

REFERENCE SPECIFICATIONS

M/S

MODEL AC Servo Motor. MINAS A6 Series
MHMF (23bit Batteryless Absolute / 23bit Absolute)

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Changed on

Industrial Device Solution Business Unit, Industrial Device Business Division
Industrial Solutions Company, Panasonic Corporation

7-1-1 Morofuku, Daito-City, Osaka 574-0044 Japan

If you have any questions, please contact the seller (Sales office or Distributor) of the product.

Checked	Checked	Designed
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REVISIONS

No SX-DSV03571

1

[illegible]

1. Scope

This specification relates to the servo motor of an AC servo system manufactured and delivered by Industrial Device Solution Business Unit, Industrial Device Business Division, Industrial Solutions Company, Panasonic Corporation.

This product is intended for industrial equipment. It cannot be used for any other Purposes (e.g. for household).

2. Applicable models, Specifications, Outline drawings.

Applicable models	Specifications	Outline drawings
MHMF024□1△9M	SX-DSV03571 5-1	SX-DSV0357101
MHMF044□1△9M	5-2	↑
MHMF084□1△9M	5-3	SX-DSV0357102
MHMF094□1△9M	5-4	↑

□ shows rotary encoder specification

Encoder Specification	Symbol "□"
23bit Batteryless Absolute	A
23bit Absolute	L

△ shows motor structure

Oil Seal	Motor Brake	Shaft	
		Straight type	With key and tap
Without	Without	A	S
	With	B	T
With	Without	C	U
	With	D	V

3. Motor brake specification

Items	Units	Applicable motors	
		MHMF024 MHMF044	MHMF084 MHMF094
Static friction torque *1	N·m	1.6 or more	3.8 or more
Rotary part inertia *2	10 ⁻⁴ kg·m ²	0.018	0.075
Armature pull in time *2	ms	50 or less	70 or less
Armature release time *2	ms	20 or less ※3	←
Release voltage *1	DC,V	1 or more	←
Suction voltage *1	DC,V	24±2.4	←
Rated current (at DC24 V) *2	DC,A	0.36	0.42
Allowable braking energy ; 1 time each *2	J	105	185
All allowable braking Energy *2	J	44.1×10 ³	80.0×10 ³
Allowable angular acceleration *2	rad/s ²	30000	←

*1 Value of our delivery inspection.

*2 Representative value at 20 °C.

*3 By varistor (TND14V271K made by Nippon Chemi-con Corporation.)

- (1) This brake is non-excited operation type brake.
- (2) Armature pull in time and Armature release time are delay time of brake operation.
Please confirm these by actual machine when motor is used.
- (3) When the motor was forwarded, the brake's backlash is 2 ° or less.
- (4) Power supply for motor brake must be prepared by user side.
(Either way of connection for polarity would be acceptable)
- (5) The above-mentioned all allowable braking energy shall be braking energy complying with the brake specification (Braking energy capable of performing a suction motion in consideration of brake temperature increases).
- (6) The motor life with the repetitions of acceleration and deceleration at the above allowable angular acceleration : 10 million times.
(The number of acceleration-deceleration cycles until brake's backlash changes rapidly)
- (7) The series connection of the protection parts such as fuses is recommended in the case of the use with varistor.

AC Servo Motor Specification

Items	Units	MHMF024□1△9M (Without brake)	MHMF024□1△9M (With brake)	Remarks
Rated output	W	200	←	
Rating	%	(*100)	←	* refer to the characteristic curve below
Number of poles	—	10	←	
Rated speed	r/min	3000	←	
Max. speed	r/min	6500	←	
Rated torque	N·m	0.64	←	
Continuous stall torque	N·m	0.76	←	
Max. torque	N·m	2.23	←	
Rated current	A(rms)	(0.8)	←	
Stall current	A(rms)	(0.9)	←	
Rotor inertia	$\times 10^{-4}$ kg·m ²	0.29	0.31	
Electrical time constant	ms	(2.0)	←	
Mechanical time constant	ms	1.92	2.06	
Power rate	kW/s	14.1	13.2	
Momentary max. current	A(0-p)	(3.8)	←	
Demagnetization current	A(0-p)	6.0	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min ⁻¹	30.6±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min ⁻¹	64.9±10 %	←	
Torque constant	N·m/A(rms)	0.88±10 %	←	
	N·m/A(0-p)	0.62±10 %	←	
Phase resistance	Ω	17.0±7 %	←	
Phase inductance	mH	(34.7)	←	* Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Partially Silver Partially Black	←	Plastic part :Black
Mass	kg	0.98	1.4	
Structure	—	Totally-enclosed self-cooled type	←	
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver.
(Representative value at 20 °C)

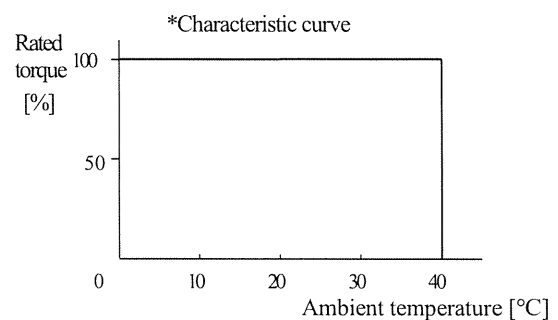
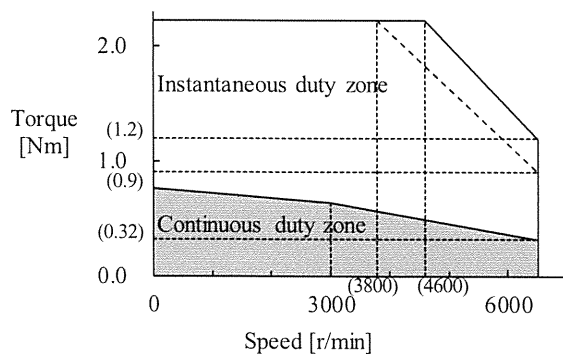
· Rated torque is the result that have been considered dispersions of motor specification refer to Appendix 5-5.

· Set the temperature of center of frame to 75 °C or less. (When ambient temperature is 40 °C)

· Speed - Torque characteristic (Representative value)

Servo driver power supply voltage: at AC 400 V

Dotted line indicates fall of servo driver power supply voltage by 10 %



AC Servo Motor Specification

Items	Units	MHMF044□1△9M (Without brake)	MHMF044□1△9M (With brake)	Remarks
Rated output	W	400	←	
Rating	%	(*100)	←	* refer to the characteristic curve below
Number of poles	—	10	←	
Rated speed	r/min	3000	←	
Max. speed	r/min	6500	←	
Rated torque	N·m	1.27	←	
Continuous stall torque	N·m	1.40	←	
Max. torque	N·m	4.46	←	
Rated current	A(rms)	(1.2)	←	
Stall current	A(rms)	(1.3)	←	
Rotor inertia	$\times 10^{-4} \text{ kg} \cdot \text{m}^2$	0.56	0.58	
Electrical time constant	ms	(2.4)	←	
Mechanical time constant	ms	1.46	1.51	
Power rate	kW/s	28.8	27.8	
Momentary max. current	A(0-p)	(5.7)	←	
Demagnetization current	A(0-p)	9.0	←	
Voltage constant per phase	$\times 10^{-3} \text{ V(rms)/min}^{-1}$	43.3 \pm 10 %	←	
Excitation voltage constant	$\times 10^{-3} \text{ V(0-p)/min}^{-1}$	91.9 \pm 10 %	←	
Torque constant	N·m/A(rms)	1.24 \pm 10 %	←	
	N·m/A(0-p)	0.88 \pm 10 %	←	
Phase resistance	Ω	13.4 \pm 7 %	←	
Phase inductance	mH	(31.9)	←	* Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Partially Silver Partially Black	←	Plastic part :Black
Mass	kg	1.4	1.8	
Structure	—	Totally-enclosed self-cooled type	←	
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver.
(Representative value at 20 °C)

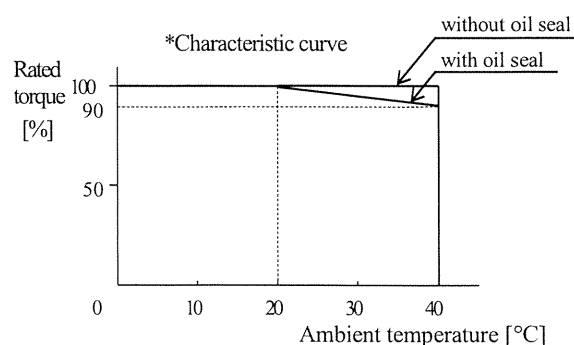
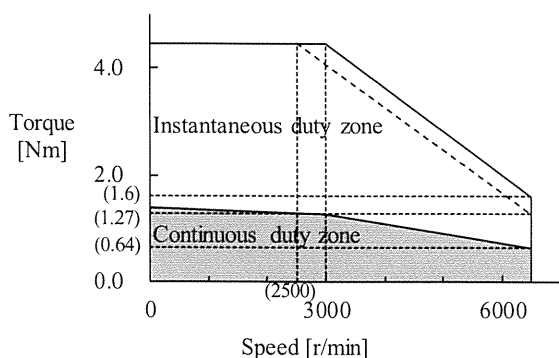
· Rated torque is the result that have been considered dispersions of motor specification refer to Appendix 5-5.

· Set the temperature of center of frame to 85 °C or less. (When ambient temperature is 40 °C)

· Speed - Torque characteristic (Representative value)

Servo driver power supply voltage: at AC 400 V

Dotted line indicates fall of servo driver power supply voltage by 10 %



AC Servo Motor Specification

Items	Units	MHMF084□1△9M (Without brake)	MHMF084□1△9M (With brake)	Remarks
Rated output	W	750	←	
Rating	%	(*100)	←	* refer to the characteristic curve below
Number of poles	—	10	←	
Rated speed	r/min	3000	←	
Max. speed	r/min	6000	←	
Rated torque	N·m	2.39	←	
Continuous stall torque	N·m	2.86	←	
Max. torque	N·m	8.36	←	
Rated current	A(rms)	(2.1)	←	
Stall current	A(rms)	(2.5)	←	
Rotor inertia	$\times 10^{-4} \text{ kg} \cdot \text{m}^2$	1.56	1.66	
Electrical time constant	ms	(5.7)	←	
Mechanical time constant	ms	0.92	0.98	
Power rate	kW/s	36.6	34.4	
Momentary max. current	A(0-p)	(10.3)	←	
Demagnetization current	A(0-p)	15	←	
Voltage constant per phase	$\times 10^{-3} \text{ V(rms)/min}^{-1}$	44.1 \pm 10 %	←	
Excitation voltage constant	$\times 10^{-3} \text{ V(0-p)/min}^{-1}$	93.6 \pm 10 %	←	
Torque constant	N·m/A(rms)	1.26 \pm 10 %	←	
	N·m/A(0-p)	0.89 \pm 10 %	←	
Phase resistance	Ω	3.12 \pm 7 %	←	
Phase inductance	mH	(17.9)	←	* Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Partially Silver Partially Black	←	Plastic part :Black
Mass	Kg	2.4	3.2	
Structure	—	Totally-enclosed self-cooled type	←	
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver.
(Representative value at 20 °C)

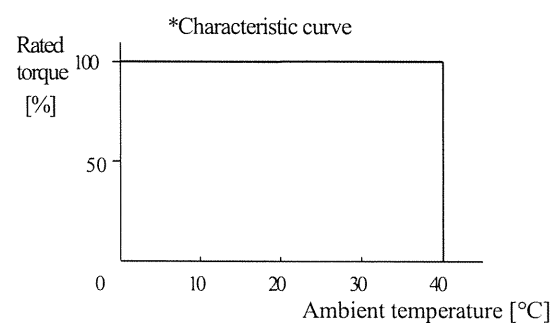
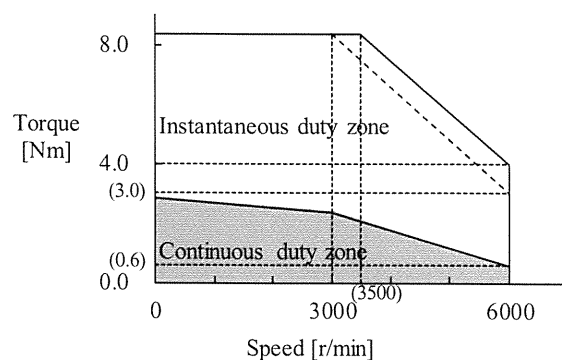
· Rated torque is the result that have been considered dispersions of motor specification refer to Appendix 5-5.

· Set the temperature of center of frame to 75 °C or less. (When ambient temperature is 40 °C)

· Speed - Torque characteristic (Representative value)

Servo driver power supply voltage: at AC 400 V

Dotted line indicates fall of servo driver power supply voltage by 10 %



AC Servo Motor Specification

Items	Units	MHMF094□1△9M (Without brake)	MHMF094□1△9M (With brake)	Remarks
Rated output	W	1000	←	
Rating	%	(*100)	←	* refer to the characteristic curve below
Number of poles	—	10	←	
Rated speed	r/min	3000	←	
Max. speed	r/min	6000	←	
Rated torque	N·m	3.18	←	
Continuous stall torque	N·m	3.34	←	
Max. torque	N·m	11.1	←	
Rated current	A(rms)	(3.1)	←	
Stall current	A(rms)	(3.3)	←	
Rotor inertia	$\times 10^{-4}$ kg·m ²	2.03	2.13	
Electrical time constant	ms	(5.9)	←	
Mechanical time constant	ms	0.84	0.89	
Power rate	kW/s	49.8	47.5	
Momentary max. current	A(0-p)	(15.5)	←	
Demagnetization current	A(0-p)	23	←	
Voltage constant per phase	$\times 10^{-3}$ V(rms)/min ⁻¹	40.4±10 %	←	
Excitation voltage constant	$\times 10^{-3}$ V(0-p)/min ⁻¹	85.7±10 %	←	
Torque constant	N·m/A(rms)	1.16±10 %	←	
	N·m/A(0-p)	0.82±10 %	←	
Phase resistance	Ω	1.86±7 %	←	
Phase inductance	mH	(11.0)	←	* Center Value
Thermal class	—	155(F)	←	
Vibration class	—	V-15	←	
Paint color	—	Partially Silver Partially Black	←	Plastic part :Black
Mass	kg	2.8	3.6	
Structure	—	Totally-enclosed self-cooled type	←	
Servo driver power supply voltage	V AC	400	←	

· This specification is guaranteed after combining and adjusting with the servo driver.
(Representative value at 20 °C)

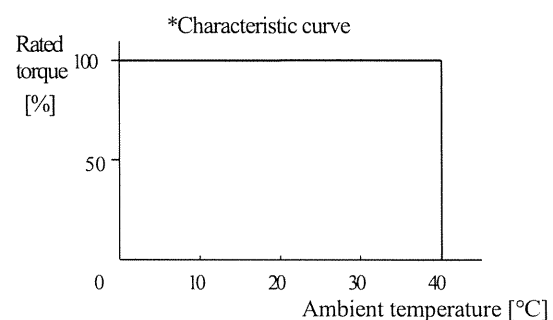
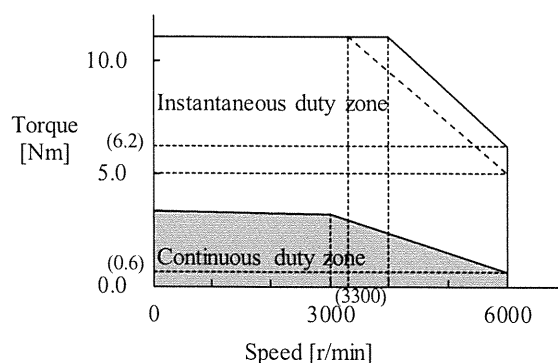
· Rated torque is the result that have been considered dispersions of motor specification refer to Appendix 5-5.

· Set the temperature of center of frame to 75 °C or less. (When ambient temperature is 40 °C)

· Speed - Torque characteristic (Representative value)

Servo driver power supply voltage: at AC 400 V

Dotted line indicates fall of servo driver power supply voltage by 10 %



• Test method

Applicable models	Reference	Flange size	Flange material
MHMF024□1△9M	Fig. 1	130×120×t12	Aluminum
MHMF044□1△9M	↑	↑	↑
MHMF084□1△9M	↑	170×160×t12	↑
MHMF094□1△9M	↑	↑	↑

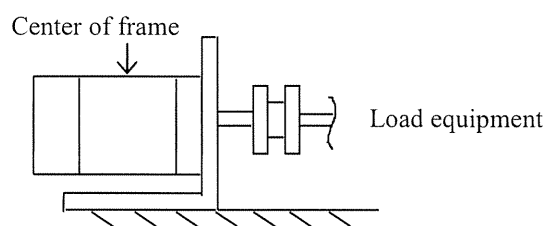
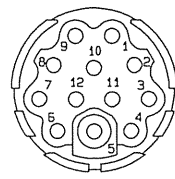
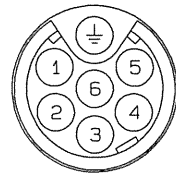


Fig. 1

SX-DSV0357101

Do NOT scale the drawings.
instead rely on the dimensions and their definitions.
 REVISION CLASS
 SVM E TRACE

 Encoder:
 AGC047N0000050A000

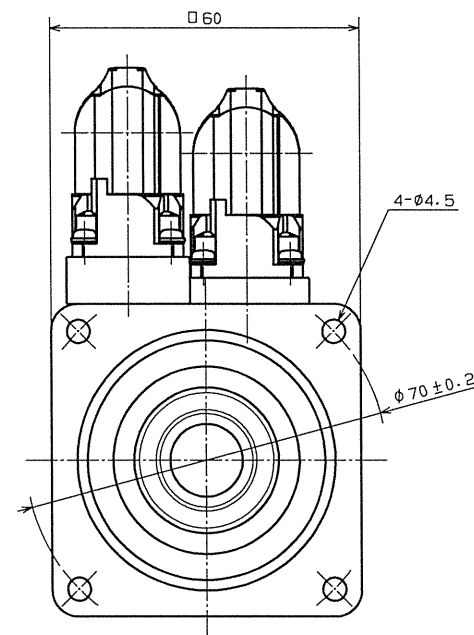
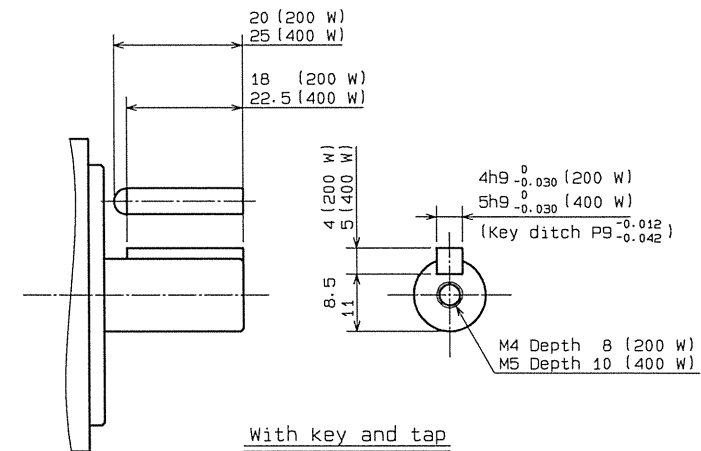
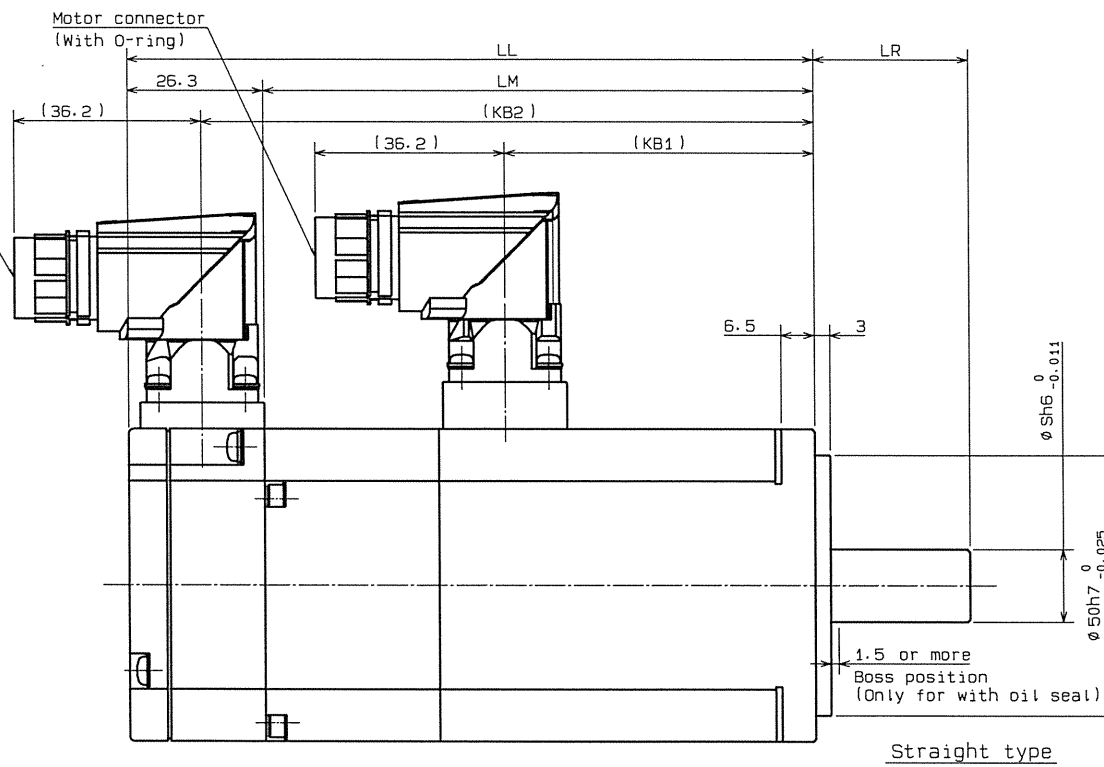
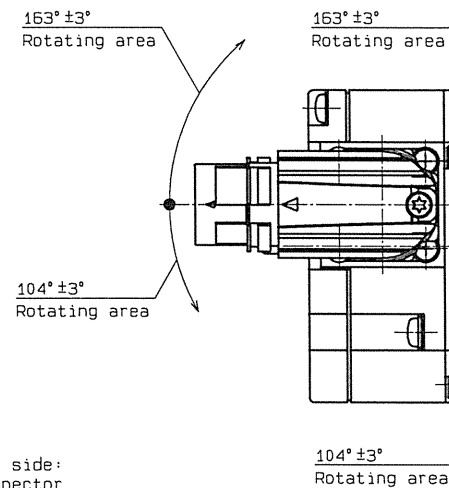
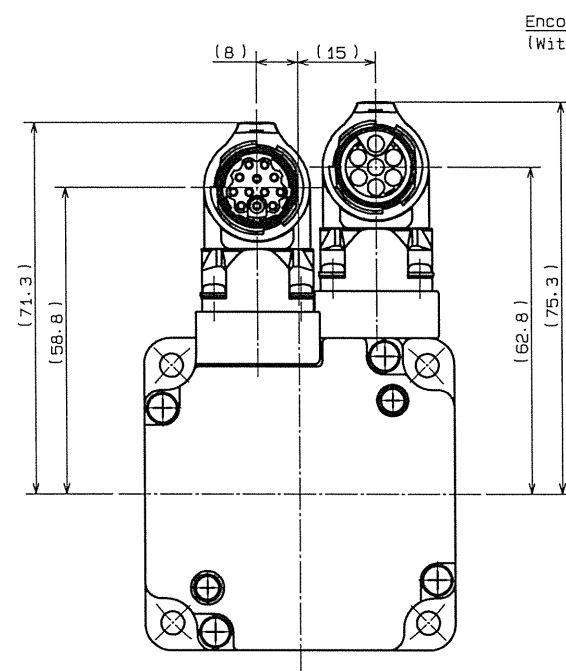
Pin No.	Signal	
	Batteryless Absolute	Absolute
1	E0 V	E0 V
2	E5 V	E5 V
3	PS(SD)	PS(SD)
4	PS(SD)	PS(SD)
5	NC	NC
6	NC	NC
7	NC	BAT-
8	NC	BAT+
9	FG	FG
10	NC	NC
11	NC	NC
12	NC	NC


 Motor:
 BGC853N0000051A000

Pin No.	Signal	
	Without Brake	With Brake
1	NC	Brake
2	U	U
3	V	V
4	W	W
5	NC	Brake
6	NC	NC
E	GND	GND

Connector specification

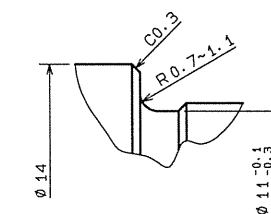
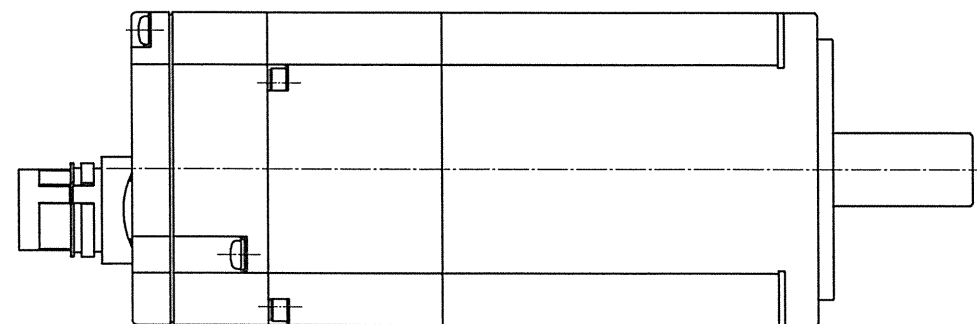
Note relating to cable connector on motor side:
Please confirm the part number of the connector
corresponding to our motor with connector supplier.



Model	Motor brake	Output (W)	LL	LR	LM	S	KB1	KB2
MHMF02401A9M	Without	200	85.8	30	59.5	11	42.7	71.5
MHMF04401A9M	I	400	102.8	1	76.5	14	59.7	88.5
MHMF02401A9M	With	200	115.3	1	89	11	42.7	101
MHMF04401A9M	I	400	132.3	1	106	14	59.7	118

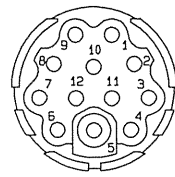
NOTES

- The assembling precision conforms to the Japan Machine Tool Association Standard (MAS402-1981). (TIR value)
 ·Shaft end runout: 0.015 (shaft exit middle)
 ·Squareness of flange face to shaft: 0.04 (Ø70)
 ·Eccentricity of flange fitting outside diameter to shaft: 0.03 (middle of spigot)
- For flange mounting bolts, use hexagonal socket head bolts.

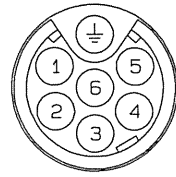


Detail of shaft step part (S=Free)
(200 W only)

Scale	Panasonic Corporation				Agreement	Model	MHMF04401A9M Ø60
1 : 1	3rd Angle System Unit:mm					Name	OUTLINE DRAWING
Designed	Drawn	Checked	Checked	Checked		No.	SX-DSV0357101
YANO	YANO	TAMURA	OKUNO	OGAWA			
2020/05/09	2020/05/09	2020/05/09	2020/05/09	2020/05/09			

Encoder:
ASC047N0000050A000

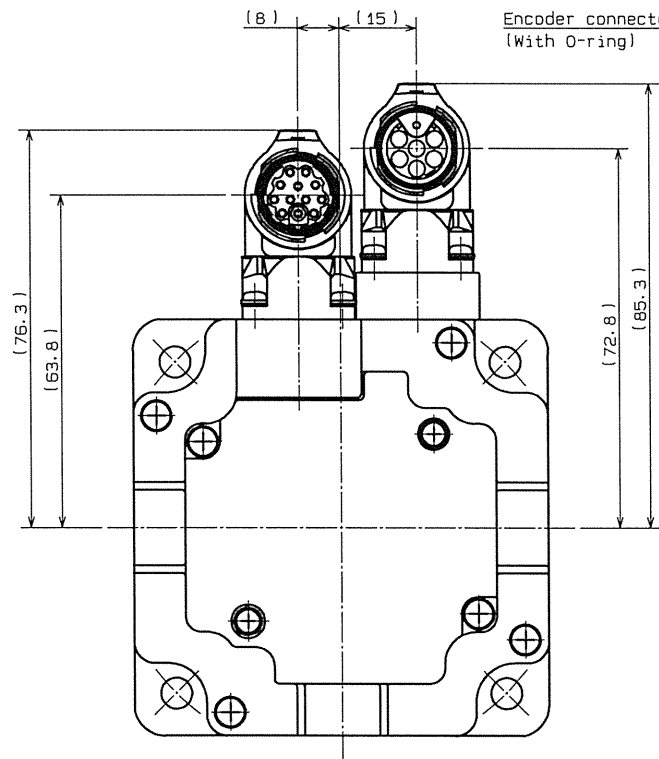
Pin No.	Signal	
	Batteryless Absolute	Absolute
1	E0 V	E0 V
2	E5 V	E5 V
3	PS(SD)	PS(SD)
4	PS(SD)	PS(SD)
5	NC	NC
6	NC	NC
7	NC	BAT-
8	NC	BAT+
9	FG	FG
10	NC	NC
11	NC	NC
12	NC	NC

Motor:
BGC863N0000051A000

Pin No.	Signal	
	Without Brake	With Brake
1	NC	Brake
2	U	U
3	V	V
4	W	W
5	NC	Brake
6	NC	NC
E	GND	GND

Connector specification

Note relating to cable connector on motor side:
Please confirm the part number of the connector
corresponding to our motor with connector supplier.

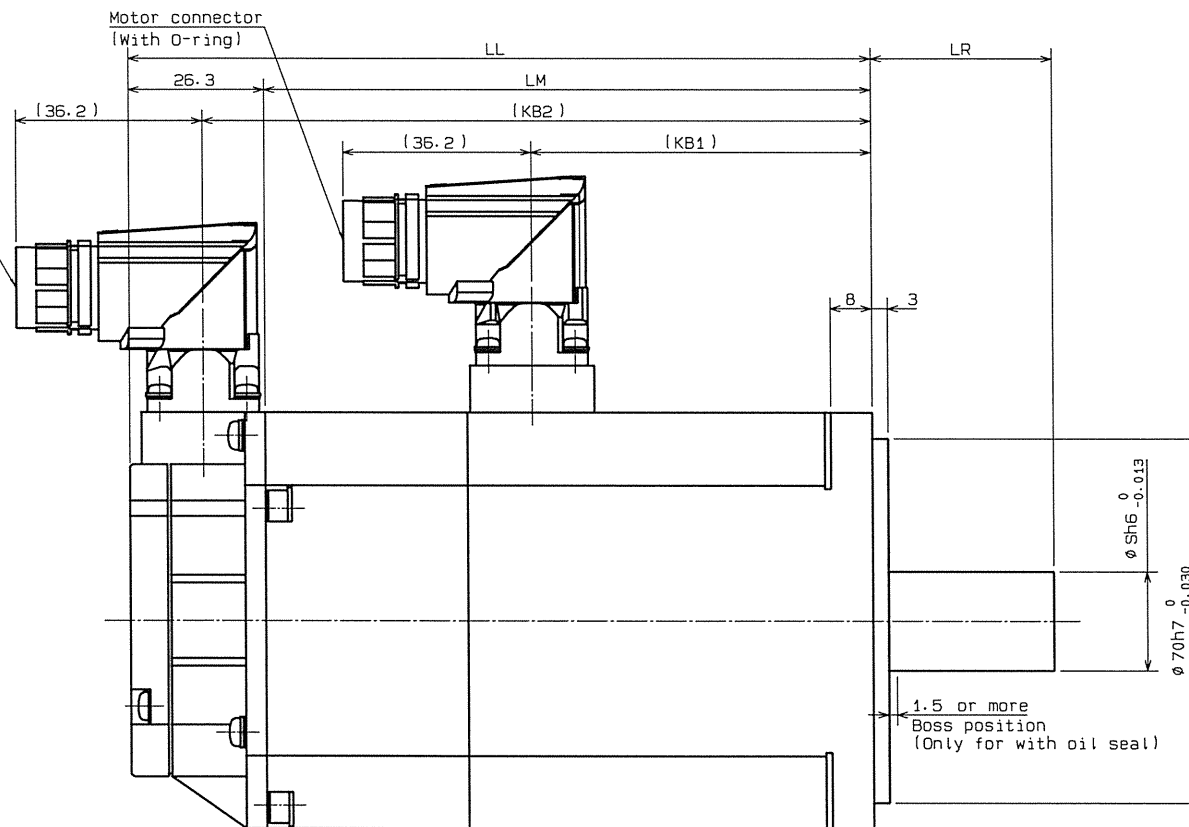
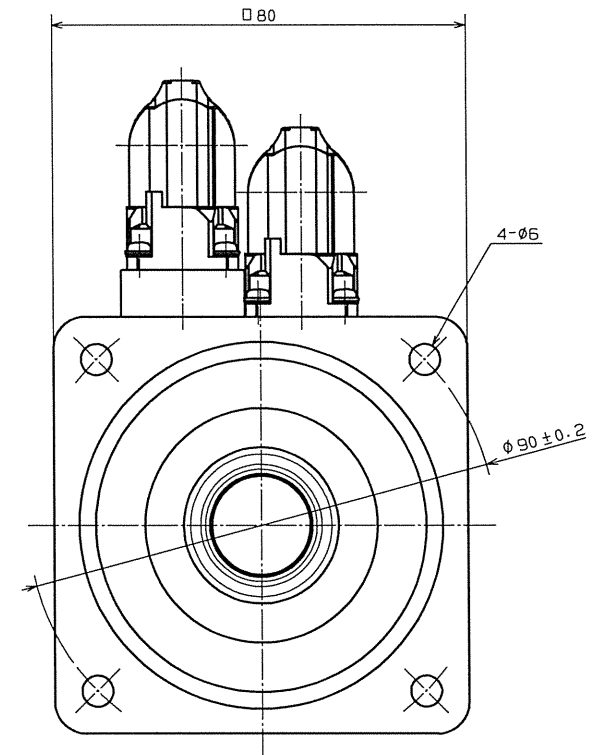
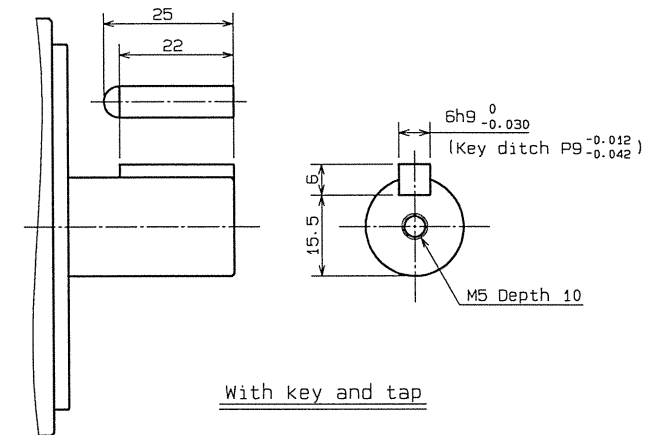


163°±3°
Rotating area

104°±3°
Rotating area

163°±3°
Rotating area

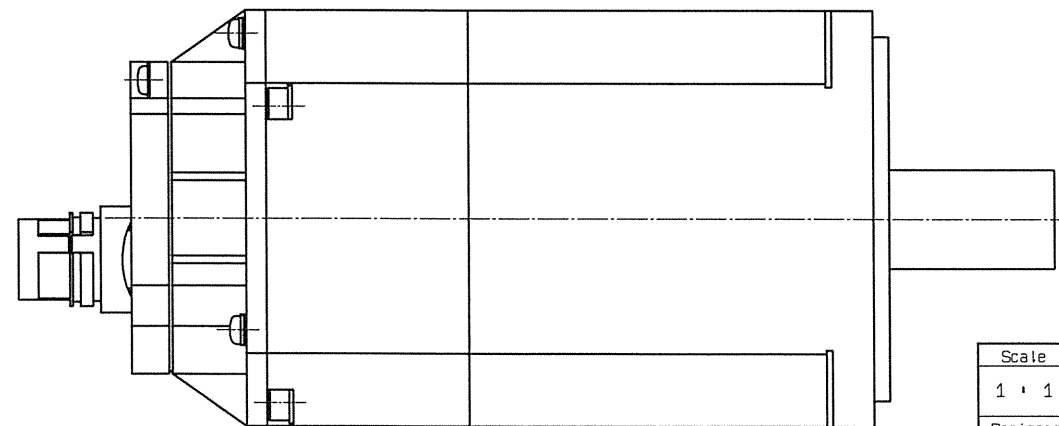
104°±3°
Rotating area

Straight type

Model	Motor brake	Output (W)	LL	LR	LM	S	KB1	KB2
MHMF084□1A9M	Without	750	109.9	35	83.6	19	65.7	95.6
MHMF094□1A9M	↑	1000	122.7	↑	96.4	↑	78.5	108.4
MHMF084□1A9M	With	750	143.5	↑	117.2	↑	65.7	129.2
MHMF094□1A9M	↑	1000	156.3	↑	130	↑	78.5	142

NOTES

- The assembling precision conforms to the Japan Machine Tool Association Standard (MAS402-1981). (TIR value)
 - Shaft end runout: 0.015 (shaft exit middle)
 - Squareness of flange face to shaft: 0.04 (Ø90)
 - Eccentricity of flange fitting outside diameter to shaft: 0.03 (middle of spigot)
- For flange mounting bolts, use hexagonal socket head bolts.



Scale		Panasonic Corporation		Agreement		Model	
1 : 1		3rd Angle System		Unit:mm		MHMF0□4□1A9M □80	
Designed		Drawn		Checked		Name	
YANO		YANO		TAMURA		OGAWA	
2020/06/09		2020/06/09		2020/06/09		No.	
						SX-DSV0357102	