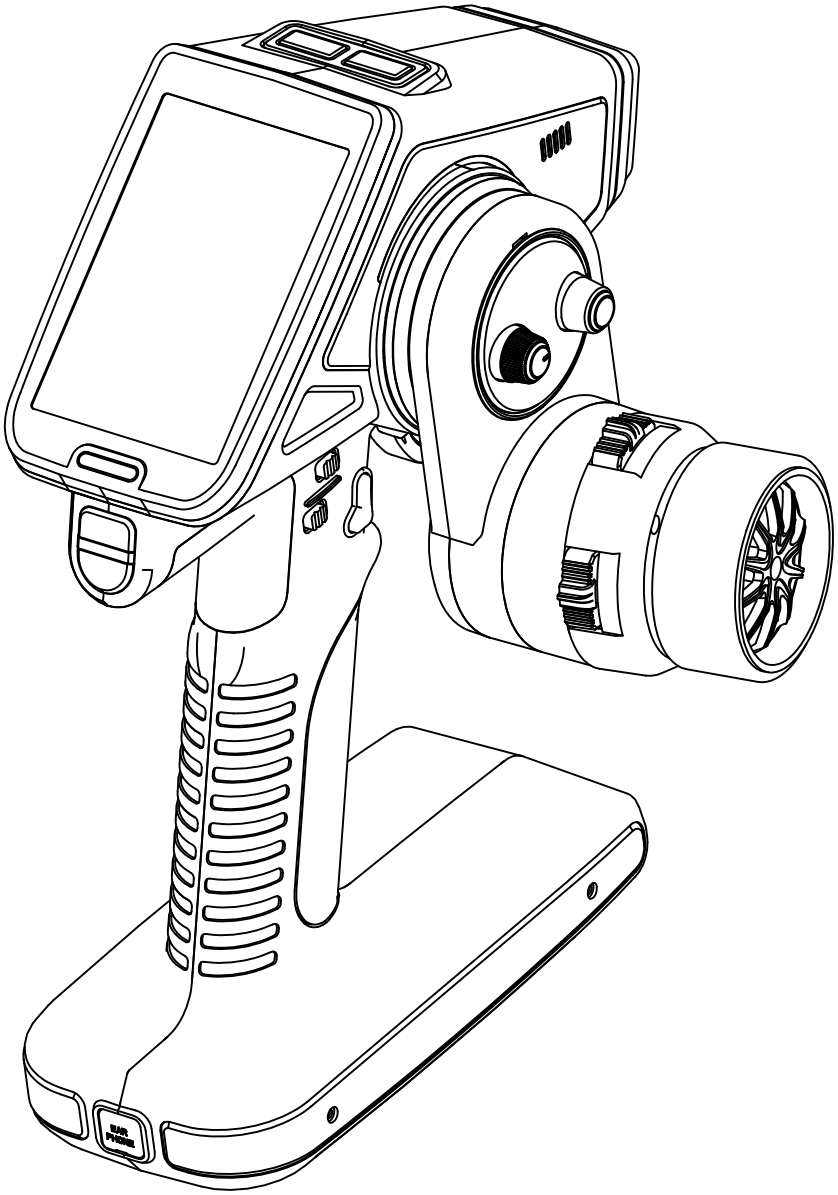
USA

Manual

X-8E

4 channel HoTT 2.4 GHz transmitter

No. S1008



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Graupner

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Introduction

Thank you for purchasing the ***Graupner X-8E HoTT*** radio. This radio will transform the way you have been experiencing surface radios and add a new level of user experience between you and your model. The **X-8E** is easy to use and setup using the TFT color and touch screen. The voice notifications will even further enhance your user experience.

You can get more out of your **X-8E** using our wide selection of telemetry speed controllers and telemetry ESC's. All HoTT compatible products can be setup and programmed directly wireless from the **X-8E**. No need for computers or programming boxes!

Check us out regularly on the web for new changes and revisions of our manuals and firmware at **www.graupnerusa.com**. This product complies with national and European legal requirements.

To maintain product condition and to ensure safe operation, you must read and follow this user manual and the safety notes before use!

Note

This operating manual is part of the product. It contains important information concerning operation and handling. Keep these instructions for future reference. Please pass this on to future owners or third parties.

Service Center

Graupner USA – OPENHOBBY LLC
3941 Park Dr., Suite 20-571
El Dorado Hills, CA 95762
United States

Phone: **(855) 572-4746 x2**
Hours: **Mon – Fri 9:00am – 4:00pm PST**
Email: **service@graupnerusa.com**
Online Support: **www.graupnerusa.com**

***Graupner* Online**

For service centers, downloads, upgrades and product list, visit our web site at **www.graupnerusa.com**.

Intended use

The **X-8E HoTT transmitter** is an ergonomically and technically modern 8 function radio control system in 2.4 GHz HoTT technology for ambitious and professional RC car and speedboat drivers.

The **X-8E HoTT transmitter** is designed exclusively to be used in battery-powered, unmanned radio controlled models; any other use is not allowed. For any improper use no warranty or liability is accepted.

Read through this entire manual before you attempt to use the **X-8E HoTT transmitter**.

Graupner/SJ constantly works on the development of all products; we reserve the right to change the item, its technology and equipment.

The product is not a toy. It is not suitable for children under 14 years. The operation of the **X-8E HoTT transmitter** must be performed by experienced modelers. If you do not have sufficient knowledge about dealing with radio-controlled models, please contact an experienced model builder or a model club.

Package content

- X-8E transmitter
- GR-8 Receiver
- LiPo battery 1S 5000 mAh
- USB update cable set (No.S8500, 7168.S)
- Micro SD card
- Steering wheel adapter 10 degree and cover
- Manual

Technical Data

X-8E transmitter data

Operating voltage	3.4 to 6 V
Frequency	2.4 Ghz
Weight	1.44 lb (657 g)
Modulation	FHSS
Range	1640 ft (500 m)
Control functions	4
Power consumption	max. 600 mA
Temperature range	**14° to 130°F** (-10 to +55 °C)
Antenna type	Patch antenna
Dimensions	8.6 x 7.3 x 5.5 in

GR-8 receiver data

Operating voltage	3.6 to 8.4 V
Frequency	2.4 Ghz
Weight	0.24 oz (6.9 g)
Modulation	FHSS
Range	1640 ft (500 m)
Control functions	4
Power consumption	80 mA
Temperature range	**14° to 130°F** (-10 to +55 °C)
Aerial length	4.3 in (110 mm)
Dimensions	1.18 x 0.82 x 0.56 in

Declaration of conformity

S1008 / X-8E

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

EN 301 489-1 V1.9.2

EN 301 489-17 V2.2.1

EN 300 328 V1.8.1

EN 60950-1:2006 + A11:2009 + A1:2010 + A2:2013

EN 62311:2008

Symbols explication

Always observe the information indicated by this warning sign. Particularly those which are additionally marked with the signal words **CAUTION** or **WARNING**.

WARNING indicates the potential for serious injury.
CAUTION indicates possibility of lighter injuries.

Note indicates potential malfunctions.

Attention indicates potential damages to objects.

Safety notes

General

These safety instructions are intended to protect this product, yourself and the safety of others. Please read this section very carefully before using this product!

To avoid risk of suffocation, keep packaging materials away from babies and small children.

- Supervision by an experienced adult is required for children, persons mentally or physically handicapped, novices, or anyone not capable of safely using this product.
- Always perform a range and function test on the ground before you use your model (hold your model tight). Repeat the test with running motor and with short throttle bursts.
- Check all relevant laws and regulations before using this remote control model. These laws and regulations must be observed in for the safety of yourself and others and may vary by state, region, or country.
- Special liability insurance policies are mandatory for all device operations. If you already own a device, determine if the respective model is covered by your insurance.

- Protect all equipment from dust, dirt, moisture, vibration and excessive heat or cold. The models may only be operated remotely in normal outside temperatures ranging from **14° to 130°F** (-10°C to 55°C).
- Maintain frequent updates of your HoTT components with the latest firmware version.
- For additional questions or support, contact the Graupner USA Service Center, or an experienced user.

Battery Safety

CAUTION

- Protect batteries from dust, moisture, heat and vibrations. For use in dry locations only.
- Do not use damaged batteries.
- Batteries not handled properly may catch fire, explode, or cause irritation and burns. To extinguish a battery fire use either water, CO^2 or sand.
- Batteries should not be heated, burned, short-circuited, incorrectly inserted, modified, soldered or welded.
- Charge batteries in a room outfitted with a smoke detector, on a non-flammable, heat-resistant and non-conductive surface. Keep away from combustible or highly flammable objects while charging. *Always monitor batteries during the charging process.*
- Do not exceed the maximum quick-charging current specified for the respective cell type.
- If a battery reaches temperatures above **140°F** (60°C) while it is being charged, immediately stop charging and let the battery cool down to approximately **86 - 104°F** (30 - 40°C).
- Never charge batteries that have already been charged, are hot or are not fully discharged. If a cell in a battery pack heats up following a quick-charge process, this may indicate a defective cell. Discard the battery immediately!

- Damaged or corroded batteries may leak an electrolyte that is caustic and should not be touched or come into contact with your skin or eyes. **In case of emergency, rinse thoroughly with water and seek immediate medical attention.**
- Always fully recharge the battery.

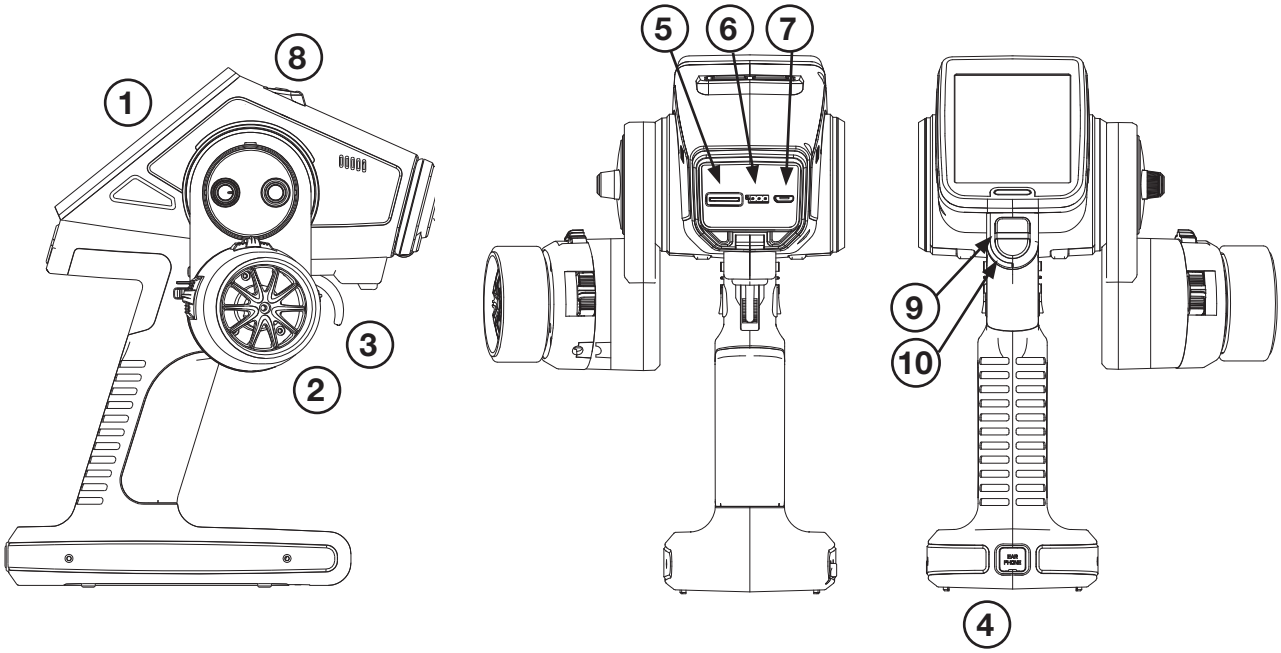
Special instructions on charging LiPo batteries

- To charge and discharge LiPo batteries, only use specifically designed chargers/dischargers with balancer connector.
- The white connector (cell count + 1 pole) is designed for the connection to a LiPo balancer or a battery charger as a single cell charger with a manual cell balancer. **Always charge the battery with the balancer connector.**

Safety notes for stocking LiPo batteries

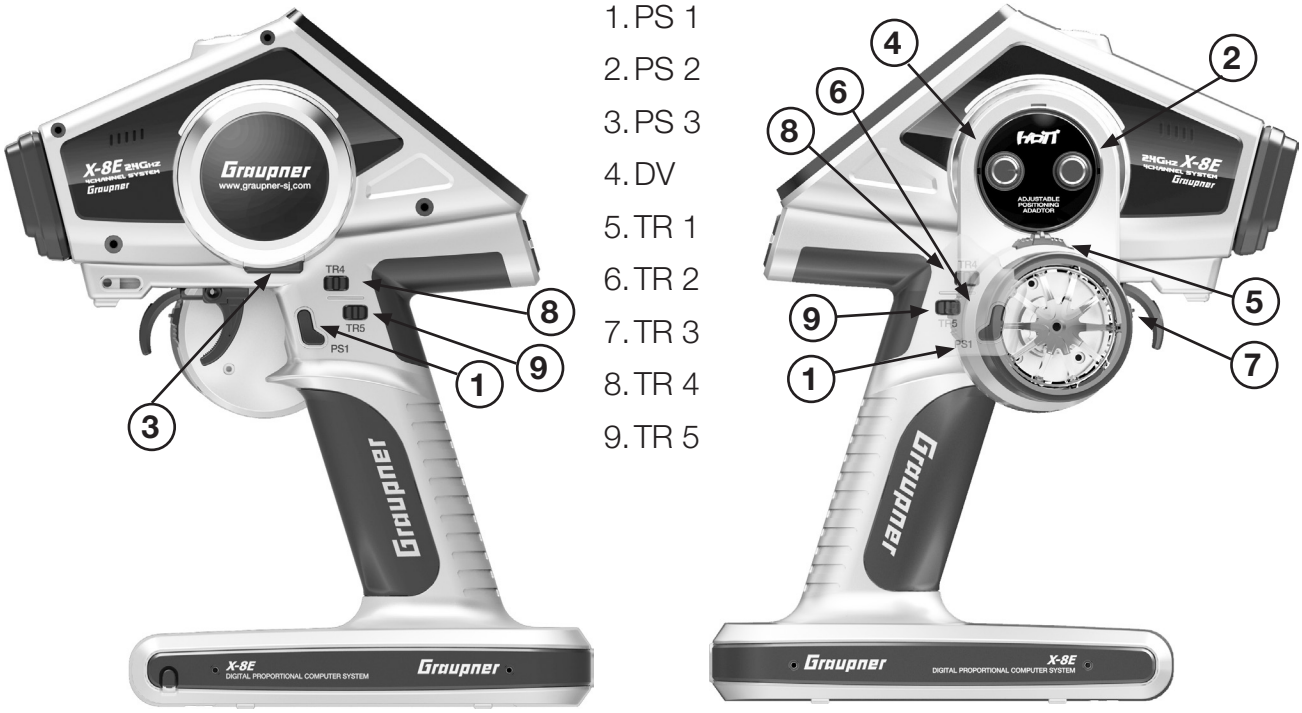
- LiPo batteries should be stored with a voltage of about 3.8V per cell. If the cell voltage falls below 3V, then the battery must be charged. Fully discharging or storing a battery with a cell voltage < 3V renders the battery useless.
- Exersize safety procautions when charging and transporting your LiPo batteries. Always use a safety bag.

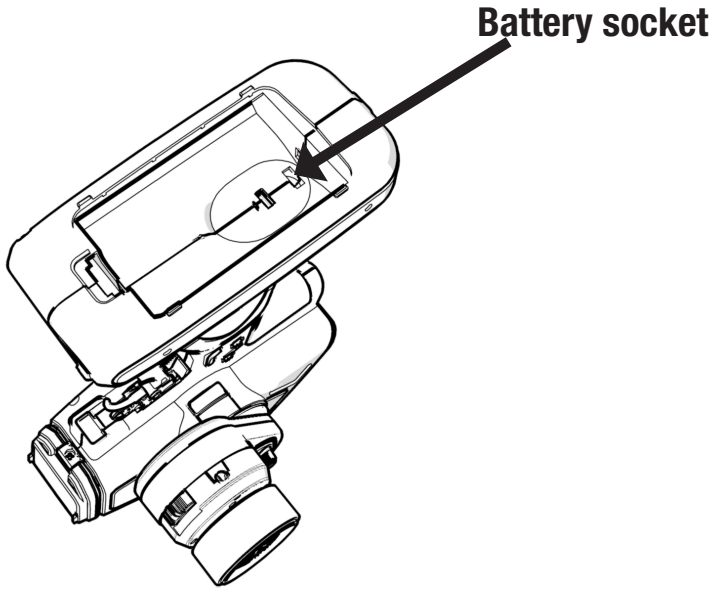
Control Elements and connections



1. Touch Display
2. Steering wheel
3. Throttle lever
4. Earphone socket
5. SD card slot
6. Data socket
7. Mini USB socket
8. On/off switches
9. Direct button S1 (see chapter SW SET)
10. Direct button S2 (see chapter SW SET)

Buttons and Switches Layout





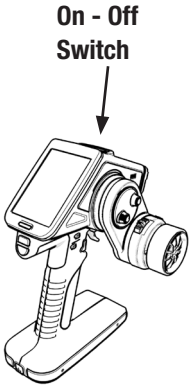
Battery connection
Remove the cover from the bottom of the transmitter and connect the battery, paying attention to the correct polarity. Shut the cover and ensure it is securely closed.

Set the the battery warning threshold in accordance with the battery used. (see Chapter "**SYS SET**")

If a voltage warning is triggered, charge the batteries.

Battery charging
Charge the LiPo batteries in the transmitter through the micro USB socket using the USB cable provided. For all other battery types, use an USB connection, e.g. a PC USB port or an USB net adapter. During the charging process the LED under the display lights up red. When the battery is full the LED turns off.

Alternatively, you can charge the battery outside the transmitter with an RC battery charger (not included).



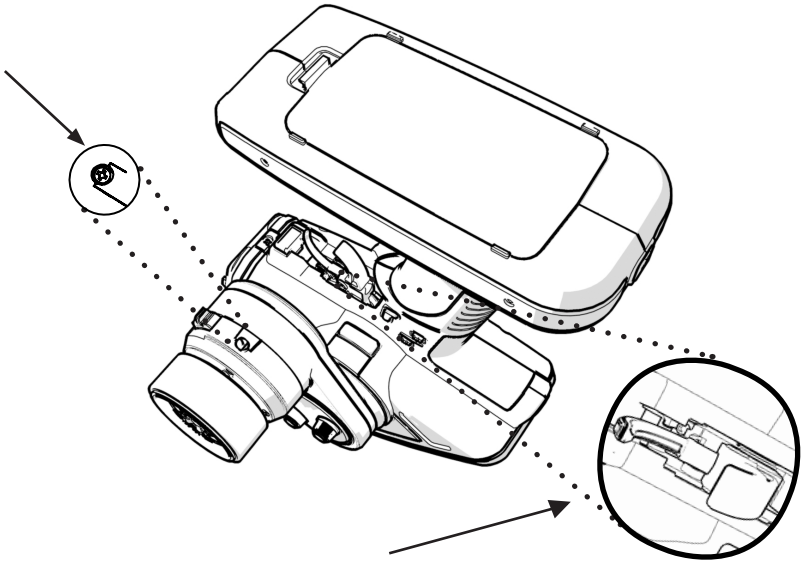
Transmitter power switch
On the top of the transmitter there are two buttons. To turn on the transmitter with RF off, push the right button for about 2 seconds. When the RF mode is off, a safety feature is activated that prevents switched-on models from accidentally starting during programming. Additionally, power consumption is reduced, significantly conserving battery life.

To turn on the transmitter with RF on, push the left button.

Tension spring adjustment

To adjust the steering wheel tension spring, locate the adjusting screw in the housing below the wheel.

Using a hex key, turn the screw left or right to increase or decrease tension force.

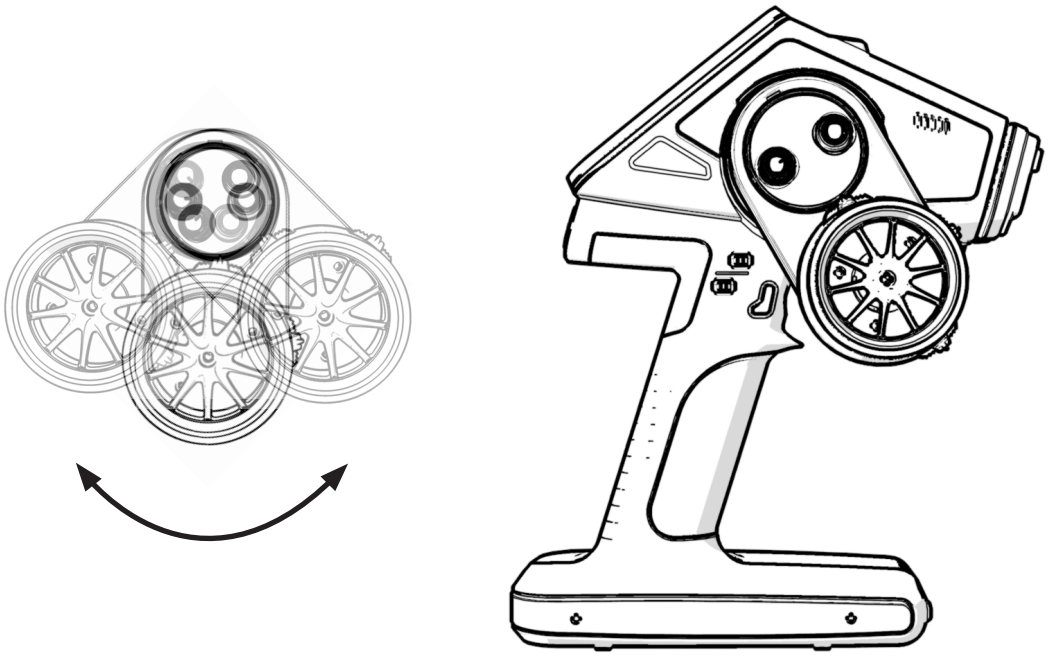


To adjust the throttle lever tension spring, locate the adjusting screw in the housing at the throttle lever.

Using a hex key, turn the screw left or right to increase or decrease tension force.

Adjusting the steering wheel position

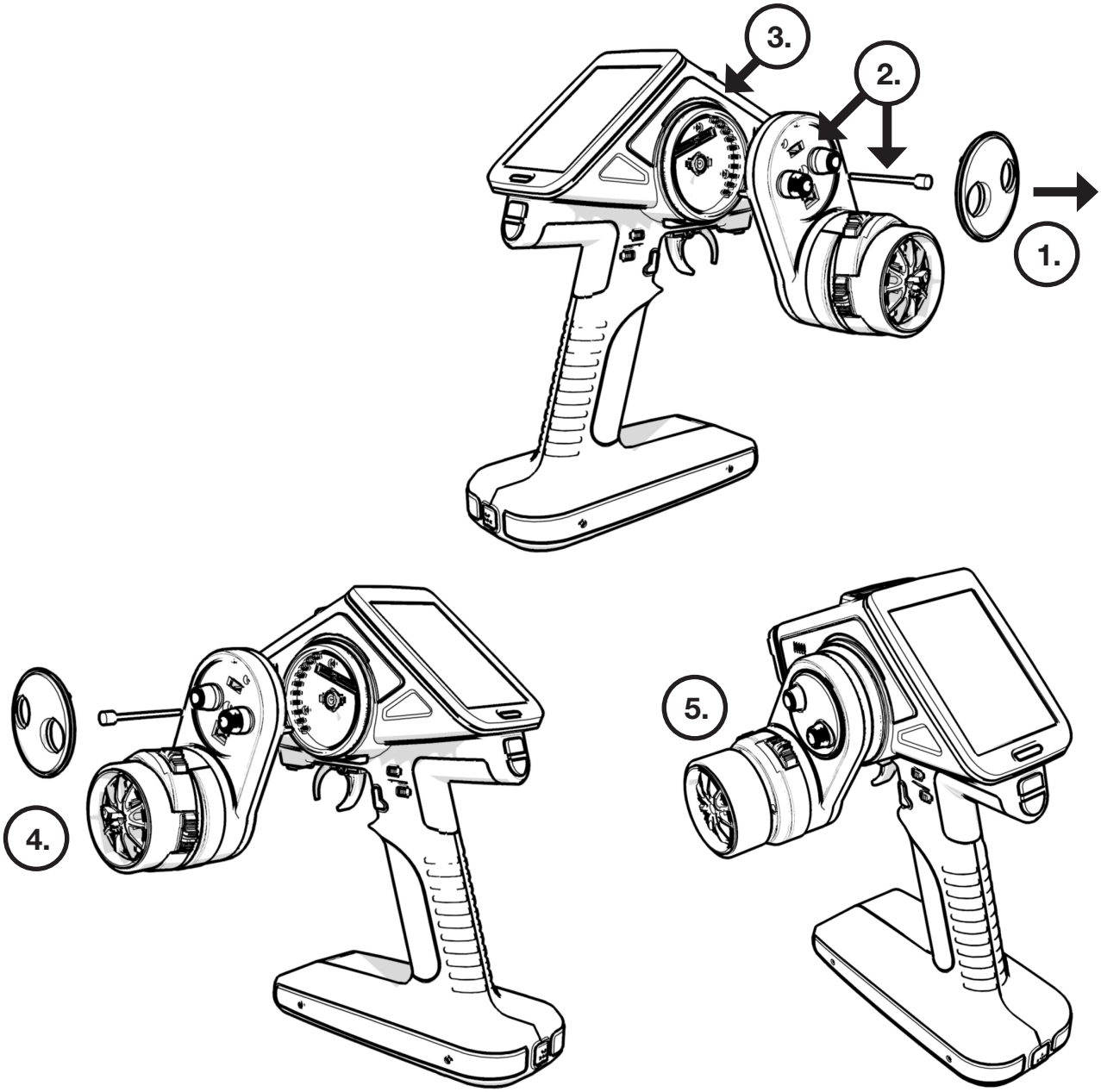
To adjust the steering wheel position forward or backward, remove the X-8E logo cover, located above the steering wheel. Loosen the two screws and maneuver the steering wheel into desired position. Retighten the two screws to secure.



Converting the steering wheel for left-handers

The entire steering wheel can be converted to the left side for operation by left-handers.

1. Remove the X-8E logo cover (see following figure).
2. Unscrew the steering wheel (2 screws).
3. Unplug the steering wheel cable.
4. Mount the steering wheel on the left side and re-plug the cable.
5. Tighten the steering wheel and replace the X-8E logo cover.



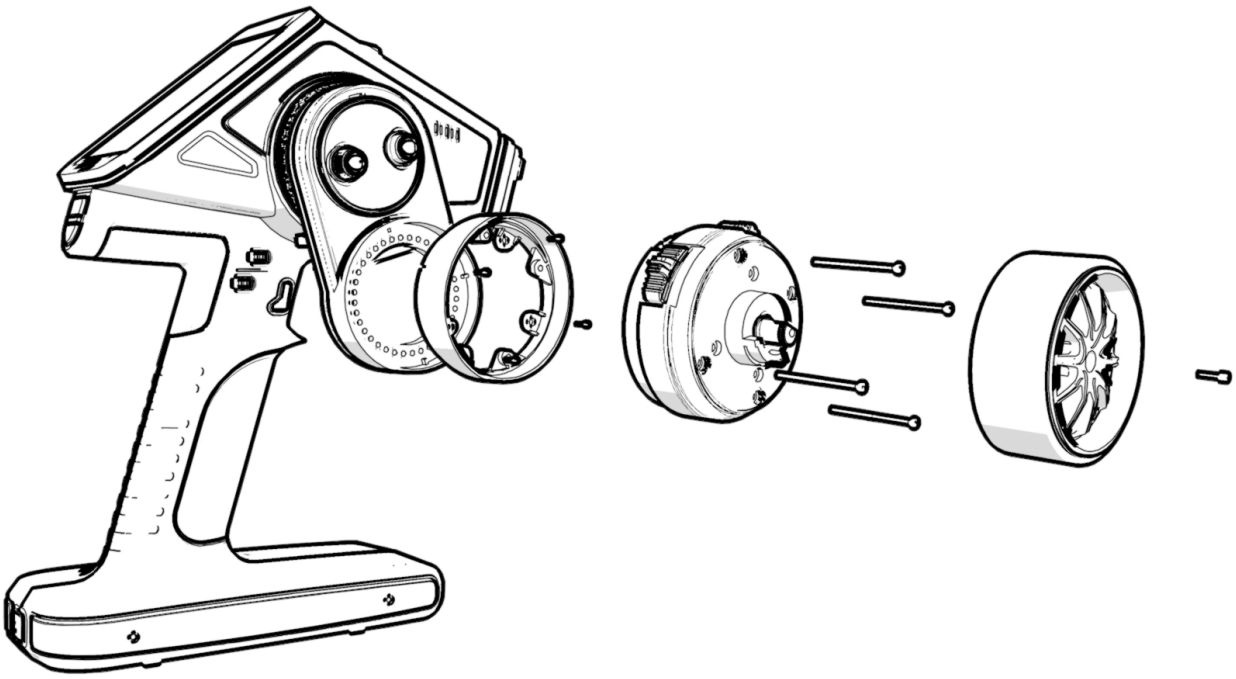
Attention After the conversion, check all steering wheel functions, buttons and rotary controls before operating the model again!

Installing the steering wheel adapter

The steering wheel position can be adjusted 10 degrees through an adapter.

1. Remove the steering wheel.
2. Remove the four long screws under the wheel.
3. Remove the steering wheel mechanism and disconnect the connector.
4. Adjust the adapter to preferred position and secure with the four short screws.
5. Reconnect the connector
6. Install the steering wheel mechanism on the adapter part and reattatch the steering wheel.

Attention After the conversion, check all steering wheel functions, buttons and rotary controls before operating the model again!



Binding and range test

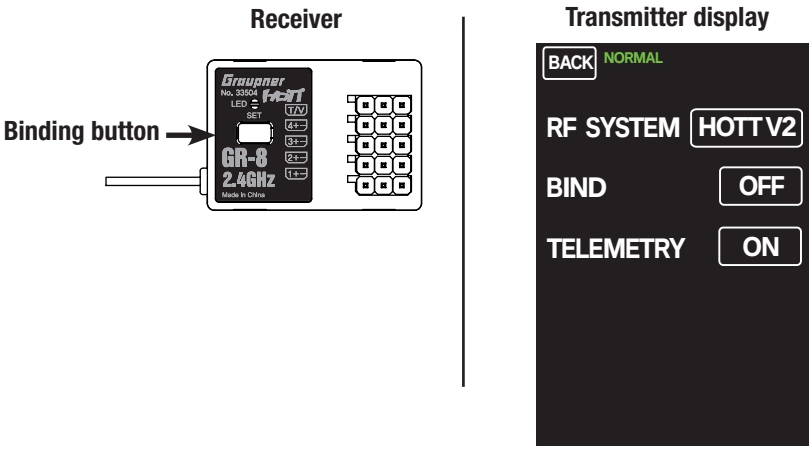
Binding

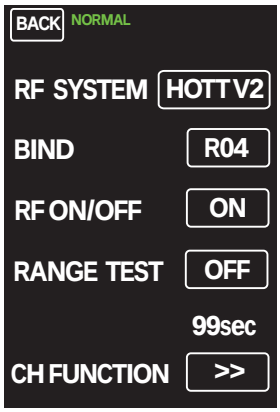
To establish a communication link, bind the Graupner-HoTT receiver to the X-8E Graupner-HoTT transmitter. The binding process has already been performed for the transmitter and the receiver included. However, binding is required for each additional receiver added to this transmitter. To bind additional receivers:

NOTE: The transmitter can be turned ON or OFF with one of two buttons. When using the white button, the transmitter RF functions are completely disabled and it **will not be possible** to turn on the RF or bind a receiver.

1. Turn on the transmitter using the **RED** button. If no receiver is bound to the model, select **SET**. Selecting SET will bring up the bind finction of the RF SET menu.
2. Select the correct RF system. (HoTT V2 for the GR-8 or HoTT for the GR-4.) **GR-8:** The red LED flashes slowly when there is no communications link. **GR-4:** The red LED glows solid red when there is no communications link.
3. Press and hold the **SET** button on the receiver for about 3 seconds.
4. Press the **BIND** button on the transmitter.
5. The OFF will change to CHK momentarily.
6. If the bind is successful, the number of receiver channels will be displayed. If not successful, the button will return to OFF status.

Repeat the bind process until successful. It is all a matter of timing. (Counting "one thousand one, one thousand two, one thousand three" will help with the timing.)





Meaning of the individual menu items

RF SYSTEM = **HoTT** for receiver (GR-4/12/16/18/24/32)

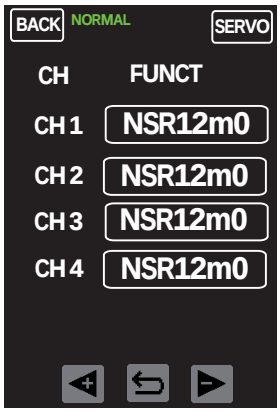
HoTT V2 for receiver with SUMD-V2 (GR-8)

BIND = Displays bound receiver channels

RF ON/OFF = Displays if RF is switched on or off

RANGE TEST = Range test (see chapter "Range test")

CH FUNCTION ==> (only available in HoTT V2 operation with compatible receiver)



Channel features (CH FUNCTION)

Only available in HoTT V2 operation with compatible receiver!

Each channel is capable of the following signals:

- **USR1m50** : ULTRA SIGNAL 1.5msec
- **FSR3m00** : FAST SIGNAL 3.0msec
- **SUMD-V2** : FAST SIGNAL BUS 3.0msec
- **NSR6m00** : NORMAL SIGNAL 6.0msec
- **NSR12m0** : NORMAL SIGNAL 12.0msec
- **NSR24m0** : NORMAL SIGNAL 24.0msec

Use this menu to adjust the servo properties by setting the individual channel properties. **(For more information refer to the servo's user's manual.)**

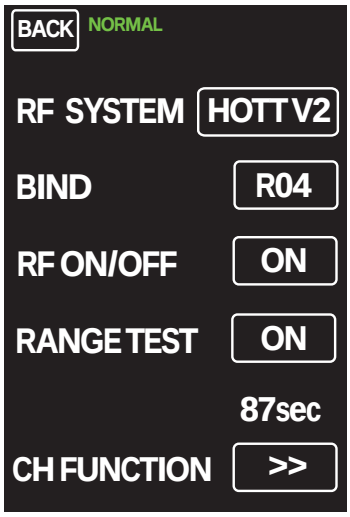
Attention

The **SUMD-V2** setting can only be used for Graupner servos, sensors and controllers that support this function!

Notice: To save receiver settings, follow the instructions on the screen in the following order:

1. **Switch receiver off**
2. **Switch transmitter off**
3. **Switch transmitter on**
4. **Switch receiver on**

To verify the receiver settings are displayed, check the telemetry menu.



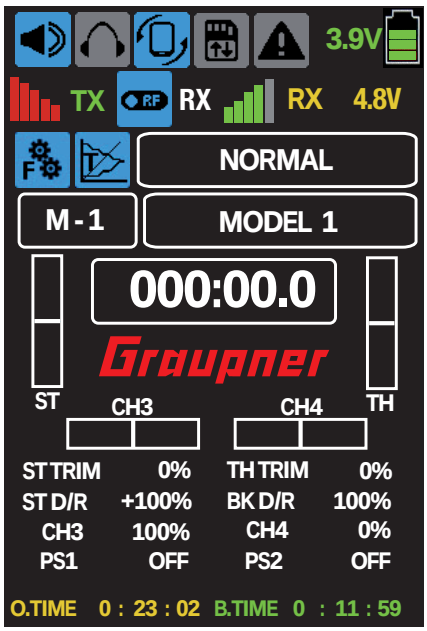
Range test

Always perform a range test before each operation. Have an assistant to help with the range test. Range test instructions are as follows:

1. Bind the receiver with the transmitter and insert into the model. Switch on the transmitter first, then the receiver. Servo movements can now be monitored.
2. Place the model on a flat surface (cement, mowed lawn or level ground) with the receiver antennas at least 6 in (15 cm) above the ground. If necessary, place a support underneath the model during the test. Hold the transmitter at waist-level at a comfortable distance from your body. **Do not point the aerial directly at the model**. Turn or angle the aerial tip so it stands vertical during operation. In the “RF SET” menu, press OFF in the “RANGE TEST” line. This switches the option **ON** and begins the range test. The test will ramian active for 99 seconds, after which it will automatically switch off. (Quit the range test at any time by pressing ON in the “RANGE TEST” line to switch this option **OFF**.)
3. Walk away from the model and turn the wheel to simulate all servo movements and normal operations. If at any time you detect an interruption in the link within a range of about 164 ft (50 m), attempt to reastablish the link.
4. To check interference resistance, switch on an existing motor. Move away from the model until it no longer responds. Manually terminate the range test mode.
5. The model should now respond again. If not, do not use the system and contact the Graupner Service Center.
6. Ground range for safe operation and handling should be within 164 ft (50 m).

Start display

Symbol explination



Voice output (announce)

Blue = Active / **Gray** = Inactive

Earphones (announce)

Blue = Connected / **Gray** = Disconnected

Display rotation (function - press)

Normal = 1 / **90° right** = 2 / **90° left** = 3

SD card (indicator)

Blue = Inserted / **Gray** = Not Inserted

Display warnings (function - press)

Warnings display (see chapter “Warnings”)

Transmitter battery display (function - press)

Graphic representation of battery power level and green voltage information (see chapter “Voltage indicator calibration”). Blinks while battery charging.

Reception strength (display)

Red bars representing receiver (RX) field strength.

RF switched on (display)

Blue = RF On / **Gray** = RF Off

Transmission strength (display)

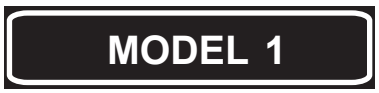
Green bars representing transmitter (TX) field strength

RX 4.8V

Receiver (RX) input voltage.

M-1

Tap for model memory selection



Model 1

Tap to input the model name

Profile

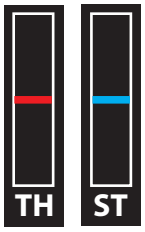
Tap to switching between the five profiles.

Main menu

Tap to move to main menu

Telemetry menu

Tap to move to telemetry menu



Bar display (display only)

Steering

Throttle

Percent display / status display

Shows the position percentage of steering, throttle, dual-rate and the switch state of PS1 and PS2.

Tap this display screen to access a detail screen for more information. (Display only.)

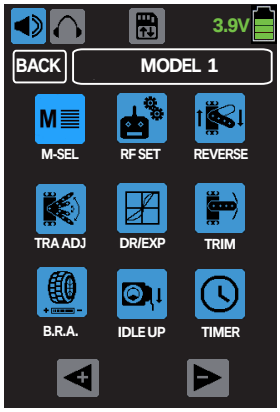
Model use time (see chapter “Timer”).

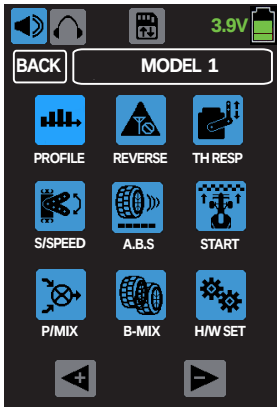
Battery use time (see chapter “Timer”).

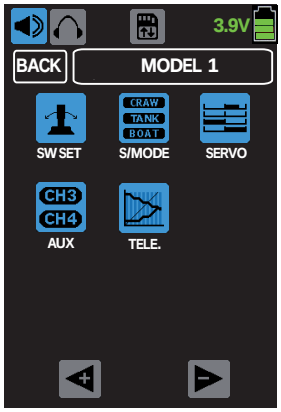
Laps timer: Tapping opens the “Timer” menu.

Main Menu

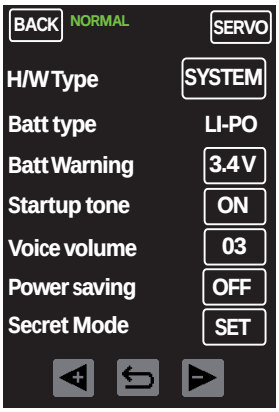
Push the "**F**" icon in the main display to access the menu. The menu system is comprised of 3 pages. Scroll between the pages by tapping the **<+** and **->** directional buttons at the bottom of the screen. Tap the blue icons to access the related sub-menu screen.







H/W SET



The **H/W SET** menu controls system setup and display settings. To switch between **System** and **Display** tap the button to the right of **H/W TYPE**.

System settings (H/W TYPE = SYSTEM)

Battery type - This transmitter only works with a LiPo battery.

LiPo - The warning threshold is automatically set to 3.6V.

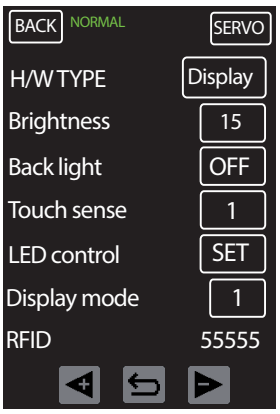
Battery warning - The battery warning threshold can be manually adjusted by 0.1V incriments.

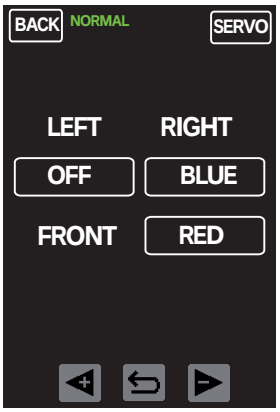
Startup tone - Turn **ON** or **OFF** the startup melody.

Voice volume - Speaker volume control for voice announcements. **OFF** = no sound / **05** = highest volume.

Power saving - Turns **ON** or **OFF** a power-saving mode that begins a 1 minute countdown following a period of inactivity. After the countdown the transmitter will automatically switch off.

Secret Mode - Refer to the **Secret Mode** chapter for additional information on these settings.





Display settings (H/W TYPE = DISPLAY)

Brightness - Adjust brightness level from **1 - 20**

Display light - Switching the backlight **ON** or **OFF**.

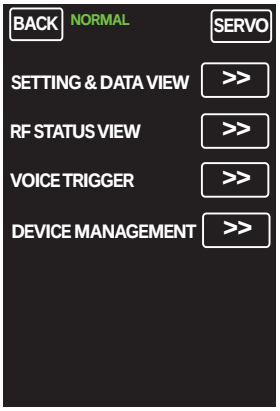
Touch sense - Adjust the touch screen sensitivity.
1 = very sensitive / **5** = reduced sensitivity.

LED control - Opens a separate page in where users can switch on/off the transmitter's LED lights or change their colors.

Display mode - Change the display orientation.
1 = Normal. **2** = 90° right rotation. **3** = 90° left rotation.

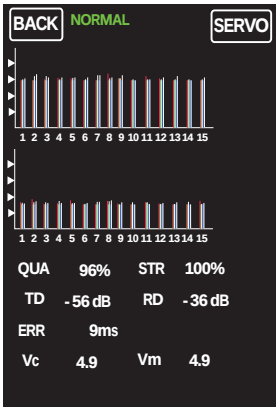
RFID - Displays transmitter's identification number.

TELE. (Telemetry Menu)



Setting & Data View
This menu option allows setup of receiver's telemetry menu.

Refer to the receiver's user's manual for specific telemetry setup information.



RF Status View
This display displays the frequency band and channel assignments.

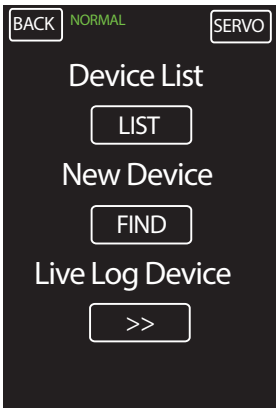
Voice Trigger

Only connected sensors and receivers are active.

REPEAT: If the REPEAT function is activated (via SW/FUN menu, VOICE RPT button), set the repetition frequency of the voice output here.

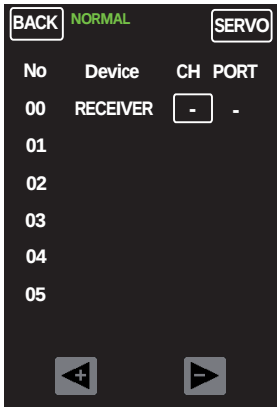
TRIGGER: Switch ON or OFF voice output from play list.

FIXED VOICE: Tap to open a drop-down menu of all voice announcemnts available on the SUMD-V2 system.



Device Management

If the SUMD-V2 system's channels are set in the RF SET menu at "**CH FUNCTION**", this menu manages the administration of all devices connected to the receiver. (display only)



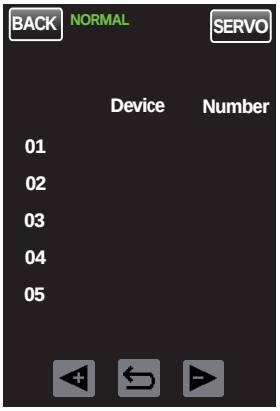
Device List

This menu shows a list of all connected devices and to which receiver port they are connected. Devices can be assigned to channels here.

New Device

Plug in a new device and push **FIND**. A pop-up menu will appear showing the device is being located and assigned to a device list number. Once found, tap OK.

Repeat this process for each new device to be assigned to the list.

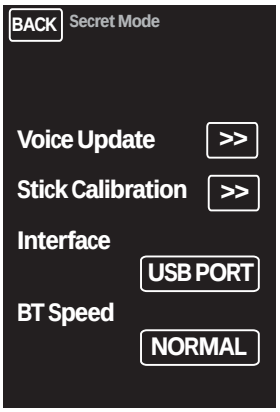


Live Log Device

If the device is equipped with the Bluetooth module S8351, real-time telemetry data can be logged and analyzed and transmitted via features available found in the Firmware Upgrade Studio. This menu logs, lists and numbers all devices being tracked through this option.

Refer to the **Secret Settings** chapter for additional information on setting up this option.

Secret Mode



The "**Secret mode**" option is the last item on the "**H/W SET**" menu.

Announcements (Voice Update)

By default, all voice announcements are recorded in German and are saved in a voice packet that is stored in the transmitter's internal memory. They can be replaced by a voice packet of a different language at any time.

On the micro SD card (included) choose from the following language options: German, English, French, Dutch, Italian and Spanish.

You can also download additional language packets at **www.graupner.de**.

Language change

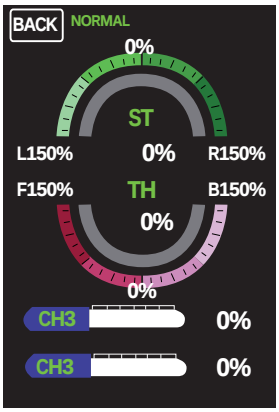
Language change step by step:

1. Insert the included SD memory card in its slot.
2. Use the left switch to turn the transmitter on in **RF mode**.
3. Select the "**Secret mode**" menu in the **H/W SET** menu.
4. Tap the "**Voice Update**" button.
5. Highlight the language from the list by tapping the appropriate button.
6. Tap the "**Load**" button. The selected language packet will be stored in the transmitter memory.
7. The loading process is finished as soon as the progress bar at the lower edge of the display disappears.
8. When this process is finished, switch the transmitter **OFF**.

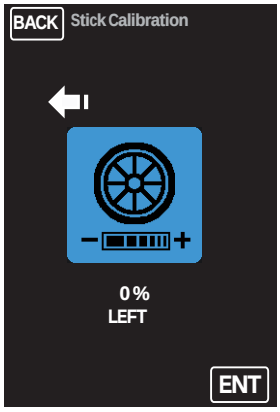
Steering wheel and throttle lever calibration

If the center position of steering wheel or if the throttle lever does not neutralize to 0% control travel, you can check and correct it as follows.

Stick calibration step by step:



1. Go to the "**M-SEL**" menu and tap on an open model memory slot to select.
2. Move to the "**SERVO**" menu without changing any trim settings or other program settings.
3. Center the steering wheel or the throttle lever by moving the steering wheel and the throttle lever to the middle position. If the throttle lever and the steering wheel are correctly centered, the display should match the one shown at left.
4. One at a time, move the steering wheel and throttle lever as far as they will go in all directions without exerting force at their position limits. The values should register between **-100%** and **+100%**.
5. If the throttle lever or the steering wheel does not reach the desired values, tap the "**Stick Calibration**" button in the "**Secret Mode**" option in the "**H/W SET**" menu.



6. Follow the prompts on the screen by moving the steering wheel and the throttle lever in the directions shown and keep them still. Confirm the position by tapping on the **ENT** button. Repeat this procedure for all of the indicated positions. If you have correctly calibrated all positions, a confirmation message will be displayed. Tap "**OK**" to save the calibrations. Tapthe "**BACK**" button to quit the process and return to the submenu "**Stick Calibration**".

Interface (BT SPEED)

Use this menu to assign transmitter ports for telemetry data transmission.

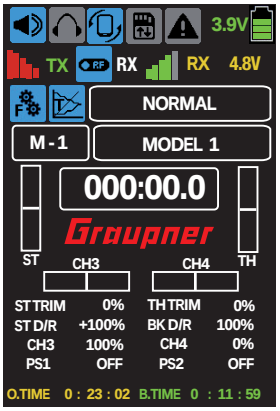
DATA PORT

Plug in the external Bluetooth module S8351 to the DATA port on the rear side of the transmitter. In the **BT SPEED** line, **FAST** or **NORMAL** will automatically select depending on the transmission speed of the counterpart device.

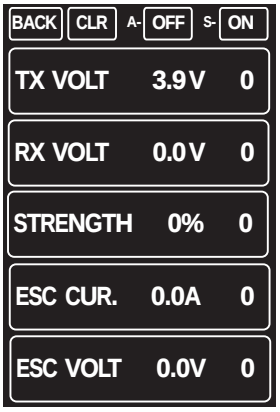
USB PORT

Plug in the supplied connection cable 7168 to the micro USB port on the rear side of the transmitter to establish a connection with a PC.

Display warnings



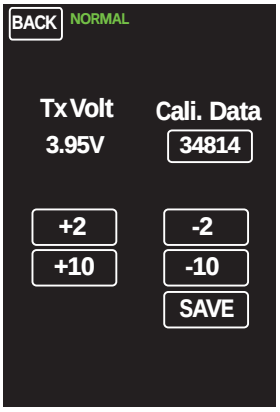
Tap the exclimation point symbol in the top line of the Start Display to open the warnings display screen-showing the current values for transmitter voltage (**TX VOLT**), receiver voltage (**RX VOLT**), signal strength (**STRENGTH**), speed controller current (**ESC CUR.**) and speed controller voltage (**ESC VOLT**).



Acoustic (**A-**) and optical (**S-**) warnings can be activated or deactivated by tapping the **ON** or **OFF** buttons.

Resets the alarms by tapping Clear (**CLR**).

Voltage display calibration



From the Main Menu, tap on the battery symbol to pull up the voltage calibration display. Calibrate the voltage display as follows:

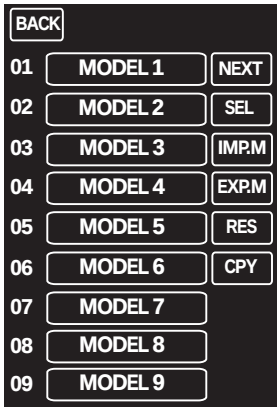
Voltage display calibration step by step:

1. Measure the battery voltage with a voltmeter.
2. Tap on the **Cali. Data** button.
3. Enter the data by changing the value by 2 or 10 unit incriments.
4. To **SAVE** tap and confirm the safety query through YES.
5. The new value is displayed under **Tx Volt**

Change the values in an input field

The following three buttons are visable on the lower part of the display of many of the following menus. To raise or lower a value by pressing the **<+** or **->** buttons. Reset the default value through the curved back-arrow button.

M-SEL (Model Selection)



Model settings can be managed and saved into memory slots by choosing from the following options:

SEL - Change active model memories.

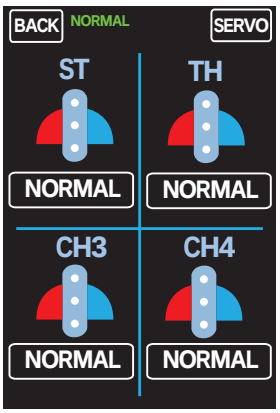
IMP.M - Import model memories from the SD card.

EXP.M - Export model memories to the SD card.

RES - Reset a model memory to the factory presets.
Warning: All personal settings will be deleted!

CPY - Copy the actual model memory in a new model memory.

REVERSE (Servo Reverse)

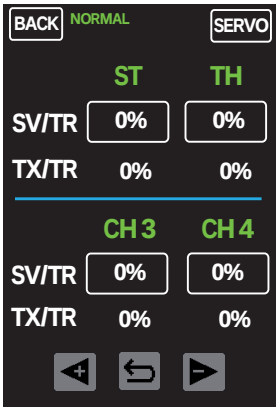


The servo operates in two directions:

Normal - **Reverse**

To change servo directions, tap the **NORMAL/REVERSE** button of the related servo to toggle between options. If changing the throttle direction, a safety warning will appear. Tap **YES** or **NO** to verify the selection and the change will take effect.

TRIM

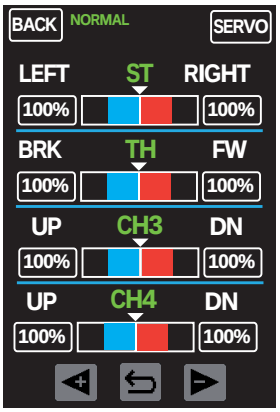


This trim function allows for the entire servo travel to be moved, i.e. full deflection position changes.

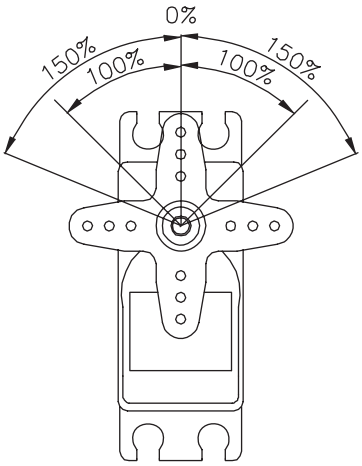
In the second line is displayed the respective trim value that has been set through the buttons.

Tap on the related button. Change the values by pushing the **<+** or **->** keys. Press the curved arrow key to reset to the default value (0%).

TRA ADJ (End Point Adjustment)

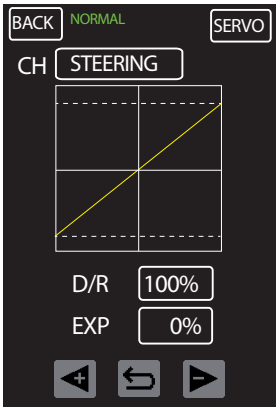


End Point Adjustment



This function sets the maximum travel of the servo per channel. The left and right deflection can be set separately in the range from **0%** - **150%**. Press the related button. Change the values by pushing the **<+** or **->** keys. Press the curved arrow key to reset to the default value (100%).

DR/EXP (Dual Rate/Exponential)

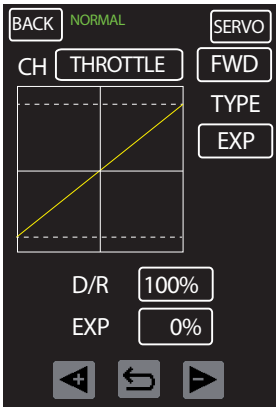


To set the **DR** (Dual Rate) and **EXPO** (Exponential) function for the steering and throttle channel, press the **STEERING** or **THROTTLE** button in the CH line. All setting changes are represented in the diagram.

Setting STEERING channel

D/R: 0% - 100% Limit the steering course. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (100%).

EXP: -100% to + 100% Exponentially change the steering course. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).



Setting THROTTLE channel

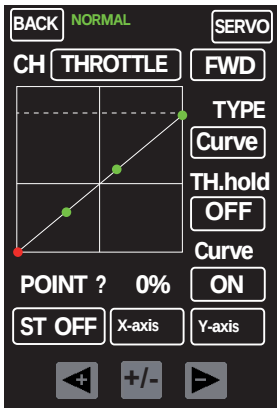
D/R: 0% - 100% Limit the throttle course. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (100%).

EXP: -100% to + 100% Exponentially change the throttle course. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

FWD: Choose between forward and brake area. Refer to the D/R and EXP settings described above and the FWD/BRK settings described on the following page.

TYPE: Select between EXPO or throttle CURVE

CURVE: Refer to the setting instructions on the following page.



THROTTLE FWD point setting step by step:

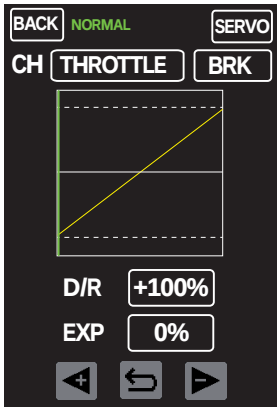
1. Press the "**ST OFF**" button to switch to "**ST ON**".
2. Move the throttle lever.
3. A green line moves horizontally through the diagram.
4. Press the **+/-** key to create a new point. Multiple points can be set by pressing the arrow key.
5. Delete highlighted points by pressing the **+/-** key.

THROTTLE FWD point moving step by step:

1. Press the "**ST ON**" button to switch to "**ST OFF**".
2. Press the **<+** or **->** keys to scroll through the points. Points will highlight red when selected. Delete highlighted points by pressing the **+/-** key.
3. Select the **X-axis** or the **Y-axis** button. Press the **<+** or **->** keys to change axis curve or to reposition points along the axis.

TH.hold

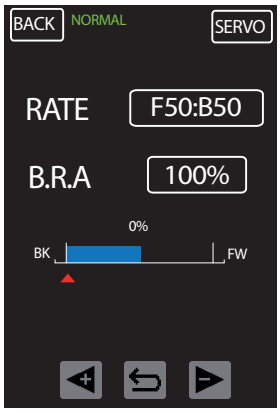
Use this option while programming a curve prevent the motor from running. Tap the **ON** and **OFF** button to switch the throttle channel on and off.



Brake force setting

1. Select the "**THROTTLE**" setting by pressing the "**STEERING**" button.
2. Select the "**BRK**" setting by tipping on the "**FWD**" button.
3. Moving the throttle lever. The green axis line moves in the diaplay.
4. To adjust the force setting, select the percent button near "**D/R**" or "**EXP**". Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset the default value.

B.R.A. (ATL)



Break rate and travel setting menu.

RATE: Factory default setting is F50:B:50. Press the button in the RATE line to switch to **F70:B:30** and move the servo center.

B.R.A: To adjust the travel, highlight the percent button in the B.R.A. line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (100%).

B-MIX

Break mixer options menu, including mixer channel assignment, mixer rate setting, delay time and ABS activation.

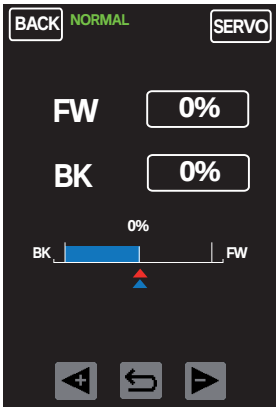
ACT: To activate the break secure function, press to change **INH** (inhibit/off) to **ON**.

RATE: To set the break mixer part, press the percent button on the RATE line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (100%).

DELAY: To set a delay time prior to activating the ABS, press the percent button on the DELAY line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0.00s).

ABS: To activate the ABS function, press to change **INH** (inhibit/off) to **ON**.

TH RESP (Throttle Response)

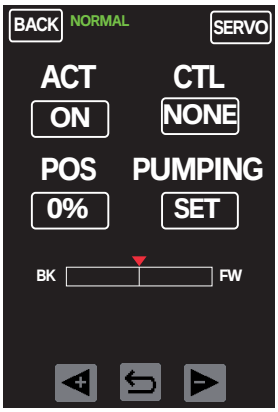


Throttle response settings menu. The throttle and break travel can be adjusted in one percent incriments, causing the servo to automatically jump to the set value during operation. This setting can compensate backlash of the throttle linkage or throttle response weakness in lower ranges.

FW: 0% - 100% To set the throttle, press the percent button on the RATE line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

BK: 0% - 100% To set the break, press the percent button on the RATE line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

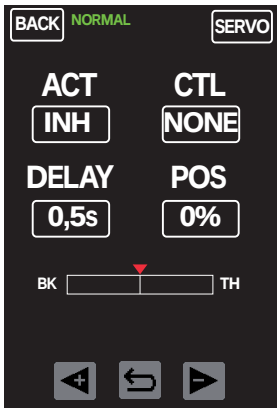
IDLE UP (Pumping)



Motor start function settings menu. Holds the throttle to a specific value to enable a better start for cold combustion engines.

POS: To adjust throttle position, press the percent button on under POS. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%). **NOTE: After starting the engine, this function must be deactivated; the throttle lever has no effect during the IDLE UP function.**

CTL: Assign this function to a switch. Refer to the **SW SET** chapter for additional information on how to program switches.

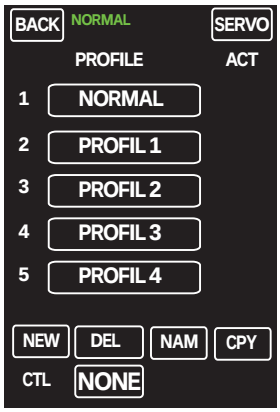


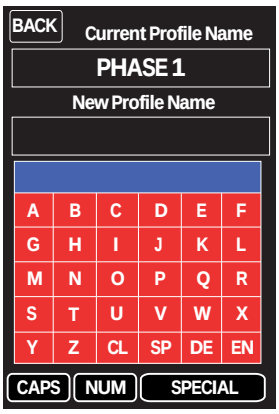
PUMPING

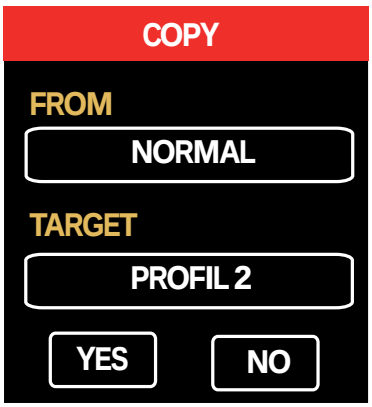
Automatic throttle activation menu. Set throttle strength and delay time to protect motor during refueling.

POS: To set the strength of the throttle activation, select the percent button below POS. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).
DELAY: To set delay time between throttle activations, select the percent button below DELAY. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0.5s).
ACT: Press **ON** or **INH** (inhibit/off) to switch the activation function on or off.
CTL: Assign this function to a switch. Refer to the **SW SET** chapter for additional information on how to program switches.

PROFILE







Set up to five different profiles for the model memories. Create names and assign settings to a programmable switch. (Refer to the **SW SET** chapter for additional information on assigning switches.)

Settings that have been changed in the other menus will be automatically populated in the assigned profile.

Change profile name:

1. Select profile to be renamed by highlighting any line, 1 - 5.
2. Press the **NAM** button at the bottom of the screen.
3. The current name appears in a field at the top of a new screen. Use the red keypad to input a new name.
4. To save, press **EN** in the lower right side of the keyboard.
5. Press the **BACK** button to return to the main menu.

Copy profile:

1. Select the profile to copy by highlighting the profile name.
2. Press **CPY**. A pop-up window will appear.
3. To select the target profile, tap to scroll through the saved profiles. Press **YES** to confirm selection.

Delete profile:

1. Select the profile to delete by highlighting the profile name.
2. Press **DEL**. Settings will reset to factory default values. **WARNING: profile will be deleted without confirm query!**

S/SPEED

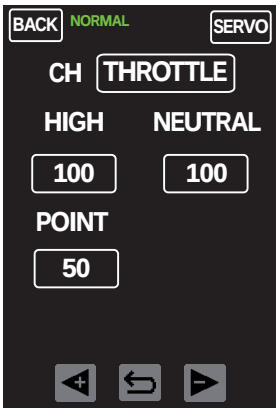
Steering and throttle servo speed settings menu.

For the steering servo, you can set the speed for left and right and for forward and return travel separately.

For the throttle servo, a point can be set at which the speed is set in two steps.

STEERING

Highlight the field to be adjusted by pressing the appriporiate button in the **LEFT** or **RIGHT** columns and **TURN** or **RETURN** lines. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (100).

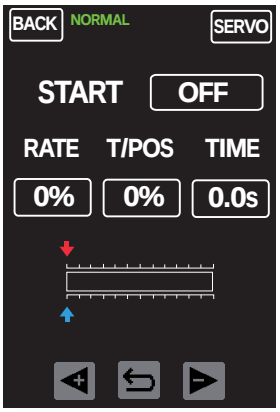


THROTTLE

HIGH or **NEUTRAL:** Select the field to be adjusted by pressing the appriporiate button. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (100).

POINT: To set the switchover point between both ranges, highlight the button under POINT. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (50).

START



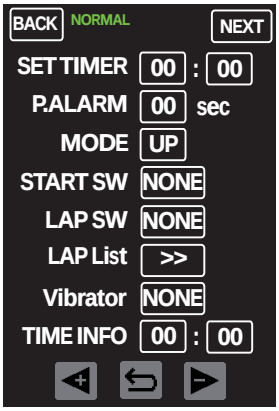
Automatic start function settings menu.

RATE: To allow a quick start without spinning the drive wheels while the throttle is held on a specific value, press the percent button below RATE. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

T/POS: To use this function, first assign a switch that sets the START function to READY. When the throttle lever exceeds the set trigger point, the READY (standby) mode is activated. To adjust the trigger position, press the percent button below T/POS. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

TIME: To delay the response of this function when exceeding the trigger point, select the button below TIME. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0.0s).

TIMER



Timer and date settings menu. To toggle between the **Timer** and **Date** display, press the **NEXT** button at the top of the screen.

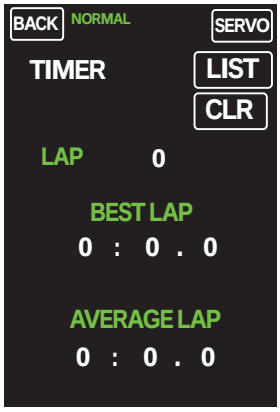
TIMER Display

P.ALARM: To set the time for a pre-alarm that will be active before the main alarm, select the button in the P.ALARM line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (00).

MODE: To toggle between mode options, press the button in the MODE line. Choose **UP** for increasing count, **DOWN** for countdown and **LAP** for lap timer. If **LAP** is selected, the **START SW** function will automatically set to **TH**, allowing the timer to start through the throttle lever.

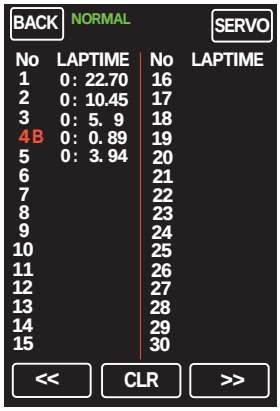
START SW: This function is only available in **UP** or **DOWN** mode. Pressing the button in the START SW line brings up the SW SET menu. For additional information on these settings, refer to the **SW SET** chapter.

LAP SW: To assign a start/stop function to the timer, press the button in the LAP SW line. This brings up the SW SET menu. For additional information on these settings, refer to the **SW SET** chapter.

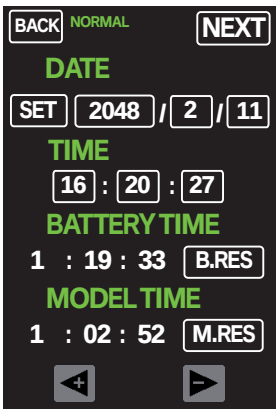


LAP List: To view total laps, best lap time and average lap time, press the right-arrows button on the LAP List line to view the statistics display. To reset to zero, press the **CLR** key.

LIST: The lap times list has 120 memory slots. To view a full list of lap times, press the button at the top of the statistics display. The best lap is alway marked in red and highlighted with a **B**. Scroll through the list by pressing the **<<** and **>>** arrow keys at the bottom of the screen. Clear the list by pressing the **CLR** key at the bottom of the screen.



Vibrator: To set or change alarm vibrations, press the button in the Vibrator line. There are five different vibration options to scroll through.



DATE/TIME

Date/Time and Battery/Model Time settings menu.

From the **TIMER** menu, press the **NEXT** button at the top of the screen.

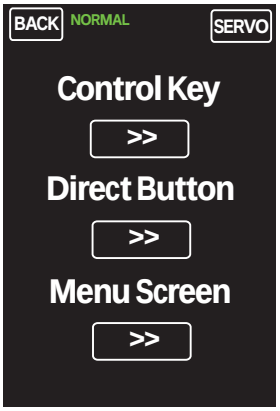
DATE/TIME

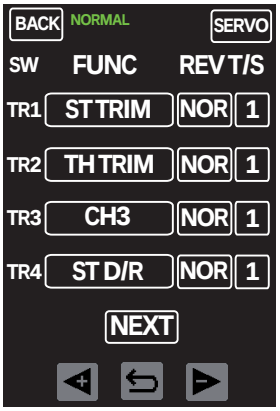
To set the date and time, press the **SET** button under the DATE line. This unlocks the Year, Month, Day, Hour, Minute and Second fields. Select to highlight and press the **<+** or **->** keys to raise or lower value. To save and lock the fields, press **SET** again.

BATTERY/MODEL TIME

To reset the battery or model times to zero, press the **B.RES** or **M.RES** buttons.

SW SET





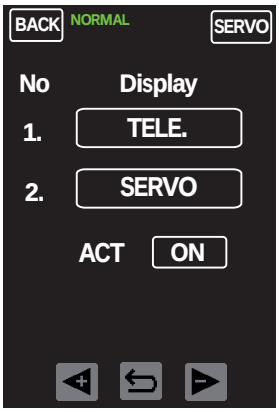
Control Key

Use this menu to assign functions to trim buttons, switches and rotary controls. Some buttons and switches have default functions assigned. All buttons, switches, controls and defaults can be assigned as follows:

1. Press the Control Key arrow **>>** button to bring up the Function screen.
2. Press the **NEXT** button to scroll through the screens.
3. Press the control button to select the desired function for the control. Depending on the control there are different functions available here. Assigned functions are greyed out. (See list on the next page.)
4. Press the **<+** or **->** keys to select the function.

REV/NOR: To change between normal and reverse switch function, press the button under REV to toggle between options.

T/S: To set the increase number for each click or step, press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (1). **Only available on trims and rotary controls.**

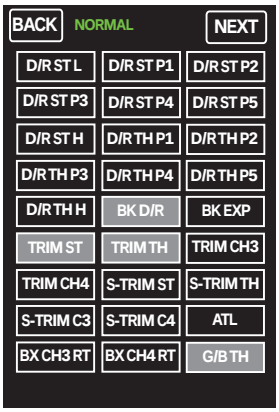


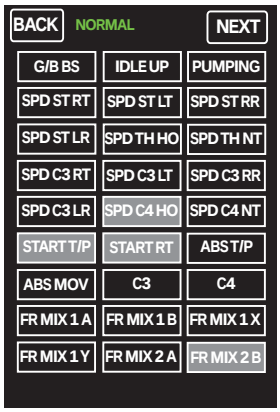
Direct Button

To assign a menu shortcut function to buttons S1, S2 (under the display):

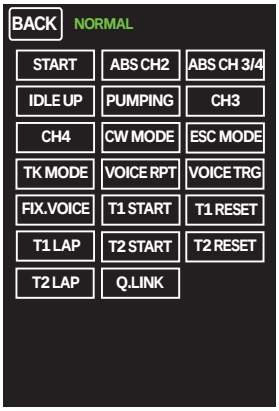
1. Press the button on line 1 to set S1; line 2 to set S2.
2. Press the **<+** or **->** keys to scroll through display options.
3. To activate settings press the **ON** or **OFF** button on the ACT line.

Select 1 to 3 for TR 1 - 5 / DV

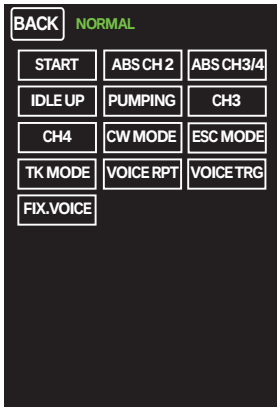




Select for PS 1 + 3



Select for PS 2



Menu Screen

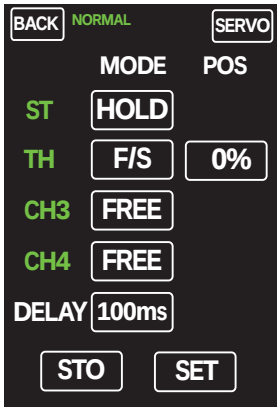
The green marked area represent the first main menu page, the yellow marked area indicates the second main menu page, the blue marked area indicates the third main menu page (see **Main Menu** section)

RES: Press the button at the top of the screen to return all functions to default factory presets. A warning screen will pop-up to verify this option. Press **YES** or **NO** to continue.

Change the display assignation:

1. Press on the field to be changed. The function name will apper on the button in the upper left corner of the screen.
2. Available buttons for this field will appear crossed out in green.
3. Select the desired function button. Confirm change by pressing the button in the upper left corner of the display screen.
4. To delete or unselect, tap the **BLANK** button in the upper right corner of the display screen.

FAIL SAFE



Fail Safe settings menu. In case of receiver signal loss or interruption, assign the servo channel to a predefined position. For example, set an engine-powered model to idle (or an electric-powered model to shut off), so the model does not move uncontrollablly.

FREE: Channel is empty with no failsafe assigned.

HOLD: Holds the servo in the previous position.

F/S: The servo automatically moves to a defined position

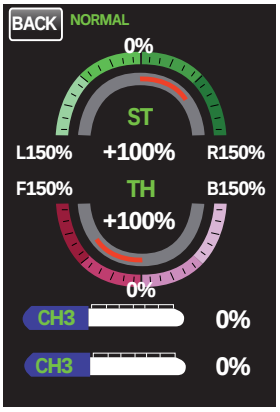
To set the position: Press and change the channel line button to **F/S**. A percent value button will appear to the right in the POS column. Press the percent button to select and set servo position by moving the related control. Press the **SET** button to confirm. The POS button displays the assigned position of the servo. Press the **STO** button to save all settings before exiting.

DELAY: To set the delay time between signal loss and failsafe launch, press the button on the DELAY line to choose between: 50ms, 100ms, 250ms, 500ms, 750ms and 1.0s. Press the **STO** button to save all settings before exiting.

Attention

To store settings, press the **STO** button on the bottom of the screen before exiting this menu. Settings will not be saved until the STO button is pressed and the "**Position stored**" confirmation message appears.

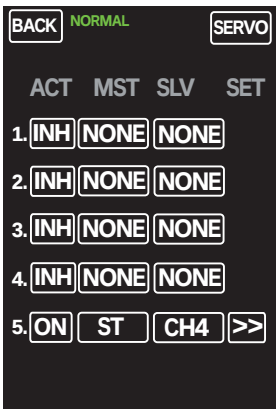
SERVO (S View)



Servo monitor (display only).

This display shows the servo travels of all four control channels. Access this display by pressing the Servo icon in the main menu, or by pressing the Servo button in the upper right corner of most submenu displays.

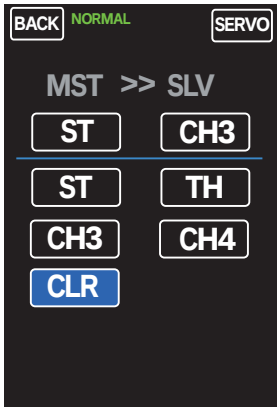
P/MIX



Mixer setup menu. Assign linear mixers to line numbers 1 and 2; curves mixers to line numbers 3 through 5. Activate mixers by pressing the first button in the number line to change from **INH** (inhibit/off) to **ON**.

Pressing the buttons in the **MST** or **SLV** columns will open a new display screen. To assign the origin (MST/master) and the target (SLV/slave), highlight the appropriate button above the blue line and select the applicable channel button below. To clear the selection press the **CLR** button.

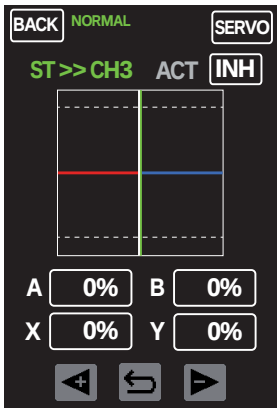
Return to the P/MIX menu screen by pressing the **BACK** button. An arrow **>>** button will appear in the SET column.



Press the arrow **>>** button for the linear and curve settings menu. The **Linear menu** is only accessable on lines 1 and 2; the **Curve menu** is only accessable on lines 3 through 5.

Linear menu (Img.1)

- Select the "**A**" percent button to set the left (red) line and the "**B**" percent button to set the right (blue) line. Use the **<+** or **->** keys or press the curved arrow key to reset to the default value (0%).
- Press the "**X**" or "**Y**" percent buttons to move the line on the X or Y axis via the **<+** or **->** keys. Press the curved arrow key to reset to the default value (0%).
- Move the throttle lever or the steering wheel. The green line moves horizontally through the diagram.

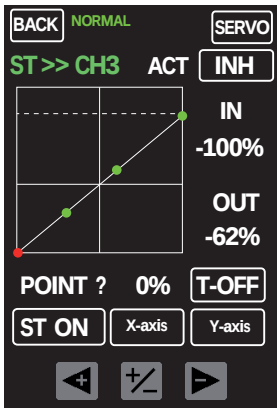


Img.1

Curve menu (Img.2)

Point setting step by step:

1. Press the button "**ST OFF**" to switch to "**ST ON**".
2. Move the throttle lever or the steering wheel. A green line moves horizontally through the diagram.
3. Press the **+/-** key to set a new point. To delete, press the point to highlight it red and press the **+/-** key.
4. Set up to a maximum of 5 points.

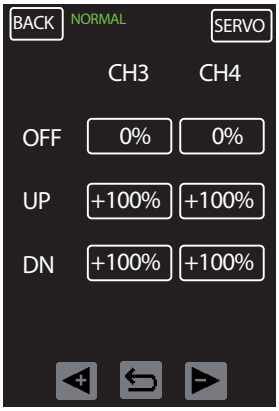


Img.2

Point moving step by step:

1. Press the button "**ST OFF**" to switch to "**ST ON**".
2. Select the point to be reallocated by moving the steering wheel or the throttle lever until the point is highlighted red.
3. Select the **X-axis** or the **Y-axis** button. Reposition the point using **+/-** key.
4. The mixer is not linear and follows the set curve.

AUX



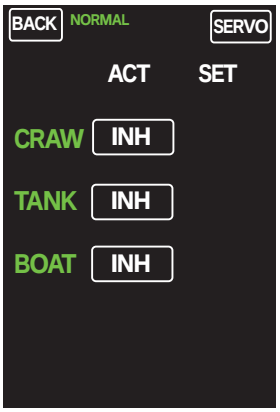
Additional channel settings menu. Set the servo deflections to OFF (center) and UP/DN on two additional control channels (CH3 and CH4).

OFF: To set the central point, press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

UP: To set the upper end point, press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

DN: To set the lower end point, press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%).

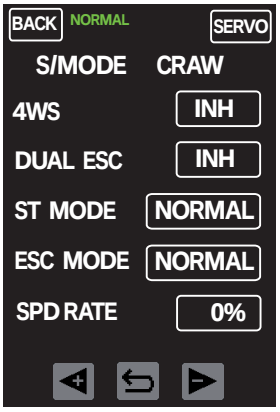
S/MODE



Various model type setup menu. Preprogrammed mixers tuned to the characteristics of model types crawler, track vehicle and boat.

To activate the model function, press the **INH** (inhibit/off) button to change to **ON**. An arrow **>>** button appears in the SET column.

Press the arrow **>>** button to bring up a settings menu specific to the vehicle type.



CRAWLER

4WS: To use all wheel steering activation on Channels 1 and 3, press **INH** (inhibit/off) button to change to **ON**.

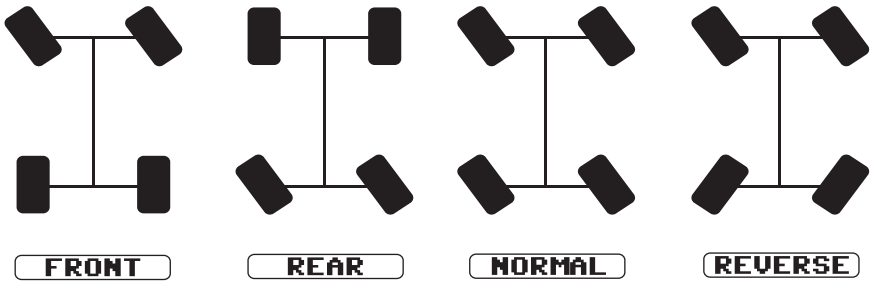
DUAL ESC: To use two independent drive motors with 2 speed controllers on channel 2 and 4, press **INH** (inhibit/off) button to change to **ON**.

ST MODE: To adjust active 4WS steering, press to select the button in the ST MODE line. Scroll between options by pressing the **<+** or **->** keys. Press the curved arrow key to reset to the default (FRONT). (see image on next page).

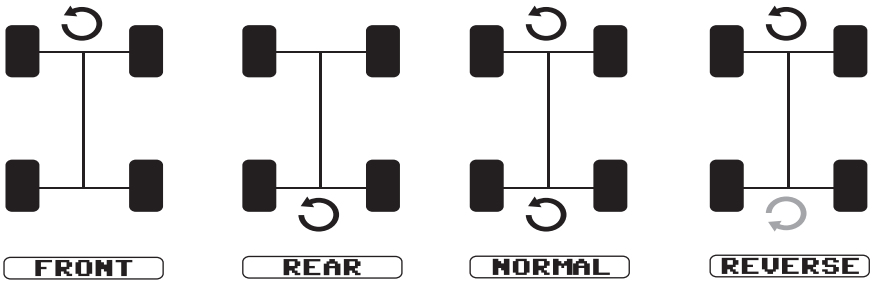
ESC MODE: To adjust active DUAL ESC in 2 motors, press to select the button in the ESC MODE line. Scroll between options by pressing the **<+** or **->** keys. Press the curved arrow key to reset to the default (FRONT). (See image on next page.)

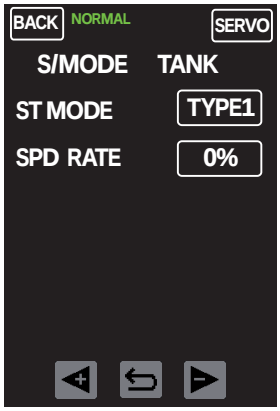
SPD RATE: To set the maximum speed for both speed controllers in DUAL ESC mode, press to select the percent button in the SPD RATE line. Press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0%). (See image on next page.)

ST MODE (steering)



ESC MODE (2 drives)



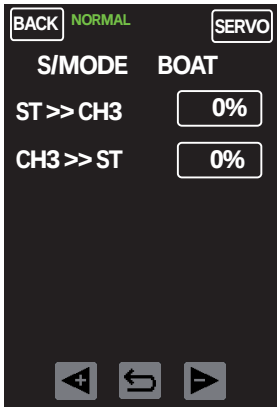


TANK

Use the ST MODE to mix the throttle and the steering on a tracked vehicle and emit on Channel 1 and 2. Actuate steering by adjusting SPD RATE of the left and right tracks speed.

ST MODE: Select the button to highlight and press to choose between: **TYPE 1** = standing rotation only, **TYPE 2** = driving rotation only. Press the curved arrow key to reset to the default (TYPE1).

SPD RATE: To set the maximum speed of the drive, highlight the percent button in the SPD RATE line and press the **<+** or **->** keys to increase or decrease value. Press the curved arrow key to reset to the default (100%).



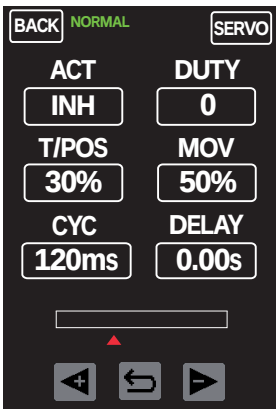
BOAT

Use these mixers to actuate a second drive (ESC).

ST -> 3CH: To adjust the mixing rate from steering to Channel 3, press the **<+** or **->** keys to increase or decrease value. Press the curved arrow key to reset to the default (0%).

3CH -> ST: To adjust the mixing rate from Channel 3 to steering, press the **<+** or **->** keys to increase or decrease value. Press the curved arrow key to reset to the default (0%).

A.B.S



A.B.S setup menu.

A.B.S. enables a better braking response, since the brake is actuated in pulses.

ACT: Press the button under ACT to choose between **INH** (inhibit/off) and **ON**.

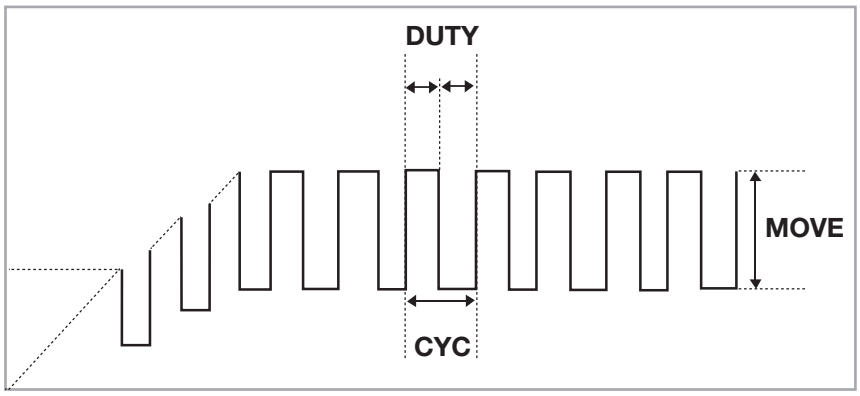
DUTY: To set the atio between pulse and pulse pause (see image below), press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0).

T/POS: To set the point on the brake lever path from which the A.B.S. will become active, press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (30%).

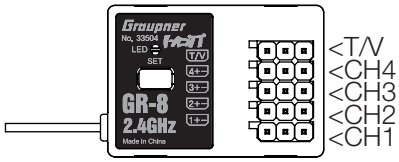
MOV: To set the pulse height (see image below), press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (50%).

CYC: To set the pulse length (see image below), press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (240ms).

DELAY: To set the delay time of the A.B.S. response (0 - 1 s), press the **<+** or **->** keys to raise or lower value. Press the curved arrow key to reset to the default value (0.00s).



Operating receiver GR-8



Description LED indicator

	Red LED	Green LED
Not bound	Flashing	Off
Bound	Off	On
Error	Flashing	On
Binding	Flashing	Flashing

Channels function

	Function	Alternative	
CH 1	Channel 1 signal output	SUMD-V2 BUS system	Battery plug connection
CH 2	Channel 2 signal output	SUMD-V2 BUS system	Battery plug connection
CH 3	Channel 3 signal output	SUMD-V2 BUS system	Battery plug connection
CH 4	Channel 4 signal output	SUMD-V2 BUS system	Battery plug connection
T/V	Ext. temp./voltage sensor	------	

The power source for the receiver is connected through channel 1 to 4. If all of the channels are used, use a Y-cable on one channel.

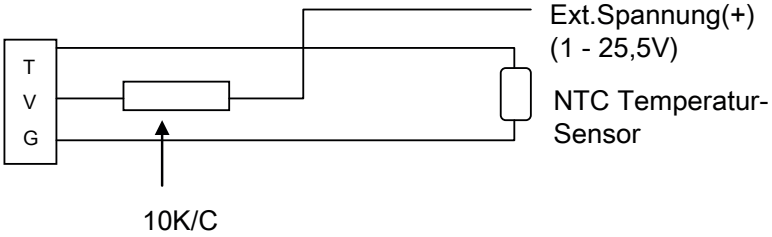
CH 1+2: Connected the steering servo.

Channel 2: Connected with the throttle servo of engine-powered models or with the speed controller of electric-powered models.

CH 3+4: Open channels freely assignable for special control functions.

T/V socket:

Used to connecting the optional external voltage and temperature sensor S8362. When reaching the warning thresholds, an alarm is generated (set the warning thresholds via Telemetry menu). Sensor and voltage of a battery must only be connected according to the following scheme:



ATTENTION: The receiver will be destroyed if you connect a battery directly to this socket without a pre-resistance. This socket is not suited for the power supply of the receiver.

GR-8 Receiver Telemetry Menu

```
RX DATA VIEW          >
S-QUA      :       100%
S-STR      :       100%
S-dBm      :     -28dBm
RX-TEMP    :      +43 C
LOSS PACK  :      403MS
BATT VOLT  :       4.9V
LOW VOLT   :       4.9V
```

Display screen (display only)

S-QUA: transmission quality
S-STR: transmission power
S-dBm: transmission power in dBm
RX-TEMP: receiver temperature
LOSS PACK: lost data packets in milliseconds
BATT VOLT: receiver voltage
LOW VOLT: warning threshold for minimum receiver voltage

```
RX SETUP    V0.04    <>
>AL RX-V(  4.9V):   3.5V
 AL RX-T( +43°C):   64°C
 AL EX-V(  0.0V):   AUTO
 AL EX-T(  --°C):   10 °C
 LANGUAGE    :ENGLISH
```

Warning Thresholds and Telemetry Language Setting Screen

AL RX-V: receiver voltage warning threshold
AL RX-T: receiver temperature warning threshold
AL EX-V: ext. voltage sensor warning threshold
AL EX-T: ext. temperature sensor warning threshold
LANGUAGE: language setting (telemetry menu only)
The current value is shown in brackets

```
CH FUNCTION          <>
>CH1  SUMD-V2      300US
 CH2  SUMD-V2      300US
 CH3  SUMD-V2      300US
 CH4  SUMD-V2      300US

*FAST SIGNAL BUS 3.0M
```

Channel Properties Setting Screen (refer to **RF SET** section)

Settings:

USR1m50 - ULTRA SIGNAL 1.5msec
FSR3m00 - FAST SIGNAL 3.0msec
SUMD-V2 - FAST SIGNAL BUS 3.0msec
NSR6m00 - NORMAL SIGNAL 6.0msec
NSR12m0 - NORMAL SIGNAL 12.0msec
NSR24m0 - NORMAL SIGNAL 24.0msec

```
DEVICE LIST VIEW     <>
No DEVICE       CH   PORT
>00 RECEIVER    --    --
 01 --------    --    --
 02 --------    --    --
 03 --------    --    --
 04 --------    --    --
 05 --------    --    --
```

Connected Components Display (display only)
(Refer to **Telemetry Menu** section)

```
FAIL SAFE            <>
>F/S MEMORY:         NO
 F/S DELAY :        50MS
 CH1(STR):HOLD
 CH2(THR): F/S      300US
 CH3(AUX):HOLD
 CH4(AUX):HOLD
```

Fail Safe Setting Screen

F/S MEMORY: To save the data in the receiver, select "**YES**. Press **ENTER** to confirm.
F/S DELAY: Fail Safe delay time
CH1(STR): FREE, HOLD, POSITION
CH2(TH): FREE, HOLD, POSITION
CH3(AUX): FREE, HOLD, POSITION
CH4(AUX): FREE, HOLD, POSITION
(Refer to **Fail Safe** section)

Firmware Update - Transmitter

NOTE

In case of transmitter firmware update, carefully observe the following instructions. Before every update it is recommend all model data on the SD card be saved externally (refer to M-SEL section).

UPDATE USING THE BACK-SIDE USB SOCKET

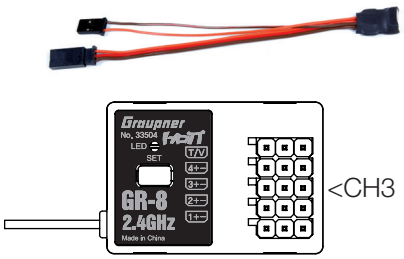
Use a PC or laptop with the Windows XP, Vista, 7 or 8 OS. Download an up-to-date software package from the Internet at **www.graupner.de** and unpack it onto a PC or laptop. Connect your switched-off transmitter with the PC or laptop by using the USB cable (USB-A to mini-B-USB, 5 pole), which is supplied as a standard accessory. Plug one end of the USB cable directly into the 5 pole micro-USB port at the rear side of the transmitter and the other end into a free USB port of the computer. For more information, please refer to the update instructions PDF file located in the respective software package.

Firmware Update - Receiver

Updates to the receiver's firmware are made via the telemetry socket using a PC running Windows XP, Vista or 7 with the included USB interface (order **No. 7168.6**), and adapter lead, (order **No. 7168.6A** or **7168.S**).

The programs and files required can be found in the Download area for the corresponding products at:

www.graupner.de.

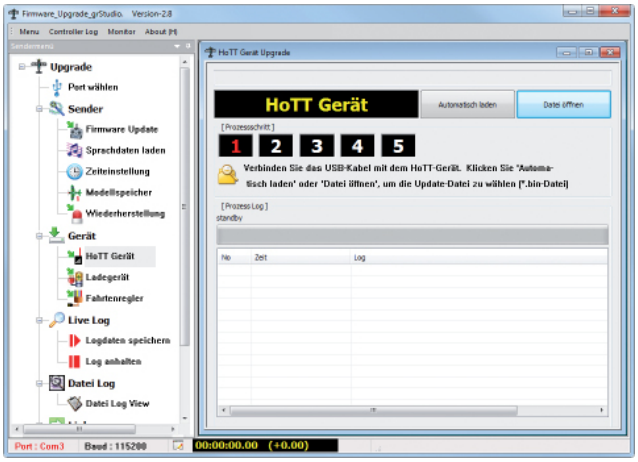


Connect the adapter lead to the USB interface. The connectors are reverse polarity protected: note the small chamfers on the sides. Never use force – the connectors should engage easily.

Connect the adapter lead to the receiver's socket 3 (CH 3). The connectors are reverse polarity protected: note the small chamfers on the sides. Never use force – the connectors should engage easily.

Update process

Ensure that the adapter lead is plugged into the receiver. Start the Firmware Update Studio.



Select the correct COM-Port "**Silicon Labs CP210x USB to UART Bridge**" under "**Port Select**" to which the USB cable is connected.

To download the file, go to the menu and select the item: "**HoTT device**". In the pop-up window, press the "**Auto Download**" button. Once the firmware file is displayed, start the update by pressing the "**File Download**" button.

If the file has been previously downloaded, go to the menu and select the item: "**HoTT device**". In the pop-up window, press the "**File Download**" button and select the previously-downloaded firmware file with the ***.bin** extension. Once the firmware file is displayed, start the update by double-clicking on the file.

Battery Disposal

Disposal notes

This symbol on the product, user manual or packaging indicates that **this product must not be disposed of with other household waste**. It must be disposed of or recycled at a facility that accepts electrical and electronic equipment.

Materials are recyclable as marked. You are making an important contribution to environmental protection by recycling materials for reuse.

Batteries and accumulators must be removed from the device and disposed of or recycled at a proper disposal centers. Contact local authorities for the appropriate facility in your area.

Care and Maintenance

Notes on care

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

Warranty

Graupner USA OPENHOBBY LLC at 3941 Park Drive Suite 20-571, El Dorado Hills, CA 95762 warranties this product from the date of purchase 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 wear, overloading, incorrect accessories or improper handling are excluded from the warranty. The legal rights and claims are not affected by this warranty. Please check defects before making a claim or send the product. If the item is found to be free of defects, we may charge shipping and handling fees.

The present construction or user manual is for informational purposes only and may be changed without prior notice. The most current version can be found at **www.graupnerusa.com** on the relevant product page. ***Graupner USA OPENHOBBY LLC*** assumes no responsibility or liability for any errors or inaccuracies that may appear in construction or operation manuals.

Graupner accepts no liability for printing errors.

IC warning

This device complies with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) This device may not cause interference and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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.

NOTES