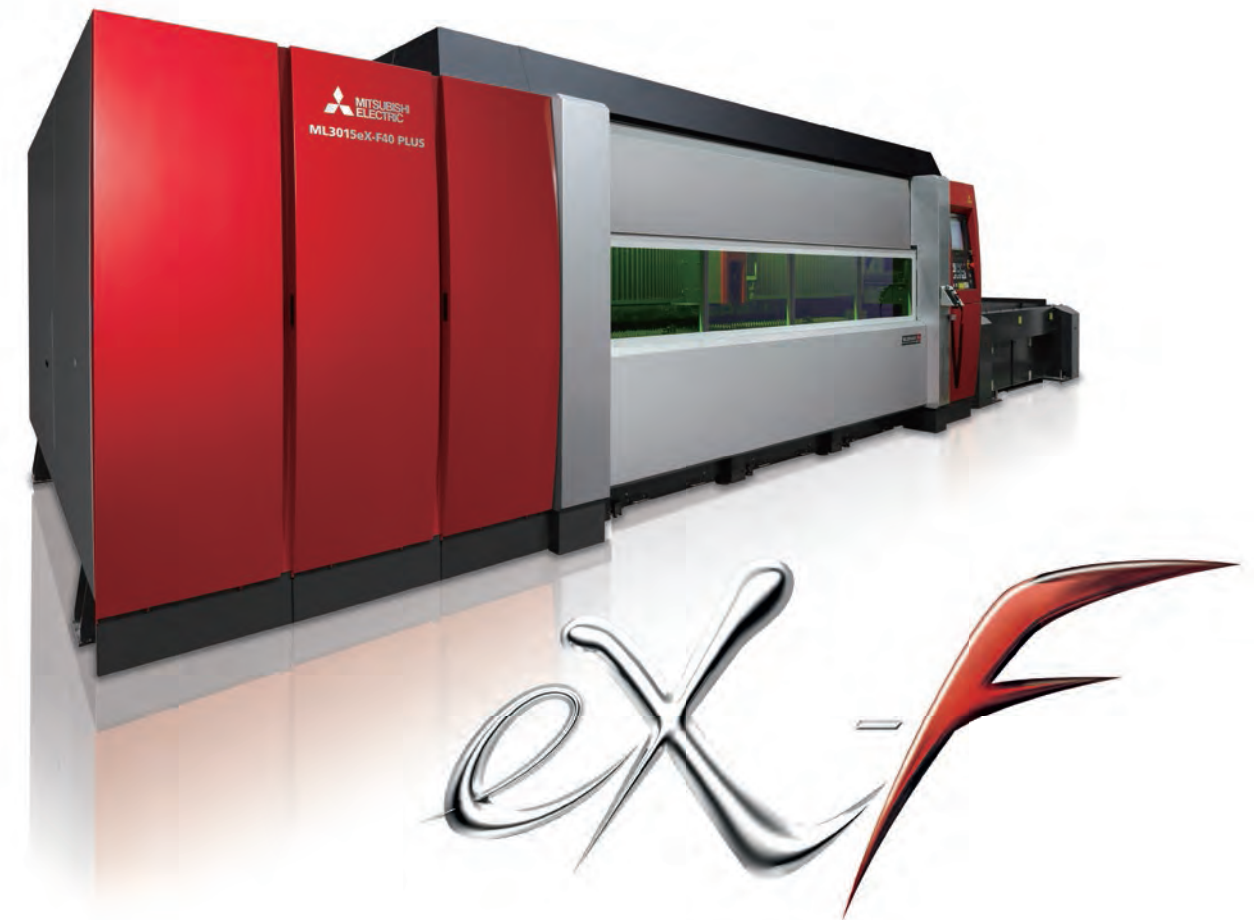


## 2-Dimensional Fiber Laser Processing Systems eX-F Series



**MITSUBISHI ELECTRIC EUROPE B.V.**  
**Mechatronics Machinery**

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[edm.sales@meg.mee.com](mailto:edm.sales@meg.mee.com)

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# Global impact of Mitsubishi Electric



Through our vision "Changes for the better", Mitsubishi Electric paves the path to 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. In order to bring greater comfort to daily life, maximize the efficiency of businesses and keep things running across society, we integrate technology and innovation to make changes for the better.

Mitsubishi electric is involved in many areas including the following business sectors.

### Energy and Electric Systems

Wide range of power and electrical products from generators to large-scale displays

### Electronic Devices

Wide portfolio of cutting-edge semiconductor devices for systems and products

### Home Appliance

Reliable consumer products like air conditioners and home entertainment systems

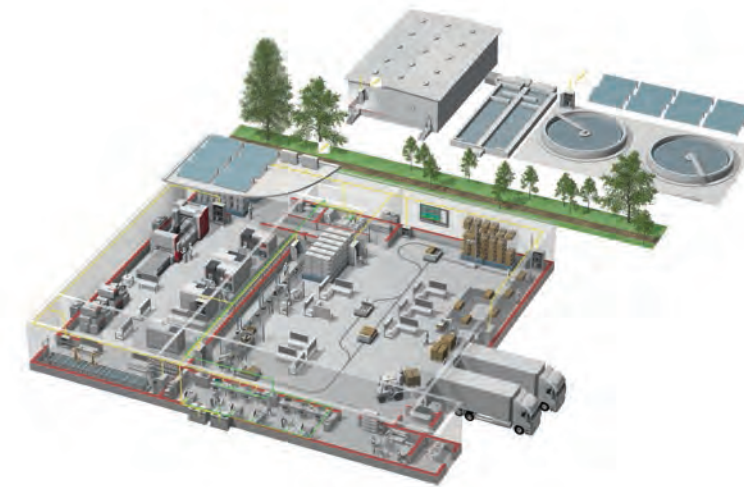
### Information and Communication Systems

Commercial and consumer-centric equipment, products and systems

### Industrial Automation Systems

Maximized productivity and efficiency with cutting-edge automation technology

# Your solution partner



Mitsubishi Electric is supplying wide ranging automation equipment from graphic operation terminal and programmable logic controller through CNC and electric discharge machine.

## Brand of trust

Our brand name "Mitsubishi" has been used as part of approximately the 45 corporation names in the financial, commercial and industrial areas. At present, "Mitsubishi" is globally renowned as a symbol of high quality. Mitsubishi Electric Corporation is engaged in the business sectors of space development, transportation, semi-conductor, energy system, information and communication processing, audio visual device, home appliance, construction, energy management and automation system with our 237 factories and laboratories over 121 countries.

What is the reason why Mitsubishi Electric automation solution is reliable? Since we check our products by using them for the first time at our factories, they are undeniably highly credible, efficient and easy-to-use automation systems. Mitsubishi Electric as one of the world's leading corporations, boasting of its sales volume of 4 trillion yen (exceeding 40 billion dollars) and employing over 100 thousand staff, not only provides the best product but also the top-level service and support to our customers.



Low-voltage circuit breaker, Magnetic motor starter



High-voltage circuit breaker, High-voltage magnetic contactor



Energy-saving support device, Energy monitoring module



Programmable logic controller (PLC), Graphic operation terminal (HMI)



AC servo, Three-phase motor, IPM motor, Inverter, Geared motor



Numerical controller (CNC)



Industrial robot



Electric discharge machine, Laser processing machine, Electron beam machine



Transformer for power distribution



Pressurized ventilation fan, Uninterruptible power supply (UPS)



# Combination of eX-Series and Fiber Laser Technology Evolutionary Progress in Performance

**Fast**

Combination with fiber laser achieves higher performance during high-speed processing

**Flexible**

Flexible operation maximizes fiber laser performance

**Fiber**

**Fine**

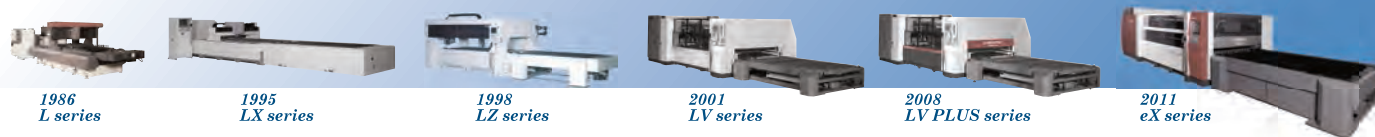
Mitsubishi Electric X fiber laser achieves the ultimate in ecology



**2015 eX-F PLUS series**

**Fiber Laser Processing Systems**

**CO<sub>2</sub> Laser Processing Systems**



1986 L series

1995 LX series

1998 LZ series

2001 LV series

2008 LV PLUS series

2011 eX series

**2015 eX PLUS series**

**Excellent**

Outstanding productivity for thin and thick plates

**eX**

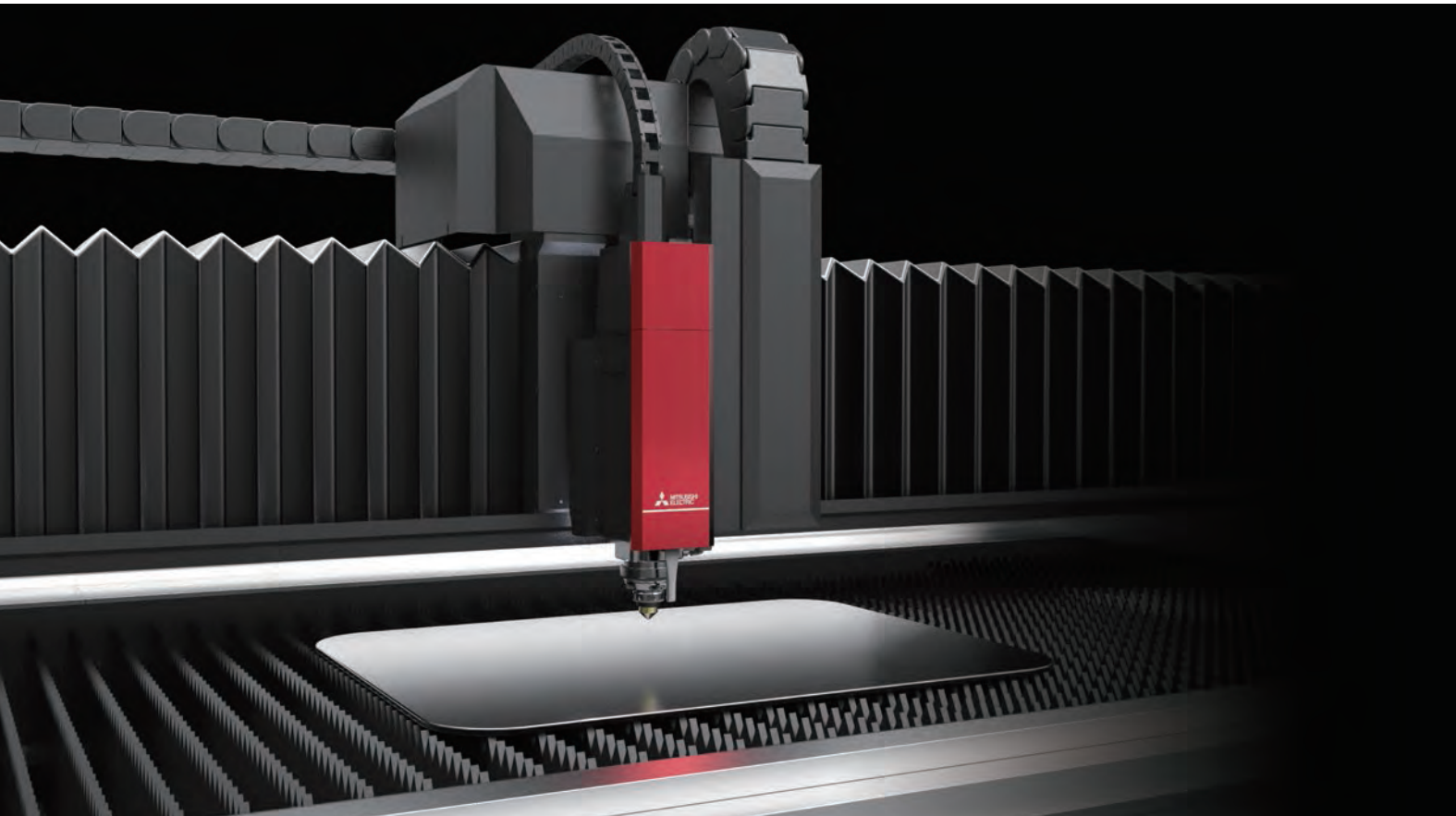
**Ecology**

Eco mode and oscillator optimization realize drastic energy savings and CO<sub>2</sub> reduction.

**Easy to use**

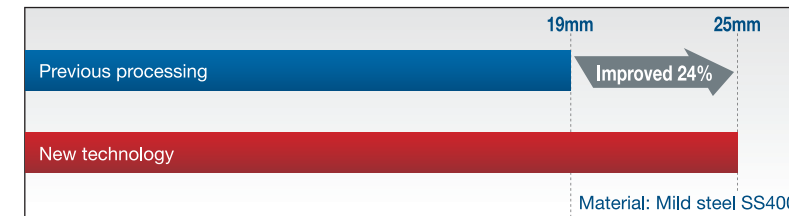
Extremely versatile-From simple 2-Action processing to advanced applications

# Fast × Excellent



Mitsubishi's original oscillator high-speed control function achieves higher performance of high-speed processing.

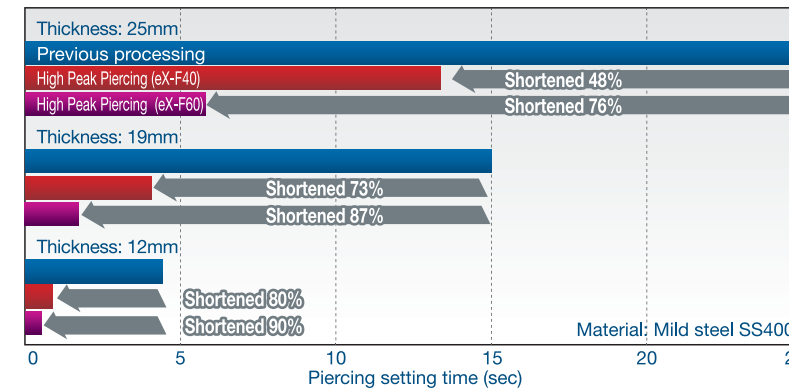
## Technologies Supporting Thick-plate Processing



### Increased plate thickness

Applying the application technologies developed for CO<sub>2</sub> laser processing machine to fiber laser, high-speed and high quality of thick plate processing has been achieved.

\*When using the Thick Mild Steel Cutting Enhancing Function (option).

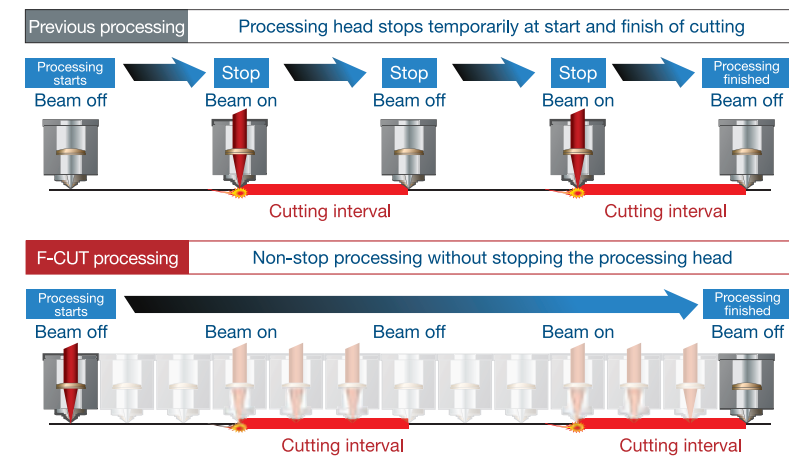


### Reduction in piercing time of medium & thick mild steel

Piercing time has been reduced by high-speed control of oscillator, application of high peak pulse condition and optimum control of focal position. Moreover, total processing time of thick mild steel can be reduced by up to 80% due to the optimal control of material self-burning using new side gas jet.

\*When using the High Peak Piercing (option).

## Technologies Supporting Thin-plate Processing



### F-CUT® - Possible to increase the speed even more

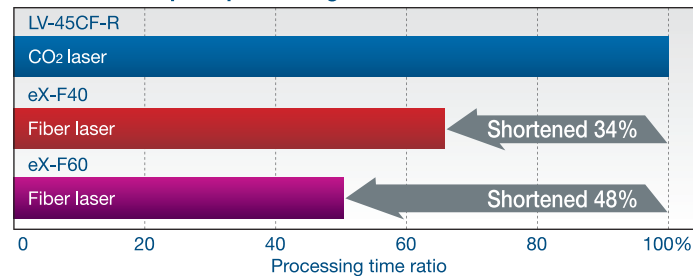
High-speed oscillator and control device communications enable the beam to be turned on/off without stopping the axis.

### MHC-L reduces the beam on/off timing

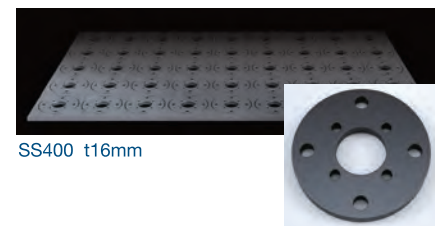
(Mitsubishi High speed Control for Laser)  
Mitsubishi Electric's original system is utilized to maximize the high-speed processing performance of the fiber laser.  
-Faster communication between control system and oscillator  
-Beam on/off timing is controlled in one-microsecond (1µsec) units (1/1,000,000).

## Outstanding productivity improvement for all thickness plates

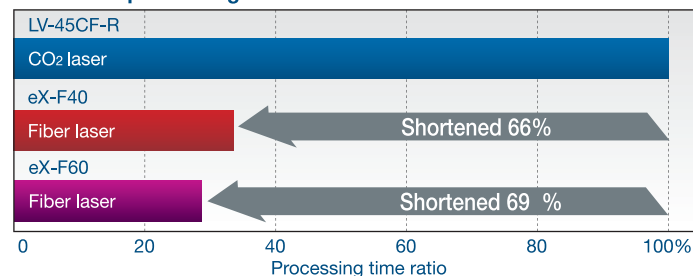
### Medium/Thick-plate processing



Productivity has been doubled owing to control technologies and application technologies optimized for medium-thick and plates.



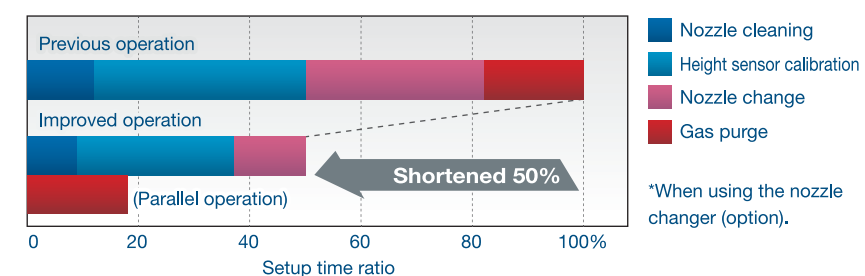
### Thin sheet processing



Productivity of thin sheet processing has been improved by 3 times owing to the high beam convergence of fiber laser and the latest control technologies.



## Technologies Supporting Higher Productivity



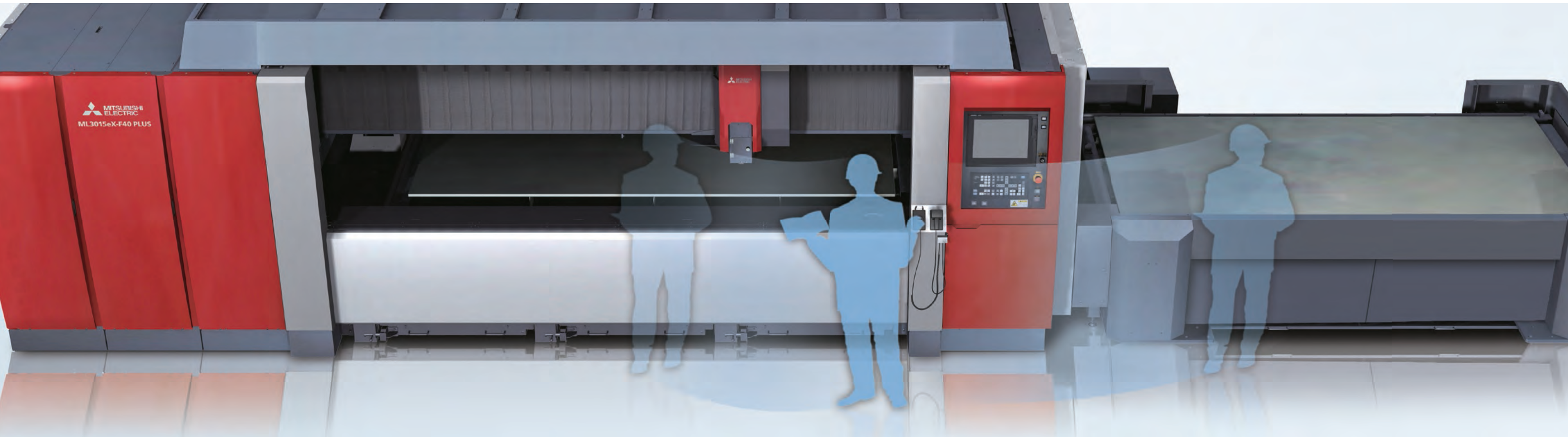
### Reduction in non-actual processing time

Total productivity has been improved with the high-speed and parallel operation of each movement before processing.

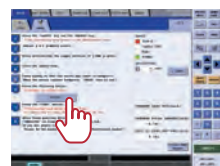


# Flexibility × Easy to use

Automatic front door ensures easy access for operator.



## Easy to use × Reliable operation



Press the FOCUS button on the screen



Press the START button on the processing machine

### Automatic focusing

Processing head developed in-house enables the automatic focusing function to be provided as standard equipment.



### Simple nesting

Allows for rectangular nesting at the CNC control to meet urgent needs for additional parts.

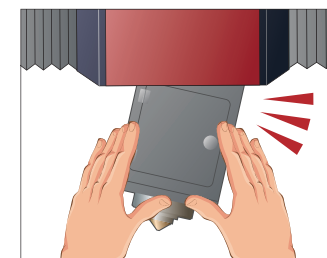


Displays the remaining processing time

### Processing time display

Equipped with processing time estimation function. Supports production plan by visualizing the processing time before processing.

[PROCESSING INFO]			
PROC. TIME	0:00:34	REMAIN TIME	0:00:34
WAIT TIME (sec)	0.0		



### Magnetic damage reduction function

Protects the head and minimizes the need for nozzle centering in the event of a crash. Allows quick recovery.



Step 1: Read barcode on instruction sheet

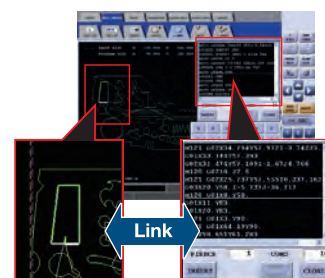


Step 2: Press the START button on the processing machine

### 2-Action processing

2-Action processing improves operability.

Processing starts



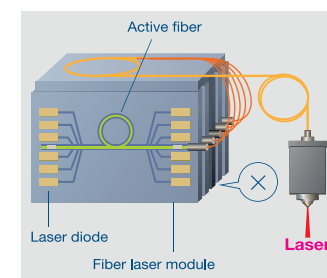
### Simple program editor

Allows the change of program and processing condition numbers easily while checking the shape on the graphic screen.



### Active control

Adjusts the processing condition by a dial while looking at the processing.



### Hot reserve function

Even if a module failure occurs, continuous operation is possible with the remaining modules at full nominal power.

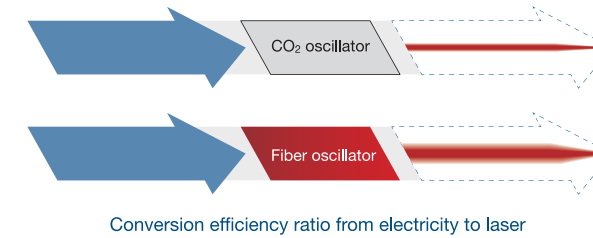


# Fine X Ecology



Combination of Mitsubishi's control device, drive unit and fiber laser has realized high-level ecology.

## High-efficiency fiber laser oscillator



### High laser conversion efficiency achieves electric power savings

Compared to CO<sub>2</sub> lasers, fiber lasers with high laser conversion efficiency consume less electricity.

## Power-saving CNC and drive unit

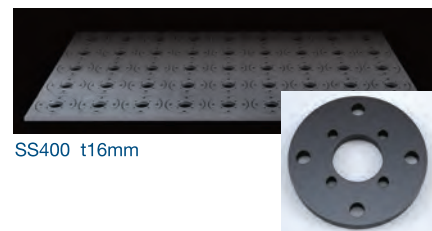
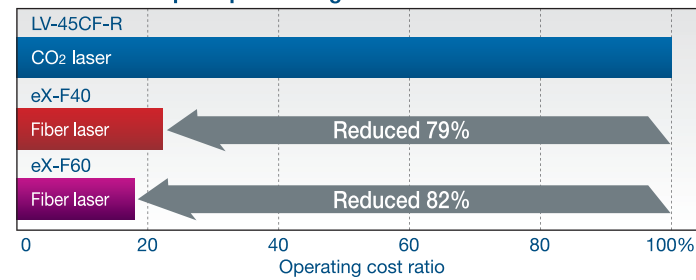


### Operating cost reduced by energy-saving CNC and drive unit

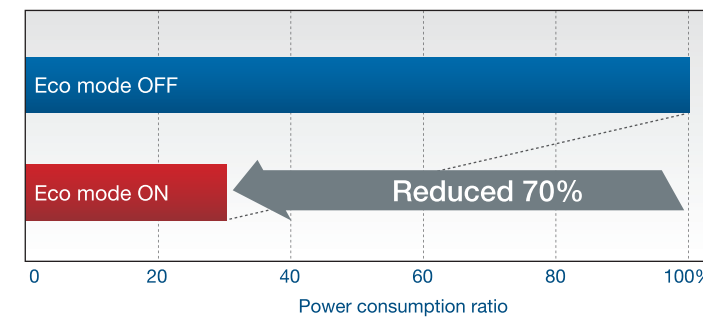
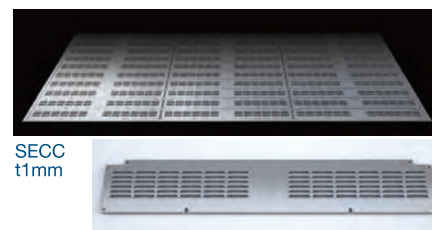
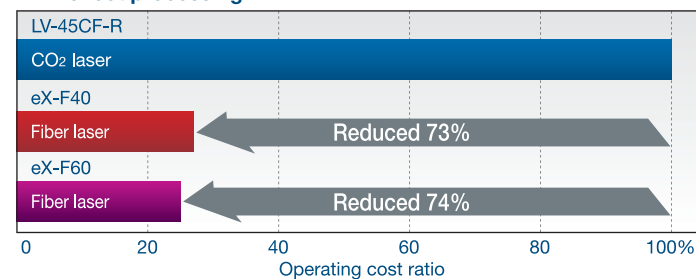
Power-saving realized using Mitsubishi Electric CNC and drive unit best matched for the fiber-laser oscillator.

## Integrated fiber laser reduces operating cost

### Medium/Thick-plate processing

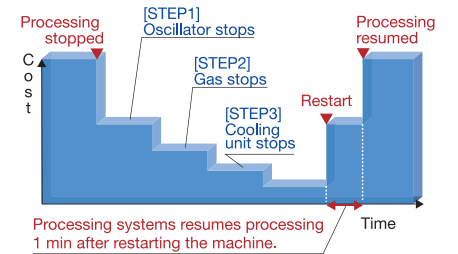


### Thin sheet processing



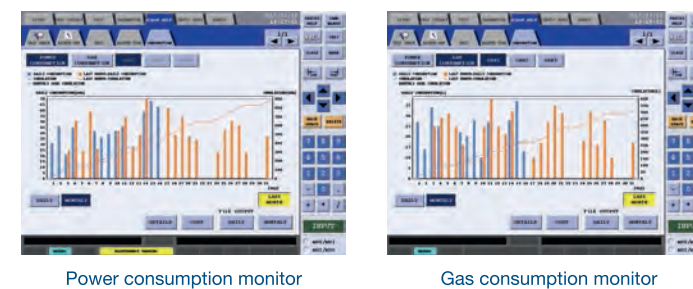
## Eco mode

Cost during standby has been reduced by up to 70% by incorporating Eco mode which automatically shuts down each operation in stages after processing stops.



\*Time required to resume operation varies depending on the equipment and usage conditions.

## Visualization



### Power/Gas consumption monitor

Power and gas consumption can be easily checked on the operating screen. Visualization supports energy savings.



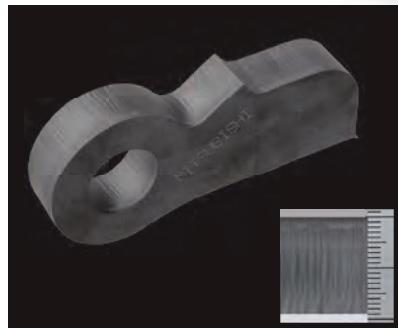
# Processing performance

Processing movies can be viewed.

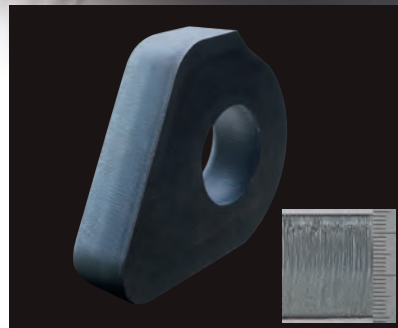


**Thin sheet** Material/Thickness: Stainless steel (SUS304) t0.8mm

## Thick plate

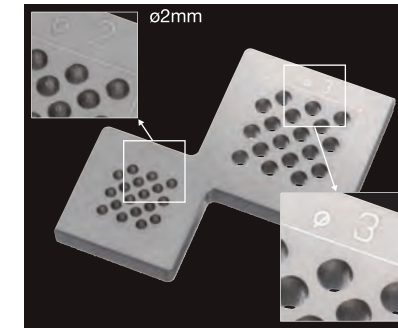


Material/Thickness:  
Mild steel (SS400) t19mm



Material/Thickness:  
Mild steel (SS400) t25mm  
\*When using the Thick Mild Steel  
Cutting Enhancing Function (option).

## Medium-thick plate



Material/Thickness:  
Stainless steel (SUS304) t6mm

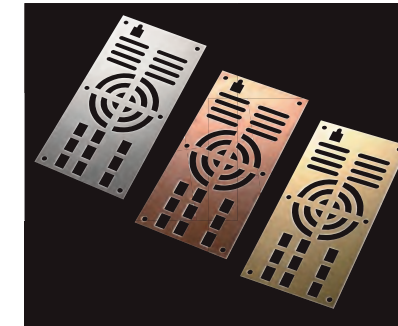


Material/Thickness:  
Mild steel (SS400) t6mm



Material/Thickness:  
Mild steel (SS400) t12mm

## Highly reflective material



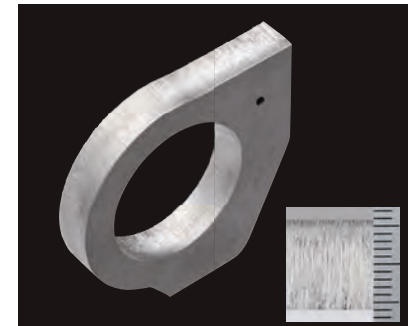
Material/Thickness:  
Stainless steel (SUS304) t1.0mm,  
Copper (C1100) t1.0mm,  
Brass (C2801) t1.0mm



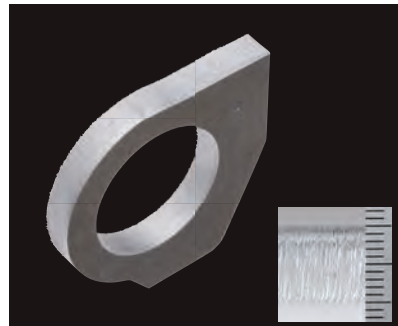
Material/Thickness:  
Brass (C2801) t5mm



Material/Thickness:  
Copper (C1100) t5mm



Material/Thickness:  
Stainless steel (SUS304) t12mm



Material/Thickness:  
Aluminum alloy (A5052) t10mm



# Options

## Processing systems



### Nozzle changer

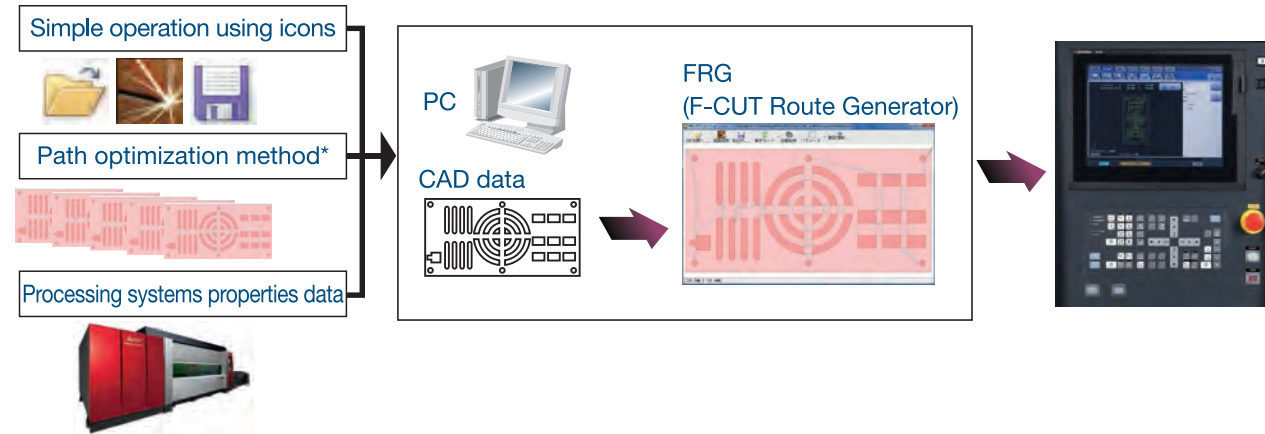
These features reduce setup time and support automation system while maximizing productivity.



### High-Peak Piercing

Reduces piercing time of mild steel with t12mm or more.

## Control unit



### Software FRG (F-CUT Route Generator)

Automatically creates the optimal NC program for F-CUT in a short time.

\*Selects the path with the shortest processing time from various processing paths.

## Options

Processing systems	eX-F40	eX-F60
Zoom head	<input type="radio"/>	Standard
Nozzle changer	<input type="radio"/>	<input type="radio"/>
Thick Mild Steel Cutting Enhancement Function	<input type="radio"/>	Standard
High-Peak Piercing	<input type="radio"/>	Standard

Control unit
Network download function
FRG(F-CUT Route Generator)

# Specifications/Layout

## Processing capability

Model	Material	Assist gas	Thickness (mm)												
			0	2	4	6	8	10	12	14	16	18	20	22	24
eX-F40	Mild steel (SS400)	Oxygen	*When using the Thick Mild Steel Cutting Enhancing Function (option).												
	Stainless steel (SUS304)	Nitrogen													
	Aluminum alloy (A5052)	Nitrogen													
	Copper (C1100)	Oxygen													
	Brass (C2801)	Nitrogen													
eX-F60	Mild steel (SS400)	Oxygen													
	Stainless steel (SUS304)	Nitrogen													
	Aluminum alloy (A5052)	Nitrogen													
	Copper (C1100)	Oxygen													
	Brass (C2801)	Nitrogen													

\*The above are processing capabilities based on special conditions. The acceptance criteria are as stated in the specifications.

\*The actual performance/quality may vary depending on the surface condition and deviation in the material composition even if materials are of the same specifications.

\*Variations in processing performance/quality may occur depending on the part geometry.

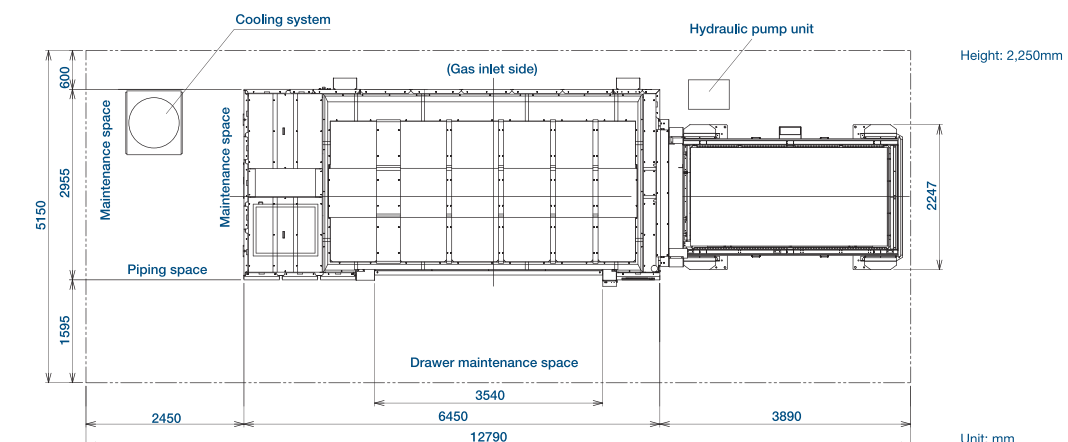
Regarding mild steel (SS400) with a thickness over t19mm, capacities listed in this catalog are based on the LS material (steel plate for laser cutting) of Chubu Steel Plate Co., Ltd.

## Specifications

Model	ML3015eX-F40	ML3015eX-F60
Drive system	Flying optic (3-axis beam movement)	
Control system	X,Y,Z simultaneous 3-axis control (Z-axis height sensing control is possible)	
<b>Processing systems</b>		
Workpiece dimensions (mm)	3,050x1,525	
Pallet load weight (kg)	950	
Workpiece support height (mm)	880	
Stroke	X-axis (mm)	3,100
	Y-axis (mm)	1,565
	Z-axis (mm)	150
Rapid feedrate XY-axis (m/min)	Max. 140 (simultaneously)	
Positioning accuracy	XY-axis (mm)	0.05/500
	Z-axis (mm)	0.1/100
Repeatability XY-axis (mm)	±0.01	
Processing head	Auto-focus preset processing head	Zoom head

Oscillator	ML3015eX-F40	ML3015eX-F60
Rated power (W)	4,000	6,000
<b>Power requirement</b>		
Processing systems (including oscillator and cooling system)	37 kVA	44 kVA
<b>Weight</b>		
Processing systems (including oscillator)	Approx. 8,900kg	
Pallet changer	Approx. 2,100kg	
Cooling system	Approx. 270 kg	

## Layout



"The cooling unit contains fluorinated greenhouse gas R410A. For further information please see the corresponding operation manual."