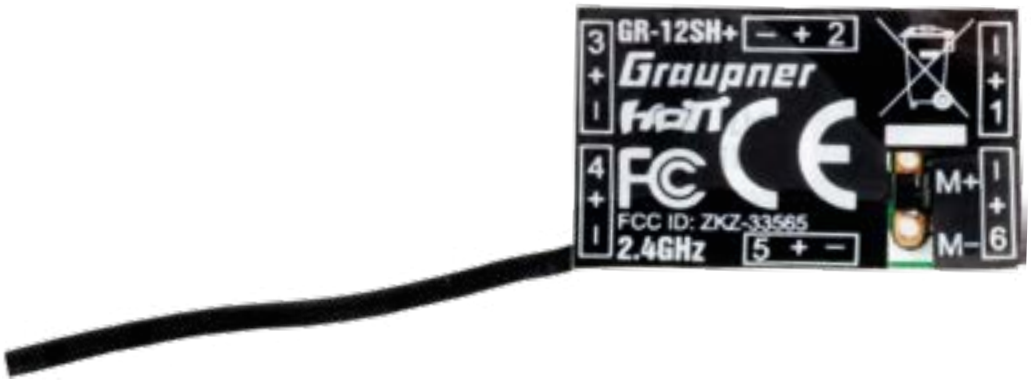
EN

Manual

GR-12SH+ and GR-12SC+

6 channel 2.4 GHz HoTT receiver

No. 33565
No. 33566



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Introduction

Thank you very much for purchasing a ***Graupner 33565 GR-12SH+*** or ***33566 GR-12SC+*** receiver.

Read this manual carefully to achieve the best results with your HoTT system but 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 all the safety notes before using the product and you have to respect those notes also for future use!

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	Servicehotline
Graupner GmbH Henriettenstrasse 96 D-73230 Kirchheim / Teck	☎ (+49) (0)7021/722-130 Monday- Thursday: 9:15 am- 4:00 pm Friday: 9:15 am- 1:00 pm ✉ ***service@graupner.de***

Graupner USA	Website: www.graupnerusa.com
3941 Park Dr Suite 20-571	Phone: +1 855-572-4746
El Dorado Hills, CA 95762	Email:service@graupnerusa.com

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

Intended use

The receivers ***GR-12SH+*** and ***GR-12SC+ HoTT*** may only be used for the purpose intended by the manufacturer, for the operation of slowflyer models whose components are equipped with SH or SC plugs. The maximum range is adapted to this model type and is about 300 m. These receivers are not suitable for models that generally require a greater range or whose servos exceed the maximum permissible current of the SH (0.5 A max.) or SC (1 A max.) connectors. In general, the receivers ***GR-12SH+*** and ***GR-12SC+ HoTT*** are not suitable for the operation of all other types of UAVs or unmanned aerial vehicles as well as all other types of unmanned land and water vehicles. This type of use is not permitted and may result in significant damage to property and / or personal injury. No warranty or liability is therefore offered for any improper use not covered by these provisions.

In addition, it is explicitly pointed out that you must inform yourself about the laws and regulations applicable at your respective starting point before starting the remote control operation. Such conditions may differ from state to state, but this must be followed in every case.

Note

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

Target group

The item is not a toy. It is not suitable for children under 14. The installation and operation of the receiver must be performed by experienced modellers. If you do not have sufficient knowledge about dealing with radio-controlled models, please contact an experienced modeller or a model club.

Package content

- Receiver ***33565 GR-12SH+*** or ***33566 GR-12SC+ HoTT***
- Manual

Note

Graupner/SJ works continuously to the further development of the products. We must therefore reserve the right to change the scope of delivery in terms of form, technology and equipment.

Technical data

	GR-12SH+ HoTT	***GR-12SC+ HoTT***
No.	33565	33566
Connection socket type	SH	SC
Max. permissible current per port	0,5 A	1 A
Operating voltage	3,6 ... 8,4 V	3,6 ... 8,4 V
Frequency	2,4 GHz	2,4 GHz
Modulation	FHSS	FHSS
Transmission protocol	HoTT	HoTT
Control functions	6	6
Power consumption	approx. 20 mA	approx. 20 mA
Temperature range	-15 ... +70 °C	-15 ... +70 °C
Antenna length	1x 30 mm	1x 30 mm
Dimensions	20 x 12 x 7 mm	20 x 12 x 7 mm
Weight	approx. 1,5 g	approx. 1,5 g

Accessories

	GR-12SH+ HoTT	***GR-12SC+ HoTT***
ESC with SBEC	33718.SH	33718.SC

Note

Instead of a servo or motor controller connected to port "1", "Channel 1" can be used as an electronic speed controller via the solder lugs marked "M +" and "M-". In this case, the continuous current of the motor directly connected in this way may under no circumstances exceed 2 A! Otherwise, there is a considerable risk that the receiver will be overloaded and consequently destroyed!

Connection table

C5	SERVO and updates / SENSOR / VOLTAGE
C6	SERVO ("No") or SUMD ("Yes")

Symbol description

Always observe the information indicated by these warning signs. Particularly those which are additionally marked with the words **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

These safety instructions are intended not only to protect the product, but also for your own and other people's safety. Therefore please read this section very carefully before using the product!

- Do not leave the packaging material lying around, this could be 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 use safely the receiver must not use the receiver without supervision or instruction by a responsible person.
- Operation and use of radio-controlled models needs to be learnt! If you have never driven such a model, then start extra carefully and make sure to be familiar with the reactions of the model 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.
- 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 receiver from dust, dirt, moisture and 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.
- Always use all your HoTT components only with the latest firmware version.

- 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.

  In Germany for example, the insurance is mandatory for all kinds of model operation. If you already have one, 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. In addition, models with a take-off weight of 250 g or higher are to be provided with a fireproof sticker bearing the name and address of the owner. And for a model operation outside of designated model airfields usually a proof of knowledge is always required.
- Due to safety and licensing reasons (CE), any reconstruction and/or modification of the product is prohibited.
- If you have questions which cannot be answered by the operating manual, please contact us or another expert in the field.

For your safety by handling the transmitter and the receiver

WARNING

Also while programming the transmitter, make sure that a connected motor cannot accidentally start. Disconnect the fuel supply or drive battery beforehand.

Avoid impacts and crushing. Check the receiver regularly for damages to the housings and cables, specially after model crashes. Damaged or wet receiver, even if re-dried, should no longer be used!

CAUTION

Avoid every kind of short-circuit in all sockets of the transmitter! Risk of fire! Use only the suitable connectors. In no case the electronic component of the transmitter or of the receiver may be changed or modified. Due to licensing reasons, any reconstruction and/or modification of the product is prohibited.

Note

During transport protect the model and the transmitter from damages.

For your safety by handling the batteries

CAUTION

- **Protect the batteries from dust, dirt, moisture, heat and vibrations. Only use in dry locations.**
- **Do not use any damaged battery.**
- **Batteries may not be heated, burned, short-circuited.**
- **If handled improperly, there is a danger of fire, explosion, irritation and burns.**
- **Leaked electrolyte is caustic and should not be touched or come into contact with your eyes. In case of emergency, rinse with a large quantity of water and consult a Med. Doctor.**
- **Stock the batteries in dry and fresh conditions.**
- **Dispose of the battery in the proper disposal centers.**

Installation

The receiver must be protected against dust, exhaust gases, splash water, etc. in the model. When you install your receiver, make sure that it is not excessively airtight to prevent it from overheating during operation.

Servo cables may not be wound around antenna or run next to it. Make sure that the cables cannot shift to lie directly adjacent to antennas during flight.

For carbon fiber fuselages, the antenna should be routed out of the fuselage as far as possible.

Connections

Attention

The cables to be connected to the receiver must be plugged into the connector strip of the receiver in accordance with the printed polarity information. Do not apply force. Although the plug-in system is reverse polarity protected, the two receivers differ not only in the type of plug-in system, but also in the order of the cables:

GR-12SH+ HoTT

GR-12SC+ HoTT

The red wire must end on the connector marked with "+", brown or black on the one with "-" and orange on the one marked with a number.

Note

RC components with the usual JR servo connectors can be connected with the aid of the adapter cable No. 33565.1 on receiver ***GR-12SH+*** and adapter cable No. 23048 for the receiver ***GR-12SC+ HoTT***.

Power supply

In principle, a battery can be connected to any free socket. By V- or Y-cable also with any remote control component. If the power supply is provided by more than one battery, it is important to ensure that the batteries have the same nominal voltage and rated capacity. It is not allowed to connect different battery types or rechargeable batteries with too different charge states to the receiver, as short-circuit-like effects can occur. For safety reasons, voltage stabilizers such as PRX-5A receiver power supplies No. 4136 should be connected between batteries and receiver.

Attention

When selecting and connecting a power supply, be aware that although the operating range of the receiver ranges from 3.6 to 8.4 V. However, practically all of the previously marketed servos, speed controllers, gyros, etc. as well as many which are offered today have a permissible operating voltage range of 4.8 to 6 V.

Binding

To establish a connection with the transmitter, the ***Graupner*** HoTT receiver must first be "bound" to at least one model memory in "its" ***Graupner*** HoTT transmitter. This process is generally called "binding". However, the methods to be used are not always the same, so the following step-by-step instructions apply only to binding a ***GR-12SH+*** or ***GR-12SC+ HoTT*** receiver to any transmitter:

Attention

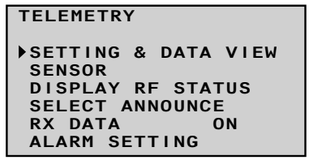
As soon as the receiver is switched on and as long as its LED is constantly red, the receiver is in bind mode. And just as long there is also the risk that the receiver inadvertently binds to another, coincidentally at the same time in the same place also in binding mode, HoTT transmitter whereupon the model can start uncontrolled at any time.

- If the receiver is already bound to a specific transmitter and this binding should be maintained, the transmitter should ideally be switched on before the receiver.
- If the receiver is unbound or it should be bound to another transmitter or only the model memory has to be changed than the previous one, proceed as follows:

Binding step-by-step

1. *Prepare the transmitter or model memory to be bound according to the instructions for binding.*
2. *Switch on the receiver power supply.*
   *The LED of a **GR-12SH+** or **GR-12SC+ HoTT** receiver lights up constantly red.*
3. *Start the transmitter-side binding according to the instructions of the transmitter.*
4. *If the red LED of the **GR-12SH+** or **GR-12SC+ HoTT** receiver goes out, the binding process has been completed successfully.*
   Your transmitter/receiver combination is ready for operation.
   *If the red LED of the **GR-12SH+** or **GR-12SC+ HoTT** starts to light up again, the "Binding" has failed. Change the positions of the associated antennas and try the entire procedure again.*

Setting and display of the receiver settings

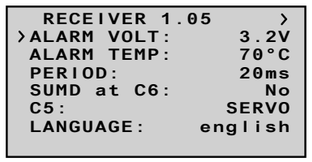


The receiver-side menus can be viewed and sometimes changed using a suitable HoTT transmitter or the SMART-BOX. You can find out how to open the menus of a receiver in the "Telemetry" section of the corresponding manual as well as a detailed description of the receiver menus on the respective product page at ***www.graupner.de*** on the Internet.

Note

The values shown in the following display illustrations always show the standard values.

Display "Receiver"



ALARM VOLT

- If "SERVO" or "SENSOR" is visible in the "C5" line described below, the operating voltage of the receiver is monitored via the limit value set in the value field of "ALARM VOLT".
- If "VOLTAGE" is visible in the "C5" line described below, the operating voltage of the drive battery connected via "VOLTAGE" is monitored via the limit value set in the value field of "ALARM VOLT".

In both cases, the actual voltage is shown in the transmitter's display in the "Receiver voltage" field.

If the voltage drops under the set limit value, a transmitter-side alarm takes place in the form of an acoustic signal (interval beep long / short).

Adjustment range: 2,5 … 24,0 Volt in 0,1 Volt steps.

ALARM TEMP

This option monitors the receiver temperature. If the set limit is exceeded, a transmitter-side alarm takes place in the form of a continuous beep.

Adjustment range: 50 … 80 °C in 5 degree steps.

PERIOD

In this line, specify the periods for the individual channel pulses. This setting is equally valid for all control channels.

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, always select 20 ms since the analogue servos may be overloaded and respond by "jittering" or "growling".

Adjustment range: 10 or 20 ms

SUMD at C6

- **"No"**

Port "6" is suitable for operating a servo or comparable RC components.

- **"Yes"**

  If the value field of this line has been set to "yes" and the relevant receiver is subsequently put into operation again, it generates a digital sum signal from the control signals of its control channels permanently and makes this available instead of the usual servo signal at the servo connection "6". This type of signal was being used by some of the newest flybarless systems and power supplies.

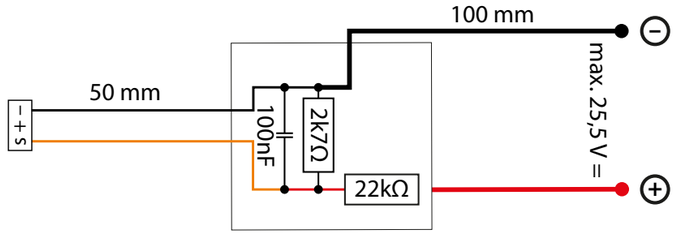
C5

- **SERVO**

  Port "5" is suitable for operating a servo or comparable RC components and for receiver updates.

- **VOLTAGE**

  After switching as described before, a DC voltage off max. 25,5 V can be displayed instead of the receiver voltage. This way it is possible to monitor the main battery voltage without using external sensors. The ESCs S3082 and S3083 have this switch already included.



Attention

Never connect a power supply with an output voltage higher than 8,4 V directly to a connection port of the receiver! The receiver and all connected devices would be immediately destroyed.

- **SENSOR**

  Port "5" is suitable for the operation of telemetry sensors.

Note

Even if the value field of the C5 line is set from the default setting "SERVO" to "VOLTAGE" or "SENSOR" and immediately afterwards reset, the receiver power supply must be switched off and on again afterwards. Otherwise, too low a receiver voltage will be displayed in the transmitter display.

Language

In the "Language" line is set the display language in the receiver menu.

The choices are: German, English, French, Italian, Spanish

Display "Free mixer"

```
  RX FREE MIXER    <
>MIXER:             1
 FROM CHANNEL:      0
 TO CHANNEL:        0
 TRIM:             0%
 TRAVEL–:        100%
 TRAVEL+:        100%
```

Up to five mixers can be programmed in the receiver.

MIXER

In the "MIXER" line, select one of mixers 1 … 5.

The following settings in this display only relate to the mixers selected in the "MIXER" line.

FROM CHANNEL

In this line, the signal source or the source channel is to be selected.

Selection range: (C)1 … (C)6

If no mixer has to be set, select "0".

TO CHANNEL

In this line, select the channel to which the signal of the signal source or of the source channel is to be proportionally mixed.

The mixer ratio is determined by the percentage values entered in the “TRAVEL-” and “TRAVEL+” lines.

Selection range: (C)1 … (C)6

If no mixer has to be set, select "0".

TRIM

Analogous to the trimming of the control functions 1 ... 4, the neutral position of the mixer in the range of ± 50% can be trimmed in this line.

TRAVEL –/+

With the settings of these two lines, the percentage of mixing is specified in relation to the source signal separately for both directions.

Firmware update

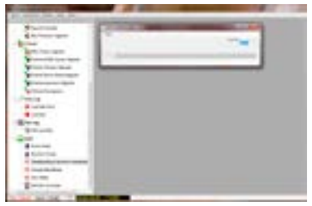
Updates to the receiver's firmware are made via connection marked with "5" using a PC running Windows 7 ... 10. The separately available USB interface, No. 7168.6, the adapter cable No. 7168.6A or 7168.S as well as the adapter cable No. 33565.1 at the receiver ***GR-12SH+*** or the adapter cable No. 23048 are needed at the receiver ***GR-12SC+ HoTT***.

The USB cable shown on the top left is compatible with the USB interface shown below, No. 7168.6 has to be connected and the adapter cable No. 7168.6A or 7168.S with the free end of the USB interface. The polarity of the plug-in system cannot be reversed. Note the small chamfers on the sides. Do not use force, the plug should click into place easily.

For the receiver ***GR-12SH+*** use the cable with the order no. 33565.1 and for the receiver ***GR-12SC+*** use the cable with the order no. 23048 to adapt the connector.

Plug the other end of each adapter cable into the receiver ***GR-12SH+*** in the "5 +-" connector and the receiver ***GR-12SC+*** into the connector labelled "+ - 5". The polarity of the plug-in system cannot be reversed. Note the small chamfers on the sides. Do not apply force. The plug should be fully inserted.

The programs and files required for updates can be found in the Download area for the corresponding products at www.graupner.de.



The update takes place via the program part "Slowflyer / Gyro Receiver Downloads" of the program "Firmware_Upgrade_gr_Studio" available under "Links". Please follow the notes of the software. The further procedure is also described in detail in the manual contained in the data package. You can also download these from the download page of the product at ***www.graupner.de***.

SIMPLIFIED DECLARATION OF CONFORMITY

Graupner/SJ hereby declares that the radio system types ***GR-12SH+ HoTT*** (No. 33565) and ***GR-12SC+ HoTT***(No. 33566) comply with Directive 2014/53/EU.

The full text of the EU Declaration of Conformity is available at the following Internet address: **www.graupner.de**

Manufacturer

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South Korea

Notes on environmental protection

If this symbol is on the product, instructions for use or packaging, it indicates that the product may not be disposed with normal household waste once it has reached the end of its service life. It must be turned over to a recycling collection point for electric and electronic apparatus.

Individual markings indicate which materials can be recycled. You make an important contribution to protection of the environment by utilizing facilities for reuse, material recycling or other means of exploiting obsolete equipment.

Care and maintenance

The product does not need any maintenance. Always protect it against dust, dirt and moisture.

Clean the product only with a dry cloth (do not use detergent!) lightly rub.

Warranty conditions

Graupner/SJ GmbH, 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 misuse, 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.

These operating instruction are exclusively for information purposes and are subject to change without prior notification. The current version can be found on the Internet at ***www.graupner.de*** on the relevant product page. In addition, the company ***Graupner/SJ*** has no responsibility or liability for any errors or inaccuracies that may appear in construction or operation manuals.

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