MITSUBISHI ELECTRIC

Changes for the Better

Wire-cut EDM Systems
MV Series

MV Series

BREAKTHROUGH INNOVATION

for a greener tomorrow eco Changes

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

MITSUBISHI ELECTRIC WIRE-CUT EDMs

1972


DWC50S-LT1


DWC50H-DNC2


DWC100H-CNC2


DWC90-CNC1

1980


DWC110N-CNC1


DWC90FSK-CNC1


DWC90G


DWC90H


DWC90PH


DWC110PH

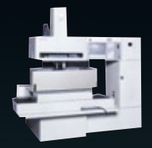

DWC90C


PX05


FX10


DWC90PA


CX20


SX20

1990


DWC400HA


DWC110SA


DWC110SZ


DWC90SB


DWC90HA


FX20K


QA20


RA90AT

2000


FA20


FA20P


PA20


FA30V

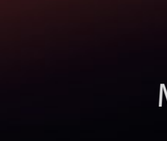

PA05S

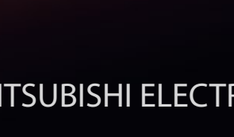

FA20S


FA10PS


NA2400


BA8


FA20S Advance


FA50V

2012

Next-generation Innovations of our best selling Performance Machine

MV Series

Product Line-up

Revolutionary MV1200R / MV2400R

High-performance Wire-cut EDMs

ADVANCE PLUS

4-axis LSM (XYUV linear shaft motor)

Four-sided hardened table

MV1200R
(manual vertical front door)

MV2400R
(automatic vertical front door)

Symmetric machine design provides stability

Standard MV1200S / MV2400S

Standard Wire-cut EDMs

2-axis LSM (XY linear shaft motor)

U-shaped hardened table

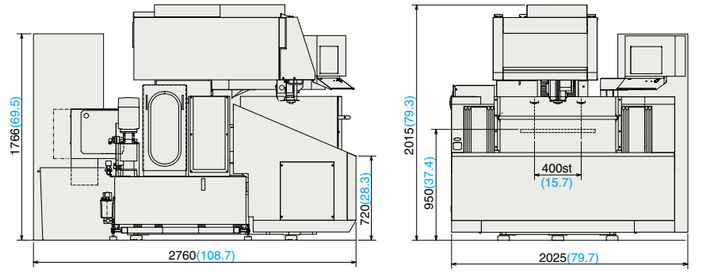
MV1200S
(manual vertical front door)

MV2400S
(automatic vertical front door)

MV1200R/S

(Unit:mm (in))

<Outline drawing>



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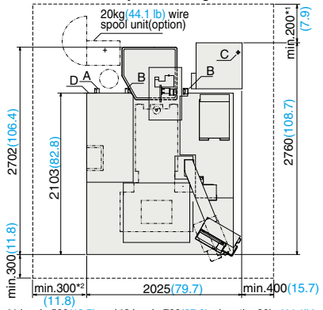
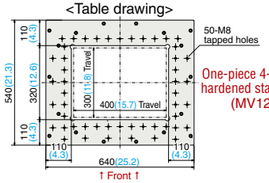
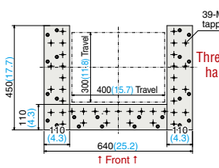


*1 is min.500(19.7) and *2 is min.700(27.6) when the 20kg(44.1lb) wire spool unit is mounted.
Footprint : 2725(107.3)×3260(128.3)(including maintenance space)

<Table drawing>



One-piece 4-sided table hardened stainless steel (MV1200R)



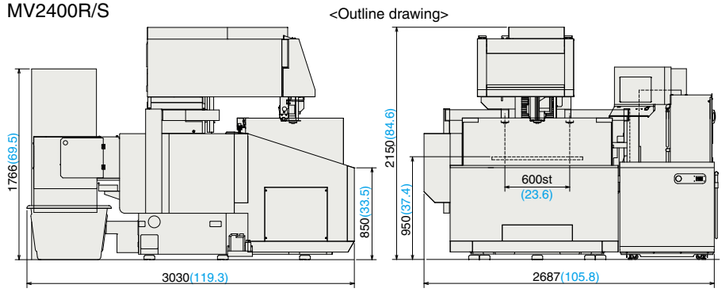
Three-piece U-shaped table hardened stainless steel (MV1200S)

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, 75 ℓ/min or more, 1/4 hose connection (hose sleeve outer diameter: ø9mm)

MV2400R/S

(Unit:mm (in))

<Outline drawing>



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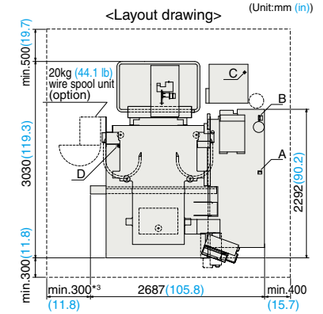
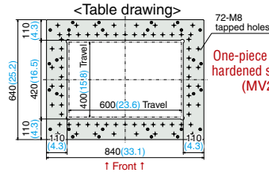
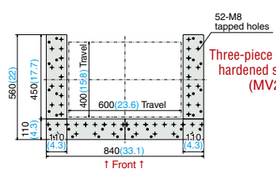


*3 is min.670(26.4) when the 20kg(44.1lb) wire spool unit is mounted.
Footprint : 3387(133.3)×3830(150.8)(including maintenance space)

<Table drawing>



One-piece 4-sided table hardened stainless steel (MV2400R)



Three-piece U-shaped table hardened stainless steel (MV2400S)

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

Standard Machine Specification

	Model		MV1200R	MV1200S	MV2400R	MV2400S
Machine unit	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)	640(25.2)×450(17.7) (U-shaped)	840(33)×640(25.2) (4-sided)	840(33)×560(22) (U-shaped)
	Machining travel (X×Y×Z)	[mm](in)	400(15.7)×300(11.8)×220(8.7) (XY axis OPT-drive specifications)		600(23.6)×400(15.7)×310(12.2) (XY axis OPT-drive specifications)	
	Machining travel (U×V)	[mm](in)	±60(2.4)×±60(2.4) (OPT-drive specifications)	±60(2.4)×±60(2.4) (Ball screw specifications)	±75(2.9)×±75(2.9) (OPT-drive specifications)	±75(2.9)×±75(2.9) (Ball screw specifications)
	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.)	18(.636)			
	Dielectric fluid chiller unit		Unit cooler			
	Weight (dry)	[kg](lb)	— (included in the machine unit weight)		350(711)	

*1 ø0.2(.008") DD guides and ø1.5(.006") jet nozzle are standard equipment.

General input		[kVA]	13.5
Required Air rate	Required air pressure	[Mpa](psi)	0.5(70)～0.7(100)
	Air rate	[ℓ (cu.ft.)/min]	75(2.6) or more

Standard functions

- R specifications : XYUV OPT-drive
- S specifications : XY OPT-drive
- ø0.1(.004"),0.15(.006") automatic wire threading
- Digital-AEⅡ power supply
- Fine machining system
- Special material machining power supply
- LAN/W
- Angle Master (S/W)
- Anti-virus protection (MV-R)

Options

- 20kg(44.1 lb) wire spool unit
- Angle Master guide kit (H/W)
- Advanced manual control box
- LED light

Default machine dimensions

MV1200R/S
Width:1910mm(75.2)
Height:2015mm(79.3)

MV2400R/S
Width:2022mm(79.6)
Height:2150mm(84.6)

Functions and Features

Fully equipped with useful functions for the manufacturing workplace, featuring refined style, high performance, energy savings, simple operation and vast expertise

Revolutionary ADVANCE PLUS
MV1200R / MV2400R

ADVANCE PLUS control offers maximum efficiency using a fully optical drive system (MV1200R/2400R)

Refer to page 19 -20

ADVANCE PLUS × PFC
Machining time reduced up to 17% (FA series ratio)

ADVANCE PLUS × ODS
Corner accuracy ±1μm

ADVANCE PLUS × ODS
Circular accuracy within 2μm

ADVANCE PLUS × ODS × PFC
Power consumption reduced up to 69% (FA Series ratio)

ADVANCE PLUS × McAfee
Anti-virus protection
McAfee® is a registered trademark of McAfee, Inc. in the United State and other countries

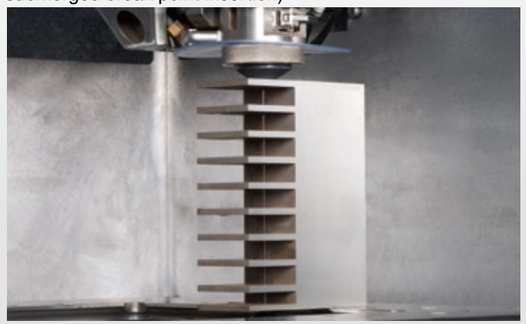
Standard
MV1200S / MV2400S

Ultimate optimization of EDM technology
Super Digital Control
Digital technology optimizes all enhanced functions required by Wire-cut EDMs

Innovative automatic wire threading

Intelligent AT Refer to page 9-10

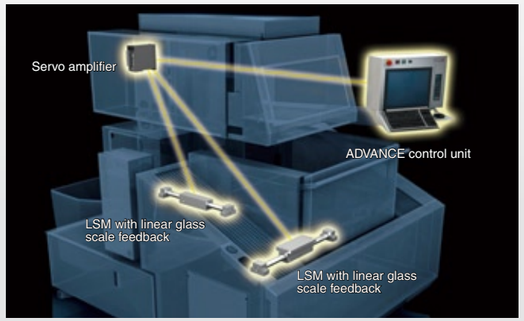
- New annealing system greatly improves wire threading with a curl ratio of less than 10%
- Wire break point insertion is greatly improved for thick workpieces
- Wire threading mode can be selected to match the workpiece shape (i.e., jet stream on, jet stream off and submerged break point insertion)



Improved machining accuracy

ODS Opt Drive System Refer to page 11-12

- Equipped with a linear shaft motor (LSM)
- Mitsubishi Electric's optical drive system uses fiber-optic communications between the control unit, servo amplifier and linear motor to improve machining accuracy

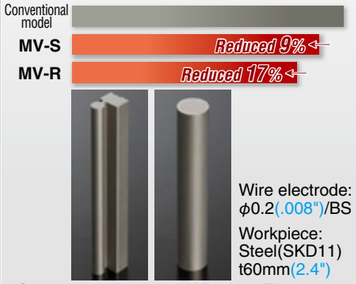


Improved productivity

PFC Precise Finish Circuit Refer to page 13-14

- Faster machining is realized with improved power-supply performance (Rz3.5μm/Ra0.45μm with 3 cuts) (Rz2.0μm/Ra0.28μm with 4 cuts)
- All machining conditions are provided (speed condition, nozzle release condition)

Machining time comparison for Rz3.5μm with 3 cuts



Wire electrode: φ0.2(.008")/BS
Workpiece: Steel(SKD11) t60mm(2.4")

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

Easy operation

NUI Natural User Interface Refer to page 15-16

- Search function for machining conditions is improved by a narrow-down function
- Job scheduling adjustments use the schedule call back, extra job insertion and ME-pack feature

*ME-pack is a package of machining processes including offset, machining speed and adaptive control settings

Machining condition search screen

3D CAM screen

Energy savings, low running cost

LLS Long Life System Refer to page 17-18

- Power consumption reduced up to 69%

- Filter cost reduced up to 45% (Automatic changing filtration flow rate)

- Wire consumption reduced up to 46%

- Ion exchange resin cost reduced up to 25%

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

Machining Samples

Revolutionizing product creation with high-performance machining required for future generations

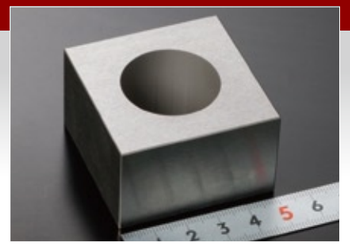
Highly accurate pitch machining

Model	MV2400R ADVANCE PLUS
Electrode material	ø0.2(.008")/BS
Workpiece	Steel(PD613)
Workpiece thickness	20mm(.787")
Surface roughness	Rz2.5µm/Ra0.32µm
Machining accuracy	Pitch ±2µm

- Stable automatic threading is realized using Intelligent AT during multi-shape machining
- Highly accurate machining is possible using ODS

Intelligent AT ODS Opt Drive System

Circular machining

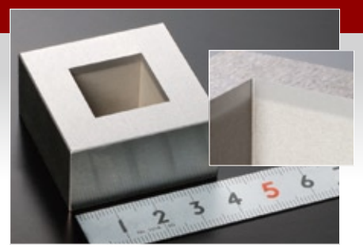


Model	MV1200R ADVANCE PLUS
Electrode material	ø0.2(.008")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	30mm(1.181")
Surface roughness	Rz2.0µm/Ra0.28µm
Machining accuracy	Roundness 2.0µm

- Circular accuracy is improved using ODS
- Bumps or undercuts at the approach point are suppressed, attaining precise circular cuts

ODS Opt Drive System

Cutting edge machining



Model	MV1200R ADVANCE PLUS
Electrode material	ø0.2(.008")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	20mm(.787")
Surface roughness	Rz2.5µm/Ra0.32µm
Machining accuracy	±3µm

- Highly accurate machining is possible using ODS
- Improved taper accuracy using PFC creates uniform cutting edge lengths

ODS Opt Drive System PFC Precise Finish Circuit

Slide core

Model	MV2400S
Electrode material	Die :ø0.20(.008")/BS Punch:ø0.25(.010")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	Die :100mm(3.9") Punch:150mm(5.9")
Surface roughness	Rz3.5µm/Ra0.45µm
Machining accuracy	±5µm

- Thick workpieces can be machined with high straight-line accuracy using ODS
- High-speed and precise straight machining are realized using PFC

ODS Opt Drive System PFC Precise Finish Circuit

Fit machining

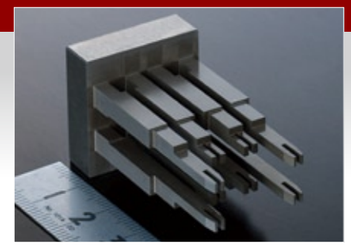
Model	MV1200S
Electrode material	ø0.2(.008")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	Die :20mm(.78") Punch:50mm(1.97")
Surface roughness	Rz2.0µm/Ra0.28µm
Machining accuracy	±3µm

- Stable automatic threading is realized using Intelligent AT during multi-shape machining
- Productivity is improved by reducing machining time using PFC

Intelligent AT PFC Precise Finish Circuit

* The listed machining results are all based on in-house conditions and measurements.
(Note) JIS B0601: '01 and ISO 4287: '97/ISO 1302: '02 compliant (Rz≒conventional notation Ry)

Connector machining



Model	MV1200R ADVANCE PLUS
Electrode material	ø0.2(.008")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	4~25mm(0.16~0.98")
Surface roughness	Rz3.1µm/Ra0.38µm
Machining accuracy	±3µm

- 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 to 4.5mm and a length of 40mm

ODS Opt Drive System

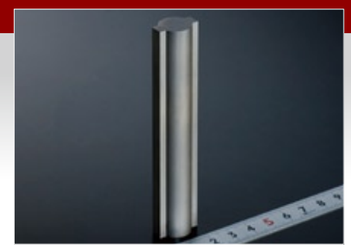
Gear machining

Model	MV1200R ADVANCE PLUS
Electrode material	ø0.1(.004")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	5mm(.197")
Surface roughness	Rz2.0µm/Ra0.26µm
Machining accuracy	±2µm

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

ODS Opt Drive System

Thick workpiece machining (tungsten carbide)



Model	MV2400R ADVANCE PLUS
Electrode material	ø0.2(.008")/BS
Workpiece	Tungsten carbide (G5)
Workpiece thickness	100mm(3.9")
Surface roughness	Rz2.2µm/Ra0.3µm
Machining accuracy	±4µm

- High-speed and precise straight machining are possible using PFC
- High-performance realized for tungsten carbide punch machining

PFC Precise Finish Circuit

Thick workpiece machining

Model	MV2400S ADVANCE PLUS
Electrode material	ø0.25(.010")/BS
Workpiece	Steel(SKD11)
Workpiece thickness	200mm(7.9")
Surface roughness	Rz4.8µm/Ra0.71µm
Machining accuracy	±3µm

- High-speed and precise straight machining are possible using PFC
- A straight-line accuracy within 5µm is possible even with a 200mm-thick workpiece

PFC Precise Finish Circuit

Parts machining

Model	MV1200S
Electrode material	ø0.2(.008")/BS
Workpiece	Titanium alloy
Workpiece thickness	40mm(1.6")
Surface roughness	Rz2.2µm/Ra0.28µm
Machining accuracy	±5µm

- High-speed and highly accurate machining are possible using PFC
- High-grade machining of special materials (e.g., titanium, graphite, PCD)is realized using a standard V power-supply

PFC Precise Finish Circuit

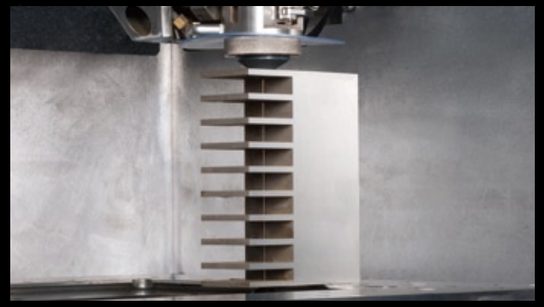
* The listed machining results are all based on in-house conditions and measurements.
(Note) JIS B0601: '01 and ISO 4287: '97/ISO 1302: '02 compliant (Rz≒conventional notation Ry)

Innovative automatic wire threading

Advanced technology for greatly improved productivity

Improved automatic wire threading

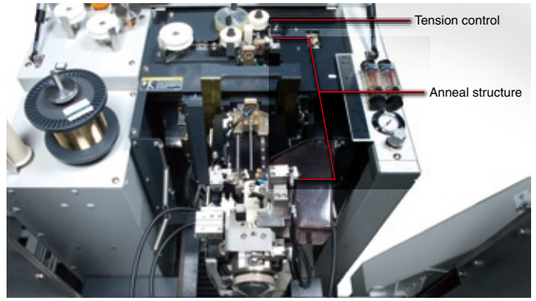
- New annealing system greatly improves wire threading with a curl ratio of less than 10%
- Wire break point insertion is greatly improved for thick workpieces
- Wire threading mode can be selected to match the workpiece shape (i.e., jet stream on, jet stream off and submerged break point insertion)



Wire electrode annealing structure

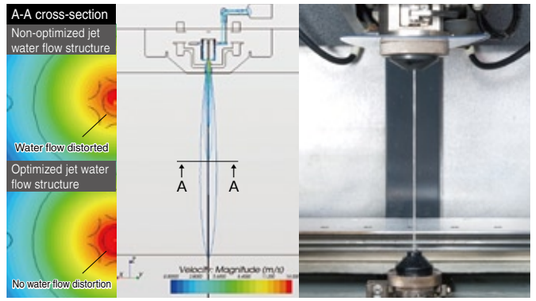
- Improved wire annealing power supply and tension control enhance wire threading (producing a curl ratio of 10% or less), which straightens the natural curl caused by spooling
- The greatly lengthened distance of annealed wire improves automatic wire threading for thick workpieces

*A curl ratio of less than 3% applied for the conventional model (FA Series)



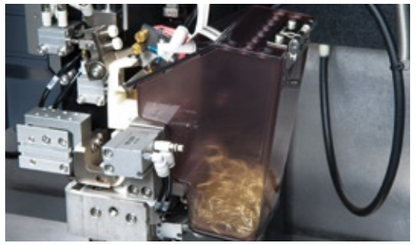
New jet water flow mechanism

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



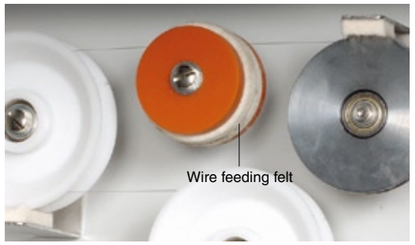
Wire collection unit

- Broken wire collection, which clears the upper guide after a wire break, has been improved so it handles even highly curled wire with no hesitation



Wire feed wiper

- A felt wiper added to the wire path removes manufacturing impurities from the wire surface, which reduces slipping on the drive rollers



One-touch lever clamp mechanism

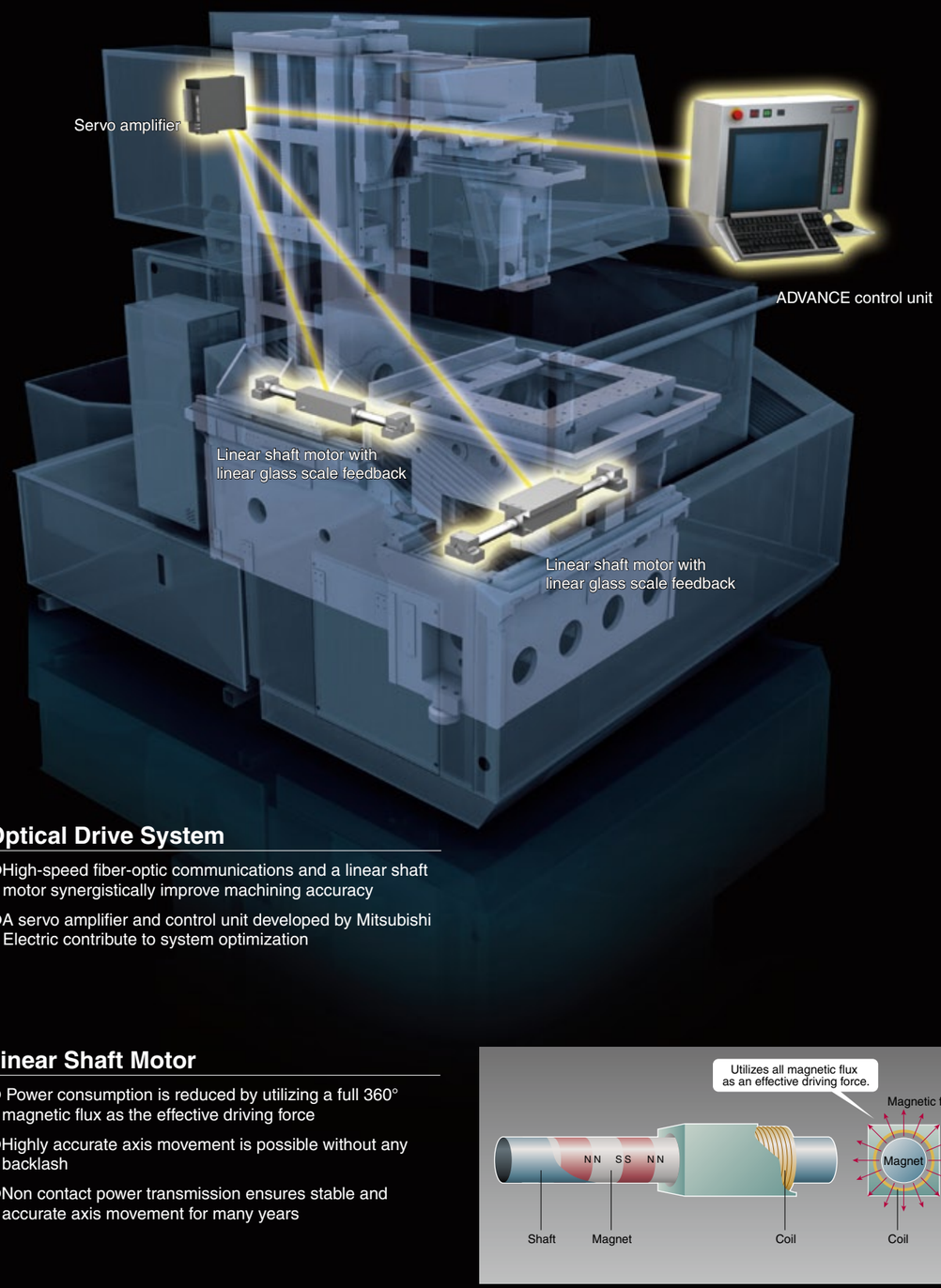
- New one-touch lever clamping system provides quick, easy and accurate power feed indexing
- The clamp lever accurately locates the power feeder with repeatable torque, unlike systems that use the set-screw method

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

Improved machining accuracy

Next-generation drive system and refined power-supply control technology



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

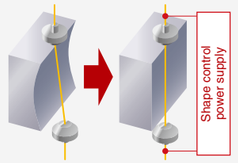
Linear Shaft Motor

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

Shape control power supply (Digital-AE Ⅱ)

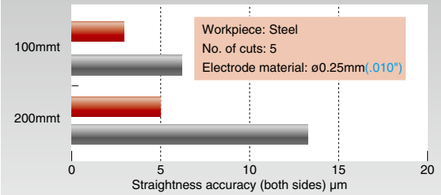
- ●Wire straightness is digitally controlled with the world's only electrical-discharge position control (As of Mar. '12)
- ●Total machining time is reduced by improving straightness accuracy during rough, intermediate and finishing processes

Conventional technology
- Machining conditions are optimized
- Number of cuts are increased
- Upper/lower dimension difference is compensated mechanically (taper angle)



Digital-AE Ⅱ
Discharge rate relative to workpiece thickness is monitored by electrical-discharge position control

Comparison of straightness accuracy during finish machining



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

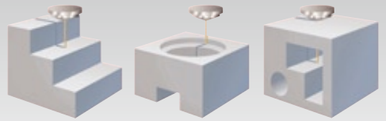
Fully-automatic rough machining control (PM control: Power Master)

- ●No need to set machining conditions or have knowledge of EDM machining
- ●Automatically recognizes machining conditions and makes adjustments for the optimum machining condition

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

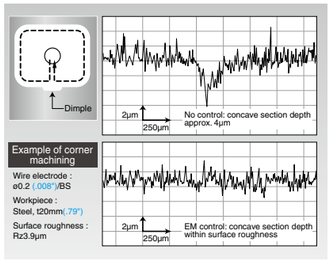
Adaptive control setting screen

Examples of PM machining applications



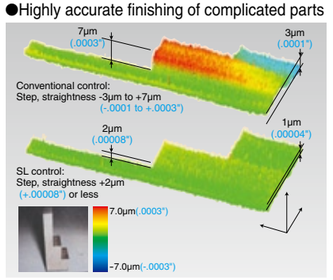
Under-cut (dimple) reduction control (EM control: Entrance Master)

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



Machining surface step/ straightness control (SL control: Stepless control)

- ●Greatly improves the step finish and wall straightness for workpieces with varying thicknesses
- ●Highly accurate finishing of complicated parts



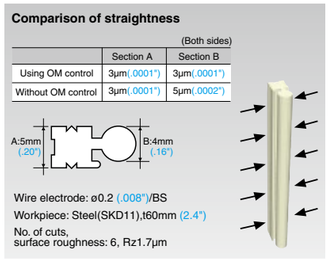
Dimensional error control (OM control: Orbit Master)

- ●OM control is designed to attain a uniform electrical-discharge gap regardless of the corner shape
- ●This improves the radial shape error and greatly improves the total part accuracy

Comparison of straightness

(Both sides)

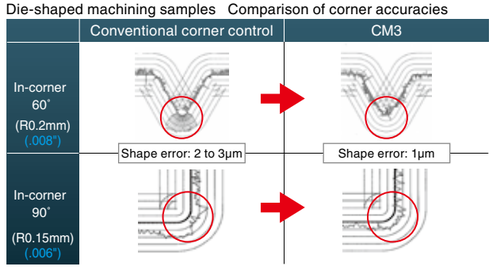
	Section A	Section B
Using OM control	3µm(.0001")	3µm(.0001")
Without OM control	3µm(.0001")	5µm(.0002")



Corner machining control (CM3 control: Corner Master3)

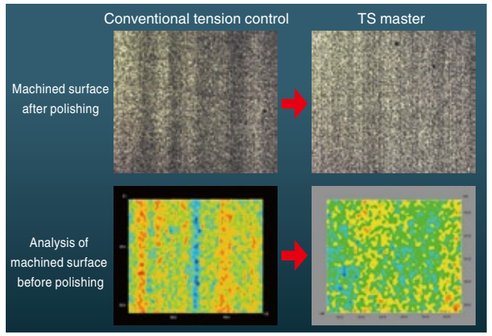
- ●Improves machining accuracy at extremely small in-corners and out-corners
- ●Realizes highly accurate shape machining even for complicated geometries with several types and sizes of corners
- ●Corner accuracy is easily controlled by the operator

Die-shaped machining samples Comparison of corner accuracies



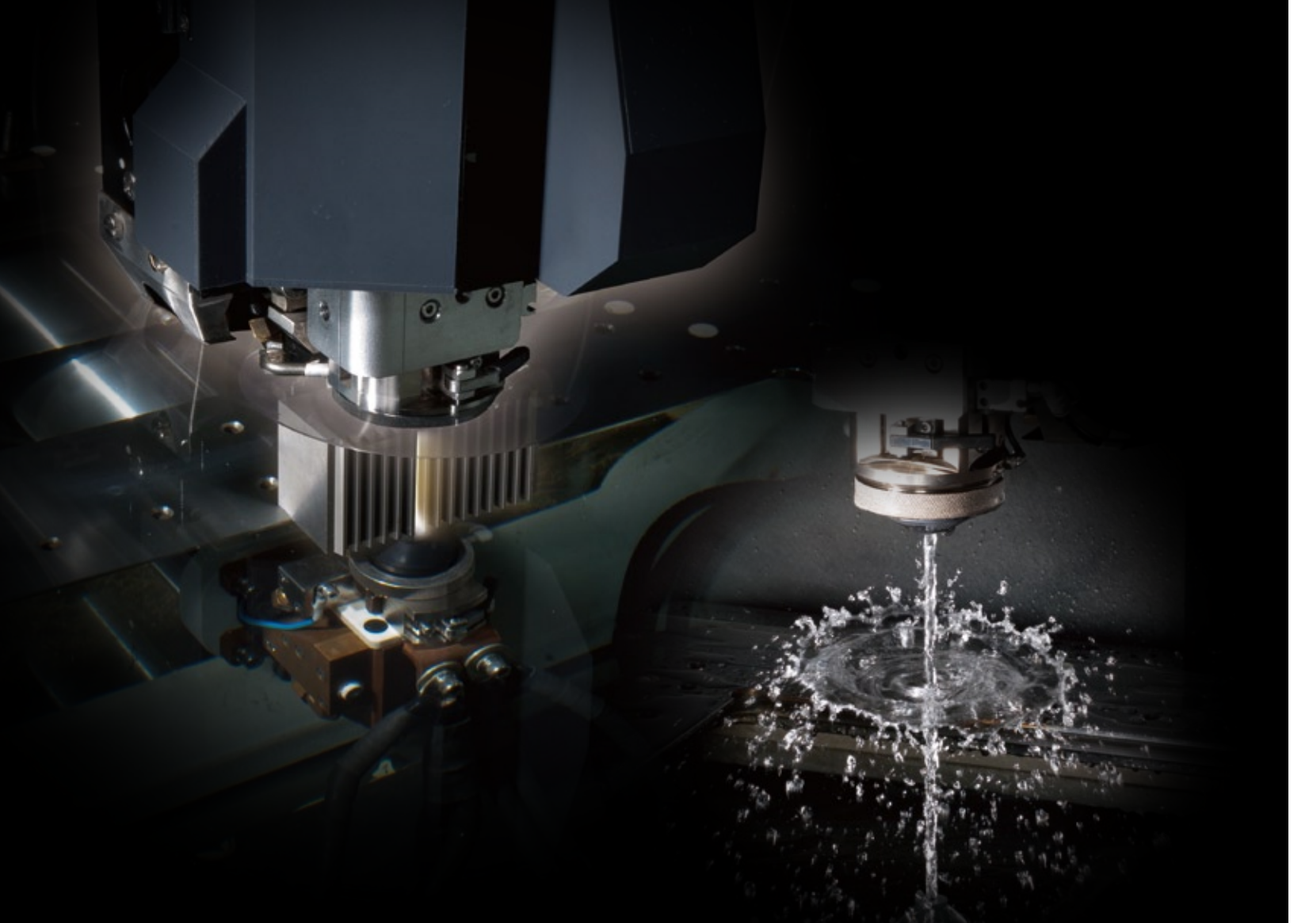
Wire tension control (TS Master)

- ●Suppresses tension fluctuation for more stable machining
- ●Suppresses lines on the machined surface after polishing



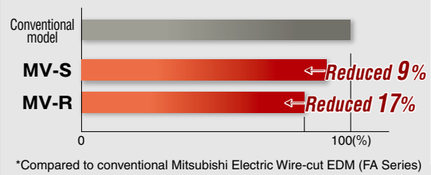
Improved productivity

Wide range of technologies for ever-changing working environments



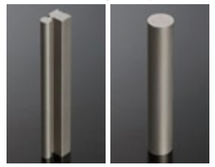
High-speed machining has been enhanced by newly improved power-supply performance for multi-pass type jobs

Machining time comparison for Rz3.5μm with 3 cuts

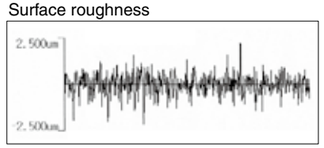


*Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series)

Machining samples

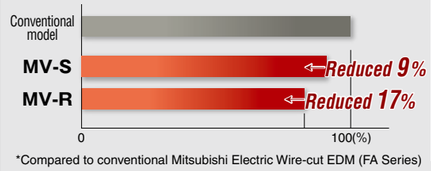


Surface roughness



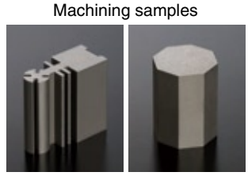
Wire electrode : ø0.2(.008")/BS
Workpiece : Steel(SDK11), t60mm(2.4")

Machining time comparison for Rz2.0μm with 4 cuts

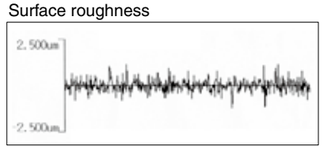


*Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series)

Machining samples



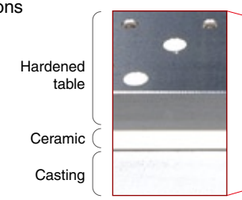
Surface roughness

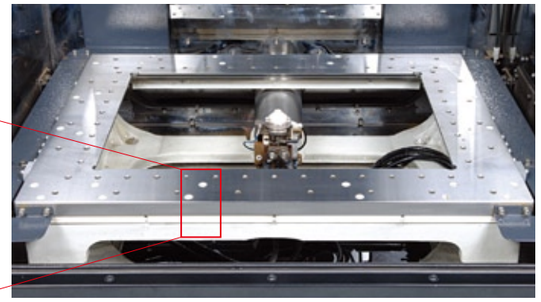


Wire electrode : ø0.2(.008")/BS
Workpiece : Steel(SDK11), t20mm(0.8")

Table insulation

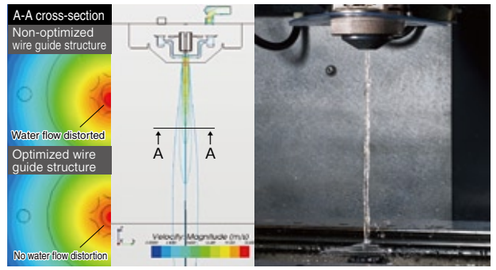
- Insulated worktable ensures improved surface finishing
- Stable machining realized when using short-pulse and low-voltage machining conditions





Wire guide

- Flow analysis simulation was used to optimize the water flow through the guide, enhancing cutting speed by improving sludge removal from the gap



High-speed digital control

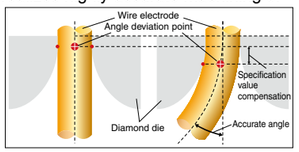
- Spark detection speed (up to twice as fast as our conventional model) provides improved discharge efficiency and suppresses wire breakage simultaneously while improving machining speed

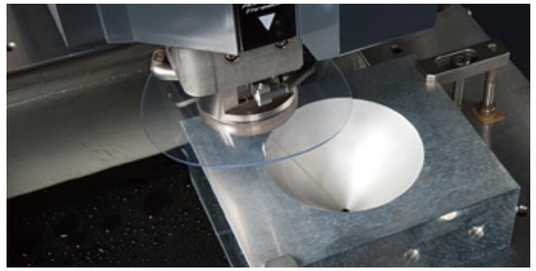
High-accuracy taper machining using round dies

- Highly accurate machining of extremely small tapered sections is realized
- 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)

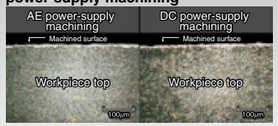




High-speed anti-electrolysis power supply (AE power supply)

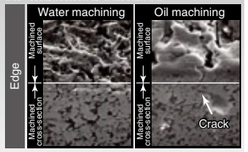
- Electrolytic corrosion is suppressed, preventing the formation of soft layers
- Compatible with all power circuits, from rough machining to finish machining
- High-speed, safe unmanned machining possible using water

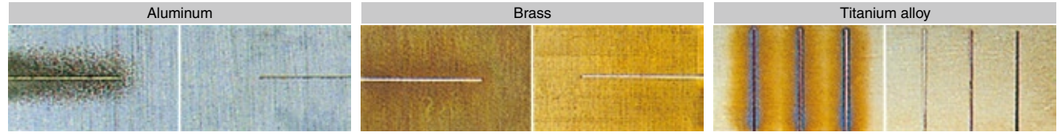
Comparison of AE and DC power-supply machining



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

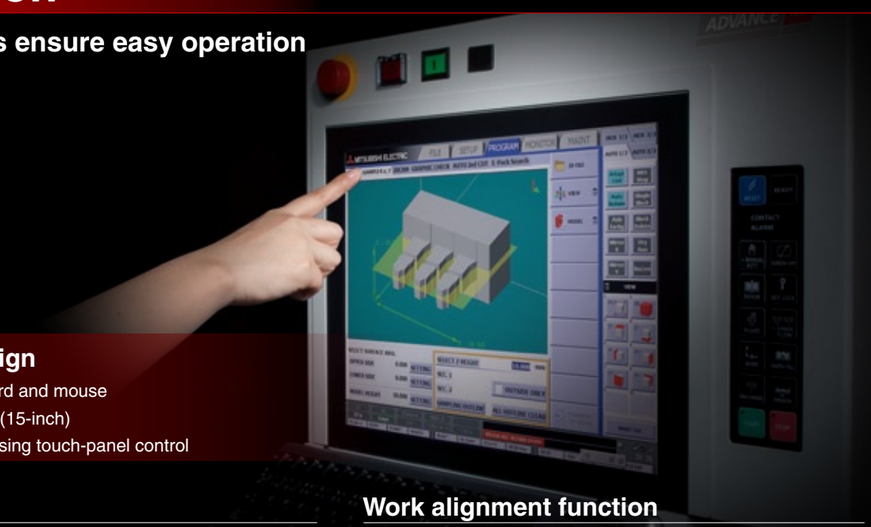
Comparison of water- and oil- machined surfaces





Easy operation

User-friendly features ensure easy operation



Ergonomic design

- User-friendly keyboard and mouse
- Easy-to-view screen (15-inch)
- Intuitive operations using touch-panel control

Set-up screen

- Outstanding graphics provides easy operation

Work alignment function

- By measuring the workpiece flatness with a dial indicator, the wire tilt can be automatically compensated to match the angle of the part This reduces further set-up time

Machining condition search function

- Interactive operation easily creates NC data with machining condition
- Job scheduling adjustment uses the schedule call back, extra job insertion and ME-pack feature

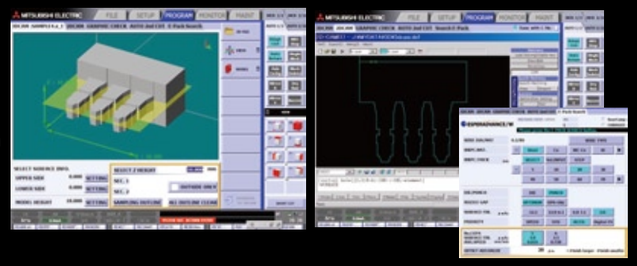
*ME-pack is a package of machining processes including offset, machining speed and adaptive control setting

High-accuracy taper machining (Angle Master)

- Angle Master function realizes precise machining of large tapered angles
- Optimum taper specifications are automatically set to match the wire electrode angle

Advanced 3D data for machine control

- Reads and displays 3D CAD data (Parasolid format *1) with a built-in 3D CAM
- Extracts 3D model contours with a built-in 3D CAM
- Creates NC data, including machining conditions, with a built-in 2D CAM
- Automatic ME-pack insertion into the 2D CAM path
- Analyzes shape features for improved machining performance with a 3D-PM

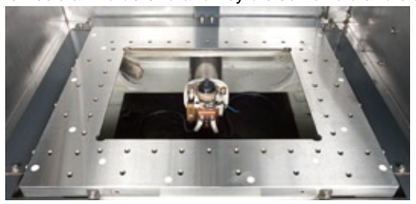


*1 Parasolid is a registered trademark of UGS PLM Solutions Co., Ltd.

NUI Natural User Interface

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

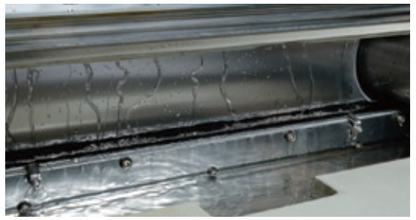


Wire alignment

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

Cleaning mechanism <MV2400R/S>

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



Precise positioning

- Highly accurate workpiece pick-up positioning is possible with the water flow on or when a workpiece is submerged

Wire travel system

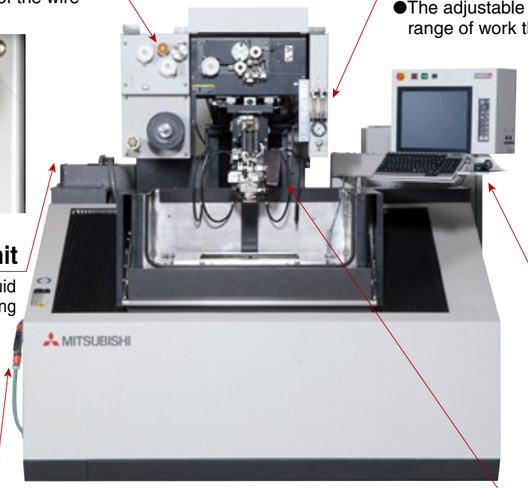
- The stability of the wire tensioning system is improved by a felt wiper and felt keeper pads that eliminate the chance of the wire jumping off the rollers

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

Dielectric fluid supply unit

- A large access window into the fluid tank provides easy entry for cleaning



Unit cooler filter

- Chiller air filter

Filter pressure gauge and jet cleaning nozzle

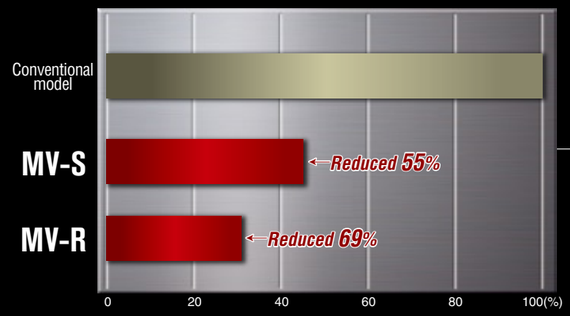
- Easily read the filter pressure
- The convenient location of the jet cleaning nozzle makes tank clean-up easy

Broken wire collection box

- Conveniently located in front for easy maintenance

Energy savings, low running cost

Realizing low costs and environment-friendly operation

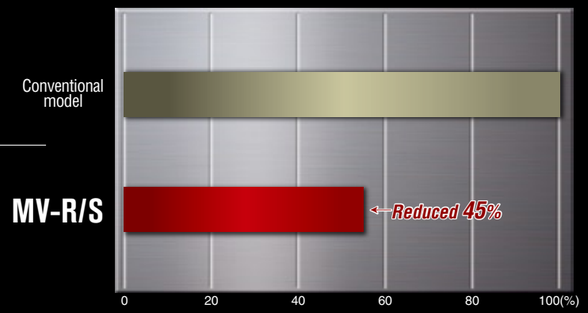


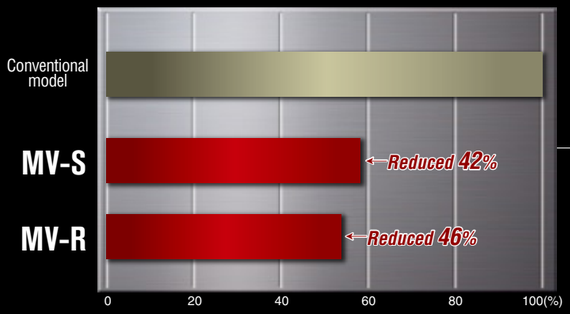
Power consumption reduced up to 69%

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



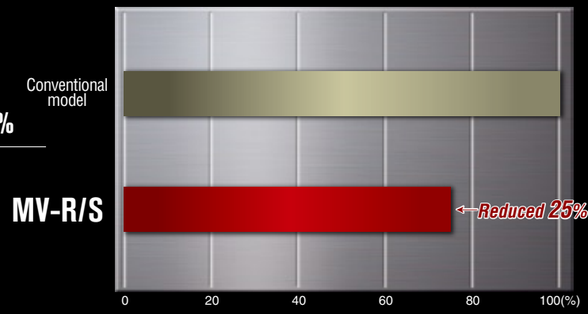


Wire consumption reduced up to 46%

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



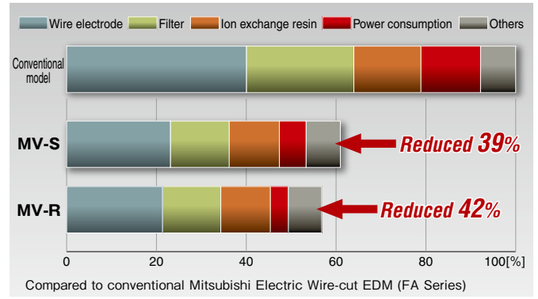
Compared to conventional Mitsubishi Electric Wire-cut EDM (FA Series), compared to the same machining amounts

LLS Long Life System

Running cost

- Total running cost reduced up to 42%, which is accounted for 90% by filter, ion exchange resin and power consumption

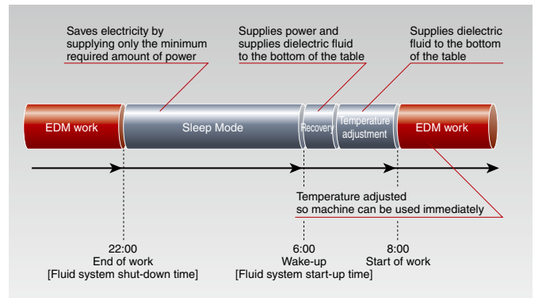
Wire electrode : ø0.2(.008")/BS
Workpiece : Steel(SKD11), t60mm(2.4")
Surface roughness : Rz3.5µm/Ra0.45µm



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

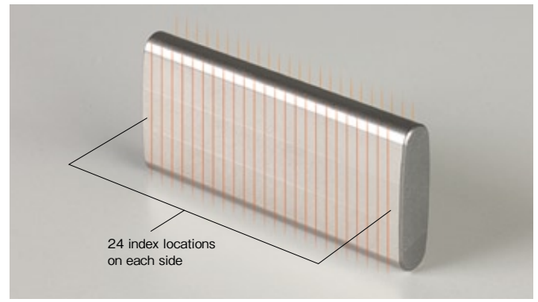
New energy-saving mode (Sleep Mode) <MV1200R/2400R>

- 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



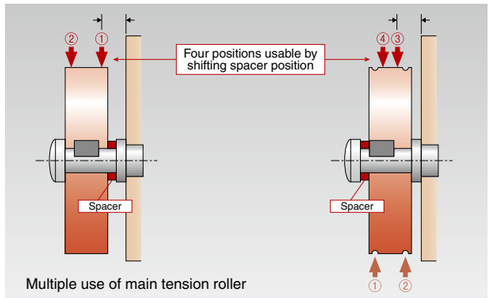
Flat power feed terminal

- 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

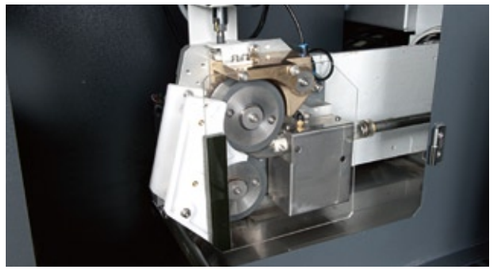
- Multiple indexing locations greatly reduce running costs



Multiple use of main tension roller

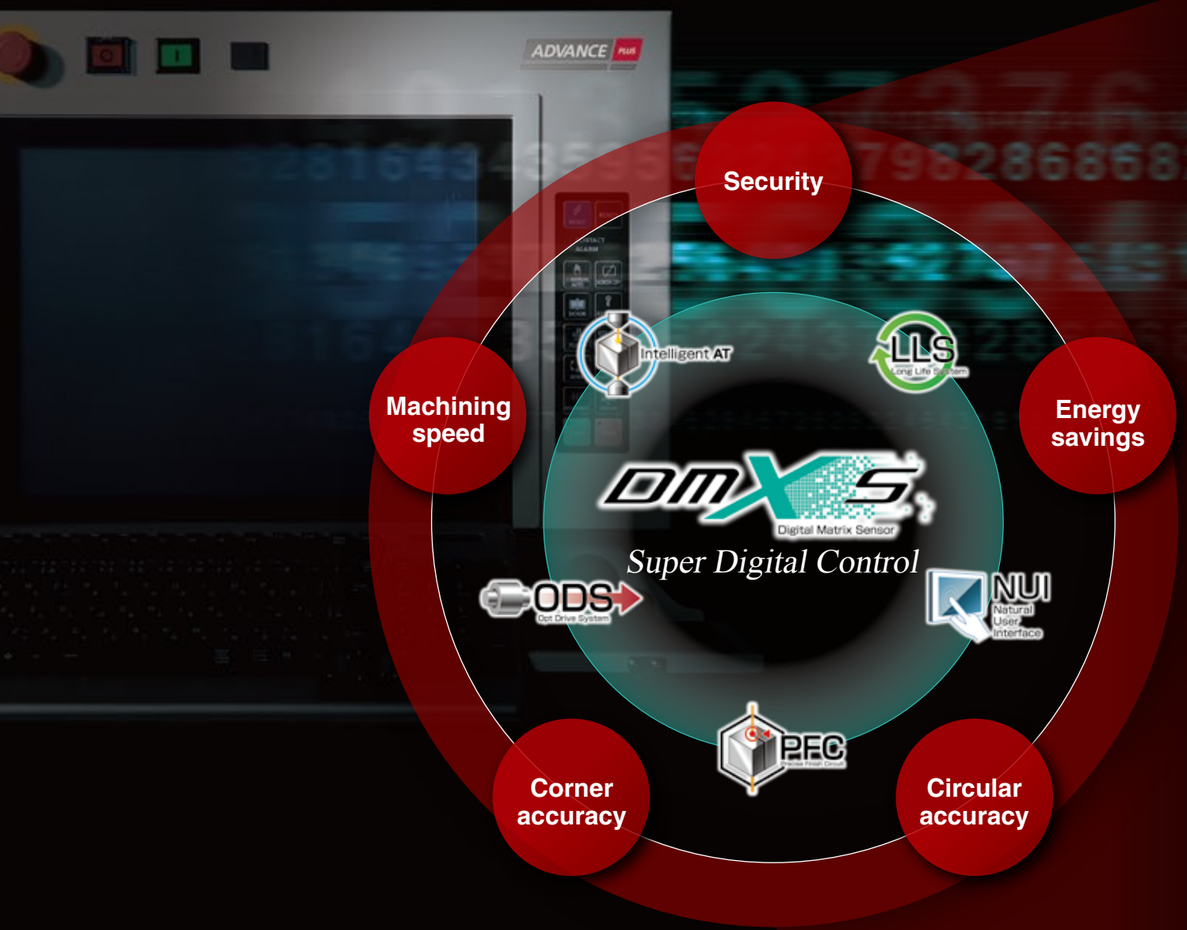
Large-diameter collection roller

- Large collection roller with multiple index locations greatly reduces running cost



ADVANCE PLUS control

Super Digital Control × ADVANCE PLUS control expand the capabilities of electrical-discharge machining



ADVANCE PLUS control is standard on the MV-R series

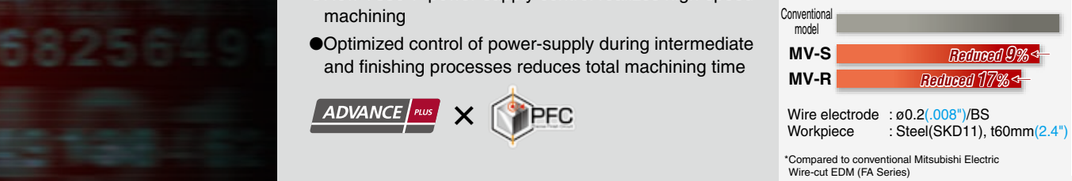
DMX-S Digital Matrix Sensor × ADVANCE PLUS (MV1200R/MV2400R)

Improved machining speed

- New V350Ⅴ power-supply control realizes high-speed machining
- Optimized control of power-supply during intermediate and finishing processes reduces total machining time

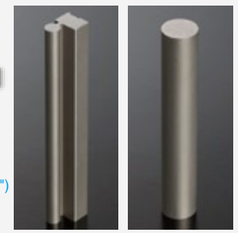
ADVANCE PLUS × PFC

Machining time reduced up to 17%



Wire electrode : ø0.2(.008")/BS
Workpiece : Steel(SKD11), t60mm(2.4")

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

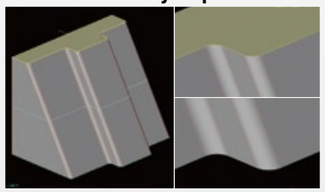


Improved corner accuracy

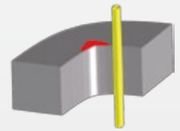
- ODS provides provides high accuracy even when cutting a U-V independent tapered shape
- Machining accuracy is improved in very small inside & outside corn radii

ADVANCE PLUS × ODS

Corner accuracy ±1μm



Corner machining control using CM3



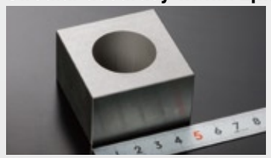
<Top surface of arbitrary shape up and down / Bottom surface of circle command>

Improved circular accuracy

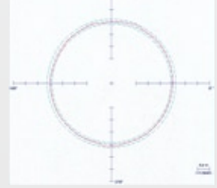
- Compensation accuracy improved by new AFC Ⅲ servo control

ADVANCE PLUS × ODS

Circular accuracy within 2μm



Wire electrode : ø0.2(.008")/BS
Workpiece : Steel(SKD11), t30mm(1.2")

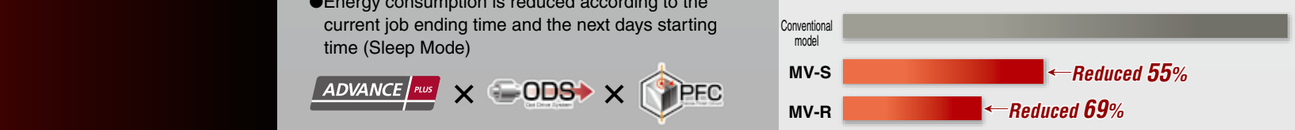


Energy savings

- Energy consumption is reduced according to the current job ending time and the next days starting time (Sleep Mode)

ADVANCE PLUS × ODS × PFC

Power consumption reduced up to 69%



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

Security

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

ADVANCE PLUS × McAfee An Intel Company

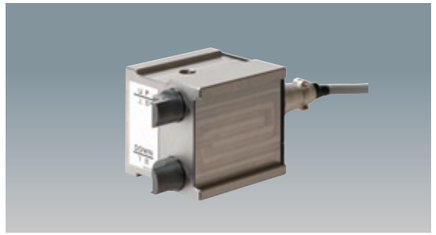
McAfee is a registered trademark of McAfee, Inc. in the United State and other countries

Anti-virus protection

Options

Advanced manual control box / Standard manual control box

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



Wire-alignment device

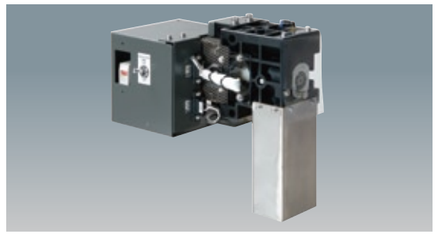
This device aligns the wire electrode with the table

Angle Master guide kit

Max. 45° tapered machining possible using dedicated diamond guide

20kg(44.1lb) wire spool unit

Long-time continuous machining is possible



Wire processing unit

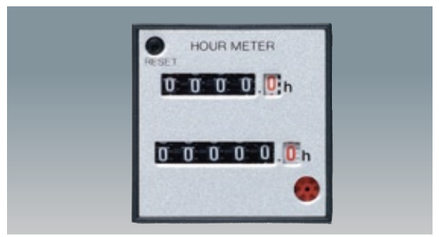
Spent wire electrode is cut at the discharge section

4-piece filter system

4-piece filter specifications reduce filter replacement frequency

3-color warning light

Indicates machine operating status



Run timer

Indicates accumulated machining time

LED light

High brightness LED lighting

Workpiece clamp set

Clamp jigs dedicated to holding workpieces

Options and retrofit specifications differ according to country and region, so please check with a Mitsubishi Electric representative

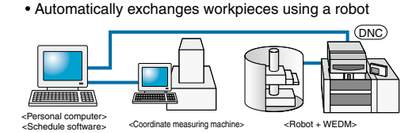
◎: Standard equipment ○: Can be field retrofitted ●: Factory installation only ×: Not available

Option name		MV1200R	MV1200S	MV2400R	MV2400S
Machine unit	XY OPT-drive system specifications	◎	◎	◎	◎
	UV OPT-drive system specifications	◎	×	◎	×
	Long stroke taper unit (±60mm)(±2.4")	◎	◎	×	×
	Long stroke taper unit (±75mm)(±3.0")	×	×	◎	◎
	ø0.1(.004"),ø0.15(.006") Automatic wire threading *1	◎	◎	◎	◎
	Wire processing unit *1	○	○	○	○
	20kg(44.1lb) wire spool unit	○	○	○	○
	Angle Master guide kit (H/W)	○	○	○	○
	Advanced manual control box (with axis display)	○	○	○	○
Power supply	Digital-AE Ⅱ power supply	◎	◎	◎	◎
	Fine machining system	◎	◎	◎	◎
	Special material machining power supply	◎	◎	◎	◎
Working tank	Manual vertical front door	◎	◎	—	—
	Automatic vertical front door	—	—	◎	◎
Dielectric fluid system	Ion exchange resin 10L(0.4cu.ft.) specifications (Organo)	○	○	○	○
	Ion exchange resin 20L(0.7cu.ft.) specifications (Organo)	○	○	○	○
	4-piece filter system	×	×	○	○
Communication	External signal output *2	○	○	○	○
	LAN/W *3	◎	◎	◎	◎
	DNC	◎	◎	◎	◎
	FTP	◎	◎	◎	◎
Software	Angle Master (S/W)	◎	◎	◎	◎
	Anti-virus protection	◎	×	◎	×
	Sleep mode	◎	×	◎	×
Display	3-color warning light *2	○	○	○	○
	Run timer *2	○	○	○	○
	Option box *4	○	○	○	○
Others	Instruction manual (paper edition)	○	○	○	○
	LED light	○	○	○	○
	Wire-alignment device	◎	○	◎	○
	Tools (tool box)	○	○	○	○
	Workpiece clamp set	○	○	○	○
Paint color designation		●	●	●	●

*1 The ø0.1 (.004") and ø0.15 (.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 Option box is needed
*3 LAN cable should 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.
*4 Necessary for mounting external signal output, 3-color warning light and run timer.

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



* Contact your local Mitsubishi Electric sales office or representative for more information.

Network connection specifications (DNC, FTP Options)

Data, such as NC programs, machining conditions and variables can be exchanged between a personal computer and EDM.
The required options differ according to the models and purpose, and can be confirmed using the following table.
One IP address must be prepared for each EDM within the user's in-house network.

Required Specifications	Image drawing	Required option	Supplement
Operate on the EDM side and receive data from personal computer.	Data transmission	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	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.

■Power-supply/Control unit specifications

Compatible model		MV1200R	MV1200S	MV2400R	MV2400S
Power supply unit specifications					
Power-supply unit	Model	WMV(R)	WMV(S)	WMV(R)	WMV(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	9 types : Anti-electrolysis power supply			
	Machine voltage selection	16 types			
	Machining setting	440 types			
	OFF time	32 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, copper, aluminum • Applicable only for rough-cut conditions			
	AVR	Built-in			
	Unit dimensions (mm) (in)	600 × 650 × 1765 (23.6 × 25.6 × 69.5)			
	Unit weight (kg) (lb)	240 (529)			
Control unit specifications					
Control unit	Model	W31MV-2(R)	W31MV-2(S)	W31MV-2(R)	W31MV-2(S)
	NC program input method	Keyboard, USB flash memory, Ethernet			
	Pointing device	Touch panel, mouse			
	Display	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) (in)	50nm (0.000050mm (0.000002"))			
	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			
	Wire offset	±99999.999mm Offset numbers: 1 to 900 (intersection point calculation)			
	Basic screen menu	5 types (file, setup, machining support, monitor, maintenance)			
	Automatic 2nd cut	Interactive screen method			
	Machining condition (E-pack) storage	1 to 6999			
	Program number command	1 to 99999999			
	Sub-program	Nesting level 30			
	Sequence numbers	1 to 99999			
	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			
	Graphics	XY plane, XY-XZ plane, solid, table scaling, 3D model display, background drawing, automatic machining path drawing			
	User memory capacity	1GB			
	Maintenance function	Management of consumable parts (time display)			
	Adaptive control	SL, CM, EM, OM, PM, BM			
	External dimensions (mm) (in)	494 × 175 × 346 (19.4 × 6.9 × 13.6) (excluding keyboard and mouse pad)			
	Weight (kg) (lb)	20 (44)			

■Control unit functions

W31 (Advance control unit) Control Unit Functions					
Year, month, date display	Reference block	Program no. designation	Automatic 2nd cut	Axis exchange	Automatic taper degree calculation
Overlap window function	Single block		Machining condition search	Mirror image	Status recording
Character string replacement function	Dry run	Expanded AT function	Block delete	Circumference calculation	Data variable operation
Geometric function	Automatic return	Graphics (drawing monitor)	USB flash memory	Backlash compensation	Alarm display
Floating decimal point function	User macro	Graphics (program check)	e-manual (electronic instruction manual)	Pitch error compensation	Machining time estimate
Control command	Automatic positioning (hole center, edge)	Graphics (automatic machining shape drawing)	Repeated positioning	Soft limit (inside/outside prohibit)	Built-in 2D-CAD/CAM
Corner R	Automatic zero point return	Graphics (surface display)	Automatic power failure recovery	Wire consumption estimate	Built-in 3D-CAM
Corner chamfer	Machining start hole return	Offset	Workpiece coordinate system (106 items)	CM3 control	EM control
Linear angle command	Memory operation 1GB	Coordinate reading	PM control	OM control	3D model compatible PM control (3D-PM)
30-sec. short-circuit stop	Program edit	Time reading	SL control	3D viewer (Parasolid data display)	Digital-AE Ⅱ
Simultaneous 2-axis wire alignment	Coordinate rotation	XY-axis independent scaling	3D graphic check	Sleep mode (MV-R)	
Workpiece inclination compensation	Pattern rotation	Axis rotation	Workpiece alignment	Maintenance check	

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

Cautions
The standard delivery entrance dimensions for standard shipment delivery are given on the product introduction page. If the entrance is smaller than the standard delivery entrance, the machine shipped may have different dimensions.
Contact a Mitsubishi Electric sales office 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 (44°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.
  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 an 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 maker 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) (MV2400 Series).

2. Machine heating

- Approx. 8,140W of heat is generated per machine, of which 1,512W is heat generated by the dielectric fluid control unit.
- Take this into consideration when studying air-conditioning requirements.

3. Power-supply equipment

- Primary wiring 3-phase 200/220VAC±10% 50/60Hz±1Hz
- Power capacity 10.0kVA (during normal use) (when using Ø0.2(.008")mm 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.
Class C grounding (grounding resistance of 10Ω or less) as set forth in the Electric Facility Standards is recommended for Mitsubishi Electric EDMs.
- Class C grounding (isolated) is recommended (Wire-cut EDM dedicated grounding) (Fig. 1).
  Note) Provide isolated grounding for each machine.
- 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.

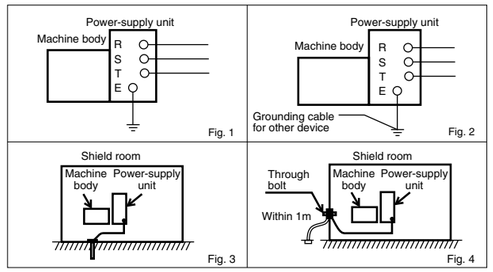
5. Primary air equipment

- Hose diameter : 1/4 hose (hose sleeve outer diameter: ø9.0 (0.35"))
- Pressure : 0.5 to 0.7MPa (70 to 100psi)
- Flow rate : 75L/min or more (26cu.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 EDM in the shield room (Fig. 3).
2. If the 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 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. 30mA 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 100mA to 200mA) is recommended for the 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).

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	Oki Electric Cable
HBZ-U (N)	Hitachi Cable
SBS-HN	Sumiden Fine Conductors

*Wire electrodes above do not guarantee performances.

Recommended sliding surface lubricants

Use one of the following lubricants for sliding surface As of February 2012

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

MEMO

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NAGOYA WORKS: 1-14, YADA-MINAMI, 5-CHOME, HIGASHI-KU, NAGOYA 461-8670, JAPAN

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

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

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