DEFENDER 1100

Instruction Manual

PASS™
Pilot Assist Stability Software

Specifications

Wingspan:	43-5/16" (1100mm)
Length:	34" (864mm)
Flying Weight:	26.5 oz. (750g)
Battery:	11.1V 3S 25C 1500mAh LiPo
Motor:	2216/1400Kv BL outrunner motor
ESC:	30A w/Heavy-Duty BEC
Charger:	110V AC Balancing LiPo Charger
Gyro:	PASS (Pilot Assist Stability Software)
Transmitter:	2.4 GHz 5-channel with compact receiver

General Precautions

- Never operate your model if the transmitter battery voltage is too low.
- Always operate your model in an open area away from obstacles, people, vehicles, buildings, etc.
- Carefully follow the directions and warnings for this and any optional support equipment. (chargers, rechargeable batteries, etc.).
- Keep all chemicals, small parts and all electronic components out of the reach of children.
- Moisture causes damage to electronic components. Avoid water exposure to all electronic components, parts, etc. not specifically designed and protected for use in water.

Safety Precautions

Failure to use this product in the intended manner as described in the following instructions can result in damage and/or personal injury. A Radio Controlled (RC) airplane is not a toy! If misused it can cause serious bodily harm and damage to property.

Keep items that could become entangled away from the propeller, including loose clothing, tools, etc. Be especially sure to keep your hands, face and other parts of your body away from the propeller. As the user of this product you are solely and wholly responsible for operating it in a manner that does not endanger yourself and others or result in damage to the product or the property of others.

This model is controlled by a radio signal that is subject to possible interference from a variety of sources outside your control. This interference can cause momentary loss of control so it is advisable to always keep a safe distance from objects and people in all directions around your model as this will help to avoid collisions and/or injury.

FCC Information

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.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the 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.

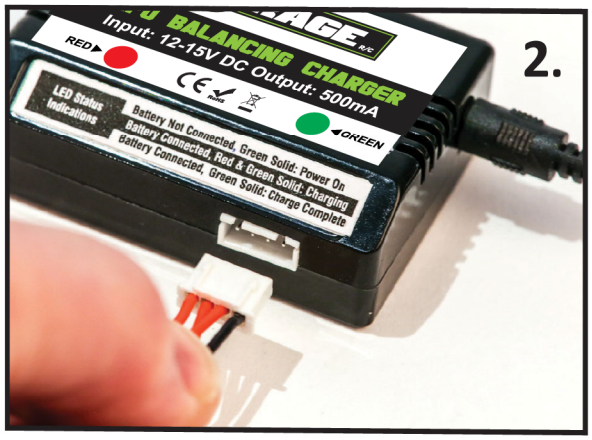
The associated regulatory agencies of the following countries recognize the noted certifications for this product as authorized for sale and use: USA, UK, AU

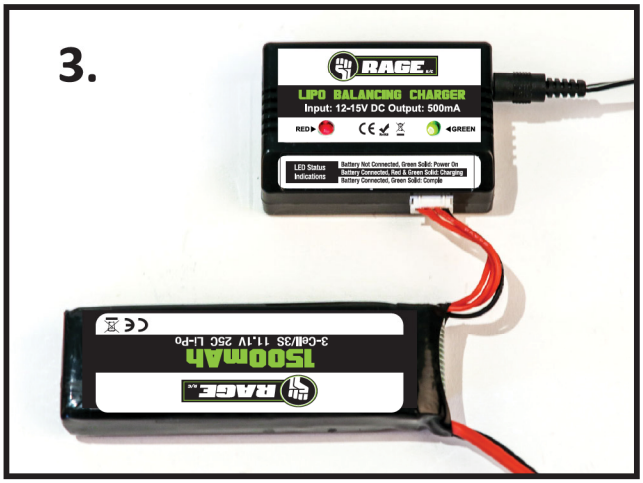
LiPo Battery Warning

IMPORTANT NOTE: Lithium Polymer batteries are significantly more volatile than the alkaline, NiCd or NiMH batteries also used in RC applications. All instructions and warnings must be followed exactly to prevent property damage and/or personal injury as mishandling of LiPo batteries can result in fire. Inspect the battery after each flight and before charging. If there is any visible damage or swelling do not charge, discard battery in accordance with local state and federal guidelines. By handling, charging or using the included LiPo battery you assume all risks associated with LiPo batteries. If you do not agree with these conditions please return the complete product in new, unused condition to the place of purchase immediately.

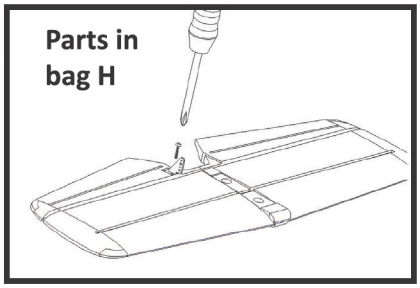
Defender 1100 RTF Contents

Charging the LiPo Battery

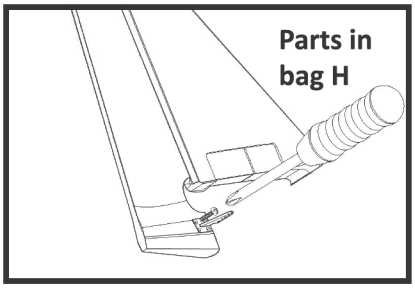




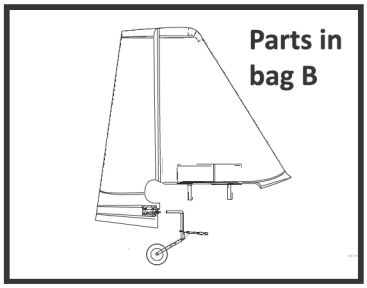
1. Plug the power supply into charger and then plug supply into AC power outlet.
2. Plug the 4-pin balance connector of the battery into the charger. Maintain correct polarity when plugging in 4-pin balance connector.
3. Both red and green LED's will light during charge. Only the green LED will remain lit when charge is complete.



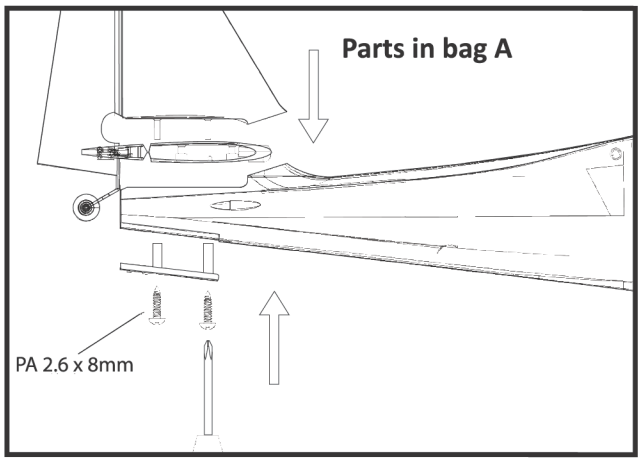
Install the control horn (Bag H) to the elevator in the direction shown using screwdriver provided. Tighten until snug.



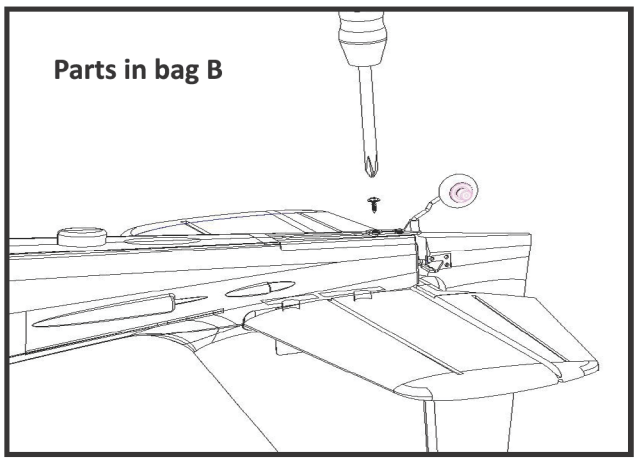
Install the control horn (Bag H) in the direction shown to the right side of the rudder.
Do not over tighten.



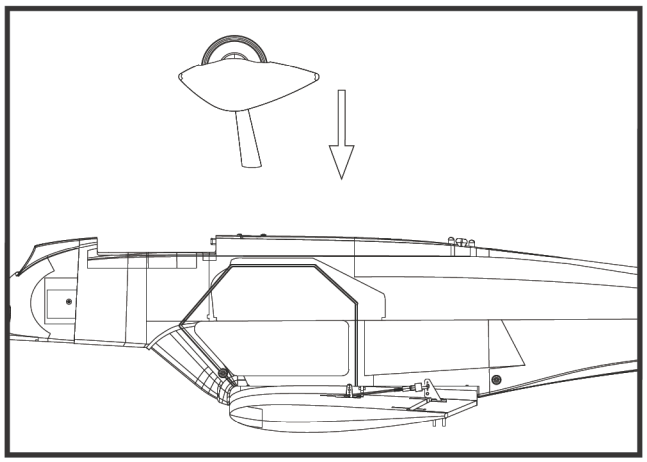
Insert the tailwheel steering arm (Bag B) into the hole in the leading edge of the rudder.



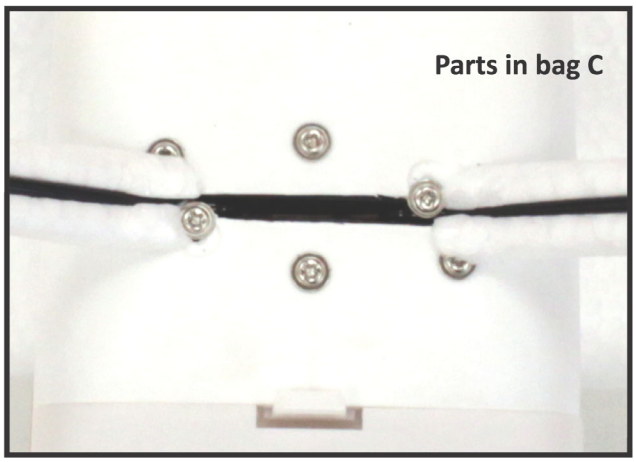
Slip the horizontal tail onto the two posts on the bottom of the rudder and set the assembly in place on the fuselage.
Insert the bottom plastic mount (Bag A) in place. Install using two 2.6 x 8mm screws.



Install the tailwheel mount (Bag A) to the bottom plastic mount using two small washer head screws from Bag B.



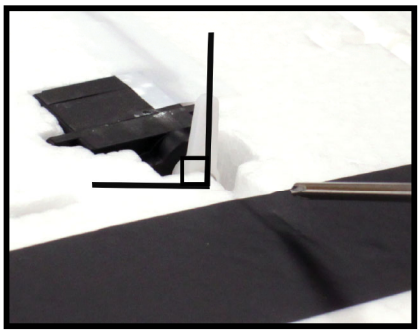
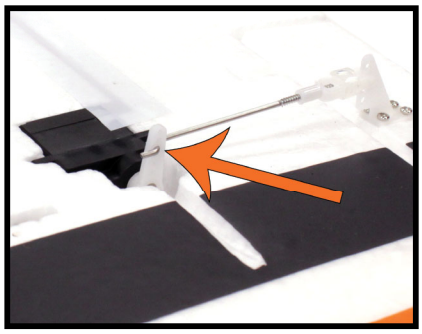
Insert main landing gear wire into forward slot on the bottom of the fuselage, with the wheels angled forward.



Retain landing gear with washer head screws which overlap the wire to hold it in place.

Defender 1100 Assembly (cont.)

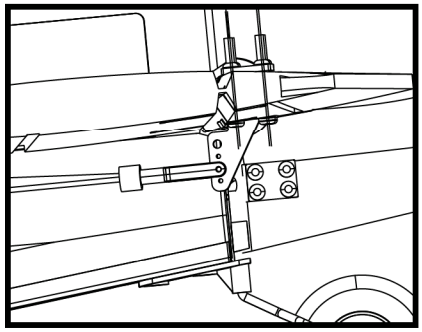
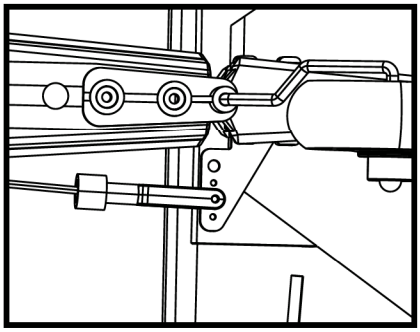
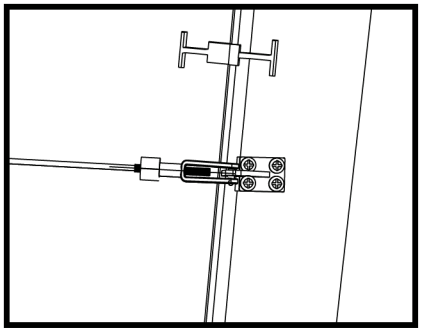
Attaching the Servo Horns to the Aileron Servos

Attach included servo horns (Bag G) to the wing aileron servos as shown above. Use the included servo screws to secure servo horn to servo. Then attach the included aileron control rod by threading the Z-bend through the enlarged hole on the servo horn.

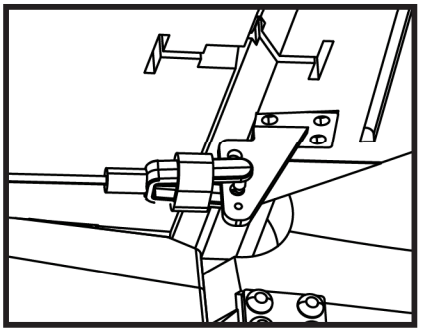
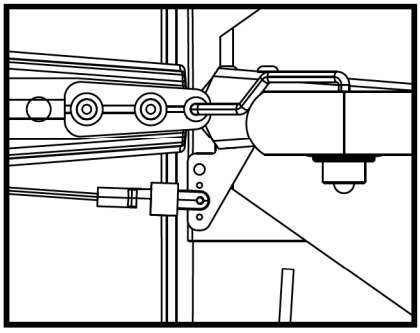
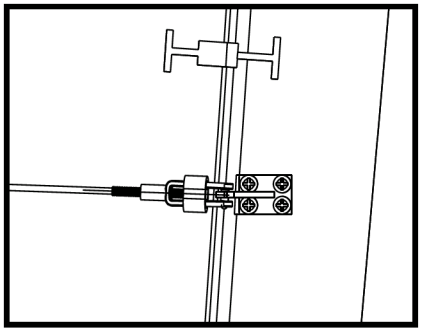
NOTE: It may be necessary to check that the servos are centered. This can be done by using the aileron Y-harness to connect the servos to the receiver. Then simply turn the transmitter on and connect the flight pack, allowing the servos to return to center.

Attaching the Control Rods to the Control Horns

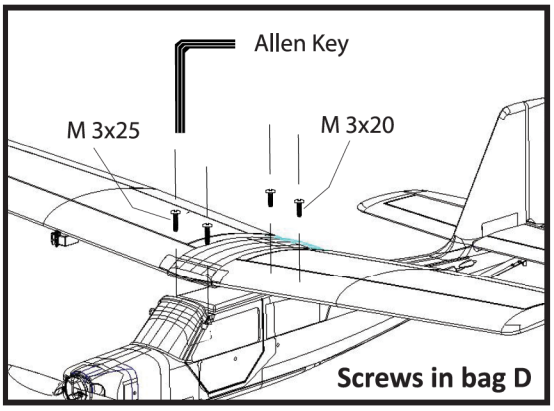




Attach each of the control rods to the control horns for each control surface as shown in the diagrams above. The clevis at the end of each control rod should be placed into the center hole of the control horn and pushed together until it "snaps" and is secure.

NOTE: For extra security during flights, it is recommended that you install the small sections of clear rubber tubing over the control rods before connecting the clevis to the control horn and then slide the fuel tubing over the connected clevis once it is attached. See diagrams below.

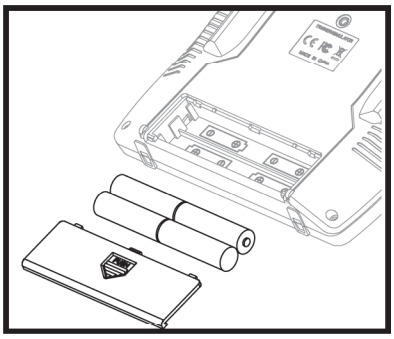
Defender 1100 Assembly (cont.)



Plug aileron servos into Y-connector. Plug Y-connector into receiver at position marked AILE. Set wing into position on fuselage. Attach wing to fuselage using two M3x25mm screws at front and two M3x20mm screws at rear (Bag D). Use included Allen key to tighten until snug.
DO NOT OVERTIGHTEN

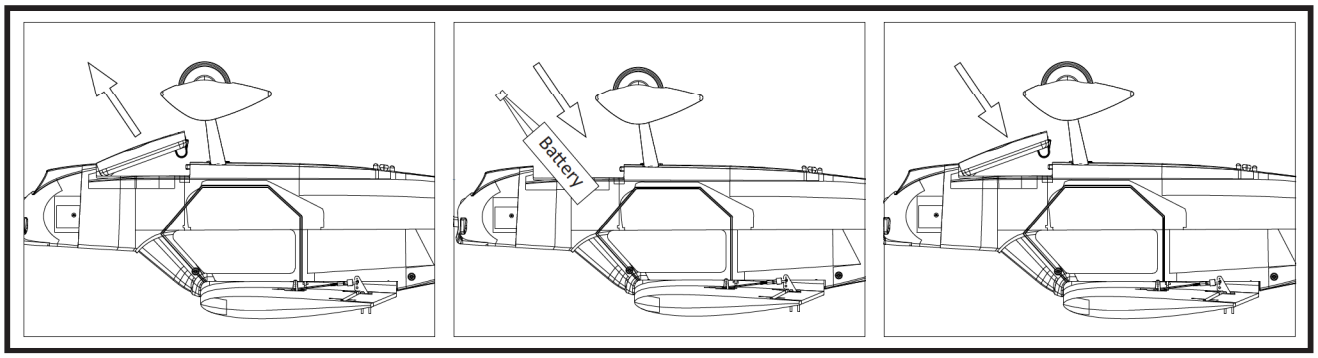
Install prop collet adapter (Bag F) onto motor shaft, and then spinner back-plate (Bag I). Locate prop (Bag J) and insert plastic spacers to both sides so the prop fits snuggly on collet shaft with lettering facing forward. Add washer and prop nut. Test spinner cap for alignment and then tighten prop nut securely with included wrench. Attach spinner cap with included screws. Ensure clearance between spinner backplate and cowl.

Install Transmitter Batteries



PLEASE NOTE: Install the included 4 AA batteries into the battery compartment located on the back of the transmitter, under the battery hatch cover. Make sure that the batteries are installed with correct polarity per the diagram inside the battery compartment.

Flight Battery Install



Insert the battery into the battery box located on the bottom of the fuselage. First, turn on the transmitter with the throttle off (left transmitter stick all the way down). Then plug the battery into the ESC which will power up the aircraft. Secure the battery in place with the included hook and loop strap. Unplug the flight battery at the end of each flight.

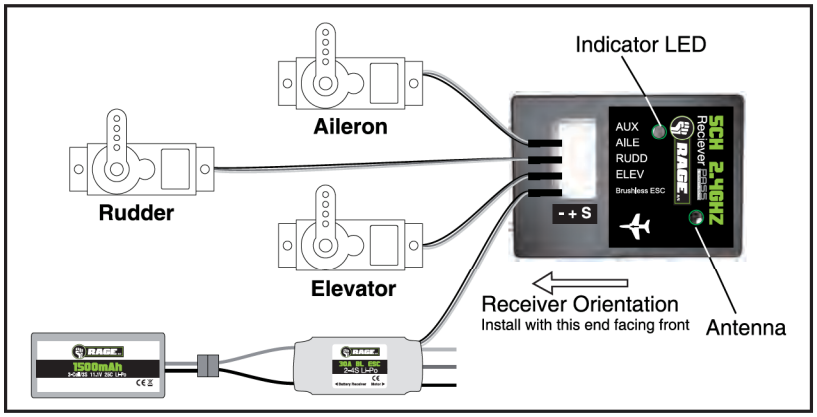
Transmitter Details

Arming the Motor

The left stick on the transmitter controls the throttle function. When the transmitter is on and the aircraft flight battery is plugged in, the electronics will be active but the motor will not be armed. To arm the motor, cycle the throttle stick from the OFF to the ON position and then back to OFF. You will hear an arming tone and the next time that the throttle stick is raised the motor will start.

In normal flight operations, always turn the transmitter on first and then power up the aircraft by connecting the battery to the ESC. Keep the aircraft still for 3-5 seconds to allow the gyro to properly calibrate before flying. Cycle the throttle OFF/ON/OFF to arm the motor. When finished flying always unplug the flight battery first and then turn off the transmitter.

Receiver Connections



The Defender 1100 includes a pre-installed 2.4GHz receiver that includes the PASS (Pilot Assist Stability Software). It is important that the receiver be securely mounted in the proper orientation. When plugging servos and ESC into the receiver, make sure to maintain correct polarity.

NOTE: Any repositioning of the receiver must use shock-absorbing double-sided tape to insure proper functioning of the PASS system.

Binding

Binding is the process of programming the receiver to recognize the GUID (Globally Unique Identifier) code of a single specific transmitter. When a receiver is bound to a transmitter, the receiver will only respond to that specific transmitter.
If you need to rebind for any reason, please follow these steps:

- Make sure the transmitter is turned off, the throttle is off (stick to bottom) and the PASS switch is in the Partial or Full Assist position. Plug the flight battery in while keeping the airframe still for gyro calibration.
- Turn on the transmitter within 3 seconds.
- The receiver LED will flash for 3-5 seconds and then bind automatically.
- Once bound, the LED will remain solidly lit.

Electronic Trims

All trims should be centered mechanically as shown in the Center Control Surfaces section. If adjustments are required for level flight when flying the Defender 1100, the electronic trims should be used. If up elevator trim is needed, press down on the elevator trim button several times until level flight is achieved. Do the opposite if down trim is required. In similar fashion, if rudder or aileron trim is required, use the corresponding electronic trim buttons to achieve the desired results.

Control Movement

With both the transmitter and the aircraft powered on and the PASS switch set to No Assist, check the movement of the control surfaces. **Please note that if the motor is not armed and the control stick is held at any full deflection for over 3 seconds the servo may be reversed.**

The PASS switch on the upper right of the transmitter should be in the OFF (toward top of transmitter) for these tests.

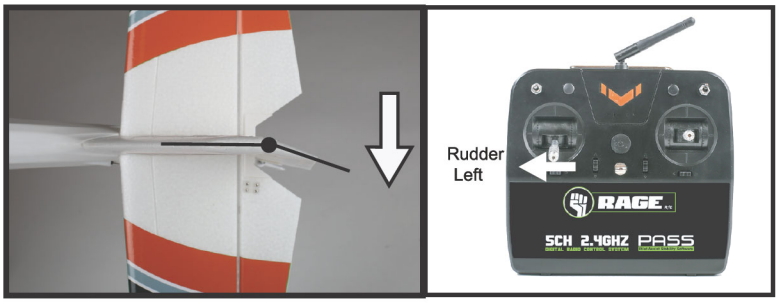
When the aileron stick is moved toward the right of the transmitter the right aileron should move up. When in flight this will roll the airplane to the right.

When the aileron stick is moved toward the left of the transmitter the left aileron should move up. When in flight this will roll the airplane to the left.

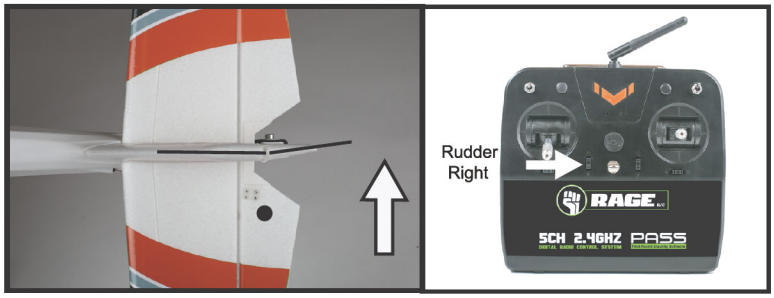
When the elevator stick is moved toward the bottom of the transmitter the elevator should move up. When in flight this will raise the nose.

When the elevator stick is moved toward the top of the transmitter the elevator should move down. When in flight this will lower the nose.

Control Movement (cont.)



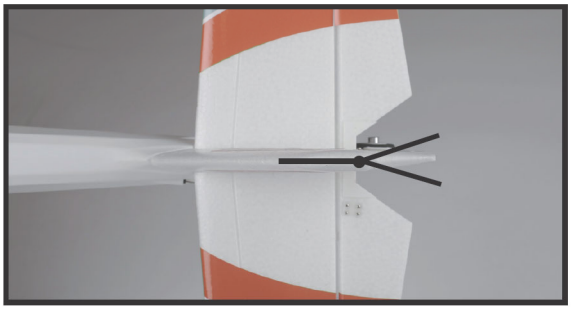
When the rudder stick is moved to the left of the transmitter the rudder should move left. When in flight this will yaw the tail to the right (the nose of the aircraft will move to the left).



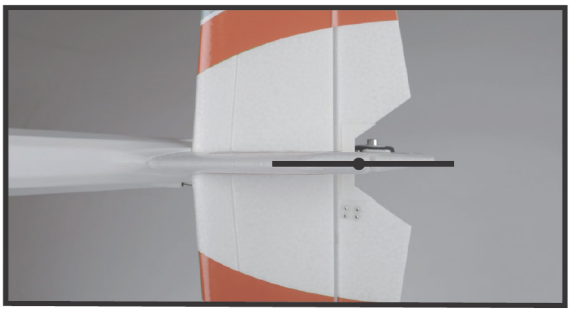
When the rudder stick is moved to the right of the transmitter the rudder should move right. When in flight this will yaw the tail to the left (the nose of the aircraft will move to the right).

Center Control Surfaces

With both the transmitter and the aircraft powered on with trim at neutral (centered) and the PASS switch in the "No Assist" position, check the control surfaces for correct centering. If the surface is not centered, make the adjustment to the pushrod length by disconnecting the clevis from the control horn and screwing the plastic clevis in or out as required. Reconnect the clevis to the control horn and slip the plastic retainer onto the clevis to prevent it from opening under load.



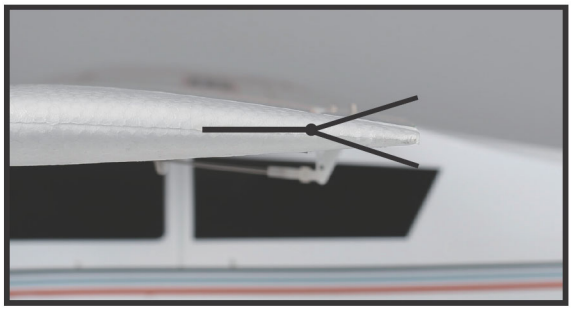
Rudder not properly centered.



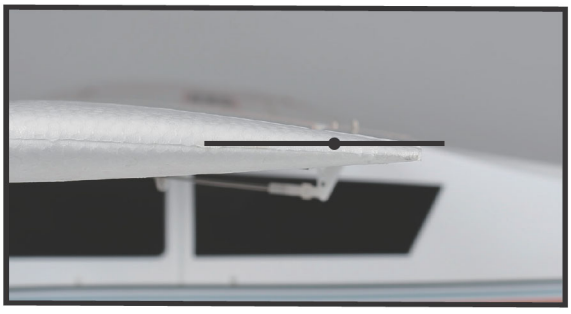
Rudder properly centered.

Elevator not properly centered.

Elevator properly centered.



Aileron not properly centered.



Aileron properly centered.

Pilot Assist Stability Software (PASS)

PASS (**P**ilot **A**ssist **S**tability **S**oftware) is incorporated into your Defender 1100. It allows the pilot to tailor the response of the airplane to his abilities. As your piloting skills grow the capabilities of the Defender 1100 grow with you.

Full Assist (Switch Down, Toward Pilot)

In this mode, the amount of roll, rate of climb, and rate of dive are limited. Self-leveling is also engaged. The reduced roll, climb and dive angles are to aid the newer pilot in not over-controlling the aircraft. If at any time the airplane feels out of control, simply let go of the sticks and the model will return to normal flight.

Partial Assist (Switch Center Position)

This mode allows for greater pilot control, by increasing the allowed maximum roll, climb and dive angles. The aircraft still cannot be rolled inverted but will loop. As in Full Assist, the aircraft is self-leveling if the sticks are released.

No Assist (Switch Up, Away from Pilot)

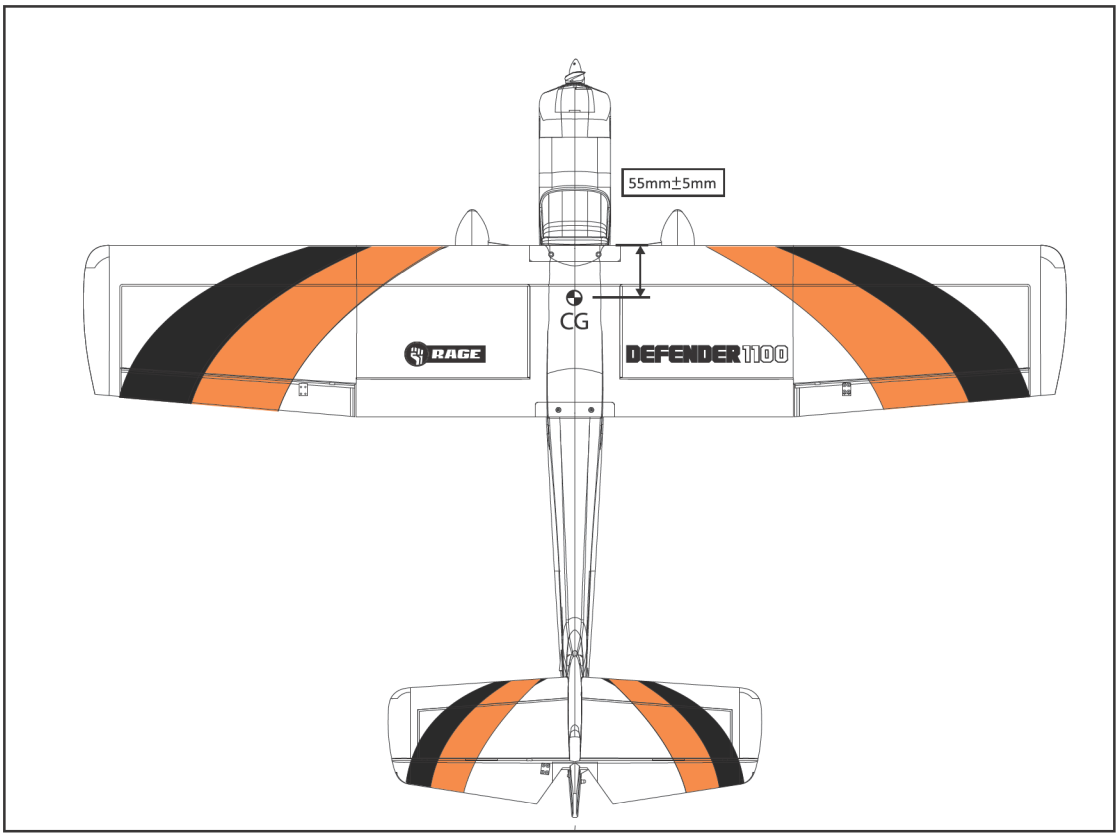
In this mode all electronic stability control is turned off. The full range of aerobatic flight, including rolls, loops and inverted flight are possible. If while first attempting these advanced maneuvers you become disoriented, simply switch to Partial or Full Assist to automatically level the aircraft and regain control.

Re-Calibration of The Pass System

The PASS system used in the Defender 1100 is pre-calibrated from the factory. Recalibration is only necessary if the aircraft does not respond correctly (pitches up or down) when the PASS switch is activated. With the aircraft sitting on a level surface and the tail raised to a "wings level" attitude, follow the steps below to recalibrate the PASS system:

- Turn on the transmitter, but do not cycle the throttle channel.
- Plug in the flight battery to the airplane and set it in its flying position (bottom of wing parallel with the ground).
- Hold the sticks as shown in the photo for several seconds until you hear a beep. This indicates that calibration has been completed.
- Power the airplane and transmitter off and restart.

Center of Gravity

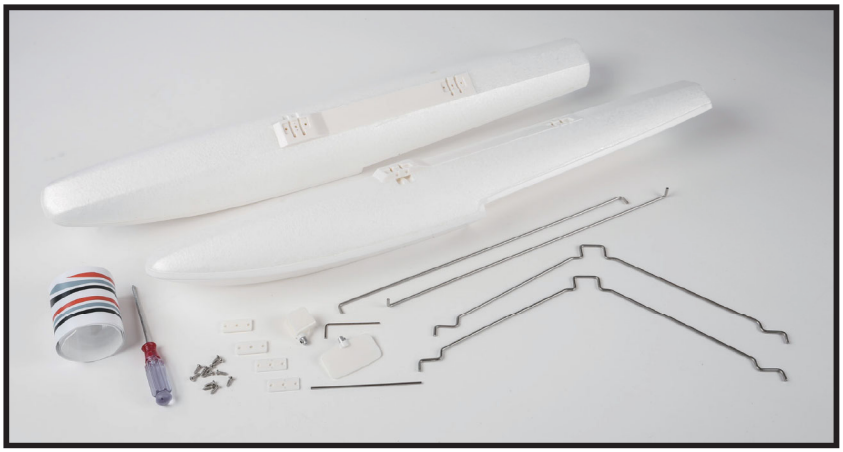


Proper Center of Gravity (CG) is important for any model airplane. Improper CG will cause poor or uncontrollable flight performance and the strong possibility of a crash. The proper CG for the Defender 1100 is 55mm back from the leading edge of the wing. With your fingers under the wing at that point the model should balance in a level flying position. If the model does not balance at that point, add weight to the nose or tail as required to obtain the proper CG. In some cases the flight battery can be adjusted forward or back to balance the aircraft.

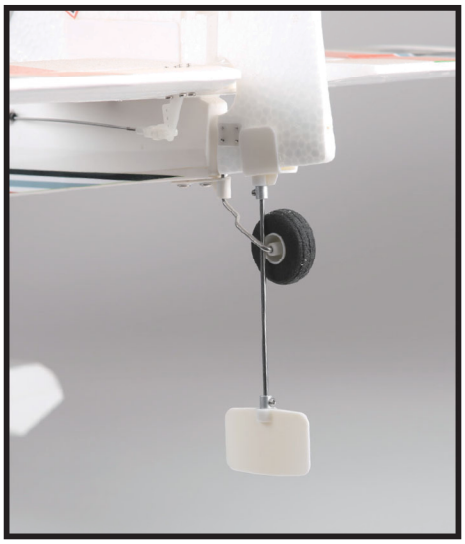
Alternate Landing Gear

Included with your Defender 1100 is an alternate set of landing gear with a set of larger tires without wheel pants. This landing gear is suitable for rough landing strips and runways, and is installed in the same manner.

Optional Floats



A float set is available for the Defender 1000 **(RGRA1258)**. Everything that you need to fly your Defender 1100 off the water is included and because the Defender 1100 fuselage comes with the rear float mount built in, converting to floats couldn't be easier.



The float kit includes matching graphics and a water rudder.

First Flight

Perform a preflight check to see that the controls are moving in the correct direction. This is best performed with the PASS system set to No Assist. After the check, switch the PASS system to Full Assist and aim the aircraft into the wind. The ideal flying site needs to be at least the size of a football field and without obstacles. Smoothly advance the throttle and allow the aircraft to take off after a short roll. Gently pull back on the elevator stick to climb and initiate a turn to keep the aircraft within easy visual distance. Full throttle is not required and for learning purposes a throttle setting of 1/2 to 2/3 throttle is best. Remember that the aircraft will return to level flight if the control sticks are released. When ready for landing make your approach with the nose of the airplane pointed into the wind. Reduce the throttle to descend and allow the PASS system to aid in maintaing a gentle glide to touchdown.

Parts List

See your local hobby shop or place of purchase first. If unavailable, parts can be ordered direct at www.ragerc.com or call 1-800-622-7223 M-F 9:00-5:00PM Mountain Time

Item Number	Description
RGRA1250	Fuselage; Defender 1100
RGRA1251	Main Wing; Defender 1100
RGRA1252	Tail Set; Defender 1100
RGRA1253	Cowl; Defender 1100
RGRA1254	Spinner; Defender 1100
RGRA1255	Landing Gear w/ Wheel Pants; Defender 1100
RGRA1256	Complete Decal Set; Defender 1100
RGRA1257	Tail Wheel; Defender 1100
RGRA1258	Optional Float Set; Defender 1100
RGRA1259	2-Blade Propeller (2); Defender 1100
RGRA1260	Complete Pushrod Set; Defender 1100
RGRA1261	Complete Control Horn Set; Defender 1100
RGRA1262	2216/1400kV Brushless Motor; Defender 1100
RGRA1263	BL Motor Mount; Defender 1100
RGRA1264	30A Brushless ESC; Defender 1100
RGRA1265	3S 11.1V 1500mAh 25C LiPo Battery; Defender 1100
RGRA1266	3S 11.1V 2200mAh 25C LiPo Battery; Defender 1100
RGRA1267	2.4GHz 5-Channel Transmitter; Defender 1100
RGRA1268	6-Channel 2.4GHz Receiver; Defender 1100
RGRA1269	AC Adapter For LiPo Balance Charger; Defender 1100
RGRA1270	3S LiPo Balance Charger; Defender 1100
RGRA1271	Prop Adapter / Collet; Defender 1100

Limited Warranty

Warranty Period: Rage R/C warrants that the Defender 1100 (“Product”) will be free from original factory defects in materials and workmanship upon purchase (“Warranty Period”).
What is Not Covered - This warranty is not transferable and does not cover (a) cosmetic damage, (b) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (c) modification to any part of the Product, (d) attempted service by anyone other than a Rage R/C authorized service center, or (e) Product not purchased from an authorized Rage R/C dealer.
OTHER THAN THE EXPRESS WARRANTY ABOVE, RAGE R/C MAKES NO OTHER WARRANTY OR REPRESENTATION, AND THREFORE DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND SUITABILITY FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL MEET THE REQUIREMENTS OF THEIR INTENDED USE.
Purchaser’s Remedy - Rage R/C’s sole obligation and purchaser’s sole and exclusive remedy shall be that Rage R/C will, at its option, either (a) service, or (b) replace, any Product determined by Rage R/C to be defective. Rage R/C 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 Rage R/C. 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 - RAGE R/C 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 RAGE R/C HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.
Further, in no event shall the liability of Rage R/C exceed the individual price of the Product on which liability is asserted. As Rage R/C 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 Utah 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. Rage R/C reserves the right to change or modify this warranty at any time without notice.

Rage R/C, an exclusive brand of:
HRP Distributing, Inc.
2034 South 3850 West
Salt Lake City, Utah 84104

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