

muratec

FIBER LASER PUNCH PRESS

MF3048 HL

MURATA MACHINERY, LTD.

muratec
MF3048 HL



Muratec's fiber laser punch press evolved from the turret punch press

Our latest series of fiber laser multi-function machines combine added value processing while fully utilizing its 30-ton press capacity. Combination machines offer a wide range of forming, processing and process integration by servo control tap units and burr elimination dies.

Laser

Punch

Tapping

Forming

FIBER LASER PUNCH PRESS

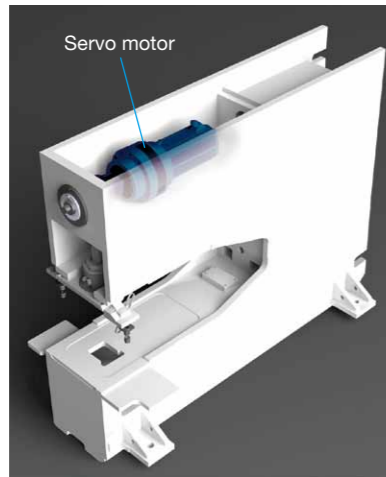
MF3048 HL



Machine structure

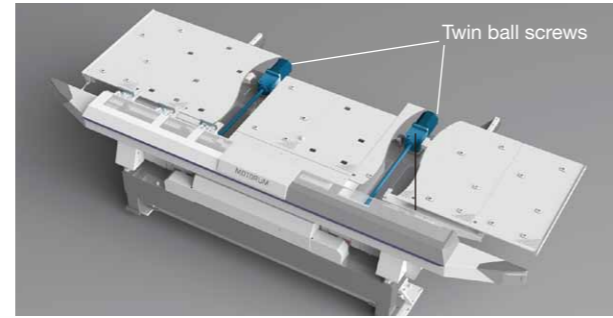
Servo motor drive

Energy saving, environmentally friendly servo motor drives improve productivity while pursuing the functional beauty of a simple design. Features a punch drive servo motor compactly fit into a C frame, enabling stable and high-quality processing.



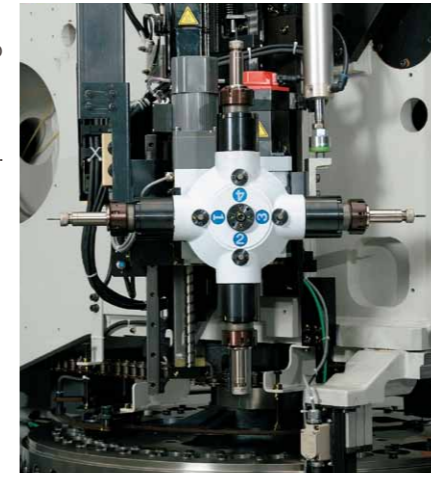
Wide table base utilizes twin ball screws

Twin ball screws help achieve stability and precision processing on the Y axis that is under load during high-speed transport. The 2.5m X stroke table is supported by a wide table base, allowing for more stable processing.



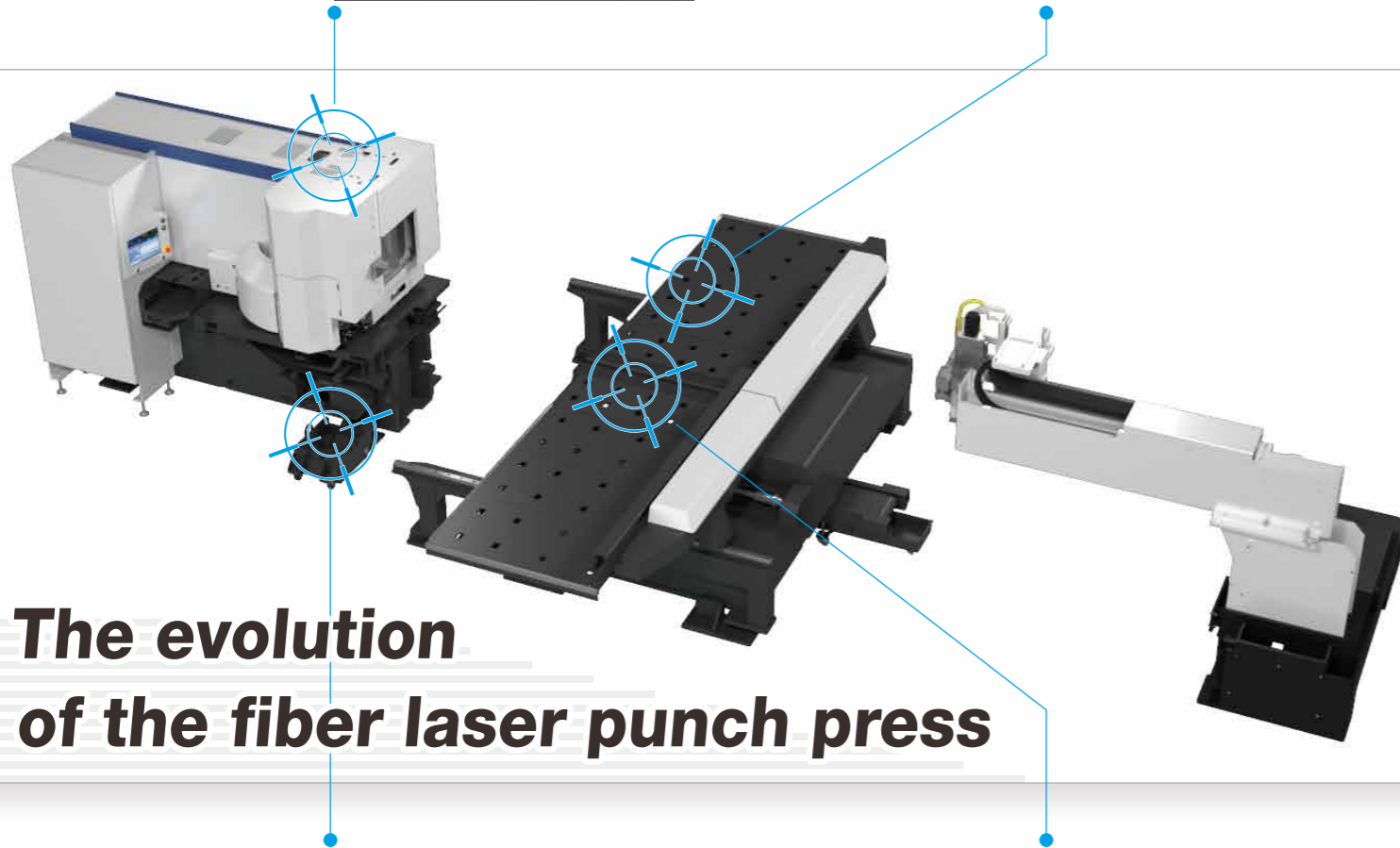
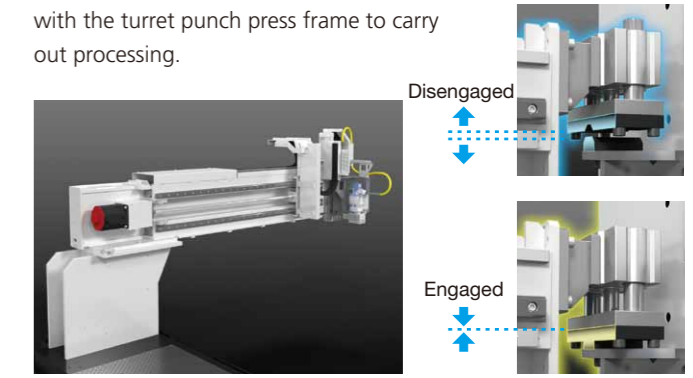
Tapping unit

Specialized units controlled by a servo motor produce high-speed and high-quality tapping.



Laser frame unit

Independent laser frame units disengage during punch processing, preventing vibrations from affecting the precision laser head. During laser processing, it securely engages with the turret punch press frame to carry out processing.



The evolution of the fiber laser punch press

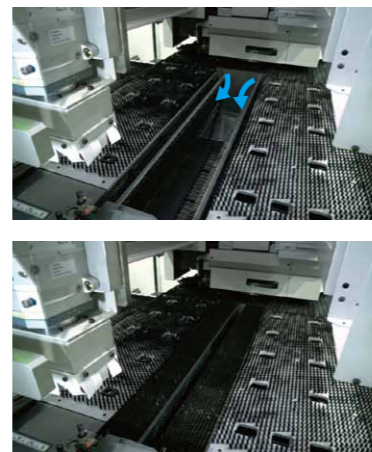
Punch slag suction device

Suction device controls slag rise by applying strong suction to the punch slag from the bottom of the die. And provides extra power for processing thin and protective sheet materials, small diameter holes, and other work where slag is more likely to rise.



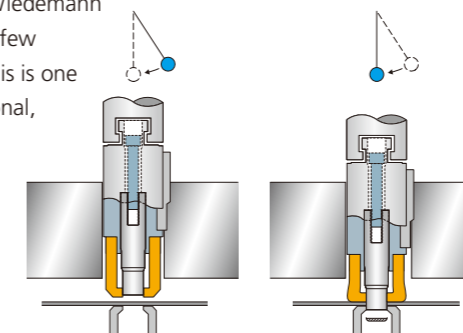
Dust chute

Slag produced during laser processing is deposited into an openable dust chute and then discharged to a dust cart located at the front of the machine by a conveyor.



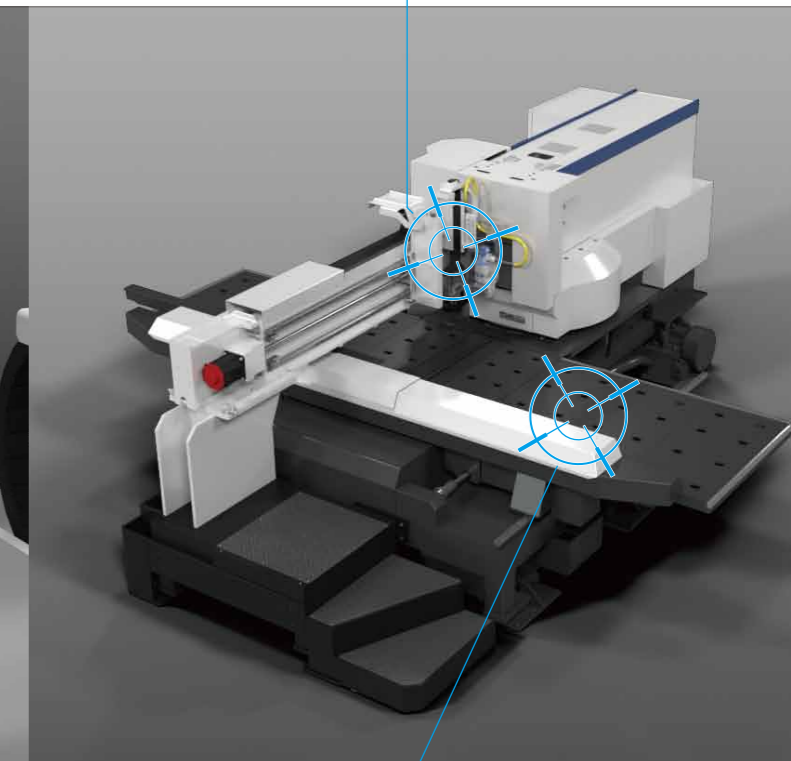
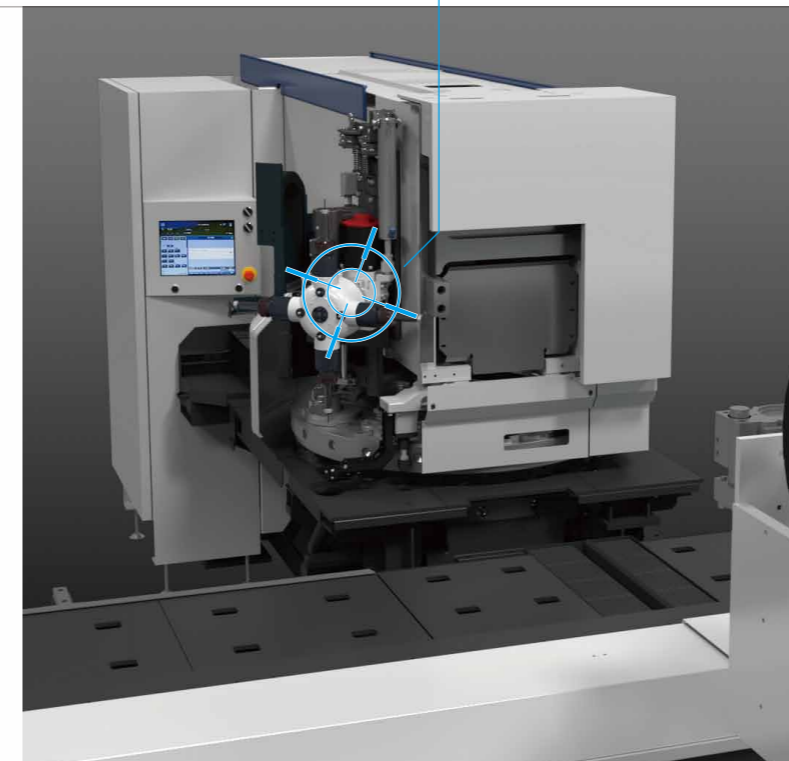
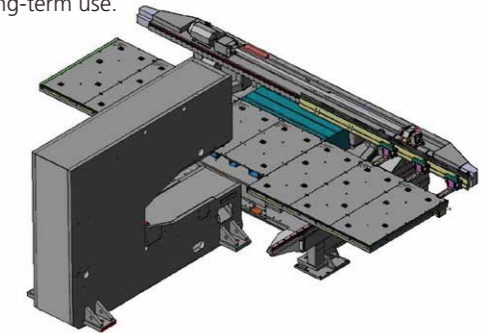
Traditional forced pull-up method

The forced pull-up method involves punching and using the force of the ram that is mechanically linked to the punch holder. Then, it extracts using the force of the ram for reliable stripping performance. Along with simple Wiedemann tooling, which have few component parts, this is one of Muratec's traditional, reliability-focused technologies.



C frame, table separation structure

To achieve both stable 300 kN processing and high speed, high quality, and high precision processing, Muratec multi-function machines use original C frames and separate table base designs for reliable, long-term use.



Machine structure

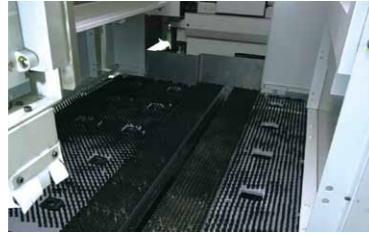
Turret guard

A guard is deployed in front of the turret during laser processing, preventing particles produced during laser processing from getting inside the turret.

Open



Closed



Laser head maintenance base

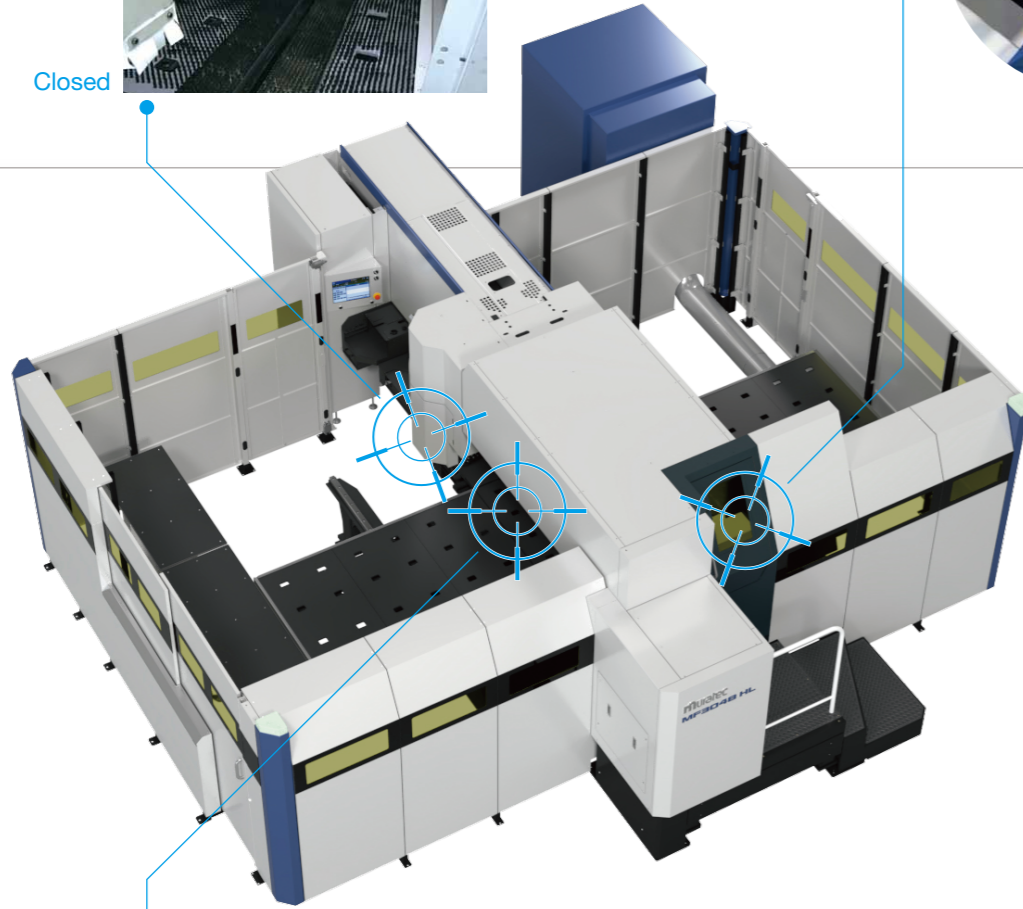


Laser head maintenance can be easily accessed from the machine's front door.



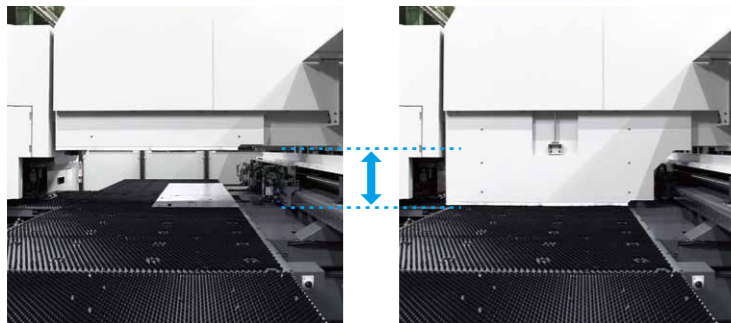
Sliding doors

Standard large opening, manual sliding doors allow for easy access and smooth handling of materials.



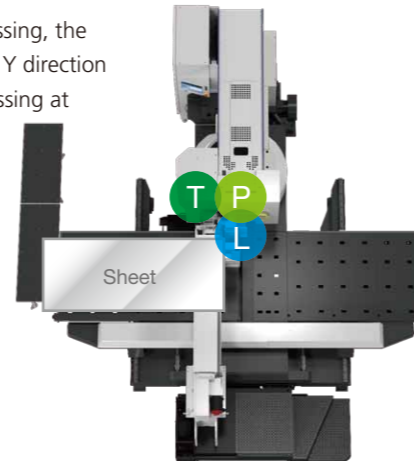
Laser frame shutter

Framed shutters securely close during laser processing to block light from shining outside of the machine.



Operation during processing

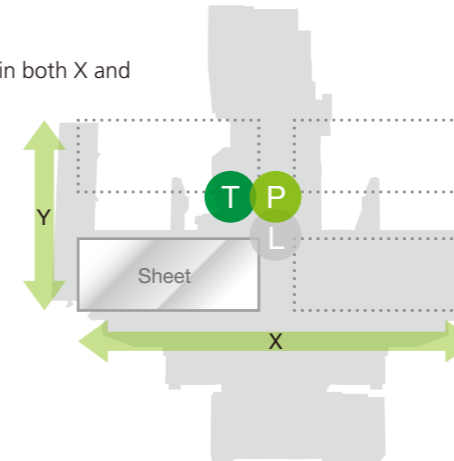
During laser processing, the head moves in the Y direction to maximize processing at high speeds.



Combined processing operation

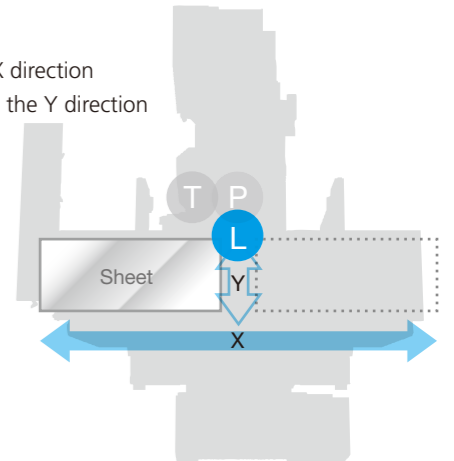
Pressing

Table moves in both X and Y directions



Laser processing

Table moves in the X direction
Laser head moves in the Y direction



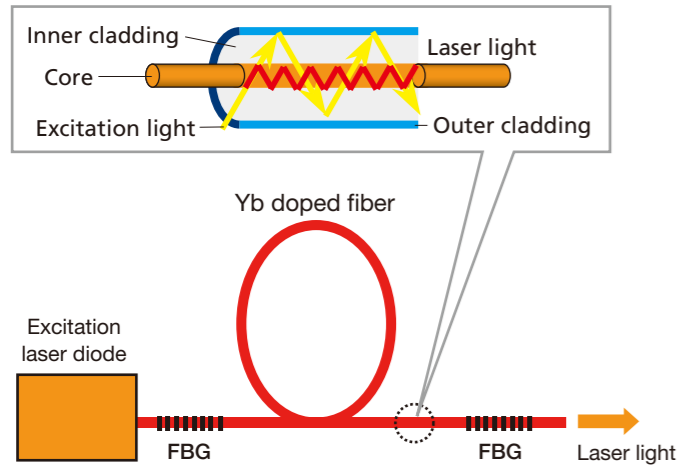
Fiber laser principles and characteristics

A control system that maximizes fiber laser potential

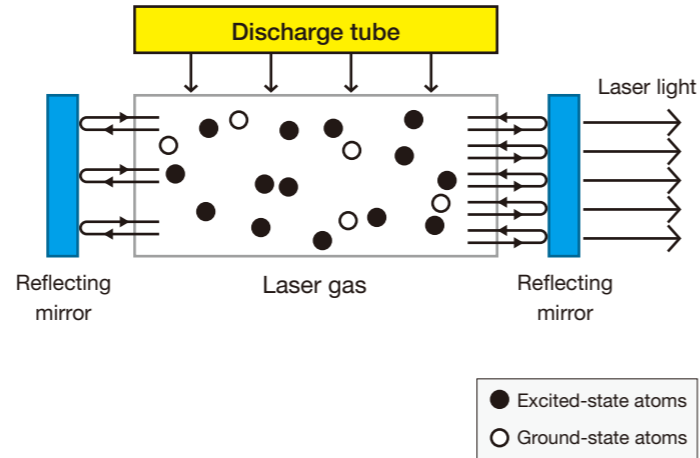
Laser media and excitation methods

A key characteristic of fiber lasers is that they can efficiently resonate and amplify using the fiber itself as the medium and without any reflecting mirrors. This eliminates optical axis deviation resulting from mirrors, lenses, or other heat or mechanical effects, allowing for continued maintenance of stable beam quality.

Fiber laser photoexcitation method

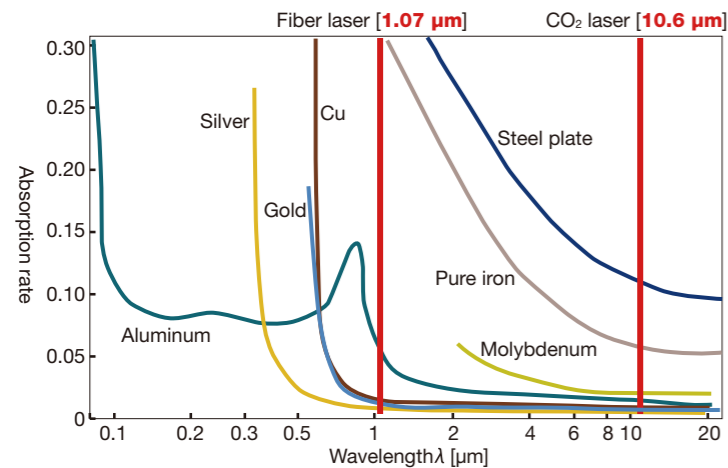


CO₂ laser discharge method



Fiber laser and material absorption characteristics

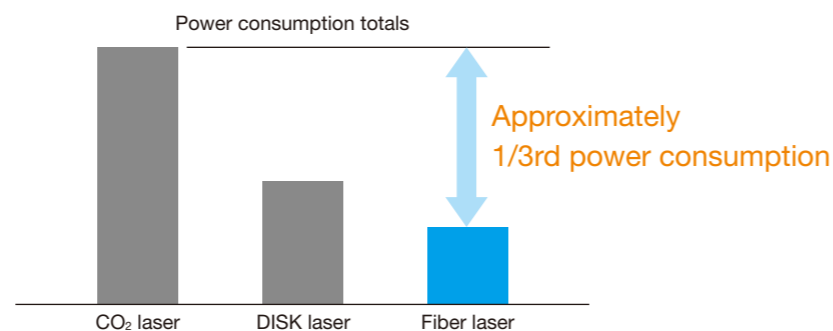
Short wavelength fiber lasers have a high laser light absorption rate on metal surfaces, allowing for processing highly reflective materials including copper and aluminum.



A fiber laser has a wavelength 1/10th that of a CO₂ laser, resulting in a higher laser light absorption rate on metal surfaces.

Low power consumption

The laser oscillators consume a low amount of power when generating the laser light and the light conversion efficiency allowed for downsizing of the chiller unit, contributing to a reduction of overall power consumption. Power consumption is reduced approximately 1/3rd that of a CO₂ laser.

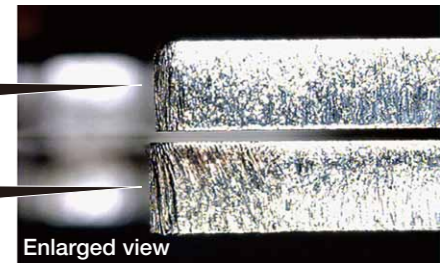


MVHS control (Microcomputer Control by Variety of High Speed Outputs)

Muratec's proprietary MVHS laser output control system enables smooth pulse output. Achieves high-quality processing by carrying out control in microsecond units based on acceleration and deceleration commands.

Processing quality utilizing MVHS

Processing quality utilizing conventional control methods



Processing defect prevention and correction system

Greater processing stability is achieved by monitoring the light intensity and optical component conditions at the laser processed point. MVHS maintains high-quality processing to the greatest degree possible by setting the light intensity at the laser processing point to a discretionary value. The connection system will not stop processing as long as the value is a measurement value at which processing can be continued, even if it is not a standard value.

In addition, the system indicates the need for maintenance by accurately detecting when the optical system is dirty.

Reflected light monitoring system

Prevents laser oscillator damage caused by reflected light. Allows for real time verification and protection by monitoring the intensity of reflected light at the oscillator.

Processing monitoring function

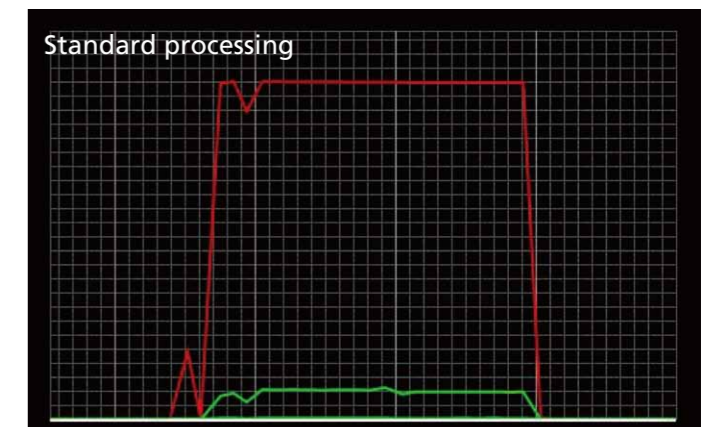
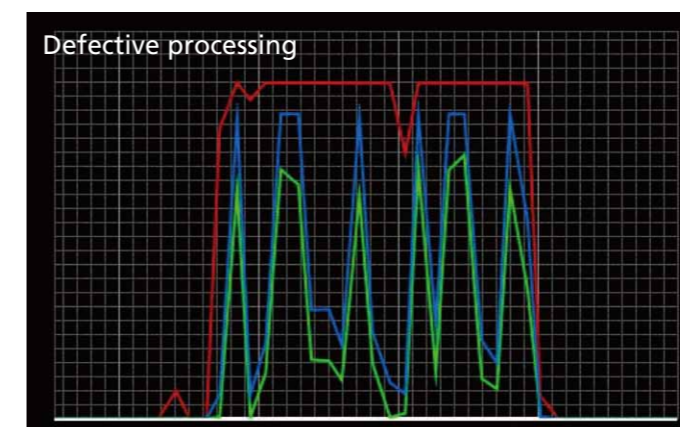
Process monitoring accurately detects if the pierce and cutting processes are functioning by monitoring the light intensity of visible and infrared light during laser processing. In the event of processing defects, the function will immediately stop the machine further preventing the production of defective products.



Processing defect condition (top surface)

Waveform conditions during standard processing and defective processing

— Red: Laser output — Green: Visible light — Blue: Infrared light



The key to reducing lead times

Laser edge processing tool (optional)

Optional laser edge tools use specialized bearings set on the top and bottom that follow processing lines, eliminating product surface edges produced during laser processing.



Punch burr processing tool BT-III (optional)

Using Muratec's proprietary ball tool, the BT-III removes burrs from the back of products produced during the punching process and follows along the processed surface with bearings set in the top and bottom frames.



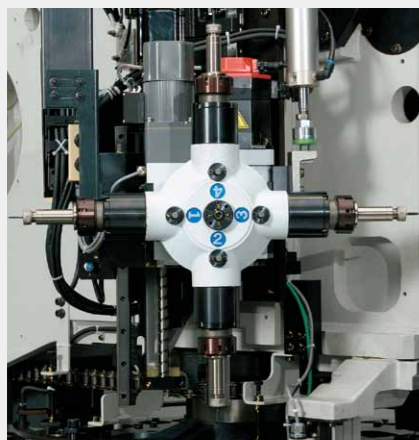
Tapping

Tapping device

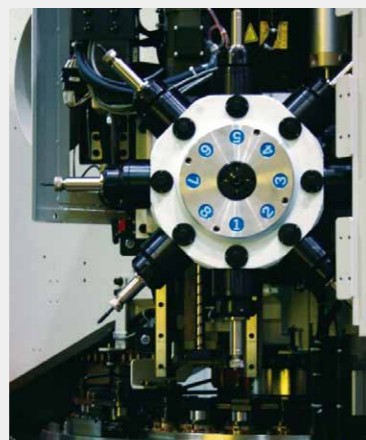
Full-fledged tapping device that employs a rigid method and synchronizes rotation speed and feed speed using a servo motor.

- Tap sizes: M2 to M10
- Tapping method: Cutting / rolled tap
- Maximum sheet thickness: 6.35 t

*Specifications vary depending on material, bottom hole diameter, and other factors.



4 axis tapping device



8 axis tapping device (optional)

Tapping slag suction device

Suction improves product processing quality by sucking tapping slag downwards.

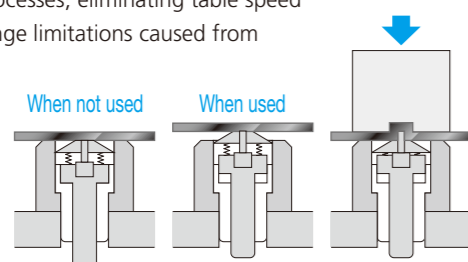
Tapping blade lifespan counter

Counters display a message when processing reaches several shots set beforehand, notifying the user a tapping blade is reaching the end of its lifespan.

Forming die lifting mechanism

Utilizes a bottom raising and lowering mechanism that lifts only during forming processes, eliminating table speed and processing range limitations caused from forming tool use.

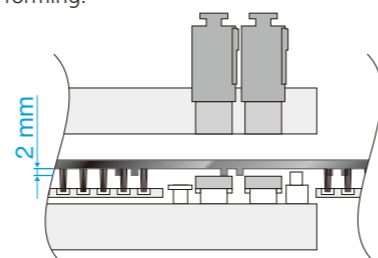
Helps reduce flaws on the back of workpieces.



Undercut burring specification (optional)

Workpieces are lifted from the die surface for transport after forming, enabling undercut forming.

Conventional punch presses were not suited for undercut burring and could cause form collapse from die interference.



Multitool / marking tools (optional)

The 12-station multitool is well suited for processing numerous small diameter holes. Combining the multitool with a 44-station turret, allows for setting up a maximum of 88 tools. Auto-indexes at high-speed rotations reduces tool calculation times, further improving productivity.

Multitool
12 station type



Marking multitools can stamp from 20 to 40 alphanumeric part numbers and characters, creating easier part identification.

Marking tools
*Stamping dimensions:
2.1x3.2 (40 character)
3.2x5.0 (20 character)



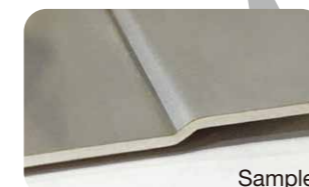
Wilson Wheels® (optional)



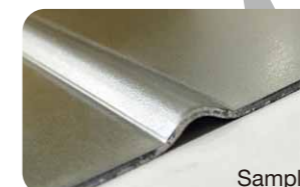
Rolling offset



Rolling rib



Sample



Sample

MATE PRECISION TOOLING® (optional)



Sheet marker

Roller ball

High speed marking mode

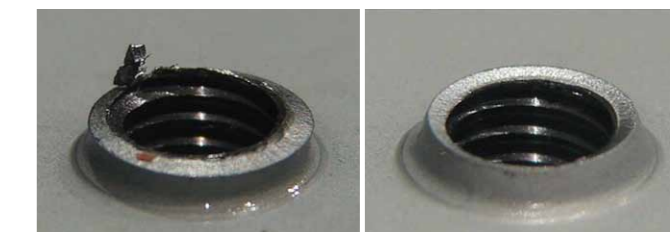
Enables high-speed mark dot stamping of sheet metal products, making products easier to identify in later processes.



Hit rate varies depending on marking pitch

HQ burring-I (optional)

Removes tapping waste and rough burrs resulting from burring processing and cut tapping.



Without HQ burring-I processing With HQ burring-I processing

Compatible materials & sheet thickness

- SPCC: 0.8 ~ 2.3 t
- AL: 0.8 ~ 3.0 t

Compatible burring

- M3, M4, M5, M6
- Upward facing burring, downward facing burring

Chamfering tool (optional)

Removes circumferential protrusion that occurs when carrying out roll tapping with a flat tap.



Compatible materials & sheet thickness

- SPCC: 0.8 ~ 2.3 t
- SUS: 0.8 ~ 2.0 t
- AL: 0.8 ~ 3.0 t

Compatible protrusion burring

- X range or B range (For M3 to M6 rolled pilot holes)

Processing scheduling function

Automates loading of planned and continuous processing of projects by inputting a schedule and pressing the cycle start button. Also, displays required die changes and material information.



Machine management function

Verifies the proper management of machine operation and tracks operating history data (power ON time and start/end time), output results, alarms and more.



Expanded processing condition table

Allows the registration of 5 processing mode patterns for each of 1,000 types of dies and 30 types of material and sheet thicknesses for each, making detailed processing conditions possible.



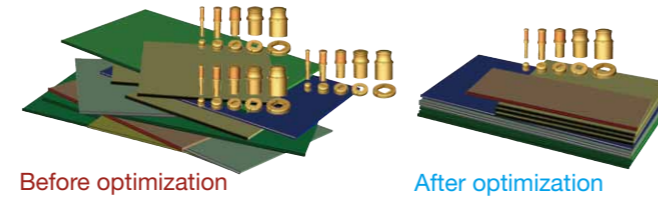
Turret monitor function*

Displays the die set in the turret while immediately identifying punching and forming die layouts. Verifies the number of hits, processing conditions, and other information for the selected dies.



Optimal scheduling function*

Creates optimal schedule proposals by analyzing materials, sheet thickness, and die setup changes when implementing multiple schedules in continuous succession. Minimizes material preparation, work holder position changes, die replacements, and other setup work.



Process drawing function*

Displays real time processing positions in red and generates at-a-glance determination of all processing areas.



Die management function*

Displays the number of hits for all punches and dies individually used on the processing machine, verifying the usage history of each die. Processing quality can be maintained by setting several warning punches in advance.

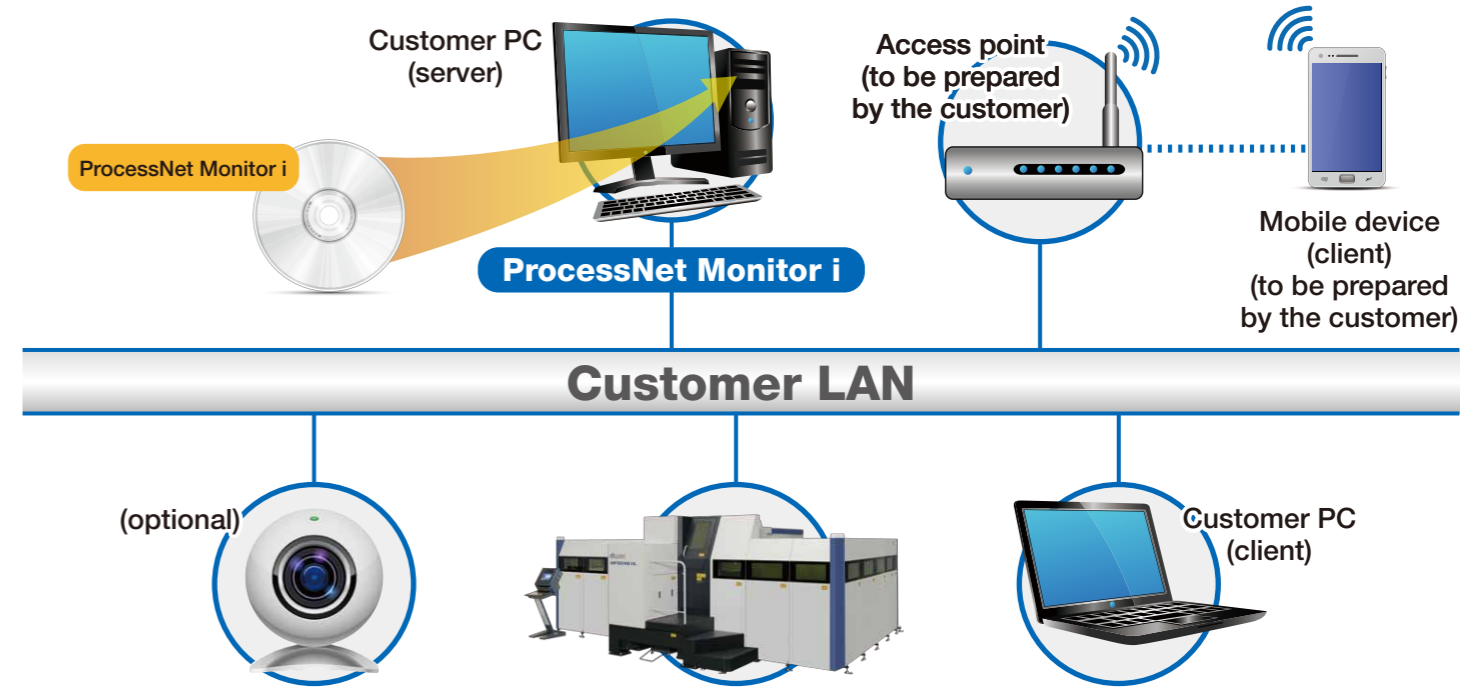


Die navigation function*

Analyzes frequently used dies and stocktaking of unused dies, driving optimal turret operation and minimizing die replacement work.

Operation monitoring system - ProcessNet Monitor i

System monitoring comes standard equipped with software that continuously evaluates machine equipment conditions, energy consumption, and alarm occurrences. For smart productivity management, install the operating system software on a computer connected to your in-house network and monitor machine processing conditions from any office or off-site location no matter where the machine is located.



- Notes: 1) Customers will need to configure a VPN environment and other settings to access the system from outside the company network.
 2) PCs, access points, mobile devices, and other hardware and LAN environments must be procured and administered by the customer.
 3) Customer is responsible to consult with your company's IT department or an external vendor to purchase, install, and setup equipment.

Equipment status list display



Dashboard displays list the machine processes, operating and stopped status, gas consumption and power consumption. Optional cameras can be installed inside facilities for increased live monitoring of machine status and processing from any office with network access.

Operating performance trend display



Machine processes, operating times, and current and past operation ratio trends are displayed for (1) month. Verification of work performance, machine processing, and load conditions can be optimized for more systematic production planning.

Alarm history



Machine processing alarms display in rank order of occurrence, showing those alarms occurring most frequently. Preventative measures can then be implemented, helping improve machine operation ratios.

Operation performance category display



Results from machine alarms display set-up, process, change, standby, and down time categories. Operational improvement actions can be identified, prioritized and corrected by category.

Energy consumption performance

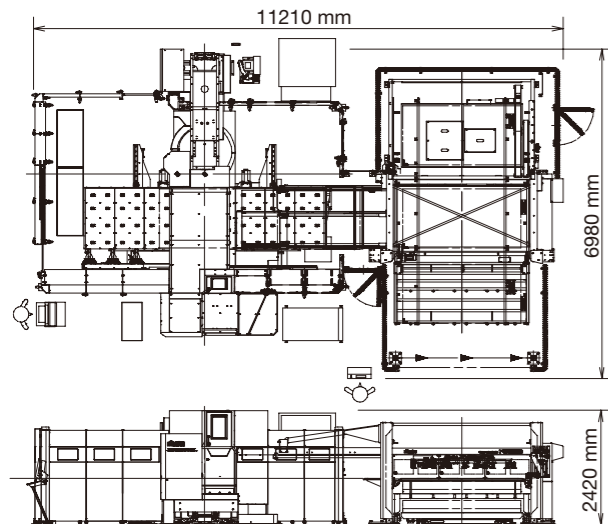


Current and past energy and gas consumption results are displayed for one (1) month. Machine operating costs can be further reduced, improving process performance and ROI.

*Requires use of a Muratec designated program format.

Cell loader - standard system, stocker system, MF3048HL + FS2512

Space-saving one piece input, one piece output types



*Layout for a 3.0 kW specification processing machine main unit.

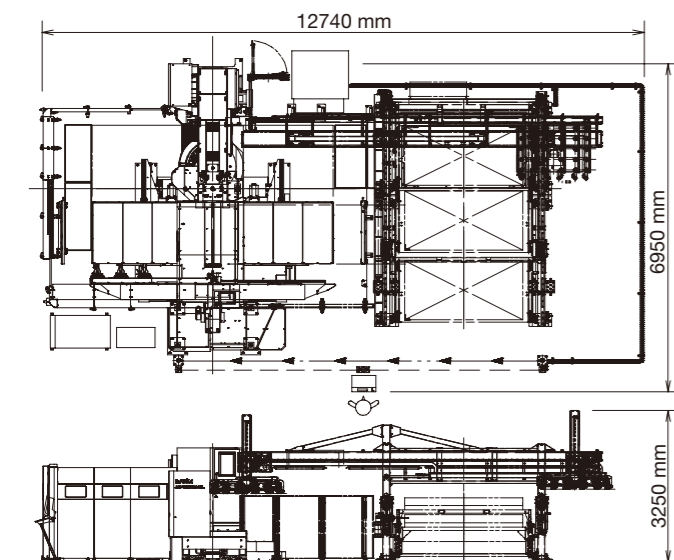
Main Specifications

		FS2512	FS2512T
Material sizes (Y x X)	Maximum	1250 mm x 2500 mm	
	Minimum	300 mm x 750 mm	
Sheet thickness		0.6 mm ~ 4.5 mm	
Maximum load weight		2 tons	
Maximum load height (including wooden pallet)		260 mm (Including wooden pallet height = 90 mm to 105 mm)	
Number of shelves		—	6 or 8 shelves
Stocker installation height	6 shelves	—	4410 mm
	8 shelves	—	5110 mm
Air supply	Flow rate	400 NL/min (0.4 m ³ /min)	
	Pressure	0.5 MPa (5 kgf/cm ²)	
Power supply capacity		9 kVA	16 kVA

*Specifications may vary depending on machine combinations and options.
*Air supply and power supply capacity values shown exclude values for the machine processing main unit.

Sorting loader - standard system, stocker system MF3048HL + FG2512

Includes material and product shelves and is suited to long-term operation



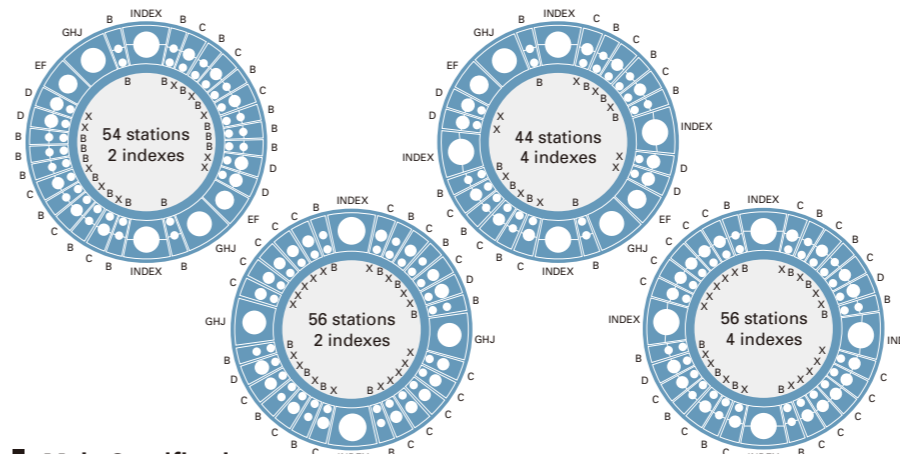
*Layout for a 3.0 kW specification processing machine main unit.

Product sizes

		FG2512	FG2512T
Material sizes (Y x X)	Maximum	1250 mm x 2500 mm	
	Minimum	300 mm x 500 mm	
Sheet thickness		0.6 mm ~ 6.35 mm	
Product sizes (Y x X)	Maximum	1250 mm x 2500 mm	
	Minimum	80 mm x 100 mm	
Maximum load weight		2 tons	
Maximum load height (including wooden pallet)		260 mm (Including wooden pallet height = 90 mm to 105 mm)	
Number of shelves		—	6 or 8 shelves
Stocker installation height	6 shelves	—	4520 mm
	8 shelves	—	5220 mm
Air supply	Flow rate	1000 NL/min (1.0 m ³ /min)	
	Pressure	0.5 MPa (5 kgf/cm ²)	
Power supply capacity		13 kVA	21 kVA

*Specifications may vary depending on machine combinations and options.
*Air supply and power supply capacity values shown exclude values for the machine processing main unit.

Turret layout



Main Specifications

Press capacity	300 kN	
Rated output	3.0 kW	
Maximum processable sheet thickness	6.35 mm	
Y axis stroke	1665 mm	
X axis stroke	2580 mm	
Processing sheet size	1250 mm x 2500 mm	
Depth (slot depth)	1340 mm	
Feed clearance	25 mm	
Maximum sheet weight	150 kg	
Hit rate (1.0 t 25 mm pitch)	510 hpm	
Table speed (combined)	125 m/min	
Punch processing precision	±0.1 mm (according to Murata's our company's precision testing standards)	
Turret rotation speed	35 rpm	
Index tool rotation speed	100 rpm	
Installation floor area (L x W x H)	6400 mm x 6610 mm x 2420 mm (*1)	
Air supply	Flow rate	760 NL/min (0.76 m ³ /min) (*4)
	Pressure	0.6 MPa (6 kgf/cm ²)
Power supply capacity (main unit)	25 kVA (*2)	
Machine weight (*3)	Main unit:	Approximately 11 tons
	Table:	Approximately 7 tons
	Laser frame:	Approximately 4 tons
	Fence:	Approximately 1 ton

Oscillator specifications

Rated output	3.0 kW
Oscillation method	LD excitation fiber laser
Laser wavelength	1.07 μm
Power supply capacity	10.4 kVA
Compatible chiller power supply capacity	8.7 kVA

*1: Includes dimensions of peripheral devices. Excludes maintenance area space.
*2: Excludes required power supply capacity for peripheral equipment.
*3: Excludes peripheral device weights.
*4: +300 NL/min (0.3 m³/min) required when connecting to FG2512 or FG2512T.

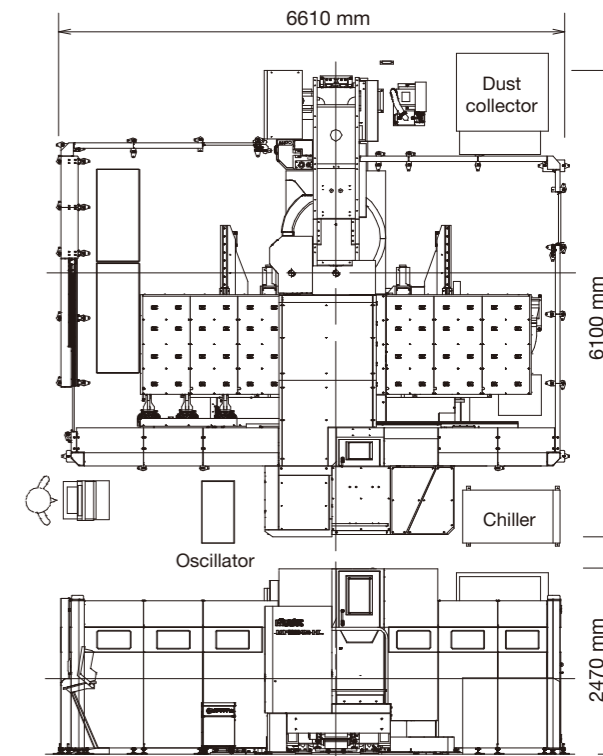
* The machines shown in the catalogue include some optional items and may vary in appearance from the actual machines.
* Specifications and designs are subject to change without prior notice.

Tooling ranges

Range	Round	Number of stations			
		54ST/2 indexes	44ST/4 indexes	56ST/2 indexes	56ST/4 indexes
X	~12.7mm	10	10	18	18
B	~25.0mm	28	16	16	16
C	~38.0mm	6	6	16	16
D	~50.0mm	4	4	2	2
E	~64.0mm	2	2	0	0
F	~75.0mm	2	2	0	0
G	~89.0mm				
H	~105.0mm	2	2	2	0
J	~120.0mm				
INDEX	~75.0mm				
M/T	12 stations	2	4	2	4
M/K	20/40 characters				

*Desired index tool (I/T), multitool (M/T: optional), and marking tool (M/K: optional) combinations can be selected for index stations.
*Also compatible with spring tool type. Contact us for more details.

Floorplan



*Layout for 3.0 kW specification.

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