Manual

Falcon 12

6 channel HoTT receiver Falcon 12 with copter-firmware Q06

No. S1035

CE

Graupner

Index

Introduction

Thank you very much for purchasing a **Graupner Falcon 12 HoTT** receiver.

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 **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 3941 Park Dr Suite 20-571 El Dorado Hills, CA 95762	Website: www.graupnerusa.com Phone: +1 855-572-4746 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 receiver only be used for the purpose specified by the manufacturer for operation of remote controlled copter models without passengers. Any other type of use is impermissible and may 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.

Notes

- In general, it should not be forbidden to fly over airfields, factories, nature reserves, built-up areas, etc.

- Where designated no-fly zones are located, and which in no way affect them, it can be determined, for example, using the "Air-Map" app.

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

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

- 6 channel receiver **S1035 Falcon 12 HoTT** copter-firmware
- Manual

Technical data

Antenna	1x 145 mm, of which the last 30 mm active
Operating voltage	(2.5) 3.6 ... 12,6 V
Frequency range	2400 ... 2483.5 MHz
Modulation	2.4 GHz FHSS
Number of controls	6
Current consumption approx.	70 mAh
Temperature range	-15 ... +70°C
Dimensions approx.	34 x 26 x 12 mm
Weight approx.	7 g

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. Do not expose it to vibrations or to extreme heath 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.
- 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.**

Installing the receiver
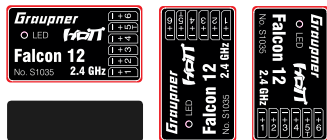
The receiver must be mounted with its lower surface parallel to any of the copter axes. Prior to installation, remove the sticker on the back of the receiver. We recommend using double-sided tape to fix the receiver in place.

The receiver must be protected against dust, 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 antenna during flight.

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

Connecting the RC components of the copter
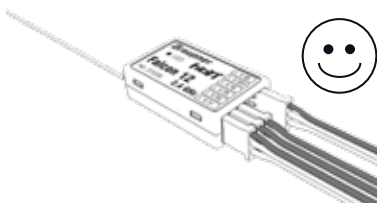
Insert the connection cable of the ESCs of the copter, which must be connected to the receiver, with the black or brown cable upwards into the connector strip of the receiver, as shown in the illustration on the left. The polarity of the plug-in system cannot be reversed. Do not apply force. The servo connections of the **Graupner**-HoTT receiver are numbered.
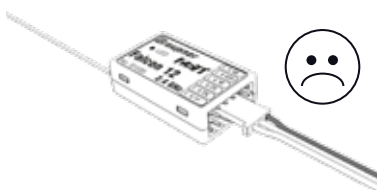
Never connect the connection cables horizontally to the receiver as shown on the left. Plugging the connectors horizontally to the 2 and 3 ports will immediately short-circuit the receiver battery, destroy the other connected components, and immediately void all warranties.

Connection socket "- + T 5"

The optional telemetry sensors or modules are connected to the socket marked with "- + T 5" Telemetry. In addition, the receiver updates are performed on this socket.

Also a receiver with SBUS signal can be connected. The SBUS signal is automatically detected after the power-up of the receiver.

Connection "- + 6"

Can be used to connect a servo, SUMD signal, SBUS signal or Smart-Audio compatible FPV video transmitter.

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 **_Falcon 12 HoTT_** receiver to any transmitter:

Binding step-by-step

- 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. At the latest, however, within approximately 15 seconds from the moment when the receiver is switched on, the red LED of the receiver is constantly on.

»

Attention

As soon as the LED starts to flash, the receiver is in bind mode. From this point on there is the risk that the receiver unintentionally binds to a transmitter, which is casually in bind mode at the same time, whereupon the model can run uncontrolled at any time.

- 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:

  1. _Prepare the transmitter or model memory to be bound according to the instructions for binding._

  2. _Switch the receiver power supply on._

  3. _The LED of the receiver **Falcon 12 HoTT** lights up constantly red._

  4. _Approximately 15 seconds after the receiver is switched on, its red LED starts to flash, indicating that the receiver is now in bind mode._

  5. _Start the transmitter-side binding according to the instructions of the transmitter._

  6. _If the red LED of the receiver goes out within about three seconds, the binding process has been completed successfully._

  7. _Your transmitter/receiver combination is ready for operation._

  8. _If the LED on the receiver remains still red, the "binding" has failed. Change the positions of the associated antennas and try the entire procedure again._

Transmitter presettings

Depending on the bandwidth of the model type selection of the transmitter used, either the model type "Copter" or alternatively a "Fixed-wing model" should be selected. Some of the current HoTT transmitters are even shipped with preconfigured model memory.

According to the transmitter instructions, the appropriate control mode and, if necessary, "motor front / rear" must be set. Usually "backwards" so that the channel 1 indicator in the servo display indicates-100% in the "motor off" position of the "motor / pitch control stick".

Flight mode

Flight mode has to be set to channel 5. To do this, program a 2-way switch in the "Control settings" menu on Channel 5 as follows:

Attitude mode

The stick movements acts directly proportionally to Roll and Nick. In the attitude mode, the maximum inclination angle is limited to approx. 50° at 100% of the stick travel.

The attitude mode is active as long as the bar of channel 5 is on the left of +49% in the »Servo display«.

(The-100% shown on the left are based on the switch programming above.)

Flight mode suggested for beginners.

```
 ▶ E5      3⊟  +100% +100%
   E6 free     +100% +100%
   E7 free     +100% +100%
   E8 free     +100% +100%

 ▼              −  trv  +
```

```
 1        0%    2        0%
 3        0%    4        0%
 5     −100%    6        0%
 7        0%    8        0%
```

Rate mode

In this mode, the rate is determined by the rash of the stick without inclination limit. In this aerobatic mode rolls and loops are possible.

The rate mode is active as soon as the bar of channel 5 in the display »Servo Display« is +50% or higher.

(The-100% shown on the left are based on the switch programming above.)

Not suitable for beginners.

```
 ▶ E5      3⊟  +100% +100%
   E6 free     +100% +100%
   E7 free     +100% +100%
   E8 free     +100% +100%

 ▼              −  trv  +
```

```
 1        0%    2        0%
 3        0%    4        0%
 5     +100%    6        0%
 7        0%    8        0%
```

Fail-Safe settings

```
         FAIL SAFE

Pos  ▮  ▯  ▯  ▯  ▮  ▯  ▯  ▮
hold ▯  ▮  ▮  ▮  ▯  ▮  ▮  ▯
      1  2  3  4  5  6  7  8
Delay 0.25s            [STO]
```
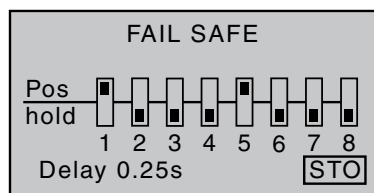
We recommend to set Channel 1 and Channel 5 to "Pos" according to the transmitter instructions and to put the pitch control stick in the motor OFF position before storing the fail-safe settings and to set the attitude / rate mode switch to the "Attitude mode" position so that the attitude mode is active in fail-safe situations and the motors stop.

Throttle Cut

```
 Mod.Name   <          >
 Control mode        1
 Motor  on  CH1    idle rear
▶M.Stop  −125% +100%  1↕
 Timers            0:00   ---
 ▾▴                      ╱‒
```
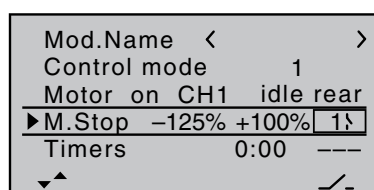
For safety reasons, a motor stop switch must always be programmed on the transmitter side according to the transmitter instructions. Only when this is placed into the appropriate position, an undesired start of the motors is reliably prevented.

But in order to be able to switch off the motors also in the Acro 3D mode, another mixer has to be programmed. Namely, if the copter is operated in the acro 3D mode with the rate mode enabled, the motor stop function would not shut off the motors, but set them to "full power backwards". To prevent this, the mixer must be programmed in such a way that switching the motor stop switch to the motor OFF position also switches to the attitude mode, in which the stop of all motors is ensured.

Programming step-by-step

```
▶M1        S → 5    1↕ ⇒
 M2        ?? → ??
 M3        ?? → ??
 M4        ?? → ??
 M5        ?? → ??
 ▾   Type from to  ╱‒
```
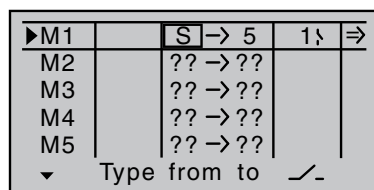
1. *Program a linear mixer of "S => 5" according to the transmitter instructions.*

2. *Assign to this mixer the same switch with the same switching direction, which switches to the attitude mode.*

3. *Change to the setting page of the mixer.*

4. *Set the "travel" symmetrically to +100%.*

5. *Change to the line "Offset".*

6. *Now either set the offset value manually to +100% or set the motor stop switch to "motor ON" and then push the ENT key. In both cases, however, the adjacent picture must arise.*

```
 MIX  1         S→5

   Trv+100%+100%
▶Offset  +100%

 [STO]   SEL
```
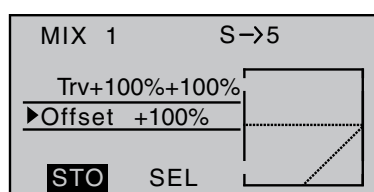
Auto-flip function on channel 6

If the copter is in attitude mode, the automatic flip function can easily trigger a flip of the copter.

```
 E5    3▫  +100% +100%
▶ E6 SW6/7 +100% +125%
 E7 free   +100% +100%
 E8 free   +100% +100%

 ▾▴           −  trv  +
```

The auto-flip function is activated via a key switch assigned to channel 6. This has to be programmed on channel 6 in the "Control setting" menu of the transmitter and then, with the button held down, the asymmetrical travel must be set to +125%.
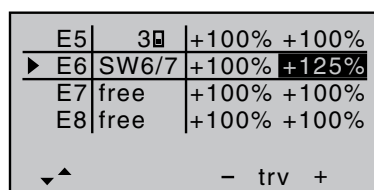
If this button is pressed, the servo position of channel 6 exceeds the value of 111% and the autoflip function is thus "armed" for 5 seconds. As soon as the roll or pitch control stick is moved over more than 50% of the stick travel within this time, the copter will automatically flip in that direction.

》》

Note

After the flip, position deviations in the range <10 ° are possible.

"Telemetry" menu

SETTING & DATA VIEW

```
TELEMETRY

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

The basic handling of the "Telemetry" menu is described in the respective transmitter instructions or the instructions of the Smart-Box. By way of derogation, only in certain receivers the menu structure is summarized under the generic term "setting & data view". These instructions also provide information on how to access this menu. Change accordingly to the first setting page of the **Falcon 12 HoTT** receiver.

Note

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

Receiver display

```
   RECEIVER Q.06     >
>LANGUAGE:     english
 ALARM VOLT:      3.8V
 ALARM TEMP:      70°C
 PERIOD:          20ms
 SUMD AT CH5:       No
 CH5:            SERVO
 video channel      R3
 VTX-Power           0
```

Language

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

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

ALARM VOLT

If the receiver voltage falls below the set value, a low-voltage warning is generated by the transmitter in the form of a "sound-declining alarm tone" or the "receiver voltage" speech output message.

ALARM TEMP

If the receiver temperature exceeds the set temperature, a warning is generated by the transmitter in the form of a "3-step sound-climbing alarm tone" or the "receiver temperature" speech output message.

PERIOD

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".

Note

Changing the cycle time is only necessary when installing servos for additional functions.

SUMD at C5

- **"Yes"**

  As soon as the value field of this line has been set to "yes" and put back into operation, the **Falcon 12 HoTT** receiver a digital sum signal from the control signals of its control channels is permanently generated. This is provided at port 5, regardless of what is set in the "Sensor at C5" line below. This setting is retained until the next changeover.

- **"No"**

C5

```
RECEIVER  Q.06      >
LANGUAGE:     english
ALARM VOLT:      3.8V
ALARM TEMP:      70°C
PERIOD:          20ms
SUMD at CH5:       No
>CH5:           SERVO
video channel      R3
VTX-power           0
```

As long as the value field of the line "SUMD at C5" is set to "No", the connection 5 of the **Falcon 12 HoTT** receiver in the value field of this line can be switched to following signal variants. Any change to these settings will be retained until the next change, but it will not take effect until the next time the receiver is used.

- **SERVO**

  Port 5 is suitable for operating a servo or comparable RC components.

- **SENSOR**

  Port 5 is suitable for connecting telemetry sensors or an SBUS-capable receiver. When the receiver is switched on, previously connected devices are automatically detected.

Note

For safety reason the "**C5**" changes take effect after switching off and on the copter.

Assuming that the receiver is preconfigured by HoTT system and it can also be readjusted if necessary, an SBUS receiver can be connected to port "C5" of the Falcon 12 instead of a sensor. However, it should be noted:

If an RF module suitable for SBUS receivers is operated on a **Graupner**-HoTT transmitter, the channel sequence described below is specified as standard. However, as soon as a foreign transmitter with a corresponding SBUS receiver is used, the channel order should be set in this transmitter as follows:

- The TAER channel order must be set in other transmitters as follows:

  Channel 1 = **T**hrottle

  Channel 2 = **A**ileron/Roll

  Channel 3 = **E**levator/Nick

Channel 4 = **R**udder/Yaw

Channel 5 = Attitude/Rate mode

Channel 6 = Auto flip in attitude mode at +125 %

- The servo direction of channels 2 and 4 should be reversed

- **VOLTAGE**

  After switching through this connection port as described before, a DC voltage of 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.
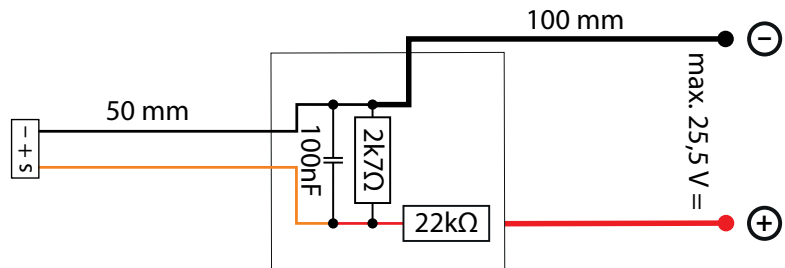
Attention

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.

C6: SERVO/SUMDI/SBUSin/SMARTAUDIO

Note

For safety reason the "**C6**" changes take effect after switching off and on the copter.

- **SERVO**

  The receiver-specific connection is suitable for operating a servo or comparable RC components.

- **SUMDI**

  A receiver SUMD or SUMD3 signal can be connected as a satellite receiver with this setting to allow redundant reception.

- **SBUSin**

  A receiver SBUS signal can be connected as a satellite receiver with this setting to allow redundant reception.

- **SMARTAUDIO**

  enables following SMARTAUDIO functions at C6.

Video channel

If a smart audio compatible FPV video transmitter with smart audio is connected to port 6, then a channel 1-8 of the Raceband video channels can be set via this menu item. In Europe may be used only race band R3-R6 channels except for events with permission.

VTX power

If a smart audio compatible FPV video transmitter V2 or newer with smart audio is connected to port 6, then the transmission power can be set via this menu item. However, the setting is for the current battery only and will not be saved.

After disconnecting the power supply and reconnecting the power supply, the transmission power 0 is automatically active again until it is set differently again.

ROLL/NICK Display

```
 MULTICOPTER RO/NI< >
>ROLL/NICK P      50
 ROLL/NICK D      50
 DAMPENING        40
 ROLL FACTOR %    95
 POWER2SENS.      80
 R/N DYNAMIC      70
 ——ATTITUDE MODE——
 ROLL/NICK I      80
 AGILITY           3
 ——RATE MODE——
 R/N RATE  I      40
 RATE             70
```

The control is based on the PID principle, where the "P" stands for "proportional", the "I" for "integral" and the "D" for "digital". In short ...

... the deviation from the setpoint proportional to the manipulated variable has an effect at the P value.

... the existing control deviation is continuously summed up at the I value and then acts on the manipulated variable via the I value.

... the differential component only takes into account the speed of the control deviation and then acts on the control accordingly via the D component.

ROLL/NICK P

This parameter determines the tilting behaviour of the copter during the maximum climb.

In order to prevent tilting at full climbing power in the end, this parameter must be increased in steps of 5 until a medium-fast tilting occurs. Subsequently, this value is to be adjusted in individual steps until the tilting has disappeared.

ROLL/NICK D

This parameter determines the tilting behaviour of the roll / pitch function of the copter.

As described above, this parameter must be adjusted until the Multicopter engages exactly over Roll and Nick. 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. To prevent oscillations or tilting, the damping should be <30. To dampen motor or prop vibration and prevent motor noise, higher values may be needed. These can be adjusted at the beginning in steps of 10 and then finer.

ROLL FACTOR %

Set the Roll setting as percent value of the overall gain. For symmetrical copters, the value should normally be left at 100. If, because of its gravity centre, the Copter is more agile on the Roll axis than on the Nick axis, then you can change here the roll factor. In the **Graupner ALPHA RACE 250 Q** this value is set about 65%.

POWER 2SENS.

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 suppression towards full throttle.

R/N DYNAMIC

Higher dynamic values provide a more direct feel for the flight (3D flight 50 ... 100), lower dynamic values for smoother flight recordings, rounder freestyle flying and races (30 ... 50).

— ATTITUDE MODE —

ROLL/NICK I

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

AGILITY

This value determines how fast a change of position is made.

— Rate mode —

R/N rate I

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

RATE

This value sets the maximum potential rate in Rate mode.

YAW Display

The general comments on PID control in the description of the roll / pitch display are also applicable here.

```
MULTICOPTER YAW   <  >
>YAW P                40
 YAW I                25
 YAW D                40
 RATE                 70
 YAW DYNAMIC          75
```

Yaw P

The P factor is responsible for the 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

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. Eventually, the motors can start rotating and thus cause unwanted rising.

Yaw D

The D-factor affects the stopping behaviour 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.

RATE

For beginners we recommend a rate of about 50. For racers and free-style pilots we recommend a value between 50 and 70.

YAW DYNAMIC

Higher dynamic values provide a more direct feel for the flight (3D flight 80 ... 100), lower dynamic values for smoother flight record-ings, rounder freestyle flying and races (30 ... 80).

Type

```
 MULTICOPTER BASE < >
>TYPE       QUADRO XI
 MODE          NORMAL
 ESC            DSHOT
 MINPOWER %         5
 FREESTYLE        MIN
 VIBRATION FILTER  50
 VIBRATION FILT.2  70
```

The "Type" line defines the basic configuration of the copter. The following selections are available:

QUADRO X   QUADRO XI (invers)

QUADRO +   TRI L + R

Tri R + L
R + L = direction
Connetion 4 = Yaw
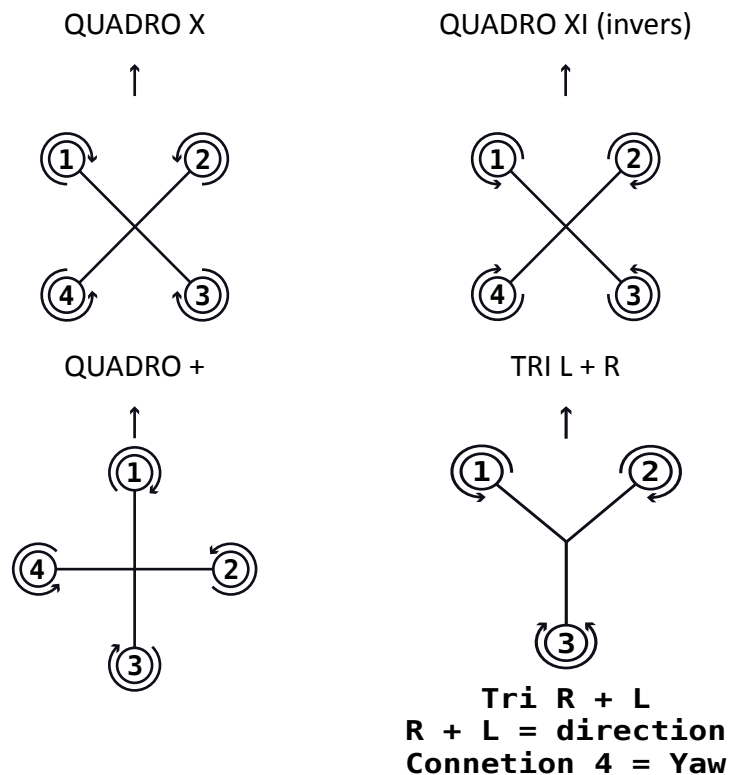
Connect the speed controllers of the motors to the receiver following the proper scheme. The represented motor direction is referred to the copter seen from the top.
In case of tricopter use only digital servos for servo 4.

MODE

Controller setting (Not necessary with DSHOT)

To initialize the controller, the signal of the motor / pitch control stick of the transmitter is transmitted directly to the speed controller of the copter.

Normal

This setting must be used for copters with speed controller without reverse of the direction of rotation.

Acro 3D

This setting is reserved for copters whose speed controllers are equipped with direction reverse.

Note

For safety reason the "**Type**" and "**Mode**" changes take effect after switching off and on the receiver system.

CAUTION

Since the power control operates differently in the rate mode, see figure on the left, the motors may start rotating more or less when switching from the attitude mode to the rate mode, depending on the current position of the pitch stick. Therefore always mount the propellers immediately before starting the flight operation and start and land exclusively in "attitude mode".
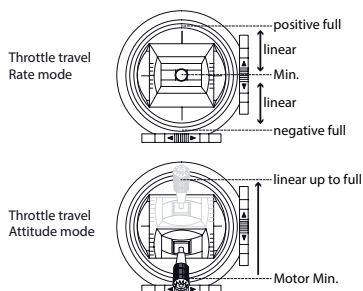
During prolonged extreme aerobatics of the copter in Acro 3D mode (e.g. , sequence> 1min), the receiver may lose its attitude information and, as a result, the copter may move to an undesired position when switching to attitude mode. In this situation, the copter should be in the Rate mode and either it is left quiet for about 30 seconds or it is landed for a short time, so that the receiver can readjust the position information again.

Throttle travel
Rate mode

- positive full
- linear
- Min.
- linear
- negative full

Throttle travel
Attitude mode

- linear up to full
- Motor Min.

Note

If the motors do not stop completely in the attitude mode, so that the position control is still active and can also serve as a rescue mode in an emergency, this can be remedied with the aid of a mixer:

Mixer programming step by step

M1		S → 5	1	⇒
▶M2		C1→C1	3I	⇒
M3		?? → ??		
M4		?? → ??		
M5		?? → ??		
⬍	Type	from	to	╱╴

1. Program a same-channel mixer "1 => 1" according to the trans-mitter instructions.

2. Assign to this mixer the same switch with the same switching direction, which switches to the attitude mode.

3. Leave this switch in the ON position.

4. Change to the setting page of the mixer.

5. Change through "ASY" to the setting field of the "Travel" line.

6. Set the value in the active value field of the "Travel" line to -30%.

    In the idle position of the throttle / pitch stick, the bar of channel 1 in the "servo display" should now be at about -66%.

MIX 2		C1→C1
▶Trv	-30%	0%
Offset		0%
▼ SYM	ASY	

ESC: Factory setting DSHOT

ONESHOT, MULTISHOT8, MULTISHOT32 (not suitable for Akro 3D) and DSHOT are faster communication protocols within receiver and controller. Please check which protocol your controller supports. It allows the speed controllers to communicate much faster with receiver. So the motors react faster to receiver controls. The motor output signal is shorter, about 125µs-250µs, instead of before PPM (1000µs – 2000µs), with MULITISHOT now even faster with 5-25µs. MULTISHOT8 is the standard setting. Faster protocols improve flight behavior, as long as the controllers can process the protocol without error.

In DSHOT mode, it is no longer necessary to set any controller travel. In addition, in DSHOT mode the controller can be toggled between MODE NORMAL and ACRO3D without reprogramming.

Turtle mode: As soon as the motors are off and the copter has more than 90 degrees of inclination angle, the turtle mode will be activated when the motors are switched on again.

Depending on the stick deflection and direction, two motors are activated with roll / pitch or yaw in reverse direction. The bigger the stick deflection, the faster the motors run.

If the copter has turned back to the normal position <90 degrees tilt, then switch the motor switch back to off. The next time the motors are switched on, the normal flight mode is active again and the direction of rotation of the motors is back to normal.

If the direction of rotation of the motors does not reverse when the copter is upside down, then the BL Heli S controllers have to be updated to version 16.7. BL Heli32 controllers must also be updated to the latest software version. BLHeli controllers are not suitable for DSHOT.

For safety reasons, however, only "Multishot 8", ONESHOT or DSHOT should be used, especially in 3D mode, as many controllers react to unexpected shutdowns on "Multishot 32".

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.

FREESTYLE

The setting basically serves to prevent the I-factor from generating a vibration.

The higher the value, the more I-vibrations are prevented, but also the straight-ahead flight is degraded. Values up to max. 20 recommended.

The adjustment range is from 1 … 100

MIN = disabled

Alternatively, the effect on the I value can also be adjusted by the transmitter. To do this, a rotary or slider control is assigned to one of the control channels 5 … 16 and the remaining settings are left at the default values. In the value field of the "Freestyle" line, the corresponding channel is then merely to be selected instead of a fixed value.

Note

If a channel is selected in this line, but no control is assigned in the transmitter or otherwise it influences its neutral position, the value "50" in parenthesis is predefined.

VIBRATION FILTER, VIBRATION FILTER2

```
MULTICOPTER BASE    ‹  ›
TYPE            QUADRO XI
MODE              NORMAL
ESC                DSHOT
MINPOWER %             5
FREESTYLE              1
›VIBRATIONS FILTER    50
 VIBRATIONS FILT.2    70
```

If you hear , for example, "clicking" noises in the motors by widely fluctuating speeds or vibrations during the flight, such as in low throttle or under hover conditions, these vibrations can be filtered out with the options "damping" and "vibration filter". Preferably, start with the "vibration filters": These also provide cooler motors. A throttle-dependent filter setting usually brings other benefits for better flight characteristics. For this you program a mixer accordingly from C1 to the channel that was set in the vibration filter (eg range 50 at idle, 80 at full throttle):

```
MULTICOPTER BASE    ‹  ›
TYPE            QUADRO XI
MODE              NORMAL
ESC                DSHOT
MINPOWER %             5
FREESTYLE              1
›VIBRATIONS FIL(67)  C12
 VIBRATIONS FILT.2    70
```
```
MULTICOPTER BASE    ‹  ›
TYPE            QUADRO XI
MODE              NORMAL
ESC                DSHOT
MINPOWER %             5
FREESTYLE              1
›VIBRATIONS FILTER    50
 VIBRATIONS FILT.2    70
```

Vibrations filter programming step by step

1. *In the transmitter assign a rotary or slider to a free control channel, e.g. channel 12*

2. *Select this channel in the value field of the "VIBRATION FILTER" line.*

3. *In flight, adjust the "VIBRATION FILTER" with the selected controller until the motor noises disappear or at least cannot be further reduced and the rotor speeds are as constant as possible.*

4. *Leave the control in this position.*

5. *After landing, read out the set value found in the "VIBRATION FILTER" line of the telemetry menu and then set it manually in the value field, see "67" in the two examples on the left.*

6. *If vibrations still occur during the flight at a different speed, the filter may need to be adjusted slightly or even adjusted according to gas.*

Adjustment range: 100 … 1, MIN, (0)C5, (50)C6 … (50)C16

The usual adjustment range of the vibration filter is between "65" with 4 … 5 inch rotors and 80 with 3 inch rotors.

Extremely low values should be avoided as these will worsen the flight behaviour.

»

Note

If a channel is selected in this line, but no control is assigned in the transmitter or otherwise it influences its neutral position, the value "50" in parenthesis is predefined.

```
MULTICOPTER BASIC< >
TYPE          QUADRO X
MODE           NORMAL
ESC         MULTISHOT
MINPOWER %           5
>FREESTYLE          NO
 CALIBR.POSITION    NO
```

Calibration position

With this option, if necessary, the basic calibration of the acceleration sensors can be readjusted, so that the copter hovers with the stick and trim to neutral, in attitude mode, precisely horizontally.

To recalibrate, place the copter on an absolutely horizontal surface and then set the value field to "YES".

As soon as the calibration is completed, the display changes back to "NO". To accept the calibration that has just been carried out in the non-volatile memory of the receiver, it is essential to push or tap on the ENT key.

REBOOT

Yes, replaces the disconnection and plugging of the battery with menu items that would otherwise only become active after the main battery is disconnected and reconnected, such as CH9, TYPE, ESC, Mode: Normal mode, Acro 3D, controller settings.

When going back from Acro 3D to normal, you should reboot twice as a precaution.

AXIS ASSIGNMENT

»

Note

The gyroscope calibration, required each time the copter is switched on, takes place as soon as the copter or its receiver is absolutely quiet. The motors will not start until the calibration is completed.

After approx. 3 seconds in the rest position, several beeps can be heard from all motors. The number of beeps varies depending on the speed controller used. These "wiggles" signal that initialisation has been successful and that calibration is complete.

⚠

CAUTION

If the copter is used for long time (>1min) in Acro 3D mode the receiver can loose its position information and the copter can move itself out of control. In this case the copter should be left in the rate mode and hover or land calmly for approx. 30 s, so that the receiver can track the position again.

```
 AXIS      ASSIGMENT<
>Do SETUP         NO
 ROLL            +0
 NICK            +0
 YAW             +0
```

In this display, the gyros and their effective direction are to be determined.

Do setup

After selecting the line "do setup" and changing the value field to "yes", assign the axes as follows:

Do setup step by step

1. Push or tap on the ENT key

   "NO" is displayed inverted.

2. Change the value field to "YES".

3. Push or tap on the ENT key

4. At the transmitter briefly bring the roll control stick to the right stop.

   The display shows the roll axis inverted.

5. Tilt the copter more than 45 degrees to the right.

   As soon as the detected axis with the required sign is displayed in "normal" representation, the axis assignation is completed.

6. At the transmitter briefly bring the nick control stick to the front stop.

   The display shows the nick axis inverted.

7. Tilt the copter more than 45 degrees to the front.

   As soon as the detected axis with the required sign is displayed in "normal" representation, the axis assignation is completed.

8. At the transmitter briefly bring the yaw control stick to the right stop.

9. Turn the copter clockwise by more than 45 degrees to the right.

   As soon as the detected axis with the required sign is displayed in "normal" representation, the axis assignation is completed.

The gyros and their operating directions have now been assigned.

》

Attention

To be on the safe side, the directions of action of the gyroscope settings must be checked.

Check step by step

1. Remove the rotors of the copter.

2. Use the pitch control stick to give approx. 25% "throttle".

   All motors run at the same speed.

3. *Switch to the attitude mode.*

4. *Tilt the copter forward.*

    The front motors must turn faster than back ones.

5. *Tilt the copter to one side.*

    The motors of the side, the "hanging" side must turn faster than those of the opposite, higher side.

    ‖   *If this is not the case, the entire gyro assignment must be repeated.*

Firmware update

Updates to the receiver's firmware are made via the receiver connection 5 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.de***.

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.

Connect the other end of the adapter lead to the receiver's socket labelled with "-+5T". The polarity of the plug-in system cannot be reversed. Do not apply force. The plug should be pushed all the way in with the black or brown wire facing the top of the receiver.

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***.

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SIMPLIFIED DECLARATION OF CONFORMITY

Graupner/SJ hereby declares that the **S1035 Falcon 12** complies with the Directive 2014/53/EU.

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

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.

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

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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