

# Manual

## GR-12 / GR-16 / GR-24 and GR-32 HoTT

6, 8, 12 and 16 channel 2.4 GHz HoTT receiver

No. 33506, 33508, 33512 and 33516





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## Introduction

Thank you very much for purchasing the **Graupner** receiver **GR-12, GR-16, GR-24** or **GR-32 HoTT**.

Read this manual carefully to achieve the best results with your HoTT system 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 **distributor of Graupner**.

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.com](http://www.graupner.com)** 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.



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## Intended use

The receiver 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.

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 modeler or a model club.

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## Package content

- Receiver according to your selection
- Manual

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## Technical data

### GR-12

Antenna	1 x wire 145 mm of which Antenna 30 mm
Operating voltage	(2.5) 3.6 ... 8.4 V
Frequency range	2400 ... 2483.5 MHz
Modulation	2.4 GHz FHSS
Number of controls	6
Current consumption approx.	70mAh
Temperature range	-15 ... +70°C
Dimensions approx.	36 x 21 x 10 mm
Weight approx.	7 g

### GR-16

Antenna	2x cable 145 mm, of which last 30 mm active
Operating voltage	(2.5) 3.6 ... 8.4 V
Frequency range	2400 ... 2483.5 MHz
Modulation	2.4 GHz FHSS
Number of controls	8
Current consumption approx.	70mAh
Temperature range	-15 ... +70°C
Dimensions approx.	46 x 21 x 14 mm
Weight approx.	12 g

## GR-24

Antenna	2x cable 145 mm, of which last 30 mm active
Operating voltage	(2.5) 3.6 ... 8.4 V
Frequency range	2400 ... 2483.5 MHz
Modulation	2.4 GHz FHSS
Number of controls	12
Current consumption approx.	70mAh
Temperature range	-15 ... +70°C
Dimensions approx.	46 x 31 x 14 mm
Weight approx.	16 g

## GR-32

Antenna	2x cable 145 mm, of which last 30 mm active
Operating voltage	(2.5) 3.6 ... 8.4 V
Frequency range	2400 ... 2483.5 MHz
Modulation	2.4 GHz FHSS
Number of controls	16
Current consumption approx.	140mAh
Temperature range	-15 ... +70°C
Dimensions approx.	63 x 30 x 14 mm
Weight approx.	24 g

## Connection table

### Connection for updates, telemetry sensors, sum signal and optional external voltage measurement

	Updates and telemetry	Sum signal	Optional voltage measurement
GR-12	C5	C6	C5
GR-16	T	C8	C6
GR-24	T	C8	–
GR-32	T	S	–

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## 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.

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## 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 firm-ware version.
- 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.**



### **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.**

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## 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 antennas or run next to them. Make sure that the cables cannot shift to lie directly adjacent to antennas during flight.

In the case of carbon fibre fuselage, at least the last 35 mm of the antennas shall be routed from the fuselage.

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## Connections

Connect the devices that have to be connected to the receiver to the row of sockets on one end of the receiver. The servo connections of the **Graupner**-HoTT receiver are numbered.

The polarity of the plug-in system cannot be reversed. Do not apply force.



### Note

For the GR-12 HoTT receiver, insert the connectors with the brown or black cable upwards.



## Power supply



For the battery connection are designated the ports provided with an additional "B". In principle, however, you can connect a battery to any free socket. By V- or Y-cable also with any remote control component. We recommend that you connect the power supply to the socket(s) close to the servos already connected to the receiver. If you wish to connect multiple separate batteries, the batteries must be of the same nominal voltage and capacity. Never connect different battery types or batteries with strongly different charges since this can cause an effect similar to a short circuit. In such cases for safety reasons, insert voltage stabilizing elements such as PRX-5A (No. 4136) receiver power supplies between the 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.

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## 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".

### *Binding step-by-step*

1. *Prepare the transmitter to be bound according to its instructions for binding.*
2. *Switch the receiver power supply on.*
  - *The LED of the **GR-12 HoTT** receiver remains dark.*
  - *The LED of the **GR-16 HoTT**, **GR-24 HoTT** or **GR-32 HoTT** receiver blinks in red with a slow rhythm.*
3. *Push and hold for about three seconds the SET button on the receiver.*
  - *The LED of the **GR-12 HoTT** receiver remains still dark.*
  - *After this time has elapsed, the LED of a **GR-16 HoTT**, **GR-24 HoTT** or **GR-32 HoTT** flashes red and green simultaneously for a further approx. three seconds. During this time, the related receiver is in bind mode.*
4. *Start the transmitter-side binding according to the instructions of the transmitter.*
5. *If the LED of the **GR-12 HoTT**, **GR-16 HoTT**, **GR-24 HoTT** or **GR-32 HoTT** receiver starts to light constantly green within approximately three seconds, the binding process has been completed successfully.*

*Your transmitter/receiver combination is ready for operation.*

*If the LED of a **GR-12 HoTT** remains dark or the LED of a **GR-16 HoTT**, **GR-24 HoTT** or **GR-32 HoTT** receiver still blinks red in a slow rhythm, the "binding" was unsuccessful. Change the positions of the associated antennas and try the entire procedure again.*

## Receiver reset

To reset the receiver, press and hold its SET button while turning on the power to the receiver:

If the reset was triggered with the transmitter switched off or with an unbound receiver, the LED of a receiver **GR-12 HoTT** lights up constantly green for about 3 seconds or the red and green LEDs of a receiver **GR-16 HoTT**, **GR-24 HoTT** or **GR-32 HoTT** flash 4x. Release the button once the LEDs go dark.

If the reset is performed with a not bound receiver, you can then start a binding process at any time.

If a reset has already been carried out on an already-connected receiver and the associated model memory is active in the switched-on transmitter, then the green LED of a receiver **GR-12 HoTT**, **GR-16 HoTT**, **GR-24 HoTT** or **GR-32 HoTT** should again be constantly lit and thus signal a correct connection to the transmitter. Otherwise the process has to be repeated.



### Notes

- Through a RESET ALL of the settings in the receiver are brought to the factory settings with the exception of the HoTT synchronization information!
- If a reset is performed accidentally, all of these settings that were made using the "Telemetry" menu in the receiver should be restored.
- Resetting is particularly recommendable when you want to switch a receiver to a different model. This makes it easy to keep settings which do not match from being transferred.



## Setting and display of the receiver settings

### TELEMETRY

```
►SETTING & DATA VIEW
SENSOR
RF STATUS DISPLAY
SELECT ANNOUNCE
RX DATA ON
ALARM SETTING
```

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.com](http://www.graupner.com) on the Internet.

## Special features of the GR-12 HoTT receiver

### Connection 5

```
RX CURVE <>
>CURVE1 CH : 02
  TYPE : B
CURVE2 CH : 03
  TYPE : B
CURVE3 CH : 04
  TYPE : B
5CH FUNCTION:SERVO
```

To the "- + 5 T" marked port it is possible to connect not only RC components but also telemetry modules. Accordingly, select in the line "5CH FUNCTION" of the page "RX CURVE" of the telemetry menu "SERVO" or "SENSOR". Carry out the changeover as described in the instructions for the transmitter or the SMART-BOX.

### Connection 6

```
RX SERVO TESTV6.39 <
>ALL-MAX : 2000µsec
ALL-MIN : 1000µsec
TEST : STOP
ALARM VOLT : 3.8V
ALARM TEMP+: 55°C
ALARM TEMP-:-10°C
CH OUTPUT TYPE:ONCE
```

Depending on the settings in the "CH OUTPUT TYPE" line of the "RX SERVO TEST" page of the telemetry menu, the output 6 can be used for different scopes. Carry out the changeover as described in the instructions for the transmitter or the SMART-BOX.

By setting ...

- ONCE or SAME
  - to connect a servo, ESC, Gyro, etc...
  - ONCE

The servo connections of the receiver are actuated sequentially. The receiver power supply is less stressed.
  - SAME

The servo connections of the receiver are actuated in a 4 pcs block synchronic. The simultaneous start-up of up to four servos has a noticeably higher load on the receiver power supply.
- SUMO, SUMI or SUMDHD06
  - to connect a sum signal cable
  - SUMO

PPM modulated sum signal "OUT" of the control channel 04 to max. 16.
  - SUMI

Sum signal "IN" in case of satellite receiver

– SUMD

Digital sum signal of the control channel 04 to max. 16.

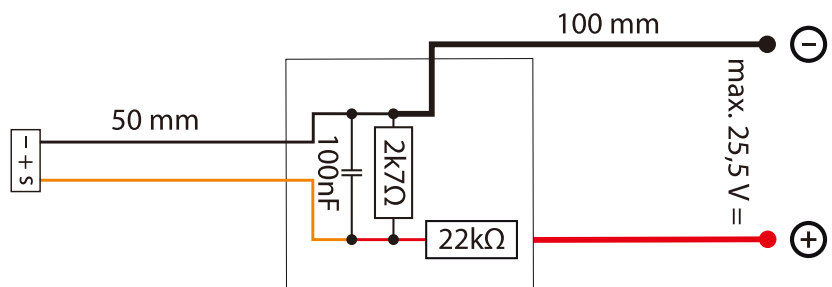
HD: Hold the last servo position in case of Fail-Safe

FS: Moving to the programmed positions in case of Fail-Safe

OF: (OFF) switch-off of the SUMD signal in case of Fail-Safe

• BATT V

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.

Special features of the GR-16 HoTT receiver

Connection 6

```

RX DATAVIEW V6.39 >
S-QUA100% S-dBM-030dBm
S-STR100% R-TEM.+28°C
L PACK TIME 00010msec
R-VOLT :05.0V
L.R-VOLT:04.5V

6CH FUNCTION: SERVO
    
```

**6CH FUNCTION**

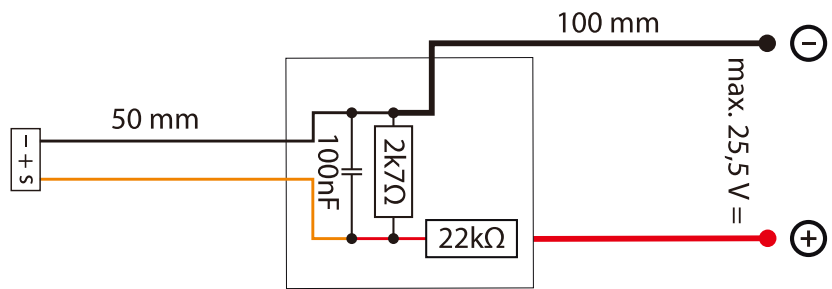
Depending on the settings in the "6CH FUNCTION" line of the "RX DATAVIEW" page of the telemetry menu, the output 6 can be used to connect RC components or a circuit for voltage measurement. Carry out the changeover as described in the instructions for the transmitter or the SMART-BOX.

• SERVO

The connection 6 is suitable for the operation of RC components.

• BATT V

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.

## Connection 8

```

RX SERVO TESTV6.39 <
>ALL-MAX : 2000µsec
ALL-MIN : 1000µsec
TEST : STOP
ALARM VOLT : 3.8V
ALARM TEMP+: 55°C
ALARM TEMP-: -10°C
CH OUTPUT TYPE:ONCE
  
```

## CH OUTPUT TYPE

Depending on the settings in the "CH OUTPUT TYPE" line of the "RX SERVO TEST" page of the telemetry menu, the output 8 can be used for different scopes. Carry out the changeover as described in the instructions for the transmitter or the SMART-BOX.

By setting ...

- ONCE or SAME
  - to connect a servo, ESC, Gyro, etc...
  - ONCE
 

The servo connections of the receiver are actuated sequentially. The receiver power supply is less stressed.
  - SAME
 

The servo connections of the receiver are actuated in a 4 pcs block synchronic. The simultaneous start-up of up to four servos has a noticeably higher load on the receiver power supply.
- SUMO, SUMI or SUMDHD08
  - to connect a sum signal cable
  - SUMO
 

PPM modulated sum signal "OUT" of the control channel 04 to max. 16.
  - SUMI
 

Sum signal "IN" in case of satellite receiver

– SUMD

Digital sum signal of the control channel 04 to max. 16.

HD: Hold the last servo position in case of Fail-Safe

FS: Moving to the programmed positions in case of Fail-Safe

OF: (OFF) switch-off of the SUMD signal in case of Fail-Safe

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## Firmware update

Firmware updates of the receiver are performed via the telemetry port of the receiver using a PC running Windows 7 ... 10. You will also need a USB interface, order no. 7168.6, and adapter lead, order no. 7168.6A or 7168.S, which are available separately.

The programs and files required can be found in the Download area for the corresponding products at [www.graupner.com](http://www.graupner.com)

Connect the adapter lead to 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 **GR-12 HoTT** receiver, plug the other end of the adapter cable into the "- +5 T" position and for the **GR-16, GR-24** and **GR-32 HoTT** receivers into the socket marked "- + T". The polarity of the plug-in system cannot be reversed. Do not apply force. The plug should be fully inserted.



The update is carried out via the "HoTT device" program section of the program "Firmware\_Upgrade\_gr\_Studio". 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.com](http://www.graupner.com)

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## 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.

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## 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.

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## Warranty conditions

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.com](http://www.graupner.com)** 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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