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Seibu Electric is accredited under ISO9001.



Be sure to read the "Instruction Manuals" and "Safety Precaution Manual" before use to ensure proper and safe use.

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Agency

Ultra-precision oil type wire EDM



**M25LP**  
Seibu Oil Technology



# The pride and tradition of the pioneer in the field



## M25LP

Seibu Oil Technology



Our traditional  
"kisage" scraping technique

## Combining traditional techniques with the latest technology

Seibu created the world's first CNC electrical discharge machine (EDM) in 1972. Since then, we have steadily improved the productivity and precision of our growing line of EDM systems, adding new functions to make a major contribution to user productivity.

This new, ultra-precision system brings EDM manufacturing to a wider range of products than ever, from metal leadframes and motor cores to tiny electronic and medical components. The secret behind our unsurpassed precision is repeated "kisage" scraping, attaining a level of flatness that even machine tools cannot match.

Tradition with technology: the M25LP brings you perfect cutting precision.



# The pioneer in wire EDM systems ushers in a new era in ultra-precision cutting

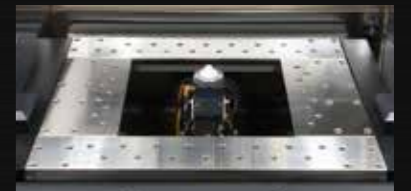
## Features of submerged oil-dielectric EDM

~ Improved cutting precision with ultra-small discharge and micro-corners ~

Featuring the newly developed SF-7 power supply, and square table for quick and sure set-up and cutting. Improved ACO control and TC cornering performance bring you a new level of ultra-precise cutting.

### ■ M25LP features

- Newly developed SF-7 finishing power supply attains best surface-roughness Rz 0.2  $\mu\text{m}$ .
- Work table is 250 mm square for faster set-up and work.
- ACO control provides improved shape precision for cut-offs.
- TC corner control and oil-dielectric cutting capabilities provide enhanced corner performance.



Work table is 250 mm square.

### ■ Comparison with water-dielectric cutting

Workpiece surface



Workpiece surface (water)



Workpiece surface (oil)

Cobalt loss



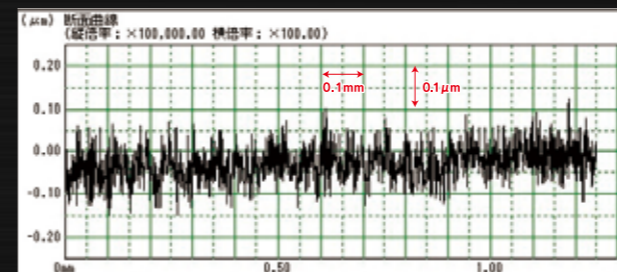
After immersion for 50 hrs (water)



After immersion for 50 hrs (oil)

Compared to the surface produced by the water-dielectric machine, ultra-small pulse control provides sub-micron level surface roughness. Oil also eliminates cobalt depletion from carbides, and significantly improves corrosion resistance, as well as preventing the formation of a soft surface layer on iron-based materials.

### ■ Best surface roughness results



Calculation standard: JIS- ' 01  
 Measurement: Roughness  
 Measured length: 1.25 mm  
 Cut-off frequency: 0.25 mm  
 Measurement magnification: x5k  
 Measurement speed: 0.60 mm/s  
 Material: WC  
 Wire diameter: 0.20  
 Best surface roughness: Rz 0.2  $\mu\text{m}$

Floating capacitance between electrodes has been minimized to achieve a best surface roughness of Rz 0.2  $\mu\text{m}$ .

### ■ Shape measurement results



Shape: Leadframe

Shape precision within  $\pm 1 \mu\text{m}$  attained

Optimal control of micro-arc corners assures stable precision to  $\pm 1 \mu\text{m}$ .

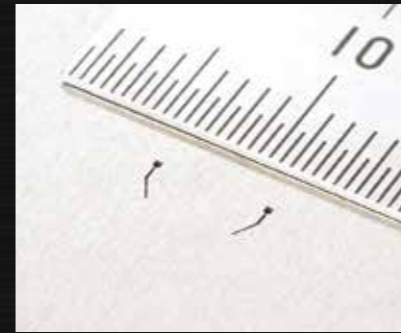
# The world of ultra-precision: Cutting to within $\pm 1 \mu\text{m}$



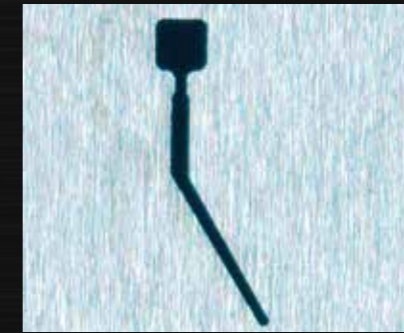
## Cutting examples

~ Even higher precision and quality with oil-dielectric cutting ~

### Leadframe cutting



Workpiece: Tungsten carbide (KD20)  
Thickness: 5 mm  
Wire diameter: 0.05  
Cutting time: 50 min/unit  
Number of cuts: 9  
Surface roughness: Rz 0.37  $\mu\text{m}$



### Best shape surface cutting



Workpiece: Tungsten carbide (RG3)  
Thickness: 60 mm  
Wire diameter: 0.2  
Cutting time: 2.6 hr  
Number of cuts: 10  
Surface roughness: Rz 0.41  $\mu\text{m}$

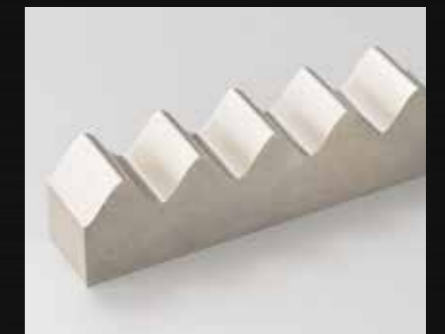
### Connector cutting



Workpiece: Tungsten carbide (KD20)  
Thickness: 5 mm  
Wire diameter: 0.05  
Cutting time: 50 min/unit  
Number of cuts: 9  
Surface roughness: Rz 0.37  $\mu\text{m}$



### Best shape surface cutting



Workpiece: Tungsten carbide (RG3)  
Thickness: 10 mm  
Wire diameter: 0.1  
Cutting time: 5 hr  
Number of cuts: 10  
Surface roughness: Rz 0.35  $\mu\text{m}$

### Ultra-fine combination cutting



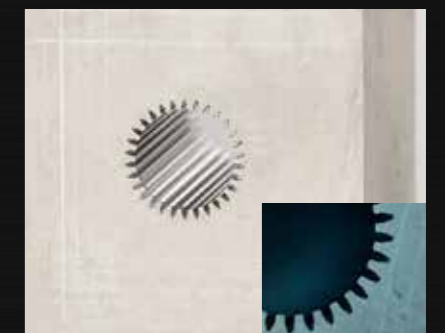
Workpiece: Tungsten carbide (RG3)  
Thickness: 20 mm  
Wire diameter: 0.05  
Cutting time: 25 hr/unit  
Number of cuts: 8  
Surface roughness: Rz 0.47  $\mu\text{m}$

### Plate fitting cutting



Workpiece: Tungsten carbide (RG3)  
Thickness: 80 mm  
Wire diameter: 0.2  
Cutting time: 10 hr  
Number of cuts: 10  
Surface roughness: Rz 0.5  $\mu\text{m}$

### Ultra-fine gear cutting



Workpiece: Tungsten carbide (RG3)  
Thickness: 15 mm  
Wire diameter: 0.05  
Cutting time: 6 hr  
Number of cuts: 9  
Surface roughness: Rz 0.38  $\mu\text{m}$

# Ensuring stable cutting precision

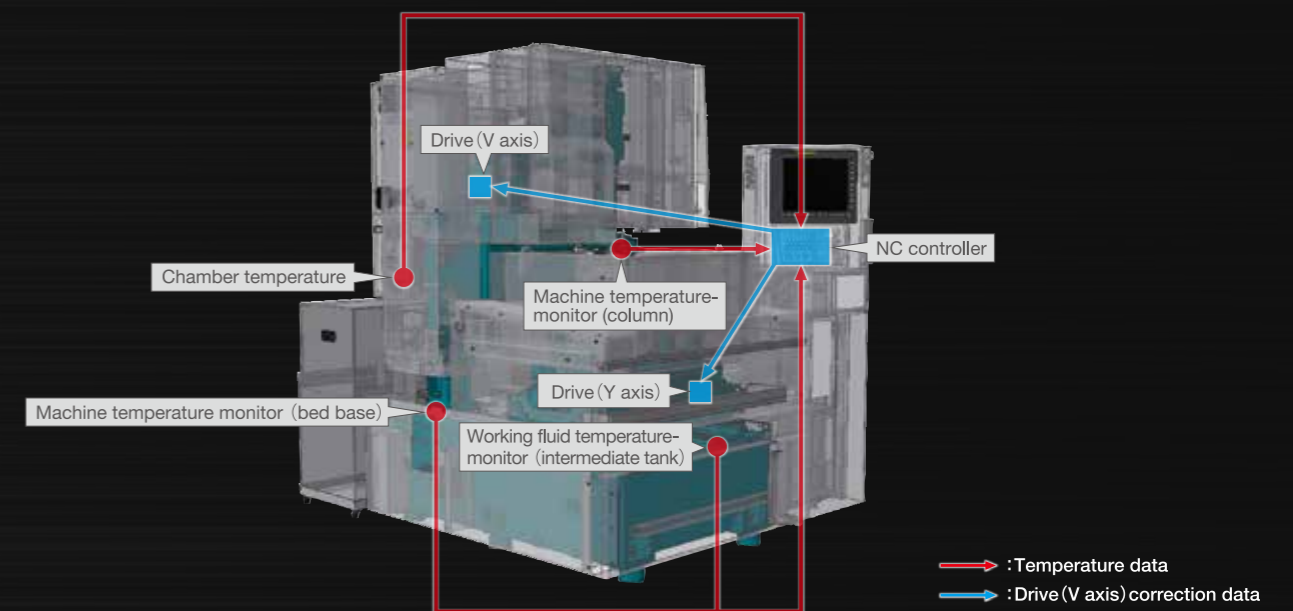


## Thermal Adjust 24

~ Long-term maintenance of high cutting precision ~

This system monitors the temperatures of the column and lower arm, using data to calculate thermal displacement of the upper and lower heads holding the wire. The upper head is automatically corrected to ensure wire verticality.

### ■ The Thermal Adjust 24 mechanism

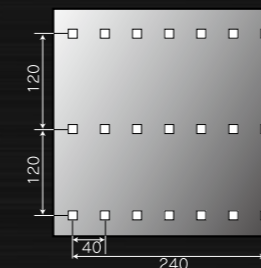


Temperature sensors in four locations on the EDM system constantly monitor room ambient, fluid, and machine temperature. Data is transmitted to the NC controller, which estimates the thermal displacement and corrects the drive (V and Y axes) accordingly.

In addition to adjusting the V and Y axes to eliminate fluctuation caused by machine thermal displacement, Thermal Adjust 24 also monitors and maintains wire vertical precision and pitch accuracy around the clock.

### ■ Performance test

The test job consists of 21 square holes. After a minimum of 20 hours of cutting, room ambient temperature was changed by 3°C, and V-axis drift measured.



Test piece dimensions

Wire verticality error was 3.2 μm without corrections, but with Thermal Adjust 24 enabled error was reduced to 1.1 μm, representing an improvement in verticality of about 65%.

# Combining ultra-precision cutting with high productivity



## Automatic Wire Feeding Device AWF-4 (LP specification)

~ Seibu's proprietary technology, with over three decades of performance in the field ~

The pioneering Seibu automatic wire feeding device contributes to automatic operation of wire EDM systems, earning high marks for performance and reliability.

### ■ Feed at break point



Seibu developed its patented dry annealing method for wire feed in 1983. The M25LP oil-dielectric submerged wire EDM system, the latest model in the field, can supply wire at the break point in oil for wires as thin as 0.05 mm dia.

### ■ Friction sensor



Our patented friction sensor technology makes possible small-diameter holes on a tight pitch, and insertion into narrow slits.

### ■ Upper and lower heads



The design of the upper and lower heads has been simplified for quick and easy maintenance, and even faster verticality adjustment.

### ■ New wire travel system



Wire vibration

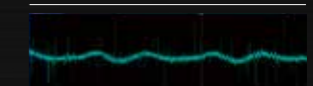


Conventional wire travel system



New wire travel system

Wire tension fluctuation



Conventional wire travel system

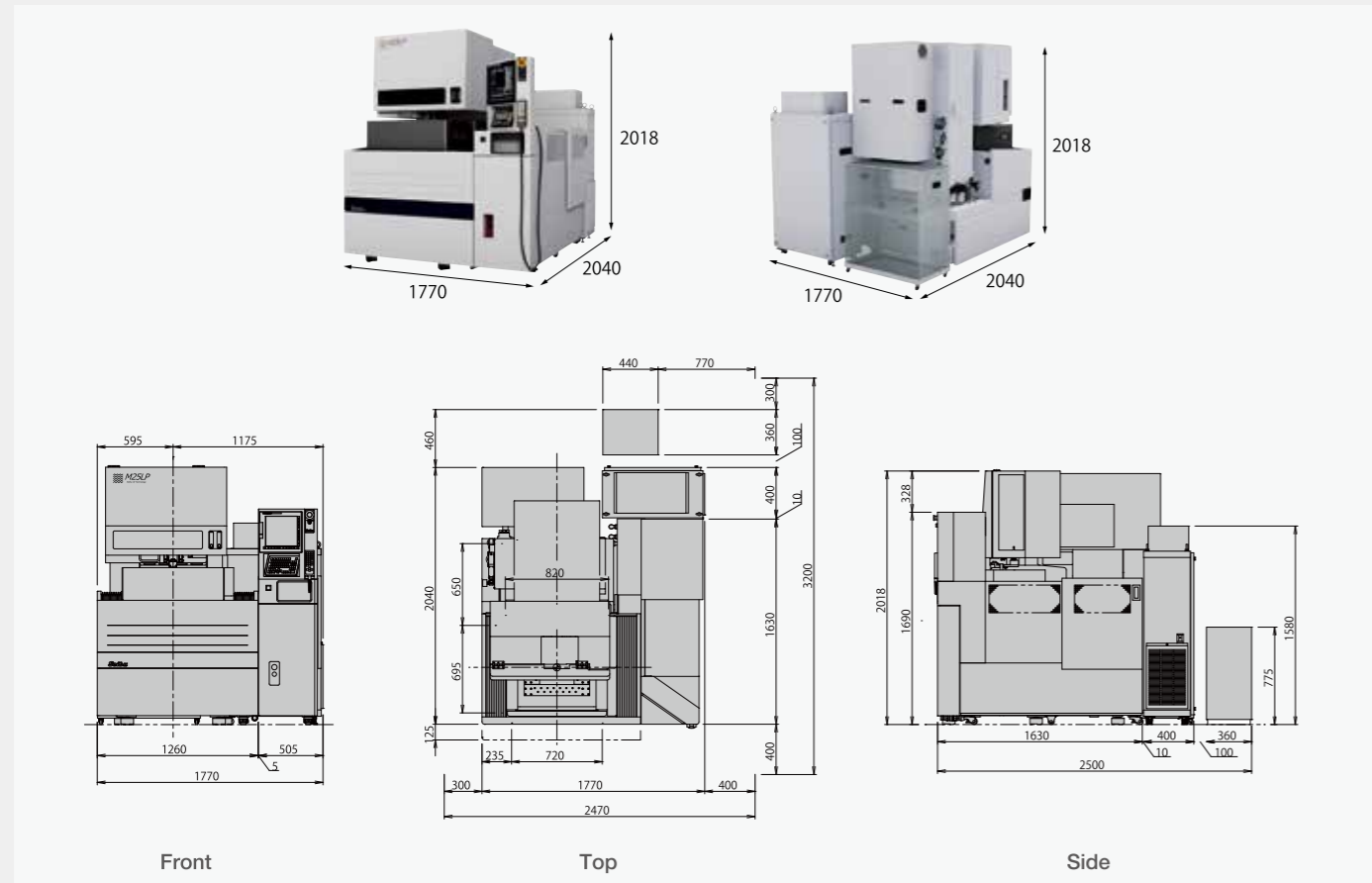


New wire travel system

The new wire travel system significantly reduces wire vibration and wire tension fluctuation, contributing to even better cutting precision.

# Major specifications and dimensions

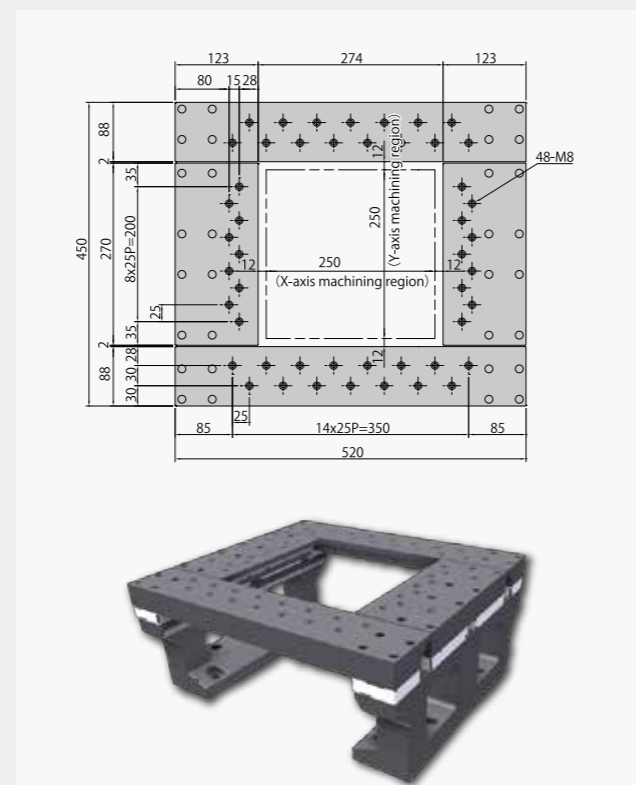
## Dimensions



## Specifications

Control axis stroke	X axis	250mm
	Y axis	250mm
	U axis	±35mm
	V axis	±35mm
	Z axis	200mm
Max workpiece dimensions	270×270×100mm	
Max workpiece weight	150kg	
Max taper angle	±10°/100mm	
Available wire dia.	φ0.05~φ0.20mm (OP:φ0.05)	
Total working fluid capacity	330L	
Working fluid	Cutting oil (fourth group, third class petroleum)	
Dimensions	1,770×2,040×2,018 (mm)	
Table shape	Square (multi-piece)	
Footprint	2,470×3,200 (mm)	
Total weight	3,100kg	

## Table drawing



## Operating environment

### Operating environment

Operating temperature range	5°C~40°C
Recommended operating temperature	20°C (±0.5°C), 20°C (±1.5°C) with Thermal Adjust 24
Humidity	30% to 75% RH (no condensation)
Atmosphere	Free of corrosive gases, acid mist, etc., and dust particles
Elevation	1000 m or lower
Foundation	Concrete thickness 400 mm min.
Permissible vibration	Acceleration 0.5 m/s <sup>2</sup> , amplitude 2 μm max

### Electrical specifications

Primary power supply	3-phase 200/220V±10%
Frequency	50/60Hz±1%
Connection terminals	M6 (5.5mm <sup>2</sup> ~22mm <sup>2</sup> )
Electric capacity (EDM machine)	13.5 kVA
Electric capacity (cooling system)	3.8 kVA
Recommended leakage protector (EDM system)	Rated current 50 A, rated trip current 100 mA
Recommended leakage protector (cooling system)	Rated current 10 A, rated trip current 30 mA
Earth	One C-type earth for every EDM system (connection resistance 10 Ω max, flexible copper cable 14 mm <sup>2</sup> or larger)
EMI	If EMI generated by wire EDM system operation is unacceptable, a shielded room may be required

### Compressed air specifications

Pressure	0.5 MPa min.
Flow rate	70 L/min. (ANR*) minimum
Connector	Nylon or urethane hose, 8-mm dia coupling

\*ANR: Standard reference atmospheric conditions  
(temperature 20°C, relative pressure 101.3 kPa (760 mmHg), RH 65%)

### Thermal output

Power supply	Max: 1,892 Kcal/h	Avg: 964 Kcal/h
EDM machine	Max: 955 Kcal/h	Avg: 478 Kcal/h
Working fluid cooling device	Max: 3,268 Kcal/h	Avg: 1,634 Kcal/h
Total	Max: 6,115 Kcal/h	Avg: 3,048 Kcal/h

## Required applications and notifications

Please comply with laws and regulations applicable in your region.  
For additional information please contact your sales representative.

