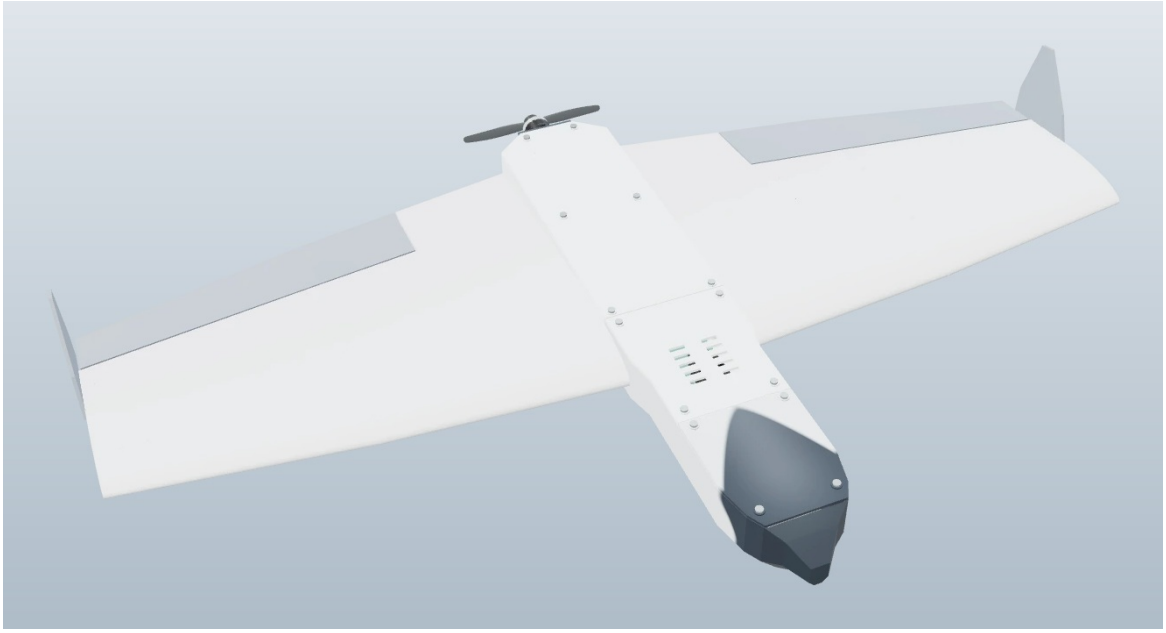
Raven Plank R2-S2

Bench-fit guide for the 650 mm Raven Plank R2-S2. This revision uses a keyed pod splice, a bolted battery tray with adjustable stops, and revised elevon servo mounts. Keep the propeller off and the pack disconnected during assembly. Physical fit, structural capacity and flight remain unverified.



Digital assembly for this revision

Open the online 3D assembly and wiring reference

In this guide

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Print setup

Bambu Lab P1S, 0.4 mm nozzle, Textured PEI and 0.20 mm layers. Use the supplied R2-S2 project placements and material-specific settings.

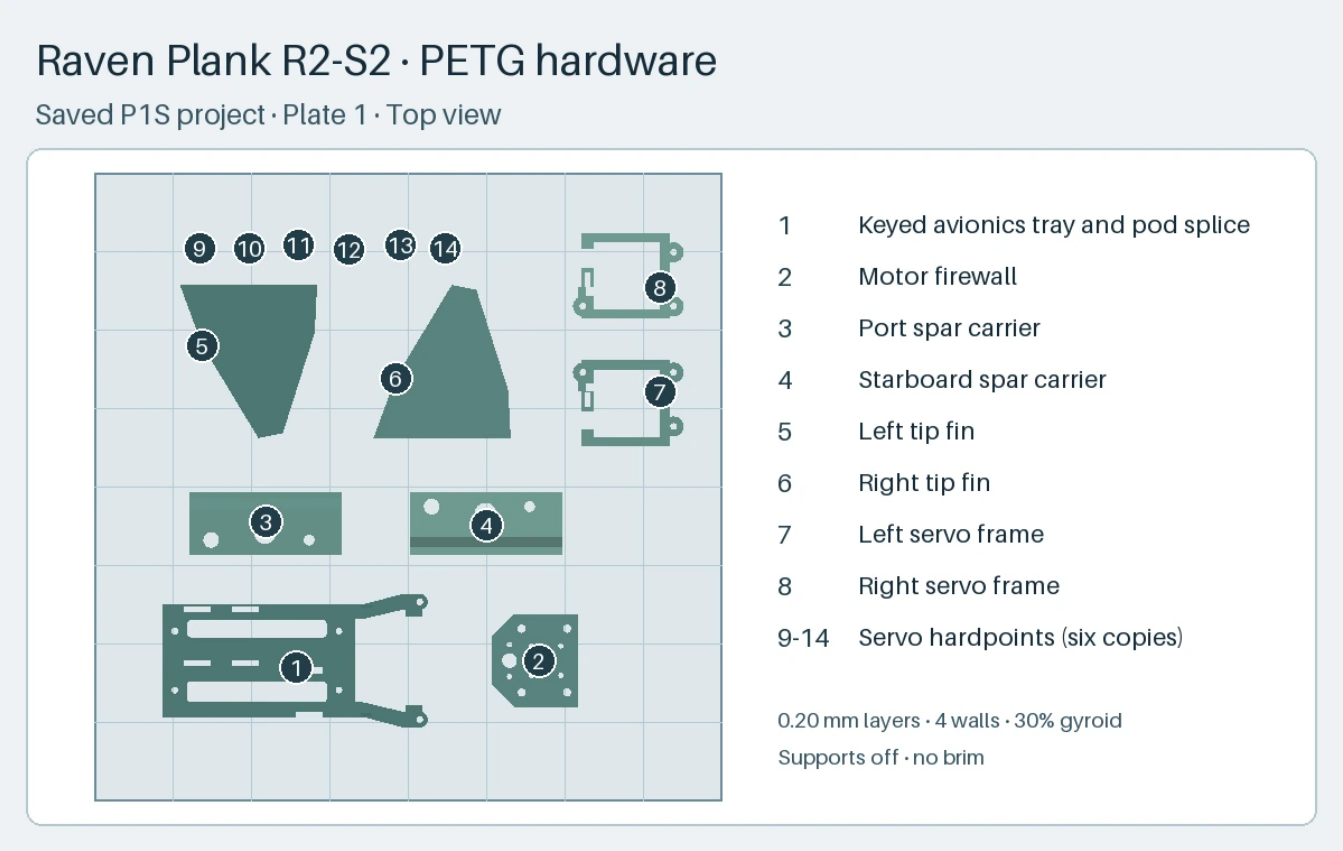
01 Check the parts and print the fit coupons



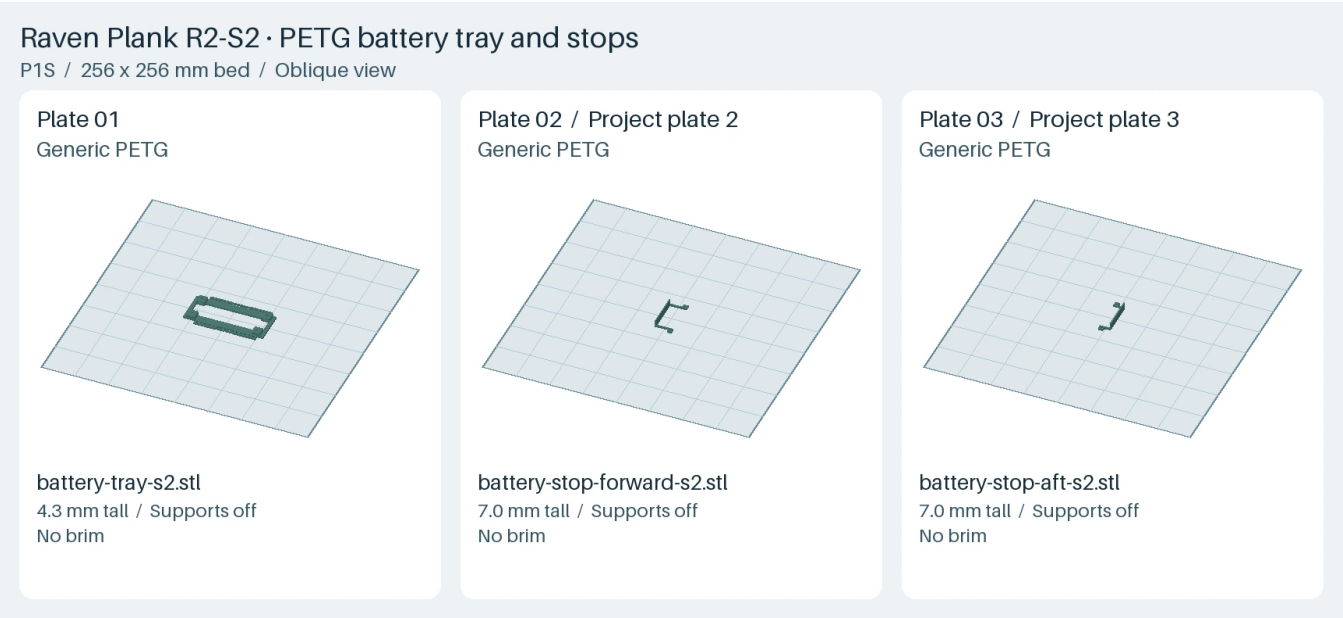
Bambu PLA Aero inner-wing project, plates 1 and 2. Keep the saved span-up orientation and 8 mm outer brim.

1. Use the R2-S2 inner wing panels, servo frames, six keyed hardpoints, battery tray and both end stops. Use one PETG R2-S1 keyed splice, either the existing matching print or the copy supplied here. Keep the original short seam doublers, stock avionics tray, stock battery tray and stock servo frames out of this assembly.
2. Print one bore coupon in PLA Aero and one in PETG. Measure both carbon tubes and check the 6.4 and 4.4 mm nominal bores on the coupons before committing to the airframe. Check spare material for bonding, and check hatch screw fit in a spare printed pilot.
3. Use Bambu PLA Aero for the flat and wing projects. The flat parts and inner panels use one wall and 5% gyroid. The retained outer wings and elevons use one wall and 3% gyroid. Keep the 8 mm outer brim on the span-up wing and elevon plates.

4 Use Generic PETG, four walls and 30% gyroid, for the battery parts, the structural and servo hardware plate, and the PETG coupon. Preview each saved plate in Bambu Studio and verify the spool, part count and placement. Regular PLA prototypes serve as fit samples only.

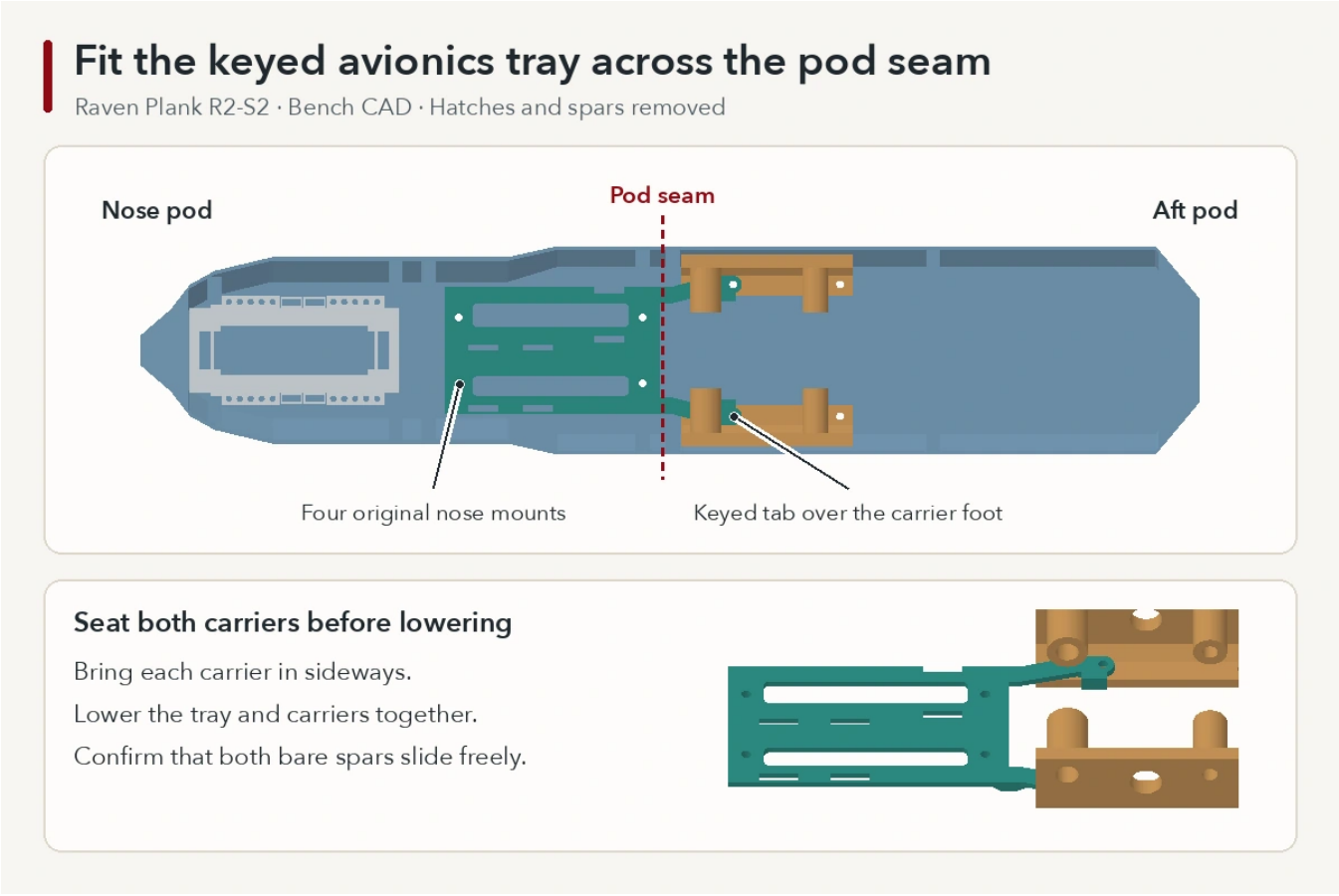


Generic PETG hardware project. The single plate holds 14 parts, including one keyed splice and six identical keyed hardpoints.



Generic PETG battery project, plates 1 to 3. Use the saved placements for the tray and the two distinct stops.

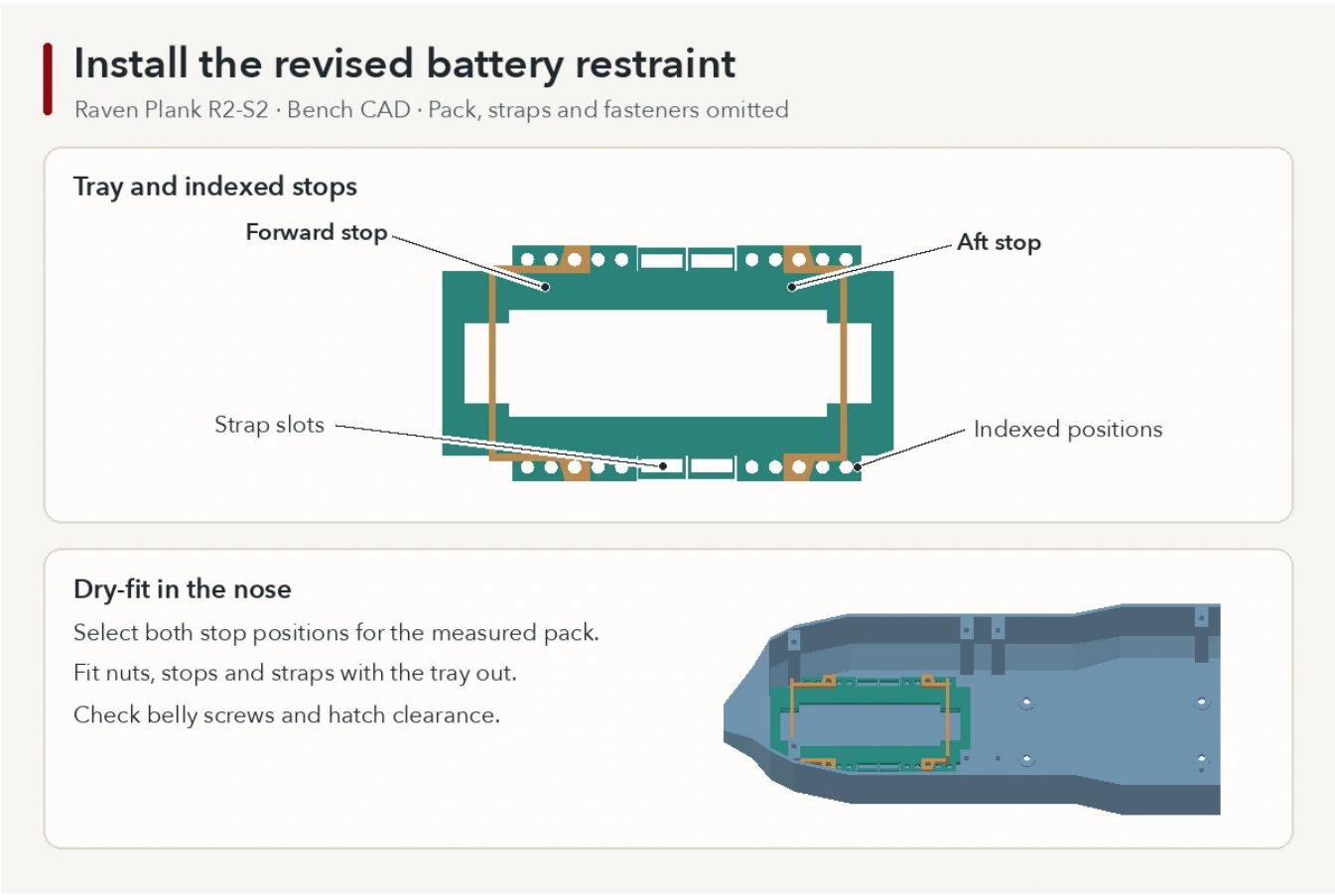
02 Join the pod with the keyed splice



The PETG tray bridges the pod seam. Seat each keyed tab over its carrier foot and measure the fastener grip with the joint aligned on a straight fixture.

1. Inspect the bare nose and aft pod for warping, cracks or lifted layers at the floor pads. Align the two shells on a straight fixture with hatches, motor, battery and spars out. The seam should close without screw pressure.
2. Outside the pod, slide each carrier foot sideways under its splice tab with the locating lip facing inward. Lower both carriers and the tray into the open pod together. Seat all four nose sockets, both tabs and both carrier feet. Check the shell seam, wing-root faces and wiring lane.
3. Fit four 90° countersunk M2.5 screws from the nose belly and two through the forward carrier stations. Try the nominal 14 mm nose candidates against the actual grip. The tabs add 2.1 mm of grip at the forward carrier stations. Select those two lengths by measurement. Fit a washer and locknut above each of the six stations.
4. Retain the two separate rear carrier screws at the original stations. Check their grip and fit a washer and locknut at each. Confirm the eight heads sit flush, all locking elements engage, and nothing projects into equipment or wiring. Slide both bare spars through the carriers to check for binding. Stop if a fastener shifts a carrier or distorts the seam.

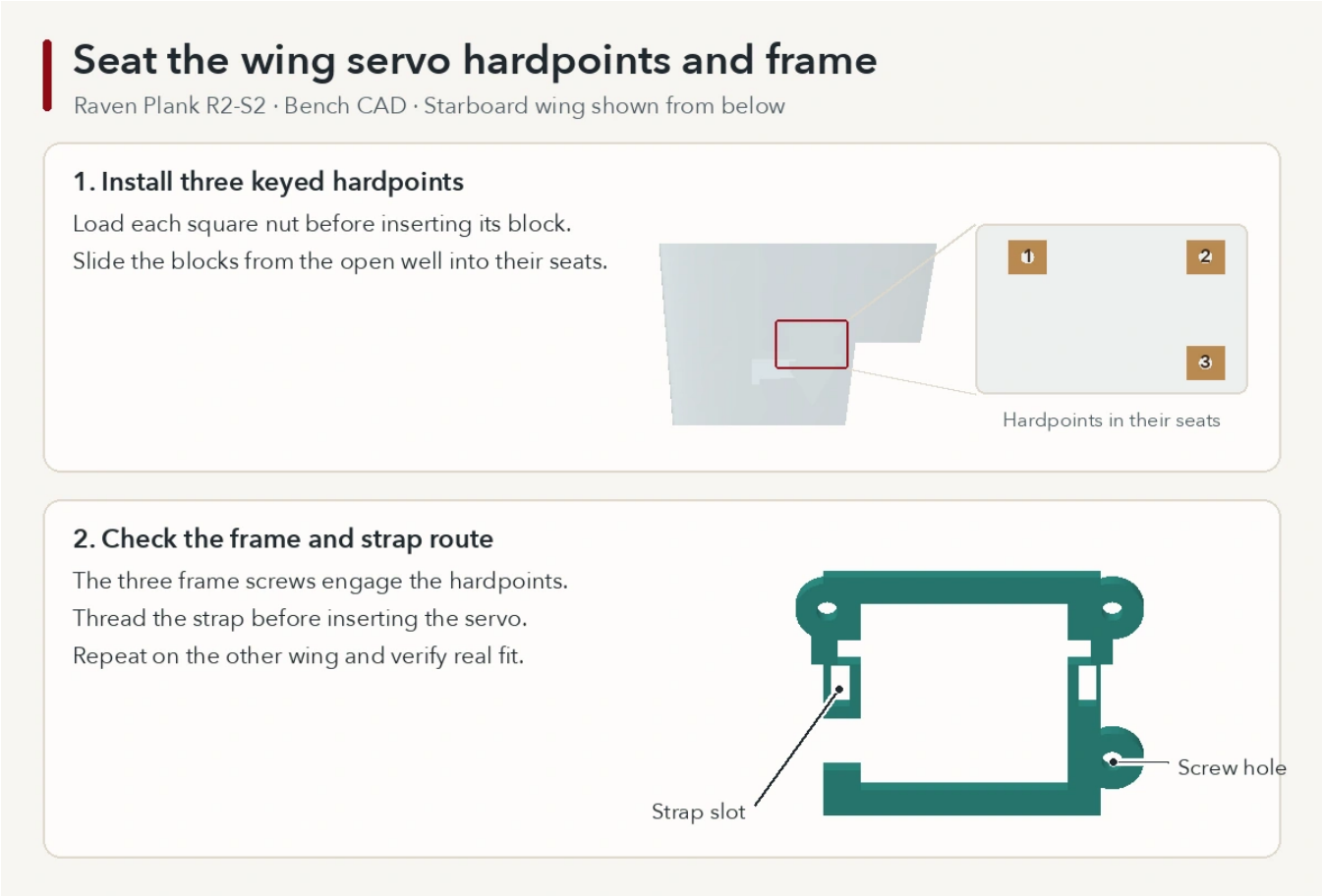
03 Fit the tray, end stops and battery restraints



Check the actual pack and straps in the installed tray. The CAD figure shows the printed restraint geometry.

1. Measure the actual pack and both lead exits. The CAD fit uses a 58 × 30 × 23 mm pack and five matching forward and aft stop positions spaced 4 mm apart. Choose the pair that seats the pack flat, limits fore-aft travel and leaves room for the leads.
2. With the tray out, load four M2.5 thin square nuts from the center opening into the floor pockets. Feed both battery straps through the tray. The CAD check uses two 6 mm wide × 1 mm thick straps. Fit both end stops using four candidate M2 × 6 mm machine screws and four low-profile M2 hex nuts.
3. Lower the tray into the nose with the hatch off. Fit four fully threaded M2.5 × 6 mm 90° countersunk machine screws from below. The modeled nut envelope is 5 × 5 × 1.6 mm. Check flush heads, engagement and suitable removable metal-thread retention. Keep the pocket roof intact and confirm no screw can touch the pack.
4. Secure an inert pack surrogate with both straps for shake, inversion and pull checks. Then check the actual unplugged pack. Keep metal and sharp edges off its contact surfaces. The hatch should close without loading the strap buckle, touching the pack or pinching either lead. The straps and stops retain the pack.

04 Fit the keyed servo mounts and route the leads



Three keyed blocks seat in each revised inner wing. Inspect the frame, slot and screw clearances before the wing is closed.

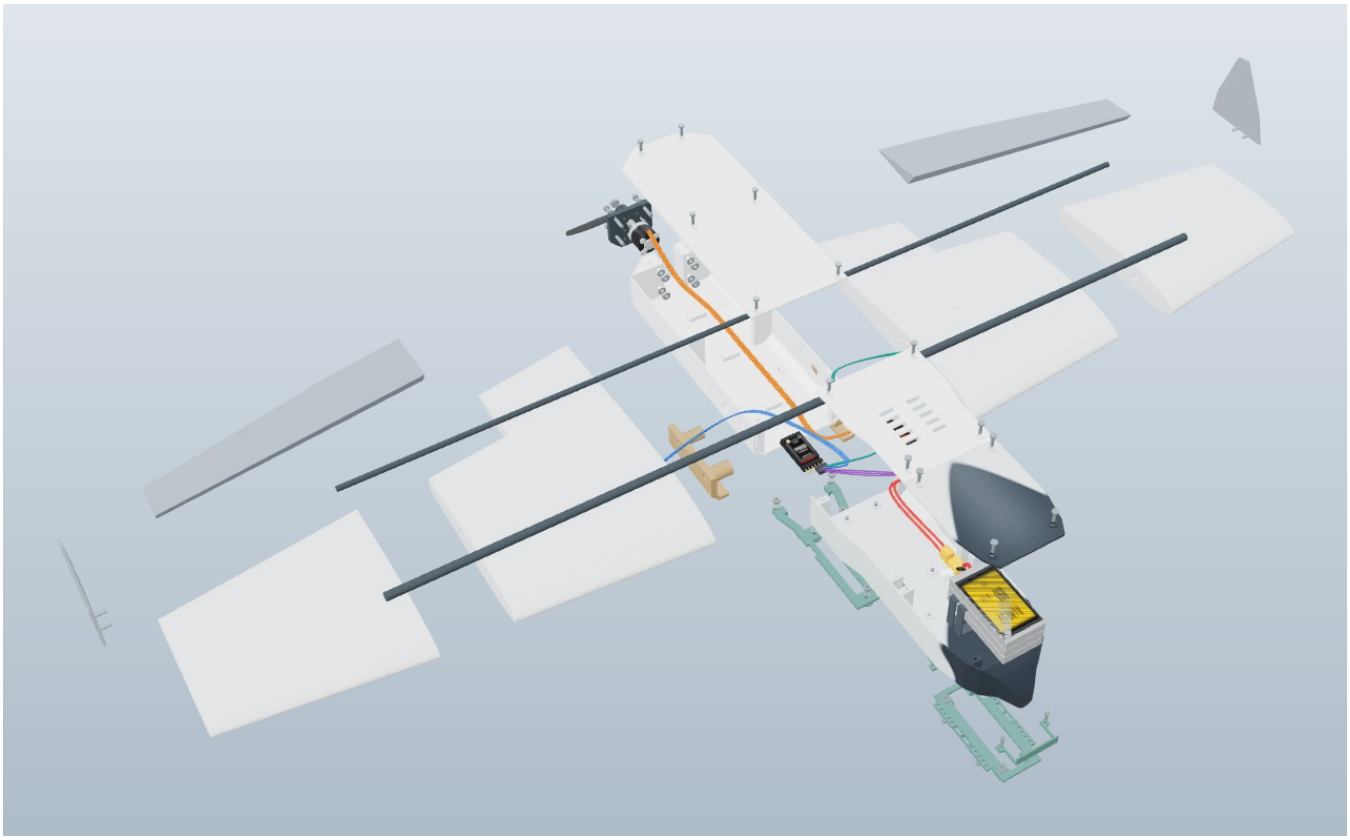
1 Load the six PETG hardpoints with 5 × 5 × 2 mm M2.5 square nuts. From each open servo well, slide three blocks into the matching keyed pockets in the bare R2-S2 inner wing panel. Confirm each block seats fully.

2 Before installing the servo, thread its flexible strap through the frame and over the empty cavity. The first bench fit allows up to 5.2 mm width and about 1 mm thickness. Insert the HS-65MG on its side and close the strap under the case. Check the tabs, lead exit and strap clearance with the real servo.

3 Clamp each frame with three candidate M2.5 × 8 mm pan-head screws. Confirm engagement and free clearance for the case and linkage. Check servo-to-frame strap retention and frame-to-wing screw retention separately.

4 Route the extension leads through their wing channels before closing or bonding the wing seams. Label left CH1 and right CH2. With the propeller off, verify that both frames remain seated through the intended servo and linkage movement.

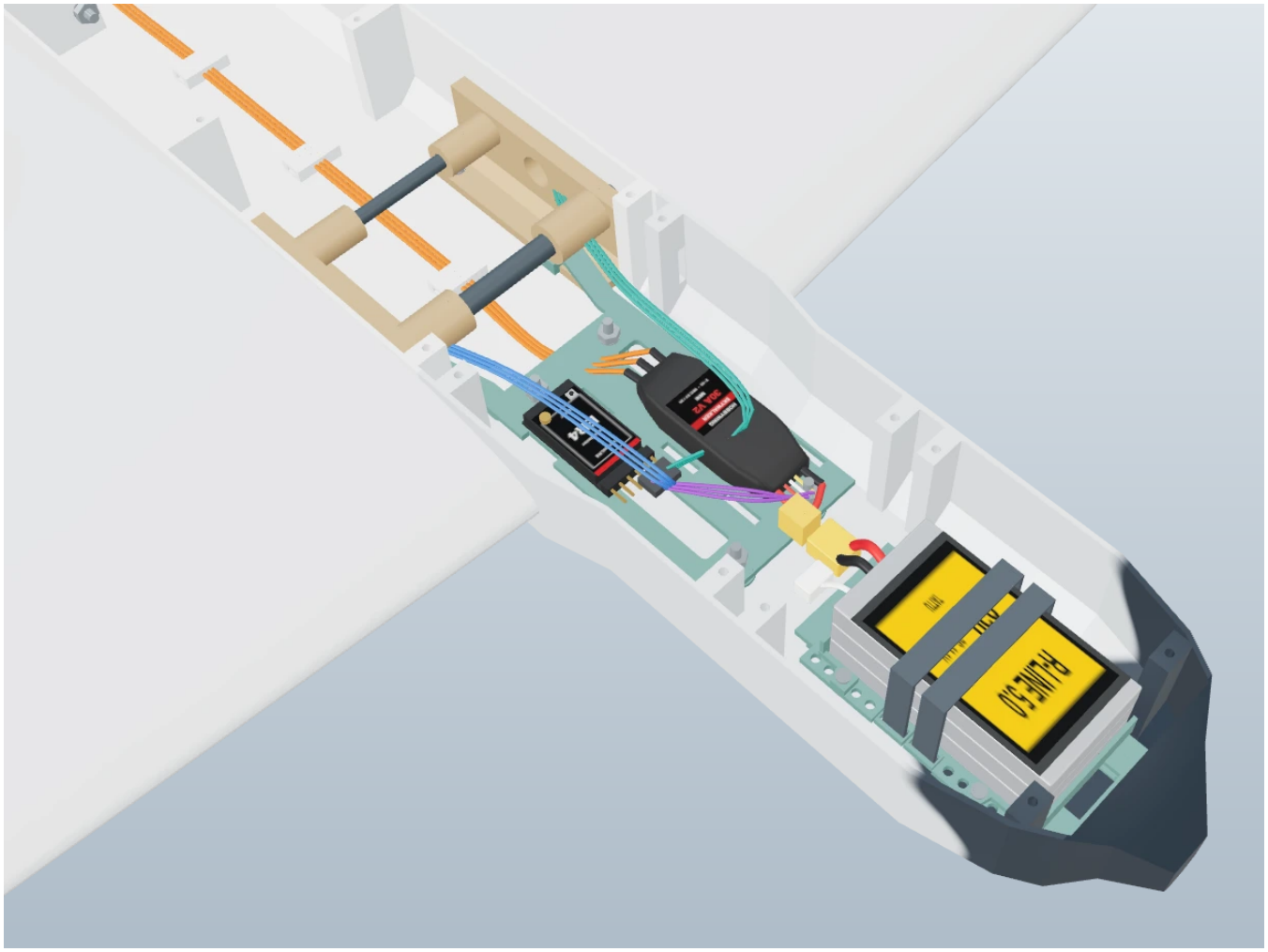
05 Dry-fit both spars, wing panels and linkages



The exploded 3D view shows both continuous spars, the keyed avionics tray, rear motor and propeller, and fasteners at their attachment points. Keep the propeller off and the battery disconnected while dry-fitting the panels.

1. Slide the continuous 6 mm × 640 mm main tube and 4 mm × 630 mm rear tube through the carriers and four panels. Check the 218 mm root seats, both inner-to-outer seams, the intentional wire entries and matching wing angles on a straight jig.
2. Dry-fit both tip-fin locating pins and both elevons. Verify the bevel and fin clearance. Select the two horn and pushrod sets after measuring the installed linkages. Keep positive mechanical retention at each linkage end.
3. Check bonding compatibility and prepare an exact-build joint test before bonding. Dry-fit and test the wing-to-pod, panel-to-spar, tip-fin and hinge interfaces separately. Keep bonding material clear of the control gaps and wiring passages.

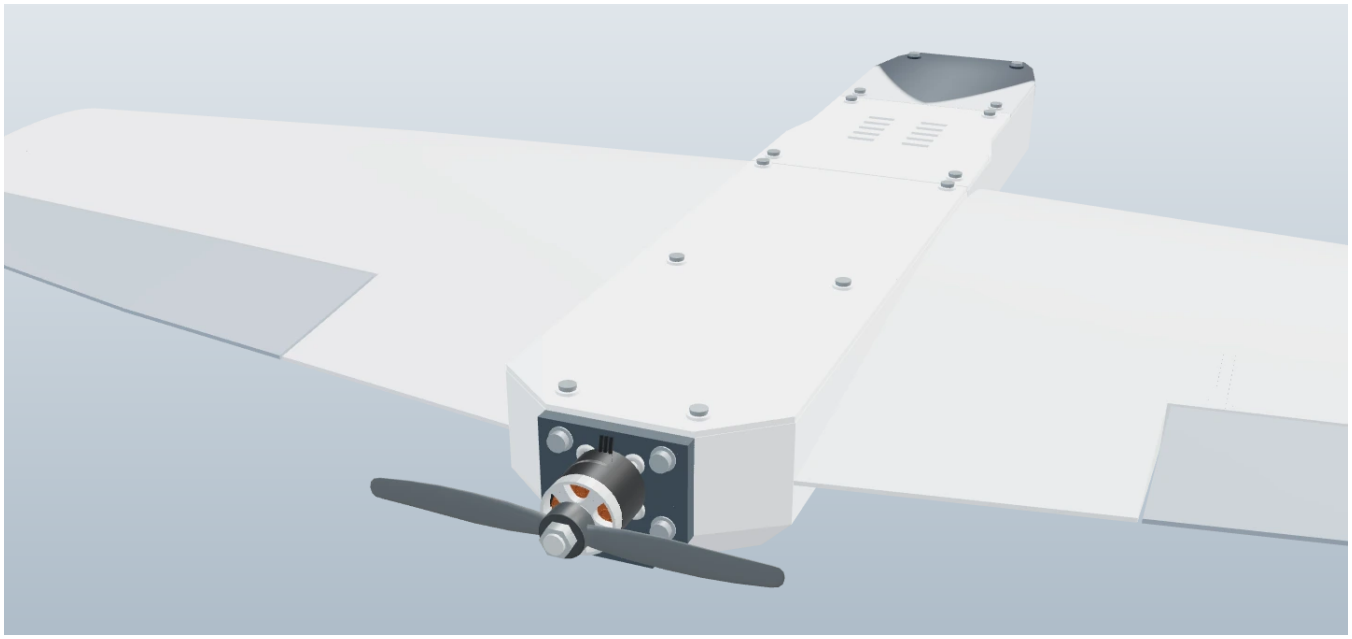
06 Dry-fit the electronics and check the harness



Schematic leads show the battery, motor and radio connections. Check the installed routes, strain relief and clearances with the battery disconnected.

1. Trial-fit the actual ESC and receiver on the keyed tray. The S1 digital check used the ESC 5 mm aft and receiver 10 mm forward of the original nominal positions. Select the actual positions after checking flat support, restraint, ventilation, antenna routing and lid clearance.
2. With the firewall loose, check the motor screws against the actual thread depth and rotor clearance. Check the four firewall bolts with washers and locknuts. Route the phase leads through the firewall, then verify clearance past the splice, spars and moving parts before adding strain relief.
3. With the propeller off and battery unplugged, check the harness for continuity, shorts and XT30 polarity. The R2 reference radio plan uses ER4 CH1 for the left elevon, CH2 for the right elevon and CH3 for ESC throttle and BEC. Check the actual receiver markings for signal, power and ground. Use 50 Hz for the HS-65MG outputs.
4. Secure and insulate loose connectors and unused leads. With the battery disconnected, close each hatch without trapping wires. Keep the motor and antenna wiring clear of moving parts and the carbon tubes. Verify the wire paths on the assembled build.

07 Record balance, retention and propeller-off control checks



Rear firewall, motor and propeller fit reference. Remove the propeller before the radio and control checks.

1. Weigh the complete airframe with the intended unplugged pack installed. Record pack position, fore-aft and lateral balance, materials, measured screw grip, and any interference or seam movement. A flight CG, trim and control throws remain open for this revision.
2. Keep the propeller off for radio checks. Verify throttle cut, motor-off failsafe and link recovery. Viewed from behind, pitch up raises both elevon trailing edges. Roll right raises the right trailing edge and lowers the left. Check the intended motion for binding, loosening, supply voltage sag or resets.
3. With the pack unplugged, verify propeller fit and its full swept clearance by hand. Use a guarded independent fixture for any powered propulsion test, and compare current, vibration and temperature with the actual components' limits.
4. Keep this assembly on the bench until the exact build has passed physical joint and retention tests, balance and control review, and the appropriate propulsion checks. A fit check alone gives no measured load capacity.

Checks to record

- Print fit, retention and repeatability for the exact materials, saved profiles and hardware.
- Load testing of the pod splice and floor mounts, wing joints, battery restraints, servo hardpoints and linkages.
- Installed mass and balance, allowable CG, trim, control throws, failsafe and guarded propulsion results.
- Controlled flight evidence for this exact revision.

Print inventory

Part	STL file	Qty	Material
Nose pod	parts/pod-nose.stl	1	Bambu PLA Aero
Aft pod	parts/pod-center.stl	1	Bambu PLA Aero
Battery hatch	parts/battery-hatch.stl	1	Bambu PLA Aero
Avionics hatch	parts/electronics-hatch.stl	1	Bambu PLA Aero
Aft service hatch	parts/service-hatch.stl	1	Bambu PLA Aero
Port spar carrier	parts/spar-carrier-port.stl	1	Generic PETG
Starboard spar carrier	parts/spar-carrier-starboard.stl	1	Generic PETG
Motor firewall	parts/motor-firewall.stl	1	Generic PETG
Right outer wing	parts/wing-tip-R.stl	1	Bambu PLA Aero
Left outer wing	parts/wing-tip-L.stl	1	Bambu PLA Aero
Right elevon	parts/elevon-R.stl	1	Bambu PLA Aero
Left elevon	parts/elevon-L.stl	1	Bambu PLA Aero
Right tip fin	parts/tip-fin-R.stl	1	Generic PETG
Left tip fin	parts/tip-fin-L.stl	1	Generic PETG
Battery tray with strap slots	parts/battery-tray-s2.stl	1	Generic PETG
Forward battery stop	parts/battery-stop-forward-s2.stl	1	Generic PETG
Aft battery stop	parts/battery-stop-aft-s2.stl	1	Generic PETG
Right inner wing	parts/wing-root-R-s2.stl	1	Bambu PLA Aero
Right servo frame	parts/servo-frame-R-s2.stl	1	Generic PETG
Servo hardpoint	parts/servo-hardpoint-R1-s2.stl	6	Generic PETG
Left inner wing	parts/wing-root-L-s2.stl	1	Bambu PLA Aero
Left servo frame	parts/servo-frame-L-s2.stl	1	Generic PETG
Keyed avionics tray and pod splice	parts/electronics-tray-keyed-splice.stl	1	Generic PETG

Bill of materials

Printed parts and filament

Item	Qty	Specification
Nose pod	1	Bambu PLA Aero · parts/pod-nose.stl
Aft pod	1	Bambu PLA Aero · parts/pod-center.stl
Battery hatch	1	Bambu PLA Aero · parts/battery-hatch.stl
Avionics hatch	1	Bambu PLA Aero · parts/electronics-hatch.stl
Aft service hatch	1	Bambu PLA Aero · parts/service-hatch.stl
Right outer wing	1	Bambu PLA Aero · parts/wing-tip-R.stl
Left outer wing	1	Bambu PLA Aero · parts/wing-tip-L.stl
Right elevon	1	Bambu PLA Aero · parts/elevon-R.stl
Left elevon	1	Bambu PLA Aero · parts/elevon-L.stl
Right inner wing	1	Bambu PLA Aero · parts/wing-root-R-s2.stl
Left inner wing	1	Bambu PLA Aero · parts/wing-root-L-s2.stl
Port spar carrier	1	Generic PETG · parts/spar-carrier-port.stl
Starboard spar carrier	1	Generic PETG · parts/spar-carrier-starboard.stl
Motor firewall	1	Generic PETG · parts/motor-firewall.stl
Right tip fin	1	Generic PETG · parts/tip-fin-R.stl
Left tip fin	1	Generic PETG · parts/tip-fin-L.stl
Battery tray with strap slots	1	Generic PETG · parts/battery-tray-s2.stl
Forward battery stop	1	Generic PETG · parts/battery-stop-forward-s2.stl
Aft battery stop	1	Generic PETG · parts/battery-stop-aft-s2.stl
Right servo frame	1	Generic PETG · parts/servo-frame-R-s2.stl
Servo hardpoint	6	Generic PETG · parts/servo-hardpoint-R1-s2.stl
Left servo frame	1	Generic PETG · parts/servo-frame-L-s2.stl
Keyed avionics tray and pod splice	1	Generic PETG · parts/electronics-tray-keyed-splice.stl

Item	Qty	Specification
Spar bore coupon · PLA Aero	1	parts/bore-coupon-lw-pla.stl. Use the bore ladder to check both delivered tubes. Bench test piece. Does not go on the aircraft.
Spar bore coupon · PETG	1	parts/bore-coupon-petg.stl. Use the bore ladder to check both delivered tubes. Bench test piece. Does not go on the aircraft.
Bambu PLA Aero	As needed	Foaming PLA for the pod, hatches, wing panels and elevons. Check wall adhesion, finished mass and cap bridges on the first part. Order / Reference
PETG	As needed	Generic PETG for the keyed splice, carriers, firewall, tip fins, revised battery parts, servo frames and hardpoints. Example unfilled 1.75 mm PETG. Confirm the material and settings on the fit coupon. Order
Generic PLA	Optional	Optional regular PLA for fit-only pod or hardware trials. Use only for unpowered fit checks. Example 1.75 mm PLA for fit prints. Order

Propulsion and onboard electronics

Item	Qty	Specification
EMAX ECO Micro 1407 brushless motor	1	3300 KV version with a 12 × 12 mm mounting pattern and M5 propeller adapter. Verify the installed motor and mounting screw engagement. Order
HQProp 4 × 2.5 two-blade propeller	1 installed	101.6 mm swept diameter, 5 mm bore and 6 mm hub thickness. Select rotation and orientation for aft airflow. Check the full disk clearance. The four-pack includes clockwise and counterclockwise propellers. Order / Reference
Hobbywing Skywalker 30A V2 Mini ESC	1	SKU 30205202. PWM throttle, 2-4S LiPo input and switched 5 V / 3 A BEC. Confirm cooling and servo-rail voltage with the actual harness. Order
Hitec HS-65MG analog servo	2	23.6 × 11.6 × 24.0 mm case, 4.8-6.0 V, one servo for each elevon. Set the ER4 servo outputs to 50 Hz. Verify frame, lead and horn clearance. Order / Reference
RadioMaster ER4 PWM receiver	1	2.4 GHz ExpressLRS, four PWM outputs, 4.5-8.4 V supply, 30 × 15 × 5 mm body. CH1 left elevon, CH2 right elevon, CH3 ESC throttle and BEC. Order
Tattu R-Line 5.0 850 mAh LiPo	1	3S, 11.1 V nominal, XT30U-F main connector, about 58 × 30 × 23 mm. Check the actual pack, leads, strap and stops for clearance under the hatch. Order / Reference
Motor-approved propeller retention hardware	1 set	Retention hardware for the motor’s M5 adapter and 6 mm propeller hub. Confirm the hardware in the exact motor package and check engagement.
PWM servo extensions	2	Budget 100 mm each with secured plugs. Confirm length, plug passage and connectors with the wing and pod dry-fitted. 100 mm JR-compatible example. Confirm the plugs and routing on the actual installation. Order
Motor-phase extensions	3 conductors	Three insulated ESC-to-motor conductors. Verify the installed route past the S2 splice, carriers and spars before cutting. Measure installed lengths and select gauge, joins, insulation and strain relief for the actual harness.

Item	Qty	Specification
Mating XT30 connector	1 as needed	Mates with the pack’s XT30U-F main lead. Verify the actual ESC input, pack mating and polarity. Amass XT30U-M cable-mount plug for the pack’s XT30U-F. Confirm polarity and whether the ESC already has the matching plug. Order

Airframe stock and linkages

Item	Qty	Specification
Main carbon tube	1	6 mm OD × 4 mm ID × 640 mm, continuous across the pod and both wing joints. Measure the delivered tube and check the bore coupon before cutting. Buy 1,000 mm stock and trim it to 640 mm after checking the bore fit. Order
Rear carbon tube	1	4 mm OD × 2 mm ID × 630 mm, continuous across the pod and both wing joints. Measure the delivered tube and check the bore coupon before cutting. Buy 1,000 mm stock and trim it to 630 mm after checking the bore fit. Order
Elevon control horns and pushrods	2 sets	One mechanically retained linkage per elevon. Include the servo horn and suitable clevises or equivalent retainers. Select the exact hardware and set lengths after dry fit.
Flexible hinge tape	2 hinge lines	Across the upper seam of each elevon. DU-BRO #916 is one option. Check adhesion, retention and free elevon travel on both printed surfaces. Order

Fasteners and assembly supplies

Item	Qty	Specification
Battery straps	2	Flexible strap to suit the tray slots. CAD fit uses 6 mm wide × 1 mm thick. Select after measuring the tray slots, pack and buckle clearance under the actual hatch.
Servo-to-frame straps	2	One flexible strap per servo. The modeled passage allows up to 5.2 mm width and about 1 mm thickness. Check the frame slots and actual servo case before ordering or cutting straps.
ESC and receiver retainers	2 fitted sets	One independent restraint per case. Size after a dry fit on the keyed splice tray and check both lids, cooling and wiring.
Nose splice screws	4	M2.5 machine screws, 90° countersunk. The nominal nose candidate is 14 mm. Measure the grip and check flush seating and full locknut engagement with a washer fitted. Order
Forward carrier and splice screws	2	M2.5 machine screws, 90° countersunk. Select length after measuring the grip with the 2.1 mm splice tab installed. Use the supplier family to select the measured length. Verify flush heads, clearance and full locknut engagement. Order
Rear spar carrier screws	2	M2.5 machine screws, 90° countersunk. The retained rear stations use the original 12 mm candidate. Check actual grip, flush seating and locknut engagement. Order
M2.5 low-profile flat washers	8	One at each of the six splice stations and each of the two rear carrier stations. Order
M2.5 locknuts	8	One above each splice and carrier washer. Verify full engagement of every locking element. Order
Battery tray floor screws	4	M2.5 × 6 mm fully threaded, 90° countersunk machine screws. Verify the blind tip clearance and keep the pocket roof intact. Order
Battery tray thin square nuts	4	M2.5 DIN 562 with the modeled 5 × 5 × 1.6 mm envelope. Slide the nuts into their pockets from the tray center opening. Order
Battery stop screws	4	M2 × 6 mm pan- or socket-head machine screw candidates. Measure length under the head and confirm the grip. Reference

Item	Qty	Specification
Battery stop nuts	4	Low-profile M2 hex nuts. Verify pocket fit, full thread engagement and clearance to the pack. Reference
Servo frame screws	6	M2.5 × 8 mm pan-head machine screw candidates. Check engagement and clearance with the actual frame, hardpoint and servo. Reference
Servo hardpoint square nuts	6	M2.5 with a modeled 5 × 5 × 2 mm square envelope, one per keyed hardpoint. Verify the actual nut seats flush in the block. The battery-floor thin nuts have a separate specification. Source and measure the actual servo nuts before ordering in quantity.
Removable metal-thread retention	As fitted	Select a removable method for the battery tray and stop fasteners and verify compatibility with the nearby PETG and pack.
Hatch screws	14	M2.5 × 8 mm plastic thread-forming screws. Four for the battery hatch, four for the avionics hatch and six for the aft hatch. Try the actual screw in a printed 2 mm pilot before installation. Pan-head Plastite example. Verify pilot fit and head clearance before installing. Order
Firewall bolts	4	Start with M3 × 25 mm bolts. Insert from aft through the firewall and check grip length with the washers and locknut fitted. Socket-head M3 × 25 mm example. Check head and tool access. Order
M3 flat washers	8	Fit one washer on each side of each firewall bolt. Order
M3 locknuts	4	Fit one locknut inside the pod at each firewall bolt. Order
Motor mounting screws	4	M2 screws for the 12 × 12 mm motor pattern. Choose length for the installed firewall and motor. Measure usable thread depth, rotor clearance and screw penetration before selecting the length.
Insulation and strain relief	As needed	Insulate and restrain phase joins, battery wiring and servo extension plugs. Size the insulation and restraints for the installed wires and plugs.
Structural adhesive	1 set	Suitable for the actual carbon, PETG and PLA Aero substrates. Test adhesion on scrap printed with the same filament and settings before bonding the airframe.

Radio and charging gear

Item	Qty	Specification
RadioMaster Pocket transmitter	1	Internal 2.4 GHz ExpressLRS variant with EdgeTX. Use the same firmware major version and regulatory domain as the ER4. US link selects the ELRS FCC version. Choose ELRS LBT where required and match the receiver's regulatory domain. Order / Reference
Pocket transmitter cells	2	Pocket-compatible 18650 cells. RadioMaster lists a 3.7 V, 3200 mAh pair. The transmitter is supplied without cells. One retailer pack supplies both 3200 mAh cells. Order / Reference
3S LiPo balance charger	1	3S LiPo balance mode with matching power and balance leads and charger supply. The Hitec RDX1 Mini #44295 supports 3S LiPo balance charging. Verify the pack's balance plug and use the pack maker's charge settings. Order / Reference
XT60-to-XT30 charge adapter	1 if the charger output is XT60	Hitec #44185 connects an XT60 charger output to the flight pack's XT30 main lead. Connect the pack's separate balance lead to the matching balance port. Check connector mating and polarity on your charger and pack before connecting. Order