



20-Size Brushless Motors

SPECIFICATIONS

ElectriFly's Ammo brushless motors are designed and produced with high quality, power, precision and efficiency in mind. All 20-size Ammo motors share the same physical size and construction, but differ in kV (rpm per volt...rating of power).

Model	Stock #	Input Voltage	RPM/Volt	Max. Constant Current	Max. Surge Current
20-3600	GPMG5000	7.2 - 12V DC	3,600	10-12 amps	18-20 amps
20-4300	GPMG5005	7.2 - 12V DC	4,300	10-12 amps	18-20 amps
20-5100	GPMG5010	7.2 - 12V DC	5,100	10-12 amps	18-20 amps

- **Motor Diameter and Length:** 20 x 40mm [0.79" x 1.57"]
- **Stainless Steel Output Shaft Diameter and Length:** 2 x 8mm [0.08" x 0.32"]
- **Weight:** 57.7g [2.0 oz.]

INSTRUCTIONS

IMPORTANT PRECAUTIONS

- Do NOT apply an input voltage that exceeds the maximum specification above.
- Do NOT apply currents to the motor that exceeds the maximum specifications above.
- 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.
- Allow the motor to adequately cool if it becomes hot during operation.
- The output shaft will rotate at very high rpm's. 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 connected to the output shaft BEFORE applying power.
- Never attempt to use a damaged motor (having mechanical or electrical defects).

SPECIAL FEATURES

- Ammo brushless motors are "slotless" in design. Compared to cheaper "slotted" brushless motors, this means Ammo motors:
 1. Are lighter-packed with more copper windings and no heavy iron "teeth."
 2. Have a higher power-to-weight ratio.
 3. Have no "cogging" for higher efficiency (up to 87%), meaning longer flight times and less energy is burned off as wasted heat.
 4. Are more expensive to produce, but provide better responsiveness especially at higher speeds and are better suited for 3D maneuvers.

- Ammo brushless motors utilized a patented method for winding the copper strands and packing them inside the motor for even better efficiency. Patent numbers 5,294,855 and 5,197,180.
- Compared to brushed motors, Ammo motors are extremely reliable and virtually maintenance free.
- High precision "ABEC3" ball-bearings are shielded from dirt and debris.
- Very low Rf and electromagnetic interference (EMI), poses less risk to the on-board R/C radio system.
- Very durable, lightweight one-piece machined aircraft grade aluminum can.
- Uses neodymium "rare earth" magnets—the strongest permanent magnets available with one of the highest temperature ratings in R/C at (302°F) 150°C.
- Uses magnet wires with one of the highest temperature ratings in R/C at 392°F (200°C).
- Great for small, fast high performance airplanes, from flat foams to built-up 3D's.
- Can be used for direct-drive or geared applications.
- High performance gold plated bullet connectors included .

COMPATIBLE ESCs

Ammo brushless motors must be controlled with a brushless ESC. And, since Ammo motors are sensorless the ESC must also be compatible with sensorless motors. The "Typhoon 25 Amp" electronic speed control from UltraFly Model is one ESC that works well with Ammo 20-size brushless motors (part number UFLM1330). More information can be found at www.ultraflymodel.com. Do NOT attempt to use Ammo motors with an ESC that is designed for traditional brushed motors as permanent damage will result.

INPUT CONNECTIONS TO ESC

Ammo motors have three input connectors. Connect all three of the motor's input wires to the output wires on the ESC. It is **not necessary** to match up the colors of the wires on the ESC to the wires on the motor. When all motor-ESC connections are complete, make sure the motor connections are not touching each other while power is applied, as permanent damage to the motor/ESC could result. Make sure all input connections are insulated electrically. Installing shrink tubing over each connection is recommended. If the motor operates in the opposite direction as required, switch **any two** of the wires from the ESC to the motor. Do not attempt to cut or remove any of the input wires from the motor as it will likely damage the motor beyond feasible repair.

Gold-plated male bullet connectors are included if you wish to install them onto the motor wires. To solder the bullet connectors onto the motor's wires:

1. Carefully strip back about 3/16" to 1/4" (5 to 6mm) of insulation away from the wire...try not to damage the conductors inside the insulation.
2. Using "60/40 rosin core" electrical solder, tin the bare wire ends with a good quality, hot soldering iron or brazing torch.
3. Gently holding the bullet connector in a bench vise, heat the soldered end of the wire while inserting it inside the open end of the bullet connector. Make sure a solid physical connection is present.
4. Allow the connector to cool. Install a piece of shrink tubing around the base of the bullet connector and shrink with heat. This is to provide electrical protection against the adjacent wires/connectors.

MOUNTING TO GEAR DRIVE OR FIREWALL

Each motor has two different sets of mounting holes as shown in the diagram below. One set of mounting holes is spaced 16.0mm apart, requiring fine threaded machine screws which are 2.5mm in diameter. A second set of mounting holes is spaced 16.8mm apart, requiring screws which are 3.0mm in diameter.

If mounting the motor to a motor-mount, refer to the instruction that are included with the motor mount for proper installation. **Always make sure the motor is mounted firmly to the mounting surface to prevent it from accidentally coming loose when power is applied to the system!**

MAINTENANCE

Ammo brushless motors require virtually NO maintenance. There aren't any brushes to wear out and replace. The "ABEC3" precision bearings have a very long service life and should maintain good operating condition for a very long period of time. The internal parts of the motor should not require any cleaning, and the output wires should not require replacement. If used with a gear drive, the gear drive itself might require addition of lubricating grease after a certain period of time. See the instructions which came with your gear drive for detailed information.

2-YEAR LIMITED WARRANTY - *U.S.A and Canada Only

Great Planes warrants this product to be free from defects in materials and workmanship for a period of two (2) years from the date of purchase. During that period, Great Planes will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt). This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, Great Planes will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may also have other rights, which vary from state to state.

For service on your Great Planes product, warranty or non-warranty, send it post-paid and insured to:

HOBBY SERVICES

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*For warranty and service information if purchased outside the USA or Canada, see the additional warranty information insert (if applicable) or ask your retailer for more information.

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