2	3X20 SHCS
5094	10	3X3 SS
5050	15	3X35 SHCS
5055	16	3X40 SHCS
5095	10	3X4 SET SCREW
5001	4	3X4 SHCS
5205	2	3X5 PAN HEAD SCREW
5005	4	3X6 SHCS
5206	2	3X8 SELF TAP

BERGEN
R/C Helicopters

5010	35	3X8 SHCS
5308	4	3X8 LOW HEAD CAP SCREWS
5090	11	3X8 FHCS
5109	3	4M WASHER
5106	2	4M LOCK NUT
1165	2	4M WASHER (SPECIAL)
5060	4	4X12 SHCS
5065	9	4X16 SHCS
5151	2	4X25 SHCS SPECIAL W/18M SHOULDER
5111	2	5X10X2 SPACER WASHER
5091	3	5X12 FHSCS
5085	4	5X12 SHCS
5072	2	5X16 SHCS
5137	8	3/16 BALL W/2M HOLE
5069	2	5X65 SHCS
5086	1	6X25 SHCS
5200	4	LONG BALLS
5195	4	MEDIUM BALL
5190	30	SHORT BALL
231B	8	SPECIAL WASHERS

BERGEN

R/C Helicopters

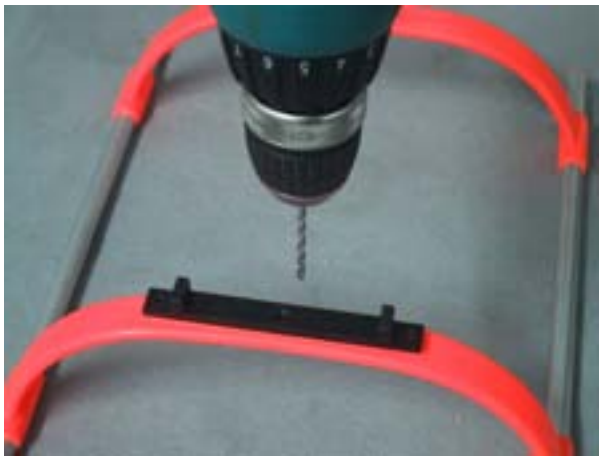
Your Intrepid Gas kit starts off something like this,

And ends up something like this!!

A note on the Hardware in your kit. MOST of the hardware is located in the long strip of plastic, and marked with a sticky label. SHCS stands for Socket Head Cap Screw; FHCS stands for Flat Head Cap Screw, which is the same as a countersunk screw.

Lets get started.

Assemble the landing gear, which will require some heat to get the plastic struts onto the aluminum skids. Actually it may take a LOT of heat. ☺ One suggestion is to boil the struts to heat them up. Use Gloves of course.. We offer different colors, so yours may vary from the pictures.



Tap the plastic ends into the skids with a soft mallet. From Bag 2 take the skid bars and use them as a template for drilling 3 ea 1/8th inch holes.

BERGEN
R/C Helicopters

Using 2 ea 3X16 FHCS (Flat Head Cap Screws) and 2 ea 3mm locknuts, secure the skid bars to the plastic struts. It's not necessary at this time to fully tighten them down; you may need some slight adjustment room later.

Bag 2 consists of your lower frames, battery tray, spacers and canopy mounts. Notice the lower frames have countersunk holes where they attach to the skid bars. Use 3X8 FHCS and attach the lower frames. It may be necessary to move the plastic struts fore and aft to line things up, use a heat gun to make moving them easier, also loosening the middle screw in the skid bar will allow the skid bars to rock, making it easier to line up the countersunk holes.

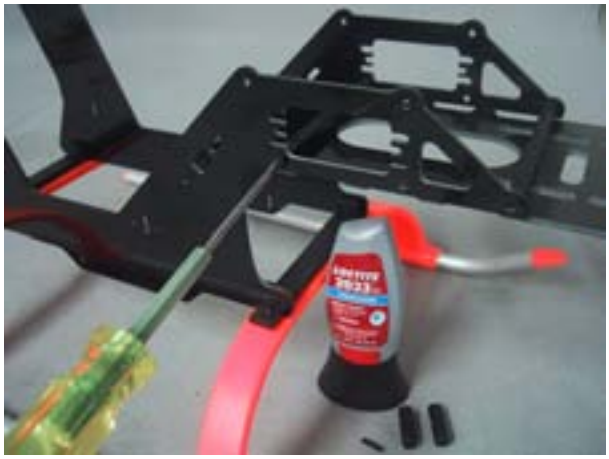
BERGEN
R/C Helicopters

With 4 ea 3X16 SHCS (Socket Head Cap Screws) and 4 ea 3m locknuts, secure the landing gear to the skid bars, including tightening up the 2 ea 3X16 FHCS and nuts.

Install an Engine Mounting Spacer with 2 ea 3X8 SHCS to the INSIDE of each frame.

BERGEN
R/C Helicopters

Your kit will include one of these battery trays, the short one is for the Standard Gasser, and the long one is for the EB version to allow more room for weight needed to offset the long tail boom. The installation is the same, using 6 ea 3X8 FHCS attaching the battery tray spacers to the tray in the countersunk holes.



The battery tray is attached to the lower frames with 2 ea 3X8 SHCS and the front canopy mounts. The 3X8 SHCS is used in the rear hole, with loctite. Repeat on other side.

BERGEN
R/C Helicopters

The front spacer is secured with a 3X12 setscrew threaded halfway in, then the canopy mount threaded onto the setscrew. Look closely at the canopy mount, one side will have a deep chamfer, this is the OUTSIDE, making it easier to install the canopy thumbscrews when installing the canopy. Use the crosshole to tighten the canopy mount. Repeat on other side.

If you've purchased the Fiberglass canopy with your kit, cheeked as shown, or no cheeked, then you will need to use the shorter 13mm canopy mounts that are supplied in place of the longer ones. If you purchase the Fiberglass canopy later, then be sure to request the new canopy mounts with it. They are installed the same way.

With the lower frames ready, let's get the engine together and ready for mounting.

You'll need Bag 3 and the contents of the engine box for these next steps. A dial indicator is ABSOLUTELY necessary to install the cooling fan to ensure a smooth running helicopter.

The crankshaft has a very sharp edge at the top of the taper that MUST be removed, round it off with a buffing wheel or file as necessary, but give it a nice smooth, soft edge.

BERGEN
R/C Helicopters

Install the pull start adapter plate to the bottom of the engine with 3 ea 5X12 FHCS, orient it to clear the primary ignition coil of the engine. Then install the Pull starter with 4 ea 4X16 SHCS. It is permissible to use a drop of CA or super glue as a form of loctite on these 4 screws.

On the opposite side of the engine, install the fan shroud mount with 4 ea 5X12 SHCS with loctite. Make sure you have the proper orientation of the mount by temporarily placing the shroud over it and lining up the holes. Using the Zenoah supplied wrench, remove the spark plug in preparation of installing the cooling fan.

BERGEN
R/C Helicopters

Place the cooling fan with hub onto the crankshaft and install the 6X25 SHCS and ¼" lock washer, only snugging it down at this point. Set up your dial indicator as shown, reading off of the top side of the hub. Spin the fan slowly, watching the dial and marking the LOW side of the hub.

With a smooth faced hammer, tap down on top of the fins, on the HIGH side of the assembly. Don't be afraid to give it a good solid tap, the check the dial indicator while rotating the fan. Repeat this process until you have less than .002, then start over again, tightening the bolt, finding the low and high side, tapping it into place and tightening the bolt some more.

BERGEN
R/C Helicopters

As an aid to holding the fan, we do have a spanner wrench. It's included in a tool set with a puller and spanner wrench for the flywheel, part #TOOL KIT.

Ultimately, you should end up with your fan having less than .002 total runout as you spin the fan. This should not be difficult to achieve, I usually spend less than 10 minutes on this step. If you cannot get less than .002, then remove the fan and hub, look for a burr inside the hub and check the crankshaft itself for runout.

BERGEN
R/C Helicopters

Install the cooling shroud over the fan and cylinder head. Due to the necessarily tight fit over the head, it helps to warm, NOT MELT, the shroud using a heat gun or hair dryer. Install 4 ea 3X16 SHCS through the shroud and shroud mount holes.

Once you have all 4 bolts in, warm the entire shroud to relieve any stress on it. This will help prevent cracking it in the future. Secure the shroud with 4 ea 3m locknuts. Just tighten enough to secure it without putting undo stress on the tabs.

BERGEN
R/C Helicopters

The aluminum motor mount is installed on the cylinder head with a 4X16 SHCS and 4m washer.

A black can muffler is included with the Zenoah engine, and a bag containing a spacer, gaskets, and muffler bolts. Included with your Intrepid Kit is a thicker spacer, which is needed to space the muffler farther away from the frames.

BERGEN
R/C Helicopters

Also included in your kit are longer muffler bolts to match the thicker spacer. Place a gasket on either side of the thick spacer, with the longer muffler bolts through the muffler, and install it on the engine.

The carburetor included is a Walbro 643, which includes a pump bulb and an idle adjustment screw. In a helicopter, we do not use the idle adjustment screw, so remove it and throw it away!! ☺ Thank you.

BERGEN
R/C Helicopters

The carburetor arm installation is important to proper throttle setup. Slide the arm over the butterfly shaft. Look at the angle of the arm in both the open,

And closed position. Rotate the arm so the angle is the same in both positions. Secure the arm with 2 ea 3X3 setscrews and loctite. Also install a short ball onto the arm with loctite.

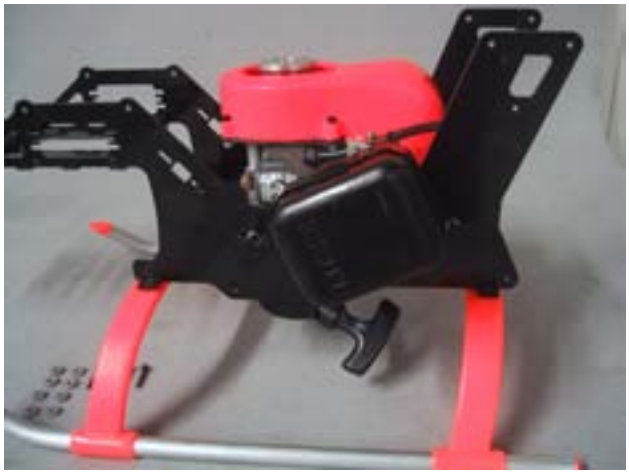
BERGEN
R/C Helicopters

The Zenoah engine also includes an air filter that is installed with the carburetor. Note the plastic washer installed over the choke lever, it's important as it keeps pressure on the lever, preventing it closing in flight.

Orient the air filter base, carburetor, and gaskets as shown with the two bolts through the whole assy. Be especially sure that the gasket between the carb and insulator block is correct with the hole in the gasket and carb lined up with each other. Thread the bolts into the insulator block, and tighten carefully. These bolts do NOT require a lot of torque, however, they do need to be tight enough to keep the choke lever from moving on it's own.

BERGEN
R/C Helicopters

Snap the air filter cover back on, and your engine is complete.



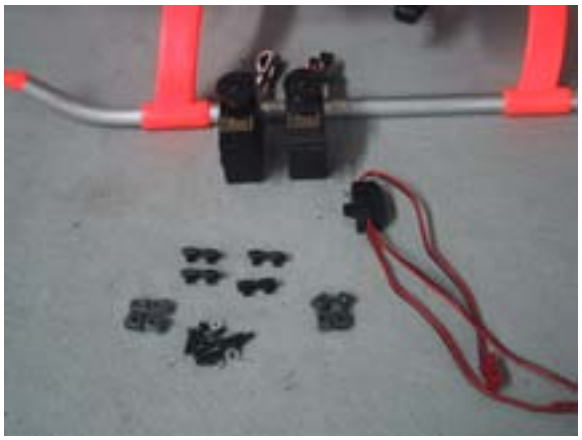
Set the engine into the lower frames and <u>loosely</u> install 2 ea 4X16 SHCS with 4m washers through the frames into the case of the engine. Also <u>LOOSELY</u> install 2 ea 3X8 SHCS with 3m washers through the frames, into the motor mount bolted to the cylinder head.

BERGEN
R/C Helicopters

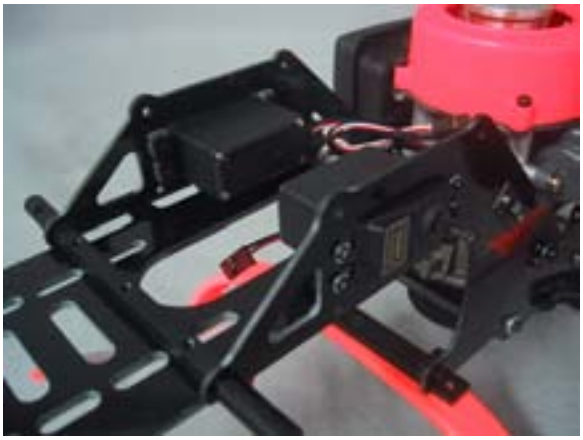
Note the slots in the Pull start adapter plate. <u>Loosely</u> install 4 ea 3X18 SHCS, 8ea special washers, and 4 ea 3m locknuts, with a special washer on the outside AND the inside. A pair of bent needle nose pliers helps to get the locknuts installed. All of these bolts are left loose so you can adjust the engine up and down; fore and aft to set the gear meshes later on.

Check the orientation of the pull starter as it's easier to change it now, than later. The pic shows the orientation for right handed people. If you're left handed, you can rotate it CCW so the rope comes straight out in front of the carb.

BERGEN
R/C Helicopters



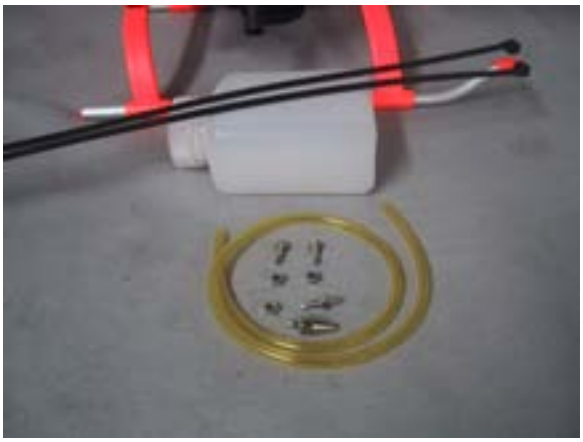
This is a good time to install the on/off switch, elevator, and throttle servos. It's a good idea to install the switch with the OFF side up, to prevent an accidental shut off in the event of a hard landing.

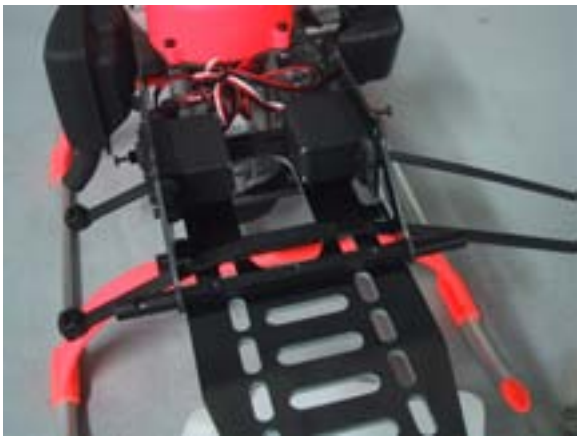


In Bag 11 you will find the plastic servo mount tabs used in place of nuts and eyelets when installed into the rubber grommets of the servos. Insert the LONG end of the tab into the grommet.
Place the servos into the frames, splined shaft to the rear, from the INSIDE, and secure with the preferred screws. If using JR servos, the supplied self tapping screws work just fine. If using Futaba servos, ask us for a set of 2.5X8 mm SHCS and 2.5mm washers, as the Futaba screws are just too small in diameter to properly secure the servos.

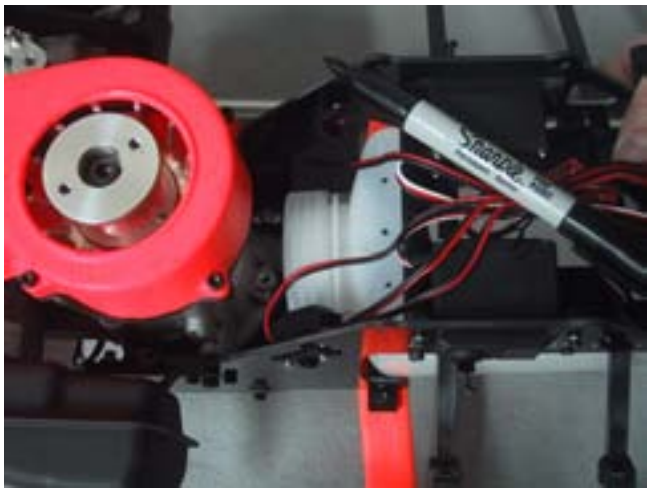
Center the servo in the hole, and do NOT crush the rubber grommets with excessive torque when tightening the screws. Remember they are supposed to isolate the servo from any vibes.

BERGEN
R/C Helicopters





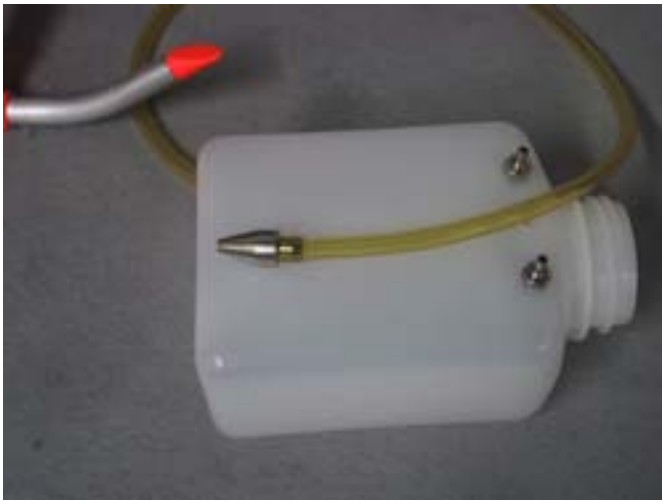
Fit and install the fuel tank next, find the large Zip ties in Bag 10B, slide them under the elevator and throttle servo, through the holes in the front battery tray.



Set the tank in place with the cap towards the rear of the heli, and mark 3 holes just behind the battery tray. The tank does NOT squeeze in between the frames, but sits just in the cutout area provided. Drill the 3 holes marked with a #16 drill bit, cleaning up any shavings from inside the tank.

BERGEN
R/C Helicopters

Insert the single end fittings through the outer 2 holes, long hemostats help, then secure with the supplied nuts.



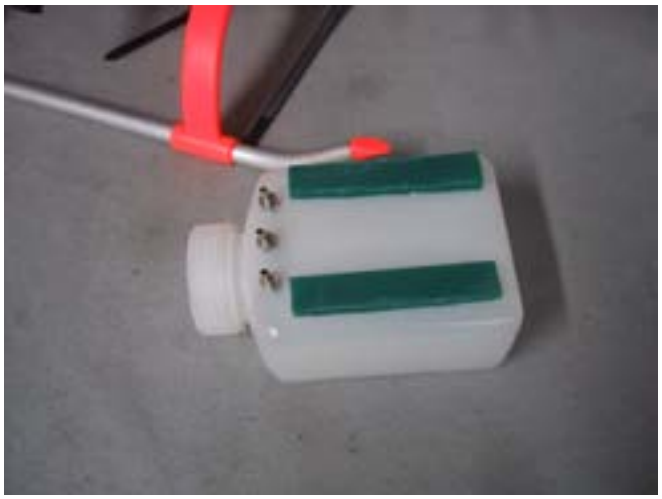
Assemble the clunk line by inserting the clunk into one end of the supplied Tygon tubing. Cut it with sufficient length to reach the end of the tank. Alternatively, a suggestion is to use a longer piece for a clunk line, looping it around inside the tank to allow for easier movement of the clunk during aerobatic maneuvers.

BERGEN
R/C Helicopters

Insert a double end fitting into the Tygon clunk line, and secure with zip ties.

Insert the fitting into the middle hole of the tank, and secure with the third nut. Be sure the tank is clean of all plastic bits from drilling, and install the cap. The clunk line should be free to flop around from side to side, and top to bottom.

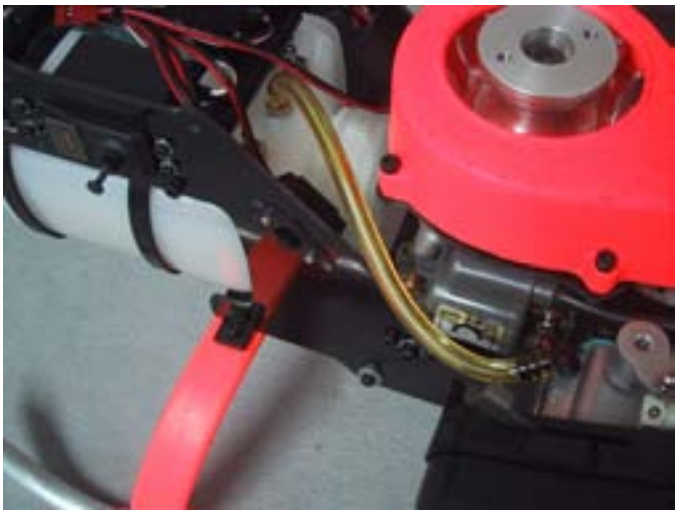
BERGEN
R/C Helicopters

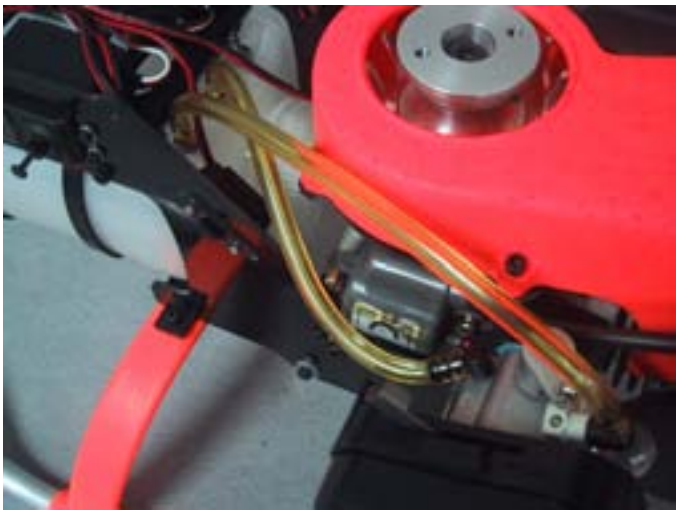


When you install the tank into the frames, you'll want some kind of padding between it and the battery tray. I like Zeal tape, but understand that it may be too expensive to use in this application. Some type of foam will suffice.

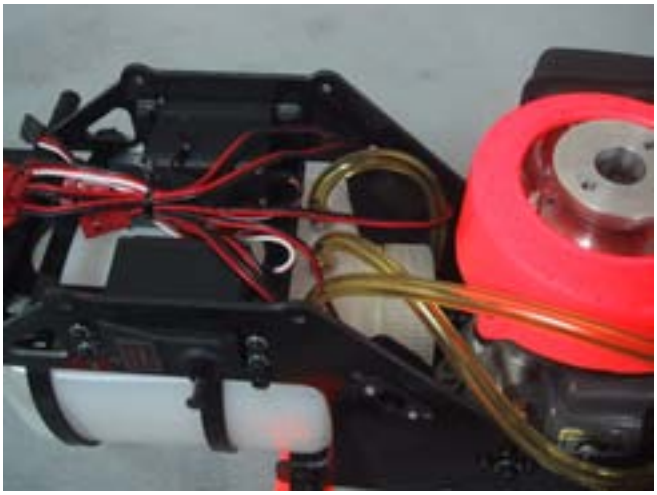
Set the tank under the battery tray and wrap the zip ties around it to secure the tank in place. Note the tank does NOT go between the lower frames, only sitting in the contoured cutout.

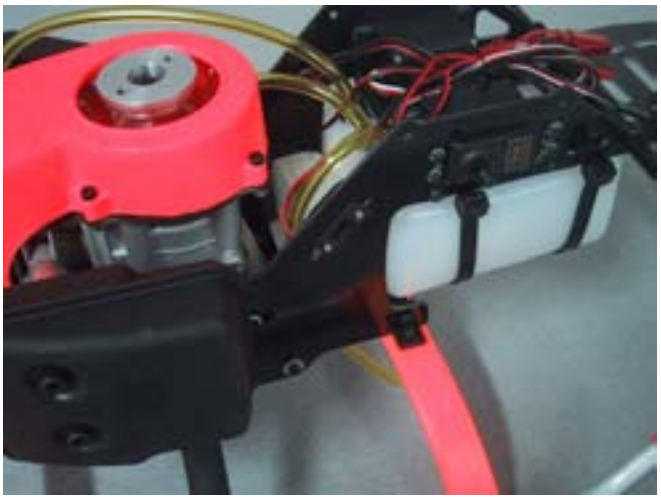
BERGEN
R/C Helicopters





Cut and install a piece of Tygon from the center fitting (clunk line) to the fwd fitting on the carburetor. Cut another piece to connect the left side single fitting to the rear fitting on the carb. This is a return line when pumping the bulb on the carb. You can also use this as a Fill line from your Gas can.

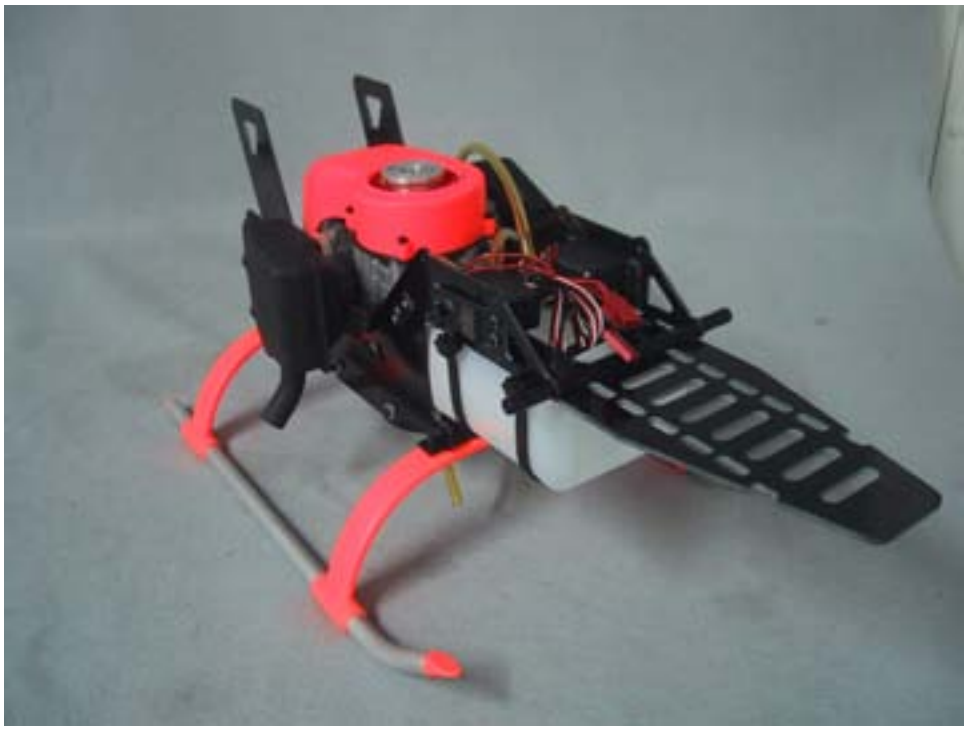




On the third fitting, install a vent line that droops down to the landing gear. Some suggest a longer hose that creates a loop to prevent fuel from dripping out when doing continuous flipping maneuvers.

Secure all 3 hoses to the fittings on the tank with zip ties.

BERGEN
R/C Helicopters



The lower frame set is now ready to accept the upper frames, but we have to put them together first…☺

Bag 5

BERGEN
R/C Helicopters

The upper frame sides are identical, but you have to make a right and a left, installing 2 ea 6X12X4 flanged bearings into the frame pieces. The flange goes on the INSIDE of each frame half. Very carefully, run a bead of thin CA (superglue) around the flange of the bearing, securing it to the frames. If you get CA into the bearing, it won't be any good…☺

If not already assembled for you, then install a long and short axle into the elevator yoke. Note the long shaft has flats on BOTH ends, the short one does not.

BERGEN
R/C Helicopters

Install the shafts into the yoke with 2 ea 3X4 SHCS and RED loctite, matching the flats on the shaft with the broached hole in the yoke. Use the screw to draw the shaft into the yoke. The second shaft will be a little more difficult; using a ball ended driver makes it a bit easier.

Assemble the front transmission next; notice the slotted holes in the front "ears" of the cage. This allows up and down adjustment of the tail pinion for gear mesh.

BERGEN
R/C Helicopters

Note the shaft has a through hole on one end and a divot on the other. Slide the delrin coupler onto the shaft, lining up the hole in the delrin coupler with the hole in the shaft. Use a 1.5mm driver to help line up the hole. If it's difficult to get it through, rotate the coupler on the shaft 180 degrees and try again. Install the cross pin, making sure it sits flush on both sides.

Secure the cross pin with a 3X4 setscrew and loctite threaded into the end of the shaft. Ensure it's secure by trying to push the pin out.

Slide the shaft through the rear bearing of the cage then slide the brass spacer tube onto the shaft.

BERGEN
R/C Helicopters

Place the pinion in the cage and slide the shaft through it all the way up through the forward bearing. Line up one of the holes in the pinion with the divot in the shaft and secure with a 3X3 setscrew and loctite. Check for fore and aft play by pulling and pushing on the delrin coupler. If you find a small amount of play, then line up the OTHER hole in the pinion with the divot on the shaft, and try again. It is NOT necessary to install a second setscrew into the pinion. You may also notice the shaft does not stick all the way through the front bearing.

Place the 2 collective axles into the flanged bearings of one side frame, on the inside (flanged side) of the frame.

BERGEN
R/C Helicopters

Place the front transmission onto the same side frame, with 2 ea 3X8 SHCS.

Place the lower mainshaft bearing block in place, noting the orientation of the bearing (up), and install 2 ea 3X35 SHCS to hold it in place. Note the rear screw also goes through the front of the transmission cage….

Place the upper mainshaft bearing block in place, also noting the orientation of the bearing (down) and hold in place with 2 ea 3X35 SHCS. If you have the Thrust Bearing block option, it is installed later….

BERGEN
R/C Helicopters

Set the elevator yoke in place, ensuring the LONG shaft sticks out the RIGHT side.

The collective servo goes into the left side frame.

Install the plastic servo mount tabs from Bag 11 and install the servo from inside the frames, with the splined shaft forward.

BERGEN
R/C Helicopters

Before putting the 2 sides together, note where the servo wires exit the servo and dremel out the frames to clear the wires.

Put the upper frames together, sliding the flanged bearings over the axles and pushing the bearing block bolts through the holes.

BERGEN
R/C Helicopters

Install 2 ea 3X8 SHCS into the front transmission cage, loosely, and put 4 ea 3m Locknuts on the 4 bolts going through the bearing blocks, but do not tighten just yet.

As an option, we offer a thrust bearing setup for the mainshaft. This is intended for load carrying birds, like an EB carrying an underslung camera mount. 4 ea 3X8 SHCS are included with the thrust bearing block, remove them and insert the block into the frames, reinstalling the 4 ea 3X8 SHCS, loosely.

BERGEN
R/C Helicopters

Install the rear canopy mounts in the bottom of the 2 holes behind the mainshaft bearing blocks, with 2 ea 3X8 SHCS and loctite.

Use the crosshole drilled in the canopy mount to tighten them down.

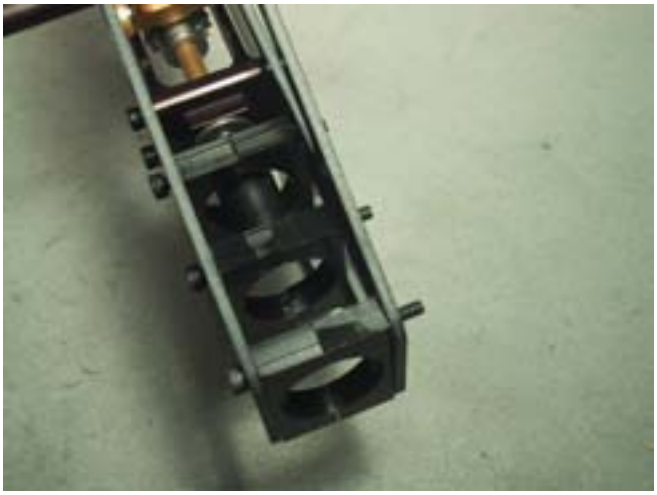
BERGEN
R/C Helicopters

Install the rudder servo into the servo mount, using the plastic servo mount tabs from Bag 11.

Orient the servo with the splined shaft forward, and secure with either the JR servo screws or 2.5X8 SHCS and 2.5 washers.

Place the forward most set of boom clamps in between the frames and put a 3X35 SHCS through the upper hole in the frames and boom clamp to hold it in place.

BERGEN
R/C Helicopters



Repeat with the other 2 sets of boom clamps.

Use 3 ea 3X40 SHCS to install the tail servo mount to the frames, with the screws going through the bottom hole of the boom clamps.

Loosely install 6 ea 3m Locknuts onto the 6 screws, then we're almost ready to install the upper frames onto the lowers.

BERGEN
R/C Helicopters

But first we have to install the main gear, mainshaft, and clutch system.

The delrin bushings are first, with 2 ea 4X16 SHCS. Note the steel insert and that one end has a chamfered hole, the other does NOT.

Insert the screw into the chamfered side, then slide the insert into the delrin bushing.

BERGEN
R/C Helicopters

The delrin bushing assembly then gets installed on top of the fan hub, with loctite.

The clutch system consists of the clutch and start shaft, clutch bell with either a 14-tooth pinion (standard) or 12-tooth pinion (EB), triple bearing block, and start shaft collar.

The clutch bell has the liner factory installed and machined to the proper diameter. If you need the liner replaced, send us your clutch bell, for $20 we will reline it and machine it to the proper size. We do NOT sell replacement liners. The bearing in the clutch bell has been cleaned of oil or grease to prevent contaminating the liner. Do NOT lubricate this bearing.

BERGEN
R/C Helicopters

Slide the clutch and shaft up into the clutch bell, then slide the triple bearing block over the shaft, and onto the pinion.

Slide the start shaft collar down to the upper bearing of the triple bearing block, and secure with 2 ea 3X3 setscrews and loctite. Make sure the clutch spins freely inside the clutch bell, and the clutch bell spins freely inside in the triple bearing block. Set this assy aside for later.

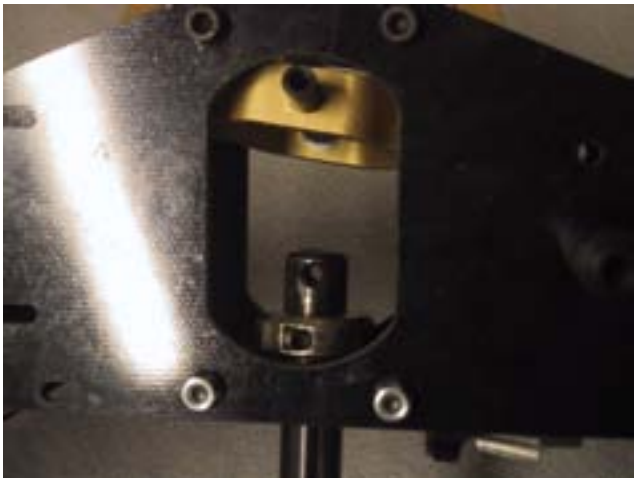
The main gear is machined from Delrin to be free of high and low spots and to be strong. Nothing is forever however, you CAN take out the crown gear by dragging the tail blades, or you can melt the outer gear with a slipping clutch caused by too low of a headspeed or by oil getting onto the liner.

BERGEN
R/C Helicopters

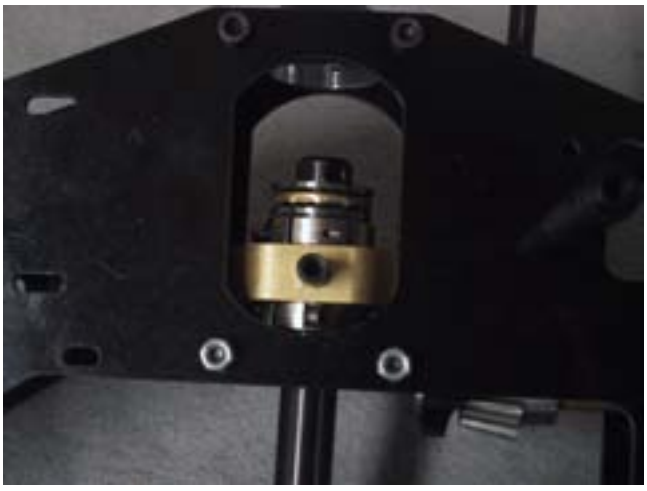
Note the auto hub has a long and short end. The long end is the TOP, and is inserted into the main gear from the bottom.

Line up the 4 holes in the main gear and the autohub and install 4 ea 3X8 Low Head Cap screws with loctite.

BERGEN
R/C Helicopters



Slide the mainshaft w/collar up through the autohub, then up through the lower mainshaft bearing block. Slip one of the split collars onto the mainshaft with the stepped side down toward the bearing and the chamfered side up.

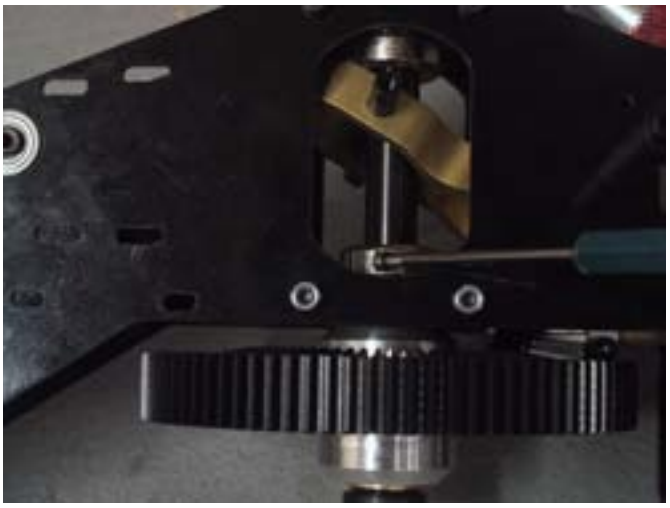


Slide the shaft up some more, through the elevator yoke, and install the second split collar onto the shaft, stepped side UP this time, chamfered side down.

***If* you have the thrust bearing block option, slide the three piece thrust bearing onto the shaft, with the 2 races on either side of the ball cage.**

Now slide the shaft up through the upper mainshaft bearing block, seating the autohub against the lower bearing.

BERGEN
R/C Helicopters



While pulling up on the mainshaft, push down on the lower split collar seating it against the bearing and tighten the 2.5mm screw. Push up on the upper split collar, seating it against the bearing and tighten the screw.
These are "special" bolts in that we turn the heads down to fit the collar. They do not require loctite, but they DO require a hardened Allen driver to tighten them down and loosen them without stripping the heads out. Cheap sets of tools at this point are NOT your friends.
Tighten the upper main shaft bearing block bolts, and tighten the forward bolt in the bottom bearing block.

The constant driven tail system is available as an option AND consists of 2 aluminum hubs, 2 machined delrin gears, the autorotation hub and a longer main shaft.

BERGEN
R/C Helicopters

Look at the 2 sides of the main gear. One side is chamfered, this is the top, the other side has a sharp edge, this is the side that the large hub sits inside of.

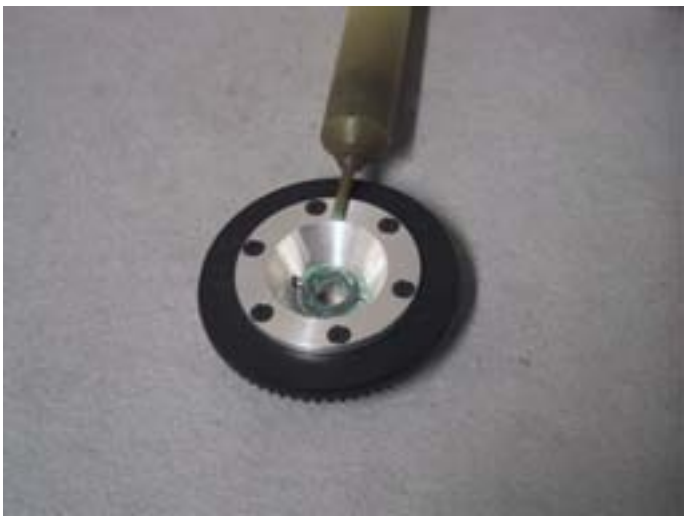
Install the hub into the gear using 10 ea 2X8 SHCS, installing all of them loosely then tightening each one a little bit at time to prevent warping the gear. The crown gear and hub are assembled with 6 ea 3X8 FHCS.

Install 2 of the screws opposite each other, loosely for now, then install the remainder, snugging them down slowly a little at a time to again prevent warping the gear.

Thread the 2 ea 3X10 SHCS into the two sides of the hub, but do not tighten them.

BERGEN
R/C Helicopters

Install the autohub into the main gear hub using 4 ea Low Head 3X8 SHCS. Notice one end of the autohub is longer, this is the top, and is inserted into the gear hub from the bottom.



Put a dab of grease in the underside of the crown gear hub, place the 10X16X1 washer in it, then dab a little more grease onto the washer. During an autorotation the crown gear hub is turning while the autohub is not, this grease is just a little lubrication to help with that interface.

BERGEN
R/C Helicopters

Install the crown gear hub onto the mainshaft, locating the 4X6 SS into the divot on the mainshaft. Do NOT tighten this setscrew; only use it to locate the hub onto the shaft

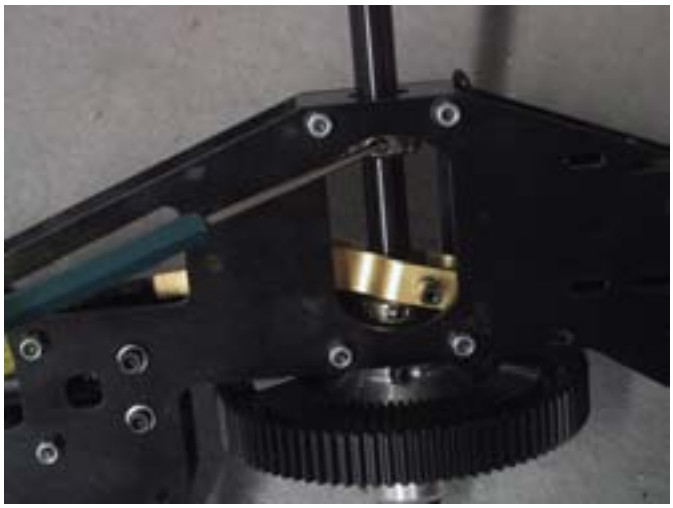
Now tighten the 2 ea 3X12 SHCS Pinch bolts, securing the hub to the mainshaft. Now you can go back, loctite, and tighten the SS in the divot. Only tighten it enough to locate the SS into the divot, it does NOT require much torque or you may pull the hub to one side, causing vibrations.

BERGEN
R/C Helicopters

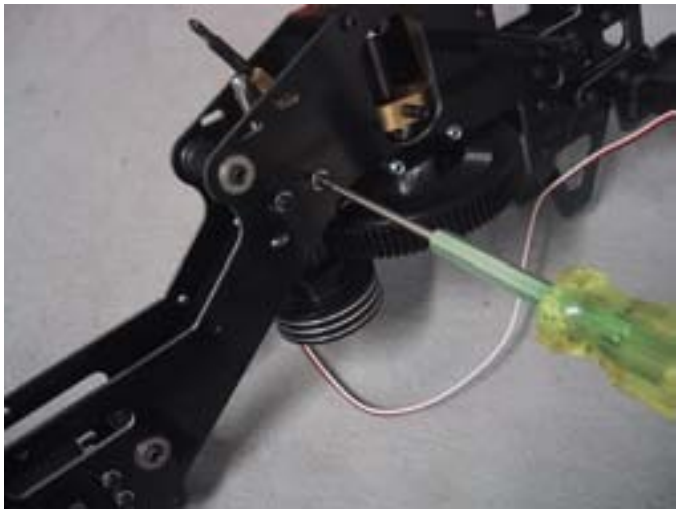
Slide the autohub and large gear onto the mainshaft, not forgetting the 10X16X1 washer on top of the autohub. Install the bottom mainshaft collar, with the step down, and secure with the 4-40 SHCS.

Insert the top of the mainshaft through the bottom mainshaft bearing, install split collars above and below the elevator yoke, with the step towards the bearings, then up through the upper mainshaft bearing. Pull up on the mainshaft, seating the crown gear hub against the lower bearing, push down on the lower split collar and tighten the pinch bolt.

BERGEN
R/C Helicopters

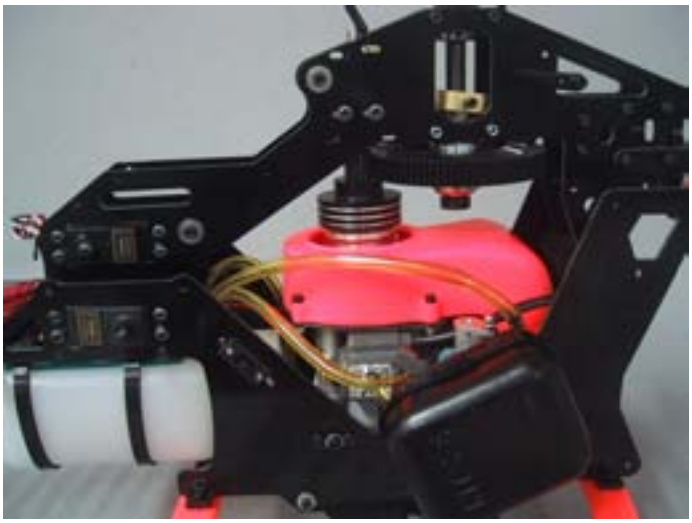


Push up on the upper split collar, seating it against the bearing, then tighten the pinch bolt. These bolts do NOT require loctite, but DO use a hardened allen driver.
Tighten the upper main shaft bearing block bolts, and tighten the forward bolt in the lower mainshaft bearing block.

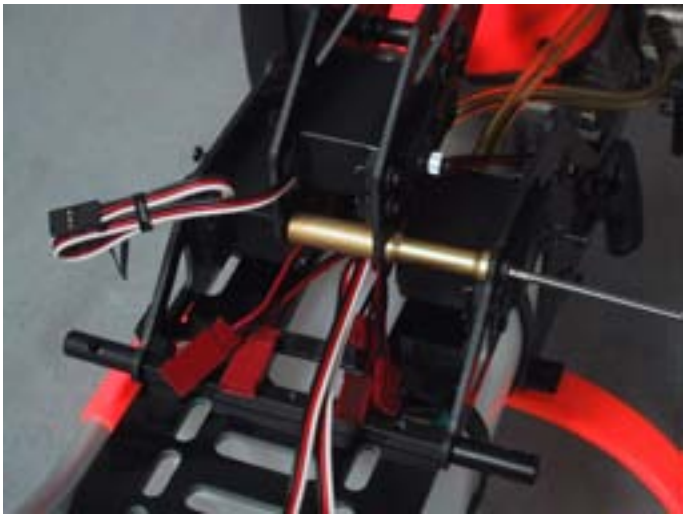


Now install the clutch assy, with 4 ea 3X8 SHCS with washers in the slotted holes in the frames, but do NOT tighten or loctite just yet. We'll set the gear mesh later, after joining the upper and lower frames.

BERGEN
R/C Helicopters

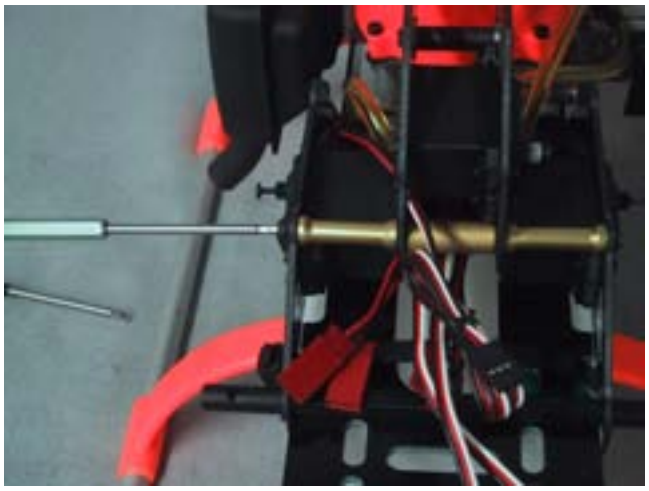


Set the clutch on top of the fan hub, sliding the delrin bushings up into the clutch.

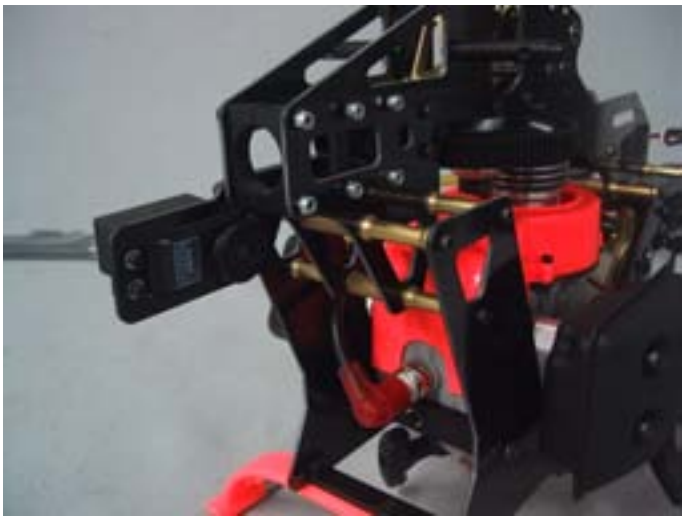


Attaching the uppers and lowers together using 5 ea 26mm threaded spacers, 10 ea 29mm unthreaded spacers, and 10 ea 3X40 SHCS. Start at the front with a threaded spacer in between the upper frames, an un-threaded spacer between the uppers and lowers and run a bolt through, threading into the inner spacer. You may have to jostle around the engine and frames to get the holes to line up, which is why we leave everything loose until the frames are secured to each other.

BERGEN
R/C Helicopters



Place another un-threaded spacer on the opposite side and install another 3X40 SHCS into the threaded spacer. Repeat the process with another set of spacers and bolts, just to the rear of the 3 servos.



Continue with the final 3 sets of spacers and bolts in the triangle shaped set of hole to the rear of the frames. Now go back and remove each bolt, one at a time, loctite it, and reinstall it.

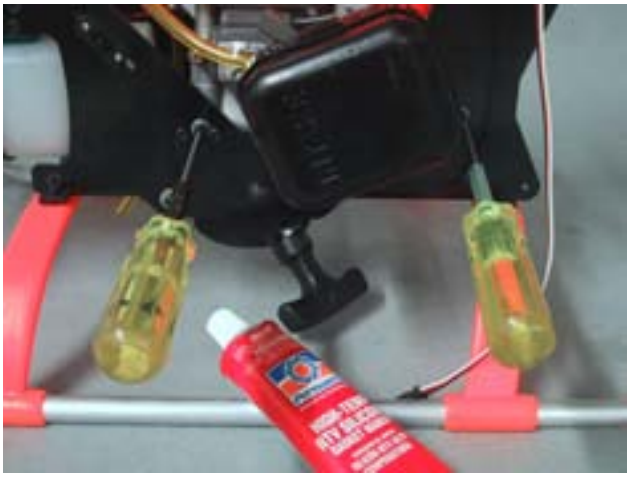
BERGEN
R/C Helicopters

Take a look at the gap between the fan hub and the clutch as well as the mesh between the pinion gear and main gear.

The easiest way to set the mesh and gap is to remove the 2 ea 4mm bolts going into the side of the motor, move the engine up and down as needed to set minimal gap between the fan hub and clutch, moving the engine and clutch assy forward and aft as a unit to set the gear mesh. What we want as a mesh is to have MINIMAL backlash, even NO backlash, as long as the main gear can spin freely. When you're happy with the mesh and the gap, tighten the 4 bolts and nuts securing the pull start adapter plate to the lower frames.

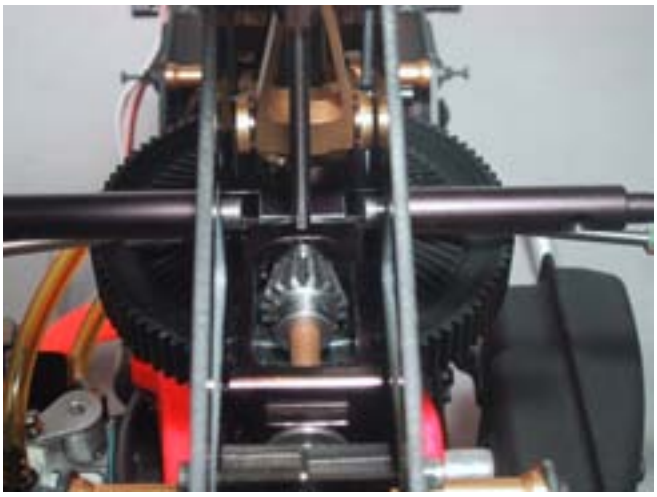
BERGEN
R/C Helicopters

Loctite and tighten the 4 bolts going into the triple bearing block, and reinstall the 2 ea 4X16mm SHCS into the side of the motor, using Red RTV as a form of loctite. We use Red RTV because it withstands the heat of the engine better than loctite does.



Install 2 ea 3X8 SHCS with 3m washers into the rear motor mount, also with Red RTV as a loctite.

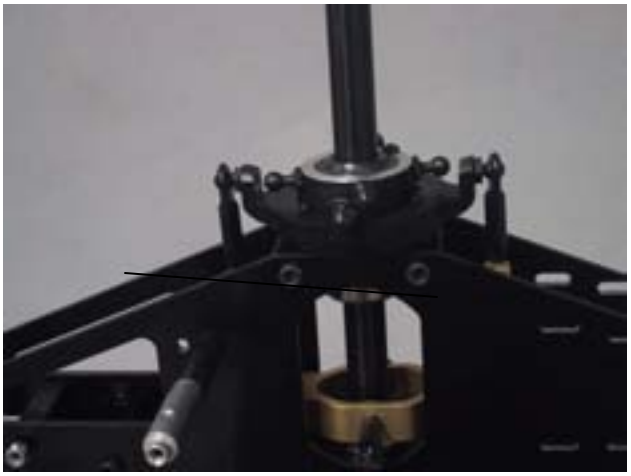
BERGEN
R/C Helicopters



Set the tail drive pinion mesh by pushing down on the front of the cage, sometimes a tap or two is necessary due to the frames squeezing together on the cage. Note the "ears" on the front of the cage should be at least flush, sometimes below flush, with the main shaft bearing block once correct mesh is set. Here again we want minimal or NO backlash, as long as everything spins freely. When you're happy with the mesh, tighten the 3X35 SHCS bolt and 3m locknut going through the front of the cage and the main shaft bearing block, THEN loctite and tighten the 4 ea 3X8 SHCS threaded into the rear part of the cage.

Build the swashplate next from bag 6, start with the outer ring, installing short balls into each leg, with loctite. Your short balls may be silver in color.

BERGEN
R/C Helicopters



Install 4 ea medium balls onto the inner ring, again with loctite. While doing this, ensure that the eyeball bearing in the center remains free to swivel.
Slide the completed swashplate onto the mainshaft and snap the elevator yoke ball links onto two of the outer balls.

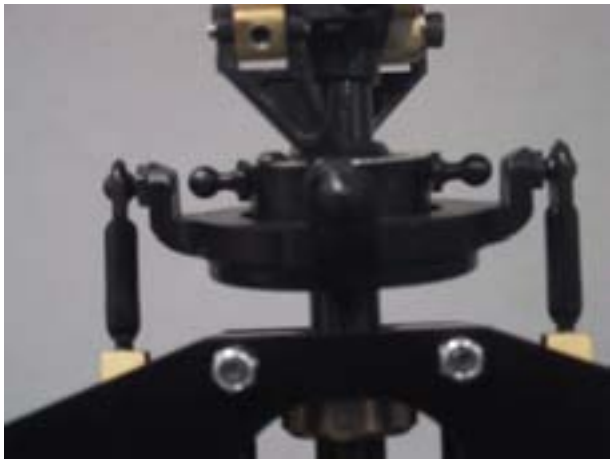
The washout unit assembly starts with the washout arms. Install 2 ea 3X7X3 flanged bearings into each arm, then install the radius links with a pin and secure with a 3X3 setscrew and loctite. Use the radius links marked (L) for left hand. This gives you "retarded" swashplate timing for stability in a hover.

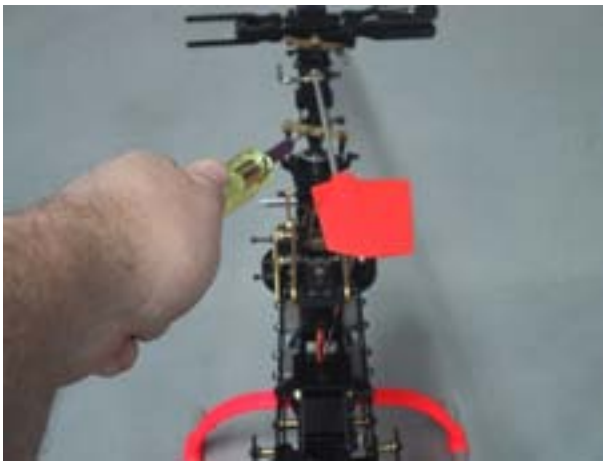
BERGEN
R/C Helicopters

Install a short ball on the opposite end, with loctite, noting the orientation. With a 3X16 w 6mm shoulder, and a brass washer as a spacer install the arm onto the washout unit, again noting the orientation. Tighten the bolt until the arm is free of slop, but not so tight that the bearings get "notchy". It should be able to spin freely. Secure the bolt with a 3X3 setscrew inserted into the hole on the opposite side, tightening it against the bolt. Check for slop and free play, readjust the tightness of the bolt if needed and resecure with the setscrew. Repeat for opposite arm.

If necessary to space the arm away from the hub, place 2 brass washers on the bolt between the bearing and the hub. Slide the washout unit on to the mainshaft and snap the radius links onto 2 of the balls on the inner swashplate.

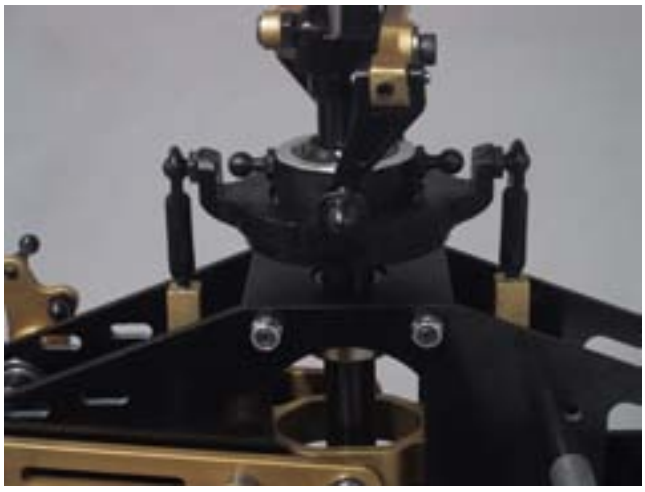
These links may require reaming to fit freely on the ball, now's a good time to do that.





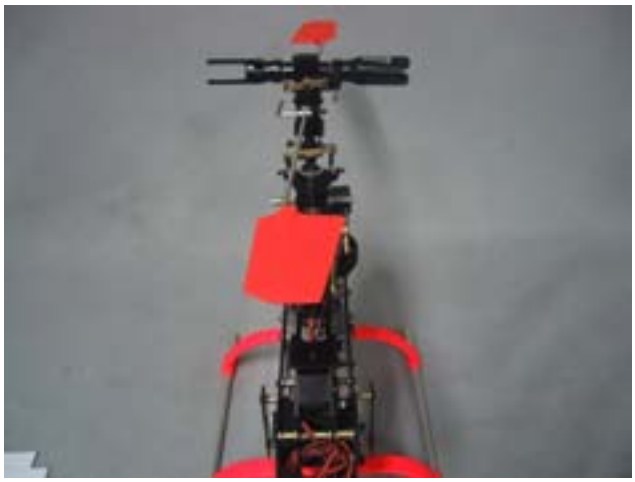
Now the explanation of the alternate links.

Line up the balls that you snapped the radius links onto with the outer balls of the swashplate, preferably the ones to the sides. Look at the flybar in the pic, noting the angle, that it is NOT pointing straight out away from the heli. This is the "retarded" setting, and in general, gives you a more stable hover and less cyclic action.



If you opt to use the other (R) links, then your assy will look like this. Note the washout arms are flipped over and the bolt is installed in the other hole. Now if you line up the swashplate balls and look at the flybar,

BERGEN
R/C Helicopters

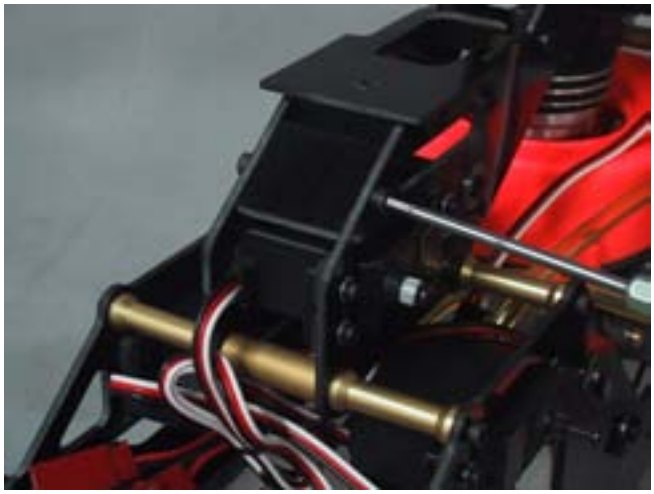


The angle is now "advanced". This gives a less stable hover, but more cyclic action. The porkchops are handed, meaning they only snap onto the ball in one direction, seen in the photo.
All of this is also called swashplate timing, and in the higher end radios can be adjusted electronically in a specific mode or by mixing in some aileron with elevator, and elevator with aileron.
If you prefer to have your swashplate timing set to 0 and have pure aileron and elevator movement, then use the first, suggested setup and mix it out in your radio.

From the Bag 7, find the 2 ea 3 hole blocks and the gyro mounting plate.

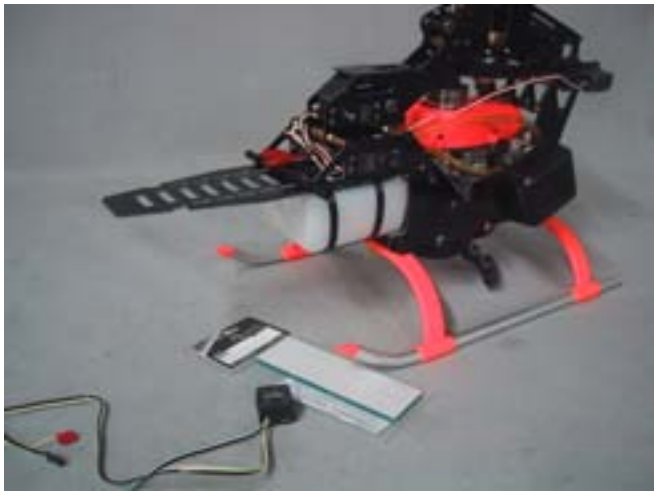
BERGEN
R/C Helicopters

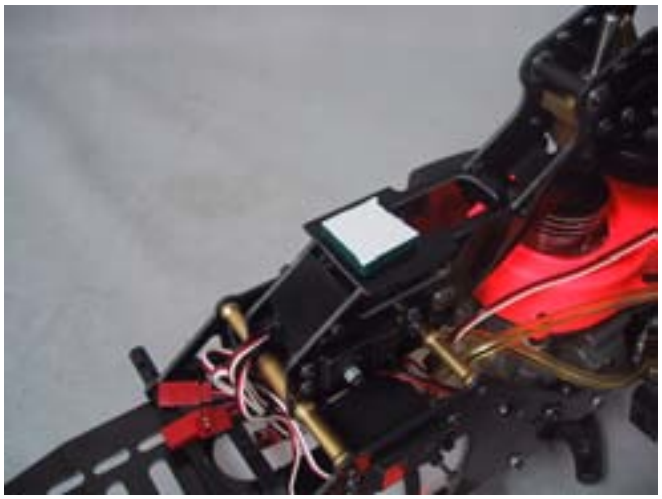
Using 1 ea 3X8 FHCS and 2 ea 3X8 SHCS, bolt the 3 hole blocks to the gyro mounting plate. Note the orientation of the holes on the sides.
Using 4 ea 3X8 SHCS, secure the assy to the upper frames, just above the collective servo and collective axle.



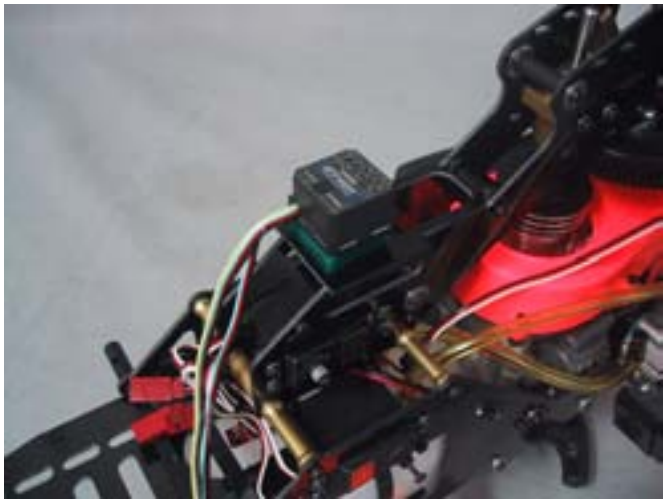
The angle plate is installed just forward of the gyro mounting plate, using 2 ea 3X8 SHCS. These bolts can be secured with a drop of CA (superglue) also. The chamfer on one side of the plate should be toward the collective servo. This plate makes an excellent mount for one of the satellite receivers if using a spektrum system.

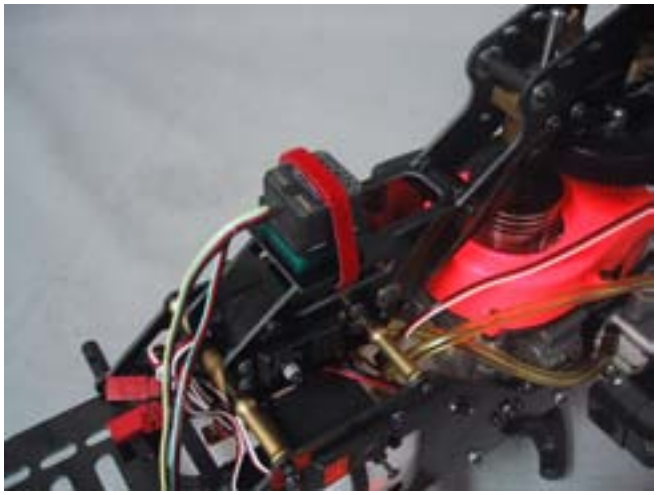
BERGEN
R/C Helicopters





Now's a good time to mount your gyro, we suggest using Zeal tape, available from us, as an isolation from normal gasser vibrations to the gyro.





Mount the gyro onto the tape, then use a small piece of velcro as a safety belt, not too tight, just enough to help keep the gyro sensor in place.

BERGEN
R/C Helicopters

Assemble the control arms, from Bag 7, starting with the "Popsicle sticks", by installing a short ball on each one. For maximum collective, install it in the innermost hole. Some or all of these arms may be black anodized.

Install short balls, 1 in the triple bellcrank, one in the single bellcrank, and 2 in the elevator arm. Install 2 ea long balls in the triple bellcrank, and in the elevator "X" arm. Take a close note of the orientation on the "X" arm and where the balls go!

BERGEN
R/C Helicopters

Install 2 ea short balls in the “X” arm, on the opposite side from the long balls. Install 2 ea short balls in each aileron bellcrank, noting that you are making a right and a left. The short balls may be silver in color.

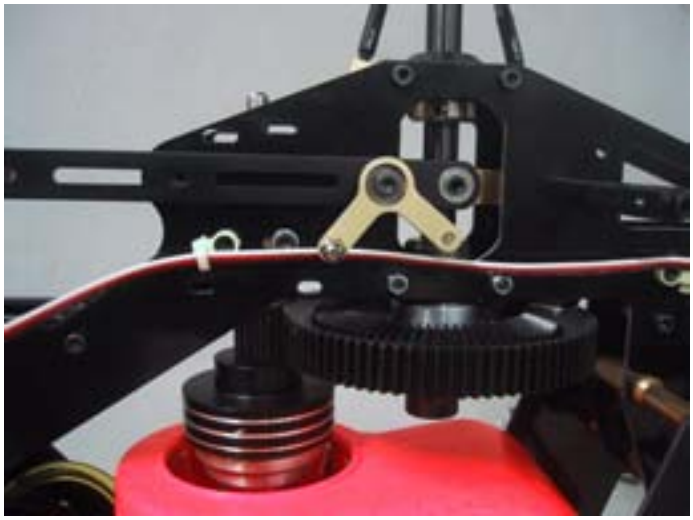
Another view of the aileron bellcranks. Install the 5 X 8 X 2.5 Flanged bearings, one in each “Popsicle stick” 2 in each aileron bellcrank, and 2 in the “X” arm.

BERGEN
R/C Helicopters

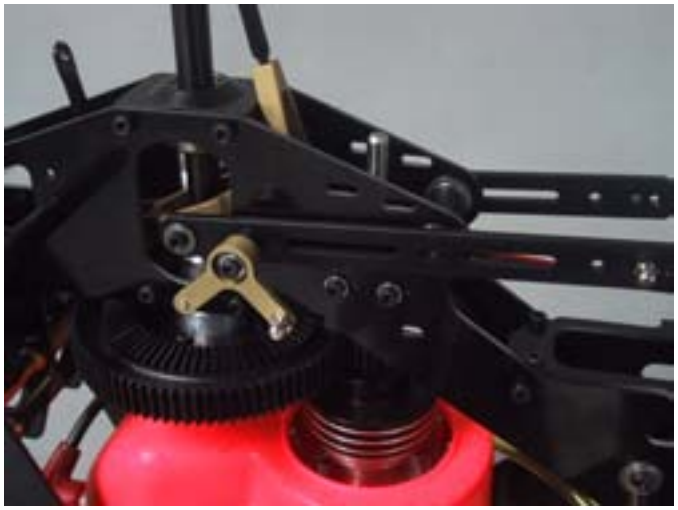
Insert the jamnuts through the bearings, from the "boss" side, then thread a SHCS through the jamnuts. The "X" arm gets a 3 X 20; the aileron bellcranks get 3 X16's.

Using loctite, thread the bolt into the popsicle stick, then tighten the jamnut against the popsicle stick. By loosening the jamnut and tightening or loosening the bolt, you can adjust the tension on the bearing, giving a free spinning AND slop free bellcrank. Then again tighten the jamnut. Repeat for other side.

BERGEN
R/C Helicopters



Install the left side Popsicle stick onto the collective axle and the short axle in the elevator yoke. Secure it with a 3X8 SHCS w loctite and 3m washer into the collective axle.



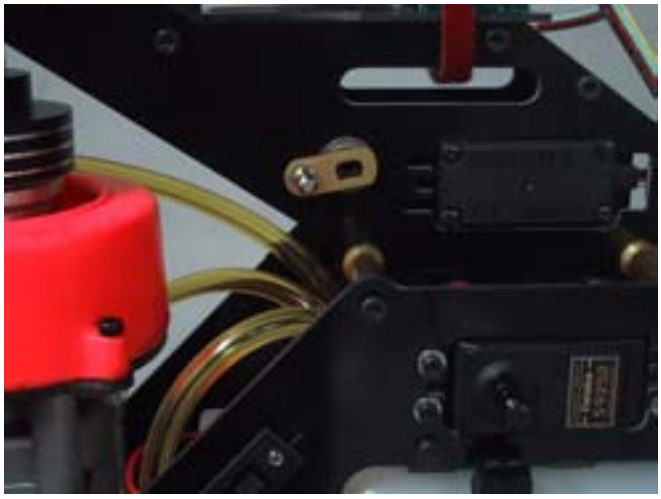
Install a 3X4 SHCS w loctite into the short axle of the elevator yoke.
Install the right side Popsicle stick onto the collective axle and the long axle of the elevator yoke.

BERGEN
R/C Helicopters

Install the "X" arm assy, threading the bolt into the collective axle, with loctite. Using the same method as the aileron bellcranks, set the tension of the bearings in the "X" arm by holding the jamnut, then tightening it against the Popsicle stick to secure it.

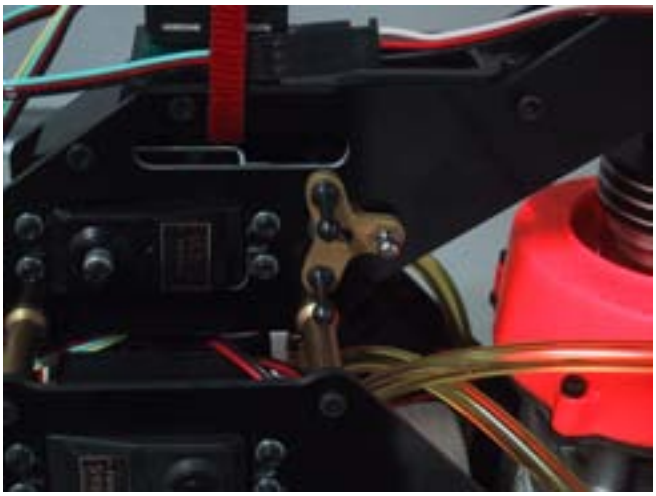
When tensioned properly, the "X" arm should spin freely, but not have any slop in and out or side to side.

BERGEN
R/C Helicopters



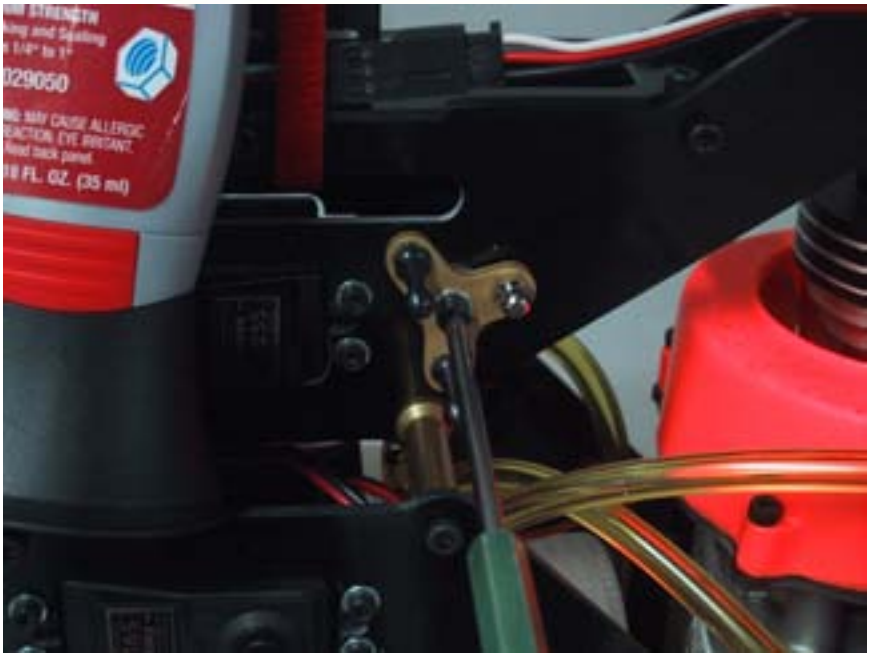
Install the elevator arm onto the long axle in the elevator yoke, matching the flats in the arm with the flats on the axle. Note the long leg of the arm goes upward. Secure it with a 3X4 SHCS with loctite and a 3m washer, drawing it onto the flats of the axle.

Install the single bellcrank onto the lower collective axle, on the right side,



and secure with a 3X8 SHCS with loctite and a 3m washer. Install the triple bellcrank on the opposite side of the collective axle, orienting the short ball in the same direction (aft) as the single bellcrank.

BERGEN
R/C Helicopters

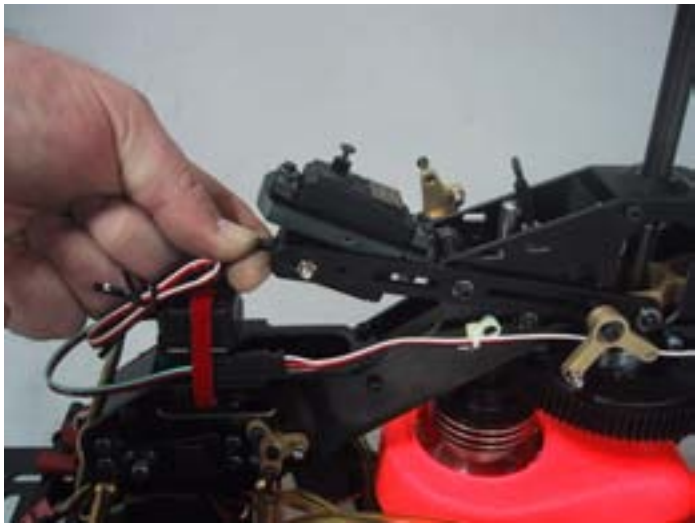


Secure with a 3X8 SHCS with loctite and a 3m washer. Be sure the bellcranks spin freely with the axle.

Begin installing the aileron servo into the aileron servo mount by installing the brass or silver eyelets into the rubber grommets from the bottom side of the servo.

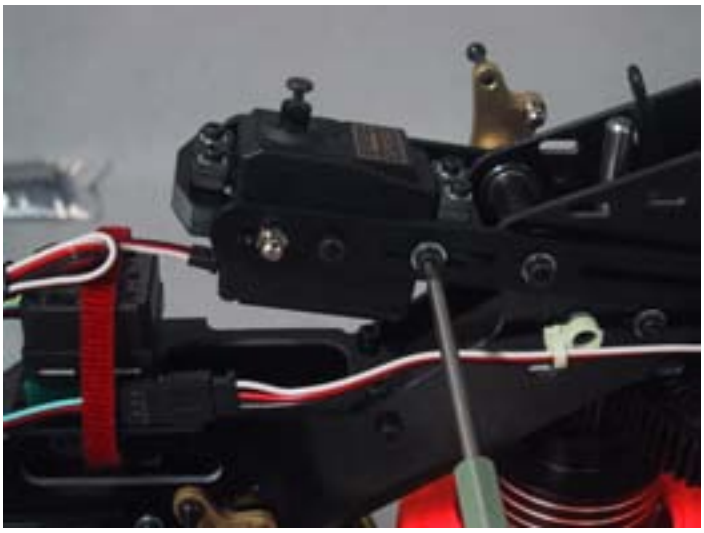
BERGEN
R/C Helicopters

Snap the plastic servo mount tabs into the aileron servo plate, from the cutout area side, with the long leg into the slots milled in the plate.
Insert the servo into the top side (smooth) of the plate, oriented as shown with the splined shaft forward.



Secure the servo to the plate with 4 ea 2.5mm SHCS and 2.5 m washers or the JR self-tapping servo screws. Snug them down enough to secure the servo, but not squish the rubber grommets.
Place the aileron servo assy in between the popsicle sticks, with the splined shaft and servo wires towards the front of the heli.

BERGEN
R/C Helicopters



Secure with 4 ea 3X8 SHCS and 2 ea 3m washers. You only need washers on the 2 rear bolts.

Do NOT use loctite on these bolts, but you CAN use CA (Superglue) as a form of loctite. The plate is made from G10, which is porous and will not allow the loctite to set up.

BERGEN
R/C Helicopters

Build the rotor head next, out of bag 8, starting with the head axle. Note the "heim" ball in the center. This ball takes the weight of the helicopter, INSTEAD of the dampeners, allowing them to do their job of dampening the flapping motion of the rotor head system.

Insert the axle into the head then slide the one piece dampeners onto the axle, seating them into the head. This may require a little lubrication. The dampeners will NOT sit flush with the head. Center the assy as best you can, it will make the next steps a little easier.

BERGEN
R/C Helicopters

The shim set includes 2 ea of .008, 2 ea of .015, 2 ea of .040, and 2 ea snap rings. If you want to fly hard 3D, then install one of each size shim on to the head axle. For softer flying, such as a camera ship, then try just the .040 and the .008 shim on each side. As a minimum, you MUST use the .040 shim.
Look closely at the snap ring. You will see one side has a sharp edge, the other side is somewhat rounded. This is from the stamping process when it is made. You want the SHARP edge facing outward when installed on the head axle. This will aid in keeping the snap rings in the grooves on the head axle. Use a set of snap ring pliers to aid in installation, available at any automotive parts store.

A tool to make getting the snap rings seated easier is a piece of metal tube, say from a piece of broken landing gear, long enough to allow the head axle bolt to press the snap ring to the groove in the head axle.

BERGEN
R/C Helicopters

You may also be able to press the snap rings into place using the blade grips if only using the "soft" setup.

There are 2 sizes of bearings associated with the seesaw tube. The 4X10X4 bearing (4mm ID) goes into the end of the tube. Do not confuse them with the 3mm ID bearing used in the next step.

BERGEN
R/C Helicopters

Using the 3X10X4 bearings (3mm ID) make 2 assemblies of a 3X8 SHCS and 2 3mm brass washers.

Insert the seesaw into the head with the milled slot facing the direction shown in the picture.

With a drop of loctite on the bolt, insert the bearing assy into the head, threading the bolt into the seesaw and drawing the bearing into the head. Once seated, tap the assy in below flush to aid in getting the opposite bearing installed.

BERGEN
R/C Helicopters

Install the opposite side bearing assy in the same manner, drawing it in while tightening the bolt. Now tap it in flush, effectively setting both sides flush with the headblock.

Install 2 ea 3X5 panhead screws, with loctite, just above each bearing as a retainer. When both screws are tight, the seesaw should rotate freely.

BERGEN
R/C Helicopters

The seesaw endcaps are installed flush with the end of the seesaw, and secured with 3X4 setscrews and loctite in the short leg. The setscrew sits in the milled groove of the seesaw tube to prevent the endcap from rotating.

Install a short ball on the long leg of each endcap, with loctite.

BERGEN
R/C Helicopters

Slide a blade grip with radial bearings installed onto each side of the head axle. Locate the 3 piece thrust bearings and 2 ea 5X16 SHCS and 5M washer.

Grease the ballcage of the thrust bearing set, then install the thrust washer with the LARGE ID first, grooved side outward.

BERGEN
R/C Helicopters

Install the ballcage with the open face inwards, then install the thrust washer with the SMALL ID, grooved side inward.

Install both 5X16 SHCS bolts and washer with loctite and tighten, using 2 Allen wrenches tightening against each other. Ensure the blade grips spin freely.

BERGEN
R/C Helicopters

Assemble the Bell/Hiller mixer with 2 ea 3X7X3 bearings, a "special" 3X12mm bolt w 6mm shank, brass washer as a spacer, and the blade grip pitch arm.

Install the assembled bell/hiller mixer by threading the bolt into the middle hole on the pitch arm (recommended). This hole gives a 0 Delta offset, the other two holes give a positive or negative delta offset for those so inclined to experiment. Set the tension on the bearings, tightening the bolt to give a free spinning yet slop free movement, then tighten the nut on the back. Check the movement and readjust as necessary. Repeat for the second pitch arm.

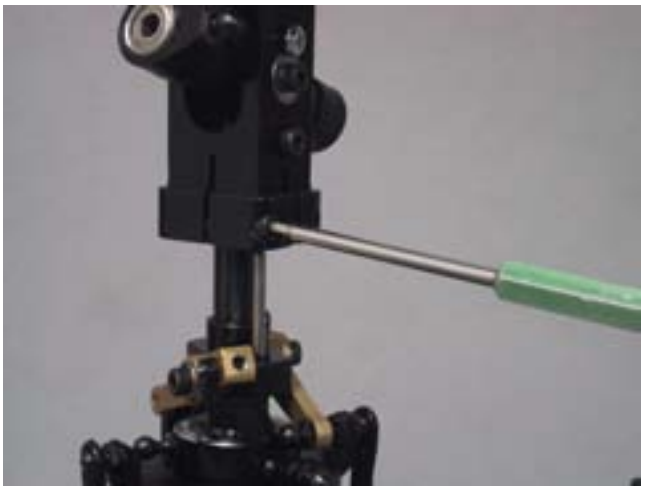
BERGEN
R/C Helicopters

Notice that one side of the bell mixer arm is longer than the other. You also have 2 holes on either side to attach the short control balls. These adjustments offer how much effect the flybar has on your rotor system. These adjustments will be discussed later in the manual. For a standard configuration we suggest the setup as shown. You will want to install the balls before attaching the pitch arm to the blade grip.

Attach the pitch arm to the blade grip using 2 ea 3X6 SHCS and loctite. Make sure the pitch arm is square and straight to the blade grip. The milled area of the pitch arm will help maintain this relationship. Repeat for opposite blade grip.

Your completed head should look like this.

BERGEN
R/C Helicopters

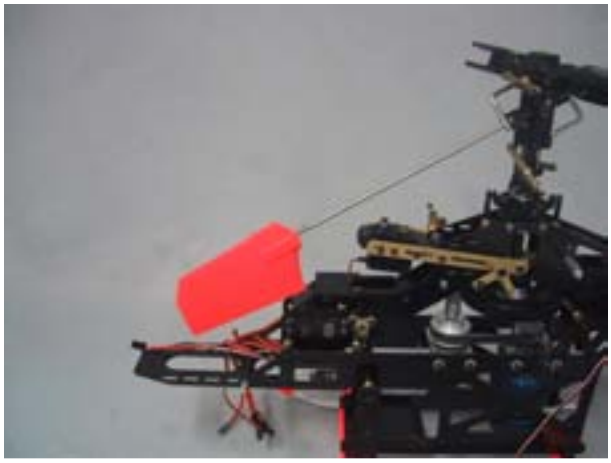


Place the rotorhead onto the mainshaft, locating it with the 3X20 SHCS as a "jesus" bolt. Do NOT tighten this bolt just yet… tighten the 2 ea 3X16 SHCS pinch bolts, alternating sides, tightening a bit at a time. These bolts are what actually hold the head to the mainshaft, the "jesus" bolt is strictly for location. Now go back and tighten the "jesus" bolt.

Insert the flybar from bag 10B through the seesaw bearings, then install a "special" washer as a spacer before installing the flybar arms, one on each side of course.

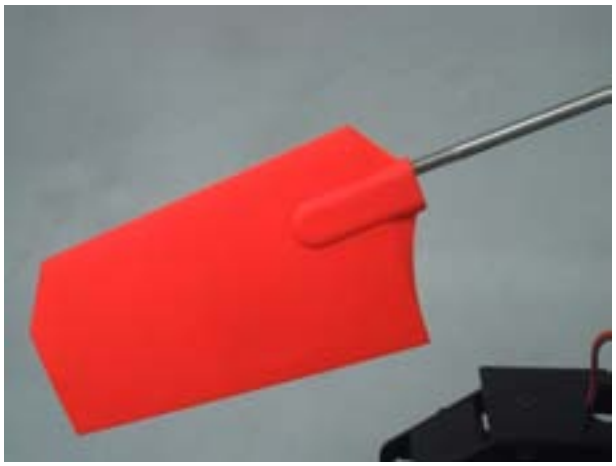
BERGEN
R/C Helicopters

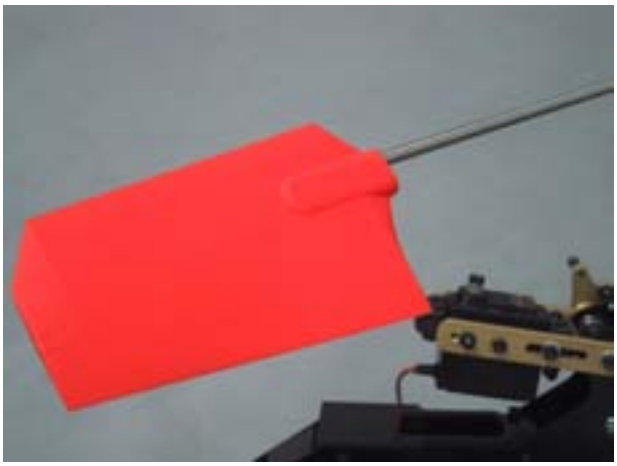
Roughly center the flybar in the seesaw and lightly tighten the flybar arms with 3X4 setscrews, while leveling the flybar arms to each other by sighting across the head.



Measure both sides of the flybar, ensuring they are EXACTLY the same, moving it in and out as necessary. We do NOT put flats on the fly bar to prevent a stress riser, meaning this would typically be where the flybar would BREAK in flight…When you are happy with the measurement AND the flybar arms are level to each other, then go back and loctite the setscrews, one at a time, holding the flybar arms in place.

BERGEN
R/C Helicopters





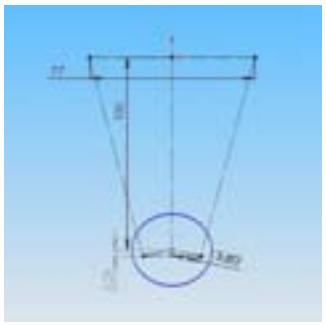
Install the flybar paddles, using the front hole, and count 19-21 turns onto the flybar. This will ensure proper thread length into the paddle.

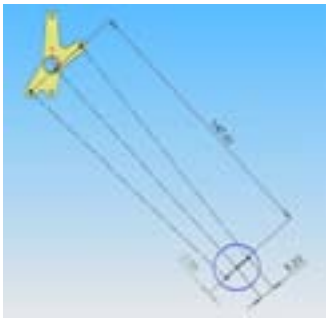
Measure the distance between the flybar arm and the paddles, making sure both sides are identical. Also ensure that the paddles are level to the flybar arms AND to each other by sighting across the head.

BERGEN
R/C Helicopters

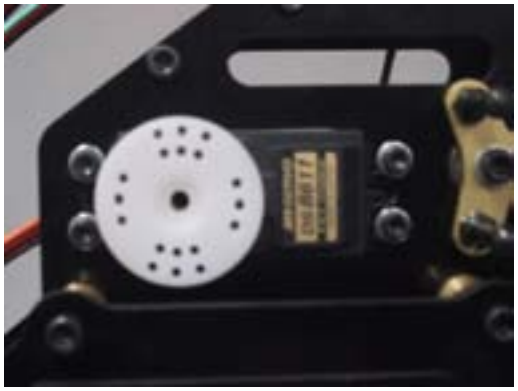
Setting up your helicopter begins in your RADIO. With our Pure Mechanical, single servo system, we use NO mixes. So to begin, set your radio to an S-1, H-1, or single servo swashplate function. Make sure all subtrims are at 0, all mixes are turned OFF. ATV's or travel adjusts should be set as follows;

Pitch 100%
Aileron 100%
Elevator 100%
Rudder 80% for now
Throttle 100%



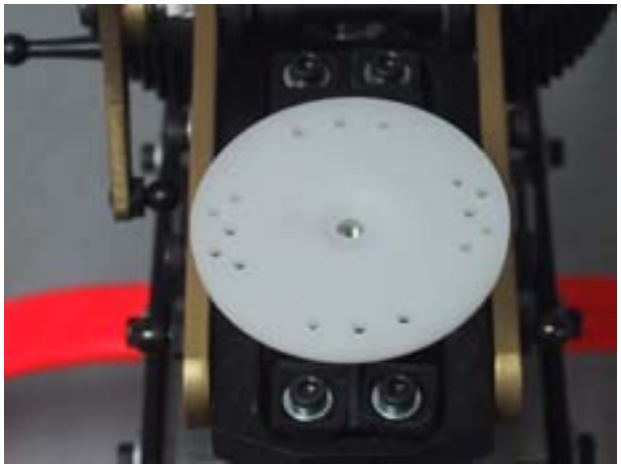


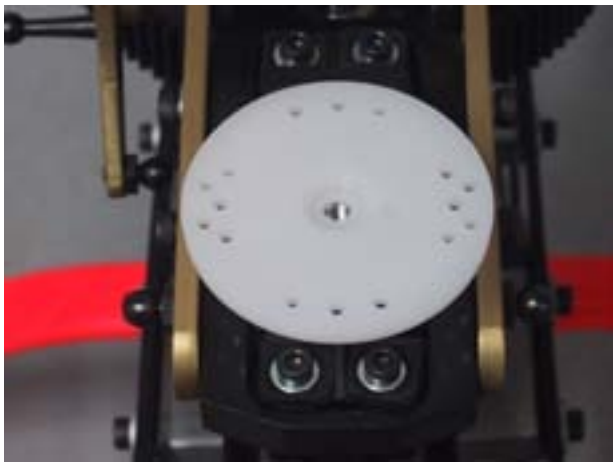
For Futaba servo users, use these servo wheel hole dimensions for the control balls. Drill holes in the servo wheels using a #50 drill bit. For the collective servo use the triple bellcrank as a template for the holes. JR servos users, the existing holes in the wheels are close enough for our purposes.



Make sure your pitch curve in the radio is set for a 0,50,100 curve, meaning a straight line from 0 at the bottom to 100 at the top. With the radio and helicopter on, set your throttle/pitch stick at **EXACTLY** half. Place a small servo wheel onto the collective servo, positioning it so that the "6 pack" of holes is at top and bottom. What we're looking for is that the holes are exactly straight up and down. If not, then rotate the wheel 180 degrees, and try again. If it's still not perfect, try another wheel. JR makes different numbered wheels (the number is on the back and very faint), 1, 2, 3, 4, and "M".

BERGEN
R/C Helicopters

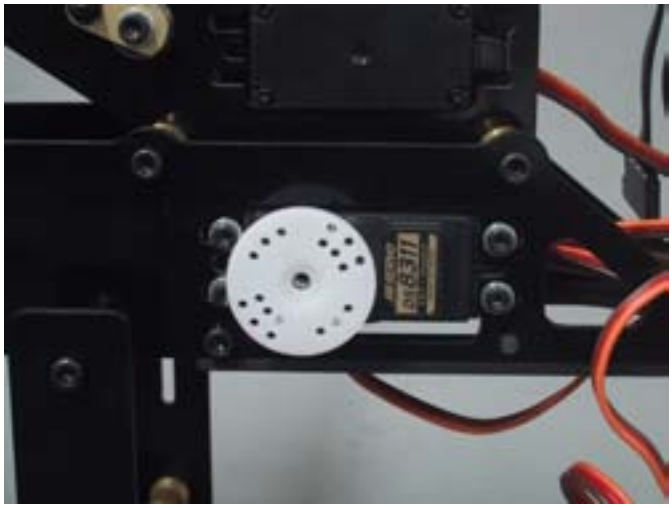


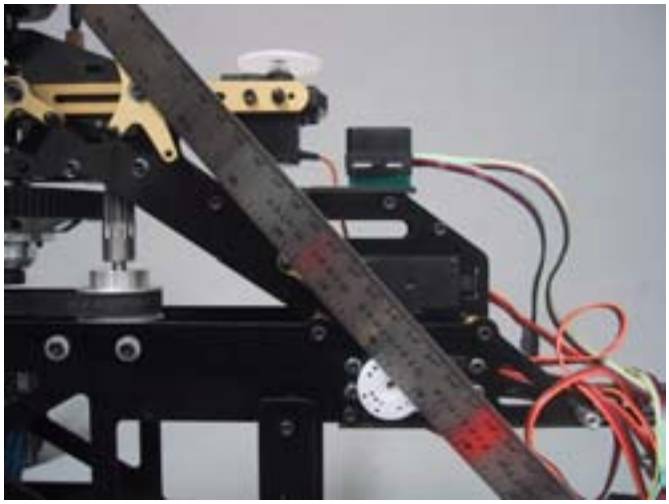


Use a Large wheel on the aileron servo, again centering it **EXACTLY**. The first pic shows it slightly off, the second pic has the wheel rotated 180 degrees and perfectly centered.

Here you can see the numbers (Blackened with a sharpie).

BERGEN
R/C Helicopters



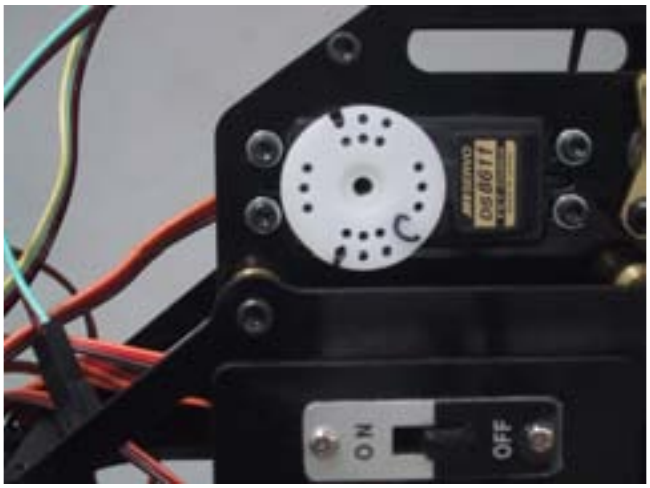


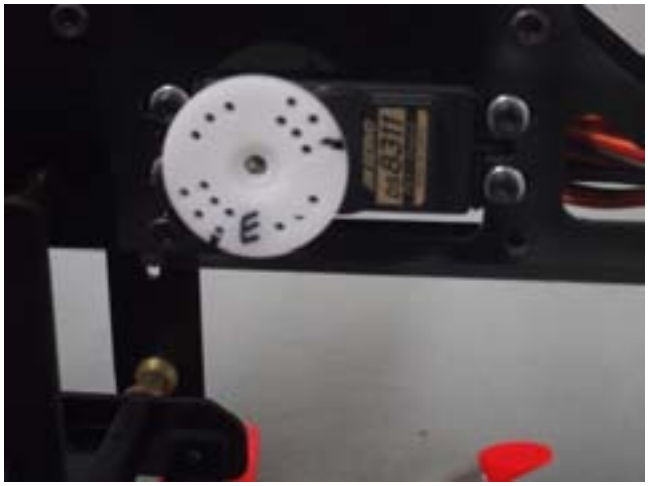
The elevator servo wheel is set up slightly different in that you want to center it from the "X" arm using a straight edge. Using a small wheel, see how the straightedge passes through the center of the "3 pack", the servo screw hole AND the center of the "X" arm bolt.

Do the same with the tail servo wheel, rotating it until one set of holes is exactly straight up and down.

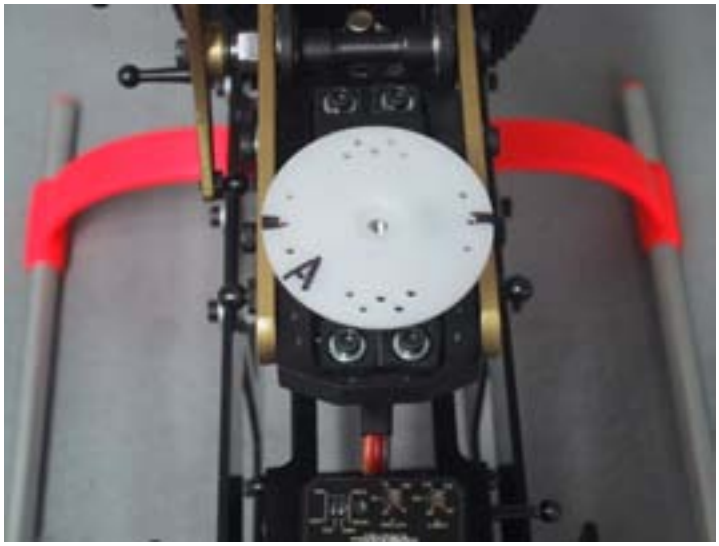
We HIGHLY recommend the use of the plastic servo WHEELS vs. metal wheels or the plastic stars or crosses. The plastic wheels are strong enough with our push pull system, but will break in the event of a crash, saving the GEARS in your servo. A metal wheel will cause you to replace gears when you crash...☺

BERGEN
R/C Helicopters





The black tic marks on the servo wheels show which holes we suggest using for proper setup in a true push pull system. Notice that they are OFFSET slightly from straight vertical, or in the case of the elevator, the angle from the "X" arm.



On the aileron servo large wheel we ARE going straight across....

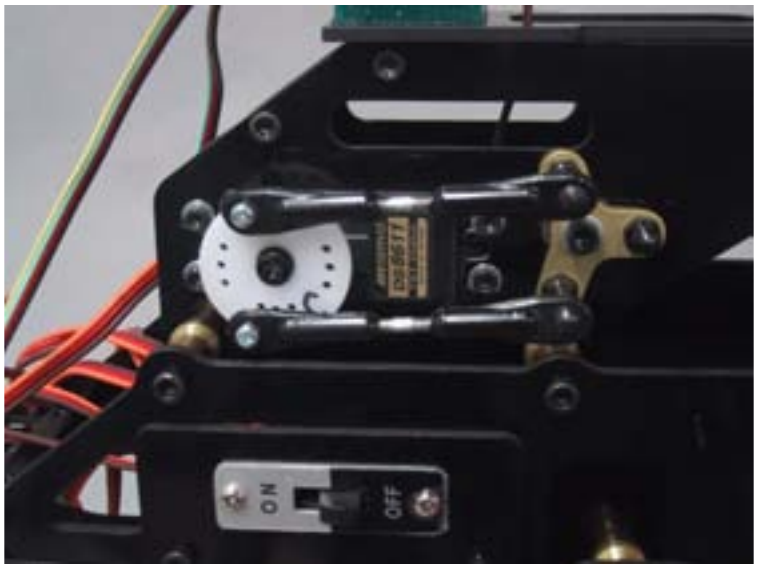
BERGEN
R/C Helicopters



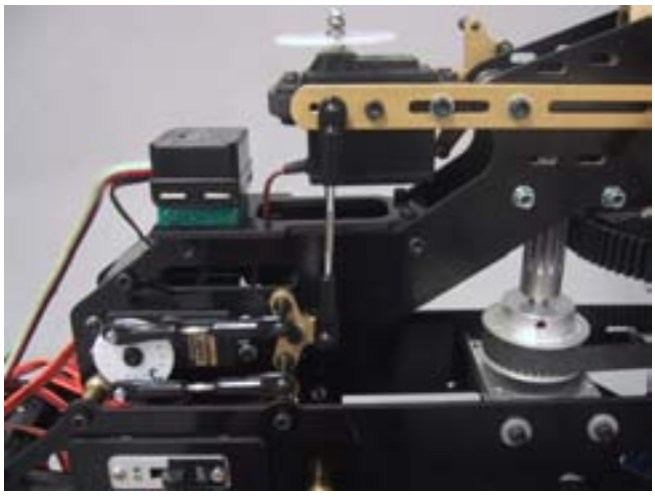
From bag 9, make up 7 ea control ball assy's using a 2X10 PHS, ball with hole, and 2mm nut. Install these control balls into each servo wheel at the marked holes and secure with another 2mm nut on the opposite side, with loctite.

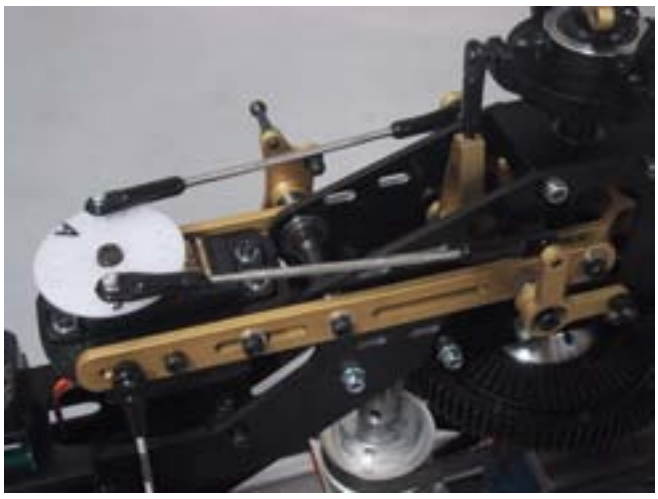
Next up are all the pushrods for the control system. Yes there are quite a few of them but with a few simple rules, it's NOT that complicated. The plastic links are what are normally referred to as "Rocket City" links, considered by many to be the best in the industry, for their durability and for the fact that you can do half turn adjustments to fine tune your controls and tracking.

BERGEN
R/C Helicopters



Start off with the collective servo to triple bellcrank using the 30mm rods, making the linkages 51mm from center to center or 58mm from end to end. These dimensions are appx; you may need one turn either way to get the setup perfect, with the idea that both links are IDENTICAL in length. Note that the Servo wheel balls AND the balls on the triple bellcrank are both straight up and down.

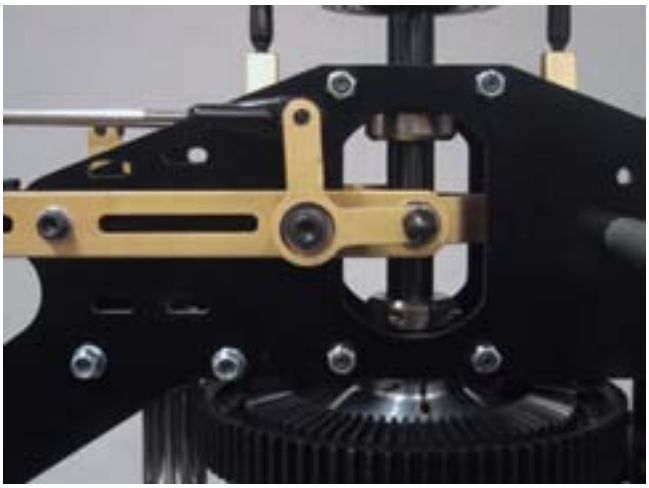


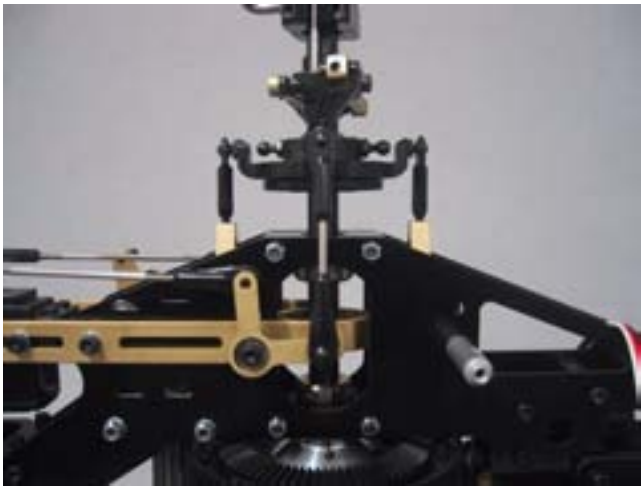


The linkage from the triple AND single bellcrank on the opposite side to the popsicle sticks use the 40mm rod and are 70mm long center to center or 77mm end to end. Make sure the Popsicle sticks are exactly horizontal with power on and collective at exactly half.

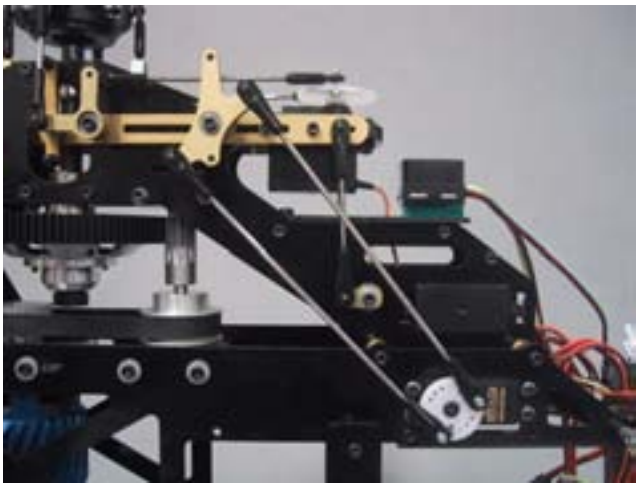
The aileron servo to aileron bellcrank rods uses the 85mm rod and is 101mm center to center or 108mm end to end.

BERGEN
R/C Helicopters





Make slight adjustments to the length of the rod so that the ball on the outside of the aileron bellcrank lines up EXACTLY over the bolt going to the elevator yoke axle. This is done with power ON to ensure the servo is centered...
Then use the 40mm long rod to make the linkage from the aileron bellcrank to the swashplate 57mm long center to center or 64mm long end to end.



Elevator servo to "X" arm linkage is made from the 130mm long rod and is 148mm long center to center or 155mm long end to end. Note the orientation of the "X" arm with the LONG leg straight up. With power on, adjust the rods as needed to get this leg to point straight up.

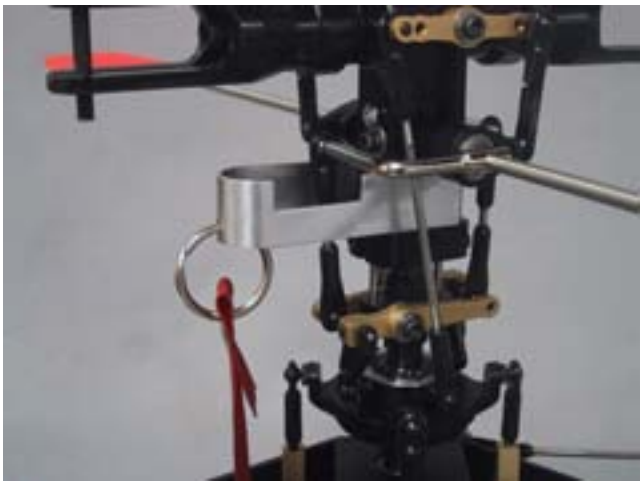
BERGEN
R/C Helicopters

From the "X" arm to the elevator arm use rods 50mm long, making them 70mm center to center or 77mm end to end. This arm should also be exactly straight up and down.
From the washout arms to the Flybar arms, use the rods 30mm long, making them 47mm center to center or 54mm end to end. The washout arms should exactly horizontal.

From the swashplate to the bell/hiller mixer use 75mm long rods, making them 97mm center to center or 104mm end to end. For the linkages from the seesaw to the bell mixer, you need to break out your x-acto knife and cut 4 ball links to make them 18mm long.

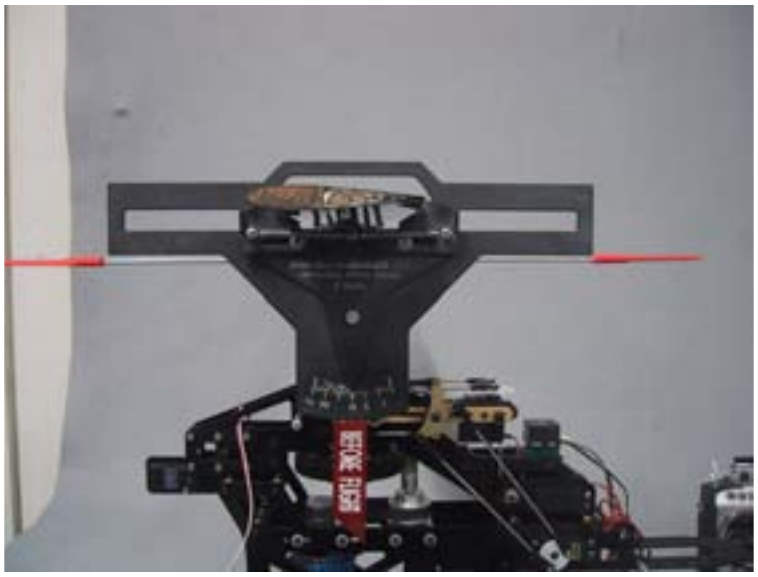
BERGEN
R/C Helicopters

Thread these links onto 2 ea 3 X12 SS, making them 30mm center to center or 37mm end to end, with a half twist and install them. With both of the rods attached to the bell/hiller mixer, they should also be exactly level.

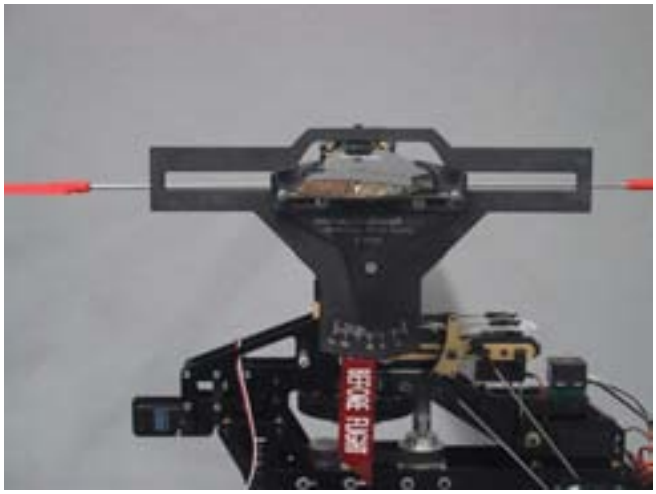


For Pitch setup purposes we offer a flybar lock w/flag to lock the flybar level to the rotor head.

BERGEN
R/C Helicopters



Which is used in conjunction with a pitch gauge, such as this one available from Miniature Aircraft USA.



With the collective stick at half, verify that the pitch on the blades is at 0 degrees. If not, go back and find which bellcrank is NOT exactly level, horizontal, or vertical. You should also be able to achieve +- 12 degrees of pitch at top and bottom stick. This may require increasing the pitch ATV or travel adjust in the radio.

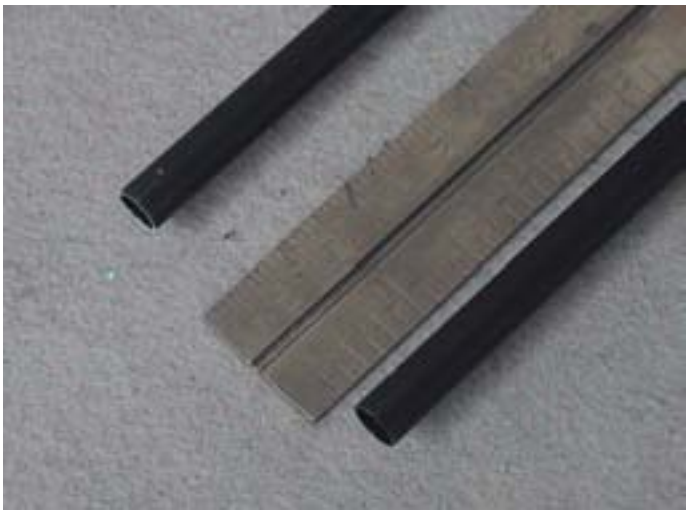
BERGEN
R/C Helicopters

Extended Boom Tail instructions

Building the EB tail starts with the dogbone, pin, and a 3X4 Setscrew.

With the pin in place, use loctite, and secure the pin with the setscrew coming in through the rear of the dogbone.

BERGEN
R/C Helicopters



From the 2 arrow shafts, cut 1" off of one end. The manufactured end of the arrow shaft may NOT be of the proper inner diameter and needs to be cut off. From that end, cut one shaft at 16 ¼", the other at 17". Cut the ends as square as possible then clean up any burrs or rough edges.
The complete TT system includes the gearbox, 4 ea collars, a bearing carrier with coupler shaft, and the dogbone.

Assemble the complete system with the shorter shaft to the front, and a collar at each joint, secured with ONE setscrew. Slide the dogbone INTO the arrow shaft, with the collar around the outside.

BERGEN
R/C Helicopters

Join the 2 arrow shafts at the bearing carrier with the coupler shaft inside the arrow shafts and collars around the outside, same thing at the gearbox, the input shaft goes inside the arrow shaft, the collar around it.
In all cases, seat the arrow shaft all the way to the shoulder of the inner shaft and secure with ONE 3X3 setscrew for the time being.

At each collar, pick one setscrew hole and drill, using a #46 drill bit, through the arrow shaft INTO the shaft inside, creating a divot. Disassemble the joint and inspect your divot, ensuring it's deep enough for a setscrew to seat down into it.

BERGEN
R/C Helicopters

Install a 3X3 setscrew with loctite into the hole with the divot, securing the joint.
Loctite and install a setscrew into the other 2 holes in the same collar.
Repeat the process for the other 3 joints, drilling a divot, inspecting the divot, installing a setscrew IN the divot, followed by the other 2 setscrews.
This system effectively pins the TT together as a unit, preventing slippage, as long as your divot is sufficient to seat the setscrew into it.

Grease the o'rings on the bearing carrier to aid in installation and removal if necessary, of the TT drive system in the tail boom.
Insert the system from the rear of the boom, the end with the 2 holes drilled into it.

BERGEN
R/C Helicopters

Clean any excess grease from the end of the boom and slide it all the way in until the gearbox seats into the boom.

Line up the holes in the boom with the holes in the gearbox. If they're not lined up, try rotating the gearbox 180 degrees and try again.
With the 2 ea 3X4 SHCS you removed earlier (you DID remove them earlier, didn't you? ☺) loctite them back in to the gearbox, getting both bolts started first, THEN tightening them both up. These bolts do NOT require excess torque, just tighten them up. If you apply excess torque, you CAN strip the threads out of the gearbox. If you find this happening, we can Helicoil the threads, fixing them and making them stronger.

BERGEN
R/C Helicopters

With the EB boom, it's easier to install the tail fins now, using the horizontal fin clamp and 2 ea sets of boom clamps.
With 4 ea 3X30 SHCS through the fin, place a boom clamp half over the bolts.

Place the boom into the clamps, tail output shaft AWAY from the fin, slide the other half of the clamps onto the bolts and secure with 4 ea 3m locknuts. These nuts again do NOT require a lot of torque, not is it necessary to close the gap between the boom clamps. All that will do is stress the clamps, breaking them in the future. Only tighten them down enough to prevent the fin from rotating on the boom.

BERGEN
R/C Helicopters

The horizontal fin is attached to it's clamp with 2 ea 3X8 SHCS. A drop of CA (superglue), will help keep these bolts secure.

Slide the horizontal fin and clamp onto the boom, back towards the vertical fin. It will get secured later with the boom supports attached to the Horizontal fin clamp.

BERGEN
R/C Helicopters

Standard Tail Instructions

Building the Standard tail system will require a couple of additional tools, a 12" ruler and a wooden dowel 3/8" dia and 33" long. Windex is needed to install the Torque Tube bearing carriers. We use it as it makes a good lubricant THEN totally evaporates, locking the bearing carriers into place in the boom. Mark your wooden dowel at 10", this is for the fwd bearing carrier.

Mark it again 12" farther back or a total of 22". This is for the rear bearing carrier. We're going to install the bearing carriers from the FRONT end of the boom, the end WITHOUT holes. Also install the bearing carriers with the delrin insert towards the front.

BERGEN
R/C Helicopters

Spray a little bit of Windex onto the o-rings, and press the bearing carrier into the boom.

Use the dowel to push the bearing carrier all the way into the boom to the rear or 22" mark. Lubricate the fwd bearing carrier with Windex and install it into the boom as well.
It is HIGHLY suggested to either let the Windex dry or use a rag to clean out the excess BEFORE installing the second carrier. Leaving the excess Windex in between the carriers can cause the bearings to rust…☹

BERGEN
R/C Helicopters

Push this bearing carrier in up to the 10” or front mark. While working on the next step, the Windex will evaporate, allowing the rubber o-rings to secure the bearing carriers in place in the Boom. If you ever need to remove the bearing carriers, squirt more Windex into the boom and push them out with the wooden dowel.

Cut 1” off of one end of the arrow shaft. This is important to get rid of the end of the arrow shaft that is NOT formed to the correct size. Now measure and cut the arrow shaft at 31”

BERGEN
R/C Helicopters

Assemble the dogbone by inserting the pin, centering it, and securing it with a 3X4 SS and loctite, installed from inside the dogbone.

Insert the dogbone into one end of the arrow shaft, and slide one collar over both pieces. Install a 3X3 SS in one hole.

BERGEN
R/C Helicopters

Using a #46 drill bit, in one of the other 2 holes, drill THROUGH the arrow shaft and INTO the dogbone, leaving a divot. Disassemble the joint and inspect your divot. You want it deep enough that the setscrew will sit into it when assembled.

Reassemble and install a 3X3 setscrew with loctite in the hole with the divot, seating the setscrew in the divot. Loctite and install the other 2 setscrews into the remaining holes.

BERGEN
R/C Helicopters

Insert the TT in from the front end of the boom and through the bearing carriers. Push the TT all the way through until the rear off the TT sticks out the back of the boom.

Slide the remaining Collar over the TT, the insert the input shaft of the tail gearbox in the TT. Again secure it with a 3X3 setscrew.

BERGEN
R/C Helicopters

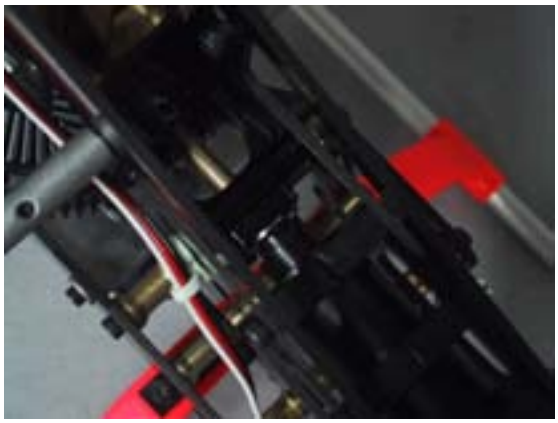
Again using the open hole in the collar, drill through the TT and into the input shaft with the #46 drill bit, creating a divot. Again disassemble and inspect the divot to ensure it's deep enough for the setscrew to set into it.

Reassemble the parts, and loctite a 3X3 setscrew into the hole with the divot, then the remaining 2 setscrews. Remove the 2 ea 3X4 SHCS from the gearbox then slide it into the tail boom, lining up the holes for the Bolts. If they don't quite line up, rotate the gearbox 180 degrees and try again.

BERGEN
R/C Helicopters

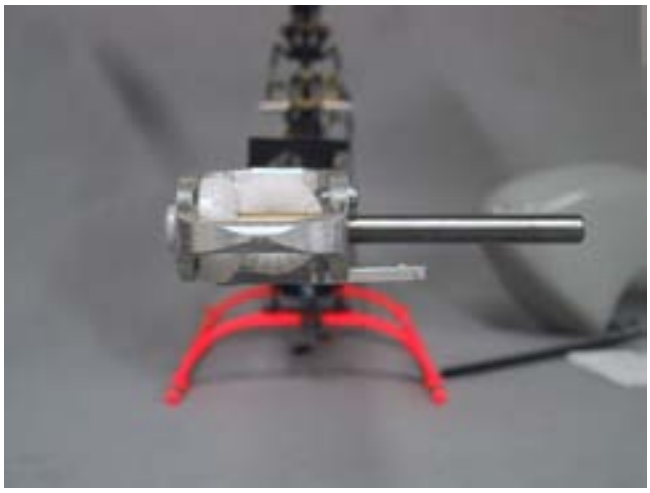
Loctite and start BOTH 3X4 SHCS into the gearbox, then tighten both of them. These bolts do NOT require gorilla torque; all that will accomplish is pulling the threads out. If that happens, we can helicoil the gearbox.
Slide the horizontal fin clamp onto the boom.

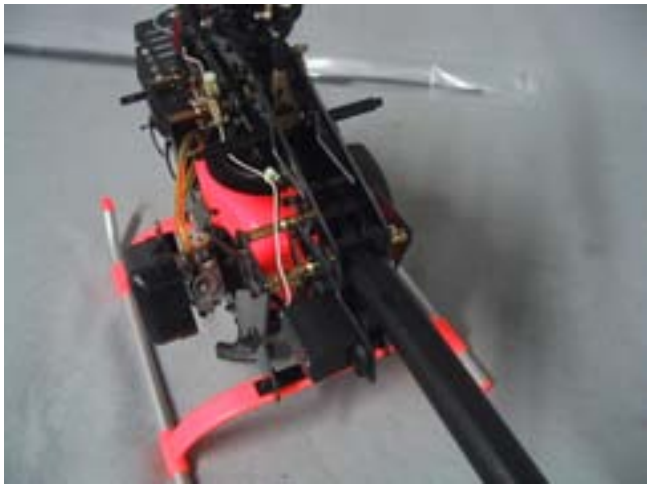
These instructions apply to BOTH Standard and EB Versions.



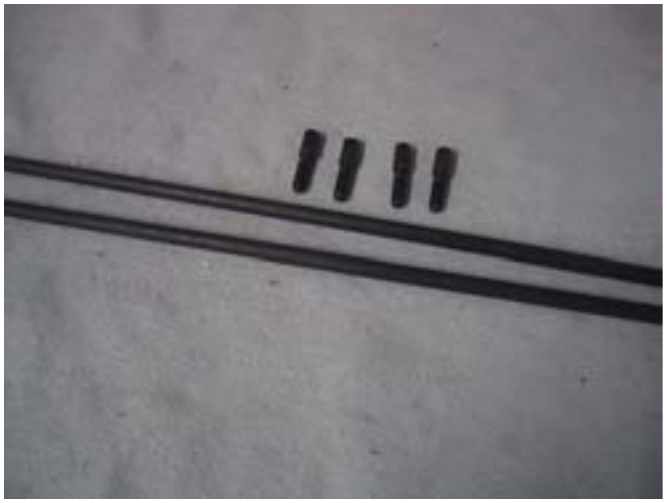
Insert the tail boom into the boom clamps at the rear of the heli; pushing it ALL the way in, ensuring the dogbone has engaged the delrin coupler. The end of the boom should go past the most forward boom clamp. Now pull the boom BACK out by 1mm. This is important to remove any rearward pressure on the TT drive system.

BERGEN
R/C Helicopters





Level the gearbox by rotating the complete tail boom assy and tighten the 6 nuts and bolts going through the boom clamps. It is NOT necessary to close the gap on the clamps, nor is it necessary to put tape, sandpaper, or screws into the boom to hold it in place.



Assemble the boom supports, noting that the plastic ends are threaded into the aluminum supports.

BERGEN
R/C Helicopters

Use JB weld to glue the ends into the boom supports. Ensure that the ends are parallel to each other. Secure one end to the bottom rear of the lower frames with 2ea 3X12 SHCS, 3m washers, and 3m Locknuts.

Secure the rear of the boom supports with a 3X35 SHCS, 2 ea 3m washers, and a 3m locknut, but don't tighten the bolt just yet. Install the horizontal fin (if not already installed) onto the clamp with 2 ea 3X8 SHCS. Use CA (superglue) as a loctite on these 2 bolts.

BERGEN
R/C Helicopters

Level the horizontal fin, then tighten the bolt securing the clamp and boom supports. Gather up the vertical fin components (if not already installed), 4 ea 3X30 SHCS, 4 ea 3m locknuts, and 2 sets of boom clamps.

Note the orientation of the fin, place the 4 bolts in the 4 holes and slide 2 of the boom clamps onto the bolts. Place the fin and clamps onto the boom and slide the remaining 2 clamps onto the bolts.

BERGEN
R/C Helicopters

Make sure the vertical fin is exactly vertical and tighten the 4 ea 3m locknuts onto the bolts. Again, it is NOT necessary to close the gap between the clamps, only to tighten them.

Assemble the tail pitch bellcrank by installing 2 ea 3X7X3 flanged bearings with a spacer in between the bearings.

BERGEN
R/C Helicopters

The bearings should sit down in the bellcrank with only the flange above the surface. It may be necessary to sand the spacer down slightly to achieve this. Install the special bolt, a 3X12 w 6mm shoulder then place 2 ea brass washers on the bolt.

Install a medium ball on to the bellcrank. For most gyro applications, the inner hole gives the proper travel amount. Install the bellcrank onto the tail gearbox, threading the bolt into the bellcrank arm.

BERGEN
R/C Helicopters

Set the tension on the bearings by tightening the bolt, then locking it in place with a 3m locknut. The bellcrank should spin freely with no notchyness and no slop.

The tail pitch slider is a preassembled unit; slide it onto the output shaft, making sure to insert the ball into the delrin cup. Operate the mechanism by moving the bellcrank by hand making sure the operation is smooth and free.
Note that there is no "star washer" or any retainer needed on this unit. The pitch plate is threaded onto a SS tube with a left hand thread and loctite.

BERGEN
R/C Helicopters

The shaft may have a coating on it from the precision grinding process, and can be cleaned off with Formula 409. A drop of oil on the shaft will also help. Check the fit of the ball into the delrin cup and ream as necessary. Proper operation here will greatly affect how well your tail rotor/gyro/servo system works.

The tail rotor hub is borrowed from our Industrial birds, capable of swinging 130mm tail blades with NO problem. Note the divot on the tail output shaft.

BERGEN
R/C Helicopters

Install the tail hub onto the tail output shaft with ONE, and only ONE, 3X4 setscrew and loctite. The tip of the setscrew MUST sit into the divot on the output shaft. Using only one setscrew IS more secure than 2 setscrews 180 degrees apart in this application.

The aluminum tail blade grips already have the radial bearings installed, so begin by inserting the 4X4 stainless shoulder bolt in the eyelet. A drop of oil in this joint is also a good idea, for lubrication AND to prevent getting loctite in the joint in the next step.

BERGEN
R/C Helicopters

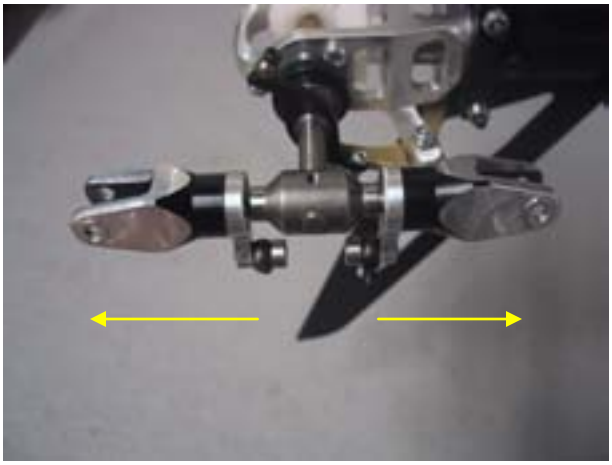
Place a small drop of loctite on the threads of the shoulder bolt and screw into the horn on the tail blade grip, being VERY careful NOT to get loctite into the joint. This will make the joint stiff and your tail rotor system will NOT function properly, causing servos to overheat, tail wags, sticking, etc.

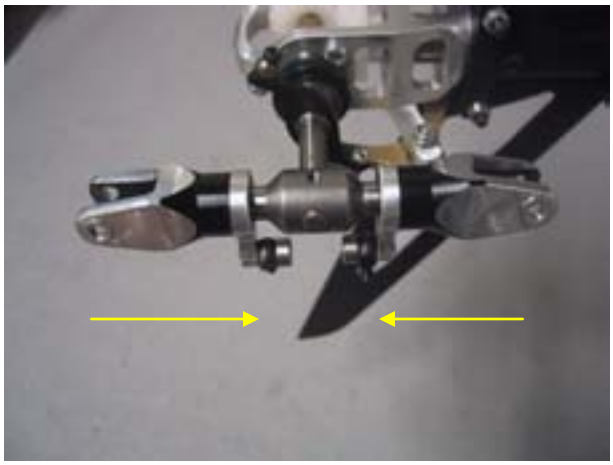
The tail blade grips and associated hardware must be installed in the proper order for proper operation, note the 10mm OD spacer installed BEFORE the thrust bearings. Also be sure to grease the ball cage of the thrust bearings.

One of the thrust bearing washers has a smaller inner diameter than the other, you can identify it by placing them onto the tail rotor hub, noting which one is tighter on the shaft.

BERGEN
R/C Helicopters

Slide a tail blade grip onto the tail rotor hub, then install the 10mm spacer, the larger ID thrust bearing washer, the greased ball cage, then the small inner diameter thrust bearing washer. Secure the assy with a 3X6 SHCS and a 3m washer, with loctite. Do not over torque this bolt, it is not necessary. Repeat for opposite blade grip.





You will notice about 1mm of in and out play, this is normal and necessary, do NOT add shims to remove it.

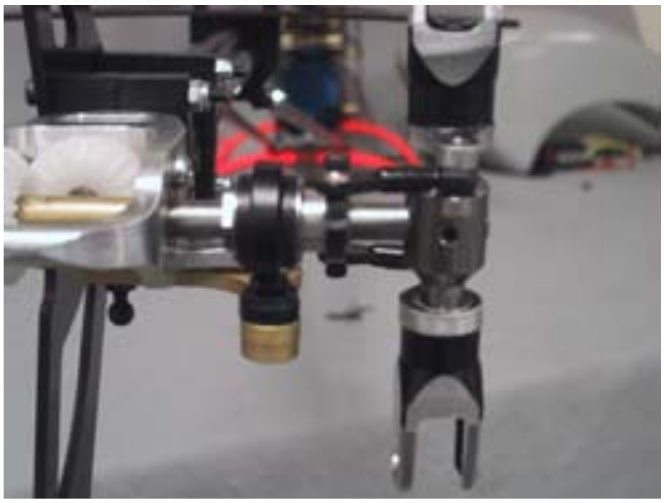
BERGEN
R/C Helicopters

Locate the "special" tail ball links. These do require a slight modification in trimming off the ribs off of each side and cutting them down to 17mm long for the Standard Gasser Magnum gearbox, or 15mm for the EB HD gearbox.

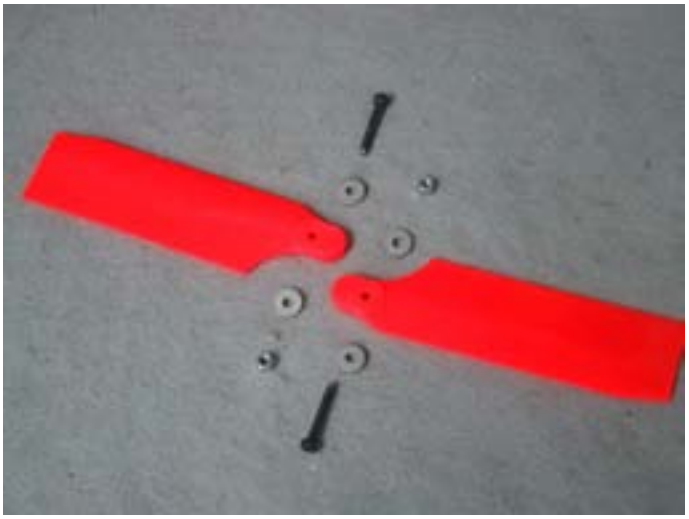
Thread the links all the way onto the eyelets, then snap the ends onto the balls installed on the pitch slider.

BERGEN

R/C Helicopters

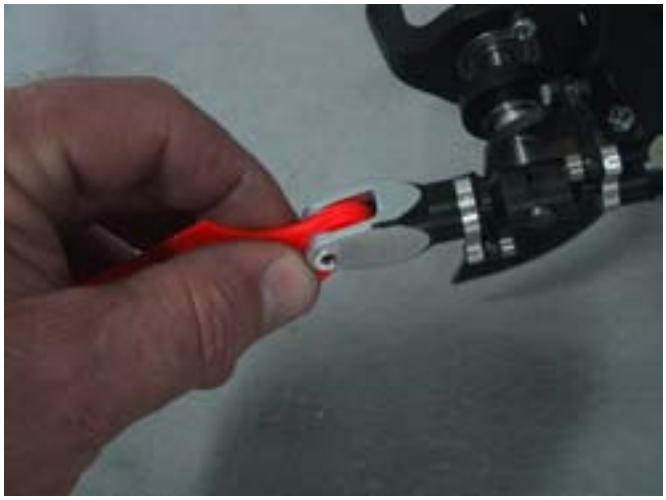


Note the direction of the blade grips in the pics. We use a "leading edge control" on our grips.



The tail blades included in your kit are from KB Dream Designs and may vary slightly in design and color from the picture. The tail blades are installed with a 1mm washer on both sides.

BERGEN
R/C Helicopters



It may be a tight fit, that's OK! Install tail blade grip bolt and secure with a 3m locknut. Only tighten enough to barely hold the blades in place. Not the direction of the tail blades leading edge.

The tail pushrod is made from a carbon fiber rod. Assemble the aluminum ends with a 3X18 SHCS, 3m locknut and ball links. Install the bolt from INSIDE the end, securing with a nut.

BERGEN
R/C Helicopters

Tighten the nut sufficiently to prevent the bolt from turning and thread the ball link onto the stud, about half way down.

Assemble the other end the same way, then glue ONE end on to the carbon fiber rod using JB weld.

BERGEN
R/C Helicopters

Snap this end onto the tail servo wheel ball; making sure the ball is pointed straight down with power on. Snap the loose push rod end onto the medium ball on the tail pitch bellcrank. Mark the point on the carbon fiber rod where it needs cutting so it fits into the push rod end assy. When measuring for this, make sure the tail pitch bell crank is at 90 degrees and the tail pitch slider is centered on the output shaft. Glue the second end onto the cut carbon fiber rod with JB Weld, and let dry overnight.

Adjust the length of the pushrod ONLY to center the pitch slider on the output shaft, between the gearbox and the tail rotor hub. Adjust the two plastic links so the arm on the tail blade grip is straight out, centered on the setscrew hole in the hub.

BERGEN
R/C Helicopters

Use a piece of ½" Velcro, wrap it around the boom, then around the tail pushrod. Only put a small amount of tension on the pushrod with the velcro. This velcro support will help to keep the pushrod from vibrating like a banjo string.

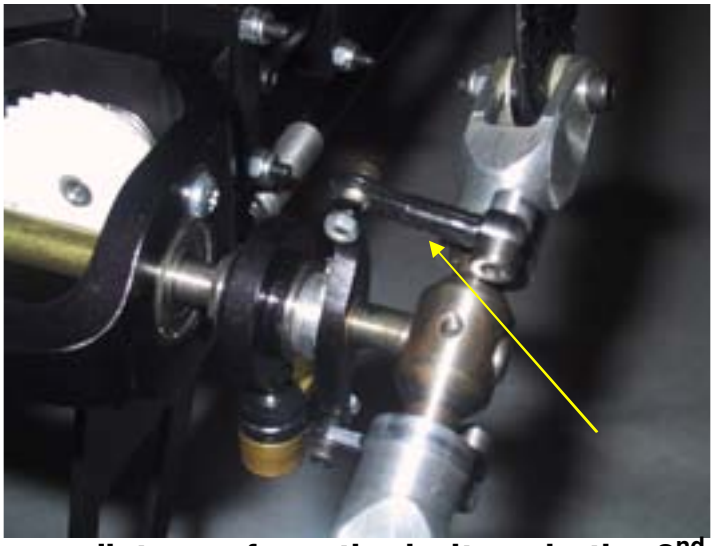
Tuck the velcro strap up under the front of the horizontal fin. This will help keep the pushrod from hitting the boom supports.

BERGEN
R/C Helicopters

1

2

To check the tail blade tracking, fold both tail blades forward in their grips. Angle one of them until it just touches the boom clamp bolt. Now carefully spin the tail blades around until the opposite blade comes near the same bolt.



If they are not the same distance from the bolt, as in the 2nd picture, then adjust the length of the special ball link associated with that blade to bring it to the same adjustment as the first blade. Check it again

BERGEN
R/C Helicopters

Install each main blade with a 4X25 SHCS w/18mm shoulder and 4mm Locknut. Note the leading edge direction. Tighten the blades enough so that if you lay the heli on it's side and shake it, the blade will not move in the grips. This is especially important with the EB using long blades. If the blades are too loose, the heli can start to "dance" back and forth on the landing gear when spooling up or down.