6. HG-KN SERIES

This chapter provides information on the servo motor specifications and characteristics. When using the HG-KN series servo motor, always read the Safety Instructions in the beginning of this manual and chapters 1 to 5, in addition to this chapter.

6.1 Model designation

The following describes model designation. Not all combinations of the symbols are available.

H G - K N 1 3 B J D

Series

Rated output

Symbol	Rated output [kW]
1	0.1
2	0.2
4	0.4
7	0.75

Rated speed
3000 [r/min]

Electromagnetic brake

Symbol	Electromagnetic brake
None	None
B	With

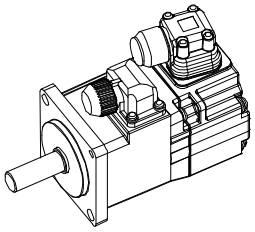
Shaft type

Symbol	Shaft shape	HG-KN_
None	Standard (straight shaft)	13 to 73
K	Keyway shaft (with key)	23 to 73
D	D cut shaft	13

Oil seal

Symbol	Oil seal
None	None
J	With

Appearance



6.2 Combination list of servo motors and servo amplifiers

Servo motor	Servo amplifier
HG-KN13	MR-JE-10A MR-JE-10B(F) MR-JE-10C
HG-KN23	MR-JE-20A MR-JE-20B(F) MR-JE-20C
HG-KN43	MR-JE-40A MR-JE-40B(F) MR-JE-40C
HG-KN73	MR-JE-70A MR-JE-70B(F) MR-JE-70C

6.3 Standard specifications

6.3.1 Standard specifications list

Item \ Servo motor			HG-KN series (low inertia/small capacity)			
			13(B)(J)	23(B)(J)	43(B)(J)	73(B)J
Power supply capacity			Refer to "Power supply equipment capacity and generated loss of servo amplifiers" in Servo Amplifier Instruction Manual.			
Continuous running duty (Note 1)	Rated output	[kW]	0.1	0.2	0.4	0.75
	Rated torque	[N•m]	0.32	0.64	1.3	2.4
Maximum torque		[N•m]	0.95	1.9	3.8	7.2
Rated speed (Note 1)		[r/min]	3000			
Maximum speed		[r/min]	5000 (6000) (Note 9)			
Instantaneous permissible speed		[r/min]	5750 (6900) (Note 9)			
Power rate at continuous rated torque	Standard	[kW/s]	12.9	18.0	43.2	44.5
	With an electromagnetic brake	[kW/s]	12.0	16.4	40.8	41.0
Rated current		[A]	0.8	1.3	2.6	4.8
Maximum current		[A]	2.4	3.9	7.8	14
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	0.0783	0.225	0.375	1.28
	With an electromagnetic brake	[× 10^{-4} kg•m^2]	0.0843	0.247	0.397	1.39
Recommended load to motor inertia ratio (Note 2)			15 times or less			
Speed/position detector	Combination with MR-JE-_B(F)/MR-JE-_C		17-bit encoder common to absolute position/incremental systems (resolution per servo motor revolution: 131072 pulses/rev)			
	Combination with MR-JE-_A		Incremental 17-bit encoder system (resolution per servo motor revolution: 131072 pulses/rev)			
Oil seal		With	○			
		None	○			
Thermistor			None			
Insulation class			130 (B) (Note 8)			
Structure			Totally enclosed, natural cooling (IP rating: IP65 (Note 3))			
Environment (Note 4)	Ambient temperature	Operation	0 °C to 40 °C (non-freezing)			
		Storage	-15 °C to 70 °C (non-freezing)			
	Ambient humidity	Operation	10 %RH to 80 %RH (non-condensing)			
		Storage	10 %RH to 90 %RH (non-condensing)			
	Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt			
	Altitude		Max. 2000 m above sea level (Note 10)			
	Vibration resistance (Note 5)		X, Y: 49 m/s^2			
Vibration rank (Note 6)			V10			
Permissible load for the shaft (Note 7)	L	[mm]	25	30		40
	Radial	[N]	88	245		392
	Thrust	[N]	59	98		147
Mass	With oil seal	Standard [kg]	0.57	0.98	1.5	3.0
		With an electromagnetic brake [kg]	0.77	1.4	1.9	4.0
	Without oil seal	Standard [kg]	0.54	0.91	1.4	
		With an electromagnetic brake [kg]	0.74	1.3	1.8	

6.4 Electromagnetic brake characteristics

⚠CAUTION

- The electromagnetic brake is provided to prevent a drop at a power failure or alarm occurrence during vertical drive or to hold a shaft at a stop. Do not use it for normal braking (including braking at servo-lock).
- Before operating the servo motor, be sure to confirm that the electromagnetic brake operates properly.
- The operation time of the electromagnetic brake varies depending on the power supply circuit you use. Be sure to check the operation delay time with a real machine.

The characteristics of the electromagnetic brake provided for the servo motor with an electromagnetic brake are indicated below.

Item \ Servo motor		HG-KN series			
		13B(J)	23B(J)	43B(J)	73BJ
Type (Note 1)		Spring actuated type safety brake			
Rated voltage (Note 4)		24 V DC $^{0}_{-10\%}$			
Power consumption	[W] at 20 °C	6.3	7.9		10
Coil resistance (Note 6)	[Ω]	91.0	73.0		57.0
Inductance (Note 6)	[H]	0.15	0.18		0.13
Brake static friction torque	[N•m]	0.32	1.3		2.4
Release delay time (Note 2)	[s]	0.03	0.03		0.04
Braking delay time (Note 2) [s]	DC off	0.01	0.02		0.02
Permissible braking work	Per braking [J]	5.6	22		64
	Per hour [J]	56	220		640
Brake looseness at servo motor shaft (Note 5)	[degree]	2.5	1.2		0.9
Brake life (Note 3)	Number of braking cycles [times]	20000			
	Work per braking [J]	5.6	22		64
Selection example of surge absorbers to be used (Note 7, 8)	For the suppressed voltage 125 V	TND20V-680KB			
	For the suppressed voltage 350 V	TND10V-221KB			

Note 1. It does not have a manual release mechanism. When it is necessary to hand-turn the servo motor shaft for machine centering, etc., use a separate 24 V DC power supply to release the brake electrically.
2. The value for initial on gap at 20 °C.
3. The brake gap will increase as the brake lining wears, but the gap is not adjustable. The brake life indicated is the number of braking cycles after which adjustment will be required.
4. Always prepare a power supply exclusively used for the electromagnetic brake.
5. These are design values. These are not guaranteed values.
6. These are measured values. These are not guaranteed values.
7. Select the electromagnetic brake control relay properly, considering the characteristics of the electromagnetic brake and surge absorber. When you use a diode for a surge absorber, the electromagnetic braking time will be longer.
8. Manufactured by Nippon Chemi-Con Corporation.

7. HG-SN SERIES

This chapter provides information on the servo motor specifications and characteristics. When using the HG-SN series servo motor, always read the Safety Instructions in the beginning of this manual and chapters 1 to 5, in addition to this chapter.

7.1 Model designation

The following describes model designation. Not all combinations of the symbols are available.

HG - SN 5 2 B J K

Series

Rated output

Symbol	Rated output [kW]
5	0.5
10	1.0
15	1.5
20	2.0
30	3.0

Rated speed
2000 [r/min]

Shaft type

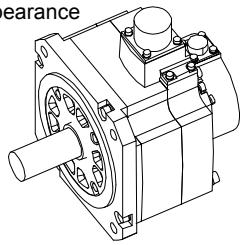
Symbol	Shaft shape
None	Standard (straight shaft)
K	(Note) Keyway shaft

With oil seal

Electromagnetic brake

Symbol	Electromagnetic brake
None	None
B	With

Appearance



Note. Key is not included.

7.2 Combination list of servo motors and servo amplifiers

Servo motor	Servo amplifier
HG-SN52	MR-JE-70A MR-JE-70B(F) MR-JE-70C
HG-SN102	MR-JE-100A MR-JE-100B(F) MR-JE-100C
HG-SN152	MR-JE-200A MR-JE-200B(F) MR-JE-200C
HG-SN202	
HG-SN302	MR-JE-300A MR-JE-300B(F) MR-JE-300C

7.3 Standard specifications

7.3.1 Standard specifications list

Item \ Servo motor			HG-SN series (3-phase 200 V AC compatible, medium inertia/medium capacity)				
			52(B)J	102(B)J	152(B)J	202(B)J	302(B)J
Power supply capacity			Refer to "Power supply equipment capacity and generated loss of servo amplifiers" in Servo Amplifier Instruction Manual.				
Continuous running duty (Note 1)	Rated output	[kW]	0.5	1.0	1.5	2.0	3.0
	Rated torque	[N•m]	2.39	4.77	7.16	9.55	14.3
Maximum torque		[N•m]	7.16	14.3	21.5	28.6	42.9
Rated speed (Note 1)		[r/min]	2000				
Maximum speed		[r/min]	3000				2500
Instantaneous permissible speed		[r/min]	3450				2875
Power rate at continuous rated torque	Standard	[kW/s]	7.85	19.7	32.1	19.5	26.1
	With an electromagnetic brake	[kW/s]	6.01	16.5	28.2	16.1	23.3
Rated current		[A]	2.9	5.6	9.4	9.6	11
Maximum current		[A]	9.0	17	29	31	33
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	7.26	11.6	16.0	46.8	78.6
	With an electromagnetic brake	[× 10^{-4} kg•m^2]	9.48	13.8	18.2	56.5	88.2
Recommended load to motor inertia ratio (Note 2)			15 times or less				
Speed/position detector	Combination with MR-JE-_B(F)/MR-JE-_C		17-bit encoder common to absolute position/incremental systems (resolution per servo motor revolution: 131072 pulses/rev)				
	Combination with MR-JE-_A		Incremental 17-bit encoder system (resolution per servo motor revolution: 131072 pulses/rev)				
Oil seal			With				
Thermistor			None				
Insulation class			155 (F)				
Structure			Totally enclosed, natural cooling (IP rating: IP67 (Note 3))				
Environment (Note 4)	Ambient temperature	Operation	0 °C to 40 °C (non-freezing)				
		Storage	-15 °C to 70 °C (non-freezing)				
	Ambient humidity	Operation	10 %RH to 80 %RH (non-condensing)				
		Storage	10 %RH to 90 %RH (non-condensing)				
	Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt				
	Altitude		Max. 2000 m above sea level (Note 8)				
	Vibration resistance (Note 5)		X, Y: 24.5 m/s^2			X: 24.5 m/s^2 Y: 49 m/s^2	
Vibration rank (Note 6)			V10				
Permissible load for the shaft (Note 7)	L	[mm]	55			79	
	Radial	[N]	980			2058	
	Thrust	[N]	490			980	
Mass	Standard	[kg]	4.8	6.2	7.3	11	16
	With an electromagnetic brake	[kg]	6.7	8.2	9.3	17	22

7.4 Electromagnetic brake characteristics

⚠CAUTION

- The electromagnetic brake is provided to prevent a drop at a power failure or alarm occurrence during vertical drive or to hold a shaft at a stop. Do not use it for normal braking (including braking at servo-lock).
- Before operating the servo motor, be sure to confirm that the electromagnetic brake operates properly.
- The operation time of the electromagnetic brake varies depending on the power supply circuit you use. Be sure to check the operation delay time with a real machine.

The characteristics of the electromagnetic brake provided for the servo motor with an electromagnetic brake are indicated below.

Item \ Servo motor			HG-SN series	
			52BJ/102BJ/152BJ	202BJ/302BJ
Type (Note 1)			Spring actuated type safety brake	
Rated voltage (Note 4)			24 V DC $^{0}_{-10\%}$	
Power consumption		[W] at 20 °C	20	34
Coil resistance (Note 6)		[Ω]	29.0	16.8
Inductance (Note 6)		[H]	0.80	1.10
Brake static friction torque		[N•m]	8.5	44
Release delay time (Note 2)		[s]	0.04	0.1
Braking delay time (Note 2) [s]	DC off		0.03	0.03
Permissible braking work	Per braking	[J]	400	4500
	Per hour	[J]	4000	45000
Brake looseness at servo motor shaft (Note 5)		[degrees]	0.2 to 0.6	0.2 to 0.6
Brake life (Note 3)	Number of braking cycles	[times]	20000	20000
	Work per braking	[J]	200	1000
Selection example of surge absorbers to be used (Note 7, 8)	For the suppressed voltage 125 V		TND20V-680KB	
	For the suppressed voltage 350 V		TND10V-221KB	

Note 1. It does not have a manual release mechanism. When it is necessary to hand-turn the servo motor shaft for machine centering, etc., use a separate 24 V DC power supply to release the brake electrically.
2. The value for initial on gap at 20 °C.
3. The brake gap will increase as the brake lining wears, but the gap is not adjustable.
The brake life indicated is the number of braking cycles after which adjustment will be required.
4. Always prepare a power supply exclusively used for the electromagnetic brake.
5. These are design values. These are not guaranteed values.
6. These are measured values. These are not guaranteed values.
7. Select the electromagnetic brake control relay properly, considering the characteristics of the electromagnetic brake and surge absorber. When you use a diode for a surge absorber, the electromagnetic braking time will be longer.
8. Manufactured by Nippon Chemi-Con Corporation.