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Product Information
EBG 189-EN

MITSUBISHI ELECTRIC
FACTORY AUTOMATION

MR-E Super

Servo and Motion Control

Excellent performance, small price
and easy operation



MORE FLEXIBILITY — Wide output range (100 W – 2 kW) for any kind of application

IMPROVED PERFORMANCE — High accuracy positioning thanks to the integrated high resolution encoder (131072 pls/rev)

SPEED UP — High-speed pulse train interface (1 MHz) for more precise command handling

SIMPLER OPERATION — Auto-tuning and diagnostic tools for easy and time-saving installation

User-friendly servo with easy operation



Bottle filling machines with Mitsubishi MR-E servo systems cut down system cost

With the MR-E Super, Mitsubishi Electric launches a servo drive on the market with unique functions and very compact dimensions. It was developed with great attention to a very quick and easy com- missioning.

Thanks to its high positioning accuracy and responsiveness, the MR-E Super is an excellent choice for applications ranging from 100 W to 2 kW.



Filling, processing and packaging in the food industry is one of the applications where MR-E Super can be found

The MR-E Super is available with pulse-train input for position and internal speed control or analog input for speed and torque control. The amplifier features Mitsubishi Electric's legendary auto-tuning and vibration suppression functions. Set-up and diagnosis is easy with the Windows based software MR-Configurator .

Compared to its performance the MR-E Super is a well-priced product for very cost- effective and economical servo solutions.

Full range for all applications

The Mitsubishi general-purpose AC servo system MR-E Super can perform operation in different control modes, e.g. position/ internal speed control. Hence, it fits a wide range of applications such as precision positioning and smooth speed control of machine tools and general industrial machines (e.g. packaging, processing or labelling machines).

■ Position/internal speed control mode

Up to 1 Mpps high-speed pulse train is used to control the speed and direction of the motor and execute precision positioning also taking advantage of the high encoder revolution of 131072 pulses/rev.

With the position smoothing function a smoother start/stop can be made in response to a sudden position command. If the application demands to control smoothly the speed of the motor, the MR-E Super also offers the possibility to switch "on-the-fly" to the internal speed modality. In this way it is possible to address up to 7 different parameter-driven speeds using 3 digital inputs.

■ Speed/torque control mode

External analog speed command (0 to ±10 V) or torque command (0 to ±8 V) are implemented making this new servo system suitable for those applications in which speed or torque has to be smoothly controlled.

High precision positioning – high flexibility

For the MR-E Super series a wide range of motor sizes from low to medium inertia are available. Hence this new servo can be considered as a powerful system for any general-purpose application, but at the same time, a cost-effective solution for the replacement of stepping motors or DC servos.

All MR-E Super servo motors are equipped with an incremental position encoder and offer a high level of internal protection.



HF-SE and HF-KE servo motors

Latest technology – easy to use

All MR-E Super servo amplifiers use the 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 application.

■ Real-time auto-tuning

The well-known real-time auto-tuning function from Mitsubishi Electric 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 MR-E Super in a much wider range of applications.

■ High-speed response

Increased dynamics and more precise positioning can be handled thanks to the high response frequency of 500 Hz.

■ Advanced suppression of mechanical vibration

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

Advanced features

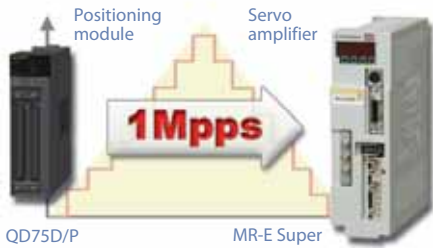
■ Quick and easy wiring

Connectors have been adapted for the servo amplifier terminal block and all connectors are located on the front of the servo amplifier which makes wiring fast and easy.

■ Auxiliary equipment

EMC footprint filters are available in order to comply with the EMC Directive of the EN Standard.

The specific terminal block can also be used in order to make the I/O wiring easier.

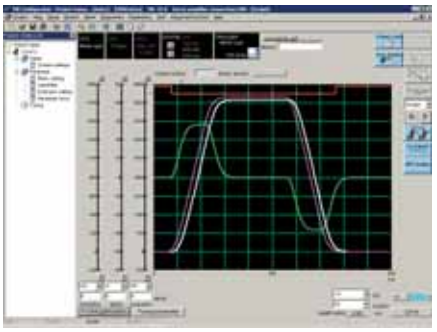


More precise positioning can be handled with the high-speed input interface

Compact component size

The compact component size is critically important to machine designers who are often called upon to sqeeze all of the control solutions they need into the smallest deliverable package. This means machine designers don't have to make as many compromises to get the right motor and deliver the right power to the right place. The compact dimensions of the MR-E Super series enable flexible installation and economical design, which helps to keep the costs down and to be more competitive on the global market.

User-friendly software



Monitoring and checking with the diagnostic tools

The MR Configurator software package makes tuning and diagnostics quick and easy and includes powerful graphical machine analysis and simulation functions. A machine analyzer allows you to get the frequency response of the connected mechanical system without any additional instruments. If necessary, you can then make design changes or install filters to achieve better machine performance.

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

Meeting global norms and standards

Mitsubishi Electric's MR-E Super servo amplifiers and motors meet all the standards and specifications laid down in the EU Low Voltage Directive 73/23/EEC and the Machinery Directive 98/37/EC. Needless to say that all systems carry the CE mark and are certified as conforming to UL, cUL.

Specifications ///

Servo amplifier MR-E-A/AG ①		10A 10AG	20A 20AG	40A 40AG	70A 70AG	100A 100AG	200A 200AG
Performance		**0.1 kW**	**0.2 kW**	**0.4 kW**	**0.75 kW**	**1 kW**	**2 kW**
Power supply		3phase 200 – 230 V AC, 50/60 Hz; 1phase 200 – 230 V AC, 50/60 Hz				3phase 200 – 230 V AC, 50/60 Hz	
Control system		Sinusoidal PWM control / current control system					
Dynamic brake		Built-in					
Protective functions		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), encoder fault protection, regeneration fault protection, undervoltage / sudden power outage protection, overspeed protection, excess error protection					
Structure/protection		Self-cooling, open (IP00); 200A/AG 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^2 (0.6 G) max.					
Weight	kg	0.7	0.7	1.1	1.7	1.7	2.0
Dimensions (W x H x D)	mm	50 x 168 x 135	50 x 168 x 135	70 x 168 x 135	70 x 168 x 190	70 x 168 x 190	90 x 168 x 195

① A type: pulse-train input interface, AG type: analog input interface

Servo amplifier		MR-E-A	MR-E-AG
Position control mode	Max. input pulse frequency	1 Mpps (differential receiver), 200 kpps (open collector)	—
	Positioning feedback pulse	131072 pulses per servo motor rotation	—
	Torque limit	Set by parameters	—
Speed control mode	Control range	Internal speed command 1:5000	Analog speed command 1:2000, internal speed command 1:5000
	Fluctuation rate	±0.01 % max. (load fluctuation 0 – 100 %)	±0.01 % max. (load fluctuation 0 – 100 %)
	Torque limit	Set by parameters	Set by parameters or external analog input (0 to ±10 V DC / max. torque)
Torque control mode	Command input	—	0 to ±8 V DC / max. torque
	Speed limit	—	Set by parametersor external analog input (0 to ±10 V DC / rated speed)

Servo motor series	Speed [rpm]	Rated output capacity [kW]	Rated torque [Nm]	Type ②	Feature	Amplifier assignment MR-E 10A 10AG	20A 20AG	40A 40AG	70A 70AG	100A 100AG	200A 200AG
HF-KE	Rated: 3000 Maximum: 4500	0.1	0.32	HF-KE13(B)W1-S100	Low inertia, small capacity	●					
		0.2	0.64	HF-KE23(B)KW1-S100			●				
		0.4	1.3	HF-KE43(B)KW1-S100				●			
		0.75	2.4	HF-KE73(B)KW1-S100					●		
HF-SE	Rated: 2000 Maximum: 3000	0.5	2.39	HF-SE52(B)KW1-S100	Medium inertia, medium capacity				●		
		1.0	4.77	HF-SE102(B)KW1-S100						●	
		1.5	7.16	HF-SE152(B)KW1-S100							●
		2.0	9.55	HF-SE202(B)KW1-S100							●

② Keyway shaft as standard (HF-KE motors come with key, HF-SE motors without) except for HF-KE13; (B) = with electromagnetic brake

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