



Cularis

Kit Cularis # 21 4218

MULTIPLEX[®]

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D Sicherheitshinweise

- ☺ Prüfen Sie vor jedem Start den festen Sitz des Motors und der Luftschraube - insbesondere nach dem Transport, härteren Landungen sowie Abstürzen. Prüfen Sie ebenfalls vor jedem Start den festen Sitz und die richtige Position der Tragflächen auf dem Rumpf.
- ☺ Akku erst einstecken, wenn Ihr Sender eingeschaltet ist und Sie sicher sind, daß das Bedienelement für die Motorsteuerung auf "AUS" steht.
- ☺ Im startbereiten Zustand nicht in den Bereich der Luftschraube greifen. Vorsicht in der Luftschraubendrehebene - auch Zuschauer zur Seite bitten!
- ☺ Zwischen den Flügeln die Motortemperatur durch vorsichtige Fingerprobe prüfen und vor einem Neustart den Motor ausreichend abkühlen lassen. Die Temperatur ist richtig, wenn Sie den Motor problemlos berühren können. Insbesondere bei hohen Außentemperaturen kann dieses bis zu 15 Minuten dauern.
- ☺ Denken Sie immer daran: Niemals auf Personen und Tiere zufliegen.

F Conseils de sécurité

- ☺ Avant chaque décollage, vérifiez la fixation du moteur et de l'hélice, notamment après le transport, après les atterrissages violents et après un "Crash". Vérifiez également, avant chaque décollage la fixation ainsi que le positionnement de l'aile par rapport au fuselage.
- ☺ Ne branchez l'accu de propulsion que si vous êtes sûr que votre émetteur est allumé et que l'élément de commande moteur est en position "ARRET".
- ☺ Ne mettez pas vos doigts dans l'hélice! Attention à la mise en marche, demandez également aux spectateurs de reculer.
- ☺ Entre deux vols, vérifiez en posant un doigt dessus, la température du moteur, laissezle refroidir suffisamment avant le prochain décollage. La température est correcte si vous pouvez maintenir votre doigt ou votre main sur le moteur. Le temps de refroidissement peut varier jusqu'à 15 minutes s'il fait particulièrement chaud.
- ☺ Pensez-y toujours: ne volez jamais vers ou au-dessus des personnes ou des animaux.

GB Safety notes

- ☺ Before every flight check that the motor and propeller are in place and secure - especially after transporting the model, and after hard landings and crashes. Check also that the wing is correctly located and firmly secured on the fuselage before each flight.
- ☺ Don't plug in the battery until you have switched on the transmitter, and you are sure that the motor control on the transmitter is set to "OFF".
- ☺ When the model is switched on, ready to fly, take care not to touch the propeller. Keep well clear of the propeller disc too, and ask spectators to stay back.
- ☺ Allow the motor to cool down after each flight. You can check this by carefully touching the motor case with your finger. The temperature is correct when you can hold your finger on the case without any problem. On hot days this may take up to 15 minutes.
- ☺ Please keep in mind at all times: don't fly towards people or animals.

I Note di sicurezza

- ☺ Prima di ogni decollo controllare che il motore e la eliche siano fissati stabilmente - specialmente dopo il trasporto, atterraggi duri e se il modello è precipitato. Controllare prima del decollo anche il fissaggio e la posizione corretta delle ali sulla fusoliera.
- ☺ Collegare la batteria solo quando la radio è inserita ed il comando del motore è sicuramente in posizione "SPENTO".
- ☺ Prima del decollo non avvicinarsi al campo di rotazione della eliche. Attenzione alla eliche in movimento - pregare che eventuali spettatori si portino alla dovuta distanza di sicurezza!
- ☺ Tra un volo e l'altro controllare cautamente con le dita la temperatura del motore e farli raffreddare sufficientemente prima di ogni nuovo decollo. La temperatura è giusta se si possono toccare senza problemi. Specialmente con una temperatura esterna alta questo può durare fino a 15 minuti.
- ☺ Fare attenzione: Non volare mai nella direzione di persone ed animali.

E Advertencias de seguridad

- ☺ Compruebe antes de cada despegue que el motor y la hélice estén fuertemente sujetos, sobretodo después de haberlo transportado, de aterrizajes más fuertes así como después de una caída. Compruebe igualmente antes de cada despegue que las alas estén bien sujetas y bien colocadas en el fuselaje.
- ☺ Conectar la batería, cuando la emisora esté encendida y Usted esté seguro que el elemento de mando para el motor esté en "OFF".
- ☺ No meter la mano en la zona inmediata a la hélice cuando el avión esté a punto de despegar. ¡Cuidado con la zona de la hélice! ¡Pedir a los espectadores que se aparten!
- ☺ Entre los vuelos hay que comprobar cuidadosamente la temperatura del motor con el dedo y dejar que el motor se enfríe antes de volver a despegar. La temperatura es correcta, si puede tocar el motor sin problemas. Sobretodo en el caso de temperaturas del ambiente muy altas, esto puede tardar unos 15 minutos.
- ☺ Recuerde: No volar nunca hacia personas o animales.

Examine your kit carefully!

MULTIPLEX model kits are subject to constant quality checks throughout the production process, and we sincerely hope that you are completely satisfied with the contents of your kit. However, we would ask you to check all the parts **before** you start construction, as **we cannot exchange components which you have already worked on**. If you find any part is not acceptable for any reason, we will readily correct or exchange it. Just send the component to our Model Department. Please **be sure** to include the purchase receipt and a brief description of the fault.

We are constantly working on improving our models, and for this reason we must reserve the right to change the kit contents in terms of shape or dimensions of parts, technology, materials and fittings, without prior notification. Please understand that we cannot entertain claims against us if the kit contents do not agree in every respect with the instructions and the illustrations.

Caution!

Radio-controlled models, and especially model aircraft, are by no means playthings. Building and operating them safely requires a certain level of technical competence and manual skill, together with discipline and a responsible attitude at the flying field. Errors and carelessness in building and flying the model can result in serious personal injury and damage to property. Since we, as manufacturers, have no control over the construction, maintenance and operation of our products, we are obliged to take this opportunity to point out these hazards and to emphasise your personal responsibility.

Warning:

Like any other aircraft, this model has static limits! Steep dives and silly, imprudent manoeuvres may cause structural failure and the loss of the model. Please note: damage caused by incompetent flying is obvious to us, and we are not prepared to replace components damaged in this way. It is always best to fly gently at first, and to work gradually towards the model's limits.

Adhesives: cyano-acrylate ("cyano") and activator

Use high-viscosity cyano-acrylate glue ("thick cyano" - not styrofoam cyano) in conjunction with activator ("cyano kicker"). Epoxy adhesives produce what initially appears to be a sound joint, but the bond is only superficial, and the hard resin breaks away from the parts under load.

Hot-melt glue (from a glue gun) is a useful alternative adhesive.

MULTIPLEX radio control system components for the Cularis

<i>Micro IPD</i> UNI receiver	35 MHz, e.g. A-band	Order No. 5 5971
alternatively	40 MHz	Order No. 5 5972
or		
<i>RX-7 SYNTH IPD</i> receiver	35 MHz, e.g. A-band	Order No. 5 5880
alternatively	40 MHz	Order No. 5 5882
<i>Tiny-S</i> UNI servo (2 required)	Elevator / rudder	Order No. 6 5121
<i>Nano-S</i> UNI servo (4 required)	2 x ailerons	Order No. 6 5120
Cularis cable set		Order No. 8 5055
Contents:		
2 x 600 mm UNI extension lead	(Order No. 8 5032)	
1 x 400 mm UNI extension lead	(Order No. 8 5029)	
Mini switch harness with charge socket	(Order No. 8 5045)	

Battery charger:

MULTIcharger LN 5014 (charge current 100 mA ... 5A) 1 - 14 cells NiCd / NiMH
and 1 - 5 Lithium-Polymer cells

Order No. **9 2531**

Cularis power set

Order No. **33 2633**

Contents: Himax 3522-0700 motor

MULTIcont BL-37 speed controller

Propeller driver and spinner

12 x 6" propeller

If you already own a suitable motor, the driver and spinner can be purchased separately:

Propeller driver, blade holder and spinner

Order No. **73 3183**

Two-blade propeller blades, 12 x 6", for Cularis

Order No. **73 3173**

MULTIPLEX Li-BATT BX 3/1-2100 flight battery 3 / 2100 mAh

Order No. **15 7131**

Receiver battery (NiMH) (caution: special pack format) 4 / 1800 mAh-AA-2L

Order No. **15 6010**

Additional item for the glider version only

Receiver battery (NiMH) 4 / 1800 mAh-AA-W

Order No. **15 6007**

Tools: Scissors, balsa knife, M3 screwdriver, combination pliers, optional soldering iron.

Note: remove the picture pages from the centre of the building instructions.

Specification: Cularis

Wingspan	2610 mm
Fuselage length	1260 mm
All-up weight	glider approx. 1400 g
	electric approx. 1680 g
Wing area (FAI)	approx. 55 dm ²
Wing loading	approx. 24,5 / 30,5 g / dm ²
RC functions	Elevator, rudder, ailerons and butterfly (crow - spoiler)
	Optional Throttle / aero-tow release

Important note

This model is not made of styrofoam™, and it is not possible to glue the material using white glue or epoxy. Please be sure to use cyano-acrylate glue exclusively, preferably in conjunction with cyano activator ("kicker"). We recommend high-viscosity (thick) cyano. This is the procedure: spray cyano activator on one face of the Elapor®; allow it to air-dry for at least two minutes, then apply cyano adhesive to the other face. Join the parts, and immediately position them accurately.

Please take care when handling cyano-acrylate adhesives. These materials harden in seconds, so don't get them on your fingers or other parts of the body. We strongly recommend the use of goggles to protect your eyes.

> Keep the adhesive out of the reach of children! <

Warped parts - do vary. For example, if something becomes bent or distorted in transit, it can usually be straightened again; in this respect it behaves in a similar manner to metal. Bend the part back, slightly "beyond straight", then release it: the material springs back slightly, and resumes its original shape. But everything has its limits - so don't overdo it!

Warped parts - do exist! If you wish to paint your model, wipe the surface lightly with MPX Primer, # 60 2700, as if you were cleaning the model. Apply the paint in even coats, but **not too thickly**, otherwise the model will indeed warp. If you overdo it, the painted part will be overweight as well as distorted, and will often be useless! In our experience matt paints give the best results in terms of appearance.

1. Before assembling the model:

Please check the contents of your kit.

You will find Figs. 01 + 02 and the Parts List helpful here.

Caution: the packaging is more than just transit protection; the wing panels are glued together with the help of the specially shaped bottom section of the foam packaging. Without this jig your wings will not turn out straight! See Fig. 07.

Please keep to the sequence described in these instructions - we've invested a lot of thought in the procedure.

COMPLETING THE WINGS

2. The first step is to prepare the aileron and flap servos.

Check the cable lengths, and connect extension leads to them if required. Note that the servo leads must extend about 3 - 5 cm out of the wing root when the servos are installed. Position the servos using the spar covers as an aid. If you are not using the specified servos you may need to adjust the servo openings, but don't enlarge them to the point where the servo well covers no longer fit in the apertures.

Glue the servos in the wings using cyano, ensuring that the glue does not penetrate inside the servo cases. Lay the servo leads in the channels and secure them with pieces of adhesive tape.

Figs. 03 - 05

Prepare the tubular wing spars **60** as follows: glue the in-fill pieces **36** (hardwood dowel) in the root end of the spars using cyano, and round off the ends of the tubes slightly.

Fig. 06

3. Lay the wing joiner jig (bottom section of the packaging) on a perfectly flat table. Invert the right-hand wing **8**, lay it in the jig and position it accurately (see Fig. 07).

Place the tubular spars **60 + 61** in the wing; note that the tubes must project by **23 mm** at the root end.

Figs. 08 + 09

The spar tubes are glued in the wing by applying thick cyano over their full length - but taking care not to allow excess glue to escape and soil the wing surfaces. Check that the spar cover **10** fits accurately - initially without gluing it. When you are satisfied, the joint areas can be "painted" with thick cyano, and the spar cover pressed into the recess.

Work briskly here, but don't be too anxious - thick cyano gives you ample time to complete the task properly without too much haste. Press both the tubular spars down simultaneously while the glue is hardening, taking care to keep them perfectly straight. This stage is important, as it determines whether the wing is usable or not.

Apply thick cyano to the remainder of the spar cover contact surface, fit the cover and press it down over its full area.

During this process it is essential to keep the wing resting squarely on the gluing jig, especially in the spar area. Fig. 08

Leave the wing resting in the jig for a few minutes, and don't be tempted to try any "bending / stress tests" yet, as the cyano-acrylate takes a few minutes to reach final strength.

Repeat the whole procedure with the left-hand wing **7**. Please note: the left wing should be turned through 180° before being placed in the jig, i.e. the "trailing edge" is always on the same side: the shorter support section of the jig.

Keep the gluing jig in a safe place, in case you ever have to repair a wing or assemble a new one!

4. Preparing the wing joiner 45

Locate the recesses in the wing joiner moulding for the servo connector sockets, fit the sockets in the slots (it makes sense to fit them all the same way round - orange signal wire up), and tack them in place with a drop of cyano. Screw the left and right fuselage-mounted wing retainers **43 + 44** in place using the M3 x 12 screw **31**, the washers **33** and the nut **32**.

Fig. 10

5. Installing the wing root mouldings

Check that the root moulding **40** is a snug fit on the right wing **8**.

Fig. 11

Fit the servo connectors in the recess in the root moulding, and push the excess cable length back into the cable duct. Fit the wing joiner **45** onto the root moulding **40**, taking care to keep it the right way round. Check that the wing joiner fits flush, and push the servo connectors fully into the sockets. Check once more that the servo connections are correctly polarised. **When you are satisfied, secure the plugs with a drop of cyano.**

Fig. 12

Caution: be very careful when gluing the connectors to the root mouldings; apply the adhesive sparingly and

accurately, otherwise you will never be able to disconnect them!

Check that the wing retainer **42** fits snugly in the wing, then carefully glue it in place in the latched state. **Fig. 13**

Repeat the whole procedure with the left-hand wing panel **7**.

6. Freeing the ailerons

Working on the wing panels **7** and **8**, cut through the ends of the ailerons and flaps leaving a gap 1 mm wide at each point. Move the control surfaces to and fro repeatedly to free up the hinge areas - take care not to separate the control surfaces! If a hinge should tear, it can easily be repaired with a tiny drop of cyano.

7. Attaching the horns to the ailerons and flaps

Fit the swivel pushrod connectors **25** in the second hole from the outside of the four horns **24** for the ailerons and flaps. Secure the connectors with the washers **26** and the nuts **27**.

Fig. 14

Caution: take care to make two handed pairs (opposite orientation left and right)! Don't overtighten the nuts, as the connectors must be free to swivel smoothly; apply a tiny drop of cyano on a pin (or a drop of paint) to prevent the nuts working loose. Fit the socket-head grub screws **28** in the pushrod connectors **25** using the allen key **29**.

Apply activator to the recesses in the ailerons and flaps, and glue the horns **24** in them, with the line of holes on the "hinge" side of the control surface.

Fig. 14

8. Installing the aileron and flap linkages

Connect the pre-formed end of the wire pushrods **30** to the outer hole in the servo output arms, and slip the plain ends through the swivel pushrod connectors **25**. Set the control surfaces and servos to neutral (centre), and tighten the grub screws (**28**) firmly.

9. Fitting the servo well covers

The servo well covers **56 + 57** look neat and finish off the wing nicely, but they are also designed to protect the servo gears. Start by trimming the covers to fit if necessary, then glue them in place with a few drops of cyano. Alternatively the covers can be held in place with adhesive tape if you prefer - this option makes it easier to replace a servo if it should ever be damaged.

Fig. 14

10. Installing the wingtips

This stage completes the work on the wings.

The moulding process leaves a "tongue" attached to the wingtips, which should now be cut off. If you are building the glider version, this scrap material can be used to seal the cooling slots in the nose of the fuselage. Trial-fit the tips, and glue them to the wing panels using cyano.

Figs. 15 - 16

11. COMPLETING THE

Prepar Completing the fuselage and the tail panels 13 – 14 ing the "snakes":

Check the length of the elevator snake sleeves **64** and **66**, and shorten them if necessary:

	64	3 / 2 Ø x 740 mm
	66	2 / 1 Ø x 790 mm
Steel insert	62	0.8 Ø x 840 mm

Repeat with the rudder snake sleeves **65** and **67**:

	65	3 / 2 Ø x 785 mm
	67	2 / 1 Ø x 850 mm
Steel insert	63	0.8 Ø x 900 mm

12. Installing the snake outers in the fuselage shells

Caution: the snake “outers” (outer sleeves) **64**, **65** and **68**, and the GRP rod **70**, should be glued to the fuselage over the full length of the tubes, as these parts **stiffen the tail boom considerably**, i.e. the snake sleeves act like the spar caps of a conventional wing spar.

Figs. 17 - 18

Ensure that the control snakes operate smoothly and freely, and take particular care to avoid glue running inside the sleeves.

13. Left-hand fuselage shell:

Trial-fit the wing joiner moulding **45** and glue it in place.

Fig. 19

Deploy the servo extension leads in the duct provided.

Glue the rudder servo and the canopy latch catches **22** in place.

Fig. 20

Check once again that the cables are deployed neatly, then glue the plastic spine **55** in the fuselage shell.

Fig. 21

Install the left bellcrank bush **48** for the all-moving tailplane, and glue it in place.

Fig. 22

If you are building the electric version, it is necessary to install one or more trim weights 35 to suit the motor you intend to fit:

If the motor weighs 100 g: no tail ballast required;

If the motor weighs 130 g: one ball;

If the motor weighs 160 g: two balls (Cularis power set).

Caution: this information is only a guide, and the balance point should still be checked carefully on the finished model.

Fig. 23

14. Right-hand fuselage shell:

Lay the right fuselage shell **4** on a flat table, joint surface down, and glue the reinforcing tube **68** in place over its full length using thick cyano.

Fig. 24

Glue the elevator snake outer sleeve **64** in place, together with the inner sleeve **66** and the pre-formed wire pushrod **62**.

Fig. 25

Glue the elevator servo and the switch harness in the fuselage. Note: if you are using different makes of servo, you may have to adjust the servo location to ensure that the output device is in the correct position.

Position the latch catch **22** carefully, and glue it in place with cyano. Deploy the servo and switch harness leads in the cable duct.

Fig. 26

Glue the plastic spine **55** and the motor bulkhead **46** in place. Note that the motor bulkhead should be fitted even if you are making the glider version, as it adds considerable strength to the structure.

Figs. 27 + 28

Install the right bellcrank bush **49** for the all-moving tailplane, and glue it in place.

Fig. 29

Mount the swivel pushrod connector **25** on the bellcrank **47**, and install the bellcrank using the tailplane joiner rod **34**. Assemble the pre-formed wire pushrod **62**, the inner sleeve **66** and the outer sleeve **64** for the all-moving tailplane linkage, and connect the pushrod to the servo. Slip the wire pushrod through the swivel pushrod connector, set it to approximate length, and tighten the grubscrew **28**.

Fig. 30

15. Joining the fuselage shells

Please take great care over this stage, as the success of the model largely depends on it.

First offer up the fuselage shells “dry” (no glue); the parts should fit together snugly, without requiring force. If necessary, carry out any minor trimming required. Check that you have not forgotten any of the internal fittings.

Apply thick cyano to all the contact areas of the fuselage shells. Work briskly, but not hurriedly - you **do** have time to assemble the fuselage accurately. Fit the 2.5 mm Ø tailplane joiner rod **34** through the tailplane bushes to act as an alignment guide.

Fig. 31

Carefully offer up the fuselage shells to each other and align them quickly and accurately. The fuselage joint line must be absolutely straight: check for curves by sighting along it from the nose and tail. Leave the joined fuselage for a few minutes, keeping it straight, and checking repeatedly that there are no warps. Don't be tempted to try any “bending / stress tests” yet, as the cyano-acrylate takes a few minutes to reach final strength.

Glue the GRP rod **69** in the channel on the underside of the fuselage. The receiver aerial also fits in the same channel later, so make sure there is space for it.

Fig. 32

16. Gluing the fin to the fuselage

Fit the swivel pushrod connector **25** in the outer hole in the glue-fitting rudder horn **24**, with the connector barrel on the underside, and secure it with the washer **26** and the nut **27**. Glue the horn **24** in the rudder. Offer up the fin **15** to the fuselage, make any adjustments required, and glue it in place. Slip the steel rudder pushrod **63** through the swivel pushrod connector **25**, set the servo and rudder to neutral, and tighten the grubscrew firmly.

Fig. 33

17. Tailplane

The tailplane **13 + 14** takes the form of two all-moving panels. You have already installed the linkage components inside the fuselage, and the joiner system consists of parts **50 - 52**. Rotate the joiner pin to and fro about ten times to remove any rough edges; it should then rotate smoothly.

Fig. 34

Slip the tailplane joiner rod **34** (2.5 mm Ø steel wire) through the tailplane bellcrank, and fit parts **50** and **51** on the fuselage without the tailplane panels. Insert the tailplane retainer tongue **52** and carry out any adjustments required: the lug on the tailplane retainer should just make contact with the inside of the opposite rib. Tighten the screw **28** to secure the retainer. Press the button on the left tailplane joiner moulding to disengage the joiner mechanism.

Figs. 35 - 37

The tailplane panels themselves can now be prepared by gluing the four spar caps **58** in the channels: apply cyano over their full length. The tailplane panels must be straight and flat; ensure that they remain so while the glue is hardening.

Fig. 38

18. Completing the tailplane

Glue the prepared tailplane joiner mouldings **50 + 51** to the right and left tailplane panels.

Fig. 39

Pressing the button releases the tailplane panels, which can then be removed; see **Fig. 40**.

19. Gluing the canopy latch tongues in place

The two latch tongues **23** should now be glued in the canopy **6** - note that both tongues must face inward! Apply thick cyano to the fluted gluing surfaces - no activator this time - then push the latch tongues into the slots in the canopy. Place the canopy in the fuselage recess, and allow the latch tongues to engage with the latch catches **22**. Immediately align the canopy on the fuselage, then wait for about a minute for the glue to set before carefully opening the canopy again. Spray activator on the joints between the latch tongues and the canopy.

Fig. 41

20. General information on installing the receiving system

The remaining radio control system components now have to be installed in the cabin area of the fuselage. It is important to check the Centre of Gravity before you determine the final position of the batteries (receiver battery and flight pack); the balance point can be corrected by altering the position of the batteries.

Velcro tape (hook tape **20**, loop tape **21**) is included in the kit for securing the RC system components. However, the adhesive on the tape is not always strong enough for this application, so cyano should be used to strengthen the joints to the fuselage.

Install the receiver in the space provided, and secure it with Velcro tape. Run the wire aerial out of the underside of the fuselage, and deploy it in the channel for the bottom fuselage longeron. Apply adhesive tape over the channel to seal it.

21. Installing the motor (electric version)

The model has an excellent performance when fitted with the Cularis power set, # 33 2633.

Powered by a 2000 mAh battery, the model is capable of around eight climbs to a height of 150 m; this is a good starting point for long, extended thermal flights. At the same time this system provides plenty of power for "hot-line" style flying.

Our power set consists of carefully matched and exhaustively tested components.

If you wish to use a different speed controller, motor or radio control system than the ones specified, you are free to do so, but please note that **we cannot offer support if you use non-MULTIPLEX items.**

INSTALLING THE MOTOR:

Attach the motor to the motor mount using the four screws supplied in the power set. Connect the speed controller, and check - without the propeller fitted - that the motor shaft rotates in the correct direction by operating the throttle control on the transmitter: when you look at the motor from the front, the output shaft must rotate anti-clockwise. If not, swap over any two of the three motor wires.

the speed controller and the motor power cables with Velcro tape.

Fit the propeller driver and the propeller blades on the motor shaft. Tighten the screws fully, but don't overtighten them - the blades must be free to swivel smoothly.

Fig. 42

Never connect the flight battery to the speed controller until you have switched the transmitter on and ascertained that the throttle control is in the "OFF" position.

Switch the transmitter on, connect the flight battery to the speed controller in the model, and connect the controller to the receiver. If the speed controller features a BEC circuit (receiver power supply from the flight battery), be sure to disable it. This usually involves disconnecting or cutting through the "POSITIVE" wire at the servo connector attached to the speed controller. The receiver and the servos must be operated using a separate battery (MPX # 15 6010 or 15 6007).

22. Completing the glider version

Trim the fuselage nose cone **5** to fit, and glue it to the fuselage.

If you wish to install the recommended aero-tow coupling, # 72 3470, all you have to do is apply a little cyano glue to it and press it into position from the front. However, you should first cut away or drill the fuselage to make space for the snake outer sleeve (scrap piece). Install the aero-tow release servo and connect it using a spare piece of 1 mm Ø steel rod.

Fig. 43

If you wish, you can install a towhook: cut a piece of 15 x 15 mm square hardwood (e.g. obechi) and glue it to a plywood spreader plate as shown. Glue this in the battery well inside the fuselage at a point 54 mm aft of the wing root leading edge using plenty of cyano and activator. The towhook itself is a standard cup hook. The parts for the towhook are not included in the kit, as fewer than 0.5% of all customers use one.

Fig. 45

23. Disengaging the wing panels

Press the button on the underside of the wing root, move the wing to and fro slightly, then pull the wing panel out and off.

Fig. 46

24. Setting the control surface travels

The control surface travels must be set correctly to ensure that the model has harmonious, well-balanced control responses. The travels are measured at the widest point of each control surface.

Elevator		
up	(stick back)	approx. + 14 mm
down	(stick forward)	approx. - 14 mm
Powermix		approx. - 2 mm

Rudder		
left and right		approx. 30 mm
each side of centre		

Ailerons		
up		approx. + 20 mm
down		approx. - 10 mm
Flap		approx. + 10 mm

Flaps (camber-changing flaps)		
up (Speed)		approx. + 3 mm
down (Thermic)		approx. - 4 mm
Down-elevator mix with Flap		approx. +/-1,5 mm

Spoilers		
both ailerons up		approx. + 15 mm
both flaps down		approx. - 30 mm

Down-elevator mix with spoiler		approx. - 8 mm
--------------------------------	--	----------------

Both ailerons can be set to move up and both flaps move down simultaneously in order to provide a "spoiler" function, i.e. to shorten the landing approach; this is known as the "butterfly" or "crow" braking system. At the same time a suitable amount of down-elevator trim must be mixed in to keep the model in a stable attitude. This can only be done if your radio control system features suitable mixers.

If you are not sure of this, please refer to the instructions supplied with your radio control system.

Note: when you apply a right aileron command, the right-hand aileron (as seen from the tail, looking forward) must move up, the left aileron down.

If you cannot set the stated travels by carrying out adjustments at the transmitter, you will need to re-connect the pushrods to different holes in the servo output arms and / or control surface horns.

25. Gilding the lily - applying the decals

The kit is supplied with a multi-colour decal sheet, part 2. Cut out the individual name placards and emblems and apply them to the model in the position shown in the kit box illustration, or in another arrangement which you find pleasing.

26. Balancing

Like any other aircraft, the Cularis must be balanced at a particular point in order to achieve stable flying characteristics. Assemble your model completely, ready to fly.

The **Centre of Gravity (CG)** should be about **74 mm** from the leading edge at the wing root, measured either side of the fuselage. This point is indicated on both sides of the fuselage by moulded-in "pimples". Support the model at this point on two fingertips, and it should balance level. If not, you can move the flight battery or receiver battery forward or aft to correct it. Once the proper position is found, mark the location of the battery inside the model to ensure that it is always replaced in the same position.

Fig. 47

27. Longitudinal dihedral

If the model is to fly "right", the angle between the wing and tailplane - the longitudinal dihedral - must be set properly in addition to the correct CG. The appropriate figure for your **Cularis** is about 2.5°. Look through the hole in the fuselage below the tailplane: if you can see the swivel pushrod connector, then the longitudinal dihedral is correct.

28. Preparing for the first flight

For the first flight wait for a day with as little breeze as possible. The early evening is often a good time.

If this is your first model aircraft, the next step is to ask an experienced model pilot to help you, as things usually do not go well if you try to manage on your own. Your local model flying club should be able to help you find someone, or - failing that - your nearest model shop may be able to assist you. Our flight simulator for the PC can also provide valuable experience prior to your "first real steps" in model flying.

You can download the simulator at no charge from our website www.multiplex-rc.de. You will also need the matching interface cable for your MPX transmitter; this is available from model shops under Order No. # 8 5153.

29. Be sure to carry out a range check before the first flight.

Just before the flight, charge up the transmitter battery, the flight pack and the receiver battery using the recommended procedures. Ensure that "your" channel is not already in use before you switch on the transmitter.

Ask your assistant to walk away from the model, holding the transmitter. The aerial should be fitted but completely collapsed. Your assistant should operate one of the functions constantly while you watch the servos. The non-controlled servos should stay motionless up to a range of about 60 m, and the controlled one should follow the stick movements smoothly and without any delay. Please note that this check can only give reliable results if the radio band is clear of interference, and if no other radio control transmitters are in use - even on different channels. If the range check is successful, repeat it **with the motor running at half-throttle** (electric version only). There should be no more than a very slight reduction in effective radio range with the motor turning.

If you are not sure about anything, please don't risk a flight. Send the whole system (including battery, switch harness and servos) to the Service Department of your RC system manufacturer and ask them to check it.

30. THE FIRST FLIGHT ...

Glider:

A test-glide from shoulder level, directly into wind, will give you an approximate idea of the model's "trim", i.e. whether it is set up correctly, or whether the control surfaces or transmitter trims need to be adjusted. If the model swings away to one side, move the rudder trim slightly in the opposite direction. If the model banks - one wing lower than the other - apply slight aileron trim correction.

Hand-towing

This is the classic method of launching a glider to height. Attached to a suitable length of towline (0.7 mm Ø nylon), the model is pulled up by your assistant running into wind; the glider will rise up the line in a similar fashion to a kite. The towline needs to be fitted with a towing and pennant or parachute at the "model" end of the line.

The ring is engaged on the towhook, the towline unwound and your assistant (launcher) takes the free end and walks upwind until the line is taut. The model should be held under gentle tension before it is released. The launcher watches the model (over his shoulder), adjusting his pace to maintain a steady rate of climb. Take care not to overstress the model during the launch; this is a particular danger in any wind above moderate strength.

Bungee launching

This is the easiest method of launching a glider of this size, as no assistant is needed, and launch heights of around 100 m are easily achieved. From this altitude quite long flying times can be achieved, and they will be even longer if you manage to contact a thermal, although your chances of this vary according to the prevailing weather.

Thermal flying

Making the best use of flat field thermals is not particularly easy, and calls for considerable skill and experience. Areas of rising air are harder to detect and recognise at a flat field, because they tend to occur at higher altitude than at the hillside, where it is often possible to find lift while the model is cruising along the edge of the slope, and then circle away in it. A thermal at a flat field which occurs directly overhead is very hard to recognise, and to exploit it to the full requires a highly skilled pilot. For this reason it is always best to go thermal seeking off to one side of where you are standing.

You will recognise thermal contact by the glider's behaviour. Good thermals are obvious because the model will climb strongly, but weak thermals take a practised eye to detect, and you will need a lot of skill to make use of them. With a little practice you will be able to recognise likely trigger points for thermals in the local landscape. The ground warms up in the sun's heat, but heat absorption varies according to the type of terrain and the angle of the sun's rays. The air over the warmer ground becomes warmer in turn, and the mass of warm air flows along close to the ground, driven by the breeze. Strong winds usually prevent thermal build-up. Any obstruction - a shrub or tree, a fence, the edge of a wood, a hill, a passing car, even your own model on the landing approach - may cause this warm air to leave the ground and rise. Imagine a drop of water on the ceiling, wandering around aimlessly, and initially staying stuck to the ceiling. If it strikes an obstruction it will fall on your head. A triggered thermal can be thought of as the opposite of the drop of water.

The most obvious thermal triggers include sharply defined snow fields on mountain slopes. The air above the snow field is cooled, and flows downhill; at the edge of the snow field, part-way down the valley, the cool air meets warm air flowing gently uphill, and pushes it up and away as if cut off by a knife. The result is an extremely powerful but bumpy thermal bubble. Your task is to locate the rising warm air and centre your model in it. You will need to control the glider constantly to keep it centred, as you can expect the most rapid climb rate in the core of the thermal. Once again, this technique does demand some skill.

To avoid losing sight of the machine be sure to leave the thermal in good time. Remember that a glider is always easier to see under a cloud than against a clear blue sky. If you have to lose height in a hurry, do bear the following in mind:

The structural strength of the **Cularis** is very great for this class of model, but it is not infinite. If you attempt to destroy the model forcibly, please don't expect any sympathy or compensation from us (alas, we speak from experience).

Flying at the slope

Ridge soaring is an extremely attractive form of model flying. Soaring for hours on end in slope lift, without needing any outside aid for launching, must be one of the finest of modelling experiences. But to "milk" a thermal to the limits of vision, bring it down again in a continuous series of aerobatic manoeuvres, and then repeat the whole show - that must surely be the last word in model flying.

But take care - there are dangers for your model lurking at the slope. Firstly, in most cases landing is much more difficult than at a flat field site. It is usually necessary to land in the lee of the hill where the air is turbulent; this calls for concentration and a high-speed approach with last-minute airbrake extension. A landing on the slope face, i.e. right in the slope lift, is even more difficult. Here the trick is to approach slightly downwind, up the slope, and flare at exactly the right moment, just before touch-down.

Aero-towing

An ideal combination for learning to aero-tow, and for actual aero-towing, is a Magister and a Cularis. You will need the brushless power set, # 33 2632, for the Magister.

For the tow you require a 20 m length of braided cable of 1 to 1.5 mm Ø. Tie a loop of nylon line (0.5 mm Ø) to the glider end of the cable; this acts as a "weak link", in case the tow should go badly wrong.

A loop in the other end of the towline should be connected to the aero-tow coupling of the Magister. Assemble the models, connect them as described, and set them up directly into wind, the glider behind the tug. Check that the towline is resting on top of the Magister's tailplane. The tug now rolls forward until the towline is taut, and only then should the tug's pilot apply full-throttle. Both aeroplanes accelerate: the tug stays on the ground initially, while the glider lifts off, but the glider pilot keeps his model flying low above the ground, directly in the wake of the tug; the tug can now lift off safely. The two models should be kept climbing steadily, even through turns. Avoid flying directly over your heads during the first few attempts at aero-towing, as it is difficult to detect the models' attitudes from this angle. To drop the tow, operate the transmitter control which opens the tow release mechanism.

Electric flying

With the electric version you have the optimum level of autonomy and independence. You can fly from a flat field and carry out about eight climbs to a sensible gliding height (around 150 m) from a single battery charge. At the slope you can also keep the electric power system as a "lifebelt", i.e. you only use the motor to "keep afloat", and avoid landing out, i.e. landing at the bottom of the slope when the lift fails.

Flight performance

What is meant by a glider's performance?

The two most important parameters are sinking speed and glide angle. Sinking speed is a measure of the vertical height lost per second relative to the surrounding air. The sinking speed is primarily determined by the wing loading (weight relative to wing area). Here the Cularis offers a really excellent performance - much better than conventional models - as its wing loading is so low (only around 27 g / dm²). This means that only slight thermal assistance is necessary (warm air rising) to cause the model to gain height. Wing loading is also the main factor in determining the model's airspeed - the lower the loading, the slower the model. Low airspeed means that the model can be turned extremely tightly, and this is also advantageous when thermal flying, as areas of lift are usually very small when close to the ground.

The other important parameter in glider performance is the **glide angle**. This is stated as a ratio, i.e. from a particular altitude the model flies such and such a distance. The glide angle increases as wing loading rises, and at the same time - of course - the model's airspeed increases. This becomes necessary if you wish to fly in relatively strong winds, and when you need "energy retention" for flying aerobatics.

For thermal flying you need a good glide angle too, as this is the key to flying across areas of "sink" (the opposite of a thermal) quickly, so that you can seek out another thermal. Ballasting, as required for the EasyGlider and similar lightweight models, is not required with the **Cularis**.

Safety

Safety is the First Commandment when flying any model aircraft. Third party insurance should be considered a basic essential. If you join a model club suitable cover will usually be available through the organisation. It is your personal responsibility to ensure that your insurance is adequate.

Make it your job to keep your models and your radio control system in perfect order at all times. Check the correct charging procedure for the batteries used in your RC set. Make use of all sensible safety measures and precautions which are advised for your system. An excellent source of practical accessories is the MULTIPLEX main catalogue, as our products are designed and manufactured exclusively by practising modellers for other practising modellers.

Always fly with a responsible attitude. You may think that flying low over other people's heads is proof of your piloting skill; others know better. The real expert does not need to prove himself in such childish ways. Let other pilots know that this is what you think too. Always fly in such a way that you do not endanger yourself or others. Bear in mind that even the best RC system in the world is subject to outside interference. No matter how many years of accident-free flying you have under your belt, you have no idea what will happen in the next minute.

Cularis Kit

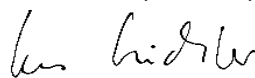
Part No.	No. off	Description	Material	Dimensions
1	1	KIT building instructions	Paper	A4
2	1	Decal sheet	Printed self-adhesive film	350 x 1000 mm
3	1	L.H. fuselage shell	Moulded Elapor foam	Ready made
4	1	R.H. fuselage shell	Moulded Elapor foam	Ready made
5	1	Fuselage nose cone, glider	Moulded Elapor foam	Ready made
6	1	Canopy	Moulded Elapor foam	Ready made
7	1	L.H. wing	Moulded Elapor foam	Ready made
8	1	R.H. wing	Moulded Elapor foam	Ready made
9	1	L.H. spar cover	Moulded Elapor foam	Ready made
10	1	R.H. spar cover	Moulded Elapor foam	Ready made
11	1	L.H. wingtip	Moulded Elapor foam	Ready made
12	1	R.H. wingtip	Moulded Elapor foam	Ready made
13	1	L.H. tailplane panel	Moulded Elapor foam	Ready made
14	1	R.H. tailplane panel	Moulded Elapor foam	Ready made
15	1	Fin and rudder	Moulded Elapor foam	Ready made
Small items set				
20	3	Hook-and-loop tape, hook	Plastic	25 x 60 mm
21	3	Hook-and-loop tape, loop	Plastic	25 x 60 mm
22	2	Canopy latch catch	Inj. moulded plastic	Ready made
23	2	Canopy latch tongue	Inj. moulded plastic	Ready made
24	5	Glue-fitting control surface horn	Inj. moulded plastic	Ready made

The fascination of it all

Model flying is, and always has been, a fascinating hobby, and a thoroughly enjoyable way of spending your leisure hours. Take your time to get to know your new Cularis / Cularis Electric really well. Plan to spend many hours in the open air, where you will learn to appreciate the model's excellent performance and its docile handling. You can join us in enjoying one of the few types of sport which combine high technology, manual dexterity, and sophisticated personal skills. You can fly alone or with friends, and at the same time you can enjoy the pleasures of nature - treats which have become rare in today's world.

We - the MULTIPLEX team - wish you many hours of pleasure in building and flying your new model. Happy landings!

MULTIPLEX Modellsport GmbH & Co. KG
Model Development Dept.



Klaus Michler

Part No.	No. off	Description	Material	Dimensions
25	6	Swivel pushrod connector	Metal	Ready made, 6 mm Ø
26	6	Washer	Metal	M2
27	6	Nut	Metal	M2
28	7	Socket-head grub screw	Metal	M3 x 3 mm
29	1	Allen key	Metal	1.5 mm A/F
30	4	Aileron pushrod, one Z-bend	Metal	1 Ø x 70 mm
31	1	Wing retainer screw	Steel	M3 x 12 mm
32	1	Self-locking nut, wing retainer screw	Steel	M3
33	2	Washer	Metal	M3
34	1	Tailplane joiner rod	Spring steel	2.5 Ø x 120 mm
35	2	Trim ballast weight, electric version	Steel ball, 9 g	13 mm Ø
36	4	Spar in-fill piece	Hardwood dowel	7.8 Ø x 40 mm
Injection-moulded plastic parts				
40	2	Wing root moulding	Inj. moulded plastic	Ready made
41	1	L.H. wing retainer	Inj. moulded plastic	Ready made
42	1	R.H. wing retainer	Inj. moulded plastic	Ready made
43	1	L.H. wing retainer tongue	Inj. moulded plastic	Ready made
44	1	R.H. wing retainer tongue	Inj. moulded plastic	Ready made
45	1	Wing joiner, fuselage	Inj. moulded plastic	Ready made
46	1	Motor bulkhead	Inj. moulded plastic	Ready made
47	1	All-moving tailplane bellcrank	Inj. moulded plastic	Ready made
48	1	L.H. tailplane bellcrank bush	Inj. moulded plastic	Ready made
49	1	R.H. tailplane bellcrank bush	Inj. moulded plastic	Ready made
50	1	L.H. tailplane joiner moulding	Inj. moulded plastic	Ready made
51	1	R.H. tailplane joiner moulding	Inj. moulded plastic	Ready made
52	1	Tailplane retainer tongue	Inj. moulded plastic	Ready made
Flat plastic and vacuum-moulded parts				
55	2	Fuselage spine	Plastic	Ready made
56	2	L.H. servo well fairing	Vac. moulded plastic	Ready made
57	2	R.H. servo well fairing	Vac. moulded plastic	Ready made
58	4	Tailplane spar	GRP rod	1.3 Ø x 220 mm
Wire and rod				
60	4	Inboard wing spar	CFRP tube	10 Ø x 8 Ø x 900 mm
61	4	Outboard wing spar	GRP tube	8 Ø x 5 Ø x 300 mm
62	1	Elevator pushrod, one Z-bend	Metal	0.8 Ø x 840 mm
63	1	Rudder pushrod, one Z-bend	Metal	0.8 Ø x 900 mm
64	1	Elevator snake outer sleeve	Plastic	3 / 2 Ø x 740 (785*) mm
65	1	Rudder snake outer sleeve	Plastic	3 / 2 Ø x 785 mm
66	1	Elevator snake inner sleeve	Plastic	2 / 1 Ø x 790 (850*) mm
67	1	Rudder snake inner sleeve	Plastic	2 / 1 Ø x 850 mm
68	1	R.H. snake outer sleeve, fuselage	Plastic	3 / 2 Ø x 605 (785*) mm
69	1	Bottom fuselage longeron	GRP rod	2 Ø x 755 mm
70	1	Top fuselage longeron	GRP rod	2 Ø x 555 (755") mm

* Length as supplied → cut to required length

Ciliaris

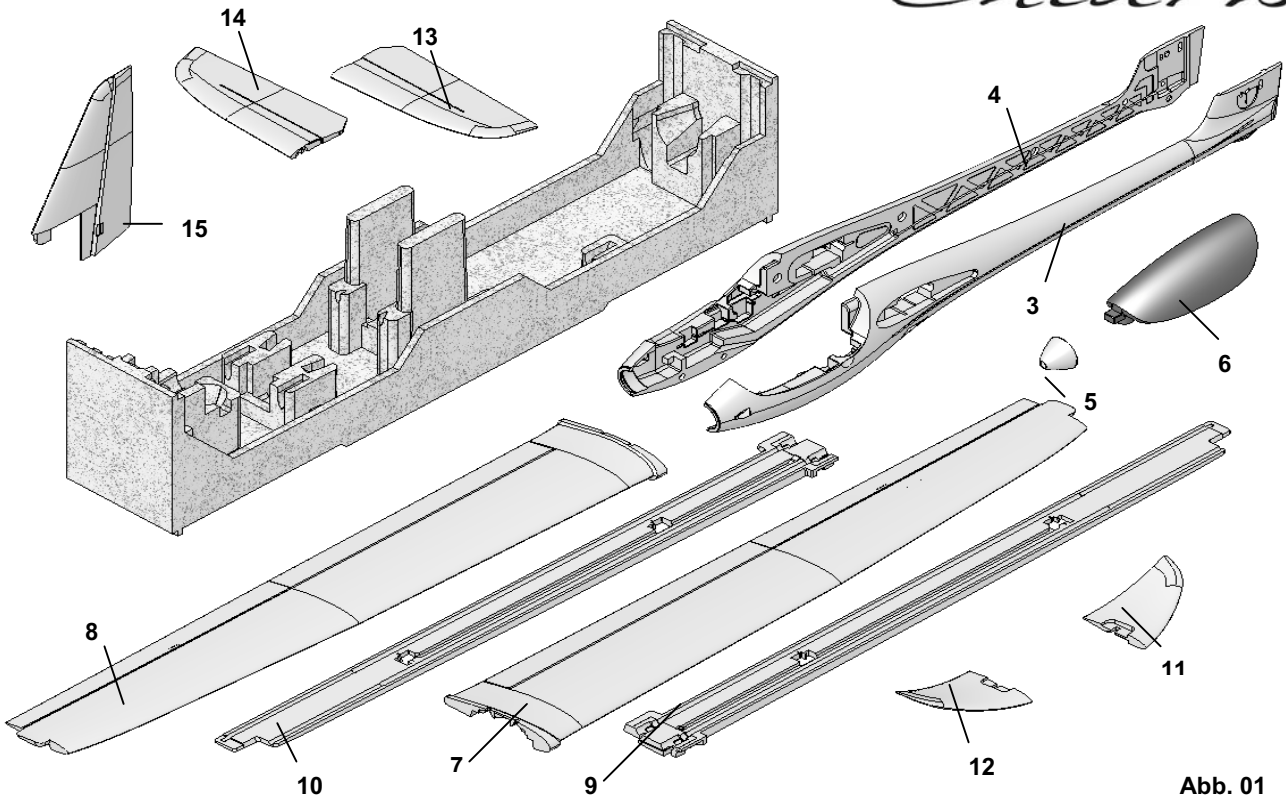


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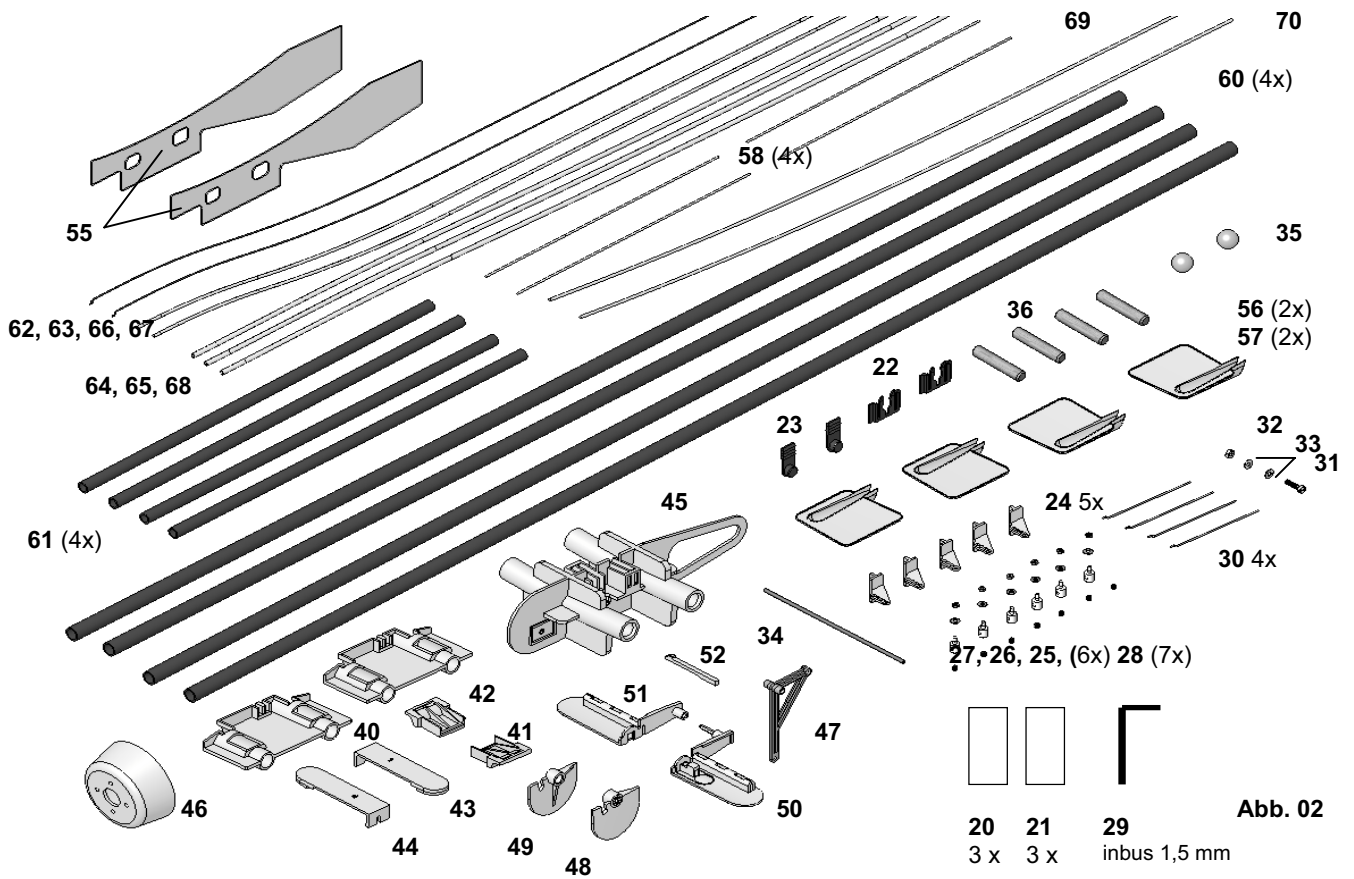
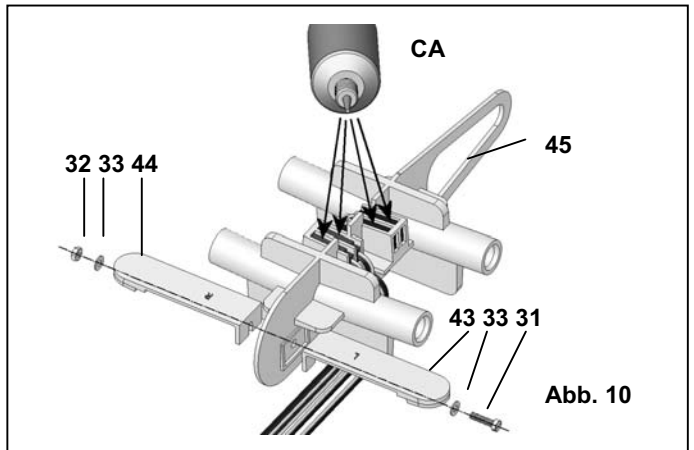
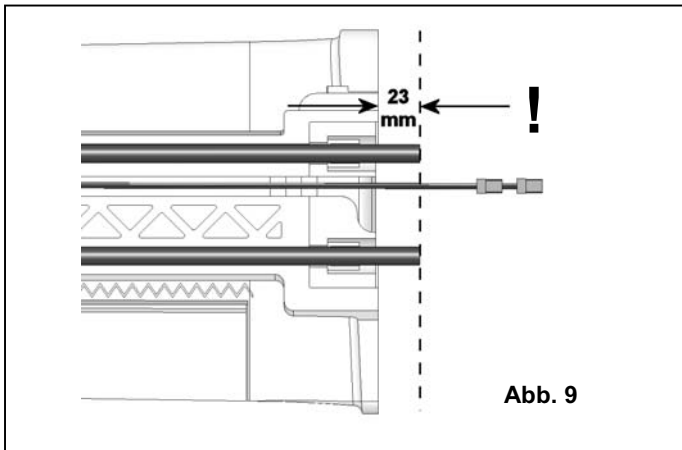
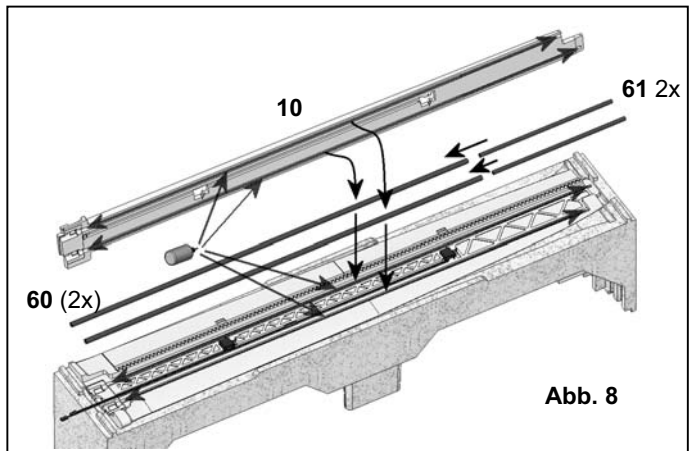
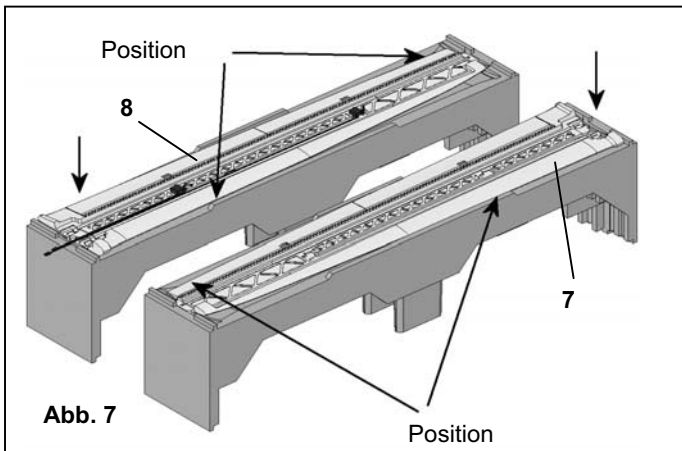
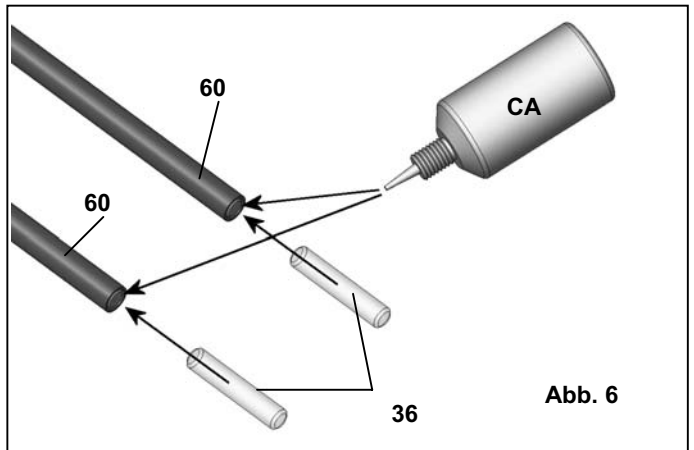
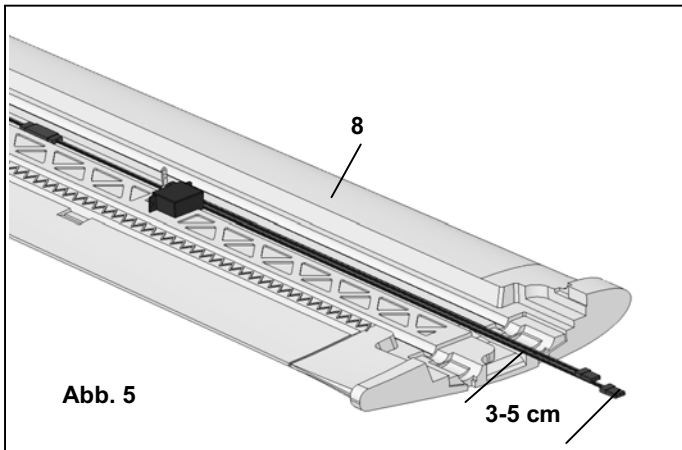
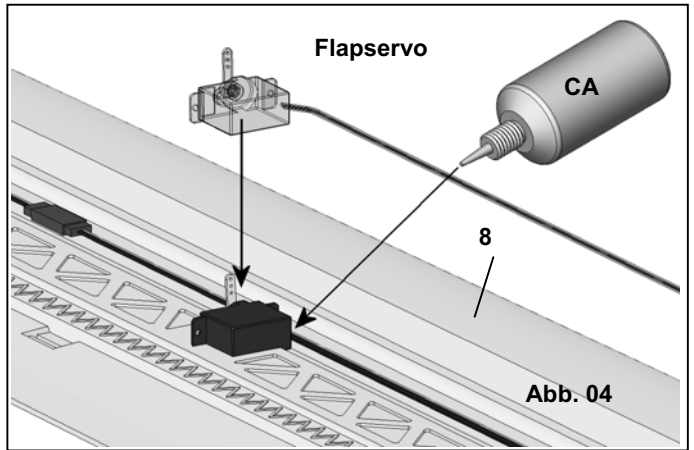
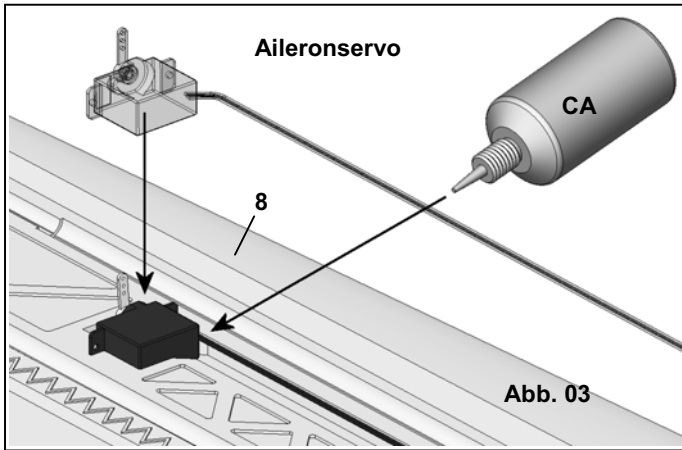
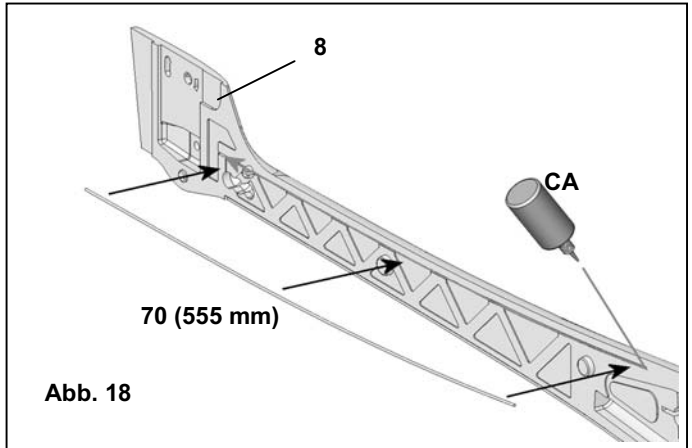
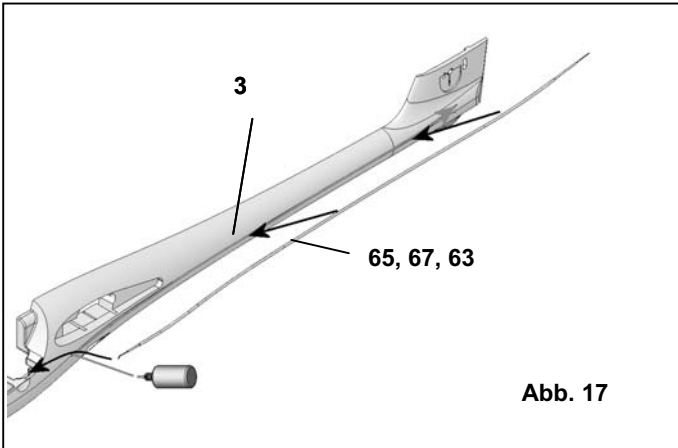
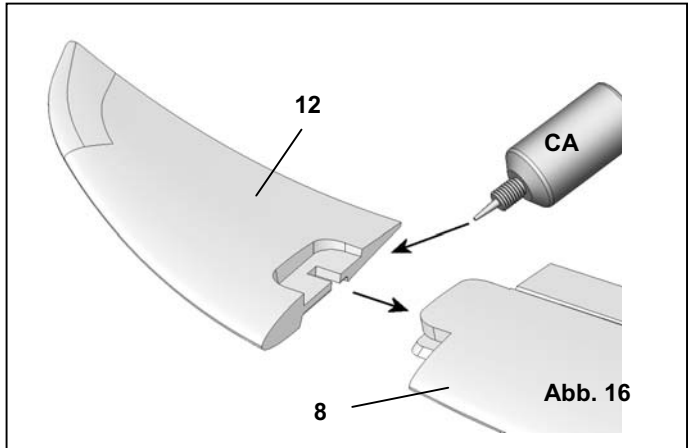
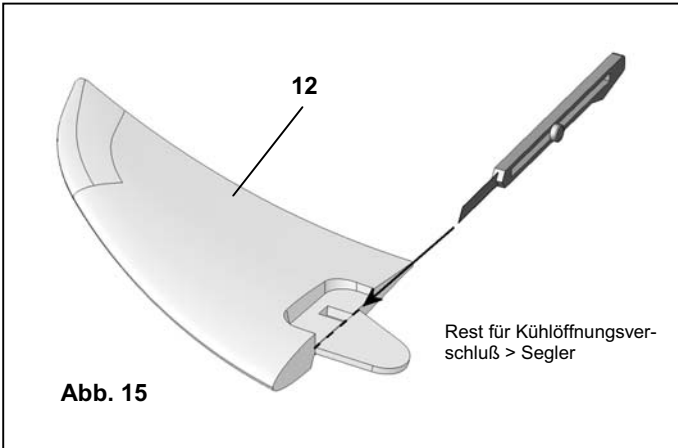
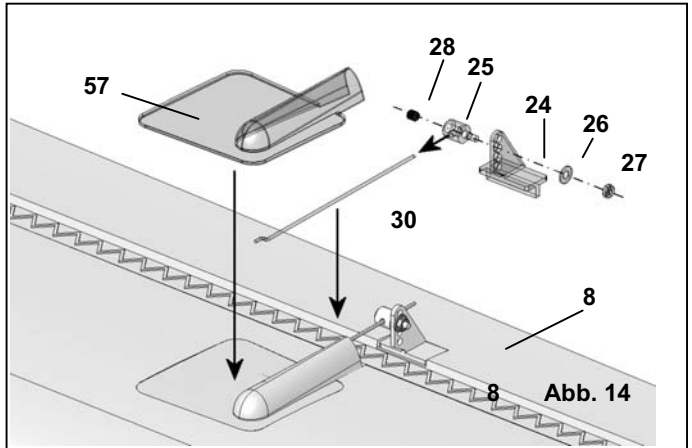
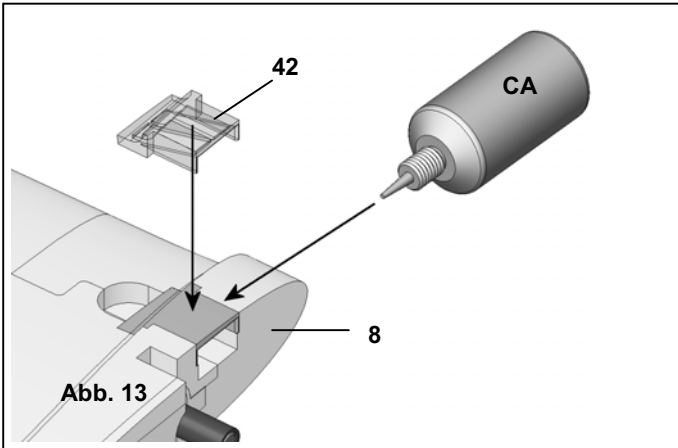
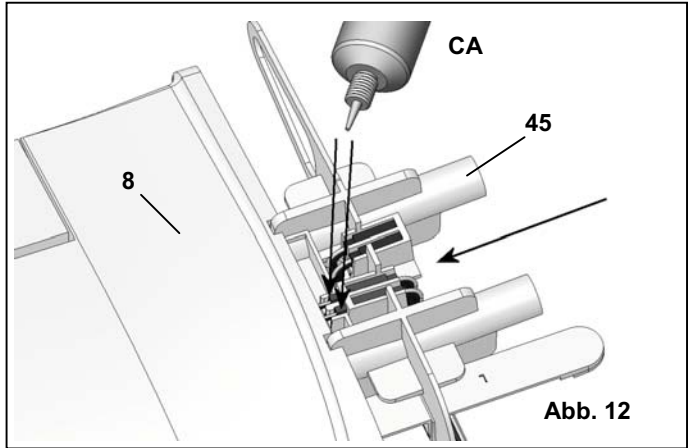
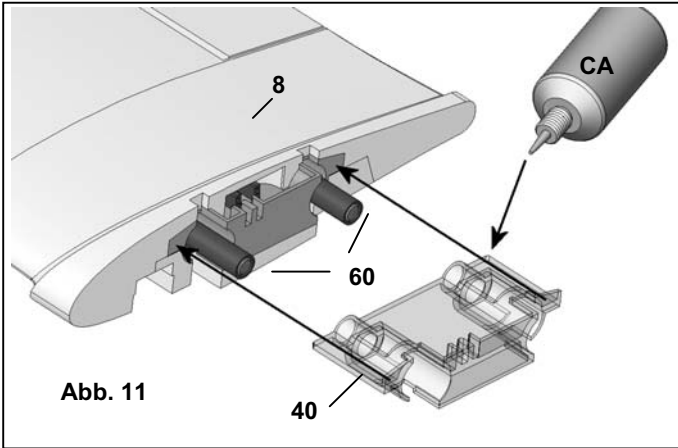
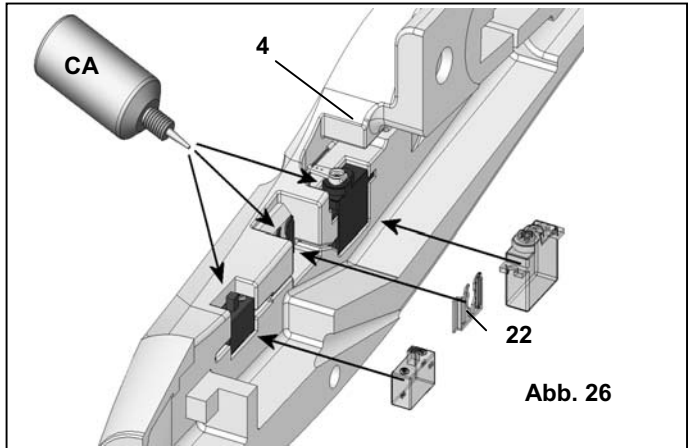
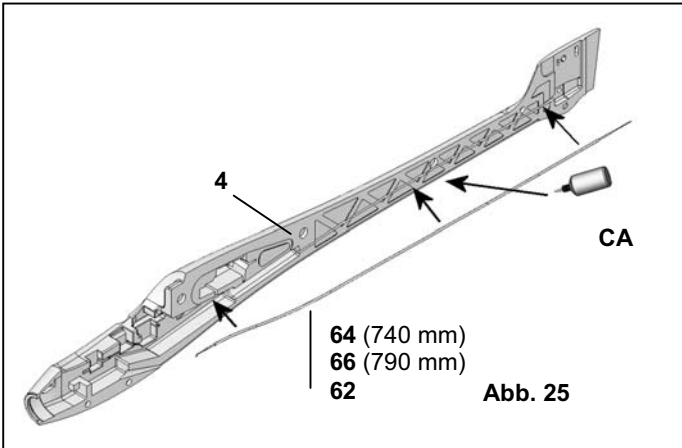
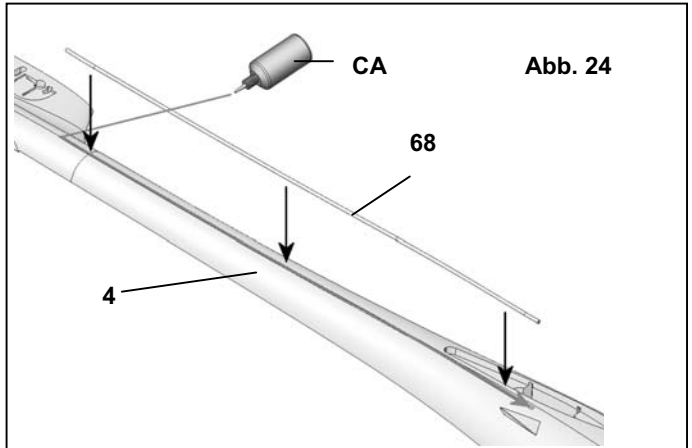
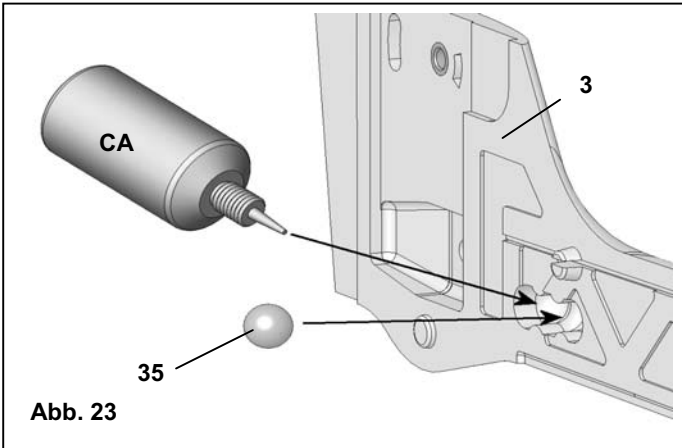
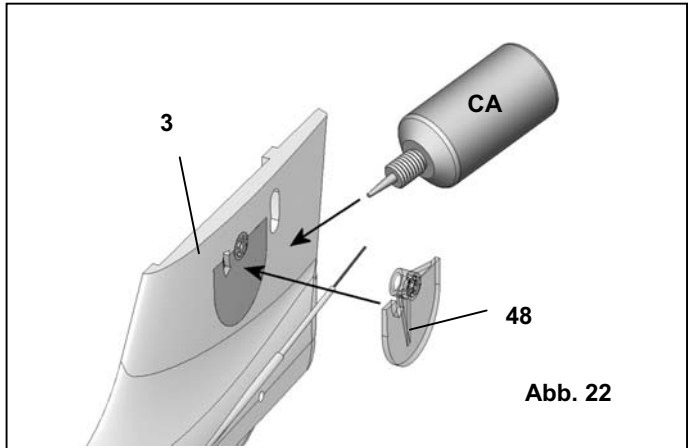
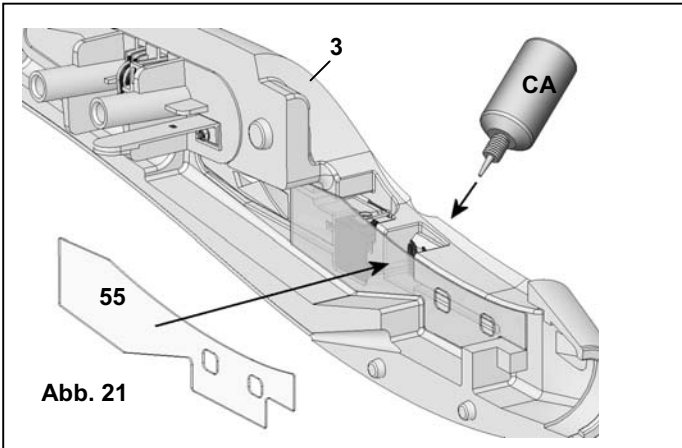
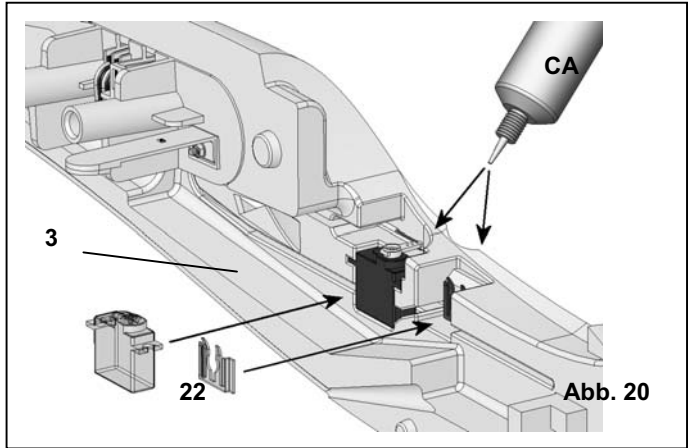
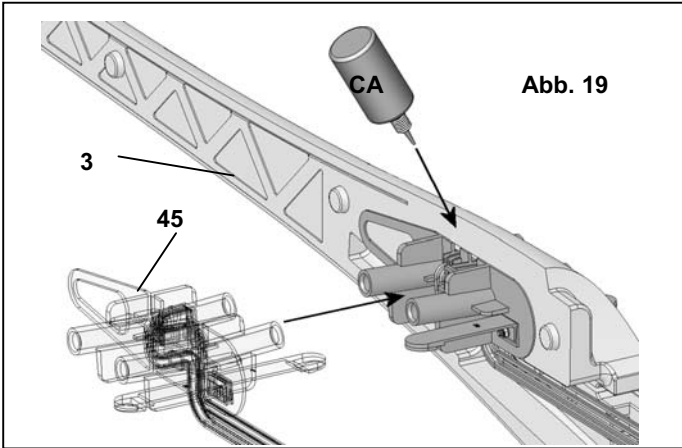
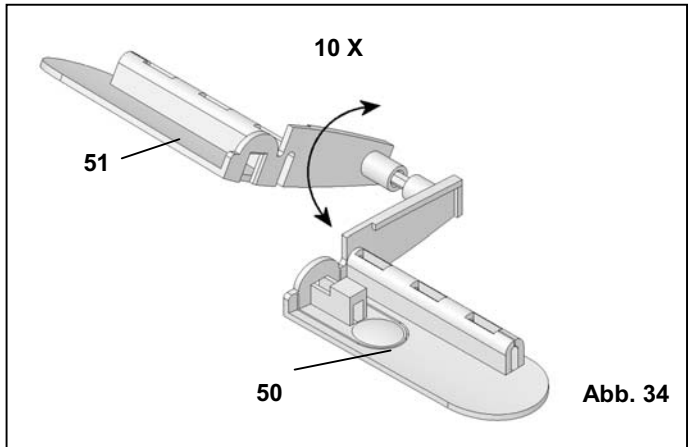
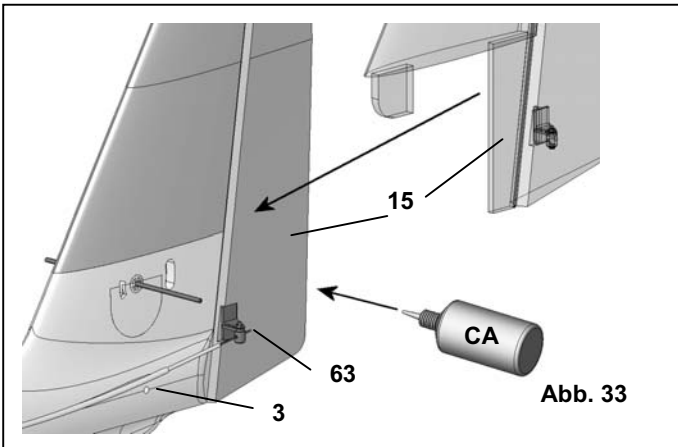
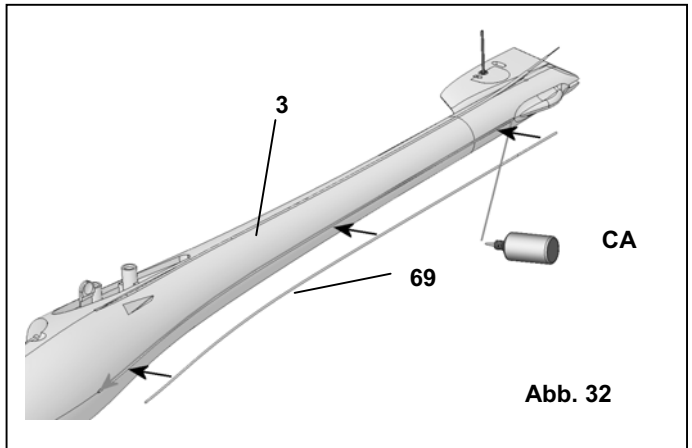
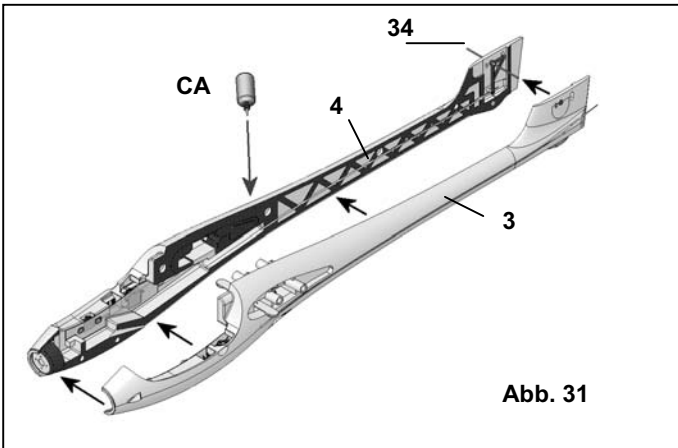
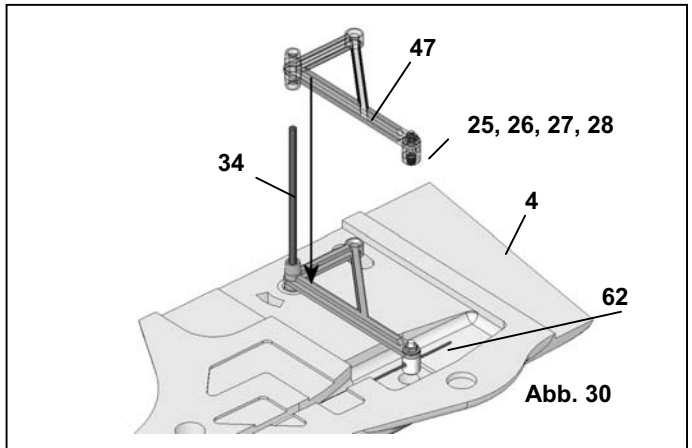
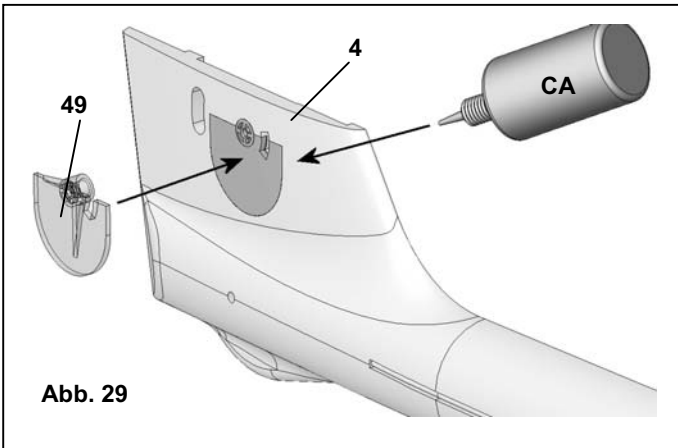
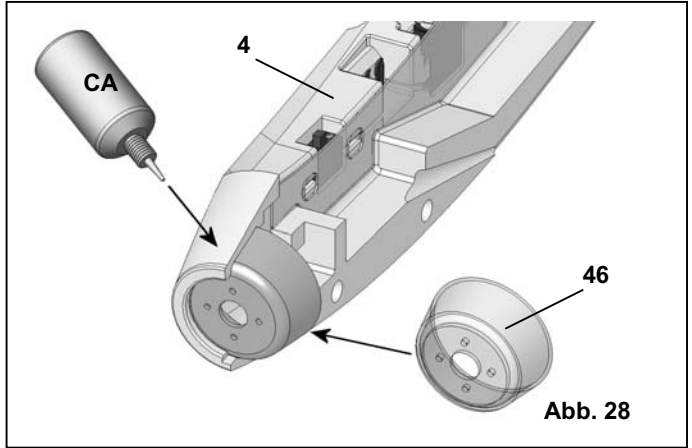
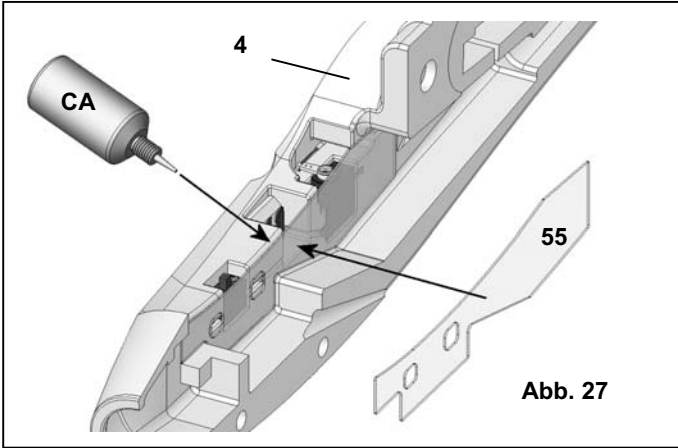


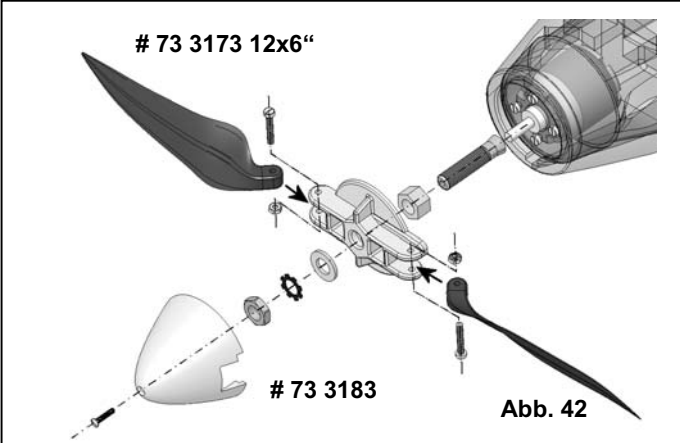
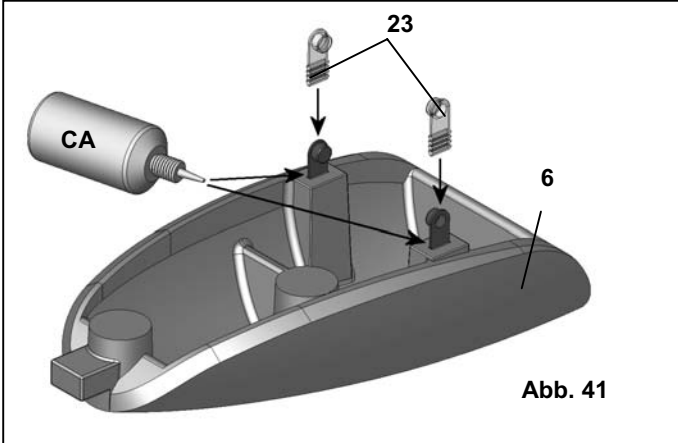
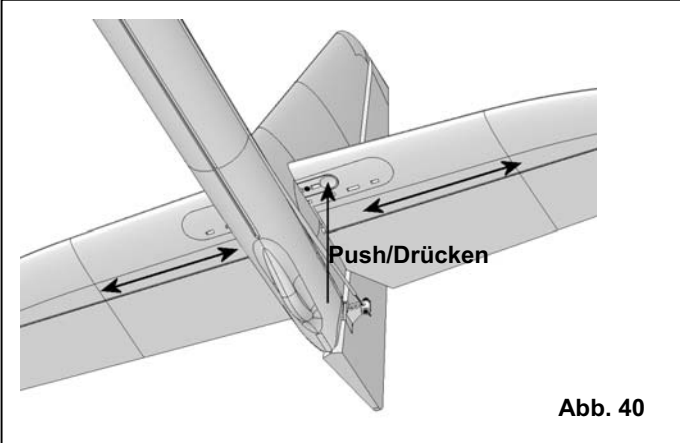
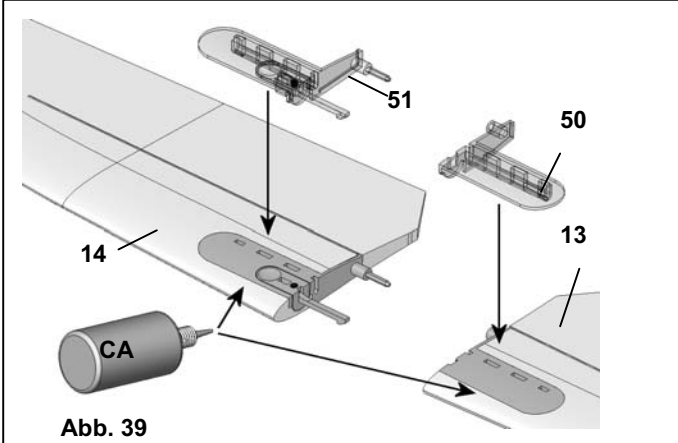
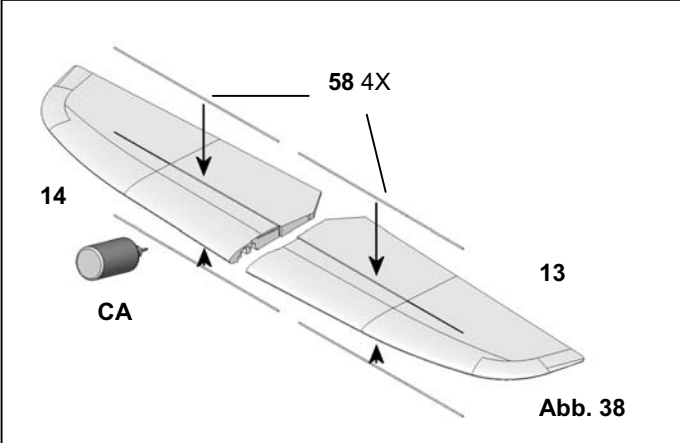
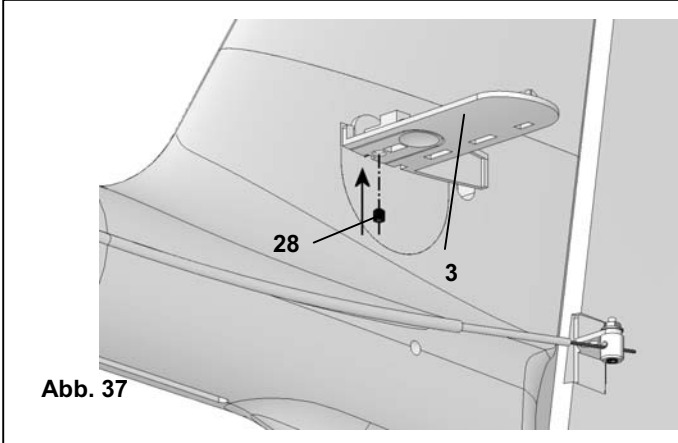
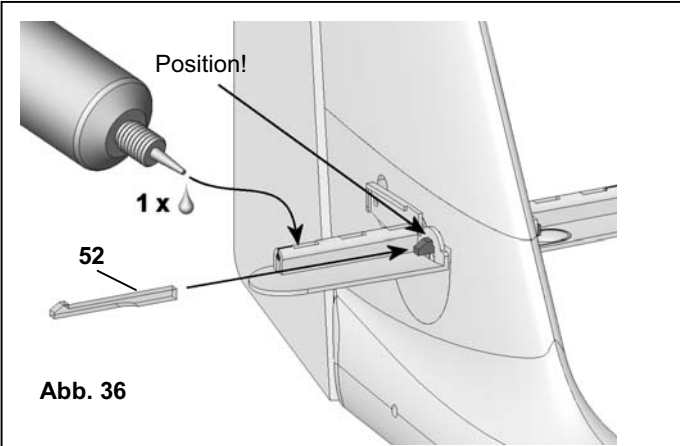
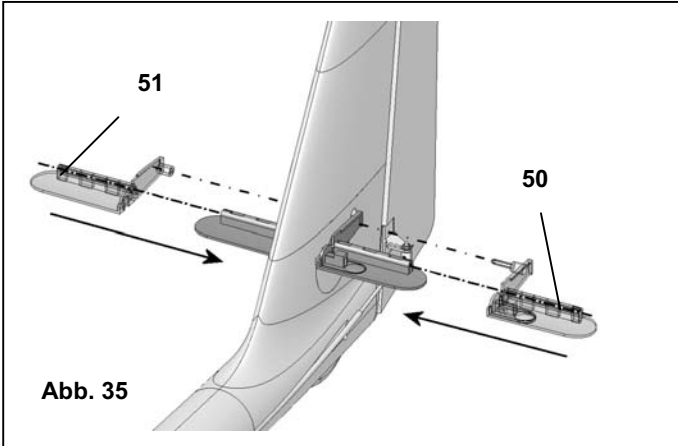
Abb. 02

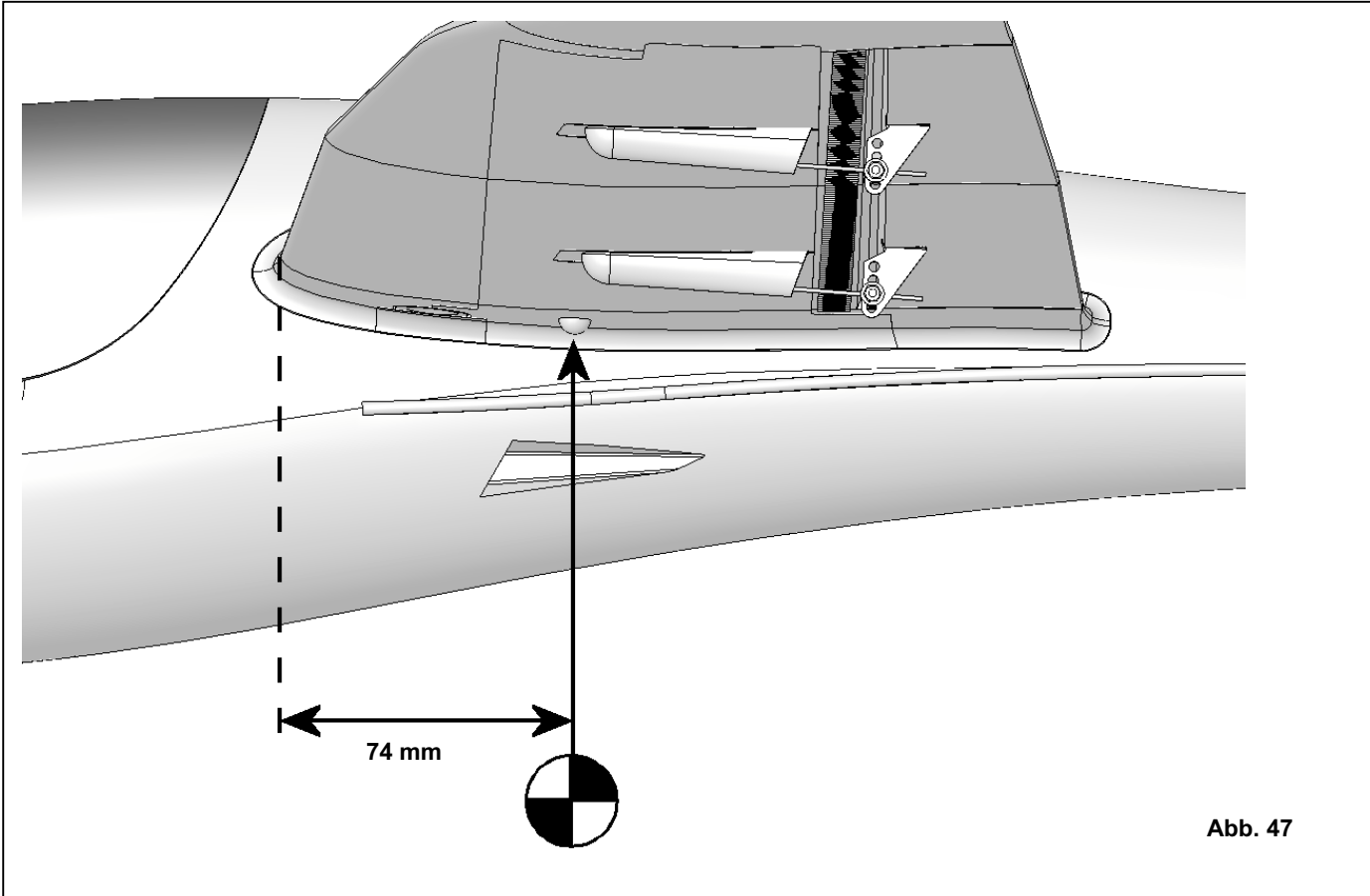
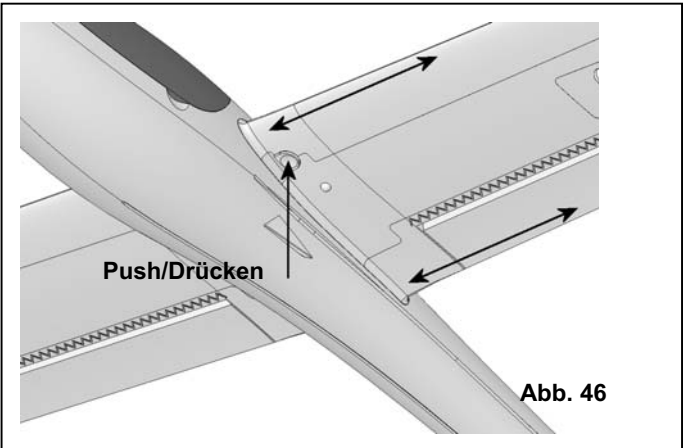
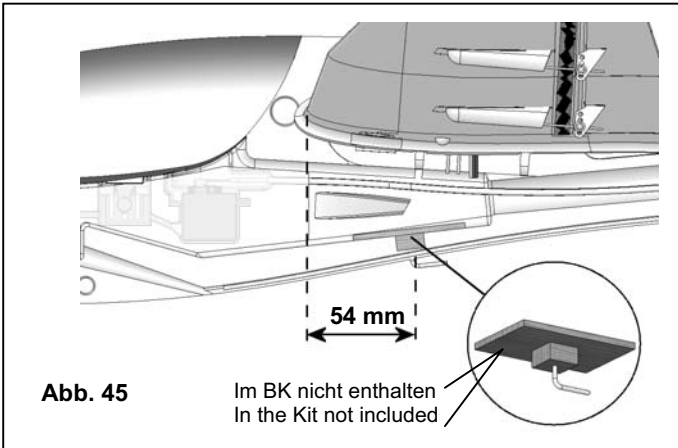
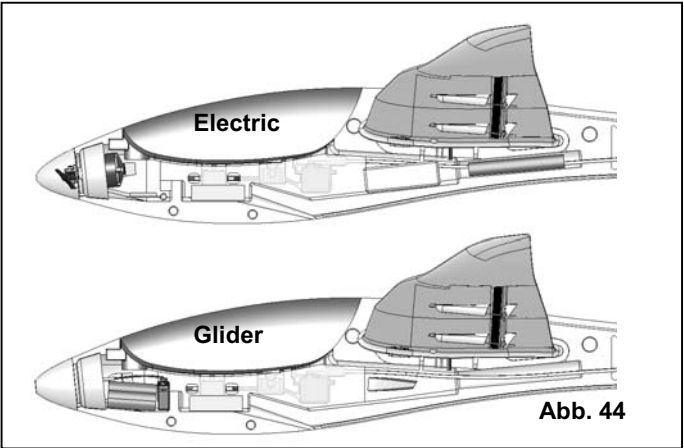
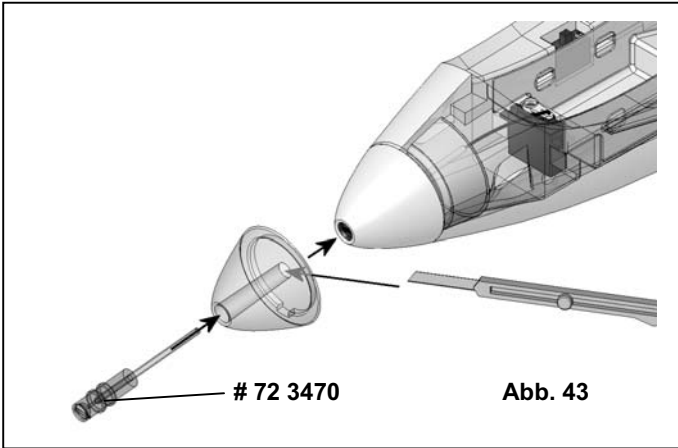










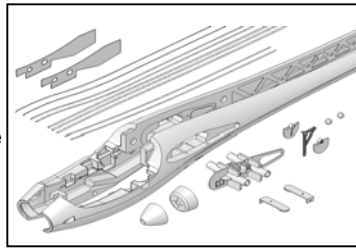


ERSATZTEILE
REPLACEMENT PARTS
PIECES DE RECHANGES
PARTI DI RICAMBIO
REPUESTOS

(bitte bei Ihrem Fachhändler bestellen)
 (please order from your model shop)
 (S.V.P. à ne commander que chez votre revendeur)
 (da ordinare presso il rivenditore)
 (por favor, dirijase a su distribuidor)

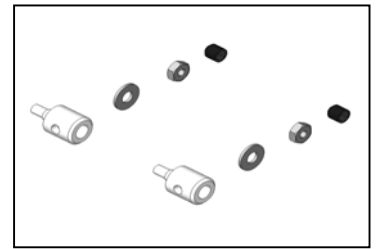
22 4208

Rumpfhälften+Bowdenzüge
 Fuselage shells + snakes
 Fuselage+gaines de commande
 Semigusci fusoliera + bowden
 Fuselaje + trans. bowden



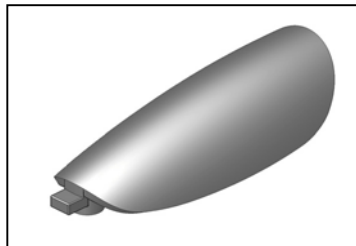
70 3455

Gestängeanschluss (2x)
 Pushrod connector (2x)
 Element de fixation (2x)
 Raccordo rinvii (2x)
 Conexión del verillaje (2x)



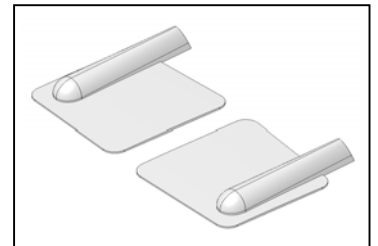
22 4209

Kabinenhaube
 Canopy
 Verrière
 Capottina
 Cabina



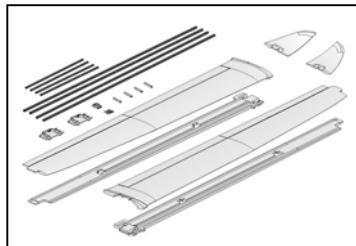
72 4382

Servohutzen (1 Paar)
 Servo cover (1 pair)
 Carrénage de servo (1 paire)
 Copertina servi (1 coppia)
 Capuchitas de Servos (1 par)



22 4210

Tragflächen + Holmrohre
 Wings + spar tubes
 Ailes + fourreau de clé
 Semiali + tubi baionetta
 Alas + largueros



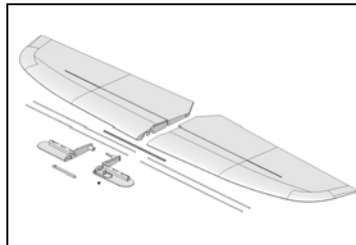
72 4437

Dekorbogen
 Decal sheet
 Planche de décoration
 Decals
 Lámina decorativa



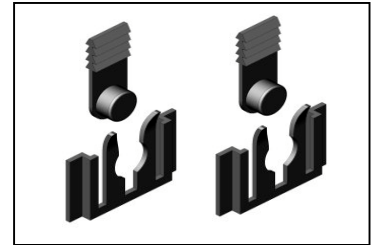
22 4211

Höhenleitwerk
 Tailplane
 Stabilisateur
 Piano di quota
 Estabilizador horizontal



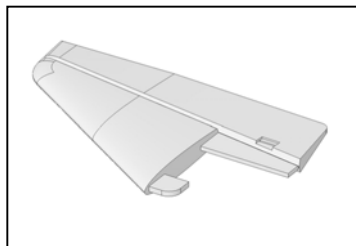
72 5136

Canopy-Lock
 Kabinenhaubverschluss
 Fermeture de verrière
 Chiusura capottina
 Cierre de cabina



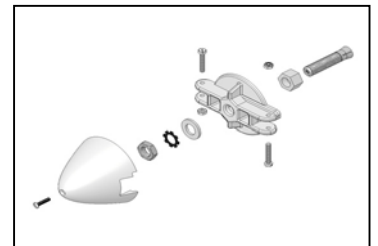
22 4212

Seitenleitwerk
 Fin
 Dérive
 Direzionele
 Estabilizador vertical



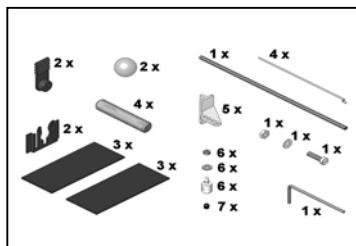
73 3183

Mitnehmer+Blatthalter+Spinner
 Driver, blade support + spinner
 Plateau, support et cône
 Mozzo portapale con ogiva
 Adaptador, port-palas y cono



22 4179

Kleinteilesatz
 Small items set
 Petit nécessaire
 Minuteria
 Piezas pequeñas



73 3173 12 x 6"

2 Luftschraubenblätter
 2 folding propeller blades
 2 pales d'hélice repliable
 2 pale elica ripiegabile
 2 hélices plegables

