

APPENDIX AH

KITPLANES FOR AFRICA

AMO: M660



AIRCRAFT FUSELAGE CONSTRUCTION MANUAL

FUSELAGE CONSTRUCTION MANUAL

NOTE:	Please read the General Manual before proceeding. Please read through the entire Fuselage Construction Manual before proceeding.
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PART 1. GENERAL PREPARATION

1.1 CLEANING AND FINISHING OF STEEL PARTS

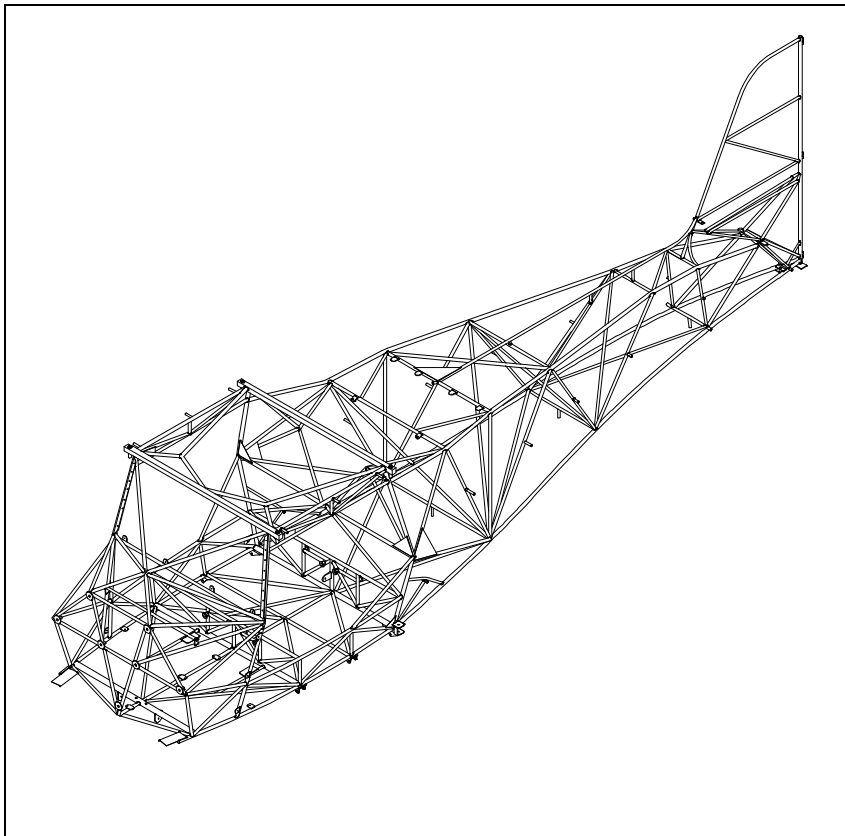
It is important to complete all work on the steel parts before corrosion protection is done.

With fabrication methods now incorporated using laser cutting of parts and TIG welding, inspection is unlikely to reveal much that requires rectification.

Inspect the entire fuselage and all other steel parts, remove all sharp edges and corners of all tabs on the fuselage, tail surface weldments and control tubes. Round the corners of the tabs and deburr their edges if any sharp edges are found.

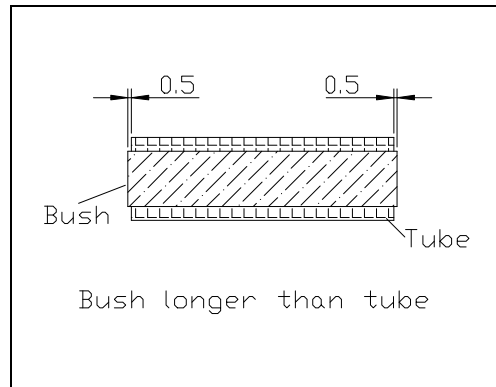
Visually inspect completion and quality of all welds and carefully file off any welding scale remnants from steel components.

De-burr the edges of all holes. It is essential for the safe operation of the aircraft to have smooth control movement without binding. Take great care not to over-ream any hole in your control system, as this will cause unwanted play in the controls. Ream just enough so that the bush or if applicable the bolt will rotate in the hole without binding.



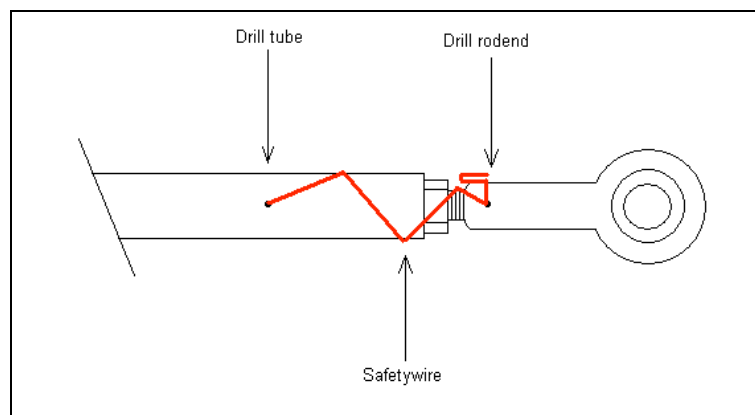
1.2 BRONZE BUSHES

The replaceable bronze bushes ensure that all the controls have the minimum tolerance without binding. The bushes must be slightly longer (1mm) than the tube or plate that they are in. Trim the bronze bush or the pivot tube to obtain the desired clearance. If the steel tubes have been reamed to the correct diameter and the brass bush still does not fit, the diameter of the bush can be reduced by fitting the bush in a drill chuck and spinning it against some fine water paper. The bushes must be so installed that the rotation occurs around the bronze bush and not around the bolt shank. On the short bronze bushes, over tightening the bolt may distort the bush and cause the controls to bind.



1.3 ROD END BEARING INSTALLATION

Whenever a bolt is used through a rod-end bearing, the bolt should fit tightly in the mounting tab holes causing the motion to occur in the rod-end bearing and not in the mounting tabs. In addition, the nut should be torqued up to pinch the tabs against the side of the ball to take up space between the ball and tab. Shim with a washer if required to prevent the tabs from bending in to meet the ball. Extra washers are supplied in the kit for this purpose. Always install a lock nut where the rod-end bearing screws into or onto a fixture. For control push-pull rods, it is advisable to drill a 1.5mm hole in the rod (tube) and rod end bearing to accept a safety wire locking.



1.4 SEAT BELT MOUNTING TABS

Ensure that the hole centres in the seatbelt tabs are at least 12mm in from the rounded edge and centred between the sides of the tabs. Deburr all holes. The seat belts are supplied with the Cover and Finish kit. Check that the seat belt tabs do not foul any of the controls when the belts are fitted.

1.5 BUTT RIBS

The fuselage kit is supplied with two plywood butt ribs (FRB-1). They will not be installed until the wings are fitted to the fuselage. The ribs can be sanded and prepared for epoxying of the cap strips (FRB-3) to the top of the ribs. The 12x12mm aluminium square tube is epoxyed and riveted on the inside (cabin side) of the butt rib. Cut the square tube to the desired length and bend it over a wooden block to the same profile as the top of the butt rib. Clean and roughen the side of the tube to be epoxyed to the butt rib. Before the epoxy sets, rivet the square tube to the butt rib with the 3.2 x 12mm rivets supplied. The butt ribs will be riveted to the fuselage mounting tabs (three at each side of the cabin) with 4.8x12mm AL rivets (2 in each tab). This is done with the wings rigged to the fuselage. See more detail about the butt rib in the Wing Manual page W40 and the Finishing Manual page CF18.

1.6 WING MOUNT BUSHINGS

The wing mount bushings will only be trimmed once the wings are ready to be mated to the fuselage. The wing spars attach to the fuselage at the 25mm square tube front and rear spar carry-through tubes (roof of the fuselage). On each end of these tubes a vertical 10mm bushing is welded in to locate the spar bolts and clevis pins. The bushings are slightly oversized, trim the length according to the drawing on page W35 of the Wing Construction Manual so that the spar root ends (with WSP-2 installed) fit snugly over the bushing.

1.7 PAINTING

The fabricated steel parts come from the KFA factory painted with black Metcote etch primer.

On completion of all the drilling, filing and fitting, the fuselage and all components may be painted. KFA suggests that when fabrication work on the fuselage is complete, all the steel parts should be either sand blasted or sanded down and re-primed with a good steel etch primer.

If the fuselage and steel parts are to be powder coated then the parts first have to be worked before coating. Do not use a thick layer of paint on the threaded ends of the push-pull tubes. Use masking tape around thread if the parts are to be power-coated.

The push-pull tube may be electro-plated with zinc or cadmium. The most popular paint is the 2-k range of paints with a slow hardener. The slow hardener allows all over spray, especially on the fuselage tubes, to settle in and thus give a smooth finish.

PART 2. FLOORBOARD INSTALLATION

2.1. Carefully trim and fit the plywood floorboards (FLB) in the fuselage. Avoid splintering the edges of the floorboards. The floorboards will have to be bowed slightly to install. Drill 3.2mm holes from below through the tabs welded to the frame and up through the floorboard. Place a block of wood on the area the drill will come through to avoid splintering of the plywood. Remove the floorboards and varnish the wood with two coats of polyurethane varnish (like Nova 17) and allow drying. If the optional sound proofing foam is to be installed, glue the sound-proofing foam to the bottom of the floorboards with contact adhesive.

2.2. Insert the four centre rivets from the top, starting from the rear, **only set these centre rivets at this time**. The other rivets are installed after the belly of the fuselage is covered. The sides and front of the floorboards need to be lifted to allow access to the longeron during covering. The control column and rudder pedals are bolted through the floorboards onto the steel tabs below.

3. CONTROL SYSTEM INSTALLATION

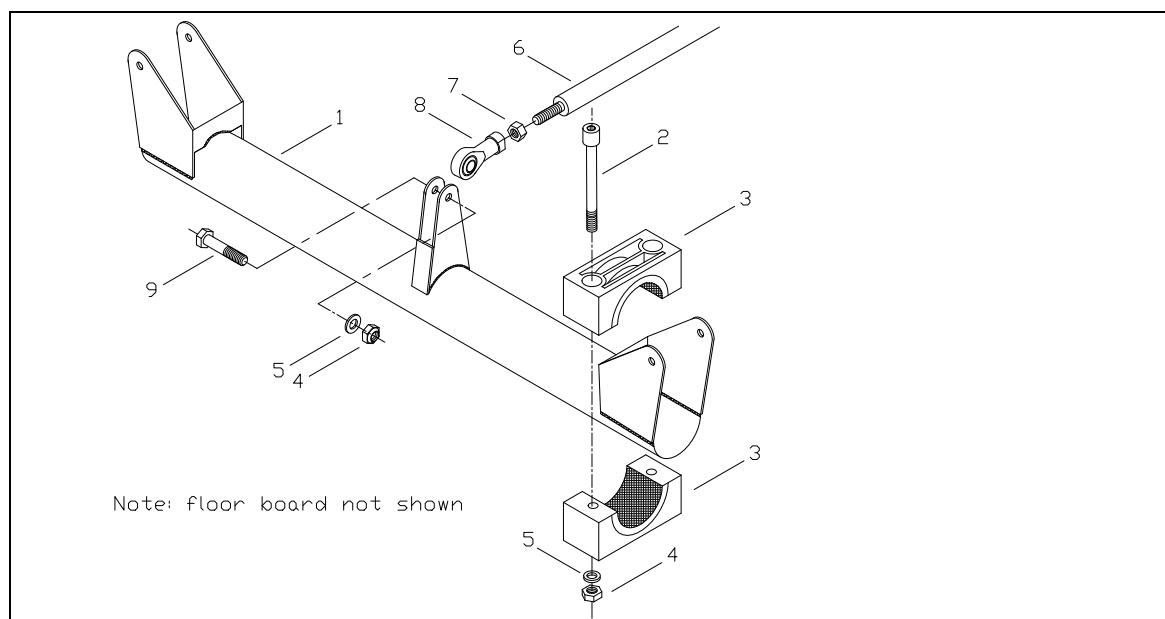


Fig #	Part #	Part description	Qty/assy	Notes
1	FCC	Control column	1	
2	C0665	Cap screw M6 x 65	4	
3	FBR-1	Nylon bearing block. Blue	2	Set (of 2)
4	NY006	Nylok M6	5	
5	W006	Washer M6	5	
6	FCT-6	Push-pull tube. Elevator, front half	1	
7	N006	Nut M6	1	
8	FC-1	Rod-end bearing. female	1	
9	B0625	Bolt 6 x 25	1	

3.1 FLIGHT CONTROLS

1. Two control column bearings (FBR-1, four halves) are supplied with the kit. Each bearing consists of a top and bottom half. The bearing needs to fit snugly around the 38mm Control column housing FCC without any play but still allowing free pivoting. If the bearing fits too tightly around the control column, sand the inner surface with a flap wheel.

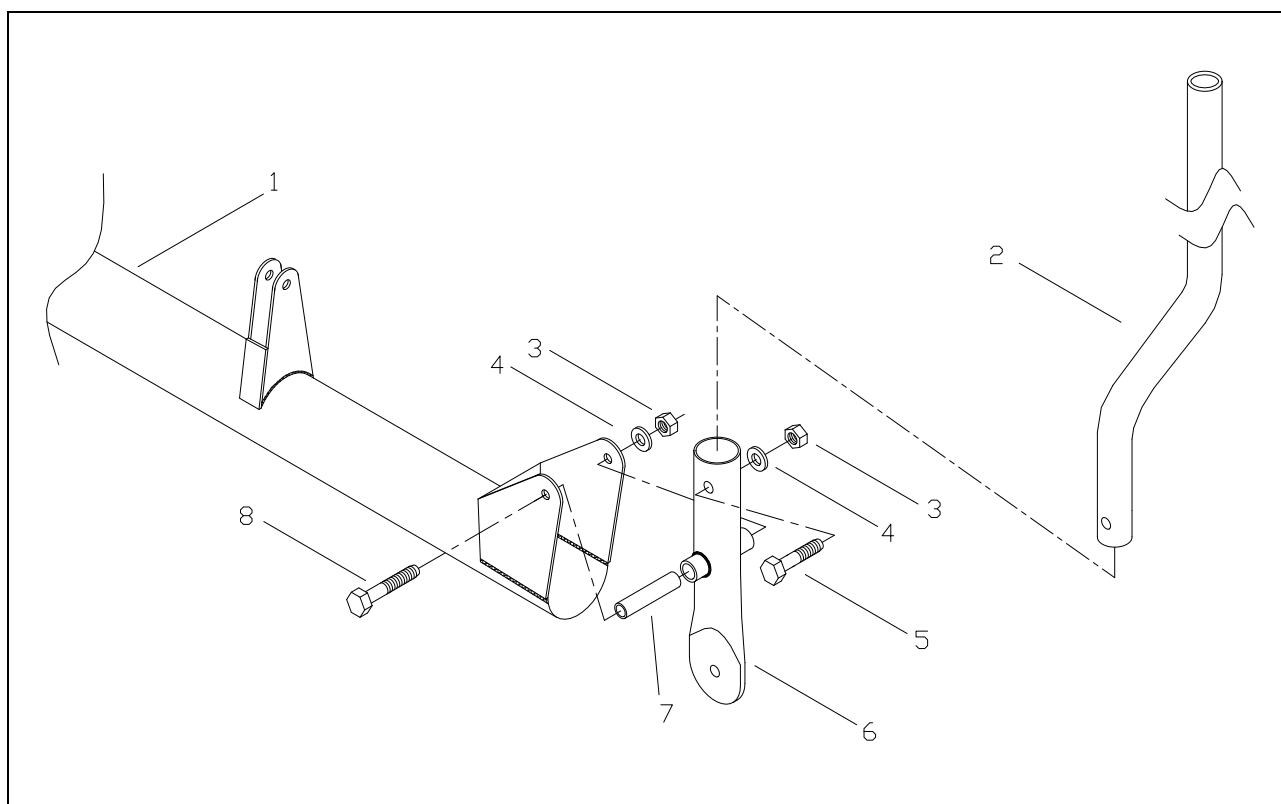


Fig #	Part #	Part description	Qty/assy	Notes
1	FCC	Control column	1	
2	FCS-B	Control stick	1	
3	NY006	Nylok M6	2	
4	W006	Washer M6	2	
5	B0635F1	Bolt 6 x 35	1	
6	FCS-A	Control stick housing	2	
7	BB8039	Bronze bush 8 x 39mm	2	
8	B0660	Bolt 6 x60	2	

2. Install two FC-1 female rod-ends and locknuts on the FCT-1 control stick connecting tube. Insert the bronze bush BB8039 into the control stick pivot bushings FCS-A. The bronze bush should be 1mm longer than the steel tube. Trim the bronze bush FCS-A tube to obtain the 1mm clearance. Mount the FCS-A housing to the Control column end towers with the 6mm B0660F1 bolt. Bolt the control tube FCT-1 and rod-ends to the bottom front (fire wall side) of the control stick flat ends. Screw the Rod-ends in or out to ensure that the control sticks are perfectly parallel to each other. Once the aircraft seats are installed and the ailerons are connected, the control sticks FCS-B are installed, pointing rearwards, in such a way that they are naturally centralized between the pilot's legs. Install the 6mm retaining bolt B0636F1 from the front with the threaded end pointing to the tail of the aircraft.

Adjust linkages to obtain neutral with both control sticks vertical to the floor.

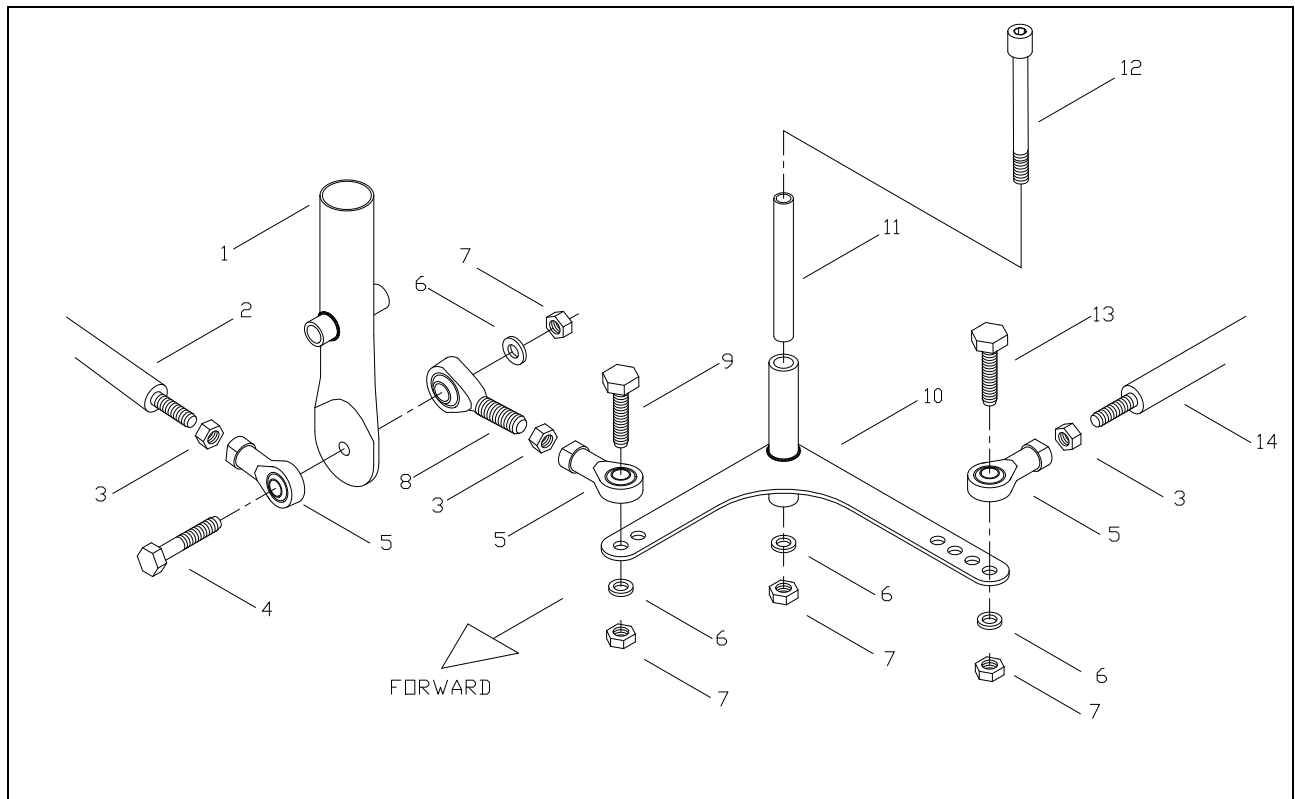


Fig #	Part #	Part description	Qty/assy	Notes
1	FCS-A	Control stick housing	2	
2	FCT-1	Push-pull tube 350mm	1	
3	N006	Nut M6	3	
4	B0630	Bolt M6 x 30	1	
5	FC-1	Rod-end bearing. Female M6	3	
6	W006	Washer M6	4	
7	NY006	Nylok M6	4	
8	FC-2	Rod-end bearing. Male M6	1	
9	B0625	Bolt M6 x 25	1	
10	FBC-1	Bell crank. Aileron	1	
11	BB8069	Bronze bush. 8 x 69mm	1	
12	B0680F1	Bolt M6 x 80	1	
13	B0625	Bolt m6 x 25	1	
14	FCT-2	Push-pull tube. Aileron 780mm	1	

3. The front aileron mixer FBC-1 needs to be installed before the control column can be installed. Insert the bronze bush BB8069 into the tube. Install the FC-1 rod-end bearing on the short arm of the bell crank with the 6mm B0625F2 bolt, 6mm nylok and washers. Install the locknut on the FC-2 rod-end and then screw it halfway into the FC-1 rod-end. Install the bell crank with the short arm towards the front. Bolt the Rod-end onto the long arm of the bell crank FBC-1 before bolting the bell crank into place. Set the FC-1 and FC-2 rod ends so that the short arm of the FBC-1 aileron bell crank is pointing forward at exactly 90 degrees to the bungee truss.

3. Prepare to drill the mounting holes for the control columns.

Position the FBR-1 nylon bearings, with the control column in them, on the floorboard over the two steel mounting channels.

Move the bearings outwards until they contact the tabs on the FCC control column housing. The tabs prevent any end float on the FCC control column torque tube.

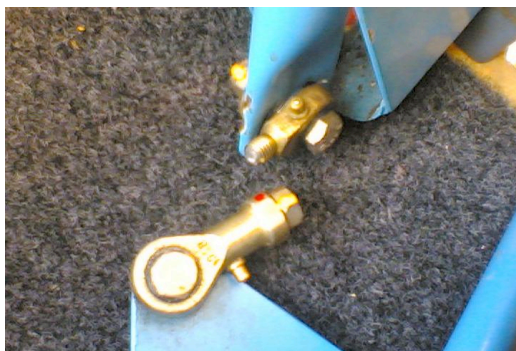
Connect the FC-2 rod-end to the bottom rear of the left FCS-A control stick housing. Move the control column so that the bell crank rod-ends FCT-1 and the control column are in a straight line and parallel to the front landing gear truss.

Check that the front bell crank is perpendicular to the landing gear truss, the control stick tubes FCS-A are vertical, the nylon bearings FBR-1 are against the column tabs and over the mounting channels, and that the control column is parallel to the front truss.

Use the FBR-1 block as a drill guide. Drill through the floorboard and mounting channels.

Fasten each mount to the floor with the 6mm C0670F1 cap screws.

WARNING:	In 2005 there was a recorded case of a Bushbaby loosing aileron control due to a rod-end bearing failure after incorrect rigging. The failure occurred in the male bearing between FBC-1 bell crank and FCS-A control stick housing. SB024 refers.
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CAUSE:

The balls of the 2 rod-end bearings allow the control stick to freely move forward and aft within a set range. If this range is exceeded the bearing will bind and put a twisting load on the bearings. The thread area of the male rod-end bearing is the weakest link in the system and will fail first.

The amount of stick travel is controlled by the two clamps either side of the FEV-1 bush, on the FCT-7 elevator pushrod.

ACTION:

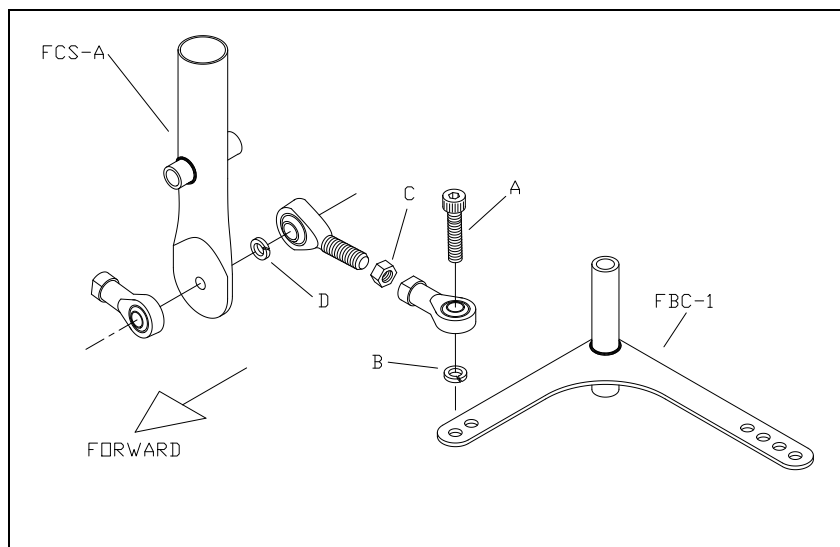
1. When rigging the elevator travel, inspect the two rod-ends for binding by moving the stick full forward and aft, the bearings must have slight free play when the stop clamps contact the FEV-1 bush.
2. If there is no free play, follow the procedure below to obtain full elevator travel whilst still having play on the rod-end bearings.
3. The N006 locknut **MUST** be installed and set. It is not acceptable to have the rod-end bearings rotate about the thread after rigging.

PROCEDURE: (see figure below for reference)

- 1) Set the hose clamp limit stops on the elevator tube for the desired up and down elevator, normally 15° down & 25° up. If more up elevator is required then reduce the down travel

NOTE : The rotation in the rod-end bearing allows for a total elevator travel of 40°.

- 2) Thread the N006 locknut onto the FC-2 male rod-end bearing, thread the FC-1 and FC-2 bearings together.
- 3) Install the assembled bearings in position, replace the B0625 bolt with a 6x25 cap screw and fit an M6 spring washer between the bearing and FBC-1. The washer acts as a spacer.
- 4) If more play is needed on the bearings, an additional M6 spring washer can be installed between the rod-end and FCS-A control stick housing.
- 5) Move the stick full back until the stop is engaged. Rotate the rod-end bearing forward and lock the lock nut. Move the stick fully forward and check that there is still free play in the rod-end.
- 6) When rigging is complete, mark the FC-2 rod-end thread for future inspection to ensure the locknut remains set.



A = Cap screw M6 x 25

B = M6 spring washer

C = M6 lock nut (must be installed)

D = M6 spring washer. Optional if rod-end fouls FCS-A

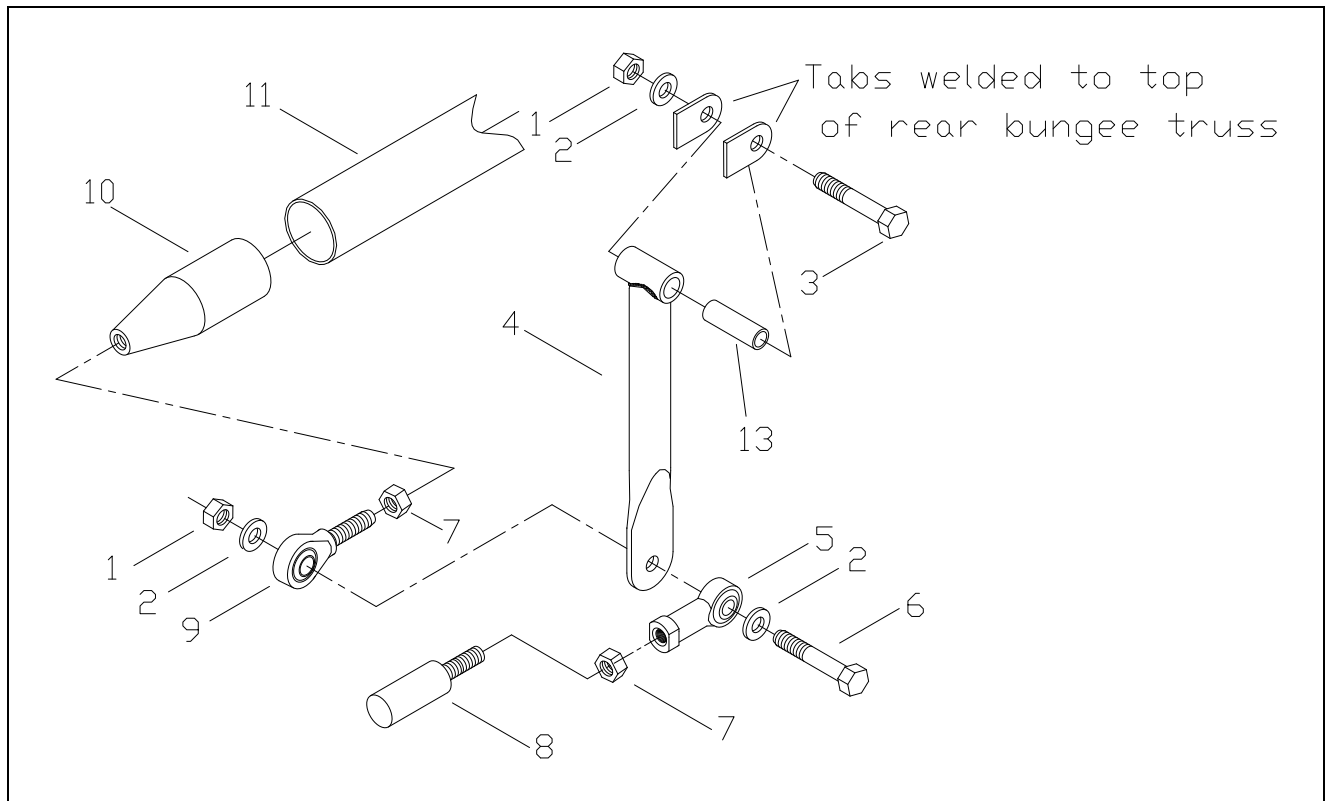


Fig #	Part #	Part description	Qty/assy	Notes
1	NY006	Nylok M6	2	
2	W006	Washer M6	2	
3	B0635	Bolt 6 x 35	1	
4	FBC-3	Idler arm, elevator.	1	
5	FC-1	Rod-end bearing, Female M6	1	
6	B0635	Bolt 6 x 35.	1	
7	N006	Nut M6	2	
8	FCT-6	Push-pull tube. Elevator front 650mm	1	
9	FC-2	Rod-end bearing, Male.	1	
10	FCT-8	End fitting, aluminium	1	See note next parts list
11	FCT-7	Push-pull tube. Ø 25 x 1.2 aluminium	1	
13	BB8025	Bronze Bush 8 x 25mm	1	

4. Install the locknuts on the forward elevator control tube FCT-6 leaving approximately $\frac{1}{2}$ of the treads on each end clear. Screw the rod-ends on up to the locknuts. Bolt the control tube to the control column horn.

5. Insert the Bronze bush BB8025 into the pivot bushing of the FBC-3 Idler bell crank. The bell crank is installed between the tabs on the centre of the rear landing gear truss behind the seats. Bolt the rear rod-end of the FCT-6 control tube and the front rod-end FC-3 of the FCT-7 to either side of the flattened end of the Idler bell crank.

NOTE:	The FCT-2, FCT-3 and FCT-6 Control tubes can all have a slight bend in the centre to allow for more clearance below the seat.
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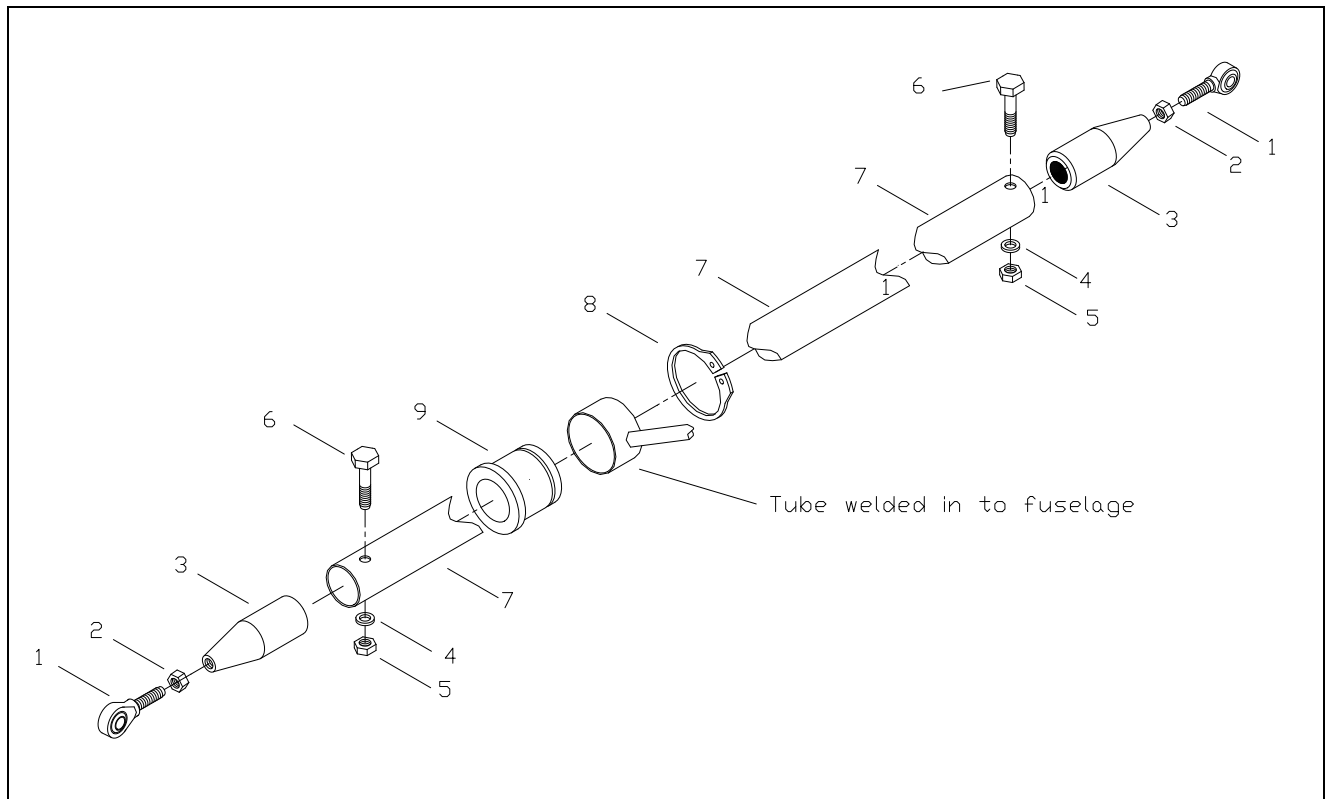


Fig #	Part #	Part description	Qty/assey	Notes
1	FC-2	Rod-end bearing. Male.	2	
2	N006	Lock Nut M6	2	
3	FCT-8	End fitting. aluminium	2	Rod end screwed in all the way.
4	W006	Washer M6	2	
5	NY006	Nylok M6	2	
6	B0640	Bolt 6 x 40	2	
7	FCT-7	Push-pull tube Ø 25 x 1.2 aluminium	1	
8	CI030	Circlip Ø 30	1	
9	FEV-1	Bushing Ø 32 x 30	1	

6. Assemble the 16mm FCT-7 aft elevator push-pull control tube by installing two FCT-8 end fittings, 6mm rod-ends FC-3 and lock nuts to each end, turn in all the way.

Mark the position of the 6mm retaining bolt, 20mm from the end of the tube.

Insert the FCT-8 fitting into the tube until the flange is flush with the tube end. Drill a 6mm hole through the centre of the tube and fitting. Install the 6mm bolt, washers and temporary nut.

Fit and install the FEV-1 nylon guide-bushing on the control tube. It should have a 0.5mm clearance to allow free sliding motion. Sand the inside of the bushing to obtain the correct amount of clearance.

The bushing should fit snugly inside the socket-guide welded into the aft portion of the fuselage structure. The nylon bushing is kept in place by the circlip C103F1. Secure the ends of the circlip with safety locking wire.

7. Remove the FCT-8 end fittings, slide the FCT-7 push-pull tube into position through the FEV-1 bearing from the rear of the fuselage. Reassemble the FCT-8 end fittings and bolt using nylok nuts.

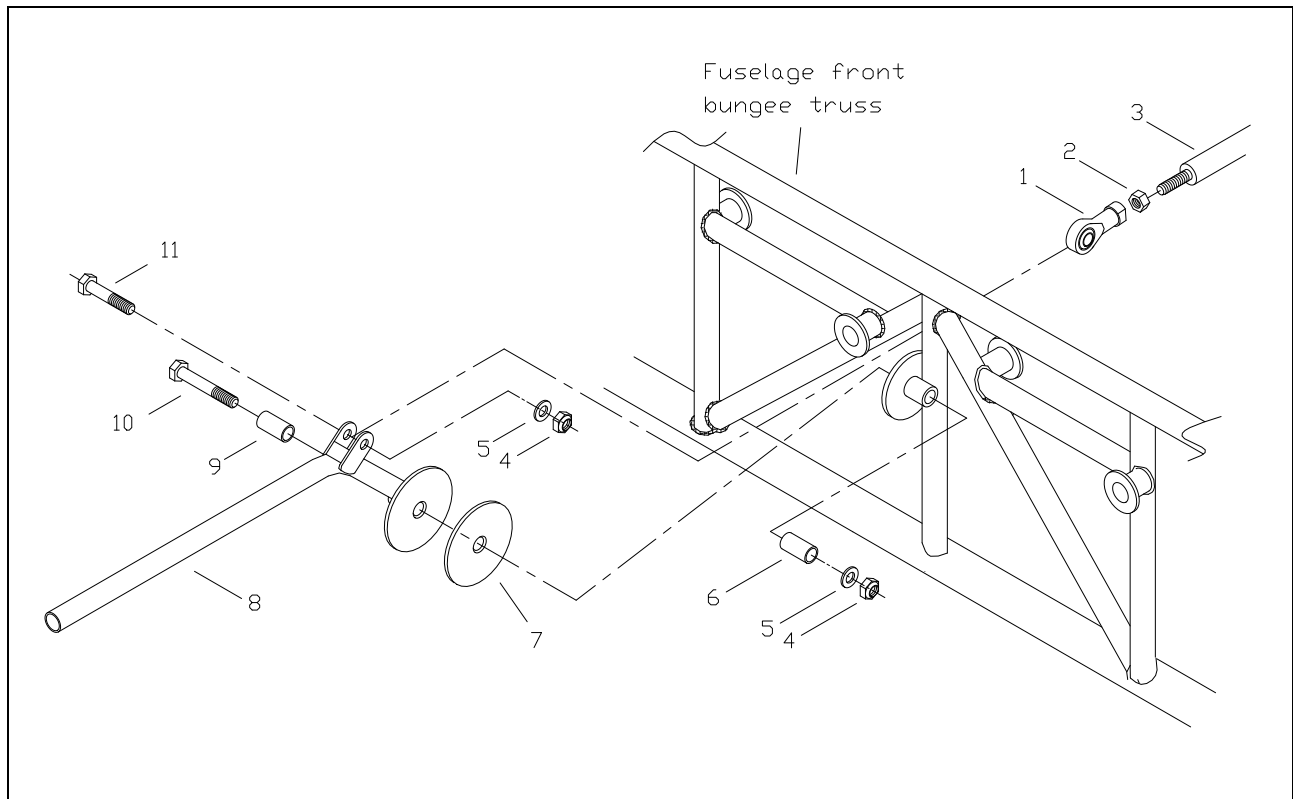


Fig #	Part #	Part description	Qty/assy	Notes
1	FC-1	Rod-end bearing. Female	1	
2	N006	Nut M6	1	
3	FCT-6	Push-pull tube	1	
4	NY006	Nylok M6	2	
5	W006	Washer M6	2	
6	FBR-4	Nylon tube ø8 x 1mm.	1	
7	LE040	Leather washer 40mm	1	
8	FLP	Flap handle	1	
9	FBR-4	Nylon tube ø8 x 1mm.	1	
10	B0650	Bolt 6 x 50	1	
11	B0625	Bolt 6 x 25	1	

3.2 FLAP CONTROL

1. Cut a circular washer from the piece of leather supplied, the size of the washer welded onto the Flap handle. The washer serves as a friction pad between the Flap handle and the matching mount on the fuselage (located in the right centre of the seat-front support truss-work). Insert some of the FBR-4 nylon bearing in the steel tubes of the flap handle and the fuselage mount. Fasten the friction washer between the washers with 6mm B0650F1 bolt and nylok nut.

Tip: Chamfer one end of the FBR-4 bearing tubing on a sanding wheel for an easier fit.

2. Bolt the rod-end bearing to the flap handle B0625F3. Ensure that there is a washer on each side of the ball.

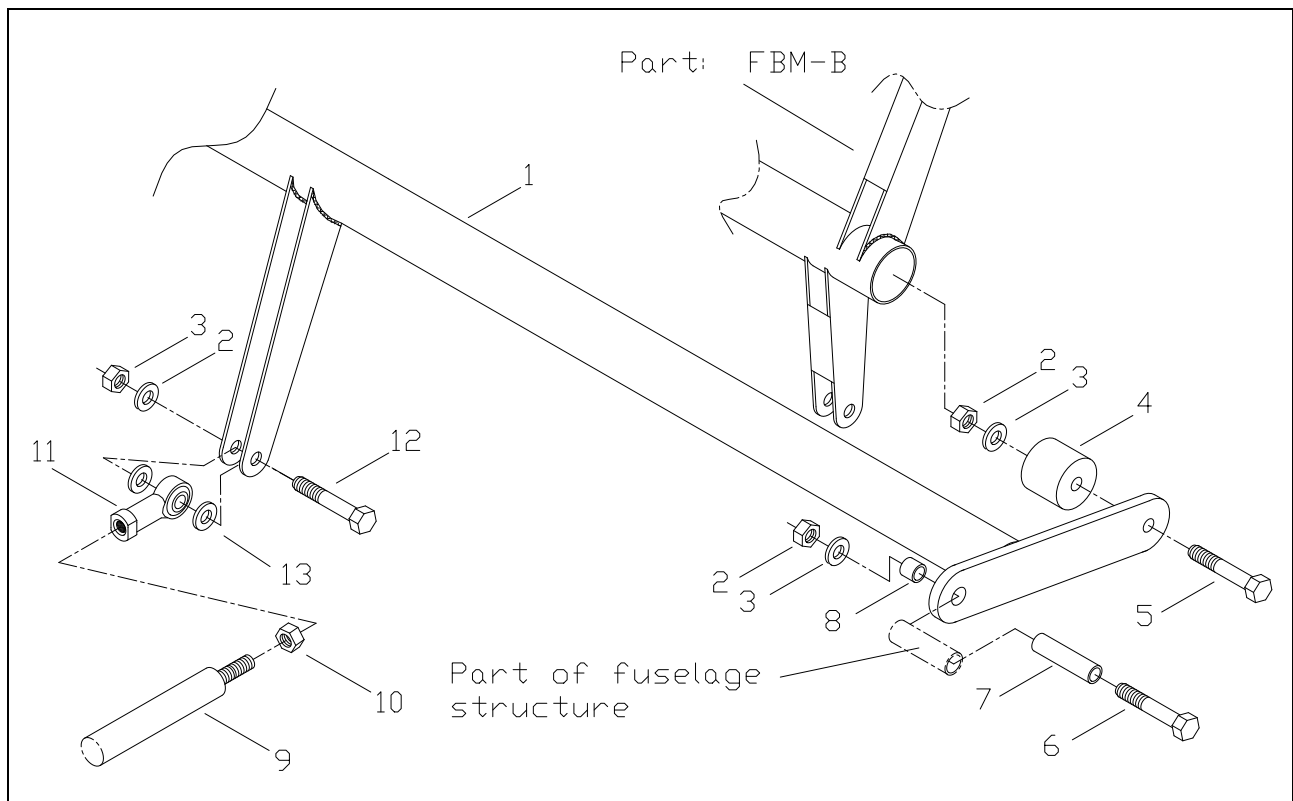


Fig #	Part #	Part description	Qty/assy	Notes
1	FBM-A	Mixer, flap	1	
2	NY006	Nylok, M6	4	
3	W006	Washer, M6	4	
4	FBR-2	Bearing, \varnothing 23 x 20. Nylon	2	
5	B0635	Bolt 6 x 35	2	
6	B0650	Bolt 6 x 50. FBM-A / fuselage	2	
7	FBR-4	Nylon bearing tube. \varnothing 8 x 40mm	2	
8	BB8007	Bronze Bush \varnothing 8 x 7mm	2	
9	FCT-3	Push-Pull tube, 700mm	1	To flap handle
10	N006	Lock nut. M6	1	
11	FC-1	Rod-end. Female M6	1	
12	B06525	Bolt 6 x 25	1	
13	W006	Washer M6	2	Only needed to take up play

3.3 FLAP AND AILERON MIXERS

1. The FBM-A Flap torque tube mixer has an arm on each end, each arm has a long end and a short end. **The short arms attach to the fuselage and the long arms to the FBM-B mixer.** Ream the holes in each of the short ends of the bell crank to a "bearing" fit 8mm hole. The mixer is attached to the bushings on the triangular tubes on each side of the fuselage behind the seat with 6mm bolts.

Cut and file the inside edges of the fuselage welded-on bushings so that both are equally long, making the distance between the bushings 4mm longer than the outer dimensions of the FBM-A flap mixer. (776mm). Trim the outside of the tube down for an overall length of 35mm. Insert the FBR-4 nylon bearing tube into the fuselage bushings and trim flush. The FBM-A mixer is installed in the following sequence: Firstly from the outside the bolt, then the bronze bush BB8007 then a washer. The bolt fits into the FBR-4 tube through each fuselage bushing.

2. Assemble the FBM-A flap mixer and FBM-B aileron torque tube mixer mechanism. The mechanism can be assembled on a bench and then installed in the aircraft as a unit. Ream the horns of the flap and aileron mixer for a tight fit of the 6mm bolts that will connect the rod-end bearings to the mixers. Also ream the holes in each of the long ends of the Flap mixer to a tight fit on the 6mm bolts.

Ream or file the inside of both ends of the Aileron mixer 25mm torque tube for a bearing fit around the FBR-2 nylon bearings to be installed. Ensure that the aileron mixer FBM-B fits in between the long legs of FBM-A. There should be at least a 1mm gap between the tube and legs.

Countersink a hole 6mm deep in one end of the nylon bearing FBR-2 with an 8mm drill. Tap a 6mm nylok nut into this countersink. This will prevent the nut from turning when you install the FBM-B bell crank. Insert the nylon bushes on both FBM-A and B mixers face down.

Insert the 6x35 bolt, with washer, through the long arm of the mixer. Turn the bolt with fingers to pick up the thread of the nylok nut in the bearing then press the torque tube tightly against the nylon to grip it while taking up the bolt torque. Add loctite to the bolts on final assembly.

Rotation is between the nylon bearing FBR-2 and the inner surface of the bell crank mixer FBM-B. The nylon bearing should be pulled up tightly against the FBM-A arms.

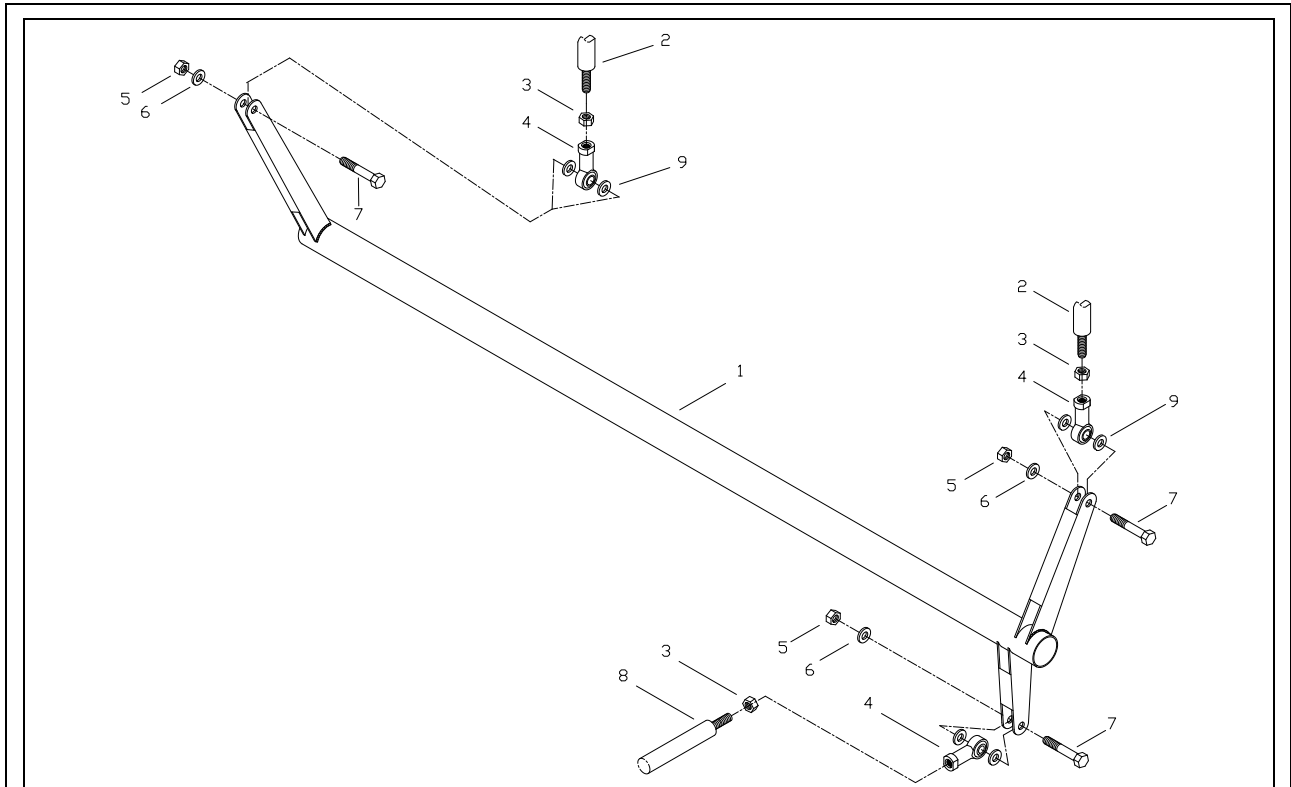


Fig #	Part #	Part description	Qty/assy	Notes
1	FBM-B	Mixer, aileron	1	
2	FCT-4	Push-pull tube	2	
3	N006	Lock nut. M6	3	
4	FC-1	Rod -end bearing. M6 female	3	
5	NY006	Nylok M6	3	
6	W006	Washer M6.	3	
7	B0625	Bolt 6 x 25	3	
8	FCT-2	Push-pull tube. Aileron control	1	To front Bell-crank FBC-1
9	W006	Washer M6	6	Used only if spacer needed.

4. The FCT-4 vertical flaperon push-pull tubes will attach to the two long horns pointing upwards on the FBM-B aileron mixer. Install the whole flap-aileron mixer assembly in the fuselage. Attach the flap mixer to the bushings on each side of the fuselage with the 6mm B0650 bolts inserted from the outside. Use washers on either side of the bronze bushing. Washers may be used to space the mixer and fuselage gap so that there is no sideways play. The mixer pivots on the replaceable bronze bush. Use loctite on final assembly.

5. Assemble the FCT-2 and FCT-4 push-pull tubes and their rod-ends. Remember to thread on the locknuts. Install the FCT-2 push-pull tube between the FBC-1 aileron bell crank and the aileron mixer horns. Then assemble the FCT-3 Flap Push Pull Tube and its rod-ends. Install the control tube between the Flap handle and the Flap mixer horns. Once the wings have been fitted to the fuselage and the flaperons rigged, the FCT-3 tube can be permanently installed. See the wing construction manual for the flaperon rigging procedure on page W-49.

3.4 TAIL PLANE INSTALLATION

1. To prevent a “dead spot” in the elevator control, one of the trailing edges of the FEV-2 elevator should be bent upwards 12-15mm while the other side is held flat on a surface like the floor, inducing a very slight “twist” into the elevator spar but maintaining a straight hinge line. This will always ensure an air load on the elevator in flight.

2. Level the fuselage in the lateral and longitudinal planes.

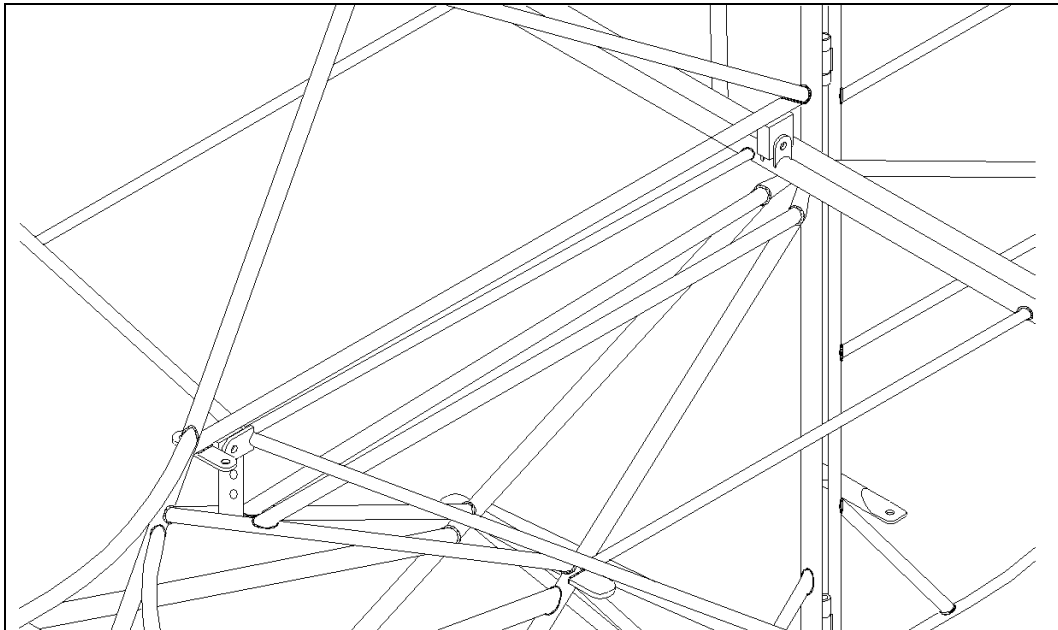
Use the underside of the cabin floor of the aeroplane to level fore and aft.

Use the rear spar carry through for left and right levelling.

Always use the same places to position the level for all readings, including Centre of Gravity calculations later on.

3. Insert the horizontal stabilizer FHS-1 into the slot on the fuselage and locate the rear mounting tab.

Bolt the stabilizer in the neutral position (middle hole) on the fuselage tabs with the 6mm B6x16F2 bolts. The stabilizer should be 3 to 3.5 degrees nose down (the front is lower than the rear). The majority of nose-wheel aircraft fly with the stabilizer set in the middle position. Set the stabilizer in the highest position for the first flight for tail-wheel aircraft.



4. Fabricate the FHS-2 Horizontal stab braces or struts.

Thread the FC-4 6mm rod-ends and lock nuts onto the stab struts.

Fit the stabilizer in position, levelled left to right and set to neutral.

Mark, drill and de-burr the 4 mounting holes for the stab strut rod-ends on the fuselage tabs, 2 holes on each side.

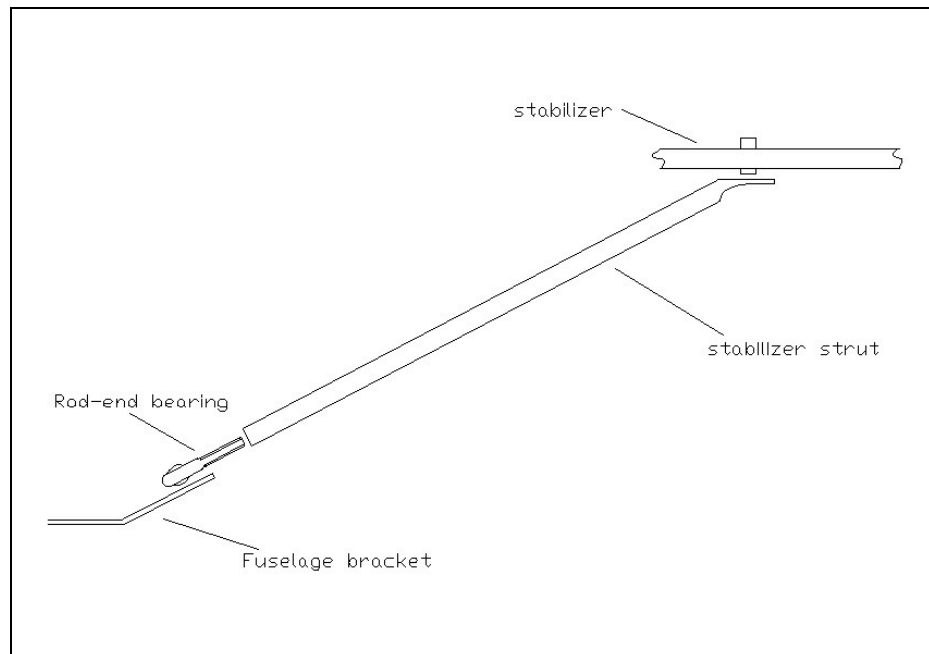
With the rod-ends threaded halfway in, measure the length of the stab struts will need to be.

Flatten and round the top ends of the stab struts.

Fit in position and mark the hole positions through the top of the stab, by pushing a 6mm drill bit or centre punch through the bush, the position for the mounting hole in the stabilizer strut can be determined.

Drill with a 6mm drill, de-burr and bolt together.

If the stabilizer front is raised or lowered the rod-ends are adjusted to ensure that the stabilizer remains horizontal.



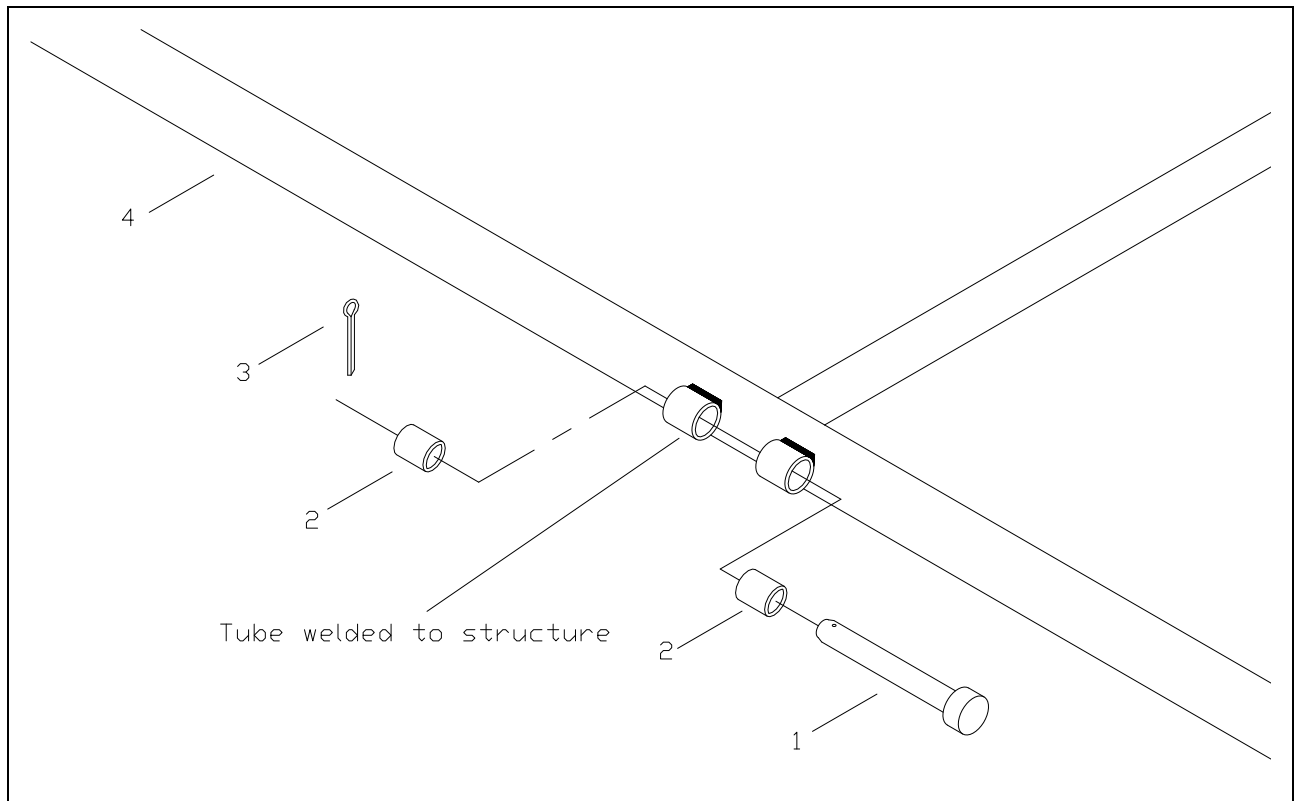


Fig #	Part #	Part description	Qty/assy	Notes
1	CP0665	Clevis pin 6 x 65mm (hinge pin)	4	For elevator. shown
1	CP0665	Clevis pin 6 x 65mm (hinge pin)	3	For rudder
2	FBR-4	Nylon tube Ø 8 x 1mm		Cut to length of welded tube
3	SP002	Split pin 2mm	7	For all pins
4	FEV-2	elevator	1	Only section shown

6. Install the FBR-4 bearing tubing in each hinge position on the elevator and horizontal stabilizer. Install the elevator in place with the clevis pins CP665F1. Connect the elevator horn to the aft push-pull tube rod-end of the FCT-7 tube with the 6mm B0625F8 bolt. Adjust the rod-ends so that the comfortable centre position of the control stick will result in neutral elevator. There should be enough stick travel fore and aft to give 25-30 degrees up and 15-20 degrees down elevator movement. Install two hose clamps FEV-4 on the FCT-7 elevator push pull tube on opposite sides of the FEV-1 bushing to act as limiting stops.

NOTE: All the tail surfaces are permanently installed after covering.

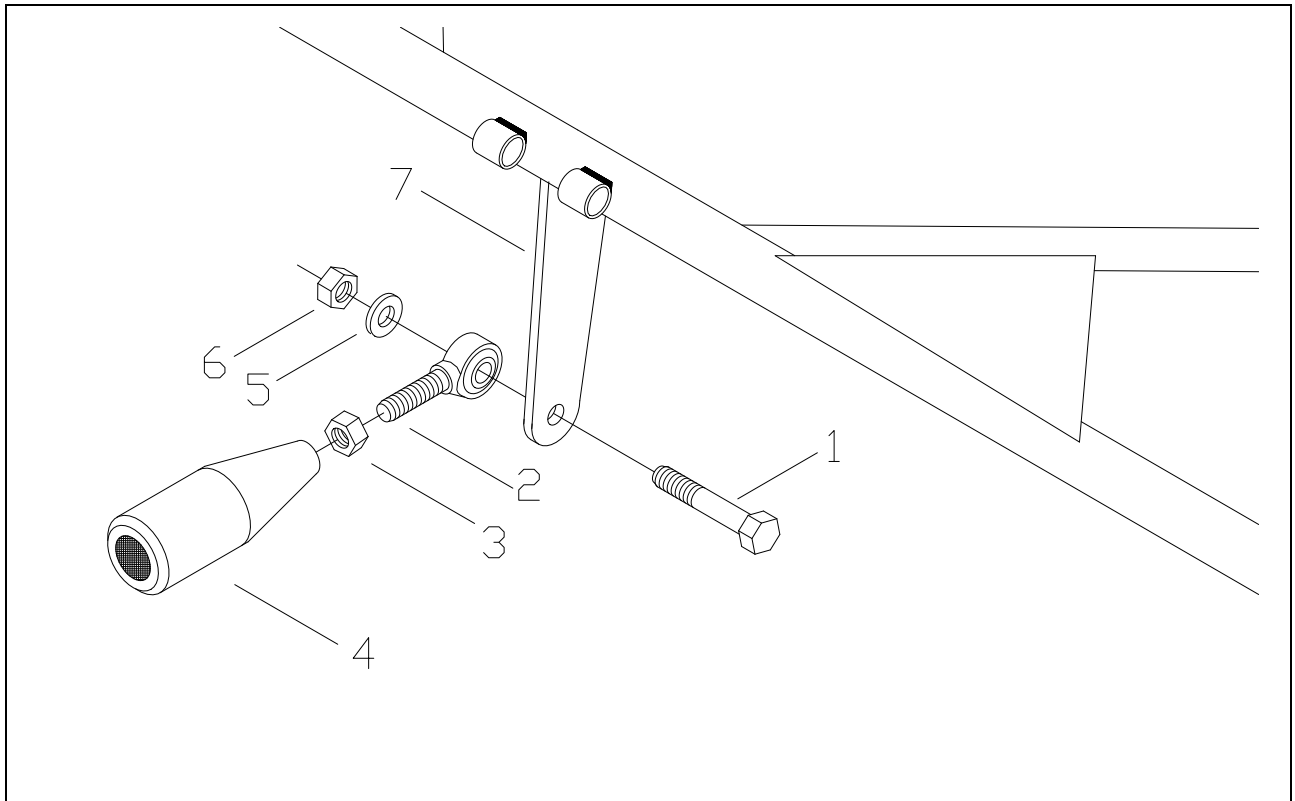
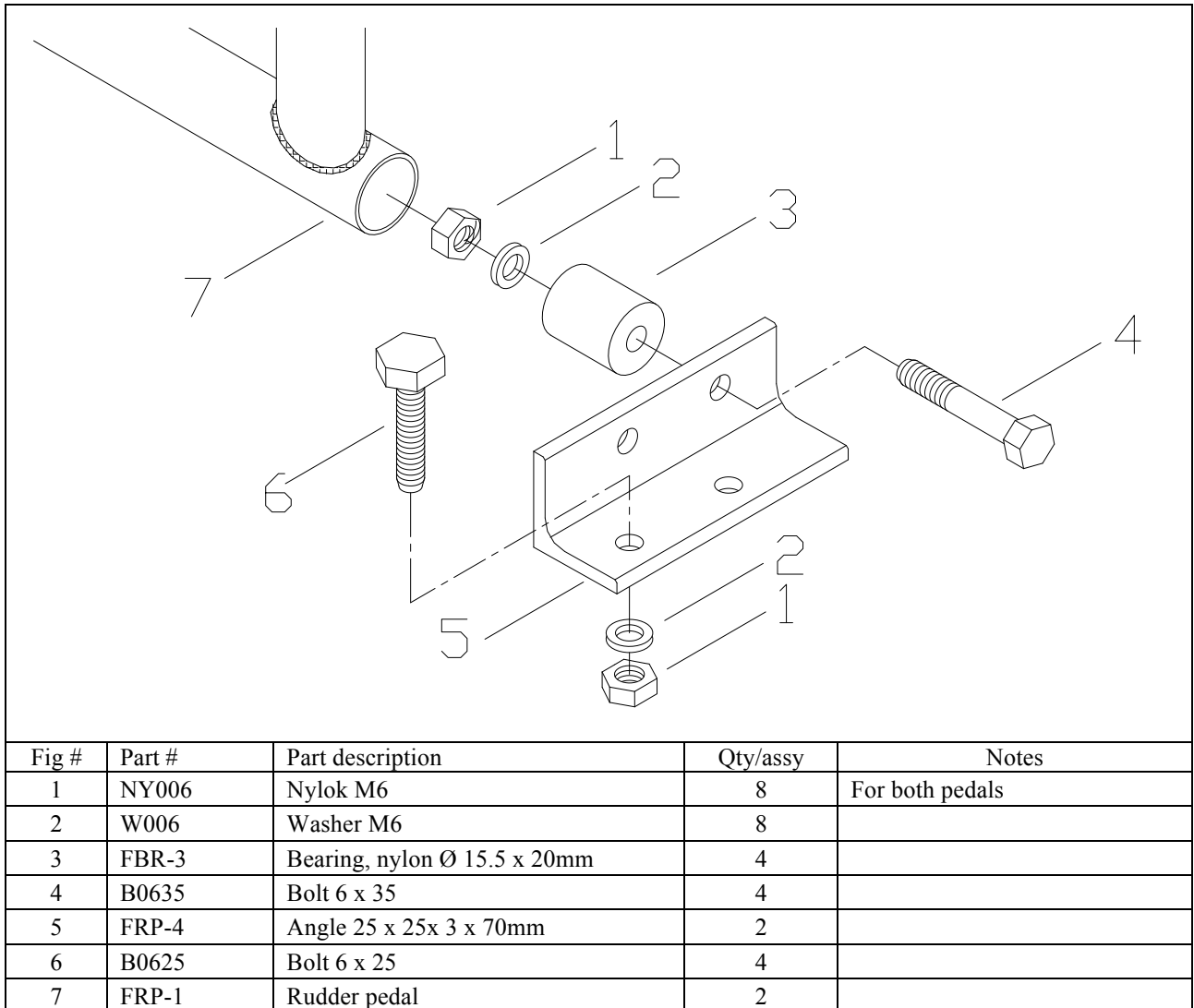


Fig #	Part #	Part description	Qty/assy	Notes
1	B0625	Bolt 6 x 25	1	
2	FC-2	Rod-end male	1	
3	N006	Lock nut M6	1	
4	FCT-8	End fitting. Aluminium	1	
5	W006	Washer M6	1	
6	NY006	Nylok m6	1	
7	FEV-2	Elevator	1	Horn shown

3.5 RUDDER CONTROL SYSTEM

1. Fabricate two FRP-4 Rudder pedal mounts according to the drawing below.



2. Ream or sand the inside ends of the rudder pedal (FRP-1) torque tubes to ensure a “bearing” fit for the FBR-3 bearings when inserted. The FRP-4 mounts with the nylon bearings go into the ends of the rudder pedal assembly. Install the bearings to the FRP-4 mounts with the 6mm B0635F3 bolts. The bolt must be tightened sufficiently to stop rotation of the bearing. The bearing area is the inside of the rudder pedal torque tubes and the outside of the FBR-3 bearings and not the bolt. Apply Loctite to all the nuts.

3. Place the rudder pedal assembly on the floorboard parallel to the firewall with the pedal nearest to the firewall 50mm aft from the inside of the nose-truss tube. Drill through the welded on tabs and the floorboard. Bolt both rudder pedal assemblies down with 6mm B0625F10 bolts and nylok nuts (nuts below floor). Apply loctite with final assembly.

NOTE: Permanent installation after covering.

4. Install the FBR-4 tubing in each hinge position on the rudder weldment (FR) and vertical fin and fit the rudder to the fuselage.

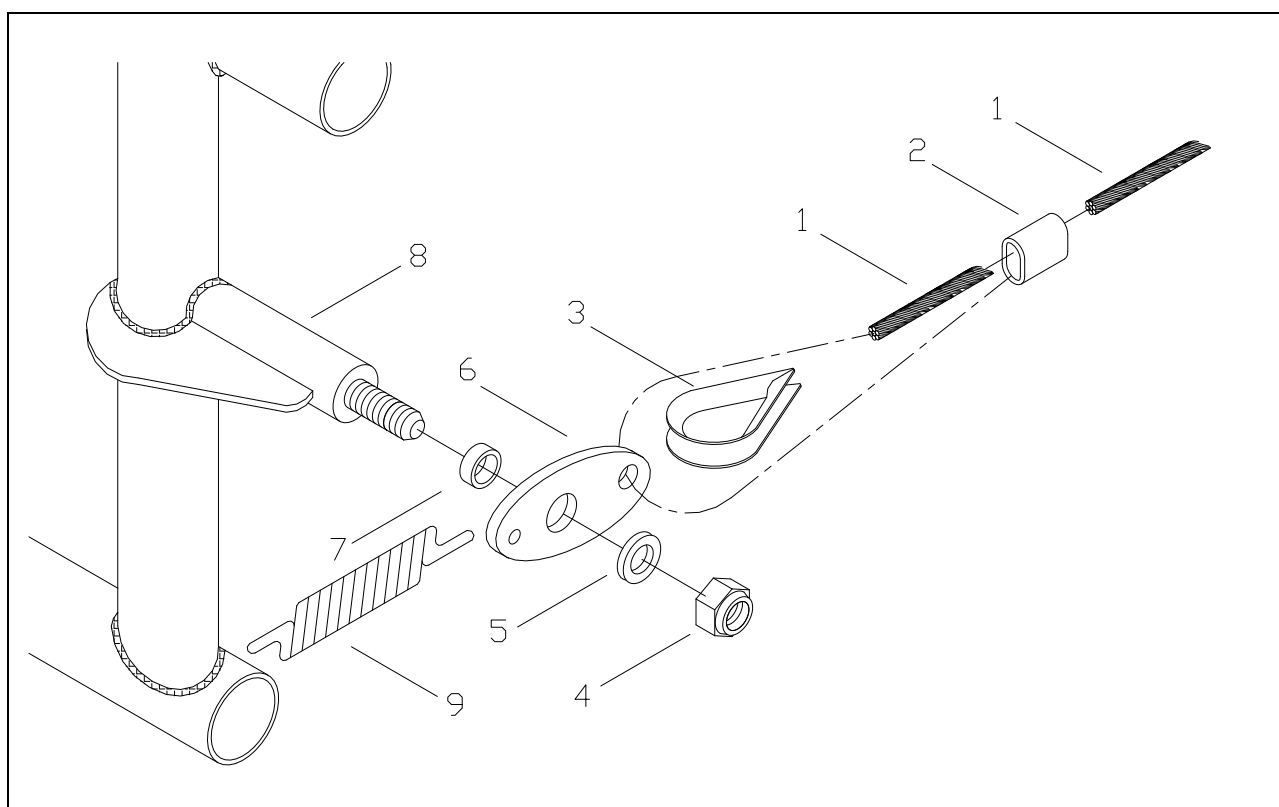
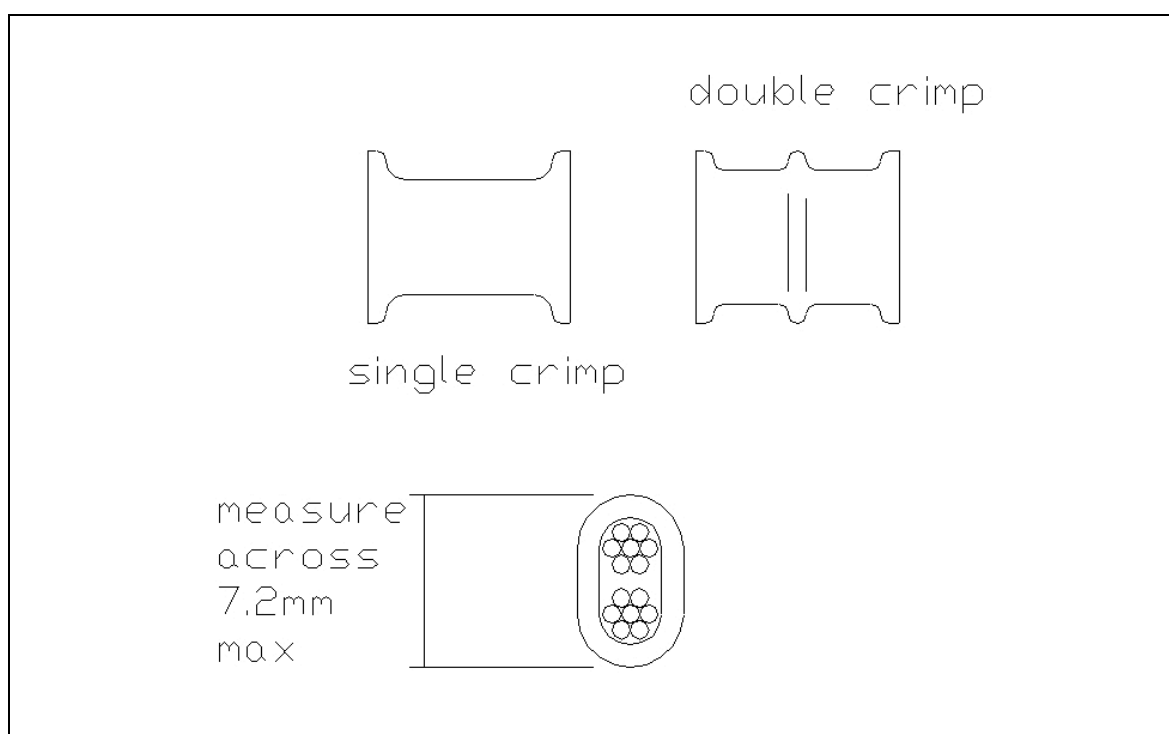


Fig #	Part #	Part description	Qty/assy	Notes
1	FRP-3	Cable. SS Ø 3 x5000mm	2	7 x 19
2	FRP-7	Nicropress 3mm	2	4 can also be used
3	FRP-8	Thimble. Stainless steel	2	
4	NY006	Nylok M6	2	
5	W006	Washer M6	4	
6	FRP-5	Rudder link plate	2	Laser cut
7	BB8003	Bronze bush Ø8 x3mm	2	
8	FRP-1	Rudder pedal	2	Left shown
9	FRP-6	Spring, rudder return	2	

5. Cut the FRP-3 rudder cable in two lengths. Wrap some masking tape tightly around the cable and cut through with one chisel blow against a steel anvil or use a bolt cutter. Push a Thimble through the first hole in the return spring tab and encircle the thimble through a nicropress cable sleeve with the cable. Pull tight and swage the sleeve with a nicropress swaging (crimping) tool. If you do not have a swaging tool, you may be able to borrow one from you local EAA chapter or take the work to your nearest Aircraft maintenance organisation or Electrical contractor to have it swaged.



Compress the cable sleeves to measure at most 7.2mm across the crimp when formed.

7. Install the return spring tabs to the rudder pedals according the drawing. The FRP-5 tab pivots around the Bronze bush BB8003F2 that fits over the bolt welded onto the rudder pedals. Clamp the rudder pedals in the neutral position (pass a rod through the centre pedal tops to ensure they are in a straight line). Neutral position will allow 30-35 degrees of rudder travel to each side (rudder against stops) before the pedals hit the firewall. (Use a straight edge to resemble the position of the firewall). The rudder pedals can later be adjusted by moving the position of the links to suit pilot leg length.

8. Insert the FBR-4 tube through the rudder cable guide bushes welded on the fuselage sides. Leave about 12mm extending forward and aft of each bushing. Install the FBR-4 material as a single long piece of tube connecting the two forward bushes along the seats. Fasten the tube to the fuselage with the cable ties FRP-9. This will protect the seat upholstery from being rubbed by the rudder cable. Route the cables through the bushes.

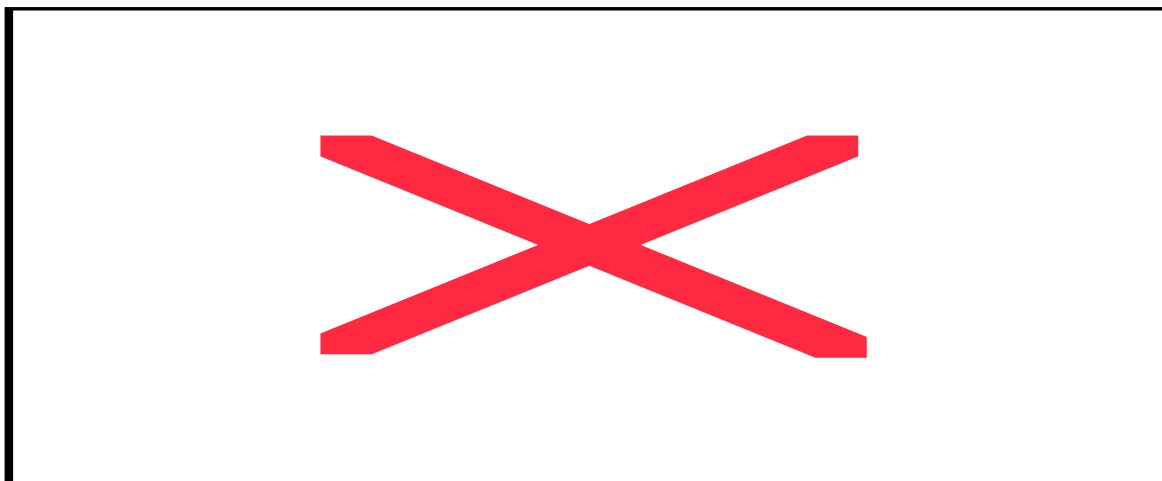


Fig #	Part #	Part description	Qty/assy	Notes
1	FR	rudder	1	Lower section shown
2	W006	Washer M6	2	
3	NY006	Nylok M6	2	
4	FRP-3	Cable. SS Ø 3 x5000mm	2	7 x 19
5	FRP-7	Nicropress 3mm	2	4 can also be used
6	FRP-8	Thimble. ss	2	
7	FRP-2	Rudder link plate, adjustable	2	Laser cut
8	BB8003	Bronze bush Ø8 x 3mm	3	
9	B0620	Bolt 6 x 20	2	

9. Clamp the rudder in a neutral position, streamlined with the vertical stabilizer. Swage the rear end of the rudder cables to the correct length with the cable through the first hole of the adjustment links FRP-2.

Install the bronze bush (BB8002F1) in the last 8mm hole of the link to the rudder. Ensure that there is a washer on either side of the bronze bush when installing the link to the rudder. The adjustment links must be free to rotate. Work the pedals to move the rudder from stop to stop. The travel should be 30-35 degrees to each side.

10. The FRP-6 rudder return spring is installed between the FRP-5 plate and the firewall support angle (CF-12). Drill a 3mm hole in the CF-12 angle, 25mm above the FRP-5 attach point. Install the spring through the FRP-5 front hole and the angle. The spring may be shortened for additional tension.

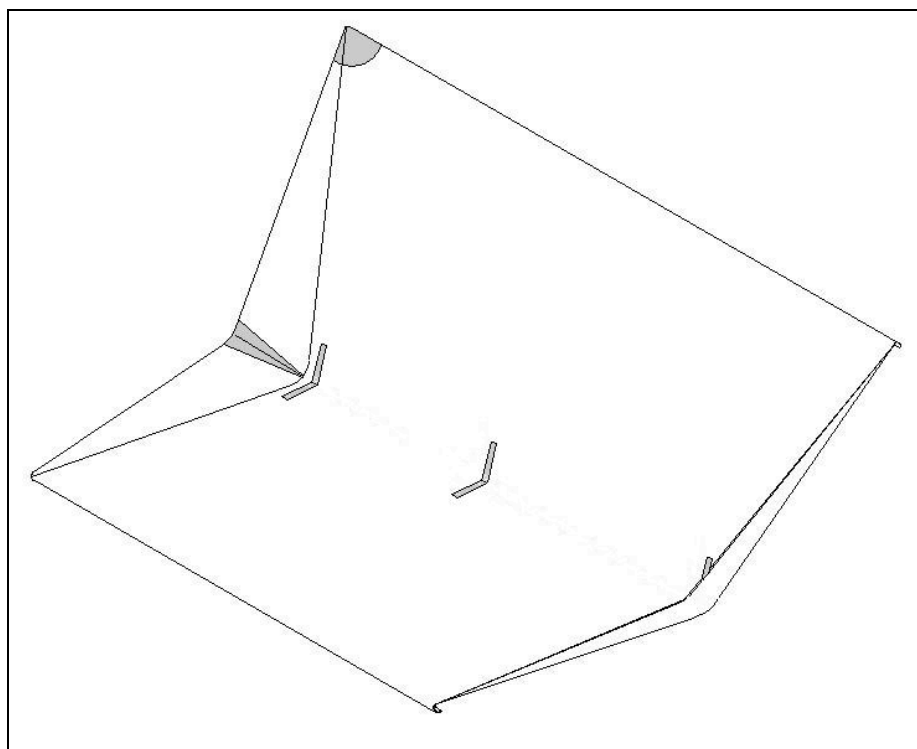
WARNING:	Use Loctite on final assembly of all pivoting or moving parts in the control system.
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3.6 ELEVATOR TRIM

The weight of the elevator will cause a slight nose down trim on the aeroplane. This may be confused with a C of G or horizontal stabilizer incidence problem during the first test flights. Install the FEV-3 trim cord so that slight forward tension will pick up the elevator to the neutral position. Using the hose clamps supplied, clamp one end to the cord to the FCT-6 push pull tube below the seat and the other end of the cord on a fuselage structural member near the idler arm. The tension in the cord should pull the FCT-6 tube rearwards, lifting the elevator. Small out of trim conditions may be rectified with the cord.

To relieve some of the elevator back pressure with flap selected, install a shock cord between the flap push-pull tube FCT-3 and the elevator tube FCT-6. When the flaps are deployed the cord pulls the FCT-6 tube forward, relieving some of the back pressure required on the control column.

4.0 SEAT INSTALLATION



Trim the seat as required to fit. See the drawing above.

It may be necessary to cut out and radius the areas on the top corners to clear the fuselage and to cut out the section at the bend web to allow proper fitting. After cutting out the web, patch and repair the modification.

Cut out 3 slots as shown for the seat belt harness lap-straps to pass through. Seat belt installation is detailed in the Finish Manual, Part 7.

Drill through the curled flange in 3 places on the top and 3 places on the bottom. Use self tapping screws to secure the seat pan to the fuselage.

FABRICATE AND INSTALL THE SEAT SUPPORT STRAPS.

Use seatbelt webbing to make 4 support straps, 2 for each side to support the seat and ensure that it does not collapse onto the control rods under the seat in the event of a heavy landing. Run each strap over and round the front and rear bungee truss, adjust the length to just support the bottom of the seat each side of the moulded hat brace on the seat. Clamp and rivet in position with aluminium flat bar.

