De Schelde S-21 RS Models\textsuperscript{1} injection kit

Monoplane fighter prototype

Scale 1:72

The Schelde S-21 was an all-metal fighter designed by T. Slot, the designer of the Pander Postjager, who joined the new aircraft department of the shipyard De Schelde after Pander went out of business in December 1934\textsuperscript{2}. The aircraft had a rather particular configuration; it had a pusher propeller, twin tail booms, a retractable nose wheel landing gear, a full glass canopy and very heavy armament: a forward firing 20 or 23 mm cannon that could be positioned either firing straight ahead or 20 degrees downward, a pair of machine guns, built into 50 mm cross section tubes, at both sides of the pilot in the fuselage in the wings, optionally a machine gun firing rearward through the hollow propeller axis and two 50 kg bombs, carried in the tail booms. The wing leading edge had fixed Handley Page slots to improve low speed handling characteristics. The engine was a Daimler Benz, and sources quote both the DB 600G and the DB 601Aa, delivering from 1000 to up to 1360 hp.

Performance with the last engine was (on paper) very good with a top speed of about 590 km per hour and an endurance of more than 4 hours. Diving speed without air brakes could be as high as 1000 km/hr, where ref. 7 contains a warning that at a speed of 800 km/hr some buffeting might occur. The aircraft was designed to withstand in flight loads of up to 14 g, and a landing load of 5 g. The aircraft was equipped with an automatic pilot and two way radio. The development was completely funded by the company.

Rudders and elevator were aerodynamically balanced and were provided with a trim surface. All control surfaces were actuated by push-pull rods, contained within the aircraft’s skin and the undercarriage was covered by doors, when it was retracted, providing an aerodynamically very clean outer surface.

The aircraft has never flown. The design of the aircraft had begun in early 1939 and when the Germans invaded the Netherlands in May 1940 the prototype was under construction. In April 1940 negotiations with the Dutch Army Military Air Arm (ML) were at full speed, concentrating on the required armament, the radio and the pilot accommodation (cf. ref. 9). One of the conclusions was already, that the rearward firing machine gun had little added value, and that the weight could probably better be used for additional ammunition. Also the type\textsuperscript{3} and accommodation of the cannon in the nose was discussed, in particular the magazine(s) to be used, and the ease of handling of the cannon by the pilot.

It is not clear what happened to the prototype, some sources report that it was tested to destruction by the Germans in 1940 or 1941; others report it “alive” in storage until 1943 in the De Schelde factory in Vlissingen. British rumours say further, that it was modified into a Focke-Wulf FW 198, which according to German sources never existed.

The kit comes in a thin carton box and contains the 30 injection plastic parts, a clear plastic canopy and a sheet of decals for a Dutch version baptised “prototype”, a version with the 1939-1940 Dutch orange markings and German markings, evoking the FW 198 story. The orange marking are not complete, the small triangles that should be
present on the tail booms are missing. The registration “23” is unlikely in view of the war time registration carried by the prototype of the De Schelde S-20 of the same period (see below in the section on decals). Also, the location on the front fuselage is unlikely in view of the location of the registration number on the operational Fokker G.I and the prototype of the Fokker D.XXIII. In both cases the registration number is located on the outside of the tail booms. Furthermore, most aircraft of the Dutch Air Force had at least a three digit registration number.

The instruction sheet is basic, but sufficient, identifying the parts, showing the assembly in two exploded views and containing a three view drawing of the aircraft. The back of the box carries the painting instructions.

There is little known about the S-21; at the time it was a secret project, and in the war most data have been lost. A description is given in Hooftman (ref.1), Wesselink (ref.2) and Tempelman (ref. 8), and much information can be found on the Internet, including a cut away drawing and an extensive description (in Dutch) in ref. 3. Most reliable information can be obtained from the original factory description of the airplane (ref. 7) and the minutes of a meeting between the De Schelde company and representatives of the Ditch army (ref. 9). Some information of these sources is included in this introduction and the appendix. The aircraft’s main characteristics are given in the table below.

On the Internet (ref. 4) also a very nice cut away drawing can be found, giving quite some interesting details.

<table>
<thead>
<tr>
<th>Ref.</th>
<th>1:72 span</th>
<th>model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span</td>
<td>8.87-9.00 m</td>
<td>123.2-125.0 mm</td>
</tr>
<tr>
<td>Length</td>
<td>8.50 m</td>
<td>118.1 mm</td>
</tr>
<tr>
<td>Height</td>
<td>3.50 m</td>
<td>48.6 mm</td>
</tr>
<tr>
<td>Engine</td>
<td>Daimler Benz DB 600G or DB 601Aa 950-1360 hp</td>
<td></td>
</tr>
<tr>
<td>Crew</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Armament</td>
<td>One 20 or 23 mm Solothurn cannon, 4 FN machine guns, one rearward firing machine gun</td>
<td></td>
</tr>
</tbody>
</table>

As can be seen from these values the length and height of the model is far too small, something that has been confirmed during the construction.
The plastic parts have quite a lot of flash and needs to be cleaned thoroughly. Also, the original factory description of the S-21 states that the parts of the horizontal tail plane at the outside of the tail booms are in fact the aerodynamic balance part of the elevator. As I will build the model with control surfaces at non-zero angles I have separated the elevator from the horizontal tail plane and detached the two stubs from the tail booms, as shown in the picture above. This operation revealed some defects on the tail booms that I have repaired at the same time.

I have cleaned the parts well with knife and sand paper. The four machine guns have to be produced from scratch; they are not included in the kit. There are no holes in the glass cockpit for the forward firing cannon and the four guns. I have drilled the hole for the cannon, the location of which was indicated on the cockpit glazing; the correct location of the machine guns can only be determined once the cockpit interior including the machine guns has been assembled. The picture shows the cleaned parts with a ten cents coin to illustrate the size of the model.

**Cockpit**

I have painted the cockpit interior light grey (Humbrol 127). The side and front instrument panel I have given a dry brush with black to show the dials. The pilot seat has been painted dark grey, the seat belts formed in the seat plastic dark green with silver fittings. The framework on the rear fuselage bulkhead (which is not in the correct position; in the original aircraft was farther to the rear, behind the machine guns and their ammunition boxes), the stick and rudder bar have been painted dark grey too, the pedals and handle accentuated with black. The Solothurn cannon has been painted gun metal, as well as a strip of 0.6 mm plastic rod, which I will use for the four machine gun tubes. All wheel boxes have been painted light grey.

When these parts had dried, I could fit the interior together, and it became clear quite some adaptations had to be done. The floor was too wide, preventing the two fuselage halves to join. Sanding them slightly has corrected that. The instrument panel was also too wide, the more so because the lower pair of machine guns has to pass alongside. So I have cut the edges of the instrument panel off just next to the outboard dials. The rear bulkhead will need some putty, when both fuselage halves will be glued in place.

Next I have fitted the glass cockpit canopy with the Solothurn cannon in it on the cockpit interior. This did not fit at all; there was interference of the circular ammunition drum with the roof itself and with the rear part of the cannon with the instrument panel. The last thing I have resolved by shortening the cannon by 2 mm, the first problem by deepening the slot in the drum, fitting it that way lower on the cannon body. This way the cannon points its characteristic 20 degrees downwards. The plastic of the cockpit canopy is clear, but quite thick; when it is mounted little detail of the interior decoration is visible. I have tried to produce a copy of the cockpit from thinner plastic, using the original canopy as a mould, but that failed terribly, damaging even the original copy (what I luckily could repair with clear gloss varnish).
The description of the S-21 (ref. 7) also contains quite some details on the instrumentation. From this appears that there was also an instrument panel at the left side of the cockpit, which carried next to a number of engine instruments and electrical switches the throttle and the propeller speed adjustment control. So I have modelled these from bits of plastic sheet material and 0.25 mm metal strand, such that it will fit between the two machine gun tubes. I have painted the instrument panels light grey and dry-brushed with black and, when dry, glued them at the left side of the cockpit, leaving sufficient space free to mount the machine gun tubes.

Next I have mounted the machine guns in the slots left open in the side instrument panels. To do so, I still had to remove a bit of material from both sides of the front instrument panel. I have not cut the tubes to the correct size yet, because I will need them to stick out forward to mark the position of the holes that need to be drilled on the canopy.

I have started with the hole right under, as it was the first tube to hit the glass when I fitted the canopy. I have marked the position on the outside with a fine liner and a sharp pin. I have drilled the hole in steps, starting with a 0.4 mm drill bit, increasing through 0.65 to 0.75 mm.

Then I have drilled the hole above it the same way, followed by the top hole at the port side and the last one below it. At this phase I noticed that the tubes were slightly bent; it was clear I would need bigger holes to accommodate small misalignments of tubes and holes. So I increased the holes to 0.85 and 9.5 mm.

I also noticed some small cracks in the glass. Apparently the plastic is rather brittle and has quite some tension in it. But maybe this is the result of heating it too much and frequently in my failed attempts to create a better canopy, using the original as a mould.

I have tried to obtain a new canopy from the kit PS Models, but did not receive any answer on my request. So I have continued with the damaged part, and have masked it for painting. The forward, strongly curved part was difficult to tape, but cutting first a circular piece of tape of approximately the right size and then trimming it once stuck in place did the trick.

I needed some three layers to obtain opaque frame with Humbrol 191. When removing the tape only very little paint had crept under the tape, and it was easy to remove with the tip of a toothpick.

In the description of the S-21 there is mentioned that the top part of the canopy was covered with blue coloured glass. In the report of the meeting with the ML representatives it was decided that yellow glass would be better, protecting equally was for UV radiation and improving the contrast in the cockpit. The drawings from Tempelman show the yellow glass extending to the nose. This seems unlikely to me, as the pilot would have half of its forward view
rendered in yellow and the rest uncoloured. So I decided to paint only the two rear top window yellow. I have used Tamiya X-24, clear yellow for that, which could be applied without too much transparency difference.

The last item to be mounted in the cockpit is the throttle against the left instrument panel. After that I have glued the canopy in place with white glue. These last steps I have done only after the whole model had been assembled, as I did not want to damage them by handling the model.

**Propeller**

The propeller diameter seemed a bit small, especially taking into account the high power of the engine. When taking the three view drawing (c.f. the appendix) as a reference, the diameter should be 41 mm, compared to the 35 mm of the propeller in the kit. This fits also with the diameter (3.00 m) quoted for the propeller of the Bf 109, which was powered by the same engine. So I have cut the three propeller blades at the widest point and glued 3 mm long strips of 1 mm thick plastic between the blade parts with Revell Contacta.

When that had well dried overnight, I have started sanding the strips in profile, but the joint failed a number of times, so I ended up joining them with thick cyanoacrylate glue, enforcing the joint with a coat of thin cyano. After that sanding did not present a problem anymore.

A layer of primer revealed still some irregularities, but, more important, one of the blades was slightly off-centre. This I have corrected by moulding a leading edge from putty and sanding off the trailing edge, as can be seen in the picture at the above. I have also sanded all blades again, and the propeller is now shaped properly and has the right diameter.

**Fuselage**

Prior to closing the fuselage I have mounted the cooling air inlet screen in the fuselage. As with the cockpit interior, this part was also too wide, and needed to be corrected. Then I have mounted the nose gear wheel bay, and supported it with a plastic strip to keep it in the correct position. And finally I have glued the two “mechanisms” of the four machine guns to the fuselage walls (these are still grey on the picture, but have been painted gun metal since).

When closing the fuselage it appeared that the cockpit floor and screen still needed some small corrections. To glue the fuselage halves I have used first Revel Contacta and finished the joints with Tamiya Extra Thin Cement. I have filled the gaps in the nose wheel bay with Revell putty, and although the fitting of the fuselage halves was good, all joints needed to be filled with Vallejo putty.

Something I did not do before closing the fuselage is to put ample lead in the part of the fuselage forward of the main wheel bays. The model needs it to avoid a tail-sitting attitude. I had to feed small pieces of lead in though the cooling air opening at the rear of the fuselage, fixing them with small drops of glue applied with a metal wire through the opening.
**Wing and tail surfaces**

I have removed the ailerons from the wings and the rudder from the tail booms. On the underside of the wing centre sections the air brake flap is engraved. I have decided to model these in extended position, so I had to remove the “top” surface. This was a difficult job, cutting the plastic away piece by piece (risking to cut away your thumb piece by piece also), until sufficient depth had been reached. The flaps themselves I have modelled from 0.25 mm plastic card, decorated with left over pieces of strip as stringers.

Mounting the two wings to the fuselage is not easy; the shallow slots in the fuselage and the short stubs on the wings do not provide sufficient accuracy to fix the wing halves in a reproducible position; they can move up and down for some 10 mm.

The front views in the instruction sheet and in my reference material were not a great help either, because neither of them corresponded exactly with the model. Also, it is difficult to fix wings and fuselage in a purely horizontal attitude, so I ended up with a completely improvised “wing alignment rig” as shown in the photograph, which yielded in my opinion a realistic appearance of the model. All joints between the wings and the fuselage needed to be filled with Vallejo putty.

Next I have mounted the booms and tail unit, gluing them with Revell Contacta. They were not exactly aligned, so the joints needed some correction with putty.

In the process of painting the control surfaces I lost one to the rudders. So I have scratch-built a second rudder using the original as template from plastic sheet material (a piece of 0.25 mm stuck to a piece of 1 mm plastic to get the 1.2 mm thickness of the original). Cutting and sanding it in shape I achieved an acceptable result. I have also engraved the trim tabs in the rudders.

The wheel bays are rather simple, and I have decorated them with some pieces of 0.25 mm metal wire, bend to lead to the location of the retraction actuator and the main landing strut to represent the hydraulic lines. I have also mounted a piece of metal wire along the landing gear legs to represent the prolongation of the hydraulic line for the wheel brakes.

**Decals**

I have decided to build the prototype version with orange triangles in its assumed wartime livery, analogous to the De Schelde S-20 four-seat general utility and training aircraft. Wesselink (ref. 2) contains a couple of pictures of the S-20, reproduced here at the right, which can be used as a reference.

Apparently the aircraft had a light finish, carried small orange triangles and the pseudo military registration Y-200⁹ on the tail booms. On the wing large orange triangle were carried. The pictures also show that on the fin the De Schelde logo was placed with (probably) the type identification S-20 under it, while a logo, this time without the type indication, was carried on the nose.

So I will finish the S-21 in aluminium⁷, likely for an all-metal prototype, and assume a pseudo-military registration of Y-201. The height
of the small triangles and the registration text must be 3.5 mm to fit the small booms. The typeface comes closest to the Square 721 BT font in my CorelDraw collection, be it that the characters are a bit bolder, and that the “1” must be replaced by an “I”.

The logo I could copy (scan it in black & white, removing the bad pixels with MS Paint) from the title page of ref. 7, where it is combined with a shape reflecting the gull-shape wing of the S-21 (the characters K M S stand for Koninklijke Maatschappij De Schelde, Royal Company De Schelde). In this elongated shape the logo might not fit on the fin or the nose of the S-21, so I have cut off the “wings” off and put S-21 in small letters under the crowned “S”.

When I applied the decal to the rudder, it appeared to be very vulnerable; by trying to slide it in the right place, it broke up in three parts, and I did not succeed rearranging the pieces well. So I decided to draw the orange part of the rudder decals as well. I have made a test print of these decals on clear decal paper and applied it to the rudder. As the print was rather transparent, the orange did not show at all, so I have printed them on white paper, which covers the black sufficiently. Disadvantage is, that the decals have to be cut out very precisely, as otherwise the white will show.

As I was well in the drawing mode, I have reproduced the big triangles also. The pictures at the right show the full set of decals, which are available from www.hollandaircraft.nl on request against materials cost and postage.

**Final assembly**

First step in the final assembly has been to paint the wing, fuselage and tail booms aluminium. The new pot of Humbrol silver paint (H19) that I use normally had a very coarse metal pigment in it, which did not fit at all with the scale of the aircraft. So I decided to use a fresh pot of chrome-silver paint (H191), as my old pot had formed some skins that would stay on the surface. But I did not manage to brush a uniform coat on the model; it developed stripes almost immediately after applying the paint. So I have reverted again to the old pot, applying the paint ample with a brush and wiping the excess paint (and the skins) off with a Kleenex tissue.

When the paint had well dried, I have applied a coat of gloss varnish at the locations where the decals would come, the wings, the fuselage and the tail booms. The decals in the kit are thin, and with a bit of Microscale Set they fell well into the panel grooves of the wings.

My “home-printed” decals were a bit thicker, and it was rather difficult to get the registration number in place due to the large curvature of the top and bottom of the tail booms, as they extend a bit over it analogous to the registration on the S-20. I have decided to apply the winged logo on the front fuselage; it seemed a pity not use it.
I have given the model a coat of clear satin varnish (Humbrol 135) to seal the decals, after having tested it on a piece of the original decals in the kit, which I will not use.

Next the undercarriage can be mounted. The side supports of the main undercarriage legs I have made from 0.4 mm, silver painted brass wire. The configuration has been copied from the three view De Schelde drawing in the appendix. When I had done so, the model appeared to sit on its tail, even when the wheels had been fitted temporarily in place. Clearly the nose wheel leg is too long, so I removed it, cut off about 1.5 mm and glued it again in place. Now the model had the right attitude, but it was still sitting on its tail. Although I had put a lot of leaden fish line beads in the forward part of the fuselage, this was apparently not enough. I will try to correct this, when the model is finished, as quite some “heavy” parts still have to be attached to the rear part.

With the undercarriage in place the diving brakes can be glued in place with some drops of thin cyanoacrylate. I am quite satisfied with their appearance.

Next I have drilled a 1 mm hole in the propeller and the rear part of the fuselage and glued a piece of 1 mm rod in the propeller. The propeller matches quite well the rear of the fuselage, but when I put the model to its feet, the propeller blades touched the ground, a consequence of lengthening the blades with 3 millimetres. The picture shows the model on a piece of 2 mm thick plastic. A check with the De Schelde original three-view drawing showed that the wheels should anyhow have a larger diameter than those in the kits, and that the main wheel bays should extend all the way to the centre fuselage spar. At this stage it is, however, too large a modification to correct for this. Also, the fuselage height of the model is much less than the height in the drawing (24.5 mm compared to 19.2 mm of the model). These differences explain the difficulty of fitting a propeller of the correct dimensions to the model. From the drawing I could also deduce that the fuselage is almost 10 mm too short.

To give the propeller some clearance with the ground I have removed the undercarriage legs and lengthened them with a piece of strip of 1.5 mm length. When I had mounted the lengthened legs to the model, it appeared to have the added benefit that the model stayed on its nose wheel as well.

I have again mounted support struts made from 0.4 mm brass wire and I have glued the wheel doors in place. The small nose wheel doors are slightly too long, and need to be shortened by about one millimetre to fit well.

Then the control surfaces could be glued in place with thick cyanoacrylate. I have glued ailerons and rudders in neutral position and the elevator down corresponding to the position of the controls in the cockpit. At the same time I have glued the canopy to the fuselage and have cut off
the four rods representing the machine guns flush with the canopy surface. I have coloured the muzzles black.

In the references two options are mentioned for the antenna: between the two fins and from the fin to a strut on the forward part of the booms. This last one seemed most advantageous to me, as then the antenna wire can be fed directly into the radio compartment, which is located above the engine. The antenna wire is made from black painted 0.06 mm fishing line, glued with thin cyanoacrylate in 0.3 mm holes in fin and fuselage.

The flashlight I have modelled by cutting a 1 mm round from aluminized plastic sheet, placing it in the 1.5 mm hole above the nose wheel and covering it with Humbrol Clearfix. This gave a convincing result. I have also repositioned the main wheels such that they are straight on the ground, and I have sanded a bit away at the bottom of all wheels to get a more natural look. Finally I have given the model a light wash with grey water paint.

Below some pictures of the finished model are shown.
It is a nice model to build, but not really a model for beginners; there are many issues which need to be solved. Major shortcoming of the model is the fuselage, which is not to scale, and results in some accommodation problems in the cockpit, a propeller diameter which is too small, and even then to little clearance of the propeller to the ground (long before the tail touches the ground the propeller tips do, which is a safety issue and is certainly is not allowed).

If you want to build this model, even in its “out-of-the-box” form, you must anticipate the following adaptations.

- The fuselage is very narrow and the canopy is quite thick; to fit all cockpit equipment in, you will have to remove a piece of material at both sides of the instrument panel and at the rear of the cannon; you will not be able to fit the ammunition drum in.
- Be sure to fill the forward fuselage completely with lead; the model is very tail heavy.
- Remove the slotted connection between wings and fuselage and horizontal tail plane and tail booms; maintaining them will lead to large gaps, which you will have to fill with putty. Anyhow, the wing slots do not help you to obtain the correct wing angle.
- Make the nose wheel strut 1 mm shorter; otherwise the tail will touch the ground.
- The nose wheel doors must be shortened a bit to fit in the available space.
- If you want to build the model with the undercarriage retracted, you will have to sand away most of the inside half of the main wheels to fit the wheel doors flush with the wing surface.

If you want to modify the model further to resemble the original better, you may introduce the following modifications.

- Produce a left side instrument panel, including the throttle, in the cockpit.
- Lengthen the propeller blades by 3.0 mm, as the diameter of the propeller is too small. As a consequence, you will also have to lengthen the struts of the main landing gear by 1.5 mm to prevent the propeller touching the ground.
- Modify the rudder decals, such that they do cover the (engraved) rudder only. For the orange decals this means you will have to paint the loser edge of the rudder black.
- Produce (or order) small orange triangles or Dutch rosettes and registrations for the tail booms and factory logo’s for the fins.
- Produce an antenna mast on the right tail boom and span an antenna wire from the top of the right fin to the top of the mast.

Other modifications are suggested in the text (air brakes, detached control surfaces, hydraulic lines in wheel bays).

References

3. www.historien.nl/de-schelde-s-21-luchtvaartrevolutie/
4. sobchak.wordpress.com
5. www.airwar.ru
6. www.ww2aircraft.net
7. N.V. Koninklijke Mij. De Schelde, Beschrijving S-21, Nr. 4003-0785, maart 1940
10. H. Hooftman, Nederlandse Vliegtuig Encyclopedie, Scheldemusch en Scheldeemeeuw, pp. 96-215, Cockpit-Uitgeverij, Bennekom, 1977
11. W. Vredeling, Collection of De Schelde S-21 data (including ref. 7 and 9), 2013
Appendix Performance figures, pictures and drawings of the De Schelde S-21

The performance figures below are taken from ref. 7.

CL-CD curve S-21

Power curve D.B. 601 Aa
Climb performance S-21

Range S-21
De Schelde drawing from ref. 11; scale 1:72
Empty weight [kg] | 2050
---|---
Take-off weight [kg] | 2750
Fuel [kg] | 360
Max. speed at 0 m [km/hr] | 450
Max. speed at 5000 m [km/hr] | 570
Range at 500 km/hr [km] | 810
Range at 300 km/hr [km] | 1400
Practical ceiling [km] | 9500
Climb to 1000 m [minutes] | 1.01
Climb to 5000 m [minutes] | 5.06
Climb to 9000 m [minutes] | 14.44

[Source: ref. 7]

Wind tunnel and demonstration model
[Source: Stichting Historisch Museum NLR - D.J. Rozema]

[Source: Wesselink]

[Source: Tempelman]

[Source: Tempelman]

---

1 www.rsmodels.cz

2 The Pander Aircraft Department was in fact, with some design staff, transferred to De Schelde in January 1935. The transition to all metal construction methods had already been prepared from 1933 onwards with the decision to cooperate with Aviolanda in Papendrecht, which was specialized in all metal aircraft construction.

3 The instruction sheet quotes a Madsen cannon, but all other sources quote a Solothurn or (optionally) a Hispano cannon.
As the model was still rather tail heavy, I have glued two small pieces of lead at the right and left of the cannon. I have used white glue for that.

I used cyanoacrylate glue to fix the lead in place, and got the advice afterwards never to do that, as apparently lead reacts with that glue and expands, which may cause the fuselage to burst open. It is better to use slightly thinned white glue for the purpose.

Fokker used an X-registration for its prototypes, Koolhoven a Z-registration.

Ref. 7 states that the aluminium material of the S-21 is treated according to the aluminite process, which is an Alcoa designation for clear anodizing. This is slightly more greyish than bare aluminium.

Making the text bolder is easily done in CorelDraw by typing the text in a big font (I have used 48 pt.), increasing the kerning to 60%, then converting the text to curves, using the contour tool to move the contour outward, separating and/or breaking the object, removing the original text, and decreasing the height of the text to the desired size.

Scaling from the De Schelde drawing the main wheels should have a diameter of 10.2 mm (kit: 8.6 mm) and the nose wheel a diameter of 8.0 mm (kit: 4.8 mm). The length of the main undercarriage legs between the lower surface of the wing and the wheel axle (11.5 mm), the length of the nose wheel leg between the underside of the fuselage and the wheel axle (11.0 mm before shortening it) is correct.