Assun Motor

Product Manual

For Brushless DC Motor

of

AM-CL3570GAN Series

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Assun Motor Inc.
Assun Motor Pte Ltd

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1. About the Manual

1.1 Validity of This Document

The product manual document here is used for AM-CL3570GAN series product by Assun Motor which is direct current brushless motor with hall sensors. The manual has made detailed description to the safety and functional usage of this motor product series. It helps the professional user to install and connect the motor, and also guide the user in relevant control function usage.

All data in this manual are based on the actual manufacturing and standard testing condition of AM-CL3570GAN series product. Standard testing condition is when the motor installed horizontally and environment temperature is 25℃.

For relevant parameter summaries of the product series, please refer to Appendix 1 “Product Series Parameters”; For specified standard model or customized model, please refer to Appendix 2 “Detailed Product Drawing and Parameter”.

1.2 Using This Document

Please read this document carefully before install and set-up the product. Please pay extra attention to the second chapter “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.

Pass a copy of this document on to any subsequent owner or user of the product.

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. Disregard may lead to injury.

Warning! Improper operation will cause product damage.

Caution! Hazardous due to hot surface. Disregard may lead to burns.

2. Product Safety

2.1 Intended Product Usage

The Assun Motor AM-CL3570GAN series DC brushed coreless motor product, which we are describing here in this manual, are used for rotating power output under rated DC supply. It is suitable for multi-types of DC driving systems, such as automation system actuators and many other precision driving systems. There is no internal electronics in the motor, graphite brushes and commutator cooperate with each other to achieve current direction change and keep the rotor rotating. Functions such as PWM speed control, CW/CCW direction change, RPM output signal, 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 condition, when the operational parameters have not exceeded the maximum continuous values, winding temperature must be maintained below 85℃. The product can be used alone or coupled to a gearbox to achieve ideal output torque and RPM.

The product is not suitable for operation in environments with high humid or excessive dust. During the operation, please follow the parameter limits in the appendices to adjust the power supply and running state, so as to achieve the optimum operational output and longest product lifetime.

For usage of product in special environment, please contact our local sales or service staff for consultancy and get the 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 commencement of operation to prevent potential hazards to people or equipment. Please refer to Chapter 4.1 of this manual for further installation guidance.

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

Power supply must be filtered DC. The input voltage shall be within the rated value for normal operation. Current cannot be over rated value continuously so as to avoid overheating and damaging the motor components.

Please install the motor in an environment with good heat sinking and/or ventilation. Inadequate heat dissipation will lead to the motor winding temperature exceeding the limit of 85℃ 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 appendix, otherwise it may cause the motor to be exceed current limits or overheat, which could lead to irreversible damage to the motor.

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

The product is a precision Brushed DC motor with high accuracy assembly requirements. Please do not personally disassemble the product.

2.3 Product Disposal/Recycling

This series of motor products is manufactured with multiple 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-CL3570GAN series products is a series of precision DC brushed motors with coreless and self-supporting rotor. Case diameter is φ35mm, case length is 70mm, rated power-is 15-40W, with a net weight of approximately 350g. For detailed series information and parameters please refer to Appendix 1.

The series product is 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.

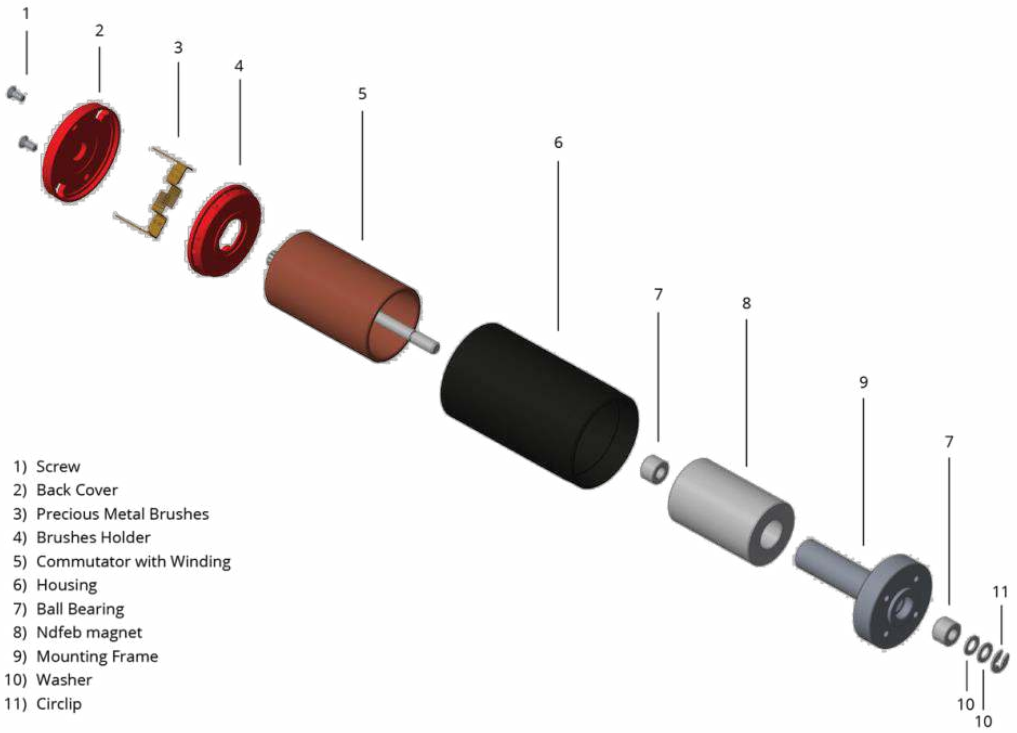

Illustration 1. Exploded Product View

This series of product are manufactured using materials using multi-types of metal, alloy material and chemical products. Specific material usage as 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	Aluminum Alloy
Part	Brush	Commutator	Adhesive	Grease	Cushion	Others
Material	Graphite	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 below in Illustration 2 the explanation for model number composition principle.

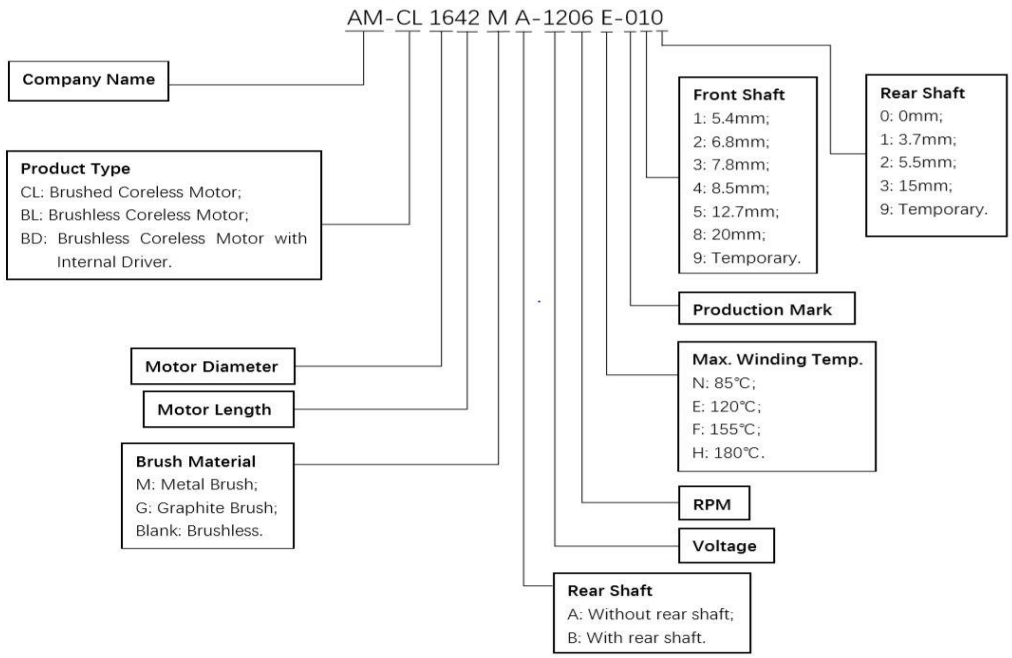

Illustration 2. Part Number Nomenclature

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

4. Product Function and Usage

The series of product have two power connecting metal plates at the rear end, connects to DC power supply positive and negative. Customer could choose to have rear shaft or not. When need to connect to encoder, rear shaft must be needed to cooperate with encoder. When don't need connect with encoder, motor usually don't have rear shaft.

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

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

4.1 Motor Installation and Power Connection

Motor must be properly and securely mounted., typically utilizing the treaded 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 motor and perpendicular to end cover in default condition, but when installed with encoder or used in other space limiting conditions the plates will go sideways. Power cable shall be connected to the copper plates according to the marked guidance on end cover, so motor will rotate in CW direction. If reverse the power supply, motor will rotate CCW. After motor installed, please double check the rotating direction, wrong rotating direction out of wrong cable connection may damage the relevant equipments.

4.2 Motor Functions

When motor connected to the controller with PWM function, the motor speed control could be achieved. The percentage of low input voltage is regarded as the duty cycle. The higher the duty cycle, the higher the motor rotating speed will be. When 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 to set the duty ratio below 5%. When the duty cycle is needed to be lower than 5%, please set it directly to 0%.

When motor is not connected to the controller with rotation direction control, motor will be able to change rotating directions.

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

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

⚠ Note: When use the brake function, motor power supply voltage will rise due to the motor's back EMF adding to the supply voltage. User shall test and adjust the speed for motor to start braking based on the specified load condition. If the voltage goes too high when braking, please set the motor to start braking in a lower speed to protect the motor and electronics.

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

5. Maintenance

The product series is maintenance free, please do not disassemble in person. 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.

Appendix

Appendix 1. Series Product Parameters

Appendix 2. Specified Product Drawing and Parameters

Contact

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