Machining Accuracy
Next-generation drive system and optimum machine structure

Optical Drive System
- High-speed long-distance communications and a linear shaft motor synergistically improve machining accuracy.
- A servo amplifier and control unit developed by Mitsubishi Electric contribute to system optimization.

Linear Shaft Motor (LSM)
- Power consumption is reduced by utilizing a full 360° magnetic flux as the effective driving force.
- Highly accurate axis movement is possible without any backlash.
- Non-contact power transmission ensures stable and accurate axis movement for many years.

Thermal Stability System
- A chiller system is used to cool the dielectric fluid to remove the heat generated by the EDM machining process.
- This process is synchronized through thermal sensors on the machine structure (thermal baser).

Axis movement accuracy
- Ultra high-accuracy linear guides are carefully installed on precisely machined mounting surfaces to provide straightness accuracy of 1-2μm.
- The effort ensures precise linear movement by reducing waving of the linear guide.

Dynamic thermal protection (Dielectric fluid temperature control and Thermal displacement compensation function [MP1200])
Controlling temperature of machine structure synchronized with dielectric fluid temperature, stabilizing accuracy machining for a long period time by controlling relative displacement of upper and lower guides.

Highly rigid structure
MP1200 utilizes a split X/Y-axis construction method allowing both to be directly mounted to the T-shaped base casting for optimum stability. This combination moves the table in the X-axis and the column in the Y-axis. MP2400 utilizes a fixed table traveling column design for improved accuracy in large heavy workpieces.

MP Series

Circular accuracy
- Circular accuracy of 0.09μm (3000μm) is realized for circular machining
- Trenching accuracy is improved by servo control (AFCB)

X-axis pitch accuracy
- Pitch accuracy in X: ±1.5μm MP1200 (Bridge holder option for easy and precise setup)

Y-axis pitch accuracy
- Pitch accuracy adjustment function
- The pitch error compensation can be entered by the result on your measuring equipment.

Circular machining measurement of machine
High circular accuracy realized in entire X-Y stroke area

Accuracy measurement of circular machining

Wire electrode: α5.3[LODE] φ0.2[BS]
Workpiece: Steel (SKD11) φ20mm [0.79"]

Circle machining of ø20(φ0.79")
Machining Accuracy

Taper accuracy
- Taper accuracy of ±0.01° and dimensional accuracy of ±5μm are realized.
- ODS provides high accuracy even when cutting tapered shapes.
- Taper accuracy is improved regardless of work angle direction using Angle Master ADVANCE.

ODS provides high accuracy even when workpiece center is reduced significantly:

<table>
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<th>Δw</th>
<th>+2.0μm</th>
<th>+0.0μm</th>
<th>−2.0μm</th>
<th>−4.0μm</th>
<th>−6.0μm</th>
<th>+4.0μm</th>
<th>+2.0μm</th>
<th>+0.0μm</th>
<th>−2.0μm</th>
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<tbody>
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ODS improves machining speed with nozzle closing conditions.

H-FS power supply (High Power FS power supply)
- Surface roughness of Rz0.6μm is possible even with a 100mm area on MP series.

Super-DFS power supply (option for MV)
- Improved surface roughness: Rz0.8μm

Angle Master ADVANCE (option)
- Taper angle accuracy is more consistent in all taper directions.

Machining accuracy of thick workpiece
- CNC area of 120×100×100×80 (the work area)
- High-accurate straightness is realized by shape control power supply.

H-FS power supply (High Power FS power supply)
- Improved performance area on MP series.

Super-DFS power supply (Super Digital-FS power supply)(option)
- Improved surface roughness: Rz0.6μm (Ra0.1μm)
- Improved machining performance area on MP series.

Dimensional error control
- Moderate error is possible even when a 100mm area is used.

Shape control power supply (Digital-AE5)
- Wire electrode: ø0.2 (.008")/Mega TypeA, ø0.15mm (0.006")
- Workpiece: Steel (SKD11), t60mm (2.4")
- Surface roughness: Rz2.0μm
- Dimensional error control: ±0.005μm

Machining Control

Fully-automatic rough machining control (PM control: Power Master)
- No need to set machining conditions or have knowledge of EDM machining.
- Automatically recognizes machining conditions and makes adjustment for the optimum machining condition.

Examples of PM machining applications:
- 3D-PM:
  - Analysis of 3D data and recognizes shape characteristics.
  - Eliminates transition lines which appear easily in stepped machining areas.
  - Improves machining speed with nozzle closing conditions.
- Stepless control (SL: Stepless control)
  - Machining surface/straightness control

Over-cut (dimple) reduction control
- Workpiece thickness [mm]: 7.0μm
- Machining surface/straightness control
- Dimensional error control
- Improved performance by using PM control.

Machining surface/straightness control
- Dimensional error control
- Over-cut (dimple) reduction control
- Improved performance by using PM control.

Wire tension control (TS Master)
- Wire tension control
- Dimple reduction control
- Wire electrode: ø0.2 (.008")/MEGA TypeA
- Workpiece: Steel (SKD11), t60mm (2.4")
- Surface roughness: Rz0.8μm
- Dimensional error control
- Over-cut (dimple) reduction control

Corner machining control (CM3 control: Corner Master)
- Dimple reduction control
- Wire electrode: ø0.2 (.008")
- Workpiece: Steel (SKD11), t60mm (2.4")
- Surface roughness: Rz2.0μm
- Dimensional error control
- Over-cut (dimple) reduction control
- Improved performance by using CM3 control.

Machining accuracy improvement
- Improved accuracy by using PM control.
- Improved accuracy by using CM3 control.

Examples of machining applications:
- Cross-cut machining
- Conventional control
- Step, straightness: ±5μm ±0.005μm ±0.005μm
- Lift behind machining
- Maching accuracy improvement
- Machined surface after polishing
- TS master
- Wire electrode: ø0.2 (.008")
- Workpiece: Steel (SKD11)
- Surface roughness: Rz0.28μm
- Dimensional error control
- Over-cut (dimple) reduction control

Example of die machining
- Wire electrode: ø0.2 (.008")
- Workpiece: Steel (SKD11), t60mm (2.4")
- Surface roughness: Rz2.0μm
- Dimensional error control
- Over-cut (dimple) reduction control

Angular error
- Angle error
- Taper 10 degree

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