MORLEY HELICOPTERS

BELL UH-1B 'HUEY'

SPECIFICATION.

Rotor diameter	48 ins (1220mm)
Main rotor rpm	approx 1200-1300
Engine	.40 - .45 cu ins (6.5 - 7cc). Ballraced crankshaft
Radio	any four or more function proportional system with five servos. Functions fore and aft cyclic, roll cyclic, main rotor collective/engine throttle, tail rotor
Fuel capacity	8 floz (250cc) in tank supplied
Flying weight	8.5lb (3.85kg) approx

Dear customer

Thank you for choosing 'Morley'. We hope you enjoy building a successful model.

A helicopter is a most fascinating machine and exciting to fly, but it does need care and persistence to become competent and enjoy the model's full performance.

The Morley Bell UH-1 'Huey' is a practical scale model suitable for experienced and novice builders alike. The model can be made semi-scale by painting on the windows and omitting a scale cockpit or can be made super scale with windows, cockpit and added surface detail.

However you aim to build and fly your model, we wish you many happy landings.

Morley Helicopters Ltd

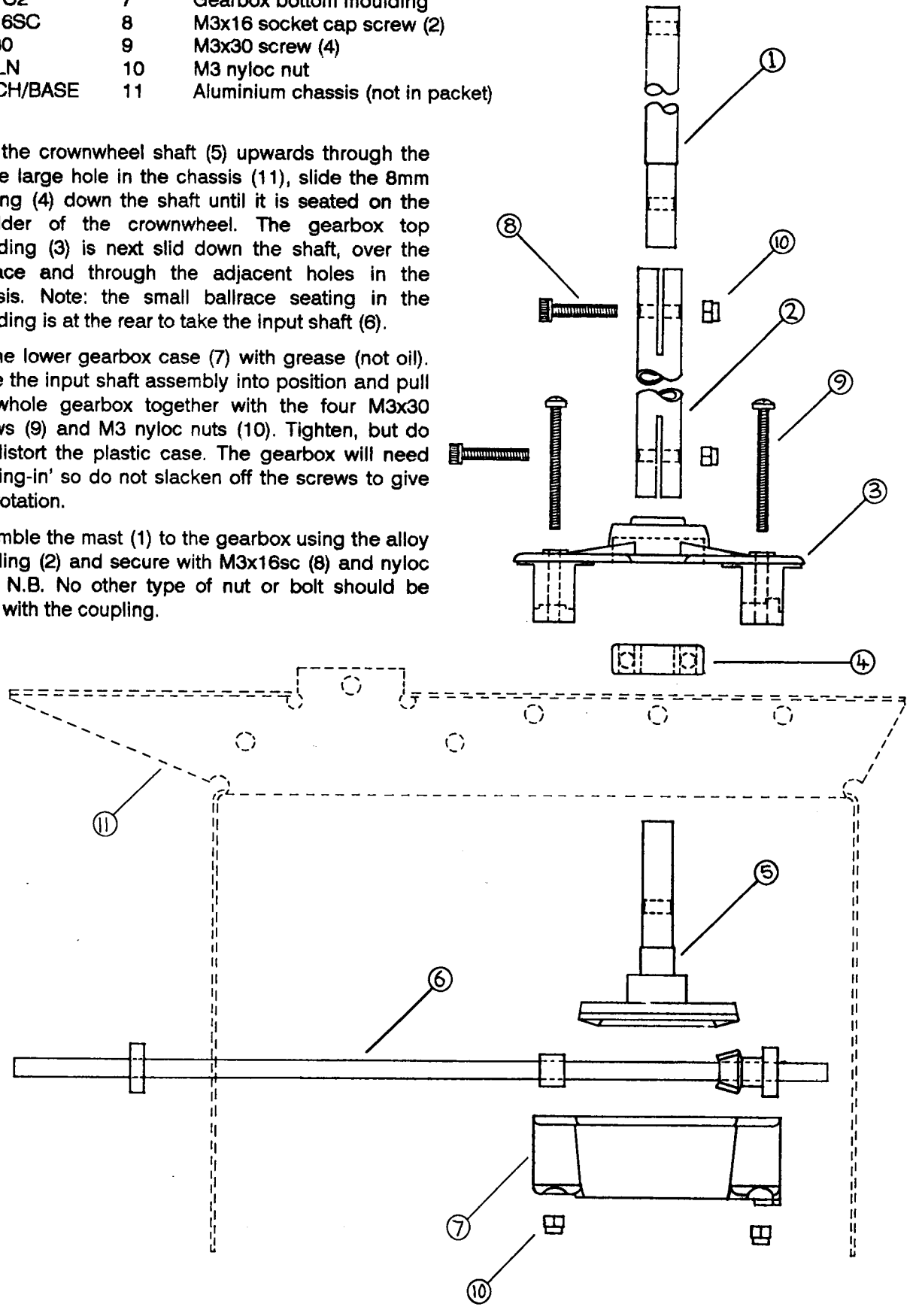
MAIN GEARBOX

STOCK CODE	DIAGRAM KEY	
0MG/MAST	1	Rotor Mast
0MG/CPL	2	Mast Coupling
0MG/C1	3	Gearbox top moulding
0MG/BB	4	8mm ball bearing
0MG/CWS-DC	5	Crownwheel and shaft (deep cut)
0MG/ISA-DC	6	Input shaft assembly (deep cut)
0MG/C2	7	Gearbox bottom moulding
M3x16SC	8	M3x16 socket cap screw (2)
M3x30	9	M3x30 screw (4)
M3NLN	10	M3 nyloc nut
UH1CH/BASE	11	Aluminium chassis (not in packet)

With the crownwheel shaft (5) upwards through the centre large hole in the chassis (11), slide the 8mm bearing (4) down the shaft until it is seated on the shoulder of the crownwheel. The gearbox top moulding (3) is next slid down the shaft, over the ballrace and through the adjacent holes in the chassis. Note: the small ballrace seating in the moulding is at the rear to take the input shaft (6).

Fill the lower gearbox case (7) with grease (not oil). Place the input shaft assembly into position and pull the whole gearbox together with the four M3x30 screws (9) and M3 nyloc nuts (10). Tighten, but do not distort the plastic case. The gearbox will need 'running-in' so do not slacken off the screws to give free rotation.

Assemble the mast (1) to the gearbox using the alloy coupling (2) and secure with M3x16sc (8) and nyloc nuts. N.B. No other type of nut or bolt should be used with the coupling.



ENGINE MOUNT

STOCK CODE	DIAGRAM KEY	
0MR/EM	1	Moulded engine mount (2)
0MR/FAN	2	Cooling fan
0MR/FLY	3	Engine flywheel
0MR/P14T	4	Std drive pulley (14 teeth)
0MR/SP	5	Starter pulley
0MR/FD	6	Fan cooling duct
0MR/FDE	7	Fan cooling duct extension
UH1CH/FR	8	Alloy mast support frame
UH1CH/BM	9	Mast bearing holder
0C0N/DRAG	10	UH 1 Drag link
UH1CH/BRKT	11	UH 1 Chassis feet (4)
UH1CH/SP	12	UH 1 Spacer
ST3	13	Plastite self tapper 8 x 3/8" (7)
M4x10	14	M4 x 10mm screw (7)
M4x8	15	M4 x 8mm screw (6)
M3x10	16	M3 x 10mm screw (3)
M3x8	17	M3 x 8mm screw (2)
M3NLN	18	M3 nyloc nut (5)
M4NLN	19	M4 nyloc nut (11)
ST1	20	Self tappers 2 x 3/8" (1)
0MG/0IL	21	0ilite bearing

Temporarily fit flywheel (3) on engine crankshaft making sure that inner face is seated properly onto the prop driver.

Place the engine between the moulded nylon mounts (1) and line up the rear face of the flywheel near the top edge of the mount leaving a 1mm gap.

Drill mounts using a 3mm drill bit to suit your engine (it may be necessary to cut away one of the vertical stiffeners on the mount). Fix the engine to the mounts using four M3 x 20SC screws and M3 nyloc nuts.

The mounted engine assembly can now be fitted into the chassis using six No8 x 3/8 plastite self tappers. The left engine mount has chassis mounting brackets (11) fixed by the same screws. The right rail requires a spacer (12) fitted between it and the chassis. The two remaining chassis feet are fixed using M4 x 10 screws and M4 nyloc nuts onto the far side of the chassis. Fit the flywheel (3), fan (2) and pulley (4) using a quality locking compound between the surfaces, especially on the prop driver, since an engine backfire on starting will undo this assembly if it is not properly tightened and locked.

Fit the starter pulley (5) over the engine pulley using epoxy or super glue.

Fit the fan duct (6) onto the chassis with two M3 x 8 screws (17) and M3NLN (18) as well as a No 8 x 3/8 self tapper fixed from the opposite side of the chassis. The fan duct extension (7) is fixed in position using a No2 x 3/8 self tapper (20) after drilling a 2mm hole in the chassis. The shroud should be cut down to leave approx 6mm between it and the engine.

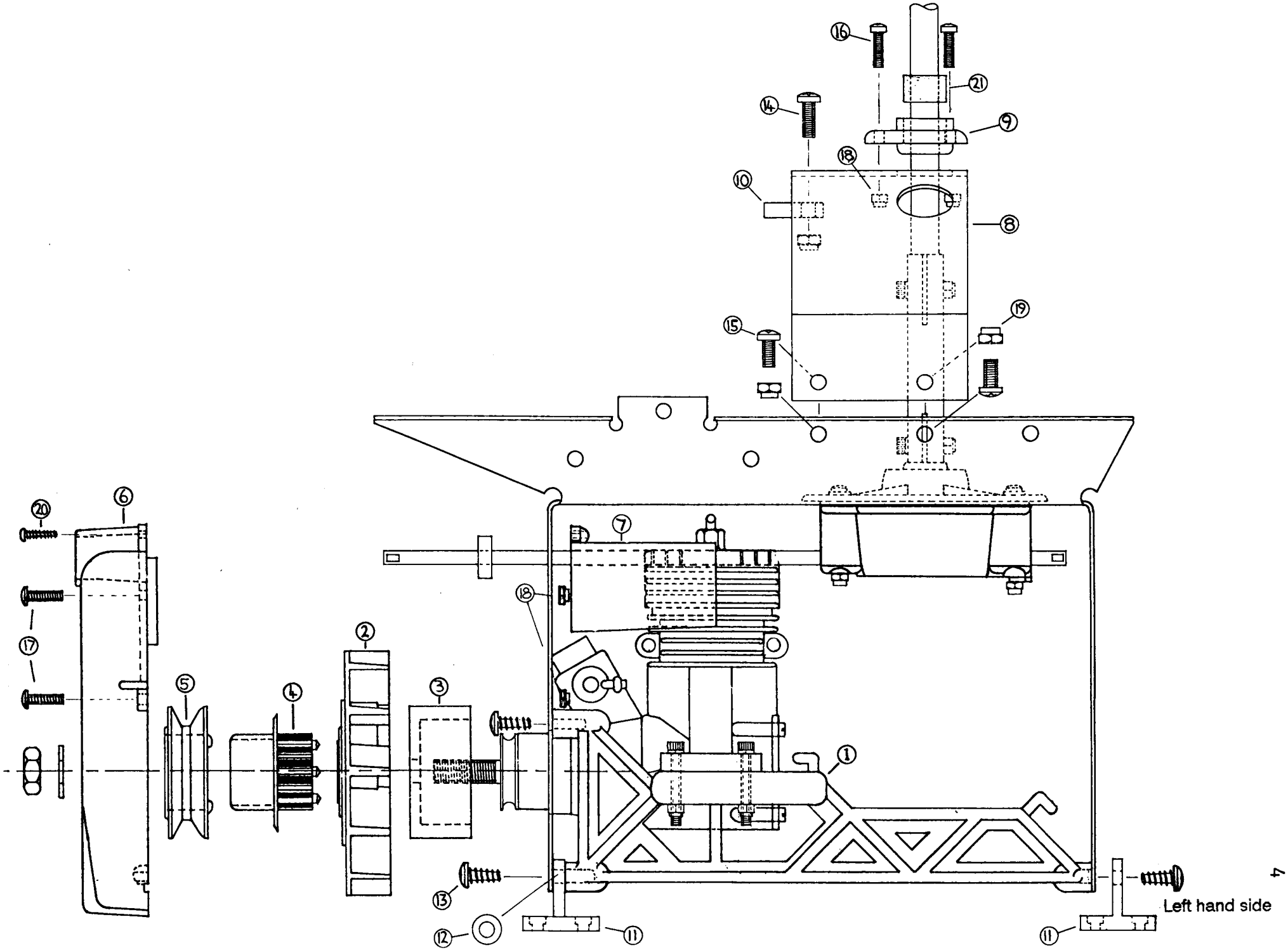
The alloy mast support frame (8) is fixed to the chassis, with the mast passing through the top hole, using M4 x 8 screws (15) and nyloc nuts (19). Note that the front two screws pass from the inside of the chassis with the nuts on the outside, the rear two screws are opposite to this.

Fit the mast bearing holder (9) using M3 x 10 screws (16) and nyloc nuts and using epoxy glue fit the oilite bearing into its holder.

Finally fit the swashplate drag link fork (10) to the front edge of the support frame using an M4 x 10 screw (14) and nyloc nut. The remaining fasteners left in the chassis pack are used for fitting the completed chassis unit into the bodyshell.

N.B. The chassis will have some surplus holes, which can be ignored.

Morley Helicopters can supply a purpose made vertical silencer which directs exhaust fumes down through the floor of the model. Order part No ACC/SILV.


16
21
14
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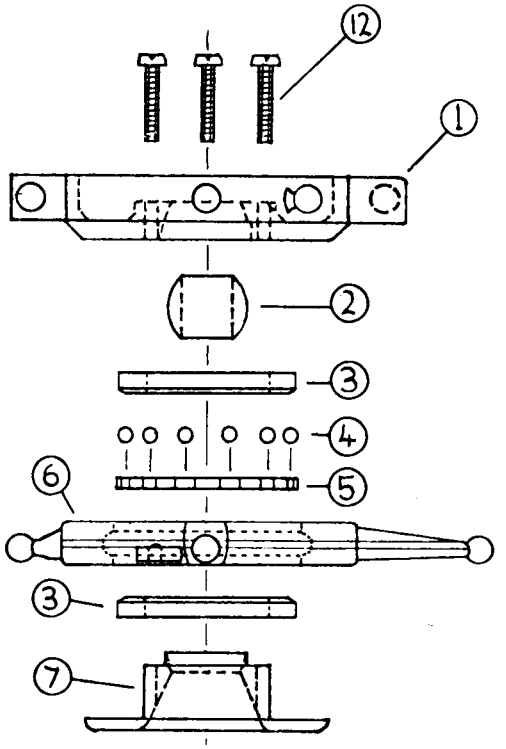
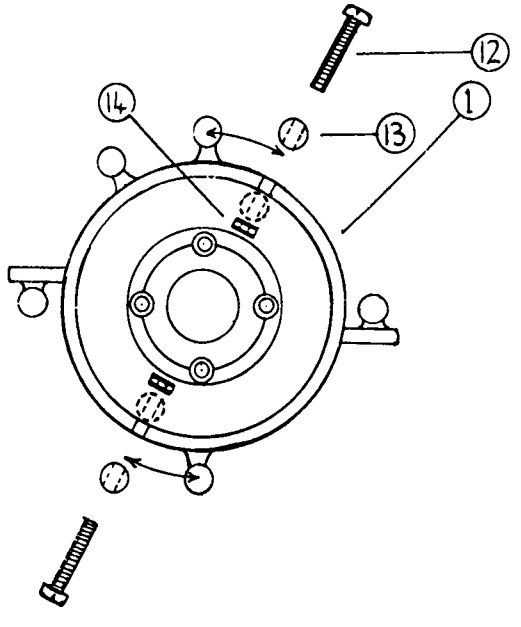
7
18
17
2
5
4
3
1
13
12
11
11
Left hand side

STOCK CODE	Diagram key	
0SP/TOP	1	top moulding
0SP/BALL	2	centre ball
0SP/RING	3	small alloy ring (2)
0SP/BRG	4	bearing balls (12)
0SP/CAGE	5	ball cage
0SP/CENTRE	6	centre plate
0SP/BOTTOM	7	bottom moulding
0SP/DRIVER	8	s/p driver assembly
ACC/BJ	9	ball eye
ST1	10	2 x 3/8 self tap screws (2)
M4X6SS	11	M4 x 6mm set screw
M2X12	12	fixing screws M2 x 12 (6)
ACC/BJ	13	brass ball (2)
M2N	14	M2 nut (2)

Any flash on the mouldings should be removed with a sharp knife.





SWASHPLATE

Drill two 2mm holes in the swashplate top (1) as shown in the diagram, and fit the brass balls (13) with M2 x 12 screws and nuts (14).

☞ Novice pilots are advised to fit the ball to the inside of the cup to reduce rotor sensitivity. (Shown dotted in the diagram.)

Wipe all the alloy parts clean to ensure smooth running. Fill the groove in the centre plate (6) with a light grease then place on a flat clean surface.

Insert one of the two small alloy rings (3) into the centre plate ensuring that the chamfered side is uppermost.

Next insert the grey plastic ball cage (5), and using tweezers insert each of the 12 bearing balls (4) into the ball cage. It may be necessary to lift the centre plate slightly the let the balls seat in the centre groove. Once this is done the second of the small alloy rings can be inserted, this time with the chamfered edge facing down.

Insert the bottom moulding (7) into the centre plate from the underside then place the large plastic centre ball (2) with some grease in the recess on the bottom moulding.

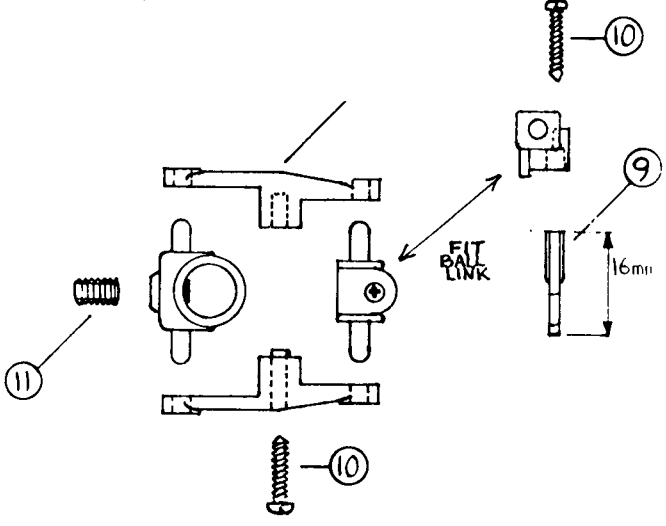
The top moulding can then be placed over the ball and the whole assembly secured together with 4 M2 x 12mm screws (12). It is important not to overtighten these screws - however, there should be no free play in the bearing, so careful fitting is required.

Any future wear in the bearing can be taken up by re-tightening the four fixing screws.

Slide the completed swash plate on the rotor mast with the long arm to the front.

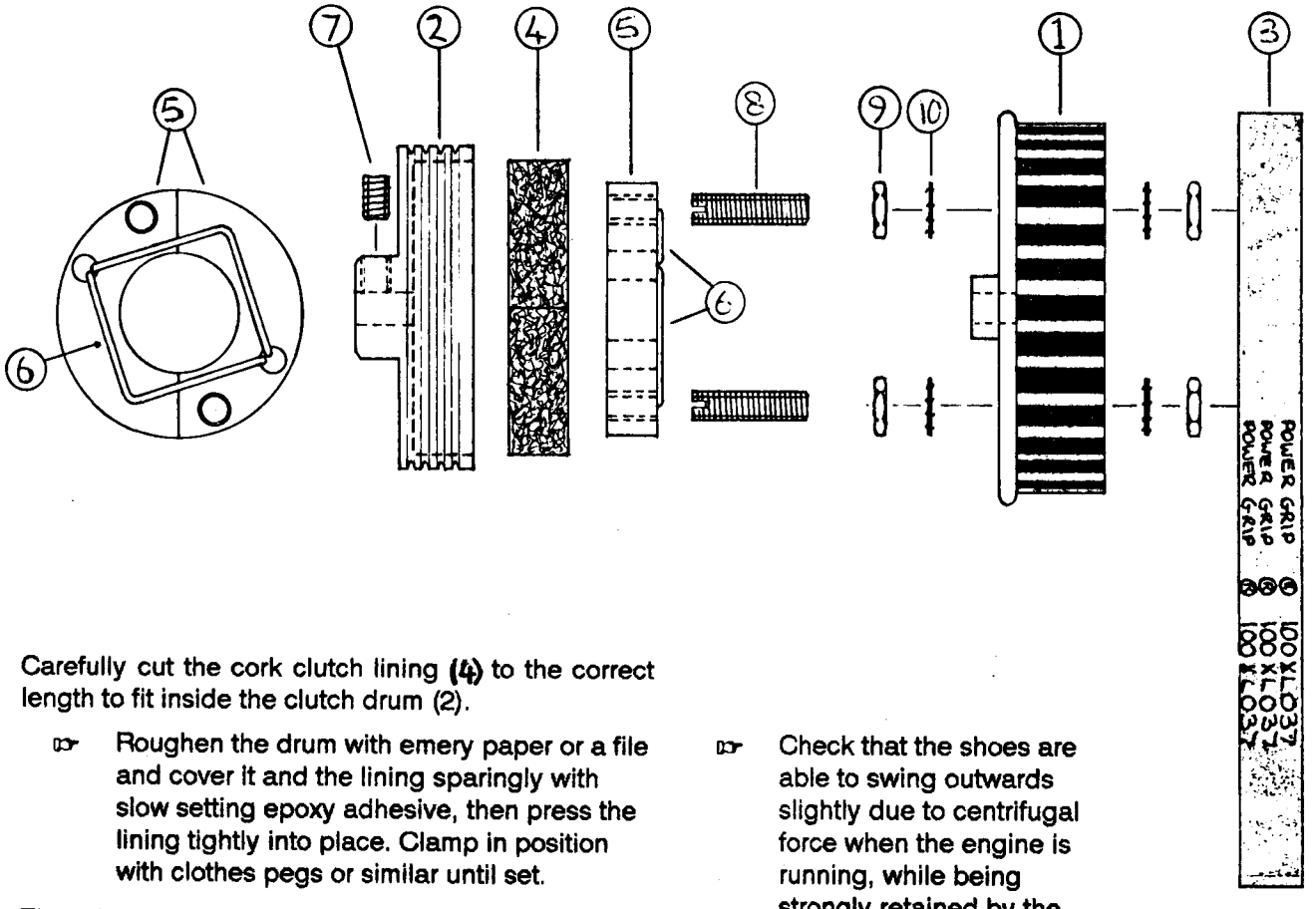
Assemble the swashplate driver using No 2 x 3/8" self tapping screws (10). Cut 5mm from the end of the ball eye (9) and fit to the small pivot. using No 2 self tapper.

☞ Swashplate rocking movement must be free and the assembly should slide easily up and down the rotor mast. Slide the swashplate driver over the mast before fitting the rotor head but do not clamp tight until later when the correct position has been found.



CLUTCH UNIT

STOCK CODE	Diagram key	
0CL/LP	1	large pulley
0CL/DRUM	2	clutch drum
0CL/XL100	3	100 XL 037 toothed drive belt
0CL/LINER	4	cork liner
OCL/SHOES	5	clutch shoe (2)
0CL/SPRING	6	clutch shoe spring (2)
M4X6SS	7	M4 x 6 socket set screw
M4X18SS	8	M4 x 18 stud (2)
M4N	9	M4 thin nut (4)
M4SW	10	M4 star washer (4)
		Set screw key



Carefully cut the cork clutch lining **(4)** to the correct length to fit inside the clutch drum (2).

☞ Roughen the drum with emery paper or a file and cover it and the lining sparingly with slow setting epoxy adhesive, then press the lining tightly into place. Clamp in position with clothes pegs or similar until set.

Thread the M4 x 18 studs (8) into the clutch shoes (5), with the slotted end of the stud just level with the surface of the shoe. Fit an M4 thin nut (9) at the rear, one turn clear of the shoe. Locate clutch springs (6) in clutch shoes and add star washers (10) onto screws.

Place the assembly into the large pulley (1) as shown in diagram and secure with star washers and thin nuts. Adhesive tape across the shoes is a help while doing this.

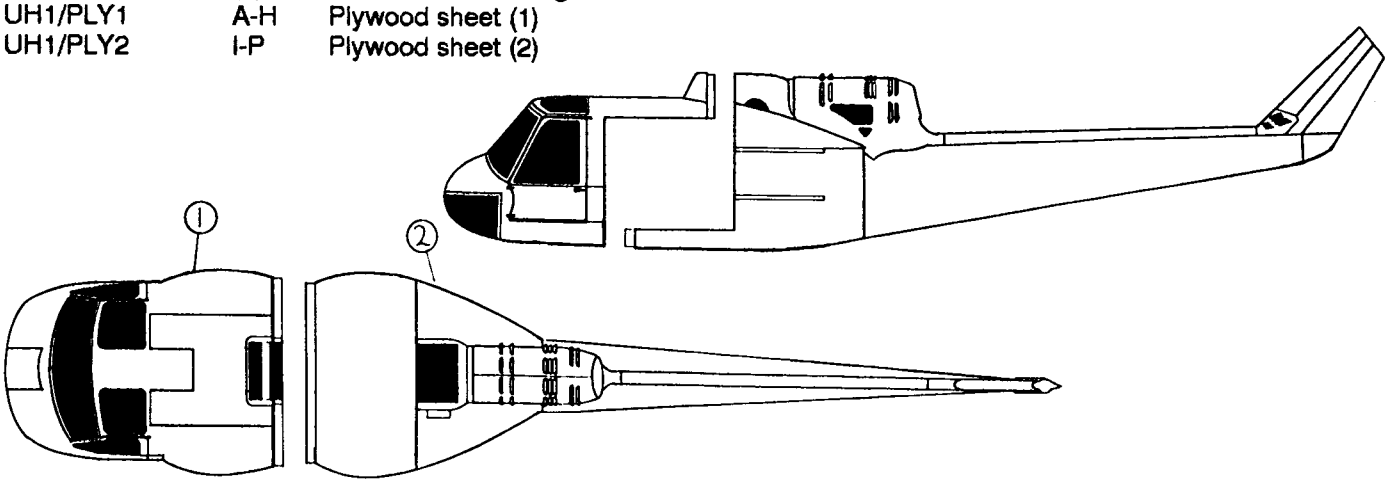
☞ Check that the shoes are able to swing outwards slightly due to centrifugal force when the engine is running, while being strongly retained by the springs when stationary.

Fit the toothed drive belt (3) round the engine pulley and slide the clutch assembly onto the gearbox input shaft, followed by clutch drum. Align large and small pulleys, using spacer washers if needed (not supplied) and tighten clutch drum grubscrew M4x6SS (7).

N.B. Do <u>not</u> use locking compound on the shaft or set screw.

BODYSHELL

STOCK CODE	DIAGRAM KEY	
UH1/BODY	(1)	GRP Body moulding
UH1/NOSE	(2)	GRP Nose moulding
UH1/PLY1	A-H	Plywood sheet (1)
UH1/PLY2	I-P	Plywood sheet (2)



Before commencing work on the bodyshell a few safety points relating to working on fibreglass (GRP) must be noted.

- Always wear a protective filter mask when rubbing down or cutting GRP.
- Use eye protectors if using electric motor tools for cutting GRP.
- To avoid skin irritation use a barrier cream and wash hands thoroughly afterwards.

The quickest and easiest way of cutting GRP is to use a mini motor tool with a cutting disc or router.

The areas shown in solid black on the diagram indicate where the GRP needs to be cut and removed. If however you do not plan to fit windows or cockpit detail the nose section can be left whole except the area around the mast and the front air intake. The main body has a pre-drilled floor to make fitting the chassis and undercarriage easier, but the shaded areas must be removed to aid ventilation of cooling air for the motor.

The windows on the nose section have two parallel lines marking them out, cut to the inner line. All the other areas are indicated by a single cut line.

The body and nose should be rubbed down smooth all over with a fine abrasive paper, approx 400 grade, especially on the centre join line. Any small imperfections on the surface can be filled with modelling or automotive filler.

Position the plywood floor (A) along the centre line of the main body with the front edge level with the edge of the GRP moulding (see note on diagram). Using a polyester two part glue (e.g. Heli Poxy by De Luxe Materials, or Stabilit Express) bond the plywood inside the body. Next, the holes in the floor of the body must be continued through the plywood base using a 3mm drill.

Using the fasteners left over from the chassis pack fit the plywood supports to the alloy chassis starting with the two rear most pieces (M). These are positioned up against the edge of the chassis and fixed using two M4 x 8 screws (4) and M4 captive nuts (3) which secure into the wood after marking and drilling a 5mm hole for the centre boss.

Next, position the two side rails (O) along the chassis sides with the rear edge level to the section just fitted. Mark and drill 4mm holes and secure using four M4 x 10 screws (5), M4 body washers (6), and M4 nyloc nuts (7).

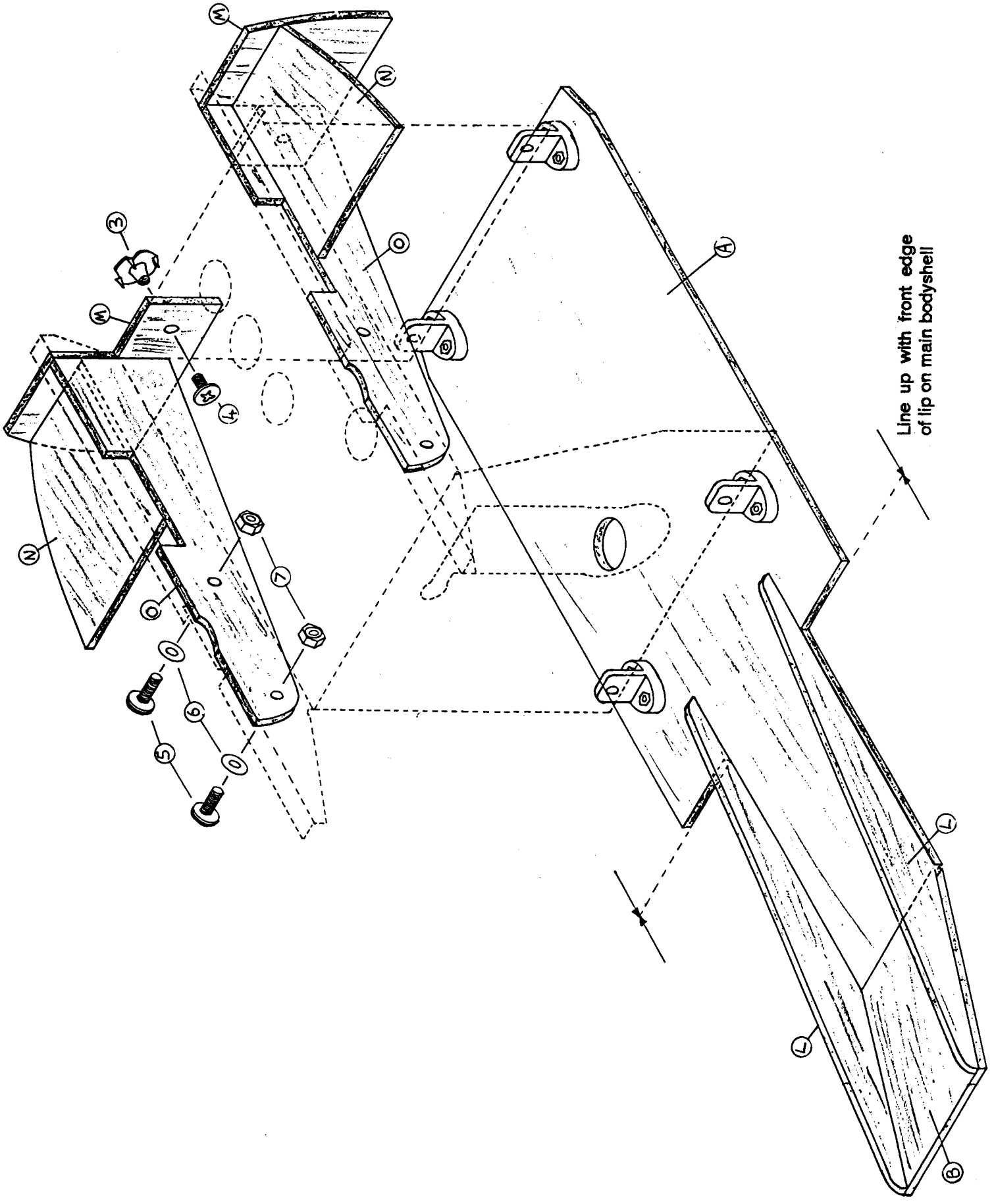
The two final pieces (N) are glued in level with the bottom edge of the cut out section on the side rails. All the joints should be glued using a good quality epoxy.

The chassis with its plywood supports can now be offered up to the body moulding. The chassis feet should line up over the holes in the floor, it may however be necessary to trim the plywood supports to enable the unit to fit correctly. The tail section should be supported and formers (N) lined up with the edge of the moulding. When this position has been obtained, secure the wood to the GRP with polyester glue, take care not to disturb the model whilst this is setting.

The section of plywood floor that protrudes beyond the body moulding needs to be extended with section (B) and reinforced with two rails (L) using epoxy glue. This unit will house the battery and gyro unit when the model is nearer completion.

Once all the glue has set hard the chassis should be removed from the body ready for the next stage.

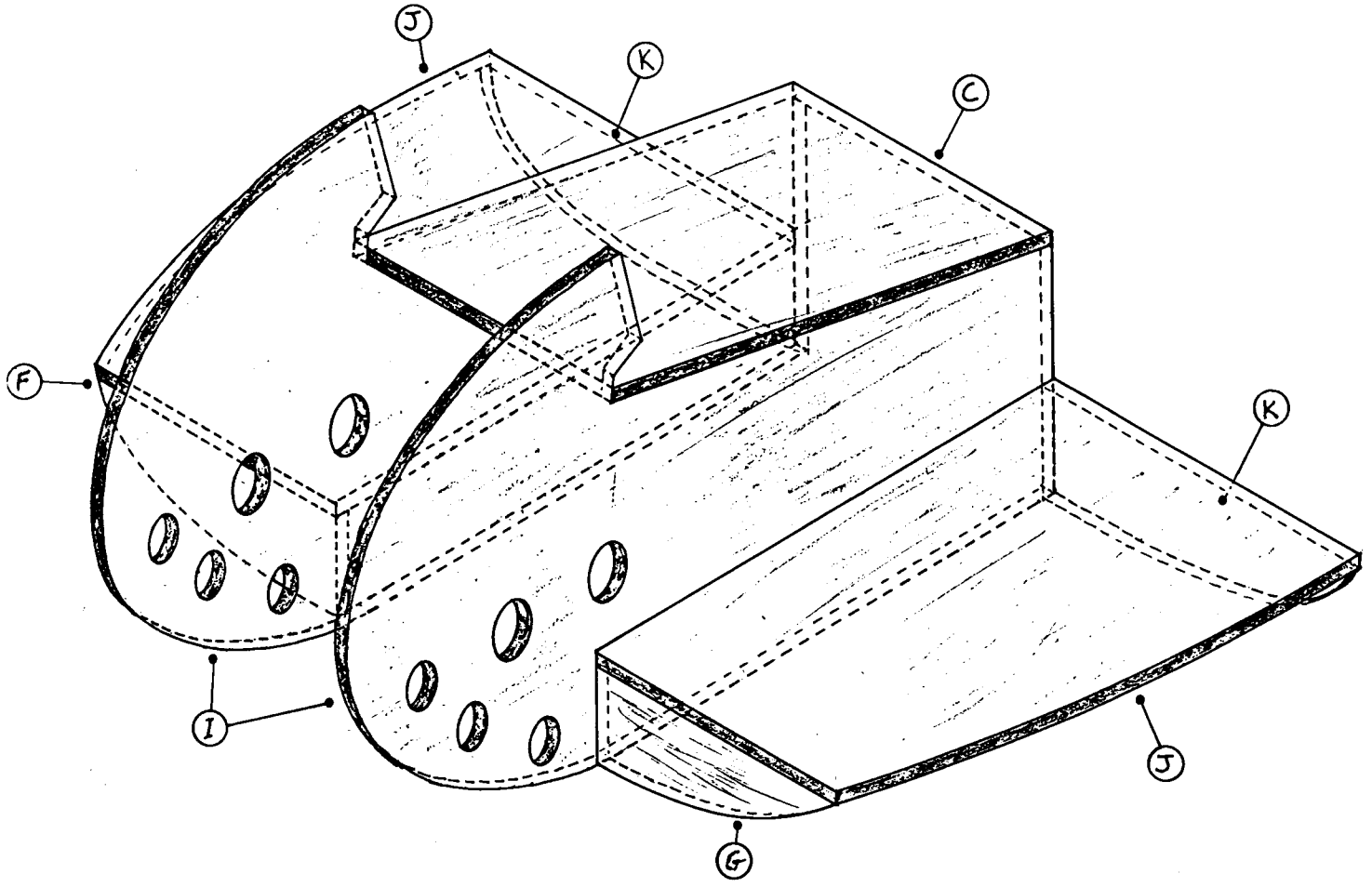
BODYSHELL



NOSE SECTION

If the windows are to be fitted, the nose section must be reinforced with plywood formers. The two main formers (I) are fitted first, level with the edge of the floor window cut outs. Never force the plywood to fit otherwise the GRP will distort, a good fit should be obtained by careful trimming before finally gluing.

The console top (C) fits across the top of the two nose formers. Formers (F) and (G) fit into the footwells, level with the window openings followed by formers (K) at the rear of the console (Not level with the edge of the GRP moulding). Lastly the two floor panels (J) are glued into place.



CONTROLS

STOCK CODE	DIAGRAM KEY	
0CON/BELL	1	bellcrank (cranked) (3)
0CON/BELL	2	bellcrank (straight) (2)
0CON/CA	3	collective cradle arm (2)
0CON/SH100	4	bellcrank pivot shaft
0CON/BRKT	5	small right angle bracket
0CON/HSP	6	Huey - bellcrank spacer (2)
0CON/LINK	7	collective link
0CON/TMNT	8	twin servo mount
0CON/SMNT	9	single servo mount
0CON/SSSM	10	single servo side mount
ACC/BJ	11	brass balls (16)
ACC/BJ	12	moulded balleyes
M4X30PS	13	M4 x 30mm plain shank (1)
M4X16	14	M4 x 16mm screws (2)
M4N	15	M4 thin nuts (3)
M4NLN	16	M4 nyloc nuts (3)
M4LW	17	M4 large washer (4)
M3X8	18	M3 x 8mm screw (5)
M3NLN	19	M3 nyloc nuts (5)
M2X12	20	M2 x 12mm screws (18)
M2N	21	M2 nuts (30)
ST1	22	Self tappers 2 x 3/8" (6)
0CON/STUD	23	Connector stud (2)
0CON/ROD37	24	Control rod 37mm (4)
0CON/ROD50	25	Thread stud 50mm (1)
0CON/ROD65	26	Control rod 65mm (3)
0CON/ROD90	27	Control rod 90mm (1)

Fit all the brass balls (11) onto the cranked (1) and straight (2) bellcranks and the small right angle bracket (5) using M2 x 12 screws (20) and M2 nuts (21), paying special attention to the number and position of the nuts. Use threadlocking compound on all the control fasteners.

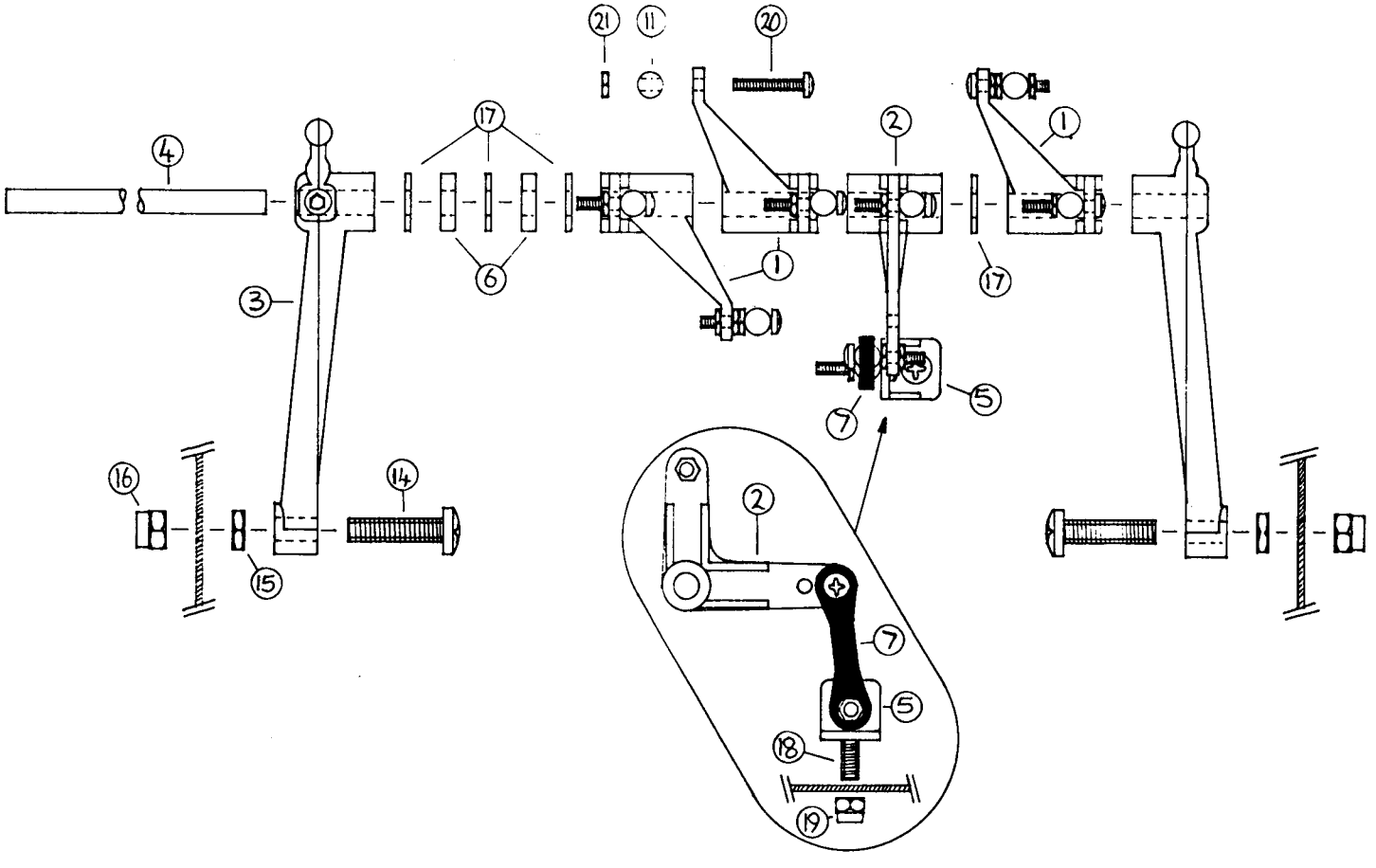
Lightly grease the 100mm pivot shaft (4) and slide on the bellcranks, spacers (6) and washers (17) in the order shown. Fit the two collective cradle arms (3) to the ends of the shaft ensuring they are both level before locking with the moulded-in grub screws (N.B. be careful not to over tighten these screws as the thread can be easily damaged).

The completed cradle assembly is fitted to the chassis using M4 x 16 screws (14), M4 thin nut (15), and nyloc nut (16). Be sure not to tighten the screws onto the cradle arms as these must be free to pivot up and down. Secure the collective link (7) with the right angle bracket to the chassis plate using an M3 x 8 screw (18) and M3 nyloc nut (19).

Fit the twin servo mount (8) to the chassis using M3 x 8 screws and nyloc nuts, then fix the two cyclic control servos (A) and (B) into the mount using self tapping screws (supplied with radio equipment) and rubber grommets.

☞ Always fit servos with rubber grommets as they protect against harmful vibration.

The collective servo (C) is fitted using the single servo side mount (10) (cutting out if required) and must be positioned as far back as possible - the mount will over hang the back of the chassis and is secured by M3 x 8 screws and nyloc nuts.

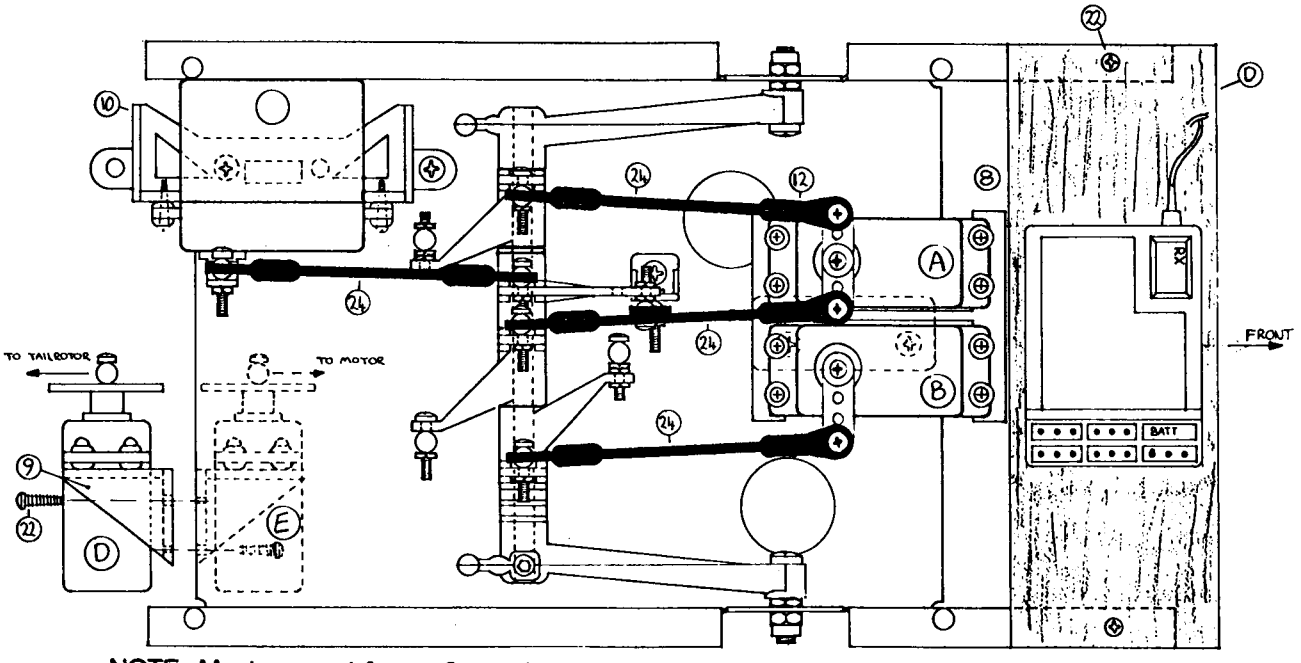


CONTROLS

The two remaining servos (D) and (E) control engine throttle and tailrotor and are held back to back either side of the chassis rear face. The single servo mounts are fixed using No 2 x 3/8" self tappers (22) which pass through the mount on one side and tap into the opposite one. The spacing can be adjusted to suit your servo size.

All five servos should be fitted with medium size output arms and brass balls secured with M2 x 12 screws and M2 nuts again paying attention to how many and where the nuts are placed. (On servos A & B the brass balls require M2 nuts between them and the output disc.)

The engine throttle is controlled via a straight armed bellcrank which pivots on an M4 x 30 plain shank



NOTE Mast support frame & gearbox are omitted for clarity

screw (23) secured both sides of the right hand engine mount with an M4 thin nut and M4 nyloc nut. The control connection is made using the 90mm rod (27) and a section of threaded stud (25) with moulded ball eyes (12) fitted to both ends. The throttle lever may need to be moved to enable it to be operated from this position.

Connect the two cyclic servos to the respective bellcranks with three 37mm rods (24) ensuring they are all of similar length and adjusted so that the bellcrank arms are vertical when the servos are centred. The 37mm rod used for the collective control should be adjusted in length so that the cradle arms are horizontal when the servo is at its limit of travel (ie. full collective).

Using the three remaining 65mm control rods (26) connect the swashplate unit to the bellcrank arms making sure the foremost rod passes between the drag link fork fixed to the mast support frame. The three links must be exactly the same length (approx 85mm measured between ball centres).

The tailrotor connection cannot be completed until the drive and control tubes are fitted into the tailboom.

The receiver unit is best mounted using thick double sided tape to protect against vibration, onto the plywood section (D) fixed to the chassis rails using two No 2 x 3/8" self tappers. When connecting the servos to the receiver ensure the wires do not pass over any sharp edges or foul the control bellcranks.

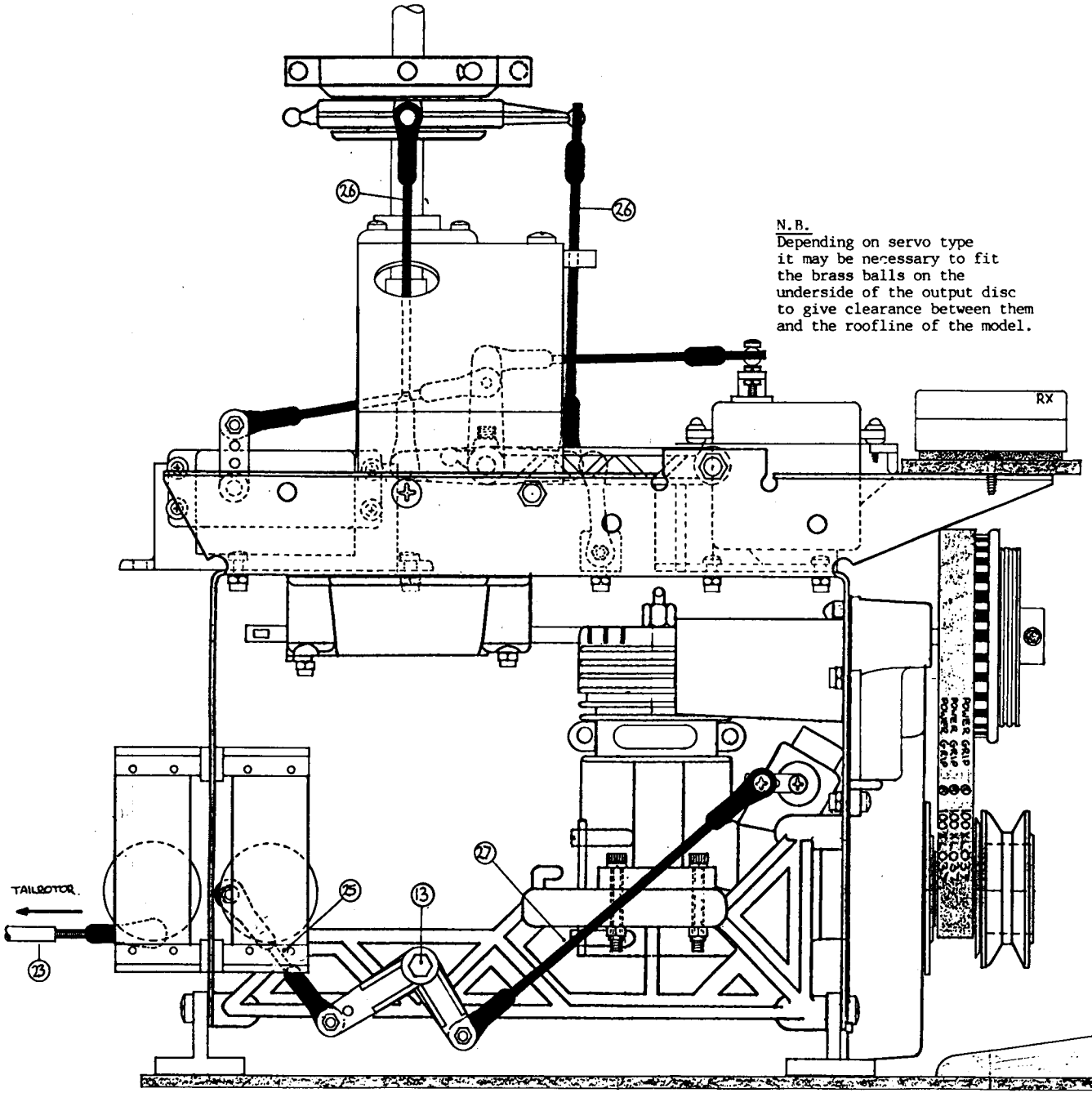
It may be necessary to use extension leads for the tail and motor servos.

If a basic four channel radio is being used it will be necessary to use a 'Y' lead to connect the throttle and collective servos together to enable them to be controlled via a single receiver channel.

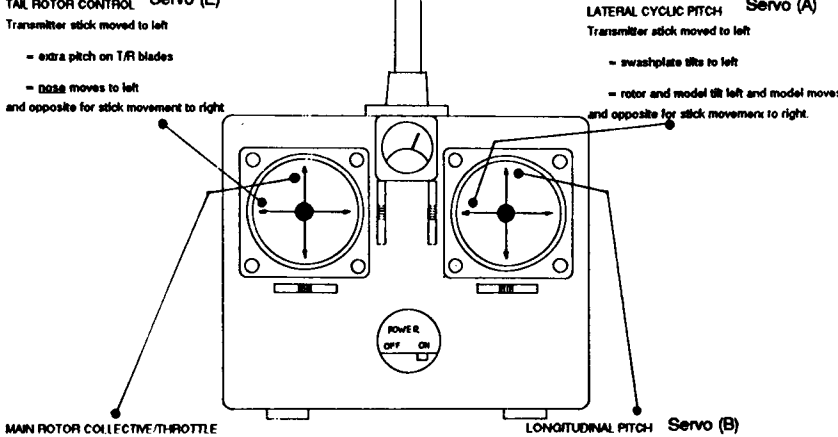
The battery (28) must be fitted as far forward in the tray as possible to achieve the correct balance in the finished model. A 1000 - 1200 Mah battery is recommended and should be securely fastened with servo tape and a harness.

A gyro (29) if fitted, is mounted just behind the battery. We recommend the Morley 'Gold Rate' gyro or the Morley 'Full Pilot Authority' gyro.

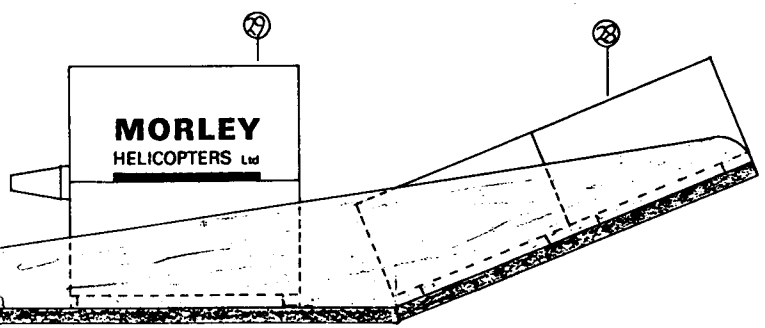
Once the radio equipment is connected check the operation of servos against the diagram showing the transmitter. It may be necessary to reverse the operation of some of the servos to give correct control response.



N.B.
Depending on servo type it may be necessary to fit the brass balls on the underside of the output disc to give clearance between them and the roofline of the model.

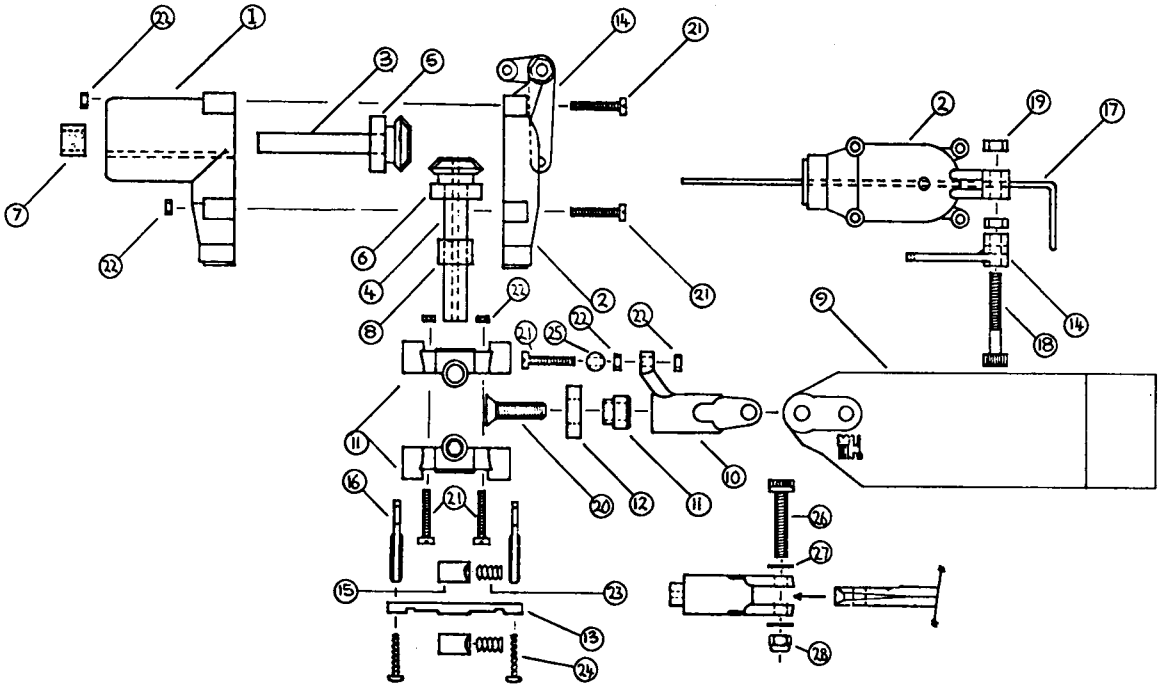


CONTROLS



TAIL ROTOR

STOCK CODE	Diagram Key	
0TR/C1	1	gearcase moulding
0TR/C2	2	gearcase back moulding
0TR/GIN	3	input mitre gear and shaft
0TR/GOUT	4	output mitre gear and shaft
0TR/BB1	5	3/16" ballrace
0TR/BB2	6	6mm ballrace
0TR/OIL1	7	3/16" oilite bearing
0TR/OIL2	8	6mm oilite bearing
0TR/BL	9	blade (2)
0TR/BM	10	blade mount (2)
0TR/HUB	11	1/2 hub and spacer (2)
0TR/BB2	12	ballrace 6 mm (2)
OTR/YOKE	13	control yoke
0TR/CRANK	14	tailrotor bell crank
0TR/CLR	15	control rod collars (2)
ACC/BJ	16	eye end (2)
0TR/WIRE	17	pitch control wire
M3X20SC	18	M3 x 20 socket cap screw
M3N	19	M3 nuts (2)
0TR/CS	20	csk screws 2ba (2)
M2X12	21	M2 x 12 screws (10)
M2N	22	M2 nuts (14)
M4X6SS	23	M4 x6mm grub screw
ST1	24	2 x 3/8 self tap screws (2)
ACC/BJ	25	ball end ball (2)
M3x16SC	26	M3x16 socketcap screw (2)
M3FW	27	M3 flat washers (4)
M3NLN	28	M3 nyloc nuts (2)



Remove the oilite bush (7) and push the input shaft (3) into the case (1). Also place the output shaft (4) in position in case (1).

Important:- Fill the case with a good quality light grease and attach the back casing (2) using four M2x12 screws (21) and M2 nuts (22).

Push the oilite bush (7) along the input shaft (3) into the case (1), check for free rotation.

Place a countersunk screw (20) through one of the ballraces (12) followed by a moulded spacer (11), and with paint or locking compound, screw tightly into one of the blade mounts (10). ***Locking with paint or compound is essential.***

Fit a ball end (25) to the pitch control arm of the blade mount (10) using one M2x12 screw (21) and an M2 nut (22) on each side of the arm. Repeat with the second ballrace and mount.

Clamp the ballraces between the moulded hub halves (11) and draw together using two M2x12 screws (21) and M2 nuts (22), do not apply adesive.

File small flats on the output shaft (4) to seat the set screws (23), and fit the tailrotor hub to the output shaft (noting the outer surface of the hub is flush with the end of the shaft), do not overtighten the grub screws.

The wire pushrod (17) passes through the centre of the output shaft (4) and moves the pitch control yoke (13) which is positioned between the two collars (15).

A plastic balleye (16) is fitted to each end of the yoke (13) with a No2x3/8 self tapping screw (24). The bellcrank (14) pivots on a 3mm bolt (18) on the arm protruding from the case (2), again with M3 nuts (19) either side of the arm.

Slot the blades (9) into the mounts (10) making sure the leading edge is forward, and hold with M3x16 socket cap screws (26) M3 flat washers (27) and M3 nuts (28). Refer to diagram for correct installation.

The groove in case (1) is for the 18g controol wire.

TAILBOOM

STOCK CODE	DIAGRAM KEY	
UH1TB/TUBE	1	Tailrotor mounting tube
ACC/HEX	2 a & b	Hexagonal ball drive coupling (2)
UH1TB/CAP	3	Mounting tube cap
UH1TB/B660	4	Formed brass drive tube 660mm
UH1TB/A630	5	Formed alloy control tube 630mm
UH1TB/TST	6	Tailskid tube
UH1TB/TSW	7	Tailskid wire
M4X6SS	8	M4 x 6 socket set screws (6)
ST1	9	Self tappers 2 x 3/8" (2)
M2FW	10	M2 Flat washers (2)
16GWIRE		drive wire (1.5mm dia)
18GWIRE		control wire (1.2mm dia)

Fit plywood former (H) into the main body where the tailboom starts, using polyester glue. The two notches should be uppermost and the lower of the two offset towards the left where the tailrotor servo will be positioned.

Whilst the open end of the tailboom is accessible fix the tailskid tube (6) into position using polyester glue or fibreglass resin after drilling a 3.5mm hole through the GRP. The tailskid is completed by gluing in the wire (7).

Fit the black plastic end cap moulding (3) into the end of the mounting tube, securing with super glue. Next glue the formed brass tube into the centre hole in the end cap and the formed alloy tube into the lower hole. Carefully feed the tubes down the tailboom until the plastic mounting tube fits into the enlarged tail section. The free ends of the two tubes are fixed into the notches on the plywood tail former (H), the brass drive tube on the upper centre one and the alloy control tube on the lower one using epoxy glue.

Grease the surface of the 16g drive wire (the thicker of the two) and feed it down the brass tube. At the tailrotor end push a hex drive plug (2a) over the wire then bend the end over to 90 degrees using a pair of grips. Pull the hex drive back so that the bend locates in the slotted end, secure using two M4 x 6 set screws (8).

Fit a hex drive socket (2b) onto the input shaft of the tailrotor gearbox using an M4 x 6 set screw. Filing a flat onto the shaft first will provide a secure seat for the screw.

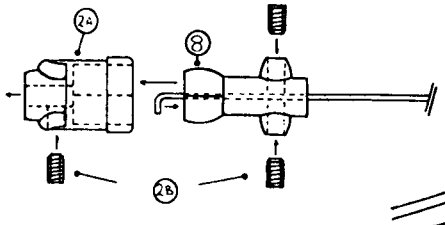
☞ Do not overtighten the set screws in the hex drives otherwise the threads will be damaged. If it is suspected that they have been damaged, replace them before flying the model.

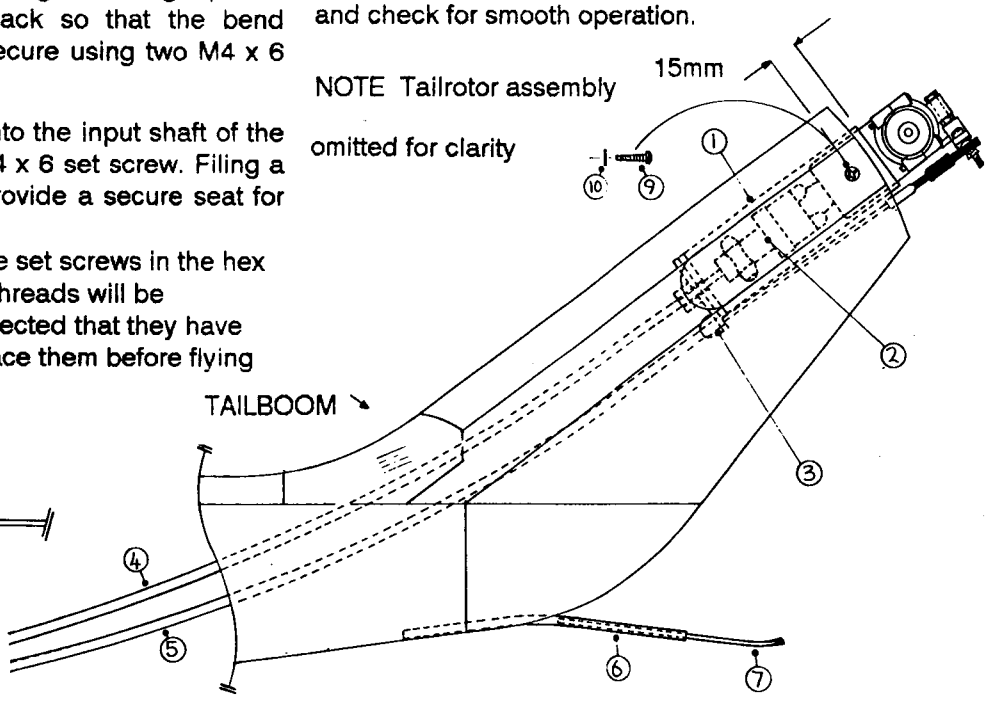
Fill the drive socket with grease (not oil) and push the gearbox into the mounting tube with the tailrotor blades on the left hand side of the model. Ensure that the tail rotor output shaft is parallel to the ground with the fuselage upright, then drill two 1.5mm holes through the GRP, plastic tube and into the gearbox body (N.B. one hole from each side approx 15mm down from the tube end, see diagram). Secure the gearbox using two No 2 x 3/8" self tappers (9) both with M2 flat washers (10) under the heads.

The 18g control wire needs the connector studs from the controls pack soldered onto its ends. Fit the tailrotor end first, remember to clean the wire to remove any grease to ensure a good bond when soldering. Always check soldered joints by applying a load to them, it must be secure. Grease the rest of the wire and feed it down the alloy control tube and fix to the gearbox operating crank with a balleye and brass ball with M2 x 12 and M2 nut.

Both the drive and control wires need to be shortened once they are in the tubes. The mechanics assembly will have to be placed back inside the bodyshell to determine where to cut. The control wire requires the second connector stud to be fitted so allow for the length of this before shortening it. The drive wire should be cut flush with the end of the main gearbox shaft at the rear of the chassis. The second hex drive plug can now be fitted as described and the socket fitted to the main gearbox shaft. **Don't forget to fill the socket with grease.** Check the drive wire for end float, there should be 3-4mm of movement. It may be necessary to adjust the angle of the brass tube so that the hex couplings line up.

Finally link up the tailrotor connection to the servo and check for smooth operation.





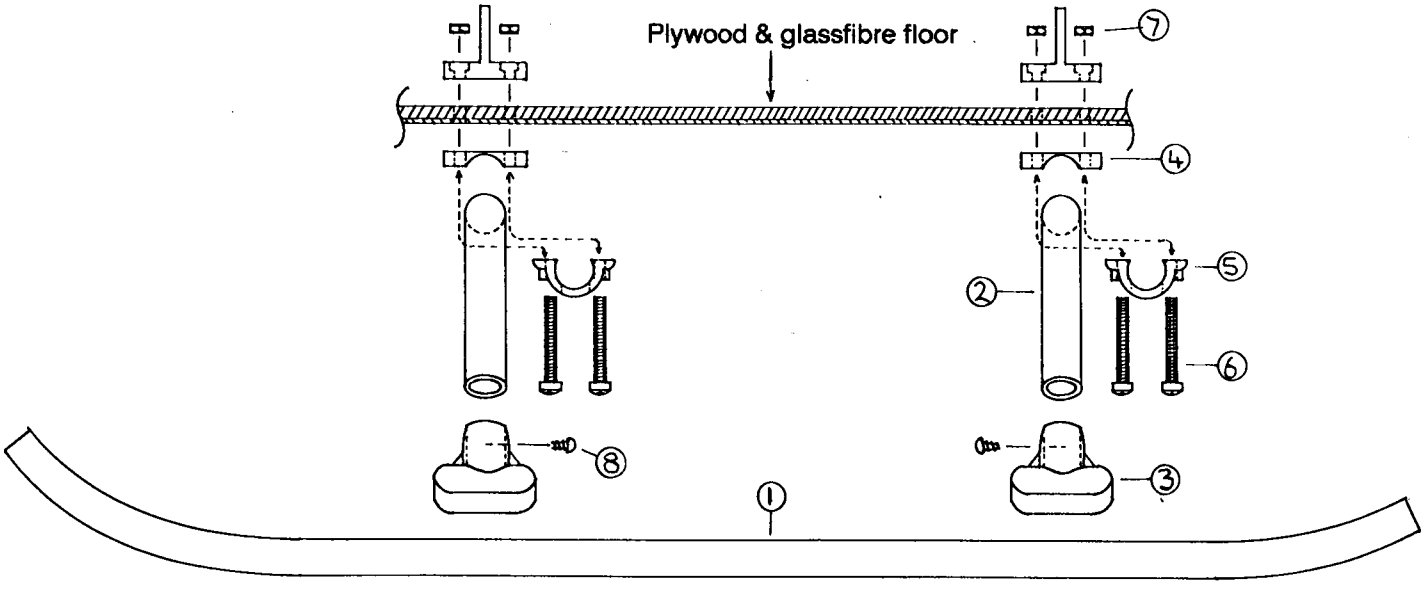
UNDERCARRIAGE

STOCK CODE	DIAGRAM KEY	
UH1UC/SKDS	1	Undercarriage skids (2)
UH1UC/CT	2	Undercarriage crosstubes (2)
UH1UC/BRKT	3	Undercarriage brackets (4)
UH1UC/SEAT	4	Undercarriage seat mouldings (4)
UH1UC/CLAMP	5	Undercarriage saddle clamp (4)
M3X20	6	M3 x 20mm screws (8)
M3N	7	M3 nuts (8)
ST	8	No2 x 1/4" self tappers (4)

Press the four undercarriage brackets (3) onto the main skids (1) and space approx 156mm apart (measuring between centres). Push fit the ends of the curved crosstubes (2) into the brackets and secure either with epoxy glue or drill and tap a No 2 x 1/4" screw into the moulding and alloy tube.

The eight M3 nuts (7) are pressed into the chassis feet mouldings, inside the bodyshell, in the hexagonal recesses.

Press the four saddle clamps (5) onto the underside of the two crosstubes and space them approx 86mm apart, again measured from centre to centre. Place the four seat mouldings over the crosstubes onto the saddle clamps. With the model held upside down position the undercarriage over the pre-drilled holes in the GRP floor then screw in the M3 x 20 screws and tighten.



FITTINGS

STOCK CODE	DIAGRAM KEY	
UH1/WIPER	1	Wiper set
ACC/NAV	2	Navigation light
UH1/MESH	3	Alloy mesh
UH1/WIRE	4	Stabilizer wires
ST1	5	No 2 x 3/8" self tappers
UH1/TRANS1	6	Huey nose windows and details
UH1/TRANS2	7	Huey cockpit and doors

The window wiper mouldings (1) are fixed over the main windows using No 2 x 3/8" screws. They will however need to be shortened to the second hole and the main arms should be curved to follow the contour of the body.

The horizontal stabilizer on the tailboom is made from the balsa wood blank (Q). Shape the wood using a sanding block to attain an aerofoil section then cut in half and angle one end to allow for the taper on the tailboom. Drill the tailboom using a 1.5mm drill on the marks etched on the boom. Mark and drill into the wood only to about 20mm depth, then push fit the two wires (4). Black self adhesive covering is supplied to cover the balsa before painting. Secure the stabilizers with epoxy.

Surface detail such as the airscoops (6), air intake (7), exhaust outlet (8) and the nav light pylon (9) should be cut out from the clear sheet using a sharp knife and carefully trimmed to fit before fixing with a 'gel' type super glue.

The alloy mesh (3) covers the openings cut out from the 'turbine' area and is best fixed from the inside with epoxy.

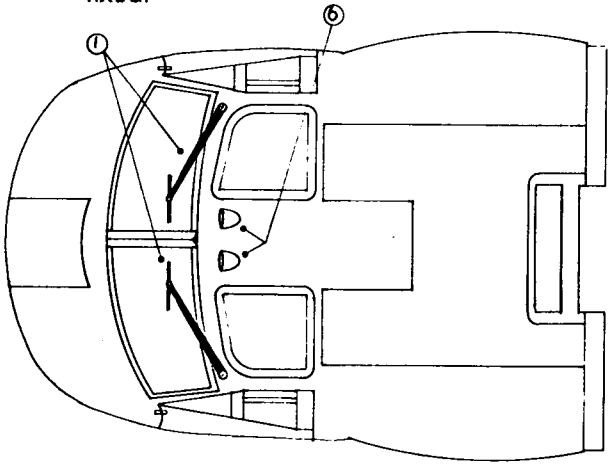
Before fitting the windows the entire model should be painted in your chosen colour scheme either with a fuel proof paint available from your hobby dealer or automotive spray paint and fuel proof lacquer.Positions for the self adhesive decals supplied are shown on the diagram. These should be applied before fuel proofing is sprayed on.The inside of the model should also be painted and in particular all the woodwork should be sealed with lacquer.

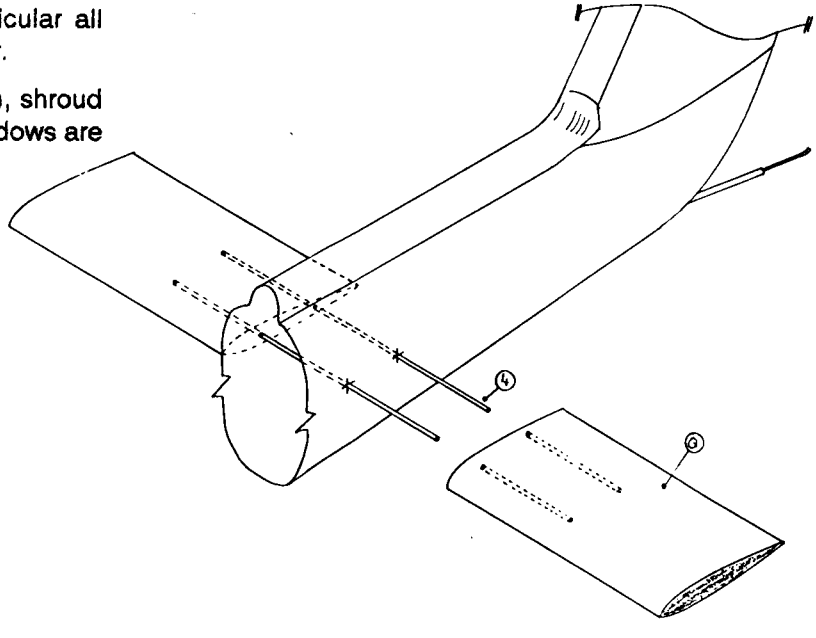
Cockpit detail including instrument panel (E), shroud (10) and seats are best fitted before the windows are fixed.

Cut out the cockpit windows leaving a generous margin then trim down. Do not cut to the inner line as this represents a panel line not a cut line. All the windows except the two side doors glue onto the outside of the nose section and have their borders painted to match the bodyshell colour.

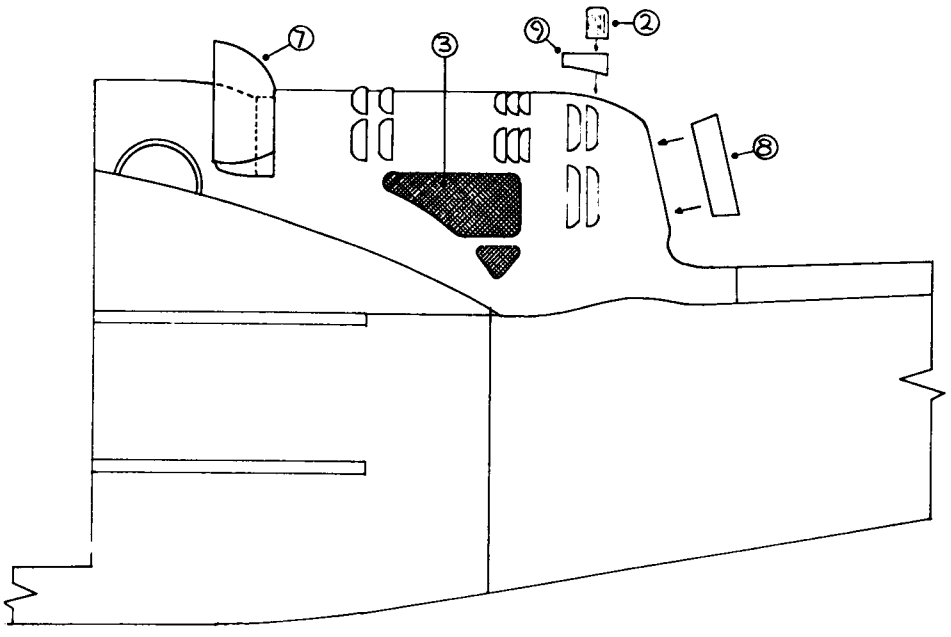
The nose section is fitted to the main body using small No 2 x 1/4" black self tappers. A minimum of four screws across the top flange and three along the underside flange should be used, however a neater join line can be made by using more screws. Using pieces of scrap plywood make small screw anchors and epoxy on the inside of the nose and body, these will hold the self tap screws more securely.

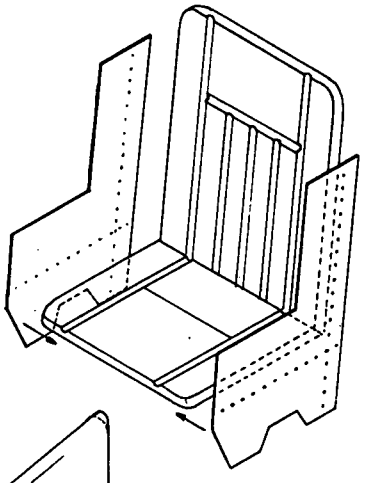
The two main side doors can be made to slide open and closed for scale purposes but they will need to be fixed in the open position when flying the model to enable sufficient cooling air to flow through. Cut the doors from the sheet with at least 6-7mm deep edge left, then carefully trim to match the bodyshell contour. Epoxy the plywood reinforcement (P) onto the cut-away front edge and slot the two ends so as to form a guide for the edge of the GRP nose and body to run in. Fix the door open by screwing a No 2 x 3/8" self tapper through it into the GRP body.

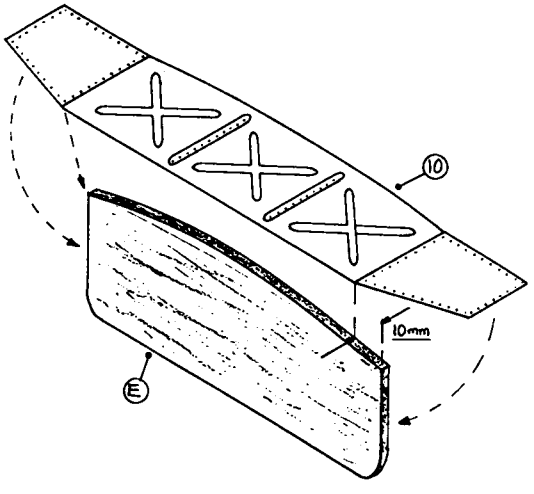


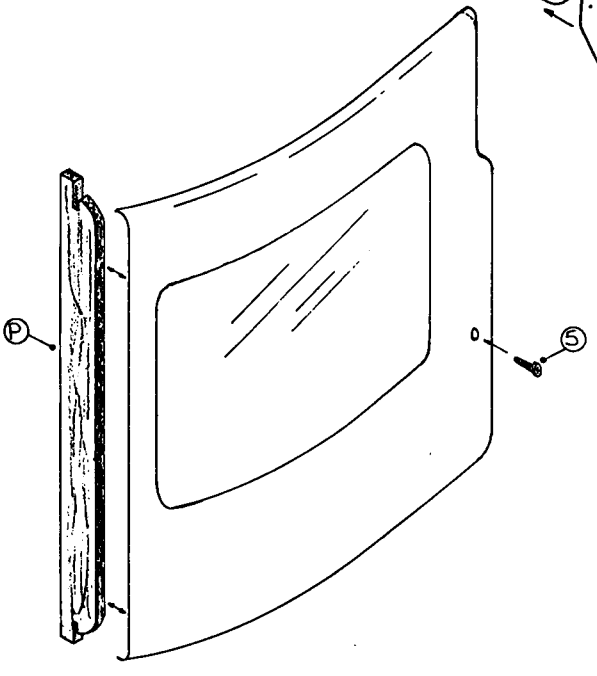


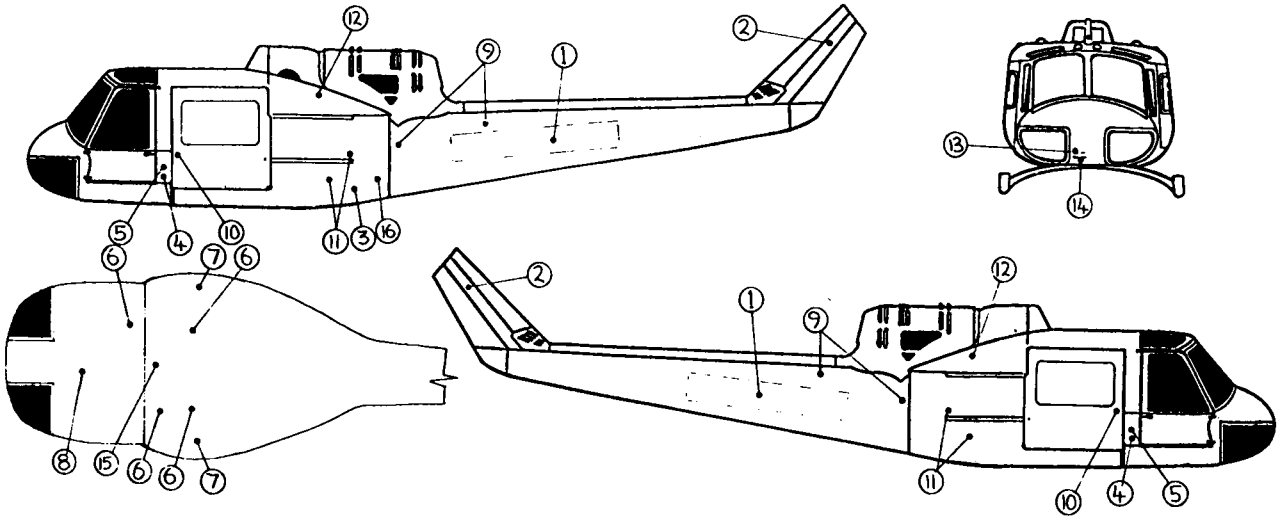
FITTINGS











① MARINES, NAVY OR UNITED STATES ARMY

② SERIAL NUMBER

③ SERVICE THIS AIRCRAFT WITH MIL-J-5624A JP-4 AVIATION FUEL IF NOT AVAILABLE REFER TO TB AVN 2 FOR ALTERNATIVE FUEL

④ HAND FIRE EXTINGUISHER INSIDE

⑤ EXIT RELEASE

⑥ FUEL CELL CAVITY DRAIN & VENT

FUEL CELL CAVITY DRAIN & VENT

⑦ FUEL PUMP ACCESS AND SUMP DRAIN

⑧ STRUCTURAL PANEL REQUIRED GROUND AND FLIGHT

FUEL PUMP ACCESS AND SUMP DRAIN

⑨ COWLING LATCH

COWLING LATCH

⑩ TURN SLIDE

⑪ STEP STEP

⑫ HAND HOLD

⑬ RADIO

⑭ BATTERY ACCESS

⑮ CARGO HOOK MAX. LOAD 4000LBS

⑯ EXTERNAL POWER 28V D.C.

ROTOR HEAD

STOCK CODE	Diagram key	
0RH/PLATE	1	head plate
0RH/FINGS	2	set of 4 finger plates
0RH/TOP	3	top plate moulding
0RH/MT	4	mast top moulding
0RH/RUBS)	5	teeter rubber
" ")	5	drag damper rubber
0RH/BM	6	blade mount
0RH/BRG	7	bearing mount pairs
0RH/CRADLE	8	cradle carrier
0RH/FBZZ	9	flybar cradle (zig zag)
0RH/FB	10	flyblade
0RH/FBOA	11	flybar operating arm
0RH/IA	12	incidence arm
0RH/FBAR	13	flybar (not in pack)
0RH/BB	14	6mm ballrace
0RH/OIL	15	3mm oilite bearing
0RH/FB	17	square brass collar
0RH/MIX)	18	mixer short rocker
" ")	19	mixer long rocker
" ")	20	mixer slider
		50mm threaded stud
		37mm control rod
		ball eye mouldings
		M3 star washer
	21	M2 x 12 screw
	22	M2 nut
	23	M3 x 16 skt cap screw
	24	M3 x 20 skt cap screw (plain shank)
	25	M3 x 20 skt cap screw
	26	M3 x 20 pan head screw
	27	M3 x 30 pan head screw
	28	M3 nut
	29	M4 x 10 socket set screw
	30	M4 x 25 plain shank screw
	31	M4 nyloc nut
	32	ball end ball
	33	M3 x 16 pan head screw
	34	M3 x 30 skt cap screw

Mixer Assembly

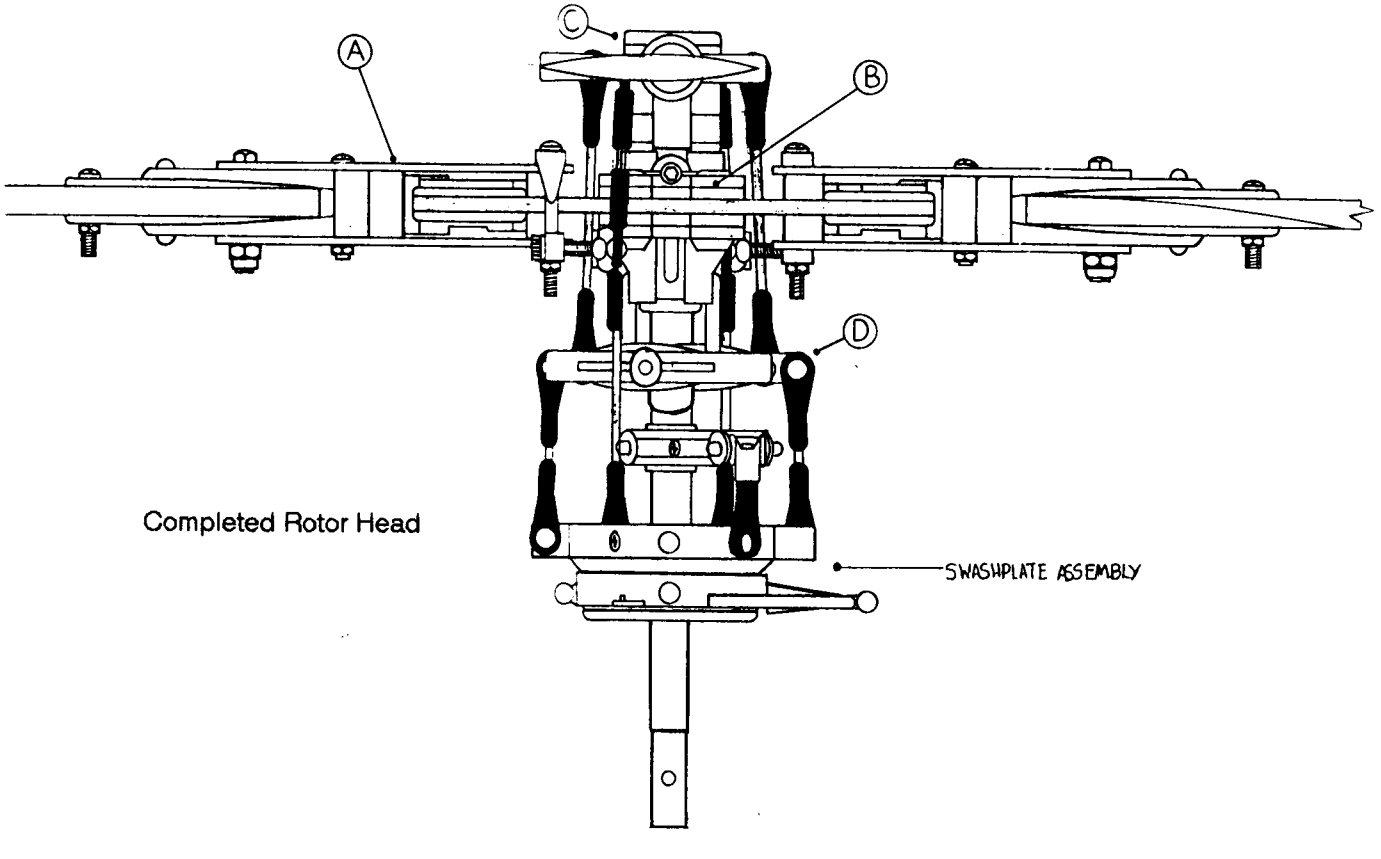
Cut the 50mm threaded stud into four equal lengths and fit a moulded ball eye to each end of each stud.

Pass an M3 x 20 skt cap screw with a smooth shank (24) through the holes in each side of the mixer slider (20) as in sketch 'D'. The smooth shank acts as a pivot, so use some light grease. Thread the screws into the long rocker arms (19), allowing it to cut its own thread in the plastic.

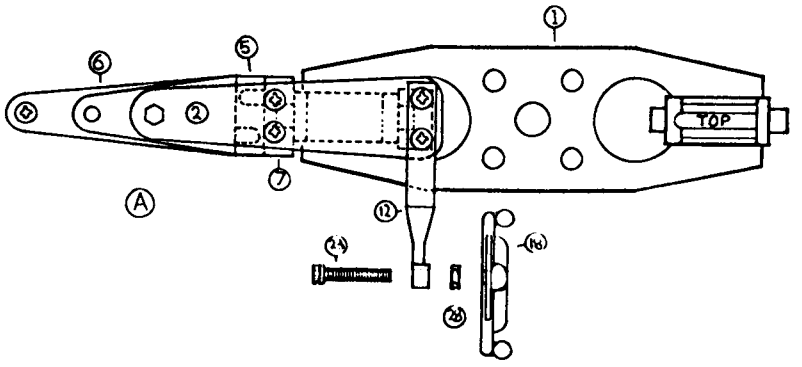
- The arms must be allowed to move freely but without slop.

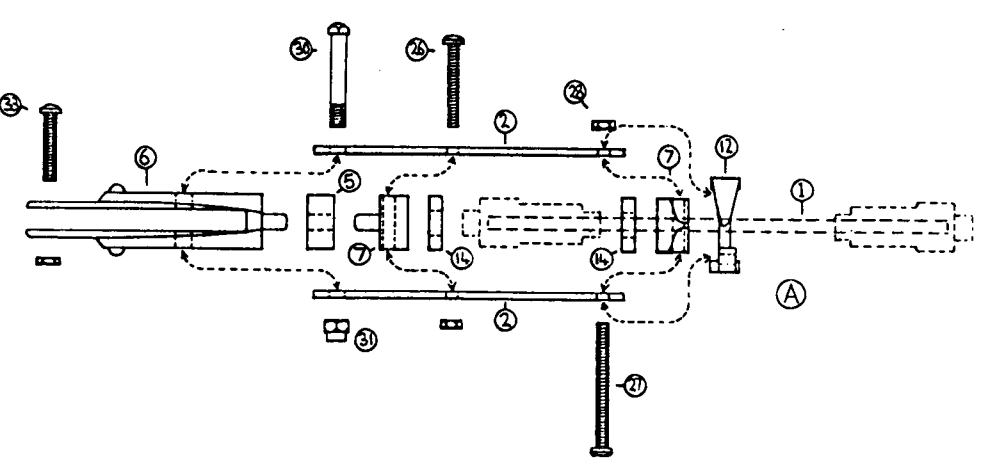
Slide the mixer slider onto the rotor mast with the fork fitting upwards to go into the grooves in the side of the mast top moulding. Connect the outer arms of the long rocker arms to the outer balls of the swashplate using two of the four ball eye and stud connectors.

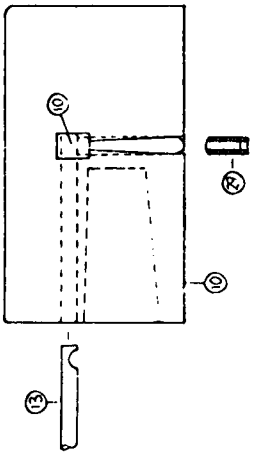
(Continued..)

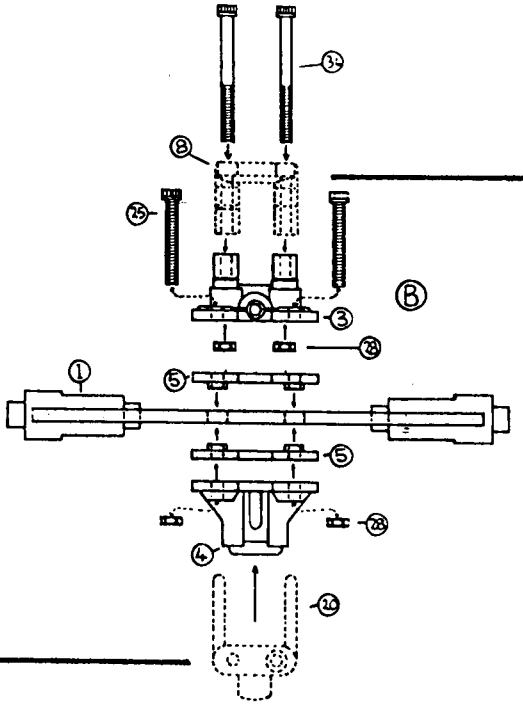


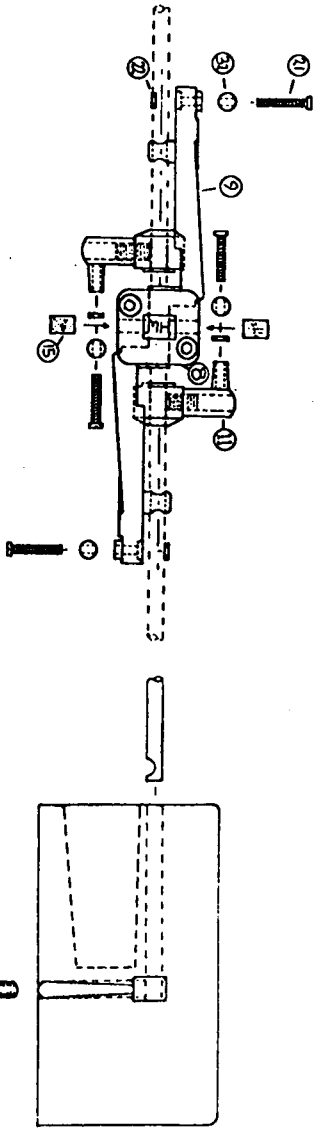
Completed Rotor Head

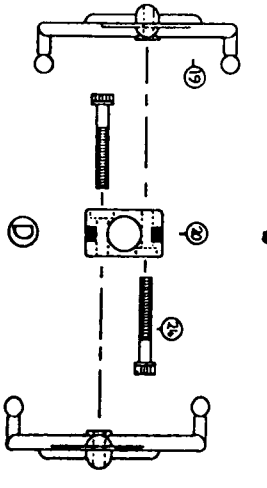

TOP











ROTOR HEAD (continued)

Insert an M3 x 16 skt cap screw (23) through the pitch control hole in the two rotor blade incidence arms (12), and fix with M3 nut (28) as shown in sketch 'A'.

Push the four ballbearings (14) onto the stub axles moulded into the rotor head alloy plate (1).

☞ Note the word 'TOP' is marked on the stub axle. Remove any excess flash on the moulding with a sharp knife.

Lightly grease the bearings when in position. Fit the moulded bearing block (7) to the outer ballrace with the moulded stud to the trailing edge (anti-clockwise rotation). Assemble two steel fingers (2) onto the block using M3 x 20 pan head (cross head) screws (26), star washers and nuts (28).

Fit the inner bearing block (7) over the inner ballrace, between the steel fingers. Push the incidence arm (12) over the fingers and fit using 2 M3 x 30 pan head screws (27) through the inner bearing block followed by star washers and nuts (28).

Refer to sketch 'B'. Push mast top (4) onto mast. Remove rotor head fixing screw from inside the top plate moulding (3). Remove any flash remaining from the moulding. Place two M3 nut in the recesses in the base.

Sandwich the headplate (1) between the two teeter rubbers (5) and between the mast top and top plate moulding. Assemble using four M3 x 20 skt cap screws (25) threaded full length and M3 flat nuts (28).

☞ Make sure the nuts are pulled home and the teeter rubbers are firmly clamped but not distorted.

Fit the assembly on to the rotor mast and replace screw in top plate moulding, through mast.

Fit a brass ball to each end of the flybar cradle 'zig zag' using M2 screws and nuts, taking care to fit it on the side opposite the flybar position.

Snap the 'zig-zag' into the moulded carrier (8) and then push in the oilite bearings (15) over the small pivot shaft. Pass the fly bar (13) through the cradle, threading in the operating arms (11) as required.

The unit is fixed to the rotor head top moulding using 2 M3 x 30 socket cap screws (34) passing through the cradle and into the two M3 nuts in the top moulding (3). (Sketch 'C').

The flyblades (10) are fitted to the flybar (13) as in the sketch 'C' with the M4 x 10 socket set screws (29) passing through the rear of the flyblade into the square brass collet (10).

☞ The set screw *must fit into the deep grooves* at the end of the flybar. Note that the trailing edge of the flyblade is square and not sharp.

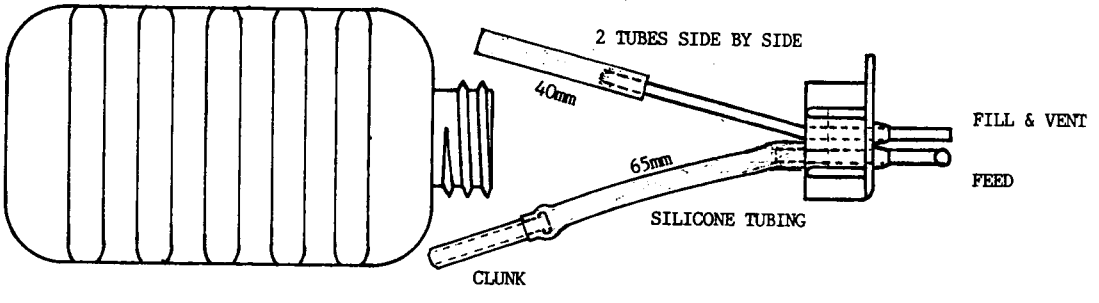
Fit a moulded ball eye to each end of the 37mm pushrods and use them to connect the flybar operating arms (11) to the inner balls on the mixer/rocker assembly. The flyblades (10) must be in line with each other. When satisfied, set the operating arms (11) in line with the flyblades and tighten the grubscrews.

Thread a small rocker arm (18) onto the M3 bolt (23) on each incidence arm (12), and use the two remaining short connecting rods to link the ends of the 'zig-zag' cradles to the long arm of the small rockers.

Thread moulded ball eyes onto the 37mm rods and use to connect the brass balls you have fitted on the swashplate cup to the short rocker on the incidence arms.

Lubricate all moving parts. Plastic on plastic should be lubricated with vaseline or similar e.g. mixer slider.

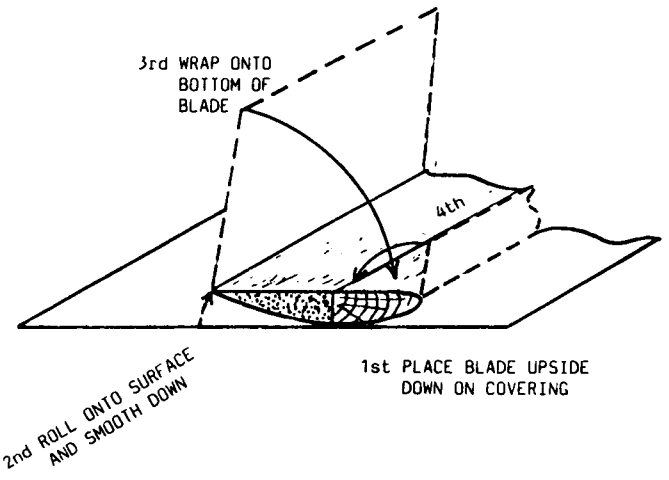
Assembly of fuel tank.



MAIN ROTOR BLADES

Cut away the balsa at the blade roots to taper the blades, and flatten the top of the blade where it fits into the moulded holder (6), with the peg on the holder to the front.

Sand the blades lightly to smooth the surface then cover with the self-adhesive vinyl supplied. The overlapping edges should be under the blade trailing edge 'downwind' - (see diagram).



BLADE BALANCE

The rotor blades must be in static and dynamic balance. To achieve this is simply a case of making sure they have the same weight, and that the centre of gravity of each blade is at the same point.

If the blades are of equal weight but differing centre of gravity, add covering material or electrical tape to move the balance point of one blade out towards the tip, and a similar amount of material to the other blade to bring the balance point towards the centre. Try and get the balance equal to within 1-2mm.

If the blades are of unequal weight and balance point, add covering material to the lighter blade in such a position that it will also move the balance point to match the other blade.

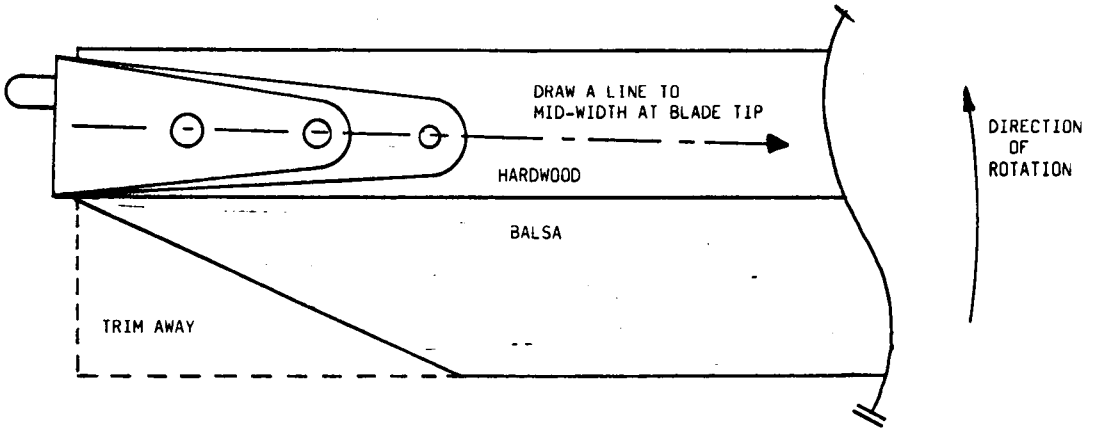
Insert the hardwood leading edge of the blades into the blade holders (6) and position so that a line from the two holes in the holders would extend to a point 50% back from the leading edge at the blade tip. This gives the correct amount of blade lead.

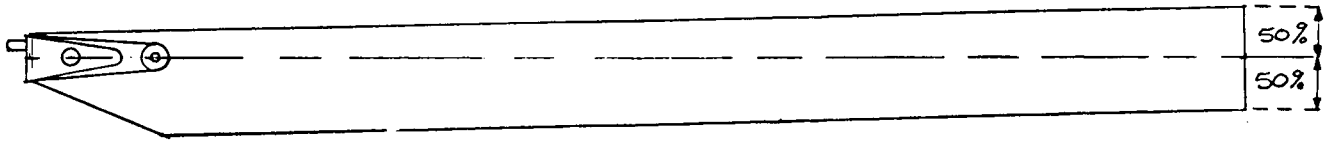
Use the holes in the moulding as a guide to drill the hardwood to fit the M3 x 16 (33) bolt and nut, then drill for the larger 4mm retaining bolt (36) and fit.

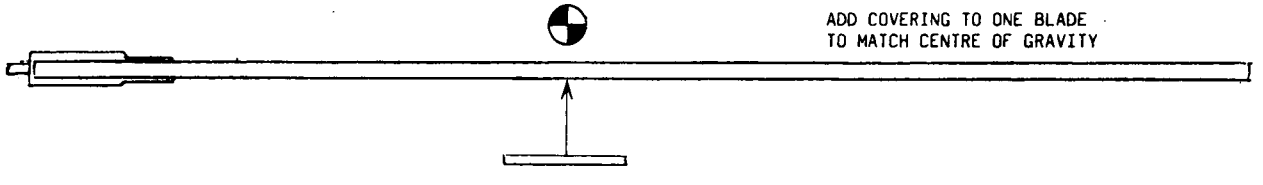
Place the rubber drag dampers (5) in position and push the complete blade assembly in place between the rotor head fingers using M4 screw (30) and nyloc nut (31) to secure.

Paint or tape one rotor tip red and the other white or yellow, or use Morley Helicopters dayglo tape, part no ACC/GLOW. Check that each tip in turn is the same height above the boom by turning the rotor until one blade is over the boom, measuring the distance down, then turning the rotor 180 degrees so the second blade is over the boom, and measuring that distance. This is static tracking and is very important.

Adjustment is made by flexing the alloy centre plate.







Assemble the fuel tank as in the diagram and fasten on the foam seating behind the engine with light rubber bands. These must not be tight or engine vibration will cause foaming of the fuel. Connect the feed tube to the carburettor with the fuel filter in line.

Check that the completed model balances just in front of the rotor mast. Turn the rotor until the main blades are along the length of the model. Lift the model by the fly bar. The nose should be slightly down with the skids almost horizontal.

Main Rotor

- Precise trim can vary widely according to many factors, including model weight, engine power, air temperature, humidity, height above sea level, type of fuel used, glowplug condition, engine condition, etc.
- However, a reliable starting point is to set the main blades to O degrees with the engine throttle closed.
- Total vertical travel of the swashplate on the main mast should be 12-14mm while throttle moves to open.
- Main blade pitch during the hover is approximatly 3 to 4 degrees.

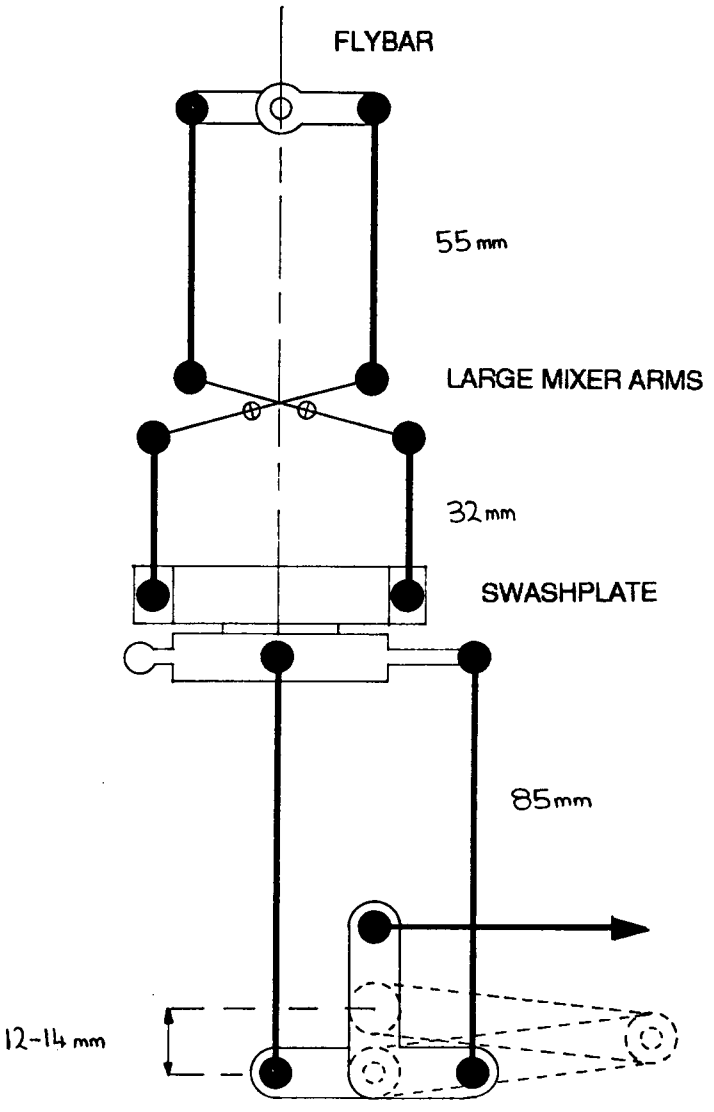
How it works:

When the rotor is spinning at flying speed, the model will move in the direction of tilt of the main rotor disc, which follows the tilt of the swashplate. This tilt is controlled by the two cyclic pitch servos.

Tilting the swashplate down at the front will result in the rotor disc also tilting down at the front, and the model dropping its nose and moving forward from the hover. The same goes for left, back, and right, and any other angle - the rotor follows the tilt of the swashplate and the model moves in that same direction.

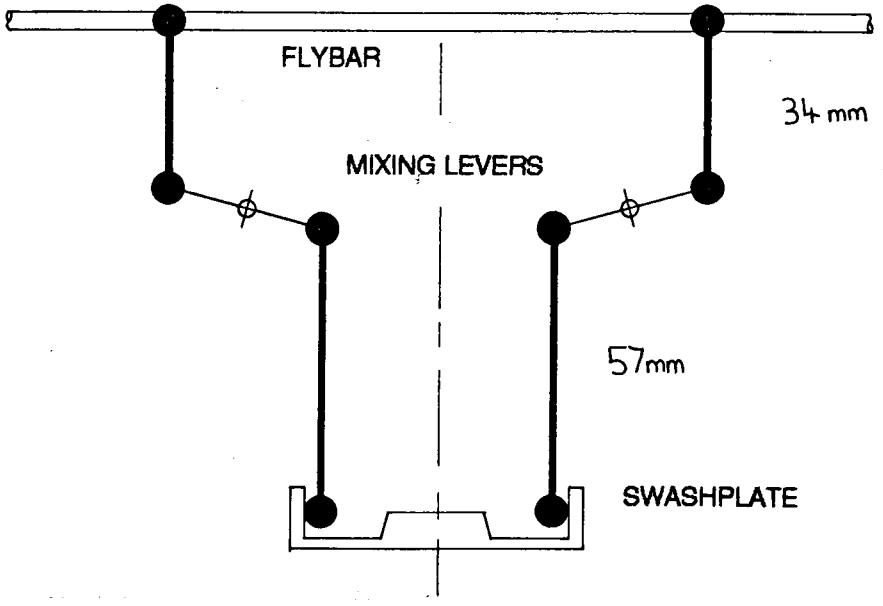
☞ An angular movement of the swashplate of about 15 degrees in each direction (total 30 degrees) is sufficient for ample control without over-sensitivity.

SETTING UP



SCHEMATIC DIAGRAM

Showing approx control rod lengths measured between ball centres



Tail Rotor

A suitable setting for the tail rotor is for the flat surface of the blades to be at right angles to the pitch control rod (i.e. pitch is O degrees) when the transmitter control stick is pushed fully to the right (with Tx trim at neutral).

☞ It is most important that the control rods move freely.

Engine

☞ Have you got grease in the gearboxes? . Grease is also essential in the hex couplings for the tail rotor drive.

To start your engine we recommend using a belt (part No ACC/B5) and an electric starter motor available from your hobby shop.

Follow the correct running in procedure for your engine as given by the manufacturer.

- The carburettor must be set rich enough to keep the engine cool, yet lean enough to provide ample power. With the rotor collective pitch set as specified the engine should be set to a rich two stroke mixture.
- The rotor head should be held while starting the engine with the throttle just open. The centrifugal clutch may drag when new but will quickly settle so it will be free at a correct idle speed. Open the throttle by pushing forward left hand stick if you have installed according to the drawing. This will speed up the rotor head and apply collective pitch.
- Rotor speed is important on any model helicopter and too great a deviation can cause aggravating problems.

At about half stick the rotor should be spinning fast and tracking correctly - that is each blade should be in the same path as the other. The coloured tips enable you to see this.

If tracking is incorrect throttle back the engine and wait for the rotor to stop, then increase pitch on the lower blade and reduce pitch on the higher blade. If in order, advance the throttle/collective to the point where the model is decidedly light.

Shaking

If there is a shake on the model, stop the rotor and add an extra band of covering material to one blade (15mm wide for minor shake, 50mm for vicious), try again, if worse put it on the other blade. The fly blades may also need dynamic balancing in this way.

When tracking and balance are sorted out the throttle/ collective may be advanced to the point of lift off.

☞ Too low a rotor speed will cause powerful oscillations of the whole model. Do not mistake them for an unbalanced head. The answer is to reduce collective pitch by lengthening the push rods between the paddle arm and the rotor incidence arm.

☞ Incidentally, an excess of collective pitch can cause the clutch to slip and heat up, and the tail rotor will be unable to cope with torque because it is running too slowly. Also in this condition the engine is working very hard at low rpm of the cooling fan, *so this is a dangerous condition to stay with.*

- If the engine screams and the model shows a reluctance to lift off then more pitch is required relative to throttle.
- If it lifts off but is very twitchy and sensitive on the controls again increase pitch to slow the rotor down.

☞ Lift off is best at about 1/2 to 2/3 of full throttle stick movement. Main rotor should be turning at approx 1100 rpm, equivalent to 4500 at the tail rotor, although up to 1300 is fine.

- Oscillations can also occur with a two bladed rotor head if the teeter is reduced by excessive tightening of the four teeter bolts (Rotor Head assembly sketch B). Try to adjust so the rotor head plate is held *firmly* but not solidly between the rubbers.

Similarly with the tail rotor. If the model tends to revolve at the point of lift off increase or decrease the tail pitch setting by moving the collars on either side of the yoke.

The model is now ready to fly.

There are a great many technicalities concerned with the flight of a helicopter, only the essential reactions will be described here.

Start by standing about three paces to the rear and three paces to the side of your model which is pointing into wind and on level ground. This is the best position for observing the attitude of the model and to be able to control the hover.

Increasing throttle/collective to the point of lift off will indicate that the model wants to go in one direction or another. Ignore this but apply a control (the cyclic control is as if you had hold of the model by the rotor top) to correct the movement. You can trim out the tail at this stage. Repeat until you are confident that your reactions will give a control in the right direction.

- Many beginners are confused by the apparent tendency of helicopters to leap off in random directions when they are about to leave the ground. Correct control inputs to counteract this have to be learned.

A touch more collective and the model will clear the ground. If at this stage it persistently goes in one direction the trim may be adjusted, either on the transmitter or by adjusting the length of the control rods to the swashplate.

Practice the above until you are confident you can keep the model in one position.

When the model is one metre clear of the ground (out of ground effect) control will be easier but a miscontrol will be more disastrous.

Training aids

If flying from rough grass then Morley floats can be an advantage, other training aids are more trouble than they are worth but the Morley string method may help.

A light extension to the tail boom is fitted to make an attachment for a 3 metre length of cord clear of the tail rotor. An active and understanding anchor man holds the other end with the model pointing down-wind. The model has forward trim set and the pilot stands to the left of the anchor man, who raises and lowers the string with the model. In this way the pilot learns the response of the model two controls at a time instead of having all four to worry about. This method has been tried, it works, and is recommended.

When you find that height control (do not let the model go above head height) and lateral control are an automatic reaction, then the forward trim is removed and the fore and aft cyclic becomes operational. As the string goes slack so the tail rotor control is needed. Persist until you find it easy. Try to get used to settling the model down - landing - rather than slamming the throttle shut when in the right place else you may chop the tail boom.

Now you can hover! Which you need to do to land. Follow this with slow flights forward, backwards and sideways until you can place the model at any point you want, and can keep it there.

The next stage is a circuit, which is easy, but coming out of forward flight back to the hover is not always so. On a calm day a slow and careful circuit is just a hovering circle. Note that the controls are used to change the attitude of the model to move it to the position required,and are not 'held' in any particular way. Note also that in forward flight above about 5 metres/second (12mph), a lot less power is required - this is caused by the addition of translational lift from the extra air going through the rotor, and is what can give rise to trouble in stopping.

To slow down, gently reduce collective and adjust cyclic to keep the model level. As the model slows the power will need to be increased to stop sink. When the model is stationary slightly reduce power to stop a vertical climbout. You can then settle it down.

Happy Landings

Morley Helicopters