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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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### Safety Precautions

- Important Notes on exporting this product or equipment containing this product;  
If the end-user or application of this product is related to military affairs or weapons, its export may be controlled by "Foreign Exchange and Foreign Trade Control Law" of Japan where export license will be required before product can be exported from Japan.
- This product is designed and manufactured for use in General Purpose Industrial Equipment and it is not intended to be used in equipment or system that may cause personal injury or death.
- All servicing such as installation, wiring, operation, maintenance and etc., should be performed by qualified personnel only.
- Tighten mounting screws with an adequate torque by taking into consideration strength of the screws and the characteristics of material to which the product will be mounted. Over tightening can damage the screw and/or material; under tightening can result in loosening.  
\*Example: apply 2.7 N·m – 3.3 N·m torque when tightening steel screw (M5) to steel surface.
- Install safety equipment to prevent serious accidents or loss that is expected in case of failure of this product.
- Consult us before using this product under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of our products, however, some applications with exceptionally large 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.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- 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 the product in an environment with high concentrations of sulfur or sulfuric gases, as sulfuration can lead to disconnection from the chip resistor or a poor contact connection.
- Do not input a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may lead to damage of the internal parts, causing smoke and/or fire and other troubles.
- The user is responsible for matching between machine and components in terms of configuration, dimensions, life expectancy, characteristics, when installing the machine or changing specification of the machine. The user is also responsible for complying with applicable laws and regulations.
- Manufacturer's warranty will be invalid if the product has been used outside its stated specifications.
- Component parts are subject to minor change to improve performance.
- Read and observe the instruction manual to ensure correct use of the product.

#### Repair

Consult to the dealer from whom you have purchased this product for details of repair work.  
When the product is incorporated to the machine you have purchased, consult to the machine manufacturer or its dealer.

#### URL

Electronic data of this product (Instruction Manual, CAD data) can be downloaded from the following web site;  
<<http://industrial.panasonic.com/ww/products/motors-compressors/fa-motors>>

Contact :



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Automotive & Industrial Systems Company,  
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The contents of this catalog apply  
to the products as of April 2015.

- This product is for industrial equipment. Don't use this product at general household.
- Printed colors may be slightly different from the actual products.
- Specifications and design of the products are subject to change without notice for the product improvement.



# BRUSHLESS MOTOR

GV series  
MINAS-BL KV series  
GP series

# Compact and high-efficiency brushless motors

High-efficiency energy saving eco-friendly MINAS series\* technology adopted more compact and higher-output brushless motors.

\* MINAS series is a registered trademark for Panasonic AC servo motors.



•90 mm square 130 W



•60 mm square 200 W



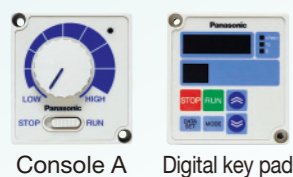
•80 mm square 50 W

MINAS-BL **GV** series  
Speed Control Type 50 W to 130 W

MINAS-BL **KV** series  
Speed Control Type 50 W to 750 W

MINAS-BL **GP** series  
Position Control Type 50 W to 130 W

### Typical options



Power Supply DC 24 V Type  
•80 mm square 50 W only



GV series, input voltage 24 V type made to order item. Please contact us if you'd like detailed information

### Typical options



### Typical options



# MINAS-BL

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# Motor Business coexisting

# with Global Environment

**Panasonic Corporation, Automotive & Industrial Systems Company, Smart Factory Solutions Business Division, Motor Business Unit promotes preservation of the environment together with industrial activities and aims to “Company Coexisting with Global Environment”**

### Basic attitude

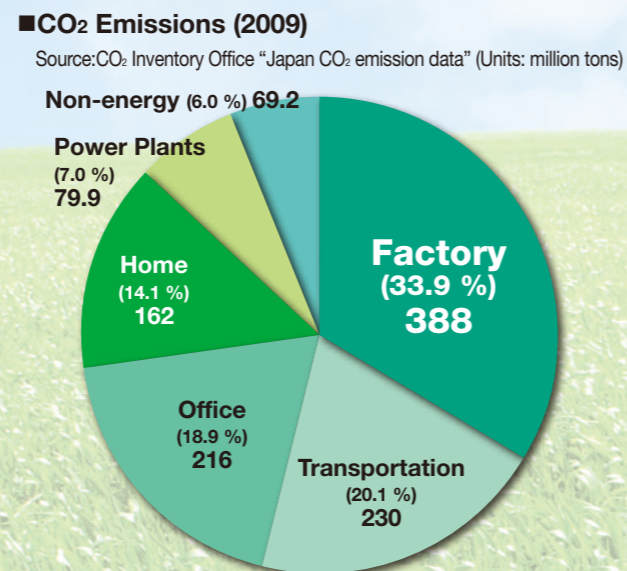
Based on “Environmental Declaration” of Panasonic, Smart Factory Solutions Business Division, Motor Business Unit of Automotive & Industrial Systems Company also established the “Environmental Policy” as the basic attitude to environmental conservation. Based on this, we create more specific policies and manuals, and have been promoting environmental conservation activities.

### Environmental Policy

Motor Business Unit of Smart Factory Solutions Business Division of Automotive & Industrial Systems Company of Panasonic Corporation recognizes that the preservation of global environment is the important mission as a good corporate citizen of society. Our philosophy is “Coexisting with the Global Environment”, and run sound business activities harmonized with nature.

## Environmental conservation activities in industrial field

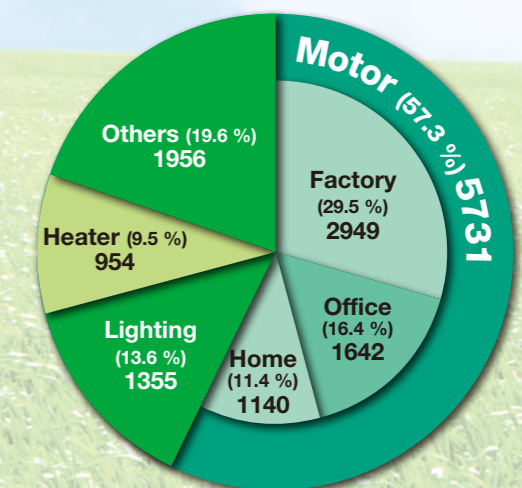
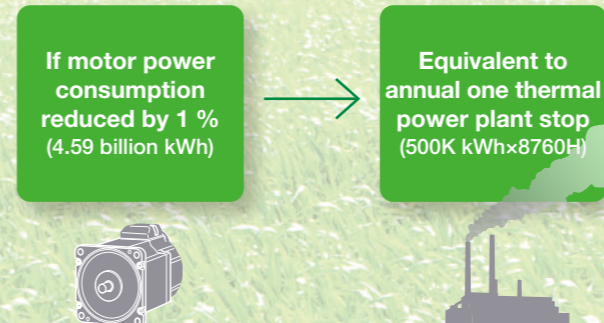
Environmental conservation activities have been required widely from home level to company level nowadays, and the role of conservation in the industrial sector has become more important. Total emissions of CO<sub>2</sub> in 2009 in Japan were approximately 1.1 billion tons, out of which 380 million tons belong to factory and industrial field. It has become a huge amount which significantly exceeded transportation and business sectors.



## Motor holds the key to global environmental protection

From small one used in mobile phones, to big one used in factories, motor has become indispensable in every aspect of our society. It has been consuming more than half part of electricity in Japan which is equal to 573 billion kWh.

■ Japan Domestic electricity consumption (2005)  
Source: Motor Business Unit Research (Units: Hundred million kWh)



**With the spread of high-efficiency motors that minimizes the loss of electrical energy, We aim to achieve significant energy savings for the entire industry.**



# Brushless motors of MINAS-BL series

# realize “Three Savings”.

Commutation brushless motor with advanced controlling technology features high efficiency and low power loss.

In addition, “Split Core Structure” developed for and proven in

MINAS series AC servo motors is introduced to these new brushless motors to further reduce their sizes but increase power.

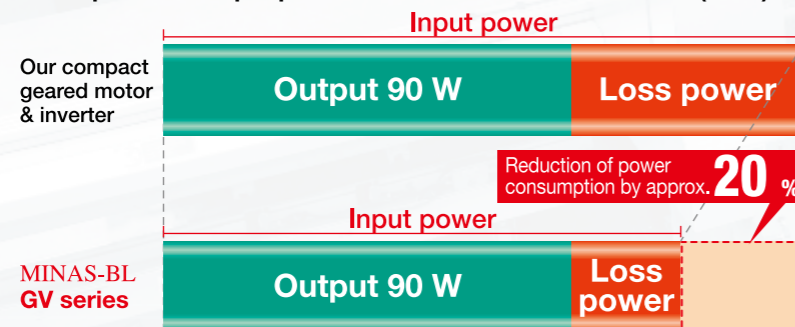
These motors promote “three saving” activities  
— Energy saving, Cost saving and Space saving.

## Energy Saving

### GV KV GP Reduce loss and increase efficiency

A permanent magnet on a rotor reduces secondary loss. It also reduces power consumption by 20 % compared with those of our small geared motors.

■ Comparison of input power with our conventional motors (90 W)



Energy saving effects are significantly seen when these new models are used on multi-axis machines, e.g. textile machinery.

## Space Saving



▲ Split core structure

### GV KV GP For simultaneous pursuit of miniaturization and high power

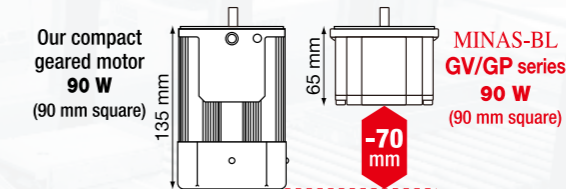
“Split core structure” developed for and proven in MINAS series AC servo motors is introduced to these new models to significantly reduce size and weight but increase output power compared with induction motors.

■ Comparison in size between GV/GP series and our compact geared motors (90 W)

Reduction in profile by approx. 55 %

■ Comparison in mass between GV/GP series and our compact geared motors

Lighter by approx. 1/3



Comparison of KV series with general purpose induction motors:  
Approx. 1/7 in volume and approx. 1/4 in mass

Output	GV/GP series (motor)	Our compact geared motor
50 W	0.7 kg	2.4 kg(40 W)
90 W	1.0 kg	3.2 kg
130 W	1.2 kg	—

• The size of a GV/GP series brushless amplifier is almost equal to that of a postcard and weights approx. 370 g.

Enable downsizing of embedded device.

## Cost Saving

### GV KV GP They also reduce maintenance and setup cost.

Commutatorless and brushless design reduces associated costs such as maintenance cost. Our setup support software helps prompt startup and reduction in operation management process.

■ Setup support software PANATERM for BL



▲ Parameter setting  
File saving (Batch reading/writing)



▲ Waveform graphical display  
Example: Velocity and torque  
Status of I/O can also be monitored.

The PANATERM for BL allows easy setup of parameters. Waveform graphical display can be used for precisely and accurately monitoring motor conditions, reducing setup and maintenance workload.

## MINAS-BL series Provide More Features

### GV GP

Speed control range **30 r/min ~4000<sup>\*1</sup> r/min**  
Proprietary CS sensor for sinewave driving  
**Wide 1:133 variable speed range**

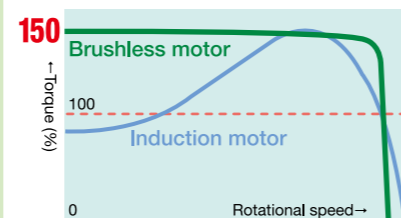
<sup>\*1</sup> Rated rotational speed: 3000 r/min

### GV KV GP

Start torque **150 %** (comparison of rated values)  
Unlike induction motor  
**Stable operation startup at lower speed**

### GV KV GP

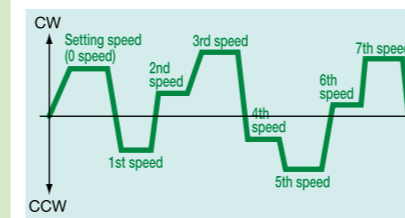
## Flat torque characteristic



Proprietary CS sensor for  
**Smooth operation**

### GV KV

## 8-speed operation

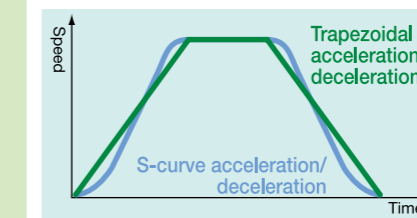


Stable operation maintains high productivity and yield ratio.  
**The speed is regulated at 0.5 % or less variation.<sup>\*2</sup>**

<sup>\*2</sup> Within rated torque

### GP

## Positioning at 4 points



Not only trapezoidal waveform,  
**S-curve acceleration/deceleration can be set.**

### GV KV GP

## Compatible with international standards



**Compatible with wider power source voltage range**  
(Single-phase: 100 V ~120 V  
Single-/Three-phase: 200 V ~240 V)

# Speed Control Type

GV series KV series



•90 mm square 130 W

MINAS-BL **GV** series

Speed Control Type 50 W to 130 W



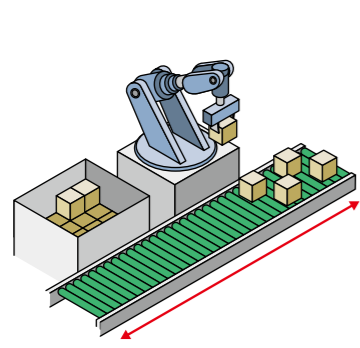
•60 mm square 200 W

MINAS-BL **KV** series

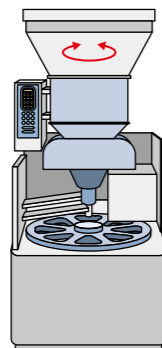
Speed Control Type 50 W to 750 W

- High efficiency brushless motors realize energy saving.
- Distinctively controlled CS signal provides smooth operation through sinewave driving.
- Compatible with international standards (CE, UL, CCC and KC), and wider power source voltage range.
- The digital keypad (sold separately) and setup support software PANATERM for BL (available from our website, free of charge) enable parameter setting and monitoring.
- The proprietary CS sensor extends variable speed control range.
- Installation compatibility:GV series is compatible with our compact geared motors  
KV series is compatible with our AC servo motors
- Environmental protection: IP65

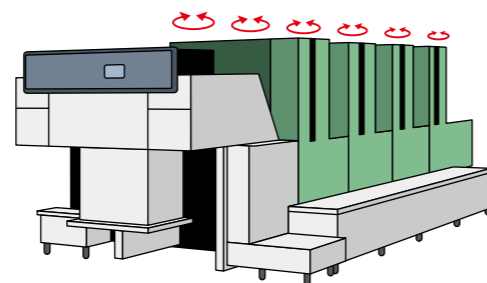
## Typical applications



Conveyor



Food processor (agitating)



Textile machinery

# Position Control Type

GP series



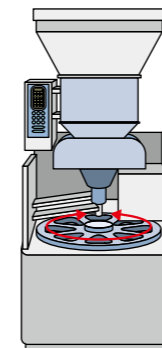
•80 mm square 50 W

MINAS-BL **GP** series

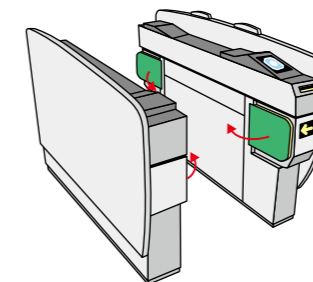
Position Control Type 50 W to 130 W

- Simple NC function enables easier positioning without help of a pulse unit.
- The proprietary CS sensor enables positioning without help of an external encoder.
- Compatible with international standards (CE, UL, CCC and KC), and wider power source voltage range.
- Internal teaching capability simplifies positioning operation.
- The digital keypad (sold separately) and setup support software PANATERM for BL (available from our website, free of charge) enable parameter setting and monitoring.
- Installation is compatible with our compact geared motors.
- Environmental protection: IP65

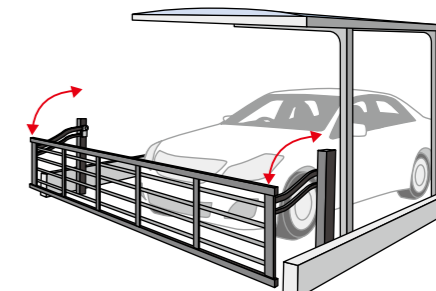
## Typical applications



Food processor (turntable)



Automatic ticket gate



Gate

# MINAS-BL **GV** series

Speed Control Type 50 W to 130 W

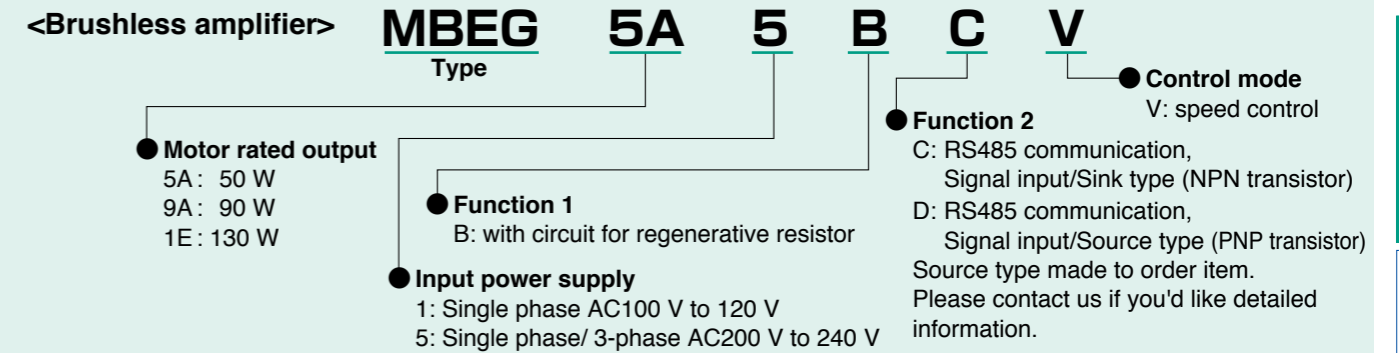
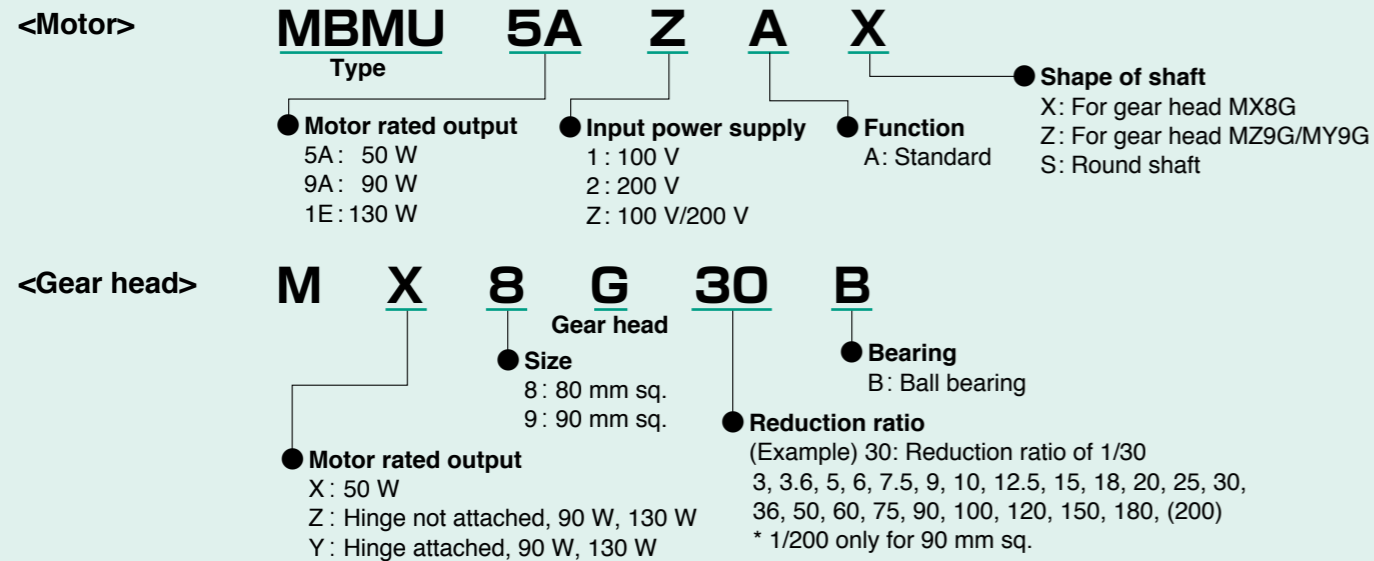
# GV series



• 90 mm square 130 W

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## Check the model number



## Brushless motor specifications

Item	Specifications				
	80 mm sq.		90 mm sq.		
Flange size	80 mm sq.		90 mm sq.		
Motor model No. *1	MBMU5AZA○	MBMU9A1A○	MBMU9A2A○	MBMU1E1A○	MBMU1E2A○
Motor rated output (W)	50		90		130
Voltage (V)	for 100/200		for 100	for 200	for 100 for 200
Rated torque (N·m)	0.16		0.29		0.41
Starting torque*2 (N·m)	0.24		0.43		0.62
Rated input current (A(rms))	0.53		1.00	0.50	1.30 0.72
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )	0.12		0.27		0.36
Rating	Continuous				
Rated rotation speed*3 (r/min)	3000				
Speed control range (r/min)	30 to 4000				
Ambient temperature	-10 °C to +40 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the motor.				
Ambient humidity	20 % to 85 % RH (free from condensation)				
Altitude	Lower than 1000 m				
Vibration	4.9 m/s <sup>2</sup> or less X, Y, Z				
Motor insulation class	130(B) (UL certified 105 (A))				
Protection structure	IP65*4,5				
Number of poles	8				
Motor mass (kg)	0.7	1.0		1.2	

\*1 Suffix of "○" in the motor model represents shape of shaft.

\*2 Representative value

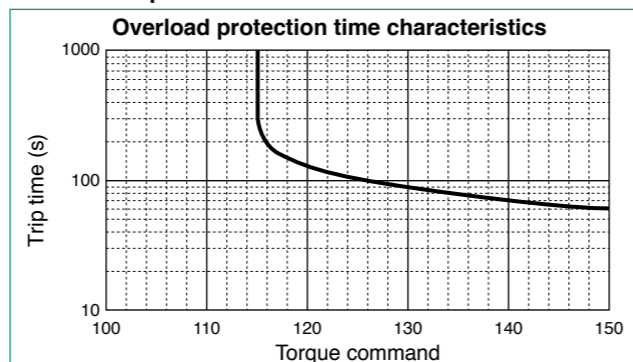
\*3 Motor shaft speed: to be multiplied by the reduction ratio when the gear head is used.

\*4 Excluding the shaft pass-through section and cable end connector.

\*5 These motors conform to the test conditions specified in EN standards (EN60529, EN60034-5).

Do not use these motors in application where water proof performance is required such as continuous wash-down operation.

### Overload protection characteristics



## Brushless amplifier specifications (GV series)

Item	Specifications								
	MBEG5A1BCV	MBEG5A5BCV	MBEG9A1BCV	MBEG9A5BCV	MBEG1E1BCV	MBEG1E5BCV			
Amplifier model No.	MBMU5AZA○		MBMU9A1A○		MBMU9A2A○		MBMU1E1A○ MBMU1E2A○		
Applicable Motor*1	MBMU5AZA○		MBMU9A1A○		MBMU9A2A○		MBMU1E1A○ MBMU1E2A○		
Motor rated output (W)	50			90			130		
Input power supply voltage (V)	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240
Frequency (Hz)	50/60								
Rated input current (A)	1.5	0.7	0.35	2.2	1.1	0.5	2.8	1.5	0.7
Voltage tolerance	±10 %								
Control method	Speed control by CS signal, PWM sine wave driving system								
Ambient temperature	0 °C to +50 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the amplifier.								
Ambient humidity	20 % to 85 % RH (free from condensation)								
Location	Indoor (No corrosive gas, A place without garbage, and dust)								
Altitude	Lower than 1000 m								
Vibration	5.9 m/s <sup>2</sup> or less (10 Hz to 60 Hz)								
Protection structure/ Cooling system	Equivalent to IP20/ Self cooling								
Storage temperature	Normal temperature * Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)								
Storage humidity	Normal humidity								
Rated rotation speed	3000 r/min								
Speed control range	30 r/min to 4000 r/min (Speed ratio 1:133)								
Speed fluctuation factor	With load		±0.5 % or below (at 0 to Rated torque, Rated rotation speed)						
	With voltage		±0.5 % or below (at supply voltage ±10 %, rated rotation speed)						
	With temperature		±0.5 % or below (at 0 °C to 50 °C, rated rotation speed)						
Acceleration/ Deceleration time	0.01 sec to 300 sec (time for changing 1000 r/min)*2								
Stopping procedure	Slowdown stop/ Free-run stop*2								
Speed setting	0 r/min to 4000 r/min (analogue voltage (0 V to 5 V), console A), 0 r/min to 4000 r/min (Setting selection by parameter on Digital key pad)								
Speed setting resolution	Analog: approx. 1/200 of upper speed limit Digital: 1 r/min								
Speed setting precision (at 20 °C)	Analog: ±3 % or below of upper speed limit (±90 r/min or below at upper speed limit 3000 r/min) [Digital: 1 % or below of upper speed limit ]								
Operation mode	8 speed								
Signal input	5 inputs*2 (run/ stop, CW run/ CCW run, multi function 3bit)								
Signal output	2 outputs (Open collector)*2 (Trip output etc)								
Communication function	RS485		Max 31 units. Setting of parameter, monitoring of control condition. Communication speed: Choose from 2400 bps/ 4800 bps/ 9600 bps						
	RS232		Setting of parameter and monitoring of control condition are enabled with commercial PC.*3						
Digital key pad	Setting of parameter, monitoring of control condition.*4								
Protective function	Warning : Undervoltage*2, Overload warning, setting change warning Protect : Undervoltage*2, Overload, Overcurrent, Overvoltage, Overheat, Overspeed, Sensor error, RS485 communication error, External forced trip error, User parameter error, CPU error								
Regenerative brake	Regenerative braking resistor can be externally connected.*5 Instantaneous braking torque 200 %, Continuous regenerative ability of external regenerative resistor: 10 W (Regenerative operation with which motor shaft is rotated by load, e.g. load lowering operation, should not be continued.)								
Protection level	Protection level: torque command 115 (inverse time characteristics)								
Amplifier mass (kg)	0.37								

\*1 Suffix of "○" in the motor model represents shape of shaft. \*2 Can be changed from PANATERM for BL or Digital key pad.

\*3 PANATERM for BL (Download from our web site.), PC connection cable (DV0P4140), Digital key pad connection cable (DV0P383\*0) is required. If your PC does not have RS232 port, use RS232-USB converter.

\*4 Digital key pad connection cable (DV0P383\*0) is required. \*5 Use optional external regenerative resistor (sold separately).



## System configuration

Power supply	Rated rotation speed (r/min)	output (W)	Motor	Gear head (Note 1)	Brushless amplifier	Optional parts				
						Brushless amplifier (supplied with power cable) (Note 2)	External regenerative resistor	Noise filter	Surge absorber	Reactor
						Reference page p. 74	p. 71	p. 67	p. 67	p. 73
Single phase 100 V	3000	50	MBMU5AZAX	MX8G□B	MBEG5A1BCV	MBEG5A1BCVC	for 100 V DV0P2890	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227
			MBMU5AZAS	—						
		90	MBMU9A1AZ	MZ9G□B MY9G□B	MBEG9A1BCV	MBEG9A1BCVC				
			MBMU9A1AS	—						
		130	MBMU1E1AZ	MZ9G□B MY9G□B	MBEG1E1BCV	MBEG1E1BCVC				
			MBMU1E1AS	—						
Single/3-phase 200 V	3000	50	MBMU5AZAX	MX8G□B	MBEG5A5BCV	MBEG5A5BCVC	for 200 V DV0PM20068	for single phase power supply DV0P4170 for 3-phase power supply DV0PM20042	for single phase power supply DV0P4190 for 3-phase power supply DV0P1450	for single phase power supply DV0P227 for 3-phase power supply DV0P220
			MBMU5AZAS	—						
		90	MBMU9A2AZ	MZ9G□B MY9G□B	MBEG9A5BCV	MBEG9A5BCVC				
			MBMU9A2AS	—						
		130	MBMU1E2AZ	MZ9G□B MY9G□B	MBEG1E5BCV	MBEG1E5BCVC				
			MBMU1E2AS	—						

(Note 1) A figure representing reduction ratio in □.

(Note 2) Refer to p. 74 for a power supply connecting cable.

This part number is the ordering part number for the amplifier and power cable, not for ordering amplifier only.

The supplied power connecting cable is for single-phase input, when supplying three-phase power; please make a cable using optional power connection kit (DV0P2870).

\* When installing the reactor, refer to p. 73.

\* Be sure to use a set of matched components (series, power source, capacity, output, etc.)

\* This motor is not provided with a holding brake. If it is used to drive a vertical shaft, the movable section may fall down by its own weight as power is turned off.

### Options

Optional parts	Parts number	Reference page	Optional parts	Parts number	Reference page	
Motor extension cable	1 m	DV0PQ1000110	Digital key pad connection cable	1 m	DV0P38310	
	3 m	DV0PQ1000130		3 m	DV0P38330	
	5 m	DV0PQ1000150		5 m	DV0P38350	
	10 m	DV0PQ10001A1				
Power supply connector kit	DV0P2870	P.70	External speed setter	DV0PM20078	P.71	
Console A <sup>1</sup>	DV0P3500	P.68	Control signal cable	2 m	DV0PM20076	P.70
Console A connection cable	1 m	DV0PM2006910	I/O connector kit	DV0PM20070	P.71	
	3 m	DV0PM2006930	Panel connector kit	DV0P3610	P.71	
	5 m	DV0PM2006950	PC connection cable <sup>3</sup>	1.5 m	DV0P4140	P.70
Digital key pad <sup>2</sup>	DV0P3510	P.68	Noise filter for signal line	DV0P1460	P.67	
			DIN rail mounting unit	DV0P3811	P.72	

\* For details of cable, refer to p. 68 to p. 70.

\*1 When using Console A, the Console A connection cable (DV0PM20069\*0) is required.

\*2 When using Digital key pad, the Digital key pad connection cable (DV0P383\*0) is required.

\*3 When connecting PC, the PC connection cable (DV0P4140) and the Digital key pad connection cable (DV0P383\*0) are required.

### Wiring equipment

Selection of circuit breaker (MCCB), magnetic contactor and electric wire. (To check conformity with international standards, refer to p. 93 Conformity with international safety standards.)

Voltage	Power capacity	MCCB Rated current	Magnetic contactor Rated Current (Contact composition)	Core of electric wire (mm <sup>2</sup> )	
				Main circuit, Grounding	Control circuit
Single phase 100 V	50 W to 130 W	5 A	20 A (3P+1a)	0.5 (AWG20)	0.13 (AWG26)
Single phase 200 V					
3-phase 200 V					

■ Be sure to connect the earth terminal to ground.

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.

#### Selection of relay

A relay used in a control circuit, e.g. at the control input terminal should be small signal relay (Min. guaranteed current 1 mA or less) for positive contact. <Example> Panasonic: DS type, HC type OMRON: G2A type

#### Selection of control circuit switch

When using a switch in place of relay, select a switch rated at minute electric current, to assure positive contact.

<Example> Nihon Kaiheiki Ind.: M-2012J-G

#### The wiring of SER and I/O connector

The wiring of SER and I/O connector should separate from power line to prevent malfunction.

#### Wiring to the I/O connector

Permissible length for control signal cable is 5 m or less.

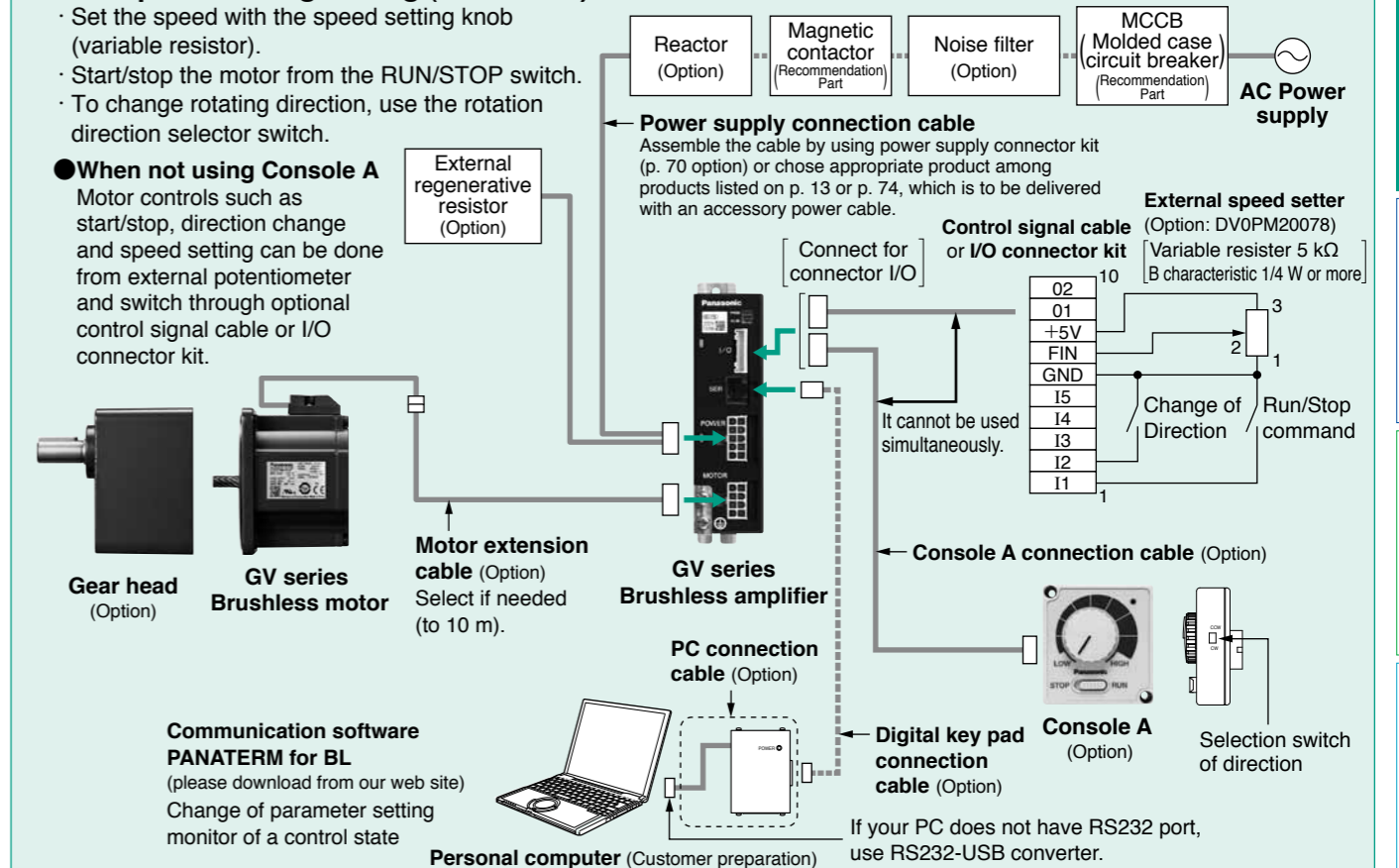
## System configuration diagram

### Example of analog setting (Console A)

- Set the speed with the speed setting knob (variable resistor).
- Start/stop the motor from the RUN/STOP switch.
- To change rotating direction, use the rotation direction selector switch.

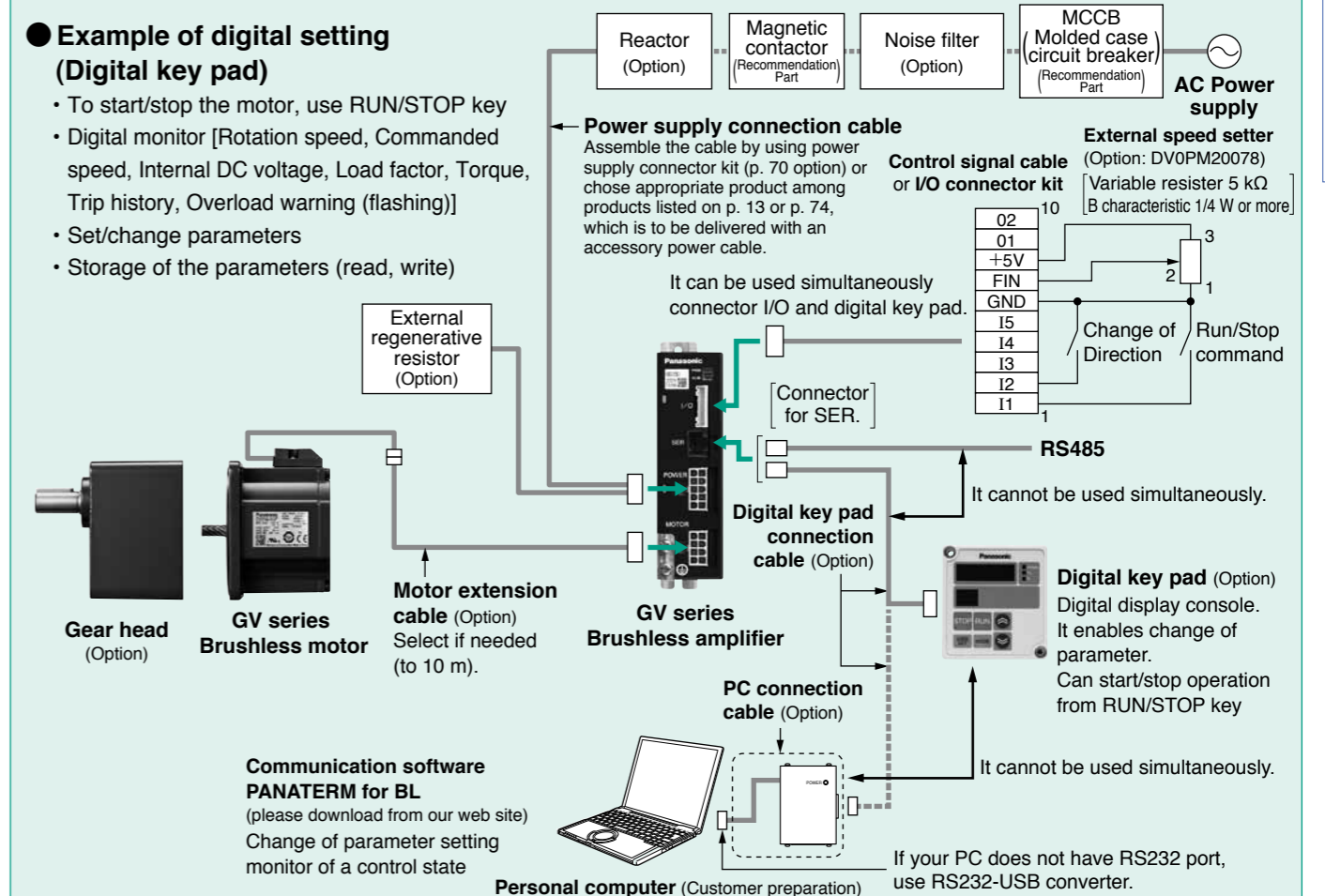
### When not using Console A

Motor controls such as start/stop, direction change and speed setting can be done from external potentiometer and switch through optional control signal cable or I/O connector kit.

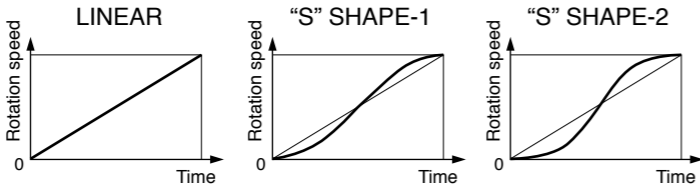
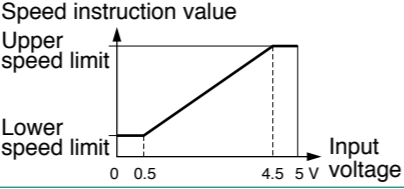


### Example of digital setting (Digital key pad)

- To start/stop the motor, use RUN/STOP key
- Digital monitor [Rotation speed, Commanded speed, Internal DC voltage, Load factor, Torque, Trip history, Overload warning (flashing)]
- Set/change parameters
- Storage of the parameters (read, write)

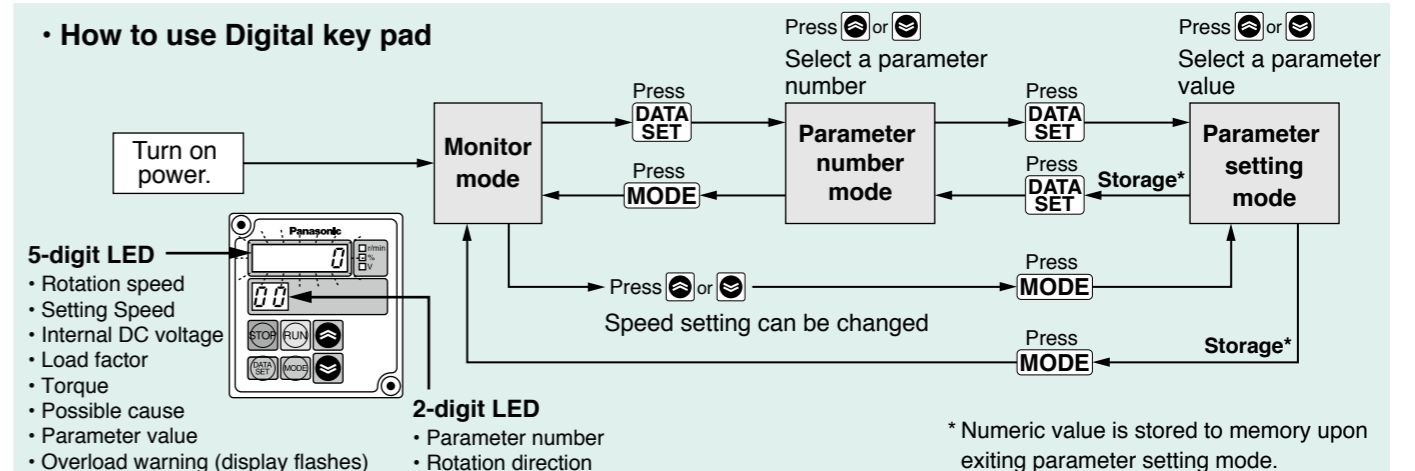


# Parameter list of brushless amplifier

Parameter No.	Parameter name	Explanation	Setting range																												
00	Internal speed (0-th speed)	Desired running speed can be set with the Digital key pad.	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
01 to 07	1st speed to 7th speed	Speed in multi-speed running can be set.	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
10 11	1st acceleration time 2nd acceleration time	The change factor of output speed in acceleration can be determined. Set by time for changing 1000 r/min.	0.01 sec to 300 sec to 3 sec: Incremented by 0.01 second 3 sec to 30 sec: Incremented by 0.1 second 30 sec to 300 sec: Incremented by 1 second																												
12 13	1st deceleration time 2nd deceleration time	The change factor of output speed in deceleration can be determined. Set by time for changing 1000 r/min.																													
14 15	Acceleration mode selection Deceleration mode selection	Straight line acceleration/deceleration and curve (S-shape) acceleration and deceleration can be chosen individually for acceleration and deceleration. 	Select S-shape when "31 Speed command selection" is PnL.																												
16	Stop mode selection	You can select how to stop the motor when stop command is input: free-run stop or stop after deceleration.																													
17	Free-run waiting time	When the stop mode is set to deceleration stop, the zero speed (servo lock time) after deceleration can be adjusted.	0.0 sec to 10.0 sec [Minimum unit 0.1 sec]																												
1A	Velocity loop proportional gain	Enables setting of proportional gain of velocity amplifier.	0 to 10000 [Minimum unit 0.1]																												
1b	Velocity loop integration gain	Enables setting of integration gain of velocity amplifier.	0 to 10000 [Minimum unit 0.1]																												
30	Run command selection	Run command can be applied through: Digital key pad, input terminal "I1", "I2" or RS485 communication, whichever selected.																													
31	Speed command selection	You can choose whether to use "00 Internal speed (0-th speed)" or analog input terminal for speed command.																													
32	Operation mode selection	Parameter for choosing operation mode <table border="1" data-bbox="418 1262 1062 1560"> <thead> <tr> <th rowspan="2">Setting</th> <th rowspan="2">Operation mode</th> <th colspan="3">Function of signal input</th> </tr> <tr> <th>I3</th> <th>I4</th> <th>I5</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1st speed operation mode</td> <td></td> <td></td> <td>Free-run stop External forced trip</td> </tr> <tr> <td>2</td> <td>2nd speed operation mode</td> <td>Speed setting</td> <td></td> <td>2nd Acc./Dec. time Trip reset</td> </tr> <tr> <td>4</td> <td>4th speed operation mode</td> <td>Speed setting</td> <td>Speed setting</td> <td></td> </tr> <tr> <td>8</td> <td>8th speed operation mode</td> <td>Speed setting</td> <td>Speed setting</td> <td>Speed setting</td> </tr> </tbody> </table>	Setting	Operation mode	Function of signal input			I3	I4	I5	1	1st speed operation mode			Free-run stop External forced trip	2	2nd speed operation mode	Speed setting		2nd Acc./Dec. time Trip reset	4	4th speed operation mode	Speed setting	Speed setting		8	8th speed operation mode	Speed setting	Speed setting	Speed setting	
Setting	Operation mode	Function of signal input																													
		I3	I4	I5																											
1	1st speed operation mode			Free-run stop External forced trip																											
2	2nd speed operation mode	Speed setting		2nd Acc./Dec. time Trip reset																											
4	4th speed operation mode	Speed setting	Speed setting																												
8	8th speed operation mode	Speed setting	Speed setting	Speed setting																											
33 34 35 36	I1/I2 function selection I3 function selection I4 function selection I5 function selection	Signal input functions I1 to I5 can be individually selected.	Free-run stop External forced trip 2nd Acc./Dec. time Trip reset																												
3A	Lower speed limit	When speed command selection is set to analog, set the motor speed at 0 V input. 	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
3b	Upper speed limit	Upper limit of motor command speed.	0 r/min to 4000 r/min [Minimum unit 1 r/min]																												
3C	Torque limit	Set the upper limit of the output torque command. 100 represents the rated torque.	50 to 150 [Minimum unit 1]																												

Parameter No.	Parameter name	Explanation	Setting range
40 41	O1 function selection O2 function selection	The type of signals from output terminals "O1" and "O2" can be selected. * Do not use it for position detector and positioning.	Trip: ON, Speed is reached to a command value: ON, Running: ON, Free run: ON, CCW run: ON, CW run: ON, Load exceeds 100 %: ON, Speed pulse signal*
42 43	O1 output polarity selection O2 output polarity selection	This is a function for inverting the polarity of signal output terminal O1 and O2.	
44	Speed matching range	"Matching range" of arriving signal can be adjusted.	20 r/min to Upper speed limit [Minimum unit 1 r/min]
45	Output pulse count selection	Set the number of pulses to be output to output terminals "O1" and "O2". • When you use it in more than 3000 r/min, choose values less than 12. • Do not use "the speed pulse" of the output signal (parameter No.45) for position sensing and a positioning use.	1, 2, 3, 4, 6, 8, 12, 24
46	Monitor mode selection	You can choose description to be displayed on 5-digit LED when turning on power.	Rotation speed, Speed command, Internal DC voltage, Load factor, Torque
47 48	Numerator of display magnification factor Denominator of display magnification factor	By setting the multiplying factor of a value displayed on 5-digit LED, the rotation speed of gear output shaft and conveyor speed can be displayed.	
4A	Trip history clear	Trip history can be cleared.	
4b to 4F	Trip history 1 to Trip history 5	Trip history for 5 times in the past is stored.	
50	Undervoltage trip selection	You can select whether tripping occurs upon detection of undervoltage.	
51	Retrial selection	Automatic reset in trip (trip retrial) can be set here.	
52	Retrial start time	You can set waiting time until retrial operation is performed after tripping is found.	1 sec to 120 sec [Minimum unit 1 sec]
54	Parameter initializing	Parameters can be initialized to the factory default.	
57	Parameter copy	Parameters can be copied.	
5A	RS485 device number	Set the device number of Amplifier in communication (Amplifier ID)	
5b	RS485 communication speed	Set the communication speed of RS485 communication.	
5C	RS485 communication standard	Set the communication standard of RS485 communication.	
5d	RS485 communication response time	You can set the shortest time necessary to set the RS485 bus to transmission mode to response upon receiving communication data.	
5E	RS485 retry times of communication	Set the retry times of RS485 communication.	
5F	RS485 protocol timeout	You can set the permissible time interval between successively received character codes.	

## • How to use Digital key pad



## Specification (For Common specification, see p. 11, p. 12)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier Model number in ( ) is shipped with power connection cable	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
80 mm sq.	MBEG5A1BCV (MBEG5A1BCVC)	MBMU5AZA○	50	Single phase 100 to 120	±10	50/60	1.5	0.16	0.24	3000	4000
	MBEG5A5BCV (MBEG5A5BCVC)	MBMU5AZA○		Single phase / 3-phase 200 to 240			Single phase 0.7 3-phase 0.35				

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 11. \* Starting torque: Representative value

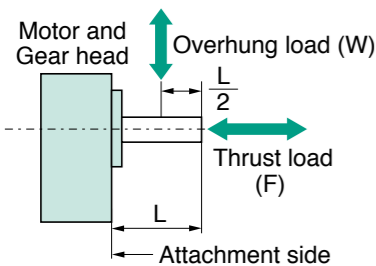
## Permissible torque at output shaft of gear head (N·m)

Applicable Gear head	Reduction ratio	Reduction ratio																							
		3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180		
MX8G□B	motor rotation speed (r/min)	3000 or less	0.39	0.46	0.64	0.77	0.96	1.16	1.29	1.61	1.92	2.33	2.59	3.23	3.61	4.33	5.93	7.29						7.84	
		3000 to 4000	0.29	0.35	0.48	0.58	0.72	0.87	0.97	1.21	1.44	1.75	1.94	2.42	2.71	3.25	4.45	5.47	6.84						7.84
Rotational direction		Same as motor rotational direction											Reverse to motor rotational direction												

## Permissible load inertia moment (×10<sup>-4</sup> kg·m<sup>2</sup>)

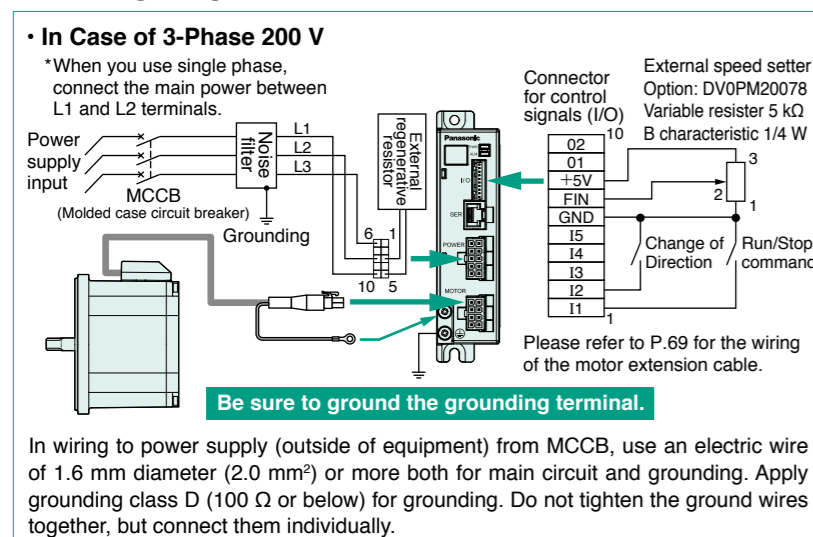
Reduction ratio	Reduction ratio																									
	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180				
Applicable Gear head																										
MX8G□B	1.25	1.79	3.42	4.90	7.72	11.2	13.8	21.6	30.6	45.2	55.8	86.9	127	183						342						

## Permissible shaft load



Motor shaft (Round shaft)	Output	Overhung load (W)	Thrust load (F)
		50 W	100 N
Applicable Gear head	MX8G□B	294 N	49 N

## Wiring diagram

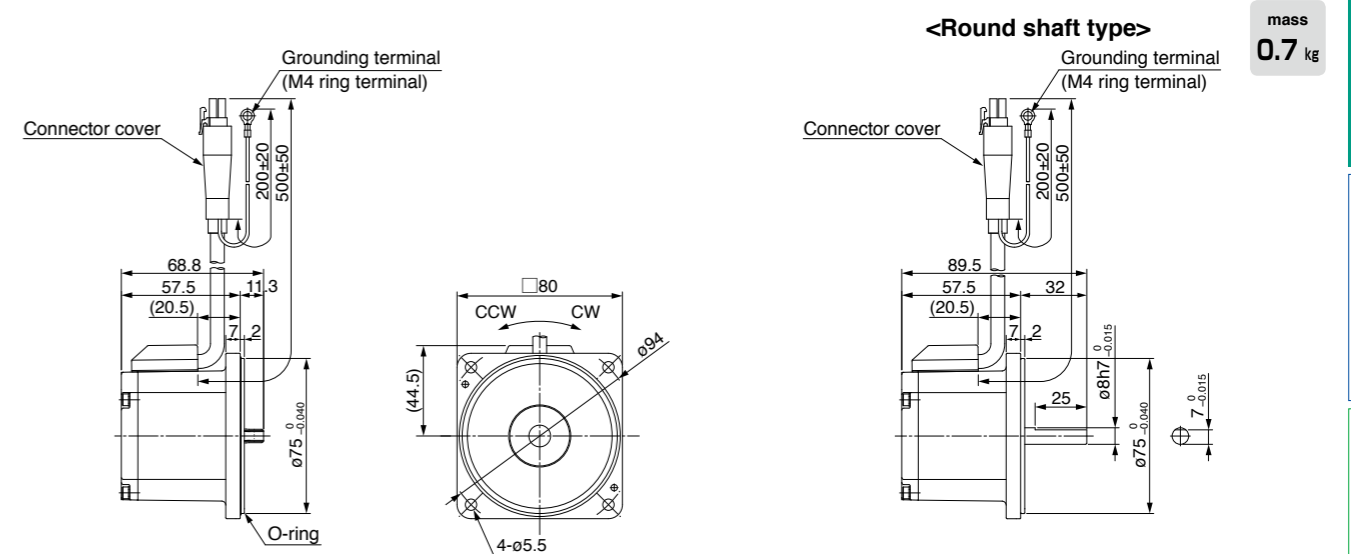


\* Please refer to P.95 Support option.

\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

## Motor (dimensions)

Unit mm

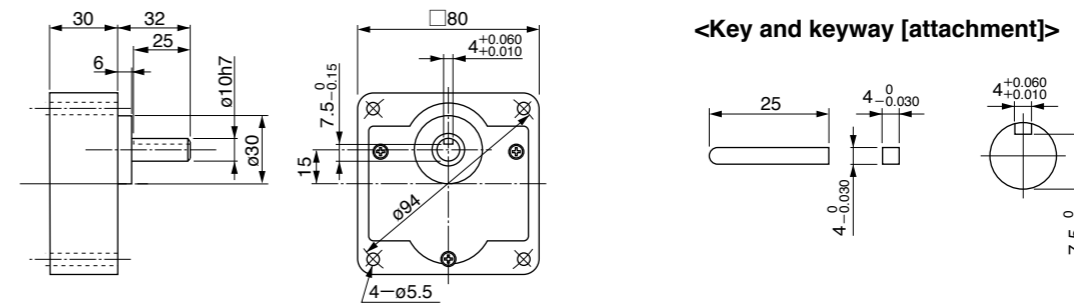


## Gear head (dimensions)

Unit mm

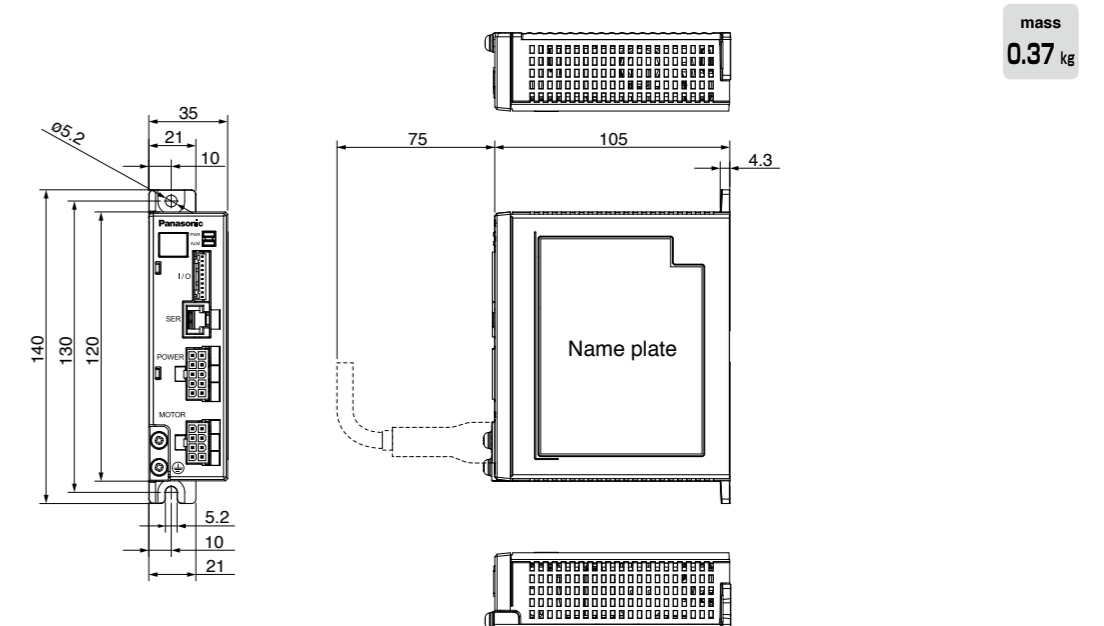
### MX8G□B

mass **0.6 kg**



## Brushless amplifier (dimensions)

Unit mm



<Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

## ■ Specification (For Common specification, see p. 11, p. 12)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier Model number in ( ) is shipped with power connection cable	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
90 mm sq.	MBEG9A1BCV (MBEG9A1BCVC)	MBMU9A1A○	90	Single phase 100 to 120	±10	50/60	2.2	0.29	0.43	3000	4000
	MBEG9A5BCV (MBEG9A5BCVC)	MBMU9A2A○		Single phase 200 to 240 3-phase			1.1 0.5				

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 11. \* Starting torque: Representative value

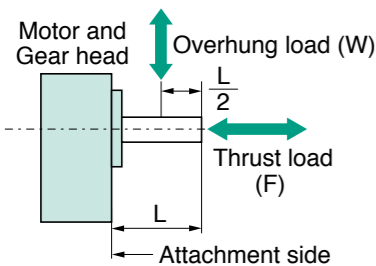
## ■ Permissible torque at output shaft of gear head (N·m)

Applicable Gear head	Reduction ratio	Reduction ratio																19.6									
		3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60		75	90	100	120	150	180	200		
MZ9G□B MY9G□B	motor rotation speed (r/min)	3000 or less	0.67	0.81	1.12	1.34	1.69	2.02	2.28	2.54	3.06	3.72	4.11	5.27	6.22	6.96	9.81	11.7	14.7	17.3	19.0						19.6
	3000 to 4000	0.50	0.61	0.84	1.01	1.27	1.52	1.71	1.91	2.30	2.79	3.08	3.95	4.67	5.22	7.36	8.78	11.0	13.0	14.3	17.0						19.6
Rotational direction		Same as motor rotational direction										Reverse to motor rotational direction					Same as motor rotational direction										

## ■ Permissible load inertia moment (×10<sup>-4</sup> kg·m<sup>2</sup>)

Reduction ratio	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200
Applicable Gear head																							
MZ9G□B / MY9G□B	5.93	8.47	16.4	23.6	37.3	53.4	67.6	98.3	142	211	257	423	589	847						1684			

## ■ Permissible shaft load

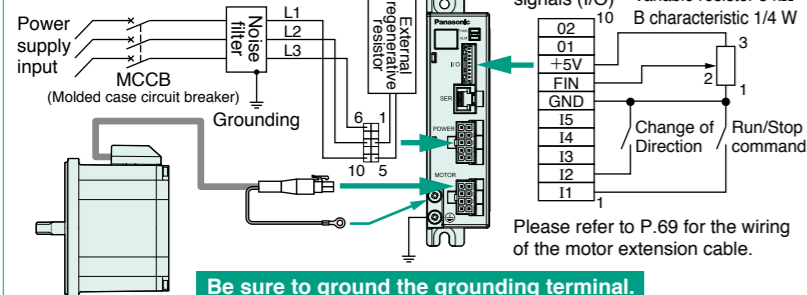


Motor shaft (Round shaft)	Output	Overhung load (W)	Thrust load (F)
		90 W	150 N
Applicable Gear head	MZ9G□B MY9G□B	588 N	147 N

## ■ Wiring diagram

### • In Case of 3-Phase 200 V

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

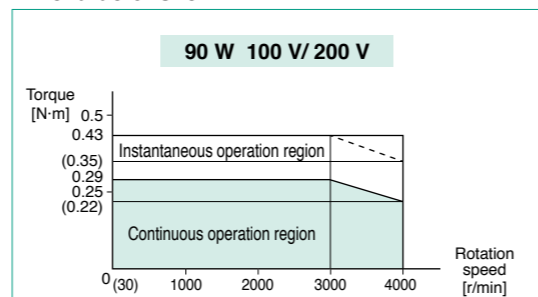


In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm<sup>2</sup>) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

\* Please refer to P.95 Support option.

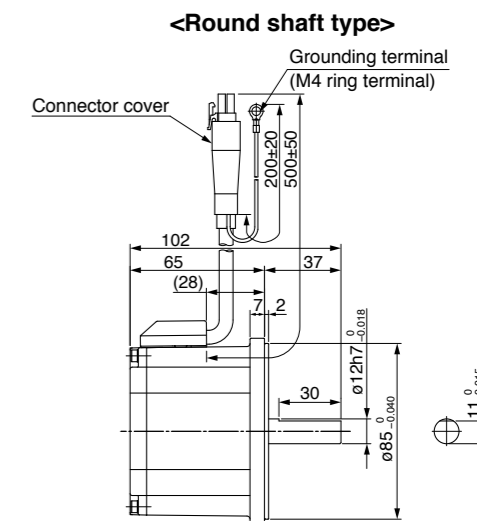
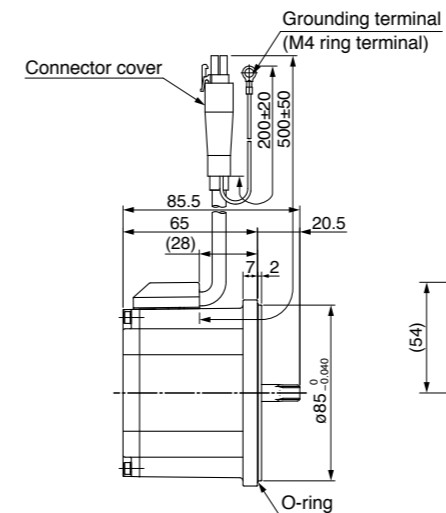
\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



## Motor (dimensions)

Unit mm



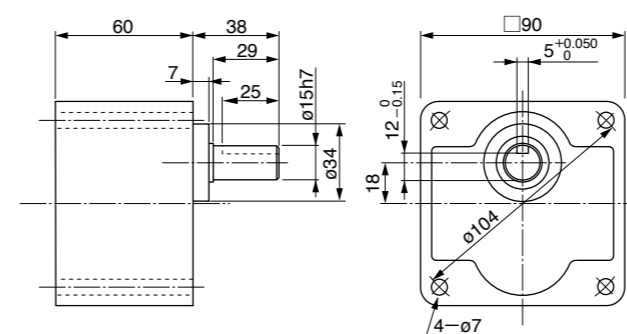
mass 1.0 kg

## Gear head (dimensions)

Unit mm

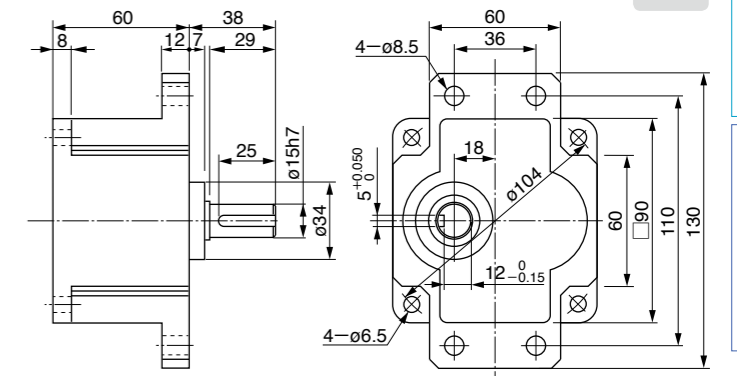
### MZ9G□B (Ball bearing/Hinge not attached)

mass 1.4 kg



### MY9G□B (Ball bearing/Hinge attached)

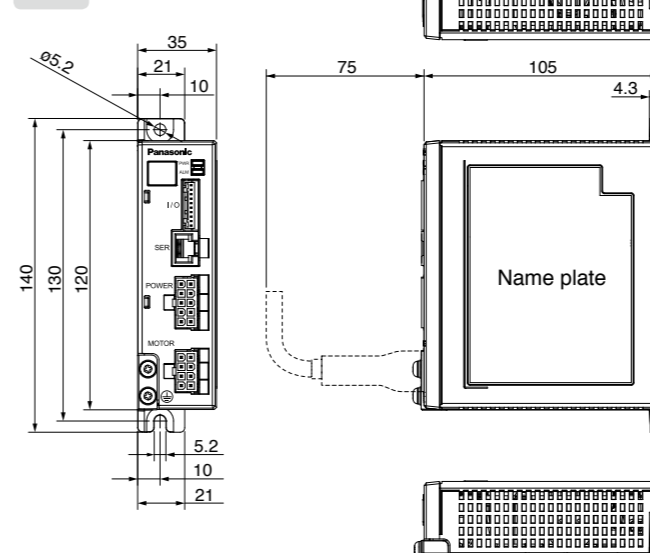
mass 1.4 kg



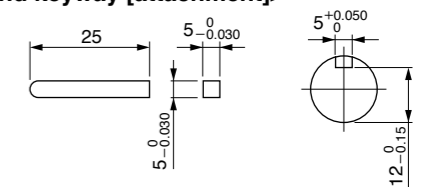
## Brushless amplifier (dimensions)

Unit mm

mass 0.37 kg



## <Key and keyway [attachment]>



<Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

## Specification (For Common specification, see p. 11, p. 12)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier Model number in ( ) is shipped with power connection cable	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
90 mm sq.	MBEG1E1BCV (MBEG1E1BCVC)	MBMU1E1A○	130	Single phase 100 to 120	±10	50/60	2.8	0.41	0.62	3000	4000
	MBEG1E5BCV (MBEG1E5BCVC)	MBMU1E2A○		Single phase 1.5 3-phase 0.7							

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 11. \* Starting torque: Representative value

## Permissible torque at output shaft of gear head (N·m)

Applicable Gear head	Reduction ratio	Reduction ratio																													
		3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200							
MZ9G□B MY9G□B	motor rotation speed (r/min)	3000 or less	1.01	1.21	1.69	2.02	2.54	3.04	3.42	3.82	4.59	5.58	6.17	7.91	9.34	10.5	14.7	17.5	19.6												
	3000 to 4000	100 V	0.59	0.71	0.99	1.18	1.49	1.78	2.00	2.24	2.69	3.27	3.61	4.63	5.47	6.15	8.60	10.2	12.9	15.4	17.2	19.6									
		200 V	0.76	0.91	1.27	1.52	1.91	2.28	2.57	2.87	3.44	4.19	4.63	5.93	7.01	7.88	11.0	13.1	16.5	19.6											
Rotational direction		Same as motor rotational direction										Reverse to motor rotational direction					Same as motor rotational direction														

## Permissible load inertia moment (×10<sup>-4</sup> kg·m<sup>2</sup>)

Reduction ratio	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200	
Applicable Gear head																								
MZ9G□B / MY9G□B	5.93	8.47	16.4	23.6	37.3	53.4	67.6	98.3	142	211	257	423	589	847	1684									

## Permissible shaft load

Motor shaft (Round shaft)	Output	Overhung load (W)	Thrust load (F)
Applicable Gear head	130 W	150 N	20 N
	MZ9G□B / MY9G□B	588 N	147 N

## Wiring diagram

**In Case of 3-Phase 200 V**  
\*When you use single phase, connect the main power between L1 and L2 terminals.

External speed setter Option: DV0PM20078 Variable resistor 5 kΩ B characteristic 1/4 W

Please refer to P.69 for the wiring of the motor extension cable.

**Be sure to ground the grounding terminal.**

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.

\* Please refer to P.95 Support option.

\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

## Motor (dimensions)

Unit mm

**Round shaft type**  
mass 1.2 kg

## Gear head (dimensions)

Unit mm

MZ9G□B (Ball bearing/Hinge not attached) mass 1.4 kg

MY9G□B (Ball bearing/Hinge attached) mass 1.4 kg

## Brushless amplifier (dimensions)

Unit mm

mass 0.37 kg

## <Key and keyway [attachment]>

<Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

# Gear head GV series

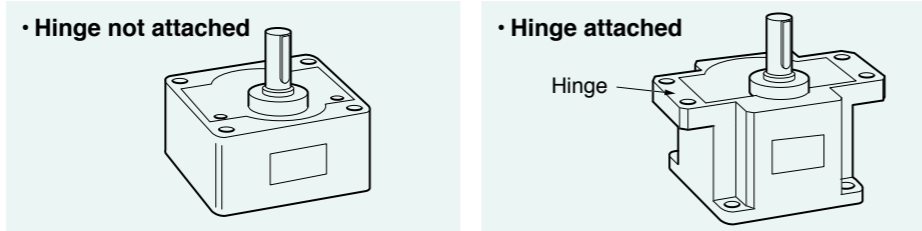
## Outline of gear head

### Reduction ratio

• 22 reduction ratios from 1/3 to 1/180 are available for the X type; 23 reduction ratios from 1/3 to 1/200 are available for the Y and Z types.

### Gear type

X: 50 W  
Z: 90 W, 130 W (Hinge not attached)  
Y: 90 W, 130 W (Hinge attached)



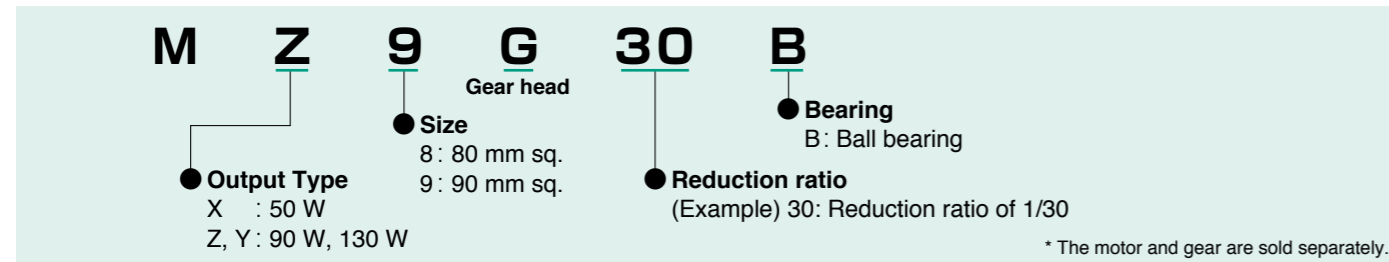
### Backlash

Less than 2° (design value)

### Type of gear head and reduction ratio

Gear type	Motor capacity	Reduction ratio																							
		1/3	1/3.6	1/5	1/6	1/7.5	1/9	1/10	1/12.5	1/15	1/18	1/20	1/25	1/30	1/36	1/50	1/60	1/75	1/90	1/100	1/120	1/150	1/180	1/200	
X	50 W	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	—
Z, Y	90 W, 130 W	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

### Check the Model number



### Calculation of torque at output shaft of gear head

#### Standard gear head only

$$N_G = \frac{N_M}{i}$$

$N_G$  : Speed of gear head (r/min)       $T_G$  : Output torque of gear head (N·m)

$$T_G = T_M \times i \times \eta$$

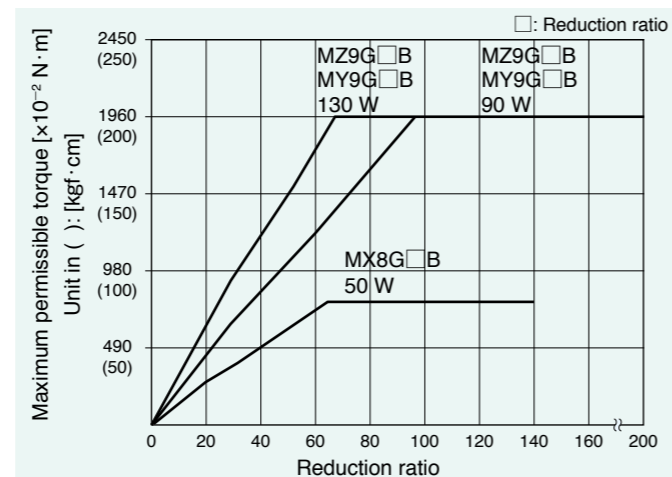
$N_M$  : Motor speed (r/min)       $T_M$  : Motor torque (N·m)

$i$  : Reduction ratio of gear head       $\eta$  : Gear head efficiency

### Maximum permissible torque

There is a limit to the strength of a gear due to its material and construction. The usable load torque determined based on this limit is called permissible torque. As can be seen from the above-mentioned formula, the load becomes larger when the reduction ratio is increased. If the gear head is used with the load exceeding the permissible torque, its life expectancy will be shortened significantly. Refer to the right graph and the permissible torque for each model and use the gear head at an appropriate load.

#### Maximum permissible torque



### Nominal reduction ratio and actual reduction ratio

Note that there is a difference between the nominal reduction ratio and actual reduction ratio of each gear head. The numbers in the following table represents the denominator of the actual reduction ratio.

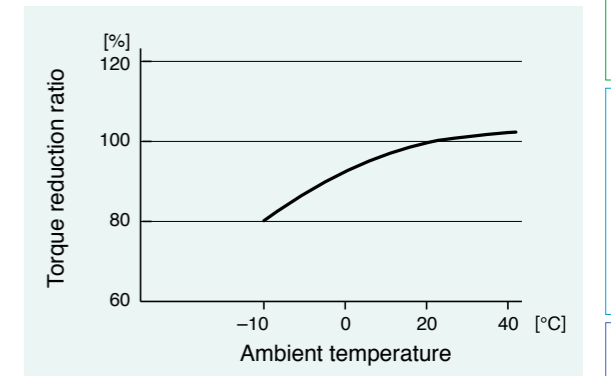
Gear type	Nominal reduction ratio																							
	1/3	1/3.6	1/5	1/6	1/7.5	1/9	1/10	1/12.5	1/15	1/18	1/20	1/25	1/30	1/36	1/50	1/60	1/75	1/90	1/100	1/120	1/150	1/180	1/200	
Actual reduction ratio	MX8G□B	3.01	3.60	4.98	5.96	7.48	9.00	9.99	12.5	14.9	18.1	20.1	25.1	30.3	36.4	49.8	61.2	76.2	90.5	98.0	122.5	148.9	183.5	—
	MZ9G□B	3.02	3.61	5.03	6.02	7.58	9.06	10.2	12.3	14.8	18.0	19.9	25.5	30.1	36.1	50.9	60.5	76.0	89.8	98.6	121.2	150.4	182.1	202.1
	MY9G□B																							

### Gear head efficiency

Gear type	Nominal reduction ratio																					
	1/3	1/3.6	1/5	1/6	1/7.5	1/9	1/10	1/12.5	1/15	1/18	1/20	1/25	1/30	1/36	1/50	1/60	1/75	1/90	1/100	1/120	1/150	1/180
MX8G□B	81 %										75 %										—	
MZ9G□B	81 %					79 %					70 %											
MY9G□B																						

### Gear head efficiency and ambient temperature

Calculate the actual gear head efficiency by multiplying the above-shown gear head efficiency at room temperature by the torque reduction ratio shown right.



### Standard life

Standard life is 5000 hours for the motor equipped with gear head. Standard life of the motor without gear head (round shaft) is 10000 hours (however, effective life of the oil seal is 5000 hours). Standard life is the designed lifetime predicted based on assumption that it is operated 8 hours/day (service factor: Sf = 1.0) under uniform loading (gear head allowable shaft torque, motor rated torque) at normal temperature and humidity.

Typical motor life can be determined as follows:  
Example: Motor speed 3000 r/min to 4000 r/min  
Standard life (hours) = 5000 (hours) × 3000 (r/min) / operating speed (r/min)

### Service factor (Sf)

$$\text{Life expectancy} = \frac{\text{Standard life}}{\text{Service factor (Sf)}}$$

Service factor (Sf) varies with impact of load and operation time. The table below shows how the service factor value depends on load condition.

Type of load	Typical load	Service factor		
		5 hours/day	8 hours/day	24 hours/day
Constant	Belt conveyor, One-directional rotation	1.0	1.0	1.5
Light-impact	Start/Stop, Cam-drive	1.2	1.5	2.0
Medium-impact	Instant FWD/REV, Instant stop	1.5	2.0	2.5
Heavy-impact	Frequent medium-impact	2.5	3.0	3.5

### <Important>

The gear heads MB8G□BV and MB9G□BV are designed for use with GP series, and MX8G□B, MZ9G□B and MY9G□B are designed for use with GV series, respectively, and they are not compatible with gear heads of different series.

# Gear head GV series

## Model list of gear head

### Gear head

#### Ball bearing

Size	Reduction ratio	Model No.	Hinge
80 mm sq. (50 W)	1/3, 1/3.6, 1/5, 1/6, 1/7.5, 1/9, 1/10, 1/12.5, 1/15, 1/18	<b>MX8G3B</b> to <b>MX8G18B</b>	
	1/20, 1/25, 1/30, 1/36	<b>MX8G20B</b> to <b>MX8G36B</b>	
	1/50, 1/60, 1/75, 1/90, 1/100, 1/120, 1/150, 1/180	<b>MX8G50B</b> to <b>MX8G180B</b>	
90 mm sq. (90 W - 130 W) (Common use)	1/3, 1/3.6, 1/5, 1/6, 1/7.5, 1/9	<b>MZ9G3B</b> to <b>MZ9G9B</b>	
	1/10, 1/12.5, 1/15, 1/18	<b>MZ9G10B</b> to <b>MZ9G18B</b>	
	1/20, 1/25, 1/30, 1/36, 1/50, 1/60	<b>MZ9G20B</b> to <b>MZ9G60B</b>	
	1/75, 1/90, 1/100, 1/120, 1/150, 1/180, 1/200	<b>MZ9G75B</b> to <b>MZ9G200B</b>	
	1/3, 1/3.6, 1/5, 1/6, 1/7.5, 1/9	<b>MY9G3B</b> to <b>MY9G9B</b>	○
	1/10, 1/12.5, 1/15, 1/18	<b>MY9G10B</b> to <b>MY9G18B</b>	○
	1/20, 1/25, 1/30, 1/36, 1/50, 1/60	<b>MY9G20B</b> to <b>MY9G60B</b>	○
	1/75, 1/90, 1/100, 1/120, 1/150, 1/180, 1/200	<b>MY9G75B</b> to <b>MY9G200B</b>	○

\* For the specifications for each item, refer to the page of the motor to which it can be applied.

### Gear head accessory

#### Ball bearing

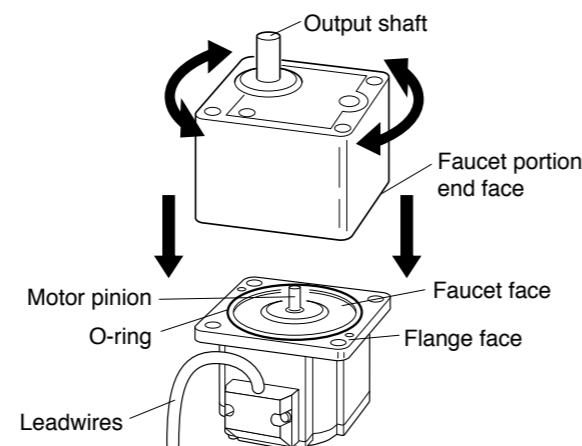
Size	Reduction ratio	Model No.	Accessory			
			Screw (mm)	Flat washer	Hexagon nut	Key
80 mm sq.	1/3 to 1/180	<b>MX8G3B</b> to <b>MX8G180B</b>	<b>M5 × 55 pan head screw</b> : 4	<b>for M5: 4</b>	<b>M5 : 4</b>	<b>4×4×25 one-end round</b> : 1
90 mm sq.	1/3 to 1/200	<b>MZ9G3B</b> to <b>MZ9G200B</b>	<b>M6 × 85 hexagon socket head bolt</b> : 4	<b>for M6: 4</b>	<b>M6 : 4</b>	<b>5×5×25 one-end round</b> : 1
	1/3 to 1/200	<b>MY9G3B</b> to <b>MY9G200B</b>	<b>M6 × 25 hexagon socket head bolt</b> : 4	<b>for M6: 4</b>	<b>M6 : 4</b>	<b>5×5×25 one-end round</b> : 1

#### O-ring

Repair parts 10pcs / bag

Size	Part No.
80 mm sq.	<b>DV0PN10008</b>
90 mm sq.	<b>DV0PN10009</b>

- Assemble with motor pinion faced up.
- Outward direction of motor leadwire can be aligned with any one of 4 sides of gear head with an output shaft at a different position.



# MINAS-BL KV series

Speed Control Type 50 W to 750 W

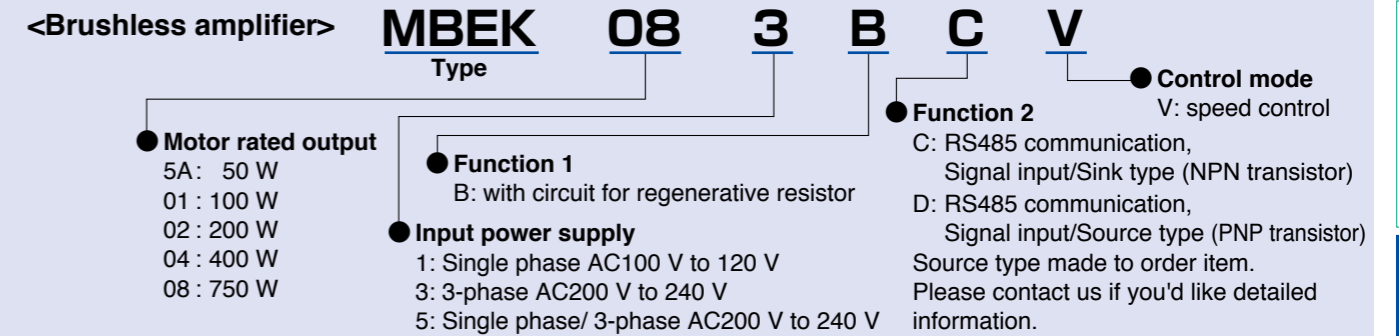
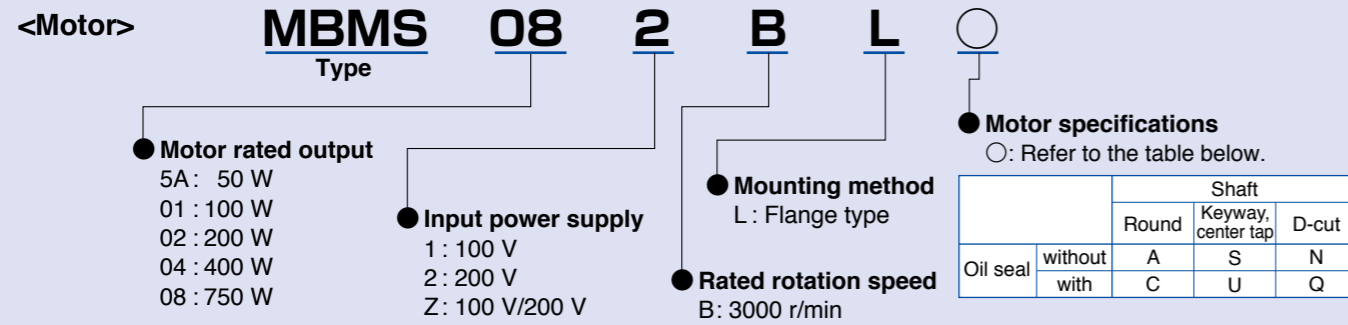
# KV series



• 60 mm square 200 W

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## Check the model number



## Brushless motor specifications

Item	Specifications						
	38 mm sq.	60 mm sq.				80 mm sq.	
Motor model No. <sup>*1</sup>	MBMS5AZBL○	MBMS011BL○	MBMS012BL○	MBMS021BL○	MBMS022BL○	MBMS042BL○	MBMS082BL○
Motor rated output (W)	50	100		200		400	750
Voltage (V)	for 100/200	for 100	for 200	for 100	for 200	for 200	
Rated torque (N·m)	0.16	0.32		0.64		1.27	2.4
Starting torque <sup>*2</sup> (N·m)	0.30	0.70		1.4		3.0	5.2
Rated input current (A(rms))	0.74	1.4	0.76	2.9	1.8	2.8	3.6
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )	0.025	0.07		0.14		0.26	0.87
Rating	Continuous						
Rated rotation speed <sup>*3</sup> (r/min)	3000						
Speed control range (r/min)	100 to 4000						
Ambient temperature	0 °C to +40 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the motor.						
Ambient humidity	20 % to 85 % RH (free from condensation)						
Altitude	Lower than 1000 m						
Vibration	24.5 m/s <sup>2</sup> or less X,Y,Z (Center of frame)						
Motor insulation class	130(B)						
Protection structure	IP65 <sup>*4,5</sup>						
Number of poles	8						
Motor mass (kg)	0.32	0.63		0.80		1.2	2.3

\*1 Suffix of "○" in the motor model represents shape of shaft.

\*2 Representative value

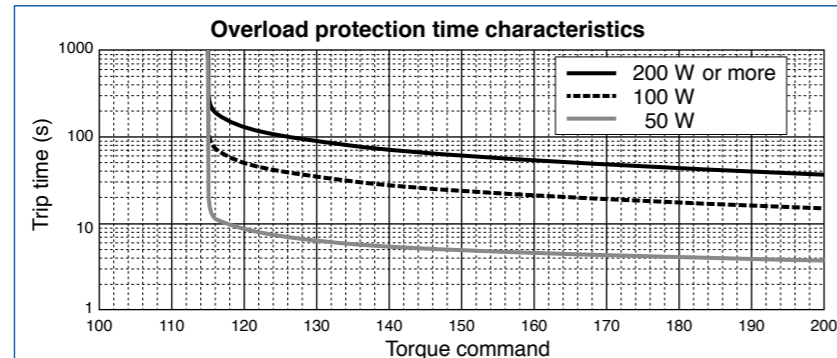
\*3 Motor shaft speed: to be multiplied by the reduction ratio when the gear head is used.

\*4 Excluding the shaft pass-through section and cable end connector.

\*5 These motors conform to the test conditions specified in EN standards (EN60529, EN60034-5).

Do not use these motors in application where water proof performance is required such as continuous wash-down operation.

### Overload protection characteristics



• 100 of the torque command represents the rated torque.

## Brushless amplifier specifications (KV series)

Item	Specifications												
	Amplifier model No.	MBEK5A1BCV	MBEK5A5BCV	MBEK011BCV	MBEK015BCV	MBEK021BCV	MBEK025BCV	MBEK045BCV	MBEK083BCV				
Applicable Motor <sup>*1</sup>	MBMS5AZBL○			MBMS011BL○	MBMS012BL○	MBMS021BL○	MBMS022BL○	MBMS042BL○	MBMS082BL○				
Motor rated output (W)	50			100			200			400		750	
Input power supply voltage (V)	Single phase 100 to 120	Single phase 200 to 240	3-phase	Single phase 100 to 120	Single phase 200 to 240	3-phase	Single phase 100 to 120	Single phase 200 to 240	3-phase	Single phase 200 to 240	3-phase	3-phase	
Frequency (Hz)	50/60												
Rated input current (A)	1.8	0.9	0.5	2.4	1.3	0.7	4.2	2.1	1.2	3.8	2.1	4.0	
Voltage tolerance	±10 %												
Control method	Speed control by CS signal, PWM sine wave driving system												
Ambient temperature	0 °C to +50 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the amplifier.												
Ambient humidity	20 % to 85 % RH (free from condensation)												
Location	Indoor (No corrosive gas, A place without garbage, and dust)												
Altitude	Lower than 1000 m												
Vibration	5.9 m/s <sup>2</sup> or less (10 Hz to 60 Hz)												
Protection structure/ Cooling system	Equivalent to IP20/ Self cooling												
Storage temperature	Normal temperature * Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)												
Storage humidity	Normal humidity												
Rated rotation speed	3000 r/min												
Speed control range	100 r/min to 4000 r/min												
Speed fluctuation factor	With load	±0.5 % or below (at 0 to Rated torque, Rated rotation speed)											
	With voltage	±0.5 % or below (at supply voltage ±10 %, rated rotation speed)											
	With temperature	±0.5 % or below (at 0 °C to 50 °C, rated rotation speed)											
Acceleration/ Deceleration time	0.01 sec to 300 sec (time for changing 1000 r/min) <sup>*2</sup>												
Stopping procedure	Slowdown stop/ Free-run stop <sup>*2</sup>												
Speed setting	0 r/min to 4000 r/min (analogue voltage (0 V to 5 V), console A), 0 r/min to 4000 r/min (Setting selection by parameter on Digital key pad)												
Speed setting resolution	Analog: approx. 1/200 of upper speed limit Digital: 1 r/min												
Speed setting precision (at 20 °C)	Analog: ±3 % or below of upper speed limit (±90 r/min or below at upper speed limit 3000 r/min) [Digital: 1 % or below of upper speed limit ]												
Operation mode	8 speed												
Signal input	5 inputs <sup>*2</sup> (run/ stop, CW run/ CCW run, multi function 3 bit)												
Signal output	2 outputs (Open collector) <sup>*2</sup> (Trip output etc)												
Communication function	RS485	Max 31 units. Setting of parameter, monitoring of control condition. Communication speed: Choose from 2400 bps/ 4800 bps/ 9600 bps											
	RS232	Setting of parameter and monitoring of control condition are enabled with commercial PC. <sup>*3</sup>											
Digital key pad	Setting of parameter, monitoring of control condition. <sup>*4</sup>												
Protective function	Warning : Undervoltage <sup>*2</sup> , Overload warning, setting change warning Protect : Undervoltage <sup>*2</sup> , Overload, Overcurrent, Overvoltage, Overheat, Overspeed, Sensor error, RS485 communication error, External forced trip error, User parameter error, CPU error												
Regenerating brake	Regenerative braking resistor can be externally connected. <sup>*5</sup> Instantaneous braking torque 200 %, Continuous regenerative ability of external regenerative resistor: 10 W (Regenerative operation with which motor shaft is rotated by load, e.g. load lowering operation, should not be continued.)												
Protection level	Protection level: torque command 115 (inverse time characteristics)												
Amplifier mass (kg)	0.37 (50 W, 100 W) / 1.0 (200 W to 750 W)												

\*1 Suffix of "○" in the motor model represents shape of shaft. \*2 Can be changed from PANATERM for BL or Digital key pad.

\*3 PANATERM for BL (Download from our web site.), PC connection cable (DV0P4140), Digital key pad connection cable (DV0P383\*0) is required. If your PC does not have RS232 port, use RS232-USB converter.

\*4 Digital key pad connection cable (DV0P383\*0) is required. \*5 Use optional external regenerative resistor (sold separately).



## System configuration (50 W, 100 W)

Power supply	Rated rotation speed (r/min)	output (W)	Motor (Note 1)	Brushless amplifier	Brushless amplifier (supplied with power cable) (Note 2)	Optional parts			
						External regenerative resistor	Noise filter	Surge absorber	Reactor
Single phase 100 V	3000	50	MBMS5AZBL○	MBEK5A1BCV	MBEK5A1BCVC	for 100 V DV0P2890	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227
		100	MBMS011BL○	MBEK011BCV	MBEK011BCVC				
Single/ 3-phase 200 V	3000	50	MBMS5AZBL○	MBEK5A5BCV	MBEK5A5BCVC	for 200 V DV0PM20068	for single phase power supply DV0P4170 for 3-phase power supply DV0PM20042	for single phase power supply DV0P4190 for 3-phase power supply DV0P1450	for single phase power supply DV0P227 for 3-phase power supply DV0P220
		100	MBMS012BL○	MBEK015BCV	MBEK015BCVC				

(Note 1) ○ : Refer to the table below.

		Shaft shape		
		Round	Keyway, center tap	D-cut
Oil seal	Without	A	S	N
	With	C	U	Q

(Note 2) Refer to p. 74 for a power supply connecting cable.

This part number is the ordering part number for the amplifier and power cable, not for ordering amplifier only. The supplied power connecting cable is for single-phase input, when supplying three-phase power; please make a cable using optional power connection kit (DV0P2870).

\* When installing the reactor, refer to p. 73.

- \* Be sure to use a set of matched components (power source, capacity, output, etc.)
- \* This motor is not provided with a holding brake. If it is used to drive a vertical shaft, the movable section may fall down by its own weight as power is turned off.

### Options

Optional parts	Parts number	Reference page	Optional parts	Parts number	Reference page	
Motor extension cable	1 m	DV0PQ1000310	Digital key pad connection cable	1 m	DV0P38310	
	3 m	DV0PQ1000330		3 m	DV0P38330	
	5 m	DV0PQ1000350		5 m	DV0P38350	
	10 m	DV0PQ10003A1				
Power supply connector kit	DV0P2870	P.70	External speed setter	DV0PM20078	P.71	
Console A <sup>1</sup>	DV0P3500	P.68	Control signal cable	2 m	DV0PM20076	P.70
Console A connection cable	1 m	DV0PM2006910	I/O connector kit	DV0PM20070	P.71	
	3 m	DV0PM2006930	Panel connector kit	DV0P3610	P.71	
	5 m	DV0PM2006950	PC connection cable <sup>3</sup>	1.5 m	DV0P4140	P.70
Digital key pad <sup>2</sup>	DV0P3510	P.68	Noise filter for signal line	DV0P1460	P.67	
			DIN rail mounting unit	DV0P3811	P.72	

\* For details of cable, refer to p. 68 to p. 70.

\*1 When using Console A, the Console A connection cable (DV0PM20069\*0) is required.

\*2 When using Digital key pad, the Digital key pad connection cable (DV0P383\*0) is required.

\*3 When connecting PC, the PC connection cable (DV0P4140) and the Digital key pad connection cable (DV0P383\*0) are required.

### Wiring equipment

Selection of circuit breaker (MCCB), magnetic contactor and electric wire. (To check conformity with international standards, refer to p. 93 Conformity with international safety standards.)

Voltage	Power capacity	MCCB Rated current	Magnetic contactor Rated Current (Contact composition)	Core of electric wire (mm <sup>2</sup> )	
				Main circuit, Grounding	Control circuit
Single phase 100 V	50 W, 100 W	5 A	20 A (3P+1a)	0.5 (AWG20)	0.13 (AWG26)
Single phase 200 V					
3-phase 200 V					

#### Be sure to connect the earth terminal to ground.

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.

#### Selection of relay

A relay used in a control circuit, e.g. at the control input terminal should be small signal relay (Min. guaranteed current 1 mA or less) for positive contact. <Example> Panasonic: DS type, HC type OMRON: G2A type

#### Selection of control circuit switch

When using a switch in place of relay, select a switch rated at minute electric current, to assure positive contact.

<Example> Nihon Kaiheiki Ind.: M-2012J-G

#### The wiring of SER and I/O connector

The wiring of SER and I/O connector should separate from power line to prevent malfunction.

#### Wiring to the I/O connector

Permissible length for control signal cable is 5 m or less.

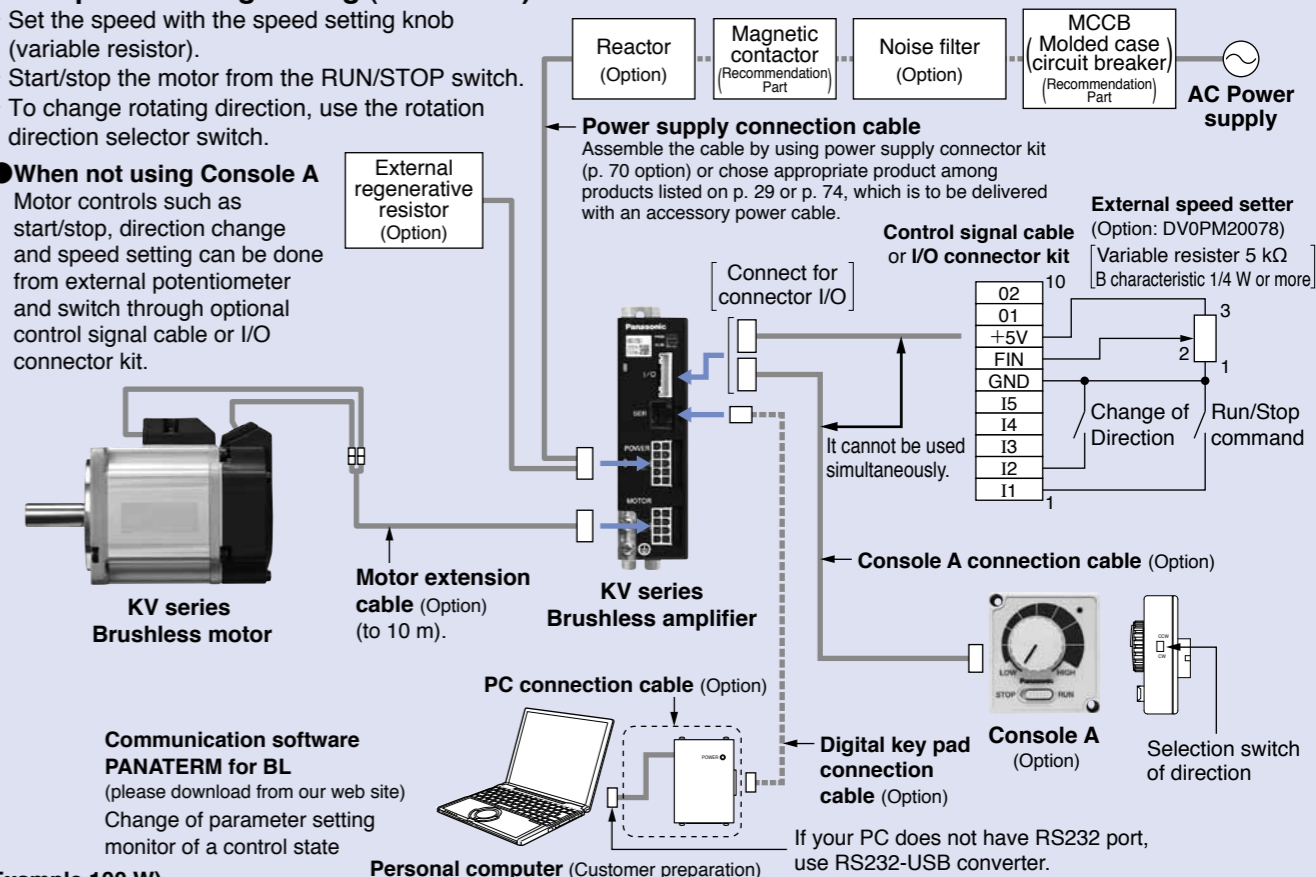
## System configuration diagram (50 W, 100 W)

### Example of analog setting (Console A)

- Set the speed with the speed setting knob (variable resistor).
- Start/stop the motor from the RUN/STOP switch.
- To change rotating direction, use the rotation direction selector switch.

### When not using Console A

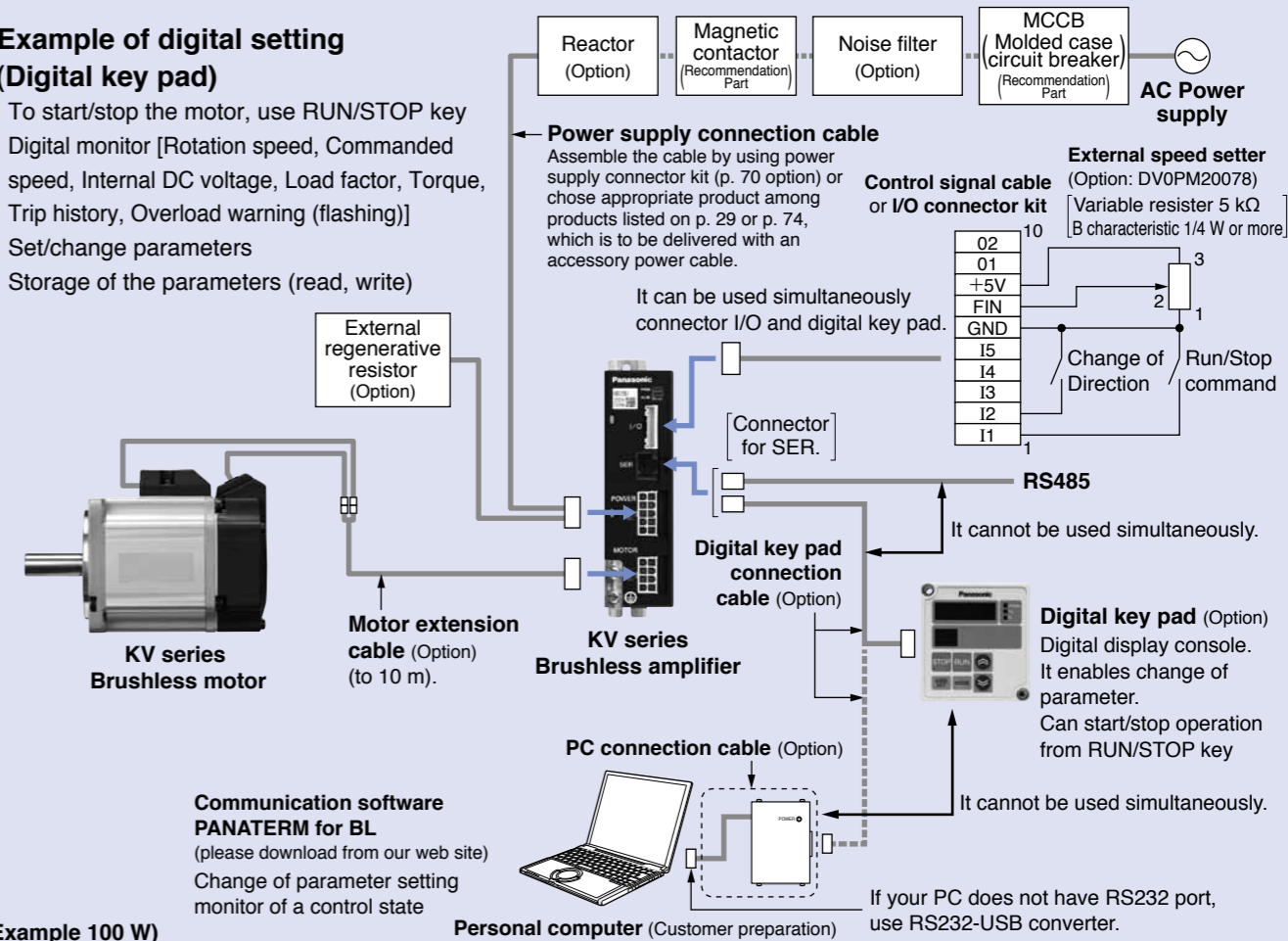
Motor controls such as start/stop, direction change and speed setting can be done from external potentiometer and switch through optional control signal cable or I/O connector kit.



(Example 100 W)

### Example of digital setting (Digital key pad)

- To start/stop the motor, use RUN/STOP key
- Digital monitor [Rotation speed, Commanded speed, Internal DC voltage, Load factor, Torque, Trip history, Overload warning (flashing)]
- Set/change parameters
- Storage of the parameters (read, write)



(Example 100 W)

## System configuration (200 W to 750 W)

Power supply	Rated rotation speed (r/min)	output (W)	Motor (Note 1)	Brushless amplifier	Optional parts			
					External regenerative resistor	Noise filter	Surge absorber	Reactor
Single phase 100 V	3000	200	MBMS021BL○	MBEK021BCV	for 100 V DV0P2890	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P228
Single/3-phase 200 V		200	MBMS022BL○	MBEK025BCV	for 200 V DV0PM20068	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227
		400	MBMS042BL○	MBEK045BCV		for 3-phase power supply DV0PM20042	for 3-phase power supply DV0P1450	for 3-phase power supply DV0P220
3-phase 200 V	750	MBMS082BL○	MBEK083BCV	for 3-phase power supply DV0PM20042	for 3-phase power supply DV0P1450	for 3-phase power supply DV0P220		

(Note 1) ○ : Refer to the table below.

		Shaft shape		
		Round	Keyway, center tap	D-cut
Oil seal	Without	A	S	N
	With	C	U	Q

\* When installing the reactor, refer to p. 73.

**\* Be sure to use a set of matched components (power source, capacity, output, etc.)**  
**\* This motor is not provided with a holding brake. If it is used to drive a vertical shaft, the movable section may fall down by its own weight as power is turned off.**

### Options

Optional parts	Parts number	Reference page	Optional parts	Parts number	Reference page	
Motor extension cable	1 m	DV0PQ1000310	Digital key pad connection cable	1 m	DV0P38310	
	3 m	DV0PQ1000330		3 m	DV0P38330	
	5 m	DV0PQ1000350		5 m	DV0P38350	
	10 m	DV0PQ10003A1				
Console A <sup>1</sup>	DV0P3500	P.68	External speed setter	DV0PM20078	P.71	
Console A connection cable	1 m	DV0PM2006910	Control signal cable	2 m	DV0PM20076	P.70
	3 m	DV0PM2006930	I/O connector kit	DV0PM20070	P.71	
	5 m	DV0PM2006950	Panel connector kit	DV0P3610	P.71	
Digital key pad <sup>2</sup>	DV0P3510	P.68	PC connection cable <sup>3</sup>	1.5 m	DV0P4140	P.70
			Noise filter for signal line	DV0P1460	P.67	

\* For details of cable, refer to p. 68 to p. 70.

\*1 When using Console A, the Console A connection cable (DV0PM20069\*0) is required.

\*2 When using Digital key pad, the Digital key pad connection cable (DV0P383\*0) is required.

\*3 When connecting PC, the PC connection cable (DV0P4140) and the Digital key pad connection cable (DV0P383\*0) are required.

### Wiring equipment

Selection of circuit breaker (MCCB), magnetic contactor and electric wire. (To check conformity with international standards, refer to p. 93 Conformity with international safety standards.)

Voltage	Power capacity	MCCB Rated current	Magnetic contactor Rated Current (Contact composition)	Core of electric wire (mm <sup>2</sup> )	
				Main circuit, Grounding	Control circuit
Single phase 100 V	200 W	10 A	20 A (3P+1a)	0.75 (AWG18)	0.13 (AWG26)
Single phase 200 V	200 W	5 A			
	400 W	10 A			
3-phase 200 V	400 W, 200 W	5 A			
	750 W	10 A			

### Be sure to connect the earth terminal to ground.

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.

#### Selection of relay

A relay used in a control circuit, e.g. at the control input terminal should be small signal relay (Min. guaranteed current 1 mA or less) for positive contact. <Example> Panasonic: DS type, HC type OMRON: G2A type

#### Selection of control circuit switch

When using a switch in place of relay, select a switch rated at minute electric current, to assure positive contact.

<Example> Nihon Kaiheiki Ind.: M-2012J-G

#### The wiring of SER and I/O connector

The wiring of SER and I/O connector should separate from power line to prevent malfunction.

#### Wiring to the I/O connector

Permissible length for control signal cable is 5 m or less.

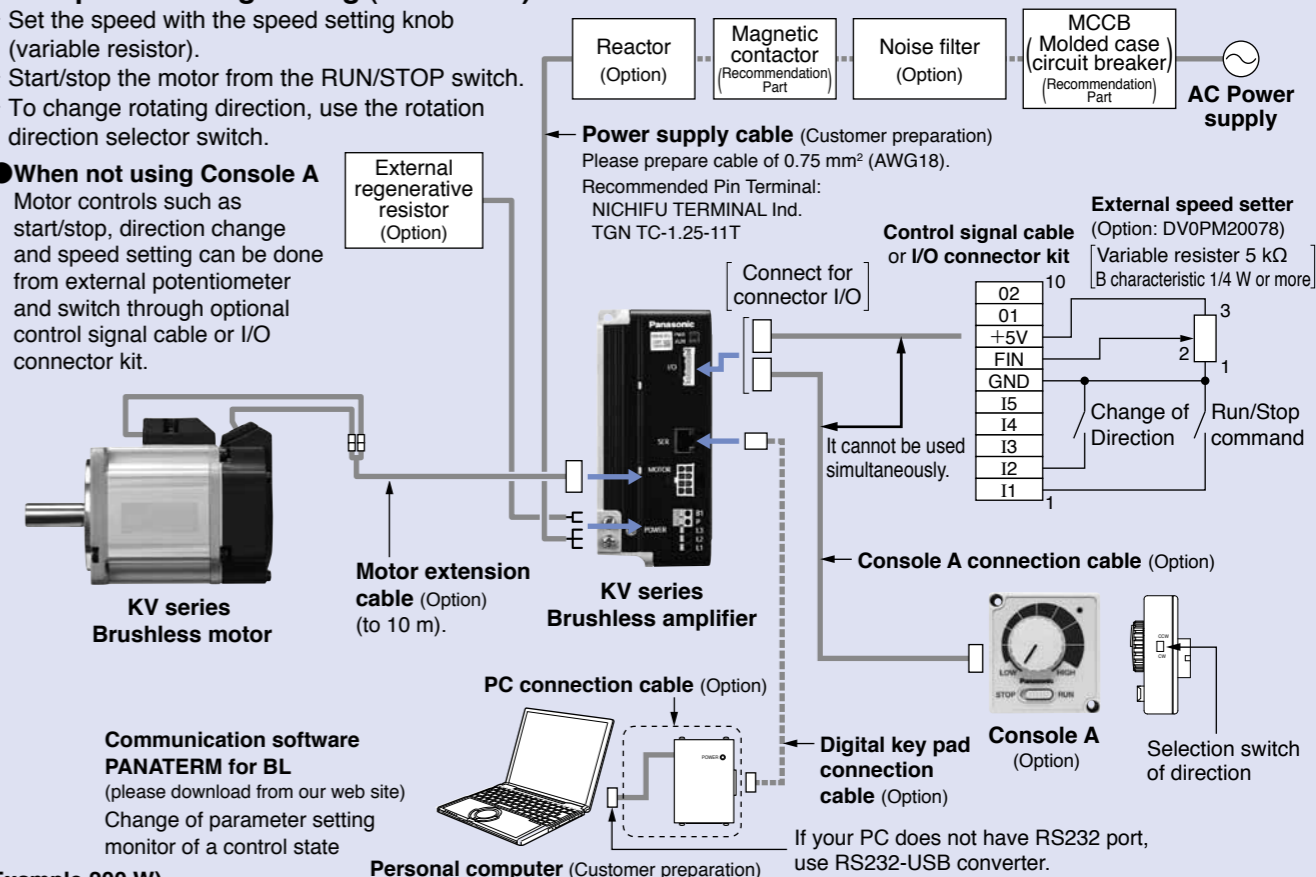
## System configuration diagram (200 W to 750 W)

### Example of analog setting (Console A)

- Set the speed with the speed setting knob (variable resistor).
- Start/stop the motor from the RUN/STOP switch.
- To change rotating direction, use the rotation direction selector switch.

### When not using Console A

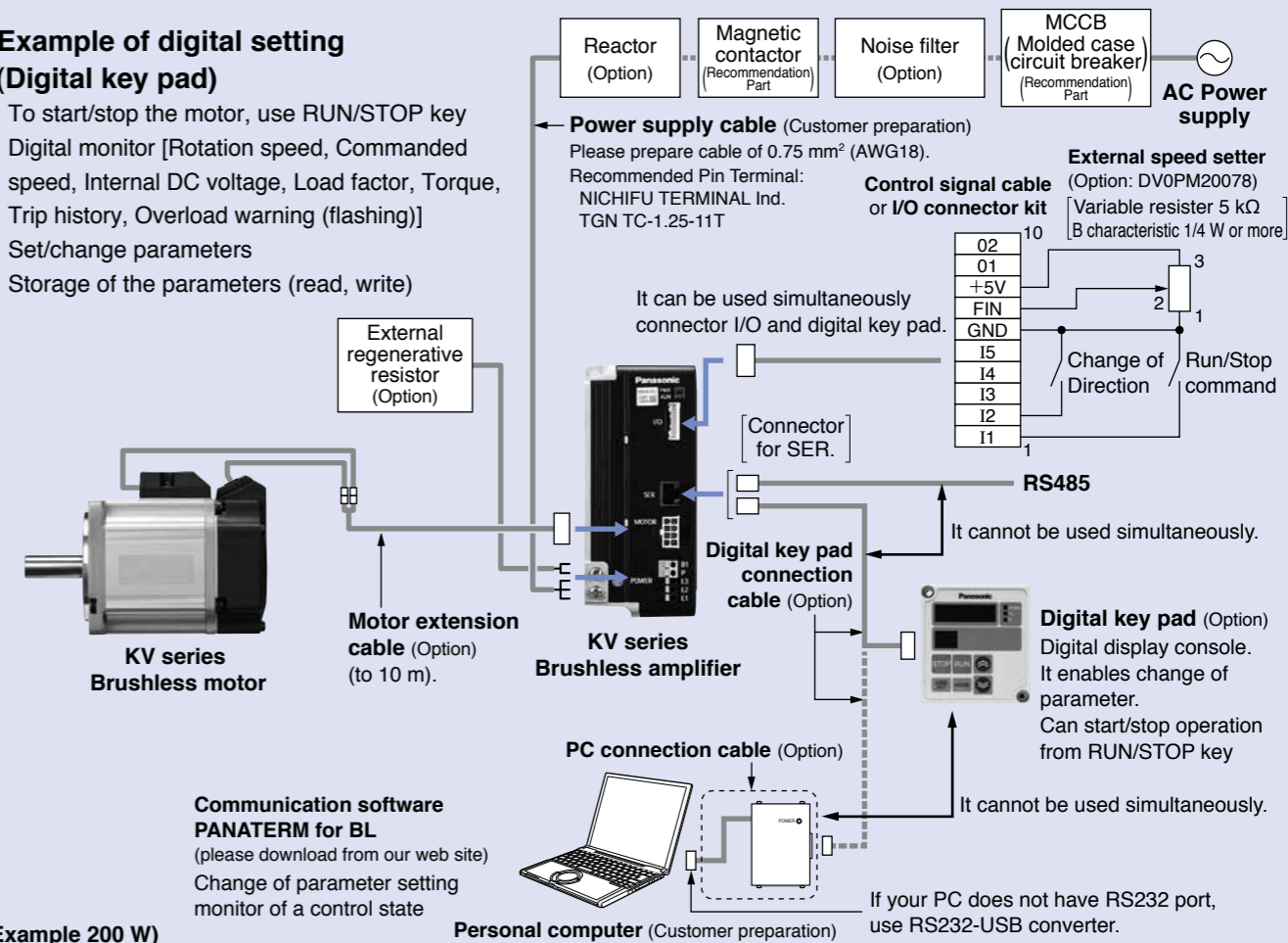
Motor controls such as start/stop, direction change and speed setting can be done from external potentiometer and switch through optional control signal cable or I/O connector kit.



(Example 200 W)

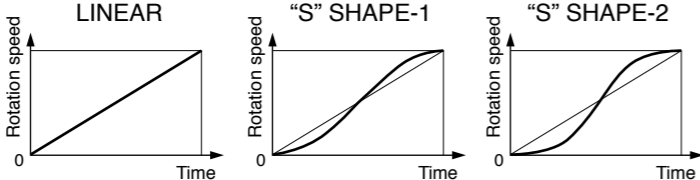
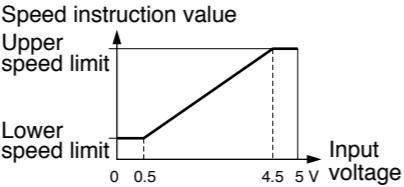
### Example of digital setting (Digital key pad)

- To start/stop the motor, use RUN/STOP key
- Digital monitor [Rotation speed, Commanded speed, Internal DC voltage, Load factor, Torque, Trip history, Overload warning (flashing)]
- Set/change parameters
- Storage of the parameters (read, write)



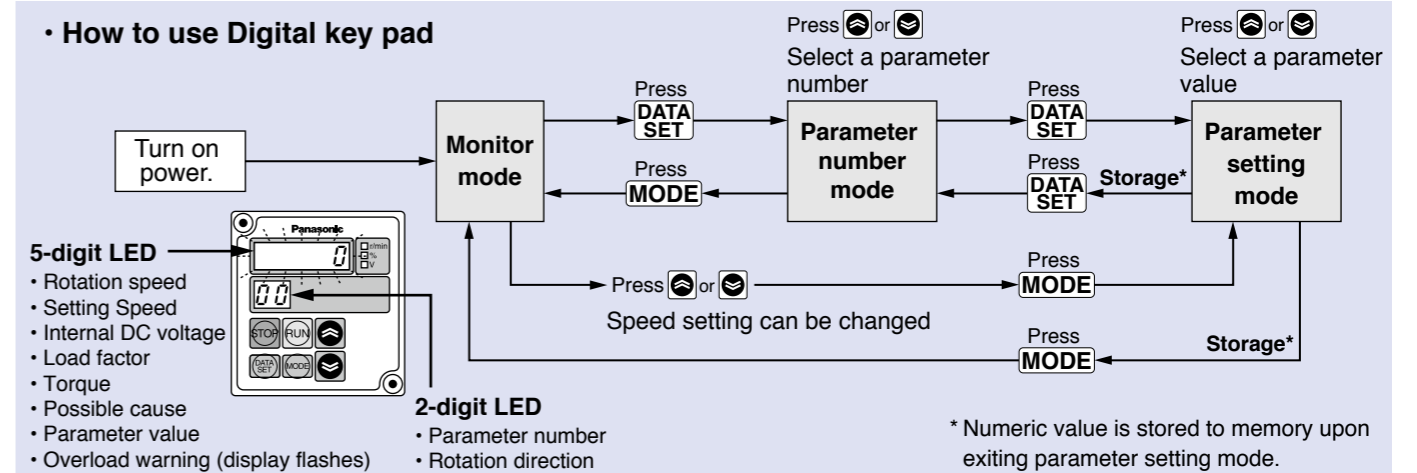
(Example 200 W)

# Parameter list of brushless amplifier

Parameter No.	Parameter name	Explanation	Setting range																												
00	Internal speed (0-th speed)	Desired running speed can be set with the Digital key pad.	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
01 to 07	1st speed to 7th speed	Speed in multi-speed running can be set.	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
10	1st acceleration time	The change factor of output speed in acceleration can be determined. Set by time for changing 1000 r/min.	0.01 sec to 300 sec																												
11	2nd acceleration time		to 3 sec: Incremented by 0.01 second 3 sec to 30 sec: Incremented by 0.1 second 30 sec to 300 sec: Incremented by 1 second																												
12	1st deceleration time	The change factor of output speed in deceleration can be determined. Set by time for changing 1000 r/min.	0.01 sec to 300 sec																												
13	2nd deceleration time		to 3 sec: Incremented by 0.01 second 3 sec to 30 sec: Incremented by 0.1 second 30 sec to 300 sec: Incremented by 1 second																												
14	Acceleration mode selection	Straight line acceleration/deceleration and curve (S-shape) acceleration and deceleration can be chosen individually for acceleration and deceleration.  	Select S-shape when "31 Speed command selection" is PnL.																												
15	Deceleration mode selection																														
16	Stop mode selection	You can select how to stop the motor when stop command is input: free-run stop or stop after deceleration.																													
17	Free-run waiting time	When the stop mode is set to deceleration stop, the zero speed (servo lock time) after deceleration can be adjusted.	0.0 sec to 10.0 sec [Minimum unit 0.1 sec]																												
1A	Velocity loop proportional gain	Enables setting of proportional gain of velocity amplifier.	0 to 10000 [Minimum unit 0.1]																												
1b	Velocity loop integration gain	Enables setting of integration gain of velocity amplifier.	0 to 10000 [Minimum unit 0.1]																												
30	Run command selection	Run command can be applied through: Digital key pad, input terminal "I1", "I2" or RS485 communication, whichever selected.																													
31	Speed command selection	You can choose whether to use "00 Internal speed (0-th speed)" or analog input terminal for speed command.																													
32	Operation mode selection	Parameter for choosing operation mode <table border="1" data-bbox="418 1249 1062 1549"> <thead> <tr> <th rowspan="2">Setting</th> <th rowspan="2">Operation mode</th> <th colspan="3">Function of signal input</th> </tr> <tr> <th>I3</th> <th>I4</th> <th>I5</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1st speed operation mode</td> <td></td> <td></td> <td>Free-run stop External forced trip</td> </tr> <tr> <td>2</td> <td>2nd speed operation mode</td> <td>Speed setting</td> <td></td> <td>2nd Acc./Dec. time Trip reset</td> </tr> <tr> <td>4</td> <td>4th speed operation mode</td> <td>Speed setting</td> <td>Speed setting</td> <td></td> </tr> <tr> <td>8</td> <td>8th speed operation mode</td> <td>Speed setting</td> <td>Speed setting</td> <td>Speed setting</td> </tr> </tbody> </table>	Setting	Operation mode	Function of signal input			I3	I4	I5	1	1st speed operation mode			Free-run stop External forced trip	2	2nd speed operation mode	Speed setting		2nd Acc./Dec. time Trip reset	4	4th speed operation mode	Speed setting	Speed setting		8	8th speed operation mode	Speed setting	Speed setting	Speed setting	
Setting	Operation mode	Function of signal input																													
		I3	I4	I5																											
1	1st speed operation mode			Free-run stop External forced trip																											
2	2nd speed operation mode	Speed setting		2nd Acc./Dec. time Trip reset																											
4	4th speed operation mode	Speed setting	Speed setting																												
8	8th speed operation mode	Speed setting	Speed setting	Speed setting																											
33	I1/I2 function selection	Signal input functions I1 to I5 can be individually selected.	Free-run stop																												
34	I3 function selection		External forced trip																												
35	I4 function selection		2nd Acc./Dec. time																												
36	I5 function selection		Trip reset																												
3A	Lower speed limit	When speed command selection is set to analog, set the motor speed at 0 V input.  	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
3b	Upper speed limit	Upper limit of motor command speed.	0 r/min to 4000 r/min [Minimum unit 1 r/min]																												
3C	Torque limit	Set the upper limit of the output torque command. 100 represents the rated torque. [Minimum unit 1]	<table border="1" data-bbox="1083 1942 1374 2011"> <tr> <td>Rated output (W)</td> <td>50, 100, 200, 400</td> <td>750</td> </tr> <tr> <td>Setting range</td> <td>0 to 200</td> <td>0 to 180</td> </tr> </table>	Rated output (W)	50, 100, 200, 400	750	Setting range	0 to 200	0 to 180																						
Rated output (W)	50, 100, 200, 400	750																													
Setting range	0 to 200	0 to 180																													

Parameter No.	Parameter name	Explanation	Setting range
40	O1 function selection	The type of signals from output terminals "O1" and "O2" can be selected. * Do not use it for position detector and positioning.	Trip: ON, Speed is reached to a command value: ON, Running: ON, Free run: ON, CCW run: ON, CW run: ON, Load exceeds 100 %: ON, Speed pulse signal*
41	O2 function selection		
42	O1 output polarity selection	This is a function for inverting the polarity of signal output terminal O1 and O2.	
43	O2 output polarity selection		
44	Speed matching range	"Matching range" of arriving signal can be adjusted.	20 r/min to Upper speed limit [Minimum unit 1 r/min]
45	Output pulse count selection	Set the number of pulses to be output to output terminals "O1" and "O2". • When you use it in more than 3000 r/min, choose values less than 12. • Do not use "the speed pulse" of the output signal (parameter No.45) for position sensing and a positioning use.	1, 2, 3, 4, 6, 8, 12, 24
46	Monitor mode selection	You can choose description to be displayed on 5-digit LED when turning on power.	Rotation speed, Speed command, Internal DC voltage, Load factor, Torque
47	Numerator of display magnification factor	By setting the multiplying factor of a value displayed on 5-digit LED, the rotation speed of gear output shaft and conveyor speed can be displayed.	
48	Denominator of display magnification factor		
4A	Trip history clear	Trip history can be cleared.	
4b to 4F	Trip history 1 to Trip history 5	Trip history for 5 times in the past is stored.	
50	Undervoltage trip selection	You can select whether tripping occurs upon detection of undervoltage.	
51	Retrial selection	Automatic reset in trip (trip retrial) can be set here.	
52	Retrial start time	You can set waiting time until retrial operation is performed after tripping is found.	1 sec to 120 sec [Minimum unit 1 sec]
54	Parameter initializing	Parameters can be initialized to the factory default.	
57	Parameter copy	Parameters can be copied.	
5A	RS485 device number	Set the device number of Amplifier in communication (Amplifier ID)	
5b	RS485 communication speed	Set the communication speed of RS485 communication.	
5C	RS485 communication standard	Set the communication standard of RS485 communication.	
5d	RS485 communication response time	You can set the shortest time necessary to set the RS485 bus to transmission mode to response upon receiving communication data.	
5E	RS485 retry times of communication	Set the retry times of RS485 communication.	
5F	RS485 protocol timeout	You can set the permissible time interval between successively received character codes.	

## • How to use Digital key pad



## ■ Specification (For Common specification, see p. 27, p. 28)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier <small>Model number in ( ) is shipped with power connection cable</small>	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
38 mm sq.	MBEK5A1BCV (MBEK5A1BCVC)	MBMS5AZBL○	50	Single phase 100 to 120	±10	50/60	1.8	0.16	0.30	3000	4000
	Single phase 200 to 240			Single phase 0.9							
MBEK5A5BCV (MBEK5A5BCVC)	3-phase 0.5										

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 27. \* Starting torque: Representative value

## ■ Permissible shaft load

Motor shaft	Output	Overhung load (W)	Thrust load (F)
	50 W	69 N	59 N

## ■ Wiring diagram

**• In Case of 3-Phase 200 V**

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

External speed setter  
Option: DV0PM20078  
Variable resistor 5 kΩ  
B characteristic 1/4 W

Change of Direction  
Run/Stop command

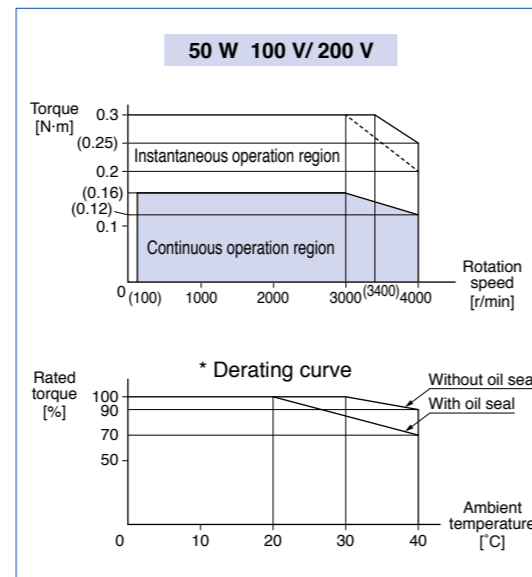
Please refer to P.69 for the wiring of the motor extension cable.

**Be sure to ground the grounding terminal.**

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.

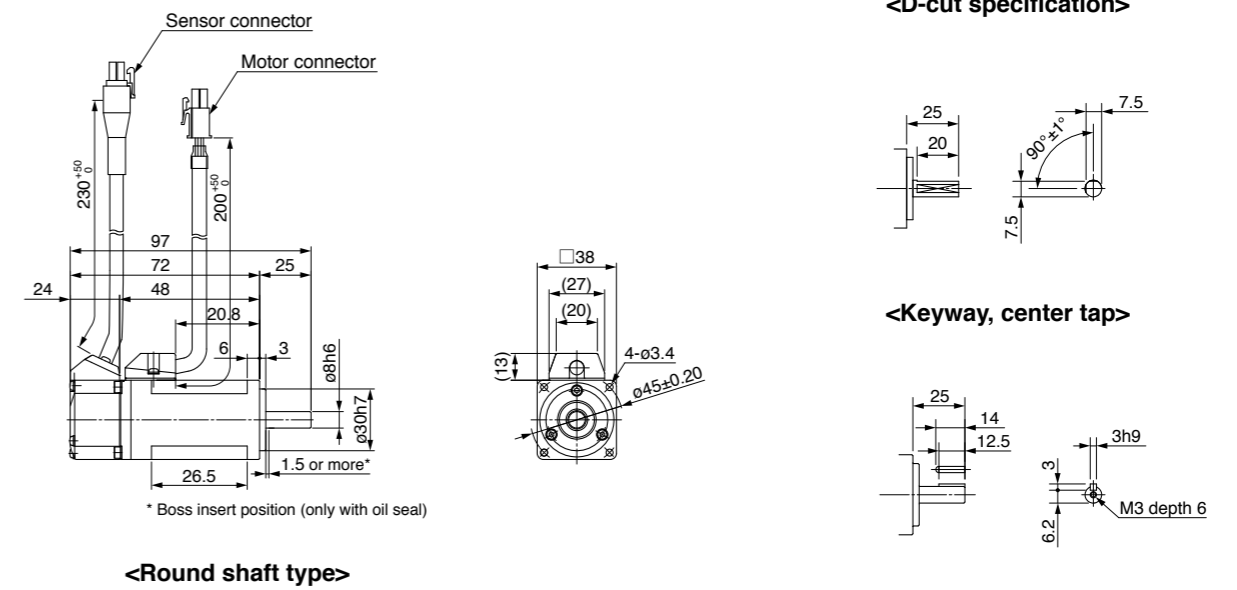
\* Please refer to P.95 Support option.

## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



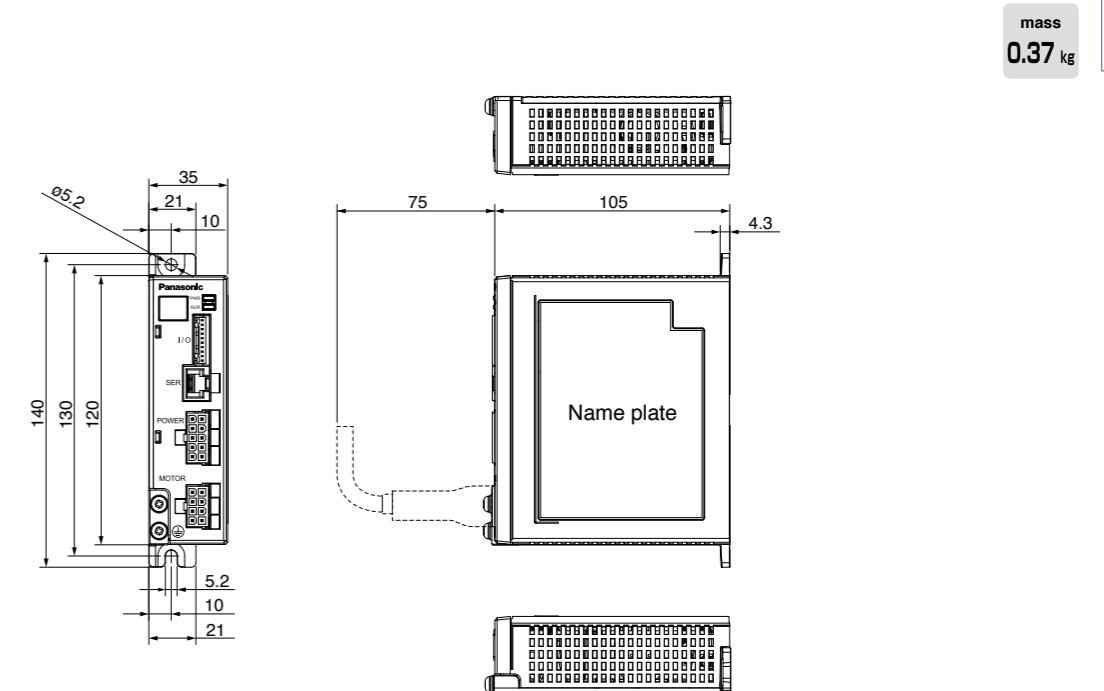
## Motor (dimensions)

Unit mm



## Brushless amplifier (dimensions)

Unit mm

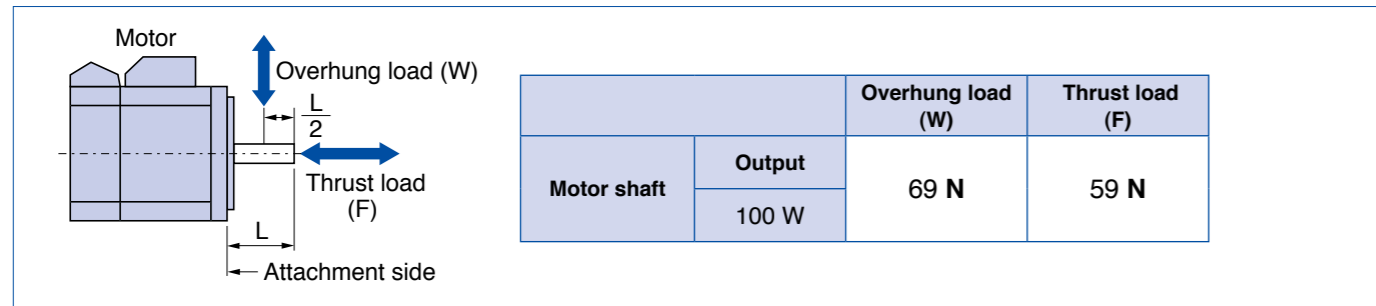


## ■ Specification (For Common specification, see p. 27, p. 28)

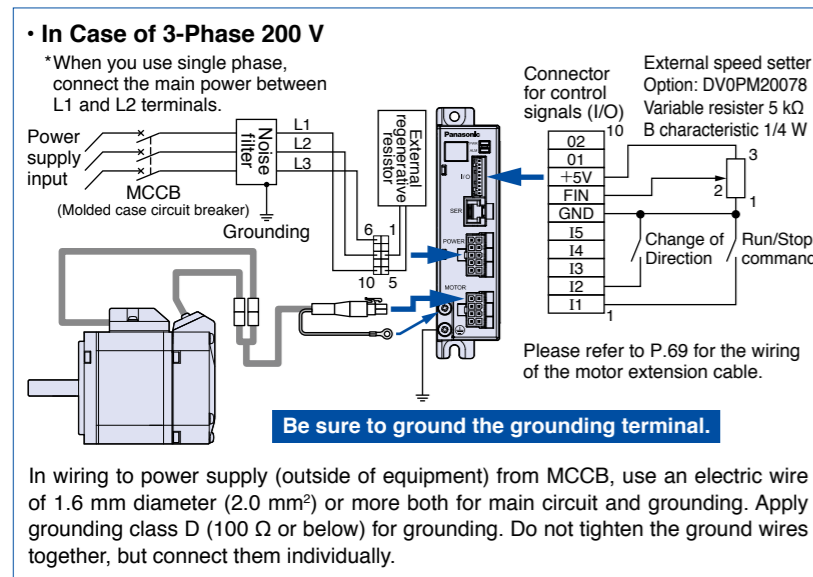
Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier Model number in ( ) is shipped with power connection cable	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
60 mm sq.	MBEK011BCV (MBEK011BCVC)	MBMS011BL○	100	Single phase 100 to 120	±10	50/60	2.4	0.32	0.70	3000	4000
	MBEK015BCV (MBEK015BCVC)	MBMS012BL○		Single phase 200 to 240 /3-phase			Single phase 1.3 3-phase 0.7				

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 27. \* Starting torque: Representative value

## ■ Permissible shaft load

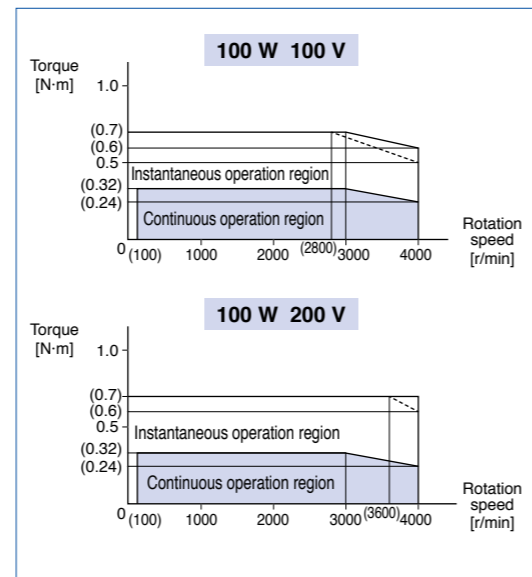


## ■ Wiring diagram



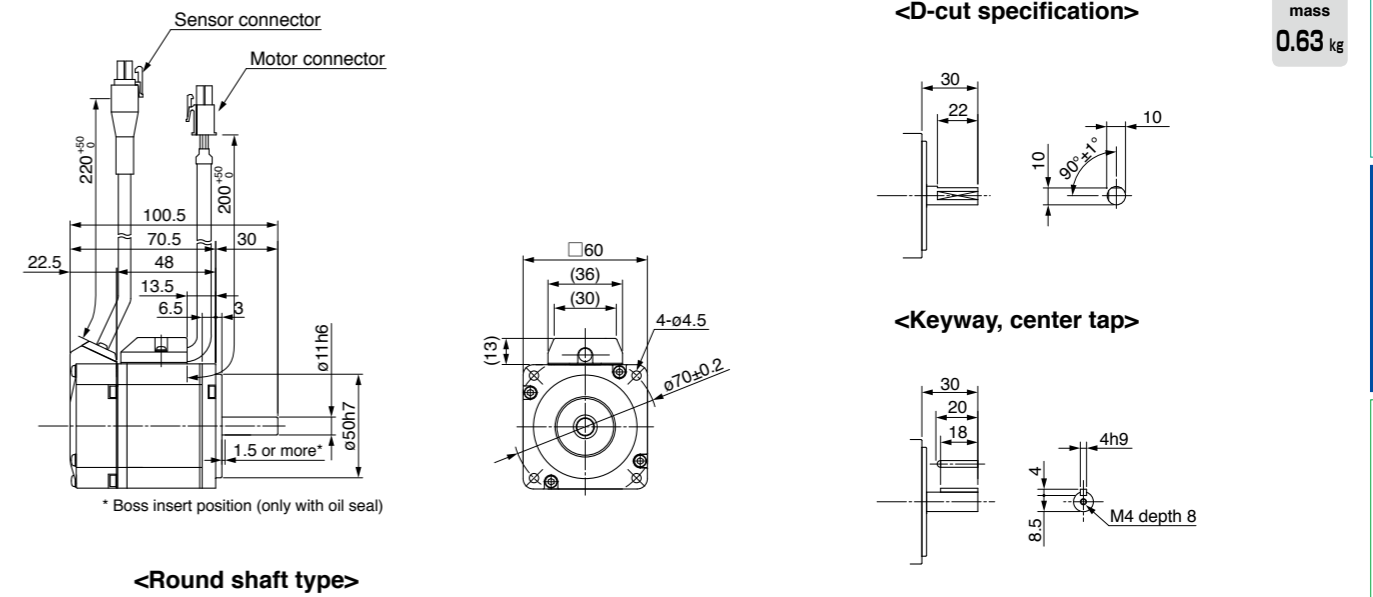
\* Please refer to P.95 Support option.

## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



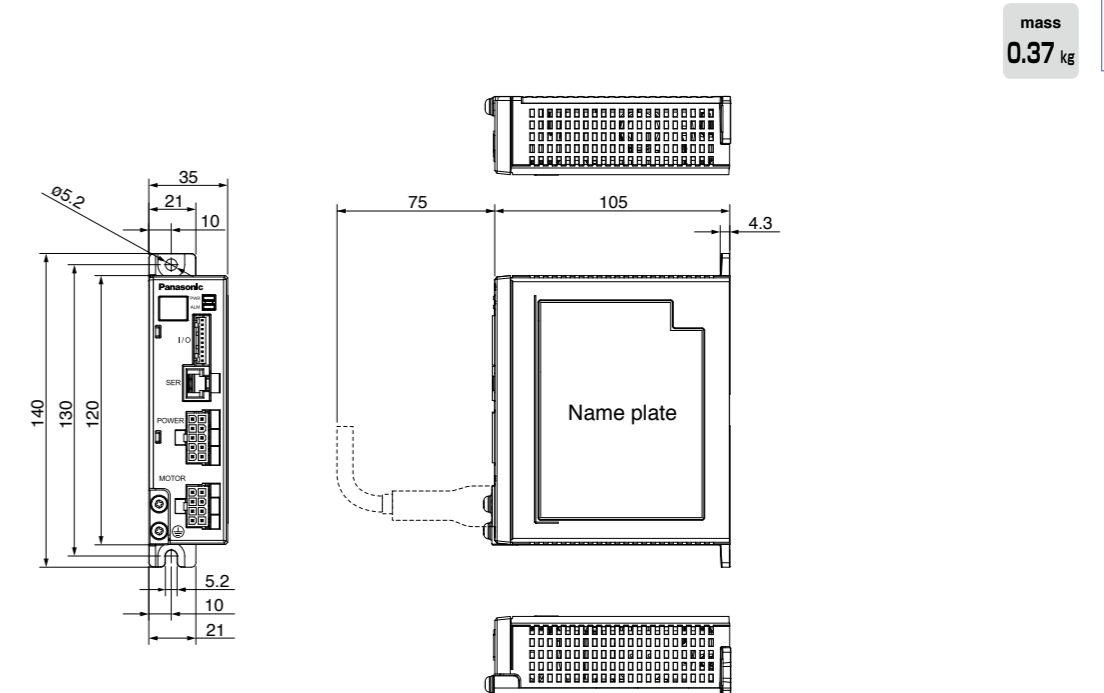
## Motor (dimensions)

Unit mm



## Brushless amplifier (dimensions)

Unit mm



## ■ Specification (For Common specification, see p. 27, p. 28)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
60 mm sq.	MBEK021BCV	MBMS021BL○	200	Single phase 100 to 120	±10	50/60	4.2	0.64	1.4	3000	4000
	MBEK025BCV	MBMS022BL○		Single phase 2.1							
			Single phase / 3-phase 200 to 240	3-phase 1.2							

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 27. \* Starting torque: Representative value

## ■ Permissible shaft load

Motor shaft	Output	Overhung load (W)	Thrust load (F)
	200 W	245 N	98 N

## ■ Wiring diagram

**• In Case of 3-Phase 200 V**

Please refer to P.69 for the wiring of the motor extension cable.  
**Be sure to ground the grounding terminal.**  
 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.

External speed setter  
 Option: DV0PM20078  
 Variable resistor 5 kΩ  
 B characteristic 1/4 W

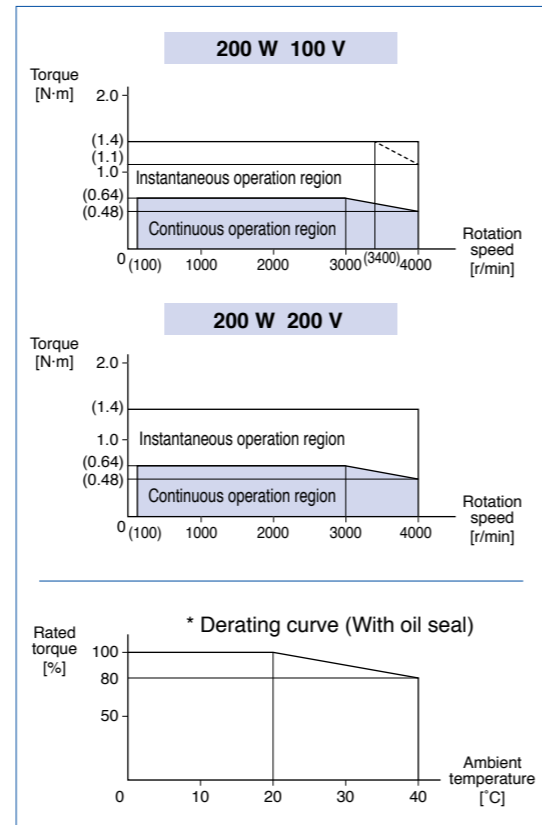
Connector for control signals (I/O)  
 Change of Direction  
 Run/Stop command

External regenerative resistor  
 Noise filter  
 Power supply input  
 MCCB (Molded case circuit breaker)  
 Grounding

\*When you use single phase, connect the main power between L1 and L2 terminals.  
 Recommended Pin Terminal:  
 NICHIFU TERMINAL Ind.  
 TGN TC-1.25-11T

\* Please refer to P.95 Support option.

## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



## Motor (dimensions)

Unit mm

Sensor connector  
 Motor connector

**<D-cut specification>**

mass **0.8 kg**

**<Keyway, center tap>**

**<Round shaft type>**

\* Boss insert position (only with oil seal)

## Brushless amplifier (dimensions)

Unit mm

mass **1.0 kg**

Name plate

\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

<Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

## ■ Specification (For Common specification, see p. 27, p. 28)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)	
	Brushless Amplifier	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)					Rated input current (A)
60 mm sq.	MBEK045BCV	MBMS042BL○	400	Single phase 200 to 240 3-phase	±10	50/60	Single phase 3.8 3-phase 2.1	1.27	3.0	3000	4000

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 27. \* Starting torque: Representative value

## ■ Permissible shaft load

Motor shaft	Output	Overhung load (W)	Thrust load (F)
	400 W	245 N	98 N

## ■ Wiring diagram

**• In Case of 3-Phase 200 V**

Please refer to P.69 for the wiring of the motor extension cable.

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.

**Be sure to ground the grounding terminal.**

External speed setter  
Option: DV0PM20078  
Variable resistor 5 kΩ  
B characteristic 1/4 W

Connector for control signals (I/O)

Change of Direction  
Run/Stop command

External regenerative resistor

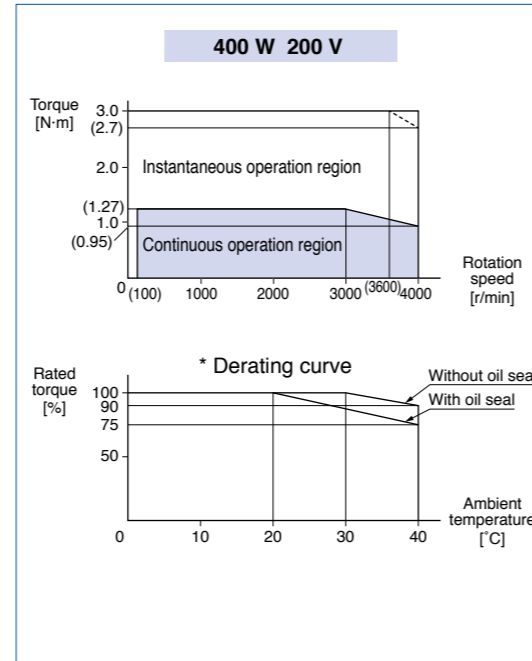
Noise filter  
Power supply input  
MCCB (Molded case circuit breaker)  
Grounding

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

Recommended Pin Terminal:  
NICHIFU TERMINAL Ind.  
TGN TC-1.25-11T

\* Please refer to P.95 Support option.

## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



## Motor (dimensions)

Unit mm

Sensor connector  
Motor connector

**<D-cut specification>**  
mass 1.2 kg

**<Keyway, center tap>**

**<Round shaft type>**

\* Boss insert position (only with oil seal)

## Brushless amplifier (dimensions)

Unit mm

mass 1.0 kg

Name plate

\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

<Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

## Specification (For Common specification, see p. 27, p. 28)

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier				Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)
	Brushless Amplifier Model number in ( ) is shipped with power connection cable	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)	Rated input current (A)				
80 mm sq.	<b>MBEK083BCV</b>	<b>MBMS082BL</b> ○	<b>750</b>	3-phase 200 to 240	±10	50/60	4.0	2.4	5.2	3000	4000

\* Suffix of "○" in the motor model No. represents shape of shaft. Refer to the "Check the model number" p. 27. \* Starting torque: Representative value

## Permissible shaft load

Motor shaft	Output	Overhung load (W)	Thrust load (F)
	750 W	392 N	147 N

## Wiring diagram

**In Case of 3-Phase 200 V**

Please refer to P.69 for the wiring of the motor extension cable.  
**Be sure to ground the grounding terminal.**  
 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.

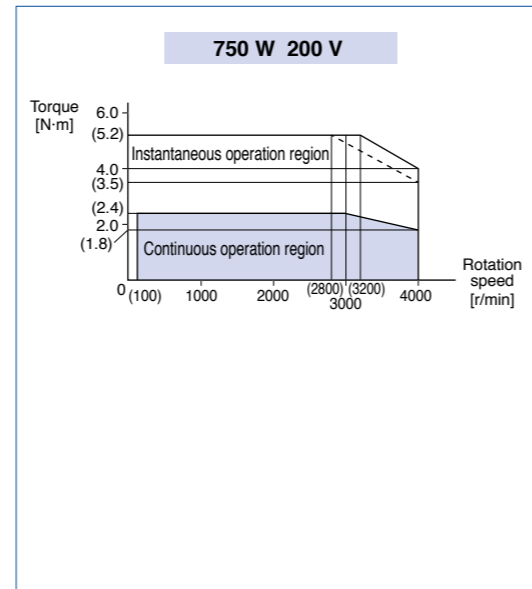
Connector for control signals (I/O)  
 Option: DV0PM20078  
 Variable resistor 5 kΩ  
 B characteristic 1/4 W

External regenerative resistor  
 Noise filter  
 Power supply input  
 MCCB (Molded case circuit breaker)  
 Grounding

Recommended Pin Terminal:  
 NICHIFU TERMINAL Ind.  
 TGN TC-1.25-11T

\* Please refer to P.95 Support option.

## Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



## Motor (dimensions)

Unit mm

Sensor connector  
 Motor connector  
 220<sup>+50</sup><sub>0</sub>  
 147  
 112  
 86.5  
 200<sup>+60</sup><sub>0</sub>  
 35  
 25.5  
 52.2  
 8  
 3  
 1.5 or more\*  
 φ19h6  
 φ70h7  
 80  
 (36)  
 (30)  
 4-φ6  
 φ90±0.2  
 13  
 35  
 25  
 22  
 17.5  
 90°±30°  
 17.5  
 6h9  
 6  
 15.5  
 M5 depth 10

\* Boss insert position (only with oil seal)

**<Round shaft type>**

**<D-cut specification>**

**<Keyway, center tap>**

mass **2.3 kg**

## Brushless amplifier (dimensions)

Unit mm

6.5  
 68  
 150  
 138  
 5.2  
 20  
 120  
 4  
 75  
 4  
 Name plate

mass **1.0 kg**

\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

<Cautions> Dimensions are subject to change without notice. Contact us or a dealer for the latest information.



# MINAS-BL **GP** series

**Position Control Type** 50 W to 130 W

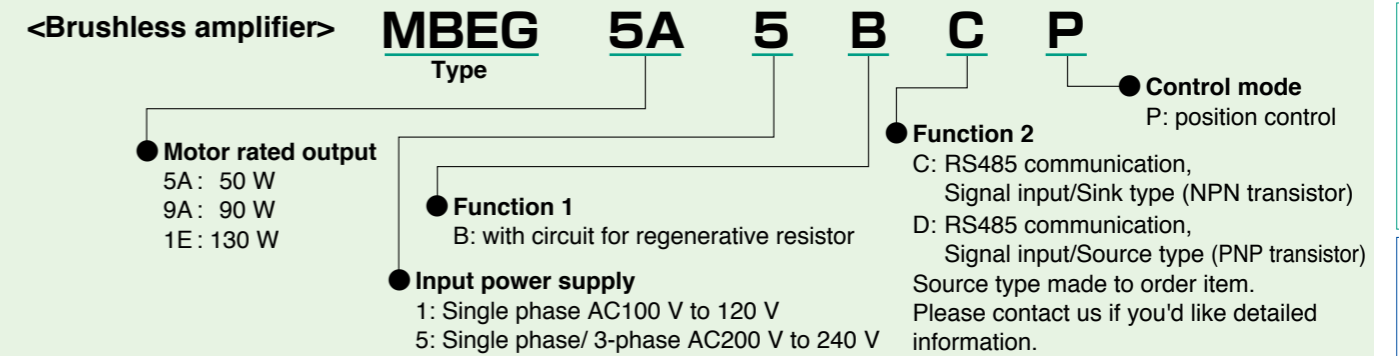
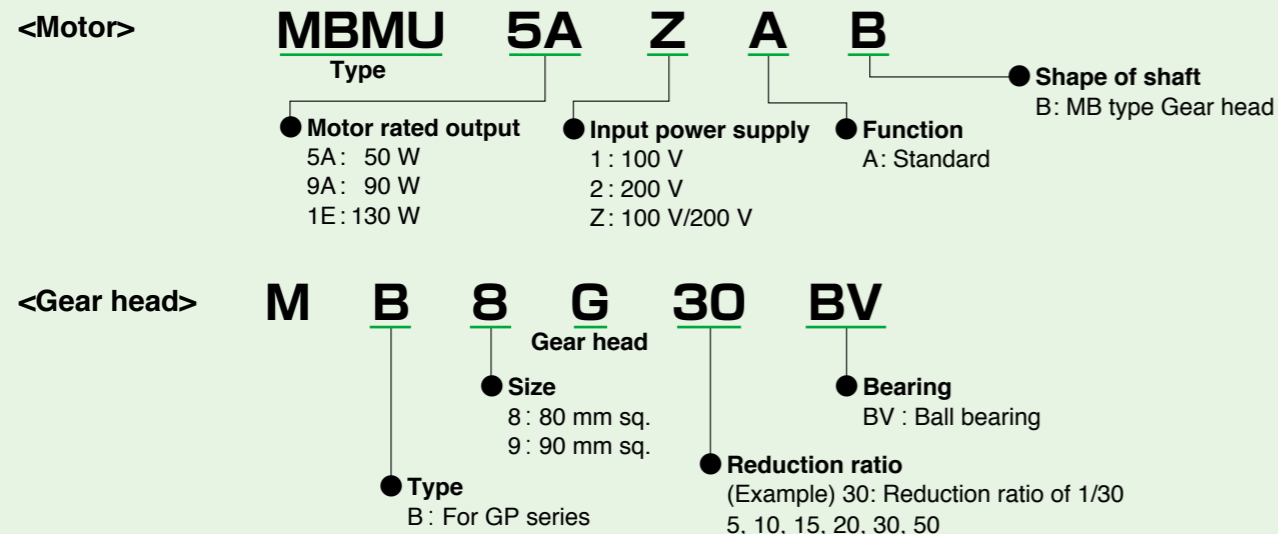
# GP series



• 80 mm square 50 W

<b>Contents</b>	
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Brushless amplifier specifications .....	48
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## Check the model number



## Brushless motor specifications

Item	Specifications				
	80 mm sq.		90 mm sq.		
Motor model No.	<b>MBMU5AZAB</b>	<b>MBMU9A1AB</b>	<b>MBMU9A2AB</b>	<b>MBMU1E1AB</b>	<b>MBMU1E2AB</b>
Motor rated output (W)	50	90		130	
Voltage (V)	for 100/200	for 100	for 200	for 100	for 200
Rated torque (N·m)	0.16	0.29		0.41	
Starting torque <sup>*1</sup> (N·m)	0.24	0.43		0.62	
Rated input current (A(rms))	0.53	1.00	0.50	1.30	0.72
Moment of inertia of rotor (×10 <sup>-4</sup> kg·m <sup>2</sup> )	0.12	0.27		0.36	
Rating	Continuous				
Rated rotation speed <sup>*2</sup> (r/min)	3000				
Speed control range (r/min)	30 to 4000				
Ambient temperature	-10 °C to +40 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the motor.				
Ambient humidity	20 % to 85 % RH (free from condensation)				
Altitude	Lower than 1000 m				
Vibration	4.9 m/s <sup>2</sup> or less X, Y, Z (Center of frame)				
Motor insulation class	130(B)				
Protection structure	IP65 <sup>*3,4</sup>				
Number of poles	8				
Motor mass (kg)	0.7	1.0	1.2		

\*1 Representative value

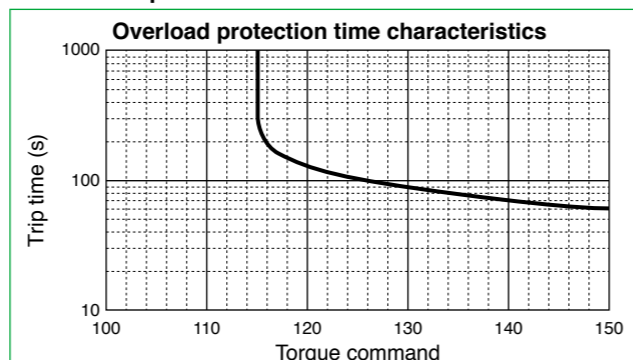
\*2 Motor shaft speed: to be multiplied by the reduction ratio when the gear head is used.

\*3 Excluding the shaft pass-through section and cable end connector.

\*4 These motors conform to the test conditions specified in EN standards (EN60529, EN60034-5).

Do not use these motors in application where water proof performance is required such as continuous wash-down operation.

### Overload protection characteristics



• 100 of the torque command represents the rated torque.

## Brushless amplifier specifications (GP series)

Item	Specifications								
	MBEG5A1BCP	MBEG5A5BCP	MBEG9A1BCP	MBEG9A5BCP	MBEG1E1BCP	MBEG1E5BCP			
Amplifier model No.	MBMU5AZAB		MBMU9A1AB	MBMU9A2AB	MBMU1E1AB	MBMU1E2AB			
Applicable Motor	50		90		130				
Motor rated output (W)	50		90		130				
Input power supply voltage (V)	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240
Frequency (Hz)	50/60								
Rated input current (A)	1.5	0.7	0.35	2.2	1.1	0.5	2.8	1.5	0.7
Voltage tolerance	±10 %								
Control method	Position control by CS signal, PWM sine wave driving system								
Ambient temperature	0 °C to +50 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the amplifier.								
Ambient humidity	20 % to 85 % RH (free from condensation)								
Location	Indoor (No corrosive gas, A place without garbage, and dust)								
Altitude	Lower than 1000 m								
Vibration	5.9 m/s <sup>2</sup> or less (10 Hz to 60 Hz)								
Protection structure/ Cooling system	Equivalent to IP20/ Self cooling								
Storage temperature	Normal temperature * Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)								
Storage humidity	Normal humidity								
Number of positioning points	4 points (Travel distance, speed, acceleration time, deceleration time, and relative/absolute can be set per point)								
Positioning resolution	288 pulse/rotation (Accuracy: Within ±5° at 20 °C at no load)								
Signal input	4 inputs								
Signal output	2 outputs (Open collector)								
Communication function	RS485	Max 31 units. Setting of parameter, monitoring of control condition. Communication speed: Choose from 2400 bps/ 4800 bps/ 9600 bps							
	RS232	Setting of parameter and monitoring of control condition are enabled with commercial PC. <sup>*1</sup>							
Digital key pad	Parameter change, status monitor, etc. can be executed through the optional Digital key pad DV0P3510. <sup>*2</sup>								
Protective function	Warning : Overload warning, Setting change warning Protect : Overload, Overcurrent, Overvoltage, Undervoltage, System error, Over-speed, Sensor error, Overheat, Position error, External forced trip, Position error counter overflow, RS485 communication error, Operation execution error, Homing error, present position overflow, Hardware limit error, Digital key pad communication trouble, user parameter error, and system parameter error								
Regenerating brake	Regenerative braking resistor can be externally connected. <sup>*3</sup> Instantaneous braking torque 200 %, Continuous regenerative ability of external regenerative resistor: 10 W (Regenerative operation with which motor shaft is rotated by load, e.g. load lowering operation, should not be continued.)								
Protection level	Protection level: torque command 115 (inverse time characteristics)								
Amplifier mass (kg)	0.37								

\*1 PANATERM for BL (Download from our web site.), PC connection cable (DV0P4140), Digital key pad connection cable (DV0P383\*0) is required. If your PC does not have RS232 port, use RS232-USB converter.

\*2 Digital key pad connection cable (DV0P383\*0) is required. \*3 Use optional external regenerative resistor (sold separately).