robbe

Assembly and operating instructions
Notice de montage et de pilotage
Istruzioni di montaggio e d'uso
Instrucciones de montaje y manejo

Eolo / Spirit Pro

No. S 2871

Specification

Main rotor diameter:	approx. 870 mm
Tail rotor diameter:	approx. 178 mm
Length:	approx. 725 mm
Height:	approx. 265 mm
Weight:	min. 1300 g

Introduction

The Eolo / Spirit Pro model helicopter you have purchased is a member of the robbe-Schlueter family of helicopter products.

The model is designed as a helicopter trainer, and can be assembled ready to fly in just a few hours.

Please follow the instructions in this section when assembling your Eolo.

The drawings corresponding to the numbered stages of construction can be found in the German instructions.

The tools and accessories required to complete the model are listed on a separate accessory sheet.

Notes on the radio control system:

All the pushrod lengths and servo output arm lengths assume the use of robbe/Futaba servos. If you wish to use other makes of servo you may need to make allowance by adjusting the stated dimensions slightly.

The building instructions are grouped according to the helicopter's sub-assemblies, and are divided up in a logical sequence of stages. Each sub-assembly is numbered, and the numbers correspond to the numbered bags in the kit.

An assembly drawing is included for each stage, showing how the parts fit together.
Each drawing also includes a full-size key to the screws, washers and shim washers required for that stage, to help you identify these parts.

Each stage includes **supplementary notes and tips** which should be read carefully while you are assembling the model.

Replacement parts

It is vitally important that you use only genuine replacement parts when required. The Order Numbers are printed adjacent to each component illustrated in these building instructions.
Please store these building instructions in a safe place so that you can refer to them later when maintaining or repairing your model. The red Quality Control sheet and any other supplementary sheets in the kit should also be kept safely.
Please state the original Order No. when ordering replacement parts, as this avoids problems and delays in obtaining spares.

If you think you have cause for complaint, or wish to make a claim under guarantee, please note that you must state the Control Number and include proof of purchase.

Replacement screws

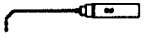
The kit includes a pack of spare screws which can be used to replace lost or damaged items during the lifetime of the model.

The electric motor

Conventional electric motors must be run-in before flying the machine.
Please read the instructions provided by the motor manufacturer.

Note: brushless motors do not need to be run-in.

Notes on construction:
You will find three different symbols throughout these instructions:



1: Oil can
At these points you must apply synthetic oil (robbe No. 5531) during assembly.

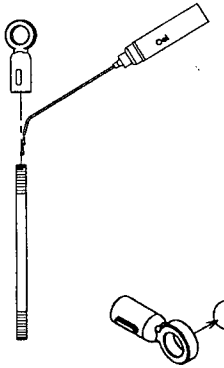
2: Grease dispenser
At these points you must apply grease (robbe No. 5532) during assembly.

3: Loctite
At these points you must apply thread-lock fluid (robbe No. 5074) during assembly.

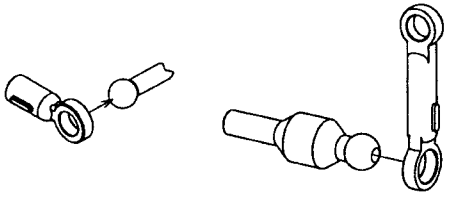
Remove all traces of grease from the threaded holes and screws before applying thread-lock fluid.

Tip: Loctite should always be applied very sparingly, otherwise there is a danger that excess fluid will run into ballraces and plain bearings. A good ploy is to apply the fluid to the female threads (holes).

Note: Oil the pushrods lightly before screwing the ball-links onto them. We recommend the use of the ball driver, No. S 5151, for this.



When pressing ball-links onto linkage balls and ball-end bolts note the position of the raised marker lug on the link, which should always be on the outside of the joint.



How a model helicopter works:

A powered aircraft with a fixed wing and tail requires the thrust of the propeller to get it flying. The forward motion of the wing through the air produces lift; the model leaves the ground and flies.

In contrast, a helicopter requires no forward motion. The wing takes the form of an oversized propeller which rotates in the horizontal plane above the fuselage. That is why helicopters are also known as rotary-wing aircraft.

How lift is generated by the main rotor:

As with a fixed wing, the rotor blades feature an airfoil section and are set at a particular angle (pitch angle) relative to the airflow. The rotor generates lift when it rotates and passes through the air. As the rotational speed and pitch angle of the rotor blades rise, there comes a point where the lift, acting in the vertical direction, is greater than gravity. The helicopter then leaves the ground and climbs vertically. If the lift generated by the rotor is the same as the helicopter's weight, the machine remains motionless in the air, i.e. it hovers. If the rotor's lift is reduced, the machine descends.

Torque compensation:

The power from the engine which is transmitted to the rotor head takes the form of a turning force, known as torque. The fuselage reacts to this force by tending to rotate in the opposite direction to the main rotor.

This yawing motion of the fuselage is unwanted, and must be eliminated. The compensation task is carried out by a small rotor mounted at the tail end of the fuselage. Like the main rotor, the blades of the tail rotor are profiled and set at a particular pitch angle, and therefore produce a lateral force. If the lateral force is equal to the torque reaction, it cancels out the helicopter's yawing tendency.

Controlling a model helicopter

The most important feature which differentiates a helicopter from a fixed-wing aircraft is that its power element - the main rotor - is also the essential control element.
The helicopter is controlled by varying the settings of both the main rotor and the tail rotor. The main rotor head includes what is known as an auxiliary rotor (flybar and paddles) which transfers the control movements to the main rotor itself.
The swashplate is a sub-assembly mounted on the main rotor shaft, or mast. It is capable of moving in all directions, and its purpose is to transfer mechanical control movements from the servos to the main rotor. Three servos are mounted below the swashplate, and they provide cyclic and collective control of the main rotor with the help of an „HR 3" mixer set up on the transmitter.

How the swashplate works:

Helicopters are capable of flying forward, backward and to both sides, and these movements are controlled by tilting the main rotor in the desired direction.

These movements are generated by varying the pitch angle of the rotor blades according to their momentary position in each cycle
= cyclic pitch control

To produce vertical movement in either direction the pitch angle of the rotor blades is varied simultaneously
= collective pitch control

Four primary functions have to be controlled:

- **Climb and descent: „collective pitch, throttle"**

  The pitch angle of both (all) blades is altered, and at the same time the throttle setting is changed to deliver the appropriate level of power to the rotor.

- **Roll: „roll-axis"**

  (movement around the longitudinal axis)
  The main rotor plane is tilted to right or left as required

- **Pitch: „pitch-axis or forward / back cyclic"**

  (movement around the lateral axis)
  The main rotor plane is tilted forward or back as required

- **Yaw: „tail rotor"**

  (movement around the vertical axis)
  The pitch of the tail rotor blades is altered as required

Stage 1

1.1 Assembling the rotor shaft pivot bracket, freewheel hub and main rotor shaft

- Fix the pre-assembled rotor shaft pivot bracket S5028 to the chassis S5000 using the screws S0079.
- Attach the pre-assembled freewheel hub S5030 to the 75-tooth gear S5094 using the screws S4354 and washers S4366.

- Slide the main rotor shaft S5020 into the rotor shaft pivot bracket from above, and insert the aluminium spacer ring (6/8 Ø x 2.7) S5031 and the freewheel hub assembly S5030.

- Fit a washer S0007 on the screw S0030 and screw it into the underside of the main rotor shaft.
- Fit the grubscrew S0041 in the collet (6/11 Ø) S5036 and fit it on the rotor shaft. Position the collet so that there is zero slop, and tighten the grubscrew.

1.2 Assembling the primary gearbox stage

- Fit the flanged ballraces S5044 in the chassis as shown.
- Press the 16-tooth pinion S5032 into the 60-tooth gear S5084, and place this gearbox stage between the flanged ballraces.

- Fit the gearbox shaft (3 Ø x 33) S5027 through the flanged ballraces and the gearbox stage from the top; the machined flat must be at the bottom.
- Fix the 16-tooth pinion to the gearbox shaft using the grubscrew S0041. Check that the screw engages on the machined flat.

1.3 Assembling the tail rotor drive system

- Slide the long tail rotor drive shaft (2 Ø x 419) S5018 into the end of the tail rotor drive coupling S5114 as far as it will go, and secure it by tightening the grubscrew S0041 onto the machined flat.
- Press the 3 x 8 x 3 ballraces S4035 into the tail rotor drive bracket S5056.
- Push the tail drive coupling through the ballrace.

- Slide the 14-tooth gear S5026 onto the tail rotor drive coupling as far as it will go, and secure it by tightening a grubscrew onto the machined flat in the shaft.

- Place the drive bracket / tail rotor drive assembly in the chassis, and secure it with the screws S3370 and washers S4366. Adjust the position of the tail rotor drive bracket in the slotted holes so that the gears rotate freely, but without slop.
- Grease the whole gearbox.

Stage 2

2.1 Completing the tail boom

- Fit the pushrod guide S5106 and holder S5096 on the tail boom; note the position of the slot.

2.2 Assembling the tail boom support bracket, tail boom and platforms

- Install the front platform S5171 and the rear platform S5081 in the chassis.
- Press the tail boom support bracket S5057 into the chassis, and fit the screw S3370 to secure it.
- Slide the front (slotted) end of the tail boom into the tail boom support bracket as far as it will go.
- Clamp the tail boom in the tail boom support bracket using the screw S3370 and the washer S4366.

2.3 Installing the electric motor

- Read the instructions supplied with your choice of electric motor before carrying out the following stage.
- **Note:** if you are using a motor other than the recommended type, please note that alternative pinions with different tooth counts are available.
- Fit the 16-tooth pinion S5187 on the output shaft of the electric motor, but do not tighten the screw fully.
- Place the motor on the chassis.

- Adjust the position of the 16-tooth pinion so that it meshes over the full depth of the teeth with the 60-tooth gear S5084.
- Tighten the retaining screw in the 16-tooth pinion.
- Adjust the lateral position of the electric motor to obtain minimal play between the two meshing gears.

- **Note: when selecting the mounting screws for the electric motor check that they do not protrude too far into the motor case.**
- Tighten the motor retaining screws.

2.4 Installing the landing skid supports

- Place the battery holders S5153 on the underside of the chassis and slide them together until the clips engage.

- The four skid support components which constitute the skid support S5095 are marked V1, V2, H3 and H4. Note: V = front, H = rear.
- Fix these parts to the chassis using the screws S0116 and washers S4366.

2.5 Installing the skid landing gear

- Assemble all the undercarriage parts as shown, and glue them together using ropoxi, No. 5066.

Stage 3

3.1 Installing the swashplate guide and servo mounts

- Remove the swashplate guide S5082 from the „servo mount" injection moulding S5082, and press it into the upper servo mount.
- Fix the linkage ball S3150 to the swashplate guide using the screw S0114.
- Slide the top and bottom servo mounts onto the rotor shaft pivot bracket.

3.2 Installing the swashplate servos

- Set the three swashplate servos to centre from the transmitter.
- Cut down the servo output devices as shown in the drawing, leaving a single arm. Ensure that the arms are mounted on the servos exactly at right-angles.
  Tip: most makes of servo feature a splined output shaft. This means that you can re-position the output device at 90° intervals and select the position which is (almost) exactly at right-angles to the servo case. Do this before cutting down the output arms.

- Fit the output arms on the servos.
- Screw the servos to the servo mounts using the plastic oval washers included on the „servo mount" injection moulding S5082.

3.3 Installing the swashplate pushrods and the swashplate driver

- Screw the ball-links S5043 and the clevises S0059 onto the pushrods S5037. Set the 19 mm dimension as shown in the drawing.
- Press the ball-links on the prepared pushrods onto the linkage balls on the outer ring of the swashplate S5004.
  Note: when pressing the ball-links onto the linkage balls note the position of the raised marker lug on the links; the lug must always be on the outside of the joint.
- Slide the swashplate onto the main rotor shaft and engage the spigot in the swashplate guide.
- Connect the clevises to the servo output arms, using a lever length of 13.5 mm.
- Assemble the clamp S5042 and the driver yoke S5105 using the screws S0028 and S0029 to produce the swashplate driver. Slip this assembly on the main rotor shaft and press the ball-link S5090 onto the „middle" ball on the swashplate inner ring. Check that the parts move freely.
  Caution: the threaded hole in part S5042 must be located above the centre of the parts.

Stage 4

4 Assembling the rotor head and transverse shaft

- Slide the blade pivot shaft S5051 through the centre piece S5049 and fit the additional parts on both ends of the shaft exactly as shown in the drawing.
  Note: it is absolutely essential to orientate the axial bearings S3364 correctly, i.e. the 4 mm I.D. disc must face the blade holder S50761.
- Install the transverse shaft S5086 in the centre piece.

Stage 5

5.1 Assembling the flybar and collective pitch compensator

- Slide the flybar S5021 through the transverse shaft, set it central, and grease it lightly where it contacts the transverse shaft.

- Fit the additional parts to the collective pitch compensator hub S5087 as shown. Fix the collective pitch compensator arms S5088 to the collective pitch compensator shaft S5089 by tightening the grubscrews S0041 onto the machined flats. Check that the parts move freely.
- Slide the collective pitch compensator and the ball collet S5085 onto the flybar, and tighten the grubscrew S0041 to secure it. There must be no slop in this assembly.

5.2 Assembling the mixer levers, completing the flybar

- Attach the mixer levers S5168 to the blade holders. Check that the parts move freely.

- Slip the double ball-links S5005 onto the flybar, and press them onto the appropriate linkage balls.
  Note: when fitting the double ball-links onto the linkage balls note the position of the raised lug on the links. The lug must always be on the outside of the joint.
- Screw the inertia weights S5068 into the flybar paddles S5069 as far as they will go.

- Fix the inertia weights to the flybar by tightening the grubscrews S0041 into the grooves in the flybar.
  Before tightening the grubscrews set the paddles exactly parallel to each other and to the collective pitch compensator hub S5087.

- **Note:** the double-links S5091 are designed for 3-D flying in conjunction with powerful motors and symmetrical-section rotor blades.
- The pushrods S5045 and S5046 should then be set to the stated lengths.

5.3 Mounting the rotor head, installing the rotor head pushrods

- Fit the rotor head on the rotor shaft and secure it with the screw S0114 and the self-locking nut S0090.
- Fit the ball-links S5043 on the pushrods S5045 / S5046 and set them to the lengths shown in the drawing.
- Attach the pushrods to the rotor head and the swashplate inner ring.
- Rotate the clamp S5042 until the pushrods S5045 are exactly vertical.
- With the servo output arms horizontal, adjust the level of the swashplate driver so that the top edge of the clamp S5042 is flush with the top face of the driver yoke S5105.

- In this position tighten the grubscrew S0041 to fix the clamp to the main rotor shaft.

Stage 6

6.1 Assembling the tail rotor gearbox

- Place the ballraces S4035 and S4350 in the tail rotor gearbox housing S5064.

- Slip the tail rotor drive coupling S5114 through the ballraces S4035 and S4350.
- Fit the 20-tooth bevel gear S5053 onto the tail drive coupling, and secure it by tightening the grubscrew S0041 onto the machined flat.
  The tail drive coupling should have zero axial play.
- Place the second 20-tooth bevel gear S5053, the spacer sleeve S5062 and the tail rotor shaft S5063 between the ballraces S4350.
- Position the tail rotor shaft so that it ends flush with the second ballrace.
- Fix the bevel gear on the tail rotor shaft by tightening the grubscrew S0041 onto the machined flat. Grease the bevel gears.

6.2 Assembling the control bridge and actuating arm

- Assemble the parts of the control bridge: 2 x S5039, S5059, S5072, S5054 and S5073. Screw the sliding sleeve S5059 into the actuator bridge S5073 to the point where the control ring S5072 rotates freely but without any slop.
- Oil the tail rotor shaft lightly and push the control bridge onto it.

- Press the spacer ring S5060 into the arm on the tail rotor gearbox housing.
- Mount the actuating arm S5075 on the arm of the tail rotor gearbox housing using the screw S0114 and washers S0000. The lever must swivel freely but without slop.
- Push the ring of the actuator arm over the linkage ball on the control ring.

6.3 Installing the tail rotor hub

- Attach the gearbox cover S5149 to the tail rotor gearbox housing using the screws S0097 and washers S0000.

- Fit the tail rotor hub S5061 on the tail rotor shaft, set it flush with the outside end, and tighten the grubscrew S0041 onto the machined flat to secure it.
- Fit the remaining parts on the tail rotor hub.
- Fit the tail rotor blades together using the 2 Ø x 36 mm dowel pin, S3499, for balancing.

- Support the rotor blades at the centre.
- The lighter blade will now rise; apply adhesive tape to that blade until the two blades balance level.
- Fix the tail rotor blades S5070 in the tail rotor blade holders using the screws S0080, and tighten the screws just to the point where the blades are still free to swivel.

6.4 Installing the tail boom and the stabilisers

- Slide the tail rotor gearbox into the tail boom as far as it will go, and at the same time fit the drive shaft S5018 into the tail rotor drive shaft coupling.
- Secure the drive shaft by tightening the grubscrew S0041 onto the machined flat.
- Attach the vertical stabiliser S5155 to the tail boom using the screws S0098, washers S0000, vertical stabiliser clips S5066 and nuts S0010.
- Screw the linkage ball S3150 to the horizontal stabiliser.
- Fix the horizontal stabiliser to the tail boom using the screws S0074, washers S0000 and the clips S5158 and S5148.

Stage 7

7 Installing the tail rotor servo and tail rotor pushrod

- Fix the tail rotor servo to the tail boom support bracket and the tail rotor servo holder using the plastic oval washers S5100.
- Clamp the tail rotor servo mount to the tail boom using the screw S4300.

- Set the tail rotor servo to centre from the transmitter.
- Cut down the servo output device as shown and screw it to the servo (see Stage 3.2).

- Screw the clevises S0059 to the tail rotor pushrod S5019 (length between clevises 378 mm).
- Connect the pushrod to the outer hole in the tail rotor actuating lever and the servo output arm, and engage it in the pushrod guide. Note the 11 mm length of the servo output arm.

Stage 8

8.1 Installing the cabin holder, receiver and gyro

- Press the cabin holder S5103 into the rear platform.
- Fix the receiver and gyro to the rear platform using double-sided adhesive tape, No. S5142.

8.2 Installing the speed controller and aerial

- Fix the speed controller to the front platform using double-sided adhesive tape, No. S5142.

- **Be sure to read the instructions supplied with the speed controller before carrying out any work involving the unit.**
- Complete the wiring between speed controller and motor following the instructions supplied with these units. Attach a connector for the flight battery to the speed controller if necessary.
- Prepare the pieces of Velcro tape S5132 which retain the battery.
- Attach the guide tube 6065 to the skid landing gear using the rubber bands.
- Thread the receiver aerial into the tube.

8.3 Securing the battery and cables

- Fix the battery under the skid supports using the prepared strips of Velcro tape S5132.
- Wrap rubber bands No. 9107 and 9112 round the battery for additional security.
- Bundle together the wires to form a loom, and secure them using the cable ties 5036 supplied.
- In the interests of clarity the aerial is not shown.

Stage 9

9.1 Finishing and installing the cabin

- **Note:** for reasons of clarity this drawing does not show the internal parts of the chassis.
- Drill 5 mm Ø holes in the cabin S5102 at the points marked „X".
- Trim the rear part of the cabin flange as shown.
- Mask out the glazed area of the cabin before applying the external painted finish.
- Lightly sand the areas to be painted, and sand the edges of the cabin smooth.

- When painting is complete cut out the decals and apply them, referring to the title page of the instructions.
- Press the rubber grommets S5199 into the 5 mm Ø holes and place the cabin on the cabin holders.

9.2 Tail boom brace

- Glue the ball-links to the rod S5185 using ropoxi (epoxy). Note: the ball-links must be offset relative to each other by 90°.
- Press the completed tail brace onto the linkage balls on the underside of the swashplate holder first.

- It should now be possible to press the rear ball-link onto the linkage ball on the horizontal stabiliser without forcing. If this is not the case, loosen the screws S0074, re-position the horizontal stabiliser, press the ball-link onto the ball, then re-tighten the screws.

Stage 10

10.1 Balancing the rotor blades

- Screw the rotor blades S5182 together through the pivot holes as shown, using a screw S0031 and a nut S0012.
- Support the rotor blade assembly at the centre.
- The lighter blade will now rise; apply a piece of the coloured tape (supplied) to the lighter tip and add more or less tape until the rotor blades balance exactly level.

10.2 Installing the main rotor blades

- Attach the rotor blades to the blade holders S50761 using the screws S0031 and self-locking nuts S0012.
- Tighten the screws S0031 just to the point where the rotor blades are still free to swivel in the blade holders.
- When transporting the model please note: fold the main rotor blades back parallel to each other - don't lay them one on top of the other.

The Centre of Gravity

- The CG should be at the front edge of the main rotor shaft. Adjust the position of the flight battery until the CG is correct.

Setting up the radio control system

Basic requirement:
You need a radio control system designed for helicopter use. Check that the servos are connected to the receiver in the sequence described in the operating instructions.

Procedure:
- Switch on the transmitter
- Select a vacant model memory
- Program the model memory to the „Heli" mixer type
- Set the swashplate mode to „HR 3"
- Activate the tail rotor mixer (Revo-Mix) if required by the gyro you are using
- Program the system for a right-hand rotation main rotor
- Set all transmitter sticks and trims to centre
- Do not set up any trim memories or freely programmable mixers
- Program throttle trim to idle trim (ATL - throttle trim active only at idle end of range)
- Switch on the receiving system (connect flight battery to speed controller).

Setting up the servos for collective pitch

- Check the travels and directions of the servos.
- Move the collective pitch stick in the direction of collective pitch maximum: all 3 servos mounted below the swashplate should now move in the same direction and through the same distance, thereby raising the swashplate evenly, without tilting it at all.

Setting up the servos for roll and pitch-axis movements

- **Note:** with an HR3 swashplate linkage the swashplate tilt corresponds to the helicopter's direction of flight.
- Check the direction of travel of the servos.
- **Apply a roll command to the right: the swashplate should tilt to the right as seen from the tail of the model.**

- Use the servo reverse facility on your transmitter if any of the servos moves in the wrong direction.
- **Apply a forward pitch (forward cyclic) command: the swashplate should tilt forward.**
- Use the servo reverse facility on your transmitter if any of the servos moves in the wrong direction.

Setting up the tail rotor servo

Note:
Fold the tail rotor blades together as shown in the drawing. When you move the tail rotor stick to the right, the tip of the top blade should also move to the right (towards the tail boom).
- Reverse the tail rotor servo if necessary.

Checking the direction of gyro effect (fig.)
Set the gyro to maximum gain.
Swing the tail boom briskly to the right (i.e. the helicopter's nose moves to the left).
With the tail rotor blades still folded together, the tip of the top blade should now move towards the tail boom („Re" in the drawing).
Reverse the gyro direction if necessary. If your gyro is a simple type without a reversing switch (e.g. G 200), invert the gyro element.

Final checks
When all the servos are at neutral, the servo output arms should be horizontal.
At this setting the pitch angle of the main rotor blades should be +9°.
Maximum collective pitch should be around +14°, minimum collective pitch around +4°.

Adjusting blade tracking (fig.)
When you first operate the model you will need to check and adjust blade tracking.
Carefully open the throttle until the blades are spinning, and check the blade tracking from the side.
If the blades revolve at different heights when the rotor is at hover speed, you need either to increase the pitch angle of the lower blade B, or reduce the pitch angle of the higher blade A.
This adjustment is made by locating the ball-link from the mixer lever to the swashplate, and adjusting it by 1 or 2 turns in the appropriate direction.

Maximum rotational speed of the main rotor head with CFRP main rotor blades: 1800 rpm.

General information on programming the radio control system
The settings stated in the following section refer to the FX 18 radio control system and the recommended components (see accessory sheet).

If your model helicopter is to operate efficiently the basic mechanical adjustments must be correct.
For safety reasons remove the main and tail rotor blades before making adjustments to the speed controller and throttle programming.

Before you continue with programming the system the following requirements must be fulfilled:

Adjust the speed controller as described in the operating instructions.

The following values should be set In the swashplate mixer (TAUM): ROLL = 100%, PITCH-AXIS = 100%.

The first step is to set the hover point.
Your aim should be to set up the helicopter so that it hovers when the collective pitch stick is at centre, with a blade pitch angle of +9°.

Set up the mixer swashplate travel in % terms so that the collective pitch range is from +4° to +14°.

Diagram 1

Gas und Pitchkurve normal = Normal throttle and collective pitch curve
Gas = Throttle
Pitch = Collective pitch
Steuerknüppelweg = Stick travel

Setting the throttle and collective pitch curve for Idle-Up 1 (GV-1)

Diagram 2

Gas und Pitchkurve 1 = Throttle and collective pitch curve 1
Gas = Throttle
Pitch = Collective pitch
Steuerknüppelweg = Stick travel

If you are using a 6-channel receiver it is possible to set a fixed value for throttle in the throttle / collective pitch curve, as shown in the diagram above.

If you are using a receiver with 7 or more channels the speed controller can be assigned to a separate slider channel. Read the controller instructions for more details.

Maximum rotational speed of the main rotor head with CFRP main rotor blades: 1800 rpm.

Tail rotor compensation (REVO)
Tail rotor compensation only needs to be set up if you are using a gyro which requires this.
The aim is to eliminate any tendency for the helicopter to yaw (swing to either side) when the model climbs or descends. This unwanted rotation is caused by variations in the torque generated by the rotor blades.

The basic requirement:

The model must first be trimmed neutrally for the hover, i.e. when hovering the model should have no tendency to yaw.

Standard REVO value: 25%.

With the model at a steady hover, increase collective pitch briskly.
If the model yaws in the opposite direction to the direction of main rotor rotation, the value for tail rotor compensation (REVO) must be increased.
If the model yaws in the same direction as the direction of main rotor rotation, the value for tail rotor compensation (REVO) must be reduced.

Important

After flying the model helicopter for the first time please take the trouble to check that all screwed joints are still tight; this applies in particular to the power train components and the rotor system. All the following areas of the helicopter should be re-greased or oiled at intervals of two or three hours:

Main rotor shaft in the swashplate area,
Tail rotor shaft in the area of the tail rotor slider,
Main gearbox, tail rotor gearbox.

And one final tip

On no account attempt to fly your new helicopter without enlisting the help of a good, experienced helicopter pilot. Many apparently difficult problems sort themselves out virtually by themselves if you can fall back on the experience of a competent helicopter pilot.

robbe Modellsport GmbH & Co. KG

We reserve the right to alter technical specifications

Art. No.	Description	No. off
S0000	Washer, 2.2	20
S0001	Washer, 3.2	20
S0007	Washer, 3.2 large	20
S0010	Hexagon nut M2	20
S0012	Self-locking nut, M3	10
S0028	Machine screw, M2x12	10
S0029	Machine screw, M2x8	10
S0030	Socket-head cap screw, M3x8	2
S0031	Socket-head cap screw, M3x16	10
S0039	Socket-head cap screw, M3x10	4
S0041	Socket-head grubscrew, M3x3	10
S0053	Shim washer, 7x10x0.2	10
S0059	Clevis, M2	2
S0074	Socket-head cap screw, M2x14	2
S0079	Socket-head cap screw, M3x5	2
S0080	Socket-head cap screw, M2x10	2
S0090	Self-locking nut M2	5
S0097	Machine screw, M2x6	10
S0098	Slot-head screw, M2 x 18	10
S0100	Socket-head cap screw, M2.5x4	4
S0114	Socket-head cap screw, M2x12	2
S0116	Socket-head cap screw, M2.5x10	4
S0117	Socket-head cap screw, M2x5	4
S3150	Brass linkage ball, 4.8 Ø	10
S3364	Axial bearing, 4x10x4	1
S3370	Socket-head cap screw, M2.5x8	2
S39131	Eolo Spirit cabin	1
S39133	Decal sheet, Eolo Spirit	1
S4035	Ballrace, 3x8x3	1
S4141	Socket-head cap screw, M3x6	4
S4300	Socket-head cap screw, M2x6	2
S4350	Flanged ballrace 3x7x3	1
S4354	Socket-head cap screw, M2.5x6	6
S4366	Washer, 2.7	20
S4524	Shim washer, 3x6x0.5	2
S5000	Chassis	1
S5004	Swashplate	1
S5005	Double ball-link 4/5Øx31	2
S5018	Long tail rotor drive shaft, 2Øx419	1
S5019	Pushrod, 2xM2x7x399	1
S5020	Main rotor shaft, 6Øx135	1
S5021	Flybar, 2Øx275	1
S5022	Tail boom 12Øx11x444	1
S5023	CFRP tube, 5Øx3Øx100	4
S5026	Bevel gear, 14-tooth	1
S5027	Gearbox shaft, 3Øx33	1
S5028	Rotor shaft pivot bracket	1
S5030	Freewheel hub	1
S5031	Spacer ring, 6Øx8Øx2.7	1
S5032	Pinion, 16-tooth	1
S5036	Collet, 6Øx11x5	1
S5037	Pushrod, 2xM2x7x33	3
S5039	Ballrace, 4x7x2.5	1
S5040	Ballrace, 2x6x3	1
S5042	Clamp	1
S5043	Ball-link, 11.5 long 2Ø M2	10
S5044	Flanged ballrace, 3x8x4	1
S5045	Pushrod, 2xM2x8x35	2
S5046	Pushrod, 2xM2x8x58	2
S5048	Ballrace, 2x6x3	1
S5049	Centre piece	1
S5050	Slotted retaining ring	1
S5051	Blade pivot shaft, 4Øx5x65	1
S5052	O-ring, 5Øx9	4
S5053	Bevel gear, 20-tooth	1
S5054	Spacer ring, 4x5x2.5	1
S5056	Tail rotor drive bracket	1
S5057	Tail boom support bracket	1
S5059	Sliding sleeve, 3Øx4Øx 4	1
S5060	Spacer ring, 2Øx3Øx4	3
S5061	Tail rotor hub	1
S5062	Spacer sleeve,3.2x4x9	1
S5063	Tail rotor shaft, 3Øx57	1
S5064	Tail rotor gearbox housing	1
S5066	Vertical stabiliser bracket	1
S5068	Inertia weight, 8Øx17.5 M3	2
S5069	Flybar paddle, 37.5x60	2
S5070	Tail rotor blade, 68 long	2
S5071	Tail rotor blade holder	1
S5072	Tail rotor control ring	1
S5073	Tail rotor actuator bridge	1
S5075	Tail rotor actuating lever	1
S50761	Main rotor blade holder	1
S5078	Skid joiner	4
S5079	Skid end-plug	4
S5081	Rear platform	1
S5082	**Injection moulding set, comprising:**	**1**
	Lower servo mount	1
	Upper servo mount	1
	Swashplate guide	1
	Oval disc	6
S5084	Gear, 60-tooth	1
S5085	Ball collet, L 24.5 M3	1
S5086	Transverse shaft, 2/3.5Ø x 18.4 M2	1
S5087	Collective pitch compensator hub	1
S5088	Collective pitch compensator arm	1
S5089	Coll. pitch compensator shaft, 2Øx30.5	1
S5090	Ball-link, 17 long, 4Ø/2Ø	2
S5091	Double ball-link, 4/5Øx26	2
S5093	Plastic jig tube, 9.0Øx7.1Øx150	1
S5094	Gear, 75/60-tooth	1
S5095	Skid support, 4-part	1
S5096	Tail rotor servo mount	1
S5100	Plastic oval washer	2
S5101	Bearing plug, 11Øx10	2
S5103	Cabin holder	1
S5105	Driver yoke	1
S5106	Pushrod guide	2
S5107	Skid tube, 6Øx225	2
S5114	Tail rotor drive coupling	1
S5142	Double-sided adhesive tape	1
S5143	Ballrace, 5x10x4	1
S5146	Washer, 5.2x8x0.5	4
S5148	Horizontal stabiliser clip	1
S5149	Gearbox cover	1
S5151	Ball-link driver	1
S5153	Battery support	2
S5155	CFRP vertical stabiliser	1
S5156	CFRP horizontal stabiliser	1
S5158	Horizontal stabiliser support	1
S5168	Mixer lever, 8 / 13	2
S5171	Front platform	1
S5172	Building instructions, Eolo / Spirit Pro	1
S5182	CFRP main rotor blades	1
S5185	Tail boom brace	1 set
S5187	Pinion, 16-tooth (electric motor)	1
S5199	Rubber grommet, 2.8/7Øx5/3.8x1	4
5036	Cable tie, 100x2.5 1	10
9107	Rubber band, 40Øx6x1	30
9112	Rubber band, 15Øx2x2	40
6065	Guide tube 2.2x3.2x1000	1

Accessories

The accessories listed below are required to complete the model, and are not included in the kit. All recommended items are from the robbe range of accessories.

Radio control system:

Computer radio control system with at least 5 channels and 120° rotor head mixer (HR 3) for 3-point linkage, e.g.

FX-18 PCM/FM 35 MHz	F 4095	1x
Servos: S3101	F 1258	4x
or		
Servos: FS 501 BB	8460	4x
G-401 piezo gyro	F 1226	1x
Power Peak 3 Sport	8425	1x
AMP charge lead	8253	1x
Transmitter charge lead	F 1415	1x

Recommended accessories for expanding the transmitter

FX-series transmitter tray	8373	1x
Two-position mixer switch, short	F 1502	2x
FX linear switch, front	F 1587	1x
FX ball / socket aerial mounting	F 1559	1x

Alternative radio control system:

FC-18 V3 Plus FM 35 MHz	F 7040	1x
or		
FC 28 PCM 35 MHz	F 8014	1x

Power system

Electric motor Twist 37	4495	1x
Speed controller Jazz 40-6-18	8280	1x
or BL-Set Twist 37 +		
Jazz 40-6-18	8281	1x

Drive battery / receiver battery

Sanyo 8N C2.4k AMP	4615	1x

Alternative:

Ni-MH battery: 8 3.3k AMP	4515	1x

Tools

Tool box	S 1390	1x
Allen key set	5568	1x
Allen key, 2.5 mm A/F	S 0061	1x
Ropoxi, 100g	5066	1x
robbe special oil for metal bearings	5531	1x
robbe precision grease	5532	1x
Loctite Superfest 243	5074	1x

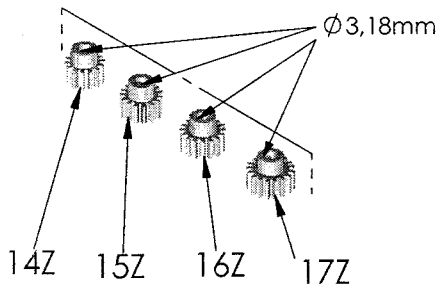
robbe Schlüter

Spirit - News

Zubehör
Accessories
Accessoires
Accessori
Accesorios

S5150

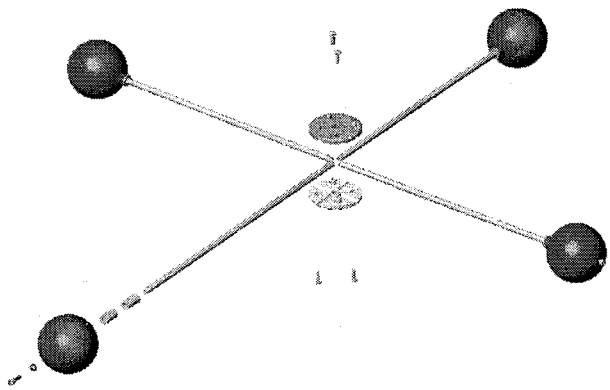
MOTORRITZELSATZ
PINION SET
JEU PIGNONS
SET INGRANAGGI
JUEGO DE PICONES



Z	i
14	1:20,0
15	1:18,8
16	1:17,6
17	1:16,6
18	1:15,6

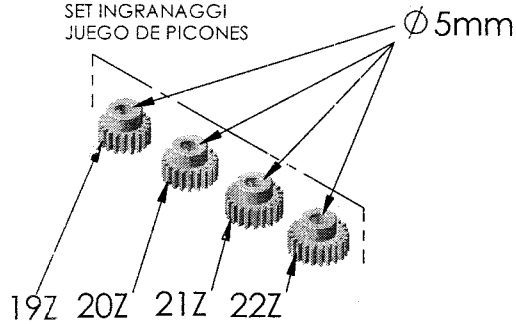
S5164

TRAINERLANDEGESTELL
TRAINER LANDING GEAR
ARCEAU PROTECTION
TREN DE ATERRIZAJE ENTRENADOR



S5154

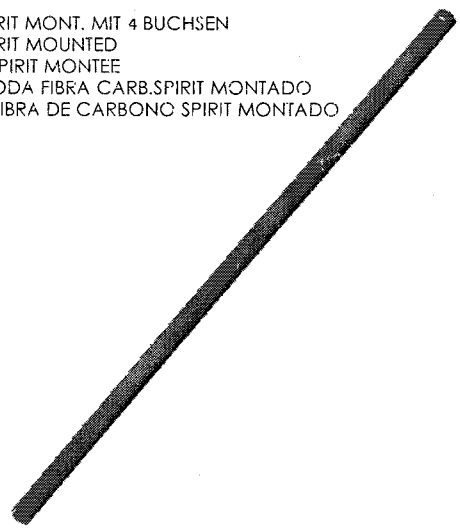
MOTORRITZELSATZ
PINION SET
JEU PIGNONS
SET INGRANAGGI
JUEGO DE PICONES



Z	i
19	1:14,8
20	1:14,0
21	1:13,4
22	1:12,8

S5159

CFK-HECKROHR SPIRIT MONT. MIT 4 BUCHSEN
TAIL BOOM CRP SPIRIT MOUNTED
FLECHE CARBONE SPIRIT MONTEE
TUBO ROTORE DI CODA FIBRA CARB.SPIRIT MONTADO
TUBO DE COLA DE FIBRA DE CARBONO SPIRIT MONTADO



S5152

ROTORBLATTAUFLAGE 160/160
ROTOR BLADE SUPPORT 160/160
GARNITURE PALES ROTO 160/160
SUPPORTO PALE ROTORE 160/160
SOPORTE DE PALA DE ROTOR 160/160