MULTIPLEX®

FUNJET

Kit Best.-Nr. 21 4213

Version 1.0

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.

Additional items required:

Radio control system components:	Function		
Micro IPD UNI receiver	35 MHz A-band	Order No.	5 5971
alternatively:	40 MHz	Order No.	5 5972
or			
RX-7 SYNTH IPD receiver	35 MHz A-band	Order No.	5 5880
alternatively:	35 MHz B-band	Order No.	5 5881
Nano S servo (2 required)	Aileron / elevator	Order No.	6 5120

Recommended power system: PERMAX BL 480/5D Order No. 33 2630
Contents: PERMAX 480/5D motor, collet propeller driver, 5.5 x 4.5" APC propeller, Multicont BL 37 controller
or:
PERMAX 480/6 # 33 2484, 5.5 x 4.5" MPX propeller # 73 3146, Multicont BL 27 # 7 2275

Flight batteries:

MULTIPLEX flight battery	LiBATT SH BX 3/1-2100P	Order No. 15 7131
or	LiBATT SH BX 3/1-3200P	Order No. 15 7136 or Order No. 15 7035

Battery charger:
MULTIcharger LN-5014 DC (charge current 100 mA … 5 A) Order No. 9 2531
1 - 14 NiCd / NiMH cells and 1 - 5 Lithium-Polymer cells

Adhesive:
Use any type of medium or thick cyano-acrylate adhesive ("cyano" - not in the MULTIPLEX range).
Do not use styrofoam cyano.

Tools:
Scissors, combination pliers, balsa knife, screwdriver, 4 - 5 mm Ø bradawl or small round file.

Specification:

Wingspan	795 mm
Fuselage length	750 mm
All-up weight	approx. 620 g
Wing area	approx. 15 dm²
RC functions	Aileron, elevator and throttle

Note: Please remove the illustration pages from the centre of the instructions.

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).

1. Before assembling the model

Please check the contents of your kit.
You will find **Figs. 01 + 02** and the Parts List helpful here.

Assembling the model:

2. Piercing the cable ducts through the fuselage

Use a bradawl, a round file or a screwdriver to pierce the cable holes through the fuselage: this is done by placing the model on its back and twisting the tool into the fuselage, working from the end of the cable duct. Remove all loose foam particles. **Fig. 03**

3. Remaining preparation work

The next step is to prepare the glue-fitting horns **24** for fitting in the control surfaces. **Fig. 04**
Fit the pushrod connector **25** in the outermost hole in the horn and secure it with the washer **26** and nut **27**. Check that the connectors swivel smoothly, but without slop.

Caution: secure the nuts with a tiny drop of paint or cyano to prevent them shaking loose, using the point of a pin to apply it.
Fit the socket-head grubscrews **28** in the pushrod connectors.
Spray activator on the base of the horns **24** and allow it to air-dry. Apply cyano to the horn recesses in the elevons, and press the horns into place.

Caution: drops of glue may be forced out of the joint - wear protective goggles to be on the safe side!

4. Installing the servos

The model is designed for MULTIPLEX Nano-S servos. The servo leads have to be soldered directly to the servo extension leads (with integral separation filters), # 8 5253: cut off the servo lead close to the connector, and solder the wires to the bare ends of the extension lead, soldering like colours together. Insulate each soldered joint with a separate heat-shrink sleeve.

Set the servos to centre from the transmitter, or use a servo tester. Fit the output arms on the servos at 90° to the case sides. Wrap adhesive tape round each servo, or shrink a heat-shrink sleeve round the case.

This is intended to prevent adhesive getting inside the servo, where it could jam the servo gearbox.

Spray activator on the prepared servo and allow it to air-dry. Apply thick cyano to the servo recess - don't be too sparing, but don't overdo it, either. **Caution: apply the adhesive only where the servo is protected by the tape or heat-shrink sleeve.** Place the servo in the recess and press it into place. Run the cable along the servo duct and apply clear tape over the slot to prevent it falling out. **Fig. 05**

5. Freeing the control surfaces

Cut through the tip end of the elevons using a balsa knife, leaving a gap about 1 mm wide. Move the panels to and fro repeatedly at the hinge line to free up the hinges. Take care not to over-stretch the hinge line, and do not cut off the control surfaces! The working range should be about +/- 45°. Fit the pushrod **30** through the pushrod connector **25**, hold the elevon at the neutral position, and tighten the clamping screw **28** in the pushrod connector. **Figs. 06 + 07**

6. Installing the wing spar

Slide the tubular GRP spar **10** through the fuselage from one side and set it exactly central. Don't glue it in place at this stage. **Fig. 08**

7. Gluing the outboard wing panels to the centre section

Trim the outboard wing panels to fit against the centre section, and glue them in place using cyano. Production tolerances may produce slight differences in thickness at the joint, but hand-pressure is sufficient to compress the foam to the correct thickness; make any adjustment required before you glue the joint. The spar can now be glued in place permanently. Deploy the servo cables and run the extension leads into the fuselage. Seal the cable ducts with clear adhesive tape as already described. Secure the servo leads inside the fuselage so that they do not get in the way when you have to change the flight battery.
Fig. 08

8. Gluing the spar

Check carefully that the wing is straight and free of warps. The GRP spar **10** should be an easy fit in its slot; it must not be tight. Apply thick cyano along the length of the spar, then spray activator over the joint. Allow the adhesive to cure for a few minutes before placing any load on the wing.

9. Elevon pushrods

Connect the pre-formed end of the pushrods **30** to the innermost hole in the servo output arms. At the elevon end slip the pushrods through the pushrod connectors **25** and tighten the socket-head M3 grubscrews **28** using the allen key **29**; hold the elevons at neutral when you tighten the grubscrews.
Trim the servo fairings **31** to fit in both wing panels. They can be glued in place with cyano if you wish, but it is better to use a few short strips of clear adhesive tape, as you may need access to the servo for maintenance. **Fig. 09**

10. Installing the canopy latch clips

Spray activator in the latch clip recesses in the fuselage and allow it to air-dry. Apply cyano to the canopy latch clips **22** and push them into position. **Fig. 10**

11. Fitting the fuselage turtle deck

Trim the fuselage turtle deck **4** to fit, together with the canopy **5**. Mark the position of both parts, then glue the turtle deck **4** to the fuselage **3**. **Fig. 11**

Caution:
Be sure to glue the fuselage turtle deck in place securely, as this joint makes a major contribution to the airframe's structural strength.
Fig. 11

Press the latch lugs **23** into the latch clips **22** so that they engage fully. Apply very little cyano to the inside of the slots in the canopy **5** and immediately fit the canopy on the model, sliding the latch lugs into the slots. **Fig. 12** Wait one minute, then carefully open the canopy and apply more glue to the latch lugs to reinforce the joints.

12. Installing and securing the motor
Offer up the motor mount **61** to the fuselage (integral scale at the bottom); and carry out any trimming required. Glue the mount to the fuselage when you are satisfied with the fit. **Fig. 13**

13. Connecting the motor
As the motor works in "pusher" mode, it must be connected to run in the opposite direction to normal; with a brushed motor this means connecting the red wire to the negative motor terminal, and black to positive. If you are using a brushless motor simply swap over any two of the three connections.

Caution!
Always reverse the connections between the speed controller and the motor, not between the battery and the controller. It can happen in a moment - and the result is always a wrecked speed controller!

14. Preparing the motor unit
The whole power train is fitted through the motor mount from the rear, and threaded forward into the fuselage.
Screw the motor to the motor bulkhead **60**. Connect the speed controller and extend the wires for the servo lead and the power connections if necessary. **Fig. 14**

The FunJet's propeller **35** has to push rather than pull, so it must be positioned in the propeller driver with the front face pointing forward, in the direction of flight. Secure the propeller carefully, and check before every flight that it is undamaged and securely fixed. If in doubt, fit a new propeller. Keep well clear of the spinning propeller, and make sure any spectators are aware of the danger. <u>You are responsible for any accident</u>!

15. Installing the fins
Offer up the fins **8 + 9** "dry" (no glue) and trim them slightly if necessary. If the joint surfaces do not make good contact with the wing, remove any rough edges and sand them back slightly until they do. Spray activator on the joint surfaces of the fins, and allow it to air-dry. Apply **cyano** to the recesses in the wing, and press the fins into place. Immediately align them carefully and tape them in position until the glue has set hard. **Fig. 16**

16. Final assembly
Glue strips of Velcro tape (hook side) **20** in the appropriate positions in the fuselage to secure the receiver and the flight pack. Stick the mating Velcro tape (loop side) **21** to the components to be installed.

The arrangement of the airborne equipment should be as follows:
Receiver in the nose, then the flight battery. The speed controller should be located in the fuselage tail boom **immediately adjacent** to the motor. **Fig. 17**

The final position of the flight battery cannot be established until you check the balance point of the completed model.

If the Velcro tape does not hold the battery securely, wedge the pack against the fuselage turtle deck.

Please check that the battery is secure before each and every flight!

Route the receiver aerial through a pierced hole in the fuselage side and into the wing duct, where it can be secured with adhesive tape.
Temporarily connect all the electrical and electronic components.

Don't connect the motor until you have switched the transmitter on, and you are sure that the throttle control is at the "OFF" position.

Connect the servo leads to the receiver. Switch the transmitter on. Connect the flight battery (in the model) to the speed controller, and the controller to the receiver. Please note that your speed controller must be a BEC type, i.e. it supplies power to the receiver from the flight battery.
Now switch on the motor briefly, and check the direction of rotation of the propeller. Hold the model very firmly before switching the motor on, and remove any loose, lightweight objects from the area behind the model before the propeller does it for you.

Caution: even small motors and propellers constitute a serious injury hazard!

17. Control surface travels and settings
The elevon travels must be set correctly in order to obtain a balanced control response: the elevators should deflect up (stick back towards you) by about **12 mm**, and down (stick forward) by about **10 mm**. Set the aileron travels to + 10 mm / - 13 mm (negative differential). If you cannot set these travels by making adjustments at the transmitter, you will need to re-position the pushrod connectors on the elevon horns. **The neutral position for the first flight should be approximately 2 mm "up".**
With the model set up in this way, you will usually need to apply slight down-trim for general flying. After the first landing mark the correct elevon setting on the fins using a waterproof felt-tip pen. When you fly the model, trim both elevons "up" by about 1 mm, i.e. 1 mm above the marked points. After the initial climb to height, move the elevator trim back to centre for the remainder of the flight.

One little point to note for the perfectionists amongst you: as is the case with all aeroplanes featuring this power configuration, the model tends to roll around the longitudinal axis in reaction to motor torque. The FunJet rolls slightly to the left at full-throttle.

18. Default downthrust setting
The downthrust (inclination of the motor thrustline) can be varied at the motor mount. For the first few flights select the "0" setting. This is done by fitting the right and left locking screws loosely, holding the motor bulkhead down with the thumb, and setting the adjustor screw (bottom) to "0". The setting should always be read off on the external scale, at the bottom of the motor mount.
Finally tighten the locking screws carefully until they rest against the bulkhead, then tighten them by a further half-turn.
Caution: on no account tighten the screws more than this, as the result will be a deformed motor bulkhead.

19. Balancing - Centre of Gravity
The FunJet, like any other aircraft, must be balanced at a particular point in order to achieve stable flying characteristics. Assemble your model completely, ready to fly, and install the flight battery. **You will find hemi-spherical markings in the underside of the wing close to the change in leading edge angle.** Support the model at this point on two fingertips and it should balance level; if not, adjust the position of the flight battery to balance the model as described. Once you have established the correct position, mark the location of the flight pack inside the model to ensure that it is always replaced in the same position.
Fig. 18

20. Fine-tuning
The FunJet offers superb flying characteristics which can be optimised by careful adjustment of the Centre of Gravity (CG) and the motor downthrust. The new design of motor mount is very helpful here, as it enables you to adjust the downthrust easily, and the set thrust line can simply be read off on a scale. Start by flying at full-throttle, and trim the model accurately, i.e. straight and level "hands-off". If you now switch the motor off, the FunJet should make the transition to a steady glide. If the model climbs and slows down, the downthrust is too great - reduce the downthrust angle. If the model goes into a dive, the downthrust is too low - increase the downthrust slightly and add a little up-trim before flying again. Repeat this procedure until the model goes into a smooth descent when you close the throttle, and responds to an open throttle by spontaneously flying straight and level, with a slight tendency to climb.

Fine-tuning the CG: fly straight and level at full-throttle, then abruptly roll inverted. You will need to apply down-elevator to maintain level flight, and this should be about 15 - 20% of full travel. If you need less down-elevator to hold level inverted flight, the CG is too far rearward; if you need more down-elevator, it is too far forward. In almost all cases you will be able to correct the CG by adjusting the position of the flight battery. If not, add a little ballast to nose or tail as required.

If you have to alter the CG, you will need to re-check the downthrust setting.

21. Gilding the lily - applying the decals
The kit is supplied with a multi-colour decal sheet **11**. 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 an alternative arrangement which you find pleasing. The cabin is completed by fitting the coloured vacuum-moulded part.

22. 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.

Be sure to carry out a range check before the first flight.
Just before the flight, charge up the transmitter battery and the flight pack 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 servo 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 ¼-throttle**. There should be only a very slight reduction (10 - 15%) in effective radio range with the motor turning.

Improving reception conditions:
1. Fit a separation filter between the speed controller and the receiver.
2. Keep the speed controller / motor cables as short as possible.
3. Do not deploy servo leads (including the speed controller lead) parallel to the high-current power cables.

If you are not sure about any aspect of the system, please do not risk a flight. Instead pack up the whole system (including battery, switch harness and servos) and send it to the equipment manufacturer for testing.

The first flight ...

Do not attempt to hand-glide this model!
The FunJet is designed for hand-launching only - always launch it directly into wind.
If you are a beginner to model flying we strongly recommend that you ask an experienced model pilot to help you for the first few flights. The model should be launched at ¾-throttle to full-throttle, with the wings level and the nose angled up at an angle of 20 - 30°.

Don't launch the model "down-hill", like a glider!

Allow the aeroplane to climb to a safe altitude, then adjust the trims on the transmitter so that the model flies straight and level without any assistance from you.
While the FunJet is still at a safe altitude, switch off the motor and try out the controls on the glide. Carry out a “dry run” of the landing approach at a safe height so that you are prepared for the real landing when the battery gives up the ghost.

Don’t try any tight turns at first, and especially not on the landing approach at low altitude.
It is always better to land safely at some distance from you, than to force the model back to your feet and risk a heavy landing.

23. 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 (i.e. that its cover includes powered model aircraft).
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 you are using. Make use of all sensible safety systems 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.

All of us in the MULTIPLEX team hope you have many hours of pleasure building and flying your new model.

MULTIPLEX Modellsport
Product development and maintenance

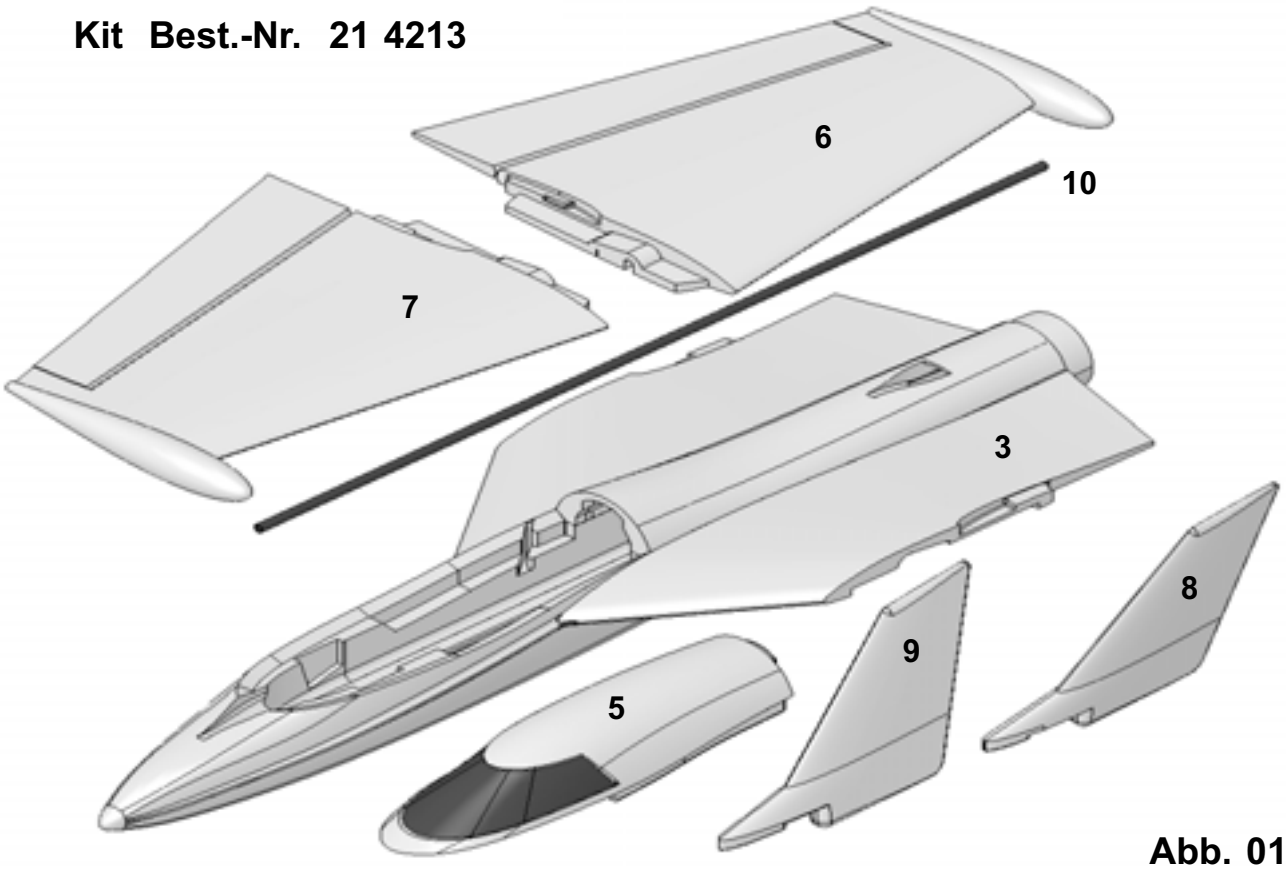
Klaus Michler

Parts list - FunJet

Part No.	No. off	Description	Material	Dimensions
1	1	Kit building instructions	Paper, 80 g / m²	A4
2	1	Decal set	Printed adhesive film	330 x 700 mm
3	1	Fuselage	Moulded Elapor foam	Ready made
4	1	Fuselage turtle deck	Moulded Elapor foam	Ready made
5	1	Canopy	Moulded Elapor foam	Ready made
6	1	L.H. wing panel	Moulded Elapor foam	Ready made
7	1	R.H. wing panel	Moulded Elapor foam	Ready made
8	1	L.H. fin	Moulded Elapor foam	Ready made
9	1	R.H. fin	Moulded Elapor foam	Ready made
10	1	Tubular spar	GRP tube	6 Ø x 580 mm
Small items set				
20	2	Hook-and-loop tape, hook	Plastic	25 x 60 mm
21	2	Hook-and-loop tape, loop	Plastic	25 x 60 mm
22	2	Canopy-Lock latch	Inj. moulded plastic	Ready made
23	2	Canopy-Lock latch tongue	Inj. moulded plastic	Ready made
24	2	Glue-fitting horn	Inj. moulded plastic	Ready made
25	2	Pushrod connector	Metal	Ready made, 6 mm Ø
26	2	Washer	Metal	M2
27	2	Nut	Metal	M2
28	2	Socket-head grubscrew	Metal	M3 x 3 mm
29	1	Allen key	Metal	1.5 mm A/F
30	2	Pre-formed aileron pushrod	Metal	1 Ø x 80 mm
31	1	Pair of servo fairings, L.H. & R.H.	Vac. moulded plastic	Ready made
FunJet motor mount incl. screws				
60	1	Motor bulkhead	Inj. moulded plastic	Ready made
61	1	Motor bulkhead holder	Inj. moulded plastic	Ready made
62	3	Screw	Metal	M3 x 16 mm

FUNJET

Kit Best.-Nr. 21 4213



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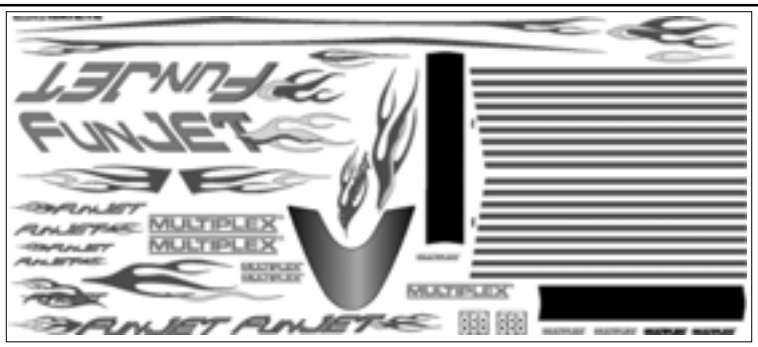

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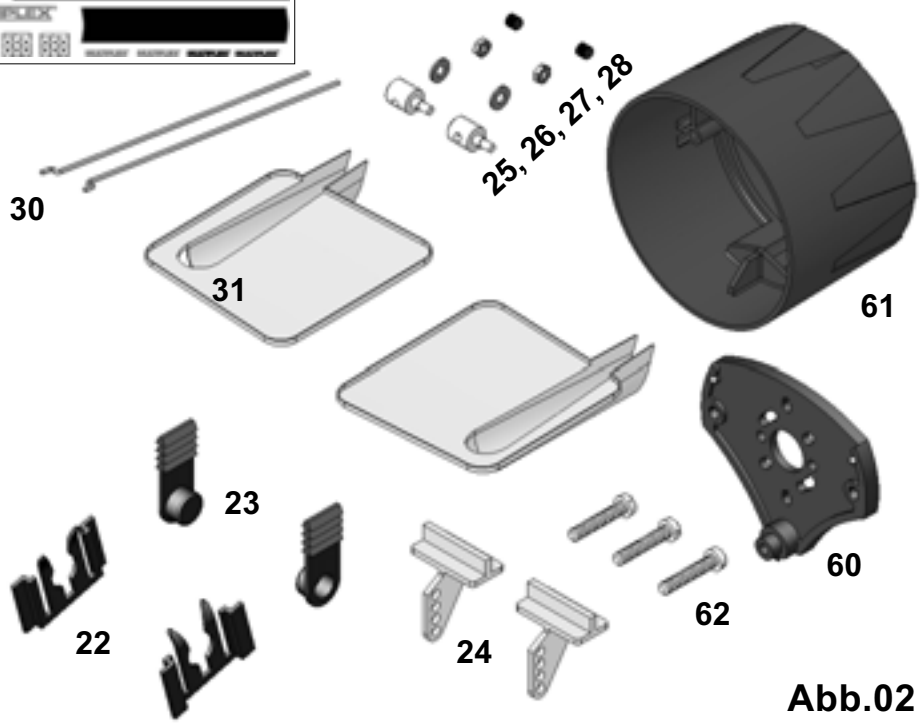

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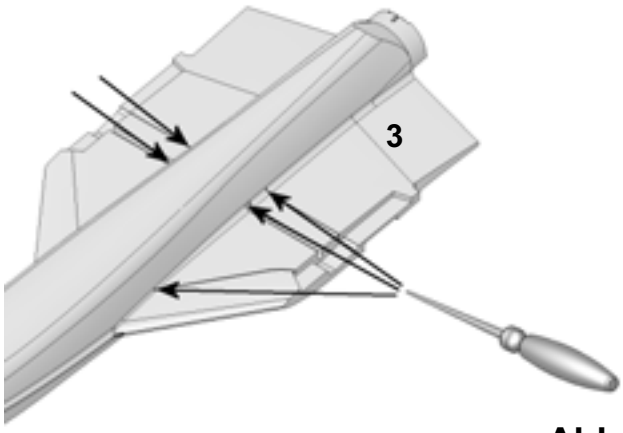

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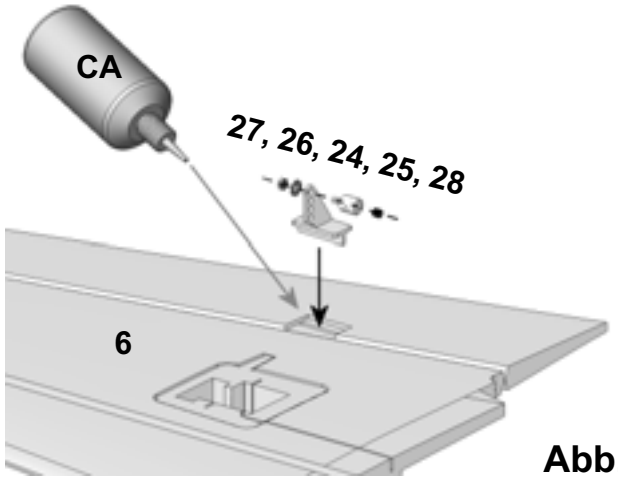

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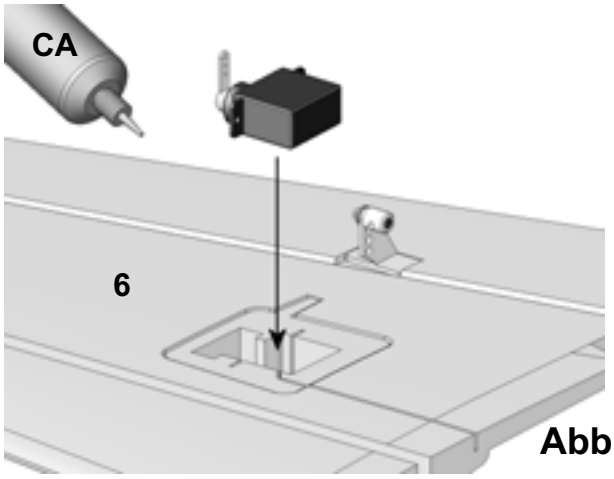

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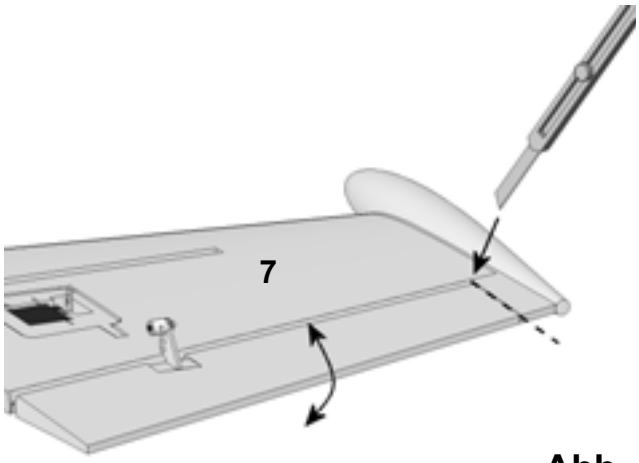

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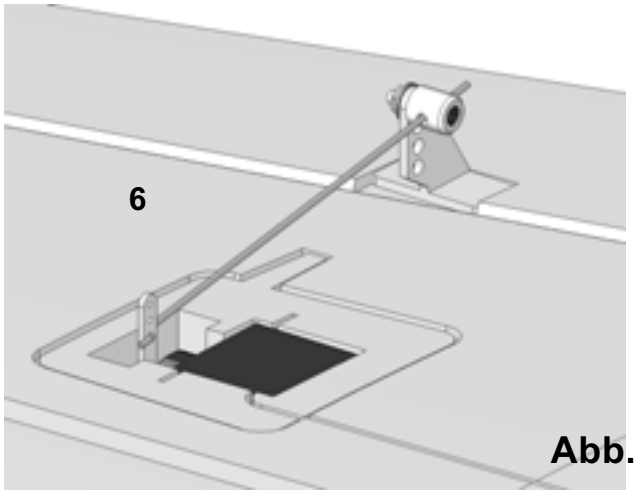

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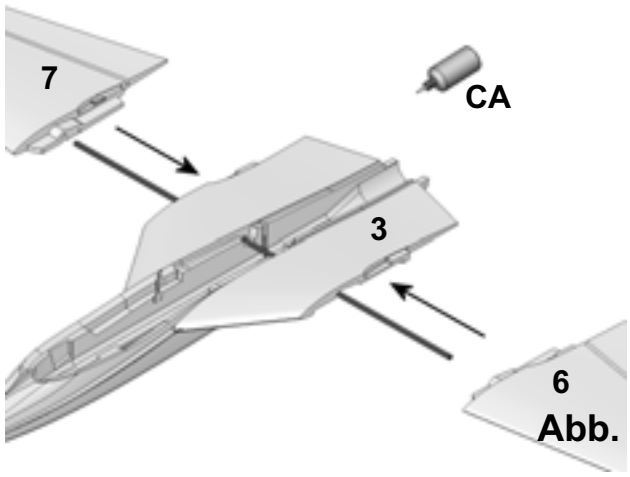

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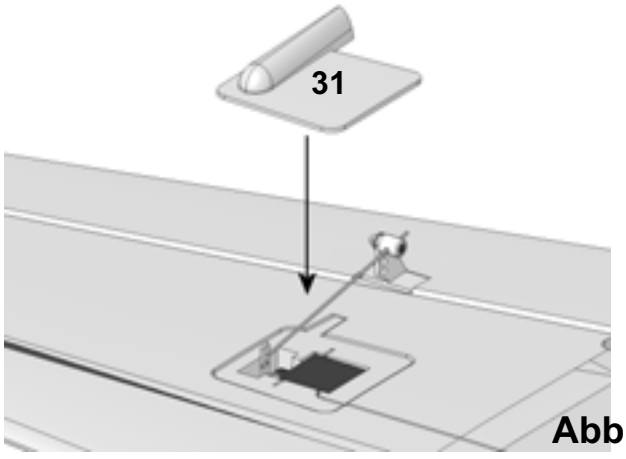

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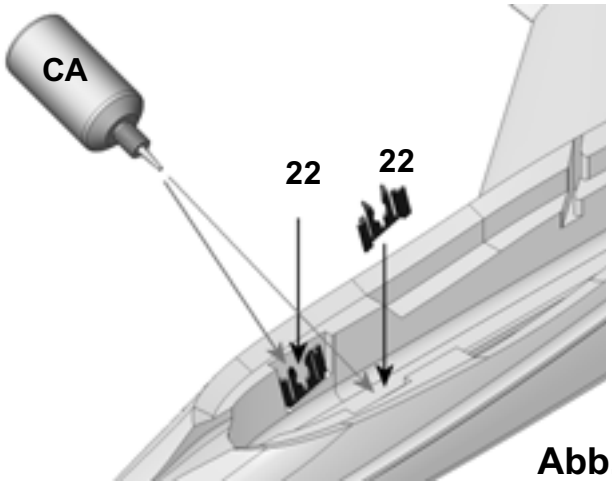

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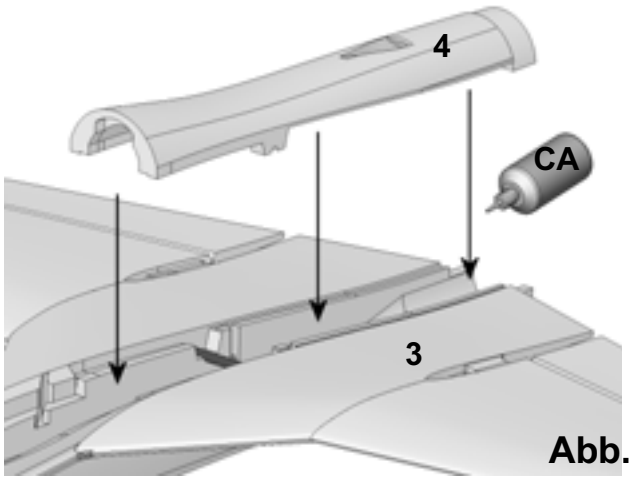

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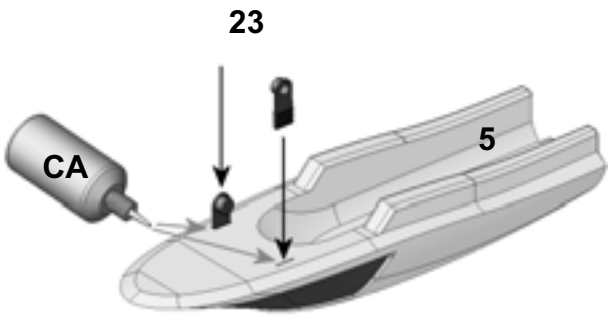

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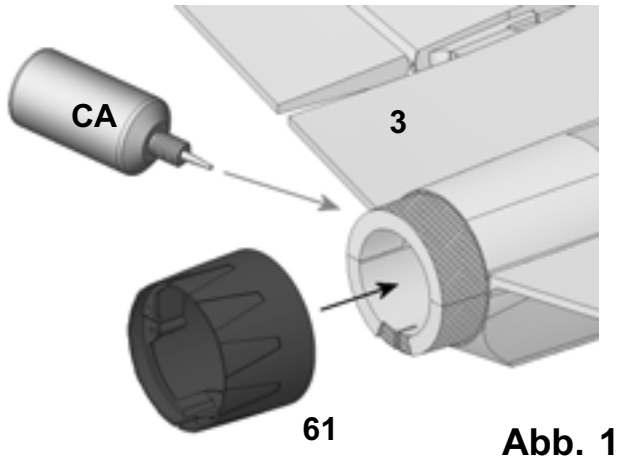

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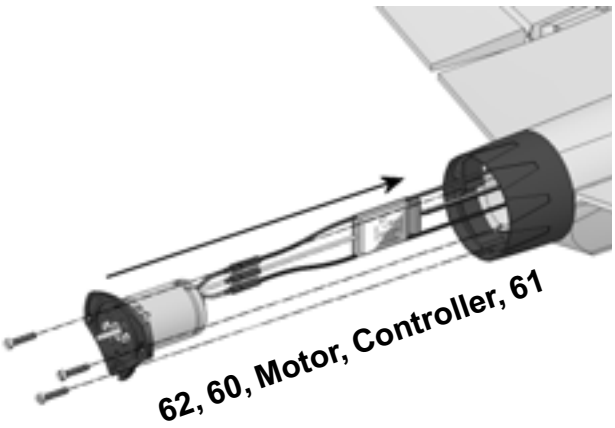

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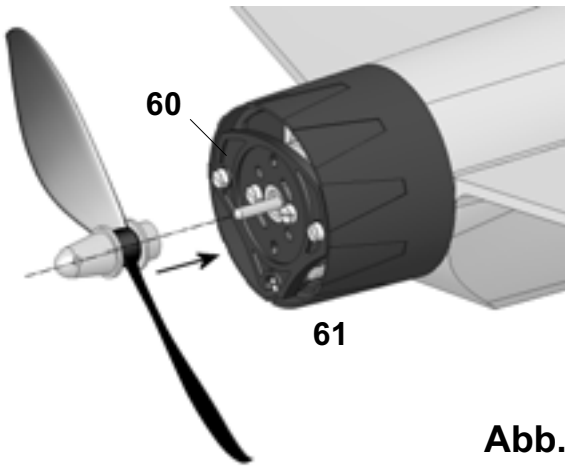

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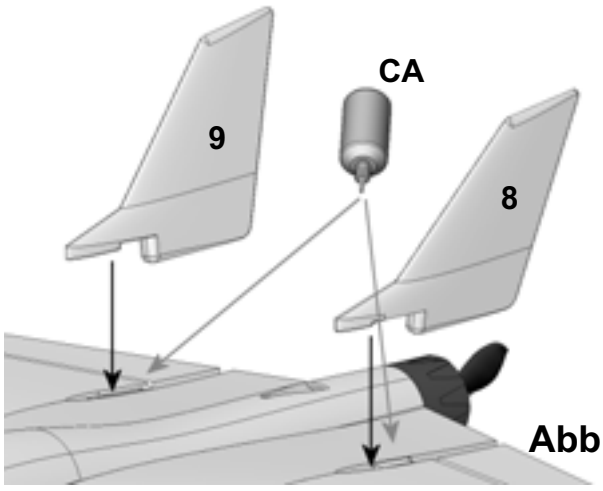

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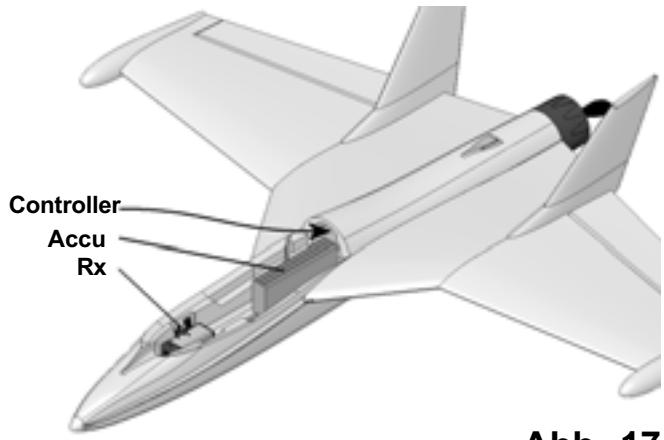


Abb. 17

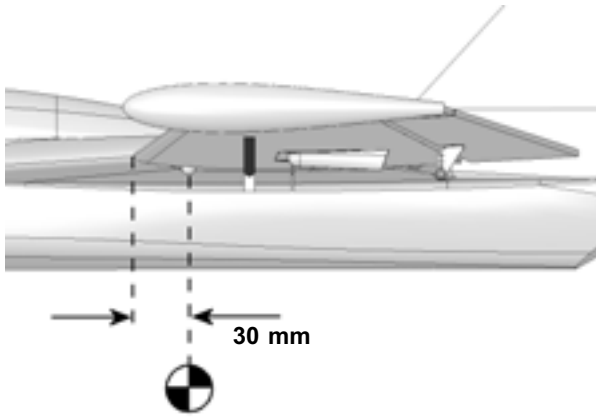
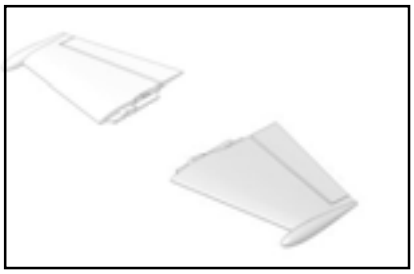


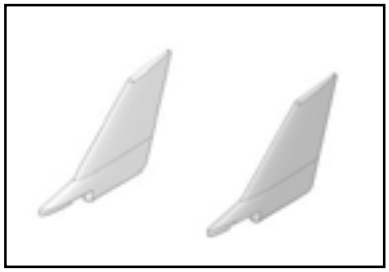
Abb. 18

Ersatzteile (bitte bei Ihrem Fachhändler bestellen)
Replacement part (please order from your model shop)
Pièces de rechan (S.V.P. à ne commander que chez votre revendeur)
Parti di ricambio (da ordinare presso il rivenditore)
Repuestos (por favor, diríjase a su distribuidor)

 # 22 4183
Tragflächen
Wing panels
Ailes
Ali
Alas

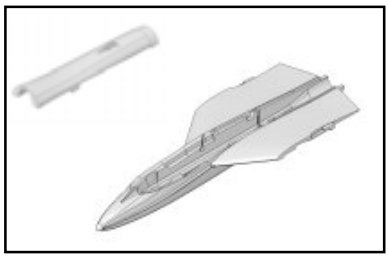


 # 22 4184
Leitwerkssatz
Tail set
Kit de gouvernes
Piani di coda
Timones

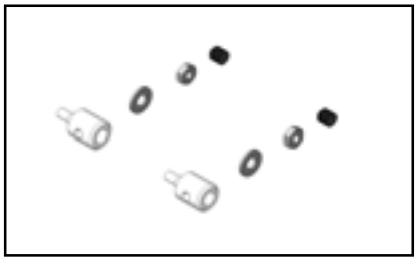


 # 72 4406
Dekorbogen
Decal sheet
Planche de décoration
Decals
Lámina decorativa

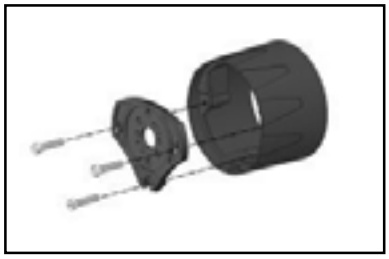
 # 22 4182
Rumpf mit Deckel
fuselage and turtle deck
fuselage avec des couvertures
fusoliera con la copertura
fuselage con la cubierta



 # 70 3455
Gestängeanschluß (2x)
Pushrod connector (2x)
Element de fixitation (2x)
Raccordo rinvii (2x)
Conexion del verillaje (2x)

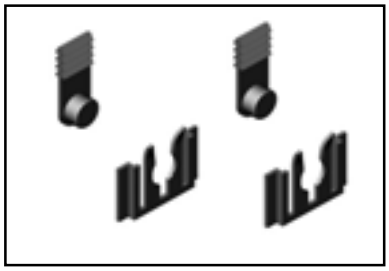


 # 33 2687
Motorträger
Motor mount
Support moteur
Supporto motore
Soporte del motor

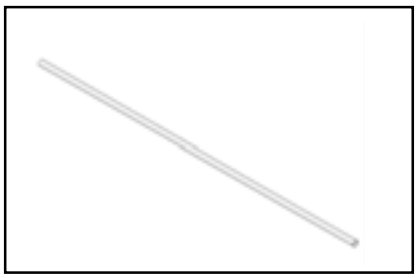


 # 22 4181
Kabinenhaube
Canopy
Verrière
Capottina
Cabina

 # 72 5136
Haubenverschluss
Canopy-Lock
Fermeture de verrière
Chiusura capottina
Cierre de cabina



 # 72 3185
Holmrohr
Wing joniner
Clé d´aile
Baionetta
Larguero



 # 22 4185
Kleinteilesatz
Small items set
Petit nécessaire
Minuteria
Piezas pequeñas