

# TANAKA

# TANAKA

## LASER SERIES

Leading the Way in Exceeding Customer Expectation

NISSAN TANAKA CORPORATION  
11CHIKUMAZAWA, MIYOSHI-MACHI, IRUMAGUN,  
SAITAMA 354-8585, JAPAN  
Tel : +81-49-258-4412  
overseas@nissantanaka.com  
<https://nissantanaka.com/english/>



TANAKA America Inc.  
2000 Bloomingdale Road, Suite 235,  
Glendale Heights, Illinois 60139, USA



Shanghai TANAKA Co., Ltd.  
628 room, 6 floor, NO.2000, Pudong Avenue,  
Free trade zone, Shanghai 200135, China  
3th. Flat A, Unit 9, No.658 Jingzhong Road,  
Changning D.C. Shanghai 200335, China

Nippon Cutting & Welding Equipment Co., Ltd.  
1/10 Moo 5 Rojana Road, Karnharm,  
U-Thai, Ayutthaya 13210, Thailand



Saitama factory is certified as ISO 9001 factory.  
Registration No.: 99QR - 156  
Scope of product/service : GAS CUTTING MACHINE  
PLASMA CUTTING MACHINE  
and LASER CUTTING MACHINE



Saitama Site (Head Office, Saitama Factory) are certified as ISO14001  
Registration No.: 05ER - 553  
Activities Defined by Products, Processes or Services:  
1. Manufacturing and After-sale Service of Laser Processing,  
Oxy-Fuel Cutting and Plasma Cutting Systems.  
2. Manufacturing of Gas Welding and Gas Cutting Apparatus.  
3. Manufacturing of Gas Control Products.

Design and specifications subject to change without notice.

# A Pioneer of in the World's Laser Industry

In 1969, TANAKA began research for the practical use of lasers in metal processing. The first laser cutting machine in the industry was completed in 1979. TANAKA introduced a groundbreaking laser cutting machine in 1989. It was the world's first oscillator integrated type laser cutting machine for medium thick plates on the market. TANAKA has continued to maintain a steady position in the steel industry. TANAKA is a leading producer of laser cutting machines that include a total integrated automation system; from the loading of material to processing, to manufacturing management and delivery. TANAKA continues to develop laser cutting technology for all customer's needs.

## TANAKA laser system history

	1969	Began research and development of laser processing technology	
	1989	Launched the world's first oscillator integrated laser cutting machine, LMX-TF2500 on to the market	
	1994	Launched the first 6kW oscillator integrated laser cutting machine, LMXII-TF3500/6000	
	1997	Established an above conventional higher speed, higher precision, and higher-powered laser cutting machine, LMXIII-TF3500/6000	
	2001	Launched the world's first twin head laser cutting machine, LMXV-TWIN TF4000	
	2004	Introduced the high-powered, long lasting operable laser cutting machine, mounted with the brand new 6kW oscillator, LMXVII-TF4000/6000.	
	2010	Introduced the compact body laser cutting machine mounted with 6kW oscillator LMRV-TF2000/TF4000/TF6000	
	2012	No.1 Gantry Laser Sales Record, Advanced Bevel Laser Cutting Machine Reborn! LMZV-TF4000/6000	
	2015	Launched the next generation Fiber Laser Cutting Machine! FMRII-TF3000/TF6000/TI10000	
	2017	Launched the Advanced Bevel Fiber Laser Cutting Machine FMZII-TI10000	
	2019	Introduced the 12kW fiber laser cutting machine FMRII-TF12000	
	2020	Introduced the 20kW fiber laser cutting machine FMRII-TI20000	
	2022	Launched the Completely Re-imagined FMR Series! FMRIII-TI12000/TI20000	

## Environmental Policy

Based on our original technologies for cutting, welding, and gas controls, we strive to prevent damage to the Earth's environment. It is our goal to minimize our environmental impact and work to improve the environment in all aspects of our business practices.

# Completely Reimagined

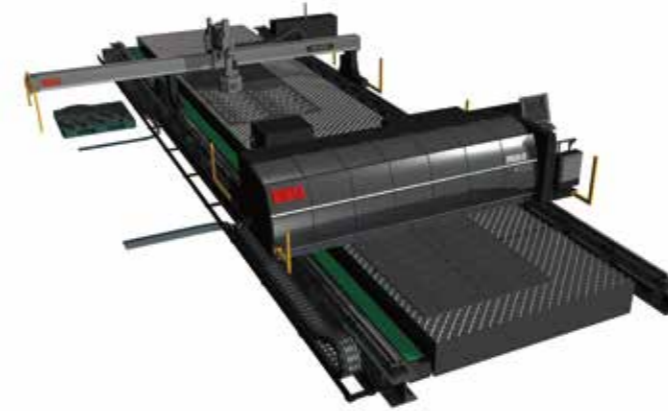


### A Gantry Type Cutting Machine

The machine is mounted on parallel rails, and the oscillator creates a limitless cutting area. Large and thick plates can be applied to make for high efficiency operation.

### B Table Type Cutting Machine

The machine is in a fixed position, and the laser head moves in a limited area. A thin plate will be applied with a pallet changer.



## Overseas Locations



### TANAKA America Inc.

Sales office based in North America. Also offers promotions for FA products.



### Shanghai TANAKA Co., Ltd.

STC is the main sales office in China for a range of cutting equipment, including laser cutting machines.



### Nippon Cutting & Welding Equipment Co., Ltd.

NCC is a production base located in Thailand. NCC produces gas apparatuses such as pressure regulators, torches, and nozzles for cutting and welding. NCC is also responsible for international sales and marketing of these products.

## Innovate for Cutting Performance

This new design achieves faster nitrogen cutting and transverses higher speeds by lowering the machine's center of gravity and decreasing the machine's weight. This design change from its predecessor provides for a superior cutting performance. This is a completely new fiber laser cutting machine from TANAKA!



## NEW & DISTINCT OPERATION DESIGN

### ■Excellent Operability

Cockpit design with a slim operation panel / New operation screen & Intuitive operation

### ■Improved Maintainability

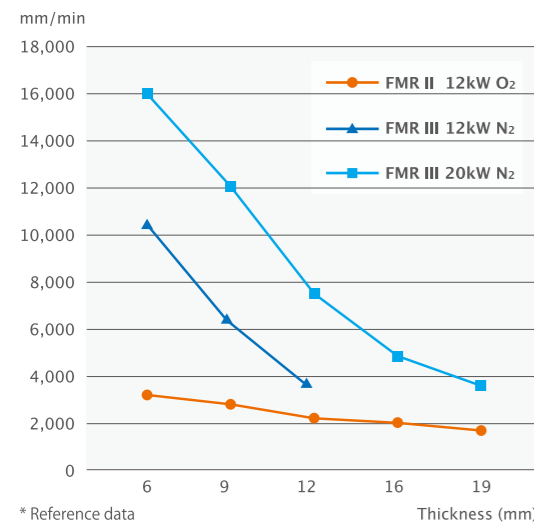
Slide door for easy maintenance / Quick access to torch head from operation deck  
Installed automatic lubrication systems

## TANAKA CUTTING SIGNATURE

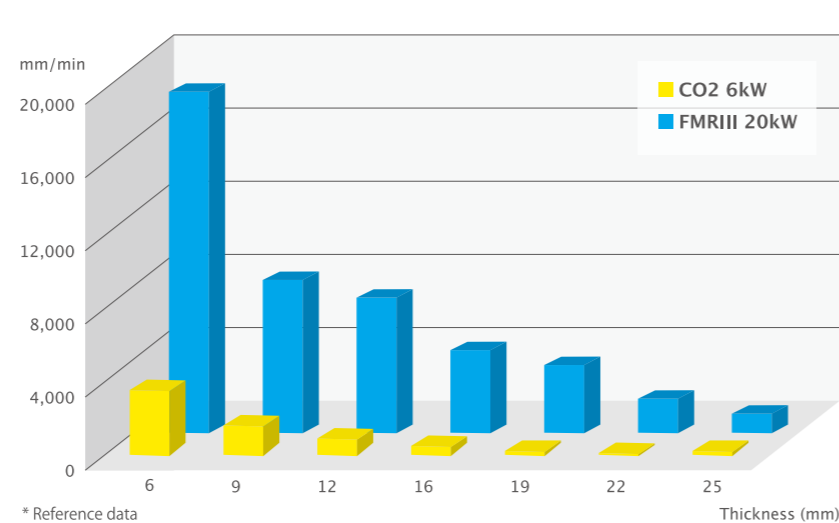
### ■High-Speed Cutting & Performance

Offers faster cutting than CO2 laser cutting machine / Great performances for rusty mild steels

#### Mild Steel Cutting Speed



#### Stainless Steel Cutting Speed (N<sub>2</sub> Cutting)



\* Reference data

\* Reference data

## Advantages of RS-CW Cutting \* RS:Range-Spread

### Cutting without Burning!

- Superior cutting edge quality
- Expanded maximum cutting thickness / FMR III-20kW: Mild steel SS400 Max.t40mm (1.57")
- Improved cutting stability on rusty surface

#### Rusty Mild Steel SS400 t25mm (1")



New CW cutting (RS-CW)

#### ■Machine specification

Model	25		30		35		40		45		50		55	
Effective cutting width mm(feet)	2,600 (8.5')		3,100 (10.1')		3,600 (11.8')		4,100 (13.4')		4,600 (15.0')		5,100 (16.7')		5,600 (18.3')	
Rail span mm(feet)	3,500 (11.4')	3,800 (12.4')	4,000 (13.1')	4,300 (14.1')	4,500 (14.7')	4,800 (15.7')	5,000 (16.4')	5,300 (17.3')	5,500 (18.0')	5,800 (19.0')	6,000 (19.6')	6,500 (21.3')	6,500 (21.3')	7,000 (22.9')
Total length of machine mm(feet)	4,700 (15.4')		5,200 (17.1')		5,700 (18.7')		6,200 (20.3')		6,700 (22.0')		7,400 (24.3')		7,900 (25.9')	
Effective cutting length mm(feet)	Rail length - 3,200 (10.5') *													
NC device	FANUC 0i-LF Plus													

\* Rail length can be extendable as per 1,200mm (3.9').

<Additional rail length shortening> i-marking device(OP): -200mm(0.66') / Mounting oscillator on machine(OP): -850mm(2.8')

#### ■Speed specification

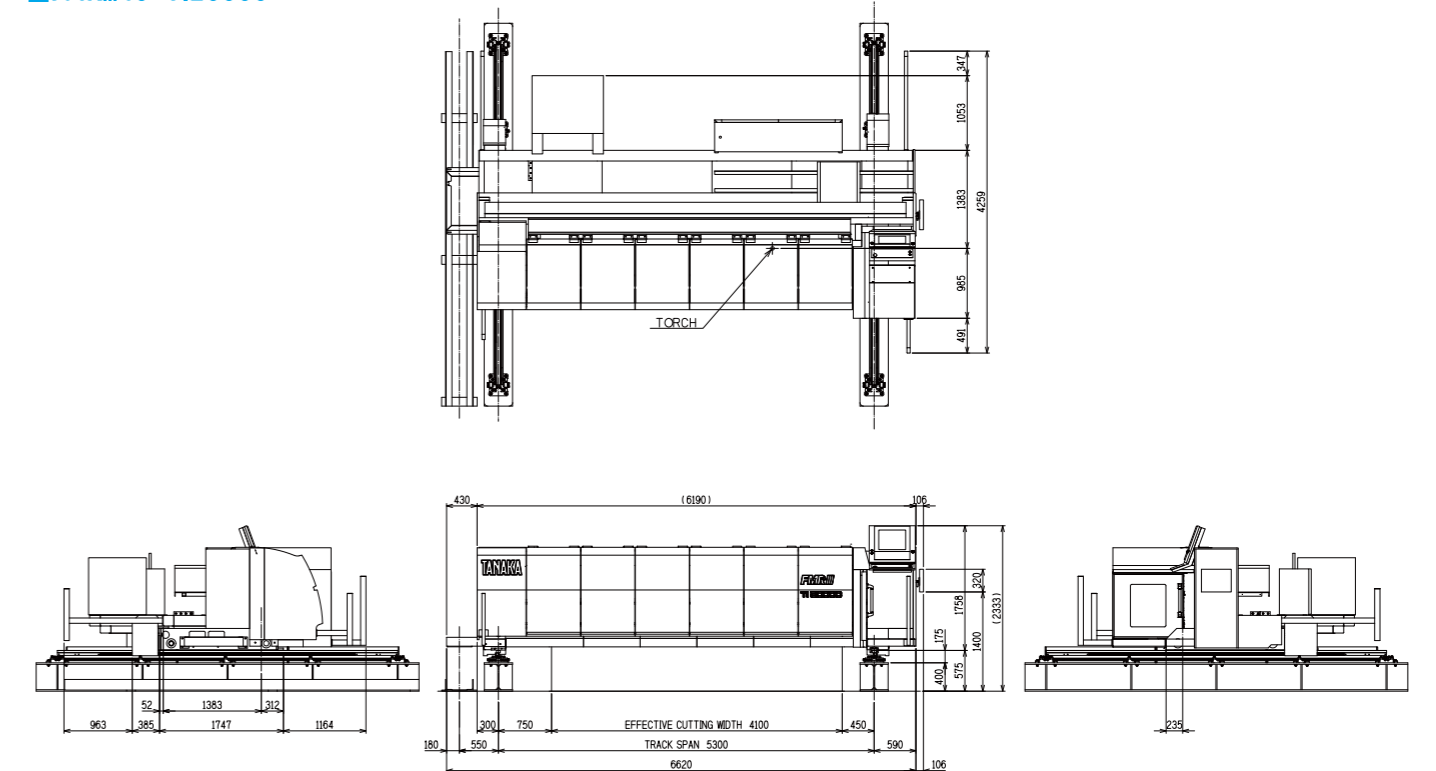
Processing feed speed (inch)	1 ~ 24,000mm/min (0.03 ~ 944ipm)
Hi-Rapid feed speed (inch)	60,000mm/min (2362ipm)
Rapid feed speed (inch)	36,000mm/min (1417ipm)
Manual rapid feed speed (inch)	24,000mm/min (944ipm)
Cutting head up/down speed (inch)	20,000/15,000mm/min (787/590ipm)
Home return speed (inch)	24,000mm/min (944ipm)
i-Marking speed (inch)	24,000mm/min (944ipm)

#### ■Standard cutting specification

Model	TI12000	TI20000
Mild steel	28mm(32mm)* / 1.1"(1.25")*	40mm / 1.57"
Stainless steel	30mm / 1.18"	40mm / 1.57"
Aluminum	30mm / 1.18"	40mm / 1.57"

Under validation  
Cutting quality and Dross adhesion may vary depending on material, thickness and condition.  
\* Figures in parentheses are not guaranteed at product cutting.

#### ■FMR III40-TI20000



\* The figures are subject to change in case of adding functions.

## The Most Powerful Fiber Laser Cutting Machine Ever

TANAKA FMR II and FMZ II now has the capability of having a 20kW fiber laser oscillator that is capable of cutting material thicker than ever before! TANAKA's original torch head and gas control technology creates excellent cut quality. This combined with an optimized cutting sequence and superior fiber laser performance provides high productivity. The FMR II and FMZ II series are now the most powerful ever!



### FMR II

#### Machine specification

Model	25	30	35	40	45	50	55
Effective cutting width mm(foot)	2,600 (8.5')	3,100 (10.1')	3,600 (11.8')	4,100 (13.4')	4,600 (15.0')	5,100 (16.7')	5,600 (18.3')
Rail span mm(foot)	3,500 (11.4')	3,800 (12.4')	4,000 (13.1')	4,300 (14.1')	4,500 (14.7')	4,800 (15.7')	5,000 (16.4')
Total length of machine mm(foot)	4,700 (15.4')	5,200 (17.1')	5,700 (18.7')	6,200 (20.3')	6,700 (22.0')	7,400 (24.3')	7,900 (25.9')
Effective cutting length mm(foot)	Rail length - 3,200 (10.5') *						
NC device	FANUC 31iLB PANELi						

\* Rail length can be extendable as per 1,200mm (3.9').  
 <Additional rail length shortening> i-marking device(OP): -200mm(0.66') / Mounting oscillator on machine(OP): -850mm(2.8')

#### Speed specification

Processing feed speed (inch)	1 ~ 24,000mm/min (0.03 ~ 944ipm)
Hi-Rapid feed speed (inch)	60,000mm/min (2362ipm)
Rapid feed speed (inch)	36,000mm/min (1417ipm)
Manual rapid feed speed (inch)	24,000mm/min (944ipm)
Cutting head up/down speed (inch)	20,000/15,000mm/min (787/590ipm)
Home return speed (inch)	24,000mm/min (944ipm)
i-Marking speed (inch)	24,000mm/min (944ipm)

#### Standard cutting specification

Model	TI6000	TI12000	TI20000
Mild steel mm(inch) Pulse / CW	32 (1.25") / 19 (0.74")	38 (1.5") / 28 (1.1")	40 (1.57") / 32 (1.25")
Stainless steel mm(inch)	20 (0.75")	30 (1.42")	40 (1.57")
Aluminum mm(inch)	20 (0.75")	30 (1.42")	40 (1.57")

Under validation  
 Cutting quality and Dross adhesion may vary depending on material, thickness and condition.

### FMZ II

#### Machine specification

Model	25	30	35	40	45	50	
Effective cutting width mm(foot)	Bevel	2,500 (8.2')	3,000 (9.8')	3,500 (11.5')	4,000 (13.1')	4,500 (14.8')	5,000 (16.4')
	Vertical	2,800 (9.2')	3,300 (10.8')	3,800 (12.5')	4,300 (14.1')	4,800 (15.7')	5,300 (17.4')
Rail span mm(foot)	4,000 (13.1')	4,300 (14.1')	4,500 (14.7')	4,800 (15.7')	5,000 (16.4')	5,300 (17.3')	5,500 (18.0')
Total length of machine mm(foot)	5,200 (17.1')	5,700 (18.7')	6,200 (20.3')	6,700 (22.0')	7,200 (23.6')	7,500 (24.6')	
Effective cutting length mm(foot)	Rail length - 4,000 (13.1')						
NC device	FANUC 30iLB PANELi						

\* Rail length can be extendable as per 1,200mm (3.9').  
 <Additional rail length shortening> i-marking device(OP): -150mm(0.49') / Mounting oscillator on machine(OP): -850mm(2.8')

#### Speed specification

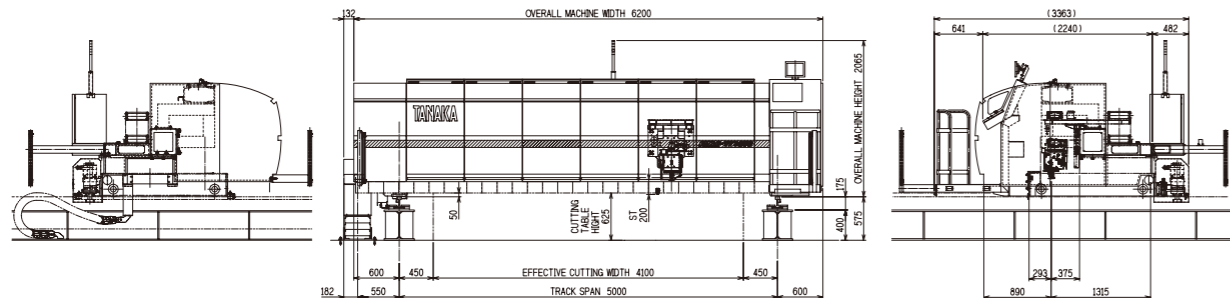
Processing feed speed (inch)	1 ~ 24,000mm/min (0.03 ~ 944ipm)
Rapid feed speed (inch)	36,000mm/min (1417ipm)
Manual rapid feed speed (inch)	24,000mm/min (944ipm)
Cutting head up/down speed (inch)	20,000/15,000mm/min (787/590ipm)
Home return speed (inch)	24,000mm/min (944ipm)
i-Marking speed (inch)	24,000mm/min (944ipm)

#### Standard cutting specification

Model	TI12000		
Mild steel material mm(inch)	Vertical	36 (1.41")	
	Top/bottom V bevel 30deg	25 (0.98")	
	Top/bottom V bevel 45deg	25 (0.98")	
Stainless steel mm(inch)	N <sub>2</sub> < 1MPa	Vertical	10 (0.39")
	N <sub>2</sub> ≥ 1MPa	Vertical	25 (1.0")
		Top / bottom V bevel 22.5deg	12 (0.47")
Aluminum mm(inch)	N <sub>2</sub> < 1MPa	Vertical	10 (0.39")
	N <sub>2</sub> ≥ 1MPa	Vertical	25 (1.0")
		Top / bottom V bevel 22.5deg	16 (0.62")

Under validation  
 Cutting quality and Dross adhesion may vary depending on material, thickness and condition.

#### FMR II 40-TI20000



\*The figures are subject to change in case of adding functions.

## Built on over 30 years of CO<sub>2</sub> Laser Cutting Machine Experience

TANAKA's laser technology and years of experience were combined to build the finest CO<sub>2</sub> laser cutting machines. The LMRV and LMZV series are about creating superior cutting quality for both straight and bevel cutting. The machines are versatile with improved beam quality, TANAKA's latest cutting torches, and spacious horizontal plate staging to ensure that the machines are customized for each customer's expectation.



### LMRV

#### Machine specification

Model	25	30	35	40	45	50	55
Effective cutting width mm(foot)	2,600 (8.5')	3,100 (10.1')	3,600 (11.8')	4,100 (13.4')	4,600 (15.0')	5,100 (16.7')	5,600 (18.3')
Rail span mm (foot)	3,500 (11.4')	3,800 (12.4')	4,000 (13.1')	4,300 (14.1')	4,500 (14.7')	4,800 (15.7')	5,000 (16.4')
Effective cutting length mm(foot)	Depends on customer's requirement						
Rail size	50kg/m (33.6 lb/ft)						
Rail length mm(foot)	Effective cutting length + 3,000 (9.8')						
Vertical stroke mm(foot)	200 (0.65')						
Overall machine length mm(foot)*1	3,130 (10.2')						
Overall machine width mm(foot)*2	4,530 (14.8')	4,830 (15.8')	5,030 (16.5')	5,330 (17.4')	5,530 (18.1')	5,830 (19.1')	6,030 (19.7')
Overall machine height mm(foot)	LMRV25~35:2,475 (8.1') / LMRV40~55:2,575 (8.4')						

\*1 Including the area sensor: 3,873mm (12.7')

\*2 Overall machine width of LMRV25-TF6000

#### Standard cutting specification

Model	TF2000	TF4000	TF6000
Mild steel material mm(inch)	19 (0.74")	22 (0.86")	32 (1.25")
Stainless steel material mm(inch)	<1MPa	Normal	8 (0.31")
	≥1MPa	Normal	10(0.39")
		High Quality	16(0.62")

Dross may be adhere in a certain thickness and conditions.

### LMZV

#### Machine specification

Model	25	30	35	40	45	50
Effective cutting width mm(foot)	2,600 (8.5')	3,100 (10.17')	3,600 (11.81')	4,100 (13.45')	4,600 (15.09')	5,100 (16.73')
Rail span mm(foot)	4,000 (13.1')	4,300 (14.1')	4,500 (14.7')	4,800 (15.7')	5,000 (16.4')	5,300 (17.3')
Effective cutting length mm(foot)	Depends on customer's requirement					
Rail size	50kg/m (33.6 lb/ft)					
Rail length mm(foot)	Effective cutting length + 3,500 (11.4')					
Vertical stroke mm(foot)	250 (0.82')					
Overall machine length mm(foot)	3,500 (11.48')					
Total length of the Machine mm(foot)	4,930 (16.17')	5,430 (17.81')	5,930 (19.45')	6,330 (20.76')	7,030 (23.06')	7,730 (25.36')
Total high of the Machine mm(foot)	2,680 (8.79')					
NC device	FANUC 30iLB PANELi					

#### Standard cutting specification

Model	TF4000	TF6000	
Mild steel material mm(inch)	Vertical	22 (0.86")	
	Top/bottom V bevel 30deg	12 (0.47")	
	Top/bottom V bevel 45deg	9 (0.35")	
Stainless steel material mm(inch)	<1MPa	Vertical	10 (0.39")
	≥1MPa	Vertical	16 (0.62")
		Top/bottom V bevel 22.5deg	20 (0.79")
High Quality	12 (0.47")		

Dross may be adhere in a certain thickness and conditions.

#### Speed specification

Processing feed speed (inch)	1~6,000mm/min (0.03~236ipm)
Rapid feed speed (inch)	24,000mm/min (944ipm)
Manual rapid feed speed (inch)	12,000mm/min (472ipm)
Cutting head approach speed (inch)	20,000mm/min (787ipm)
Cutting head lifting speed (inch)	15,000mm/min (590ipm)
Home return speed (inch)	24,000mm/min (944ipm)

#### Speed specification

Processing feed speed (inch)	1~6,000mm/min (0.03~236ipm)
Rapid feed speed (inch)	24,000mm/min (944ipm)
Manual rapid feed speed (inch)	12,000mm/min (472ipm)
Cutting head approach speed (inch)	20,000mm/min (787ipm)
Cutting head lifting speed (inch)	15,000mm/min (590ipm)
Home return speed (inch)	24,000mm/min (944ipm)

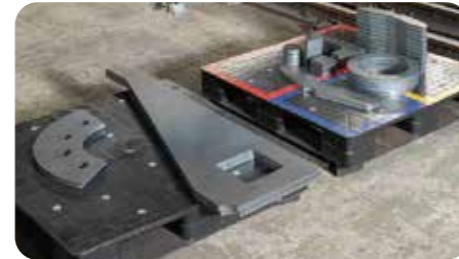
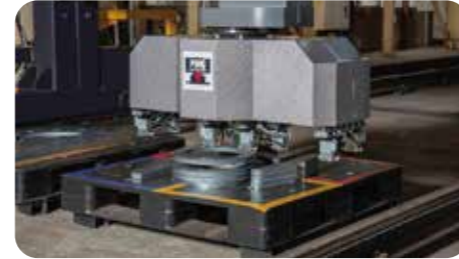
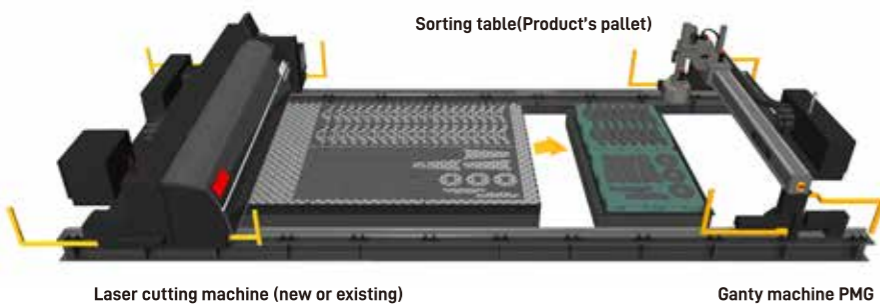
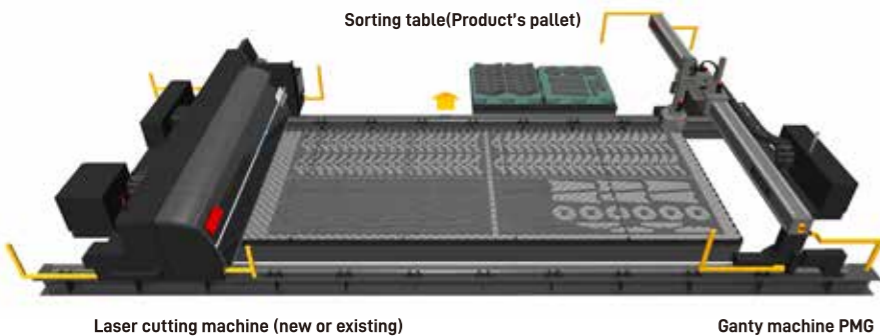
\*The figures are subject to change in case of adding functions.

## Creates Innovation at the Cutting Site

With the goal of improving the automation rate of cutting work, this machine automates the picking, and sorting of cutting tasks. Contributing to the overall reduction of the workload.



### Machine operation example



### Optional equipment

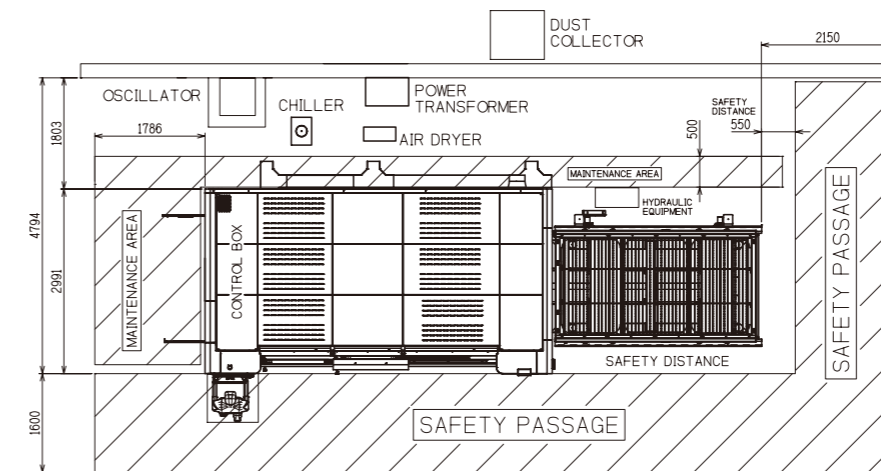
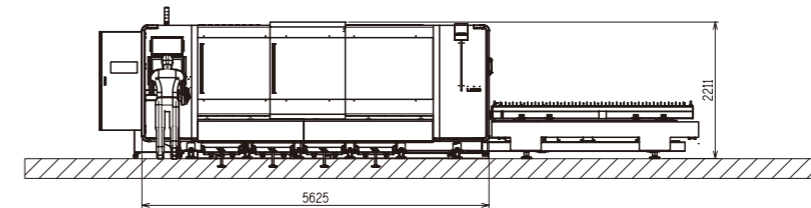
Pallet Changer Stocker



Customize HAN'S SONGU LASER cutting machine to TANAKA's specification.



### Mach 3015 / Wind 3015



### Components

- Machine body
- Machine housing & Workbench
- NC device [BECKHOFF]
- Oscillator [IPG]
- Laser torch head [PRECITEC]
- Dust collector [DONALDSON]
- Cooling water circulator
- Cold dryer & Filter unit

\* Air compressor and CAM/CAD are not included.

### Machine specification

Model	3015	4020	6025
Output Laser power W		4,000 / 6,000	
Working area mm(feet)	3,000 x 1,500 (9.8' x 4.9')	4,000 x 2,000 (13.1' x 6.5')	6,000 x 2,500 (19.6' x 8.2')
Transmission system	Synchronized direct driving system		
Loading method	Automatic exchanging pallets Hydraulic shuttle tables		
Rapid feed speed m/min(feet/min)	Mach: 240 (787.4) / Wind: 200 (656.1')		
Position accuracy mm/m	±0.05		
Reposition accuracy mm/m	±0.03		
Overall dimension mm(feet)	9,800 x 3,000 x 2,200 (31.1' x 9.8' x 7.2')	12,000 x 3,500 x 2,200 (39.3' x 11.4' x 7.2')	15,500 x 4,200 x 2,200 (50.8' x 13.7' x 7.2')
Gross Weight tonne(pound)	13.5 (29,762 lb)	15.5 (34,171 lb)	17.5 (38,580 lb)

### Standard cutting specification

Model	4000	6000
Mild steel [O <sub>2</sub> ]	16 (0.62")	22 (0.86")
Mild steel [N <sub>2</sub> ]	4 (0.15")	6 (0.23")
Stainless steel [N <sub>2</sub> ]	14 (0.55")	20 (0.78")

Dross may be adhere in a certain thickness and conditions.

·The figures are subject to change in case of adding functions.

·The figures are subject to change in case of adding functions.

# Specifications



## Oscillator specification

Model	Fiber Laser				CO2 Laser		
	TI6000	TI12000	TI20000	TF2000	TF4000	TF6000	
Laser gas composition	N/A						
Max. fiber cable length (mm)	30,000	YLS-CUT 50,000	YLS-U 30,000	30,000	N/A	N/A	N/A
External dimension (mm)	430x808x700	1,007x806x805	430x808x900	1,007x806x805	1,007x806x805	2,050x750x1,376	3,250x790x1,490
Weight (kg)	About 190	About 400	About 250	About 500	About 700	About 900	About 1,300

## Cooling water circulator specification

Model	Fiber Laser			CO2 Laser		
	TI6000	TI12000	TI20000	TF2000	TF4000	TF6000
Cooling water circulator	RKE5500B-V-2CH-TA	RKE11000B-V-2CH-TA	RKE18000A-V-ISP-TA	RKL-5500-GTA-B	RKE-12000A-VTA	RKE-22000V-VTA
External dimension (mm)	854x1,100x1,700	854x1,610x1,700	2,100x960x2,220	1,404x800x1,780	1,440x930x1,800	2,010x1,200x2,190
Weight (kg)	About 360	About 510	About 770	About 390	About 550	About 1,050

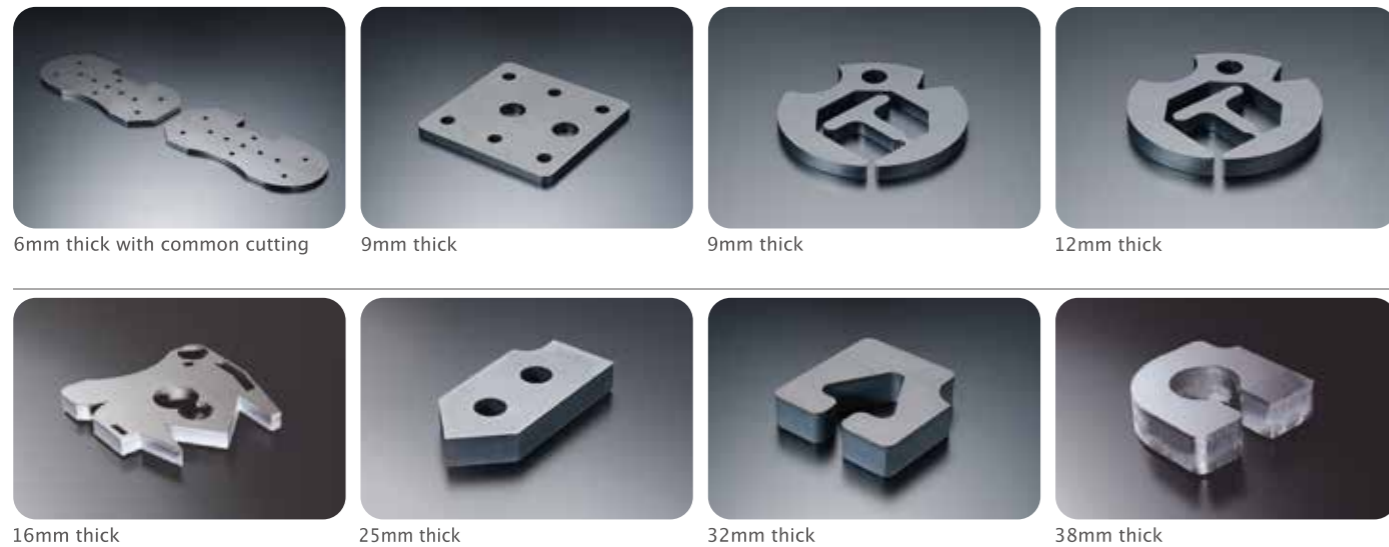
## Utility / Input power supply capacity

Model	Fiber Laser			CO2 Laser		
	TI6000	TI12000	TI20000	TF2000	TF4000	TF6000
Machine body	15 kVA	15 kVA	15 kVA	15 kVA	15 kVA	20 kVA
Oscillator	40 kVA	45 kVA	70 kVA	33 kVA	55 kVA	75 kVA
Cooling water circulator	19 kVA	29 kVA	40 kVA	17 kVA	27 kVA	44 kVA

## Fluid used

Model	Fiber Laser			CO2 Laser			
	TI6000	TI12000	TI20000	TF2000	TF4000	TF6000	
Laser gas	0.3MPa	N/A			10 L/hr	10 L/hr	20 L/hr
Oxygen	0.7MPa	10 m3/hr	20 m3/hr	20 m3/hr	10 m3/hr	10 m3/hr	10 m3/hr
Dry air for cutting	0.7MPa	24 m3/hr	24 m3/hr	24 m3/hr	43 m3/hr	43 m3/hr	43 m3/hr

## Mild steel SS400



The sample picture is for reference only. No warranty is given for actual cutting.  
-The figures are subject to change in case of adding functions.

# Functions

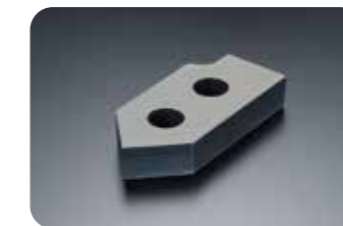
## Standard functions

	FMRIII	FMRII	FMZII	LMRV	LMZV
Automatic lens positioning controlled by NC	○	○	○	○	○
AICC control	○	○	○	○	○
Scheduled operation	○	○	○	○	○
NC memory extension	○	○	○	○	○
Capacitance height sensor controlled by NC	○	○	○	○	○
High-speed piercing	N/A	○	○	○	○
Piercing completion detection	○	○	○	○	○
Self burning detection	N/A	○	○	○	○
Coordinate axis rotation	○	○	○	○	○
Laser spot function	○	○	○	○	○
Retry cut fault recovery	○	○	○	○	○
Fault skipping	○	○	○	○	○
Retry/Skip log for re-cutting	○	○	○	○	○
Flashing warning lights	○	○	○	○	○
Obstacle detection	○	○	○	○	○
Maintenance screen	○	○	○	○	○
Operators platform	○	○	○	○	○
Ping-pong torch motion	○	○	○	○	○
Shield gas optimizing function (GOS)	○	○	○	○	○
Stand-by	○	○	○	○	○
Shape drawing	○	○	○	○	○
Backward travel	○	○	○	○	○
Ultra-high-speed piercing	○	○	○	○	○
Stainless steel nitrogen cutting up to 1 MPa	○	○	○	○	○
Automatic power shut off	○	○	○	○	○
Operator reflection light protection	○	○	○	○	○
Torch monitoring TV camera & monitor	○	○	○	N/A	N/A
Positioning TV camera & monitor	○	○	○	N/A	N/A
Machine back face monitoring TV camera & monitor	○	○	○	N/A	N/A
Air blow inside machine cover	N/A	○	○	N/A	N/A

## Optional functions

	FMRIII	FMRII	FMZII	LMRV	LMZV
Preceding burning function	○	○	○	○	○
Stainless steel nitrogen cutting up to 2 MPa	○	○	○	○	○
i-Marking device	○	○	○	○	○
Pen marking device	N/A	○	○	○	○
Coordinate rotation ITV	○	○	○	○	○
Nozzle monitoring ITV	○	○	○	○	○
Collision prevention function	○	○	○	○	○
Automatic power-on	○	○	○	○	○
Laser cutting table	○	○	○	○	○
Air compressor	○	○	○	○	○
Steel plate stocker	○	○	○	○	○
High-speed piercing II	N/A	○	○	N/A	N/A
High-speed piercing III	○	N/A	N/A	N/A	N/A

## Coated steel plate (Zinc rich primer material)



## Bevel cutting



## Aluminum A5052



## Stainless steel SUS304



The sample picture is for reference only. No warranty is given for actual cutting.  
-The figures are subject to change in case of adding functions.