Die-Sinking EDM Systems

EA-V
Advance Series

for a greener tomorrow
Our masterpieces – EA-V Advance Product Program

Maximum ease of use makes these die-sinking systems absolutely flexible in use. Our robust machine construction is the basis for highest precision and enormous load capacity of these die-sinking systems.

**EA8P-V Advance**
Precision die-sinking for micromould fabrication, medical engineering, tool production etc.. The best choice when precision and best finish are crucial.

**EA12-V Advance**
The all-round machine for application in all cases. No matter whether you use graphite electrodes or copper – the EA12-V Advance is equipped with the matching technology. You need to machine tungsten carbide? No problem - without the necessity of special options.

**EA28-V Advance**
You need a bigger size? No problem, without any restrictions in capability and precision! Autonomy and ergonomics at their best.
High-quality mechanical engineering

Only high-quality components are installed in the classic cast steel machine design.

Granite table

The EA8P-V Advance is equipped with a granite table as a standard. A completely insulated clamping process improves the obtainable surface qualities and reduces machining times.

Optimum ease of maintenance

The extremely well accessibility of important components simplifies maintenance work essentially. The central lubrication unit and the filters which allow replacement during machining keep downtimes as short as possible.

Thermally regulated machine body

The CNC recognizes deviations of thermal origin and corrects these in real time by more than 50%. Even in case of changing room temperatures, this allows higher precision and improved repeat accuracy.

Compact, robust mechanical engineering based on cast steel. No other material can better guarantee the stability you need in order to benefit from your investment in long term. Best mechanical engineering made in Japan!

The high-resolution direct drives (0.1 μm resolution), combined with generously dimensioned spindles, ensure highest precision over the entire lifetime of the machine.

The dual way measuring system with additional linear scales for the X, Y and Z axis works in closed loop and ensures long-lasting precision.

Precision needs perfection!

The rise and fall work tank offers best accessibility to the working space of the machine as well as manifold automation possibilities.
Mitsubishi Electric's newly developed FP-V generator series is the new standard in die-sinking. Not only the combination of reduced electrode wear, but also high removal rates, coupled with high precision and best surface quality, will surely increase your options. In particular for tungsten carbide machining, the EA-V Advance series has established as the best reference in the industry.

**Tungsten carbide / copper tungsten**

Workpiece: Extrusion die for indexable inserts

**PCD / copper tungsten**

The fixing bore in an indexable insert has been eroded. Processing was performed with a PCD / CMB circuit.

**Titanium / graphite**

Suspension arms for Formula 1. The Sauber F1 Team machines titanium with graphite electrodes.

**Steel / graphite**

Difficult flushing conditions and big sections are no problems for the Mitsubishi Advance Generator. Additional contours are eroded into the pre-milled workpiece, and the entire surface is finished to the required quality.

Extrusion die for steel cutlery, machined with copper electrode, surface quality Ra 0.4μm
You manufacture compound tools, plastic mouldings, gearwheel moulds, profiles, prototypes and many more things?
And you think that highest productivity, flexibility and precision are most important?
Then you need the Mitsubishi Electric EA-V Advance series models, with their unlimited scope of applications.
You will obtain results giving you competitive advantages and economical success.

**Longer tool life**
The specialty of the new FP-V Generator is significant reduction in heat effected zone. This allows you to reach an essentially longer tool service life. (Upper picture; for comparison, the result of a die-sinking machine using a conventional generator).

**Medical technology**
Workpiece: Chrome-cobalt alloy
Electrode: graphite
Surface quality: Ra 1.6μm

**Mirror Finish Processing**
The GM circuit available for this application reduces the polishing efforts drastically.
Material: Steel (Stavax)
Electrode: Copper
Surface quality: Ra 0.07μm

**Multi-Rib Processing**
The technology creation with 3D “Shape Expert” delivers a stable eroding process with minimum electrode wear, even for the finest rib electrodes.

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**Gearwheel processing**
Function: integrated C axis
Material: Tungsten carbide
Electrode: Copper tungsten
Surface quality: Ra 0.3 μm
Ultra-precise gearwheel processing is possible as a result of the extremely rigid and integrated C axis. The E.S.P.E.R. Advance programming function allows easy programming of gearwheel processing.
The key to your success – FP-V Generator

You have rather small workpieces, but very high requirements to accuracy and surface quality?
You want minimum electrode wear? The machine EA8P-V Advance is designed specially for these applications. The NP circuit allows you to obtain best quality in small cavities as well as in tungsten carbide. Furthermore you can work with small electrode undersizes in the range of one hundredth of a millimetre, achieving highest contour accuracy.

**Electrical connection technology**

| Workpiece: Steel | Electrode: Copper | Undersize: 0.05 mm per side | Surface quality: Ra 0.15μm |

**Extrusion die for drill tips**

| Workpiece: Tungsten carbide | Electrode: Copper tungsten | Surface quality: Ra 0.15μm |

**Particularly smooth, mat surfaces**

| Use of the NP circuit | Workpiece: Steel |

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You have rather small workpieces, but very high requirements to accuracy and surface quality? You want minimum electrode wear? The machine EA8P-V Advance is designed specially for these applications. The NP circuit allows you to obtain best quality in small cavities as well as in tungsten carbide. Furthermore you can work with small electrode undersizes in the range of one hundredth of a millimetre, achieving highest contour accuracy.

**Electrical connection technology**

Highest precision and contour exactness through smallest undersizes for smallest radii and sharp corners. Corner radius of 0.006 mm
Workpiece: Steel
Electrode: Copper tungsten
Undersize: 0.05 mm per side
Surface quality: Ra 0.15μm

**Extrusion die for drill tips**

Workpiece: Tungsten carbide
Electrode: Copper tungsten
Surface quality: Ra 0.15μm

**Particularly smooth, mat surfaces**

Use of the NP circuit
Workpiece: Steel
**Production of micro drillings**

Drilling with inlet side and outlet side of Ø 60μm as an example, and tolerance (shape, roundness) of continuously 1μm in 0.5 mm of stainless steel sheet. Drilling borders can be produced sharp-edged, with negligible edge rounding.

**Production of miniature injection moulds**

Micro components and electrodes can be produced to the highest precision, with the integration of a high speed spindle (option) and wire dressing unit by

allows for ultra-precise machining with biggest possible process autonomy.

**Mould insert for injection moulds**

Medical technology
Workpiece: High-alloyed steel
Surface quality: Ra 0.22μm

**Mould insert for miniature gear wheels**

After the wire erosion of the gear wheel shape, the inclined contour was die-sunk with the EA8P-V Advance.
Simple operation

The new Advance control system based on the Mitsubishi CNC M700 is captivating due to its user-friendliness and reliability. In spite of its complex range of functions, it can be operated instinctively via control based on Windows XP. The logical menu structure and uncomplicated design allow you to achieve your goal quickly and reliably.

Ergonomics

The control is performed via a sturdy 15" touch screen monitor, as well as via keyboard and mouse. There are additional fixed function keys for frequently used commands.

Network integration

Of course, the control can be linked to existing networks using the standard Ethernet card. In addition, a network-independent data exchange can be performed via two free USB interfaces.

Safe updating

The EA-V Advance is generally equipped and delivered with an individualized USB memory. Any type of software update regarding the control of the machine is performed via this USB stick. This ensures that all user and machine-specific data are saved before the update and can be retrieved at a later point of time.
Advance control system – dialogue-guided programming

Programmed in dialogue

The technology is created in "Shape Expert". For this, the user resorts to different basic forms and specifications, allowing him or her to program the machine as easily as possible. The optimum processing technology is created automatically.

Clearly understandable and safe to use

The machining program is created completely via the control system, ESPER Advance. Clearly understandable selection windows guide the user from the set-up cycle to the technology selection. Only a few basic parameters are necessary in order to start processing. Beginners as well as users familiarized with other control systems will appreciate this. Customers who already know our wire eroding machines can benefit from the identical control system right from the start.

Deflection orbits

The control system offers multiple deflection possibilities during eroding work. This is only a small selection.
Advance control system – leverage existing 3D CAD data

**Adaptive processing control**

The Mitsubishi Advance is a powerful control system allowing you to obtain optimum results at all times. For example, the generator settings are optimised by the adaptive machining control system “Fuzzy Control” during the eroding process. This delivers stable and optimum processing speeds with maximum performance at all times.

**3D “Shape Expert”**

This new function of the ESPER Advance control system automatically calculates the optimal generator current levels for the different processing surfaces of the contour to be machined. This function can also be used if only 2D data are available.

**3D simulation**

Subsequent to the creation of the programs, a simulated processing in 3D can be performed.

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**3D simulation prior to processing**

The Advance control system does not only include a 3D-, but also a 2D CAM system. 3D data in Parasolid format as well as DXF or IGES files can be directly imported and converted to NC programs. The shape of work piece and electrode can be analysed immediately after the import. This easily understandable verification gives you additional safety before the start.
EA-V Advance — compact, safe, fast

The new standard in die-sinking
No matter which model you select — our machines will live up to your expectations in an optimal way.
The compact EA8P-V Advance for highly precise work, the EA12-V Advance for universal work, or the EA28-V Advance, appropriate also for large moulds due to its travel paths.

EA8P-V Advance

EA12-V Advance

EA28-V Advance

The dimensions relate to the distance between working table and electrode chuck (Erowa).
Do you want to increase the operating efficiency of your machine? Our strength is the individual configuration of the automation exactly to your requirements. Contact us!

You decide how much automation you need.
Mitsubishi Electric machines are completely equipped when delivered. However, there are some options we offer additionally in order to allow you to adapt your new machine even better to your personal needs.

**mcAnywhere functions**

offers you the chance to have everything under control, no matter where you are. With mcAnywhere Contact, the machine automatically sends status messages in plain text to your mobile phone. The function **mcAnywhere Control** allows a remote control of the machine and the optimization of ongoing machining processes using an iPad (or a PC).

The iPhone or iPad is included in the scope of delivery.

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**Tool changing fixture**

Tool changing fixture with 20 positions

**High-speed spindle**

Infinitely variable between 1 and 1,500 rpm. For particularly high precision requirements in case of rotation-symmetric electrodes (electrode trimming) or for smallest diameters.

**PCD / CBN circuit**

For the machining of diamond-bonded materials

**Adaptive processing control for graphite**

Adaptive processing control (“Graphite Fuzzy”) in particular for the processing with small graphite electrodes

**Programmable flushing**

This allows to control individual flushing nozzles via M commands. This optionally available function can be meaningful if different work pieces are to be flushed individually and frequently. This ensures a safe and fast eroding process.
### Machine

<table>
<thead>
<tr>
<th>Model</th>
<th>EA8P-V Advance</th>
<th>EA12-V Advance</th>
<th>EA28-V Advance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel path (X/Y/Z)</strong> mm</td>
<td>300 x 250 x 250</td>
<td>400 x 300 x 300</td>
<td>650 x 450 x 350</td>
</tr>
<tr>
<td><strong>Max. electrode weight</strong> kg</td>
<td>10</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>Max. workplace dimensions (W x D x H)</strong> mm</td>
<td>660 x 450</td>
<td>820 x 450</td>
<td>1015 x 750</td>
</tr>
<tr>
<td><strong>Max. filling height of dielectric tank</strong> mm</td>
<td>216</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td><strong>Width between jaws (table – C axis with Erowa chuck)</strong> mm</td>
<td>127.5 x 425.5</td>
<td>152.5 x 452.5</td>
<td>317.5 x 687.5</td>
</tr>
<tr>
<td><strong>Max. workplace weight</strong> kg</td>
<td>700</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Table dimensions (W x D)</strong> mm</td>
<td>500 x 350</td>
<td>700 x 550</td>
<td>850 x 600</td>
</tr>
<tr>
<td><strong>Overall dimensions with tool changer (W x D x H)</strong> mm</td>
<td>2315 x 2150 x 2288</td>
<td>2145 x 2050 x 2380</td>
<td>2429 x 2512 x 2660</td>
</tr>
<tr>
<td><strong>Tank capacity</strong> l</td>
<td>175</td>
<td>400</td>
<td>595</td>
</tr>
<tr>
<td><strong>Filter density</strong> µm</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Filter elements</strong></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Dielectric cooler</strong></td>
<td>Dielectric cooler</td>
<td>Dielectric cooler</td>
<td>Dielectric cooler</td>
</tr>
<tr>
<td><strong>Magazine positions</strong></td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Max. transfer weight</strong> kg</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Max. weight in magazine</strong> kg</td>
<td>40</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td><strong>Max. electrode dimensions, square (W x D x H)</strong> mm</td>
<td>140 x 140 x 200</td>
<td>127 x 127 x 190</td>
<td>127 x 127 x 190</td>
</tr>
<tr>
<td><strong>Max. electrode dimensions, round (Ø x H)</strong> mm</td>
<td>180 x 200</td>
<td>180 x 190</td>
<td>180 x 190</td>
</tr>
</tbody>
</table>

If the tool changer is fully loaded, smaller dimensions apply for the edge length resp. diameter of the electrodes.

### Generator and control

<table>
<thead>
<tr>
<th>Model</th>
<th>EA8P-V Advance</th>
<th>EA12-V Advance</th>
<th>EA28-V Advance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power unit</strong></td>
<td>Transistor controlled pulse generator</td>
<td>Transistor controlled pulse generator</td>
<td>Transistor controlled pulse generator</td>
</tr>
<tr>
<td><strong>Generator cabinet</strong></td>
<td>Compartly light</td>
<td>Compartly light</td>
<td>Compartly light</td>
</tr>
<tr>
<td><strong>Cooling method</strong></td>
<td>Indirect air cooling</td>
<td>Indirect air cooling</td>
<td>Indirect air cooling</td>
</tr>
<tr>
<td><strong>Max. working current</strong> A</td>
<td>80</td>
<td>80 (120 optional)</td>
<td>120</td>
</tr>
<tr>
<td><strong>Weight</strong> kg</td>
<td>260</td>
<td>260 (300)</td>
<td>300</td>
</tr>
<tr>
<td><strong>Input system</strong></td>
<td>Keyboard, USB, Ethernet</td>
<td>Keyboard, USB, Ethernet</td>
<td>Keyboard, USB, Ethernet</td>
</tr>
<tr>
<td><strong>TFT colour screen</strong></td>
<td>15&quot; Touchscreen</td>
<td>15&quot; Touchscreen</td>
<td>15&quot; Touchscreen</td>
</tr>
<tr>
<td><strong>Control system</strong></td>
<td>CNC, closed loop</td>
<td>CNC, closed loop</td>
<td>CNC, closed loop</td>
</tr>
<tr>
<td><strong>Min. instruction step X, Y, Z / C</strong> µm</td>
<td>0.1 / 0.0001</td>
<td>0.1 / 0.0001</td>
<td>0.1 / 0.0001</td>
</tr>
<tr>
<td><strong>Min. axis resolution</strong> µm</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Max. instruction value</strong> mm</td>
<td>±99999.999</td>
<td>±99999.999</td>
<td>±99999.999</td>
</tr>
<tr>
<td><strong>Overall power consumption</strong> KVA</td>
<td>6.5</td>
<td>7.0 (10.0)</td>
<td>13</td>
</tr>
<tr>
<td><strong>Max. heat output</strong> kW</td>
<td>3.9</td>
<td>4.2 (6.6)</td>
<td>7.8</td>
</tr>
</tbody>
</table>

### Equipment

<table>
<thead>
<tr>
<th>Model</th>
<th>EA8P-V Advance</th>
<th>EA12-V Advance</th>
<th>EA28-V Advance</th>
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</thead>
<tbody>
<tr>
<td><strong>20-fold electrode changer</strong></td>
<td></td>
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<tr>
<td><strong>FP120 V High performance generator</strong></td>
<td></td>
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<tr>
<td><strong>Adaptive processing control “Graphite Fuzzy”</strong></td>
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<tr>
<td><strong>NP circuit</strong></td>
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<tr>
<td><strong>PCD/CBN circuit</strong></td>
<td></td>
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<tr>
<td><strong>Chuck JR Macro</strong></td>
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<tr>
<td><strong>High-speed spindles (1 bis 1.500 U/min)</strong></td>
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</tr>
<tr>
<td><strong>Programmable flushing nozzles</strong></td>
<td></td>
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<tr>
<td><strong>External signal outlet</strong></td>
<td></td>
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<tr>
<td><strong>mcAnywhere - Get Service</strong></td>
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<tr>
<td><strong>mcAnywhere - Take Control</strong></td>
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<tr>
<td><strong>mcAnywhere - Keep Contact</strong></td>
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</tbody>
</table>

(S = standard  D = retrofittable  O = not retrofittable)

(Values in brackets are only valid for EA12-V Advance with FP120 V generator)
You can find current information about novelties and support to technical questions on the Mitsubishi Electric Internet pages (www.mitsubishi-edm.de).

In the products area of the Mitsubishi homepage you will find different documentation items on the Mitsubishi Electric product portfolio, as well as the most current version of the present catalogue as download.

All data are updated daily and are currently available in English and German.