

Hyperion VP Z2209-30 Variable Pitch Motor System - Setup Guide

| Z2209-30-VP Motor Specs | | | |
|-----------------------------|------|------------|-----------|
| Weight Complete with Blades | Kv | Resistance | No Load A |
| 73g | 1130 | 109mΩ | 0.68A |

The Hyperion VP motor system is perhaps the most powerful of its kind available today. It is capable of lifting models with flying weight of 270 grams from an inverted torque roll. In most cases, the Z2209-30-VP is used in models with all-up weight of 220g to 250g. The recommended battery is Hyperion HP-LVX0800-3S, but any 3S lithium battery capable of supplying 12A continuous current can be used.

NOTE: Maximum current allowed for the motor is 12A. While it is possible to set the motor for up to 15A peak current, it is not advised in general, nor necessary on basis of performance. It is YOUR responsibility to set up the linkage and your transmitter properly, and to check that peak current is 12A or less (see the Hyperion Emeter). While bench testing, do not run the motor for extended periods. Run for just the few seconds it takes to check current.

In the event that you "burn up", "fry", "toast", or otherwise "let the magic smoke out of" the motor, be advised that your Hyperion dealer will offer replacement at 40% discount, but will not replace the motor under warranty for free.



Note: Choosing an airframe. VP motor systems weigh more compared to normal prop, and may require larger batteries. Calculate an additional 40g or so for total VP system additional weight, pitch servo, 6ch Rx and larger battery. Models with 180-200g flying weight, when using normal prop and motor, are most appropriate. To keep the weight down, use light servos such as W-038 for control surfaces, eliminate excess wiring length, etc...

----- Requirements -----

Transmitter / Receiver: Variable Pitch motors require the use of a transmitter which can set throttle curves and flight modes, typically used for helicopters. Pitch control servo requires one additional channel, typically ch 6.

Equipment: An Ammeter is absolutely required to safely and properly setup a VP system.

Suggested Pitch Control Servo: Waypoint W-060BB or Waypoint W-068PB

Suggested Battery: Hyperion HP-LVX0800-3S

Suggested Controller: Hyperion TITAN 10 (for lighter models) or TITAN 20

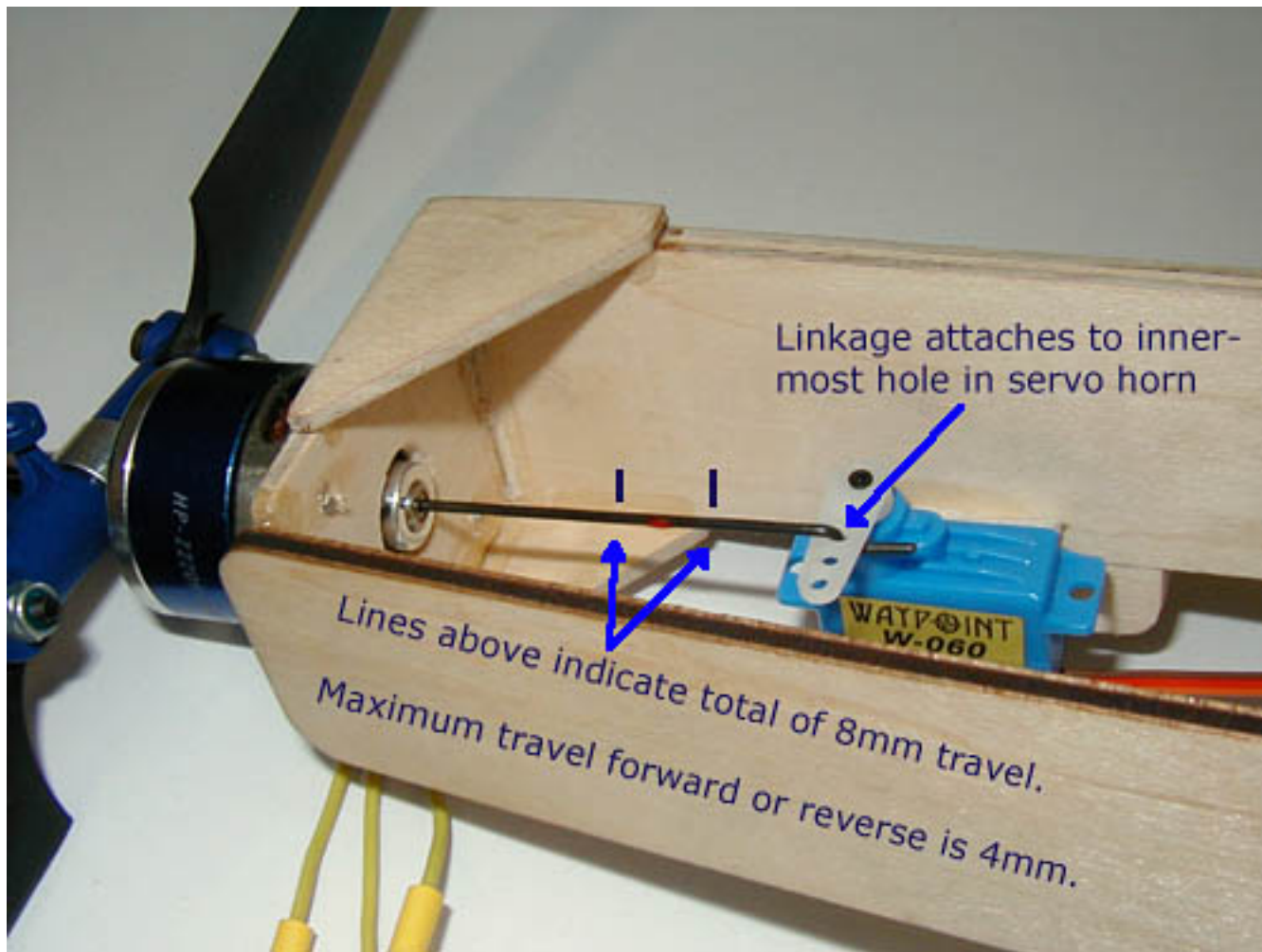
Suggested Rx: Light 6ch Rx such as GWS R6N

----- Setup -----

1) The blades MUST be balanced. It is easiest to hold the two blades together using a thin strip of tape, with holes centered on top of each other, and chuck the assembly in a standard prop balancer. Use thin clear tape on the light side till balanced.

2) The pinion bolts with nyloc nuts should be tightened just until there is slight friction on the blades. The blades must be allowed to swing out under rpm, but should not be "loose" in their grips.

3) Servo must be firmly attached to the model, so that pitch control is precise. Attach linkage z-bend to innermost hole in servo arm. See arrangement of servo linkage here: Connect pitch servo to ch 6 of Rx for most radios (check your radio manual).



4) Set servo travel for the servo at transmitter such that 4mm of travel each way is the maximum, as in picture above. Increase later only if necessary to reach target current level at full throttle. Never exceed 5mm travel in each direction under any circumstances.

Transmitter setup

You will prepare at least 2 modes, one for normal flight with fixed pitch, the other for variable pitch enabled. Many radios have normal, idle up 1, and idle up 2 mode. In this case you can set different flavors of variable pitch modes with idle up 1 and idle up 2.

- 1) Set transmitter for pitch/throttle curves similar to the given below. See the "basic" examples by graph, and also the screen shots of one user's transmitter below. You will need to program your Tx in heli mode. Your Tx should allow programming pitch and throttle at 0%, 25%, 50%, 75% and 100% throttle stick position (or three points, at bare minimum).
- 2) Program 'normal mode' to fixed pitch. Set pitch to near 100% at all points and linear throttle curve. (see below figure)
- 3) Program 'Idle-up mode' for variable pitch curve setting. Set pitch curve linear to stick position. Pitch is 0 at 50% stick position. Set throttle up in both end of stick to apply more power for more pitch. (see dotted line in below figure) You will select the mode during flight with flip switch of your Tx. Consult your Tx manual for programming detail.

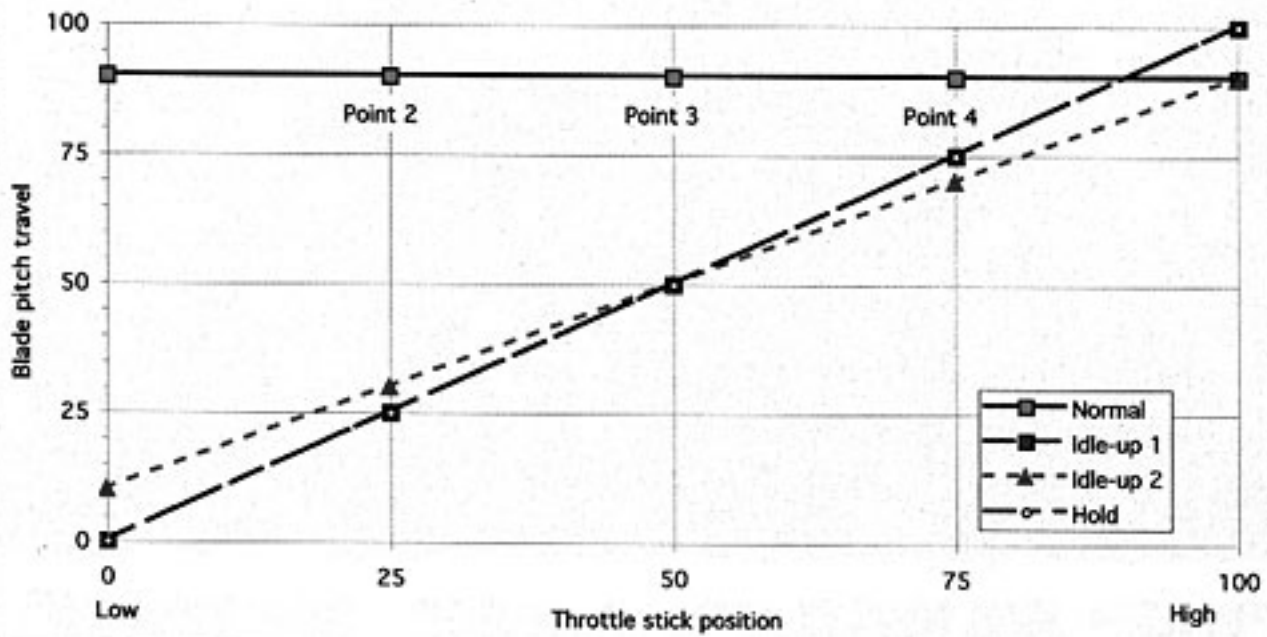
Note: the motor will not stop in Idle-up 2 mode in this example. You need to flip switch to normal when you land (or crash), or use throttle cut button.

Important: Use Emeter to measure amp draw. Do not exceed 12A when stick is full up or full down in either mode. If it exceeds 12A, decrease pitch at 0% and 100% point.

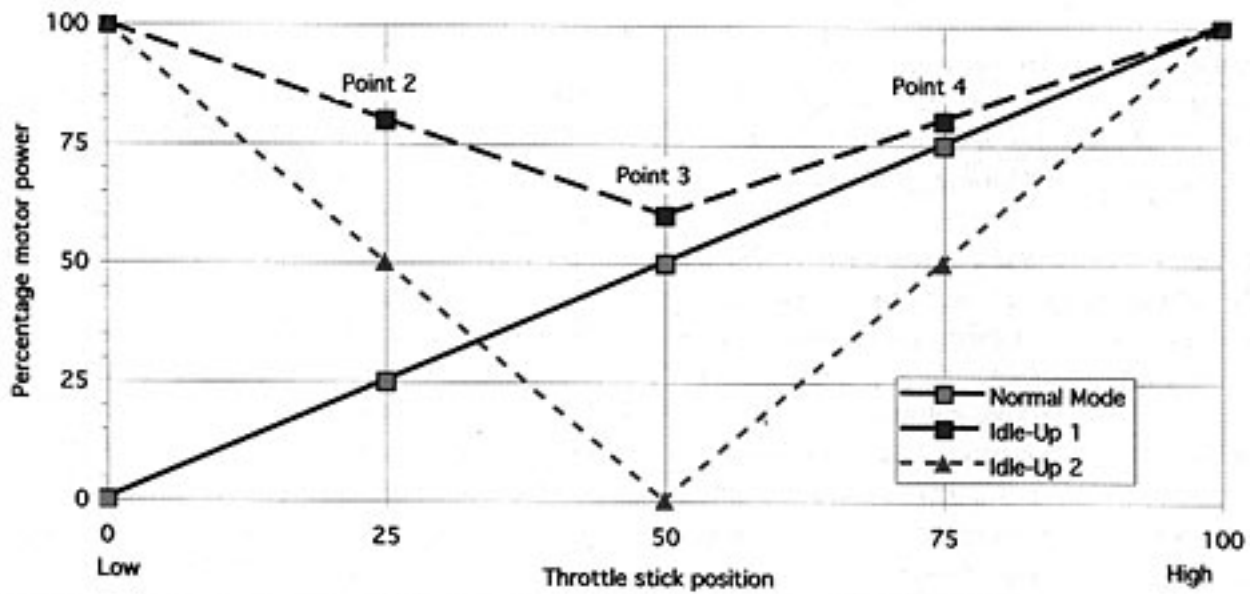
If you experience auto cut or excess power decrease at 0% or 100%, that is the sign of your battery is not supplying enough voltage for the current. Use a higher-rated and/or larger capacity battery, or decrease maximum pitch.

Fig. A basic example of Pitch and Throttle curve settings

5-Point Pitch Curves for Variable Pitch Propellers

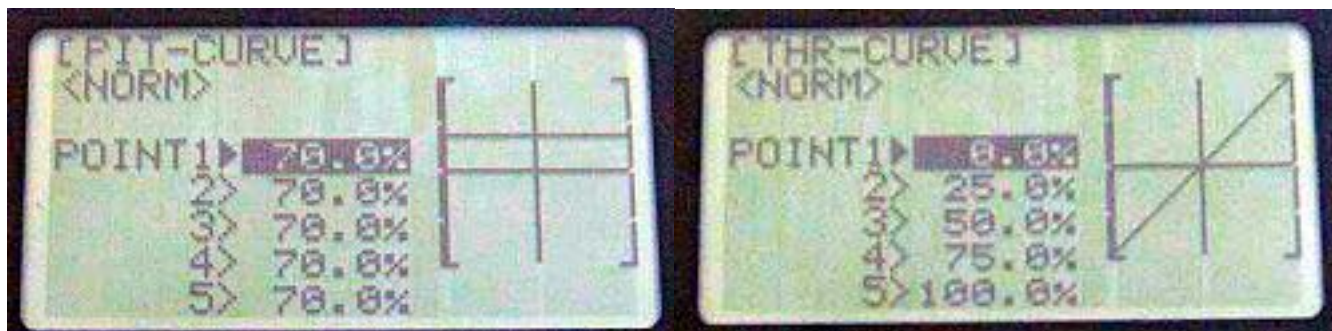


5-Point Throttle Curves for Variable Pitch Propellers



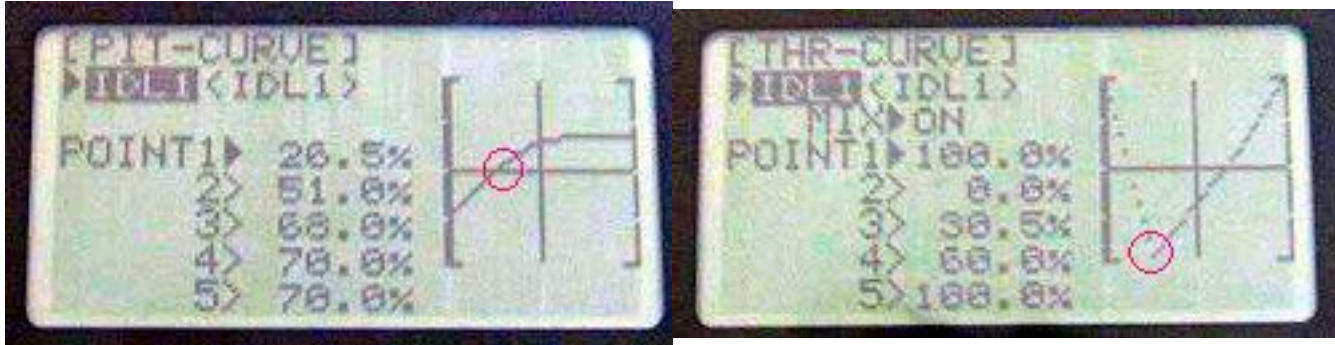
A screen shots example from one user's Futaba FF9 Transmitter:

Normal mode: (no reversing pitch)



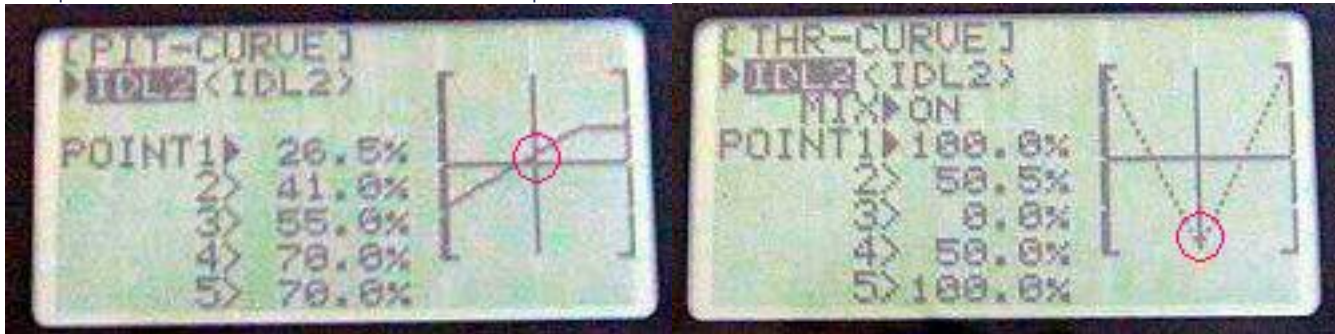
Idle up 1 mode:

This is for mostly for forward flight and full reverse at stick full down (0%)
Note pitch is about neutral and throttle is 0% at 25% stick position.



Idle up 2 mode:

This gives more control on reverse.
Note pitch is neutral and throttle is 0% at 50% stick position.



In-Flight Techniques (courtesy Mr. Ono, owner of RC Hobby, Japan)

Important: When you fly for the first time, practice outdoors on a calm day, over soft grass. Maintain sufficient altitude in order to recover from any position. If you do crash on an indoor hard floor surface, check propeller alignment before resuming flight.

Technique: All these maneuvers depend on model design and balance. Some you can do, some cannot. You may be able to find your own maneuvers!

- Inverted torque roll: The model will rotate counter clockwise with prop torque. Apply left aileron for more rotation. To keep it long, start from high altitude, apply forward thrust (less reverse) periodically to keep balance. You cannot recover once you lose balance. You cannot climb backwards. Indoors with limited space, make a slow loop and apply reverse at the down leg to start inverted torque roll, or flip from torque roll.
- Back flat spin: Once you lose a balance in Inverted torque roll, you will get into this.
- Recovery: To recover from head down position, you usually need to recover to downwards. If you have enough power, you can apply full reverse, nose will flip then apply full forward to climb. Cool!
- Slow loop: Apply brake to make slow loop in down leg. Good for F30 pattern.
- Hard brake turn: Apply full reverse at 45 degree decent, you can turn abruptly. Apply down elevator to see an "interesting" effect.
- Plan your own flight pattern. Slow loop to 3/4 -> Inverted torque roll etc.

Right Side Up... or Up Side Down... Happy Flights!

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