

Hollow Frameless Motor Instruction Manual



Stator: IA-A3BZA/B4BZA/C5BZA/D5BZA

Rotor: IB-A3BZA/B4BZA/C5BZA/D5BZA

Note to Users

Read the safety warnings for proper use of this product.

Mabuchi Motor Co., Ltd. has no liability to indemnity damages, including any malfunction of the motor resulting from failure to follow this instruction manual. The performance, specifications and appearance of this product are subject to change without notice.

- This product consists of a rotor and a stator component for the construction of a brushless motor. To use it as a motor, the customer should select, assemble, and adjust the mechanical parts such as the rotating shaft, the bearings, and the case that holds the stator and rotor.
- This manual is intended for engineers who are experienced with assembling and installing hollow frameless motors.
- Please keep this manual in a safe place so that you can refer to it whenever necessary.
- We have made every effort to ensure that the contents of this manual are correct, but if you have any questions, concerns, or notice any errors, please contact us.
- The description may differ in details due to improvements made to certain parts. If you have any questions, please contact us.

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1 Safety

1.1 Safety Signs



Signal words

The following signal words are used to indicate the level of harm or damage that may be caused by improper use as a result of ignoring the instruction.


 WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or property damage.

Explanation of graphic symbols

The following symbols are used to indicate specific types of actions.

	Indicates prohibited actions.
	Indicates mandatory actions.

The following symbol is used to indicate useful information for operating the product.

	Useful information about handling the product.
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1.2 Safety Precautions

1.2.1 Common precautions



WARNING

- Those wearing medical devices such as cardiac pacemakers must maintain a certain distance from the rotor to ensure their safety. Such medical devices may malfunction and impact health.
- Do not make any modifications to this product. We do not guarantee the characteristics, quality, or safety if the product is modified in any way.
- Do not use in atmospheres with the presence of corrosive or flammable gas(es), or near combustible materials. It may cause fire, injury, or equipment damage.



CAUTION

- If the product is to be stored for a long period of time, keep it in the proper packaging. If the product is stored in an unpacked state, it may not be able to function to full performance specifications.
 - This product is intended for general use. This product cannot be used for special applications such as medical, military, aerospace, or for in-vehicle equipment.
 - A strong magnetic field is generated near this product. Keep objects that are sensitive to magnetic fields, such as watches, credit cards, assembly tools, or other metallic objects, away from the product.
 - Keep precision electronic equipment away from this product. Strong magnetic fields may adversely affect precision electronic equipment.
 - When disposing of this product, please dispose of it according to the laws and regulations and the instructions of the local authority.
 - Do not bring the products close to each other or to ferromagnetic materials such as iron. The permanent magnets used in this product have a strong attractive force. Doing so may result in product damage or injury.
 - The rotor and stator are not waterproof. Observe the storage and installation conditions described in this manual.
 - It is the responsibility of the purchaser to confirm and assure the proper matching, installation and reliability of the product in the application along with confirming the service life and carrying out necessary quality assurance. Examples of items to confirm when configuring:
Applicable laws, standards, service life, various electrical characteristics, mechanical characteristics, mechanical/electrical noise, environmental exposure, etc.
 - Avoid storing this product in hot and humid places and in the presence of corrosive gases. The recommended environment is +10 to +20°C and 30 to 60% relative humidity.
 - Agents used for fumigation can contaminate metal components. When fumigating the packaging of this product or products containing this product (e.g. pallets), do not expose the motor to the fumigant and its gases.
-

1.2.2 Precautions for assembly and installation



WARNING

- Do not plug the motor power cable or motor terminal into a household electrical outlet. It may cause electric shock, injury, or damage to equipment.



CAUTION

- Assembly, wiring and inspection of this product must be performed by an engineer with specialized knowledge of the target equipment or by a trained operator.
- Do not touch the steel plate with unprotected/bare hands. There is a risk of injury from sharp edges on the steel plate.
- Do not apply excessive force when assembling the stator and rotor. Doing so may adversely affect the motor functionality and characteristics.
- Startability and rotational stability may be affected depending on the internal resistance and capacity of the motor drive power supply (including circuits). Also, check the actual operating conditions not only at room temperature but also at low and high temperatures.
- When using lead wires, switches, relays, controllers, etc., give due consideration to electrical capacity and heat resistance. Failure to comply with the appropriate standards may cause equipment damage such as burning.
- This product is assembled into a brushless motor. It cannot be used by directly connecting to an AC power supply or battery power supply. Be sure to connect a dedicated brushless motor controller compatible with this product between the power supply and the motor.
- Use the combination of stator and rotor specified by our company. If the combination part numbers listed in "1.3 Product Assembly Precautions" are different, correct assembly will not be possible and the specified characteristics and reliability cannot be guaranteed.
- Do not apply excessive force (excessive bending, pulling, or pinching) to the motor power cable or motor terminals. Do not move or transport the motor by pulling the motor power cable. Doing so may result in fire, electric shock, or product damage.

1.2.3 Cautions when operating



WARNING

- Do not touch live parts such as live terminals while the power is on. There is a risk of electric shock.
- Do not enter the working range of the product while in operation. Also, do not touch any moving parts of the motor or product. Doing so may result in injury.
- Be careful not to fix (lock) the rotor or output shaft while the product (stator) is powered. There is a danger of burning out even if the lock is held for a short time.
- Do not touch the hot motor. Depending on the operating conditions of the motor (mounting condition, load, environmental temperature), heat generation may increase, and cause burns.
- If an abnormality occurs, immediately turn off the power and discontinue use of the product.



CAUTION

- Using the output shaft with an excessive load may shorten product life. Please handle with care.
- Do not apply excessive pressure on or to the motor output shaft. It may cause equipment damage.
- The ambient temperature (motor temperature) when the motor is in use affects its performance and life. Be especially careful when ambient conditions are hot and humid.
- Please note that the temperature of the main unit will rise while the motor is rotating or immediately after stopping.
- Never disconnect the motor terminals while the motor is running. Also, be sure to turn off the power before inserting or removing the motor. It may cause equipment damage.

1.3 Product Assembly Precautions

Use the combination of stator and rotor as specified below.

Assembly part number				
Stator part number:	IA-A3BZA	IA-B4BZA	IA-C5BZA	IA-D5BZA
Rotor part number:	IB-A3BZA	IB-B4BZA	IB-C5BZA	IB-D5BZA

1.4 Storage and Precautions

In order to maximize the performance of this product, store it in a place that satisfies the following conditions and keep it in an appropriately packaged state.



It is recommended that this product be stored in its original packaging until use.
The product may rust if left out in the open unpacked.

Temperature and Humidity

- Temperature: +10 to +20°C
- Relative humidity: 30% to 60% (with no condensation)

Ambient conditions

Store in a location that meets the following conditions.

- A place free of corrosive gas, flammable gas, and oil mist
- Places that are not hot or humid
- Places not exposed to water droplets or oil
- Places away from combustible materials
- Places where there are no noise radiation sources such as nearby high-frequency furnaces
- Places not directly exposed to air from air conditioners, etc.
- Places not exposed to direct sunlight

2 Overview

2.1 Product Summary

The "IA/IB Series" are hollow frameless motors suitable for powering robot arms. The product lineup features four variants, enabling you to select one with the optimum size and output for your needs.

2.2 Product Features

- Light weight due to the frameless structure
It can be installed as a module directly in the housing.
Adopting a frameless structure contributes to making equipment lighter and more compact.
- The hollow structure allows motor power cables and tubes to pass through
A through hole is provided in the center, which improves the convenience of wiring inside the equipment and contributes to reduced wiring.
- Low cogging torque motor for high controllability
The low cogging torque magnetic circuit design achieves high controllability.
- Highly efficient design with reduced energy loss
The high-efficiency magnetic circuit design reduces energy loss even when used for long periods of time, contributing to energy savings.
- A lineup designed to meet diverse needs
We have a lineup of four types that allows you to select the optimum diameter and output.

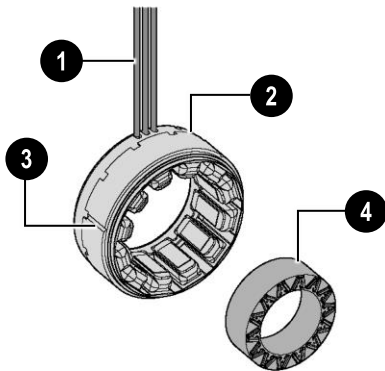
2.3 Scope of Application

This product is intended for general use.

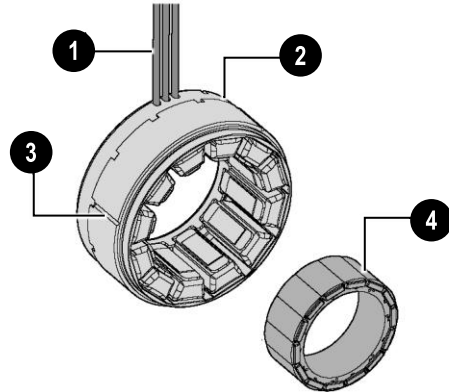
This product cannot be used for special applications such as medical, military, aerospace, or for in-vehicle equipment.

3 Parts Description

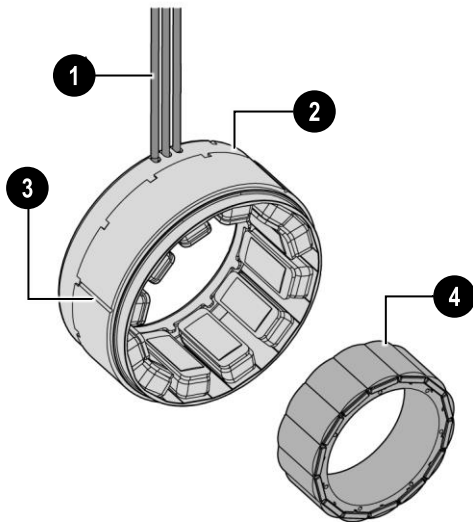
IA-A3BZA / IB-A3BZA



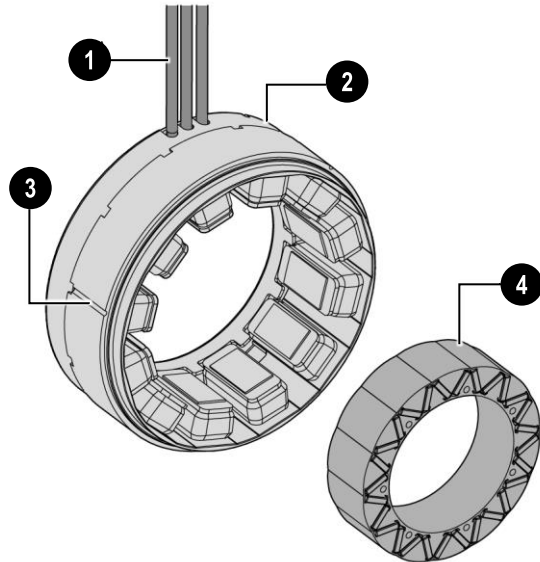
IA-B4BZA / IB-B4BZA



IA-C5BZA / IB-C5BZA



IA-D5BZA / IB-D5BZA



Number	Name	Function/Remarks
1	Motor power cable	Connect to the controller (prepared by the customer).
2	Stator	It is used by fixing it to the housing (prepared by the customer).
3	Anti-rotation groove	Used for mechanical detent.
4	Rotor	Used by fixing to the shaft (prepared by the customer).

4 Installation

4.1 Preparation



It is recommended that this product be stored in its original packaging until use.
The product may rust if left out in the open unpacked.

Check for any signs of damage.

If the product is damaged, please contact us or your dealer.

Unpacking the stator

Observe the following precautions when unpacking the stator.

- 1) Please wear gloves.



Do not touch the steel plate with unprotected/bare hands.
Touching the steel plate with bare hands may cause rust.



Do not use fabric gloves that are easy to fray.
Frayed fibers may get caught on the burr of the steel plate and cause problems.

- 2) Remove the stator from the box and place it away separately from the rotor.



If the stator is placed close to the rotor, the rotor may be pulled in and damaged.

- 3) Check the stator for any signs of damage.



We recommend that you return the product to its original packaging as soon as possible after inspection.

Unpacking the rotor

Observe the following precautions when unpacking the rotor.



Those wearing medical devices such as cardiac pacemakers must maintain a certain distance from the rotor to ensure their safety. Such medical devices may malfunction and impact health.

<Precautions>

- Keep magnetic cards and precision electronic equipment away from the rotor. The magnetic force of the rotor may destroy data or damage equipment.
- Maintain a safe distance so that the rotors do not attract and bind together. If the rotors are allowed to bind together, they may be damaged, affecting their performance.
- Make sure not to bring the removed rotor in proximity to any source of magnetism or magnetic materials. If any magnetic material adheres to the rotor, the rotor may be damaged, affecting its performance.

<Unpacking procedure>

- 1) Please wear gloves.



Do not touch the steel plate with unprotected/bare hands. Touching the steel plate with bare hands may cause rust.



Do not touch the steel plate with unprotected/bare hands. Touching the steel plate with bare hands may cause rust.

- 2) Remove the rotor from the box and place it away separately from the stator and other rotors.



If the rotor is placed near the stator or other rotors, the rotor may be pulled in and damaged.

- 3) Check the rotor for any signs of damage.



We recommend that you return the product to its original packaging as soon as possible after inspection.

4.2 Product Assembly



Use the combination of stator and rotor as specified in Section 1.3. The use of any unauthorized parts in the assembly may result in fire, injury, or damage to the product.



Do not plug the motor power cable and terminal into the outlet. There is a risk of electric shock, injury, or damage to the product.



Do not forcibly bend, pull or pinch the motor power cable. Fire, electric shock, or damage to the product may result.

4.2.1 Assembly example of housing (enclosure) and stator

Fix the stator firmly so that it does not detach from the housing during operation. Here are three examples of typical housing and stator assembly patterns.

Example 1: Fixing the stator by fastening force (bolt tightening) between the housing and the endbell (P.12)

Example 2: Fixing the stator to the housing with an adhesive (P.13)

Example 3: Fixing the stator to the housing by shrink fitting (P.14)

Example 1: Fixing the stator by fastening force between the housing and the endbell

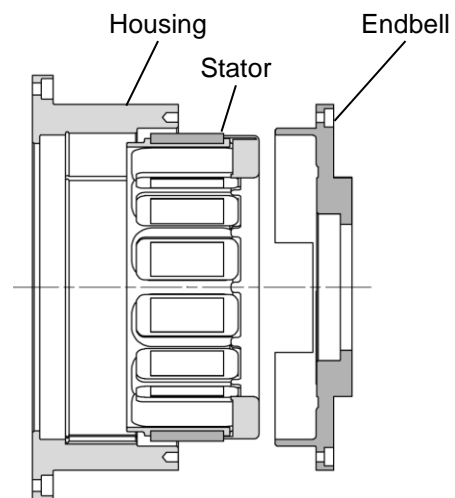
<Assembly procedure>

- 1) Confirm there is no dirt or debris contaminating the product.
- 2) Install the stator in the housing.



Adjust the position and insert so that the anti-rotation groove is engaged with the housing.

- 3) Attach the endbell to the housing and tighten with bolts.



Example 2: Fixing the stator to the housing with an adhesive

If the temperature rises when using adhesive, do not exceed the heat resistance temperature of the winding (155°C). Also, select an appropriate adhesive and fit tolerance to meet the strength required for fixing.

<Recommended fit tolerances>

- Housing: H8

<Assembly procedure>

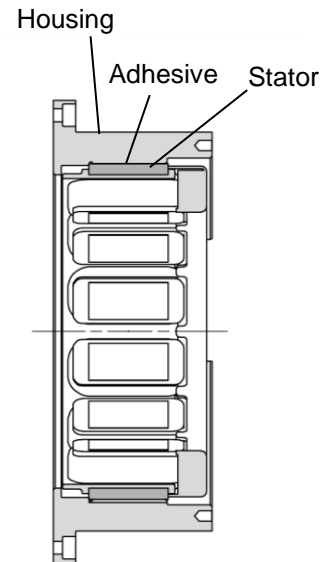
- 1) Confirm that there is no dirt or debris contaminating the product.
- 2) Clean the adhesive coated surfaces of the stator and housing.
- 3) Apply adhesive evenly to the outer circumference of the stator.
- 4) Install the stator in the housing.
- 5) Wipe away any excess adhesive.



Cover the housing to prevent dust and foreign matter from adhering to it.



After bonding, do not use the stator until the stator is completely fixed.



Example 3: Fixing the stator to the housing by shrink fitting

<Prerequisites>

Make sure the housing meets the following conditions:

- The housing has a thickness* that corresponds to the torque.
 - * The housing receives torque from the stator. A thicker housing can receive more torque.
- The housing has suitable surface roughness for shrink fit fixing.

<Assembly procedure>

- 1) Confirm there is no dirt or debris contaminating the product.
- 2) Use a high-frequency coil to heat the housing up to the shrink fitting design temperature.

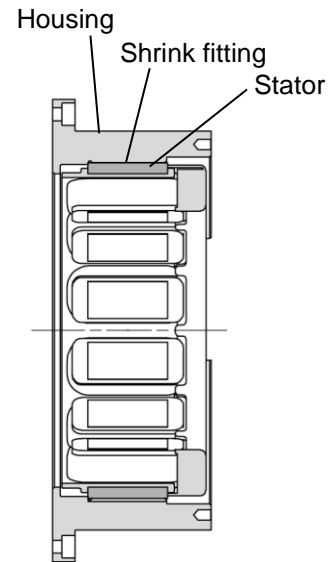


Different housing materials have different coefficients of thermal expansion (CTE).

- 3) Install the stator.



Do not use the stator until the stator is completely fixed by cooling.



4.2.2 Assembly example of shaft and rotor

Here are two typical assembly examples of shafts and rotors.

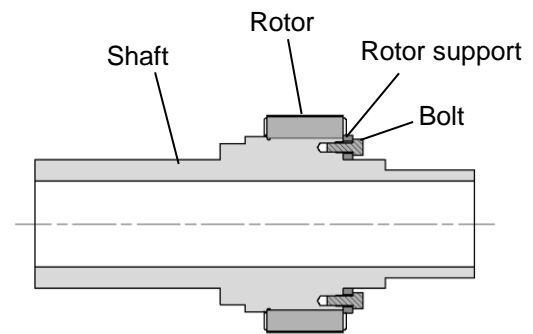
Example 1: Fixing the rotor by fastening force (bolt tightening) between the shaft and the rotor support

Example 2: Fixing the rotor to the shaft with an adhesive

Example 1: Fixing the rotor by fastening force between the shaft and the rotor support

<Assembly procedure>

- 1) Confirm there is no dirt or debris contaminating the product.
- 2) Install the rotor on the shaft.
- 3) Install the rotor support on the shaft.
- 4) Fix the rotor by tightening the rotor support with bolts.



Example 2: Fixing to the shaft with adhesive

If the temperature rises when using adhesive, do not exceed the heat resistance temperature of the winding (155°C).

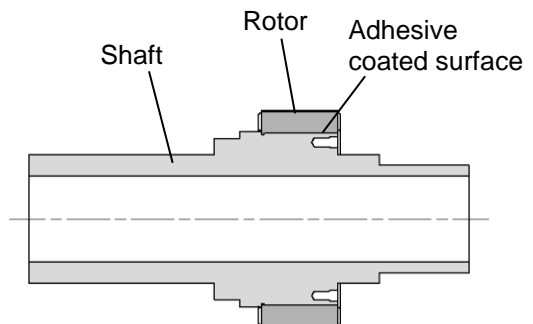
Also, select an appropriate adhesive and fit tolerance to meet the strength required for fixing.

<Recommended fit tolerances>

- Shaft; H7

<Assembly procedure>

- 1) Confirm that there is no dirt or debris contaminating the product.
- 2) Clean the adhesive surfaces of the rotor and shaft.
- 3) Apply adhesive evenly around the outer circumference of the shaft.
- 4) Install the rotor on the shaft.
- 5) Wipe away any excess adhesive.



Cover the shaft to prevent dust and foreign matter from adhering to it.



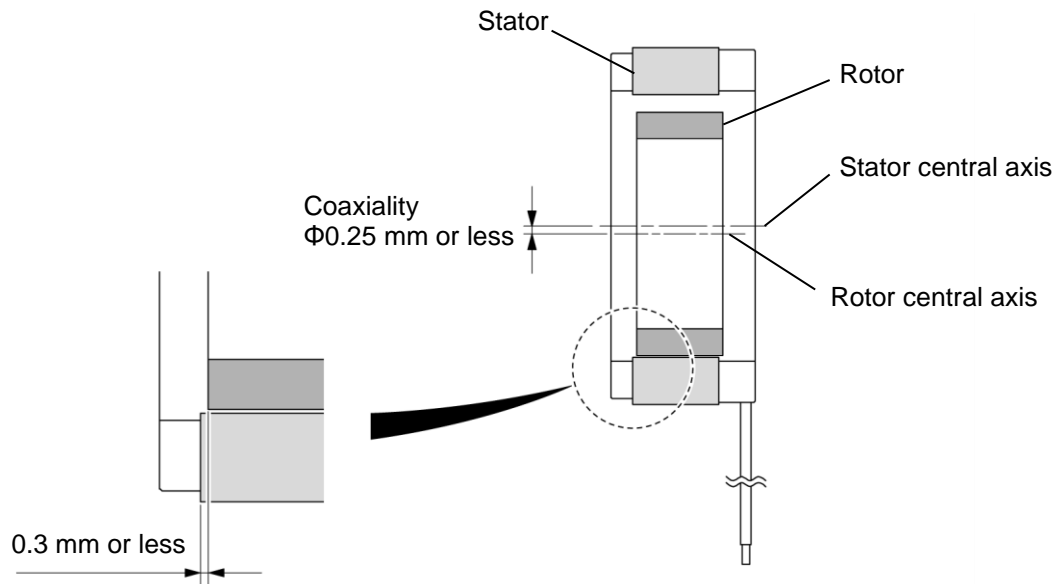
After bonding, do not use the rotor until the rotor is completely fixed.

4.2.3 Positioning of stator and rotor

In order for this product to operate smoothly, assemble the stator and rotor with the following accuracy.

<Positioning Accuracy>

- Axial: Stator and rotor end face 0.3 mm or less
- Radial: Coaxiality of stator outer diameter and rotor inner diameter $\Phi 0.25$ mm or less



4.2.4 Assembly example of stator and rotor



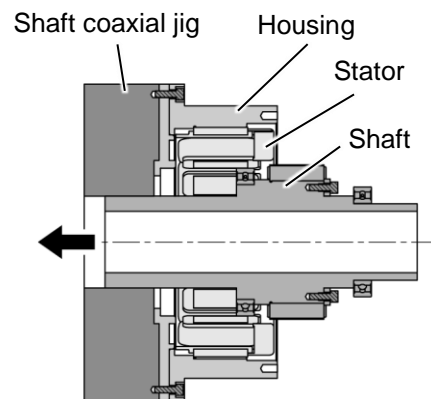
Prepare a jig that supports the shaft so that the rotor can be coaxial with the stator while assembling (hereinafter referred to as shaft coaxial jig), and use it to assemble.
If a shaft coaxial jig is not used, the product may be damaged.

- 1) Confirm that there is no dirt or foreign debris contaminating the product.
- 2) Attach the shaft coaxial jig to the housing.

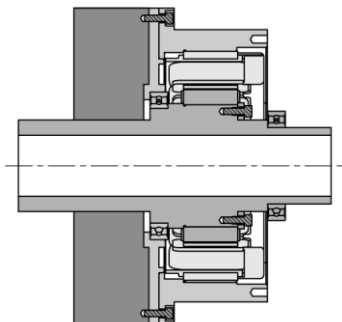


Be careful not to pinch the motor power cable when installing.

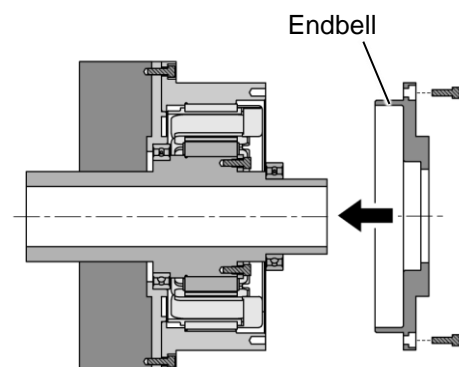
- 3) Insert the shaft into the shaft coaxial jig.



- 4) Insert the shaft until the rotor is completely inside the stator.
- 5) Adjust the position of the stator and rotor. (4.2.3)

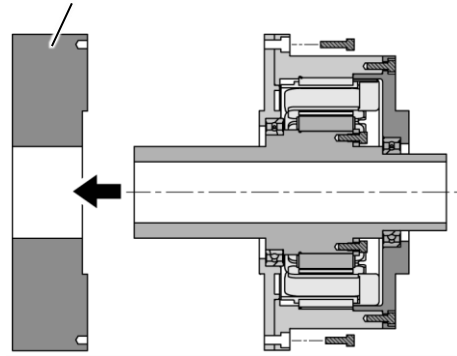


- 6) Attach the endbell.



7) Remove the shaft coaxial jig.

Shaft coaxial jig



5 Installation and Connection

This section describes how to connect this product and the controller.



Pay attention to the following when handling the motor terminals and motor power cable. There is a risk of fire or electric shock.

1. Do not forcibly connect or disconnect the motor terminals.
 2. Do not forcibly bend or pinch the motor power cable.
 3. Do not pull the motor power cable forcibly.
-

5.1 Installation Environment

In order to ensure safety in use and to fully demonstrate the performance of this product, please install it in a location that satisfies the following conditions.

Power Supply

- Voltage: 15 to 55 V
Please contact us if you use the product outside the above range.

Temperature and Humidity

- Temperature: -10 to 50°C
- Relative humidity: 20% to 60% RH (with no condensation)

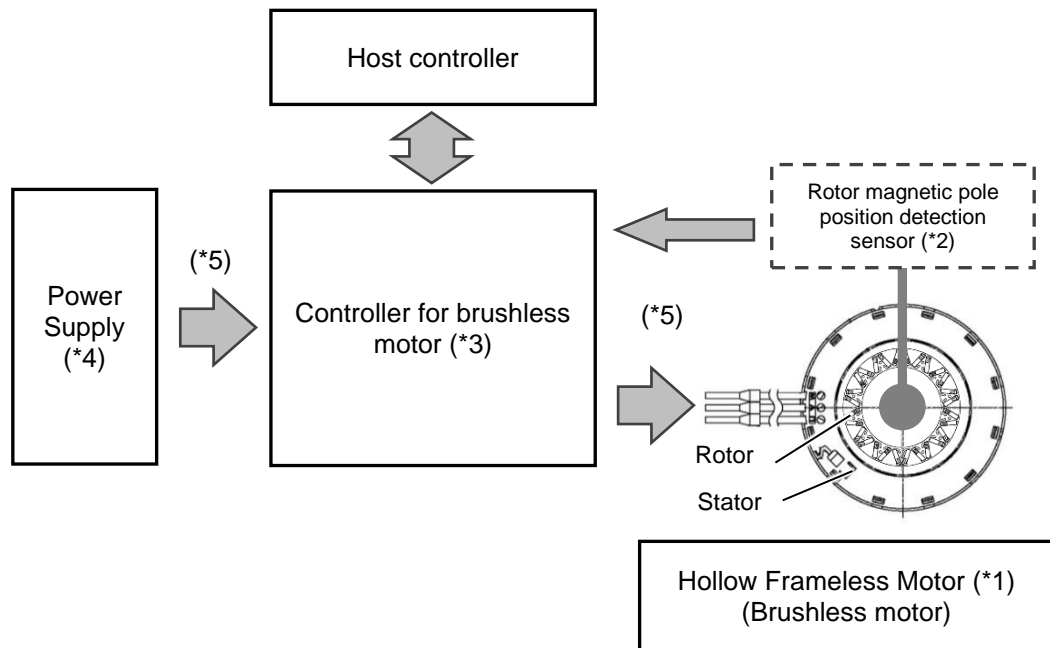
Ambient Conditions

Set up in a location that meets the following conditions.

- Places free of volatile, flammable, corrosive gases and liquids
- Places that are not hot or humid
- Places not exposed to water droplets or oil
- Places away from combustible materials
- Places where there are no noise radiation sources such as nearby high-frequency furnaces

5.2 Connection

Configuration example of brushless motor drive system



*1: The rotor and stator (hollow frameless motor) is shown in a conceptual drawing. Parts other than the rotor and stator are not included. To use the product as a motor, the customer should select, assemble, and adjust the mechanical parts such as the rotating shaft, the bearings, and the case that holds the stator and rotor.



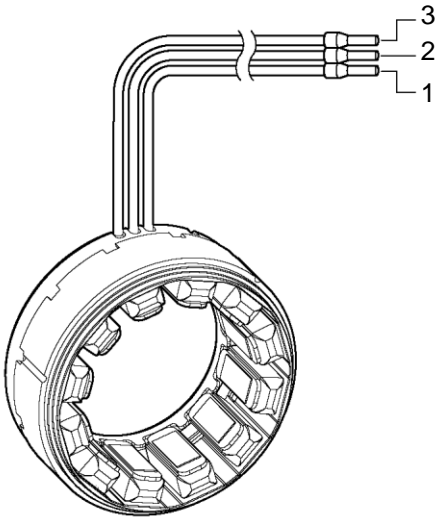
*2: Install a rotor magnetic pole position detection sensor (Hall sensor, etc.) if necessary.

*3: Use a brushless motor controller compatible with the brushless motor.

*4: Use a power supply that can supply sufficient power to the brushless motor and controller.

*5: Make sure that the current capacity of the power cable and motor power cable has sufficient margin.

5.3 Motor Power Cable Specifications



ID	Signal name	Function	Line color
1	Motor: U phase	Motor power supply	Red
2	Motor: V phase		Blue
3	Motor: W phase		Black

Stator	Lead wire specification	Cable length (Reference value) (mm)	Terminal type (Manufacturer)
IA-A3BZA	AWG#18 UL Style 3266	200	AI 1-10 RD (Phoenix Contact)
IA-B4BZA	AWG#16 UL Style 3266	200	AI 1.5-10 BK (Phoenix Contact)
IA-C5BZA	AWG#14 UL Style 3266	200	AI 2.5-10 BU (Phoenix Contact)
IA-D5BZA	AWG#10 UL Style 3266	200	AI 6-18 YE (Phoenix Contact)

6 Troubleshooting

Incorrect connection may cause the motor to malfunction.

If the motor is not operating normally, refer to this chapter and take appropriate measures.

6.1 Motor does not run

No.	Cause	Possible solution
1	Power is not connected properly	Check the power connection.
2	Poor power connection	Check the power connection.
3	Motor terminals are not connected properly	Check the connection and input status.
4	Not using the correct controller	We do not have a dedicated controller, so please select and use an appropriate controller yourself.

6.2 Motor rotates in opposite direction

No.	Cause	Possible solution	Reference
1	Incorrect connection of motor terminals	Check motor terminal connections.	5.2 5.3

6.3 Unstable operation, large vibration

No.	Cause	Possible solution	Reference
1	Improperly assembled stator and rotor	Assemble the stator and rotor correctly.	4.2.3

7 Specifications

7.1 Product Specifications

Type		IA-A3BZA/ IB-A3BZA	IA-B4BZA/ IB-B4BZA	IA-C5BZA/ IB-C5BZA	IA-D5BZA/ IB-D5BZA
Mechanical properties	Stator outer diameter	Φ60.0 mm	Φ75.0 mm	Φ90.0 mm	Φ120.0 mm
	Hollow diameter	Φ26.0 mm	Φ35.0 mm	Φ48.0 mm	Φ55.0 mm
	Stator length	24.5 mm	31.8 mm	39.4 mm	44.9 mm
	Rotor length	12.95 mm	16.8 mm	21.35 mm	22.4 mm
	Weight (for reference)	190 g	360 g	600 g	1,350 g
	Cable length (for reference)	200 mm	200 mm	200 mm	200 mm
	Number of stator grooves	12			
	Stator connection	Delta connection			
	Number of rotor poles	14			
	Rotor structure	IPM			
	Rotor inertia (Reference)	0.149 kg·cm ²	0.356 kg·cm ²	1.37 kg·cm ²	4.53 kg·cm ²
Standard usage	Rated voltage	48 V			
	Rated output (reference)*1	200 W	500 W	650 W	950 W
	Rated torque (reference)*1	0.42 Nm	0.9 Nm	1.3 Nm	3.4 Nm
	Rated speed (reference)*1	4,600 r/min	5,300 r/min	4,800 r/min	2,700 r/min
	Operating voltage range	15 to 55 V			
	Operating temperature range	-10°C to 50°C			
	Operating humidity range	20% RH to 60% RH			
	Storage temperature range	+10°C to +20°C			
	Storage humidity range	30% RH to 60% RH			
Motor electrical characteristics (Reference)	No-load current	1.2 A or less	2.1 A or less	2.0 A or less	3.4 A or less
	No-load speed	6,400 r/min	6,950 r/min	5,400 r/min	3,450 r/min
	Instant peak torque	0.9 Nm (up to 5 seconds)	2.1 Nm (up to 5 seconds)	5.0 Nm (up to 5 seconds)	11.0 Nm (up to 5 seconds)
	Instant maximum output	350 W	880 W	1,050 W*2	1,380 W*2
	Dielectric strength	500 V AC for 1 minute (between motor winding and stator laminated core)			
	Insulation resistance	10 MΩ or more (DC500 V, between motor winding and stator laminated core)			
	Line resistance	487 mΩ±10%	124 mΩ±10%	62 mΩ±10%	39 mΩ±10%
	Line inductance	408 μH±10%	219 μH±10%	117 μH±10%	138 μH±10%

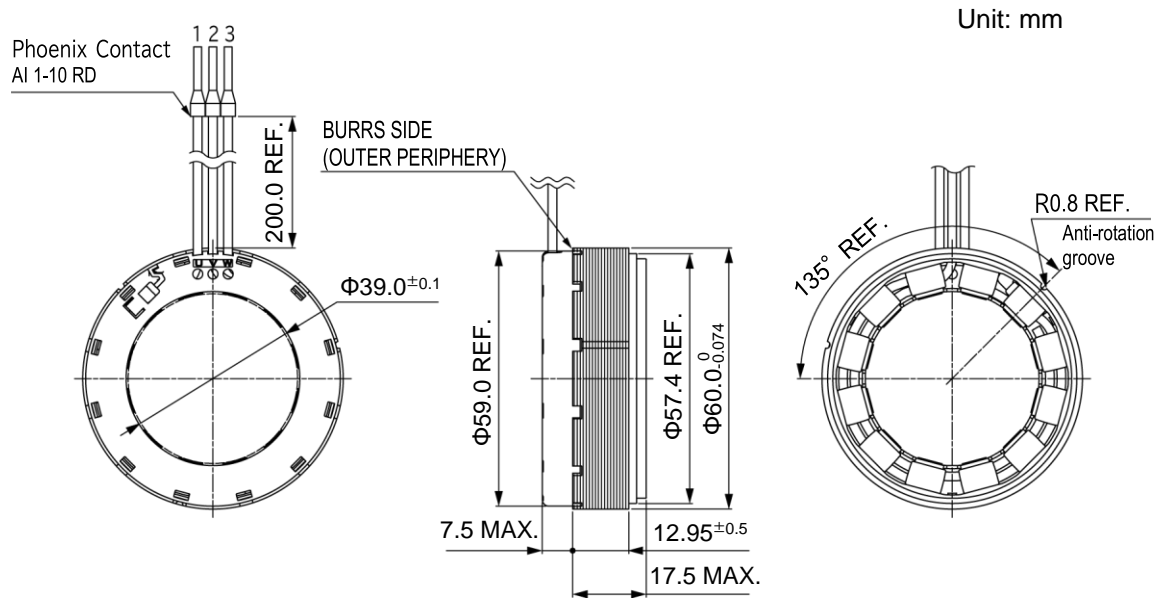
*1 Rated output/torque/speed varies depending on the heat dissipation of the housing.

*2 Calculated from the assumed number of rotations when 48 V is applied at the instant maximum torque.

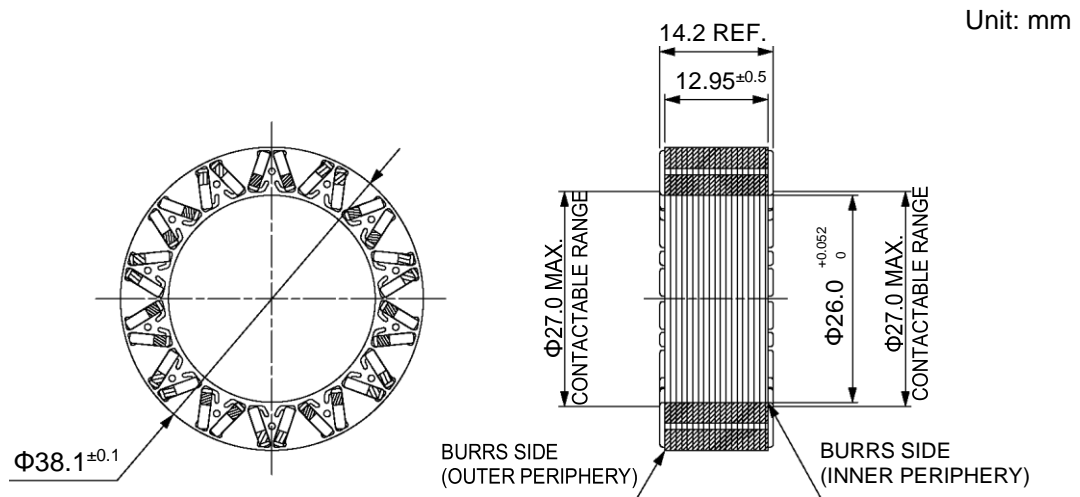
7.2 Technical Drawings

7.2.1 IA-A3BZA, IB-A3BZA

Stator (IA-A3BZA)

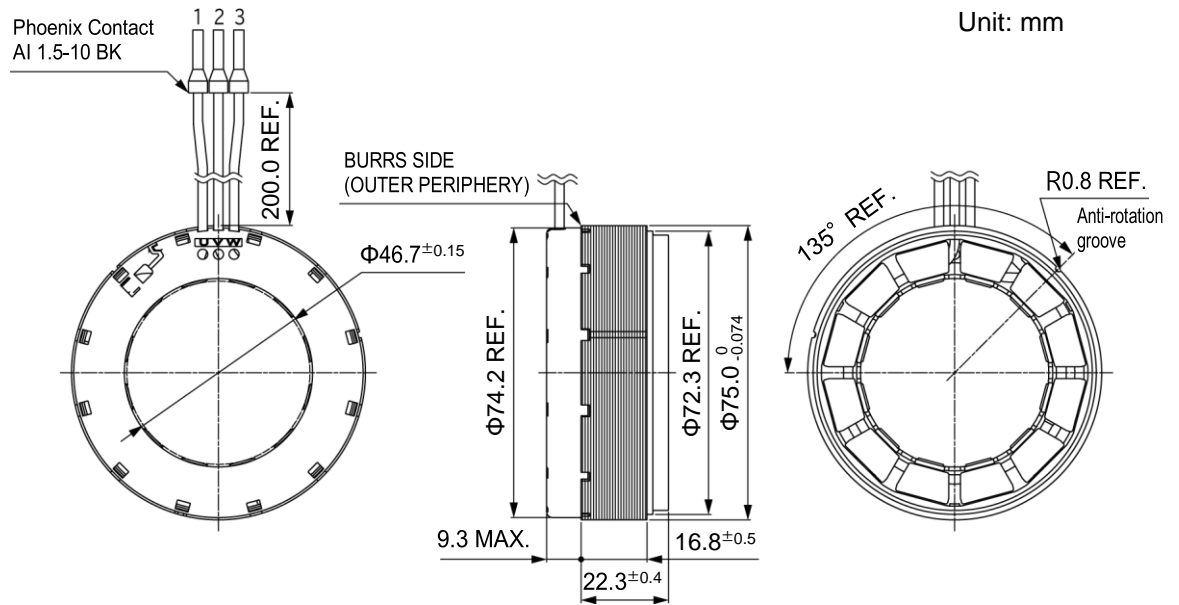


Rotor (IB-A3BZA)

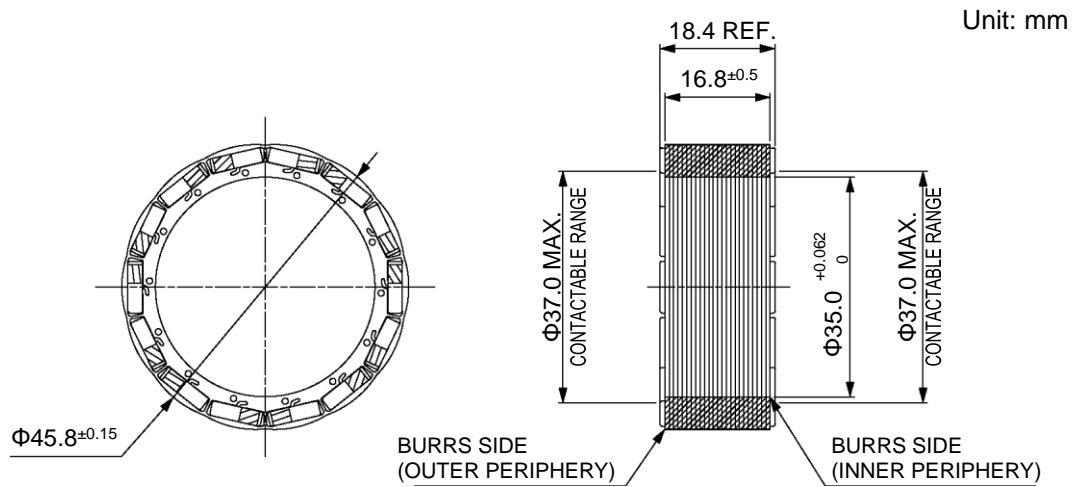


7.2.2 IA-B4BZA, IB-B4BZA

Stator (IA-B4BZA)

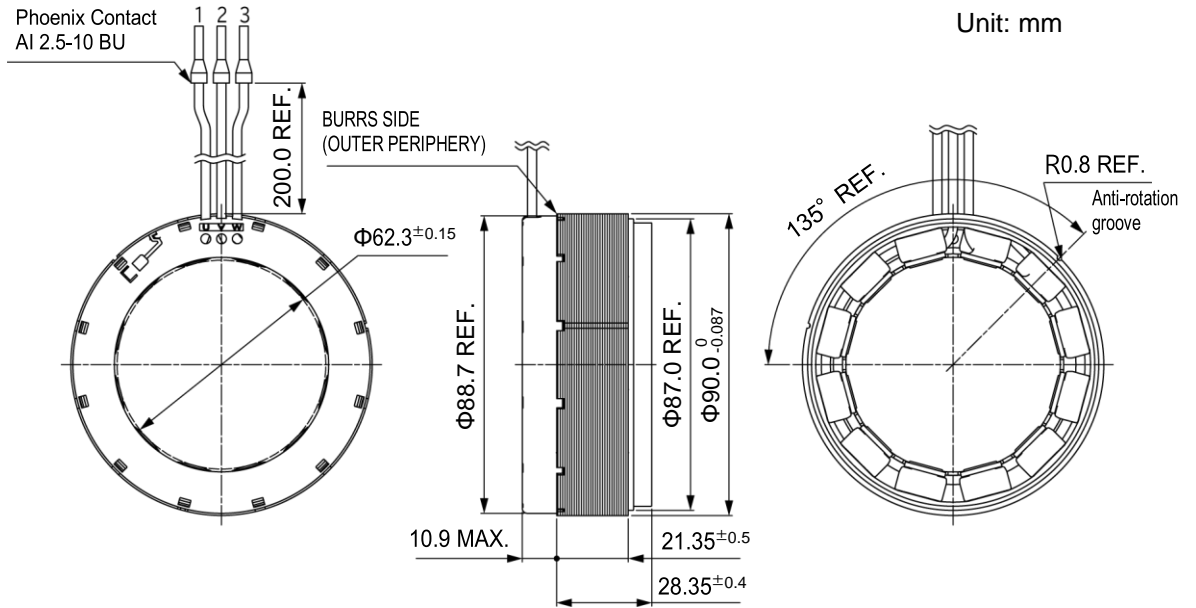


Rotor (IB-B4BZA)

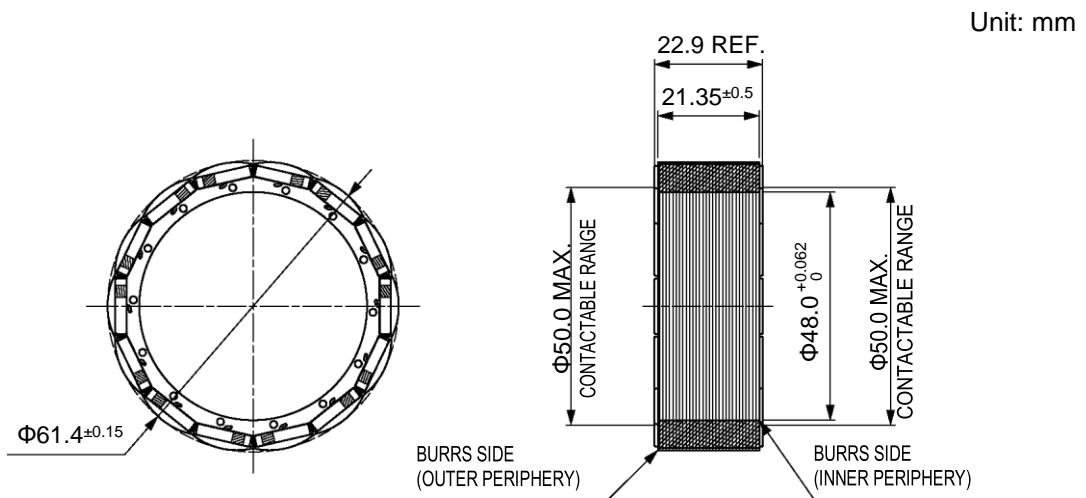


7.2.3 IA-C5BZA, IB-C5BZA

Stator (IA-C5BZA)

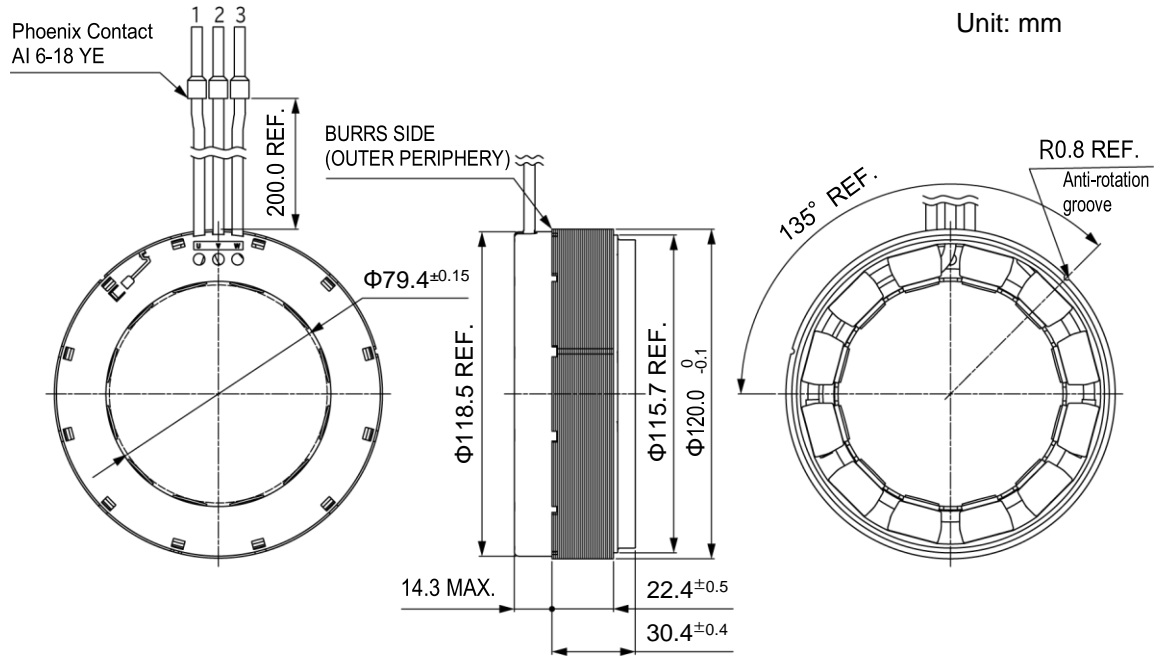


Rotor (IB-C5BZA)

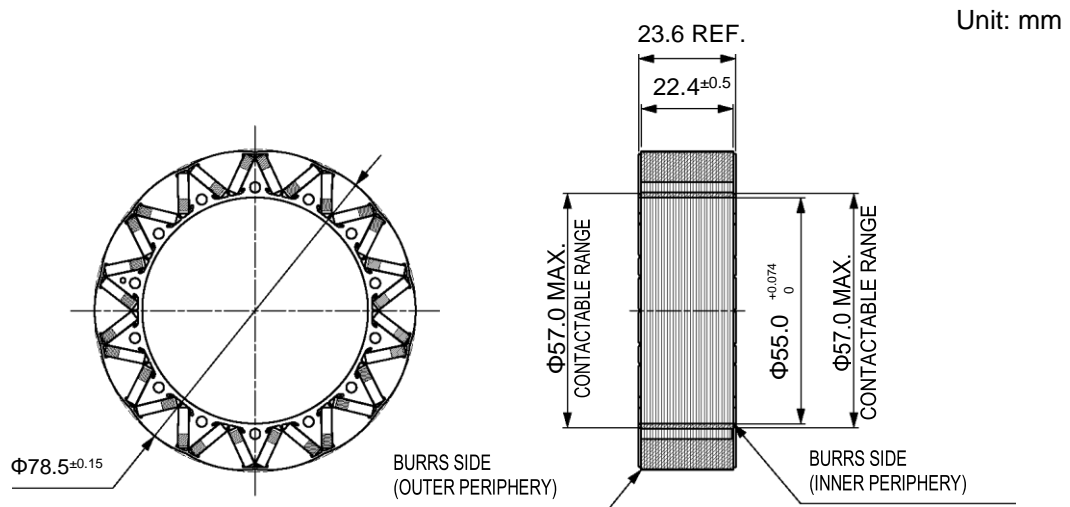


7.2.4 IA-D5BZA, IB-D5BZA

Stator (IA-D5BZA)



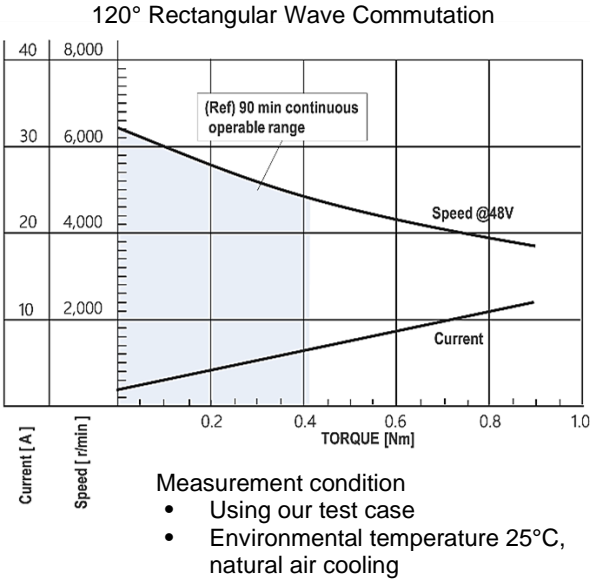
Rotor (IB-D5BZA)



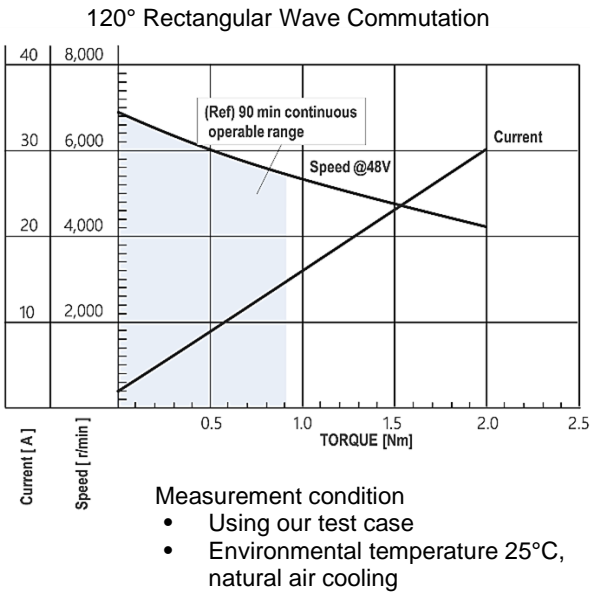
7.3 Characteristics Diagrams

48V drive motor characteristics diagram

IA-A3BZA/IB-A3BZA

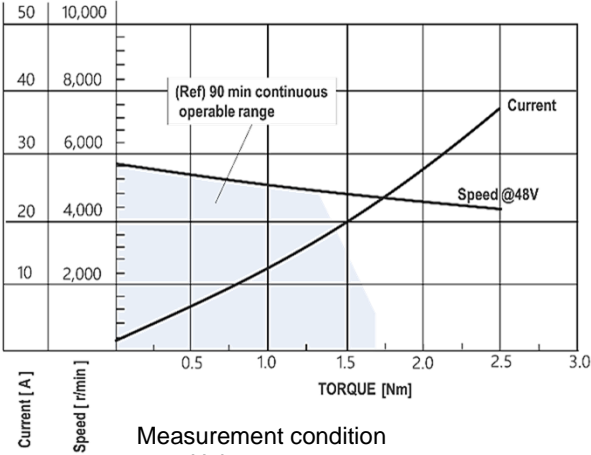


IA-B4BZA/IB-B4BZA



IA-C5BZA/IB-C5BZA

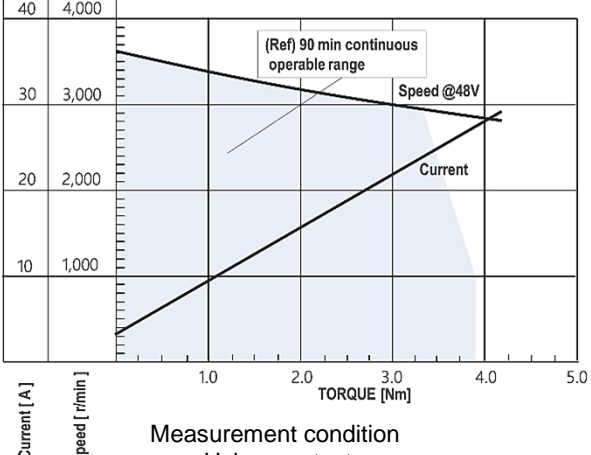
120° Rectangular Wave Commutation



- Measurement condition
- Using our test case
 - Environmental temperature 25°C, natural air cooling

IA-D5BZA/IB-D5BZA

120° Rectangular Wave Commutation



- Measurement condition
- Using our test case
 - Environmental temperature 25°C, natural air cooling

8 Laws and Standards

Conforms to the European RoHS Directive.

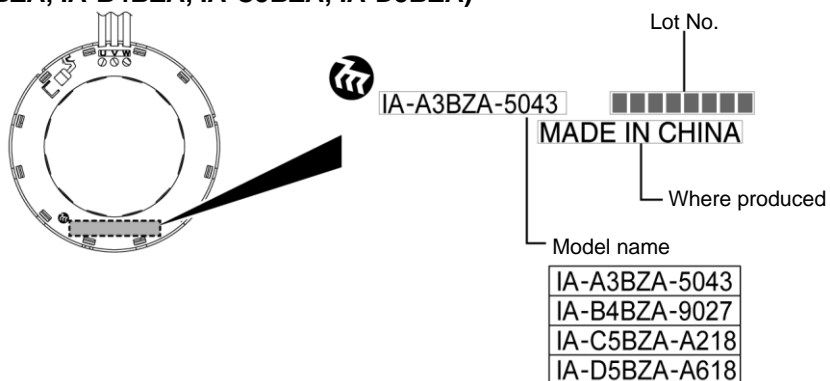
9 Product Warranty

- 1.** Product warranty period is 1-year from the date of delivery.
- 2.** Warranty Coverage
During the warranty period, should a failure occur that we are liable for, we will repair or replace parts free of charge. However, even within the warranty period, the following failures will not be covered by the warranty.
 - (1) Wear and deterioration due to normal use.
 - (2) Failure due to improper handling, or failure to follow the instructions in this manual.
 - (3) Failure due to use with unauthorized components.
 - (4) Failure due to disassembly, modification, or repair conducted by an unauthorized entity.
 - (5) Failure due to natural disasters or unexpected external factors.
 - (6) Failure due to unforeseeable reasons at the time of shipment based on scientific and technical standards.
 - (7) Other failures not attributable to our company.
- 3.** We make no warranties, express, implied, or statutory, as to fitness for general use or fitness for any particular use.
- 4.** Covered by warranty
This limited warranty applies to the original owner of this product during the warranty period provided the product was purchased from Mabuchi or an authorized distributor/dealer.
- 5.** Limitation of Liability
We are not responsible for any damage caused by failure of our products.
- 6.** Specification Changes
For purposes of improvement, the specifications in this document are subject to change without notice.
- 7.** Range of Service
Technician dispatch costs are not included in the product sales price. If you wish, we will consult with you separately.

10 After Sales Service

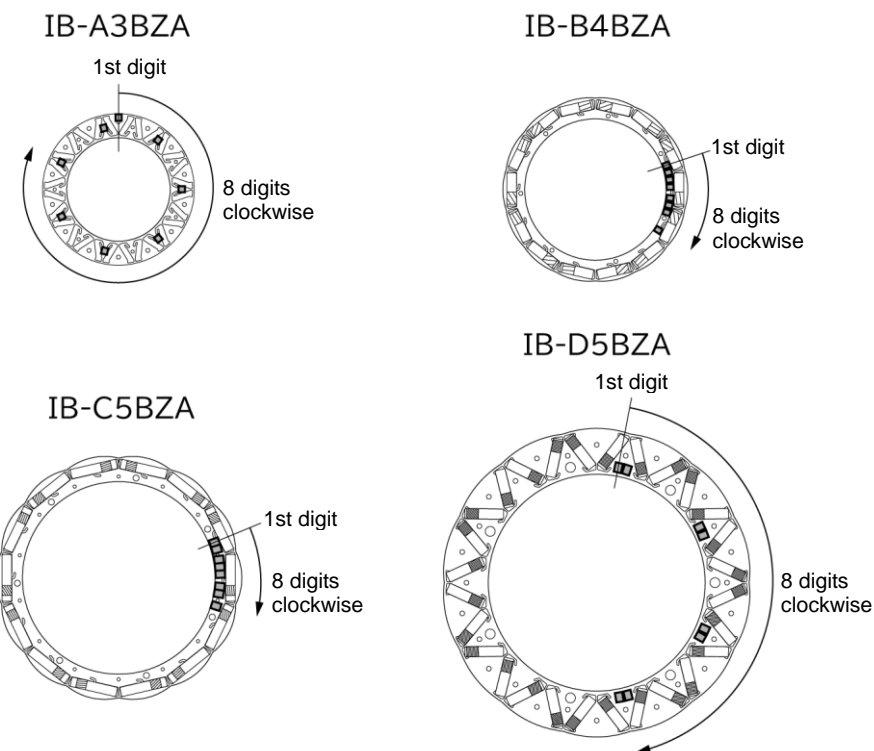
- Make a note of the "model name", "lot number", and "order number" and contact the dealer where you purchased the product.

Stator (IA-A3BZA, IA-B4BZA, IA-C5BZA, IA-D5BZA)



Rotor (IB-A3BZA, IB-B4BZA, IB-C5BZA, IB-D5BZA)

- Check the lot number by referring to the figure below.



Contact

Mabuchi Motor Co., Ltd. Sales Group 1

Please fill in the inquiry form using the QR code.

430 Matsuhidai, Matsudo City, Chiba Prefecture 270-2280, Japan

Phone : +81-47-710-1868

Hours: 10:00-16:00 (excluding weekends, company or national holidays)



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