Muratec

Fiber Laser by Muratec, Pursuing Perfection in Sheet Metal Processing

With over 80 years of experience in the metal fabrication industry , Muratec understands the quality requirements of the sheet metal marketplace. Utilizing advancements in technology and the unique characteristics of fiber laser, Muratec raises the bar for superior, high quality, sheet metal equipment.
Furthermore, Muratec's real-time monitoring system enables safe, automatic operation, founded on the principles of efficiency and safety.

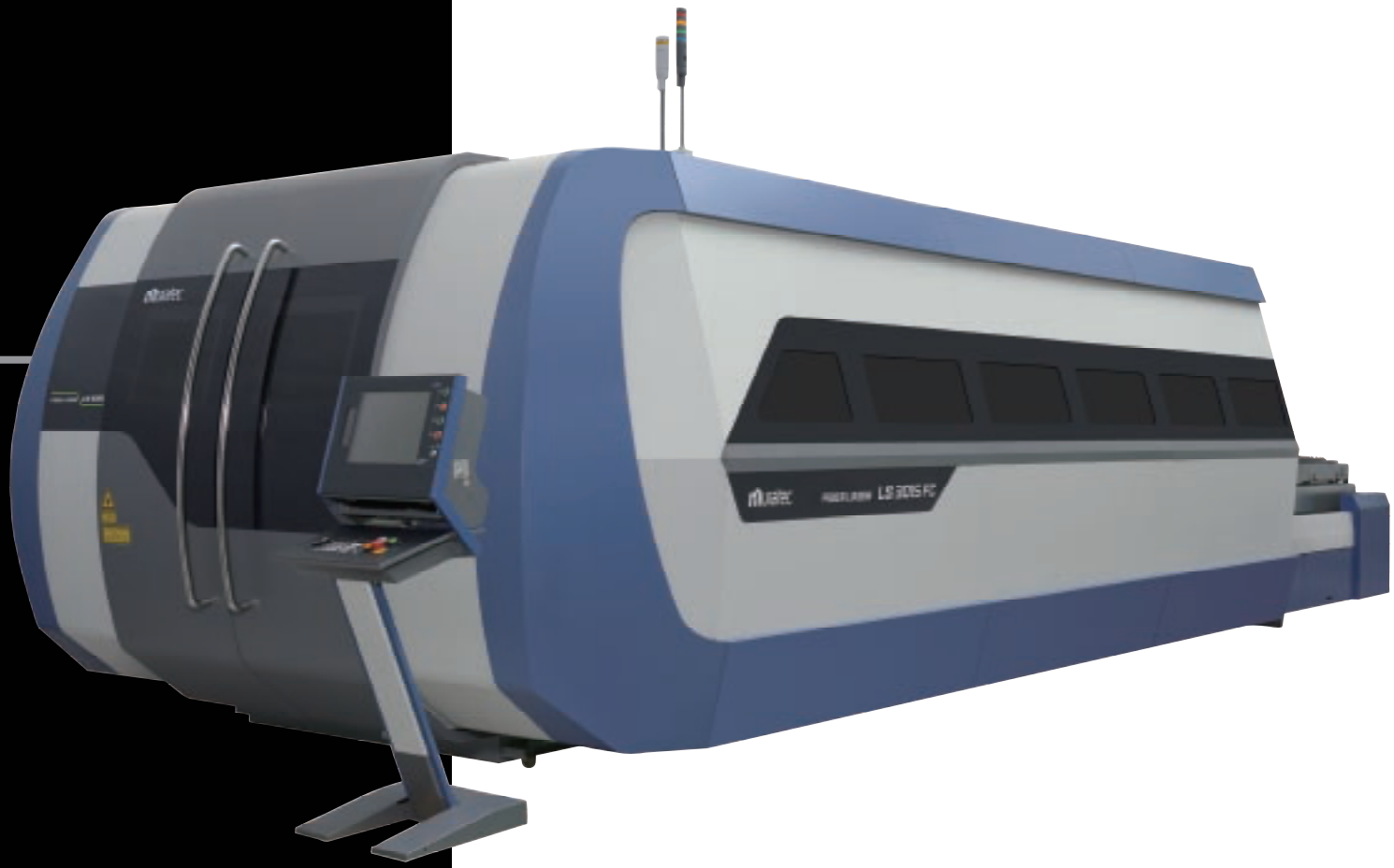
Dynamic

- Three-Axis Linear Drive System
- Rigid Frame Design
- Laser Head Supports Safe Operation
- Fully Enclosed Cutting Area Enhances Safety
- Internal ventilation provides a clean working environment
- Double sliding doors provide easy access
- Pallet Changer

Advanced Features

- **MVHS control** (Microcomputer Control by Variety of High Speed Outputs)
- Light Reflection Monitor
- Beam Monitor Function
- High Quality Marking
- Operation Monitoring System
- Auto Programming System

LS 3015 FC

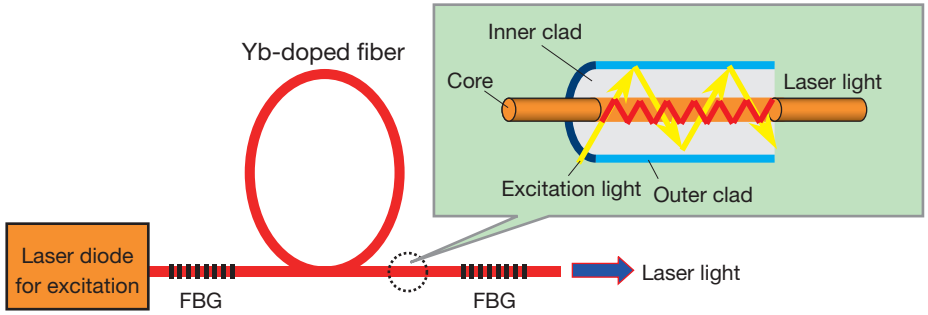


Principles and Characteristics of Fiber Laser

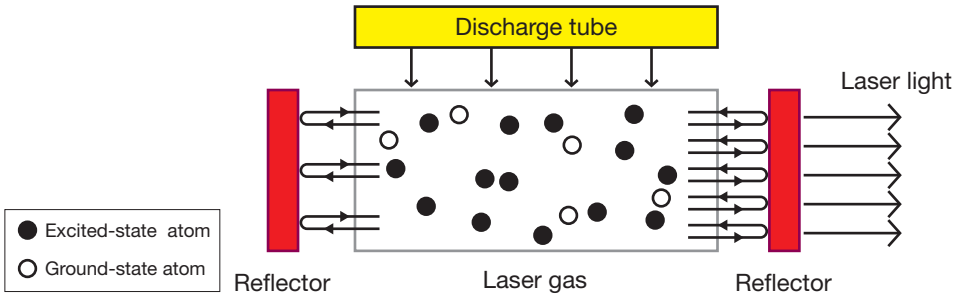
Laser Medium and Excitation Method

Fiber lasers are created using active optical fibers and semiconductor diodes. The laser beam is emitted by way of an armored, flexible, fiber optic cable. Amplification is achieved without the use of reflective mirrors and lenses. Therefore, optical misalignment due to thermal or mechanical influence is virtually eliminated.

Fiber Laser Beam Generation Method



CO_2 Laser Beam Generation Method

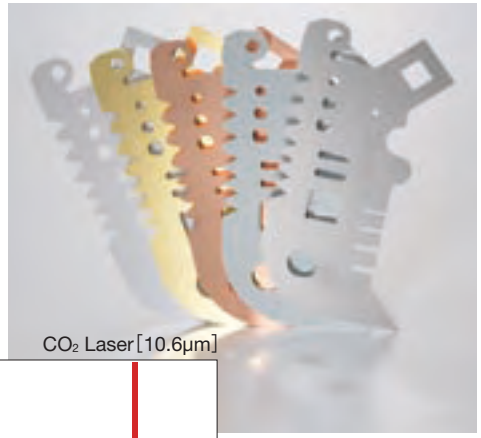


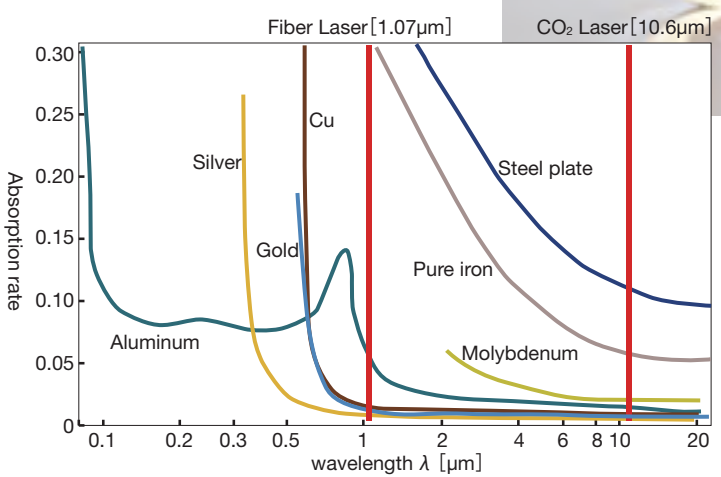
Fiber Laser Resonator by IPG Photonics

IPG is the world leader in the production of fiber laser resonators and amplifiers. By incorporating manufacturing processes that surpass the Bellcor standards for electrical components IPG products offer the the highest quality and reliability.

Material Absorption Properties of Fiber Laser

The fiber lasers short wavelength beam enhances the ability to process highly reflective materials such as Copper and Aluminum.

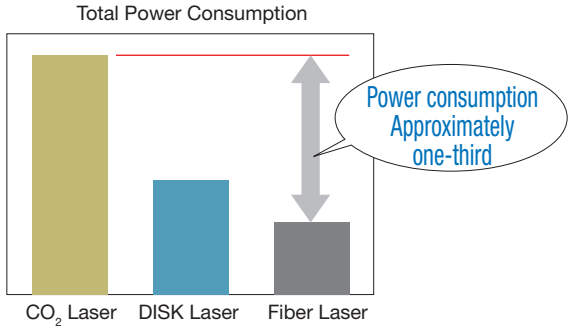




The wavelength of fiber laser is 1/10th that of CO_2 lasers. This difference greatly improves the absorption rate when processing reflective materials.

Low Power Consumption

The fiber laser resonator has a lower power consumption and a superior light conversion efficiency when compared to conventional CO_2 lasers. This efficiency allows for the use of a smaller chiller which in turn reduces the power consumption by approximately one third when compared to CO_2 lasers.



Significantly Reduced Maintenance Costs

Significantly Reduced Maintenance Costs

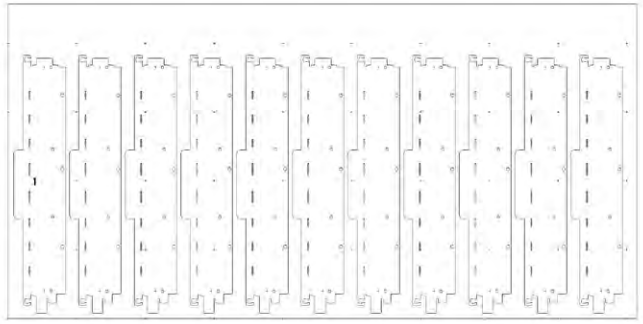
Mirror cleaning, laser gas, and other CO_2 consumables become a thing of the past when utilizing fiber laser.

Operating Cost Analysis

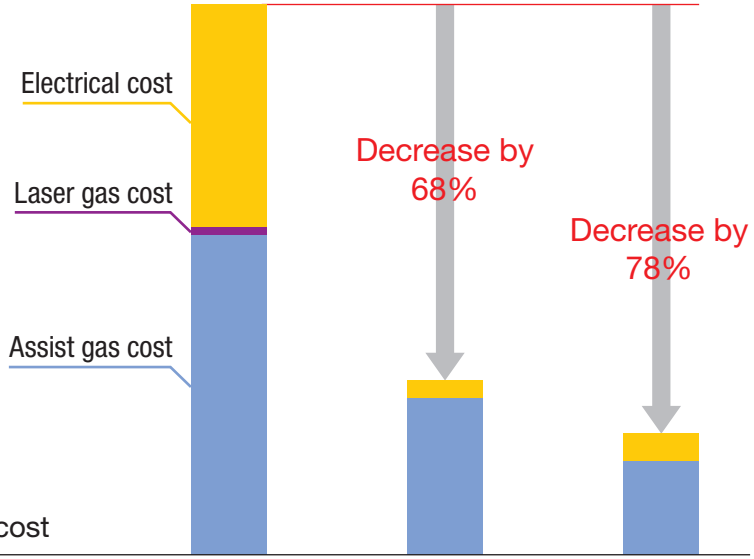
Effective monitoring of power and gas consumption rates allows for accurate operating cost analysis. Real-time monitoring of material processing times provides true job cost feedback.

Cost Reducing, Job Related Process Modes

The LS3015FC is equipped with three modes of cutting, High quality mode when the best possible cut is required, economy mode which allows for a reduction in gas consumption thus reducing operational cost and high speed mode for the fastest production time.



- Material size: 914 mm x 1829 mm [36" x 72"]
- Material, thickness: mild steel 1mm [0.039"]
- Number of Parts: 11
- Machinery: LS3015FC (2.5 kW)
  CO_2 laser (3kW)

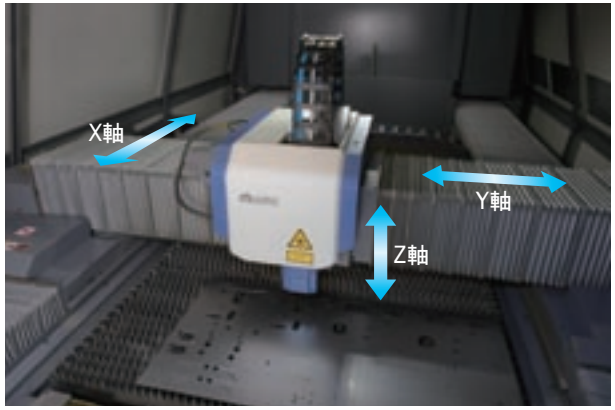


Running cost			
Cutting speed	7.5 m/min	40 m/min	8 m/min
Processing time	8 m 00 s	4 m 42 s	7 m 11 s
	CO_2 laser (3 kW)	LS3015FC High-speed mode	LS3015FC Economy mode

Engineered to Maximize Fiber Laser Capabilities

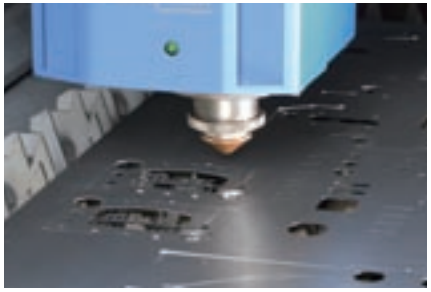
Three Axis Linear Drive System - X, Y & Z

Three axis linear encoders are controlled by a closed loop system and realizes a maximum high-speed transfer rate of 340 m/min - 1,115 ft./min (XY simultaneous biaxial).



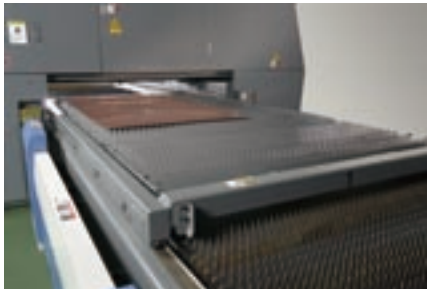
Safety Features of the LS3015FC Cutting Head

Muratecs continued focus on safety is included at the laser cutting head by way of a real-time monitoring system that provides feed back to the operator during the cutting process.



Pallet Shuttle System

The dual pallet system allows preparation of new material. During exchange the finished product pallet is always transferred under the material pallet to eliminate parts and scrap from falling onto the material.



Enclosed Structure and Internal Ventilation

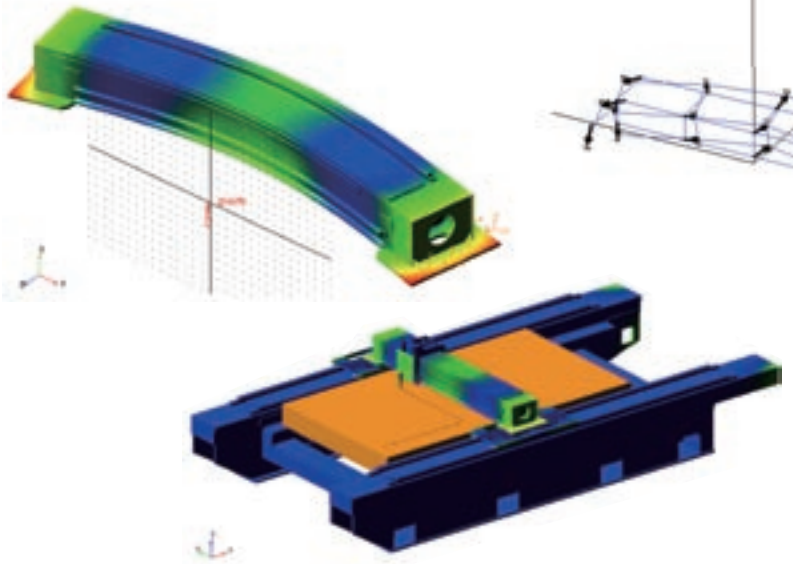
Safety is ensured by the fully enclosed cutting area while also providing a cleaner working environment by way of the recirculating ventilation system.

High-Rigidity Frame Design

The resonance frequency of the Y axis frame is controlled by adopting a low center of gravity with a rigid design. This provides the ability for highspeed yet precise processing capabilities.

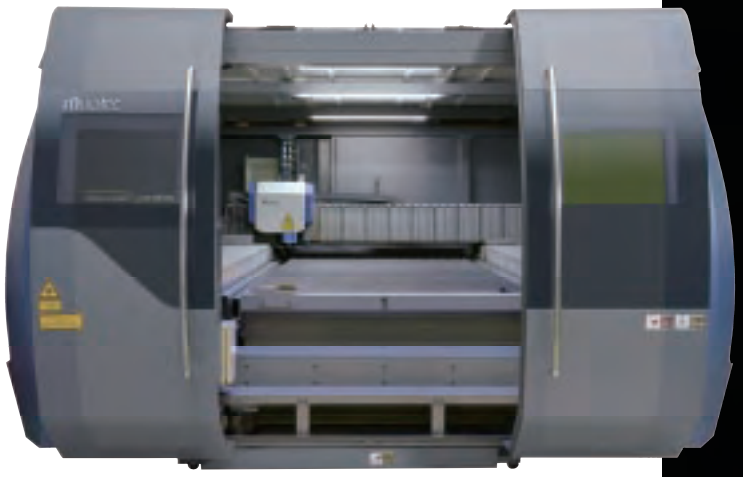
Analysis results

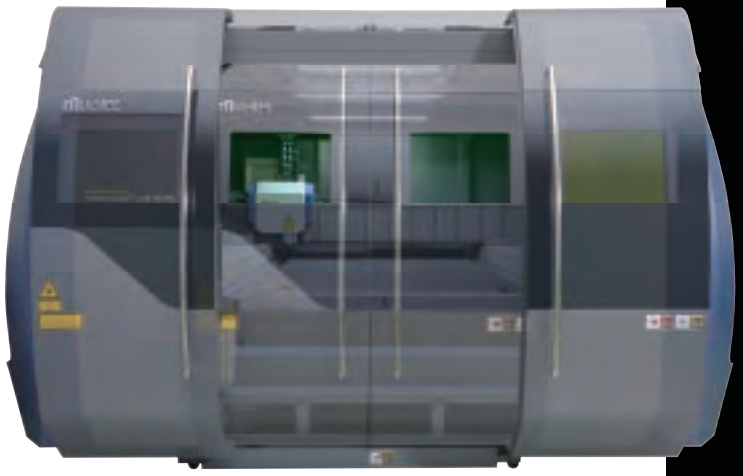
Observation results



Double Sliding Access Doors

Open area of 1,350 mm [53"] allows for easy access to the cutting head or quick part inspection.



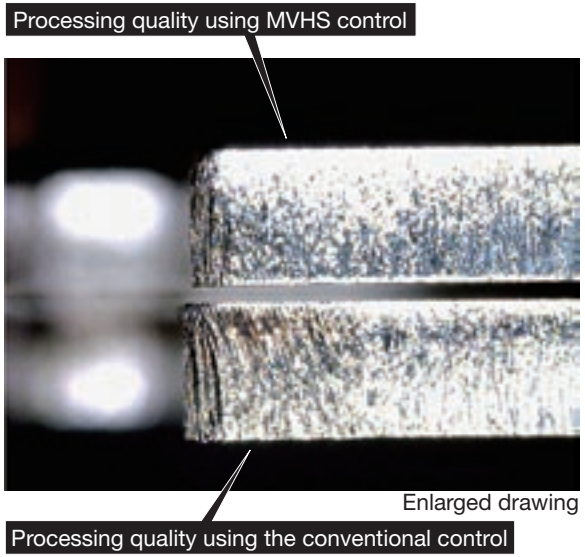


FIBER LASER LS 3015 FC

Control System to Maximize the Potential of Fiber Laser

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

The Muratec designed laser output control system MVHS can adjust within milliseconds acceleration and deceleration commands, which enables smooth pulse output to realize high quality cutting.



Beam Monitoring System

Machine stability is monitored throughout the cutting process. The laser beam is measured from the optics to the focal point in an effort to maintain optimum cutting conditions. The system allows for continued cutting as long as the variables do not exceed the range of acceptable conditions thus extending productivity. Optical contamination is also monitored in order to improve maintenance scheduling and avoid unscheduled down time.

Light Reflection Monitoring System

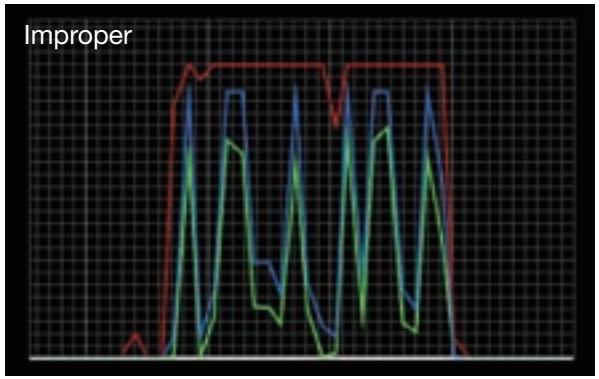
The equipped reflected light monitoring system prevents the laser beam from reflecting back to and damaging the resonator. This is achieved by constantly monitoring the beam in real-time and providing feedback for corrective measures.

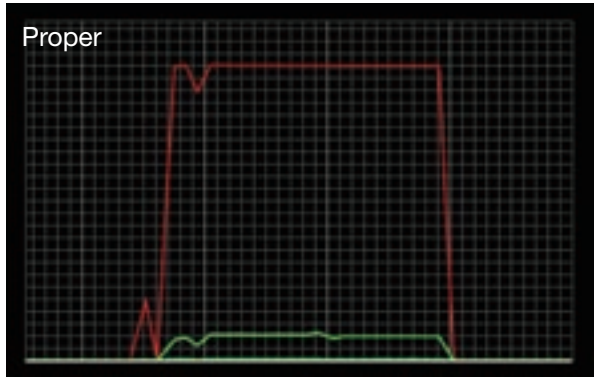
Process Monitor Function

The cutting process is monitored for the correct pierce and cutting parameters by gauging the amount of visible and infrared light. If improper conditions are detected the machine will shut down to prevent damaging parts.

Improper cut example

State of waveforms at time of processing

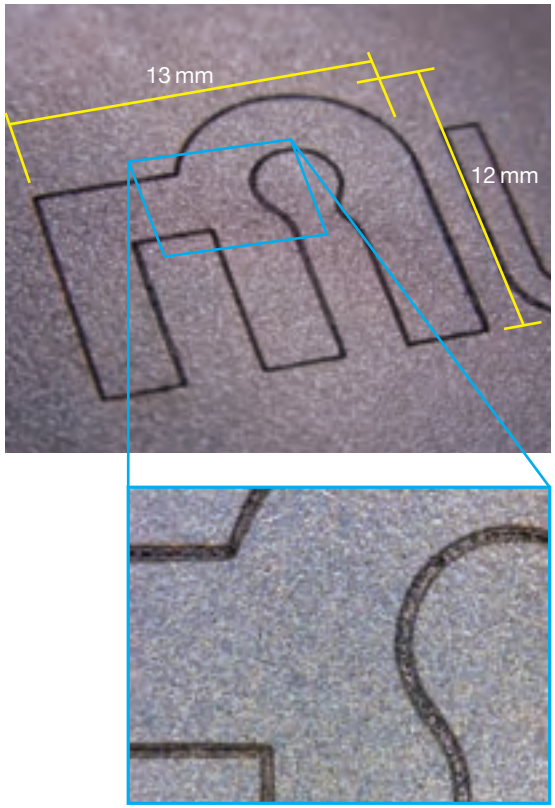




Red --- laser output
Green --- visible light
Blue---infrared light

Laser Marking Process

Muratec's fiber beam output control enables stable laser irradiation processing in a low power band which provides a high quality marking process.



Economical

FIBER LASER LS 3015 FC

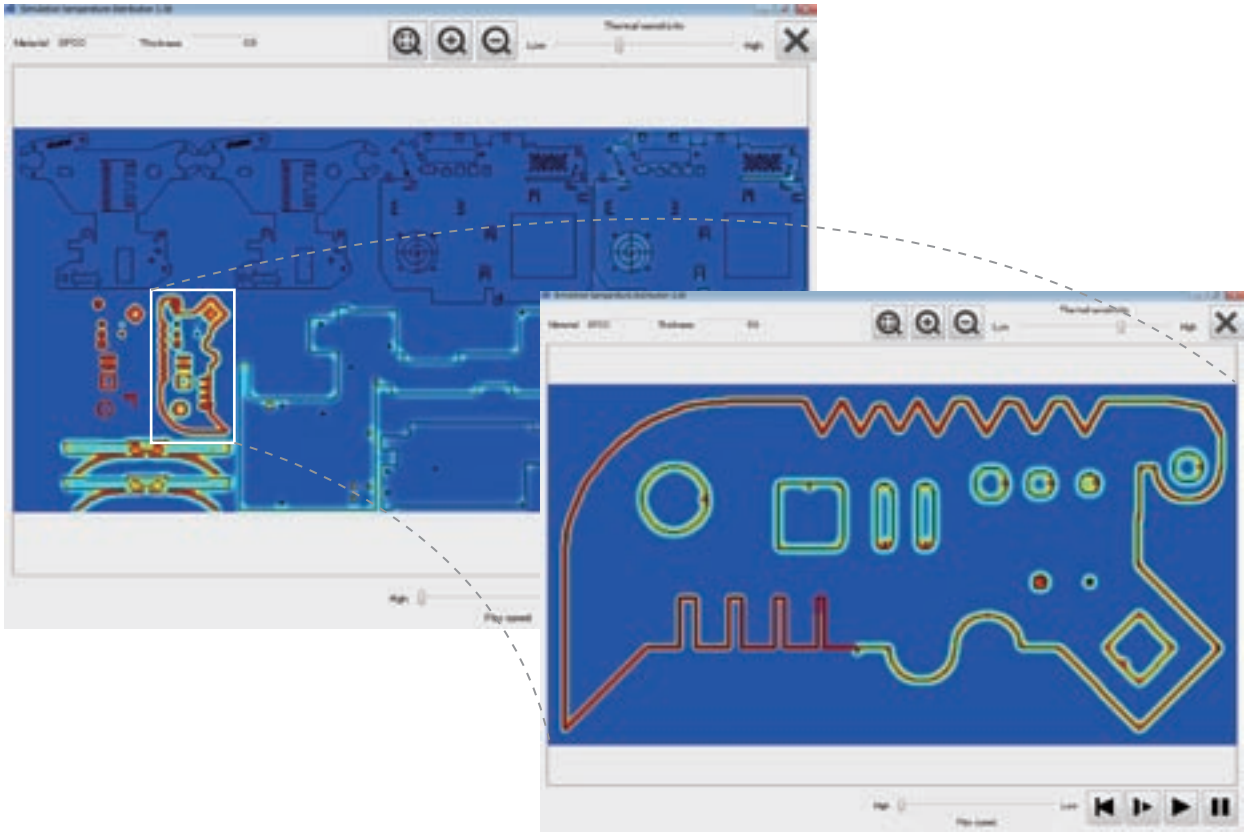
Make the Most of Your Fiber Laser

Automatic programming system CAMPATH G4

Campath G4 is an automatic programming system that integrates CAD with superior operability to improve operator efficiency. THe CAM side reflects superior knowledge of laser processing. The operators workload is decreased when setting up the machine for production. The system allows for a consistant high quality production process.

Heat Distribution Simulation

After preparaing the part layout and before actual cutting begins, the laser beam heat distribution can be predicted in a simulation.



Economical

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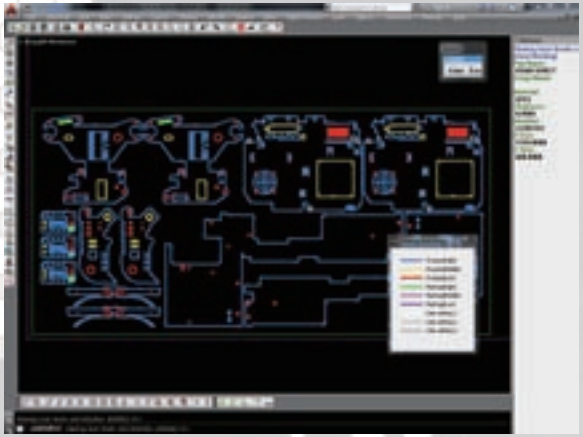
List of Functions

- Laser attribute edit functions
- Multiple part tab edit functions
- Automatic laser condition settings
- Approach interference avoidance function
- Processing order edit function
- Positioning path edit function
- Laser head interference and avoidance simulation
- Temperature distribution simulation



Processing attribute confirmation

Obtain Operating Conditions

ProcessNet Monitor i

The software system monitors the equipment state and the power consumption. The information can be obtained remotely from a PC connected to the systems network. The software provides data that can be used to improve productivity as well as cost analysis.

Note: 1) In case of a remote connection from the outside of the company, it is necessary for customers to set VPN environment.
2) Hardware and LAN equipment such as a personal computer,network, access point and mobile terminal are customer prepared items.

Display of Current Machine Conditions

The system software will display the machines current state of processing including flow rate and power consumption. Additionally video can be used to monitor the laser operation in real-time. (Optional camera installation required)

Display of the Operating History

The system stores the laser processing information from the previous four weeks of production. The volume of work and the load conditions can be obtained for production comparisons.

Alarm Results

Past operational alarms of the laser are displayed in the system by rank. The content of an alarm that was most frequently generated can be obtained and used as a preventive measure to improve the operating procedures.

Display and Classification of Production

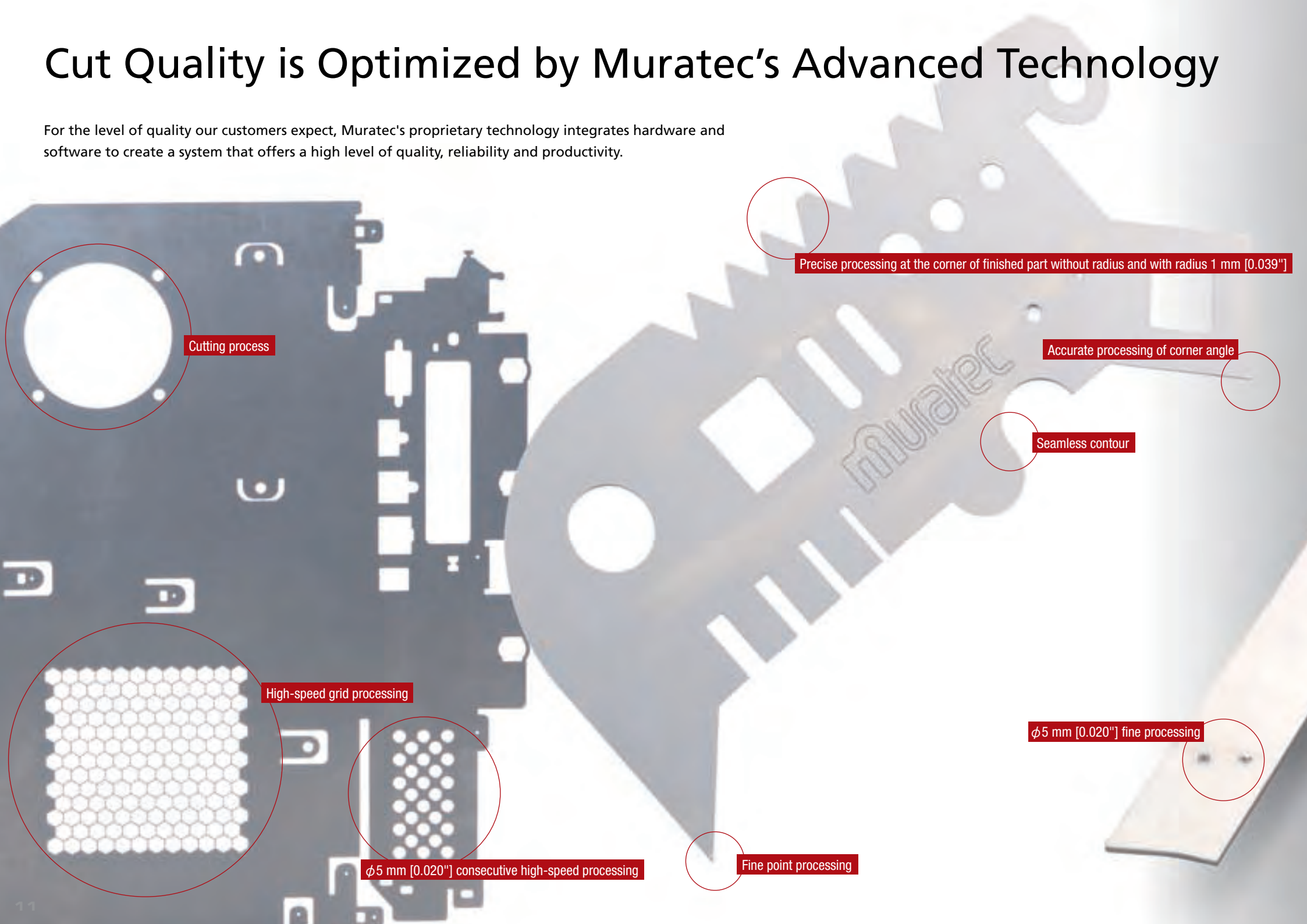
Processing time, setup time, and down time by alarms can be displayed. Factors that can provide improvement in operating rates can be easily accessed and confirmed.

Energy Use Results

The power and gas consumption as well as flow rate for the previous four weeks are displayed. Energy consumption from the laser can be obtained for accurate cost accounting.

Cut Quality is Optimized by Muratec's Advanced Technology

For the level of quality our customers expect, Muratec's proprietary technology integrates hardware and software to create a system that offers a high level of quality, reliability and productivity.

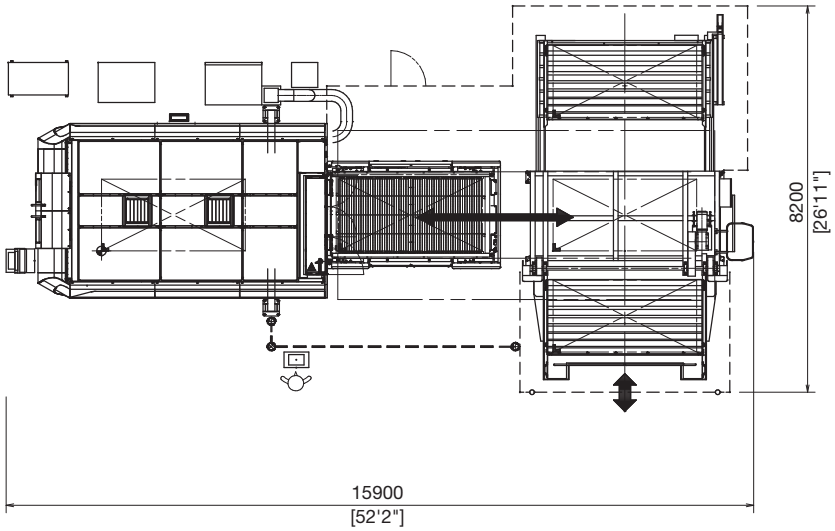


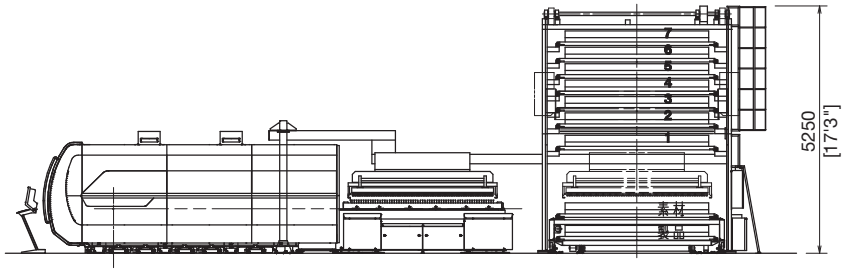

Dross-free processing
Dross-free processing
Minimum pierce diameter
Fine 0.4 mm [0.016"] square processing
Small circle processing
(ϕ0.3, ϕ0.5 ϕ0.7, ϕ0.9 mm)
[0.012" , 0.020", 0.028", 0.035"]
Dross-free processing
Slit width of 0.3 mm [0.011"]
Dross-free processing of sharply-angled edge

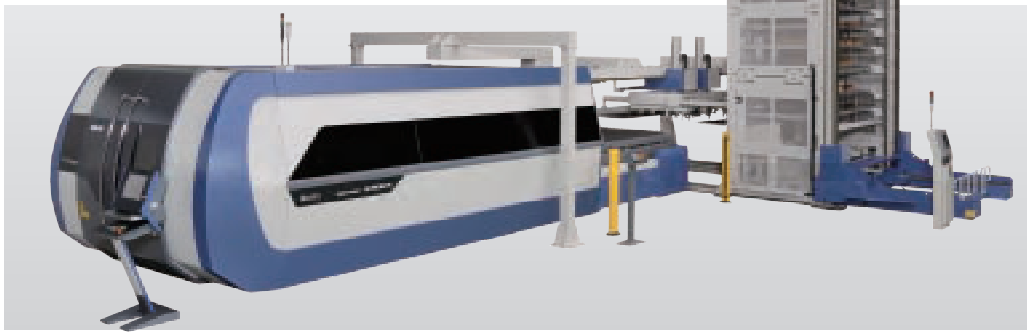
Automation that is Efficent and Reliable

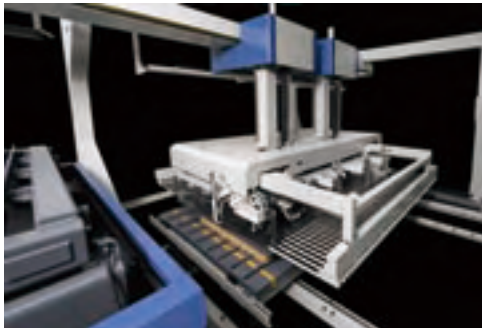
Material Stocking System

The material stocking system provides a stable prolonged production cycle. Muratec's years of automation, innovation & engineering know-how has produced a system that is efficent and reliable.









Specifications

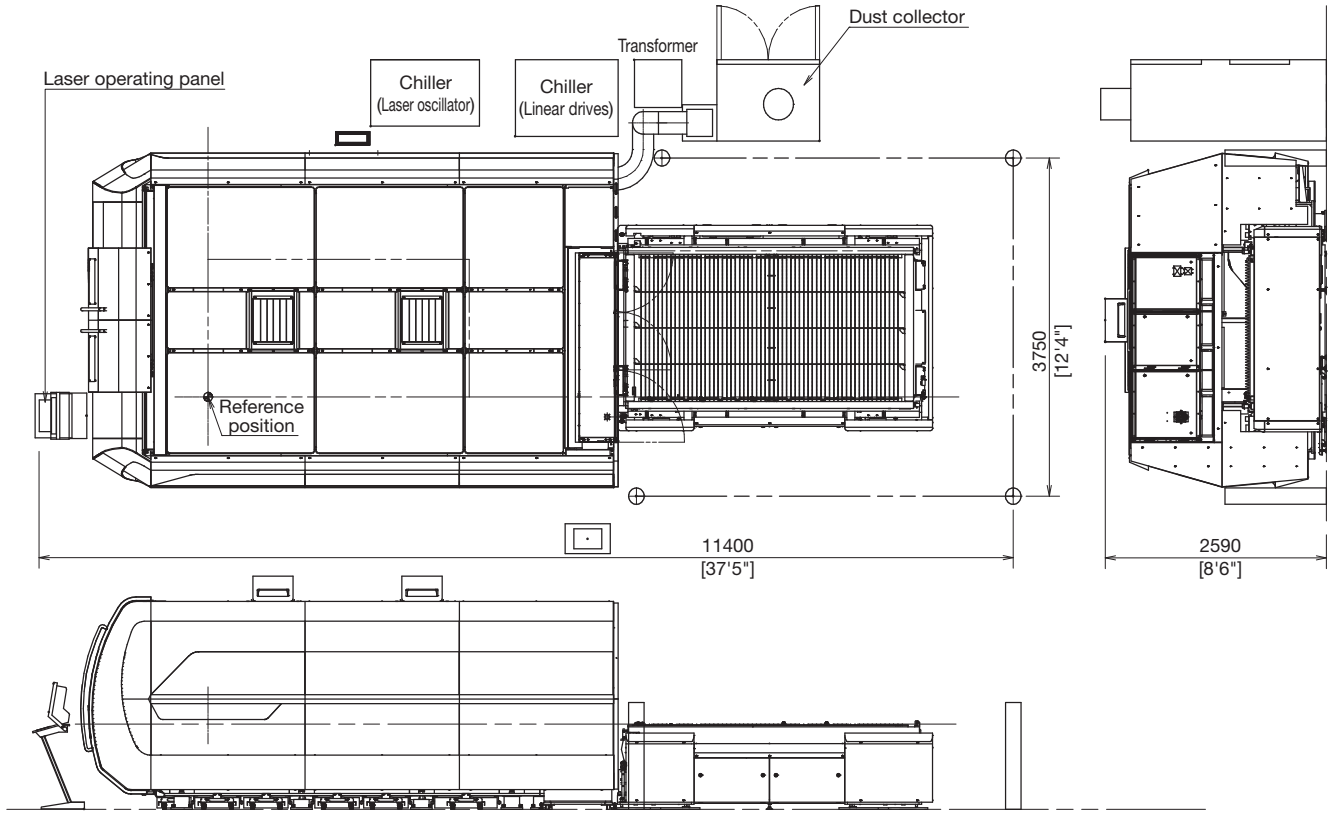
FIBER LASER LS 3015 FC

Material Thickness Capacities

Material	Assist gas	Thickness (mm) 2 4 6 8 10 12 14 16
Mild steel	Oxygen	
Stainless	Nitrogen	
Aluminum	Nitrogen	
Copper	Oxygen	
Brass	Nitrogen	

Maximum cutting area (X x Y x Z)	3070 mm x 1550 mm x 95 mm [120.8" x 61.0" x 3.7"]
Maximum material weight	600 kg [1322 lbs]
Maximum material thickness	[Mild steel] 16 mm [0.63"], [Stainless] 10 mm [0.39"], [AL] 8 mm [0.31"], [Brass] 5 mm [0.20"], [Copper] 5 mm [0.20"]
Fast traverse speed	340 m/min (XY simultaneous) [13385"/min]
Positioning accuracy	+/-0.01 mm [+/-0.0004"]
Repeat accuracy	+/-0.01 mm [+/-0.0004"]
Oscillation method	LD excitation of fiber laser
Rated output	2500 W
Laser wavelength	1.07 µm
Installation area (L x W x H)	11400 mm x 3750 mm x 2590 mm(*1) [37'5" x 12'4" x 8'16"]
Air supply Flow rate	130 NL/min
Pressure	0.5 MPa [71 PSI]
Power supply	23 kVA (Body)(*2) [200 V ~ 460 V]
Machine weight	Approximately 11 tons(*3)

*1: Except peripheral equipment and maintenance area space
*2: Except required power supply capacity of peripheral equipment
*3: Except weight of peripheral equipment and pallet changer



• Specifications and external appearance of the machine are subject to change without notice. • Some items pictured may be optional • Some areas of the brochure may have safety precautions removed from the machine for illustration purposes.

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