

Aircraft Static Setup

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Jan 23rd, 2014

Agenda

- Servo Selection
- Batteries
- Wiring
- Switches
- Servo Arm/Control Horn Geometry
- Hinge Gap Sealing
- Control Surface Travel and Alignment
- Static Control Surface Trim
- Failsafe Setup

Servo Selection

- Metal vs. Nylon Gears
 - Nylon
 - Faster
 - Tighter
 - Metal
 - Stronger
 - Vibration resistant
- Analog vs. Digital
 - Digital
 - Better “Holding Power”
 - Requires heavy duty wire, switches, and batteries
- Servo Slop
- Programmable
 - Fail Safe
 - Direction
 - Resolution
 - Speed
 - Center
 - End Points
 - Dead Band Width
 - Overload Protection
 - Reset

Common R/C Batteries

- Nickel Cadmium (NiCd)
 - Needs Conditioned
 - Heavy
 - Resistant to damage
- Nickel Metal Hydride (NiMH)
 - Needs Conditioned
 - Lighter than NiCd
 - Rather high self-discharge
- Lithium Ion (Li-ion)
 - Light weight
 - Typically requires regulator
 - Susceptible to cold
- Lithium Polymer (LiPo)
 - Unstable and dangerous
 - Typically requires Regulator
 - Light
- Lithium Iron Phosphate (LiFePO₄)
 - Resistant to damage
 - Does not require Regulator
 - Constant voltage
 - Fast charge
 - Low self-discharge

R/C Aircraft Wiring

- Typically 22 gauge
 - Thinner for smaller aircraft with weaker analog servos
 - Thicker for larger aircraft with strong digital servos
- Twisted for electrical interference rejection
- Should be secured to prevent rubbing and chafing

Switches

- Heavy Duty for Servos
- Regular for Ignition
- Ignition Kill Switch
 - Optically isolated receiver and ignition electronics
- Fail-Safe switches
 - Normally open switch (enables servo electronics)
 - Closed switch disables servo electronics

Servo Arm/Control Horn Geometry

- Center must be at 90 degrees to **Control Arm**
- Ensure maximum travel of servo arm
 - However, do not allow any linkage to bind
- If possible, allow control rod to be in-line with servo arm at full deflection
- Do not allow ball links to bind against servo arm
- Watch for control rod flex during “push”
- For multiple control horns per control surface
 - Ensure that control horn height is the same from hinge center line

Hinge Gap Sealing

- Prevents air from moving through hinge gap
- Reduces flutter
- Increases control surface efficiency
- Ensure that control surface can move to full deflection
- Bond to inside of control surface bevel, not control surface itself

Control Surface Travel and Alignment

- Manage control surface travel with full servo travel
 - 3D aircraft will want full deflection with full servo travel
 - Warbirds will want minimal deflection with full servo travel
- Control surfaces must be aligned at equal angles at all deflection rates
 - Use your eyes to determine angles for both control surfaces at neutral and full deflection

Static Control Surface Trim

- Ailerons
 - Aligned with wings as close as possible, however, ensure they are equal (with your eyes)
- Rudder
 - Aligned with vertical fin
- Elevator
 - Aligned with horizontal stabilizer, with a very small bit of “down elevator” (physically “up” as viewed on the aircraft)

Failsafe Setup

- Throttle Failsafe
 - Off setting for electric
 - Low setting for glow/gas
- Control surface
 - Hold position
- Other signal loss indicator
 - Enable lights, sounds, etc.