



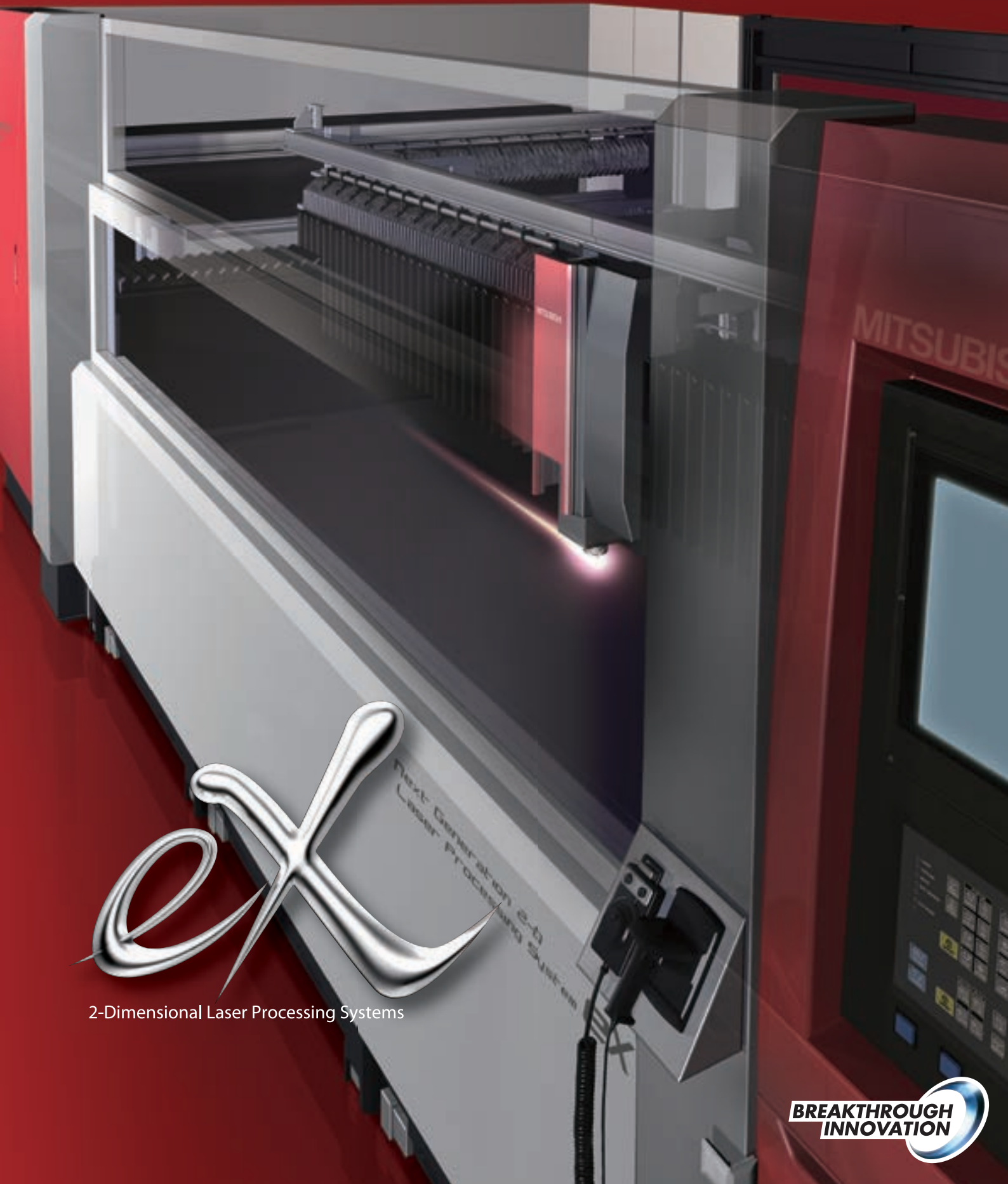
**mitsubishi
ELECTRIC**

Changes for the Better

for a greener tomorrow



CO₂ 2-Dimensional Laser Processing Systems eX Series



2-Dimensional Laser Processing Systems





The Revolutionary
 New Mitsubishi *eX* series
 High Speed Flying Optic CO₂ Laser

eX Series
 2-Dimensional Laser Processing Systems

Advanced Solution for Productivity and Environmental Requirements

The eX delivers maximum productivity and incorporates 2 Action Cutting which provides extremely simple operation. It also features an ECO mode that reduces power consumption during standby by up to 99%*. *In-house comparison

e **xcellent** [high performance]

The faster processing speed and optimized control system of the eX Series reduces thin-plate processing time by approximately 42%*. The cutting-edge piercing technology allows for about a 48% reduction* in processing time of mid-thick and thick mild steel plates. *In-house comparison

e **cology** [energy-saving]

When not processing, the system switches to ECO mode and the resonator stops idling. Minimizes energy consumption, reducing running costs by up to 99%* during standby. Quickly resumes normal operation.

Mitsubishi Electric's original resonator reduces CO₂ emissions by approximately 30% compared to standard high-speed, axial-flow resonators.

*In-house comparison

e **asy to use** [simple operation]

2 Action Cutting allows for the entire process, from job setup to parts cutting, to be completed in two simple actions. Delivers easy operation and stable performance. CAD/CAM computer, connected via network, is a great aid for operators on the shop floor.

 MITSUBISHI
ELECTRIC

ML3015eX

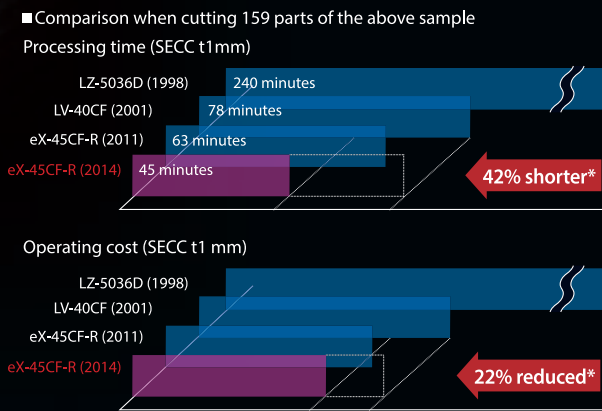
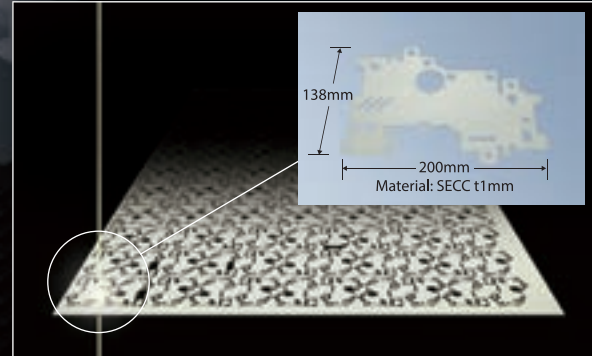


Faster Moving Axes

Increased machine tool rigidity, Helical Rack and Pinion on the X and Y axes and optimized path-control technology result in approximately 1.2 times* faster movement and 2 times* faster acceleration speeds compared to previous model. The result is amazingly short processing times. *Comparison with LV-40CF

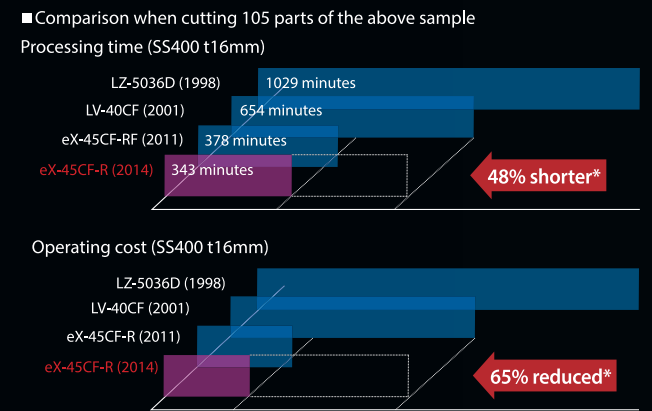
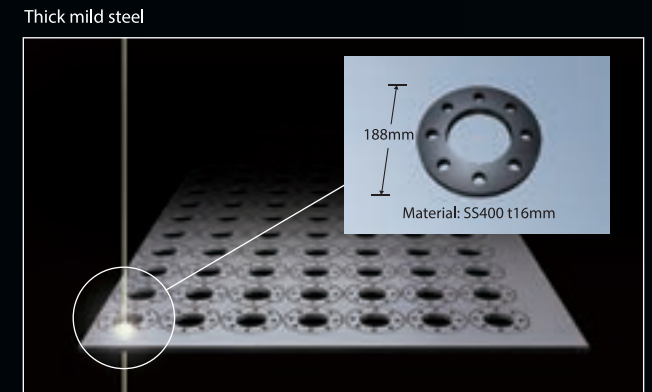
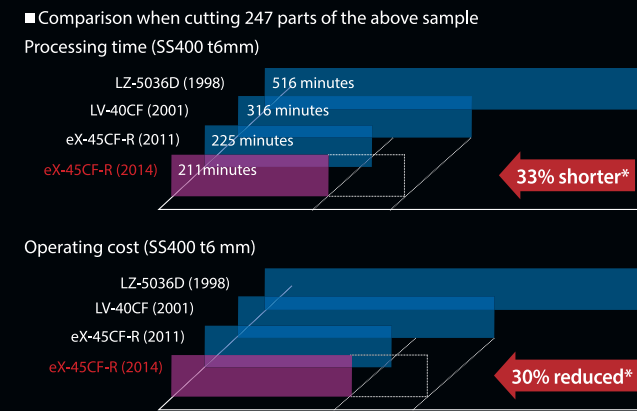
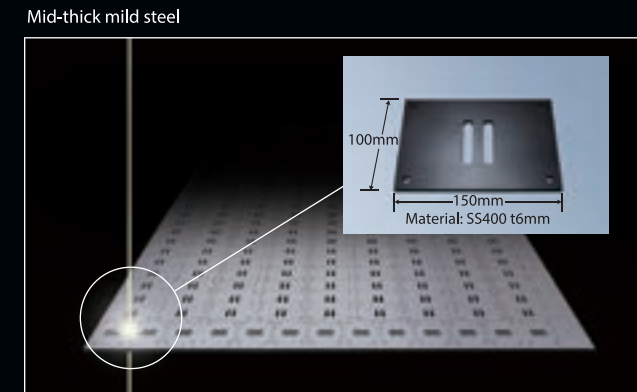
Thin-plate High-speed Cutting

Productivity has been dramatically enhanced owing to improved acceleration and the latest control technologies exclusive to Mitsubishi Electric. An example is Dross Reduction (DR) Control, which contributes to high-speed corner processing while maintaining high quality.



Mild-steel Cutting

Less time is required for piercing and changing conditions, resulting in substantially reduced operating cost and enhanced productivity when cutting medium and thick mild steel plates.

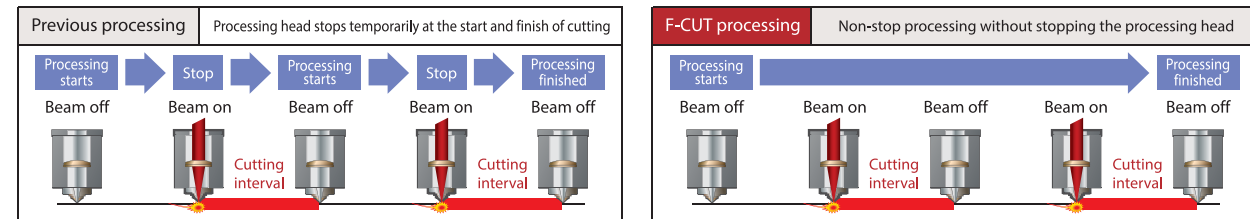


Outstanding Productivity for Thin & Thick Plates

Technologies Supporting Thin-plate High-speed Cutting

F-CUT function

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



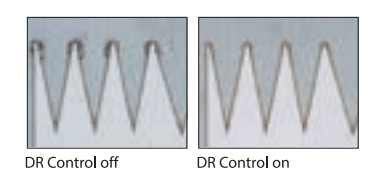
Faster Z-axis

In addition to the latest control technologies, travel in the Z-axis is 3 times faster and has twice the acceleration speed (compared to previous model), enabling shorter processing times.



Dross Reduction (DR) Control

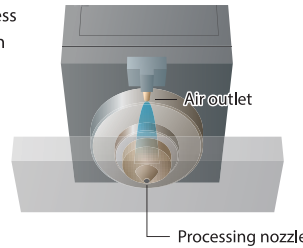
DR Control reduces dross adhesion at corners, realizing high-speed processing while maintaining high quality.



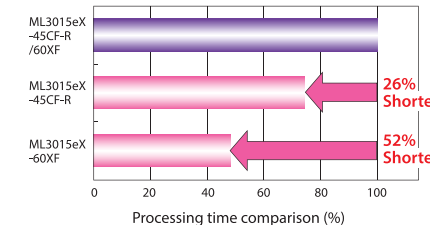
Technologies Supporting High-speed Cutting of Medium/Thick Mild-steel Plate

Blow piercing

Produces smaller piercing holes faster in mild steel up to t16mm in thickness by controlling the oxidation reaction and optimizing beam quality.



High peak piece (Option)



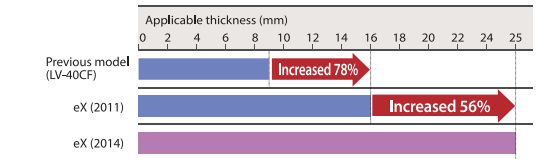
Processing Shape
Material: Thickness: Mild Steel t25mm
Assistgas: Oxygen

FAB control

FAB control is an original Mitsubishi Electric control technology that stabilizes beam characteristics and realizes a stable beam at all times.

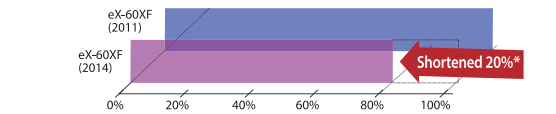


Applicable thickness of blow piercing



*For thicknesses exceeding t16mm, new blow piercing (option) is required.

Processing time



*Processing time reduction ratio when combined with new blow piercing (option).
*Time comparison when processing t16mm mild steel to a shape specified by Mitsubishi Electric with 100 being the time required by the previous model.
*Equipped in eX-45CF-R, 60XF only.

*Data in this catalog is for reference only, and may vary from actual values.

excellent
technology
[simple operation]
easy to use

Step 1
① Read barcode

Step 2
③ Press the start button

② Automatically loads onto NC

④ Automatic nozzle change and height calibration

⑤ Automatic tilt measurement
Automatically measures the tilt of the workpiece on the work table

⑥ Starts cutting

Barcode reader (handle box shown on left)

* To create instruction sheets with barcodes, a CAD/CAM software capable of producing barcodes is required.
* The F10* specifications shown in the photo are optional.
* The nozzle changer is optional.

Extremely Versatile - From Simple 2-Action Processing to Advanced Applications

Easy to Use, Even for Beginners

Simple Nesting

Allows for rectangular nesting at the laser's NC control to meet urgent needs for additional parts.

New Reset - Restart Function

If the system resets in the middle of processing, it will easily restart cutting once the cause of stoppage is eliminated. Allows the operator to check and adjust the restart position quickly and easily on the control.

Reset position
Restart position

Red: Processing complete Green: Processed incomplete

E-Processing mode

A novice-friendly operating environment can be created by hiding the advanced settings screen.

Features Designed for Experienced Operators

Pro-Processing mode

The advanced settings screen can be displayed for advanced laser applications.

Double-cut function

Allows high quality cutting of poor quality material and protected sheet metal, which often causes cutting defects, in two runs.

1st cut: Surface removal 2nd cut: Main processing

Sample using the double-cut feature

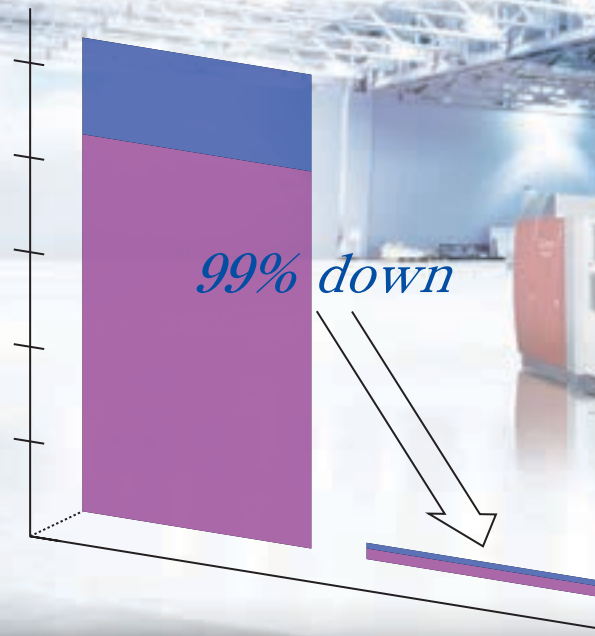
Offcut Cutting

Easily cut offcuts into several pieces by using the Offcut Cutting screen.

Offcut Cutting screen

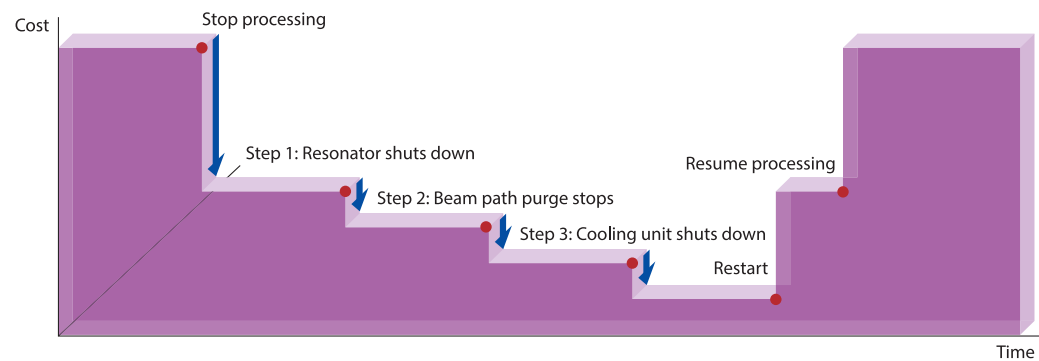
ECO mode available for increased energy savings

Costs during standby have been dramatically reduced by incorporating Mitsubishi's original just-on-time discharge method. ECO mode allows the processing machine to quickly resume operation.



Eco mode

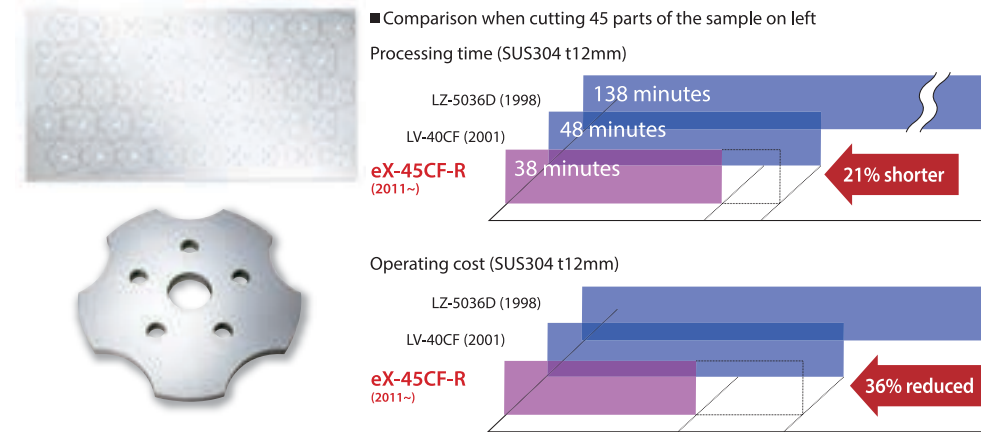
After processing, equipments automatically shut down one by one.
 Step 1: Resonator shuts down ▶ Step 2: Beam path purge stops ▶ Step 3: Cooling unit shuts down
 This process reduces costs during standby by up to 99%.
 Processing machine will resume processing in 1 to 3 minutes* after pressing the LASER key.
 *Time required for equipments to resume operation varies depending on the equipment and the conditions of use.



Energy-saving/Low Operating Cost

Reduced assist gas usage (ECO conditions)

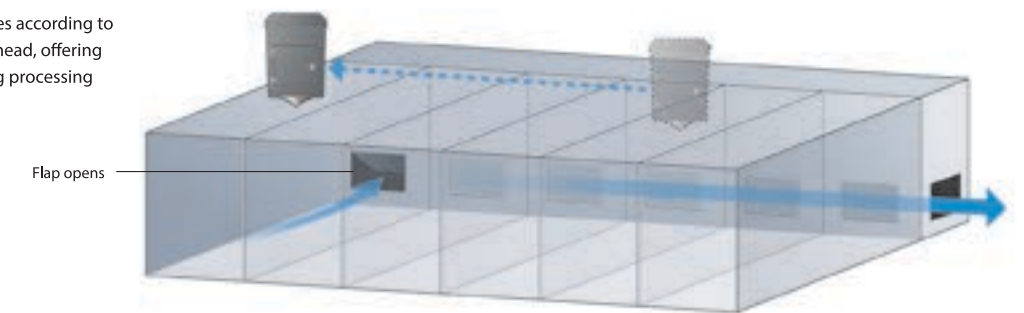
A technology that optimally controls assist-gas conditions has realized a large reduction in the consumption of nitrogen gas.



Work Environment

Partitioned dust-collection function

An automatic flap opens and closes according to the movement of the processing head, offering on-the-spot dust collection during processing



Ease of Maintenance

Self-check

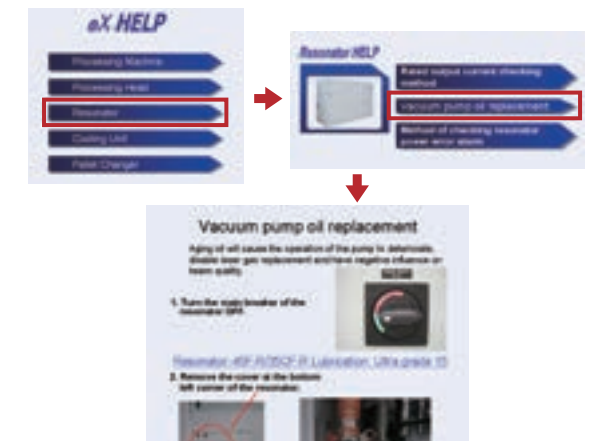
Monitors the main components on a regular basis and displays results on the screen. Supports continuous operation and preventive maintenance.



Help screen

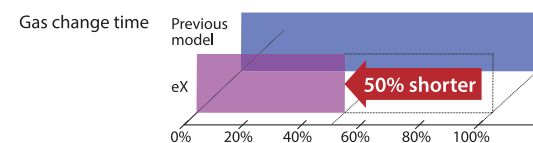
Step-by-step instructions are given with pictures and illustrations to help operators perform important tasks for each component.

E.g.: Vacuum pump oil change



Laser-gas change

Gas change time is improved by 50% over previous model.



Lower Operating and Maintenance Costs

Fusing people, environments and high-speed performance
to a highly advanced degree



eX series

Combining high productivity and low-cost operation



eX-S Edition series



Productivity-enhancing eX and superior cost performance eX-S Edition

Choice of manual pallet according
to work content and production volume



Manual pallet

Processing machine specifications

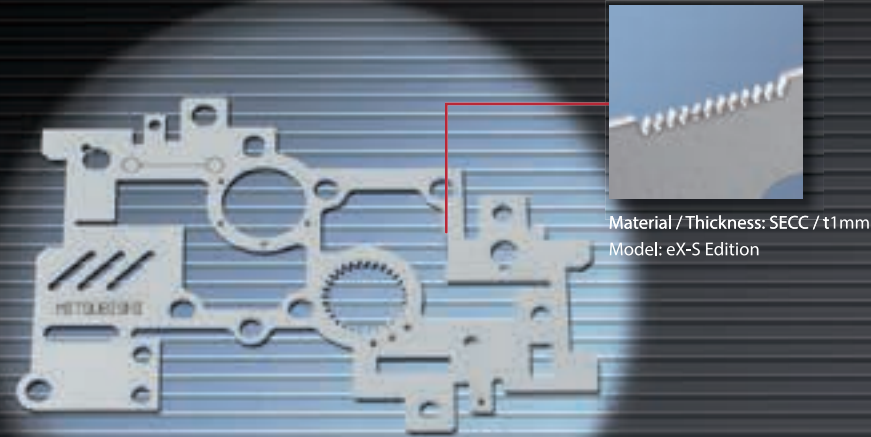
Model name		ML3015eX-S Edition (M) (manual pallet)		
Drive system		Flying optic (3-axis beam movement)		
Control system		X-Y-Z simultaneous 3-axes (Z-axis height control is also possible)		
Dimensions and Performance	Target workpiece dimensions (mm)		3,050×1,525	
	Max. workpiece weight (kg)		950	
	Table pass height (mm)		880	
	Stroke	X axis (mm)		3,100
		Y axis (mm)		1,565
		Z axis (mm)		150
	Speed	Rapid travel speed	X, Y axis (m/min)	Max. 100
			Z axis (m/min)	Max. 65
		Maximum processing feedrate (m/min)		50
	Accuracy	Positioning accuracy	X, Y axis (mm)	0.05/500
Z axis (mm)			0.1/100	
Repeatability (mm)		±0.01		
Processing head		Auto-focus preset		
Compatible oscillator		ML32XP		
Power consumption of entire system (kW) ※		36		
Exterior	Exterior dimensions (W×D×H) (mm)		9,943×3,134×1,954	
	Weight (kg)	Total system	Approx. 9,600	
		Pallet changer	—	

※ including dust collector, controller, resonator, and cooling system, depending on the machining program.

Cutting performance

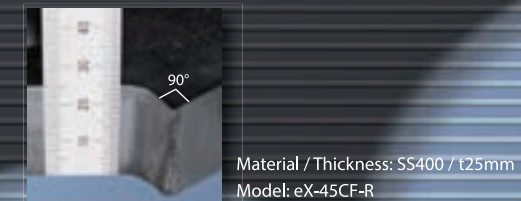
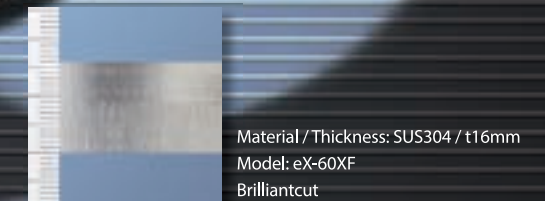
Greater Flexibility Increases Cutting Capabilities

Thin plate



Material / Thickness: SUS304 / t9mm
Model: eX-45CF-R

Thick plate



Mid-thick plate



* 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), capacities listed in this catalog are based on LS material (steel plate for laser cutting) of Chubu Steel Plate Co., Ltd.
 * Optional features may have been used in the above cut samples.

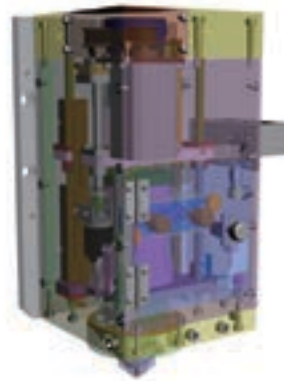
Key Technologies Ensuring High Stability and High Productivity

Mitsubishi Electric's cutting-edge technologies provide ultimate stability to ensure non-stop operation, realizing higher productivity and ease of maintenance.

Auto Focus Preset Head

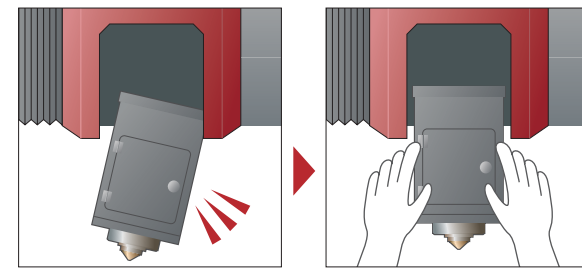
Automatically controls the focus according to the given NC command. Lens movement is five times faster*, realizing reduced piercing and processing times.

* Compared to previous model.



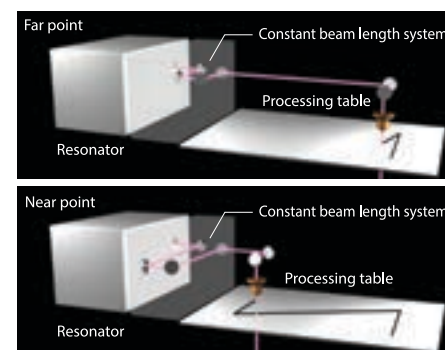
Magnetic Damage Reduction Function (Option)

Incorporates a magnetic part to hold the processing head in position which allows recovery in less than 1 minute after collision.



Constant Beam Length System

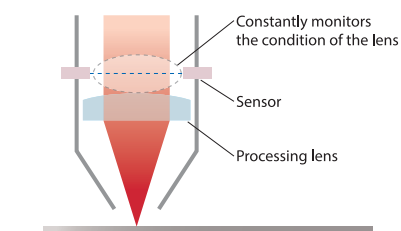
Maintains consistent beam quality by fixing the system's beam path length regardless of the position of the processing head. Provides stable and superior cut quality.



Processing Lens Monitor*

Monitors the condition of the processing lens at all times, contributing to stable performance.

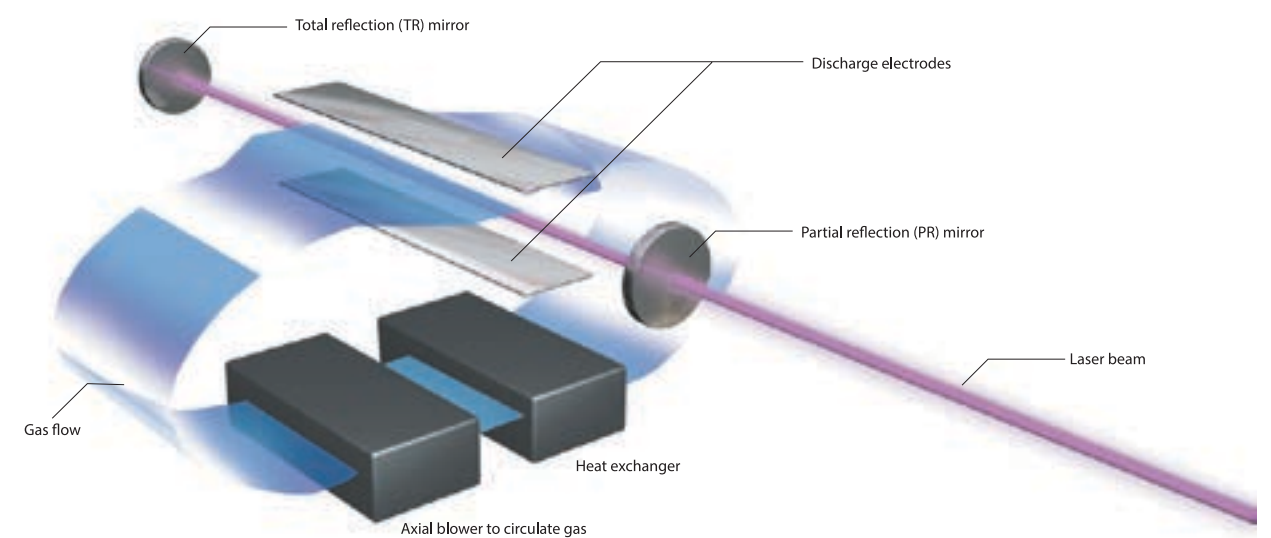
* Not available to 35CF-R



* Only for eX-45CF-R, eX-60XF

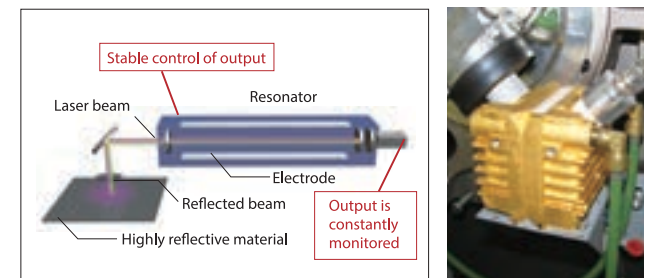
Unique Technologies Supporting Highly Reliable Processing

Mitsubishi Electric's resonator series realizes further enhancements in performance and stability, and incorporates original technologies that ensure high reliability.



High-speed power sensor

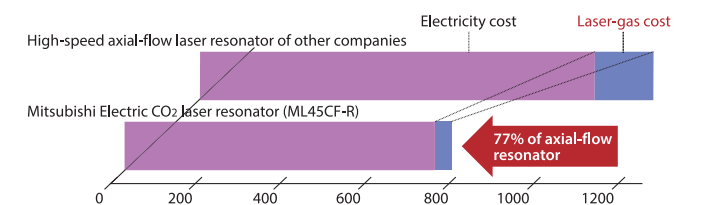
Mitsubishi's high-speed power sensor, which comes standard on the eX, monitors the laser output in real time. Maintains an output true to the desired setting with a power variation less than $\pm 1\%$. Allows processing of highly reflective materials such as aluminum and copper.



Patent No. 1836228
Kokoku
(examined patent publication)
No. 4-56479

Gas-sealed resonator

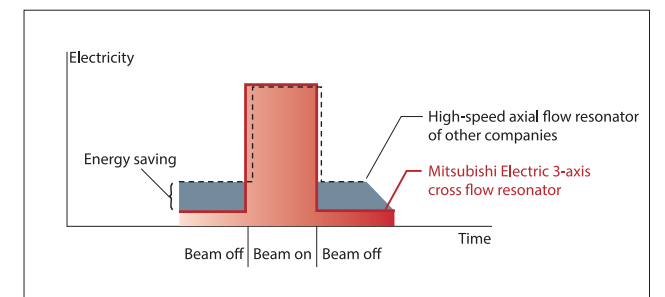
The seal-off operation reduces gas consumption to only about four gas cylinders per year (operating 250 days per year). Allows 24 beam on hours at rated power between gas changes. Significantly reduces operating cost and eliminates the need to change gas cylinders on a frequent basis.



* Comparison when processing a t6mm mild steel at a 50% operating ratio (resonator only, does not include processing machine)

Just-On-Time discharge method

The Just-on-time discharge method significantly reduces power consumption when the beam is turned off.



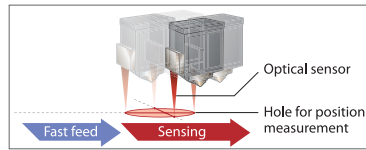
NC turn table

Used for cutting tubes. Through combination with a tube support, long tubes can also be processed.



High-precision positioning function

Use of an optical sensor to measure the hole position, which acts as a benchmark, enables multi-task processing with a punch press.



f254mm (f10") lens cartridge

Improves the processing capability when cutting stainless steel with nitrogen.



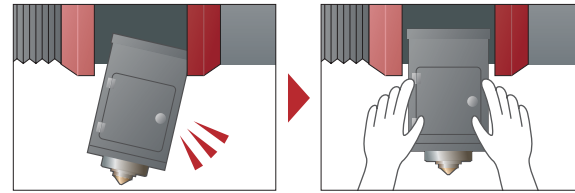
Optional Features

Options	ML3015eX		
	ML60XF	ML45CF-R	S Edition
F127mm (F5") Lens Cartridge	Standard	Standard	○
F254mm (F10") Lens Cartridge	Standard	○	○
Oil Spray	○	○	—
High Peak Piercing	○	○	—
Magnetic Damage Reduction	Standard	Standard	—
Automatic Nozzle Changer	○	○	—
NC Turn Table	○	○	—
Lifting Type Pipe Holder	○	○	—
Pipe Holder	○	○	—
High Accuracy Positioning Function	○	○	—
Barcode Reader	Standard	Standard	○
Control unit	Network Download	○	—

○: Available —: Not Available

Magnetic damage reduction function

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



Automation pack

This combined package includes the magnetic damage reduction and a nozzle changer, realizing shorter setup times and higher productivity.

Magnetic Damage Reduction Mechanism

Nozzle Changer

These features reduce setup time and allow automated high-mix, low volume production, while maximizing productivity.



Cutting Capability

Resonator	Material	Assist gas	Thickness (mm)												
			0	2	4	6	8	10	12	14	16	18	20	22	24
ML60XF	Mild steel (SS400)	Oxygen	[Graph showing cutting capability for Mild steel (SS400) with Oxygen]												
	Stainless steel (SUS304)	Nitrogen	[Graph showing cutting capability for Stainless steel (SUS304) with Nitrogen]												
	Aluminum alloy (A5052)	Air	[Graph showing cutting capability for Aluminum alloy (A5052) with Air]												
ML45CF-R	Mild steel (SS400)	Oxygen	[Graph showing cutting capability for Mild steel (SS400) with Oxygen]												
	Stainless steel (SUS304)	Nitrogen	[Graph showing cutting capability for Stainless steel (SUS304) with Nitrogen]												
	Aluminum alloy (A5052)	Air	[Graph showing cutting capability for Aluminum alloy (A5052) with Air]												
ML32XP (eX-S Edition)	Mild steel (SS400)	Oxygen	[Graph showing cutting capability for Mild steel (SS400) with Oxygen]												
	Stainless steel (SUS304)	High pressure nitrogen	[Graph showing cutting capability for Stainless steel (SUS304) with High pressure nitrogen]												
	Aluminum alloy (A5052)	Nitrogen	[Graph showing cutting capability for Aluminum alloy (A5052) with 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 LS material (steel plate for laser cutting) of Chubu Steel Plate Co., Ltd.

※ Optional

Processing Machine Specifications

Model name	ML3015eX-45CF-R	ML3015eX-60XF	ML3015eX-S Edition	
Drive system	Flying optic (3-axis beam movement)			
Control system	X-Y-Z simultaneous 3-axes (Z-axis height control is also possible)			
Dimensions and Performance	Target workpiece dimensions (mm)	3,050x1,525		
	Max. workpiece weight (kg)	950		
	Table pass height (mm)	880		
	Stroke	X-axis (mm)	3,100	
		Y-axis (mm)	1,565	
		Z-axis (mm)	150	
	Speed	Rapid travel speed	XY-axis (m/min)	Max. 100
			Z-axis (m/min)	Max. 65
		Maximum processing feedrate (m/min)	50	
	Accuracy	Positioning accuracy	XY-axis (mm)	0.05/500
Z-axis (mm)		0.1/100		
Repeatability (mm)	±0.01			
Processing head	Auto-focus preset			
Power consumption of entire system (kW) ※	58	85	36	
Weight (kg)	Machine	Approx. 10,600	Approx. 10,600	
	Pallet changer		Approx. 2,100	

※ including dust collector, controller, resonator, and cooling system, depending on the machining program.

Cooling System Specifications

Model name	ML45CF-R	ML60XF	ML32XP
Applicable resonator	45CF-R	60XF	32XP
Cooling method	Air		
External dimensions (mm)	2,000 x 1,500 x 2,055		1,500 x 1,000 x 2,055
Weight (kg)	Approx. 1,040	Approx. 1,240	Approx. 625

Control System Specifications

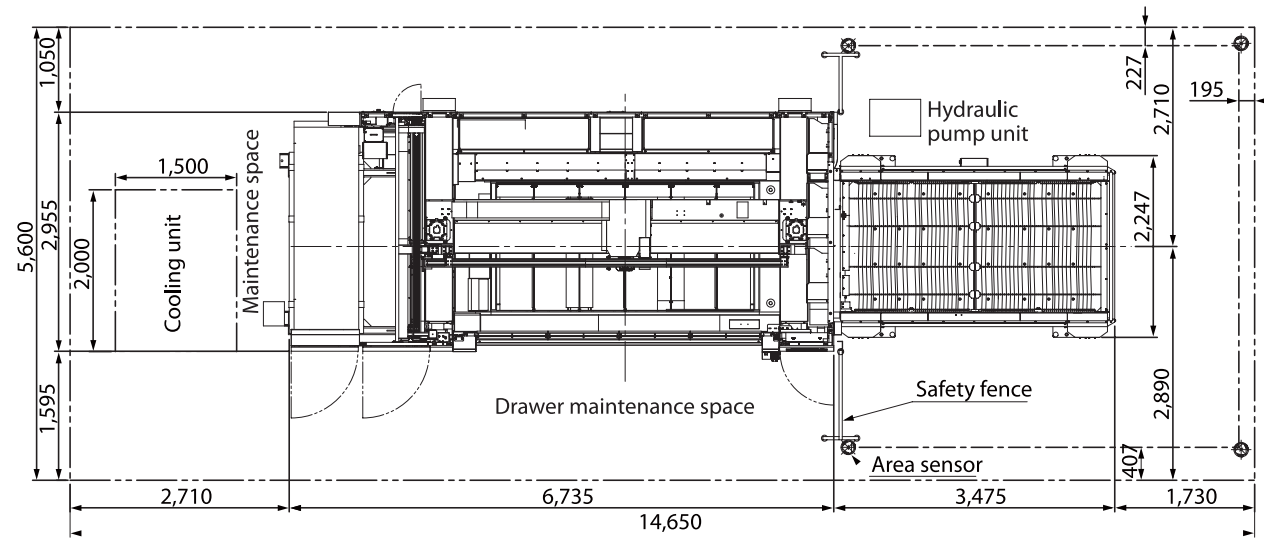
Model name	LC30BX
Display screen	15" TFT (touch panel)
Hard disk (GB)	20
Program input method	Screen creation, USB (ver. 2.0), Ethernet
Operation method	Memory operation, HD direct operation

Resonator Specifications

Model name	ML45CF-R	ML60XF	ML32XP
Excitation method	3-axis SD excitation cross flow resonator		
Laser output characteristics	Pulse peak output (W)	5,000	7,000
	Rated output (W)	4,500	6,000
	Beam mode	Lower order (TEM ₀₁ *main component)	
	Power stability (%)	±1 or less during power control (relative to rated output)	
Output power adjustable range (%)	0~100		
Laser gas composition	CO ₂ :CO:N ₂ :He=8:4:60:28		
Laser gas consumption (L/hr)	Approx. 3		Approx. 1
Weight (kg)	Approx. 2,200	Approx. 2,250	Approx. 1,200
Standard features	Beam shutter, Visible laser, High-speed power sensor		

- ML3015eX-45CF-R
- ML3015eX-60XF

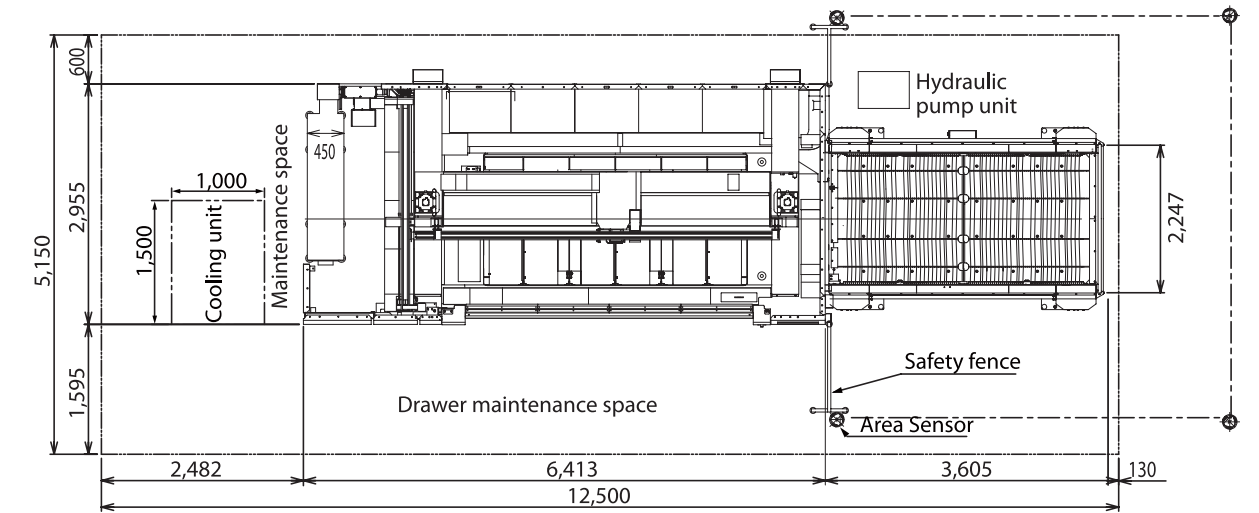
Unit: mm



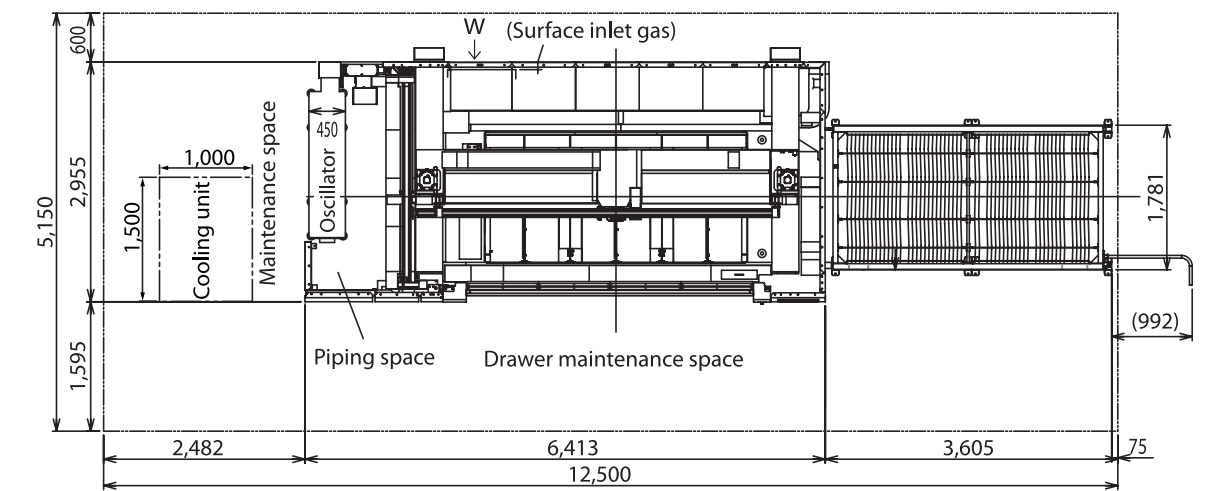
* Maximum height: 2,580 mm (45CF-R), 2,660 mm (60FX)

- ML3015eX-S Edition

Unit: mm



- ML3015eX-S Edition (M)



* Maximum height: 2,260mm (45CF-R), 2,410mm (60XF), 1,954mm (S Edition)
* Please contact a Mitsubishi Electric representative regarding installation space for the cooling unit.

PLC | MELSEC-Q Series Universal Model



Introducing the high-speed QCPU (QnUDVCPU) for faster processing of large data volumes.

- ◎Realize high-speed, high-accuracy machine control with various iQ Platform compatible controllers and multiple CPUs.
- ◎Easily connect to GOTs and Programming tools using built-in Ethernet port.
- ◎25 models from 10 k step small capacity to 1000 k step large capacity, are available.
- ◎Seamless communication and flexible integration at any network level.

Product Specifications

Program capacity	10k steps to 1000k steps
Number of I/O points [X/Y], number of I/O device points [X/Y]	256 points to 4096 points/8192 points
Basic instruction processing speed (LD instruction)	120ns to 1.9ns
External connection interface	USB (all models equipped), Ethernet, RS-232, memory card, extended SRAM cassette
Function module	I/O, analog, high-speed counter, positioning, simple motion, temperature input, temperature control, network module
Module extension style	Building block type
Network	Ethernet, CC-Link IE controller network, CC-Link IE field network, CC-Link, CC-Link/LT, MELSECNET/H, SSCNET III (H), AnyWire, RS-232, RS-422

AC Servo | Mitsubishi General-Purpose AC Servo MELSERVO-J4 Series



Industry-leading level of high performance servo

- ◎Industry-leading level of basic performance: Speed frequency response (2.5kHz), 4,000,000 (4,194,304p/rev) encoder
- ◎Advanced one-touch tuning function achieves the one-touch adjustment of advanced vibration suppression control II, etc.
- ◎Equipped with large capacity drive recorder and machine diagnosis function for easy maintenance.
- ◎2-axis and 3-axis servo amplifiers are available for energy-conservative, space-saving, and low-cost machines.

Product Specifications

Power supply specifications	1-phase/3-phase 200V AC, 3-phase 400V AC
Command interface	SSCNET III/H, SSCNET III (compatible in J3 compatibility mode), CC-Link IE Field Network interface with Motion, pulse train, analog
Control mode	Position/Speed/Torque/Fully closed loop
Speed frequency response	2.5kHz
Tuning function	Advanced one-touch tuning, advanced vibration suppression control II, robust filter, etc. STO, SS1
Safety function	SS2, SOS, SLS, SBC, SSM (compatible when combined with motion controller)
Compatible servo motor	Rotary servo motor (rated output: 0.05 to 22kW), linear servo motor (continuous thrust 50 to 3000N), direct drive motor (rated torque: 2 to 240N-m)

CNC | Mitsubishi CNC M700V Series



High-grade model equipped with advanced complete nano control

- ◎Achieve complete nano control with the latest RISC-CPU and high-speed optical servo network.
- ◎Realize super-high grade processing by combining the complete nano control, state-of-the-art SSS control and OMR control, etc.
- ◎Display of essential information of grouped on three screens to greatly reduce processing setup time with easy operability.
- ◎The M700VW Series with WindowsXPe and M700VS Series with integrated control unit and display type are available.

Product Specifications

Maximum number of control axes (NC axes + spindles + PLC axes)	16 axes (M720VW/M720VS have 12 axes)
Maximum number of part systems	Machining center system: 2 systems Lathe system: 4 systems
Least command increment	1nm (M720VW/M720VS 0.1μm)
Least control increment	1nm
Maximum program capacity	2,000kB(5,120m)
Maximum PLC program capacity	128,000 steps
Main functions (for machining center)	Simultaneous 5-axis machining, SSS control, high-speed high-accuracy control, tool nose point control, tilt plane machining, etc.
Main functions (for lathe)	Milling interpolation, 2-system simultaneous thread cutting, inter-system control axis synchronization, control axis superimposition, combination control, etc.

HMI | Graphic Operation Terminal GOT2000 Series GT27 Model



To the top of HMIs with further user-friendly, satisfactory standard features.

- ◎Comfortable screen operation even if high-load processing (e.g. logging, device data transfer) is running. (Monitoring performance is twice faster than GT16)
- ◎Actual usable space without using an SD card is expanded to 128MB for more flexible screen design.
- ◎Multi-touch features, two-point press, and scroll operations for more user-friendliness.
- ◎Outline font and PNG images for clear, beautiful screen display.

Product Specifications

Screen size	12.1", 10.4", 8.4" (15" coming soon)
Resolution	SVGA, VGA (XGA coming soon)
Intensity adjustment	32-step adjustment
Touch panel type	Analog resistive film
Built-in interface	RS-232, RS-422/485, Ethernet, USB, SD card
Applicable software	GT Works3
Input power supply voltage	100 to 240VAC (+10%, -15%), 24VDC (+25%, -20%)

EDM | Wire EDM MV1200R



Next-generation Innovations of our best selling Performance Machine.

- ◎Total running cost reduced up to 42%, which is accounted for 90% by filter, ion exchange resin and power consumption.
- ◎Improved productivity by an innovative automatic wire threading.
- ◎Faster machining is realized with improved power-supply performance. (Rz3.5μm/Ra0.45μm with 3cuts) (Rz2.0μm/Ra0.28μm with 4cuts)

Product Specifications

Model	MV1200R
Machining travel (X×Y×Z)[mm]	(in) 400(15.7)×300(11.8)×220(8.7)(XY axis OPT-drive specifications)
Machining travel (U×V)[mm]	(in) ±60(2.4)×±60(2.4)(OPT-drive specifications)
Max. taper angle [°]	15° (maximum 200mm)(7.9°)
Max. workpiece dimensions [mm]	(in) 810(31.9)×700(27.6)×215(8.5)
Wire diameter [mm]	(in) 0.1(.004) to 0.3(.012) ^{□1}
Dielectric fluid	Water
Footprint (W×D)[mm]	(in) 2,025(79.7)×2,760(108.7)

□1: □0.2(0.08) DD guides and □1.5(0.06) jet nozzle are standard equipment.

Robot | MELFA F Series



High speed, high precision and high reliability industrial robot

- ◎Compact body and slim arm design, allowing operating area to be expanded and load capacity increased.
- ◎The fastest in its class using high performance motors and unique driver control technology.
- ◎Improved flexibility for robot layout design considerations.
- ◎Optimal motor control tuning set automatically based on operating position, posture, and load conditions.

Product Specifications

Degrees of freedom	Vertical:6 Horizontal:4
Installation	Vertical:Floor-mount, ceiling mount, wall mount (Range of motion for J1 is limited) Horizontal:Floor-mount
Maximum load capacity	Vertical:2-20kg Horizontal:3-20kg
Maximum reach radius	Vertical:504-1,503mm Horizontal:350-1,000mm



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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