



LASER CUTTING MACHINES

# AXEL SERIES



# A cost-effective laser processing center

**T**he ability to react and provide a fast response to opportunities has become increasingly necessary in today's competitive marketplace. To obtain maximum flexibility, the application of new technologies is regarded as one of the most effective production resources.

Backed by years of technical knowledge and experience in sheet metal fabrication and laser cutting, LVD offers the Axel high-speed laser processing center as part of its range of precision laser cutting machines.

Becoming competitive also depends on the cost-effectiveness of new equipment placed on-line. The integration of automatic load/ unload allows unattended production, permitting the operator to perform other tasks.

The Axel offers reliable, consistent laser cutting. Each component of the machine has been carefully chosen to guarantee the highest quality results and the best productivity.



*Axel 3015 S*



*Axel 3015 L2*

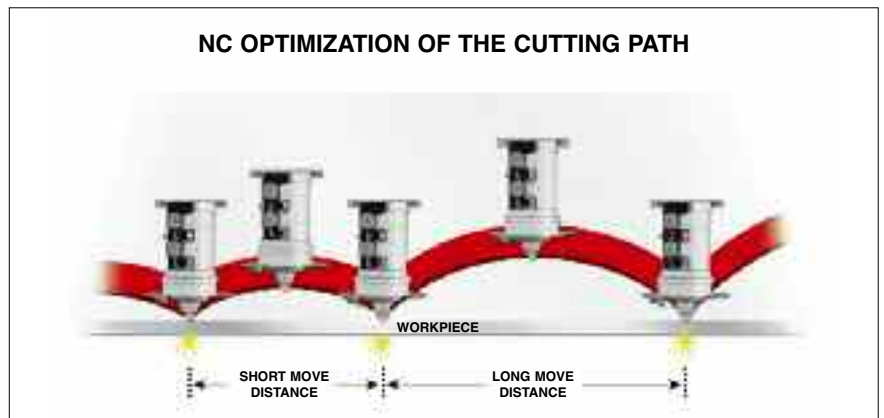
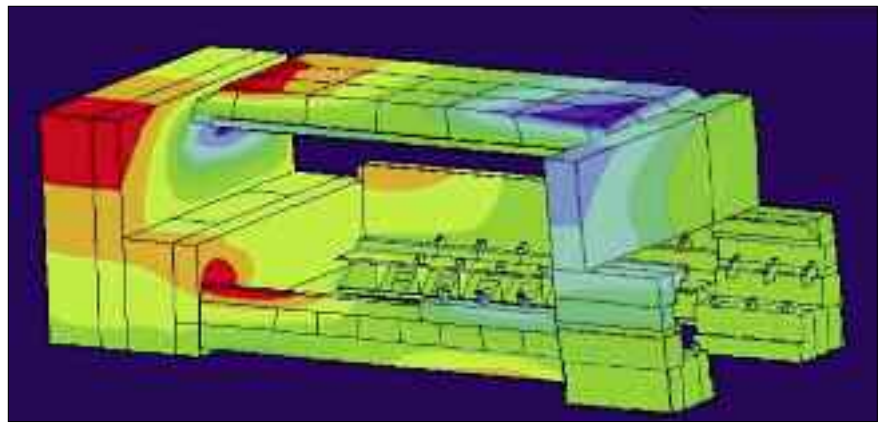
## ***Axel***

- Compact flying optics laser profiling machine with a constant beam length system
- 1500 x 3000 mm work table area
- Incorporates automatic shuttle tables or a fully integrated and programmable load/unload system
- Equipped with a single system package from GE Fanuc comprised of laser source, control, motors and AC drive amplifiers
- Offers the flexibility of 2500 W, 4000 W or 5000 W laser source
- The user-friendly CADMAN-L 3D software package (optional) offers even higher flexibility and productivity
- Conforms to all current safety standards
- The Axel laser cutting machine provides the following advantages:
  - high productivity
  - high flexibility
  - fast cut-to-cut workpiece changeover
  - improved accuracy
  - high reliability
  - simplified operating procedure
  - low maintenance and operation costs
  - compact design

- Crash protection:  
Cutting head with built-in safety system to protect the cutting head in case of collision with the workpiece



- Thanks to finite elements and modal analysis the rigid closed frame has been optimised to cope with the high acceleration rates.



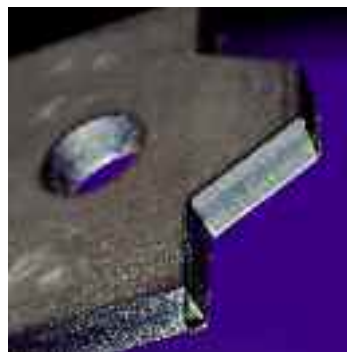
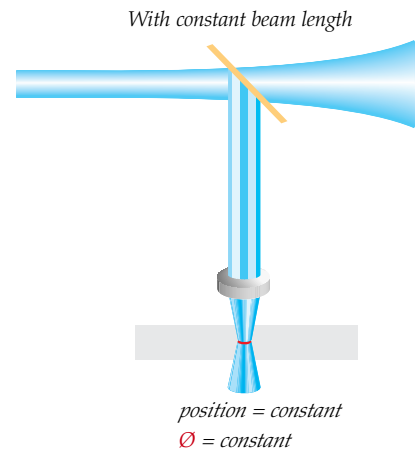
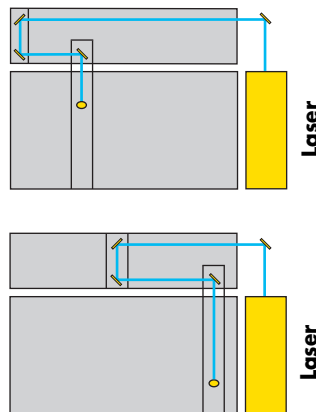
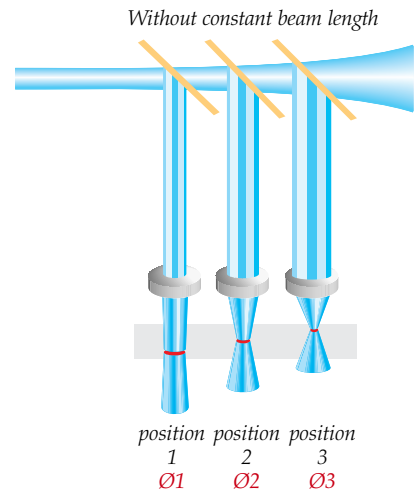
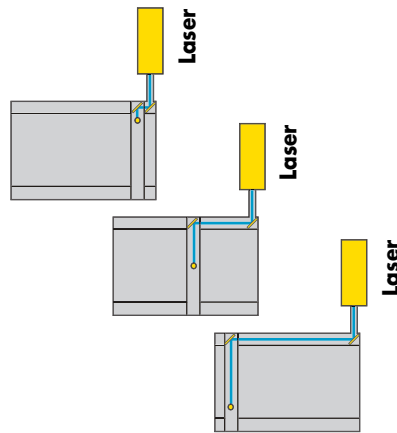
- Quick change lens (5", 7.5" and 10"): equipped as standard with a cassette system for quick replacement of the water-cooled focusing lens
- Laser Eye: optical sensor referencing system allows automatic and non-contact sheet referencing
- Capacitive height sensing built into the cutting head:
  - maintains a constant distance between the head and the material being processed
  - adjusts to any undulations in the plate

- NC Optimization maximizes machine productivity without operator intervention by automatically determining the cutting head motion based on travel distance.
- The Axel equipped with linear motor and 5 kW resonator achieves cutting speeds up to 40 m/min for maximum output.



### Outstanding edge quality

- Constant beam length system keeps the diameter of the laser beam constant, always maintaining the focal point at the same position in the material. This results in:
  - higher cutting speeds being maintained over the complete working area
  - superior cutting quality over the complete working area
- Edge function for cutting sharp corners particularly in thicker plate
- Start-up function for optimal lead ins
- Total power control: automatic adjustment of laser power as a function of speed change
- Pulse function for cutting high quality small holes
- Numerous other processing technologies: engraving, marking, cutting of coated material, etc.
- Back reflection control: important while cutting aluminium, copper and other reflective materials
- Process Control (optional): control of the piercing and cutting process



Without edge function



With edge function

# Integrated GE Fanuc laser package

All LVD lasers systems feature the GE Fanuc laser package. GE Fanuc, global market leader in CNCs and drive mechanisms, is a major supplier of laser systems with over 10000 units sold. The company produces a custom package solution for LVD that delivers important benefits for laser systems users.

The GE Fanuc laser package includes a laser, PC-based controller, and digital servo drives. It gives the user full control over the cutting process with the most reliable technology in the world. End-users benefit from integral interfaces, easy installation and start-up, and a host of additional functions that make laser processing more economical.

Axel systems use a 2.5, 4 or 5 kW fast axial flow high power CO<sub>2</sub> laser with high frequency (HF) excitation. High frequency resonators are universally accepted as extremely reliable and maintenance friendly. There is no need to change electrodes due to erosion or because of contamination. These lasers also provide extremely economical use of laser gas (10-20 l/H). The Axel resonators feature the latest radio frequency excitation technology for high reliability.

The integrated system offers other unique features that enhance laser system performance.



*GE Fanuc 160i-L control*



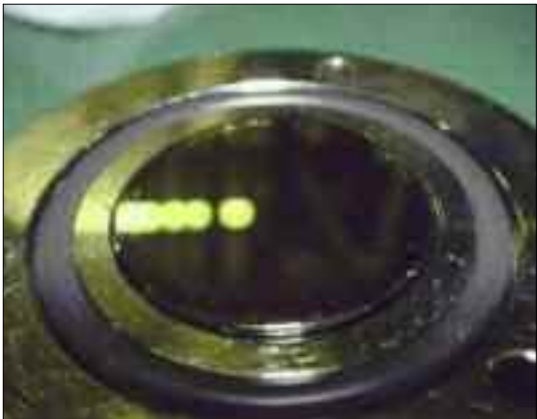
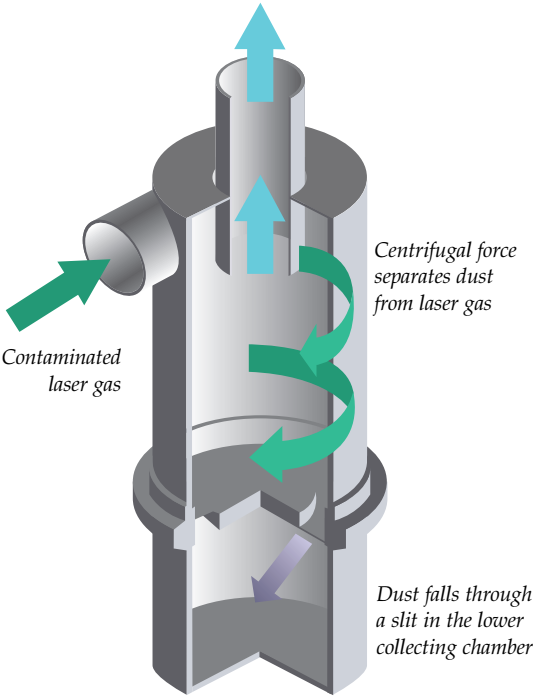
*GE Fanuc RF resonator*



■ Photo catalytic element: Used to remove contamination from laser gas, reducing the need for mirror cleaning. The photo catalytic element employs a  $\text{TiO}_2$ -coated ceramic ring located in the resonator. Ultraviolet rays create a photo catalytic effect, which dissociates hydrocarbons into carbon dioxide and water.



■ Cyclone cleaner unit: separates dust and laser gas by centrifugal force, keeping the cavity clean. The cyclone cleaner unit collects dust and prevents it from adhering to the mirror, reducing contamination of resonator mirrors and minimizing cleaning requirements.



*The resonator mirror with a centrifugal separator.*



*The resonator mirror without a centrifugal separator. To prove the efficiency of the cyclone cleaner unit, the laser gas was contaminated with 5 gr. of glass powder.*

## CONFIGURATIONS



*Axel 3015 S*

Axel is designed with a modular construction. The Axel 3015 S comes equipped with shuttle tables. This design allows one table to be loaded while the machine is cutting on the other table, maximizing uptime. Table change in only 12 sec. Due to rigid construction, no special floor preparation is needed.



*Axel 3015 L1*

Axel L features a fully integrated load/unload system that permits unattended production, freeing the operator to perform other tasks.

The load/unload system is designed for maximum efficiency in material handling, while minimizing the required floorspace.

The Axel system also unloads parts in an optimal way. The speed of the unloading system can be controlled through the CNC according to the weight of the material or the size of the parts being off-loaded, to ensure that the unloaded parts stack smoothly.



*Axel 3015 L2*

Axel can be configured with 1, 2 or 3 loading stations. These extra station(s) improve the flexibility of the system without investing in a storage tower.

Axel L3 features three material stations and an output station for cut parts.

Taking up the same floorspace as an L3, an Axel L2.2 is equipped with two loading stations and two output stations for finished parts.



*Axel 3015 L3*

Axel LT features storage towers that work in concert with the material handling system, providing full capabilities for loading, unloading and storage.

Material enters the warehouse through a de-palletizing station that facilitates the removal of steel banding and other shipping materials. A transport system delivers material to the tower.

Each piece of the system is controlled through a single CNC control for easy and efficient monitoring and programming.



*Axel 3015 LT*

# Fully integrated programming system

The Axel is available with CADMAN-L 3D, a fully integrated, highly automated CAD/CAM programming system for the design, unfolding, importing, nesting and cutting of laser parts and sheets.

This optional software package offers precise importing and unfolding of 3D models, importing of 2D files and a powerful built-in CAD system for part design.

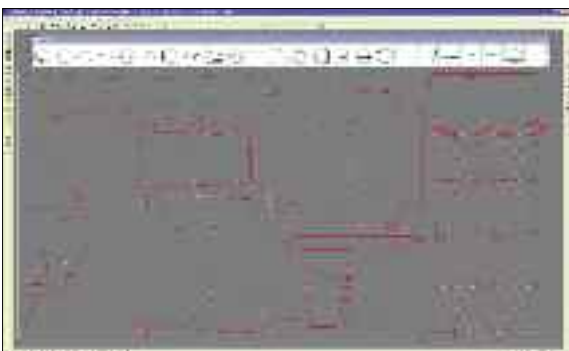
CADMAN-L 3D is completely configurable for manual or automatic programming featuring:

- Parametric lead-ins and lead-outs for contours, bridges, loops and micro-joints
- Automatic control of cutting and nesting parameters by material type and thickness
- Advanced common-line cutting

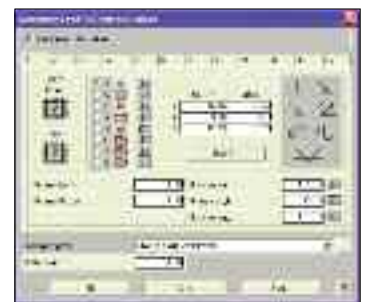
- Powerful nesting and sequencing for maximum efficiency
- Skeleton cutting and full utilization of sheet remnants
- Program optimization, verification and simulation

CADMAN-L 3D is built upon a powerful database and can be connected directly to the Axel laser machine, as well as integrated with a shop floor management system.

CADMAN-L 3D is part of the integrated family of CADMAN® programming software which streamlines the fabricating process by providing a seamlessly integrated solution from concept to finished part.



Nesting



Advanced common line cutting; flexible lead-in/lead outs; skeleton cutting and utilization of sheet remnants.

**Machine**

Maximum Sheet Size	3000 x 1500 mm
X-Axis Travel	3150 mm
Y-Axis Travel	1600 mm
Z-Axis Travel	100 mm
Maximum Positioning Speeds	
X-Axis	120 m/min
Y-Axis	120 m/min
X-Y Simultaneous	169 m/min
Z-Axis	30 m/min
Repetitive Accuracy	± 0,025 mm
Positioning Accuracy*	± 0,05 mm/m

**Laser**

Type	GE-Fanuc HF excited fast axial flow CO <sub>2</sub> laser
Laser Power (± 2%)	2500 W, 4000 W or 5000 W
Power Stability	± 2%
Wave Length	10,6 µm
Mode	D
Divergence	< 2 mrad
Directional Stability	< 0,2 mrad
Pulses	up to 2 kHz
Polarization	circular
Laser Gas	10 l/hour (2,5 - 4 kW) 20 l/hour (5 kW)

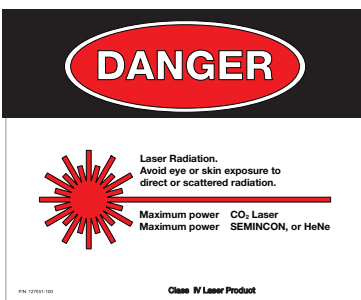
**General Specifications**

Overall Dimensions	Axel 3015 L	L	11000 mm
		W	7400 mm
		H	4000 mm
	Axel 3015 S	L	11500 mm
		W	4450 mm
		H	2350 mm

**Material Capacities**

	2500 W	4000 W	5000 W
Max. Sheet Thickness:			
Steel	16	20	25
Stainless steel (N <sub>2</sub> )	10	15	15
Aluminium	5	10	12

\* Achievable workpiece accuracy depends on type of workpiece, pre-treatment and sheet size, as well as other variables.





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