

Gemíní

Building instructions

Kit # 21 4224



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.

21 4224



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 (referring to the Parts List) **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, please take the kit back to your model shop in the first instance, as he will be able to advise you. After checking, he will send the component or the kit to our Quality Control department. We can only process guarantee claims if the purchase receipt and a brief description of the fault are supplied.

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:

e.g. MULTIPLEX Micro IPD receiver	35 MHz, A-band	Order No. 5 5971
alternatively	40 MHz	Order No. 5 5972
or MULTIPLEX RX-7 SYNTH DS IPD receiver	35 MHz, A-band	Order No. 5 5885
MULTIPLEX Nano-S servo	2 x required for ailerons	Order No. 6 5120

2 x required for elevator / rudder

Servo extension lead 3 required for aileron servos Order No. 8 5031

"Gemini" power set: HiMax HC 2816-0890 Contents: 1 HC 2816-0890 motor 1 APC 10" x 5" E propeller

1 Driver for Elapor spinner, 4 mm Ø split taper collet

1 BL 27 speed controller

Flight battery:

MULTIPLEX flight pack, e.g. LiBatt 3/1-2100 mAh (load capacity approx. 36 A) Order No. 15 7131

Adhesive: cyano-acrylate

Use medium and high-viscosity cyano-acrylate glue ("cyano" - <u>not</u> styrofoam cyano) for this model. 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 an excellent alternative adhesive, especially for servo mounting.

Tools:

Scissors, balsa knife, combination pliers, long pointed-nose pliers, slot-head / cross-point screwdrivers (for the servo output arm screws).

Specification:

Wingspan 920 mm
Overall fuselage length 920 mm
All-up weight, min. 840 g
Wing area 34 dm²
Wing loading (FAI) min. 25 g / dm²

RC functions Rudder, elevator, ailerons and throttle

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 medium or high-viscosity (thick) cyano. This is the procedure with Elapor®: spray cyano activator on one face of the joint; allow it to air-dry for around two minutes until the surface appears to be "dry", 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!

1. Before assembling the model:

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

2. Preparing the control "snakes"

The first step is to cut the plastic outer and inner snake sleeves to the lengths stated below. The sleeves are best cut by placing them on a hard flat surface and rolling them to and fro under the blade of a balsa knife; the sleeves can then simply be broken off at the scored points.

3 mm Ø x 2 mm Ø outer snake sleeves

2 x **52** = 300 mm

2 mm Ø x 1 mm Ø inner snake sleeves

2 x **53** = 320 mm

3. Completing the control snakes

Prepare the snakes as follows prior to installing them: slip the inner sleeves **53** into the outer sleeves **52**, and slide the steel rods **51** into the inner sleeves.

4. Preparing the fuselage shells

The Nano-S servos for rudder and elevator should now be installed in the fuselage shells **2 + 3**. Place the servos in the recesses, and apply a drop of thick cyano or hot-melt glue to the mounting lugs to hold them in place.

Fig. 03

Stand the fuselage shells on a flat surface, and connect the preformed end of the steel pushrods (with snake sleeves fitted) to the servo output arms, using the outermost hole in the levers. Apply cyano to the snake channels, then press the snakes into them as far as they will go (press against them from the inside) until the adhesive has set hard.

Fig. 04

5. Installing the motor mounts

The motor mounts 39 (2 x) can now be glued in the fuselage shells on both sides using cyano. Ensure that the motor mounts 39 are a snug, accurate fit in the foam components before you apply glue. Sand the joint surface of the plastic mouldings and glue them in place very securely. The quality of these joints dictates whether the motor stays attached to the fuselage or not!

Fig. 05

6. Canopy latch

Glue the latch catches 22 in the fuselage shells as shown in Fig. 05

7. Preparing the wing screw supports

Glue parts **32 + 33** together in pairs using cyano. You may find it useful to press them together using a pair of pliers. Protect your eyes!

Fig. 06

Glue both wing screw supports 32 / 33 in the fuselage shell 3.

Fig. 07

8. Joining the fuselage shells

Temporarily tape the servo leads to the fuselage so that they do not get in the way when you are joining the fuselage shells. Hold the fuselage shells **2 + 3** together "dry" (no glue), and check that everything fits together without requiring force. Apply thick cyano to one face, join the shells and align them carefully before the glue starts to set; this normally takes about ten seconds, but varies according to humidity. Hold the fuselage in your hands for another two or three minutes, checking continually that it is still perfectly straight, because the glue takes at least this length of time to harden sufficiently.

Fig. 08

9. Completing the front fuselage hatch and canopy

Insert the latch tongues 23 and set them to approximately the right position. Fit the front hatch 4 on the fuselage under light pressure, allowing the tongues to take up their correct position. Carefully open the hatch, bend the latch tongues 23 slightly to one side and apply cyano in the gap. Straighten them immediately, and allow the glue to set hard.

Fig. 09

Repeat the procedure with the canopy frame **5**. Check that the canopy **19** is an accurate fit on the canopy frame, place it on the fuselage, and fix the canopy to the frame using a few drops of glue. Let the glue harden, then lift off the canopy assembly and reinforce the joints with more glue.

Figs. 10 + 11

If you wish, you can cut down the canopy to form a simple windshield, transforming the "saloon" into an "open-top" machine.

10. Preparing the tailplane

Move the elevators to and fro to free up the hinges. Attach the swivel pushrod connector to the elevator horn, and glue it in the recess in the elevator 12. Secure the nut 27 on the pushrod connector 25 using a drop of glue.

Fig. 12

11. Gluing the tailplane to the fuselage

Place the tailplane **12** on the fuselage "dry" (no glue), and check that it is possible to set it exactly central and horizontal. Glue it in place using cyano, and pin it in the correct position before the glue sets.

Fig. 13

12. Preparing the fin

Move the rudder to and fro (about ten to twenty times) to free up the hinge.

Slip the wire tailwheel unit **68** through the glue-fitting tailwheel bracket **37**, fit it through the glue-fitting horn **36** and use a pair of combination pliers to bend the end over at 90° as close as possible to the horn, as shown in **Fig. 14**.

The horn **36** can now be glued to the rudder, <u>applying cyano only</u> <u>from the underside</u>. When the glue has set hard, cut a slot about

1.5 mm deep above the horn to accept the tailwheel wire.

Rotate the tailwheel wire **68** over the horn **36**, align the tailwheel unit, and glue the wire to the rudder using plenty of cyano.

Figs. 14 - 15

Mount the swivel pushrod connector on the rudder horn, and secure the nut with a drop of paint or glue.

Fig. 15

13. Glue the fin to the fuselage

Fig. 16

The tailwheel **69** can now be fitted: slip one wheel retainer (tubular rivet) **70** on the wire, followed by the wheel and the second retainer. Glue the retainers **70** to the wire using a drop of cyano.

Caution: apply small drops of glue on the tip of a small screwdriver or similar. Please don't glue the wheel to the axle!

Fig. 17

14. Preparing the cabane

Remove the cabane moulding 6 (L/R) from the moulding sprue. Glue the following parts together: 2×6 (cabane), 34 (glue-fitting screw sleeve) and 7 (cabane centre piece).

Fig. 18

15. Decals!

Before you carry out any more work, it makes sense to apply the decals to the wings, as access will never be as good again!

16. Completing the top wing

Glue the GRP spar **50** in the channel in the underside of the top wing **11**, after checking that the channel is the correct length; apply the glue to the full length of the spar. Take great care to keep the wing exactly flat and straight while the glue is curing. Release the ailerons by cutting along the marked lines at both ends. Free up the hinges by moving them to and fro repeatedly. Glue the cabane assembly **6** / **7** to the top wing.

Fig. 19

Trim the wing struts **10** and **9** to fit before gluing them to the underside of the top wing. Before reaching for the glue, check that you are fitting the left strut to the left wing (right to right), and that the struts are the right way up!

Figs. 20 + 21

17. Installing the aileron linkages

Glue the flat link horns **35** in the ailerons of the top wing **11**, with the small 1.6 mm Ø holes projecting.

Fig. 22

18. Completing the bottom wing

Mount the swivel connectors on the aileron horns **24** and glue them to the bottom ailerons. Repeat the procedure with the flat link horns **35**, but this time with the 2.5 mm \varnothing holes projecting; the swivel connectors for the aileron link pushrods are fitted in these holes.

Fig. 23

Install the servos and the aileron pushrods **30**, set the servos to centre from the transmitter, and adjust the linkages so that the ailerons are at neutral.

Fig. 24

19. Installing the main undercarriage retainer

The undercarriage retainer **66** is installed in the moulded-in recess in the bottom wing. Press it into place "dry" first, so that the projecting tongues are forced into the foam, then simply glue it in place with plenty of cyano. Glue the wing screw sleeve **34** in the recess in the bottom wing, again using cyano.

Fig. 25

20. Joining and completing the top and bottom wings

The wing struts can now be glued to the bottom wing.

Fig. 26

Connect the aileron link pushrods **54**, fit them through the swivel connectors at the bottom, and tighten the grubscrews. Check that all four ailerons are at neutral, then cut the bottom ailerons free (1 mm gap at both ends).

Fig. 27

21. Preparing the wheel spats (replacement part No. 22 4204)

Glue the holders for the wheel spats 65 into the right and left outer spat shells 16 / 17. Fit the collets 62 on both sides together with the 5 mm socket-head grubscrews 64. Join the wheel spats and glue the inner shells 14 / 15 to the outer shells 16 / 17 using cyano.

Fig. 28

22. Assembling and installing the main undercarriage

First check the wheel tracking as shown in the drawing, and correct it if necessary.

Fig. 29

Attach the inner collets **62**, and fit the wheels **61** together with the wheel spat assemblies. Align the parts and tighten the grubscrews **63** in the outer collets **62** to hold everything in place. Snap the wire undercarriage unit **60** in the plastic retainer, and secure it with the screw **67**.

23. Provisional final assembly

Gently widen the gap between the wings so that the fuselage fits between them, insert the fuselage, and connect the aileron servo leads. Gently prise the bottom wing away from the wing saddle, and thread the servo connectors into the fuselage. Fix the wings to the fuselage using the two plastic M5 screws **31**.

Figs. 30 + 31

24. Installing the motor

We recommend the use of the Gemini power set, Order No. 33 2634. Attach the motor to the motor bulkhead **40**; the end of the shaft should project beyond the face of the motor bulkhead by 10 mm.

Fig. 32

If the shaft projects more than this (for example, if you are using a different make of motor) you will need to add packing pieces behind the motor.

25. Attaching the motor bulkhead to the motor mounts

The motor sidethrust and downthrust can be altered by adjusting the motor mounts **39** relative to the motor bulkhead **40**. The motor mount is asymmetrical by nature; if the four adjustor screws **41** are fitted flush, the motor is installed with maximum sidethrust and no downthrust. We recommend the following base set-up; note that the motor bulkhead is viewed from behind (!).

Top left adjustor screw

Top right adjustor screw

Bottom left adjustor screw

Bottom right adjustor screw

0.5 mm = approx. 1 turn

The fuselage nose is designed to be sanded down to line up with the spinner, using sharp paper and a sanding block, but you should not do this until you have carefully determined the correct motor thrustline through test-flying, as this affects the position of the spinner.

26. Receiving system components

- 1. The motor is already installed
- 2. The speed controller fits behind the motor, suspended on its

cables

- 3. Install the 2100 mAh LiPo battery in the battery compartment aft of the motor, adjust its position to obtain the correct Centre of Gravity, then secure it with Velcro tape.
- 4. Stow the receiver and cables in the space below the cabin, and hold them in place with Velcro.

Velcro tape **20 + 21** is supplied in the kit to hold these parts in place.

27. Centre of Gravity

The CG should be borne in mind when you are installing the RC system components, to avoid the need for ballast as far as possible.

The CG should be within the range **75 mm** aft of the leading edge "nose" of the top wing. The moulded-in dimples adjacent to the cabane indicate the correct balance point.

Fig. 33

28. Initial test-run

All the radio control components are installed and connected. Check the base settings of the control surface travels and the direction of servo rotation. Ensure that the hinges are free-moving. Check the direction of rotation of the motor shaft, and reverse it if necessary.

29. Fitting the propeller

Assemble and install the propeller as shown in Fig. 32. The propeller driver 38 doubles up as the mounting for the EPP spinner 18

30. Model settings (guideline only):

CG: 75 mm (top wing) Longitudinal dihedral: top -1°, bottom +1°

Downthrust: 0°

Sidethrust: 2 - 4° (right)

31. Control surface travels:

Measured at the widest point of the control surfaces

Ailerons: 16/12 mm +/-Elevator: 12/10 mm +/-Rudder: 20 mm L/R

Exponential: ailerons 30%

32. Test-flying:

Centre of Gravity

Start by balancing the model within the stated range. Once you have test-flown the model, you can fine-tune the setting as follows: fly straight and level at half-throttle, and roll the model inverted. If you now have to apply a great deal of "down" to hold level flight, the model is nose-heavy; the CG must be shifted further aft. If the machine climbs whilst inverted, without requiring elevator correction, the CG is too far aft. When balanced correctly, the model will require slight down-elevator for level inverted flight.

Correcting straight and level flight:

First the static balance: support the model by the spinner and the rudder: with the fuselage level, the wings should remain horizontal. If not, add ballast to the lighter wingtips.

On the next flight, fly the aeroplane at minimum throttle (just enough power to keep the model in the air), keep it straight and level, and adjust the trims for straight flight. Now switch to inverted and check the straight flying characteristics. If necessary, adjust the wingtip ballast after landing the model.

Sidethrust:

Apply full throttle and fly the model straight and level past yourself before pulling up into a vertical climb. When ascending vertically the model should not exhibit any tendency to veer off to right or left. If this is not the case, adjust the sidethrust to correct the fault. Repeat the test several times, as any sidewind will tend to falsify the model's track.

Downthrust:

Apply full throttle and fly the model straight and level until it is level with you, so that you have a clear view of the model from one side. Pull the aircraft up into a vertical climb: it should continue to climb vertically, and not fall away forward or back. If this is not the case, adjust the motor downthrust to correct the fault.

After these tests you may find it necessary to repeat the CG tests.

Aileron differential:

Fly three or four rolls to the right at half-throttle; if the Gemini veers to the right during this manoeuvre, you need to increase the aileron differential. If it veers to the left, i.e. against the direction of rolling, you should reduce the aileron differential.

33. Gilding the lily - applying the decals

The kit is supplied with a multi-colour decal sheet, part 1. Cut out the individual name placards and emblems and apply them to the model in the positions shown in the kit box illustration, or in another arrangement which you find pleasing.

34. 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 for the type of model (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 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.

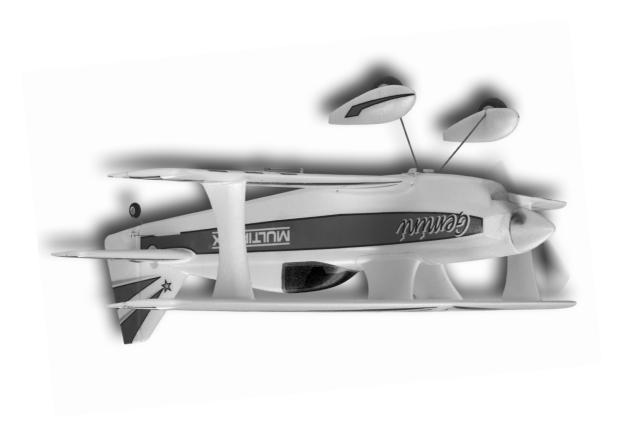
Always fly with a responsible attitude. You may think that flying low over other people's heads is proof of your piloting skill; others know better. The real expert does not need to prove himself in such childish ways. Let other pilots know that this is what you think too. Always fly in such a way that 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.

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.

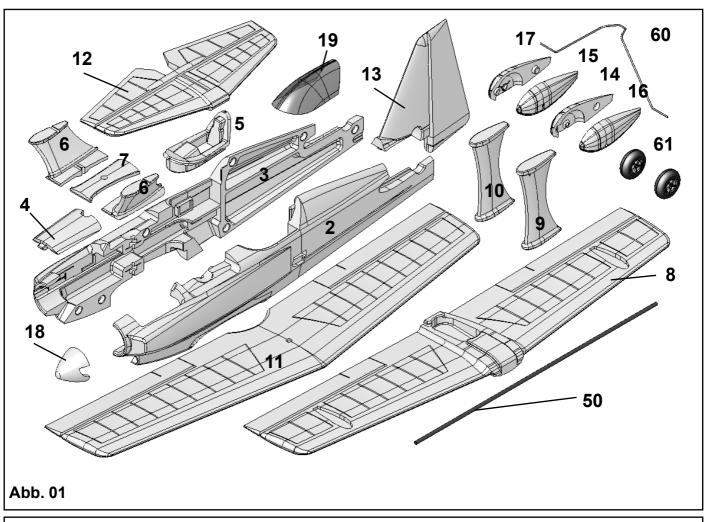
Klaus Michler

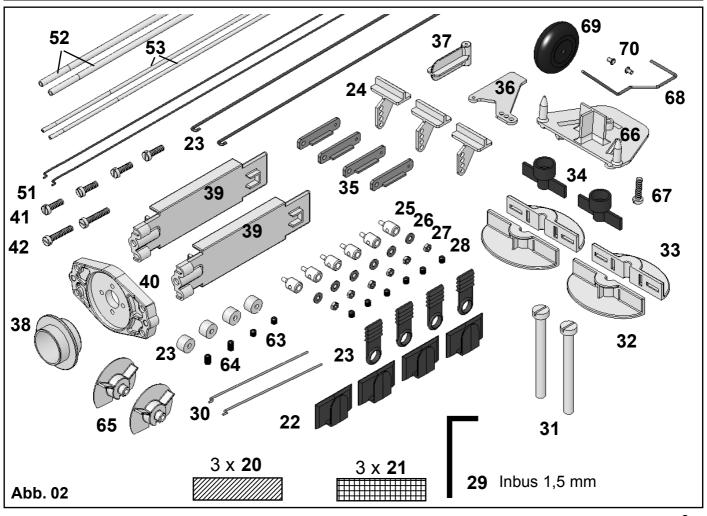
Part No.	No of	•	Material	Dimensions
	1	KIT building instructions	Paper, 80 g / m²	A4
	1	Decal sheet	Printed self-adhesive film	700 x 1000 mm
	1	L.H. fuselage shell	Moulded Elapor foam	Ready made
	1	R.H. fuselage shell	Moulded Elapor foam	Ready made
4	1	Front fuselage hatch	Moulded Elapor foam	Ready made
	1	Canopy frame	Moulded Elapor foam	Ready made
6	1	L.H. / R.H. cabane	Moulded Elapor foam	Ready made
	1	Cabane centre piece	Moulded Elapor foam	Ready made
8	1	Bottom wing	Moulded Elapor foam	Ready made
9	1	L.H. wing strut	Moulded Elapor foam	Ready made
	1	R.H. wing strut	Moulded Elapor foam	Ready made
	1	Top wing	Moulded Elapor foam	Ready made
	1	Tailplane	Moulded Elapor foam	Ready made
-	1	Fin	Moulded Elapor foam	Ready made
	1	Left inner wheel spat	Moulded Elapor foam	Ready made
	1	Right inner wheel spat	Moulded Elapor foam	Ready made
	1	Left outer wheel spat	Moulded Elapor foam	Ready made
	1	Right outer wheel spat	Moulded Elapor foam	Ready made
	1	Spinner	Moulded Elapor foam	Ready made, 62 Ø
19	1	Canopy	Vac. moulded plastic	Ready made
	II pa 3	rts set	Plastic	25 x 60 mm
	3	Velcro tape, hook	Plastic	25 x 60 mm
	4	Velcro tap, loop Latch catch	Injection-moulded plastic	
	4	Latch tongue	Injection-moulded plastic	Ready made Ready made
	3	Glue-fitting control surface horn	Injection-moulded plastic	Ready made
	6	Swivel pushrod connector	Metal	Ready made, 6 mm Ø
	6	Washer	Metal	M2
	6	Nut	Metal	M2
	8	Socket-head grubscrew	Metal	M3 x 3 mm
	1	Allen key	Metal	1.5 mm A/F
	2	Aileron pushrod, one Z-bend	Metal	1 Ø x 70 mm
	2	Wing screw	Plastic	M5 x 50 mm
	2	Wing screw support A	Injection-moulded plastic	Ready made, M5
	2	Wing screw support B	Injection-moulded plastic	Ready made, M5
	2	Glue-fitting sleeve for M5 screw	Injection-moulded plastic	Ready made
	4	Glue-fitting link horn, flat, 1.3 Ø + 2.5 Ø	Injection-moulded plastic	Ready made
	1	Glue-fitting tailwheel horn	Injection-moulded plastic	Ready made
	1	Glue-fitting tailwheel bracket	Injection-moulded plastic	Ready made
38	1	Spinner holder	Injection-moulded plastic	Ready made
	2	Motor mount	Injection-moulded plastic	Ready made
	1	Motor bulkhead	Injection-moulded plastic	Ready made
	4	Adjustor screw, motor bulkhead mounting	Metal	M3 x 10 mm
	2	Motor bulkhead mounting screw	Metal	M3 x 16 mm
		tube set		
	1	Tubular spar	GRP tube	6 Ø x 3.4 Ø x 575 mm
	2	Steel pushrod, elevator + rudder, one Z-bend	Metal	0.8 Ø x 355 mm
	2	Snake outer sleeve, elevator + rudder	Plastic	3 Ø x 2 Ø x 300 mm
	2	Snake inner sleeve, elevator + rudder	Plastic	2 Ø x 1 Ø x 320 mm
54	2	Aileron link pushrod	Metal	1.3 Ø x 185 mm
		rriage set	Chring stool	25 Ø roody mode
	1	Main undercarriage	Spring steel	2.5 Ø, ready made
	2	Lightweight wheel	Plastic, EPP	53 Ø, hub bore 2.6
	4	Collet	Metal Metal	2.7 Ø x 8 Ø x 5 mm
	2	Socket-head grubscrew	Metal Metal	M3 x 3 mm
	2	Socket-head grubscrew	Metal	M3 x 5 mm
	2	Wheel spat holder	Plastic	Ready made
	1	Undercarriage retainer	Plastic Motal	Ready made
	1	Screw	Metal Metal	M3 x 12 mm
	1	Tailwheel unit	Metal	1.3 mm Ø
	1	Lightweight tailwheel Tailwheel retainer (tubular rivet)	Foam rubber Metal	26 mm Ø A2.0 x 0.2 x 3
10	_	ranwheet retainet (tubulat fivet)	IVICIAI	M2.U X U.Z X 3

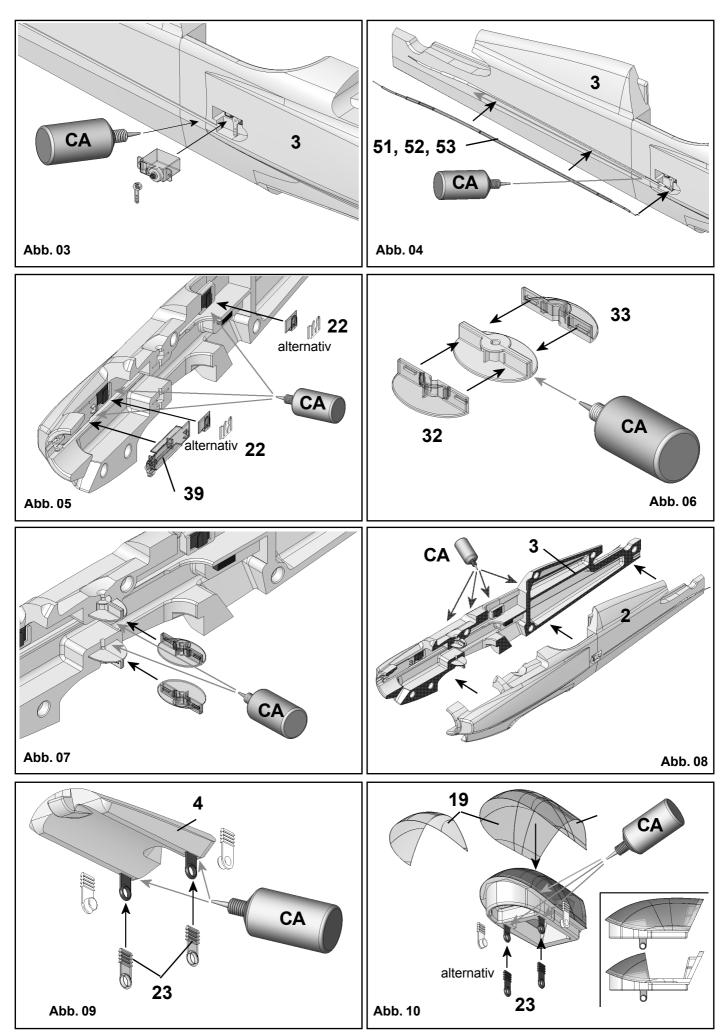


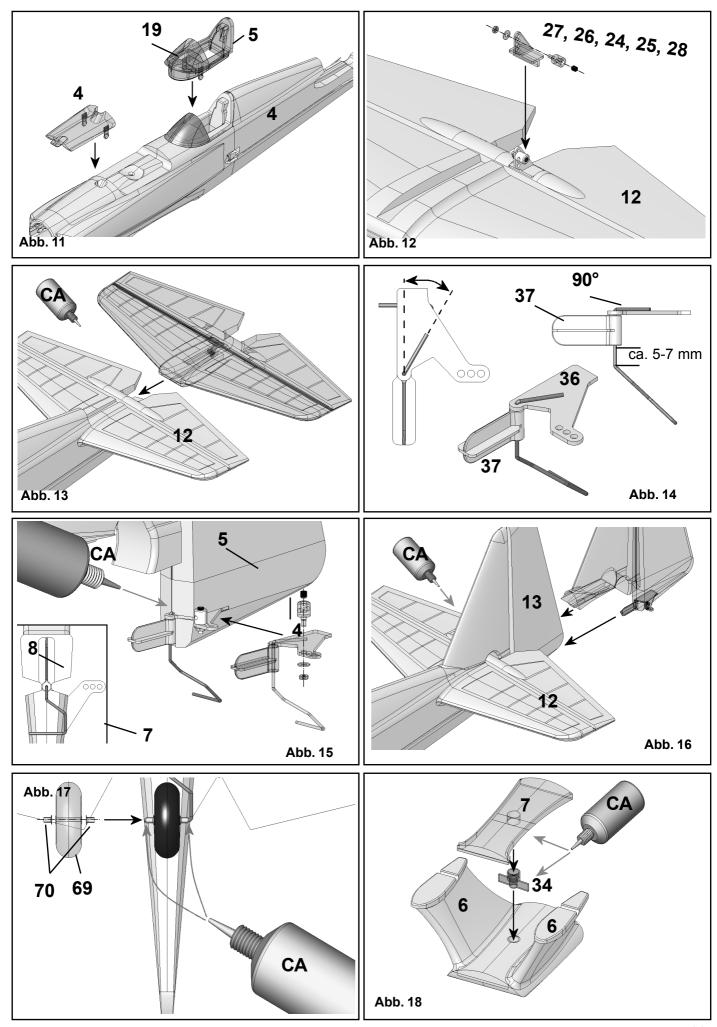
Gemínú

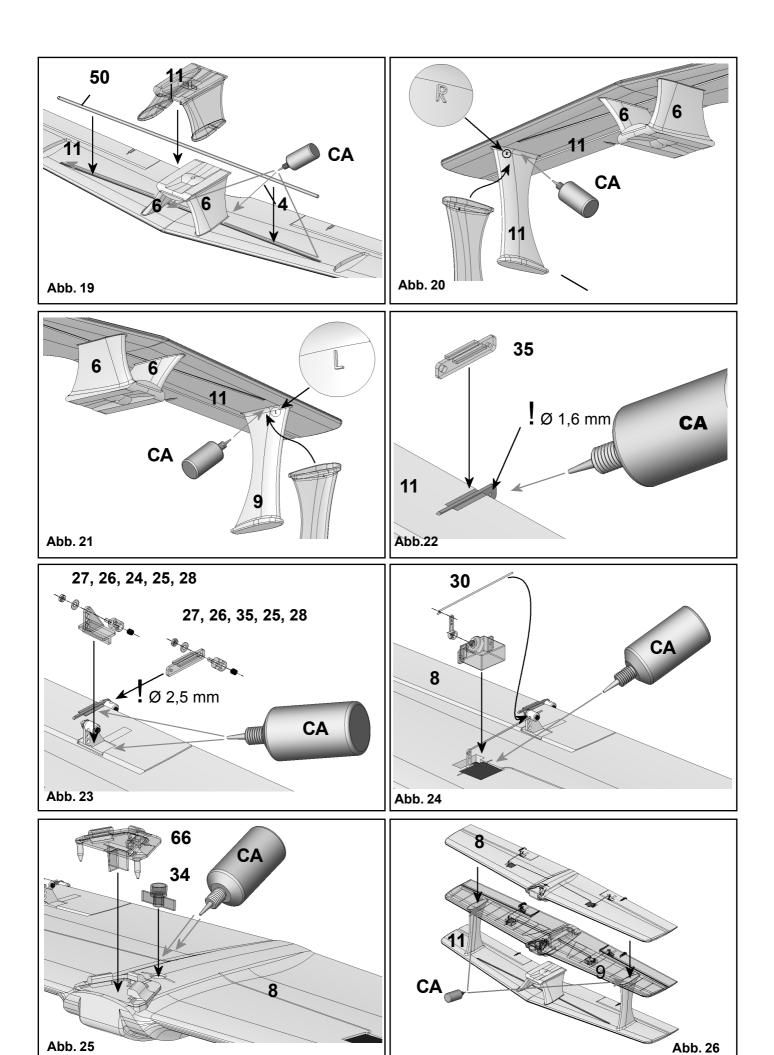


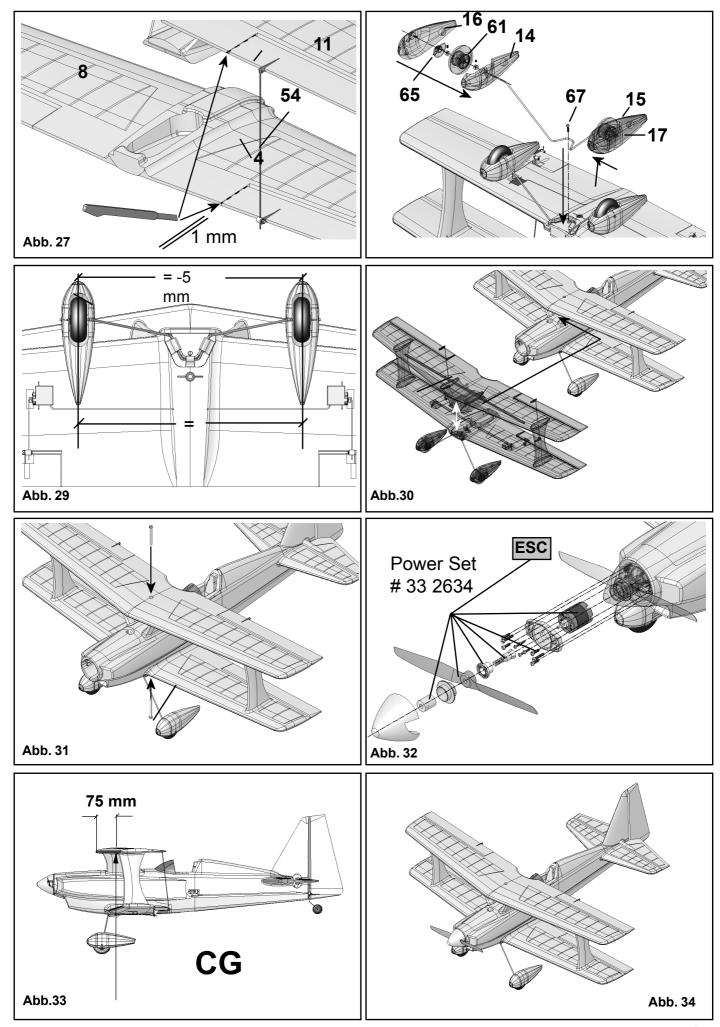










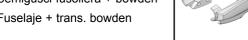


ERSATZTEILE REPLACEMENT PARTS PIECES DE RECHANGES PARTI DI RICAMBIO REPUESTOS

(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, diríjase a su distribuidor)

22 4214

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



22 4215

Kabinenh.+ Rahmen+Deckel Canopy + frame + top decking Verrière + support de verriére+ capot moteur

Capottina + telaio + coperchio fusoliera

Cabina +marco + tapa del fuselaje



Tragflächen Wings Ailes

Semiali

Alas

22 4216

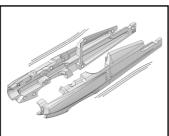
Tragflächen-Streben Wing struts Haubans Montanti alari Riostras

22 4218

Seiten- u. Höhenleitwerk Tail set Empennage Piani di coda Kit de timones

22 4219

Kleinteilesatz Small items set Petit nécessaire Minuteria Piezas pequeñas



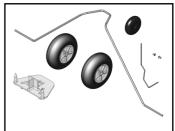
70 3455

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



22 4206

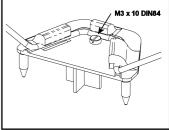
Fahrwerkssatz mit Rädern Undercarriage set with wheels Train d'atterrissage avec roues Kit carrello con ruote Kit del tren de aterrizaje, con ruedas



72 3135

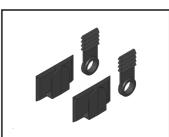
Fahrwerkshalter mit Schraube Undercarriage retainer and screw

Support de train, avec vis Supporto carrello con vite Soporte del tren con tornillos



72 5136

Canopy-Lock (2 Paar) Canopy-Lock (2 paires) Canopy Lock (2 pairs) Canopy-Lock (2 coppie) Cierre de cabina (2 pares)



72 3185

Holmrohr Tubular spar Clé d'aile Tubo baionetta Larguero

