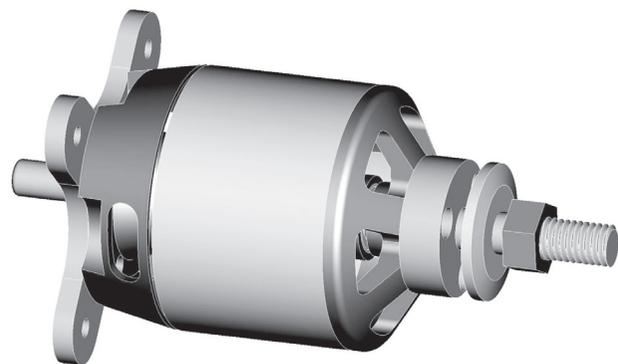




Potenza 60 Brushless Outrunner Motor, 470Kv

FPZM1060A | User Guide



Thank you for purchasing your Potenza 60 brushless outrunner motor. It has been designed, developed, and extensively tested to provide the best combination of power, performance, and user-friendliness in its class.

FEATURES

- Equivalent to 60-sized glow motor for 6-12 pound (2.7-5.4kg) aircraft
- Ideal for 3D aircraft up to 9-pounds (4.1kg) in weight
- Designed for up to 6S LiPo and 1800 watts of power
- Powerful, quiet, lightweight operation
- Factory-installed 4.0mm bullet connectors
- Includes X-mount, bolt-on prop adapter, and mounting hardware
- External rotor design -- 7mm prop shaft can be easily reversed for alternative mounting and applications.
- Slotted, 14-pole design
- High-quality construction with (4) ball bearings and hardened steel motor shaft

SPECIFICATIONS

Continuous Current	75A (with proper cooling)
Max Burst Current	90A (<15 seconds with proper cooling)
Continuous Power	1800 Watts
Input Voltage	22.2v nominal (6S LiPo)
Motor Can Diameter	50.0 mm
Motor Can Length	61.0 mm
Shaft Diameter	7.0 mm (0.28 in)
Weight	427g (15.0 oz)
RPM/Volt (Kv)	470
No-Load Amperage (I _o)	2.1A
Resistance (R _i)	0.02 Ω
Propeller Range	15x8-17x7 electric
Recommended ESC	80A Brushless

Notice: Proper cooling airflow is required. The maximum operating temperature for this motor is 220°F (104°C). Maximum burst current is rated at 90A and can be sustained for 15 seconds. Decrease the throttle after flying at or near max burst current to allow the motor to properly cool and prevent overheating.

REPLACEMENT/OPTIONAL PARTS

FPZM1060A3	60 Motor Shaft w/Collar
FPZM1060A2	60 Motor X-Mount w/Screws
FPZM1060A1	60 Motor Bolt-on Prop Adapter
FPZM1060A4	7mm Collet Prop Adapter

UNDERSTANDING ELECTRIC MOTORS

In order to get the most out of your motor, it is helpful to understand a few basic principles about how they run. The most important of these is the knowledge of Kv. Kv is a measurement that states the number of revolutions per minute that an electric motor will rotate per volt applied (RPM/volt) with **NO** load applied to the motor.

For example, a 1000Kv motor that is connected to a 12v power supply will try to spin 12,000 RPM (1000Kv x 12v) with no load. When a load, in our case a propeller, is applied to the motor, it will still try to turn at the same RPM. The diameter and pitch of a propeller dictate the load imposed on the motor, and the larger the diameter and/or higher the pitch, the more load that propeller will impart on the motor. When load increases, so does current; conversely, when load decreases the current follows. It is highly recommended that a watt meter be used to determine proper propeller sizing.

Every motor has a maximum current value. There are many factors which decide this, including motor design and motor cooling. Taking these factors into consideration, a maximum propeller size for a given setup can be determined. Use of an oversized propeller will cause the motor to spin at a much lower RPM than it was designed to, and the motor will draw more current to run at its design RPM. Not only can current values for the motor be exceeded, but excess current generates excess heat which can damage internal components in the motor.

Kv is a constant value, meaning that it will not change as input voltage changes. If a motor turning a certain-sized propeller on a 4S battery is connected to a 5S battery with the same propeller, the motor will try to turn that propeller the the higher RPM. Because this is a higher load than before, current will increase, therefore, if a higher voltage battery is installed in an aircraft, the propeller will have to be reduced in diameter and/or pitch to accommodate the new load factors.

OPERATING THE MOTOR

1. This brushless motor requires a sensorless brushless electronic speed control (ESC). Failure to use the correct ESC may result in damage to the motor and/or ESC itself.
2. If applicable, solder the (3) included female bullet connectors to the output wires of your ESC. Do not allow the input connectors to make contact when power is applied to the motor. Ensure all input connections are insulated.
3. The (3) motor wires can be connected in any order to the ESC output wires. If the motor is turning reverse than the direction desired, the connection of any TWO wires may be reversed.
4. Once the battery is connected to the ESC, remain well clear of the motor and propeller. The motor shaft of the motor will rotate at very high rpm and can cause serious injury.
5. Do not apply an input voltage or current that exceeds the maximum specification for your motor.
6. 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.
7. Do not cut the wires from the motor. The wires are part of the windings and cannot be reattached by soldering.
8. Allow the motor to cool after each flight. Ensure that your model has adequate air circulation during operation. Overheating the motor is NOT covered under any warranty.
9. Never attempt to use a damaged motor

SPECIAL LANGUAGE DEFINITIONS

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of serious injury.

ATTENTION

Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to assemble or operate the product correctly can result in damage to the product, personal property, and cause serious or fatal injury.

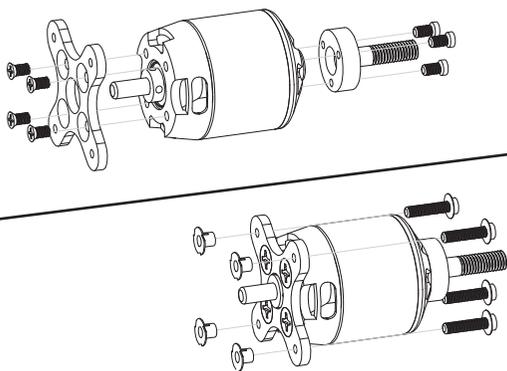
All instructions, warranties and other collateral documents are subject to change at the sole discretion of Flex Innovations, Inc. For up-to-date product literature, please visit our website at www.flexinnovations.com and click on the support tab for this product.



WARNING

This product is not intended for use by children under 14 years without direct adult supervision.

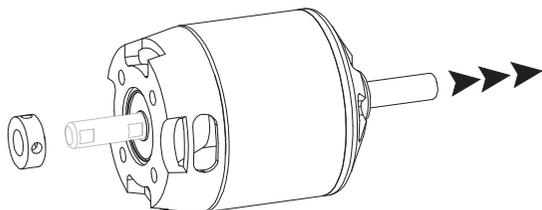
MOTOR MOUNTING USING X-MOUNT



The most common installation of brushless outrunner motors is to install the X-mount on the rear of the motor and attach this mount to the firewall. Other options exist for mounting motors including mounting in reverse directly to the nose ring or using standoffs. Please consult the directions with your model to ensure proper motor mounting and configuration. DO NOT install the X-mount onto the motor until the firewall has been prepared for the motor mount.

1. Trial-fit the aluminum X-mount on the model's firewall and mark the locations for the four screw holes and shaft (if applicable).
2. Using the appropriate size drill bit, drill out the four holes for the mounting screws, and enlarge them properly for blind nut installation.
3. Install the (4) blind nuts on the rear side of the firewall. Run medium CA around the perimeter of the blind nuts, but ensure that no adhesive enters the threaded shank.
4. Attach the X-mount to the motor using (4) countersunk screws and a small amount of blue threadlocker.
5. Attach the motor assembly to the firewall with the included socket head cap screws and flat washers.
6. Once satisfied with the final assembly of the motor, apply blue threadlocker to all mounting screws EXCEPT the prop nut.

CHANGING SHAFT POSITION



1. Loosen the set screws on the shaft collar and remove the collar from the shaft.
2. Loosen the set screw on the flange of the motor can (the rotating portion of the motor)
3. Carefully push the shaft through the motor. A small hammer may be required to lightly tap the shaft.
4. Reinstall the shaft collar against the main bearing, apply blue threadlocker to the set screws and tighten them
5. Apply blue threadlocker and tighten the screw on the flange of the motor can.

LIMITED WARRANTY

Warranty Coverage - Flex Innovations, Inc. and its authorized resellers ("Flex") warrant to the original purchaser that the product purchased (the "Product") it will be free from defects in materials and workmanship at the date of purchase.

Outside of Coverage - This warranty is not transferable and does not cover: (i) Products with more than 45 days after purchased date; (ii) Damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance; (iii) Modification of or to any part of the Product; (iv) Product not compliant with applicable technical regulations; (v) Shipping damage; (vi) Cosmetic damage

OTHER THAN THE EXPRESS WARRANTY ABOVE, FLEX MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

Purchaser's Solution - Flex's sole obligation and purchaser's sole and exclusive remedy shall be that Flex will, at its option, either (i) service, or (ii) replace, any Product determined by Flex to be defective. Flex reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Flex. Proof of purchase is required for all warranty claims. **SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.**

Limitation of Liability - **FLEX SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF FLEX HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.**

Further, in no event shall the liability of Flex exceed the individual price of the Product on which liability is asserted. As Flex has no control over use, setup, assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

Law - These terms are governed by Florida law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. **FLEX RESERVES THE RIGHT TO MODIFY THIS WARRANTY AT ANY TIME WITHOUT PRIOR NOTICE.**

Questions & Assistance - For customer support in your region, visit: <http://www.flexinnovations.com/index.php/reseller-sub>

Inspection or Services - If this Product needs to be inspected or serviced and is compliant in the region you live and use the Product in, please contact your regional Flex authorized reseller. Pack the Product securely using a shipping carton. Please note that original boxes needs to be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Flex is not responsible for merchandise until it arrives and is accepted at our facility.

Warranty Requirements - **For Warranty consideration, you must include your original sales receipt verifying the proof of purchase date.** Provided warranty conditions have been met, your Product will be replaced free of charge. Shipping charges are as follow: to Flex by customer, Flex out it is by Flex. Service or replacement decisions are at the sole discretion of Flex.

COMPLIANCE INFORMATION FOR THE EUROPEAN UNION



Declaration of Conformity (In accordance with ISO/IEC 17050-1)

Product(s): Potenza 60 470Kv Motor
Item Number(s): FPZM1060A

The object of declaration described above is in conformity with the requirements of the specifications listed below, following the provisions of the EMC Directive 2004/108/EC.

EN55022:2010 + AC:2011
EN55024:2010



Instructions for disposal of WEEE by users in the European Union

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collections point for the recycling of waste and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where to drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.