

# RIMFIRE™

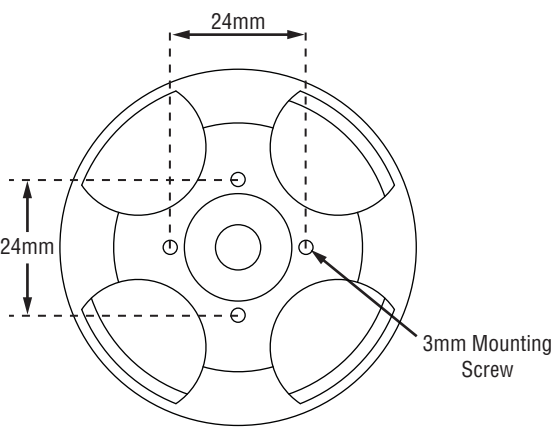
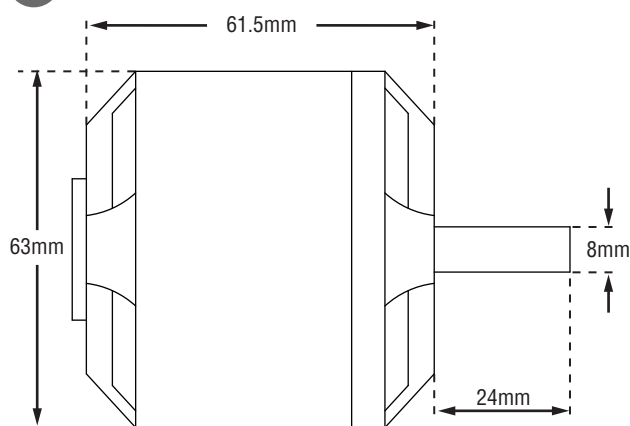
## 63MM BRUSHLESS OUTRUNNER MOTOR



**ElectriFly**  
by Great Planes

Congratulations, you have just purchased one of the RimFire 63mm power system components. All the components are sold separately to allow you to customize your power system to your airplane. The components needed to assemble your complete RimFire 63mm power system are: RimFire 63mm motor, propeller, propeller adapters and brushless speed controls. This instruction sheet explains how to determine what you will need and how to assemble each component.

### 1 MOTOR



#### RimFire 1.60 (63-62-250) (GPMG4795)

The RimFire motors are labeled to provide the most information at a glance. For example: The RimFire 1.60 (63-62-250) is 63mm diameter, 62mm long and has a kV (rpm-per-volt) of 250.

**Motor Output Shaft Diameter and Length:** 8x24mm [0.32"x0.96"]

**Weight:** 628g [25.1oz.]

**Input Voltage:** 33.3 – 44.4V

**Max. Surge Current:** 72A

**Max. Surge Watts:** 3200W

#### 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 a motor with 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 to spin), the motor's current draw can be increased or decreased. 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. If the propeller is too large, 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



**A** Great Planes® Pro™ Thread Locking Compound (GPMR6060)

**B** Standoff Brushless Motor Mount X-Large (GPMG1270)

**C** 4mm/6mm Female Bullet Adapter (GPM3118)

**D** 6mm/4mm Female Bullet Adapter (GPM3119)

**E** 6mm Bullet Connector Male (GPM3116)

**F** 6mm Bullet Connector Female (GPM3117)

### 3 PROPELLERS



There is a wide selection of propellers available for electric use. The RimFire 1.60 (63-62-250) motor uses high performance glow/gas props such as the Zinger wood props. The larger the propeller used, the more current your motor will draw. The smaller the propeller, the less current the motor will draw.

Shown are a few of the recommended props. Due to the large range of propellers and the constant addition of new sizes, visit our web sites at [www.electrifly.com](http://www.electrifly.com) and [www.greatplanes.com](http://www.greatplanes.com) for the most up-to-date listing of props.

|          |                     |          |                      |
|----------|---------------------|----------|----------------------|
| ZINQ1103 | 16x8 Wood Propeller | ZINQ1402 | 20x8 Wood Propeller  |
| ZINQ1202 | 18x6 Wood Propeller | ZINQ1403 | 20x10 Wood Propeller |
| ZINQ1203 | 18x8 Wood Propeller |          |                      |

### 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 4x 3.7V or 14.8V. The capacity is listed in milli-amp 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](http://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)



An ESC is basically the device that controls your motor through your radio system. Never run any RimFire motors with a brushed ESC. It will not work and you may damage both the motor and the ESC. Always use a brushless ESC. ElectriFly offers the **Silver Series SS-80 Brushless ESC (GPM1860)** or the **Silver Series SS-100 Brushless ESC (GPM1870)** that work well with the RimFire 1.60 (63-62-250) motor.

The SS-80 and SS-100 ESCs come with 6mm female bullet connectors and require an adapter (GPM3119) to connect to the RimFire 1.60 (63-62-250). Also, these ESCs come with a Deans® Ultra Plug® battery connector that matches the connectors that are found on most batteries that it will use.

## 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 props and battery combinations. See the battery section for some of the battery weights for the suggested batteries.

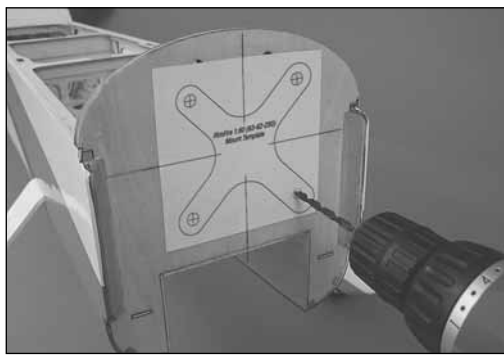
- Perform the following calculation to determine the wattage required:
  - If you expect trainer-like performance, then multiply **75 x Airplane Weight (lbs)**
  - If you expect aerobatic or high speed performance, then multiply **100 x Airplane Weight (lbs)**
  - If you expect 3D or extreme performance, multiply **150 x Airplane Weight (lbs)**
- The number you get is the minimum wattage you will need for your plane to perform as you wish.
- 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.
- Divide the minimum wattage that you came up with by the voltage you selected. This will give you the current you should expect.
- 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.
- 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 Electrify 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:** 12S Battery, 16x8 gas/glow propeller.

## 7 INSTALL YOUR MOTOR

1) If you will mount your motor directly to the firewall or if you will use the Great Planes 63mm Motor Standoff Motor Mount set, cut out the mounting template in this manual and

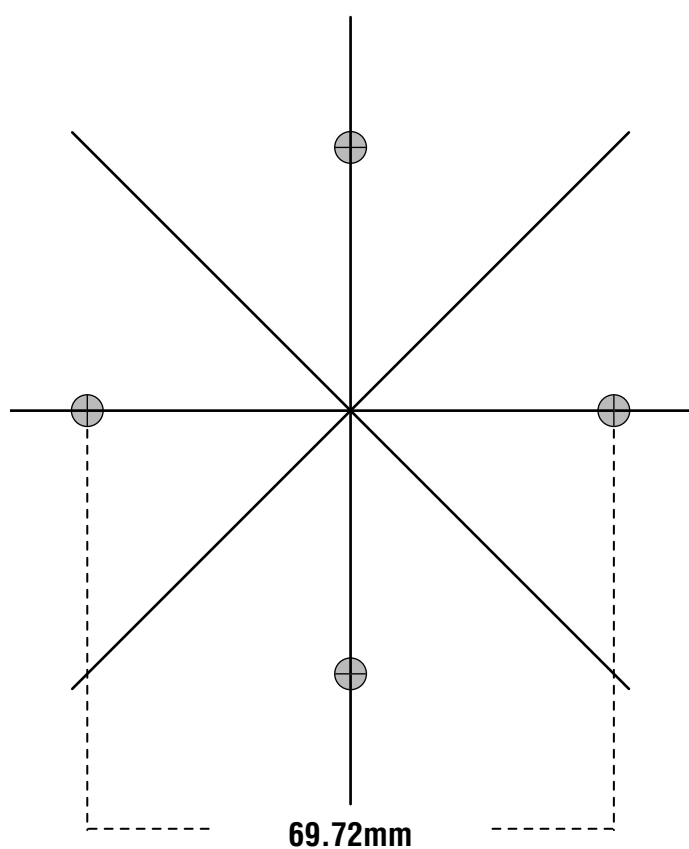


mount it to your firewall using tape or a spray adhesive. Align the template crosshairs with the centering marks provided on the firewall. Drill four 13/64" [5.2mm] mounting holes.

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.



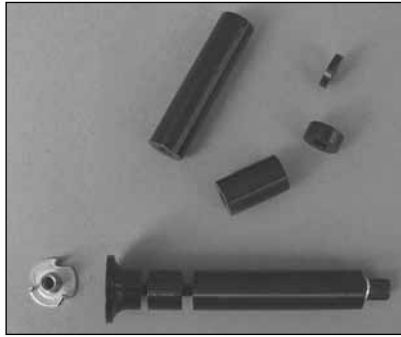
### Motor Mount Template



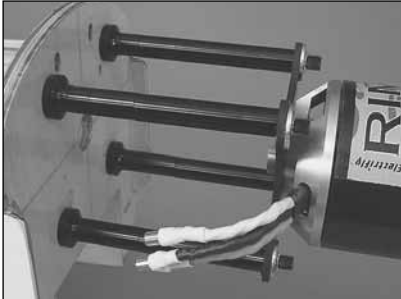
3) Determine the mounting space required by your model – this is usually found during the engine/motor installation steps in your model's instruction manual. Subtract the mounting space of the motor from the total required mounting space. For example, if the mounting space is 171mm [6-3/4"] and we want to mount the RimFire 1.60 which itself has a mounting space of 75.4mm [2.97"]:

$$171\text{mm} - 75.4\text{mm} = 95.6\text{mm}$$

4) Using a Great Planes Standoff Brushless Motor Mount set (sold separately, GPMG1270), 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 70mm standoff dimension.



5) Select good quality 8-32 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. Attach your motor to the firewall using lock washers and thread locking compound.



## 8 INSTALL THE BRUSHLESS ESC

Mount your ESC in the desired location. Always make sure that the ESC is positioned so that it gets some cooling air flowing over it.

Use the instructions included with the ESC to correctly connect the ESC.

## 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:

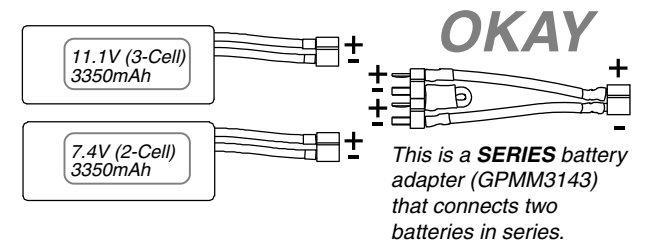
[www.greatplanes.com](http://www.greatplanes.com)    [www.electrify.com](http://www.electrify.com)

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

## 11 BATTERY PRECAUTIONS

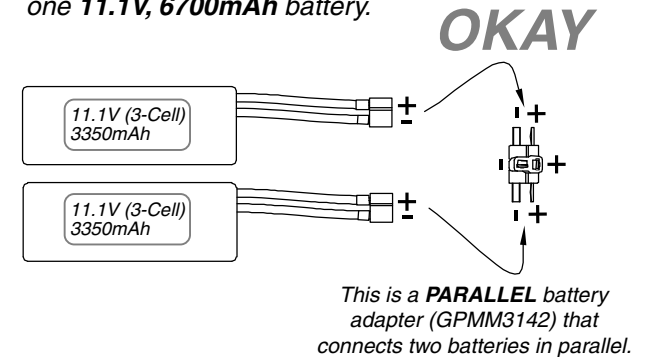
There are two ways to connect multiple battery packs: In Series and in Parallel.

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



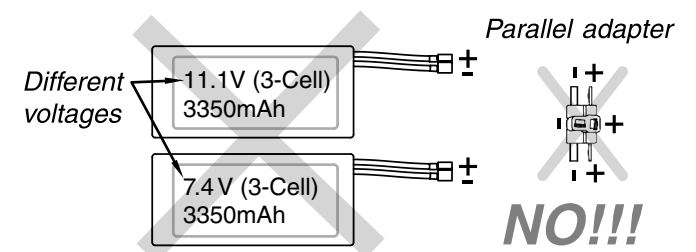
1) Connecting batteries in "Series" means to connect the +s to the -s and the -s to the +s. This combines the batteries' voltages, but the capacity remains the same.

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

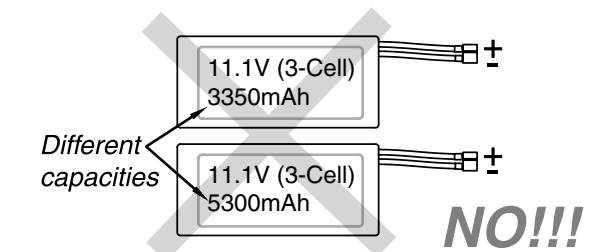


This is a **PARALLEL** battery adapter (GPMM3142) that connects two batteries in parallel.

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.

## 12 REPLACEMENT PARTS

- GPM3114** 4mm gold plated bullet connectors - Male (3)
- GPM3115** 4mm gold plated bullet connectors - Female (3)
- GPMQ4912** RimFire Prop Adapter for 63mm Motors
- GPMG1210** RimFire Backplate Motor Mount for 50-63mm Motors
- GPMG1436** C-Clip (10) for 8mm RimFire Motor Shafts
- GPMG1460** Bearings (3) for RimFire 63-xx-xx Motors
- GPMG1422** Replacement Shaft Kit for RimFire 63-62-xx Motors