

Mazak

FG-400 NEO

[3D Fiber Laser Processing Machine]

FG-400 NEO

Mazak



YAMAZAKI MAZAK CORPORATION

1-131 Takeda, Oguchi-cho, Niwa-gun, Aichi-pref., Japan
TEL : +(81)587-95-1131

www.mazak.com

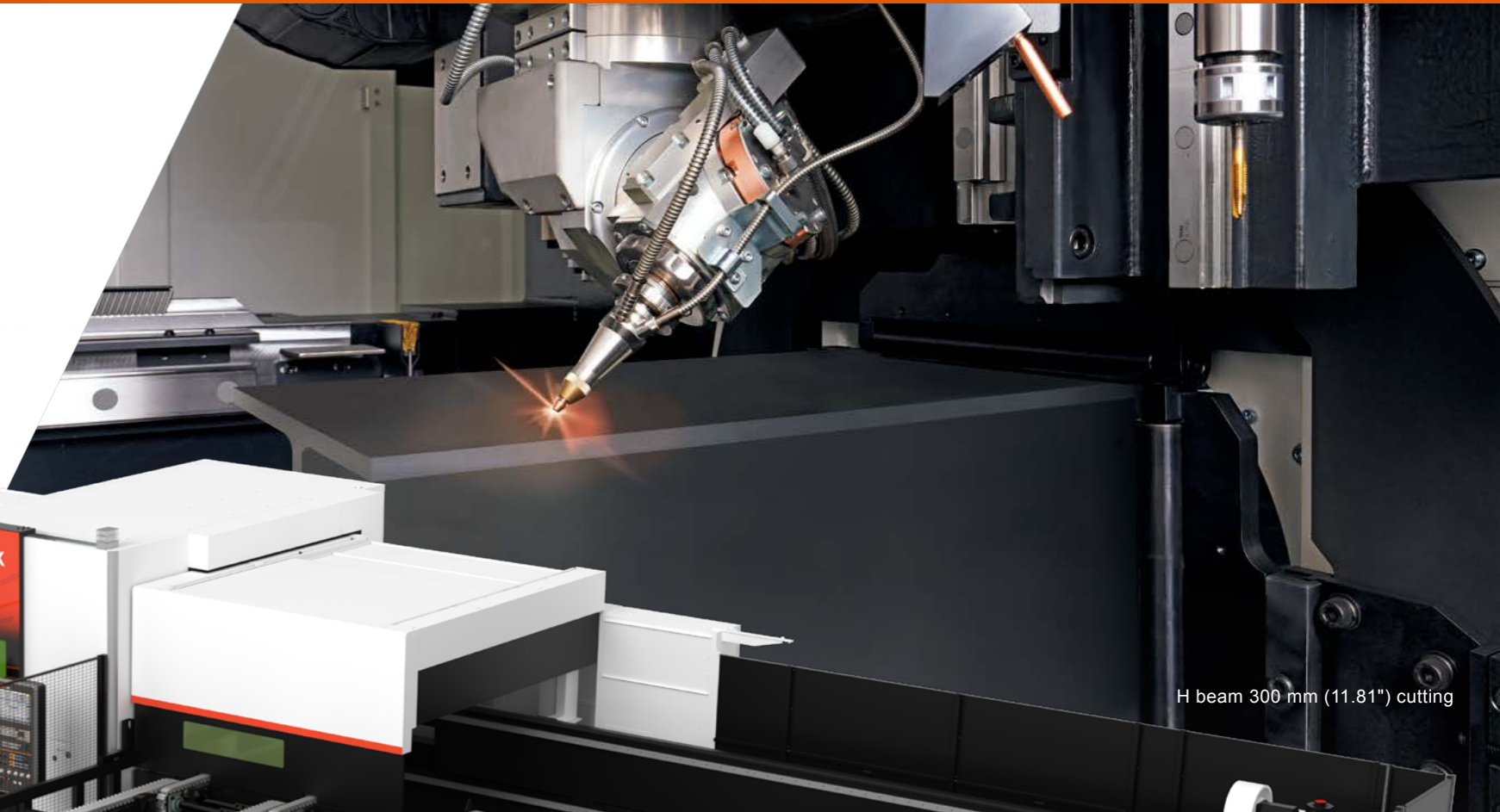
- Specifications are subject to change without notice.
- This product is subject to all applicable export control laws and regulations.
- The accuracy data and other data presented in this catalogue were obtained under specific conditions. They may not be duplicated under different conditions. (room temperature, workpiece materials, tool material, cutting conditions, etc.)
- Unauthorized copying of this catalogue is prohibited.

E

FG-400 NEO 22.06.0 G 99J453322E0

FG-400 NEO

Automatic and continuous 3D laser cutting of large and long structural material
High precision cutting of complex features

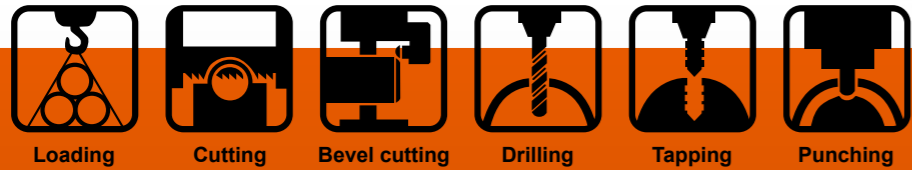


H beam 300 mm (11.81") cutting



Complete all cutting processes in one machine.
The FG-400 NEO streamlines production processing and corporate performance.

The FG-400 NEO covers all processes from material supply to a finished part.



The resulting benefits are as follows:

- Reduction of time required for machine setup
- Reduction of production lead time
- Smaller in-process inventory
- Reduced the number of machines and fixtures
- Smaller number of required operators
- Reduced floor space requirements

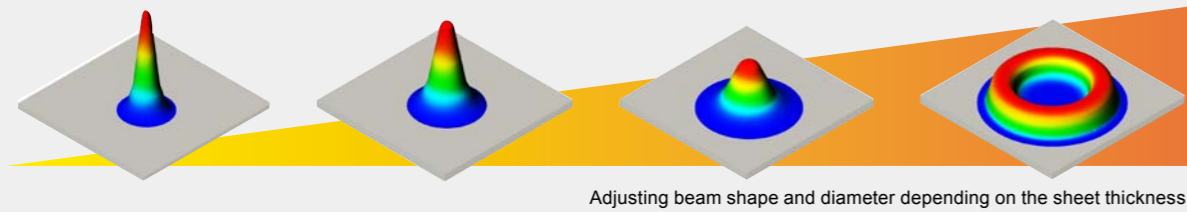
Chain type conveyor (option) shown.

Higher Productivity

The advanced technology of the Fiber Laser provides higher productivity and higher efficiency than other systems

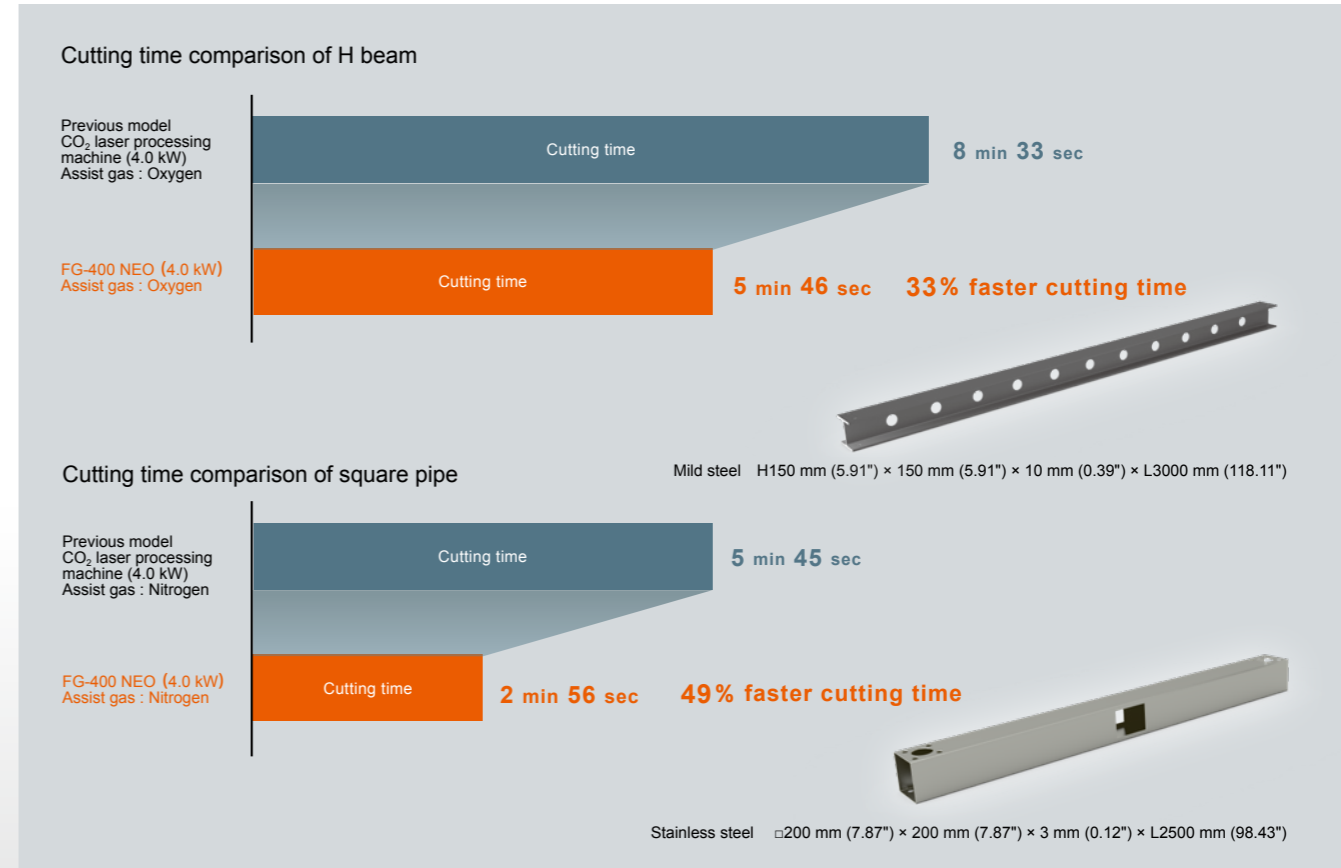
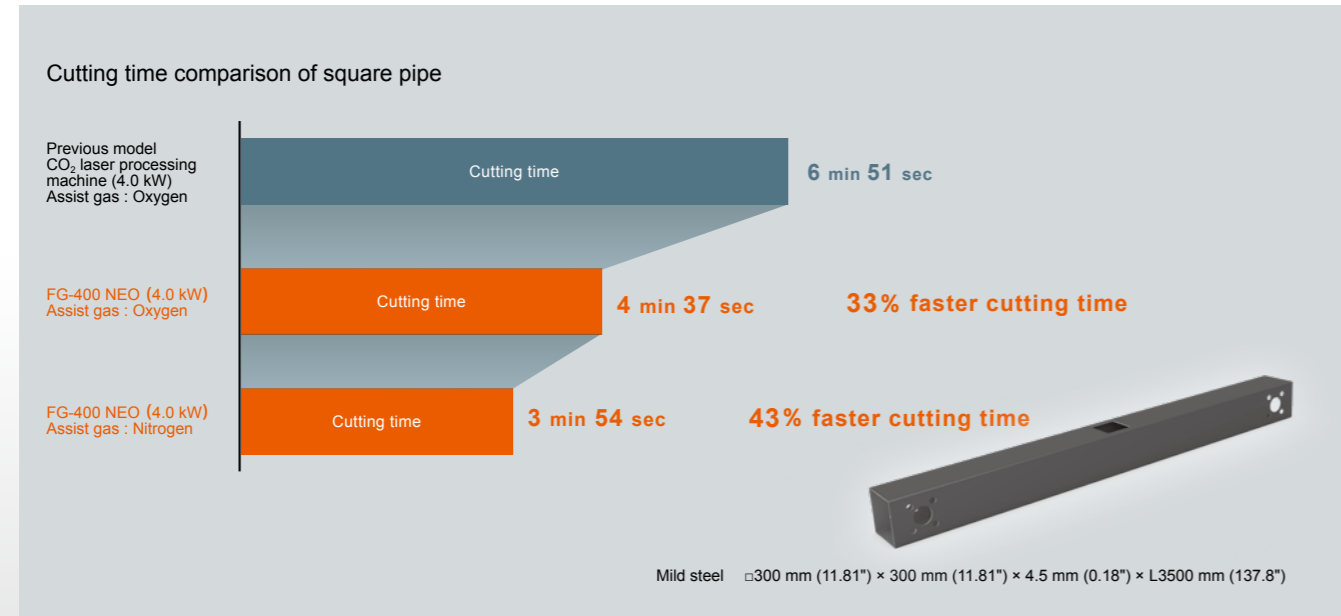
Maximum control of beam shape and beam diameter

FG-400 NEO automatically adjusts beam diameter to accommodate the cutting of various materials and thicknesses. Additionally, machines are equipped with beam shaping technology which controls where the power density of the laser beam is concentrated. Together, these functions improve cut speed and cut quality for a wide range of materials.



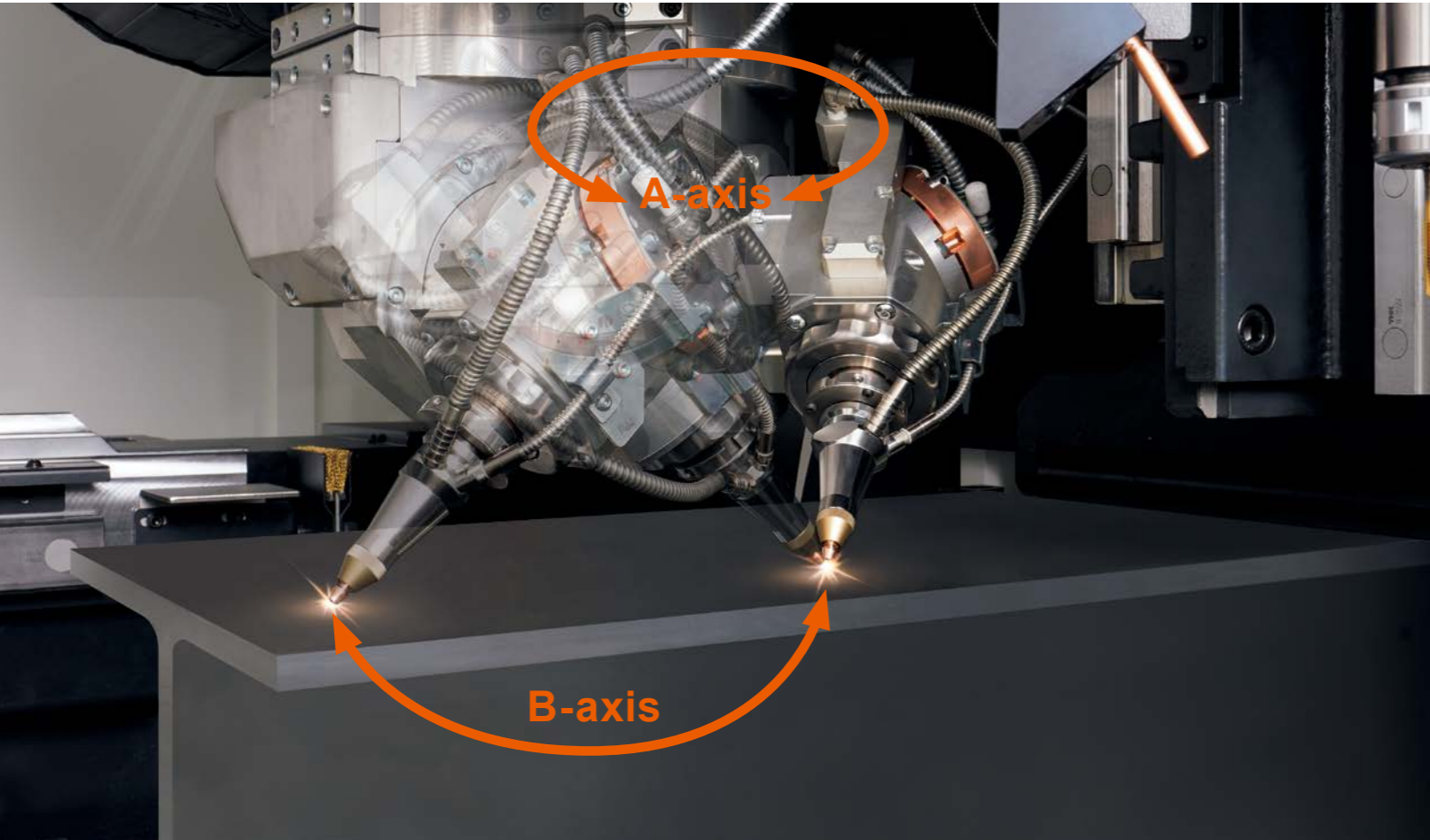
Productivity comparison

The Fiber Laser has a shorter wavelength than a CO₂ laser for high speed cutting of medium steel.
 The FG-400 NEO improves productivity of cutting thin to medium thickness pipe and other structural material.
 Productivity in stainless steel cutting is further improved.

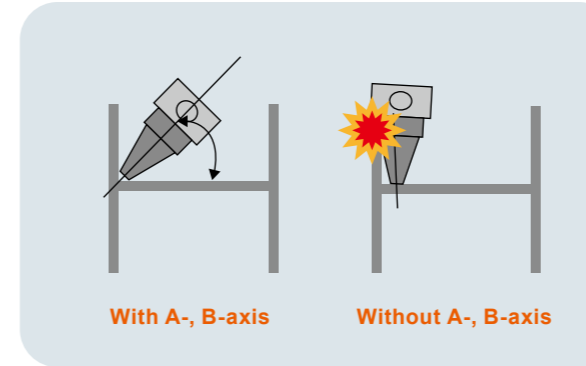


Higher Accuracy

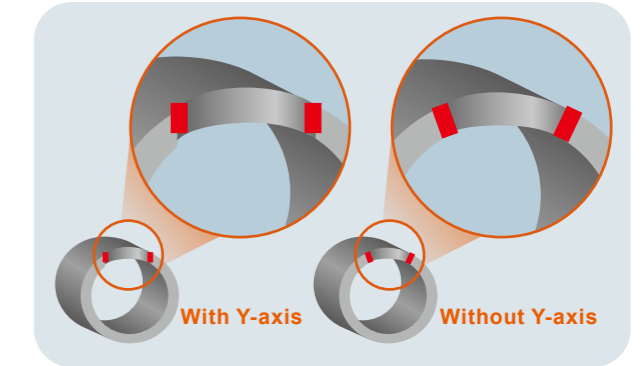
The 3D laser head with A-axis and B-axis can process a broader range of materials at desired angle



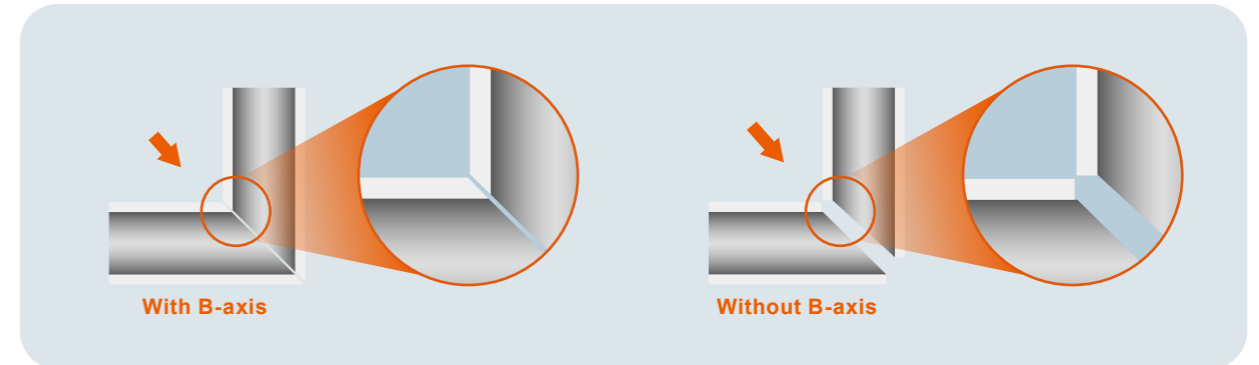
- Cutting off the H beam by the A-axis and the B-axis



- Vertical cutting by the Y-axis



- Bevel cutting by the B-axis provides tight-joint of pipes



Tight joint-fits by the 3D laser head

The 3D laser head enables machining from various angles and directions, as well as improves accuracy for joining pipes and structural materials.

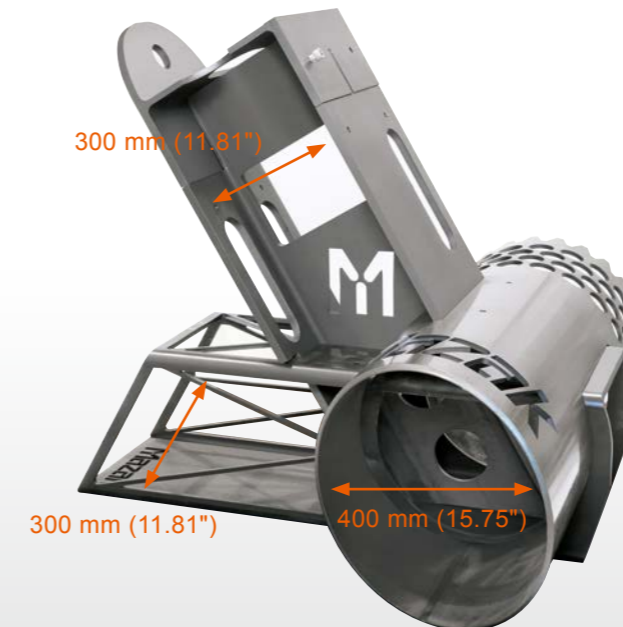
Protection torch

Minimize damage by tilting if torch collides with workpiece.



A wide range of workpieces, including highly reflective materials can be processed

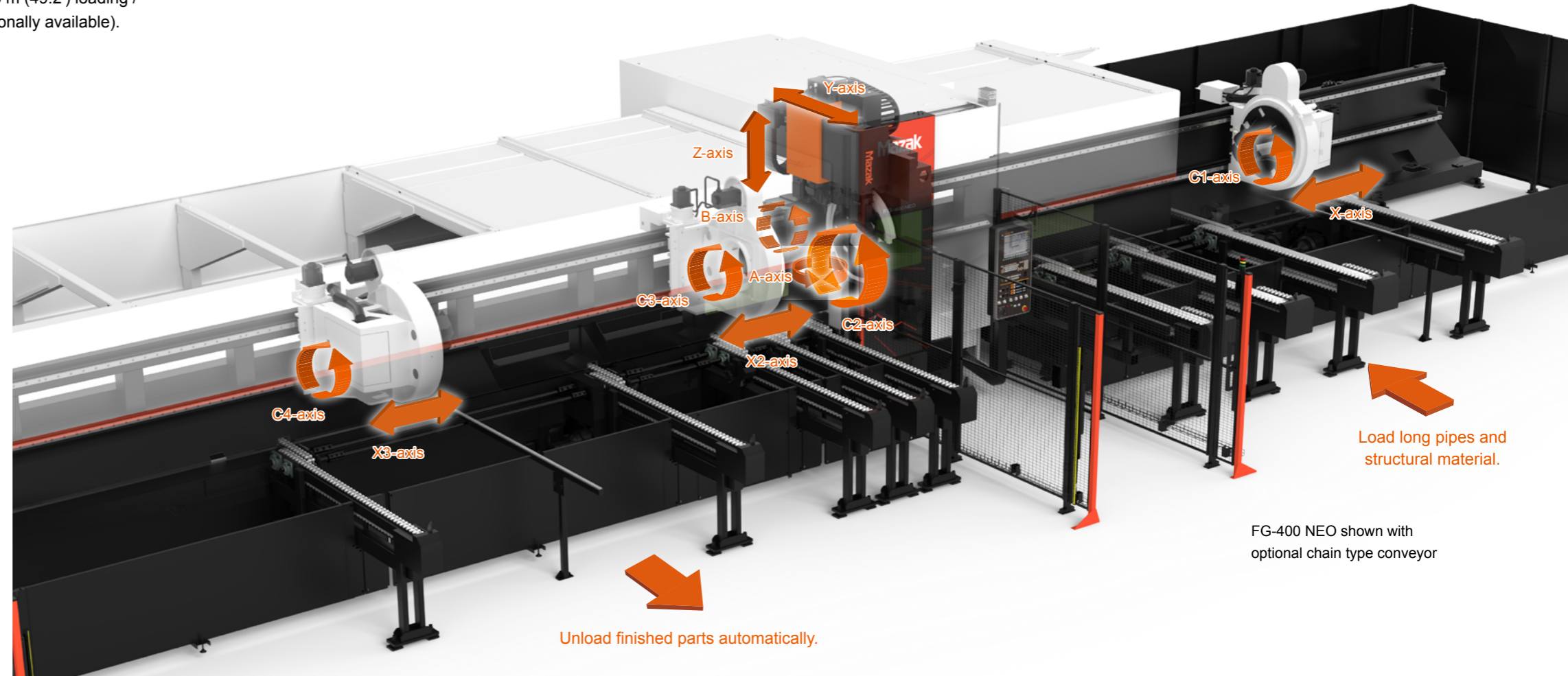
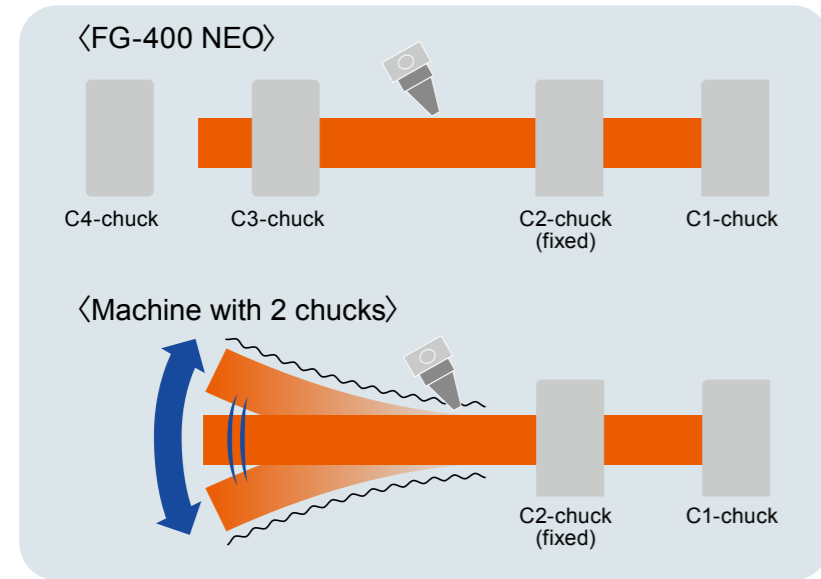
The combination of the 3D laser head and the fiber laser ensures stable machining of complex features and highly reflective materials, such as copper and brass.



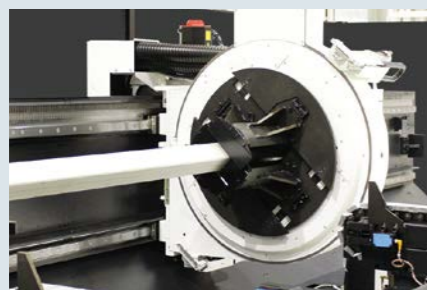
Higher Accuracy

To prevent material from distorting, 4 chucks simultaneously travel and rotate. A wide variety of equipment, such as supporters enables high accuracy cutting of long material.

Standard model can load 8 m (26.2') material, also unload 8 m (26.2') finished parts (6 m (19.6') and 12 m (39.4') and 15 m (49.2') loading / unloading units are optionally available).



Auto centering and clamping of material



Automatically center and clamp different shapes such as round, square and rectangular.

Horizontal workpiece centering OPTION



Horizontal workpiece centering for long beams and small pipes by roller to prevent material displacement.

Flat support



Flat roller follows the shape of material in order that the material will not sag from its own weight.

Fixed support



Long, small diameter material is supported by fixed supports located just beside V-shaped supports, therefore the material will not sag from its own weight.

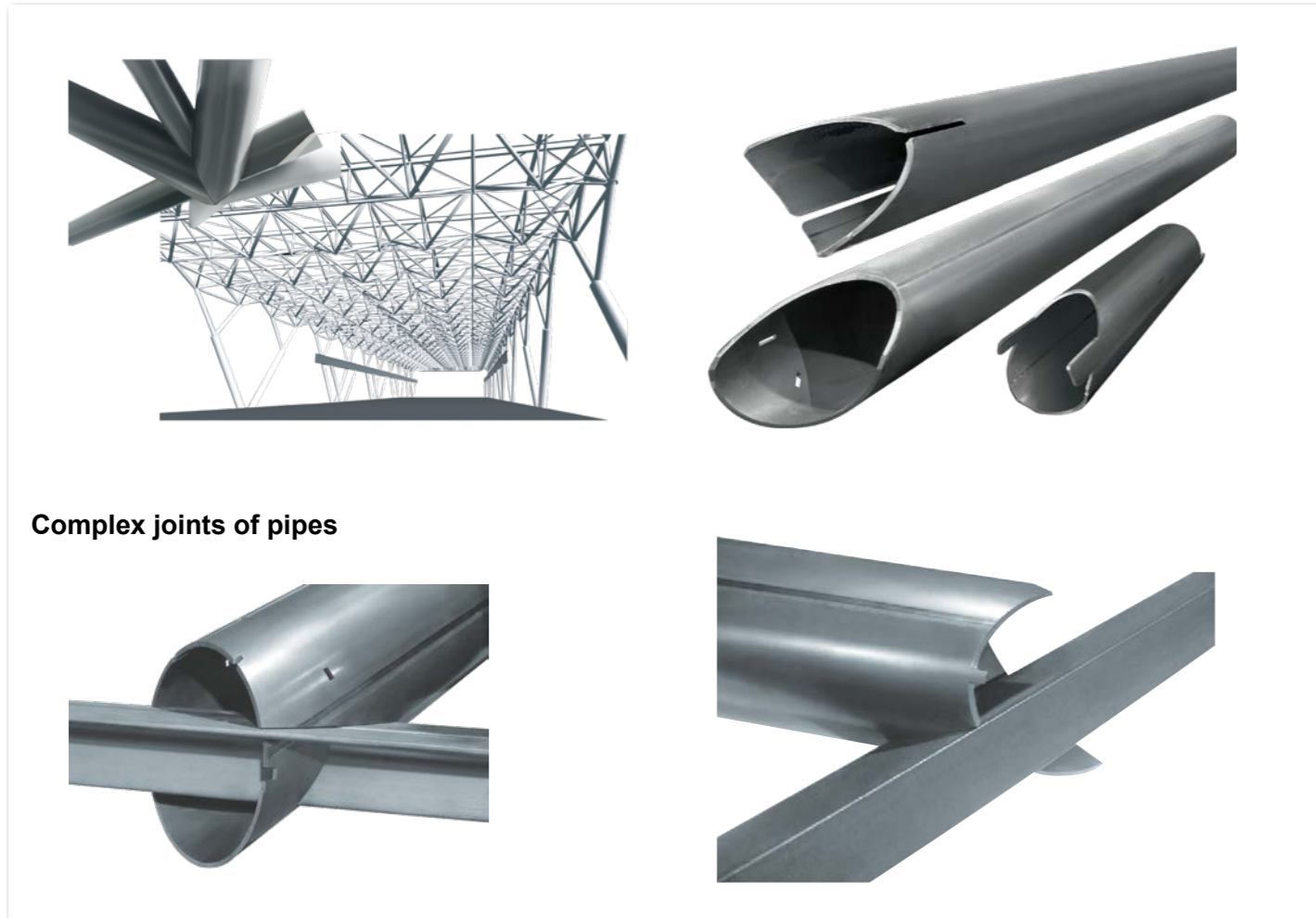
Round pipe support



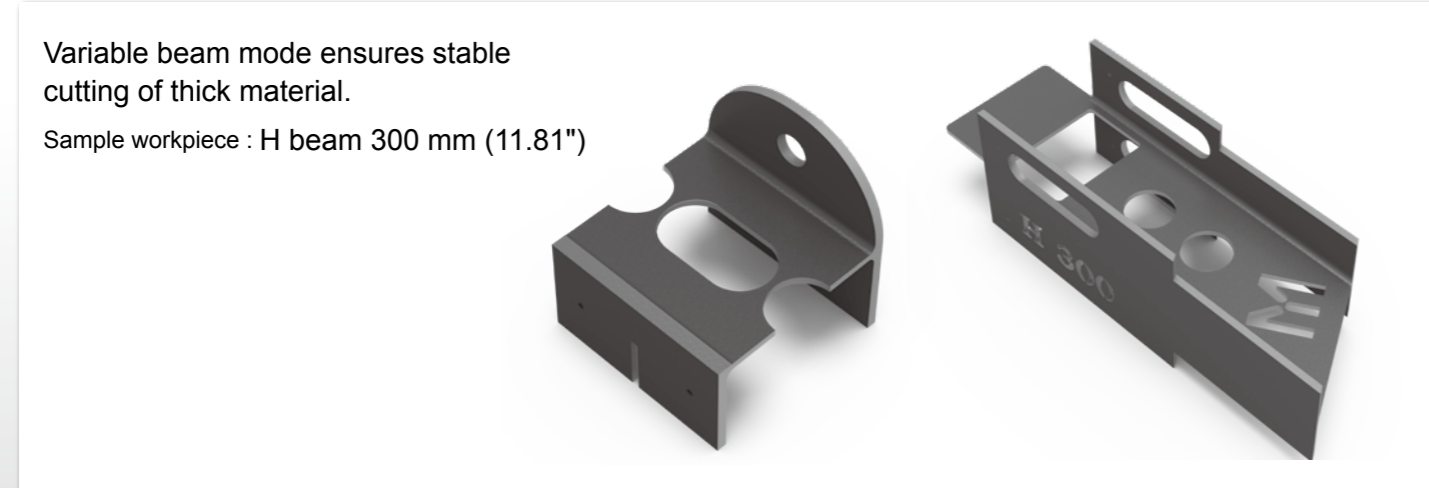
Round material is supported by V-shaped supports, and the material will not sag from its own weight.

Steel Space Frames

By laser cutting pipes and structural material with high precision, tight pipe joints can be produced. As a result, rigid space frames can be quickly constructed with reduced welding when compared to conventional construction processes.



Complex joints of pipes



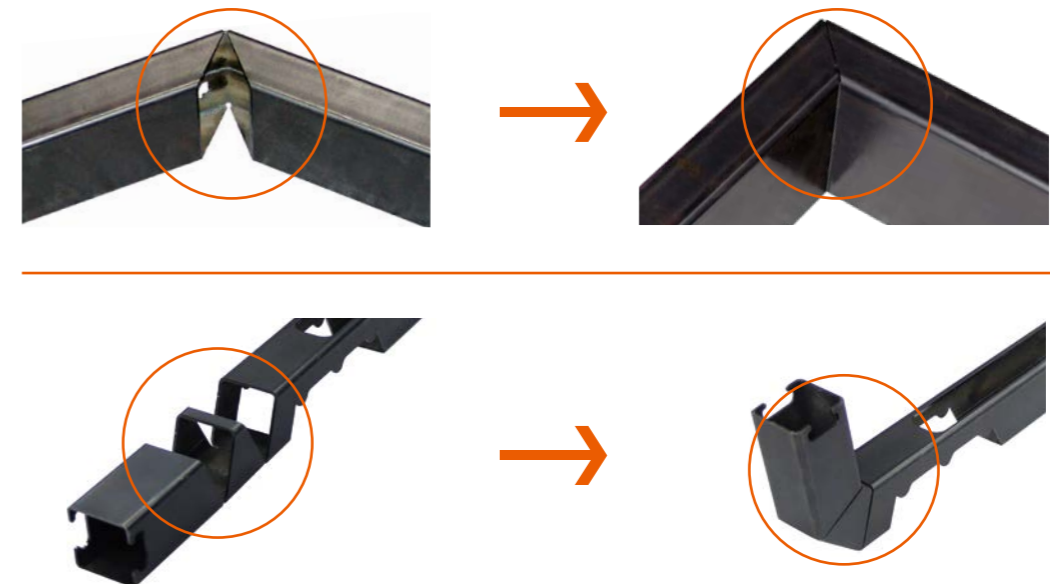
Laser cut complex contours with tabs and slots shortens positioning time for welding

By assembling with laser cut tabs and slots on pipe components, tight fit joints are produced and positioning time for welding is reduced.

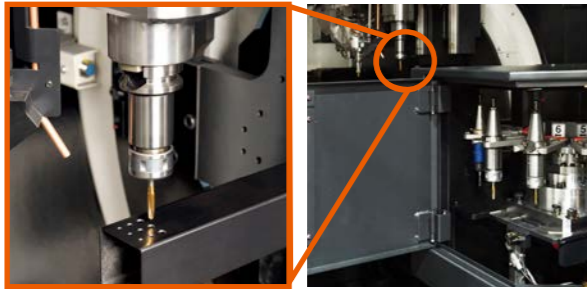


Bending and folding method reduces in-process time

By utilizing bending and folding method, assembly accuracy for joining pipes is improved, and processes required for marking and welding is reduced. This significantly reduces in-process time.



Tapping unit



Complete all cutting processes from 3D cutting to tapping in the same machine. The hole to be tapped is cut by the laser and tapped for shorter production lead time and higher productivity.
[Max. M16 (5/8 UNC and UNF)]

Chain type conveyor



Easily load larger quantities of material (depends on diameter) for continuous operation.
(Max. quantity of material diameter :
Φ20 (0.79") mm × 40, Φ400 (15.75") mm × 5)

Flat bar handling



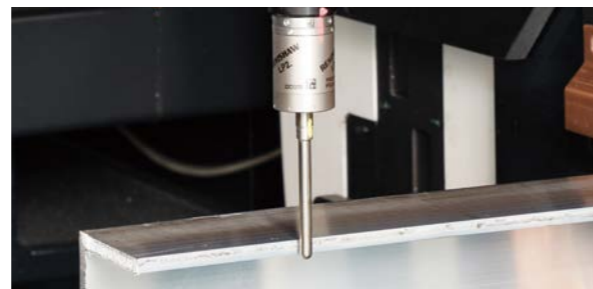
By attaching a jaw dedicated for flat bar cutting, flat bars can be processed.

Workpiece measurement



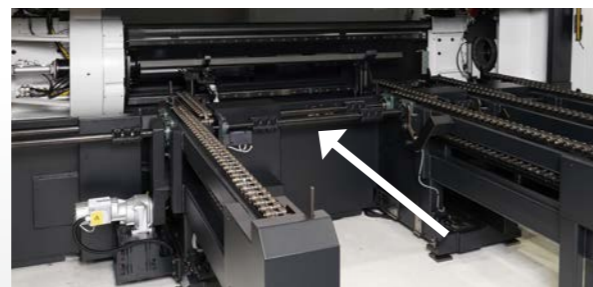
Automatically measures material length after loading into machine, eliminating manual measuring for each piece of material.

Touch sensor



Measures the O.D. of pipe and structural material, also automatically compensates for material distortion to ensure high precision positioning.

Short material carrying function



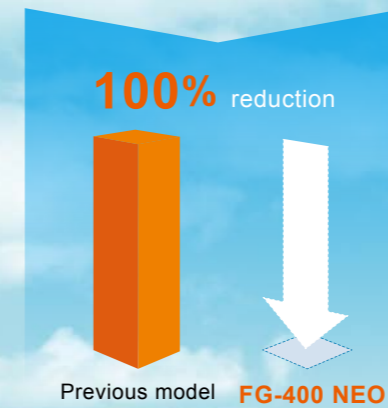
Even short materials, which cannot be loaded from the loader side, can be loaded from the unloader side, making use of material efficiently.

Designed with environmental considerations

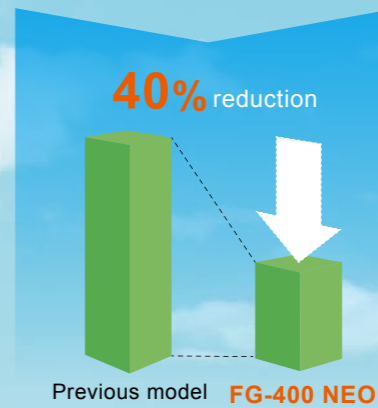


The environment and our impact on natural surroundings have always been important concerns of Yamazaki Mazak.
This is shown by the fact that all factories in Japan where Mazak machine tools and laser processing machines are produced are ISO 14001 certified, an international standard confirming that the operation of our production facilities does not adversely affect air, water or land.

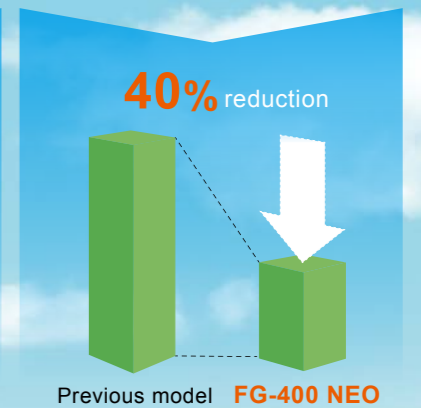
Reduced laser gas consumption compared to previous model



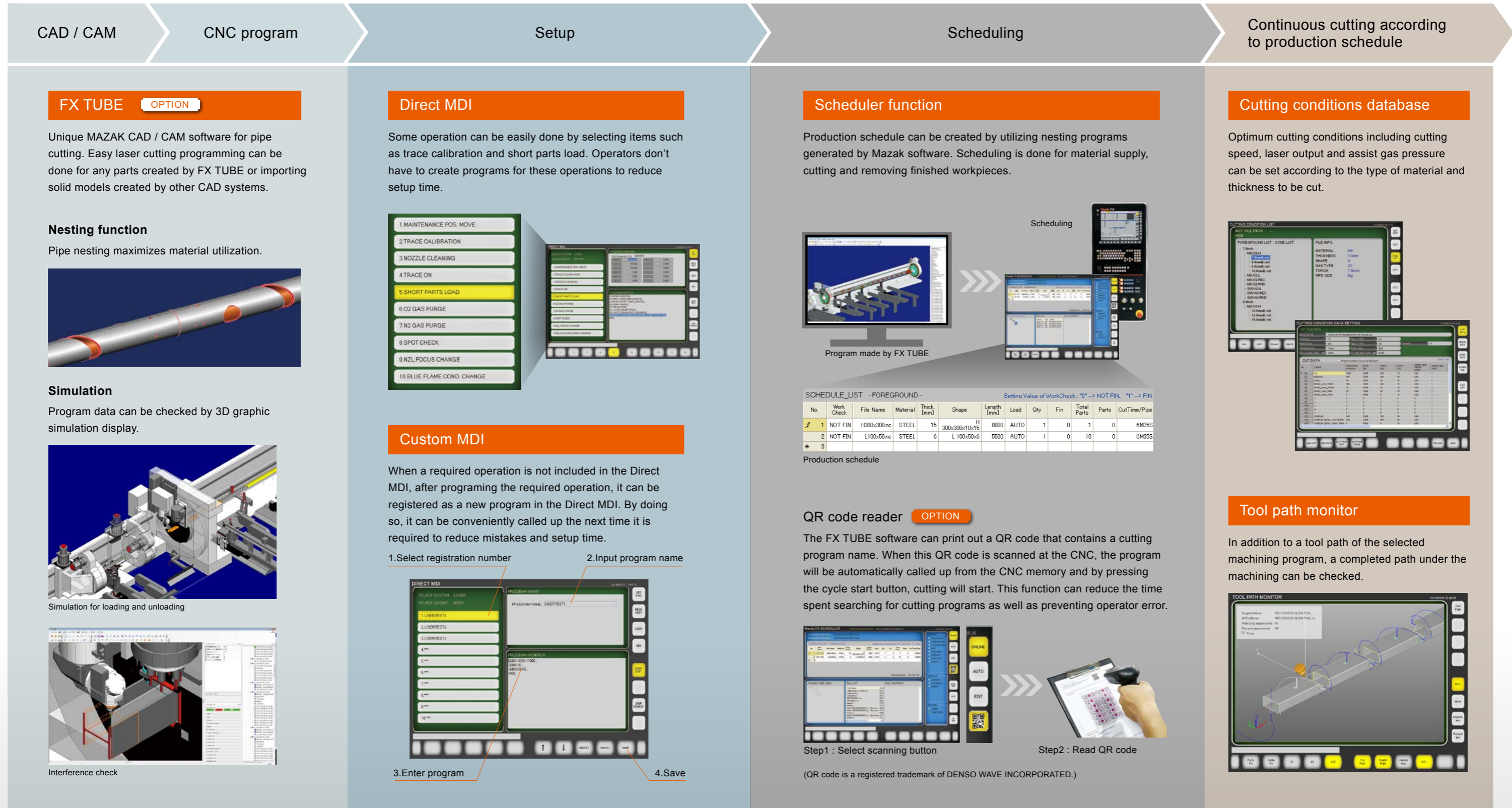
Reduced electrical power consumption during cutting compared to previous model



Reduced electrical power consumption during stand-by state compared to previous model



Convenient operation of FG-400 NEO from making CNC program to cutting

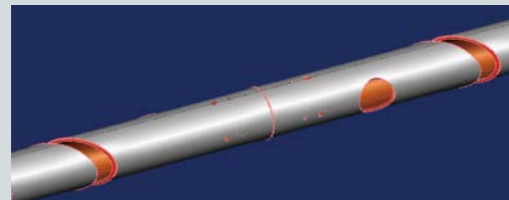


FX TUBE OPTION

Unique MAZAK CAD / CAM software for pipe cutting. Easy laser cutting programming can be done for any parts created by FX TUBE or importing solid models created by other CAD systems.

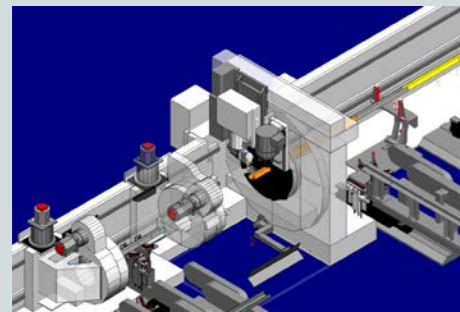
Nesting function

Pipe nesting maximizes material utilization.

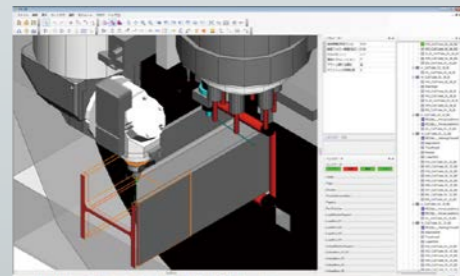


Simulation

Program data can be checked by 3D graphic simulation display.



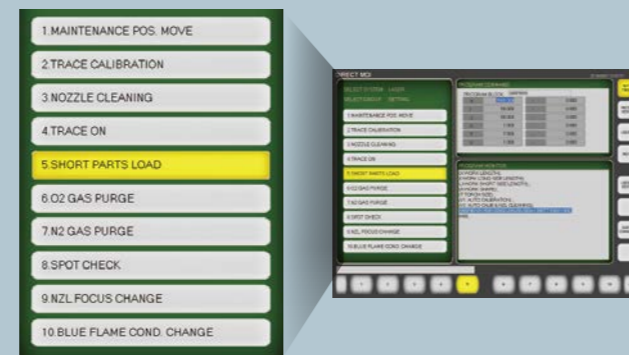
Simulation for loading and unloading



Interference check

Direct MDI

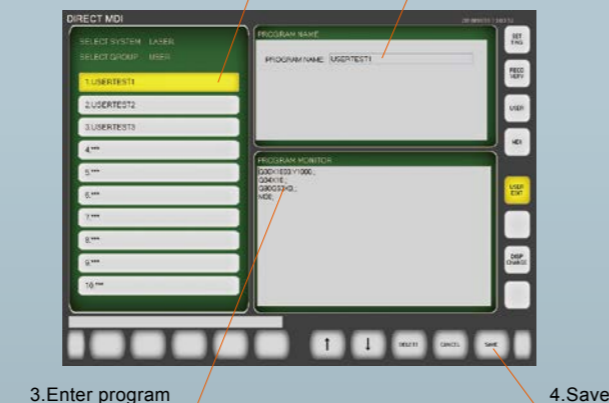
Some operation can be easily done by selecting items such as trace calibration and short parts load. Operators don't have to create programs for these operations to reduce setup time.



Custom MDI

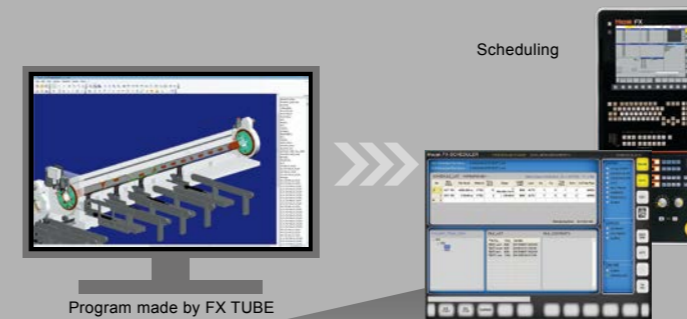
When a required operation is not included in the Direct MDI, after programming the required operation, it can be registered as a new program in the Direct MDI. By doing so, it can be conveniently called up the next time it is required to reduce mistakes and setup time.

1. Select registration number
2. Input program name



Scheduler function

Production schedule can be created by utilizing nesting programs generated by Mazak software. Scheduling is done for material supply, cutting and removing finished workpieces.



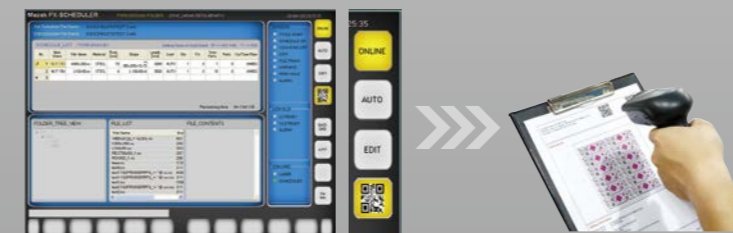
SCHEDULE_LIST - FOREGROUND - Setting Value of WorkCheck: '0' -> NOT FIN, '1' -> FIN

No.	Work Check	File Name	Material	Thick. [mm]	Shape	Length [mm]	Load	Qty	Fin	Total Parts	Parts	OutTime/Pipe
1	NOT FIN	H300x300.nc	STEEL	15	300x300x10x15	8000	AUTO	1	0	1	0	6M36S
2	NOT FIN	L100x50.nc	STEEL	6	L 100x50x6	5500	AUTO	1	0	10	0	6M36S
* 3												

Production schedule

QR code reader OPTION

The FX TUBE software can print out a QR code that contains a cutting program name. When this QR code is scanned at the CNC, the program will be automatically called up from the CNC memory and by pressing the cycle start button, cutting will start. This function can reduce the time spent searching for cutting programs as well as preventing operator error.



Step1 : Select scanning button

Step2 : Read QR code

(QR code is a registered trademark of DENSO WAVE INCORPORATED.)

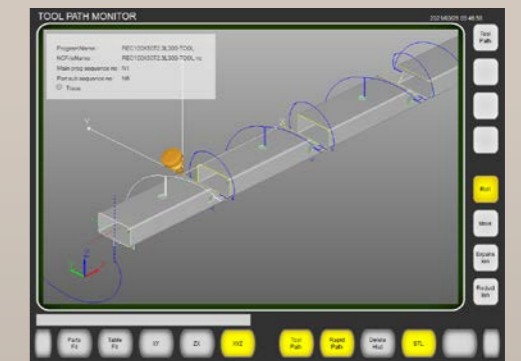
Cutting conditions database

Optimum cutting conditions including cutting speed, laser output and assist gas pressure can be set according to the type of material and thickness to be cut.





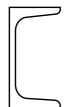
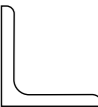
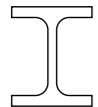

Tool path monitor

In addition to a tool path of the selected machining program, a completed path under the machining can be checked.



■ Specification in Materials

The list below shows the JIS steel reference masses for each material shape.

Material shape	Minimum to maximum	JIS steel reference masses
	Φ20 mm to Φ406.4 mm (Φ0.79" to Φ16")	Φ152.4 mm × t 12 mm (Φ6.00" × t 0.47") : 41.5 kg/m (27.89 lbs/ft) Φ216.3 mm × t 8.2 mm (Φ8.52" × t 0.32") : 42.1 kg/m (28.29 lbs/ft) Φ267.4 mm × t 9.3 mm (Φ10.53" × t 0.37") : 59.2 kg/m (39.78 lbs/ft) Φ318.5 mm × t 10.3 mm (Φ12.54" × t 0.41") : 78.3 kg/m (52.62 lbs/ft) Φ355.6 mm × t 11.1 mm (Φ14.00" × t 0.44") : 94.3 kg/m (63.37 lbs/ft) Φ406.4 mm × t 9.3 mm (Φ16.00" × t 0.37") : 93 kg/m (62.49 lbs/ft)
	20 mm × 20 mm to 305 mm × 305 mm (0.79" × 0.79" to 12.01" × 12.01")	150 mm × 150 mm × t 9 mm (5.91" × 5.91" × t 0.35") : 38.2 kg/m (25.67 lbs/ft) 200 mm × 200 mm × t 12 mm (7.87" × 7.87" × t 0.47") : 67.0 kg/m (45.02 lbs/ft) 250 mm × 250 mm × t 12 mm (9.84" × 9.84" × t 0.47") : 85.8 kg/m (57.65 lbs/ft) 300 mm × 300 mm × t 9 mm (11.81" × 11.81" × t 0.35") : 80.6 kg/m (54.16 lbs/ft)
	20 mm × 20 mm to 305 mm × 140 mm (0.79" × 0.79" to 12.01" × 5.51")	150 mm × 75 mm × t 9 mm × t 12.5 mm (5.91" × 2.95" × t 0.35" × t 0.49") : 24.0 kg/m (16.13 lbs/ft) 200 mm × 90 mm × t 8 mm × t 13.5 mm (7.87" × 3.54" × t 0.31" × t 0.53") : 30.3 kg/m (20.36 lbs/ft) 250 mm × 90 mm × t 11 mm × t 14.5 mm (9.84" × 3.54" × t 0.43" × t 0.57") : 40.2 kg/m (27.01 lbs/ft) 300 mm × 90 mm × t 12 mm × t 16 mm (11.81" × 3.54" × t 0.47" × t 0.63") : 48.6 kg/m (32.66 lbs/ft)
	20 mm × 20 mm to 254 mm × 254 mm (0.79" × 0.79" to 10" × 10")	150 mm × 150 mm × t 12 mm (5.91" × 5.91" × t 0.47") : 27.3 kg/m (18.34 lbs/ft) 175 mm × 175 mm × t 15 mm (6.89" × 6.89" × t 0.59") : 31.8 kg/m (21.37 lbs/ft) 200 mm × 200 mm × t 15 mm (7.87" × 7.87" × t 0.59") : 45.3 kg/m (30.44 lbs/ft)
	20 mm × 20 mm to 305 mm × 305 mm (0.79" × 0.79" to 12.01" × 12.01")	150 mm × 150 mm × t 7 mm × t 10 mm (5.91" × 5.91" × t 0.28" × t 0.39") : 31.1 kg/m (20.9 lbs/ft) 200 mm × 200 mm × t 5.5 mm × t 8 mm (7.87" × 7.87" × t 0.22" × t 0.31") : 49.9 kg/m (33.53 lbs/ft) 250 mm × 250 mm × t 9 mm × t 14 mm (9.84" × 9.84" × t 0.35" × t 0.55") : 71.8 kg/m (48.25 lbs/ft) 300 mm × 300 mm × t 10 mm × t 15 mm (11.81" × 11.81" × t 0.39" × t 0.59") : 93.0 kg/m (62.49 lbs/ft)
	20 mm × 20 mm to 305 mm × 305 mm (0.79" × 0.79" to 12.01" × 12.01")	150 mm × 125 mm × t 8.5 mm × t 14 mm (5.91" × 4.92" × t 0.33" × t 0.55") : 36.2 kg/m (24.33 lbs/ft) 200 mm × 150 mm × t 9 mm × t 16 mm (7.87" × 5.91" × t 0.35" × t 0.63") : 50.4 kg/m (33.87 lbs/ft) 300 mm × 150 mm × t 10 mm × t 18.5 mm (11.81" × 5.91" × t 0.39" × t 0.73") : 65.5 kg/m (44.01 lbs/ft)
Others	In the range of 20 mm × 20 mm to 305 mm × 305 mm (0.79" × 0.79" to 12.01" × 12.01") This applies to workpieces that can be transferred in the correct posture without interfering with any device.	

Note 1: Even though the material brand used is the same, the maximum processable material thickness, the machining speed, and the surface roughness vary depending on the dispersion and surface condition of materials.
The actual material thickness depends on the pipe shape and the maximum loading mass.

Note 2: The above table shows material shapes that can be clamped and transferred by a standard chuck. However, they may not be machined due to bends, warps, machining shapes, etc. in actual machining.

Note 3: The permissible range of cross-sectional dimensions is as shown above for each shape. Do not fail to consider the length and thickness in order that the maximum allowable deadmass should not be exceeded.

Note 4: For the 12 m (39.4') model and 15 m (49.2') model, materials with a diameter of less than 40 mm (1.57"), or materials with a short side of less than 40 mm (1.57") and a length larger than the regular length material may not be able to be loaded because of deflection.

■ Machine Specifications

Model *1	6 m (19.6') (option)	8 m (26.2')	12 m (39.4') (option)	15 m (49.2') (option)
Workpiece shape	Round, square, L / H / I beam and channel			
Workpiece material	Mild steel / stainless steel / copper / brass / aluminum			
Workpiece diameter *2	Round pipe	Φ20 mm ~ Φ406.4 mm (Φ0.79" ~ Φ16")		
	Square pipe	20 mm × 20 mm ~ 305 mm × 305 mm (0.79" × 0.79" ~ 12.01" × 12.01")		
	L beam	20 mm × 20 mm ~ 254 mm × 254 mm (0.79" × 0.79" ~ 10" × 10")		
	H / I beam	20 mm × 20 mm ~ 305 mm × 305 mm (0.79" × 0.79" ~ 12.01" × 12.01")		
	Channel	20 mm × 20 mm ~ 305 mm × 140 mm (0.79" × 0.79" ~ 12.01" × 5.51")		
Max. material length for loading	6180 mm (243.31")	8080 mm (318.11")	12280 mm (483.46")	15180 mm (597.64")
Min. material length for loading	2500 mm (98.43")	3450 mm (135.83")	2200 mm (86.61")	3600 mm (141.73")
Min. material length for loading (option)	1700 mm (66.93")	2200 mm (86.61")	—	—
Max. material length for unloading	6100 mm (240.16")	8000 mm (314.96")	12200 mm (480.31")	15100 mm (594.49")
Max. workpiece weight*3	600 kg (1323 lbs)	800 kg (1764 lbs)	1200 kg (2646 lbs)	1200 kg (2646 lbs)
	100 kg/m (67 lbs/ft)			
Stroke	X Chuck left / right	6890 mm (271.26")	8790 mm (346.06")	12990 mm (511.42")
	X2 Chuck left / right	7400 mm (291.34")	9300 mm (366.14")	13500 mm (531.5")
	X3 Chuck left / right	2515 mm (99.02")		
	Y Head back / forth*4	1270 mm (50")		
	Z Head up / down	425 mm (16.73")		
	A Head rotation	±99999.999 deg		
	B Head swing	±135 deg		
Max. traverse rate	X, X2, X3	60 m/min (2362 IPM)		
	Y	36 m/min (1417 IPM)		
	Z	30 m/min (1181 IPM)		
	A, B	9600 deg/min		
	C (Chuck rotation)	17400 deg/min		
Machine weight*5	36000 kg (79365 lbs)	38500 kg (84877 lbs)	43500 kg (95899 lbs)	47200 kg (104056 lbs)
Electrical requirement	63 kVA			
Sound*6	Less than 80 dB (A)			

*1 Workpiece length for loading and unloading can be different length

*2 Jaws are changed according to material diameter

*3 Requires to meet maximum workpiece weight and maximum workpiece weight per 1 meter

*4 Including ATC stroke of rotary-tool spindle unit (option)

*5 When workpiece length for loading and unloading is the same length

*6 Equivalent continuous sound pressure level at operator position (dependent on equipment options)

■ Loader / Unloader Specifications

	V support	Chain (option)
Max. quantity of material loaded	Φ400 mm (Φ15.75")	5
	Φ150 mm (Φ5.91")	11
	Φ50 mm (Φ1.97")	23
	Φ20 mm (Φ0.79")	40
Max. total weight capacity of loader / unloader	6000 kg (13228 lbs)	6000 kg (13228 lbs)
Transfer speed	2.5 m/min*7 (98 IPM)	2.5 m/min (98 IPM)

*7 Transfer speed may vary depending on region

■ CNC Standard Specifications

Model	MAZAK FX
CPU	64 bit
Controlled axes	Max. 32
Minimum program increment	0.001 mm (0.0001")
Programming method	EIA / ISO
Monitor	15" color LCD

■ Specification of Laser Resonator

Resonator	4.0 kW
Wave length	1060 ~ 1080 nm

■ Standard and Optional Equipment

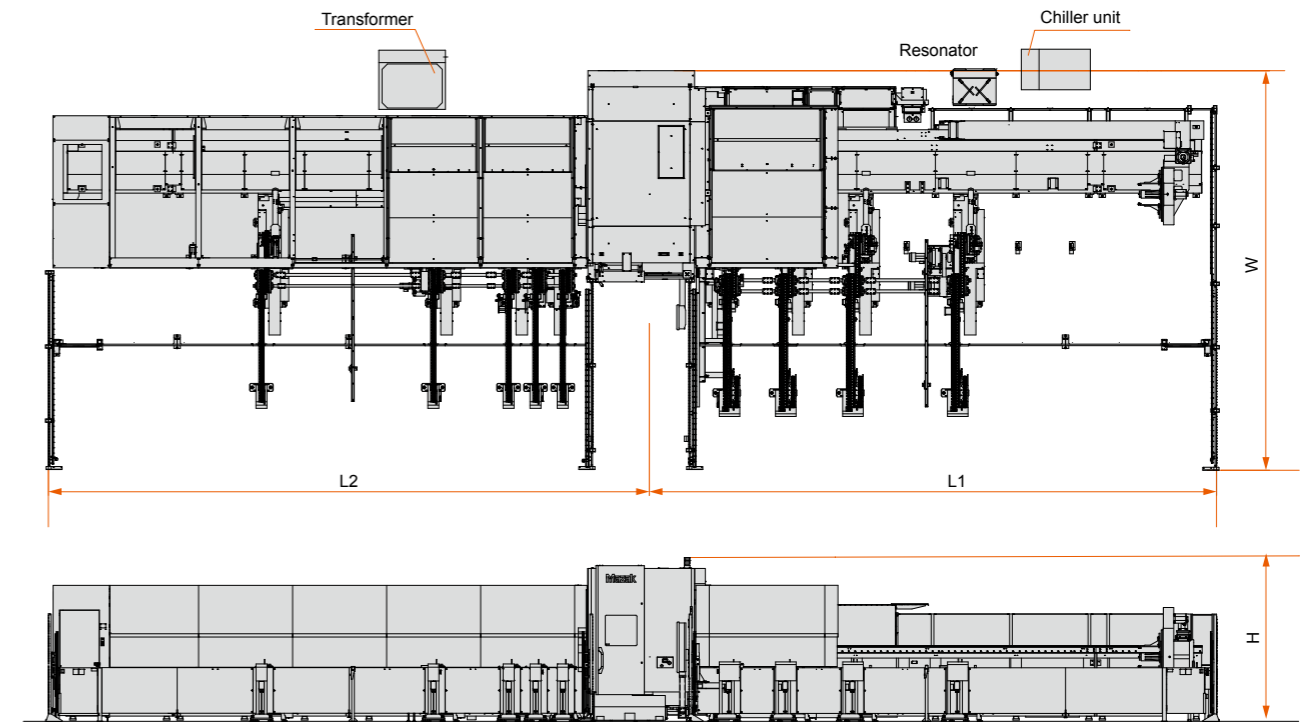
		● : Standard ○ : Option
Machine	Resonator status indicator light	●
	Chiller unit	●
	8 m (26.2') loading equipment	●
	8 m (26.2') unloading equipment	●
	6 m (19.6') / 12 m (39.4') / 15 m (49.2') loading equipment	○
	6 m (19.6') / 12 m (39.4') / 15 m (49.2') unloading equipment	○
	6 m (19.6') / 8 m (26.2') additional loader ^{*1}	○
	V support type conveyor	●
	Chain type conveyor	○
	Safety fence, light curtain	●
	Material support function (flat support, fixed support and round pipe support)	●
	Workpiece measurement function	○
	Short material carrying function	○
	6 m (19.6') / 8 m (26.2') horizontal workpiece centering ^{*1}	○
	Support for small diameter work (C2 chuck)	○
	Sliding jaw	○
	Flat bar handling ^{*2}	○
Parts catcher	●	
Auto power off	●	
Cutting head	Additional protection window	○
	Nozzle pointer	●
	Auto profiler calibration	●
	Auto nozzle cleaning	●
	Auto focus positioning	●
	Beam diameter change function	●
	Variable beam mode	●
	Touch sensor (X-axis end measurement, rechucking and twist compensation)	○
	Seam detector	○
	Rotary-tool spindle unit ^{*3}	○
Tapping unit ^{*3}	○	
Assist gas	3rd assist gas piping (supply : 3.0 MPa (435 PSI))	●
	4th assist gas piping (supply : 3.0 MPa (435 PSI))	○
	Assist gas pressure NC control	●
Environment	Scrap bucket	●
CNC	Scheduler function	●
	MTCconnect adapter	○
	QR code reader	○
Other	Manual	●

^{*1} Regarding 6 m (19.6') loading unit, additional loader and horizontal workpiece centering are not available simultaneously

^{*2} Material length for loading and unloading is partially restricted

^{*3} Rotary-tool spindle unit and tapping unit are not available simultaneously

■ Floor Space



Shown with 8 m (26.2') loading and unloading unit and optional chain conveyor.

Model		6 m (19.6') (option)	8 m (26.2')	12 m (39.4') (option)	15 m (49.2') (option)
Dimensions	L1	8709 mm (342.87")	10609 mm (417.68")	14989 mm (590.12")	17909 mm (705.08")
	L2	9279 mm (365.31")	11179 mm (440.12")	15379 mm (605.47")	18129 mm (713.74")
	W (V support)	7041 mm (277.2")			
	W (chain) (option)	7441 mm (292.95")			
	H	3052 mm (120.16")			