



THE WEAK SIGNAL

January 2009

Toledo Weak Signals Radio Control Club, Inc.
TOLEDO, OHIO CHARTER NO. 521

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Welcome to 2009. With the weather inhibiting flying, it is building time. Lets bring those new planes to the meeting for show and tell.

There have been four new members voted into the club. Lets welcome John Smokovitz, Tim Tworek, Bill Montie and Ryan Clark.

New Years Day saw quite a few members out flying. There were members showing up and leaving starting in the morning through mid-afternoon. Although the wind picked up there were a few daring pilots. I chose not to fly, a little to windy for my abilities

The newsletter always can use articles, pictures or equipment for sale. Send any of these to Brian Harris at toledoweaksignals@yahoo.com. If you have any special techniques for winter storage of equipment this would be a great time to have that article published.

The Expo Committee is gearing up for our 2009 event. There are openings on several committees. If you are interested in helping on any specific committee contact that committee chairman for details. If you are not on any specific committee you will be assigned as door security. Working the Expo is a requirement for Regular, Associate and Perspective members.

Remember the clubhouse has been winterized. The water has been turned off and you will need to use the porta-johns for the winter.

Safe Flying

Dale Rupert
President

2009 Expo April 3rd, 4th, & 5th, 2009

EXPO

It is that time of the year again for the 54th Expo which will be held on April 3rd, 4th and 5th. All non-life members are required to work on Wednesday April 2nd. Be at the Seagate Center at 6pm to start setting up. It usually takes approximately 1½ hour for set up. After set up is over there will be a short meeting. Please do not leave before your name is called for role. You will receive your name badges, a copy of the by-laws and a commemorative pin at that time.

If you have not been contacted by a committee member you will be working security under Dale Rupert. Please contact Dale EARLY so he can work on scheduling you in time slots that are mutually beneficial to you and Dales needs. This does not guarantee you will get “Good” hours but it may help.

Remember this is our show and has a reputation for being the best Exposition in the industry. We as members need to make sure that we act professionally no matter how unprofessional a guest may act. We rely on the money generated by the show and one bad experience by one person can affect our income dramatically so please be on your best behavior.

As most people know working at the show is a mandatory requirement of all members except Life.

2009 Expo Door Security

For those members that will be working door security I need you to let me know what day and times you can and can't work. Please let me know as soon as possible but no later than March 13, 2009. I would prefer if you would email your information. You can also mail the information or call. My email is DaleRupert@aol.com, address is 5555 303rd Street, Toledo, Ohio 43611, and phone is (419) 727-9343.

Bob's RC Electric Basics Part 2.

Motor:

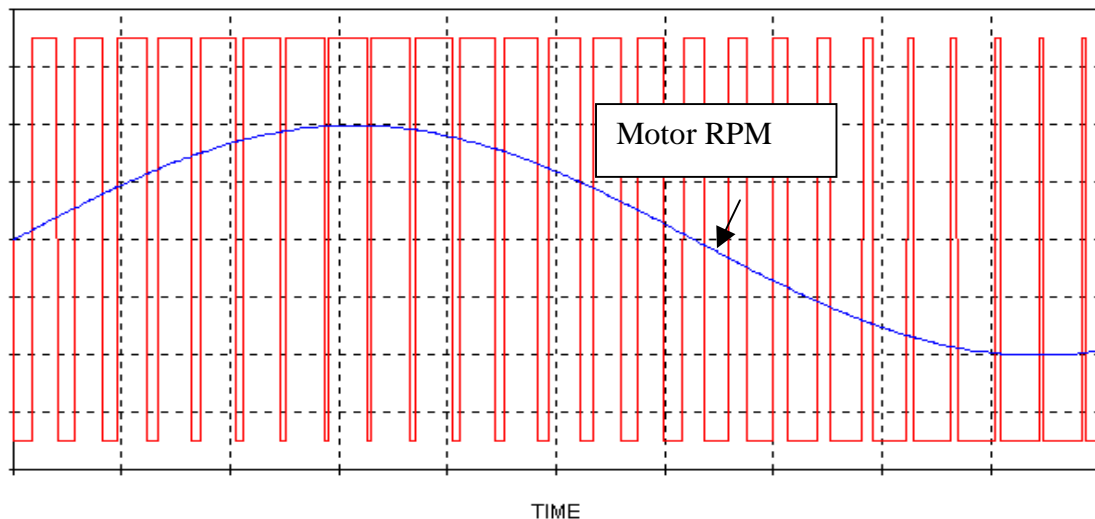
A motor operates by a principle called the Lorentz Force. A force will be produced on a wire if a current is passed through it and it is in a magnetic field. The inverse is also true; a current will be induced in the wire if it is moved by an external force through a magnetic field. A motor will become a generator if we turn it with an external force. This effect is how braking is performed with an electric motor.

In order for a motor powered by DC current to rotate, the current direction must be alternated. A brushed motor accomplishes this by switching the current in the armature mechanically using brushes riding on a conductive commutator. Brushless motors use special controllers which electronically switch the current through the motor so it will rotate. Brushless motors (and their controllers) are more expensive than brushed types, but they offer higher efficiency and are typically built to high mechanical and electrical standards.

Motors have several electrical characteristics that allow us to compare them. Winding resistance (ohms), Back EMF or Kv (RPM/Volt), maximum power dissipation (Watts), and efficiency. DC motors may also have a nominal voltage rating, but this is really an attempt to summarize the other characteristics into a single number. Motors can operate over a wide voltage range, you just can't exceed their electrical or mechanical limit, or you have to be willing to put up with short motor life.

Speed controller:

Speed Controllers give us proportional control of the motor by varying the power supplied to the motor. Modern controllers vary the power by switching the full battery voltage on and off very quickly and varying how long the power is on or off. Technically this is called Pulse Width Modulation or PWM. Many controllers now offer user adjustable pulse frequencies. I'm not sure how the casual consumer would know how to set the frequency so I would use the default unless you have good information to change it.

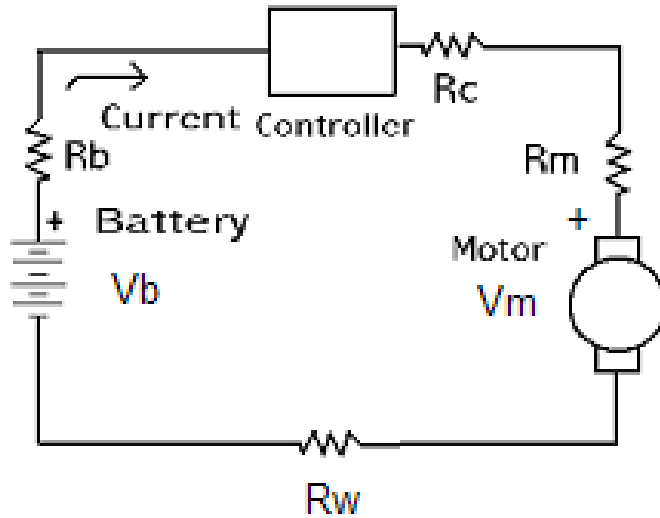


Most controllers will shut down power to the motor when the battery voltage drops to pre-determined voltage. This maintains power to the radio (if you are using the battery eliminator circuit) so you can safely land your plane. Other features include brake and failsafe.

The main electrical characteristics we need to concern ourselves with are the controller's resistance and current capacity.

Now let's put everything together and see how it works. This diagram is simplified

Simplified motor circuit:



R_c represents the internal resistance of the battery, R_c represents the internal resistance of the controller, and R_m represents the internal resistance of the motor and losses due to friction, and R_w is the resistance of the wire, V_b is the voltage of the battery, and V_m is the voltage of the motor.

How do you select the right motor, controller, battery pack, and propeller combination?

A safe and reliable method is to go with the manufacturer's recommendations.
The next reliable method is to copy somebody else's setup
The third is to experiment.

The recommended power for flight goes something like this:

Trainer & Sport Performance: 75-100 Watts Per Pound
Aerobatic & High Speed Performance: 100-150 Watts Per Pound
3D & Extreme Performance: Over 150 Watts Per Pound

So for a Pattern aircraft weight between 10 and 11 pounds we need 1650 watts of power available. I chose the Great Planes Rimfire 63-62-250 Out-Runner Brushless motor. Its specifications are as follows:

Can Diameter: 2.48" (63mm)
Can Length: 2.44" (62mm)
Shaft Diameter: .32" (8mm)
Shaft Length: .98" (25mm)
RPM/V (kV Rating): 250
Input Voltage: 29.6-44.4V
Max. Constant Current: 45A
Max. Surge Current: 72A
Max. Constant Watts: 1665W
No Load Current: 1.5A
Weight: 22.4oz (635g)

I wanted a direct drive motor to eliminate the need for a gearbox. The out runner design allows this motor to turn large propellers without a gearbox.

Controller. I chose the Castle Creations HV-85 controller because it had the maximum voltage and current ratings needed for this application and Patrick Castillo has been in the business for a while, knows his stuff and as a nice guy with great customer focus. (I was not paid to say that and I am not sponsored)

Choosing the battery. Here I went with what others are using and picked the

Choosing the prop. This is the tricky part. With 42 volts and a 250 kV rating, this motor will turn 42×250 or 10500 RPM at full throttle. Chances are the voltage will sag a little due to in circuit resistance, but the number is close. So, you need to prop the motor so it will not draw any more than the maximum current at full throttle, and remember not to use full throttle all the time.

If you put a prop too big for the application, the motor will draw more current in an attempt to meet its kV rating for the given input voltage and will likely burn up or break something (I have first hand experience). Something WILL become a fuse. You must have a reliable way to measure current when experimenting with props. I use the Astro Flight Wattmeter in between the battery and the controller to monitor current as I test the propeller.

Thank You Bob Kane for sharing this with the membership!

Pictures from The Great Start Fly in held November 1st

Thanks to Tim Jesky for organizing this event and to all the members who helped make this day one the kids will remember.



More pictures from Great Start



Fun Stuff (sometimes)



Can you name the plane?

Last months answer was the B-58 Hustler.

IMPORTANT DATES

Jan. 8th	Meeting 7pm Legion Hall
Jan. 22nd	Meeting 7pm Legion Hall
Feb. 12th	Meeting 7pm Legion Hall
Feb. 26th	Meeting 7pm Legion Hall
Mar. 12th	Meeting 7pm Legion Hall
Mar. 26th	Meeting 7pm Legion Hall
April 1st	Work Night 6pm at Seagate Center