



THE INVERTED FLYER

NEWS of the BOULDER AEROMODELING SOCIETY
AMA Charter # 906

February 2010 Edition

E-Flight 101 Update - Motor Poles

What is a motor pole and do I care when selecting a speed control? This conversation came up last month and here is my understanding.

In a brushless motor, a pole is a magnet. Basically you don't care about the maximum RPM of your speed control unless you have a very high RPM motor or a low maximum speed (commutation speed) on your (cheap) ESC. But, lets look at the possible concern.

Looking at the typical brushless motor, the number of magnets in the motor is the number of poles. The number of poles will always be an even number and will never be a multiple of 3. (The stator is always 3 or multiples of 3.)

For a given arm on the stator, the speed control pulses the arms when it is between two magnets. The speed control really does not know what RPM the motor is running. It only knows that it has to pulse the stator every time the motor asks it to. What this says is that the speed control must be able to pulse a stator arm once for each magnet located on the rotor.

Not all, but some speed controls give you the maximum RPM for a given motor structure. Like maximum 200,000 RPM for a 2 pole motor. (Most specs are stated for 2 poles.)

This controller would have a maximum RPM of 100,000 for a 4 pole, 50,000 for an 8 pole, etc. What we see now is that RPM wise, a 4 pole motor running 10,000 RPM looks identical to an 8 pole motor running at 5,000 RPM to the ESC.

How do I figure the max RPM for any given pole count?

Take the speed controls maximum RPM and multiply it by the specified poles and you will get the maximum RPM per pole. (Remember we really don't have any 1 pole motors.) So for the above controller stating 200,000 for 2 poles it would be $200,000 * 2$ or 400,000 per pole. Now just divide the 400,000 by the number of poles on your motor. For instance a 10 pole motor would be $400,000/10$ or 40,000 for a 14 pole it would be $400,000/14$ or 28,571, etc.

Knowing that, you would now calculate the maximum RPM of your motor which is $K_v * 3.7 * \#cells$ and make sure that the speed control is capable of handling it.

As stated above, the necessary data is not always given, and for most of our controllers and motors it is not a problem that we should even be concerned about...

One of the most popular ESCs, Castle Creations, does not give you a maximum RPM. I have found statements that equate it to 300,000 per pole for the 25A and below, and 384,000 per pole for the 35A and above. (This data has not been validated.)

For what it's worth - Al Coelho

BAS MEETING MINUTES JANUARY 13, 2010 HOBBYTOWN USA LONGMONT, CO

Meeting called to order at 7:02 pm by **President Rich Anderson** with 17 members present. Motion by Al Coelho with a second by Mark Bradley to accept December meeting minutes as they appeared in last newsletter. Motion voted and passed.

TREASURE REPORT--Treasure Dean Ehn gave a detailed report on the clubs financial status. Rich reported on the clubs CD which will mature Sept. 11. Options were discussed on what to do if the club needs more funds in the coming months.

1ST VICE PRESIDENT REPORT-- 1ST Vice President Augie Bruno reported club membership is now at 53. Welcome new member Scott Redheffer. Augie also stated the locks will change March 1st so do not discard your old keys yet.

2nd VICE PRESIDENT REPORT-- 2nd Vice President David Goodnow reported no new safety issues. Rich Anderson reported that some members are standing on the runway while flying. Flying pilots should be at a flight station. David mentioned some pilots using 2.4 S. S. are not putting their pin on the frequency board. David said he would add numbers to the board to help in its clarity.

OLD BUSINESS--Rich mentioned we have one student in the Mal Meador Youth program who is about to solo. Rich asked members if they were interested in volunteering at the reservoir for inspecting boats for zebra mussels this coming boating season. He will get more information later on when and what instruction is needed and when it will take place. **WINGS OVER THE ROCKIES MUSEUM** model show will take place on Saturday February 27th. Members going should be their 8:00 a.m. and contact Ken Jochjim about taking a plane to the show. Rich Thanked Al Coelho for his work on the float fly power point presentation his electric Flight 101 Document to the clubs web site.

NEW BUSINESS--Rich asked for a audit of the clubs financial records. Al Coelho stated Mike Gulizia and himself will perform the task sometime in March. Rich extends the Clubs THANKS TO Gary of Hobbytown USA for its yearend sale for our club members. Some of the upcoming events and dates are spring work-day April 3rd, fun fly June 5th.

Jeffco Auction February 5 thru 7 and club picnic July 31. Motion by Wendel Wickstrom with a second by Dean Chandler to purchase one truck load of gravel for area next to shelter and entrance to parking lot. Motion voted on and passed. Discussion was held on pit and taxi area repaving. Motion by Tony Kilwein with a second by Mark Bradley to repave the pit and taxi area with the expense not to exceed \$5000.00. If expense is over this amount this Motion will be brought back to a club meeting for further discussion. Motion voted and passed. Augie Bruno will talk to Greg Hine on being the coordinator for this project. Tony Kilwein and Rich will also help. Rich reported the Clubs agreement with the City of Boulder should be completed by April 31. Circle City Flyers a California club wants to exchange newsletters with our club. Al Coelho stated all they need to do is get on our web site and all of our past newsletters are available. Rich stated he would contact their club and inform them of our newsletter availability. Motion by Wendel Wickstrom with a second by Ernie Groves to adjourn the meeting. Motion voted and passed.

SHOW AND TELL-- Dean Chandler displayed some clamping devices for soldering he made with clothespins and blocks of wood. Dean also showed us his new Hi-tech Aurora 9 channel 2.4 radio. Rudy Glick displayed a new in the box F4 Phantom 70mm electric ducted fan jet which he purchased during Hobbytown USA year end sale.

Respectfully submitted Rudy Glick

**6th ANNUAL ROCKY MOUNTAIN AEROMODELING
EXPO DEMOS. February 27th, 2010**

Time Demonstration

10:00 Indoor – Micro U – Control
Larry Fuehrer

10:20 Indoor - Electric 3D Flying
Mark Dennis

10:40 Indoor – Electric Helicopter Flying
Nathan & Evan

Open Hangar Doors

11:00 Outdoor East Lot - Control Line
Larry Fuehrer

11:20 Jet Engine Run-up & Taxi
Sid Gates

Close Hangar Doors

11:40 Radial Engine Run-up
Rudy Glick

Noon Indoor - Electric 3D Flying
Mark Dennis

12:20 Indoor – Electric Helicopter Flying
Nathan & Evan

12:40 Indoor – Micro U – Control
Larry Fuehrer

1:00 Radial Engine Run-up
Rudy Glick

Open Hangar Doors

1:20 Outdoor East Lot - Control Line
Larry Fuehrer

1:40 Jet Engine Run-up & Taxi
Sid Gates

Close Hangar Doors

2:00 Indoor – Micro U – Control
Larry Fuehrer

2:20 Indoor - Electric 3D Flying
Mark Dennis

2:40 Indoor – Electric Helicopter Flying
Nathan & Evan

Open Hangar Doors

3:00 Jet Engine Run-up & Taxi
Sid Gates

3:20 Outdoor East Lot - Control Line
Larry Fuehrer

Close Hangar Doors

For Sale

Members, I need to sell some of my RC model airplanes and other RC related items. I've created a web site.

For Sale: RC Model Airplanes, Model Airplane Kits, Futaba PCM transmitter and more.

Go to www.armantrout.com/rcforsale to see complete listing. Or contact Chuck Armantrout at Chuck.armantrout@gmail.com.

Thank you for any help you can give me. As I sell the items I will be taking the items off the web page.

Also, if you feel like it. I would appreciate any feedback you feel like giving me on the web page. Both positive/negative comments would be appreciated.

Charles (Chuck) Armantrout AMA 242244
Home 303-275-9550

**Members Birthdays for the
Month of February**

**Charles Armantrout
Raymond L. Hauger
Dan Lawry
Wayne Tighe
Rudy Furman
Jerry Hahn
Erik Feiereisen
Kirk Conn**

WINGS OVER THE ROCKIES MUSEUM

model show will take place on Saturday February 27th. Members going should be their by 8:00 a.m, contact Ken Jochjim about taking a plane to the show. kjochim@aol.com

NOTICE

**BAS Meeting, February, 10th
Hobby Town USA at 6:30 pm**