Building Instructions

Canadair CL-415

electric-powered RC
model aircraft
Order No. 1343/00

Specification:

Wingspan	approx. 1505 mm
Length	approx. 1043 mm
Wing area	approx. 31.6 dm²
Tailplane area	approx. 7.98 dm²
Total surface area	approx. 39.58 dm²
All-up weight incl. 12 Panasonic EX cells	approx. 2450 g
Area loading (wing only)	approx. 77.5 g/dm²
Total surface area loading	approx. 61.9 g/dm²

RC functions:

Elevator
Ailerons
Rudder
Throttle
Landing flaps (optional)

Replacement parts:

GRP fuselage	1343/02
GRP motor nacelle	1343/03

„aero-naut“ Modellbau
Stuttgarterstr. 18-22
D-72766 Reutlingen

http://www.aero-naut.de

10-cell power system:

1.) Race 400 / 6.0 V with gearbox	2.64 : 1	7121/06
with propeller	8.5 x 6	7229/28

12-cell power system:

1.) Race 400 / 6.0 V with gearbox	2.64 : 1	7121/06
or	3.00 : 1	7121/07
with propeller	8.5 x 6	7229/28
2.) Race 400 / 7.2 V with gearbox	2.23 : 1	7120/05
or	2.64 : 1	7120/06
with propeller	8.5 x 6	7229/28

For the 10-cell power system we recommend the Micro-Mos mc-410 speed controller, Order No. 7019/34, with the EMF brake switched off. For the 12-cell system a different controller should be used. Make sure it features a suitably rated BEC system and a switchable EMF brake.
In this model the whole power system is very highly stressed, and to ensure reasonable motor life we strongly recommend that you carry out the following work:
Use the motor timing adjustment tool, Order No. 7329/34 to rotate the rear bearing plate through 20° to 30° in the opposite direction to shaft rotation. In linear terms this means a distance of 5 to 7 mm, measured at the motor can.

Dismantle the gearboxes. Originally these gearboxes featured a glued brass bush (hub for plastic output gear), but in later models the bush is made of steel. If your gearboxes have the earlier brass bush, it is necessary to bond the output gear to the hub: carefully pull the output gear almost off the hub (don't remove it entirely). Moisten the bush with a few drops of Loctite adhesive No. 601 or 603, then push the gear back onto it. This joint will never fail. At the same time you may wish to glue the ballraces in the housing with a drop of Loctite (take care!).

Lubricate the gears with a little high-viscosity (thick) grease, e.g. titanium grease (for helicopters), then re-assemble the gearboxes.

The motors should also be run-in: connect them to the speed controller and operate the controller using a servo tester. Run the motors under minimal load (e.g. with a 6 x 5" electric prop, Order No. 7228/11) until they have accumulated about 10 to 15 minutes' running; the flight propellers can then be fitted. During this period there should be a steady decline in sparking at the brushes. It is important that the motors should run at the same speed; to set this up you will either need four hands or a "T"-mount consisting of hardwood rails. The plan shows how both motors are wired up (the wiring is later threaded through the wing structure), but you can use the cables to connect both motors; speed measurements only make sense if both motors are running simultaneously. Do balance the propellers as accurately as you can. If the motors run at different speeds, adjust their timing using the adjustment tool so that the speed difference is acceptable (+/- 100 - 150 rpm). If it proves to be impossible, either buy a third geared motor or a bare motor, with or without gear set. This gives you a much better chance of achieving perfectly synchronous running.
When you are satisfied, attach the suppressor capacitors to each motor: the absolute minimum is to solder one capacitor of 0.1 - 1 nF between the motor terminals, plus two more of around 47 nF, one from each motor terminal to the motor can.
Warning! the motors will become hot relatively quickly under load. You can check the motor temperature by hand if the fairings are not in place, and for this reason they should not be fitted until all test-runs have been completed. Do not run the motors for more than about 20 seconds at a time under static conditions.
Before final installation dismantle the gearboxes, wash them out with white spirit, and lubricate the parts: use high-quality oil on the ballraces, and high-viscosity grease on the gears. In flight the motors spin at around 30,000 rpm. After the first two hours of flying open the gearboxes and repeat the procedure. If their condition is satisfactory, the maintenance intervals can be extended.
Alternative geared motors can also be fitted at the builder's discretion. Motors such as the Speed 480BB Race 7.2 V, Kyosho AP 29BB, Permax 400BB with Reisenauer planetary gearbox (approx. 4:1), 8.5 x 6" propellers and 10 cells are likely candidates. Aim for a propeller speed of around 8300 rpm, and a current of about 12 - 13 A per motor. With 12 cells the reduction ratio would need to be around 4.5 - 5 : 1.

Glued joints: selecting the correct adhesive can save a significant amount of weight. Use cyano-acrylate glue ("cyano") wherever possible, either thin or thick as appropriate; the thin type penetrates into the wood grain and stiffens it considerably. You can often simply hold balsa parts together and tack-glue them with cyano. Increased humidity (e.g. breathing on the joint) accelerates the hardening process. In many situations it is easier to apply the adhesive using a length of stick with a pointed end.
Caution: cyano-acrylate adhesives are injurious to health! Do not breathe in the fumes, and build the model in a well-ventilated workshop. Read and observe the instructions on the glue packaging. We also recommend epoxy laminating resin for this model. Compared to fast-setting epoxy glues, laminating resin is easier to apply accurately, producing stronger, lighter joints. It penetrates into the smallest gaps and ensures really sound joints.
For some work the resin should be thickened using a thixotropic additive; this prevents it running out of the joint, and makes it easier to apply in exactly the right place. These and other resin additives can be obtained from any good model shop.

Sanding: many of the model's components are made of GRP, but there is still plenty of wood which requires sanding. A block of wood with new abrasive paper stuck to it is the basic requirement for building this model successfully. The kit is supplied with two blocks (280 x 50 x 20 mm and 200 x 25 x 20 mm), but please check that they are perfectly flat before using them.
If necessary, sand them flat by rubbing them on a sheet of abrasive paper. Apply abrasive paper to the blocks using thin double-sided adhesive tape (e.g. carpet tape). We recommend that you apply medium-grade paper (approx. 100 to 150-grit) to one face, and fine-grade paper (approx. 240-grit) to the other. Thin balsa sheet parts (e.g. the two-part wing trailing edge) should be sanded to the correct taper by pressing them down on the building board and sanding them back gradually, holding the block at an angle to the grain direction. Solid parts and sub-assemblies can also be sanded free-hand. However, it is always best to lay the part down on the board if possible, as this makes it easier to direct the sanding block accurately. For larger areas, whether flat or curved, the sanding block can be used to "remove the high points", i.e. any inaccuracies arising in the course of construction are smoothed out, producing a continuously curved surface. The designer of this model can no longer imagine building models without a range of commercially available reinforced plastic sanding plates, to which a variety of self-adhesive metal sanding sheets can be applied. These can be purchased in any DIY store, and are highly recommended.
Advantages: a very sharp, long-lasting cutting tool, with no tendency to clog from sanding dust. Ideal for quite hard wood, transitions between hard and soft materials (e.g. balsa - hardwood), and produces flat results even with dissimilar materials.
Preparation: these building instructions include a reduced-scale drawing of all the die-cut balsa and plywood sheets. Use a soft pencil to write the part numbers on the components, referring to this drawing. Separate the parts from the die-cut sheets using a balsa knife. You may find it necessary to ease the plywood parts out of their carrier sheet using a balsa knife or a fretsaw. All parts must be trial-fitted and trimmed before being glued in place, as many are supplied slightly oversize to allow for final adjustment. A flat building board is essential for constructing the model.
If you are an experienced builder, you may wish to deviate from the sequence described in these building instructions, but please think ahead carefully before you do this!
Refer to the building instructions constantly, together with the stage photos and parts list, and check actual dimensions of motors and gearboxes, servos, receiver, speed controller and your choice of flight battery as you build the model. We hardly need to mention that micro-servos and a small receiver are a basic necessity for a model of this type.
Whenever you are working on the model please keep the principle of weight saving in mind from the outset. For example, the GRP parts are moulded using the minimum possible thickness of gelcoat resin, but it is still possible to sand away some excess resin to save weight. However, the surface should remain white overall, so take care not to sand through to the glass cloth. Don't round off edges and corners. We recommend starting with 240-grit abrasive paper, used dry, and finishing with 400-grit paper.
Wings: the wing panels are assembled directly over the plan, which should be laid out on a completely flat building board and protected with clear plastic film
The trailing edge panels (55) are supplied sanded to a taper at the extreme trailing edge; check the taper and trim if necessary. Place one panel (55) accurately over the plan and pin it down. Position the bottom leading edge sheet panel (61) in the same way (align the rear edge with the plan) and pin it down. Open up the slots in the main and secondary spar for the outboard ribs (57) to 3 mm.
Position the main spar (53) exactly as shown on the plan - it should be offset slightly to the rear relative to part (61) - and pin it in place. Place the secondary spar (54) in position, checking the correct spacing by trial-fitting a few wing-ribs. Fit all the ribs and the secondary spar, check that everything is exactly at right-angles, and pin the parts in place. Tack the ribs to the trailing edge (55) using individual drops of thin cyano, and glue them to the secondary spar (54) in the same way. Glue the bottom leading edge sheeting

(61) to the main spar by running thin cyano along the joint. Slide a tapered-section balsa strip under the front edge of the leading edge sheeting (61), as shown in section F-F, so that it is pushed up against the ribs; glue the ribs to part (61). Sand the underside of the false leading edge (70) at a slight angle (see section F-F), place it in position and attach it to part (61) and the ribs using thin cyano.
Glue the in-fill block (59) and the aileron horn block (60) in place, and install the servo mount (66). Glue the top trailing edge panel (51) in place using thickened laminating resin; press it down using jig strips as shown in section D-D, and leave the resin to set hard.
Remove the wing framework from the building board and trim the false leading edge (70) to follow the top camber of the wing section. Cut the tip and root sheeting panels from part (51) and trim them carefully to fit between parts (55) and (61). Before gluing them in place check the plan view (tip ribs at right-angles!). Glue the capstrips (50) to the unsheeted ribs. Caution - two of the capstrips are 10 mm wide - see plan.
Fit the pushrod connector on the aileron servo output arm (check the servo is at neutral first), then install the servo mount and servo - see section F-F. Cut one 25 mm wide capstrip from part (51), and cut a slot in it at this early stage to accept the pushrod guide sleeve (25) - see section F-F and the wing plan view. Cut an opening about 8 mm in diameter under the pushrod connector to provide access for the allen key.
From part (60) make the reinforcements for the motor nacelle mountings and the supports for the dowels (88) - see sections D-D and E-E. Parts (66) to (69) are plywood reinforcements for the wing ribs (57); trim them to fit and glue them in place as shown on the plan.
It is important that there should not be a gap between the root ribs when the wing panels are joined, and this means that the root rib should be fitted very carefully at this stage. The main point is that the root rib must be at right-angles when viewed from above. The slots for the dihedral braces (62) and (63) are best cut using a hacksaw blade. Fix the dihedral braces in place using plenty of glue. Thread the prepared motor wiring and servo leads through the wing structure. The top wing leading edge sheeting (61) can now be attached using white glue. Press the panel into place using jig strips as shown in section D-D. Working from the plan, mark the position of the 4 mm Ø holes for attaching the motor nacelles, and drill them with a sharp drill bit (using a pillar drill for preference). Open up the holes in the bottom wing sheeting (51) to 10 mm Ø.
Mark the position of the holes for the float pegs on the ribs (57) from underneath, using part (76) as a guide. Lay the wing on the drilling table, and drill the 3 mm and 4 mm Ø holes from the underside, as shown in section B-B. Run thin cyano into all the holes to harden the wood, allow it to cure, then run the drill through again. Refer also to Figs. 1 to 4 during this stage.
Mark the position of the ailerons on parts (55) top and bottom as accurately as you can, noting the width of the slot required for the lining strips (73) as shown in section F-F. Cut out the slots neatly using a sharp, pointed-tip balsa knife; see Fig. 5.
The second wing panel can now be assembled in exactly the same way, but initially without the top leading edge sheeting (61); this is only attached after the wing panels have been glued together.
Initially offer up the wing panels “dry” (no glue), and check that they fit together really accurately; trim if necessary. Protect the building board with plastic film and pin down one wing panel. The panels are joined using thickened laminating resin. Join the panels, and carefully remove all excess glue using kitchen paper where it is squeezed out of the joint. Allow the glue to cure fully, and only then glue the top leading edge sheet panel (61) in place - see Fig. 6. Cut out the top sheeting panels from part (51), trim and glue them in place, and install the capstrips (50). Caution: a 10 mm wide capstrip must be fitted where the boundary layer fence is to be located.

Remove the wing from the building board, glue the leading edge (71) to the structure and carefully sand it to section as shown in the pictures and on the plan. Cut the openings as indicated in the illustrations and on the plan. Attach the tapered-section balsa strips (72) to the tip ribs, mark the line of the wing section on them and cut off the excess. Mark the position of the holes for the M4 screws and drill them at right-angles to the mating surface (= tip rib). Run thin cyano into the holes, then run the drill through again. Parts (72) can now be pressed against the tip rib; mark the position of the holes using a 4 mm Ø drill bit. Drill the hole itself using a 3.2 mm Ø bit, then cut an M4 thread using the appropriate size of tap. Harden the threads with thin cyano, then run the tap through again. Fix parts (72) in place using M4 screws, and sand these parts back flush with the wing surface. The winglets are made as shown on the plan; Fig. 8 shows the correct profile.
Cut out the float half-shells (78) along the marked lines, and check that the pairs of shells fit together accurately. If the float ribs (77) are not flat, straighten them by gluing a strip of wood to them. Inset the rib in one shell (78) and glue it in place using Stabilit-Express - see Fig. 9.
Glue the balsa sheet cladding panels (75) to both sides of the float pylons (76), then sand them to the profile shown. Relieve parts (75) to form a socket for the M4 nuts. Fit the float pegs (dowels) (32) in the holes in the wing, apply a little glue in the recesses in parts (76) and fit the pylons on the projecting dowels. When the glue has set hard, push the M4 nuts into place, secure them with the M4 screws, then glue them to the float pylons (76 + 75) using Stabilit-Express.

Relieve the floats (78) to accept the pylons, and push them onto the float ribs (77). Check that everything fits correctly, then glue these parts together. Glue the second float shell in place using Stabilit-Express. Work carefully here, as the floats must, of course, be watertight! Fig. 10.

Fuselage: we have already mentioned the advisability of sanding back the excess gel-coat in the interests of saving weight. Drill round the periphery of the air inlets and outlets using a bit of around 1.5 - 2 mm Ø, and trim them neatly to final size using small files. The wing saddle can also be reduced somewhat: the flange should be about 6 - 7 mm wide at both sides, and 2 or 3 mm less at the leading edge. The opening in the top of the stub fin can also be enlarged - see view E. Sand the periphery of the stub fin using fairly coarse abrasive paper, and also sand the bottom of the fin itself. Check and trim these parts to ensure they fit accurately. Don't force the fin onto the stub, otherwise the balsa parts already bonded in may burst!
Section J-J shows all the dimensions for the main undercarriage holes; these must be marked out as accurately as possible. Start by drilling 1.5 mm Ø pilot-holes (for the struts (11) and (12) the holes must be at the appropriate angle), then open them up to 3 mm Ø and 2 mm Ø to accept parts (11 + 12). Use two pieces of 3 mm Ø steel rod to check the position: they should be exactly horizontal and parallel.
Cut the openings in the undercarriage bearer (5) as shown in view G (drill, fretsaw if required), and place the bearer in the fuselage. Both ends must be cut at an angle as shown in section J-J. It must be possible to fit the bearer low enough to allow the steel rods to be pushed into the channels in the component. Once the bearer is correctly located, remove it from the fuselage. Make up the aluminium straps and drill 1.5 mm Ø holes in the bearer as shown. Roughen the joint area with coarse abrasive paper, and glue the bearer in place using thickened laminating resin. Fit the steel rods. The half-former (4) can be glued in place at the same time. The half-former (3) is not strictly essential.
Sand back the solder joint areas of the undercarriage wires (9) and (10) to bright metal, install them, align them carefully, and tighten the aluminium straps to secure them. The strut (11) can now be fitted in the fuselage side, aligned, and bound to parts (9) and (10) using soft binding wire. Apply flux to the joints on a paintbrush, then solder the parts together using a heavy-duty soldering iron (approx. 100 W). Make sure the joints are strong. Install both parts (12), secure them with binding wire, align them and solder the joints in the same way. To remove the undercarriage the straps must be undone. Clean the soldered joints with paint thinners, and file the joints smooth where necessary.
Section J-J shows the guide sleeves for parts (11 + 12) which are cut from part 20. Carefully enlarge the holes in the fuselage to 3.2 mm Ø. Slip pieces of part (20) in the fuselage side, install the undercarriage and tighten the strap retaining screws. Now carefully glue the guide sleeves to the fuselage side using epoxy resin. Cut off the excess sleeve length using a sharp chisel or plane blade.
Landing loads are absorbed by the lower wires (9 + 10) alone, whereas parts (11 + 12) are dummies; they must be free to slide into the guide sleeves when the undercarriage is compressed. See Figs. 11 to 13.
Section A-A shows the noseleg support; these parts are best glued using laminating resin, leaving the guide sleeve (8) projecting on the underside. The sleeve must project out of the fuselage! From the brass sheet supplied make up a U-shaped strap as shown and install it using two M2 screws. Drill it out from the underside using a 3 mm Ø drill. Use a length of 3 mm Ø rod as a guide for soldering the collet (the M3 thread in the collet must face the tail).
Place the noseleg support in the fuselage, check that it fits properly and trim if necessary. If everything is correct, tack it in place using thin cyano, then apply plenty of epoxy round the joints. Take care that the guide sleeve is truly vertical.
Sand the soldered joints of the noseleg unit smooth, align it and solder the parts together thoroughly.
At this point you have a decision to make. The kit is supplied with perfectly serviceable wheels, but nowadays there are significantly lighter alternatives available, and every gramme saved is valuable. If you wish to buy new ones we recommend Sullivan Sky Lite wheels, Order No. 7353/02 (45 mm Ø) and 7353/08 (64 mm Ø).
The height of the main undercarriage is fixed, but the height of the noseleg depends on the wheel diameter - the fuselage must stand horizontally on the workbench!
Glue the wing retainer plates (2) together in pairs using epoxy (after lightening the plates if possible), then glue them in the fuselage using thickened resin. Position the wing accurately on the fuselage, and mark the position of the dowel holes. Drill 3 mm Ø pilot-holes, then open them up to 5 mm Ø. Fit the locating dowels in the wing, and check that the wing can be fitted into the fuselage. Adjust the dowel holes as required until a perfect fit is obtained. The next step is to mark the position of the holes for the M5 screws: align the wing accurately on the fuselage, tape the wing in place, then drill 4 mm Ø holes, taking care to drill at right-angles. Remove the wing.
Now run an M5 tap through the holes, harden the wood with thin cyano and re-cut the threads. Open up the holes in the wing to 5 mm Ø, and countersink the holes for the screw-heads. Harden the material with thin cyano in the usual way. Assemble the servo mounts from parts (21) to (24), taking care to produce a handed pair. The rudder linkage should be on the right-hand side of the fuselage. Cut the slots for the "snakes" in the stub fin as shown in view E, and file them out at the appropriate angle. The snake outers must not bend sharply at this point - this applies in particular to the rudder. Prepare the support plate (95)

and slip the snakes into place. Fit the steel pushrods (26) from the rear, and fit them in the appropriate sleeve (25). Now slide the support plate (95) and snakes slowly into the fuselage, allowing the wires to guide the snakes to and through the appropriate exit slots. Part (95) must be positioned carefully in the fuselage to guarantee a smooth run of the sleeves (25). When you are sure this is the case, glue part (95) in place with cyano, then reinforce the joints with epoxy.

Parts (25) should only be glued to part (95) (using thin cyano) once the snake inners (steel wire) have been connected to the servos: see Figs. 14, 15. Install the receiver aerial sleeve as shown on the plan.

Cut out the battery supports (16) accurately and drill a series of 2 mm Ø holes in the side flanges as shown in Fig. 16. Glue the reinforcements (18) to the inside of the rear support (16) using thin cyano. Bend the retainer bars from aluminium strip and drill the 2 mm Ø holes as shown in Fig. 16. A single metal strap should also be adequate if you prefer. The battery supports are not installed in the fuselage until a later stage.
Carefully cut out the hatch cover (28) and trim it to fit. Caution: the front and rear faces are not the same! Drill two 3 mm Ø holes in the support (31), stiffen the material with thin cyano and glue it to the fuselage together with the hatch support (30). Insert the dowels, fill the space between the dowels and the hatch cover (28) with a strip of scrap wood, and glue the parts together. Mark the position of the hatch latch (29), cut the slot for the latch lever in the hatch cover, and tack part (29) in place with thin cyano.
Reinforce the joints with Stabilit-Express. Glue the second hatch support (30) in place and add 5 x 5 mm balsa strips to stiffen the sides of the hatch cover - Fig. 17.
The tailplane is assembled directly over the plan (building board). Pin down the trailing edge sheeting (44), and fit all the ribs on the spars (40) and (41). Position the framework as accurately as you can on part (44), then tack the spar (41) to the trailing edge sheet using thin cyano. Align the ribs carefully and glue them to part (44) using thin cyano. Remove the structure from the building board. Now pin down the leading edge sheeting (46) on the building board. Place the framework on the sheet panel, aligning the main spar accurately, and tack it to part (46) using thin cyano. Now glue the ribs to the leading edge sheet (46) one by one, again using thin cyano. Sand the underside of the false leading edge (45) to the angle shown and glue it in place. Cut the centre section sheeting from part (51) and glue it to the framework.
The plan also shows the “scale” version of the tailplane. If you wish to build this, the half-ribs (43) must also be installed; see section F-F.
The top trailing edge sheet (44) is applied using thickened resin in exactly the same manner as for the wing, working directly over the building board. The torsion box must be exactly straight, as this guarantees the symmetry of the tailplane when the top leading edge sheet panel (46) is attached. Fit the centre section sheeting (51) and the capstrips (50), glue the leading edge (47) in place, and sand everything smooth overall. Check that the tailplane is perfectly square when viewed from above.
At this stage the channel at the elevator separation line has to be marked out as accurately as possible; take care not to cut into the spar (41): see sections G-G and H-H. Remove the sheeting over the hinge line channel.
Glue the balsa tip blocks (48) to the tailplane and sand them to shape (Figs. 18 to 20). Mark the elevator separation line accurately and separate the elevator panel from the tailplane. Sand back the excess rib material neatly. The elevator panel can now be divided into two as shown. Glue the elevator lining strips (49) in place, fit the root end-pieces (36) to complete and stiffen the elevators, then sand everything smooth.
Mark the position of the horns on the elevators - note that the 3 mm Ø holes must be at an angle as shown in section H-H. This is done by packing up the elevators on the drilling table, so that the angle of the horn is the same on both sides. Strengthen the holes with thin cyano, then run the drill through the holes again.
Fin: you have already trial-fitted this on the stub fin. Check the fit once more, and ensure that it stands truly vertical (relative to the wing). Relieve the trailing edge as shown on the plan to simulate the scale trim tab. As mentioned at the start of the building instructions, sand away as much of the gel-coat as possible to save weight at the tail end. Cut the “snake” exit slots by drilling 2.2 mm Ø holes at an angle, and file them out at the correct angle.
Drill a series of 2 mm Ø holes all round the inside of the marked tailplane opening on both sides of the fin, taking great care to follow the marked airfoil as accurately as you can. The tailplane must be an easy sliding fit in the slots. With the tailplane installed, place the fin on the fuselage and tape the parts together. Fit the wing on the fuselage and check the longitudinal dihedral! Correct any deviation by sanding back the trailing edge of the fin root.
The marked lines on the moulding show where the rudder has to be separated - including the hinge line gap. This is best done using a small electric drill (e.g. Proxxon) and a thin disc cutter, although a stiff, fine-tooth sawblade could also be used. The fin / rudder construction is drawn full-size on the plan.
Start by sanding back the edges of the glass moulding to a neat finish, and reinforce the joint between the factory-fitted spar and the fin if required. Make an in-fill piece from part (36) for the horn and epoxy it in the rudder as shown. Seal the open faces of the fin and rudder using scrap 2 mm balsa sheet.

Three aluminium hinge lugs (38) are used as the basis of the rudder hinge system.
Drill the 2 mm Ø holes and remove all rough edges. Cut down the lugs (38) approximately as shown on the plan. Roughen the surface of the metal lugs as follows: place the lug on a hard surface, lay a coarse, sharp file on it, and roll it to and fro - job done. Prepare the horns (39) in just the same way.
Part (96) is the tubular rudder shaft, while the plastic sleeves (20) act as a guide, making it easier to install part (96) when the model is assembled. Parts (20) also serve as spacers between the three hinge lugs, thereby limiting the axial play of the rudder. Please study the plan carefully here - the bottom end of all the sleeves (20) should rest on the top surface of the hinge lugs (38). Assemble the rudder shaft (96) and the hinge lugs (38) and (20), and carefully mark the position of parts (38) on the rudder. Cut away the balsa to provide clearance for the lugs (38). Hold the parts together, keeping the pivot system central, and tack the plastic guide sleeves (20) in place. Mark the position of the holes in the fin to accept the hinge lugs (38), working as accurately as you can. Drill 2 mm Ø pilot-holes, then open them up to 4 mm Ø. Enlarging them to the final diameter of 5 mm is best done with a round file.
De-grease the rudder hinge lugs (38), apply a little resin to them and press the rudder hinge assembly into the fin. Position the system carefully, check that it is exactly central, then leave the adhesive to harden. Remove the pivot shaft (96) so that the hinge assembly can be removed for further work.
Drill 5 mm Ø pilot-holes for the hinge lugs (38) in the channeled rudder leading edge strip (37), and glue it to the leading edge of the rudder. Trim both ends of part (37) flush with the rudder, and finally trim the front face. Note that part (37) should taper to a thickness of 3 mm at the top.
Sand part (37) to the section shown in section D-D, and trim the 5 mm Ø holes for the rudder hinge lugs as shown in section E-E. Place the rudder in the fin, and check that it is free to deflect to about +/- 20° to both sides of centre. If necessary trim the balsa strips (27) until this is the case. Remove the rudder and add the top leading edge block, part (36) - see section C-C.
The fin should be glued to the fuselage without the rudder attached. The first step is to apply epoxy to the snake exit slots in the stub fin, and pull the snakes out a little. Apply a little thickened resin to the edge of the fin, thread the snakes into the appropriate slots, fit the fin and tape it in place. Fix the wing to the fuselage and check that the fin is truly vertical, and that the longitudinal dihedral is correct! If everything is in order, apply adhesive tape all round the periphery of the fin, and press it down onto the stub!

The time for **covering** has arrived. This model deserves a painted finish, i.e. we recommend that it should be tissue-covered. Since most of the areas to be covered are fully balsa-sheeted (and because weight-saving is important) we recommend lightweight 17 g/m² tissue, although you may prefer to cover the open bays with 21 g/m² tissue.
The ailerons are already cut out of the wing, the lining pieces are fitted, and all openings are cut in the wing. Apply thinned sanding sealer to the balsa surfaces and sand smooth using 400-grit abrasive paper.
Apply the tissue using thinned clear dope, then apply several more coats, rubbing down gently with 400-grit paper between coats. Obvious irregularities should be made good using fast-setting filler. A perfect white surface can then be achieved by painting the surfaces with slightly thinned white primer. Allow this coat to dry really well, then rub down gently using 400-grit wet-and-dry paper, used wet. If you rub right through the paint, apply a second coat of primer to those areas.

Sand down the GRP finlets (92) as shown, and cut openings for the tailplane; it is important to work accurately here. Now it's time to install the tailplane, after covering and priming it. Fix the wing to the fuselage and align the tailplane carefully with it. The tailplane can now be glued in place with epoxy. Do check the longitudinal dihedral before doing this! Mark the position of the finlets (offset approx. 2° to the right!), slide them into place and secure them with thin cyano. Apply epoxy afterwards to strengthen the joints. If necessary use small quantities of fast-setting filler (2-pack filler paste) to fill any gaps.
Motor nacelles: sand the nacelles and motor fairings smooth overall. It is best to laminate the two-part motor bulkheads (80) using epoxy. Be sure to round off the opening for the motor as shown on the plan and in the photos. Use the motor mount as a drilling template for the 2.5 mm Ø retaining screw holes. Install the mounts, and secure the nuts with thickened resin or Stabilit-Express.
Trim the periphery of the nacelle bulkheads (80) as required, position them carefully and fix them in place with thin cyano. Trim the bulkheads (82) to fit snugly (they must not be a tight fit in the nacelles, or they will produce an ugly distortion in the surface), and secure them using thin cyano. Cut pieces from the spruce strip (81) as shown on the plan and glue them in place with cyano. Trim the cross-pieces (83) and (84) to fit and tack them in place. When you are satisfied, apply epoxy to all the joints in one process, and apply thickened resin where necessary to ensure strong joints.
The nacelles can now be trimmed to follow the wing section accurately; a little patience will be required in order to obtain a perfect fit. This is also the best time to prepare the nacelles to accept the outer guide vanes, which are fitted later - see Fig. 29 and section E-E. The sharp edge of the nacelle floor (outer side of nacelle) should be extended with filler paste as far as the front edge of the outer guide vane. This is shown in section E-E and Fig. 29. Caution: remember the nacelles are handed (different left and right). Paint the inside of the nacelles matt black (Humbrol enamel or similar).

Fix the nacelles to the wing using three M4 x 30 mm screws each (you did remember to route the motor cables out of the wing, didn't you?), and run thin cyano all round the periphery (and also to the screws inside the nacelles); reinforce the joints with epoxy when the cyano has set hard. Cut the guide vanes to shape from 1 mm ABS sheet as shown in section E-E (trim the joint edge to fit snugly first!), and glue them in place using thin cyano. The half-ribs (93) are supplied in two forms: 1.2 and 3 mm thick; choose the ones you prefer. Trim them to fit (the radius of the nacelle is in the way), align them as shown in section E-E, and glue them in place. Trim the leading edge gussets (85) to fit and glue them in place.
Cut out the plastic fairings (86) and (87) neatly (both are present in left and right versions) and trim them to fit. Sand back the rear edge of both parts to a neat taper, as they should blend continuously into the wing section. Fix them with thin cyano. Apply a sparing fillet of filler all round the nacelles: see Figs. 27 to 29.
Solder the motors to the power cables, install the motor fairings and spinners, set them dead central by lining up the spinners, and drill the mounting holes. Glue the dummy oil coolers (89) in place. Cut out the dummy mountings for the landing flaps (90), sand them flat and glue them together using acetone. Sand the top surface of the mountings flat and glue them to the wing using thin cyano. When fitting these parts do take care to line them up accurately; all eight of them should form a neat line.
The position of the two battery holders (16) can now be established. Temporarily stow the servos, receiver and speed controller in the fuselage and fit the steel pushrods (26). Temporarily attach the elevators to the tailplane, place the flight pack on the fuselage floor, and mount the wing with the power units. Support the model on the underside of the wing at the marked CG position (close to the wing root), and adjust the position of the battery to correct any discrepancy. When you are satisfied, mark the battery position before dismantling the model again. Position the battery supports so that the battery can still be moved fore and aft by about +/- 15 mm for fine trimming.
Mark the position of both battery supports (16) on the fuselage floor, and roughen the joint surfaces with abrasive paper. They should be glued in place securely using thickened resin. Apply the adhesive to the support flanges, and press them against the fuselage floor so that the resin is forced through the 2 mm Ø holes previously drilled. Apply a fillet of glue round the supports. When the resin has cured, trim the support formers (19) to fit and glue them to parts (16) using thin cyano. Fix them to the fuselage using resin.
Cut out the circular window panels, glue together three pieces of balsa about 3 x 5 mm in section in a star-shape, and sand them flat. They should be painted light grey (Humbrol enamel) and glued to the fuselage using thin cyano after it has been painted and the decals have been applied.
Fig. 31 shows the fuselage with the spray rails already fitted, together with the breakaway plates X, Y and Z. The position of parts Y and Z is stated on the plan - i.e. set the fuselage horizontal on the table and mark the positions on the fuselage. Use a fine-blade fretsaw to cut out the inside shape of the panels from the 1 mm ABS sheet supplied, leaving the outside shape slightly oversize initially. Trim them to fit on the fuselage and glue them in place using the minimum of thin cyano (apply it on a pointed stick). Trim the joint edge of part Z approximately to follow the angle of the fuselage nose.
Mark the outline of parts X on the ABS sheet supplied (omitting the round cut-outs), and carefully mark the central holes. Use a sharp 8 mm Ø wood bit (with two pointed cutters at the periphery) to drill all the holes. We suggest that you try out this procedure on some scrap ABS so that you get the hang of it. Only then cut the periphery, position them accurately on the fuselage and glue them in place using thin cyano.
A tip: if you intend to try rise-off-water take-offs, cut parts X about 20 mm longer and about 2 - 3 mm deeper than shown, as this provides better protection against spray (less water reaches the propellers). The all-up weight, with a 12-cell Panasonic 180 EX battery, should now be about 2350 g; the lower, the better.
Painting: first check the surface of the model thoroughly - the more perfect and even, the better the painted finish will look. Use a tack-cloth or an anti-static cloth to remove all traces of dust from the surfaces to be sprayed. You did remove all the control surfaces first, didn't you? These parts must be sprayed separately.
We recommend the use of two-pack acrylic car paints. The yellow is RAL 1007 (chrome yellow), the red (approximately) RAL 3020; although Standox paint, Mix 541 (ruby red), is a better match. These paints have superb covering power, i.e. the weight gain is minimal.

An alternative method is to use Humbrol enamel paints, intended for plastic kits: yellow No. 188 (chrome yellow), red No. 19, and original thinners. The circular window should be squirrel grey, No. 126. Spray the spinners with metal, Code No. 27003 - 0 (polished steel), then re-polish. The upper walkways should be No. 27, matt sea grey.
Use good-quality masking tape to mask off individual areas, referring to the photos; the yellow should be sprayed first. Carefully seal off the colour dividing line (tape edge) with thinned primer.
Caution: the surface of the model features dozens of projections, and if you try to spray everything at once, you will inevitably get "runs" where too much paint collects in corners. Instead use a fine spraygun and spray the projecting details first, e.g. the landing flap mountings, guide vanes etc., followed by the

remainder from a greater range. Allow the first coat of paint to dry slightly, then apply a second coat to achieve even coverage.
Once the paint is dry remove the masking tape and paper etc. Remove all adhesive residues carefully. Mask out the model for the red areas.
Once the red has been sprayed and dried, the surface can be cleaned up using a fine cutting paste to remove trapped dust particles etc.
Applying the decals: these are self-adhesive and straightforward to apply, but you can make the task even easier as follows: mix a little liquid detergent into a bowl of water and moisten the area before applying the decal. Carefully lay the prepared decal in place; you will find that the film of moisture allows you to slide it into position and get it in exactly the right place. Press it down all over using a paper towel, wiping any air bubbles out to the edge to avoid trapping them under the film. Try out the procedure with some unprinted decal material beforehand.
The position of the decals is shown on the plan, with dimensions where necessary (fuselage). Mark the decal positions on the fuselage using a soft pencil. Cut out the decals carefully and place them temporarily on the fuselage. Start with the rear part (the white stripe ends forward of the undercarriage well). Once it is in place, cut it away at the front end to clear the spray rail "Y". Offer it up, trim carefully, then apply. The fin decal is in two parts.
In all cases take care to align the decals as straight as possible.
Trim the window panels (cockpit glazing) as required. The dark grey pieces represent the undercarriage wells and water drains. The round (painted) windows should be glued on with thin cyano; paint the spray rails "Y" red. The fuselage forward of the cockpit should be matt black (Humbrol No. 33). A tip: mark the edge of the colour with a soft pencil, apply a strip of flexible decal material about 1.5 mm wide and paint over it. The tape stays on the fuselage, producing a sharp colour division line.

The control surfaces are attached using hinge tape: temporarily attach the control surface using two pieces of tape about 30 mm long applied on the top, then fold it up and over. Now apply three pieces of hinge tape, each about 40 mm long, on the underside. Return the control surface to neutral. Remove the short strips of tape and apply a full-length strip along the top hinge line. You have already prepared (roughened) the horns (39); shorten the one for the elevator as shown on the plan. Shorten the M2 brass screws so that they clamp the steel pushrods securely, but the head does not project too far "in the open air". Flare the edges of the 3 mm Ø holes using a sharp countersink bit, fit the horns, and align the cross-hole by fitting a piece of steel wire through it. Apply thin cyano round the periphery of the horn using a pointed stick as an applicator. Fit the rudder and secure it with the aluminium pivot sleeve (96).
Radio control system installation: the speed controller can be left in mid-air, suspended from its cables (good cooling). A tip: connect the aileron extension leads to the receiver permanently, and stick them to the inside of the fuselage in the area of the wing leading edge using strong adhesive tape; this ensures that they are easily accessible when connecting the aileron servo leads. Slip the aerial into the sleeve (20), using a length of soft binding wire to draw it through if necessary. For the first few flights set the CG to around the 75 - 78 mm point. The battery should be secured to the front support using a piece of Velcro (hook-and-loop) tape. We recommend setting up Dual Rates on your transmitter, so that you can reduce control surface deflections in flight if necessary. Exponential can also be very helpful.

Control surface travels:	Elevator	+/- 8 mm
	Ailerons	up 12 mm
		down 6 mm
	Rudder	+/- 15 - 20°

Before the first flight it is important to adjust the noseleg: the model must roll straight ahead without the motors running. Take-off from a hard strip is completely trouble-free, as are the model's flying characteristics generally. Take a little time at first to become used to the model's control response, check its stalling characteristics by flying at minimum speed at a safe height, and try out the model's handling on the glide. Landings should be carried out in good time, so that there is sufficient "juice" for any necessary corrections. Close to the ground, raise the model's nose (up-elevator), allow it to lose speed, and watch the lateral (roll) attitude - remember those tip floats may snag! the model should now touch down safely by itself.
12 cells is the maximum which the standard motors can be expected to tolerate. Bear in mind that they are working at their limit, and be sparing with full-throttle. Fly the model in a scale style and all will be well. For example, after lift-off you can reduce throttle as soon as the model has reached about 5 m altitude. The Canadair cruises at a scale speed at around half-throttle. Do fly the model in the scale manner: the CL-415 is a water-carrier - not a fighter! Don't forget that the speed controller gets hot under part-load conditions, so it is always best to alternate periods of full-throttle and idle. If you wish to try a rise-off-water take-off, remove the undercarriage, fill all openings with pieces of Plasticine, and seal them with adhesive tape.

The model must be balanced laterally on the water. If necessary correct the trim by adding a little lead ballast to the lighter winglet. It is permissible for the starboard side to be a little heavier, as motor torque tends to push the left-hand float down towards the water.
Bear in mind the danger of overheating the motors (they only have adequate cooling when in the air), so do not carry out repeated take-off attempts in rapid sequence. Always take off directly into wind. A breeze of about 2 - 5 m/sec is advantageous, and very small waves even make take-off easier. The fin acts as a weathercock, and turns the model into wind.

We hope you have many pleasant flights with your new model, and wish you as many happy landings as take-offs.

aero-naut Modellbau

Parts List - Canadair CL-415

Part No.	Description	No. off	Material	Size in mm
1	Fuselage	1	GRP	Ready made
2	Wing retainer plate	4	Plywood	3 mm, die-cut
3	Half-former	1	Plywood	3 mm, die-cut
4	Half-former	1	Plywood	3 mm, die-cut
5	Hardwood undercarriage bearer	1	Lime	Ready made
6	Half-former	2	Plywood	3 mm, die-cut
7	Spacer	2	Plywood	3 mm, die-cut
8	Guide sleeve	1	Brass	4 / 3 Ø x 35 mm
9	Undercarriage wire 1	2	Steel	3 mm Ø, ready made
10	Undercarriage wire 2	2	Steel	3 mm Ø, ready made
11	Undercarriage strut 1	2	Steel	2 mm Ø, ready made
12	Undercarriage strut 2	4	Steel	2 mm Ø, ready made
13	Noseleg unit	1	Steel	3 mm Ø, ready made
14	Wheel axle	1	Steel	3Øx40mm, ready made
15	T-piece	1	Brass	Ready made
16	Battery support	2	Plastic	Ready made
17	Battery retainer strap	2	Aluminium	8 x 1 x 130 mm
18	Reinforcement	2	Plywood	3 mm, die-cut
19	Battery support former	4	Plywood	3 mm, die-cut
20	Snake outer sleeve	1	Plastic	3 / 2 mm Ø, as plan
21	Servo mount support 1	2	Plywood	3 mm, die-cut
22	Servo mount support 2	2	Plywood	3 mm, die-cut
23	Servo plate	2	Plywood	3 mm, die-cut
24	Hardwood servo rail		Lime	5 x 5 mm, as plan
25	Snake outer sleeve	2	Plastic	2 / 1 mm Ø, as plan
26	Wire pushrod	3	Steel	0.6 mm Ø, as plan
27	Hatch reinforcing strip		Balsa	5 x 5 mm, as plan
28	Hatch cover	1	Plastic	Ready made
29	Hatch latch	1	Steel / brass	Ready made
30	Hatch support 1	2	Plywood	3 mm, ready made
31	Hatch support 2	1	Plywood	3 mm, ready made
32	Dowel		Beech	3 mm Ø, as plan
33	Main wheel	2	Plastic	65 mm Ø, ready made
34	Nosewheel	2	Plastic	35 mm Ø, ready made
35	Fin	1	GRP	Ready made
36	Elevator end-piece		Balsa	8 x 25 mm, as plan
37	Channeled rudder leading edge	1	Balsa	Ready made
38	Rudder hinge lug	3	Aluminium	Ready made
39	Control surface horn	5	Plated brass	Ready made
40	Tailplane main spar	1	Balsa	Ready made
41	Tailplane secondary spar	1	Balsa	Ready made
42	Tailplane rib	12	Balsa	2 mm, die-cut
43	Tailplane half-rib	4	Balsa	2 mm, die-cut

Part No.	Description	No. off	Material	Size in mm
44	Tailplane trailing edge sheeting	2	Balsa	65 x 1.5 mm, as plan
45	Tailplane false leading edge	1	Balsa	7 x 3 mm, as plan
46	Tailplane leading edge sheeting	2	Balsa	37 x 1.5 mm, as plan
47	Tailplane leading edge	1	Balsa	Ready made
48	Tailplane tip block	2	Balsa	Ready made
49	Elevator lining strip	1	Balsa	13 x 3 mm, as plan
50	Tailplane capstrip		Balsa	6 x 1.5 mm, as plan
51	Sheeting		Balsa	1.5 mm, as plan
53	Wing main spar	2	Balsa	Ready made
54	Wing secondary spar	2	Balsa	Ready made
55	Wing trailing edge sheeting	4	Balsa	Ready made
56	Wing rib	24	Balsa	2 mm, die-cut
57	Wing rib	4	Plywood	3 mm, die-cut
58	Wing half-rib	2	Balsa	2 mm, die-cut
59	In-fill piece	1	Balsa	Ready made
60	Aileron horn block		Balsa	24 x 15 mm, as plan
61	Wing leading edge sheeting	4	Balsa	50 x 1.5 mm, as plan
62	Dihedral brace 1	2	Plywood	1.2 mm, die-cut
63	Dihedral brace 2	2	Plywood	1.2 mm, die-cut
64	Servo support	4	Balsa	2 mm, die-cut
65	Servo mount	2	Plywood	1.2 mm, die-cut
66	Wingtip reinforcement	4	Plywood	3 mm, die-cut
67	Wingtip reinforcement	4	Plywood	3 mm, die-cut
68	Wingtip reinforcement	2	Plywood	3 mm, die-cut
69	Wingtip reinforcement	2	Plywood	3 mm, die-cut
70	False leading edge	2	Balsa	10 x 3 mm, as plan
71	Wing leading edge	2	Balsa	Ready made
72	Tapered strip (wingtip)	2	Balsa	Ready made
73	Aileron lining strip	4	Balsa	15 x 3 mm, as plan
74	Winglet	2	Plywood	3 mm, die-cut
75	Float cladding		Balsa	3 mm, as plan
76	Float pylon	2	Plywood	3 mm, die-cut
77	Float rib	2	Plywood	3 mm, die-cut
78	Float	2 + 2	Plastic	Ready made
79	Motor nacelle	2	GRP	Ready made
80	Motor bulkhead	4	Plywood	3 mm, die-cut
81	Hardwood strip		Spruce	5 x 2 mm, as plan
82	Nacelle bulkhead	2	Plywood	3 mm, die-cut
83	Cross-piece 1	2	Plywood	3 mm, die-cut
84	Cross-piece 2	2	Plywood	3 mm, die-cut
85	Gusset	2	Plywood	3 mm, die-cut
86	Fairing	2	Plastic	Ready made
87	Fairing	2	Plastic	Ready made
88	Dowel		Beech	5 mm Ø, as plan
89	Oil cooler	2	Plastic	Ready made
90	Dummy flap mounting	8 + 8	Plastic	Ready made
91	Motor fairing	2	GRP	Ready made
92	Finlet	2	GRP	Ready made
93	Half-rib	2	Plywood	3 mm, die-cut
94	Round glazing panel	2	Plastic	Ready made
95	Support plate	1	Plywood	3 mm, die-cut
96	Metal rudder hinge sleeve	1	Aluminium	2 / 1.6 Ø, overlength
	Tapered jig strip	1	Balsa	1000 x 3 x 12 mm
	Jig strip	1	Balsa	1000 x 5 x 10 mm
	Tapered jig strip	2	Balsa	1000 x 5 x 5 mm
	Self-tapping screw	8	Steel	2.2 Ø x 6.5 mm
	Self-tapping screw	8	Steel	2.2 Ø x 9.5 mm
	Cheesehead screw	6	Brass	M2.5 x 18 mm
	Cheesehead screw	10	Brass	M2 x 12 mm
	Cheesehead screw	5	Brass	M2 x 20 mm

Part No.	Description	No. off	Material	Size in mm
	Nut	6	Brass	M2.5
	Nut	10	Brass	M2
	Nut	2	Steel	M4
	Washer	5	Brass	3.2 / 7 Ø
	Collet, complete	5	Steel	3 / 6 Ø x 5 mm
	Cheesehead screw	10	Nylon	M4 x 30 mm
	Cheesehead screw	2	Nylon	M5 x 50 mm
	Pushrod connector	2	Steel	4.5 x 2 Ø x 10 mm
	Pushrod connector	2	Steel	6 / 2 Ø x 9 mm
	Aluminium sheet	1	Aluminium	8 x 1.5 x 120 mm
	Aluminium sheet	2	Aluminium	8 x 1 x 130 mm
	Brass sheet	1	Brass	30 x 26 x 0.3 mm
	Cable	1 + 1	Red / black	0.75 mm², 600 mm long
	Cable	1 + 1	Red / black	1.5 mm², 125 mm long
	ABS sheet	1	Plastic	225 x 100 x 1 mm
	Decal sheet	3		
	Plan	2		
	Building instructions	1		

As plan: see plan for dimensions, or measure from model.

The following extra items are required to build the model:

Ponal Express	Order No. 7638/10	Laminating resin (low-viscosity)
Stabilit-Express	Order No. 7646/01	Thixotropic additive (for thickening
Pattex cyano-acrylate	Order No. 7639/21	laminating resin)
Pattex gel cyano	Order No. 7639/25	Soft binding wire, hinge tape

Plan text - Canadair CL-415

1 View D
2 View G
3 Aluminium strap, 37 x 8 x 1.5 mm
4 Cut openings with fretsaw or similar
5 Schematic view only of parts (11) and (12)
6 Section J-J
7 Fuselage side guide sleeves from part 20 - see building instructions
8 Bind tightly with soft binding wire, solder joint securely
9 View C
10 Rudder servo installation (R.H. fuselage side)
11 Section C-C
12 Section D-D
13 Section E-E
14 Cut away GRP
15 Scrap 2 mm balsa
16 These parts factory-fitted in the fin
17 Cut tailplane opening carefully - see building instructions
18 Glue fin to stub fin - see building instructions
19 Section F-F
20 Section G-G
21 Rudder pushrod slot
22 Elevator pushrod slots
23 Section H-H
24 View E
25 Wheel axle
26 Solder washer
27 Solder collet
28 Make from brass sheet - see building instructions
29 Section A-A

30 M2 screw and nut
31 Solder washer (wheel retainer)
32 Axis of finlets offset approx. 2° right
33 Tailplane structure before elevators are separated
34 Aluminium strap, 10 x 1 x 130 mm
35 Section B-B
36 Edge of decal
37 Glue receiver aerial guide sleeve (20) to the fuselage side
38 Centre of Gravity (C.G.) 70 - 85 mm
39 Fix receiver to fuselage side with Velcro tape
40 Longitudinal dihedral: wing incidence +0.5° to +0.75° relative to tailplane
41 Flight battery: 10 - 12 cells
42 View B
43 View A
44 View F
45 Align parts (13) and (14) in the T-piece (15), solder joint
46 Cut 3 mm slot
47 Scale elevator outline
48 We reserve the right to modify any feature in order to improve our products
49 Opening for motor power cables
50 Opening for two servo leads
51 Right-hand wing panel shown with all sheet panels omitted
52 Motor power cables
53 Servo lead
54 Landing flap linkage: 0.6 mm Ø steel pushrod, Order No. 7730/06, running in snake inner sleeve, Order No. 7499/01
55 Landing flap servo
56 Opening for cables - see section D-D
57 Inboard end of landing flap
58 Boundary layer fence
59 Section C-C
60 Section A-A, A1-A1
Suggested flap linkage
61 Balsa trailing edge, 3 x 10 mm
62 GRP sheet, 1.5 mm
63 Flap horn, Order No. 7491/06
64 Separate landing flap from wing structure here
65 5 mm balsa
66 Tubular rivet, 2 Ø x 5 mm
67 Landing position - lowered by 25°
68 Take-off position - lowered by 10°
69 Seal bottom of nacelle with 2 mm balsa
70 Cut boundary layer fence from 1 mm ABS sheet
71 High-flex copper cable, 0.75 mm², 600 mm long
72 Insulate wiring carefully here, e.g. use heat-shrink sleeve to hold cables together
73 High-flex copper cable, 1.5 mm², 125 mm long
74 Servo cable - 3-core ribbon cable, Order No. 7457/31 or /33
75 Section B-B
76 Section H-H
77 Glue M4 nut in place using thickened epoxy
78 Cut away to clear cables
79 Section D-D
80 Section F-F
81 Jig strip
82 Section G-G
83 Glue M2.5 nuts in place
84 Section E-E
85 Spinner: Order No. 7252/colour
86 Propeller driver FB - Order No. 7124/14
87 Round off opening
88 Guide vane (outside of nacelle)
89 See section G-G
90 Guide vane (inside of nacelle)