450 PNP Sport Scale Helicopter Series

Instruction Manual

(Last Updated March 27, 2023)

INTRODUCTION

Thank you for purchasing a RotorScale 450 PNP Sport Scale Helicopter! We have prepared this instruction manual to maximize your enjoyment and safety when flying your new helicopter. As its pilot, you are solely responsible for the usage of this product. Adhering to all instructions as proscribed in this manual is required for safe operation. Serious physical injury can result from improper usage of this product, so if you have any questions after consulting both this guide and the official online multimedia resources for this product, please contact Motion RC Customer Support before attempting to operate it. Our Customer Support Team is happy to help you at www.motionrc.com.

⚠ Required Safety Actions

- Never plug in the flight battery before the radio transmitter is powered on
- Never plug in the flight battery before the radio transmitter is set to the correct Model
- Never power off the radio transmitter while the flight battery is plugged in
- Never fly this product indoors
- Never fly this product within 50 meters of trees, buildings, property, or other people
- Always fly this product in a safe and legally designated area for RC Model Aircraft
- Always keep this product dry and clean
- Always use a properly and fully charged 4s 14.8V lipo 1600mAh-2200mAh battery
- Always conduct the Basic Pre-Flight Inspection before each flight
- Always conduct the Basic Post-Flight Inspection after each flight

WHAT'S INSIDE

- RotorScale 450 PNP Fiberglass Sport Scale Helicopter
- Two (2) Carbon Fiber Main Rotor Blades
- Decals and Scale Accessories (see your model for specifics)

PRODUCT OVERVIEW

Your RotorScale 450 PNP Sport Scale Helicopter combines the quality of Roban fiberglass fuselages, the reliability of modern flybarless mechanics, and the versatility of adding a flight controller of your choosing. The RotorScale 450 PNP Sport Scale Helicopter Series seeks to bring scale helicopter flying within the reach of pilots with basic collective pitch flight experience who are looking to move upward toward larger scale 500-800 size helicopters. With the addition of your preferred receiver, radio transmitter, flight controller, and flight battery, you can enjoy the thrill of piloting a sport scale helicopter. The durable fiberglass bodies are finished in automotive paint and clearcoat for durability, and feature sharp panel lines, rivets, and other surface details. The flybarless mechanics utilize carbon frames and all-metal swashplate, rotorhead, and tailbox. Digital servos provide precise and responsive action, and breakaway landing gear plates help divert damage during hard landings away from major frame components. If ever required, the internal frame can be completely removed from the body in a few minutes with eight screws. Fully backed by Motion RC's world-renowned service and technical support team, a complete line of spare parts is also available to keep you flying.

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SPECIFICATIONS

Motor: Brushless *450L 3035-1800kV (4s 14.8V)*

ESC: *50A with XT60 Connector*

Cyclic Servos: *EMAX ES09MD Metal Gear Digital*

Tail Servo: *EMAX ES9258 Metal Gear Digital*

Main Rotor Blades: *Carbon Fiber, 325mm length*

Flight Controller: *Required (see www.motionrc.com for recommendations)*

Flight Battery: *Required* (4s 1600mAh-2200mAh)

Radio Transmitter: *Required*

Receiver: *Required*

UNBOXING AND INSPECTION

Immediately inspect the outer shipping box for any damage. Also inspect the interior for any damage, either to the box supports or the model itself. If any damage is present, do not continue unpacking the model. Instead, please contact Motion RC Customer Support at www.motionrc.com.

If the box and packaging are undamaged, continue unpacking the model itself. Remove the bubble wrap and inspect the model for physical damage to the fiberglass, landing gear, and other external areas. If you find any damage or the model does not meet your preference for workmanship, please contact Motion RC Customer Support at www.motionrc.com.

BASIC ASSEMBLY

Your RotorScale 450 PNP Helicopter was test flown at the factory. The blades included in the box are the exact blades that were balanced and flown with your specific helicopter, and then were removed before packaging to reduce the risk of damage during transport. For safety, do not install the main rotor blades until after the Radio Setup has been completed.

You may apply the included waterslide decals and optional scale accessories before or after Radio Setup. See the "Scale Accessories and Waterslide Decals" section in this Manual for further details.

RADIO SETUP

Your RotorScale 450 helicopter requires a Flybarless Flight Controller. See www.motionrc.com for recommended Flight Controllers. Refer to your selected Flight Controller's instruction manual for setup. For a basic we recommend the Tarot ZYXS2 3-Axis Flight Controller. Download the Setup and Software Guides online here.

PROGRAM A THROTTLE CUT SWITCH

As an additional safety precaution, we recommend that pilots program a switch on their radio transmitter to act as a Throttle Cut. Best practices includes always toggling the Throttle Cut manually on your radio whenever the model is powered on but you are not actually flying it. Be vigilant to avoid accidental spinning of the rotor blades.

PROGRAM DUAL RATES AND EXPONENTIAL ("EXPO")

If desired, you may program Dual Rates and Expo However, we recommend limiting the highest Expo value to less than 50. As a Sport Scale helicopter, set mild throws and exponential. Avoid excessive throws or sudden and severe control inputs that may damage your helicopter. Due to the heavier weight and fiberglass fuselage, flying a RotorScale 450 helicopter is intended to be more realistic and less aggressive than flying aerobatic 3D helicopters.

BINDING THE RECEIVER

Follow the normal bind procedure for your selected radio transmitter and receiver. A special bind process is not required, however as with any RC model, please be mindful of potential Throttle channel reversing.

CONTROL DIRECTION AND POTENTIAL CHANNEL REVERSING

Observe the model's response to your stick inputs and reverse the servo in your radio settings menu if required.

1. Pushing the elevator stick away from you should dip the swashplate down toward the model's nose.
2. Pulling the elevator stick toward you should dip the swashplate down toward model's tail.
3. Moving the aileron stick to the right should dip the swashplate down toward the right side of the helicopter (as if sitting inside the helicopter).
4. Moving the aileron stick to the left should dip the swashplate down toward the left side of the helicopter (as if sitting inside the helicopter).
5. Moving the rudder stick to the left should twist the tail rotor blades with the trailing edge facing the left side of the helicopter.
6. Moving the rudder stick to the right should twist the tail rotor blades with the trailing edge facing the right side of the helicopter.

SETTING EXPECTATIONS: FLIGHT CHARACTER AND FLYING TIPS

Different Flybarless Flight Controllers offer different features. Simpler variations do not feature recovery modes or auto-leveling modes. Regardless of which flight controller you choose to install in your RotorScale helicopter, it is important to "fly two steps ahead" of the model at all times. For example, if a pilot puts their helicopter into a slow and level forward motion then releases the control sticks, the helicopter will continue to drift forward but at a decreasing speed until all that forward momentum is depleted and/or environmental conditions counteract that

direction and speed. If at any time the pilot wishes to halt that forward advance, the pilot must feed in opposing cyclic input. The speed and extent of an opposite input by the pilot will determine how quickly the model opposes its previous heading and adopts a new heading. Do not overcontrol the model by holding severe inputs for too long, or by excessively "banging the sticks". Your RotorScale sport scale helicopter should not be flown aggressively. Users without previous experience confidently operating a collective pitch helicopter are encouraged to train on lighter models before flying the RotorScale series of sport scale helicopters.

We recommend using small but quick inputs to maintain hover, using slow and gradual inputs to initiate forward flight, and using moderate inputs coordinated with both the left and right stick to execute scale turns. To stop forward motion, avoid pulling the Elevator stick sharply toward you, as this may cavitate the blades and reduce lift. Instead, fly the model in a turn to reduce its forward speed. Fly a descending spiral to return the model to the ground –never reduce the throttle below 40% when higher than ankle height. Helicopters don't glide, and your model is not configured to autorotate. Be aware that physical factors such as current momentum, inertia, speed, and environmental factors such as wind and rotorwash will affect the overall behavior of the model.

At all times, expect to fly the aircraft yourself, and adopt the mindset of controlling the aircraft without ever releasing the control sticks.

PRE-FLIGHT INSPECTION AND CG

Before each flight, conduct this Pre-Flight Inspection routine:

1. Verify the main rotor blades and tail blades are free of any cracks or defects
2. Verify the main rotor blades and tail blades are properly tensioned. Main blades should be tight enough to hold themselves parallel to the ground when the helicopter is held on its side, yet loose enough where they can be moved downward with one finger or when the helicopter is lightly shaken while on its side.
3. Verify the landing gear is free of any cracks or breaks.
4. Verify the tail wire ("stinger"), if equipped, is properly attached.
5. Verify the model is dry and clean, and placed on a level, firm surface, safely away from obstacles.
6. Verify the interior fuselage is clean of debris, and that all wires are secured away from all moving parts
7. Verify the flight controller is level and that the encoder is fully plugged into the flight controller.
8. Verify the 4s battery is fully charged and all cells are balanced at 4.20V per cell
9. Verify the battery is properly secured with the included hook-and-loop strap.
10. Verify the battery is positioned correctly to achieve the correct CG. When gripping the model from the main rotor mast head evenly, the main shaft should be roughly perpendicular to the ground, and the main blades should be roughly parallel to the ground.

YOUR FIRST FLIGHT

1. Conduct the Pre-Flight Inspection
2. Power on your radio and plug in the flight battery.
3. THROTTLE LOCK: Toggle the Throttle Lock switch to disable the safety hold. Be careful.
4. Clear all bystanders within a 50 foot radius of the helicopter.
5. Slowly advance the throttle forward to 30%. The rotor blades will spin but the model will likely not hover.
6. Gently manipulate the flight controls to verify they are moving in the correct direction.
7. Advance the throttle to 40%-50%, and feed appropriate cyclic and rudder to hold the model's tail toward you as the model lifts off the ground. Use the throttle conservatively to keep the model between knee height and waist height. Evaluate the hover and stability of the model. Observe the degree of input required to begin, adjust, and end a maneuver. Trim the model as needed, adjusting after short hops.
8. Land at 3:00 minutes by gradually reducing throttle until the landing gear touch the ground. Throttle Lock!
9. Check your battery's voltage, record, and adjust your flight timer accordingly. Never fly to Low Voltage Cutoff –the flight controller will give 2-5 seconds of advance warning depending on the current amp draw, which is not enough time to land safely. Flying to LVC will result in a crash and potential serious injury.

POST-FLIGHT INSPECTION

1. Check the battery voltage. Aim to land with at least 3.75v per cell.
2. Verify the landing gear is structurally sound.
3. Verify the tail blades did not impact the ground.
4. Verify the swashplate linkages are tight and secure
5. Verify the receiver's antenna and all other wires did not move toward the spinning gears or motor.

TROUBLESHOOTING

1. If the aircraft's ESC does not arm, try reducing the subtrim on the Throttle stick.
2. If the aircraft's ESC does not arm, try holding the rudder stick 90% to the right, but not 100%.
3. If the aircraft vibrates excessively on the ground, verify the blades are not too tight or too loose
4. If the aircraft vibrates excessively or a loud grinding noise is heard, verify the gear mesh is correct and that the tail belt is neither too tight nor too loose. If the tail rotors ever impact the ground, consider replacing the tail shaft.
5. If the aircraft's tail wobbles excessively, recalibrate the flight controller and verify it is firmly mounted.

SCALE ACCESSORIES AND WATERSLIDE DECALS

Waterslide decals are also provided to enhance the scale fidelity of your model. A waterslide decal is comprised of three parts printed together like a sandwich: The base layer is the "backing paper", the middle layer is the decal itself, and the top layer is a thin carrier film. Only the decal itself remains on the aircraft –the backing paper and carrier film are only there to help position the decal.

To apply a waterslide decal, it is important to apply it individually because the working time per decal is very short. First, cut out one decal from the decal sheet, and fully submerge it in a shallow basin of warm water for 15-20 seconds. Remove the backing paper from the water, position the backing paper near your preferred location on the fiberglass fuselage, then gently slide the decal itself off the backing paper and directly onto the fiberglass fuselage. While it is still wet, use your fingers to position the decal precisely, then dab a cotton cloth over the decal to soak up the water. Allow the decal to fully dry overnight, then peel away the light pink layer of carrier film.

Certain models in the RotorScale 450 PNP Lineup also include scale accessories such as antennas, ordnance, and horizontal stabilizers or tail fins. These cosmetic items are not required to fly the model. Basic modeling skill is required to install them using epoxy or hot glue. For horizontal stabilizers or tail fins, epoxy is recommended, in addition to boring small holes into both surfaces to strengthen the glue bond between the fin and the fuselage itself. Cyanoacrylate ("CA") glue is not recommended due to poor adhesion on the fiberglass fuselage.

For visual reference and additional tips to install your scale accessories and waterslide decals, refer to the Overview Video of your helicopter on its product page at www.motionrc.com.

MAINTENANCE SCHEDULE

Regular maintenance is essential to prevent vibration and other damage-causing component failures. Conducting pre-flight and post-flight inspections will help identify loose screws, tight bearings, etc. Service as needed.

CONCLUSION

Your RotorScale 450 PNP Sport Scale Series Helicopter has been designed to provide you with many flights of enjoyment. Thank you for the opportunity to earn your business with this unique and new RC PNP model category at Motion RC. Please contact our friendly tech support teach at www.motionrc.com for any questions or concerns you may have regarding this product.

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