Assun Motor

Product Manual

For Graphite Brush DC Motor

of

AM-CL2968GAE Series

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Assun Motor Pte Ltd

Shenzhen Zhengyuan Motor Co., Ltd

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1. About the Manual

1.1 Validity of This Document

The manual is for the AM-CL2968GAE series product manufactured by Assun Motor which is a direct current Graphite brush motor. The manual contains detailed descriptions of the safety and functional usage of this motor product series. It helps the user install and connect the motor and also guides the user in relevant control function usage.

All data in this manual are based on the actual manufacturing and standard testing of the AM-CL2968GAE series product. The standard testing condition is when the motor is installed horizontally and subjected to an environment temperature of 25℃.

For relevant parameter summaries of the product series, please go to the required product on our website and download the “Product Sheet”. For customized parameters or dimension, please contact our sales personnel.

1.2 Using This Document

Please read this document carefully before installing and setting up the product and pay attention to the second chapter under “Product Safety”, and strictly follow the warnings and instructions.

Please retain this document throughout the entire working life of the product, and keep the document accessible to the operating and, if necessary, maintenance personnel at all times.

1.3 Definition of Terms

Term	Meaning
PWM	Pulse Width Modulation
CW/CCW	Clockwise/Counter Clockwise
FG Pulse	Frequency Generator Pulse

VIL/VIH	Voltage Input Low / Voltage Input High
Pin	Control Function Connect Pin
Cable	Power Connection Cable
GND	Ground / Negative Pole
Vcc	Direct Current Voltage
RPM	Revolution per Minute

1.4 Definition of Symbols

Caution! Hazard to persons. Disregarding may lead to injury.

Warning! Improper operation will damage the product

. Caution! Hazardous due to hot surface.

2. Product Safety

2.1 Intended Product Usage

The Assun Motor AM-CL2968GAE series DC brushed coreless motor product, which we are describing here in this manual, is used for rotating under a DC supply. It is suitable for different types of DC driving systems, such as automation system actuators and many other precision driving systems. There are no internal electronics in the motor. Metal brushes and commutators work together to achieve current direction change and keep the rotor rotating. Functions such as PWM speed control, CW/CCW direction change, RPM output signal, and Brake and Servo Control (Torque, Speed & Position) can be achieved after connection with a suitable controller and/or encoder.

The product must be properly installed when in use and shall be operated in an environment with good heat dissipation conditions. In normal installation conditions, when the operational parameters have not exceeded the maximum continuous values, the winding temperature must be maintained below 125℃. The product can be used alone or coupled to a gearbox to achieve the required output torque and RPM.

The product is not suitable for operation in environments with high humidity or excessive dust. During the operation, please adhere to the parameter limits as shown in the Product Sheet by adjusting the power supply and running state, to achieve the optimum operational output and longer product life.

For usage of the product in a special environment, please contact our local sales or service staff for consultation and get relevant advice or customized service.

This product is NOT SUITABLE for applications where the failure of the product could result in the death of an individual or group of individuals.

2.2 Product Usage Safety

The product is a high-speed rotating device. Please make sure the product is properly mounted before operation to prevent potential hazards to people or equipment. Please refer to Chapter 4.1 of this manual for further installation guidance.

The motor surface temperature could be high after long-term operation. Please exercise caution when touching or handling the product.

The power supply must be filtered DC. The input voltage must be within the rated value for normal operation. The current cannot be over the rated value continuously to avoid overheating and damaging the motor components.

Please install the motor in an environment with a good heat sink and/or ventilation. Inadequate heat dissipation will lead to the motor winding temperature exceeding the limit of 125℃ and will cause thermal damage to the internal electronic parts and winding, resulting in motor malfunction and/or failure.

Please use the motor according to the parameter limits in the spec, otherwise, it may cause the motor to exceed current limits or overheat, which could lead to irreversible damage to the motor.

The motor is not suitable for operating in highly humid and dusty environments. High humidity or excessive dust concentration could lower the motor's performance and shorten the motor's lifespan.

The product is a precision Brushed DC motor with high-accuracy assembly requirements. Please do not disassemble the product on your own.

2.3 Product Disposal/Recycling

This series of motor products are manufactured with different types of metals, alloy materials, chemical adhesives, and lubricants. Please dispose it properly as recyclable material. For a detailed product material listing please refer to Chapter 3.1.

3. Product Series Information

3.1 Product Series Structure Introduction

AM-CL2968GAE series products are a series of precision DC brushed motors with coreless and self-supporting rotors. The casing diameter is φ29mm, length is 68mm, and rated power is 54.8W -65.2W, with a net weight of approximately 268g. For detailed series information and parameters please refer to the “Product sheet” on our website.

The series product is an inner rotor brushed DC motor, relying on the brushed and commutators to change winding current directions and thus attract the permanent magnetic rotors to rotate in synchronization. The product's basic structure is depicted in illustration 1.

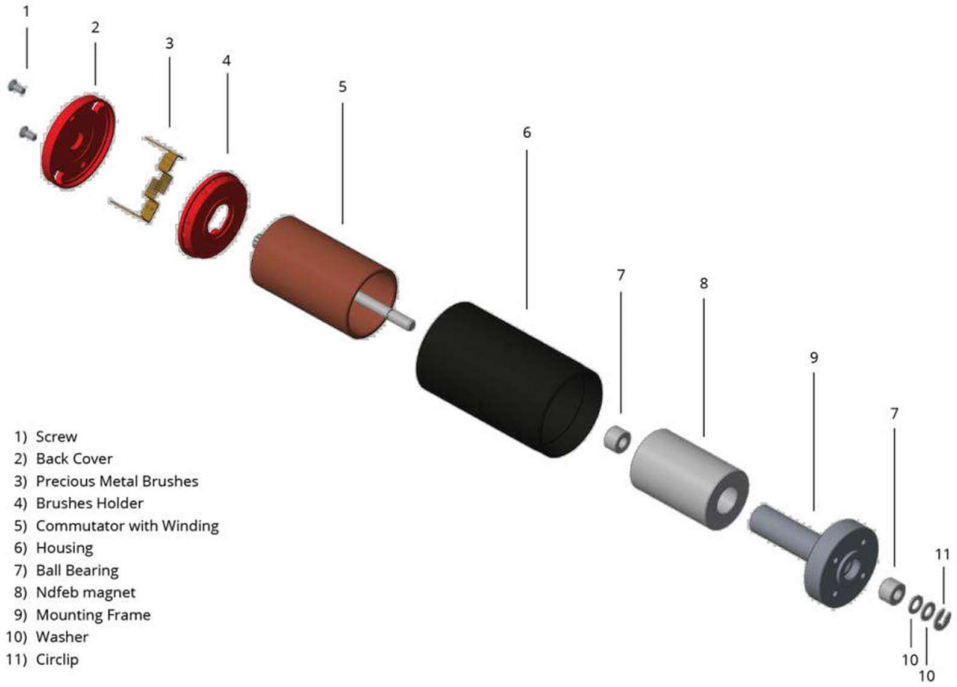

Illustration 1. Exploded Product View

This series of products is manufactured using different types of metal, alloy material, and chemical products. Specific material usage is shown in Table 1.

Table 1. Product Material Matrix

Part	End Cover	Winding	Bearing	Magnet	Shaft	Housing
Material	Stainless Steel	Copper	Stainless Steel	NdFeB	Stainless Steel	Aluminium Alloy
Part	Brush	Commutator	Adhesive	Grease	Cushion	Others
Material	Precious Metal	Copper	Epoxy Resin	Fluorine Grease	Stainless Steel	Other Metal and Plastic

3.2 Product Model Information

To make it convenient for the customer to choose a specific part number or model and understand the part number methodology, please refer to Illustration 2 below for the explanation of the model number composition principle.

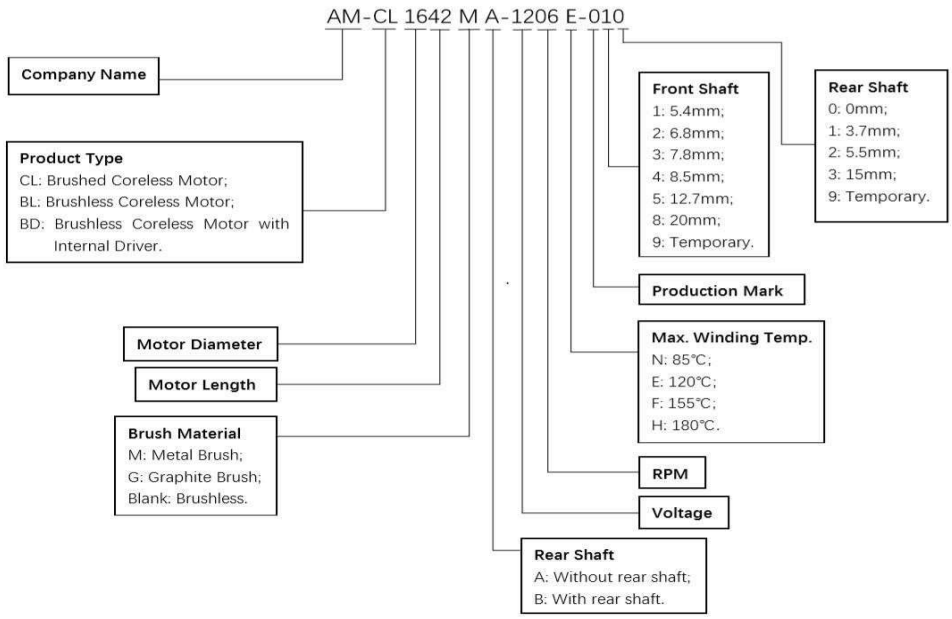

Illustration 2. Part Number Nomenclature

Customers can choose suitable products based on their types and characteristics shown in the part naming methodology. If products with special characteristics are required, please contact our regional salesperson for customized service.

4. Product Function and Usage

The series of products have two power-connecting metal plates at the rear end, connecting to the DC power supply positive and negative. Customers could choose to have a rear shaft or not to have a rear shaft. Rear shaft is needed when the motor is working with the encoder. When an encoder is not needed, the motor usually does not have a rear shaft.

The motor is using ball bearings thus there will be a boss in both the front and back cover. When connecting to a gearbox or encoder, the customer should consider the boss dimension to comply. There are threaded holes on the front/back cover for connection to the gearbox/encoder.

Note: The motor power supply should be connected according to the guidance for the motor to rotate in a Clockwise direction. CW/CCW direction is defined when looking from the front end of the motor. When the power supply is reversed, the motor will rotate in Counter Clockwise direction.

Typically we propose to operate the motor in CW direction.

4.1 Motor Installation and Power Connection

The motor must be properly and securely mounted, typically utilizing the threaded holes in the front cover to fix the motor. It will be proposed to install the motor to metal parts, or installed in well-ventilated environments for better heat dissipation.

⚠ There are two copper plates at the end of the motor and perpendicular to the end cover in default condition, but when installed with an encoder or used in other space-limiting conditions the plates will go sideways. The power cable shall be connected to the copper plates according to the marking on the end cover so that the motor will rotate in the CW direction. If the power supply is reversed, the motor will rotate in the CCW direction. After the motor is installed, double-check the rotating direction. Wrong rotating direction using the wrong cable connection may damage the relevant equipment.

4.2 Motor Functions

When the motor is connected to the controller with the PWM function, the motor speed can be controlled. The percentage of low input voltage is regarded as the duty cycle. The higher the duty cycle, the higher the motor's rotating speed will be. When the duty cycle reaches 100%, the motor reaches its top speed. When the duty cycle is lower than 5%, the motor will stop running.

⚠ Note: Please avoid setting the duty ratio below 5%. When the duty cycle is needed to be lower than 5%, please set it directly to 0%.

When a motor is not connected to the controller with rotation direction control, the motor will be able to rotate in CW/CCW directions manually.

⚠ Note: When the rotating speed is over 100 rpm, please take precautions: do not reverse the motor direction while the motor is rotating! It is highly recommended to stop the motor before reversing the motor rotational direction.

When a motor is connected to a controller with a brake function, the motor will be controlled by the brake accordingly.

⚠ Note: When using the brake function, the motor power supply voltage will rise due to the motor's back EMF adding to the supply voltage. The user shall test and adjust the speed for the motor to start braking based on the specified load condition. To prevent the voltage from going too high when braking, please set the motor to start braking at a lower speed to protect the motor and electronics components.

When the motor is connected to the Servo Controller, control of Speed, Torque, and Position can be achieved. When under servo control, the torque, speed, and power shall not exceed the motor's rated value. If the motor needs to operate beyond the rated value, please contact our company for more detailed information.

5. Maintenance

The product series is maintenance free, please do not disassemble on your own. There are no repairable components inside the motor. Regarding any quality issue or maintenance needs, please contact our regional service person for relevant technical support.

Ignoring this warning will void the warranty.

Contact

Singapore

Tel: +65 6532-5243

Email: info@assunmotor.com

Add: 1092 Lower Delta Road, #06-05, Singapore 169203.

China

Tel: +86 755-8368-8818

Email: info_cn@assunmotor.com

Add: 7th Floor, Blk 6, Yongping Industrial Area, 9 Tongfu Road. Shenzhen, P.R.China.