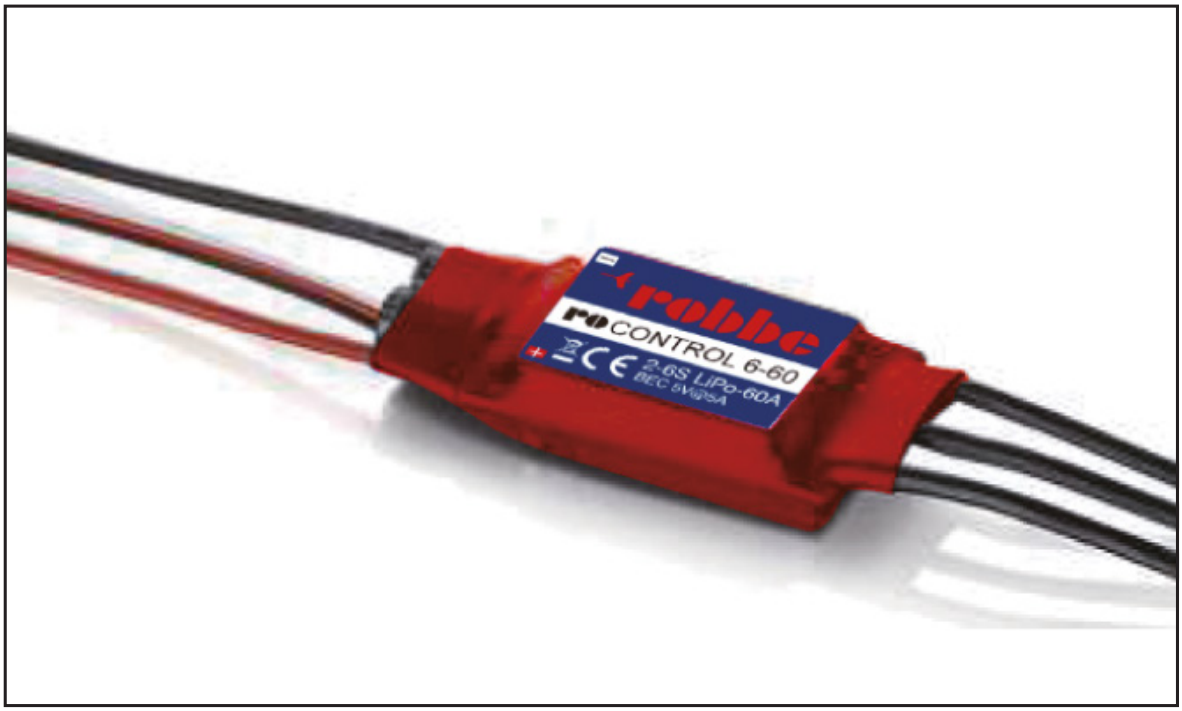
robbe
Modellsport



Instruction manual

CONTROL

Dear customer, we are pleased that you have chosen a speed regulator for brushless motors from our range. With the ROCONTROL series controllers, you have a particularly powerful controller for controlling your brushless motors, which can be individually adapted to your model by simple programming.

Despite the relatively simple operation of the controllers, its use requires some knowledge from you. These instructions will enable you to quickly familiarize yourself with the possibilities of the speed controllers. To achieve this goal safely and quickly, you should read the operating instructions carefully before starting up the controller.

SAFETY INSTRUCTIONS

General Hazard Information

Please note for all our deliveries: Please read these safety and hazard notes first, and then read through all operating and assembly instructions completely and carefully before commissioning for the first time. Remote-controlled models are not a toy and can only be used by young people under the age of 14 under permanent supervision of adults who are familiar with construction, operation, materials and potential hazards. The construction, commissioning and operation of remote-controlled models are dangerous and are the operator's responsibility. We expressly point out these dangers and assume no liability. Careful, well-considered handling during operation protects against personal injury and damage to property. Carry out maintenance and inspection of your models and electrical equipment at short, regular intervals. Regularly check that all fasteners are securely seated.

Applies to all remote-controlled models:

- Make sure that nobody else in the environment is using your transmission frequency.
- Turn it on: Switch on the transmitter first and then the receiver.
- Turn it off: First switch off the receiver and then switch off the transmitter.

Make sure that the transmitter and receiver are fully charged before starting.

In addition, please observe the following instructions:

- Do not use different types of batteries or rechargeable batteries or new and used batteries together.
- Please remove empty batteries from the devices, especially if they will not be used for a long time.
- Never expose electrical equipment to dirt, dust, moisture, cold or heat. Damage to cables can lead to short circuits, fire and destruction of the equipment!
- Avoid injury by exercising caution when working with your models.
- Check with your insurance company to see if the risks posed by your models are covered by liability insurance or if you need to insure them additionally.
- Adhesives and paints contain solvents that can be harmful to health. Follow the manufacturer's instructions and warnings.

Hazard warnings Aircraft models
Please ask experienced model pilots, clubs or flight schools for information in order to reduce hazards and avoid damage. Ask all spectators to maintain a safety distance of at least 5 m. Never steer your model towards people, animals or high-voltage lines. Avoid public roads, paths, squares and places where people may be present. Be considerate of aircraft noise that you have condemned.

Hazard warnings Controller
Make sure that you do not reverse the polarity of the battery, that you avoid short circuits of the cables, that the drive motor is effectively suppressed and that the air can circulate well. Use reverse polarity connector systems. All cables and connections should be well insulated. The regulator must not come into contact with grease or oil. The regulators are only intended for use in battery-operated, remote-controlled models. Any other operation is not permitted. Always carry out a range test. Only use the plug connections, original parts and accessories recommended by us. Do not make any changes to the controller unless this is specified in the description. Important: Before you plug in the controller, consult with the other operators that your transmitter is the only one operating on this frequency if you are not using a 2.4 GHz system. Before turning on the transmitter, always set the throttle to "Stop".

Motor hazard warnings
Motors are not suitable for persons under 14 years of age. Commissioning may only be carried out under the constant supervision of an adult who is familiar with the dangers. Before each operation, check the seat of the motor and the propeller. Never let a motor run in your hand. Protect the motor from dirt and moisture. Do not allow foreign objects to enter the motor. Always maintain a safety distance from the rotating propeller (propellers can separate fingers!!!!). Always observe the maximum permissible speed of the motor and propeller.

Disposal of electrical equipment
After use a request: Remove all batteries and dispose of them separately. Dispose of old electrically operated devices free of charge at the collection points of the municipalities for electronic scrap. The remaining parts should be disposed of as household waste. Thank you for your help!

Safety Information for LiPo Cells and Batteries
Exact data on load capacity and dimensions can be found on our homepage and in the catalogue. Information on the continuous load capacity of the cells is only valid with optimum cooling. Lithium polymer batteries (short form: LiPo batteries) require particularly careful handling. This applies to charging and discharging as well as to storage and other handling. IMPORTANT! It is imperative that you observe the following special instructions:

- Incorrect handling can lead to explosion, fire, smoke and poisoning. Failure to observe the instructions and warnings will result in loss of performance and possible further defects. Only when properly stored and charged with an optimum charger can you achieve the maximum battery life.

At 300 - 600 charging cycles you must expect a power drop of only approx. 20%.

- If the charger is not optimal, the capacity will be significantly reduced with each charge/ discharge and thus also the service life. Storage at temperatures too high or too low can result in a gradual reduction in capacity.

General warnings - Avoid hazards!

Do not burn batteries. Never immerse the cells in liquids. Keep batteries / cells out of the reach of children. Never disassemble LiPo batteries. Disassembling a battery may cause internal short circuits. Gas emission, fire and explosion or other problems may result. The electrolytes and electrolyte vapors contained in the LiPo batteries are harmful to health. Avoid direct contact with electrolytes in any case. If electrolytes come into contact with skin, eyes or other parts of the body, rinse immediately with sufficient fresh water and consult a doctor.

Remove all batteries not required in the model. Always charge batteries in good time. Store batteries on a non-combustible, heat-resistant and non-conductive surface! Deeply discharged Li-Po batteries are defective and must no longer be used! If the battery is not in use, disconnect it from all consumers such as speed governors, as these always consume a little power, even if they are switched off. Otherwise the battery may be destroyed by deep discharge.

Special instructions for charging LiPo batteries
As we cannot monitor the correct charging and discharging of the cells, any warranty due to faulty charging or discharging is excluded. Only approved chargers with balancers may be used for charging Li-Po batteries. The maximum charging capacity must be limited to 1.05 times the battery capacity. Example: 700 mAh battery = 735 mAh max. charging capacity. Make sure that the number of cells, the charge end and the discharge end voltage are set correctly. Follow the operating instructions of your charger/discharger. The battery to be charged must be placed on a non-combustible, heat-resistant and non-conductive surface during the charging process! When charging, keep all flammable or easily inflammable objects away. Batteries may only be charged and discharged under supervision.

In principle, LiPo batteries connected in series in the pack may only be charged together if the voltage of the individual cells does not differ by more than 0.1 V from each other. If the voltage deviation of the individual cells is more than 0.1 V, the cell voltage must be adjusted as accurately as possible by single cell charging or single cell discharging. Under these conditions, LiPo batteries may be charged with max. 1 C charging current. The value 1 C charge current in mA corresponds to the capacity in mAh, i.e. 200 mA for a 200 mAh battery. Avoid a voltage of more than 4.2 V per cell in any case, as otherwise the cell will be permanently damaged and can cause fire. In order to avoid overcharging individual cells in the pack, the switch-off voltage should be set to values between 3.1 V - 3.15 V per cell for a longer service life. You can also charge batteries with a lower voltage for safety and to extend their service life. After each charge, check that one of the cells in the pack has a voltage greater than 4.2V. All cells must have the same voltage. If the voltage of the individual cells differs by more than 0.1 V, the cell voltage must be adjusted by single cell charging or single cell discharging. To avoid overcharging the cells after prolonged use in packs, they should be charged individually on a regular basis. Never charge the battery cells with wrong polarity.
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If the batteries are charged the wrong way round, there will be abnormal chemical reactions and the battery will become unusable. This can cause fractures, smoke and flames.

Special instructions for discharging LiPo batteries

A continuous current of approx. 15 C is not a major problem for LiPo batteries. For higher currents, please refer to the information in the respective product data sheets. A discharge of less than 2.5 V per cell will permanently damage the cells. Avoid this deep discharge unintentionally! It is essential that you switch off the motor before you notice a drop in performance. Then LiPo batteries would already be damaged. For safety reasons, leave a remaining capacity of approx. 20 % in the battery. If individual cells are differently fully charged, the undervoltage switch-off of the regulator may come too late, so that individual cells could be deeply discharged. Avoid short circuits at all costs. A short circuit allows a very high current to flow which heats the cells. This leads to electrolyte loss, gas leakage or even explosion. Because of the danger of a short circuit, you should avoid the proximity of conductive surfaces or contact with them when using LiPo batteries. Permanent short circuits lead to the destruction of the battery, high temperatures and possibly self-ignition can result. The batteries must never rise to temperatures above 70° C during discharge. Ensure cooling or a lower discharge. You can easily check the temperature with an infrared thermometer.

Stability of the battery housing foil
The foil of the aluminium housing can easily be damaged by sharp objects such as needles, knives, nails, motor connections, soldering or the like. Damage to the film will render the battery unusable. The battery must therefore be installed in the model in such a way that it cannot be deformed even in the event of a crash. In the event of a short circuit, the battery could burn. Temperatures above 70° C can also cause the housing to leak. Loss of electrolyte will render the battery unusable. Dispose of defective cells individually packed in poly bags or foil with hazardous waste.

Mechanical Shock
The LiPo batteries are not as mechanically stable as batteries in metal housings. Avoid mechanical shocks caused by falling, hitting, bending, etc.. Therefore, never cut, tear, deform or drill the laminate film. Never bend or twist LiPo batteries. Do not apply pressure to the battery or connectors.

Handling the connections
The LiPo connectors are not as robust as other batteries. Especially the aluminium (+) connector can break off easily. Never use damaged cells: Never use damaged cells under any circumstances. Damaged cells can be identified in this way, among other things: Damaged housing packaging, deformation of the battery cells, smell of electrolytes, leaking electrolytes. In these cases, further use of the batteries is no longer permitted. Dispose of them.

NOTES FOR USE

Before putting the controller into operation, read the operating instructions carefully and follow the instructions exactly. In addition, please observe the following rules when operating a ROCONTROL controller:

- Use the controller only within the limits of the technical data, otherwise the controller could be destroyed.
- Use of the controller in applications that do not comply with these instructions can lead to problems in operation, destroy the controller and lead to injuries. There are considerable dangers, which can lead to material damage and personal injury.
- The flight controllers are designed exclusively for operation with rechargeable batteries. Never operate the motor controllers with a power supply unit!
- Protect the speed controller from vibrations, dust, moisture and mechanical stress!
- Never use a damaged controller in operation, e.g. due to the effect of water or mechanical deformation due to a fall or similar!
- Do not expose the controller to extreme heat or cold!
- Check the device for damage at regular intervals!
- Keep the connection cables as short as possible, especially the battery connection cables must not be extended!
- Observe the specifications of the manufacturers of the batteries used!
- The three output sockets can be connected directly to the motor connections. If you make sure that no short circuits can occur, insulate everything very carefully.
- If the motor has the wrong direction of rotation, you can correct it by replacing any two motor connections. Never change the polarity of the battery connections.
- Once the battery is plugged into the controller, the motor may start up, so extreme caution is required. To avoid injury, disassemble the propeller when adjusting the model, for example.
- Allow the controller to cool down well after each use. Make sure that there is adequate air circulation in your model, even if the model has been taken out of operation. Damage caused by overheating the controller will void the warranty.

FEATURES

- depending on type suitable for 2 - 6 S LiPo or 5 -18 NiMH cells, please note the sticker on the controller
- depending on type up to 80 A continuous current and 100 A peak current, please pay attention to the sticker on the controller
- The ROCONTROL controllers with up to 40 A load are equipped with a linear BEC (5 V / 2A).
- the ROCONTROL controllers from 50 A load are equipped with a clocked UBEC (5 V / 5 A)
- programmable parameters: Brake, battery type, switch-off behaviour, switch-off voltage for the battery types, start behaviour and timing

PROTECTION FUNCTIONS OF THE CONTROLLER

The ROCONTROL controllers are equipped with several protective functions for safe operation.

1. Start-up protection: If the motor does not start within 2 seconds of the throttle stick being actuated the power supply is automatically interrupted. In this case, the throttle stick must be returned to its lowest position.

This situation may occur if the connection between the controller and the motor is faulty or if the motor is blocked or the gearbox is damaged.

2. Overheating protection: if the temperature of the controller exceeds 110 degrees, the power is automatically reduced for safety reasons.
3. Protection against signal loss: If no valid signal comes from the receiver for a period of 1 second, the output power is reduced. If there is no correct signal in the next 2 seconds, the controller switches off the motor completely.

PROGRAMMABLE PARAMETERS

Note: The parameters printed in bold type reflect the factory default settings.

1. brake adjustment: **aktivated** / deaktivated
2. Battery type: **LiPo** / NiMH
3. undervoltage protection: Gradual reduction in output / immediate switch-off
4. cut-off voltage low / medium / high

   1) With LiPo batteries, the number of cells is automatically determined, the switch-off voltages apply for low 2.85 V / cell, for medium 3.15 V / cell and for high 3.30 V / cell. With a 3S LiPo battery at the preset average cut-off voltage, the cut-off voltage is 3.15 V x 3 = 9.45 V.

   2) For NiMH batteries, the cut-off voltage is calculated as a percentage of the initial voltage; it is 0 % for low, 50 % for medium and 65 % for high. When set to 0 %, the undervoltage protection is deactivated. For a 6-cell NiMH battery, the voltage of a fully charged battery is 1.44V x 6 cells = 8.64V, and for the preset average cut-off voltage, the cut-off voltage is 8.64V x 50% = 4.32V.

5. Start Mode: normal / soft / super soft (300 ms / 1.5 s / 3 s acceleration time)

   a) The normal mode is suitable for practically all types of models, the soft mode or the super soft start-up mode is intended for helicopters. The acceleration in soft and super soft start-up mode is slower than in normal mode, it lasts 1.5 sec. for a soft and 3.0 sec. for a super soft start, from start of throttle stick movement to full throttle. To avoid problems with low acceleration due to slow response in emergency situations, the engine switches to normal starting mode when the engine is in idle position (throttle stick in lowest position) and full throttle is applied again within 3 seconds (throttle stick in foremost position). This feature makes the throttle well suited for aerobatics applications where a fast throttle response is required.

6. Timing level low / medium / high

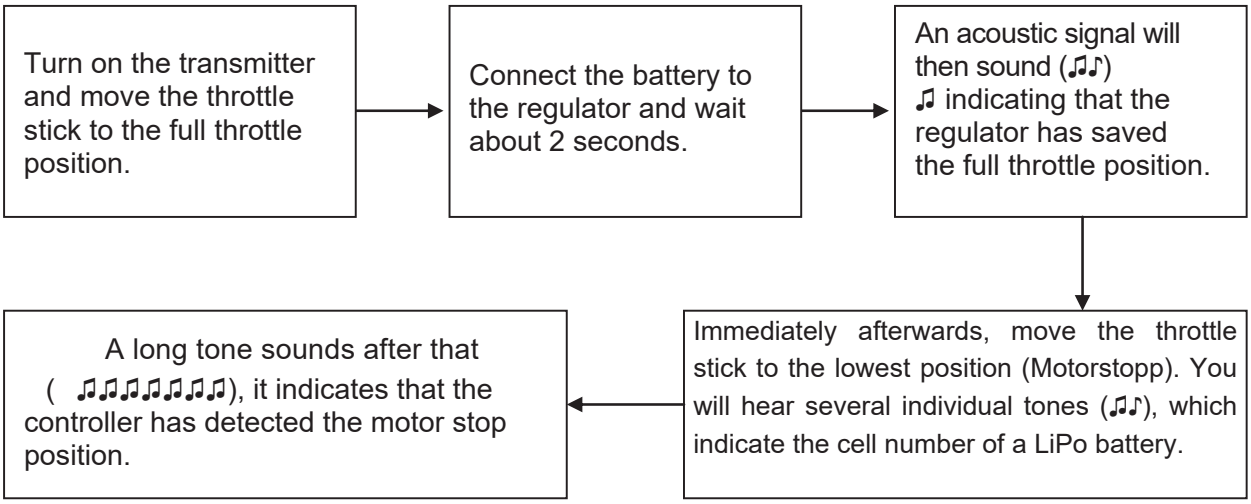
   In the low stage the timing setting is 3.75 degrees, in the middle 15 degrees and in the high stage 26.25 degrees. For many motors, the low stage is suitable, for multipole motors and for increasing the speed, the medium or high timing stage can be used.

USE OF THE BRUSHLESS CONTROLLER

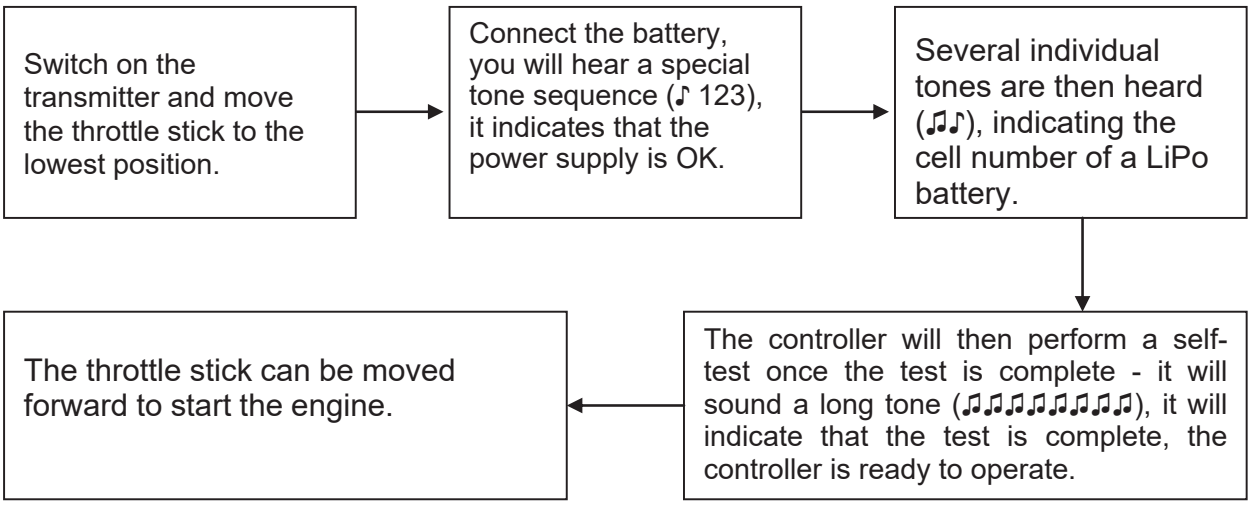
Connect the controller to the motor and to the receiver, connect the servo connection cable to the receiver output assigned to the throttle stick of your remote control. Before connecting the battery, check the polarity again. The black cable of the controller must be connected to the negative terminal and the red cable to the positive terminal of the battery. If the battery is connected with the wrong polarity, the controller will be destroyed and you have no warranty claim. The controller is then ready for operation. If the battery is connected, be extremely careful, the motor could start.

Teach-in of the throttle stick travel

Important note: This procedure must be carried out during initial operation and when changing the remote control transmitter, as the different transmitters have different stick travel. To ensure smooth operation, please proceed as follows:



Normal commissioning



For each normal start-up, carry out the above steps conscientiously in the order shown.

PROBLEM SOLUTIONS

Errors	possible cause	solution
After switching on, the motor does not start and no tones are generated.	There is no correct connection between the controller and the drive battery.	Check the connection between battery and controller, replace the plug!
After switching on, the motor does not start, it sounds a warning tone with two short tones each (♪, ♪) in an interval of 1 second.	The input voltage is outside the technical data, it is either too high or too low.	Check the voltage of the drive battery!
After switching on, the motor does not start, it sounds a warning tone with three short tones each (♪, ♪, ♪) in an interval of 2 seconds.	An incorrect input signal is present.	Check all components of the remote control as well as the connection between receiver and controller!
After switching on, the motor does not start, it sounds a warning tone with three short tones each (♪, ♪, ♪) at an interval of 0.25 sec.	The throttle stick is not in the neutral (engine off) position.	Move the throttle stick to the lowest position (engine stop).
After switching on, the motor does not start, a special tone sequence sounds. (♪ 56721).	The direction of travel of the control stick for the gas function is reversed, the controller starts in programming mode.	Specify the correct running direction for the throttle channel on the transmitter!
The motor rotates the wrong way round	The connection cables between controller and motor are incorrectly installed.	Two of the connection lines between the controller and the motor must be replaced!

With the help of the table above, most errors can be eliminated quickly and safely. It is best if you check everything thoroughly before the first start-up.

PROGRAMMING THE CONTROLLER

The configuration of the ROCONTROL controller is done with the transmitter in four steps, proceed very carefully and check everything very carefully. Incorrect configuration of the controller can have serious consequences.

1. Activate programming mode
2. Select the parameter to be changed
3. Changing the selected parameter
4. Exit programming mode

Note: Please make sure that the control stick is set to exactly 0 % in the neutral position (engine stop) and to exactly 100 % in the full throttle position.

1. activate programming mode

- Switch on the transmitter and move the throttle knob to the full throttle position. Then plug in the drive battery.
- After about 2 seconds you will hear an acoustic signal (♫♪ ♫♪).
- Wait another 5 seconds and you will hear a sequence of tones (♪ 56712) indicating that the programming mode is active.

2. Specify the parameters to be changed

After activating the programming mode, eight different tones are heard in a loop, which are to be assigned to the individual parameters. To select a parameter, the throttle stick must be moved to the neutral (engine off) position within 3 seconds of the respective tone sequence. Table 1 shows the relationships between the various parameters and the associated tone sequences.

3. Changing the selected parameter

After selecting a parameter, you will hear different tones in a loop, which have to be assigned to the individual values of a parameter. To program a specific value, move the throttle stick to the full throttle position. A special tone sequence will then sound (♪ 1515), confirming the selection and indicating that the value has been saved. Table 2 shows the relationships between the different values of the individual parameters and the corresponding tones.
If the throttle stick remains in the full throttle position, you return to point 2 to select another parameter. If the throttle stick is moved to the neutral (engine off) position, the programming mode is exited directly.

4. Exit programming mode

There are two possibilities. You can move the throttle stick to the neutral position at step 2 after the 8th tone sequence (two long tones, or at step 3 after the sound of the special tone sequence (♪ 1515).

	Parameter	Sequence of tones	Description
1	Brake adjustment	♪	a short note
2	Battery type	♪, ♪	two short notes
3	Undervoltage protection	♪, ♪, ♪	three short notes
4	Cut-off voltage	♪, ♪, ♪, ♪	four short notes
5	Start Modus	♫♫♫♫	a long tone
6	Timing	♫♫♫♫ , ♪	a long tone, a short tone
7	Reset, activate factory settings	♫♫♫♫ , ♪, ♪	one long, two short tones
8	Exit programming mode	♫♫♫♫ ♫♫ ♫	two long notes

Table 1 above shows the relationships between the parameters and the corresponding tone sequences during a programming process.

Note: A long tone (♫♫♫♫) corresponds to five short tones (♪, ♪, ♪, ♪, ♪).

	a short note	two short notes	three short notes
Brake adjustment	deactivated	**activated**	-
Battery type	**LiPo**	NiMH	-
Undervoltage protection	gradual reduction in performance	immediate shutdown	-
Cut-off voltage	profound	**medium**	high
Start Modus	**normal**	soft	supersoft
Timing	**low**	medium	high

Table 2 above shows the relationships between the values of the parameters and the associated tones.

Note: The parameters printed in bold type reflect the factory default settings.

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+14

This product is not a toy. Operate only under the direct supervision of adults.

Made in China

V2_04/2019