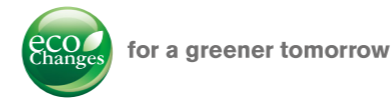


Global Partner. Local Friend.



EA Series

FACTORY AUTOMATION

MITSUBISHI ELECTRIC NC EDM Systems EA Series Medium&Large

EA

series

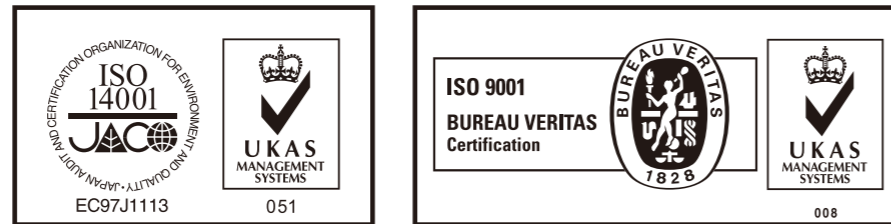


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MITSUBISHI ELECTRIC CORPORATION HEAD OFFICE: TOKYO BLDG., 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

GLOBAL IMPACT OF MITSUBISHI ELECTRIC



Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and Electric Systems

A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices

A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance

Dependable consumer products like air conditioners and home entertainment systems.

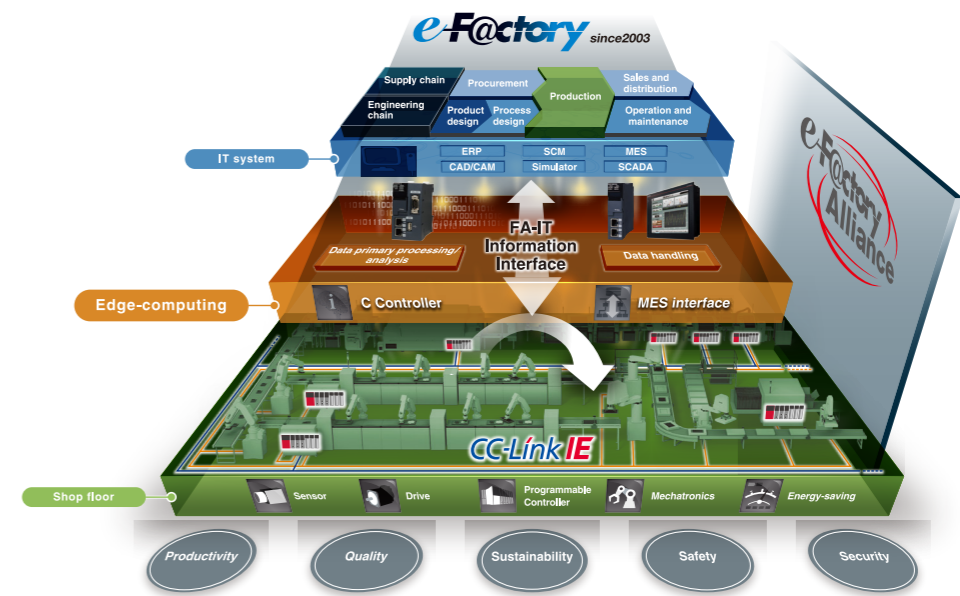
Information and Communication Systems

Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems

Maximizing productivity and efficiency with cutting-edge automation technology.

Mitsubishi Electric continues the challenge to be the only one FA machine and systems supplier delivering total customer satisfaction.



Mitsubishi Electric is a world-leading general electrical and electronic products manufacturer with wide-ranging business reach, from appliances for the home to systems used in outer space. Global-scale business development is in five business domains: heavy electrical machinery and systems, industrial automation, information and communication systems, electronic devices, and home appliances. Producing general electrical machinery for over 90 years, as Mitsubishi Electric's Factory Automation Systems Business Group, we have supported manufacturing in Japan, China, and Asia, and around the globe. In doing so, we have accumulated and refined technologies for FA control, drive control, automation, and manufacturing that are utilized to expand and improve a vast product lineup, such as controllers, drives, and automation and power distribution control products. In addition to product components like those listed above, we are quick to propose systems such as e-F@ctory and iQ Platform as solutions for production site innovation. As a comprehensive supplier of FA products and systems, Mitsubishi Electric will continue to respond to the voice of customers and deliver products of the utmost quality throughout the world.

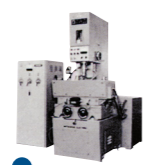
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The history of Mitsubishi Electric EDMs is the history of electrical-discharge machining

1964



DM201
Thyristor power supply
Hydraulic servo system
Production started 1964



DM500+DE90T
Began shipment in Nov. 1965



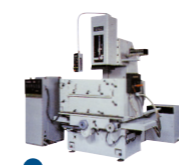
DM250+DE30T
Transistor pulse power supply
Began shipment in Feb. 1967



DM100
Began shipment in Dec. 1971



DM300N+EP120M
Began shipment in Jul. 1972



DK700
Began shipment in Oct. 1974



DK280
Began shipment in Apr. 1976



DK140
Began shipment in Sep. 1978



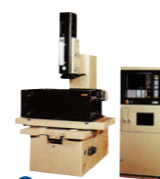
DK360NC
Began shipment in May 1980



M35K
Began shipment in May 1986



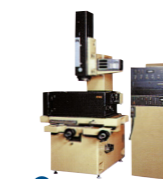
M25KC4
Equipped with ultralow-wear
power supply
(slope control system)
Began shipment May 1986



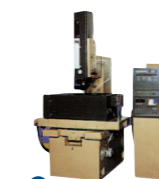
M55C6
Equipped with 16bit CNC
Began shipment in Dec. 1982



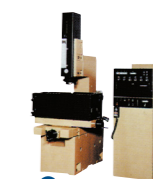
M25C3
Began shipment in Dec. 1982



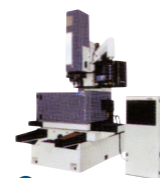
M55
Began shipment in Dec. 1982



M35C2
Began shipment in May 1982



M30
Motor servo system
Began shipment in Jan. 1982



M85KW
Began shipment in Feb. 1987



M115K
Began shipment in Jan. 1998



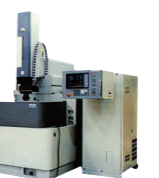
EML20
Began shipment in Aug. 1988



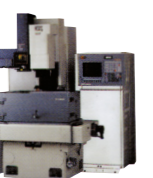
M35J
Began shipment in May 1989



M35S
Began shipment in Dec. 1989



M65E
Began shipment in Mar. 1990



V35F
Equipped with 32bit CNC and FUZZY Control
Began shipment in Feb. 1991



EA12E
Equipped with 64bit CNC
Began shipment in Aug. 1999



EDSCAN8E
Began shipment in May 1996



EX30
Began shipment in Jun. 1996



EX8
Began shipment in Jan. 1995



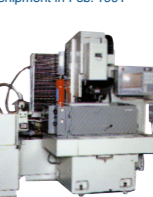
VX20
Began shipment in Jan. 1995



VX10
Began shipment in Dec. 1994



ADMAQ-E
Began shipment in Oct. 1994



VP35F
NS powder specifications
Began shipment in Jun. 1992



EA8
Began shipment in Oct. 1999



VA10
Began shipment in Apr. 2001



MA2000
Equipped with thermal
displacement compensation
Began shipment in May 2001



EA8P
Began shipment in Feb. 2004



EA12V
Equipped with V power supply
(tungsten carbide circuit standard equipment)
Began shipment in Apr. 2004



EA8PV
Equipped with ultrafine matte
finish circuit (NP circuit)
Began shipment in Jun. 2006



EA28V
Began shipment in Jan. 2007



EA12PS
Began shipment in Feb. 2016



EA8PS
Began shipment in Feb. 2016



EA12S
Began shipment in Mar. 2015



EA8S
Began shipment in Feb. 2014



EA8PV ADVANCE
Began shipment in Feb. 2008



EA28V ADVANCE
Began shipment in Feb. 2008



EA12V ADVANCE
Equipped with ADVANCE control device
Began shipment in Feb. 2008

2008 EA Series Medium & Large

Medium & Large size machine Standard model pursuing multi-function and productivity



EA Series Medium & Large

NC-EDM Systems

An extensive product lineup ready to support the most diversified needs, from high-precision machining of small workpieces to highly productive machining of large workpieces. Mitsubishi Electric die-sinking EDMs offer comprehensive solutions that contribute to improving the productivity of customers' facilities.

Ultrahigh-accuracy machine

MA2000

Flagship model integrating advanced technologies



High-accuracy machine

EA-PS Series

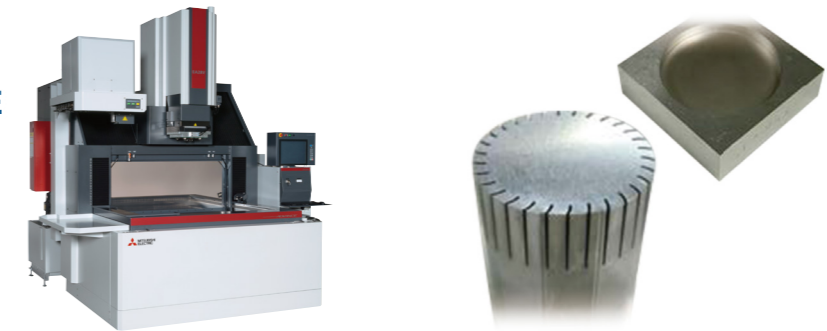
High-grade model compatible for various uses



High-performance machine

EA-V ADVANCE Series

High-class model pursuing accuracy and productivity



Productivity machine

EA-S Series

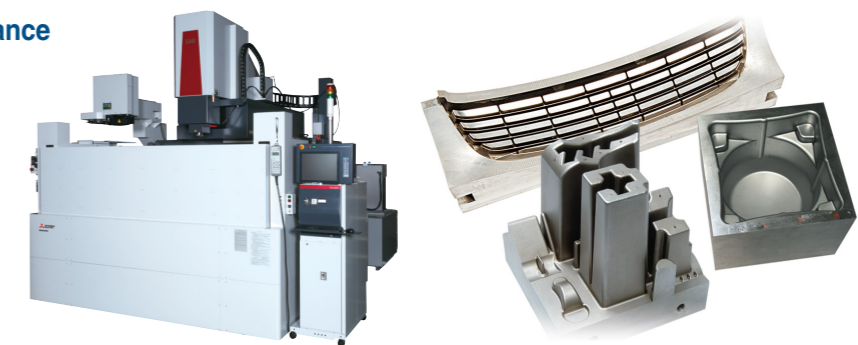
Supports various machining needs in pursuit of higher productivity



Large-size high-performance machine

EA ADVANCE Series

Standard model pursuing high performance and high productivity



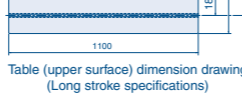
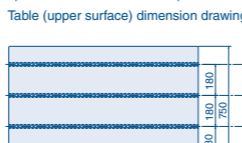
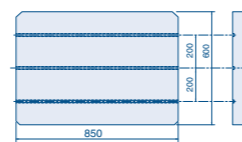
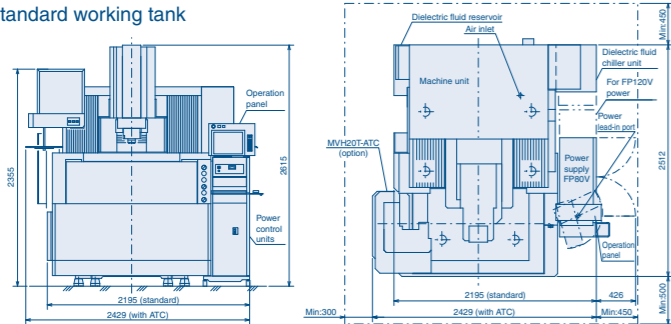
Medium-size high-performance machine
EA28V ADVANCE
EA28V ADVANCE
 Long stroke specifications



Photo: EA28V ADVANCE Long stroke specifications MVH20T-ATC C-axis(option)

Photo: C-axis(option)

Standard working tank



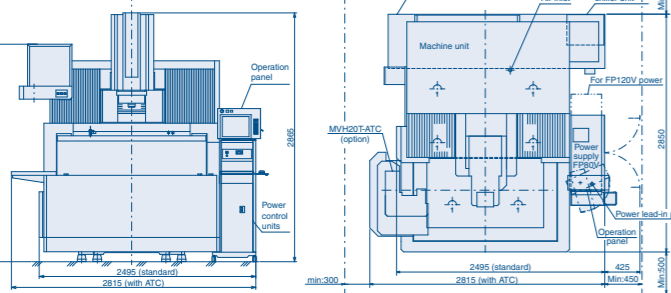
Electrode mounting table dimension drawing

* The 3R/ EROWA electrode holder is used when the built-in C-axis/ automatic clamp (option) is provided.

- Standard functions**
- Tungsten carbide machining circuit
 - Fine matte finish circuit (PS circuit)
 - Glossy mirror finish circuit (GM2 circuit)
 - Narrow gap circuit
 - Thermal displacement compensation system
 - Z-axis linear scale
 - High-accuracy positioning circuit
 - Automatic elevation tank
 - Working tank fluid flow adjustment function
 - High-function manual operation box
 - DNC H/W

- Option**
- Column up 150mm (5.9in) specifications
 - High-accuracy built-in C-axis
 - High-accuracy built-in spindle
 - Automatic clamp
 - Large electrode adaptor
 - LS-10T ATC/LS-20T ATC
 - MVH-20T ATC/MVH-40T ATC
 - NS powder specifications
 - XY-axis linear scale
 - Z-axis stroke 450 specifications
 - Emission/suction automatic changeover
 - Programmable flushing nozzle (eight nozzles) + Automatic changeover
 - Fluid pressure 3-step changeover
 - Dielectric fluid distributor
 - Special working tank (including 150mm (5.9in) column up)
 - Long stroke specifications
 - FP120V
 - IDPM
 - Ultrafine matte finish circuit (NP2 circuit)
 - FP-V power supply extension unit

Long stroke specifications / Special working tank



Standard machine specifications

		EA28VM ADVANCE	EA28VM ADVANCE <Long stroke specifications>
Machine unit	Dimensions (W x D x H) [mm]	2195x2512x2615	2495x2850x2865
	Total system weight [kg]	5400	5950
Machine travels (X x Y x Z) [mm]		650x450x350	1000x470x450
Spindle	Distance between table and electrode mounting surface [mm]	425 to 775 ^(Note 1)	575 to 1025
	Max. electrode weight [kg]	200	200
Method		Automatic elevation tank	Automatic elevation tank
Working tank	Inner dimensions (W x D x H) [mm]	1100x810x450	1400x900x550
	Fluid level adjustment range (from top of table) [mm]	100 to 400	150 to 500
Table	Dimensions (W x D) [mm]	850x600	1100x750
	Max. workpiece dimensions (W x D x H) [mm]	1050x760x350	1350x850x450
	Distance between floor and top of table [mm]	900	900
	Max. workpiece weight [kg]	2000	2000
T-slot		Three slots at 14-200mm pitch	Four slots at 14-180mm pitch
Dielectric fluid reservoir	Capacity (initial dielectric fluid supply amount) [ℓ]	390 (595)	740 (1070)
	Filtering method [mm]	Three fine paper filters	Three fine paper filters
	Dielectric fluid chiller unit [mm]	Unit cooler	Unit cooler

(Note 1) In the case of the special working tank, it becomes 575 to 925 mm (22.6" to 36.4").

Distance between table and electrode mounting surface

		3R COMBI	
		MACRO	Jr
C-axis	[mm]	300 to 650	310 to 660
Spindle	[mm]	279 to 629	289 to 639
Automatic clamp	[mm]	300 to 650	310 to 660

Standard delivery entrance

	Width [mm]	Height [mm]
Standard specifications	2063	2660
LS-10T ATC specifications	2250	2660
LS-20T ATC specifications	2475	2660
MVH-20T ATC specifications	2297	2660
MVH-40T ATC specifications ^(Note 2)	2168	2660

(Note 2) With the MVH40T-ATC specifications, the ATC unit and holder are removed before shipment. A crane or lifting device is required when installing the system.

C-axis/ATC (option)

			3R		EROWA	
			MACRO	Combi	ITS	COMBI
C-axis	Max. electrode weight	50 ^(Note 3)	○	○	○	○
	Speed	1 to 30 [min ⁻¹]	○	○	○	○
Spindle	Max. electrode weight	10 ^(Note 3)	○	○	○	○
	Speed	1 to 1500 [min ⁻¹]	○	○	○	○
LS-10T ^(Note 10)	Max. electrode dimensions	54x54x200 [mm]	○	○	○	-
	Max. electrode weight	5kg/electrode ^(Note 4) Magazine total: 20kg	○	○	○	-
LS-20T ^(Note 10)	Max. electrode dimensions	54x54x200 [mm]	○	○	○	-
	Max. electrode weight	10kg/electrode ^(Note 4) Magazine total: 40kg	○	○	○	-
MVH20T	Max. electrode dimensions	70x70x200 [mm] ^(Note 5)	○	○	○	(Note 9)
	Max. electrode weight	10kg/electrode ^(Note 5) Magazine total: 80kg ^(Note 6)	○	○	○	(Note 9)
MVH40T	Max. electrode dimensions	70x70x200 [mm] ^(Note 6)	○	○	○	(Note 9)
	Max. electrode weight	10kg/electrode ^(Note 6) Magazine total: 80kg ^(Note 7)	○	○	○	(Note 9)

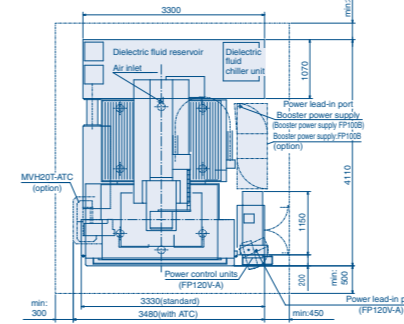
(Note 3) For MACRO Jr of 3R combi and Compact of EROWA COMBI, the weight is 2.5kg/electrode.
 (Note 4) MACRO of 3R combi, the weight is 5kg/electrode, and is 2.5kg/electrode with MACRO Jr.
 (Note 5) Please contact a Mitsubishi Electric representative if the electrode exceeds the specified dimensions
 (Note 6) For MACRO of 3R Combi, the weight is 5kg/electrode, is 2.5kg/electrode with MACRO Jr, and Compact of EROWA COMBI, the weight is 2.5kg/electrode.
 (Note 7) For MACRO and MACRO Jr of 3R Combi, the magazine total is 40kg.
 (Note 8) MVH40T-ATC, electrodes exceeding the specified dimensions cannot be mounted even if space is provided in the magazine because there will be interference with the machine.
 (Note 9) ATC can be used with EROWA ITS50, but not with EROWA Compact (manual only).
 (Note 10) LS-10T/LS-20T ATC can not be mounted for the long stroke specifications.

Large-size high-performance machine
EA40 ADVANCE specifications
EA50 ADVANCE specifications

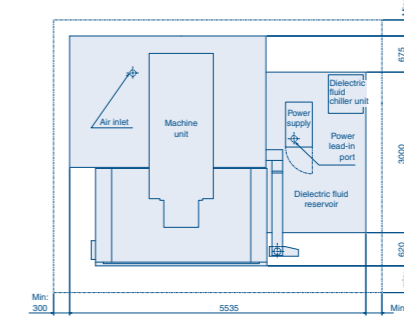


EA40 ADVANCE specifications MVH20T-ATC/C-axis (option)
 EA50 ADVANCE specifications Automatic filter system and booster power supply (option)

EA40 ADVANCE



EA50 ADVANCE



- Options**
- High-accuracy built-in C-axis
 - Automatic tool changer ^{(Note 1)*}
 - Automatic filter system
 - Booster power supply
 - Programmable flushing nozzle section (eight nozzles) + automatic changeover
 - Lighting
 - Dielectric fluid distributor
 - Special working tank
 - Large electrode adaptor (for built-in C-axis)
 - Maximum electrode weight 500kg (1102lb.) specifications (EA40 ADVANCE)

(Note 1) Please contact a Mitsubishi Electric representative for details on the EA40/50 ADVANCE specifications ATC.

Standard machine specifications

		EA40M ADVANCE specifications	EA50M ADVANCE specifications
Machine unit	Dimensions (WxDxH) [mm]	3050x3633x3140	4280x4295x4100
	Total system weight [kg]	12000	20000
Machine travels (XxYxZ) [mm]	Extra travel for workpiece loading	None	X-axis left 600
	Distance between table and electrode mounting surface [mm]	450 to 900	500 to 1100
Spindle	Max. electrode weight [kg]	300(500) ^(Note 2)	500
	Method	Automatic vertical front door	Automatic vertical front door
Working tank	Inner dimensions (WxDxH) [mm]	2000x1200x700(XK210A)	2500x1600x850(XK270)
	Fluid level adjustment range (from top of table) [mm]	310 to 650	400 to 800
Table	Dimensions (WxD) [mm]	1400x950	2000 x 1350
	Max. workpiece dimensions (WxDxH) [mm]	1900x1100x600	2400x1500x750
	Distance between floor and top of table [mm]	860	1300
	Max. workpiece weight [kg]	5000	10000
T-slot		Five slots at 14-200mm pitch	Seven slots at 14-200mm pitch
Dielectric fluid reservoir	Capacity (initial dielectric fluid supply amount) [ℓ]	2650	5200
	Filtering method	Two paper filter	Four paper filter
Dielectric fluid chiller unit		Unit cooler	Unit cooler
Thermal displacement compensation function		Standard	Standard
Standard functions	Operation panel	-	Pendant with turning arm
	Manual operation box	High-function manual operation box	High-function manual operation box
Automatic dielectric fluid supply/ drain		Standard	Standard

(Note 2) The maximum electrode weight 500kg (1102lb.) specifications are available as an option for the EA40 ADVANCE specifications.
 (Note 3) Ensure that the floor is thick enough to install a large-size machine.

Special working tank (option)

In addition to the standard working tanks above, the following special working tanks are available for the EA40 ADVANCE/EA50.

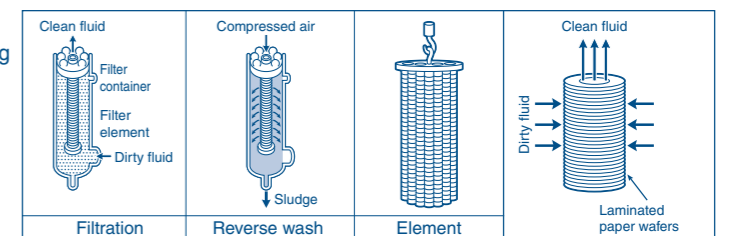
Model	Working tank	Inner dimensions [mm]	Max. workpiece dimensions [mm]	Table electrode mounting surface distance [mm]	Fluid level adjustment range [mm]	Required column up [mm]	Door method	Dielectric fluid reservoir capacity	Remarks
EA40M ADVANCE	XK212A	2000x1200x800	1900x1100x700	550 to 1000	360 to 750	100	Automatic vertical front door	3400 ℓ	
	XK240A	2300x1600x700	2200x1500x600	450 to 900	310 to 650	-	Automatic vertical front door	3400 ℓ	Dummy workpiece 400L
	XK261A	2500x1200x800	2400x1100x700	550 to 1000	360 to 750	100	Automatic vertical front door	3400 ℓ	Dummy workpiece 400L
EA50M ADVANCE	XK291A	2800x1600x1100	2700x1500x1000	700 to 1300	500 to 1050	200	Automatic vertical front door	6300 ℓ	Dummy workpiece 400L

Automatic filter system

- Long-life laminated paper wafers with outstanding filtering performance are used
- Reverse washing eliminates filter replacement (Option for EA40/50 ADVANCE specifications)

Automatic filter

Type	Capacity	Remarks
TF50	4000 ℓ	EA40 ADVANCE specifications(XK212A)
TF63	6300 ℓ	EA50 ADVANCE specifications(XK270)



Functions and Features

Integration of advanced machining technologies and ADVANCE control equipment
Supports various types of EDM machining

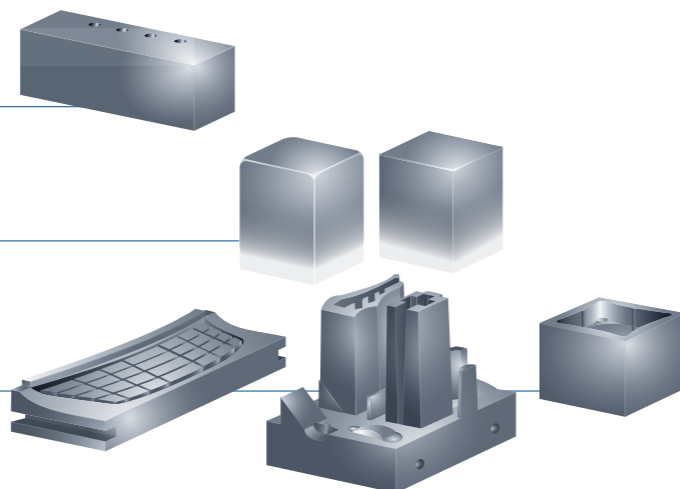


Realizes high-speed and low electrode wear machining

Machining time up to 40% shorter compared to conventional model

Electrode wear to 80% improved compared to conventional model

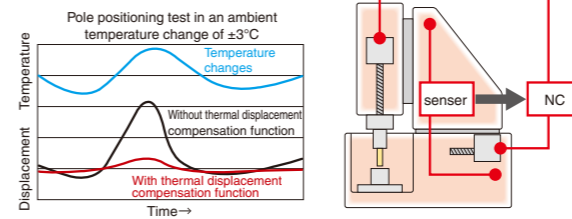
Large size machining



Machining Accuracy

Refer to Page 13

- Thermal displacement compensation system to be reduced thermal displacement caused by temperature changes
- Highly rigid and accurate built-in C-axis, which increased permission moment of inertial

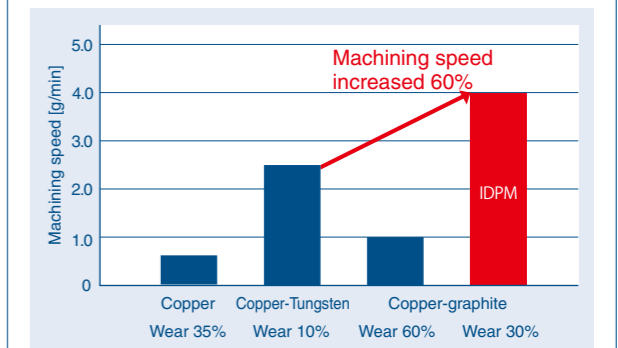


Productivity

Refer to Page 15-16

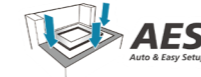


- IDPM reduces graphite electrode wear up to 80%
- Machining speed is improved up to 60% with using IDPM and copper-graphite electrode



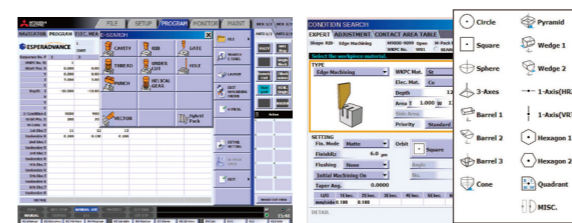
Machining performance may vary depending on machine specifications and electrode materials.

Workability / Operability

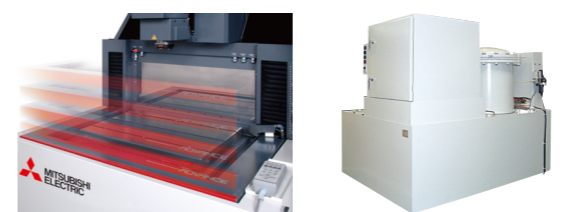


Refer to Page 17

- Machining conditions and programs suitable for various shapes can be created (Shape Expert)
- 3-sided automatic elevation tank standardized. Improved access for workpiece setup(EA28V ADVANCE)
- Reverse wash function is effective in achieving high performance over a long time.



Machining program screen Machining condition search screen

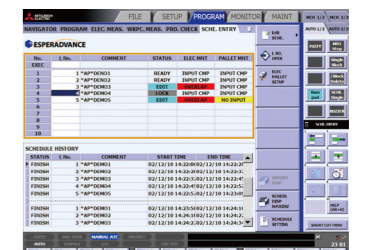


LS-20T (automatic tool changer) MVH-40T (automatic tool changer)

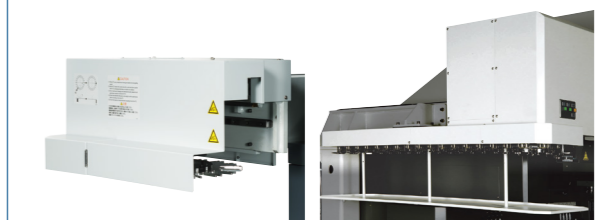
Automation compatibility

Refer to Page 18

- Continuously run multiple programs on a schedule
- Two kinds of ATC can be selected as LS type and MVH type (LS type is EA28V ADVANCE only)



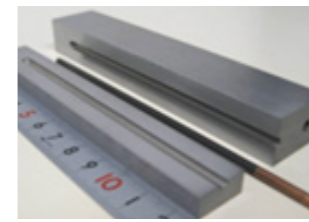
Built-in scheduler screen



LS-20T (automatic tool changer) MVH-40T (automatic tool changer)

Machining Samples

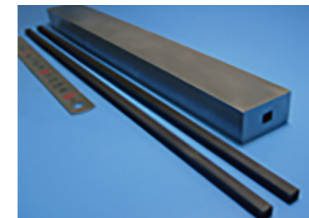
▶ Example of machine sample



Deep Machining

Model	EA28V ADVANCE
Electrode	copper(φ3.0mm)
workpiece	Steel(NAK80)
Surface roughness	Rz8.0μm/Ra1.2μm
Depth	110mm

- Machining speed 20 to 30% improvement with deep machining of L / D > 30 (With FF mode) (L : depth, D : Electrode diameter)
- SS jump 5 realizes high speed jump in Z axis machining
- Suppression of load and heat influence by optimization of speed and acceleration control



Graphite Deep Machining

Model	EA28V ADVANCE long stroke specifications
Electrode	Graphite(TTK-5)
workpiece	Steel(SKD11)
Surface roughness	Rz15μm/Ra2.0μm
Depth	300mm

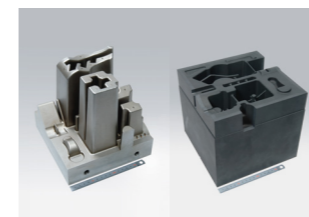
- Maximum workpiece height up to 450 mm by long stroke specifications
- High Speed and low consumption machining with graphite electrode is realized by IDPM and SS jump 5



Rib Machining with graphite electrode

Model	EA28V ADVANCE
Electrode	Graphite(EX-70)
workpiece	Steel(SKD61)
Surface roughness	Rz10μm/Ra1.5μm
Depth	50mm

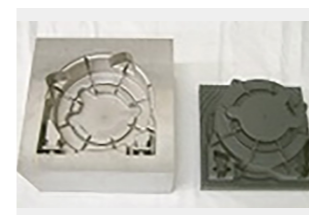
- Graphite electrode achieves a length consumption ratio of 0.04%
- IDPM control reduces generation of protrusions during low consumption machining
- SS jump 5 realizes uniform machining surface even in deep rib machining



Deep Die Casting

Model	EA40 ADVANCE specifications
Electrode	Graphite(EX-70)
workpiece	Steel(SKD61)
Surface roughness	Rz15μm/Ra2.4μm
Depth	150mm

- High speed and stable machining is realized for the machining with a complex and complicated electrode



Die Casting for Automobil

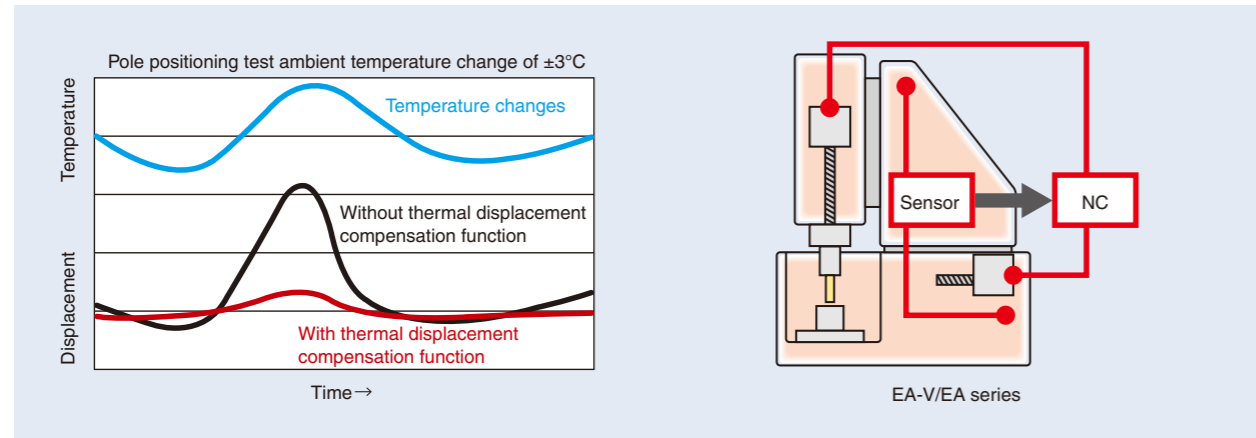
Model	EA28V ADVANCE
Electrode	Graphite(EX-70)
workpiece	Steel(SKD61)
Surface roughness	Rz7.9μm/Ra1.0μm

- Uniform matte surface is realized for even for the large machining area.
- Low consumable machining with IDPM realizes stable machining and abnormal waste reduction

Machining Accuracy

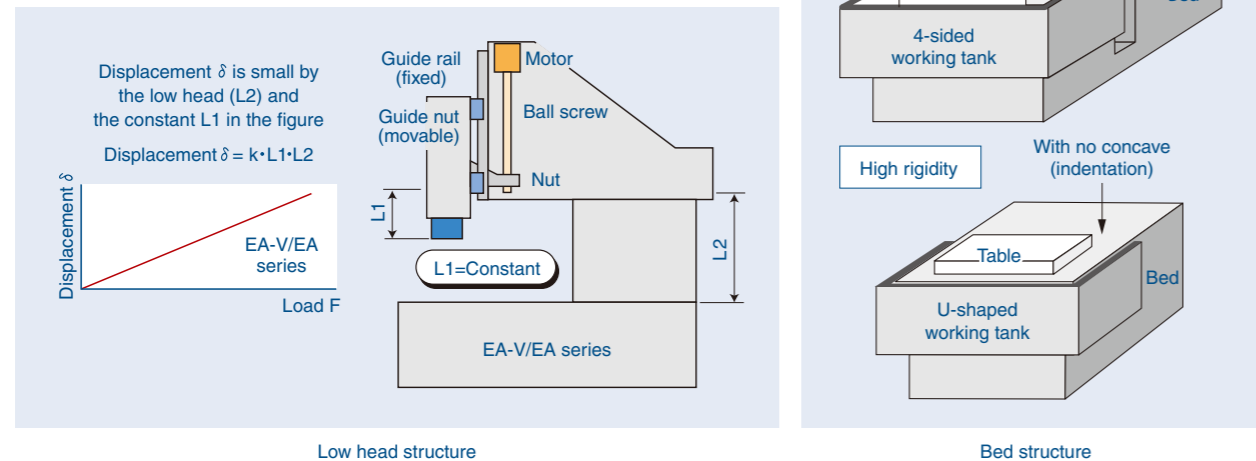
Thermal displacement compensation system (EA28V ADVANCE)

- Semi-cabin structure reduces the effect of external temperature fluctuation
- Thermal displacement compensation system to be reduced thermal displacement caused by temperature changes



High rigidity construction

- Highly rigid Z-axis thanks to low head structure
- Highly rigid integrated bed structure with no concave section (indentation)
- Improved servo responsiveness using direct drive method



High-accuracy built-in C-axis / high-accuracy built-in spindle

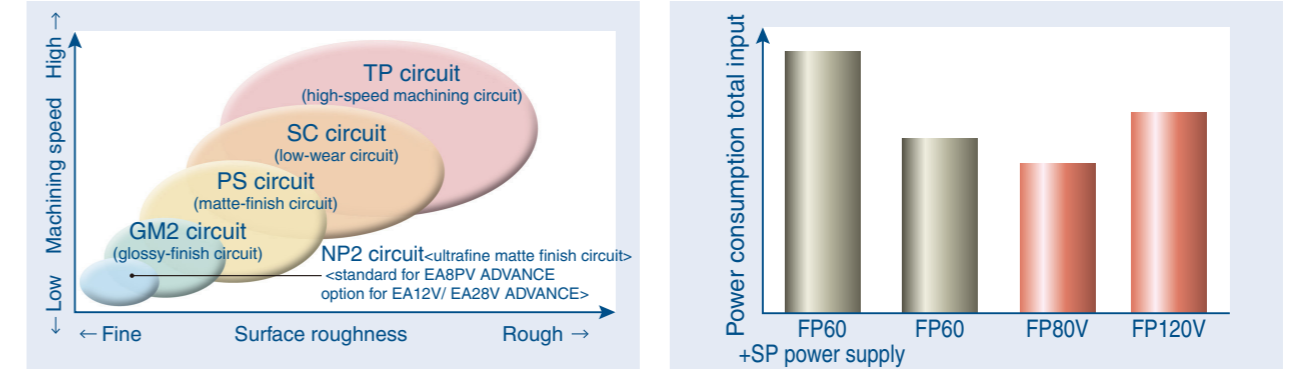
- Highly accurate helical machining and index machining are possible
- Highly rigid and accurate built-in C-axis with increased permission moment of inertia



Machining Performance

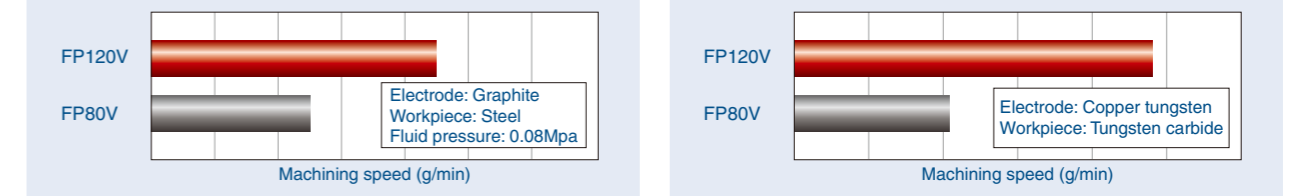
FP-V Power supply (EA28V ADVANCE/EA40 ADVANCE specifications)

- Circuits suitable for various machining
- Energy saving power supply reduces operating cost



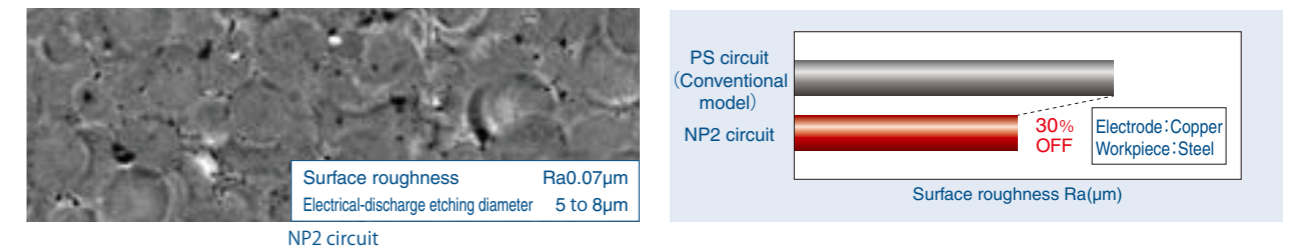
FP120V power supply (EA40/50 ADVANCE specifications Standard)

- Machining speed increased by around two times when machining with a graphite electrode
- Machining speed increased by around two times when machining tungsten carbide



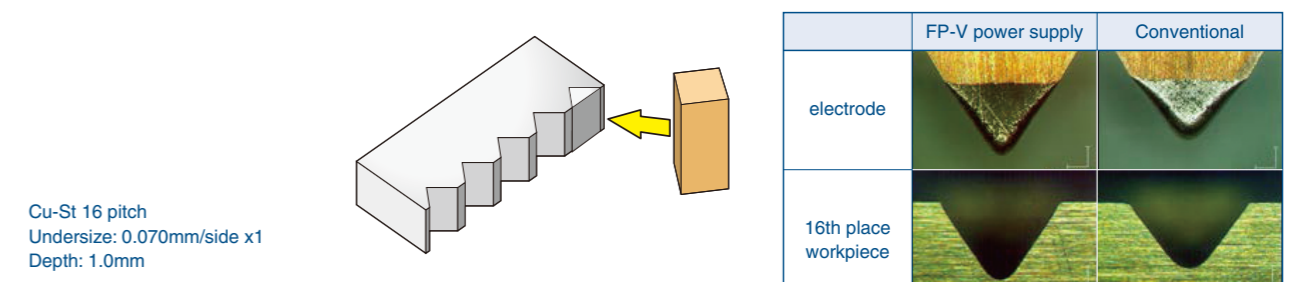
High-quality ultrafine finishing function (NP2 circuit) (EA28V ADVANCE option)

- Improved fine best surface roughness by NP2 circuit
- Improvement of best surface roughness of steel



Narrow gap circuit

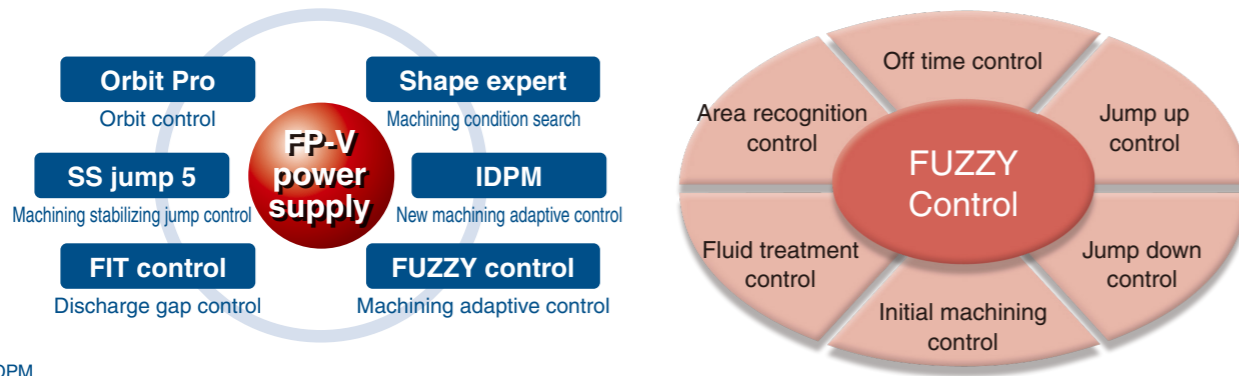
- Compatible with small undersize amounts of 0.015 to 0.030mm per side
- Small in-corner R realized by suppressing electrode wear for small undersize machining



Productivity



High-speed machining is realized using advanced machining control

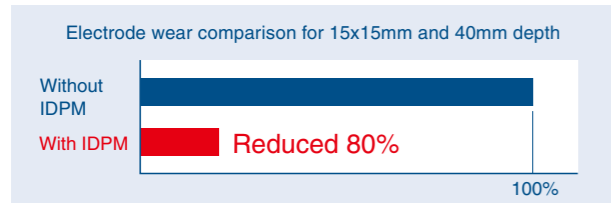


IDPM
 •Intelligent Digital Power Master: Adaptive control to be integrated ever developed technologies
 •Integrated Discharge Power Monitor: Adaptive control to reduce abnormal discharge with detecting discharge pulse

Machining adaptive control: IDPM

High-speed/Low-wear machining with graphite electrodes

•IDPM reduces graphite electrode wear up to 80%

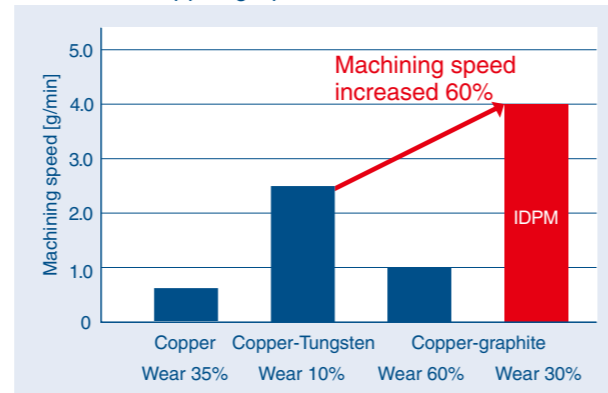


*Above data is a comparison with a conventional Mitsubishi Electric EDM (EA Series).



Tungsten carbide high-speed machining

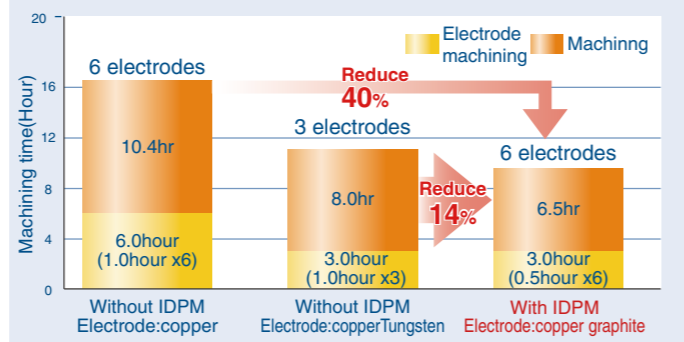
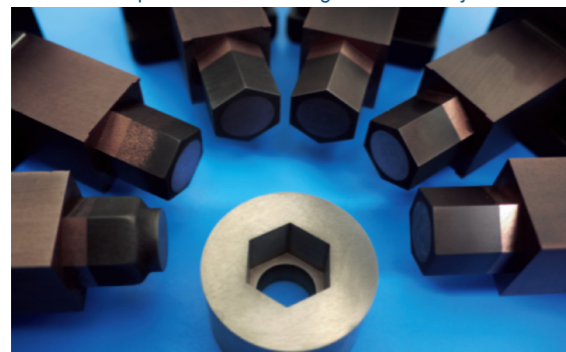
•Machining speed is improved up to 60% with-using IDPM and copper-graphite electrode



*Machining performance may vary depending on machine specifications and electrode materials.

Improve productivity of tungsten carbide

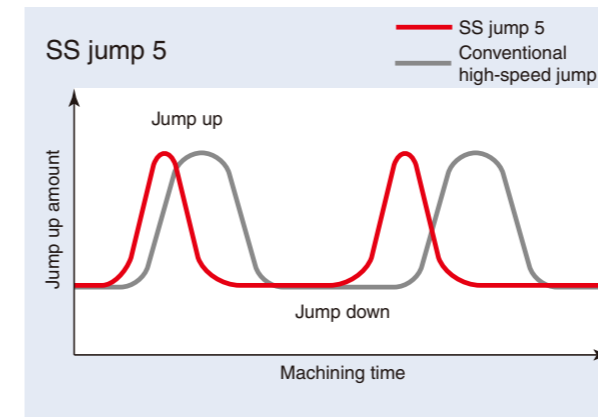
•The time required for electrode creation and machining is reduced by 40% compared to the time using copper electrodes and without IDPM.
 •The time required for machining is reduced by 14% compared to the time using copper-tungsten electrodes and without IDPM.



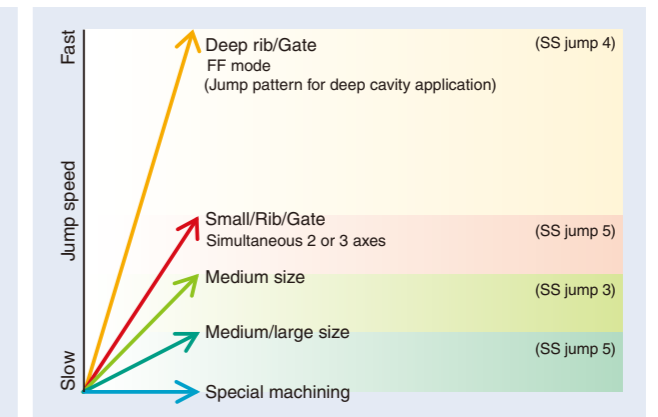
Machining stabilizing jump control (SS jump 5)

•Jump control suitable for various shapes is realized by optimizing smoothing of jump up operation and speed/acceleration control

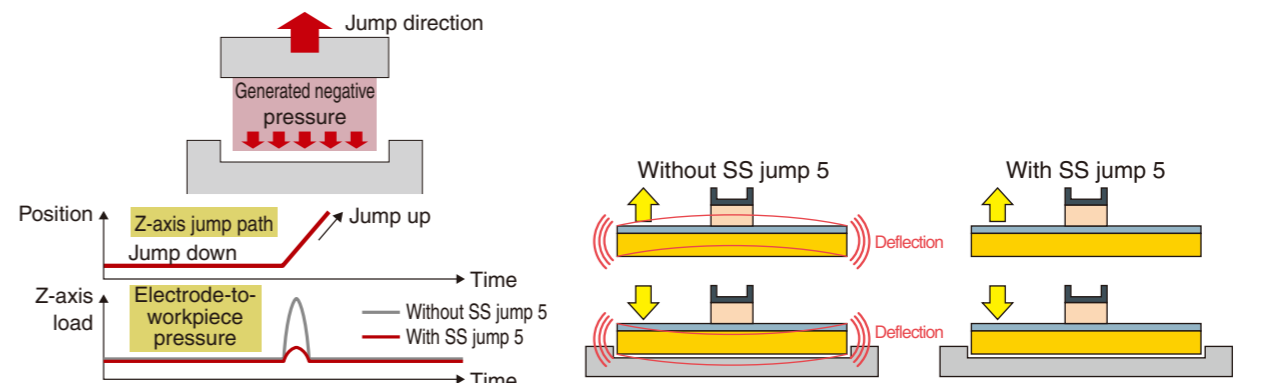
Machine vibration when jumping is suppressed, realizing high-speed jump



Jump control suitable for various shapes is realized

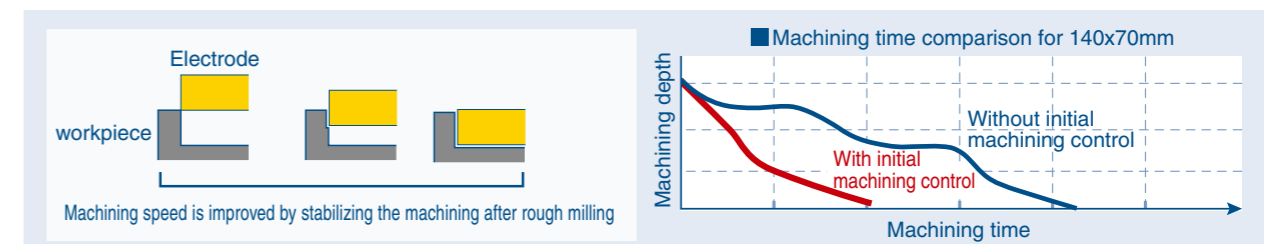


Machining time reduced for the uniform fine finish machining using medium-size electrode

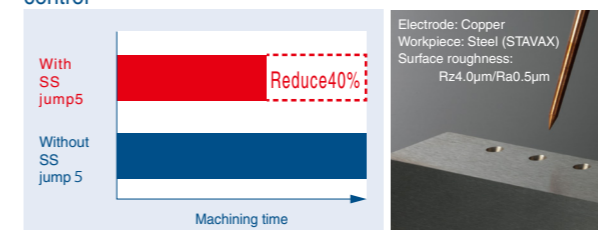


Machining optimization control: Initial machining control

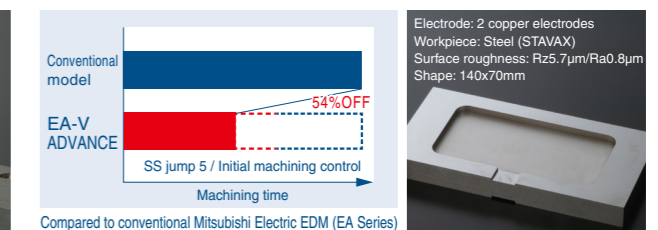
•Faster machining is realized with improved initial machining control for the start of machining after rough milling. Machining time reduced up to 50% for the start of machining after rough milling



Machining time is reduced up to 40% by optimizing smoothing of simultaneous 2 or 3 axes operation and speed/acceleration control



Machining time reduced for the uniform fine finish machining using medium-size electrode



Workability / Operability

Easy-to-use control (ADVANCE control unit)

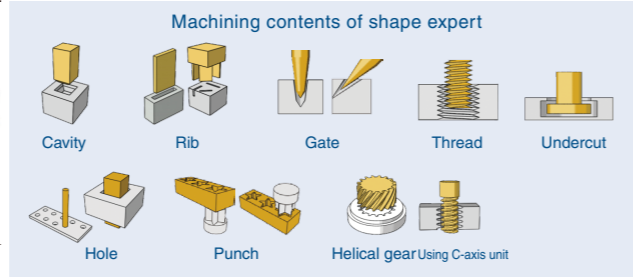
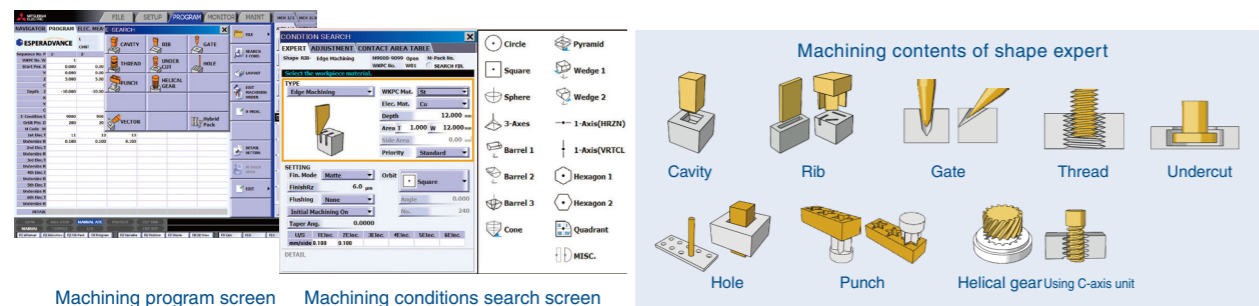


Ergonomic design

- Easy-to-view screen (15-inch)
- Intuitive operation using touch-panel display
- User-friendly keyboard and mouse

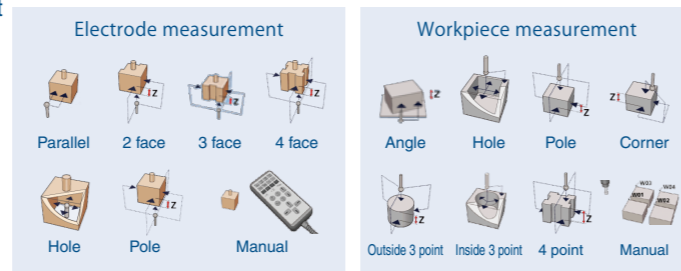
ESPERADVANCE - Easy Programming and machining condition search -

- Programming is possible simply by inputting the machining start position and machining depth, etc., into a table format
- Machining conditions and programs suitable for various shapes can be created (Shape Expert)

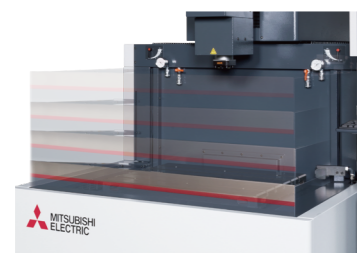


Electrode/Workpiece measurement

- Electrode measurement screen for electrode alignment
- Workpiece measurement screen for workpiece alignment



3-sided automatic elevation tank (EA28V ADVANCE standard)



AES
Auto & Easy Setup

• 3-sided automatic elevation tank standardized. Improved access for workpiece setup

Automatic filter (EA40/50 ADVANCE specifications option)



• Effective for medium to large-size EDMs which discharge large quantities of sludge. Reverse wash function is effective in achieving high performance over a long time.

• Effective for medium and large die sink EDM with many sludge

Automation

Auto tool changer

LS type (only EA28V ADVANCE)

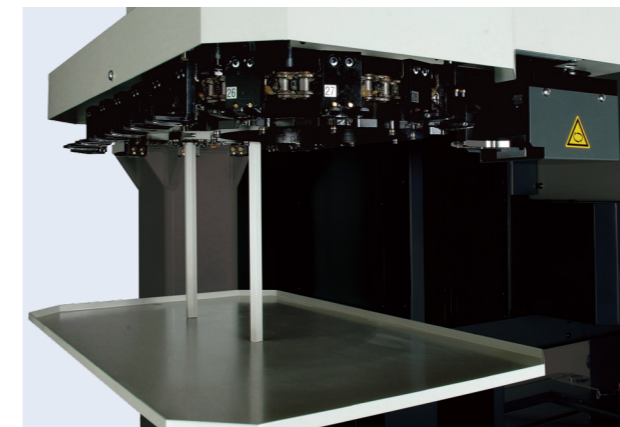


10T



20T

MVH type

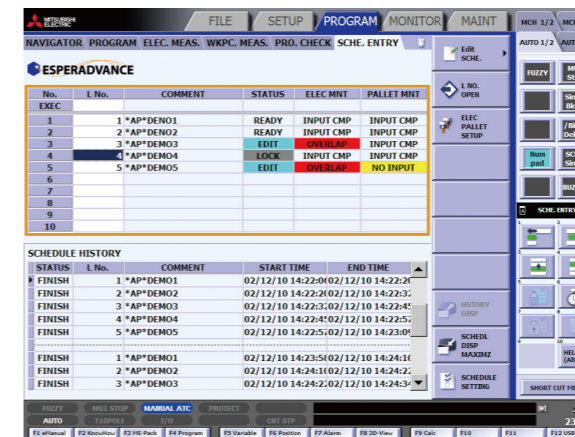


20T



40T

Built-in scheduler



- Continuously run multiple programs on a schedule
- Schedules can be added and edited during machining

Power Supply / Control Specifications and Options

Power Supply and Control Specifications

Model		EA28VM ADVANCE		EA40M ADVANCE specifications	EA50M ADVANCE specifications
Power supply unit	Power supply model	FP80V-A	FP120V-A	FP120V-A	
	Maximum machining current peak [A]	80	120	120	
	Standard machining circuit and functions	Transfer pulse circuit (TP circuit), Ultralow-wear machining circuit (SC, α-SC circuit), Fine-matte finish circuit (PS circuit), Glossy mirror-finish circuit (GM2 circuit), FUZZY control, SS Jump5, Intelligent Digital Power Master (IDPM, optimum machining control)			
	Power supply system	Compact, resistor-less, low-heat generation, power regenerating energy-saving method			
Control unit	C31EA-2				
Control unit	Input method	Keyboard, USB flash memory, network			
	Pointing device	Touch panel, mouse			
	Display	15-in color TFT-LCD			
	Display characters	Alphanumeric characters			
	Control system	CNC closed loop			
	Number of controlled axis	Maximum four axis			
	Setting (command) unit	XYZ ... 0.1μm, C (rotary axis) ... 0.0001°			
	Minimum drive unit	XYZ ... 0.1μm, C (rotary axis) ... 0.0001°			
	Maximum command value	±99999.9999mm/±9999.9999 inch			
	Position command format	Incremental/Absolute value combination			
	Interpolation function	Linear, circular, spiral			
	Orbit mode	Fixed pattern and random path, 3D pattern			
	Orbit control system	4 types (free, semi-fixed, fixed, variable)			
	Scale magnification	0.000001 to 99.999999/0.001 to 99999.999			
	Graphics	X-Y/Z-Z-X plane, solid, table scale, automatic machining path drawing, orbit block drawing			
	Automatic programming	ESPERADVANCE			
	Program No. designation range	1 to 99999999			
	Sequence No. designation range	1 to 99999			
	Subprogram	Nesting levels: 30			
	Manual feed	High-speed, low-speed, inching (1μm/10μm), extension mode (high-speed/low-speed) Maximum feedrate XYZ: 2000 mm/min			
	Manual input positioning	Screen input			
	Graphic check	3D display compatible, high-speed graphic drawing			
	Screen basic menu	15 types (file, setup, machining support, monitor, maintenance, e-manual, know-how display, E-condition, NC program, variable, coordinate value, alarm troubleshooting, 3D viewer, calculator, USB removal)			
	Network specifications	Ethernet port (10/100BaseT (X) port RJ45 connector) 1 port (Note 1)			
	RS232C interface				
Maintenance functions	Consumption rate control (time display)				
Outline dimensions (W × D × H) [mm]	FP80V-A: 400 × 900 × 1763 (Operation panel 500 × 175 × 346)		FP120V-A: 500 × 840 × 1610 (Operation panel 546 × 170 × 346)		
Weight [kg]	260		300		

(Note 1) Refer to below table for the network specifications option combinations.

Control unit functions

C31 (Advance control unit) control unit functions

NC functions	Corner chamfer command	Maintenance functions
Year, month, date display	Linear angle command	Maintenance check
Character string replace function	Backlash compensation	Alarm display
Teaching function	Pitch error compensation	(with troubleshooting guidance)
Machining start time designation function	Soft limit (inside/outside prohibit)	e-manual (electronic manual)
Automatic return	Reference block	System update over web
Start point return	Automatic zero point return	Automatic positioning functions
Axis rotation	Electrode multiple deviation compensation	Edge positioning
Program support function	(Electrode rotation compensation)	Hole center positioning
E.S.P.E.R ADVANCE	Machining functions	Pole center positioning
E.S.P.E.R ADVANCE Navigator	Fuzzy Pro Plus adaptive control	Electrical-discharge positioning
Memory operation	Machining results graph	Width center positioning
Offset	machining results table	Slot center positioning
Coordinate value read	Machining condition expert	3-point center positioning
Time read	Master Pack	2 to 4 face positioning
Workpiece coordinate system (106 coordinates)	Orbit machining	Repeated positioning
Coordinate rotation	Lateral machining	Check functions
Figure rotation	Automatic coreless machining	3D graphic check
Axis change	3D machining	3D viewer
Mirror image	Side servo machining	(Parasolid data display)
Scales for XY-axis	Offset machining	EPX format data read
Function computations	Inclined machining	
Corner R command	Contour machining (spindle required)	
	C-axis machining (C-axis required)	

Power Facilities Capacity

Model (Note 2)	EA28VM ADVANCE		EA28VM ADVANCE Special work tank		EA40VM/50VM ADVANCE specifications
Power supply	FP80V-A	FP120V-A	FP80V-A	FP120V-A	FP120V-A
Maximum machining current average [A]	60	100	60	100	100
Maximum machining current peak [A]	80	120	80	120	120
Dielectric fluid chiller unit[kW]	1.74	3.5	1.74	3.5	3.5
Total input capacity[kVA]	9.0	13.0	10.0	14.0	19.0
Machine's generated heating value [kW] (Note 3)	5.4	7.8	6.0	8.4	11.4

(Note 2) Please contact a Mitsubishi Electric representative regarding EA50 ADVANCE specifications.
(Note 3) The machine's generated heating value is a reference value.
Please add 3[kW] for machine-generated heat value with SP power supply specifications

Network Connection Specifications (FTP and DNC S/W)

Data such as NC programs, machining conditions and variables can be exchanged between a personal computer and EDM. One IP address must be prepared for each EDM within the user's in-house network.

Required specifications	Image	Remarks
Operate on the EDM side, and receive data from personal computer		Standard (DNC H/W) Uses Explorer on EDM side and receives data to common HDD on the EDM side. After that, data I/O operation is required.
Operate on the EDM side, and send data directly to the EDM's NC		Option (FTP) Data can only be received via data I/O operation.
Operate on the personal computer side, and send data to the EDM		Standard (DNC H/W) Uses Explorer on personal computer-side and common HDD on EDM-side. After that, data I/O operation is required for the EDM.
Operate on the personal computer side, and send data directly to the EDM's NC		Option (DNC S/W) Commercially available DNC software must be installed on the personal computer-side. Refer to DNC specifications documentation for details.

Options

Options and retro t specifications differ according to country and region; please contact a Mitsubishi Electric representative for details.

Main options correspondence table: ● Standard equipment, ○ Can be added after installation, ● Cannot be added after installation, × Not available

Model	EA28VM ADVANCE	EA28VM ADVANCE <Long stroke specifications>	EA40M ADVANCE	EA50M ADVANCE	
Machine main unit	Lubricant	Automatic lubrication unit	○	○	
	Scale	Scale feedback specifications	○	○	
	Thermal Buster (Thermal displacement correction system)	Z-axis	○	○	
		XY-axis	○	○	
Column up specifications	150mm	150mm	100mm	200mm	
Advanced-function manual operation box	○	○	○	○	
LED light	○	○	○	○	
Working tank	Automatic elevation tank	○	○	○	
	Automatic vertical front door	○	○	○	
	Special working tank	● (Note 1)	○ (Note 1)	○	○
Dielectric fluid system	fluid filter	Paper filter 2 pc. specifications	○	○	○
		Paper filter 3 pc. specifications	○	○	○
		Paper filter 4 pc. specifications	○	○	○
		Automatic filter	○	○	○
	Cooler	Dielectric fluid chiller unit (unit cooler)	○	○	○
		Dielectric fluid chiller unit (for booster power supply)	○	○	○
	Fluid system	Dielectric fluid automatic supply/drain	○	○	○
		Emission/suction automatic changeover	○	○	○
		Programmable flushing nozzle (eight nozzles) + Automatic changeover	○	○	○
		Dielectric fluid distributor	○	○	○
Power supply	Main Power supply	FP80V-A	○	○	○
		FP120V-A	○	○	○
	Special power supply	NP2 circuit (Ultrafine matte finish circuit)	○	○	○
		Narrow gap circuit	○	○	○
		FP-V power supply extension unit	○	○	○
IDPM	○	○	○		

(Note 1) When the special working tank is at the lowest limit, the upper end of the working tank is approx. 95mm (3.7") above the table.

Model		EA28VM ADVANCE	EA28VM ADVANCE <Long stroke specifications>	EA40M ADVANCE	EA50M ADVANCE	
Head-side tooling	High-accuracy built-in C-axis (Note 2,3)	○	○	○	○	
	High-accuracy built-in spindle (Note 2)	○	○	○	○	
	Automatic clamp (Note 2)	○	○	○	○	
	Removable holder (3R-16M-MACRO-R specifications)	○	○	○	○	
ATC	Large electrode adaptor	○	○	○	○	
		○	○	○	○	
		○	○	○	○	
		○	○	○	○	
	LS	10 T	3R-MACRO	○	○	○
			3R-Combi	○	○	○
			EROWA-ITS	○	○	○
			3R-MACRO	○	○	○
		20 T	3R-Combi	○	○	○
			EROWA-ITS	○	○	○
3R-MACRO			○	○	○	
3R-Combi			○	○	○	
MV	20 T	EROWA-ITS	○	○	○	
		3R-MACRO	○	○	○	
	40 T	3R-MACRO	○	○	○	
		3R-Combi	○	○	○	
Control unit	Communication	External signal output (M code) (Note 5)	○	○	○	
		External signal output (M code with answer) (Note 6)	○	○	○	
		DNC H/W (Note 7)	○	○	○	
		FTP	○	○	○	
		DNC S/W	○	○	○	
		RS232C interface	○	○	○	
		NS powder specifications	○	○	○	
Software	Electronic manual (e-manual)	○	○	○		
	Built-in scheduler	○	○	○		
	ESPERADVANCE PRO (Note 8)	○	○	○		
	Protect mode	○	○	○		
	Anti-virus protection	○	○	○		
	Power saving function	○	○	○		
	Infrared flame detecto	○	○	○		
Safety	Double automatic fire extinguisher specifications	○	○	○		
	Run timer	○	○	○		
Display	3-color warning light	○	○	○		
	Instruction manual (paper edition)	○	○	○		
Others	Paint color designation	○	○	○		

(Note 2) Select the chuck from the following types: 3R MACRO, 3R Combi, EROWA ITS, EROWA COMBI
(Note 3) Specifications are slightly different for EA28V ADVANCE and EA40/50 ADVANCE specifications
(Note 4) Please contact a Mitsubishi Electric representative for details on the EA40/50 ADVANCE specifications ATC.
(Note 5) It is necessary for attaching an automation system (electrode / workpiece automatic changer unit)
(Note 6) The external signal output (M code with answer) is necessary for attaching external equipment which requires an answer signal.
(Note 7) LAN cable should be all straight wiring type with shielding connector, category 5 (100BASE-TX compliant), STP (four shielded twist pair). A switchable hub that can ground the shielded LAN cable should be used.
(Note 8) A personal computer is required for ESPERADVANCE PRO.

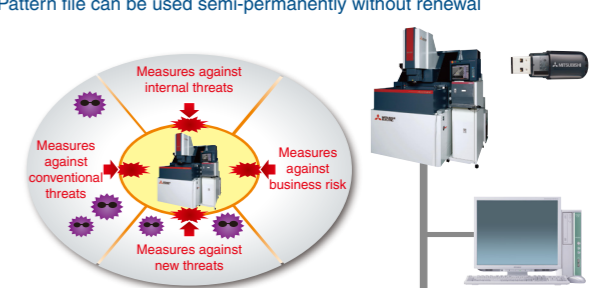
Protect mode

Protecting data from thoughtless changes, forbidding data taken out



Anti-virus protection

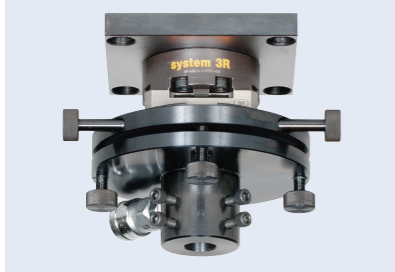
Defends machines against the threat of computer viruses (LAN, USB) Pattern file can be used semi-permanently without renewal



Options

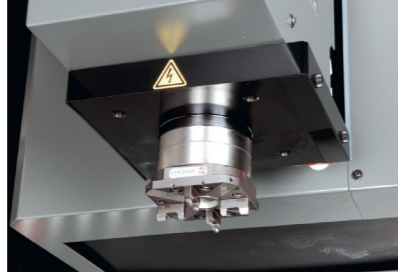
Head-side tooling

Removable holder



3R-16M-MACRO-R specifications

Automatic clamp



Clamp spindle side holder with air chuck
(photo shows EROWA-ITS chuck specifications)

High-rigidity C-axis



Supports parallel electrode setup and index machining
Supports fluid emission from spindle center
(photo shows 3R-MACRO chuck specifications)

* Tooling should be selected

ATC

LS-10T(automatic tool changer)



Change up to 10 electrodes
Supports continuous machining using many electrodes

LS-20T(automatic tool changer)



Change up to 20 electrodes
Supports continuous machining using many electrodes

MVH-20T/40T(automatic tool changer)



Change up to 20/40 electrodes
Supports continuous machining using many electrodes

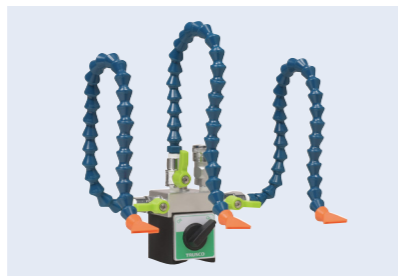
Dielectric fluid system and others

Dielectric fluid distributor



Sprays dielectric fluid between the workpiece and electrode during pitch machining

Large electrode adapter



Distributes dielectric fluid into three flows and sprays onto the machining section

Large electrode adapter



Prepare two T-slots and electrode mounting table installation screw
(photo shows EA28V ADVANCE specifications)

LED light



Power-supply specifications for LED light require DC24V.

Infrared flame detector



Catches infrared rays from flames and stops power supply

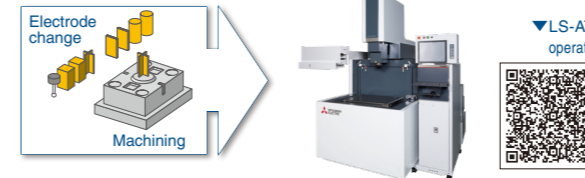
Specifications are subject to change without notice, and appearance may be different from the photo.

Automation Support



LS-10T/20T Tool changer

•Automatic electrode replacement enables continuous operation



Automatic electrode/workpiece changer(1 robot, 2 EDMs)

•Robotic transfer devices automatically change electrodes and workpieces, enabling continuous operation



Peripheral equipment/System extension options

Scheduling system

E.S.P.E.R SCHEDULE

- Execute continuous schedule operation of EDMs with job management(*) (manage up to five EDMs)
- Control ID numbers, as well as monitor the mounting state of electrodes and the state of communications with the EDM and electrode / workpiece changing unit

(*) A personal computer is required for installing applications

Machine remote monitor

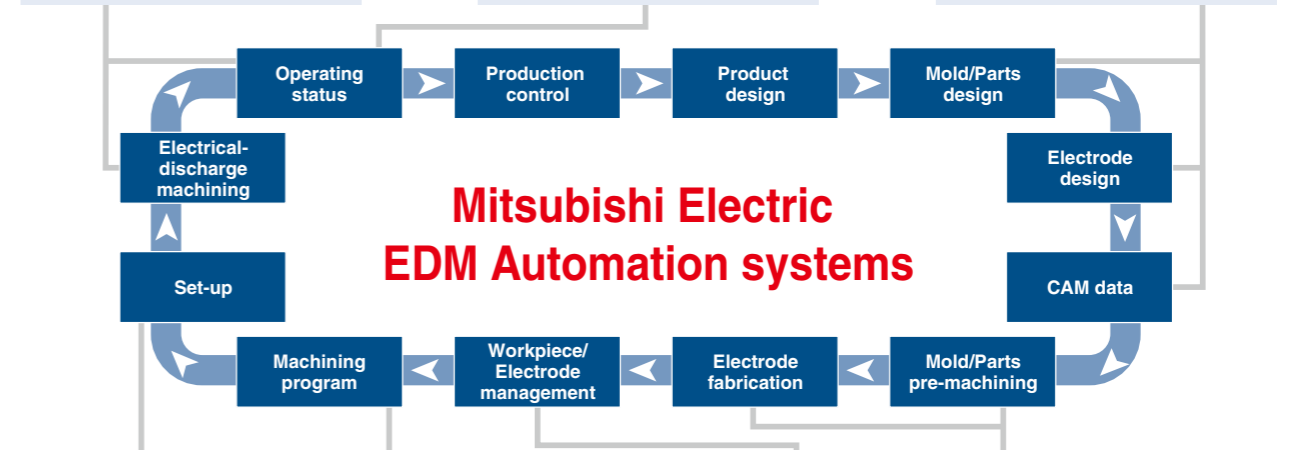
RemoteMagic II

- Visualizes workshop with monitor and notification for improving machine operating ratio
- Remotely monitor machining with a personal computer
- Mail notifications when an alarm occurs

3D CAD/CAM system

AD

- 3D electrode model can be created easily, and electrode design CAD system handling orbit deformation
- Die-sinking electrical-discharge CAM system, which calculates machining positions automatically and eliminates value input mistake
- Operations can be sequenced to wire, milling and hole machining CAMs



Touch probe

- Support in-line setup
- Reduces core alignment measurement and measuring time of workpiece position (Note 3)
- Speeds up machine operation by use of installed measuring programs

Offline automatic programming system

ESPERADVANCE PRO

- Offline programming and program management is possible(*)
- Same screens and operability as ESPERADVANCE, and compatible with 64-bit models (MA, EA Series machining condition search is also available)
- Import data from AD or EPX compatible CAD/CAM

(*) A personal computer is required for installing applications.

ID tag system

- Mounting status of carrier device robot is managed by ID tag which mounted electrode and workpiece pallets (Note 2)
- Electrode and workpiece pallets can be identified to prevent mounting mistakes and program registering mistake
- Workpiece and electrode can be easily managed using ID tag system and scheduler

Presetter

- Supports setup operation at machine offline, and setup time can be reduced (Note 1)
- The usage of offline setup system will improve machine runtime
- Electrode and workpiece can be easily managed using ID tag system and scheduler

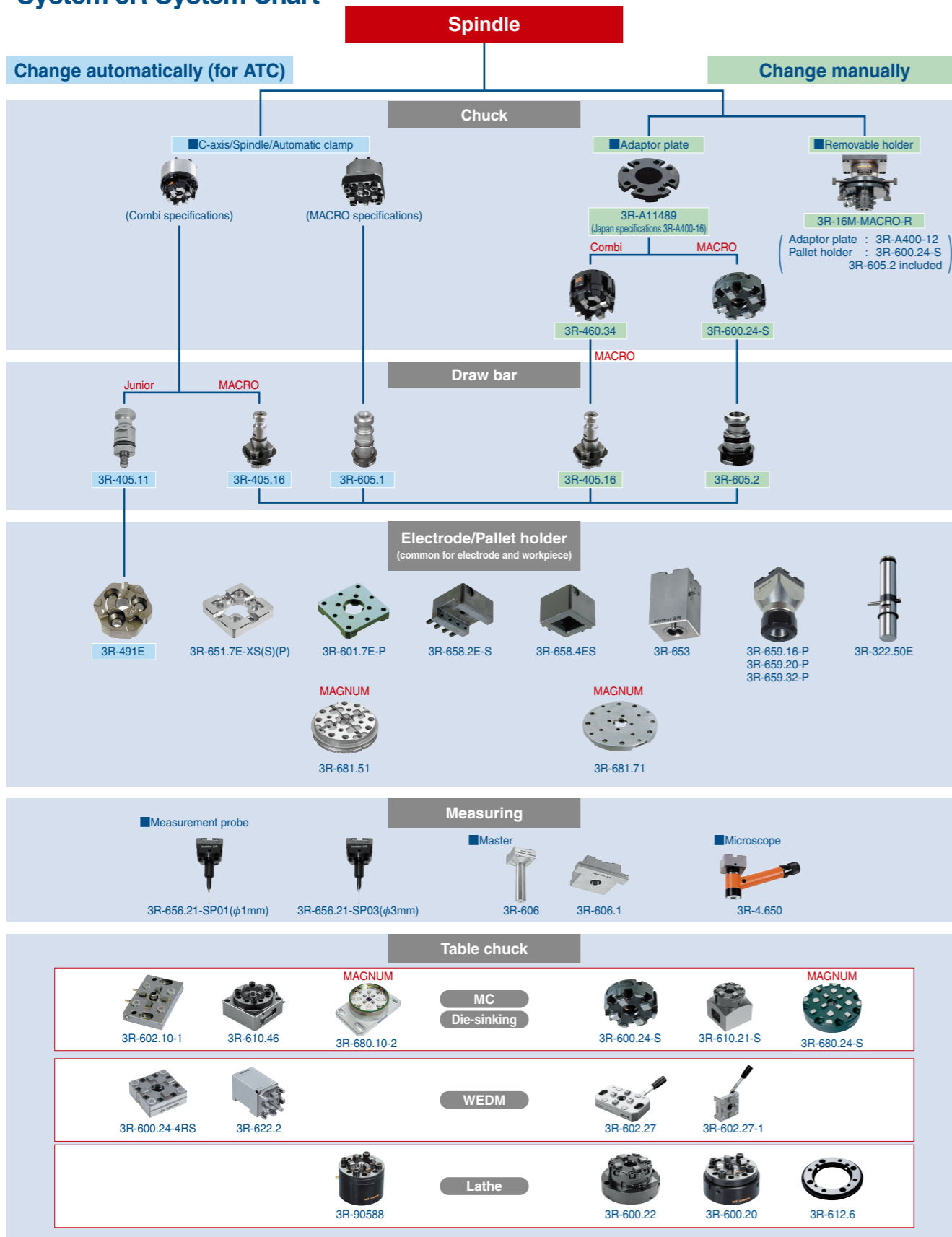
(Note 1) Please contact a Mitsubishi Electric representative for more information regarding the presetters and coordinate measuring machines.

(Note 2) Please contact a Mitsubishi Electric representative for more information regarding the ID tag systems.

(Note 3) Please contact a Mitsubishi Electric representative for more information regarding the touch probes.

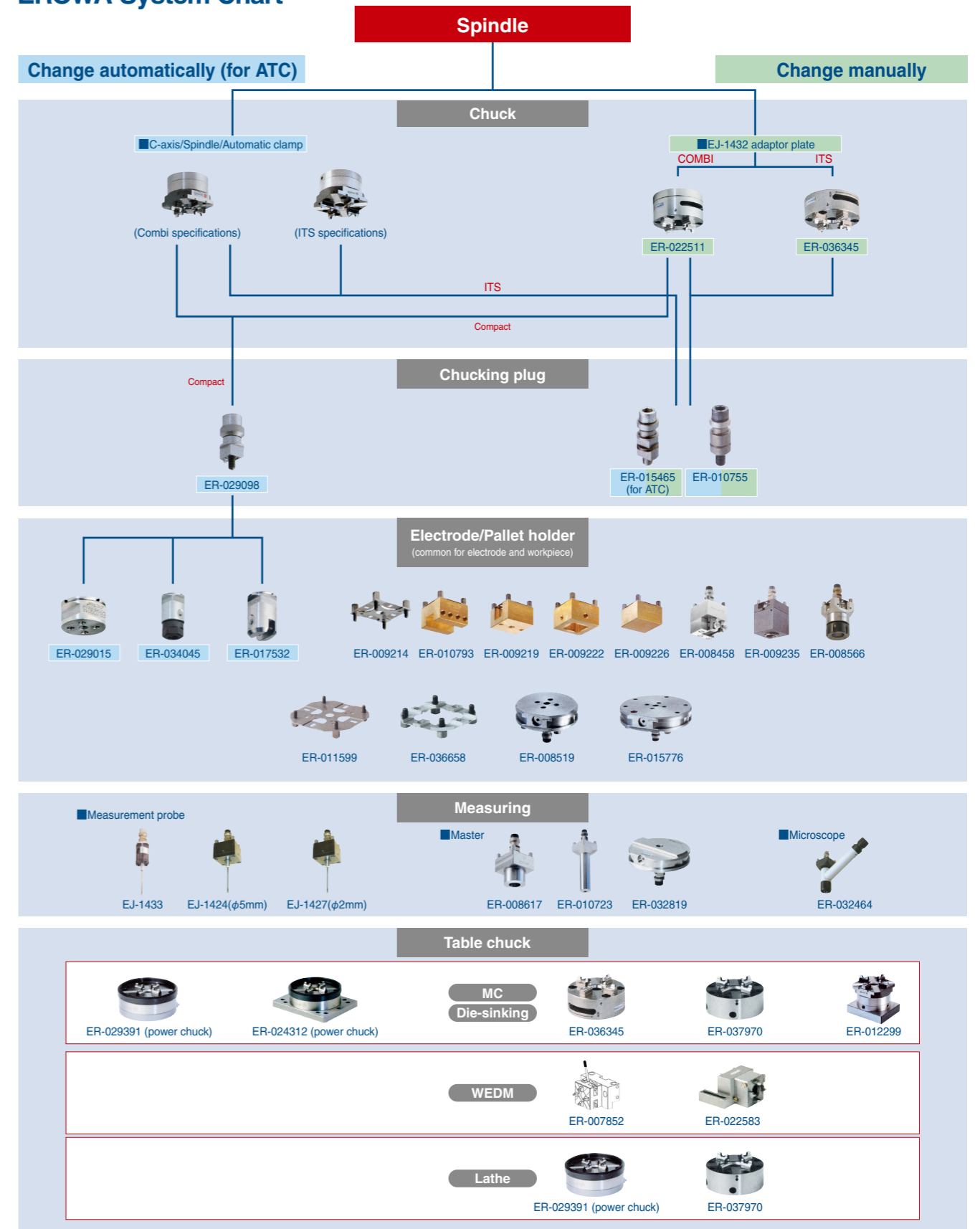
Tooling

System 3R System Chart



* Please contact System 3R Co., Ltd. for detailed tooling specifications.

EROWA System Chart

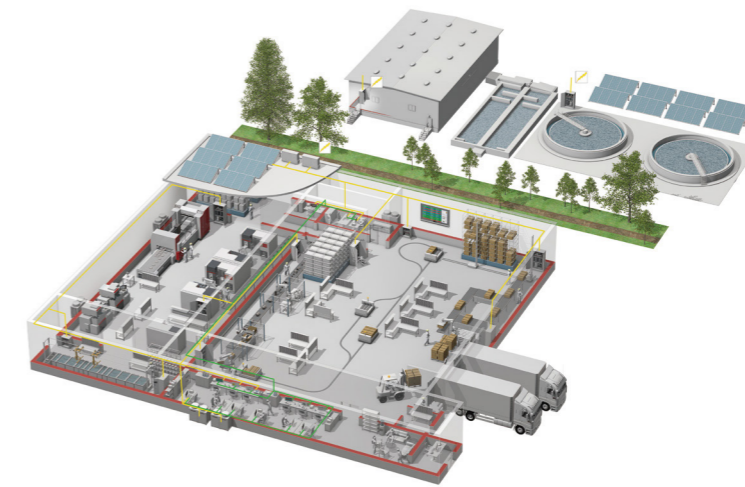


* Please contact EROWA Japan Co., Ltd. for detailed tooling specifications.

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Global Production Bases

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Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.



Low voltage: MCCB, MCB, ACB



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Robots: SCARA, Articulated arm



Processing machines: EDM, Lasers, IDS



Transformers, Air conditioning, Photovoltaic systems

A NAME TO TRUST

Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over \$40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

* Not all products are available in all countries.

① Nagoya Works
Programmable controllers, display panels (HMI), AC servos, inverters, industrial robots, CNCs for power distribution transformers, EDMs, laser processing machines

② Kani Factory
Electromagnetic switchgear

③ Shinshiro Factory
3-phase motors, IPM motors

④ Fukuyama Works
Power management meters, energy-saving UPS support devices, low-voltage circuit breakers

⑤ Nagatsugawa Works
Pressurized ventilators

⑥ Power Distribution Systems Center
High-voltage circuit breakers, high-voltage electromagnetic contactors

⑦ Mitsubishi Electric Factory Industrial Products Corporation
Geared motors

⑧ Tada Electric Co., Ltd.
Electron-beam processing machines

⑨ China (Dalian)
Mitsubishi Electric Dalian Industrial Products Co., Ltd.
Inverters, low-voltage circuit breakers, electromagnetic switchgear EDMs, laser processing machines

⑩ India (Pune)
Mitsubishi Electric India Pvt. Ltd.
Inverters

⑪ Thailand (Bangkok)
Mitsubishi Electric Automation (Thailand) Co., Ltd.
3-phase motors

⑫ China (Xiamen)
Mitsubishi Electric Low Voltage Equipment (Xiamen) Co., Ltd.
Low-voltage circuit breakers

⑬ China (Changshu)
Mitsubishi Electric Automation Manufacturing (ChangShu) Co., Ltd.
Programmable controllers, display panels (HMI), AC servo CNCs

MEMO

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