MITSUBISHI ELECTRIC

SERVO AMPLIFIERS & MOTORS

Changes for the Better

MELSERVO-J2-Super

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)

MELSOFT TÜV Rheinland

Servo Amplifier Series and Servo Motor Models

1. Flexible specifications corresponding to users' needs

	Servo amplifier type (Note 9)	Interface						Control mode					Setup S/W	Model	Power supply spec.	Capacity (kW) (Note 1)	Compatible motor series						
		Pulse train	Analog	DIO	SSCNET	RS-422 multi-drop	CC-Link	Position	Speed	Torque	Positioning function	Fully closed loop control compatible					HC-KFS	HC-MFS	HC-SFS	HC-LFS	HC-RFS	HA-LFS	HC-UFS
MR-J2S	**General-purpose interface MR-J2S-□A** 	●	●	●		●		●	●	●		○ (Note 3)	●	MR-J2S-□A	3-phase 200VAC	0.05 to 37	●	●	●	●	●	●	●
														MR-J2S-□A1	1-phase 100VAC	0.05 to 0.4	●	●					●
														MR-J2S-□A4	3-phase 400VAC	0.5 to 55			●			●	
	SSCNET, high-speed serial bus compatible MR-J2S-□B 			●	●			●				○ (Note 3)	●	MR-J2S-□B	3-phase 200VAC	0.05 to 37	●	●	●	●	●	●	●
														MR-J2S-□B1	1-phase 100VAC	0.05 to 0.4	●	●					●
														MR-J2S-□B4	3-phase 400VAC	0.5 to 55			●			●	
	With built-in positioning function MR-J2S-□CP 	● (Note 4)	● (Note 8)	●		●	○ (Note 7)				●		●	MR-J2S-□CP	3-phase 200VAC	0.05 to 7	●	●	●	●	●	●	●
														MR-J2S-□CP1	1-phase 100VAC	0.05 to 0.4	●	●					●
	With built-in program operation function MR-J2S-□CL 	● (Note 4)	● (Note 8)	●		●					●		●	MR-J2S-□CL	3-phase 200VAC	0.05 to 7	●	●	●	●	●	●	●
														MR-J2S-□CL1	1-phase 100VAC	0.05 to 0.4	●	●					●
MR-J2M (Multi-axis servo amplifier)	**General-purpose interface MR-J2M-A** (Note 5) 	● Max. 8 slots		●				●					●	• MR-J2M-P8A • MR-J2M-□DU • MR-J2M-BU□	3-phase 200VAC	0.05 to 0.75	●	●					●
	High speed serial bus, SSCNET compatible MR-J2M-B (Note 5) 			● (Note 6)	● Max. 8 slots			●					●	• MR-J2M-P8B • MR-J2M-□DU • MR-J2M-BU□	3-phase 200VAC	0.05 to 0.75	●	●					●

Notes: 1. The capacity selection software (MRZJW3-MOTSZ111E) can be obtained for free. Contact Mitsubishi for details.
2. ● indicates compliance with standard parts. ○ indicates compliance with special parts.
3. For further details of the fully closed loop control compatible servo amplifier, refer to "Fully Closed Loop Control Compatible INSTRUCTION MANUAL".
4. Use the manual pulse generator (MR-HDP01).
5. For further details of MR-J2M, refer to "MELSERVO-J2M Series SERVO AMPLIFIER INSTRUCTION MANUAL".
6. The expansion IO unit (MR-J2M-D01) is required.
7. Compatible with MR-J2S-□CP-S084.
8. This ● indicates "Override" and "Analog torque limit" command.
9. Actual product availability may vary according to region.

Motor series (Note 7)		Rated speed (maximum speed) (r/min)	Rated output (kW)	Servo motor type: With electro-magnetic brake (B)	Global standards: EN	Global standards: UL cUL	Protection level (Note 2)	Features	Application examples
Small capacity series	**HC-KFS series** 	3000 (4500)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	●	●	IP55 Excluding the shaft-through portion and connector (IP65 Note 3)	**Low inertia** Perfect for general industrial machines. Ultra-high velocity motors, 6000 or 10000r/min, have been prepared.	• Belt drive • Robots • Mounters • Sewing machines • X-Y tables • Food processing machines • Semiconductor manufacturing devices • Knitting and embroidery machines
		6000 (6000)	1 type 0.4	—	●	●	IP55 Excluding the shaft-through portion and connector		
		10000 (10000)	1 type 0.4	—	●	●			
	HC-MFS series 	3000 (4500)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	●	●	IP55 Excluding the shaft-through portion and connector (IP65 Note 3)	**Ultra-low inertia** Well suited for high-frequency operation.	• Inserters • Mounters
Medium capacity series	**HC-SFS series** 	1000 (1500 : 0.85kW, 1200 : 1.2~3kW)	4 types 0.85, 1.2, 2.0, 3.0	●	●	●	IP65	**Medium inertia** Three models, from low to high-speed, are available for various applications.	• Material handling systems • Robots • X-Y tables
		2000 (3000 : 0.5~1.5kW, 2500 : 2, 3.5kW, 2000 : 5, 7kW)	14 types 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0 / 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0	●	●	●	IP65		
		3000 (3000)	5 types 0.5, 1.0, 1.5, 2.0, 3.5	●	●	●	IP65		
	HC-LFS series 	2000 (3000)	5 types 0.5, 1.0, 1.5, 2.0, 3.0	●	●	●	IP65	**Low inertia** Perfect for general industrial machines.	• Roll feeders • Loaders and unloaders • High-frequency material handling systems
	HC-RFS series 	3000 (4500)	5 types 1.0, 1.5, 2.0, 3.5, 5.0	●	●	●	IP65	**Ultra-low inertia** Well suited for high-frequency operation.	• Ultra-high-frequency material handling systems
Medium/Large capacity series	**HA-LFS series** 	1000 (1200)	16 types 6.0, 8.0, 12, 15, 20, 25, 30, 37 / 6.0, 8.0, 12, 15, 20, 25, 30, 37	● (For only 6.0kW to 12kW)	●	●	IP44	**Low inertia** Three models, from low to medium-speed, are available for various applications. As standard, 30kW and larger capacities are compatible with flange mounting or leg mounting. (Note 6)	• Injection molding machines • Semiconductor manufacturing equipment • Large material handling systems
		1500 (2000)	14 types 7.0, 11, 15, 22, 30, 37 / 7.0, 11, 15, 22, 30, 37, 45, 50	● (For only 7.0kW to 15kW)	●	●	IP44		
		2000 (2000)	14 types 5.0, 7.0, 11, 15, 22, 30, 37 / 11, 15, 22, 30, 37, 45, 55	● (For only 11kW to 22kW)	●	●	IP44 IP65 for HA-LFS502 or HA-LFS702		
Flat Small/Medium capacity series	**HC-UFS series** 	2000 (3000 : 0.75~2kW, 2500 : 3.5, 5kW)	5 types 0.75, 1.5, 2.0, 3.5, 5.0	●	●	●	IP65	**Flat type** The flat design makes this unit well suited for situations where the installation space is restricted.	• Robots • Food processing machines
		3000 (4500)	4 types 0.1, 0.2, 0.4, 0.75	●	●	●	IP65 Excluding the connector (Note 4)		

Notes: 1. A ● mark shows production range.
2. The protection level inside ( ) can be complied with special products. Consult Mitsubishi for details.
3. Motor capacity 50W is excluded.
4. IP65-compliant product (HC-UFS□-S1) including connector components is also available.
5. Shaded values are for 400V type.
6. Some motors from 15 to 25kW capacities can be mounted with the legs. Refer to "Motor Dimensions" shown in this catalog.
7. Actual product availability may vary according to region.

Super Performance with MELSERVO-J2-Super

2. High Functionality, High Performance

High-resolution Encoder 131072p/rev (17bit)

- The inclusion of a high-resolution encoder ensures high performance and stability at low speeds.
- Motor sizes are the same as previous products and wiring is compatible.

High-performance CPU Incorporated for Improved Response

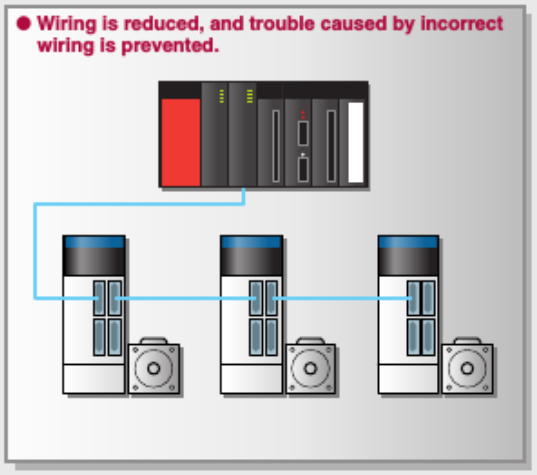
- The application of a high-performance CPU has enhanced response significantly. Speed loop frequency response is improved to 550Hz or more.
  The MR-J2-Super series are the best choice for use in high-speed positioning applications.

Absolute encoder is Standard Equipment

- The absolute positioning method, which does not require home position return, can be used by adding a battery to the servo amplifier. The servo motor does not need to be replaced.

SSCNET, high-speed serial bus compatible: B type

- A completely synchronized system can be made using SSCNET utilizing high-speed serial communication with cycle times of up to 0.888ms between controller and amplifier. Such a system will provide high levels of reliability with high levels of performance.
- As the SSCNET bus system is used to connect the servo system together, the consolidated management features such as servo amplifier parameter settings and data gathering are all present in the motion controller.
- A dedicated cable is used for the SSCNET system that simply connects the amplifiers and controllers. This simple connection method reduces wiring time and also helps to prevent noise (due to the serial data transfer when using SSCNET).
- The command frequency is not limited even when using the high resolution encoders standard on the MELSERVO-J2-Super series products.
- SSCNET is a completely synchronized network, so synchronized control and synchronized starting for advanced interpolation etc. can all be carried out.
- An absolute system can be made by simply adding a battery to the Servo amplifier.
- More than 1,000,000 SSCNET amplifier units of this highly reliable network are in use.



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3. Optimum Tuning

Easy tuning

Model Adaptive Control/ Advanced Real-time Auto-tuning

The load inertia moment (machine system's ideal model) is automatically estimated by the auto-tuning function.
Stable control is carried out following the ideal model estimated by the model adaptive control.

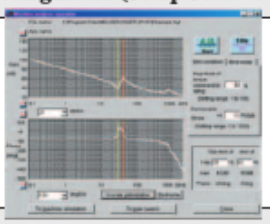
A simple parameter change allows gain settings to change, tuning the Servo

High performance tuning :Perfect Tuning using Personal Computer and MR configurator (Setup Software)

● When machine resonates

Machine Analysis Function

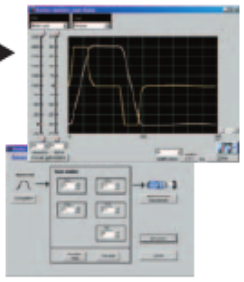
The servo motor is automatically oscillated, and the machine system's frequency characteristics are analyzed. The "Machine Resonance Suppression Filter" can be set easily based on the result.



● When thinking about changing motors
● When thinking about changing command patterns

Machine Simulation Function

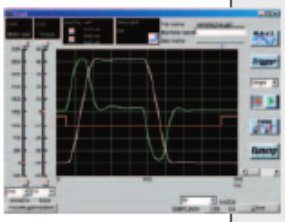
The performance can be confirmed without actually replacing the motor. The results of the machine analysis function can be read in, and the response in the machine system can be simulated.



● To see the motor state

Monitor/Diagnostic Function

The graph function to display the motor state, such as the motor's speed and torque, and functions to diagnose the motor state at an alarm occurance are provided.



Contents

Note: The cables and connectors in the section "Options ● Cables and connectors" in this catalog are sold separately.
The motor power supply connector is different for each motor, so carefully look through this catalog before ordering.

Model Configurations

■For servo amplifier 100V/200V

MR-J2S- 10 A 1- □

Special product

Mitsubishi general-purpose AC servo amplifier MELSERVO-J2-Super Series

A : General-purpose interface
B : SSCNET compatible
CP: Positioning function built-in (Note)
CL: Program operation function built-in (Note)
Note: The MR-J2S-□CP type and CL type are compatible with the 0.05 to 7kW capacity motors.

Symbol	Power supply
None	3-phase 200VAC or 1-phase 230VAC (Note 1)
1	1-phase 100VAC (Note 2)

Notes: 1. The 1-phase 230VAC is available only for the MR-J2S-70□ or smaller servo amplifiers.
2. Only for the MR-J2S-40□1 or smaller servo amplifiers.

List of compatible motors

Symbol	HC-KFS	HC-MFS	HC-SFS	HC-LFS	HC-RFS	HA-LFS	HC-UFS
10	053, 13	053, 13	—	—	—	—	13
20	23	23	—	—	—	—	23
40	43	43	—	—	—	—	43
60	—	—	52, 53	52	—	—	—
70	73, 46, 410	73	—	—	—	—	72, 73
100	—	—	81, 102, 103	102	—	—	—
200	—	—	121, 201, 152, 202, 153, 203	152	103, 153	—	152
350	—	—	301, 352, 353	202	203	—	202
500	—	—	502	302	353, 503	502	352, 502
700	—	—	702	—	—	601, 701M, 702	—
11K	—	—	—	—	—	801, 12K1, 11K1M, 11K2	—
15K	—	—	—	—	—	15K1, 15K1M, 15K2	—
22K	—	—	—	—	—	20K1, 25K1, 22K1M, 22K2	—
30K	—	—	—	—	—	30K1, 30K1M, 30K2	—
37K	—	—	—	—	—	37K1, 37K1M, 37K2	—

Note: There are some motors that cannot be connected depending on the amplifier's software version. Refer to the servo motor specifications in this catalog.

- **Conforms to following standards: EN, UL and cUL**
- **A converter unit (MR-HP30KA) is required for the 30kW or larger amplifier.**

■For servo amplifier 400V

MR-J2S- 30K A 4- □

Special product

Mitsubishi general-purpose AC servo amplifier MELSERVO-J2-Super Series

A: General-purpose interface
B: SSCNET

3-phase 400VAC

List of compatible motors

Symbol	HC-SFS	HA-LFS
60	524	—
100	1024	—
200	1524, 2024	—
350	3524	—
500	5024	—
700	7024	6014, 701M4
11K	—	8014, 12K14, 11K1M4, 11K24
15K	—	15K14, 15K1M4, 15K24
22K	—	20K14, 22K1M4, 22K24
30K	—	25K14, 30K14, 30K1M4, 30K24
37K	—	37K14, 37K1M4, 37K24
45K	—	45K1M4, 45K24
55K	—	50K1M4, 55K24

Note: There are some motors that cannot be connected depending on the amplifier's software version. Refer to the servo motor specifications in this catalog.

- **Conforms to following standards: EN, UL and cUL**
- **A converter unit (MR-HP55KA4) is required for the 30kW or larger amplifier.**

■For servo motor 200V

HC-MFS 05 3 B □

Symbol	Motor series
HC-KFS	Low inertia, small capacity
HC-MFS	Ultra-low inertia, small capacity
HC-SFS	Medium inertia, medium capacity
HC-LFS	Low inertia, medium capacity
HC-RFS	Ultra-low inertia, medium capacity
HA-LFS	Low inertia, medium-large capacity
HC-UFS	Flat model, small-medium capacity

Symbol	Rated output (kW)
05	0.05
1 to 8	0.1 to 0.85
10 to 80	1.0 to 8.0
11K to 37K	11 to 37

Symbol	Rated speed (r/min)
1	1000
1M	1500
2	2000
3	3000
6	6000
10	10000

Symbol	Electromagnetic brake
None	None
B	Installed

Note: Refer to "Electromagnetic brake specifications" in this catalog for the compatible models and detailed specifications.

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way or with key (Note)
D	D-cut (Note)

Note: Refer to "Special shaft end specifications" in this catalog for the compatible models and detailed specifications.

● **Conforms to following standards: EN, UL and cUL**

■For servo motor 400V

HA-LFS 30K 2 4 B □

Symbol	Motor series
HC-SFS	Medium inertia, medium capacity
HA-LFS	Low inertia, medium-large capacity

400VAC type

Symbol	Rated output (kW)
5	0.5
10 to 80	1.0 to 8.0
11K to 55K	11 to 55

Symbol	Rated speed (r/min)
1	1000
1M	1500
2	2000

Symbol	Electromagnetic brake
None	None
B	Installed

Note: Refer to "Electromagnetic brake specifications" in this catalog for the compatible models and detailed specifications.

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way (Note)

Note: Refer to "Special shaft end specifications" in this catalog for the compatible models and detailed specifications.

● **Conforms to following standards: EN, UL and cUL**

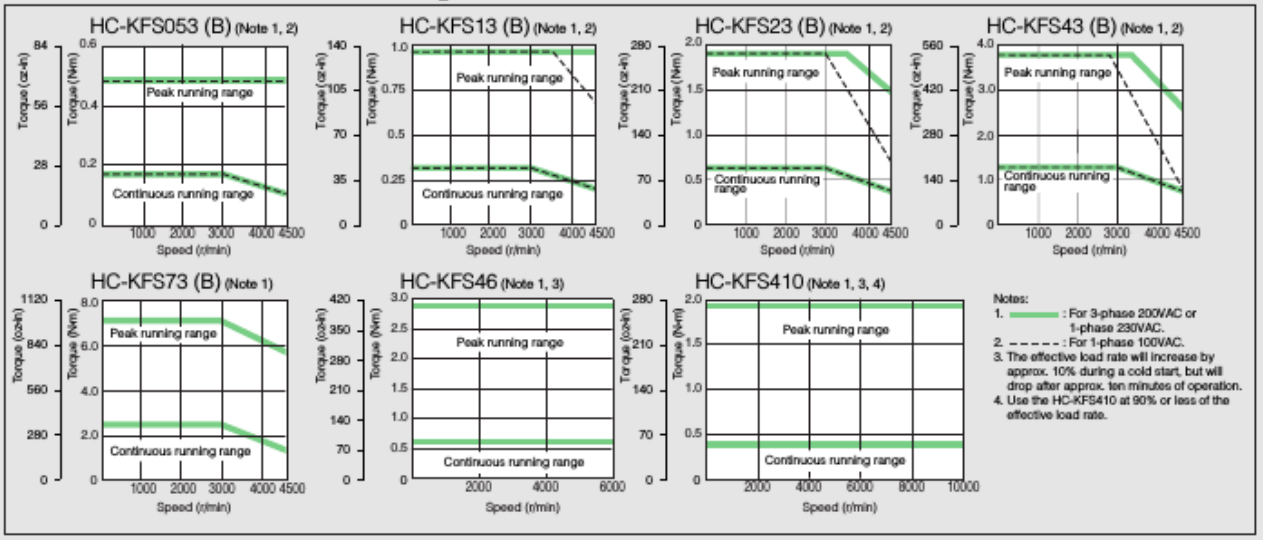
Motor Specifications and Characteristics

HC-KFS series servo motor specifications

Servo motor series			HC-KFS series (Low inertia, small capacity)					HC-KFS Ultra-high velocity series (Low inertia, small capacity)	
Models / Specifications	Servo motor model HC-KFS		053 (B)	13 (B)	23 (B)	43 (B)	73 (B)	46	410
	Servo-amp model (Note 9) MR-J2S-		10A (1)/B (1)/CP (1)/CL (1)		20A (1)/B (1)/CP (1)/CL (1)	40A (1)/B (1)/CP (1)/CL (1)	70A/B/CP/CL(Note 10)	70A/B/CP/CL-U005	70A/B/CP/CL-U006
Servo motor	Power facility capacity (Note 2) (kVA)		0.3	0.3	0.5	0.9	1.3	0.9	0.9
	Continuous running duty	Rated output (W)	50	100	200	400	750	400	
		Rated torque (N·m [oz·in])	0.16 (22.7)	0.32 (45.3)	0.64 (90.6)	1.3 (184.1)	2.4 (339.8)	0.64 (90.6)	0.38 (53.8)
	Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (134.5)	1.9 (269.0)	3.8 (538.1)	7.2 (1019.5)	2.87 (406.4)	1.91 (270.5)
	Rated speed (r/min)		3000					6000	10000
	Maximum speed (r/min)		4500					6000	10000
	Permissible instantaneous speed (r/min)		5175					6900	11500
	Power rate at continuous rated torque (kW/s)		4.78	12.1	15.8	36.7	37.7	6.4	3.1
	Rated current (A)		0.83	0.71	1.1	2.3	5.8	2.9	2.9
	Maximum current (A)		2.5	2.2	3.4	6.9	18.6	12.9	14.5
	Regenerative braking frequency (times/min) (Note 3, 4)	With no options	(Note 5)	(Note 5)	(Note 5)	220	190	110	55
		MR-RB032 (30W)	(Note 5)	(Note 5)	(Note 5)	660	280	160	80
		MR-RB12 (100W)	—	—	(Note 5)	2200	940	550	275
		MR-RB32 (300W)	—	—	—	—	2800	1650	825
	Moment of inertia J (×10^{-4}kg·m^2) [J (oz·in^2)]	Standard	0.053 (0.29)	0.084 (0.459)	0.260 (1.422)	0.460 (2.515)	1.51 (8.255)	0.64 (3.499)	0.47 (2.569)
		With electromagnetic brake	0.056 (0.306)	0.087 (0.476)	0.310 (1.695)	0.510 (2.788)	1.635 (8.938)	—	—
	Recommended load/motor inertia moment ratio (Note 6)		Max. 15 times		Max. 24 times	Max. 22 times	Max. 15 times		
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		—						
	Structure		Totally enclosed non ventilated (protection level: IP55) (Note 1, 7)						
	Environment	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/vibration (Note 8)	1000m (3280ft) or less above sea level; X: 49m/s^2 Y: 49m/s^2					1000m (3280ft) or less above sea level; X, Y: 19.6m/s^2	
	Mass (kg [lb])	Standard	0.4 (0.88)	0.53 (1.17)	0.99 (2.18)	1.45 (3.19)	3.0 (6.61)	1.5 (3.30)	1.5 (3.30)
		With electromagnetic brake	0.75 (1.65)	0.89 (1.96)	1.6 (3.53)	2.1 (4.63)	4.0 (8.81)	—	—

Notes: 1. If used in location such as actual site of machinery where oil or water may contact the product, special specifications apply, so contact Mitsubishi.
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative braking frequency shows the permissible frequency when the motor without a load decelerates from the rated speed to stop. When a load is connected; however, the value will be the table value/(m+1), where m=the load inertia moment/the motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is in 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 regeneration heating value (W) while operating. Provisions must be made to keep the generated heat below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the Servo Support software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
4. The regenerative braking frequency of the 600W or smaller servo amplifier may fluctuate with the affect of the power voltage due to the large energy ratio charged to the electrolytic capacitor in the servo amplifier.
5. There are no limits on regeneration frequency as long as the effective torque is within the rated torque range. However, the load/motor of inertia moment ratio must be within the value in the table above.
6. The value is a ratio of load inertia moment to motor inertia moment. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
7. The shaft-through portion and connector for cable terminal are excluded.
8. The vibration direction is shown in the right-side diagram. 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.
9. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as MR-J2S-□CP (1).
10. The HC-KFS series 750W is compatible with the following amplifier software version.
A type: Version A4 or above B type: Version A3 or above

HC-KFS series servo motor torque characteristics



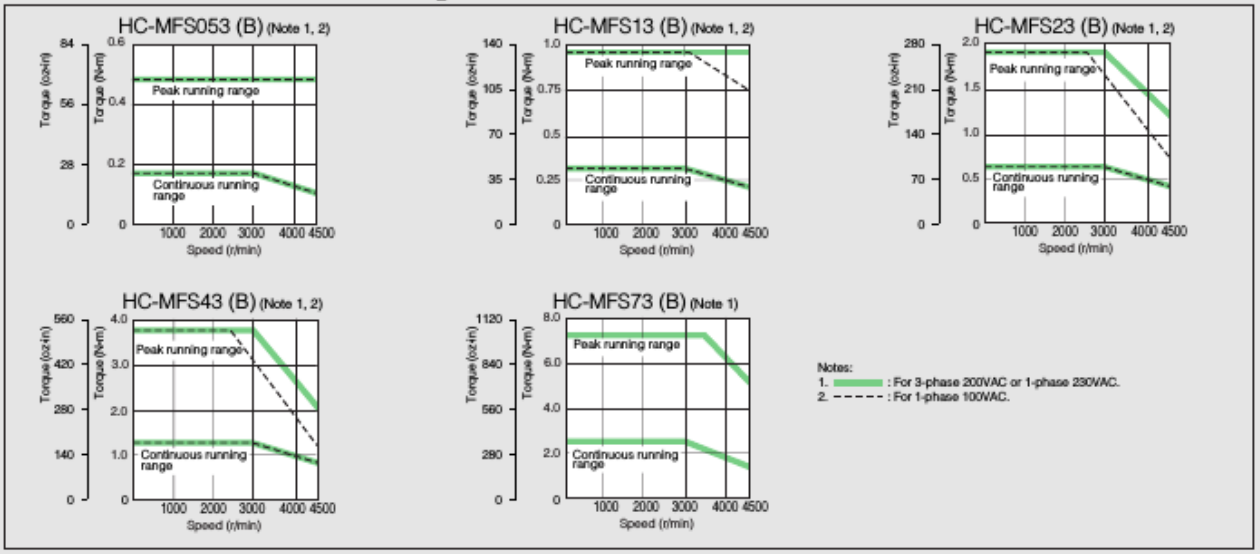
Notes:
1. ——— : For 3-phase 200VAC or 1-phase 230VAC.
2. – – – – – : For 1-phase 100VAC.
3. The effective load rate will increase by approx. 10% during a cold start, but will drop after approx. ten minutes of operation.
4. Use the HC-KFS410 at 90% or less of the effective load rate.

HC-MFS series servo motor specifications

Servo motor series			HC-MFS series (Ultra-low inertia, small capacity)				
Models / Specifications		Servo motor model HC-MFS	053 (B)	13 (B)	23 (B)	43 (B)	73 (B)
		Servo-amp model (Note 9) MR-J2S-	10A (1)/B (1)/CP (1)/CL (1)		20A (1)/B (1)/CP (1)/CL (1)	40A (1)/B (1)/CP (1)/CL (1)	70A/B/CP/CL
Servo motor	Power facility capacity (Note 2) (kVA)		0.3	0.3	0.5	0.9	1.3
	Continuous running duty	Rated output (W)	50	100	200	400	750
		Rated torque (N·m [oz·in])	0.16 (22.7)	0.32 (45.3)	0.64 (90.6)	1.3 (184.1)	2.4 (339.8)
	Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (134.5)	1.9 (269.0)	3.8 (538.1)	7.2 (1019.5)
	Rated speed (r/min)		3000				
	Maximum speed (r/min)		4500				
	Permissible instantaneous speed (r/min)		5175				
	Power rate at continuous rated torque (kW/s)		13.47	34.13	46.02	116.55	94.43
	Rated current (A)		0.85		1.5	2.8	5.1
	Maximum current (A)		2.6		5.0	9.0	18
	Regenerative braking frequency (times/min) (Note 3, 4)	With no options	(Note 5)	(Note 5)	(Note 5)	1010	400
		MR-RB032 (30W)	(Note 5)	(Note 5)	(Note 5)	3000	600
		MR-RB12 (100W)	—	—	(Note 5)	(Note 5)	2400
		MR-RB32 (300W)	—	—	—	—	(Note 5)
	Moment of inertia J (×10^{-4} kg·m^2) [J (oz·in^2)]	Standard	0.019 (0.104)	0.03 (0.164)	0.088 (0.481)	0.143 (0.782)	0.6 (3.28)
		With electromagnetic brake	0.022 (0.12)	0.032 (0.175)	0.136 (0.743)	0.191 (1.044)	0.725 (3.963)
	Recommended load/motor inertia moment ratio		30 times the servo motor's inertia moment maximum (Note 6)				
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)				
	Attachments		—				
	Structure		Totally enclosed non ventilated (protection level: IP55) (Note 1, 7)				
	Environment	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/vibration (Note 8)	1000m (3280ft) or less above sea level; X, Y: 49 m/s^2				
	Mass (kg [lb])	Standard	0.4 (0.88)	0.53 (1.17)	0.99 (2.18)	1.45 (3.19)	3.0 (6.61)
		With electromagnetic brake	0.75 (1.65)	0.89 (1.96)	1.6 (3.53)	2.1 (4.63)	4.0 (8.81)

Notes: 1. If used in location such as actual site of machinery where oil or water may contact the product, special specifications apply, so contact Mitsubishi.
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative braking frequency shows the permissible frequency when the motor without a load decelerates from the rated speed to stop. When a load is connected; however, the value will be the table value/(m+1), where m=the load inertia moment/the motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is in 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 regeneration heating value (W) while operating. Provisions must be made to keep the generated heat below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the Servo Support software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
4. The regenerative braking frequency of the 600W or smaller servo amplifier may fluctuate with the affect of the power voltage due to the large energy ratio charged to the electrolytic capacitor in the servo amplifier.
5. There are no limits on regeneration frequency as long as the effective torque is within the rated torque range. However, the load/motor of inertia moment ratio must be 30 times or less.
6. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
7. The shaft-through portion and connector for cable terminal are excluded.
8. The vibration direction is shown in the right-side diagram. 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.
9. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as MR-J2S-□CP (1).

HC-MFS series servo motor torque characteristics



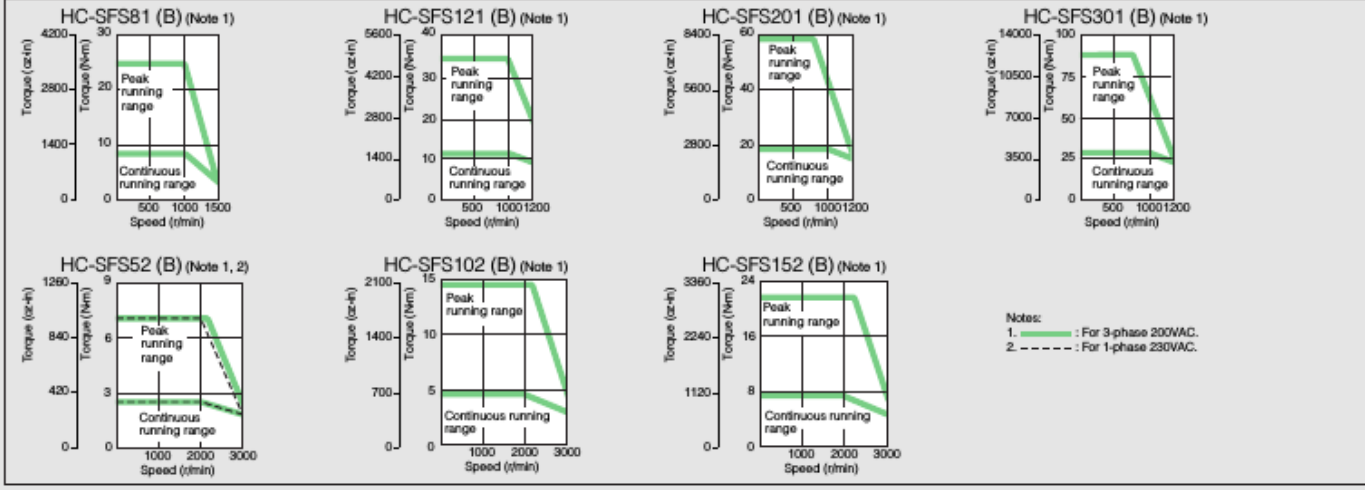
Motor Specifications and Characteristics

HC-SFS series servo motor specifications (200VAC type)

Servo motor series			HC-SFS1000 r/min series (Medium inertia, medium capacity)				HC-SFS2000 r/min series		
Models / Specifications	Servo motor model HC-SFS		81 (B)	121 (B)	201 (B)	301 (B)	52 (B)	102 (B)	152 (B)
	Servo-amp model (Note 7) MR-J2S-		100A/B/CP/CL (Note 8)	200A/B/CP/CL (Note 8)		350A/B/CP/CL (Note 8)	60A/B/CP/CL	100A/B/CP/CL	200A/B/CP/CL
Servo motor	Power facility capacity (Note 1) (kVA)		1.5	2.1	3.5	4.8	1.0	1.7	2.5
	Continuous running duty	Rated output (kW)	0.85	1.2	2.0	3.0	0.5	1.0	1.5
		Rated torque (N·m [oz·in])	8.12 (1149.8)	11.5 (1628.4)	19.1 (2704.6)	28.6 (4049.8)	2.39 (338.4)	4.78 (676.8)	7.16 (1013.9)
	Maximum torque (N·m [oz·in])		24.4 (3455.0)	34.4 (4871.0)	57.3 (8113.7)	85.9 (12163.4)	7.16 (1013.9)	14.4 (2039.0)	21.6 (3058.6)
	Rated speed (r/min)		1000				2000		
	Maximum speed (r/min)		1500	1200			3000		
	Permissible instantaneous speed (r/min)		1725	1380			3450		
	Power rate at continuous rated torque (kW/s)		32.9	30.9	44.5	81.3	8.7	16.7	25.6
	Rated current (A)		5.1	7.1	9.6	16	3.2	6	9
	Maximum current (A)		15.3	21.3	28.8	48	9.6	18	27
	Regenerative braking frequency (times/min) (Note 2, 3)	With no options	140	240	100	84	56	54	136
		MR-RB032 (30W)	220	—	—	—	165	80	—
		MR-RB12 (100W)	740	—	—	—	560	270	—
		MR-RB30 (300W)	—	730	330	250	—	—	408
		MR-RB31 (300W)	—	—	—	—	—	—	—
		MR-RB32 (300W)	2220	—	—	—	—	810	—
		MR-RB50 (500W) (Note 6)	—	1216	550	430	—	—	680
		MR-RB51 (500W) (Note 6)	—	—	—	—	—	—	—
	Moment of inertia J (x10^{-4}kg·m^2) [J (oz·in^2)]	Standard	20.0 (109)	42.5 (232)	82.0 (448)	101 (552)	6.6 (36.1)	13.7 (74.9)	20.0 (109)
		With electromagnetic brake	22.0 (120)	52.5 (287)	92.0 (503)	111 (607)	8.6 (47.0)	15.7 (85.8)	22.0 (120)
	Recommended load/motor inertia moment ratio		15 times the servo motor's inertia moment maximum (Note 4)						
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		Oil seal						
	Structure		Totally enclosed non ventilated (protection level: IP65)						
	Environment	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 (3280ft) or less above sea level						
		Vibration (Note 5)	X,Y : 24.5m/s^2	X : 24.5m/s^2 Y : 49m/s^2		X : 24.5m/s^2 Y : 29.4m/s^2	X,Y : 24.5m/s^2		
	Mass (kg [lb])	Standard	9 (19.8)	12 (26.4)	19 (41.9)	23 (50.7)	5 (11.0)	7 (15.4)	9 (19.8)
		With electromagnetic brake	11 (24.2)	18 (39.7)	25 (55.1)	29 (63.9)	7 (15.4)	9 (19.8)	11 (24.2)

Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor without a load decelerates from the rated speed to stop. When a load is connected; however, the value will be the table value/(m+1), where m=the load inertia moment/the motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is in 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 regeneration heating value (W) while operating. Provisions must be made to keep the generated heat below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the Servo Support software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. The regenerative braking frequency of the 600W or smaller servo amplifier may fluctuate with the affect of the power voltage due to the large energy ratio charged to the electrolytic capacitor in the servo amplifier.
4. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.

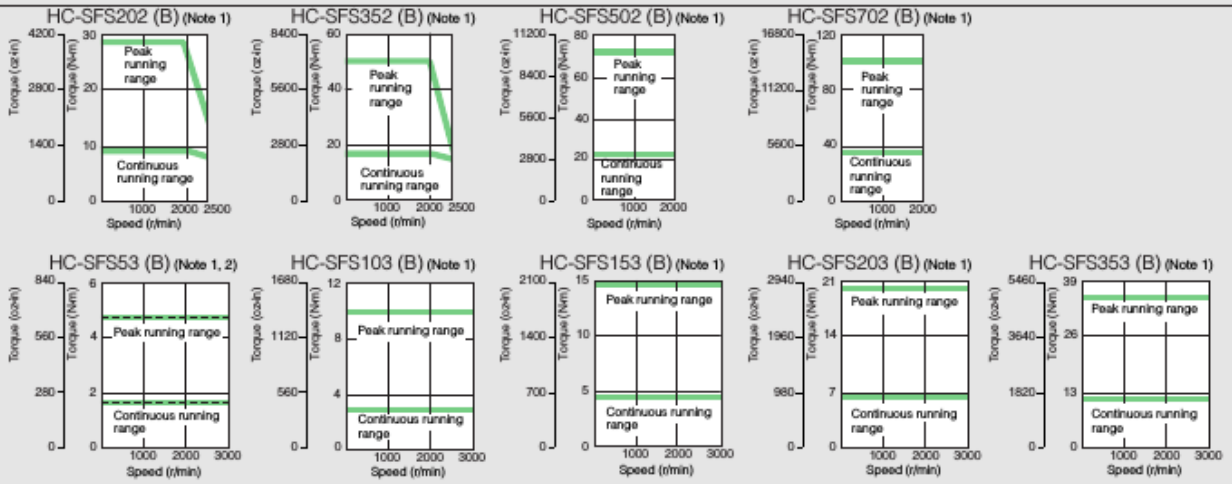
HC-SFS series servo motor torque characteristics (200VAC type)



Motor Specifications and Characteristics

	(Medium inertia, medium capacity)				HC-SFS3000 r/min series (Medium inertia, medium capacity)				
	202 (B)	352 (B)	502 (B)	702 (B)	53 (B)	103 (B)	153 (B)	203 (B)	353 (B)
	200A/B/CP/CL	350A/B/CP/CL	500A/B/CP/CL (Note 9)	700A/B/CP/CL (Note 9)	60A/B/CP/CL (Note 10)	100A/B/CP/CL (Note 10)	200A/B/CP/CL (Note 10)		350A/B/CP/CL (Note 10)
	3.5	5.5	7.5	10.0	1.0	1.7	2.5	3.5	5.5
	2.0	3.5	5.0	7.0	0.5	1.0	1.5	2.0	3.5
	9.55 (1352.3)	16.7 (2364.7)	23.9 (3384.2)	33.4 (4729.4)	1.59 (225.1)	3.18 (450.3)	4.78 (676.8)	6.37 (902.0)	11.1 (1571.8)
	28.5 (4035.6)	50.1 (7094.2)	71.6 (10138.6)	100 (14160)	4.77 (675.4)	9.55 (1352.3)	14.3 (2024.9)	19.1 (2704.6)	33.4 (4729.4)
	2000				3000				
	2500		2000		3000				
	2875		2300		3450				
	21.5	34.1	56.5	69.7	3.8	7.4	11.4	9.5	15.1
	11	17	26	35	3.2	5.3	8.6	10.4	16.4
	33	51	84	105	9.6	15.9	25.8	31.2	49.2
	64	31	39	32	25	24	82	24	14
	—	—	—	—	73	36	—	—	—
	—	—	—	—	250	120	—	—	—
	192	95	90	—	—	—	250	70	42
	—	—	—	57	—	—	—	—	—
	—	—	—	—	—	360	—	—	—
	320	158	150	—	—	—	410	110	70
	—	—	—	95	—	—	—	—	—
	42.5 (232)	82.0 (448)	101(552)	160 (875)	6.6 (36.1)	13.7 (74.9)	20.0 (109)	42.5 (232)	82.0 (448)
	52.5 (287)	92.0 (503)	111 (607)	170 (929)	8.6 (47.0)	15.7 (85.8)	22.0 (120)	52.5 (287)	92.0 (503)
	15 times the servo motor's inertia moment maximum (Note 4)								
	17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)								
	Oil seal								
	Totally enclosed non ventilated (protection level: IP65)								
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)								
	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)								
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust								
	1000m (3280ft) or less above sea level								
	X : 24.5m/s^2 Y : 49m/s^2		X : 24.5m/s^2 Y : 29.4m/s^2		X,Y : 24.5m/s^2			X : 24.5m/s^2 Y : 49m/s^2	
	12 (26.4)	19 (41.9)	23 (50.7)	32 (70.5)	5 (11)	7 (15.4)	9 (19.8)	12 (26.4)	19 (41.9)
	18 (39.7)	25 (55.1)	29 (63.9)	38 (83.7)	7 (15.4)	9 (19.8)	11 (24.2)	18 (39.7)	25 (55.1)

5. The vibration direction is shown in the right-side diagram. 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.
6. Install a cooling fan (approx. 1.0m³/min, □92).
7. MR-J2S-□CP-S084 is also compatible. The compatible motor is the same as MR-J2S-□CP.
8. The HC-SFS 1000r/min series is compatible with the following amplifier software version:
   A type: Version A1 or above
9. The HC-SFS 2000r/min series 5.0kW/7.0kW is compatible with the following amplifier software version:
   A type, B type: Version B0 or above
10. The HC-SFS 3000r/min series is compatible with the following amplifier software version:
    A type: Version A1 or above

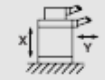


Motor Specifications and Characteristics

HC-SFS series servo motor specifications (400VAC type)

Servo motor series			HC-SFS2000 r/min series (Medium inertia, medium capacity)						
Models / Specifications	Servo motor model HC-SFS		524 (B)	1024 (B)	1524 (B)	2024 (B)	3524 (B)	5024 (B)	7024 (B)
	Servo-amp model MR-J2S-		60A4/B4	100A4/B4	200A4/B4		350A4/B4	500A4/B4	700A4/B4
Servo motor	Power facility capacity (Note 1) (kVA)		1.0	1.7	2.5	3.5	5.5	7.5	10.0
	Continuous running duty	Rated output (kW)	0.5	1.0	1.5	2.0	3.5	5.0	7.0
		Rated torque (N·m [oz·in])	2.39 (338.4)	4.78 (676.8)	7.16 (1013.9)	9.55 (1352.3)	16.7 (2364.7)	23.9 (3384.2)	33.4 (4729.4)
	Maximum torque (N·m [oz·in])		7.16 (1013.9)	14.4 (2039.0)	21.6 (3058.6)	28.5 (4035.6)	50.1 (7094.2)	71.6 (10138.6)	100 (14160)
	Rated speed (r/min)		2000						
	Maximum speed (r/min)		3000			2500		2000	
	Permissible instantaneous speed (r/min)		3450			2875		2300	
	Power rate at continuous rated torque (kW/s)		8.7	16.7	25.6	21.5	34.1	56.5	69.7
	Rated current (A)		1.5	2.8	4.4	5.4	8.6	14	17
	Maximum current (A)		4.5	8.4	13.2	16.2	25.8	42	51
	Regenerative braking frequency (times/min) (Note 2, 3)	With no options	56	54	136	64	31	39	32
		MR-RB1L-4 (100W)	560	—	—	—	—	—	—
		MR-RB3M-4 (300W)	—	810	—	—	—	—	—
		MR-RB3H-4 (300W)	—	—	408	192	—	—	—
		MR-RB5H-4 (500W) (Note 6)	—	—	680	320	—	—	—
		MR-RB3G-4 (300W)	—	—	—	—	95	90	—
		MR-RB5G-4 (500W) (Note 6)	—	—	—	—	158	150	—
		MR-RB34-4 (300W)	—	—	—	—	—	—	57
		MR-RB54-4 (500W) (Note 6)	—	—	—	—	—	—	95
	Moment of inertia J (x10^{-4}kg·m^2) [J (oz·in^2)]	Standard	6.6 (36.1)	13.7 (74.9)	20.0 (109)	42.5 (232)	82.0 (448)	101 (552)	160 (875)
		With electromagnetic brake	8.6 (47.0)	15.7 (85.8)	22.0 (120)	52.5 (287)	92.0 (503)	111 (607)	170 (929)
	Recommended load/motor inertia moment ratio		15 times the servo motor's inertia moment maximum (Note 4)						
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		Oil seal						
	Structure		Totally enclosed non ventilated (protection level: IP65)						
	Environment	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 (3280ft) or less above sea level						
		Vibration (Note 5)	X,Y : 24.5m/s^2			X : 24.5m/s^2 Y : 49m/s^2		X : 24.5m/s^2 Y : 29.4m/s^2	
	Mass (kg [lb])	Standard	5 (11.0)	7 (15.4)	9 (19.8)	12 (26.4)	19 (41.9)	23 (50.7)	32 (70.5)
		With electromagnetic brake	7 (15.4)	9 (19.8)	11 (24.2)	18 (39.7)	25 (55.1)	29 (63.9)	38 (83.7)

Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor without a load decelerates from the rated speed to stop. When a load is connected; however, the value will be the table value/(m+1), where m=the load inertia moment/the motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is in 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 regeneration heating value (W) while operating. Provisions must be made to keep the generated heat below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the Servo Support software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. The regenerative braking frequency of the 600W or smaller servo amplifier may fluctuate with the affect of the power voltage due to the large energy ratio charged to the electrolytic capacitor in the servo amplifier.
4. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
5. The vibration direction is shown in the right-side diagram. 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.
6. Install a cooling fan (approx. 1.0m^3/min, □92).
7. The HC-SFS series 400V is compatible with the following amplifier software version:
   • For 0.5kW to 2.0kW, A type: Version A2 or above • For 7.0kW, A type: Version A1 or above



HC-SFS series servo motor torque characteristics (400VAC type)