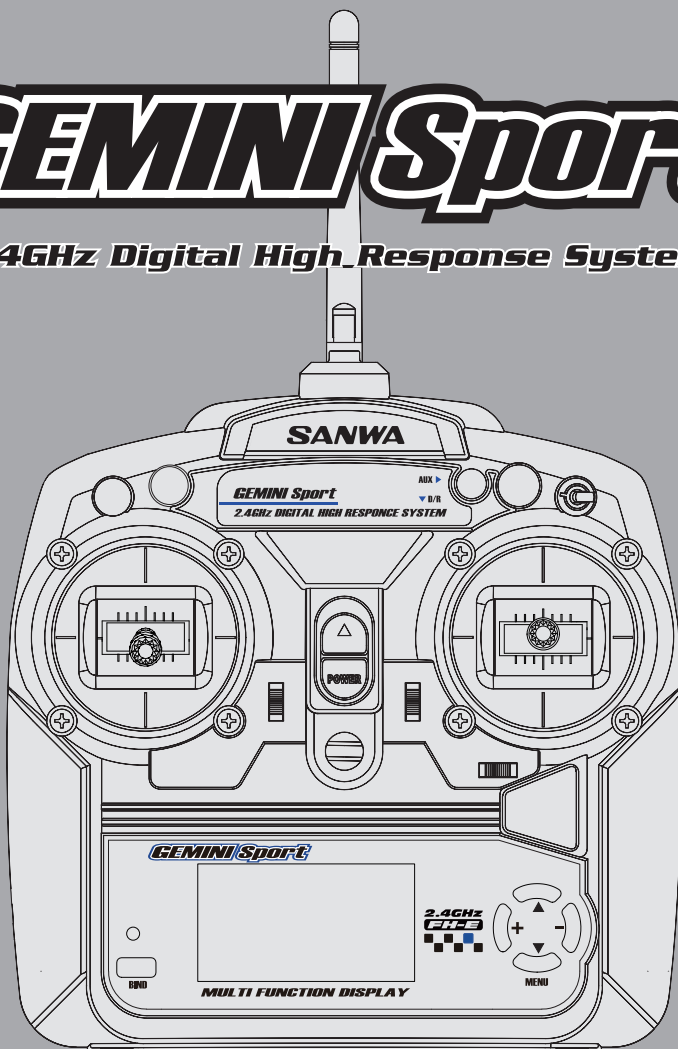


SANWA

GEMINI Sport

2.4GHz Digital High Response System



2.4^{FH-E}**GHZ**

Spread Spectrum
Technology By **SANWA**

User's Guide

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INTRODUCTION

Congratulations! We appreciate your purchase of the **GEMINI Sport** 3-Channel 2.4GHz FHSS-E radio control system. This User's Guide is intended to acquaint you with the many unique features of your new radio control system. Please read this User's Guide carefully so that you may obtain maximum success and enjoyment from the operation of your new radio control system.

The **GEMINI Sport** 3-Channel 2.4GHz FHSS-E radio control system has been designed for the entry level user, but still retains the easy programming, precise control and ergonomic layout found in our higher-end systems.

The **GEMINI Sport** boasts a number of features that will make it perfect for use with both cars, trucks and boats. We wish you the best of success and fun with your new purchase.



Additional SANWA 2.4GHz receivers can be purchased and paired with the **GEMINI Sport** transmitter.

Please note that due to differences in the implementation of 2.4GHz technology among different manufacturers, only SANWA brand 2.4GHz FHSS-E surface receivers are compatible with your radio control system.

Please visit your local SANWA dealer or our website at

<http://www.sanwa-denshi.com> for more information.

PACKAGING

The packaging of your **GEMINI Sport** 2.4GHz FHSS-E radio control system has been specially designed for the safe transportation and storage of the radio control system's components. After unpacking your radio control system, do not discard the packaging materials. Save the packaging materials for future use if you ever need to send your radio control system to us for service or to store your radio control system if you don't plan on using it for an extended period of time.

SERVICE AND SUPPORT

This is warranted against manufacturer defects in materials and workmanship, at the original date of purchase. This warranty does not cover components worn by use or damage caused by improper voltage, tempering, modification, misuse, abuse, improper wiring, reverse polarity, moisture or using outside its intended scope of use.

Terms of this warranty can vary by region. Please read the warranty card included with your radio control system for specific warranty information.

If you have any questions or concerns, we're here to help. If you encounter a problem with your radio control system, first check the Troubleshooting Guide on Page 19.

If you require further help that cannot be solved using The Troubleshooting Guide, or if you have technical questions, please contact SANWA service center in your region.

For a complete list of distributors in your region, please visit www.sanwa-denshi.com/rc/distributors.html.

Factory Service: Sanwa Electronic Instrument CO., LTD. 1-2-50 Yoshida-Honmachi Higashiosaka, Osaka, 578-0982 Japan Telephone: 81-729-62-1277 Fax: 81-729-64-2831 Email: rcintl@sanwa-denshi.co.jp

Product features and specifications can vary by region. Not all products are legal for use in all regions.

SAFETY

This is a high-output, full-range radio control system that should well exceed the range needed for any surface model. For safety, the user should perform a range test at the area of operation to ensure that the radio control system has complete control of the model at the farthest reaches of the operational area. Rather than operating the model, we recommend that the user enlist the help of a fellow modeler to walk the model to the farthest reaches of the track (or for boats, to walk the shore line well in excess of the operational distance of the boat), then test for proper operation.

- Be certain to read this User's Guide in its entirety.
- 'Safety First' for yourself, others and your equipment.
- Observe all the rules of the field, track or lake where you operate your radio control equipment.
- If at any time during the operation of your model, should you feel or observe erratic operation or abnormality, end your operation as quickly and safely as possible. DO NOT operate your model again until you are certain the problem has been corrected.
- Your model can cause serious damage or injury. Please use caution and courtesy at all times.
- Do not expose the radio control system to water or excessive moisture.
- Waterproof the receiver and servos by placing them in a water-tight radio box when operating R/C model boats.
- If you have little to no experience operating R/C models, we recommend you seek the assistance of an experienced modeler or your local hobby shop for guidance.
- The Low Voltage Alarm will sound when the transmitter battery voltage drops to the minimum threshold of 4.6 volts. If this occurs, stop using the transmitter as soon as is safely possible, then replace the transmitter batteries.

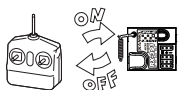


This radio control system operates on the 2.4GHz frequency band. The 2.4GHz connection is determined by the transmitter and receiver pair. Unlike ordinary crystal-based systems, your model can be used without frequency control.

2.4GHZ FREQUENCY BAND PRECAUTIONS

- The 2.4GHz frequency band may be used by other devices, or other devices in the immediate area may cause interference on the same frequency band. Always before use, conduct a bench test to ensure that the servos operate properly. Also, conduct checks with the transmitter as distant as possible from your model.
- The response speed of the receiver can be affected if used where multiple 2.4GHz radio controllers are being used, therefore, carefully check the area before use. If response seems slow during use, stop your model immediately and discontinue use.
- If the 2.4GHz frequency band is saturated (too many radio controllers on at once), as a safety precaution, the radio control system may not bind. This ensures that your radio control system does not get hit by interference. Once the frequencies have been cleared, or the saturation level has dropped, your radio control system should be able to bind without any problems.

TRANSMITTER PRECAUTIONS



- To prevent possible damage to your servos or a runaway model, turn the transmitter ON first, then turn the receiver ON. After running your model, turn the receiver OFF first, then turn the transmitter OFF.
- Before use, double-check that the transmitter and receiver batteries have sufficient power.
- The transmitter features an internal antenna installed inside the front portion of the transmitter. Do NOT cover the front of the transmitter in any way during use! Doing so can block the RF signal, resulting in loss of control of your model.



- During use, hold the transmitter so that its orientated as close to vertical as possible at all times. This provides the best RF signal between the transmitter and the receiver. Try not to ever 'follow' your model with the transmitter, as this can result in a weakened RF signal.
- Do not expose the transmitter or any other components to excessive heat, moisture, fuel, exhaust residue, etc.



- Do not press the Bind Button during use. The signal is interrupted while the Bind Button is pressed. It may also require a short time to restore the signal after releasing the Bind Button, which can be dangerous.
- If the outer case becomes dirty, it can be cleaned with a soft dry cloth. If the outer case becomes soiled, it can be cleaned with a damp cloth and liquid detergent.



- Do not use any solvents to clean the outer case. Solvents will damage the finish.


RECEIVER PRECAUTIONS


- The antenna wire is delicate, therefore, handle with care. Do not pull on the antenna wire with force.
- Do not cut the antenna wire shorter or extend the antenna wire.
- The antenna wire can be bent into gentle curves, however, do not bend it acutely, or repeatedly bend it, or the antenna wire can be damaged.
- The antenna wire should be installed into a vertical plastic tube per your particular model's assembly instructions. Keep the receiver antenna as far away from the motor, battery and ESC as possible.
- There is a danger of runaway operation if connectors shake loose during use. Make sure that the receiver, servo(s) and switch connectors are securely fitted.
- The receiver is susceptible to vibration, shock and moisture. Take appropriate measures to protect against vibration and moisture. Failure to take appropriate measures could result in runaway operation or damage to the receiver. We suggest wrapping the receiver in shock-absorbing foam or securing it with double-sided foam tape when installing it into your model.
- When installing the receiver and routing the receiver antenna, avoid contact with any carbon or metal chassis components. Contact between metal parts mounted on a model can result in electrical noise, which can adversely effect receiver performance and possibly result in runaway operation or damage to your model.
- With electric-powered models, be sure to fit any brushed motors with a noise suppression capacitor. Without a noise suppression capacitor, excessive electrical noise generation can cause runaway operation and/or result in damage to your model.
- The receiver does not feature BEC circuitry. If using an electronic speed control, verify that it features BEC circuitry to drop the receiver voltage between 4.8v to 7.4v.

SERVO CONNECTORS

The receiver included with your radio control system uses SANWA 'Z' connectors, which are electronically compatible with the servos of other radio control system manufacturers. The connectors are rugged, but should be handled with care.



 If using another brand of servo, double-check the polarity of the servo connector prior to plugging it into the receiver.

 When unplugging the servo connector, don't pull on the servo wire itself. This could result in damage to the servo wire pins in the plastic plug. Always grasp the plastic connector itself.

SYSTEM FEATURES

- 3-Channel Full-Range 2.4GHz FHSS-E Digital Proportional Computer Radio for Cars, Trucks and Boats
- Compatible with all SANWA 2.4GHz FHSS-E Surface Receivers
- 4-Cell Battery Holder for Lighter Weight and Improved Balance
- Easy-to-Read LCD Screen
- 10 Model Memory
- Servo Reversing All Channels
- Dual Rate Steering
- End Point Adjustment All Channels
- Exponential Steering and Throttle
- Anti-Lock (ABS) Braking
- Digital Trim Display
- Servo Sub-Trim Steering and Throttle
- 3-Character Model Naming
- Battery Voltage Monitor
- Ergonomic, Comfortable Feel
- Textured grip to prevent slipping
- Battery-Less Memory Retention
- Throttle Fail Safe
- Low Voltage Alarm
- Over 180 meter Range
- Compatible with Analog or Digital Servos

SYSTEM SPECIFICATIONS

Transmitter:

- Model: GEMINI SPORT
- Output Power: 100mW (FH-E)
- Nominal Input Voltage: 4.8v ~ 6.0v
- Operating Voltage Range: 4.0v ~ 9.6v
- Dry Weight: 290g
- Frequency: 2.4GHz FHSS-E

Receiver:

- Model: RX-391WP
- Nominal Input Voltage: 4.8v ~ 7.4v
- Weight: 9.5g
- Dimensions: 24.0 x 37.0 x 18.2mm
- Frequency: 2.4GHz FHSS-E
- Fail Safe Support: Yes (Throttle)


TRANSMITTER BATTERY RECOMMENDATIONS

The transmitter's Operating Voltage Range is 4.0 ~ 9.6 volts. This allows you to use several different battery options (not included), depending on your preference.

Alkaline - In the default configuration, the transmitter is designed to be powered using four 'AA' Alkaline batteries. This results in a transmitter that is lightweight and well-balanced for unmatched comfort.

Ni-Cd/Ni-MH - Rechargeable Ni-Cd or Ni-MH batteries of desired capacity can be used in place of the Alkaline batteries. Using rechargeable Ni-Cd or Ni-MH batteries is more convenient and cheaper in the long run. The higher capacity batteries will also provide longer usage time than most Alkaline batteries.

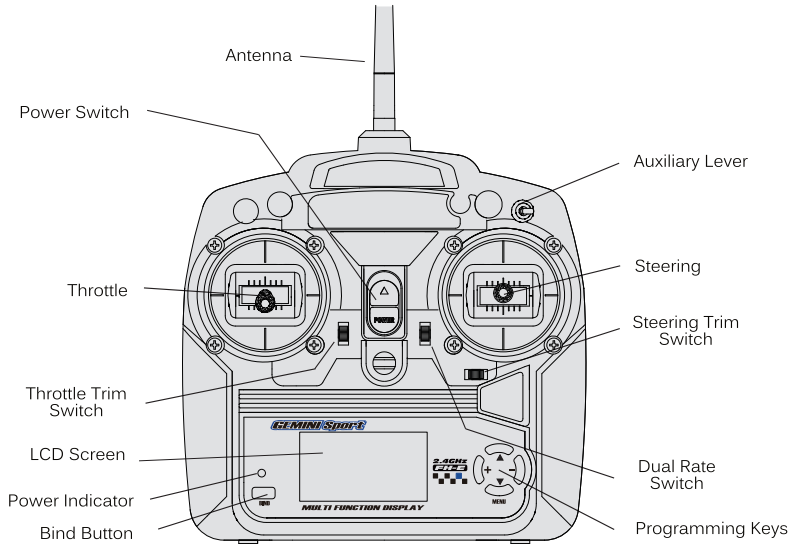
Li-Po or Li-Fe - A 2 cell Li-Po battery pack or a 2 cell Li-Fe battery pack can not be used to power the transmitter.

 Rechargeable batteries will need to be charged with a dedicated charger outside of the transmitter. Transmitter power output, range and speed are the same, regardless of the battery voltage and type used. If using a Li-Po or Li-Fe battery pack, please observe the warnings in the *Battery Installation* section on page 7.

TRANSMITTER AND RECEIVER DIAGRAMS

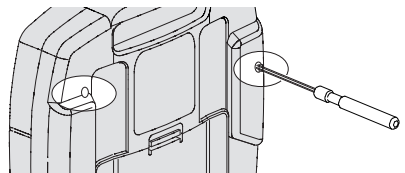
Use the diagrams below to familiarize yourself with the different parts of your MX-6 3-Channel 2.4GHz FHSS-E transmitter and RX-391 receiver. Descriptions of these parts can be found in the *Transmitter and Receiver Layout Descriptions* section on the next page.

- ⚠ This provides the best RF signal between the transmitter and the receiver.
Do NOT cover the front of the transmitter in any way during use!
Doing so can block the RF signal, resulting in the loss of control of your model.

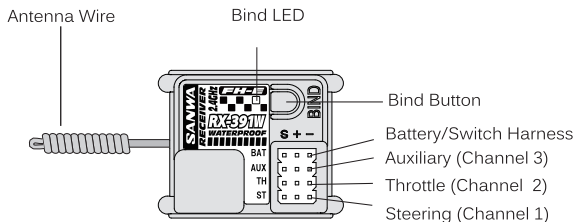


Stick Tension Adjustment

Using a 1.5 mm hex wrench, adjust the spring tension as shown in the figure,
* The spring tension is factory-set at the softest position
Spring tension increases as you tighten the hex screw.



RECEIVER



S = Signal + = Positive - = Negative

TRANSMITTER AND RECEIVER DIAGRAM DESCRIPTIONS

Antenna: Transmits the signal from the transmitter to the receiver in the model.

Antenna Wire: Receives the transmitter signal. The antenna wire should be installed through a nylon tube (antenna tube) in the vertical position for the best reception. Do not alter the length of the antenna or the operation of the receiver will be compromised.

Auxiliary Lever: Controls Auxiliary channel 3 High and Low servo travel.

Battery Compartment: Houses the four 'AA' Alkaline cells that power the transmitter.

Bind Button: Used in the process of binding the transmitter and receiver.

Bind LED: Displays the current status of the receiver.

Dual Rate Switch: Used to adjust Steering Dual Rate quickly and easily while your driving.

LCD Screen: The heart of the programming and display features of the transmitter. All programming and transmitter display functions are shown on the LCD screen.

Power Indicator: Illuminates red, indicating the transmitter is turned ON.

Power Switch: Turns the transmitter ON and OFF.

Programming Keys: The programming keys consist of four different keys - the MENU UP key, the MENU DOWN key, the INCREASE key and the DECREASE key. These four keys are used to program the functions of your transmitter, select saved models and change the Modulation Type.

Steering Trim Switch: Used to adjust Steering Trim quickly and easily while you're driving.

Steering : Proportionally operates the model's right and left steering control.

Throttle : Controls the speed of the model, both forward and backward, or the model's brake.

Throttle Trim Switch: Used to adjust Throttle Trim quickly and easily while you're driving.

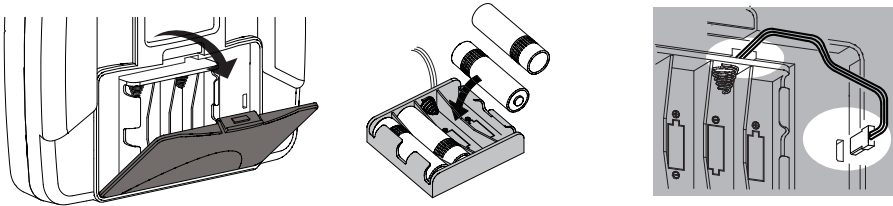
TRANSMITTER LOW VOLTAGE ALARM

The transmitter features a Low Voltage Alarm to warn you when the transmitter batteries need to be replaced or recharged (if using rechargeable batteries). The Low Voltage Alarm will sound when the transmitter batteries reach 4.6 volts. If the Low Voltage Alarm sounds while you are driving, you should stop as soon as it's safe, then replace or recharge the transmitter batteries.

If the Low Voltage Alarm sounds after replacing or recharging the transmitter batteries, there may be a problem with the transmitter.

BATTERY INSTALLATION

1) Remove the battery cover from the bottom of the transmitter by pushing firmly on the battery cover in the direction of the arrow.



2) Install four fresh 'AA' Alkaline batteries into the battery holder, making sure that the polarity is correct. The direction that each battery should be installed is molded into the bottom of the battery holder.

3) Slide the battery cover back onto the transmitter and push it firmly until it 'clicks' closed.

! If you choose to use rechargeable batteries (as described in the *Transmitter Battery Recommendations* section on page 5), they will need to be charged with a dedicated charger outside of the transmitter. Transmitter power output, range and speed are the same, regardless of the battery voltage and type used. If using a Li-Po or Li-Fe battery pack, please observe the following warnings:

- Do not use a 3S Li-Po or 3S Li-Fe battery pack or the transmitter will be damaged. Use only a 2S Li-Po or 2S Li-Fe battery pack.
- You will need to remove the dry cell battery holder in the transmitter and solder a plug on the transmitter's power wires to match your battery pack. Please observe correct polarity (red + positive and black - negative).
- Observe all safety precautions provided with your Li-Po or Li-Fe battery pack.
- Damage to the transmitter and/or receiver caused by improper use, wrong battery type, incorrect voltage or reverse polarity will not be covered under warranty.

RECEIVER CONNECTIONS AND MOUNTING

Use the diagram below to make the connections to the RX-391 3-Channel 2.4GHz FHSS-E receiver included with your MX-6 3-Channel 2.4GHz FHSS-E radio control system.

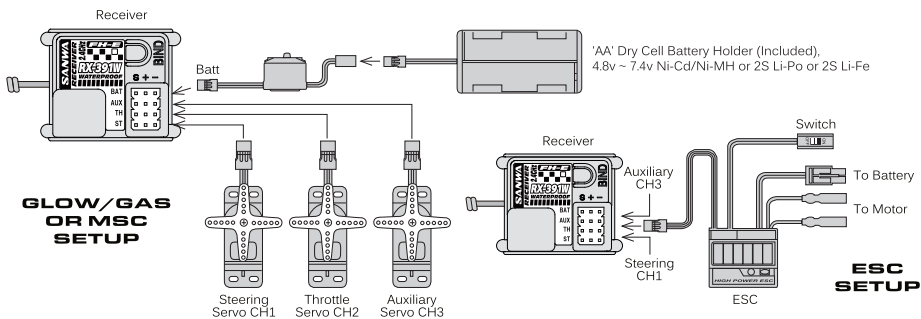
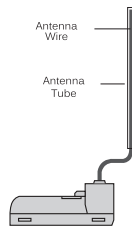
! The receiver's Nominal Input Voltage is 4.8 ~ 7.4 volts. A 2 cell Li-Po or 2 cell Li-Fe battery pack can be used to power the receiver without the use of a voltage regulator. In addition, this allows you to take advantage of the higher torque and speed provided by using 7.4 volt digital servos.

Use a 2 cell Li-Po or 2 cell Li-Fe battery pack ONLY if your servos are rated to handle the higher voltage.

! If you're using an Electronic Speed Control with BEC circuitry, verify that it reduces the voltage to between 4.8 and 7.4 volts before making your connections and turning your radio control system ON.

- We suggest binding the transmitter and receiver and making all receiver connections to check for correct operation prior to mounting the receiver in your model.
- The receiver should be mounted as far away from any electrical components as possible.
- Route the receiver antenna up through a plastic tube so that it is in the vertical position.
- To protect the receiver from vibration and other damage, we recommend wrapping the receiver in shock absorbing foam or using double-sided foam tape when installing it in your model.

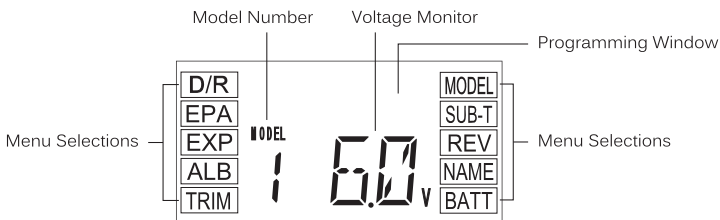
! As a safety precaution, set your model on a stand so the wheels are off the ground before turning on your radio control system or connecting your motor for the first time.



! Do not use servos rated for 4.8 or 6.0 volts with a 2S Li-Po or Li-Fe receiver battery pack or damage to the servos could result.

LCD AND PROGRAMMING KEYS

The transmitter features four programming keys that are used to facilitate transmitter programming. The programming keys consist of four different keys - the MENU UP key, the MENU DOWN key, the INCREASE key and the DECREASE key. These four keys are used to program the functions of your transmitter, select saved models and change the Modulation Type. This section summarizes the functions of each of the four programming keys, in addition to describing the main areas of the LCD screen



Model Number: Displays the model that is currently loaded into memory. Up to 10 different models can be stored.



Menu Selections: Displays the available Programming Menus. The currently Active menu will flash. The information displayed in the Programming Window will vary based on the menu selected.

Programming Window: Displays transmitter programming information. When the transmitter is turned ON, the BATT menu will be selected, the current model number will be shown and the Voltage Monitor will display the transmitter's current voltage.

Voltage Monitor: Displays the current voltage of the transmitter batteries. When the transmitter batteries reach 4.6 volts, the Low Voltage Alarm will sound.

LCD AND PROGRAMMING KEYS

Selecting menus and programming the transmitter is accomplished using the four programming keys.

PROGRAMMING KEY	NAME	FUNCTION
	▲ MENU UP	Cycles up through the list of menus and sub-menu functions you would like to make programming changes to. Press the MENU UP and MENU DOWN keys at the same time to display the Voltage Monitor.
	▼ MENU DOWN	Cycles down through the list of menus and sub-menu functions you would like to make programming changes to. Press the MENU UP and MENU DOWN keys at the same time to display the Voltage Monitor.
	+ INCREASE	Increases Programming Values and used to select models. Press the INCREASE and DECREASE keys at the same time to reset Programming Values to default.
	- DECREASE	Decreases Programming Values and used to select models. Press the INCREASE and DECREASE keys at the same time to reset Programming Values to default.

TRANSMITTER AND RECEIVER BINDING

The Binding function allows you to bind the transmitter and receiver pair. When new, it is necessary to pair the transmitter and receiver to prevent interference from radio controllers operated by other users. This operation is referred to as 'binding'. Once the binding procedure is complete, the setting is remembered even when the transmitter and receiver are turned OFF, therefore, this procedure usually only needs to be done once. Bind codes are unique to each transmitter and receiver pair, so you can bind multiple receivers to the same transmitter.

⚠ Before beginning the binding procedure, connect the switch harness, servos and the receiver battery to your receiver, using the diagram on page 8. Make sure that both the transmitter and the receiver are turned OFF.

⚠ The transmitter is compatible with FH-E receivers.

1) Turn the transmitter ON. The Power Indicator on the transmitter will illuminate red.

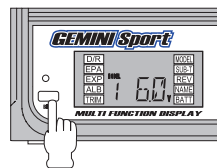
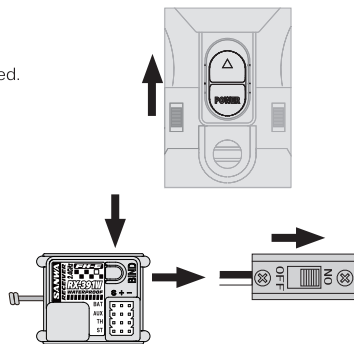
2) While holding down the Bind Button on the receiver, turn the receiver ON. The Bind LED on the receiver will flash slowly. Release the Bind Button. The Bind LED on the receiver will continue to flash slowly.

* * *

⚠ You must complete step 3 below within 10 seconds after pressing the Bind Button on the receiver or you will need to start the binding procedure over.

3) Quickly press the Bind Button on the transmitter. The Bind LED on the receiver will flash rapidly, go out momentarily, then illuminate solid blue, indicating the binding procedure is complete.

* * * * * → *



⚠ When the binding procedure is successful, the Bind LED on the receiver will stay solid blue when both the transmitter and receiver are turned ON. If the Bind LED on the receiver is flashing rapidly or not illuminated at all, the transmitter and receiver are not paired. In this case, turn both the transmitter and receiver OFF, then repeat the binding procedure again.

⚠ Under some circumstances, the receiver may not operate after turning the transmitter and receiver ON. If this occurs, perform the binding procedure again.

THROTTLE FAIL SAFE PROGRAMMING

The Throttle Fail Safe function automatically moves the throttle servo to a predetermined position in the event that the signal between the transmitter and the receiver is interrupted, whether due to signal degradation or to low transmitter battery voltage. For example, the Throttle Fail Safe function can be set so that the throttle returns to idle or the brake engages so that your model doesn't run away if the signal is lost.

 The Throttle Fail Safe function will not operate if the receiver loses power, for example, if the receiver battery comes loose or if the receiver battery is drained.

Setting the Throttle Fail Safe Position:


- 1) Turn the transmitter ON, then turn the receiver ON. The Power Indicator on the transmitter should be illuminated and the Bind LED on the receiver should also be illuminated.
- 2) Move the transmitter steering and throttle to verify correct servo movement.
- 3) Move the throttle trigger to the desired Throttle Fail Safe position. While holding the throttle in the desired position, press and HOLD the Bind Button on the receiver. After approximately 2 seconds, the Bind LED will begin to flash slowly. Continue holding the Bind Button until the Bind LED begins to flash rapidly (approximately 2 more seconds). Once the Bind LED begins to flash rapidly, release the Bind Button.
- 4) Turn the transmitter OFF to test the Throttle Fail Safe operation. The throttle servo should move to the position that you set previously in step 3.

Clearing the Throttle Fail Safe Setting:

- 1) To clear the currently programmed Throttle Fail Safe setting, re-bind the transmitter and receiver pair.

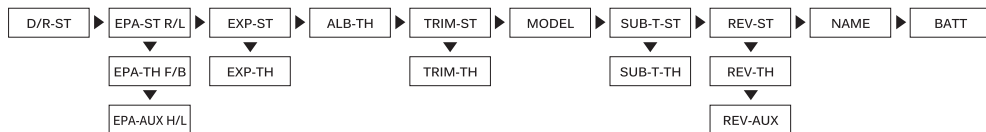
PROGRAMMING MENUS OVERVIEW

When the transmitter is turned ON, the Voltage Monitor will be displayed. To cycle through the different Programming Menus, press the MENU UP or MENU DOWN keys. The currently selected Programming Menu will flash.

 When you make Programming Value changes, those changes are reflected immediately. There is no need to 'save' your changes.

If you're in a Programming Menu when you turn the transmitter OFF, the Voltage Monitor will be displayed when the transmitter is turned back ON. If you adjust the Steering Trim, Throttle Trim, or Steering Dual Rate using either of the three switches, the value will be displayed on the LCD screen for approximately 5 seconds, then revert to the last menu you were in.

Use the flow chart below to familiarize yourself with the layout of the various Programming Menus available. Each is available by repeatedly pressing the MENU UP or MENU DOWN keys.



MENU	MENU NAME	MENU DESCRIPTION	PAGE #
D/R	Dual Rate	Adjust Steering Dual Rate	Page 11
EPA	End Point Adjustment	Adjust Steering, Throttle and Auxiliary End Points	Page 11
EXP	Exponential	Adjust Steering and Throttle Exponential	Page 13
ALB	Anti-Lock Braking	Program Throttle Anti-Lock Braking	Page 14
TRIM	Servo Trim	Adjust Steering and Throttle Servo Trim	Page 15
MODEL	Model Select	Select Programmed Models 1 Through 10	Page 16
SUB-T	Servo Sub-Trim	Adjust Steering and Throttle Servo Sub-Trim	Page 16
REV	Servo Reversing	Adjust Steering, Throttle and Auxiliary Servo Travel Direction	Page 17
NAME	Model Name	Name Your Models	Page 18
BATT	Voltage Monitor	Displays Transmitter Battery Voltage and Current Model Number	Page 18

D/R - DUAL RATE

The Dual Rate function allows you to change the control authority of your model's steering by changing the amount of servo travel relative to control input. For example, by increasing the Dual Rate, you can make the steering servo travel more which might prevent your model from pushing during turns. If your model oversteers during turns, you can reduce the amount of Dual Rate.

IMPORTANT: Prior to programming the Dual Rate function, you should adjust the Left and Right Steering End Points, using the End Point Adjustment function. For more information, see the *End Point Adjustment* section below.

Adjusting the Steering Dual Rate Percentage Value:

1) Press the MENU UP or MENU DOWN keys to open the D/R menu. D/R will flash and ST 100% will be displayed.



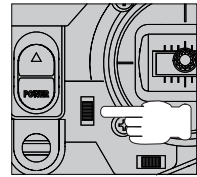
2) Press the INCREASE or DECREASE keys to change the Steering Dual Rate percentage value. When the Steering Dual Rate percentage value is decreased, steering servo travel is decreased. When the Steering Dual Rate percentage value is increased, steering servo travel is increased.



D/R ST setting range is 0% to 100%. The default setting is 100%.

! Dual Rate is a percentage of End Point Adjustment. For example, if you set the Steering Dual Rate percentage value to 100%, the steering will travel the same amount as defined by your Steering End Point Adjustment programming. If you set the Steering Dual Rate percentage value to 50%, the steering will travel half that amount.

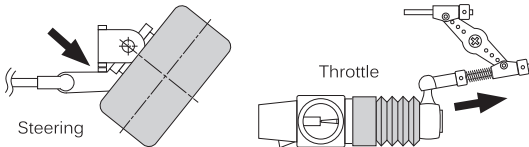
3) Steering Dual Rate can be adjusted at any time while driving using the Dual Rate Switch. Press the Dual Rate Switch forward to increase the Steering Dual Rate percentage value and press the Dual Rate Switch backward to decrease the Steering Dual Rate percentage value.



EPA - END POINT ADJUSTMENT

The End Point Adjustment function allows you to adjust servo travel in each direction. This makes it possible to balance servo travel in both directions and set the maximum desired amount of servo travel. For example, on a gas-powered model, if you pull the throttle trigger and the carburetor does not open completely, you can increase the Throttle Forward End Point Adjustment so that the carburetor opens completely. Another example is with steering. If your model turns sharper to the right than to the left, you can increase the Steering Left End Point Adjustment to balance the steering.

The End Point Adjustment function can be adjusted for the Steering channel (Left and Right), the Throttle channel (Forward and Brake) and Auxiliary Channel 3 (High and Low).



! If you're using an electronic speed control, the Throttle Forward and the Throttle Brake End Point Adjustment percentage values are both generally set to 100%, although the Throttle Forward direction may need to be increased to achieve full power. In some cases the End Point Adjustments can also be set directly via the electronic speed control.

WARNING: End Point Adjustment percentage values should not be increased to the point where your linkages and/or servos bind when moved all the way in either direction. Binding will cause the servos to 'buzz', draining the receiver battery quickly and eventually damaging the servos.

! Before making End Point Adjustments, the servo horns need to be centered. Install the servo horns onto the servos, making sure that they're as close to being centered as possible, then use the Servo Sub-Trim function to center the servo arms exactly. For more information, see the *Servo Sub-Trim* section on page 16.

EPA - END POINT ADJUSTMENT

Adjusting the Steering End Point Adjustment Percentage Values:

Your model's turning radius can differ from left to right because of variations in linkage, suspension balance, tire diameter or weight distribution. In such cases, Left Steering servo travel and Right Steering servo travel are adjustable using the End Point Adjustment function.

- 1) Press the MENU UP or MENU DOWN keys to open the EPA menu. EPA will flash and ST L or ST R 100% will be displayed.



- 2) Turn the steering stick to the left and release it. ST L should be displayed. Press the INCREASE or DECREASE keys to increase or decrease the Steering Left End Point Adjustment percentage value. Increasing the percentage value will increase steering servo travel in that direction and decreasing the percentage value will decrease steering servo travel in the that direction.



EPA ST L setting range is 0% to 150%. The default setting is 100%.

- 3) Turn the steering stick to the right and release it. ST R should be displayed. Press the INCREASE or DECREASE keys to increase or decrease the Steering Right End Point Adjustment percentage value. Increasing the percentage value will increase steering servo travel in that direction and decreasing the percentage value will decrease steering servo travel in the that direction.

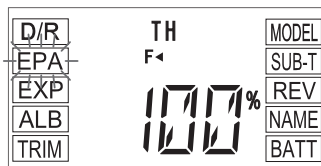


EPA ST R setting range is 0% to 150%. The default setting is 100%.

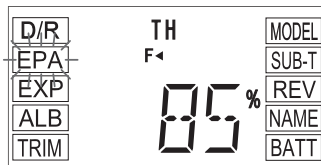
Adjusting Throttle End Point Adjustment:

Your model's carburetor may not open completely or it may open too much and cause the throttle servo to bind. If you're using an electronic speed control, the electronic speed control may not command full power or the brake may not engage adequately. In such cases, Throttle Forward servo travel and Throttle Brake servo travel can be independently adjusted using the End Point Adjustment function.

- 1) From within the EPA menu, press the MENU UP or MENU DOWN keys to display TH F or TH B 100%.

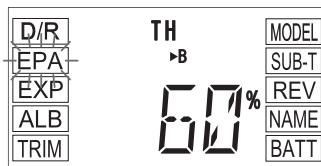


- 2) Up the throttle stick and release it. TH F should be displayed. Press the INCREASE or DECREASE keys to increase or decrease the Throttle Forward End Point Adjustment percentage value. Increasing the percentage value will increase throttle servo travel in that direction and decreasing the percentage value will decrease throttle servo travel in the that direction.



EPA TH F setting range is 0% to 150%. The default setting is 100%.

- 3) Down the throttle stick and release it. TH B should be displayed. Press the INCREASE or DECREASE keys to increase or decrease the Throttle Brake End Point Adjustment percentage value. Increasing the percentage value will increase throttle servo travel in that direction and decreasing the percentage value will decrease throttle servo travel in the that direction.



EPA TH B setting range is 0% to 150%. The default setting is 100%.

EPA - END POINT ADJUSTMENT

Adjusting the Auxiliary Channel 3 End Point Adjustment Percentage Values:

Auxiliary Channel 3 can be used for a number of different uses. One of the more common uses would be for the reverse function in a glow-powered monster truck. Often, the transmission only requires a small amount of travel, but the servo binds because of too much servo travel. In such a case, Auxiliary High servo travel and Auxiliary Low servo travel are adjustable using the End Point Adjustment function.

- 1) From within the EPA menu, press the MENU UP or MENU DOWN keys to display AUX H or AUX L 100%.



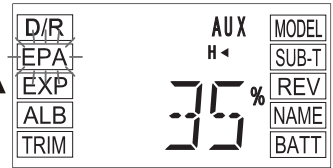
- 2) Push the Auxiliary Lever down. AUX L should be displayed. Press the INCREASE or DECREASE keys to increase or decrease the Auxiliary Low End Point Adjustment percentage value. Increasing the percentage value will increase auxiliary servo travel in that direction and decreasing the percentage value will decrease auxiliary servo travel in that direction.

EPA AUX L setting range is 0% to 150%. The default setting is 100%.



- 3) Push the Auxiliary Lever up. AUX H should be displayed. Press the INCREASE or DECREASE keys to increase or decrease the Auxiliary High End Point Adjustment percentage value. Increasing the percentage value will increase auxiliary servo travel in that direction and decreasing the percentage value will decrease auxiliary servo travel in that direction.

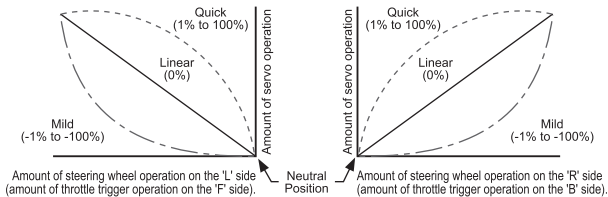
EPA AUX H setting range is 0% to 150%. The default setting is 100%.



EXP - EXPONENTIAL

The Exponential function allows you to vary the amount of servo travel in relation to the movement of the steering wheel and throttle trigger near the Neutral positions to change the way those functions react to control movement. Decreasing the Exponential percentage values will soften the control feel around Neutral and increasing the Exponential percentage values will heighten the control feel around Neutral. Using a lower negative value allows for smoother control. Using a higher positive value may result in more 'twitchy' control response.

The Exponential function can be adjusted for the Steering channel and the Throttle channel.



Adjusting the Steering Exponential Percentage Value:

Steering Exponential can be variably adjusted from Mild through Linear to Quick to allow you to set the most effective steering response for your model. Generally, if your model over-steers, reduce the Exponential percentage value, and if your model under-steers, increase the Exponential percentage value.

- 1) Press the MENU UP or MENU DOWN keys to open the EXP menu. EXP will flash and ST 0% will be displayed.



EXP - EXPONENTIAL

Adjusting the Steering Exponential Percentage Value, Continued:

- 2) Press the INCREASE or DECREASE keys to change the Steering Exponential percentage value. Decreasing the Steering Exponential percentage value will make the steering less sensitive around Neutral and increasing the Steering Exponential percentage value will make the steering more sensitive around Neutral.



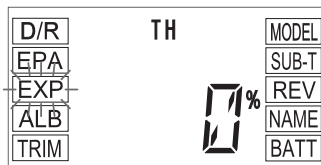
EXP ST setting range is -100% (Mild) to 100% (Quick). The default setting is 0% (Linear).

- Changes to the Steering Exponential percentage value affects the Left and Right sides equally.

Adjusting the Throttle Exponential Percentage Value:

Throttle Exponential can be variably adjusted from Mild through Linear to Quick. In general, reduce the Exponential percentage value on a slippery track or with a model that has a higher-torque motor or engine to help prevent your model from spinning out during acceleration. Increase the Exponential percentage value on a high-grip track where your model is less likely to spin out, or with a model that has a lower-torque motor or engine.

- 1) From within the EXP menu, press the MENU UP or MENU DOWN keys to display TH 0%.



- 2) Press the INCREASE or DECREASE keys to change the Throttle Exponential percentage value. Decreasing the Throttle Exponential percentage value will make the throttle less sensitive around Neutral and increasing the Throttle Exponential percentage value will make the throttle more sensitive around Neutral.

EXP TH setting range is -100% (Mild) to 100% (Quick). The default setting is 0% (Linear).

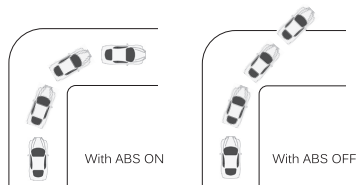


- Changes to the Throttle Exponential percentage value affects the Forward and Brake sides equally.

ALB - ANTI-LOCK BRAKING

The Anti-Lock Braking function makes it possible to achieve stable braking even on a slippery surface. With stable braking, your model is better able to trace an exact line under braking. When the Anti-Lock Braking function is Active, the throttle servo will pulse when you apply brake. Three Pulse Rate values are available to suit your particular model, track conditions and driving style.

- The Anti-Lock Braking function is primarily used on gasoline or glow (nitro) models that feature a throttle servo. It can be used on an electric model that uses an electronic speed control, however, if your electronic speed control features a reverse function, the Anti-Lock Braking function will not operate properly.



- Use the fastest Pulse Rate value that allows your model's tires to not slip and loose traction under the hardest braking. Be aware that using the Anti-Lock Brake function will never result in your model losing traction under braking. It only improves braking under less than ideal conditions.

Activating the Anti-Lock Braking Function:

- 1) Press the MENU UP or MENU DOWN keys to open the ALB menu. ALB will flash and TH OFF will be displayed.



ALB - ANTI-LOCK BRAKING

Activating the Anti-Lock Braking Function, Continued:

- 2) Press the INCREASE or DECREASE keys to choose the desired Anti-Lock Braking Pulse Rate value. The Pulse Rate value determines how fast the throttle servo pulsates the brake. Experimentation will be necessary to determine which Pulse Rate value to use.



ALB setting range is OFF, SLW (Slow), NOR (Normal) and FST (Fast). The default setting is OFF.

! Due to the nature of the Anti-Lock Braking function, we suggest using a high-quality, strong throttle servo. If your throttle servo is not strong enough, the Anti-Lock Braking function may not operate optimally.

TRIM - SERVO TRIM

The Servo Trim function allows you to view the currently programmed Servo Trim value for the steering and throttle channels and, if desired, allows you to change the Trim values from within the TRIM menu, using the programming keys.

The transmitter features Digital Trim Memory. Any amount of Steering or Throttle Trim that you set during use by pressing the Trim Switches or using the TRIM menu is automatically stored in memory for that specific channel and for that specific Model Number. The Trim values for each model will automatically be loaded when the transmitter is turned ON.

! Before adjusting the Trim values, you should first adjust the servo Sub-Trim values to center the servo horns. For more information, see the *Servo Sub-Trim* section on pages 16 and 17.

! The Servo Trim function should not be used to center the steering and throttle servos. Use the Servo Sub-Trim function for that. The Servo Trim function is used to make trim adjustments to your model during use. For example, if your models always pulls to the left while driving, apply enough Steering Right Trim to make you model drive straight.

Changing the Steering Servo Trim Values:

- 1) Press the MENU UP or MENU DOWN keys to open the TRIM menu. TRIM will flash and ST 0 will be displayed.



- 2) Press the INCREASE or DECREASE keys to adjust the Steering Servo Trim value either Right or Left. The actual direction will differ based on the steering channel's Servo Reversing setting.

TRIM ST setting range is R25 to L25. The default setting is 0.



Changing the Throttle Servo Trim Values:

- 1) From within the TRIM menu, press the MENU UP or MENU DOWN keys to display TH 0.



- 2) Press the INCREASE or DECREASE keys to adjust the Throttle Servo Trim value either Forward or Brake. The direction will differ based on the throttle channel's Servo Reversing setting.

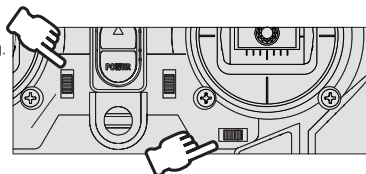
TRIM TH setting range is F25 to B25. The default setting is 0.



TRIM - SERVO TRIM

Controlling the Servo Trim Function:

- Steering and Throttle Servo Trim can be adjusted at any time while driving. Trm1 controls the Steering Right and Left Servo Trim and Trim Switch. Trm2 controls the Throttle Forward and Brake Servo Trim. When you press the Trim Switches, the Servo Trim values change in 1° increments.



- Each time you press a Trim Switch a single audible tone is heard and the Servo Trim value will be displayed on the LCD screen for approximately 5 seconds, then revert to the last menu you were in.
- Pressing the INCREASE and DECREASE keys at the same time will NOT reset the Servo Trim values to zero, since there is no 'default' Servo Trim setting.

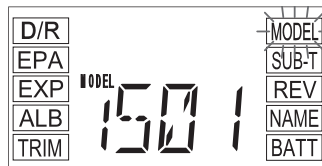
MODEL - MODEL SELECT

The Model Select function allows you to store and retrieve Programming Data for any model 1 through 10. If you're using your transmitter with more than one model, use the Model Select function to load the Programming Data for the particular model that you wish to drive. The currently selected Model Number is displayed next to the Voltage Monitor.

WARNING: Model Programming Data changes immediately upon selection. Do not attempt to attempt to select a different model when your model's receiver is turned ON under actual operational conditions. You may lose control of your model or the servos may be damaged.

Selecting a Model:

- Press the MENU UP or MENU DOWN keys to open the MODEL menu. MODEL will flash and MODEL 1 S01 will be displayed.



- Press the INCREASE or DECREASE keys to select the desired Model Number.



SUB-T - SERVO SUB-TRIM

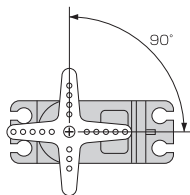
The Servo Sub-Trim function allows you to fine-tune the Neutral trim setting for the steering and throttle channels, making it possible to center the Trim Switches while ensuring the steering and throttle servo horns remain centered.

It's not unusual that when you center a servo and install the servo horn, the servo horn is not perfectly centered. The Servo Sub-Trim function allows you to center the servo horn perfectly, without altering the servo End Point travel.

- Before using the Servo Sub-Trim function you should make sure that the Steering and Throttle Trim values are set to '0'. For more information, see the *Servo Trim* section on pages 15 and 16.

Installing the Servo Horn:

- Install the servo horn (or servo saver) onto your servo, making sure that the servo horn (or servo saver) is as close to being centered as possible.



- In some cases, you can get the servo horn (or servo saver) closer to being centered by rotating the servo horn (or servo saver) 180° and reinstalling it.

SUB-T - SERVO SUB-TRIM

! After adjusting the Servo Sub-Trim values, use the End Point Adjustment function to set the desired amount of maximum servo travel in both directions. For more information, see the *End Point Adjustment* section on pages 11 through 13.

Changing the Steering Servo Sub-Trim Value:

1) Press the MENU UP or MENU DOWN keys to open the SUB-T menu. SUB-T will flash and ST 0 will be displayed.



2) Press the INCREASE or DECREASE keys to adjust the Steering Servo Sub-Trim value either Right or Left to center the servo horn (or servo saver). The direction will differ based on the steering channel's Servo Reversing setting.



SUB-T ST setting range is R25 to L25. The default setting is 0.

Changing the Throttle Servo Sub-Trim Value:

1) From within the SUB-T menu, press the MENU UP or MENU DOWN keys to display TH 0.



2) Press the INCREASE or DECREASE keys to adjust the Throttle Servo Sub-Trim value either Forward or Brake to center the servo horn (or adjust it's Neutral point). The direction will differ based on the steering channel's Servo Reversing setting.



SUB-T TH setting range is F25 to B25. The default setting is 0.

REV - SERVO REVERSING

The Servo Reversing function allows you to electronically switch the direction of servo travel. For example, if you rotate the steering wheel to the right and your model turns left, you can use the Servo Reversing function to make your model turn right. The Servo Reversing function can be adjusted for the Steering channel, Throttle channel and Auxiliary channel 3.

! When you change the direction of Steering or Throttle servo travel, the servo horn may no longer be centered. If this occurs, use the Servo Sub-Trim function to center the servo horn(s). For more information, see the *Servo Sub-Trim* section above and on the previous page.

Changing the Servo Reversing Values:

1) Press the MENU UP or MENU DOWN keys to open the REV menu. REV will flash and ST NOR will be displayed.




2) Press the MENU UP or MENU DOWN keys to choose which channel you would like to change the Servo Reversing value for, then press the INCREASE or DECREASE keys to change the direction of servo travel.



REV setting range is NOR and REV. The default setting for all channels is NOR.

NAME - MODEL NAMING

The Model Naming function allows you to name each of the 10 different models. This makes it easy to keep track of multiple models. The Model Name can consist of up to 3 upper-case letters, numbers or symbols, or a combination of all three.

 Before naming your model, use the Model Select function to choose the Model Number you would like to name. For more information, see the *Model Select* section on page 16.

Changing the Model Name:

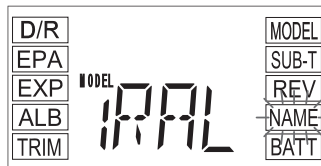
1) Press the MENU UP or MENU DOWN keys to open the NAME menu. NAME will flash and MODEL 1 S01 will be displayed.



2) Turn the steering wheel right or left to select the character you would like to change. The currently selected character will flash.


3) Press the INCREASE or DECREASE keys to select the desired character.

4) Repeat steps 2 and 3 to change any desired remaining characters.



BATT - VOLTAGE MONITOR


The Voltage Monitor function displays the transmitter's battery voltage in 0.1 volt increments. The current model number is also displayed.

 A Low Voltage Alarm warns you when the transmitter batteries need to be replaced or recharged (if using rechargeable batteries). The Low Voltage Alarm will sound when the transmitter batteries reach 4.6 volts. If the Low Voltage Alarm sounds while you are driving, you should stop as soon as it's safe, then replace or recharge the transmitter batteries.

Viewing the Transmitter Battery Voltage:

1) Press the MENU UP or MENU DOWN keys to open the BATT menu. BATT will flash and the current model number, along with the transmitter batteries' voltage, will be displayed.



 The BATT menu is the transmitter's default menu. Each time the transmitter is turned ON, the BATT menu will be displayed. In addition, the BATT menu can be displayed at any time from within any other menu by pressing the MENU UP and MENU DOWN keys at the same time.

TROUBLESHOOTING GUIDE

This troubleshooting guide can help you diagnose and solve some of the more common problems that you may encounter with your **GEMINI Sport** 2.4GHz FHSS-E radio control system. If you cannot solve the problem using this troubleshooting guide, please contact Customer Service using the information in the *Service*

PROBLEM	CAUSE	SOLUTION
Transmitter does not turn ON	Batteries not installed correctly	Reinstall batteries, observing correct polarity
	Batteries are dead	Replace batteries
	There's an internal problem	Contact Customer Service
Transmitter will not bind to receiver	Modulation Type incorrect	Change Modulation Type to match receiver
	Too much time elapsed after pressing receiver Bind Button	Quickly press the transmitter Bind Button after releasing the receiver Bind Button
	Attempting to bind incompatible receiver	Use only SANWA 2.4GHz FHSS-E surface receivers
	Using electronic speed control	Disconnect ESC and use dry cell battery for binding procedure, then reconnect ESC after binding
Receiver won't power ON	Batteries not installed correctly	Reinstall batteries, observing correct polarity
	Batteries dead	Replace or recharge batteries
	Loose switch connection	Double-check all connections including switch
Audible alarm beeps continuously	Low transmitter battery voltage	Replace transmitter batteries
Servo movement is slow	Low receiver battery voltage	Replace or recharge receiver batteries
	Control linkages binding	Adjust control linkages to operate smoothly
Servo does not move when using Trim Switch	Trim is outside of operational range	Reset trim to zero and center the servo horn and control linkages
Inadequate transmitting range	Low transmitter battery voltage	Replace transmitter batteries
	Low receiver battery voltage	Replace or recharge receiver batteries
	Receiver antenna not mounted correctly in your model	Mount receiver antenna as recommended
Servo(s) move the wrong direction	Incorrect Servo Reversing setting	Change Servo Reversing setting
Servo Horn(s) not centered	Servo horn not installed correctly	Turn servo horn 180° and reinstall
	Servo Sub-Trim out of adjustment	Adjust Servo Sub-Trim to center servo horn
Control linkage(s) bind	To much servo travel	Decrease servo travel using EPA function
LCD appears dark or hard to read	Transmitter left in direct sunlight too long	Place transmitter in shade.
Throttle servo pulsates	ABS function is ON	This is normal under braking with ABS function ON
Model veers right or left without control input	Steering out of trim	Use Steering Trim Switch to adjust Steering Trim so model drives straight
Throttle servo or ESC moves to programmed position without input	Throttle out of trim	Use Throttle Trim Switch to adjust Throttle Neutral point
Cannot select characters when naming model	Not using steering wheel	Turn steering wheel right or left to highlight desired characters

GLOSSARY OF TERMS

Activate: To turn a particular function ON.

Antenna: Transmits the signal from the transmitter to the receiver in the model.
Do NOT cover the front of the antenna in any way during use! Doing so can block the RF signal, resulting in the loss of control of your model.

Antenna Wire: Receives the transmitter signal. The antenna wire should be installed through a nylon tube (antenna tube) in the vertical position for the best reception. Do not alter the length of the antenna or the operation of the receiver will be compromised.

Auxiliary Lever: Controls Auxiliary channel 3 High and Low servo travel.

Anti-Lock Braking: Makes it possible to achieve stable braking even on slippery surfaces. With stable braking, your model is better able to trace an exact line under braking.

Battery Compartment: Houses the four 'AA' Alkaline cells that power the transmitter. Alternatively, the transmitter can be powered using four 'AA' Ni-Cd or Ni-MH rechargeable batteries or a 2S Li-Po or 2S Li-Fe battery pack.

Battery Eliminator Circuitry (BEC): A circuit typically found in an electronic speed control that eliminates the need for a separate receiver battery by using the battery pack that powers the model to also power the receiver and the servos.

GLOSSARY OF TERMS

Binding: The act of pairing the transmitter and receiver to prevent interference from transmitters operated by other users. The transmitter and receiver must be paired so that the two can 'talk' to each other. Once the binding procedure is complete, the setting is remembered even when the transmitter and receiver are turned OFF.

Bind Button: Used in the process of binding the transmitter and receiver.

Bind LED: Displays the current status of the receiver.

Decrease Key: Decreases Programming Values and used to select models. Press the INCREASE and DECREASE keys at the same time to reset Programming Values to default.

Digital Trim Memory: Allows the transmitter to store Trim values in its memory. Any amount of Trim that you set during use using the Trim Switches is automatically stored in memory for that specific channel and for that specific model. The Trim values for each model will automatically be loaded when the transmitter is turned ON.

Dual Rate: Used to change the control authority of your model's steering by changing the amount of servo travel relative to control input.

End Point Adjustment: Used to adjust the desired amount of servo travel in both directions independently. This makes it possible to balance servo travel in both directions.

Exponential: Allows you to vary the amount of servo travel in relation to the movement of the steering wheel and throttle trigger near the Neutral positions to change the way those functions react to control movement.

Fail Safe: Automatically moves the throttle servo to a predetermined position in the event that the signal between the transmitter and the receiver is interrupted, whether due to signal degradation or low transmitter battery. This helps prevent the chance of a runaway model, should the transmitter lose power or the signal between the transmitter and receiver be lost.

FH-E Modulation: Frequency Hopping 2.5th generation FHSS technology. FH-E modulation is not compatible FH2 modulation.

FHSS: Frequency Hopping Spread Spectrum. FHSS is a Modulation Type which transmits data across the entire frequency spectrum by transmitting data on different channels at an extremely fast interval.

High Side: Refers to the position of Auxiliary channel 3 servo movement (pushing the Auxiliary Lever up).

Increase Key: Increases Programming Values and used to select models. Press the INCREASE and DECREASE keys at the same time to reset Programming Values to default.

Low Side: Refers to the position of Auxiliary channel 3 servo movement (pushing the Auxiliary Lever down).

Low Voltage Alarm: Warns you when the transmitter batteries need to be replaced or recharged (if using rechargeable batteries). The Low Voltage Alarm will sound when the transmitter batteries reach 4.6 volts. If the Low Voltage Alarm sounds while you are driving, you should stop as soon as it's safe, then replace or recharge the transmitter batteries.

LCD Screen: The heart of the programming and display features of the transmitter. All programming and transmitter display functions are shown on the LCD screen.

Menu Selections: Displays the available Programming Menus. The currently Active menu will flash. The information displayed in the Programming Window will vary based on the menu selected.

Menu Down Key: Cycles down through the list of menus and sub-menu functions you would like to make programming changes to. Press the MENU UP and MENU DOWN keys at the same time to display the Voltage Monitor.

Menu Up Key: Cycles up through the list of menus and sub-menu functions you would like to make programming changes to. Press the MENU UP and MENU DOWN keys at the same time to display the Voltage Monitor.

Model Naming: Used to name the different models you have saved in the transmitter. This makes it easy to keep track of multiple models. The Model Name can consist of up to 3 letters, numbers or symbols.

Model Number: Displays the model that is currently loaded into memory. Up to 10 different models can be stored.

Model Select: Used to store and retrieve Programming Data for any model 1 through 10. If you have Programming Data stored for more than one model, use the Model Select function to load the Programming Data for the particular model that you wish to drive. The currently selected Model Number is displayed next to the Voltage Monitor.

Operating Voltage: The safe voltage that the transmitter can operate within. Exceeding the minimum operating voltage can result in loss of power to the device. Exceeding the maximum operating voltage can result in damage to the device.

Output Power: The power (in Milliwatts) that your transmitter transmits a signal. Output power is defined by government guidelines and differs by region.

Power Indicator: Illuminates red, indicating the transmitter is turned ON.

GLOSSARY OF TERMS

Power Switch: Turns the transmitter ON and OFF.

Programming Keys: The programming keys are used to program the functions of your transmitter, select saved models

Programming Window: Displays transmitter programming information. When the transmitter is turned ON, the BATT menu will be selected, the current model number will be shown and the Voltage Monitor will display the transmitter's current voltage.

Servo Reversing: Used to electronically switch the direction of servo travel. For example, if you move the steering wheel to the right and your model turns left, you can use the Servo Reversing function to make your model turn right.

Servo Sub-Trim: Used to correct the Neutral trim setting for the servos, making it possible to center the Trim Switches while ensuring the servo horns remain centered.

Steering Trim Switch: Used to adjust the Steering Trim quickly and easily while you're driving.

Suppression Capacitor: Primarily used on brushed electric motors, a suppression capacitor helps eliminate electrical noise that could interfere with the operation of your radio control system.

Temperature Range: The range in temperature of the outside air that the transmitter can safely and reliably operate in.

Throttle Trim Switch: Used to adjust Throttle Trim quickly and easily while you're driving.

Voltage Monitor: Displays the current voltage of the transmitter batteries. When the transmitter batteries reach 4.6 volts, the Low Voltage Alarm will sound.

Z-Connector: The type of servo and battery connector used by SANWA. The Z-Connector is a universal connector which is electronically compatible with the components of other radio control system manufacturers.



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