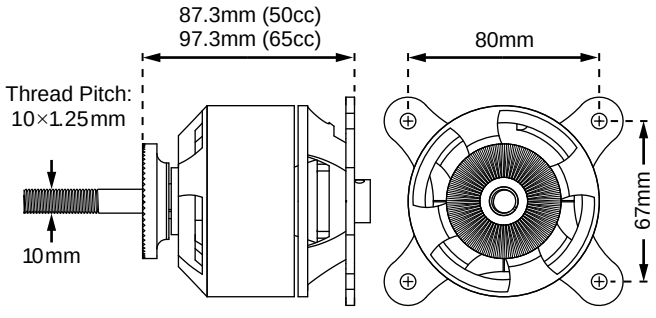
RIMFIRE™

50CC-65CC BRUSHLESS OUTRUNNER MOTOR

ElectriFly™ by Great Planes

Thanks for purchasing the ElectriFly RimFire™ 50cc-65cc Brushless Motor! In order to complete your power system you will need to select the correct LiPo batteries, propeller, ESC, and motor mount. The following instruction manual will explain what you will need to complete your new RimFire power system.

1 MOTOR



RimFire 50cc (80-75-230) (GPMG4800)

Motor Output Shaft Size: 10mm
Motor Diameter: 80mm [3.14"]
Motor Can Length: 75mm [3.0"]
Mounting Space Length: 87.3mm [3.44"]
Weight: 1250g [44.1oz]
Input Voltage: 33.3-55.5V (9-15S LiPo)
Max Continuous Current: 110A (at 12S)
Max Continuous Power: 5000W
Max Surge Current: 135A (at 12S)
Max Surge Power: 6500W
Prop Range: 22x8 to 26x10 glow/gas prop
Sport Aircraft Weight: 12.7kg [28lbs] [460oz]
3D Aircraft Weight: 8.17kg [18lbs] [288oz]

RimFire 65cc (80-85-160) (GPMG4805)

Motor Output Shaft Size: 10mm
Motor Diameter: 80mm [3.14"]
Motor Can Length: 85mm [3.35"]
Mounting Space Length: 97.3mm [3.83"]
Weight: 1480g [52.2oz]
Input Voltage: 33.3-55.5V (9-15S LiPo)
Max Continuous Current: 135A (at 12S)
Max Continuous Power: 7500W
Max Surge Current: 150A (at 12S)
Max Surge Power: 8400W
Prop Range: 22x10 to 26x12 glow/gas prop
Sport Aircraft Weight: 19.7kg [42lbs] [665oz]
3D Aircraft Weight: 11.79kg [26lbs] [416oz]

Understanding Motors

kV (rpm/volt): This is a number that gets thrown around quite a bit when talking electrics and it is important to know what it is. kV is the number of rpm a motor will spin per each volt applied (rpm/volt) under no load.

This means that basically a motor that has a kV of 1000 when connected to a 12V battery will try to spin at 12,000rpm (1000x12) under no load. Likewise a 3500kV motor will try to spin at 42,000rpm (3500x12) under no load.

When a propeller is attached to the motor, the motor will try to spin the prop at the rated kV. Depending on the diameter and pitch of the propeller (the larger the diameter or higher the pitch, the harder it is for the motor to spin), the motor's current draw increases as the load increases and decreases as the load decreases. There are meters available from your hobby dealer that measure current and voltage.

Because every motor has a maximum current it can take based on its design and cooling ability, the maximum size of propeller that can be used with each motor can be determined. Use a propeller that's too large and the motor will spin at a much lower rpm than its rated kV, causing it to draw a lot of current and overheat. If the propeller/fan is too small, it will require little effort (current) to turn the prop at the rated kV.

Ideally the motor should be matched with a propeller that causes the motor to draw 80-100% of its rated maximum constant current. Once a power system is set up, it can be fine-tuned by adjusting the propeller size and measuring the amount of current the motor is drawing.

Please note that the kV of a motor does not change with voltage, but if a higher voltage is applied to the motor, it will try to spin the same propeller at a higher rpm. This will cause the motor to draw more current and possibly exceed the maximum rated current of the motor. So, if a battery with lower voltage is replaced with one with a higher voltage, it is recommended that a smaller propeller be used to keep the current in check. If a higher voltage battery is replaced by a lower voltage battery, the size of the propeller can be increased to keep the motor at its rated current.

Another possibility to fine tune the power system's performance is to use another motor with higher kV to increase the current or a lower kV to lower the current.

2 ACCESSORIES

Items not shown actual size.

A Great Planes® Pro™ Thread Locking Compound (GPMR6060)
B Standoff Brushless Motor Mount XX-Large (GPMG1275)
C 4mm/6mm Female Bullet Adapter (GPMM3118)
D 6mm/4mm Female Bullet Adapter (GPMM3119)
E 6mm Bullet Connector Male (GPMM3116)
F 6mm Bullet Connector Female (GPMM3117)

3 PROPELLERS

Because of the high torque of this motor and its ability to spin at high rpm, we recommend **against** using electric-only propellers. Below is a listing of a few of the recommended props.

TOPQ5260	22x10 Power Point™	ZINQ1803	24x10 Pro-Zinger
TOPQ5270	24x10 Power Point	ZINQ2014	26x10 Zinger Prop
ZINQ1403	20x10 Pro-Zinger	ZINQ2017	26x12 Zinger Prop
ZINQ1603	22x10 Pro-Zinger		

4 LI-POLY BATTERIES (LIPO)

Number of Cells

Batteries can be connected in series (S) or in parallel (P). A LiPo battery is advertised by voltage and capacity where each cell carries 3.7 volts. A 4S LiPo battery would be 4 x 3.7V or 14.8V. The capacity is listed in milliamp hours or mAh, so a 5300mAh battery can discharge a maximum of 5300 milliamp-hours or 5.3 amp-hours. Please also be aware of the battery's discharge current delivery capability, or C-rating. A 25C, 5300mAh battery will deliver 132.5A of current regardless of voltage.

For the most up-to-date list of LiPo batteries, check out the ElectriFly web site at: **www.electrifly.com**

Stock #	Voltage	Capacity	Weight	Type
GPMP0540	7.4V (2S)	3350mAh	6.6 oz (188g)	25C LiPo
GPMP0541	11.1V (3S)	3350mAh	9.7 oz (275g)	25C LiPo
GPMP0542	14.8V (4S)	3350mAh	12.2 oz (347g)	25C LiPo
GPMP0543	18.5V (5S)	3350mAh	15.3 oz (435g)	25C LiPo
GPMP0560	7.4V (2S)	5300mAh	10.3 oz (291g)	25C LiPo
GPMP0561	11.1V (3S)	5300mAh	15.4 oz (426g)	25C LiPo
GPMP0562	14.8V (4S)	5300mAh	19.6 oz (555g)	25C LiPo
GPMP0563	18.5V (5S)	5300mAh	24.6 oz (697g)	25C LiPo

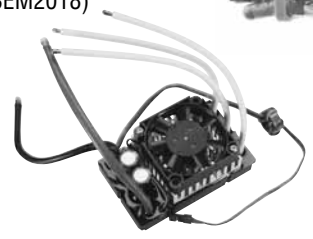
5 ELECTRONIC SPEED CONTROL (ESC)

The following brushless electronic speed controls are compatible with these motors.

ElectriFly Silver Series 80A Brushless ESC High-Volt (GPMM1860)

ElectriFly Silver Series 100A Brushless ESC High-Volt (GPMM1870)

Castle Creations Phoenix 110 High-Volt Brushless ESC (CSEM2018)



Kontronik™ Power Jazz 63V Brushless ESC 120A (KONM3140)

6 DETERMINE WHAT YOU NEED TO BUILD YOUR POWER SYSTEM

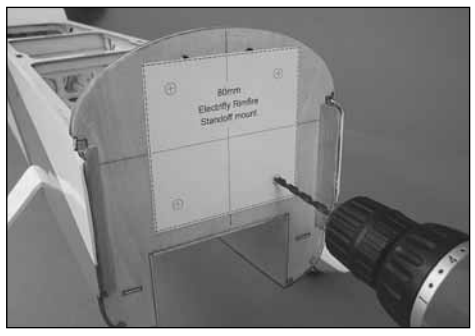
If you know the approximate weight of your airplane, including the motor and battery, and the performance you want from it, answer the questions below to determine the correct power system for your plane. You may need to make more than one calculation using different motors and battery combinations. See the battery section for some of the battery weights for the suggested batteries.

1. Perform the following calculation to determine the wattage required:
   - If you expect trainer-like performance, then multiply **75 x Airplane Weight (lbs)**
   - If you expect aerobatic or high speed performance then multiply **100 x Airplane Weight (lbs)**
   - If you expect 3D or extreme performance multiply **150 x Airplane Weight (lbs)**
2. The number you get is the minimum wattage you will need for your plane to perform as you wish.
3. Select a LiPo battery voltage within the recommended range of the motor. Keep in mind that voltage affects prop size (lower volts require bigger props). 12S is a good reference point to start at. See "Sample Power Systems" in this manual.
4. Divide the minimum wattage that you came up with by the voltage you selected. This will give you the current you should expect.
5. Determine the battery capacity needed based on the current draw of your system and your desired flight time. Be sure to select batteries with the proper C-rating that can deliver the current you need.
6. Determine the ESC you need based on the system current draw. See the ESC section for recommended ESCs.

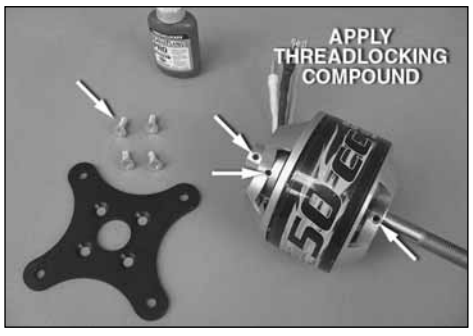
In addition to this procedure, you can also visit the Great Planes ElectriFly web site for descriptions of the power systems recommended for our line of electric and glow airplanes as well as more detailed explanation on the subject.

RECOMMENDED SETUP	**RimFire 50cc**	12S 5300mAh 25C LiPo, 120A ESC, 22×8 glow/gas prop
	RimFire 65cc	12S 5300mAh 25C LiPo, 120A ESC, 24×8 glow/gas prop

7 INSTALL YOUR MOTOR



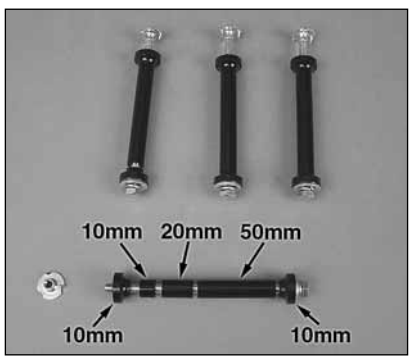
1) If you will mount your motor directly to the firewall or if you will use the Great Planes 80mm Motor Standoff Motor Mount set, cut out the mounting template in this manual and mount it to your firewall using tape or a spray adhesive. Align the template crosshairs with the centering marks provided on the firewall. Drill four 9/32" [7.1mm] mounting holes.



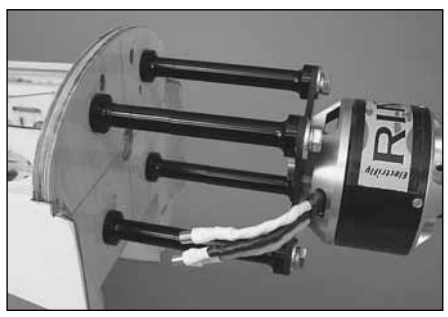
2) Remove the four countersunk screws holding the X-mount to the motor and reinstall them using thread locking compound. Remove the set screws from the wheel collar, the rear case, and the front case and reinstall them using thread locking compound.

3) Determine the mounting space required by your model – this is usually found during the engine/motor installation steps in your model's instruction manual. Subtract the mounting space of the motor from the total required mounting space. For example, if the mounting space is 184mm [7-1/4"] and we want to mount the 50cc RimFire which itself has a mounting space of 87.3mm [3.44"]:

184mm - 87.3mm = 96.7mm



4) Using a Great Planes XX-Large Standoff Brushless Motor Mount set (sold separately, GPMG1275), combine standoffs to achieve the dimension you came up with. You may not get the exact dimension with the standoffs, so check to see if your cowl or balance condition will allow you to increase or decrease this dimension. The standoffs shown in the photo above combine to make a 100mm standoff dimension.



5) Select good quality 1/4-20 bolts that are long enough to fully engage all of the threads of your blind nuts, or use the bolts included with the standoff kit. We used 5" [127mm] long bolts for this example. Attach your motor to the firewall using flat washers, lock washers, and thread locking compound.

8 INSTALL THE BRUSHLESS ESC

1) Make sure that the ESC you have selected has the proper 6mm **female** bullet connectors attached to the three motor leads. If it does not, this motor is supplied with 6mm female bullet connectors. These are fitted to the male bullet connectors on the motor leads. Slide them off and solder them to your ESC motor leads. Insulate the bare connector body with some heat-shrink tubing. The heat shrink on the motor wires and the ESC wires must completely cover the gold connectors. If the bare connectors touch each other while power is supplied to the motor, permanent damage to the ESC/motor may result. **Note:** DO NOT try to remotely mount your ESC by extending the motor lead wires. This will adversely affect motor timing.

2) Attach the ESC you have selected to your model in the location suggested by the manufacturer. If your model does not come with mounting equipment for an ESC, fit your ESC to a place where it will receive adequate airflow. Make sure that airflow is directed over the cooling fins of the ESC and that air has a path to exit from the model.

3) Attach a suitable battery lead connector from your ESC to your battery. For safety reasons, you may want to build an arming switch which will allow you to quickly and safely arm and disarm your motor without opening or removing any hatch. Keep all leads as short as possible to reduce resistance, and well insulated to eliminate short-circuits.

4) Connect the three motor leads from the ESC to the motor. Check to see that the motor rotates in the correct direction. Swap the position of any two motor leads to reverse the rotation of the motor.

9 RIMFIRE MOTOR MAINTENANCE

RimFire brushless motors require virtually no maintenance. There are no brushes to wear out and replace. The precision bearings have a very long service life and should last a very long time. The internal parts of the motor should not require any cleaning. The only thing that needs to be checked is to make sure all the screws and set screws remain tight.

10 IMPORTANT PRECAUTIONS

- Once the battery is connected to the ESC, stay clear of the motor and prop.
- **DO NOT** apply an input voltage that exceeds the maximum specification of each motor.
- **DO NOT** apply currents to the motor that exceed the maximum specifications of each motor.
- **DO NOT** allow the input connectors to accidentally touch each other while power is applied to the motor. Make sure all input connections are insulated electrically.
- **DO NOT** allow water or moisture to enter the motor, as it can cause permanent damage to the motor and possibly short out the attached ESC.
- **DO NOT** cut the wires from the motor. The wires are part of the windings and are coated with an insulating material and cannot be soldered without removing the coating, which is very difficult. If you must remove the bullet connectors, unsolder them.
- Allow the motor to cool after each flight.
- The motor shaft of the motor will rotate at very high rpm. **DO NOT** attempt to touch the shaft while it is rotating. If setting up the motor/ESC on the workbench, make sure the motor is securely attached and that nothing is attached to the motor shaft BEFORE applying power.
- **NEVER** attempt to use a damaged motor (having mechanical or electrical defects).
- Great Planes carries a complete line of Ammo™ (inrunner style) and RimFire (outrunner style) brushless motors, gear drives, motor mounts, prop adapters and speed controls. For a complete list of these products, check out our web sites at:

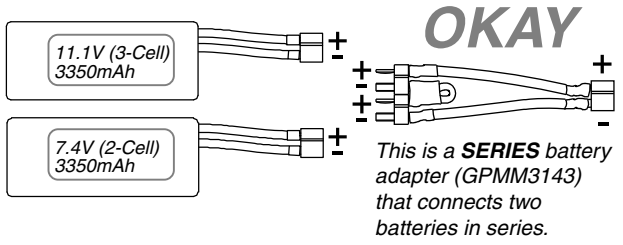
www.greatplanes.com **www.electrifly.com**

or visit your nearest hobby shop that carries the full line of Great Planes and ElectriFly products.

11 BATTERY PRECAUTIONS

There are two ways to connect multiple battery packs: In Series and in Parallel.

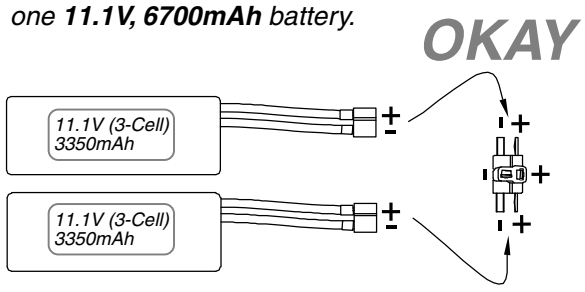
*These are two 33500mAh batteries (one 11.1V and the other 7.4V). When joined in **SERIES**, the result will be a 18.5V, 3350 mAh battery.*



*This is a **SERIES** battery adapter (GPMM3143) that connects two batteries in series.*

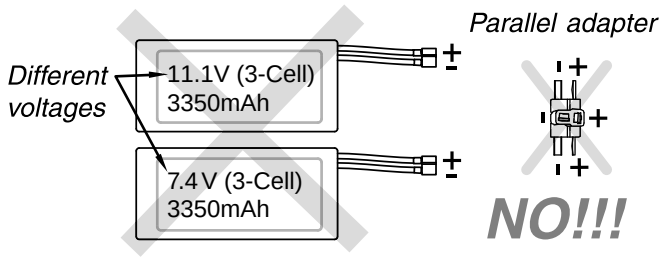
1) Connecting batteries in "Series" means to connect the +'s to the –'s and the –'s to the +'s. This combines the batteries' voltages, but the capacity remains the same.

*These two 3350mAh batteries (both 11.1V) are being joined in **PARALLEL**. The result will be one **11.1V, 6700mAh** battery.*

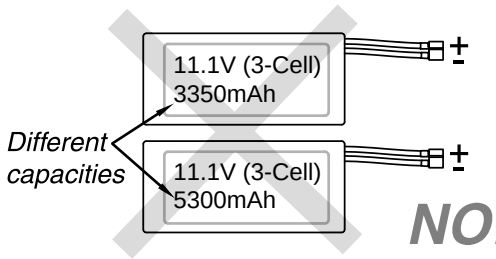


*This is a **PARALLEL** battery adapter (GPMM3142) that connects two batteries in parallel.*

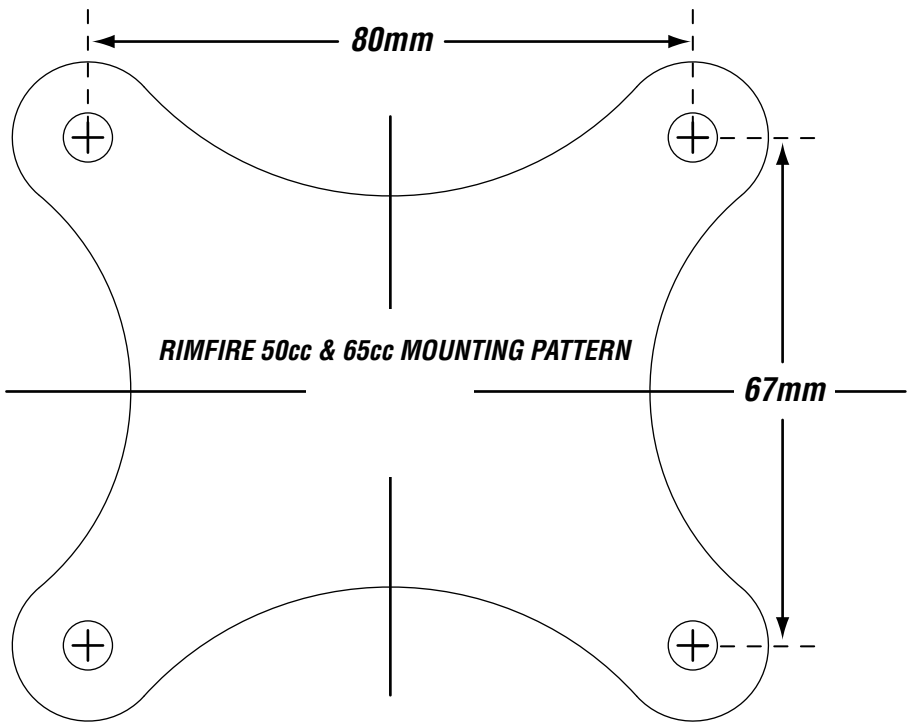
2) Connecting batteries in "Parallel" means to connect the +'s to the +'s and the -'s to the -'s. This combines the batteries' capacities, but the voltage remains the same.



NEVER connect battery packs with different Voltages in Parallel–only combine in Series. Otherwise, the batteries will try to "equalize" with the larger one trying to "charge" the smaller one, thus causing heat and likely a fire.



Also NEVER connect battery packs with different capacities in Series or in Parallel.



Note: This mounting pattern matches the DLE-55 engine. An optional mount that matches the DA-50 engine is GPMG1214.

RimFire 50cc Accessory and Spare Parts

GPMM3116	6mm Gold Plated Bullet Cnnectors - Male (3)
GPMM3117	6mm Gold Plated Bullet Connectors - Female (3)
GPMQ4914	RimFire 50cc and 65cc Replacement Prop Drive
GPMG1212	RimFire Backplate Motor Mount for 50cc and 65cc Motors
GPMG1214	Optional DA50 RimFire Backplate Motor Mount for 50cc & 65cc Motors
GPMG1438	C-clip (10) for 10mm RimFire Motor Shafts
GPMG1462	Bearings (3) for RimFire 50cc and 65cc Motors
GPMG1424	Replacement Shaft Kit for RimFire 50cc
GPMG1275	Stand Off Brushless Motor Mount XX Large

RimFire 65cc Accessory and Spare Parts

GPMM3116	6mm Gold Plated Bullet Cnnectors - Male (3)
GPMM3117	6mm Gold Plated Bullet Connectors - Female (3)
GPMQ4914	RimFire 50cc and 65cc Replacement Prop Drive
GPMG1212	RimFire Backplate Motor Mount for 50cc and 65cc Motors
GPMG1214	Optional DA50 RimFire Backplate Motor Mount for 50cc & 65cc Motors
GPMG1438	C-clip (10) for 10mm RimFire Motor Shafts
GPMG1462	Bearings (3) for RimFire 50cc and 65cc Motors
GPMG1426	Replacement Shaft Kit for RimFire 65cc
GPMG1275	Stand Off Brushless Motor Mount XX Large