



Innovation

Progress of technology is still continuing! This is, "State-of-the-art machine, MA Series."

since
1972

Seibu made the world's first CNC wire Electrical Discharge Machine (EDM) in 1972 by our most-advanced technology and innovative ideas we have gained so far.

The extremely-high precision is the fruit of our traditional techniques and the passion for manufacturing.

Seibu will continue to take extra step in EDM manufacturing to give the greatest satisfaction to our valued customers.

Search

$\pm 1\mu\text{m}$ Search for higher level of cutting accuracy

We have been searching for better cutting accuracy to suit the conditions such as workpiece material, size, and cutting shape. Pitch accuracy of $\pm 1\mu\text{m}$ is achieved.



Inheritance

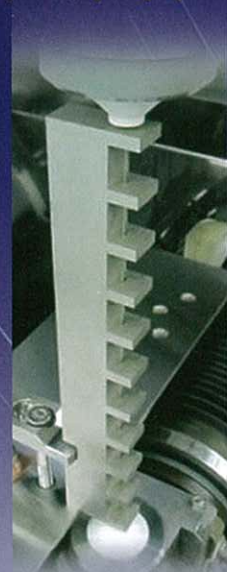
Inheritance of the passion for manufacturing and experienced technique

We place much value on the inheritance of traditional scraping technique called "Kisage". Highly accurate flat finish can be attained by "Kisage". This is unattainable by machining process.

Seibu original "Automatic Wire Feeding Device" with the world's best technology has a very simple and trouble-free structure.

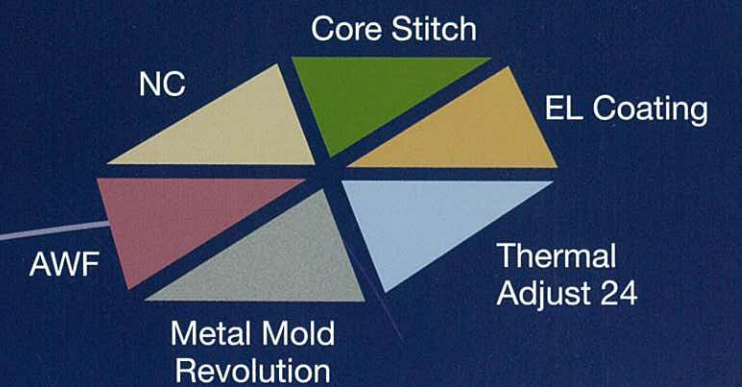
Therefore, it is highly praised as easy maintenance and very reliable machine. The advantage has been passed from M series to MA series.

AWF



KISAGE

Evolution



Unique

"Unique" as the company's motto!

We provide various original functions to solve high-level problems. Innovative functions were developed from our long years of experience.

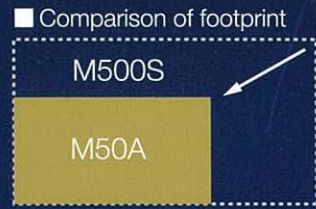
MA series, the most-advanced machine, can solve the challenges of accuracy, efficiency, and operability.



We value harmony with people and the environment.

MA series has evolved to the machines that are good for people and the environment along with accuracy and efficiency.
The space-saving design and layout provides an ideal working conditions to workers.

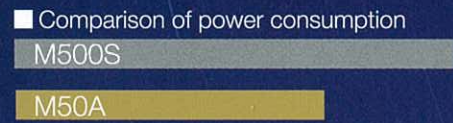
Space Saving Vertical sliding door for work tank has improved operability and realized the space-saving of 35%*.



35%
DOWN

Energy Saving Newly developed power supply can cut power consumption by up to 23%*.

23%
DOWN



Better Operability Equipped with the most advanced CNC which has increased processing power. Large screen display (15 inch) has further improved operability and information-displaying capacity.

SPEED UP!
2 to 10
times*

* : our company-compared

MA series

M35A · M50A · M75A

Standard type with high speed, high precision, high function

- Pitch cutting accuracy $\pm 3\mu\text{m}$
- Wire diameter 0.1 mm to 0.3 mm



M50A

LINEUP

3 types, 8 models, satisfactory lineup

MMA series

MM35A · MM50A · MM75A

High-performance type: highly accurate cutting even for large-size plate.

- Pitch cutting accuracy $\pm 2\mu\text{m}$
- Wire diameter 0.07 mm to 0.3 mm



MM75A

SuperMMA series

SuperMM35A · SuperMM50A

High-end type that achieves micro fabrication of $\pm 1\mu\text{m}$

- Pitch cutting accuracy $\pm 1\mu\text{m}$
- Wire diameter 0.05 mm to 0.3 mm

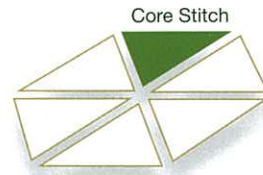


SuperMM35A



Revolution in Core Processing! Core Stitch

Patent pending option



Core stitch function means that cutting-off process is not necessary!
Instead of leaving uncut part, cutting can proceed while the brass wire is being welded.
So, you have only to tap on the core to remove it. This can greatly reduce the time!

Problem:

When operator completes the rough cut for all shapes leaving uncut part, he has to move the axis manually for each shape to finish the uncut part and has to remove the core. This causes the following problems.

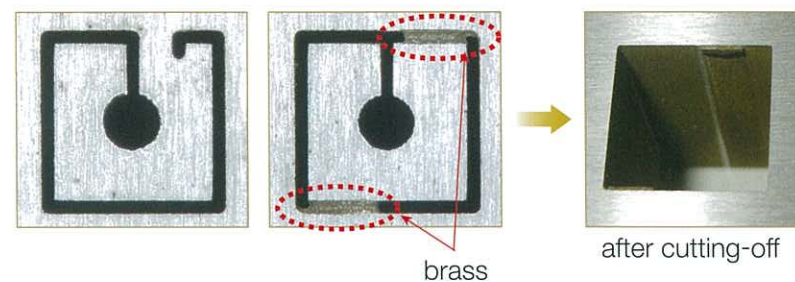
- (1) It requires human hand. So, the more shapes, the more time it requires.
- (2) Operator's mistake tends to happen due to manual operation.
- (3) Repeated simple task is troublesome.

Improvement:

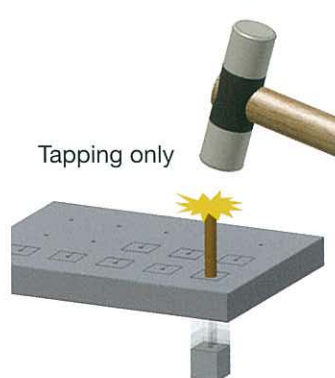
Since the brass can be welded on the part 1 mm from the upper face, it is possible to cut off the welded part by only tapping on the cores. This provides the following improvement.

- (1) You can solve the conventional problems quickly. (e.g. man-hour reduction, mistake prevention, relief of simple task)
- (2) Simplification of NC program (Programming for uncut part is not necessary.)

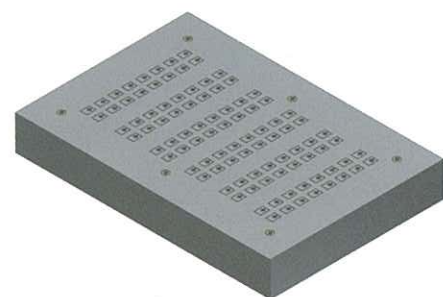
■ Portion left uncut ■ Core stitch



Simple task by only tapping on the core!

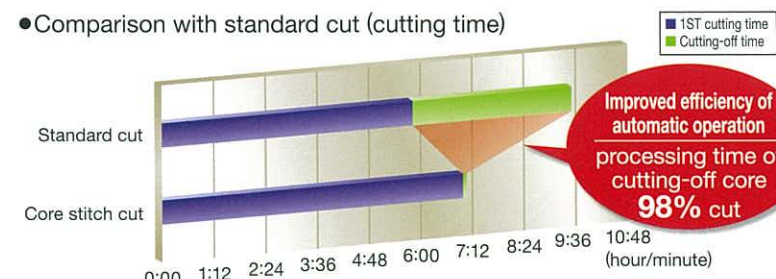


■ Proven data

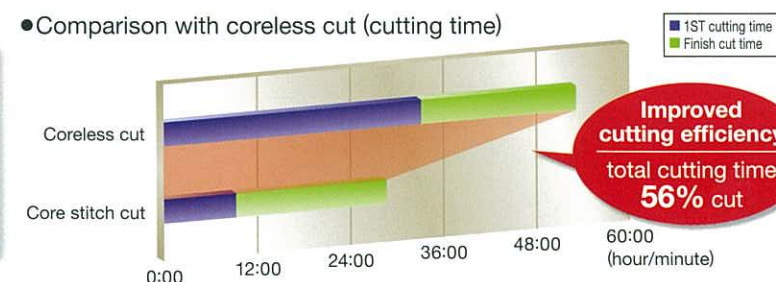


Wire electrode: ϕ 0.20mm (brass wire)
Workpiece : SKD11 T20mm
Cutting shape : \square 3mm \times 4mm (96 pcs)
 ϕ 3 (6pcs)

● Comparison with standard cut (cutting time)

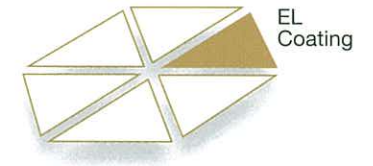


● Comparison with coreless cut (cutting time)



Measure against Tungsten Corrosion EL Coating

Patent pending option



EL coating is a new technology that prevents cobalt (Co) from dissolving in water by means of coating the cutting surface with brass.
This makes it possible to cut in water (not in oil), which makes maintenance work very easy.
Furthermore, the life of metal mold can be lengthened.

Problem:

When tungsten carbide material is cut in water, the cobalt (as binder) starts to dissolve in water. As a result, the material becomes weak.

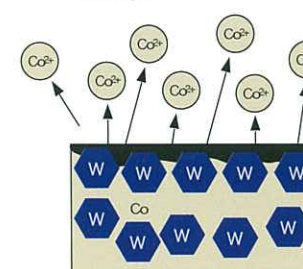
Improvement:

It makes it possible to cut in water by coating the cutting surface with brass. You can also obtain much better result with the use of anticorrosion material. Compared with cutting in oil, maintenance work is very easy. Nevertheless, you can have equal life of oil cutting.

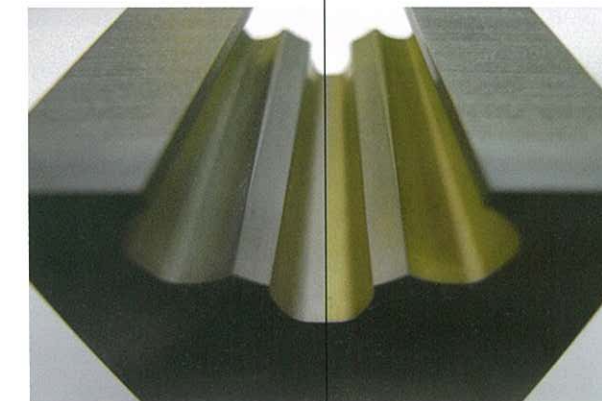
● Sample photo



● Image



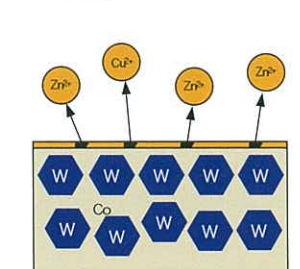
without coating ← → with coating



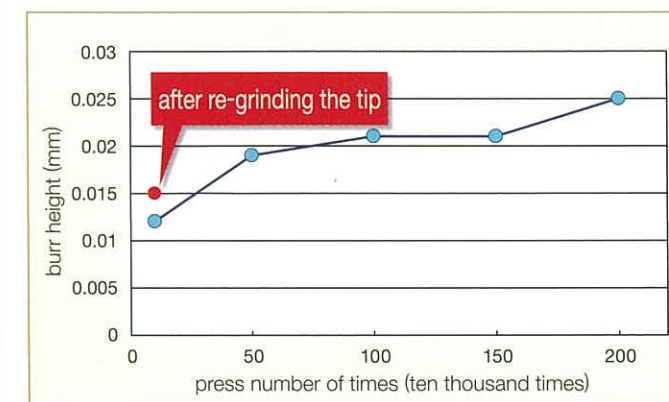
● Sample photo



● Image



■ Proven data by press test



■ Conditions of press test

Metal mold : anticorrosion tungsten carbide (RG5)
Pressed material: 35H360 (silicon steel plate 0.35mm)
press speed : 400 times/min.
Equal life compared to the life of metal mold cut in oil !!

ONLY ONE Thermal displacement can be corrected by NC. Thermal Adjust 24

(Correction by temperature monitoring system)

Patent pending option



Thermal Adjust 24 is a function to maintain wire verticality by correcting the thermal displacement caused by the temperature change between upper and lower head.

Problem:

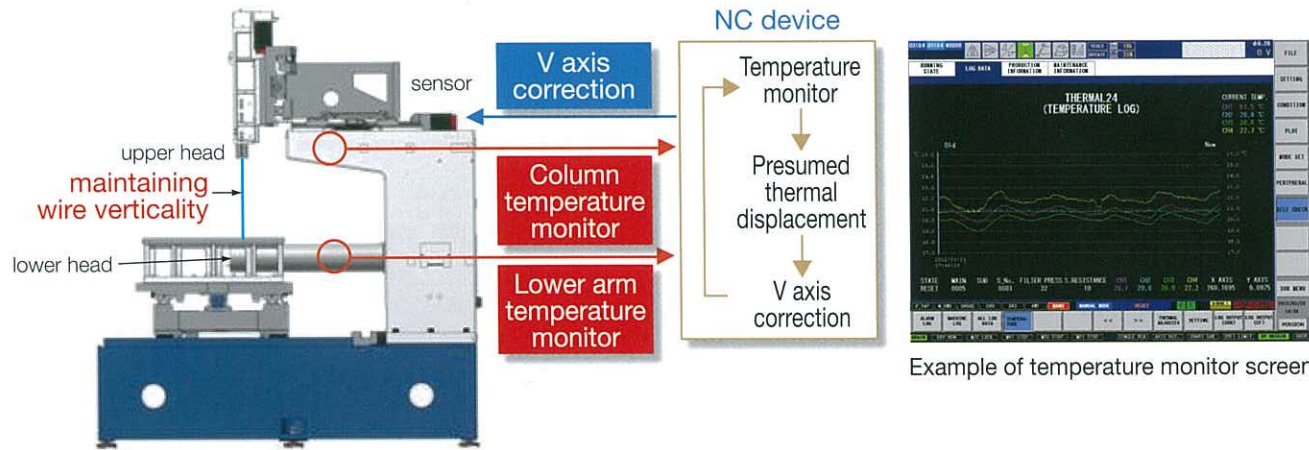
In the case of long-time cutting, wire verticality can't be maintained because machine has thermal displacement due to the ambient temperature change. It costs a lot of money to have a temperature-controlled room to solve this problem. It is also costly to maintain the room.

Improvement:

You have only to enable "Thermal Adjust 24" function to maintain the wire verticality for 24 hours.

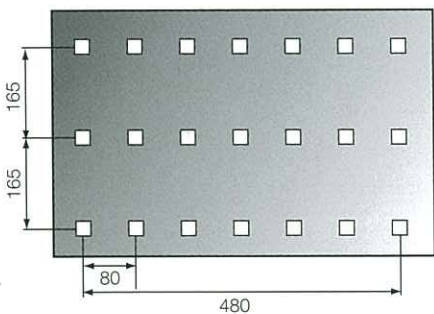
Mechanism of Thermal Adjust 24

It is possible to maintain wire vertical accuracy by correcting V axis to eliminate the vertical variation due to the thermal displacement of the machine. (But, at least you need factory environment with the temperature within the range of 4°C.)

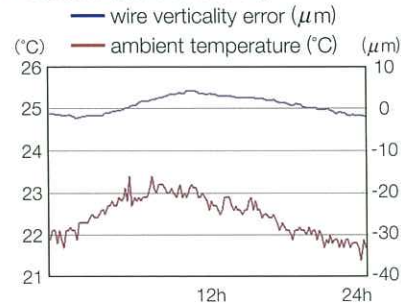


Actual cutting test

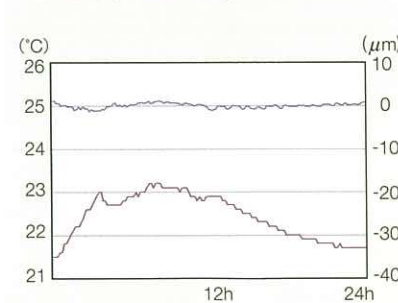
In the cutting of 21 pieces of square holes, the room temperature was changed 3°C for the cutting that takes more than 20 hours.



Disable (no correction)



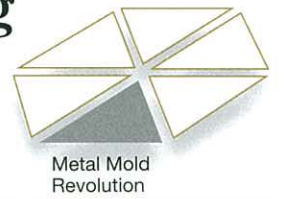
Enable (correction)



Wire verticality error: Thermal Adjust 24 Disable: 6.5 μm Enable: 2.5 μm Wire verticality error was improved 62%.

SuperMM Series

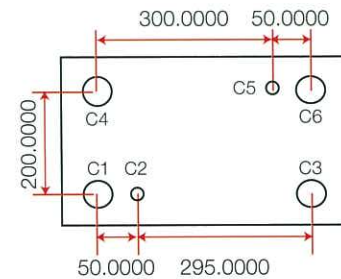
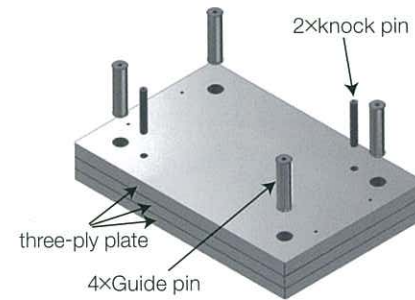
Metal mold production without jig grinding machine (three-ply plate)



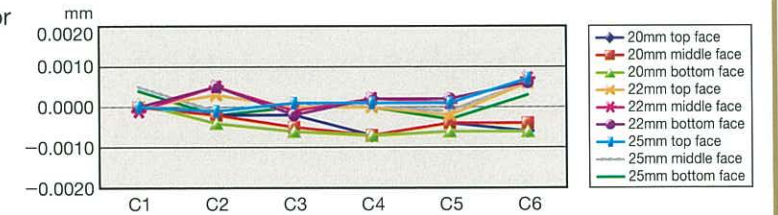
SuperMM35A/MM50A that achieves microfabrication needs no refinishing by jig grinding machine, which greatly contributes to man-hour reduction.

Plate cutting accuracy

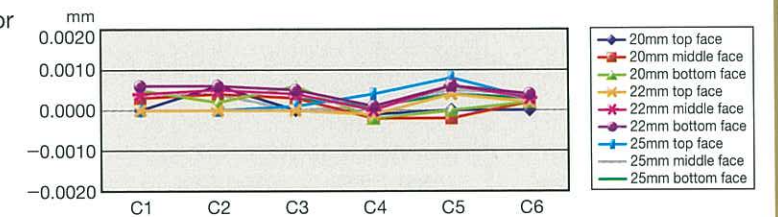
Inserting the pins into three plates separately cut with different thickness (T20,22,25 mm) shows the following measurement result.



X axis error



Y axis error



	MIN	MAX	RANGE
X axis error (top, middle, bottom×3)	-0.0007	0.0007	0.0014mm
Y axis error (top, middle, bottom×3)	-0.0002	0.0008	0.0010mm

Material : SKD11
Thickness : 20 to 25mm
Number of cuts : 6 times
Wire diameter : φ 0.2

Ra 0.19 μm
Rz 1.57 μm

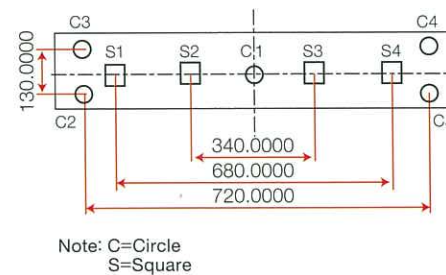
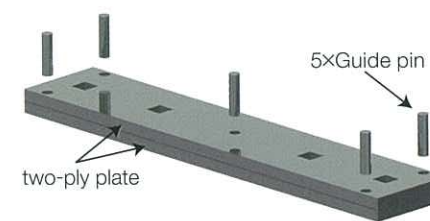
MM Series

Large plate cutting (two-ply plate)

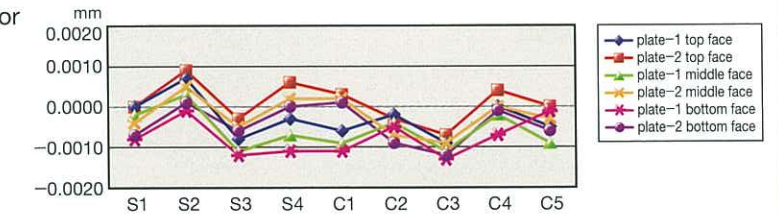
Metal mold more than 500 mm long is usually separately manufactured (die plate, stripper plate, punch plate). But, Seibu MM75A makes it possible to manufacture precision metal mold up to 750 mm long.

Plate cutting accuracy

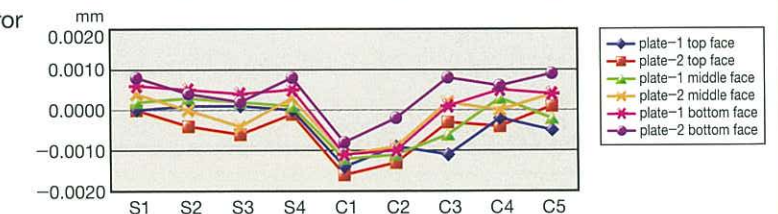
Inserting the pins into two plates separately cut with different thickness shows the following measurement result.



X axis error



Y axis error



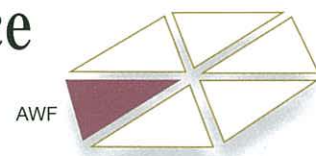
	MIN	MAX	RANGE
X axis error (top, middle, bottom×3)	-0.0013	0.0009	0.0022mm
Y axis error (top, middle, bottom×3)	-0.0016	0.0009	0.0025mm

Material : SKD11
Thickness : 20.0mm
Number of cuts : 6 times
Wire diameter : φ 0.2

Ra 0.19 μm
Rz 1.72 μm

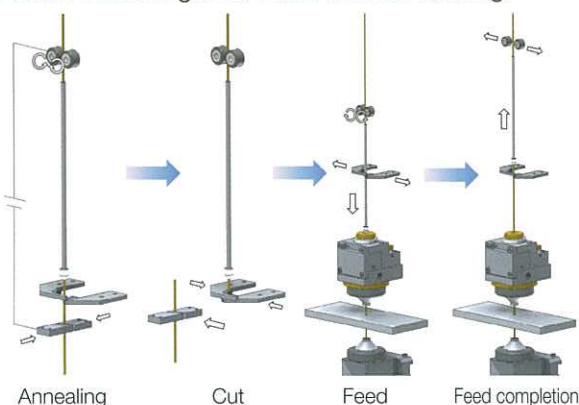
AWF Greatly Improved Automation Efficiency Automatic Wire Feeding Device

We successfully developed the world's fastest AWF device in 1995. Our AWF with useful functions to enhance feeding efficiency and automatic operation ensures customer satisfaction.



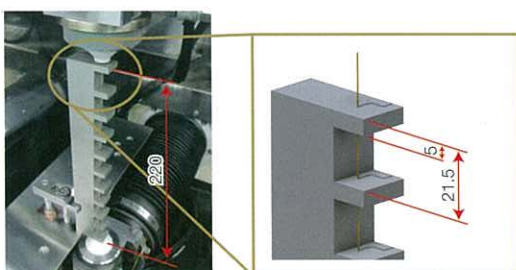
Automatic wire feeding (AWF)

An annealing current is repeatedly passed through the wire, and the wire is pulled while being heated to straighten it using dry annealing method. This results in a straight wire and smooth feeding.



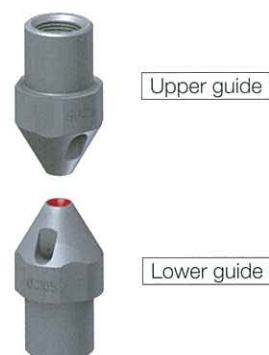
Reliable feeding to difficult workpiece

It is possible to feed automatically to the slit of comb-shaped workpiece.



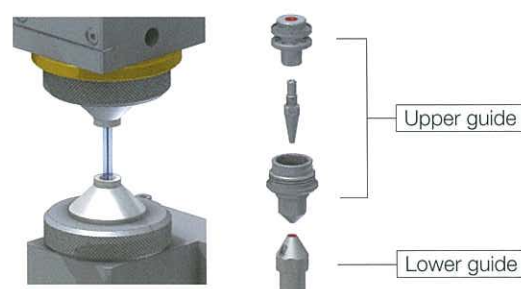
Round diamond die guide

Accuracy-focused round guide has been adopted. (common to upper and lower guides)



Jet feed guide

Water jet is flushed from upper head nozzle to enhance the success rate of feeding. [Option for SuperMM (equipped as standard for $\phi 0.05\text{mm}$ spec.), Guides are not common to upper and lower guide.]



All-in-one AWF

Feed at wire break point

Wire can be reliably supplied even at wire break point. This is an essential function for core stitch cutting.

Wire feeding in water

It is possible to feed wire in water owing to anneal dry method.

Friction sensor

Wire can be reliably inserted into narrow slits or hole.

Skip figure function

Automatic operation can continue without stopping even at an unexpected trouble.

Thin wire feeding ($\phi 0.05$)

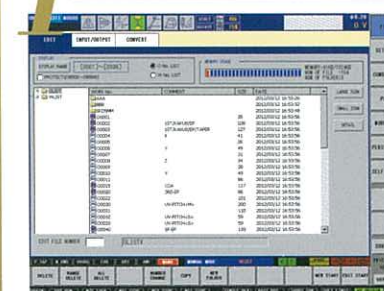
It contributes to the automatization of microfabrication.

NC Further Improved Operability 15-inch TFT-LCD Touch Panel

For all operators, the design is simple and easy to understand. The operation panel has GUI for Windows. You can do necessary operation smoothly as shown below.



1 Program input



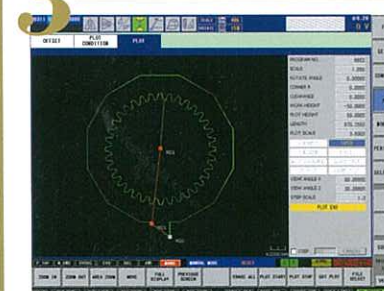
NC program can be input through CF card, USB memory, Ethernet. File management is effectively done by folder hierarchy.

2 Search of cutting conditions



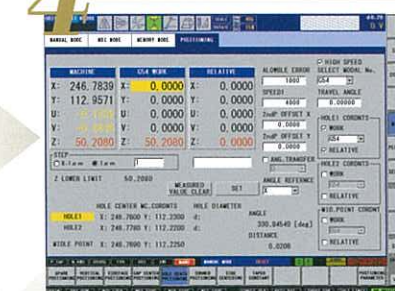
Best suited cutting conditions can be extracted by simple method of selecting workpiece material, wire diameter, workpiece thickness, finishing method.

3 Graphic display of plotting



The plot before cutting can be checked on the background at high speed. You can check the detailed part by simply touching the screen.

4 Positioning



Various types of positioning is available. The setup before cutting becomes greatly efficient.

5 Cutting



Various changing information during cutting can be displayed on one screen. You can see the cutting status and various settings at first sight. It is also easy to control cutting energy using slider bar. These functions will be helpful to beginners.

Maintenance information



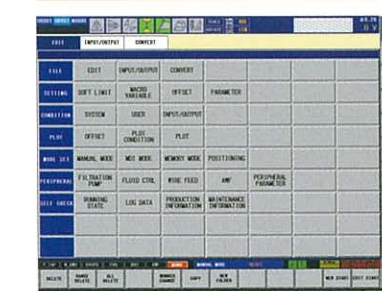
Displays maintenance period by alarm. It informs you of the time for parts replacement and the time for daily inspection.

Peripheral equipment



Each equipment is displayed in 3D. The sensor status and each item can be visually checked.

Compatibility



You can move to your desired screen at one touch of a button. It is compatible with conventional models.

35A

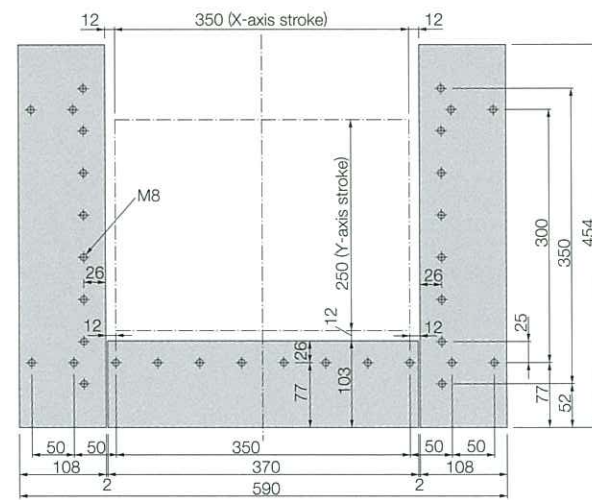
■ Wire diameter ($\phi 0.2$ mm is standard.)

MA	MMA	SuperMMA
$\phi 0.1$ to 0.3 mm	$\phi 0.07$ to 0.3 mm	$\phi 0.05$ to 0.3 mm

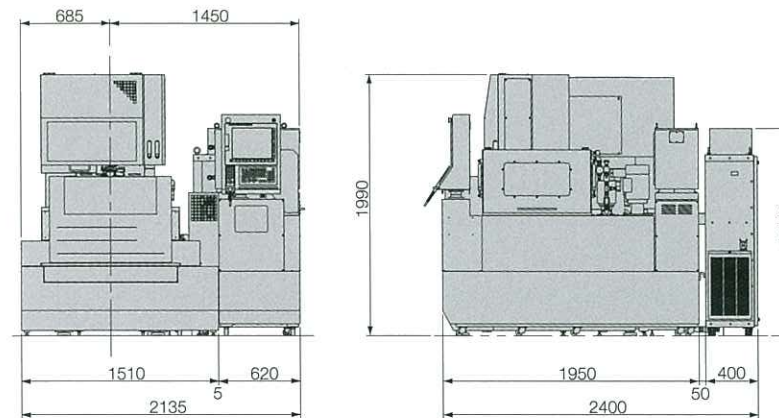
■ Standard Specifications

Model	M35A, MM35A, SuperMM35A
Max. workpiece dimensions WxDxH	600x550x220 mm
Max. workpiece weight	350 kg
Axis travel range XxYxZ	350x250x230 mm
Automatic wire feeding device	AWF-4 Equipped as standard
U-V axis travel UxV	$\pm 60 \pm 60$ mm
Max. taper angle	$\pm 10^\circ$ (220 mm work thickness) ($\pm 45^\circ/40$ mm option)
Dimensions WxDxH	1,370x1,765x1,990 mm
Weight	2,900 kg

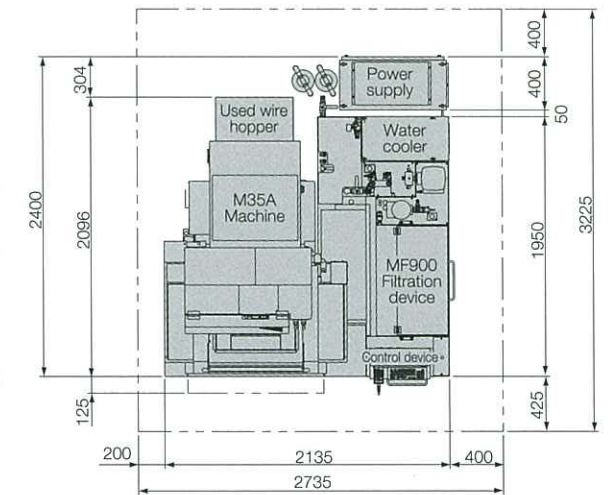
■ Work Table



■ Dimension



■ Layout



50A

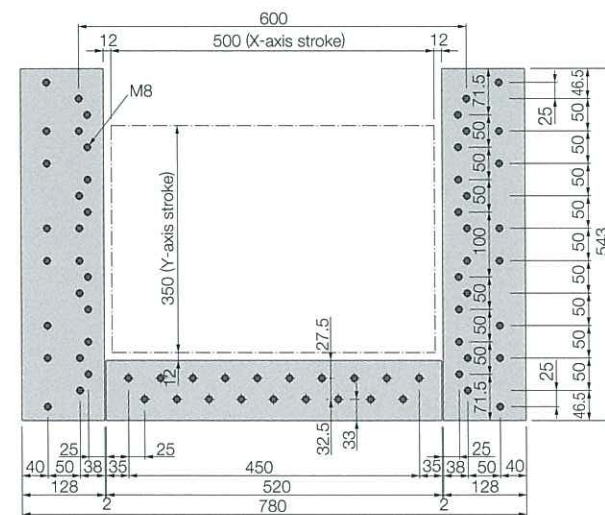
■ Wire diameter ($\phi 0.2$ mm is standard.)

MA	MMA	SuperMMA
$\phi 0.1$ to 0.3 mm	$\phi 0.07$ to 0.3 mm	$\phi 0.05$ to 0.3 mm

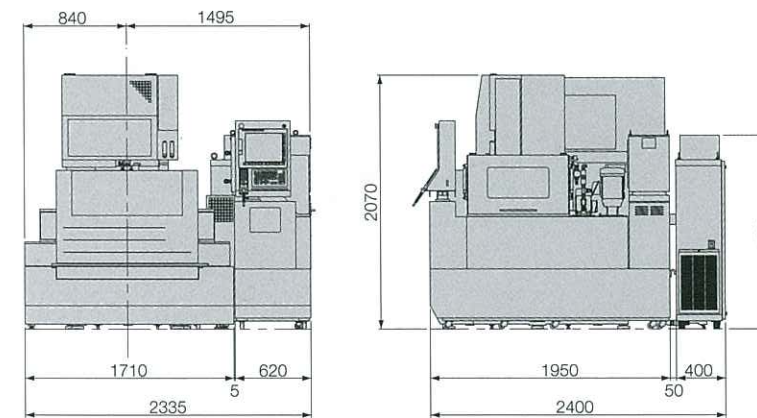
■ Standard Specifications

Model	M50A, MM50A, SuperMM50A
Max. workpiece dimensions WxDxH	800x650x300 mm
Max. workpiece weight	800 kg
Axis travel range XxYxZ	500x350x310 mm
Automatic wire feeding device	AWF-4 Equipped as standard
U-V axis travel UxV	$\pm 60 \pm 60$ mm
Max. taper angle	$\pm 10^\circ$ (300 mm work thickness) ($\pm 45^\circ/40$ mm option)
Dimensions WxDxH	1,680x1,915x2,070 mm
Weight	3,400 kg

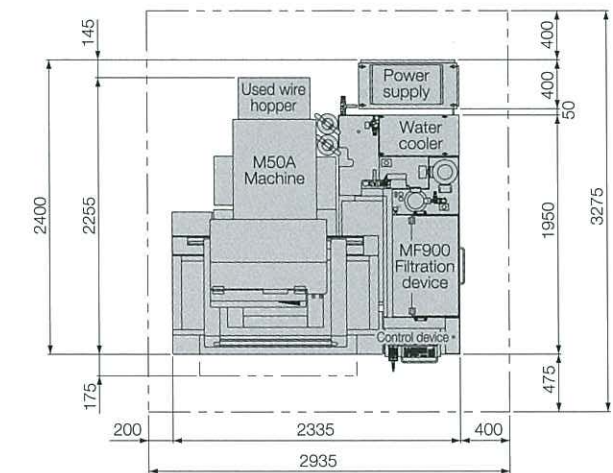
■ Work Table



■ Dimension



■ Layout



75A

■ Wire diameter ($\phi 0.2$ mm is standard.)

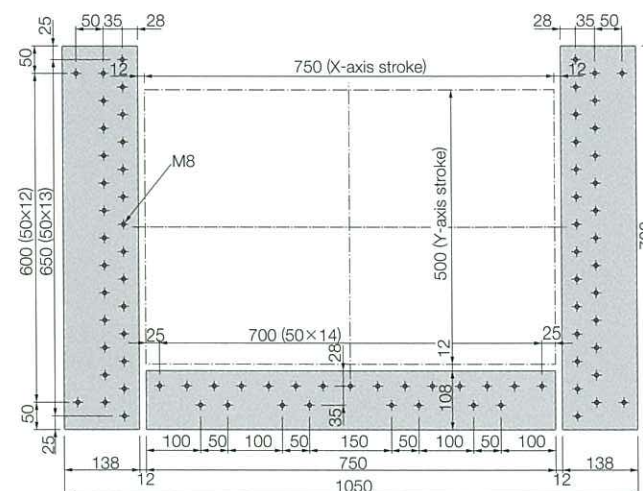
MA	MMA
$\phi 0.1$ to 0.3 mm	$\phi 0.07$ to 0.3 mm

■ Standard Specifications

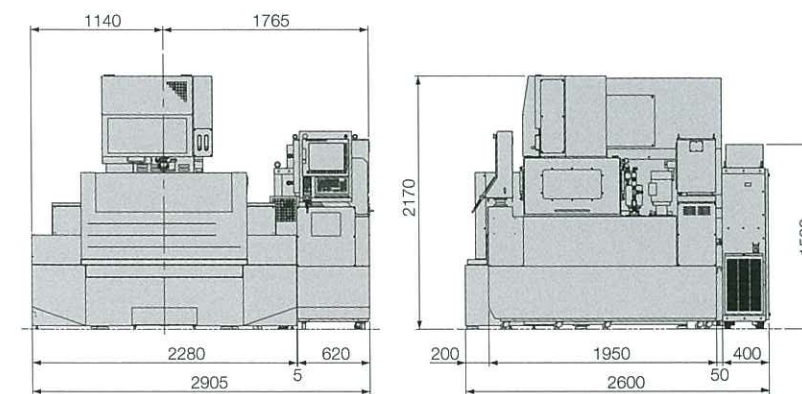
Model	M75A, MM75A
Max. workpiece dimensions WxDxH	900x700x250*(300) mm
Max. workpiece weight	1,000 kg
Axis travel range XxYxZ	750x500x310 mm
Automatic wire feeding device	AWF-4 Equipped as standard
U-V axis travel UxV	$\pm 60 \pm 60$ mm
Max. taper angle	$\pm 10^\circ$ (300 mm work thickness) ($\pm 45^\circ/40$ mm option)
Dimensions WxDxH	2,280x2,200x2,170 mm
Weight	5,100 kg

*: Flushing cut available for workpiece of 250 to 300 mm high.

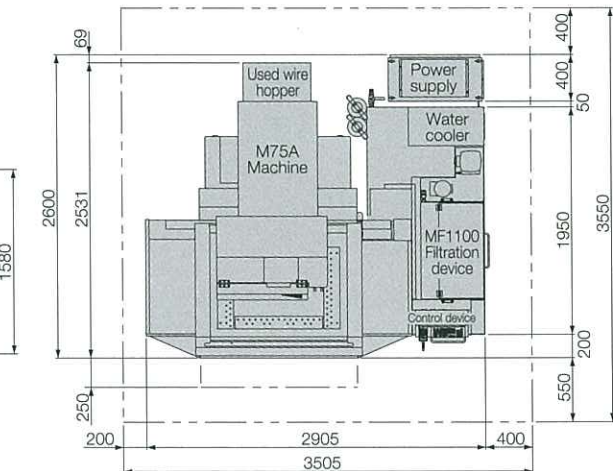
■ Work Table



■ Dimension



■ Layout



Common Specification

Filtration device

Model	MF900
Applicable model	M35A, MM35A, SuperMM35A, M50A, MM50A, SuperMM50A
Tank capacity	900 L
Filter element	2 paper filters (option=4) ϕ 340x300 mm
Deionizer	Ion-exchange resin 20 L

Model	MF1100
Applicable model	M75A, MM75A
Tank capacity	1,100 L
Filter element	2 paper filters (option=4) ϕ 340x300 mm
Deionizer	Ion-exchange resin 20 L

Control device

Model	M8A
Input system	MDI, memory card, Ethernet, USB
Display	15 inch color TFT LCD (Touch panel)
Axes controlled	5 axes (simultaneously 4 axes)
Least input increment	0.001/0.0001 mm
Least command increment	0.0001 mm
Program memory capacity	1Mbyte
Input power source	3-phase 200/220 V \pm 10%, 13.5 kVA, 50/60 Hz

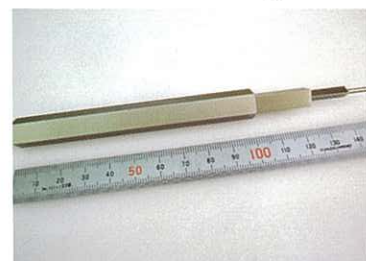
Cutting example

Different thickness cutting



Model	M50A
Material	SKD11
Wire dia.	BS ϕ 0.20
Thickness	20 to 60 mm
Surface roughness	Rz 3.0 μ m
Cutting time	22 hours

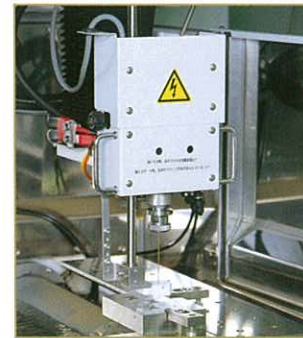
Combination cutting



Model	M50A
Material	SKD11
Wire dia.	BS ϕ 0.20
Thickness	100 mm
Surface roughness	Rz 2.0 μ m
Cutting time	8.5 hours

Options

SHM



The SHM is a start-hole drill that can be mounted on a machine in one second. The wiring, piping, and connections to the electrodes (ϕ 1.0x300 mm) are simplified. The positioning for the X, Y, and Z-axes to a work point on the workpiece can be made manually or from the touch panel.

Unit for filter replacement



This unit helps workers to replace the used filter easily. Using chain block can lighten the worker's work load. It is also easy to mount to filtration device.

Best surface finish cutting



Model	MM50A
Material	WC (VGH2)
Wire dia.	BS ϕ 0.20
Thickness	65 mm
Surface roughness	Rz 0.44 μ m
Cutting time	1.8 hours

Wide angle 45° taper cut (option)



Model	M50A
Material	SKD11
Wire dia.	MEGA T ϕ 0.20
Thickness	40 mm
Surface roughness	Rz 4.5 μ m
Cutting time	5 hours

Options

○ Standard ○ Option (available after shipment) ● Option (not available after shipment) × not available

Options	MA	MMA	Super MMA	Remarks
SF Unit	○	○	○	Unit for finish cut
Core stitch	●	●	●	Refer to page 6.
EL coating	○	○	○	External alarm output unit and SF unit are necessary. (Refer to page 7.)
Thermal 24	●	●	●	Monitors the temperature of machine inside and the ambient temperature.
Thermal Adjust 24	●	●	●	This has to be used along with Thermal 24.
Wide angle taper nozzle	○	○	○	Wide angle nozzle for standard die guide
Large taper cutting *1	○	○	○	Large taper cut up to 45 degrees is available.
Power off unit	○	○	○	Power can be automatically cut off by the command of NC program.
External alarm output unit	○	○	○	This is an I/O unit for external signal.
Signal lamp (3 lamps)	○	○	○	Indication lamp
ϕ 0.10, ϕ 0.15, ϕ 0.25, ϕ 0.30 *2	○	○	○	You can choose the wire diameter. (ϕ 0.20 is standard)
ϕ 0.05 thin wire specification [See Table 1.]	×	×	●	This is necessary when using ϕ 0.05 wire.
ϕ 0.07 thin wire specification [See Table 1.]	×	●	○	This is necessary when using ϕ 0.07 wire.
ϕ 0.10 thin wire specification [See Table 1.]	●	●	○	This is necessary when using ϕ 0.10 wire.
Auxiliary flushing device [See Table 1.]	●	●	○	Wire feeding can be helped by auxiliary flushing.
Suction unit of wire take-up for thin wire [See Table 1.]	●	●	○	Wire can be easily discharged when using thin wire (ϕ 0.05 to 0.1).
Jet feed unit for thin wire [See Table 1.]	×	×	●	Wire feeding can be helped by water jet when using thin wire (ϕ 0.05 to 0.1).
20 kg roll wire feeder	○	○	○	
Inclination compensation software	○	○	○	Can correct the pitch error of X,Y axes.
Mail function software	○	○	○	The machine status can be sent to the designated mail address.
Straightness compensation software	○	○	○	Straightness of X,Y axes can be corrected.
Program memory size 2, 4, 8Mbyte *3	●	●	●	Memory of NC program can be added. (Standard=1Mbyte.)
Extended number of program registration *4	○	○	○	The number of registration of NC programs can be extended. (Standard=1000)
X-Y linear scale	●	○	○	
U-V linear scale	●	●	○	
Sub work table	○	○	○	
Height adjustment jig	○	○	○	Jig for adjusting flatness when plate cutting
Automatic vertical square jig	○	○	○	Wire verticality can be automatically measured.
Sponge sheet for drain	○	○	○	Wire sludge can be removed.
Cartridge filter unit	○	○	○	Finer sludge can be removed.
Start hole device (SHM)	●	●	●	Simple type start hole cutting device
Unit for mounting SHM	●	●	●	SHM function is available. (without SHM device.)
Working fluid cooling device	○	○	○	
Deionizer	○	○	○	Including ion exchange resin 10Lx2
External lamp for work tank	○	○	○	LED lamp
Internal lamp	○	○	○	LED lamp
Unit for filter replacement	○	○	○	Filter can be easily replaced.
Specified color	●	●	●	

*1 : This cannot be added later when UV linear scale is provided.

*2 : Adjustment of automatic feeding is done for the specified diameter only before shipment. If you think the other diameter may be needed in future, specify the diameter.

*3 : 2, 4Mbyte are available after shipment. (not 8Mbyte)

*4 : Program memory capacity can be extended up to 2000 for 1Mbyte. For 2, 4, 8Mbyte, it can be extended up to 4000.

Table 1: Details for each wire diameter

Wire diameter	Auxiliary flushing device	Suction unit of wire take-up for thin wire	Jet feed unit for thin wire (Note)
ϕ 0.05	○	○	○
ϕ 0.07	○	○	●
ϕ 0.10	●	●	●
ϕ 0.15 to 0.30	●	×	×

Note : This option is available only for SuperMM.



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