

# 6 Best Heavy Lift Drone Motors for Sale 2024 (Selection Guide)

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In the rapidly evolving world of unmanned aerial vehicles (UAVs), the demand for heavy lift drone motors has surged, driven by a diverse range of applications from industrial logistics to emergency response.

The key factors in choosing the right heavy lift drone motor include power output, efficiency, and the ability to withstand demanding operational conditions. These elements are crucial in ensuring optimal performance and reliability for a variety of UAV applications.

This guide is crafted to navigate you through the top 6 heavy lift drone motors available in the market, providing a comprehensive overview to assist in making an informed decision for your specific UAV needs.

## What Exactly Are Heavy Lift Drone Motors?



Heavy lift drone motors are specialized electric motors designed to provide the necessary power and torque for lifting and maneuvering heavy payloads in unmanned aerial vehicles (UAVs) and drones. These motors are typically more robust and powerful than standard drone motors, enabling them to handle significant weights, the thrust range would be from a few kilograms to several hundred kilograms.

## Key Characteristics

**Power and Torque:** Heavy lift motors are engineered to deliver high power and torque, essential for lifting heavy loads.

**Size and Weight:** Despite their power, these motors are often designed to be as lightweight and compact as possible to maximize the drone's payload capacity and flight efficiency.

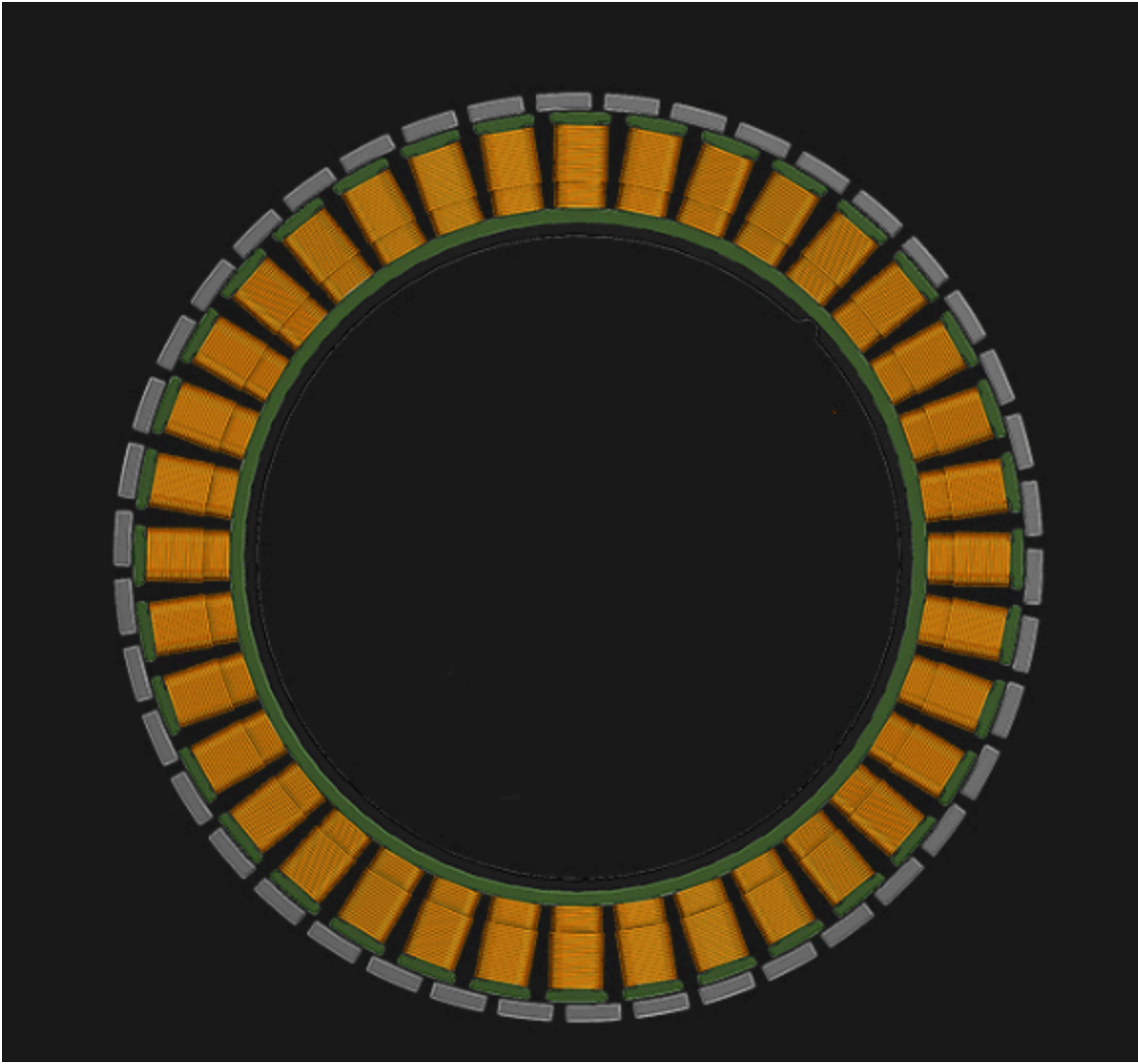
**Durability:** They are built to withstand the rigors of carrying heavy loads, often featuring enhanced durability and resistance to wear and tear.

**Efficiency:** High efficiency is crucial to optimize battery usage and prolong flight times, especially under heavy load conditions.



Heavy lift drone motors are used in various applications, including industrial inspections, aerial photography with heavy camera equipment, agricultural operations, cargo delivery, and emergency response scenarios where carrying substantial payloads is necessary.

## What Types of Heavy Lift Drone Motors Exist?



## Brushless DC Motors

The most common type of motor used in heavy lift drones is the electric brushless DC motor. These motors are preferred for their efficiency over brushed motors. Brushless motors operate using non-contact methods to transfer current, which significantly reduces energy loss through friction. This efficiency is vital for drones that need to carry heavier payloads.

### Key Features of Brushless Motors

**Integrated Cooling Systems:** Many brushless motors incorporate integrated centrifugal fans for enhanced cooling, which is essential for maintaining performance under heavy loads.

**High-Temperature Solid Core Copper Windings:** These windings ensure that the motors can operate efficiently even under high-temperature conditions, which is a common scenario in heavy lift operations.

**Angular-Contact and Radial-Contact Ball Bearings:** These bearings are used to reduce friction and wear, further enhancing the motor's lifespan and reliability.

A significant number of brushless heavy-lift motors utilize an "outrunner" design. In this design, the rotor rotates outside the stator, as opposed to within it. This configuration allows for a greater diameter over which the forces are applied, being further from the center of rotation, and hence generates greater torque. This increased torque is crucial for lifting heavy payloads.

## Counter-Rotating Drone Motors

Some heavy lift drones employ a unique counter-rotating motor setup. This design features a mechanism with a slip ring that captures energy from both the active and reactive force of the spinning motor. The energy from the reactive counter-force, typically absorbed by the non-moving stator and the body of the UAV, is utilized to drive a counter-rotating propeller from the same motor. This results in greater efficiency compared to standard motors, making it a valuable feature for heavy lift drones.

### Key Features of Counter-Rotating Drone Motors

**Energy Capture Mechanism:** This design features a slip ring that captures energy from both the active and reactive forces of the spinning motor.

**Utilization of Reactive Counter-Force:** The energy from the reactive counter-force, typically absorbed by the non-moving stator and the body of the UAV, is used to drive a counter-rotating propeller from the same motor.

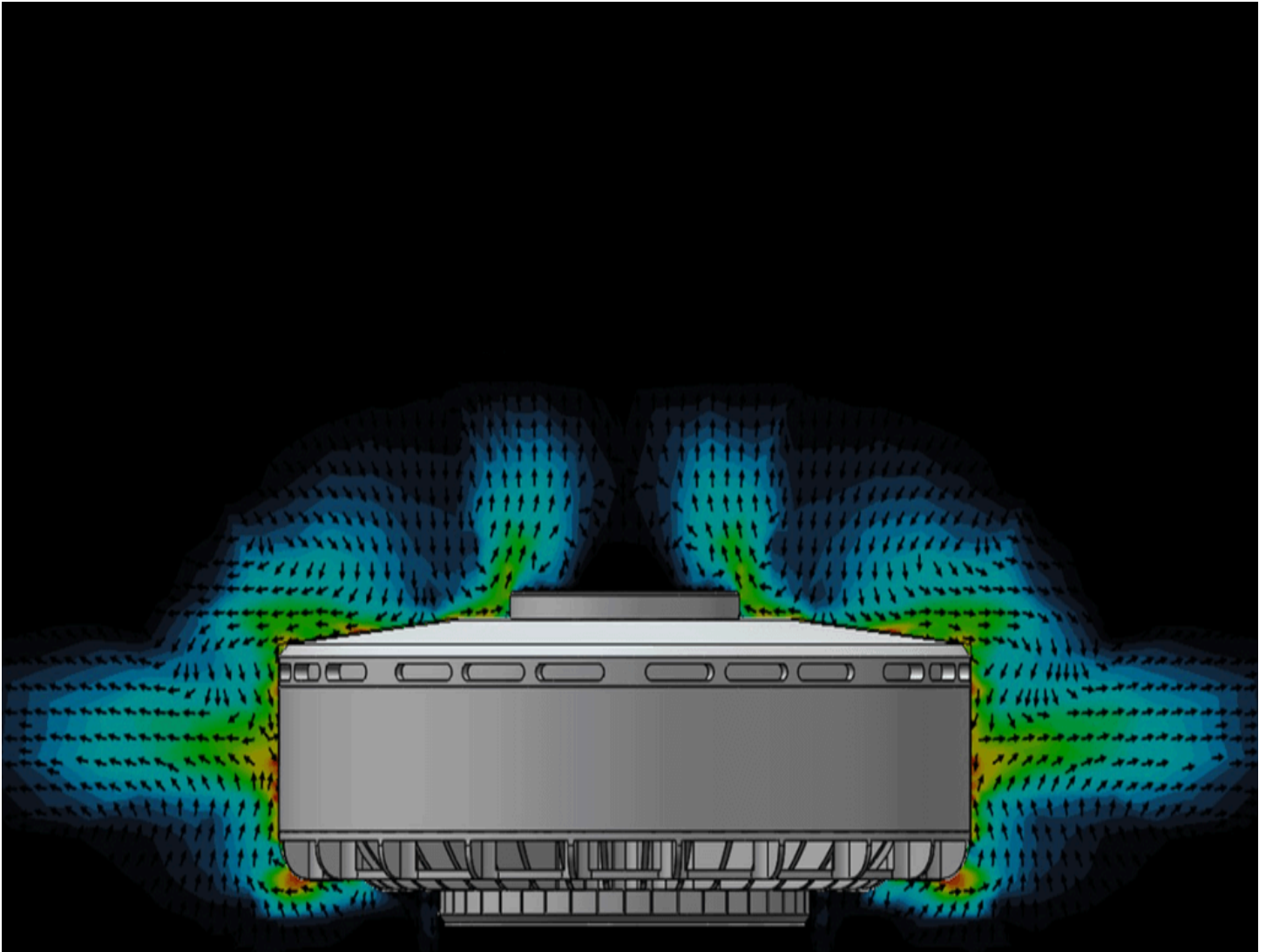
**Increased Efficiency:** This setup results in greater efficiency compared to standard motors, making it a valuable feature for heavy lift drones.

**Enhanced Stability:** Counter-rotating propellers help in reducing the torque effect and increasing the stability of the drone during flight.

These two motor types represent the forefront of technology in heavy lift drone applications, each offering unique advantages in terms of efficiency, power, and operational stability.



# How Do You Choose the Right Heavy Lift Drone Motor?



When selecting a motor for a heavy lift drone, it's crucial to consider several key factors to ensure the drone operates efficiently and effectively. These factors include understanding the power and thrust requirements, the thrust-to-weight ratio, and the appropriate propeller size in relation to the motor. Here's a more detailed look at these considerations:

## Understanding Power and Thrust Requirements

**Power Rating:** The motor's power rating is a critical factor. It's not just about the RPM; the motor must generate enough force to lift significant weights while maintaining the desired speed. For heavy lifting tasks, such as lifting a 100kg weight, calculate the force required in Newtons and then determine the necessary power in Watts. This calculation should consider the efficiency of the lifting mechanism, often leading to the selection of motors with higher power ratings, like 1.5kW.

**Motor Efficiency:** High-efficiency motors are preferred as they provide more power output per unit of energy consumed. This is particularly important for heavy lift drones to maximize flight time and payload capacity.

## Thrust-to-Weight Ratio

**Sufficient Thrust:** Ensure that the motors can produce enough thrust to lift the total weight of the drone and its payload. For a drone designed to lift 50 kg, each motor should ideally lift about 20 kg for good control and safety. This ratio is crucial for the drone's lifting capability and stability.

**Safety Margin:** It's advisable to choose motors that provide a thrust margin above the minimum requirements. This extra thrust can be crucial in challenging conditions or if the drone carries variable payloads.

## Propeller Size and Motor Selection

**Propeller Constraints:** The choice of propeller size is limited by the drone's frame size. For a drone with a 1 square meter frame, each propeller can be approximately 60-70 cm in length.

**Motor Specifications:** When selecting a motor, consider the current draw, thrust, efficiency, and power required. The total thrust should exceed the drone's total loaded weight. Additionally, calculate the power requirements based on the thrust and the radius of the propeller.

**Propeller Compatibility:** Ensure that the chosen motor is compatible with the propeller size and type. The motor-propeller combination should be optimized for the best balance between thrust and efficiency.

## Additional Considerations

**Environmental Factors:** Consider the operating environment of the drone. Motors should be capable of handling the specific challenges of the intended use-case, such as high altitudes or extreme temperatures.

**Durability and Maintenance:** Choose motors known for their durability and ease of maintenance. This is especially important for drones used in commercial or industrial applications where downtime can be costly.

# TOP 6 Heavy Lift Drone Motors for Sale

We have ranked six contenders for the Heavy Lift Drone Motor category, from the lowest to the highest power output. To facilitate easy comparison, we've compiled the data into a convenient table:

Motor	Max. Power	Max. Torque	Max. RPM	Max. Thrust	Weight	Size/Dimensions
T-MOTOR U15II KV80	8580W (180s Continuous)	18 Nm	3546	36.5 kg	1.74kg	Φ147.5*55 mm
T-MOTOR U15L KV43	16KW	32.32 Nm	3134	61.2 kg	3.6kg	Φ151.5*86mm
T-MOTOR U15XXL KV29	28KW	75.28 Nm	2439	102.3kg	5.13kg	Φ151.5*106mm
SUPER-E S150	42KW	136.53 Nm	2703	160kg	9.1/9.05 kg (±0.2 kg)	Φ198mm (±0.5) * 132.5mm (±1)
Plettenberg NOVA 50	50KW	142 Nm	5600	-	11.5kg	Φ225mm*274mm
MGM COMPRO REB 90	80KW	300 Nm	3999	-	23.791kg	Φ270.2mm

**T-MOTOR U15II KV80 - Best Industrial Drone Motor with a Maximum Thrust of 36kg**





Max. Thrust: 36kg

# DREAM BIG

emergency rescue,  
freight transport, manned uav program

Performance brushless motor, specifically designed for heavy-duty applications in the UAV industry. It caters to a range of uses, including freight transport and manned UAV programs. This motor is a testament to T-MOTOR's commitment to providing safe, stable, and reliable solutions for demanding aerial tasks.

## Product Features

**Versatile Applications:** Ideal for emergency rescue, freight transport, and manned UAV programs, demonstrating its versatility in various demanding scenarios.

**High Efficiency:** The motor uses highly efficient magnets for stable output and consistent efficiency, even in harsh environments.

**Durability:** It features a redesigned custom bearing, enhancing the bearing life to 1000 hours under trouble-free operation. The motor is wound with military-grade, high-temperature-resistant enameled wires for superior durability.

**Heat Management:** Equipped with a centrifugal air-cooling system and a built-in array for efficient heat

dissipation, ensuring reliable operation even in high-temperature environments.

**Environmental Resistance:** With an IP33 rating, the motor is dust-resistant and waterproof, making it suitable for operation in challenging weather conditions and environments.

**Dust Prevention:** A new dust prevention network protects the motor from sand, dust, foreign matter, and magnetic particles.

## Main Specifications

**Max. Power:** 8580W (180s Continuous)

**Max. Torque:** 18 Nm

**Max. RPM:** 3546

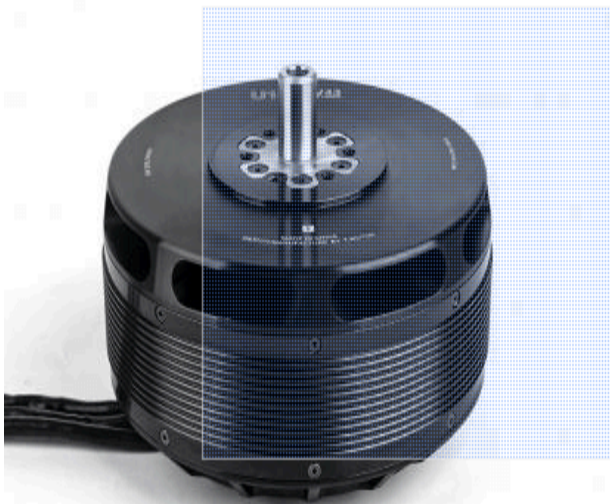
**Max. Thrust:** 36.5 kg

**Weight:** 1.74 kg

**Max Continuous Current 180S:** 14A

The T-MOTOR U15II KV80 motor is designed to offer exceptional performance and reliability, making it a top choice for professionals in the UAV industry seeking a motor that combines power, efficiency, and durability.

## T-MOTOR U15L KV43 - A High-Performance Motor for Heavy-Lift Drones



The T-MOTOR U15L KV43 is a high-end motor designed for heavy-lift drones and UAVs. It is particularly suited for applications in freight transport, emergency rescue, and manned UAV programs. This motor is an upgrade from the T-MOTOR U15II, retaining its core attributes while enhancing overall performance and efficiency.

## Product Features

**Enhanced Power and Efficiency:** The U15L KV43 is engineered to deliver high power and efficiency, making it ideal for demanding applications that require heavy lifting.

**Advanced Cooling System:** Equipped with a sophisticated cooling system to maintain optimal temperatures, enhancing the motor's reliability and lifespan.

**Waterproof and Dust Resistant:** Offers a high level of protection against water and dust, suitable for diverse weather conditions.

**Versatile Applications:** Perfect for heavy-lift drones used in industrial applications, including freight transport, emergency services, and manned UAVs.

## Main Specifications

**Weight (Including Cable):** 3600g

**Motor Dimensions:**  $\Phi 151.5 \times 86\text{mm}$

**Max. Thrust:** 61.231 kg

**Operating Temperature:** Up to 115°C

**Peak Current (120s):** 160A

**Max. Power (120s):** 16KW

**Max. RPM:** 3134

The T-MOTOR U15L KV43 is a testament to T-MOTOR's commitment to providing powerful, reliable, and efficient motors for advanced UAV applications, making it a top choice for professionals in the drone industry.

## T-MOTOR U15XXL KV29 - The Ultimate Motor for High-End Heavy-Lift Drones



The T-MOTOR U15XXL KV29 is a top-tier motor designed for heavy-lift drones, representing an advanced upgrade from the U15II and U15L models. This motor is tailored for high-end applications, including industrial,

commercial, and specialized UAVs, where exceptional lifting capacity and reliability are paramount.

## Product Features

**Superior Lifting Capacity:** Engineered for heavy-duty tasks, the U15XXL KV29 excels in lifting heavy payloads, making it ideal for industrial and commercial drone applications.

**Enhanced Efficiency and Power:** Delivers high efficiency and power output, ensuring optimal performance even under demanding conditions.

**Robust Design:** Built to withstand challenging environments, offering durability and consistent performance.

**Advanced Cooling System:** Features a sophisticated cooling system to maintain optimal operating temperatures, enhancing the motor's reliability and lifespan.

**Versatile Applications:** Perfect for heavy-lift drones used in logistics, emergency services, aerial photography, and other specialized applications.

## Main Specifications

**Weight (Including Cable):** 5130g

**Motor Dimensions:**  $\Phi 6\text{mm}$

**Internal Resistance:** 20m $\Omega$

**Max. Power (120s):** 28KW

**Max. RPM:** 2439

**Max. Thrust:** 102.354 kg

The T-MOTOR U15XXL KV29 sets a new standard in the drone motor industry, offering unparalleled power and efficiency for heavy-lift drones. Its robust design and advanced features make it a top choice for professionals seeking the best in drone motor technology.

## SUPER-E S150 - A Revolution in Heavy-Lift Drone Motors

## 1 Specifications (25°C)

S150			
KV	9.5	Reference Weight	9.05kg (±0.1kg)
Rated Voltage	400V	Diameter	198mm (±0.5mm)
Rated Current	45A	Height	132.5mm (±1mm)
Continuous Power	18KW	Continuous thrust in a propulsion system	90kg
Maximum Power	40KW	Maximal thrust in a propulsion system	150kg
Motor Wire Length	280mm (±10mm)	Temperature Sensor Wire Length	300mm (±30mm)
Temperature Sensor Quantity	2	Temperature Sensor Type	PT1000

The SUPER-E S150 motor is a groundbreaking innovation in the field of heavy-lift drone motors. It is designed to cater to high-end applications, particularly in industrial and commercial sectors, where power, efficiency, and reliability are critical.

### Product Features





**Innovative Cooling Design:** The outrunner air cooling design with a radiant area of  $330000\text{mm}^2$ , equivalent to 5.4 sheets of A4 paper, provides exceptional heat dissipation. This design, coupled with a 24-blade centrifugal fan, ensures airflow is 3-5 times faster than traditional models.

**High Efficiency:** The motor boasts an electromagnetic efficiency of 95%, thanks to the advanced electromagnetic structure accumulated from years of industry application.

**Robust and Reliable:** With its ultra-low thermal resistance conduction path, the S150 significantly reduces heat loss, enhancing overall performance. The motor's design also includes a new dust prevention network, ensuring protection against environmental elements.

**Versatile Applications:** Ideal for various demanding applications, including emergency rescue, freight transport, and manned UAV programs.

## Main Specifications

**KV Rating:** 9.5

**Rated Voltage:** 400V

**Rated Current:** 41.5A

**Continuous Power:** 16.5KW

**Maximum Power:** 42KW

**Motor Wire Length:** 280mm ( $\pm 10$ mm)

**Weight:** 9.1/9.05 kg ( $\pm 0.2$  kg)

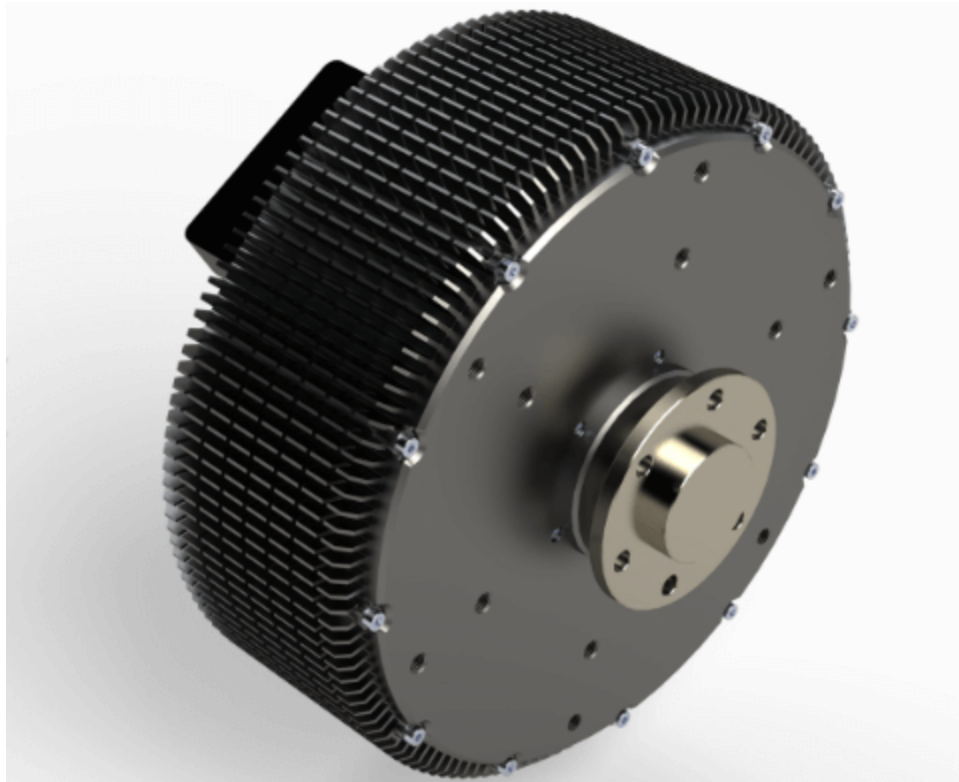
**Continuous Thrust:** 90kg

**Maximum Thrust:** 160kg

**Temperature Sensor Type:** NTC-100K -3950K-1%

The SUPER-E S150 represents a significant leap in drone motor technology, offering unparalleled performance for heavy-lift drones. Its advanced features and robust design make it a top choice for professionals seeking a motor that combines power, efficiency, and reliability.

## Plettenberg NOVA 50 - High Performance Inrunner BLDC Motor



The Plettenberg NOVA 50 is a high-performance inrunner BLDC motor, known for its efficiency and power in a compact form. It is capable of delivering a maximum power of 50 kW and a peak torque of 142 Nm. The motor is designed to operate at a maximum RPM of 5,600, making it suitable for demanding applications in UAVs and other sectors requiring high power in a limited space.

## Product Features

**Robust and Compact:** Ideal for applications where space and weight are critical.

**High Power and Torque:** Delivers significant power and torque, reducing the need for additional gearboxes.

**Versatile and Reliable:** Suitable for a wide range of demanding applications.

**Customizable:** Can be tailored for specific needs, including adjustments in housing, shaft, winding, cooling, and IP rating.

## Key Specifications

**Maximum Power:** 50 kW

**Peak Torque:** 142 Nm

**Maximum RPM:** 5,600

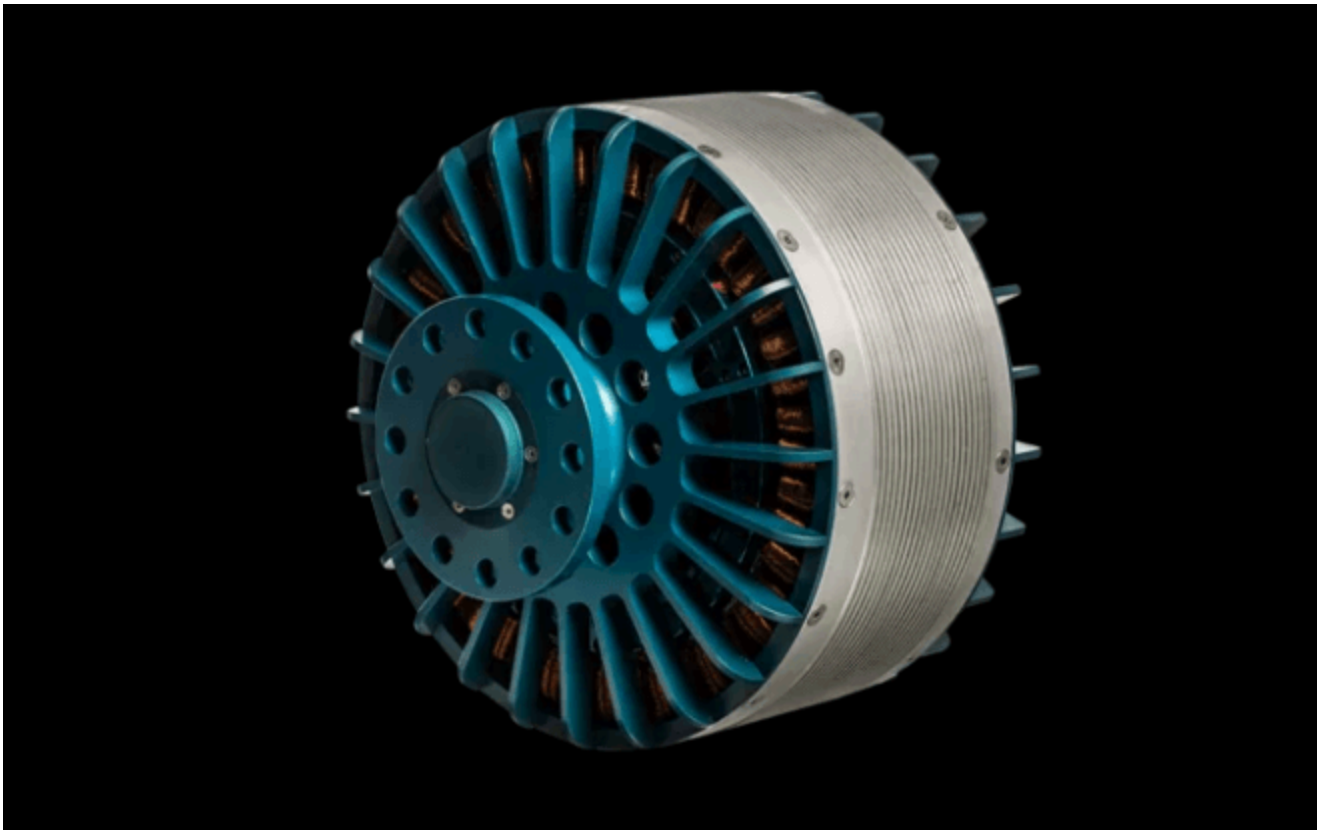
**Weight:** 11.5 kg

**Protection Class:** IP 54 (with options for higher classes)

**Voltage Range:** 250 – 320 V

**Customization:** Available for specific application needs

## MGM COMPRO REB 90 - High Torque Electric Motor for Diverse Applications



The MGM COMPRO REB 90 is a high-performance electric motor, offering a peak power of 80 kW. It is designed for applications where a significant power output is required in a compact and lightweight form. This motor is particularly suitable for a variety of aviation and marine projects, including drones, multi-rotor UAVs, gliders, and even unique applications like airships.

### Product Features

**High Power-to-Weight Ratio:** The REB 90's design focuses on delivering maximum power with minimal weight, making it ideal for applications where space and weight are critical factors.

**Customizable Performance:** The motor offers variable winding and can be either sensored or sensorless, allowing for customization based on specific project requirements.

**Advanced Monitoring:** Features like temperature monitoring and a sensor for absolute position ensure safe and efficient operation.

**Robust and Durable:** Built with proven, high-quality materials, the REB 90 boasts a compact and durable design, suitable for demanding applications.

## Main Specifications

**Peak Power:** 80 kW

**Max Torque:** 300 Nm

**Max RPM:** 3,989

**Weight:** 23.734 kg

**Voltage Range:** 400-800 V

**Cooling:** Air/hybrid (fluid/air) cooling system

**Applications:** Ideal for UAVs, drones, gliders, marine projects, and airships.

# FAQs

## What is the average lifespan of a heavy lift drone motor?

The lifespan of a heavy lift drone motor can vary significantly depending on several factors:

**Motor Quality and Build:** Higher quality motors with robust construction and better materials tend to have longer lifespans.

**Usage and Maintenance:** Regular maintenance and careful usage can extend the life of drone motors. Overloading, frequent high-intensity usage, and lack of maintenance can shorten their lifespan.

**Operating Conditions:** Environmental factors such as temperature, humidity, and exposure to dust or corrosive elements can impact the longevity of the motors.

**Type of Motor:** Brushless motors generally have a longer lifespan compared to brushed motors due to their construction and efficiency.

In general, with proper maintenance and under normal operating conditions, heavy lift drone motors can last for several years. However, it's important to consult specific manufacturer guidelines and consider the operational context for more accurate lifespan estimates.

## How do I calculate the required thrust for heavy lift drone motors?

To calculate the required thrust for heavy lift drone motors, follow these steps:

**Total Weight Calculation:** First, determine the total weight of your drone. This includes the weight of the drone frame, batteries, payload, and any additional equipment..

**Calculate Individual Motor Thrust:** Divide the total required thrust by the number of motors. For example, if your drone weighs 10 kg and you are using four motors, the total required thrust is 20 kg ( $10 \text{ kg} \times 2$  for the 2:1 ratio). Each motor should then provide at least 5 kg of thrust ( $20 \text{ kg total thrust} / 4 \text{ motors}$ ).

**Consider Additional Factors:** Keep in mind that environmental factors such as altitude and temperature can affect motor performance. It may be wise to choose motors with a slightly higher thrust rating than the minimum requirement to account for these variables.

By following these steps, you can calculate the required thrust for each motor on your heavy lift drone, ensuring it has sufficient power to perform as needed.

## Can heavy lift drone motors be used in extreme weather conditions?

Heavy lift drone motors are often designed to withstand a range of extreme weather conditions. However, the extent to which they can operate effectively in such conditions depends on their design, build quality, and specific protective features.

**Temperature Tolerance:** Many high-quality heavy lift drone motors are built to function in both high and low-temperature environments. They often feature advanced cooling systems to manage heat effectively during



operation in hot conditions.

**Water and Dust Resistance:** Motors with higher Ingress Protection (IP) ratings can withstand exposure to elements like dust, sand, and water, making them suitable for use in environments like deserts and rainy conditions.

**Robust Construction:** The materials and construction of the motor play a crucial role. Motors designed with corrosion-resistant materials and protective coatings are more likely to endure harsh weather.

**Manufacturer Specifications:** Always check the manufacturer's specifications for environmental tolerances. Some motors are specifically designed for extreme conditions, while others may have limitations.

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