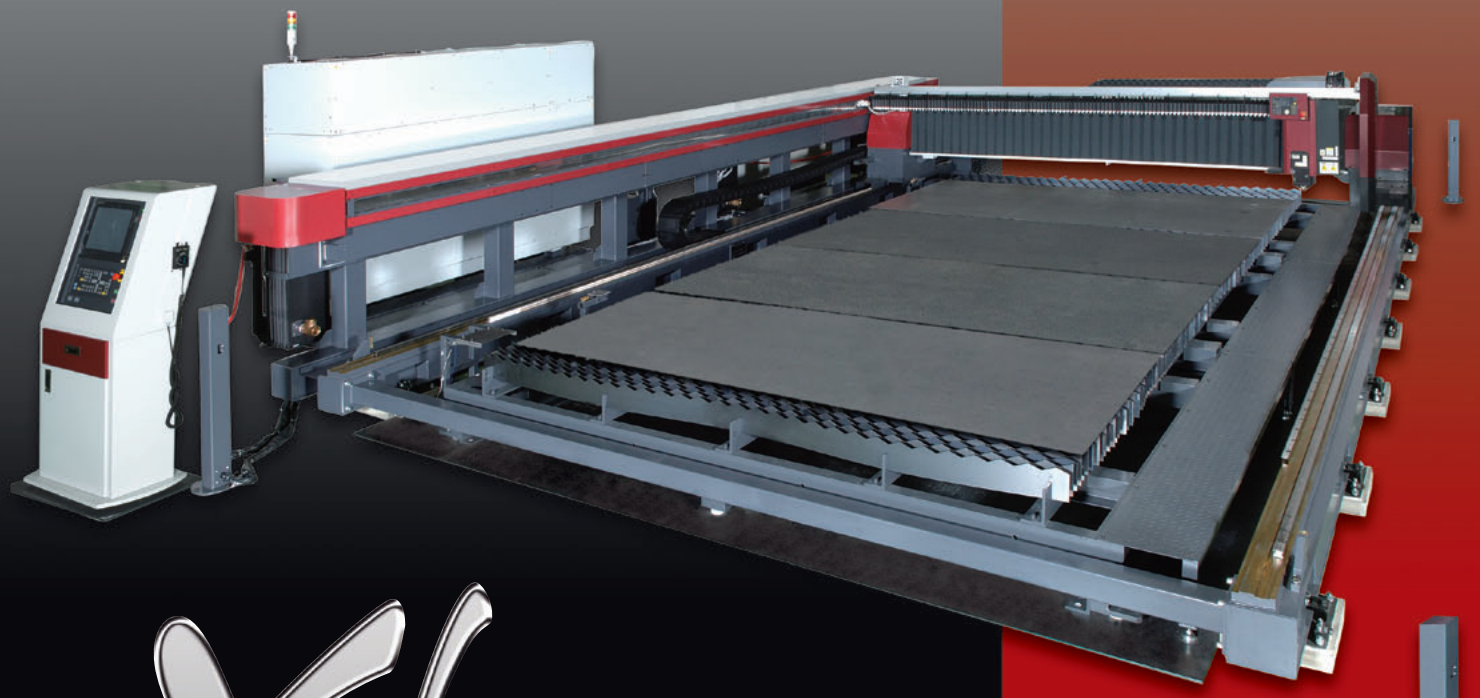
MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow eco Changes

Large-size CO_2 Laser Processing Machine
XL Series



XL Series

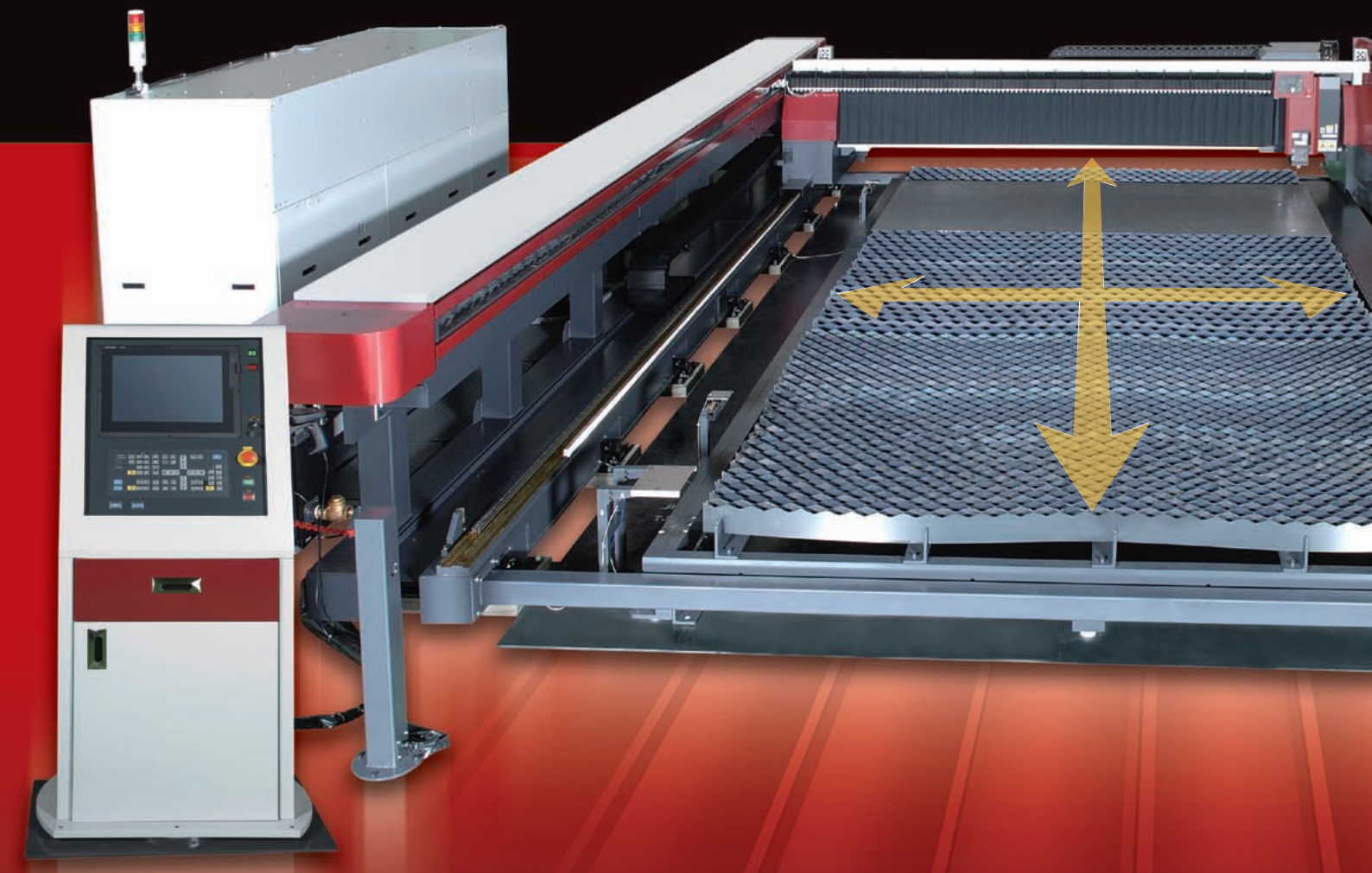
Large size laser processing machine

BREAKTHROUGH INNOVATION

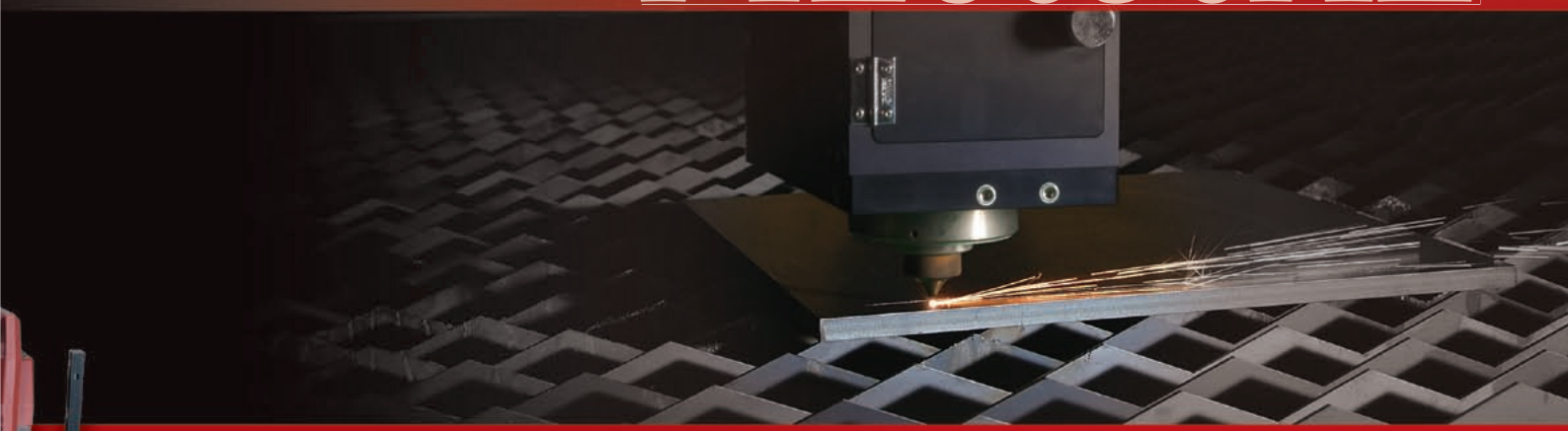
Bigger Processing Area, High Precision Maintained

Providing the Essential Elements Required in Laser Processing

In laser processing, the bottom line is simultaneously ensuring high productivity and high performance. Mitsubishi Electric's ML6030XL achieves this through its large-scale processing capabilities, while maintaining performance comparable to that of general-purpose, high-speed laser processing machines. From diverse applications to high-speed, highly precise processing, the ML6030XL is the comprehensive solution.



ML6030XL



Wide Stroke 6,600×3,200mm

<Applicable workpiece size: 6,100 × 3,050mm>

- ◇ Processing performance beyond expectations
  (High speed, high precision and support for an extended range of workpiece thicknesses)
- ◇ Long strokes improve productivity
- ◇ Excellent operability

Wider Stroke for Diverse Application Needs

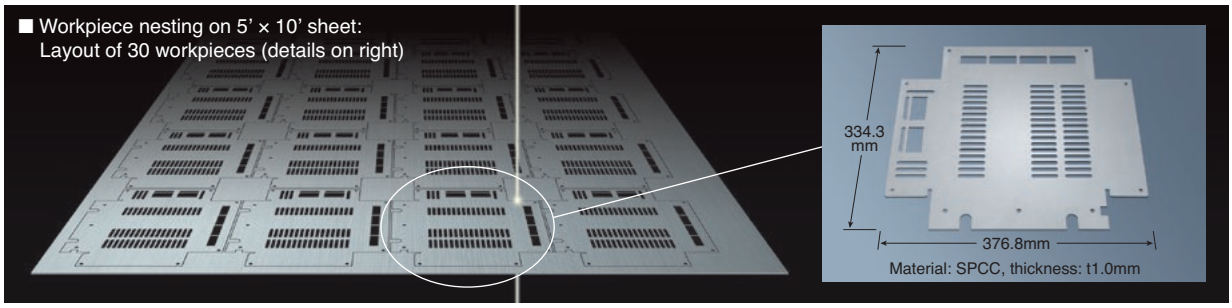
The 6,660 × 3,200mm (X × Y) wide stroke of the ML6030XL makes it possible to:

1. Cut out large workpieces from large sheets (e.g., 6,100 × 2,100mm sheets)
2. Cut out small workpieces from large sheets with high productivity (e.g., 6,100 × 2,100mm sheets)
3. Process four 5 × 10 workpieces on the worktable in a single setup

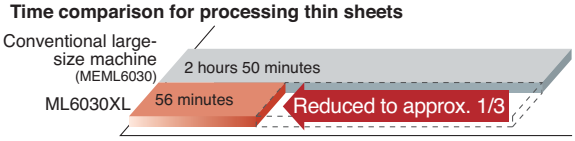
High-speed, High-precision Processing Beyond Expectations

For high-speed processing of thin sheets

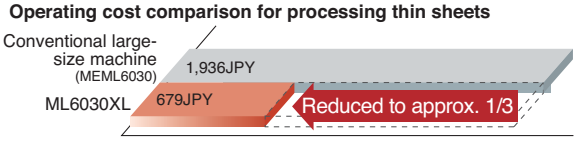
High-speed cutting with feedrates up to 50m/min (65m/min for Z axis) and the latest control technology are combined to achieve a dramatic improvement in productivity. In addition, Dross Reduction (DR) Control contributes to high-quality corner processing at high speed.



Time comparison for processing thin sheets



Operating cost comparison for processing thin sheets



Assumptions for simulation

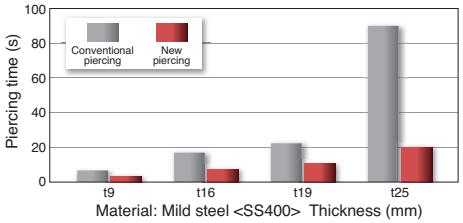
Electricity cost	Laser gas cost	Assist gas cost (O_2)
20JPY/kwh	8.94JPY/ℓ	0.13JPY/ℓ

Technologies Supporting High-speed Processing and High Productivity

New piercing systems significantly reduce piercing time

Using a new piercing system incorporating beat piercing and blow piercing, Mitsubishi Electric's laser generator achieves high-speed response and boasts a processing parameter step control that optimizes heat input. As a result, the time required for piercing thick mild-steel plates is reduced 50 to 70%* compared to our conventional models.

* Reduced processing time varies depending on materials and processing machine conditions.

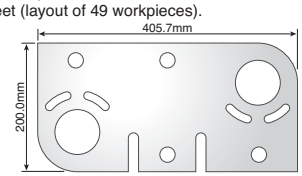


New-model nozzle significantly speeds up processing

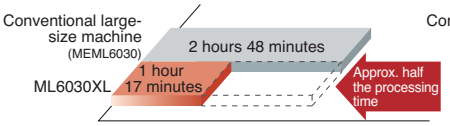
The combination of high-speed cutting technology using a small-diameter nozzle and development of a new piercing method improves productivity for processing medium to thick sheets of mild steel, and significantly reduces operating costs compared to conventional processing machines.

Processing example

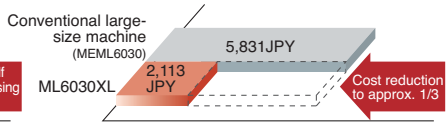
Processing time and operating costs when nesting the workpiece shown below on a 5' × 10' × t9 SS400 sheet (layout of 49 workpieces).



Processing time



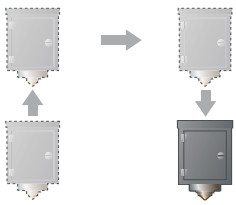
Operating costs



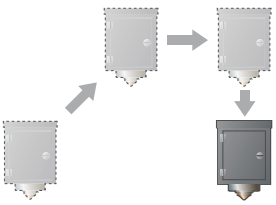
New emulation system (circular arc emulation) reduces the rapid traverse time

The evacuation method can be chosen according to the material and sheet thickness. Processing time and stability can be considered when selecting the optimal method.

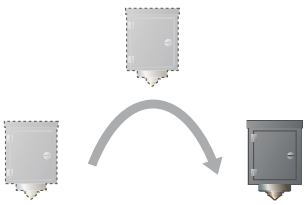
Conventional emulation



High-speed emulation



Circular arc emulation



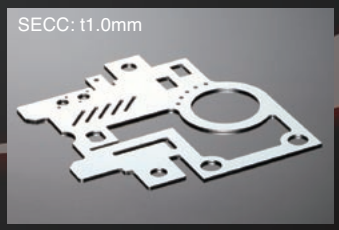
Workpiece Samples

Support for processing of various materials and thicknesses

Non-ferrous materials

SUS

Steel

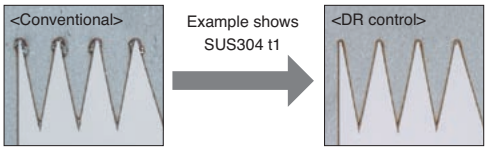


Coverage of conventional large-size machines

Technologies Supporting High-Precision Processing

Dross reduction (DR) control

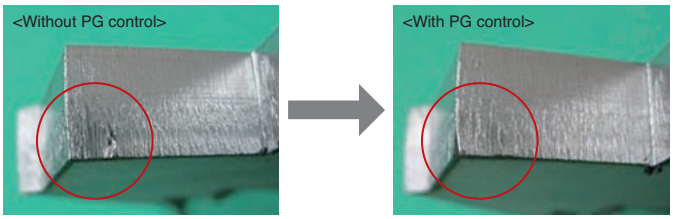
During acceleration and deceleration at corners, dross control detects and controls power output in accordance with the changes in speed. This reduces any adverse thermal effects with respect to the back of the sheet or at the end of processing. In addition, the dross when processing stainless steel or zinc-plated sheets is reduced, which means less time is required for finishing after cutting is complete.



Plasma guard (PG) control improves edge quality

Optimum control of the power output, frequency and load after cornering prevents the kerf from being roughed up immediately after a corner when cutting thick stainless-steel sheets.

Example shows SUS304 t10



High-quality processing of small holes

Rectangular pulses suppress any adverse thermal effect, enabling very high-quality processing of small holes and edges. The optimized processing nozzles improve process gas shielding and kerf smoothness.

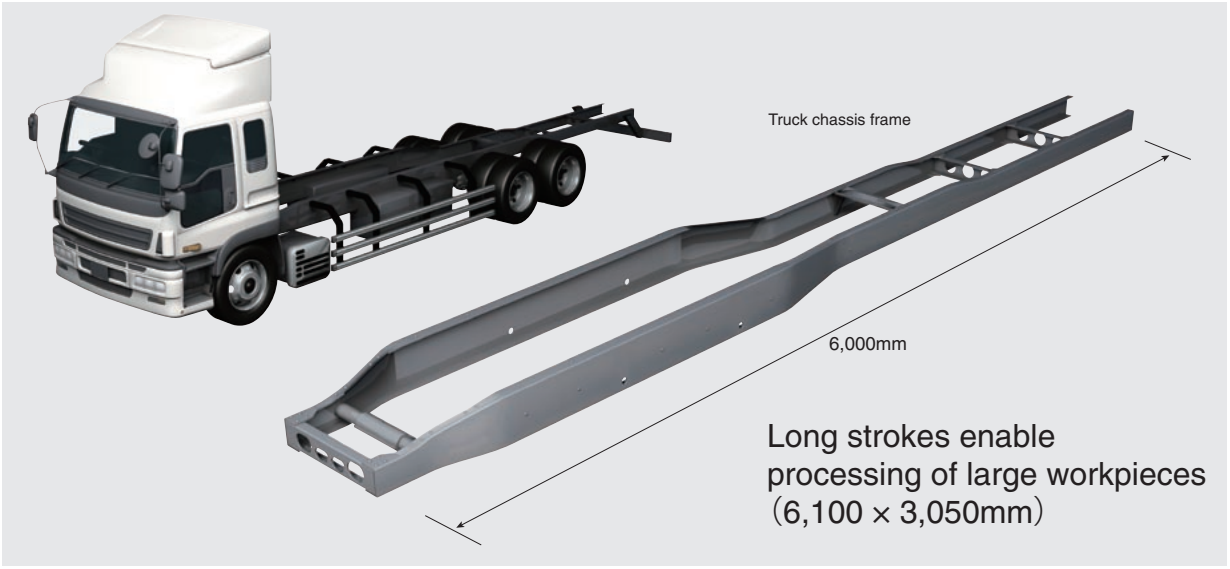
Example shows SS400 t9

Excellent Economic Performance

Improved processing efficiency cuts costs

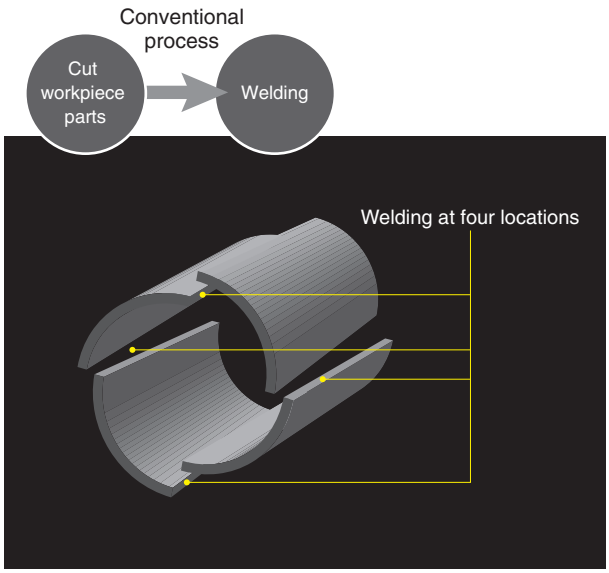
Case 1 Truck chassis frames

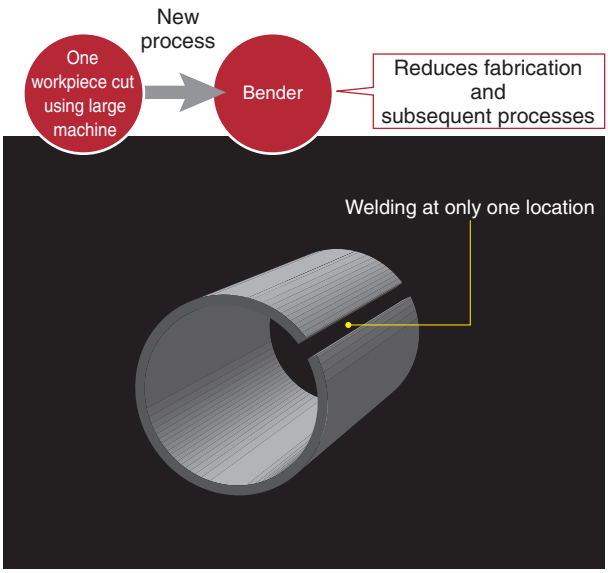
The ML6030XL large-size laser processing machine makes it possible to cut out the chassis frames of trucks as one piece rather than several pieces.
This eliminates the number of fabrication and bending processes and reduces the production cost.



Case 2 Reduces time and labor in fabrication processes

The ability to cut single, large workpieces eliminates welding processes that were previously necessary to join small parts.
This contributes significantly to cost reduction.

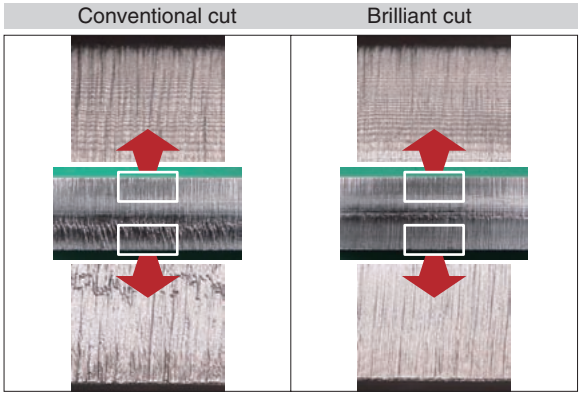




Reduces subsequent processes

Brilliant cut stainless steel for high-quality cut surfaces

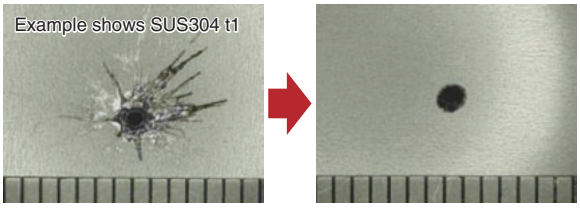
Use of the rectangular pulse control, optimized optical path design and dedicated laser beam nozzles realize processing parameters that significantly improve stainless-steel cut surfaces.



Considerably improves the cut-surface roughness when processing thinner sheets.
<Example shows SUS304 t10>

Fine piercing reduces spatters

Using an interfacial active agent coating, fine piercing reduces the piercing spatters that particularly tend to occur when cutting stainless steel with nitrogen. The small-diameter laser nozzle also offers high quality in processing small holes.
Rinsing with water is all that is needed for removal.



<Conventional piercing>
Spatters present in 4-mm square around the hole.

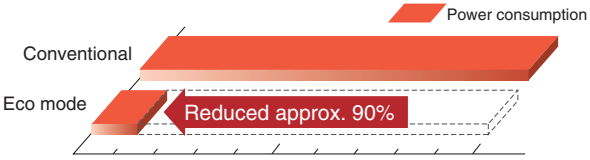
<Fine piercing>
No spatters are present around the pierced hole (rinsed off with water after laser processing).

Eco mode

The machine switches to eco mode when not processing. This reduces operating costs during standby up to 90%* while still ensuring a quick return to operation mode.
Mitsubishi Electric's laser generators can reduce CO_2 emissions by approximately 30% compared to general high-speed axial flow models.

*Compared with our conventional model.

Example of operating cost reduction in eco mode



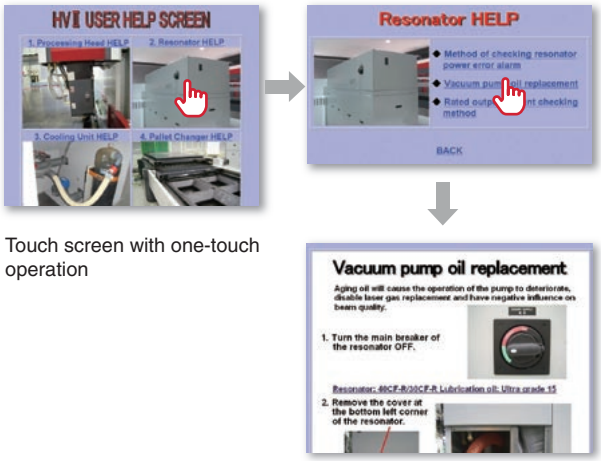
Improves productivity/efficiency even further

Attaching the pallet changer improves productivity and efficiency to the maximum.

Excellent Operability and Safety

Work Help Screen

The main tasks of each component are explained using photos and diagrams.



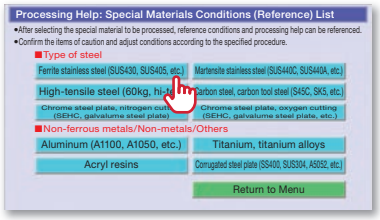
Touch screen with one-touch operation

Self-check function

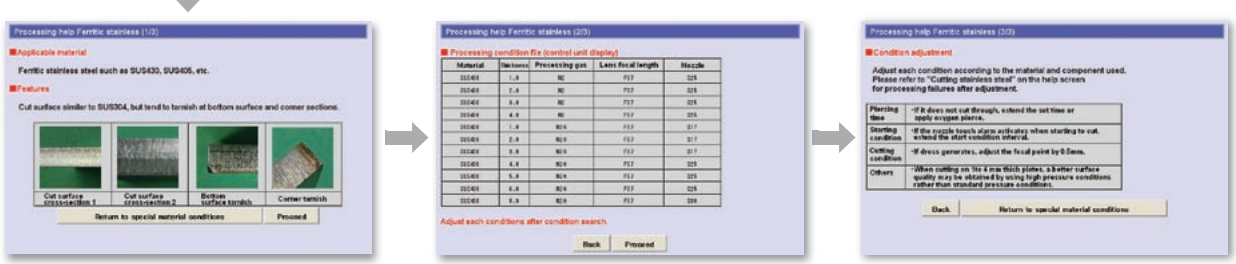
The main components are periodically checked, and the diagnostic results are reported. This supports continuous operation.

Processing help screen

The NC provides full support of reference conditions for special materials, modification method and processing know-how.



- After selecting the special material to be processed, reference conditions and processing help can be referenced.
- Confirm the precautions and adjust conditions according to the specified procedures.



NC control system

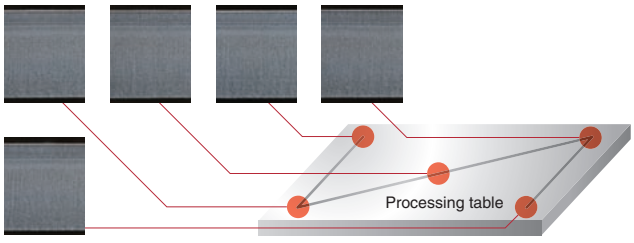
Equipped with a 64-bit CPU, 20GB hard disk drive and large 15-inch thin-film transistor (TFT) touch panel for easier operation.

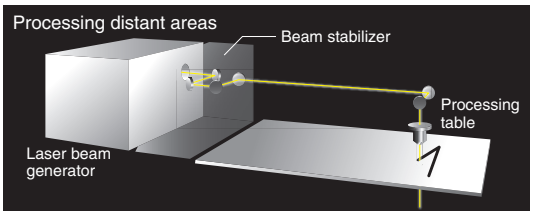
Separate operation board

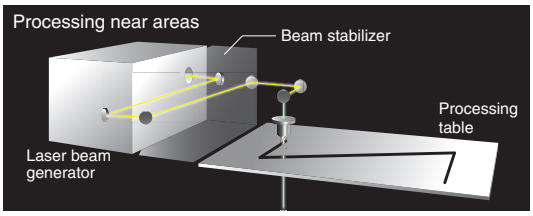
The separate operation board positioned at the upper part of the Z-axis enables adjustments in workpiece position and travel (travel via wheel or jog operation), improving operability.

Equipped with constant optical path system

The constant optical path system maintains the conditions for a stable laser beam to ensure consistent, stable processing throughout.
Use of bellows on the X-axis reduces the overall optical path length to approximately two meters. This stabilizes the laser beam quality and extends the processing margin.







Easy-to-operate barcode reader

The simple and convenient process only requires two actions.
Networks with CAD/CAM systems support on-site processing.

Read barcodes

Press start button

Specifications

Processing Capabilities

Resonator	Material	Assist gas	Thickness (mm) 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
ML45CF-R	Mild steel (SS400)	Qxygen	
	Stainless steel (SUS304)	Nitrogen	Using f254mm (f10") lens*1
	Aluminum alloy (A5052)	Air	
		Nitrogen	Using f254mm (f10") lens*1
ML60XF	Mild steel (SS400)	Nitrogen	
	Stainless steel (SUS304)	Nitrogen	Using f254mm (f10") lens*1
	Aluminum alloy (A5052)	Air	
		Nitrogen	When using f245mm (f10") lens. *1Optional.

✻ The values in the above capacity table apply to specific conditions. The conditions adopted are in accordance with the specifications listed.
✻ The process performance and quality may vary depending on surface conditions and chemical compositions even when processing the materials to the same standards.
✻ The processing performance and quality may vary depending on the workpiece profiles.
✻ The capacity details for processing mild steel (SS400) t19mm or thicker are derived from processing materials "LS" (for laser cutting steel sheets) produced by Chubu Steel Plate Co., Ltd.
*1 Optional.

Processing Machine Specifications

Model				Standard-speed mode	High-speed mode (optional)
Travel system				Optical scanning system	
Control system				X, Y and Z axes simultaneous control (Z-axis emulation function available)	
Performance	Applicable sheet size (mm)			6,100 × 3,050	
	Stroke		X-axis (mm)	6,600	
			Y-axis (mm)	3,200 + 100 (for maintenance)	
			Z-axis (mm)	150	
	Speed	Rapid traverse	X-axis (mm/min)	24	50
			Y-axis (mm/min)	50	100
			Z-axis (mm/min)	65	
		Maximum processing feed (m/min)		20	30
	Accuracy	Positioning accuracy	XY-axis (mm)	0.05/500	
			Z-axis (mm)	0.1/100	
		Repeatability (mm)		±0.01	
	Processing head			Auto-focus preset processing head (standard: f7.5")	
Applicable laser beam generator				ML45CF-R, ML60XF	
Power input (processing machine only) (kVA)				5	
Weight (processing machine only) (kg)				Approx. 7,000	

Resonator Specifications

Model		ML45CF-R	ML60XF
Excitation system		SD excitation 3-axis orthogonal	
Laser output characteristics	Rated output (W)	4,500	6,000
	Beam mode	Low order (TEM01*, principal component)	
	Output stability (%)	When controlling output of ±1 or less (with respect to rated output)	
	Range of variable output (%)	0 to 100	
Laser gas composition		CO_2:CO:N_2:He=8:4:60:28	
Laser gas consumption (ℓ /hr)		Approx. 3	
Power supply (laser beam generator only) (kVA)		69	90
External dimensions (mm)		2,500×800×1,810	2,600×800×1,960
Weight (laser beam generator only) (kg)		Approx. 2,200	Approx. 2,250
Auxiliary functions		Equipped with beam shutter, visible laser device and high-speed power sensor as standard features	

Control unit specifications

Model	LC30BX
Display unit	(Touch panel type) 15" TFT
Hard disk drive User memory space (GB)	20
Program input method	Screen creation, USB (Ver. 2.0), Ethernet
Operation method	Memory operation, HD direct operation

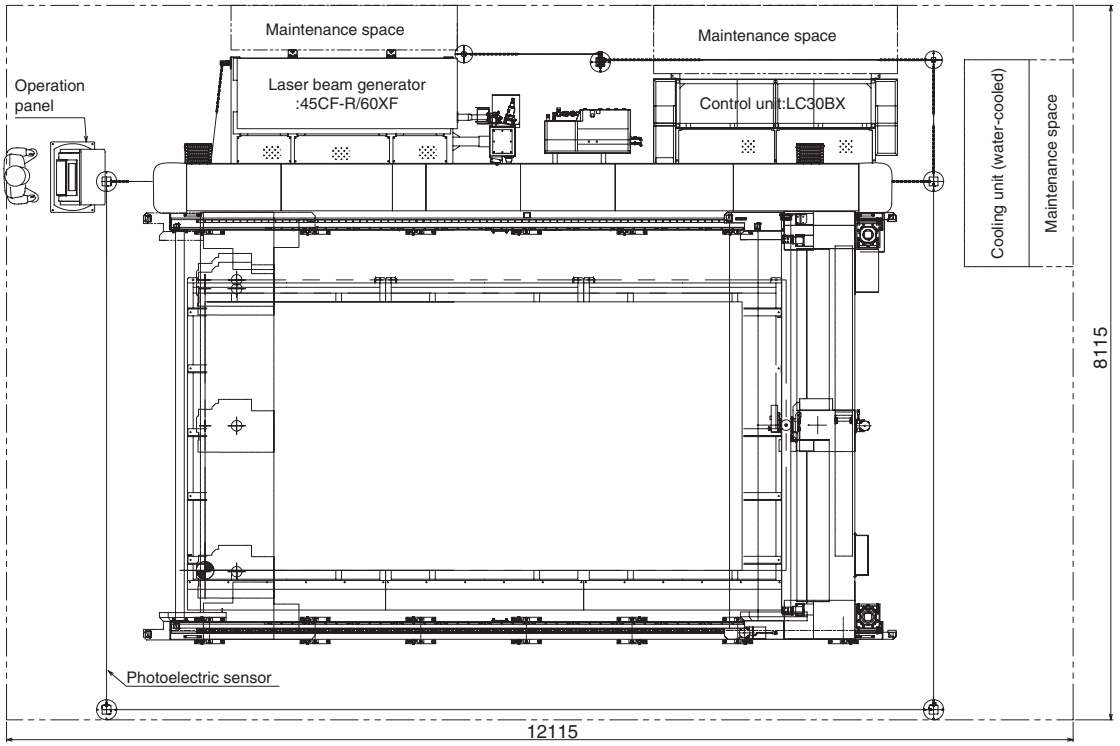
Cooling System Specifications

Model	LCU20WIX	LCU20AIX	LCU30WIX	LCU30AIX
Applicable laser beam generator	ML45CF-R		ML60XF	
Cooling method	Water-cooled	Air-cooled	Water-cooled	Air-cooled
Power supply (cooling unit only) (kVA)	32	40	51	64
Cooling performance	60	60	90	90
External dimensions (mm)	2,350×735×1,720	2,980×1,010×2,027	1,852×1,670×1,720	3,990×1,010×2,027
Weight (kg)	Approx. 1,000	Approx. 1,100	Approx. 1,300	Approx. 1,500

Options

Item		Standard/Optional	Remarks
Processing system body	Auto-focus preset head PH-XS	Standard	
	Beam optimizing unit	Standard	
	ML60XF (6kW) specifications	○	Optional processing machine height adjustment stand is required.
	High-speed mode	○	Optional APC specifications and perimeter cover/fence are required.
	Air-cooled cooling unit	○	Standard specifications use water-cooled cooling unit.
	f127mm (f5") lens cartridge	○	
	f254mm (f10") lens cartridge (including adapter)	○	
	High-pressure gas NC control	Standard	
	Oil spraying function	○	
	Beat piercing	Standard	
	Fine piercing	○	
	Bellows for X-axis rack and guide	○	
	Processing machine height adjustment stand (pass line 500mm to 880mm)	○	The entire processing machine is raised by 380mm to support the 6kW specifications and devices such as the APC and stocker.
	Network connection unit	Standard	
	Network downloading function	○	
	External I/O extension	○	
Work table	Work table	○	Standard work table (without dust collection function).
	Work table manufacturing drawings (for manufacturing my user) * Free	○	When user is manufacturing work table (without dust collection function), the manufacturing drawings are available for free.
	Work table (with dust collection function)	○	Work table when dust collection function (without dust collector) is requested.
Peripheral devices	Elevating pallet changer (with table in processing system)	○	Optional processing machine height adjustment stand is required.
	Elevating pallet changer (with table in processing system) with dust collection function	○	Does not include dust collector. Optional processing machine height adjustment stand is required.
	Advance/retract shuttle type pallet changer (with table in processing system) with dust collection function	○	Does not include dust collector. Optional processing machine height adjustment stand is required.
	Scrap ejector (16m)	○	Optional processing machine height adjustment stand is required.

Layout



✻ This is a standard layout. The locations of the operation panel and cooling unit are to be determined on each occasion.

Large-size CO_2 Laser Processing Machine XL Series

⚠ Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Manufacturer

Ryoden Koki Engineering Co., Ltd.

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