



REVOLUTION 500E RTF

Manual v1.0

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Dear Customer,
thank you for choosing the Revolution 500E RTF helicopter.
PLEASE READ THIS MANUAL CAREFULLY BEFORE THE INITIAL STARTUP.

The Revolution 500E Ready To Fly is a high performance model helicopter that was specifically designed for beginners with sufficient experience of pitch-controlled models. The helicopter is completely assembled, tested and ready for use. The model is equipped with high-quality RC components. Besides a 4S 4250mAh lithium polymer battery, digital servos, a brushless motor, a 2.4 GHz transmitter with receiver and the Xelaris Flybarless-3X System (FBL-3X) are included.

Due to its various settings, the model is extremely versatile and offers setups for the individual needs of every pilot. Since piloting a remote controlled model helicopter is very complex, we strongly recommend taking model helicopter flight lessons or using a flight simulator when you are a beginner.

Although the Revolution 500E is a Ready To Fly model, we also strongly recommend to read this manual carefully. Please don't hesitate to contact your local dealer if you have any questions.

Product Contents	
Revolution 500E RTF	FBL-3X flybarless system
520mm GFK main rotor blades	Digital swash plate and tail rotor servos with plastic gearing
85mm tail rotor blades	4S 4250mAh battery
Bicolor plastic canopy	X-4DC charger
4S 1300kv brushless motor	2.4GHz Transmitter and receiver
4S LiPo Brushless ESC	



Specifications

Main rotor diameter:	approx. 1200 mm
Take-off weight:	approx. 2800 g
Height:	approx. 340 mm
Length:	approx. 1100 mm
Tail rotor diameter:	approx. 235 mm
LiPo battery:	4S 4250 mAh

General Safety Instructions

A model helicopter is a very powerful flying device and not a toy. Disregarding our instructions, inappropriate use, and insufficient maintenance by persons lacking necessary competence may result in injuries for the user and can cause damage to the surroundings and to materials. Therefore, we strongly recommend to get insurance. Children and juveniles should operate a model helicopter only under supervision of an experienced adult.

Make sure that all necessary batteries for regular flights are fully charged. Do not fly on public roads, in residential areas or close to people. Contact with rotating blades can cause severe injuries or even death.

Heli Professional will not accept responsibility for any damage caused by products of the delivery program and rejects any liability, as we are not in a position to supervise proper operation, handling, and maintenance by the user. Furthermore, we ask you to follow our operating instructions carefully and to use only original Heli Professional parts.

Flight Battery Safety Instructions



Inappropriate use can cause lithium polymer batteries to burn, explode, and release toxic gas which can cause severe burns and poisoning.

Heli Professional will not accept responsibility for any damage caused by inappropriate use and rejects any liability, as we are not in a position to supervise proper operation, handling, and maintenance. You are also obliged to comply to the safety regulations in dealing with lithium polymer batteries. If you disagree with these safety regulations, we kindly ask you to return the helicopter boxed as new and in unused condition to your dealer.

- Charge and store the battery ALWAYS in a non-flammable environment resp. in a fireproof container (e.g. LiPo-bag), which prevents a flashover in case of a battery ignition.
- Never charge the battery unattended.
- The battery must always be charged outside the helicopter model. Therefore, remove the battery including the battery plate from the model.
- Only use the battery in combination with the included charger. Other uses are prohibited.
- Always store the battery in a dry and dark environment at room temperature. Never expose the battery to direct insolation or intense heat. When transporting the battery, the temperature must be between +10°C and +35°C. Never store the battery in your vehicle as it may catch fire or explode due to heat development in the interior.
- Should the battery bloat during the charging or discharging process, disconnect the charger or the ESC immediately from the battery. Danger of fire! A bloated battery can never be used again and must be disposed properly.
- In case of a crash: Disconnect the battery as fast as possible from the ESC. Make sure the battery doesn't bloat and check it for mechanical damages. Store the battery in a LiPo-bag or outside. The battery can still catch fire even after several hours.
- Keep the battery away from children and unauthorized persons.
- Let the battery cool down after each flight and before every charge.

- The battery must neither be overcharged nor exhausted. The battery is totally damaged and cannot be used anymore in case of an exhaustive discharge. Therefore do not exceed following flight times:

Flight Style	3D Mode	Max. Flight Time*
Hover	Off	6.5 Minutes
Basic Flight	Off	5.5 Minutes
Aerobatics	On	4 Minutes

* Please note: the max. flight time will be shorter in cold condition or with old batteries.

- Heli Professional will not accept responsibility for any damage or secondary failures caused by inappropriate use and rejects any liability, as we are not in a position to supervise proper operation, handling, and maintenance.



Checklist Maiden Flight

Attention: This checklist is supposed to give you a short overview of the preparations for the maiden flight and does not replace the contents of this manual.

- Unbox and check all parts for damage.
- Check if all screws are fully tighten
- Check if all connectors are plugged in securely
- The main blade screws must be tightened until the blades can only be moved with a lot of force
- Charge the battery with the included charger according to the instructions. Notice the safety instructions and pay attention to the correct polarity of the charger, the balancer and the ESC of the model.
- Insert AA batteries into the Transmitter. Do not change the settings of the transmitter in any way!
- Position and tighten the fully charged battery according to the picture on the battery plate with the included hook and loop fasteners and secure it with O-rings in the helicopter model.
- Secure the balancer plug under the hook and loop fastener according to the picture.



- Test all functions of the model. The FBL-3X system and the transmitter are already programmed. No further settings are required.
- The initial startup should be done on an appropriate airfield. Local clubs generally offer the best possibilities for safe and fun helicopter flying.

Checklist Regular Flights

Attention: This checklist is supposed to give you a short overview of regular flights and does not replace the contents of this manual.

- Check all connections and screws before every flight
- Secure the battery with O-rings in the battery rails and connect the ESC with the battery.

- To avoid the main blades from fold together when starting or landing, the main blade screws must be tighten very hard, so that the blades can only be moved with a lot of force. If the main blades fold together, they start an extreme vibration which can destroy the helicopter! If this happens, due to less tightened main blade screws, it can be stopped by pushing the pitch stick hard and fast to positive pitch (Motor must be cut off!). If you do this, you can avoid the helicopter from destroying itself.
- Always switch on the transmitter first! Throttle/pitch stick and other switches must be set on their zero position beforehand!
- Wait until the ESC and the FBL-3X system have initialized. The FBL-3X system has initialized when the swash plate has rotated once. The helicopter must stand absolutely still and leveled during this procedure.
- Check the function of all servos (direction of movement, etc.). **Therefore, put the autorotation switch in the position "lock". This prevents the motor from running unintendedly.**
- Fly with your model.
- Start the landing procedure before the battery is low.
- Disconnect the ESC from the battery and switch off the transmitter finally.

Charging the Flight Battery



Charge the 4S 4250mAh lithium polymer battery only with the included charger, which is optimally adjusted to charge and balance the battery. Disregarding this procedure may cause damage to the battery, the charger and the immediate environment (danger of fire). Never charge the battery unattended!

We recommend to charge and store the battery in a non-flammable environment (e.g. LiPo-bag). Pay attention to the correct polarity when connecting the charger and the balancers with the battery.

Power supply:

- 12V car battery: Use a 12V lead gel battery to connect directly to the charger (no power adaptor necessary).
- 230V power supply: Use the charger only with an appropriate power adaptor (Not included. Ord. no. 01.1378 and 01.1376).

Charging the battery:

1. Disconnect the battery from the ESC and remove the battery with the battery plate from the model.
2. Connect the charger first with the 12V power supply. All LEDs must **blink** red and green.
3. Now connect the battery with the charger and the balancer plug of the battery with the balancer socket of the charger according to the picture. The LEDs are blinking red.
4. Choose the charging current with the knob (recommendation: 4.5A).
5. Press the start button. All LEDs must **glow** red.
6. When the charging is finished, you will hear a whistling sound and all LEDs must **glow** green.
7. Disconnect the battery from the charger and disconnect the charger from the power supply.



Insert the Batteries in the Transmitter

Insert 8 AA batteries (not included) into the 2.4 GHz transmitter. Pay attention to the correct polarity. Check the power level of the batteries on the voltage display. Change the batteries immediately when the voltage is too low and the acoustic warning signal sounds.

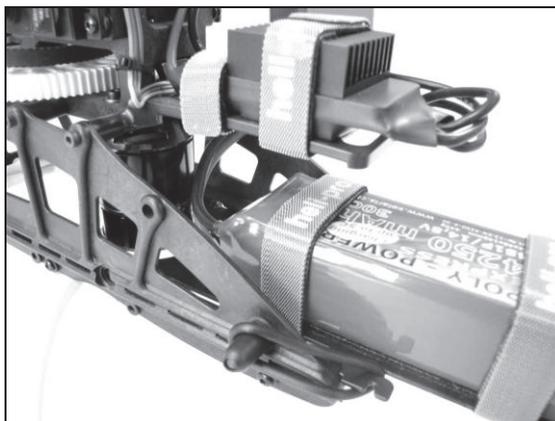


Inserting the flight battery

Slide the battery plate including the flight battery into the battery rails of the front porch and secure it with O-rings.



Sliding in the battery plate.



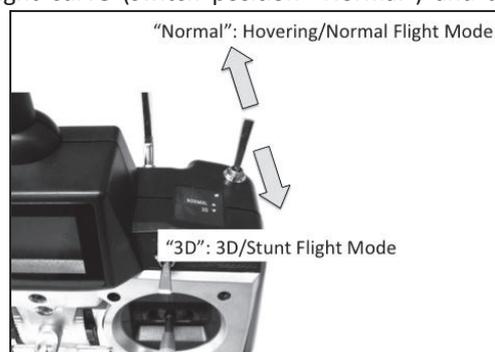
Securing the battery plate with O-rings.

Transmitter settings

Do not change any settings or the programming of the transmitter. All settings are optimally configured ex works. Any changes whatsoever are at your own risk. Heli Professional will not accept responsibility for damages or any secondary failures.

Two throttle curves are programmed ex works: a hovering/normal flight curve (switch position "Normal") and a 3D/stunt flight curve (switch position "3D").

Hovering/Normal Flight Mode (Pitch Range $-5^{\circ}/+12^{\circ}$): When switching on the transmitter or starting the model, always put the pitch stick in its lowest position. If you tilt the pitch stick slowly upwards, the collective pitch angle of the main blades will increase, and the helicopter will start to climb. If you lower the pitch stick, the collective pitch angle of the main blades will decrease and the helicopter will start to descent.



Never change the stick positions of the aileron, elevator and rudder stick while the helicopter lifts off! You are only allowed to actually pilot the helicopter after it has lifted off from the ground completely. Otherwise, the gyro stabilizer system can be interfered.

3D/Stunt Flight Mode (Pitch Range $-12^{\circ}/+12^{\circ}$): In contrast to the hovering/normal flight mode, the maximum negative pitch range is -12° . This means that you have a collective pitch angle of 0° in the mid-position of the pitch stick. So, when switching on the transmitter or starting the model, always put the pitch stick in a position some degrees below the mid-position. If you tilt the pitch stick slowly upwards, the collective pitch angle of the main blades will increase, and the helicopter will start to climb. If you lower the pitch stick towards the mid-position, the collective pitch angle of the main blades will decrease and the helicopter will start to descent. If you lower the pitch stick below the mid-position, the collective pitch angle of the main blades (in the negative direction) will increase again and you are able to fly loops, rolls and 3D maneuvers.

Never change the stick positions of the aileron, elevator and rudder stick while the helicopter lifts off! You are only allowed to actually pilot the helicopter after it has lifted off from the ground completely. Otherwise, the gyro stabilizer system can be interfered.

Do not toggle between the flight modes during 3D flights or normal flights. Set the pitch stick in mid-position and hover or land the helicopter to toggle between the flight modes!

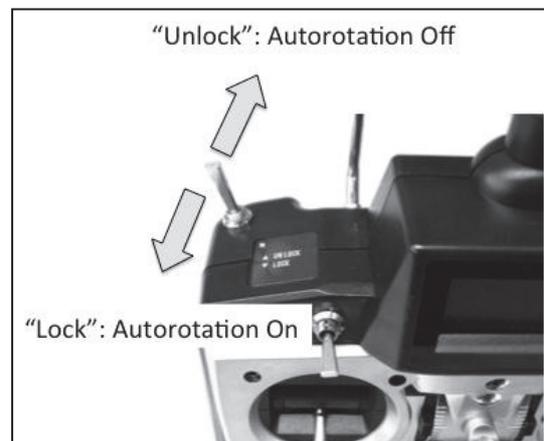
Autorotation: Set the autorotation switch during regular flights to "Unlock". Otherwise, the motor will not run.

If you want to initiate an autorotation, put the autorotation switch into the "Lock" position. The motor will immediately stop running and you land the helicopter with the residual energy of the rotor blades.

Attention: An autorotation is a difficult maneuver, needs training and should not be performed by beginners!

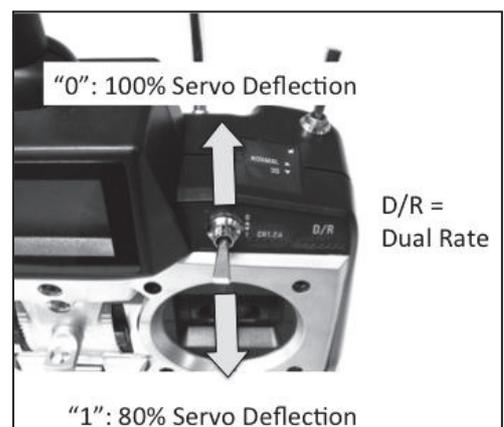
If you lose control of the helicopter and a crash is imminent, use the autorotation switch to stop the motor from running. This will reduce the damage on the model.

For safety reasons: Always put the autorotation switch into the "Lock" position when you perform a function control, change settings, carry the helicopter, etc. This avoids the motor from unintentional starting which can lead to serious injuries.



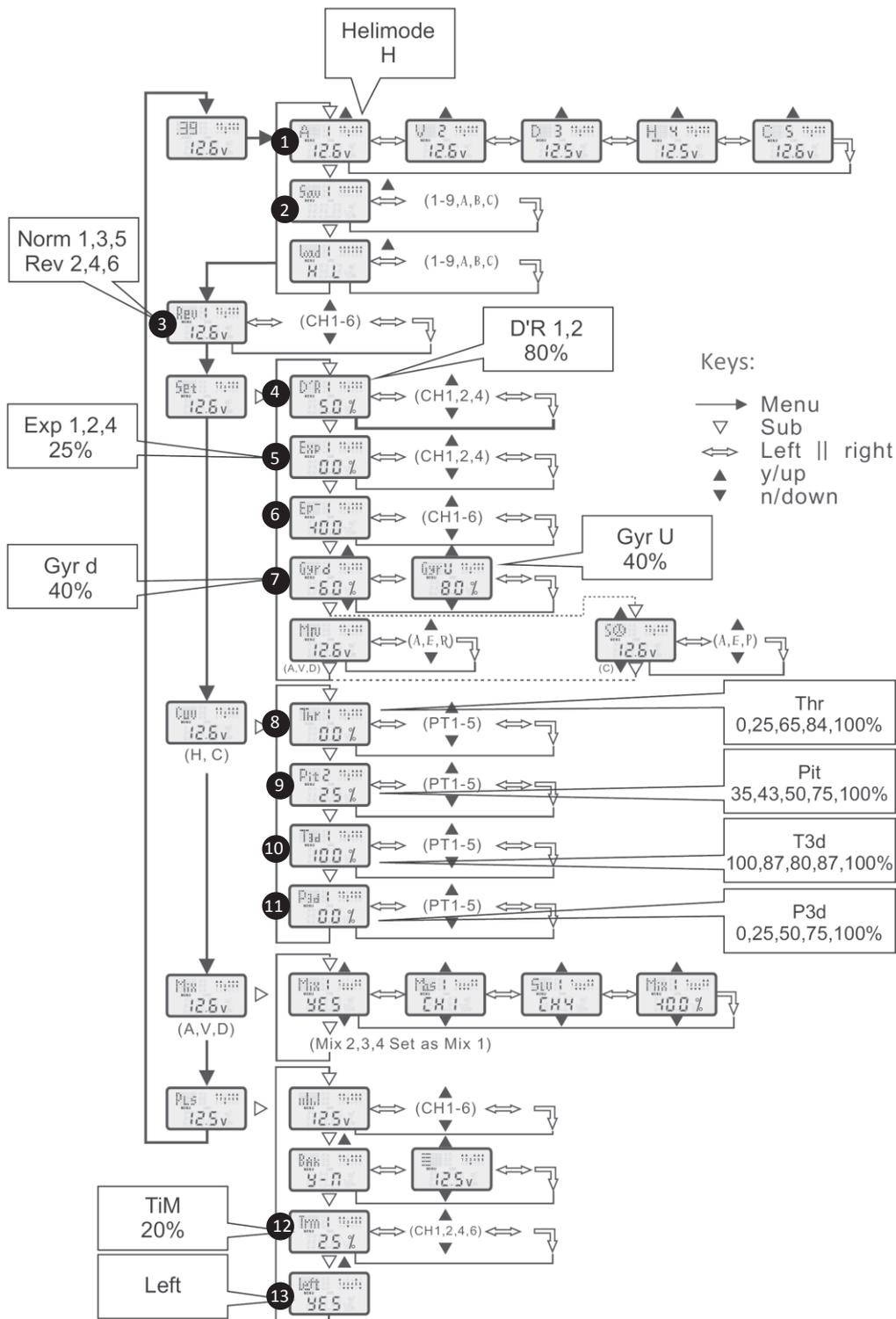
Dual Rate: The "Dual Rate" switch limits the servo deflection. Limiting the servo deflection can be helpful to get used to the model and to avoid oversteering.

This helpful function has already been programmed: If you put the D/R switch into position "0", the servo deflections are not limited (100% servo deflection). If you put the D/R switch into position "1", the servo deflections are limited to 80%. We recommend beginners to limit the servo deflection to 80%.

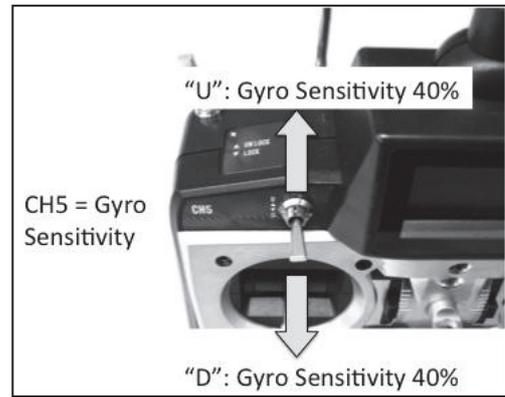


Standard Transmitter Configuration

Menü 1		Menü SET		Menü CUV	
Mode	1 Helimode	D/R Channel 1	4 80%	Throttle Normal	8 0-25- 65-84-100
Model Nr.	2 1 of 12	D/R Channel 2	80%	Pitch Normal	9 35-43-50- 75-100
Menü Reverse	3	D/R Channel 4	100%	Throttle 3D	10 100-87-80-87-100
Kanal 1	Normal	Expo Channel 1	5 25%	Pitch 3D	11 0-25-50-75-100
Kanal 2	Reverse	Expo Channel 2	25%	Menü PLS	
Kanal 3	Normal	Expo Channel 4	25%	Timer Start	12 20%
Kanal 4	Reverse	Endpoint 1 – 6	6 Individuell	Mode	13 2
Kanal 5	Normal	Gyro U	7 40%		
Kanal 6	Reverse	Gyro D	40%		



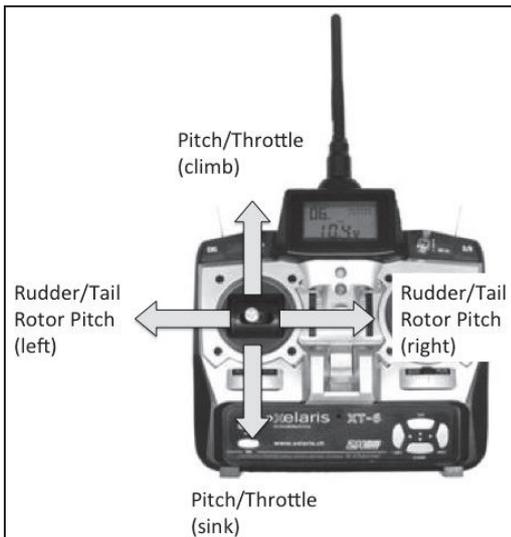
Gyro Sensitivity: The “CH 5” switch controls the gyro sensitivity. 40% sensitivity is factory-adjusted which turned out to be the perfect adjustment for all flight modes. So, both switch positions are set to the same value and you are not allowed to change this setting. The switch position is irrelevant.



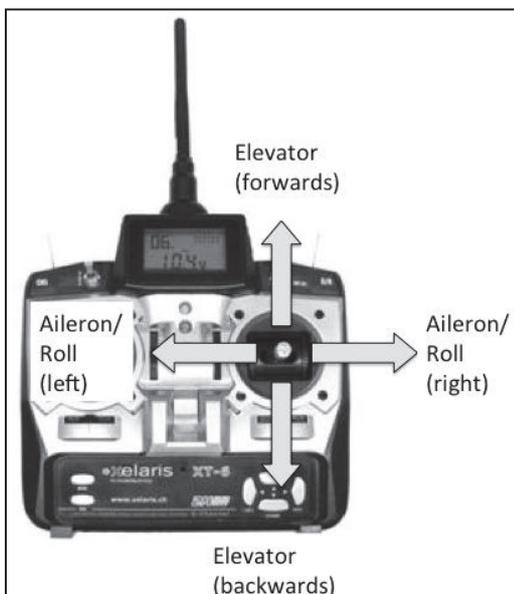
Control Test

Although the helicopter was mounted, adjusted and tested ex works, it is necessary to check all functions of the model to exclude any damages that might have arisen during the transport. Before you start the function test, you have to adjust the steering mode configuration. There are two options to choose from: Mode 1 and Mode 2. Mode 2 is the default configuration. If you want to change the mode, see the included transmitter manual for detailed instructions.

Mode 2:

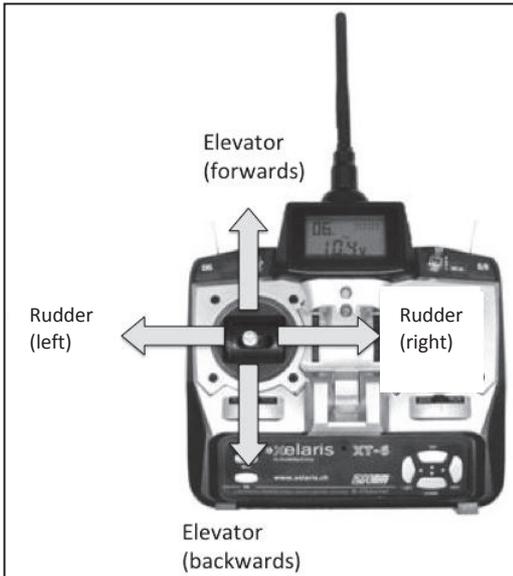


The left stick controls collective pitch/throttle (climb/sink) and rudder/tail rotor pitch (left/right).

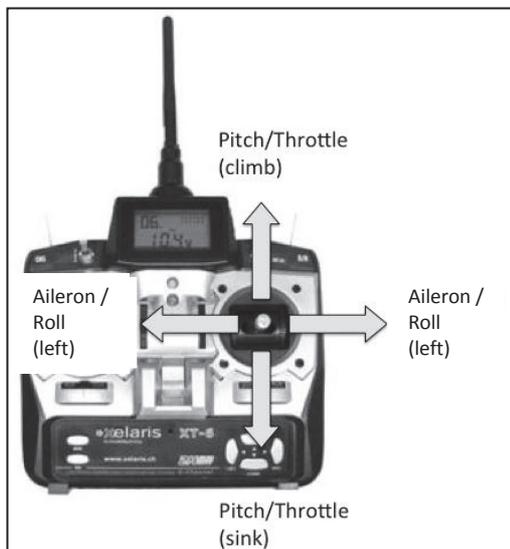


The right stick controls the wash plate movements, i.e. elevator (forwards/backwards) and aileron/roll (left/right).

Mode 1:



The left stick controls the swash plate movements, i.e. elevator (forwards/backwards) and aileron/roll (left/right).

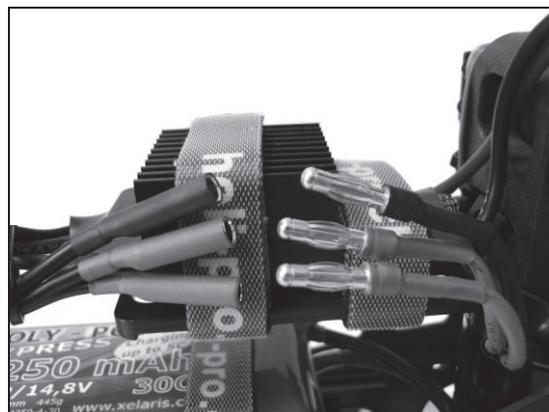


The right stick controls collective pitch/throttle (climb/sink) and rudder/tail rotor pitch (left/right).

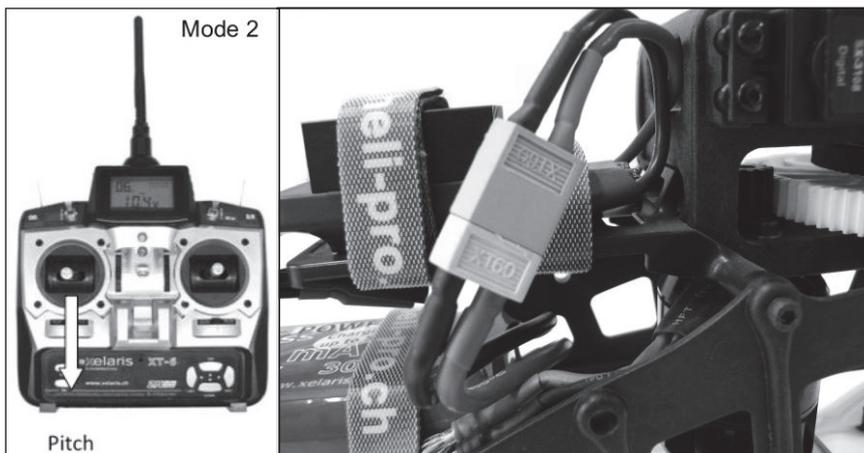
The following control test is explained on the basis of mode 2! If you use mode 1, the control commands change accordingly.

Place the helicopter on a flat surface and position yourself in a way that you can look at the model from all angles.

1. It is absolutely necessary to disconnect the plugs between motor and ESC.



2. Put the pitch/throttle stick into its lowest position and switch on the transmitter.



3. Connect the flight battery and the ESC and wait until both the ESC and the FBL-3X have initialized.

4. Put the autorotation switch into the position “Lock”!

5. Move the pitch stick all the way up and down and check the vertical movement of the swash plate on the main rotor shaft as well as the ease of movement of all linkage rods.



Mode 2: Topmost position of the pitch/throttle stick (seen from the left side in direction of flight).



Mode 2: Lowest position of the pitch/throttle stick. (seen from the left side in direction of flight).

6. Check the rudder/tail rotor pitch function by moving the stick all the way from left to right. Check the ease of movement of the tail pitch control lever on the tail rotor shaft. When you move the stick to the left, the tail pitch control lever must move to the right and vice versa.

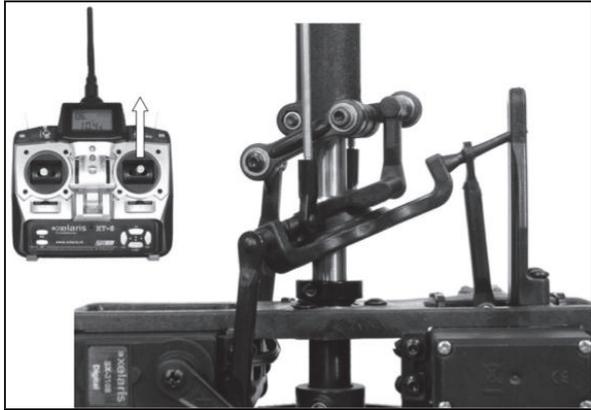


Mode 2: Left position of the rudder/tail rotor pitch stick.

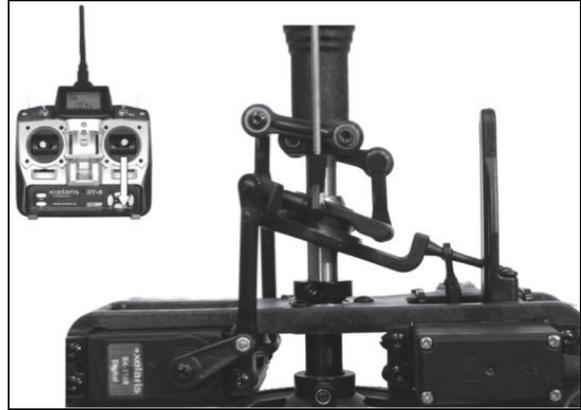


Mode 2: Right position of the rudder/tail rotor pitch stick.

7. Move the elevator stick all the way up and down and check the tilt direction of the swash plate. When you move the stick forwards, the swash plate must tilt forwards (in the direction of flight) and vice versa.



Mode 2: Topmost position of the elevator stick (seen from the left side in direction of flight).

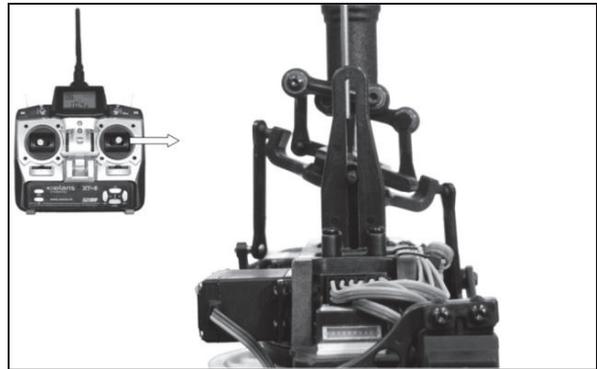


Mode 2: Lowest position of the elevator stick (seen from the left side in direction of flight).

8. Move the aileron/roll stick all the way from left to right and check the tilt direction of the swash plate. When you move the stick to the left, the swash plate must tilt to the left (in the direction of flight) and vice versa.



Mode 2: Left position of the aileron stick (seen from behind the swash plate in direction of flight).



Mode 2: Right position of the aileron stick (seen from behind the swash plate in direction of flight).

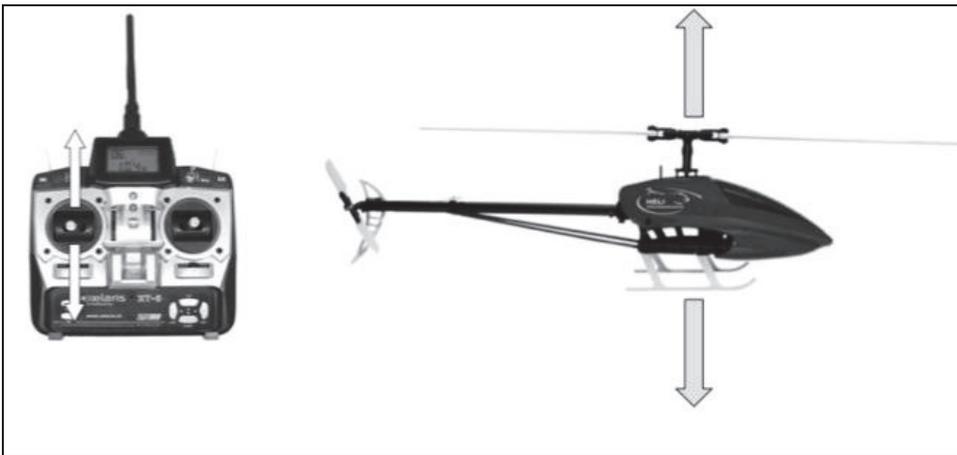
Control Functions During Flights

This chapter explains the basic control/steering functions of the helicopter based on Mode 2.

In general: Steering one of the four control functions (e.g. pitch/throttle) does always lead to a change in the overall flight position of the model. This means that you always have to steer the other three control functions accordingly to keep the helicopter in the desired flight position.

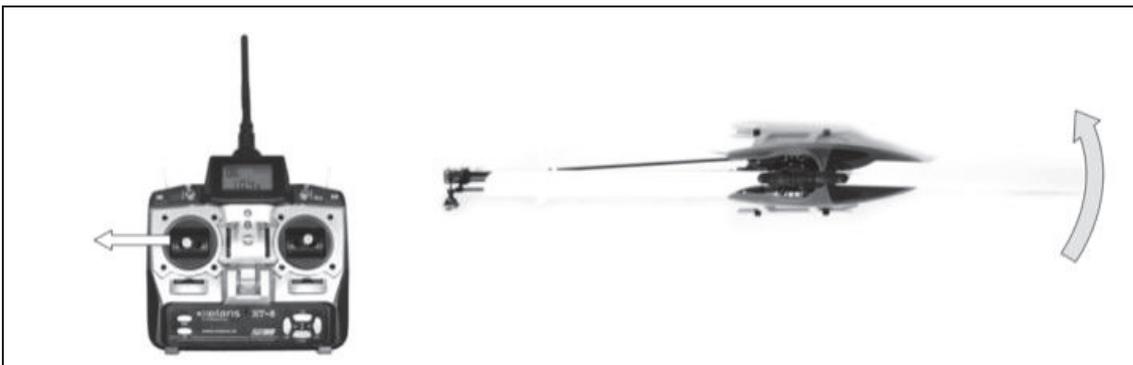
Important: Steering the rudder/tail rotor pitch function changes the position of the tail boom, but in fact, you always steer the nose of the model (see rudder/tail rotor pitch function for more details).

Pitch/Throttle Function



If you move the pitch/throttle stick forwards, the main rotor blade angle will change and the helicopter will climb. If you move the pitch/throttle stick backwards, the main rotor blade angle will change and the helicopter will descend.

Rudder/Tail Rotor Pitch Function

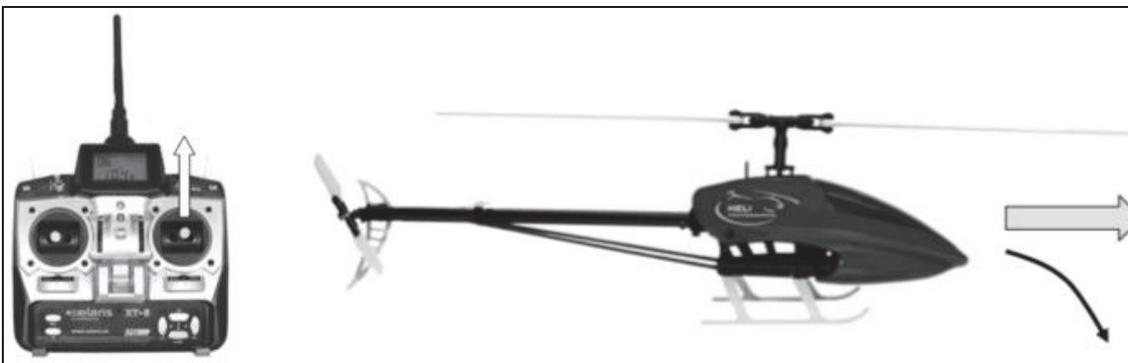


If you move the rudder/tail rotor pitch stick to the left, the tail blade angle will change and the helicopter will turn around its vertical axis. Consequently, the nose of the helicopter will turn to the left in the direction of flight.



If you move the rudder/tail rotor pitch stick to the right, the tail blade angle will change and the helicopter will turn around its vertical axis. Consequently, the nose of the helicopter will turn to the right in the direction of flight.

Elevator Function

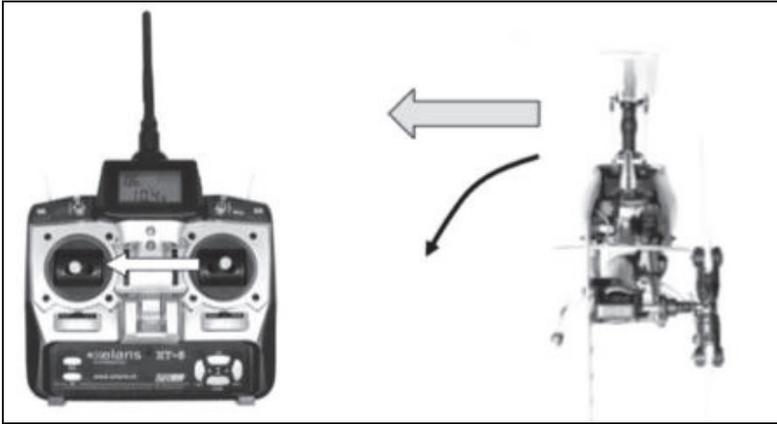


If you move the elevator stick forwards, the main rotor blade angle will change and the helicopter will turn around its lateral axis. Consequently, the helicopter will tilt forwards and fly forwards.

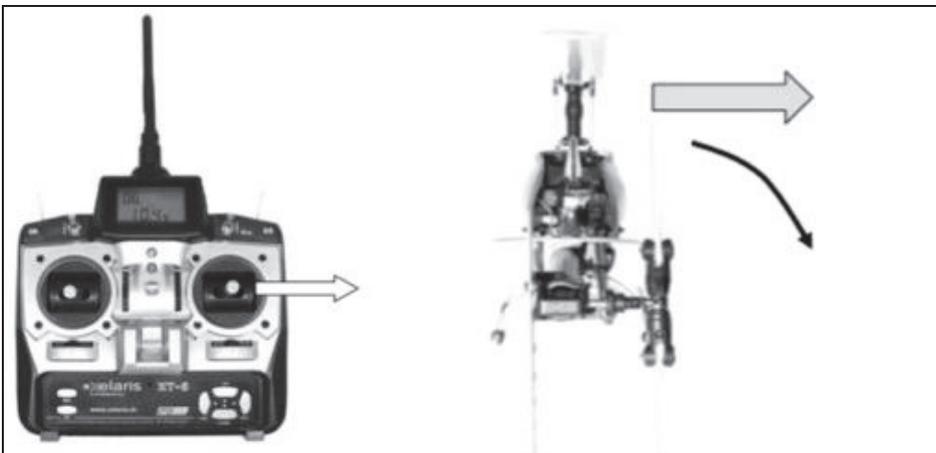


If you move the elevator stick backwards, the main rotor blade angle will change and the helicopter will turn around its lateral axis. Consequently, the helicopter will tilt backwards and fly backwards.

Aileron/Roll Function



If you move the aileron/roll stick to the left, the main rotor blade angle will change and the helicopter will turn around its longitudinal axis. Consequently, the helicopter will tilt and fly to the left.



If you move the aileron/roll stick to the right, the main rotor blade angle will change and the helicopter will turn around its longitudinal axis. Consequently, the helicopter will tilt and fly to the right.

Trim Functions

The trim functions allow you to adjust the flight characteristics and to avoid an unintended drift of the helicopter via the longitudinal and lateral axis. **Do not trim the rudder/tail rotor pitch because this is done automatically by the gyro system. However, should the tail rotor drift away unintentionally, switch off the helicopter, disconnect all plugs and then, reconnect all plugs so that the ESC and the FBL-3X gyro system can initialize again.**

Nevertheless, the helicopter will never remain absolutely stable in its hovering position even with a perfect trimming. A steady correction of all control functions is always necessary to keep the helicopter in the intended flight position.



Mode 2: Hovering/Normal Flight Mode and 3D/Stunt Flight Mode: Trimming the pitch/throttle is never necessary. Leave the slide control in mid-position.



Mode 2: Use the elevator trim slide control if the helicopter drifts forwards or backwards when hovering with no elevator stick input.



Mode 2: Use the aileron/roll trim slide control if the helicopter drifts to the left or right when hovering with no aileron/roll stick input.

Preparing the Maiden Flight

Although the helicopter was mounted, adjusted and tested ex works, it is necessary to check the following functions.

- Check the tail drive belt tension: It is sufficiently tense when you can push it down max. 5 mm in the tail rotor housing with normal force. Check the tension regularly. Tensing the tail drive belt: Loosen both M3x20 mm bolts of the tail boom housing in the frame. Loosen the M3x35 mm bolt of the stabilizer fin. Tense the tail drive belt by pulling the tail boom backwards. Level the tail boom exactly horizontally and tighten all bolts again. A too loose or too tense tail drive belt can wear out quickly or can even jump out of its guidance (failure of the tail rotor).
- Check the fastenings of all electrical parts and the wiring. Cables must not come in contact with rotating parts.
- Check the main and tail rotor blades for firm seating. Tighten the blades until they can only be moved with a lot of force.
- Check all bolts for firm seating. Tighten loose bolts if necessary.
- **All bolts must always be secured with thread lock!**

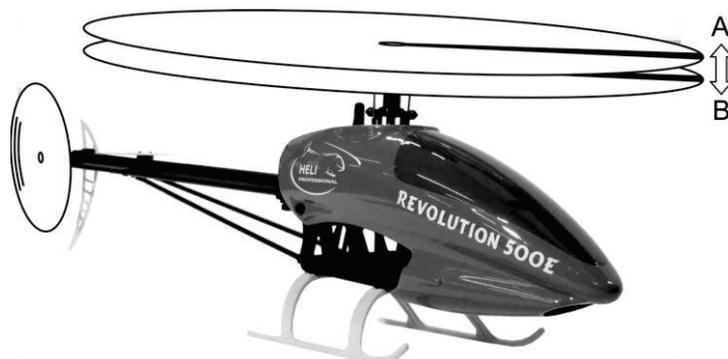
You are finally ready for the maiden flight with your new Revolution 500E RTF.

Adjusting the Rotor Blade Tracking

Although the rotor blade tracking was adjusted ex works, it is absolutely necessary to check it during the maiden flight and on a regular basis afterwards. In addition, you must adjust the rotor blade tracking after every crash. If the main blades are running out of track, vibrations, loss of power and instability will be the result. Hence, adjusting the rotor blade tracking is a crucial process and should be done with special diligence.

Attention: Adjusting the rotor blade tracking is executed with rotating blades. Always keep a safety distance of at least 10 m between you and the model.

1. Switch the model on and bring the rotor blades to hovering speed. If both blades are running at one level, no further adjustments will be necessary.
2. If you see two rotor blade levels (as in the illustration below), adjustments will be necessary.
3. Switch the model off and wait until the blades stop to rotate. Mark one rotor blade with thin, colored duct tape or a clearly visible, colored pen.
4. Switch the model on again and bring the rotor blades to a hovering speed. You can either check the rotor blade tracking on the ground or in the air at approximately eye level. It is useful to have an assistant who eyeballs the rotor blade tracking. By targeting the marked rotor blade, you can easily spot whether the rotor blade is running out of track upwards or downwards.
5. Bring the rotor blades to a standstill.
6. **A:** The rotor blade, which runs out of track upwards, has too much pitch. This means that you have to shorten the pitch linkage rod between the blade holder and the swash plate by screwing in one ball link for one full rotation. **Never screw in the ball link for only half a rotation!**
7. **B:** The rotor blade, which runs out of track downwards, has not enough pitch. This means you have to lengthen the pitch linkage rod between the blade holder and the swash plate by unscrewing one ball link for one full rotation. **Never unscrew the ball link for only half a rotation!**
Change the lengths of the linkage rods **only on one rotor blade at a time** and check the rotor blade tracking again.
8. Repeat this procedure until the rotor blade tracking is adjusted almost perfectly. Minimal deviations do not compromise the flight characteristics.



Thanks for purchasing a Xelaris Brushless Electronic Speed Controller (ESC). High power system for RC model is very dangerous, please read this manual carefully. In that we have no control over the correct use, installation, application, or maintenance of our products, no liability shall be assumed nor accepted for any damages, losses or costs resulting from the use of the product. Any claims arising from the operating, failure or malfunctioning etc. will be denied. We assume no liability for personal injury, property damage or consequential damages resulting from our product or our workmanship. As far as is legally permitted, the obligation to compensation is limited to the invoice amount of the affected product.

Specifications:

Current:	80A
Peaks:	100A
BEC:	Switch BEC
BEC output:	5V – 4A
Cells:	2 – 4 LiPo Cells / 5 – 12 NiMH Cells
Weight:	82g
Size (L x W x H)	86x38x12

Programmable Items (The option written in bold font is the default setting):

1. Brake Setting: **Enabled** / Disabled
2. Battery Type: **Lipo** / NiMH
3. Low Voltage Protection Mode(Cut-Off Mode): **Soft Cut-Off (Gradually reduce the output power)** /Cut-Off (Immediately stop the output power)
4. Low Voltage Protection Threshold(Cut-Off Threshold): Low / **Medium** / High
 - 1) For lithium battery, the battery cell number is calculated automatically. Low / medium / high cutoff voltage for each cell is: 2.85V/3.15V/3.3V. For example: For a 3S Lipo, when "Medium" cutoff threshold is set, the cut-off voltage will be: 3.15*3=9.45V
 - 2) For NiMH battery, low / medium / high cutoff voltages are 0%/50%/65% of the startup voltage (i.e. the initial voltage of battery pack), and 0% means the low voltage cut-off function is disabled. For example: For a 10 cells NiMH battery, fully charged voltage is 1.44*6=8.64V, when "Medium" cut-off threshold is set, the cut-off voltage will be:8.64*50%=4.32V.
5. Startup Mode: Normal /Soft /**Super-Soft** (300ms / 1.5s / 3s)
 Normal mode is suitable for fixed-wing aircraft. Soft or Super-soft modes are suitable for helicopters. The initial acceleration of the Soft and Super-Soft modes are slower, it takes 1.5 second for Soft startup or 3 seconds for Super-Soft startup from initial throttle advance to full throttle. If the throttle is completely closed (throttle stick moved to bottom position) and opened again (throttle stick moved to top position) within 3 seconds after the first startup, the re-startup will be temporarily changed to normal mode to get rid of the chance of a crash caused by slow throttle response. This special design is suitable for aerobatic flight when quick throttle response is needed.
6. Timing: **Low** / Medium / High,(3.75°/15°/26.25°)
 Usually, low timing is suitable for most motors. To get higher speed, High timing value can be chosen.

Begin to use your ESC

IMPORTANT! Because different transmitter has different throttle range, please calibrate throttle range before flying.

Throttle range setting: (Throttle range should be reset whenever a new transmitter is being used)

Switch on the transmitter, move throttle stick to the top position	Connect battery pack to the ESC, and wait for about 2 seconds	The "Beep-Beep-" tone should be emitted, means the top point of throttle range has been confirmed	Move throttle stick to the bottom position, several "beep-" tones should be emitted to present the amount of battery cells	A long "Beep-" tone should be emitted, means the lowest point of throttle range has been correctly confirmed
--	---	---	--	--

Normal startup procedure:

Move throttle stick to bottom position and then switch on transmitter.	Connect battery pack to ESC, special tone like "♪123" means power supply is OK	Several "beep-" tones should be emitted to present the amount of lithium battery cells	When self-test is finished, a long "beep-----" tone should be emitted	Move throttle stick upwards to go flying
--	--	--	---	--

Protection Function

1. Start up failure protection: If the motor fails to start within 2 seconds of throttle application, the ESC will cut-off the output power. In this case, the throttle stick **MUST** be moved to the bottom again to restart the motor. (Such a situation happens in the following cases: The connection between ESC and motor is not reliable, the propeller or the motor is blocked, the gearbox is damaged, etc.)
2. Over-heat protection: When the temperature of the ESC is over about 110 Celsius degrees, the ESC will reduce the output power.
3. Throttle signal loss protection: The ESC will reduce the output power if throttle signal is lost for 1 second, further loss for 2 seconds will cause the output to be cut-off completely.

Trouble shooting

Trouble	Possible Reason	Action
After power on, motor does not work, no sound is emitted	The connection between battery pack and ESC is not correct	Check the power connection. Replace the connector.
After power on, motor does not work, such an alert tone is emitted: "beep-beep-, beep-beep-,beep-beep-" (Every "beep-beep-" has a time interval of about 1 second)	Input voltage is abnormal, too high or too low.	Check the voltage of battery pack
After power on, motor does not work, such an alert tone is emitted: "beep-, beep-, beep- "(Every "beep-" has a time interval of about 2 seconds)	Throttle signal is irregular	Check the receiver and transmitter Check the cable of throttle channel
After power on, motor does not work, such an alert tone is emitted: "beep-, beep-, beep- "(Every "beep-" has a time interval of about 0.25 second)	The throttle stick is not in the bottom (lowest) position	Move the throttle stick to bottom position
After power on, motor does not work, a special tone "♪567i2" is emitted after 2 beep tone (beep-beep-)	Direction of the throttle channel is reversed, so the ESC has entered the program mode	Set the direction of throttle channel correctly
The motor runs in the opposite direction	The connection between ESC and the motor need to be changed.	Swap any two wire connections between ESC and motor

Program the ESC with your transmitter (4 Steps)

Note: Please make sure the throttle curve is set to 0 when the throttle stick is at bottom position and 100% for the top position.

1. Enter program mode
2. Select programmable items
3. Set item's value (Programmable value)
4. Exit program mode

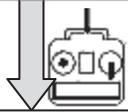
1. Enter program mode

- 1) Switch on transmitter, move throttle stick to top position, connect the battery pack to ESC
- 2) Wait for 2 seconds, the motor should emit special tone like "beep-beep-"
- 3) Wait for another 5 seconds, special tone like "♪567i2" should be emitted, which means program mode is entered



2. Select programmable items:
After entering program mode, you will hear 8 tones in a loop with the following sequence. If you move the throttle stick to bottom within 3 seconds after one kind of tones, this item will be selected.

1. "beep"	brake	(1 short tone)
2. "beep-beep-	battery typ	(2 short tone)
3. "beep-beep-beep-"	cutoff mode	(3 short tone)
4. "beep-beep-beep-beep-"	cutoff threshold	(4 short tone)
5. "beep-----"	startup mode	(1 long tone)
6. "beep-----beep-"	timing	(1 long 1 short)
7. "beep-----beep-beep-"	set all to default	(1 long 2 short)
8. "beep-----beep-----"	exit	(2 long tone)





3. Set item value (Programmable value):
You will hear several tones in loop. Set the value matching to a tone by moving throttle stick to top when you hear the tone, then a special tone "i5i5" emits, means the value is set and saved. (Keeping the throttle stick at top, you will go back to Step 2 and you can select other items; or moving the stick to bottom within 2 seconds will exit program mode directly)

Tones	"beep-" 1 short tone	"beep-beep-" 2 short tones	"beep-beep-beep-" 3 short tones
Brake	Off	On	-
Battery type	Lipo	NiMH	-
Cutoff mode	Soft-Cut	Cut-Off	-
Cutoff threshold	Low	Medium	High
Start mode	Normal	Soft	Super soft
Timing	Low	Medium	High



4. Exit program mode
There are 2 ways to exit program mode:

1. In step 3, after special tone "i5i5", please move throttle stick to the bottom position within 2 seconds.
2. In step 2, after tone "beep-----beep-----"(ie.The item #8), move throttle stick to bottom within 3 seconds.

RTF



REVOLUTION 500E RTF

Bauanleitung V 2.0
Assembly Instruction V 2.0

INHALT/CONTENT

Benötigtes Werkzeug & Allgemeine Hinweise/Required Tools & General Information

Bauanleitung und Handbuch/Assembly Instructions and Manual

Teileliste/Parts List

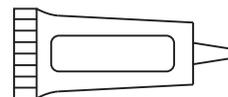
Benötigtes Werkzeug/Required Tools



Innensechskantschlüssel
Hexagon Socket Wrenches
SW 1.5/2/2.5/3



Schraubensicherungslack, mittelfest
Locking Paint, medium



Sekundenkleber
Superglue



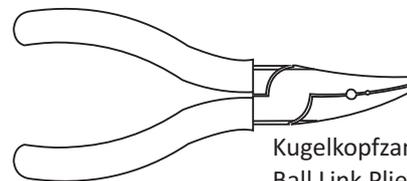
Fett
Grease



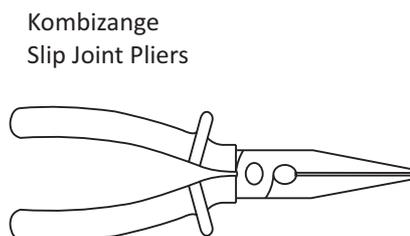
Kreuzschlitzschraubendreher
Phillips Screwdriver



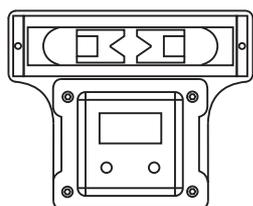
Messschieber
Caliper



Kugelpkopfzange
Ball Link Pliers



Kombizange
Slip Joint Pliers



Digi-Pitch

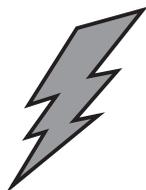


Kugelpkopfeindreher
Ball Link Driver

1 m Schnur
1 m Piece of String

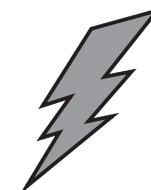


Allgemeine Hinweise/General Information

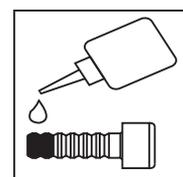


WICHTIG: Bevor Sie mit dem Zusammenbau oder der Inbetriebnahme beginnen, lesen Sie diese Anleitung bitte sorgfältig durch!

IMPORTANT: Before beginning with the assembly or taking the helicopter into operation please read this manual thoroughly!



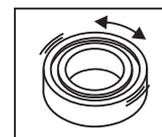
- Grundsätzlich muss jede Schraube mit Sicherungslack eingeklebt werden. Das rechts abgebildete Symbol soll Sie während des Zusammenbaus daran erinnern. Rillenkugellager werden NICHT eingeklebt.
- In general, every screw must be secured with locking paint. The symbol on the right-hand side is supposed to remind you while going through the assembly process. Ball bearings must NOT be secured with locking paint.



1:1

- Die in den Bauabschnitten abgebildeten Schrauben und Kleinteile sind in Originalgröße dargestellt.
- The screws and all other parts depicted in the assembly steps are actual-size drawings.

- Achten Sie auf die Freigängigkeit aller verbauten Rillenkugellager, Flanschlager und Drucklager.
- Check all ball bearings, flanged bearings, and thrust bearings for ease of movement.

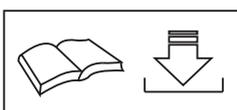


A → B → C

- Montieren Sie die Bauteile in der angegebenen Reihenfolge.
- Assemble the parts in the specified order.

- Wiederholen Sie den Montageschritt so oft wie angegeben (hier: zwei Mal).
- Repeat the assembly step as often as specified (here: twice).

2x



- Handbücher und Bauanleitungen für Tuningteile sind direkt von der Webseite zu beziehen.
- Manuals and assembly instructions for tuning parts are to be downloaded directly from the website. **www.heli-professional.com**

1

Normteile/Standard Parts

8 3x12 Treibschraube
Self-Tapping Screw 8x

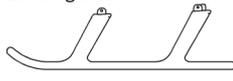


9 3x7.5 Linsenkopf-Treibschraube
Hex Over-Head Self-Tapp. Screw 2x



1:1

1 Landegestell
Landing Skid 1x



2 Seitenplatte links
Side Plate left 1x



7 I-Ø 25.5 O-Ring 2x

3 Seitenplatte rechts
Side Plate right 1x

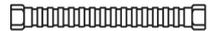


4 Heckplatte
Rear Plate 1x

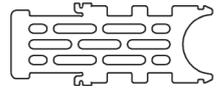


104 Kufenstopper
Landing Skid Nut 4x

5 Distanzrolle Vorbau
Spacer Sleeve Porch 1x



6 Akkuplatte
Battery Plate 1x

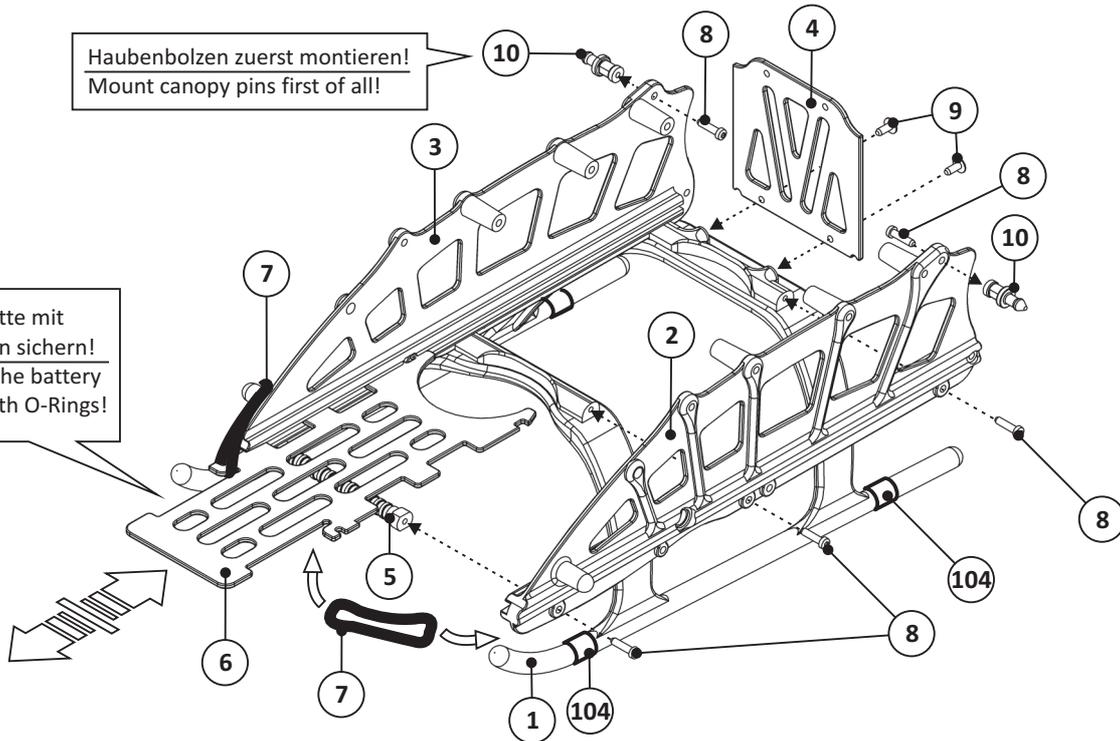


10 Haubenbolzen
Canopy Pin 2x



Haubenbolzen zuerst montieren!
Mount canopy pins first of all!

Akkuplatte mit
O-Ringen sichern!
Secure the battery
plate with O-Rings!



2

Normteile/Standard Parts

11 3.2x7x0.5 U-Scheibe
M3 Washer 2x



12 3x10x4 Kugellager
Ball Bearing 4x



13 3x16 Treibschraube
Self-Tapping Screw 2x



14 3x6x1.3 Hülse
Sleeve 2x

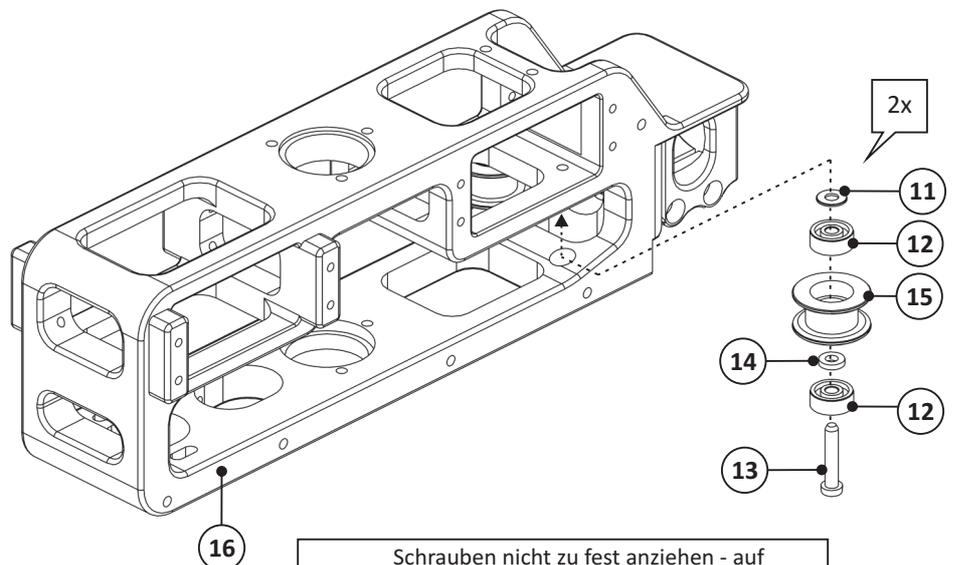
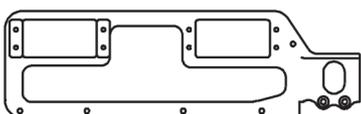


1:1

15 Heckriemenrolle
Tail Belt Guidance 2x



16 Rahmen
Frame 1x



Schrauben nicht zu fest anziehen - auf
Freigängigkeit der Riemenrolle achten!
Don't tighten screws too much - make sure
that tail belt guidance spins freely!



Normteile/Standard Parts

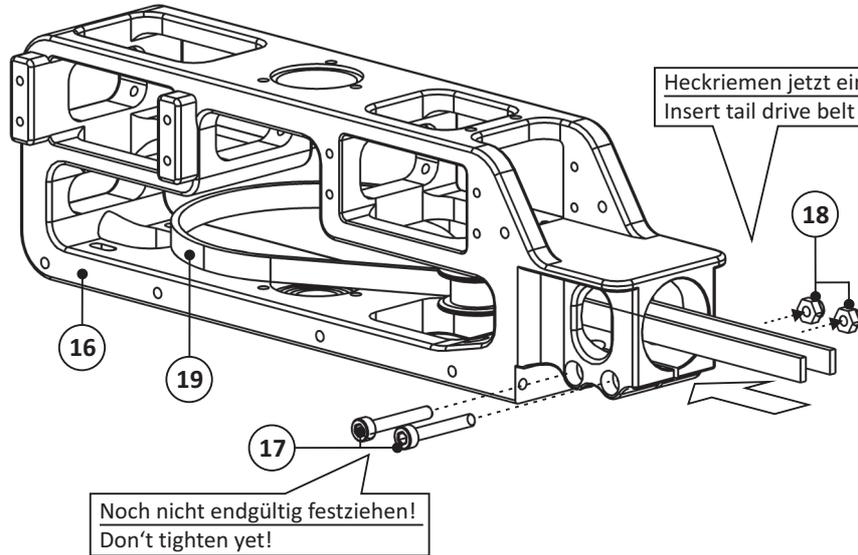
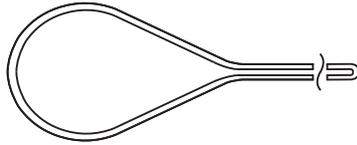
- 17** M3x20 Schraube
Hex Socket Screw 2x


- 18** M3 Stopmutter
Lock Nut 2x



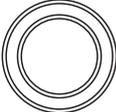
1:1

- 19** Heckriemen
Tail Drive Belt 1x



Normteile/Standard Parts

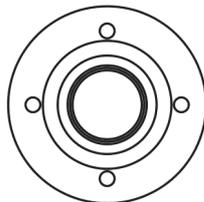
- 20** 10x15x4 Kugellager
Ball Bearing 2x


- 21** M3x6 Schraube
Hex Socket Screw 4x

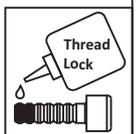
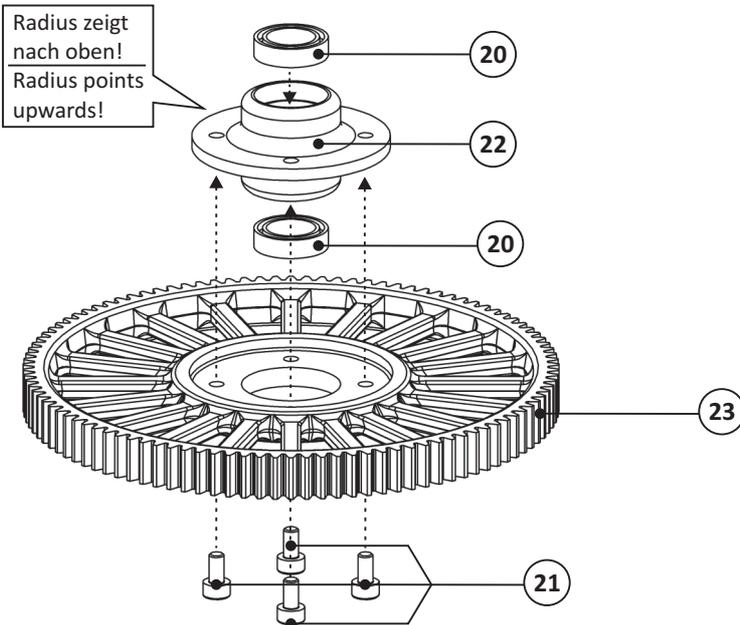
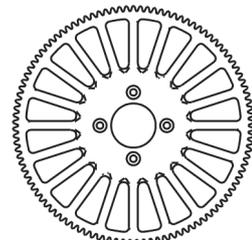


1:1

- 22** Freilaufnabe
Autorotation Hub 1x

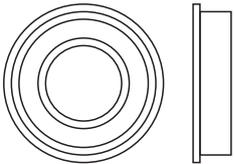


- 23** Hauptzahnrad 106Z
Main Drive Gear 106T 1x



Normteile/Standard Parts

- 24** 10x19x5 Flanschlager 2x
Flanged Bearing

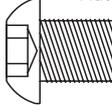


18 M3 Stopmutter 1x
Lock Nut


- 9** 3x7.5 Linsenkopf-Treibrschraube 6x
Hex Over-Head Self-Tapp. Screw

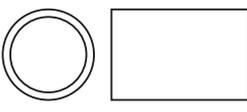


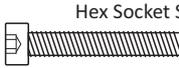
26 M8x10 Flachkopfschraube 1x
Flat-Head Hex Screw


- 25** M2.5x8 Schraube 1x
Hex Socket Screw



27 10x12x18 Hülse 1x
Main Shaft Sleeve


- 17** M3x20 Schraube 1x
Hex Socket Screw



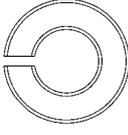
189 Innensechskantschlüssel SW 5 1x
Hexagon Socket Wrenches SW 5

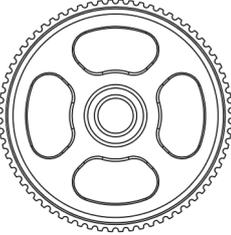


1:1

- 28** Hauptrotorwelle 1x
Main Shaft


- 29** Klemmring 1x
Clamping Ring


- 30** Heckriemenrad 70Z 1x
Tail Drive Pulley 70T



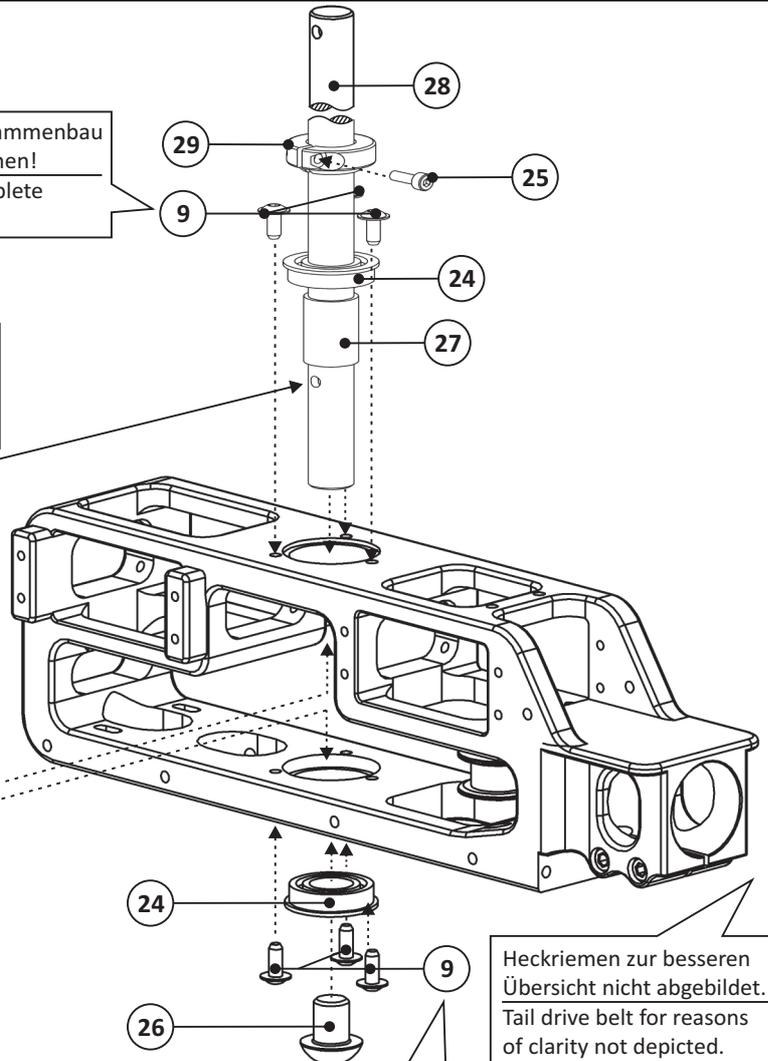
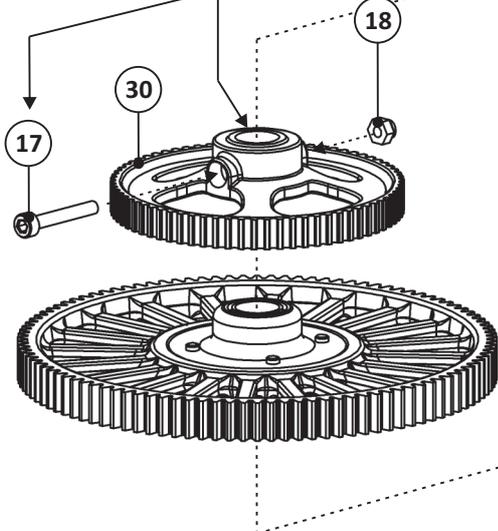


Getriebeeinheit und Rotorwelle dürfen kein axiales Spiel im Rahmen haben. Der Rahmen hat deshalb eine gewölbte Formgebung!
Transmission and main shaft must not have axial clearance in the frame! The frame has therefore a curved shape!



Schrauben erst NACH komplettem Zusammenbau der Getriebeeinheit gleichmäßig anziehen!
Tighten screws equally AFTER the complete assembly of the transmission unit!

Geben Sie etwas Öl auf die Innenfläche des Riemenrades, um die Hauptrotorwelle leichter einschieben zu können.
Put a drop of oil onto the inner surface of the tail drive pulley to insert the main shaft more easily.



Heckriemen zur besseren Übersicht nicht abgebildet.
Tail drive belt for reasons of clarity not depicted.

Spreizen Sie den Rahmen etwas auseinander, um die Getriebeeinheit leichter einlegen zu können.
Spread the frame a bit to insert the transmission unit more easily.



Schrauben erst NACH komplettem Zusammenbau der Getriebeeinheit gleichmäßig anziehen!
Tighten screws equally AFTER the complete assembly of the transmission unit!

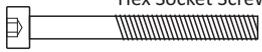


Normteile/Standard Parts

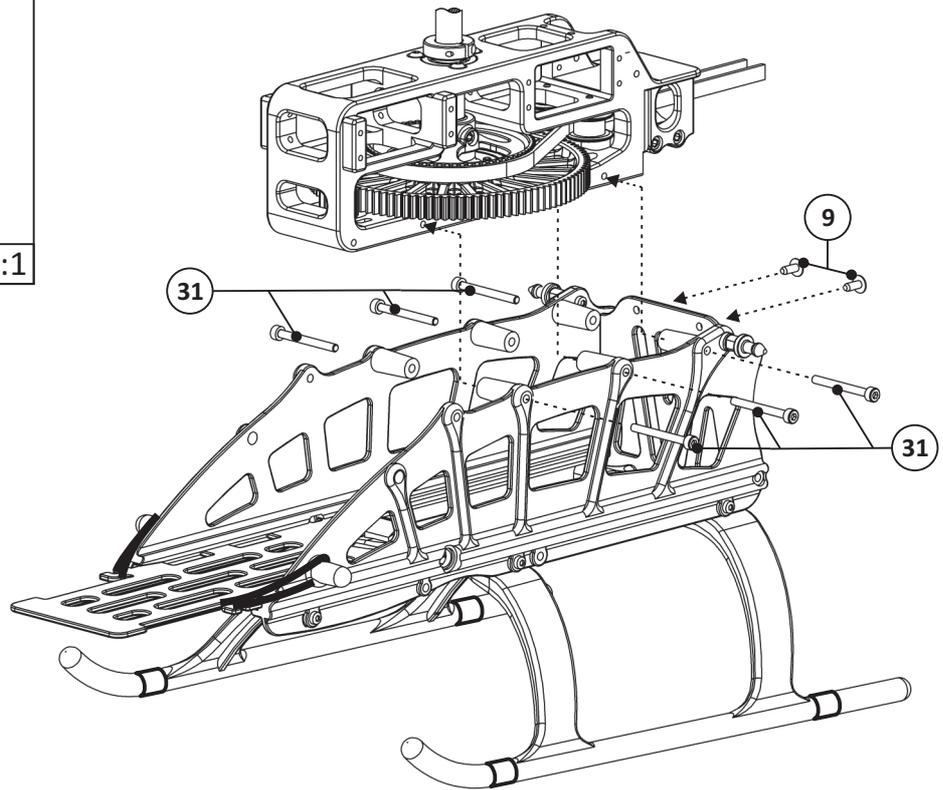
- 9 3x7.5 Linsenkopf-Treibrschraube 2x
Hex Over-Head Self-Tapp. Screw



- 31 M3x30 Schraube 6x
Hex Socket Screw

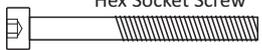


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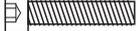


Normteile/Standard Parts

- 31 M3x30 Schraube 2x
Hex Socket Screw



- 32 M3x14 Schraube 2x
Hex Socket Screw



- 33 M4x4 Gewindestift 1x
Set Screw

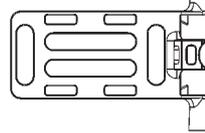


- 39 M3 3.2x9x0.8 U-Scheibe, groß
Washer, large

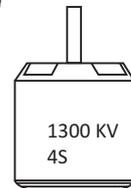


1:1

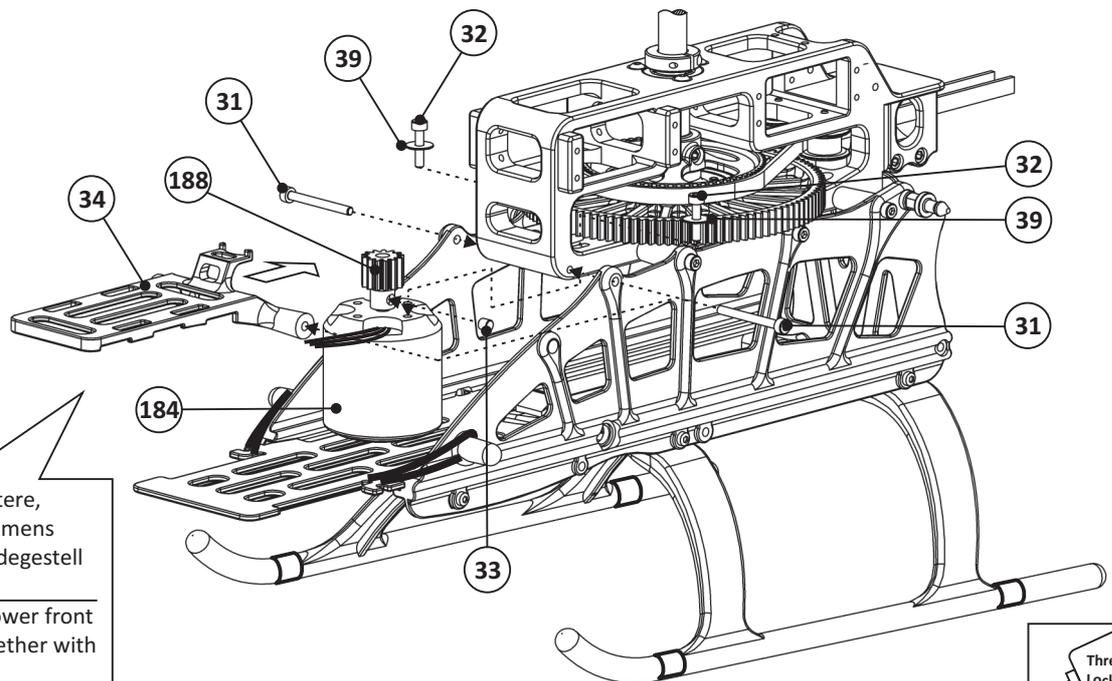
- 34 Reglerplatte
ESC Plate 1x



- 184 Motor 1x

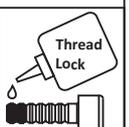


- 188 Ritzel 12Z
Pinion 12T 1x



Reglerplatte zuerst in untere, vordere Öffnung des Rahmens einklipsen, dann mit Landegestell verschrauben!

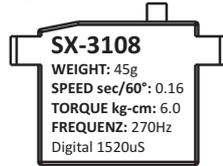
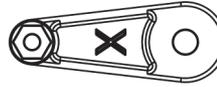
First clip ESC plate into lower front opening, then bolt it together with landing skid!



Normteile/Standard Parts

- 8 3x12 Treibschraube 12x
Self-Tapping Screw
- 37 M2x6.2 Kugelbolzen 3x
Ball-End Bolt
- 38 M2 Mutter 3x
Nut
- 1:1

185 Servo 3x

41 Servobefestigungsplatten 6x
Servo Mounting Plates42 Servohebel 3x
Servo Horn40.1 Servohebelschraube 3x
Servo Horn Screw40.2 Gummitülle Servo 12x
Rubber Grommet Servo

Pos. 40.1 & 40.2 sind bei den Servos
enthalten.
Pos. 40.1 & 40.2 come with the servos.

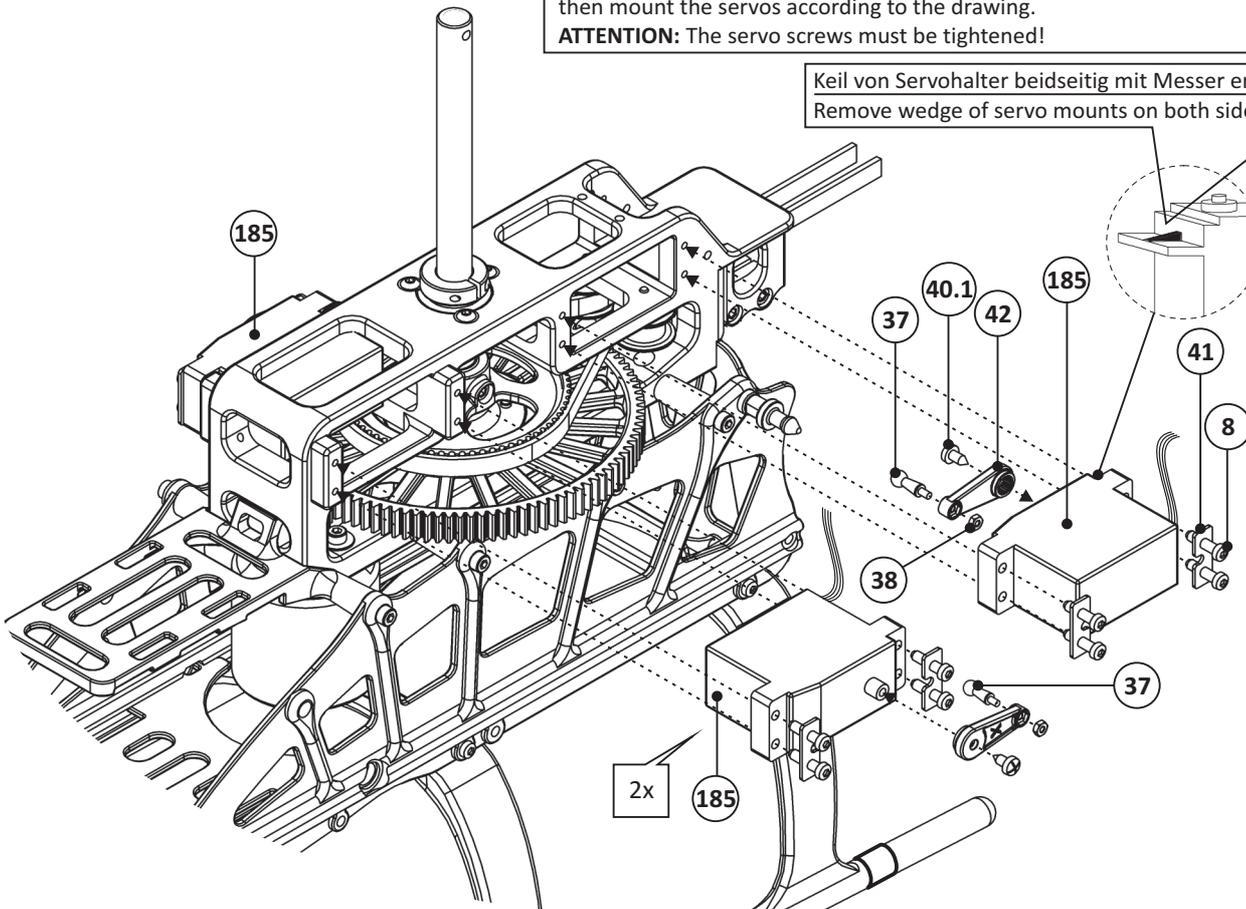
Die bei den Servos enthaltenen Gummitüllen (40.2, nicht abgebildet) unbedingt in die Servoaufnahmen einsetzen und Servos erst dann gemäß Zeichnung einbauen.

ACHTUNG: Die Servoschrauben müssen fest angezogen werden!

First insert the included rubber grommets (40.2, not depicted) into the servo sockets, then mount the servos according to the drawing.

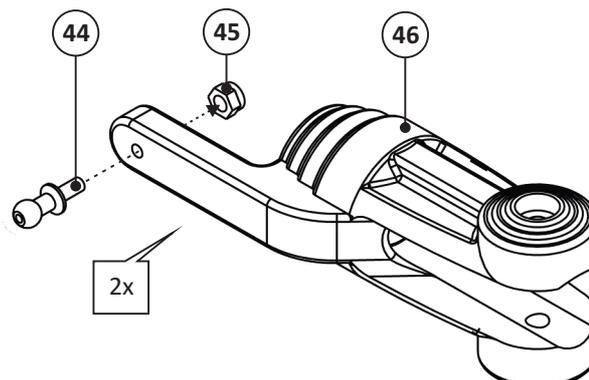
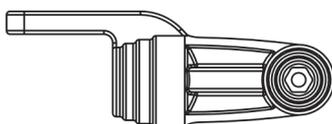
ATTENTION: The servo screws must be tightened!

Keil von Servohalter beidseitig mit Messer entfernen!
Remove wedge of servo mounts on both sides with a cutter!



Normteile/Standard Parts

- 44 M2.5x5.5 Kugelbolzen 2x
Ball-End Bolt
- 45 M2.5 Stopmutter 2x
Lock Nut
- 1:1

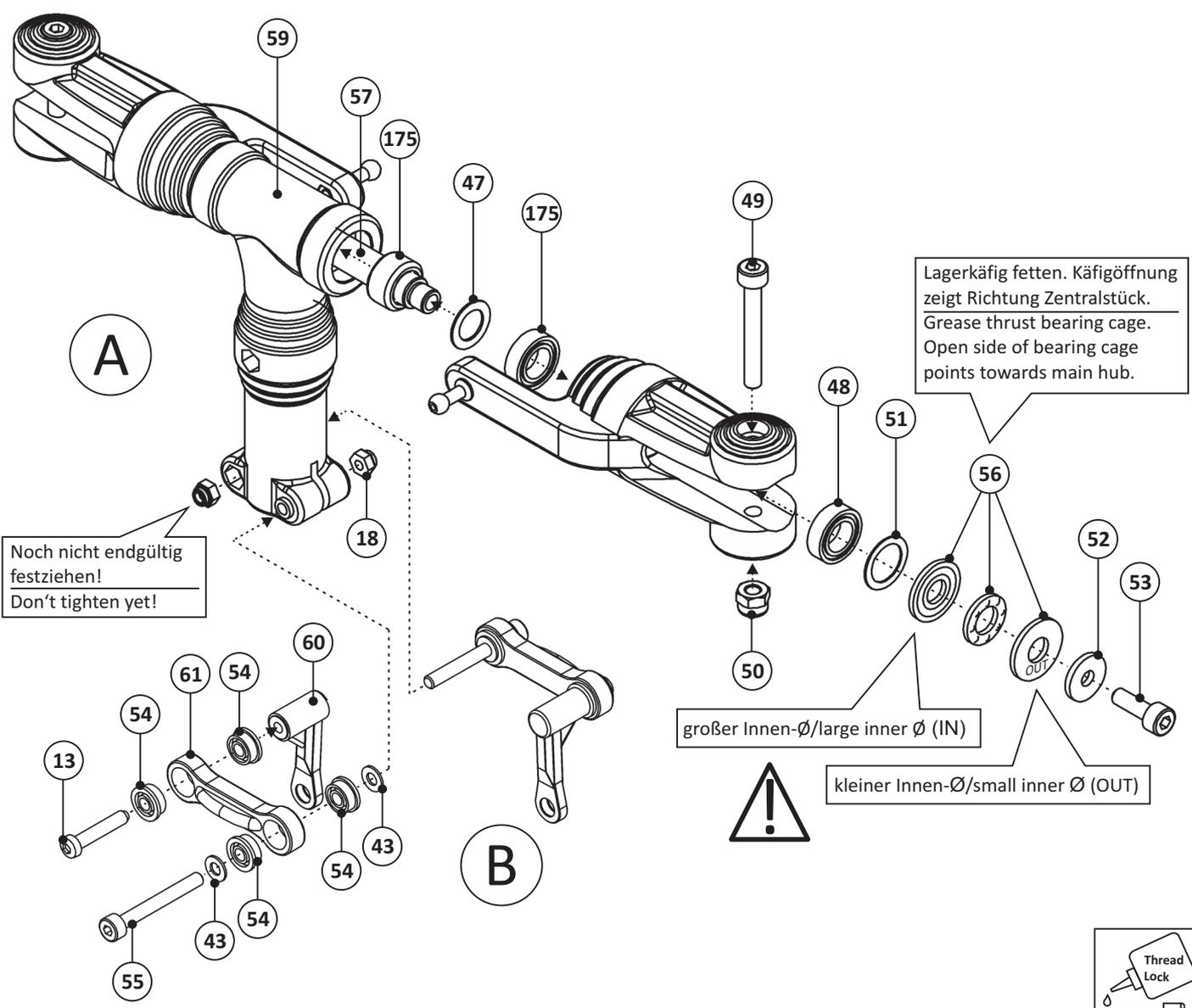
46 Blatthalter 2x
Blade Holder

Normteile/Standard Parts

- | | |
|---|--|
| 43 3x6x0.5 U-Scheibe Washer 4x | 52 4x12x1 U-Scheibe Washer 2x |
| 47 8x11.6x0.5 Distanzscheibe 2x Shim Washer | 53 M4x14 Schraube Hex Socket Screw 2x |
| 48 8x14x4 Kugellager Ball Bearing 4x | 18 M3 Stopmutter Lock Nut 2x |
| 49 M4x31 Rotorblattschraube 2x Blade Screw | 54 3x7x3 Flanschlager Flanged Bearing 8x |
| 50 M4 Stopmutter Lock Nut 2x | 13 3x16 Treibschraube 2x Self-Tapping Screw |
| 51 10x13.8x0.4 Distanzscheibe 2x Shim Washer | 55 M3x25 Schraube Hex Socket Screw 2x |

- | | |
|---|---|
| 56 Drucklager Thrust Bearing 2x | small ID (IN) large ID (OUT) |
| 57 Blattlagerwelle Spindle Shaft 1x | |
| 175 Dämpfergummi Damper 2x 70° Shore | |
| 59 Zentralstück 1x Main Hub | 60 L-Kugelpfanne L-shaped Ball-Link 2x |
| 61 Mischhebel Mixing Lever 2x | |

1:1

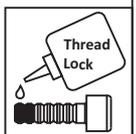


Noch nicht endgültig festziehen!
Don't tighten yet!

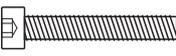
Lagerkäfig fetten. Käfigöffnung zeigt Richtung Zentralstück.
Grease thrust bearing cage.
Open side of bearing cage points towards main hub.

großer Innen-Ø / large inner Ø (IN)

kleiner Innen-Ø / small inner Ø (OUT)



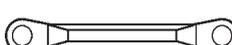
Normteile/Standard Parts

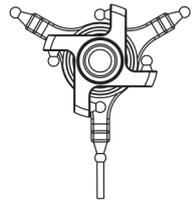
- 17 M3x20 Schraube Hex Socket Screw 1x

- 18 M3 Stopmutter Lock Nut 1x

- 145 M3x4.5 Kugelbolzen Ball End Bolt 4x

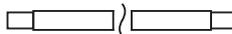

1:1

- 62 Kugelpfanne Ball Link 4x

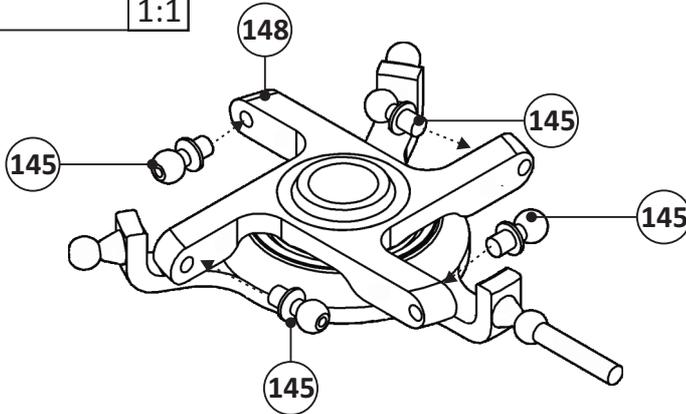

- 64 Doppelkugelpfanne 2x Double Ball Link


- 66 Taumelscheibe Swash Plate 1x


- 63 Doppelkugelpfanne 1x Double Ball Link


- 65 Schubstange Control Rod 2x


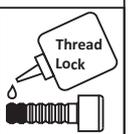
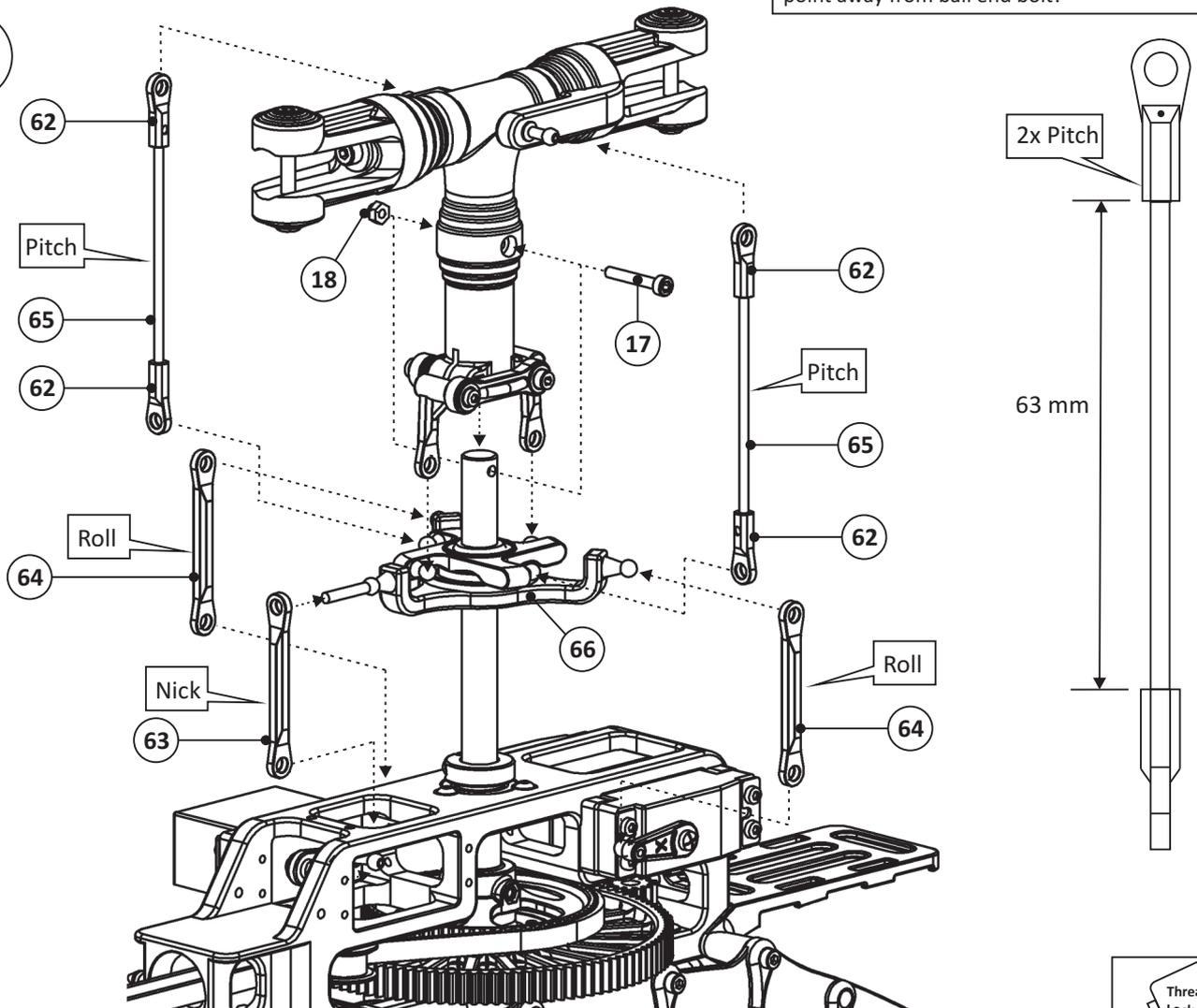
A



Beide Schubstangen müssen gleich lang sein!
Both control rods must have the same length!

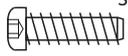
Kugelköpfe: Zahlmarkierung muss immer zum Kugelbolzen hin zeigen, Punktmarkierung muss immer vom Kugelbolzen weg zeigen!
Ball Links: Number mark must always point towards ball end bolt, point mark must always point away from ball end bolt!

B



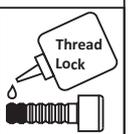
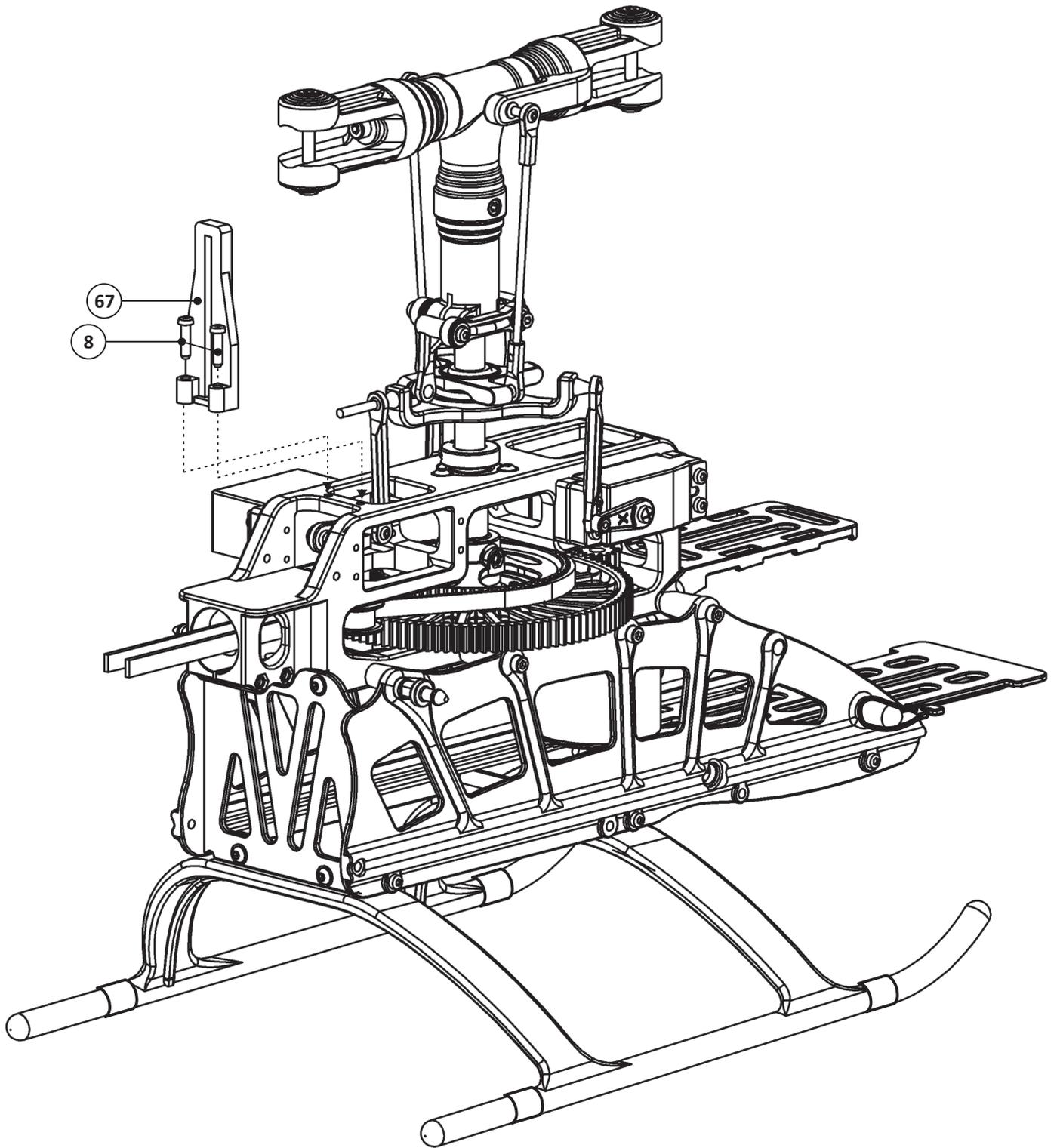
Normteile/Standard Parts

8 3x12 Treibschraube 2x
Self-Tapping Screw



1:1

67 TS-Führung 1x
Swash Plate Driver

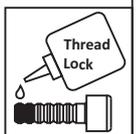
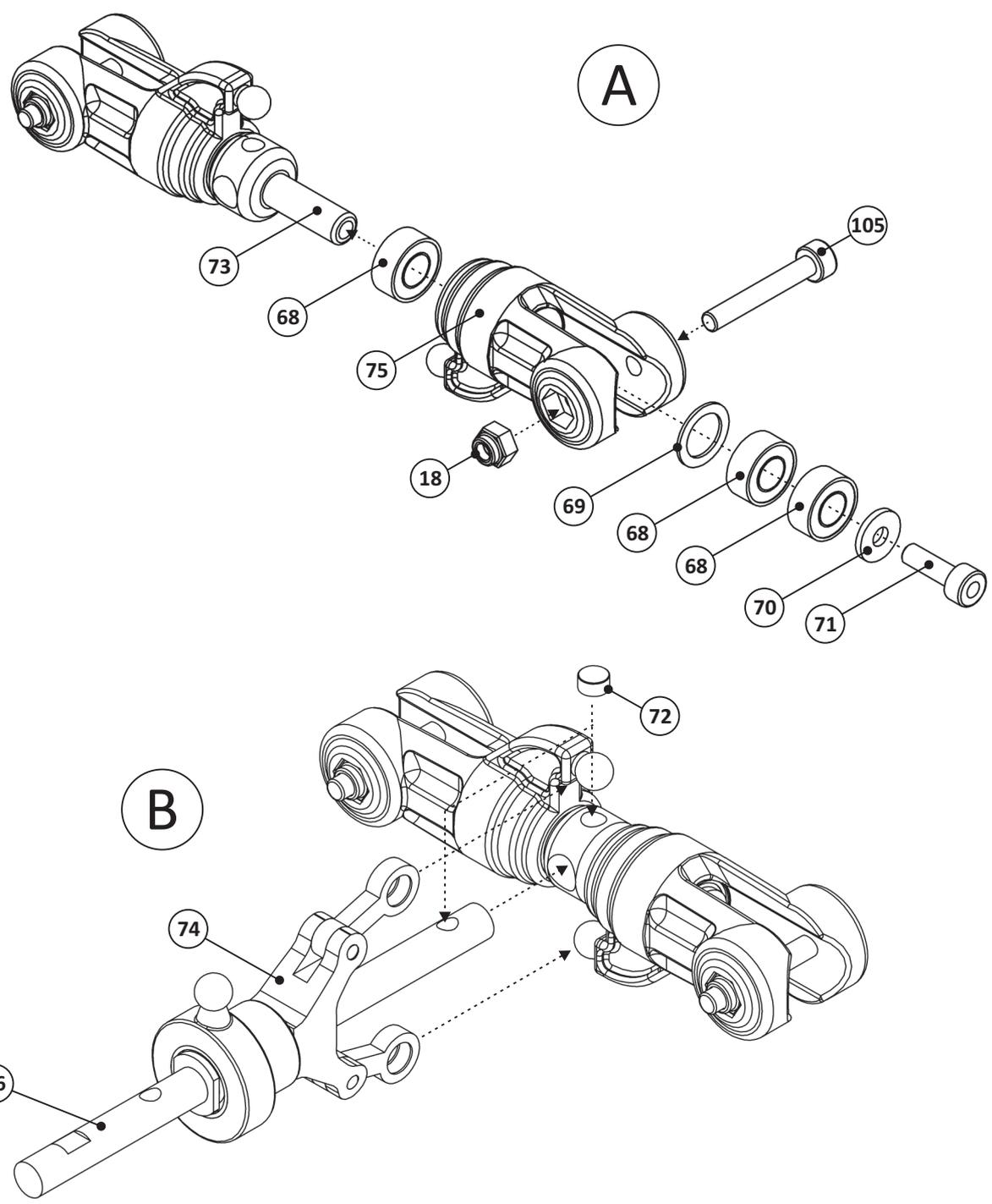



Normteile/Standard Parts

68 5x10x4 Kugellager Ball Bearing 6x	69 7.5x9.9x0.4 Distanzscheibe Shim Washer 2x
105 M3x18 Schraube Hex Socket Screw 2x	70 3x7.5x1 U-Scheibe Washer 2x
18 M3 Stopmutter Lock Nut 2x	71 M3x10 Schraube Hex Socket Screw 2x
	72 M4x5 Gewindestift, spitz Set Screw, sharp 1x

1:1

73 Heckrotornabe Tail Rotor Hub 1x	75 Blatthalter Heckrotor Blade Holder Tail Rotor 2x
74 Hecksteuerbrücke Tail Pitch Control Lever 1x	76 Heckrotorwelle Tail Rotor Shaft 1x



Normteile/Standard Parts

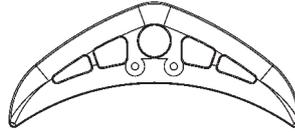
77	M3x16	Schraube Hex Socket Screw	1x
18	M3	Stopmutter Lock Nut	1x
8	3x12	Treibschraube Self-Tapping Screw	2x
78	M2.5x14	Schraube Hex Socket Screw	1x
9	3x7.5	Linsenkopf-Treibschraube Hex Over-Head Self-Tapp. Screw	3x
79	5x13x4	Flanschlager Flanged Bearing	2x

1:1

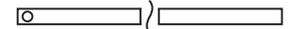
80 Steuerhebel 1x
Tail Lever



82 Höhenleitwerk 1x
Stabilizer Fin



85 Drehstab 1x
Torque Tube



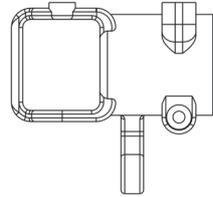
86 Heckrohr 1x
Tail Boom



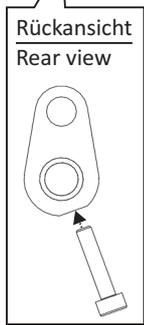
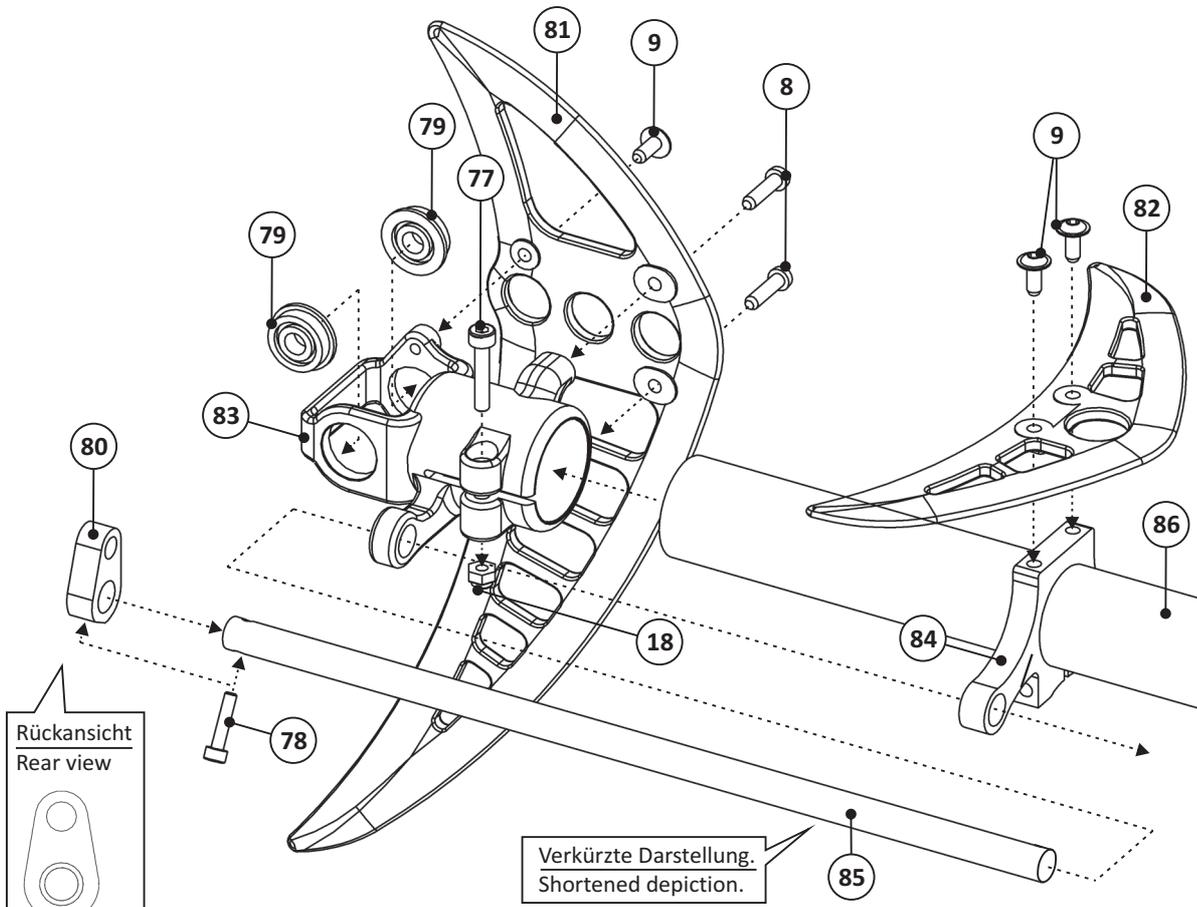
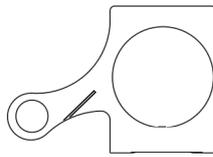
81 Seitenleitwerk 1x
Vertical Fin



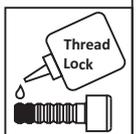
83 Heckgehäuse 1x
Tail Rotor Housing



84 Leitwerkhalter 1x
Stabilizer Fin Clamp



Verkürzte Darstellung.
Shortened depiction.



Normteile/Standard Parts

- 8 3x12 Treibschraube 5x Self-Tapping Screw

1:1

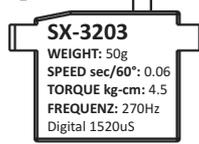
- 41 Servobefestigungsplatten 2x Servo Mounting Plates



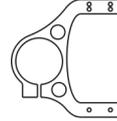
- 40.1 Servohebelschraube 1x Servo Horn Screw



- 186 Heckservo 1x Tail Servo



- 88 Heckservohalter 1x Tail Servo Holder



- 89 Drehstabaufnahme 1x Torque Tube Lever



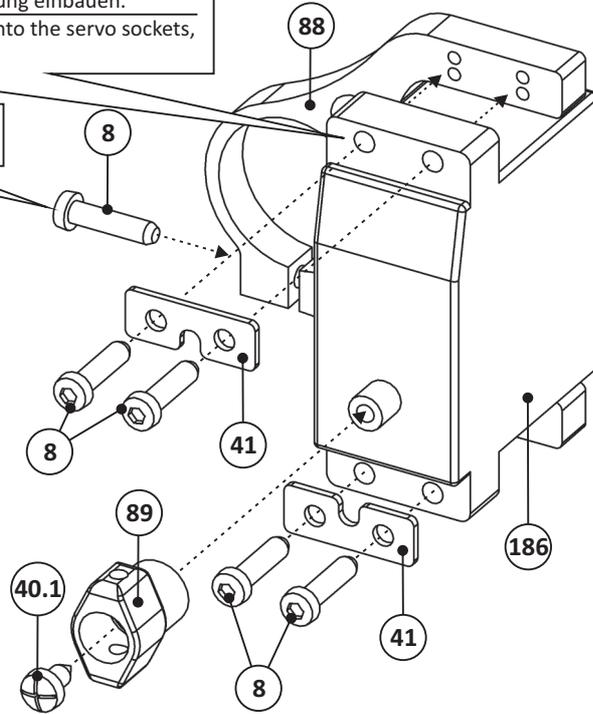
- 40.2 Gummitülle Servo 4x Rubber Grommet Servo



Pos. 40.1 & 40.2 sind bei den Servos enthalten.
Pos. 40.1 & 40.2 come with the servos.

Die bei den Servos enthaltenen Gummitüllen (40.2, nicht abgebildet) unbedingt in die Servoaufnahmen einsetzen und Servos erst dann gemäß Zeichnung einbauen.
First insert the included rubber grommets (40.2, not depicted) into the servo sockets, then mount the servos according to the drawing.

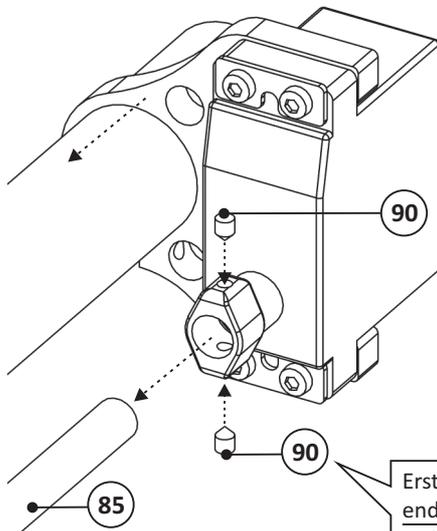
Noch nicht endgültig festziehen!
Don't tighten yet!



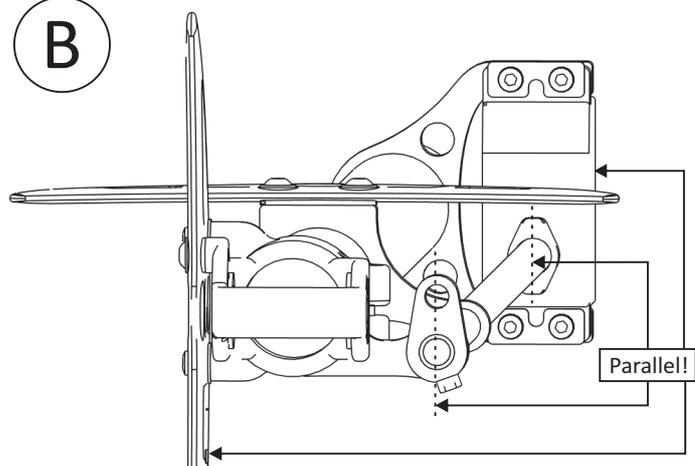
Normteile/Standard Parts

- 90 M3x4 Gewindestift, spitz 2x Set Screw, sharp

A

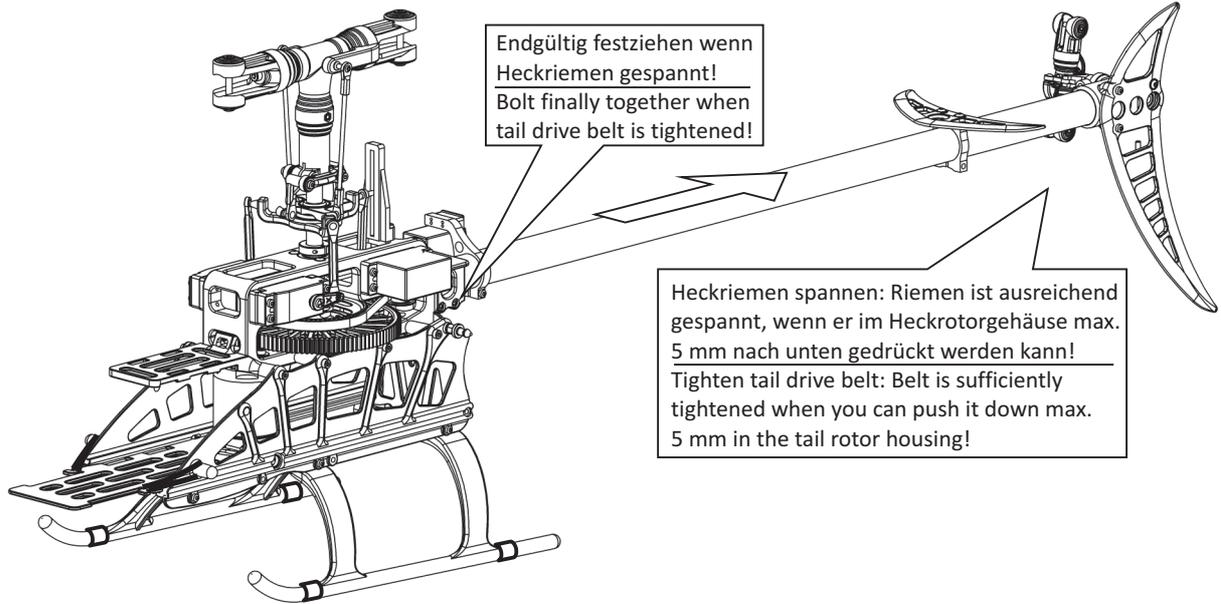


B



Erst beim Programmieren des Heckservos endgültig festziehen!
Tighten finally when programming the tail rotor servo!





Normteile/Standard Parts

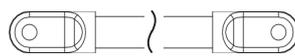
- 9 3x7.5 Linsenkopf-Treibrschraube 1x
 Hex Over-Head Self-Tapp. Screw

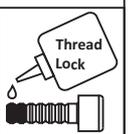
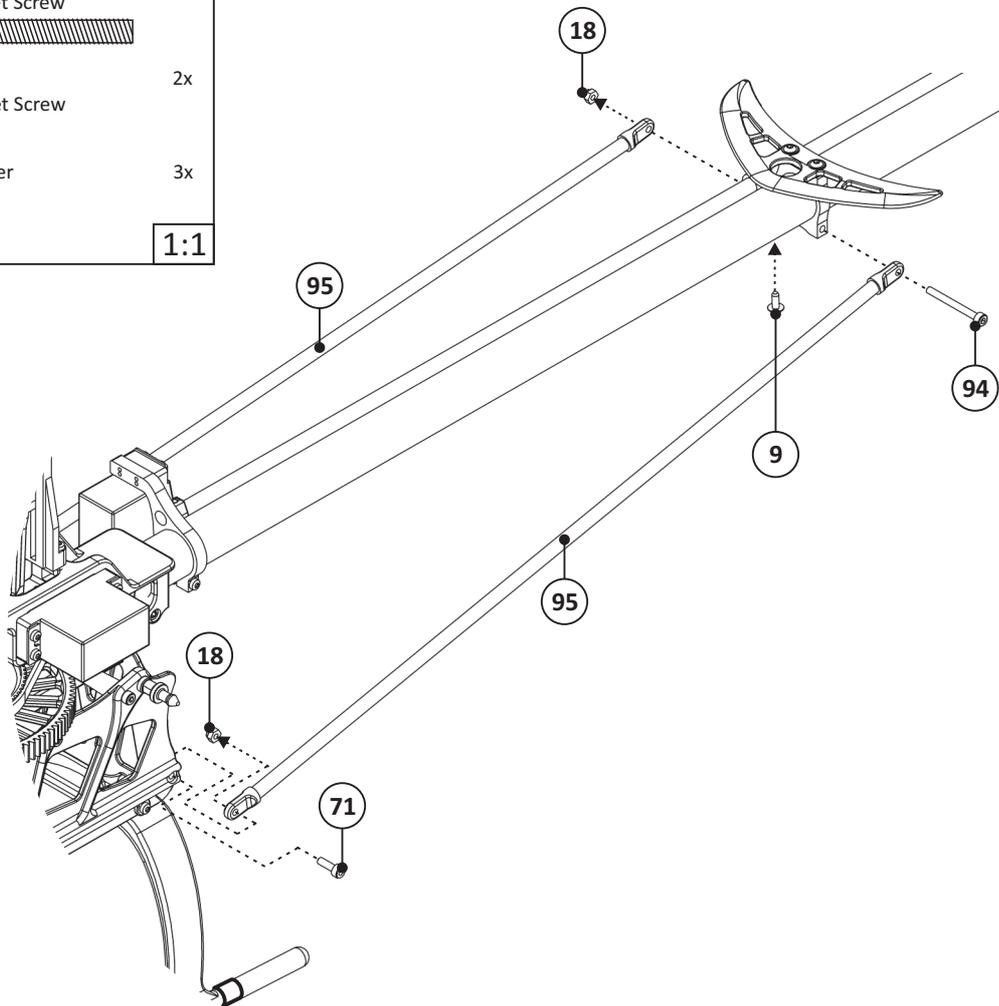
- 94 M3x35 Schraube 1x
 Hex Socket Screw

- 71 M3x10 Schraube 2x
 Hex Socket Screw

- 18 M3 Stopmutter 3x
 Lock Nut

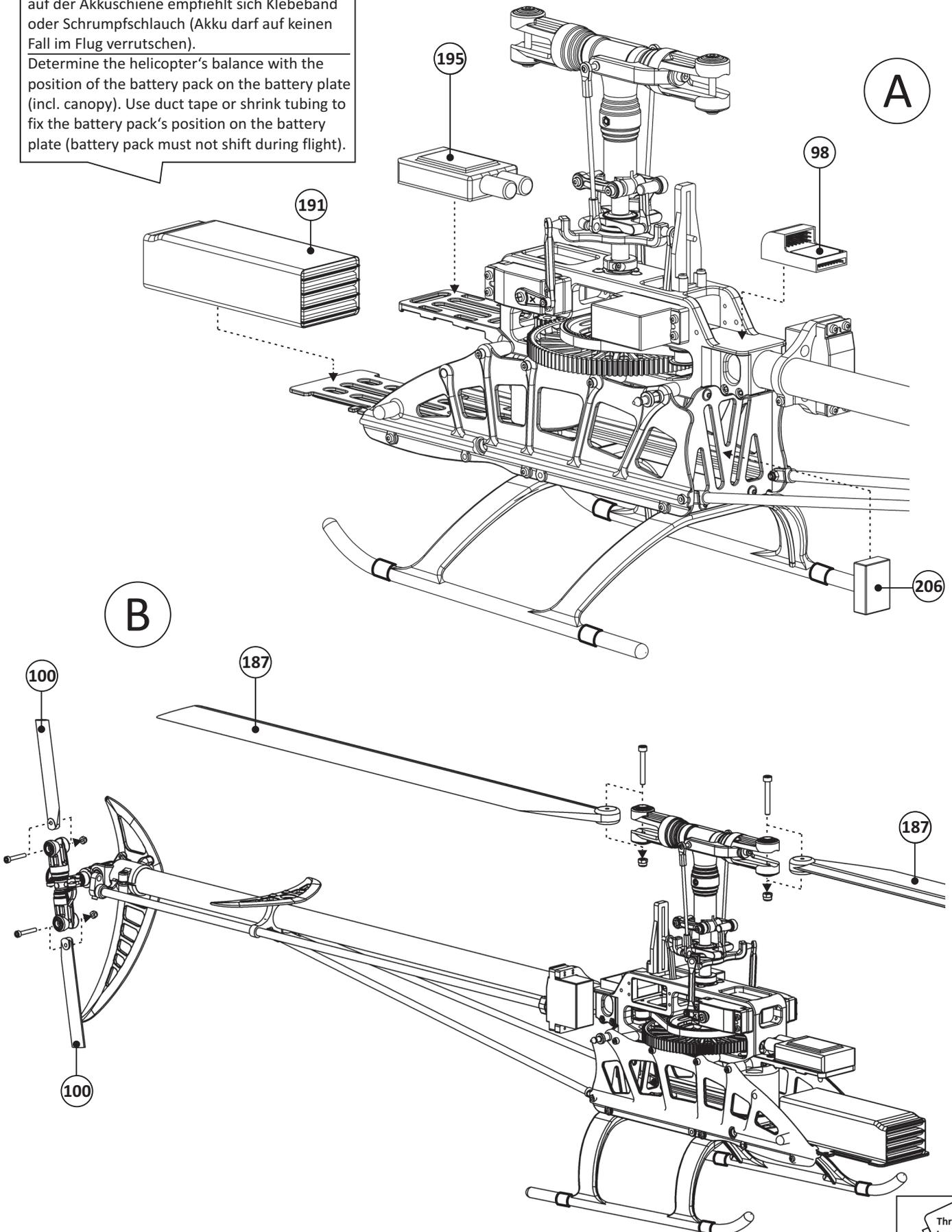

1:1

95 Heckstrebe 2x
 Tail Brace Tube


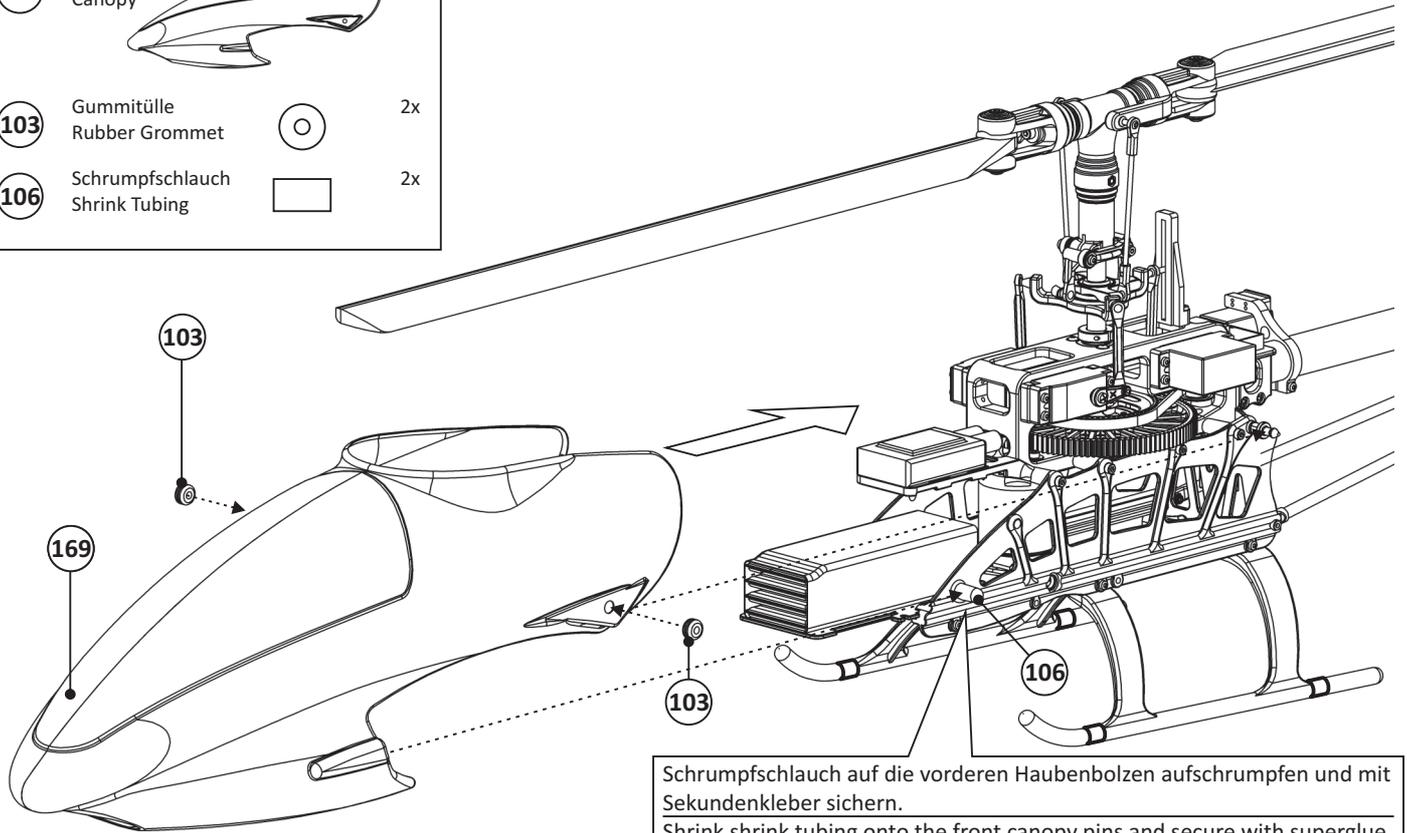


Mit Positionierung des Akkus auf der Akkuschiene Balance des Modells festlegen (inklusive Haube). Zur Befestigung des Akkus auf der Akkuschiene empfiehlt sich Klebeband oder Schrumpfschlauch (Akku darf auf keinen Fall im Flug verrutschen).

Determine the helicopter's balance with the position of the battery pack on the battery plate (incl. canopy). Use duct tape or shrink tubing to fix the battery pack's position on the battery plate (battery pack must not shift during flight).



- Haube Canopy 1x
- ⊙ 103 Gummitülle Rubber Grommet 2x
- ▭ 106 Schrumpfschlauch Shrink Tubing 2x



Schrumpfschlauch auf die vorderen Haubenbolzen aufschumpfen und mit Sekundenkleber sichern.
 Shrink shrink tubing onto the front canopy pins and secure with superglue.

