

Nummer	Bezeichnung	Anzahl	Material
167	Strebenhälfte	4	Kiefer 3x16x300 mm
168	Splint	4	Stahl 2x40 mm
169	Schraube, Mutter	4	Stahl M2,3x12 mm
170	Schlitzabdeckung	1	Aluminium 0,5x44x247 mm
171	Höhenflossenstrebe	2	Eisendraht 2x115 mm
172	Steuerseil	2	Perlongarn 0,7 mm
173	Steuerseilhaken	2	Stahldraht 1x50 mm
174	Gabelanschluß	2	Fertigteil
175	Stoßstange	1	Balsa 8x8x420 mm
176	Anschlußhaken	1	Eisendraht 1,5x120 mm
177	Sicherungsfeder	2	Stahldraht 1x50 mm
178	Hebel	1	Fertigteil
179	Welle	1	Ms-Rohr 3x0,45x165 mm
180	Führungsleiste	1	Sperrholz 3 mm
181	Scheibe	2	Unterlegscheibe M 3
182	Antriebsbaken	1	Stahldraht 1x37 mm
183	Verbindungsschlauch	1	PVC-Schlauch 4,9x1x13 mm

Parts List

Number	Part	Qty.	Material
1	Fuselage Side	2	Balsa 2 mm
2	Fuselage Side	2	Balsa 2 mm
3	Doubler	2	Balsa 2 mm
4-6	Doubler	2 ea.	Balsa 2 mm
7	Doubler	2	Balsa 2 mm
8	Reinforcing Strip	24	Balsa 2x3x1600 mm total
9-18	Former	1 ea.	Plywood 3 mm
19	Former	2	Balsa 2 mm
20+21	Former	1 ea.	Plywood 3 mm
22	Cross Brace	1	Plywood 3 mm
23+24	Stab Mount	1 ea.	Plywood 3 mm
25	Wing Tongue Mount	2	Brass Tubing 3x27 mm
26	Cotter Pin	4	Steel 2x30 mm
27	Cotter Pin	4	Steel 2x40 mm
28	Bolt c/w nut + washer	2	Steel 2x20 mm
29	Spacer	2	Plywood 3 mm
30	Spacer	2	Balsa 2 mm
31	Former	1	Balsa 2 mm
32	Nose Planking	2	Balsa 2 mm
33	Nose Planking	1	Balsa 2 mm
34	Top Planking	2	Balsa 2 mm
35	Fin Base	1	Balsa 2 mm
36	Fin	1	Balsa 19x50x54 mm
37	Reinforcing Strip	1	Balsa 2 mm
38+39	Top Cover	1 ea.	Plywood 3 mm
40	Spacer	1	Plywood 3 mm
41	Bottom Planking	1	Balsa 2 mm
42+43	Bottom Planking	2 ea.	Balsa 2 mm
44	Skid Block	1	Obeche 10x19x28 mm
45	Tail Skid	1	Brass 2x5x30 mm
46	Nose Block	1	Balsa 40x60x82 mm
47	Hatch Key	1	Sheet Metal Screw 2,2x13 mm
48+49	Hatch Bottom	1 ea.	Balsa 2 mm
50-52	Hatch Former	1 ea.	Balsa 2 mm
53	Bolt Guide	1	PVC-Tubing 3,2x42 mm
54	Hatch Bolt	1	Mild Steel Wire 2x67 mm
55	Hatch Side	2	Balsa 2 mm
56	Hatch Top	1	Balsa 2 mm
57	Rudder Cable Guide	2	PVC-Tubing 3,2x30 mm
58	Stab Strut Socket	1	PVC-Tubing 3,2x24 mm

Number	Part	Qty.	Material
59	Rudder Spar	2	Balsa 2 mm
60	Nose Block	1	Balsa 12x43x93 mm
61-63	Fillets	2 ea.	Balsa 6x10x200 mm total
64	Bottom Edge	1	Pine 2x3x110 mm
65	Rudder Tip	1	Balsa 2 mm
66	Trailing Edge	1	Pine 2x3x175 mm
67	Rudder Rib	7	Balsa 2x14x600 mm total
68	Reinforcing Strip	1	Balsa 2x14x100 mm
69	Rudder Horn	4	Plastic Moulding
70	Stab Spar	1	Balsa 7x11x460 mm
71	Center Planking	2	Balsa 2 mm
72	Leading Edge	1	Balsa 11x13x510 mm
73-77	Stab Rib	2 ea.	Balsa 2 mm
78	Elevator Spar	1	Balsa 2x11x460 mm
79	Tip Rib	4	Balsa 2 mm
80	Trailing Edge	2	Pine 2x3x210 mm
81-84	Elevator Rib	4 ea.	Balsa 2 mm
85	Elevator Rib	2	Balsa 2 mm
86	Trailing Edge Fillet	2	Plywood 3 mm
87	Mounting Tubes	2	PVC-Tubing 3,2x11 mm
88	Stab Strut Sockets	2	PVC-Tubing 3,2x6 mm
89	Elevator Horn	1	Brass 2x5x38 mm
90	Spar Fillet	4	Pine 5x16x28 mm
91	Cotter Pin	4	Steel 2x30 mm
92	Inner Main Spar	4	Pine 2x5x318 mm
93	Outer Main Spar	4	Pine 2x5x764 mm
94	Wing Tip	8	Balsa 2 mm
95	Aileron Tip	6	Balsa 2 mm
96+97	Wing Rib	2 ea.	Plywood 3 mm
98+99	Wing Rib	2 ea.	Balsa 2 mm
100	Wing Rib	6	Balsa 2 mm
101	Wing Rib	8	Balsa 2 mm
102-107	Wing Rib	2 ea.	Balsa 2 mm
108	Push Rod	2	Mild Steel Wire 1,5x820 mm
109	Safety Stop	2	Washer 3 mm
110	Push Rod End	2	Brass Tubing 3x30 mm
111	Wing Tongue Socket	4	Brass Tubing 3x45 mm
112-117	Wing Rib	2 ea.	Balsa 2 mm
118	Spar Web	42	Balsa 1,5x47x800 mm total
119	Wing Trailing Edge	2	Pine 2x3x535 mm
120	Aileron Trailing Edge	2	Pine 2x3x580 mm
121	Auxiliary Spar	4	Pine 2x3x580 mm
122	Aileron Spar	4	Pine 2x3x590 mm
123	Reinforcing Strip	4	Balsa 2x8x310 mm
124	Nose Planking Joiner	4	Balsa 2 mm
125	Inner Nose Planking	4	Balsa 2x65x583 mm
126	Outer Nose Planking	4	Balsa 2x65/35x501 mm
127	Root Planking	4	Balsa 2 mm
128	Center Planking	4	Balsa 2 mm
129	Planking	2	Balsa 2 mm
130	Rib Stiffener	4	Pine 2x5x57 mm
131	Rib Stiffener	4	Balsa 2x8x100 mm
132	Aileron Root Rib	2	Plywood 3 mm
133	Bellcrank Mount	2	Plywood 3 mm
134	Inner Leading Edge	2	Balsa 6x13x583 mm
135	Outer Leading Edge	2	Balsa 6x13x503 mm
136-146	Aileron Rib	2 ea.	Balsa 2 mm
147	Spar Web	4	Balsa 3x16x590 mm
148	Push Rod	2	Mild Steel Wire 1,5x60 mm
149	Bellcrank	2	Plastic Moulding
150	Bolt c/w nut + washer	2	Steel 3x15 mm
151	Planking	2	Balsa 2 mm
152	Skid	1	Ash 3x15x285 mm

Number	Part	Qty.	Material
153	Buffer	2	Rubber Tubing 16x13 mm
154	Bolt c/w nut + washer	2	Steel 2x10 mm
155	Dowel	2	Mild Steel Wire 2x19 mm
156	Skid Mounting Block	3	Plywood 3 mm
157	Screw	1	Sheet Metal Screw 2,2x13 mm
158	Speed Probe Tube	1	PVC-Tubing 3,2x17 mm
159	Speed Probe Foot	1	Mild Steel Wire 2x50 mm
160	Handle	1	PVC-Tubing 3,2x76 mm
161	Hatch Window	2	Perspex 0,25 mm
162	Cockpit Padding	1	Fuel Tubing
163	Windscreen	1	Perspex 0,25 mm
164	Rudder Hinge	11	Supronyl Sheet 0,4 mm
165	Cotter Pin	4	Steel 2x40 mm
166	Wing Tongue	2	Piano Wire 2x107 mm
167	Strut Half	4	Pine 3x16x300 mm
168	Cotter Pin	4	Steel 2x40 mm
169	Bolt & Nut	4	Steel 2,3x12 mm
170	Wing Slot Cover	1	Aluminium 0,5x44x247 mm
171	Stub Strut	2	Mild Steel Wire 2x115 mm
172	Rudder Cable	2	Nylon Thread
173	Rudder Cable Hock	2	Piano Wire 1x50 mm
174	Nylon Clevis	2	
175	Push Rod	1	Balsa 8x8x420 mm
176	Push Rod Hook	1	Mild Steel Wire 1,5x120 mm
177	Safety Spring	2	Piano Wire 1x50 mm
178	Aileron Drive Lever	1	Brass 2x5x35 mm
179	Aileron Drive Shaft	1	Brass Tubing 3x165 mm
180	Shaft Bearing	1	Plywood 3 mm
181	Washer	2	Brass 3 mm dia.
182	Aileron Drive Hook	1	Piano Wire 1x37 mm
183	Push Rod Coupling	1	PVC-Tubing 4,9x13 mm

Grunau Baby IIb

1/6 Scale Multi Channel RC-Glider

The "Grunau Baby" was developed in 1932, based on Edmund Schneider's and Wolf Hirth's co-design ESG 31 "Stanavo". Thanks to it's good performance, excellent flying characteristics and suitability for club construction, it soon became the most popular secondary training glider in Germany.

It's full capabilities were shown in August 1933, when Kurt Schmidt flew a "Grunau Baby" for 36 1/2 hours over the dunes of the south-eastern shore of the Baltic Sea, putting up a new world duration record. Just six months later, Hanna Reitsch, later to gain fame as "V-1" test pilot, set up a world height record for ladies, flying a "Grunau Baby" up to 7200 feet over Rio de Janeiro.

Even now, 39 years after the first flight of the prototype, quite a few "Grunau Babies" are still flying regularly in Austria, Germany and Switzerland.

Numerous improvements of the basic design eventually led to "Series III", but development was stopped soon thereafter by the end of WW II. Therefore, the previous sub-type "Series IIb" was the one that had been built in largest numbers and made it a natural choice for our kit model. Scaled down to 1/6 from blue prints of 1938 original drawings and cross checked with a "Baby" still flying each weekend a few miles from our factory, this model is absolutely true to scale with exception of the airfoil, which had to be slightly modified to better suit model aircraft Reynold's numbers.

As on the original, the wing is built in halves and mounted with struts, which take up most of the wing loads, permitting a light but crushproof construction. The tailplane is fixed with two bolts and struts, it's incidence easily adjustable for trimming. Only the spoilers have been omitted to avoid undue difficulties and because they are not really needed on a model of this size.

Not quite as simple to build as a normal glider model, the "Grunau Baby" can be successfully built by the average modeler if he follows instructions carefully, which avoid all complications and show the easiest and safest, if not quickest way to finish a model that will please builder and spectators alike.

Technical Data	of the Original	of the Model
Wing Span	44 ft. 6 in.	89 in.
Length	20 ft. 0 in.	40 in.
Wing Area	152.6 sq.ft.	610 sq.in.
Tailplane Area	24.9 sq.ft.	100 sq.in.
Gross Weight	552 lb.	46 oz.
Wing Loading	3.6 lb/sq.ft.	10.9oz/sq.ft.

Building Preparations:

To speed construction and to familiarize yourself with this model cut out all plywood parts with a coping saw, remove all balsa parts from diecut sheets, sort out all parts on the plan, drilling the necessary holes as you go along and put the parts away as they belong together. Then cut and sort all strip and wire material as per following list, using plans and parts list as reference:

2 Balsa Strips	2x3x800 mm	for 24 parts 8
2 Balsa Strips	2x8x840 mm	for 4 parts 123 and 4 parts 131
1 Balsa Strip	2x14x800 mm	for 7 parts 67 and part 68
4 Balsa Strips	3x16x600 mm	for 4 parts 147
1 Balsa Strip	6x10x200 mm	for 2 parts 61, 2 parts 62 and 2 parts 63
4 Balsa Strips	6x13x600 mm	for 2 parts 134 and 2 parts 135
2 Balsa Strips	7x11x460 mm	for parts 70 and 78
1 Balsa Strip	8x8x420 mm	for part 175
1 Balsa Strip	11x13x510 mm	for part 72
14 Pine Strips	2x3x600 mm	for parts 64, 66, 2 parts each 80, 119 + 120

6 Pine Strips	2x5x770 mm	for 4 parts each 92, 93 and 130
2 Pine Strips	3x16x610 mm	for 4 parts 167
1 Ash Strip	3x15x285 mm	for part 152
1 Piano Wire	1,0x250 mm	for 2 parts 173, 2 parts 177 and part 182
1 Mild Steel Wire	1,5x250 mm	for 2 parts 148 and part 176
2 Mild Steel Wires	1,5x820 mm	for 2 parts 108
1 Mild Steel Wire	2,0x425 mm	for parts 54, 159 and 2 parts each 155 and 171
1 PVC-Tubing	3,2x270 mm	for parts 53, 58, 158, 160 and 2 parts each 57, 87 and 88.

Fuselage Construction:

Join sides 1 and 2, add doublers 3 to 7 and reinforcing strips 8 and cement formers 19 together.

Bind and epoxy tubes 25 to formers 12 and 13 and cotter pins 26 and 27 to formers 20 and 21. Epoxy bolts 28 in stab mounts 23 and 24.

Join fuselage sides with formers 19 and 21 and formers 12 and 13 with spacers 29, then add all other formers, cross brace 22, spacers 30 and 40 and former 31.

Bevel top and bottom edges of fuselage sides as per former drawings and butt join bottom plankings 32 and 33. Then fit and cement nose plankings 32 and 33, top plankings 34 and bottom plankings 41 to 43.

Flatten rear of tail skid 45 with a hammer and bend and file to shape. Then complete fuselage with fitting and cementing of nose block 46,

top covers 38 and 39, fin base 35, fin 36, reinforcing strip 37, skid block 44, skid 45, rudder cable guides 57 and stab strut socket 58.

When dry, carefully sand all over, but keep edges sharp as on the original.

Hatch Construction:

Butt join bottom pieces 48 and 49, bevel front edge and spot cement hatch bottom to fuselage. Screw hatch key 47 into former 12, cement formers 50 to 52 onto hatch bottom and epoxy bolt guide 53 into formers 50 and 51.

Drill one 2 mm hole through bolt guide 53 into former 31, bend and insert bolt 54, bevel bottom edges of hatch sides 55 and fit and cement hatch sides and hatch top 56.

Carefully sand hatch to fit into fuselage contours, cut off hatch and lightly sand front, rear and bottom.

Rudder Construction:

Cement spars 59 together and pin onto plan with the tongue touching the building board. Pack up nose block 60 1 mm and cement against spar. Cement one fillet 61 to 63 each and pin onto building board, then cement bottom edge 64 onto them. Pack up 6 mm and cement rudder tip 65 and trailing edge 66 to finish outline. Fit and cement square ribs 67 (will be tapered later) and reinforcing strip 68, then add remaining fillets 61 to 63.

Remove rudder from board, taper ribs, shape nose block, fair in fillets and carefully sand rudder all over. Cut slots and cement rudder horns 69 into them.

Tailplane Construction:

Spot cement stab spar 70 and elevator spar 78 together and pin onto plan, add bottom center planking 71, leading edge 72, ribs 73 to 77 and top center planking 71.

Cement tip ribs 79 together in pairs, pack them up 2,5 mm and cement against leading edge and spars, add trailing edges 80 (packing them up 4,5 mm), finish outline with ribs 81 and trailing edge fillets 86 and fit and cement oversize ribs 82 to 85.

Remove tailplane from building board, taper outer ends of leading edge and spars, round off leading edge and carefully sand all over, but don't round off sides of tip ribs 79. Cut elevator from stab and bevel rear and front edges respectively as shown in section D-D.

Drill holes for mounting tubes 87 and stab strut sockets 88 and epoxy the PVC-tubes into those holes. Twist drilled end of elevator horn 89 by 90 degrees and epoxy onto elevator spar. Strengthen center of elevator spar with a thin coat of epoxy.

Wing Construction:

Because the outer part of the wing is tapered upwards in front view, wing halves are built upside down. Cut out wing tip drawings and paste to main wing plan. Bind and epoxy two cotter pins 91 each to two wing spar fillets 90.

Pack up inner and outer top mainspars 92 and 93 2 mm and pin onto plan. Cement together wing tips 94 from four and aileron tips 95 from three laminations and pin onto plan. Cement fillets 90 and ribs 96 to 107 onto mainspars.

Bend outer ends (7 mm long) of push rods 108 at right angles and slide pushrods through ribs. Hold angled ends over bellcrank drawing and cut off inner ends flush with root ribs 96. Solder washers 109 over pushrod ends 110 and epoxy same over pushrods that they protrude 12 mm out of root ribs. Epoxy wing tongue sockets 111 into ribs 96 and 97.

Cement ribs 112 to 117 onto spars and add bottom main spars. Cut spar webs from sheet 118 and cement in front of main spars. Steam bend aileron trailing edges 120 and cement trailing edges 119 and 120.

Spot join spars 121 and 122 with scrap balsa exactly 6 mm apart, reinforce spars 122 with strips 123 and fit and cement as units, packing up outer ends 2 mm.

Cement planking joiners 124 onto ribs 103, contact cement nose plankings 125 and 126 in position, add plankings 127 to 129 and rib stiffeners 130 and 131.

When dry, remove wing halves from plan, turn over, pack up center panels 3 mm and tips accordingly and pin down again. Add spars 121 and 122 with reinforcing strips 123, planking joiners 124, nose plankings 125 and 126, plankings 127 and 128, rib stiffeners 130 and 131, aileron root ribs 132 and bellcrank mounts 133.

Remove wing halves from building board, sand front edges of plankings 125 and 126 flush with rib noses and again pin down wing halves upside down. Cement leading edges 134 and 135, fit and cement oversize aileron ribs 136 to 146 and spot cement "feet" A to G from scrap balsa. Cut off ailerons, sand rib rests flush with spars 121 and 122, pin or weigh down wing halves and ailerons to building board again and cement spar webs 147. Let dry thoroughly.

Cut off rib tongues and remove feet A to G, taper wing and aileron tips, round off leading edges, fair in aileron ribs, bevel spar webs 147 as per section F-F and carefully sand wing halves and ailerons all over.

Bend push rods 148 around horns 69 and install with bellcranks 149, then add planking 151.

Covering:

Brush all parts with two coats of sanding sealer and lightly sand each coat when dry. Cover all wooden parts wider than 3 mm with lightweight yellow modelspan, then cover open framework with heavyweight white modelspan. Water shrink and brush or spray on at least five coats of clear dope, plasticized with some drops of castor oil. Add decals and let dry overnight, then finish off with one coat of clear varnish.

Final Work on Fuselage:

Taper skid 152 to 9 mm from front buffer to tip and to 13 mm from rear buffer to end, then steam bend to shape. Drill two 2 mm countersunk holes for bolts 154 and bolt down buffers 153. Press buffers between cotter pins 26 and fix with dowels 155, securing them with epoxy. Epoxy mounting block laminations 156 between fuselage bottom and skid tip, let cure, secure with screw 157 and cut sand to shape.

Assemble speed probe from parts 158 and 159 and epoxy into fuselage nose, then add handle 160.

Cut holes into hatch sides and cement in hatch windows 161. Split

black fuel tubing lengthwise and install as cockpit padding. Then cement windscreen 163 in position.

Assembly:

Cut hinges 164 and mount rudder, elevator and ailerons, securing hinges with thin pins. Temporarily tape ailerons in neutral position, wedge pushrod ends 110 protruding 12 mm out of root ribs, slot ailerons and cement in aileron horns.

Drill holes for cotter pins 165 as per section B-B and epoxy two of them into one wing. When cured, epoxy cotter pins into other wing, mount wings with tongues 166, push a piece of toothpick, match or dowel through all four cotter pins, turn model over with wings flat on building board, push wings tightly against fuselage and let cure.

Fit and assemble struts from grooved pine strips 167 and cotter pins 168, carve and sand to streamline section and mount with bolts and nuts 169.

Bend slot cover 170 as per side view, cover with lightweight yellow modelspan, dope, fix decal (center of hyphen) and protect with clear varnish. Slot cover is normally kept over one wing root and slid over slot after assembly of wings.

Bend and fit stab struts 171 and fix stab with washers and nuts over bolts 28. Paint speed probe, wing struts, handle, stab struts and tail skid with silver dope.

RC-Installation:

Install battery, receiver and servos as per makers instructions, the latter between formers 11 and 12. Connect center servo with hooks 173 and cables 172 to rudder horns.

Assemble elevator pushrod from parts 174 to 177 and install between left servo and elevator horn.

Solder aileron drive lever 178 over drive shaft 179 at right angle to holes near upper shaft end and hook up the suitably shortened remaining kwik-link to lever 178. Mount shaft bearing 180 between soldered washers 181, install assembly through slot in top cover 38 and epoxy bearing 180 to top cover. Bend drive hook 182, push through drive shaft and push coupling tube 183 over drive hook. Mount wings with pushrod ends slid in coupling tube and solder drive hook to drive shaft.

Flying:

Trim model slightly nose heavy for first flights and remember that all turns have to be flown with rudder and aileron. In case you have never done that before, you can mount the wings with some dihedral for the first few flights by way of makeshift struts from 2 mm music wire, simply angled at both ends to engage cotter pins 27 and 91.

If you want or have to launch your "Grunau Baby" by some towing method, fix a tow hook on the skid bottom exactly beneath former 12.

As the original, your "Grunau Baby" can do simple stunts, but if you want to do manoeuvres with negative g-loads, you have to hold the wings together with a steel bolt instead of the toothpick - at the risk of some damage in case of a very rough landing.

Scale Contests:

If you want to compete in scale contests, you can gain additional scale points with the following improvements:

1. Use the narrowest molded hinges available instead of the supplied hinge material or make true scale "fork and eye" hinges from 3 mm dia. brass or steel. Leave 4 mm wide gaps between all hinged surfaces by shaving off the beveled portions of parts 70, 78 and 147 and omitting parts 37 and 68.

2. Add aileron horns at aileron bottoms and actuate ailerons with two cables, lead through bend tubes at bellcrank positions. Install suitable 180 degree bellcranks in wing center panels to connect cables with pushrods 108.

Happy Landings Klaus Krick