EN

# Manual

## Alpha 110 Q

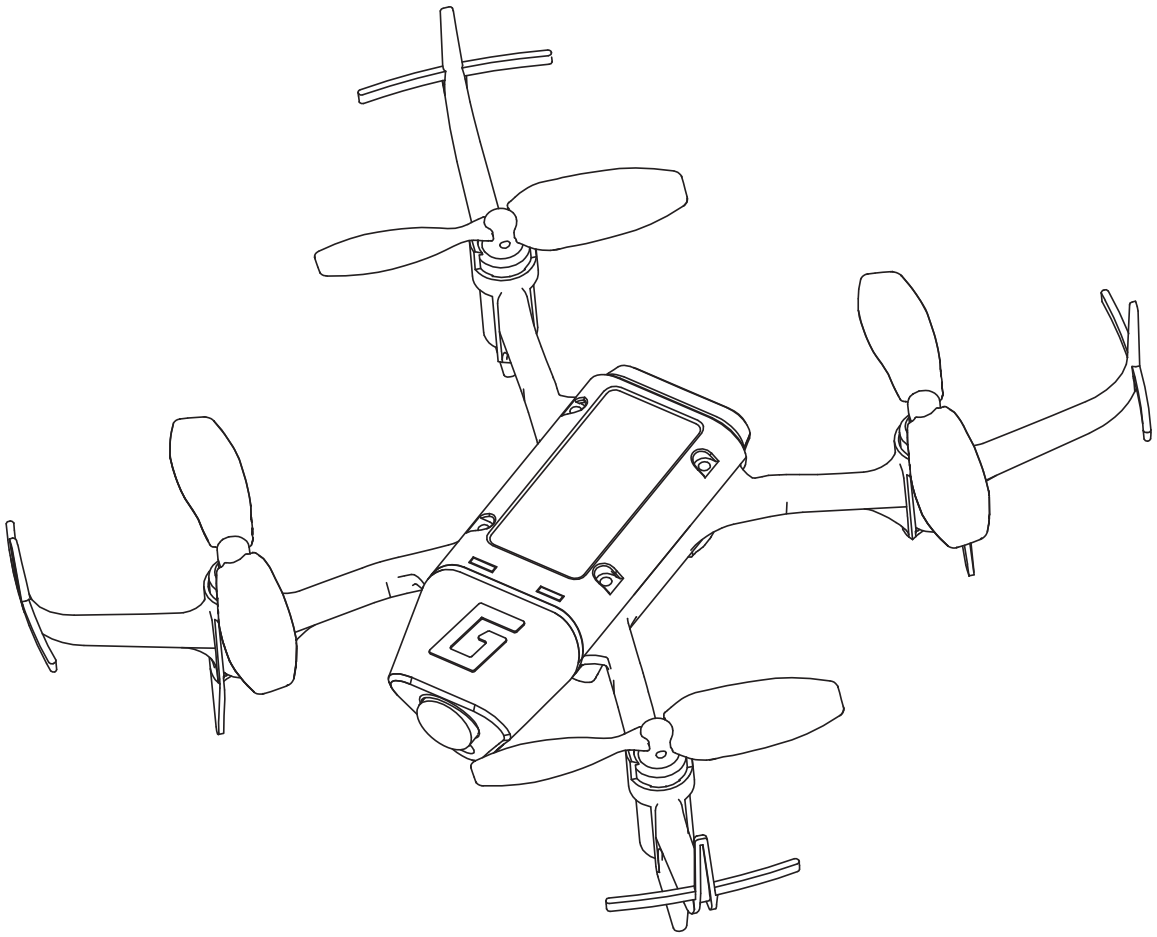
### Quadcopter

*S5012.RFH (Copter)*

*S5012.RTF (Copter with transmitter)*

*S5012.FPV (Copter with camera)*

*S5012.FPVRTF (Copter with camera and transmitter)*



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## Index

## Introduction

Thank you very much for purchasing a Graupner **Quadcopter Alpha 110**. This **Alpha 110 Quadcopter** is extremely versatile. This manual is valid for all quadcopters listed on the cover sheet. The package content changes depending on the version.

Read this manual carefully to achieve the best results with your **Alpha 110 Quadcopter** and first of all to safely control your models. If you experience any trouble during operation, take the instructions to help or ask your dealer or ***Graupner*** Service Centre.

Due to technical changes, the information may be changed in this manual without prior notice. Be always updated by checking periodically on our website, **www.graupner.de** to be always uptodate with the products and firmwares.

This product complies with national and European legal requirements.

**To maintain this condition and to ensure safe operation, you must read and follow this user manual and the safety notes before using the product!**

**Note**

**This manual is part of that product. It contains important information concerning operation and handling. Keep these instructions for future reference and give it to third person in case you gave the product.**

## Service Centre

***Graupner Central Service***

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Friday
9:15 am - 1:00 pm

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El Dorado Hills, CA 95762

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***Graupner* in Internet**

For the service centers outside Germany please refer to our web site **www.graupner.de**

## Intended use

### Copter Alpha 110Q

The **Alpha 110 Quadcopter** is a remote controlled Quadcopter. Other components are required to finish the **Alpha 110 Quadcopter**. Punctual technical information about the components can be found in the Technical data section.

The **110 Quadcopter** is designed exclusively to be used as a battery-powered, radio controlled model, any other use is not allowed. For any improper use no warranty or liability is accepted.

Read through this entire manual before you attempt to assemble or use or use the **Alpha 110 Quadcopter**.

***Graupner/SJ*** constantly works on the development of all products; we reserve the right to change the item, its technology and equipment.

#### Target group

The **Alpha 110 Quadcopter** is not a toy. It is not suitable for children under 14 years. For questions about radio-controlled models, please contact an experienced RC model expert or a RC model club.

### Transmitter MZ-8 (only by S5012.RTF)

This remote-control system may only be used for the purpose specified by the manufacturer for operation of remote control models without passengers. Any other type of use is impermissible and may damage the system and cause significant property damage and/or personal injury. No warranty or liability is therefore offered for any improper use not covered by these provisions.

Read through this entire manual before you attempt to install or use the transmitter.

***Graupner/SJ*** constantly works on the development of all products; we reserve the right to change the item, its technology and equipment.

#### Target group

The product is not a toy. It is not suitable for children under 14 years. For questions about radio-controlled models, contact an experienced RC model expert or a RC model club.

## Package content

**S5012.RFH**

Alpha 110 Quadcopter

Propellers

Battery, battery charger

Manual

**S5012.RTF**

Alpha 110 Quadcopter

Propellers

Battery, battery charger

S1008 MZ-8 HoTT transmitter

Manual

**S5012.FPV**

Alpha 110 Quadcopter with camera and video transmitter

Propellers

Battery, battery charger

Manual

**S5012.FPVRTF**

Alpha 110 Quadcopter with camera and video transmitter

S1008 MZ-8 HoTT transmitter

Propellers

Battery, battery charger

Manual

## Technical Data

**Copter**

| | |
|---|---|
| Chassis size | 110 mm |
| Weight | 55 g |
| Battery | LiPo 1S / 350 mAh |
| Video frequency (only S5012.FPV) | 5,8 GHz (5740 - 5860 Mhz) |

**mz-8 transmitter**

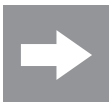
| | |
|---|---|
| Dimensions | 151 x 134 x 63,7 mm |
| Weight | 260 g (incl. batteries) |
| Current source | 3x AA batteries, 3,6 ... 4,8 V |
| Operating temperature range | -10 ... +55°C |
| Transmitter frequency | 2,4 GHz |

**S5012.FPV Frequency list video transmitter, F-band**

| | |
|---|---|
| Channel 1 | 5740 Mhz |
| Channel 3 | 5780 Mhz |
| Channel 5 | 5820 Mhz |
| Channel 7 | 5860 Mhz |

## Symbols explication

Always observe the information indicated by this warning sign. Particularly those which are additionally marked with the **CAUTION** or **WARNING**. The signal word **WARNING** indicates the potential for serious injury, the signal word **CAUTION** indicates possibility of lighter injuries.



The signal word **Note** indicates potential malfunctions.

**Attention** indicates potential damages to objects.

## Safety notes

This safety notes are intended to protect you and other people. They are also used for safe handling the product. Therefore please read this section very carefully before using the product!

Do not carelessly leave the packaging material lying around, since it might become a dangerous toy for children.

Persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, or not capable to assemble and use safely the **Alpha 110 Quadcopter** must not use the **Alpha 110 Quadcopter** without supervision or instruction by a responsible person.

Operation and use of radio-controlled models needs to be learned! If you have never operated a model of this type before, start carefully and make yourself familiar with the model's reactions to the remote control commands. Proceed responsibly.

First, always perform a range and function test on the ground (to do so, hold your model tight), before you use your model. Repeat the test with running motor and with short throttle bursts.

Inform yourself before flying your model on which maximum altitude you can fly in the uncontrolled airspace over the starting position and do not exceed it.

Before you start using the remote control model, you have to check the further relevant laws and regulations. These laws you must obey in every case. Pay attention to the possibly different laws of the countries.

The insurance is mandatory for all kinds of model operation. If you already have one, so please inform yourself if the operation of the respective model is covered by your insurance. If this is not the case, conclude a special liability insurance policy for models. We recommend to provide the **Alpha 110 Quadcopter** with a label, where are indicated the name, address, tel. n., E-mail and Insurance N. So that the copter can be clearly assigned in the event of a crash.

Due to safety and licensing reasons (CE), any unauthorized reconstruction and/or modification of the product is prohibited.

Only use the components and spare parts that we recommend. Always use matching, original ***Graupner*** plug-in connections of the same design and material.

Make sure that all of the plug-in connections are tight. When disconnecting the plug-in connections, do not pull the cables.

Protect the Copter from dust, dirt, moisture and other foreign parts. It must be protected from vibration as well as excessive heat or cold. The models may only be operated remotely in normal outside temperatures such as from -10°C to +55°C.

Only operate all your ***HoTT*** components using the current software version.

If you have questions which cannot be answered by the operating manual, please contact us (contact information see page 3) or another expert in the field.

**WARNING**

**Safety notes during the use**

Also while programming, make sure that a connected electric motor cannot accidentally start. Injury risk by the turning propellers! Always remove the propellers when programming. Program always the motors stop switch on the transmitter. (See transmitter manual)

Avoid shock and pressure. Check the **Alpha 110 Quadcopter** regularly for damages to the housings and cables, specially after model crashes. Damaged or wet electronic components, even if re-dried, should no longer be used!

Never touch the turning propellers, this can cause serious injury.

The propellers must be mounted securely, thrown parts can cause serious injury.

Keep long hair, loose clothing such as scarves, loose shirts or similar well away from the danger zone of the revolving propeller, they may be withdrawn by the propeller, flying debris can cause serious injury.

Observe the safety notes of the required components.

**Safety notes for battery**

**CAUTION**

- LiPo batteries are not a toy. Persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, or not capable to use safely the battery must not use the battery without supervision or instruction by a responsible person.
- Any alterations to the battery, charger or charging cables can cause serious injury. Risk of fire and explosions! Risk of burns!
- Do not use any damaged battery or charger, risk of short-circuit and fire!

### Storage

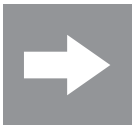
LiPo batteries should be stored with a voltage of about 3,8V per cell. If the cell voltage falls below 3 V, then the battery must be necessarily charged. Deep discharge and storage in discharge status (cell voltage < 3V) make the battery useless. For transport and storage the LiPo batteries should be placed in a safety bag e.g. No. 8373.

### Safe use of the battery charger

**WARNING**

- Persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, or not capable to use safely the charger must not use the charger without supervision or instruction by a responsible person.
- The battery charger should be connected only to power sources which voltage complies with the indications on the label! See technical data. Risk of fire!
- The connection socket for the battery is polarized, Never use force while inserting the connector . It must plug easily. Short-circuit and fire risk!
- The battery charger can be used only in dry spaces.
- The charger should always be supervised during charge and it should be used only in rooms fitted with a smoke detector.
- A damaged charger or power cord must not be used until they are repaired by the manufacturer, his customer service or a suitably qualified person. Electric shock risk!
- The charger is only suitable for LiPo batteries, it cannot charge other types of batteries (eg Nixx, LiFe, Pb). If you connect other type of batteries to the charger, both battery and charger can be damaged, risk of fire and explosions!
- A wet charger, even if re-dried, should no longer be used. Risk of electric shock!
- Due to safety and licensing reasons (CE), any unauthorized reconstruction and/or modification of the product is prohibited. Risk of electric shock!
- Protect the charger from dust, dirt, moisture and other foreign parts. It must be protected from vibration as well as excessive heat or cold.
- Do not cover the charger during charge, the ventilation slots must be free. Risk of fire!

- The charger and the battery to be charged must be placed on a non-combustible, heat-resistant and non-conducting surface during operation. Do not use the charger near easily flammable materials.
- Always disconnect the charger from the power supply when it is not in use.



**Note:**

After you perceive your model, check if all components are inside the package and eventual damages.

Remove the battery from the model when transporting or when not in use.

During transport protect the model and the transmitter from damages.


**Care:**

Clean the Copter, the battery and the charger only with the suitable cleaners. Good is a spirit-free cloth. Never use chemical cleaners, solvents, petrol, alcohol or similar.

## Charging the battery

Plug the USB connector of the included charger to a suitable 5 V port.

1. The LED on the charger will light green.
2. Plug the battery connector to the charger charging port.
3. The LED will turn from green (stand by mode) to red (charge mode).

When the charge process has finished, the LED lights on green again. Then is the battery fully charged.

4. Unplug first the battery connector from the battery charger and then the USB cable from the power supply.

## Transmitter power supply

The **mz-8** HoTT transmitter is normally delivered with three alkaline batteries.

The transmitter battery voltage is monitored by a status LED during operation.

If the voltage drops below 3,5 V, an acoustic alarm (4x beeps) will sound and the red status LED starts to blink quickly. Now at the latest, stop operation and change the transmitter batteries!


### Inserting the transmitter batteries

To insert the transmitter batteries remove the battery case cover on the back side of the transmitter. Insert the included batteries in the holder paying attention to the correct polarity (see figure)

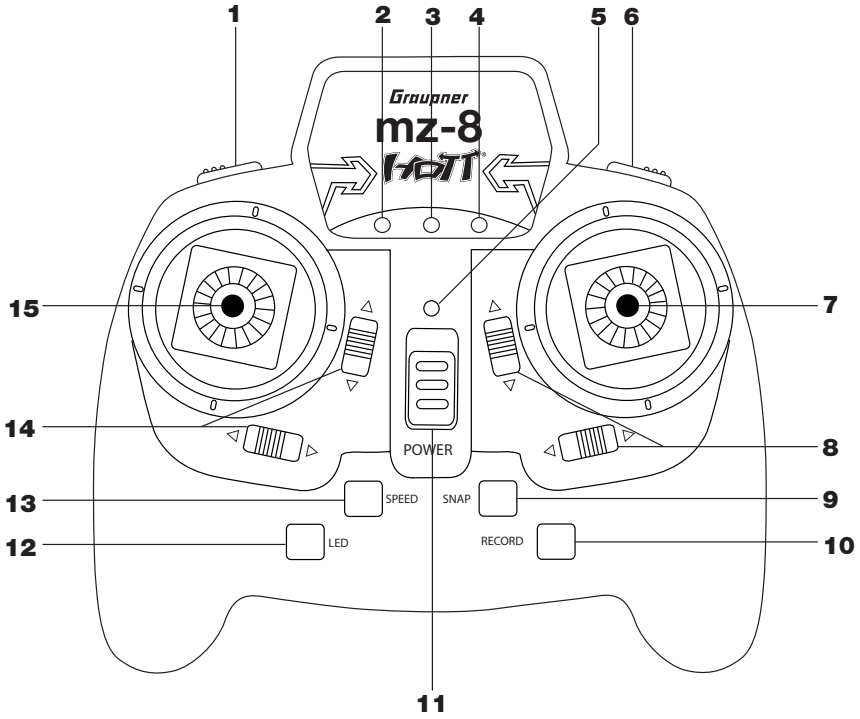
### Removing the transmitter batteries

If the transmitter is not going to be used for a long time, the batteries should be removed from the device to avoid damages to the transmitter due to electrolyte leaks.

## Transmitter description (only by version S5012.RTF)

### Control elements on the transmitter

**Front side**



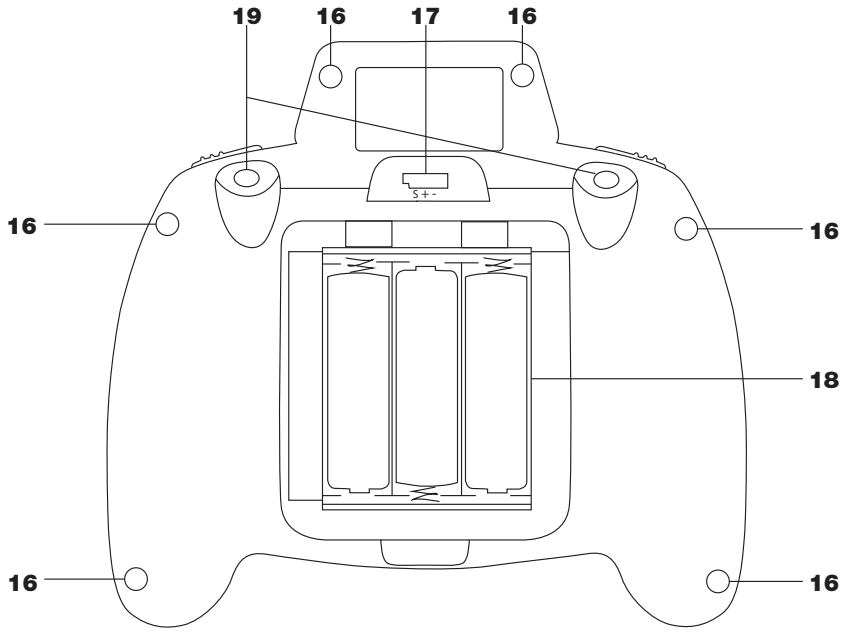

| | |
|---|---|
| 1 | Motor-off switch |
| 2 | LED, yellow (indicates motor-off) on: Motor stop |
| 3 | LED, red (indicates camera recording) blinking: Recording |
| 4 | LED, green (if off indicates: Attitude mode, if on: Rate mode) |
| 5 | LED, red (indicates status and binding) on: bound* |
| 6 | Switch for Attitude and Rate mode |
| 7 | Right control stick |
| 8 | Trim |
| 9 | Button for photographs (not available by Alpha 110) |
| 10 | Button for video recording (not available by Alpha 110) |
| 11 | On/off switch |
| 12 | Switch for LED lights and binding |
| 13 | S5012.RTF = LED lighting / S5012.FPV = Video channel change |
| 14 | Trim |
| 15 | Left control stick |

* Acoustic warning:

Blinking and 2x beeps - Flight battery under voltage

Blinking and 4x beeps - transmitter battery under voltage

**Back side**




| | |
|---|---|
| 16 | Case screws |
| 17 | DATA socket |
| 18 | Battery case |
| 19 | Fixture points for attachment holder |

## Mode setting

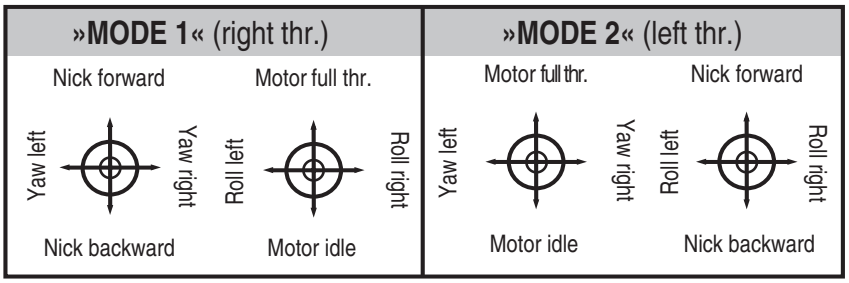
The transmitter MZ-8 HoTT is normally delivered in mode 1, throttle on the right, or in mode 2, left throttle. This configuration can be changed through a software.

You can find the software as free download on the **mz-8 HoTT** item page on ***www.graupner.de***.

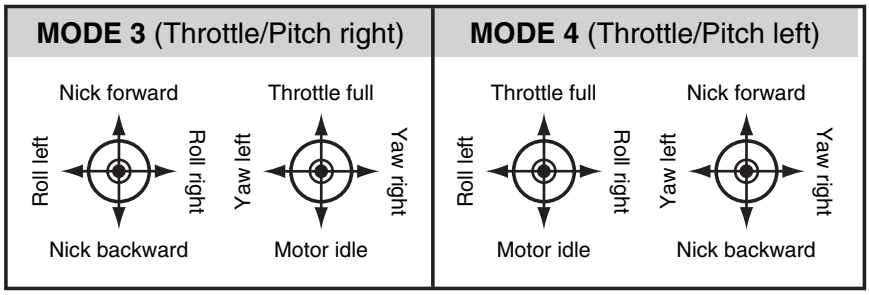
If you have the mode 1 version, you can change your transmitter into mode 3 through the software.

If you have the mode 2 version, you can change your transmitter into mode 4 through the software.

**Controls directions Mode 1 - 2**



**Controls directions Mode 3 - 4**




## Preparation before use

The following components are required to use the model: Transmitter HoTT (MZ-8 / MX-12 / MZ-12 or higher) MZ-8 included by S5012.RTF.

For the version S5012.FPV will be required a video goggle or an FPV monitor to fly in FPV.

### Receiver

The transmitter is already completely set for **Alpha 110 Quadcopter**. To program some parameters, refer to the section "Receiver settings". (only possible with HoTT transmitter with display)

### Installing the battery in the copter

Insert the battery in the battery case. Push the battery completely inside its compartment so that the **Alpha 110 Quadcopter**'s center of gravity is in the middle.

## Binding the receiver

The included receiver is already bound to the MZ-8 transmitter in the version S 5012.RTF. In the other versions without included transmitter, you can bind the copter receiver with your favorite HoTT transmitter. Thereto read the manual of your HoTT transmitter. The copter receiver is already in binding mode as soon as it is switched on. Then simply start the binding process in the transmitter.

### Binding with the MZ-8 transmitter

If you want to bind the copter with the MZ-8 transmitter push the "LED" button on the transmitter when the copter is switched on.

If the binding process was successful the status LEDs will light red on the transmitter and green on the copter.

## Range test

The integrated range test reduces the transmitter output so that you can perform a function test at a distance between 5 and about 10 m.

Perform the range test for the Graupner-HoTT system according to the following instructions. It is useful to have an assistant to help you with the range test.

Switch on the transmitter and the copter then wait until the green LED on the copter lights. You are now able to monitor control movements.

Place the model on a flat surface (cement, mowed lawn or ground) so that the receiver antennas are at least 15 cm above the ground. It may therefore be necessary to place a support underneath the model during the test.

Hold the transmitter at hip level at a slight distance from your body.

You can start the range test process by pushing simultaneously the "SPEED + SNAP" buttons.

The red status LED on the transmitter will start to blink quickly and a signal tone is emitted twice each two seconds.

After the 90 seconds range test, the transmitter switches back to full output, and the signal tone stops.

You can stop the range test in every moment by pushing the POWER button.

During the 90 seconds, walk away from the model and move the sticks. If you detect an interruption in the link within a range of about 5 - 10 m at any time, attempt to reproduce it.

Move further away from the model until it does not respond perfectly. Move further away from the model until it does not respond perfectly.

At this location, wait for the remainder of the test period with the still operable model. The model should still react to control commands once the range test is finished. If this is not 100 % the case, do not use the system and contact our Service department.

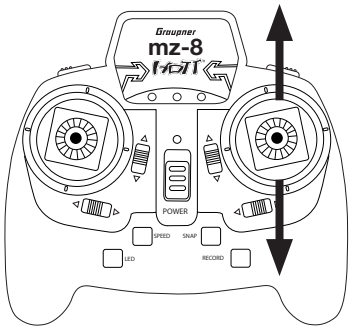
Perform a range test before each flight, and simulate all control movements that could occur during the flight. In order to guarantee a safe model operation, the range must always be at least 5 - 10 m on the ground.

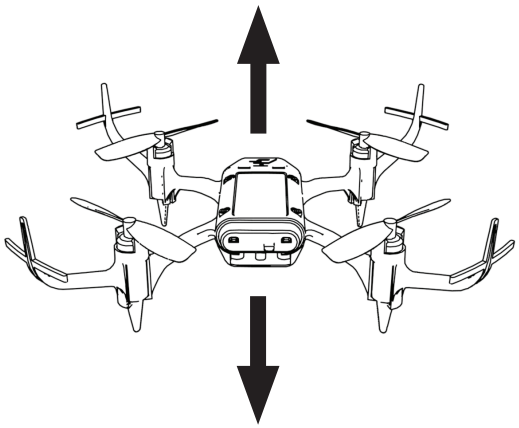
**Attention**

Never start a range test on the transmitter during normal model operation!

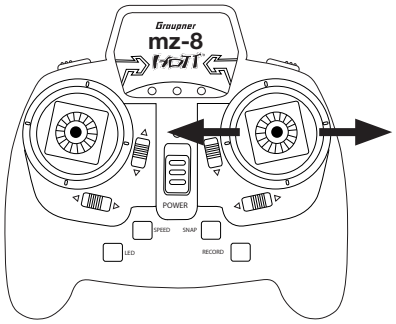
## Example flight control MODE 1

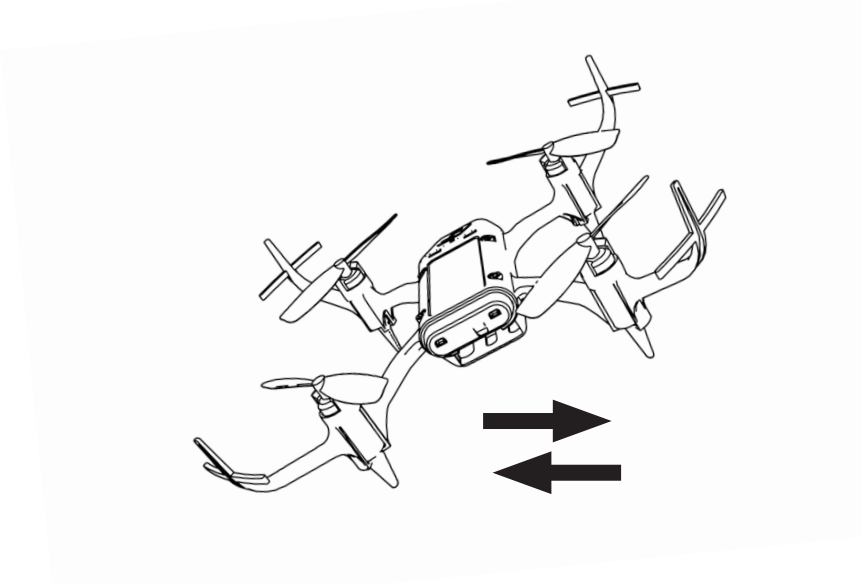
### Climb - Sink



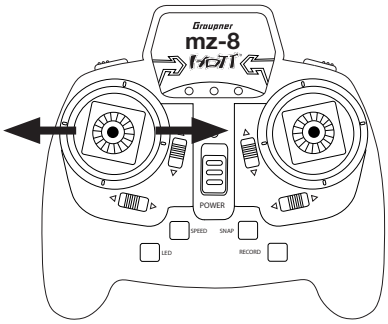



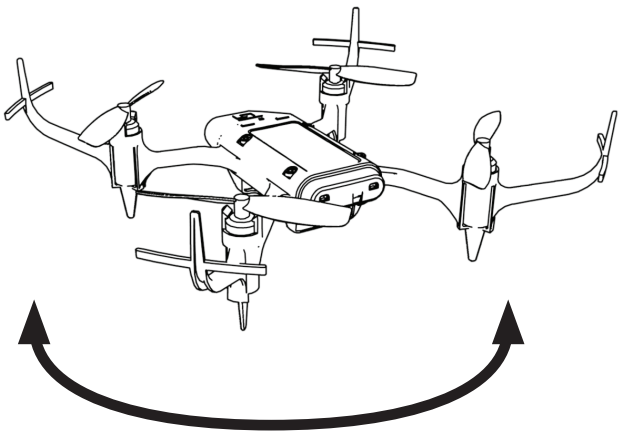
### Roll to the right and left



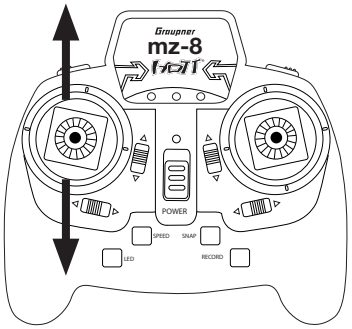



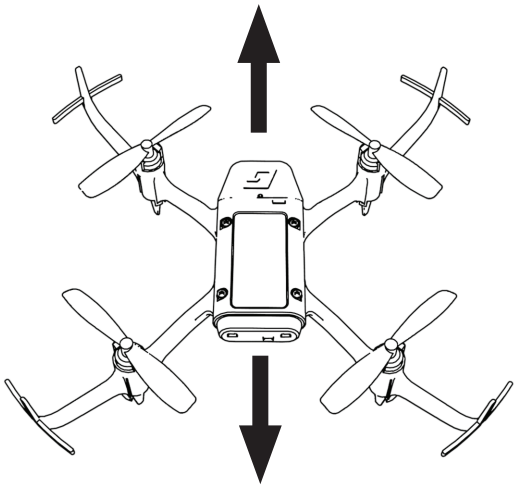
### Turn on its own axis



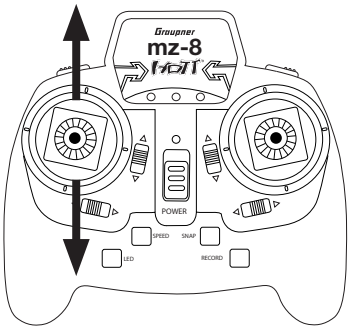
### Forward and backward

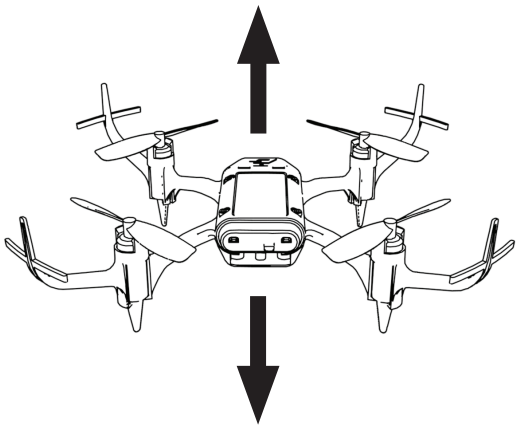


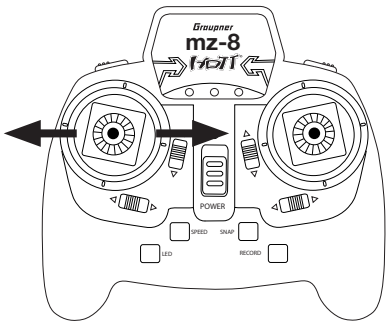
## Example flight control MODE 2

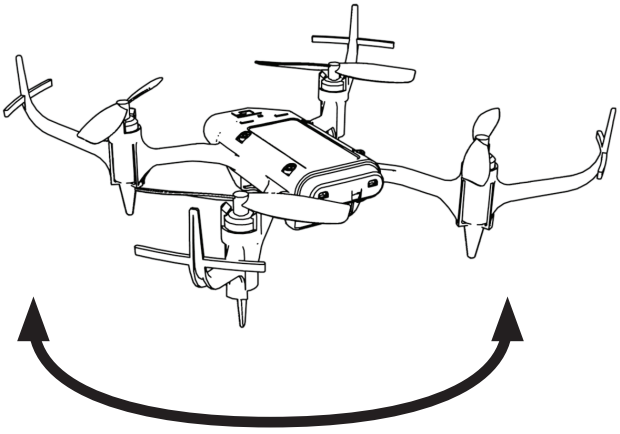
### Climb - Sink



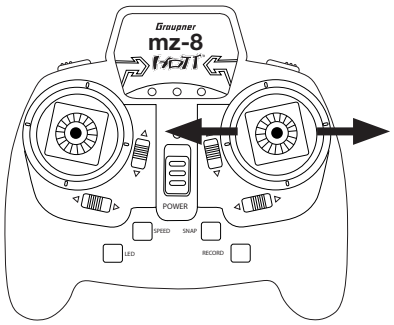



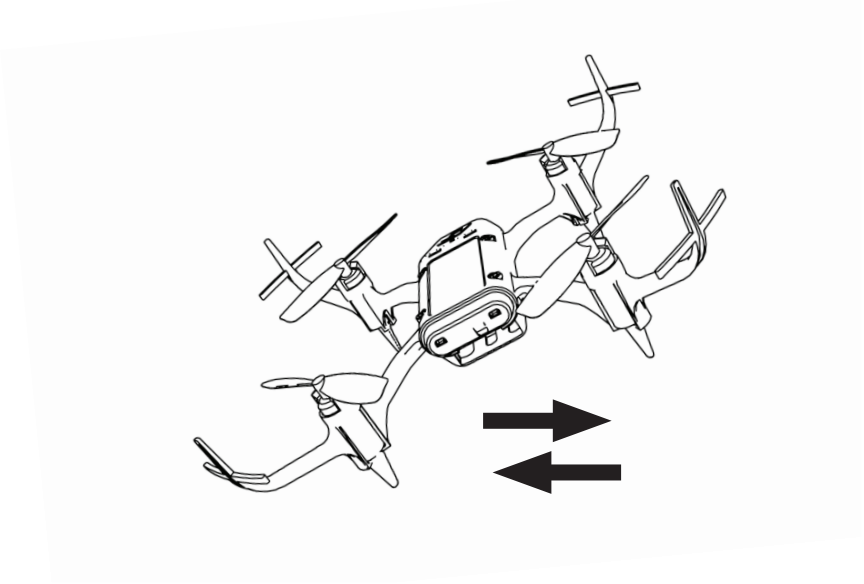
### Turn on its own axis



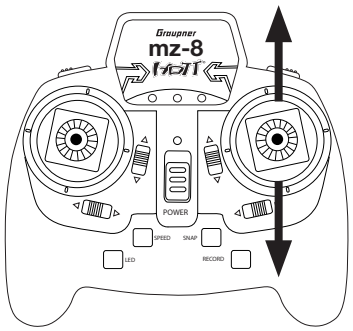



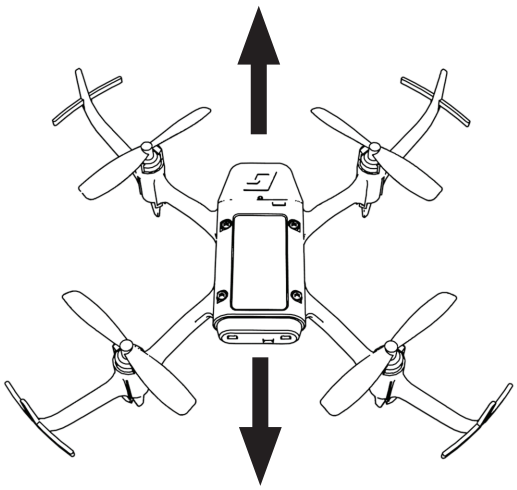
## Roll to the right and left



## Forward and backward



## Stick calibration

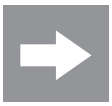
If the center position of your self-neutralizing control stick does not precisely correspond to 0% control travel, you can check and correct it as follows.

*Stick calibration step by step:*

- Bring the transmitter to the programming mode by pushing and holding the left stick while switching on the transmitter.
- The red LED blinks 3 times to confirm the programming mode.
- Move both sticks to all direction and then back to the middle position.
- After that leave the sticks for about 3 seconds in the middle position.
- To confirm the correct sticks calibration the red and the green LED blink 3 times simultaneously.
- After checking LED, press stick button for a while to save.
- If this blink signal is not emitted, repeat the entire procedure.

## Factory reset

If it was necessary to erase all the values saved in the copter and to recall the factory settings you can operate a factory reset. Therefor proceed as follows:



**Attention!** All model settings will be erased!

Push all the trims to the inside and then switch the transmitter on. In this way all the saved values will be deleted and reset to the factory settings.

## Installing the propellers

**CAUTION**

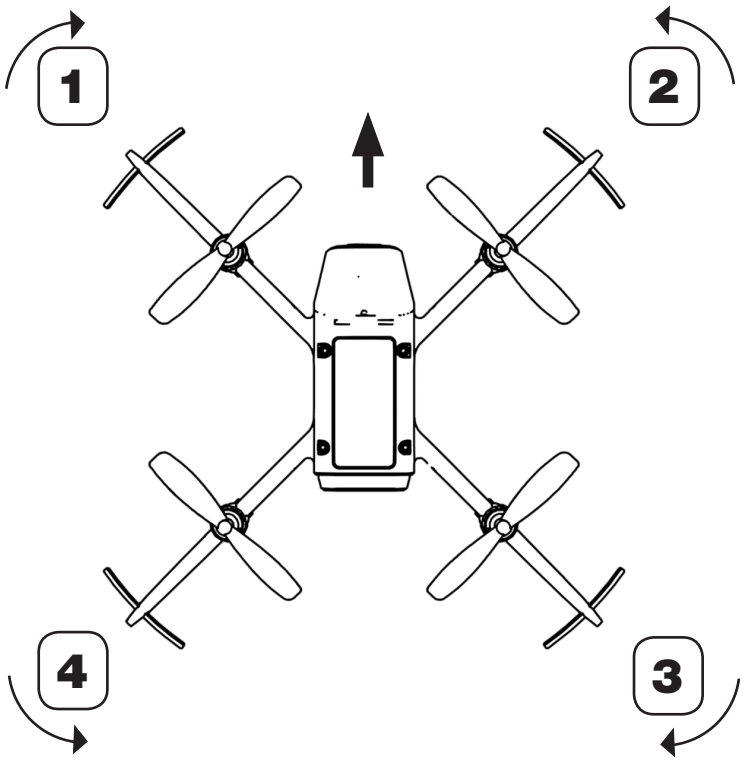
Risk of injury through rotating propellers by motors start. Always unplug the connector to the battery before working on the propellers.

Install the propellers as shown in the picture below. Pay attention to install the proper propeller to each motor. The propeller rotation sense is written on the propeller (R/L)! The image represents the copter seen from the top.

red or white, R+L (front A+B) / black, R+L (back A+B)

1 = Clockwise motor propeller (A)

2 = Counter-clockwise motor propeller (B)




4 = Counter-clockwise motor propeller (B)

3 = Clockwise motor propeller (A)

## First flight

Choose a free area for your first flight. Select always first the Attitude mode, because the Copter is thus easier to control and to become familiar with the flight characteristics of the **Alpha 110Q**. Proceed carefully and responsibly. Start and land always in Attitude mode.

### Initialization of the gyro

Once the model has been switched on, the gyro immediately becomes active but still needs to be initialized. To initialize the gyro, keep your model still for about 3 seconds when you switch it on. The calibration process can only be performed when the receiver is absolutely still. Always wait until the calibration process has finished before starting to fly the model.

### Flight control

Move the throttle stick to the lowest position. To let the motors start you have to push the motor-stop button (signal tone). For the beginning move the throttle stick carefully frontward until the copter flies about one meter over the ground. The flight movements are as described in the section "Example of flight control mode 1". Move initially the sticks carefully and take confidence withe the reactions of the copter. If the copter moves autonomously in one direction, compensate the movement through by trimming the control in the opposite direction. To stop the motors push again the motor-stop button (signal tone).

### Auto-flip function

The copter can autonomously perform a roll by pushing a button if, while flying it in Attitude mode, you push the neutralizing control stick (the opposite to the throttle stick), a quick acoustic signal is emitted for 5 seconds. If during these 5 seconds you move the nick or roll control more than 50%, the copter performs autonomously a 360° turn (Flip) in the direction of the control that you moved. Then push the throttle stick to full throttle to stabilize the copter and avoid loss of altitude. The copter cannot always come back to its prior position, eventually you may have to correct its position after the roll.

**CAUTION**

If the flip function is used many times repeatedly the receiver can loose the attitude information and the copter may move in an uncontrolled direction. Before switching back to Attitude mode, hover the copter for 30 s or land it in Rate mode, so that the receiver can calibrate the position.

## Camera function by version S 5012.FPV

Through the installed camera and the video transmitter is emitted a video signal. The transmission starts as soon as you connect the copter battery. Scan the transmission signal of the copter in your video goggles or video monitor.

The video channel switching will be described in the next section Special functions. (Channel list see “technical data”)

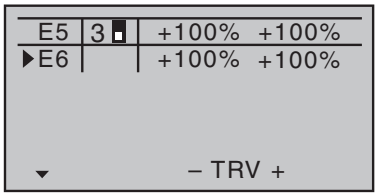
## Setting in connection with HoTT transmitter with display

### Transmitter settings

If you use a HoTT transmitter with display to control the copter, you will have the following setting options through the transmitter telemetry menu:

**Function channel 5**
**Setting of the flight-mode : attitude or rate mode**

In the transmitter it must be selected a free model memory, the model type must be “surface model“ and the channel 1 direction must be set so that in “motor off“ position the channel 1 power indicator must show -100%.




The flight mode must be set on channel 5. For this program a 2-way switch (e.g. switch 3) in the transmitter control menu on Channel 5 as follows:

**Attitude mode:** Channel 5 = -100% to +50%. The stick movement determines the Copter reaction on Roll and Nick. It allows a maximal angle of about 50° at 100% of stick movement. Mode suggested for beginners. The stick movements acts directly proportionally to Roll and Nick.

**Rate mode:** Channel 5 = more than +50%. The stick movement determines the rate without angle limit. Aerobatic mode that allows rolls and loopings.

### Special functions channel 6

Through the transmitter channel 6 it is possible to activate the special functions **(Auto-flip, video channel switch, LED On/Off Version S5012.RFH)**

**Video channel switch**

Four video channels are available. Thus program on the transmitter in the controls menu a switch for channel 6 with +100%. Push the switch for two seconds to switch the channel. The channel switches each time one position.

**Auto-flip function**

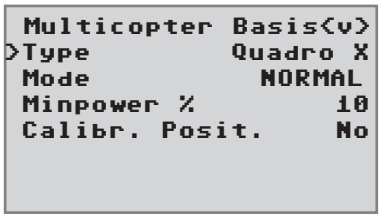
It allows you to flip your copter in a very easy way. It is essential that you control in Attitude mode (function not allowed in Rate mode).

The **auto-flip function** must be controlled by a switch assigned in a free mixer on your transmitter to the channel 6 with +110%. Activate the switch and within 5 sec move the nick or roll stick to more than 50% of its course, then the copter makes autonomously a flip in the selected direction. After the flip it is possible to have some little position movements (<10°).

**LED On/Off**
**(Version S5012.RFH)**

The S5012.RFH version has a big white LED on the front. To switch the LED on program a mixer on your transmitter to channel 6 with -100%. With the LED on the Auto-flip function is not available.

**Receiver's base settings**




**TYPE**

**Quadro x, Quadro +, Tri L, Tri R**

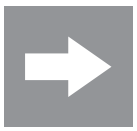
**Here it must always be selected in this model the setting Quadro X.**

**MODE**

**ESC settings** for the learning of the controller the receiver K1 signal will be passed directly to the controller.

**Normal** is set for 'normal' multicopter. (Must always be selected)

**Acro 3D** should not be selected for this model because this model is not suitable for this function.



**Note:**

For safety reason the **Type** and **Mode** changes take effect after switching off and on (only for this parameter).

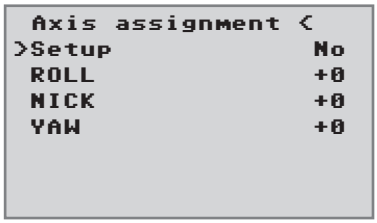
**Minpower%**

The setting is principally used to prevent the motors shut down in flight. Adjust so that the motors are running straight. Under no circumstances unnecessarily high set, this would limit the controller possibilities.

**CALIBR. POSITION**

With **Calibr. Position** the acceleration sensors can be calibrated so that in attitude mode with stick and trim neutral, the copter is precisely horizontally aligned. For this purpose, it is simply placed on absolute level surface and set the value to Yes. After a moment, it jumps back to No and the calibration is done. Do not forget to store disabling the field!

**Axis assignment**
**Step 3**
**Axis assignment in the gyro**




**Setup**: Setup: Yes/No

Assignment of the gyros and their operating direction.
In the receiver's "Axis assign" menu, go to the "Setup" option and set it to "Setup: Yes". Now assign the axes as follow:
On the transmitter, briefly set the roll command fully to the right; the roll axis is highlighted. Roll the copter more than 45 degrees to the right the identified axis with the required prefix is displayed, the field is no longer highlighted and identification of this axis is complete.
Now do the same for nick: on the transmitter, briefly set the nick command so that it is fully forward. Roll the copter more than 45 degrees forwards; the axis is displayed, the field is no longer highlighted and identification of this axis is complete.

Finally complete the procedure for yaw: on the transmitter, briefly set the yaw command fully to the right. Turn the copter so that the nose turns more than 45 degrees to the right; the axis is displayed, the field is no longer highlighted and identification of this axis is complete.

The gyros and operating directions have now been assigned. Now check to make sure that the operating directions are correct.

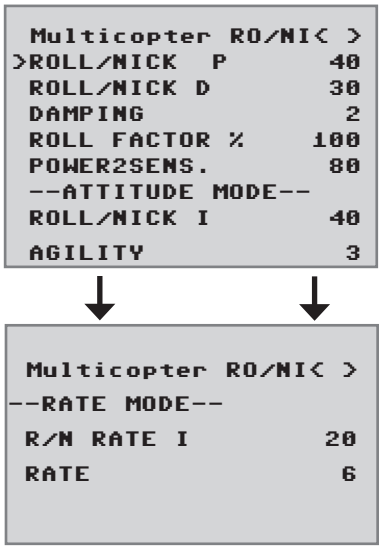
To do this remove the propeller of the copters and give approximately a quarter throttle, all motors are running at the same speed.

Tilt the Copter in Attitude mode so that its nose is facing downwards the front motors must turn faster than back ones. Tilt the Copter in Attitude mode to one side the motors of the side, in witch you tilt the model, must turn faster then the motors on the other side.

## Roll and Nick setting

**Step 4**

**Optional setting for Roll and Nick**




**For Attitude and Rate mode:**

### ROLL/NICK P

Set this parameter in steps of 5 higher and higher, until a medium-speed overshoot occurs. Then go some steps back in order to prevent the soar up climb in case of full throttle.

### ROLL/NICK D

Now adjust well to the D component in steps of 5, until the Copter engages exactly on nick and roll. A too high value leads to very rapid oscillations.

### DAMPING

The damping factor should be set as low as possible, but as high as necessary, so that the PID control can operate optimally and the setting can be increased at best. If you do not get vibrations away with the PID settings , then change the damping of 1 step and test whether the setting works better or worse. Recommended settings:

### ROLL FACTOR %

Set the Roll setting as percent value of the overall gain. For symmetric Copters the value can be 100. If, because of its center of gravity, the Copter is more agile on the Roll axis than on the Nick axis, then you can change here the roll factor.

**POWER2SENS.:**

Very strong drives can lead to oscillating at full throttle. This parameter allows you to set a kind of gyro suppression. Higher values result in an increased gyro suppression towards full throttle.

**Only for attitude mode**

**ROLL/NICK I**

Set the I component of the Attitude mode. At too low values of Copter swings slowly. If it stops after a roll or pitch command and “oscillates”, the value must be reduced.

**AGILITY**

Agility determines at what speed (yaw rate) a new position is occupied.

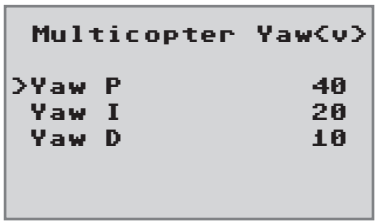
**Only for rate mode**

**R/N rate I**

Sets the I component of the rotation in rate mode. At too low values of Copter swings slowly. If it stops after a roll or pitch command and “oscillates”, the value must be reduced.

**RATE:** Sets the max. potential rate of rotation in Rate mode.

**Multicopter Yaw settings**




**Yaw P - Factor**

Default setting: +45

The P factor is responsible for the harder snap to yaw. Higher values result in a faster stop. At too high P-values the copter starts to “swing”. In such cases, the value must be reduced again.

**Yaw I - Factor**

Default setting: +15

The I-factor ensures constant rotations. Start with low values and only increase them until the rotations are constant. Too high value cause an oscillation when you stop and possibly the motors can run higher. This can lead to an undesirable rise.

**Yaw D - Factor**

Default setting: 10

The D-factor affects the stopping behavior in yaw. In most Copters a hard D action is necessary. The D component must be set as low as possible, since it affects the whole system.

## Replacement parts

| | |
|---|---|
| S5012.2 | Camera attachment |
| S5012.2.0 | Camera holder 0° |
| S5012.2.9 | Camera holder 9° |
| S5012.11 | Frame |
| S5012.12 | Cover |
| S5012.30 | Spare screws and detail parts |
| S5012.50 | Front LED |
| S5012.100 | Spare motors (4 motors) |
| S5012.110 | Spare propellers (2x red, 2x black) |
| S5012.120 | Main board |
| S5012.121 | Camera module |
| S8489 | LiPo battery 350 mAh |
| S2022 | SLIM 400 charger |
| S1030 | Transmitter mz-8 (mode 1 or 2) |

## Transmitter's firmware update

Firmware updates of the **MZ-8 HoTT** can be performed via the Data socket of the transmitter using a computer operating on Windows XP, Vista, 7, 8 or 10. You will also need an optional USB interface No. 7168.6, so as the optional adapter lead No. 7168.S. The programs and files required can be found in the Download area for the related products at **www.graupner.de**.

## Declaration of conformity

CE

S5012 Alpha 110Q

Graupner/SJ declares that the product is conform to EU norms.

EN 300 440-1 V1.6.1; EN 300 440-2 V1.4.1 3.2; EN 301 489-1 V1.9.2; EN 301 489-3 V1.6.1 3.1

EN 62479: 2010 3.1

EN 60950-1:2006 +A11:2009+ A1:2010+A12:2011+A2:2013

## Notes on environmental protection

### Disposal notes

This symbol on the product, user manual or packaging indicates that this product must not be disposed of with other household waste at the end of its life. It must be handed over to the applicable collection point for the recycling of electrical and electronic equipment.

The materials are recyclable as marked. By recycling, material reusing or other forms of scrap usage you are making an important contribution to environmental protection.

Batteries and accumulators must be removed from the device and disposed of at an appropriate collection point. Please inquire if necessary from the local authority for the appropriate disposal site.

## Care and maintenance


### Notes on care

The product does not need any maintenance, it works so as it is without any special care. In your own interests protect it from dust, dirt and moisture.

## Warranty certificate

The company ***Graupner***, Henriettenstrassee 96, 73230 Kirchheim/Teck grants from the date of purchase of this product for a period of 24 months. The warranty applies only to the material or operational defects already existing when you purchased the item. Damage due to wear, overloading, incorrect accessories or improper handling are excluded from the guarantee. The legal rights and claims are not affected by this guarantee. Please check exactly defects before a claim or send the product, because we have to ask you to pay shipping costs if the item is free from defects.

The present construction or user manual is for informational purposes only and may be changed without prior notice. The current version can be found on the Internet at **www.graupner.de** on the relevant product page. In addition, the company ***Graupner*** has no responsibility or liability for any errors or inaccuracies that may appear in construction or operation manuals.

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