

# P-51D Mustang



Catalogue No.: 2401

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## Technical data:

Wingspan:	460 mm / 18.11 in
Length:	406 mm / 16 in
Wing surface:	3,7 dm <sup>2</sup> / 57,4 sq. In.
Propulsion:	Brushless motor 5-7 g / 0.18-0.25 oz, 2000-3000kV
Weight:	max. 65 g / 2.3 oz
Controlled functions:	motor, ailerons, elevator, (rudder optional)

Congratulations for your purchase of the flying scale model of a WW 2 fighter - the North American P-51D Mustang. The real airplane, often considered the most successful fighter aircraft of that conflict, has been created based on specifications issued by the British Ministry of Aircraft Production. The British Purchasing Commission sought in January 1940 at the North American Aviation Company (NAA) a help with licence production of the Curtiss P-40 Tomahawk fighters for the RAF. The NAA company offered the British to design and build (within the same time it would take to prepare a licence production) its own project instead, offering substantially better parameters. The prototype NA-73X took to the air for the first time on 26<sup>th</sup> October 1940, 178 days (!) after the order was placed. The NAA's chief engineer Ed Schmued used NACA's laminar wing/airfoil work, and gave the prototype many virtues: speed, large fuel tanks and good manoeuvrability. A disadvantage for European theatre was the poor high-altitude performance of the Allison V-1710 V-twelve engine. The initial orders were for a total of 620 of the NA-73 and NA-83 series-built fighters (the British designated both of them as the Mustang Mk.I), armed with two synchronised cal.50/12.7mm machine guns in fuselage and one cal.30/7.62mm in each wing. They entered the RAF service in spring of 1942. Performance of the new airplane attracted interest of the US Army Air Corps. It eventually ordered 150 of the type NA-91 and put them in service as the P-51, called briefly Apache, before re-adopting the British name of Mustang. An attack version, the A-36A with dive flaps and more potent armament of four wing-mounted 20mm cannon, followed soon (to be designated Mustang Mk.IA in the RAF).

The Allison-powered Mustangs' good low/medium-level performance notwithstanding, the British still wanted a better high-altitude performer, so they test-installed the two-speed, two-stage supercharger-equipped Rolls-Royce Merlin 61 in five prototypes, designated Mustang Mk.X. Thence the parent company devised the NA-102 or P-51B and NA-103 or P-51C, with strengthened airframe and lowered belly radiator with much-improved ducting. In British service both machines were known as Mustang Mk. III. Powered by a licence-built Packard (Rolls-Royce) Merlin V-1650-3, they have got a standard fit of four wing-mounted cal.50/12.7mm M2/AN Brownings and bomb racks.

The limited visibility backwards was first improved by field shop modification to the rearward-sliding, free-blown Malcolm hood, adopted from Spitfires, and finally cured in the NA-104 version, designated, depending on the manufacturing plant of Inglewood or Dallas, as the P-51D and K, respectively. Both became the Mustang IV in the RAF. The D/K had the fuselage spine cut down and a teardrop, full vision backwards sliding canopy with simpler armoured-glass windshield installed. Its armament grew by a pair of half-inch machine guns, their modified mounting removed the previous propensity to feed jams under high *g*'s. The vertical tail strake was soon introduced as a remedy for a certain loss of directional stability and effectivity of the vertical tail, caused by the cutting down of fuselage spine. The last series-produced single-seat Mustang was the lightweight P-51H, easily discernible from the previous versions by its higher vertical tail and straight leading edge of the wing root.

Altogether, there were some 15 500 Mustangs produced, with some 9 600 of the P-51D/K alone. Many machines served with various air forces until sixties, long after the end of the WWII. Nowadays Mustangs populate not only the halls of world's museums, but they also often roar down the racing courses in Reno and please the crowds at other sporting and nostalgia air shows and venues.

## Reference:

Osprey Aircraft of the Aces No.1, Mustang Aces of the Eighth Air Force; Wikipedia;  
[www.airliners.net](http://www.airliners.net)

**The model is not intended for beginners.** Its flying characteristics depend substantially on its all-up weight. Make sure that the maximum permissible weight is not exceeded, and keep to the weights suggested in the instructions. The airframe weights 30 grams, leaving 35 grams for the equipment. Once the all-up weight is above 65 grams, the controllability and flying quality of the model is strongly reduced. The model can be fitted with a standard set of RC equipment in the micro range, enabling you to utilise for its control your full-size transmitter. In order to save weight when using individual servos, controller and receiver, it is recommended to omit rudder control. Another possibility is to use the integrated module, containing, besides (usually linear) elevator and rudder servos, also the receiver and motor controller. The module must be designed to operate on 7,4 Volts (e.g. a LiPol 2S) and brushless motors. In that case the aileron control requires an extra very light servo. Thanks to the lower weight of the complete equipment the rudder control is available, as the necessary parts are already contained in the kit. However, some integrated module systems have the transmitter equipped with the basic functions only, which, due to the type of model, reduce the comfort of the model control.

The instructions describe the model fitted with individual elements of the control equipment.

Model you have bought has several characteristic features:

- The model is a very accurate scale rendering of the real fighter, and sports details in a quality that is quite uncommon even on much larger models.
- The model is supplied in highly pre-fabricated state. Once you assemble it, all that you have to do is to apply decals and install the power unit and the RC equipment.
- The model is made of extruded polystyrene (EPS), and its exposed surfaces are protected by plastic covers. Thanks to the ratio of the all-up weight and strength of the EPS used, the model is rather strong and compact, with a low risk of damage in normal operation.
- When designing the model, maximum attention was paid to its aerodynamic layout (like the choice of a semi-symmetric wing section, symmetric section of the horizontal stabilizer etc.), ensuring high aerodynamic fineness, thus allowing for a very good usable speed range and kind flying characteristics, usual on much larger models.

## Finishing the model

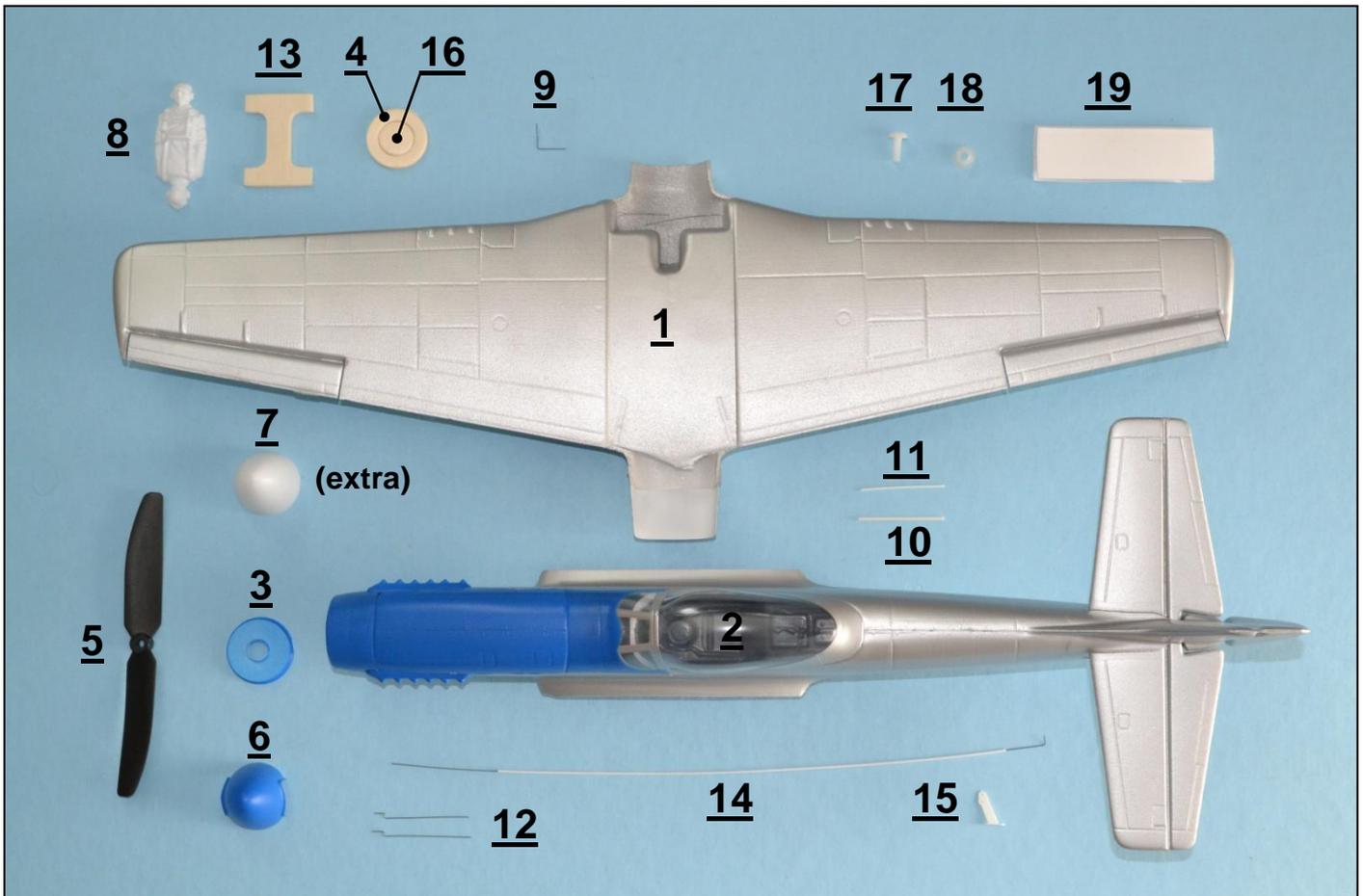
It is very simple, nevertheless please read the following text thoroughly. Bear in mind the small size of the model, work carefully and consider each step well.

## Decals

The model is painted in the basic colour scheme. The national markings and tactical codes are of waterslide type decals.

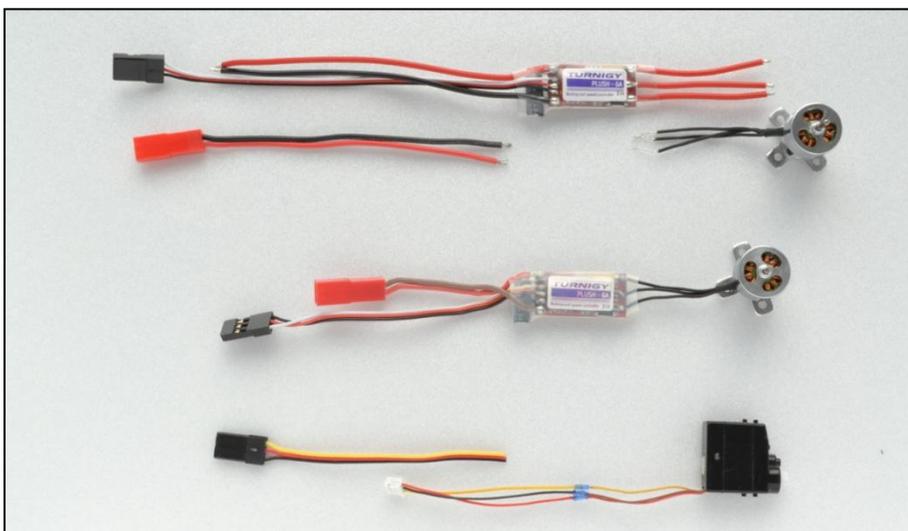
- For applying the decals, use the decal setting solution for plastic (static) scale model kits, available in the modelling shops. Check, please, that the solution does not attack the extruded polystyrene (EPS) and follow the instructions for its use. The procedure listed here applies to the Tenzol, produced by the Agama company.
- Cut-out a decal from the sheet, dip briefly (about 10 seconds) in lukewarm water and let it soak on a flat, non-porous surface.
- Apply the setting solution on the surface where you would place the decal.
- The sufficiently soaked decal slides on the backing paper easily. Put the decal on place, still on the backing paper, and slide it slightly over the paper's edge to place it on the correct spot on the model. Put a finger on the protruding edge of decal to hold it in place and pull the backing paper from beneath it slowly. To adjust the position of the decal precisely (if it does not move freely), add some water with a paintbrush to the edge of the decal. This method would allow you to loosen an already set decal, if needed, too.
- Let the solution work on the decal in place for about a minute or two. Smoothen the decal gently and press any bubbles out radially, centre to edges, with a soft blotter or, better, a small polyurethane foam roller. Note the decal will adhere snugly to the surface only when dry, i.e. after several hours.

## Kit content



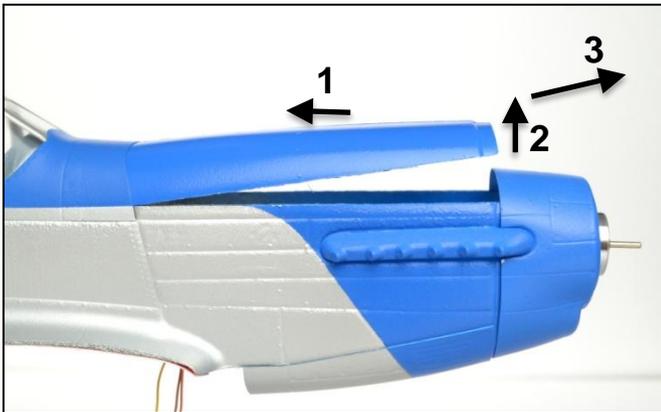
## RC equipment

- Solder the cables with the feed connector (JST-BEC) to the controller, solder also the motor cables to it (check the sense of rotation) and, eventually, shorten the cable to the receiver. Solder either to the shortened controller cables, or, with maximum care, directly to the controller board (saving weight in this way). Insulate all joints and enclose the controller in a heat-shrunk plastic tube. Note that as the cables represent a major proportion of the total equipped weight, it is good to keep them as short as possible without jeopardising the ease of handling the equipment.
- If need be, replace the servo connectors to suit the output sockets of your receiver, preferably by changing a part of the servo cable.

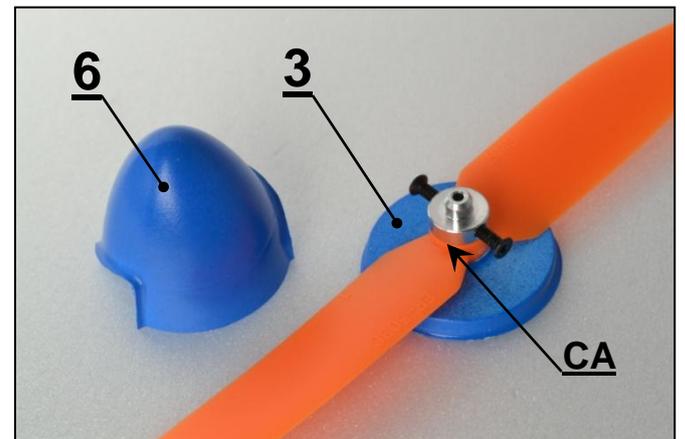
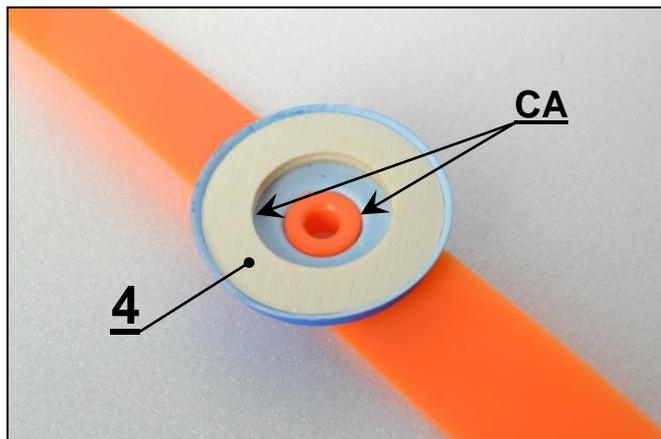


## Battery cover, propulsion unit, canopy/cockpit

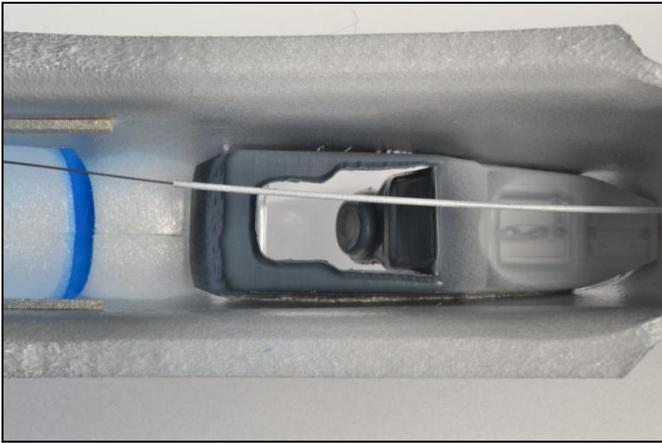
- Slide the battery compartment cover slightly backwards so that its front edge clears the edge of the engine cowling. Then remove the cover moving it forward. Replace the cover in opposite sequence.
- The motor is attached to the motor bulkhead by screws, two suffice. Insert the controller through the lower opening in the bulkhead into the engine tub and attach it with pieces of self-adhesive hook-and-loop tape to the fuselage bottom.
- Attach the engine cowling to the fuselage either by tack-gluing with glue (PU), or keep in place by pieces of thin double-sided adhesive tape. To ensure better cooling of the model's inside, cut out carefully the carburettor air intake beneath the propeller spinner.



- Reinforce the rear web of the propeller spinner by gluing (CA) the plywood ring into it. Once cured, glue (CA) the rear web to the propeller hub. Ensure that rear web is parallel to the propeller hub and that the web/spinner assembly would run true, without wobble.
- Glue (CA) the propeller carrier plate to the front of the propeller hub.
- Insert the propeller onto the motor shaft and, after checking that the rear web does not touch the cowling face, tighten the attaching bolts. It is convenient to put piece of plastic tube (**10**) between attaching bolts and motor shaft as a "washer" before tightening the bolts, otherwise the joint could come loose.
- Glue the spinner to the rear web, ensuring its true, wobble-free rotation. Use the UHU Por or another contact glue, allowing for eventual spinner removal.

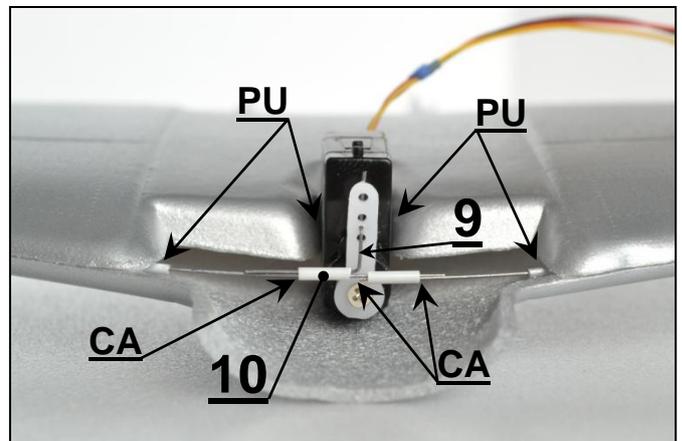
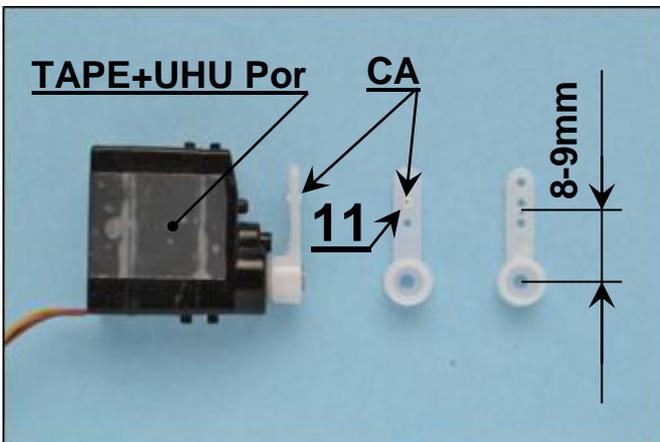


- Carefully bend the pilot's seat to the inside of the cockpit.
- Insert the assembled and painted pilot figure to the cockpit and glue (UHU Por, PU) it in place. Do not use the CA glue, as, most probably, it would haze the clear plastic.
- Provided you want to apply decals to the instrument board, or to add more detail to the cockpit, carefully remove the tack-glued canopy from the fuselage and once the work inside the cockpit will be done, re-glue it back (UHU Por).

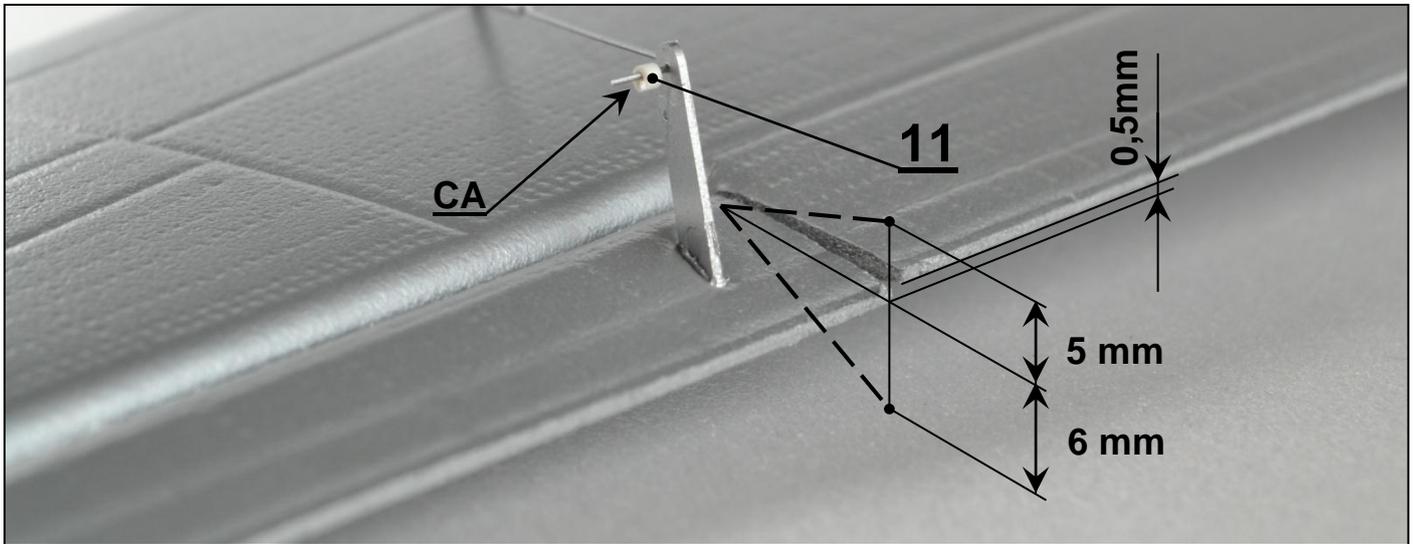


## Aileron control

- Wrap the servo body with self-adhesive tape to both keep it in one piece and to protect it from the effects of glue on its surface or even penetrating inside. Smear lightly the tape where the servo will be glued with UHU Por to provide for a stronger bond of the glue when attaching the servo to the wing.
- Bush-out the appropriate opening in the servo arm, gluing in (CA) a piece of plastic tube, or drill in the arm a new opening of 0.5 mm diameter. Insert the wire link to the opening, attach the arm to the servo and secure with a screw.
- Insert the servo to the cut-out in the wing.
- Using plastic tubes join the wire link to the aileron control rods and place the servo so that the rods form a mild, smooth curve.
- Glue (epoxy, PU) the servo and plastic tubes to the wing.

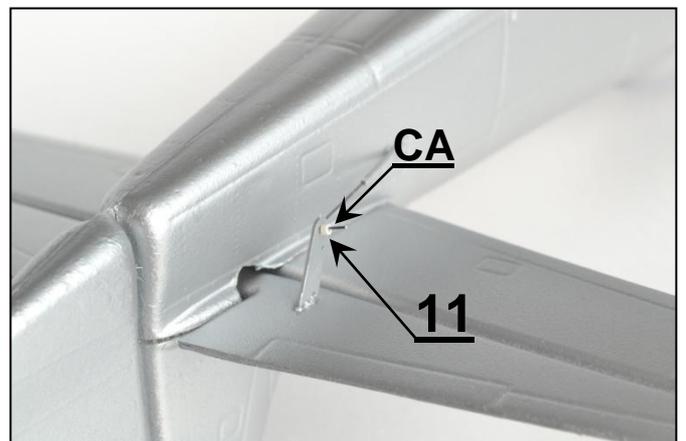
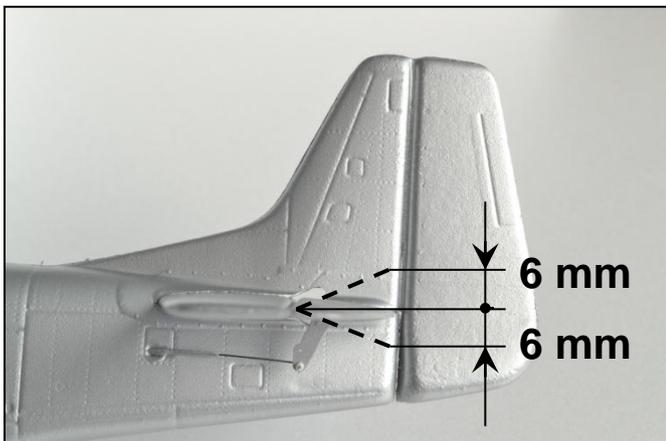
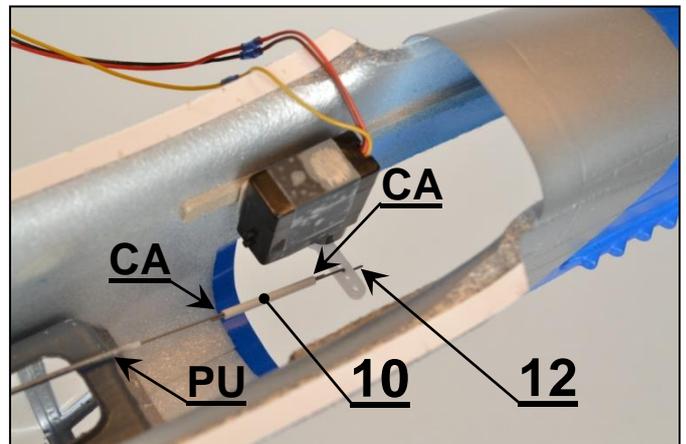
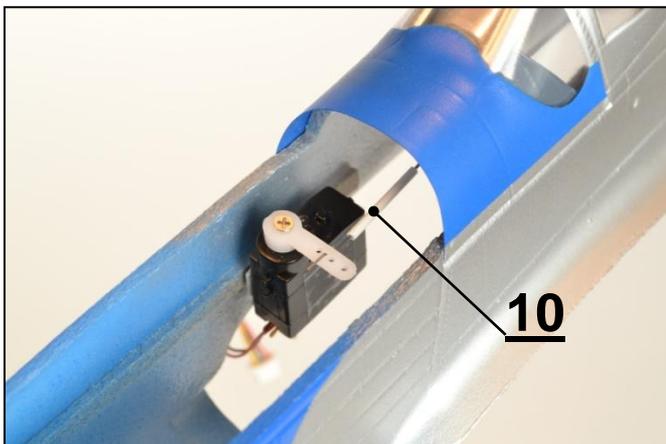


- Check that the sense of rotation of the servo and aileron movement is correct, then set the ailerons so that their trailing edges are some 0.5 mm higher than (above) the wing trailing edge (wingtip washout). Then apply a drop of CA glue to the plastic tubes, joining the aileron control rods with the wire link, to seep in and fix the setting. If this procedure fails and the setting is not correct, the simplest remedy is to very carefully remove (melt away) the plastic tubes with soldering iron and repeat the procedure better. Bear in mind that once the model is complete, this assembly would be accessible only after removal (ungluing) of the wing. It is possible to reinforce the joint by gluing tiny carton/plywood triangle over it.
- The maximum aileron deflection (throw) should be about +6/-5 mm.
- Secure the control rods in the control arm by gluing (CA) pieces of plastic tubing on the rod ends.



## Elevator and rudder control

- Prepare the servo for installation the same way as the aileron servo (tape, bushing the arm).
- Insert the control rod into the bushed out opening in the servo arm, place the arm on the servo shaft and secure with screw.
- Insert the servo to the fuselage and, using the tube, join both sections of the control rod.
- Glue (Epoxy, PU, UHU Por) the servo to the longeron on the right (stbd.) side of the fuselage so that the control rod tube could be glued (Epoxy, PU, CA) to the bottom of the cockpit floor.
- Check the sense of rotation of servo and movement of the elevator, neutralize the servo and elevator and fix the control rod in position by a small drop of CA to each end of the tube joining both parts of the control rod.
- The maximum deflection (throw) of the elevator should be about +/-6 mm.
- Secure the control rod in the control arm by gluing (CA) a piece of plastic tubing on the rod's end.



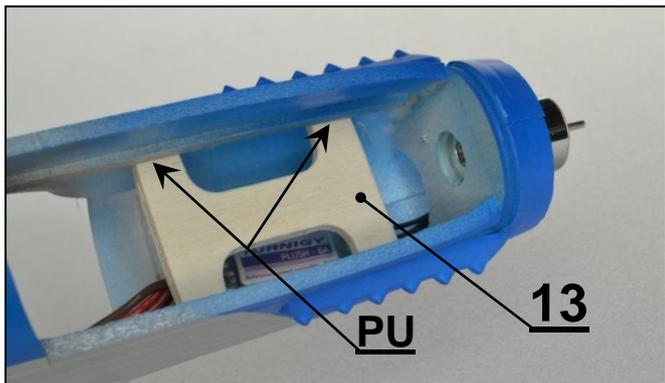
The rudder control enables to fly with the model a wider range of aerobatic figures, but for daily flying it is not necessary. If the model is equipped with individual servos, controller and receiver, the installation of the rudder control with its third servo and control rods is not recommended due to the consequent increase in all-up weight.

The rudder control is almost identical to the elevator control, and all necessary parts are in the kit (12, 14, 15).

- The maximum recommended deflection (throw) of the rudder is +/- 8mm.

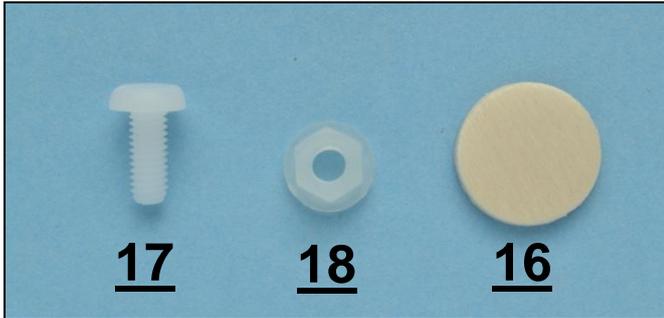
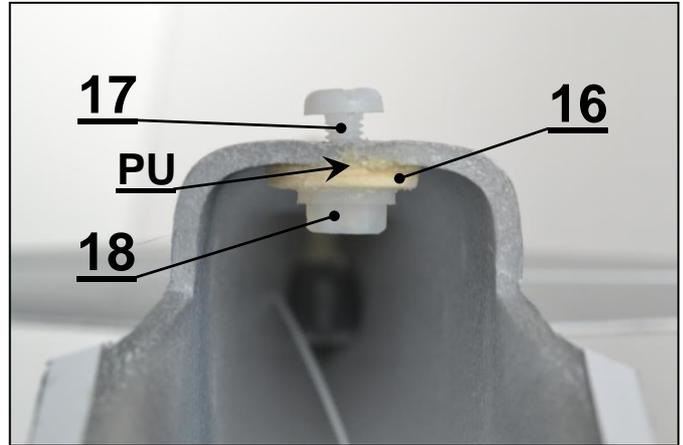
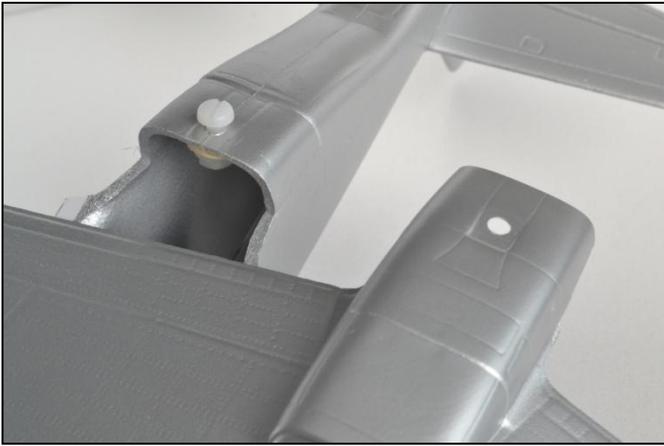
## Completing the model, test flying

The receiver is attached to the left (port) inner side of the fuselage using a hook-and-loop self-adhesive strip. Its position and the position of the battery support plate, the latter being glued (PU) to the underside of the fuselage longerons, derives from the necessary adjustment of battery position when fine-balancing the model. The properly balanced model, supported on one's fingers at the points marked on the wing underside, should stabilize in a slightly nose-down attitude.



The wing could be made either detachable, or glued to the fuselage. In order to save weight and provide for more rigidity to the model we suggest tack-gluing (PU, UHU Por) the wing to the fuselage. Still, if need be, the glue tacks could be carefully cut through and the wing removed again.

Parts for one possible method of making the wing detachable are included in the kit. We recommend reinforcing the contact surfaces of the wing/fuselage fillets by gluing some carton or 0.4mm thick birch plywood strips onto them.



Prior to maiden flight, check all functions of the model, and set on your transmitter the non-linearity of about 40 %, if possible, for both ailerons and elevator.

Test-fly the model over taller grass. Launch it with motor at full throttle to a slight climb. Make sure to let the model fly straight and not to impart to it any additional vertical or horizontal rotation (yaw or pitch input). If, for the few first launches, you have available the help from a more experienced modeller, do not hesitate to ask him for it!

After trimming for powered flight, climb to a safe height and try flying in some border regimes - especially test the behaviour of the model during impending and fully developed stall.

With the properly trimmed and tested Alfa Model P-51D Mustang it is not necessary to wait for a calm – it can easily handle wind to 3 m/s.

Because of the properties of the material used, avoid high temperatures and long exposure of the model to the direct sunlight. Also do not leave the model behind a window inside your car.

Let us wish you many happy landings

**ALFA MODEL s.r.o.**

#### **A list of parts and tools necessary for finishing the model, not part of the kit:**

- Polyurethane (PU) glue, UHU Por, five-minute Epoxy, cyanoacrylate (CA) glue.
- Modelling knife, screwdrivers, transparent self-adhesive tape, 0.5mm, 4mm drill bits.
- At least three-channel (four-channel) RC set, a micro receiver of max. 4gram weight.
- Battery charger .

#### **Recommended equipment for the model**

- Two micro servos of up to 3.5gram weight
- controller, minimum.3 Amps, weight max. 6 g (Turnigy Plush-6A, MGM Compro EASY 7, JETI Advance 04 plus)
- AC motor max. weight of 7 g, 2000-3000kV (HXM 1400-2000, Turnigy 1400/2000 – 3000kV, Dualsky XM1812MA-42 – new longer shaft necessary for the latter)
- battery 2S LiPol (7.4V), 150mAh, 15/25C, max.10 g

The weights listed here include complete equipment with cables, connectors etc.

**ALFA MODEL s.r.o., Nový Svět 89/4, 118 00 Praha 1, Hradčany, Czech Republic, [www.alfamodel.cz](http://www.alfamodel.cz)**