Wire-cut EDM Systems
NA Series

MITSUBISHI WIRE EDM

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001 (standards for quality assurance management systems)
Reaching for the leading edge of Monozukuri (Excellent-product development/manufacturing) together with you

There are things which only Mitsubishi Electric, the leader in electrical-discharge machines, can do.

Introducing the wire-cut EDM, which combines the innovative technology style from drive systems to control systems and power systems.

The NA Series, surpassing common knowledge to open up the next era.

Three advantages for the next era

High quality
A refined design makes impossible accuracies possible

Usability
An ultimate operability is extremely operator-friendly

Economy & Ecology
Enhanced efficiency reduces operating costs from energy used to consumables
High-grade model combines high accuracy and ease of use.

High-grade model combines high accuracy and ease of use with larger capacity.
Revolutionizing monozukuri (product creation) with high-accuracy machining which focuses on quality required for the next generation

### Round machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA1200</td>
<td>OPT-drive system</td>
<td>e0.2(0.008&quot;)BS</td>
<td>STEEL (PD613)</td>
<td>50mm (2&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.5µm (15µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - High accuracy machining is realized with the OPT-drive system's high responsiveness.
  - EM control suppresses possible bumps or undercuts at the approach point created during multiple skim cuts, attaining a higher degree of roundness.

### High-accuracy pitch machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA1200</td>
<td>OPT-drive system</td>
<td>e0.2(0.008&quot;)BS</td>
<td>STEEL (PD613)</td>
<td>20mm (0.8&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.2.5µm (10µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - Highly accurate pitch machining is possible using the OPT-drive system and XY independent construction method.

### High-accuracy punch machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA1200</td>
<td>Digital-FS</td>
<td>e0.2(0.008&quot;)BS</td>
<td>STEEL (SKD11)</td>
<td>50mm (2&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.1.4µm (4µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - A shape accuracy of ±1µm (.00004") or less is realized.
  - High-grade machining to a surface roughness of Rz1.0µm or less is possible with Digital-FS.

### High-accuracy fit machining of thick workpiece

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA2400</td>
<td>Digital-V power supply</td>
<td>e0.3(0.010&quot;)BS</td>
<td>STEEL (SKD11)</td>
<td>300mm (11.8&quot;)</td>
<td>Rz 1.5µm (60µ&quot;Rz) / Rd.3µm (24µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - Thick workpieces can be machined with a high straightness accuracy using the Digital-V power supply.
  - Highly accurate machining with a straightness accuracy of Rz1.0µm (.0004") is possible even with 300mm (11.8") thick workpieces.

### High-accuracy fit machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA1200</td>
<td>Corner control</td>
<td>e0.2(0.008&quot;)BS</td>
<td>STEEL (SKD11)</td>
<td>60mm (2.4&quot;) (punch)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.2.5µm (10µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - Corners can be machined to a high accuracy of ±1µm (.00004") using new corner machining control (CM3).
  - Highly accurate fit machining with a fit clearance of 2µm (.00007") is possible.

### High-accuracy connector machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA1200</td>
<td>OPT-drive system</td>
<td>e0.05(0.002&quot;)SP</td>
<td>STEEL (PD613)</td>
<td>20mm (0.8&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.1.4µm (4µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - A machining accuracy of ±1µm (.00004") is possible when using the L/D machining mode with Fine Wire.
  - This core pin example requires a 0.15mm (.006") pin width.

### Long stroke, high-accuracy pitch machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA2400</td>
<td>OPT-drive system</td>
<td>e0.05(0.002&quot;)SP</td>
<td>STEEL (PD613)</td>
<td>20mm (0.8&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.1.4µm (4µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - Even when machining large plates with a stroke of 300mm (11.8") or more, the OPT-drive system enables highly accurate machining. ±3µm (.00012") is possible.

### Tungsten carbide punch machining

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
<th>Surface roughness</th>
<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA1200</td>
<td>Digital-FS</td>
<td>e0.2(0.008&quot;)BS</td>
<td>STEEL (SKD61)</td>
<td>70mm (2.8&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.1.4µm (4µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - A surface roughness of Rz1.0µm (.0004") or less and a machining accuracy of ±1µm (.0004") are possible using Digital-FS for tungsten carbide punch machining.

### Fit machining of taper shape

<table>
<thead>
<tr>
<th>Model</th>
<th>Function used</th>
<th>Electrode material</th>
<th>Workpiece</th>
<th>Workpiece thickness</th>
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<th>Material of Electrode</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA2400</td>
<td>Angle Master</td>
<td>e0.25(0.010&quot;)MEGA-T</td>
<td>STEEL (SKD11)</td>
<td>150mm (5.9&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.1.4µm (4µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
</tr>
</tbody>
</table>

- **Function used:**
  - The UV-axis OPT-drive system realizes highly accurate tapered machining with an angle of 7°.
  - New corner machining control (CM3) improves the shape accuracy of corner areas, so the mold can slide smoothly.

### Wide-angle taper machining

<table>
<thead>
<tr>
<th>Model</th>
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<td>NA2400</td>
<td>Angle Master</td>
<td>e0.25(0.010&quot;)MEGA-T</td>
<td>STEEL (SKD11)</td>
<td>20mm (0.8&quot;)</td>
<td>Rz 2.0µm (79µ&quot;Rz) / Rd.1.4µm (4µ&quot;Rz)</td>
<td>Tungsten carbide (G8)</td>
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</table>

- **Function used:**
  - Wide-angle taper machining with an angle of up to 45° is possible using the Angle Master option.

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*The listed machining results are all based on in-house conditions and measurements.
(Revolutionizing monozukuri (product creation) with high-accuracy machining which focuses on quality required for the next generation)*

(Note: JIS B 0601: ‘01 and ISO 4287: ‘97/ISO 1302: ‘02 compliant (Rz conventional notation Ry).*)
Highly accurate drive systems

Highly rigid structure
- Newly designed with CAE analysis, the machine structure is highly rigid with a low center of gravity
- Ribs are optimally arranged to suppress the structure’s deformation during axis movement

Optimum structure matches machining applications
- **NA1200**
  - X/Y-axis independent construction method combines table movement and column movement
  - This structural design eliminates axis overhang, enhancing machining accuracy
- **NA2400**
  - Drive method which combines table fixing and column movement incorporated
  - Fixed table, and movable-column design eliminates the need to move large workpiece, enabling a higher degree of machining accuracy

UV-axis OPT-drive system*
- The UV-axis can also be fitted with the OPT-drive system
- High-accuracy taper machining is possible
* Compatible models: NA1200/NA2400 (option).

Excellent frame design provides higher-dimensional performance

OPT-drive system
- Shape machining accuracy is greatly improved by the synergistic effect of high-speed optical communication and motor technology
- Optimum system uses Mitsubishi Electric servo amplifier and control units

Integrated rectangular table
- A highly rigid one-piece stainless steel table is used for easy workpiece setup
- Workpieces can be machined to a high accuracy at any position
High quality
High-accuracy power systems

Merging high speed and high accuracy
Refined power supply control technology

High-speed anti-electrolysis power supply
(AE power supply)
- Electrolytic corrosion is suppressed to prevent the formation of softened layers
- Compatible with all power circuits from rough machining to finish machining
- High-speed, safe unmanned machining possible using water

Shape control power supply (Digital-AE II)
- Digitally control 3D shapes with the world’s only (as of April ‘11), electrical-discharge position control
- Reduce the total machining time by improving straightness accuracy during rough, intermediate and finishing processes

Super-fine finishing power supply (Digital-FS)
- Optimum surface roughness of Rz0.4µm
- Machining with the workpiece set directly on the table (dedicated jig not required)
- Machining range not limited (entire XY stroke area)
- Achieves both surface roughness and straightness accuracy
- Extends die life and improves die releasing properties

Oxidation of workpiece surface
- Aluminum
- Brass
- Titanium alloy

Comparison of straightness accuracy in finish machining

Comparison of AE and conventional machining

Comparison of water- and oil-machined surfaces

* The photo shows a comparison under adverse conditions where electrolysis occurs easily.

Conventional machining
AE machining

Titanium alloy

Conventional machining
AE machining

Brass

Conventional machining
AE machining

Aluminum

Conventional machining
AE machining

Conventional technology
- Machining conditions are optimized
- Nozzle of pulse is increased
- Number of cuts are increased
- The discharge ion is compressed electrostatically (upper angle)

New technology
- The discharge ion is reduced to the workpiece thickness by the electrical-discharge position control

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Optimized machining conditions

Shaping control power supply (Digital-AE II)
- Digitally control 3D shapes with the world’s only (as of April ‘11), electrical-discharge position control
- Reduce the total machining time by improving straightness accuracy during rough, intermediate and finishing processes

Super-fine finishing power supply (Digital-FS)
- Optimum surface roughness of Rz0.4µm
- Machining with the workpiece set directly on the table (dedicated jig not required)
- Machining range not limited (entire XY stroke area)
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Optimized machining conditions
High quality
High-accuracy control system

Advanced knowledge-base system controls cutting-edge machine performance

Corner machining control (CM3 control: Corner Master3)
- Improve machining accuracy at extremely small in-corners and out-corners
- Realize highly accurate shape machining even in complicated geometry with several types and sizes of corners
- Corner accuracy can be easily controlled by the operator

Wire tension control (TS Master)
- Suppress tension fluctuation to realize stable machining
- Suppress lines on the machined surface after polishing

Die-shaped machining samples

Comparison of corner accuracies

<table>
<thead>
<tr>
<th>Conventional Corner Control</th>
<th>CM3</th>
<th>Analysis of&lt;br&gt;Machined surface before polishing</th>
<th>Analysis of&lt;br&gt;Machined surface after polishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-corner 60 ° (0.3 mm)</td>
<td></td>
<td>Shape error: 1 to 3 µm</td>
<td>Shape error: &lt;0.1 µm</td>
</tr>
<tr>
<td>In-corner 90 ° (0.3 mm)</td>
<td></td>
<td>Shape error: 1 to 3 µm</td>
<td>Shape error: &lt;0.1 µm</td>
</tr>
</tbody>
</table>

Fully-automatic rough machining control
(PM control: Power Master)
- No need to set machining conditions or have EDM machining know-how
- Automatically recognizes machining conditions
- Makes adjustments for the optimum machining condition

<3D-PM>
- Analyzes 3D data and recognizes shape characteristics
- Eliminates transition lines which appear easily in stepped machining areas
- Improves machining speed with nozzle close conditions

Under-cut (dimple) reduction control
(EM control: Entrance Master)
- Reduces dimples at the approach section
- Allows shape adjustment from convex to concave
- Greatly reduces polishing time

Machining surface step/straightness control
(SL control: Stepless control)
- Greatly improves the step finish and wall straightness for workpieces with varying thickness
- Finish complicated parts to a high accuracy

Dimensional error control
(OM control: Orbit Master)
- OM control is designed to attain a uniform electrical discharge gap regardless of the corner shape
- This improves the radial shape error and greatly improves the total part accuracy

Examples of PM machining applications
- Stepped shape machining
- Stepped shape machining
- Cross-cavity shape machining

 Examples of corner machining

- Wire electrode: Ø0.2 (.008") / BS
- Workpiece: SKD-11.60mm (2.4")
- No. of cuts, surface roughness: 6 cuts, Rz 1.7µm

<Test shape>

A: 5mm (0.2")
B: 4mm (.16")

OM control (Orbit Master)
- No control: concave section depth approx. 4µm
- Using OM control: concave section depth within surface roughness
- EM control: convex section depth +2µm (+.00008") or less
- SL control: concave section depth +2µm (+.00008") or less
- No control: concave section depth +7µm (.0003")
- OM control: convex section depth +7µm (.0003")
- No control: convex section depth -7µm (-.0003")
- OM control: concave section depth -7µm (-.0003")

Examples of PM machining applications
- Stepped shape machining
- Stepped shape machining
- Cross-cavity shape machining
Creating a comfortable, reassuring operating environment

**3-sided elevating work-tank (NA4300)**
- 3-sided elevating work-tank allows easy loading of large workpieces
- The machine table can be reached from three sides making workpiece setups quick and easy
- Multiple workpiece setups are made easy by the open access to the machine table

**Hand lift mode (NA4300)**
- Top surface of the working tank can be lowered approx. 60mm (2.4") from the top of the table
- Table access is improved when loading/unloading using a hand lift

**Increased machining stroke**
- Ample stroke for large workpieces
  - X600 (23.6") x Y400mm (15.7") (NA2400)
  - X400 (15.7") x Y300mm (11.8") (NA1200)

**High-accuracy taper machining (Angle Master)**
- Angle Master function realizes high-grade machining of large tapers
- Optimum taper specifications are automatically set to match the wire electrode angle

**All stainless-steel structure**
- Workpiece mounting table
- Lower machine arm
- Seal plate
- Work-tank and dielectric fluid reservoir

**Seal plate self-cleaning mechanism**
- Forced flush self-cleaning mechanism prevents sludge from sticking to the stainless-steel seal plate
- A simple jet wash nozzle provides the operator with the ability to quickly rinse down the work area after each job is completed

**Example of NA4300**
Compact head design
- The new compact head design greatly improves how close the nozzle can get to stepped workpieces or clamping fixtures such as vises and ruler systems.

One-touch lever clamp mechanism
- New one-touch lever clamping system provides quick, easy, and accurate power feed indexing.
- The clamp lever accurately locates the power feeder with repeatable torque, unlike systems that use a set-screw method.

Diamond guide
- A round diamond guide is used to provide the best accuracy for both straight and taper cutting applications.
- Both upper and lower guides can be replaced by simply unscrewing the flush cups (no tools required).

Jet off wire insertion (AT Master)*
- The automatic wire threading range has been increased to provide capability for wire breakage point insertion, top/bottom countersunk hole insertion, slit insertion, small diameter initial hole and submerged threading.
- By using the AT Master guide kit and AT Enhance Mode setting, the auto-threading performance can be improved where using, jet stream on, causes enough turbulence to prohibit threading.

* Applicable models: All models (option).
Applicable wire diameter: ø0.2, ø2.0BS, (0.008, 0.010" BS)
Taking the interface to new heights with three advanced levels

**Easy-ADVANCE — New advanced ergonomic design**

**Easy-to-read screen and outstanding operability**
- 15-inch LCD and touch panel
- Simple menu configuration eliminates deep nesting

**Ergonomic design**
- Smooth operations with mouse
- Easy-to-use screen, keyboard and mouse position

**Quick simple workpiece Setup**

(Work alignment function)
- By measuring the workpiece flatness with a dial indicator, the wire tilt can be automatically compensated to match the angle of the part rather than taking time to indicate it in perfectly flat.
- Even when using multiple workpieces, the flatness can be automatically compensated in each workpiece coordinate system without editing the program.

**Creates NC data including machining condition with easy operation**

(machining condition search function)
- Creates NC data with machining condition easily by an interactive operation
- The job schedule adjustment, used schedule call back, and extra job addition is now supported by the ME pack.

**3D-ADVANCE — Advanced 3D data for machine control**

- Reads and display 3D CAD data (Parasolid format *) with a built-in 3D CAM
- Extracts 3D model contours with a built-in 3D CAM
- Creates NC data including machining condition with a built-in 2D CAM
- Utilizing ME pack available in built-in 2D CAM
- Analyzes shape features for improved machining performance with a 3D-PM (refer to following page for details)

*1: Parasolid is a registered trademark of UGS PLM Solutions Co., Ltd.

**Net-ADVANCE — Advanced support service using Internet technology**

Providing the newest systems, manuals and machining conditions
- The latest system software, manuals and machining conditions, etc., are provided through the Internet
- Users can download the latest version and upgrade their system

### Product Line-up

**Machining samples**

Drive systems

Power systems

Machining Control

Machine systems

Control Unit

Efficiency

Options

Support and Field Data
Extensive utilization of 3D CAD data for machine control

**CAM**

Read 3D data
- 3D CAD data (Parasolid format*) can be read and displayed in original format and design information can be taken directly to the site

**Built-in 3D CAM**
- Extract contour lines with the height designated in 3D data
- Transmit the contour lines to the built-in 2D CAM

**Built-in 2D CAM**
- Creates NC data from contour lines
- Simple CamMagic operations
- Revise drawings and define additional machining on the EDM

**3D Viewer**
- Reference the 3D image display at any time, even during setup

**Program check/monitor**
- Overlay and display 3D data during the NC data path check
- Overlay and display 3D data on the monitor screen even while machining
- Check the status at a glance

**High compatibility with CamMagic**
- Common operability
- Mutual use of Machining-defined data

**Utility**
- Common operability
- Mutual use of Machining-defined data

**3D-PM**
- Analyzes 3D data and recognizes shape characteristics
- Eliminates transition lines while improving machining performance
- Eliminates streaks which appear easily in stepped machining areas
- Improves machining speed when nozzles are closed

**Advanced 3D data for machine control**

**3D-ADVANCE**

**Product Line-up**
- Machining samples
- Drive systems
- Power systems
- Power supply / Control specifications
- Machine Installation

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*1 This is not a function to create or edit the 3D model.
*2 This 2D CAM is based on CamMagic, but is limited to basic 2D CAM functions.
*3 Parasolid is a registered trademark of UGS PLM Solutions Co., Ltd.
Economy & Ecology

Pursuing efficiency while realizing low costs and environmental awareness

**Efficiency**

**Conventional model**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machining time reduced by up to</td>
<td>30%</td>
</tr>
<tr>
<td>Wire consumption rate reduced by up to</td>
<td>44%</td>
</tr>
<tr>
<td>Machining power consumption reduced by up</td>
<td>58%</td>
</tr>
<tr>
<td>Total power consumption reduced by up</td>
<td>68%</td>
</tr>
</tbody>
</table>

Digital V power supply improves machining performance in all ranges.

Wire consumption rate reduced by up to 44%.

The new control system (Intelligent Master) optimally controls the wire speed during machining.

**New energy-saving mode (Sleep Mode)**

- The new energy-saving mode can be scheduled according to the current job ending time and your next day start time.
- In Sleep Mode, the amount of energy consumed is greatly reduced through the use of an automated pump-shut-off system.
- Once the scheduled start time is reached, the system restarts the fluid system thermally, stabilizing the machine for the next day’s work.

**Flat power feed terminal**

- The flat shape makes it easy to index to the next location.
- A total of 48 index locations can be used (24 on each side).

**Main tension roller**

- Multiple indexing locations greatly reduces running costs.

**Large-diameter collection roller**

- Large collection roller, now with multiple index locations, greatly reduces running costs.

---

* The right graph gives the values when the idle time is contained and the same machining amounts are compared.
* The left graph gives the values when the same machining amounts are compared.
* The above data is a comparison with designated machining conducted by Mitsubishi Electric using the conventional Mitsubishi FA Series.

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* The above data is a comparison with designated machining conducted by Mitsubishi Electric using the conventional Mitsubishi FA Series.
**Options**

### XY-axis OPT-drive system specifications
- High accuracy, fine wire machining specification *2

### Wire processing unit
- Spent wire is cut at discharge section

### Angle Master guide kit
- Max. 45˚ taper machining possible using dedicated diamond guide

### AT Master guide kit
- Broken wire threading performance is improved when using the AT Enhanced mode and the (Type Z) guide kit. Ø0.05 (.002”), Ø0.07 (.003”) sizes available.

### High-accuracy wire-alignment device / Wire-alignment device
- Use this device to align the wire to the table

### Advanced manual control box
- The advanced manual control box is provided with an LCD display, and can be used for positioning, zero set and AT operations

### 4-piece filter kit
- 4-piece filter specifications reduce filter replacement frequency

### Angle Master guide kit
- Max. 45˚ taper machining possible using dedicated diamond guide

### AT Master guide kit
- Broken wire threading performance is improved when using the AT Enhanced mode and the (Type Z) guide kit. Ø0.2, Ø0.25 (.008, .010”) sizes available.

### Tools

### Workpiece clamp set
- Clamp jigs dedicated for workpiece

---

### Wire-cut EDM automation system
- **Accumulates workpiece measurement data**
  - Compatible for external set-up using a coordinate measuring machine
  - Enables automatic measurement when measuring on an EDM
- **Creates processes offline**
  - Automatically exchanges workpieces using a robot

### Network connection specifications (DNC, FTP Options)
- Data, such as NC programs, machining conditions and variables can be exchanged between a personal computer and EDM.
- The required options differ according to the models and purpose, and can be confirmed using the following table.

- **One IP address must be prepared for each EDM within the user’s in-house network.**

<table>
<thead>
<tr>
<th>Option Name</th>
<th>NA1200</th>
<th>NA2400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced manual control box/standard manual control box</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-accuracy wire-alignment device / Wire-alignment device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT Master guide kit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital-PS power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital-AC power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine machining system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special material machining power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working tank door automatic lock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic elevating work-tank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dielectric fluid overflow control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ion exchange resin 10L (0.4cu.ft.) specifications (Organo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ion exchange resin 20L (0.7cu.ft.) specifications (Organo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-piece filter kit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital-FS power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital-AE power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAN/W *4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DNC (DNC64W S/W)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTP (SW)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*The ø0.05 (.002”) and ø0.07 (.003”) sizes cannot be used with the wire processing unit. (These sizes can be used with the continuous wire feeder after removing the wire processing unit.)

*The wire processing unit cannot be mounted when using high accuracy, fine machining specifications.

*LAN cable should be used all straight wiring type with shielding connector, category 5 (100BASE-TX correspondence), STP (four shielded twist pair).

The switching type HUB should be used which can ground shielded LAN cable.

---

**Standard equipment**
- Can be field retrofitted
- Factory installation only
- Not available

---

**Wire-cut EDM automation system**
- Automatic threading *1
  - Available with the ø0.1 (.004”), ø0.15 (.006”) wires.
- Wire processing unit *1
  - Available with the ø0.1 (.004”), ø0.15 (.006”) wires.
- UV-axis OPT-drive system specifications
  - Available only with the ø0.05 (.002”), ø0.07 (.003”) fine wire automatic feed specifications and UV-axis OPT-drive system specifications set.

---

**Options**
- Standard equipment
- Can be field retrofitted
- Factory installation only
- Not available

---

**UV-axis OPT-drive system**
The OPT-drive system has been adopted for the UV-axis.
### Control specifications

#### Power supply / Control unit specifications

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>White</td>
</tr>
<tr>
<td>Power supply circuit</td>
<td>Regenerative transistor type</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Convection/vented / Heat pump cooling</td>
</tr>
<tr>
<td>Anti-electric discharge</td>
<td>Anti-electric discharge in all modes</td>
</tr>
<tr>
<td>Maximum input rating</td>
<td>50VA</td>
</tr>
<tr>
<td>Power supply mode</td>
<td>10 types (RL, RFL, RL, RFL, RF, RF, MP, ML, MA, LB, LB, LC)</td>
</tr>
<tr>
<td>Machine dimension</td>
<td>17 types</td>
</tr>
<tr>
<td>Machine setting</td>
<td>50 types</td>
</tr>
<tr>
<td>OFF time</td>
<td>32 types</td>
</tr>
<tr>
<td>Stabilization circuit A</td>
<td>10 types</td>
</tr>
<tr>
<td>Stabilization circuit B</td>
<td>20 types</td>
</tr>
<tr>
<td>Stabilization circuit C</td>
<td>3 types</td>
</tr>
<tr>
<td>Stabilization circuit D</td>
<td>3 types</td>
</tr>
<tr>
<td>PM circuit (LA, LC, LD)</td>
<td>3 types</td>
</tr>
<tr>
<td>PM control</td>
<td>3 matches</td>
</tr>
</tbody>
</table>

- **PM control**: can be switched easily with each switch.
- **Input**: Use the input power supply with a capacity of 500VA or less.
- **Protection**: Use a protective relay with a capacity of 4A or more.
- **Power cord**: Use a power cord with a capacity of 4A or more.

#### Interface specifications

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC program input method</td>
<td>Keyboard, USB flash memory, Ethernet</td>
</tr>
<tr>
<td>Display</td>
<td>Touch panel, mouse</td>
</tr>
<tr>
<td>Display character type</td>
<td>Alphanumeric characters</td>
</tr>
<tr>
<td>Control method</td>
<td>CNC closed loop</td>
</tr>
<tr>
<td>Number of control axes</td>
<td>Max. 4 axes simultaneously</td>
</tr>
<tr>
<td>Safety supply</td>
<td>3 types</td>
</tr>
<tr>
<td>Maximum braking force</td>
<td>50 ton (0.005MPa)</td>
</tr>
<tr>
<td>Max. command value</td>
<td>±99999 999mm</td>
</tr>
<tr>
<td>Position command format</td>
<td>Combined use of incremental/absolute value</td>
</tr>
<tr>
<td>Interpolation function</td>
<td>Linear, circular, and spiral</td>
</tr>
<tr>
<td>Scale magnification</td>
<td>0.00001 ~ 999999999 (G code) 0.001 ~ 99999 (S code)</td>
</tr>
<tr>
<td>Optimum head feed speed</td>
<td>Automatic control of machine head feed speed</td>
</tr>
<tr>
<td>Path-path control</td>
<td>Reverse path control during a short-circuit</td>
</tr>
<tr>
<td>Wire insertion</td>
<td>±99999 999mm</td>
</tr>
<tr>
<td>Off site</td>
<td>3 types</td>
</tr>
<tr>
<td>Measurement result</td>
<td>1 to 99999</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>±99999 999mm</td>
</tr>
</tbody>
</table>

#### Control unit functions

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Management of consumable parts (time display)</td>
</tr>
<tr>
<td>Adaptive control</td>
<td>SL, CAME, EM, OM, PM</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>464 x 175 x 348 (16.8 x 7.3 x 13.7 inches)</td>
</tr>
</tbody>
</table>

#### Machine installation

**Precautions for Selecting Earth Leakage Breaker**

To prevent malfunctions caused by the external noise from control units, etc., a filter is installed in the power supply output. By grounding one end of this filter, an earthing leakage current of approx. 30mA to 40mA passes through the filter. A highly sensitive earth leakage breaker (TL type) is recommended for the EDM. A medium-sensitivity type earth leakage breaker (sensitivity current 10mA to 20mA) is recommended for the EDM. The current setting of earth leakage breaker must be determined individually.

**Disposal**

- The parts that make up the machine are not limited to such parts as the machine body, maintenance devices, etc. Those must be disposed of in accordance with national and local laws and ordinances.

**Harmonic Distortion**

If a harmonic distortion in the power supply, the machine operation could be affected. This distortion factor should be considered in the machine design. The following guidelines should be followed:

- **Standard for harmonic distortion**: The value of the harmonic distortion should be determined in the standards.
- **Recommended equipment**: Use power lines with a capacity of 10A or more, and use a power filter with a capacity of 10A or more.

**Recommended Wire Electrode**

Always use the following applicable wire electrode.

**Recommended Sliding Surface Lubricant**

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terrace Oil 68</td>
<td>Recommended Sliding Surface Lubricant</td>
</tr>
</tbody>
</table>

---

#### Checklist for Installing Machine

**Determining the machining details**

- Choose such a work that meets the work that is required.
- Make sure that the work is not damaged.
- Make sure that the work is not damaged.

**Preparation of installation fixtures**

- Preparation of consumable parts

**Preparation of consumable parts**

- Consumable parts:
  - Tool: Carbide, cBN, etc.
  - Wire: Steel wire, copper wire, etc.

**Training of programmers and operators**

- Train the programmers and operators.

**Confirmation of foundation work and power supply work**

- If there is any possibility of reliability damage, inspect prior to starting work.

**Confirmation of delivery path**

- Check the path inside and outside the facility to avoid any trouble during delivery.

**Installation Conditions**

1. **Installation site**

   - **Confirmation of floor area**
   - **Confirmation of environment (constant pressure, dust-proof room, measure for radio disturbance, prevention of external noise)**

2. **Determine the machining site**

   - **Foundation work**
   - **Confirmation of foundation floor**

3. **Determine the post-processing site**

   - **Grounding work**
   - **Application of training seminars**

4. **Determine the post-processing site**

   - **Application of training seminars**

5. **Check the installation location**

   - **Check the installation location**

6. **Check for local laws and ordinances**

   - **Check for local laws and ordinances**

---

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Wire-cut EDM SYSTEMS

*M Not all models are supported for all countries and regions.
*M Machine specifications differ according to the country and region, so please check with your dealer.
M Processing data provided in this brochure is for reference only.

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