MITSUBISHI ELECTRIC

Changes for the Better

CO_2 2-Dimensional Laser Processing Systems
ML4020RX Series

4020RX

2-Dimensional Laser Processing Systems

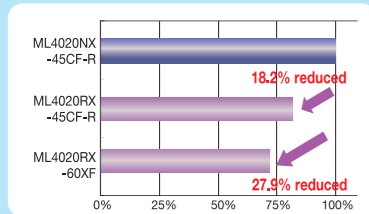**BREAKTHROUGH INNOVATION**

RX-Series
4 x 2m sheetsize!!

4020RX

Reliable

Refined

Revolution

Low operating cost

| Small gap processing reduces the assist gas consumption
| ECO mode function reduces the cost during standby
| New clean technology increases the lifetime of optical parts

Low assist gas cost

Small gap processing (Nitrogen cutting) reduces the operating cost by approx.30%.

Example of SUS304t12mm
Cutting condition 4.5kW, F800mm/min

Running cost (yen/m)

Reduces Nitrogen gas by 30%

400 350 300 250 200 150 100 50 0

Previous processing   Small gap processing

Note: Running cost is calculated with unit price of electricity and gas in Japan. (Calculated as gas: 0.2yen/ℓ)

Low power consumption

ECO mode function reduces the power consumption during standby by up to 99%.

[%]
100 80 60 40 20 0

Power consumption (Relative value)

Reduced by up to 99%

Without ECO mode   With ECO mode
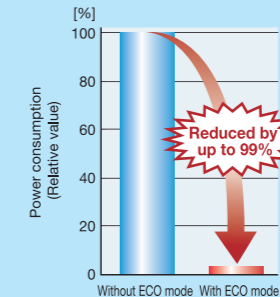
New clean technology

Enhanced clean technology extends the life of the PR mirror drastically.

Dirt amount of PR mirror

Previous

Extends life drastically

New clean technology

X

Beam ON time

t₁ *2   t_II *2
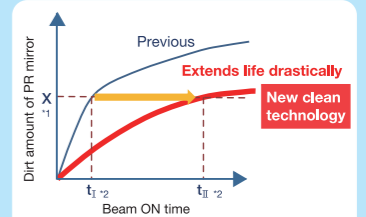
*1: Dirt limit value X of PR mirror differs depending on the processing contents, required specifications, etc.
*2: Time of t₁ and t_II that reach to the dirt limit value of PR mirror differ depending on the deterioration condition of the oscillator parts.

Easy to Use

| Easy nesting allows quick on-site response
| Double-cut function allows high quality processing of protected sheet metal
| Offcut Cutting function easily cut offcuts. High material yield rate is achieved

Easy nesting

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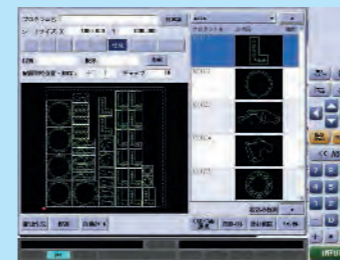
Double-cut function

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

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

Sample using the double-cut feature
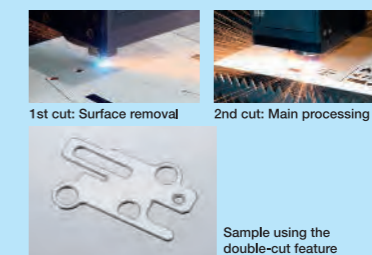
Offcut Cutting

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

Offcut Cutting screen

High Productivity

| Shorter piercing time by High peak pierce
| Improved processing stability by FAB control
| High speed processing of thin material by F-CUT

High peak pierce

In mild steel up to t25mm, controlling the oxidation reaction and optimizing beam quality realize small diameter piercing in a short time.

ML4020NX -45CF-R

ML4020RX -45CF-R   18.2% reduced

ML4020RX -60XF   27.5% reduced
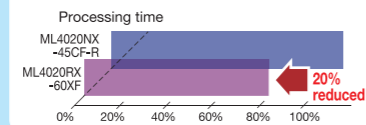
0%   25%   50%   75%   100%

[Processing shape]
Material/Thickness: SS400 t16mm
Assist gas: Oxygen

Processing time on 4020RX as compared to previous model which is taken as 100%.

FAB control

Mitsubishi's Original "FAB control" greatly improves processing stability.

Beam Optimized Technology

FAB RICATION

MITSUBISHI original "control"

Processing time

ML4020NX -45CF-R

ML4020RX -60XF   20% reduced
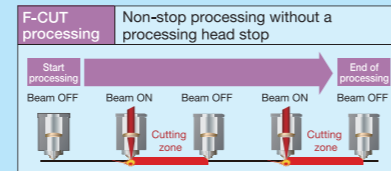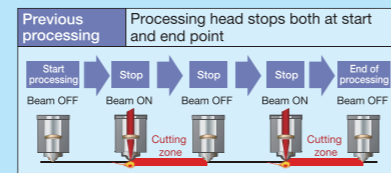
0%   20%   40%   60%   80%   100%

Material: Mild steel t16mm Processing time on 4020RX as compared to previous model which is taken as 100%.

*Processing time when used with high peak pierce

F-CUT

High-speed communication of oscillator and control unit controls the beam ON/OFF without axis stop and reduces the processing time.
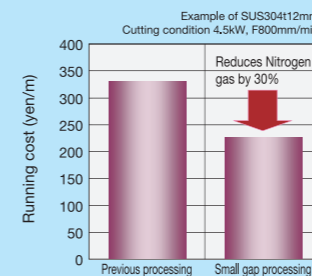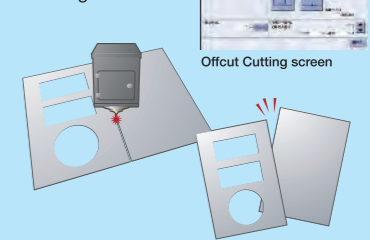
Previous processing   Processing head stops both at start and end point

Start processing | Stop | Stop | Stop | End of processing
Beam OFF | Beam ON | Beam OFF | Beam ON | Beam OFF

Cutting zone   Cutting zone

F-CUT processing   Non-stop processing without a processing head stop

Start processing | End of processing
Beam OFF | Beam ON | Beam OFF | Beam ON | Beam OFF

Cutting zone   Cutting zone

Optional Features

	ML60XF	ML45CF-R
F127mm (F5") Lens Cartridge	Standard	○
F254mm (F10") Lens Cartridge	Standard	○
Oil Spray	Standard	Standard
High Peak Piercing	Standard	Standard
Magnetic Damage Reduction	Standard	Standard
Automatic nozzle changer	○	○
Barcode Reader	Standard	Standard

○: Available   —: Not Available

Cutting capability

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

* 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		ML4020RX-45CF-R	ML4020RX-60F
Drive system		Flying optics (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)	4,050 x 2,060	
	Max. workpiece weight	1650	
	Table Pass height	880	
	Stroke — X-axis (mm)	4,100	
	Stroke — Y-axis (mm)	2,100	
	Stroke — Z-axis (mm)	150	
	Speed — Rapid travel speed — XY-axis (m/min)	Max. 100	
	Speed — Rapid travel speed — Z-axis (m/min)	Max. 65	
	Speed — Max. processing feed speed (m/min)	50	
	Accuracy — Positioning accuracy — XY-axis (mm)	0.05/500	
	Accuracy — Positioning accuracy — Z-axis (mm)	0.1/100	
	Accuracy — Repetition accuracy (mm)	±0.01 (X, Y-axis)	
	Processing head	Auto-focus preset	
Power consumption of entire system (kW)※		77	98
Weight (kg) — Machine		Approx. 12,000	
Weight (kg) — Pallet changer		Approx. 4,000	

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

Resonator Specifications

| Model name		ML45CF-R	ML60XF
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	
Weight (kg)		Approx. 2,200	Approx. 2,250
Standard features		Beam shutter, Visible laser, High-speed power sensor	

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

Cooling System Specifications

Model name	ML45CF-R	ML60XF
Applicable resonator	45CF-R	60XF
Cooling method	Air	
Exterior dimensions (mm)	2,000 × 1,500 × 2,055	
Weight (kg)	Approx. 1,040	Approx. 1,240

Standard layout
ML4020RX (Water-Cooled)
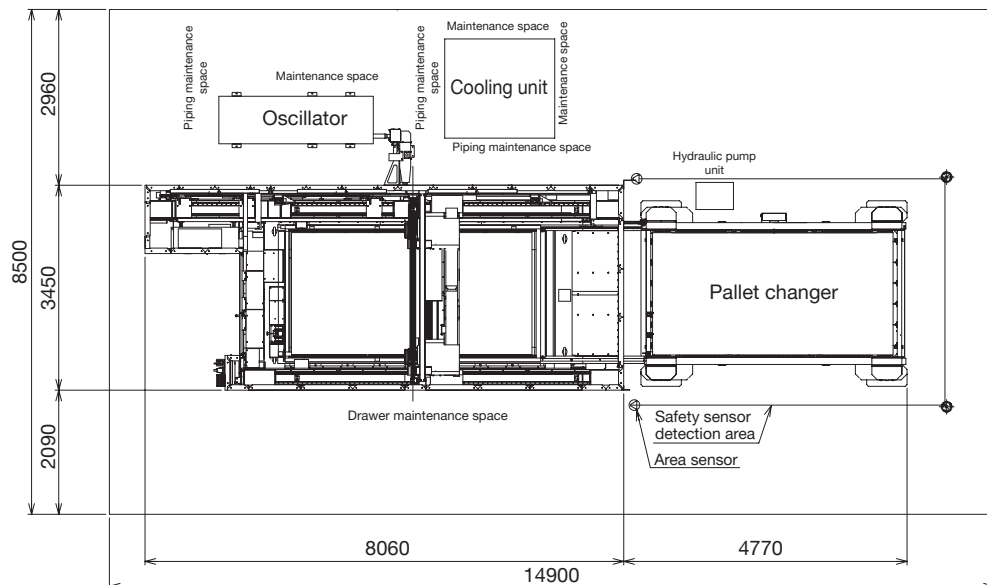
MITSUBISHI ELECTRIC

* 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)

ISO 14001 JACO
UKAS MANAGEMENT SYSTEMS
EC97J1113   051

ISO 9001 BUREAU VERITAS Certification
BUREAU VERITAS 1828
UKAS MANAGEMENT SYSTEMS 008