Global Partner. Local Friend.

MV Series

for a greener tomorrow

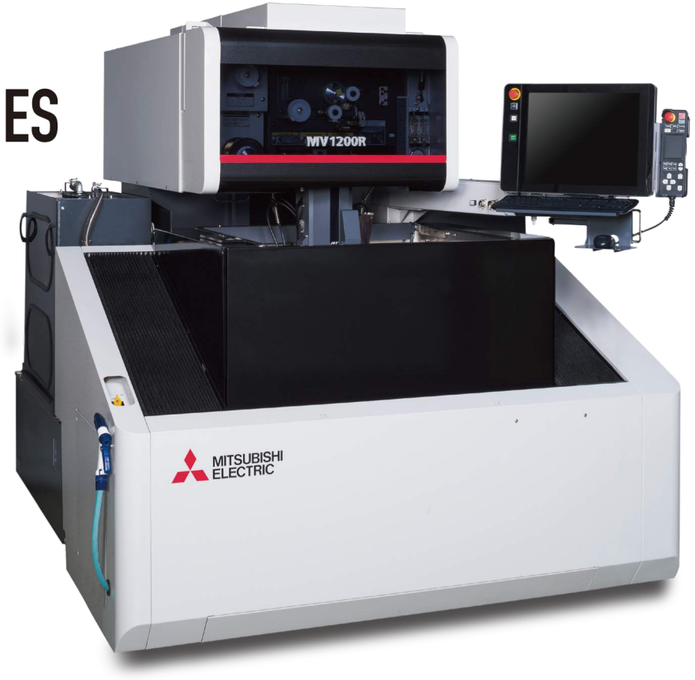
MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

Wire-cut EDM Systems
MV Series

MV
series

D-CUBES



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Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)

ISO 14001 JACO EC97J1113 UKAS MANAGEMENT SYSTEMS 051

ISO 9001 BUREAU VERITAS Certification UKAS MANAGEMENT SYSTEMS 008

MITSUBISHI ELECTRIC CORPORATION HEAD OFFICE: TOKYO BLDG., 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

▶MV Series

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GLOBAL IMPACT OF MITSUBISHI ELECTRIC

Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

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.

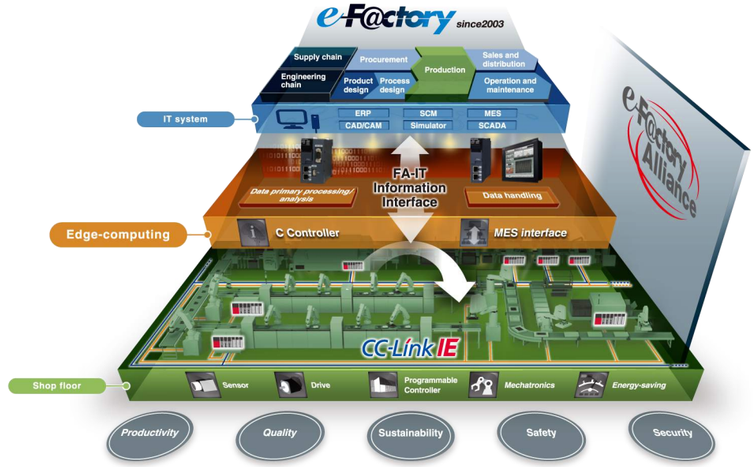
Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

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.

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 lineup, 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

MV Series

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

1972

Line tracer type wire-cut EDM

DWC50S-LT1

DWC50H-DNC2

Taper machining unit

DWC100H-CNC2

Max. machining speed 60mm²/min

DWC90-CNC1

1980

DWC110N-CNC1

Max. machining speed 110mm²/min
Optimum surface roughness of Rz2μm

DWC90FSK-CNC1

DWC90G

Max. machining speed 250mm²/min

DWC90H

DWC90PH

DWC110PH

DWC90C

Ultrahigh accuracy wire-cut EDM
(Full-cabin)

PX05

FX10

DWC90PA

CX20

SX20

Anti-electrolysis power supply
(AE power supply)

DWC400HA

DWC110SA

Automatic wire
threading unit "AF2"

DWC110SZ

Automatic wire threading unit
(water jet type)

DWC90SB

32 bit CNC

DWC90HA

1990

FX20K

64 bit CNC

QA20

RA90AT

2000

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

FA20

FA20P

PA20

World's fastest "V500"
power supply

FA30V

PA05S

FA20S

Super fine finishing
power supply "Digital-FS"

FA10PS

2016

MV1200

2014

MP1200

2013

Oil wire-cut EDM

MX600

PA10 ADVANCE

2012

MV1200R

Linear Shaft motor

NA2400P

BA8

Digital-AE power supply

FA20S Advance

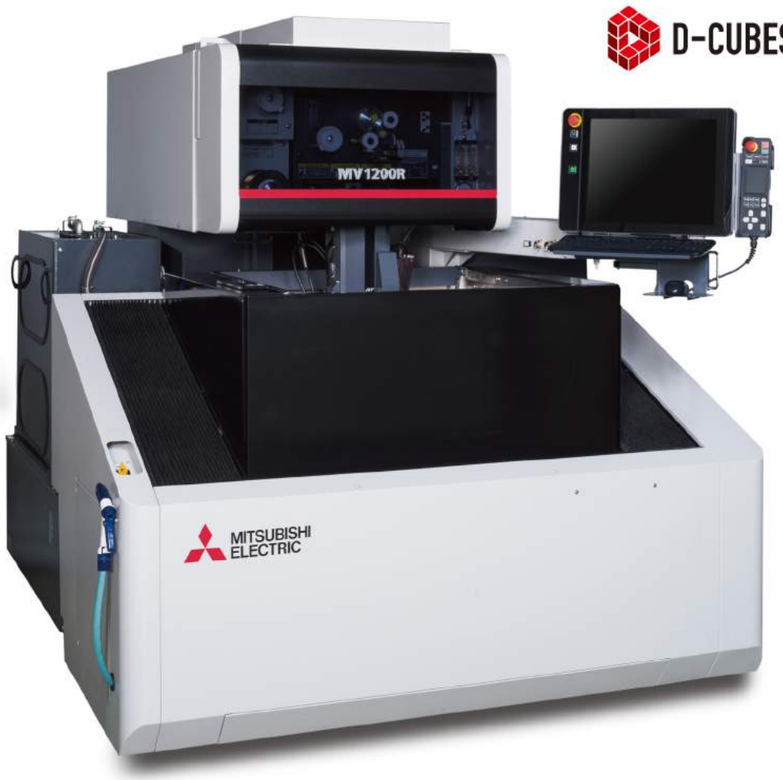
Large-sized wire-cut EDM

FA50V

MITSUBISHI ELECTRIC Wire-cut EDM Systems

MV Series

Innovated basic performance for Wire cut EDM



MVSeries

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 precision machining

PA05S ADVANCE

Flagship model incorporating
extreme precision machining

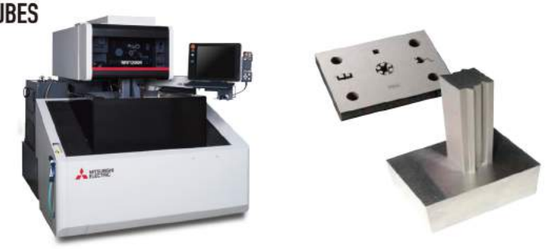
MP Series series MP Water Technology

High-class model incorporating
a ultra-high accuracy machining

High-performance machine D-CUBES

MV-R Series

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



High-productivity machine D-CUBES

MV-S Series

Standard model pursuing
a cost performance machining system

MV Series

Opening the door to IoT New type control unit "D-CUBES"

MV series with new controller D-CUBES
By improving machining accuracy and utilizing IoT technology, we will support customer productivity improvement, with innovation technology, manufacturing will be on the next stage

D-CUBES

C onnect
- MTConnect (open)

U niversal
- Multilingual support
- Rotating / tilting mechanism
- Thin manual control box

B rain
- Adaptive control automatic setting
- Wire residual quantity detection function
- Consumables check

E volution
- For productivity IoT compatible NC

S mooth
- 19inch touch screen
- Navigation
- Easy shape (CAD/CAM)

Product Line-up

High quality machining is the "MV-R" series

<Automatic vertical Front door>

D-CUBES

MV1200R

4-axis LSM (XYUV linear shaft motor)
Four-sided hardened table

D-CUBES

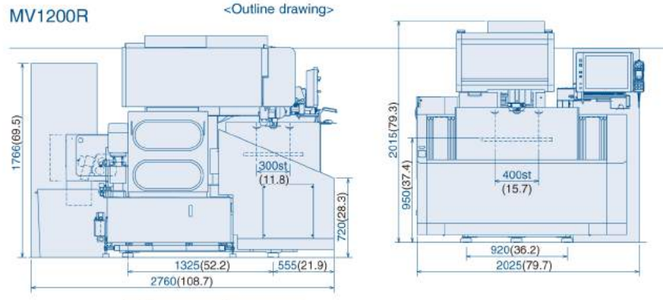
MV2400R

4-axis LSM (XYUV linear shaft motor)
Four-sided hardened table

<Automatic vertical Front door>

MV1200R

<Outline drawing>



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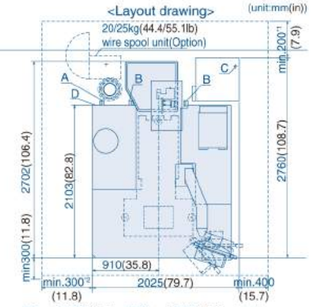
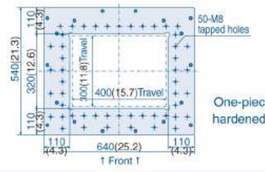


*1 is min.500(19.7) and *2 is min.700(27.6) when the 20/25kg(44.1/55.1b) wire spool unit is mounted.
Machine unit dimensions
Width:1910mm(75.2) Height:2015mm(79.3)

<Talbe drawing>

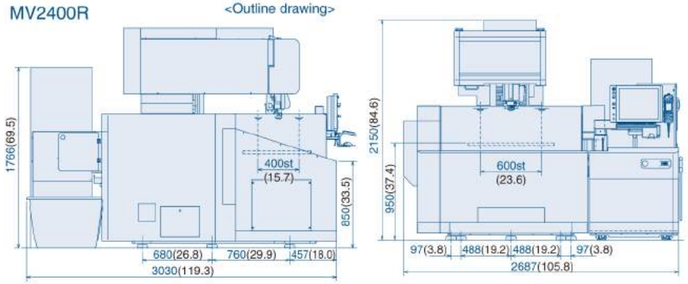


One-piece 4-sided table
hardened stainless steel

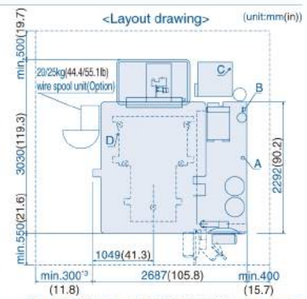
A: Clean tank drain port	Fitted with PT1 screw valve (165(6.5) from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (165(6.5) from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa (70 to 100 psi) 75ℓ (2.6cu.ft.)/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

MV2400R

<Outline drawing>

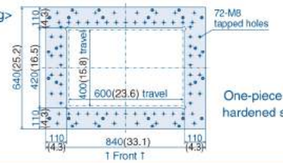


<Layout drawing> (unit:mm(in))



*3 is min.670(26.4) when the 20/25kg(44.1/55.1lb) wire spool unit is mounted.
Footprint : 3387(133.3)×3830(150.8)(including maintenance space)
Machine unit dimensions
Width:2022mm(79.6) Height:2150mm(84.6)

<Talbe drawing>



One-piece 4-sided table
hardened stainless steel

A: Clean tank drain port	Fitted with PT1/2 screw valve (52(2.0) from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (52(2.0) from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa (70 to 100 psi) 75ℓ (2.6cu.ft.)/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

Standard machine specifications

			MV1200R	MV2400R
Machine unit	Model			
	Max. workpiece dimensions	[mm](in)	810(31.9)×700(27.6)×215(8.5)	1050(41.3)×820(32.3)×305(12)
	Max. workpiece weight	[kg](lb)	500(1102)	1500(3307)
	Table dimensions	[mm](in)	640(25.2)×540(21.3) (4-sided)	840(33)×640(25.2) (4-sided)
	Machine travels (XxYxZ)	[mm](in)	400(15.7)×300(11.8)×220(8.7) (XY axis LSM-drive)	600(23.6)×400(15.7)×310(12.2) (XY axis LSM-drive)
	Machine travels (UxV)	[mm](in)	±60(2.4)×±60(2.4) (LSM-drive)	±75(2.9)×±75(2.9) (LSM-drive)
	Max. taper angle	[°]	15°(max. 200mm(7.9"))	15°(max. 260mm(10.2"))
	Wire diameter	[mm](in)	0.1(.004) ~ 0.3(.012)*1	
	Weight	[kg](lb)	2700(5952) (including dielectric fluid reservoir)	3500(7716)
Dielectric fluid reservoir	Tank capacity	[ℓ](US gal)	550(145)	860(227)
	Filtration method		Paper filter (2)	
	Filtered particle size	[μm]	3	
	Water purifier (ion exchange resin)	[ℓ](cu.ft.)	10(0.35)	
	Dielectric fluid chiller unit		Unit cooler	
	Weight (dry)	[kg](lb)	— (included in the machine unit weight)	350(772)

*1 ø0.25(.010") DD guides and ø1.5(.06") jet nozzle are standard equipment.

General input		[kVA]	13.5
Required air rate	Air pressure	[Mpa](psi)	0.5(72) ~ 0.7(101)
	Air rate	[ℓ](cu.ft.)/min]	75(2.6) or more

Standard functions

- Automatic wire threading
- Digital-AEII power supply
- LAN/W (Ethernet)
- Angle Master (S/W)
- Anti-virus protection
- Option box
- Sleep mode
- Filter pressure sensor
- DNC (S/W)
- FTP (S/W)

Options

- ø0.05(.002"), 0.07(.003") automatic wire threading
- Angle Master ADVANCE (S/W)
- Digital-FS power supply
- COREHOLD
- LED light
- Angle Mater guide kit ø0.2(0.008")
- Angle Mater guide kit ø0.25(0.010")
- External signal output
- 4-piece filter system
- Filter automatic switching (4-piece filter system)

Product Line-up

Standard Wire-cut EDMs

D-CUBES

MV1200S

2-axis LSM (XY linear shaft motor)

U-shaped hardened table

<manual vertical front door>

D-CUBES

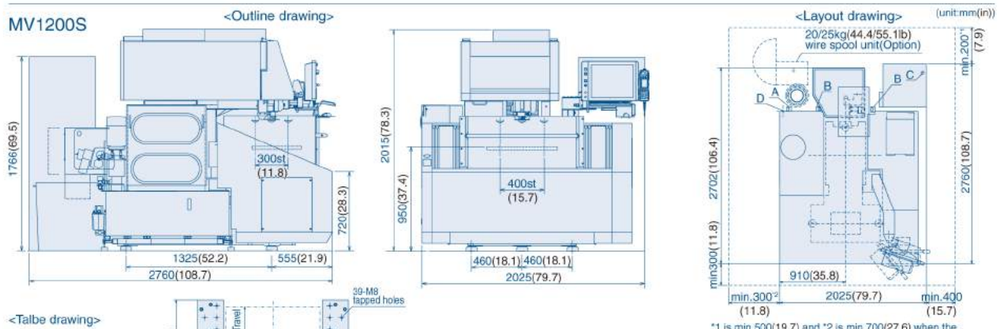
MV2400S

2-axis LSM (XY linear shaft motor)

U-shaped hardened table

<Automatic vertical Front door>

MV1200S

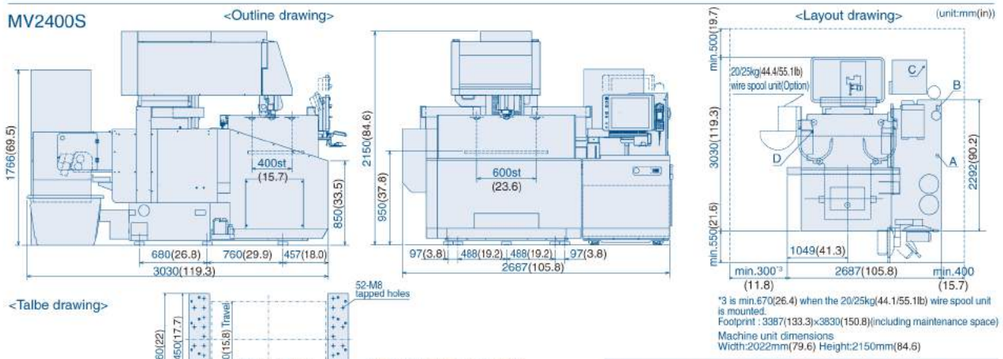


Three-piece U-shaped table hardened stainless steel

*1 is min.500(19.7) and *2 is min.700(27.6) when the 20/25kg(44.1/55.1lb) wire spool unit is mounted.
Machine unit dimensions
Width:1910mm(75.2) Height:2015mm(79.3)

A: Clean tank drain port	Fitted with PT1 screw valve (16ℓ(6.5) from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (16ℓ(6.5) from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa (70 to 100 psi) 75ℓ (2.6cu.ft.)/min or more, 1/4 hose connection

MV2400S



Three-piece U-shaped table hardened stainless steel

*3 is min.670(26.4) when the 20/25kg(44.1/55.1lb) wire spool unit is mounted.
Footprint : 3387(133.3)×3830(150.8)(including maintenance space)
Machine unit dimensions
Width:2022mm(79.6) Height:2150mm(84.6)

A: Clean tank drain port	Fitted with PT1/2 screw valve (52(2.0) from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (52(2.0) from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa (70 to 100 psi) 75ℓ (2.6cu.ft.)/min or more. 1/4 hose connection (hose sleeve outer diameter: ∅9mm)

Standard machine specifications

			MV1200S	MV2400S
Machine unit	Model		MV1200S	MV2400S
	Max. workpiece dimensions	(mm)(in)	810 (31.9) ×700 (27.6) ×215 (8.5)	1050 (41.3) ×820 (32.3) ×305 (12)
	Max. workpiece weight	(kg)(lb)	500 (1102)	1500 (3307)
	Table dimensions	(mm)(in)	640 (25.2) ×450 (17.7) (3-sided)	840 (33) ×560 (22.0) (3-sided)
	Machine travels (XxYxZ)	(mm)(in)	400 (15.7) ×300 (11.8) ×220 (8.7) (XY axis LSM-drive)	600 (23.6) ×400 (15.7) ×310 (12.2) (XY axis LSM-drive)
	Machine travels (UxV)	(mm)(in)	±60(2.4) ×±60(2.4) (Ball screw drive)	±75(2.9) ×±75(2.9) (Ball screw drive)
	Max. taper angle	[°]	15°(max. 200mm (7.9"))	15°(max. 260mm (10.2"))
	Wire diameter	(mm)(in)	0.1 (.004) ~ 0.3 (.012) *1	
	Weight	(kg)(lb)	2700 (5952) (including dielectric fluid reservoir)	3500 (7716)
Dielectric fluid reservoir	Tank capacity	(ℓ)(US gal)	550 (145)	860 (227)
	Filtration method		Paper filter (2)	
	Filtered particle size	[μm]	3	
	Water purifier (ion exchange resin)	(ℓ)(cu.ft.)	10 (0.35)	
	Dielectric fluid chiller unit		Unit cooler	
	Weight (dry)	(kg)(lb)	— (included in the machine unit weight)	350 (772)

*1 φ 0.25 (.010") DD guides and φ 1.5 (.06") jet nozzle are standard equipment.

General input		[kVA]	13.5
Required air rate	Air pressure	[Mpa](psi)	0.5(72) ~ 0.7(101)
	Air rate	[ℓ(cu.ft.)/min]	75(2.6) or more

Standard functions

- Automatic wire threading
- Digital-AEII power supply
- LAN/W (Ethernet)
- Angle Master (S/W)

Options

- 20/25kg(44.1/55.1lb) wire spool unit
- Angle Mater guide kit ∅0.2(0.008")
- Angle Mater guide kit ∅0.25(0.010")
- External signal output
- Option box
- Run timer
- LED light
- 4-piece filter system
- Filter automatic switching (4-piece filter system)
- Anti-virus protection

Product Line-up

MV2400S column up specification

ADVANCE TYPE 3
2-axis LSM (XY linear shaft motor)
Four-sided hardened table

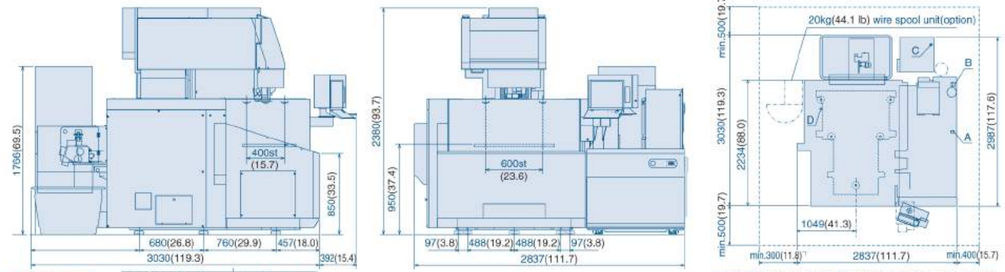
<automatic vertical front door>

MV4800

ADVANCE TYPE 3
2-axis LSM (XY linear shaft motor)
U-shaped hardened table

Standard
<automatic vertical front door>

MV2400S (column up specification) <Outline drawing> <Layout drawing> (unit:mm(in))



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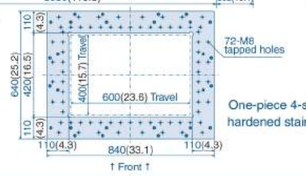
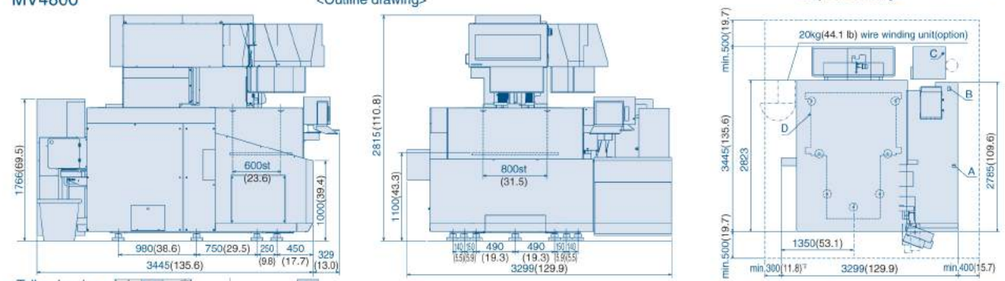


One-piece 4-sided table
hardened stainless steel

*1 is min.670(26.4) when the 20kg(44.1lb) wire spool unit is mounted.
Footprint : 3537(139.3)×4222(166.2)(including maintenance space)
Machine unit dimensions
Width:2085mm(82.1) Height:2380mm(93.7)

A: Clean tank drain port	Fitted with PT1/2 screw valve (52(2.0) from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (52(2.0) from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa (70 to 100 psi) 75ℓ (2.6cu.ft.)/min or more, 1/4 hose connection (hose sleeve outer diameter: ϕ9mm)

MV4800 <Outline drawing> <Layout drawing> (unit:mm(in))



<Talbe drawing>

Three-piece U-shaped table
hardened stainless steel

*2 is min.570(22.4) when the 20kg(44.1lb) wire spool unit is mounted.
Footprint : 3999(157.4)×4445(175.0)(including maintenance space)
Machine unit dimensions
Width:2587mm(101.9) Height:2815mm(110.8)

A: Clean tank drain port	Fitted with PT1/2 screw valve (52(2.0) from floor)
B: Dirty tank drain port	Fitted with PT1 screw valve (52(2.0) from floor)
C: Power supply port	200/220VAC±10% 50/60Hz, 13.5kVA
D: Primary air side	0.5 to 0.7 MPa (70 to 100 psi) 75ℓ (2.6cu.ft.)/min or more, 1/4 hose connection (hose sleeve outer diameter: ϕ9mm)

Standard machine specifications

			MV2400S (column up specification)	MV4800
Machine unit	Model			
	Max. workpiece dimensions	[mm](in)	1050(41.3)×820(32.3)×420(16.5)	1250(49.2)×1020(40.2)×505(19.9)
	Max. workpiece weight	[kg](lb)	1500(3307)	3000(6614)
	Table dimensions	[mm](in)	840(33.1)×640(25.2) (4-sided)	1080(42.5)×780(30.7) (U-shaped)
	Machine travels (XxYxZ)	[mm](in)	600(23.6)×400(15.7)×425(16.7) (XY axis LSM-drive)	800(31.5)×600(23.6)×510(20.1) (XY axis LSM-drive)
	Machine travels (UxV)	[mm](in)	±75(3.0)×±75(3.0) (Ball screw drive)	±100(3.94)×±100(3.94) (Ball screw drive)
	Max. taper angle	[°]	15°(max. 260mm(10.2"))	15°(max. 355mm(14.0"))
	Wire diameter	[mm](in)	0.1(.004) ~ 0.3(.012)*1	0.15(.006) ~ 0.3(.012)*1
	Weight	[kg](lb)	3650(8047)	5700(12566)
Dielectric fluid reservoir	Tank capacity	[ℓ](US gal)	980(259)	1480(391)
	Filtration method		Paper filter (2)	Paper filter (4)
	Filtered particle size	[μm]	3	
	Water purifier (ion exchange resin)	[ℓ](cu.ft.)	10(0.35)	
	Dielectric fluid chiller unit		Unit cooler	
	Weight (dry)	[kg](lb)	390(860)	450(992)

*1 ϕ0.25(.010") DD guides and ϕ1.5(.06") jet nozzle are standard equipment.

General input		[kVA]	13.5
Required air rate	Air pressure	[Mpa](psi)	0.5(72) ~ 0.7(101)
	Air rate	[ℓ/(cu.ft.)/min]	75(2.6) or more

Standard functions

- Automatic wire threading
- Digital-AEII power supply
- LAN/W (Ethernet)
- Angle Master (S/W)
- Sleep mode (MV4800)

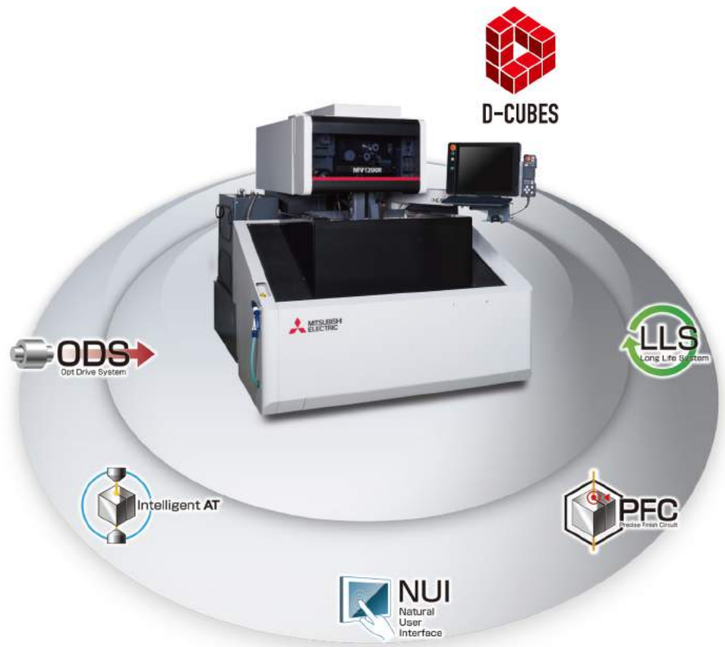
Options

- 20kg(44.1lb) wire spool unit
- 50kg(110.2lb) wire spool unit
- Angle Mater guide kit ϕ0.2(0.008")
- Angle Mater guide kit ϕ0.25(0.010")
- Angle Master ADVANCE (S/W) (MV4800)
- Advanced manual control box
- External signal output
- 3-color warning light
- Run timer
- Option box
- LED light
- 4-piece filter system
- Anti-virus protection

Functions and Features

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

MV1200R
MV2400R
MV1200S
MV2400S



MV2400S Column up specification
MV4800

Automatic wire threading

Intelligent AT

Refer to page19-20

- 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)

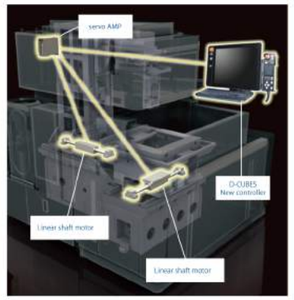
▲Video of automatic wire threading

Machining accuracy

ODS Opt Drive System

Refer to page21-22

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



Improved productivity

PFC Precise Finish Circuit

Refer to page23-24

- Surface roughness improvements are realized through enhanced power supply performance for high speed machining.

Workpiece : Steel/60(2.4)
Electrode : ⌀0.20(.008")mm BS
Accuracy : ±3μm(0.00012)

- Surface finish reduced by 50% by machining with only 2 cuts.

- Machining time comparison for Rz Ra0.45μm/18μ"Ra with 3 cuts

Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series), with to the same machining amounts

Operability

NUI Natural User Interface

Refer to page25-28

- 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 hand pendant box with LED.

Energy savings, low running cost

LLS Long Life System

Refer to page31-32

- The running cost of the machine can be viewed on the cost management screen. This is useful for budget planning.
- The remaining wire amount is accurately managed to help in the reduction of wire cost (remaining wire amount detection function)

Power monitor

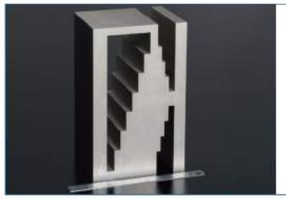
Machining results monitor

D-CUBES

Sample

Revolutionize manufacturing with next generation high performance machining

D-CUBES

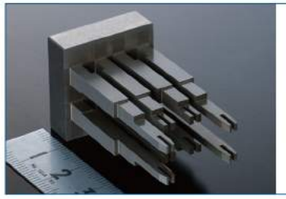


Step

Model	MV2400R
Electrode material	ϕ0.25(.010")/BS
Workpiece	Steel (SKD11/D2)
Workpiece thickness	20-200mm(.78~7.87")
Surface roughness	Ra0.55μm/21.6μ"Ra
Machining accuracy	±15μm(0.00059")

- Highly accurate machining is possible using ODS
- Due to D-CUBES SL, the occurrence of wire lines is prevented even with parts having varying workpiece thickness

ODS D-CUBES

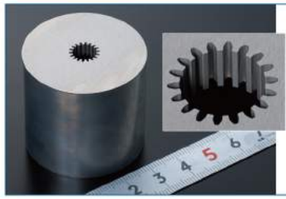


Conecter

Model	MV1200R
Electrode material	ϕ0.2(.008")/BS
Workpiece	Steel (SKD11/D2)
Workpiece thickness	4~25mm(0.16~0.98")
Surface roughness	Ra0.38μm/15μ"Ra
Machining accuracy	±3μm(0.00012")

- Highly accurate machining is possible using ODS
- A machining accuracy of ±3μm is realized for high L/D machining of pin widths from 1.0(.04") to 4.5mm(.18") and a length of 40mm(1.6")

ODS D-CUBES

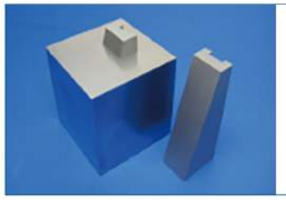


Gear

Model	MV1200R
Electrode material	ϕ0.2(.008")/BS
Workpiece	Steel (SKD11/D2)
Workpiece thickness	5mm(.2")
Surface roughness	Ra0.38μm/15μ"Ra
Machining accuracy	±3μm(0.00012")

- Highly accurate machining is possible using ODS
- New corner machining control (CM3) improves shape accuracy to within ±2μm(0.00008") under nozzle release conditions

ODS D-CUBES



Taper

Model	MV2400R
Electrode material	ϕ0.2(.008")/BS
Workpiece	Steel (SKD11/D2)
Workpiece thickness	D:60(2.4"), P:70(2.75")Angle10°
Surface roughness	Ra0.35μm/14μ"Ra
Machining accuracy	±5μm(0.0002")

- Taper accuracy is improved regardless of wire angle direction using Angle Master ADVANCE
- ODS provides high accuracy when cutting a U-V independent tapered shape

Intelligent AT ODS D-CUBES

High thickness

Model	MV2400S
Electrode material	ϕ0.25(.010")/BS
Workpiece	Steel (SKD11/D2)
Workpiece thickness	200mm(7.9")
Surface roughness	Ra0.71μm/28μ"Ra
Machining accuracy	±3μm

- High-speed and highly accurate machining are possible using PFC
- High-speed and highly accurate machining are possible using PFC with thickness of 200mm(7.9")

PFC D-CUBES

Pitch

Model	MV2400R
Electrode material	ϕ0.2(.008")/BS
Workpiece	Steel (SKD11/D2)
Workpiece thickness	30mm(1.2")
Surface roughness	Ra0.2μm/8μ"Ra
Machining accuracy	Pitch±1.5μm(0.00006")

- Stable automatic wire threading is realized by Intelligent AT even in multi-shape machining.
- Stable high accuracy machining is realized by ODS, improvement of axis movement accuracy and dielectric fluid control.

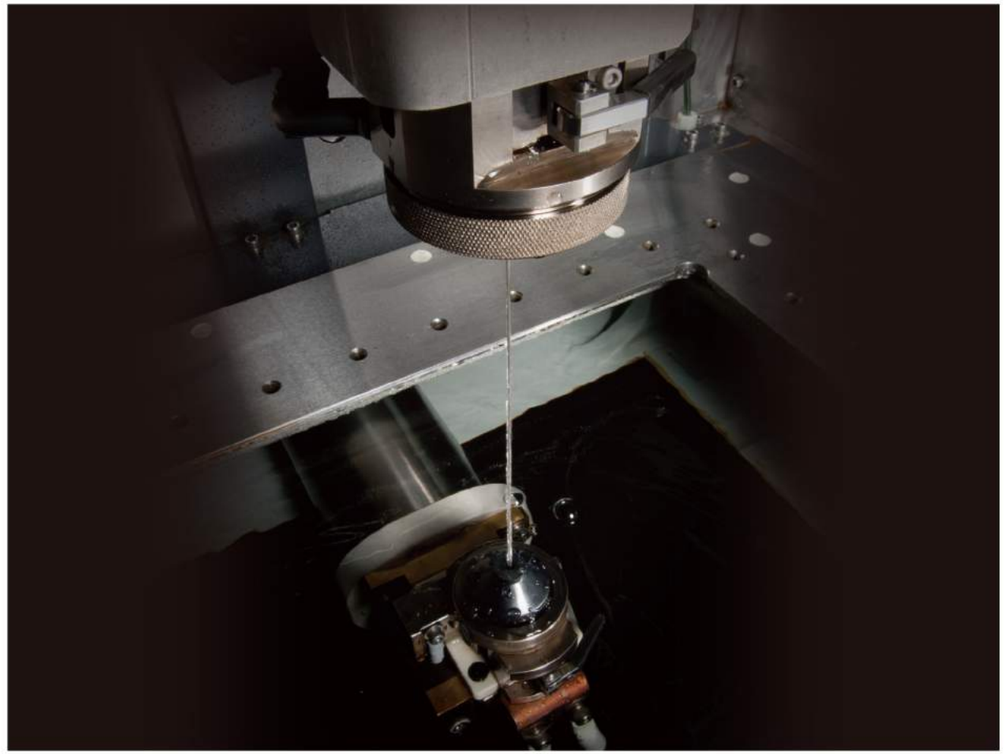
ODS Intelligent AT

*The listed machining results are all based on in-house conditions and measurements.

Innovative Automatic Wire Threading

Intelligent AT

Advanced technology for greatly improved productivity

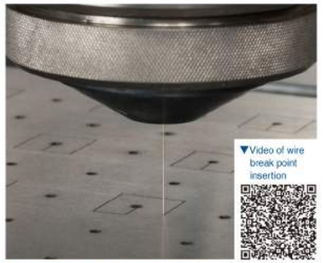


Improved automatic wire threading

- 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)

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

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

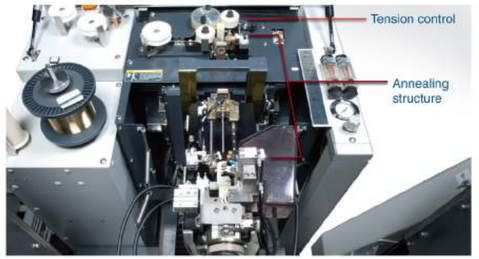


Wire break point insertion is possible

Wire electrode annealing structure

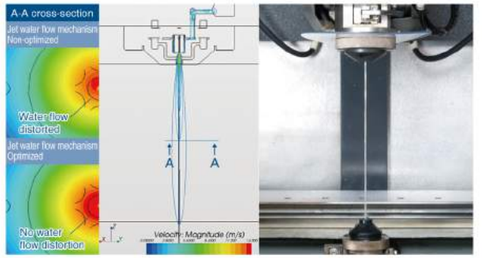
- Improved wire annealing power supply and tension control enhance wire threading (reducing the curl ratio down to 10% or less), which straightens the natural curl caused by spooling
- The greatly increased length of annealed wire improves automatic wire threading for thick workpieces

*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 the water flow mechanism for straightening the 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

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

One-touch lever clamp mechanism

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

Diamond guide

- A round diamond guide is used to provide the best accuracy for both straight and taper cutting applications
- Both upper and lower guides can be replaced by simply unscrewing the flush cups

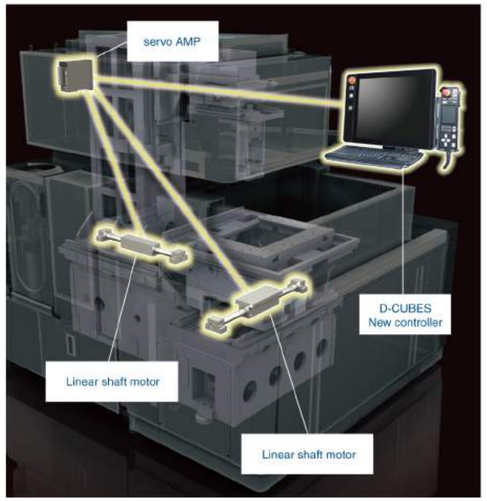
Machining Accuracy

ODS Opt Drive System

Next-generation drive system and optimum machine structure

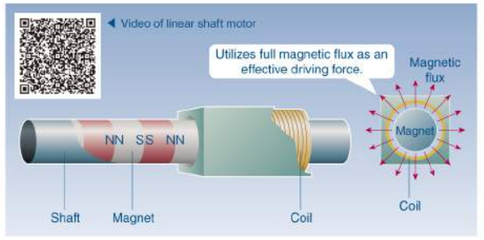
Optical Drive System

- 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



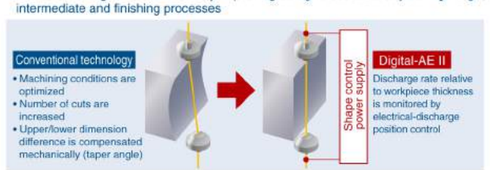
Linear Shaft Motor (LSM)

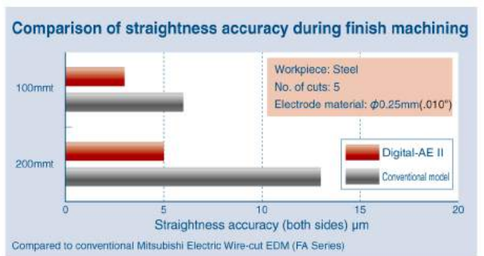
- Power consumption is reduced by utilizing a full 360° magnetic ux as the effective driving force
- Highly accurate axis movement is possible without any backlash
- Non contact power transmission ensures stable and accurate axis movement for many years



Shape control power supply (Digital-AE II)

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

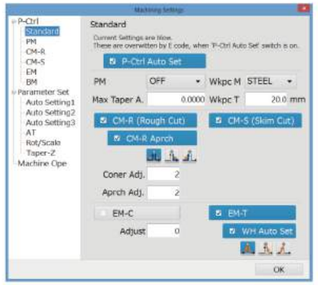




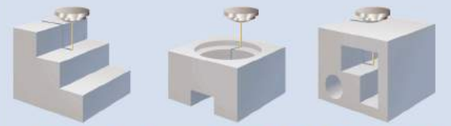
Fully-automatic rough machining control (D-CUBES)

D-CUBES

- 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 the E pack command depending on the shape (die, punch) or workpiece thickness. The optimum machine processing values are set even if the operator forgets to enter them



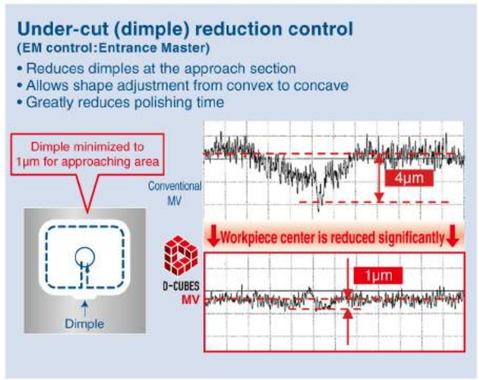
Examples of PM machining applications



Under-cut (dimple) reduction control

(EM control:Entrance Master)

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



Corner machining control (CM3control:Corner Master3)

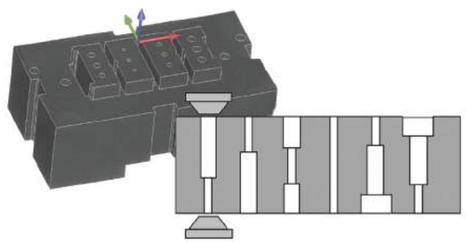
- Improves machining accuracy at extremely small in-corners and out-corners
- Realizes highly accurate shape machining even for complicated geometries with several types and sizes of corners
- Corner accuracy is easily controlled by the operator
- The dimensional errors of not only the corners, but also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

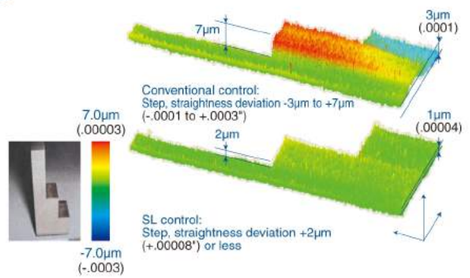
Conditiuin	
Wire electrode : ϕ0.1(.004)/BS	Tickness 5mm(0.197")
Workpiece Tungsten carbide	Suerface roughness RA0.28μm/11μ"Ra

Machining surface step/straightness control

(D-CUBES SL Control :Stepless control)

- The straightness deviation is reduced significantly in workpieces with variable thickness
- A maximum step height of 300mm(11.8") is now possible by using the enhanced step profile conditions for large-size materials.
- High speed machining of stepped profiles is now possible.
- Best suited for machining materials with a large variation in workpiece thickness





Productivity

Advanced Productivity

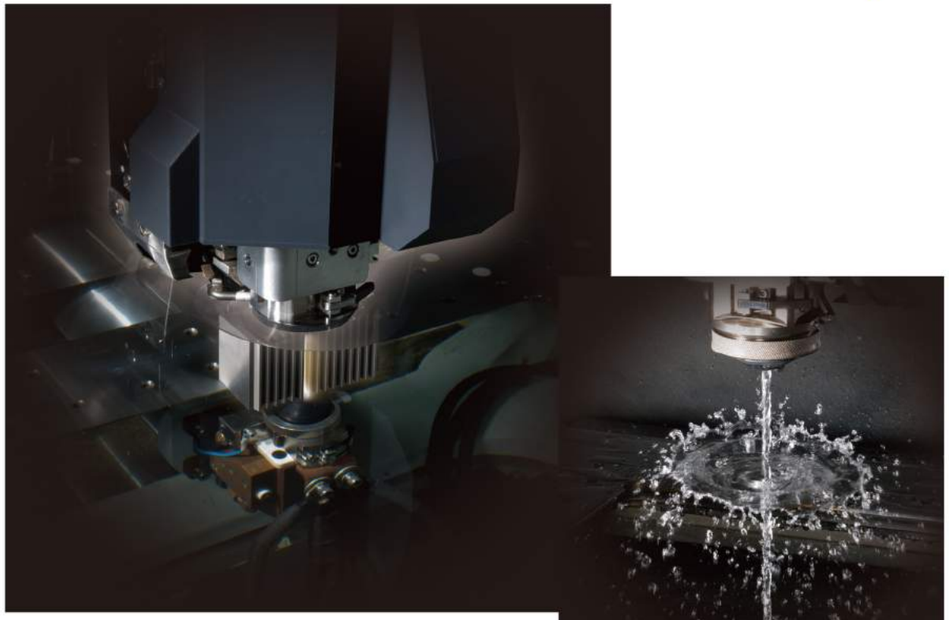
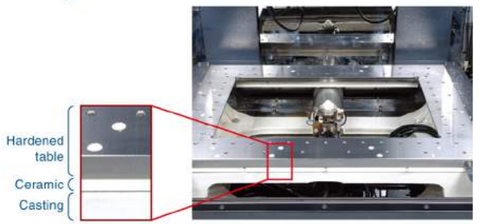


Table insulation (MV1200R/S, 2400R/S)

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

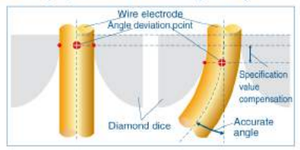


High-accuracy taper machining using round dies

- 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

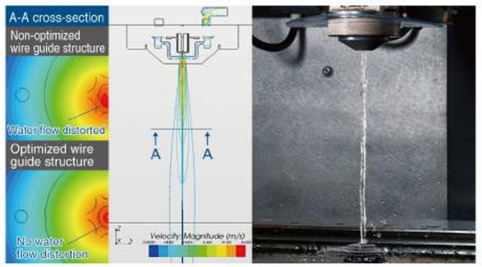
* Angle Master guide kit is optional

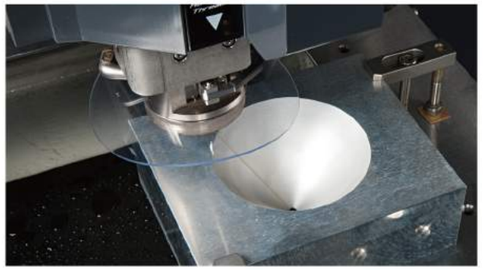
* Max. taper angle is 45° (at max. 40(1.6")mm)



New jet stream flow mechanism

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



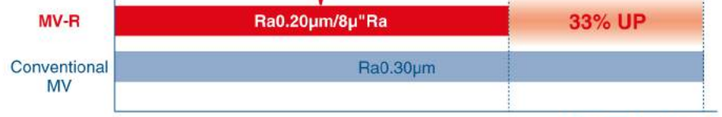


Pursuit of fine surface finish with standard power supply

New fine finish circuit (H-FS circuit)

Ra0.2 m achieved without optional power supply (D-FS)

Workpiece: Steel/60mmt(2.36")
Wire: ϕ0.20mm(.008") BS
Surface Finish: Ra0.20μm/8μ"Ra
Accuracy: ±3μm/0.00012"



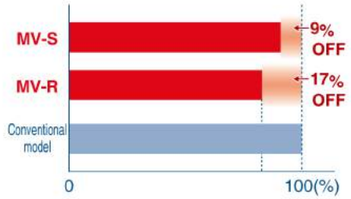
The finished surface roughness has been reduced by 50% with 2 cuts by using the new machining servo "D-CUBES NL Control"

Comparison of surface roughness with 2 cuts

Workpiece: Steel/60mmt(2.36")
Electrode: ϕ0.3mm(.012") BS

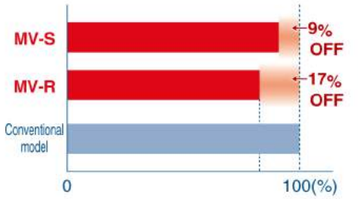
High-speed machining has been enhanced by newly improved power-supply performance for range of multiple cuts type jobs.

Machining time comparison for Ra0.45μm/18μ"Ra with 3 cuts



Workpiece: Steel,60mm(2.36") Electrode: ϕ0.2(.008")/BS

Machining time comparison for Ra0.28μm/11μ"Ra with 4 cuts



Workpiece: Steel,60mm(2.36") Electrode: ϕ0.2(.008")/BS

Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series), compared to the same machining amounts

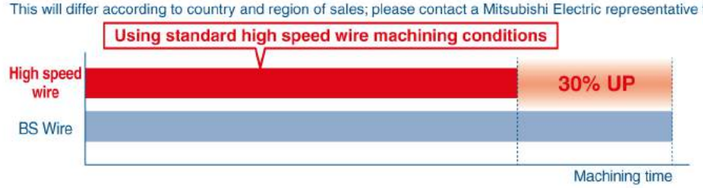
High speed machining condition

Fastest rough machining in the industry *ϕ0.3(.012") wire

Steel/60mmt(2.36") ϕ0.30mm(.012") Topas® plus D (Berkenhoff)

Increased finish machining productivity

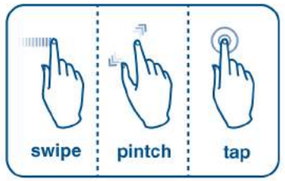
This will differ according to country and region of sales; please contact a Mitsubishi Electric representative for derails.



Workability / Operability

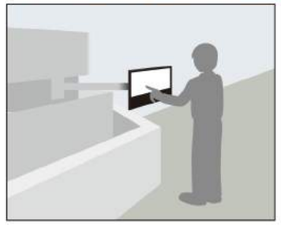
Control unit

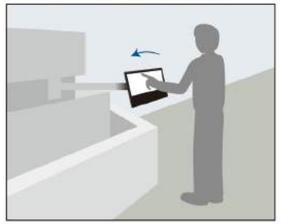
- Information is displayed on a new larger 19-inch touch screen
- Keyboard and mouse are standard
- Intuitive operation is performed by gestures from a multi-touch supporting panel



Screen tilt mechanism

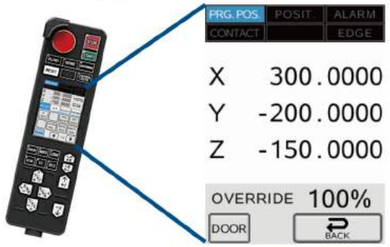
- The new tilt mounting system allows adjust ability to fit operators of varying heights.





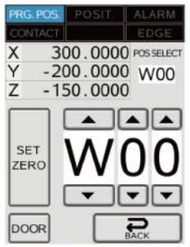
Thin liquid-crystal hand-held pendant box

- The new design of the thin liquid crystal manual pendant box improves workpiece setup and saves time.
- The hand-held operation box is equipped with an LED flash light mounted on the back.



- Magnified view of coordinates

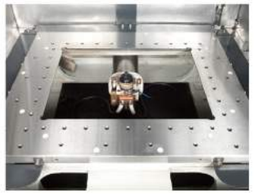
- Various setup functions
- Screen customization



- Teaching function

Hardened table and all stainless steel structure

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

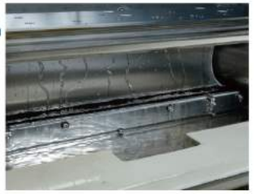


Wire alignment

- Highly accurate wire alignment is easy using the wire-alignment device
- Taper parameter set-up is simple using the wire-alignment device

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

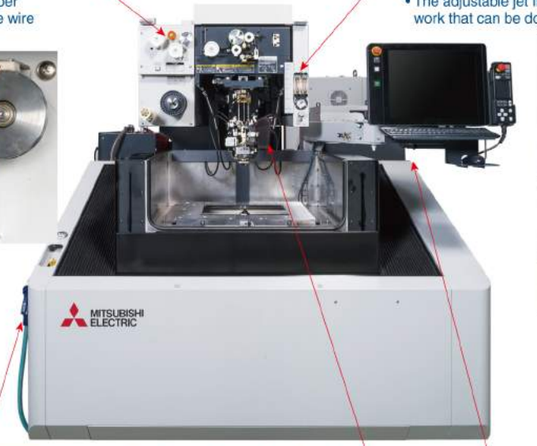
- Highly accurate workpiece edge positioning is possible with water flow on or when the workpiece is submerged.
- The edge positioning tolerance can be adjusted to match workpiece accuracy requirements.
- Wire electrode consumption is reduced by 70% during edge positioning. (wire must be 0.1mm/.004" or larger)

Wire travel system

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

Dielectric fluid flow meter and jet flow adjustment valve

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



Filter pressure gauge and jet cleaning nozzle

- Easily read the filter pressure
- The convenient location of the jet cleaning nozzle makes tank clean-up easy

Broken wire collection box

- Conveniently located at the front for easy maintenance

Chiller unit fil

- Conveniently located for easy cleaning

Operability

D-CUBES

"Fast" and "Economical!"operation

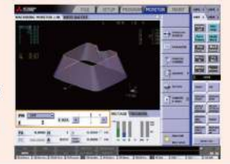
Excellent performance with "Easy operation","human error reduction" and "connect ability" supporting productivity improvement for customers.

HOME

Easy to understand machining progress and screen selection
- The 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

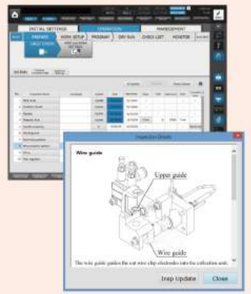


Operation

■Pre-machining preparation

Daily inspection and wire/workpiece mounting

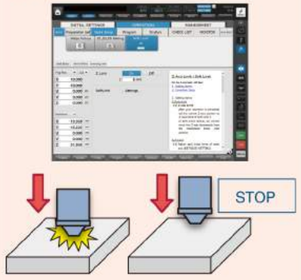
Maintenance inspection tools
- The maintenance manual as well as maintenance history are supported
- Reduction in machine down time from insufficient maintenance



■Workpiece setup

Reference positioning, Z paramater (Z1, Z2, Z5) setting

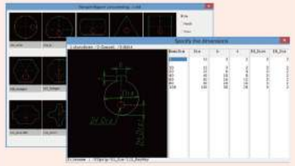
Z-axis limit setting
- The Z-axis limit can be set easily after mounting the workpiece
- Collisions caused by erroneous operations are prevented



■Program

Simple creation of machining program

Standard shape library
- Simple standard shapes can be easily programmed by entering a few key dimensions into variables.

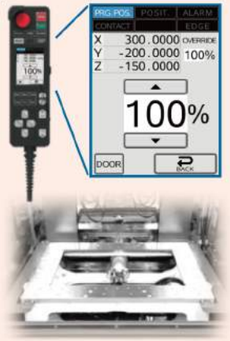


Consumables check
- The remaining amount of consumables is checked in accordance with the machining estimate
- It prevents a machine stop caused by insufficient consumables, such as an empty wire spool

■Dry run

Programs can be checked for possible interference.

Override
- The dry run speed can be set at the pendant box to shorten the required run time.



■Check list

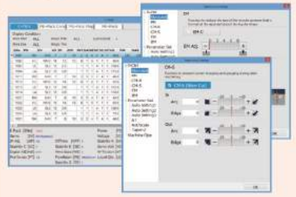
All necessary operations to be performed before machining can be checked

Check list
- The pre machining checklist is displayed
- The machine cannot be started if any checklist item has been skipped
- Errors by operators who are not accustomed to using the machine are prevented

■Monitoring machining

The 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.

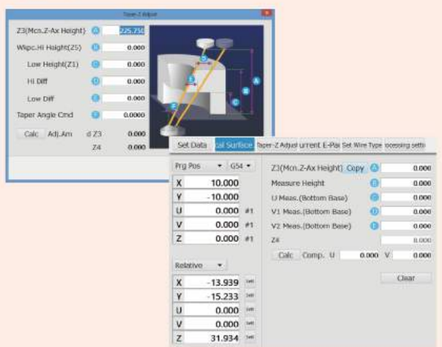


Resuming machining
- A machining task that has been aborted by resetting the machine can be selected from the list and resumed

Initial setting

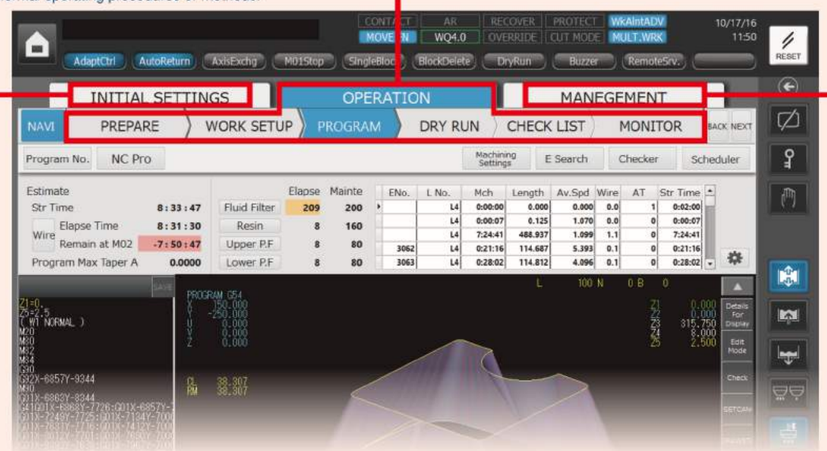
Most initial settings are locked in place and do not change once machining has started

Calculation tool (wire alignment and taper function adjustment)
- Taper Z calculations specific to the machine can be automatically performed by simply entering the angle amount. No manual calculations are required.
- Reduces operator's labor and possible errors from manual calculations.



Main menu

Basic machine setup and machine operation are grouped onto 3 simple screens.
Operator the ability to run the machine without being confused by normal operating procedures or methods.



History management

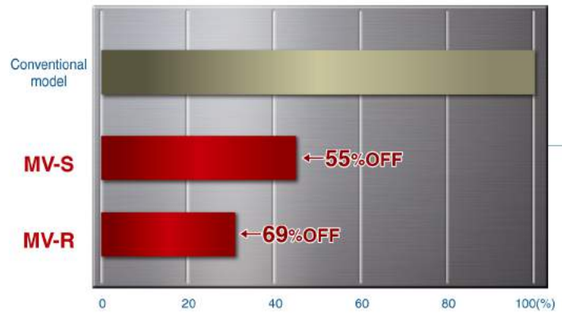
The operation history, inspection and maintenance history, consumables, and cost can be managed

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

■Cost management
- Cost management can be performed in a planned manner through display of each job and the time required

Energy Savings, Low Operating Cost

Consideration for the environment and cost reduction

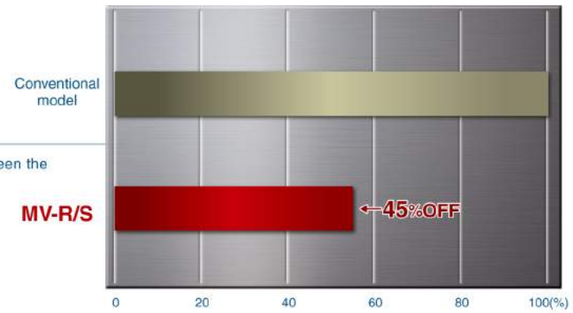


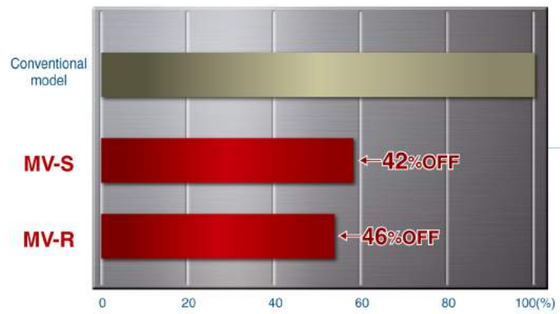
Power consumption reduced up to 69%

Power consumption reduced by ODS

Filter cost reduced up to 45%

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



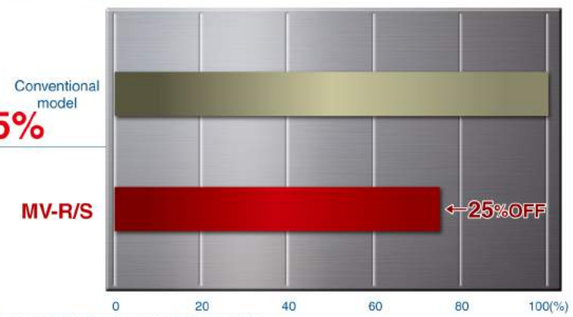


Wire consumption reduced up to 46%

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

Ion exchange resin cost reduced up to 25%

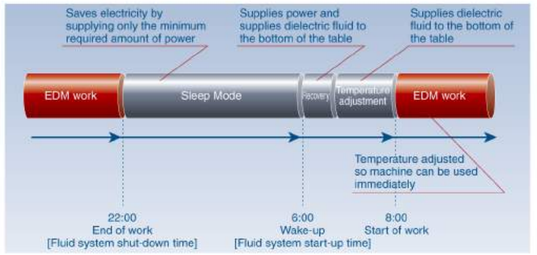
Enhanced power-supply conditions can be used with a lower fluid resistivity setting by PFC



Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series), compared to the same machining amounts

New energy-saving mode (Sleep Mode)

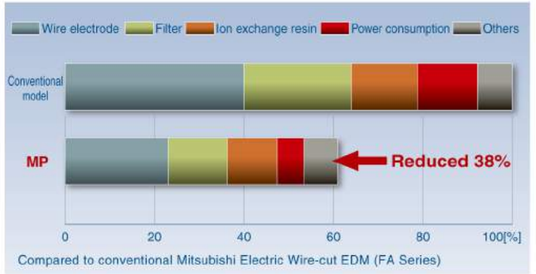
- The new energy-saving mode can be scheduled according to the current job ending time and start time the next day
- In Sleep Mode, the amount of energy consumed is greatly reduced as the result of using an automated pump-shut-off system.
- Once the scheduled start time is reached, the system restarts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



Running cost

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

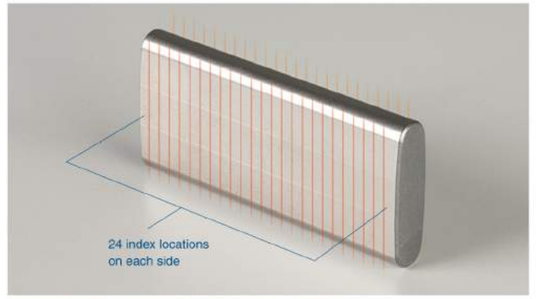
Electrode material : ø0.2/.008" BS
Workpiece : SKD11-D2, t60mm/2.36"
Surface roughness : Ra0.45µm/18µ"Ra



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

Flat power feed terminal

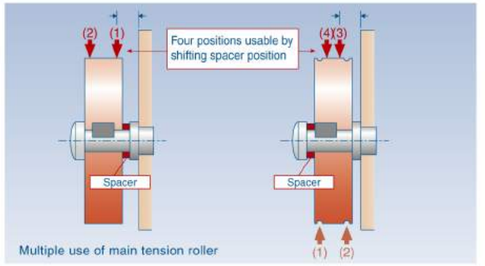
The flat shape makes it easy to index to the next location



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

Main tension roller

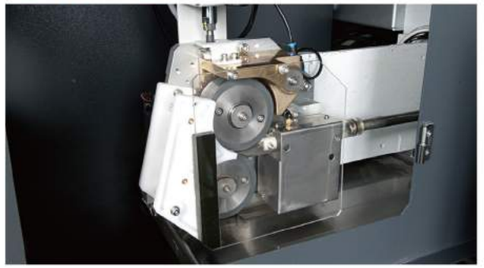
Multiple indexing locations greatly reduce running costs



Multiple use of main tension roller

Large-diameter collection roller

Large collection roller with multiple index locations greatly reduces operating cost



Revolution (MV-R)

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

MV1200R

MV2400R

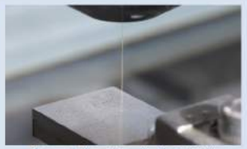
High-value-added functions are available on the MV1200R/2400R (option)

ϕ0.05(.002"),ϕ0.07(.003") automatic wire threading

Intelligent AT

- ϕ0.05(.002") wire electrode available
  Minimum in-corner R 30μm (0.0012")
- Improved design reduces maintenance

Wire electrode : ϕ0.05(.002")/SP
Workpiece : Steel(PD613)
Length 20mm(.79") width 2mm(.08")

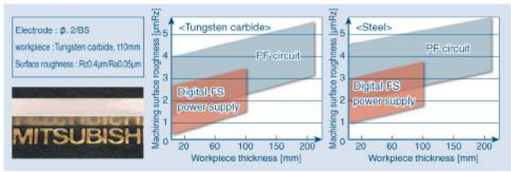


Automatic threading with ϕ0.05(.002")
wire electrode into a 0.2(.008") start hole

Digital-FS power supply

PFC

- Optimum surface roughness of Ra0.05μm/2μ"Ra(tungsten carbide)
- Optimum surface roughness of Ra0.12μm/5μ"Ra(steel)
- Machining with the workpiece set directly on the table (insulation jig not required)
- Machining range not limited (entire XY stroke area)



Angle Master ADVANCE II

ODS

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

Wire electrode: ϕ0.2(.008")/BS
Workpiece: Steel (SKD11-D2) t20mm(0.79")

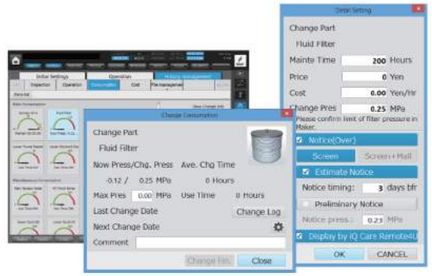
Measuring jig

Angle Mastre ADVANCE II screen

Consumables management

D-CUBES

- Similar to periodic inspection, the consumables are also managed by the machine
- The replacement period is recorded so as to estimate the next date of replacement. The parts list can also be updated
- The parts list can also be updated. Updates are performed as required



Operating management

D-CUBES

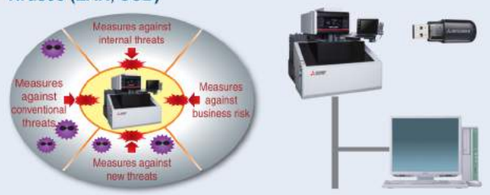
- The operating cost for each machine/job and the associated expenses for that period can be visualized.
- The operating cost for each machine and each machining, and the expenses during a period can be visualized

Security improvement

- Anti-virus protection is provided as standard by one of the world leaders in security control
- Pattern file can be used semi-permanently without renewal

intel Security

Defends machines against the threat of computer viruses (LAN, USB)



Options

Advanced manual control box / Standard manual control box
The advanced manual control box has an LCD display, and can be used for positioning, zero set and AT operations

High-accuracy wire-alignment device / wire-alignment device
This device aligns the wire electrode with the table

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

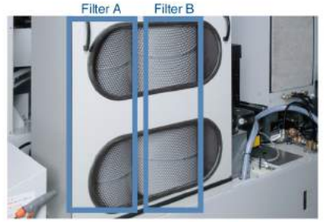
Angle Master guide kit
Max. 45° tapered machining possible using dedicated diamond guide

20/25kg(44.1/55.2lb) wire spool unit
Long-time continuous machining is possible

Wire processing unit
The wire is chopped after the collection roller

3-color 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

LED light
High-brightness LED lighting

Workpiece clamp set
Clamp jigs dedicated for use in holding workpieces

Options and retrofit specifications differ according to country and region; please contact a Mitsubishi Electric representative for details.

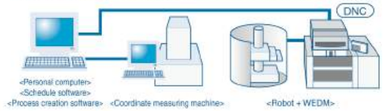
◎ : Standard equipment ○ : Can be retrofitted ● : Factory installation only × : Not available

Option neme		D-CUBES MV-R	D-CUBES MV-S	MV2400S column up specification	MV4800
Machine unit	UV OPT-drive system specifications	◎	×	×	×
	φ0.05 (.002"), φ0.07 (.003") automatic wire threading*1	●	×	×	×
	Wire processing unit*1	○	○	○	○
	20/25kg (44.1/55.2lb) wire spool unit	○	○	○	○
	50kg (110.2lb) wire spool unit	×	×	×	○
	Thin liquid-crystal hand-held pendant box	◎	◎	×	×
	Advanced manual control box (with axis display)	×	×	○	○
	auxiliary table	×	×	×	●
Power supply	Digital-FS power supply	●	×	×	×
	H-FS power supply	◎	×	×	×
Dielectric fluid system	Ion exchange resin 20L(0.7cu.ft.) specifications (Organo)	○	○	○	○
	4-piece filter system	○	○	○	◎
	Filter pressure sensor	◎	●	×	×
	Filter automatic switching*7	●	●	×	×
Communications	External signal output	○	○*3	○*3	○*3
	LAN/W*4	◎	◎	◎	◎
	DNC	◎	◎	○	○
	FTP(S/W)	◎	◎	○	○
	Operation status data output function	○	○	○	○
Taper Machining	Angle Master guide kit φ0.2 (.008") (±30°)*5	○	○	○	○
	Angle Master guide kit φ0.2 (.008") (±45°)*5	○	○	○	○
	Angle Master guide kit φ0.25 (.01") (±30°)*5	○	○	○	○
	Angle Master guide kit φ0.25 (.01") (±45°)*5	○	○	○	○
	Angle Master (S/W)*3	◎	◎	◎	◎
	Angle Master ADVANCE (S/W)*2	○	×	×	×
	Angle Master ADVANCE (measuring jig)*2	○	×	×	×
Software	Anti-virus protection	◎	○	○	○
	Sleep mode	◎	◎	×	◎
	COREHOLD	○	×	×	×
	3D Data import (Parasolid)	○	○	◎	◎
Display	LED light	○	○	○	○
	3-color warning light*3	○	○*3	○*3	○*3
	Run timer*3	◎	○	○	○
	Optionbox*6	◎	○	○	○
Others	Mnnual (Booklet)	○	○	○	○
	High-accuracy wire-alignment device	○	○	○	○
	Workpiece clamp set	○	○	○	○

*1 The φ0.05 (.002") to φ0.15 (.006") wire electrodes cannot be used with the wire processing unit. (These sizes can be used with the continuous wire feeder after removing the wire processing unit.)
*2 Angle Master ADVANCE (measuring jig) is needed for using Angle Master ADVANCE (S/W).
*3 Option box is needed
*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 (φ7(.28")) is used for taper machining of 15 degrees or less. Angle Master guide kit (H/W) is needed for taper machining of 15 degrees or more
*6 Necessary for mounting external signal output, 3-color warning light and run timer.
*7 Equipped with four filters.

Wire-cut EDM automation system

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



* Please contact a Mitsubishi Electric representative for details.

Network connection specifications (DNC, FTP)

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	Required option	Supplement
Operate on the EDM side and receive data from personal computer.	Data transmission	LAN/W (standard)	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.	Data transmission	FTP	Data can be received only using data I/O operation.
Operate on the personal computer side and send data to the EDM.	Data transmission	LAN/W (standard)	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.	Data transmission	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	No parson in both	Operating status Outpit data	Customer should prepare FTP server

Power Supply, Control Specifications/Machine Installation

■Power supply/Control unit specifications

Compatible model		MV-R	MV-S	MV2400S column up specification	MV4800
Power supply unit specifications					
Power supply unit	Model	WMV R	WMV S	WMV S	WMV48S
	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	10 types : Anti-electrolysis power supply			
	Machine voltage selection	16 types			
	Machining setting	44 types			
	OFF time	36 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	Bult-in			
	Unit dimensions (mm) (in)	600×600×1765 (23.6 × 23.6 × 69.5)			
	Unit weight (kg) (lb)	220 (485)			
Control unit specifications					
Control unit	Model	W41MV-2 R	W41MV-2 S	W31MV-2 S	W31MV-2 S
	NC program input method	Keyboard, USB flash memory, Ethernet			
	Pointing device	Touch panel, mouse			
	Display	19"color TFT		15"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)	10nm		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)		5 types (file, setup, machining support, monitor, maintenance)	
	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		Inching (0.005mm/0.001mm/0.0001mm)	
	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		CM, EM, PM, OM, BM, SL	
	External dimensions (mm) (in)	518×97×363 (20.4×3.6×14.3)		494 × 175 × 346 (19.4 x 6.9 x 13.6) (excluding keyboard and mouse pad)	
	Weight (kg) (lb)	15 (33)		20 (44)	

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 × width)		(m)
3) Constant-temperature dust-proof room entrance dimensions (height × 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

①Constant-temperature dust-proof room
- Recommended room temperature 20±1°C (68°F±2)
- Usable temperature range 5 to 35°C (41°F to 95°F)
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 precision machining, even when using skim cuts.
Note that an environment where the temperature fluctuates by 3°C (5°F) or more within 24 hours, or 1°C (2°F) 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 (-13°F to 131°F) (when power is not connected).

②Tolerable 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.

③Foundation
- The floor should be concrete with a thickness of 400mm (15.7") 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 φ0.2(.008")mm wire electrode)
13.5kVA (when using the maximum)
* Use a 14mm² 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 14mm² grounding wire.

5. Primary air equipment
- Hose diameter : 1/4 hose (hose sleeve outer diameter: φ9.0 (0.35"))
- Pressure : 0.5 to 0.7MPa (72.5 to 101.5psi)
- Flow rate : 75ℓ/min or more (2.65cu.ft./min.)
* 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.
1. Ground the wire-cut EDM in the shield room (Fig. 3).
2. 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.
3. 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 (φ0.1/BS ~ φ0.3/BS)	Oki Electric Cable
HBZ-U(N) (φ0.1/BS ~ φ0.3/BS)	Hitachi Metals
SBS-HN (φ0.1/BS ~ φ0.3/BS)	Sumiden Fine Conductors
SWP-SP (φ0.05/SP ~ φ0.07/SP)	Nippon Steel & Sumikin Wire

*The wire electrodes shown above do not guarantee performance

Recommended sliding surface lubricants

Use one of the following lubricants for sliding surface As of June 2016

Manufacturer	Product name
Exxon Mobil	Mobil DTE26
Idemitsu Kosan	Super Hydro 68A
Showa Shell	Terrace Oil 68
JX Nippon Oil & Energy Corporation	Super Mulpas DX68

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:
①When a failure occurs that was caused by a machine modification that directly affects the machine's functioning or accuracy.
②When a failure occurs caused by the use of non-standard parts, consumables or lubricants.
③When a failure occurs caused by a natural disaster such as lighting, earthquake or storms and flooding.
④When 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:
①Damages caused by any cause found not to be the responsibility of Mitsubishi.
②Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
③Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
④Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

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.

MEMO

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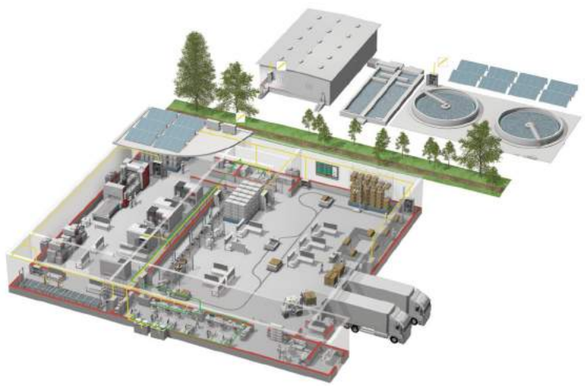

Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

A NAME TO TRUST

Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.

Low voltage: MCCB, MCB, ACB

Medium voltage: VCB, VCC

Power monitoring, energy management

Compact and Modular Controllers

Inverters, Servos and Motors

Visualisation: HMIs

Numerical Control (NC)

Robots: SCARA, Articulated arm

Processing machines: EDM, Lasers, IDS

Transformers, Air conditioning, Photovoltaic systems

* Not all products are available in all countries.