

MINAS-BL **GV** series

Speed Control Type 50 W to 130 W

GV series

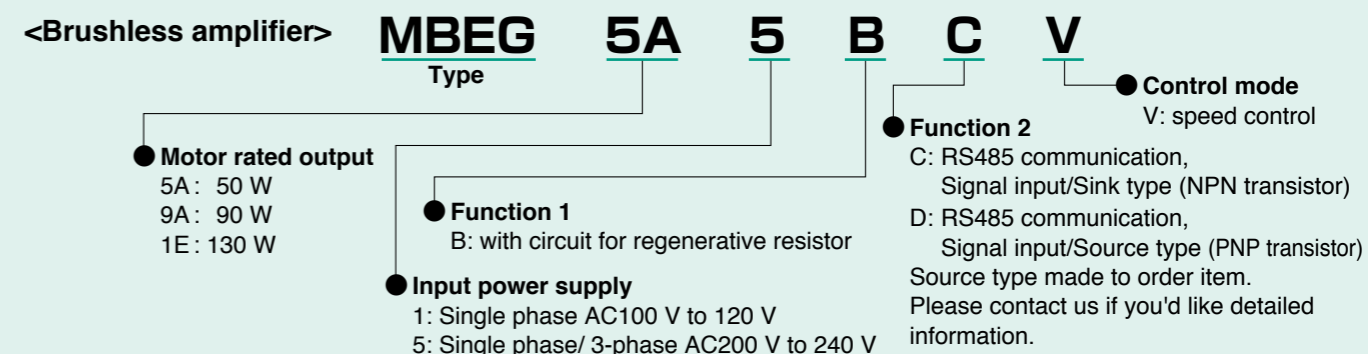
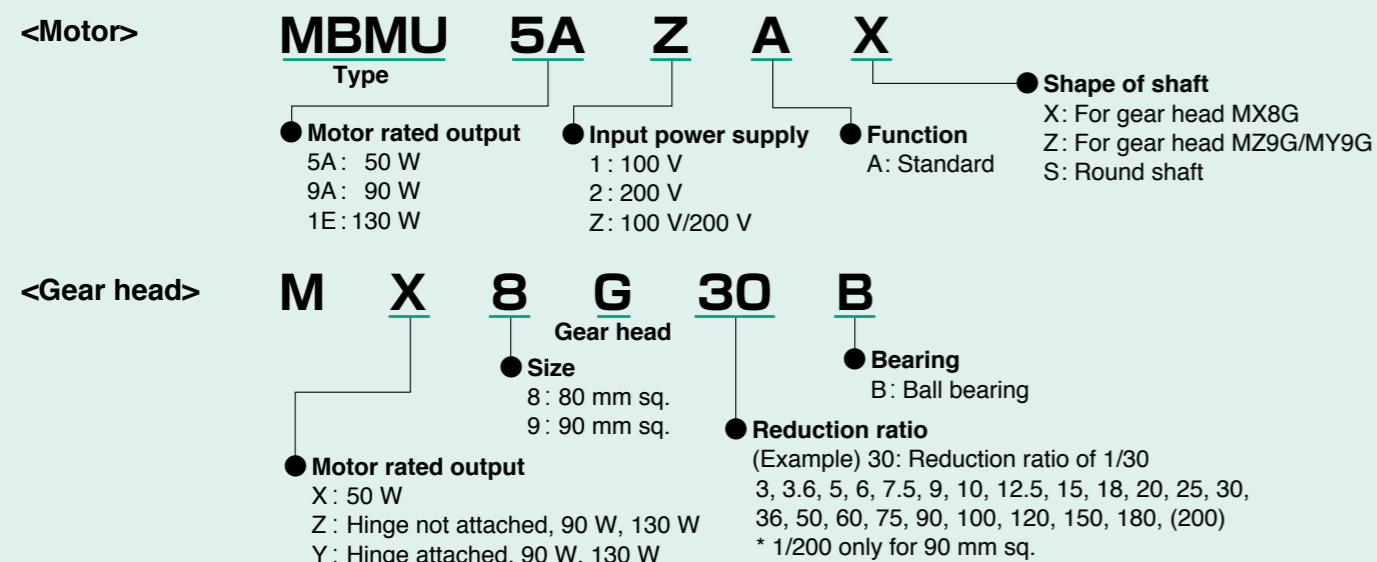


• 90 mm square 130 W

Contents

Check the model number	11
Brushless motor specifications	11
Brushless amplifier specifications	12
System configuration/ System configuration diagram	13
Parameter list of brushless amplifier	15
Brushless motors – Details	17
Gear head	23

Check the model number



Brushless motor specifications

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

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

*2 Representative value

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

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

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

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

Brushless amplifier specifications (GV series)

Item	Specifications								
	MBEG5A1BCV	MBEG5A5BCV	MBEG9A1BCV	MBEG9A5BCV	MBEG1E1BCV	MBEG1E5BCV			
Amplifier model No.	MBMU5AZA○		MBMU9A1A○		MBMU9A2A○		MBMU1E1A○ MBMU1E2A○		
Applicable Motor *1	MBMU5AZA○		MBMU9A1A○		MBMU9A2A○		MBMU1E1A○ MBMU1E2A○		
Motor rated output (W)	50			90			130		
Input power supply voltage (V)	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240
Frequency (Hz)	50/60								
Rated input current (A)	1.5	0.7	0.35	2.2	1.1	0.5	2.8	1.5	0.7
Voltage tolerance	±10 %								
Control method	Speed control by CS signal, PWM sine wave driving system								
Ambient temperature	0 °C to +50 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the amplifier.								
Ambient humidity	20 % to 85 % RH (free from condensation)								
Location	Indoor (No corrosive gas, A place without garbage, and dust)								
Altitude	Lower than 1000 m								
Vibration	5.9 m/s ² or less (10 Hz to 60 Hz)								
Protection structure/ Cooling system	Equivalent to IP20/ Self cooling								
Storage temperature	Normal temperature * Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)								
Storage humidity	Normal humidity								
Rated rotation speed	3000 r/min								
Speed control range	30 r/min to 4000 r/min (Speed ratio 1:133)								
Speed fluctuation factor	With load: ±0.5 % or below (at 0 to Rated torque, Rated rotation speed) With voltage: ±0.5 % or below (at supply voltage ±10 %, rated rotation speed) With temperature: ±0.5 % or below (at 0 °C to 50 °C, rated rotation speed)								
Acceleration/ Deceleration time	0.01 sec to 300 sec (time for changing 1000 r/min) ^{*2}								
Stopping procedure	Slowdown stop/ Free-run stop ^{*2}								
Speed setting	0 r/min to 4000 r/min (analogue voltage (0 V to 5 V), console A), 0 r/min to 4000 r/min (Setting selection by parameter on Digital key pad)								
Speed setting resolution	Analog: approx. 1/200 of upper speed limit Digital: 1 r/min								
Speed setting precision (at 20 °C)	Analog: ±3 % or below of upper speed limit (±90 r/min or below at upper speed limit 3000 r/min) [Digital: 1 % or below of upper speed limit]								
Operation mode	8 speed								
Signal input	5 inputs ^{*2} (run/ stop, CW run/ CCW run, multi function 3bit)								
Signal output	2 outputs (Open collector) ^{*2} (Trip output etc)								
Communication function	RS485	Max 31 units. Setting of parameter, monitoring of control condition. Communication speed: Choose from 2400 bps/ 4800 bps/ 9600 bps							
	RS232	Setting of parameter and monitoring of control condition are enabled with commercial PC. ^{*3}							
Digital key pad	Setting of parameter, monitoring of control condition. ^{*4}								
Protective function	Warning : Undervoltage ^{*2} , Overload warning, setting change warning Protect : Undervoltage ^{*2} , Overload, Overcurrent, Overvoltage, Overheat, Overspeed, Sensor error, RS485 communication error, External forced trip error, User parameter error, CPU error								
Regenerating brake	Regenerative braking resistor can be externally connected. ^{*5} 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								

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

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

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

System configuration

Power supply	Rated rotation speed (r/min)	output (W)	Motor	Gear head (Note 1)	Brushless amplifier	Brushless amplifier (supplied with power cable) (Note 2)	Optional parts			
							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	—						
			MBMU9A1AZ	MZ9G□B MY9G□B						
	50	MBMU1E1AZ	MZ9G□B MY9G□B	MBEG1E1BCV	MBEG1E1BCVC					
		MBMU1E1AS	—	—	—					
		MBMU5AZAX	MX8G□B	MBEG5A5BCV	MBEG5A5BCVC					
Single/3-phase 200 V	3000	50	MBMU5AZAX	MX8G□B	MBEG5A5BCV	MBEG5A5BCVC	for 200 V DV0PM20068	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227
			MBMU5AZAS	—						
			MBMU9A2AZ	MZ9G□B MY9G□B						
	90	MBMU9A2AS	—	—	—					
		MBMU1E2AZ	MZ9G□B MY9G□B	MBEG1E5BCV	MBEG1E5BCVC					
		MBMU1E2AS	—	—	—					

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

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

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

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

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

Options

Optional parts	Parts number	Reference page	Optional parts	Parts number	Reference page	
Motor extension cable	1 m	DV0PQ1000110	Digital key pad connection cable	1 m	DV0P38310	
	3 m	DV0PQ1000130		3 m	DV0P38330	
	5 m	DV0PQ1000150		5 m	DV0P38350	
	10 m	DV0PQ10001A1		External speed setter	DV0PM20078	P.71
Power supply connector kit	DV0P2870	P.70	Control signal cable	2 m	DV0PM20076	P.70
Console A ¹	DV0P3500	P.68	I/O connector kit	DV0PM20070	P.71	
Console A connection cable	1 m	DV0PM2006910	Panel connector kit	DV0P3610	P.71	
	3 m	DV0PM2006930	PC connection cable ³	1.5 m	DV0P4140	P.70
	5 m	DV0PM2006950	Noise filter for signal line	DV0P1460	P.67	
Digital key pad ²	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 ²)	
				Main circuit, Grounding	Control circuit
Single phase 100 V	50 W to 130 W	5 A	20 A (3P+1a)	0.5 (AWG20)	0.13 (AWG26)
Single phase 200 V					
3-phase 200 V					

Be sure to connect the earth terminal to ground.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) 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

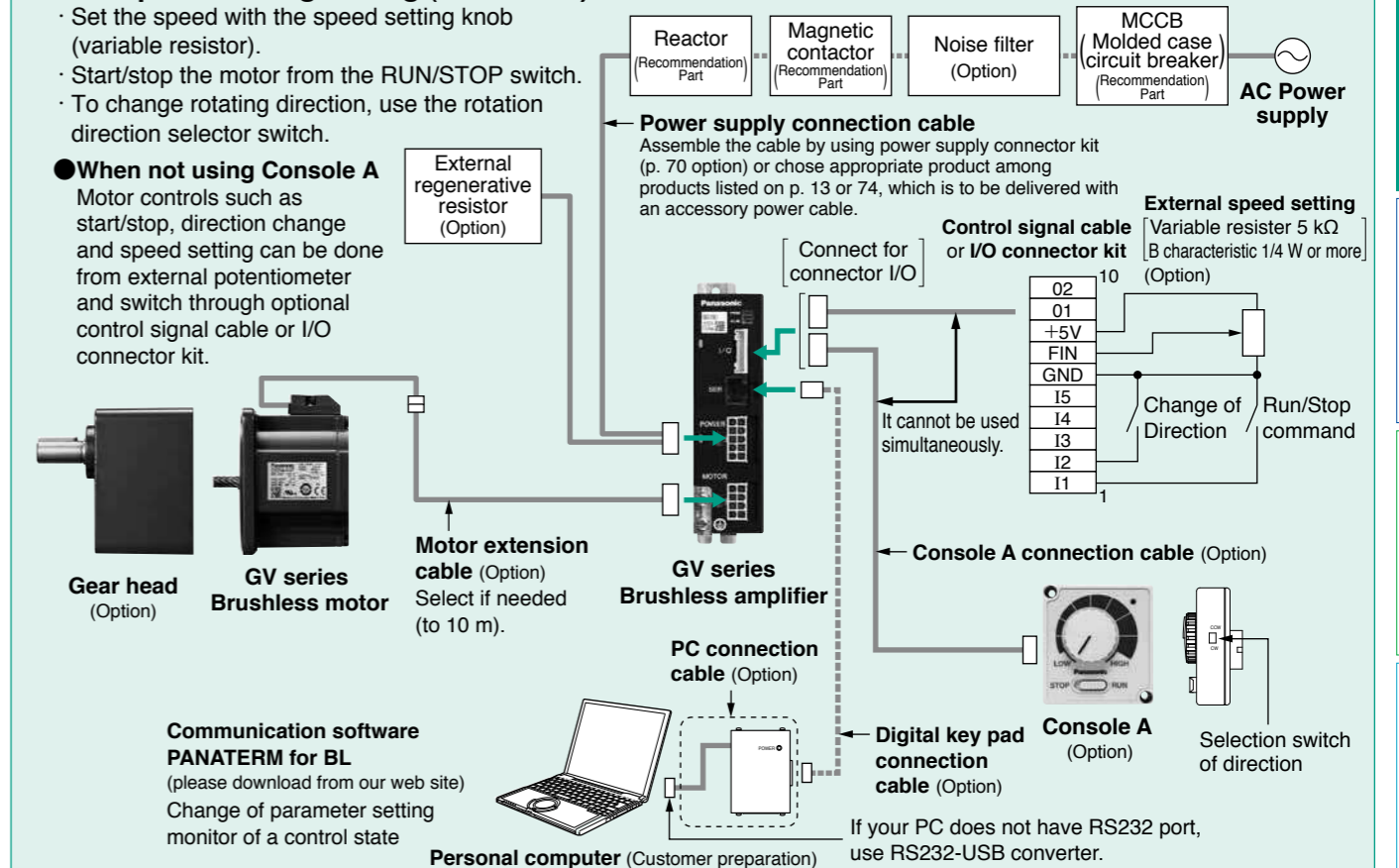
System configuration diagram

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.

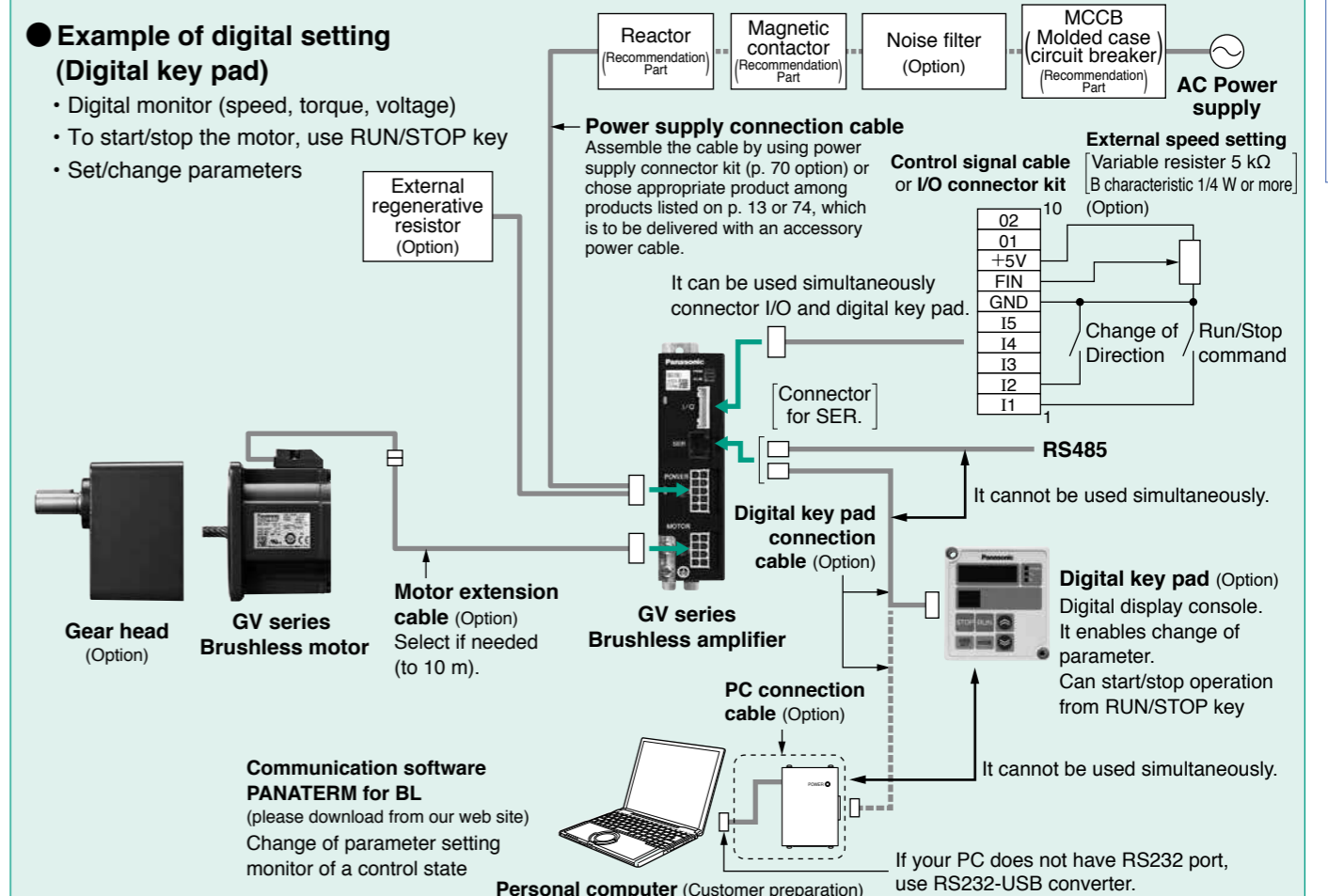
When not using Console A

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.

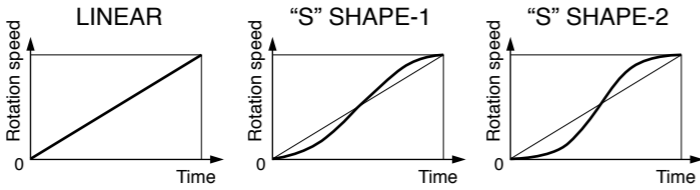
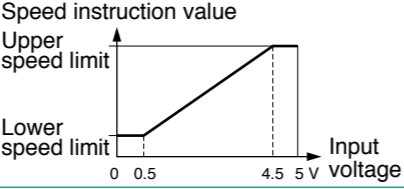


Example of digital setting (Digital key pad)

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

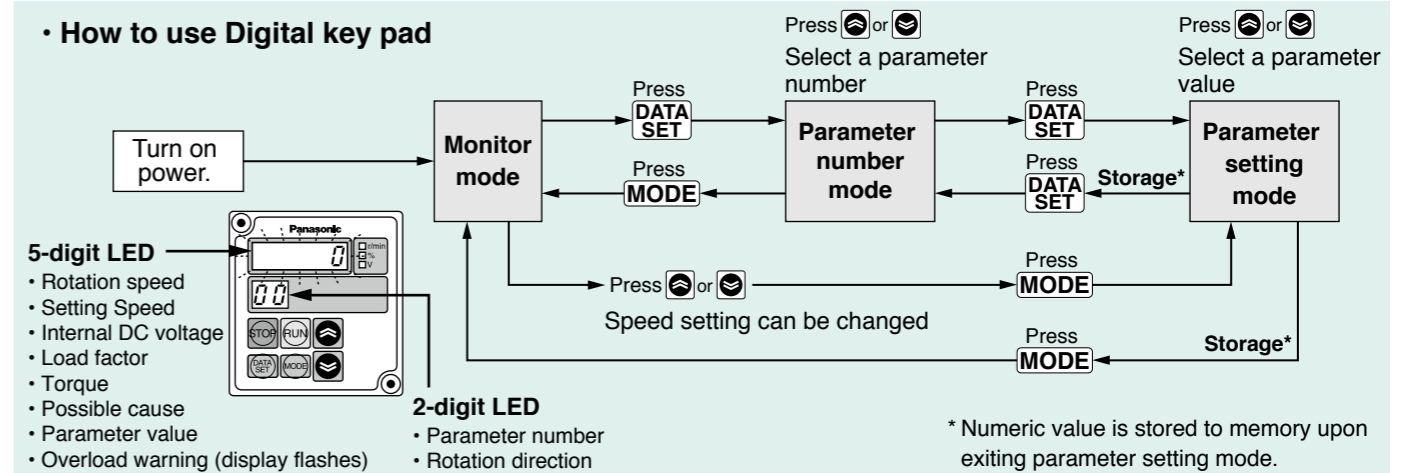


Parameter list of brushless amplifier

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

• How to use Digital key pad



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

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

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

* Starting torque: Representative value

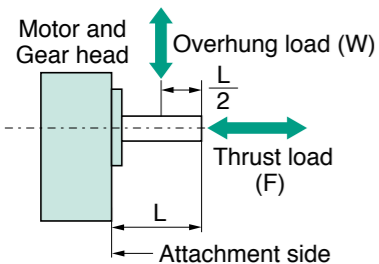
Permissible torque at output shaft of gear head (N·m)

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

Permissible load inertia moment (×10⁻⁴ kg·m²)

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

Permissible shaft load

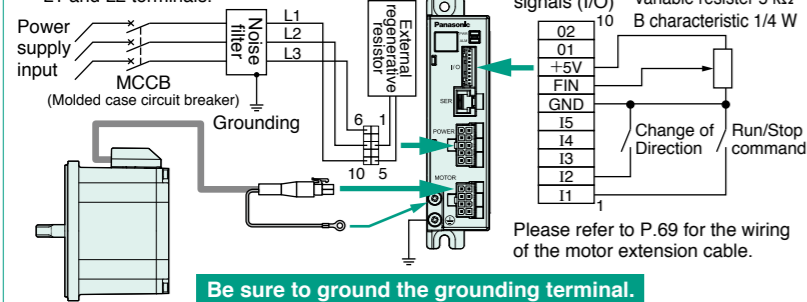


Motor shaft (Round shaft)	Output	Overhung load (W)	Thrust load (F)
		50 W	100 N
Applicable Gear head	MX8G□B	294 N	49 N

Wiring diagram

In Case of 3-Phase 200 V

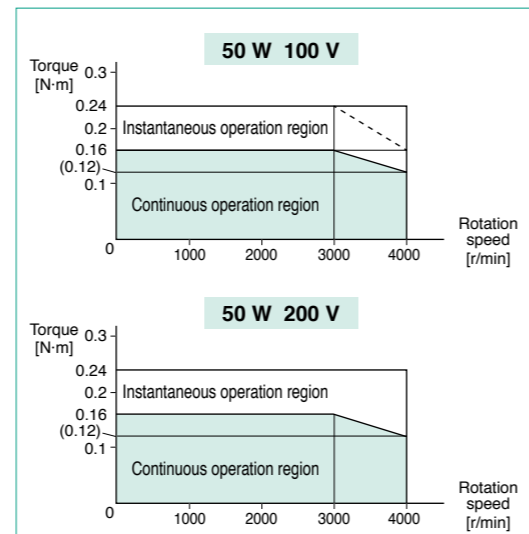
*When you use single phase, connect the main power between L1 and L2 terminals.



Be sure to ground the grounding terminal.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

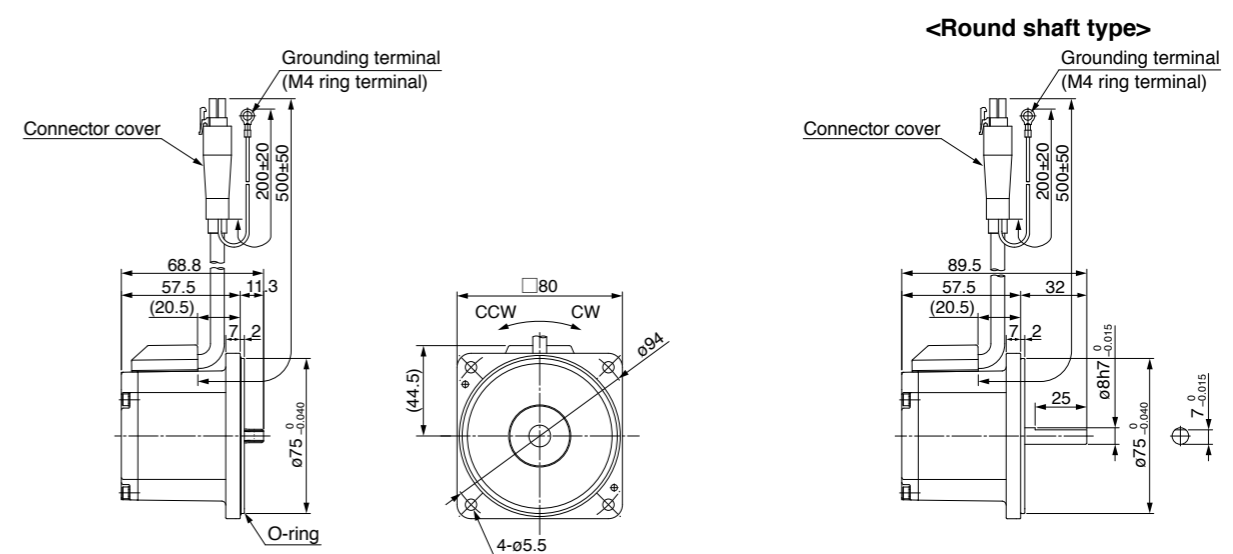
Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



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

Motor (dimensions)

Unit mm

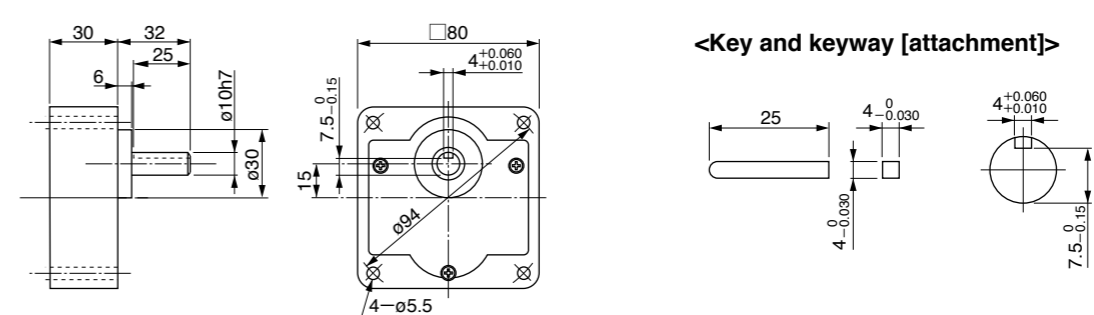


mass **0.7 kg**

Gear head (dimensions)

Unit mm

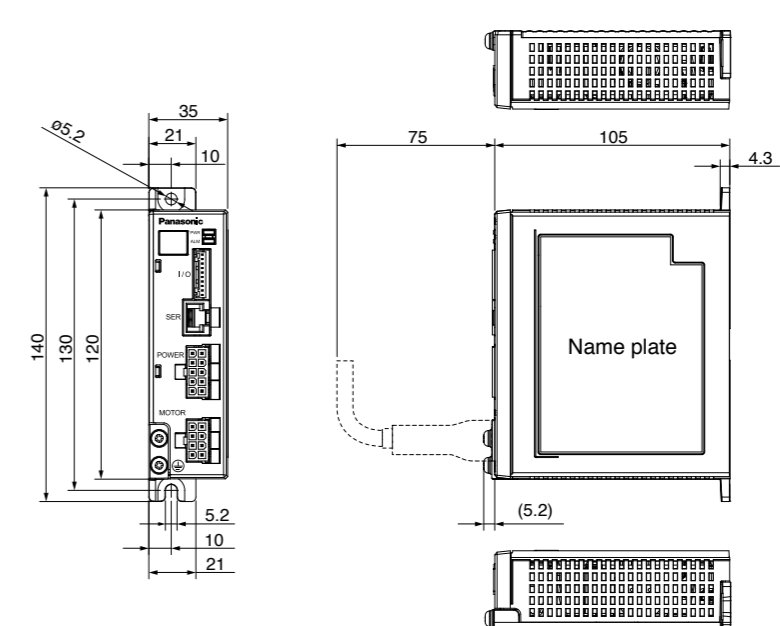
MX8G□B



mass **0.6 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.

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

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

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

* Starting torque: Representative value

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

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

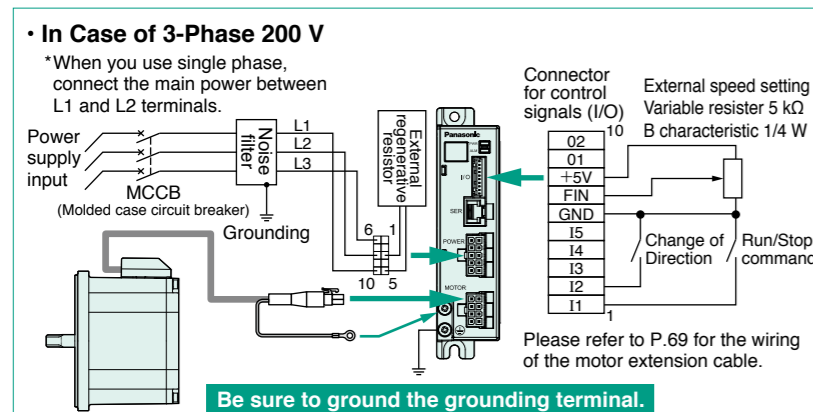
Permissible load inertia moment (×10⁻⁴ kg·m²)

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

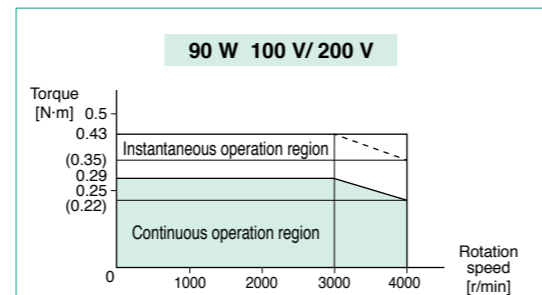
Permissible shaft load

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

Wiring diagram



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

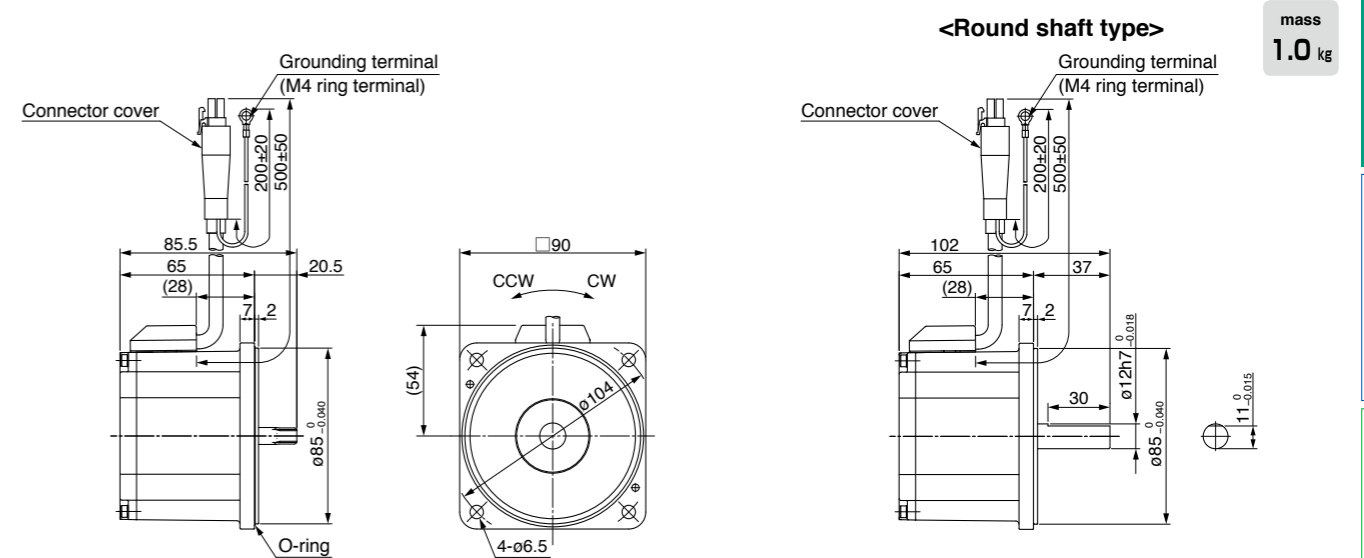


In wiring to power supply (outside of equipment) from Mccb, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

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

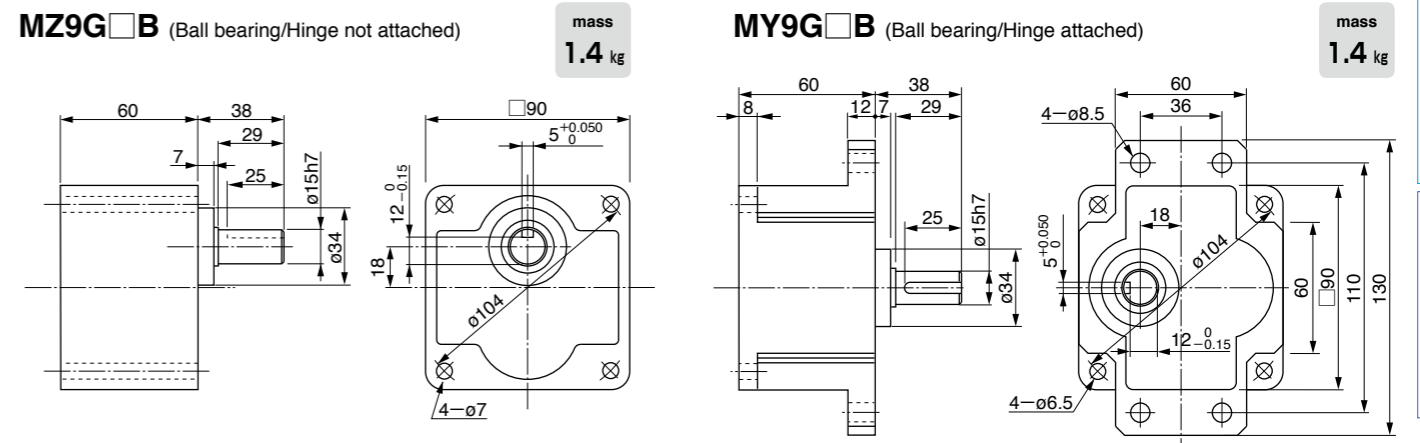
Motor (dimensions)

Unit mm



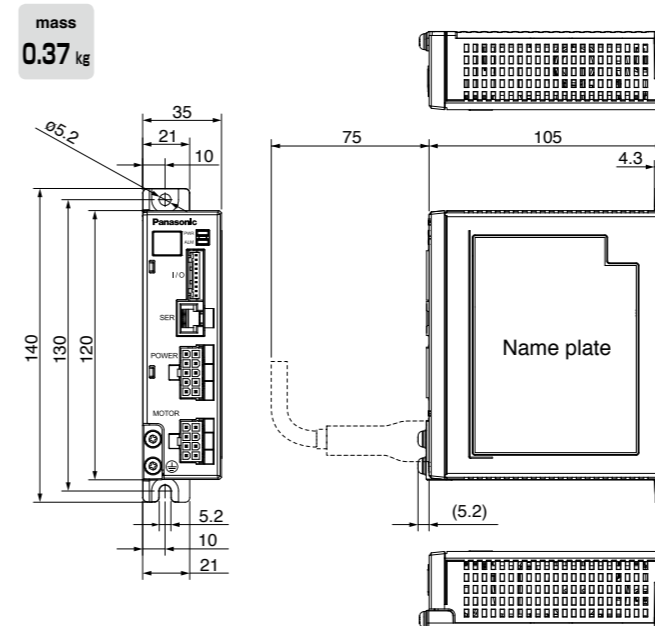
Gear head (dimensions)

Unit mm

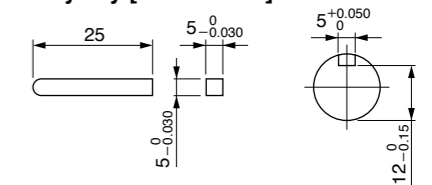


Brushless amplifier (dimensions)

Unit mm



<Key and keyway [attachment]>



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

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

Size	Model No. / Amplifier and Motor		Rated output (W)	Input power supply for Amplifier			Rated torque (N·m)	Starting torque (N·m)	Rated speed (r/min)	Maximum rotation speed (r/min)
	Brushless Amplifier	Motor		Voltage AC (V)	Allowed range (%)	Frequency (Hz)				
90 mm sq.	MBEG1E1BCV	MBMU1E1A○	130	Single phase	±10	50/60	0.41	0.62	3000	4000
	MBEG1E5BCV	MBMU1E2A○		200 to 240						

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

* Starting torque: Representative value

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

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

Permissible load inertia moment (×10⁻⁴ kg·m²)

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

Permissible shaft load

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

Wiring diagram

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

Connector for control signals (I/O)

02	10
01	
+5V	
FIN	
GND	
15	
14	
13	
12	
11	

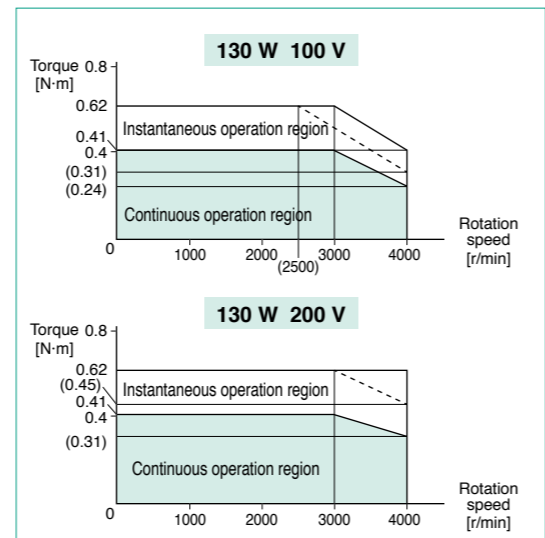
Change of Direction / Run/Stop command

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

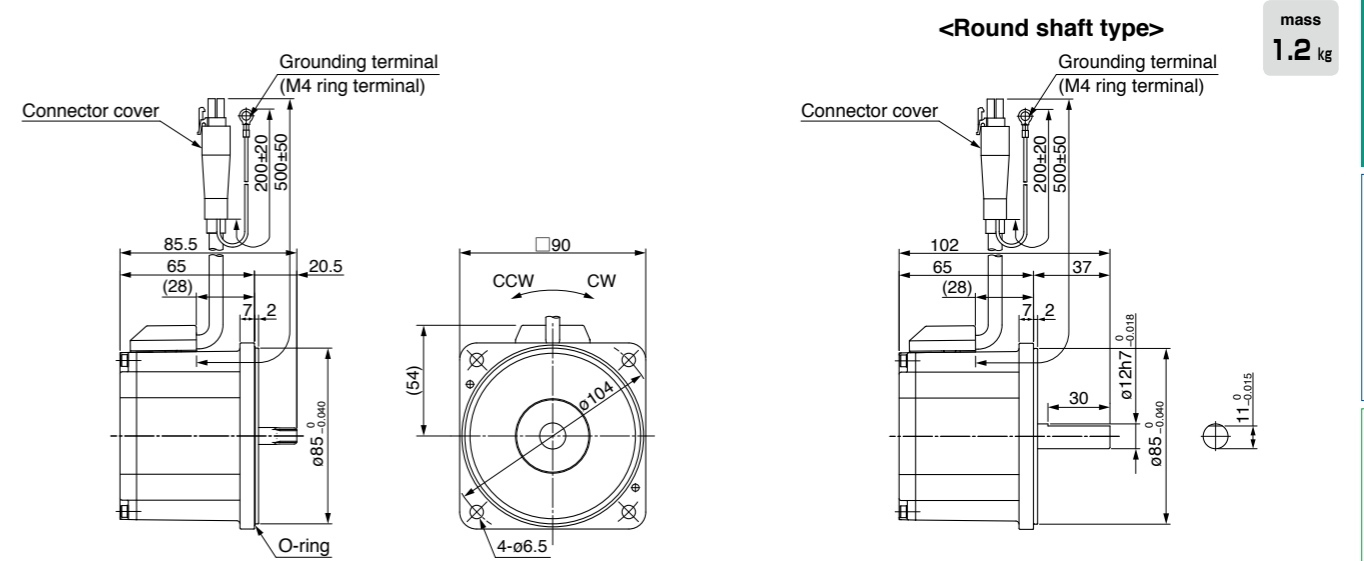
Be sure to ground the grounding terminal.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

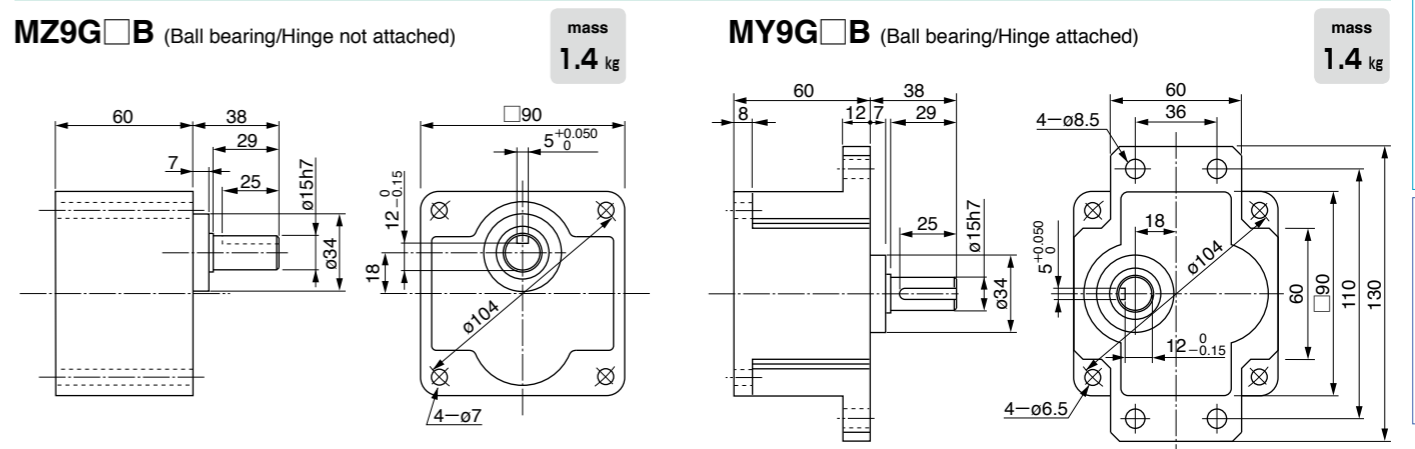
Speed-torque characteristic



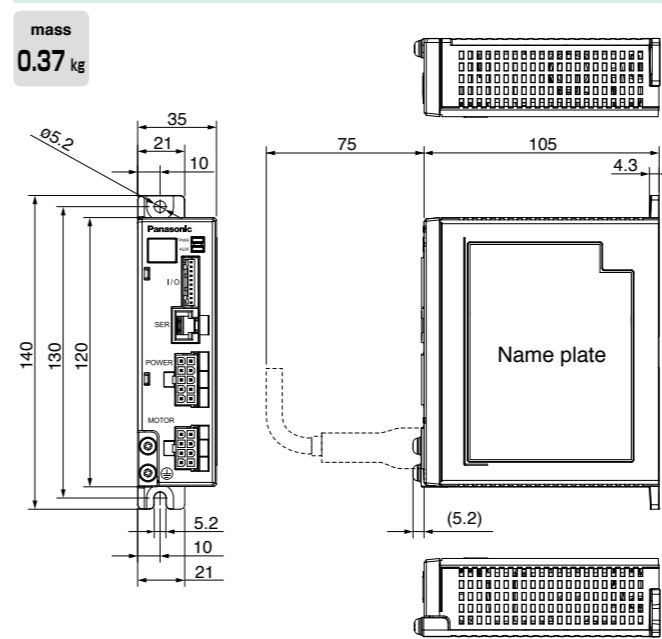
Motor (dimensions)



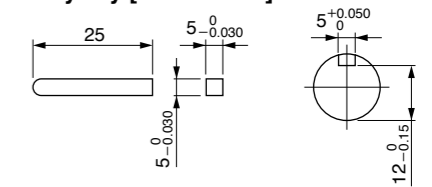
Gear head (dimensions)



Brushless amplifier (dimensions)



<Key and keyway [attachment]>



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

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

Gear head GV series

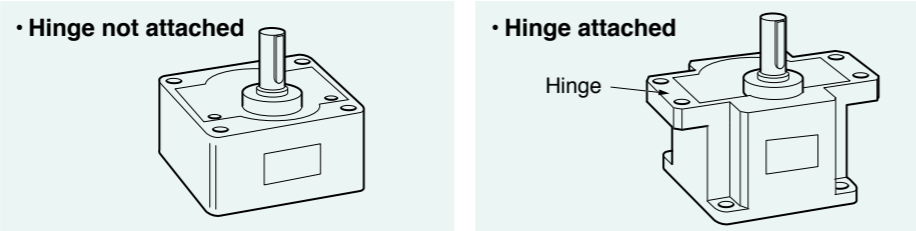
Outline of gear head

Reduction ratio

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

Gear type

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



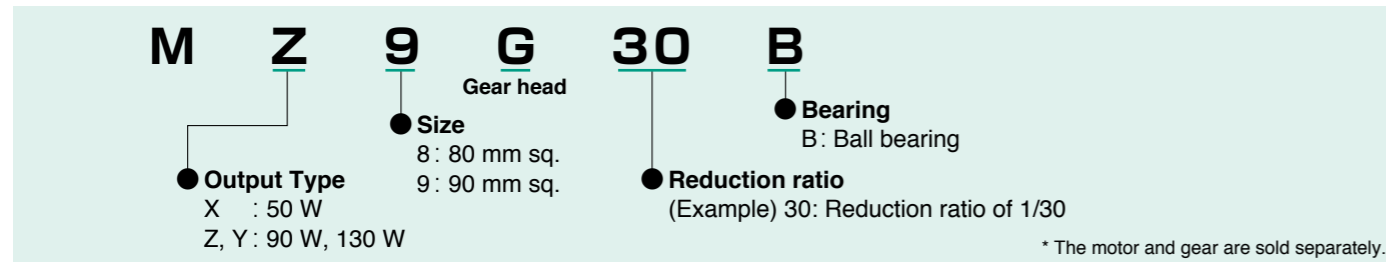
Backlash

Less than 2° (design value)

Type of gear head and reduction ratio

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

Check the Model number



Calculation of torque at output shaft of gear head

Standard gear head only

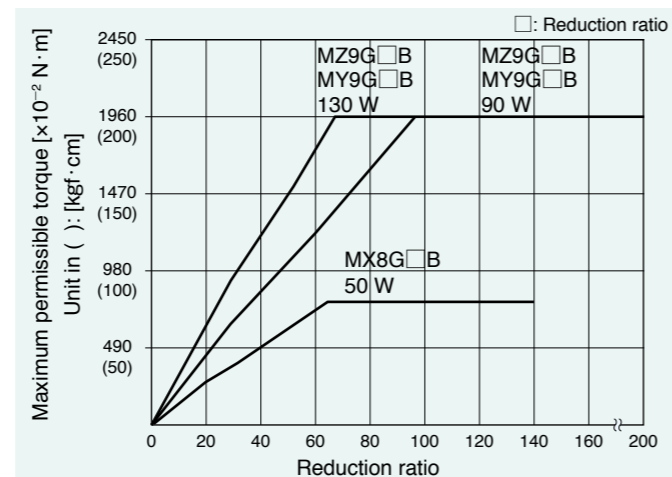
$$N_G = \frac{N_M}{i}$$

N_G : Speed of gear head [r/min] T_G : Output torque of gear head [N·m]
 $T_G = T_M \times i \times \eta$ N_M : Motor speed [r/min] T_M : Motor torque [N·m]
 i : Reduction ratio of gear head η : Gear head efficiency

Maximum permissible torque

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

Maximum permissible torque



Nominal reduction ratio and actual reduction ratio

Note that there is a difference between the nominal reduction ratio and actual reduction ratio of each gear head. Refer to the table on the right.

Gear head

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

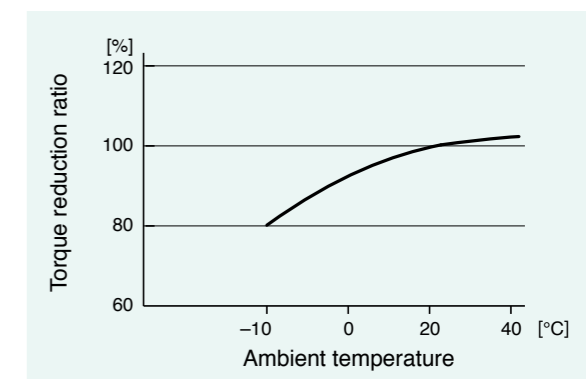
* 1/200: only 90 mm sq. size

Gear head efficiency

Model No.	Reduction ratio																							
	3	3.6	5	6	7.5	9	10	12.5	15	18	20	25	30	36	50	60	75	90	100	120	150	180	200	
MX8G□B						81 %											75 %							—
MZ9G□B MY9G□B				81 %						75 %								70 %						

Gear head efficiency and ambient temperature

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



<Important>

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

Gear head GV series

Model list of gear head

Gear head

Ball bearing

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

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

Gear head accessory

Ball bearing

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

MINAS-BL KV series

Speed Control Type 50 W to 750 W

KV series

GV series

KV series

GP series

Options

Information

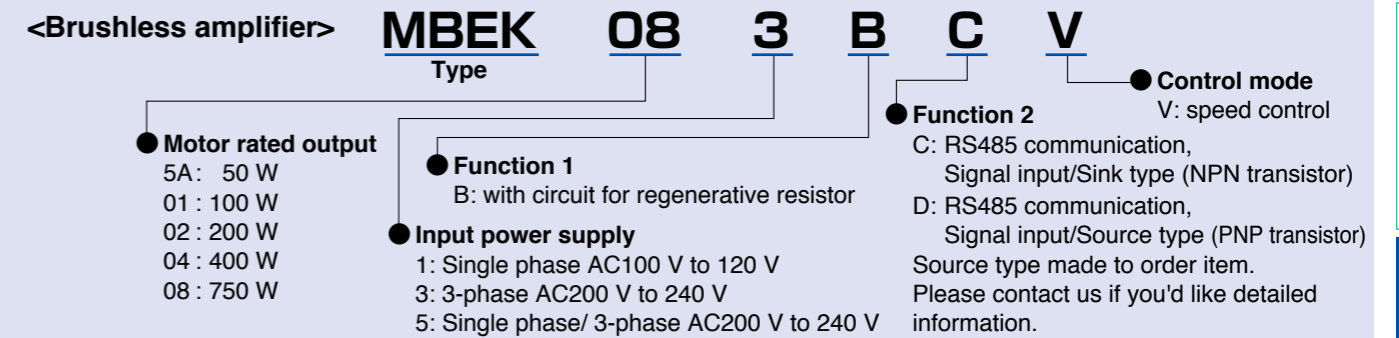
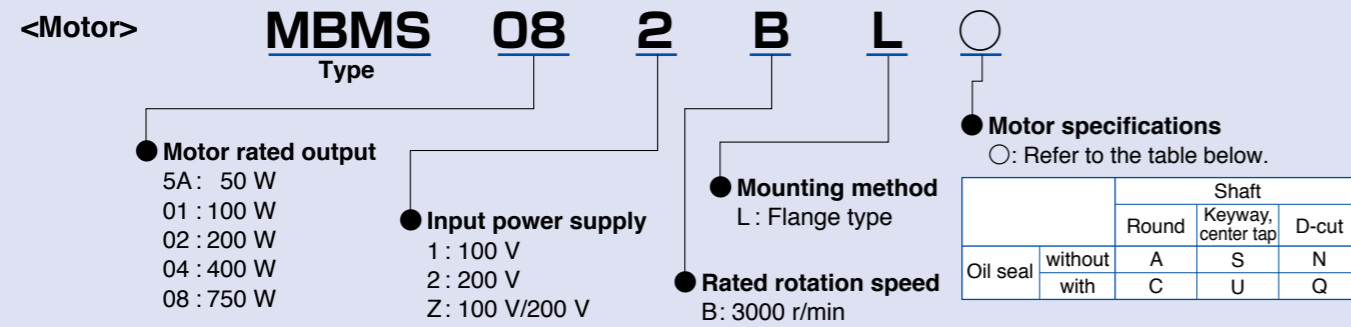


• 60 mm square 200 W

Contents

Check the model number	27
Brushless motor specifications	27
Brushless amplifier specifications	28
System configuration/ System configuration diagram	29
Parameter list of brushless amplifier	33
Brushless motors – Details	35

Check the model number



Brushless motor specifications

Item	Specifications						
	38 mm sq.	60 mm sq.				80 mm sq.	
Flange size	38 mm sq.	60 mm sq.				80 mm sq.	
Motor model No. ^{*1}	MBMS5AZBL○	MBMS011BL○	MBMS012BL○	MBMS021BL○	MBMS022BL○	MBMS042BL○	MBMS082BL○
Motor rated output (W)	50	100		200		400	750
Voltage (V)	for 100/200	for 100	for 200	for 100	for 200	for 200	
Rated torque (N·m)	0.16	0.32		0.64		1.27	2.4
Starting torque ^{*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 (×10 ⁻⁴ kg·m ²)	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 °C to +40 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the motor.						
Ambient humidity	20 % to 85 % RH (free from condensation)						
Altitude	Lower than 1000 m						
Vibration	24.5 m/s ² 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 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 ^{*1}	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 100 to 120	Single phase 200 to 240	3-phase 100 to 120	Single phase 200 to 240	3-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 °C to +50 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the amplifier.										
Ambient humidity	20 % to 85 % RH (free from condensation)										
Location	Indoor (No corrosive gas, A place without garbage, and dust)										
Altitude	Lower than 1000 m										
Vibration	5.9 m/s ² or less (10 Hz to 60 Hz)										
Protection structure/ Cooling system	Equivalent to IP20/ Self cooling										
Storage temperature	Normal temperature * Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)										
Storage humidity	Normal humidity										
Rated rotation speed	3000 r/min										
Speed control range	100 r/min to 4000 r/min										
Speed fluctuation factor	With load		±0.5 % or below (at 0 to Rated torque, Rated rotation speed)								
	With voltage		±0.5 % or below (at supply voltage ±10 %, rated rotation speed)								
	With temperature		±0.5 % or below (at 0 °C to 50 °C, rated rotation speed)								
Acceleration/ Deceleration time	0.01 sec to 300 sec (time for changing 1000 r/min) ^{*2}										
Stopping procedure	Slowdown stop/ Free-run stop ^{*2}										
Speed setting	0 r/min to 4000 r/min (analogue voltage (0 V to 5 V), console A), 0 r/min to 4000 r/min (Setting selection by parameter on Digital key pad)										
Speed setting resolution	Analog: approx. 1/200 of upper speed limit Digital: 1 r/min										
Speed setting precision (at 20 °C)	Analog: ±3 % or below of upper speed limit (±90 r/min or below at upper speed limit 3000 r/min) [Digital: 1 % or below of upper speed limit]										
Operation mode	8 speed										
Signal input	5 inputs ^{*2} (run/ stop, CW run/ CCW run, multi function 3 bit)										
Signal output	2 outputs (Open collector) ^{*2} (Trip output etc)										
Communication function	RS485	Max 31 units. Setting of parameter, monitoring of control condition. Communication speed: Choose from 2400 bps/ 4800 bps/ 9600 bps									
	RS232	Setting of parameter and monitoring of control condition are enabled with commercial PC. ^{*3}									
Digital key pad	Setting of parameter, monitoring of control condition. ^{*4}										
Protective function	Warning : Undervoltage ^{*2} , Overload warning, setting change warning Protect : Undervoltage ^{*2} , Overload, Overcurrent, Overvoltage, Overheat, Overspeed, Sensor error, RS485 communication error, External forced trip error, User parameter error, CPU error										
Regenerating brake	Regenerative braking resistor can be externally connected. ^{*5} 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
Single phase 100 V	3000	50	MBMS5AZBL○	MBEK5A1BCV	MBEK5A1BCVC	for 100 V DV0P2890	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227
		100	MBMS011BL○	MBEK011BCV	MBEK011BCVC				
Single/3-phase 200 V	3000	50	MBMS5AZBL○	MBEK5A5BCV	MBEK5A5BCVC	for 200 V DV0PM20068	for single phase power supply DV0P4170 for 3-phase power supply DV0PM20042	for single phase power supply DV0P4190 for 3-phase power supply DV0P1450	for single phase power supply DV0P227 for 3-phase power supply DV0P220
		100	MBMS012BL○	MBEK015BCV	MBEK015BCVC				

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

(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	Digital key pad connection cable	1 m	DV0P38310
	3 m	DV0PQ1000330		3 m	DV0P38330
	5 m	DV0PQ1000350		5 m	DV0P38350
	10 m	DV0PQ10003A1			
Power supply connector kit	DV0P2870	P.70	External speed setter	DV0PM20078	P.71
Console A ^{*1}	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 ^{*3}	1.5 m DV0P4140	P.70
Digital key pad ^{*2}	DV0P3510	P.68	Noise filter for signal line	DV0P1460	P.67
			DIN rail mounting unit	DV0P3811	P.72

* For details of cable, refer to p. 68 to 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 ²)	
				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 mm²) 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

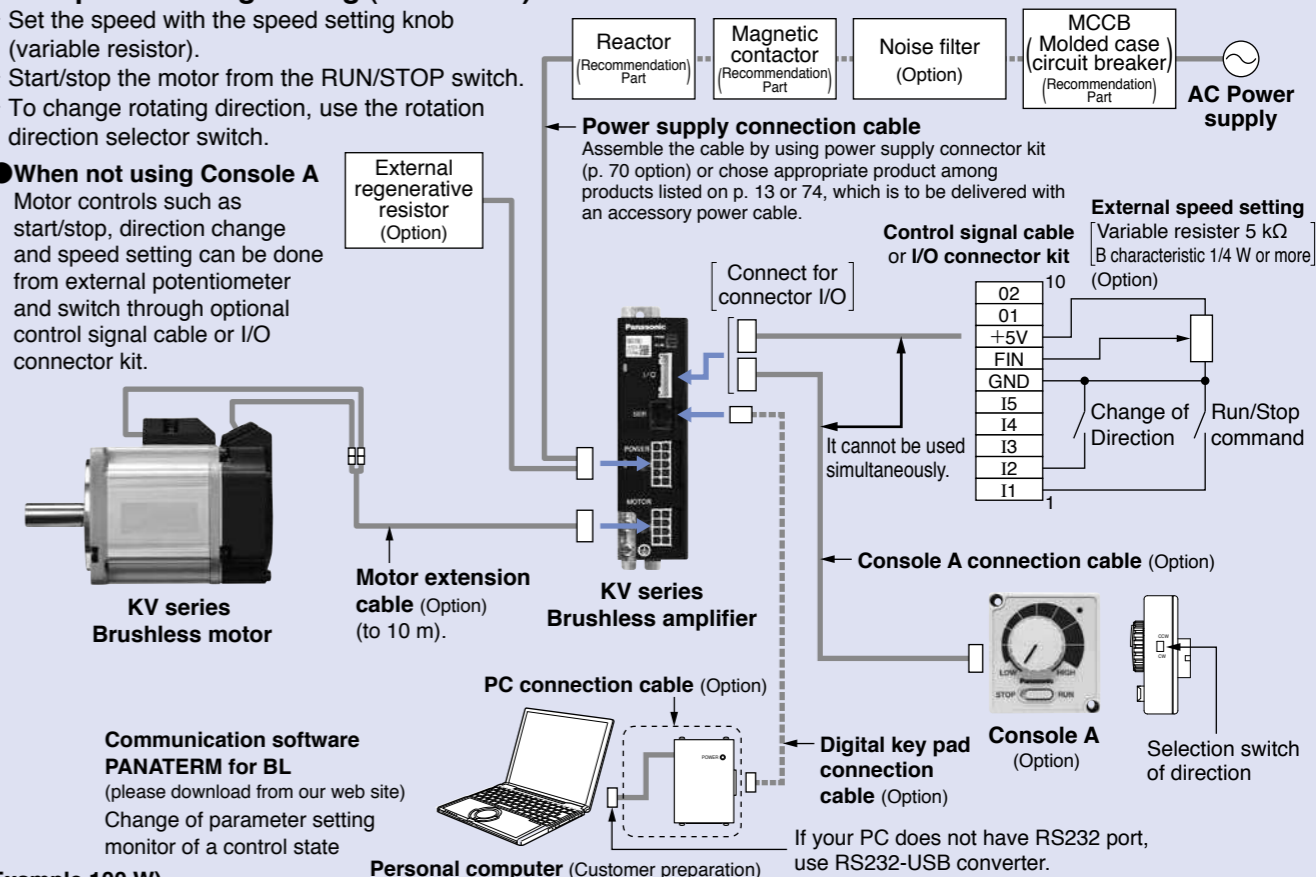
System configuration diagram (50 W, 100 W)

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

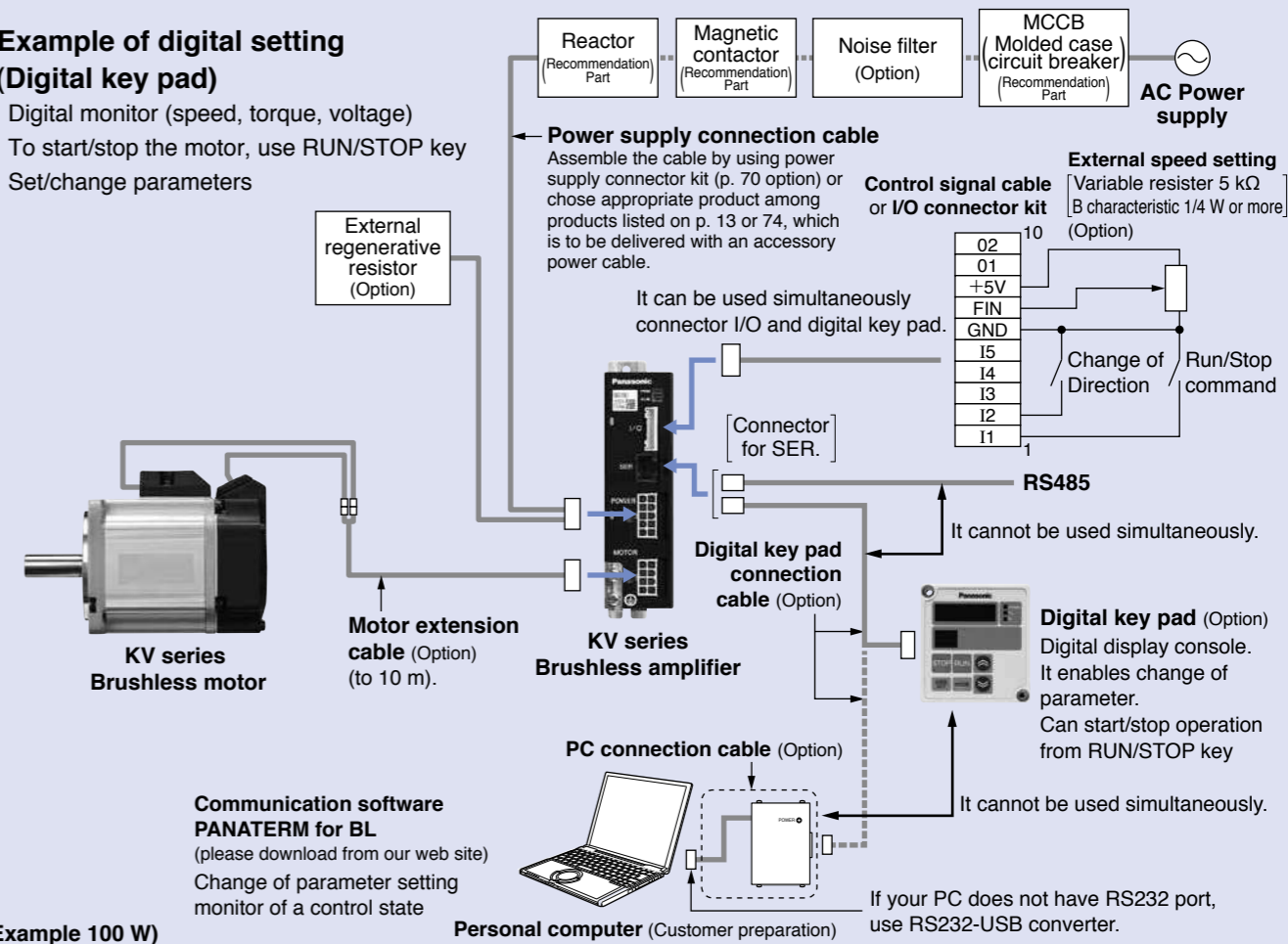
Motor controls such as start/stop, direction change and speed setting can be done from external potentiometer and switch through optional control signal cable or I/O connector kit.



(Example 100 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 100 W)

System configuration (200 W to 750 W)

Power supply	Rated rotation speed (r/min)	output (W)	Motor (Note 1)	Brushless amplifier	Optional parts			
					External regenerative resistor	Noise filter	Surge absorber	Reactor
Single phase 100 V		200	MBMS021BL○	MBEK021BCV	for 100 V DV0P2890 Reference page p. 71	for single phase power supply DV0P4170 p. 67	for single phase power supply DV0P4190 p. 67	for single phase power supply DV0P228 p. 73
Single/3-phase 200 V	3000	200	MBMS022BL○	MBEK025BCV	for 200 V DV0PM20068	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227
		400	MBMS042BL○	MBEK043BCV		for 3-phase power supply DV0PM20042	for 3-phase power supply DV0P1450	for 3-phase power supply DV0P220
3-phase 200 V		750	MBMS082BL○	MBEK083BCV	for 3-phase power supply DV0PM20042	for 3-phase power supply DV0P1450	for 3-phase power supply DV0P220	

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

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

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

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

Options

Optional parts	Parts number	Reference page	Optional parts	Parts number	Reference page
Motor extension cable	1 m	DV0PQ1000310	Digital key pad connection cable	1 m	DV0P38310
	3 m	DV0PQ1000330		3 m	DV0P38330
	5 m	DV0PQ1000350		5 m	DV0P38350
	10 m	DV0PQ10003A1			
Console A ¹	DV0P3500	P.68	External speed setter	DV0PM20078	P.71
Console A connection cable	1 m	DV0PM2006910	Control signal cable	2 m	DV0PM20076
	3 m	DV0PM2006930	I/O connector kit	DV0PM20070	P.71
	5 m	DV0PM2006950	Panel connector kit	DV0P3610	P.71
Digital key pad ²	DV0P3510	P.68	PC connection cable ³	1.5 m	DV0P4140
			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 ²)	
				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 mm²) 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

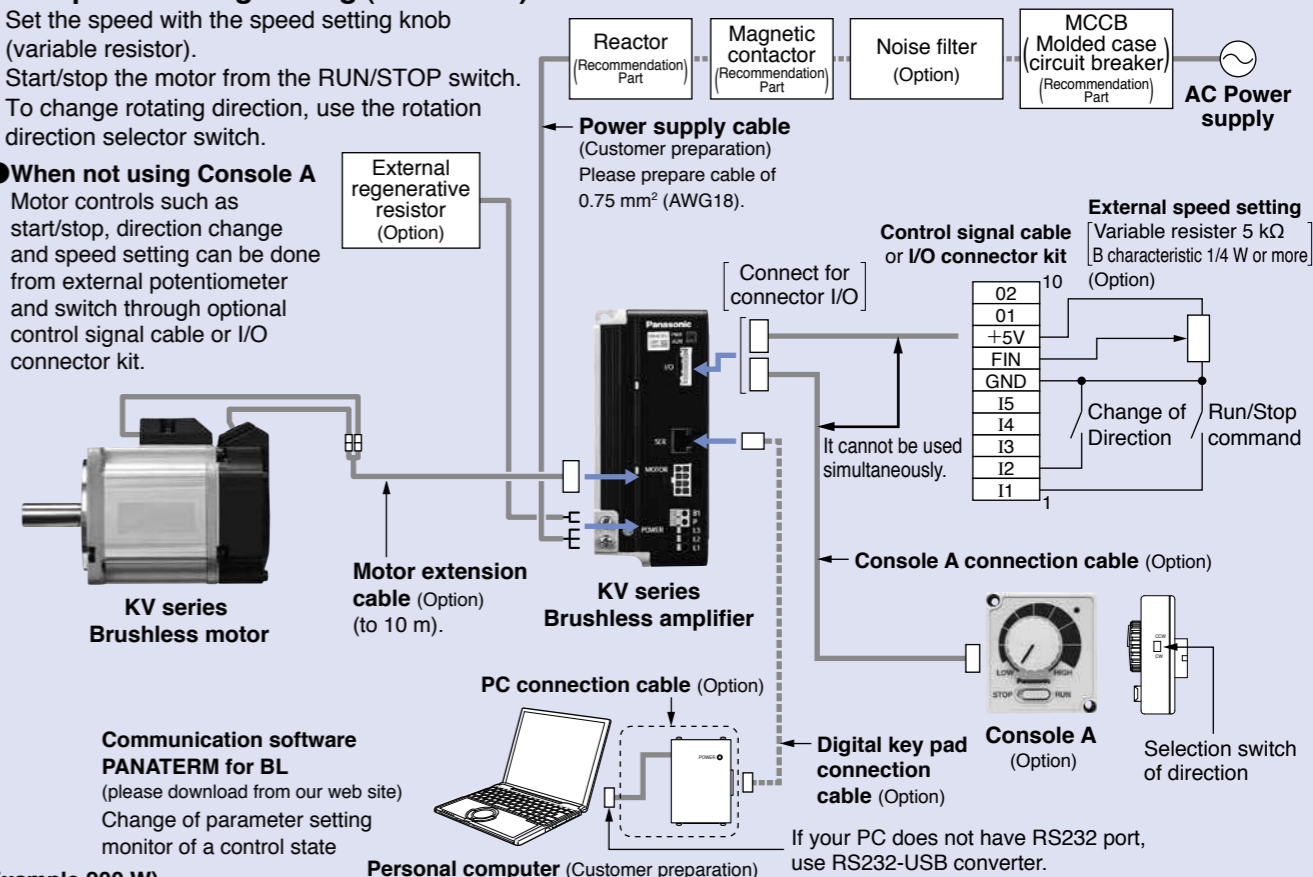
System configuration diagram (200 W to 750 W)

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

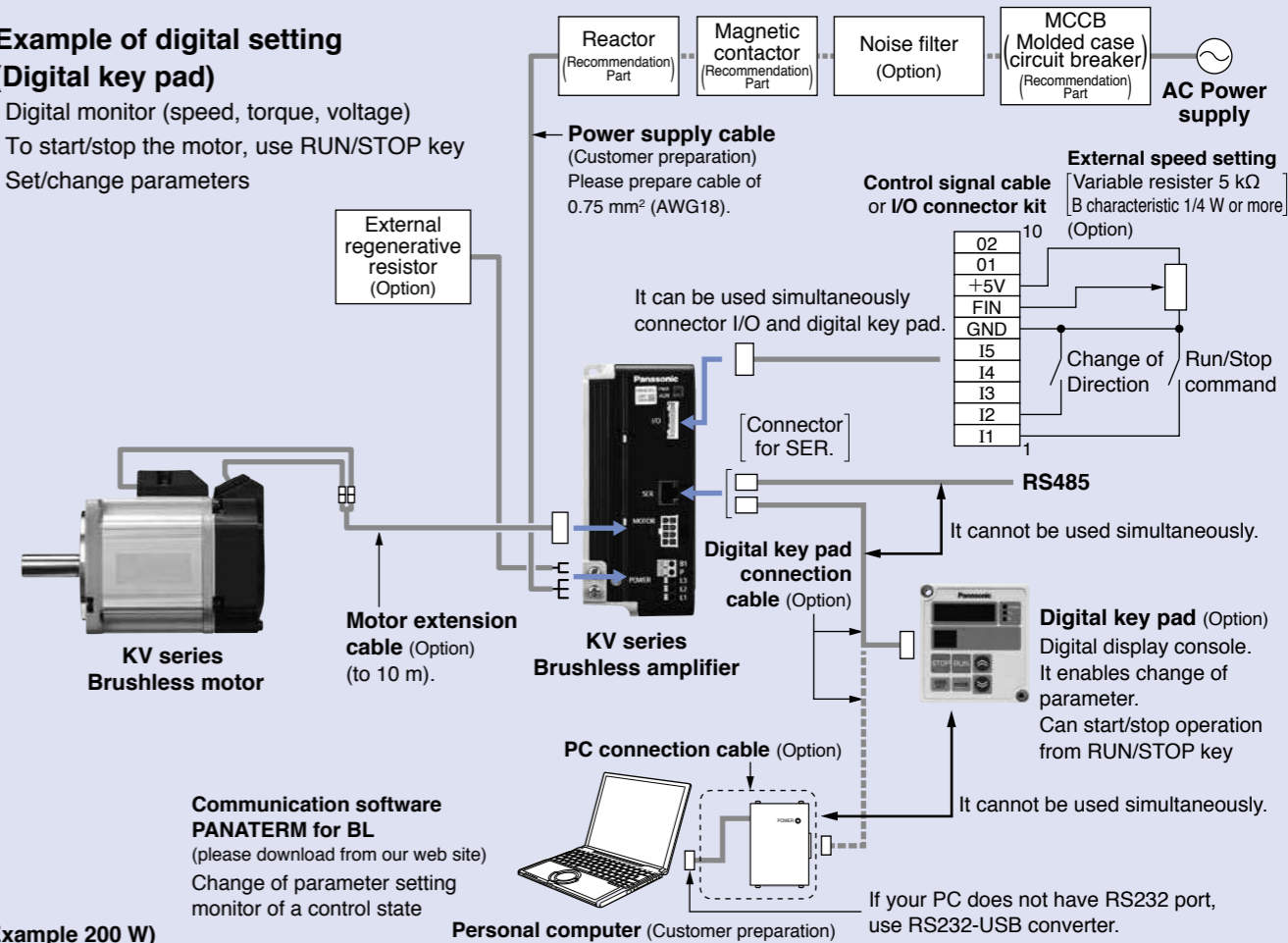
Motor controls such as start/stop, direction change and speed setting can be done from external potentiometer and switch through optional control signal cable or I/O connector kit.



(Example 200 W)

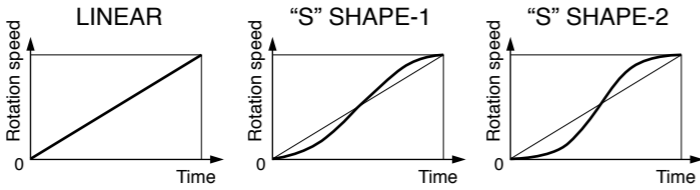
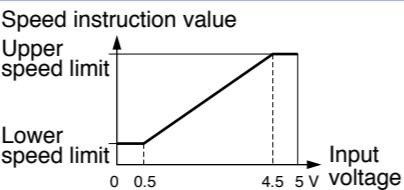
Example of digital setting (Digital key pad)

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

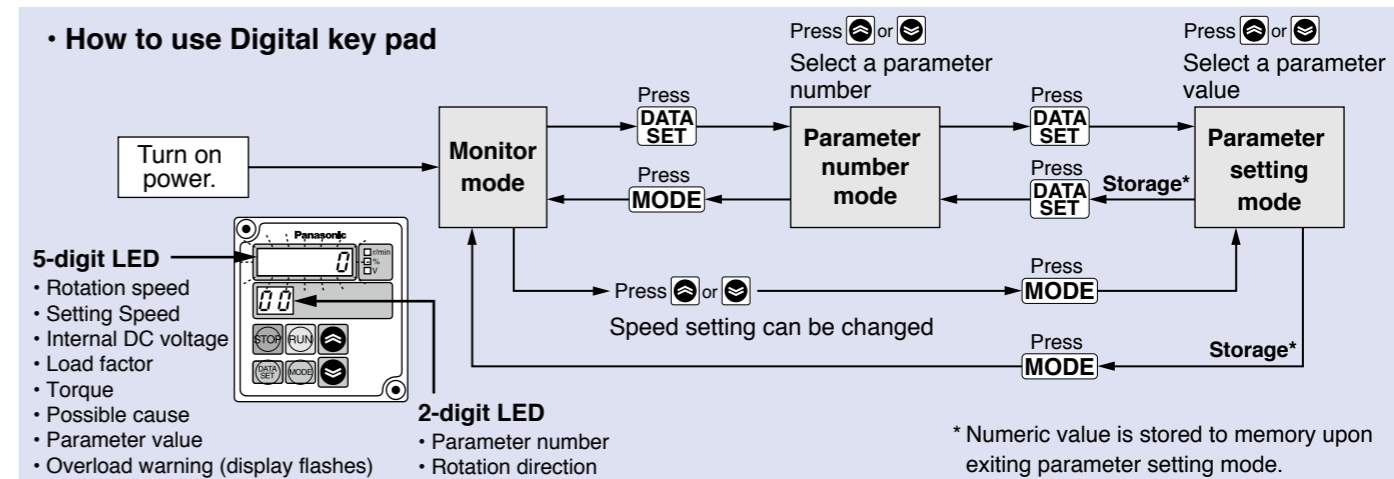


(Example 200 W)

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="418 1255 1062 1558"> <thead> <tr> <th rowspan="2">Setting</th> <th rowspan="2">Operation mode</th> <th colspan="3">Function of signal input</th> </tr> <tr> <th>I3</th> <th>I4</th> <th>I5</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1st speed operation mode</td> <td></td> <td></td> <td>Free-run stop External forced trip</td> </tr> <tr> <td>2</td> <td>2nd speed operation mode</td> <td>Speed setting</td> <td></td> <td>2nd Acc./Dec. time Trip reset</td> </tr> <tr> <td>4</td> <td>4th speed operation mode</td> <td>Speed setting</td> <td>Speed setting</td> <td></td> </tr> <tr> <td>8</td> <td>8th speed operation mode</td> <td>Speed setting</td> <td>Speed setting</td> <td>Speed setting</td> </tr> </tbody> </table>	Setting	Operation mode	Function of signal input			I3	I4	I5	1	1st speed operation mode			Free-run stop External forced trip	2	2nd speed operation mode	Speed setting		2nd Acc./Dec. time Trip reset	4	4th speed operation mode	Speed setting	Speed setting		8	8th speed operation mode	Speed setting	Speed setting	Speed setting	
Setting	Operation mode	Function of signal input																													
		I3	I4	I5																											
1	1st speed operation mode			Free-run stop External forced trip																											
2	2nd speed operation mode	Speed setting		2nd Acc./Dec. time Trip reset																											
4	4th speed operation mode	Speed setting	Speed setting																												
8	8th speed operation mode	Speed setting	Speed setting	Speed setting																											
33 34 35 36	I1/I2 function selection I3 function selection I4 function selection I5 function selection	Signal input functions I1 to I5 can be individually selected.	Free-run stop External forced trip 2nd Acc./Dec. time Trip reset																												
3A	Lower speed limit	When speed command selection is set to analog, set the motor speed at 0 V input. 	0 r/min to Upper speed limit [Minimum unit 1 r/min]																												
3b	Upper speed limit	Upper limit of motor command speed.	0 r/min to 4000 r/min [Minimum unit 1 r/min]																												
3C	Torque limit	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.	



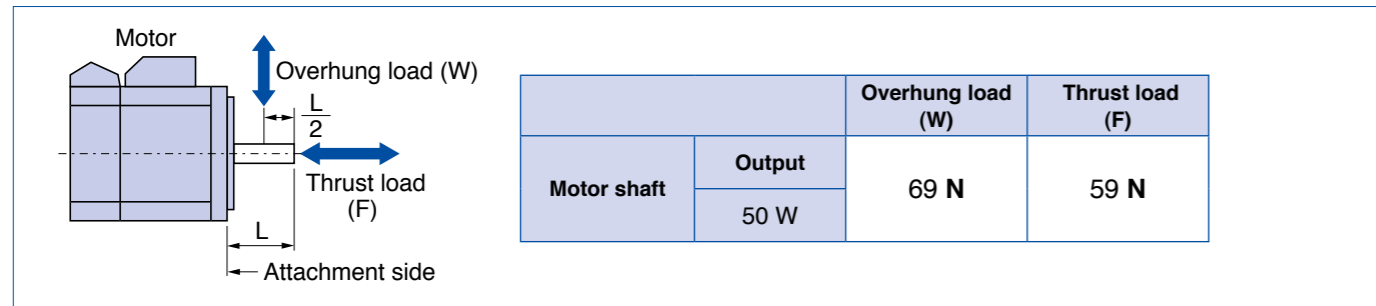
■ Specification (For Common specification, see p. 27, 28)

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				

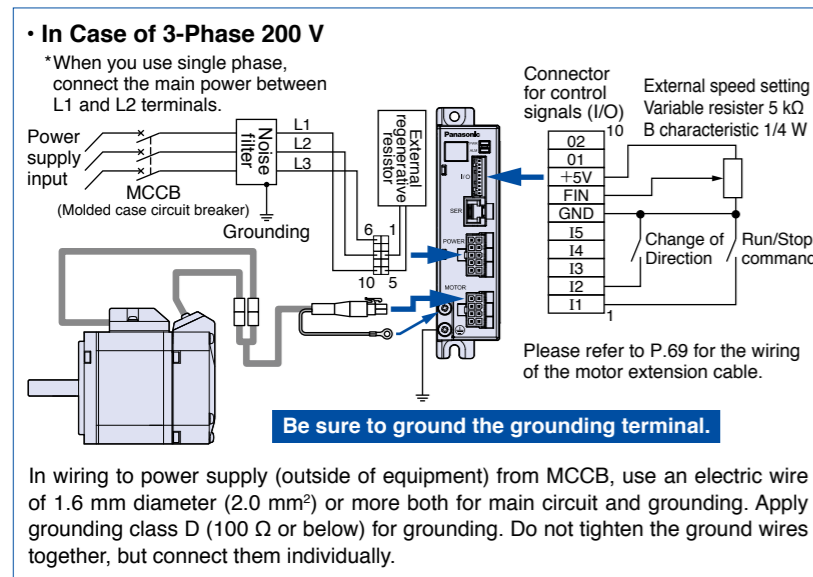
* Suffix of "○" in the motor model No. represents shape of shaft.

* Starting torque: Representative value

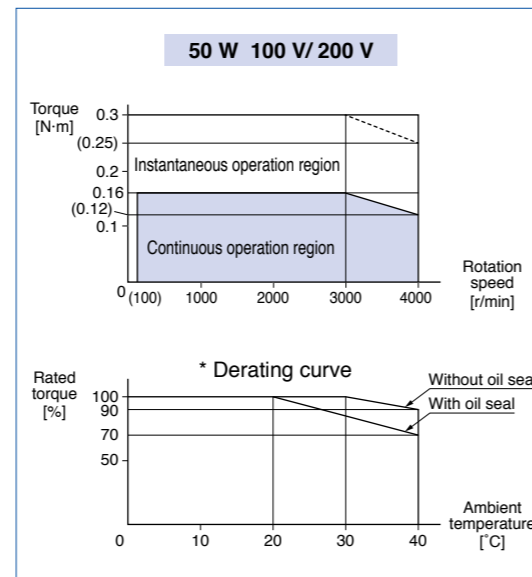
■ Permissible shaft load



■ Wiring diagram

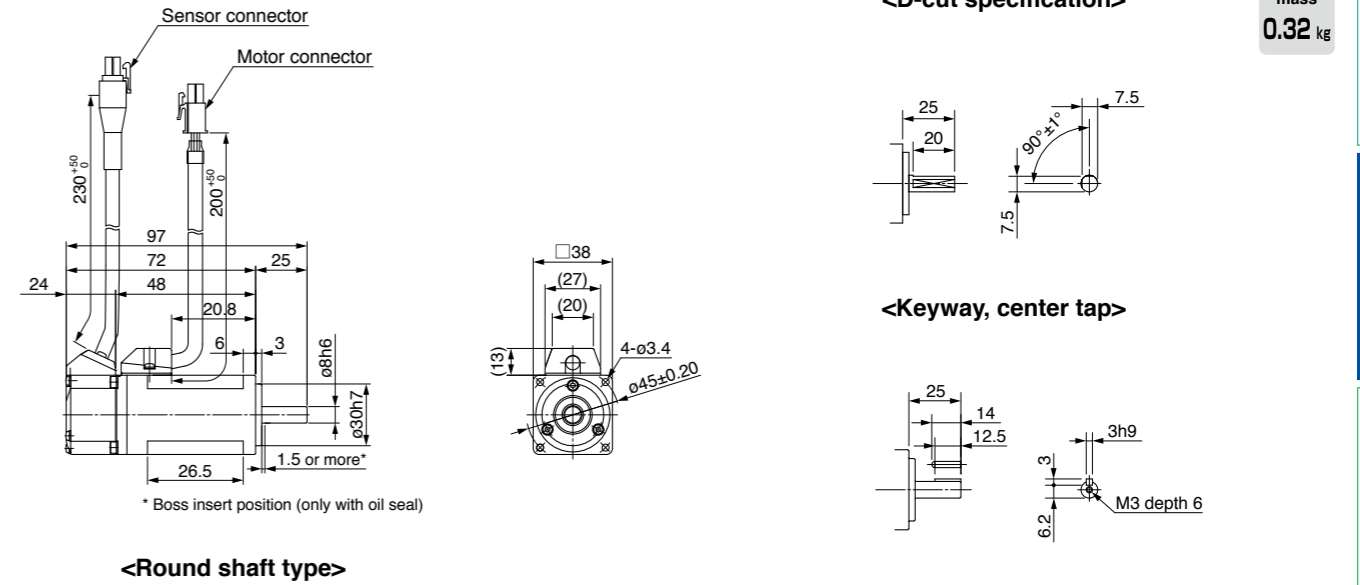


■ Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



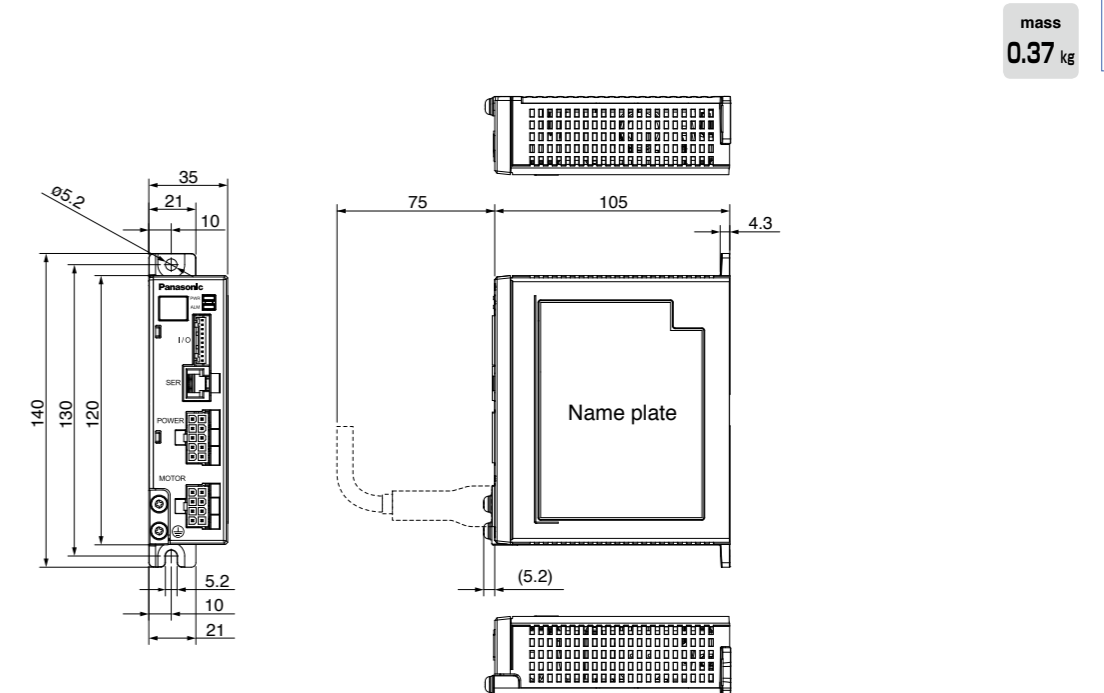
Motor (dimensions)

Unit mm



Brushless amplifier (dimensions)

Unit mm



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

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

Specification (For Common specification, see p. 27, 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.	MBEK011BCV	MBMS011BL○	100	Single phase 100 to 120	±10	50/60	2.4	0.32	0.70	3000	4000
	MBEK015BCV	MBMS012BL○		Single phase 200 to 240 3-phase			1.2 0.7				

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

* Starting torque: Representative value

Permissible shaft load

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

Wiring diagram

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

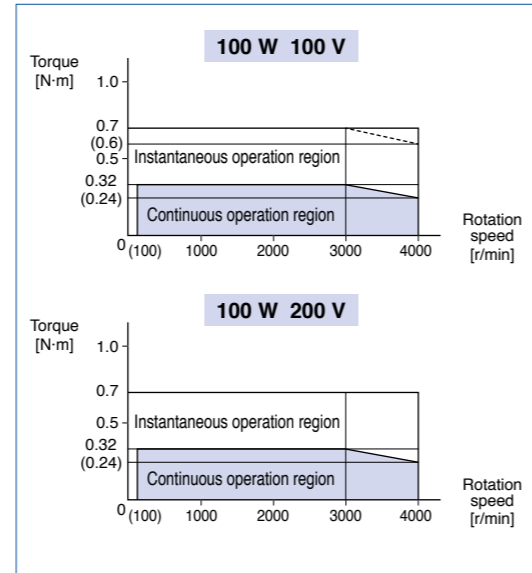
Connector for control signals (I/O)
External speed setting Variable resistor 5 kΩ
B characteristic 1/4 W
Change of Direction
Run/Stop command

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

Be sure to ground the grounding terminal.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

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



Motor (dimensions)

Unit mm

mass 0.63 kg

Keyway, center tap

Round shaft type

Brushless amplifier (dimensions)

Unit mm

mass 0.37 kg

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

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

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.	MBEK021BCV	MBMS021BL○	200	Single phase 100 to 120	±10	50/60	4.2	0.64	1.4	3000	4000
	MBEK025BCV	MBMS022BL○		Single phase 200 to 240			Single phase 2.1				
				3-phase 1.2							

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

* Starting torque: Representative value

Permissible shaft load

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

Wiring diagram

In Case of 3-Phase 200 V

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

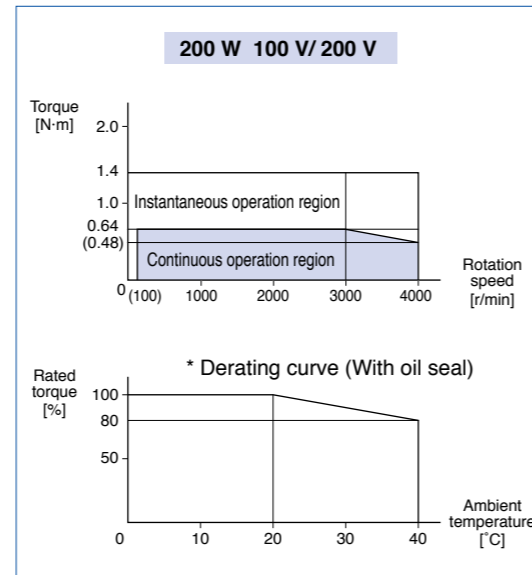
In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding.

Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

Be sure to ground the grounding terminal.

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

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



Motor (dimensions)

Unit mm

Sensor connector
Motor connector

<D-cut specification>

mass 0.8 kg

<Keyway, center tap>

<Round shaft type>

* Boss insert position (only with oil seal)

Brushless amplifier (dimensions)

Unit mm

6.5 68 150 138 5.2 20 120 4 75 4

Name plate

mass 1.0 kg

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

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

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.	MBEK043BCV	MBMS042BL○	400	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

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

Wiring diagram

In Case of 3-Phase 200 V

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

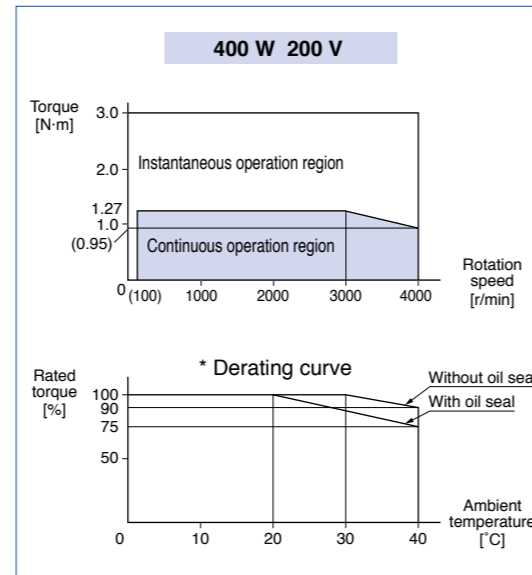
In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding.

Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

Be sure to ground the grounding terminal.

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

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



Motor (dimensions)

Unit mm

<D-cut specification>

<Keyway, center tap>

<Round shaft type>

* Boss insert position (only with oil seal)

mass **1.2 kg**

Brushless amplifier (dimensions)

Unit mm

mass **1.0 kg**

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

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

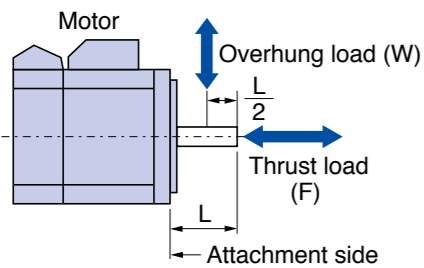
Specification (For Common specification, see p. 27, 28)

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

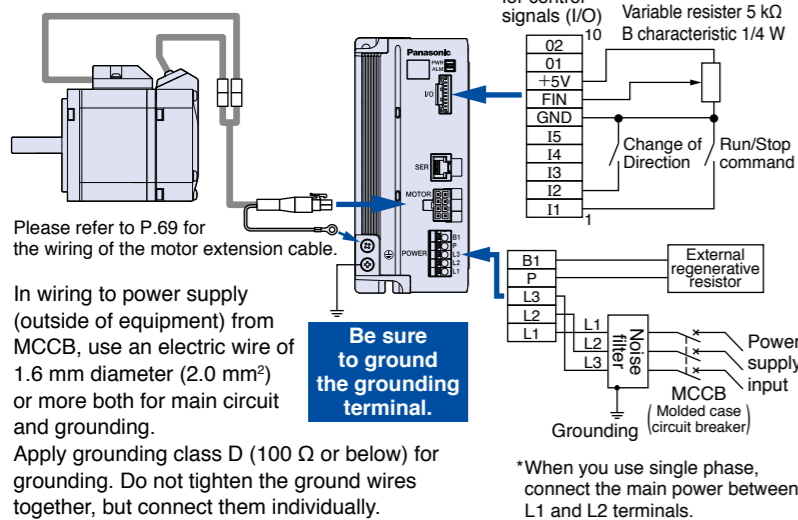
Permissible shaft load



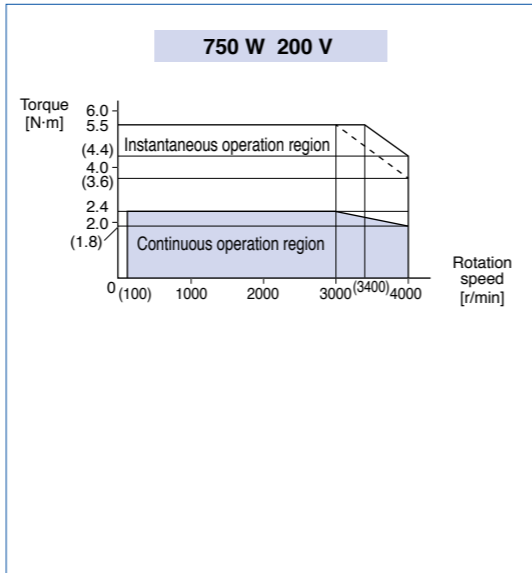
Motor shaft	Output	Overhung load (W)	Thrust load (F)
	750 W	392 N	147 N

Wiring diagram

In Case of 3-Phase 200 V

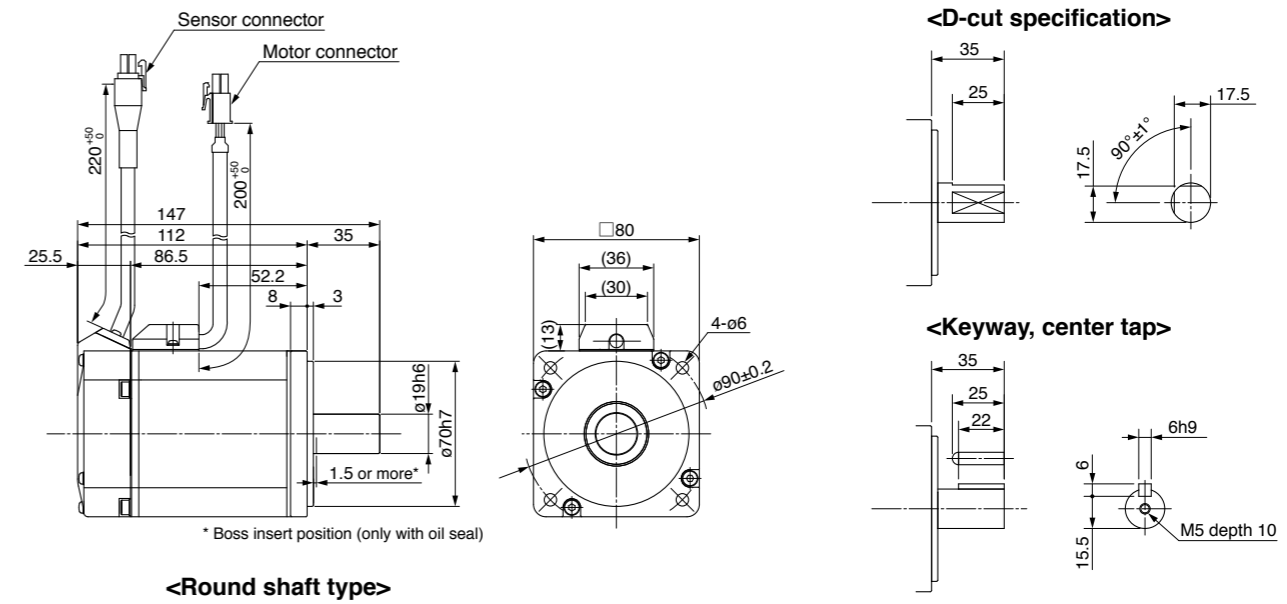


Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



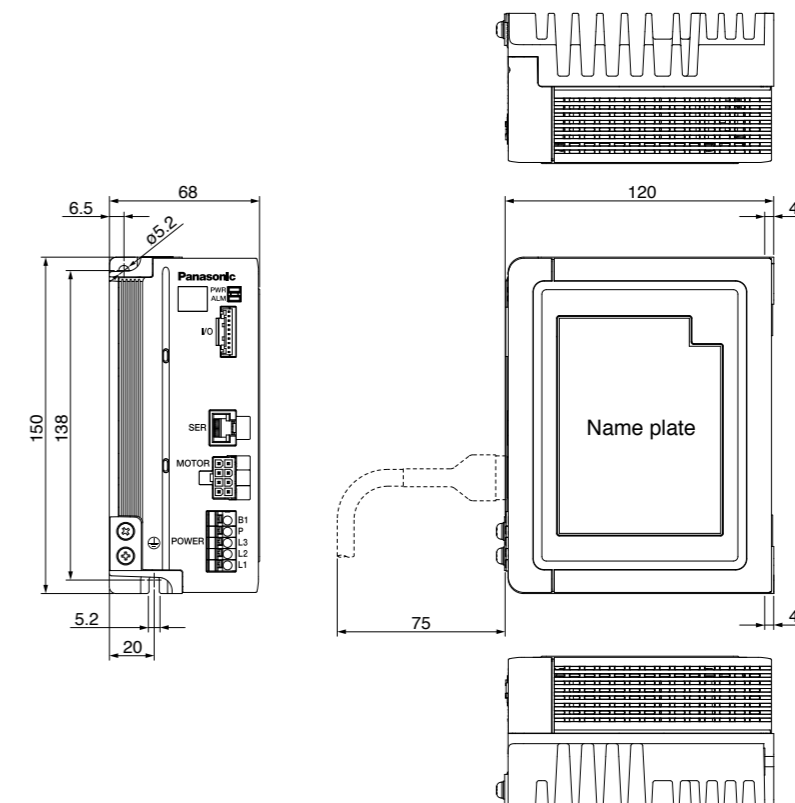
Motor (dimensions)

Unit mm



Brushless amplifier (dimensions)

Unit mm



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

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

MINAS-BL **GP** series

Position Control Type 50 W to 130 W

GP series

GV series

KV series

GP series

Options

Information

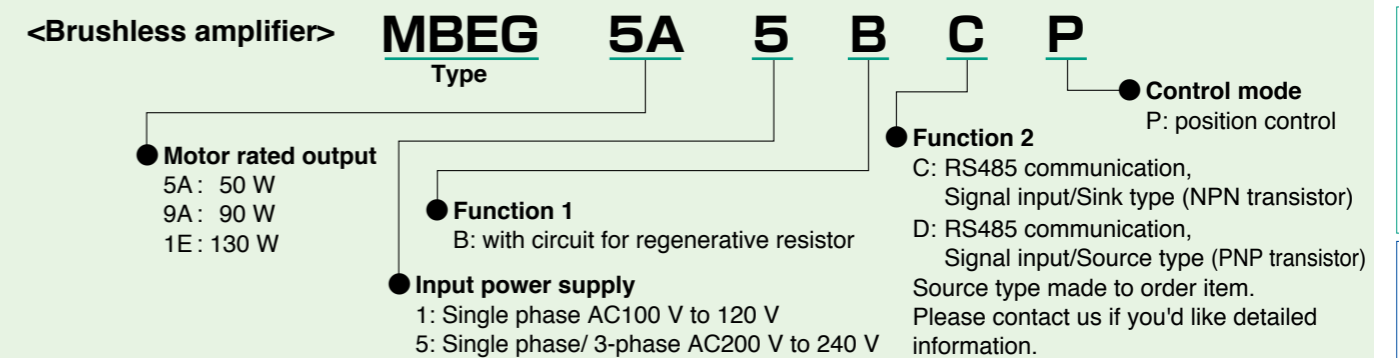
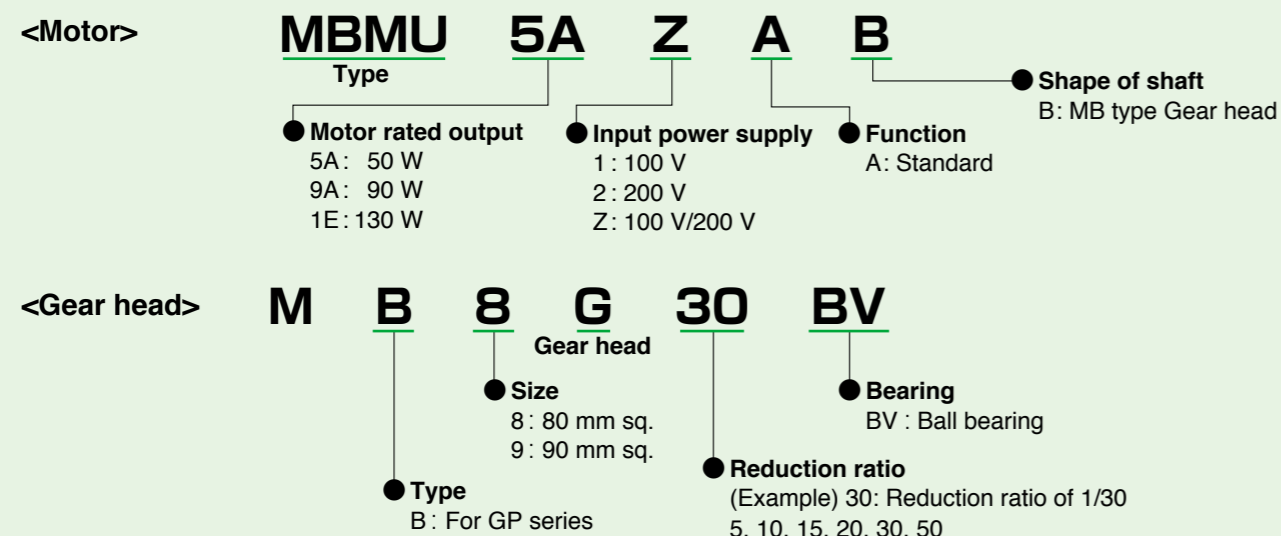


• 80 mm square 50 W

Contents

Check the model number	47
Brushless motor specifications	47
Brushless amplifier specifications	48
System configuration/ System configuration diagram	49
Parameter list of brushless amplifier	51
Example setting of motion pattern	53
Brushless motors – Details	57
Gear head	63

Check the model number



Brushless motor specifications

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

*1 Representative value

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

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

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

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

Brushless amplifier specifications (GP series)

Item	Specifications								
	MBEG5A1BCP	MBEG5A5BCP	MBEG9A1BCP	MBEG9A5BCP	MBEG1E1BCP	MBEG1E5BCP			
Amplifier model No.	MBMU5AZAB		MBMU9A1AB	MBMU9A2AB	MBMU1E1AB	MBMU1E2AB			
Applicable Motor	50		90		130				
Motor rated output (W)	50		90		130				
Input power supply voltage (V)	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240	Single phase 100 to 120	Single phase 200 to 240	3-phase 200 to 240
Frequency (Hz)	50/60								
Rated input current (A)	1.5	0.7	0.35	2.2	1.1	0.5	2.8	1.5	0.7
Voltage tolerance	±10 %								
Control method	Position control by CS signal, PWM sine wave driving system								
Ambient temperature	0 °C to +50 °C (free from freezing) * Ambient temperature is measured at a distance of 5 cm from the amplifier.								
Ambient humidity	20 % to 85 % RH (free from condensation)								
Location	Indoor (No corrosive gas, A place without garbage, and dust)								
Altitude	Lower than 1000 m								
Vibration	5.9 m/s ² or less (10 Hz to 60 Hz)								
Protection structure/ Cooling system	Equivalent to IP20/ Self cooling								
Storage temperature	Normal temperature * Temperature which is acceptable for a short time, such as during transportation is -20 °C to 60 °C (free from freezing)								
Storage humidity	Normal humidity								
Number of positioning points	4 points (Travel distance, speed, acceleration time, deceleration time, and relative/absolute can be set per point)								
Positioning resolution	288 pulse/rotation (Accuracy: Within ±5° degrees at 20 °C at no load)								
Signal input	4 inputs								
Signal output	2 outputs (Open collector)								
Communication function	RS485	Max 31 units. Setting of parameter, monitoring of control condition. Communication speed: Choose from 2400 bps/ 4800 bps/ 9600 bps							
	RS232	Setting of parameter and monitoring of control condition are enabled with commercial PC. ^{*1}							
Digital key pad	Parameter change, status monitor, etc. can be executed through the optional Digital key pad DV0P3510. ^{*2}								
Protective function	Warning : Overload warning, Setting change warning Protect : Overload, Overcurrent, Overvoltage, Undervoltage, System error, Over-speed, Sensor error, Overheat, Position error, External forced trip, Position error counter overflow, RS485 communication error, Operation execution error, Homing error, present position overflow, Hardware limit error, Digital key pad communication trouble, user parameter error, and system parameter error								
Regenerating brake	Regenerative braking resistor can be externally connected. ^{*3} 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								

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

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

System configuration

Power supply	Rated rotation speed (r/min)	output (W)	Motor	Gear head (Note 1)	Brushless amplifier	Optional parts					
						Brushless amplifier (supplied with power cable) (Note 2)	External regenerative resistor	Noise filter	Surge absorber	Reactor	
						Reference page	p. 74	p. 71	p. 67	p. 67	p. 73
Single phase 100 V	3000	50	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/3-phase 200 V	3000	50	MBMU5AZAB	MB8G□BV	MBEG5A5BCP	MBEG5A5BCPC	for 200 V DV0PM20068	for single phase power supply DV0P4170	for single phase power supply DV0P4190	for single phase power supply DV0P227	
		90	MBMU9A2AB	MB9G□BV	MBEG9A5BCP	MBEG9A5BCPC					
		130	MBMU1E2AB	MB9G□BV	MBEG1E5BCP	MBEG1E5BCPC					for 3-phase power supply DV0PM20042

(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.

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

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

Options

Optional parts	Parts number	Reference page	Optional parts	Parts number	Reference page
Motor extension cable	1 m	DV0PQ1000110	Control signal cable	2 m	DV0PM20076 P.70
	3 m	DV0PQ1000130	I/O connector kit		DV0PM20070 P.71
	5 m	DV0PQ1000150	PC connection cable*2	1.5 m	DV0P4140 P.70
	10 m	DV0PQ10001A1	Noise filter for signal line		DV0P1460 P.67
Power supply connector kit	DV0P2870	P.70	DIN rail mounting unit	DV0P3811	P.72
Digital key pad*1	DV0P3510	P.68			
Digital key pad connection cable	1 m	DV0P38310			
	3 m	DV0P38330			
	5 m	DV0P38350			

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

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

*2 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 ²)	
				Main circuit, Grounding	Control circuit
Single phase 100 V	50 W to 130 W	5 A	20 A (3P+1a)	0.5 (AWG20)	0.13 (AWG26)
Single phase 200 V					
3-phase 200 V					

Be sure to connect the earth terminal to ground.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) 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

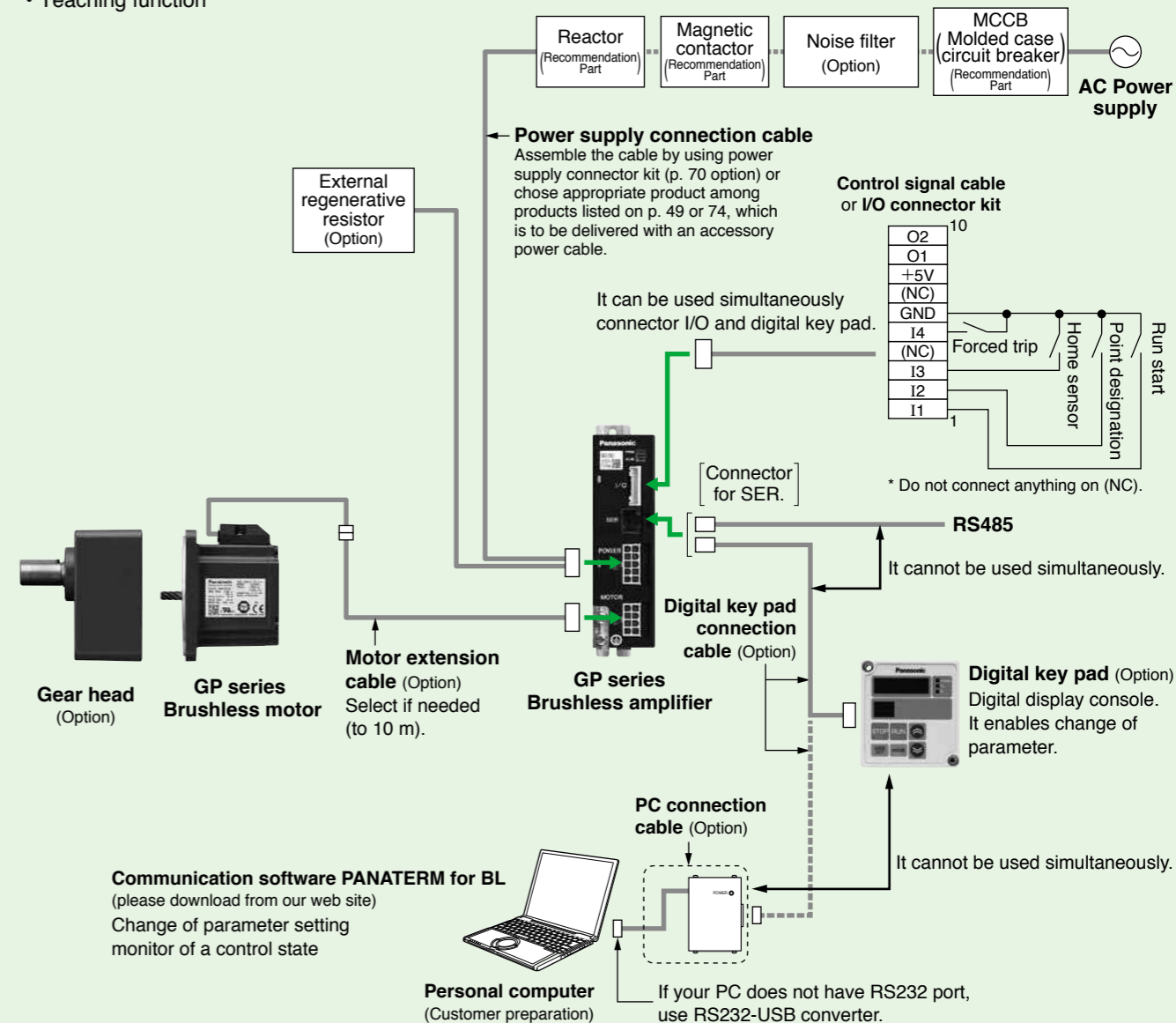
When using a switch in place of relay, select a switch rated at minute electric current, to assure positive contact.

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

System configuration diagram

Example of digital setting (Digital key pad)

- Monitoring (rotation speed, Current position, trip history etc.)
- Parameter setting, initialization, and copying function.
- Teaching function



Parameter list of brushless amplifier

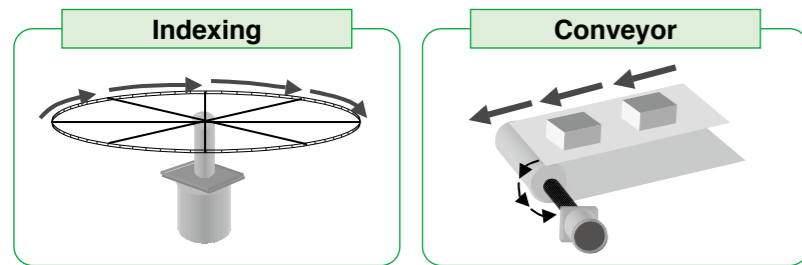
Parameter No.	Parameter name	Explanation	Setting range
00	The 1st target position (rotation number)	You can set travel distance in rotation numbers and pulses.	-16384 to 16383
01	The 1st target position (Pulse)	(288 pulses per rotation)	-288 to 288
02	The 1st coordinate setting	You can select positioning system to the 1st point. 0: Relative travel, 1: Absolute travel	0, 1
03	The 1st setting speed (r/min)	You can set the speed moving to the 1st point.	0 to 4000
04	The 1st acceleration time (ms)	You can set time taken for reaching the 1st setting speed.	1 to 30000
05	The 1st deceleration time (ms)	You can set time taken from the 1st setting speed to stop.	1 to 30000
06	The 1st block setting	0: Normal operation 1: Continuous block operation (1st point → 2nd point) 2: Combined block operation (1st point + 2nd point)	0 to 2
07	The 1st block timer setting (ms)	Start commanding of 2nd point after this setting time elapses and command of 1st point is completed.	0 to 30000
08	The 2nd target position (rotation number)	You can set travel distance in rotation numbers and pulses.	-16384 to 16383
09	The 2nd target position (pulse)	(288 pulses per rotation)	-288 to 288
0A	The 2nd coordinate setting	You can select positioning system to the 2nd point. 0: Relative travel, 1: Absolute travel	0, 1
0b	The 2nd setting speed (r/min)	You can set the speed moving to the 2nd point.	0 to 4000
0C	The 2nd acceleration time (ms)	You can set time taken for reaching the 2nd setting speed.	1 to 30000
0d	The 2nd deceleration time (ms)	You can set time taken from the 2nd setting speed to stop.	1 to 30000
0E	The 2nd block setting	0: Normal operation, 1: Continuous block operation (2nd point → 3rd point)	0, 1
0F	The 2nd block timer setting (ms)	Start commanding of 3rd point after this setting time elapses and command of 2nd point is completed.	0 to 30000
10	The 3rd target position (rotation number)	You can set travel distance in rotation numbers and pulses.	-16384 to 16383
11	The 3rd target position (Pulse)	(288 pulses per rotation)	-288 to 288
12	The 3rd coordinate setting	You can select positioning system to the 3rd point. 0: Relative travel, 1: Absolute travel	0, 1
13	The 3rd setting speed (r/min)	You can set the speed moving to the 3rd point.	0 to 4000
14	The 3rd acceleration time (ms)	You can set time taken for reaching the 3rd setting speed.	1 to 30000
15	The 3rd deceleration time (ms)	You can set time taken from the 3rd setting speed to stop.	1 to 30000
16	The 3rd block setting	0: Normal operation, 1: Continuous block operation (3rd point → 4th point) 2: Combined block operation (3rd point + 4th point)	0 to 2
17	The 3rd block timer setting (ms)	Start commanding of 4th point after this setting time elapses and command of 3rd point is completed.	0 to 30000
18	The 4th target position (rotation number)	You can set travel distance in rotation numbers and pulses.	-16384 to 16383
19	The 4th target position (Pulse)	(288 pulses per rotation)	-288 to 288
1A	The 4th coordinate setting	You can select positioning system to the 4th point. 0: Relative travel, 1: Absolute travel	0, 1
1b	The 4th setting speed (r/min)	You can set the speed moving to the 4th point.	0 to 4000
1C	The 4th acceleration time (ms)	You can set time taken for reaching the 4th setting speed.	1 to 30000
1d	The 4th deceleration time (ms)	You can set time taken from the 4th setting speed to stop.	1 to 30000
1E	The 4th block setting	0: Normal operation, 1: Continuous block operation (4th point → 1st point)	0, 1
1F	The 4th block timer setting (ms)	Start commanding of 1st point after this setting time elapses and command of 4th point is completed.	0 to 30000
20	Acceleration mode	You can select running pattern in acceleration.	0, 1
21	Deceleration mode	You can select running pattern in deceleration.	0, 1
22	Sequential run maximum point number	You can set the maximum point number for positioning by use of sequential run signal.	1 to 4
23	Coordinate system setting	0: CCW rotation in + direction, 1: CW rotation in + direction	0, 1
28	Position loop gain (the 1st gain)	You can determine the response of position control.	0 to 100
29	Velocity loop gain (the 1st gain)	You can determine the response of velocity loop.	0 to 10000
2A	Velocity loop integration gain (the 1st gain)	You can determine the rigidity of velocity loop.	0 to 10000
2b	Velocity feed forward gain (the 1st gain) (%)	This is the function to forward (add) position command to speed command.	0 to 100
2C	Speed detection filter (the 1st gain)	You can set the time constant of low-pass filter of speed feedback.	5 to 20
2d	Velocity feed forward-timeconstant (Common to the 1st/2nd gain) (ms)	This is a filter in velocity feed forward section.	0 to 500
2E	Torque limit setting (the 1st gain)	Output torque of motor is limited.	50 to 150
2F	Torque filter-timeconstant (Common to the 1st/2nd gain)	You can set the time constant of primary delay filter of torque instruction.	0 to 500
30	The 2nd position loop gain (the 2nd gain)	You can determine the response of position control.	0 to 100
31	The 2nd velocity loop gain (the 2nd gain)	You can determine the response of velocity loop.	0 to 10000
32	The 2nd velocity loop integration gain (the 2nd gain)	You can determine the rigidity of velocity loop.	0 to 10000
33	The 2nd velocity feed forward gain (the 2nd gain) (%)	Set it at 0 in normal use. This is the function to forward (add) position command to speed command during on the 2nd gain.	0 to 100
34	The 2nd speed detection filter (the 2nd gain)	Use the default setting normally. You can set the time constant of low-pass filter in speed feedback.	5 to 20
35	The 2nd torque limit setting (the 2nd gain) (%)	Output torque of the motor is limited.	50 to 150
36	Gain switching mode selection	0: Fixed at the 1st gain, 1: Fixed at the 2nd gain 2: Automatic switching (In running = the 2nd gain, In standstill = the 1st gain)	0 to 2
37	Gain switching time (ms)	When the gain switching mode is set to automatic switching, after the output of instruction, the 2nd gain (in running) changes to the 1st gain (in standstill) when time setting has elapsed.	0 to 10000

Parameter No.	Parameter name	Explanation	Setting range
38	In-position range	In-position signal is turned on when position error (difference between command position and actual position) is below setting.	0 to 16383
39	Position error set-up	Abnormal detect when deviation value exceeds the set value × 8.	0 to 16383
3A	Position error invalidation	0: Effective, 1: Ineffective (Motor does not trip but keeps on operating.)	0, 1
3E	Run-command selection	You can select the run-command. 0: I/O, 1: RS485	0, 1
40	Homing mode	Select homing method.	0 to 5
41	Homing direction	You can set the detection direction of home.	0, 1
42	Homing speed (r/min)	You can set the speed in homing action.	0 to 4000
43	Homing limit	Sets the limit of the amount of movement during homing. Homing error detect if travel distance has exceeded this setting.	0 to 16383
44	Homing acceleration/deceleration time (ms)	You can set time taken for reaching the homing speed.	1 to 30000
45	Bumping torque detection value (%)	You can limit the output torque of motor when returning to bumping home.	50 to 150
46	Bumping detection time (ms)	You can set the detection time of bumping toque in returning to bumping home.	0 to 15000
47	Home offset (pulse)	You can set the offset from home detection position.	-16384 to 16383
48	Homing function	0: Required, 1: Not required (Position when power is turned on is the home.) 2: When homing is not completed yet, homing operation is executed by positioning start signal.	0 to 2
49	Homing selection when motor is free	0: When homing is unavailable after motor free state is reset (when trip occurs, after trip is reset), positioning operation is enabled. 1: When motor is free (trip occurs), homing is required again.	0, 1
4A	Present position overflow permission	You can set operation when the present position counter of motor has overflowed (exceeded ±32767 rotations). 0: Prohibited (motor trip), 1: Permitted (no motor trip)	0, 1
4b	Jog speed (r/min)	You can set the operation speed in jog operation.	0 to 4000
4C	Jog acceleration time (ms)	You can set time taken for reaching jog speed.	1 to 30000
4d	Jog deceleration time (ms)	You can set time taken from jog speed until stopping.	1 to 30000
4E	Teaching speed (r/min)	You can set speed used in applying teaching function of Digital key pad.	0 to 4000
50	I1 function selection	You can assign functions to I1 through I4. 0: Forced trip, 1: Instantaneous stop, 2: Deceleration stop 3: Homing start, 4: Forward jog, 5: Reverse jog, 6: Point designation 1 7: Point designation 2, 8: Run start, 9: Sequential run start 10: Trip reset, 11: Home sensor, 12: Limit in + direction 13: Limit in - direction, 14: Direction switching, 15: Motor-free	0 to 15
51	I2 function selection		
52	I3 function selection		
53	I4 function selection		
54	I1 Input logic selection	0: Normal logic (Input is effective (ON) when connected to GND.)	
55	I2 Input logic selection	1: Reverse rotation logic (Input is effective (ON) when OPEN (open))	
56	I3 Input logic selection	Set the reverse rotation logic to the input desired to be operated on wiring break side such as forced trip (emergency stop input).	0, 1
57	I4 Input logic selection		
58	Trip reset function enable	0: Disable, 1: Enable (Operation start signal longer than 1 second enables execution of trip reset.)	0, 1
59	Deceleration time in instantaneous stop (ms)	Set the deceleration time in executing instantaneous stop.	0 to 30000
5C	O1 function selection	You can assign functions to O1 and O2. 0: Trip output, 1: In-position, 2: In-motion signal (BUSY) 3: Homing completion, 4: Overload detection, 5: Torque under restriction	0 to 5
5d	O2 function selection		
5E	O1 output polarity selection	0: Normal logic (Output transistor ON at enabled, OFF at disabled) 1: Reversed logic (Output transistor OFF at enabled, ON at disabled)	0, 1
5F	O2 output polarity selection	When only trip output is normal logic, output transistor is off in tripping, and output transistor is on in no tripping.	
60	RS485 device number	Set the device number of amplifier in communication (Amplifier ID).	128 to 159 (80h to 9Fh)
61	RS485 communication speed	Set the communication speed of RS485 communication.	0 to 2
62	RS485 communication standard	Set the communication standard of RS485 communication.	0 to 11
63	RS485 communication response time (ms)	Communication response time is the shortest time for setting transmission mode in RS485 bus for response after the amplifier has received communication data.	10 to 100
64	RS485 retry times of communication	Set the retry times of RS485 communication.	0 to 9
65	RS485 protocol timeout (seconds)	Protocol timeout is the time allowed from reception of a character code to reception of the next one in communication.	1 to 255
6A	Trip history clear	When "(yes)" is set, trip history (Pr6b to 6F) is cleared.	0(No), 1(Yes)
6b	Trip history 1	Display the latest trip.	—
6C	Trip history 2	Display the 2nd latest trip.	—
6d	Trip history 3	Display the 3rd latest trip.	—
6E	Trip history 4	Display the 4th latest trip.	—
6F	Trip history 5	Display the 5th latest trip.	—
77	Parameter copy function	This function is only available with use of the Digital key pad.	No/P.INIT/ P.LOAD/P.PROG
7A	Monitor mode switching	You can choose monitor screen to be displayed first when the Digital key pad is connected.	0 to 6
7b	Numerator of command pulse ratio		
7C	Denominator of command pulse ratio	You can set the division multiplier ratio of travel distance.	1 to 20000
7F	For manufacturer use	It cannot be changed.	—

Example setting of motion pattern

Indexing (feeding by fixed length)

- When feeding by fixed length of travel



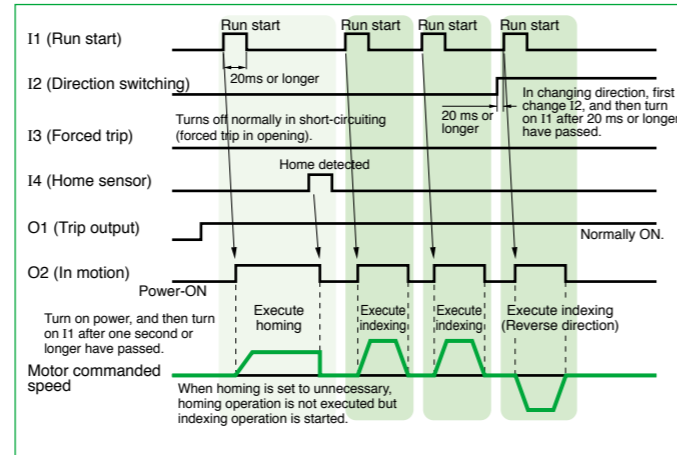
<Example of setting>

- Every time I1 is turned on, the motor runs for fixed travel distance.
- Homing operation is executed and the home is set when I1 is turned on just once after power-on. (It is also possible to set power-on position to the home.)

[Signal function setting]

Terminal symbol	Terminal number	Terminal name	Description of function
I1	1	Signal input 1	Operates when "I1" and "GND" are shorted (Homing operation for the first time after power-on)
I2	2	Signal input 2	CW operation when "I2" and "GND" are shorted, CCW operation when they are opened (including homing operation mode)
I3	11	Signal input 3	Motor trips when "I3" and "GND" are open.
I4	4	Signal input 4	Home detected when "I4" and "GND" are shorted.
O1	6	Signal output 1	Trip output (Normally on, and off in tripping)
O2	12	Signal output 2	In motion signal (including homing operation)

[Operation timing chart]



[Parameter setting] Indicates only the point changed from default setting. (Parameter marked with * is effective after power resetting.)

Function	Parameter No. (Pr□□)	Name of parameter	Setting	Remarks
Selection of signal function	50*	I1 function selection	8	Run start (used only for the 1st point)
	51*	I2 function selection	14	Direction switching input
	52*	I3 function selection	0	Forced trip input
	53*	I4 function selection	11	Home sensor input
	56*	I3 input logic selection	1	Changes the polarity of 3 to effective when open (forced trip in this case).
	5C	O1 function selection	0	Trip output
	5d	O2 function selection	2	In-motion signal
Homing function	40	Homing mode	0, 1, 5	Set homing in which to use home sensor.
	41	Homing direction	0, 1	Set any desired homing direction.
	42	Homing speed	200	Set any desired operation speed.
	44	Homing acceleration/deceleration time	200	Set any desired acceleration/deceleration time.
	48*	Homing function	2	Set to 1 when setting power-on position to the home.
	49	Selecting homing when motor is free	1	Set to 1 (homing is required again when tripping occurs.)
	4A	Present position overflow permission	1	Set to 1 (permits overflow).
The 1st point (indexing length)	00	The 1st target position (rotation number)	10	Set the travel distance by rotation number and pulse (one rotation per 288 pulses).
	01	The 1st target position (pulse)	0	When the setting does not represent proper mechanical reduction gear ratio, accumulated error occurs, which results in dislocation.
	02	The 1st coordinate setting	0	Set relative travel.
	03	The 1st setting speed	2000	Set any desired operation speed.
	04, 05	The 1st acceleration time/ The 1st deceleration time	200	Set any desired acceleration time and deceleration time.
	06	The 1st block setting	0	Set normal operation.

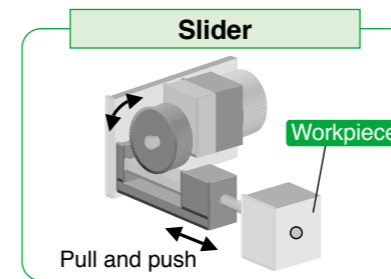
<Information>

In this setting, I3 is set to forced trip when open. Connect an emergency stop switch or the like which is shorted but open at error to I3 terminal.

Please note that the motor will not run due to forced trip without such connection.

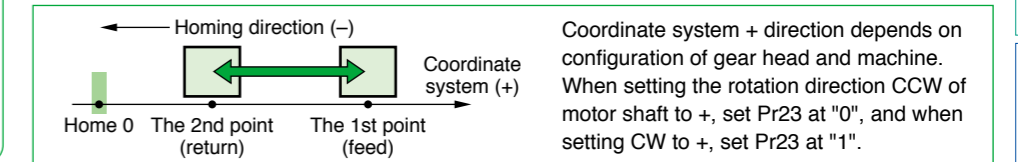
Reciprocating

- When executing reciprocating run between fixed positions



<Example of setting>

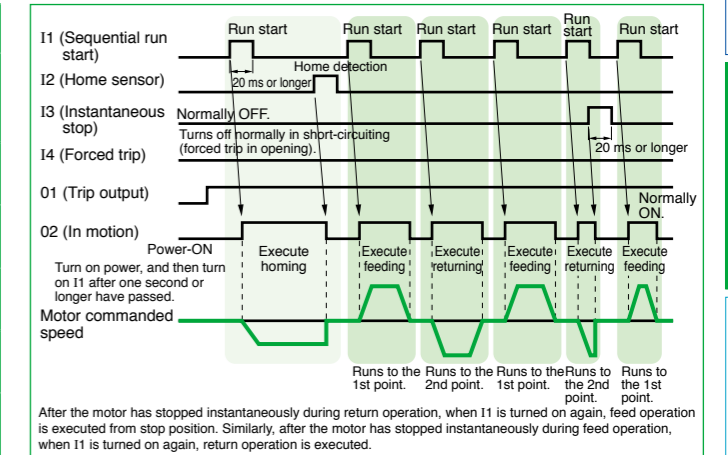
- Every time I1 is turned on, feed action → return action → feed action is repeated in turn.
- When power is on, homing operation is executed and home is set by I1.



[Signal function setting]

Terminal symbol	Terminal number	Terminal name	Description of function
I1	1	Signal input 1	Operates when "I1" and "GND" are shorted (Homing operation for the first time after power-on)
I2	2	Signal input 2	Home detected when "I2" and "GND" are shorted.
I3	11	Signal input 3	Operation stops when "I3" and "GND" are shorted.
I4	4	Signal input 4	Motor trips when "I4" and "GND" are open.
O1	6	Signal output 1	Trip output (Normally on, and off in tripping)
O2	12	Signal output 2	In motion signal (including homing operation)

[Operation timing chart]



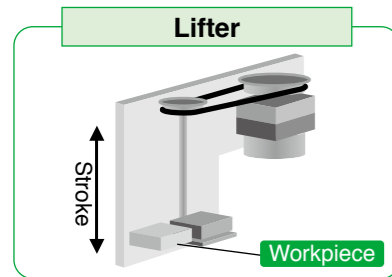
[Parameter setting] Indicates only the point changed from default setting. (Parameter marked with * is effective after power resetting.)

Function	Parameter No. (Pr□□)	Name of parameter	Setting	Remarks
Selection of signal function	50*	I1 function selection	9	Sequential run start
	51*	I2 function selection	11	Home sensor input
	52*	I3 function selection	1	Instantaneous stop input
	53*	I4 function selection	0	Forced trip input
	57*	I4 input logic selection	1	Changes the polarity of I4 to effective when open (forced trip in this case).
	5C	O1 function selection	0	Trip output
	5d	O2 function selection	2	In-motion signal
Homing function	40	Homing mode	0	Set homing in which to use home sensor.
	41	Homing direction	1	Set the homing direction normally to minus direction (return direction).
	42	Homing speed	200	Set any desired operation speed.
	44	Homing acceleration/deceleration time	200	Set any desired acceleration/deceleration time.
	48*	Homing function	2	Homing operation by initial I1 input when power is turned on.
	49	Selecting homing when motor is free	0	Homing is not required when tripping occurs.
	4A	Present position overflow permission	0	Overflow is not permitted because absolute travel is set.
The 1st point (feed position)	23*	Coordinate system setting	0, 1	Set so that homing is in minus direction.
	00	The 1st target position (rotation number)	10	Set the feed position coordinates.
	01	The 1st target position (pulse)	0	
	02	The 1st coordinate setting	1	Set absolute travel.
	03	The 1st setting speed	2000	Set any desired travel.
	04, 05	The 1st acceleration time/ The 1st deceleration time	200	Set any desired acceleration time and deceleration time.
	06	The 1st block setting	0	Set normal operation.
The 2nd point (return position)	08	The 2nd target position (rotation number)	2	Set the return position coordinate.
	09	The 2nd target position (pulse)	0	(Set 0 when the position is the same as home.)
	0A	The 2nd coordinate setting	1	Set absolute travel.
	0b	The 2nd setting speed	2000	Set any desired travel.
	0C, 0d	The 2nd acceleration time/ The 2nd deceleration time	200	Set any desired acceleration time and deceleration time.
0E	The 2nd block setting	0	Set normal operation.	
Others	22	Sequential run Maximum point number	2	Restricts the maximum point number in sequential operation. When this parameter is set to 2, whenever I1 is turned on, system operates in turn from the 1st point → the 2nd point → the 1st point ...

Example setting of motion pattern

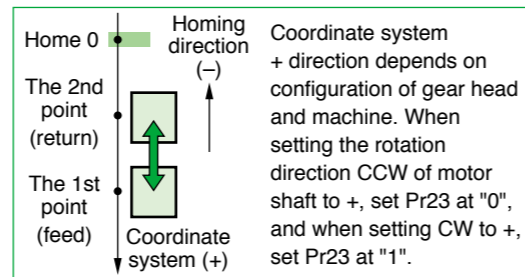
Automatic reciprocating

• When executing fixed reciprocating sequence operation with single run start signal



<Example of setting>

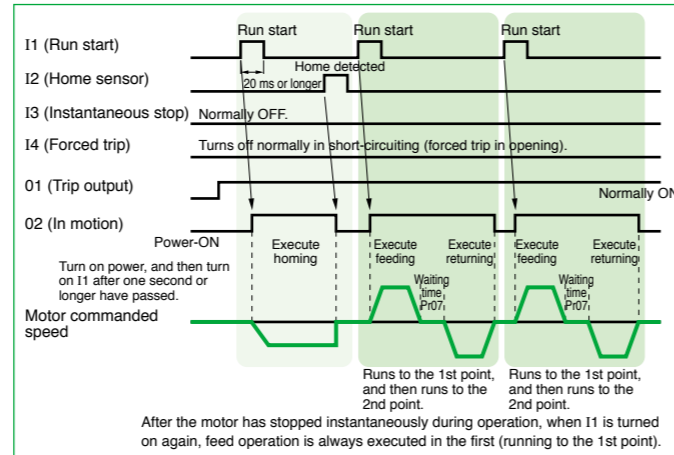
- When I1 is turned on, the unit moves to target position (feed position), waits for a specified time, and returns to original position (return position).
- When power is on, homing operation is executed and home is set by I1.



[Signal function setting]

Terminal symbol	Terminal number	Terminal name	Description of function
I1	1	Signal input 1	Operates when "I1" and "GND" are shorted (Homing operation for the first time after power-on)
I2	2	Signal input 2	Home detected when "I2" and "GND" are shorted.
I3	11	Signal input 3	Operation stops when "I3" and "GND" are shorted. (Motor does not operate during short-circuit.)
I4	4	Signal input 4	Motor trips when "I4" and "GND" are open.
O1	6	Signal output 1	Trip output (Normally on, and off in tripping)
O2	12	Signal output 2	In motion signal (including homing operation)

[Operation timing chart]

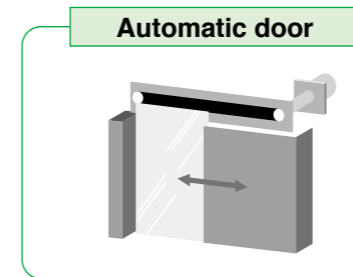


[Parameter setting] Indicates only the point changed from default setting. (Parameter marked with * is effective after power resetting.)

Function	Parameter No. (Pr□□)	Name of parameter	Setting	Remarks
Selection of signal function	50*	I1 function selection	8	Run start
	51*	I2 function selection	11	Home sensor input
	52*	I3 function selection	1	Instantaneous stop input
	53*	I4 function selection	0	Forced trip input
	57*	I4 input logic selection	1	Changes the polarity of I4 to effective when open (forced trip in this case).
	5C	O1 function selection	0	Trip output
	5d	O2 function selection	2	In-motion signal
Homing function	40	Homing mode	0	Set homing in which to use home sensor.
	41	Homing direction	1	Set the homing direction normally to minus direction (return direction).
	42	Homing speed	200	Set any desired operation speed.
	44	Homing acceleration/deceleration time	200	Set any desired acceleration/deceleration time.
	48*	Homing function	2	Homing operation by initial I1 input when power is turned on.
	49	Selecting homing when motor is free	0	Homing is not required when tripping occurs.
	4A	Present position overflow permission	0	Overflow is not permitted because absolute travel is set.
The 1st point (feed position)	23*	Coordinate system setting	0, 1	Set so that homing is in minus direction.
	00	The 1st target position (rotation number)	10	Set the feed position coordinates.
	01	The 1st target position (pulse)	0	
	02	The 1st coordinate setting	1	Set absolute travel.
	03	The 1st setting speed	2000	Set any desired operation speed.
	04, 05	The 1st acceleration time/ The 1st deceleration time	200	Set any desired acceleration/deceleration time.
	06	The 1st block setting	1	Execute running to the 2nd point, after executing running to the 1st point.
The 2nd point (return position)	07	The 1st block timer setting	500	The 2nd point operation is started in 500 ms.
	08	The 2nd target position (rotation number)	2	Set the return position coordinate.
	09	The 2nd target position (pulse)	0	(Set 0 when the position is the same as home.)
	0A	The 2nd coordinate setting	1	Set absolute travel.
	0b	The 2nd setting speed	2000	Set any desired operation speed.
	0C, 0d	The 2nd acceleration time/ The 2nd deceleration time	200	Set any desired acceleration/deceleration time.
	0E	The 2nd block setting	0	Set normal operation.
0F	The 2nd block timer setting	0	Ineffective because 0E is 0.	

Door opening/closing

• When executing reciprocating operation between 2 points

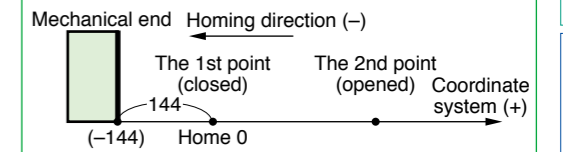


<Example of setting>

- When open/close is chosen and I1 is input, open/close operation is executed.
- When the door is stopped in any position on the way of action, opening or closing operation is enabled from such position. (It is the same when the door is moved by hand with motor disabled.)
- Use of bumping homing enables elimination of home sensor.
- Holding torque when motor is stopped can be changed.

• Coordinate system + direction depends on configuration of gear head and machine. When setting the rotation direction CCW of motor shaft to +, set Pr23 at "0", and when setting CW to +, set Pr23 at "1".

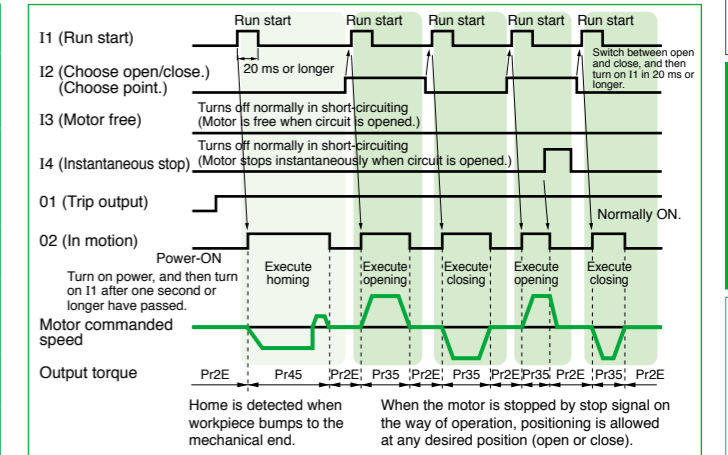
• When setting the Mechanical end offset value to -144, the Home is the point which has moved 144 pulses to the + direction seen from the Mechanical end.



[Signal function setting]

Terminal symbol	Terminal number	Terminal name	Description of function
I1	1	Signal input 1	Operates when "I1" and "GND" are shorted (Homing operation for the first time after power-on)
I2	2	Signal input 2	Opening (point 2) operation when "I2" and "GND" are shorted, and closing (point 1) operation when they are open.
I3	11	Signal input 3	Motor is free when "I3" and "GND" are open. (Servo lock released)
I4	4	Signal input 4	Operation is stopped when "I4" and "GND" are open. (Motor is not activated while they are open.)
O1	6	Signal output 1	Trip output (Normally on, and off in tripping)
O2	12	Signal output 2	In motion signal (including homing operation)

[Operation timing chart]



[Parameter setting] Indicates only the point changed from default setting. (Parameter marked with * is effective after power resetting.)

Function	Parameter No. (Pr□□)	Name of parameter	Setting	Remarks	
Selection of signal function	50*	I1 function selection	8	Run start	
	51*	I2 function selection	6	Point designation 1 input (choosing the 1st/2nd point)	
	52*	I3 function selection	15	Motor-free input	
	53*	I4 function selection	1	Instantaneous stop input	
	56*	I3 input logic selection	1	Changes the polarity of I3 to effective when open (motor-free in this case).	
	57*	I4 input logic selection	1	Changes the polarity of I4 to effective when open (instantaneous stop in this case).	
	5C	O1 function selection	0	Trip output	
	5d	O2 function selection	2	In-motion signal	
	Homing function	40	Homing mode	3	Bumping homing
		41	Homing direction	1	Set the homing direction normally to minus direction (closing direction).
42		Homing speed	200	Set any desired operation speed.	
44		Homing acceleration/deceleration time	200	Set any desired acceleration/deceleration time.	
45		Bumping torque detection value	50	Torque limit during bumping homing	
46		Bumping torque detection time	100	Home is detected when torque restriction continues for one second.	
47		Home offset	-144	Set the distance from the home desired to be set to the mechanical end.	
48*		Homing function	2	When power is turned on, homing operation is executed by initial I1 input.	
49		Homing selection when motor is free	0	Homing is not required when tripping occurs.	
4A		Present position overflow permission	0	Overflow is not permitted because absolute travel is set.	
The 1st point (door closing position)	23*	Coordinate system setting	0, 1	Set so that homing is in minus direction.	
	00	The 1st target position (rotation number)	0	Set the door closing position coordinate. (Coordinate is 0 when closing position is the same as home position.)	
	01	The 1st target position (pulse)	0		
	02	The 1st coordinate setting	1	Set absolute travel.	
	03	The 1st setting speed	2000	Set any desired operation speed.	
	04, 05	The 1st acceleration time/ The 1st deceleration time	200	Set any desired acceleration time and deceleration time.	
	06	The 1st block setting	0	Set normal operation.	
	The 2nd point (door opening position)	08	The 2nd target position (rotation number)	40	Set the door opening position coordinate.
		09	The 2nd target position (pulse)	0	
		0A	The 2nd coordinate setting	1	Set absolute travel.
0b		The 2nd setting speed	2000	Set any desired operation speed.	
0C, 0d		The 2nd acceleration time/ The 2nd deceleration time	200	Set any desired acceleration time and deceleration time.	
0E		The 2nd block setting	0	Set normal operation.	

For automatically changing the retention torque (retention force) when door is stopped

Gain switching function	Parameter No.	Name of parameter	Setting	Remarks
Gain switching function	2E	Torque limit setting	100	Sets the retention torque when door is stopped. The smaller the value is, the weaker the retention force becomes.
	35	The 2nd torque limit setting	150	Maximum output torque when door is operating.
	36	Gain switching mode selection	2	Set to 0 when executing no switching.
	37	Gain switching time	100	Torque is changed in 100 ms after completion of operation instruction.

Specification (For Common specification, see p. 47, 48)

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.	MBEG5A1BCP	MBMU5AZAB	50	Single phase 100 to 120	±10	50/60	1.5	0.16	0.24	3000	4000
	MBEG5A5BCP			Single phase / 3-phase 200 to 240			Single phase 0.7 3-phase 0.35				

* Starting torque: Representative value

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

Applicable Gear head	Reduction ratio	5	10	15	20	30	50
MB8G□BV	3000 or less	0.71	1.4	2.2	2.8	4.0	6.8
	3000 to 4000	0.53	1.1	1.7	2.1	3.0	5.1
Rotational direction		Same as motor rotational direction				Reverse to motor rotational direction	

Permissible load inertia moment (×10⁻⁴ kg·m²)

Reduction ratio	5	10	15	20	30	50
Applicable Gear head	3.42	13.8	30.6	55.8	127	342
MB8G□BV						

Permissible shaft load

Applicable Gear head	Overhung load (W)	Thrust load (F)
MB8G5BV	245 N	98 N
MB8G10BV, 15BV, 20BV	343 N	
MB8G30BV, 50BV	539 N	

Wiring diagram

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

Connector for control signals (I/O): 02, 01, +5V, (NC), GND, 14, (NC), 13, 12, 11.

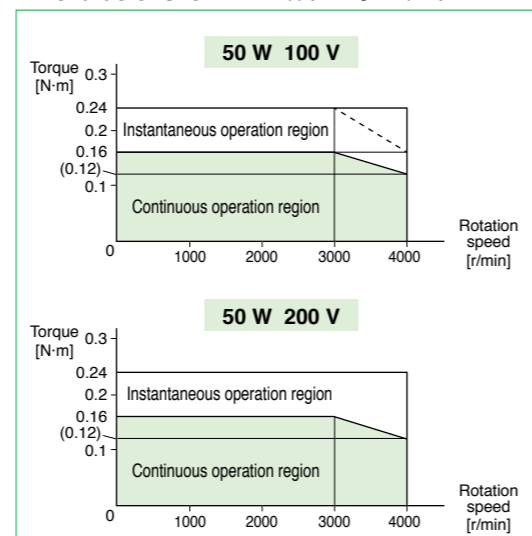
* Do not connect anything on (NC). Please refer to P.69 for the wiring of the motor extension cable.

Be sure to ground the grounding terminal.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

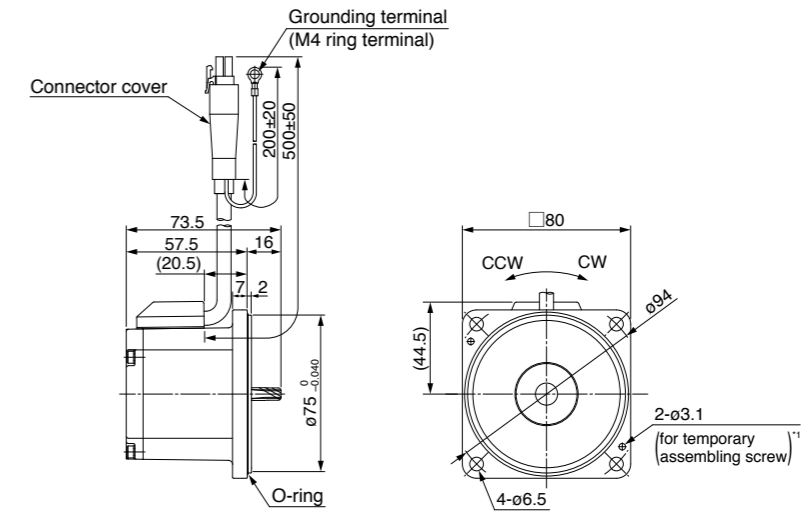
* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

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



Motor (dimensions)

Unit mm



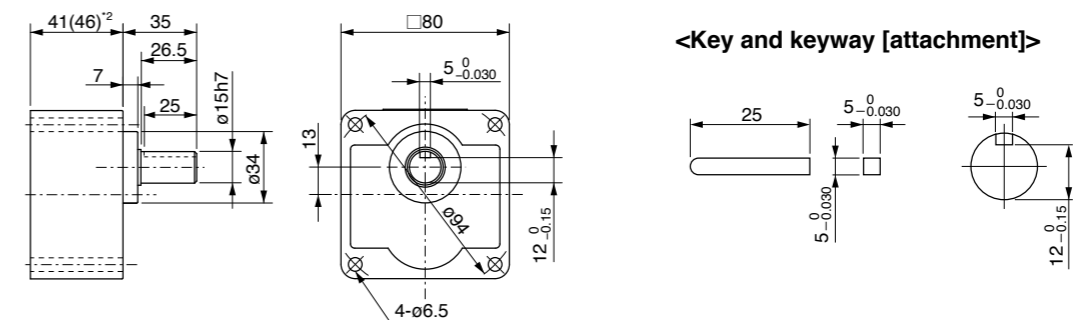
mass
0.7 kg

*1 Before installing the equipment, assemble the motor and gear head temporarily, which will ensure stable installation of the equipment.

Gear head (dimensions)

Unit mm

MB8G□BV

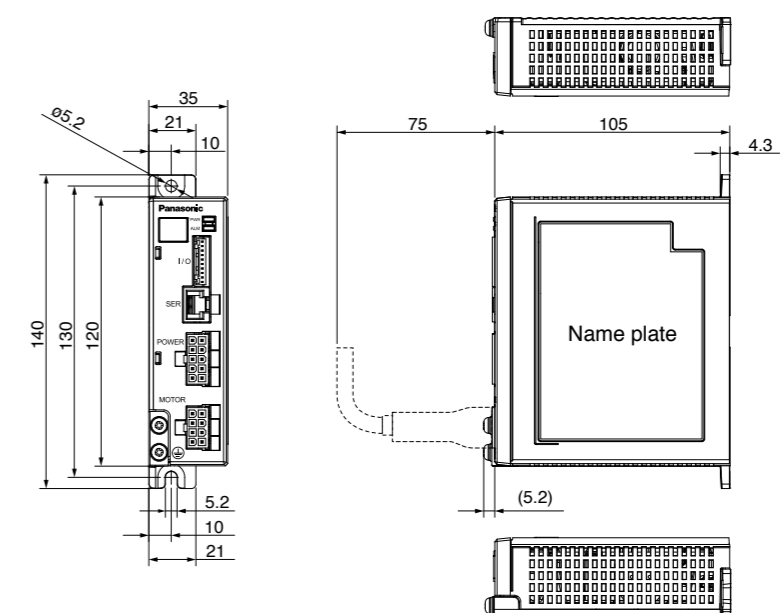


mass
0.8 kg
(0.9 kg)*2

*2 Dimensions and mass with () is the gearhead of gear ratio greater than 30.

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.

Specification (For Common specification, see p. 47, 48)

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)
90 mm sq.	MBEG9A1BCP	MBMU9A1AB	90	Single phase 100 to 120	±10	50/60	2.2	0.29	0.43	3000	4000
	MBEG9A5BCP	MBMU9A2AB		Single phase 200 to 240			Single phase 1.1				

* Starting torque: Representative value

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

Applicable Gear head	Reduction ratio	5	10	15	20	30	50	
								MB9G□BV
3000 to 4000	0.90	1.9	2.7	3.7	5.3	8.7		
Rotational direction		Same as motor rotational direction				Reverse to motor rotational direction		

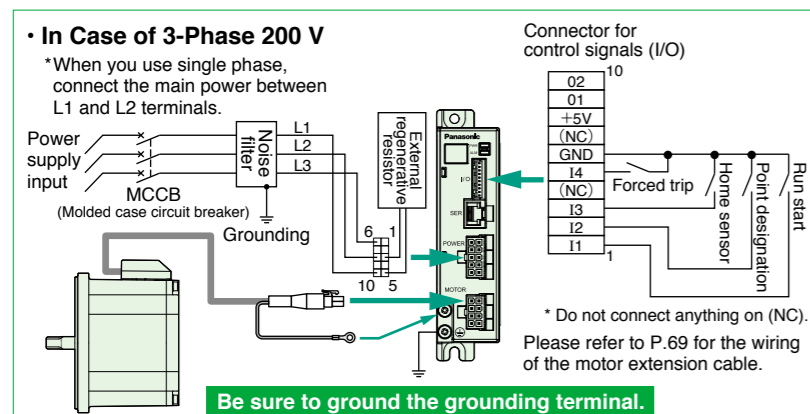
Permissible load inertia moment (×10⁻⁴ kg·m²)

Reduction ratio	5	10	15	20	30	50
Applicable Gear head	16.4	67.6	142	257	589	1684
MB9G□BV						

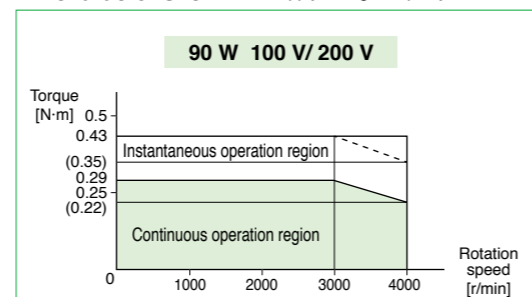
Permissible shaft load

Applicable Gear head	Overhung load (W)	Thrust load (F)
MB9G10BV, 15BV, 20BV	490 N	
MB9G30BV, 50BV	637 N	

Wiring diagram

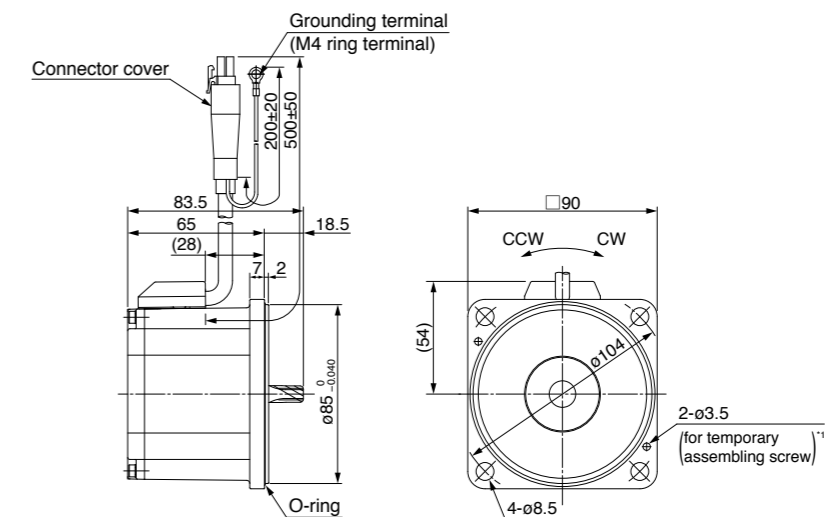


Speed-torque characteristic (Dotted line shows a characteristic curve when supply voltage drops by 10 %)



Motor (dimensions)

Unit mm



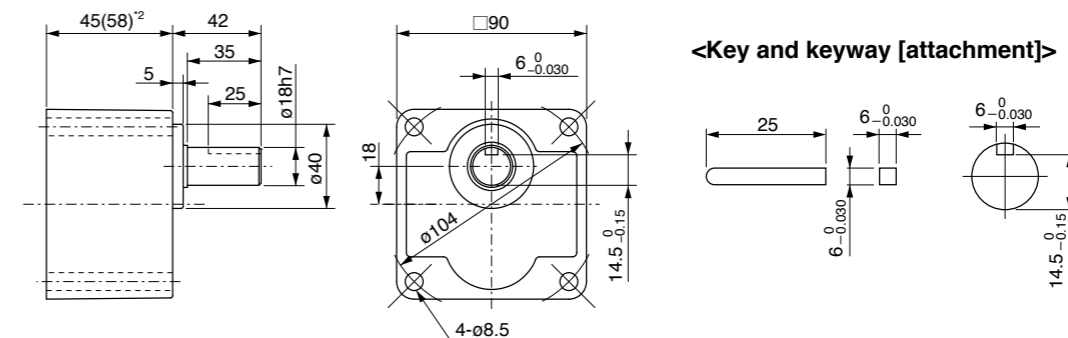
*1 Before installing the equipment, assemble the motor and gear head temporarily, which will ensure stable installation of the equipment.

Gear head (dimensions)

Unit mm

MB9G□BV

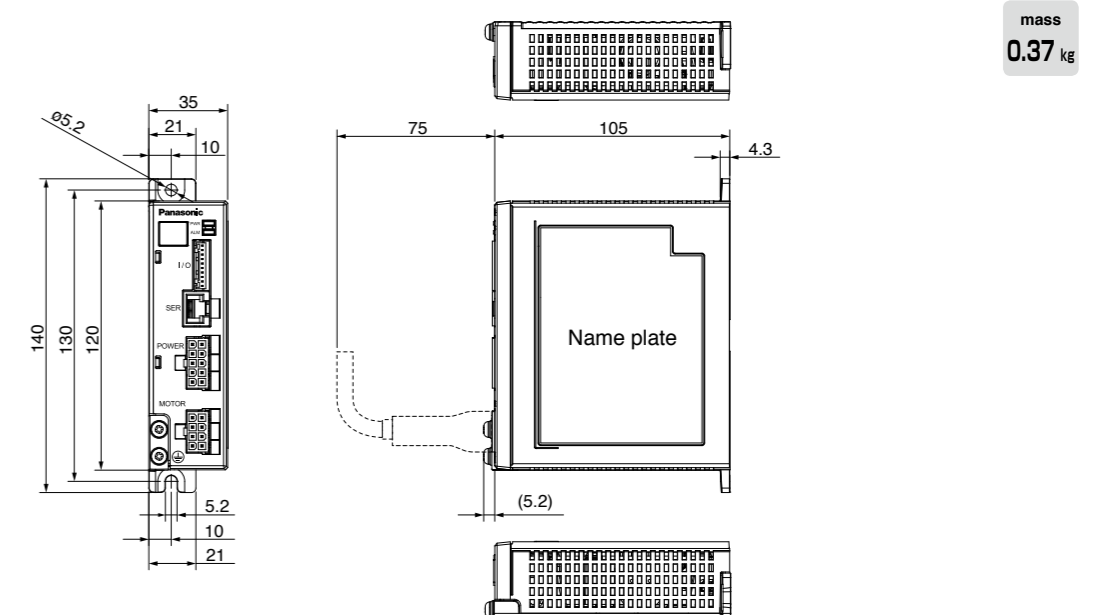
mass **1.1 kg**
(1.4 kg)^{*2}



*2 Dimensions and mass with () is the gearhead of gear ratio greater than 30.

Brushless amplifier (dimensions)

Unit mm



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

■ Specification (For Common specification, see p. 47, 48)

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)
90 mm sq.	MBEG1E1BCP	MBMU1E1AB	130	Single phase 100 to 120	±10	50/60	2.8	0.41	0.62	3000	4000
	MBEG1E5BCP	MBMU1E2AB		Single phase 1.5 3-phase 0.7							

* Starting torque: Representative value

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

Applicable Gear head	Reduction ratio	Permissible torque (N·m)						
		5	10	15	20	30	50	
MB9G□BV	3000 or less	1.9	3.7	5.6	7.4	10.7	17.7	
		1.1	2.1	3.3	4.3	6.2	10.3	
	3000 to 4000	100 V	1.1	2.1	3.3	4.3	6.2	10.3
		200 V	1.4	2.8	4.2	5.6	8.0	13.3
Rotational direction		Same as motor rotational direction			Reverse to motor rotational direction			

■ Permissible load inertia moment (×10⁻⁴ kg·m²)

Reduction ratio	5	10	15	20	30	50
Applicable Gear head						
MB9G□BV	16.4	67.6	142	257	589	1684

■ Permissible shaft load

Applicable Gear head	Permissible shaft load	
	Overhung load (W)	Thrust load (F)
MB9G5BV	294 N	147 N
MB9G10BV, 15BV, 20BV	490 N	
MB9G30BV, 50BV	637 N	

■ Wiring diagram

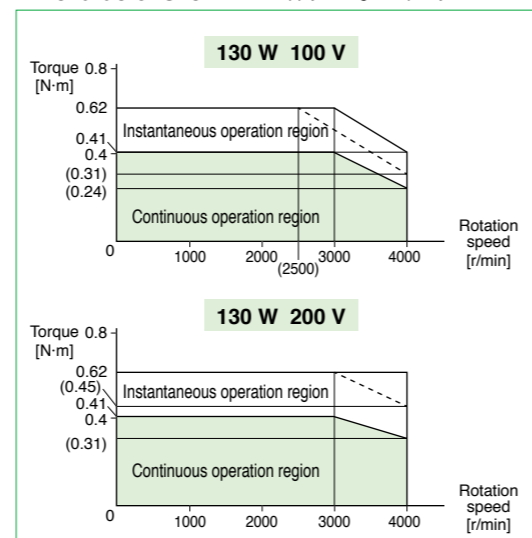
• In Case of 3-Phase 200 V
*When you use single phase, connect the main power between L1 and L2 terminals.

Be sure to ground the grounding terminal.

In wiring to power supply (outside of equipment) from MCCB, use an electric wire of 1.6 mm diameter (2.0 mm²) or more both for main circuit and grounding. Apply grounding class D (100 Ω or below) for grounding. Do not tighten the ground wires together, but connect them individually.

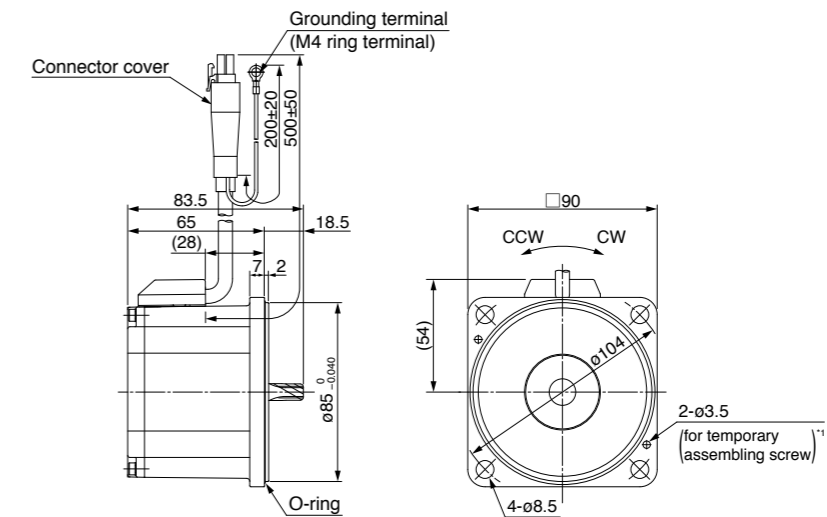
* Before using, be sure to read "Instruction manual" to check precautions and correct procedure.

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



Motor (dimensions)

Unit mm



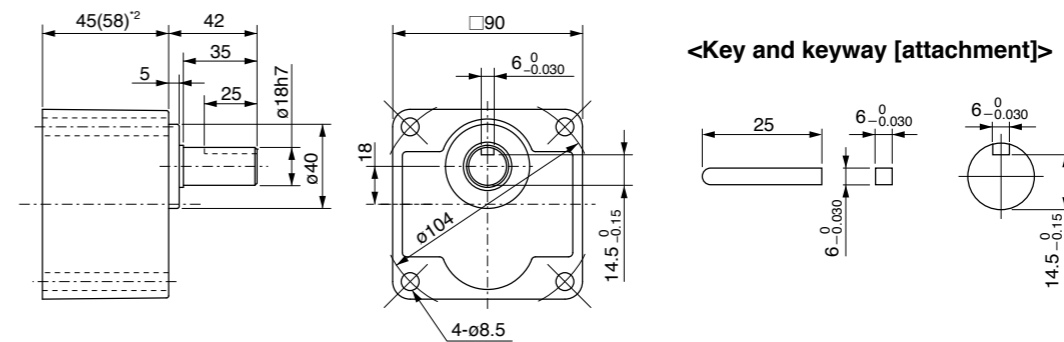
mass
1.2 kg

*1 Before installing the equipment, assemble the motor and gear head temporarily, which will ensure stable installation of the equipment.

Gear head (dimensions)

Unit mm

MB9G□BV

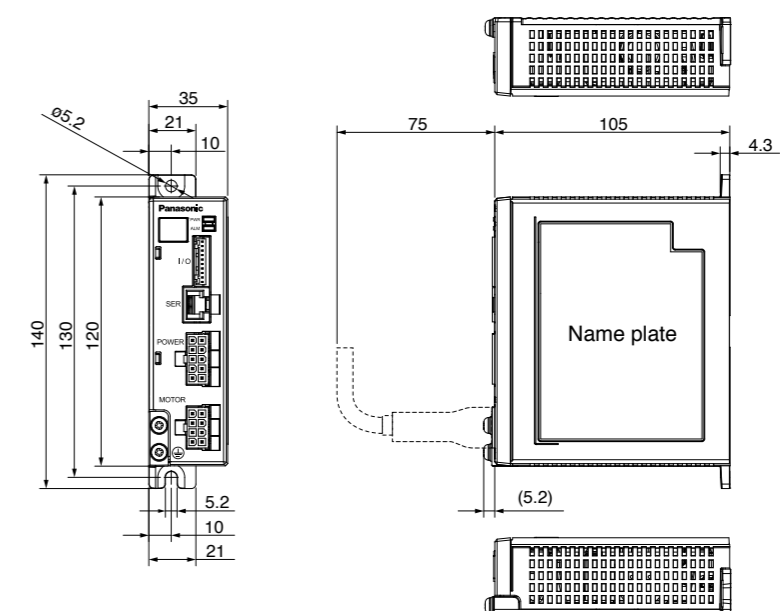


mass
1.1 kg
(1.4 kg)^{*2}

*2 Dimensions and mass with () is the gearhead of gear ratio greater than 30.

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.

Gear head GP series

Outline of gear head

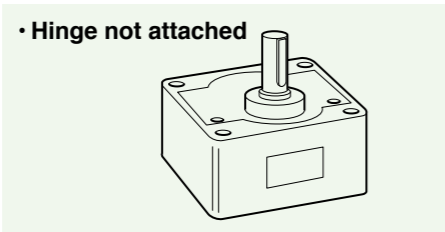
Reduction ratio

- Reduction ratio are 6 types 1/5 to 1/50.

Gear type/size

MB8 : 50 W (Hinge not attached)

MB9 : 90 W, 130 W (Hinge not attached)



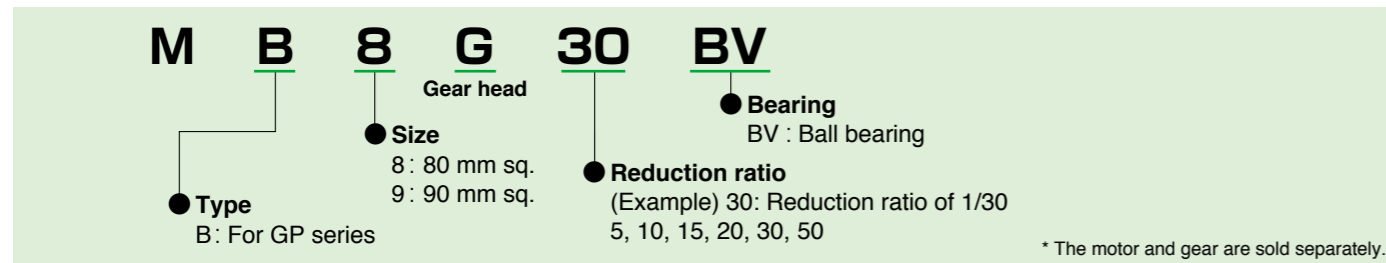
Backlash

Less than 2° (design value)

Type of gear head and reduction ratio

Gear type/size	Motor capacity	Reduction ratio					
		1/5	1/10	1/15	1/20	1/30	1/50
MB8	50 W	○	○	○	○	○	○
MB9	90 W, 130 W	○	○	○	○	○	○

Check the Model number



Calculation of torque at output shaft of gear head

Standard gear head only

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

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

N_G : Speed of gear head [r/min] T_G : Output torque of gear head [N·m]
 N_M : Motor speed [r/min] T_M : Motor torque [N·m]
 i : Reduction ratio of gear head η : Gear head efficiency

Maximum permissible torque

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

Nominal reduction ratio and actual reduction ratio

Actual reduction ratio of MB8, MB9 is the same as the nominal reduction ratio.

Gear head

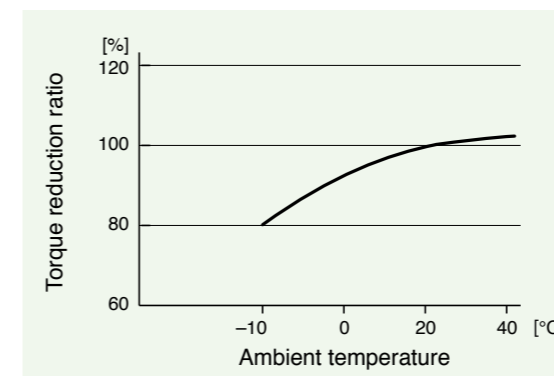
Nominal reduction ratio	Actual reduction ratio	
	MB8G□BV	MB9G□BV
1/5	1/5	1/5
1/10	1/10	1/10
1/15	1/15	1/15
1/20	1/20	1/20
1/30	1/30	1/30
1/50	1/50	1/50

Gear head efficiency

Model No.	Reduction ratio					
	5	10	15	20	30	50
MB8G□BV	90 %				86 %	
MB9G□BV	90 %				86 %	

Gear head efficiency and ambient temperature

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



<Important>

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

Gear head GP series

Model list of gear head

Gear head

Ball bearing

Size	Reduction ratio	Model No.
80 mm sq. (50 W)	1/5, 1/10, 1/15	MB8G5BV、 MB8G10BV、 MB8G15BV
	1/20, 1/30	MB8G20BV、 MB8G30BV
	1/50	MB8G50BV
90 mm sq. (90 W·130 W) (Common use)	1/5	MB9G5BV
	1/10, 1/15	MB9G10BV、 MB9G15BV
	1/20, 1/30, 1/50	MB9G20BV、 MB9G30BV、 MB9G50BV

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

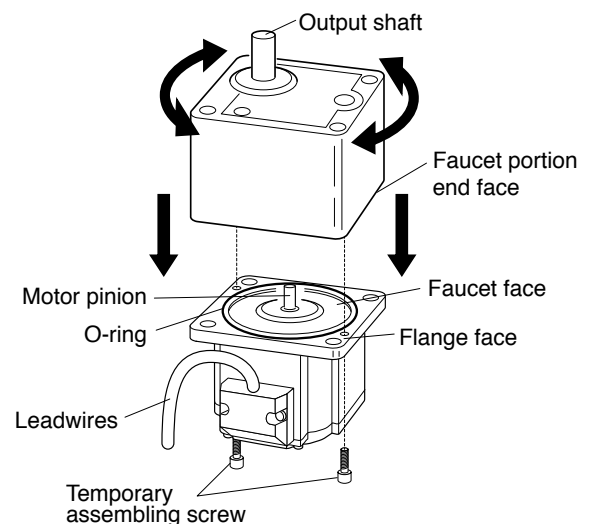
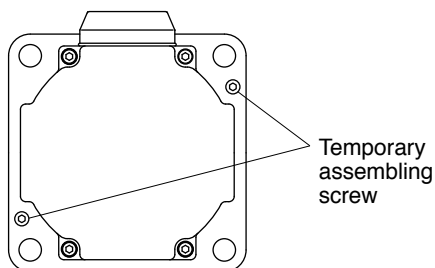
Gear head accessory

Ball bearing

Size	Reduction ratio	Model No.	Accessory				
			Screw (mm)	Flat washer	Hexagon nut	For temporary assembling screw hexagon socket head bolt	Key
80 mm sq.	1/5 to 1/20	MB8G5BV to MB8G20BV	M6×65 hexagon socket head bolt : 4	for M6: 4	M6: 4	M2.6×12 : 2	5×5×25 one-end round : 1
	1/30, 1/50	MB8G30BV、 MB8G50BV	M6×70 hexagon socket head bolt : 4	for M6: 4	M6: 4	M2.6×12 : 2	5×5×25 one-end round : 1
90 mm sq.	1/5 to 1/20	MB9G5BV to MB9G20BV	M8×75 hexagon socket head bolt : 4	for M8: 4	M8: 4	M3×12 : 2	6×6×25 one-end round : 1
	1/30, 1/50	MB9G30BV、 MB9G50BV	M8×90 hexagon socket head bolt : 4	for M8: 4	M8: 4	M3×12 : 2	6×6×25 one-end round : 1

<Information>

MB type gear head is provided with temporary assembling screw (two hexagon socket head bolt). Before installing the equipment, assemble the motor and gear head temporarily, which will ensure stable installation of the equipment. In installing to the equipment, be sure to use four "mounting screws" attached to the gear head for secure installation.



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