



## BRUSHLESS MOTOR

GV series  
MINAS-BL KV series  
GP series

Panasonic Corporation, Appliances Company, Motor Business Unit

[http://industrial.panasonic.com/ww/i\\_e/25000/motor\\_fa\\_e/motor\\_fa\\_e.html](http://industrial.panasonic.com/ww/i_e/25000/motor_fa_e/motor_fa_e.html)

# 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

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

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

### Typical options



Console A



Digital key pad

### 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



Console A



Digital key pad

# MINAS-BL



•80 mm square 50 W

## MINAS-BL **GP** series

Position Control Type 50 W to 130 W

### Typical options



Digital key pad

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# Motor Business coexisting

**Panasonic Corporation, Appliances Company,  
Motor Business Unit promotes preservation of  
the environment together with industrial activities and  
aims to “Company Coexisting with Global Environment”**

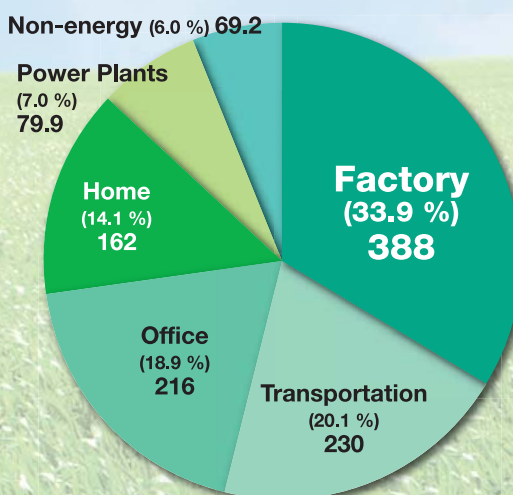
## Environmental conservation activities in industrial field

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.

### CO<sub>2</sub> Emissions (2009)

Source: CO<sub>2</sub> Inventory Office “Japan CO<sub>2</sub> emission data” (Units: million tons)



**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.**

# with Global Environment

### Basic attitude

Based on "Environmental Declaration" of Panasonic, Motor Business Unit of Appliances 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.

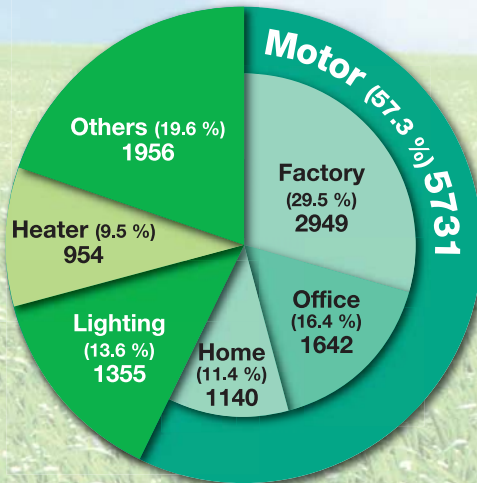
### Environmental Policy

Motor Business Unit of Appliances 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.

## 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)



If motor power consumption reduced by 1 % (4.59 billion kWh)



Equivalent to annual one thermal power plant stop (500K kWh×8760H)



### eco ideas

Panasonic is committed to the development of eco-friendly products.

# Brushless motors of MINAS-BL series

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.

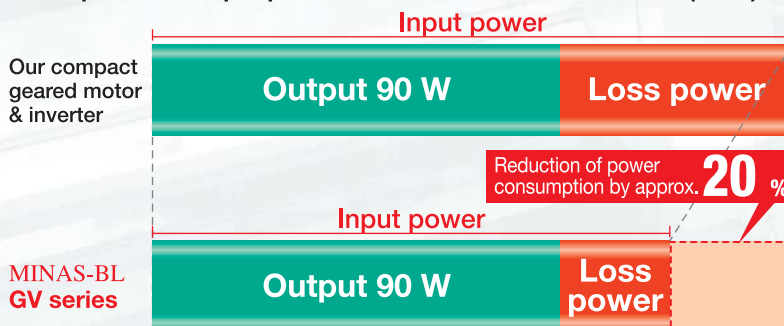
These motors promote “three saving” activities – Energy saving, Cost saving and Space saving.



## 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.

## 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**

\*1 Rated rotational speed: 3000 r/min

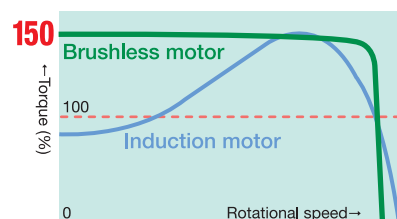
GV KV GP

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**

# realize “Three Savings”.

## Space Saving

**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 %

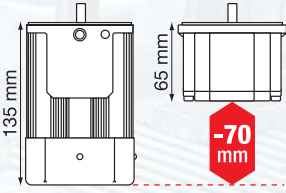
■ Comparison in mass between GV/GP series and our compact geared motors

Lighter by approx. 1/3



▲ Split core structure

Our compact geared motor 90 W (90 mm square)



MINAS-BL GV/GP series 90 W (90 mm square)

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.

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

Enable downsizing of embedded device.

## Cost Saving

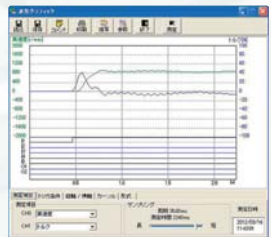
**GV KV GP** They also reduce maintenance and setup cost.

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)

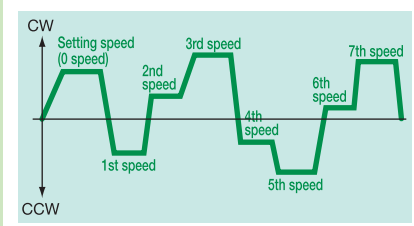


▲ Waveform graphical display  
Example: Velocity and torque  
Status of I/O can also be monitored.

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.

**GV KV**

### 8-speed operation

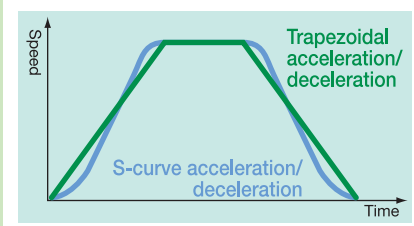


Stable operation maintains high productivity and yield ratio.  
**The speed is regulated at 0.5 % or less variation.**

\*2 Within rated torque

**GP**

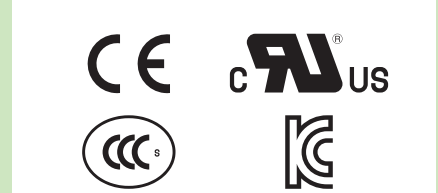
### Positioning at 4 points



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

(Under application)  
**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

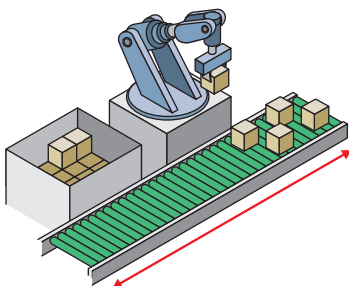


•60 mm square 200 W

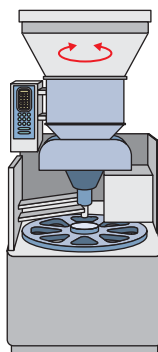
MINAS-BL **KV** series  
Speed Control Type 50 W to 750 W

- 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 (KV series will also be compatible with the standards in the near future), 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

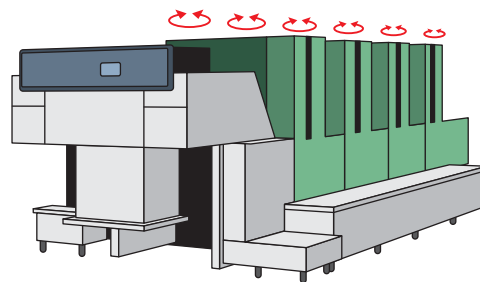
## Typical applications



Conveyer



Food processor (agitating)



Textile machinery



# Position Control Type GP series

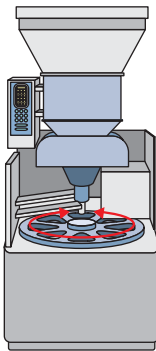


•80 mm square 50 W

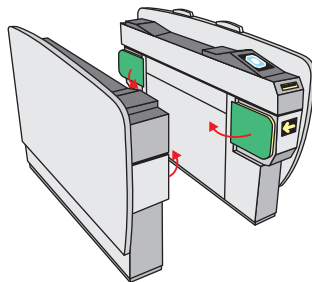
## MINAS-BL GP series Position Control Type 50 W to 130 W

- 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

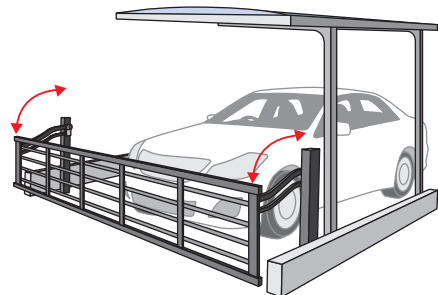
### Typical applications



Food processor (turntable)



Automatic ticket gate



Gate

# MINAS-BL KV series

Speed Control Type 50 W to 750 W

# KV series

GV series

KV series

GP series

Options

Information



• 60 mm square 200 W

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# Check the model number

<Motor>

**MBMS**  
Type

**08**

**2**

**B**

**L**



● **Motor rated output**

5A: 50 W  
01: 100 W  
02: 200 W  
04: 400 W  
08: 750 W

● **Input power supply**

1: 100 V  
2: 200 V  
Z: 100 V/200 V

● **Mounting method**

L: Flange type

● **Rated rotation speed**

B: 3000 r/min

● **Motor specifications**

○: Refer to the table below.

		Shaft		
		Round	Keyway, center tap	D-cut
Oil seal	without	A	S	N
	with	C	U	Q

## Brushless motor specifications

Item	Specifications						
	38 mm sq.		60 mm sq.				80 mm sq.
Motor model No. *1	<b>MBMS5AZBL</b> ○	<b>MBMS011BL</b> ○	<b>MBMS012BL</b> ○	<b>MBMS021BL</b> ○	<b>MBMS022BL</b> ○	<b>MBMS042BL</b> ○	<b>MBMS082BL</b> ○
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*2 (N·m)	0.30	0.70		1.4		3.0	5.5
Rated input current (A(rms))	0.7	1.2	0.7	2.9	1.8	2.8	3.6
Moment of inertia of rotor ( $\times 10^{-4}$ kg·m <sup>2</sup> )	0.025	0.07		0.14		0.26	0.87
Rating	Continuous						
Rated rotation speed*3 (r/min)	3000						
Speed control range (r/min)	100 to 4000						
Ambient temperature	0 ℃ to +40 ℃ (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*4,5						
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.

<Brushless amplifier>

**MBEK**  
Type

**08**

**3**

**B**

**C**

**V**

- **Motor rated output**  
5A: 50 W  
01: 100 W  
02: 200 W  
04: 400 W  
08: 750 W

- **Function 1**  
B: with circuit for regenerative resistor
- **Input power supply**  
1: Single phase AC100 V to 120 V  
3: 3-phase AC200 V to 240 V  
5: Single phase/ 3-phase AC200 V to 240 V

- **Function 2**  
C: RS485 communication, Signal input/Sink type (NPN transistor)  
D: RS485 communication, Signal input/Source type (PNP transistor) Source type made to order item. Please contact us if you'd like detailed information.
- **Control mode**  
V: speed control

## Brushless amplifier specifications (KV series)

Item	Specifications										
	MBEK5A1BCV	MBEK5A5BCV	MBEK011BCV	MBEK015BCV	MBEK021BCV	MBEK025BCV	MBEK043BCV	MBEK083BCV			
Amplifier model No.	MBEK5A1BCV	MBEK5A5BCV	MBEK011BCV	MBEK015BCV	MBEK021BCV	MBEK025BCV	MBEK043BCV	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	200 to 240	
Frequency (Hz)	50/60										
Rated input current (A)	1.8	0.9	0.5	2.4	1.2	0.7	4.2	2.1	1.2	2.1	4.0
Voltage tolerance	±10 %										
Control method	Speed control by CS signal, PWM sine wave driving system										
Ambient temperature	0 ℃ to +50 ℃ (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 ℃ to 60 ℃ (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 150 %, Continuous regenerative power 10 W (Regenerative operation with which motor shaft is rotated by load, e.g. load lowering operation, should not be continued.)										
Protection level	Overload protection: 115 %, Time characteristics: 150 % 60 sec										
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	
					Reference page	p. 74	p. 71	p. 67	p. 67	p. 73
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		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.

(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.

		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	P.69	Digital key pad connection cable	1 m	DV0P38310	P.68
	3 m	DV0PQ1000330			3 m	DV0P38330	
	5 m	DV0PQ1000350			5 m	DV0P38350	
	10 m	DV0PQ10003A1		External speed setter	DV0PM20078	P.71	
Power supply connector kit		DV0P2870	P.70	Control signal cable	2 m	DV0PM20076	P.70
Console A <sup>*1</sup>		DV0P3500	P.68	I/O connector kit		DV0PM20070	P.71
Console A connection cable	1 m	DV0PM2006910	P.68	Panel connector kit		DV0P3610	P.71
	3 m	DV0PM2006930		PC connection cable <sup>*3</sup>	1.5 m	DV0P4140	P.70
	5 m	DV0PM2006950		Noise filter for signal line	DV0P1460	P.67	
Digital key pad <sup>*2</sup>		DV0P3510	P.68	DIN rail mounting unit		DV0P3811	P.72

\* For details of cable, refer to p. 68 to 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, NK or HC series, OMRON: G2A series

### 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

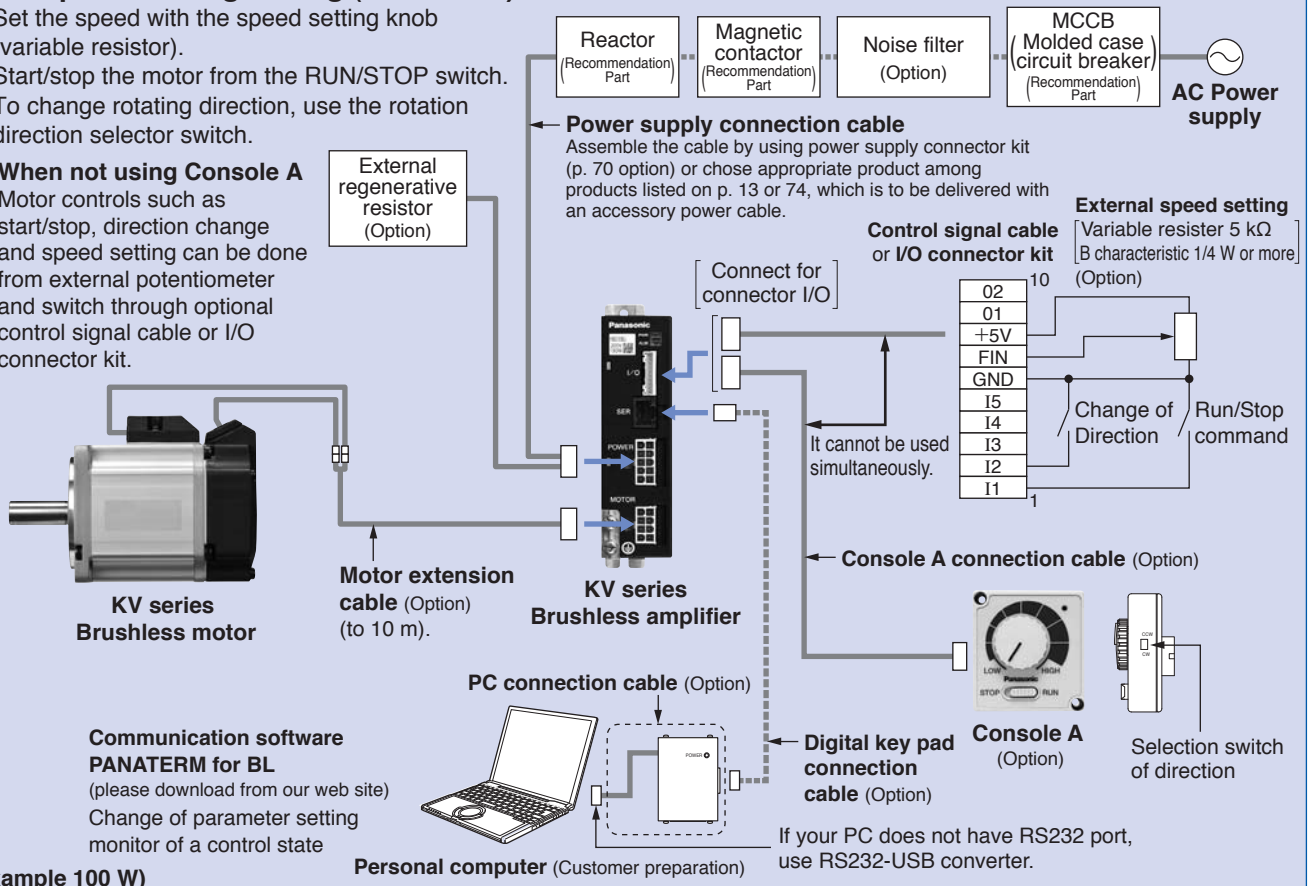
# System configuration diagram (50 W, 100 W)

## ● 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.

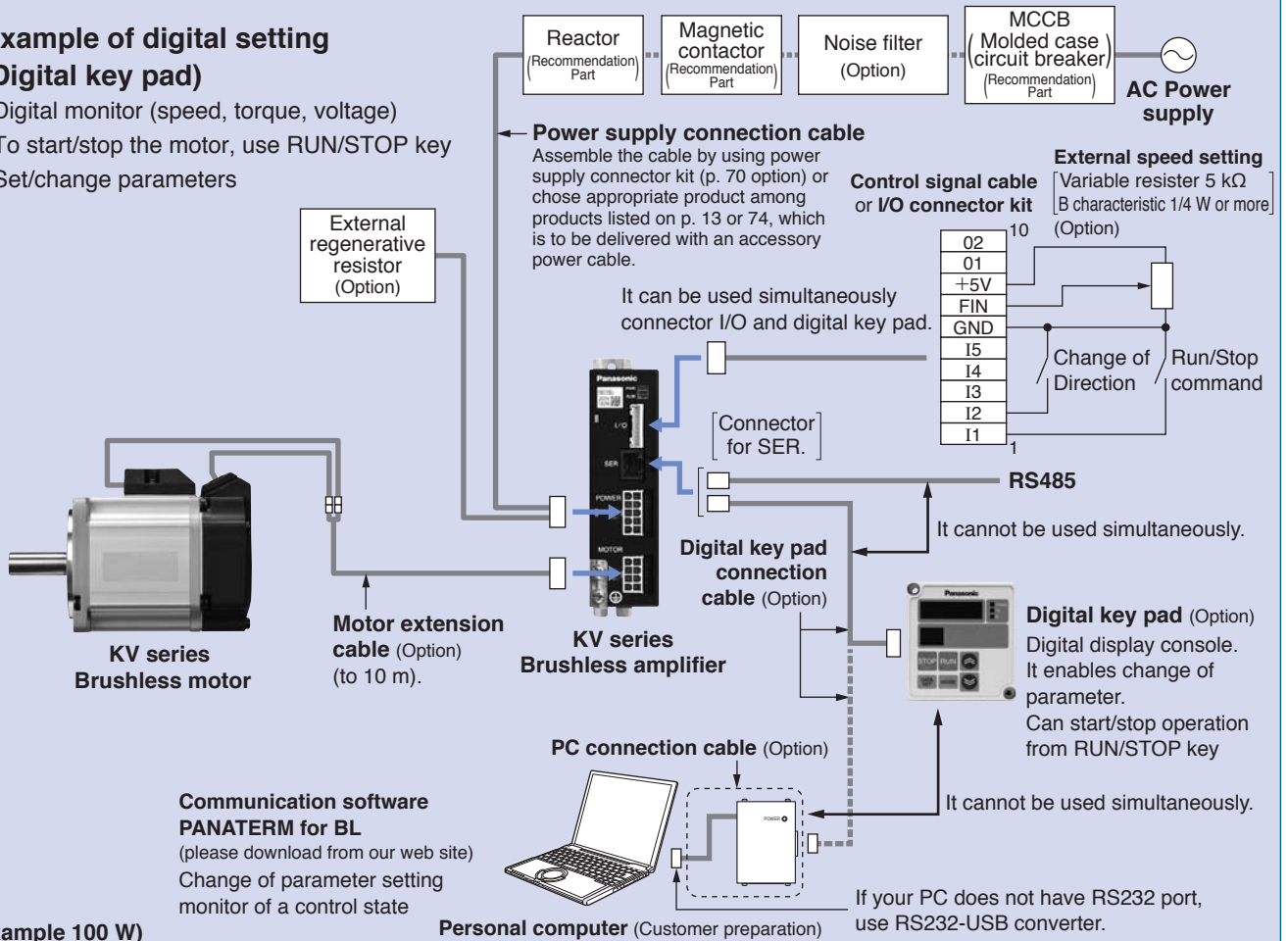
### ● When not using Console A

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 of digital setting (Digital key pad)

- Digital monitor (speed, torque, voltage)
- To start/stop the motor, use RUN/STOP key
- Set/change parameters



# 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
					Reference page	p. 71	p. 67	p. 67
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 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
3-phase 200 V		400	MBMS042BL○	MBEK043BCV		for 3-phase power supply DV0PM20042	for 3-phase power supply DV0P1450	for 3-phase power supply DV0P220
		750	MBMS082BL○	MBEK083BCV				

(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	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	

\* For details of cable, refer to p. 68 to 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	5 A	20 A (3P+1a)	0.75 (AWG18)	0.13 (AWG26)
Single phase 200 V					
3-phase 200 V	400 W, 200 W	10 A			
	750 W				

### 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, NK or HC series, OMRON: G2A series

### 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

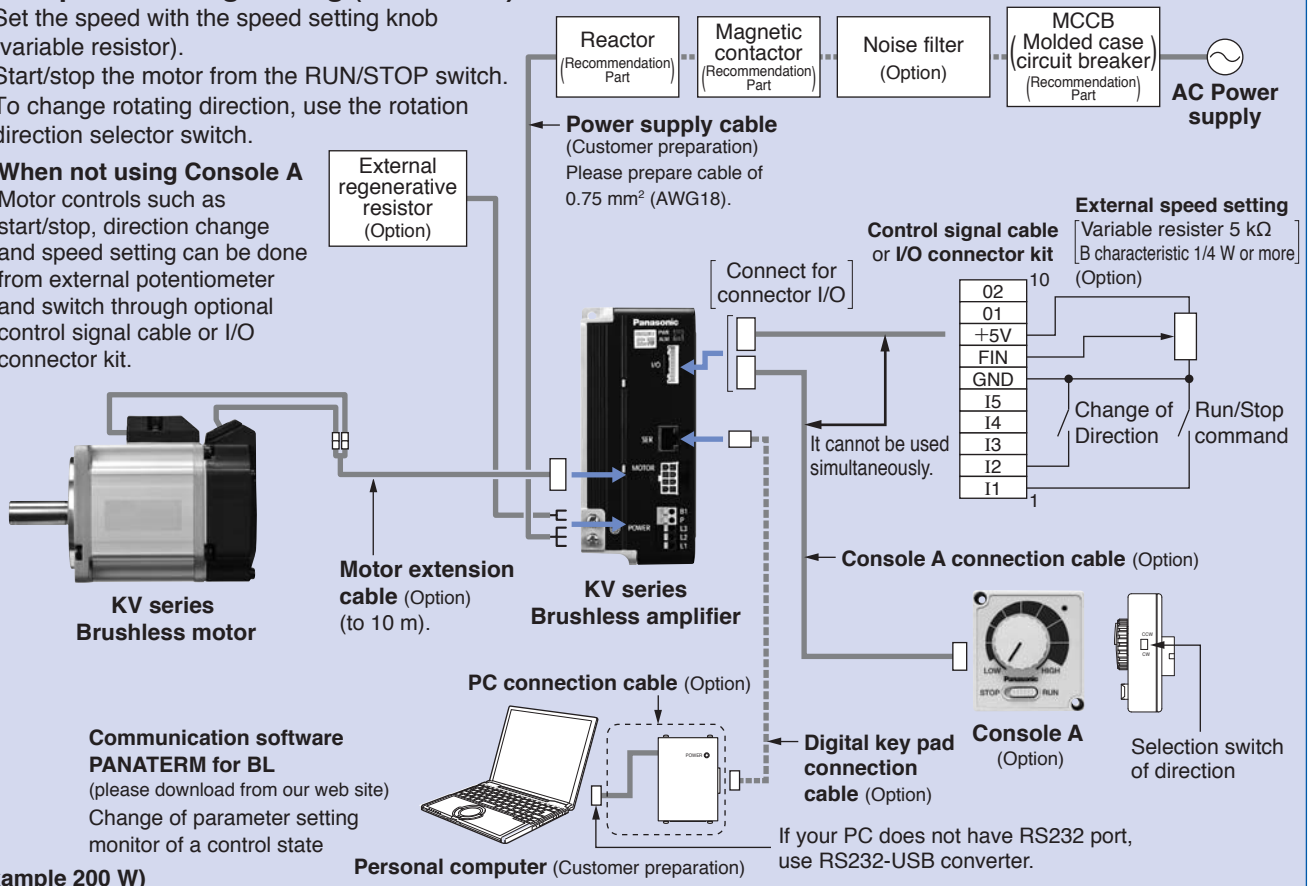
# System configuration diagram (200 W to 750 W)

## ● 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

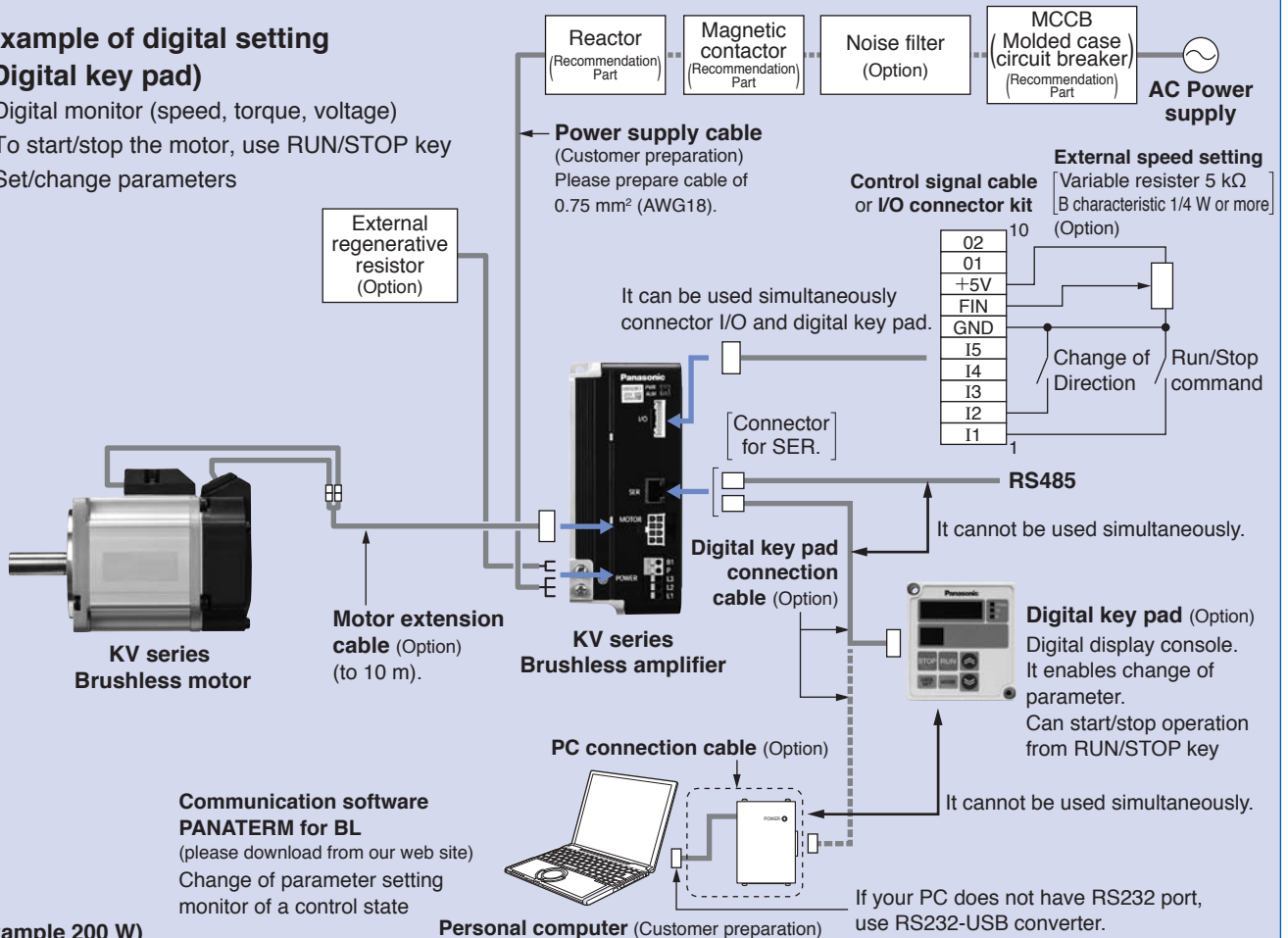
Motor controls such as start/stop, direction change and speed setting can be done from external potentiometer and switch through optional control signal cable or I/O connector kit.



(Example 200 W)

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

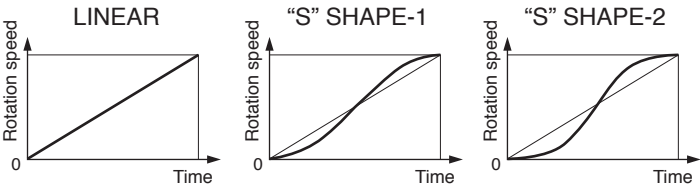
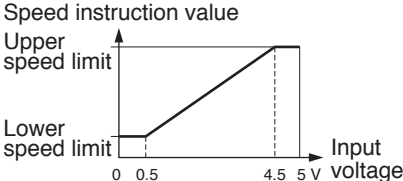
- Digital monitor (speed, torque, voltage)
- To start/stop the motor, use RUN/STOP key
- Set/change parameters



(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 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="448 1346 1139 1659"> <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 colspan="2">Free-run stop External forced trip</td> </tr> <tr> <td>2</td> <td>2nd speed operation mode</td> <td>Speed setting</td> <td colspan="2">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	Upper limit of motor output torque is set.	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 r/min]
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.	

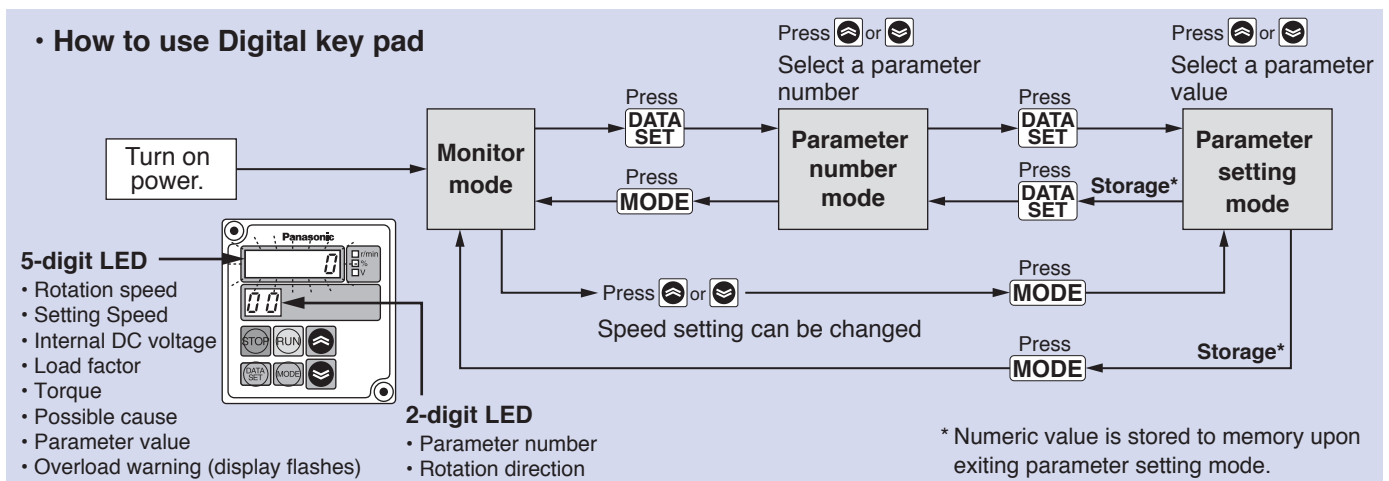
GV series

KV series

GP series

Options

Information



# MINAS-BL KV series

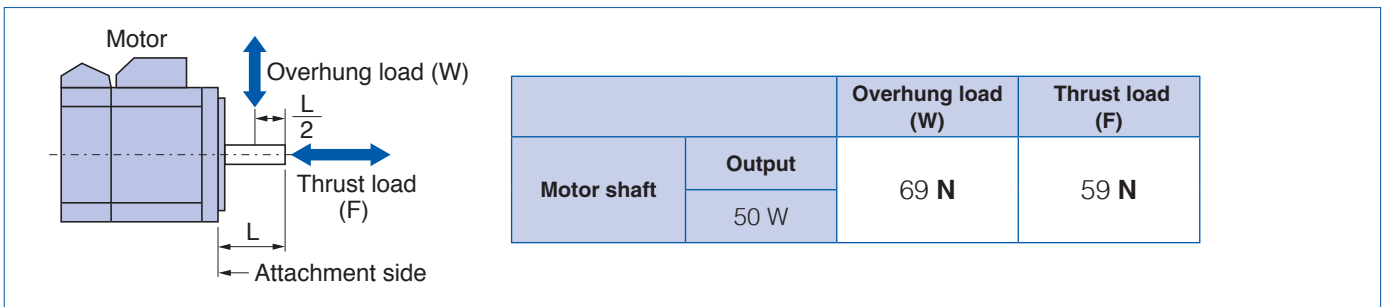
## Specification (For Common specification, see p. 27, 28)

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)
38 mm sq.	MBEK5A1BCV	MBMS5AZBL○	50	Single phase 100 to 120	±10	50/60	1.8	0.16	0.30	3000	4000
	MBEK5A5BCV			Single phase 200 to 240			Single phase 0.8				

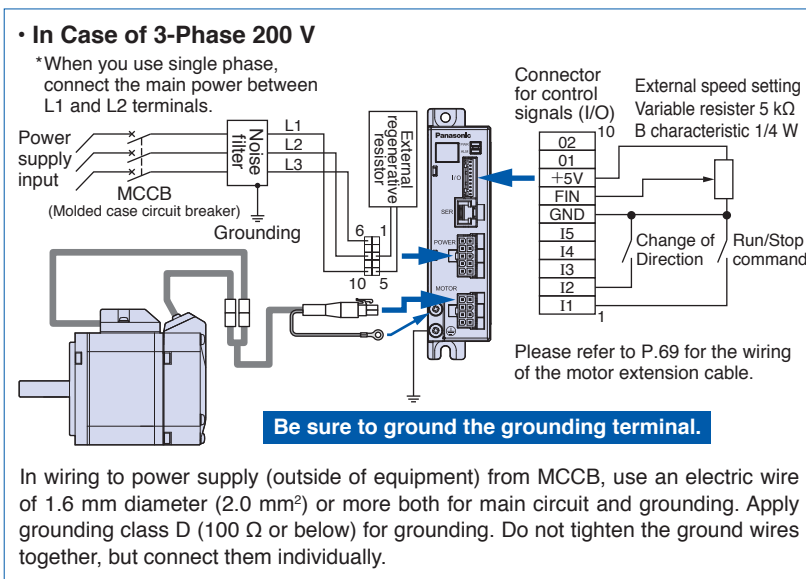
\* Suffix of "○" in the motor model No. represents shape of shaft.

\* Starting torque: Representative value

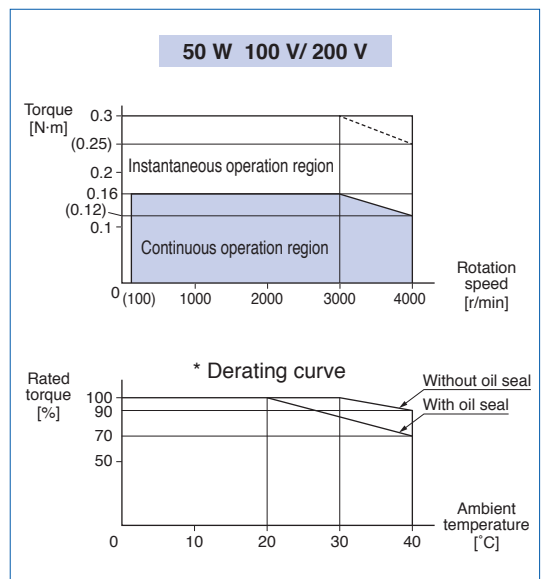
## Permissible shaft load



## Wiring diagram



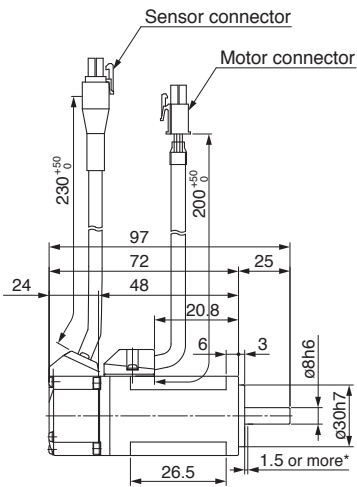
## Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



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

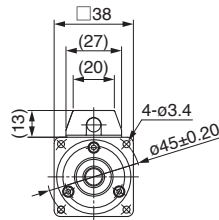
### Motor (dimensions)

Unit mm

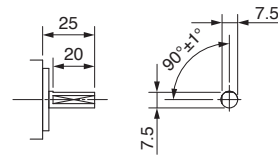


\* Boss insert position (only with oil seal)

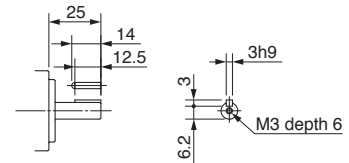
### <Round shaft type>



### <D-cut specification>



### <Keyway, center tap>



mass  
0.32 kg

GV series

KV series

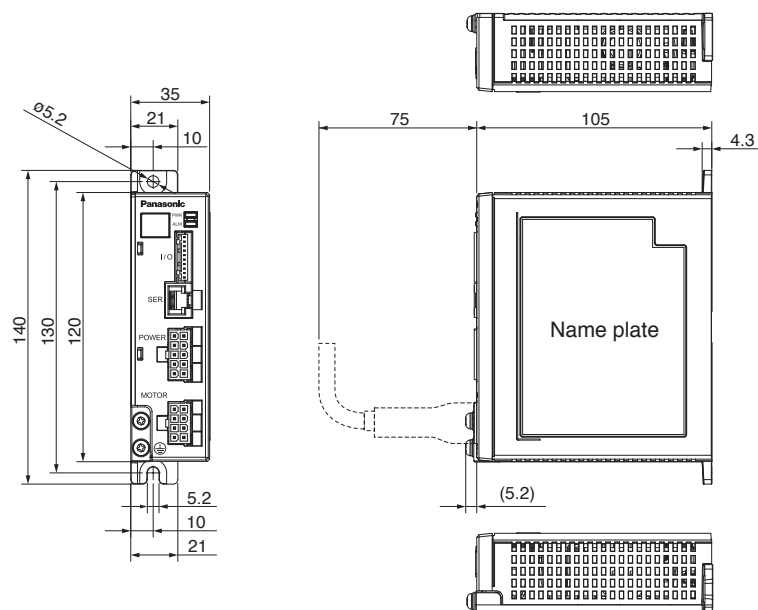
GP series

Options

Information

### Brushless amplifier (dimensions)

Unit mm



mass  
0.37 kg

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

# MINAS-BL KV series

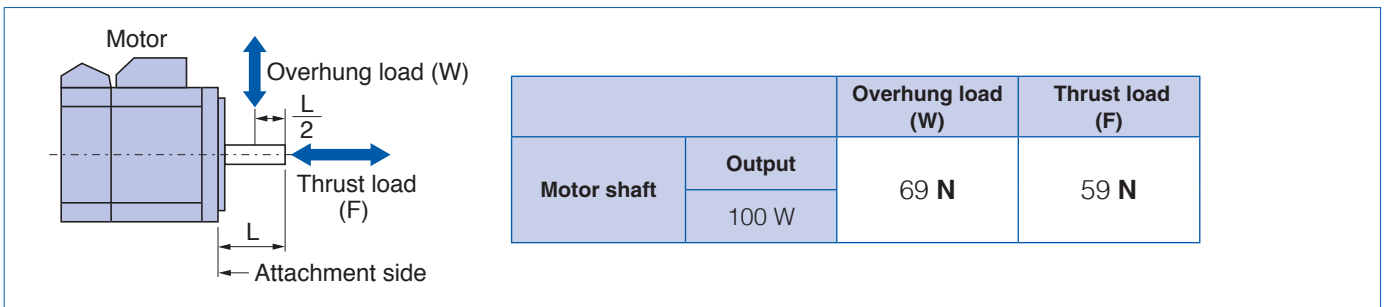
## ■ Specification (For Common specification, see p. 27, 28)

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)				
60 mm sq.	MBEK011BCV	MBMS011BL○	100	Single phase 100 to 120	±10	50/60	0.32	0.70	3000	4000
	MBEK015BCV	MBMS012BL○		Single phase /3-phase 200 to 240						

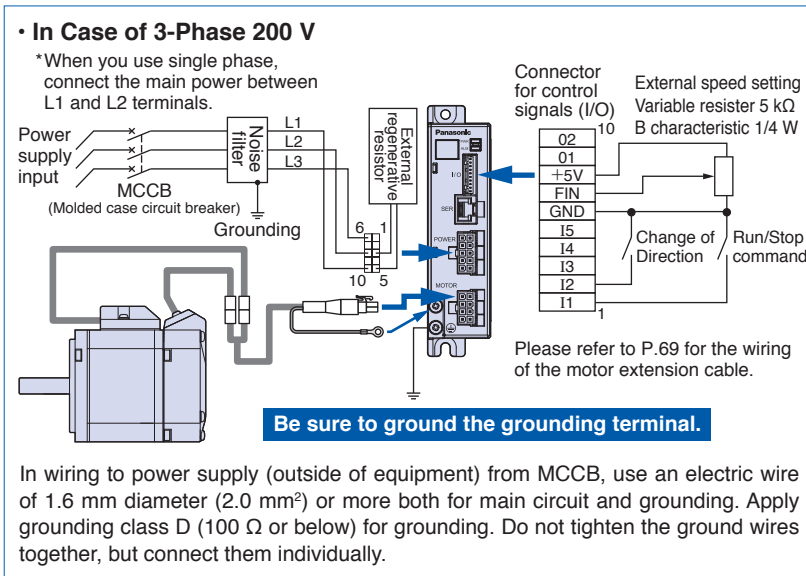
\* Suffix of "○" in the motor model No. represents shape of shaft.

\* Starting torque: Representative value

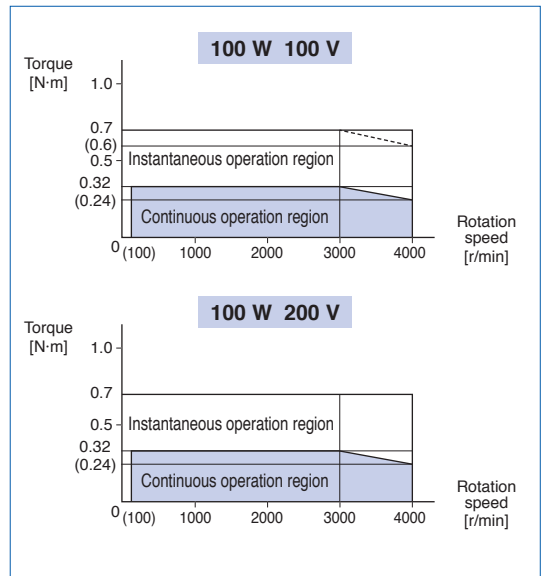
## ■ Permissible shaft load



## ■ Wiring diagram



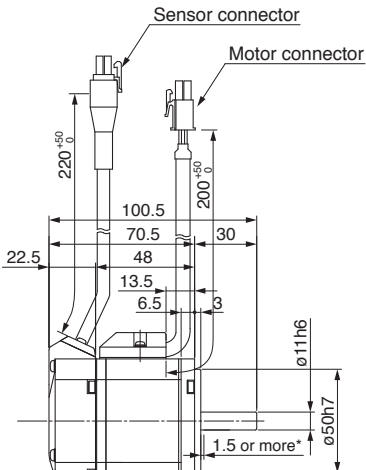
## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %.)



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

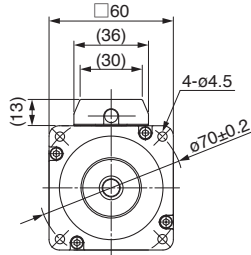
### Motor (dimensions)

Unit mm

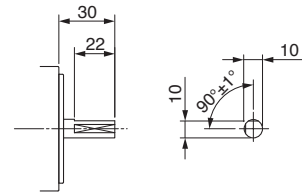


\* Boss insert position (only with oil seal)

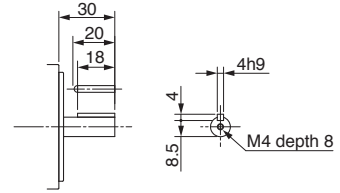
### <Round shaft type>



### <D-cut specification>



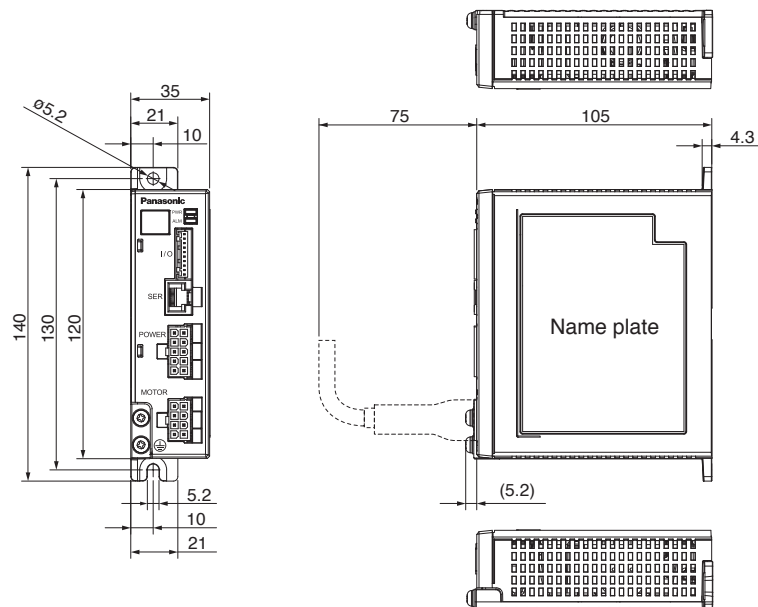
### <Keyway, center tap>



mass  
0.63 kg

### Brushless amplifier (dimensions)

Unit mm



mass  
0.37 kg

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

# MINAS-BL KV series

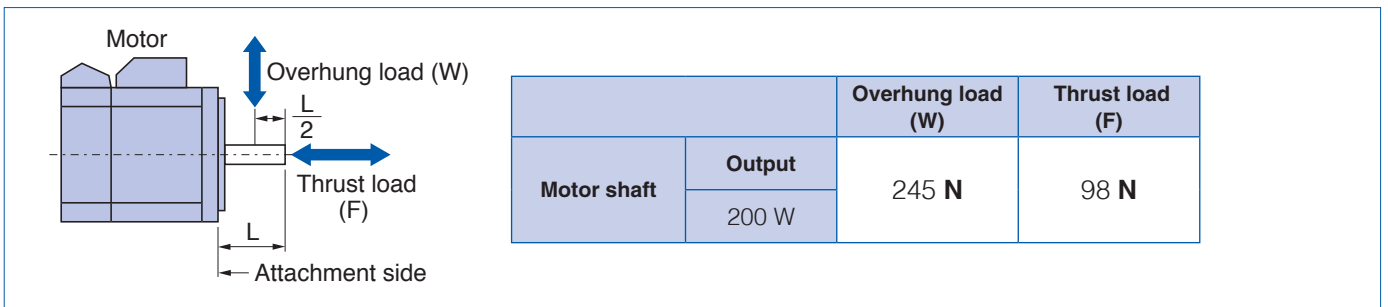
## ■ Specification (For Common specification, see p. 27, 28)

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)				
60 mm sq.	MBEK021BCV	MBMS021BL○	200	Single phase 100 to 120	±10	50/60	0.64	1.4	3000	4000
	MBEK025BCV	MBMS022BL○		Single phase 200 to 240 /3-phase						

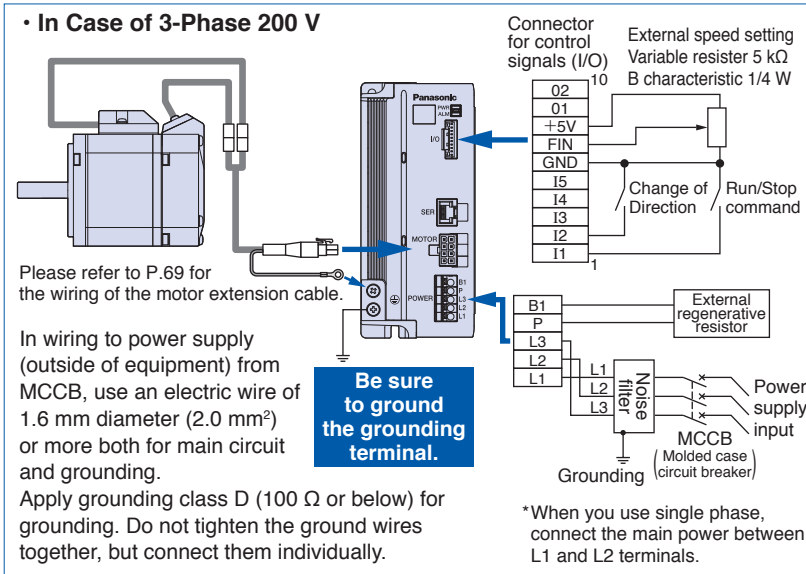
\* Suffix of "○" in the motor model No. represents shape of shaft.

\* Starting torque: Representative value

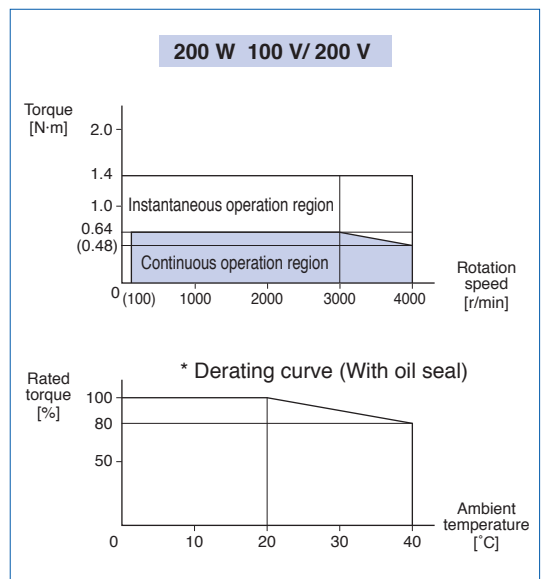
## ■ Permissible shaft load



## ■ Wiring diagram



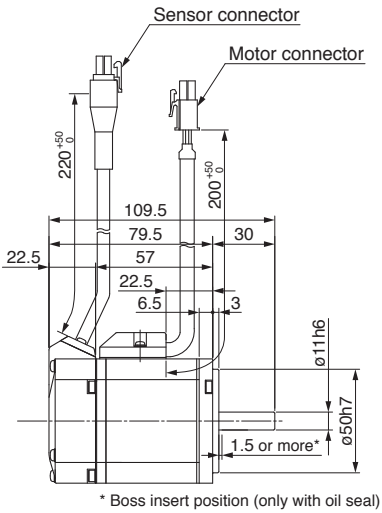
## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



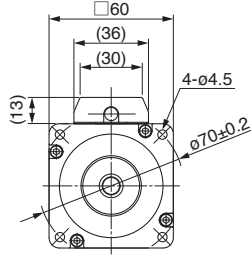
\* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

Motor (dimensions)

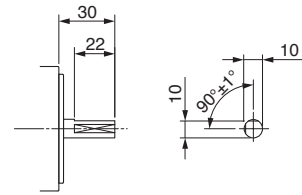
Unit mm



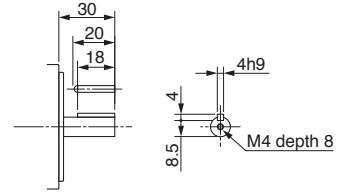
<Round shaft type>



<D-cut specification>



<Keyway, center tap>



mass  
0.8 kg

GV series

KV series

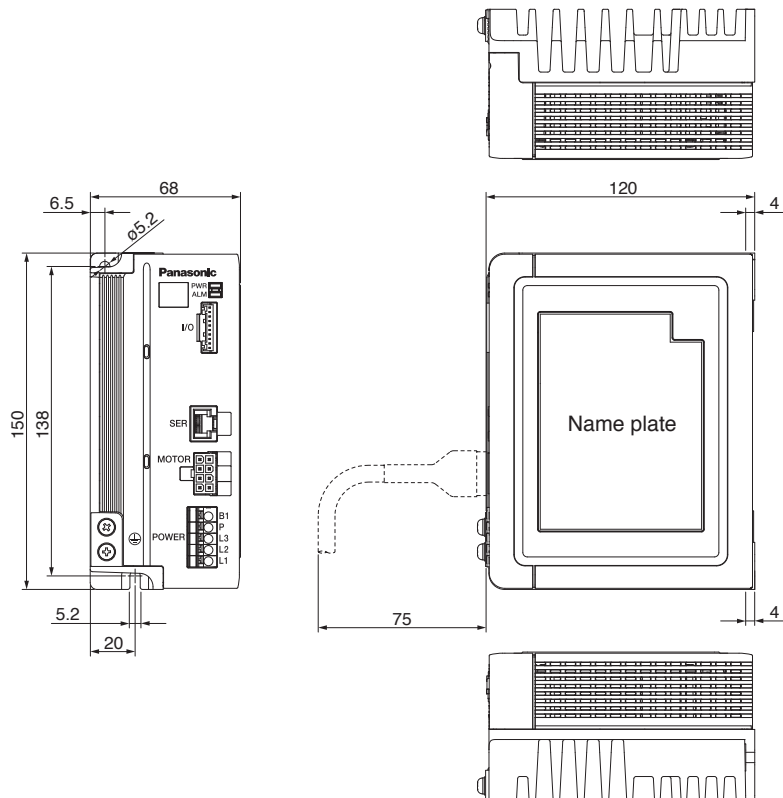
GP series

Options

Information

Brushless amplifier (dimensions)

Unit mm



mass  
1.0 kg

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



# MINAS-BL KV series

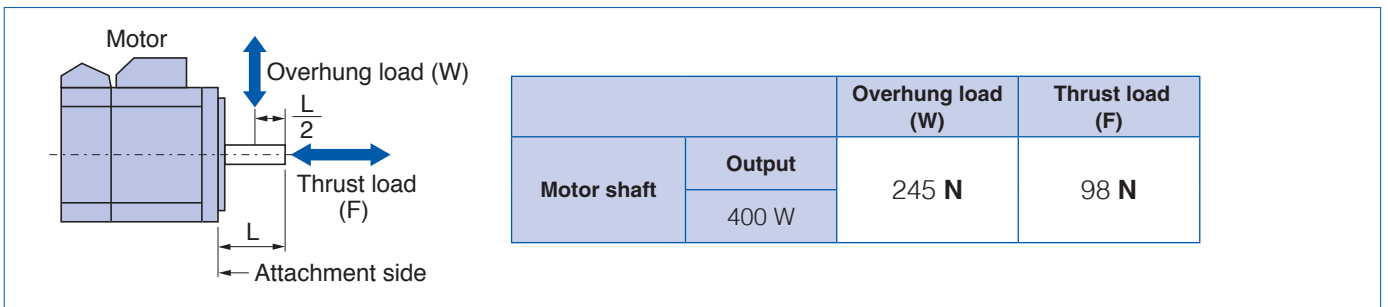
## ■ Specification (For Common specification, see p. 27, 28)

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.	<b>MBEK043BCV</b>	<b>MBMS042BL</b> ○	<b>400</b>	3-phase 200 to 240	±10	50/60	2.1	1.27	3.0	3000	4000

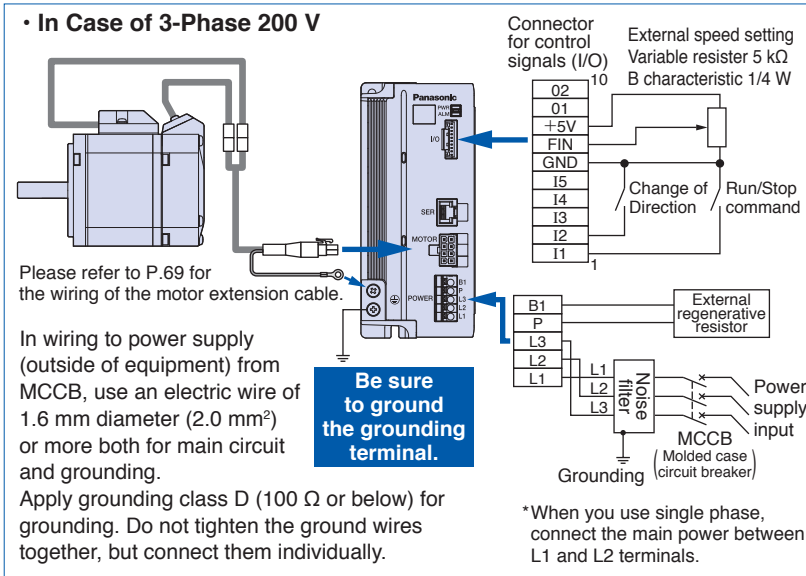
\* Suffix of "○" in the motor model No. represents shape of shaft.

\* Starting torque: Representative value

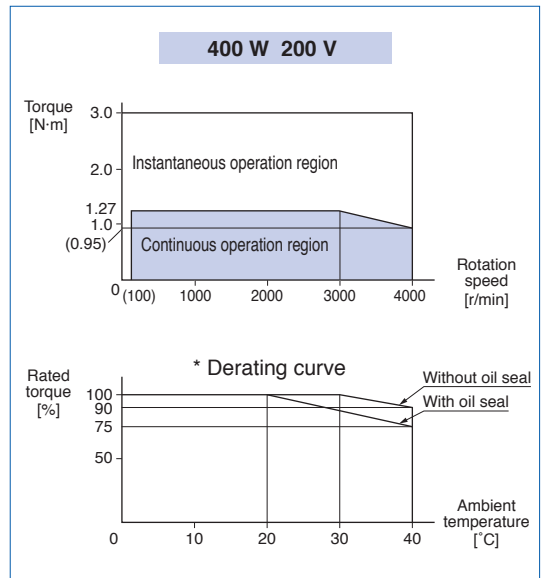
## ■ Permissible shaft load



## ■ Wiring diagram



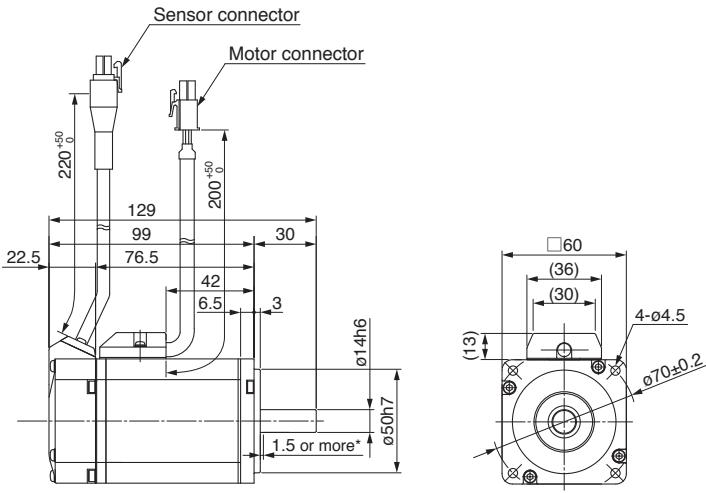
## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %.)



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

### Motor (dimensions)

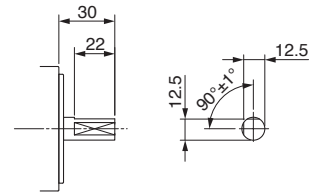
Unit mm



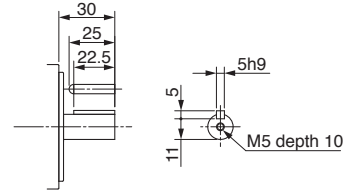
\* Boss insert position (only with oil seal)

### <Round shaft type>

### <D-cut specification>



### <Keyway, center tap>



mass  
1.2 kg

GV series

KV series

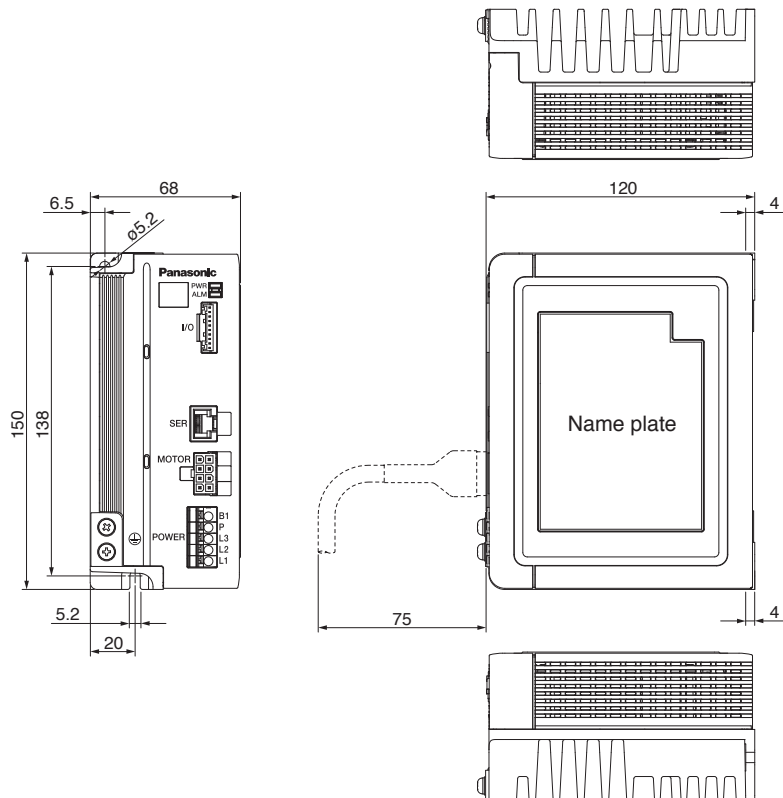
GP series

Options

Information

### Brushless amplifier (dimensions)

Unit mm



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

# MINAS-BL KV series

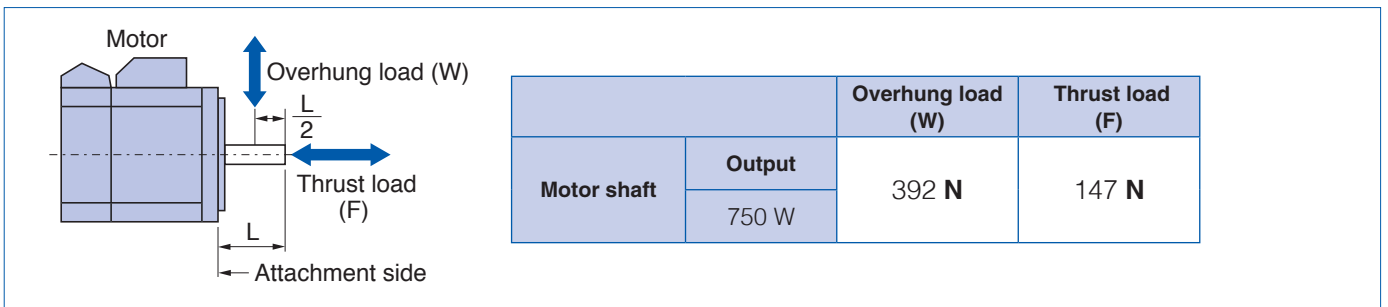
## ■ Specification (For Common specification, see p. 27, 28)

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)
80 mm sq.	MBEK083BCV	MBMS082BL○	750	3-phase 200 to 240	±10	50/60	4.0	2.4	5.5	3000	4000

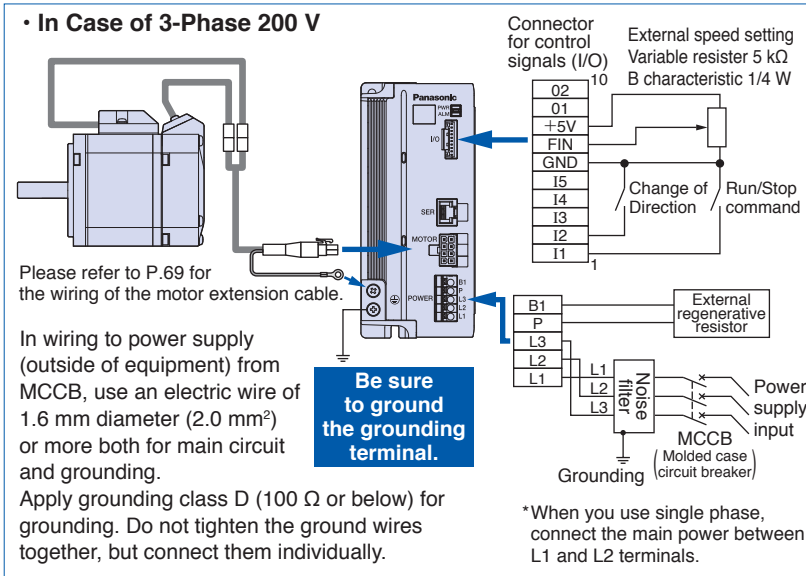
\* Suffix of "○" in the motor model No. represents shape of shaft.

\* Starting torque: Representative value

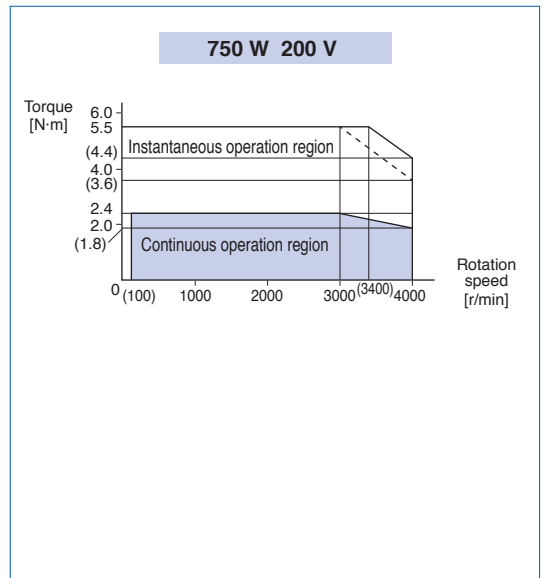
## ■ Permissible shaft load



## ■ Wiring diagram



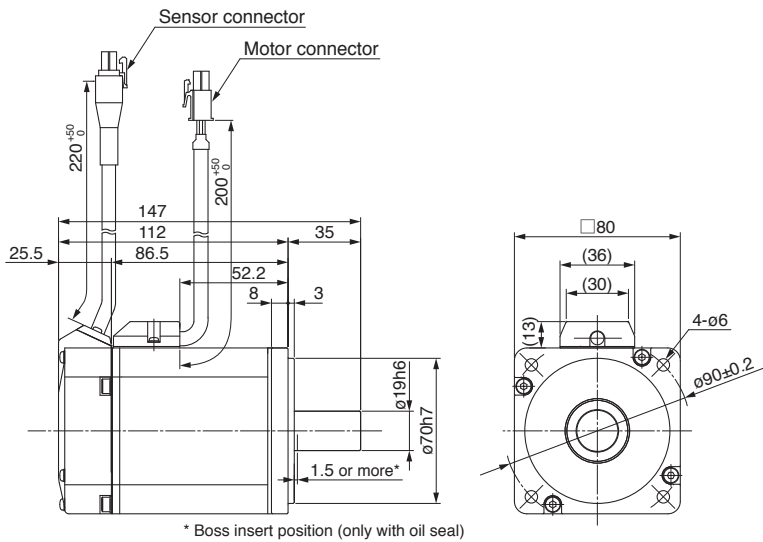
## ■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



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

### Motor (dimensions)

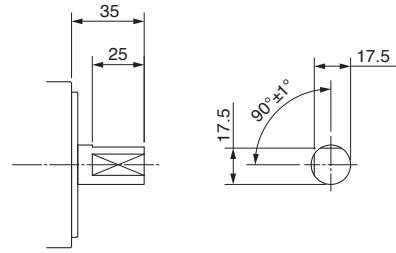
Unit mm



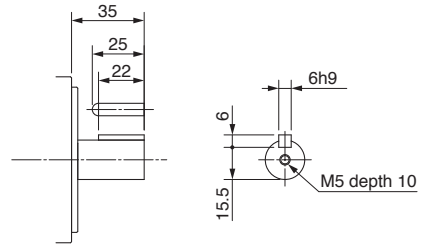
\* Boss insert position (only with oil seal)

<Round shaft type>

### <D-cut specification>



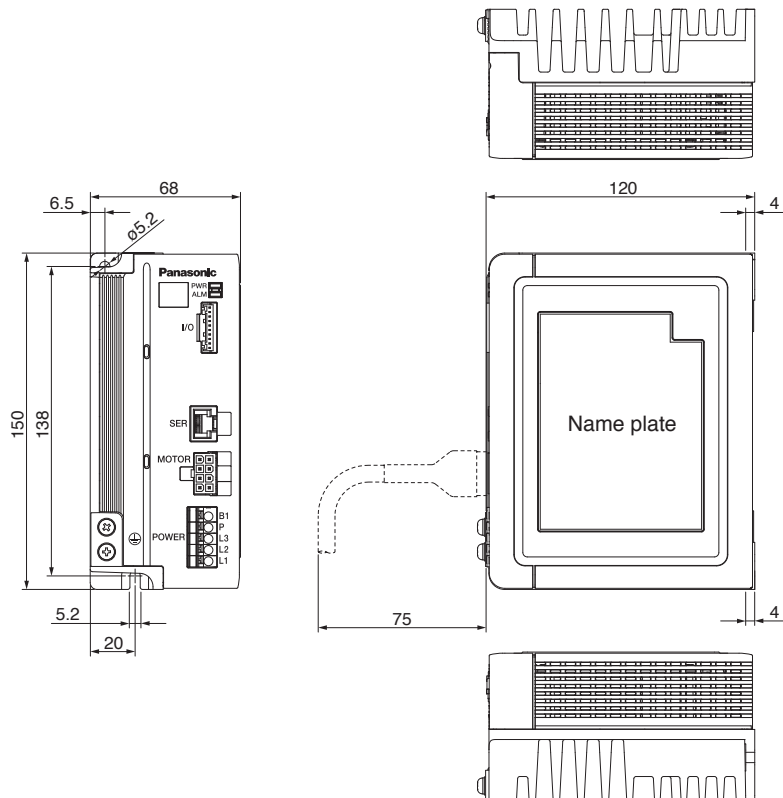
### <Keyway, center tap>



mass  
2.3 kg

### Brushless amplifier (dimensions)

Unit mm



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

---

MEMO

A series of horizontal dashed lines for writing.

# Options

# Options

GV series

KV series

GP series

Options

Information



**Contents**  
Options – Details .....67  
List of peripheral equipments .....74

# Option

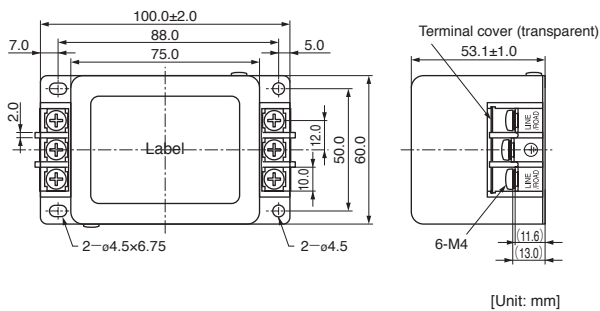
## Noise filter/ Surge absorber/ MCCB

Part name	Optional parts number (option)	Manufacturer's parts number	Qty.	Manufacturer
Noise filter (single phase 100 V, 200 V)	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 100 V, 200 V)	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 Corporation

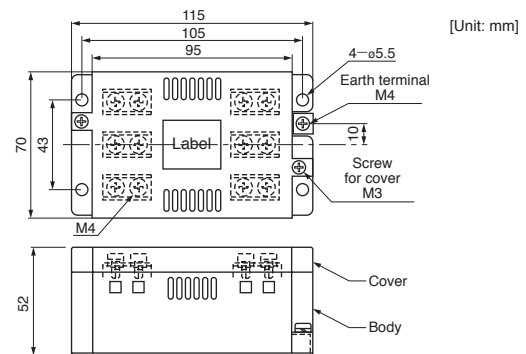
### Noise filter



#### • DV0P4170



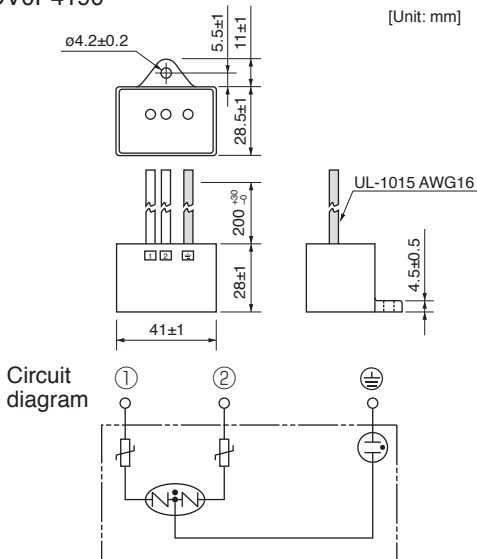
#### • DV0PM20042



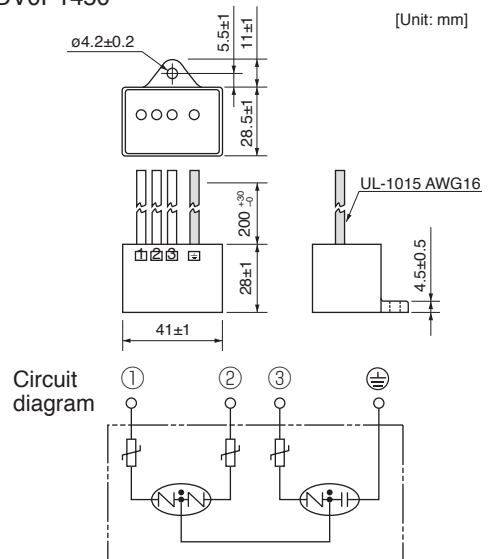
### Surge absorber



#### • DV0P4190



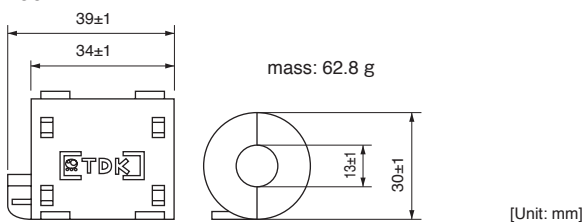
#### • DV0P1450



### Noise filter for control signals



#### • DV0P1460



### Recommended circuit breaker (MCCB)

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

## Settings

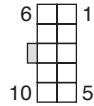
### Console A GV KV

#### Optional part number

DV0P3500

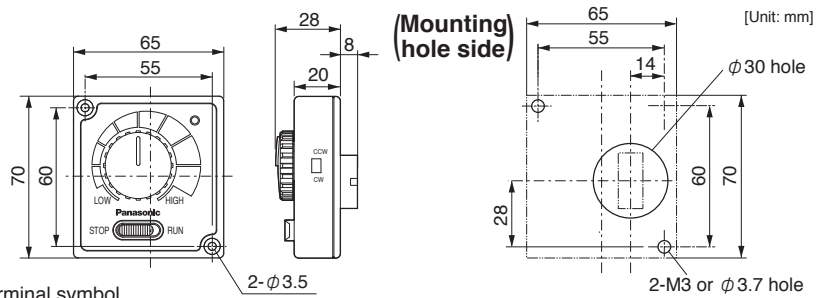
- Speed adjusting knob
- RUN/STOP switch
- Rotation direction selector switch

Console A connector pin No.



Console A connector terminal symbol

Terminal No.	1	2	3	4	5	6	7	8	9	10
Terminal name	I1	I2	GND	FIN	+5V	-	-	-	-	-



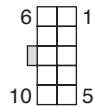
### Digital key pad GV KV GP

#### Optional part number

DV0P3510

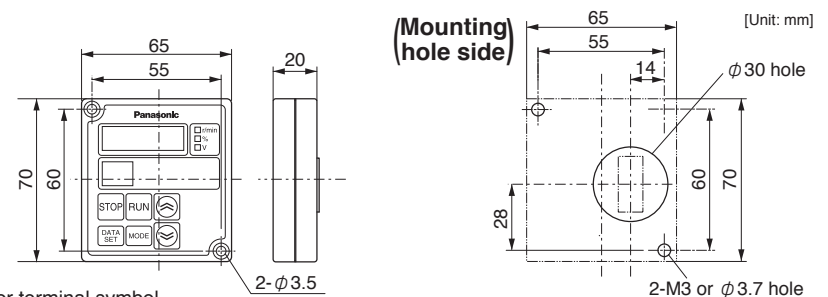
- Digital display (Speed, torque, voltage)
- Parameter settings change
- Parameter storage (read/write)

Digital key pad connector pin No.



Digital key pad connector terminal symbol

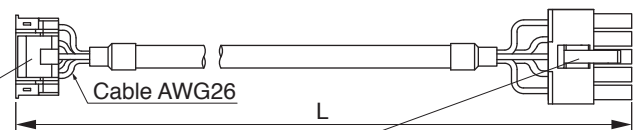
Terminal No.	1	2	3	4	5	6	7	8	9	10
Terminal name	-	-	GND	-	+5V	-	SCK	SIN	SOT	-



## Cable

### Console A connection cable GV KV

Optional parts number	Length (L)
DV0PM2006910	1 m
DV0PM2006930	3 m
DV0PM2006950	5 m



Amp./I/O side connector (J.S.T Mfg.Co.,Ltd.)  
Connector : PAP-10V-S  
Connector pin : SPHD-002T-P0.5

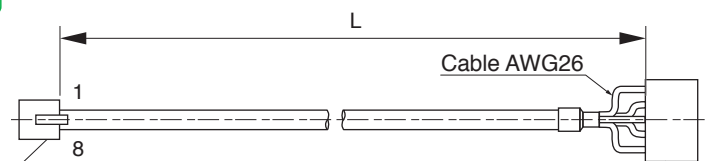
Console A side connector (Molex Inc.)  
Connector : 39-01-2105 (5557-10R-210)  
Connector pin : 39-00-0046 (5556T2)

or  
39-00-0047 (5556T2L)

Amp./I/O side connector pin No.	1	2	3	4	5	6	7	8	9	10
Lead color of a cable	Brown	Red				Orange	Yellow	Green		
Console A side connector pin No.	1	2	-	-	-	3	4	5	-	-

### Digital key pad connection cable GV KV GP

Optional parts number	Length (L)
DV0P38310	1 m
DV0P38330	3 m
DV0P38350	5 m



Amp.side connector (SER)/modular plug RJ45

Digital key pad side connector (Molex Inc.)  
Connector : 39-01-2105 (5557-10R-210)  
Connector pin : 39-00-0046 (5556T2)

or  
39-00-0047 (5556T2L)

Amp.side connector pin No.(SER)	1	2	3	4	5	6	7	8
Terminal name	-	+5V	SOT	SIN	-	-	GND	SCK
Digital key pad side connector pin No.	-	5	9	8	-	-	3	7



# Option

## Motor extension cable

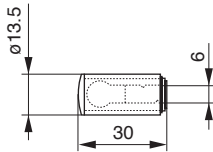
**GV GP**

Optional parts number	Length (L)
DV0PQ1000110	1 m
DV0PQ1000130	3 m
DV0PQ1000150	5 m
DV0PQ10001A1	10 m

### Accessories

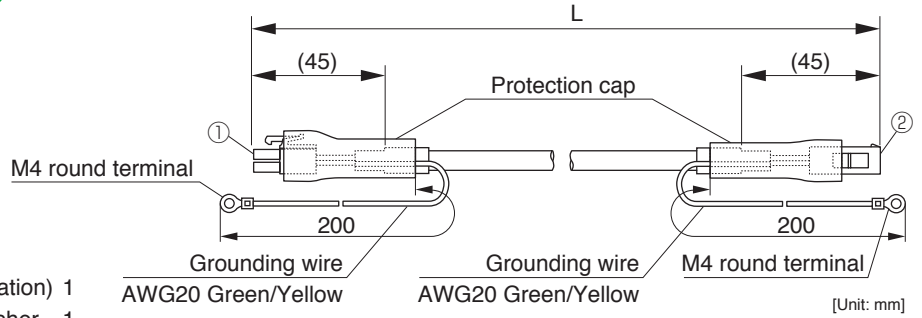
- Insulating cap (for grounding wire insulation) 1
- M4 × 6 pan head screw with spring washer 1
- M4 hex. nut 1

Insulating cap (for grounding wire insulation)



[Unit: mm]

- When using motor extension cable, be sure to connect its grounding wire to the grounding wire of the motor, and connect the other end of grounding wire of the extension cable to the earth terminal of the brushless amplifier.
- For connecting grounding wire of motor and motor extension cable, use M4 screw and insulating cap supplied as accessories.



[Unit: mm]

- ① Brushless amplifier side connector (Molex Inc.)  
 Connector : 39-01-2085 (5557-08R-210)  
 Connector pin : 39-00-0039 (5556TL) [for AWG 20]  
 39-00-0047 (5556T2L) [for AWG 26]
- ② Motor side connector (Molex Inc.)  
 Connector : 39-01-2086 (5559-08P-210)  
 Connector pin : 39-00-0041 (5558TL) [for AWG 20]  
 39-00-0049 (5558T2L) [for AWG 26]

### <Connector wiring>

#### • Brushless amplifier side

Pin No.	Signal	Wire color	Wire size
1	U	Red	AWG20
2	V	White	AWG20
3	W	Black	AWG20
4	Vcc	White	AWG26
5	CS1	Red	AWG26
6	CS2	Blue	AWG26
7	CS3	Yellow	AWG26
8	0V	Black	AWG26
M4 round terminal	E	Green/Yellow	AWG20

#### • Motor side

Pin No.
1
2
3
4
5
6
7
8
M4 round terminal

## Motor extension cable

**KV**

Optional parts number	Length (L)
DV0PQ1000310	1 m
DV0PQ1000330	3 m
DV0PQ1000350	5 m
DV0PQ10003A1	10 m

### <Wiring of motor side connector>

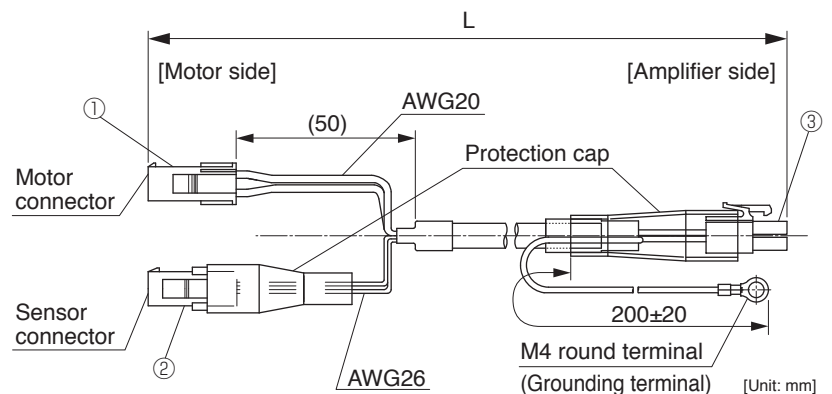
#### • Motor connector

Pin No.	Signal	Wire color
1	U	Red
2	V	White
3	W	Black
4	E	Green/Yellow

#### • Sensor connector

Pin No.	Signal	Wire color
1	CS1	Red
2	CS2	Blue
3	CS3	Yellow
4	Vcc	White
5	0V	Black
6	NC	—

Do not connect anything on (NC).



[Unit: mm]

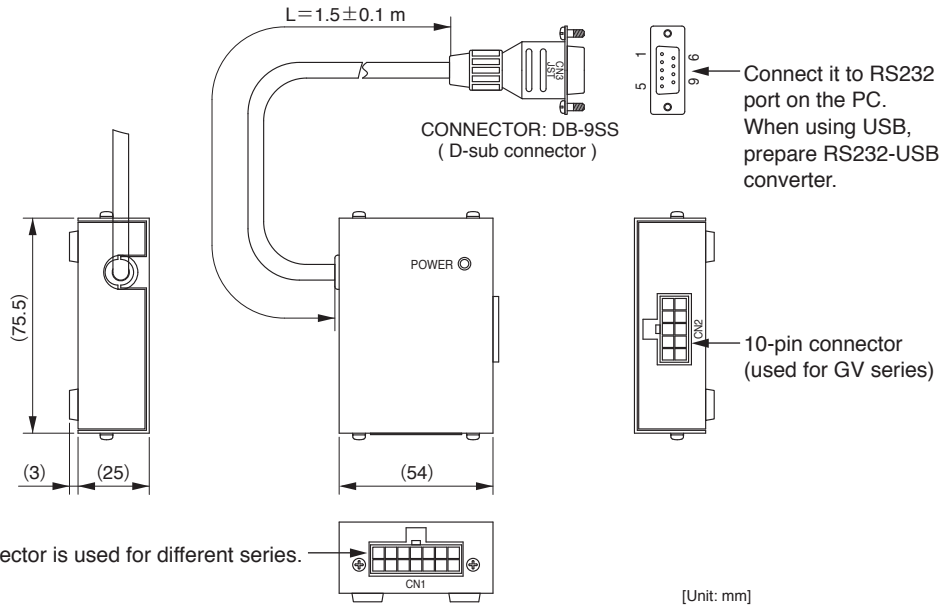
- ① Motor side motor connector (Tyco Electronics.)  
 Connector : 172159-1  
 Connector pin : 170366-1 [for AWG 20]
- ② Motor side sensor connector (Molex Inc.)  
 Connector : 39-01-2066 (5559-06P-210)  
 Connector pin : 39-00-0049 (5558T2L) [for AWG 26]
- ③ Brushless amplifier side connector (Molex Inc.)  
 Connector : 39-01-2085 (5557-08R-210)  
 Connector pin : 39-00-0039 (5556TL) [for AWG 20]  
 39-00-0047 (5556T2L) [for AWG 26]

### <Connector wiring of amplifier side>

Pin No.	Signal	Wire color	Wire size
1	U	Red	AWG20
2	V	White	AWG20
3	W	Black	AWG20
4	Vcc	White	AWG26
5	CS1	Red	AWG26
6	CS2	Blue	AWG26
7	CS3	Yellow	AWG26
8	0V	Black	AWG26
M4 round terminal	E	Green/Yellow	AWG20

**PC connection cable (10-pin D-sub connector pin 1.5 m)** GV KV GP

Optional parts number	Length (L)
DV0P4140	1.5 m



**Communication software** GV KV GP

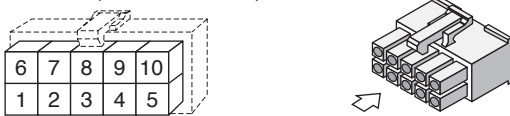
Model No.	
PANATERM for BL	Can be downloaded from our web site, free of charge. <a href="http://industrial.panasonic.com/ww/i_e/25000/motor_fa_e/motor_fa_e.html">http://industrial.panasonic.com/ww/i_e/25000/motor_fa_e/motor_fa_e.html</a>

**Connector Kit/ Cable/ External speed setter**

**Power supply connector kit** GV KV (50 W, 100 W) GP

Optional part number	Name	Manufacturer's parts No.	Qty.	Manufacturer	Note
DV0P2870	Connector	39-01-2105 (5557-10R-210)	1	Molex Inc	Fits to power supply connector (POWER)
	Connector pin	39-00-0060 (5556PBTL)	6		

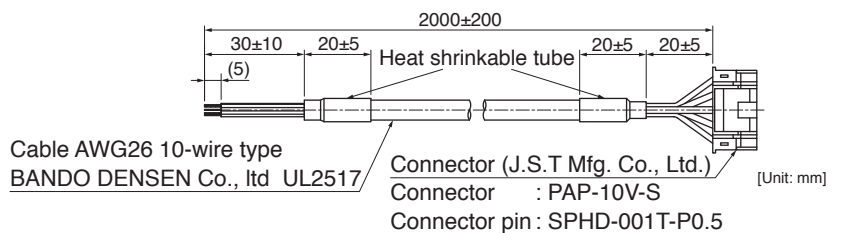
• 39-01-2105 (5557-10R-210)



**Control signal cable (Cable with an I/O connector)** GV KV GP

Optional parts number	Length (L)
DV0PM20076	2 m

\* Do not connect anything to the pin no.4 and pin no.7 in case of use the GP series.



**<For your reference>**

For tools such as crimp tools necessary to assemble the cable, access the connector manufacturer's web site or consult the manufacturer: refer to p. 74 "List of peripheral equipment manufacturers".

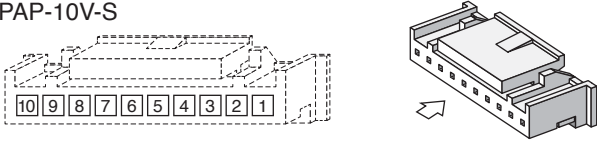
# Option

## I/O connector kit

**GV** **KV** **GP**

Optional part number	Name	Manufacturer's parts No.	Qty.	Manufacturer	Note
DV0PM20070	Connector	PAP-10V-S	1	J.S.T Mfg.Co.,Ltd.	Fits to I/O connector
	Connector pin	SPHD-002T-P0.5	10		

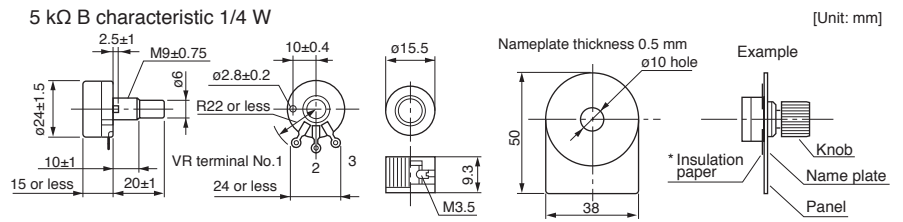
• PAP-10V-S



## External speed setter

**GV** **KV**

Optional part number
DV0PM20078

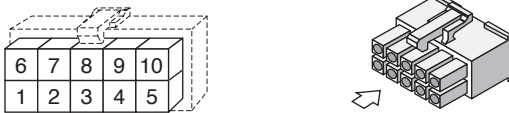


## Panel connector kit (Fits to Console A)

**GV** **KV**

Optional part number	Name	Manufacturer's parts No.	Qty.	Manufacturer	Note
DV0P3610	Connector	39-01-2105 (5557-10R-210)	1	Molex Inc	Fits to Console A
	Connector pin	39-00-0047 (5556T2L)	10		

• 39-01-2105 (5557-10R-210)

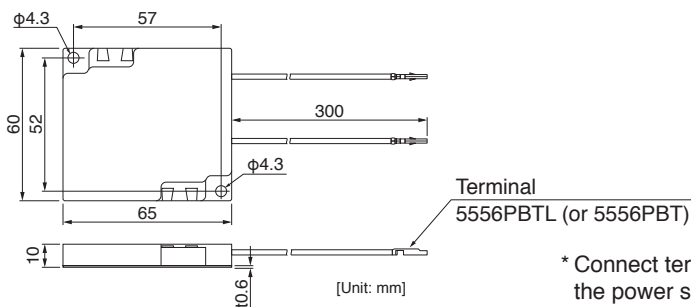


## External regenerative resistor

**GV** **KV** **GP**

Optional parts number	Specifications	Manufacturer
DV0P2890	100 V, 50 $\Omega$ 10 W	Iwaki Musen Kenkyusho Co., Ltd
DV0PM20068	200 V, 200 $\Omega$ 10 W	

• DV0P2890, DV0PM20068



\* Connect terminals to pins No. 3 and No. 5 of the power supply connector, respectively.

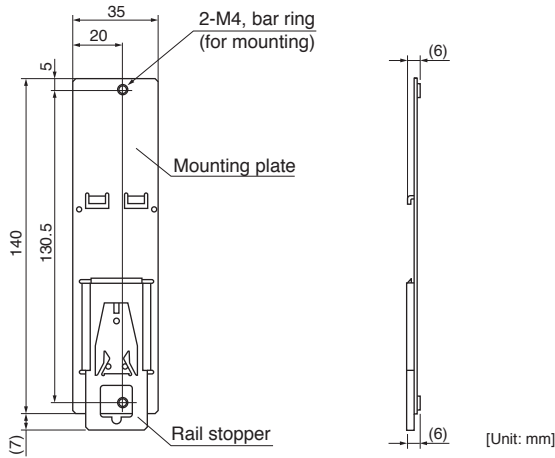
### <For your reference>

For tools such as crimp tools necessary to assemble the cable, access the connector manufacturer's web site or consult the manufacturer: refer to p. 74 "List of peripheral equipment manufacturers".

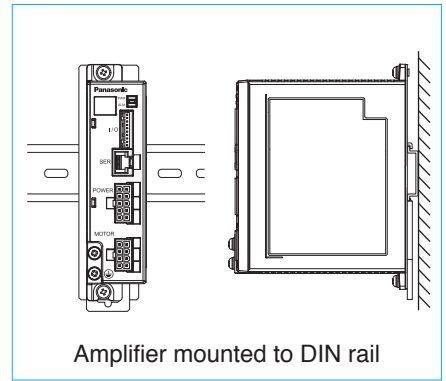
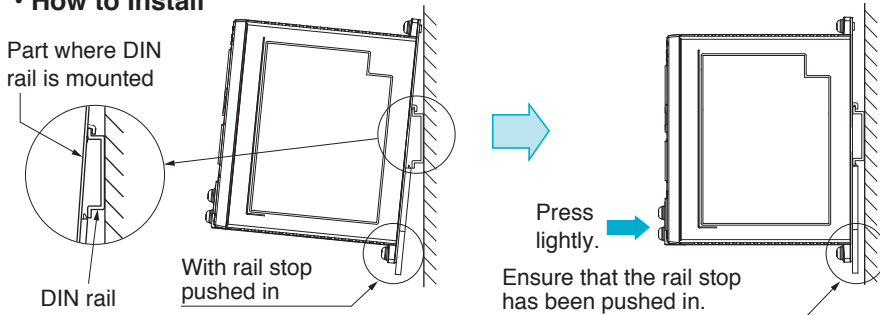
# DIN rail mounting unit **GV** **KV** (50 W, 100 W) **GP**

**Optional part number**

DV0P3811



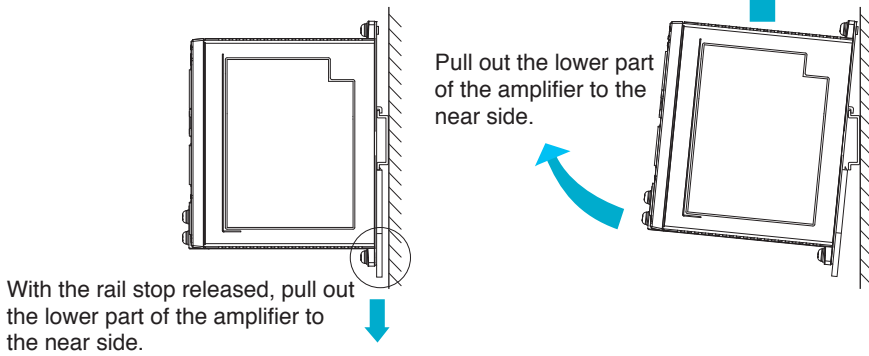
**• How to Install**



Hook the upper side of DIN rail mounting part on the DIN rail.

Press lightly the lower part of the main body of amplifier.

**• Removing from DIN Rail**



With the rail stop released, pull out the lower part of the amplifier to the near side.

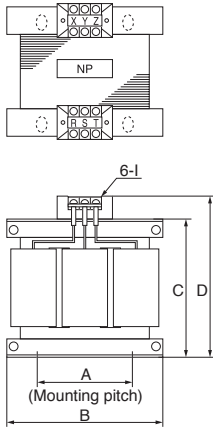
Pull out the lower part of the amplifier to the near side.

By lifting the amplifier, you can remove it from the DIN rail.

# Option

## Reactor **GV** **KV** **GP**

Fig.1



•Wiring of the reactor  
<3-Phase 200 V>

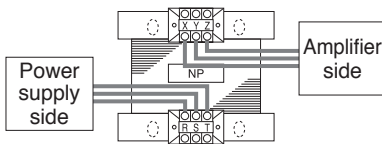
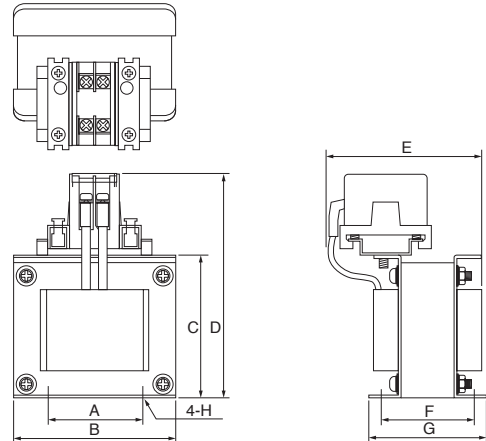
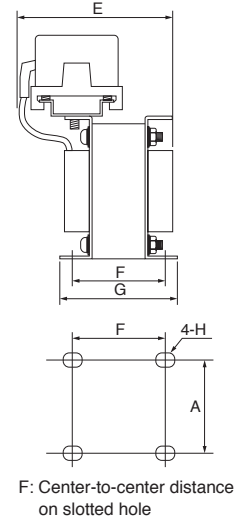
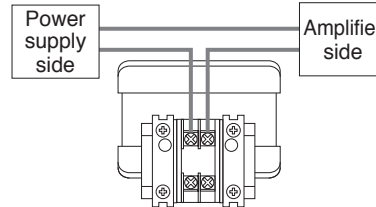


Fig.2



•Wiring of the reactor  
<Single phase 100 V, 200 V>



[Unit: mm]

	Optional parts number	A	B	C	D	E(Max)	F	G	H	I	Inductance (mH)	Rated current (A)
Fig.1	DV0P220	65±1	125±1	(93)	136Max	155	70+3/-0	85±2	4-7 $\times$ 12	M4	6.81	3
Fig.2	DV0P227	55±0.7	80±1	66.5±1	110Max	90	41±2	55±2	4-5 $\times$ 10	M4	4.02	5
	DV0P228	55±0.7	80±1	66.5±1	110Max	95	46±2	60±2	4-5 $\times$ 10	M4	2	8

\* For applicability of reactor, refer to the corresponding table on p. 95.

### Harmonic restraint

Harmonic restraint measures are not common to all countries. Therefore, prepare the measures that meet the requirements of the destination country.

With products for Japan, on September, 1994, "Guidelines for harmonic restraint on heavy consumers who receive power through high voltage system or extra high voltage system" and "Guidelines for harmonic restraint on household electrical appliances and general-purpose articles" established by the Agency for Natural Resources and Energy of the Ministry of Economy, Trade and Industry (the ex-Ministry of International Trade and Industry). According to those guidelines, the Japan Electrical Manufacturers' Association (JEMA) have prepared technical documents (procedure to execute harmonic restraint:

JEM-TR 198, JEM-TR 199 and JEM-TR 201) and have been requesting the users to understand the restraint and to cooperate with us. On January, 2004, it has been decided to exclude the general-purpose inverter and servo driver from the "Guidelines for harmonic restraint on household electrical appliances and general-purpose articles". After that, the "Guidelines for harmonic restraint on household electrical appliances and general-purpose articles" was abolished on September 6, 2004.

We are pleased to inform you that the procedure to execute the harmonic restraint on general-purpose inverter and servo driver was modified as follows.

1. All types of the general-purpose inverters and servo drivers used by specific users are under the control of the "Guidelines for harmonic restraint on heavy consumers who receive power through high voltage system or extra high voltage system". The users who are required to apply the guidelines must calculate the equivalent capacity and harmonic current according to the guidelines and must take appropriate countermeasures if the harmonic current exceeds a limit value specified in a contract demand. (Refer to JEM-TR 210 and JEM-TR 225.)
2. The "Guidelines for harmonic restraint on household electrical appliances and general-purpose articles" was abolished on September 6, 2004. However, based on conventional guidelines, JEMA applies the technical documents JEM-TR 226 and JEM-TR 227 to any users who do not fit into the "Guidelines for harmonic restraint on heavy consumers who receive power through high voltage system or extra high voltage system" from a perspective on enlightenment on general harmonic restraint. The purpose of these guidelines is the execution of harmonic restraint at every device by a user as usual to the utmost extent.

### <Remarks>

When using a reactor, be sure to install one reactor to one brushless amplifier.

# List of peripheral equipments

Manufacturer	Tel No. / Home page	Peripheral components
TDK Corporation	+81-3-5201-7229 http://www.tdk.co.jp/	Noise filter for signal lines
Okaya Electric Industries Co. Ltd.	+81-3-4544-7040 http://www.okayatec.co.jp/	Surge absorber Noise filter
Sensata Technologies Japan Limited	+81-49-283-7575 www.sensata.com/japan	Circuit breaker (MCCB)
Japan Molex Inc.	+81-462-65-2313 http://www.molex.co.jp	Connector
J.S.T. Mfg. Co., Ltd.	+81-45-543-1271 http://www.jst-mfg.com/index_i.html	
Iwaki Musen Kenkyusho Co., Ltd.	+81-44-833-4311 http://www.iwakimusen.co.jp/	Regenerative resistor

\* This list is for reference only and subject to change without notice.

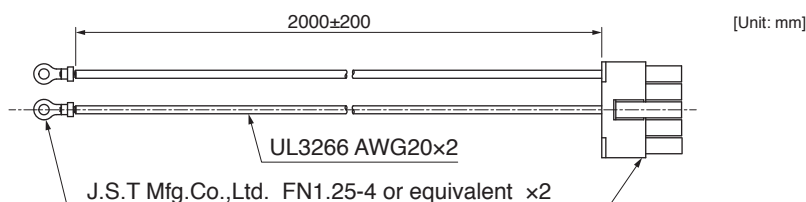
## Power cable (single phase 100 V, 200 V) with connector **GV** **KV** (50 W, 100 W) **GP**

When the following part number is specified in the order, the power cable is delivered with the product.

		50 W	90 W	100 W	130 W
GV series	100 V	<b>MBEG5A1BCVC</b>	<b>MBEG9A1BCVC</b>	—	<b>MBEG1E1BCVC</b>
	200 V	<b>MBEG5A5BCVC</b>	<b>MBEG9A5BCVC</b>		<b>MBEG1E5BCVC</b>
KV series	100 V	<b>MBEK5A1BCVC</b>	—	<b>MBEK011BCVC</b>	—
	200 V	<b>MBEK5A5BCVC</b>		<b>MBEK015BCVC</b>	
GP series	100 V	<b>MBEG5A1BCPC</b>	<b>MBEG9A1BCPC</b>	—	<b>MBEG1E1BCPC</b>
	200 V	<b>MBEG5A5BCPC</b>	<b>MBEG9A5BCPC</b>		<b>MBEG1E5BCPC</b>

- When supplying 3-phase power source to a 200 V brushless amplifier, use the supplied power cable and connect 2 conductors to L1 and L2.
- When supplying 3-phase power, use a power connection kit and connect three conductors to L1, L2 and L3.
- For location of L1, L2 and L3, refer to the wiring diagram on pages 17, 19 and 21 (GV series), pages 55, 57 and 59 (GP series).

### ■ Cable specification

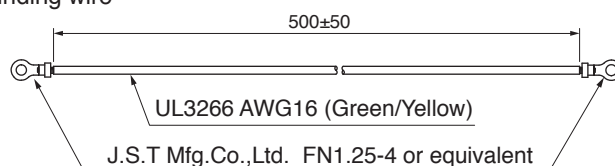


Connector for power supply connection (Molex Inc.)

Connector : 39-01-2105 (5557-10R-210)

Connector pin : 39-00-0038 (5556T) or 39-00-0039 (5556T2)

- Grounding wire



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MEMO

A series of horizontal dashed lines for writing.

# Information

# Information

GV series

KV series

GP series

Options

Information

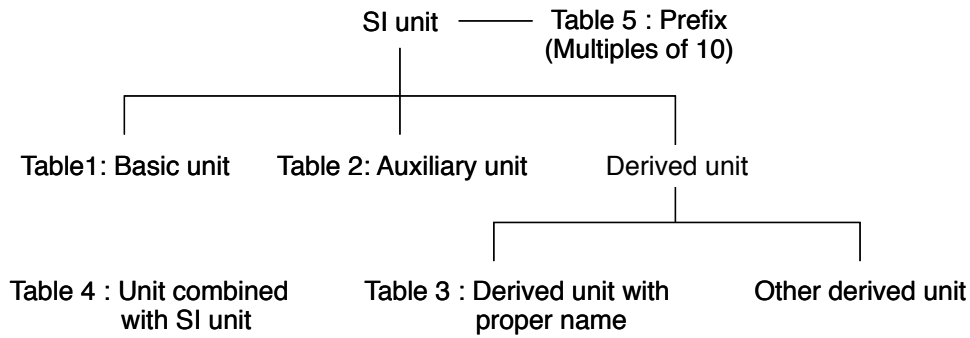
**Contents**

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# Guide to the international system of units (SI)

## Organization of the system of units



**Table 1: Basic unit**

Quantity	Name of unit	Symbol of unit
Length	meter	m
Weight	kilogram	kg
Time	second	s
Current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mol	mol
Luminous intensity	candela	cd

**Table 2: Auxiliary unit**

Quantity	Name of unit	Symbol of unit
Plane angle	radian	rad
Solid angle	steradian	sr

**Table 3: Major derived unit with proper name**

Quantity	Name	Symbol of unit	Derivation from basic unit, auxiliary unit or other derived unit
Frequency	hertz	Hz	1 Hz = 1 s <sup>-1</sup>
Force	newton	N	1 N = 1 kg·m/s <sup>2</sup>
Pressure, Stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>
Energy, Work, Amount of heat	joule	J	1 J = 1 N·m
Amount of work, Work efficiency, Power, Electric power	watt	W	1 W = 1 J/s
Electric charge, Amount of electricity	coulomb	C	1 C = 1 A·s
Electric potential, Potential difference, Voltage, Electromotive force	volt	V	1 V = 1 J/C
Electrostatic capacity, Capacitance	farad	F	1 F = 1 C/V
Electric resistance	ohm	Ω	1 Ω = 1 V/A
Electric conductance	siemens	S	1 S = 1 Ω <sup>-1</sup>
Magnetic flux	weber	Wb	1 Wb = 1 V·s
Magnetic flux density, Magnetic induction	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Inductance	henry	H	1 H = 1 Wb/A
Degree centigrade (Celsius)	degree centigrade (Celsius)/ degree	°C	t °C = (t+273.15) K
Luminous flux	lumen	lm	1 lm = 1 cd·sr
Illuminance	lux	lx	1 lx = 1 lm/m <sup>2</sup>

**Table 4: Unit combined with SI unit**

Quantity	Name	Symbol of unit
Time	minute	min
	hour	h
	day	d
Plane angle	degree	°
	minute	'
	second	"
Volume	liter	l, L
Weight	ton	t

**Table 5: Prefix**

Multiples powered to unit	Prefix	
	Name	Symbol
10 <sup>18</sup>	exa	E
10 <sup>15</sup>	peta	P
10 <sup>12</sup>	tera	T
10 <sup>9</sup>	giga	G
10 <sup>6</sup>	mega	M
10 <sup>3</sup>	kilo	k
10 <sup>2</sup>	hecto	h
10	deca	da
10 <sup>-1</sup>	deci	d
10 <sup>-2</sup>	centi	c
10 <sup>-3</sup>	milli	m
10 <sup>-6</sup>	micro	μ
10 <sup>-9</sup>	nano	n
10 <sup>-12</sup>	pico	p
10 <sup>-15</sup>	femto	f
10 <sup>-18</sup>	atto	a

## Major compatible unit

Quantity	Symbol of conventional unit	Symbol of SI unit and compatible unit	Conversion value
Length	$\mu$ (micron)	$\mu\text{m}$	$1 \mu = 1 \mu\text{m}$ (micrometer)
Acceleration	Gal	$\text{m/s}^2$	$1 \text{ Gal} = 10^{-2} \text{ m/s}^2$
	G	$\text{m/s}^2$	$1 \text{ G} = 9.80665 \text{ m/s}^2$
Frequency	c/s, c	Hz	$1 \text{ c/s} = \text{Hz}$
Revolving speed, Number of revolutions	rpm	$\text{s}^{-1}$ or $\text{min}^{-1}$ , r/min	$1 \text{ rpm} = 1 \text{ min}^{-1}$
Weight	kgf	–	} Same value
Mass	–	kg	
Weight flow rate	kgf/s	–	} Same value
Mass flow rate	–	kg/s	
Specific weight	kgf/m <sup>3</sup>	–	} Same value
Density	–	kg/m <sup>3</sup>	
Specific volume	m <sup>3</sup> /kgf	m <sup>3</sup> /kg	Same value
Load	kgf	N	$1 \text{ kgf} = 9.80665 \text{ N}$
Force	kgf	N	$1 \text{ kgf} = 9.80665 \text{ N}$
	dyn	N	$1 \text{ dyn} = 10^{-5} \text{ N}$
Moment of force	kgf·m	N·m	$1 \text{ kgf·m} = 9.806 \text{ N·m}$
Pressure	kgf/cm <sup>2</sup>	Pa, bar <sup>(1)</sup> or kgf/cm <sup>2</sup>	$1 \text{ kgf/cm}^2 = 9.80665 \times 10^4 \text{ Pa}$ $= 0.980665 \text{ bar}$
	at (Engineering atmospheric pressure)	Pa	$1 \text{ at} = 9.80665 \times 10^4 \text{ Pa}$
	atm (Atmospheric pressure)	Pa	$1 \text{ atm} = 1.01325 \times 10^5 \text{ Pa}$
	mH <sub>2</sub> O, mAq	Pa	$1 \text{ mH}_2\text{O} = 9.80665 \times 10^3 \text{ Pa}$
	mmHg Torr	Pa or mmHg <sup>(2)</sup> Pa	$1 \text{ mmHg} = 133.322 \text{ Pa}$
Stress	kgf/mm <sup>2</sup>	Pa or N/m <sup>2</sup>	$1 \text{ kgf/mm}^2 = 9.80665 \times 10^6 \text{ Pa}$ $= 9.80665 \times 10^6 \text{ N/m}^2$
	kgf/cm <sup>2</sup>	Pa or N/m <sup>2</sup>	$1 \text{ kgf/cm}^2 = 9.80665 \times 10^4 \text{ Pa}$ $= 9.80665 \times 10^4 \text{ N/m}^2$
Elastic modulus	kgf/m <sup>2</sup>	Pa or N/m <sup>2</sup>	$1 \text{ kgf/m}^2 = 9.80665 \text{ Pa} = 9.80665 \text{ N/m}^2$ $1 \text{ kgf/cm}^2 = 9.80665 \times 10^4 \text{ N/m}^2$
Energy, Work	kgf·m	J (joule)	$1 \text{ kgf·m} = 9.80665 \text{ J}$
	erg	J	$1 \text{ erg} = 10^{-7} \text{ J}$
Work efficiency, Power	kgf·m/s	W (watt)	$1 \text{ kgf·m/s} = 9.80665 \text{ W}$
	PS	W	$1 \text{ PS} = 0.7355 \text{ kW}$
Viscosity	PP	Pa·s	$1 \text{ P} = 0.1 \text{ Pa·s}$
Kinetic viscosity	St	mm <sup>2</sup> /s	$10^{-2} \text{ St} = 1 \text{ mm}^2/\text{s}$
Thermodynamic temperature	K	K (kelvin)	$1 \text{ K} = 1 \text{ K}$
Temperature interval	deg	K <sup>(3)</sup>	$1 \text{ deg} = 1 \text{ K}$
Amount of heat	cal	J	$1 \text{ cal} = 4.18605 \text{ J}$
Heat capacity	cal/°C	J/K <sup>(3)</sup>	$1 \text{ cal/}^\circ\text{C} = 4.18605 \text{ J/K}$
Specific heat, Specific heat capacity	cal/ (kgf·°C)	cal/ (kgf·K) <sup>(3)</sup>	$1 \text{ cal/ (kgf} \cdot ^\circ\text{C)} = 4.18605 \text{ J/ (kg} \cdot \text{K)}$
Entropy	cal/K	J/K	$1 \text{ cal/K} = 4.18605 \text{ J/K}$
Specific entropy	cal/ (kgf·K)	J/(kg·K)	$1 \text{ cal/ (kgf} \cdot \text{K)} = 4.18605 \text{ J/ (kg} \cdot \text{K)}$
Internal energy (Enthalpy)	cal	J	$1 \text{ cal} = 4.18605 \text{ J}$
Specific internal energy (Specific enthalpy)	cal/kgf	J/kg	$1 \text{ cal/kgf} = 4.18605 \text{ J/kg}$
Heat flux	cal/h	W	$1 \text{ kcal/h} = 1.16279 \text{ W}$
Heat flux density	cal/ (h·m <sup>2</sup> )	W/m <sup>2</sup>	$1 \text{ kcal/ (h} \cdot \text{m}^2) = 1.16279 \text{ W/m}^2$
Thermal conductivity	cal/ (h·m·°C)	W/ (m·K) <sup>(3)</sup>	$1 \text{ kcal/ (h} \cdot \text{m} \cdot ^\circ\text{C)} = 1.16279 \text{ W/ (m} \cdot \text{K)}$
Coefficient of thermal conductivity	cal/ (h·m <sup>2</sup> ·°C)	W/ (m <sup>2</sup> ·K) <sup>(3)</sup>	$1 \text{ kcal/ (h} \cdot \text{m}^2 \cdot ^\circ\text{C)} = 1.16279 \text{ W/ (m}^2 \cdot \text{K)}$
Intensity of magnetic field	Oe	A/m	$1 \text{ Oe} = 10^3 / (4\pi) \text{ A/m}$
Magnetic flux	Mx	Wb (weber)	$1 \text{ Mx} = 10^{-8} \text{ Wb}$
Magnetic flux density	Gs, G	T (tesla)	$1 \text{ Gs} = 10^{-4} \text{ T}$

### Note

- (1) Applicable to liquid pressure. Also applicable to atmospheric pressure of meteorological data, when “bar” is used in international standard.  
(2) Applicable to scale or indication of blood pressure manometers.  
(3) “°C” can be substituted for “K”.

# Selecting motor capacity

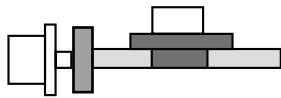
## Flow of motor selection

### 1. Definition of mechanism to be driven by motor.

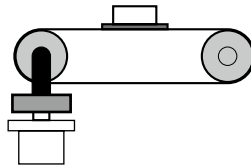
Define details of individual mechanical components (ball screw length, lead and pulley diameters, etc.)

#### <Typical mechanism>

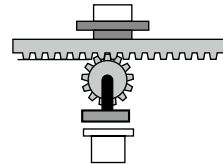
Ball screw mechanism



Belt mechanism

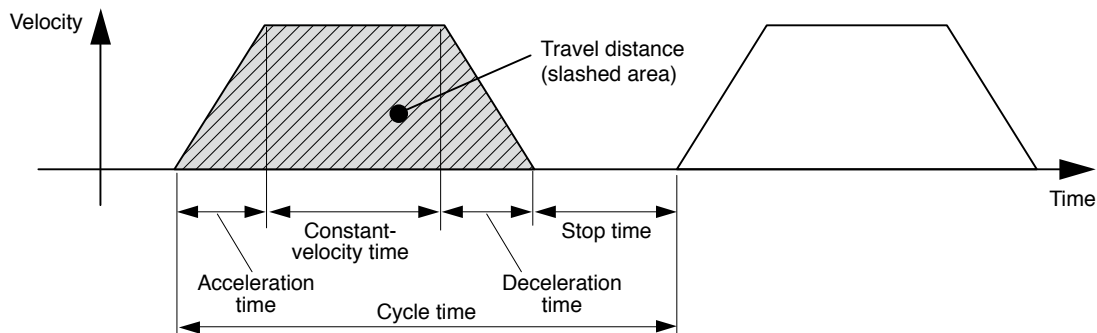


Rack & pinion, etc.



### 2. Definition of operating pattern.

Acceleration/deceleration time, Constant-velocity time, Stop time, Cycle time, Travel distance



Note) Selection of motor capacity significantly varies depending on the operating pattern.

The motor capacity can be reduced if the acceleration/deceleration time and stop time are set as long as possible.

### 3. Calculation of load inertia and inertia ratio.

Calculate load inertia for each mechanical component. (Refer to "General inertia calculation method" described later.)

Divide the calculated load inertia by the inertia of the selected motor to check the inertia ratio.

For calculation of the inertia ratio, note that the catalog value of the motor inertia is expressed as " $\times 10^{-4}$  kg·m<sup>2</sup>".

### 4. Calculation of motor velocity

Calculate the motor velocity from the moving distance, acceleration / deceleration time and constant-velocity time.

### 5. Calculation of torque

Calculate the required motor torque from the load inertia, acceleration/deceleration time and constant-velocity time.

### 6. Calculation of motor

Select a motor that meets the above 3 to 5 requirements.

## Description on the items related to motor selection

### 1. Torque

#### (1) Peak torque

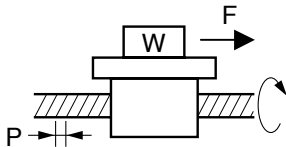
Indicate the maximum torque that the motor requires during operation (mainly in acceleration and deceleration steps). The reference value is 80 % or less of the maximum motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

#### (2) Traveling torque, Stop holding torque

Indicates the torque that the motor requires for a long time. The reference value is 80 % or less of the rated motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

#### Traveling torque calculation formula for each mechanism

##### Ball screw mechanism



Traveling torque  $T_f = \frac{P}{2\pi\eta} (\mu g W + F)$

**W** : Weight [kg]

$\eta$  : Mechanical efficiency

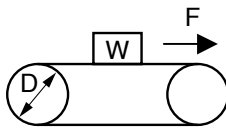
**P** : Lead [m]

$\mu$  : Coefficient of friction

**F** : External force [N]

$g$  : Acceleration of gravity 9.8 [m/s<sup>2</sup>]

##### Belt mechanism



Traveling torque  $T_f = \frac{D}{2\eta} (\mu g W + F)$

**W** : Weight [kg]

$\eta$  : Mechanical efficiency

**P** : Pulley diameter [m]

$\mu$  : Coefficient of friction

**F** : External force [N]

$g$  : Acceleration of gravity 9.8 [m/s<sup>2</sup>]

#### (3) Effective torque

Indicates a root-mean-square value of the total torque required for running and stopping the motor per unit time. The reference value is approx. 80 % or less of the rated motor torque.

$$T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}}$$

**T<sub>a</sub>** : Acceleration torque [N·m]

**t<sub>a</sub>** : Acceleration time [s]

**t<sub>c</sub>** : Cycle time [s]

**T<sub>f</sub>** : Traveling torque [N·m]

**t<sub>b</sub>** : Constant-velocity time [s]

(Run time + Stop time)

**T<sub>d</sub>** : Deceleration torque [N·m]

**t<sub>d</sub>** : Deceleration time [s]

### 2. Motor velocity

#### Maximum velocity

Maximum velocity of motor in operation: The reference value is the rated velocity or lower value.

When the motor runs at the maximum velocity, you must pay attention to the motor torque and temperature rise.

For actual calculation of motor velocity, see "Example of motor selection" described later.

# Selecting motor capacity

## Description on the items related to motor selection

### 3. Inertia and inertia ratio

Inertia is like the force to retain the current moving condition.

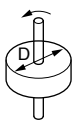
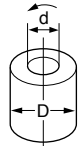
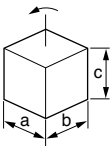
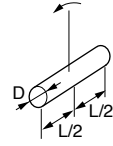
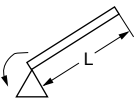
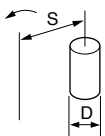
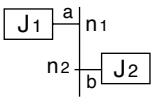
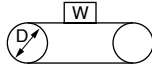
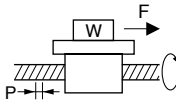
Inertia ratio is calculated by dividing load inertia by rotor inertia.

Generally, for motors with 750 W or lower capacity, the inertia ratio should be "20" or less. For motors with 1000 W or higher capacity, the inertia ratio should be "10" or less.

If you need quicker response, a lower inertia ratio is required.

(For example, when the motor takes several seconds in acceleration step, the inertia ratio can be further increased.)

### General inertia calculation method

Shape	J calculation formula	Shape	J calculation formula
<b>Disk</b> 	$J = \frac{1}{8} W D^2 \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] D : Outer diameter [m]</p>	<b>Hollow cylinder</b> 	$J = \frac{1}{8} W (D^2 + d^2) \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] D : Outer diameter [m] d : Inner diameter [m]</p>
<b>Prism</b> 	$J = \frac{1}{12} W (a^2 + b^2) \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] a, b, c : Side length [m]</p>	<b>Uniform rod</b> 	$J = \frac{1}{48} W (3D^2 + 4L^2) \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] D : Outer diameter [m] L : Length [m]</p>
<b>Straight rod</b> 	$J = \frac{1}{3} W L^2 \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] L : Length [m]</p>	<b>Separated rod</b> 	$J = \frac{1}{8} W D^2 + W S^2 \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] D : Outer diameter [m] S : Distance [m]</p>
<b>Reduction gear</b> 	<p>Inertia on shaft "a"</p> $J = J_1 + \left(\frac{n_2}{n_1}\right)^2 J_2 \text{ [kg}\cdot\text{m}^2]$ <p>n<sub>1</sub> : A rotational speed of a shaft [r/min] n<sub>2</sub> : A rotational speed of b shaft [r/min]</p>		
<b>Conveyor</b> 	$J = \frac{1}{4} W D^2 \text{ [kg}\cdot\text{m}^2]$ <p>W : Workpiece weight on conveyor [kg] D : Drum diameter [m]</p> <p>* Excluding drum J</p>	<b>Ball screw</b> 	$J = J_B + \frac{W \cdot P^2}{4\pi^2} \text{ [kg}\cdot\text{m}^2]$ <p>W : Weight [kg] P : Lead [m] J<sub>B</sub> : J of ball screw</p>

If weight (W [kg]) is unknown, calculate it with the following formula:

$$\text{Weight } W \text{ [kg]} = \text{Density } \rho \text{ [kg/m}^3] \times \text{Volume } V \text{ [m}^3]$$

Density of each material

$$\text{Iron } \rho = 7.9 \times 10^3 \text{ [kg/m}^3]$$

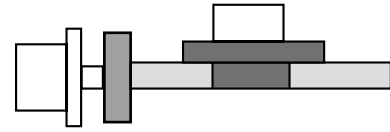
$$\text{Aluminum } \rho = 2.8 \times 10^3 \text{ [kg/m}^3]$$

$$\text{Brass } \rho = 8.5 \times 10^3 \text{ [kg/m}^3]$$

## To drive ball screw mechanism

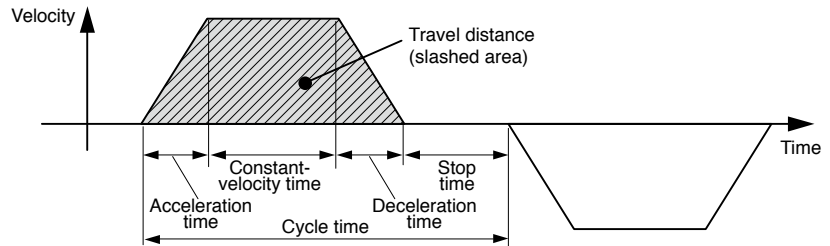
### 1. Example of motor selection for driving ball screw mechanism

Workpiece weight	<b>WA = 10</b> [kg]
Ball screw length	<b>BL = 0.5</b> [m]
Ball screw diameter	<b>BD = 0.02</b> [m]
Ball screw lead	<b>BP = 0.02</b> [m]
Ball screw efficiency	<b>Bη = 0.9</b>
Travel distance	<b>0.3</b> [m]
Coupling inertia	<b>Jc = 10 × 10<sup>-6</sup></b> [kg·m <sup>2</sup> ] (Use manufacturer-specified catalog value, or calculation value.)



### 2. Running pattern :

Acceleration time	<b>ta = 0.7</b> [s]
Constant-velocity time	<b>tb = 1.3</b> [s]
Deceleration time	<b>td = 0.7</b> [s]
Cycle time	<b>tc = 4</b> [s]
Travel distance	<b>0.3</b> [m]



### 3. Ball screw weight

$$\begin{aligned} \mathbf{Bw} &= \rho \times \pi \times \left(\frac{\mathbf{BD}}{2}\right)^2 \times \mathbf{BL} = 7.9 \times 10^3 \times \pi \times \left(\frac{0.02}{2}\right)^2 \times 0.5 \\ &= 1.24 \text{ [kg]} \end{aligned}$$

### 4. Load inertia

$$\begin{aligned} \mathbf{JL} &= \mathbf{Jc} + \mathbf{JB} + \mathbf{Jw} = \mathbf{Jc} + \frac{1}{8} \mathbf{Bw} \times \mathbf{BD}^2 + \frac{\mathbf{WA} \cdot \mathbf{BP}^2}{4\pi^2} \\ &= 0.00001 + (1.24 \times 0.02^2) / 8 + 10 \times 0.02^2 / 4\pi^2 \\ &= 1.73 \times 10^{-4} \text{ [kg·m}^2\text{]} \end{aligned}$$

### 5. Provisional motor selection

In case of GP series 50 W, gear ratio 1/5. Permissible load inertia moment =  $3.42 \times 10^{-4}$  [kg·m<sup>2</sup>]

### 6. Inertia moment compared

Permissible load inertia moment =  $3.42 \times 10^{-4}$  [kg·m<sup>2</sup>] > Load inertia =  $1.73 \times 10^{-4}$  [kg·m<sup>2</sup>] Cleared specification

### 7. Calculation of maximum velocity (Vmax)

$$\frac{1}{2} \times \text{Acceleration time} \times V_{\max} + \text{Constant-velocity time} \times V_{\max} + \frac{1}{2} \times \text{Deceleration time} \times V_{\max} = \text{Travel distance}$$

$$\frac{1}{2} \times 0.7 \times V_{\max} + 1.3 \times V_{\max} + \frac{1}{2} \times 0.7 \times V_{\max} = 0.3$$

$$2.0 \times V_{\max} = 0.3$$

$$V_{\max} = 0.3 / 2.0 = 0.15 \text{ [m/s]}$$

### 8. Calculation of motor velocity (N [r/min]) Ball screw lead per resolution: BP = 0.02 [m]

$$N = 0.15 / 0.02 = 7.5 \text{ [r/s]}$$

$$= 7.5 \times 60 = 450 \text{ [r/min]} < 600 \text{ [r/min]} \text{ (rated rotation speed of GP series 50 W, gear ratio 1/5)}$$

### 9. Calculation of torque

$$\begin{aligned} \text{Traveling torque } \mathbf{Tf} &= \frac{\mathbf{BP}}{2\pi\mathbf{B}\eta} (\mu\mathbf{gWA} + \mathbf{F}) = \frac{0.02}{2\pi \times 0.9} (0.1 \times 9.8 \times 10 + 0) \\ &= 0.035 \text{ [N·m]} \end{aligned}$$

$$\begin{aligned} \text{Acceleration torque } \mathbf{Ta} &= \frac{\mathbf{JL} \times 2\pi\mathbf{N} \text{ [r/s]}}{\text{Acceleration time [s]}} + \text{Traveling torque} = \frac{1.73 \times 10^{-4} \times 2\pi \times 7.5}{0.7} + 0.035 \\ &= 0.012 + 0.035 = 0.047 \text{ [N·m]} \end{aligned}$$

$$\begin{aligned} \text{Deceleration torque } \mathbf{Td} &= \frac{\mathbf{JL} \times 2\pi\mathbf{N} \text{ [r/s]}}{\text{Deceleration time [s]}} - \text{Traveling torque} = \frac{1.73 \times 10^{-4} \times 2\pi \times 7.5}{0.7} - 0.035 \\ &= 0.012 - 0.035 = -0.023 \text{ [N·m]} \end{aligned}$$

# Selecting motor capacity

## 10. Verification of maximum torque

Acceleration torque =  $T_a$

= 0.047 [N·m] < 0.71 [N·m] (GP series 50 W, 1/5 gear, Permissible torque at output shaft of gear head)

## 11. Verification of effective torque

$$T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}}$$

$$= \sqrt{\frac{0.047^2 \times 0.7 + 0.035^2 \times 1.3 + (-0.023)^2 \times 0.7}{4}}$$

= 0.030 [N·m] < 0.71 [N·m] (GP series 50 W, 1/5 gear, Permissible torque at output shaft of gear head)

## 12. Load torque, load inertia moment are cleared specification.

## Example of motor selection for timing belt mechanism

### 1. Mechanism

Workpiece weight

$W_A = 2$  [kg] (including belt)

Pulley diameter

$P_D = 0.05$  [m]

Pulley weight

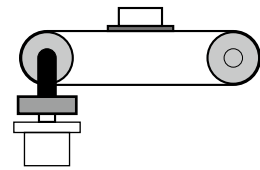
$W_P = 0.5$  [kg] (Use manufacturer-specified catalog value, or calculation value.)

Mechanical efficiency

$B_\eta = 0.8$

Coupling inertia

$J_c = 0$  (Direct connection to motor shaft)



### 2. Running pattern

Acceleration time

$t_a = 1.0$  [s]

Constant-velocity time

$t_b = 1.0$  [s]

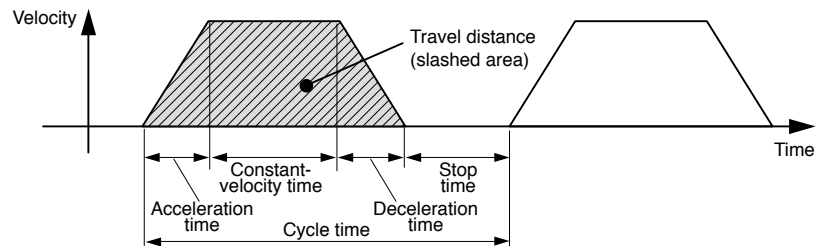
Deceleration time

$t_d = 1.0$  [s]

Cycle time

$t_c = 4$  [s]

Travel distance 1 [m]



### 3. Load inertia

$$J_L = J_c + J_B + J_P$$

$$= J_c + \frac{1}{4} W_A \times P_D^2 + \frac{1}{8} W_P \times P_D^2 \times 2$$

$$= 0 + \frac{1}{4} \times 2 \times 0.05^2 + \frac{1}{8} \times 0.5 \times 0.05^2 \times 2$$

$$= 0.00156 = 15.6 \times 10^{-4} \text{ [kg}\cdot\text{m}^2]$$

### 4. Provisional motor selection

In case of GP series 50 W, gear ratio 1/15. Permissible load inertia moment =  $30.6 \times 10^{-4}$  [kg·m<sup>2</sup>]

### 5. Inertia moment compared

$30.6 \times 10^{-4}$  [kg·m<sup>2</sup>] >  $15.6 \times 10^{-4}$  [kg·m<sup>2</sup>]

## 6. Calculation of maximum velocity (Vmax)

$$\frac{1}{2} \times \text{Acceleration time} \times V_{\max} + \text{Constant-velocity time} \times V_{\max} + \frac{1}{2} \times \text{Deceleration time} \times V_{\max} = \text{Travel distance}$$

$$\frac{1}{2} \times 1.0 \times V_{\max} + 1.0 \times V_{\max} + \frac{1}{2} \times 1.0 \times V_{\max} = 1$$

$$2.0 \times V_{\max} = 1$$

$$V_{\max} = 1 / 2.0 = 0.5 \text{ [m/s]}$$

## 7. Calculation of motor velocity (N [r/min])

$$\text{A single rotation of pulley} : \pi \times P_D = 0.157 \text{ [m]}$$

$$N = 0.5 / 0.157 = 3.18 \text{ [r/s]}$$

$$= 3.18 \times 60 = 191 \text{ [r/min]} < 200 \text{ [r/min]} \text{ (rated rotation speed of GP series 50 W, gear ratio 1/15)}$$

## 8. Calculation of torque

$$\begin{aligned} \text{Traveling torque } T_f &= \frac{P_D}{2\eta} (\mu g W_A + F) = \frac{0.05}{2 \times 0.8} (0.1 \times 9.8 \times 2 + 0) \\ &= 0.061 \text{ [N}\cdot\text{m]} \end{aligned}$$

$$\begin{aligned} \text{Acceleration torque } T_a &= \frac{JL \times 2\pi N \text{ [r/s]}}{\text{Acceleration time [s]}} + \text{Traveling torque} \\ &= \frac{15.6 \times 10^{-4} \times 2\pi \times 3.18}{1.0} + 0.061 \\ &= 0.031 + 0.061 = 0.092 \text{ [N}\cdot\text{m]} \end{aligned}$$

$$\begin{aligned} \text{Deceleration torque } T_d &= \frac{JL \times 2\pi N \text{ [r/s]}}{\text{Deceleration time [s]}} - \text{Traveling torque} \\ &= \frac{15.6 \times 10^{-4} \times 2\pi \times 3.18}{1.0} - 0.061 \\ &= 0.031 - 0.061 = -0.03 \text{ [N}\cdot\text{m]} \end{aligned}$$

## 9. Verification of maximum torque

Acceleration torque

$$T_a = 0.092 \text{ [N}\cdot\text{m]} < 2.2 \text{ [N}\cdot\text{m]} \text{ (GP series 50 W, 1/15 gear, Permissible torque at output shaft of gear head)}$$

## 10. Verification of effective torque

$$\begin{aligned} T_{\text{rms}} &= \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}} \\ &= \sqrt{\frac{0.092^2 \times 1.0 + 0.061^2 \times 1.0 + (-0.03)^2 \times 1.0}{4}} \end{aligned}$$

$$= 0.057 \text{ [N}\cdot\text{m]} < 2.2 \text{ [N}\cdot\text{m]} \text{ (GP series 50 W, 1/15 gear, Permissible torque at output shaft of gear head)}$$

**11. A GP series 50 W, 1/15 gear selected by following the above procedure will cause no problem.**

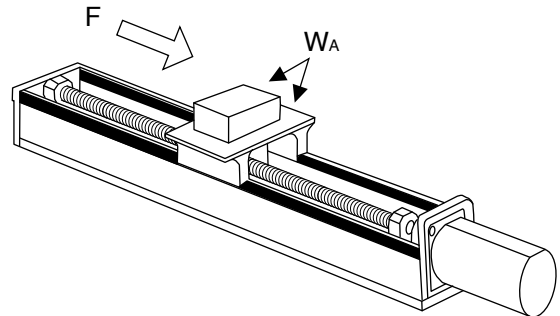
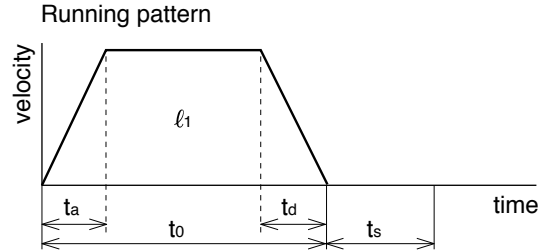


# Request sheet for motor selection

## Request for motor selection I : Ball screw drive

### 1. Driven mechanism and running data

- |   |            |      |
|---|------------|------|
| 1) Travel distance of the work load per one cycle | $\ell_1$ : | mm   |
| 2) Cycle time                                     | to:        | s    |
| (Fill in items 3) and 4) if required.)            |            |      |
| 3) Acceleration time                              | ta:        | s    |
| 4) Deceleration time                              | td:        | s    |
| 5) Stopping time                                  | ts:        | s    |
| 6) Max. velocity                                  | V:         | mm/s |
| 7) External force                                 | F:         | N    |
| 8) Positioning accuracy of the work load          | $\pm$      | mm   |
| 9) Total weight of the work load and the table    | WA:        | kg   |
| 10) Power supply voltage                          |            | V    |
| 11) Diameter of the ball screw                    |            | mm   |
| 12) Total length of the ball                      |            | mm   |
| 13) Lead of the ball screw                        |            | mm   |



14) Traveling direction (horizontal, vertical etc.)

### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name : \_\_\_\_\_

Department/Section : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Tel : \_\_\_\_\_

Fax : \_\_\_\_\_

E-mail address: \_\_\_\_\_

# Request sheet for motor selection

## Request for motor selection II : Timing pulley + Ball screw drive

### 1. Driven mechanism and running data

		Motor side	Ball screw side
1) Travel distance of the work load per one cycle	$l_1$ : mm	15) Diameter of the pulley D1: mm	D2: mm
2) Cycle time	$t_0$ : s	16) Weight of the pulley W1: kg	W2: kg
(Fill in items 3) and 4) if required.)		(or item 17) and 18))	
3) Acceleration time	$t_a$ : s	17) Width of the pulley L1: mm	
4) Deceleration time	$t_d$ : s	18) Material of the pulley	
5) Stopping time	$t_s$ : s	19) Weight of the belt W <sub>M</sub> : kg	
6) Max. velocity	V: mm/s	<div style="text-align: center;"> <p>Running pattern</p> </div> <div style="text-align: center;"> </div>	
7) External force	F: N		
8) Positioning accuracy of the work load	± mm		
9) Total weight of the work load and the table	W <sub>A</sub> : kg		
10) Power supply voltage	V		
11) Diameter of the ball screw	mm		
12) Total length of the ball screw	mm		
13) Lead of the ball screw	mm		
14) Traveling direction (horizontal, vertical etc.)			

### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name : \_\_\_\_\_

Department/Section : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Tel : \_\_\_\_\_

Fax : \_\_\_\_\_

E-mail address: \_\_\_\_\_

GV series  
KV series  
GP series  
Options  
Information

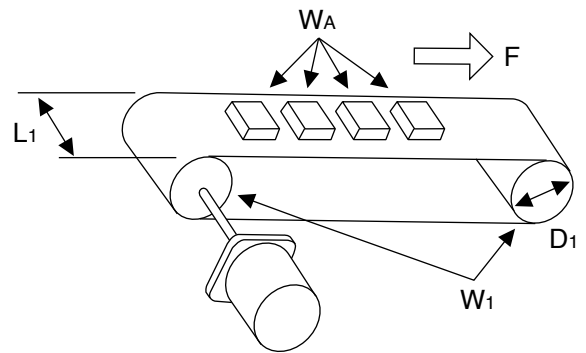
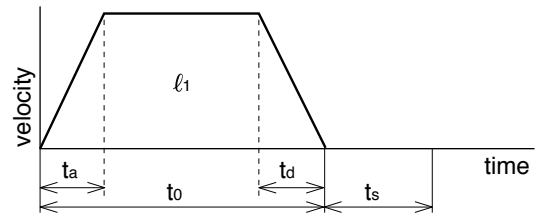
# Request sheet for motor selection

## Request for motor selection III : Belt drive

### 1. Driven mechanism and running data

- |   |         |      |
|---|---------|------|
| 1) Travel distance of the work load per one cycle | $l_1$ : | mm   |
| 2) Cycle time                                     | $t_0$ : | s    |
| (Fill in items 3) and 4) if required.)            |         |      |
| 3) Acceleration time                              | $t_a$ : | s    |
| 4) Deceleration time                              | $t_d$ : | s    |
| 5) Stopping time                                  | $t_s$ : | s    |
| 6) Max. velocity                                  | V:      | mm/s |
| 7) External force                                 | F:      | N    |
| 8) Positioning accuracy of the work load          | $\pm$   | mm   |
| 9) Total weight of the work load                  | $W_A$ : | kg   |
| 10) Power supply voltage                          |         | V    |
| 11) Weight of the belt                            | $W_M$ : | kg   |
| 12) Diameter of the driving pulley                | $D_1$ : | mm   |
| 13) Total weight of the pulley                    | $W_1$ : | kg   |

Running pattern



(or item 14) and 15))

- |   |         |    |
|---|---------|----|
| 14) Width of the pulley                             | $L_1$ : | mm |
| 15) Material of the pulley                          |         |    |
| 16) Traveling direction (horizontal, vertical etc.) |         |    |

### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name : \_\_\_\_\_

Department/Section : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Tel : \_\_\_\_\_

Fax : \_\_\_\_\_

E-mail address: \_\_\_\_\_

# Request sheet for motor selection

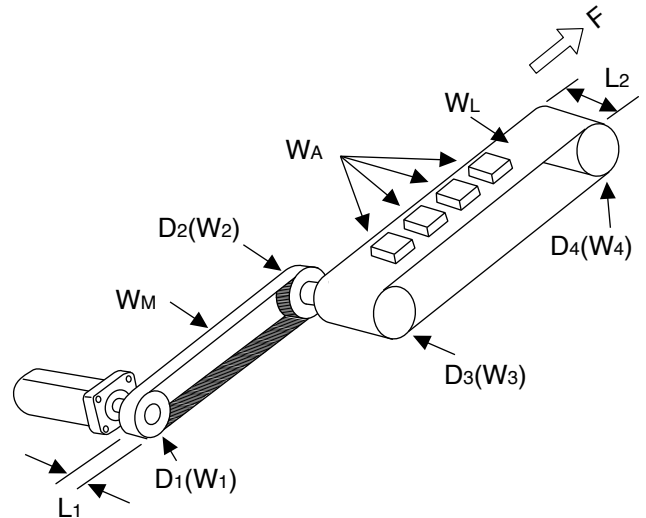
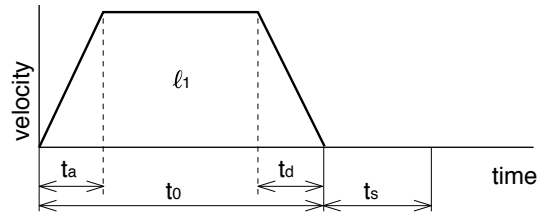
## Request for motor selection IV : Timing pulley + Belt drive

### 1. Driven mechanism and running data

- |   |            |      |
|---|------------|------|
| 1) Travel distance of the work load per one cycle | $\ell_1$ : | mm   |
| 2) Cycle time                                     | to:        | s    |
| (Fill in items 3) and 4) if required.)            |            |      |
| 3) Acceleration time                              | ta:        | s    |
| 4) Deceleration time                              | td:        | s    |
| 5) Stopping time                                  | ts:        | s    |
| 6) Max. velocity                                  | V:         | mm/s |
| 7) External force                                 | F:         | N    |
| 8) Positioning accuracy of the work load          | $\pm$      | mm   |
| 9) Total weight of the work load and the table    | WA:        | kg   |
| 10) Power supply voltage                          |            | V    |
| 11) Weight of motor side belt                     | WM:        | kg   |

- |   | Motor side | Belt side |
|---|------------|-----------|
| 16) Diameter of the pulley                          | D3: mm     | D4: mm    |
| 17) Weight of the pulley                            | W3: kg     | W4: kg    |
| (or item 18) and 19))                               |            |           |
| 18) Width of the pulley                             | L2: mm     |           |
| 19) Material of the pulley                          |            |           |
| 20) Weight of the belt                              | WM: kg     |           |
| 21) Traveling direction (horizontal, vertical etc.) |            |           |

Running pattern



- |                            | Motor side | Belt side |
|----------------------------|------------|-----------|
| 12) Diameter of the pulley | D1: mm     | D2: mm    |
| 13) Weight of the pulley   | W1: kg     | W2: kg    |
| (or item 14) and 15))      |            |           |
| 14) Width of the belt      | L1: mm     |           |
| 15) Material of the pulley |            |           |

### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name : \_\_\_\_\_

Department/Section : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Tel : \_\_\_\_\_

Fax : \_\_\_\_\_

E-mail address: \_\_\_\_\_

GV series  
KV series  
GP series  
Options  
Information

# Request sheet for motor selection

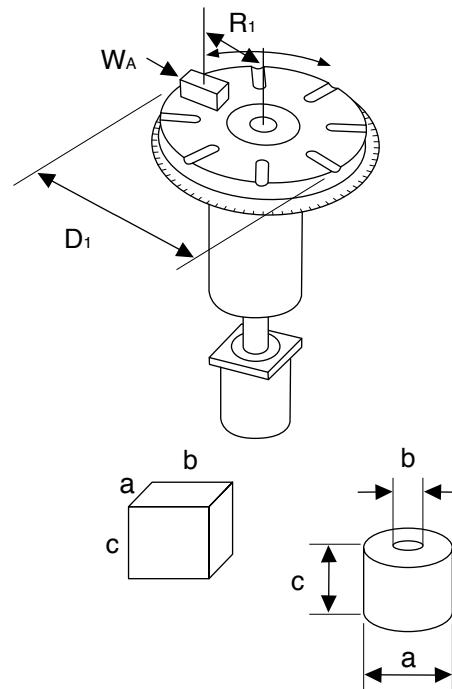
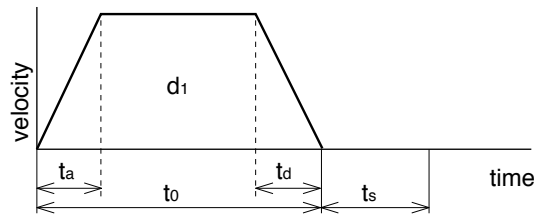
## Request for motor selection $V$ : Turntable drive

### 1. Driven mechanism and running data

1) Travel distance of the work load per one cycle	d <sub>1</sub> :	deg	
2) Cycle time	t <sub>0</sub> :	s	
(Fill in items 3) and 4) if required.)			
3) Acceleration time	t <sub>a</sub> :	s	
4) Deceleration time	t <sub>d</sub> :	s	
5) Stopping time	t <sub>s</sub> :	s	
6) Max. rotational speed of the table	v:	deg/s	
	(or)	V:	r/s
7) Positioning accuracy of the work load	±	deg	
8) Weight of one work load	W <sub>A</sub> :	kg	
9) Driving radius of the center of gravity of the work	R <sub>1</sub> :	mm	
10) Diameter of the table	D <sub>1</sub> :	mm	
11) Mass of the table	W <sub>1</sub> :	kg	
12) Diameter of the table support	T <sub>1</sub> :	mm	
13) Power supply voltage		V	

14) Dimensions of the work load		Prism	Cylinder	
	a:	mm	a:	mm
	b:	mm	b:	mm
	c:	mm	c:	mm
15) Number of work loads	pcs			

Running pattern



### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

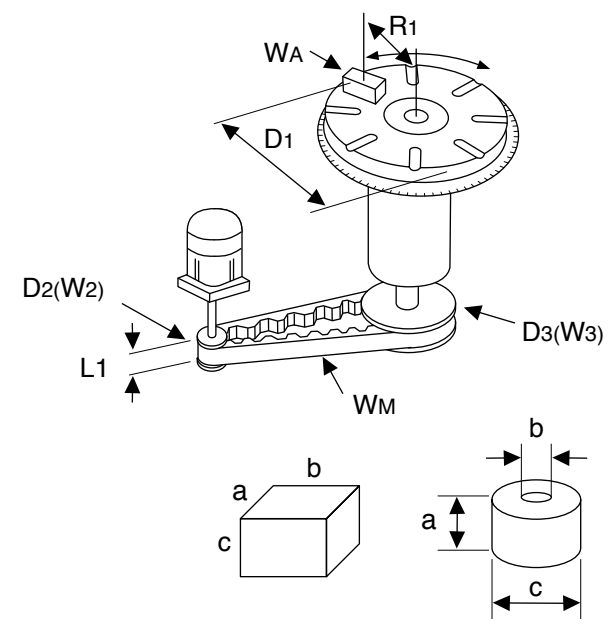
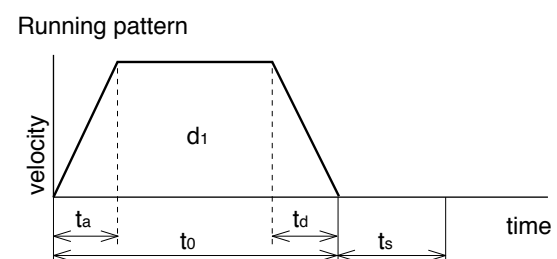
<div style="border: 1px solid black; padding: 5px; margin-top: 10px;">                 Company name : _____                  Department/Section : _____                  Name : _____                  Address : _____                  Tel : _____                  Fax : _____                  E-mail address: _____             </div>
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# Request sheet for motor selection

## Request for motor selection VI : Timing pulley + Turntable drive

### 1. Driven mechanism and running data

			Motor side	Turntable side
1) Travel distance of the work load per one cycle	d <sub>1</sub> : deg	16) Diameter of the pulley	D <sub>2</sub> : mm	D <sub>3</sub> : mm
2) Cycle time	t <sub>0</sub> : s	17) Weight of the pulley	W <sub>2</sub> : kg	W <sub>3</sub> : kg
(Fill in items 3) and 4) if required.)		(or item 18) and 19))		
3) Acceleration time	t <sub>a</sub> : s	18) Width of the pulley	L <sub>1</sub> : mm	
4) Deceleration time	t <sub>d</sub> : s	19) Material of the pulley		
5) Stopping time	t <sub>s</sub> : s	20) Weight of the belt	W <sub>M</sub> : kg	
6) Max. rotational speed of the table	v: deg/s			
	(or) V: r/s			
7) Positioning accuracy of the work load	± deg			
8) Weight of one work load	W <sub>A</sub> : kg			
9) Driving radius of the center of gravity of the work	R <sub>1</sub> : mm			
10) Diameter of the table	D <sub>1</sub> : mm			
11) Mass of the table	W <sub>1</sub> : kg			
12) Diameter of the table support	T <sub>1</sub> : mm			
13) Power supply voltage	v			
14) Dimension of the work load	(Prism)		(Cylinder)	
	a: mm	a: mm		
	b: mm	b: mm		
	c: mm	c: mm		
15) Number of work loads		pcs		



### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

	Company name : _____ Department/Section : _____ Name : _____ Address : _____ Tel : _____ Fax : _____ E-mail address: _____
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GV series  
 KV series  
 GP series  
 Options  
 Information

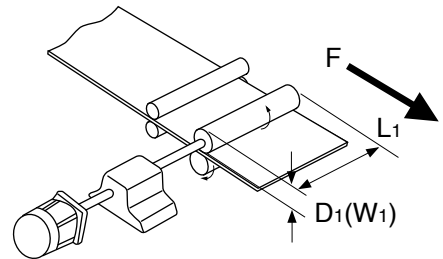
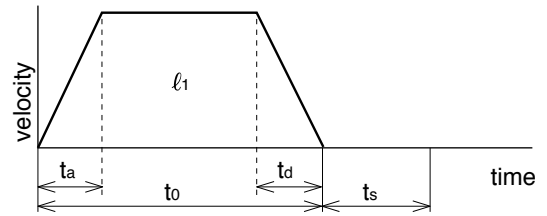
# Request sheet for motor selection

## Request for motor selection VII : Roller feed drive

### 1. Driven mechanism and running data

1) Travel distance of the work load per one cycle	$l_1$ :	mm
2) Cycle time	$t_0$ :	s
(Fill in items 3) and 4) if required.)		
3) Acceleration time	$t_a$ :	s
4) Deceleration time	$t_d$ :	s
5) Stopping time	$t_s$ :	s
6) Max. velocity	$v$ :	mm/s
7) External pulling force	$F$ :	N
8) Positioning accuracy of the work load	$\pm$	mm
9) Number of rollers		pcs
10) Power supply voltage		V
11) Diameter of the roller	$D_1$ :	mm
12) Mass of the roller	$W_1$ :	kg

Running pattern



(or item 13) and 14))

13) Width of the roller	$L_1$ :	mm
14) Material of the roller		

### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name : \_\_\_\_\_

Department/Section : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Tel : \_\_\_\_\_

Fax : \_\_\_\_\_

E-mail address: \_\_\_\_\_

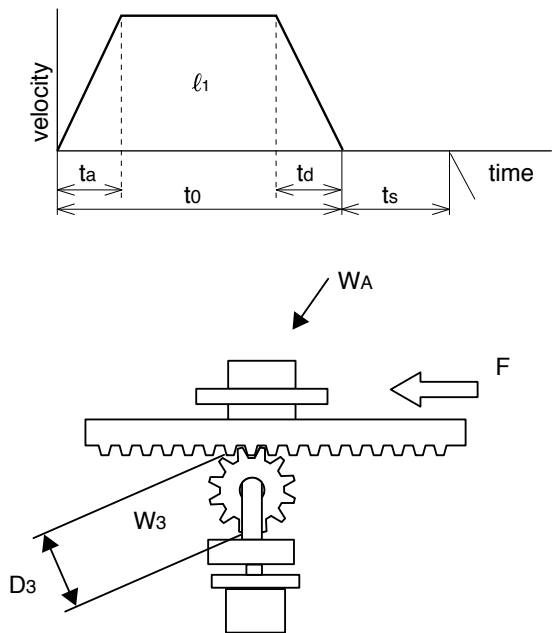
# Request sheet for motor selection

## Request for motor selection VIII : Driving with Rack & Pinion

### 1. Driven mechanism and running data

- |  |         |      |
|--|---------|------|
| 1) Travel distance of the work load per one cycle    | $l_1$ : | mm   |
| 2) Cycle time  | $t_0$ : | s    |
| (Fill in items 3) and 4) if required.)               |         |      |
| 3) Acceleration time                                 | $t_a$ : | s    |
| 4) Deceleration time                                 | $t_d$ : | s    |
| 5) Stopping time                                     | $t_s$ : | s    |
| 6) Max. velocity                                     | V:      | mm/s |
| 7) External force                                    | F:      | N    |
| 8) Positioning accuracy of the work load             | $\pm$   | mm   |
| 9) Total weight of the work load                     | $W_A$ : | kg   |
| 10) Power supply voltage                             |         | V    |
| 11) Diameter of the pinion                           | $D_3$ : | mm   |
| 12) Mass of the pinion                               | $W_3$ : | kg   |
| 13) Traveling direction (horizontal, vertical, etc.) |         |      |

Running pattern



### 2. Other data (Fill the details on specific mechanism and its configurations in the following blank.)

Company name : \_\_\_\_\_

Department/Section : \_\_\_\_\_

Name : \_\_\_\_\_

Address : \_\_\_\_\_

Tel : \_\_\_\_\_

Fax : \_\_\_\_\_

E-mail address: \_\_\_\_\_



# Conformance to international safety standards


## Conformance to international standards (KV series : Under application)

### EC Directives

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

### Conformity to UL Standards

Observe the following conditions of (1) and (2) to make the system conform to UL508C (E164620).

- (1) Use the driver in an environment of Pollution Degree 2 or 1 prescribed in IEC60664-1.  
(e.g. Install in the control box with IP54 enclosure.)
- (2) Make sure to install a circuit breaker or fuse which are UL recognized (Listed  marked) between the power supply and the noise filter.  
Use a copper cable with temperature rating of 75 °C or higher.

### EMC Directives

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

	Applicable standards		Installation condition
<b>UL</b>	UL1004 UL508C	Standard for electric motor Standard for electric converter equipment	Class I equipment Pollution degree 2 SCCR *1
<b>CSA (c-UL)</b>	C22.2 No.100	Standard for electric motor	
<b>CE</b>	EN61800-5-1 EN60034-1 EN60034-5 EN61800-3 EN55011 EN61000-6-2	Adjustable speed electrical power drive systems. – Safety requirements. Electrical, thermal and energy Standard for rotary electric machine (low voltage directive) Standard for rotary electric machine (low voltage directive) Adjustable speed electrical power drive systems. – EMC requirements and specific test methods Radio interference wave characteristics of industrial, scientific, and medical high-frequency equipment Standards for immunity in industrial environment (EMC directive)	Overvoltage category II Class I equipment Pollution degree 2
<b>CCC</b>	GB12350	Motor safety standard	
<b>KC</b>	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.

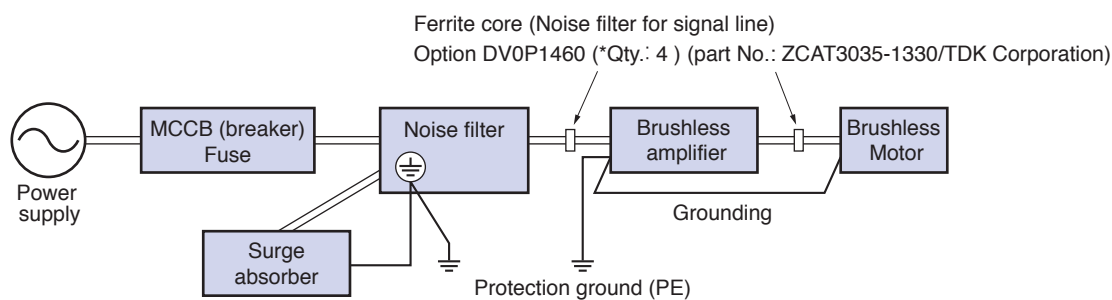
**A 급 기기 (업무용 방송통신기자재)**  
이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

( 대상기종 : Brushless Amplifier )

## Configuration of peripheral equipment

<b>Power supply</b>	<ul style="list-style-type: none"> <li>• 100 V system: Single phase 100 V ± 10 % to 120 V ± 10 %, 50/60 Hz</li> <li>• 200 V system: Single/3-phase 200 V ± 10 % to 240 V ± 10 %, 50/60 Hz</li> <li>• 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.</li> <li>• Use an electric wire size suitable to EN60204-1.</li> </ul>
<b>MCCB (breaker) Fuse</b>	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) .
<b>Noise filter</b>	When installing one noise filter at the power supply for more than one brushless motor used, contact the manufacturer of noise filter.
<b>Surge absorber</b>	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.
<b>Grounding</b>	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



\* The ferrite core should insert one or more pieces in an electric wire, respectively.

## List of compatible peripheral equipment

Part name	Optional parts number (option)	Manufacturer's parts number	Qty.	Manufacturer	Reference page
Noise filter (single phase 100 V, 200 V)	DV0P4170	SUP-EK5-ER-6	1	OKAYA ELECTRIC IND. CO., LTD.	P.67
Noise filter (3-phase)	DV0PM20042	3SUP-HU10-ER-6	1		
Surge absorber (single phase 100 V, 200 V)	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 Corporation	

# Table of model numbers and options

## ■ GV series

Power supply	Rated rotation speed (r/min)	output (W)	Motor	Gear head (Note 1)	Brushless amplifier	Brushless amplifier (supplied with power cable) (Note 2)	External regenerative resistor	Noise filter	Surge absorber	Reactor
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 phase/ 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 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	—						

## ■ KV series

Power supply	Rated rotation speed (r/min)	output (W)	Motor (Note 3)	Gear head	Brushless amplifier	Brushless amplifier (supplied with power cable) (Note 2)	External regenerative resistor	Noise filter	Surge absorber	Reactor			
Single phase 100 V	3000	50	MBMS5AZBLO	—	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	MBMS011BLO		MBEK011BCV	MBEK011BCVC				for single phase power supply DV0P228			
		200	MBMS021BLO		MBEK021BCV	—				for single phase power supply DV0P227			
Single phase/ 3-phase 200 V		50	MBMS5AZBLO		MBEK5A5BCV	MBEK5A5BCVC	for 200 V DV0PM20068			for single phase power supply DV0P4170 for 3-phase power supply DV0PM20042	for 3-phase power supply DV0P1450	for 3-phase power supply DV0P1450	for single phase power supply DV0P227
		100	MBMS012BLO		MBEK015BCV	MBEK015BCVC							for 3-phase power supply DV0P220
3-phase 200 V		200	MBMS022BLO		MBEK025BCV	—							for 3-phase power supply DV0P220
	400	MBMS042BLO	MBEK043BCV	—	for 3-phase power supply DV0P220								
	750	MBMS082BLO	MBEK083BCV	—	for 3-phase power supply DV0P220								

## ■ GP series

Power supply	Rated rotation speed (r/min)	output (W)	Motor	Gear head (Note 1)	Brushless amplifier	Brushless amplifier (supplied with power cable) (Note 2)	External regenerative resistor	Noise filter	Surge absorber	Reactor					
Single phase 100 V	3000	50	MBMU5AZAB	MB8G□BV	MBEG5A1BCP	MBEG5A1BCPC	for 100 V DV0P2890	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227					
		90	MBMU9A1AB	MB9G□BV							MBEG9A1BCP	MBEG9A1BCPC			
		130	MBMU1E1AB	MB9G□BV									MBEG1E1BCP	MBEG1E1BCPC	
Single phase/ 3-phase 200 V		50	MBMU5AZAB	MB8G□BV	MBEG5A5BCP	MBEG5A5BCPC	for 200 V DV0PM20068				for single phase power supply DV0P4170 for 3-phase power supply DV0PM20042	for single phase power supply DV0P4190			for single phase power supply DV0P227 for 3-phase power supply DV0P220
		90	MBMU9A2AB	MB9G□BV									MBEG9A5BCP	MBEG9A5BCPC	
		130	MBMU1E2AB	MB9G□BV											

(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.

(Note 3) Suffix of "○" in the motor model represents shape of shaft. For more information, please refer to p. 27.

(Note 4) When connecting PC, the PC connection cable (DV0P4140) and the Digital key pad connection cable (DV0P383\*0) are required.

If your PC does not have RS232 port, use RS232-USB converter.

- When installing the reactor, refer to p. 73.
- Be sure to use a set of matched components (series, power source, capacity, output, etc.)

Motor extension cable	Power supply connector kit	Console A	Console A connection cable	Digital key pad	Digital key pad connection cable	External speed setter	Control signal cable	I/O connector kit	Panel connector kit	PC connection cable (Note 4)	Noise filter for signal line	DIN rail attachment unit
1 m DV0PQ1000110	DV0P2870	DV0P3500	1 m DV0PM2006910	DV0P3510	1 m DV0P38310	DV0PM20078	2 m DV0PM20076	DV0PM20070	DV0P3610	1.5 m DV0P4140	DV0P1460	DV0P3811
3 m DV0PQ1000130			3 m DV0PM2006930		3 m DV0P38330							
5 m DV0PQ1000150			5 m DV0PM2006950		5 m DV0P38350							
10 m DV0PQ10001A1												

Motor extension cable	Power supply connector kit	Console A	Console A connection cable	Digital key pad	Digital key pad connection cable	External speed setter	Control signal cable	I/O connector kit	Panel connector kit	PC connection cable (Note 4)	Noise filter for signal line	DIN rail attachment unit
1 m DV0PQ1000310	DV0P2870	DV0P3500	1 m DV0PM2006910 3 m DV0PM2006930 5 m DV0PM2006950	DV0P3510	1 m DV0P38310 3 m DV0P38330 5 m DV0P38350	DV0PM20078	2 m DV0PM20076	DV0PM20070	DV0P3610	1.5 m DV0P4140	DV0P1460	DV0P3811
3 m DV0PQ1000330	—											—
5 m DV0PQ1000350	DV0P2870											DV0P3811
10 m DV0PQ10003A1	—											—

Motor extension cable	Power supply connector kit	Console A	Console A connection cable	Digital key pad	Digital key pad connection cable	External speed setter	Control signal cable	I/O connector kit	Panel connector kit	PC connection cable (Note 4)	Noise filter for signal line	DIN rail attachment unit
1 m DV0PQ1000110	DV0P2870	—	—	DV0P3510	1 m DV0P38310	—	2 m DV0PM20076	DV0PM20070	—	1.5 m DV0P4140	DV0P1460	DV0P3811
3 m DV0PQ1000130					3 m DV0P38330							
5 m DV0PQ1000150					5 m DV0P38350							
10 m DV0PQ10001A1												

GV series

KV series

GP series

Options

Information

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<b>DV0PM20068</b>	External regenerative resistor 200 Ω for 200 V	71
<b>DV0PM2006910</b>	Console A connection cable 1 m	68
<b>DV0PM2006930</b>	Console A connection cable 3 m	68
<b>DV0PM2006950</b>	Console A connection cable 5 m	68
<b>DV0PM20070</b>	I/O connector kit	71
<b>DV0PM20076</b>	Control signal cable (cable with I/O connector)	70
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<b>MB8G10BV</b>	80 mm sq. Reduction ratio: 1/10	57,63
<b>MB8G15BV</b>	80 mm sq. Reduction ratio: 1/15	57,63
<b>MB8G20BV</b>	80 mm sq. Reduction ratio: 1/20	57,63
<b>MB8G30BV</b>	80 mm sq. Reduction ratio: 1/30	57,63
<b>MB8G50BV</b>	80 mm sq. Reduction ratio: 1/50	57,63
<b>MB8G5BV</b>	80 mm sq. Reduction ratio: 1/5	57,63

Model No.	Specifications	Page
<b>MB9G (For GP series gear head)</b>		
<b>MB9G10BV</b>	90 mm sq. Reduction ratio: 1/10	59,61,63
<b>MB9G15BV</b>	90 mm sq. Reduction ratio: 1/15	59,61,63
<b>MB9G20BV</b>	90 mm sq. Reduction ratio: 1/20	59,61,63
<b>MB9G30BV</b>	90 mm sq. Reduction ratio: 1/30	59,61,63
<b>MB9G50BV</b>	90 mm sq. Reduction ratio: 1/50	59,61,63
<b>MB9G5BV</b>	90 mm sq. Reduction ratio: 1/5	59,61,63

Model No.	Specifications	Page
<b>MBEG (For GP series amplifier)</b>		
<b>MBEG1E1BCP</b>	130 W Single phase 100 V to 120 V	61
<b>MBEG1E1BCPC</b>	130 W Single phase 100 V to 120 V (Power cable included)*	61
<b>MBEG1E5BCP</b>	130 W Single/3-Phase 200 V to 240 V	61
<b>MBEG1E5BCPC</b>	130 W Single/3-Phase 200 V to 240 V (Power cable included)*	61
<b>MBEG5A1BCP</b>	50 W Single phase 100 V to 120 V	57
<b>MBEG5A1BCPC</b>	50 W Single phase 100 V to 120 V (Power cable included)*	57
<b>MBEG5A5BCP</b>	50 W Single/3-Phase 200 V to 240 V	57
<b>MBEG5A5BCPC</b>	50 W Single/3-Phase 200 V to 240 V (Power cable included)*	57
<b>MBEG9A1BCP</b>	90 W Single phase 100 V to 120 V	59
<b>MBEG9A1BCPC</b>	90 W Single phase 100 V to 120 V (Power cable included)*	59
<b>MBEG9A5BCP</b>	90 W Single/3-Phase 200 V to 240 V	59
<b>MBEG9A5BCPC</b>	90 W Single/3-Phase 200 V to 240 V (Power cable included)*	59

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

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<b>MBEG (For GV series amplifier)</b>		
<b>MBEG9A1BCV</b>	90 W Single phase 100 V to 120 V	19
<b>MBEG9A1BCVC</b>	90 W Single phase 100 V to 120 V (Power cable included)*	19
<b>MBEG9A5BCV</b>	90 W Single/3-Phase 200 V to 240 V	19
<b>MBEG9A5BCVC</b>	90 W Single/3-Phase 200 V to 240 V (Power cable included)*	19
<b>MBEG5A1BCV</b>	50 W Single phase 100 V to 120 V	17
<b>MBEG5A1BCVC</b>	50 W Single phase 100 V to 120 V (Power cable included)*	17
<b>MBEG5A5BCV</b>	50 W Single/3-Phase 200 V to 240 V	17
<b>MBEG5A5BCVC</b>	50 W Single/3-Phase 200 V to 240 V (Power cable included)*	17
<b>MBEG1E1BCV</b>	130 W Single phase 100 V to 120 V	21
<b>MBEG1E1BCVC</b>	130 W Single phase 100 V to 120 V (Power cable included)*	21
<b>MBEG1E5BCV</b>	130 W Single/3-Phase 200 V to 240 V	21
<b>MBEG1E5BCVC</b>	130 W Single/3-Phase 200 V to 240 V (Power cable included)*	21

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

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<b>MBEK (For KV series amplifier)</b>		
<b>MBEK011BCV</b>	100 W Single phase 100 V to 120 V	37
<b>MBEK011BCVC</b>	100 W Single phase 100 V to 120 V (Power cable included)*	37
<b>MBEK015BCV</b>	100 W Single/3-Phase 200 V to 240 V	37
<b>MBEK015BCVC</b>	100 W Single/3-Phase 200 V to 240 V (Power cable included)*	37
<b>MBEK021BCV</b>	200 W Single phase 100 V to 120 V	39
<b>MBEK025BCV</b>	200 W Single/3-Phase 200 V to 240 V	39
<b>MBEK043BCV</b>	400 W 3-Phase 200 V to 240 V	41
<b>MBEK083BCV</b>	750 W 3-Phase 200 V to 240 V	43
<b>MBEK5A1BCV</b>	50 W Single phase 100 V to 120 V	35
<b>MBEK5A1BCVC</b>	50 W Single phase 100 V to 120 V (Power cable included)*	35
<b>MBEK5A5BCV</b>	50 W Single/3-Phase 200 V to 240 V	35
<b>MBEK5A5BCVC</b>	50 W Single/3-Phase 200 V to 240 V (Power cable included)*	35

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

<b>MBMS (For KV series motor)</b>		
<b>MBMS011BLA</b>	60 mm sq. Round shaft motor 100 W Single phase 100 V to 120 V	Without oil seal 37
<b>MBMS011BLC</b>	60 mm sq. Round shaft motor 100 W Single phase 100 V to 120 V	With oil seal 37
<b>MBMS011BLN</b>	60 mm sq. D-cut shaft motor 100 W Single phase 100 V to 120 V	Without oil seal 37
<b>MBMS011BLQ</b>	60 mm sq. D-cut shaft motor 100 W Single phase 100 V to 120 V	With oil seal 37
<b>MBMS011BLS</b>	60 mm sq. Keyway, center tap shaft motor 100 W Single phase 100 V to 120 V	Without oil seal 37
<b>MBMS011BLU</b>	60 mm sq. Keyway, center tap shaft motor 100 W Single phase 100 V to 120 V	With oil seal 37
<b>MBMS012BLA</b>	60 mm sq. Round shaft motor 100 W Single/3-Phase 200 V to 240 V	Without oil seal 37
<b>MBMS012BLC</b>	60 mm sq. Round shaft motor 100 W Single/3-Phase 200 V to 240 V	With oil seal 37
<b>MBMS012BLN</b>	60 mm sq. D-cut shaft motor 100 W Single/3-Phase 200 V to 240 V	Without oil seal 37
<b>MBMS012BLQ</b>	60 mm sq. D-cut shaft motor 100 W Single/3-Phase 200 V to 240 V	With oil seal 37
<b>MBMS012BLS</b>	60 mm sq. Keyway, center tap shaft motor 100 W Single/3-Phase 200 V to 240 V	Without oil seal 37
<b>MBMS012BLU</b>	60 mm sq. Keyway, center tap shaft motor 100 W Single/3-Phase 200 V to 240 V	With oil seal 37
<b>MBMS021BLA</b>	60 mm sq. Round shaft motor 200 W Single phase 100 V to 120 V	Without oil seal 39
<b>MBMS021BLC</b>	60 mm sq. Round shaft motor 200 W Single phase 100 V to 120 V	With oil seal 39
<b>MBMS021BLN</b>	60 mm sq. D-cut shaft motor 200 W Single phase 100 V to 120 V	Without oil seal 39
<b>MBMS021BLQ</b>	60 mm sq. D-cut shaft motor 200 W Single phase 100 V to 120 V	With oil seal 39
<b>MBMS021BLS</b>	60 mm sq. Keyway, center tap shaft motor 200 W Single phase 100 V to 120 V	Without oil seal 39
<b>MBMS021BLU</b>	60 mm sq. Keyway, center tap shaft motor 200 W Single phase 100 V to 120 V	With oil seal 39
<b>MBMS022BLA</b>	60 mm sq. Round shaft motor 200 W Single/3-Phase 200 V to 240 V	Without oil seal 39
<b>MBMS022BLC</b>	60 mm sq. Round shaft motor 200 W Single/3-Phase 200 V to 240 V	With oil seal 39
<b>MBMS022BLN</b>	60 mm sq. D-cut shaft motor 200 W Single/3-Phase 200 V to 240 V	Without oil seal 39
<b>MBMS022BLQ</b>	60 mm sq. D-cut shaft motor 200 W Single/3-Phase 200 V to 240 V	With oil seal 39
<b>MBMS022BLS</b>	60 mm sq. Keyway, center tap shaft motor 200 W Single/3-Phase 200 V to 240 V	Without oil seal 39
<b>MBMS022BLU</b>	60 mm sq. Keyway, center tap shaft motor 200 W Single/3-Phase 200 V to 240 V	With oil seal 39
<b>MBMS042BLA</b>	60 mm sq. Round shaft motor 400 W 3-Phase 200 V to 240 V	Without oil seal 41
<b>MBMS042BLC</b>	60 mm sq. Round shaft motor 400 W 3-Phase 200 V to 240 V	With oil seal 41
<b>MBMS042BLN</b>	60 mm sq. D-cut shaft motor 400 W 3-Phase 200 V to 240 V	Without oil seal 41

Model No.	Specifications	Page
<b>MBMS (For KV series motor)</b>		
<b>MBMS042BLQ</b>	60 mm sq. D-cut shaft motor 400 W 3-Phase 200 V to 240 V	With oil seal 41
<b>MBMS042BLS</b>	60 mm sq. Keyway, center tap shaft motor 400 W 3-Phase 200 V to 240 V	Without oil seal 41
<b>MBMS042BLU</b>	60 mm sq. Keyway, center tap shaft motor 400 W 3-Phase 200 V to 240 V	With oil seal 41
<b>MBMS082BLA</b>	80 mm sq. Round shaft motor 750 W 3-Phase 200 V to 240 V	Without oil seal 43
<b>MBMS082BLC</b>	80 mm sq. Round shaft motor 750 W 3-Phase 200 V to 240 V	With oil seal 43
<b>MBMS082BLN</b>	80 mm sq. D-cut shaft motor 750 W 3-Phase 200 V to 240 V	Without oil seal 43
<b>MBMS082BLQ</b>	80 mm sq. D-cut shaft motor 750 W 3-Phase 200 V to 240 V	With oil seal 43
<b>MBMS082BLS</b>	80 mm sq. Keyway, center tap shaft motor 750 W 3-Phase 200 V to 240 V	Without oil seal 43
<b>MBMS082BLU</b>	80 mm sq. Keyway, center tap shaft motor 750 W 3-Phase 200 V to 240 V	With oil seal 43
<b>MBMS5AZBLA</b>	38 mm sq. Round shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	Without oil seal 35
<b>MBMS5AZBLC</b>	38 mm sq. Round shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	With oil seal 35
<b>MBMS5AZBLN</b>	38 mm sq. D-cut shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	Without oil seal 35
<b>MBMS5AZBLQ</b>	38 mm sq. D-cut shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	With oil seal 35
<b>MBMS5AZBLS</b>	38 mm sq. Keyway, center tap shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	Without oil seal 35
<b>MBMS5AZBLU</b>	38 mm sq. Keyway, center tap shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	With oil seal 35

<b>MBMU (For GP series motor)</b>		
<b>MBMU1E1AB</b>	90 mm sq. Pinion shaft motor 130 W Single phase 100 V to 120 V	61
<b>MBMU1E2AB</b>	90 mm sq. Pinion shaft motor 130 W Single/3-Phase 200 V to 240 V	61
<b>MBMU5AZAB</b>	80 mm sq. Pinion shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	57
<b>MBMU9A1AB</b>	90 mm sq. Pinion shaft motor 90 W Single phase 100 V to 120 V	59
<b>MBMU9A2AB</b>	90 mm sq. Pinion shaft motor 90 W Single/3-Phase 200 V to 240 V	59

<b>MBMU (For GV series motor)</b>		
<b>MBMU1E1AZ</b>	90 mm sq. Pinion shaft motor 130 W Single phase 100 V to 120 V	21
<b>MBMU1E2AZ</b>	90 mm sq. Pinion shaft motor 130 W Single/3-Phase 200 V to 240 V	21
<b>MBMU1E1AS</b>	90 mm sq. Round shaft motor 130 W Single phase 100 V to 120 V	21
<b>MBMU1E2AS</b>	90 mm sq. Round shaft motor 130 W Single/3-Phase 200 V to 240 V	21
<b>MBMU5AZAX</b>	80 mm sq. Pinion shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	17
<b>MBMU5AZAS</b>	80 mm sq. Round shaft motor 50 W Single phase 100 V to 120 V, Single/3-Phase 200 V to 240 V	17
<b>MBMU9A1AZ</b>	90 mm sq. Pinion shaft motor 90 W Single phase 100 V to 120 V	19
<b>MBMU9A2AZ</b>	90 mm sq. Pinion shaft motor 90 W Single/3-Phase 200 V to 240 V	19
<b>MBMU9A1AS</b>	90 mm sq. Round shaft motor 90 W Single phase 100 V to 120 V	19
<b>MBMU9A2AS</b>	90 mm sq. Round shaft motor 90 W Single/3-Phase 200 V to 240 V	19

GV series

KV series

GP series

Options

Information

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<b>MX8G100B</b>	80 mm sq. Reduction ratio: 1/100	17,23
<b>MX8G10B</b>	80 mm sq. Reduction ratio: 1/10	17,23
<b>MX8G12.5B</b>	80 mm sq. Reduction ratio: 1/12.5	17,23
<b>MX8G120B</b>	80 mm sq. Reduction ratio: 1/120	17,23
<b>MX8G150B</b>	80 mm sq. Reduction ratio: 1/150	17,23
<b>MX8G15B</b>	80 mm sq. Reduction ratio: 1/15	17,23
<b>MX8G180B</b>	80 mm sq. Reduction ratio: 1/180	17,23
<b>MX8G18B</b>	80 mm sq. Reduction ratio: 1/18	17,23
<b>MX8G20B</b>	80 mm sq. Reduction ratio: 1/20	17,23
<b>MX8G25B</b>	80 mm sq. Reduction ratio: 1/25	17,23
<b>MX8G3.6B</b>	80 mm sq. Reduction ratio: 1/3.6	17,23
<b>MX8G30B</b>	80 mm sq. Reduction ratio: 1/30	17,23
<b>MX8G36B</b>	80 mm sq. Reduction ratio: 1/36	17,23
<b>MX8G3B</b>	80 mm sq. Reduction ratio: 1/3	17,23
<b>MX8G50B</b>	80 mm sq. Reduction ratio: 1/50	17,23
<b>MX8G5B</b>	80 mm sq. Reduction ratio: 1/5	17,23
<b>MX8G60B</b>	80 mm sq. Reduction ratio: 1/60	17,23
<b>MX8G6B</b>	80 mm sq. Reduction ratio: 1/6	17,23
<b>MX8G7.5B</b>	80 mm sq. Reduction ratio: 1/7.5	17,23
<b>MX8G75B</b>	80 mm sq. Reduction ratio: 1/75	17,23
<b>MX8G90B</b>	80 mm sq. Reduction ratio: 1/90	17,23
<b>MX8G9B</b>	80 mm sq. Reduction ratio: 1/9	17,23

Model No.	Specifications	Page
<b>MY9G (For GV series gear head)</b>		
<b>MY9G100B</b>	90 mm sq. Hinge attached Reduction ratio: 1/100	19,21,23
<b>MY9G10B</b>	90 mm sq. Hinge attached Reduction ratio: 1/10	19,21,23
<b>MY9G12.5B</b>	90 mm sq. Hinge attached Reduction ratio: 1/12.5	19,21,23
<b>MY9G120B</b>	90 mm sq. Hinge attached Reduction ratio: 1/120	19,21,23
<b>MY9G150B</b>	90 mm sq. Hinge attached Reduction ratio: 1/150	19,21,23
<b>MY9G15B</b>	90 mm sq. Hinge attached Reduction ratio: 1/15	19,21,23
<b>MY9G180B</b>	90 mm sq. Hinge attached Reduction ratio: 1/180	19,21,23
<b>MY9G18B</b>	90 mm sq. Hinge attached Reduction ratio: 1/18	19,21,23
<b>MY9G200B</b>	90 mm sq. Hinge attached Reduction ratio: 1/200	19,21,23
<b>MY9G20B</b>	90 mm sq. Hinge attached Reduction ratio: 1/20	19,21,23
<b>MY9G25B</b>	90 mm sq. Hinge attached Reduction ratio: 1/25	19,21,23
<b>MY9G3.6B</b>	90 mm sq. Hinge attached Reduction ratio: 1/3.6	19,21,23
<b>MY9G30B</b>	90 mm sq. Hinge attached Reduction ratio: 1/30	19,21,23
<b>MY9G36B</b>	90 mm sq. Hinge attached Reduction ratio: 1/36	19,21,23
<b>MY9G3B</b>	90 mm sq. Hinge attached Reduction ratio: 1/3	19,21,23
<b>MY9G50B</b>	90 mm sq. Hinge attached Reduction ratio: 1/50	19,21,23
<b>MY9G5B</b>	90 mm sq. Hinge attached Reduction ratio: 1/5	19,21,23
<b>MY9G60B</b>	90 mm sq. Hinge attached Reduction ratio: 1/60	19,21,23
<b>MY9G6B</b>	90 mm sq. Hinge attached Reduction ratio: 1/6	19,21,23
<b>MY9G7.5B</b>	90 mm sq. Hinge attached Reduction ratio: 1/7.5	19,21,23

Model No.	Specifications	Page
<b>MY9G (For GV series gear head)</b>		
<b>MY9G75B</b>	90 mm sq. Hinge attached Reduction ratio: 1/75	19,21,23
<b>MY9G90B</b>	90 mm sq. Hinge attached Reduction ratio: 1/90	19,21,23
<b>MY9G9B</b>	90 mm sq. Hinge attached Reduction ratio: 1/9	19,21,23

Model No.	Specifications	Page
<b>MZ9G (For GV series gear head)</b>		
<b>MZ9G100B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/100	19,21,23
<b>MZ9G10B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/10	19,21,23
<b>MZ9G12.5B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/12.5	19,21,23
<b>MZ9G120B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/120	19,21,23
<b>MZ9G150B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/150	19,21,23
<b>MZ9G15B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/15	19,21,23
<b>MZ9G180B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/180	19,21,23
<b>MZ9G18B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/18	19,21,23
<b>MZ9G200B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/200	19,21,23
<b>MZ9G20B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/20	19,21,23
<b>MZ9G25B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/25	19,21,23
<b>MZ9G3.6B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/3.6	19,21,23
<b>MZ9G30B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/30	19,21,23
<b>MZ9G36B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/36	19,21,23
<b>MZ9G3B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/3	19,21,23
<b>MZ9G50B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/50	19,21,23
<b>MZ9G5B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/5	19,21,23
<b>MZ9G60B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/60	19,21,23
<b>MZ9G6B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/6	19,21,23
<b>MZ9G7.5B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/7.5	19,21,23
<b>MZ9G75B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/75	19,21,23
<b>MZ9G90B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/90	19,21,23
<b>MZ9G9B</b>	90 mm sq. Hinge not attached Reduction ratio: 1/9	19,21,23

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MEMO

GV series

KV series

GP series

Options

Information



# Sales office

## [Panasonic sales office of motors]

(January 2013)

Country	Company Name	City	Address	TEL
				FAX
North America	Panasonic Industrial Devices Sales Company of America (PIDSA)	New Jersey	Three Panasonic Way, 7E-2 Secaucus, NJ 07094 U.S.A.	+1-201-348-5356
				+1-201-392-4315
	Panasonic Electric Works Corporation of America (PEWA)	New Jersey	629 Central Avenue New Providence, NJ 07974 U.S.A.	+1-908-464-3550
				Technical Support: +1-877-624-7872 +1-908-771-5655
Brazil	Panasonic Electric Works Corporation of America Brazil Rep. Office	Sao Paulo	Rua Cubatao, 320- 8 andar-Paraiso, CEP 04013-001 Sao Paulo-SP	+55-11-3889-4006
				+55-11-3889-4103
Spain	Panasonic Electric Works Espana S.A.	Madrid	Barajas Park, San Severo 20, 28042 Madrid, Spain	+34-91-329-3875
				+34-91-329-2976
Germany	Panasonic Industrial Devices Sales Europe GmbH	Munich	Hans-Pinsel-Strasse 2 • D - 85540 Haar • Germany	+49-89-46-159-0
				+49-89-46-159-212
Italy	Panasonic Electric Works Italia srl	Verona	Via del Commercio 3-5 (Z.I.Ferlina), 37012 Bussolengo (VR), Italy	+39-045-6752711
				+39-045-6700444
Russia	Electroprivod Ltd. (*Distributors)	St.Petersburg	Russia, 194044, St.Peterburg, 29A, Viborgskay emb.  Website: <a href="http://www.electroprivod.ru">http://www.electroprivod.ru</a>	+7-703-09-81
				+7-493-27-26
China	Panasonic Shun Hing Industrial Devices Sales (Hong Kong) Co.,Ltd. (PSIDSHK)	Hong kong	Level 33, Office Tower, Langham Place, 8 Argyle Street, Mongkok, Kin.,Hong Kong	+852-2529-7322
				+852-2598-9743
	Panasonic Industrial Devices Sales (China) Co.,Ltd. (PIDSCN)	Shanghai	Floor 7, China Insurance Building, 166 East Road LuJiaZui PuDong New District, Shanghai, China	+86-21-3855-2442
				+86-21-3855-2375
Panasonic SH Industrial Devices Sales (Shenzhen) Co.,Ltd. (PSIDSSZN)	Shenzhen	8/F, Tower Three, Kerry Plaza, 1-1 Zhongxinsi Road, Futian District, Shenzhen, China	+86-755-8255-8551	
			+86-755-8255-8668	
India	Panasonic Industrial Devices Sales India (PIDSIN) (A division company of Panasonic India Pvt Ltd.)	Haryana	7th Floor, ABW Tower, IFFCO Chowk, MG Road, Sector 25, Gurgaon-122 001, Haryana, India	+91-124-4596600
				+91-124-4596625
Korea	Panasonic Industrial Devices Sales Korea Co., Ltd. (PIDSKR)	Seoul	14F, West-gate Bldg, 332 Migeundong, Seodaemun-gu, Seoul, 120-020, Korea	+82-2-795-9600
				+82-2-795-1542
Taiwan	Panasonic Industrial Devices Sales Taiwan Co.,Ltd.	Taipei	12F, No.9, SongGao Rd., Taipei 110, Taiwan, R.O.C.	+886-2-2757-1900
				+886-2-2757-1977
Singapore	Panasonic Industrial Devices Sales Asia Pte. Ltd.	Singapore	300 Beach Road #16-01 The Concourse Singapore 199555	+65-6390-3718
				+65-6390-3801
	Intermech Machinery Pte Ltd. (*Distributors)	Singapore	2 Woodlands Sector 1 #03-25, Woodlands Spectrum 1 Singapore 738068  Website: <a href="http://www.intermech.com.sg">http://www.intermech.com.sg</a>	+65-6751-5088
				+65-6759-2122

Country	Company Name	City	Address	TEL
				FAX
Malaysia	Panasonic Industrial Devices Sales Asia Pte. Ltd.	Singapore	300 Beach Road #16-01 The Concourse Singapore 199555	+65-6390-3718
				+65-6390-3801
	Panamech Machinery Sdn Bhd (*Distributors)	Kuala Lumpur	No.14, Lorong Sanggul 1C, Bandar Puteri, 41200 Klang, Selangor Darul Ehsan	+60-3-5161-7876
				+60-3-5161-7136
	Website: <a href="http://www.panamech.com.my">http://www.panamech.com.my</a>			
	Panamech (PG) Sdn Bhd (*Distributors)	Penang	Sri Relau Komplek, Unit 1-3-11, Persiaran Bukit Jambul 1, 11900 Penang	+60-4-643-8266
+60-4-645-1639				
Website: <a href="http://www.panamech.com.my">http://www.panamech.com.my</a>				
Thailand	Panasonic Industrial Devices Sales Asia Pte. Ltd.	Singapore	300 Beach Road #16-01 The Concourse Singapore 199555	+65-6390-3718
				+65-6390-3801
	Premier Automation Center Co.,Ltd. (*Distributors)	Bangkok	73 Soi Ladkrabang 30 Ladkrabang Bangkok 10520	+66-2181-2299
				+66-2181-2288
	Website: <a href="http://www.premier-ac.co.th">http://www.premier-ac.co.th</a>			
	Plenty Island (Thai) Co.,Ltd. (*Distributors)	Bangkok	3 Soi Charoenrat 10, Charoenrat Road., Bangkhlo, Bangkokorlaem, Bangkok 10120	+66-2291-9933
				+66-2291-2065
	Website: <a href="http://www.plenty.co.th">http://www.plenty.co.th</a>			
Seng Charoen Muang Co.,Ltd. (*Distributors)	Bangkok	12/349 Moo 15, Bangkaew, Bangplee, Samutprakam 10540	+66-2397-9577	
			+66-2361-8207	
Website: <a href="http://www.sengscm.com">http://www.sengscm.com</a>				
Indonesia	Panasonic Industrial Devices Sales Asia Pte. Ltd.	Singapore	300 Beach Road #16-01 The Concourse Singapore 199555	+65-6390-3718
				+65-6390-3801
	PT. Handal Yesindo Sejahtera (*Distributors)	Surabaya	Jl. Raya Kutisari 8A, Surabaya, Indonesia	+62-31-843-8844
				+62-31-841-4333
	Website: <a href="http://www.handalyesindo.com">http://www.handalyesindo.com</a>			
	PT.Riasarana Electrindo (*Distributors)	Jakarta	Jl. Prof. Dr. Latumenten Grogol Permai blok D No. 8-15 Jakarta 11460, Indonesia	+62-21-564-9178
+62-21-566-7405				
Website: <a href="http://www.risacorps.com">http://www.risacorps.com</a>				

GV series

KV series

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