

MR-J3

Servo and Motion Control

Simple, easy, dynamic
Ultimate positioning control



IMPROVED COMMUNICATION

Industry leading performance gives faster production cycles and reduced material wastage

INTELLIGENT DESIGN

Reduced component size means more flexibility for installation and reduced enclosure sizes

SIMPLER OPERATION

Many built in functions have automatic setup, reducing both installation time and installation mistakes

MR-J3 – Use tomorrow's technology today



Handling systems require exceptional precision and dynamic response.

Mitsubishi Electric servo systems are globally renowned and respected. Offering a perfect combination of high-end performance and ease of use, they are now found in a huge range of applications throughout all branches of industry – from single and multiple axis systems in mechanical engineering and other metal-working sectors to complex, fully-synchronised solutions in the semiconductor and motor industries.

Designed for challenging tasks

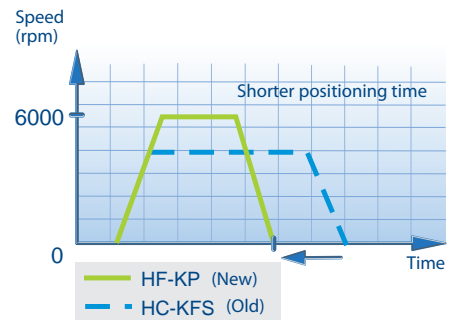
Every detail of the MR-J3 series is designed for performance and reliability, from the intelligent drive electronics to the robust mechanical components. These next-generation servo systems are both compact and flexible, featuring Plug & Play functionality, fibre-optics technology and optical feedback systems.



Plug and palay minimises wiring errors and speeds up installation

Increased response speed

The MR-J3's 2100 Hz speed-frequency response rate is over 30% faster than existing models. For users this means faster operation, greater precision, faster retooling in production, less wastage and better product quality.



Reduced component size

The reduced component size is critically important to machine designers who are often called upon to squeeze all of the control solutions they need into the smallest deliverable package. The MR-J3 series boasts an intelligent design that has reduced amplifier sizes by up to 40 % and motor lengths by almost a quarter. This means machine designers don't have to make as many compromises to get the right motor and deliver the right power in the right place. These servos' compact dimensions enable flexible installation and economical design, which helps you to keep your costs down and be more competitive in the global economy.

Firmware that delivers performance

All MR-J3 servo amplifiers use the very latest regulation and control technologies. These systems ensure fast installation and setup and make it possible to configure stable systems with very short response times – no matter what your application.

■ Real-time auto-tuning

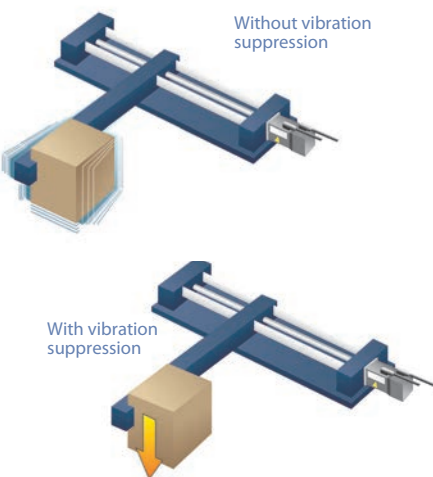
The real-time auto-tuning function sets the servo's control parameters automatically, eliminating the need to calibrate the system for each individual application. But that's not all – auto-tuning also works continuously while the system is in operation, making constant adjustments to cater for applications with fluctuating moments of inertia. This makes it possible to use these servos in a much wider range of applications.

■ Adaptive filtering

Adaptive filters ensure dynamic response and vibration-free operation, even in more demanding applications with suspended loads and high friction coefficients.

■ Advanced suppression of mechanical vibration

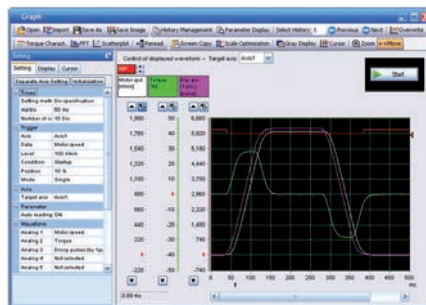
The MR-J3 has an automatic feature that enables the amplifier to minimize the effects of a vibrating load. In another first, this innovative function can also suppress vibrations at the end of a tool arm as well as those in the drive train.



In applications with extreme load vibrations this function significantly improves both performance and system response.

Software that makes your life easier

The MR Configurator2 software package makes configuration and diagnostics quick and easy and includes powerful graphical machine analysis and simulation functions. Machine analysis enables determination of the frequency response of the connected drive train without any additional instruments. The system can be connected to a personal computer with a standard USB (Universal Serial Bus) port.



Monitoring and checking with the diagnostics features

A wide range of automatic configuration assistants make it easy to set up your new servo systems correctly, even for less experienced users.

Advanced features

■ Increased motor speed

MR-J3 motors lead the market, combining speeds of up to 6,000rpm with high torques. This makes it easier for designers to select the motors they need to meet tough performance criteria.

■ Increased encoder resolution

All MR-J3 encoders are 18 bit, delivering an industry-leading 262,144 pulses per revolution. This high resolution makes it possible to detect and suppress mechanical vibrations. The non-volatile absolute encoder system has a backup battery, eliminating the need for time-wasting zero-point calibration routines.

■ Improved motor IP ratings

All MR-J3 motors are IP65 rated as standard (all 400 V motors are IP67). This means that MR-J3 systems can be used in heavy-duty industrial environments.

■ Compliant with applicable safety standard EN IEC61800-5-2

MR-J3-BSafety series servo amplifiers have integrated Safe Torque Off (STO) and can achieve Safe Stop 1 (SS1) function in combination with MR-J3-D05 safety option module.

SSCNET III – The benchmark standard

In addition to conventional pulse train positioning, the MR-J3 series also supports the SSCNET III high-speed motion control network. SSCNET III guarantees data transfer rates of 50 Mbit/s and a bus cycle period of just 0.44 ms. It is a fully-optical network using fibre-optics cabling for maximum performance, precision, reliability and resistance to interference. It is also a Plug & Play system that reduces both wiring overheads and configuration errors.



Flexible control solutions

Today, the MR-J3 series and SSCNET III support a very broad spectrum of applications with between 2 and 96 axes. You can combine the components with a variety of different PLC and positioning systems for a modular and fully-scalable configuration. This gives you full control over the system and complete cost transparency, combined with the dependable controller performance of the MELSEC FX series or the MELSEC System Q series with motion controllers and the new MELSEC L-series simple motion module.

For customers requiring European standard open Networks, Mitsubishi Electric developed an EtherCAT I/F solution.

Specifications ///

Servo amplifier MR-J3-A/A-EtherCAT/BS ^①	10 0.1 kW	20 0.2 kW	40 0.4 kW	70 0.7 kW	60 (4) 0.6 kW	100 (4) 1 kW	200 (4) 2 kW	350 (4) 3.5 kW	500 (4) 5 kW	700 (4) 7 kW
Performance ^②										
Power supply	3~ 200 – 230 V AC, 50/60 Hz; 1~ 200 – 230 V AC, 50/60 Hz					3~ 200 – 230 V AC, 50/60 Hz (200 V type without (4)); 3~ 380 – 480 V AC, 50/60 Hz (400 V type with (4))				
Control system	Sinusoidal PWM control / current control system									
Dynamic brake	Built-in									
Protective functions	Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage / sudden power outage protection, excess error protection									
Structure/protection	Self-cooling, open (IP00); from 70A/B (200 V) and 200A4/B4 (400 V) fan-cooling, open (IP00)									
Environment	Ambient temperature: Operation: 0 – 55 °C (no freezing); Storage: -20 – 65 °C (no freezing)									
	Ambient humidity: Operation: 90 % RH max. (no condensation); Storage: 90 % RH max. (no condensation)									
	Others: Elevation: 1000 m or less above sea level; Oscillation: 5.9 m/s (0.6 G) max.									

① A type: general purpose I/F, A-EtherCAT type: EtherCAT I/F, BS type: for SSCNET III and Safety integrated ; (4) = 400 V type ② 11–55 kW types on request

Series (200 V)	Rated speed [U/min]	Rated voltage [V]	Rated out- put capacity [kW]	Type ^③	Feature	Amplifier assignment MR-J3-A/A-EtherCAT/BS											
						10	20	40	60	70	100	200	350	500	700		
HF-MP	3000	200	0.1	HF-MP13(B)	Ultra low inertia, small performance	●											
			0.2	HF-MP23(B)			●										
			0.3	HF-MP43(B)				●									
			0.75	HF-MP73(B)					●								
HF-KP	3000	200	0.1	HF-KP13(B)	Low inertia, medium performance	●											
			0.2	HF-KP23(B)			●										
			0.3	HF-KP43(B)				●									
			0.75	HF-KP73(B)					●								
HF-SP	2000	200	0.5	HF-SP52(B)	Medium inertia, medium performance				●								
			1.0	HF-SP102(B)					●								
			1.5	HF-SP152(B)						●							
			2.0	HF-SP202(B)							●						
			3.5	HF-SP352(B)								●					
			5.0	HF-SP502(B)									●				
Series (400 V)						—	—	—	60 (4)	—	100 (4)	200 (4)	350 (4)	500 (4)	700 (4)		
	HF-SP	2000	400	0.5	HF-SP524(B)	Medium inertia, medium performance				●							
1.0				HF-SP1024(B)					●								
1.5				HF-SP1524(B)						●							
2.0				HF-SP2024(B)							●						
3.5				HF-SP3524(B)								●					
5.0				HF-SP5024(B)									●				
7.0	HF-SP7024(B)									●							

③ (B) = with electromagnetic brake

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