

## Assembly Instructions

### F9F Panther

RC-Electric  
Part-Nr. 1354/00



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#### Specification

|                            |   |
|----------------------------|---|
| Wingspan                   | 1090 mm                                   |
| Length                     | 1090 mm                                   |
| Total surface area         | 17.4 dm <sup>2</sup>                      |
| All-up weight              | 1800 - 2200 g (depending on power system) |
| Total surface area loading | 103.5 – 126.5 g/dm <sup>2</sup>           |

#### RC functions

Aileron, elevator, motor

#### Replacement parts

|                                  |                   |
|----------------------------------|-------------------|
| GRP fuselage                     | Order No. 1354/02 |
| Canopy                           | Order No. 1354/04 |
| GRP wing set                     | Order No. 1354/05 |
| GRP tailplane                    | Order No. 1354/09 |
| GRP fin                          | Order No. 1354/10 |
| Acrylic spray paint, Saturn blue | Order No. 7684/06 |

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**Power system**

The model is designed for the Turbo-Fan 1000 impeller Order No. 7249/51.

Other impellers can be installed at the builder's discretion. In this case you will need to make a mounting ring for the impeller; this is best cut from GRP sheet, with an opening the size of the impeller's outside diameter. Glue the mounting ring to the impeller, flush at the front, and screw it to the motor bulkheads (13) at the rear.

**We recommend the following motors:**

|                 |                        |
|-----------------|------------------------|
| Fun 500-21      | (14 cells)             |
| Fun 500-19      | (16 cells)             |
| Hacker B5018S   | (14 cells)             |
| HP 220/20 A3P6  | (14 – 16 cells)        |
| HP 220/30 A4SP4 | (18 –21 cells CP 1700) |
| LMT Basic 2400  | (12 cells)             |
| LMT 1930-12     | (14 – 16 cells)        |
| LMT 1930-16     | (20 cells CP 1700)     |

We strongly recommend the use of laminating resin as an adhesive. This material penetrates into the smallest gaps, and produces really strong joints. You will need to add a thixotropic (thickening) agent to the resin for some joints. Roughen all joint areas of the fuselage with abrasive paper beforehand. When gluing to a pigmented surface, the colour layer must be completely sanded away. Be sure to use slow-setting resin for all joints involving the GRP components. Do **not** use 5-minute epoxy.

The drawing shows the die-cut parts at reduced scale. Identify the components and write the part numbers on them using a soft pencil. Separate them from the die-cut sheets using a balsa knife and a saw where necessary. Trim all parts as required before gluing them in place.

You may wish to deviate from the sequence of assembly described in these instructions. This is left entirely to the builder's discretion.

**Fuselage**

- The air ducts must be glued to the outside of the fuselage using laminating resin. Thicken the resin with thixotropic filler (thickener) to achieve a smooth transition to the air intake.
- Glue the reinforcements (15) in the front section of the fuselage (1) as shown on the plan. Drill a 4 mm Ø hole at an angle through the fuselage and reinforcement, as shown on the plan, and glue the brass tube (14) in it. Parts (14 + 15) assume that the model will be launched by the ROG (rise off ground) method. If you prefer catapult launching, parts (14 + 15) must be re-positioned further aft at the builder's discretion.
- The formers are already bonded into the fuselage, but it is important to check that the joints are really strong. Reinforce them with more resin if necessary.
- The half-former (5) has to be glued in the rear fuselage section to provide additional reinforcement.

**Tail**

- The slot for the tailplane must be cut out accurately. This is done by applying the film templates [9] on both sides of the fin. Cut along the lines using a diamond cutting disc, and continue the cut backwards for about 15 mm to allow the tailplane to be slid into place.
- Cut the openings in both sides of the fin for the elevator pushrods (threaded rods (19)).
- The elevator servo is mounted on a plywood plate (7) which is glued in the fin.
- Glue the dowels (11) in the front fin former; this is the locating piece for the joint with the motor bulkhead.
- Cut slots for the horns (22) in the elevators using a cutting disc. Don't glue the horns in place at this stage.
- Cover the tailplane in protective film and slide it through the opening in the fin, taking care not to scratch the surface. Glue the tailplane in place.
- Glue the horns in the elevators.
- The reinforcements (4) can now be glued in the fin; they provide strength for the screw fixing to the fuselage. Drill a hole for the M3 screw through the fuselage (1), the fin (2) and the reinforcements (4). Open up the hole in the fin and the reinforcements (4) to accept the M3 captive nut (24), and glue the captive nut in place.
- The fin is fixed to the fuselage using an M3 screw. Before you fit the screw glue the washer (25) over the hole in the fuselage (1) to reinforce the area.

## Wings

- Apply the film templates [7] to the underside of the wings, and open up the servo openings by cutting along the white line. Keep the panels you remove, as they are later fitted to the wings as servo well covers, held in place by the decals [8].
- The aileron servos can now be installed in the wings (6). Each is glued to a plywood plate (7) which also reinforces the area.
- Cut the horn slots in the ailerons using a cutting disc, and glue the aileron horns (22) in the slots.
- Connect the servos to the aileron horns using the threaded pushrods (19), the clevises and the locknuts (21).
- Cut a slot in the servo well cover (removed from the wing) to clear the servo output arm. Connect the threaded pushrod, and cover the servo well with the decal [8].
- Attach the white sealing pieces (20) to the wingtips.
- The wings should be secured to the fuselage with adhesive tape before flying.

## Cockpit and canopy

- Cut out the canopy (8) using scissors, and trim it carefully to fit on the fuselage.
- Place the canopy over the cockpit moulding (9) and align the parts accurately. Mark the line of the canopy on the cockpit, and cut along the marked line.
- Draw a flange 2 mm wide round the pilot's seat (10), cut along the line and glue the seat in the cockpit.
- Paint the cockpit black, the seat padding dull brown, and the gas bottles red.
- Glue the canopy retainer dowel (11) to the underside of the cockpit at the front, and drill a matching hole in the fuselage.
- Check that the canopy latch (12) fits in the cockpit moulding (9) and canopy (8), and glue it in place. Drill a matching hole in the fuselage.

## Impeller + nozzle

- Glue the mounting ring of the Turbofan 1000 to the casing ring of the impeller, flush at the front. Apply glass tape (26) between the three holes as far as the stators to reinforce the joint.
- Glue the centre walls of the air ducts together. You will need to cut away the centre walls slightly in a rounded shape to clear the rotor of the Turbofan 1000.
- Push the impeller casing ring over the air duct, and screw it to the motor bulkhead. The M3 nuts for this are already in place.
- With the impeller screwed to the motor bulkhead, the nozzle (13) can be cut out of the plastic sheet and formed into a tapered tube using the marked line as a guide. Tape the edges together.
- Slide the nozzle into the fuselage, and fix it to the rear of the impeller using adhesive tape.

## Decals

Apply the decals to the model as shown in the illustration above. The white stripes on the decal sheet (18) are numbered. Stripe No. 6 has to be assembled from several pieces.

## Parts list

|     |                             |   |                   |                     |
|-----|-----------------------------|---|-------------------|---------------------|
| 1.  | Fuselage                    | 1 | GRP               | Ready made          |
| 2.  | Fin                         | 1 | GRP               | Ready made          |
| 3.  | Tailplane                   | 1 | GRP               | Ready made          |
| 4.  | Fin reinforcement           | 2 | Plywood, 2 mm     | Die-cut             |
| 5.  | Reinforcing former          | 1 | Plywood, 2 mm     | Die-cut             |
| 6.  | Wing                        | 2 | GRP, left + right | Ready made          |
| 7.  | Servo plate                 | 3 | Plywood, 2 mm     | Die-cut             |
| 8.  | Canopy                      | 1 | ABS               | Ready made          |
| 9.  | Cockpit                     | 1 | ABS               | Ready made          |
| 10. | Pilot's seat                | 1 | ABS               | Ready made          |
| 11. | Dowel                       | 2 | Beech dowel       | 5 Ø x 25 mm         |
| 12. | Canopy latch                | 1 | Metal             | Ready made, 7329/00 |
| 13. | Nozzle                      | 1 | Plastic sheet     | Printed             |
| 14. | Launch sleeve               | 1 | Brass             | Tube, 4 I.D. x 25mm |
| 15. | Launch sleeve reinforcement | 2 | Plywood, 2 mm     | Die-cut             |
| 16. | Decal sheet 1               | 1 | Printed           | Self-adhesive film  |
| 17. | Decal sheet 1 (correction)  | 1 | Printed           | Self-adhesive film  |

|     |                       |   |         |                        |
|-----|-----------------------|---|---------|------------------------|
| 18. | Decal sheet 2         | 1 | Printed | Self-adhesive film     |
| 19. | M2 threaded rod       | 4 | Metal   | Ready made, 7488/04    |
| 20. | Wingtip sealing piece | 2 | GRP     | Ready made             |
| 21. | M2 clevis + M2 nut    | 4 | Metal   | Ready, 7489/01+7774/01 |
| 22. | Horn                  | 4 | GRP     | Ready made, ???        |
| 23. | M3 captive nut        | 1 | Metal   | 7766/03                |
| 24. | Screw                 | 4 | Metal   | M3 x 10 mm, 7775/10    |
| 25. | Washer                | 1 | Metal   | 7780/23                |

## Operating instructions - Panther

### Control surfaces

The Panther requires at least three control functions: ailerons, elevator and motor speed. A working rudder can also be fitted at the builder's discretion. Note that the model's flying characteristics depend to a very great extent on correct control surface travels.

**Elevator:** Apply 1 to 1.5 mm down-trim,  
From this setting: 5 mm up, 4 mm down.

**Ailerons:** 6 mm up, 3 mm down.

On no account set larger travels, especially for the first few flights, otherwise the model will be distinctly "twitchy".

### Centre of Gravity

The Centre of Gravity **must be set exactly correctly**: it should be 66 to 67 mm aft of the leading edge of the wing (6), at the level of the wing joiner.

### Test-flying

Ducted-fan models are no more difficult to fly than models with a propeller. In fact, the power plant concealed inside the fuselage has a number of pleasant features. For example, impellers generate virtually zero torque effects, unlike a conventional propeller. They have practically no influence on the model's movements around the longitudinal (roll) axis, and generate absolutely zero turbulence in the area close to the fuselage. Admittedly there is a drawback to this characteristic: the control surfaces have almost no effect at launch time. For this reason the model should not be hand-launched.

The safest method of launching has proved to be a rubber cord, as sold by model shops as bungee rubber. This gives the Panther the necessary initial acceleration. A 7 - 10 m length of rubber around 8 mm<sup>2</sup> in cross-section is sufficient. If the cord is thinner, use more than one strand. Attach a thin nylon line about 10 to 15 metres long to the end of the rubber.

The rubber cord should now be anchored to the ground by means of a strong tent peg. The end of the nylon line should be fitted with a 3 mm Ø steel pin which engages in the launch sleeve (14), as shown on the plan. The pin must be a very easy sliding fit (clearance fit) in the sleeve to ensure that the launch pin disengages automatically at the right moment.

To launch the model the rubber should be stretched to 2.5 to 3 times its slack length. Place the Panther on the ground - the grass should be **as closely mown as possible** - and hold the tail end of the fuselage securely. Check all the working systems and give the all-clear, then you are ready to launch. If the catapult is powerful enough we recommend that you do not switch on the motor until the model is already in the air. This eliminates the potential problem of the fan sucking in foreign bodies when on the ground. For the first launch the best method has proved to be an aero-tow using a tow release; this can be removed again after test-flying.

Usually the Panther is airborne after just a few metres, and will take up a straight climb provided that the CG is correct and the control surfaces are trimmed as stated. The climb angle depends primarily on the thrust of the power system. We strongly advise you not to force the model to climb strongly immediately after launch, as ducted fans by their nature only reach high levels of efficiency at high airspeeds. Only when the model has reached a safe altitude in a long straight climb, or a broad turn, should any necessary trim corrections be carried out.

It is perfectly normal for impeller jets not to reach their natural airspeed until they are flying straight and level, or have completed the first reversal. It is up to the pilot to maintain this high speed as far as possible through

an appropriate flying style. The secret of smooth, scale-like jet flying is a fluid, wide-ranging piloting style without unnecessary loss of speed. This is the most efficient method, and produces the longest flight times.

Naturally the Panther is capable of **simple** aerobatics, such as rolls and loops, but abrupt manoeuvres such as snap rolls, sudden climbs and similar should not be attempted. If your ducted fan system is not particularly powerful you should ensure that the model has plenty of speed before you try any manoeuvres.

At landing time we recommend that you fly a broad approach, maintaining adequate speed. For the first flight it certainly does no harm to keep enough charge in the flight pack to allow an overshoot and second approach. However, do bear in mind that an impeller power system's ability to accelerate from low speed (i.e. shortly before touch-down) is not exactly its strong point!

And do take care: once the model is on the ground, don't switch on the motor again until you have checked that there are no foreign bodies in the air intake.

Wish you loads of fun with your Panther!

