

## Technical Instructions (Basic)

### Brushless Motor

### MINAS-BL KV Series

- Thank you very much for your purchase of Panasonic product.
- Please read this instruction manual carefully for proper use.
- In particular, be sure to read Safety precautions (P.E2 to E4) before use for safety.
- Keep this manual with care after reading, and read as necessary.
- **This product is for industrial equipment. Don't use this product at general household.**



\* This product image is 200 W type of KV-series.

**If you are the first user of this product, please be sure to read the instruction Manual (Overall) from our Web Site.**

**[Web address of Panasonic Industry Co., Ltd.]**  
**[industrial.panasonic.com/ac/e/](http://industrial.panasonic.com/ac/e/)**

**Be sure to give this Instruction manual to an end user.**

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# Safety Precautions

Please observe safety precautions fully.

The following explanations are for things that must be observed in order to prevent harm to people and damage to property.

- Misuses that could result in harm or damage are shown as follows, classified according to the degree of potential harm or damage.

**⚠ Danger** Indicates great possibility of death or serious injury.

**⚠ Caution** Indicates the possibility of injury or property damage.

- The following indications show things that must be observed.



Indicates something that must not be done.



Indicates something that must be done.

## ■ Considerations on transportation

<b>⚠ Caution</b>		Do not hold the motor cable or motor shaft during the transportation.	Failure to heed this instruction could result in breaking of cable, and personal injury due to falling materials.

## ■ Considerations on installation

<b>⚠ Danger</b>		Do not subject the Product to water, corrosive or flammable gases, and combustibles.	Flammable materials, when ignited, will cause fire.
		In the case of the motor with shaft end keyway, do not touch the keyway with bare hands.	Edge of the keyway can cause personal injury.
		Mount the motor, amplifier and external regenerative resistor on incombustible material such as metal.	Flammable materials, when ignited, will cause fire.
		Install and mount the Product and machinery securely to prevent any possible fire or accidents incurred by earthquake.	Unstable installation or setting will cause fire, electrical shock or personal injury.
		Install an emergency stop circuit externally so that you can stop the operation and shut off the power immediately.	The failure to heed this instruction will cause improper operation that could result in hazards to personnel.
		Install an overcurrent protection, earth leakage breaker, over-temperature protection and emergency stop apparatus without fail.	Failure to observe this instruction could result in fire or electrical shock due to malfunction or overheating.
		Since the holding brake on the motor is not a shutdown device designed to secure safety, install a safety shutdown system on the equipment.	Unexpected operation, movement, etc., could cause injury.

<b>⚠ Caution</b>		Do not install the Product in any of the following locations. <ul style="list-style-type: none"> <li>Locations that are subject to vibration or shock that exceeds product specifications.</li> <li>Locations that are subject to dust or iron powder.</li> <li>Locations that are subject to water or oil.</li> <li>Locations that are subject to direct sunlight.</li> <li>Location that are near the heating elements ; heaters or large size resistors.</li> </ul>	Possible malfunction or overheating will cause fire, electrical shock or injury.
		Make an appropriate mounting of the product matching to its weight and output rating.	Unstable installation or setting will cause personal injury.
		Do not get on the product. Do not place heavy object on the product.	Failure to heed this instruction could result in electrical shock or injury due to malfunction or improper installation of the product.
		Do not place any obstacle object which blocks air passage around the motor, amplifier and peripheral.	Fault or overheating due to poor ventilation can cause burn injury or fire.
		Do not put foreign material into the product through the opening.	Failure to heed this instruction could result in fire or electrical shock due to malfunction or short circuit.
		Run the test with the motor fixed and disconnected from the equipment. After the operation is verified, connect it to the equipment.	Operation with wrong model or wrong wiring will cause bodily injury.
		Provide protection device against idling of internal electro-magnetic brake or gear head, or grease leakage from gear head.	Lack of protection against unexpected product operation will cause personal injury, equipment damage, or pollution.

## ■ Precautions for wiring

<b>⚠ Danger</b>		Wiring work must be done only by a qualified electrician.	Wrong or improper wiring will cause fire or electrical shock.
		Arrange the phase sequence of the motor and wiring of the CS sensor.	Wrong or improper wiring will cause fire, electrical shock or injury.
		Ground the earth terminal of the motor and amplifier without fail.	Earth leakage or other failure will cause electrical shock.
<b>⚠ Caution</b>		Operate from the specified voltage.	Malfunction or overheating will cause electrical shock, injury or fire.
		Positively and securely connect cables and safely isolate the live parts with insulation.	Poor insulation will cause electrical shock and electrical leakage.
		Do not subject the cables to excessive force, heavy object, or pinching force, nor damage the cables.	Poor insulation and short circuit will cause electrical shock.
		Do not connect the motor directly to the commercial power supply.	Malfunction or overheating will cause fire.
		In series with the brake control relay, connect a relay which will turn off the circuit upon emergency stop.	Unexpected operation, movement, etc., could cause injury.

## ■ Considerations on operation

<b>⚠ Danger</b>		Do not touch the rotating portion of the motor while it is running.	To protect against catch up by the rotating member which may cause injury.
		Do not put your hand in the energized amplifier. Do not remove front cover or terminal cover.	Current carrying part, when touched, will cause burn injury and electrical shock.

# Safety Precautions

Please observe safety precautions fully.

<b>Danger</b>		Because certain device, upon recovery from power interruption, may suddenly restart, design a restarting procedure to secure safety for the operator.	Unexpected operation, movement, etc., could cause injury.
		Check and confirm the safety of the operation after the earthquake.	Unexpected operation, movement, etc., could cause injury, electrical shock or fire.
<b>Caution</b>		When adjusting amplifier parameters, do not make an extreme gain adjustment or do not significantly change setting value.	Unexpected and unstable operation will cause personal injury.
		Do not touch potentially hot heat sink and regenerative resistor in the motor amplifier during operation.	The hot member, when touched, will cause burn injury.
		Do not drive the motor with external power.	If the amplifier becomes failure, it will cause fire.
		Do not repeatedly turn off and on power supply.	Rush currents will deteriorate amplifier internal circuit elements, causing troubles and fire.
		Do not use the built-in brake as a braking to stop the moving load.	Excessively worn brake and malfunctioning equipment will cause injury.
		When a trip occurs, remove the cause, secure the safety, reset the error and restart operation.	Unexpected operation, movement, etc., could cause injury.
		When failure occurs at the amplifier, turn off power to the amplifier.	Continuous high current flow will cause fire and electrical shock.
			The failure to heed this instruction will cause improper operation that could result in hazards to personnel.
			Always keep power disconnected when the power is not necessary for a long time.
Even if wrinkles appear on the label attached to the motor, there is no problem in using the product.			

## Considerations on maintenance and checking

<b>Danger</b>		When transferring, wiring or checking the amplifier, turn off power and wait for period specified on the nameplate attached to the side face of the body, and make sure that the product is free from electrical shock.	Performing work without turning off the power source will cause electrical shock.
		Never attempt to perform modification, dismantle or repair.	Failure to heed this instruction could result in fire, electrical shock or personal injury due to malfunction.
<b>Caution</b>		Maintenance must be performed by an experienced personnel.	Wrong or improper wiring will cause injury or electrical shock.

## Considerations on disposal

This Product shall be treated as Industrial Waste when you dispose.

# Introduction

## Product Overview

This motor is brushless type. Carefully read through this manual so that you will properly and safely operate it for a long term.

This motor is designed to be built into general-purpose industrial equipment. However, only properly trained and responsible individuals should operate this product.

### <Caution>

When exporting a product containing this motor, make sure that the product will meet the legal requirements of the destination country.

## After unpacking

- Make sure that the model is what you have ordered.
- Check whether the product has been damaged or not during transportation.

**If any deficiency should be found, contact the dealer store where you bought this product.**

## Checking the model of Motor and Amplifier

This amplifier is designed for use in combination with a motor to be specified by us.

Check a name of series, rated output, voltage specifications you wish to use.

**You must not use any other combinations than those listed below:**

**Failure to observe this instruction could result in breakdowns.**

### • KV series (Velocity control type)

Voltage (V)	Out put (W)	Motor Type	Applicable Amplifier
Single phase AC100 to 120	50	MBMS5AZBL○	MBEK5A1BCV
	100	MBMS011BL○	MBEK011BCV
	200	MBMS021BL○	MBEK021BCV
Single phase/ 3-phase AC200 to 240	50	MBMS5AZBL○	MBEK5A5BCV
	100	MBMS012BL○	MBEK015BCV
	200	MBMS022BL○	MBEK025BCV
3-phase AC200 to 240	400	MBMS042BL○	MBEK045BCV
	750	MBMS082BL○	MBEK083BCV

\* A symbol in ○ of a motor part number represents structure of the motor.

Product designation/ Name of each part

Checking the model number of brushless motor

Nameplate

Motor type

Model number

Rated input voltage

Rated current

Rated output

Rated frequency

Rated speed

**Panasonic**

BRUSHLESS MOTOR

Model No. MBMS082BLS

INPUT 30 AC 0-240 V

RATED OUTPUT 3.6 A 750 W

RATED FREQ. 200 Hz

RATED REV. 3000 r/min

CONT. TORQUE 2.4 N·m

RATING S1 (CONT.)

THERMAL 105(A)-UL

130(B)-TUV

CONNECTION TE, 4.0 °C

SER. No. 15040001N

IP65

Panasonic Industry Co., Ltd. Made in China

S1: Continuous rating

Thermal class

Serial number

Protection structure

Model designation

MBMS 08 2 B L

Type

Output

5A: 50 W

01: 100 W

02: 200 W

04: 400 W

08: 750 W

Input power supply

1: 100 V

2: 200 V

Z: 100 V/200 V (50 W only)

Mounting type

L: Flanged

Rated speed

B: 3000 r/min

Structure of the motor

For the encircled symbol, refer to the table below.

Symbol	Shaft		Holding brake		Oil seal		
	Round	Key-way, center tap	D-cut *1	Without	With	Without	With *1
A	●			●		●	
B	●				●	●	
C	●			●			●
D	●				●		●
S		●		●		●	
T		●			●	●	
U		●		●			●
V		●			●		●
N			●	●		●	
P			●		●	●	
Q			●	●			●
R			●		●		●

\*1 Motor with D cut shaft and with oil-seal is made-to-order.

Products are standard stock items or manufactured by order. For details, inquire the dealer.

Serial number

Example) SER. No. 15 04 0001 \*

Year of production (Lower 2 digits of AD year)

Month of production

Consecutive number

The motor manufactured in April 2015 is given the Serial number 0001.

Production date

Example) 2015 04 01

Year of production (AD year)

Month of production

Day of production

Name of part

Brushless motor

Connector for CS signal cable

Connector for motor cable

Output shaft

Bracket A

Oil seal

Bracket B

Nameplate

Frame

Installation

This section describes the installation guidelines and the various considerations that must be taken into account when planning the installation.

Transport

Use caution enough in transporting the unit to prevent injury by drop or fall, and avoid damage to the equipment.

Storage

Keep the unit indoors in a clean and dry place free from vibration with little change of temperature.

Location

Location gives great influence upon the life of brushless motor, therefore choose a place in conformance with the conditions below:

- (1) Indoors where the motor is not subjected to rain water and direct sun beam.

(2) Do not use the motor in corrosive atmosphere such as hydrogen sulfide, sulfurous acid, chlorine, ammonia, sulfur, gas chloride, gas sulfide, acid, alkali, and salt, in the atmosphere of combustible gas, or in the vicinity of flammables.

(3) Place not exposed to grinding liquid, oil mist, iron powder, and cutting particle.

(4) Well-ventilated place with little moisture, oil, or inundation, and place far from heat source such as a furnace.

(5) Place easy to check and clean

(6) Place free from vibration

(7) Do not use the unit in an enclosed environment. Enclosing may raise the temperature of motor (amplifier), and shorten their life.

Environmental condition

Item	Condition
Ambient temperature	0 °C to 40 °C (free from freezing) *1
Ambient humidity	20 % to 85 % RH (free from condensation)
Storage temperature	At normal temperature and normal humidity*2
Protection structure	IP65 (Excluding shaft pass-through section and lead wire connector)*3
Vibration	Not greater than 4.9 m/s <sup>2</sup> (10 Hz to 60 Hz)
Altitude	Not greater than 1000 m

\*1 Ambient temperature is measured at a distance of 5 cm from the motor.

\*2 Temperature which is acceptable for a short time, such as during transportation, is -20 °C to 65 °C (free from freezing).

\*3 This motor meets test requirements specified in EN standards (EN60529 and EN60034-5). This motor cannot be used for an application that requires long term waterproof performance, such as the case where the motor is always washed with water.

# Installation

## Installation of brushless motor

### Oil and water protection

- 1) Direct down the lead of cable as far as possible.
- 2) Avoid use in such an environment where the motor is always exposed to oil and water.
- 3) Avoid use with cable immersed in oil or water.

### Stress to cable

- 1) Make sure that stress is not applied to the lead or connection of cable due to bending or dead weight.

### Output shaft permissible load

- 1) The mechanical system should be so designed that the permissible radial load and thrust load specified for a specific model will be supported by the shaft during installation and operation.
- 2) When using rigid coupling, avoid application of unnecessary load. Excessive bending load will cause breaking of shaft or shortening of bearing life.
- 3) Use a high rigid but flexible coupling so that the radial load due to minute misalignment is limited below the allowable value.

### Installation guidelines

- 1) When installing a coupling to or removing a coupling from the motor shaft end, do not apply shock directly to the shaft with e.g. a hammer.
- 2) Make an exact centering (incomplete alignment may cause vibration and damage the bearing).
- 3) While the motor is running, its frame surface must be maintained at a temperature as shown below depending on its output power.  
100 W or below: 70 °C or below, 200 W: 80 °C or below, 400 W and 750 W: 85 °C or below

(ambient temperature at 40 °C)

- Motor should be used with its heat dissipated to the machine and equipment.

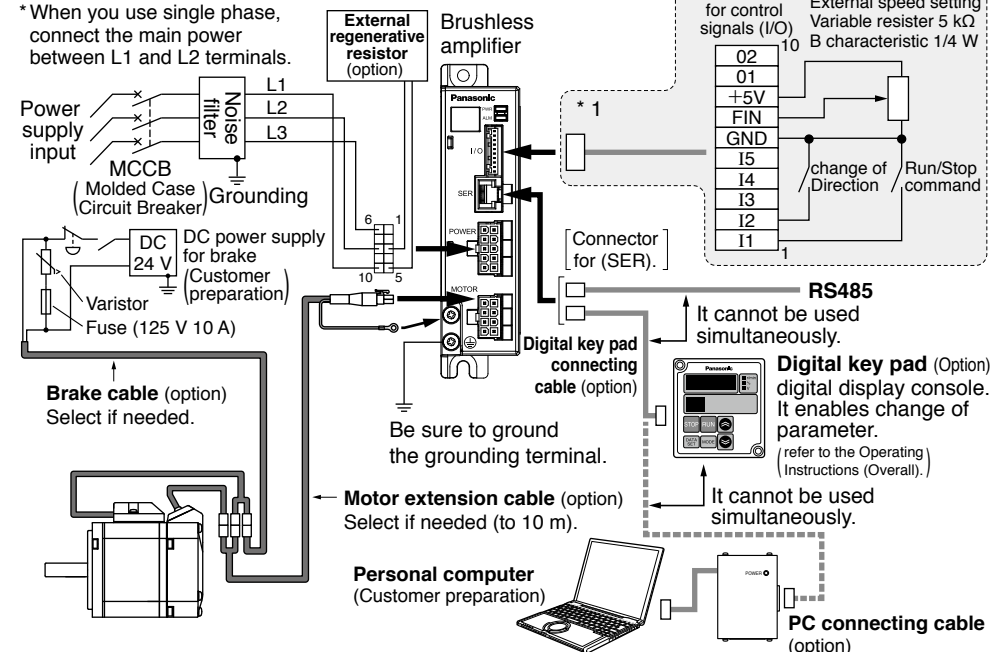
# System configuration and wiring

## System configuration and wiring

### Standard wiring diagram

#### • In Case of 3-Phase 200 V (50 W, 100 W)

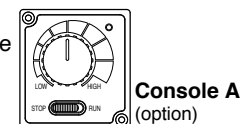
\* When you use single phase, connect the main power between L1 and L2 terminals.



- Compose a duplex Brake Control Circuit so that the brake can also be activated by an external immediate stop signal.
- The holding brake has no polarities.
- For the holding brake power supply capacity and how to use the brake, refer to “Specifications of Built-in Holding Brake” on P.E14.
- Provide a varistor. Connect a 10 A fuse in series with the varistor.

- In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm<sup>2</sup>) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually. Fastening torque of earth screws to be 0.49 N·m to 0.98 N·m. For brake wiring, use φ1.0 mm (0.75 mm<sup>2</sup>) or larger wire.
- For details of parameters, refer to the Instruction Manual (Overall).
- When a personal computer is connected, please use communicating software “PANATERM for BL” (it is gratis download from URL). Change of parameter and the monitor of operational status can be performed. If your PC does not have RS232 port, use RS232-USB converter.

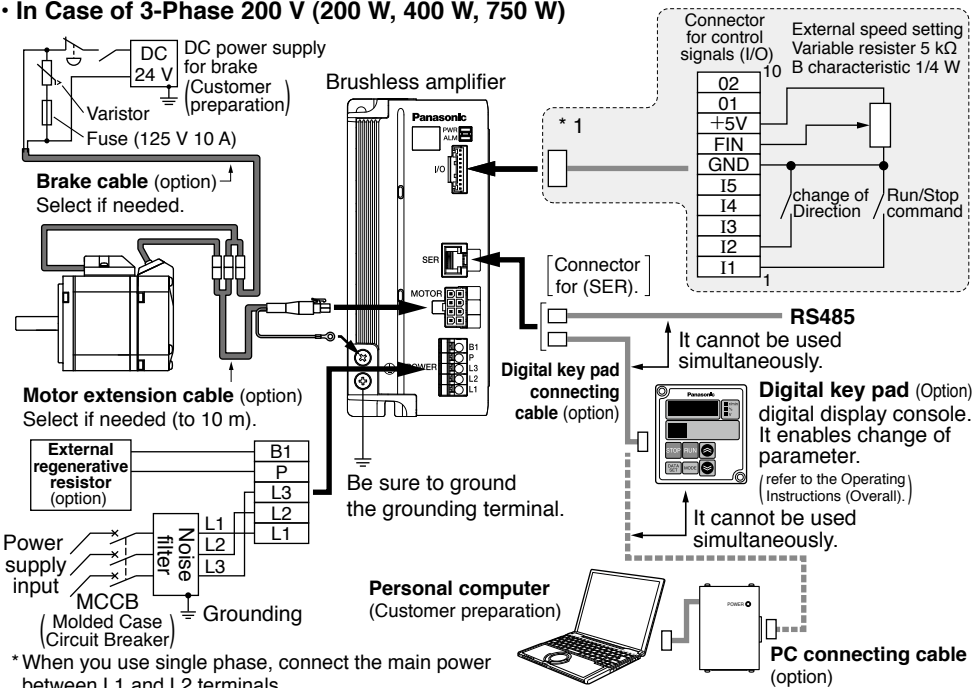
- \*1 You can use the Console A (option) and a Console A connecting cable (option) for connection with the Connector for control signals (I/O)



Console A (option)

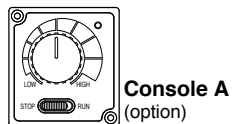
Standard wiring diagram

• In Case of 3-Phase 200 V (200 W, 400 W, 750 W)



- \* When you use single phase, connect the main power between L1 and L2 terminals.
- Compose a duplex Brake Control Circuit so that the brake can also be activated by an external immediate stop signal.
- The holding brake has no polarities.
- For the holding brake power supply capacity and how to use the brake, refer to “Specifications of Built-in Holding Brake” on P.E14.
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\*1 You can use the Console A (option) and a Console A connecting cable (option) for connection with the Connector for control signals (I/O)



Routine maintenance and inspection are essential for proper and satisfactory operation of the motor.

Notes to maintenance/inspection personnel

- Power-on/off operations should be done by the operators themselves for ensuring safety in checking.
- Do not touch the motor while it is running or immediately after it stops because it gets hot and stays hot for a while after power has been turned off.
- When testing the insulation resistance of the brushless amplifier with the megger, disconnect the amplifier from all associated devices. Performing megger testing without first disconnecting these devices will cause failure.

Maintenance/ Inspection item

Maintenance/ Check item	Inspection procedure	Condition
Input voltage	Voltmeter	Must be within ±10 % of rating.
Input current	Ammeter	Must be within rated input current described on nameplate.
Insulation resistance	Insulation resistance tester	The resistance of motor should be 1 MΩ or higher when tested with a 500 V megger. Brushless motor: Across phase (U, V, W) and ground terminals
Noise	Hearing	Noise level must not be different from the usual level. In addition, abnormal noise such as rumbling noise must not be heard.
Vibration	By hand	Free from abnormal vibration.
Grease leakage	Visual check	Check that circumference of the motor and gear head are free from oil and grease. If grease leakage will cause problem, use grease sealing cover.
Installation bolt	Torque wrench	Check for loosening of bolt, and tighten additionally as necessary.
Use environment	By sight	Check the ambient temperature and humidity, and make sure that dirt, dust, or foreign substance is not found.

When disassembly, troubleshooting, etc., is needed, be sure to contact our service department or the sales agent of purchase.



Conformance to EU directive and UL standard

EU Directives

The EU directives apply to all such electronic products as those having specific functions and directly sold to general consumers in EU countries. These products are required to meet the EU unified standards and to be furnished with CE marking. Our brushless motor and amplifier meet the EU Directives for Low Voltage Equipment so that the machine or equipment comprising our brushless motor and amplifier can meet relevant EU Directives.

EMC Directives

Our brushless motor can meet EMC Directives and related standards. However, to meet these requirements, the systems must be limited with respect to configuration and other aspects, e.g. the installation and some special wiring conditions must be met. This means that in some cases machines and equipment comprising our brushless systems may not satisfy the requirements for wiring and grounding conditions specified by the EMC Directives. Therefore, conformance to the EMC Directives (especially the requirements for emission noise and noise terminal voltage) should be examined based on the final products that include our system.

Applicable standard

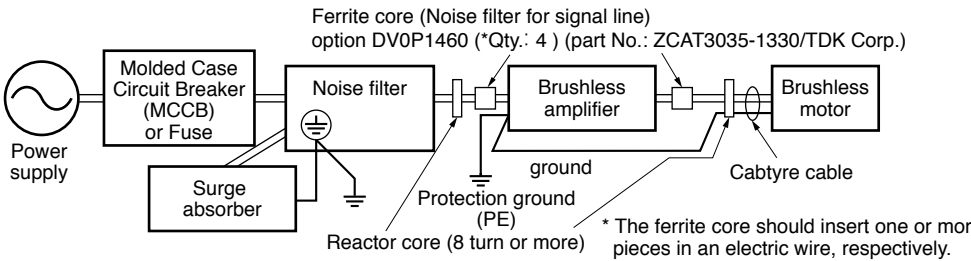
Marking	Applicable standard	
UL	UL1004	Standard for electric motor
CSA (c-UL)	C22.2 No.100	Standard for electric motor
CE/UKCA	EN60034-1 EN60034-5	Standard for rotary electric machine (low voltage directive) Standard for rotary electric machine (low voltage directive)
CCC	GB12350	Safety standard for low-power electric motor

Configuration of peripheral equipment

Power supply	· 100 V system: Single phase 100 V to 120 V ± 10 %, 50 Hz/60 Hz 200 V system: Single phase/ 3-phase 200 V to 240 V ± 10 %, 50 Hz/60 Hz · Use the equipment under the environment of overvoltage category II specified by IEC60664-1. In order to obtain overvoltage category III, insert a transformer conforming to EN standard or IEC standard to the input of brushless amplifier. · Use an electric wire size suitable to EN60204-1.
Circuit breaker Fuse	Be sure to connect a specified no-fuse breaker certified by IEC standard or UL, or a fuse certified by UL between power supply and noise filter. Meeting this condition allows conformance with UL508C (file No. E164620) and UL1004 (file No. E166557).
Noise filter	When installing one noise filter at the power supply for more than one brushless motor used, contact the manufacturer of noise filter.
Surge absorber	Install a surge absorber on the primary side of noise filter. However, in performing the voltage resistance test of machine and equipment, be sure to remove the surge absorber; otherwise, the surge absorber may be ruptured.
Grounding	Be sure to connect the grounding Terminal of brushless amplifier and protective grounding wire (PE) of system for preventing electric shock. Do not tighten the grounding wires together but connect them individually.

Conformance to EU directive and UL standard/ Specifications

Wiring of peripheral equipment



Specifications

General specification

Model name		Rated output (W)	Power input			Motor Rated Current (A)	Rated torque (N·m)	Starting torque (N·m)	Rated rotation speed (r/min)
Brushless * motor	Brushless * amplifier		Voltage (V)	Tolerance (%)	Frequency (Hz)				
MBMS5AZBL○	MBEK5A1BCV	50	Single phase 100 to 120	±10	50/60	0.74	0.16	0.30	3000
MBMS5AZBL○	MBEK5A5BCV		Single/3-phase 200 to 240			0.74			
MBMS011BL○	MBEK011BCV	100	Single phase 100 to 120			1.4	0.32	0.70	
MBMS012BL○	MBEK015BCV		Single/3-phase 200 to 240			0.76			
MBMS021BL○	MBEK021BCV	200	Single phase 100 to 120			2.9	0.64	1.4	
MBMS022BL○	MBEK025BCV		Single/3-phase 200 to 240			1.8			
MBMS042BL○	MBEK045BCV	400	3-phase 200 to 240			2.8	1.27	3.0	
MBMS082BL○	MBEK083BCV	750	3-phase 200 to 240			3.6	2.4	5.2	

- \* A symbol in ○ of a motor part number represents structure of the motor.
- Use only the specified amplifier: a wrong combination of amplifier and motor will result in system failure.

Common specification

Item	Specifications							
Brushless motor	MBMS 5AZBL○		MBMS 011BL○	MBMS 012BL○	MBMS 021BL○	MBMS 022BL○	MBMS 042BL○	MBMS 082BL○
Brushless amplifier	MBEK 5A1BCV	MBEK 5A5BCV	MBEK 011BCV	MBEK 015BCV	MBEK 021BCV	MBEK 025BCV	MBEK 045BCV	MBEK 083BCV
Rated output (W)	50		100		200		400	750
Rated speed	3000 r/min							
Speed control range	100 r/min to 4000 r/min (Speed ratio 1:40)							
Motor heat resistance class	130 (B) (UL certified 105 (A))							
Time rating	Continuous							
Motor mass (kg)	0.32	0.63	0.63	0.8	0.8	1.2	2.3	
Motor mass (kg) with Brake	0.53	1.1	1.1	1.3	1.3	1.7	3.1	

\* A symbol in ○ of a motor part number represents structure of the motor.

# Built-in Holding Brake

## Outline / Specifications

In the applications where the motor drives the vertical axis, this brake would be used to hold and prevent the work (moving load) from falling by gravity while the power to the brushless amplifier is shut off.

**Use this built-in brake for "Holding" purpose only, that is to hold the stall status. Never use this for "Brake" purpose to stop the load in motion.**

## Brake release / application timing

### Brake release timing

- Release the brake (energize) before the motor starts running.

### Brake application timing

- Internal brake is designed for holding and not for braking.
- Arrange the circuit so that the brake is applied (de-energized) after the motor stops.
- Motor is in free-running condition while the amplifier protection function is active (trip).
- When the work (moving member) has potential risk of falling, design the brushless amplifier so that it outputs trip signal; and provide a sequence which actuates the brake by using this signal.

#### <Note>

- The lining sound of the brake (chattering and etc.) might be generated while running the motor with built-in brake, however this does not affect any functionality.
- Magnetic flux might be generated through the motor shaft while the brake coil is energized (brake is open). Pay an extra attention when magnetic sensors are used nearby the motor.

## Specifications of Built-in Holding Brake

Size mm	Motor output	Static friction torque N·m	Rotor inertia ×10 <sup>-4</sup> kg·m <sup>2</sup>	Engaging time ms	Releasing time ms	Exciting current DC A (at cool-off)	Releasing voltage	Permissible work (J) per one braking	Permissible total work × 10 <sup>3</sup> J	Permissible angular acceleration rad/s <sup>2</sup>
38 sq.	50 W	0.29 or more	0.002	35 or less	20 or less	0.30	DC 1 V or more	39.2	4.9	10000
60 sq.	100 W	0.29 or more	0.020	50 or less	50 or less	0.29	DC 1 V or more	137	44.1	
	200 W 400 W	1.27 or more	0.018	50 or less	15 or less	0.36	DC 1 V or more	137	44.1	
80 sq.	750 W	2.45 or more	0.075	70 or less	20 or less	0.42	DC 1 V or more	196	147	

- Excitation voltage is DC24 V±5 %.
- Releasing time values represent the ones with DC-cutoff using a varistor.
- Above values (except static friction torque, releasing voltage and excitation current) represent typical values.
- Backlash of the built-in holding brake is kept ±1 ° or smaller at ex-factory point.
- Service life of the number of acceleration/deceleration with the above permissible angular acceleration is more than 10 million times. (Life end is defined as when the brake backlash drastically changes.)

# Cautions for Proper Use

## Cautions for Proper Use

- Practical considerations for exporting the product or assembly containing the product  
When the end user of the product or end use of the product is associated with military affair or weapon, its export may be controlled by the Foreign Exchange and Foreign Trade Control Law. Complete review of the product to be exported and export formalities should be practiced.
- Parts are subject to minor change to improve performance.
- This product is intended to be used with a general industrial product, but not designed or manufactured to be used in a machine or system that may cause personal death when it is failed.
- Install a safety equipments or apparatus in your application, when a serious accident or loss of property is expected due to the failure of this product.
- If you are planning to use this product under special environment, such as atomic power control, aerospace equipment, traffic organization, medical equipment, various safety systems, and equipment which requires cleanliness, please contact us.
- We have been making the best effort to ensure the highest quality of the products, however, application of exceptionally larger external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- When this product is operated without the shaft electrically grounded, such as in driving the fan, bearing noise may become higher due to the occurrence of electrocorrosion depending on the motor used or setting environment, so confirm and verify the condition on the customer side in such a case.
- Failure of this product depending on its content, may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using in an environment with high concentrations of sulphur or sulphuric gases, as sulphuration can lead to disconnection from the chip resistor or a poor contact connection.
- Take care to avoid inputting a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may result in damage to the internal parts, causing smoking and/or a fire and other trouble.

English



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MEMO

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MEMO

# After-Sale Service (Repair)

## Repair

Consult to a dealer from whom you have purchased the product for details of repair. When the product is incorporated to the machine or equipment you have purchased, consult to the manufacuter or the dealer of the machine or equipment.

## Technical information

Technical information of this product (Instruction Manual, CAD data) can be downloaded from the following web site.  
[industrial.panasonic.com/ac/e/](http://industrial.panasonic.com/ac/e/)

■ Authorized Representative in EU  
Panasonic Marketing Europe GmbH  
Panasonic Testing Centre  
Winsbergring 15, 22525 Hamburg, Germany

■ Authorized Representative in UK  
Panasonic UK, a branch of Panasonic  
Marketing Europe GmbH, Maxis 2,  
Western Road, Bracknell, Berkshire, RG12 1RT

### For your records:

The model number and serial number of this product can be found on either the back or the bottom of the unit. Please note them in the space provided and keep for future reference.

Model No.	MBMS <input type="text"/> <input type="text"/> <input type="text"/> BL <input type="text"/>	Serial No.	
Date of purchase			
Dealer	Name		
	Address		
	Phone	(       )       -	

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