MITSUBISHI ELECTRIC
Changes for the Better

Automating the World

FACTORY AUTOMATION

Wire-cut EDM Systems
MV series

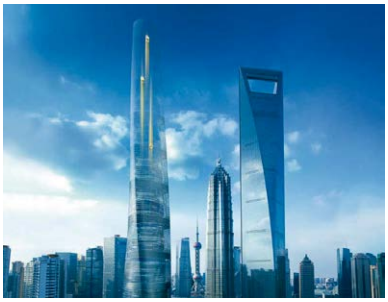
MV
series

Maisart

D-CUBES

▶MV series

Automating the World



Our Factory Automation business is focused on "Automating the World" to make it a better, more sustainable environment supporting manufacturing and society, celebrating diversity and contributing towards an active and fulfilling role.

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.

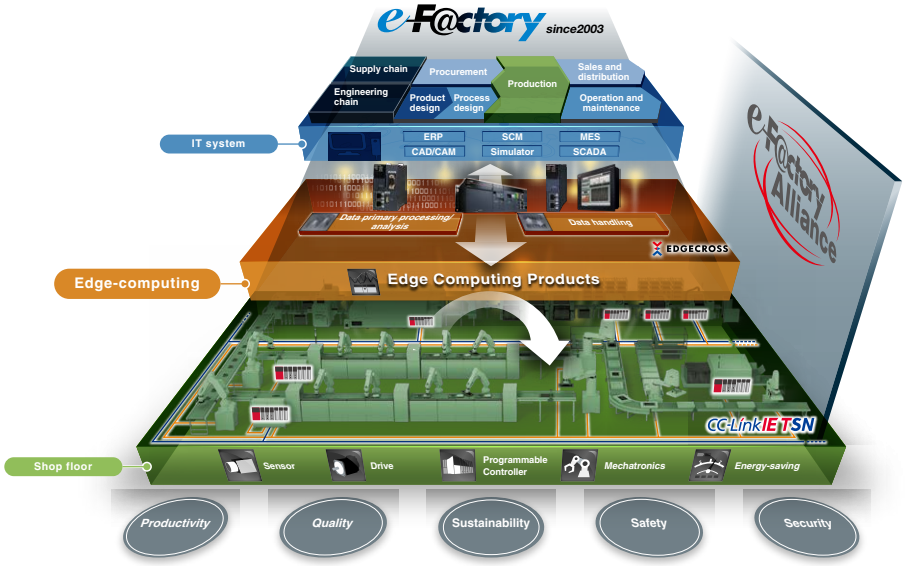
Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

SUSTAINABLE DEVELOPMENT GOALS

The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

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 line up, 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.

INDEX

New generation makes it's mark in a continuously updated lineage.

1972–

1972
DWC50S-LT1
Line tracer type wire-cut EDM

1974
DWC50H-DNC2

1976
DWC100H-CNC2
Taper machining unit

1979
DWC90-CNC1
Max. machining speed 60mm²/min

1980
DWC110N-CNC1

1990–

1990
DWC90HA
32 bit CNC

1990
DWC90SB
Automatic wire threading unit (water jet type)

1990
DWC110SZ
Automatic wire threading unit "AF2"

1991
DWC110SA

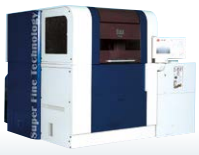
1992
DWC400HA

1994
SX20
Anti-electrolysis power supply (AE power supply)

2000–

2000
FA20
Max. machining speed 325mm²/min
Automatic wire threading unit "AT"

2002
FA20P



2002
PA20

2003
FA30V
World's fastest "V500" power supply

2004
PA05S

2010-

2012
MV1200R

2012
PA10 ADVANCE

2013
MX600
Oil wire-cut EDM

2014
MP1200

D-CUBES

2016
MV1200R

1982
DWC90FSK-CNC1
Max. machining speed 110mm²/min
Optimum surface roughness of Ra0.25μm

1984
DWC90G

1984
DWC90H
Max. machining speed
250mm²/min

1986
DWC90PH

1987
DWC110PH

1989
DWC90C

1995
CX20

1996
DWC90PA

1996
FX10

1997
PX05
Ultrahigh accuracy wire-cut EDM
(Full-cabin)

1998
FX20K

1999
QA20
64bit CNC

1999
RA90AT

2004
FA20S

2005
FA10PS
Super fine finishing
power supply "Digital-FS"

2005
FA50V
Large-sized wire-cut EDM

2007
FA20S Advance
FA20S Advance

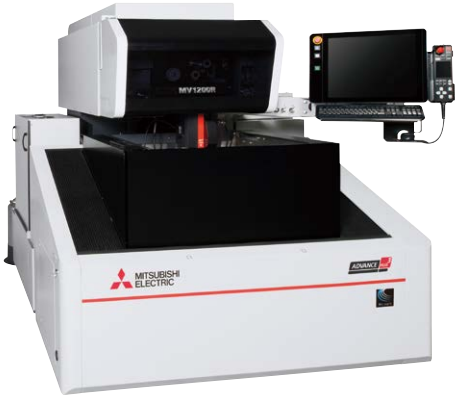
2007
BA8

2008
NA2400P
Linear Shaft Motor

2017
MP1200

2019
MV1200R
Plus2

2023
MV1200R



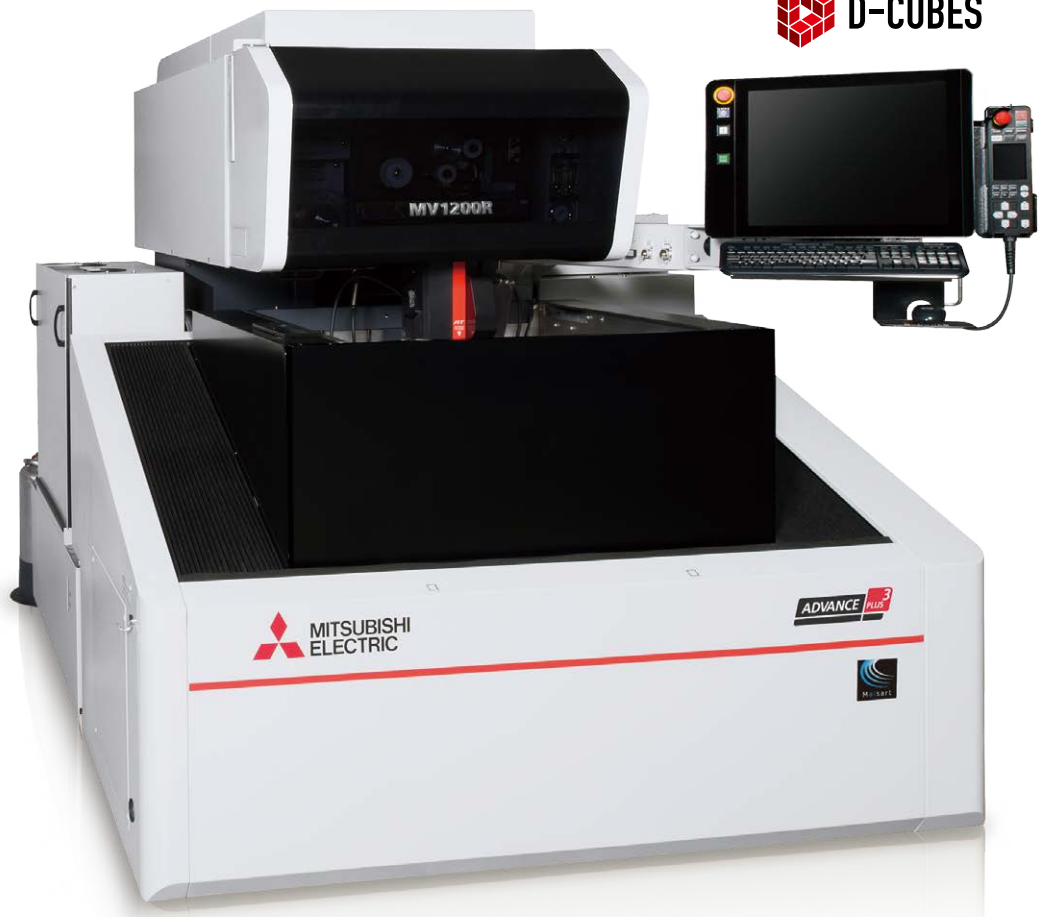
MITSUBISHI ELECTRIC Wire-cut EDM Systems

MV series

Innovated basic performance for Wire-cut EDMs

Maisart

D-CUBES



MV series

Wire-cut EDM Systems Line up

Model Line up covers your machining needs from parts production machining to super-accurate mold making

Ultra-high accuracy machines

MX 600 Oil

Flagship model incorporating
extreme accuracy machining

MP series

series MP Water Technology

Maisart

D-CUBES

High-class model incorporating
a ultra-high accuracy machining

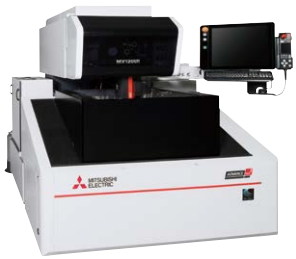
High-performance machine

MV-R series

High-performance model innovating the
next-generation of high-performance machines

Maisart

D-CUBES

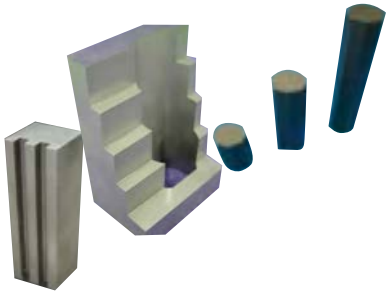


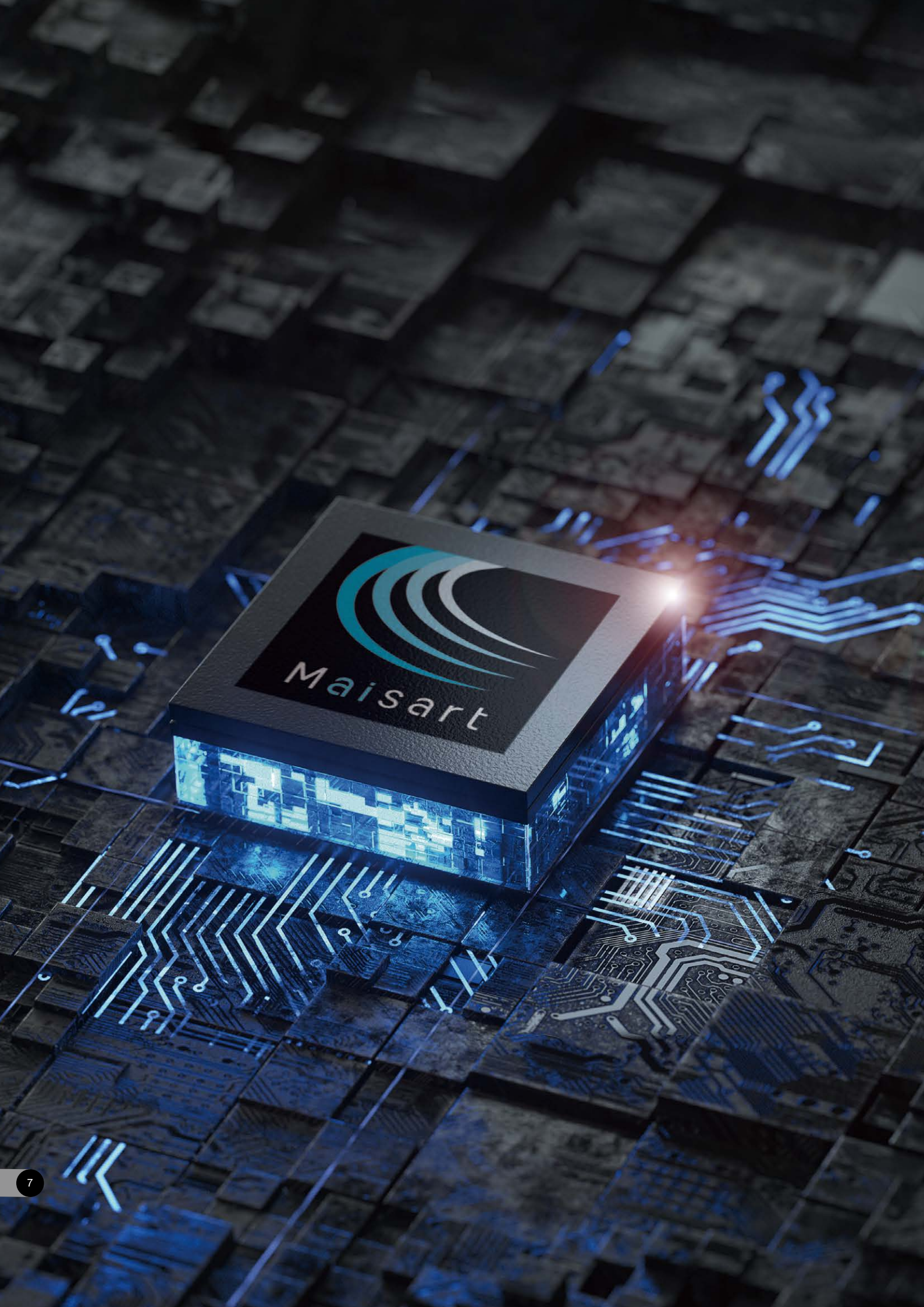
High-productivity machine

MV-S series

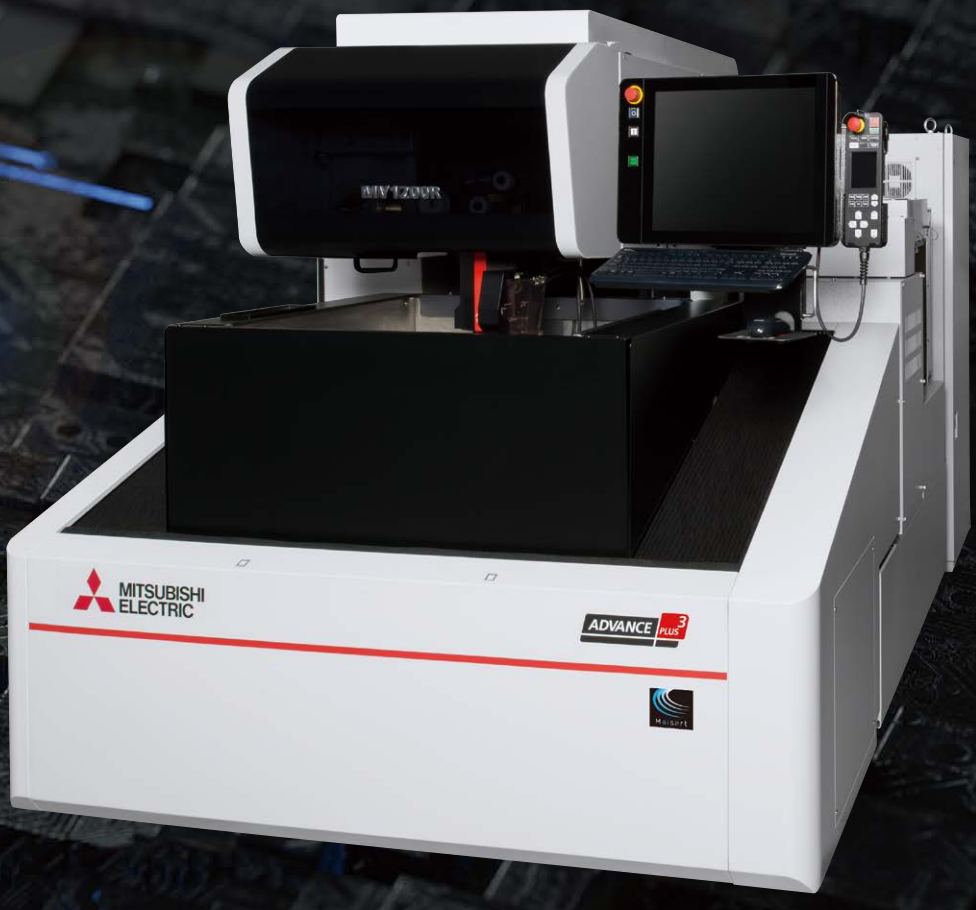
Standard model pursuing
a cost performance machining system

D-CUBES




Maisart

Future manufacturing built with AI



MV series

Product Line up

High quality machining is the “MV-R” series

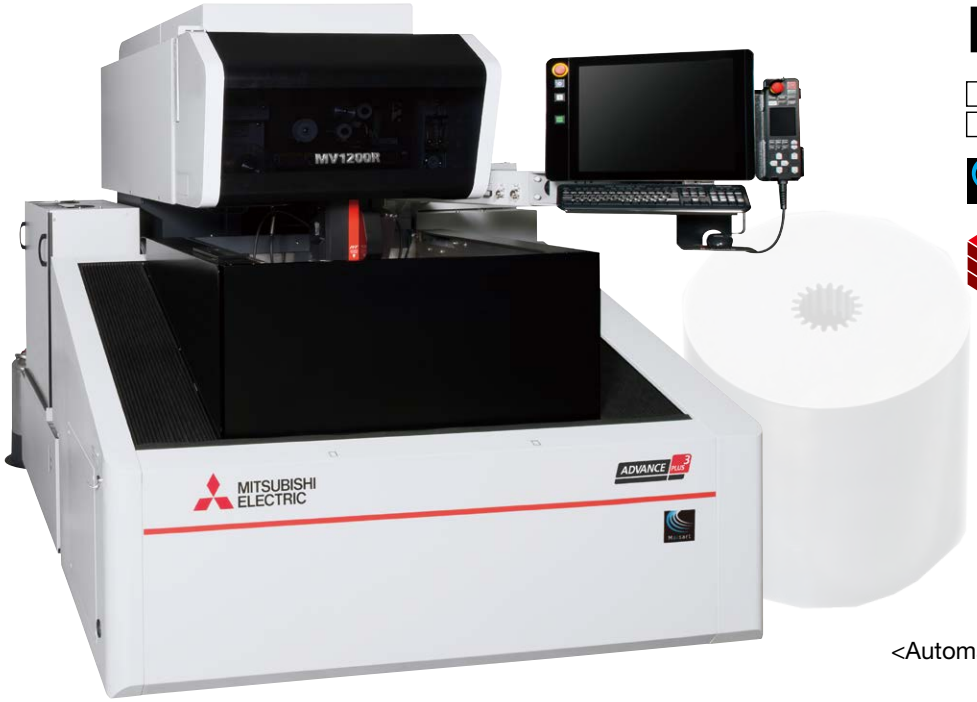
MV1200R

4-axis LSM (XYUV linear shaft motor)

4-sided hardened table

Maisart

D-CUBES



<Automatic vertical front door>

MV2400R

4-axis LSM (XYUV linear shaft motor)

4-sided hardened table

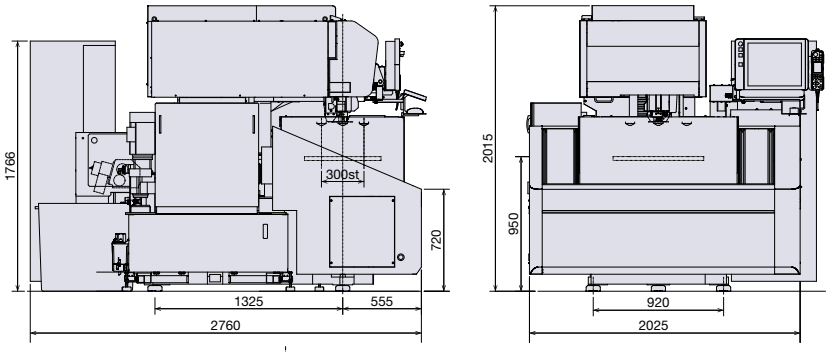
Maisart

D-CUBES

<Automatic vertical front door>

MV1200R

<Outline drawing>



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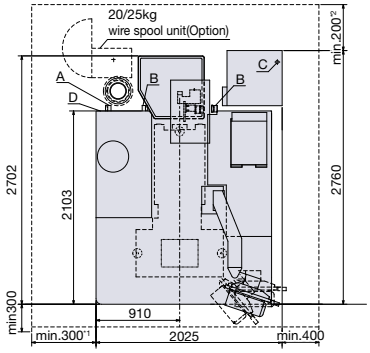

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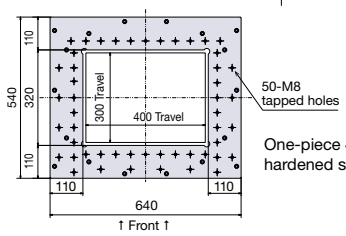


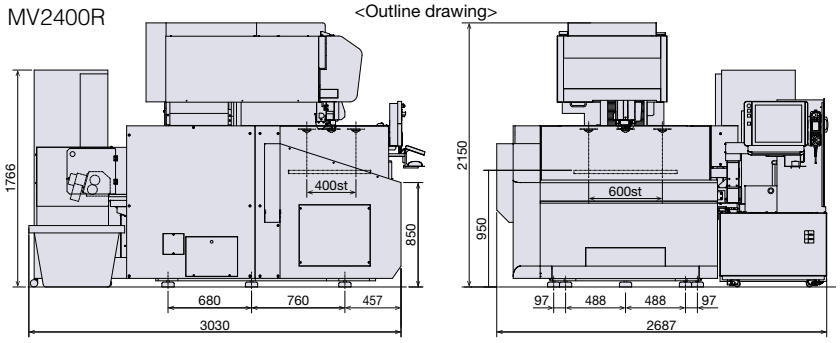
One-piece 4-sided table
hardened stainless steel

*1 is min.500 and *2 is min.700 when the 20/25kg wire spool unit is mounted.
Machine unit dimensions
Width:1910mm Height:2015mm

A: Clean tank drain port	Fitted with PT1 screw valve (165 from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (165 from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa 75L/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

MV2400R

<Outline drawing>



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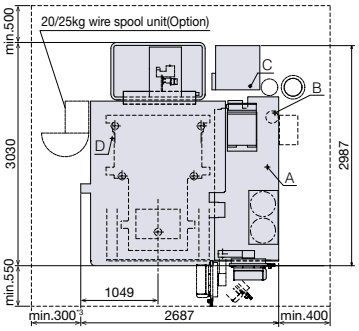

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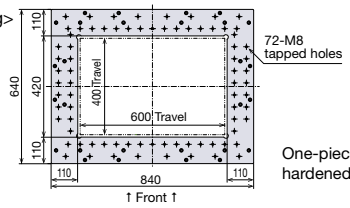


One-piece 4-sided table
hardened stainless steel

*3 is min.670 when the 20/25kg wire spool unit is mounted.
Footprint : 3387x4080(including maintenance space)
Machine unit dimensions
Width:2103mm Height:2150mm

A: Clean tank drain port	Fitted with PT1/2 screw valve (52 from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (52 from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa 75L/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

Standard machine specifications				
Machine unit	Model		MV1200R	MV2400R
	Max. workpiece dimensions	[mm]	810x700x215	1050x820x305
	Max. workpiece weight	[kg]	500	1500
	Table dimensions	[mm]	640x540 (4-sided)	840x640 (4-sided)
	Machine travels (XxYxZ)	[mm]	400x300x220 (XY axis LSM-drive)	600x400x310 (XY axis LSM-drive)
	Machine travels (UxV)	[mm]	±60x±60 (LSM-drive)	±75x±75 (LSM-drive)
	Max. taper angle	[°]	15°(max. 200mm)	15°(max. 260mm)
	Wire diameter	[mm]	ø0.1 - 0.3*1	
	Weight	[kg]	2700 (including dielectric fluid reservoir)	3500
Dielectric fluid reservoir	Tank capacity	[L]	550	860
	Filtration method		Paper filter (2)	
	Filtered particle size	[µm]	3	
	Water purifier (ion exchange resin)	[L]	10	
	Dielectric fluid chiller unit		Unit cooler	
	Weight (dry)	[kg]	— (included in the machine unit weight)	350

*1 ø0.25 DD guides and ø1.5 jet nozzle are standard equipment.

General input		[kVA]	13.5
Required air rate	Air pressure	[Mpa]	0.5 - 0.7
	Air rate	[L/min]	75 or more

Standard functions

- Maisart
- Automatic wire threading
- Digital-AE power supply
- LAN/W (Ethernet)
- Angle Master (S/W)
- Anti-virus protection
- Working Light (LED)
- Sleep mode
- Filter pressure sensor
- DNC (S/W)
- FTP (S/W)

Options

- ø0.05, 0.07 automatic wire threading
- Angle Master ADVANCEⅡ (S/W) (JIG)
- Digital-FS power supply
- Option box
- Status data output*2
- MTConnect*2
- DD kit for Angle Master ADVANCEⅡ(ø0.2)
- DD kit for Angle Master ADVANCEⅡ(ø0.25)
- External signal output
- 4-piece filter system
- Filter automatic switching (4-piece filter system)
- 3D Import

*2 Select status data output or MTConnect.

Product Line up

High-speed machining is the “MV-S” series

<Manual vertical front door>

MV1200S

2-axis LSM (XY linear shaft motor)

U-shaped hardened table

D-CUBES

MV2400S

2-axis LSM (XY linear shaft motor)

U-shaped hardened table

D-CUBES

<Column up specifications>

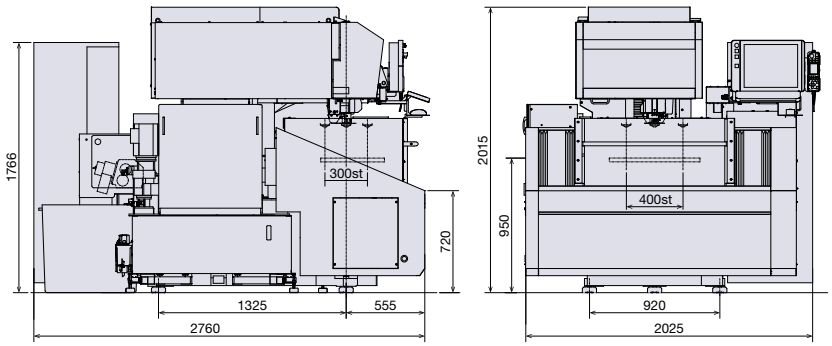
2-axis LSM (XY linear shaft motor)

One-piece 4-sided hardened table

<Automatic vertical front door>

MV1200S

<Outline drawing>



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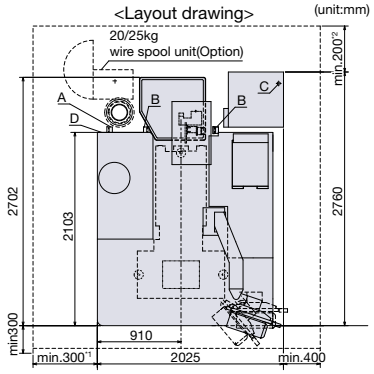

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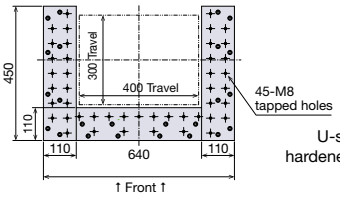


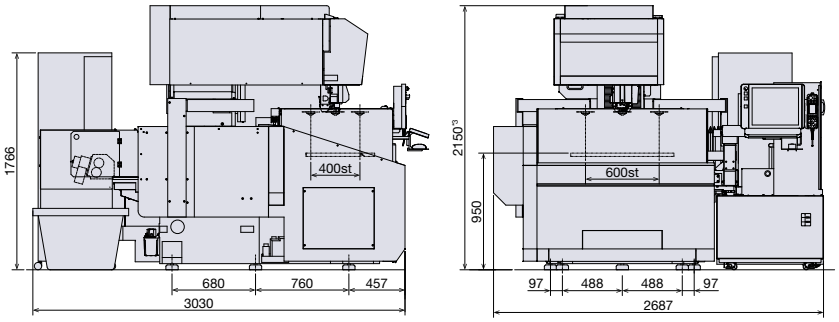
U-shaped table
hardened stainless steel

*1 is min.500 and *2 is min.700 when the 20/25kg wire spool unit is mounted.
Machine unit dimensions
Width:1910mm Height:2015mm

A: Clean tank drain port	Fitted with PT1 screw valve (165 from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (165 from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa 75L/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

MV2400S

<Outline drawing>



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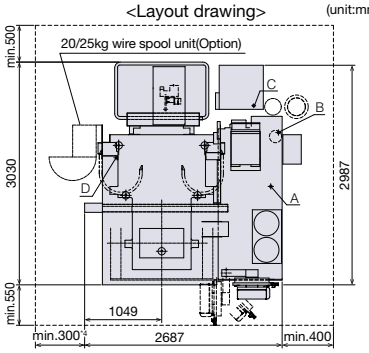

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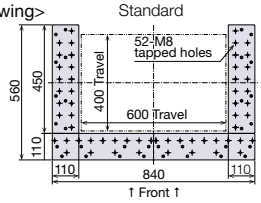
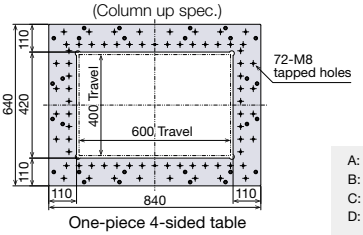
Standard



U-shaped table
hardened stainless steel

(Column up spec.)



One-piece 4-sided table
hardened stainless steel

*3 Column up specifications is 2380mm.
*4 is min.670 when the 20/25kg wire spool unit is mounted.
Footprint : 3387x4080(including maintenance space)
3537x4080(including maintenance space) (Column up)

Machine unit dimensions
Width:2103mm Height:2150mm
Width:2103mm Height:2380mm (Column up)

A: Clean tank drain port	Fitted with PT1/2 screw valve (52 from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (52 from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa 75L/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

Standard machine specifications					
Machine unit	Model		MV1200S	MV2400S	MV2400S (Column up)
	Max. workpiece dimensions	[mm]	810x700x215	1050x820x305	1050x820x420
	Max. workpiece weight	[kg]	500	1500	
	Table dimensions	[mm]	640x450 (U-shaped)	840x560 (U-shaped)	840x640 (4-sided)
	Machine travels (XxYxZ)	[mm]	400x300x220 (XY axis LSM-drive)	600x400x310 (XY axis LSM-drive)	600x400x425 (XY axis LSM-drive)
	Machine travels (UxV)	[mm]	±60x±60 (Ball screw drive)	±75x±75 (Ball screw drive)	
	Max. taper angle	[°]	15°(max. 200mm)	15°(max. 260mm)	
	Wire diameter	[mm]	ø0.1 - 0.3*1		
	Weight	[kg]	2700 (including dielectric fluid reservoir)	3500	3650
Dielectric fluid reservoir	Tank capacity	[L]	550	860	980
	Filtration method		Paper filter (2)		
	Filtered particle size	[µm]	3		
	Water purifier (ion exchange resin)	[L]	10		
	Dielectric fluid chiller unit		Unit cooler		
	Weight (dry)	[kg]	— (included in the machine unit weight)	350	390

*1 ø0.25 DD guides and ø1.5 jet nozzle are standard equipment.

General input		[kVA]	13.5
Required air rate	Air pressure	[Mpa]	0.5 - 0.7
	Air rate	[L/min]	75 or more

Standard functions

- Automatic wire threading
- Digital-AE power supply
- LAN/W (Ethernet)
- Angle Master (S/W)
- Working Light (LED)

Options

- 20/25kg wire spool unit
- DD kit for Angle Master ADVANCEⅡ(ø0.2)
- DD kit for Angle Master ADVANCEⅡ(ø0.25)
- External signal output
- Option box
- Run timer
- Status data output*2
- MTConnect*2
- 4-piece filter system
- Filter automatic switching (4-piece filter system)
- Anti-virus protection
- 3D Import

*2 Select status data output or MTConnect.

Product Line up

Large Type Wire-cut EDMs

MV4800R

4-axis LSM (XYUV linear shaft motor)

4-sided table (Separated) hardened stainless steel

D-CUBES

<Automatic vertical front door>

MV4800S

2-axis LSM (XY linear shaft motor)

U-shaped hardened table

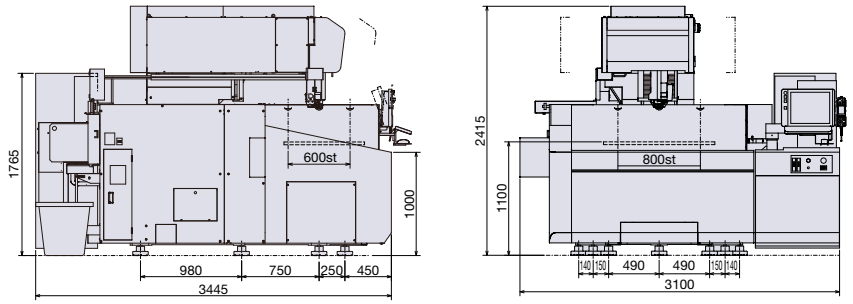
D-CUBES

<Automatic vertical front door>

MV4800R

(Unit:mm)

<Outline drawing>



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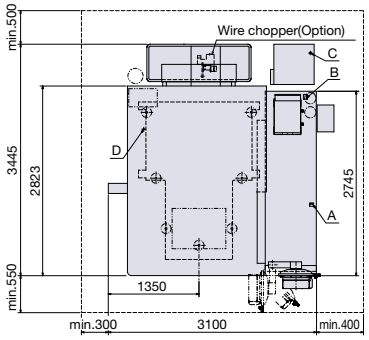

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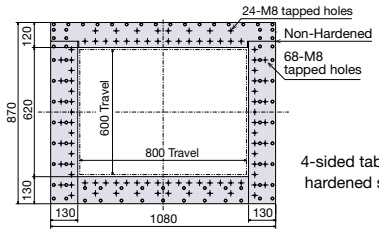

4-sided table (Separated)
hardened stainless steel

Footprint : 3800x4495(including maintenance space)
Machine unit dimensions
Width:2654mm Height:2415mm

A: Clean tank drain port	Fitted with PT1 screw valve (165mm from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (165mm from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7MPa, 75L/min or more, 1/4 hose connection

MV4800S

(Unit:mm)

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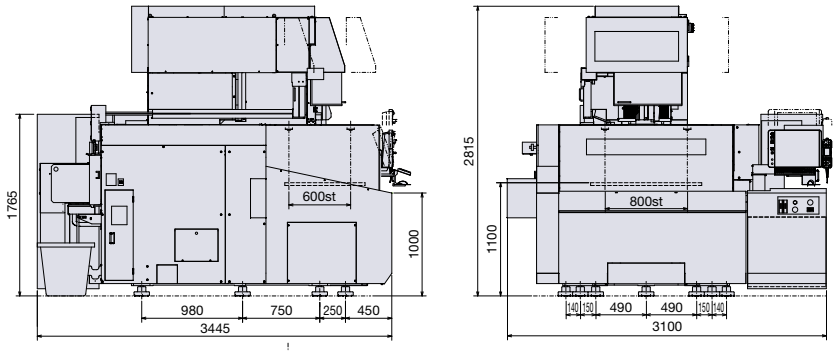

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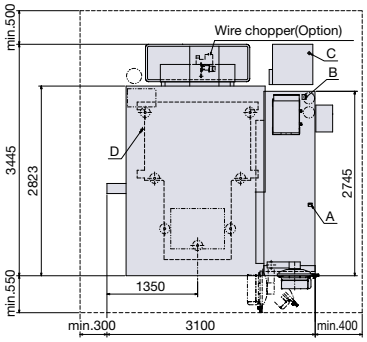

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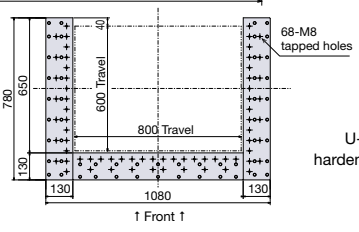


U-shaped table
hardened stainless steel

Footprint :3800x4495 (including maintenance space)
Machine unit dimensions
Width:2654mm Height:2815mm

A: Clean tank drain port	Fitted with PT1 screw valve (165mm from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (165mm from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7MPa, 75L/min or more, 1/4 hose connection

Standard machine specifications				
Machine unit	Model		MV4800R	MV4800S
	Max. workpiece dimensions	[mm]	1250x1020x305	1250x1020x505
	Max. workpiece weight	[kg]	3000	
	Table dimensions	[mm]	1080x870 (4-sided separated)	1080x780(U-shaped)
	Machine travels (XxYxZ)	[mm]	800x600x310 (XY axis LSM drive)	800x600x510 (XY axis LSM drive)
	Machine travels (UxV)	[mm]	±75x±75 (LSM drive)	±100x±100 (Ball screw drive)
	Max. taper angle	[°]	15°(max. 260mm)	15°(max. 355mm)
	Wire diameter	[mm]	ø0.15 - 0.30	
	Weight	[kg]	5300	5900
Dielectric fluid reservoir	Tank capacity	[L]	1480	
	Filtration method		Paper filter(4)	
	Filtered particle size	[µm]	3	
	Water purifier (ion exchange resin)	[L]	10	
	Dielectric fluid chiller unit		Unit cooler	
	Weight (dry)	[kg]	450	

*1 ø0.25 DD guides and ø1.5 jet nozzle are standard equipment.

General input		[kVA]	13.5
Required air rate	Air pressure	[Mpa]	0.5 - 0.7
	Air rate	[L/min]	75 or more

Standard functions

- Automatic wire threading
- Digital-AE power supply
- LAN/W (Ethernet)
- Angle Master (S/W)
- Sleep mode
- 4-piece filter system
- Thermal Stability System
- Built-in 20/25kg wire spool unit
- Digital FS power supply (4800S is not available)
- Anti-virus protection (4800S is option)

Options

- DD kit for Angle Master ADVANCEⅡ (ø0.2)
- DD kit for Angle Master ADVANCEⅡ (ø0.25)
- Angle Master ADVANCEⅡ (S/W) (JIG) (4800S is not available)
- Option Box
- Status data output*2
- MTConnect*2
- External signal output
- 3-color warning light
- Run timer
- 3D Import
- Filter automatic switching

*2 Select status data output or MTConnect.

Functions and Features

MV series is fully equipped with enhanced functions that satisfy the requirements of manufacturing site, such as sophisticated style, high performance, energy-saving, operability and workability, abundant machining knowhow, etc.

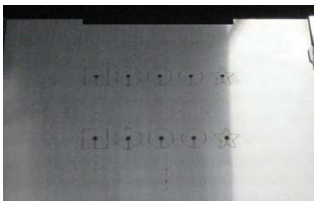
Automatic wire threading

Intelligent AT

Refer to page 17-18

- New annealing system greatly improves wire threading with a curl ratio of less than 10%.
- Wire break point insertion is greatly improved for thick workpieces.
- Wire threading suitable for workpiece shape (jet stream on, jet stream off and submerged break point insertion).

▲Video of Automatic wire threading

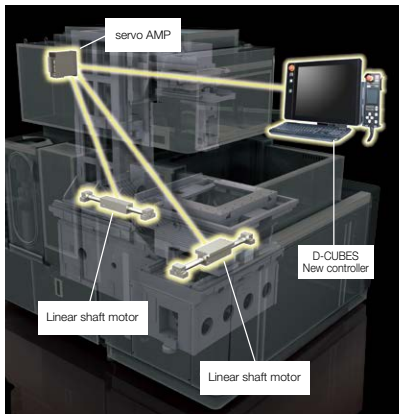


Machining accuracy

ODS Opt Drive System

Refer to page 19

- Equipped with a linear shaft motor(LSM).
- Circular accuracy within 1μm is realized using optical drive system(ODS).



Improved productivity

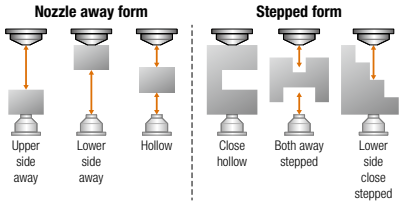
PFC Precise Finish Circuit

Maisart

Refer to page 20-24

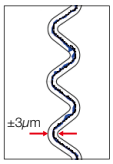
Maisart (Nozzle away)

- From the information during machining, Mitsubishi Electric's original AI technology detects machining state such as thickness and nozzle away amount in real time, and automatically adjusts machining conditions.
- Stable and high-accuracy machining is realized without troublesome adjustment of machining conditions even if there is a stepped workpiece or nozzle away.



Maisart (Corner control)

- As for machining that roughness is more than 1.6μm and shape accuracy is ±5μm, corner control adjustment is not required even in complicated shapes.
- 50% productivity improvement for replacement from oil specifications wire EDM.



Operability

NUI Natural User Interface

Refer to page 25-30

- Information is displayed on a large 19-inch screen.
- Functions to be viewed or used are called by one touch from the HOME screen.
- The number of operations performed on the Navigation menu from setup to machining is reduced by almost 40% (as compared to the past).
- Setup performance is improved by a thin manual control box with LED.

Energy savings, low operating cost

LLS Long Life System

Refer to page 31-32

- The operating cost of machine can be viewed on the cost management screen. This is useful for budget planning.

Power monitor

Machining results monitor (Only MV-R)

Maisart

D-CUBES

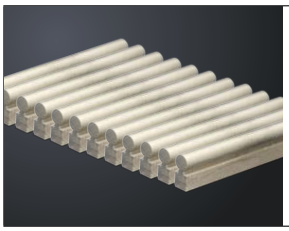
Sample D-CUBES

Revolutionize manufacturing with next generation high performance machining

High speed finish

Model	MV1200S
Electrode material	ø0.30mm/BS
Workpiece	Steel(SKD11)
Workpiece thickness	60mm
Surface roughness	Rz6.4µm/Ra0.8µm
Machining accuracy	±5µm

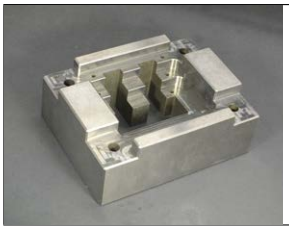
- Spark gaps kept constant for the 2 times machining by using "D-CUBES NL Control"
- Number of times of machining reduced to twice for Rz6.4µm



High speed production

Model	MV2400S
Electrode material	ø0.25mm/BS
Workpiece	Steel(SKD11)
Workpiece thickness	60mm
Surface roughness	Rz10.0µm/Ra1.3µm
Machining accuracy	±5µm

- Realized maximum 28% faster speed for rough machining with BS wire as compared to conventional models
- Realized maximum 21% improvement for speed of 2 times machining

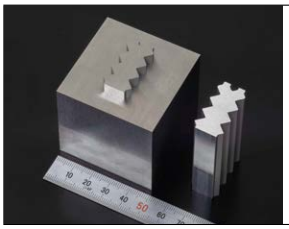


Stepped

Model	MV1200R
Electrode material	ø0.2/BS
Workpiece	Steel(NAK80)
Workpiece thickness	20 to 40mm
Surface roughness	Rz3.5µm/Ra0.4µm
Machining accuracy	±2µm

- Realizes high-accuracy machining without know-how for automatic adjustment of machining conditions with Maisart
- Realizes high accuracy with controlling amount of machining in thickness change machining (1) Reduces of dimensional difference (2) Improvement of straightness (3) Reduces of vertical streaks

Maisart

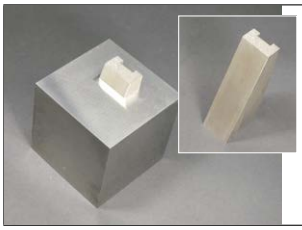


Corner

Model	MV1200R
Electrode material	ø0.2/BS
Workpiece	Steel(SKD11)
Workpiece thickness	50mm
Surface roughness	Rz3.2µm/Ra0.4µm
Machining accuracy	±3µm

- Automatic adjustment of machining conditions by Maisart High-accuracy machining without know-how
- Machining accuracy of 3µm or less for continuous corners

Maisart



Taper fitting

Model	MV2400R
Electrode material	ø0.20mm/BS
Workpiece	Steel(SKD11)
Workpiece thickness	D: 60mm, P: 70mm taper angle 10°
Surface roughness	Rz2.8µm/Ra0.35µm
Machining accuracy	±5µm

- Taper accuracy is improved over all around with Angle Master ADVANCEⅡ
- High-accuracy taper machining is possible due to UV axis opt drive system specifications

Pitch

Model	MV4800R
Electrode material	ø0.20mm/BS
Workpiece	Steel(SKD11)
Workpiece thickness	30mm
Surface roughness	Rz1.8µm/Ra0.22µm
Machining accuracy	Pitch ±3µm

- Stable automatic wire threading realized by Intelligent AT even in multi-shape machining
- Precise surface finishing with roughness of Rz2µm or less realized by using super fine finishing power supply (Digital-FS)

High thickness

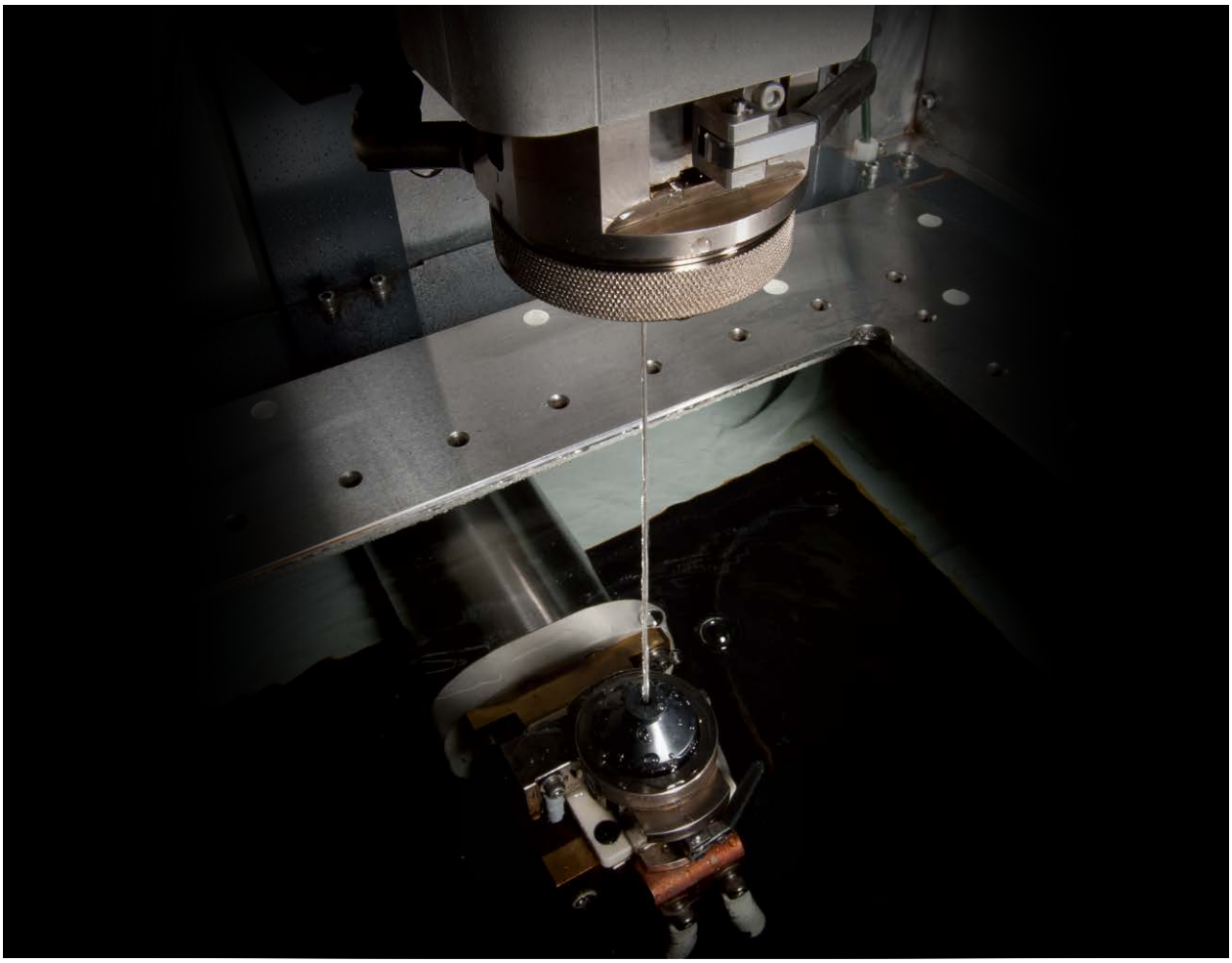
Model	MV4800S
Electrode material	ø0.30mm/BS
Workpiece	Steel(SKD11)
Workpiece thickness	300mm
Surface roughness	Rz10.2µm/Ra1.2µm
Machining accuracy	±15µm

- The PM function makes it easy to set machining conditions that are difficult to set, such as upper and lower nozzles being separated and hollow
- Shape accuracy for finishing also improved by using SL Control

Innovative Automatic Wire Threading

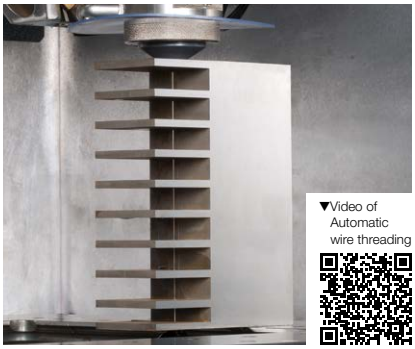
Intelligent AT

Advanced technology for greatly improved productivity



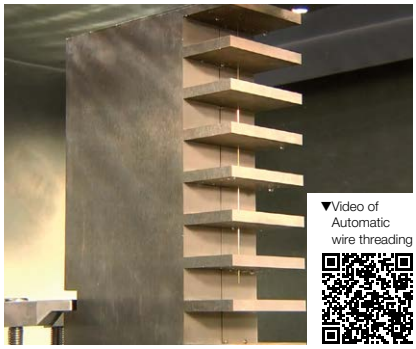
Improved automatic wire threading

- New annealing system greatly improves wire threading with a curl ratio of less than 10%.
- Wire break point insertion is greatly improved for thick workpieces.
- Wire threading mode can be selected to match the workpiece shape (i.e., jet stream on, jet stream off and submerged break point insertion).
- Automatic threading time is reduced by up to 35% when using AT high-speed mode (includes one wire-cut and insertion cycle).



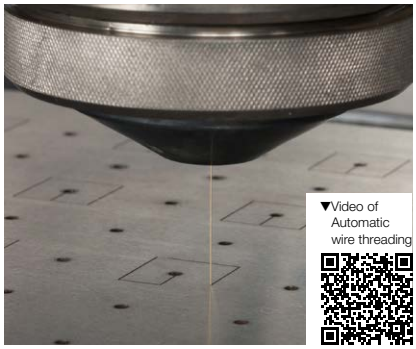
▼Video of Automatic wire threading

Multiple level wire threading is possible even without a jet stream.
Highly dependable automatic threading for multi-opening applications



▼Video of Automatic wire threading

Submerged automatic wire threading/re-threading drastically reduces total machining time in multiple level workpieces.



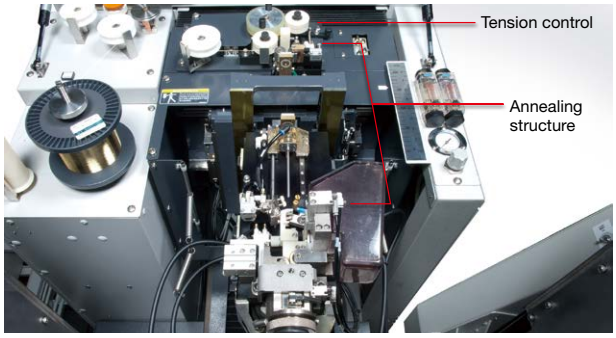
▼Video of Automatic wire threading

Wire break point insertion is possible

Wire electrode annealing structure

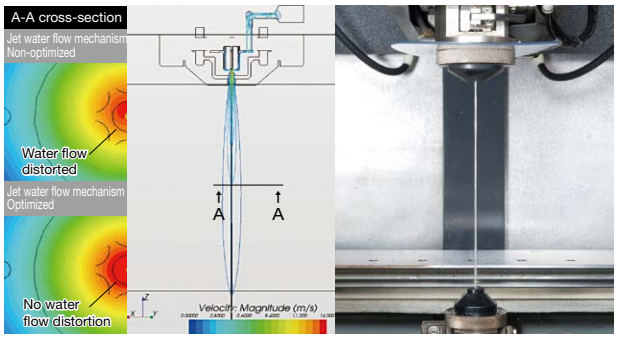
- Improved wire annealing power supply and tension control enhance wire threading (reducing the curl ratio down to 10% or less*), which straightens the natural curl caused by spooling.
- The greatly increased length distance of annealed wire improves automatic wire threading for thick workpieces.

* Wire with a curl ratio of no more than 3% is required for the conventional model (FA series)



New jet stream flow mechanism

- Flow analysis simulation has been used to optimize water flow mechanism for straightening jet stream, which improves wire threading for thick workpieces.

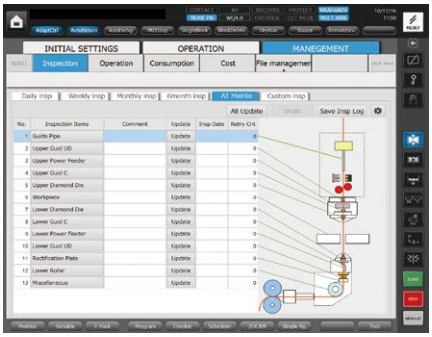


Wire collection unit

- Broken wire collection, which clears the upper guide after a wire break, has been improved so it handles even highly curled wire.

Maintenance management

- AT maintenance screen displays each section of the AT unit and records any miss-feed locations. This quick reference makes it easy to maintenance the effected area.



One-touch lever clamp mechanism

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

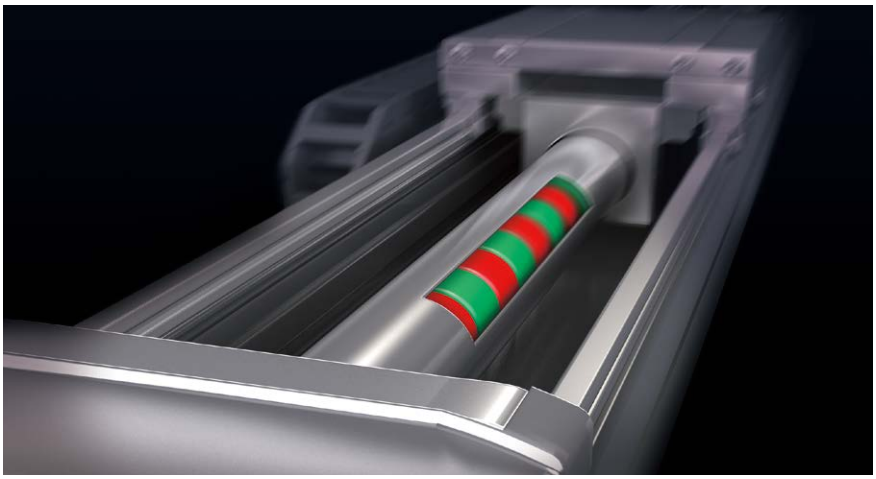
Diamond guide

- 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 each flashing nozzles.

Machining Accuracy

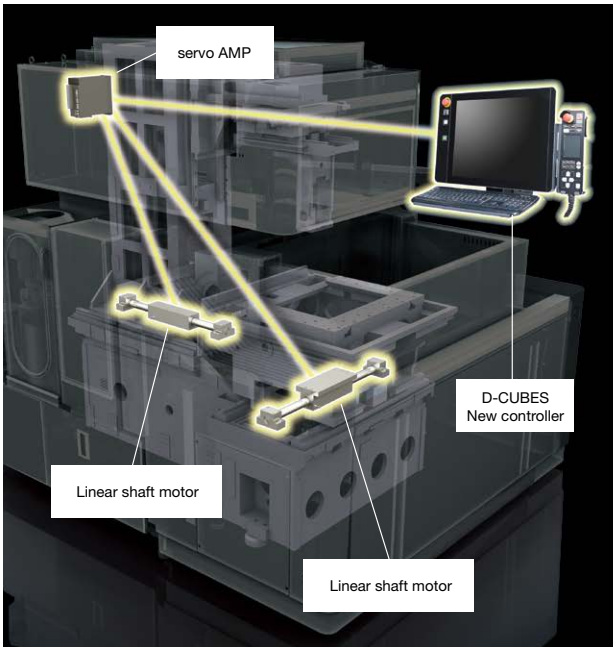
ODS Opt Drive System

Next-generation drive system and optimum machine structure



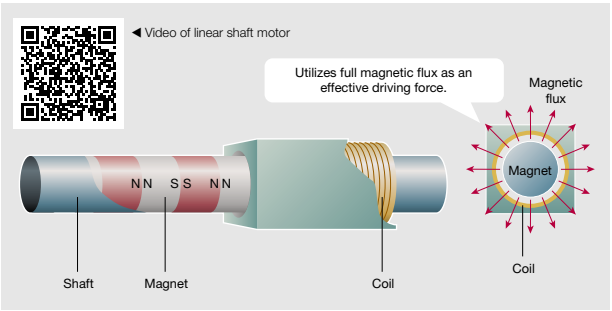
Optical Drive System

- High-speed fiber-optic communications and a linear shaft motor synergistically improve machining accuracy.
- A servo amplifier and control unit developed by Mitsubishi Electric contribute to system optimization.



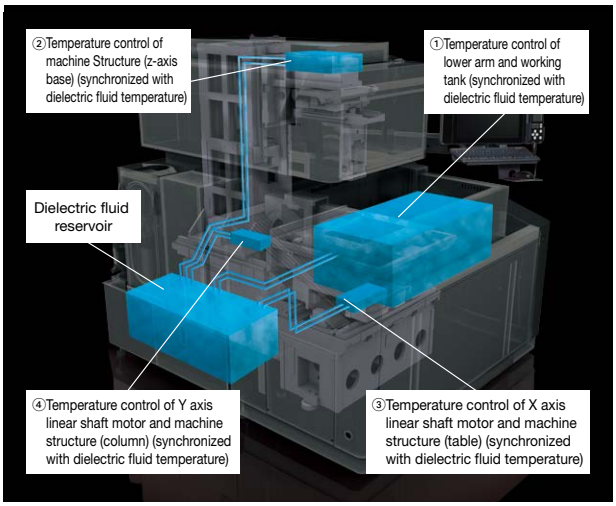
Linear Shaft Motor (LSM)

- Power consumption is reduced by utilizing a full 360° magnetic use 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 (Only MV4800 type)

- This process is synchronized through thermal sensors on the machine casting while circulating the fluid through key areas of the machine structure (Thermal buster).
- A chiller system is used to cool the dielectric fluid to remove the heat generated by the EDM machining process.

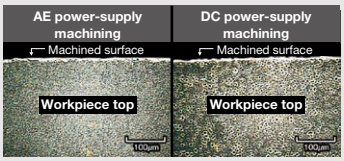


Machining Control

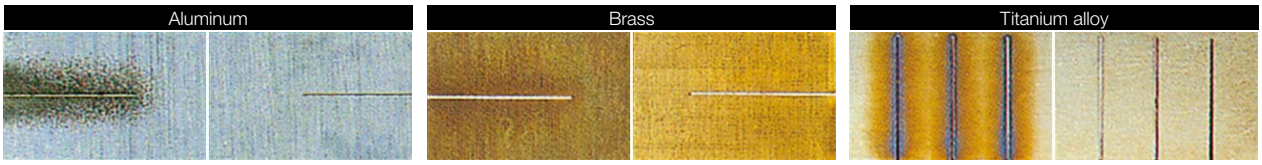
High-speed anti-electrolysis power supply (Digital-AE power supply)

- Electrolytic corrosion is suppressed, preventing formation of soft layers
- Compatible with all power circuits, from rough to finish machining
- High-speed, safe unmanned machining possible using water

Comparison of AE and DC power-supply machining



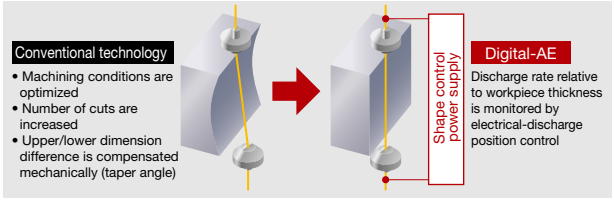
* Photo shows a comparison under adverse conditions where electrolysis occurs easily



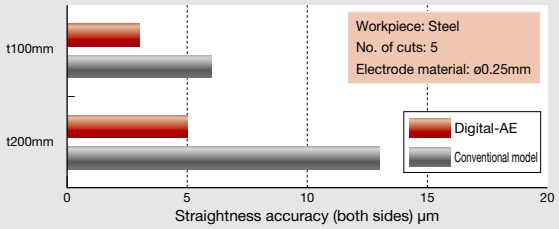
DC power-supply machining | AE power-supply machining | DC power-supply machining | AE power-supply machining | DC power-supply machining | AE power-supply machining

Shape control power supply (Digital-AE)

- Wire straightness is digitally controlled with the world's only electricaldischarge position control (As of Mar. '12)
- Total machining time is reduced by improving straightness accuracy during rough, intermediate and finishing processes

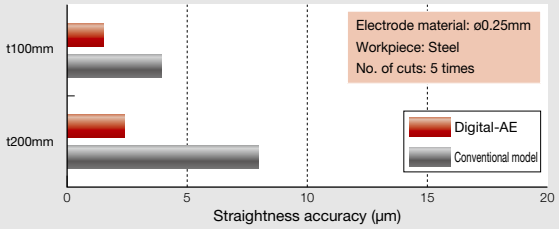


Comparison of straightness accuracy during finish machining



* Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series)

Comparison of straightness accuracy during finish machining



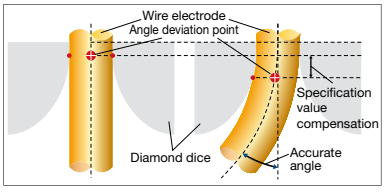
* Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series)

High-accuracy taper machining using round dies

- Highly accurate machining of extremely small tapered sections is now possible
- Uniform die edge land cuts are possible
- Angle Master Function realizes highly accurate machining of large tapered sections

* Angle Master ADVANCEⅡ guide kit is optional

* Max. taper angle is 45° (at max. 40mm)



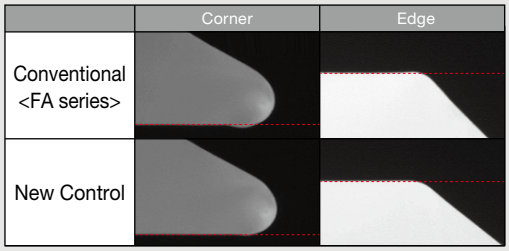
Machining Control

Adaptive control

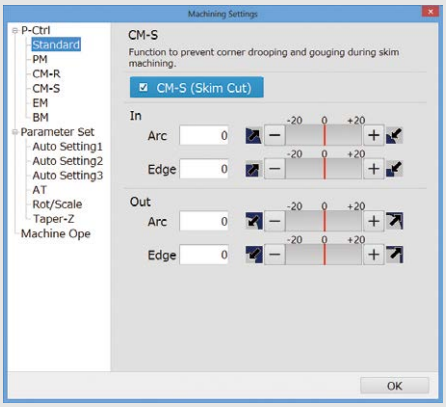
- Approach control adjustment parameters (CM level selection, EM wire path correction).
- CM-R expansion (corner control, approach control) can be set individually (control ON/OFF, parameters).
- Adaptive control switches such as EM are set automatically by E pack command depending on the shape (die, punch) or workpiece thickness. Optimum machining values are set even if the operator forgets to enter them.

Corner machining control (CM control: Corner Master3)

- Improves machining accuracy at extremely small in-corners and out-corners
- Realizes highly accurate shape machining even for complicated geometries with several types and sizes of corners
- Corner accuracy is easily controlled by operator
- Dimensional errors of not only corners, but also “circle” and “square” is improved



Contents			
Wire	ø0.2/BS	Thickness	20mm
Workpiece	Steel	Surface Roughness	Rz2.5µm/ Ra0.30µm

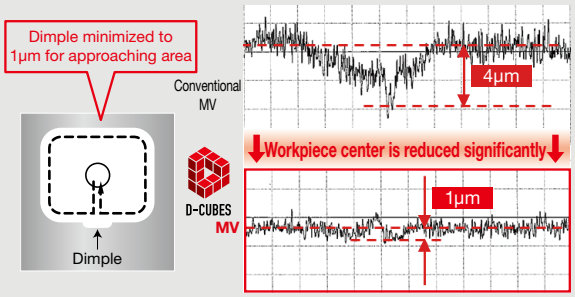


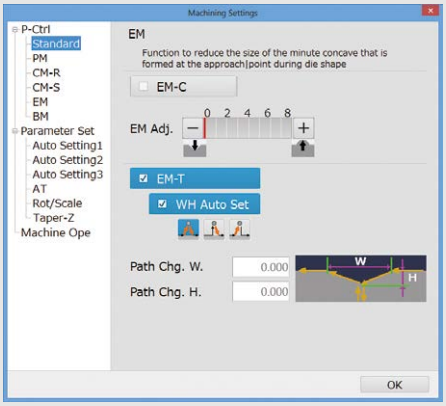
Corner adjustment screen

Under-cut (dimple) reduction control

(EM control: Entrance Master)

- Reduces dimples at approach section
- Allows shape adjustment from convex to concave
- Greatly reduces polishing time



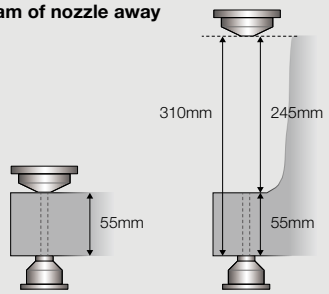


Under-cut adjustment screen

Stepped dimensional difference inhibitory control (P-SL control) (only 4800 type)

- Shape accuracy for various machining state improved by workpiece thickness sensing technology and upgraded power supply control
- Machining with less dimensional difference realized without changing machining conditions or offset value settings even while nozzle away amount changes
- 55% reduction of dimensional difference for rough machining as compared to machine with conventional SL control (ADVANCE control)

Schematic diagram of nozzle away



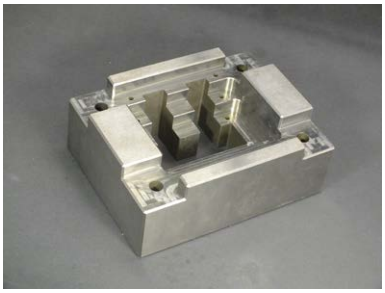
Electrode : ø0.30mm BS
Workpiece : Steel (SKD11)
Thickness : 300mm
Roughness : Rz10.2µm, Ra1.2µm

AI technology

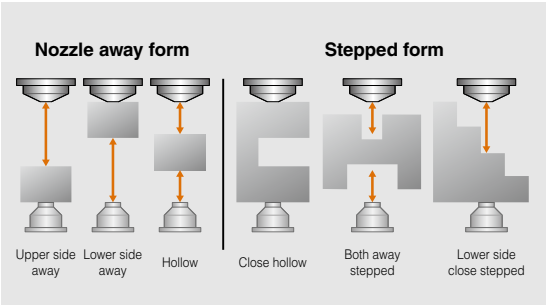
Maisart (Nozzle away control) (MV1200R, MV2400R)

Optimizes machining conditions and improves machining accuracy without know-how with original AI technology - Maisart.
Realizes high accuracy with controlling the amount of machining depending on the situation of nozzle away.

- Improves straightness accuracy with reducing dimensional differences due to in nozzle away or thickness
- Reduces vertical streaks in areas where thickness changes

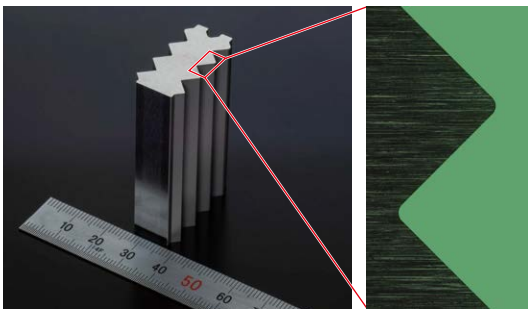


Wire : ø0.20mm BS
Workpiece : Steel(NAK80)
Thickness : 20 to 40mm
Roughness : Rz3.2μm、Ra0.4μm



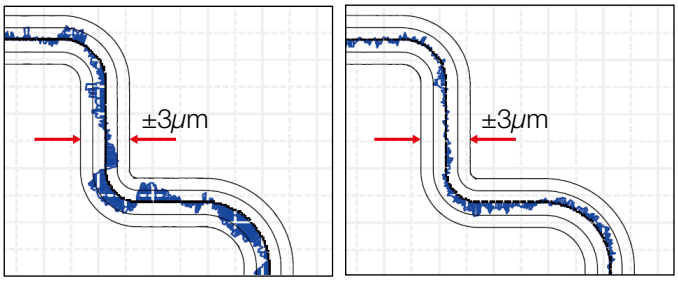
Maisart (Corner control) (MV1200R,MV2400R)

- As for machining that roughness is more than 1.6μm and shape accuracy is ±5μm, corner control adjustment is not required even in complicated shapes
- As for cornerR machining that is more than wire diameter, corner control adjustment is not required even at continuous corners
  Realizes accuracy error of ±2μm or less at straight part of corner start and end
- 50% productivity improvement for replacement from oil specifications wire EDM
- Improves accuracy / stability of machining conditions for copper machining



Wire : ø0.20mm BS ×50
Workpiece : Steel 50mm
Nozzle away amount : upper 5mm/lower 10mm

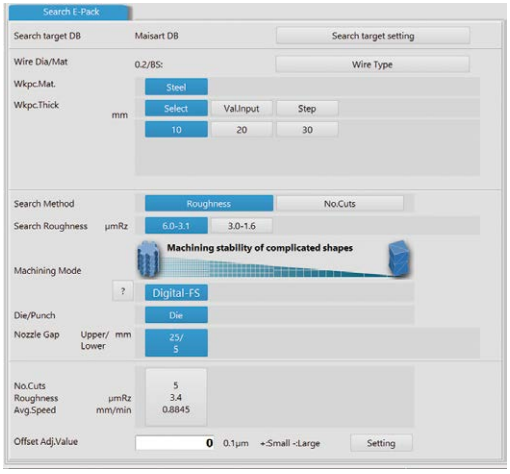
Black : tolerance level, Blue : Error



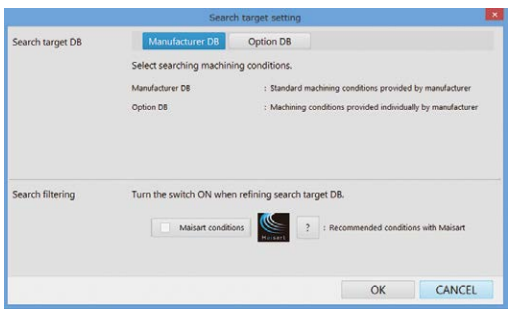
Without Maisart　　With Maisart

Machining condition search

- By refined search, you can set by simply selecting items with similar machining contents
- Nozzle away status is also displayed, so no need to check machining condition table
- Possible to search not only with the conventional machining condition roughness but also by number of machining times
- Automatically set taper Z parameter from search results



For Maisart
Machining condition search screen

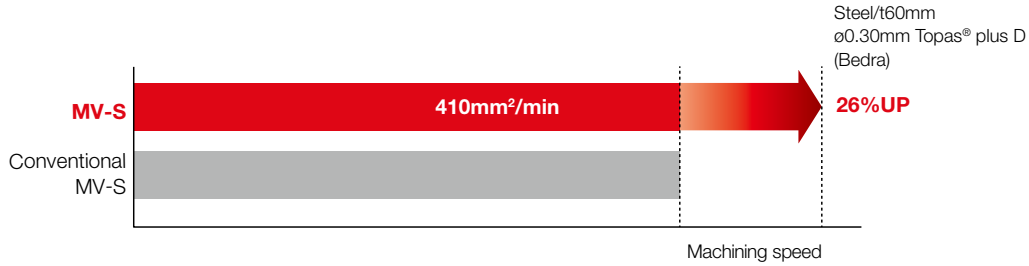


Easy search with Maisart dedicated database

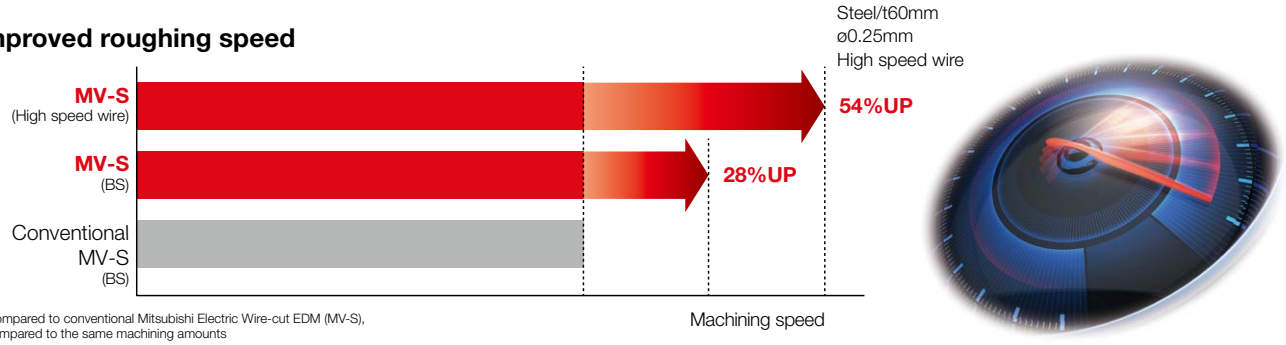
Productivity

High Speed machining condition

Fastest rough machining in the industry



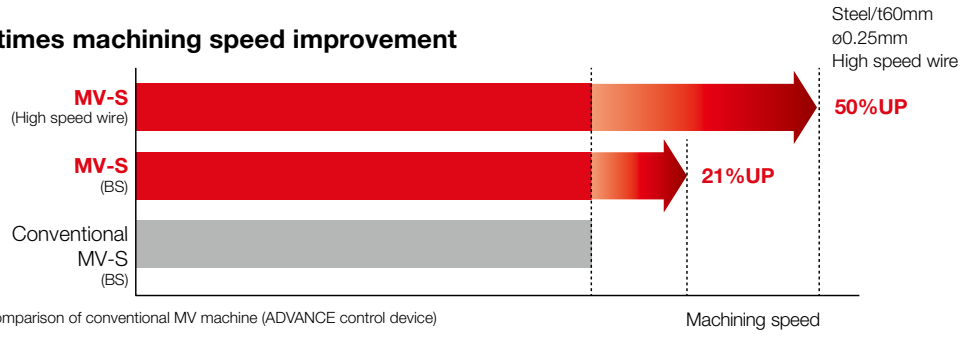
Improved roughing speed



* Compared to conventional Mitsubishi Electric Wire-cut EDM (MV-S), compared to the same machining amounts

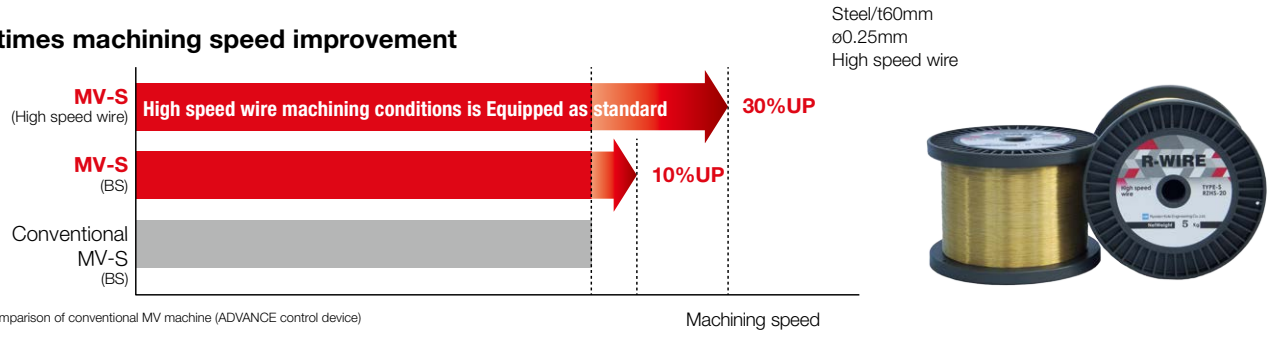
Realize a reduction of the finishing machining time

2 times machining speed improvement



* Comparison of conventional MV machine (ADVANCE control device)

3 times machining speed improvement

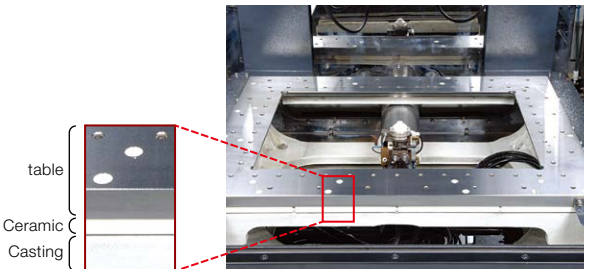


* Comparison of conventional MV machine (ADVANCE control device)

Table insulation (MV1200R/S, MV2400R/S)

- Insulated worktable ensures improved surface finishing
- Stable machining realized when using short-pulse and low-voltage machining conditions

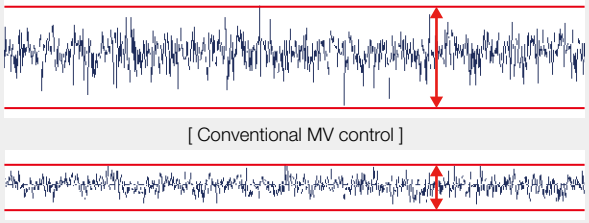
Achieves Rz 1.6 µm with standard power supply!



Machining servo
(D-CUBES NL control)

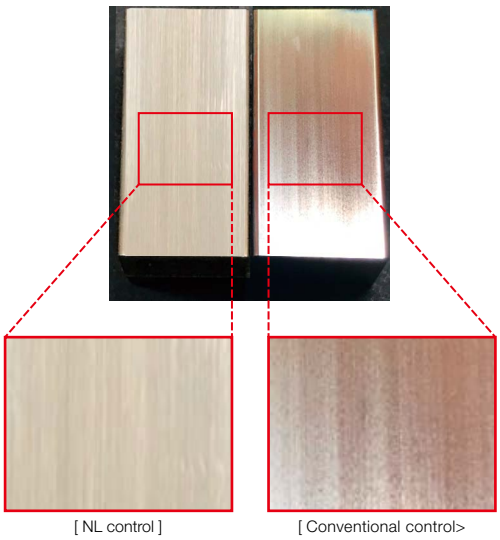
- Spark gaps kept constant for finish machining operation by new machining servo “D-CUBES NL Control”
- Conditions between electrodes are precisely detected to suppress speed variation, reducing lines remaining after polishing. Polishing margin reduced to improve productivity.
- Number of times of machining reduced to twice for Rz6.4µm

Comparison of speed variation



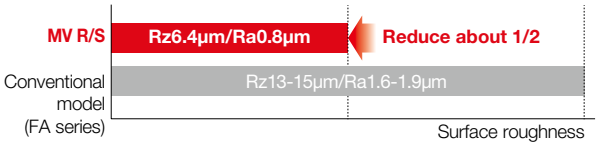
Voltage application method modified
to precisely reflect the condition between electrodes

Comparison of polished surface



* The surface is colored before polishing to facilitate understanding of effect.

Comparison of surface roughness with 2 cuts



Super fine finishing power supply (Digital-FS)
(MV1200R/MV2400R: Option, MV4800R: Standard)

- Further pursuit surface roughness by using Digital-FS power supply (option)

Model :MV1200R
Electrode :ø0.20BS
Workpiece :Steel
Thickness :60mm
Surface rougness :Rz1.4µm /Ra0.18µm
Accuracy :0.003mm

Built-in 20/25kg wire spool unit
(Provided as standard for MV4800 type)

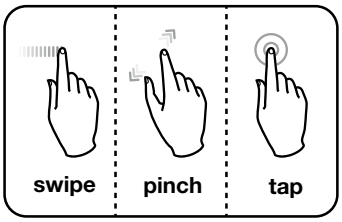
- The 20/25kg wire spool unit essential for continuous machining of large workpieces is provided as standard.
- Built-in structure requires less space.

Workability/ Operability

NUI Natural User Interface

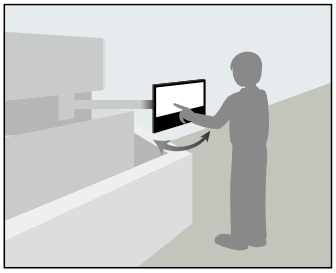
Control unit

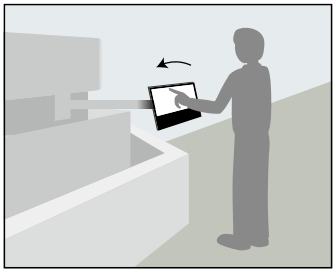
- Information is displayed on a new large19-inch touch screen
- Keyboard and mouse are standard
- Intuitive operation is performed by gestures from a multi-touch supporting panel



Screen tilt mechanism

- New tilt mounting system allows adjust ability to fit operators of varying heights.

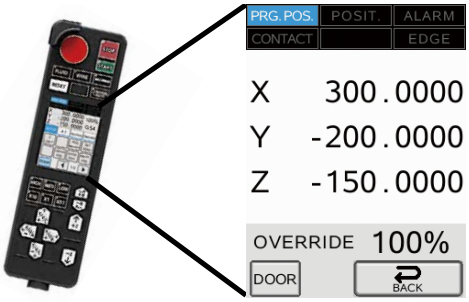




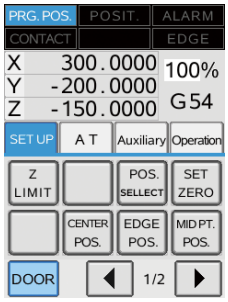
Screen rotation handle

Thin manual control box with LED

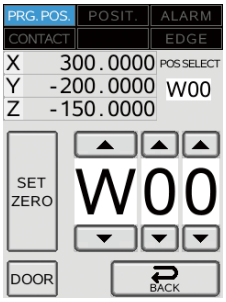
- New design of Thin manual control box with LED improves workpiece setup and saves time.
- Thin manual control box is equipped with an LED flash light mounted on the back.



•Magnified view of coordinates



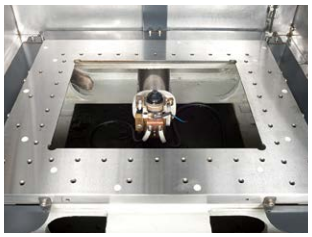
•Various setup functions
•Screen customization



•Teaching function

Hardened table and all stainless steel structure

- Equipped with a hardened table
- Working tank and dielectric supply unit are made of stainless steel
- Resistant to deterioration by dielectric fluid and sludge

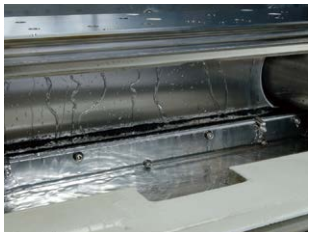


Wire alignment

- High accuracy wire alignment is easy using wire-alignment device
- Taper parameter set-up is simple using wire-alignment device
- High accuracy type wire alignment device is option

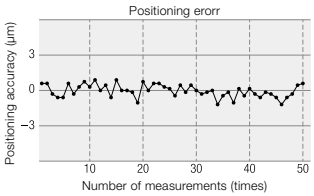
Cleaning mechanism <2400, 4800 type>

- A forced-flush self-cleaning mechanism prevents sludge from sticking to the stainless-steel seal plate



High accuracy edge positioning

- Significantly improved positioning accuracy
- Positioning time halved as compared to conventional model when using high-speed mode

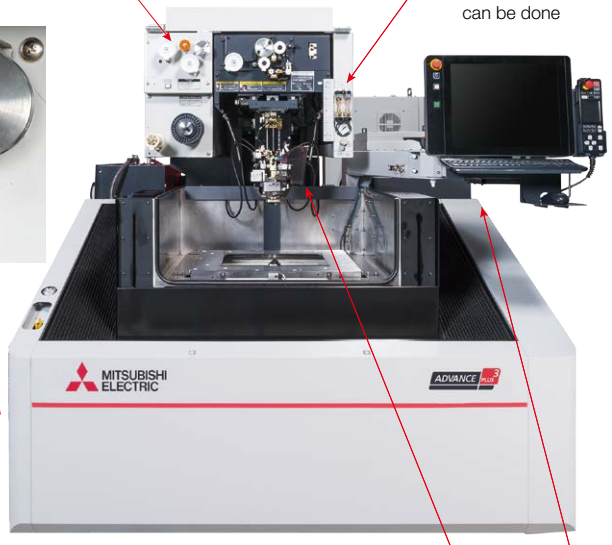


Wire travel system

- Stability of wire tensioning system is improved by a felt wiper and felt keeper pads that eliminate the chance of wire jumping off rollers

Dielectric fluid flow meter and jet flow adjustment valve

- Dielectric flow meters are easy to read
- Adjustable jet flow valve increases range of work that can be done

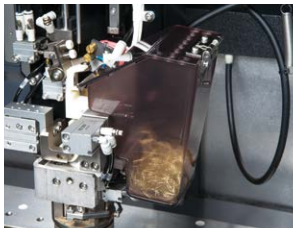


Filter pressure gauge and jet cleaning nozzle

- Easily read the filter pressure
- Conveniently located jet nozzle for working tank easy cleaning

Broken wire collection box

- Conveniently located at the front for easy maintenance



Chiller unit filter

- Conveniently located for easy cleaning

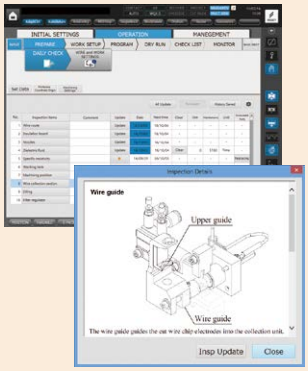
Operability

"Fast" and "Economical" operation

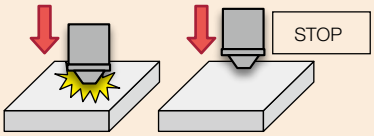
Excellent performance with "Easy operation", "human error reduction" and "connect ability" supporting productivity improvement for customers.

Operation

■Pre-machining preparation
Daily inspection and wire/workpiece mounting.
Maintenance inspection tools
- Maintenance manual as well as maintenance history are supported.
- Reduction in machine down time from insufficient maintenance.

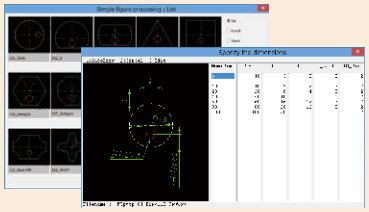


■Workpiece setup
Reference positioning, Z paramater (Z1, Z2, Z5) setting.
Z-axis limit setting
- Z-axis limit can be set easily after mounting workpiece.
- Collisions caused by erroneous operations are prevented.



No limit set　　Limit set

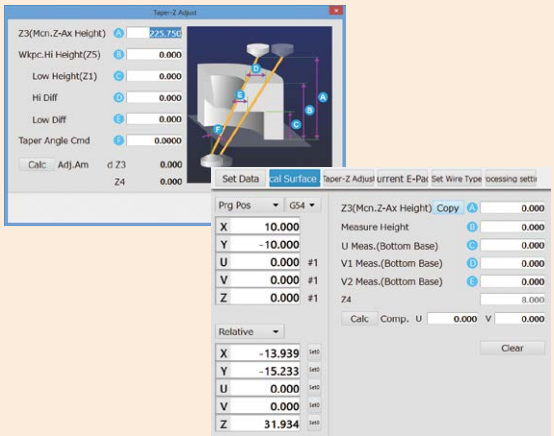
■Program
Simple creation of machining program.
Standard shape library
- Simple standard shapes can be easily programmed by entering a few key dimensions into variables.



Consumables check
- Remaining amount of consumables is checked in accordance with the machining estimate.
- It prevents a machine stop caused by insufficient consumables, such as an empty wire spool.

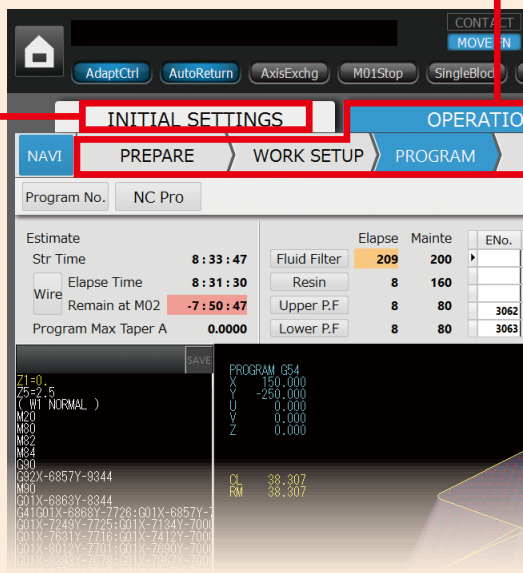
Initial setting

Once the processing machine has been started, the items that do not change during daily operation are set.
Calculation tool (vertical correction and taper function adjustment)
- Even calculations specific to machine can be performed only by entering measurement results, and do not require any manual calculations.
- Reduces operator's labor and also errors by operation setting.



Main menu

To enable the necessary information to be set and referred at required time, aggregated on three screens.
This enables easy usage of information by anyone without being getting confused by operating procedures and operation methods.



HOME

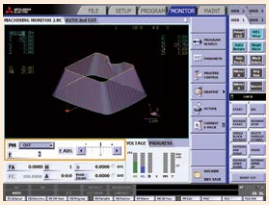
Easy to understand machining progress and screen selection.

- Machining progress status can be understood at a glance (machining path, remaining time, consumables).
- Operation screens are intuitively selected by one-touch on screen buttons.

Classic

Inherited ADVANCE control operability.

- Operations can be performed on the previous ADVANCE control style screens for operators that are accustomed to them.
- Easy-to-view with large characters.

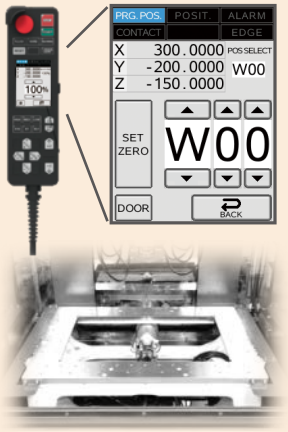


■Dry run

Programs can be checked for possible interference.

Override

- Dry run speed can be set at pendant box to shorten required run time.



■Check list

All necessary operations to be performed before machining can be checked.

Check list

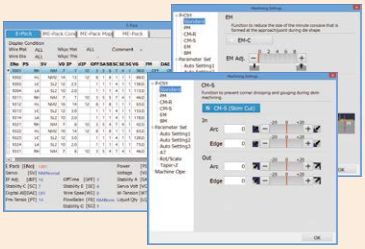
- Pre-machining checklist is displayed.
- Machine cannot be started if any checklist item has been skipped.
- Errors by operators who are not accustomed to using machine are prevented.

■Monitoring machining

Start of machining and the machining status can be checked.

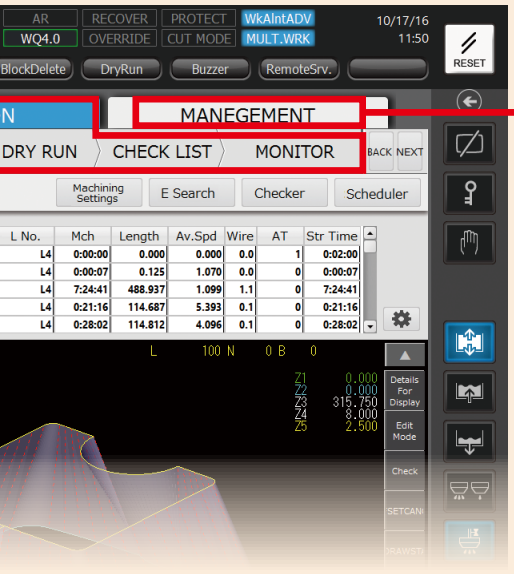
Automatic setting of adaptive control

- Our EDM knowhow is used to optimize machining through automatic control settings.



Resuming machining

- A machining task that has been aborted by resetting the machine can be selected from the list and resumed.



History management

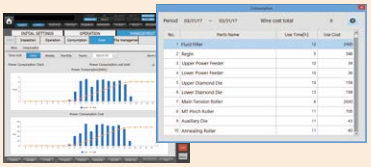
Operation history, inspection and maintenance history, consumables, and cost can be managed.

■Consumables management

- Consumables screen manages usage time and replacement history of all consumables.

■Operating cost

- Operating cost of the machine can be viewed on the cost management screen. This is useful for budget planning.



Operability

NV-2 [Machining support system] (Option)

Supporting machining aiming for operability that is easy for all customers to use

Operation

Positioning

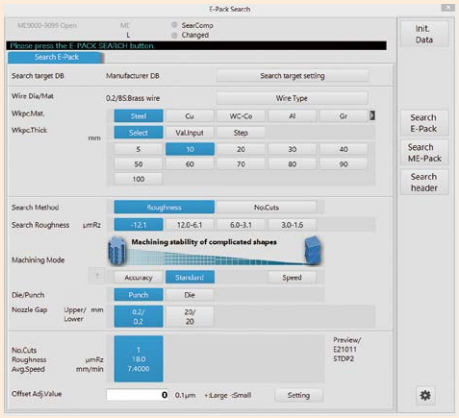
MDI function

- Can be operated with a well-acquainted G code.
- Stored G codes can be used repeatedly.
- This function is also available for cut-off machining.

Workpiece tilt correction
Workpiece tilt is measured using the two-point center positioning function

Programing

Machining condition search



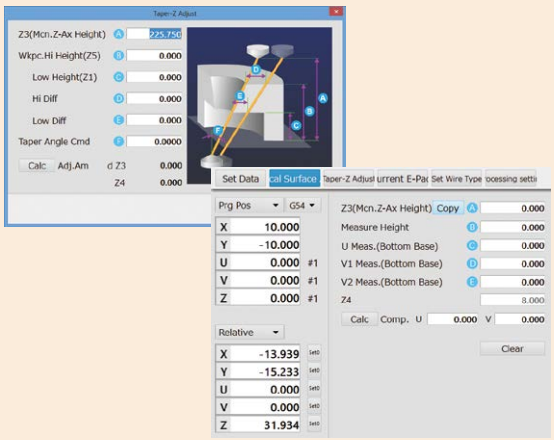
- Centralized machining condition selection.
- Machining priority presented in visual form.

Initial setting

Once the processing machine has been started, the items that do not change during daily operation are set.

Calculation tool (vertical correction and taper function adjustment)

- Even calculations specific to machine can be performed only by entering measurement results, and do not require any manual calculations.
- Reduces operator's labor and also errors by operation setting.



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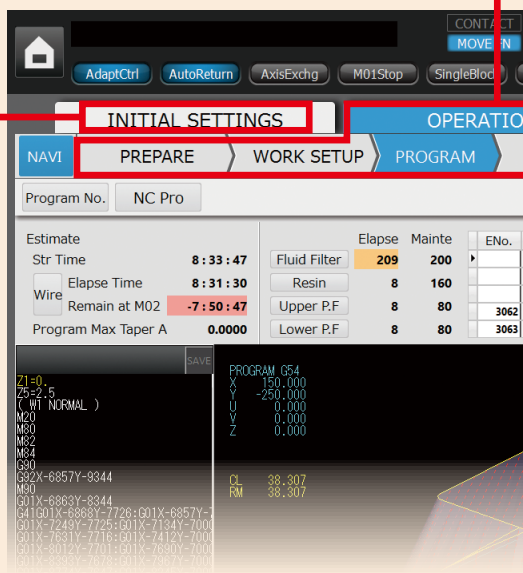
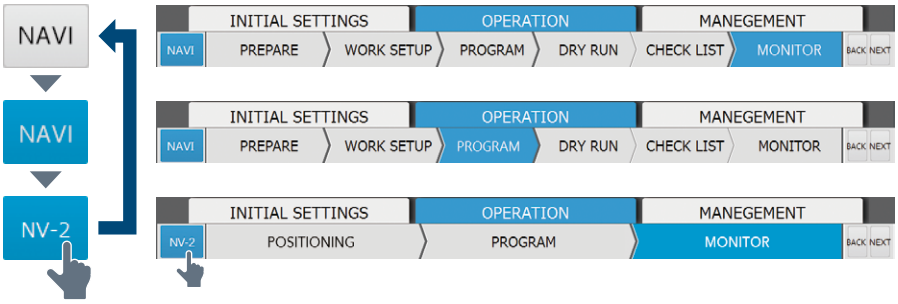


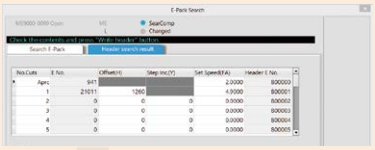
Features of the NV2 <Machining support system>

- Positioning and automatic workpiece tilt correction using G code by MDI function.
- Integrating machining conditions and shape programs.
- Machining conditions adjusted during machining are automatically recorded in control unit.



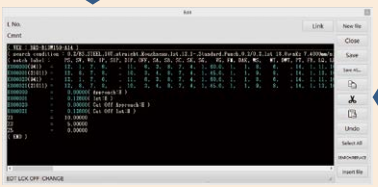
Machining

Reflect



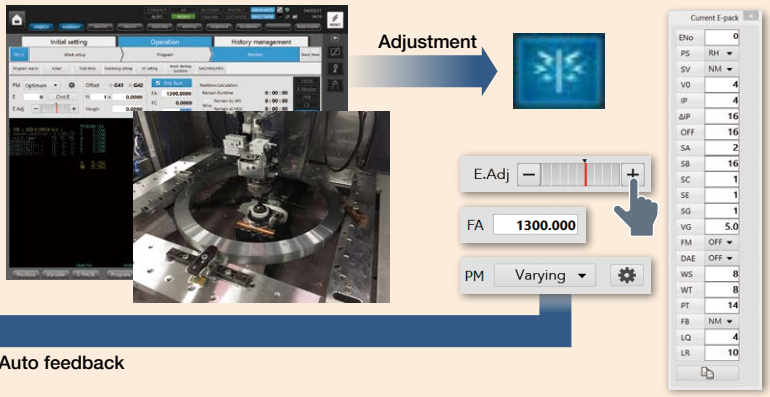
Writing

Save the machining conditions to the program



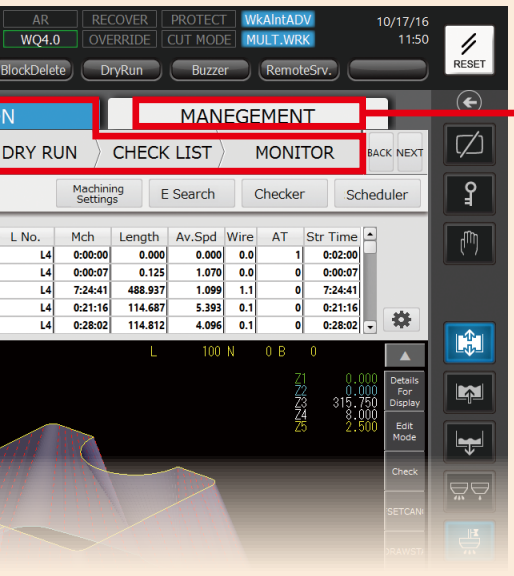
Integrating shape programs and machining conditions

- Can be managed only with a shape program.
- Easy to adjust machining conditions according to shapes.



Auto feedback

- Machining conditions are reusable.
- Machining conditions after adjustment and shape programs are comprehensively managed, and machining conditions adjusted during machining are automatically recorded.
- Machine control unit records all adjustment status.



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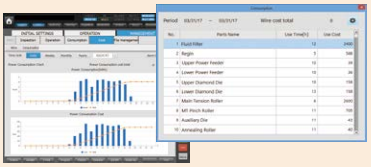
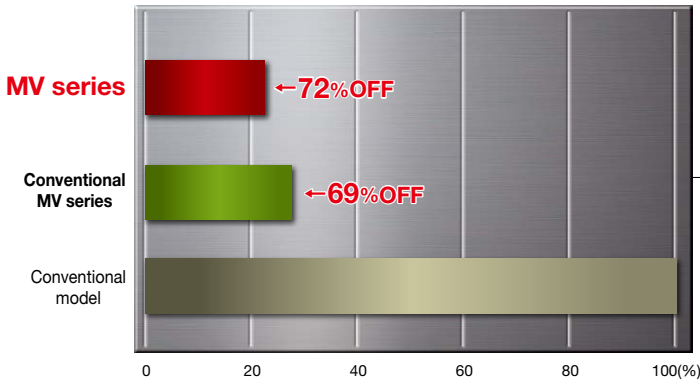


Energy Savings, Low Operating Cost

Consideration for the environment and cost reduction

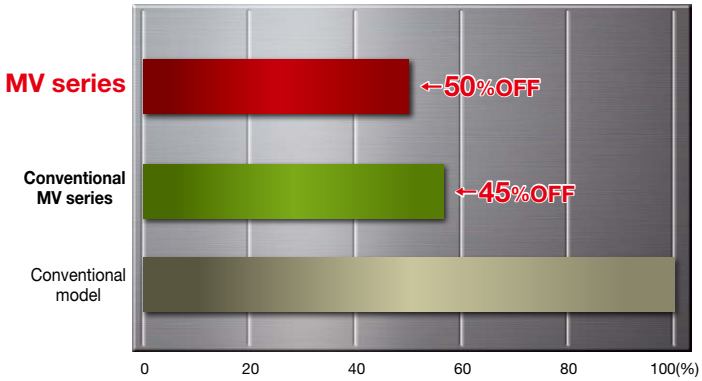


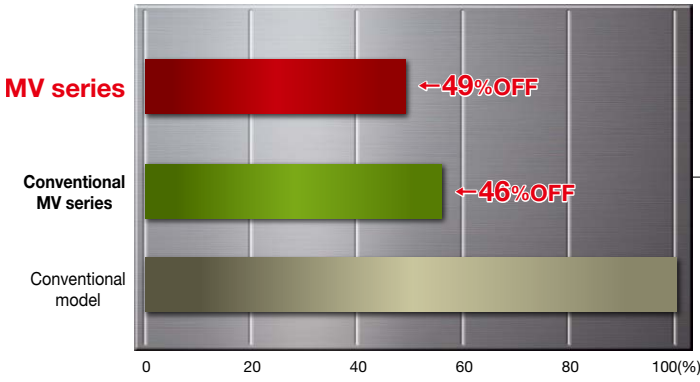
Power consumption reduced up to 72%

Power consumption reduced by ODS.

Filter cost reduced up to 50%

Filter cost is reduced by changing filtration flow rate between rough cut and finishing processes.



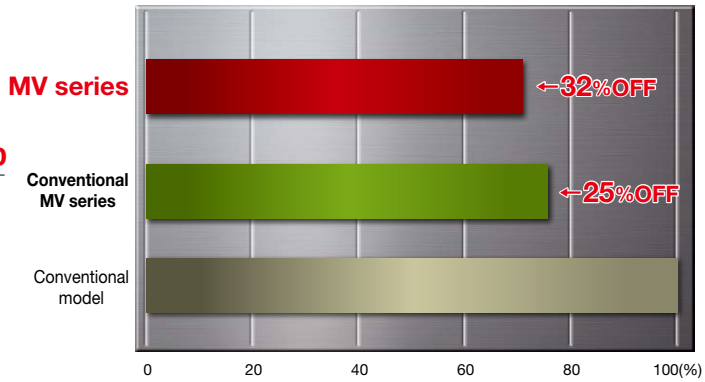


Wire consumption reduced up to 49%

Increased power-supply efficiency reduces wear on wire allowing the wire spooling rate to be reduced by PFC.

Ion exchange resin cost reduced up to 32%

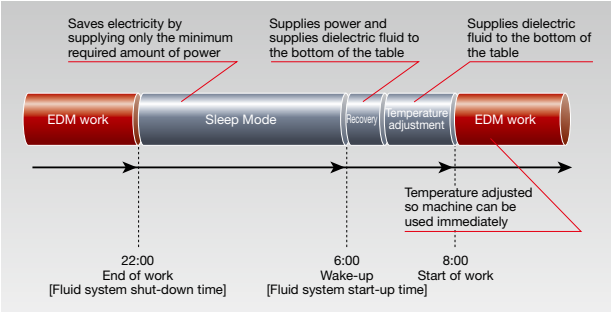
Enhanced power-supply conditions can be used with a lower fluid resistivity setting by PFC.



Compared to conventional Mitsubishi Electric Wire-cut EDM with same machining amounts (FA series and ADVANCE controller)

New energy-saving mode (Sleep Mode)

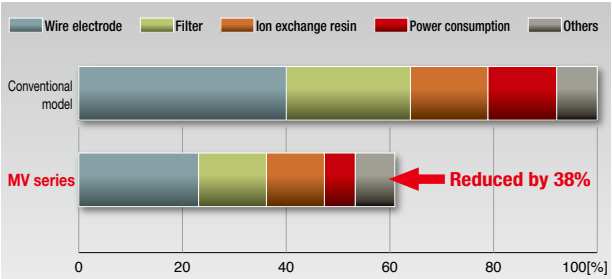
- New energy-saving mode can be scheduled according to the current job ending time and start time the next day.
- In Sleep Mode, amount of energy consumed is greatly reduced as the result of using an automated pump-shut-off system.
- Once the scheduled start time is reached, system restarts fluid system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



Operating cost

- Total operating cost reduced by up to 38%, which is accounted for filter, ion exchange resin and power consumption.

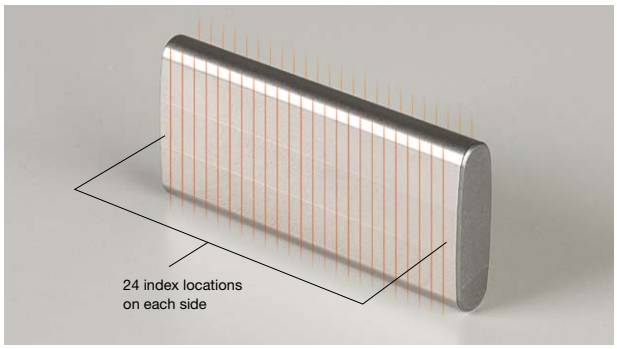
Electrode material : ø0.2/BS
Workpiece : SKD11,t60mm
Surface roughness : Rz3.5µm/Ra0.45µm



Compared to conventional Mitsubishi Electric Wire-cut EDM (FA series)

Flat power feed terminal

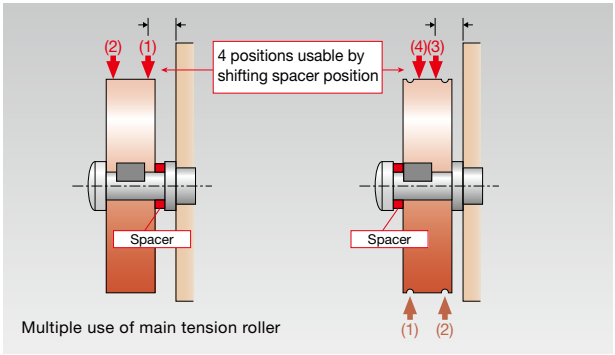
- Flat shape makes it easy to index to the next location.



A total of 48 index locations can be used (24 on each side)

Main tension roller

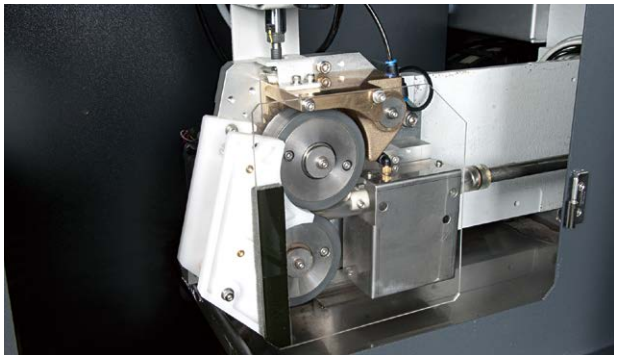
- Multiple indexing locations greatly reduce operating costs.



Multiple use of main tension roller

Large-diameter collection roller

- Large collection roller with multiple index locations greatly reduces operating cost.



Revolution(MV-R) D-CUBES Maisart

Realizing high-value-added machining with a top ranking technology

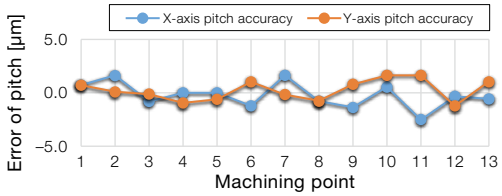
MV2400R

MV1200R

MV4800R

Stable machining of large plates (MV4800R)

- Thermal buster suppresses thermal displacement of structure, realizing improvement of the pitch accuracy for long-time machining of plates.
- Pitch accuracy of ±3μm realized for 600mm plate machining.
- Enriched die-shaped both nozzle away machining conditions.



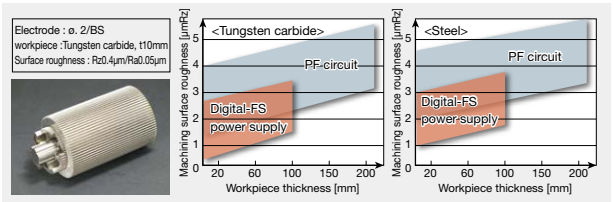
High-value-added functions are available on the R-type (Option)

Digital-FS power supply

MV1200R, MV2400R: Option, MV4800R: Standard

PFC Precise Finish Circuit

- Optimum surface roughness of Rz0.4μm/Ra0.05μm (tungsten carbide).
- Optimum surface roughness of Rz1.0μm/Ra0.12μm (steel).
- Machining with workpiece set directly on the table (insulation jig not required).
- Machining range not limited (entire XY stroke area).

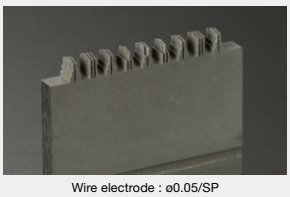


ø0.05, ø0.07 automatic wire threading

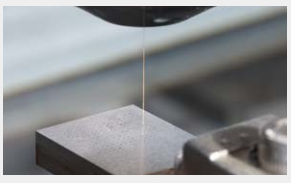
(MV1200R, MV2400R option)

Intelligent AT

- ø0.05 wire electrode available.
- Improved design reduces maintenance.



Wire electrode : ø0.05/SP
Workpiece : Steel (PD613)
Length 20mm width 2mm

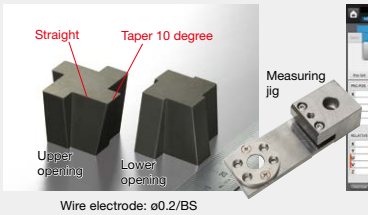


Automatic threading with ø0.05
wire electrode into a ø0.2 start hole

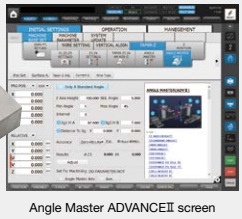
Angle Master ADVANCEⅡ (Option)

ODS Opt Drive System

- Taper accuracy of ±0.01° and dimensional accuracy of ±5μm are realized.
- Taper angle accuracy is more consistent in all taper directions.



Wire electrode: ø0.2/BS
Workpiece: Steel (SKD11-D2) t20mm



Angle Master ADVANCEⅡ screen

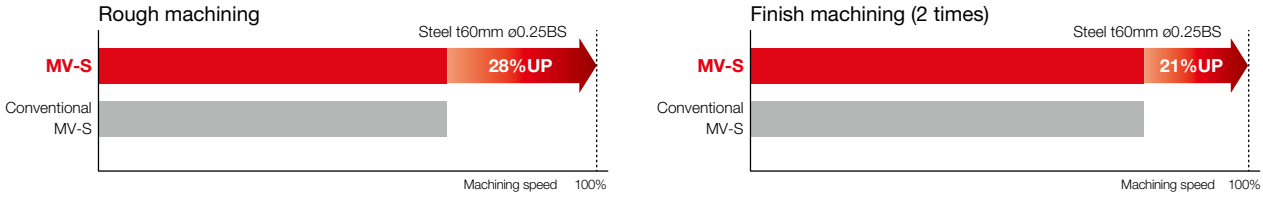
Speed(MV-S) D-CUBES

Realizes high-speed machining and reduced operating costs

Improves power supply performance to achieve high-speed machining and low operating costs with practical surface roughness

Machining speed

- 160mm²/min achieved with BS wire(MV1200S, 2400S).
- 180mm²/min achieved with high speed wire (MV1200S, 2400S).



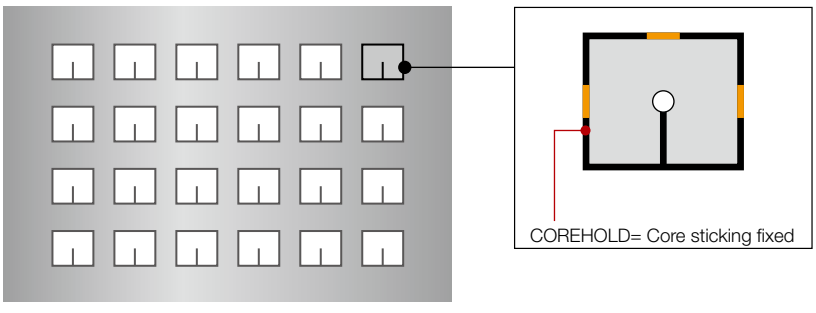
* Compared to conventional MV-S (ADVANCE controller), compared to the same machining amounts

Energy saving and low operating cost (MV4800S)

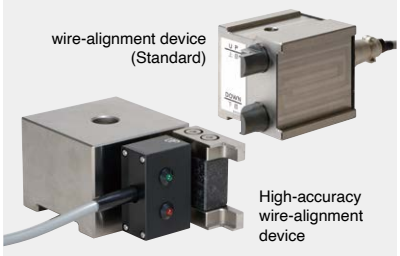
- Operating cost reduction by reducing wire consumption and shortening the tact time for machining thick workpieces.

COREHOLD (MV-R series option)

- This function allows the Slug to be automatically held in place after the rough cut for complete unattended operation
- Slug retention positions and lengths can be set by the built-in CAM or CamMagic on the machine



Options



High-accuracy wire-alignment device / wire-alignment device

Used for wire aligns and taper degree calculation in UV axis directions

Angle Master ADVANCEⅡ (jig)

Measuring jig to be used for Angle Master ADVANCEⅡ (S/W)
Use for taper degree calculation in UV axis at 4 directions

Angle Master ADVANCEⅡ guide kit

Max. 45° tapered machining possible using dedicated diamond guide

20/25kg wire spool unit

Long-time continuous machining is possible

Wire processing unit

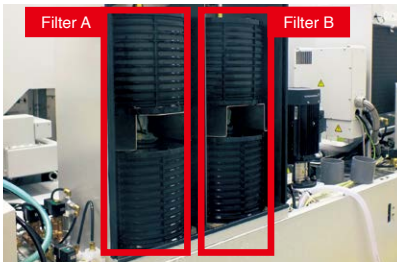
The wire is chopped after the collection roller

Warning light

Indicates machine operating status

4-piece filter system

4-piece filter specifications reduce filter replacement frequency



Filter automatic switching

Switching the filters to be used automatically according to the filter pressure.
(4-piece filter specification is necessary)

Run timer

Indicates accumulated machining time

Options and specifications are different depending to country and region.
Please contact a Mitsubishi Electric representative for details.

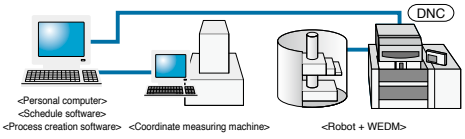
◎ : Standard equipment ○ : Can be retrofitted ● : Factory installation only × : Not available

Option name		MV1200R	MV1200S	MV2400R	MV2400S	MV4800R	MV4800S
Machine unit	UV OPT-drive system specifications	◎	×	◎	×	◎	×
	ø0.05, ø0.07 automatic wire threading*1	●	×	●	×	×	×
	ø0.1, ø0.15 automatic wire threading*1	◎	◎	◎	◎	◎only ø0.15	◎only ø0.15
	Wire processing unit*1	○	○	○	○	○	○
	20/25kg wire spool unit	○	○	○	○	×	×
	Built in type 20/25kg wire spool unit	×	×	×	×	◎	◎
	Column up	×	×	×	●	×	×
	Thin manual control box with LED	◎	◎	◎	◎	◎	◎
	Thermal Stability System	×	×	×	×	◎	◎
	Non hardeing 4-sided table (separated)	×	×	×	×	◎	×
Power supply	Digital-FS power supply	●	×	●	×	◎	×
	H-FS power supply	◎	×	◎	×	×	×
Dielectric fluid system	Ion exchange resin 20L specifications (Organo)	○	○	○	○	○	○
	4-piece filter system	○	○	○	○	◎	◎
	Filter pressure sensor	◎	○	◎	○	◎	○
	Filter automatic switching*2	○	○	○	○	○	○
Communications	External signal output*3	○	○	○	○	○	○
	LAN/W*4	◎	◎	◎	◎	◎	◎
	DNC	◎	◎	◎	◎	◎	◎
	FTP (S/W)	◎	◎	◎	◎	◎	◎
Taper Machining	DD kit for Angle Master ADVANCEⅡ ø0.2 (±30°)*5	○	○	○	○	○	×
	DD kit for Angle Master ADVANCEⅡ ø0.2 (±45°)*5	○	○	○	○	○	×
	DD kit for Angle Master ADVANCEⅡ ø0.25 (±30°)*5	○	○	○	○	○	×
	DD kit for Angle Master ADVANCEⅡ ø0.25 (±45°)*5	○	○	○	○	○	×
	Angle Master (S/W)*5	◎	◎	◎	◎	◎	◎
	Angle Master ADVANCEⅡ (S/W)*6	○	×	○	×	○	×
	Angle Master ADVANCEⅡ (measuring jig)*6	○	×	○	×	○	×
Software	Anti-virus protection	◎	○	◎	○	◎	○
	Sleep mode	◎	◎	◎	◎	◎	◎
	Maisart						
	Nozzle away control	◎	×	◎	×	×	×
	Corner control	◎	×	◎	×	×	×
	COREHOLD	○	×	○	×	○	×
	P-SL Control	×	×	×	×	◎	◎
	3D Data import (Parasolid)	○	○	○	○	○	○
	Machining support system NV-2	○	○	○	○	○	○
	Power consumption meter	○	○	○	○	○	○
	Status data output*7	○	○	○	○	○	○
	MTConnect*7	○	○	○	○	○	○
Display	Working light (LED)	◎	◎	◎	◎	◎	◎
	Warning light*3	○	○	○	○	○	○
	Run timer*3	○	○	○	○	○	○
	Optionbox*8	○	○	○	○	○	○
Others	Manual (Booklet)*9	○	○	○	○	○	○
	Wire-alignment device	◎	◎	◎	◎	◎	◎
	High-accuracy wire-alignment device	○	○	○	○	○	○
	Workpiece clamp set,Tool box	◎	◎	◎	◎	◎	◎

*1 ø0.05 to 0.15 wire electrodes cannot be used with the wire processing unit. (These sizes can be used with the continuous wire feeder after removing wire processing unit.)
*2 Equipped with 4-pieces filters.
*3 Option box is required.
*4 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.
*5 Standard diamond guide and nozzle (ø7) is used for taper machining of 15 degrees or less. Angle Master ADVANCEⅡ guide kit (H/W) is needed for taper machining of 15 degrees or more.
*6 Angle Master ADVANCEⅡ (measuring jig) is needed for using Angle Master ADVANCEⅡ (S/W).
*7 Select status data output or MTConnect.
*8 Necessary for mounting external signal output, warning light and run timer.
*9 Different depending on countries.

Wire-cut EDM automation system

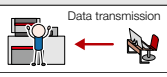
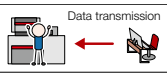
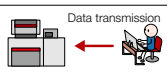
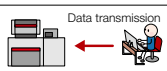
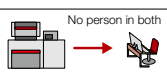
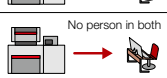
- Accumulates workpiece measurement data
  - Compatible for external set-up using a coordinate measuring machine
  - Enables automatic measurement when measuring on an EDM
- Creates processes off-line
- Automatically exchanges workpieces using a robot



* Please contact a Mitsubishi Electric representative for details.

Network connection specifications

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.

Required specifications	Image drawing	Function	Supplement
Operate on the EDM side and receive data from personal computer		LAN/W	Use EDM's Explorer and receive data in the common HDD on the EDM side. After that, data I/O operations are required.
Operate on the EDM side and send data directly to the EDM's NC data area.		FTP	Data can be received only using data I/O operation.
Operate on the personal computer side and send data to the EDM		LAN/W	The personal computer's Explorer and the EDM's common HDD are used. After that, data I/O operations are required for the EDM.
Operate on the personal computer side and send data directly to the EDM's NC data area		DNC	Commercially available DNC software must be installed on the personal computer side. Refer to DNC specifications operation for details.
Automatically send data from machining machine to FTP server		Operating status data output (Option)	Customer should prepare FTP server.
Automatically send data from machining machine to MTConnectAgent		MTConnect (Option)	Customer should prepare MTConnectAgent. Machine operating Status, alarm data, and machining history data are output using the MTConnect communication protocol.

Power Supply, Control Specifications/ Machine Installation

■ Power supply/Control unit specifications

Compatible model		MV-R	MV-S	MV4800R	MV4800S
Power supply unit specifications					
Power supply unit	Model	WMV(R)	WMV(S)	WMV48(R)	WMV48(S)
	Power supply circuit	Regenerative transistor pulse type			
	Cooling method	Completely sealed/Indirect cooling			
	Anti-electrolytic power supply	All modes			
	Maximum output current	50A			
	Power supply mode	12 types : Anti-electrolysis power supply			
	Machine voltage selection	19 types			
	Machining setting	45 types			
	OFF time	20 types			
	Stabilization circuit A	10 types			
	Stabilization circuit B	20 types			
	Stabilization circuit C	7 types			
	Stabilization circuit E	5 types			
	FM circuit (LA, LC)	2 types			
	PM control	3 notches (changeable with M code or screen) Workpiece material: Steel, tungsten carbide, copper, aluminum Applicable only for rough-cut conditions			
	AVR	Built-in			
	Unit dimensions (mm)	600×600×1767			
	Unit weight (kg)	230			
Control unit specifications					
Control unit	Model	W41MV-2(R)	W41MV-2(S)	W41MV-2(R)	W41MV-2(S)
	NC program input method	Keyboard, USB flash memory, Ethernet			
	Pointing device	Touch panel, mouse			
	Display	19"color TFT			
	Display characters	Alphanumeric characters			
	Control method	CNC closed loop			
	Number of control axes	Max. 4 axes simultaneously			
	Setting unit	X, Y, U, V, Z … 1/0.1μm			
	Minimum driving unit (mm)	50nm			
	Max. command value	±99999.999mm			
	Position command format	Combined use of increment/absolute values			
	Interpolation function	Linear, circular, and spiral			
	Scale magnification	0.00001-99.999999 (G code) 0.001-9999.999 (S code)			
	Optimum feed control	Automatic selection of machining speed according to gap voltage sensing			
	Path-retrace control	Reverse path retrace during short-circuit			
	Z axis limit setting	Z axis limit setting			
	Wire offset	±99999.999mm Offset numbers: 1 to 900 (intersection point calculation)			
	Basic screen menu	3 types (Initial setting, operation, history management)			
	Simple shape	28 shapes (Plotting not required)			
	Calculation tool	Wire alignment and taper specification adjustment			
	Check tool	Daily/periodic inspection, consumables check list			
	Manual input positioning	Input on screen			
	Manual operation box	High-speed, medium-speed, low-speed, ultra-slow speed, inching (0.0001mm/0.0005mm/0.0001mm) Positioning function, AT function Touch panel screen operation, override function, teaching			
	Graphics	XY plane, XY-XZ plane, solid, table scaling, 3D model display, background drawing, automatic machining path drawing Gestures, graphic link			
	User memory capacity	1GB			
	Maintenance function	Management of consumable parts (time display)			
	Adaptive control	CM, EM, PM, BM, SL			
	External dimensions (mm)	518×97×363			
	Weight (kg)	15			

Machine installation checklist

Determining the machining details

Check each item, and make sure that no item or order is overlooked.

1) Determine the workpiece	
2) Determine the machining site	
3) Determine the pre-processing site	
4) Determine the post-processing site	

Preparation of installation fixtures

1) Plan the installation fixtures	
2) Prepare or manufacture the fixtures	

Preparation of consumable parts

1) Purchase consumable parts such as wire electrodes	

Training of programmers and operators

1) Select the programmers and operators	
2) Apply for training seminars	

Confirmation of foundation and power-supply work

If there is any possibility of radio disturbance, investigate it prior to starting work.

1) Confirmation of floor area	
2) Confirmation of environment (constant-temperature dust-proof room, measure for radio disturbance, prevention of external noise)	
3) Confirmation of foundation floor	
4) Foundation work	
5) Primary wiring for power lead-in	
6) Grounding work	
7) Construction of dielectric fluid (city water) supply/drainage facilities	
8) Air piping work	

Confirmation of delivery path

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

1) Traffic restrictions to factory		
Road width		
Entry road		
2) Factory entrance and width of gate in factory	(m)	
Factory building entrance dimensions (height x width)	(m)	
3) Constant-temperature dust-proof room entrance dimensions (height x width)	(m)	

Cautions

The standard delivery entrance dimensions for standard shipment delivery are given on the product line up page.
If the entrance is smaller than the standard delivery entrance, a machine with different dimensions can be shipped.
* Please contact a Mitsubishi Electric representative for details (a separate estimate will be issued).
Note that delivery may not be possible in some cases depending on the dimensions.

Installation conditions

1. Installation site

❶ Constant-temperature dust-proof room
– Recommended room temperature 20±1°C
– Usable temperature range 5 to 35°C
Temperature fluctuation will directly affect machine accuracy. To maintain performance accuracy, select a place with minimal temperature fluctuation.
Install the EDM in a constant-temperature room when performing high accuracy machining, even when using skim cuts.
Note that an environment where the temperature fluctuates by 3°C or more within 24 hours, or 1°C or more within one hour can adversely affect machining accuracy. Make sure that the machine body is not subject to direct wind from air-conditioners or to direct sunlight.
– Dust-free location is recommended.
Install a wire-cut EDM in an environment with no corrosive gases, such as acid or salt, or mist, and with low levels of dust.
Grinding dust can adversely affect the machine's linear scales and ball screws.
Pay special attention to installation location to avoid this hazard (separate from grinding machine, or install in separate room, etc.).
– Humidity Within 30 to 75%RH (with no dew condensation).
– Temperature range during transportation and storage -25 to 55°C (when power is not connected).
❷ Tolerable vibration of floor
– Select a floor where vibration or impact will not be conveyed.
– As a reference, the vibration level should have a max. amplitude of 2μm or less at a 10 to 20Hz frequency.
* Consult with the contractor or vibration measuring instrument manufacturer for details on the measuring method.
❸ Foundation
– The floor should be concrete with a thickness of 400mm or more so it can sufficiently withstand the system's weight.
– The floor inclination (step) must be within 6/1000 (floor inclination 6mm per 1m) (MP2400 series).

2. Machining heating value

Use the equipment capacity to calculate the wire-cut EDM's heating value required for designing a constant-temperature room.

Heating value (kW) = Equipment capacity (kVA) x 0.6
= 13.5kVA x 0.6
= 8.1kW

The above value is a guideline. Consult with the constant-temperature room manufacturer for details.

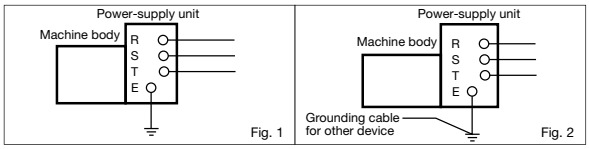
3. Power-supply equipment

- Primary wiring 3-phase 200/220VAC±10% 60Hz, 3-phase 200VAC±10% 50Hz
- Power capacity 10.0kVA (during normal use) (when using ø0.2mm wire electrode)
13.5kVA (when using the maximum)

* Use a 14mm^2 or thicker cable for the primary connection.

4. Grounding work

Wire-cut EDMs must always be grounded to prevent external noise, radio disturbance and earth leakage. Install a wire-cut EDM in an environment with no corrosive gases, such as acid or salt, or mist, and with low levels of dust.
– Common grounding can be used if noise from other devices will not enter through the common grounding; the grounding cable must be connected independently to the grounding location (Fig. 2).
– Use a 14mm^2 grounding wire.



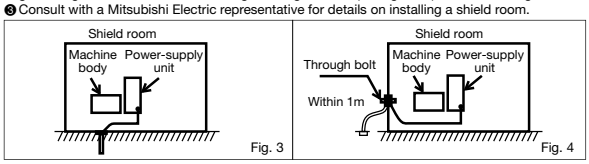
5. Primary air equipment

- Hose diameter : 1/4 hose (hose sleeve outer diameter: ø9.0)
- Pressure : 0.5 to 0.7MPa
- Flow rate : 75L/min or more

* Air (compressed air) is used to operate the automatic wire feeder and work tank door, etc. Air supplied from a normal compressor contains various impurities that could cause operation faults if they get into the pneumatic devices such as the solenoid valve. Install an air filter with a drainage discharge mechanism, etc., in the air source (primary source) piping to prevent impurities from entering the pneumatic devices.

6. Shield room

Install a shield room if a wire-cut EDM affects televisions or other communication facilities in the area. Observe the following points when installing the wire-cut EDM in the shield room.
❶ Ground the wire-cut EDM in the shield room (Fig. 3).
❷ If the wire-cut EDM cannot be grounded in the shield room, connect the wire-cut EDM's grounding cable to the shield room's grounding terminal (through bolt) as shown in Fig. 4.
❸ Consult with a Mitsubishi Electric representative for details on installing a shield room.



Precautions for selecting earth-leakage breaker

To prevent malfunctions caused by the external noise from control units, etc., a filter is installed for the power-supply input. By grounding one end of this filter, an earth-leakage current of approx. 30 to 40mA passes through the filter. A highly sensitive earth-leakage breaker (sensitivity current 30mA) could malfunction. Thus, a medium-sensitivity earth-leakage breaker (sensitivity current 100 to 200mA) is recommended for the wire-cut EDM. Class C grounding (grounding resistance of 10Ω or less) is recommended for the wire-cut EDM. Even if the sensitivity current is 200mA, the contact voltage will be 2V or less, and no problems will occur in preventing electric shock (application of tolerable contact current Class 2, 25V or less).

Refrigerant for dielectric fluid chiller

The dielectric fluid chiller unit includes a fluorinated greenhouse gas R410A. Please use only the specified refrigerant (R410A), when servicing the dielectric fluid chiller unit. The use of any refrigerant other than that specified will cause mechanical failure, system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

Disposal

The dielectric fluid, dielectric fluid filter, ion exchange resin, wire, etc. are industrial waste.
These must be disposed of following national and local laws and ordinances.

Harmonic distortion

If there is harmonic distortion in the power supply, the machine operation could be affected even if the voltage does not fluctuate. In addition, the harmonic current could flow from the wire-cut EDM to the power system and adversely affect peripheral devices. If the effect of the harmonic distortion causes problems, install a harmonic suppression filter or take other measures.

Wire electrodes

Use the following wire electrodes

OB-PN (ø0.1/BS - ø0.3/BS)	Oki Electric Cable
HBZ-U(N) (ø0.1/BS - ø0.3/BS)	Proterial
SBS-HN (ø0.1/BS - ø0.3/BS)	Sumiden Fine Conductors
SWP-SP (ø0.05/SP - ø0.07/SP)	Nippon steel SG Wire

* The wire electrodes shown above do not guarantee performance

Recommended sliding surface lubricants

Use lubricant with viscosity ISOVG 68 (sliding oil, turbine oil, etc.).

Terms of warranty

1. Terms of warranty

This will differ according to country and region of sale; please contact a Mitsubishi Electric representative for details.

2. Coverage

(1) Terms of repairment free of charge
Parts labor and travel are included free of charge when the failure occurs during normal use for the stated Terms of the warranty (based on proper usage and maintenance as described in the operations manual and sales agreement).
Coverage exceptions:
❶ When a failure occurs that was caused by a machine modification that directly affects the machine's functioning or accuracy.
❷ When a failure occurs caused by the use of non-standard parts, consumables or lubricants.
❸ When a failure occurs caused by a natural disaster such as lighting, earthquake or storms and flooding.
❹ When the use of non-recommended consumables or aftermarket parts are used such as filters or flushing nozzles.
(2) Exclusion of loss in opportunity and secondary loss from warranty liability
Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:
❶ Damages caused by any cause found not to be the responsibility of Mitsubishi Electric.
❷ Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi Electric products.
❸ Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric products.
❹ Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.
(3) Information regarding modifications or alterations obtained during product support will be used to improve product quality and service.

3. Post Warranty / Expected Service Life

After the warranty period expires, all standard service rates and travel expenses will apply.
Normal service life expectancy is 11 years after installation, but there may be some cases where discontinued electrical parts such as semiconductors and motors will reduce this period.

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Mitsubishi Electric's product lineup, from various controllers and drives to energy-saving devices and processing machines, all help you to automate your world. They are underpinned by software, innovative data monitoring, and modelling systems supported by advanced industrial networking and Edgecross IT/OT connectivity. Together with a worldwide partner ecosystem, Mitsubishi Electric factory automation (FA) has everything to make IoT and Digital Manufacturing a reality.

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Note: not all products are available in all countries

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