

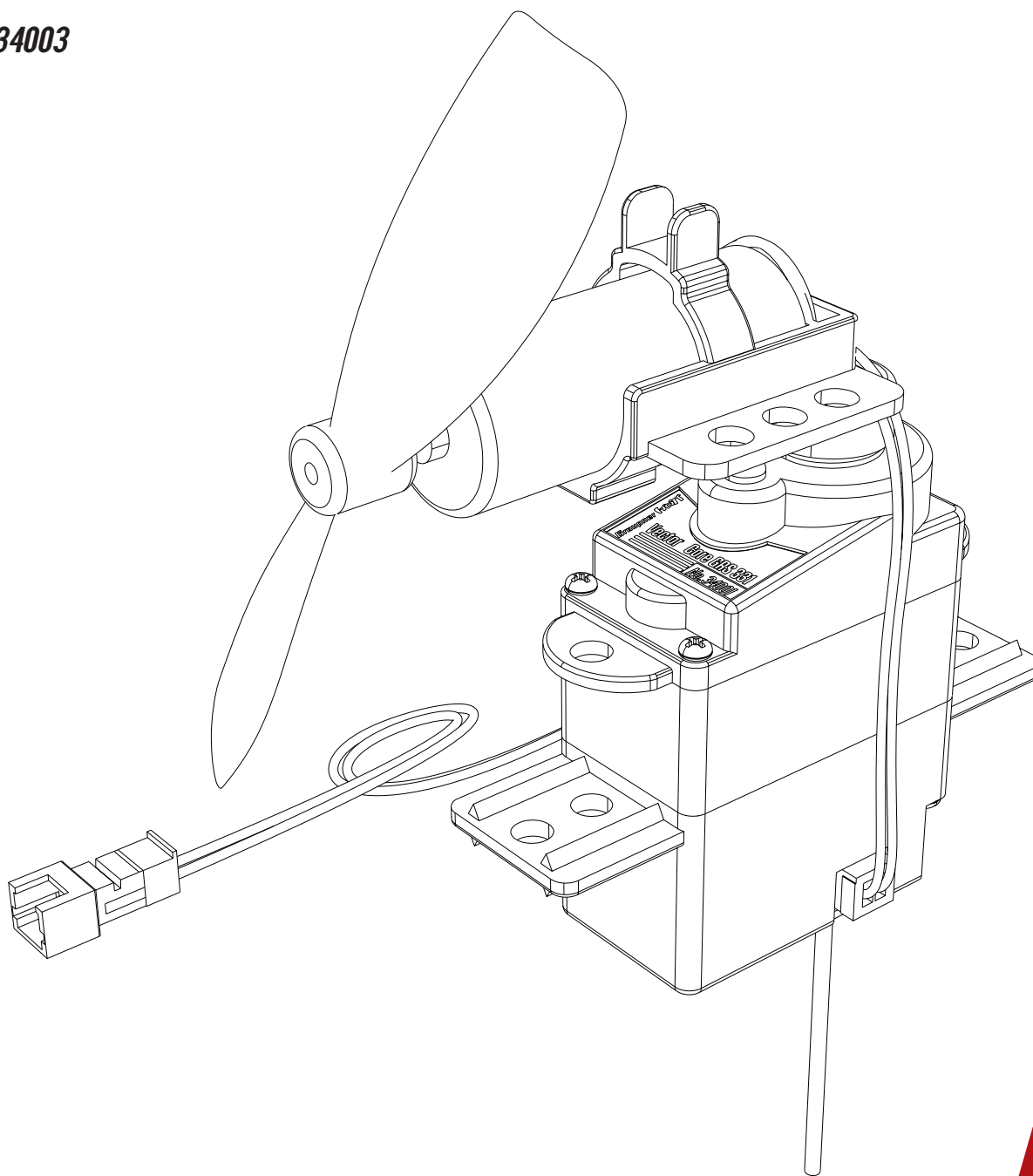
Manual

Vector Unit / Vector Unit Extreme

2 channel HoTT 2,4 GHz receiver/servo/speed controller unit

No. 34002

No. 34003



CE

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Introduction

Thank you very much for purchasing the **Graupner Vector** unit. This manual is valid for all the units listed on the cover sheet. The package content changes depending on the version.

Read this manual carefully to achieve the best results with your **Vector** unit 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. Keep updated by regularly checking our own website, **www.graupner.de** to be always updated with the products and firmware.

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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Graupner in Internet

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

Intended use

This **Vector** unit 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. The installation and operation of the unit must be performed by experienced modellers. If you do not have sufficient knowledge about dealing with radio-controlled models, please contact an experienced modeler or a model club.

Package content No.34002

- ◆ **Vector Core GRS 331**

- ◆ 34001.4 **Vector Motor CW**
- ◆ 34001.30 **Vector Propeller 46 mm**
- ◆ Manual

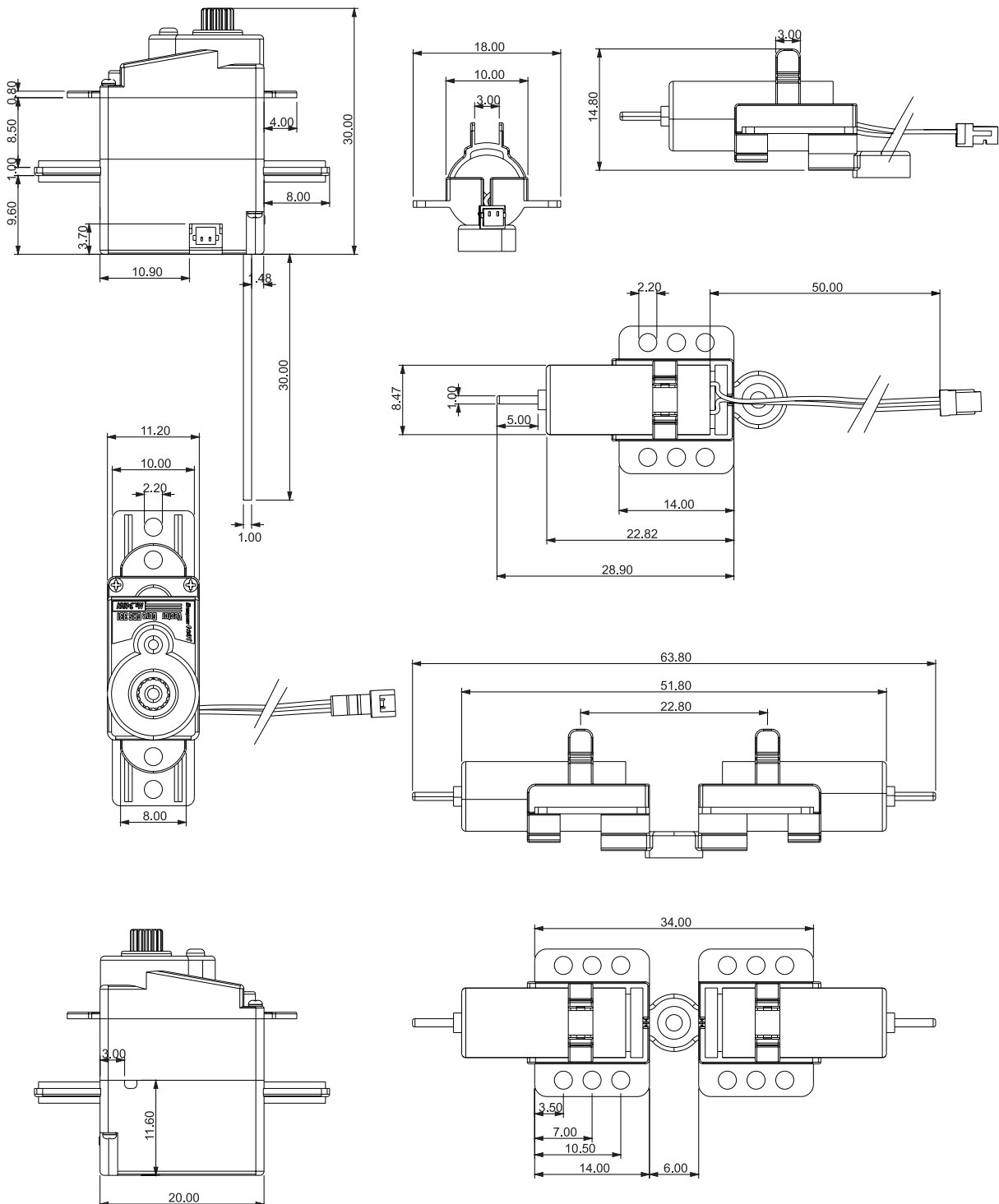
Package content No.34003

- ◆ **Vector Core GRS 331**

- ◆ 34001.4 **Vector Motor Extreme CW**
- ◆ 34001.31 **Vector Propeller 56 mm**
- ◆ Manual

Technical Data

Frequency band	2,4 ... 2,4835 GHz	Motor unit single	approx. 6,8 g
Modulation	FHSS	Motor unit double	approx. 13,7 g
Temperature range	-10 ... +55 °C	Current consumption	max. 2A continuous current
Antenna	Wire 30 mm	Stall torque/3,7 V approx	5 Ncm
Operating voltage	3.0V ~ 4.2V	Speed/3,7C approx.	0,06 sec./40°
Weight Vector Core	approx. 6,6 g		



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 **Vector** unit must not use the **Vector** unit 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 model 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 **Vector** unit 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 **Vector** unit regularly for damages to the housings and cables, specially after a crash of the model. Damaged or wet electronic components, even if re-dried, should no longer be used!

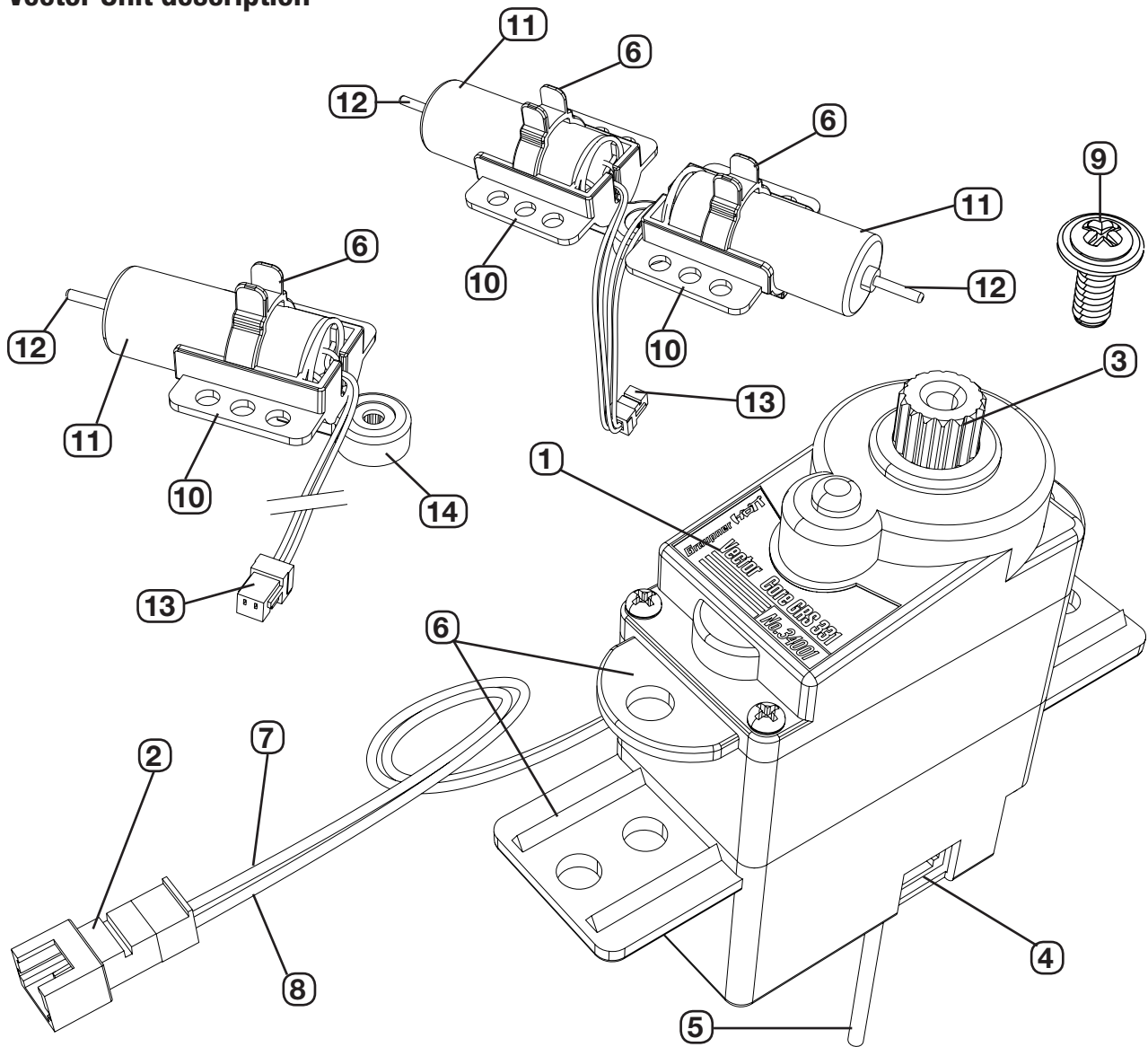
Never touch the turning propellers, this can cause injury

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

Observe the safety notes of the required components.

Never fly against people or animals, risk of injury through the propellers

Vector Unit description



1	Vector Core, Servo DES 131 with integrated receiver and speed controller
2	Battery connection cable
3	Drive gear to install a motor unit or a servo lever
4	Motor connection socket max. 2A continuous current
5	Receiver antenna
6	Fixture arms
7	+ cable (red)
8	- cable (black)
9	Motor mount fixing screw, flat-head screw 1,2 x 3 mm
10	Motor mount
11	Motor
12	Propeller
13	Motor connection plug
14	Drive gear joint

Preparation before use

The **Vector** unit should only be powered by a 1 S LiPo battery **Power Pack** No. 78101.1.

The input voltage of the drive battery is monitored during the flight through the telemetry function of the **HoTT** transmitter.

If the voltage drops under 3.2 V, the warning alarm will be activated in the **HoTT** transmitter. Stop immediately the use and charge the drive battery!

Connecting the battery

To switch on the unit connect the drive battery to the battery connection cable (2).

Use exclusively the batteries recommended by us.

The connectors are reverse polarity protected: note the small chamfers on the sides. Never use force – the connectors should engage easily.

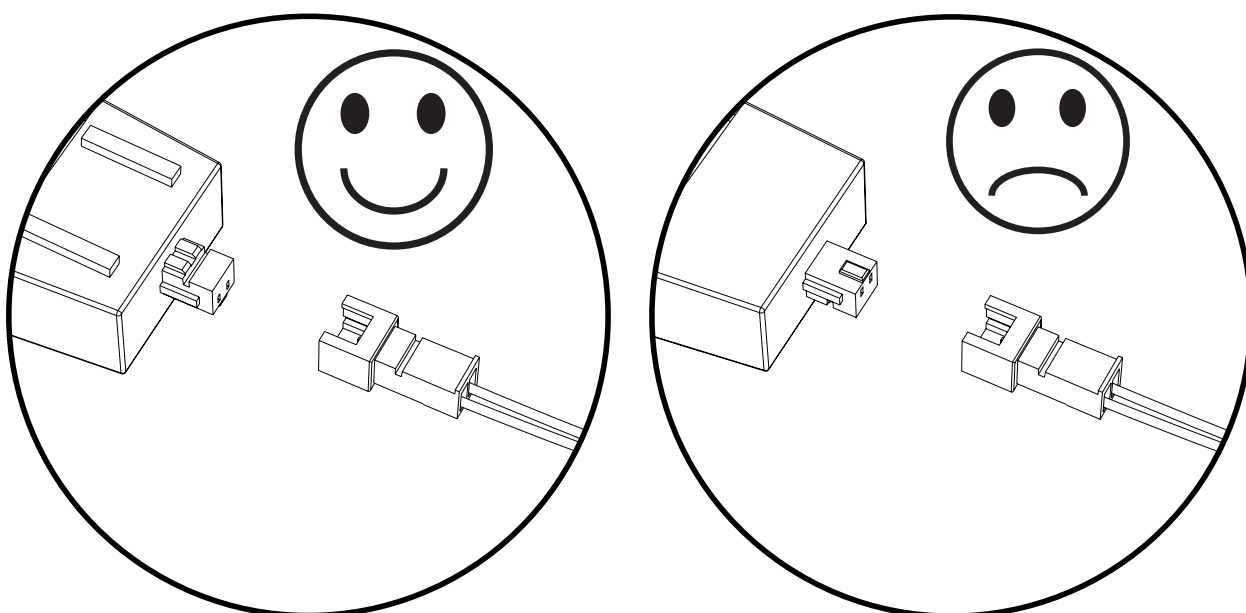


Attention

If the connection system is connected and forced in the wrong direction, then the connector of the battery connection cable will be ruined.

Never connect a battery with voltage higher than 4,2 V DC to the unit! The receiver and the servo would be destroyed.

Never connect a battery to the motor socket in the unit! The receiver and the servo would be destroyed.

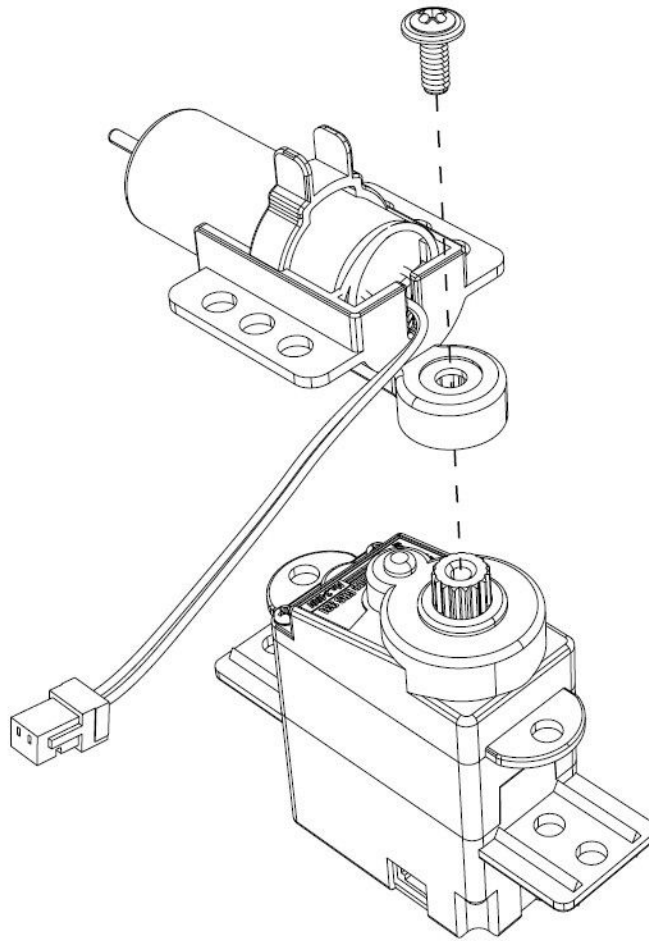


Installing the motor unit

The motor unit is installed onto the drive gear through the fixture screw.

Alternatively you can install a servo arm onto the drive gear.

- The servo arm will then be used to move a control surface.
- The motor will then be installed in the model.



Connecting the motor unit

Use exclusively the motor units recommended by us.

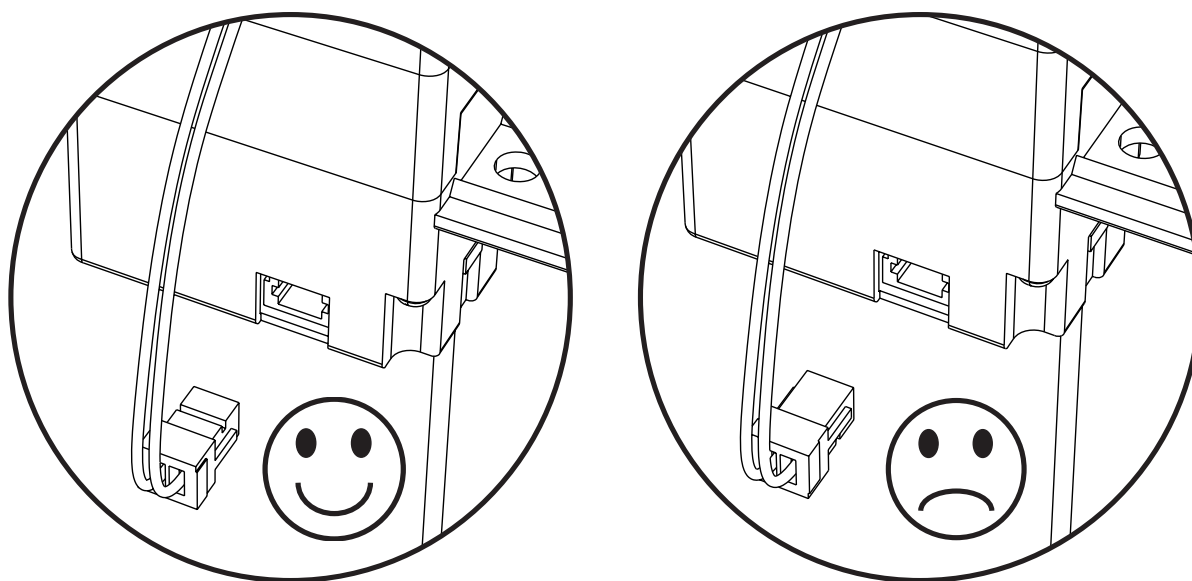
The connectors are reverse polarity protected: note the small chamfers on the sides. Never use force – the connectors should engage easily.



Attention

If the connection system is connected and forced in the wrong direction, then the connector of the motor connection cable will be ruined.

Never connect a battery with voltage higher than 4,2 V DC to the motor unit! The motor will be damaged.



Binding the unit

To be able to establish a connection to a **HoTT** transmitter, the unit must at first be "bound" to "its" Graupner-HoTT 2.4 RF module (transmitter). This process is known as "binding". Binding is only necessary once for each combination of receiver / RF module. However, binding can be repeated at any time if you wish; for example, if you switch transmitters. Read also the "BINDING" section in the manual of your HoTT transmitter!

1. Switch on transmitter
2. Connect the drive battery to the unit.
 - The unit is already in binding mode.
3. Start the binding process in your **HoTT** transmitter (see transmitter manual)
4. The successful binding process is confirmed by the transmitter
 - If the binding for this transmitter/receiver combination has already been performed, the model can be used immediately.

Successful binding process

If the binding process was successful, the unit can be controlled through the transmitter.

Unsuccessful binding process

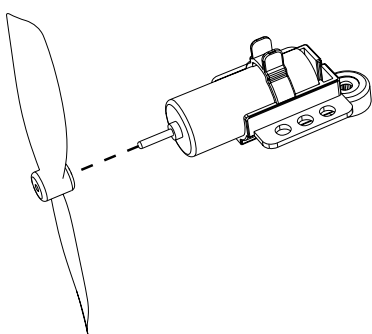
If the binding process has been unsuccessful, repeat the binding process with at least 1 meter distance between transmitter and receiver.

Binding several units

This function is described in detail in the manual of the **HoTT** transmitter which support this function. The process is described in the section "**Bindign several receivers**".

This function is important for model pilots who want to build and fly their very own models or fun models which require more than two channels. The use of the **Vector** Unit is in this sense very versatile. In the unit there are up to 12 channels available for channel mapping.

Installing and installing possibilities of the propellers



While installing the propellers note:

- ◆ Push the propeller on the motor shaft without using violence
- ◆ Hold the motor unit from the motor mount
- ◆ The turning direction of the motor CW or CCW
- ◆ The propeller profile (curvature of the propeller)
- ◆ The turn direction of the propeller
- ◆ The incisions on the propeller
- ◆ The air flow arrow

Sketch seen from the front of the propellers!



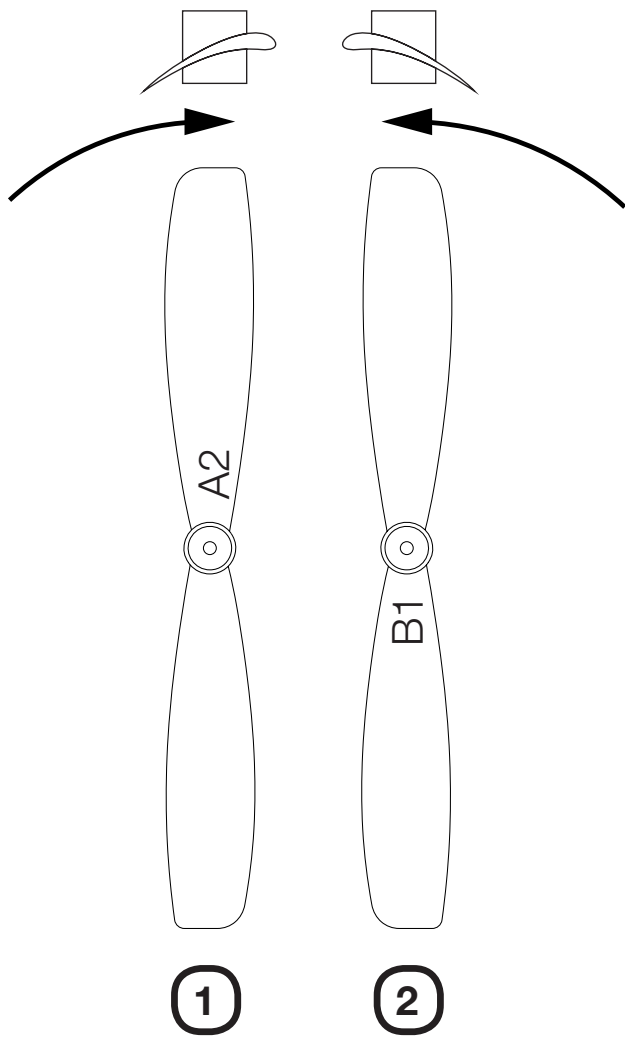
CAUTION

Risk of injury by rotating propeller (propellers) in case the motor (motors) starts. Always unplug the connector to the battery before working on the propeller (propellers).

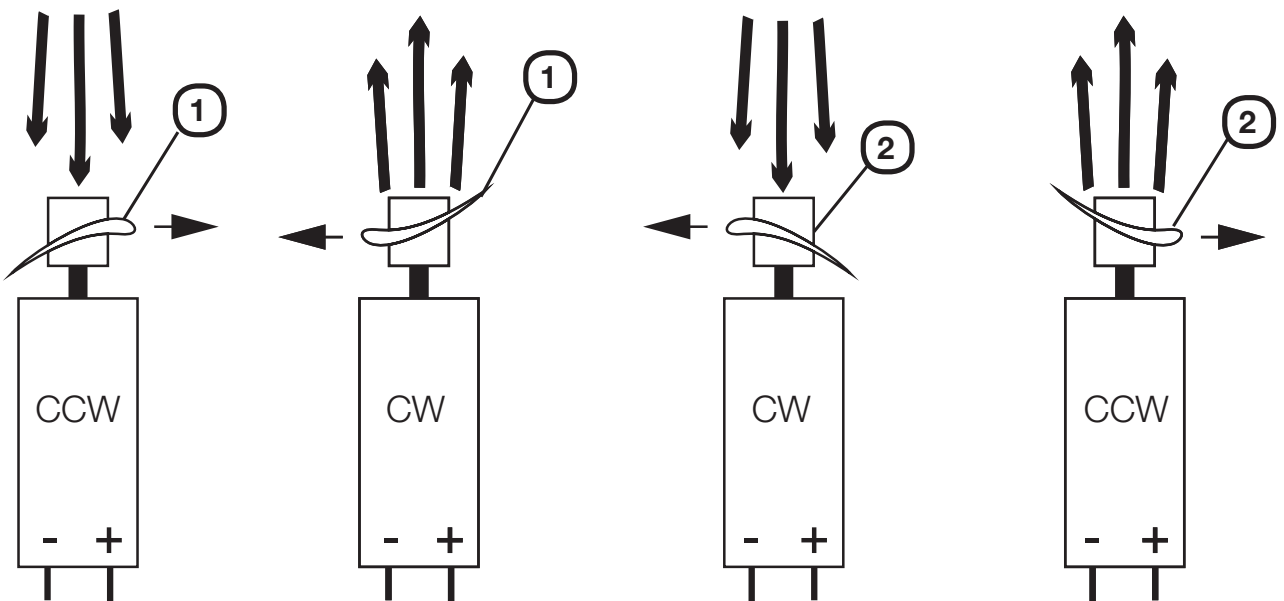
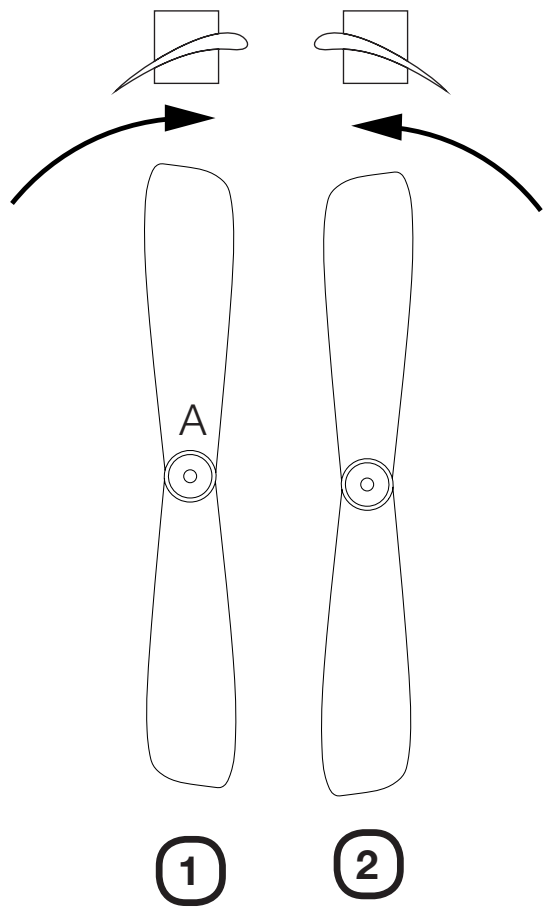
While removing the propeller note:

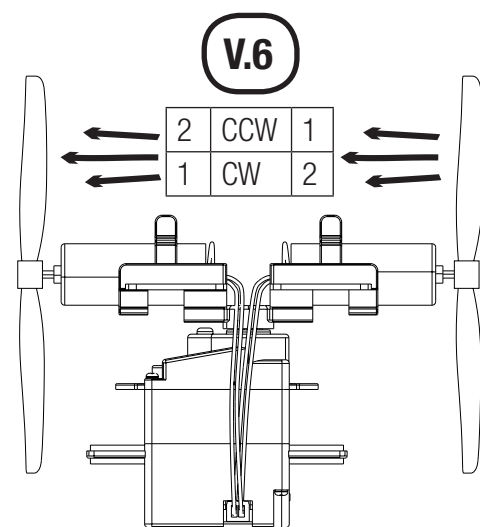
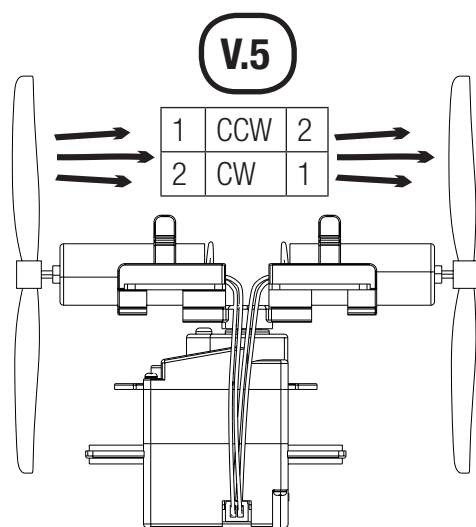
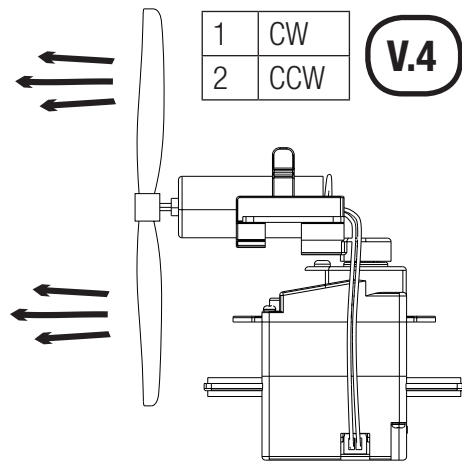
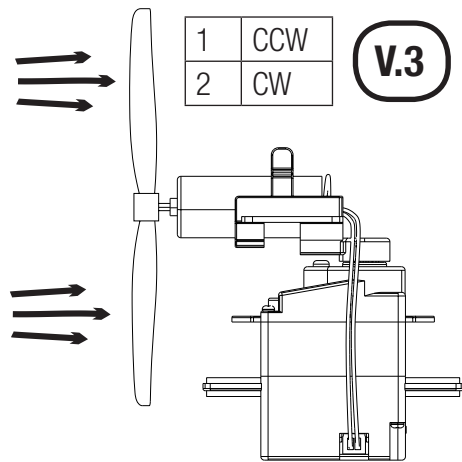
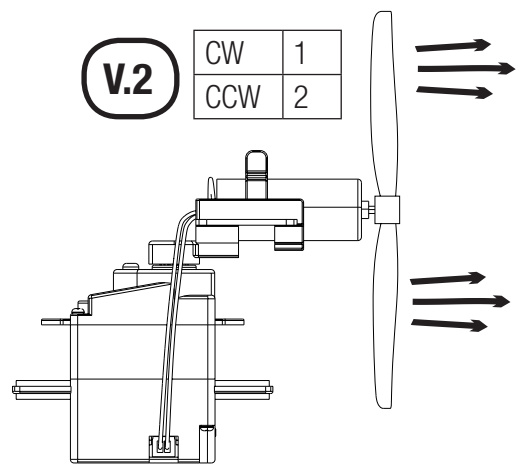
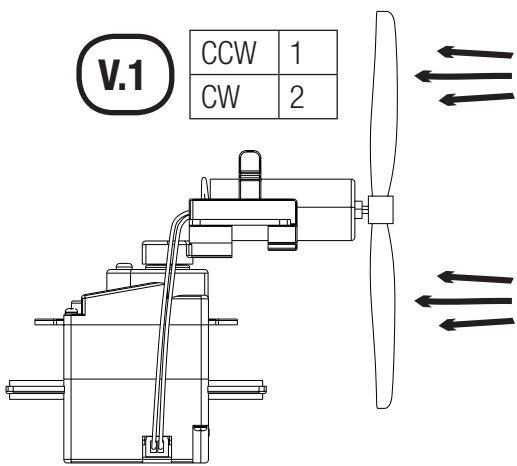
- ◆ Pull out the propeller
- ◆ Hold the motor from the motor case, not from the motor mount

No. 34001.31



No. 34001.30





Receiver settings for experienced

The receiver can be programmed with a suitable HoTT transmitter or in connection with the SMART-BOX.

Receiver settings menu

```
RECEIVER      1.0< >
>ALARM VOLT   3.2V
ALARM TEMP:   70°C
CYCLE:        20ms
SUMD at C6:   No
Sensor at C5  No
LANGUAGE:     English
```

The receiver setup menu appears in the "Telemetry" menu under SETTINGS / DISPLAYS or if you are using a SMART-BOX under SETTING & DATAVIEW. How to access this menu is described in the operating instructions supplied with your transmitter or Smart-Box.

Low voltage warning (ALARM VOLT):

If the receiver voltage or the external voltage at channel 5 falls below the set value, a low-voltage warning is generated by the transmitter's RF module in the form of a "general alarm tone" (regular beeping at a rate of approx. one beep per second) or the "receiver voltage" speech output message.

Temperature warning (ALARM TEMP):

If the receiver temperature exceeds the set temperature, a warning is generated by the transmitter's RF module in the form of a "general alarm tone" (regular beeping at a rate of approx. one beep per second) or the "receiver temperature" speech output message.

Cycle time (CYCLE):

If your system is used exclusively with digital servos, you can set a cycle time (frame rate) of 10 ms. If your system includes some or uses exclusively analogue servos, you should always select 20 ms, as many analogue servos cannot process the higher frame rate and may respond by "jittering" or "growling".

HoTT sum signal (SUMD):

This function cannot be used.

Channel 5 (C5):

This function cannot be used.

Free mixers



```
FREE MIXER      < >
>MIXER:         1
FROM CHANNEL:   1
TO CHANNEL:     6
TRIM:           +0%
TRV - :         +100%
TRV + :         +100%
```

Note

If you have already programmed mixer functions in the “Wing mixers” or “Free mixers” menu of your HoTT transmitter, you must ensure that those mixers do not overlap with those available in this menu!

MIXER:

Up to five mixers can be contemporaneously programmed. You can switch between Mixer 1, Mixer 2, ... and mixer 5 in the “Mixer” line.

The following settings only affect the mixer selected in this line.

FROM CHANNEL:

The signal source (or source channel) is mixed in to the target channel (TO CHANNEL) with a programmable amount. The method of setting up the values is analogous to the “Free mixers” menu in HoTT transmitters.

Flying, assembling and experimenting with the Vector Unit

Ground ideas

The **Vector Unit** has been conceived for simple airplane models, which are basically made as free-flight models.

With the unit also launch gliders or models which have not been produced for flying as remote controlled models can be controlled, they just have not to be heavier than 50 g.

- ◆ Foam launch gliders.
- ◆ Rubber motor models.
- ◆ Small balsa models.
- ◆ Everything which an RC model fan can conceive

The small 1 x 1 to install the unit

While installing the unit note:

1. Mark the centre of gravity of the glider or model and install battery and unit accordingly.
 - This is important to let the model fly properly by itself with the installed unit
2. The unit must be installed so that the motor is 1-2° upward when installed as pulling motor, when installed as pushing motor it should be installed 1-2° downward this is important:
 - to let the unit have a little ascending elevator effect while accelerating.
 - to let the model not to fly downward while accelerating
3. The pushing or pulling point on the drive gear on which the motor thrust acts
 - must be always at least 10-20mm before the center of gravity (according to the wing geometry)
 - or just after the wing front edge (according to the wing geometry) see **LEO** No.13301
 - must always be upon the wing
 - or wide under it see **Hexe** No.13304
4. The airflow of the propeller must be limited as less as possible, this is important:
 - so that not so much thrust is required to let the model fly (flight time increases)
 - so that the controls reacts well
5. Fix the unit
 - by the fixture arms through screws
 - on each side with a strip of adhesive tape
 - with contact glue, at best UHU-por No.596.

Tips to fly with the unit

While flying with the unit note:

1. Without throttle you cannot control the rudder.
2. Set for the first flight a not too big rudder travel, start with 15-20% of the normal servo travel.
3. If the model starts to rear up, reduce the throttle control or, when it is in the apex of the rearing up, use the rudder control to fly a curve.
4. If 3. does not work and the model cannot be controlled well the unit angle (motor inclination) or the center of gravity must be checked and set again.
5. Note the torque of the motor:
 - You have to trim the unit accordingly.
 - To turn in the torque direction is easier, less travel is required.
 - To turn against the torque direction is harder, more travel is required.

Declaration of conformity

Vector Unit GRS 331



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

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Note 2: 1.Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.