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MS-74BZA
Instruction Manual

MS-74BZA
Geared Motor

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MABUCHI MOTOR CO., LTD.

MABUCHI MOTOR

FOR YOUR SAFETY

Read the safety warnings for proper use of this product.
Mabuchi Motor Co., Ltd. has no liability to indemnify damages, including any malfunction of the motor resulting from failure to follow this operation manual. Thank you for your understanding.

Safety Precautions

⚠ Warning: May result in death or serious injury

⚠ Caution: May result in injury or damage

⃠ Prohibition: Prohibited actions.

❗ Instruction: Required actions.

⚠ Warning ⃠ Prohibition

- Do not plug the lead wire or motor terminal into home electrical outlets. This will cause electrical shock, injury, and equipment damage.
- Do not touch conductive parts such as powered terminals when the power is on. This may result in electrical shock.
- Do not touch rotating parts, including attachments, with the hands or fingers while the power is on. This may result in injury.
- Do not lock the shaft while the motor is powered on. This will cause equipment damage.
- The motor operating conditions (installation condition, load, environmental temperature) may cause significant heat buildup in the motor, with the risk of burns.
- Do not disassemble the motor. This may cause equipment damage, injury, and electrical shock.
- Do not use in the presence of corrosive or flammable gas, or near combustibles. This may cause fire, injury, and equipment damage.

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Caution **Prohibition** **Instruction**

- This product is a brushless motor. It cannot be used directly connected to an AC or battery power source. Connect a dedicated brushless motor drive circuit compatible with this product between the power source and the motor.

- This is a general purpose product. It cannot be used with special equipment for medical, military, aerospace, or vehicle mounted applications.

- Do not detach connectors while the motor is in operation under any circumstances. Always shut off power before inserting them. This will cause equipment damage.

- When inserting or detaching cable connectors, support the plug with your fingers while releasing the detachment prevention mechanism, and insert or detach it in the direction of the connector pin, making sure that the connector is not subject to excessive force.

- Using it with an excessive load on the output shaft will reduce service life.
  Handle the shaft carefully so that there is no impact load in the direction of thrust.

- When using lead wires, switches, relays, or controllers, etc., give careful consideration to their electrical capacity and heat tolerance. If they do not meet the appropriate standards, this may result in equipment damage such as burnout.

- Confirm compatibility and service life through set implementation, and carry out quality assurance on your end.

  Example Checklist for Set Installation:
  Laws and standards applicable to the mounting product.
  Service life, electrical characteristics, mechanical characteristics, mechanical/electrical noise, storage environment, atmosphere gases, etc.

- The internal resistance and capacity of the motor drive power source (including the circuit) may affect starting performance and rotational stability. Confirm the actual operating conditions at high and low temperatures as well as room temperature.

- When using transmission systems which apply lateral pressure to the motor, such as a belt drive on the output shaft, the lateral pressure on the shaft bearing may reduce service life.

- Significant radial loads from eccentric cams, etc., during motor operation or outside vibrations may affect motor service life. Verify the actual usage conditions.

- Do not subject the motor output shaft to excessive impacts. This will cause equipment damage.

- When securing the motor, do not apply forces that would cause deformation of the motor. When securing with screws, avoid uneven tightening. This may negatively affect the flatness and other characteristics of the motor installation plate.

・When used for a long period of time, a small amount of grease may seep out from the gear part in rare cases.
This will not change the characteristics of motor but inspect periodically that no problems have arisen with the equipment where the motor is installed.

・When using in an environment where the ambient temperature is lower than room temperature, the load torque and motor current may increase due to changes in the viscosity of the grease used in the reducer. As the operation time progresses, the grease will become more fluid, and the load torque and motor current will decrease.

・Always use the designated components for extension cable connectors.

・If abnormalities occur, shut down power immediately.

・The temperature of the motor rises during operation and after immediately after shut down, so exercise caution.

・Do not apply excessive force to cables or connectors.
Do not use cables to move or carry the motor.

・Dispose of this product in accordance with local laws and government instructions.

● Operating and Storage Environment

・Avoid storing the motor in high temperature or humidity areas, or in contact with corrosive gases.
The recommended environment: +10～+30℃ temperature, 30～95% relative humidity.

・Chemicals used for fumigation may contaminate metal components of the motor.
When fumigating packaging (pallets, etc.) for the motor itself or products into which the motor is integrated, make sure that the motor is not exposed to the fumigating material or gases.

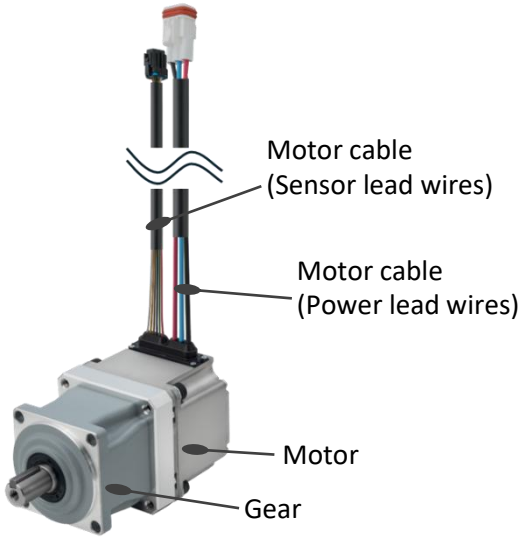
・High ambient temperature while the motor is in use (motor temperature) will affect performance and service life. Exercise special caution in cases of high temperature and humidity.

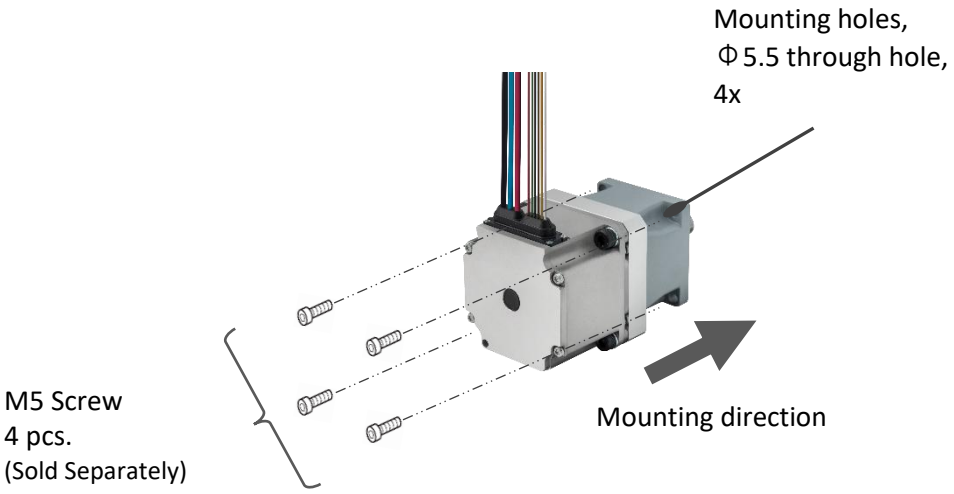
MABUCHI MOTOR

Motor Parts and Features

● Motor parts

・Type: MS-74BZA

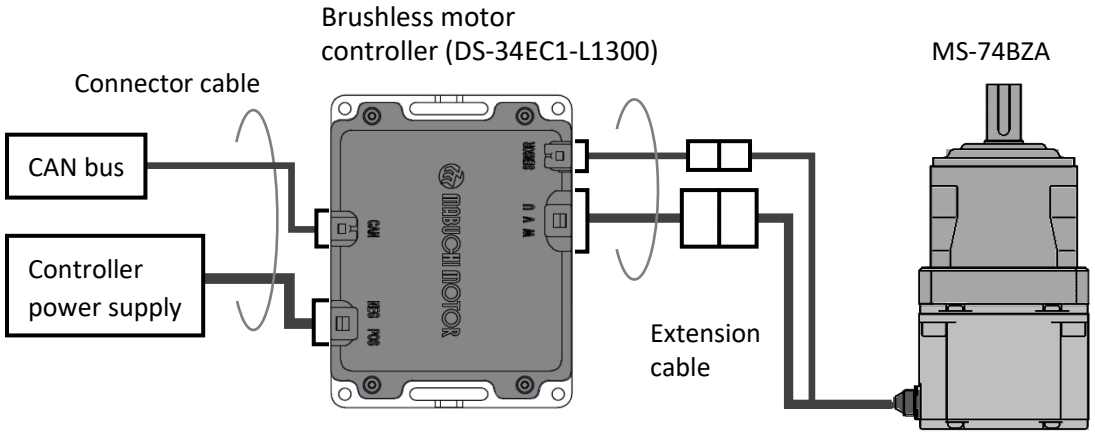




Caution **Prohibition** **Instruction**

・Ensure there are no gaps on the mounting surface.
・Do not separate or disassemble the motor or gear head.
・Ensure that the motor is mounted without applying tension or stress on the cables.

● Connection diagram



・The example above shows an MS-74BZA being connected with a Mabuchi motor controller (DS-34EC1-L1300), power supply, etc.

・The Motor Controller (DS-34EC1-L1300) and connection, extension cables are available as optional items.

For details about the DS-34EC1-L1300, connection cables, and extension cables, please refer to the separate "DS-34EC1 Series Instruction Manual."

⚠ Caution **❗ Instruction**

・The controller power supply has polarity. Be sure to connect it correctly.

・Use the designated extension cables (motor power, sensor, brake).

・Do not interconnect multiple extension cables, as it may reduce performance.

・Ensure that there is a sufficient safety margin for the current capacity of the power source and the current carrying capacity of distribution cables, etc.

● Extension cables

Extension cables are sold separately.
Please purchase these separately.

・Motor power line extension cable
Part number: 67-Q22AA
Cable length: 1m
Poles: 3
Terminals: Double ended connectors

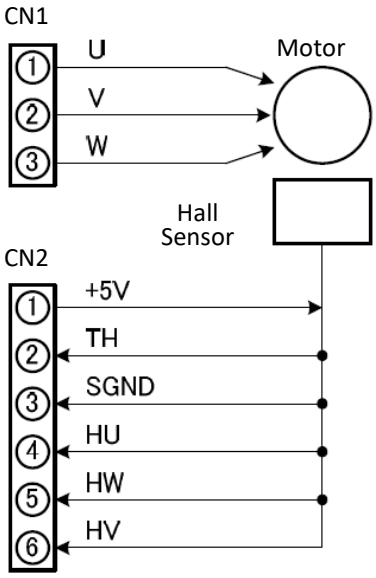
・Motor sensor line extension cable
Part number: 67-Q23AA
Cable length: 1m
Poles: 6
Terminals: Double ended connectors

● Cable connector specification table

Cable type	Connector manufacturer	Connector type (Controller, Control device)		Connector type (Motor side)		Wire seal	# of poles	Wire type (AWG)
		Housing (F)	Terminal (F)	Housing (M)	Terminal(M)			
Motor power line	MINEBEA CONNECT	CL07D03A	215006 -2M	CL07D03M	215005 -2M	WS07MF -0D	3	AWG14
Motor sensor line	MINEBEA CONNECT	CA01A6-06B0 -01	CA01C6 -010A	CA01A5-06B0 -01	CA01C5 -010A	01 (Light Blue)	6	AWG26

For detailed connector specifications, please consult the connector maker's website.

● Cable Connector Signal Explanation

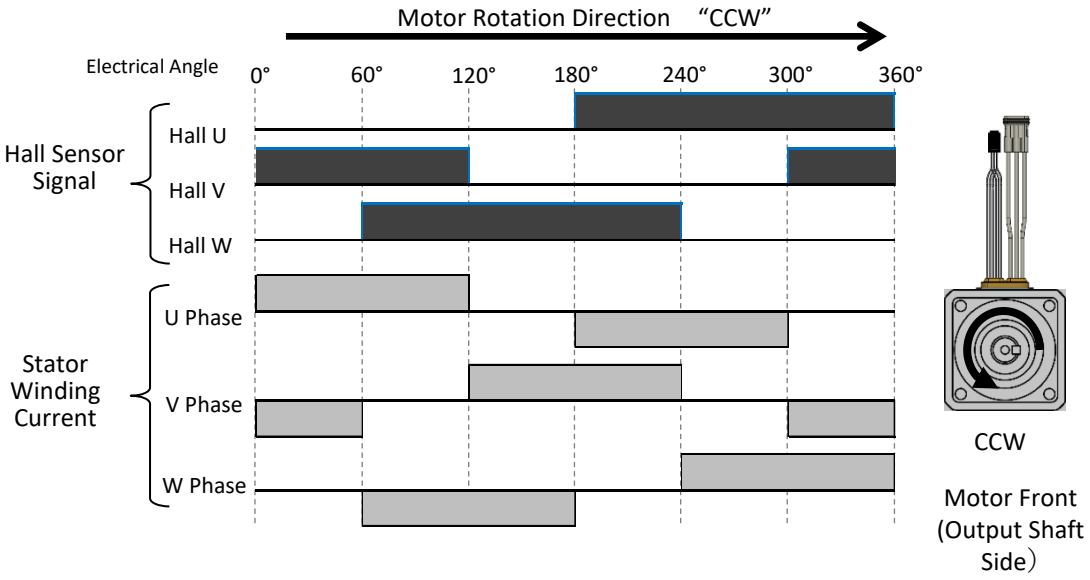


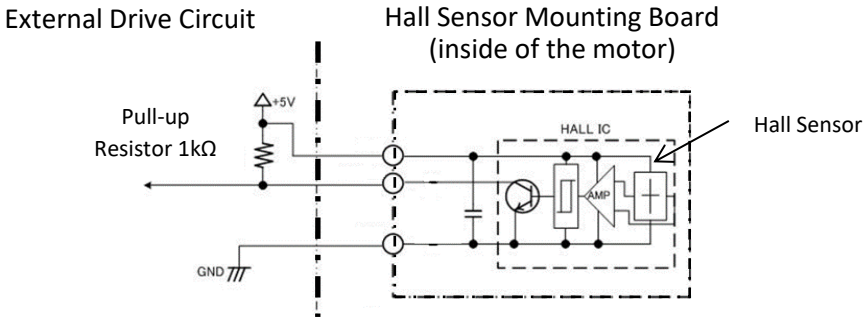
Connector	Pin #	Signal Name, Specification	Abbrev.
CN1	1	Stator Winding: U	U
	2	Stator Winding: V	V
	3	Stator Winding: W	W
CN2	1	Hall Sensor Power Supply: DC＋5V	+5V
	2	Temperature Monitoring Thermistor	TH
	3	Signal Ground: SGND	SGND
	4	Rotor Position Detection Hall Sensor Output: U Phase	HU
	5	Rotor Position Detection Hall Sensor Output: W Phase	HW
	6	Rotor Position Detection Hall Sensor Output: V Phase	HV

● Hall Sensor Output Signal

The relationship between the Hall sensor signal and the stator winding current is shown in the following chart.

Example: Motor driven by 120° square wave current





・The hall sensors in this motor are not equipped with pull-up resistors. Connect pull-up resistors for each phase on the drive circuit end.
・If you are using the motor controller (DS-34EC1-L1300), pull-up resistors are not necessary.

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● Specifications

Item		MS-74BZA
Components	Motor	●
	Gear	●
Mechanical Characteristics	Exterior	Refer to External Diagram
	Mass (Ref. Value)	1.06kg
	Reduction Ratio	10
	Cable, Connector Tensile Strength	9.8N (min.)
	Waterproofing	IPx4 (Use a Dedicated Connector)
Standard Usage	Rated Voltage	24V (controller power supply voltage when using DS-34EC1-L1300)
	Operating Voltage Range (*1)	17 to 32V (controller power supply voltage when using DS-34EC1-L1300)
	Operating Temperature Range	-10 to +50°C (*2)
	Operating Humidity Range	20 to 95% RH (No condensation)
	Direction of Rotation	CCW/CW viewed from the output shaft side.
	Storage Temperature Range	+10 to +30°C
	Storage Humidity Range	30 to 95% RH (No condensation)
	Allowable Inertial Load	0.26kg・m^2 (max.) (Applicable Acceleration Rate: 200r/min/s)
	Allowable Radial Load	650N (10mm from tip of the output shaft)
Motor Electrical Characteristics	No-Load Current	2.4A (Reference, under 120° square wave current, 24V DC power)
	No-Load Speed	285r/min (Reference, under 120° square wave current, 24V DC power)
	Instantaneous Maximum Torque	7.5 Nm, 10sec (max) (Reference, under 120° square wave current, 24V DC power)
	Maximum Output	140W (Reference, under 120° square wave current, 24V DC power)
	Insulation Resistance	10MΩ (min.) (DC500V) Between housing and electromagnetic brake winding/motor
	Withstand Voltage	AC500V, 1 minute Between housing and electromagnetic brake winding/motor
	Thermistor	For motor winding temperature monitor (*2) 100kΩ±10%, B constant (25/50°C), 4250K±10% (ref. value)

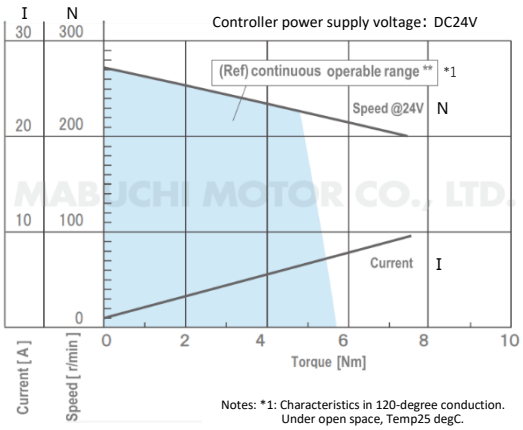
• The product's performance, specifications, and appearance may be modified for improvements without advance notice. Thank you for your understanding.

*1: If you are supplying your own controller, be careful that the controller power voltage does not exceed the maximum limit.

*2: The motor operating conditions (installation condition, load, environmental temperature) may cause significant heat buildup in the motor. Be careful that the detected temperature of the thermistor does not exceed 100°C. High ambient temperature while the motor is in use (motor temperature) will affect performance and service life.

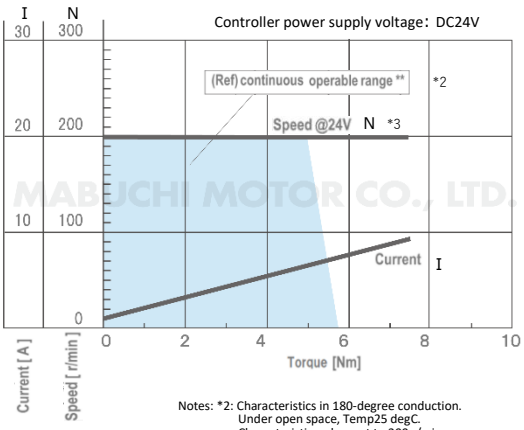
● Motor Characteristics：MS-74BZA

Applying 120° Square-wave Current



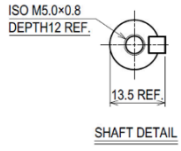
Notes: *1: Characteristics in 120-degree conduction.
Under open space, Temp25 degC.

Connected to DS-34EC1-L1300
(180° Sine Wave Drive)



Notes: *2: Characteristics in 180-degree conduction.
Under open space, Temp25 degC.
Characteristics when set to 200 r/min
within the speed control range of DS-34EC1-L1300

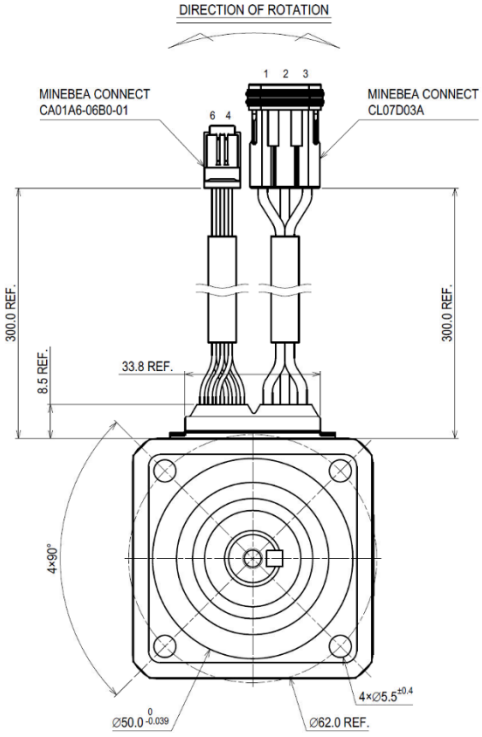
● Drawing：MS-74BZA

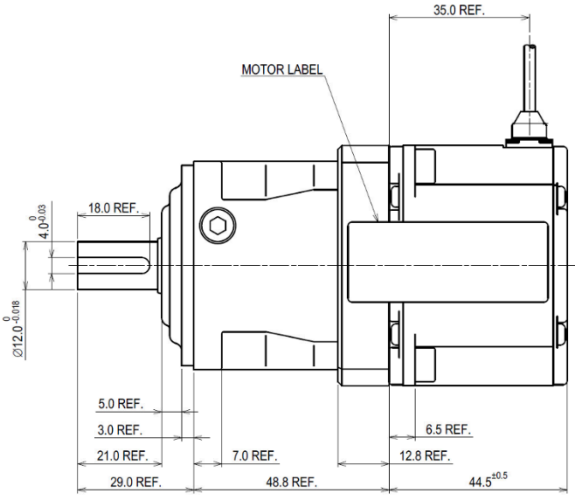


SHAFT DETAIL

CIRCUIT No. AND CHARACTERISTICS			
CONNECTOR	No.	DEFINITION	COLOR
CL07D03A	1	U PHASE OF MOTOR	RED
	2	V PHASE OF MOTOR	BLUE
	3	W PHASE OF MOTOR	BLACK
CA01A6-06B0-01	1	+5V POSITIVE ELECTRODE	RED
	2	THERMISTOR	GREEN
	3	GND	BLACK
	4	U SIGNAL BY ELECTROMAGNETIC WAVE	BROWN
	5	W SIGNAL BY ELECTROMAGNETIC WAVE	YELLOW
	6	V SIGNAL BY ELECTROMAGNETIC WAVE	WHITE

LEAD WIRE AND CONNECTOR





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Product Warranty, Inquiries

Please contact the retailer from whom you purchased this product.