



## Φ72-20190-220 Brushless DC Motor for Centrifuge

### Product Datasheet

#### Φ72-20190-220 BLDC Overview

- Three Phase, Six Step, Full Wave, Y-Circuit
- Sintered Nd-Fe-B Permanent Magnet Rotor
- Hall Sensor
- Stepless (Coggingless)
- Slot



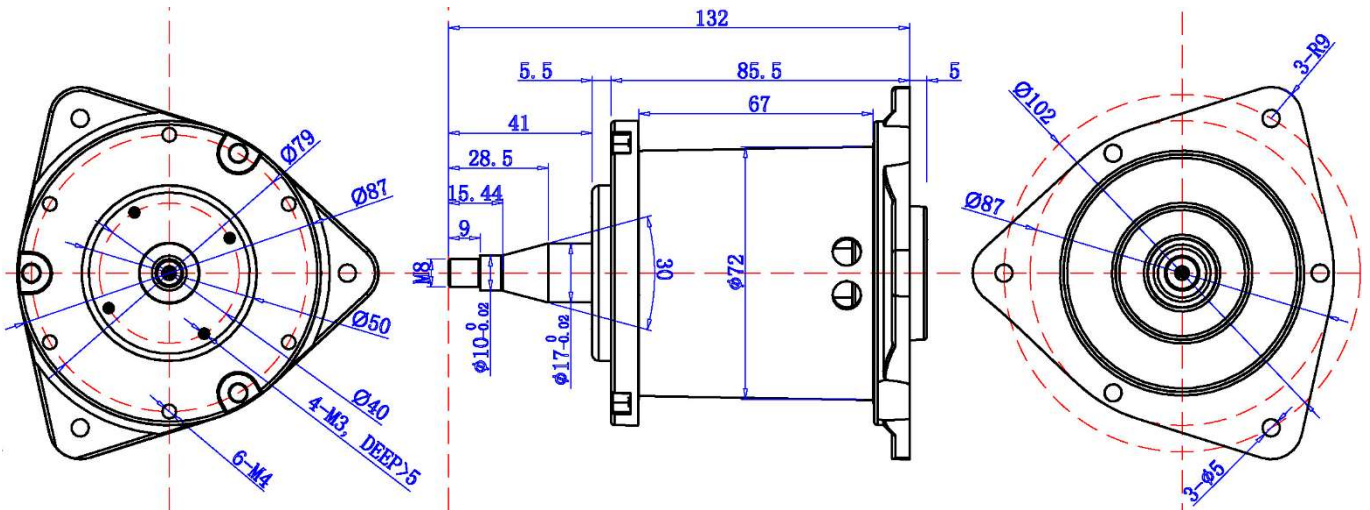
| Parameters                          | Φ72-20190-220 BLDC Absolute Maximum Ratings | Unit |
|-------------------------------------|---|------|
| Rotor/Bearing Broken Speed          | 23000                                       | rpm  |
| Winding and Rotor Temperature       | -20 to +130                                 | °C   |
| Front/Rear Lids Surface Temperature | 0 to 70                                     | °C   |
| HIPOT (Winding to Shell)            | 2000VDC, 1s                                 |      |

**Notice: The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed**

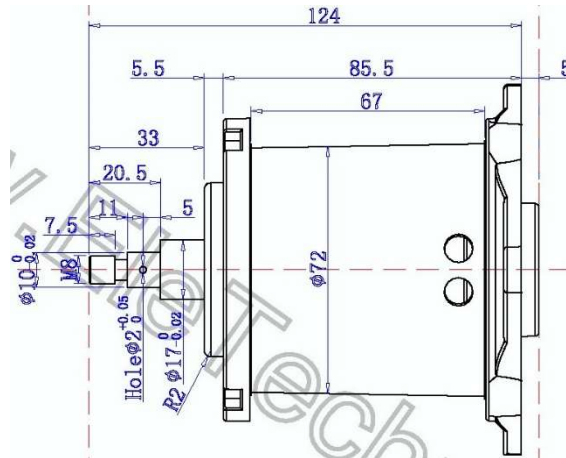
| Parameters                  | Φ72-20190-220 BLDC Intrinsic Characteristics (20°C) |      | Unit   |
|-----------------------------|---|------|--------|
| Resistance (Including Line) | 8   |      | Ohm    |
| Inductance (Including Line) | 19  |      | mH     |
| Speed-Torque Gradient       | 24500   |      | rpm/Nm |
| Torque Constant             | 0.12  |      | Nm/A   |
| Speed Constant              | 95  |      | rpm/V  |
| Back-EMF Constant           | 10  |      | mV/rpm |
| Rotor Magnetic Poles        | 2   |      | Poles  |
| Weight (Including Line)     | Approximate   | 1200 | g      |



## Φ72-20190-220 BLDC Physical Size (Unit: mm)



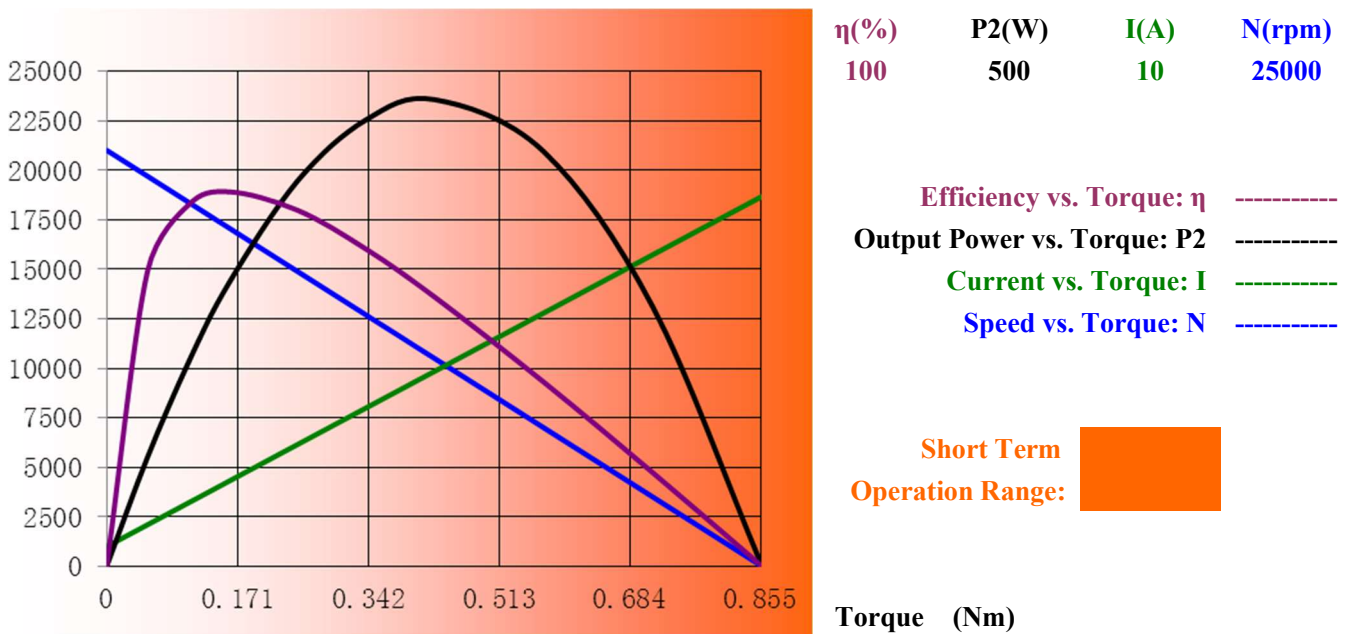
Taper Shaft



Multi-step Shaft

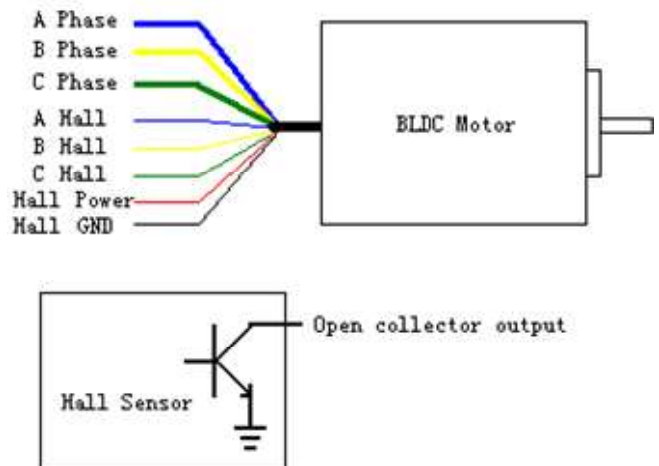


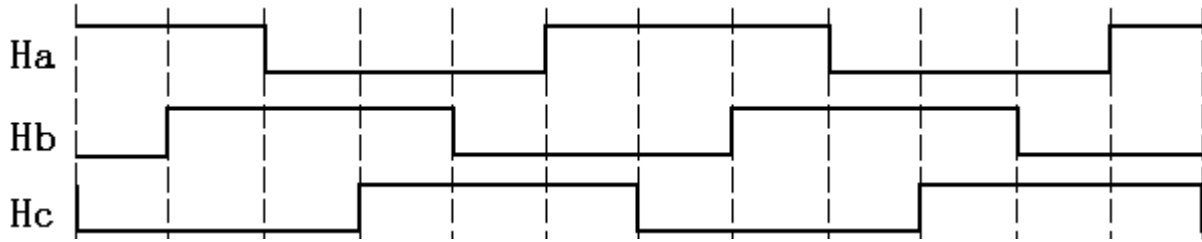
| Parameters                | Φ72-20190-220 BLDC Performance Characteristics (20°C)   |                                |       |       |       | Unit |
|---------------------------|---|--------------------------------|-------|-------|-------|------|
| Nominal Voltage           | 220   |                                |       |       |       | V    |
| Maximum Output Power (P2) | 471   |                                |       |       |       | W    |
| (See Curves Below)        | No Load Point   | Some Loaded Points Performance |       |       |       |      |
| Output Torque (T)         | 0   | 0.1                            | 0.15  | 0.2   | 0.25  | Nm   |
| Output Speed (N)          | 21000   | 18550                          | 17330 | 16100 | 14880 | rpm  |
| Input Current (I)         | 0.40  | 1.23                           | 1.64  | 2.05  | 2.46  | A    |
| Output Power (P2)         | 0   | 194                            | 272   | 337   | 390   | W    |
| Efficiency (η)            | 0   | 72                             | 76    | 75    | 72    | %    |
| Free-convction Cooling    | <u>If the shell temperature of the motor is higher than 85°C, fan or other cooling equipments must be installed. Otherwise the motor may be damaged by hotness.</u> |                                |       |       |       |      |



### Φ72-20190-220 BLDC Connection Diagram and Hall Output Waveforms

- Three Phases: AWG18, Blue thick--A phase, Yellow thick--B phase, Green thick--C phase
- Halls: AWG24, Blue thin--A hall, Yellow thin--B hall, Green thin--C hall, Red thin--Hall power supply, Black thin--Hall GND
- Three Encoder Halls: AWG24, Purple, Gray, White
- Brown: MZ6-105, Positive Temperature Coef. Resistance
- Hall Supply Voltage: 4.5 to 16VDC Regulated Supply
- Hall Power Supply Current: Less than 20mA
- Hall Output: Open collector. Require external pull-up resistors. Maximum output voltage is 16V
- Electrical Hall Sensor Phasing: 120°

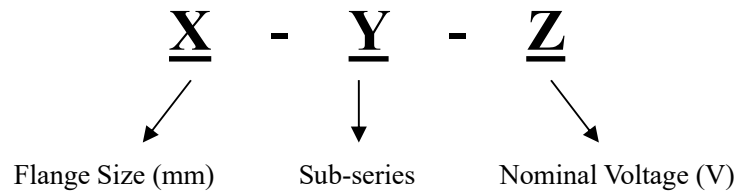




Hall Sensor Output Commutation Waveforms

Notice: The A, B, C three windings and Ha, Hb, Hc three hall sensors must be connected correctly, otherwise the controller and motor may be damaged.

### Eletechnic BLDC Motor Product Code Regulation



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