

Technical Instructions (Basic)

MINAS-BL GV/GP series

Brushless Amplifier

- Thank you very much for your purchase of Panasonic product.
- Please read this instruction manual carefully for proper use.
- In particular, be sure to read Safety precautions (P.2 to 4) before use for safety.
- Keep this manual with care after reading, and read as necessary.

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



- Label of safety precaution is affixed to the product.

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


[Web address of Panasonic Industry Co., Ltd.]
industrial.panasonic.com/ac/e/


This product is for industrial equipment. Don't use this product at general household.

Safety Precautions Important

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

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

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

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

- The following indications show things that must be observed.



Indicates something that must not be done.



Indicates something that must be done.

DANGER

Do not touch the rotating part of the motor while operating.



The failure could result in injuries.

Do not expose the cables to sharp objects, excessive pressing or pinching forces, and heavy loads.



The failure could result in electric shocks, damages, or malfunction.

Do not climb or stand on the brushless equipment.



The failure could result in electric shocks, injuries, damages, or malfunction.

Do not place inflammable matter near the motor, amplifier and external regenerative resistor.



The failure could result in fire.

Do not touch the motor, amplifier, and external regenerative resistor, since they become hot.



The failure could result in burns.

Do not subject the product to water, corrosive or flammable gases, and combustibles.



The failure could result in fire.

Do not put your hands in the brushless amplifier.



The failure could result in burns, or electric shocks.

Do not connect the cable (U, V and W) of the brushless motor directly to the commercial power source.



The failure could result in fire, malfunction or damage.

Ground the earth of the brushless motor and brushless amplifier.



The failure could result in electric shocks.

Install an external emergency stop device to shut down the main power source in any emergency.



The failure could result in electric shocks, injuries, fire, damages or malfunction.

Make sure to secure the safety after the earthquake.



The failure could result in electric shocks, injuries, or fire.

Mount the brushless motor, brushless amplifier and external regenerative resistor on incombustible material such as metal.



The failure could result in electric shocks, injuries, or fire.

Arrange the phase sequence of the motor and wiring of the CS sensor.



The failure could result in injuries, damages, or malfunction.

An over-current protection, earth leakage breaker, over temperature protector and emergency stop device must be installed.



The failure could result in electric shocks, injuries, or fire.

Install the product properly to avoid personal accidents or fire in case of an earthquake.



The failure could result in electric shocks, injuries, or fire.

Only persons who are trained and qualified to work with or on electrical equipment are permitted to operate or maintain this equipment.



The failure could result in electric shocks.

Transportation, wiring and checking must be performed with power source turned off and after making sure that there is no risk of electric shock.



The failure could result in electric shocks or injuries.

CAUTION

Do not approach to the equipment after recovery from the power failure because they may restart suddenly.



The failure could result in injuries.

Do not hold the cables or motor shaft when transporting the motor.



The failure could result in injuries.

Do not drive the motor from the external power.



The failure could result in fire.

Never start and stop the motor by magnet contactor which is provide on the main line.



The failure could result in damages.

Safety Precautions

Important

CAUTION

Do not frequently turn on and off the master power source.



The failure could result in malfunction.

Do not subject the brushless amplifier, motor or shaft to high impact.



The failure could result in malfunction.

Do not modify, dismantle or repair the product.



The failure could result in electric shocks, injuries, or fire.

If trip occurs, remove the causes of the trip and secure the safety before restarting.



The failure could result in injuries.

Execute the trial-operations with the motor fixed and a load unconnected. Connect a load to the motor after the successful trial-operations.



The failure could result in injuries.

Use the specified voltage on the product.



The failure could result in electric shocks, injuries, or fire.

Install a safety device against idling or locking of gear head, and leakage of grease.



The failure could result in injuries, damages, and contaminations.

Do not place any obstacle that blocks ventilation around the brushless amplifier and the motor.



The failure could result in burns or fire.

Do not block the heat dissipation hole.



The failure could result in electric shocks, or fire.

Be sure to turn off power when not using it for a prolonged time.



The failure could result in injuries due to unintentional operation.

Maintenance and check must be performed by an expert.



The failure could result in injuries and electric shock.

Conduct proper installation according to product weight or rated output.



The failure could result in injuries, or damages.

Use the motor and amplifier with the specified combination.



The failure could result in fire.

Ambient temperature of installed motor and amplifier should be under permissible one.



The failure could result in damages.

This product should be treated as an industrial waste when it is disposed.

Introduction/ Checking the model

After unpacking

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

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

Checking the model of Amplifier, Motor and Gear head

This amplifier is designed for use in combination with a motor to be specified by us. Check a name of series, rated output, voltage specifications you wish to use. You must not use any other combinations than those listed below:

Standard

	Shaft type	Voltage	Out put	Amplifier Type	Applicable Motor	Applicable Gear head
GV series	Pinion shaft	Single phase AC100 to 120 V	50 W	MBEG5A1BCV	MBMU5AZAX	MX8G □ B * Reduction ratio: 3 to 180
			90 W	MBEG9A1BCV	MBMU9A1AZ	MZ9G □ B * MY9G □ B *
			130 W	MBEG1E1BCV	MBMU1E1AZ	Reduction ratio: 3 to 200
		Single phase/ 3-phase AC200 to 240 V	50 W	MBEG5A5BCV	MBMU5AZAX	MX8G □ B * Reduction ratio: 3 to 180
			90 W	MBEG9A5BCV	MBMU9A2AZ	MZ9G □ B * MY9G □ B *
			130 W	MBEG1E5BCV	MBMU1E2AZ	Reduction ratio: 3 to 200
	Round shaft	Single phase AC100 to 120 V	50 W	MBEG5A1BCV	MBMU5AZAS	—
			90 W	MBEG9A1BCV	MBMU9A1AS	
			130 W	MBEG1E1BCV	MBMU1E1AS	
		Single phase/ 3-phase AC200 to 240 V	50 W	MBEG5A5BCV	MBMU5AZAS	
			90 W	MBEG9A5BCV	MBMU9A2AS	
			130 W	MBEG1E5BCV	MBMU1E2AS	
GP series	Pinion shaft	Single phase AC100 to 120 V	50 W	MBEG5A1BCP	MBMU5AZAB	MB8G □ BV * Reduction ratio: 5 to 50
			90 W	MBEG9A1BCP	MBMU9A1AB	MB9G □ BV *
			130 W	MBEG1E1BCP	MBMU1E1AB	Reduction ratio: 5 to 50
		Single phase/ 3-phase AC200 to 240 V	50 W	MBEG5A5BCP	MBMU5AZAB	MB8G □ BV * Reduction ratio: 5 to 50
			90 W	MBEG9A5BCP	MBMU9A2AB	MB9G □ BV *
			130 W	MBEG1E5BCP	MBMU1E2AB	Reduction ratio: 5 to 50

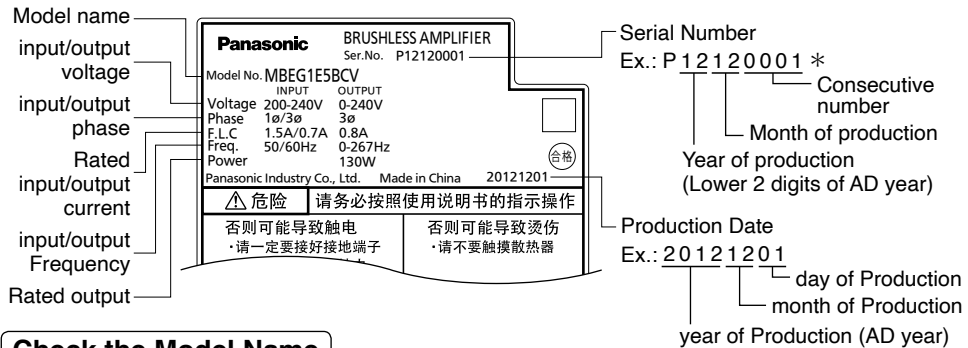
* A figure representing reduction ration in □

e.g.) Part number of MX type gear head with reduction ratio 10 is MX8G10B.

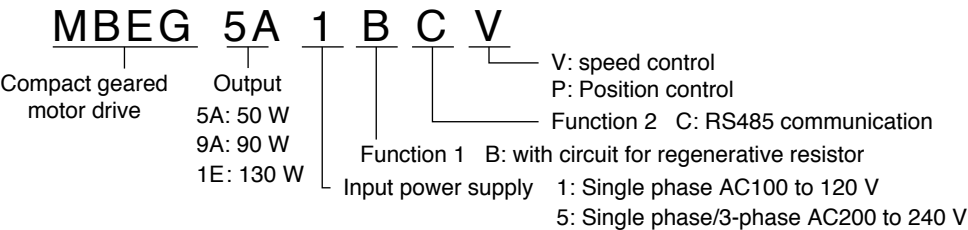
Checking the model/ Name of part

Checking the model of brushless amplifier

Nameplate

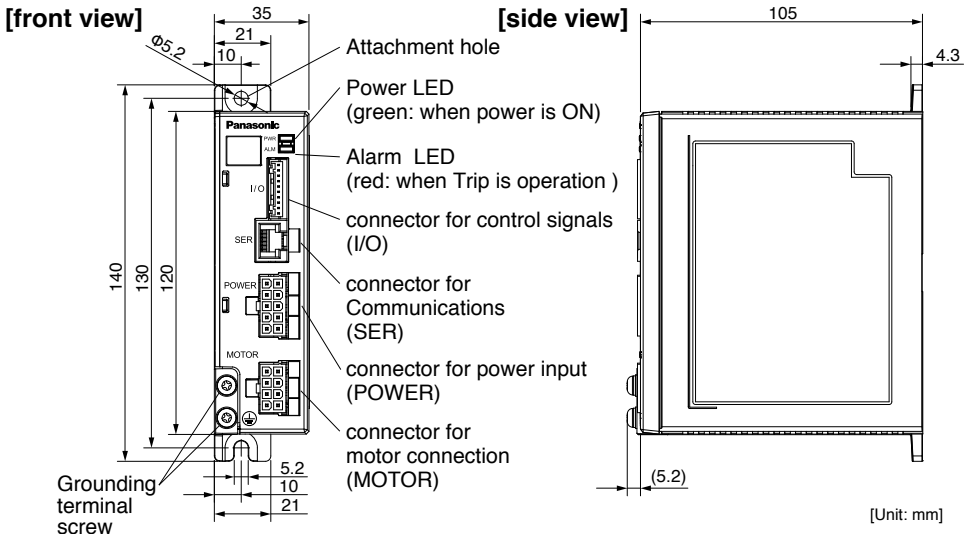


Check the Model Name



Name of part

Brushless amplifier



Installation

Install the brushless amplifier properly for preventing failure and accident.

Transport

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

Storage

- Keep the unit indoors in a clean and dry place free from vibration with little change of temperature.
- In keeping a gear head alone, direct the output shaft down.
(Otherwise, grease leaking is possible.)

Location

- Location gives great influence upon the life of brushless amplifier, therefore choose a place in conformance with the conditions below:
 - Indoors where the motor is not subjected to rain water and direct sun beam.
 - Do not use the motor in corrosive atmosphere such as hydrogen sulfide, sulfurous acid, chlorine, ammonia, sulfur, gas chloride, gas sulfide, acid, alkali, and salt, in the atmosphere of combustible gas, or in the vicinity of flammables.
 - Place not exposed to grinding liquid, oil mist, iron powder, and cutting particle.
 - Well-ventilated place with little moisture, oil, or inundation, and place far from heat source such as a furnace.
 - Place easy to check and clean
 - Place free from vibration
 - Do not use the unit in an enclosed environment. Enclosing may raise the temperature of motor (amplifier), and shorten their life.

Environmental condition

Item	Condition
Ambient temperature	0 °C to 50 °C (free from freezing) *1
Ambient humidity	20 to 85% RH (free from condensation)
Storage temperature	At normal temperature and normal humidity*2
Protection structure	Equivalent to IP20
Vibration	Not greater than 5.9 m/s ² (10 to 60 Hz)
Altitude	Not greater than 1000 m

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

*2 Temperature which is acceptable for a short time, such as during transportation, is -20 °C to 60 °C (free from freezing).

How to Install

The amplifier is a vertical placement type. Install it vertically and provide at least 10 cm space around it for ventilation.

(1) When installing with screw

Determine the fastening torque of the fixing screw based on the strength of the screw and material of the mounting surface, to ensure secure and safe installation.

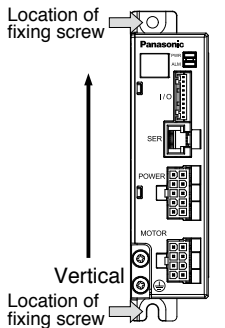
Example:

To install to steel plate with steel screw (M4): 1.35 to 1.65 N·m

(2) When installing to DIN rail

The DIN rail mounting unit is available as option.

For details, refer to the Instruction Manual (Overall).



Wiring

• GP series

Connector on amplifier side: Parts No. S10B-PASK-2 (J.S.Tmfg.,Co.,Ltd.) or equivalent.

(mating connector: Representative Housing PAP-10V-S,
Terminal SPHD-001T-P0.5 or SPHD-002T-P0.5)

Terminal number	Terminal symbol	Terminal name	Default	Terminal explanation	function selection	logic selection
1	I1 ^{*1}	Signal input 1	Run start	In turning on signal, short between "I1" and "GND". ^{*2}	Pr50	Pr54
2	I2 ^{*1}	Signal input 2	Point designation	In turning on signal, short between "I2" and "GND". ^{*2}	Pr51	Pr55
3	I3 ^{*1}	Signal input 3	Home sensor	In turning on signal, short between "I3" and "GND". ^{*2}	Pr52	Pr56
4	(NC)	—	—	Do not connect anything.	—	—
5	I4 ^{*1}	Signal input 4	Forced trip	In turning on signal, short between "I4" and "GND". ^{*2}	Pr53	Pr57
6	GND	Control ground	—	Common ground terminal for control signal.	—	—
7	(NC)	—	—	Do not connect anything.	—	—
8	+5V	Power supply	—	Set 50 mA or below	—	—
9	O1 ^{*1}	Signal output 1	Trip output	Open collector output. Open collector Vce max: DC30 V, Ic max: 50 mA	Pr5C	Pr5E
10	O2 ^{*1}	Signal output 2	In-motion signal	Open collector output. Open collector Vce max; DC 30 V, Ic max; 50 mA	Pr5d	Pr5F

*1 Function of input/output can be changed by PANATERM for BL and the Digital key pad.
Default is shown.

*2 Maximum rated voltage: -0.5 to 5.5V.

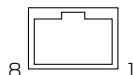
- Connector for control signals pin number is 1, 2, ... 10 in the order from grounding terminal side.
- Permissible length for control signal cable is 5m or less.

Connector for communications (SER)

Modular jack: 85503-0001 (Japan Molex Inc.) or equivalent (RJ45)

Terminal number	Terminal Symbol	Terminal explanation
1	—	Do not connect anything.
2	+5 V	DC5 V power supply for digital key pad
3	SOT	Interface for digital key pad or PANATERM for BL
4	SIN	
5	RS485+	for connect RS485+
6	RS485-	for connect RS485-
7	GND	power supply GNG for Digital key pad
8	SCK	Interface for digital key pad

- Connection of digital key pad of an option is possible. digital key pad connecting cable of an option (DV0P383**) is required.
- The terminal number of a modular jack is the following figure



- Refer to operation manual (Overall) for the correspondence procedure of RS485.

Maintenance/inspections/ How to reset a trip

Maintenance/ inspections

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

Maintenance/ Inspection item

Maintenance/ Check item	Inspection procedure	Condition
Input voltage	Voltmeter	Must be within $\pm 10\%$ of rating.
Input current	Ammeter	Must be within rated input current described on nameplate.
Insulation resistance	Insulation resistance tester	Measure the insulation resistance with 500 V Megger. It must be above 1 M Ω . Measuring position: Between power input line (L1, L2,L3) and grounding wire
Noise	Hearing	Noise level must not be different from the usual level. In addition, abnormal noise such as rumbling noise must not be heard.
Vibration	By hand	Free from abnormal vibration.
Installation bolt	Torque wrench	Check for loosening of bolt, and tighten additionally as necessary.
Use environment	By sight	Check the ambient temperature and humidity, and make sure that dirt, dust, or foreign substance is not found. check the waste thread etc don't attached to the windhole of brushless amplifier.

Caution

- Power-on/off operations should be done by the operators themselves for ensuring safety in checking.
- Do not touch the motor while it is running or immediately after it stops because it gets hot and stays hot for a while after power has been turned off.
- The DC500 V megger testing should be performed only on the main circuit. Be sure to disconnect the power supply. Otherwise, failure will occur. The resistance should be 1 M Ω between the ground with L1, L2 and L3 short-circuited.

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

How to clear trip

If the motor trips (alarm LED is lit), remove the cause and use one of the following clearing procedures.

- Turn off power, and when the power LED goes off, turn on power again.
- For clearing procedure using the panel B or an input terminal, refer to the Instruction Manual (Overall).

<CAUTION>

Before clearing the trip, be sure to locate and remove the cause.

Conformance to EC directive and UL standard

EC Directives

This brushless amplifier realizes compliance with the relevant standard of low voltage directive in order to facilitate conformity to the EC directive of the machinery and equipment to be incorporated.

EMC Directives

Brushless amplifiers are not intended for general home use or connection to low-voltage public communication lines. Connecting to such a circuit may cause radio frequency interference. This brushless amplifier decides the model such as installation and wiring, and it conforms to the relevant standard of the EMC directive in that model. Wiring conditions, grounding conditions, etc. may not be the same as those of the model in the state where it is incorporated in actual machinery / equipment. Therefore, as for compliance with the EMC directive in machinery / equipment, it is necessary to measure with the final machinery / equipment incorporating this product (especially Radiated Emissions, Conducted Emissions etc.).

Applicable standard

	Applicable standard	Installation condition
UL	UL508 C Standard for electric converter equipment	Class I equipment Pollution degree 2 SCCR ^{*1}
CE	EN61800-5-1 Adjustable speed electrical power drive systems. – Safety requirements. Electrical, thermal and energy EN61800-3 Adjustable speed electrical power drive systems. – EMC requirements and specific test methods EN55011 Radio interference wave characteristics of industrial, scientific, and medical high-frequency equipment EN61000-6-2 Standards for immunity in industrial environment (EMC directive)	Overvoltage category II Class I equipment Pollution degree 2
KC	Korea Radio Law ^{*2} Class A Instrument (commercial broadcast communications equipment)	—

*1 SCCR: Symmetrical current 5,000 Arms, Max. 240 V
Motor over-temperature protection is not provided.
Motor over-load-temperature protection shall be provided at the final installation upon required by the NEC (National Electric Code).

*2 Information related to the Korea Radio Law
This brushless amplifier is a Class A commercial broadcasting radio wave generator not designed for home use. The user and dealer should be aware of this fact.

A 급 기기 (업무용 방송통신기자재)

이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

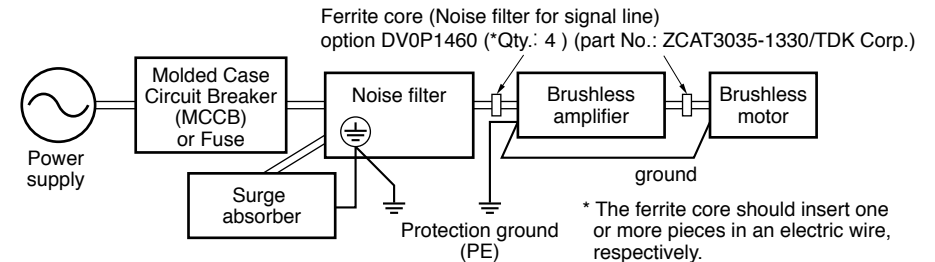
(대상기종 : Brushless Amplifier)

Conformance to EC directive and UL standard

Configuration of peripheral equipment

Power supply	<ul style="list-style-type: none"> 100 V system: Single phase 100 V to 120 V \pm 10%, 50/60 Hz 200 V system: Single phase 200 V to 240 V \pm 10%, 50/60 Hz Use the equipment under the environment of overvoltage category II specified by IEC60664-1. In order to obtain overvoltage category III, insert a transformer conforming to EN standard or IEC standard to the input of brushless motor. Use an electric wire size suitable to EN60204-1.
MCCB (breaker) Fuse	Be sure to connect a specified MCCB certified by IEC standard and UL, or a fuse certified by UL between power supply and noise filter. Observance of this condition allows conformance with UL508C (file No. E164620) .
Noise filter	When installing one noise filter at the power supply for more than one brushless motor used, contact the manufacturer of noise filter.
Surge absorber	Install a surge absorber on the primary side of noise filter. However, in performing the voltage resistance test of machine and equipment, be sure to remove the surge absorber; otherwise, the surge absorber may be ruptured.
Grounding	Be sure to connect the grounding Terminal of brushless amplifier and protective grounding wire (PE) of system for preventing electric shock. Do not tighten the grounding wires together but connect them individually.

Wiring of peripheral equipment



List of compatible peripheral equipment

Part name	Optional part number (option)	Manufacturer's part No.	Qty.	Manufacturer
Noise filter(single phase)	DV0P4170	SUP-EK5-ER-6	1	OKAYA ELECTRIC IND. CO., LTD.
Noise filter(3-phase)	DV0PM20042	3SUP-HU10-ER-6	1	
Surge absorber(single phase)	DV0P4190	R·A·V-781BWZ-4	1	
Surge absorber(3-phase)	DV0P1450	R·A·V-781BXZ-4	1	
Noise filter for control signals	DV0P1460	ZCAT3035-1330	4	TDK Co.Ltd.,

Recommended circuit breaker

Made by Sensata Technologies Japan Limited:

Type IELH-1-11-63-5A-M (single phase) Type IELH-1-111-63-5A-M (3-phase)

(Rated current 5A, cutoff characteristics DELAY63)

• Recommended cutoff characteristics: DELAY61-63

Specifications

Item		Specifications						Applies *2
Model name	Brushless amplifier	MBEG 5A1BC *	MBEG 5A5BC *	MBEG 9A1BC *	MBEG 9A5BC *	MBEG 1E1BC *	MBEG 1E5BC *	V,P
	Brushless motor	MBMU5AZ **		MBMU 9A1 **	MBMU 9A2 **	MBMU 1E1 **	MBMU 1E2 **	V,P
Rated output (W)		50		90		130		V,P
Power input	Voltage (V) Tolerance ±10%	Single phase 100 to 120	Single/ 3-phase 200 to 240	Single phase 100 to 120	Single/ 3-phase 200 to 240	Single phase 100 to 120	Single/ 3-phase 200 to 240	V,P
	Frequency (Hz)	50/60						V,P
	Rated input current (A)	1.5	0.7/0.35	2.2	1.1/0.5	2.8	1.5/0.7	V,P
Motor Rated Current (A)		0.53		1.0	0.50	1.3	0.72	V,P
Rated torque (N·m)		0.16		0.29		0.41		V,P
Starting torque (N·m)		0.24		0.43		0.62		V,P
Rated rotation speed		3000 r/min						V,P
Speed control range		30 to 4000 r/min (Speed ratio 1:133) *3						V,P
Speed fluctuation factor	With load	±0.5% or below (at 0 to rated torque, rated rotation speed)						V
	With voltage	±0.5 % or below (at supply voltage ±10%, rated rotation speed)						V
	With temperature	±0.5% or below						V
Acceleration/ Deceleration time		0.3 sec *1						V
Stopping procedure		Free-run stop (A slowdown stop and a free-run stop to selection is possible) *1						V
Speed control range		0 to 4000 r/min (analogue voltage (0 to 5 V), console A), 0 to 4000 r/min (Setting selection by parameter on Digital key pad)						V
Speed setting Resolution		Analogue: About 1/ 200 of Upper speed limit Digital: 1 r/min						V
Speed setting precision (at 20°C)		Analogue: ±3% or below of upper limit speed (±90r/min or below at upper limit speed 3000 r/min) [Digital: 1% or below of upper limit speed]						V
Number of positioning points		4 points (Travel distance, speed, acceleration time, deceleration time, and relative/absolute can be set per point.)						P
Positioning resolution		288 pulses/rotation (Accuracy: Within –5 degrees at 20 °C at no load)						P
Regenerating brake		Regenerative braking resistor can be externally connected.						V,P
Protective function		Overload, Overcurrent, Overvoltage, Parameter error, CPU error, Overspeed, Sensor error, Overheat, setting change. External forced trip, RS485 communication error, User parameter error, System parameter error						V,P
		Undervoltage warning (Can be changed to Undervoltage error.) *1						V
		Undervoltage error, Excessive position deviation, Deviation counter overflow, Operation execution error, Homing error, Present position overflow, Hardware limit error						P
Overload rating		115%/ Overload protection time characteristics 150% 60 sec						V,P
Amplifier mass (kg)		0.37						V,P

*1 Can be set by using the optional Digital key pad DV0P3510 (sold separately) or PANATERM for BL or through communication over RS485.

*2 The mark V is applied to the GV series, P is applied to the GP series.

*3 Adjustment of parameters is required depending on the driving load conditions.

Cautions for Proper Use

Cautions for Proper Use

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

After-Sale Service (Repair)

Repair

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

Technical information

Technical information of this product (Instruction Manual, CAD data) can be downloaded from the following web site.

industrial.panasonic.com/ac/e/

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

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

For your records:

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

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

Industrial Device Business Division, Panasonic Industry Co., Ltd.
7-1-1 Morofuku, Daito, Osaka, 574-0044, Japan

