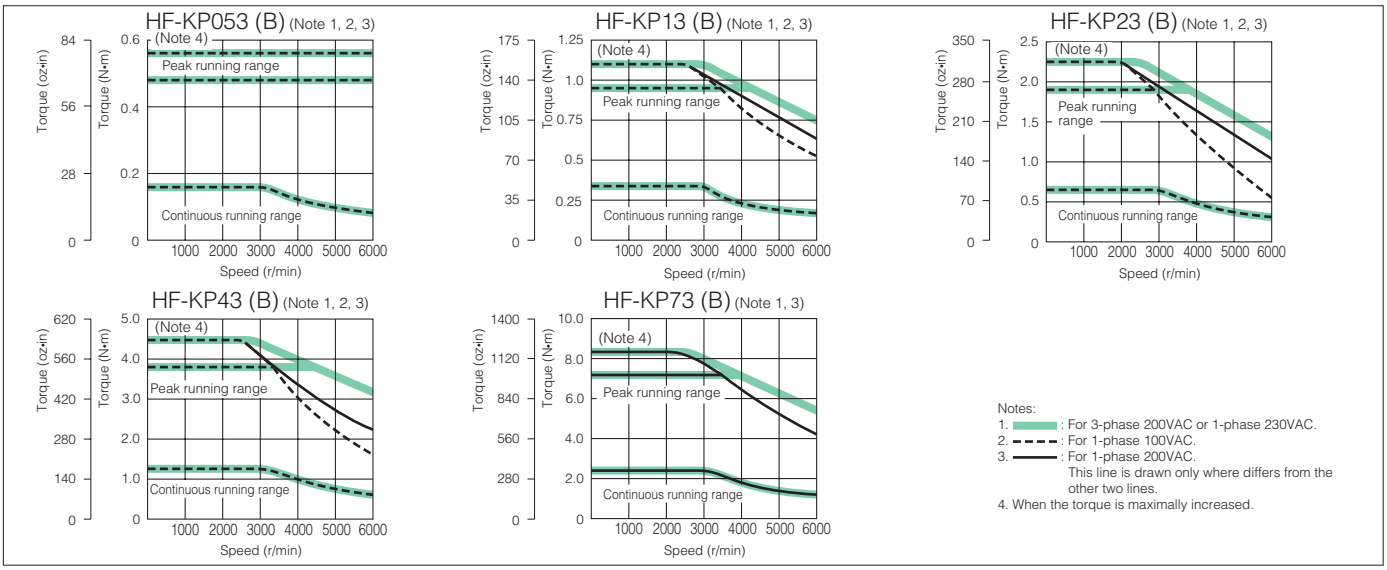
HF-KP Series Servo Motor Specifications

Servo motor series		HF-KP series (Low inertia, small capacity)				
Servo motor model HF-KP		053(B)	13(B)	23(B)	43(B)	73(B)
Compatible servo amplifier model MR-J3-		10A(1)/B(1)(-RJ006)/T(1)		20A(1)/B(1)(-RJ006)/T(1)	40A(1)/B(1)(-RJ006)/T(1)	70A/B(-RJ006)/T
Power supply capacity (Note 1) (kVA)		0.3	0.3	0.5	0.9	1.3
Continuous running duty	Rated output (W)	50	100	200	400	750
	Rated torque (Note 9) (N·m [oz·in])	0.16 (22.7)	0.32 (45.3)	0.64 (90.6)	1.3 (184)	2.4 (340)
Maximum torque (when increased) (Note 8) (N·m [oz·in])		0.56 (79.3)	1.11 (157)	2.23 (316)	4.46 (632)	8.36 (1180)
Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (135)	1.9 (269)	3.8 (538)	7.2 (1020)
Rated speed (r/min)		3000				
Maximum speed (r/min)		6000				
Permissible instantaneous speed (r/min)		6900				
Power rate at continuous rated torque (kW/s)		4.87	11.5	16.9	38.6	39.9
Rated current (A)		0.9	0.8	1.4	2.7	5.2
Maximum current (when increased) (Note 8) (A)		3.1	2.8	4.9	9.5	18.2
Maximum current (A)		2.7	2.4	4.2	8.1	15.6
Regenerative braking frequency (times/min) (Note 2)		(Note 3)	(Note 3)	448	249	140
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	0.052 (0.284)	0.088 (0.481)	0.24 (1.31)	0.42 (2.30)	1.43 (7.82)
	With electromagnetic brake	0.054 (0.295)	0.090 (0.492)	0.31 (1.69)	0.50 (2.73)	1.63 (8.91)
Recommended load to motor inertia moment ratio (Note 4)		15 times maximum		24 times maximum	22 times maximum	15 times maximum
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)				
Attachments		—	— (Motors with an oil seal are available (HF-KP□J))			
Insulation class		Class B				
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 5)				
Environment (Note 7)	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)				
	Ambient humidity	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)				
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Elevation	1000m or less above sea level				
	Vibration (Note 6)	X: 49m/s^2 Y: 49m/s^2				
Mass (kg [lb])	Standard	0.35 (0.78)	0.56 (1.3)	0.94 (2.1)	1.5 (3.3)	2.9 (6.4)
	With electromagnetic brake	0.65 (1.5)	0.86 (1.9)	1.6 (3.6)	2.1 (4.7)	3.9 (8.6)

Notes:1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. When the motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range. When the motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range and if the load to motor inertia moment is 8 times or less for HF-KP053(B) or 4 time or less for HF-KP13(B).
4. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
5. The shaft-through portion is excluded.
6. The vibration direction is shown in the diagram to the right. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when the motor stops, so maintain vibration to approximately one-half of the allowable value.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.
8. The maximum torque can be increased from 300% to 350% of the rated toque by setting servo amplifier's parameter. Refer to "Combinations for Increasing the Maximum Torque" in this catalog for more details.
9. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the motor's rated torque.

HF-KP Series Servo Motor Torque Characteristics



MR-J3-A Servo Amplifier Specifications: 400VAC, 22kW or Smaller

Servo amplifier model MR-J3-		60A4	100A4	200A4	350A4	500A4	700A4	11KA4	15KA4	22KA4
Output	Rated voltage	3-phase 323VAC								
	Rated current (A)	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation	3-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	0.1			0.2					
	Permissible voltage fluctuation	1-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
	Power consumption (W)	30			45					
Interface power supply		24VDC ±10% (required current capacity: 0.3A (Note 7))								
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	15	15	100	100	130 (Note 9)	170 (Note 9)	—	—	—
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)
Control system		Sine-wave PWM control/current control system								
Dynamic brake		Built-in (Note 8, 10)						External option (Note 12)		
Safety features		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection								
Position control mode	Maximum input pulse frequency	1Mpps (when using differential receiver), 200kpps (when using open collector)								
	Positioning feedback pulse	Encoder resolution: 262144 p/rev								
	Command pulse multiple	Electronic gear A/B multiple, A: 1 to 1048576, B: 1 to 1048576, 1/10 < A/B < 2000								
	Positioning complete width setting	0 to ±65535 pulses (command pulse unit)								
	Excess error	±3 rotations								
	Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque)								
Speed control mode	Speed control range	Analog speed command 1:2000, internal speed command 1:5000								
	Analog speed command input	0 to ±10VDC/rated speed (possible to change the speed in 10V using parameter No. PC12.) (Note 11)								
	Speed fluctuation rate	±0.01% maximum (load fluctuation 0 to 100%), 0% (power fluctuation ±10%) ±0.2% maximum (ambient temperature 25°C±10°C (59°F to 95°F)), when using analog speed command								
	Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque) (Note 11)								
Torque control mode	Analog torque command input	0 to ±8VDC/maximum torque (input impedance 10 to 12kΩ) (Note 11)								
	Speed limit	Set by parameters or external analog input (0 to ±10VDC/rated speed)								
Structure (IP rating)		Natural-cooling open (IP00)		Fan cooling open (IP00)						
Environment	Ambient temperature (Note 6)	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)								
	Ambient humidity	90% RH maximum (non condensing), storage: 90% RH maximum (non condensing)								
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Elevation	1000m or less above sea level								
	Vibration	5.9m/s^2 or less at 10 to 55Hz (directions of X, Y and Z axes)								
Mass (kg [lb])		1.7 (3.7)	1.7 (3.7)	2.1 (4.6)	4.6 (10)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)

Notes:1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section “Servo motor torque characteristics” in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section “Options ● Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “Servo Amplifier Model Designation” in this catalog for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min).
Note that change in parameter No. PA02 is required.
7. 0.3A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to “MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□A4-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the motor is used within the rated speed and the recommended load to motor inertia moment ratio. Contact your local sales office if the operating motor speed and the load to motor inertia moment ratio exceed the rated speed and the recommended ratio.
10. When using the built-in dynamic brake, refer to “MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL” for the permissible load to motor inertia moment ratio.
11. For the servo amplifier 11kW to 22kW, high resolution analog speed command and analog torque command is available with a set of MR-J3-□A4-RJ040 and MR-J3-D01 extension IO unit. Servo amplifier 7kW or smaller, compatible with high resolution analog speed torque command, will be available.
12. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-A Servo Amplifier Specifications: 400VAC, 30kW or Larger

Drive unit	Drive unit model		MR-J3-DU30KA4	MR-J3-DU37KA4	MR-J3-DU45KA4	MR-J3-DU55KA4
	Output	Rated voltage	3-phase 323VAC			
		Rated current (A)	87	102	131	143
	Main circuit power supply		The drive unit's main circuit power is supplied from the converter unit.			
	Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	0.2			
		Permissible voltage fluctuation	1-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
		Power consumption (W)	45			
	Interface power supply		24VDC ±10% (required current capacity: 0.3A (Note 3))			
	Control system		Sine-wave PWM control/current control system			
	Dynamic brake		External option (Note 4)			
	Safety features		Overcurrent shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection			
	Position control mode	Maximum input pulse frequency	1Mpps (when using differential receiver), 200kpps (when using open collector)			
		Positioning feedback pulse	Encoder resolution: 262144 p/rev			
		Command pulse multiple	Electronic gear A/B multiple, A: 1 to 1048576, B: 1 to 1048576, 1/10 < A/B < 2000			
		Positioning complete width setting	0 to ±65535 pulses (command pulse unit)			
		Excess error	±3 rotations			
		Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque)			
	Speed control mode	Speed control range	Analog speed command 1:2000, internal speed command 1:5000			
		Analog speed command input	0 to ±10VDC/rated speed (possible to change the speed in 10V using parameter No. PC12.)			
		Speed fluctuation rate	±0.01% maximum (load fluctuation 0 to 100%), 0% (power fluctuation ±10%) ±0.2% maximum (ambient temperature 25°C±10°C (59°F to 95°F)), when using analog speed command			
		Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque)			
	Torque control mode	Analog torque command input	0 to ±8VDC/maximum torque (input impedance 10 to 12kΩ)			
		Speed limit	Set by parameters or external analog input (0 to ±10VDC/rated speed)			
	Structure (IP rating)		Fan cooling open (IP00)			
	Mass (kg [lb])		18 (40)		26 (57)	
Converter unit	Converter unit model		MR-J3-CR55K4			
	Output	Rated voltage	538 to 678VDC			
		Rated current (A)	113.8			
	Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	132.2			
		Permissible voltage fluctuation	3-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
	Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	0.2			
		Permissible voltage fluctuation	1-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
		Power consumption (W)	45			
	Interface power supply		24VDC ±10% (required current capacity: 0.13A (Note 3))			
	Safety features		Regeneration overvoltage shutdown, regeneration fault protection, overload shutdown (electronic thermal), undervoltage/sudden power outage protection			
	Structure (IP rating)		Fan cooling open (IP00)			
	Mass (kg [lb])		25 (55)			
Drive unit/ Converter unit	Environment	Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)			
		Ambient humidity	90% RH maximum (non condensing), storage: 90% RH maximum (non condensing)			
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust			
		Elevation	1000m or less above sea level			
		Vibration	5.9m/s^2 or less at 10 to 55Hz (directions of X, Y and Z axes)			

Notes: 1. Rated output and speed of a servo motor are applicable when the drive unit and the converter unit, combined with the servo motor, are operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. The interface power supply can be shared with the drive unit and the converter unit. When all of the input/output points are used, 0.3A is required for the drive unit, and 0.13A is required for the converter unit. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.