SPEKTRUM®

SPMAR9130T, SPMAR12300T, and SPMAR20300T PowerSafe™ User Guide

Bedienungsanleitung SPMAR9130T, SPMAR12300T und SPMAR20300T PowerSafe

Guide de l'utilisateur SPMAR9130T, SPMAR12300T et SPMAR20300T PowerSafe

Manuale utente SPMAR9130T, SPMAR12300T e SPMAR20300T PowerSafe

NOTICE

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Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, LLC. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

Age Recommendation: Not for children under 14 years. This is not a toy.

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NOTICE: This product is only intended for use with unmanned, hobby-grade, remote-controlled vehicles and aircraft. Horizon Hobby disclaims all liability outside of the intended purpose and will not provide warranty service related thereto.

WARRANTY REGISTRATION

Visit www.spektrumrc.com/registration today to register your product.

User Guide

The Spektrum™ AR9130T, AR12300T and AR20300T PowerSafe™ telemetry receivers offer the ultimate solution for powering high-current draw radio systems. In aircraft with multiple high-current draw servos (e.g. giant-scale aircraft, jets, etc.), the PowerSafe receivers can provide peak current of up to 50 amps and offers true dual battery redundancy and a fail-on soft switch for the ultimate in reliability. By locating up to three remote receivers throughout the aircraft, the RF link can be optimized in even the most demanding aircraft installations that have significant conductive materials like carbon, stainless steel bypass tubes, tuned exhausts, etc. For models high in carbon fiber content the SPM9646 DSMX® Carbon Fiber Remote Receiver is compatible with these PowerSafe receivers.

These telemetry receivers feature 4 integrated telemetry ports that are compatible with Spektrum telemetry capable transmitters.

For information on Spektrum Telemetry Sensors visit:
http://www.spektrumrc.com

Applications

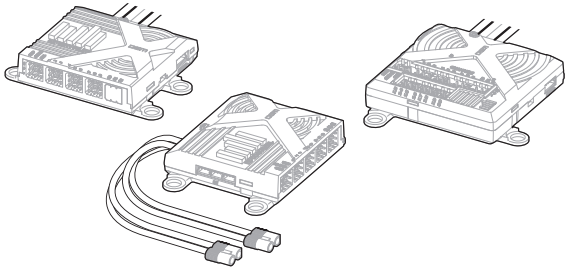
- Giant-scale aircraft
- Jets with multiple high-current draw servos
- Scale aircraft with multiple high-current draw servos and accessories (e.g. lights, ESCs, air valves, etc.)
- Scale helicopters

Features

- Integrated full range telemetry
- True dual battery redundancy—each battery is isolated and if one fails/shorts the other takes over.
- Utilizes up to three remote receivers for the ultimate RF link in even the most demanding applications.
- Up to 35 amps continuous and 50 amps peak current handling capability
- Fail-on soft switch in case the switch is damaged
- Two types of failsafe—SmartSafe™ (throttle only) and preset failsafe (all servos)
- QuickConnect™ technology—if a power interruption (brownout) occurs, the system
  reconnects in less than 1/2 second
- Flight Log compatible
- Heavy 13AWG dual battery leads with pre-wired E-flite® EC3™ connectors
- Compatible with all Spektrum™ and JR® full range radio and module systems
- 2048 resolution
- Compatible with X-Plus™ modules (AR20300T has the X-Plus module built in)

IMPORTANT: The PowerSafe receiver has a power distribution center that provides up to 35-amps continuous and 50-amps peak current to power your system. The AR9130T, AR12300T and AR20300T PowerSafe receivers use up to three (1 minimum connected to operate) remotely mounted receivers that can be optimally placed in your aircraft providing the best possible RF link in the most demanding conditions.

Specifications	AR9130T	AR12300T	AR20300T
Type	DSM2/DSMX PowerSafe Telemetry Receiver		
Dimensions (LxWxH)	55.12 x 55.94 x 17.73mm	55.12 x 55.94 x 17.73mm	64.31 x 61.03 x 16.29mm
Weight	48.19g	48.19g	59.5g
Antenna Length	(1) - 6", (1) - 7"		
Remote Receivers	Yes(2)-Included	Yes(3)-Included	Yes(3)-Included
Channels	9	12	20
Band	2.4GHz		
Voltage Range	3.5-10V		



Included Items	AR9130T	AR12300T	AR20300T
SPM9645	(2) DSMX Remote Receiver	(3) DSMX Remote Receiver	(3) DSMX Remote Receiver
SPM9011	9" Remote Receiver Extension	9" Remote Receiver Extension	9" Remote Receiver Extension
SPM9012	12" Remote Receiver Extension	12" Remote Receiver Extension	12" Remote Receiver Extension
SPM9013	N/A	24" Remote Receiver Extension	24" Remote Receiver Extension
SPM6820	Soft switch	Soft switch	Soft switch
	Instruction Manual	Instruction Manual	Instruction Manual
EFLAEC302	(2) battery EC3 connectors	(2) battery EC3 connectors	(2) battery EC3 connectors
	(2) Charge receptacle	(2) Charge receptacle	(2) Charge receptacle
SPMA9570A	Aircraft Telemetry Volt Sensor	Aircraft Telemetry Volt Sensor	Aircraft Telemetry Volt Sensor

Battery Requirements

Using One Battery

The PowerSafe receiver allows the option of using one or two battery packs. When using one battery simply plug the battery into either one of the two battery connectors (BATT 1 or BATT2). Be sure to secure the unused battery connector. Note that the open contacts of the unused battery are not back powered (not electrically hot), however, the unused connector should be secured to prevent it from entangling during flight. When the system is powered using one battery, a single blue LED will constantly emit when the system is powered on.

Using Two Batteries

The PowerSafe receiver offers a true redundant dual battery system. When using two battery packs, each pack functions independently and is isolated from the other, so that if one pack should fail (open circuit, short-circuit, or become discharged), the other battery will provide power to operate the system. When using dual batteries, it's important that both batteries be of the same capacity and ideally of the same age and condition.

It's normal for one battery to discharge slightly more than the other. This is the nature of a truly redundant isolated battery system. The battery that has the higher voltage or lower internal resistance will discharge at a faster rate. Generally the difference is negligible (less than 10%). Because of this it's normal for only one blue LED (Batt 1 or Batt 2) to be on when the system is not under a heavy current load depending on which pack is providing more power.

When using two batteries, the total available capacity equals the sum total of both batteries e.g., BATT1—2000mAh + BATT2- 2000mAh = a total capacity of 4000mAh. 12- and 24-inch EC3 battery extensions are available for installations where the battery is located a distance from the main PowerSafe unit.

Using Dual Voltage Regulators

The Spektrum™ 7.5 am (11-amp peak) 6.0 volt regulator (SPMVR6007) is specifically designed for use with the PowerSafe receivers.

IMPORTANT: When using two batteries powered through two regulators, each regulator operates independently and it's common for one battery to be discharged at a slightly higher rate depending on the condition of the battery (internal resistance, voltage, etc.) and the tolerance of the regulators. This causes one battery to discharge before the other and it's important to check each battery using a loaded battery tester (HAN171) at a recommended 1-amp load before each flight monitoring the voltage of each pack and recharging when the weakest pack reaches 40% capacity. (See Battery Capacity pg. 5)

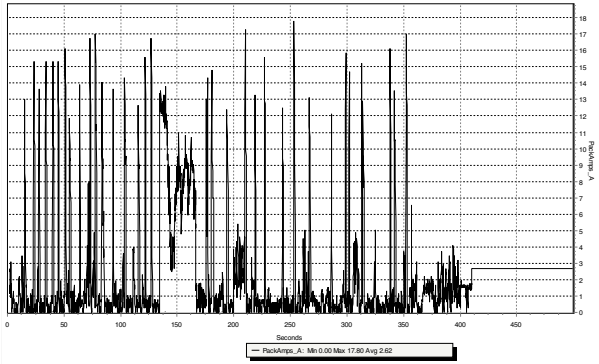
Battery Capacity

It's important to select a battery(s) that has more than adequate capacity to provide the necessary flight time. Our staff has been recording in-flight data to determine typical current consumption of aircraft in flight. Following are two graphs that illustrate the in-flight current draw of the radio system. Current draws may vary depending on your servos, installation and flying style.

The following setup is shown as a worst-case scenario indicative of some aerobatic pilots' setups. It is not recommended to use this setup without proper voltage regulation for your servos.

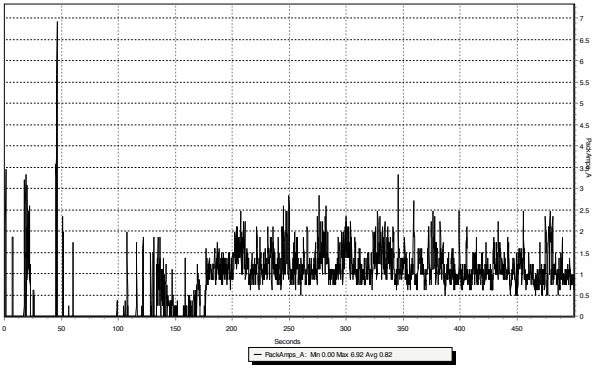
Airplane	40% YAK
Servos	9-JR8711's 1-8317 (throttle)
Batteries	Two 4000mAh 2-cell 7.4-volt Li-Pos
Regulator	None
Engine	DA150
Weight	40 lb
Flight envelope	Aggressive 3D
Average current	2.62 amps
Peak current	17.8 amps
Milliamps (used per 10-minute flight)	435mAh

JR8711's and 8317's are rated at a maximum of 6-volt 5-cell use. Using higher voltages will void the warranty.



In the example above, the average current was 2.62 amps, which calculates to 435mAh per 10 minutes (typical flight length). It's recommended that only 60% of the available capacity be used to ensure plenty of reserve battery capacity. In this example using two 4000mAh batteries (8000mAh total capacity) x 60%= 4800mAh (available usable capacity) divided by the capacity used per 10-minute flight, 435mAh would allow up to 11 flights, of 10 minutes each.

Airplane	33% Sukhoi
Servos	7-JR8611's 1-8317 (throttle)
Batteries	1- 4000mAh 2-cell 7.4-volt LiPo
Regulator	6 volts
Engine	DA100
Weight	26 lb
Flight envelope	Moderate 3D
Average current	.82 amps
Peak current	6.92 amps
Milliamps (used per 10-minute flight)	137mAh



Recommended Guidelines for Battery Capacity

40-45% Aerobatic aircraft w/ 9-12 high-current servos: 4000–8000mAh

33-35% Aerobatic aircraft w/ 7-10 high-current servos: 3000–6000mAh

25% Quarter Scale Aerobatic aircraft w/ 5-7 high-current servos: 2000–4000mAh

Jets - BVM Super BANDIT, F86, Euro Sport, etc.: 3000–6000mAh

Giant-Scale Jets - BVM Ultra Bandit:4000–8000mAh

Scale aircraft - The varieties of scale aircraft and the accessories they use vary tremendously, making it difficult to give capacity recommendations for these types of aircraft. Using the previously mentioned aerobatic guidelines relative to the size and number of servos used will provide a conservative capacity for your scale aircraft. As always, check battery charge condition before each flight.

Battery Voltage

IMPORTANT: DO NOT use a 4-cell 4.8-volt battery to power the PowerSafe receiver.

Four-cell 4.8-volt batteries do not provide enough voltage headroom (additional margin needed) necessary to power the system when heavily loaded. Under load the system voltage can drop below the voltage system's minimum operating voltage threshold (3.5 volts) and cause loss of control.

The PowerSafe receiver is capable of handling voltages from 6.0 to 10.0 volts. The voltage limitations are generally the servos. Most servos are compatible with 5-cell 6-volt packs. Five-cell 6-volt NiMH packs have become the standard for many giant-scale applications.

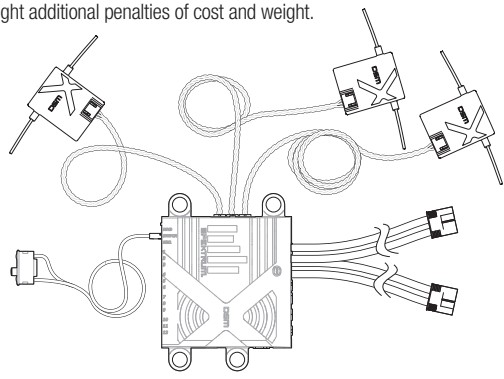
Be aware that NiMH batteries have a tendency to false peak when being fast charged. Be especially careful when using NiMH batteries that they are fully charged and have not false peaked.

Many pilots are using 2-cell LiPo batteries to power their aircraft. LiPo batteries offer greater capacity for their size and weight, and are easier to manage when charging. Before using LiPo batteries, please check the voltage specifications of your servos. Use of a voltage regulator, such as the Spektrum VR6007 (SPMVR6007), might be necessary.

When a battery is connected to the PowerSafe, a low current drain of less than 1mA occurs even when the switch is turned off. If the system is going to be stored for any length of time, it's important that the battery(s) be disconnected from the PowerSafe receiver to prevent over discharge.

Installation

The PowerSafe receiver requires a minimum of one remote receiver to operate. Two or three remote receivers are included and, in most cases, it is recommended that two or three receivers be used. Each receiver functions independently and additional receivers (up to three) offer a more secure RF link in difficult environments. The added security of redundancy should a failure occur will outweigh the slight additional penalties of cost and weight.



1. Using foam or thick double-sided foam tape and tie wraps, secure the main PowerSafe unit in the position where you would normally mount the receiver.

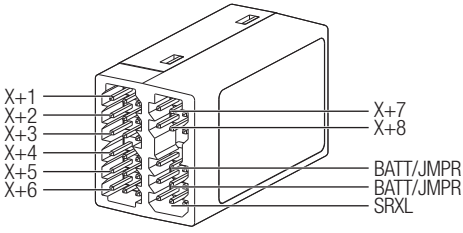
2. Mount the switch on the side of your aircraft and insert the switch plug in the port in the main unit marked SWITCH.

The PowerSafe receiver uses a specifically designed switch. Conventionally wired switches are not compatible with the PowerSafe receiver.

Installing Optional X-Plus 8 Module

When using an X-Plus™ receiver and module (Not compatible w/ the AR20300T - it's built into the receiver) it is recommended the X-Plus 8 module be mounted as close to the receiver as possible. When using the X-Plus power jumper lead mounting the X-Plus 8 module close will minimize the current loss from the receiver. Servo extensions can be use with each servo, it is recommended to use heavy 22 gauge wire with gold plated connectors.

If an auxiliary battery or batteries are to be used there is no need for the X-Plus power jumper. The X-Plus 8 module can be mounted as far away from the receiver when using the auxiliary power option.



Installing the Batteries

Using the given guidelines select the battery system that best fits your application and install the battery(s)/regulator(s) in your aircraft. Connect the battery(s) to the PowerSafe receiver. Spektrum batteries are pre-wired with an EC3™ connector and plug directly in. If using another brand of battery it will be necessary to solder EC3 connectors (two are included with these PowerSafe receivers) to the battery leads. If using a regulator, install it per the guidelines included with the regulator.

Mounting the Remote Receivers

Antenna Polarization

For optimum RF link performance, it's important that the remote antennas be mounted in an orientation that allows for the best possible signal reception when the aircraft is at all possible attitudes and positions. This is known as antenna polarization. This allows the greatest exposed visual cross-section of the antennas from all aircraft orientations. If three antennas are used, it is recommended that one antenna be mounted vertically, one horizontally in-line with the fuselage and one horizontally perpendicular to the fuselage (see illustrations on pages 11-12). This covers the X,Y and Z axis offering superb cross-section visibility in all aircraft orientations. An optional fourth antenna can be added at an intermediate angle offering even greater RF link security and system redundancy.

Locating the Remote Receivers

While Spektrum 2.4GHz systems are far more resistant to interference caused from internal RF generating sources, the remote receivers should be mounted as far away as practical (typically 4" or greater if possible) from the following:

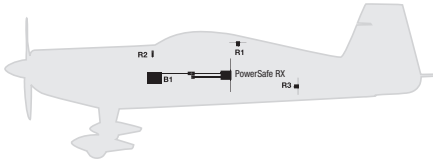
- Ignition systems
- Ignition switches
- ECU pumps
- Receiver batteries
- Metal bypass tubes
- High-vibration areas
- Ignition batteries
- Engines
- Electric motors
- Fuel tanks
- High-temperature components like exhaust systems
- Any significant metallic conductive components

The remote antennas should be mounted a minimum of at least 2" apart from each other as greater antenna separation gives improved path diversity (RF link performance) in critical environments. In large aircraft where space is not an issue, it is highly recommended that the antennas be mounted throughout the aircraft as illustrated. Spektrum remote receiver extensions range from 6" to 36" allowing the receivers to be mounted in the most optimum locations throughout the aircraft.

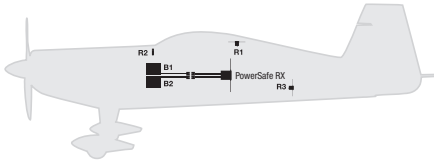
Using double-sided foam tape and tie wraps, mount a minimum of three and up to four remote receivers in your aircraft as per the illustrations and plug them into the receiver ports.

The following are illustrations of typically recommended installations. Note the remote receiver orientation.

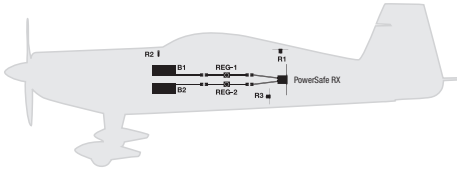
- 35% aerobatic plane with single NiMH battery and three remote receivers



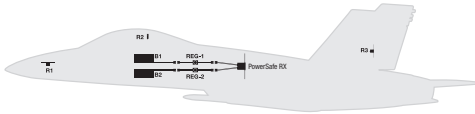
- 35% aerobatic plane with dual NiMH batteries and three remote receivers



- 40% aerobatic plane with dual LiPo batteries, dual regulators and tree remote receivers



- Jet with dual LiPo batteries, dual regulators and three remote receivers



Binding

NOTICE: In order for the system to operate, one remote receiver must be connected. If an additional remote receiver is added after initial binding, the system must be re-bound to recognize the additional remote receiver.

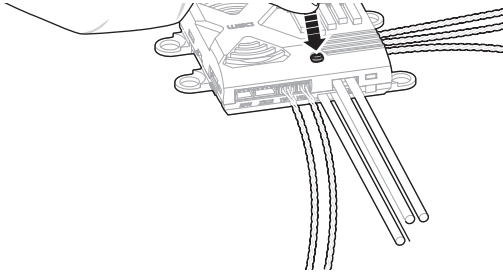
How To Bind the PowerSafe Receiver

The AR9130T, AR12300T and AR20300T PowerSafe receivers must be bound to the transmitter before they will operate. Binding is the process of teaching the receiver the specific code of the transmitter so it will only connect to that specific transmitter.

1. Connect the remote receivers and any telemetry sensors to the main receiver.
2. Push and hold the bind button on the PowerSafe receiver while turning on the soft switch. Release the Bind button once all the LEDs on receiver and remote receivers start to flash continuously.

Tip: It is still possible to use a bind blug in the BIND port if desired.

3. Put your transmitter in bind mode.
4. The bind process is complete when all the orange LEDs are solid.



NOTICE: If using a bind plug, remove after binding to prevent the system from entering bind mode the next time the power is turned on.

5. After you set up your model, always rebind the transmitter and receiver to set the desired failsafe positions. See FAILSAFE on the next page.

Failsafe

The AR9130T, AR12300T and AR20300T PowerSafe receivers features two types of failsafe: SmartSafe™ and Preset Failsafe.
Failsafe position is set during binding. In the unlikely event that the radio link is lost during use, the receiver will drive all channels to its pre-programmed failsafe position.

Receiver Power Only

When the receiver only is turned on (no transmitter signal is present), all servos except for the throttle are driven to their preset failsafe positions, normally all control surfaces at neutral and the landing gear down. These failsafe positions are stored in the receiver during binding. At this time the throttle channel has no output, to avoid operating or arming an electronic speed control (if used). In glow-powered models, the throttle servo has no input so it remains in its current position. The receiver remains in standby mode with the blue battery LEDs lit. When the transmitter is turned on, the receiver locates the signal (GUID), connects and normal control resumes. When connected, the amber LEDs on all attached remote receivers will be on.

SmartSafe + Hold Last

If loss of signal occurs, SmartSafe™ technology moves the throttle channel to its preset failsafe position (low throttle) that was set during binding. All other channels hold their last position. When the receiver detects signal from the transmitter, normal aircraft operation resumes.

Tip: Use either the built in BIND button OR a bind blug in the BIND/BATT port.

SmartSafe + Hold Last

1	Lower Throttle on transmitter
2	Push and Hold Bind Button
3	Power on Receiver
4	Release Button once RX goes into Bind Mode (flashing LED)
5	Place transmitter in Bind Mode and finish Binding.

A*	*Install bind plug (optional)*
B*	*Leave in through entire bind process**

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

Preset Failsafe

Preset failsafe is ideal for sailplanes, allowing the aircraft to automatically dethermalize if the signal is lost. With preset failsafe, all channels go to their preset failsafe positions if the signal is lost, preventing a flyaway. When the receiver detects signal from the transmitter, normal aircraft operation resumes.

Preset Failsafe

1	Move all sticks and switches on the transmitter to desired Failsafe position.
2	Push and Hold Bind Button
3	Power on Receiver
4	Release Button after RX goes into Bind Mode (flashing LED)
5	Push and Hold the Bind Button again before the transmitter enters Bind Mode.

A*	*Install bind plug (optional)*
B*	*Remove plug once RX goes into Bind Mode*

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

After Connection

When the transmitter and receiver are turned on and after the receiver connects to the transmitter and normal control of all channels occurs, if loss of signal occurs Preset Failsafe drives all servos to their preset failsafe positions. For sailplanes it's recommended that the spoilers/flaps deploy to dethermalize the aircraft, preventing a flyaway. Some modelers prefer to use this failsafe system to program a slight turn and low throttle to prevent their aircraft from flying away. When the signal is regained, the system immediately (less than 4 ms) regains control.

Range Testing

Before each flying session, and especially with a new model, it's important to perform a range check. All Spektrum aircraft transmitters incorporate a range testing system, which reduces the output power allowing a range check.

1. With the model resting on the ground, stand 30 paces (approx. 90 feet/28 meters) away from the model.
2. Face the model with the transmitter in your normal flying position and put your transmitter into range test mode. This causes reduced power output from the transmitter.
3. You should have total control of the model in range test mode at 30 paces (90 feet/28 meters).
4. If control issues exist, call Horizon Product Support for further assistance.

Advanced Range Testing

The Standard Range Testing procedure is recommended for most sport aircraft. For sophisticated aircraft that contain significant amounts of conductive materials (e.g. turbine powered jets, some types of scale aircraft, aircraft with carbon fuselages, etc.), the following advanced range check will confirm that all remote receivers are operating optimally and that the installation (position of the receivers) is optimized for the specific aircraft. This Advanced Range Check allows the RF performance of each remote receiver to be evaluated and to optimize the locations of each individual remote receiver.

IMPORTANT: If you don't have a telemetry-capable transmitter, you can connect a Flight Log to the Bind/Prog port on the receiver.

1. Standing 30 paces away from the model, face the model with the transmitter in your normal flying position.
2. Put your transmitter in range test mode. Range test mode reduces the power output from the transmitter.
3. Have someone position the model in various orientations (nose up, nose down, nose toward the transmitter, nose away from the transmitter, etc.).
4. Observe the telemetry on your transmitter. Note any orientations that cause higher fade or hold values. Perform this step for at least one minute.
5. Re-position any remote receivers as necessary.
6. Have your helper position the model in various orientations (nose up, nose down, nose toward the Tx, nose away from the Tx, etc.) observe the telemetry on your transmitter or while your helper watches the Flight Log noting any correlation between the aircraft's orientation and frame losses. Do this for 1 minute. The timer on the transmitter can be used here. For giant-scale aircraft, it's recommended that the airplane be tipped up on its nose and rotated 360 degrees for one minute then the data recorded. Next place the airplane on its wheels and do a second test, rotating the aircraft in all directions for one minute.

7. After one minute, a successful range check will have less than ten recorded frame losses. Scrolling the Flight Log through the antenna fades (A, B, L, R) allows you to evaluate the performance of each receiver. Antenna fades should be relatively uniform. If a specific antenna is experiencing a high degree of fades then that antenna should be moved to a different location.

8. A successful advanced test will yield the following:

   H - 0 holds

   F - less than 10 frame losses

   A, B, R, L - Frame losses will typically be less than 100. It's important to compare the relative frame losses. If a particular receiver has a significantly higher frame loss value (2 to 3X) then the test should be redone. If the same results occur, move the offending receiver to a different location.

Flight Log

If you do not have a telemetry capable Spektrum transmitter, the Spektrum Flight Log (SPM9540) is also compatible with the AR9130T, AR12300T and AR20300T PowerSafe receivers.
The Flight Log displays overall RF link performance as well as the individual internal and external receiver link data. Additionally it displays receiver voltage.

Using the Flight Log
After a flight and before turning off the receiver or transmitter, plug the Flight Log into the Data port on the PowerSafe. The screen will automatically display voltage e.g. 6v2= 6.2 volts.

When the voltage reaches 4.8 volts or less, the screen will flash indicating low voltage.

Press the button to display the following information:

A - Antenna fades on antenna A	B - Antenna fades on antenna B
L - Antenna fades on the left antenna	R - Antenna fades on the right antenna
F - Frame loss	H - Holds

Antenna fades

Represents the loss of a bit of information on that specific antenna. Typically it's normal to have as many as 50 to 100 antenna fades during a flight. If any single antenna experiences over 500 fades in a single flight, the antenna should be repositioned in the aircraft to optimize the RF link.

Frame loss

represents simultaneous antenna fades on all attached receivers. If the RF link is performing optimally, frame losses per flight should be less than 20. The antenna fades that caused the frame loss are recorded and will be added to the total antenna fades.

A Hold occurs when 45 consecutive frame losses occur. This takes about one second. If a hold occurs during a flight, it's important to reevaluate the system, moving the antennas to different locations and/or checking to be sure the transmitter and receivers are all working correctly. The frame losses that led to the hold are not added to the total frame losses.

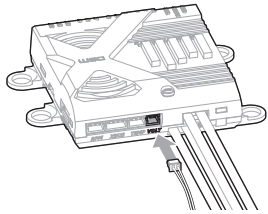
A servo extension can be used to allow the Flight Log to more conveniently be plugged in without having to remove the aircraft's hatch or canopy. On some models, the Flight Log can be plugged in, attached and left on the model using double-sided tape. This is common with helicopters, mounting the Flight Log conveniently to the side frame.

Telemetry

The Spektrum AR9130T, AR12300T and AR20300T PowerSafe telemetry receivers features 4 integrated telemetry ports that are compatible with Spektrum telemetry capable transmitters.

- No telemetry module required. Telemetry is built into the receiver.
- No sensor is required to receive Flight Log or receiver pack voltage directly on any telemetry capable Spektrum transmitter.
- The PowerSafe telemetry receivers include the SPMA9570 Aircraft Telemetry Flight Pack Voltage Sensor.

1. Plug the Aircraft Telemetry Flight Pack Voltage Sensor into the VOLT Telemetry Port on the PowerSafe Receivers.
2. Splice the other end into the flight battery pack noting polarity.



For information on Spektrum Telemetry Sensors visit:
http://www.spektrumrc.com

Receiver Power System Requirements

Inadequate power systems that are unable to provide the necessary minimum voltage to the receiver during flight have become the number one cause of in-flight failures. Some of the power system components that affect the ability to properly deliver adequate power include:

- Receiver battery pack (number of cells, capacity, cell type, state of charge)
- The ESC's capability to deliver current to the receiver in electric aircraft
- The switch harness, battery leads, servo leads, regulators etc.

The AR9130T/AR12300T/AR20300T have a minimum operational voltage of 3.5 volts; it is highly recommended the power system be tested per the guidelines below.

Recommended Power System Test Guidelines
If a questionable power system is being used (e.g. small or old battery, ESC that may not have a BEC that will support high-current draw, etc.), it is recommended that a voltmeter be used to perform the following tests.

The Hangar 9® Digital Servo & Rx Current Meter (HAN172) or the Spektrum Flight Log (SPM9540) is the perfect tool to perform the test below.

Plug the voltmeter into an open channel port in the receiver and with the system on, or simply monitor the voltage on a telemetry capable transmitter, load the control surfaces (apply pressure with your hand) while monitoring the voltage at the receiver. The voltage should remain above 4.8 volts even when all servos are heavily loaded.

How QuickConnect™ Techonlogy Works

- When the receiver voltage drops below 3.5 volts the system ceases to operate.
- When power is restored the receiver immediately attempts to reconnect.
- If the transmitter was left on, the system reconnects typically in about 4/100 of a second.

NOTICE: If a brownout occurs in flight it is vital that the cause of the brownout be determined and corrected.

Important: Y-Harnesses and Servo Extensions
When using a Y-harness or servo extensions in your installation, it's important to use standard non-amplified Y-harnesses and servo extensions as this can/will cause the servos to operate erratically or not function at all. Amplified Y-harnesses were developed several years ago to boost the signal for some older PCM systems and should not be used with Spektrum equipment.
Note that when converting an existing model to Spektrum be certain that all amplified Y-harnesses and/or servo extensions are replaced with conventional non-amplified versions.

ModelMatch™ Technology

Some Spektrum and JR transmitters offer a patent pending feature called ModelMatch. ModelMatch technology prevents the possibility of operating a model using the wrong model memory, potentially preventing a crash. With ModelMatch, each model memory has its own unique code (GUID) and during the binding process the code is programmed into the receiver. Later, when the system is turned on, the receiver will only connect to the transmitter if the corresponding model memory is programmed on screen.

If at any time you turn on the system and it fails to connect, check to be sure the correct model memory is selected in the transmitter. Please note that the DX5e and Aircraft Modules do not have ModelMatch technology.

Frequently Asked Questions on Spektrum 2.4GHz

1. **Q: After I've bound the receiver to my transmitter, which do I turn on first when I want to fly?**

   A: Either one. Every DSM 2.4GHz transmitter has a GUID (Globally Unique Identifier) code imbedded in its signal. When you bind a DSM receiver to your transmitter, this GUID code is stored in the receiver. If you turn the receiver on before the transmitter, you don't have to worry about it responding to another transmitter. The receiver will go into failsafe mode while it waits for a signal from the transmitter with the same GUID code it has stored. See the Receiver Power Only section for more information. If a DSM transmitter is turned on first you can expect it to connect within 6 seconds of powering on the receiver.

2. **Q: Sometimes the system takes longer to connect or doesn't connect at all. Why?**

   A: In order for a DSM system to connect, the receiver must receive a large number of uninterrupted signal packets from the transmitter. This process takes just a few seconds, but if the transmitter is too close to the receiver (within 4 feet) or near reflective material (metal objects, carbon fiber material, etc.) it may detect its own reflected 2.4GHz energy as "noise". This can delay or prevent connection. If this happens, make sure you are a sufficient distance from metal objects and the receiver itself before you power up and try again.

3. **Q: How important is Flight Log information?**

   A: All 2.4GHz signals, not just DSM, are affected by proximity to conductive materials such as carbon fiber or metal. If you are flying a model that uses a lot of conductive materials in its construction, Flight Log information can be helpful. The information collected when you fly can help determine the optimum location for your receiver(s) so you can minimize the effects of these materials on your signal performance.

1-Year Limited Warranty

What this Warranty Covers - Horizon Hobby, LLC, (Horizon) warrants to the original purchaser that the product purchased (the "Product") will be free from defects in materials and workmanship for a period of 1 year from the date of purchase.

What is Not Covered

This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, (v) Product not purchased from an authorized Horizon dealer, (vi) Product not compliant with applicable technical regulations, or (vii) use that violates any applicable laws, rules, or regulations.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Remedy

Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims. SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

Limitation of Liability

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

Law

These terms are governed by Illinois law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

WARRANTY SERVICES

Questions, Assistance, and Services

Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact your local distributor or Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may

need any assistance. For questions or assistance, please visit our website at www.horizonhobby.com, submit a Product Support Inquiry, or call the toll free telephone number referenced in the Warranty and Service Contact Information section to speak with a Product Support representative.

Inspection or Services

If this Product needs to be inspected or serviced and is compliant in the country you live and use the Product in, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. An Online Service Request is available at http://www.horizonhobby.com/content/service-center_render-service-center. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

NOTICE: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

Warranty Requirements

For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Service

Should your service not be covered by warranty, service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashier's checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/content/service-center_render-service-center.

ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

Warranty and Service Contact Information

Country of Purchase	Horizon Hobby	Contact Information	Address
United States of America	Horizon Service Center (Repairs and Repair Requests)	servicecenter.horizonhobby.com/RequestForm/	4105 Fieldstone Rd Champaign, Illinois, 61822 USA
	Horizon Product Support (Product Technical Assistance)	productsupport@horizonhobby.com.	
		877-504-0233	
	Sales	websales@horizonhobby.com	
		800-338-4639	
United Kingdom	Service/Parts/Sales: Horizon Hobby Limited	sales@horizonhobby.co.uk	Units 1–4, Ployters Rd, Staple Tye, Harlow Essex, CM18 7NS United Kingdom
		+44 (0) 1279 641 097	
Germany	Horizon Technischer Service	service@horizonhobby.de	Christian-Junge--Straße 1 25337 Elmshorn, Germany
	Sales: Horizon Hobby GmbH	+49 (0) 4121 2655 100	
France	Service/Parts/Sales: Horizon Hobby SAS	infofrance@horizonhobby.com	11 Rue Georges Charpak 77127 Lieusaint, France
		+33 (0) 1 60 18 34 90	

FCC Information – FCC ID: BRWAR9130T • FCC ID: BRWAR20300T

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 to an outlet on a circuit different from that to which the receiver is connected.

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.

NOTICE: Modifications to this product will void the user's authority to operate this equipment.

This product contains a radio transmitter with wireless technology which has been tested and found to be compliant with the applicable regulations governing a radio transmitter in the 2.400GHz to 2.4835GHz frequency range.

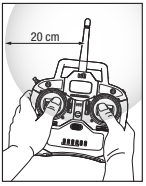
IC Information – IC: 6157A-AR9130T • IC: 6157A-AR20300T

This device complies with Industry Canada license-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.

Antenna Separation Distance

When operating your transmitter, please be sure to maintain a separation distance of at least 20 cm between your body (excluding fingers, hands, wrists, ankles and feet) and the antenna to meet RF exposure safety requirements as determined by FCC regulations.

This illustration shows the approximate 20 cm RF exposure area and typical hand placement when operating your transmitter.



Compliance Information for the European Union

Horizon Hobby, LLC hereby declares that this product is in compliance with the essential requirements and other relevant provisions of the RED Directive.

A copy of the EU Declaration of Conformity is available online at: http://www.horizonhobby.com/content/support-render-compliance.

Instructions for Disposal of WEEE by Users in the European Union

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

E328

HINWEIS

Alle Anweisungen, Garantien und andere zugehörige Dokumente können im eigenen Ermessen von Horizon Hobby, LLC jederzeit geändert werden. Die aktuelle Produktliteratur finden Sie auf horizonhobby.com unter der Registerkarte „Support" für das betreffende Produkt.

Spezielle Bedeutungen

Die folgenden Begriffe werden in der gesamten Produktliteratur verwendet, um auf unterschiedlich hohe Gefahrenrisiken beim Betrieb dieses Produkts hinzuweisen:

HINWEIS: Wenn diese Verfahren nicht korrekt befolgt werden, können sich möglicherweise Sachschäden UND geringe oder keine Gefahr von Verletzungen ergeben.

ACHTUNG: Wenn diese Verfahren nicht korrekt befolgt werden, ergeben sich wahrscheinlich Sachschäden UND die Gefahr von schweren Verletzungen.

WARNUNG: Wenn diese Verfahren nicht korrekt befolgt werden, ergeben sich wahrscheinlich Sachschäden, Kollateralschäden und schwere Verletzungen ODER mit hoher Wahrscheinlichkeit oberflächliche Verletzungen.

WARNUNG: Lesen Sie die GESAMTE Bedienungsanleitung, um sich vor dem Betrieb mit den Produktfunktionen vertraut zu machen. Wird das Produkt nicht korrekt betrieben, kann dies zu Schäden am Produkt oder persönlichem Eigentum führen oder schwere Verletzungen verursachen.

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Nicht geeignet für Kinder unter 14 Jahren. Dies ist kein Spielzeug.

WARNUNG ZU GEFÄLSCHTEN PRODUKTEN

Bitte kaufen Sie Spektrum Produkte immer von einem autorisierten Händler um sicher zu stellen, dass Sie ein authentisches hochqualitatives original Spektrum Produkt gekauft haben. Horizon Hobby lehnt jede Unterstützung, Service oder Garantieleistung von gefälschten Produkten oder Produkten ab die von sich in Anspruch nehmen kompatibel mit Spektrum oder DSM zu sein.

HINWEIS: Dieses Produkt ist ausschließlich für die Verwendung in unbemannten ferngesteuerten Fahrzeugen und Fluggeräten im Hobbybereich vorgesehen. Horizon Hobby lehnt jede Haftung und Garantieleistung ausserhalb der vorgesehen Verwendung ab.

GARANTIE REGISTRIERUNG

Registrieren Sie bitte Ihr Produkt unter www.spektrumrc.com/registration.

User Guide

Die Spektrum AR9130T, AR12300T und AR20300T PowerSafe Telemetrie-empfänger bieten die ultimative Lösung für den Betrieb von Funksystemen mit hohem Stromverbrauch. PowerSafe bietet die ultimative Lösung für die Versorgung von RC Empfangssystemen mit hohem Strombedarf (Große Scale Flugzeuge, Jets etc.) Der kann Spannungen von bis zu 50 Ampere liefern und bietet echte duale Akku Redundanz. Das System ist mit einem Softschalter ausgestattet. Sollte dieser beschädigt werden oder ausfallen arbeitet das System weiter. Mit der Bestückung von bis zu 4 Empfangssatelliten können selbst technisch sehr anspruchsvolle Flugzeuge sicher ausgerüstet werden, die einen Anteil an RF schirmenden Materialien haben. Für Modell mit einem hohen Anteil an Carbon/ Kohlefaserbauteilen ist der SPM9646 DSMX Carbon Satellitenempfänger kompatibel mit dem PowerSafe.

Diese Telemetrieempfänger umfassen 4 integrierte Telemetrieanschlüsse, die mit den telemetriefähigen Spektrum-Sendern kompatibel sind.

Weitere Informationen zu den Spektrum-Telemetriesensoren finden Sie unter: http://www.spektrumrc.com

Anwendungen:

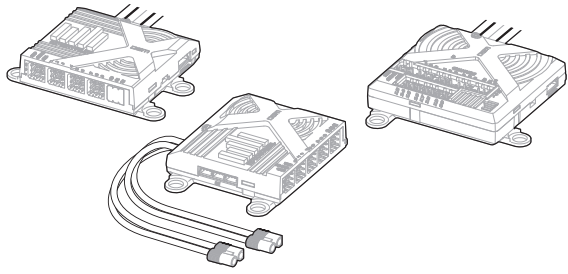
- Große Scale Flugzeuge
- Jets mit Hochleistungsservos
- Scale Flugzeuge mit Hochleistungsservos und Zusatzfunktionen (Licht, Regler, Pneumatikventile etc..)
- Scale Helicopter

Eigenschaften

- Echte Akku Redundanz. Jeder Akku ist isoliert und übernimmt bei Ausfall des anderen die Stromversorgung.
- Ermöglicht mit dem Einsatz von bis zu 3 Satellitenempfängern eine saubere RF Verbindung auch in sehr anspruchsvollen RF Umgebungen.
- Liefert bis zu 35 Ampere kontinuierlich und bis zu 50 Ampere Spitzen-strom.
- Eingebautes Schalter Failsafe für den Fall dass der Schalter beschädigt wird.
- Wählbares Failsafe- SmartSafe und Preset Failsafe (alle Servos)
- Quick Connect - das System verbindet sich innerhalb einer halben Sekunde nach einem Spannungsabfall erneut.
- Flight Log kompatibel
- Fertig konfektionierte E-flite EC3 Anschlüsse auf 16AWG Anschlußka-beln.
- Kompatibel mit allen DSM2 Spektrum und JR Modulen mit voller Reichweite.
- 2048 Schritte Auflösung
- X Plus kompatibe

WICHTIG: Der PowerSafe-Empfänger verfügt über eine Stromverteilung, die bis zu 35 A Dauerstrom und 50 A Spitzenstrom zum Betreiben Ihres Systems bietet.Die AR9130T, AR12300T und AR20300T PowerSafe-Empfänger nutzen bis zu drei (wobei mindestens 1 für den Betrieb verbundenen ist) extern mon-tierte Empfänger, die optimal im Flugzeug platziert sind und die bestmögliche RF-Verbindung in den schwierigsten Bedingungen bieten.

Specifications	AR9130T	AR12300T	AR20300T
Typ	DSM2/DSMX PowerSafe Telemetrieempfänger		
Abmessungen (LxBxH)	55,12 x 55,94 x 1,73mm	55,12 x 55,94 x 17,73mm	64,31 x 61,03 x 16,29mm
Gewicht	48,19g	48,19g	59,5g
Antenne Länge	(1) - 6", (1) - 7"		
Funk Empfänger	Ja (2) - mitgeliefert	Ja (3) - mitgeliefert	Ja (3) - mitgeliefert
Kanäle	9	12	20
Band	2,4GHz		
Spannungsbereich	3,5-10V		



Mitgelieferte Bauteile	AR9130T	AR12300T	AR20300T
SPM9645	(2) DSMX-Funkempfänger	(3) DSMX-Funkempfänger	(3) DSMX-Funkempfänger
SPM9011	9" Externe Empfängerverlängerung	9" Externe Empfängerverlängerung	9" Externe Empfängerverlängerung
SPM9012	12" Externe Empfängerverlängerung	12" Externe Empfängerverlängerung	12" Externe Empfängerverlängerung
SPM9013	N/A	24" Externe Empfängerverlängerung	24" Externe Empfängerverlängerung
SPM6820	Soft-Taste	Soft-Taste	Soft-Taste
	Bedienungsanleitung	Bedienungsanleitung	Bedienungsanleitung
EFLAEC302	(2) EC3 Akkustecker	(2) EC3 Akkustecker	(2) EC3 Akkustecker
	(2) Steckdose	(2) Steckdose	(2) Steckdose
SPMA9570A	Flugzeug Telemetrie Voltsensor	Flugzeug Telemetrie Voltsensor	Flugzeug Telemetrie Voltsensor

Die Stromversorgung

Betrieb mit einem Akku

Der PowerSafe kann mit einem oder mit zwei Akkus betrieben werden. Wenn Sie nur einen Akku verwenden, stecken Sie ihn bitte an den Akkuanschluss Ihrer Wahl. (BATT 1 oder BATT2) Wenn Sie nur einen Akku verwenden, sichern Sie bitte den zweiten Stecker im Flugzeug, dass er nicht während des Fluges herumschleudert. Der Akkustecker des nicht benutzten 2. Anschlusses steht nicht unter Strom. Ist das System mit einem Akku eingeschaltet leuchtet eine blaue LED.

Betrieb mit zwei Akkus

Der PowerSafe kann mit zwei Akkus betrieben werden, die jeweils eine komplette redundante Stromversorgung darstellen. Sollte ein Akku ausfallen durch Defekt, Entladung oder Kurzschluß übernimmt das zweite Akku die Versorgung.

Wenn Sie das System mit zwei Akkus betreiben ist es wichtig, dass beide Akkus die gleiche Kapazität und idealerweise das gleiche Alter und den gleichen Wartungszustand haben.

Es ist normal, dass sich ein Akku stärker entlädt als das andere. Der Akku mit der höheren Volt Zahl oder dem geringeren Innenwiederstand wir sich eher entladen. Normalerweise ist dieser Unterschied kleiner als 10%. Aus diesem Grund wird auch normalerweise nur eine LED leuchten, solange das System nicht unter schwerer Last steht.

Werden zwei Akkus verwendet, verdoppelt sich die totale verfügbare Kapazität auf die Summe der beiden Akkus z.B BATT1 - 2000 mAh + BATT2 2000 mAh = gesamt Kapazität 4000 mAh.

Für den Fall, dass der Akku weiter entfernt von der PowerSafe Einheit eingebaut werden soll sind 30,48 cm und 60,96 cm Akkukabelverlängerungen verfügbar.

Betrieb mit dualen Spannungsreglern

Spektrum bietet einen 7,5 Ampere (11 Amp Peak) 6.0 Volt Spannungsregler (SPMVR6007) an der speziell für den Betrieb mit dem AR12120 PowerSafe entwickelt wurde.

WICHTIG: Wenn Sie zwei Akkus zusammen mit zwei Spannungsreglern verwenden, arbeitet jeder Regler unabhängig und es ist normal das sich ein Akku etwas mehr entlädt als der andere. Überprüfen Sie bitte daher regelmäßig den Zustand des Akku, zum Beispiel mit einen Akku Tester (Best HAN 171) und laden die Akkus nach wenn der schwächste 40% seiner Kapazität erreicht hat.

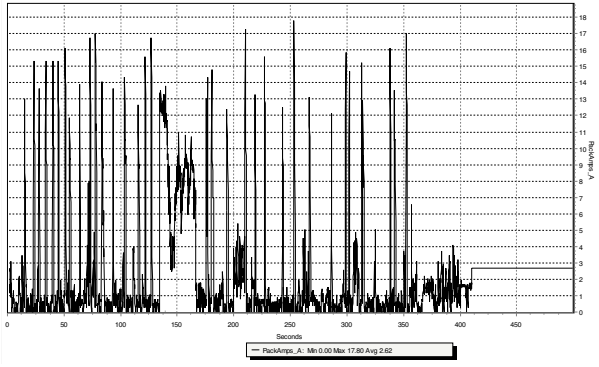
Akkukapazität

Es ist sehr wichtig, dass Sie für Ihr Modell Empfängerakkus auswählen, die eine deutliche größere Kapazität aufweisen als die die für einen Flug benötigt wird. Wir haben zur Veranschaulichung der benötigten Kapazität Testflüge durchgeführt. Die unten stehenden Grafiken stellen dieses dar. Der Stromverbrauch ist grundsätzlich abhängig von dem Typ der eingebauten Servos und dem Flugstil.

Das folgende Set Up kann als Extrembeispiel für Kunstflug gewertet werden. Es ist nicht ratsam dieses Set Up zu verwenden, ohne das eine ausreichende Stromversorgung sicher gestellt ist.

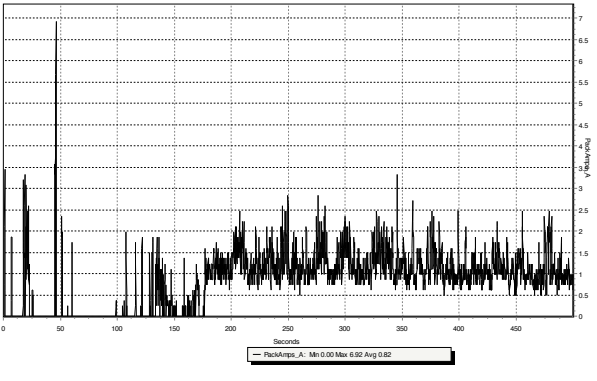
Flugzeug	40% YAK
Servos	9-JR8711's 1-8317 (Gas)
Akkus	Zwei 4000 mA 7,4 V 2-Zellen-Li-Po
Regler	None
Motor	DA150
Gewicht	40 lb
Flugbereich	3D aggressiv, 3D moderat
Durchschnittliche Stromstärke:	2,62 A
Spitzenstrom:	17,8 A
Milliampere (je 10-Minuten-Flug verbraucht):	435mAh

Die Servotypen JR8711 und 8317 sind bis 6 Volt zugelassen. Bei Betrieb mit höherer Spannung erlischt die Garantie.



In dem oben beschriebenen Beispiel beträgt der durchschnittliche Stromverbrauch 2,62 Ampere, der sich zu 435mAh per 10 Minuten Flugzeit summiert. Für einen sicheren Flugbetrieb ist es empfohlen, nur ca. 60% der Akkukapazität zu nutzen. In unserem Beispiel, wo zwei 4000mAh Akkus genutzt werden (8000mAh Gesamtkapazität) x 60%= 4800m Ah (empfohlene Entnahme) steht dann bei einem Verbrauch von 435mAh per 10 Minuten Flug Akkukapazität für 11 Flüge (mit je 10 Minuten Dauer) zur Verfügung.

Flugzeug	33% Sukhoi
Servos	7-JR8611's 1-8317 (throttle)
Akkus	1- 4000mAh 2-cell 7.4-volt LiPo
Regler	6 volts
Motor	DA100
Gewicht	26 lb
Flugbereich	Moderate 3D
Durchschnittliche Stromstärke:	,82 amps
Spitzenstrom:	6,92 amps
Milliampere (je 10-Minuten-Flug verbraucht):	137mAh



Empfohlene Richtlinien für Akkukapazität
Maßstab 40–45% Kunstflugzeug mit 9–12 Hochleistungsservos: 4000–8000mAh
Maßstab 33–35% Kunstflugzeug mit 7–10 Hochleistungsservos: 3000–6000mAh
Maßstab 25% Quarter Scale Kunstflugzeug mit 5–7 Hochleistungsservos: 2000–4000mAh
Jets–BVM Super BANDIT F86 Euro Sport etc.: 3000–6000mAh
Groß Modelle und Jets: BVM Ultra Bandit: 4000–8000mAh

Scale Flugzeuge: Die große Vielfalt an Schale Flugzeugen und Ihren Funktionen macht es schwierig hier die genaue benötigte Akkukapazität zu nennen. Sie können jedoch die genannten Beispiele in Relation zur Größe des Modells und Anzahl der benötigten Servos zur Ermittlung ihrer benötigen Akkukapazität als konservative Richtlinie verwenden. Bitte prüfen Sie immer vor jedem Flug den Ladezustand ihrer Akkus.

Empfängerstromversorgung

Wichtig: Verwenden Sie keines Falls 4 Zellen 4,8 Volt zur Stromversorgung.

4,8 Volt Akkus, haben wenn das System voll belastet wird, keine Reserven und so kann die Spannung unter 3,5 Volt fallen und einen Kontrollverlust des Flugzeuges zur Folge haben.

Der PowerSafe ist für eine Betriebsspannung für 6.0 bis 10 Volt ausgelegt. Limitierender Faktor sind grundsätzlich die Servos. Die meisten Servos sind kompatibel zu 5 Zellen, 6 Volt Packs und somit zum Standard geworden. Bitte berücksichtigen Sie, daß NiMH Zellen bei Schnellladung dazu neigen einen falschen Peak auszulösen, der dem Ladegerät ein voll geladenes Akku signalisiert. Seien Sie bitte bei der Verwendung solcher Akkutypen vorsichtig und überzeugen sich immer vom Ladezustand des Akkus.

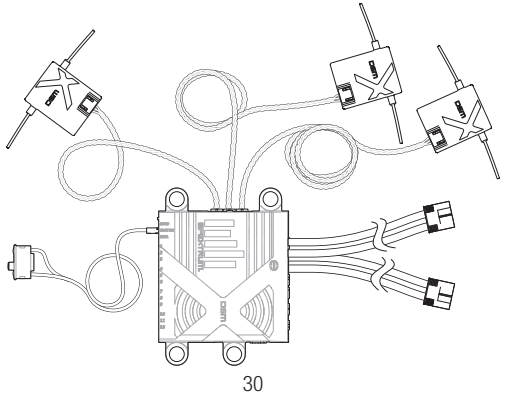
Viele Piloten nutzen schon 2 LiPo Akkus zur Empfängerstromversorgung. Diese Akkus bieten mehr Kapazität im Verhältnis Größe/ Gewicht und sind leichter zu laden.

Bevor Sie LiPo Akkus zur Empfängerstromversorgung einsetzen, prüfen Sie bitte den Spannungsbereich der Servos. Der Einsatz eines Spannungsreglers wie dem Spektrum Spannungsregler VR6007 (SPMVR6007) ist hierbei sehr hilfreich.

Bitte beachten Sie, dass wenn ein Empfängerakku an den PowerSafe angeschlossen ist, ein Ruhestrom von ca. 1mA fließt. Bitte trennen Sie daher die Steckverbindung wenn Sie nicht fliegen, um eine Tiefentladung des Empfängerakkus zu vermeiden.

Installation

Der PowerSafe-Empfänger benötigt mindestens einen Funkempfänger für den Betrieb. Zwei oder drei Funkempfänger sind enthalten und in den meisten Fällen wird empfohlen, dass zwei oder drei Empfänger verwendet werden. Jeder Empfänger funktioniert unabhängig und zusätzliche Empfänger (bis zu drei) bieten eine sichere RF-Verbindung in schwierigen Umgebungen. Die zusätzliche Sicherheit durch Redundanz wird bei einem Ausfall die leicht negativen Auswirkungen von Kosten und Gewicht überwiegen.



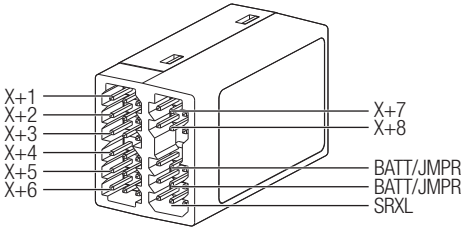
1. Bitte benutzen Sie geschäumtes doppelseitiges Klebeband und Kabelbinder um die die PowerSafe Einheit zu befestigen. Wählen Sie als Einbauort den Platz, wo normalerweise auch der Empfänger eingebaut wird.
2. Befestigen Sie den Schalter an der Rumpfseite des Flugzeuges und stecken Sie den Stecker des Schalters in die Buchse Switch an der PowerSafe Einheit.

Der Ein/Aus Schalter ist ein spezieller Schalter. Herkömmliche Ein/Aus Schalter sind nicht kompatibel mit dem PowerSafe.

Einbau des optionalen X-Plus 8 Modul

Bei der Verwendung eines X-Plus™ Empfänger und Modules ist es empfohlen das X-Plus 8 Modul so nah wie möglich am Empfänger zu montieren um Spannungsverluste zu vermeiden Servoverlängerungen können für jedes Servo verwendet werden, wir empfehlen ein 22 Gauge Kabel mit Goldkontaktsteckern.

Verwenden Sie ein separates Akku brauchen Sie den X-Plus Jumper nicht zu stecken und können das X-Plus 8 Modul so weit weg vom Empfänger montieren wie Sie es wünschen.



Einbau der Akkus

Folgen Sie den beschriebenen Richtlinien und wählen ein Akkussystem das am besten zu dem Flugzeugtyp paßt. Bauen Sie dieses mit den Spannungsregler(n) in ihrem Luftfahrzeug ein. Schließen Sie den Akku an dem PowerSafe Empfänger an. Spektrum Akkus sind bereits mit dem EC3 Stecksystem ausgerüstet und können direkt eingesteckt werden. Sollten Sie einen anderen Hersteller verwenden, müssen Sie noch EC3 Anschlüsse an die Akkus anlöten.(Zwei Stecker sind im Lieferumfang) Sollten Sie einen Spannungsregler verwenden bauen Sie die Akkus nach der Richtlinie des Herstellers ein.

Einbau der Satellitenempfänger

Antennen Polarisation
For optimum reception it is important that the satellite receivers are installed in such a way that there is an optimal connection in every possible flight position and height. This setting is called antenna polarization. If you use two satellite receivers, the antennas should be aligned at right angles to each other. Typically, one antenna should be vertical and the other horizontal. (See figure on page 11 - 12) This orientation allows the greatest visual connection to the aircraft from all possible flight positions.

Use three antennas to mount an antenna vertically, one horizontally in the direction of the tailplane, and the third at a right angle to the tailplane. (See illustration) This alignment covers the X, Y and Z axes and provides an excellent visual connection. The optional fourth antenna can be mounted at an intermediate angle for further reception improvement.

Lokalisierung der Einbauorte der Satelliten Empfänge

Während das 2,4GHz System generell gegenüber Störungen nicht anfällig ist, sollten Sie bei der Montage der Satellitenempfänger von folgenden Bauteilen einen Mindestabstand von 10,2 cm oder mehr einhalten.

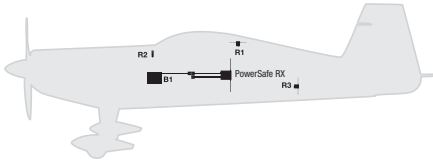
- Zündsysteme
- Zündschalter
- Treibstoffpumpen
- Empfänger Akkus
- Zündakkus
- Motoren
- E-Motoren
- Treibstofftanks
- RF schirmende Metallbauteile
- Temperaturbelastete Bauteile wie Auspuffanlagen
- Bauteile die hohen Vibrationen ausgesetzt sind

Die Satellitenempfänger sollten mindestens 5cm voneinander entfernt eingebaut werden um die Empfangsleistungen gerade in kritischen Umgebungen zu verbessern. In großen Flugzeugen, wo Platz kein Problem ist, montieren Sie bitte die Empfänger wie in den Abbildungen dargestellt. Spektrum bietet hierzu Kabelverlängerungen von 15,24 cm bis 91,44 cm an, die eine optimale Montage in allen Flugzeugen ermöglichen.

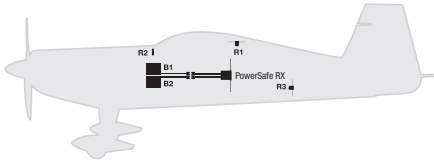
Verwenden Sie bitte zur Montage dickes geschäumtes doppelseitiges Klebeband und Kabelbinder. Sie benötigen mindestens 3 Empfänger, die wie abgebildet in das Flugzeug eingebaut werden und am PowerSafe eingesteckt werden.

Die folgenden Abbildungen zeigen empfohlene Einbauvarianten. Bitte beachten Sie die Einbaurichtung der Empfänger/ Antennen.

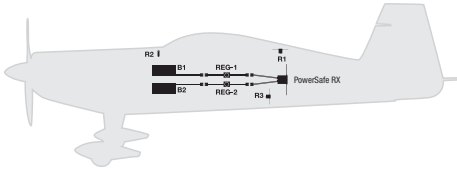
• 35 % Kunstflugflugzeug mit einem einzigen NiMH-Akku und drei Funkempfängern



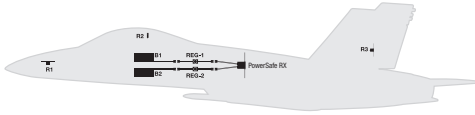
• 35 % Kunstflugflugzeug mit zwei NiMH-Akkus und drei Funkempfängern



• 40 % Kunstflugflugzeug mit zwei LiPo-Akkus, zwei Reglern und drei Funkempfängern



• Jet mit zwei LiPo-Akkus, zwei Reglern und drei Funkempfängern



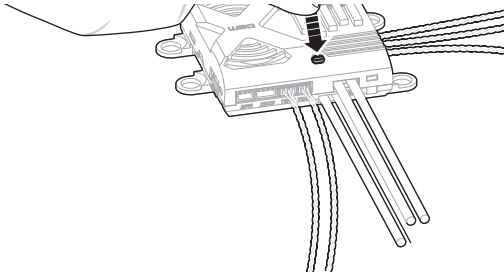
Binden

HINWEIS: Damit das System betrieben werden kann, muss ein Funkempfänger verbunden sein. Wird ein zusätzlicher Funkempfänger nach dem Binden hinzugefügt, muss das System erneut gebunden werden, um den zusätzlichen Funkempfänger zu erkennen.

How To Bind the PowerSafe Receiver

Für den Betrieb muß der Empfänger an den Sender gebunden werden. Binden ist der Prozess der Programmierung des Empfängers mit dem eindeutigen Signal eines spezifischen Senders (GUID) ist der Empfänger an den Sender gebunden wird nur er auf die Signale des Senders reagieren.

1. Die Funkempfänger und jeden Telemetriesensor mit dem Hauptempfänger verbinden.
2. Bindungsschalter auf dem PowerSafe-Empfänger beim Einschalten der Soft-Taste betätigen und gedrückt halten.



TIPP: Es ist auch noch möglich den Bindestecker zur Bindung zu nutzen.

3. Aktivieren Sie die Bindung bei dem Sender.
4. Der Bindevorgang ist durchgeführt wenn die orange LED leuchtet.

HINWEIS: Sollten Sie einen Bindestecker verwenden entfernen Sie diesen nach dem Bindevorgang um eine unbeabsichtigte Bindung zu vermeiden.

5. Nachdem Sie ihr Modell programmiert haben müssen Sie es noch einmal binden damit der Empfänger die gewünschten Failsafeeinstellungen übernimmt. Lesen Sie dazu die Informationen auf der nächsten Seite.

Failsafe

Stellen Sie sicher, dass das Luftfahrzeug am Boden gesichert ist und Nehmen Sie die Propeller. Testen Failsafe den Sender auszuschalten, und beachten sie wie der Empfänger ist treiben Ruderflächen.

Empfänger ist eingeschaltet (ohne Sender)

Wenn der Empfänger eingeschaltet ist, fahren alle Servos mit Ausnahme des Gaskanals in Ihre programmierten Failsafe Positionen. (normalerweise alle Ruder auf neutral und Fahwerk ausgefahren)
Der Gaskanal erhält keinen Steuerimpuls um ein unbeabsichtigtes Laufen lassen oder scharf schalten des Antriebs zu verhindern. In Modellen mit Verbrennungsmotor erhält das Gasservo keinen Impuls. Einige analoge Servos können sich bei dem Einschalten leicht bewegen, das ist normal.
Der Empfänger bleibt im Standby Mode (in Bereitschaft) mit der blauen Akku Kontroll-LED an. Wird der Sender eingeschaltet erhält der Empfänger das GUID Signal des Senders und verbindet sich. Nach dem Verbinden werden alle gelben LED der Empfänger leuchten.

SmartSafe + Hold Last

Im Falle eines Signalverlustes fährt die Smart Safe Technologie den Gaskanal in die bei dem Binden eingestellte Failsafeposition. Alle anderen Kanäle halten ihre letzte Position. Erkennt der Empfänger wieder das Sendersignal haben Sie wieder volle Kontrolle über das Modell.

Tipp: Verwenden Sie entweder den Bindebutton oder den Bindestecker in dem BIND /BATT Port.

SmartSafe + Letzen halten

1	Gas auf Empfänger senken
2	Bindungsschalter betätigen und gedrückt halten
3	Empfänger einschalten
4	Schalter loslassen, sobald RX in Bindungsmodus übergeht (blinkende LED)
5	Empfänger in Bindungsmodus bringen und Binden abschließen.

A*	*Bindungsstecker montieren (optional)*
B*	*Während des gesamten Bindungsprozessen eingesteckt belassen***

Preset Failsafe

Die Preset Failsafe Funktion ist ideal für Segelflugzeuge da sie ein wegfliegen in der Thermik bei Signalverlust verhindern kann. Mit der Preset Failsafefunktion fahren alle Kanäle in die vorgegebenen Positionen. Erkennt der Empfänger wieder das Sendersignal haben Sie wieder volle Kontrolle über das Modell.

FAILSAFE VOREINSTELLEN

1	Alle Hebel und Schalter auf dem Empfänger in die Failsafe-Position bringen.
2	Bindungsschalter betätigen und gedrückt halten
3	Empfänger einschalten
4	Schalter loslassen, nachdem RX in Bindungsmodus übergeht (blinkende LED)
5	Bindungsschalter erneut betätigen und gedrückt halten, eher der Sender in den Bindungsmodus übergeht.

A*	*Bindungsstecker montieren (optional)*
B*	*Stecker entfernen, sobald RX in den Bindungsmodus übergeht*

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

Bei eingeschalteten Sender und Empfänger
Wird SmartSafe durch einen Signalverlust bei eingeschalteten Empfänger aktiv, fährt nur das Gasservo (oder Regler) in die Leerlaufstellung oder die Position die während des Bindevorganges eingestellt wurde. Alle anderen Kanäle halten ihre Position. Ist das Signal wieder da, wird sich das System in weniger als 4ms wieder binden.

Reichweitentest

Führen Sie vor jedem Flugtag einen sorgfältigen Reichweitentest durch. Alle Spektrum Systeme verfügen über einen Test, der die Ausgangsleistung reduziert, wenn er aktiviert wird.

1. Entfernen Sie sich 30 Schritte von dem am Boden* stehenden Modell.
2. Richten Sie den Sender so zum Modell aus, wie Sie üblicherweise fliegen. Aktivieren Sie den Reichweitentestfunktion.
3. Sie sollten in dieser Entfernung komplette Kontrolle über das Modell haben.
4. Sollten bei diesem Test Probleme auftreten wenden Sie sich bitte an den Fachhändler oder an den technischen Service von Horizon Hobby

Erweiterter Reichweitentest

Für hochentwickelte Modelle, die überwiegend leitfähiges Material enthalten, wird der erweiterte Reichweitentest mit einem Flight Log empfohlen. Der erweiterte Reichweitentest bestätigt, dass die internen und Satellitenempfänger optimal arbeiten, und dass der Einbau (die Position der Empfänger) für das jeweilige Flugzeug optimiert wurde. Dieser erweiterte Reichweitentest gestattet, die RF-Leistung der einzelnen Empfänger auszuwerten und die Positionen des Satellitenempfänger zu optimieren.

WICHTIG: Sollten Sie keinen Telemetrie-fähigen Sender oder STI Interface haben, können Sie ein Flight Log an den BIND/Prog Eingang des Empfängers anschließen.

1. Stecken Sie das Anschlußkabel des Flight Log in den Data Anschluss und schalten Sie Sender und Empfänger ein.
2. Drücken Sie den Knopf auf dem Flight Log bis auf dem Display Frame Losses erscheint.
3. Bitten Sie einen Helfer das Modell zu halten und dabei den Flight Log zu beobachten.
4. Stellen Sie sich bitte ca. 28 Meter entfernt vom Modell und aktivieren Sie den Reichweitentest.
5. Bitten Sie den Helfer das Modell in alle möglichen Lagen (Nase rauf/ runter, zu dem Sender hin/ vom Sender weg.....) zu bringen und dabei den Flight zu beobachten. Machen Sie diese bitte für eine Minute. Der Timer auf der Fernsteuerung kann hier hilfreich sein. Für Großmodelle ist es empfohlen, sie auf die Nase zu stellen und sie für eine Minute um die eigene Achse zu drehen. Stellen Sie danach das Modell auf das Fahrwerk und drehen es ebenfalls um die eigene Achse.
6. Ein erfolgreicher Reichweitentest wird weniger als 10 Frame Losses haben. Drücken Sie den Knopf auf dem Flight Log und blättern Sie durch die Empfangsleistung jeder einzelnen Antenne. Die Antennenausblendungen sollten sein bei allen Antennen relativ gleich ein. Sollte eine Antenne auffallend mehr Frame Losses zeigen, ist sie an einem anderem Ort zu montieren oder anders auszurichten.

7. Ein erfolgreicher Reichweitentest sieht im Details so aus:

   H - 0 Holds
   F - weniger als 10 Frame Losses

   A, B, R, L Frame Losses werden in der Regel unter 100 sein. Es ist wichtig die einzelnen Antennen miteinander zu vergleichen. Sollte eine Antenne deutlich höhere Werte aufweisen (2 - 3 Mal mehr) sollte der Test wiederholt werden. Ergeben sich dann die gleichen Werte sollte der betreffende Empfänger an einer anderen Stelle eingebaut werden.

Flight Log

Wenn Sie nicht über eine telemetriefähigen Spektrum-Empfänger verfügen, Spektrum Flight Log (SPM9540) ist außerdem mit den AR9130T, AR12300T und AR20300T PowerSafe-Empfängern kompatibel.
The Flight Log displays overall RF link performance as well as the individual internal and external receiver link data. Additionally it displays receiver voltage.

So nutzen Sie das Flight Log:
Nach dem Flug bevor Sie den Empfänger ausschalten stecken Sie das Flight Log in den Datenport des PowerSafe Empfängers. Das Display zeigt ihnen dann automatisch die Spannung an 6v2 = 6,2 Volt.

HINWEIS: Wenn die Spannung 4,8 Volt oder weniger erreicht blinkt das Display und zeigt ihnen damit die niedrige Spannung an.

Drücken Sie auf den Knopf am Display um folgende Informationen abzurufen:

A - Antenne wird auf Antenne A schwächer	B - Antenne wird auf Antenne B schwächer
L - Antenne wird auf linker Antenne schwächer	R - Antenne wird auf rechter Antenne schwächer
F - Videoverlust	H - Halten

Antennen Ausblendungen

Steht für den Verlust von einem kleinem Informationsanteil an dieser Antenne Normal sind 50 bis 100 Ausblendungen pro Flug. Sollte eine Antenne über 500 Ausblendungen in einem Flug anzeigenmuß sie neu positioniert werden.

Frame loss

steht für die gleichzeitige Ausblendung aller Antennen im Flug dar. Arbeitet die HF Strecke einwandfrei, dürfen nicht mehr als 20 Datenpakete pro Flug verloren gehen.

Hold

Ein Hold tritt ein, wenn 45 aufeinanderfolgende Dateblöcke verloren gehen. Diese dauert ca. 1 Sekunde. Wenn ein Hold auftritt, muss das gesamte System sorgfältig geprüft werden. Die Position der Antennen und die Funktion der Empfänger und des Senders sind zu prüfen

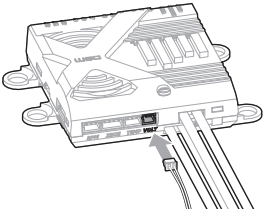
Sie können den Flight Log auch mit einer Servo Verlängerung an einen für Sie gut zugänglichen und einsehbaren Platz montieren. Bei Helikoptern befestigen Sie ihn bitte seitlich am Rahmen. Nutzen Sie zur Befestigung dickes doppelseitiges Klebeband.

Telemetrie

Die Spektrum AR9130T, AR12300T und AR20300T PowerSafe Telemetrieempfänger umfassen 4 integrierte Telemetrieanschlüsse, die mit den Spektrum-telemetriefähigen Sendern kompatibel sind.

- Kein Telemetrie-Modul erforderlich. Telemetrie ist im Empfänger integriert.
- Es ist kein Sensor erforderlich, um Flight Log oder Empfänger-Packspannung direkt über jeden telemetriefähigen Spektrum-Empfänger zu erhalten.
- Die PowerSafe-Telemetrieempfänger umfassen den SPMA9570 Flugzeug Telemetrie Packspannungssenor.

1. Den Flugzeug Telemetrie Packspannungssenor in den VOLT Telemetrieanschluss auf den PowerSafe-Empfängern einstecken.
2. Das andere Ende des Flug-Akkupacks spleißen und die Polarität beachten.



Weitere Informationen zu den Spektrum-Telemetriesensoren finden Sie unter:

http://www.spektrumrc.com

Anforderung an die Empfängerstromversorgung

Unzureichende Empfängerstromversorgungen haben in der Vergangenheit Probleme verursacht, die fälschlicherweise dem 2,4GHz System zugeordnet wurden. Folgende Komponenten der Stromversorgung spielen eine Rolle:

- Empfängerakkupack (Anzahl Zellen, Kapazität, Zellentyp, Ladestatus, Alter)
- BEC System des Reglers und dessen Belastbarkeit und Stabilität
- Schalterkabel, Akkukabel, Servokabel, Spannungsregler, usw.

Der AR8010T/AR9030T/AR9320T benötigt eine Mindestspannung von 3,5V bei allen Lastzuständen. Testen Sie Ihre Stromversorgung gründlich gemäss folgender Richtlinien:

Richtlinien für den Test der Empfängerstromversorgung

Liegt eine fragwürdige Empfängerstromversorgung vor, kleine oder alte Zellen, schwaches oder undefiniertes BEC, sollten Sie mit einem Spannungsmesser den folgenden Test durchführen.

Das Hangar 9 Digitalvoltmeter HAN172 oder das Spektrum Flight Log SPM9540 sind bestens für diesen Test geeignet.

Stecken Sie das Voltmeter in einen offenen Kanal oder überprüfen die Spannung auf einem Telemetriefähigen Sender. Drücken Sie mit der Hand auf die Servos und bewegen Sie diese um Last zu simulieren und überprüfen dabei die Empfängerspannung. Die Spannung sollte sich auch bei Last auf allen Servos über 4,8 Volt bewegen.

Die Funktion von QuickConnect

- Fällt die Empfängerspannung unter 3,5 Volt stellt das System den Betrieb ein.
- Steigt die Spannung wieder über 3,5V versucht der Empfänger auf den letzten beiden eingenommenen Frequenzen sofort einen Verbindung herzustellen.
- Sind die beiden Frequenzen vorhanden (der Sender blieb eingeschaltet), wird die Verbindung innerhalb von 4/100 Sekunden wiederhergestellt.

HINWEIS: Sollten diese auftreten ist die Ursache zur Gefahrenabwehr vor dem nächsten Flug zu beseitigen.

Wichtig: Y-Kabelbäume und Servoerweiterungen
Wenn Sie in Ihrer Installation einen Y-Kabelbaum oder Servoerweiterungen verwenden, muss es sich um standardmäßige Y-Kabelbäume und Servoerweiterungen ohne Verstärkung handeln, da die Servos sich sonst möglicherweise erratisch verhalten oder gar nicht funktionieren.

ModelMatch Funktion

Einige Spektrum und JR Sender verwenden das Feature ModelMatch. Durch diese Technik wird sichergestellt, dass der Pilot nicht ein Modell mit einem falschen Speicher fliegt und es so zu einem Absturz kommen kann. Jedes Modell/Empfänger erhält beim Binden einen eigenen spezifischen Code (GUID), der senderseitig nur mit der richtigen Auswahl des Speicherplatzes (Modell) angesprochen werden kann.
Sollte Ihr Modell nach dem einschalten nicht reagieren, überprüfen Sie bitte, ob Sie den richtigen Speicherplatz gewählt haben.

Tips zum Betrieb von Spektrum 2,4GHz

1. F: Um zu fliegen nach dem Binden was schalte ich als erstes ein, Sender oder Empfänger?

A: Wenn der Empfänger als erstes eingeschaltet wird: erfolgen keine Servobewegungen, alle Servos bleiben in ihren Positionen. Ist ein Regler angeschlossen wird dieser nicht scharfgeschaltet. Wird dann der Sender eingeschaltet, scant er das Band und sichert zwei offene Kanäle. Der Empfänger scant ebenfalls das Band und mit der GUID Funktion wird die Verbindung hergestellt und das System arbeitet normal. Wenn der Sender zuerst eingeschaltet wird: Der Sender scant das 2,4GHz Band und sichert zwei offene Kanäle. Der Empfänger scant ebenfalls das Band und sucht die GUID Information. Ist diese aktiv und der ununterbrochene Austausch von Dateninformationen bestätigt, verbindet sich das System. Dieses dauert zwischen 2–6 Sekunden.

2. F: Manchmal braucht das System länger zum Verbinden, manchmal verbindet es sich gar nicht, warum?

A: Damit die Verbindung zwischen Sender und Empfänger (mit einem bereits gebundenen Empfänger) hergestellt werden kann, muss der Empfänger einen ununterbrochenen Satz Datensätze vom Sender empfangen. Diese Erstverbindung kann von der Umgebung beeinflußt werden oder wenn der Sender zu nah (unter 1,20m) am Empfänger placiert ist. Metalische Gegenstände/Oberflächen wie z. B. ein Autodach oder eine Alubox können die Einschaltverbindung durch Reflektion beeinflussen, dass sie länger dauert oder nicht zustande kommt. Stellen Sie in diesen Fällen den Sender etwas weiter weg vom Modell oder von den reflektierenden Flächen. Diese gilt nur für das initiale Einschalten, ist die Verbindung gegeben und ein Loss oder Hold tritt auf, wird sich das System unverzüglich (innerhalb 4ms) wieder verbinden.

3. F: Wie wichtig sind Flight Log Daten ?

A. Alle 2.4 Ghz -Signale (nicht nur DSM) werden von leitfähigen Materialien wie Kohlefaser oder Metall beeinflusst. Sollten Sie ein Modell nutzen dass eine große Menge dieser Materialien enthält kann der Einsatz eines Flight Log sehr sinnvoll sein. Die gesammelten Informationen können dabei hilfreich sein die optimale Position der Antennen und Empfänger zu finden.

Garantie und Service Informationen

Garantiezeitraum
Exklusive Garantie Horizon Hobby LLC (Horizon) garantiert, dass das gekaufte Produkt frei von Material- und Montagefehlern ist. Der Garantiezeitraum entspricht den gesetzlichen Bestimmung des Landes, in dem das Produkt erworben wurde. In Deutschland beträgt der Garantiezeitraum 6 Monate und der Gewährleistungszeitraum 18 Monate nach dem Garantiezeitraum.

Einschränkungen der Garantie
(a) Die Garantie wird nur dem Erstkäufer (Käufer) gewährt und kann nicht übertragen werden. Der Anspruch des Käufers besteht in der Reparatur oder dem Tausch im Rahmen dieser Garantie. Die Garantie erstreckt sich ausschließlich auf Produkte, die bei einem autorisierten Horizon Händler erworben wurden. Verkäufe an dritte werden von dieser Garantie nicht gedeckt. Garantieansprüche werden nur angenommen, wenn ein gültiger Kaufnachweis erbracht wird. Horizon behält sich das Recht vor, diese Garantiebestimmungen ohne Ankündigung zu ändern oder modifizieren und widerruft dann bestehende Garantiebestimmungen.

(b) Horizon übernimmt keine Garantie für die Verkaufbarkeit des Produktes, die Fähigkeiten und die Fitness des Verbrauchers für einen bestimmten Einsatzzweck des Produktes. Der Käufer allein ist dafür verantwortlich, zu prüfen, ob das Produkt seinen Fähigkeiten und dem vorgesehenen Einsatzzweck entspricht.
(c) Ansprüche des Käufers Es liegt ausschließlich im Ermessen von Horizon, ob das Produkt, bei dem ein Garantiefall festgestellt wurde, repariert oder ausgetauscht wird. Dies sind die exklusiven Ansprüche des Käufers, wenn ein Defekt festgestellt wird.
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Die Garantie schließt Schäden, die durch falschen Einbau, falsche Handhabung, Unfälle, Betrieb, Service oder Reparaturversuche, die nicht von Horizon ausgeführt wurden aus. Rücksendungen durch den Käufer direkt an Horizon oder eine seiner Landesvertretung bedürfen der Schriftform.

Schadensbeschränkung
Horizon ist nicht für direkte oder indirekte Folgeschäden, Einkommensausfälle oder kommerzielle Verluste, die in irgendeinem Zusammenhang mit dem Produkt stehen verantwortlich, unabhängig ab ein Anspruch im Zusammenhang mit einem Vertrag, der Garantie oder der Gewährleistung erhoben werden. Horizon wird darüber hinaus keine Ansprüche aus einem Garantiefall akzeptieren, die über den individuellen Wert des Produktes hinaus gehen. Horizon hat keinen Einfluss auf den Einbau, die Verwendung oder die Wartung des Produktes oder etwaiger Produktkombinationen, die vom Käufer gewählt werden. Horizon übernimmt keine Garantie und akzeptiert keine Ansprüche für in der folge auftretende Verletzungen oder Beschädigungen. Mit der Verwendung und dem Einbau des Produktes akzeptiert der Käufer alle aufgeführten Garantiebestimmungen ohne Einschränkungen und Vorbehalte.

Wenn Sie als Käufer nicht bereit sind, diese Bestimmungen im Zusammenhang mit der Benutzung des Produktes zu akzeptieren, werden Sie gebeten, dass Produkt in unbenutztem Zustand in der Originalverpackung vollständig bei dem Verkäufer zurückzugeben.

Sicherheitshinweise
Dieses ist ein hochwertiges Hobby Produkt und kein Spielzeug. Es muss mit Vorsicht und Umsicht eingesetzt werden und erfordert einige mechanische wie auch mentale Fähigkeiten. Ein Versagen, das Produkt sicher und umsichtig zu betreiben kann zu Verletzungen von Lebewesen und Sachbeschädigungen erheblichen Ausmaßes führen. Dieses Produkt ist nicht für den Gebrauch durch Kinder ohne die Aufsicht eines Erziehungsberechtigten vorgesehen. Die Anleitung enthält Sicherheitshinweise und Vorschriften sowie Hinweise für die Wartung und den Betrieb des Produktes. Es ist unabdingbar, diese Hinweise vor der ersten Inbetriebnahme zu lesen und zu verstehen. Nur so kann der falsche Umgang verhindert und Unfälle mit Verletzungen und Beschädigungen vermieden werden.

Fragen, Hilfe und Reparaturen
Ihr lokaler Fachhändler und die Verkaufstelle können eine Garantiebeurteilung ohne Rücksprache mit Horizon nicht durchführen. Dies gilt auch für Garantiereparaturen. Deshalb kontaktieren Sie in einem solchen Fall den Händler, der sich mit Horizon kurz schließen wird, um eine sachgerechte Entscheidung zu fällen, die Ihnen schnellst möglich hilft.

Wartung und Reparatur
Muss Ihr Produkt gewartet oder repariert werden, wenden Sie sich entweder an Ihren Fachhändler oder direkt an Horizon.
Rücksendungen/Reparaturen werden nur mit einer von Horizon vergebenen RMA Nummer bearbeitet. Diese Nummer erhalten Sie oder ihr Fachhändler vom technischen Service. Mehr Informationen dazu erhalten Sie im Serviceportal unter www. Horizonhobby.de oder telefonisch bei dem technischen Service von Horizon.
Packen Sie das Produkt sorgfältig ein. Beachten Sie, dass der Originalkarton in der Regel nicht ausreicht, um beim Versand nicht beschädigt zu werden. Verwenden Sie einen Paketdienstleister mit einer Tracking Funktion und Versicherung, da Horizon bis zur Annahme keine Verantwortung für den Versand des Produktes übernimmt. Bitte legen Sie dem Produkt einen Kaufbeleg bei, sowie eine ausführliche Fehlerbeschreibung und eine Liste aller eingesendeten Einzelkomponenten. Weiterhin benötigen wir die vollständige Adresse, eine Telefonnummer für Rückfragen, sowie eine Email Adresse.

Garantie und Reparaturen
Garantieanfragen werden nur bearbeitet, wenn ein Originalkaufbeleg von einem autorisierten Fachhändler beiliegt, aus dem der Käufer und das Kaufdatum hervorgeht. Sollte sich ein Garantiefall bestätigen wird das Produkt repariert oder ersetzt. Diese Entscheidung obliegt einzig Horizon Hobby.

5-14-2015

Garantie und Service Kontaktinformationen

Land des Kauf	Horizon Hobby	Adresse	Telefon/E-mail Adresse
Deutschland	Horizon Technischer Service	Christian-Junge-Straße 1 25337 Elmshorn Germany	+49 (0) 4121 2655 100 service@horizonhobby.de

Rechtliche Informationen für die Europäische Union

CE Horizon LLC erklärt hiermit, dass dieses Produkt konform zu den essentiellen Anforderungen der RED Direktive ist.
Eine Kopie der Konformitätserklärung ist online unter folgender Adresse verfügbar:
http://www.horizonhobby.com/content/support-render-compliance.

Entsorgung in der Europäischen Union

Dieses Produkt darf nicht über den Hausmüll entsorgt werden. Es ist die Verantwortung des Benutzers, dass Produkt an einer registrierten Sammelstelle für Elektroschrott abzugeben diese Verfahren stellt sicher, dass die Umwelt geschont wird und natürliche Ressourcen nicht über die Gebühr beansprucht werden. Dadurch wird das Wohlergehen der menschlichen Gemeinschaft geschützt. Für weitere Informationen, wo der Elektromüll entsorgt werden kann, können Sie Ihr Stadtbüro oder Ihren lokalen Entsorger kontaktieren.

REMARQUE

La totalité des instructions, garanties et autres documents est sujette à modification à la seule discrétion d'Horizon Hobby, LLC. Pour obtenir la documentation à jour, veuillez consulter le site www.horizonhobby.com et cliquez sur l'onglet de support de ce produit.

Signification de certains termes spécifiques

Les termes suivants sont utilisés dans l'ensemble du manuel pour indiquer différents niveaux de danger lors de l'utilisation de ce produit:
REMARQUE: procédures qui, si elles ne sont pas suivies correctement, peuvent entraîner des dégâts matériels ET potentiellement un risque faible de blessures.
ATTENTION: procédures qui, si elles ne sont pas suivies correctement, peuvent entraîner des dégâts matériels ET des blessures graves.
AVERTISSEMENT: procédures qui, si elles ne sont pas suivies correctement, peuvent entraîner des dégâts matériels et des blessures graves OU engendrer une probabilité élevée de blessure superficielle.

14 ans et plus. Ceci n'est pas un jouet.

AVERTISSEMENT: lisez la TOTALITÉ du manuel d'utilisation afin de vous familiariser avec les caractéristiques du produit avant de le faire fonctionner. Une utilisation incorrecte du produit peut entraîner l'endommagement du produit lui-même, ainsi que des risques de dégâts matériels, voire de blessures graves.
Ceci est un produit de loisirs sophistiqué. Il doit être manipulé avec prudence et bon sens et requiert des aptitudes de base en mécanique. Toute utilisation de ce produit ne respectant pas les principes de sécurité et de responsabilité peut entraîner des dégâts matériels, endommager le produit et provoquer des blessures. Ce produit n'est pas destiné à être utilisé par des enfants sans la surveillance directe d'un adulte. N'essayez pas de démonter le produit, de l'utiliser avec des composants incompatibles ou d'en améliorer les performances sans l'accord d'Horizon Hobby, LLC. Ce manuel comporte des instructions relatives à la sécurité, au fonctionnement et à l'entretien. Il est capital de lire et de respecter toutes les instructions et tous les avertissements du manuel avant l'assemblage, le réglage ou l'utilisation afin de manipuler correctement l'appareil et d'éviter tout dégât matériel ainsi que toute blessure grave.

ATTENTION AUX CONTREFAÇONS

Nous vous remercions d'avoir acheté un véritable produit Spektrum. Toujours acheter chez un revendeur officiel Horizon hobby pour être sur d'avoir des produits authentiques. Horizon Hobby décline toute garantie et responsabilité concernant les produits de contrefaçon ou les produits se disant compatibles DSM ou Spektrum.

REMARQUE: Ce produit est uniquement réservé à une utilisation avec des modèles réduits radiocommandés de loisir. Horizon Hobby se dégage de toute responsabilité et garantie si le produit est utilisé d'autre manière que celle citée précédemment.

GARANTIE ET ENREGISTREMENT
Veuillez visiter www.spektrumrc.com/registration pour enregistrer en ligne votre produit.

User Guide

Les récepteurs télémétrie PowerSafe AR9130T, AR12300T et AR20300T vous offrent la meilleure solution pour alimenter un système de réception avec une consommation de courant élevée. Dans un appareil équipé de plusieurs servos très puissants (par exemple : les petits gros, les jets, etc...), le PowerSafe peut fournir 50A en crête et profite d'une véritable double alimentation par deux circuits indépendants. En installant jusqu'à 3 récepteurs satellite dans l'avion, vous pouvez optimiser la liaison RF même dans les avions avec la présence de matériaux conducteurs comme le carbone, l'acier, les résonateurs d'échappement, etc. Le récepteur satellite SPM9646DSMX pour fuselage carbone est compatible avec PowerSafe.

Ces récepteurs télémétrie sont équipés de 4 ports télémétrie intégrés qui sont compatibles avec les émetteurs Spektrum compatibles télémétrie.

Pour plus d'informations sur les capteurs télémétrie Spektrum, veuillez consulter: http://www.spektrumrc.com

Applications

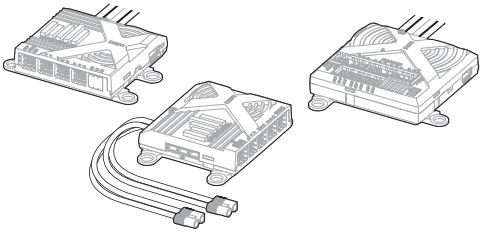
- Avions de grande échelle
- Jets équipés de nombreux servos
- Avions maquettes équipés de nombreux servos et accessoires (par exemple : éclairages, distributeur pneumatique, etc.)
- Hélicoptères maquettes

Caractéristiques

- Integrated full range telemetry
- Double alimentation—chaque batterie est totalement indépendante, si une des deux batterie à une défaillance, l'autre prend le relais
- Possibilité d'utiliser jusqu'à 3 récepteurs satellites pour obtenir une liaison RF ultime.
- Délivre jusqu'à 35A en continu et 50A en crête.
- Interrupteur ouvert en cas d'endommagement de l'interrupteur.
- Deux types de failsafe-SmartSafe (gaz uniquement) et failsafe paramétrable (toutes les voies)
- QuickConnect—Si une coupure d'alimentation se produit (brownout), le système se reconnecte en moins d'une demie seconde.
- Compatible Flight Log
- Câbles de batterie de 1.31mm² équipés de prises E-flite EC3
- Compatible avec tous les émetteurs et modules Spektrum et JR
- Résolution 2048
- Compatible X-Plus (l'AR20300T a un module X-Plus intégré)

IMPORTANT: Le récepteur PowerSafe a un centre de distribution d'alimentation qui fournit 35A en continu et 50A en crête pour alimenter votre système. Les récepteurs PowerSafe AR9130T, AR12300T et AR20300T peuvent utiliser jusqu'à trois (un au minimum pour le fonctionnement) récepteurs satellite dont l'emplacement peut être optimisé pour obtenir la meilleure liaison RF même dans les conditions les plus difficiles.

Caractéristiques	AR9130T	AR12300T	AR20300T
Type	Récepteur télémétrie PowerSafe DSM2/DSMX		
Dimensions (L x l x H)	55,12 x 55,94 x 17,73mm	55,12 x 55,94 x 17,73mm	64,31 x 61,03 x 16,29mm
Masse	48,19 g	48,19 g	59,5 g
Longueur antenne	(1) - 15cm, (1) - 17cm		
Récepteurs satellite	Oui (2)- Inclus	Oui (3)- Inclus	Oui (3)- Inclus
Voies	9	12	20
Fréquence	2.4GHz		
Tension d'alimentation	3.5-10V		



Éléments inclus	AR9130T	AR12300T	AR20300T
SPM9645	Récepteur satellite DSMX (2)	Récepteur satellite DSMX (3)	Récepteur satellite DSMX (3)
SPM9011	Rallonge pour récepteur satellite de 22,8cm	Rallonge pour récepteur satellite de 22,8cm	Rallonge pour récepteur satellite de 22,8cm
SPM9012	Rallonge pour récepteur satellite de 30cm	Rallonge pour récepteur satellite de 30cm	Rallonge pour récepteur satellite de 30cm
SPM9013	N/A	Rallonge pour récepteur satellite de 60cm	Rallonge pour récepteur satellite de 60cm
SPM6820	Interrupteur ouvert	Interrupteur ouvert	Interrupteur ouvert
	Guide utilisateur	Guide utilisateur	Guide utilisateur
EFLAEC302	Prise batterie EC3 (2)	Prise batterie EC3 (2)	Prise batterie EC3 (2)
	Prise charge (2)	Prise charge (2)	Prise charge (2)
SPMA9570A	Capteur télémétrique de tension pour avion	Capteur télémétrique de tension pour avion	Capteur télémétrique de tension pour avion

Batteries

Utilisation d'une seule batterie

Le PowerSafe permet d'utiliser une ou deux batteries. Quand vous n'utilisez qu'une seule batterie, branchez-la simplement dans n'importe quelle prise (BATT1 ou BATT2). Fixez la prise inutilisée. Notez que, cette prise n'est pas alimentée, mais il est conseillé de la fixer pour éviter qu'elle se déplace durant le vol. Quand le système est alimenté par une seule batterie, une seule DEL bleue s'allumera en continu quand le système sera alimenté.

Utilisation de deux batteries

Le PowerSafe possède une véritable double alimentation. Quand vous utilisez deux batteries, elles fonctionnent de façon indépendante, si une des batteries se décharge, entre en court circuit ou autre défaut, l'autre batterie continuera à alimenter le système. Quand vous utilisez 2 batteries, il est important qu'elles aient le même nombre d'éléments et la même capacité, il est idéal qu'elles soient dans les mêmes conditions (état, âge).

Il est normal qu'une batterie se décharge toujours un peu plus vite qu'une autre. C'est dû à l'indépendance des deux batteries. La batterie qui a la tension la plus élevée ou la résistance interne la plus faible se déchargera plus vite. Généralement la différence est négligeable (moins de 10%). A cause de cela il est normal d'avoir qu'une seule DEL bleue d'allumée (Batt1 ou Batt2) quand le circuit n'est pas soumis à une forte charge, la DEL allumée correspond à la batterie qui fournit le plus de puissance.

Quand vous utilisez deux batteries, la capacité disponible est égale à la somme des capacités des deux batteries, par exemple, BATT1 (2000mA) + BATT2 (2000mA) = une capacité totale de 4000mA. En cas d'installation éloignée des batteries par rapport au PowerSafe, des rallonges câblée EC3 de 30 et 60 cm sont disponibles.

Utilisation de doubles régulateurs de tension

Spektrum propose un régulateur (SPMVR6007) délivrant 7.5A (11A en crête) sous 6V spécifiquement conçu pour PowerSafe.

IMPORTANT: Quand vous utilisez deux batteries en passant par deux régulateurs, chaque régulateur est indépendant et il est fréquent qu'une batterie ait un taux de décharge légèrement plus élevé que l'autre, cela dépend des conditions de la batterie (résistance interne, tension, etc...) et de la tolérance des régulateurs. Cela entraîne une décharge plus rapide d'une batterie par rapport à l'autre et il est important de contrôler avant chaque vol chaque batterie à l'aide d'un testeur (HAN171) en appliquant une charge d'1A et en les rechargeant quand elles chutent à 40% de la capacité. (Consultez „Capacité de batterie“ page 5)

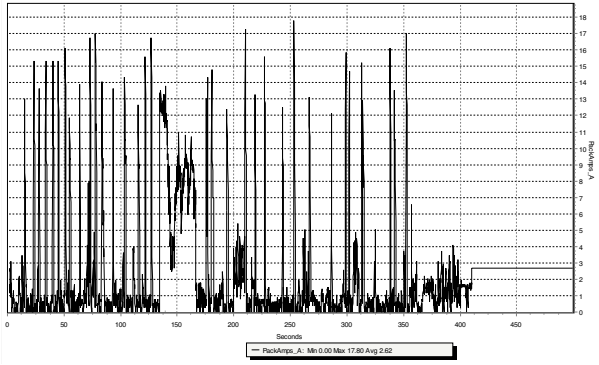
Capacité de batterie

Il est important de choisir des batteries qui ont une capacité supérieure à la capacité nécessaire durant le temps de vol. Notre équipe a enregistré des données de vol afin de déterminer les consommations de courant typique en vol. Les deux graphiques suivants illustrent la consommation de l'installation radio durant le vol. La consommation de courant dépend de vos servos, de l'installation et de votre style de pilotage.

Les paramètres suivants correspondent à un scénario d'utilisation par des pilotes de voltige. Il n'est pas recommandé d'utiliser directement ces paramètres sans votre propre régulateur de tension pour vos servos.

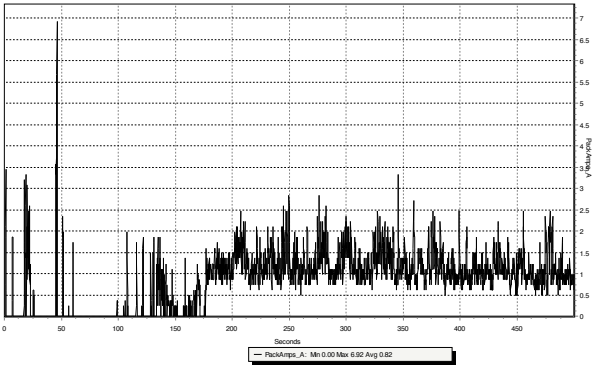
Avion	YAK 40%
Servos	9-JR8711 1-8317 (gaz)
Batteries	Deux Li-Po 2S 7,4V 4000mA
Régulateur	Aucun
Moteur	DA150
Masse	18 kg
Type de vol	3D agressif
Courant moyen	2,62A
Courant en crête	17,8A
Milliamps (used per 10-minute flight)	435mA

Les servos JR8711 et 8317 supportent 6 volts maximum. Une utilisation à une tension supérieure annulera la garantie.



Dans l'exemple ci-dessus, l'intensité moyenne est de 2.62A et la consommation de 435mA pour 10 minutes (durée de vol typique). Il est recommandé de ne pas dépasser 60% de la capacité totale afin de conserver de la réserve. Dans cet exemple, nous utilisons deux batteries 4000mA (8000mA au total) X 60%=4800mA (capacité utilisable) divisée par la capacité utilisée pour 10 minutes de vol (435mA), nous pouvons effectuer jusqu'à 11 vols de 10 minutes chacun.

Avion	33% Sukhoi
Servos	7-JR8611's 1-8317 (throttle)
Batteries	1- 4000mAh 2-cell 7.4-volt LiPo
Régulateur	6 volts
Moteur	DA100
Masse	11,7 kg
Type de vol	3D modéré
Courant moyen	0,82A
Courant en crête	6,92A
Milliampères (conso par vol de 10min)	137mA



Conseils relatifs à la capacité des batteries
Avion de voltige 40-45% équipé de 9 à 12 servos haute-intensité:

Avion de voltige 30-35% équipé de 7 à 10 servos haute-intensité:

Avion de voltige 25% équipé de 5 à 7 servos haute-intensité:

Jets - BVM Super BANDIT, F86, Euro Sport, etc.: 3000–6000mA

Jets de grande échelle - BVM Ultra Bandit:4000–8000mA

Concernant les avions maquette, les modèles et accessoires étant extrêmement variés, il est difficile de donner des capacités recommandées pour ce type d'appareil. Utilisez le tableau ci-dessus en vous basant sur la taille et le nombre de servos qui équipent votre modèle. Vérifiez toujours la charge des batteries avant chaque vol.

Tension de la batterie

ATTENTION: N'utilisez JAMAIS une batterie 4 éléments 4.8V Ni-MH pour alimenter le PowerSafe

Les batteries 4.8V ne fournissent pas assez de puissance quand le système est sous contrainte. En cours d'utilisation, la tension pourrait chuter sous la tension minimale de 3.5V, ce qui provoquerait une perte de contrôle.

Le PowerSafe est capable de supporter les tensions de 6V à 10V. La limite de tension est souvent la limite des servos. La majorité des servos sont compatibles avec les batteries 6 volts. L'utilisation des batteries 5 éléments 6 volts est devenue standard avec beaucoup d'avions de grande échelle.

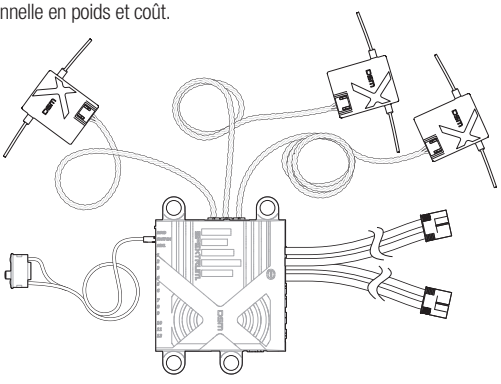
Soyez prudent, les batteries Ni-MH ont tendance à fausser le peak quand elles sont chargées rapidement. Vérifiez toujours que les batteries NiMH sont entièrement chargées.

De nombreux pilotes utilisent des batteries Li-Po 2S pour alimenter leurs récepteurs, ces batteries offrent une meilleure capacité pour une masse et un encombrement réduit. Avant d'utiliser des batteries Li-Po, contrôlez la tension maximale supportée par vos servos. Utilisez un régulateur de tension, comme par exemple le Spektrum VR6007 (SPMVR6007), si nécessaire.

Quand une batterie est connectée au PowerSafe, un faible courant de moins d'1mA est consommé même si l'interrupteur est en position OFF. Si vous stockez votre appareil, il est très important de débrancher la batterie afin d'éviter une décharge trop importante qui endommagerait la batterie.

Installation

Le récepteur PowerSafe nécessite au moins un récepteur satellite pour fonctionner. Deux ou trois satellites sont fournis et, la plupart du temps, il est recommandé d'utiliser deux ou trois satellites. Chaque récepteur satellite fonctionne de manière indépendante et l'ajout de récepteurs satellite (jusqu'à trois) offre une liaison RF plus sûre dans les environnements difficiles. En cas de problème, la sécurité supplémentaire de redondance contrebalancera la légère pénalité additionnelle en poids et coût.



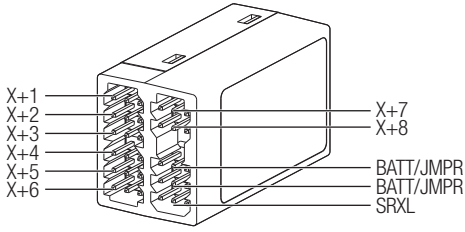
1. Utilisez de la mousse adhésive double face et des colliers pour fixer le PowerSafe à l'emplacement où vous souhaitez placer le récepteur.
2. Installez l'interrupteur sur le flanc de votre avion et reliez la prise au port SWITCH de l'unité principale.

The PowerSafe receiver uses a specifically designed switch. Conventionally wired switches are not compatible with the PowerSafe receiver.

Installation du module optionnel X-Plus 8

Lorsque vous utilisez un récepteur et un module X-Plus (non compatible avec l'AR20300T - il est intégré au récepteur), il est recommandé de fixer le module X-Plus 8 le plus près possible du récepteur. Utilisez le câble le plus court possible pour relier le X-Plus 8 au récepteur afin de limiter les pertes. Des rallonges peuvent être utilisées pour chaque servo, il est recommandé d'utiliser des câbles de 0.64mm de diamètre équipés de connecteurs plaqués or.

Si une batterie auxiliaire est utilisée, vous n'avez donc pas besoin de relier par câble le X-Plus et le récepteur. Le module X-Plus 8 peut être éloigné du récepteur quand il est alimenté pas une batterie auxiliaire.



Installation des batteries

Utilisez les conseils donnés précédemment pour choisir vos ou votre batterie. Connectez la batterie au récepteur PowerSafe. Les batteries Spektrum sont équipées de prises EC3 et se branchent directement. Si vous utilisez de batteries d'une autre marque, il sera nécessaire de souder des prises EC3 (deux sont fournies avec ces récepteurs PowerSafe) sur les câbles. Si vous utilisez un régulateur, suivez les conseils donnés avec celui-ci.

Installation des satellites

Antenna Polarization
Pour une réception RF optimale, placez les antennes des récepteurs de façon à obtenir le meilleur signal dans toutes les positions de l'avion. Si vous utilisez 3 antennes, il est recommandé d'en placer une à la verticale, une autre à l'horizontale dans le sens de la longueur du fuselage et la troisième à la verticale perpendiculaire au fuselage (voir illustrations pages 11-12). Cela permet de couvrir les axes X, Y et Z et d'offrir une visibilité optimale dans toutes les orientations. Une quatrième antenne en option peut être ajoutée à un angle intermédiaire offrant encore une meilleure liaison RF.

Positionnement des récepteurs

Bien que les systèmes Spektrum 2.4GHz sont très résistants aux interférences RF internes, les récepteurs satellites doivent êtres éloignés au minimum de 10 cm des éléments suivants:

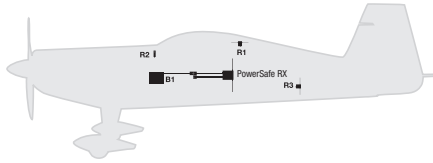
- Système d'allumage
- Batteries d'allumage
- Coupe circuit
- Moteur
- Pompes électriques
- Moteurs électriques
- Batterie de réception
- Réservoir à carburant
- Structures métalliques
- Les matériaux conducteurs
- Les composants haute température (échappement par exemple)
- Les zones soumises à de hautes vibrations

Espacez les récepteurs satellite d'au moins 6 cm les uns des autres afin d'obtenir la meilleure réception RF dans les environnements encombrés. Dans les avions de grande échelle où la place n'est pas un problème, placez les récepteurs comme sur les illustrations suivantes. Spektrum propose des rallonges d'une longueur de 15 à 90 cm, permettant de placer les satellites dans des positions optimales.

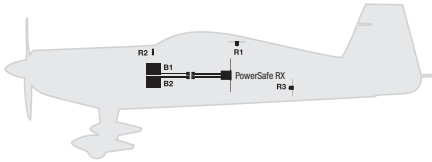
Utilisez de l'adhésif double face et des colliers pour fixer les satellites, vous devez utiliser 3 satellites au minimum et les connecter aux ports récepteurs du module principal.

Les illustrations suivantes montrent les installations recommandées. Notez l'orientation des récepteurs satellites.

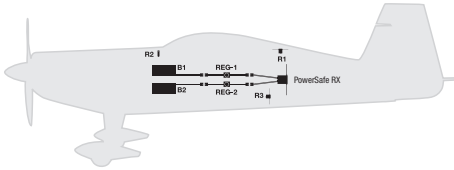
• Avion voltige 35% avec une batterie Ni-MH et trois récepteurs satellite



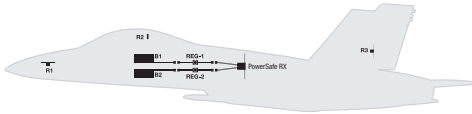
• Avion voltige 35% avec deux batteries Ni-MH et trois récepteurs satellite



• Avion voltige 40% avec deux batteries Li-Po, deux régulateurs et trois récepteurs satellite



• Jet avec deux batteries Li-Po, deux régulateurs et trois récepteurs satellite



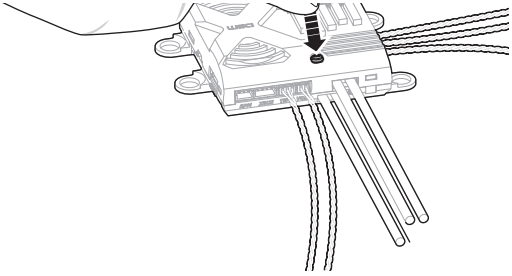
Affectation

REMARQUE: Pour que le système fonctionne, un récepteur satellite doit être connecté. Si un autre récepteur satellite est ajouté après l'initiation initiale, le système doit être ré-affecté pour reconnaitre le récepteur satellite additionnel.

How To Bind the PowerSafe Receiver

Vous devez affecter le récepteur AR9130T, AR12300T et AR20300T avec votre émetteur avant toute utilisation. L'affectation permet de communiquer au récepteur le code de l'émetteur. De cette façon, il ne se connectera qu'à cet émetteur.

1. Connectez les récepteurs satellite et tout autre capteur télémétrie au récepteur principal.
2. Pressez et maintenez le bouton affectation du récepteur PowerSafe en activant l'interrupteur ouvert. Relâchez le bouton affectation une fois que toutes les DEL du récepteur et récepteurs satellite commence à clignoter en continu.



Conseil: Il est toujours possible d'utiliser un prise affectation avec le port BIND si vous le souhaitez.

3. Mettez votre émetteur en mode affectation.
4. La procédure d'affectation est terminée une fois que la DEL orange du récepteur reste fixe.

REMARQUE: Si vous utilisez la prise affectation, retirez-la après l'affectation pour éviter que le système ne rentre de nouveau en mode affectation lors de la prochaine mise sous tension.

5. Après avoir réglé votre modèle, réaffectez toujours votre émetteur et le récepteur pour régler les positions Failsafe. Voir la section FAILSAFE sur la page suivante.

Failsafe

Les positions de sécurité intégrée (failsafe) sont également réglées lors de l'affectation. Dans l'hypothèse peu probable d'une perte de la liaison radio en cours d'utilisation, le récepteur ramène le servo des gaz à sa position préprogrammée de failsafe.

Récepteur sous tension

Quand le récepteur est sous tension, mais que l'émetteur ne l'est pas, tous les servos sauf les gaz, se placent en position failsafe, généralement, toutes les gouvernes au neutre et le train sorti. Ces positions sont enregistrées dans le récepteur lors de l'affectation. Durant cette période, la voie des gaz n'a aucune entrée, empêchant l'armement du contrôleur. Pour les modèles thermiques, le servo de gaz ne reçoit aucun signal et reste dans sa position initiale. Les récepteurs restent en attente avec la DEL bleue de batterie allumée. Quand l'émetteur est mis sous tension, le récepteur capte le signal, la connexion s'effectue et le contrôle est rétabli. La connexion est indiquée par l'allumage des DELs oranges.

SmartSafe + Hold Last

En cas de perte de signal, la technologie SmartSafe met les voies gaz en position préprogrammée (gaz bas) qui a été réglée lors de l'affectation. Lorsque le récepteur détecte le signal de l'émetteur, vous pouvez reprendre l'utilisation normale de votre modèle.

Conseil: Utilisez soit le bouton affectation intégré OU la prise affectation dans le port BIND.

SmartSafe + Hold Last

1	Baissez les gaz sur l'émetteur
2	Pressez et maintenez le bouton affectation
3	Mettez le récepteur sous tension
4	Relâchez le bouton affectation une fois que le RX entre en mode Affectation (DEL clignotante)
5	Mettez l'émetteur en mode affectation et terminez l'affectation

A*	*Installez la prise affectation (optionnel)*
B*	*Laissez-la installée tout au long de la procédure d'affectation***

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

Preset Failsafe

Le Failsafe préprogrammé est idéal pour les planeurs, permettant au modèle de rompre la portance thermique en cas de perte de signal. Avec le Failsafe préprogrammé, toutes les voies se mettent en position préprogrammée en cas de perte de signal, évitant ainsi que le modèle ne s'éloigne de trop. Lorsque le récepteur détecte le signal de l'émetteur, vous pouvez reprendre l'utilisation normale de votre modèle.

Preset Failsafe

1	Placez tous les manches et interrupteurs de l'émetteur en position Failsafe désirée
2	Pressez et maintenez le bouton affectation
3	Mettez le récepteur sous tension
4	Relâchez le bouton affectation une fois que le RX entre en mode Affectation (DEL clignotante)
5	Pressez et maintenez de nouveau le bouton affectation avant que l'émetteur entre en mode affectation

A*	*Install bind plug (optional)*
B*	*Retirez la prise une fois que le RX entre en mode affectation*

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

Après la connexion
L'émetteur et le récepteur sont mis sous tension, la connexion s'effectue, les commandes fonctionnent normalement, si une perte de signal se produit, tous les servos se placent dans la position de failsafe. Pour les planeurs, il est recommandé de déployer les volets et les aérofreins, pour que le planeur quitte la thermique afin d'éviter qu'il ne s'éloigne. Certains pilotes préfèrent programmer le failsafe de façon à faire descendre progressivement en virage léger leur avion afin de l'empêcher de s'éloigner. Quand le signal est rétabli, le système se reconnecte immédiatement (en moins de 4ms).

Test de portée

Effectuez toujours un test de portée avant chaque session de vol, particulièrement quand vous allez faire voler un nouveau modèle. Tous les émetteurs avions Spektrum possèdent une fonction de test de portée.

1. Avec la radio sous tension et votre modèle sécurisé, éloignez-vous à environ 28 mètres de votre modèle.
2. Face au modèle, émetteur en position normale de vol, passez en mode test de portée. Cela réduit la puissance d'émission de l'émetteur.
3. Vous devez avoir le contrôle complet de votre modèle à 28m de distance.
4. Si un défaut de commande apparaît, contactez le service technique Horizon Hobby pour obtenir de l'assistance.

Test de portée avancé à l'aide du Flight Log

Le test de portée standard est recommandé pour tous les avions de loisir. Pour les modèles complexes comportant une grande quantité de matériaux conducteurs (par exemple les jets à réacteur, certaines maquettes, les avions possédant un fuselage en carbone, etc..) le test suivant vous permettra de contrôler que tous les satellites fonctionnent correctement et que leur position est optimisée pour votre avion. Ce test avancé vous permet de contrôler les performances RF de chaque satellite et d'évaluer leur position optimale pour obtenir la meilleure réception du signal.

IMPORTANT: If you don't have a telemetry-capable transmitter, you can connect a Flight Log to the Bind/Prog port on the receiver.

1. Connectez un Flight Log à la prise data du récepteur principal. Allumez l'émetteur et le récepteur.
2. Pressez le bouton du Flight Log jusqu'à ce que les pertes de trame (F-Frame losses) soient affichées.
3. Demandez à une personne de tenir votre modèle et d'observer les données du Flight Log
4. Eloignez vous de votre modèle d'une distance de 28m environ, face au modèle avec l'émetteur en position normale de vol et activez le mode test de portée. Cela réduit la puissance d'émission de l'émetteur.
5. Demandez à une personne de porter votre modèle et d'orienter le nez vers le haut, puis vers le bas, ensuite le nez vers l'émetteur puis le nez dans la direction opposée (pour simuler les conditions réelles de vol) cela permet de voir les effets de l'orientation sur les pertes de trames. Effectuez ce test durant une minute, vous pouvez utiliser le chronomètre de l'émetteur. Pour les appareils de grande échelle, il est conseillé d'effectuer le test en plaçant le modèle sur le nez et de le faire tourner sur 360° durant 1 minute en enregistrant les données. Placez le modèle sur ses roues et faites le pivoter dans toutes les directions durant 1 minute.

6. Après une minute d'essai, le test est réussi si vous avez moins de 10 pertes de trames. Faites défiler les pertes de trames des antennes (A,B,L,R) pour évaluer les performances de chaque récepteur. Les pertes d'antenne doivent être relativement uniforme. Si une antenne a plus de perte, changez son orientation.

7. Un test réussi montre comme résultats

   H - holds (pertes de signal)
   F - less inférieur à 10 (pertes de trame)
   A,B,R,L - Frame losses inférieur à 100 (pertes de trames). Si un récepteur a un nombre de pertes de trames supérieur de 2X à 3X par rapport aux autres récepteur, effectuez le test une deuxième fois. Si le problême persiste, déplacez le récepteur.

Flight Log

Si vous n'avez pas d'émetteur Spektrum compatible télémétrie, le Flight Log Spektrum (SPM9540) est également compatible avec les récepteurs PowerSafe AR9130T, AR12300T et AR20300T.
Le Flight Log indique les performances RF de chaque récepteur et indique également la tension de la batterie de réception.

Utilisation du Flight Log
Après un vol et avant de mettre le récepteur hors tension, reliez le Flight Log au port data du PowerSafe. La tension va automatiquement s'afficher à l'écran, par exemple 6v2=6.2Volt.
Quand la tension descend à 4.8V ou moins, l'écran se met à clignoter, indiquant que la tension est trop faible.

Pressez le bouton pour afficher les informations suivantes :

A - Perte d'antenne sur le récepteur satellite A	B - Perte d'antenne sur le récepteur satellite B
L - erte d'antenne sur le récepteur satellite gauche	R - Perte d'antenne sur le récepteur satellite droit
F - Perte de trame	H - Coupures

Antenna fades

Les pertes d'antenne représentent les pertes d'informations sur une antenne spécifique. Typiquement, il est normal d'avoir entre 50 et 100 pertes d'antenne durant un vol. Si une antenne compte plus de 500 pertes durant un vol, elle devra être repositionnée afin d'optimiser le signal RF.

Frame loss

Une perte de trame représente des pertes d'antennes simultanées sur tous les récepteurs. Si votre liaison RF est optimale, les pertes de trames doivent être inférieures à 20. Les pertes d'antenne qui ont causé des pertes de trames sont enregistrées et seront additionnées aux total des pertes d'antenne.

Une coupure apparaît quand il y a 45 pertes de trames consécutives. Cela représente environ 1 seconde. Si une coupure apparaît durant le vol, il est important de vérifier l'installation, placer les antennes à différents endroits et contrôler que les récepteurs fonctionnent tous correctement. Les pertes de trames qui mènent aux coupures ne sont pas additionnées au total des pertes de trames.

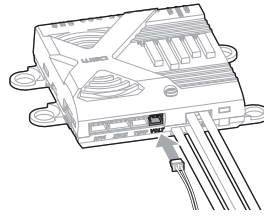
Une rallonge de servo peut être utilisée pour placer le Flight Log à un emplacement ne nécessitant pas l'ouverture de la verrière ou d'une trappe pour y accéder. En fonction de votre modèle, vous pouvez choisir d'installer le Flight Log de façon permanente en utilisant de l'adhésif double face. En cas d'utilisation du Flight Log sur un hélicoptère, il est recommandé de le placer sur un flanc du fuselage pour avoir un accès optimal.

Télémétrie

Les récepteurs télémétrie PowerSafe Spektrum AR9130T, AR12300T et AR20300T sont équipés de 4 ports télémétrie intégrés qui sont compatibles avec les émetteurs Spektrum compatible télémétrie.

- Sur les émetteurs Spektrum compatibles télémétrie, aucun capteur n'est nécessaire pour recevoir le Flight Log et la tension du pack récepteur.
- Les récepteurs télémétrie PowerSafe comprennent le capteur télémétrique de tension pour avion SPMA9570.

1. Branchez le capteur télémétrique de tension pour avion dans le port télémétrie VOLT sur le récepteur PowerSafe.
2. Glissez l'autre extrémité dans la batterie en respectant la polarité.



Pour plus d'informations sur les capteurs télémétrie Spektrum, veuillez consulter: http://www.spektrumrc.com

Spécifications pour le système d'alimentation du récepteur

Les systèmes d'alimentation inadaptés et incapables de fournir la tension minimale requise au récepteur en vol sont la première cause de défaillances en vol. Quelques-uns des composants du système d'alimentation affectant la capacité à fournir correctement l'alimentation appropriée sont énumérés ci-après :

- Pack de batteries de réception (nombre d'éléments, capacité, type de batterie, état de charge)
- La capacité du contrôleur électronique de vitesse à fournir du courant au récepteur sur les aéronefs à moteur électrique
- Le câble d'interrupteur, les raccordements des batteries, les raccordements des servos, les régulateurs etc.

L'AR9130T, AR12300T et AR20300T nécessitent une tension d'alimentation de 3.5V minimum; il est fortement recommandé de tester alimentation en respectant la procédure suivante.

Directives recommandées pour le test du système d'alimentation
En cas d'utilisation d'un système d'alimentation douteux (p. ex. batterie de petite capacité ou usagée, contrôleur électronique de vitesse n'ayant pas de BEC acceptant un fort appel de courant, etc.), nous recommandons d'utiliser un voltmètre pour effectuer les tests suivants.

L'appareil de mesure pour récepteur et servo digital Hangar 9 (HAN172) ou le Spektrum Flight Log (SPM9540) sont des outils parfaits pour effectuer le test ci-dessous.

Branchez le voltmètre sur une voie libre. Le système étant en marche, appuyez sur les gouvernes en appliquant une pression avec la main tout en contrôlant la tension au niveau du récepteur. La tension doit rester au-dessus de 4,8 volts même lorsque tous les servos sont fortement contraints.

Fonctionnement du système QuickConnect à détection de perte de tension

- Lorsque la tension du récepteur chute en dessous de 3,5 volts, le système cesse de fonctionner.
- Lorsque l'alimentation est rétablie, le récepteur tente immédiatement de se reconnecter.
- Si les deux fréquences sont présentes (émetteur resté en marche), le système se reconnecte typiquement en 4/100èmes de seconde.

REMARQUE: Si une perte de tension se produit en vol, il est impératif d'en déterminer la cause et d'y remédier.

Important: Utilisez uniquement des rallonges et cordons Y standards
L'utilisation de rallonges ou cordons Y amplifiés causera des dysfonctionnements des servos et un souci d'incompatibilité avec le système Spektrum.

Technologie ModelMatch

Certains émetteurs Spektrum et JR proposent une fonction (brevet en instance) appelée ModelMatch. ModelMatch empêche de faire fonctionner un modèle en utilisant une mémoire de modèle erronée, évitant potentiellement un écrasement au sol. Avec ModelMatch, chaque mémoire de modèle dispose d'un code unique propre (GUID), qui est programmé dans le récepteur lors du processus d'affectation. Lorsque le système est mis en marche ultérieurement, le récepteur se connectera à l'émetteur uniquement si la mémoire de modèle correspondante est programmée à l'écran.
Si à tout moment le système ne se connecte pas lorsque vous l'allumez, assurez-vous que la bonne mémoire de modèle est bien sélectionnée au niveau de l'émetteur. Veuillez noter que la DX5e et les modules avion ne sont pas équipés de la technologie ModelMatch.

Conseils pour l'utilisation de Spektrum 2,4 GHz

1. **Q: Après avoir affecté le récepteur à mon émetteur, lequel des deux dois-je allumer en premier, lorsque je veux effectuer un vol ?**

   R: L'un ou l'autre. Chaque émetteur DSM 2,4 GHz possède un code GUID (Globally Unique Identifier) interlacé dans son signal. Lorsque vous affectez un récepteur DSM à votre émetteur, ce code GUID est mémorisé dans le récepteur. Si vous allumez le récepteur avant l'émetteur, vous n'avez pas à craindre qu'il réponde à un autre émetteur. Le récepteur va bloquer la sortie des gaz et amener toutes les commandes à leurs positions de sécurité préréglées pendant qu'il attend un signal en provenance de l'émetteur comportant le même code GUID que celui qu'il a mémorisé . Si un émetteur DSM est allumé en premier vous pouvez vous attendre à ce qu'il se connecte dans les 6 secondes suivant l'allumage du récepteur.

2. **Q: Le système prend parfois plus de temps pour se connecter et parfois ne se connecte pas du tout. Pourquoi ?**

   R: Afin d'assurer la connexion du système DSM, le récepteur doit recevoir une quantité importante de paquets ininterrompus de la part de l'émetteur. Ce processus ne prend pas plus de quelques secondes, mais si l'émetteur est trop proche du récepteur (moins de 1,20 m) ou qu'il se trouve près d'objets en métal il se peut que le système détecte son propre signal à 2,4 GHz réfléchi, l'interprétant alors comme du «bruit ». Ceci peut retarder la connexion voire l'empêcher. Si cela devait arriver, assurez-vous qu'il y ait une distance suffisante entre les objets métalliques et le récepteur avant de le remettre en route et d'essayer à nouveau.

3. **Q: Les informations Flight Log sont-elles importantes?**

   R: Tous les signaux 2,4GHz, pas seulement DSM, sont affectés par la proximité de matériaux conducteurs comme la fibre de carbone ou le métal. Si vous pilotez un modèle avec beaucoup de matériaux conducteurs, les informations Flight Log peuvent être utiles. Les informations récoltées en vol peuvent aider à déterminer le meilleur emplacement pour votre/vos récepteur(s) afin de minimiser les effets de ces matériaux sur la qualité du signal.

Garantie et réparations

Durée de la garantie

Garantie exclusive - Horizon Hobby, LLC. (Horizon) garantit que le Produit acheté (le « Produit ») sera exempt de défauts matériels et de fabrication à sa date d'achat par l'Acheteur. La durée de garantie correspond aux dispositions légales du pays dans lequel le produit a été acquis. La durée de garantie est de 6 mois et la durée d'obligation de garantie de 18 mois à l'expiration de la période de garantie.

Limitations de la garantie

(a) La garantie est donnée à l'acheteur initial (« Acheteur ») et n'est pas transférable. Le recours de l'acheteur consiste en la réparation ou en l'échange dans le cadre de cette garantie. La garantie s'applique uniquement aux produits achetés chez un revendeur Horizon agréé. Les ventes faites à des tiers ne sont pas couvertes par cette garantie. Les revendications en garantie seront acceptées sur fourniture d'une preuve d'achat valide uniquement. Horizon se réserve le droit de modifier les dispositions de la présente garantie sans avis préalable et révoque alors les dispositions de garantie existantes.

(b) Horizon n'endosse aucune garantie quant à la vendabilité du produit ou aux capacités et à la forme physique de l'utilisateur pour une utilisation donnée du produit. Il est de la seule responsabilité de l'acheteur de vérifier si le produit correspond à ses capacités et à l'utilisation prévue.

(c) Recours de l'acheteur – Il est de la seule discrétion d'Horizon de déterminer si un produit présentant un cas de garantie sera réparé ou échangé. Ce sont là les recours exclusifs de l'acheteur lorsqu'un défaut est constaté.

Horizon se réserve la possibilité de vérifier tous les éléments utilisés et susceptibles d'être intégrés dans le cas de garantie. La décision de réparer ou de remplacer le produit est du seul ressort d'Horizon. La garantie exclut les défauts esthétiques ou les défauts provoqués par des cas de force majeure, une manipulation incorrecte du produit, une utilisation incorrecte ou commerciale de ce dernier ou encore des modifications de quelque nature qu'elles soient.

La garantie ne couvre pas les dégâts résultant d'un montage ou d'une manipulation erronés, d'accidents ou encore du fonctionnement ainsi que des tentatives d'entretien ou de réparation non effectuées par Horizon. Les retours effectués par le fait de l'acheteur directement à Horizon ou à l'une de ses représentations nationales requièrent une confirmation écrite.

Limitation des dégâts

Horizon ne saurait être tenu pour responsable de dommages conséquents directs ou indirects, de pertes de revenus ou de pertes commerciales, liés de quelque manière que ce soit au produit et ce, indépendamment du fait qu'un recours puisse être formulé en relation avec un contrat, la garantie ou l'obligation de garantie. Par ailleurs, Horizon n'acceptera pas de recours issus d'un cas de garantie lorsque ces recours dépassent la valeur unitaire du produit. Horizon n'exerce aucune influence sur le montage, l'utilisation ou la maintenance du produit ou sur d'éventuelles combinaisons de produits choisies par l'acheteur. Horizon ne prend en compte aucune garantie et n'accepte aucun recours pour les blessures ou les dommages pouvant en résulter. En utilisant et en montant le produit, l'acheteur accepte sans restriction ni réserve toutes les dispositions relatives à la garantie figurant dans le présent document.

Si vous n'êtes pas prêt, en tant qu'acheteur, à accepter ces dispositions en relation avec l'utilisation du produit, nous vous demandons de restituer au vendeur le produit complet, non utilisé et dans son emballage d'origine.

Indications relatives à la sécurité

Ceci est un produit de loisirs perfectionné et non un jouet. Il doit être utilisé avec précaution et bon sens et nécessite quelques aptitudes mécaniques ainsi que mentales. L'incapacité à utiliser le produit de manière sûre et raisonnable peut provoquer des blessures et des dégâts matériels conséquents. Ce produit n'est pas destiné à être utilisé par des enfants sans la surveillance par un tuteur. La notice d'utilisation contient des indications relatives à la sécurité ainsi que des indications concernant la maintenance et le fonctionnement du produit. Il est absolument indispensable de lire et de comprendre ces indications avant la première mise en service. C'est uniquement ainsi qu'il sera possible d'éviter une manipulation erronée et des accidents entraînant des blessures et des dégâts.

Questions, assistance et réparations

Votre revendeur spécialisé local et le point de vente ne peuvent effectuer une estimation d'éligibilité à l'application de la garantie sans avoir consulté Horizon. Cela vaut également pour les réparations sous garantie. Vous voudrez bien, dans un tel cas, contacter le revendeur qui conviendra avec Horizon d'une décision appropriée, destinée à vous aider le plus rapidement possible.

Maintenance et réparation

Si votre produit doit faire l'objet d'une maintenance ou d'une réparation, adressez-vous soit à votre revendeur spécialisé, soit directement à Horizon. Emballez le produit soigneusement. Veuillez noter que le carton d'emballage d'origine ne suffit pas, en règle générale, à protéger le produit des dégâts pouvant survenir pendant le transport. Faites appel à un service de messagerie proposant une fonction de suivi et une assurance, puisque Horizon ne prend aucune responsabilité pour l'expédition du produit jusqu'à sa réception acceptée. Veuillez joindre une preuve d'achat, une description détaillée des défauts ainsi qu'une liste de tous les éléments distincts envoyés. Nous avons de plus besoin d'une adresse complète, d'un numéro de téléphone (pour demander des renseignements) et d'une adresse de courriel.

Garantie et réparations

Les demandes en garantie seront uniquement traitées en présence d'une preuve d'achat originale émanant d'un revendeur spécialisé agréé, sur laquelle figurent le nom de l'acheteur ainsi que la date d'achat. Si le cas de garantie est confirmé, le produit sera réparé Cette décision relève uniquement de Horizon Hobby.

Réparations payantes

En cas de réparation payante, nous établissons un devis que nous transmettons à votre revendeur. La réparation sera seulement effectuée après que nous ayons reçu la confirmation du revendeur. Le prix de la réparation devra être acquitté au revendeur. Pour les réparations payantes, nous facturons au minimum 30 minutes de travail en atelier ainsi que les frais de réexpédition. En l'absence d'un accord pour la réparation dans un délai de 90 jours, nous nous réservons la possibilité de détruire le produit ou de l'utiliser autrement.

ATTENTION: Nous n'effectuons de réparations payantes que pour les composants électroniques et les moteurs. Les réparations touchant à la mécanique, en particulier celles des hélicoptères et des voitures radiocommandées, sont extrêmement coûteuses et doivent par conséquent être effectuées par l'acheteur lui-même.

5-14-2015

Coordonnées de Garantie et réparations

Pays d'achat	Horizon Hobby	Adresse	Numéro de téléphone/ E-mail
France	Horizon Hobby SAS	11 Rue Georges Charpak 77127 Lieusaint	+33 (0) 1 60 18 34 90 infofrance@horizonhobby.com

Information IC – IC: 6157A-AR9130T • IC: 6157A-AR20300T

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.

Informations de conformité pour l'Union européenne

CE Déclaration de conformité de l'Union européenne : Horizon Hobby, LLC déclare par la présente que ce produit est en conformité avec les exigences essentielles et les autres dispositions de la directive RED. Une copie de la déclaration de conformité européenne est disponible à : http://www.horizonhobby.com/content/support-render-compliance.

Instructions relatives à l'élimination des D3E pour les utilisateurs résidant dans l'Union européenne

Ce produit ne doit pas être éliminé avec les ordures ménagères. Il est de la responsabilité de l'utilisateur de remettre le produit à un point de collecte officiel des déchets d'équipements électriques. Cette procédure permet de garantir le respect de l'environnement et l'absence de sollicitation excessive des ressources naturelles. Elle protège de plus le bien-être de la communauté humaine. Pour plus d'informations quant aux lieux d'éliminations des déchets d'équipements électriques, vous pouvez contacter votre mairie ou le service local de traitement des ordures ménagères.

AVVISO

Tutte le istruzioni, le garanzie e gli altri documenti pertinenti sono soggetti a cambiamenti a totale discrezione di Horizon Hobby, LLC. Per una documentazione aggiornata sul prodotto, visitare il sito horizonhobby.com e fare clic sulla sezione Support del prodotto.

Convenzioni terminologiche

Nella documentazione relativa al prodotto vengono utilizzati i seguenti termini per indicare i vari livelli di pericolo potenziale durante l'uso del prodotto:
AVVISO: indica procedure che, se non debitamente seguite, possono determinare il rischio di danni alle cose E il rischio minimo o nullo di lesioni alle persone.

ATTENZIONE: indica procedure che, se non debitamente seguite, determinano il rischio di danni alle cose E di gravi lesioni alle persone.

AVVERTENZA: indica procedure che, se non debitamente seguite, determinano il rischio di danni alle cose, danni collaterali e gravi lesioni alle persone O il rischio elevato di lesioni superficiali alle persone.

⚠ **AVVERTENZA:** leggere TUTTO il manuale di istruzioni e familiarizzare con le caratteristiche del prodotto prima di farlo funzionare. L'uso improprio del prodotto può causare danni al prodotto stesso e ad altre cose e gravi lesioni alle persone.

Questa ricevente è un prodotto sofisticato per appassionati di modellismo. Deve essere utilizzato in modo attento e responsabile e richiede alcune conoscenze basilari di meccanica. L'uso improprio o irresponsabile di questo prodotto può causare lesioni alle persone e danni al prodotto stesso o a proprietà. Questo prodotto non deve essere utilizzato dai bambini senza la diretta supervisione di un adulto. Non tentare mai di smontare, utilizzare componenti incompatibili o modificare il prodotto senza previa approvazione di Horizon Hobby, LLC. Questo manuale contiene le istruzioni per la sicurezza, l'uso e la manutenzione del prodotto. È fondamentale leggere e seguire tutte le istruzioni e le avvertenze del manuale prima di montare, impostare o utilizzare il prodotto per poterlo utilizzare correttamente ed evitare di causare danni alle cose o gravi lesioni alle persone.

Almeno 14 anni. Non è un giocattolo.

AVVERTENZA CONTRO PRODOTTI CONTRAFFATTI

Acquistate sempre da rivenditori autorizzati Horizon Hobby per essere certi di avere prodotti originali Spektrum di alta qualità. Horizon Hobby rifiuta qualsiasi supporto o garanzia riguardo, ma non limitato a, compatibilità e prestazioni di prodotti contraffatti o che dichiarano compatibilità con DSM o Spektrum.

AVVISO: questo prodotto è inteso per un uso su veicoli o aerei senza pilota, radiocomandati e di livello hobbistico. Horizon Hobby declina ogni responsabilità al di fuori di queste specifiche e di conseguenza non fornirà alcuna garanzia in merito.

REGISTRAZIONE DELLA GARANZIA

Visitate www.spektrumrc.com/registration oggi stesso per registrare il vostro prodotto.

Manuale utente

Le riceventi Spektrum AR9130T, AR12300T e AR20300T PowerSafe con telemetria sono la soluzione perfetta per alimentare i sistemi radio ad alto assorbimento di corrente. Sugli aerei che impiegano servi potenti con un forte assorbimento di corrente (riproduzioni in scala, jets, ecc.) il PowerSafe fornisce picchi di corrente fino a 50 A e un sistema di ridondanza con due batterie e un interruttore speciale per avere il massimo dell'affidabilità. Potendo gestire fino a 4 ricevitori remoti installati sull'aereo, si può ottimizzare il collegamento RF anche sugli aerei più „difficili" che impiegano materiali conduttivi come strutture in carbonio, tubi in acciaio e silenziatori accordati. Per modelli che contengono molto carbonio, il ricevitore remoto SPM9646 DSMX Carbon Fiber è compatibile con PowerSafe

Queste riceventi con telemetria dispongono di 4 prese integrate compatibili con le trasmittenti Spektrum che supportano la telemetria.

Per ulteriori informazioni sui sensori Spektrum per telemetria, visitare il sito: http://www.spektrumrc.com

Applicazioni

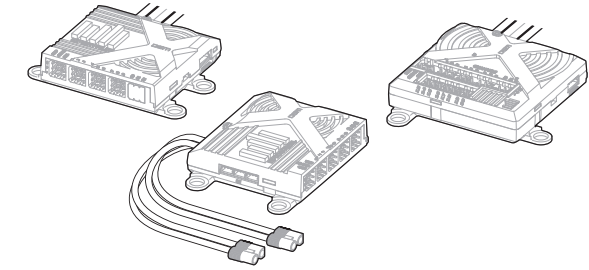
- Aerei in scala di grosse dimensioni.
- Jet con molti servi ad alto assorbimento di corrente.
- Aerei in scala con molti servi ad alto assorbimento di corrente e accessori vari come luci, regolatori, valvole per l'aria.
- Elicotteri riproduzione in scala.

Caratteristiche

- Telemetria integrata a piena portata
- Vera ridondanza con due batterie; ogni batteria è isolata dall'altra e se una si scarica o va in corto circuito, l'altra subentra tranquillamente.
- Utilizza fino a 3 ricevitori remoti per avere il collegamento RF ideale anche nelle applicazioni più esigenti.
- Capacità di gestire correnti di 35 A in continuo e fino a 50 A di picco.
- Interruttore soft nel caso che quello principale sia danneggiato.
- Due tipi di failsafe: SmartSafe™ per il solo motore e Preselezionato per tutti i servi.
- unzione QuickConnect: se capita una interruzione momentanea nell'alimentazione, il sistema si riconnette in meno di 1/2 secondo.
- Compatibile con il Flight Log.
- Fili per le batterie da 1,3 mm di diametro (16 AWG) con connettore EC3 E-flite già montato.
- Risoluzione 2048 passi.
- Compatibile X-Plus

IMPORTANTE: la ricevente PowerSafe dispone di un distributore di corrente che fornisce fino a 35 ampere di corrente continua e 50 ampere di corrente di picco per alimentare il sistema. Le riceventi AR9130T, AR12300T e AR20300T PowerSafe utilizzano fino a tre riceventi installate in remoto (di cui almeno una collegata per funzionare) che possono essere posizionate in maniera ottimale sul velivolo, garantendo il miglior collegamento RF possibile in tutte le condizioni.

Specifiche	AR9130T	AR12300T	AR20300T
Tipo	Riceventi PowerSafe DSM2/DSMX con telemetria		
Dimensioni (LxPxA)	55,12 x 55,94 x 17,73 mm	55,12 x 55,94 x 17,73 mm	64,31 x 61,03 x 16,29 mm
Peso	48,19 g	48,19 g	59,5 g
Lunghezza antenna	(1) - 6", (1) - 7"		
Riceventi remote	Sì, (2) incluse	Sì, (3) incluse	Sì, (3) incluse
Canali	9	12	20
Banda	2,4 GHz		
Gamma voltaggio	3,5-10 V		



Articoli inclusi	AR9130T	AR12300T	AR20300T
SPM9645	(2) ricevente DSMX remota	(3) ricevente DSMX remota	(3) ricevente DSMX remota
SPM9011	Estensione 9" per ricevente remota	Estensione 9" per ricevente remota	Estensione 9" per ricevente remota
SPM9012	Estensione 12" per ricevente remota	Estensione 12" per ricevente remota	Estensione 12" per ricevente remota
SPM9013	N/D	Estensione 24" per ricevente remota	Estensione 24" per ricevente remota
SPM6820	Interruttore soft	Interruttore soft	Interruttore soft
	Manuale di istruzioni	Manuale di istruzioni	Manuale di istruzioni
EFLAEC302	(2) connettori EC3 per batteria	(2) connettori EC3 per batteria	(2) connettori EC3 per batteria
	(2) presa per carica	(2) presa per carica	(2) presa per carica
SPMA9570A	Sensore per il voltag gio per telemetria	Sensore per il voltag gio per telemetria	Sensore per il voltag gio per telemetria

Requisiti per la batteria

Usare una batteria

Il PowerSafe ha la possibilità di usare una o due batterie. Quando si usa una batteria basta semplicemente collegarla ad uno qualsiasi dei due connettori dedicati (BATT1 o BATT2). Fissare adeguatamente il connettore non utilizzato. Da notare che questo connettore non è alimentato, però sarebbe meglio fissarlo per evitare che vada a impigliarsi da qualche parte durante il volo. Quando il sistema è alimentato da una sola batteria, resterà acceso un solo LED blu.

Usare due batterie

Il PowerSafe offre un vero sistema ridondante con due batterie; ognuna è isolata dall'altra e funzionano in modo indipendente, così che se una dovesse avere problemi (interruzione del collegamento, corto circuito o scarica), l'altra continuerebbe a fornire l'alimentazione al sistema.

Quando si usano due batterie è importante che entrambe abbiano la stessa capacità e che siano anche nelle stesse condizioni di efficienza ed età.

Si tenga presente comunque che è normale che una si scarichi un po' più dell'altra; è la natura di un sistema di batterie isolate. Le batterie che hanno una tensione più alta o una resistenza interna più bassa si scaricano più rapidamente. Ad ogni modo la differenza è trascurabile (meno del 10%). Per questo è normale che, quando il sistema non fornisce correnti elevate, resti acceso un solo LED blu (BATT1 o BATT2) in base a quale delle due fornisce maggiore corrente.

Quando si usano due batterie la capacità totale disponibile è la somma di quella delle due batterie, per esempio: BATT1 (2000mAh) + BATT2 (2000mAh) = capacità totale 4000mAh. Sono disponibili prolunghe da 30 o 60 cm per batterie con connettore EC3 per installazioni dove le batterie siano collocate ad una certa distanza dall'unità PowerSafe.

Utilizzo dei regolatori a doppia tensione

Il regolatore Spektrum (SPMVR6007) 6,0 V 7,5 A (11 ampere di picco) è appositamente studiato per essere usato con le riceventi PowerSafe.

IMPORTANTE: quando si usano due batterie alimentate attraverso due regolatori, ognuno operante indipendentemente, è normale che una batteria si scarichi con una corrente leggermente più elevata, in dipendenza dalle sue condizioni (resistenza interna, tensione, ecc.) e dalla tolleranza dei regolatori. Questo fa sì che una batteria si scarichi prima dell'altra e quindi è importante provare ciascuna batteria usando un prova-batterie (HAN171) con carico (si consiglia 1 A) prima di ogni volo, per controllarne la tensione ed eventualmente ricaricarla se la sua capacità è scesa al 40%.)

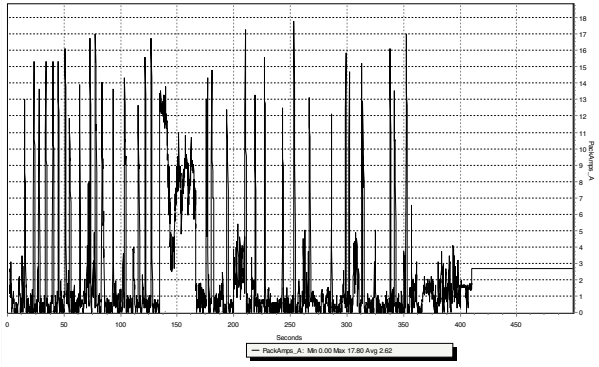
Capacità della batteria

È importante scegliere delle batterie che abbiano una capacità più che adeguata per fornire il necessario tempo di volo. Il nostro staff ha registrato i dati (in volo) per determinare il consumo di corrente di un aereo in volo. Qui di seguito ci sono due grafici che illustrano la corrente assorbita da un impianto ricevente in volo. La corrente assorbita può variare in base ai servi utilizzati, all'installazione e allo stile di pilotaggio.

I dati che seguono si possono riferire alla configurazione più gravosa, tipica di alcuni piloti acrobatici. Si sconsiglia di usare questa configurazione senza un'adeguata regolazione di tensione per i serv.

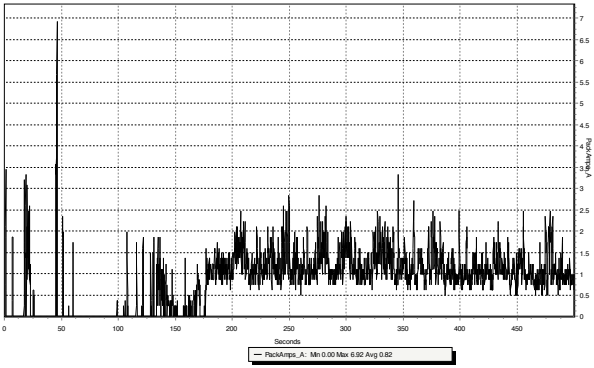
Aereo	YAK 40%
Servi	9 JR8711 - 1 8317 (gas)
Batterie	Due LiPo 7,4 V 2 celle 4000 mAh
Regolatore	Nessuno
Motore	DA150
Peso	18 kg
Inviluppo di volo	Aggressivo 3D
Corrente media	2,62 A
Corrente di picco	17,8 A
Milliampere (usati per volo di 10 min.)	435 mAh

I servi JR8711 e 8317 possono sopportare una tensione massima di 6 V con 5 celle. Se si usano tensioni più alte la garanzia viene invalidata.



Nell'esempio qui sopra, la corrente media era 2,62 A, per cui si calcola un consumo di 435 mAh per un volo tipico di 10 minuti. Si raccomanda di usare solo il 60% della potenza disponibile per avere una buona riserva di capacità della batteria. In questo esempio usando due batterie da 4000 mAh (capacità totale 8000 mAh) x 60% = 4800 mAh (capacità disponibile utilizzabile) diviso per 435 mAh (capacità usata in 10 minuti di volo), si ottengono fino a 11 voli da 10 minuti ciascuno.

Aereo	Sukhoi 33%
Servi	7 JR8611 1 8317 (gas)
Batterie	1 LiPo 7,4 V 2 celle 4000 mAh
Regolatore	6 V
Motore	DA100
Peso	12 kg
Inviluppo di volo	Moderato 3D
Corrente media	,82 A
Corrente di picco	6,92 A
Milliampere (usati per volo di 10 min.)	137 mAh



Raccomandazioni per la capacità della batteria
Aereo acrobatico in scala 40-45% con 9-12 servi ad alto assorbimento: 4000-8000 mAh

Aereo acrobatico in scala 33-35% con 7-10 servi ad alto assorbimento: 3000-6000 mAh

Aereo acrobatico in scala 1:4 (25%) con 5-7 servi ad alto assorbimento: 2000-4000 mAh

Jet BVM Super Bandit, F86, Euro Sport, ecc.: 3000-6000 mAh Jets di grosse dimensioni - BVM Ultra Bandit: 4000-8000 mAh

Aerei in scala: in questo campo c'è una notevole varietà di modelli e di accessori per cui diventa difficile dare indicazioni attendibili. Usando come riferimento le indicazioni fornite negli esempi precedenti si potrà stabilire una capacità adatta al vostro aereo. Come sempre, prima del volo controllare le condizioni di carica della batteria.

Tensione della batteria

IMPORTANTE: NON usare una batteria a 4 celle NiCd/NiMH da 4,8 V per alimentare il PowerSafe.

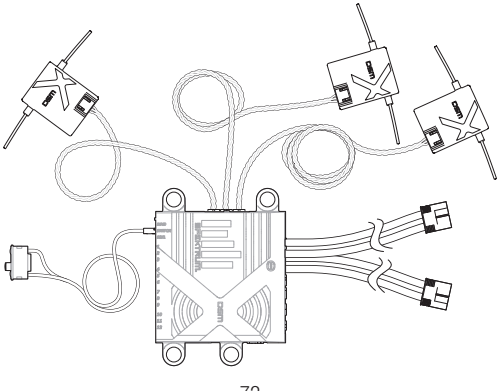
Le batterie con 4 celle non forniscono abbastanza tensione per avere il margine necessario per alimentare il sistema quando viene richiesta una maggiore corrente. Sotto carico la tensione del sistema potrebbe scendere al di sotto della minima tensione operativa (3,5 V) e causare una perdita di controllo. I I PowerSafe è in grado di gestire tensioni da 6,0 a 10,0 V. In genere il limite viene posto dai servi perché molti di essi sono adatti per batterie da 5 celle con tensioni da 6 V. Queste batterie a 5 celle sono diventate uno standard per molte applicazioni su aerei in scala di grosse dimensioni.

Bisogna fare attenzione perché le batterie NiMH hanno la tendenza a manifestare falsi picchi quando vengono caricate rapidamente, in special modo quando si usano batterie completamente cariche e non hanno raggiunto il falso picco. Molti piloti usano batterie LiPo da 2 celle per alimentare i loro aerei, infatti queste batterie hanno una maggiore capacità in relazione alle loro dimensioni e peso, e sono anche più facili da gestire per la carica. Però prima di usare le batterie LiPo bisogna controllare le specifiche dei servi per vedere se possono sopportare queste tensioni. Si può usare un regolatore di tensione come lo Spektrum VR6007 (SPMVR6007).

Quando si collega una batteria al PowerSafe, si ha un assorbimento di corrente di circa 1 mA anche se l'interruttore è su OFF. Se si mette via il sistema per un certo tempo, è importante che le batterie siano scollegate dal PowerSafe per evitare una loro scarica eccessiva.

Installazione

La ricevente PowerSafe richiede almeno una ricevente remota per funzionare. Due o tre riceventi remote sono incluse e, nella maggior parte dei casi, si consiglia di utilizzarne due o tre. Ognuna di queste funziona autonomamente. Le riceventi supplementari (fino a tre) garantiscono un collegamento RF più sicuro in ambienti difficili. In caso di guasto la ridondanza garantisce maggior sicurezza e compensa lo svantaggio rappresentato dal costo e dal peso.



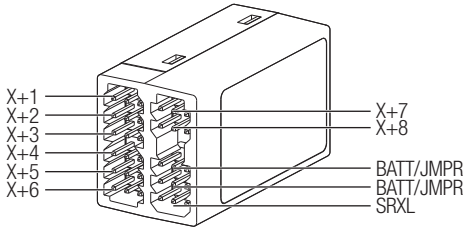
1. Sistemare il PowerSafe fissandolo con biadesivo e fascette dove di solito si metterebbe il ricevitore.
2. Montare l'interruttore sulla fiancata della fusoliera e inserire il suo connettore nella presa dell'unità principale marcata SWITCH.

Il PowerSafe usa un interruttore progettato specificamente e quindi gli interruttori normali con i fili, non sono compatibili.

Installazione del modulo opzionale X-Plus 8

Se si utilizza una ricevente e un modulo X-Plus (non compatibile con l'AR20300T; è integrato nella ricevente), si consiglia di installare il modulo X-Plus 8 alla minor distanza possibile dalla ricevente. Quando si usa una ricevente X-Plus™ e questo modulo, si raccomanda di montare il modulo X-Plus 8 il più vicino possibile alla ricevente utilizzando il suo cavetto per minimizzare le perdite di corrente. Per i servi si possono usare delle prolunghe ma è meglio che i cavi siano di sezione maggiorata e i connettori dorati.

Se si usano batterie ausiliarie non è necessario il cavetto speciale X-Plus e il modulo X-Plus 8 può essere montato lontano dalla ricevente quanto si vuole.



Installare le batterie

Usando le indicazioni già date, scegliere le batterie che meglio si adattano al caso specifico e installarle (con gli eventuali regolatori) sull'aereo. Collegare le batterie al PowerSafe. Le batterie Spektrum sono già predisposte con i connettori EC3. Se si usano altre marche di batterie bisogna saldare sui loro fili i connettori EC3. Se si usa un regolatore bisogna installarlo seguendo le indicazioni fornite insieme.

Montare i ricevitori remoti

Polarizzazione dell'antenna
Un avere le migliori prestazioni dal collegamento RF, è importante che le antenne siano montate in modo che si abbia sempre una buona ricezione del segnale del trasmettitore in tutti i possibili assetti dell'aereo. Questo viene chiamato polarizzazione dell'antenna e permette la miglior esposizione visiva della sezione trasversale delle antenne da tutte le posizioni dell'aereo. Se si usano tre antenne, sarebbe raccomandabile che un'antenna fosse verticale, un'altra orizzontale allineata con la fusoliera, un'altra pure orizzontale ma allineata con l'ala (vedi l'illustrazione alle pagg. 11-12). In questo modo si coprono gli assi X, Y e Z offrendo al trasmettitore la miglior visibilità delle antenne riceventi da qualunque posizione si trovi l'aereo. Si potrebbe aggiungere anche una quarta antenna con un'angolazione intermedia per dare maggior sicurezza al collegamento RF e aumentare la ridondanza del sistema.

Posizionare i ricevitori remoti

Anche se i sistemi Spektrum a 2,4 GHz sono di gran lunga più resistenti alle interferenze causate dalle sorgenti interne di RF, comunque si dovrebbero montare i ricevitori remoti il più lontano possibile (almeno 10 cm o più) dalle seguenti fonti:

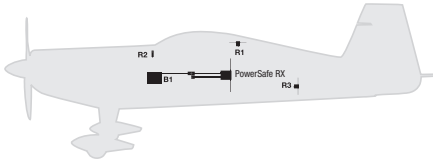
- Sistemi di accensione
- Motori
- Pompe ECU
- Batterie dei ricevitori
- Tubi metallici di bypass
- Batterie per i sistemi di accensione
- Interruttori per i sistemi di accensione
- Motori elettrici
- Serbatoi carburante
- Zone con forti vibrazioni
- Componenti ad alta temperatura come i silenziatori
- Ogni componente conduttivo di una certa dimensione

Le antenne remote andranno montate ad almeno 5 cm l'una dall'altra, considerando che maggiore è la distanza e migliore sarà la capacità di catturare il segnale del trasmettitore lavorando in „diversity" con le altre antenne, specialmente in situazioni critiche. In aerei di grosse dimensioni, dove lo spazio non è un problema, si raccomanda caldamente di montare le antenne lungo tutto l'aereo come si vede dalle illustrazioni. Spektrum offre varie prolunghe di collegamento tra i ricevitori, che vanno da 15 a 90 cm in modo da poter sfruttare tutte le posizioni più favorevoli all'interno dell'aereo.

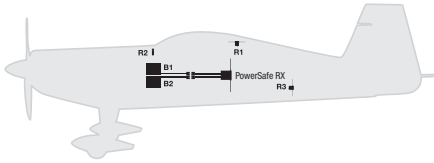
Usando del nastro di spugna biadesivo e delle fascette, montare sull'aereo almeno 3, o meglio 4, ricevitori remoti collegandoli alle porte del ricevitore (come si vede dalle illustrazioni seguenti).

Le illustrazioni che seguono sono quelle tipicamente raccomandate. Da notare l'orientamento dei ricevitori remoti.

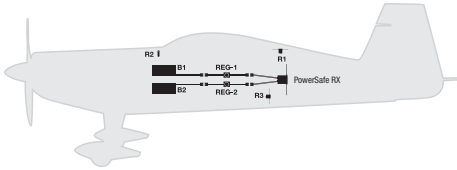
- 35% aereo acrobatico con batteria NiMH singola e tre riceventi remote



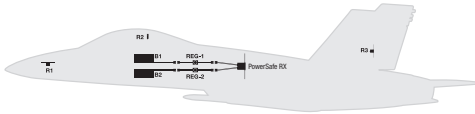
- 35% aereo acrobatico con doppia batteria NiMH e tre riceventi remote



- 40% aereo acrobatico con doppia batteria LiPo, doppio regolatore e tre riceventi remote



- Jet con doppia batteria LiPo, doppio regolatore e tre riceventi remote



Connessione

AVVISO: affinché il sistema funzioni, è necessario che una ricevente remota sia collegata. Se si aggiunge una ricevente remota supplementare dopo il binding iniziale, è necessario ripetere la procedura di binding affinché il sistema riconosca la ricevente remota aggiuntiva.

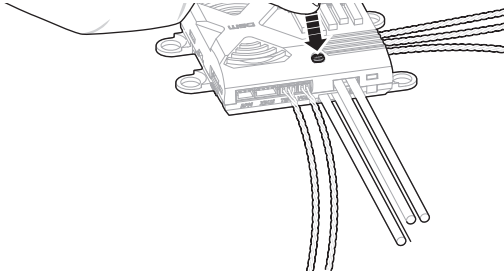
How To Bind the PowerSafe Receiver

Prima di poter operare bisogna connettere ("bind") il ricevitore AR9130T, AR12300T en AR20300T al trasmettitore in uso. L'operazione di "binding" fa in modo che il ricevitore riconosca il codice GUI (Globally Unique Identifier) del trasmettitore e così si connette solo con quello.

1. Collegare alla ricevente principale la ricevente remota e qualsiasi sensore per la telemetria.
2. Tenere premuto il tasto BIND nella ricevente quando la si sta accendendo. Rilasciare il tasto BIND una volta che il LED comincia a lampeggiare continuamente; questo indica che la ricevente si trova in modalità BIND.

Consiglio: se desiderato, si può usare un Bind Plug nella presa BIND/BATT.

3. Mettere la trasmittente in modalità connessione (bind).



4. La procedura di connessione è completa quando il LED arancio sulla ricevente resta acceso fisso.

AVVISO: se si usa un Bind Plug, bisogna toglierlo a procedura ultimata per evitare che il sistema entri in modalità connessione all'accensione successiva.

5. Dopo aver impostato il proprio modello, rifare la connessione fra trasmittente e ricevente per avere le corrette posizioni del failsafe. Si veda FAILSAFE alla pagina seguente.

Failsafe

La posizione di failsafe viene impostata durante la connessione (binding). Nel caso improbabile che si perda il collegamento radio durante l'uso, il ricevitore manderà nella posizione di failsafe preprogrammata.

Solo il ricevitore alimentato

Quando solo il ricevitore è alimentato (non c'è segnale del trasmettitore), tutti servi, escluso il motore, vanno nella posizione di failsafe preselezionata; normalmente tutte le superfici mobili sono centrate e il carrello è giù. Queste posizioni di failsafe sono quelle memorizzate durante la connessione (binding). A questo punto il canale del motore non ha uscita per evitare di armare il regolatore elettronico (se usato). Nei modelli con motore a scoppio il servo del motore non riceve segnali così resta fermo nella sua posizione attuale. É normale che alcuni servi analogici tendano a muoversi leggermente nel momento dell'accensione anche se non c'è segnale.
I ricevitori restano in attesa (standby) con i LED blu delle batterie accesi finché non si accende il trasmettitore; a questo punto avviene la connessione e i servi rispondono ai comandi del trasmettitore. A connessione avvenuta i LED rossi restano accesi.

SmartSafe + Hold Last

Se si verifica una perdita del segnale, la tecnologia SmartSafe porta il canale del motore nella sua posizione impostata (motore al minimo) al momento della procedura di connessione. Tutti gli altri canali mantengono la loro ultima posizione. Quando la ricevente rileva dei segnali provenienti dalla trasmittente, riprende il funzionamento normale.

Consiglio: Si può usare sia il tasto BIND incorporato, sia un Bind Plug inserito nella presa BIND/BATT.

SmartSafe + Hold Last

1	Abbassare il comando del gas sulla trasmittente
2	Tenere premuto il pulsante Bind
3	Accendere la ricevente
4	Quando la ricevente entra in modalità Bind (LED lampeggiante), rilasciare il pulsante
5	Impostare la trasmittente in modalità Bind e terminare la procedura di connessione.

A*	*Installare la presa bind (opzionale)*
B*	*Lasciarlo inserito durante l'intera procedura di connessione***

Preset Failsafe
(AR9320T) Questa funzione è ideale per gli alianti, perché permette al modello di fare automaticamente una discesa rapida qualora il segnale venga perso. Con il failsafe preimpostato, tutti i canali vanno nelle posizioni preimpostate quando il segnale viene perso, evitando di perdere il modello. Quando la ricevente rileva dei segnali provenienti dalla trasmittente, riprende il funzionamento normale.

Preset Failsafe

1	Spostare tutti gli stick e gli interruttori sulla ricevente nella posizione desiderata di failsafe
2	Tenere premuto il pulsante Bind
3	Accendere la ricevente
4	Quando la ricevente entra in modalità Bind (LED lampeggiante), rilasciare il pulsante
5	Tenere nuovamente premuto il pulsante Bind prima che la trasmittente entri in modalità Bind

A*	*Installare la presa bind (opzionale)*
B*	*Rimuovere il connettore dopoché la ricevente entra in modalità Bind*

*Le impostazioni del Failsafe si possono fare, volendo, con il Bind Plug.
**Terminato di impostare il Failsafe, togliere il Bind Plug.

Dopo la connessione
Quando tutto è a posto, se capita una perdita del segnale RF, la funzione Smart-Safe manda il servo del motore al minimo (come era stato impostato durante il „binding"). Tutti gli altri canali mantengono l'ultima posizione. Quando si ripristina il collegamento RF tutto ritorna a funzionare normalmente.

Prova della portata

Prima di ogni sessione di volo e specialmente con un nuovo modello, è importante fare una prova di portata del radiocomando. Ogni trasmettitore Spektrum ha una funzione che serve a ridurre la sua potenza di uscita per fare questa prova.

1. Con il modello appoggiato a terra, allontanarsi dal modello di 30 passi (circa 25-30 metri).
2. Rivolti verso il modello con il trasmettitore in mano nella posizione di volo, attivare la funzione di prova della portata per ridurre la potenza di uscita del trasmettitore.
3. Entro un raggio di 30 passi bisogna avere il controllo totale del modello.
4. Se ci fosse qualche problema, chiamare l'assistenza Horizon per informazioni.

Prova avanzata della portata

La prova di portata standard è adatta ai modelli di tipo sport. Per i modelli più sofisticati che contengono una certa quantità di materiali conduttivi (jet a turbina, alcuni tipi di aerei in scala, aerei con fusoliera in carbonio, ecc.), il seguente test avanzato della portata permette di verificare che tutti i ricevitori remoti siano perfettamente operativi e che la loro posizione sul modello sia ottimizzata. Quindi questo test avanzato permette di verificare le prestazioni in RF di ogni singolo ricevitore per capire se la sua posizione sul modello è ottimale o va modificata.

IMPORTANT: If you don't have a telemetry-capable transmitter, you can connect a Flight Log to the Bind/Prog port on the receiver.

1. Collegare il Flight Log sulla porta Data dell e accendere il sistema (Tx e Rx).
2. Far avanzare la lettura con il pulsante sul Flight Log finché si vedono i „pacchetti" persi.
3. Procurarsi un aiutante che regga il modello mentre si fa la lettura del Flight Log.
4. Rivolti verso il modello a circa 30 passi di distanza, con il trasmettitore in mano nella posizione di volo, attivare la funzione di prova della portata per ridurre la potenza di uscita del trasmettitore.
5. L'aiutante deve posizionare il modello in vari assetti (naso in su, naso in giù, naso verso il TX, naso nella direzione opposta, ecc.) mentre controlla sul Flight Log se c'è una qualche correlazione tra i dati letti e le posizioni dell'aereo. Questa prova deve durare per circa 1 minuto. In questo caso si può usare il timer del trasmettitore. Gli aerei di grosse dimensioni vanno tenuti per il muso e fatti ruotare di 360° sempre per 1 minuto mentre si registrano i dati. Poi ripetere la prova appoggiando l'aereo sul suo carrello e girandolo in tutte le direzioni, sempre per un minuto.

6. Terminata la prova si verifica che ci siano state meno di 10 perdite di „pacchetti“. Facendo scorrere i dati sul Flight Log fino alle evanescenze sull‘antenna (A, B, L, R) si valutano le prestazioni di ogni ricevitore. Le evanescenze devono essere abbastanza uguali sui vari ricevitori
7. Se la prova ha avuto successo, sul Flight Log si leggeranno i seguenti risultati:

   H - 0 blocchi del sistema (hold)

   F - meno di 10 „pacchetti“ persi

   A, B, R, L - Le perdite di „pacchetto“ devono essere inferiori a 100. È importante fare un paragone tra i vari ricevitori per vedere se ce n‘è qualcuno che ha più perdite degli altri (il doppio o il triplo). In questo caso il test va rifatto e, se si ottiene lo stesso risultato, allora bisogna spostare il ricevitore in una posizione diversa.

Flight Log

Se non si dispone di una trasmittente Spektrum compatibile con la telemetria, anche lo Spektrum Flight Log (SPM9540) è compatibile con le riceventi AR9130T, AR12300T e AR20300T PowerSafe.
Il Flight Log Spektrum è compatibile con PowerSafe e serve per mostrare le prestazioni generali del collegamento RF e dei ricevitori collegati al sistema. Inoltre mostra la tensione del ricevitore.

Come usare il Flight Log
Dopo un volo e prima di spegnere il ricevitore o il trasmettitore, collegare il Flight Log alla porta Dati (data port) del PowerSafe e il suo schermo mostrerà automaticamente la tensione (es. 6v2 = 6,2 V). Quando la tensione arriva a 4,8 V o meno, lo schermo lampeggia per indicare che la tensione è troppo bassa.

Premere il pulsante per mostrare le informazioni seguenti:

A - perdita di segnale sull‘antenna A	B - perdita di segnale sull‘antenna B
L - perdita di segnale sull‘antenna sinistra	R - perdita di segnale sull‘antenna destra
F - perdita di frame	H - interruzioni

Antenna fades

Una perdita di segnale (evanescenza) dell‘antenna significa anche una perdita di dati da parte di quella antenna. È normale avere da 50 a 100 di queste perdite di segnale durante un volo. Se un‘antenna ha più di 500 evanescenze in un solo volo

Frame loss

La perdita di un „pacchetto“ di dati si ha quando il segnale viene perso contemporaneamente da tutti i ricevitori collegati. Se il collegamento radio (RF) ha delle buone prestazioni, le perdite di „pacchetto“ non dovrebbero essere più di 20. Le evanescenze di segnale sull‘antenna che causano la perdita di pacchetto sono registrate e verranno sommate al totale.

Un „blocco“ del sistema avviene quando ci sono 45 perdite consecutive di „pacchetto“. Questo richiede circa 1 secondo. Se dovesse capitare un „blocco“ del sistema durante il volo, è necessario rivalutare l'impostazione del sistema ricevente, spostando l'antenna in una posizione diversa e/o verificando che trasmettitore e ricevitore funzionino correttamente. Le perdite di „pacchetto“ che portano ad un „blocco“ non vengono aggiunte al totale.

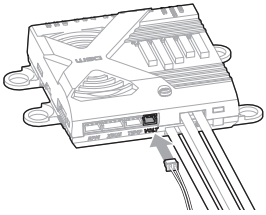
Si può usare una prolunga dei servi per potersi collegare al Flight Log senza dover rimuovere sportelli o capottine. In base anche al tipo di modello, si potrebbe fissare il Flight Log con nastro biadesivo. Questo è comunemente usato con gli elicotteri dove il Flight Log viene fissato su di un lato del telaio.

Telemetria

Le riceventi Spektrum AR9130T, AR12300T e AR20300T PowerSafe con telemetria dispongono di 4 prese integrate per telemetria compatibili con le trasmittenti Spektrum che supportano la telemetria.

- Non è necessario alcun modulo per telemetria. La telemetria è integrata nella ricevente.
- Non è necessario alcun sensore per ricevere il flight log o il voltaggio del pacco batterie della ricevente direttamente su qualsiasi trasmittente Spektrum compatibile con la telemetria.
- Le riceventi PowerSafe con telemetria includono il sensore per il voltaggio della batteria di volo SPMA9570.

1. Inserire il sensore per il voltaggio della batteria di volo nella porta VOLT sulle riceventi PowerSafe.
2. Collegare l'altra estremità al pacco batterie, facendo attenzione alle polarità.



Per maggiori informazioni sui sensori per telemetria Spektrum, visitare il sito: http://www.spektrumrc.com

Requisiti del sistema di alimentazione del ricevitore

I sistemi di alimentazione inadeguati che non sono in grado di fornire la tensione minima necessaria al ricevitore durante il volo sono diventati la prima causa di guasto durante il volo. Alcuni dei componenti del sistema di alimentazione che influiscono sulla capacità di fornire un'adeguata tensione sono:

- Set di batterie del ricevitore (numero di celle, capacità, tipo di celle, stato della carica)
- La capacità dell'ESC di fornire una corrente adeguata al ricevitore presente nell'aereo
- Il collegamento dell'interruttore, i cavi della batteria, i cavi del servo, regolatori, etc.

L'AR9130T, AR12300T en AR20300T ha una tensione minima di esercizio di 3.5 volt; quindi si raccomanda vivamente di testare il sistema di alimentazione in base
alle linee guida sottostanti.

Linee guida raccomandate per testare il sistema di alimentazione

Se si usa un sistema di alimentazione non molto idoneo (ad es. batteria piccola o vecchia, ESC che non ha un BEC che supporta elevati assorbimenti di corrente, etc.), si raccomanda di usare un voltmetro per eseguire i seguenti test.

L'Hangar 9 Digital Servo & Rx Current Meter (HAN172) o lo Spektrum Flight Log (SPM9540) sono gli utensili ideali per eseguire il test indicato sotto.

Collegare il voltmetro ad una presa libera della ricevente e, con il sistema acceso, caricare le superfici di comando (premendo con la mano) mentre si tiene sotto controllo la tensione della ricevente, altrimenti si può controllare la tensione con una trasmittente con telemetria. La tensione deve aggirarsi bei anche in caso di carico su tutti i servi sopra i 4,8 volt.

Come funziona QuickConnect con rilevamento di calo di tensione

- Quando la tensione della ricevente scende sotto i 3,5V, il sistema smette di funzionare.
- Quando l'alimentazione è ripristinata il ricevitore tenterà immediatamente di riconnettersi alle ultime due frequenze alle quali era connesso.
- Se le due frequenze sono presenti (il trasmettitore è rimasto acceso) il sistema si riconnetterà solitamente in 4/100 di secondo.
  4/100 of a second.

AVVISO: se si verifica un "brownout" in volo, bisogna determinarne la causa ed eliminarla.

Importante: collegamenti a Y e servo estensioni
Quando si usa un collegamento a Y o delle servo estensioni durante il montaggio è importante usare dei collegamenti Y standard non amplificati e delle servo estensioni, in quanto ciò potrà causare un errato o mancato funzionamento dei servocomandi.

ModelMatch

Alcuni trasmettitori Spektrum e JR offrono una funzione chiamata ModelMatch che impedisce di adoperare un modello scegliendo la memoria non corrispondente, per evitare un potenziale danno. Con ModelMatch, ogni memoria del modello ha il suo codice unico (GUID) e durante il processo di connessione il codice viene programmato nel ricevitore. Successivamente, quando si accende il sistema, il ricevitore si connetterà al trasmettitore solo se la memoria del modello corrispondente è programmata sullo schermo.

Se quando si accende il sistema non avviene nessuna connessione bisogna assicurarsi di aver selezionato la giusta memoria del modello nel trasmettitore. Si prega di notare che i moduli Spektrum Aircraft non hanno la funzione ModelMatch.

Consigli sull'uso di Spektrum 2.4GHz

1. D: Dopo aver collegato il ricevitore al mio trasmettitore con l'operazione di "bind", quale dei due devo accendere per primo quando voglio volare?

R: L'uno o l'altro indifferentemente. Ogni trasmettitore DSM 2.4GHz ha un codice GUID (Identificatore Unico Globale) inserito nel suo segnale. Quando si fa l'operazione di "bind" del ricevitore con il trasmettitore, questo codice GUID viene memorizzato dal ricevitore. Anche se accendete prima il ricevitore non c'è pericolo che si colleghi ad un altro trasmettitore. Il ricevitore resta in failsafe attendendo il segnale dal trasmettitore con il codice GUID che lui ha immagazzinato prima. Vedi la sezione "Accensione del solo ricevitore" per ulteriori informazioni. Se si accende prima il trasmettitore DSM, ci sarà il collegamento entro 6 secondi dall'accensione del ricevitore.

2. D: Qualche volta il sistema impiega un po' di tempo a connettersi o non si connette affatto. Perché?

R: In un sistema DSM per avere la connessione è necessario che il ricevitore riceva un certo numero di pacchetti ininterrotti dal segnale del trasmettitore. Questa procedura avviene normalmente in pochi secondi ma se il trasmettitore è troppo vicino al ricevitore (entro 120 cm) o è vicino a materiali riflettenti (oggetti di metallo, fibra di carbonio, etc.) si possono generare delle onde riflesse che vengono interpretate dal ricevitore come un disturbo. Questo fatto può ritardare o impedire del tutto la connessione. Se si verifica questo caso è necessario allontanarsi da ogni oggetto conduttore e riprovare la procedura di accensione.

3. Q: Quanto sono importanti le informazioni del Flight Log?

R: Tutti i segnali a 2,4GHz, non solo il DSM, sono influenzati dalla vicinanza di materiali conduttivi, come la fibra di carbonio o i metalli. Se si manda in volo un modello che usa molti materiali conduttivi nella sua struttura, il Flight Log potrebbe essere di aiuto. Le informazioni raccolte durante il volo possono aiutare a determinare la posizione ottimale per il ricevitore(i) per minimizzare gli effetti di questi materiali sull'affidabilità del segnale.

Garanzia

Periodo di garanzia

La garanzia esclusiva - Horizon Hobby, LLC, (Horizon) garantisce che i prodotti acquistati (il "Prodotto") sono privi di difetti relativi ai materiali e di eventuali errori di montaggio. Il periodo di garanzia è conforme alle disposizioni legali del paese nel quale il prodotto è stato acquistato. Tale periodo di garanzia ammonta a 6 mesi e si estende ad altri 18 mesi dopo tale termine.

Limiti della garanzia

(a) La garanzia è limitata all'acquirente originale (Acquirente) e non è cedibile a terzi. L'acquirente ha il diritto a far riparare o a far sostituire la merce durante il periodo di questa garanzia. La garanzia copre solo quei prodotti acquistati presso un rivenditore autorizzato Horizon. Altre transazioni di terze parti non sono coperte da questa garanzia. La prova di acquisto è necessaria per far valere il diritto di garanzia. Inoltre, Horizon si riserva il diritto di cambiare o modificare i termini di questa garanzia senza alcun preavviso e di escludere tutte le altre garanzie già esistenti.

(b) Horizon non si assume alcuna garanzia per la disponibilità del prodotto, per l'adeguatezza o l'idoneità del prodotto a particolari previsti dall'utente. È sola responsabilità dell'acquirente il fatto di verificare se il prodotto è adatto agli scopi da lui previsti.

(c) Richiesta dell'acquirente – spetta soltanto a Horizon, a propria discrezione riparare o sostituire qualsiasi prodotto considerato difettoso e che rientra nei termini di garanzia. Queste sono le uniche rivalse a cui l'acquirente si può appellare, se un prodotto è difettoso. Horizon si riserva il diritto di controllare qualsiasi componente utilizzato che viene coinvolto nella rivalsa di garanzia. Le decisioni relative alla sostituzione o alla riparazione avvengono solo in base alla discrezione di Horizon. Questa garanzia non copre dei danni superficiali o danni per cause di forza maggiore, uso errato del prodotto, negligenza, uso ai fini commerciali, o una qualsiasi modifica a qualsiasi parte del prodotto. Questa garanzia non copre danni dovuti ad una installazione errata, ad un funzionamento errato, ad una manutenzione o un tentativo di riparazione non idonei a cura di soggetti diversi da Horizon. La restituzione del prodotto a cura dell'acquirente, o da un suo rappresentante, deve essere approvata per iscritto dalla Horizon.

Limiti di danno

Horizon non si riterrà responsabile per danni speciali, diretti, indiretti o conseguenziali; perdita di profitto o di produzione; perdita commerciale connessa al prodotto, indipendentemente dal fatto che la richiesta si basa su un contratto o sulla garanzia. Inoltre la responsabilità di Horizon non supera mai in nessun caso il prezzo di acquisto del prodotto per il quale si chiede la responsabilità. Horizon non ha alcun controllo sul montaggio, sull'utilizzo o sulla manutenzione del prodotto o di combinazioni di vari prodotti. Quindi Horizon non accetta nessuna responsabilità per danni o lesioni derivanti da tali circostanze. Con l'utilizzo e il montaggio del prodotto l'utente acconsente a tutte le condizioni, limitazioni e riserve di garanzia citate in questa sede. Qualora l'utente non fosse pronto ad assumersi tale responsabilità associata all'uso del prodotto, si suggerisce di restituire il prodotto intatto, mai usato e immediatamente presso il venditore.

Indicazioni di sicurezza
Questo è un prodotto sofisticato di hobbistica e non è un giocattolo. Esso deve essere manipolato con cautela, con giudizio e richiede delle conoscenze basilari di meccanica e delle facoltà mentali di base. Se il prodotto non verrà manipolato in maniera sicura e responsabile potrebbero risultare delle lesioni, dei gravi danni a persone, al prodotto o all'ambiente circostante. Questo prodotto non è concepito per essere usato dai bambini senza una diretta supervisione di un adulto. Il manuale del prodotto contiene le istruzioni di sicurezza, di funzionamento e di manutenzione del prodotto stesso. È fondamentale leggere e seguire tutte le istruzioni e le avvertenze nel manuale prima di mettere in funzione il prodotto. Solo così si eviterà un utilizzo errato e di preverranno incidenti, lesioni o danni.

Domande, assistenza e riparazioni
Il vostro negozio locale e/o luogo di acquisto non possono fornire garanzie di assistenza o riparazione senza previo colloquio con Horizon. Questo vale anche per le riparazioni in garanzia. Quindi in tale casi bisogna interpellare un rivenditore, che si metterà in contatto subito con Horizon per prendere una decisione che vi possa aiutare nel più breve tempo possibile.

Manutenzione e riparazione
Se il prodotto deve essere ispezionato o riparato, si prega di rivolgersi ad un rivenditore specializzato o direttamente ad Horizon. Il prodotto deve essere Imballato con cura. Bisogna far notare che i box originali solitamente non sono adatti per effettuare una spedizione senza subire alcun danno. Bisogna effettuare una spedizione via corriere che fornisce una tracciabilità e un'assicurazione, in quanto Horizon non si assume alcuna responsabilità in relazione alla spedizione del prodotto. Inserire il prodotto in una busta assieme ad una descrizione dettagliata dei problemi e ad una lista di tutti i singoli componenti spediti. Inoltre abbiamo bisogno di un indirizzo completo, di un numero di telefono per rivolgere ulteriori domande e di un indirizzo e-mail.

Garanzia e riparazione
Le richieste in garanzia verranno elaborate solo se è presente una prova d'acquisto in originale proveniente da un rivenditore specializzato autorizzato, nella quale è ben visibile la data di acquisto. Se la garanzia viene confermata, allora il prodotto verrà riparato o sostituito. Questa decisione spetta esclusivamente a Horizon Hobby.

Riparazioni a pagamento
Se bisogna effettuare una riparazione a pagamento, effettueremo un preventivo che verrà inoltrato al vostro rivenditore. La riparazione verrà effettuata dopo l'autorizzazione da parte del vostro rivenditore. La somma per la riparazione dovrà essere pagata al vostro rivenditore. Le riparazioni a pagamento avranno un costo minimo di 30 minuti di lavoro e in fattura includeranno le spese di restituzione. Qualsiasi riparazione non pagata e non richiesta entro 90 giorni verrà considerata abbandonata e verrà gestita di conseguenza.

ATTENZIONE: Le riparazioni a pagamento sono disponibili solo sull'elettronica e sui motori. Le riparazioni a livello meccanico, soprattutto per gli elicotteri e le vetture RC sono molto costose e devono essere effettuate autonomamente dall'acquirente.

Garanzia e Assistenza - Informazioni per i contatti

Stato di acquisto	Horizon Hobby	Indirizzo	Telefono/Indirizzo e-mail
Germania	Horizon Technischer Service Horizon Hobby GmbH	Christian-Junge-Straße 1 25337 Elmshorn, Germania	+49 (0) 4121 2655 100 service@horizon-hobby.de

Dichiarazione di conformità per l'Unione europea:

Horizon Hobby, LLC dichiara che il presente prodotto è conforme ai requisiti essenziali e ad altre disposizioni rilevanti della direttiva RED.

Una copia della dichiarazione di conformità UE è disponibile online all'indirizzo: http://www.horizonhobby.com/content/support-render-compliance.

Istruzioni del RAEE per lo smaltimento da parte di utenti dell'Unione Europea

Questo prodotto non deve essere smaltito assieme ai rifiuti domestici. Al contrario, l'utente è responsabile dello smaltimento di tali rifiuti che devono essere portati in un centro di raccolta designato per il riciclaggio di rifiuti elettrici e apparecchiature elettroniche. La raccolta differenziata e il riciclaggio di tali rifiuti provenienti da apparecchiature nel momento dello smaltimento aiuteranno a preservare le risorse naturali e garantiranno un riciclaggio adatto a proteggere il benessere dell'uomo e dell'ambiente. Per maggiori informazioni sui centri di raccolta, contattare il proprio ufficio locale, il servizio di smaltimento rifiuti o il negozio presso il quale è stato acquistato il prodotto.

SPMAR9130T | SPMAR12300T | SPMAR20300T

Created 10/16 **52883**

SPMAR9140T, SPMAR12310T, and SPMAR20310T PowerSafe™ User Guide

NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, LLC. For up-to-date product literature, visit horizonhobby.com and click on the support tab for this product.

Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, LLC. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

Age Recommendation: Not for children under 14 years. This is not a toy.

WARNING AGAINST COUNTERFEIT PRODUCTS

Always purchase from a Horizon Hobby, LLC authorized dealer to ensure authentic high-quality Spektrum product. Horizon Hobby, LLC disclaims all support and warranty with regards, but not limited to, compatibility and performance of counterfeit products or products claiming compatibility with DSM® or Spektrum™ technology.

NOTICE: This product is only intended for use with unmanned, hobby-grade, remote-controlled vehicles and aircraft. Horizon Hobby disclaims all liability outside of the intended purpose and will not provide warranty service related thereto.

WARRANTY REGISTRATION

Visit www.spektrumrc.com/registration today to register your product.

User Guide

The AR9140T, AR12310T and AR20310T PowerSafe receivers feature 4 integrated telemetry ports that are compatible with Spektrum telemetry capable transmitters.

For information on Spektrum Telemetry Sensors visit:
http://www.spektrumrc.com

Applications
- Giant-scale aircraft
- Jets with multiple high-current draw servos
- Scale aircraft with multiple high-current draw servos and accessories (e.g. lights, ESCs, air valves, etc.)
- Scale helicopters

Features
- Integrated full range telemetry
- Dual battery capacity monitoring through telemetry
- True dual battery redundancy—each battery is isolated and if one fails/shorts the other takes over.
- Utilizes up to three remote receivers for the ultimate RF link in even the most demanding applications.
- Up to 35 amps continuous and 50 amps peak current handling capability
- Fail-on soft switch in case the switch is damaged
- Two types of failsafe—SmartSafe™ (throttle only) and preset failsafe (all servos)
- QuickConnect™ technology—if a power interruption (brownout) occurs, the system reconnects in less than 1/2 second
- Heavy 13AWG dual battery leads with pre-wired E-flite® EC3™ connectors
- 2048 resolution
- Compatible with X-Plus™ modules (AR20310T has the X-Plus module built in)

IMPORTANT: The PowerSafe receiver has a power distribution center that provides up to 35-amps continuous and 50-amps peak current to power your system. The AR9140T, AR12310T and AR20310T PowerSafe receivers use up to three (1 minimum connected to operate) remotely mounted receivers that can be optimally placed in your aircraft providing the best possible RF link in the most demanding conditions.

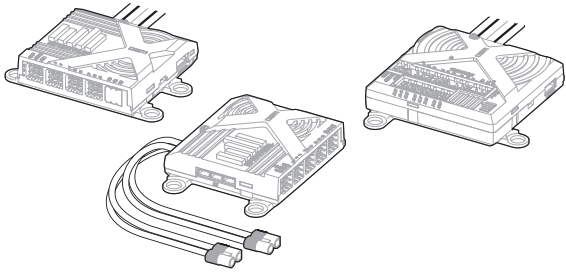
IMPORTANT: Flight Log data is available through a telemetry capable Spektrum AirWare™ transmitter. The Flight Log displays overall RF link performance as well as the individual internal and external receiver link data. Additionally it displays receiver voltage.

IMPORTANT: Aircraft using this receiver should use AMA sactioned flying fields and follow the AMA safety codes at https://www.modelaircraft.org/files/105.pdf

NOTICE: The SPM9540 Flight Log is no longer compatible with the PowerSafe™ receivers.

NOTICE: The Spektrum PowerSafe telemetry receivers are not compatible with the Spektrum/JR/FUTABA DSM2™ modules

Specifications	AR9140T	AR12310T	AR20310T
Type	DSM2/DSMX PowerSafe Telemetry Receiver		
Dimensions (LxWxH)	55.12 x 55.94 x 17.73mm	55.12 x 55.94 x 17.73mm	64.31 x 61.03 x 16.29mm
Weight	48.19g	48.19g	59.5g
Antenna Length	(1) - 6", (1) - 7"		
Remote Receivers	Yes(2)-Included	Yes(3)-Included	Yes(3)-Included
Channels	9	12	20
Band	2.4GHz		
Voltage Range	3.5-10V		



Included Items	AR9140T	AR12310T	AR20310T
SPM9645	(2) DSMX Remote Receiver	(3) DSMX Remote Receiver	(3) DSMX Remote Receiver
SPM9011	9" Remote Receiver Extension	9" Remote Receiver Extension	9" Remote Receiver Extension
SPM9012	12" Remote Receiver Extension	12" Remote Receiver Extension	12" Remote Receiver Extension
SPM9013	N/A	24" Remote Receiver Extension	24" Remote Receiver Extension
SPM6820	Soft switch	Soft switch	Soft switch
	Instruction Manual	Instruction Manual	Instruction Manual
EFLAEC302	(2) battery EC3 connectors	(2) battery EC3 connectors	(2) battery EC3 connectors
	(2) Charge receptacle	(2) Charge receptacle	(2) Charge receptacle
SPMA9570A	Aircraft Telemetry Volt Sensor	Aircraft Telemetry Volt Sensor	Aircraft Telemetry Volt Sensor

Battery Requirements

Using One Battery

The PowerSafe receiver allows the option of using one or two battery packs. When using one battery, simply plug the battery into either one of the two battery connectors (BATT 1 or BATT2). Be sure to secure the unused battery connector. Ensure that the open contacts of the unused battery are not back powered (not electrically hot), however, the unused connector should be secured to prevent it from entangling during flight. When the system is powered using one battery, a single blue LED will constantly emit when the system is powered on.

Using Two Batteries

The PowerSafe receiver offers a true redundant dual battery system. When using two battery packs, each pack functions independently and is isolated from the other so that if one pack should fail (open circuit, short-circuit, or become discharged) the other battery will provide power to operate the system. When using dual batteries, it's important that both batteries be of the same capacity and ideally of the same age and condition.

It's normal for one battery to discharge slightly more than the other. This is the nature of a truly redundant isolated battery system. The battery that has the higher voltage or lower internal resistance will discharge at a faster rate. Generally the difference is negligible (less than 10%). Because of this it's normal for only one blue LED (Batt 1 or Batt 2) to be on when the system is not under a heavy current load depending on which pack is providing more power.

When using two batteries, the total available capacity equals the sum total of both batteries e.g., BATT1 @ 2000mAh + BATT2 @ 2000mAh = a total capacity of 4000mAh. 12- and 24-inch EC3™ battery extensions (SPMEXEC312, SPMEXEC324) are available for installations where the battery is located a distance from the main PowerSafe unit.

Using Dual Voltage Regulators

The Spektrum™ 7.5 am (11-amp peak) 6.0 volt regulator (SPMVR6007) is specifically designed for use with the PowerSafe receivers.

IMPORTANT: When using two batteries powered through two regulators, each regulator operates independently and it's common for one battery to be discharged at a slightly higher rate depending on the condition of the battery (internal resistance, voltage, etc.) and the tolerance of the regulators. This causes one battery to discharge before the other and it's important to check each battery using a loaded battery tester (HAN171) at a recommended 1-amp load before each flight monitoring the voltage of each pack and recharging when the weakest pack reaches 40% capacity. (See Battery Capacity pg. 5)

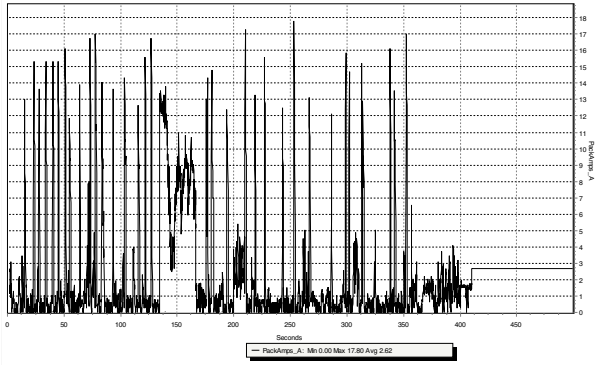
Battery Capacity

It's important to select a battery(s) that has more than adequate capacity to provide the necessary flight time. Our staff has been recording in-flight data to determine typical current consumption of aircraft in flight. Following are two graphs that illustrate the in-flight current draw of the radio system. Current draws may vary depending on your servos, installation and flying style.

The following setup is shown as a worst-case scenario indicative of some aerobatic pilots' setups. It is not recommended to use this setup without proper voltage regulation for your servos.

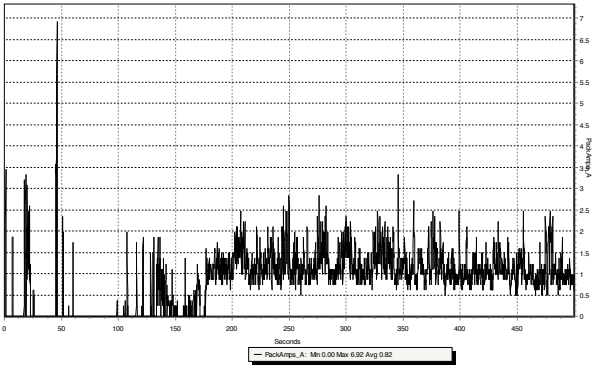
Airplane	40% YAK
Servos	9-JR8711's 1-8317 (throttle)
Batteries	Two 4000mAh 2-cell 7.4-volt Li-Pos
Regulator	None
Engine	DA150
Weight	40 lb
Flight envelope	Aggressive 3D
Average current	2.62 amps
Peak current	17.8 amps
Milliamps (used per 10-minute flight)	435mAh

JR8711's and 8317's are rated at a maximum of 6-volt 5-cell use. Using higher voltages will void the warranty.



In the example above, the average current was 2.62 amps, which calculates to 435mAh per 10 minutes (typical flight length). It's recommended that only 60% of the available capacity be used to ensure plenty of reserve battery capacity. In this example, using two 4000mAh batteries (8000mAh total capacity) x 60%= 4800mAh (available usable capacity) divided by the capacity used per 10-minute flight. 435mAh would allow up to 11 flights of 10 minutes each.

Airplane	33% Sukhoi
Servos	7-JR8611's 1-8317 (throttle)
Batteries	1- 4000mAh 2-cell 7.4-volt LiPo
Regulator	6 volts
Engine	DA100
Weight	26 lb
Flight envelope	Moderate 3D
Average current	.82 amps
Peak current	6.92 amps
Milliamps (used per 10-minute flight)	137mAh



Recommended Guidelines for Battery Capacity

40-45% Aerobatic aircraft w/ 9-12 high-current servos: 4000–8000mAh

33-35% Aerobatic aircraft w/ 7-10 high-current servos: 3000–6000mAh

25% Quarter Scale Aerobatic aircraft w/ 5-7 high-current servos: 2000–4000mAh

Jets - BVM Super BANDIT, F86, Euro Sport, etc.: 3000–6000mAh

Giant-Scale Jets - BVM Ultra Bandit:4000–8000mAh

Scale aircraft - The varieties of scale aircraft and the accessories they use vary tremendously, making it difficult to give capacity recommendations for these types of aircraft. Using the previously mentioned aerobatic guidelines relative to the size and number of servos used will provide a conservative capacity for your scale aircraft. As always, check battery charge condition before each flight.

Battery Voltage

IMPORTANT: DO NOT use a 4-cell 4.8-volt battery to power the PowerSafe receiver.

Four-cell, 4.8-volt batteries do not provide enough voltage headroom (additional margin needed) necessary to power the system when heavily loaded. Under load the system voltage can drop below the voltage system's minimum operating voltage threshold (3.5 volts) and cause loss of control.

The PowerSafe receiver is capable of handling voltages from 6.0 to 10.0 volts. The voltage limitations are generally the servos. Most servos are compatible with 5-cell 6-volt packs. Five-cell, 6-volt NiMH packs have become the standard for many giant-scale applications. There is no voltage regulation in the receiver. Voltage in = voltage out.

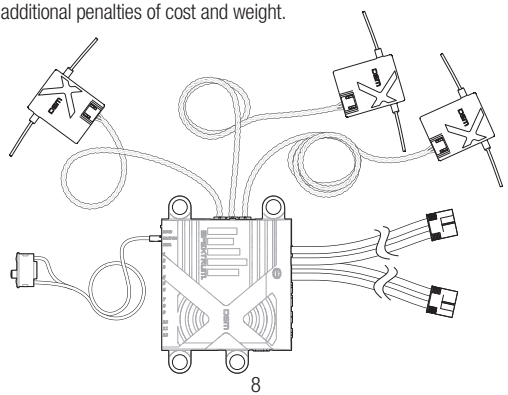
Be aware that NiMH batteries have a tendency to false peak when being fast charged. Be especially careful when using NiMH batteries that they are fully charged and have not false peaked.

Many pilots are using 2-cell LiPo batteries to power their aircraft. LiPo batteries offer greater capacity for their size and weight, and are easier to manage when charging. Before using LiPo batteries, please check the voltage specifications of your servos. Use of a voltage regulator, such as the Spektrum VR6007 (SPMVR6007), might be necessary.

When a battery is connected to the PowerSafe receiver, a low current drain of less than 1mA occurs even when the switch is turned off. If the system is going to be stored for any length of time, it's important that the battery(s) be disconnected from the PowerSafe receiver to prevent over discharge.

Installation

The PowerSafe receiver requires a minimum of one remote receiver to operate. Two or three remote receivers are included and, in most cases, it is recommended that two or three receivers be used. Each receiver functions independently and additional receivers (up to three) offer a more secure RF link in difficult environments. The added security of redundancy should a failure occur will outweigh the slight additional penalties of cost and weight.



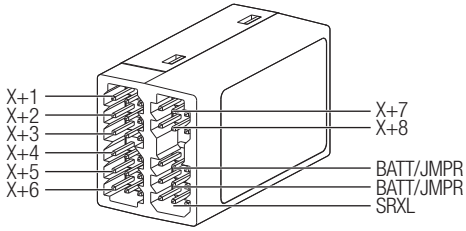
1. Using foam or thick double-sided foam tape and tie wraps, secure the main PowerSafe unit in the position where you would normally mount the receiver.
2. Mount the switch on the side of your aircraft and insert the switch plug in the port in the main unit marked SWITCH.

The PowerSafe receiver uses a specifically designed switch. Conventionally wired switches are not compatible with the PowerSafe receiver.

Installing Optional X-Plus 8 Module

When using an X-Plus™ receiver and module (Not required w/ the AR20310T - it's built into the receiver) it is recommended the X-Plus 8 module be mounted as close to the receiver as possible. When using the X-Plus power jumper lead, mounting the X-Plus 8 module close will minimize the current loss from the receiver. Servo extensions can be use with each servo, it is recommended to use heavy 22 gauge wire with gold plated connectors.

If an auxiliary battery or batteries are to be used there is no need for the X-Plus power jumper. The X-Plus 8 module can be mounted further away from the receiver when using the auxiliary power option.



Installing the Batteries

Using the given guidelines, select the battery system that best fits your application and install the battery(s)/regulator(s) in your aircraft. Connect the battery(s) to the PowerSafe receiver. Spektrum batteries are pre-wired with an EC3™ connector and plug directly in. If using another brand of battery it will be necessary to solder EC3 connectors (two are included with these PowerSafe receivers) to the battery leads. If using a regulator, install it per the guidelines included with the regulator.

Mounting the Remote Receivers

Antenna Polarization

For optimum RF link performance, it is important that the remote antennas be mounted in an orientation that allows for the best possible signal reception when the aircraft is at all possible attitudes and positions. This is known as antenna polarization. This allows the greatest exposed visual cross-section of the antennas from all aircraft orientations. Up to three Remote Receivers can be used, it is recommended that one remote be mounted vertically, one horizontally in-line with the fuselage and one horizontally perpendicular to the fuselage (see illustrations on pages 11–12). This covers the X, Y and Z axis offering superb cross-section visibility in all aircraft orientations.

Locating the Remote Receivers

While Spektrum 2.4GHz systems are far more resistant to interference caused from internal RF generating sources, the remote receivers should be mounted as far away as practical (typically 4" or greater if possible) from the following:

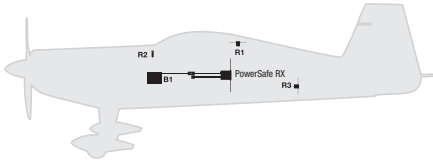
- Ignition systems
- Ignition switches
- ECU pumps
- Receiver batteries
- Metal bypass tubes
- High-vibration areas
- Ignition batteries
- Engines
- Electric motors
- Fuel tanks
- High-temperature components like exhaust systems
- Any significant metallic conductive components

The remote antennas should be mounted a minimum of at least 2" apart from each other as greater antenna separation gives improved path diversity (RF link performance) in critical environments. In large aircraft where space is not an issue, it is highly recommended that the antennas be mounted throughout the aircraft as illustrated. Spektrum remote receiver extensions range from 6" to 36" allowing the receivers to be mounted in the most optimum locations throughout the aircraft. Do not extend remote receivers greater than 36" from the main receiver.

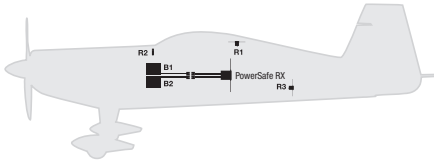
Using double-sided foam tape and tie wraps, mount the remote receivers in your aircraft as per the illustrations and plug them into the receiver ports.

The following are illustrations of typically recommended installations. Note the remote receiver orientation.

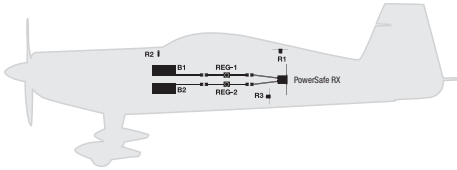
- 35% aerobatic plane with single NiMH battery and three remote receivers



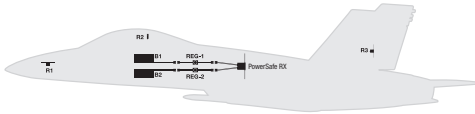
- 35% aerobatic plane with dual NiMH batteries and three remote receivers



- 40% aerobatic plane with dual LiPo batteries, dual regulators and three remote receivers



- Jet with dual LiPo batteries, dual regulators and three remote receivers



Binding

NOTICE: In order for the system to operate, one remote receiver must be connected. If an additional remote receiver is added after initial binding, the system must be re-bound to recognize the additional remote receiver.

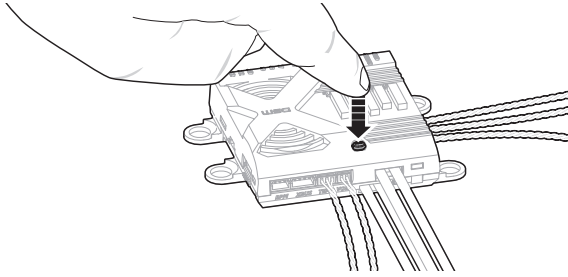
How To Bind the PowerSafe Receiver

The AR9140T, AR12310T and AR20310T PowerSafe receivers must be bound to the transmitter before they will operate. Binding is the process of teaching the receiver the specific code of the transmitter so it will only connect to that specific transmitter.

1. Connect the remote receivers and any telemetry sensors to the main receiver.
2. Push and hold the bind button on the PowerSafe receiver while turning on the soft switch. Release the Bind button once all the LEDs on the receiver and remote receivers start to flash continuously.

Tip: It is still possible to use a bind blug in the BIND port if desired.

3. Put your transmitter in bind mode.
4. The bind process is complete when all the orange LEDs are solid.



NOTICE: If using a bind plug, remove the bind plug after binding to prevent the system from entering bind mode the next time the power is turned on.

5. After you set up your model, always rebind the transmitter and receiver to set the desired failsafe positions. See FAILSAFE on the next page.

Failsafe

The AR9140T, AR12310T and AR20310T PowerSafe receivers features two types of failsafe: SmartSafe™ and Preset Failsafe.

Failsafe position is set during binding. In the unlikely event that the radio link is lost during use, the receiver will drive all channels to its pre-programmed failsafe position.

Pre-Connect Failsafe - Receiver Power Only

If the receiver is powered on, but there is no transmitter signal present (transmitter powered off), there will be no output pulses to the servos. The receiver remains in standby mode with the blue battery LEDs lit. When the transmitter is turned on, the receiver locates the signal (GUID), connects and normal control resumes. When connected, the amber LEDs on all attached remote receivers will be on.

After Connection

When the transmitter and receiver are turned on and after the receiver connects to the transmitter and normal control of all channels occurs, if loss of signal occurs Preset Failsafe drives all servos to their preset failsafe positions. For sailplanes it is recommended that the spoilers/flaps deploy to dethermalize the aircraft, preventing a flyaway. Some modelers prefer to use this failsafe system to program a slight turn and low throttle to prevent their aircraft from flying away. When the signal is regained, the system immediately (less than 4 ms) regains control.

SmartSafe + Hold Last

If loss of signal occurs, SmartSafe™ technology moves the throttle channel to its preset failsafe position (low throttle) that was set during binding. All other channels hold their last position. When the receiver detects a signal from the transmitter, normal aircraft operation resumes.

Tip: Use either the built in BIND button OR a bind blug in the BIND/BATT port.

SmartSafe + Hold Last

1	Lower Throttle on transmitter
2	Push and Hold Bind Button
3	Power on Receiver
4	Release Button once RX goes into Bind Mode (flashing LED)
5	Place transmitter in Bind Mode and finish Binding.

A*	*Install bind plug (optional)*
B*	*Leave in through entire bind process**

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

Preset Failsafe

Preset failsafe is ideal for sailplanes, allowing the aircraft to automatically dethermalize if the signal is lost. With preset failsafe, all channels go to their preset failsafe positions if the signal is lost, preventing a flyaway. When the receiver detects a signal from the transmitter, normal aircraft operation resumes.

Preset Failsafe

1	Move all sticks and switches on the transmitter to desired Failsafe position.
2	Push and Hold Bind Button
3	Power on Receiver
4	Release Button after RX goes into Bind Mode (flashing LED)
5	Push and Hold the Bind Button again before the transmitter enters Bind Mode.

A*	*Install bind plug (optional)*
B*	*Remove plug once RX goes into Bind Mode*

*Setting Failsafe can be done with the Bind Plug if desired.
**Remove Bind Plug when finished setting up Failsafe.

Range Testing

Before each flying session, and especially with a new model, it's important to perform a range check. All Spektrum aircraft transmitters incorporate a range testing system, which reduces the output power to allow a range check.

1. With the model resting on the ground, stand 30 paces (approx. 90 feet/28 meters) away from the model.
2. Face the model with the transmitter in your normal flying position and put your transmitter into range test mode. This causes reduced power output from the transmitter.
3. You should have total control of the model in range test mode at 30 paces (90 feet/28 meters).
4. If control issues exist, call Horizon Product Support for further assistance.

Advanced Range Testing

The Standard Range Testing procedure is recommended for most sport aircraft. For sophisticated aircraft that contain significant amounts of conductive materials (e.g. turbine powered jets, some types of scale aircraft, aircraft with carbon fuselages, etc.), the following advanced range check will confirm that all remote

receivers are operating optimally and that the installation (position of the receivers) is optimized for the specific aircraft. This Advanced Range Check allows the RF performance of each remote receiver to be evaluated and to optimize the locations of each individual remote receiver.

1. Standing 30 paces away from the model, face the model with the transmitter in your normal flying position.
2. Put your transmitter in range test mode. Range test mode reduces the power output from the transmitter.
3. Have someone position the model in various orientations (nose up, nose down, nose toward the transmitter, nose away from the transmitter, etc.).
4. Observe the telemetry on your transmitter. Note any orientations that cause higher fade or hold values. Perform this step for at least one minute.
5. Re-position any remote receivers as necessary.
6. Have your helper position the model in various orientations (nose up, nose down, nose toward the Tx, nose away from the Tx, etc.) observe the telemetry on your transmitter or while your helper watches the Flight Log noting any correlation between the aircraft's orientation and frame losses. Do this for 1 minute. The timer on the transmitter can be used here. For giant-scale aircraft, it's recommended that the airplane be tipped up on its nose and rotated 360 degrees for one minute then the data recorded. Next place the airplane on its wheels and do a second test, rotating the aircraft in all directions for one minute.
7. After one minute, a successful range check will have less than ten recorded frame losses. Scrolling the Flight Log through the antenna fades (A, B, L, R) allows you to evaluate the performance of each receiver. Antenna fades should be relatively uniform. If a specific antenna is experiencing a high degree of fades then that antenna should be moved to a different location.
8. A successful advanced test will yield the following:

   H - 0 holds

   F - less than 10 frame losses

   A, B, R, L - Fades will typically be less than 100. It's important to compare the relative frame losses. If a particular receiver has a significantly higher frame loss value (2 to 3X) then the test should be redone. If the same results occur, move the offending receiver to a different location.

Flight Log

Flight Log is available through a telemetry capable Spektrum AirWare™ transmitter. The Flight Log displays overall RF link performance as well as the individual internal and external receiver link data. Additionally it displays receiver voltage.

Using the Flight Log

A - Antenna fades on antenna A	B - Antenna fades on antenna B
L - Antenna fades on the left antenna	R - Antenna fades on the right antenna
F - Frame loss	H - Holds

Antenna Fades
Represents the loss of a bit of information on that specific antenna. Typically it's normal to have as many as 50 to 100 antenna fades during a flight. If any single antenna experiences over 500 fades in a single flight, the antenna should be repositioned in the aircraft to optimize the RF link.

Frame Loss
Represents simultaneous antenna fades on all attached receivers. If the RF link is performing optimally, frame losses per flight should be less than 20. The antenna fades that caused the frame loss are recorded and will be added to the total antenna fades.

A Hold occurs when 45 consecutive frame losses occur. This takes about one second. If a hold occurs during a flight, it's important to re-evaluate the system, moving the antennas to different locations and/or checking to be sure the transmitter and receivers are all working correctly. The frame losses that led to the hold are not added to the total frame losses.

A servo extension can be used to allow the Flight Log to more conveniently be plugged in without having to remove the aircraft's hatch or canopy. On some models, the Flight Log can be plugged in, attached and left on the model using double-sided tape. This is common with helicopters, mounting the Flight Log conveniently to the side frame.

IMPORTANT: The Spektrum Flight Log (SPM9540) is not compatible with the PowerSafe receivers.

Receiver Power System Requirements

Inadequate power systems that are unable to provide the necessary minimum voltage to the receiver during flight have become the number one cause of in-flight failures. Some of the power system components that affect the ability to properly deliver adequate power include:

- Receiver battery pack (number of cells, capacity, cell type, state of charge)
- The ESC's capability to deliver current to the receiver in electric aircraft
- The switch harness, battery leads, servo leads, regulators, etc.

The AR9140T/AR12310T/AR20310T have a minimum operational voltage of 3.5 volts; it is highly recommended the power system be tested per the guidelines below.

Power System Test Guidelines
If a questionable power system is being used (e.g. small or old battery, ESC that may not have a BEC that will support high-current draw, etc.), it is recommended that a voltmeter be used to perform the following tests.

The Hangar 9® Digital Servo & Rx Current Meter (HAN172) or the Spektrum Flight Log (SPM9540) is the perfect tool to perform the test below.

Plug the voltmeter into an open channel port in the receiver and with the system on, or simply monitor the voltage on a telemetry capable transmitter, load the control surfaces (apply pressure with your hand) while monitoring the voltage at the receiver. The voltage should remain above 4.8 volts even when all servos are heavily loaded.

How QuickConnect™ Techonlogy Works

- When the receiver voltage drops below 3.5 volts the system ceases to operate.
- When power is restored the receiver immediately attempts to reconnect.
- If the transmitter was left on, the system reconnects typically in about 4/100 of a second.

NOTICE: If a brownout occurs in flight it is vital that the cause of the brownout be determined and corrected.

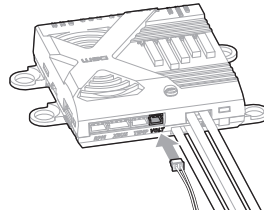
NOTICE: When using Y-harness or servo extensions with Spektrum equipment, always use standard, non-amplified Y-harnesses and servo extensions. Using amplified Y-harnesses or servo extensions may cause servos to operate erratically or not function at all.

Telemetry

The Spektrum AR9140T, AR12310T and AR20310T PowerSafe telemetry receivers features 4 integrated telemetry ports that are compatible with Spektrum telemetry capable transmitters.

- No telemetry module required. Telemetry is built into the receiver.
- No sensor is required to receive Flight Log or receiver pack voltage directly on any telemetry capable Spektrum transmitter.
- The PowerSafe telemetry receivers include the SPMA9570 Aircraft Telemetry Flight Pack Voltage Sensor.

1. Plug the Aircraft Telemetry Flight Pack Voltage Sensor into the VOLT Telemetry Port on the PowerSafe Receivers.
2. Splice the other end into the flight battery pack noting polarity.



For information on Spektrum Telemetry Sensors visit:
http://www.spektrumrc.com

Dual Battery Capacity Monitoring

The PowerSafe receivers feature dual battery capacity monitoring through telemetry when used with Spektrum AirWare G2 transmitters. The capacity is automatic and is simply activated in the transmitter using the Auto Config function. The capacity used is stored flight to flight and adds until reset. The capacity can be reset when the battery is charged, allowing easy battery capacity monitoring.

To reset the capacity used:

1. Power on the transmitter and receiver and allow the receiver to connect to the transmitter.
2. Once connected to the transmitter, either press the bind button or connect a bind plug to the bind port.
3. Capacity used will now be reset.

NOTICE: The capacity will only reset if the transmitter and receiver are connected before pressing the Bind button or connecting a bind plug. If the receiver is not connected, capacity used will not be reset, and the receiver will either enter bind mode or do nothing if the receiver is powered on but not connected.

ModelMatch™ Technology

Some Spektrum and JR transmitters offer a feature called ModelMatch. ModelMatch technology prevents the possibility of operating a model using the wrong model memory, potentially preventing a crash. With ModelMatch, each model memory has its own unique code (GUID) and during the binding process the code is programmed into the receiver. Later, when the system is turned on, the receiver will only connect to the transmitter if the corresponding model memory is programmed on screen.

If at any time you turn on the system and it fails to connect, check to be sure the correct model memory is selected in the transmitter. Please note that the DX5e and Aircraft Modules do not have ModelMatch technology.

Frequently Asked Questions on Spektrum 2.4GHz

1. **Q: After I've bound the receiver to my transmitter, which do I turn on first when I want to fly?**

   A: Either one. Every DSM 2.4GHz transmitter has a GUID (Globally Unique Identifier) code imbedded in its signal. When you bind a DSM receiver to your transmitter, this GUID code is stored in the receiver. If you turn the receiver on before the transmitter, you don't have to worry about it responding to another transmitter. The receiver will go into failsafe mode while it waits for a signal from the transmitter with the same GUID code it has stored. See the Receiver Power Only section for more information. If a DSM transmitter is turned on first you can expect it to connect within 6 seconds of powering on the receiver.

2. **Q: Sometimes the system takes longer to connect or doesn't connect at all. Why?**

   A: In order for a DSM system to connect, the receiver must receive a large number of uninterrupted signal packets from the transmitter. This process takes just a few seconds, but if the transmitter is too close to the receiver (within 4 feet) or near reflective material (metal objects, carbon fiber material, etc.) it may detect its own reflected 2.4GHz energy as "noise". This can delay or prevent connection. If this happens, make sure you are a sufficient distance from metal objects and the receiver itself before you power up and try again.

3. **Q: How important is Flight Log information?**

   A: All 2.4GHz signals, not just DSM, are affected by proximity to conductive materials such as carbon fiber or metal. If you are flying a model that uses a lot of conductive materials in its construction, Flight Log information can be helpful. The information collected when you fly can help determine the optimum location for your receiver(s) so you can minimize the effects of these materials on your signal performance.

1-Year Limited Warranty

What this Warranty Covers - Horizon Hobby, LLC, (Horizon) warrants to the original purchaser that the product purchased (the "Product") will be free from defects in materials and workmanship for a period of 1 year from the date of purchase.

What is Not Covered

This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, (v) Product not purchased from an authorized Horizon dealer, (vi) Product not compliant with applicable technical regulations, or (vii) use that violates any applicable laws, rules, or regulations.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Remedy

Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims. SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

Limitation of Liability

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

Law

These terms are governed by Illinois law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

WARRANTY SERVICES

Questions, Assistance, and Services

Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact your local distributor or Horizon directly. This will enable Horizon

to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please visit our website at www.horizonhobby.com, submit a Product Support Inquiry, or call the toll free telephone number referenced in the Warranty and Service Contact Information section to speak with a Product Support representative.

Inspection or Services

If this Product needs to be inspected or serviced and is compliant in the country you live and use the Product in, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. An Online Service Request is available at http://www.horizonhobby.com/content/service-center_render-service-center. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

NOTICE: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

Warranty Requirements

For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

Non-Warranty Service

Should your service not be covered by warranty, service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashier's checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/content/service-center_render-service-center.

ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

Warranty and Service Contact Information

Country of Purchase	Horizon Hobby	Contact Information	Address
United States of America	Horizon Service Center (Repairs and Repair Requests)	servicecenter.horizonhobby.com/RequestForm/	4105 Fieldstone Rd Champaign, Illinois, 61822 USA
	Horizon Product Support (Product Technical Assistance)	productsupport@horizonhobby.com.	
		877-504-0233	
	Sales	websales@horizonhobby.com	
		800-338-4639	
EU	Horizon Technischer Service	service@horizonhobby.eu	Hanskampring 9 D 22885 Barsbüttel, Germany
	Sales: Horizon Hobby GmbH	+49 (0) 4121 2655 100	

FCC Information

FCC ID: BRWAR9130T • BRWAR20300T

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 to an outlet on a circuit different from that to which the receiver is connected.

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.

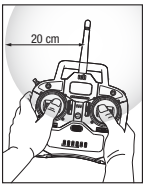
NOTICE: Modifications to this product will void the user's authority to operate this equipment.

This product contains a radio transmitter with wireless technology which has been tested and found to be compliant with the applicable regulations governing a radio transmitter in the 2.400GHz to 2.4835GHz frequency range.

Antenna Separation Distance

When operating your transmitter, please be sure to maintain a separation distance of at least 20 cm between your body (excluding fingers, hands, wrists, ankles and feet) and the antenna to meet RF exposure safety requirements as determined by FCC regulations.

This illustration shows the approximate 20 cm RF exposure area and typical hand placement when operating your transmitter.



IC Information

IC: 6157A-AR9130T • IC: 6157A-AR20300T
This device complies with Industry Canada license-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.

Information IC

IC: 6157A-AR9130T • IC: 6157A-AR20300T
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.

Compliance Information for the European Union

CE Horizon Hobby, LLC hereby declares that this product is in compliance with the essential requirements and other relevant provisions of the RED Directive.
A copy of the EU Declaration of Conformity is available online at:
http://www.horizonhobby.com/content/support-render-compliance.

Instructions for Disposal of WEEE by Users in the European Union

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

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