MITSUBISHI ELECTRIC

SERVO AMPLIFIERS & MOTORS

Changes for the Better

MELSERVO-J3

High Functionality

High Performance

Usability

High Precision

A sign of the future

J3

High Speed

Advanced Technology

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

MELSOFT

TÜV Rheinland

ISO 14001 JACO UKAS ENVIRONMENTAL MANAGEMENT 051

BVQI ISO 9001 UKAS QUALITY MANAGEMENT 008

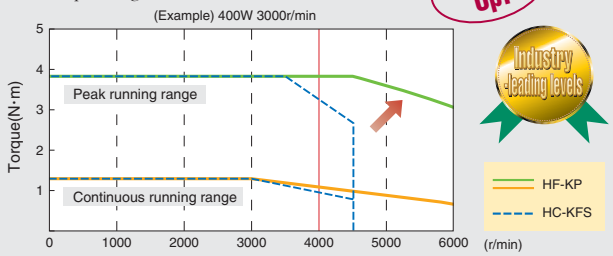
MELSERVO-J3 The ever-evolving new

Realizing high speeds and high accuracies

■ Tact time improved with high-speed positioning

- High-speed, high-torque motor HF series
  ✻Patent pending

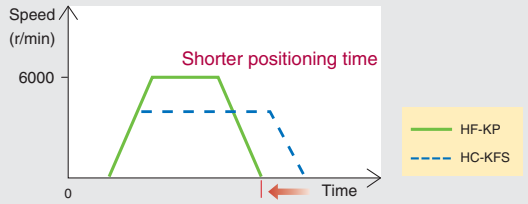
Power Up!



Industry-leading levels

- The high speed (6000r/min) and high-function speed frequency response (900Hz) shorten positioning times.

Higher speed!



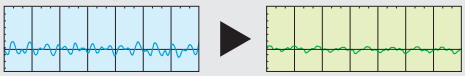
- Maximum speed has been increased to 6000r/min for the HF-KP series, and 3000r/min for the HF-SP 2000r/min series.

■ Machine performance improved with highly accurate operation

Industry's No.1

- A high-resolution encoder 262144p/rev (18-bit) is mounted as a standard to realize stability even at low speeds.
- Fluctuations in motor torque are reduced by reducing the cogging torque.

<Cogging torque> (Note 2)



Existing motor (HC series) ▶ New motor (HF series)

1/2 of existing products

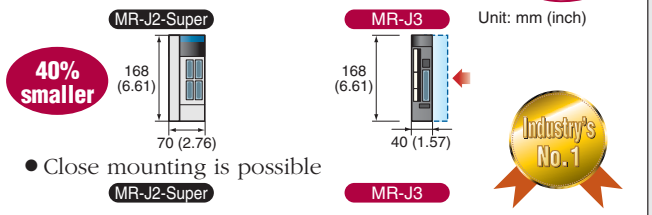
- The absolute encoder is standard equipment. Home position return at each power on is not necessary if a battery (MR-J3BAT) is mounted on the servo amplifier.

Compact and flexible

<Servo amplifier>

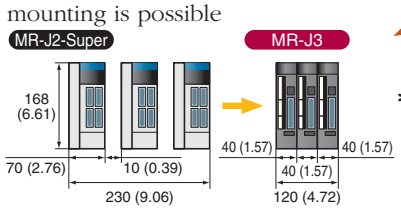
- Installation area is 40% smaller than existing model (compared with 400W)

More compact!



Industry's No.1

- Close mounting is possible

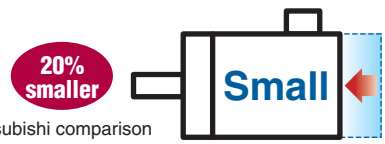


✻The working environment is different for close mounting. (Note 3)

<Servo motor>

- 20% smaller than existing model (Example: HF-KP series 400W)

Even smaller!



Mitsubishi comparison of HC-KFS

Industry's No.1

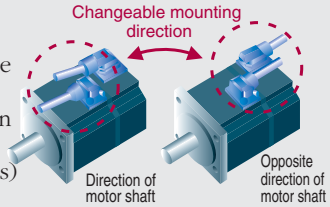
<Servo motor>

- The connectors of the HF-SP series are smaller than the existing HC-SFS series, so the user's system is even more compact.

■ Flexible wiring

- Connectors have been adapted for the servo amplifier terminal block thereby reducing the time required for wiring. Refer to the section "Connections with peripheral equipment" in this catalog for details regarding the connector.

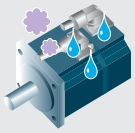
- The cable from the motor can be led out in the direction of the motor shaft or opposite direction of the motor shaft according to the selected cable. (HF-KP series)



Environmental safety

■ Improved environmental safety

IP65 is conformed as a standard for the servo motor HF-KP series (excluding the shaft-through portion). (Note 4)
IP67 is conformed as a standard for the servo motor HF-SP series (excluding the shaft-through portion).



Resists both water and dust!

Compatible with overseas standards

■ Conformity to EN, UL, cUL standards

The MELSERVO-J3 standard specifications conform to overseas standards.

✻ This product is not subject to China Compulsory Certification (CCC).

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Notes: 1. "Industry's No. 1" indicated on pages 1 and 2 of this catalog is current as of August 2003.
2. This data is for the 750W.
3. Refer to "Servo Amplifier Specifications" and "Cautions Concerning Use" in this catalog for details.
4. Use an IP65 compatible cable when using the motor in an IP65 environment.

generation servo

Emerging tuning functions

■ Easy tuning

Ever-evolving Real time Auto-tuning ▶

Detailed setting of the response value now possible!

With Mitsubishi's original model adaptive control and the ever-evolving auto-tuning function, tuning can be completed just by changing the response setting value!!

■ Precise tuning

● To suppress vibration at the end of the arm or the residual vibration in the machine

Advanced Vibration Control ▶ **Easily eliminates vibration!**

*Patent pending

The auto-tuning suppresses vibration automatically.

Industry's first

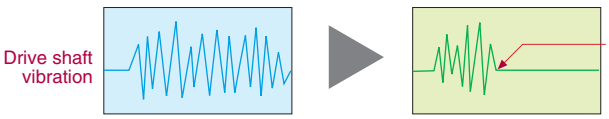
● When drive shaft, such as ball screw resonates

Adaptive Filter II ▶

*Patent pending

Easier to use!!

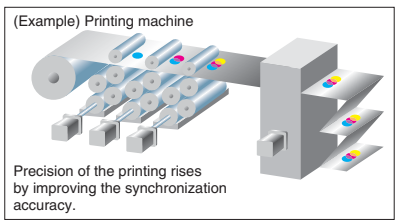
The optimum "machine resonance suppression filter" is automatically set to suppress resonance without even measuring the machine system's (drive shaft) frequency characteristics. The adaptive frequency range has been increased compared to the existing models, so resonance at the drive shaft can also be suppressed.



● To improve the synchronization accuracy of printing machines and packaging machines, etc.

Robust Disturbance Compensation Function ▶

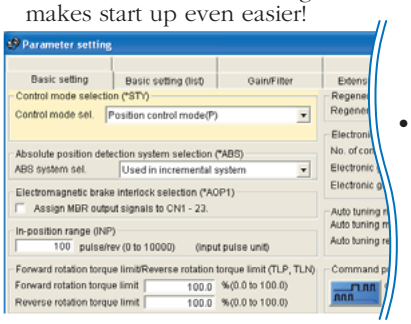
The response for just the disturbance element can be increased, making it possible to suppress the disturbance in a stable state.



■ Powerful startup and tuning support tools – Easy-to-use MR Configurator (Setup software) –

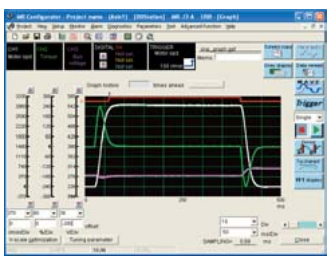
● For startup

The new "Parameter setting" window makes start up even easier!



● To find the motor status

Monitor function diagnostic function ▶



• One analog channel has been added to the graph function (total: 3ch).

• The amplifier diagnostic function has been newly added.

• USB interface enables the high-speed sampling and long-term waveform measurement.

Industry's first

Industry's first

Model Configurations

■ For servo amplifier

MR-J3- 10 A □

Mitsubishi general-purpose AC servo amplifier MELSERVO-J3 Series

A : General-purpose interface

✻ Conforms to following standards: EN, UL, cUL

List of compatible motors

Symbol	HF-KP	HF-SP	
		1000r/min (Available soon)	2000r/min
10	053, 13	—	—
20	23	—	—
40	43	—	—
60	—	51	52
70	73	—	—
100	—	81	102
200	—	121, 201	152, 202
350	—	301	352

Symbol	Power supply
None	3-phase 200VAC or single-phase 230VAC (Note)
1	Single-phase 100VAC (in planning stages)

Note: The single 230VAC is available only for the MR-J3-70A or smaller servo amplifiers.

■ For servo motor

HF-KP 05 3 B □

Symbol	Motor series
HF-KP	Low inertia, small capacity 
HF-SP	Medium inertia, medium capacity 

Symbol	Electromagnetic brake
None	None
B	Installed

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way (Note1)
D	D-cut (Note2)

Notes: 1. The 200W or larger capacity HF-KP□K has a key.
2. D-cut applies only to the 100W or smaller capacity HF-KP.

✻ Conforms to following standards: EN, UL, cUL

Symbol	Rated output (kW)
05	0.05
1 to 7	0.1 to 0.75
10 to 35	1.0 to 3.5

Symbol	Rated speed (r/min)
1	1000 (Available soon) (Note1)
2	2000 (Note1)
3	3000 (Note2)

Notes: 1. 1000r/min and 2000r/min are available only for the HF-SP series.
2. 3000r/min is available only for the HF-KP series.

Note: Contact Mitsubishi for details on whether standards have been acquired for special-order products.

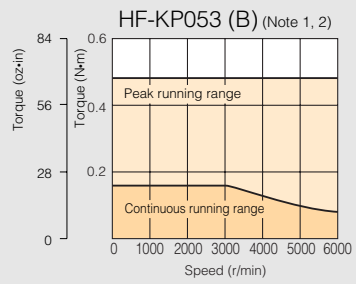
Specifications and Characteristics

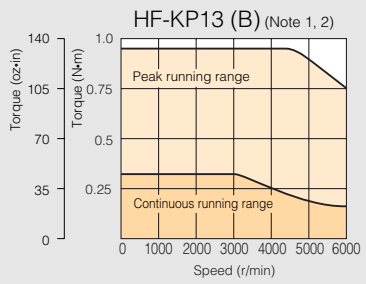
HF-KP series servo motor specifications

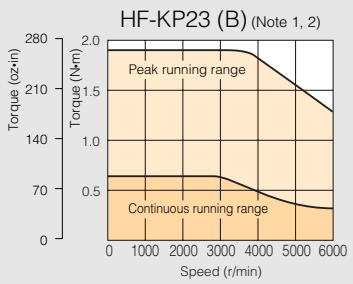
Servo motor series			HF-KP series (Low inertia, small capacity)				
Specifications \ Models		Servo motor model	HF-KP053(B)	HF-KP13(B)	HF-KP23(B)	HF-KP43(B)	HF-KP73(B)
		Servo amplifier model	MR-J3-10A		MR-J3-20A	MR-J3-40A	MR-J3-70A
Servo motor	Power facility capacity (Note 1) (kVA)		0.3	0.3	0.5	0.9	1.3
	Continuous running duty	Rated output (W)	50	100	200	400	750
		Rated torque (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)		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 (A)		2.7	2.4	4.2	8.1	15.6
	Regenerative braking frequency (times/min) (Note 2)	With no options	(Note 2-1)	(Note 2-2)	448	249	140
		MR-RB032 (30W)	9747	4435	1344	747	210
		MR-RB12 (100W)	—	—	4480	2490	700
		MR-RB32 (300W)	—	—	—	—	2100
	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 (1.312)	0.42 (2.296)	1.43 (7.817)
		With electromagnetic brake	0.054 (0.295)	0.090 (0.492)	0.31 (1.695)	0.50 (2.733)	1.63 (8.911)
	Recommended load/motor inertia moment ratio		Less than 15-times the servo motor's inertia moment (Note 3)				
	Speed/position detector		Resolution per encoder/servo motor rotation: 262144 p/rev				
	Attachments		18 bit encoder				
	Insulation class		Class B				
	Structure		Totally enclosed non ventilated (protection level: IP65) (Note 4)				
	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 max. (non condensing), storage: 90% RH max. (non condensing)				
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust				
		Elevation/vibration (Note 5)	1000 meters or less above sea level; X: 49m/s^2 Y: 49m/s^2				
	Mass (kg [lb])	Standard	0.35 (0.77)	0.56 (1.23)	0.94 (2.07)	1.5 (3.30)	2.9 (6.39)
		With electromagnetic brake	0.65 (1.43)	0.86 (1.89)	1.6 (3.53)	2.1 (4.63)	3.9 (8.59)

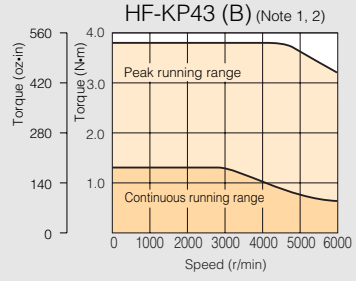
Notes: 1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
2-1. When a 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 a motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is 8-fold or less and the effective torque is within the rated torque range.
2-2. When a 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 a motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is 4-fold or less and the effective torque is within the rated torque range.
3. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
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 a motor stops, so please maintain vibration to approximately one-half of the allowable value.

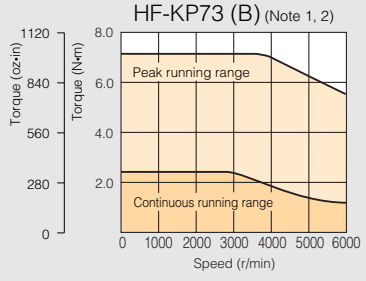
HF-KP series servo motor torque characteristics











Notes:
1. For 3-phase 200VAC operation.
2. For single-phase 230VAC operation.

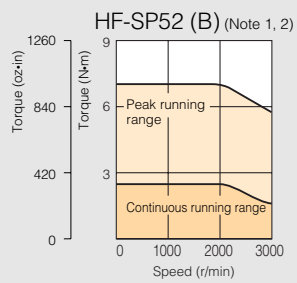
Specifications and Characteristics

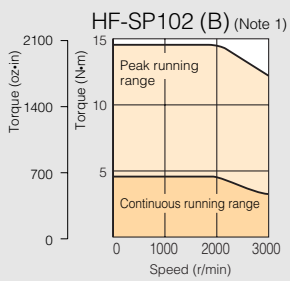
HF-SP series servo motor specifications

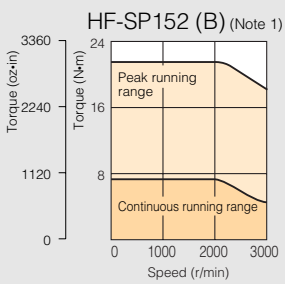
Servo motor series			HF-SP2000r/min series (Medium inertia, medium capacity)				
Specifications \ Models		Servo motor model	HF-SP52(B)	HF-SP102(B)	HF-SP152(B)	HF-SP202(B)	HF-SP352(B)
		Servo amplifier model	MR-J3-60A	MR-J3-100A	MR-J3-200A		MR-J3-350A
Servo motor	Power facility capacity (Note 1) (kVA)		1.0	1.7	2.5	3.5	5.5
	Continuous running duty	Rated output (kW)	0.5	1	1.5	2	3.5
		Rated torque (N·m [oz·in])	2.39 (338.4)	4.77 (675.4)	7.16 (1013.9)	9.55 (1352.3)	16.7 (2364.7)
	Maximum torque (N·m [oz·in])		7.16 (1013.9)	14.3 (2024.9)	21.5 (3044.4)	28.6 (4049.8)	50.1 (7094.2)
	Rated speed (r/min)		2000				
	Maximum speed (r/min)		3000				
	Permissible instantaneous speed (r/min)		3450				
	Power rate at continuous rated torque (kW/s)		9.34	19.2	28.8	23.8	37.2
	Rated current (A)		2.9	5.3	8.0	10	16
	Maximum current (A)		8.7	15.9	24	30	48
	Regenerative braking frequency (times/min) (Note 2)	With no options	60	62	152	71	33
		MR-RB032 (30W)	180	93	—	—	—
		MR-RB12 (100W)	600	310	—	—	—
		MR-RB30 (300W)	—	—	456	213	99
		MR-RB32 (300W)	—	930	—	—	—
		MR-RB50 (500W)	—	—	760	355	165
	Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	6.1 (33.3)	11.9 (65.1)	17.8 (97.3)	38.3 (209)	75.0 (410)
		With electromagnetic brake	8.3 (45.4)	14.0 (76.5)	20.0 (109)	47.9 (262)	84.7 (463)
	Recommended load/motor inertia moment ratio		Less than 15-times the servo motor's inertia moment (Note 3)				
	Speed/position detector		Resolution per encoder/servo motor rotation: 262144 p/rev				
	Attachments		18 bit encoder				
	Insulation class		Class F				
	Structure		Totally enclosed non ventilated (protection level: IP67) (Note 4)				
	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 max. (non condensing), storage: 90% RH max. (non condensing)				
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust				
		Elevation	1000 meters or less above sea level				
		Vibration (Note 5)	X: 24.5m/s^2 Y: 24.5m/s^2			X: 24.5m/s^2 Y: 49m/s^2	
	Mass (kg [lb])	Standard	4.8 (10.6)	6.5 (14.3)	8.3 (18.3)	12 (26.4)	19 (41.9)
		With electromagnetic brake	6.7 (14.8)	8.5 (18.7)	11 (24.2)	18 (39.7)	25 (55.1)

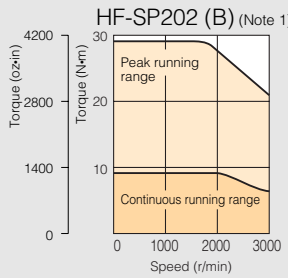
Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
3. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
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 a motor stops, so please maintain vibration to approximately one-half of the allowable value.

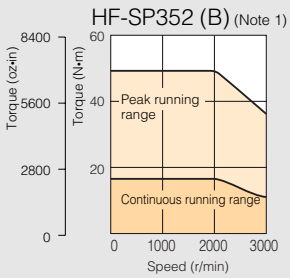
HF-SP series servo motor torque characteristics









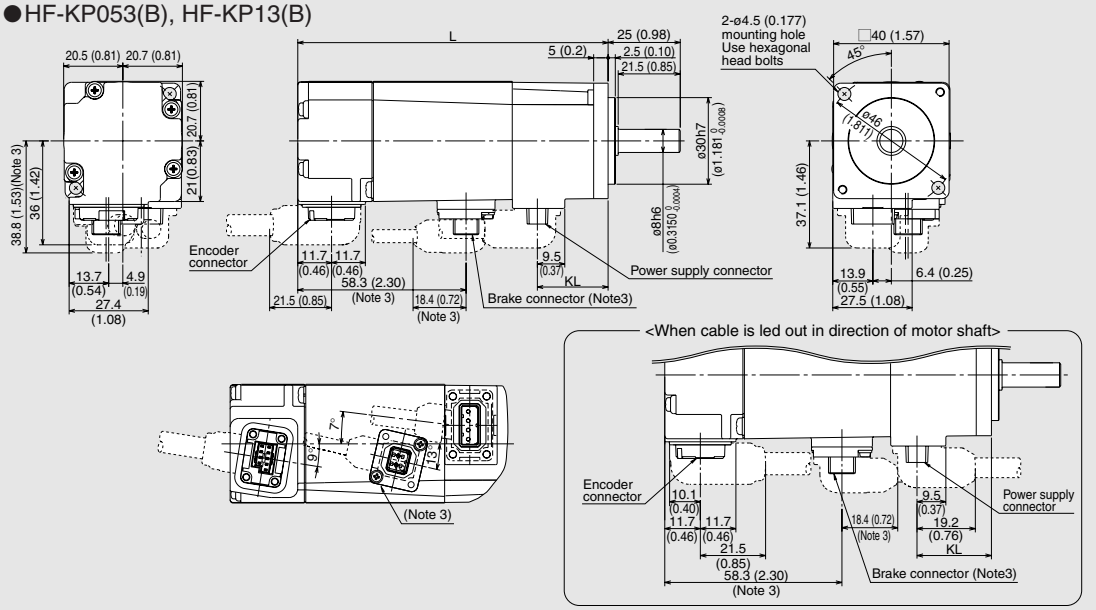


Notes:
1. For 3-phase 200VAC operation.
2. For single-phase 230VAC operation.

Motor Dimensions

Unit: mm (inch)

●HF-KP053(B), HF-KP13(B)



Power supply connector pin assignment

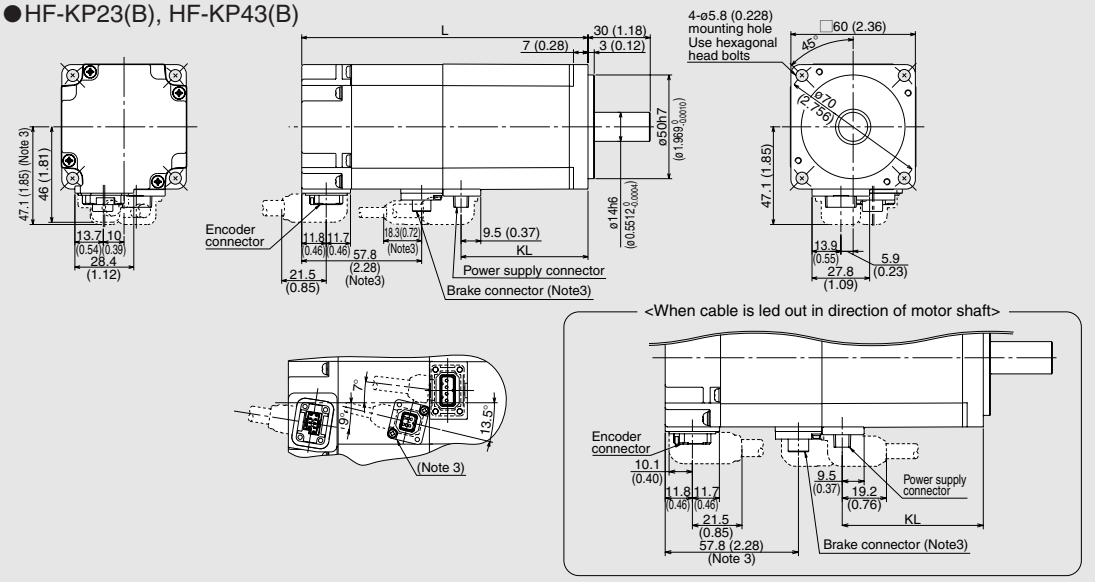
Pin No.	Signal name
1	Earth
2	U
3	V
4	W

Brake connector pin assignment (Note 3)

Pin No.	Signal name
1	B1
2	B2

Model	Variable dimensions	
	L	KL
HF-KP053 (B)	66.4 (2.61) <107.5 (4.23)>	24.5 (0.96)
HF-KP13 (B)	82.4 (3.24) <123.5 (4.86)>	40.5 (1.59)

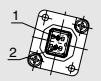
●HF-KP23(B), HF-KP43(B)



Power supply connector pin assignment

Pin No.	Signal name
1	Earth
2	U
3	V
4	W

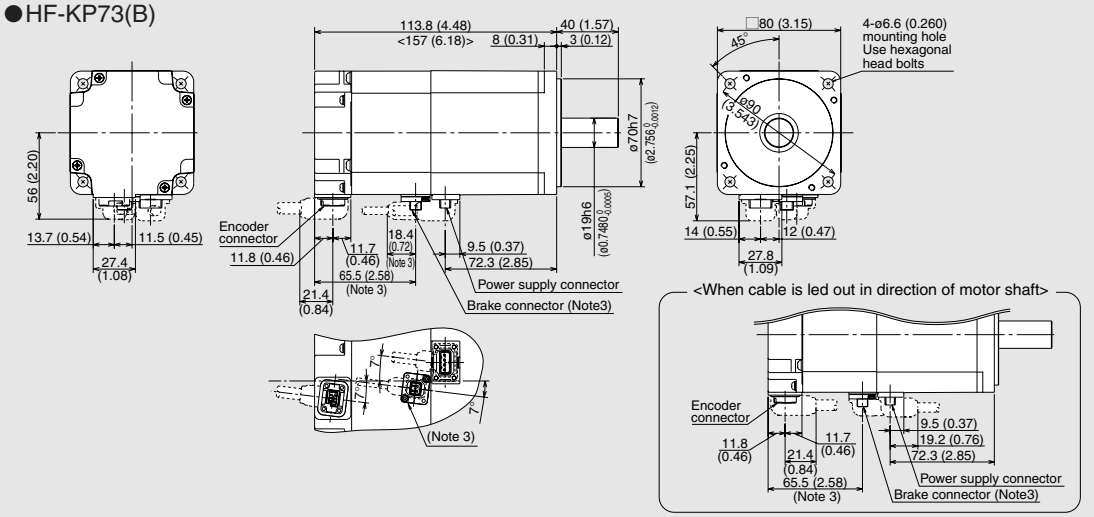
Brake connector pin assignment (Note 3)



Pin No.	Signal name
1	B1
2	B2

Model	Variable dimensions	
	L	KL
HF-KP23 (B)	76.6 (3.02) <116.1 (4.57)>	39.3 (1.55)
HF-KP43 (B)	98.5 (3.88) <138 (5.43)>	61.2 (2.41)

●HF-KP73(B)



Power supply connector pin assignment

Pin No.	Signal name
1	Earth
2	U
3	V
4	W

Brake connector pin assignment (Note 3)

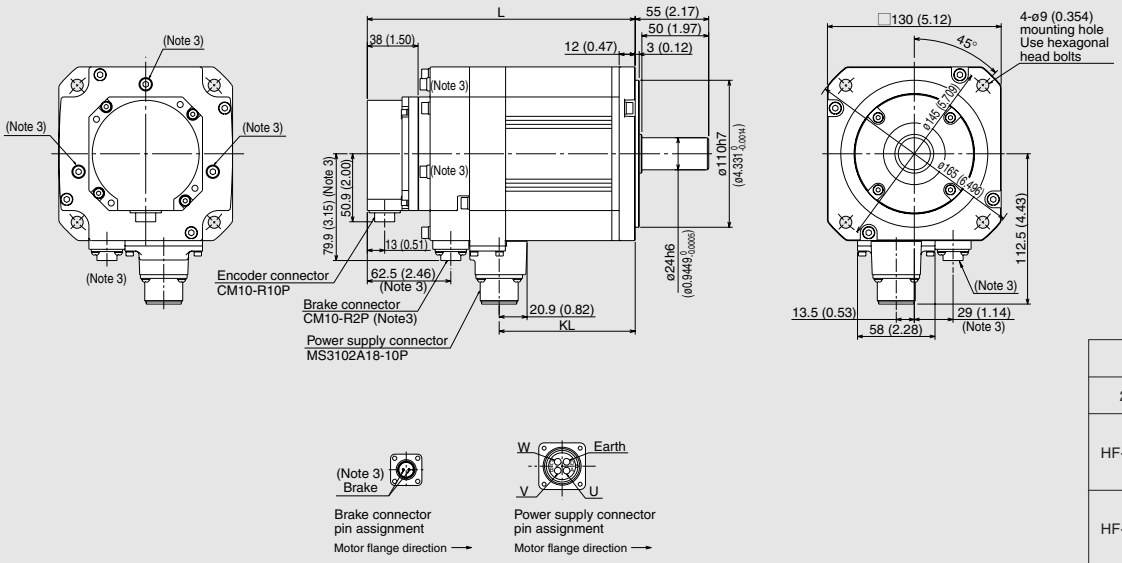
Pin No.	Signal name
1	B1
2	B2

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.

Motor Dimensions

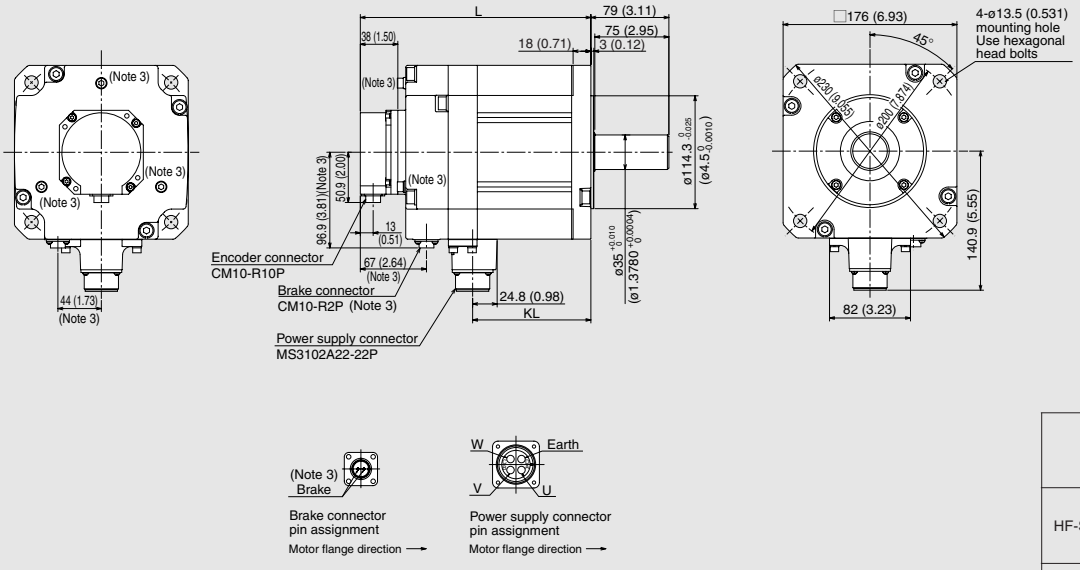
Unit: mm (inch)

●HF-SP52(B), HF-SP102(B), HF-SP152(B)



Model	Variable dimensions	
2000r/min	L	KL
HF-SP52 (B)	118.5 (4.67) <156.5 (6.16)>	57.8 (2.28)
HF-SP102 (B)	140.5 (5.53) <178.5 (7.03)>	79.8 (3.14)
HF-SP152 (B)	162.5 (6.4) <200.5 (7.89)>	101.8 (4.01)

●HF-SP202(B), HF-SP352(B)



Model	Variable dimensions	
	L	KL
HF-SP202 (B)	143.5 (5.65) <193.5 (7.62)>	79.8 (3.14)
HF-SP352 (B)	183.5 (7.22) <233.5 (9.19)>	119.8 (4.72)

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake. The power supply connected to the electromagnetic brake is not related to the polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

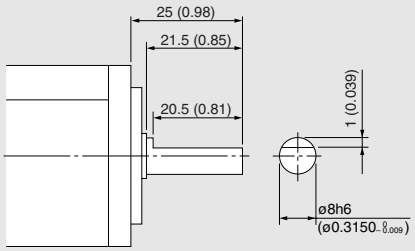
Special Specifications

Special shaft end specifications

Motors with the following specifications are available.

HF-KP series

● D-cut (Note 1) (50, 100W)

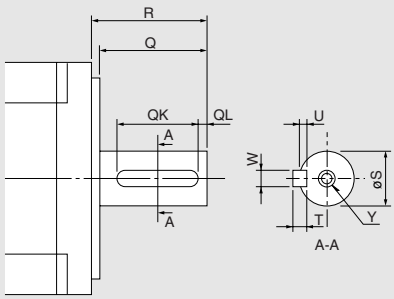


Unit: mm (inch)

● With key (200, 400, 750W)

Motor series	Capacity (W)	Variable dimensions								
		T	S	R	Q	W	QK	QL	U	Y
HF-KP	200, 400	5 (0.197)	14h6 (0.5512 0 -0.0004)	30 (1.18)	27 (1.06)	5 (0.197)	20 (0.79)	3 (0.12)	3 (0.12)	M4 screw Depth: 15mm (0.591 inch)
	750	6 (0.236)	19h6 (0.7480 0 -0.0005)	40 (1.57)	37 (1.46)	6 (0.236)	25 (0.98)	5 (0.20)	3.5 (0.14)	M5 screw Depth: 20mm (0.787 inch)

(Note 1)



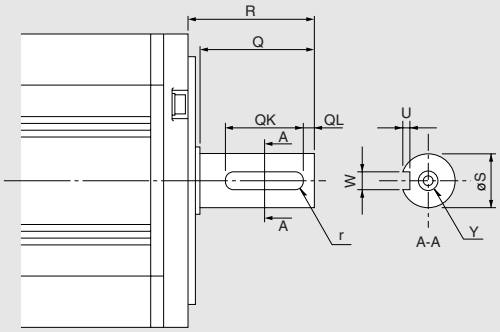
Unit: mm (inch)

HF-SP 2000r/min series

● Key way

Motor series	Capacity (kW)	Variable dimensions								
		S	R	Q	W	QK	QL	U	r	Y
HF-SP	0.5 to 1.5	24h6 (0.9449 0 -0.0005)	55 (2.17)	50 (1.97)	8 0 -0.036 (0.315 0 -0.001)	36 (1.42)	5 (0.20)	4 +0.2 0 (0.16 +0.008 0)	4 (0.16)	M8 screw Depth: 20mm (0.787 inch)
	2.0, 3.5	35 +0.01 0 (1.3780 +0.0004 0)	79 (3.11)	75 (2.95)	10 0 -0.036 (0.394 0 -0.001)	55 (2.17)	5 (0.20)	5 +0.2 0 (0.20 +0.008 0)	5 (0.20)	M8 screw Depth: 20mm (0.787 inch)

(Note 1, 2)



Unit: mm (inch)

Notes:
1. Cannot be used in applications that involve high frequency. Loose keys may damage the motor shaft - voiding motor warranty.
2. Keys are not installed. Keys are installed by the user.

Electromagnetic brake specifications

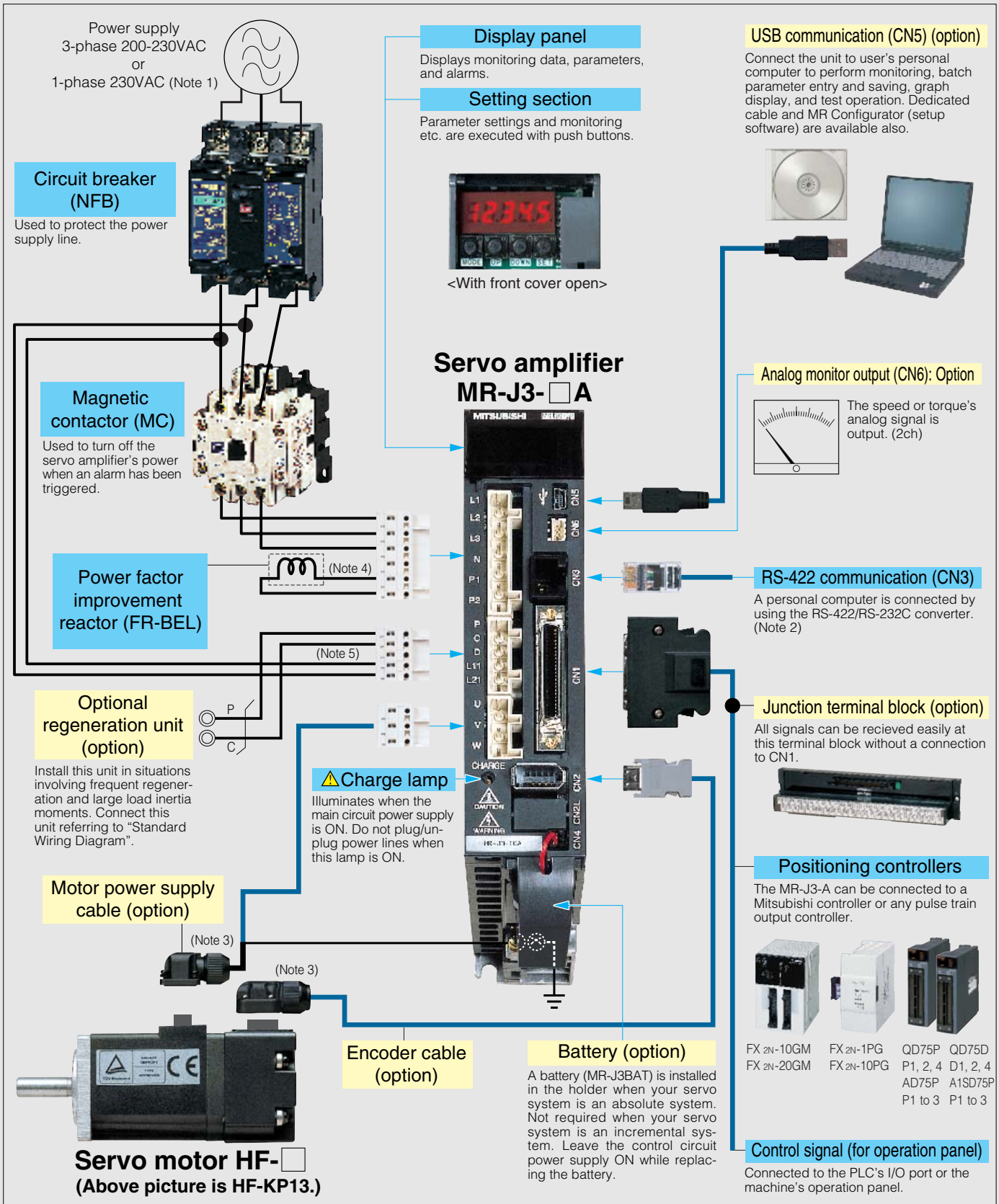
Motor model		HF-KP					HF-SP 2000r/min				
		053B	13B	23B	43B	73B	52B	102B	152B	202B	352B
Type		Spring-action safety brake					Spring-action safety brake				
Rated voltage		24VDC 0 -10%					24VDC 0 -10%				
Static friction torque	(N·m)	0.32	0.32	1.3	1.3	2.4	8.5	8.5	8.5	44	44
	(oz·in)	45.3	45.3	184	184	340	1203	1203	1203	6230	6230
Power consumption (W) at 20°C		6.3	6.3	7.9	7.9	10	20	20	20	34	34
Permissible braking work	(J)/time	5.6	5.6	22	22	64	400	400	400	4500	4500
	(oz·in)/time	793.6	793.6	3117.6	3117.6	9069.3	56683.3	56683.3	56683.3	637687.1	637687.1
	(J)/hour	56	56	220	220	640	4000	4000	4000	45000	45000
	(oz·in)/hour	7936	7936	31176	31176	90693	566833	566833	566833	6376871	6376871
Brake life (Note 1) (Braking work per braking action)	Times	20000 (5.6J)	20000 (5.6J)	20000 (22J)	20000 (22J)	20000 (64J)	20000 (200J)	20000 (200J)	20000 (200J)	20000 (1000J)	20000 (1000J)

Notes:
1. The brake gap cannot be adjusted. The brake life shows time until the readjustment is needed.
2. The electromagnetic brake is for holding. It cannot be used for braking applications.

Peripheral Equipment (MR-J3-□A)

Connections with peripheral equipment

Peripheral equipment is connected to MR-J3-A as described below.
Connectors, options, and other necessary equipment are available so that users can set up MR-J3-A easily and begin using it right away.



Notes: 1. If a 1-phase power supply (230VAC) is used, please connect it to terminals L1 and L2. Nothing should be connected to L3.
2. When a personal computer is connected with the RS-422/RS-232C converter cable (refer to "Introductory Parts" in this catalog), some functions of the MR Configurator (setup software) may be limited.
3. This example is the case that the cable from the motor is led out in the opposite direction of the motor shaft. An option cable is also available for leading the cable out in the direction of motor shaft. Refer to the section "Options ● Cables and Connectors" in this catalog.
4. Always disconnect the connection across P1-P2 when using the FR-BEL.
5. Always disconnect the connection across P-D when connecting the optional regeneration unit externally.

Servo Amplifier Specifications

MR-J3-A type

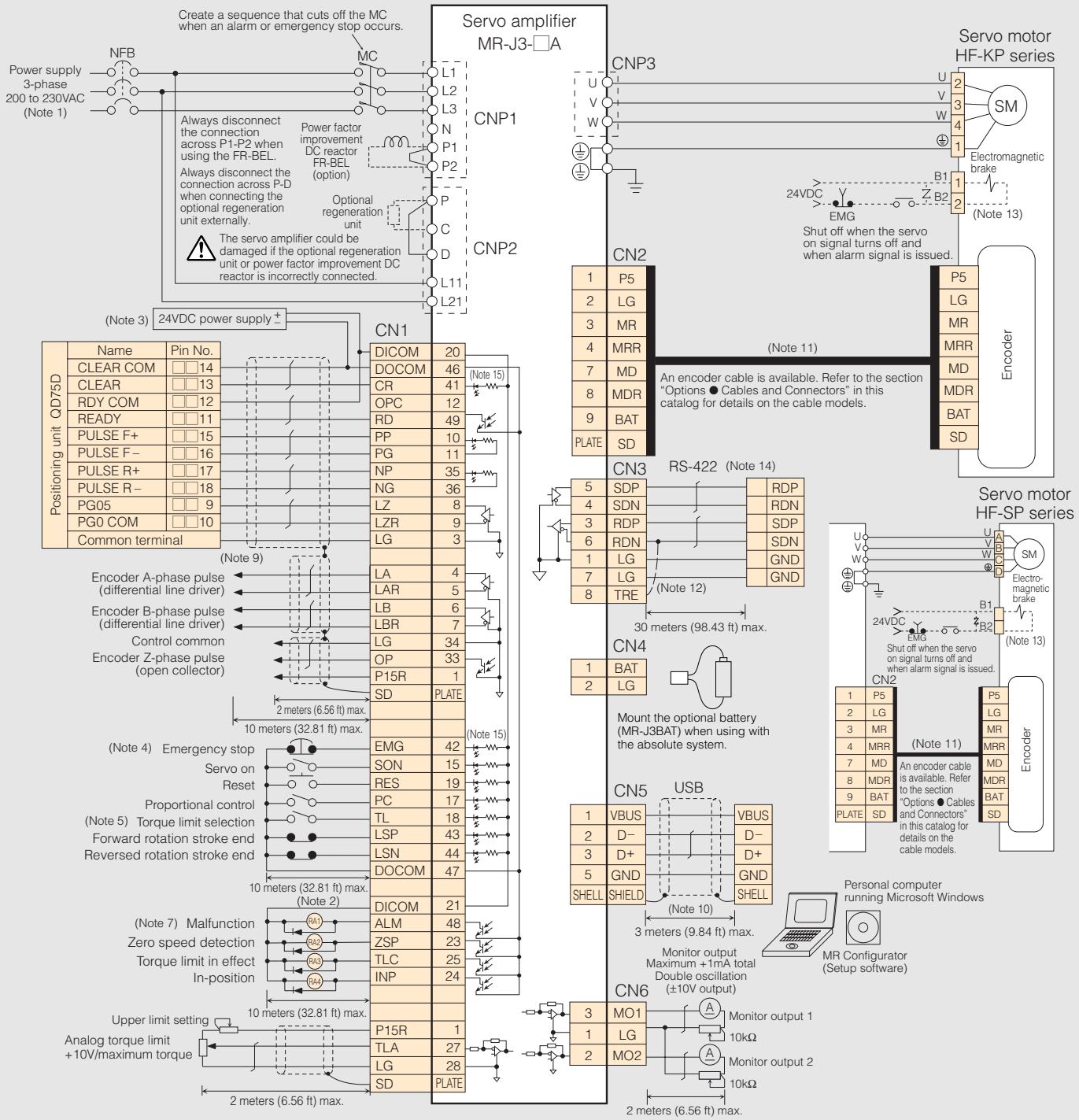
Servo amplifier model MR-J3-				10A	20A	40A	60A	70A	100A	200A	350A	10A1 (in planning stages)	20A1 (in planning stages)	40A1 (in planning stages)
Servo amplifier	Main circuit power supply	Voltage/frequency (Note 1)		3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz (Note 2)					3-phase 200 to 230VAC 50/60Hz (Note 2)			1-phase 100 to 120VAC 50/60Hz		
		Permissible voltage fluctuation		3-phase 200 to 230VAC: 170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC			—		
		Permissible frequency fluctuation		±5% max.								—		
	Control circuit power supply	Voltage/frequency		1-phase 200 to 230VAC 50/60Hz								—		
		Permissible voltage fluctuation		1-phase 170 to 253VAC 50/60Hz								—		
		Permissible frequency fluctuation		±5% max.								—		
		Power consumption (W)		30								—		
	Interface power supply (Note 7)			24VDC ±10% 300 to 900mA								—		
	Regenerative registor/ tolerable regenerative power (W)	With no option (Amplifier built-in resistor)		—	10	10	10	20	20	100	100	—		
		Optional regeneration unit	MR-RB032	30	30	30	30	30	30	×	×			
			MR-RB12	×	100	100	100	100	100	×	×			
			MR-RB30	×	×	×	×	×	×	300	300			
			MR-RB32	×	×	×	×	300	300	×	×			
			MR-RB50 (Note 3)	×	×	×	×	×	×	500	500			
	Control system			Sine-wave PWM control/current control system										
	Dynamic brake			Built-in (Note 4)										
	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		Resolution per encoder/servo motor rotation: 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 ±10000 pulses (command pulse unit)										
		Excess error		±3 rotations										
		Torque limit		Set by parameters or external analog input (0 to +10VDC, max. 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 (Note 5)										
		Speed fluctuation rate		±0.01% max. (load fluctuation 0 to 100%) 0% (power fluctuation ±10%) ±0.2% max. (ambient temperature 25°C±10°C (77°F±50°F)), when using analog speed command										
		Torque limit		Set by parameters or external analog input (0 to +10VDC, max. torque)										
	Torque control mode	Analog torque command input		0 to ±8VDC max. torque (input impedance 10 to 12kΩ)										
		Speed limit		Set by parameters or external analog input (0 to ±10VDC, rated speed)										
	Structure			Self-cooling open (IP00)				Fan cooling open (IP00)			Self-cooling open (IP00)			
	Environ-ment	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 max. (non condensing), storage: 90% RH max. (non condensing)										
		Atmosphere		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust										
		Elevation		1000 meters or less above sea level										
		Vibration		5.9m/s^2 max.										
	Mass (kg [lb])			0.8 (1.8)	0.8 (1.8)	1.0 (2.2)	1.0 (2.2)	1.4 (3.1)	1.4 (3.1)	2.3 (5.1)	2.3 (5.1)	—	—	—

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The output capacity and speed cannot be guaranteed when the power supply voltage is less than specified.
2. For torque characteristics applied when the servo amplifier is combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.
3. Install the cooling fan (1.0m^3/min, approx. □92).
4. For products without a dynamic brake (MR-J3-□A-ED), special compliance is possible.
5. It is possible to change the speed in 10V using the parameter No.C12.
6. When mounting the amplifier closely, keep the ambient temperature within 0 to 45°C (32 to 113°F), or use with the effective load rate of 75% or less.
7. The power capacity differs according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

Standard Wiring Diagram

MR-J3-□A type: Position control operation

● Connection to QD75D (position servo, incremental)

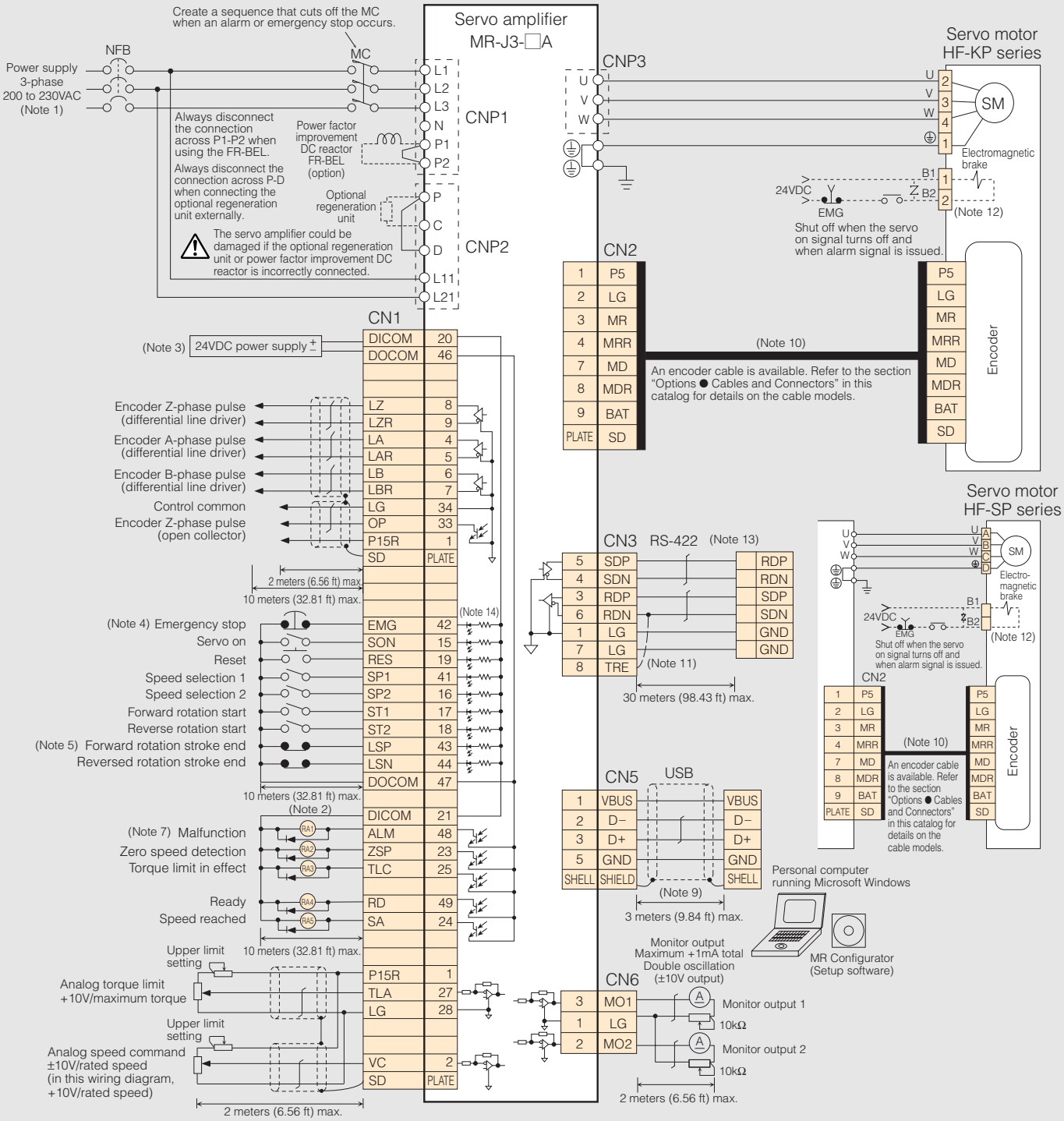


Notes:

1. When using the 1-phase 230VAC (MR-J3-70A or smaller), connect the power supply to L1 and L2. Do not connect anything to L3.
2. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
3. Use the 24VDC±10% 300 to 900mA power supply. Note that the power capacity differs according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. EMG (emergency stop) contact (normally closed contact) must be installed. If it is not installed, operation will be impossible.
5. LSP and LSN contacts must be closed for normal operation. If they are not closed, command will not be accepted.
6. Signals with the same name are connected inside.
7. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
8. Connect the shield wire securely to the plate inside the connector (ground plate).
9. Connect between LG and common terminal to increase noise resistance.
10. Max. 3m (9.84ft) is possible in a good noise environment.
11. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the connection. Change the parameter No. PC22 when using the 4-wire cable (MR-EKCBL30M-H/-L to MR-EKCBL50M-H) for the HF-KP series.
12. In the final axis, connect between TRE and RDN.
13. For the motor with an electromagnetic brake. The power supply connected to the electromagnetic brake is not related to the polarity.
14. A personal computer can also be connected with the RS-422/RS-232C conversion cable (refer to "Introductory Parts" in this catalog).
15. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

MR-J3-□A type: Speed control operation

● Connection



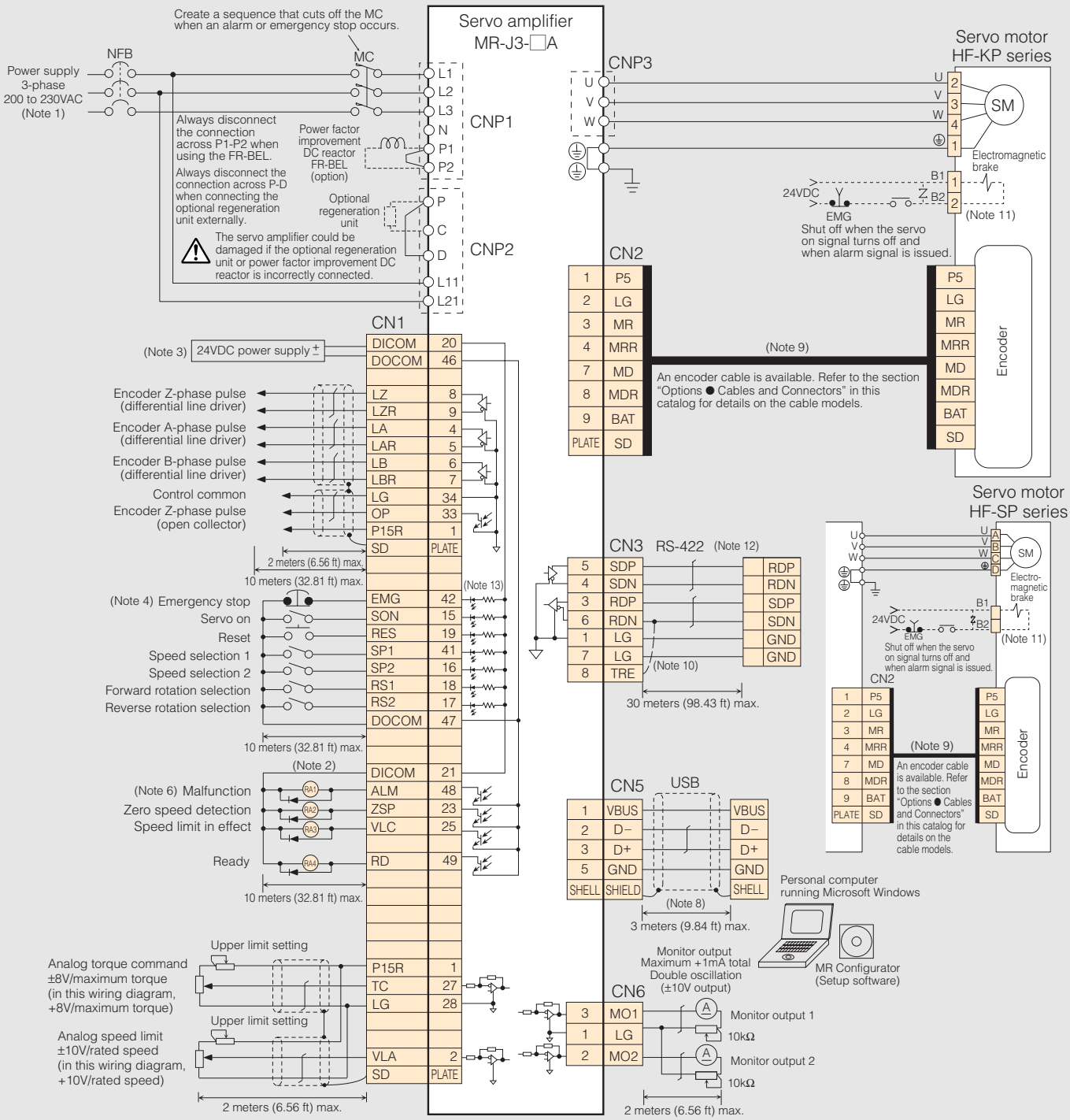
Notes:

1. When using the 1-phase 230VAC (MR-J3-70A or smaller), connect the power supply to L1 and L2. Do not connect anything to L3.
2. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
3. Use the 24VDC±10% 300 to 900mA power supply. Note that the power capacity differs according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. EMG (emergency stop) contact (normally closed contact) must be installed. If it is not installed, operation will be impossible.
5. LSP and LSN contacts must be closed for normal operation. If they are not closed, command will not be accepted.
6. Signals with the same name are connected inside.
7. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
8. Connect the shield wire securely to the plate inside the connector (ground plate).
9. Max. 3m (9.84ft) is possible in a good noise environment.
10. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the connection. Change the parameter No. PC22 when using the 4-wire cable (MR-EKCBL30M-H/-L to MR-EKCBL50M-H) for the HF-KP series.
11. In the final axis, connect between TRE and RDN.
12. For the motor with an electromagnetic brake. The power supply connected to the electromagnetic brake is not related to the polarity.
13. A personal computer can also be connected with the RS-422/RS-232C conversion cable (refer to "Introductory Parts" in this catalog).
14. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

Standard Wiring Diagram

MR-J3-□A type: Torque control operation

● Connection



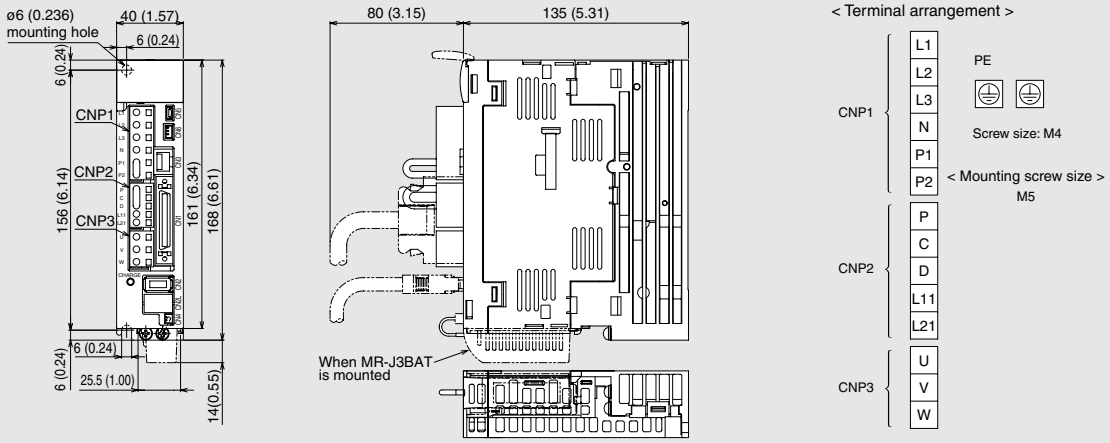
Notes:

1. When using the 1-phase 230VAC (MR-J3-70A or smaller), connect the power supply to L1 and L2. Do not connect anything to L3.
2. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
3. Use the 24VDC±10% 300 to 900mA power supply. Note that the power capacity differs according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. EMG (emergency stop) contact (normally closed contact) must be installed. If it is not installed, operation will be impossible.
5. Signals with the same name are connected inside.
6. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
7. Connect the shield wire securely to the plate inside the connector (ground plate).
8. Max. 3m (9.84ft) is possible in a good noise environment.
9. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the connection. Change the parameter No. PC22 when using the 4-wire cable (MR-EKCBL30M-H/-L to MR-EKCBL50M-H) for the HF-KP series.
10. In the final axis, connect between TRE and RDN.
11. For the motor with an electromagnetic brake. The power supply connected to the electromagnetic brake is not related to the polarity.
12. A personal computer can also be connected with the RS-422/RS-232C conversion cable (refer to "Introductory Parts" in this catalog).
13. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

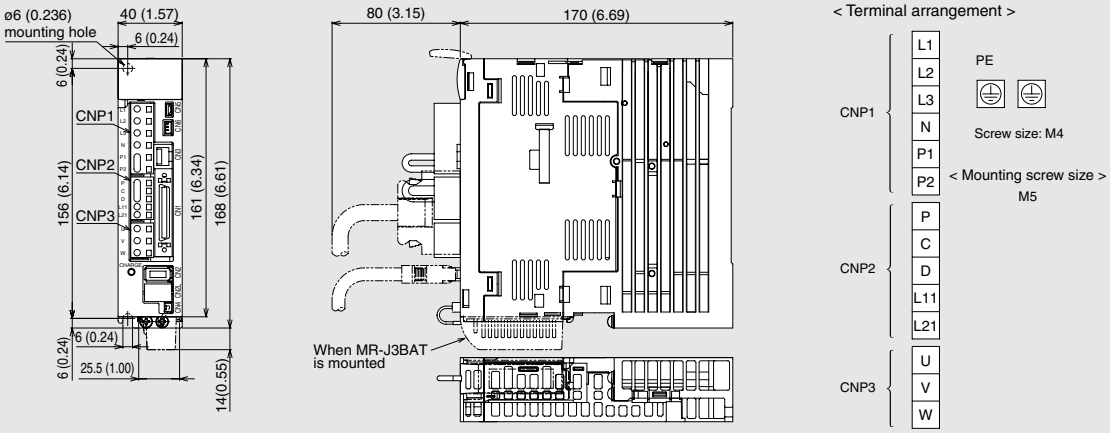
Amplifier Dimensions

● MR-J3-10A, 20A

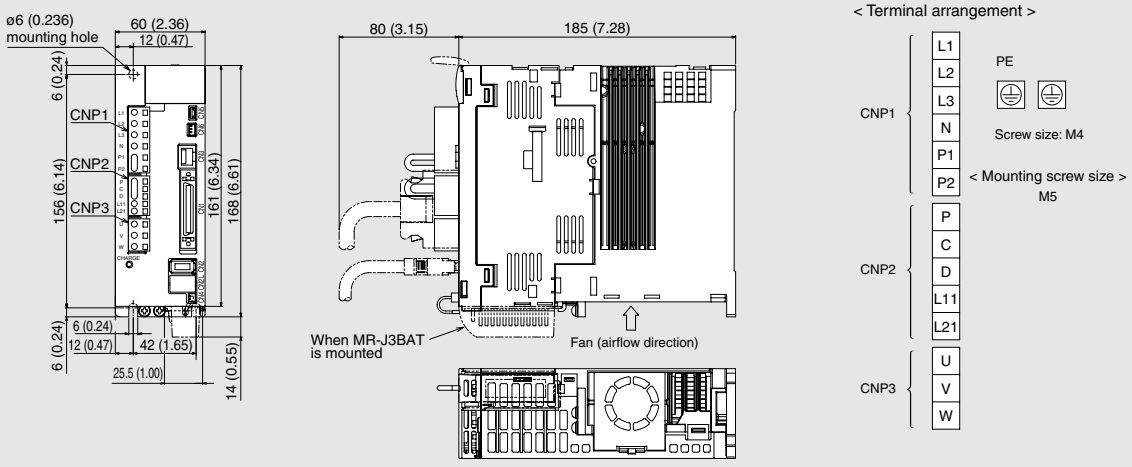
Unit: mm (inch)



● MR-J3-40A, 60A



● MR-J3-70A, 100A

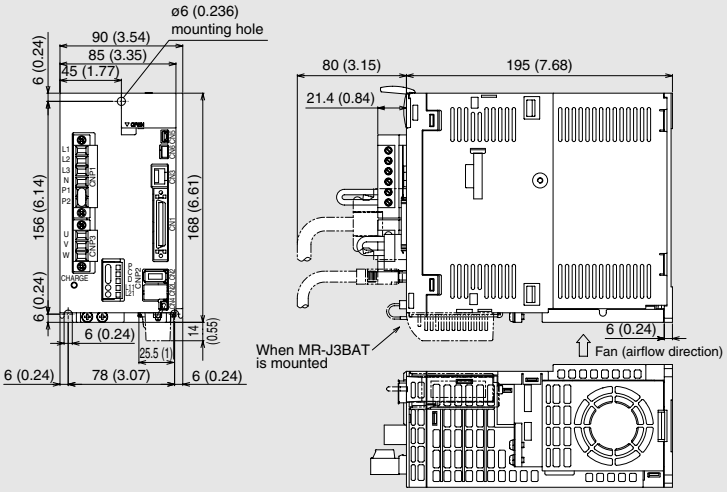


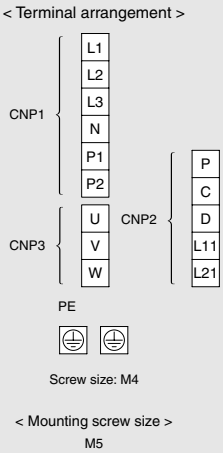
Note: The CNP1 connector, CNP2 connector and CNP3 connector (insertion type) are enclosed with the servo amplifier.

Amplifier Dimensions

● MR-J3-200A, 350A

Unit: mm (inch)





Note: The CNP1 connector, CNP2 connector and CNP3 connector (insertion type) are enclosed with the servo amplifier.

Options

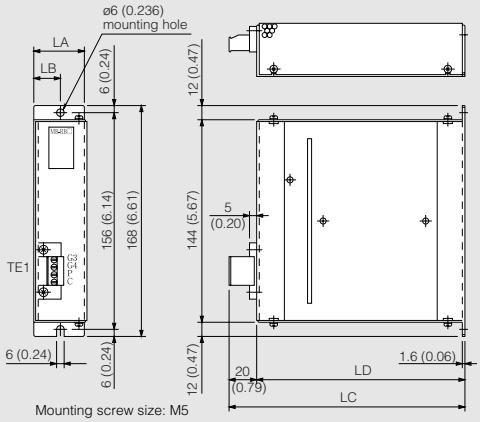
● Optional regeneration unit

Servo amplifier model	Built-in regenerative resistor/ tolerable regenerative power (W)	Optional regeneration unit/tolerable regenerative power (W)					Resistance value (Ω)
		MR-RB032	MR-RB12	MR-RB30	MR-RB32	MR-RB50	
MR-J3-10A	—	30	×	×	×	×	40
MR-J3-20A	10	30	100	×	×	×	40
MR-J3-40A	10	30	100	×	×	×	40
MR-J3-60A	10	30	100	×	×	×	40
MR-J3-70A	20	30	100	×	300	×	40
MR-J3-100A	20	30	100	×	300	×	40
MR-J3-200A	100	×	×	300	×	500	13
MR-J3-350A	100	×	×	300	×	500	13

Note: The tolerable regenerative power in the table differs from the regenerative resistor's rated wattage.

External dimensions Unit: mm (inch)

● MR-RB032, MR-RB12



Mounting screw size: M5

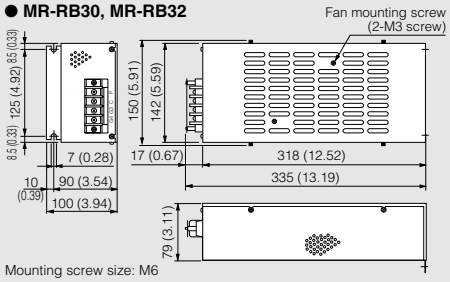
<Terminal arrangement>

TE1
G3
G4
P
C

Terminal screw size: M3

Type	Variable dimensions				Mass kg (lb)
	LA	LB	LC	LD	
MR-RB032	30 (1.18)	15 (0.59)	119 (4.69)	99 (3.90)	0.5 (1.1)
MR-RB12	40 (1.57)	15 (0.59)	169 (6.65)	149 (5.87)	1.1 (2.4)

● MR-RB30, MR-RB32



Mounting screw size: M6

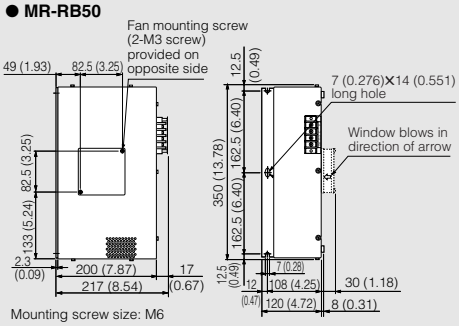
Type	Mass kg (lb)
MR-RB30	2.9 (6.4)
MR-RB32	2.9 (6.4)

<Terminal arrangement>

P
C
G3
G4

Terminal screw size: M4

● MR-RB50



Mounting screw size: M6

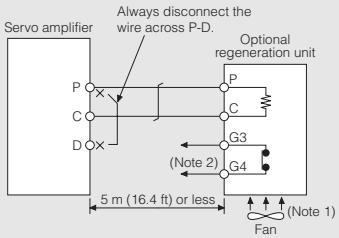
Type	Mass kg (lb)
MR-RB50	5.6 (12.3)

<Terminal arrangement>

P
C
G3
G4

Terminal screw size: M4

Connection

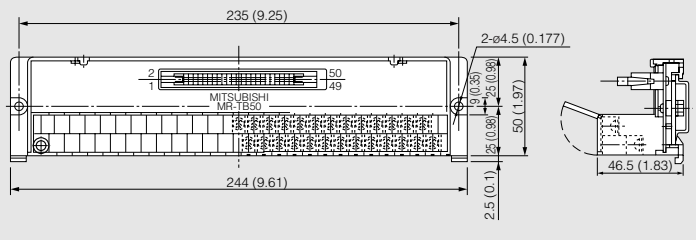


Notes: 1. When using the MR-RB50, always forcibly cool with the cooling fan (approx. 1.0m³/min, □92).
2. Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

Notes: 1. The optional regeneration unit will heat up to approx. 100°C (212°F), so do not directly mount it on a wall susceptible to heat. Use nonflammable wires or provide flame resistant treatment (use silicon tubes, etc.), and wire so that the wires do not contact the optional regeneration unit.
2. Always use twisted wires for the optional regeneration unit, and keep the length as short as possible (5m (16.4 ft) or less).
3. Always use twisted wires for a temperature detector, and make sure that the detector does not fail to work properly due to inducted noise.

● Junction terminal block (MR-TB50)

All signals can be recieved with this junction terminal block without a connection to CN1.



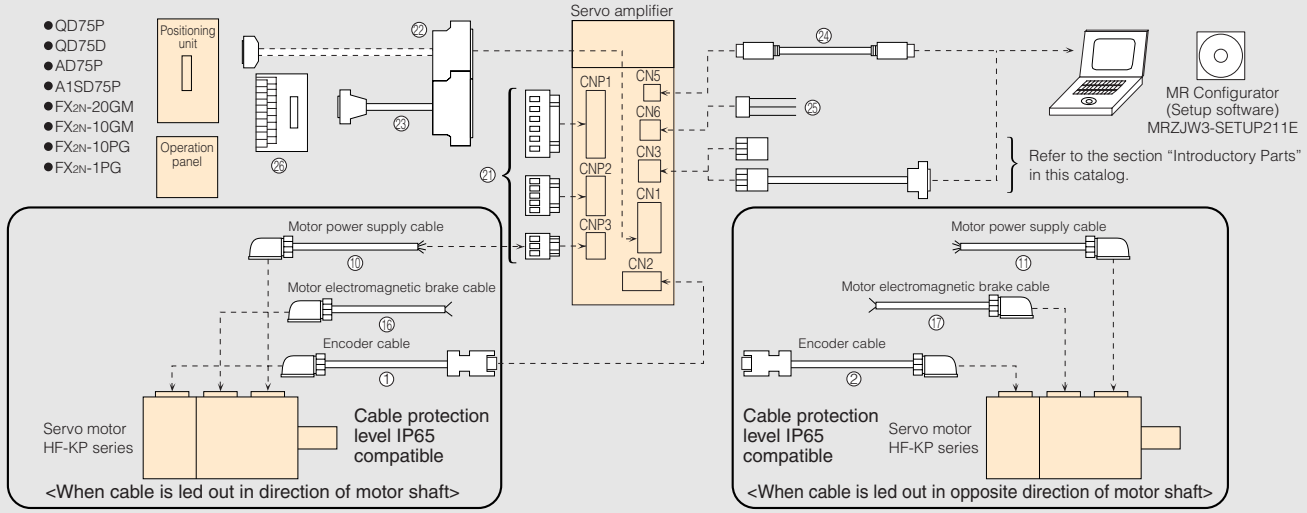
Unit: mm (inch)

Terminal block screw size: M3.5
Compatible wire: 2mm² max. (AWG14)
Crimping terminal width: 7.2mm (0.283 inch) max.

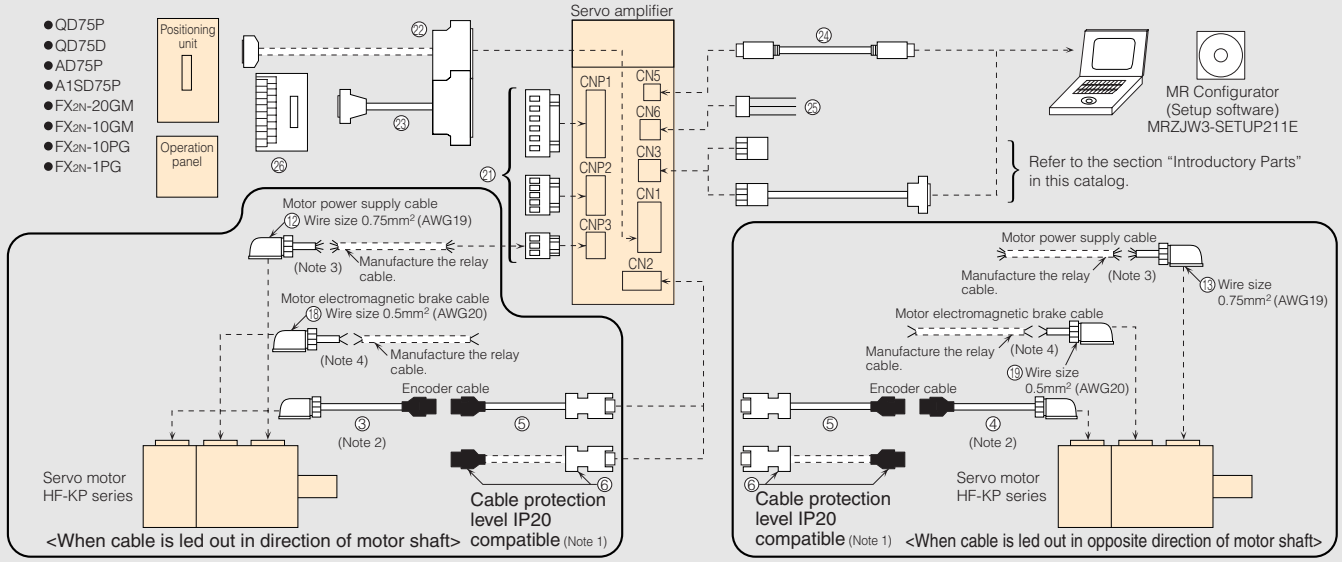
● Cables and connectors (MR-J3-A type)

Optional cables and connectors are shown in the diagram below.

<Servo motor HF-KP series: encoder cable length 10m (32.81ft) or shorter>

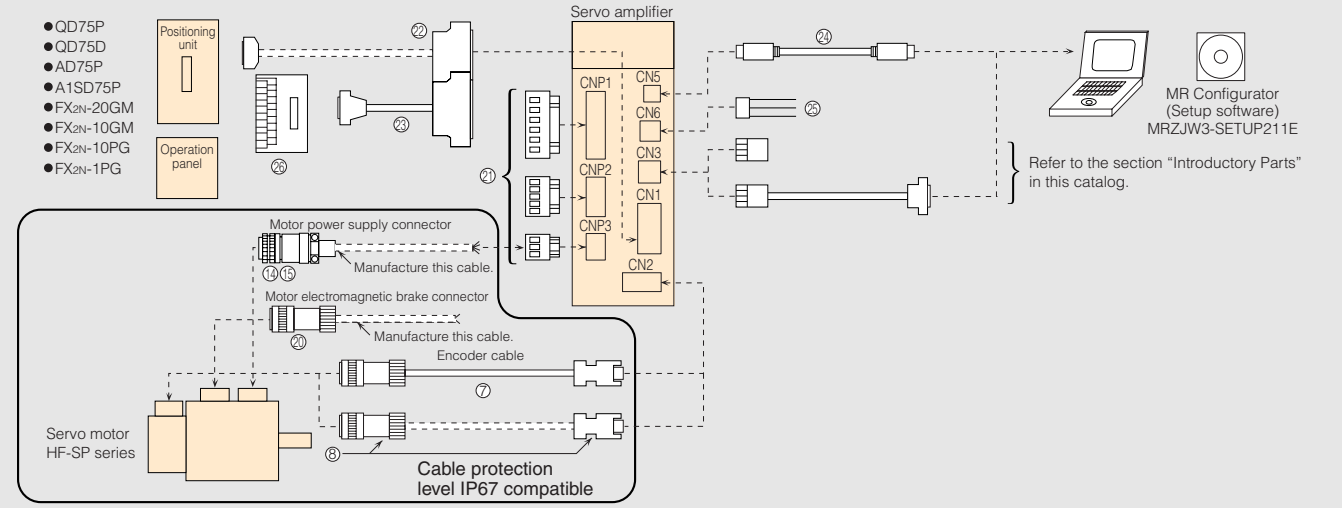


<Servo motor HF-KP series: Encoder cable length over 10m (32.81ft) >

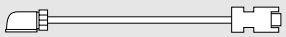
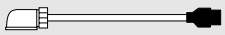
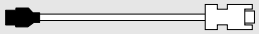
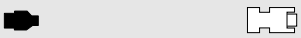
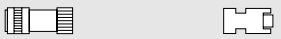
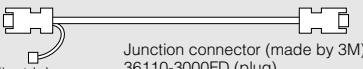


Notes: 1. Compatible with protection level IP20. Contact Mitsubishi when using in a protection level IP65 environment.
2. This cable does not have a long bending life, so always fix the cable before using.
3. If the length exceeds 10m (32.81ft), relay the cable using the cable MR-PWS2CBL03M-A1-L/-A2-L. This cable does not have a long bending life, so always fix the cable before using.
4. If the length exceeds 10m (32.81ft), relay the cable using the cable MR-BKS2CBL03M-A1-L/-A2-L. This cable does not have a long bending life, so always fix the cable before using.

<For servo motor HF-SP series>



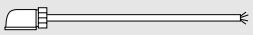
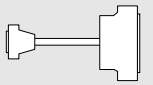
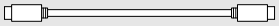
● Cables and connectors

		Item		Model	Protection level	Description
Encoder cable for CN2	①	10m (32.81ft) or shorter (Direct connection type)	Encoder cable for HF-KP series motor Lead out in direction of motor shaft	MR-J3ENCBL□M-A1-H □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	Encoder-side connector (made by AMP) 1674320-1  Amplifier-side connector (made by 3M, or an equivalent product) 36210-0100JL (receptacle) 36310-3200-008 (shell kit)
				MR-J3ENCBL□M-A1-L □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
	②		Encoder cable for HF-KP series motor Lead out in opposite direction of motor shaft	MR-J3ENCBL□M-A2-H □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
				MR-J3ENCBL□M-A2-L □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
	③	Exceeding 10m (32.81ft) (Relay type)	Encoder cable for HF-KP series motor Lead out in direction of motor shaft	MR-J3JCBL03M-A1-L Cable length 0.3m (0.98 ft) (Note 1)	IP20	Encoder-side connector (made by AMP) 1674320-1  Use this in combination with ⑤ or ⑥. Junction connector (made by AMP) 1473226-1 (with ring) (contact) 1-172169-9 (housing) 316454-1 (cable clamp)
	④		Encoder cable for HF-KP series motor Lead out in opposite direction of motor shaft	MR-J3JCBL03M-A2-L Cable length 0.3m (0.98 ft) (Note 1)	IP20	
	⑤		Amplifier-side encoder cable for HF-KP series motor	MR-EKCBL□M-H □=cable length 20, 30, 40, 50m (65.62, 98.43, 131.23, 164.04 ft) (Note 1)	IP20	Junction connector (made by AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by Toa Electric)  Use this in combination with ③ or ④. Amplifier-side connector (made by 3M, or an equivalent product) 36210-0100JL (receptacle) 36310-3200-008 (shell kit)
				MR-EKCBL□M-L □=cable length 20, 30m (65.62, 98.43 ft) (Note 1)	IP20	
	⑥	Exceeding 10m (32.81ft) (Relay type)	Junction connector, Amplifier-side connector (Note 2) for HF-KP series motor	MR-ECNM	IP20	Junction connector (made by AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by Toa Electric)  <Applicable cable example> Wire size: 0.3mm² (AWG22) Completed cable outer diameter: ϕ8.2mm (ϕ0.323 inch) Crimping tool (91529-1) is required. Amplifier-side connector (made by Molex, or an equivalent product) 54593-1011 (connector housing) 54594-1015 (plug cover A) 54595-1005 (plug cover B) 58935-1000 (shell cover) 58934-1000 (shell body) 58937-0000 (cable clamp) (Note 3) Use these in combination with ③ or ④.
	⑦	Encoder cable for HF-SP series motor		MR-J3ENSCBL□M-H □=cable length 2, 5, 10, 20, 30, 40, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 131.23, 164.04 ft) (Note 1)	IP67	 Encoder-side connector (made by DDK) <For 10m (32.81ft) or shorter cable> CM10-SP10S-M-C1 (connector) <For 20m (65.62ft) or longer cable> CM10-SP10S-M-C2 (connector) Amplifier-side connector (made by 3M, or an equivalent product) 36210-0100JL (receptacle) 36310-3200-008 (shell kit)
				MR-J3ENSCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43 ft) (Note 1)	IP67	
	⑧	Encoder connector set for HF-SP series motor		MR-J3SCNS	IP67	 Encoder-side connector (made by DDK) CM10-SP10S-M-S1 (connector) <Applicable cable example> Wire size: 0.5mm² (AWG20) or less Completed cable outer diameter: ϕ6.0 to 9.0mm (ϕ0.236 to 0.354 inch) Amplifier-side connector (made by Molex, or an equivalent product) 54593-1011 (connector housing) 54594-1015 (plug cover A) 54595-1005 (plug cover B) 58935-1000 (shell cover) 58934-1000 (shell body) 58937-0000 (cable clamp) (Note 3)
	⑨	Battery connection relay cable		MR-J3BTCBL03M Cable length 0.3m (0.98 ft) (Note 4)	—	Amplifier-side CN2 connector (made by 3M, or an equivalent product) 36210-0100JL (receptacle) 36310-3200-008 (shell kit)  Battery-side connector (Hirose Electric) DF3-2EP-2C (plug) DF3-EP2428PCA (Crimping terminal for plug) 2 pcs. Junction connector (made by 3M) 36110-3000FD (plug) 36310-F200-008 (shell kit) Not required when your servo system is used in an incremental mode. Refer to "Options ● Battery connection relay cable" for details.
Select one of motor power supply cables ⑩ to ⑮ for use	⑩	10m (32.81ft) or shorter (Direct connection type)	Power supply cable for HF-KP series motor Lead out in direction of motor shaft	MR-PWS1CBL□M-A1-H □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	Motor power supply-side connector (made by Japan Aviation Electronics Industry) JN4FT04SJ1 (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead lead-out
				MR-PWS1CBL□M-A1-L □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
	⑪		Power supply cable for HF-KP series motor Lead out in opposite direction of motor shaft	MR-PWS1CBL□M-A2-H □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
				MR-PWS1CBL□M-A2-L □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	

Notes: 1. -H and -L indicate bending life. -H indicates a long bending life part, -L indicates a standard part.
2. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details on manufacturing the cable.
3. 3M connector can be used for the amplifier-side connector. Model: 36210-0100JL (receptacle), 36310-3200-008 (shell kit)
4. Use this battery connection junction cable (MR-J3BTCBL03M), as the cable is a special cable with a built-in diode. Don't manufacture the cable.

Options

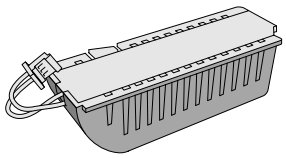
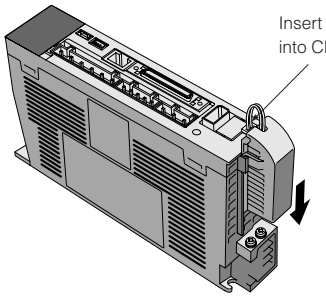
● Cables and connectors

		Item		Model	Protection level	Description
Select one of motor power supply cables ⑩ to ⑮ for use	⑫	Exceeding 10m (32.81ft) (Relay type)	Power supply cable for HF-KP series motor Lead out in direction of motor shaft	MR-PWS2CBL03M-A1-L Cable length 0.3m (0.98 ft) (Note 1)	IP55	Motor power supply-side connector (made by Japan Aviation Electronics Industry) JN4FT04SJ1 (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead lead-out
	⑬		Power supply cable for HF-KP series motor Lead out in opposite direction of motor shaft	MR-PWS2CBL03M-A2-L Cable length 0.3m (0.98 ft) (Note 1)	IP55	
	⑭	Power supply connector for HF-SP52, 102, 152 motor		MR-PWCNS4 (Straight type)	IP67	 Motor power supply connector (made by DDK) CE05-6A18-10SD-B-BSS (plug) (straight) CE3057-10A-1 (D265) (cable clamp) <Applicable cable example> Wire size: 2mm² (AWG14) to 3.5mm² (AWG12) Completed cable outer diameter: ϕ10.5 to 14.1mm (ϕ0.413 to 0.555 inch)
	⑮	Power supply connector for HF-SP202, 352 motor		MR-PWCNS5 (Straight type)	IP67	 Motor power supply connector (made by DDK) CE05-6A22-22SD-B-BSS (plug) (straight) CE3057-12A-1 (D265) (cable clamp) <Applicable cable example> Wire size: 5.5mm² (AWG10) to 8mm² (AWG8) Completed cable outer diameter: ϕ12.5 to 16mm (ϕ0.492 to 0.630 inch)
Select one of motor brake cables for use	⑯	10m (32.81ft) or shorter (Direct connection type)	Brake cable for HF-KP series motor Lead out in direction of motor shaft	MR-BKS1CBL□M-A1-H □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	Motor brake-side connector (made by Japan Aviation Electronics Industry) JN4FT02SJ1 (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead lead-out
				MR-BKS1CBL□M-A1-L □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
	⑰		Brake cable for HF-KP series motor Lead out in opposite direction of motor shaft	MR-BKS1CBL□M-A2-H □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
				MR-BKS1CBL□M-A2-L □=cable length 2, 5, 10m (6.56, 16.40, 32.81 ft) (Note 1)	IP65	
	⑱	Exceeding 10m (32.81ft) (Relay type)	Brake cable for HF-KP series motor Lead out in direction of motor shaft	MR-BKS2CBL03M-A1-L Cable length 0.3m (0.98 ft) (Note 1)	IP55	
	⑲		Brake cable for HF-KP series motor Lead out in opposite direction of motor shaft	MR-BKS2CBL03M-A2-L Cable length 0.3m (0.98 ft) (Note 1)	IP55	
	⑳	Brake connector for HF-SP series motor		MR-BKCNS1 (Straight type)	IP67	 Motor brake connector (made by DDK) CM10-SP2S-L-S2 (connector) (straight) <Applicable cable example> Wire size: 1.25mm² (AWG16) or less Completed cable outer diameter: ϕ9.0 to 11.6mm (ϕ0.354 to 0.457 inch)
For CNP1, CNP2, CNP3	㉑	Servo amplifier power supply connector set		(Standard accessory: Insertion type)	—	 CNP1 connector • 1kW or less (made by Molex, or an equivalent product) 54928-0610 (connector) • 2, 3.5kW (PHOENIX or an equivalent product) PC4/6-STF-7.62-CRWH (connector)  CNP2 connector (made by Molex, or an equivalent product) 54927-0510 (connector)  CNP3 connector • 1kW or less (made by Molex, or an equivalent product) 54928-0310 (connector) • 2, 3.5kW (PHOENIX or an equivalent product) PC4/3-STF-7.62-CRWH (connector)  Insertion tool (made by Molex, or an equivalent product) 54932-0000 <Applicable cable example> • CNP1 and CNP3 for 1kW or less • CNP2 for 3.5kW or less Wire size: 0.14mm² (AWG26) to 2.5mm² (AWG14) Completed cable outer diameter: to ϕ3.8mm (to ϕ0.150 inch) <Applicable cable example> • CNP1 and CNP3 connector for 2 and 3.5kW Wire size: 0.2mm² (AWG24) to 5.5mm² (AWG10) Completed cable outer diameter: to ϕ5mm (to ϕ0.197 inch)
For CN1	㉒	CN1 connector		MR-J3CN1	—	 Amplifier-side connector (made by 3M, or an equivalent product) 10150-3000VE (connector) 10350-52F0-008 (shell kit)
	㉓	Junction terminal block cable		MR-J2M-CN1TBL□M □=cable length 0.5, 1m (1.64, 3.28 ft)	—	Junction terminal block-side connector (made by 3M) D7950-B500FL (connector)  Amplifier-side connector (made by 3M, or an equivalent product) 10150-6000EL (connector) 10350-3210-000 (shell kit) (Note 2)
For CN5	㉔	Personal computer communication cable	USB cable	MR-J3USBCBL3M Cable length 3m (9.84 ft)	—	Amplifier-side connector mini-B connector (5 pin) Personal computer-side connector A connector 
For CN6	㉕	Monitor cable		MR-J3CN6CBL1M Cable length 1m (3.28 ft)	—	 Amplifier-side connector (made by Molex) 51004-0300 (housing) 50011-8100 (terminal)
	㉖	Junction terminal block		MR-TB50	—	

Notes: 1. -H and -L indicate bending life. -H indicates a long bending life part, -L indicates a standard part.
2. The model listed in the table is the model for press bonding. The soldered model is 10150-3000VE (connector) and 10350-52F0-008 (shell kit).

● Battery (MR-J3BAT)

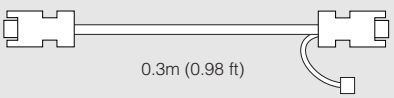
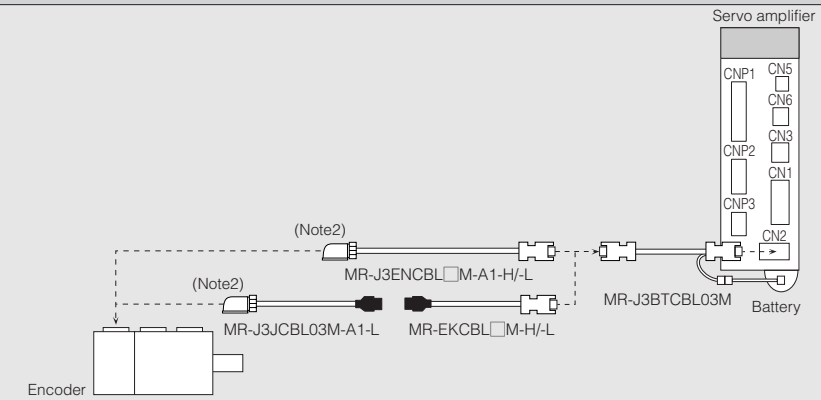
The servo motor's absolute value can be maintained by installing a battery in the servo amplifier.
There is no need to install the battery when your servo system is used in an incremental mode.

Appearance	Installation method
 Model: MR-J3BAT Nominal voltage: 3.6V Nominal capacity: 2000mAh Lithium content: 0.65g	

Note: The 44th Edition of the IATA (International Air Transportation Association) Dangerous Goods Regulations was effected in January 1st, 2003 and administered immediately.
In this edition, the provisions relating to lithium and lithium ion batteries have been revised to strengthen regulations on the air transportation of battery.
This battery is not dangerous goods (not class 9). Therefore, these batteries of 24 units or less are not subject to the regulations.
These batteries more than 24 units require packing based on Packing Instruction 903.
If you need the self-certification form for the battery safety test, contact Mitsubishi.
For more information, contact Mitsubishi. (as of March, 2004)

● Battery connection relay cable (MR-J3BTCBL03M)

Use this to hold the absolute value when shipping the product with the machine and servo amplifier removed. The servo motor HF series does not have a super capacitor (for holding absolute value for short time) in the encoder. When this option cable is used, the absolute value can be held even when the encoder cable is disconnected from the servo amplifier, making it easy to do maintenance on the servo amplifier.

Appearance	Installation method
	

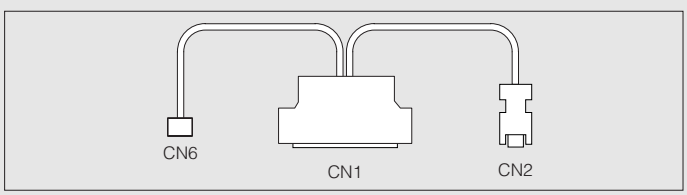
Notes: 1. The absolute value can not be held when the connections between each cable or the connection with the motor is disconnected.
2. The encoder cable lead-out direction is shown for the motor shaft side.
An option cable is also available for leading the cable out in the opposite direction of the motor shaft. Refer to the section "Options ● Cables and Connectors" in this catalog.

User's system		Battery (MR-J3BAT)	Battery connection relay cable (MR-J3BTCBL03M)
Incremental	—	Not required	Not required
Absolute	Absolute value does not need to be held after encoder cable is disconnected from amplifier	Required	Not required
	Absolute value must be held after encoder cable is disconnected from amplifier (Note)	Required	Required

Note: Start up the absolute system after mounting this option cable.

● Diagnostic cable (MR-J3ACHECK)

This cable is required to use the amplifier diagnostic function MR Configurator (Setup software).



Introductory Parts

To order the following products, contact the relevant manufacturer directly.

● Personal computer communication cable

Item	Model	Protection level	Description
RS-422/RS-232C conversion cable	FA-T-RS40S	—	RS-422 cable / RS-422/RS-232C converter / RS-232C cable  Manufacturer: MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED
	DSV-CABV	—	Amplifier-side connector / Personal computer-side connector  Manufacturer: Diatrend Corp.

● RS-422 connector

Item	Model	Protection level	Description
RS-422 connector	TM10P-88P	—	 Manufacturer: HIROSE ELECTRIC CO., LTD.

● RS-422 distributor (for multi drop)

Item	Model	Protection level	Description
RS-422 distributor	BMJ-8	—	 Manufacturer: Hachiko Electric Co. LTD

● Servo amplifier power supply connector (press bonding type) ··· For 1kW or less

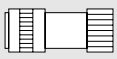
Item	Model	Protection level	Description	Applicable cable example
Amplifier-side CNP1 connector	51241-0600 (connector) 56125-0118 (terminal)	—	 Manufacturer: Molex	Wire size: 0.75mm² (AWG18) to 2.5mm² (AWG14) Completed cable outer diameter: to ϕ3.8mm (to ϕ0.150 inch) Crimping tool (CNP57349-5300) is required.
Amplifier-side CNP2 connector	51240-0500 (connector) 56125-0118 (terminal)	—	 Manufacturer: Molex	
Amplifier-side CNP3 connector	51241-0300 (connector) 56125-0118 (terminal)	—	 Manufacturer: Molex	

● Encoder connector

<For HF-KP series>

Item	Model	Protection level	Description	Applicable cable example
Motor encoder connector	1674320-1	IP65	 Manufacturer: Tyco Electronics AMP K.K.	Wire size: 0.14mm² (AWG26) to 0.3mm² (AWG22) Completed cable outer diameter: ϕ7.1 ± 0.3mm (ϕ0.280 ± 0.012 inch) Crimping tools 1596970-1 (for gland clip) and 1596847-1 (for receptacle contact) are required.
Amplifier-side CN2 connector (Note 1)	54593-1011 (connector housing) 54594-1015 (plug cover A) 54595-1005 (plug cover B) 58935-1000 (shell cover) 58934-1000 (shell body) 58937-0000 (cable clamp)	—	 Manufacturer: Molex	

<For HF-SP series>

Item	Connector Type	Connector Model	Contact	Protection level	Description	Applicable cable example: Wire size	Applicable cable example: Completed cable outer diameter
Motor encoder connector	Straight	CM10-SP10S-M-C1	Press bonding type	IP67	 Manufacturer: DDK Ltd.	0.3mm² (AWG22) to 0.5mm² (AWG20) Crimping tool (357J-50446) is required	ϕ6.0 to 9.0mm (ϕ0.236 to 0.354 inch)
		CM10-SP10S-M-C2				0.08mm² (AWG28) to 0.25mm² (AWG23) Crimping tool (357J-50447) is required	
		CM10-SP10S-M-S1	Soldered type			0.5mm² (AWG20) or less	
Amplifier-side CN2 connector (Note 1)	—	54593-1011 (connector housing) 54594-1015 (plug cover A) 54595-1005 (plug cover B) 58935-1000 (shell cover) 58934-1000 (shell body) 58937-0000 (cable clamp)	—	—	 Manufacturer: Molex	—	—

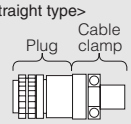
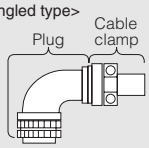
Note) 1. The amplifier-side CN2 connector made by 3M can be used.
Model: 36210-0100JL (receptacle), 36310-3200-008 (shell kit).

● Motor power supply connector

<For HF-KP series>

Item	Model	Protection level	Description	Applicable cable example
Motor power supply-side connector	JN4FT04SJ1 (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)	IP65	 Manufacturer: Japan Aviation Electronics Industry, Limited	Wire size: 0.75mm² (AWG19) Completed cable outer diameter: ϕ6.2 ± 0.3mm (ϕ0.244 ± 0.012 inch) (Vinyl jacket cable FV4C <UL Style 2103> (SP3866W-X) made by KURABE INDUSTRIAL CO.,LTD or equivalent) Crimping tool (CT160-3-TMH5B) is required.

<For HF-SP series>

Item	Plug		Cable clamp	Protection level	Description	Applicable cable example	
	Type	Model	Model			Wire size	Completed cable outer diameter
Motor power supply connector for HF-SP52, 102, 152	Straight	CE05-6A18-10SD-B-BSS	CE3057-10A-2(D265)	IP67 EN standards	<Straight type>  Manufacturer: DDK Ltd.	2mm² (AWG14) to 3.5mm² (AWG12)	ϕ8.5 to 11mm (ϕ0.335 to 0.433 inch)
			CE3057-10A-1(D265)				ϕ10.5 to 14.1mm (ϕ0.413 to 0.555 inch)
	Angled	CE05-8A18-10SD-B-BAS	CE3057-10A-2(D265)				ϕ8.5 to 11mm (ϕ0.335 to 0.433 inch)
			CE3057-10A-1(D265)				ϕ10.5 to 14.1mm (ϕ0.413 to 0.555 inch)
	Straight	MS3106B18-10S	MS3057-10A	General environment (Note 1)			ϕ14.3mm (ϕ0.563 inch) (Inner diameter of bushing)
	Angled	MS3108B18-10S	MS3057-10A				
Motor power supply connector for HF-SP202, 352	Straight	CE05-6A22-22SD-B-BSS	CE3057-12A-2(D265)	IP67 EN standards	<Angled type>  Manufacturer: DDK Ltd.	3.5mm² (AWG12) to 8mm² (AWG8)	ϕ9.5 to 13mm (ϕ0.374 to 0.512 inch)
			CE3057-12A-1(D265)				ϕ12.5 to 16mm (ϕ0.492 to 0.630 inch)
	Angled	CE05-8A22-22SD-B-BAS	CE3057-12A-2(D265)				ϕ9.5 to 13mm (ϕ0.374 to 0.512 inch)
			CE3057-12A-1(D265)				ϕ12.5 to 16mm (ϕ0.492 to 0.630 inch)
	Straight	MS3106B22-22S	MS3057-12A	General environment (Note 1)			ϕ15.9mm (ϕ0.626 inch) (Inner diameter of bushing)
	Angled	MS3108B22-22S	MS3057-12A				

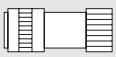
Note: 1. Not compliant with EN standards.

● Motor brake connector

<For HF-KP series>

Item	Model	Protection level	Description	Applicable cable example
Motor brake connector	JN4FT02SJ1 (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)	IP65	 Manufacturer: Japan Aviation Electronics Industry, Limited	Wire size: 0.5mm² (AWG20) Completed cable outer diameter: ϕ4.5 ± 0.3mm (ϕ0.177 ± 0.012 inch) (Vinyl jacket cable FV2C <UL Style 2103> (SP3866U-X) made by KURABE INDUSTRIAL CO.,LTD or equivalent) Crimping tool (CT160-3-TMH5B) is required.

<For HF-SP series>

Item	Connector		Contact	Protection level	Description	Applicable cable example	
	Type	Model				Wire size	Completed cable outer diameter
Motor brake connector	Straight	CM10-SP2S-S-S2	Soldered type	IP67	 Manufacturer: DDK Ltd.	1.25mm² (AWG16) or less	ϕ4.0 to 6.0mm (ϕ0.157 to 0.236 inch)
		CM10-SP2S-M-S2					ϕ6.0 to 9.0mm (ϕ0.236 to 0.354 inch)
		CM10-SP2S-L-S2					ϕ9.0 to 11.6mm (ϕ0.354 to 0.457 inch)
		CM10-SP2S-S-C3	Press bonding type			0.5mm² (AWG20) to 1.25mm² (AWG16) Crimping tool (357J-50448) is required.	ϕ4.0 to 6.0mm (ϕ0.157 to 0.236 inch)
		CM10-SP2S-M-C3					ϕ6.0 to 9.0mm (ϕ0.236 to 0.354 inch)
		CM10-SP2S-L-C3					ϕ9.0 to 11.6mm (ϕ0.354 to 0.457 inch)

MR-J3 basic configuration

MR-J3 basic configurations using the Mitsubishi options are shown below.
When using a servo motor with no electromagnetic brake, parts No.1 to No.5 shown below are required.
When using a servo motor with an electromagnetic brake, parts No.1 to No.6 shown below are required.

< For low inertia, small capacity motor HF-KP series >

No.	Item					Model	
1	Servo amplifier					MR-J3-□A	
2	Servo motor					HF-KP□(B)	
3	CN1 connector					MR-J3CN1	
4	Encoder cable: Select one from (1) to (8) below.						
	10m (32.81ft) or shorter (Direct connection type)	IP65	Lead out in direction of motor shaft	Long bending life	(1)	MR-J3ENCBL□M-A1-H	Refer to item ① on page 18 of this catalog.
				Standard	(2)	MR-J3ENCBL□M-A1-L	
			Lead out in opposite direction of motor shaft	Long bending life	(3)	MR-J3ENCBL□M-A2-H	Refer to item ② on page 18 of this catalog.
				Standard	(4)	MR-J3ENCBL□M-A2-L	
	Exceeding 10m (32.81ft) (Relay type)	IP20	Lead out in direction of motor shaft	Long bending life	(5)	Two types of cables are required. • MR-J3JCBL03M-A1-L • MR-EKCBL□M-H	Refer to item ③ and ⑤ on page 18 of this catalog.
				Standard	(6)	Two types of cables are required. • MR-J3JCBL03M-A1-L • MR-EKCBL□M-L	
			Lead out in opposite direction of motor shaft	Long bending life	(7)	Two types of cables are required. • MR-J3JCBL03M-A2-L • MR-EKCBL□M-H	Refer to item ④ and ⑤ on page 18 of this catalog.
				Standard	(8)	Two types of cables are required. • MR-J3JCBL03M-A2-L • MR-EKCBL□M-L	
5	Motor power supply cable: Select one from (1) to (6) below.						
	10m (32.81ft) or shorter (Direct connection type)	IP65	Lead out in direction of motor shaft	Long bending life	(1)	MR-PWS1CBL□M-A1-H	Refer to item ⑩ on page 18 of this catalog.
				Standard	(2)	MR-PWS1CBL□M-A1-L	
			Lead out in opposite direction of motor shaft	Long bending life	(3)	MR-PWS1CBL□M-A2-H	Refer to item ⑪ on page 18 of this catalog.
				Standard	(4)	MR-PWS1CBL□M-A2-L	
	Exceeding 10m (32.81ft) (Relay type)	IP55	Lead out in direction of motor shaft	Standard	(5)	Connect the user-manufactured cable to MR-PWS2CBL03M-A1-L (option cable) and use.	Refer to item ⑫ on page 19 of this catalog.
			Lead out in opposite direction of motor shaft	Standard	(6)	Connect the user-manufactured cable to MR-PWS2CBL03M-A2-L (option cable) and use.	Refer to item ⑬ on page 19 of this catalog.
6	Motor electromagnetic brake cable: Select one from (1) to (6) below.						
	10m (32.81ft) or shorter (Direct connection type)	IP65	Lead out in direction of motor shaft	Long bending life	(1)	MR-BKS1CBL□M-A1-H	Refer to item ⑯ on page 19 of this catalog.
				Standard	(2)	MR-BKS1CBL□M-A1-L	
			Lead out in opposite direction of motor shaft	Long bending life	(3)	MR-BKS1CBL□M-A2-H	Refer to item ⑰ on page 19 of this catalog.
				Standard	(4)	MR-BKS1CBL□M-A2-L	
	Exceeding 10m (32.81ft) (Relay type)	IP55	Lead out in direction of motor shaft	Standard	(5)	Connect the user-manufactured cable to MR-BKS2CBL03M-A1-L (option cable) and use.	Refer to item ⑱ on page 19 of this catalog.
			Lead out in opposite direction of motor shaft	Standard	(6)	Connect the user-manufactured cable to MR-BKS2CBL03M-A2-L (option cable) and use.	Refer to item ⑲ on page 19 of this catalog.

< For medium inertia, medium capacity HF-SP series >

No.	Item				Model	
1	Servo amplifier				MR-J3-□A	
2	Servo motor				HF-SP□(B)	
3	CN1 connector				MR-J3CN1	
4	Encoder cable: Select one from (1) to (2) below.					
	IP67	Long bending life	(1)	MR-J3ENSCBL□M-H		Refer to item ⑦ on page 18 of this catalog.
		Standard	(2)	MR-J3ENSCBL□M-L		
5	Motor power supply cable: Select one from (1) to (2) below.					
	IP67	For HF-SP52, 102, 152	(1)	Manufacture the cable using MR-PWCNS4 (option connector).		Refer to item ⑭ on page 19 of this catalog.
		For HF-SP202, 352	(2)	Manufacture the cable using MR-PWCNS5 (option connector).		Refer to item ⑮ on page 19 of this catalog.
6	Motor electromagnetic brake cable			Manufacture the cable using MR-BKCNS1 (option connector).		

Peripheral Equipment

● Power factor improvement reactor (FR-BEL, FR-BAL)

This reactor enables users to boost the servo amplifier's power factor and reduce its power supply capacity.
The power factor improvement effect of the DC reactor (FR-BEL) is higher than the AC reactor (FR-BAL), the size is compact and light, and the wiring is easy (The AC reactor uses six wires, and the DC reactor uses two wires). Use of the DC reactor is recommended.

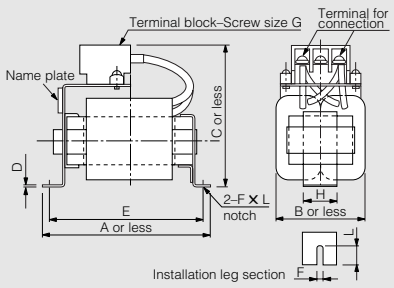
Type	Model	Applicable servo amplifier	Fig.
DC reactor	FR-BEL-0.4K	MR-J3-10A MR-J3-20A	A
	FR-BEL-0.75K	MR-J3-40A	
	FR-BEL-1.5K	MR-J3-60A MR-J3-70A	
	FR-BEL-2.2K	MR-J3-100A	
	FR-BEL-3.7K	MR-J3-200A	
	FR-BEL-7.5K	MR-J3-350A	

Type	Model	Applicable servo amplifier	Fig.
AC reactor	FR-BAL-0.4K	MR-J3-10A MR-J3-20A	B
	FR-BAL-0.75K	MR-J3-40A	
	FR-BAL-1.5K	MR-J3-60A MR-J3-70A	
	FR-BAL-2.2K	MR-J3-100A	
	FR-BAL-3.7K	MR-J3-200A	
	FR-BAL-7.5K	MR-J3-350A	

External dimensions

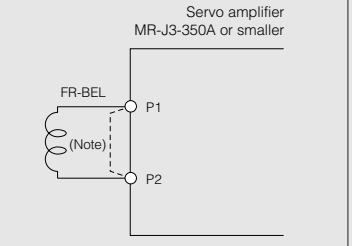
Unit: mm (inch)

A



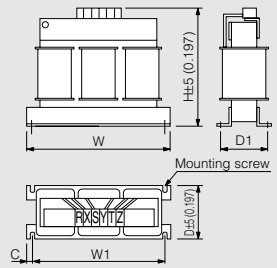
Type	Variable dimensions mm (inch)								Mounting screw size	Mass kg (lb)
	A	B	C	D	E	F X L	G	H		
FR-BEL-0.4K	110 (4.33)	50 (1.97)	94 (3.7)	1.6 (0.06)	95 (3.74)	6 X 12 (0.24) X (0.47)	M3.5	25 (0.98)	M5	0.5 (1.1)
FR-BEL-0.75K	120 (4.72)	53 (2.09)	102 (4.02)	1.6 (0.06)	105 (4.13)	6 X 12 (0.24) X (0.47)	M4	25 (0.98)	M5	0.7 (1.5)
FR-BEL-1.5K	130 (5.12)	65 (2.56)	110 (4.33)	1.6 (0.06)	115 (4.53)	6 X 12 (0.24) X (0.47)	M4	30 (1.18)	M5	1.1 (2.4)
FR-BEL-2.2K	130 (5.12)	65 (2.56)	110 (4.33)	1.6 (0.06)	115 (4.53)	6 X 12 (0.24) X (0.47)	M4	30 (1.18)	M5	1.2 (2.6)
FR-BEL-3.7K	150 (5.91)	75 (2.95)	102 (4.02)	2.0 (0.08)	135 (5.31)	6 X 12 (0.24) X (0.47)	M4	40 (1.57)	M5	1.7 (3.7)
FR-BEL-7.5K	150 (5.91)	75 (2.95)	126 (4.96)	2.0 (0.08)	135 (5.31)	6 X 12 (0.24) X (0.47)	M5	40 (1.57)	M5	2.3 (5.1)

Connections

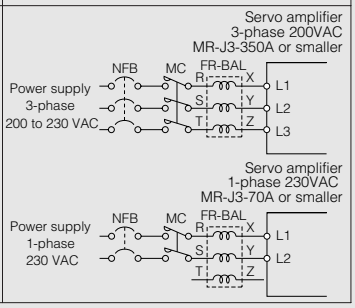


Note: Always disconnect the short bar across P1-P2 when using the DC reactor.

B



Type	Variable dimensions mm (inch)						Mounting screw size	Terminal screw size	Mass kg (lb)
	W	W1	H	D	D1	C			
FR-BAL-0.4K	135 (5.31)	120 (4.72)	115 (4.53)	59 (2.32)	45 -2.5 (1.77 -0.0984)	7.5 (0.3)	M4	M3.5	2.0 (4.4)
FR-BAL-0.75K	135 (5.31)	120 (4.72)	115 (4.53)	69 (2.72)	57 -2.5 (2.24 -0.0984)	7.5 (0.3)	M4	M3.5	2.8 (6.2)
FR-BAL-1.5K	160 (6.3)	145 (5.71)	140 (5.51)	71 (2.8)	55 -2.5 (2.17 -0.0984)	7.5 (0.3)	M4	M3.5	3.7 (8.2)
FR-BAL-2.2K	160 (6.3)	145 (5.71)	140 (5.51)	91 (3.58)	75 -2.5 (2.95 -0.0984)	7.5 (0.3)	M4	M3.5	5.6 (12.3)
FR-BAL-3.7K	220 (8.66)	200 (7.87)	192 (7.56)	90 (3.54)	70 -2.5 (2.76 -0.0984)	10 (0.39)	M5	M4	8.5 (18.7)
FR-BAL-7.5K	220 (8.66)	200 (7.87)	194 (7.64)	120 (4.72)	100 -2.5 (3.94 -0.0984)	10 (0.39)	M5	M5	14.5 (31.9)



● EMC filter

The following filters are provided as a filter compliant with the EMC directive for the servo amplifier's power supply.

Model	Applicable servo amplifier	Fig.
HF3010A-UN	MR-J3-10A to 100A	A
HF3030A-UN	MR-J3-200A MR-J3-350A	B

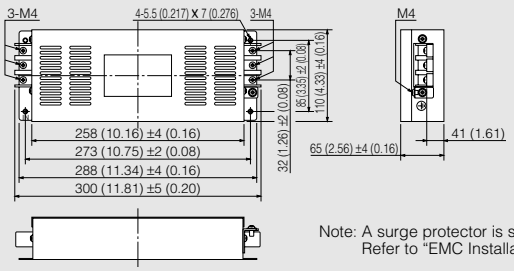
Note: The EMC filters described above are made by Soshin Electric.

External dimensions

Unit: mm (inch)

A

● HF3010A-UN

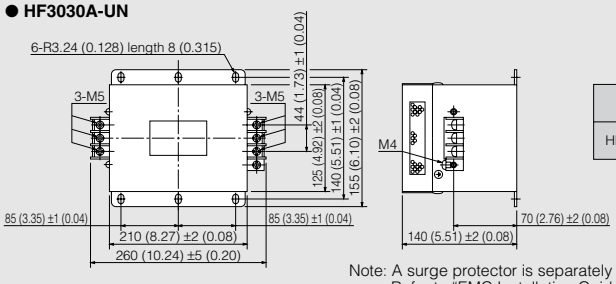


Model	Mass kg (lb)
HF3010A-UN	3 (6.6)

Note: A surge protector is separately required to use this EMC filter. Refer to "EMC Installation Guidelines".

B

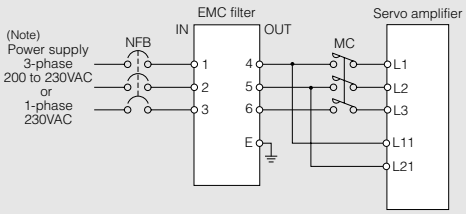
● HF3030A-UN



Model	Mass kg (lb)
HF3030A-UN	5.5 (12.1)

Note: A surge protector is separately required to use this EMC filter. Refer to "EMC Installation Guidelines".

Connections



Note: For 1-phase 230VAC power supply, connect the power supply to L1, L2, and leave L3 open. 1-phase 230VAC is available only for the MR-J3-70□ or smaller.

● Electric wires, circuit breakers, magnetic contactors

Servo amplifier	Circuit breaker	Magnetic contactor	Electric wire size (mm²)				
			L1, L2, L3, P1, P2, ⏚ (Note 2)	L11, L21	U, V, W, ⏚	P, C (Note 2)	B1, B2
MR-J3-10A	30A frame 5A	S-N10	2 (AWG14)	1.25 (AWG16)	1.25 (AWG16)	2 (AWG14)	1.25 (AWG16)
MR-J3-20A							
MR-J3-40A	30A frame 10A						
MR-J3-60A	30A frame 15A						
MR-J3-70A							
MR-J3-100A					2 (AWG14)		
MR-J3-200A	30A frame 20A	S-N18	3.5 (AWG12)		3.5 (AWG12)		
MR-J3-350A	30A frame 30A	S-N20	5.5 (AWG10)		5.5 (AWG10)		

Notes: 1. Assuming use of a 600V polyvinyl chloride electric wire having a length of 30 m (98.43 ft) for the wires in the table. Use a wire with the above size or larger.
2. Connect a DC reactor or an optional regeneration unit using the 5m (16.4 ft) or shorter electric wire.

● Surge suppressor

Attach surge suppressors to the servo amplifier, signal cable's AC relays, AC valves, and AC electromagnetic brake. Attach diodes to DC relays and DC valves.

Sample configuration
Surge suppressor: 972A-2003 504 11 (rated 200V, made by Matsuo Denki)
Diode : A diode with resisting pressure 4 or more times greater than the relay's drive voltage, and 2 or more times greater than the current.

● Data line filter

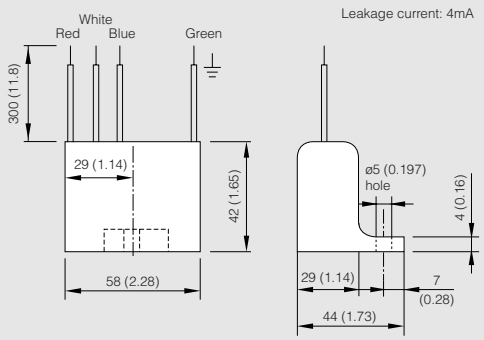
Attaching a data line filter to the pulse output cable or motor encoder cable of the pulse train output controller (QD75D, etc.) is effective in preventing noise penetration.

Sample configuration
Data line filter: ESD-SR-25 (made by NEC TOKIN), ZCAT3035-1330 (made by TDK)

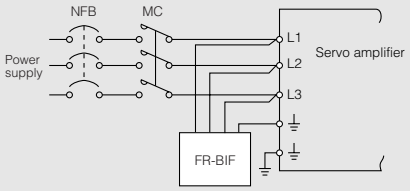
● Radio noise filter (FR-BIF)

This filter effectively controls noise transmitted from the power supply side of the servo amplifier, and is especially effective for radio frequency bands under 10MHz. Only for input.

External dimensions Unit: mm (inch)



Connections



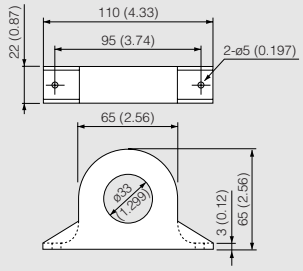
Notes:
1. Cannot be connected to output side of the servo amplifier.
2. Wiring should be as short as possible.

● Line noise filter (FR-BSF01, FR-BLF)

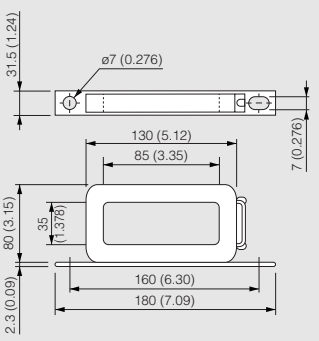
This filter is effective for suppressing radio noise emitted from the servo amplifier's power supply side or output side, and high-frequency leakage current (zero-phase current). Especially effective in the 0.5MHz to 5MHz band.

External dimensions Unit: mm (inch)

<FR-BSF01>
MR-J3-200A or smaller

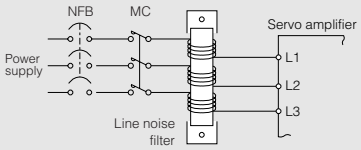


<FR-BLF>
MR-J3-350A



Connections

Wind the 3-phase wires in the same direction and the same number of winds, and then connect them to the power supply side and output side of the servo amplifier. Increasing the number of winds on the power supply side is effective, but normally, the number of penetrations on the power supply side is approx. four times. If the wire is thick and hard to wind, use two or more filters, and make sure that the total of penetrations exceeds the above number. Make sure that the number of penetrations on the output side is four times or less. Do not wind the grounding (earth) wire together with the 3-phase wires. The effect of the filter will drop.



Using a Personal Computer

Servo support software

MR Configurator (Setup software) and capacity selection software are available as support softwares to improve usability.

● Compatible personal computer

IBM PC/AT compatible model running with the following operation conditions.

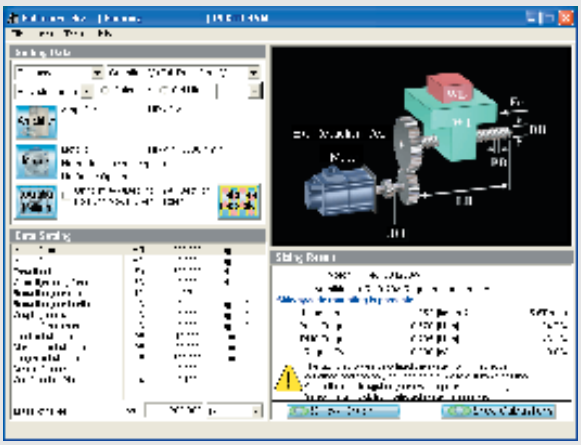
● Operating conditions

Software			Capacity selection software MRZJW3-MOTSZ111E (Note 4)	MR Configurator (Setup software) MRZJW3-SETUP211E
Personal computer (Note 2)	OS (Note 1)	Windows® 95	○	×
		Windows® 98	○	×
		Windows® 98 Second Edition	○	○
		Windows® Me	○	○
		Windows NT® Workstation4.0	○	×
		Windows® 2000 Professional	○	○
		Windows® XP Professional	○	○
		Windows® XP Home Edition	○	○
	Processor		Pentium133MHz or more (Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows NT® Workstation4.0, Windows® 2000 Professional) Pentium150MHz or more (Windows® Me) Pentium300MHz or more (Windows® XP Professional, Windows® XP Home Edition)	
	Memory		16MB or more (Windows® 95) 24MB or more (Windows® 98, Windows® 98 Second Edition) 32MB or more (Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional) 128MB or more (Windows® XP Professional, Windows® XP Home Edition)	
	Open hard disk capacity		40MB or more	60MB or more
	Communication interface		—	Use serial port or USB port
Monitor			Capable of resolution 800×600 or more, high Color (16-bit display)	
Keyboard			Compatible with above personal computers.	
Mouse			Compatible with above personal computers. Note that serial mice are incompatible.	
Printer			Compatible with above personal computers.	
Communication cable			Not required	MR-J3USBCBL3M

○ : Available × : Unavailable

<Capacity selection software>

●MRZJW3-MOTSZ111E (Note 4)



A user-friendly design facilitates selection of the optimum servo amplifier, servo motor (including the servo motor with a electromagnetic brake) and optional regeneration unit when entering constants and an operation pattern into machine-specific windows.

Features

(1) User defined operation patterns can be set. The user defined operation pattern can be selected from the position control mode operation or speed control mode operation patterns. The set operation pattern can be also displayed in the graph.

(2) The feedrate (or motor speed) and torque can be displayed in the graph during the selection process.

● Specifications

Item		Description
Types of machine component		Horizontal ball screws, vertical ball screws, rack and pinions, roll feeds, rotating tables, dollies, elevators, conveyors, and other (direct inertia input) devices.
Output of results	Parameter	Selected servo amplifier model, selected servo motor model, selected regenerative resistor model, load inertia moment, load inertia moment ratio, peak torque, peak torque ratio, effective torque, effective torque ratio, regenerative power and regenerative power ratio.
	Printing	Prints input specifications, operation pattern, calculation process, selection process feedrate (or motor speed) and torque graphs and selection results.
	Data storage	Assigns a file name to input specifications, operation patterns and selection results, and saves them on hard disk or floppy disk, etc.
Inertia moment calculation function		Cylinder, core alignment column, variable speed, linear movement, suspension, conical, truncated cone

Notes:
1. Windows and Windows NT are registered trademarks of Microsoft Corporation in the United States and other countries.
2. This software may not run correctly depending on the personal computer being used.
3. The screen shown on this page are for reference and may differ from the actual screen.
4. The servo amplifier MR-J3-10A, 20A, 40A or 70A is planned to be compatible with the MRZJW3-MOTSZ111E software version A1 or above in the near future.
The servo amplifier MR-J3-60A, 100A, 200A or 350A and servo motor HF-SP series are planned to be compatible with MRZJW3-MOTSZ111E software version A2 or above in the near future.

Servo support software

<MR Configurator>

● **MRZJW3-SETUP211E (Setup software)**

This software makes it easy to do setup, tuning, monitor display, diagnostics, reading and writing of parameters, and test operations with a personal computer. User-satisfying functions that enable the balance with the machine system, optimum control and short start up time are available.

● **Features**

(1) This software can set up easily and tune your servo system with a personal computer.
(2) Multiple monitor functions
Graphic display functions are provided to display the servo motor status with the input signal triggers, such as the command pulse, droop pulse and speed.
(3) Test operations from a personal computer
Allows servo motors to be tested easily from a personal computer with multiple test mode menus.
(4) Further advanced tuning is possible with the improved advanced functions.

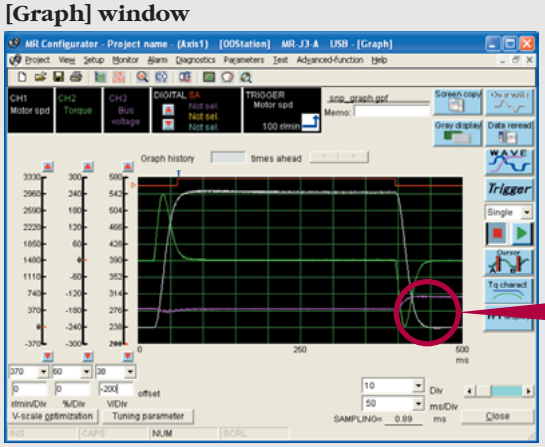
● **Specifications**

Main-menu	Functions
Monitors	Batch display, input/output I/F display, high speed monitor, and graph display
Alarms	Alarm display, alarm history, display of data that generated alarm
Diagnostics	Failure to rotate reason display, system information display, tuning data display, absolute data display, axis name setting, amplifier diagnostic (Note 2)
Parameters	Parameter setting, device setting, tuning, display of change list, display of detailed information, converter and parameter copy
Test operations	JOG operation, positioning operation, operation without motor, forced digital output, program operation using simple language
Advanced function	Machine analyzer, gain search, machine simulation
Project	Project creation, reading or saving, various data reading, saving or printing
Other	Automatic operation and help display

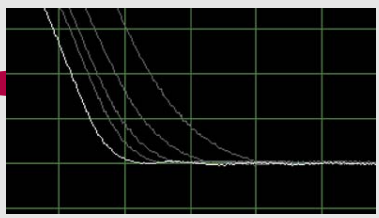
Notes: 1. The screens shown on this page and next page are for reference and may differ from the actual screens.
2. The amplifier diagnostic function is compatible from the following versions.
• Servo amplifier: Software Version A1 and above • MR Configurator: MRZJW3-SETUP211E Software Version A0 and above

New functions! Selecting a variety of waveforms now possible !

[Graph] window



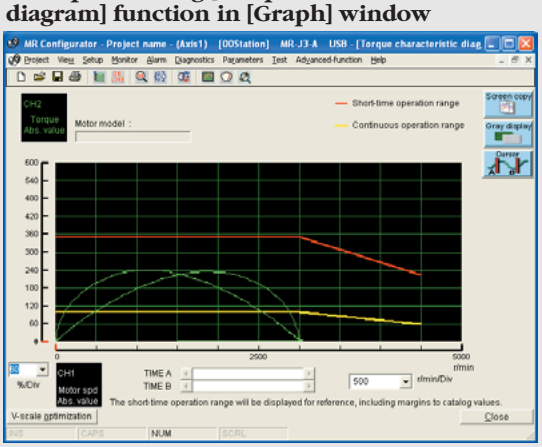
Powerful graph functions with 3 analog channels and 4 digital channels support tuning. User-friendly functions such as the [Over write] function and [Graph history] function and a diverse waveform selection powerfully support user work. Other functions include the [Gray display] function (easy to read printing data), and functions to save data in CSV format or JPEG format.



Example of using [Over write] function in [Graph] window

New functions!

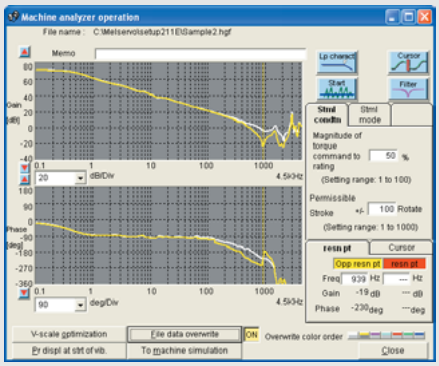
Example of using [Torque characteristic diagram] function in [Graph] window



The speed-torque characteristic diagram of the motor in operation can be displayed using the [Torque characteristic diagram] function.
Since the actual operation status can be displayed on the servo motor torque characteristics drawing, the status of your servo system can be checked.

Improved accuracy!

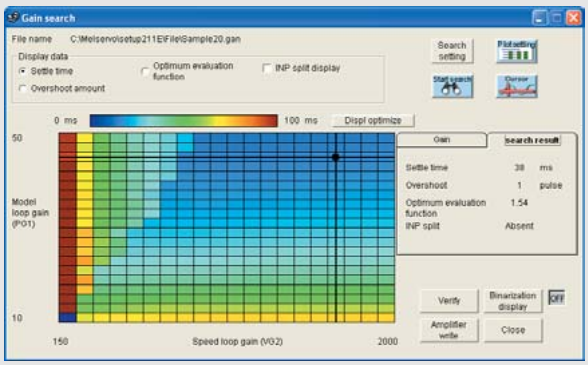
[Machine analyzer operation] window



When the [Start] button is pressed, the servo motor is automatically oscillated, and the machine system's frequency characteristics are displayed.
The frequency characteristics that could only be analyzed in a range between 0.1 and 1kHz can now be analyzed in a range between 0.1 and 4.5kHz. Use this also as a tool to comprehend the machine system's characteristics. In addition, data can be overwritten.

Improved usability!

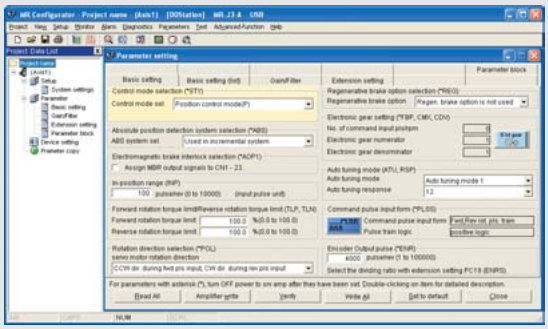
[Gain search] window



While automatically fluctuating the gain, the servo support software "MR Configurator" searches for values with the shortest settling time and lowest overshooting or vibration.
Ever-higher level tuning is now possible.

Improved usability!

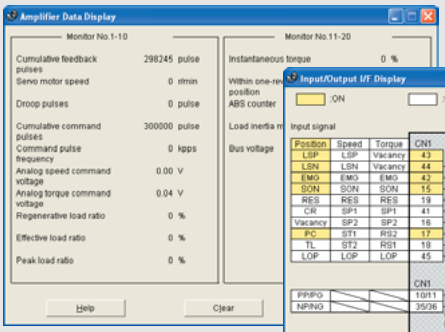
[Parameter setting] window



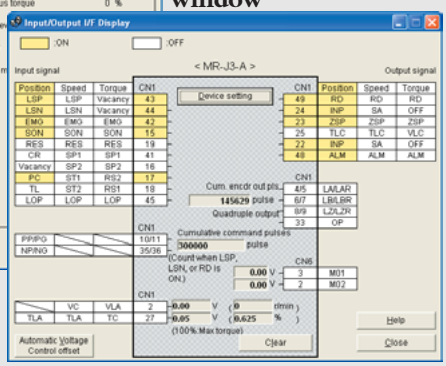
The [Parameter setting] window has been renewed.
The basic setting parameters can be easily set in a selection format. Settings in the list format are also possible.

Improved usability!

[Monitor] function:
[Amplifier Data Display] window



[Input/Output I/F Display] window



The [Input/Output I/F Display] window has been renewed.
The [Input/Output I/F Display] window and [Amplifier Data Display] window can be opened simultaneously, so the DI/DO ON/OFF status and operation status can be checked in real time.

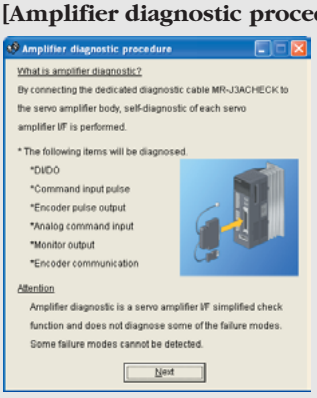
Additional menus further improve usability!

[Test mode menu] window

The test operation that matchs the application can be selected from the multiple test mode menus.

New functions!

[Amplifier diagnostic procedure] window



The amplifier diagnostic function has been newly added.
The DI/DO signal, command pulse I/F and encoder pulse output are checked. If any fault is found, the amplifier's faulty section is pinpointed to speed up recovery.

The diagnostic cable (MR-J3ACHECK) is required.

Cautions Concerning Use

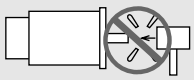
To ensure safe use

- To ensure the safe and proper use of the product, we ask that you read the instruction manual and "MR-J3 INSTRUCTION MANUAL" prior to its use.
- These products are not designed or manufactured for use in machinery and systems where people's safety is at stake.
- When considering the product for use in such special applications as equipment or systems employed in passenger transportation, medicine, aerospace, nuclear power generation, or underwater relays, please contact our sales representative.
- These products have been manufactured to the most rigorous quality standards. However, we ask that you employ safety devices when using the product in equipment in which any failure on its part can be expected to cause a serious accident or loss.

Cautions concerning use

Transport and installation of motor

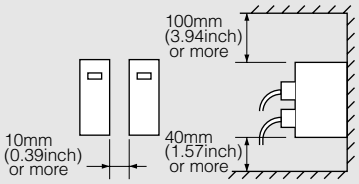
- Protect the motor or encoder from impact during handling. When installing a pulley or coupling, do not hammer on the shaft. Impact can damage the encoder. In the case of motor with key, install a pulley or coupling with the screw of shaft-end. Use a pulley extractor when taking off the pulley.



- Do not apply a load exceeding the tolerable load onto the servo motor shaft. The shaft could break.

Installation

- Avoid installation in an environment in which oil mist, dust, etc. are in the air. When using in such an environment, enclose the servo amplifier in an sealed panel. Protect the motor by furnishing a cover for it or taking similar measures.
- Mount the amplifier vertically on a wall.
- When installing several amplifiers in a row in a sealed panel, leave 10mm(0.39inch) or more open between each amplifier. The amplifiers can be mounted closely. In this case, keep the ambient temperature within 0 to 45°C (32 to 113°F), or use them with the effective load rate of 75% or less.
  When using one amplifier, always leave 40mm(1.57inch) or more open in the upward direction and 40mm(1.57inch) or more open in the downward direction.
  To ensure the life and reliability, keep space as open as possible toward the top plate so that heat does not build up.
  Take special care, especially when installing several amplifiers in a row.
- For installing a single motor, the motor can be installed horizontally or vertically. When installing vertically (shaft-up), take measures on the machine side to ensure that oil from the gear box does not get into the motor.



- Do not touch the servo motor and so on, while the servo motor is turned ON or for a while after the power has been shutoff. The motor could be very hot, and touching it could burn skin.
- The optional regeneration unit becomes hot (temperature rise of 100°C(212°F) or more) with frequent use. Do not install within flammable objects or objects subject to thermal deformation. Take care to ensure that electric wires do not come into contact with the main unit.
- Carefully consider the cable clamping method, and make sure that bending stress and the stress of the cable's own weight are not applied on the cable connection section.
- If using in an application where the servo motor moves, select the cable bending radius according to the required bending life and wire type.

Grounding

- Securely ground to prevent electric shocks and to stabilize the potential in the control circuit.
- To ground the servo motor and servo amplifier at one point, connect the grounding terminal from each unit, and ground from the servo amplifier side.
- Faults such as a deviation in position could occur if the grounding is insufficient.

Wiring

- When a commercial power supply is applied to the amplifier's output terminal (U, V, W), the amplifier will be damaged. Before switching the power on, perform thorough wiring and sequence checks to ensure that there are no wiring errors, etc.
- When a commercial power supply is applied to the motor's input terminal (U, V, W), the motor will be burned out. Connect the motor to the amplifier's output terminal (U, V, W).
- Match the phase of the motor's input terminal (U, V, W) to the amplifier's output terminal (U, V, W) before connecting. If they are not the same, the motor control cannot be performed.
- Validate the stroke end signals (LSP, LSN) in the position control or speed control mode.
  The motor will not start if the signals are invalid.

Factory settings

- All available motor and amplifier combinations are predetermined. Confirm the model of the motor and amplifier to be used before installation.
- For the MR-J3-A type, use the parameter No.A01 for the control mode to set position, speed and torque.
  The default value is set to position, so when using the speed operation, change the setting value.
- When using the optional regeneration unit, please change the parameter No.A02 (for MR-J3-A type). The optional regeneration unit is disabled as the default, so the parameter must be changed to increase the regeneration performance.

Operation

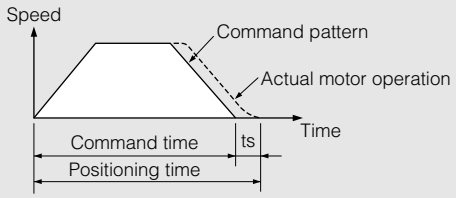
- When a magnetic contactor (MC) is installed on the amplifier's primary side, do not perform frequent starts and stops with the MC. Doing so could cause the amplifier to fail.
- When a trouble occurs, the amplifier's safety features are activated, halting output, and the dynamic brake instantly stops the motor. If free run is required, contact Mitsubishi about solutions involving servo amplifiers where the dynamic brake is not activated.
- When using a motor with an electromagnetic brake, do not apply the brake when the servo is on. Doing so could cause an amplifier overload or shorten brake life. Apply the brake when the servo is off.

Precautions for Choosing the Products

- Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

Cautions concerning model selection

- Select a motor with a rated torque above the continuous effective load torque.
- Design the operation pattern in the command section so that positioning can be completed, taking the stop setting time (ts) into account.



- The load inertia moment should be below the recommended load inertia moment ratio of the motor being used. If it is too large, desired performance may not be attainable.

⚠ Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

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