



Showstopper Precision Variable Pitch Prop System

Specifications and Items Needed to Complete

Diameter: 10 1/4" in (260mm)

System Weight: 0.7 oz (20 g)

Motor: 300- to 370-size, 1080–1360Kv brushless outrunner w/hollow shaft

Speed Control: 10A to 20A brushless (depending on motor)

Battery: 3S 11.1V 480–910mAh Li-Po (depending on motor)

Servo: Sub-micro with 17 oz/in (minimum) of torque

Radio: 6+ channel with helicopter and 5-point (minimum) pitch and throttle curve programming

Recommended Setup

For models weighing up to 12 ounces (340 g) ready to fly (including the SSVPP system):

Motor: E-flite Park 370 Brushless Outrunner, 1200Kv w/4mm Hollow Shaft (EFLM1210HS)

Speed Control: E-flite 10-Amp Pro Brushless (EFLA1010)

Battery: Thunder Power 730mAh 3S 11.1V Li-Po (THP7303SJPL)

Pitch Servo: E-flite 7.5 Gram S75 Sub-Micro (EFLRS75)

Included and Replacement Parts

EFLPVPP101	10 1/4" Diameter Blade Set
EFLPVPP103	Blade Grip and Center Hub Set
EFLPVPP104	Blade Grip Bearing, 3x6x2.5mm (2)
EFLPVPP105	Pitch Bridge and Link Set
EFLPVPP106	Pitch Bridge Bearing, 2x6x3mm (2)
EFLPVPP107	Carbon Fiber Pushrod and Nut
EFLPVPP108	Spinner and Hardware Set

Introduction

This manual will guide you through installation and setup of the Showstopper Variable Pitch Prop (SSVPP) System on the E-flite® Extra 260 3D Profile model (EFL2300). And although only the Extra 260 is shown, the SSVPP will also work very well on the E-flite Byp Yak 3D (EFL2325, if measures are taken to keep the airframe as light as possible) or any other model that weighs 12 ounces (340 g) or less when ready to fly with the SSVPP and battery installed.

Radio Requirements and Initial Setup

Before beginning assembly and installation of the SSVPP, it will be necessary for you to take a few minutes to complete the initial setup and programming of your transmitter.

Note: You will need to use a transmitter with 6 or more channels, equipped with helicopter and 5-point (minimum) pitch and throttle curve programming for proper setup and the best performance. You will also need to use a 6 or more channel receiver that is compatible with your chosen transmitter.

☐ After selecting a new "helicopter" model, be sure that the programming is set for Standard swashplate mixing and NOT 90- or 120-degree CCPM.

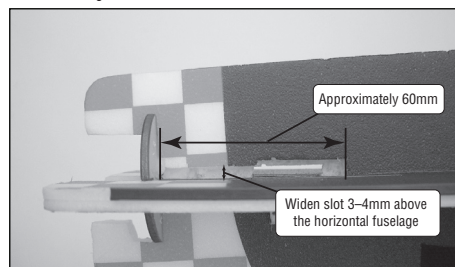
☐ Next, connect the rudder, aileron and elevator servos to the receiver as you would for a typical airplane setup. Connect the ESC to the throttle channel and the "Pitch" servo (used for changing pitch of the SSVPP) to the "Pitch" or "Aux 1" channel (usually channel 6).

Model Preparation and Motor Mounting

The following steps outline installation of the SSVPP on an Extra 260 airframe that has already been assembled. However, many of the steps can also be completed for an airframe that is not yet assembled.

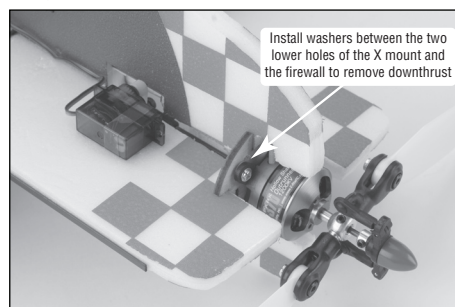
Note: The Extra 260 comes from the factory with a slot in the vertical fuselage that serves as a starting point for installation of the SSVPP. All of the measurements shown are based on this slot, though they are approximate and may need to be fine-tuned for your particular installation.

☐ Start by widening the slot in the vertical fuselage by 3–4mm above the horizontal fuselage. Overall, the widened slot needs to be approximately 60mm long.



☐ Next, mount the E-flite Park 370 1200Kv brushless outrunner motor (EFLM1210HS) to the plywood motor mount. If your mount has any left/right or up/down thrust built in, we suggest shimming the motor so that the thrust angle is zero in all directions. In the case of the Extra 260, you will need to shim the motor upward to eliminate the down thrust that is built into the firewall. Do this by installing a #2 washer between each of the two lower holes of the X mount and the firewall.

It may take 1–2 washers to eliminate the down thrust, depending on the thickness of the washers used.



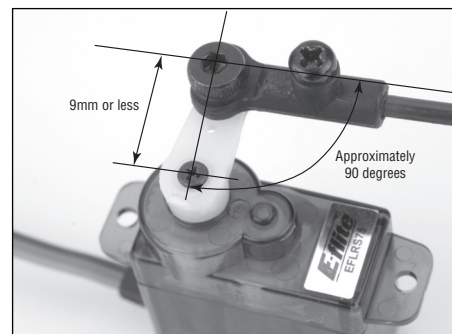
Servo and Servo Arm Setup and Mounting

For the best possible performance, we recommend that you use a servo that has at least 17 ounce inches (oz/in) of torque, like the E-flite S75 Sub-Micro Servo (EFLRS75). You must also keep the distance between the center of the servo output shaft and the pushrod linkage to 9mm or less. **DO NOT exceed 9mm as it will require you to further reduce the pitch servo travel for proper pitch range, in turn, lowering the effective torque the servo is actually offering.** Reduced torque can result in a lack of pitch control in flight.

☐ Once you have selected your servo and servo arm, mount the pushrod linkage to the arm using the supplied socket head shoulder screw and hex nut. You will likely have to enlarge the hole in the arm to fit the screw. Then, be sure to use blue threadlock to secure the nut on the screw, making sure that the pushrod linkage is able to move side to side on the slot and rotate around the screw freely.

☐ After installing the pushrod linkage on the servo arm, power your radio system on and center the pitch servo at what should be the "zero pitch" setting. This is usually easiest to accomplish by using the default pitch curve programming of the transmitter with the throttle/collective stick set to exactly the middle position. If your transmitter features a graphic display of pitch curves, it may also be helpful to select this menu to better determine the exact mid-stick position.

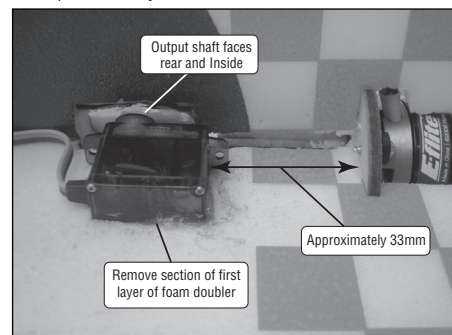
With the pitch servo centered, we suggest installing the servo arm on the servo so that it will be as close to perpendicular (90 degrees) to the pitch control pushrod as possible.



With the servo arm installed on the servo, it will now be necessary to choose where to install the servo on the model. In the case of the Extra 260, the front edge of the servo should be about 33mm back from the firewall, with the output shaft of the servo facing toward the rear and inside of the model.

Note: When choosing the proper mounting position for the servo, the pitch control pushrod will need to be approximately centered in the hollow motor shaft when the servo arm is perpendicular to the pushrod. To check this, temporarily install the pushrod through the motor shaft and into the pushrod linkage on the servo arm (do not worry about cutting the pushrod to proper length at this time). If the servo cannot be positioned so that the pushrod is centered in the motor shaft, remove foam and/or add shims as necessary until it can be.

☐ Once you have determined the servo mounting location, mark the outline of the servo on the foam. In the case of the Extra 260, carefully cut the first/bottom layer of foam around the outline that you made, making sure not to cut in to the second/top layer. Removing this section of the foam doubler will allow the servo to be positioned so that the pushrod is very close to centered in the motor shaft.



Center Hub, Pitch Bridge and Pitch Control Pushrod Installation

Note: All parts MUST be assembled with blue threadlock for maximum security and reliability.

☐ Position the center hub and blade grip assembly on the motor shaft, making sure that the blade grips are positioned so that the recess for the nut is facing toward the motor and the rear of the model. The rounded side of the center hub goes toward the motor, and the flat side should be positioned flush with the end of the motor shaft. Use the included setscrews (and threadlock) to mount the hub on the shaft, making sure that at least one of the setscrews engages the flat spot on the end of the E-flite Park 370 (EFLM1210HS) motor's shaft.

☐ Next, install the pitch bridge assembly by snapping the ball links in place on the ball ends of the blade grips. Then, slide the pitch control pushrod through the bearings in the pitch bridge until the end of the pushrod just exits past the rear bearing.

☐ Before sliding the pushrod into the motor shaft, it will be necessary to slide the pitch bridge securing collar onto the end of the pushrod that extends past the rear bearing of the pitch bridge. This collar must be installed with the "cone" side toward the bearing in the pitch bridge, and by using the included setscrews (and threadlock). However, do not tighten the setscrews all the way down at this time.

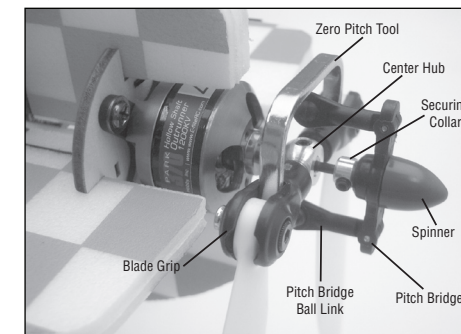
☐ Slide the pushrod through the securing collar and motor shaft, then past the servo arm and pushrod linkage as the pushrod will likely need to be shortened in the next step. Once the nut on the end of the pushrod is pressing against the front bearing of the pitch bridge, slide the securing collar up against the rear bearing. Sandwich the pitch bridge bearings between the securing collar and nut, noting that the pitch bridge should spin freely, but with no play, between them. Then, fully tighten the setscrews on the securing collar.

☐ During the following steps you will need to determine the final length of the pitch control pushrod.

Note: Determining the final length of the pitch control pushrod is a critical step and we strongly suggest that you take your time to read through the following steps first. If you do happen to cut the pushrod to a length that is too short, replacement pushrods are available (EFLPVPP107).

In the case of the Extra 260, the pushrod will need to be shortened to a length of approximately 105mm from end to end. However, be sure to double check this required length after reviewing the following steps first, as it may vary slightly depending on your particular setup.

☐ With the radio system powered on and the Pitch servo centered (at what should be the "zero pitch" setting), slide the U-shaped "zero pitch" tool into the blade grips. This tool will set the blade grips to exactly zero pitch, and with the servo set to the zero pitch setting, you will now be able to determine the correct length required for the pushrod.



☐ Once you have determined the correct length required for the pushrod, making sure to allow as much length of the pushrod as possible to pass by the securing screw location, cut the pushrod to length. Then, insert the pushrod into the pushrod linkage.

- After ensuring that the servo arm and blade grips are in the zero pitch positions, secure the pushrod in the pushrod linkage by using the included self-tapping screw. However, be sure that you do not use too much force to tighten the screw as it could strip the plastic.
- Install the included rubber spinner over the front "lip" of the pitch bridge to complete installation.

Main Blade Installation and Initial Pitch Curve/Travel Settings

Now that you have completed installation of the SSVPP system, you will need to install the main blades and complete initial setup and adjustment of the pitch curves and pitch servo travel value in the various flight modes that will be used.

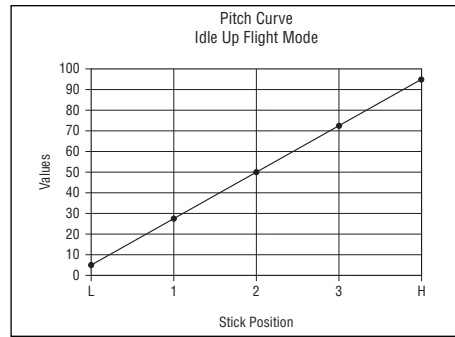
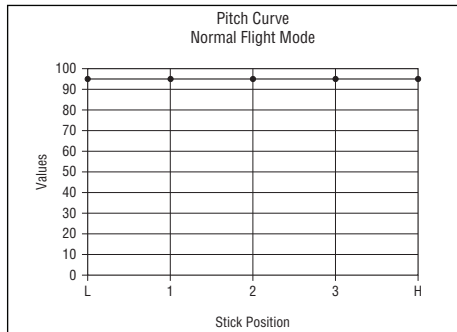
- Install one main blade in each blade grip using the included socket head shoulder screws and nylon insert locknuts. Be sure that the blades are installed so that the leading edges will rotate counterclockwise.
- Tighten the main blade mounting screws until some moderate force is required to rotate the main blades in the blade grips. Be sure that you do not leave the blades loose in the grips.

Note: It may be necessary for you to further tighten the main blade mounting screws after the first few flights to prevent the blades from moving too freely in the grips.

Before proceeding, be sure that your transmitter and onboard electronics are powered on. **Also, be sure that the motor is left unplugged from the ESC for safety.**

- Set the Travel Adjustment/End Point Adjustment values for the "Pitch" channel to approximately 50% each way. This is generally a good starting point for adjusting the overall pitch range/travel of your system.
- Next, program the following pitch curves for the "Normal" and "Idle Up" flight modes:

Note: The values shown are approximate and may need to be adjusted depending on your particular setup and/or preferred performance. However, these values are similar to those used during most of our testing.



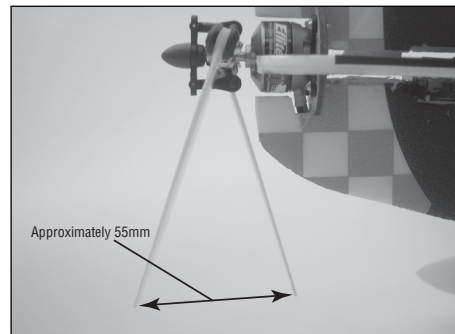
With the pitch curves programmed, use the corresponding switch on your transmitter to enter the Idle Up flight mode. In this mode you will be able to check the maximum travel/pitch range of the blades. You will also be able to confirm proper operating direction of the pitch servo.

- When in the Idle Up flight mode, **and with the motor still disconnected from the ESC**, advance the throttle/pitch stick to the full position. With the blades extended outward, the leading edge of the blades should now be positioned away from the model and motor, indicating that they are providing "positive" pitch for forward thrust.

With the throttle/pitch stick in the lowest position, the leading edge of the blades should now be positioned toward the model and motor, indicating that they are providing "negative" pitch for reverse thrust.

If you find that the pitch response is opposite to the stick movements indicated, simply use the servo reversing function of your transmitter to reverse the operating direction of the pitch servo.

- After confirming proper control response of main blade pitch, you can now make initial adjustments to the overall travel/pitch range. In the case of the Extra 260, when using the recommended setup, we find that there should be approximately 55mm between the ends of the blades when they are folded parallel (when viewed from the front) to one another and viewed from the side (when in the Idle Up flight mode, with the throttle/pitch stick in the highest and lowest positions).



If you find that the distance between the ends of the blades is more or less than 55mm, use the travel/endpoint adjustment function of your transmitter to adjust the overall pitch servo travel in both the highest and lowest stick positions. Typically we find that a travel/endpoint adjustment value of approximately 70% in both directions provides the correct pitch servo travel for the Extra 260.

Note: The actual amount of overall travel/pitch range of the blades you need to set will depend on your chosen power system's performance and maximum power output capability, as well as the size and weight of your model. In general it is best to adjust the maximum travel/pitch values by using a Power Meter (EFLA110) to measure the current and power of your power system when full positive or negative pitch is applied. Typically you will want to be sure that you are not pulling too much current for the motor, ESC or battery pack you have chosen to use, based on the maximum recommendations from the manufacturer.

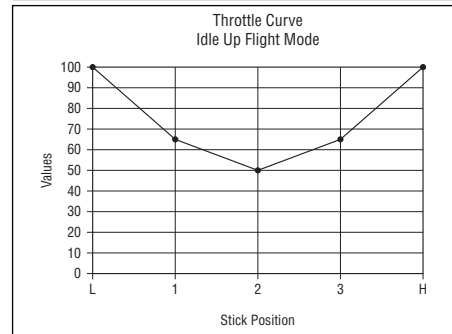
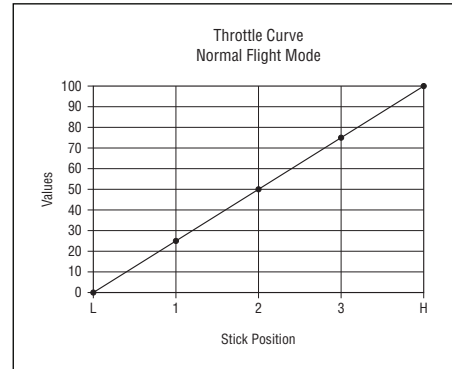
In the case of the recommended setup for the Extra 260, you should be sure not to exceed approximately 12 amps of current consumption when full positive or negative pitch is applied in the Idle Up flight mode.

Throttle Curve Settings

With the pitch curves and travel values set, you can now program the throttle curves for the various flight modes that will be used.

- Program the following throttle curves for the "Normal" and "Idle Up" flight modes:

Note: The values shown are approximate and may need to be adjusted depending on your particular setup and/or preferred performance. However, these values are similar to those used during most of our testing



Flying Tips

- We have found that the use of white lithium grease on the pushrod where it slides through the motor shaft helps to smooth out the operation of the Showstopper Variable Pitch Prop System. You may purchase this at any local hardware store, however, be sure to keep the grease away from the foam parts of the airplane as it can cause damage to the foam.
- The "Normal" flight mode is typically used for flying like you would when using a standard, fixed-pitch propeller. This is why the recommended pitch curve for this mode keeps the blades at a consistent pitch setting through the entire throttle/pitch range, and why the recommended throttle curve allows the power to be adjusted from zero to full power.

In general, it is best to begin and end each flight in the Normal flight mode. Also, you will need to be in the Normal flight mode for the ESC to arm properly, and in order to power down the motor.

- The "Idle Up" flight mode is typically used when you would like to utilize forward and reverse thrust during flight. In this flight mode, placing the throttle/pitch stick in the highest position will offer maximum forward thrust by providing full power and full positive pitch. Placing the throttle/pitch stick in the lowest position will offer

maximum reverse thrust by providing full power and full negative pitch. When the throttle/collective stick is in the middle position, the thrust will be approximately zero in either direction when using the recommended curve.

In general, it is best to enter and exit the Idle Up flight mode during level forward flight at cruise speed. This will help to minimize any pitch and thrust changes during the transition. Also, it is usually best to keep abrupt positive to negative (and vice versa) pitch changes to a minimum as it can place a significant amount of stress on the airframe and system. With some practice, you will find that smooth and deliberate applications of positive to negative (and vice versa) pitch can result in controlled flight, opening the door to many maneuvers never before possible with a fixed-pitch propeller.

Take your time when learning to fly the model in the Idle Up flight mode, and be sure to remember that any time you lower the stick below approximately the middle position, the power system will offer reverse thrust. For this reason, most of the flight will be spent with the stick in the 3/4 to 2/3 position (for typical forward flight), with lower stick positions typically reserved for reverse thrust maneuvers.

- After you have gained some flight experience and confidence using the SSVPP system, you may choose to adjust the pitch and throttle curves (especially in the Idle Up flight mode) to better suit your preferred performance and flying style. You can also visit www.E-fliteRC.com for more pitch and throttle curve setups, including those used by Quique Somenzini for his competition Byp Yak 3D model.

Precautions, Warnings and Support

Please read these safety precautions and warnings before use. Failure to comply with these warnings and/or improper use of the Showstopper Variable Pitch Prop System may result in serious injury.

Please make sure the Showstopper Variable Pitch Prop System is properly balanced before use for proper performance. You must also make sure that the blades and all other components are secure before use. Keep fingers and hands, hair, face, body parts, or clothing away from the moving propeller or risk serious injury. Keep all spectators twenty feet from the path of this propeller. Do not start the motor/propeller near any loose gravel or dirt to prevent particles from flying and injuring individuals. Do not throw anything into the moving propeller to stop it from running. Please discard and replace any blades that appear damaged, showing signs of wear, nicks or cracks. Please do not attempt to repair parts of the SSVPP system or modify it from its intended use.

For additional information concerning the Showstopper Variable Pitch Prop System, please refer to our web page for this item or contact your E-flite distributor. You can also direct emails to productsupport@horizonhobby.com, or in the U.S. call 877.504.0233 toll-free to speak to a support technician.

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