

Fokker E-III

German 1915 fighter



Assembly Manual
for ARF stand-off scale model
in 1:5 scale.
Historical data and presentation.
Model design and construction drawing by
Göran Kalderén ©



Fokker E-III

Fokker E-III is one of the most historically significant German combat aircraft of World War I. The E-III, sometimes referred to as the "Eindecker" ('one wing'), deserves a significant place in aviation history not necessarily because of its aerial prowess, but because it was the first combat aircraft in the world to be equipped with a forward-firing, fixed machine gun synchronized to fire between the propeller blades.

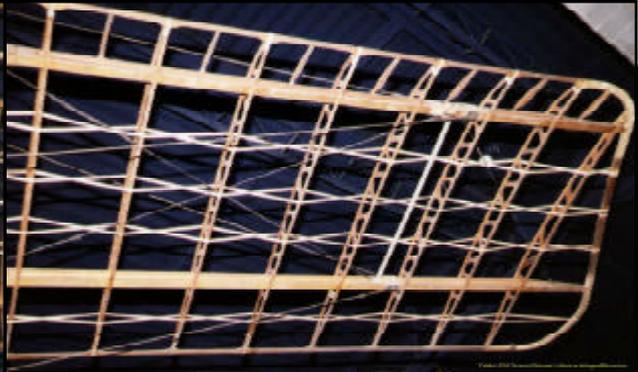
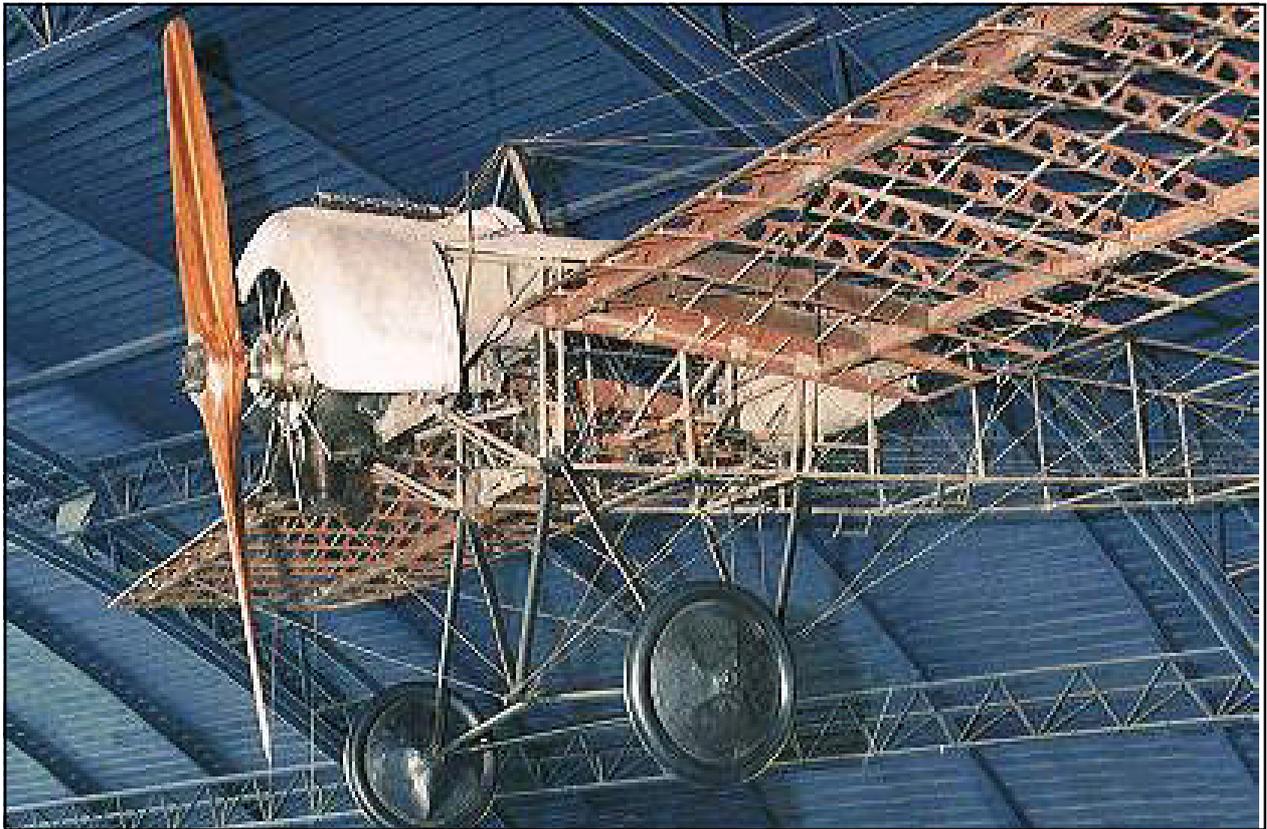
The E.III was the third and most important permutation of the original monoplane Fokker family. Being a small but important step forward in the evolution of the fighter, it is important to note this aircraft used wing warping for roll control, rather than the "more advanced" aileron flight control system.

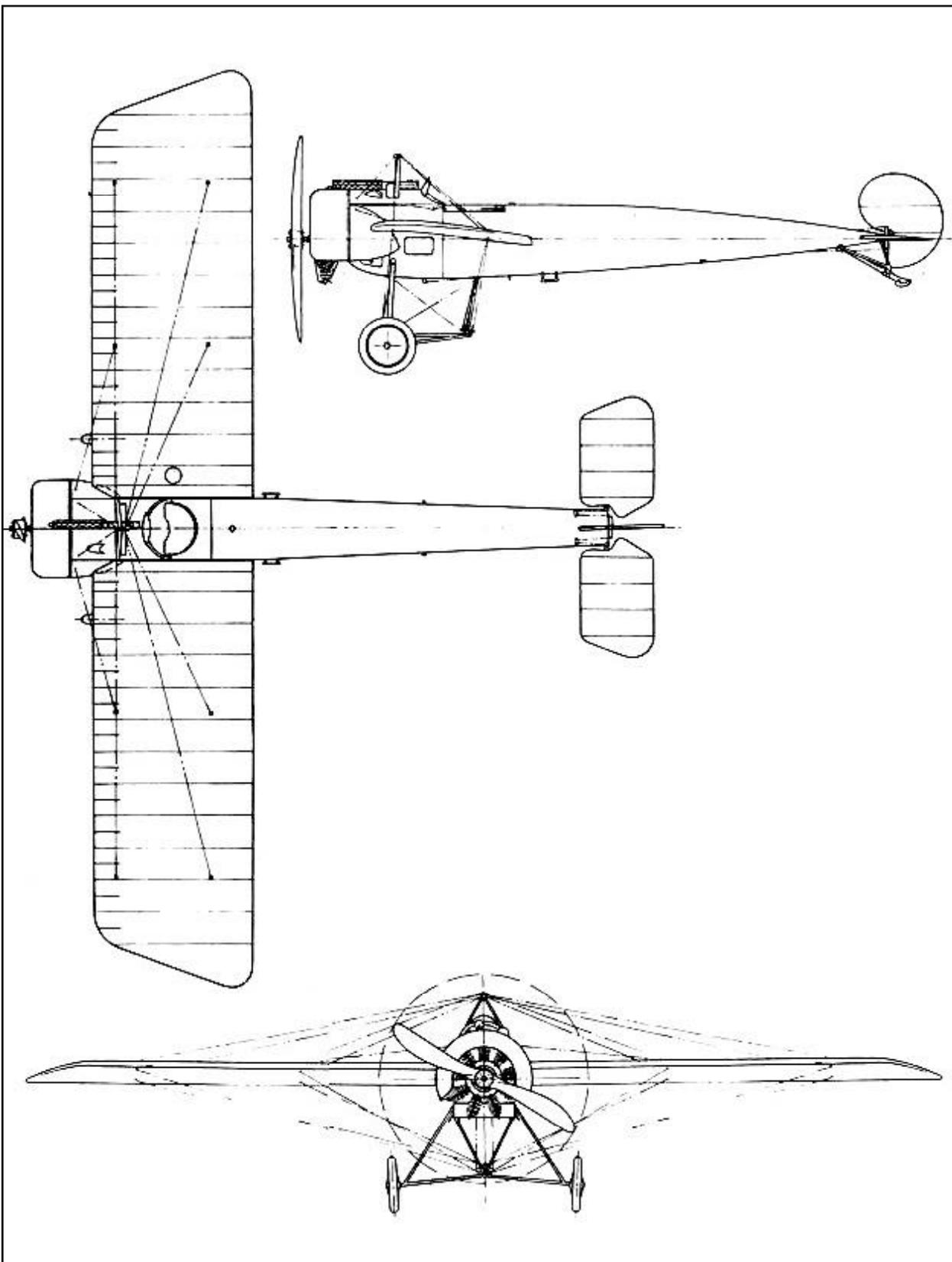
The only surviving aircraft is displayed in Science Museum in London. There are a number of replicas of which we show pictures of some.

The Champlin Collection's Fokker E-III

replica aircraft was built during 1981. It is extremely accurate in virtually every detail. It is equipped with an authentic World War I-vintage Oberursel rotary engine and an authentic Spandau machine gun offset to the starboard side of the forward engine cowling.







Specification

Manufacturer: Fokker Flugzeugbau

Model: E.III

Year: 1915

Wingspan: 30' 10.5" (9.41m)

Length: 23' 11.25" (7.3 m)

Height: 9' 1.75" (2.79 m)

Wing Area: 172.8 square feet

Engine: Oberursel UI 9-cylinder air-cooled rotary, 100 hp

Empty Weight: 878 pounds

Weight (Gross): 1,342 lbs. (610 kg)

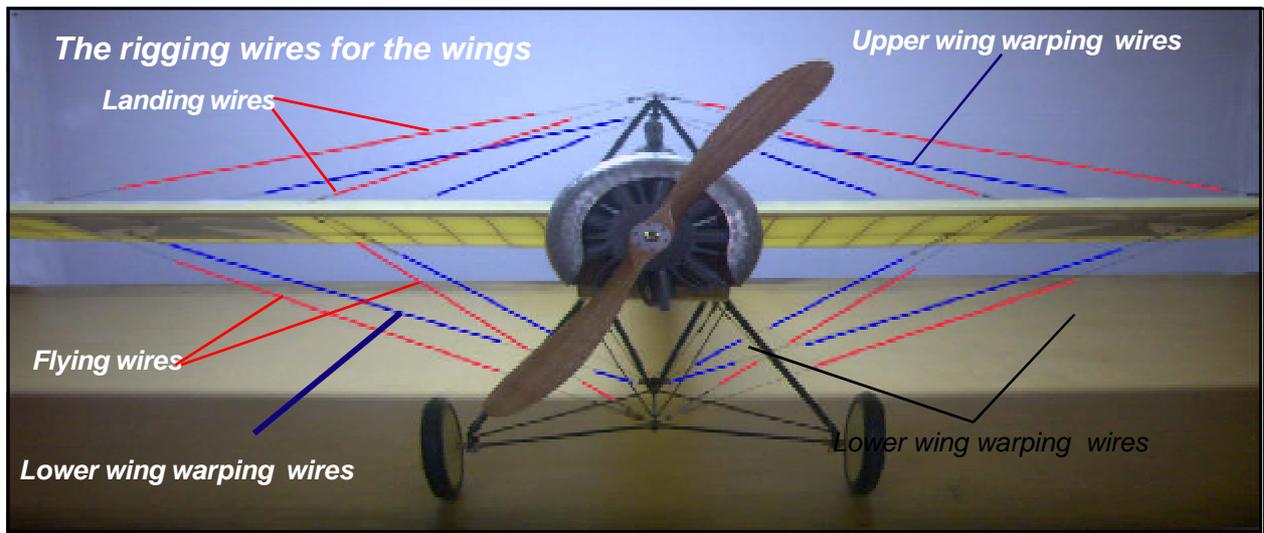
Speed: 87.5 mph (140 km/h) at sea level

Ceiling: 11,483 ft. (3,500 m)

Max. Range: 1.5 hours

Armament: 1 fixed 7.92mm Spandau machine gun

Crew: 1



Fokker E III

German fighter from the early part of World War I. Entering service in spring 1915, it was a development of the french Morane Saulnier type H.

The engine was an Oberursel 90 hp., licence built in Steyer Germany and based on the french LeRhône rotary engine.

By all accounts it was not a difficult machine to fly, it was modestly aerobatic and had a top speed of around 80 m.p.h. Wing warping was used in preference to ailerons and the airframe design was light and economically designed. Without the single forward firing machine gun it would probably have been regarded as just an average fighting machine but, with the advantage of one of the first to use this device it became a deadly killer in the hands of a skilful pilot.

The Model

We have chosen the scale of 1:5 rendering a model size that is easy to fly but also relatively easy to transport. Both wing panels can be removed for transportation which gives very limited requirement for transportation size. With a .60 2-stroke engine the airplane is capable of all the manouvers in the book but still as docile as you can demand from an early fighter. The moment arms are short and the rudders sensitive so fly, if you can, with a dual rate transmitter.

The finished model is painted in 1914 livery and further detailing can be made as per documentation.

Specs:	Wingspan	180 cm
	Length	138 cm
	Weight	3,9 kgs
	Engine	10 cc 2-stroke

You have received this model ARF, that means all the pleasant work is left to be done by you.

Covering and finish

The model is covered with Solartex Antique and painted where applicable with black enamel. You may desire to add patina and give the entire model a coat of varnish to render the proper finish. The original aeroplane was covered with cotton fabric and coated several times with dope. This gave a translucent, very glossy finish.

The insignia (crosses on the wing upper and under sides) are painted with enamel. Same paint is used on the fuselage and rudder.

The black striping along the fuselage on some models is a 12 mm black cotton ribbon, glued to the fabric. This ribbon covers the stitching of the fabric to the fuselage. See further on page 5 for more finishing details.

Scale propeller

There is a scale propeller provided for static display (Not for flying)

Radio installation

The upper tray is intended for the receiver, the battery and the switch. Make compartments on the tray to suit your equipment. The lower tray is the servo tray, located side by side with the fuel tank. Push-rods are attached to the servo arms with quick-links and to the throttle, the joy stick and the rudder bar with ball links to allow maximum freedom of movement. When installed, lock the trays with small screws in the rails. Make sure to run the aerial away from or parallel with the wires! You can let it hang out from below and hook it to the tail skid

Start with installing the servos. The wing warping servo goes into the brackets in the lower

part of the fuselage. Wires are led from the servo arm straight down to the arms of the wing warping actuator. Stretch the wires and lock.

The remaining servos are installed in the servo tray and note that the tray is inverted!

Next is the servo for the throttle. Connect the wire arm to the servo and through the fire wall to the arm on the throttle with a ball link. Make sure that is working freely.

Elevator servo is connected to the joy stick, also with a ball link on the joy stick.

Rudder servo is connected in the same fashion to the rudder bar.

The upper tray contains the receiver and the battery pack. The switch can be mounted on the dash board or hidden under the cowl on the upper tray and actuated by a push-rod protruding into the cockpit.

Installation of engine.

The engine mounts have been installed in a unusual fashion for several reasons.

The need for adequate cooling. The access to the glow plug without hoe in the cowl and finally to get the carburator in line with the center of the tank.

1. Remove the engine mounts and drill and tap the holes for the engine. Place the engine as close to the fire wall as possible. If you have to relocate the engine mounts, you can do so and the blind nuts are not secured with glue. Should you desire to install a 4-stroke engine you may have to make an opening in the firewall for the carburator and a small "box" so that no fuel spreads into the fuselage. On the full size plane, the carburator is located between the two air intake tubes!

2. Drill the holes from the tank to the carburator, pressure tap and the filling cap.

3. Install the engine and connect the throttle servo.

4. Make cut outs in the dummy engine so that this will fit in front of your engine. You may have to remove 1 complete cylinder to allow for the cooling air to pass the engine head. This "surgery" is executed by removing a little at the time and checking. When you are satisfied with the fit and openings, screw the dummy engine onto the engine mounts using 3 mm screws and washers.

5. Reinstall the engine cowl using 3 #2 sheet metal screws.

Installation of servos, tank, battery and receiver.

The **aileron servo** is installed in the lower part of the fuselage

The **trottle servo** and the **rudder servo** are installed in the servo tray. The **tank** is positioned at the side of these servos.

The **elevator servo** is installed inverted in the tray.

Battry pack and **receiver** are positioned in the upper tray.

The **switch** is mounted on the dash board.

1. Attach a ball link head to joystick and rudder bar in the appropriate holes. You may have to enlarge the holes to take the screw from the ball link (Dubro #189 set of 2).

2. Install the servos for rudder and elevator and temporarily connect the servo arms to the ball links. Deflection for elevator is 20° up and down and for rudder 30° right and left..

3. Install and connect the throttle servo in the fashion you prefer.

4. Install the tank in the available space in front of the rudder and throttle servos..

5. Install the aileron servo in the lower wing using servo tape. The servo arm attaches to the Kwick-link already installed on the aileron connection rod. Deflection should be 20° up and down.

6. Fasten the upper servo tray and make the final connections.

7. Install the radio switch on the dash board.

8. Place the receiver and the battery pack in the upper tray, wrapped in foam rubber and secure with rubber bands.

Assembly of the Fokker E III

All parts have been assembled at the factory and only disassembled for transportation.

Rudder and elevator wires are factory adjusted but may need some tensioning adjustment after a while.

1. Fasten the elevator to the fuselage with 4 screws supplied. Slide the upper elevator wires through the holes in the fuselage and attach to the upper elevator horns.

2. Install the rudder assy by inserting the music wire the hole in the rudder and secure with a stopper screw in the tail skid assy.

3. Attach the lower elevator wires and the rudder wires. The upper set of wires are for the rudder. Check the action of elevator and rudder. The elevator is actuated with the joy-stick and the rudder with the rudder bar.

4. Push the wing halves into the holes in the fuselage.

5. Attach the upper wing wires by inserting the screws in the upper pylon and securing them with the 2 mm nuts. Install the lower (flying) wires and secure the kwick-links.

6. Install the upper wing warping wires and make sure that they run freely through the pulley. Now attach the lower wing warping wires and make sure that they make half a loop on the pulley. Check the wing warping with the warping actuator.

7. Install the wheels on the shaft and secure with the stoppers.

Balancing

The center of gravity / balancing point should be approx. 4" = 10 cm from the leading edge of the wing. Make adjustments if necessary.

Flying

It is advisable to fit an engine that does not protrude too far forward or some alterations have to be made in the fire wall.

Let the engine swing a 14x4 propeller if possible. This gives better thrust outside the big cowling and reduces sound to a more realistic

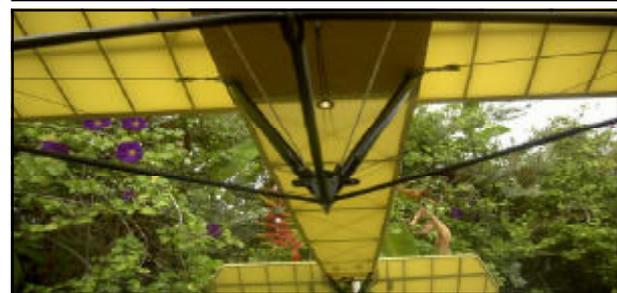
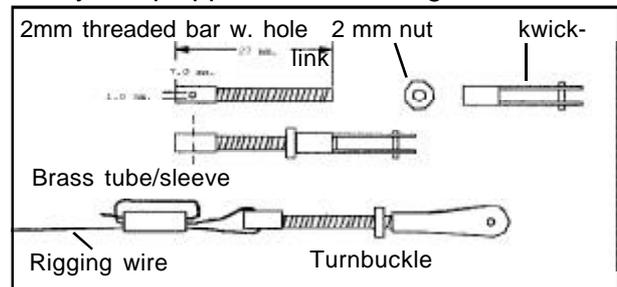
level.

Flying characteristics are very forgiving but the aerobatic manoeuvres limited. Set the elevator at zero angle or at the same angle as the wing, for the first flight but be prepared to give down elevator if the model climbs out too steep. This model should fly off the ground and not be pulled by the propeller.

Ground handling, taxiing, on hard surface is difficult in anything but calm weather, because the model will weather-vane into the wind.

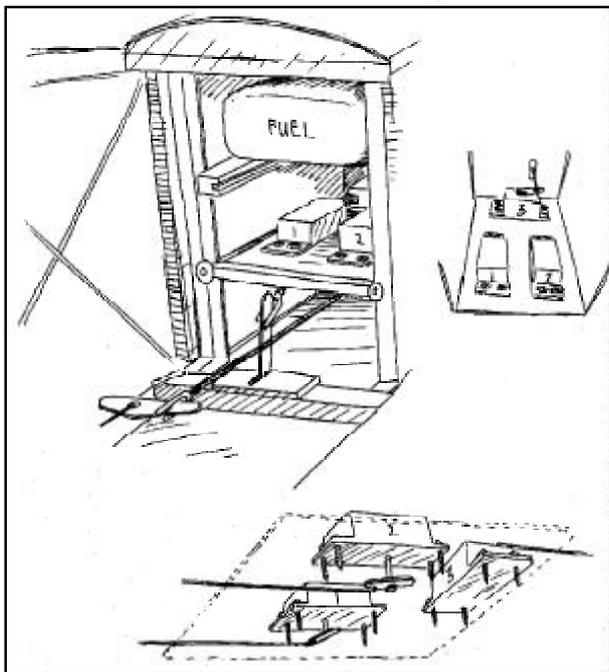
Take-off should be done straight into the wind and the take-off run is relatively short. Make corrections with elevator and rudder. The wing-warping during take-off is slow and not so effective but in flight responsive enough. Turns should be executed using both wing-warping and rudder.

Use gentle handling during approach and make the landing straight into the wind. On the ground, taxiing, unless very calm weather, should only be attempted with assistance at the wing tips (as per prototype). Note that the gliding ratio with the engine throttled back, is very steep. Aeroplanes from this period usually had a very steep approach for landing.



Servo installation

The sketches below show a typical servo installation. The pushrods from the servos connect to the joy stick and the rudder bar with a kwick-link as shown or, with a ball link which gives a somewhat smother actuation.

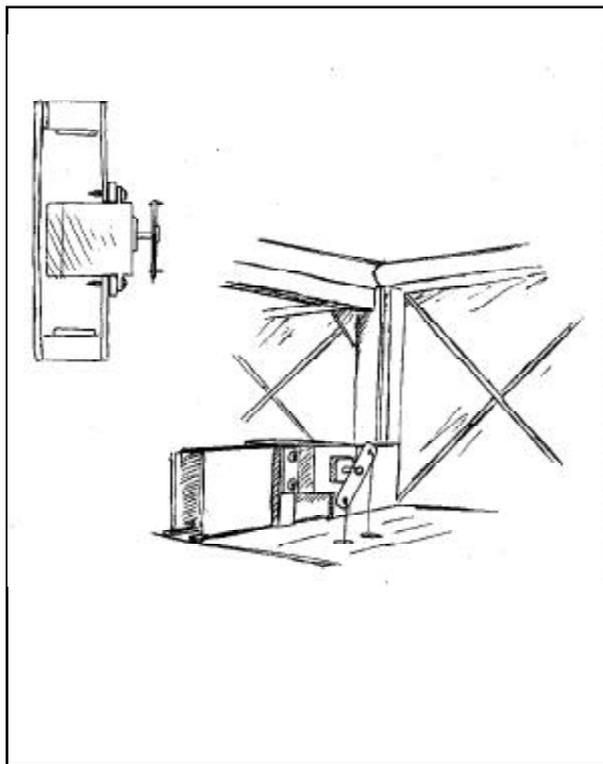


Note that the servos are inverted in the tray and that the pushrods come out under the servo tray. The position of the tank, receiver and accu are optional and to the builders discession. The radio switch is conveniently mounted on the instrument panel
Number 1 servo is the elevator servo, to be connected with the joy-stick.

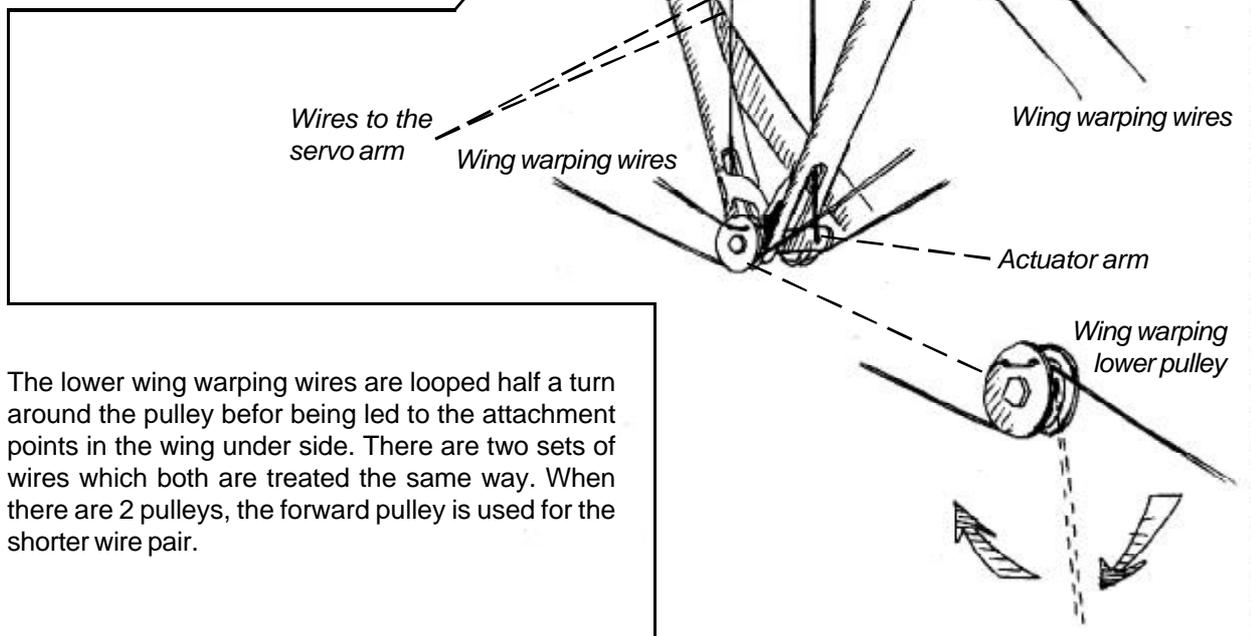
Number 2 servo is the rudder servo, to be connected with the rudder bar.

Number 3 servo is the thrrottle servo to be connected forward through the firewall with the carburator/throttle arm.

Wingwarping set up and wing warping servo installation



The wing warping servo is installed in the vertical tray above the lower pylon. Wires are connected from the servo arm to the arm of the actuator with the 2 pulleys. Neutral servo should render horisontal actuator arm.



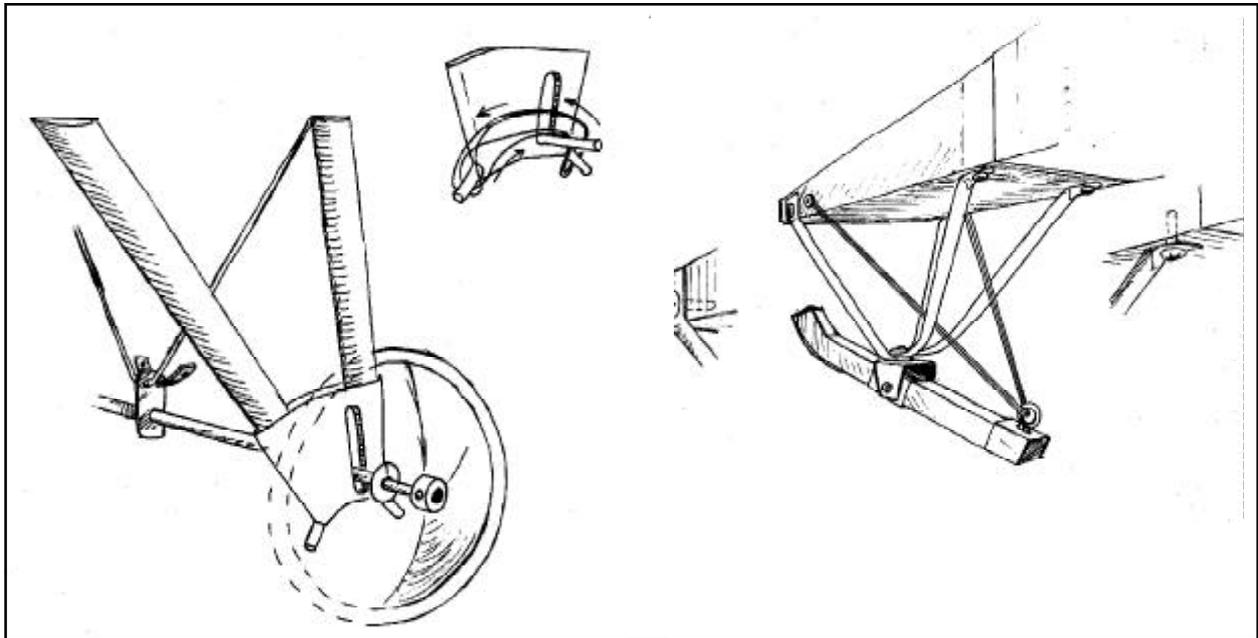
The lower wing warping wires are looped half a turn around the pulley before being led to the attachment points in the wing under side. There are two sets of wires which both are treated the same way. When there are 2 pulleys, the forward pulley is used for the shorter wire pair.

Landing gear suspension, bunge rubber installation

The rubberband is laced as illustrated so that the wheel shaft is tight against the lower part of the shaft support. The more you stretch the rubber the harder the spring action will be.

Tail skid bunge rubber installation

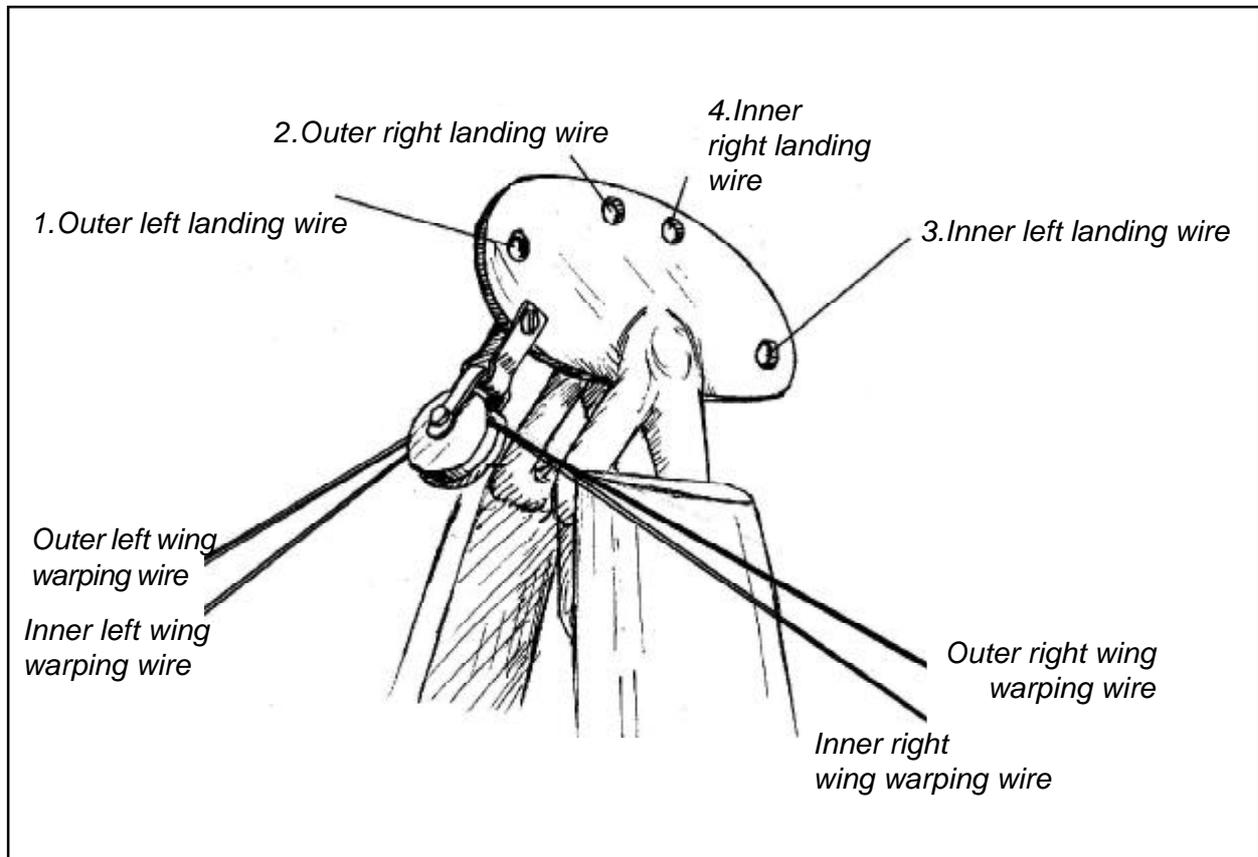
The rubberband is attached at the 2 screws as illustrated. The more you stretch the rubber the harder the spring action will be.



Rigging of upper pylon and lower wingwarping wires

The upper landing wires are attached to the pylon in the sequence illustrated (1-4). Start with the outer wires and make sure that the wing is parallel and perpendicular to the pylon.

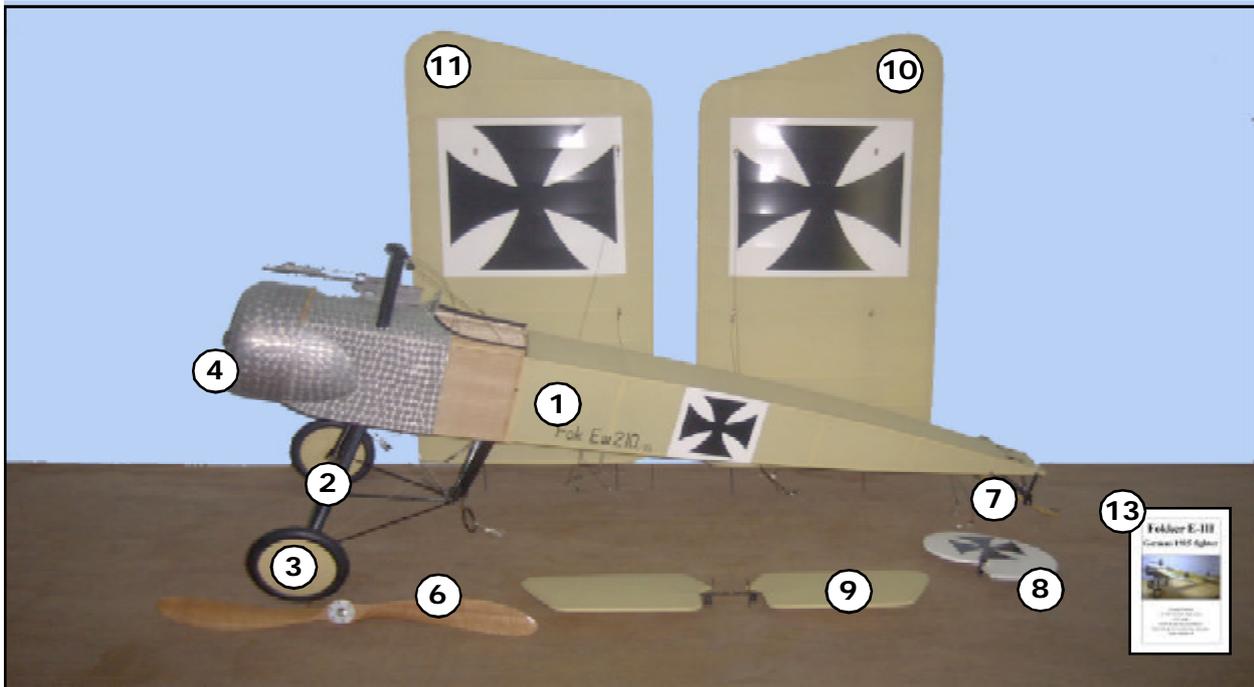
The upper wing warping wires are through the pulley in the upper pylon as illustrated. Start with the outer wires and make sure that the wing is given approx. 1 inch washout (dihedral at the trailing edge) at the wingtips. Make sure that the wires run freely in the pulley.



What is in the box:

The ARF kit contains the parts shown in the picture. All the parts are covered and painted.

All the rigging wires are supplied in the correct lengths and need only to be clipped to their positions.

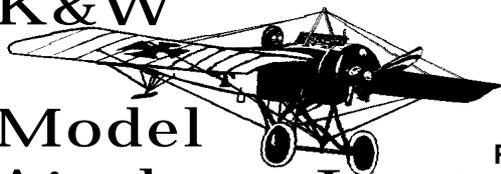


- 1. Fuselage with wing-warping pylon
- 2. Landing gear
- 3. Scale wheels
- 4. Engine cowl
- 5. Dummy engine with mount (not shown)
- 6. Scale propeller
- 7. Tail skid assy.

- 8. Rudder
- 9. Elevator
- 10. Left wing panel
- 11. Right wing panel
- 12. Wires, turnbuckles and hardware for assembly (not shown)
- 13. Assembly manual with scale documentation



K&W



**Model
Airplanes Inc.**

P.O.Box 1229, Cebu City Centrl. Postoffice
Cebu City 6000, Philippines
Visiting address:

3343 Gun-Ob, Kinalumsan,
Lapu-Lapu City 6015, PHILIPPINES

Phone +63 32-340 0772, Cellular +63 917-3200 985

Telefax +63 32-340 7131, E-mail: kwmairpl@gsilink.com
Website: www.kwmairpl.com.ph