



LASER CUTTING MACHINES

# IMPULS SERIES



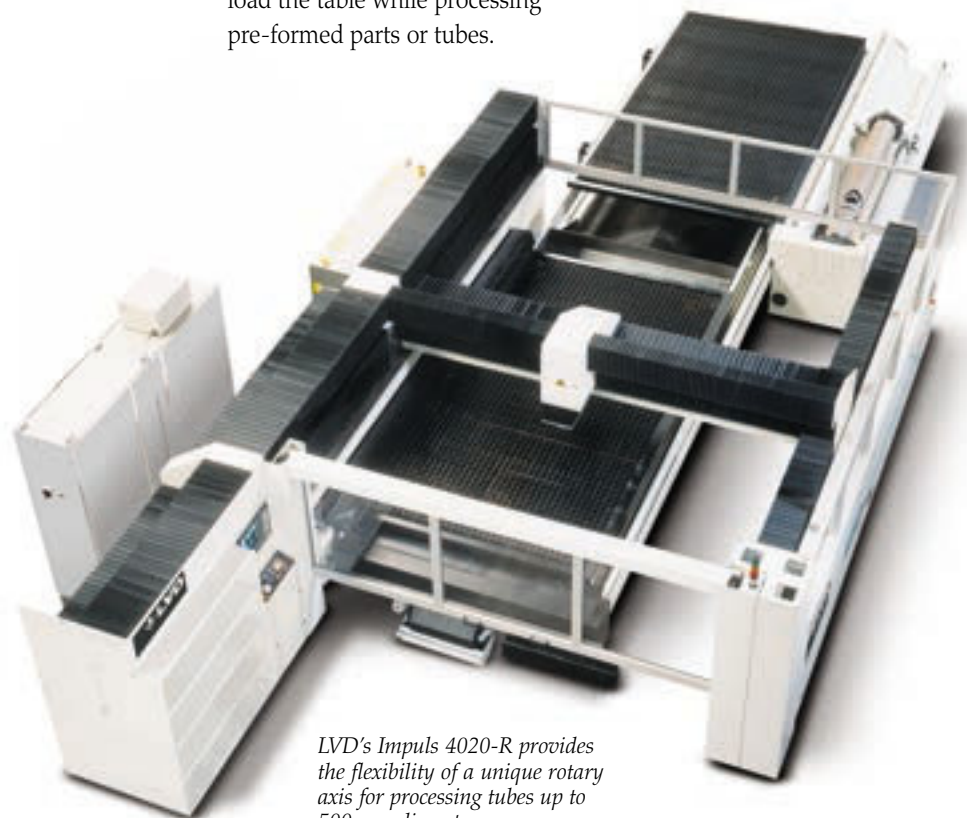
# Advanced Laser Processing Systems

**M**ake your heavy-duty fabrications more productive and profitable with advanced laser cutting technology from LVD, a leading manufacturer of metal fabrication equipment.

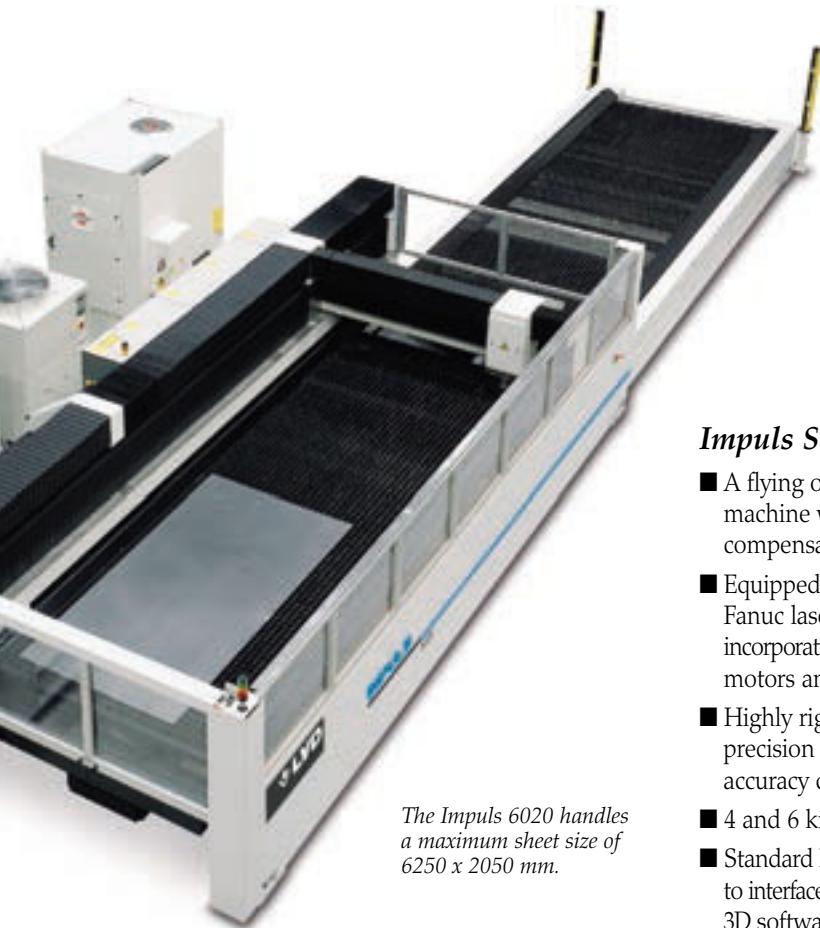
Our line of heavy-duty Impuls lasers addresses the special needs of plate fabricators.

We've advanced such features as rotary axis cutting and introduced the powerful Fanuc 6 kW resonators to our Impuls laser systems for fast and accurate processing of a range of materials and material thicknesses, including stainless steel, plate and wear and structural plate such as Hardox, Weldox, Domex and others.

Impuls Series lasers offer large table capacities to handle materials up to 12500 x 3000 mm and the flexibility to process flat plate or load the table while processing pre-formed parts or tubes.



*LVD's Impuls 4020-R provides the flexibility of a unique rotary axis for processing tubes up to 500 mm diameter.*



*The Impuls 6020 handles a maximum sheet size of 6250 x 2050 mm.*

### ***Impuls Series lasers:***

- A flying optics laser profiling machine with a beam length compensation system
- Equipped with a single system Fanuc laser package, incorporating laser source, control, motors and AC drive amplifiers
- Highly rigid design with precision drives ensures high accuracy cutting
- 4 and 6 kilowatt laser options
- Standard Network Card provided to interface to optional CADMAN-L 3D software package, which offers even more capabilities for higher flexibility and productivity

### **Impuls Series Advantages:**

- *high productivity*
- *high flexibility*
- *fast cut-to-cut workpiece changeover*
- *improved accuracy*
- *high reliability*
- *simplified operating procedure*
- *low maintenance and operation costs*



*The Impuls 12530 features a work area of 12.5 x 3 meters.*

# Features Designed for Productivity

## Quick Set-up

- **Laser Eye:** optical sensor referencing system
  - Allows automatic and non-contact datum calculation and sheet referencing from pre-punched holes or two adjacent plate edges
  - Guarantees scratch-free referencing and geometric accuracy
- **Quick-change lens** (5", 7.5" and 10") equipped as standard with a cassette system for quick replacement of the water-cooled focusing lens
- **Crash protection:** built-in safety system to protect the cutting head in case of collision with a tipped part



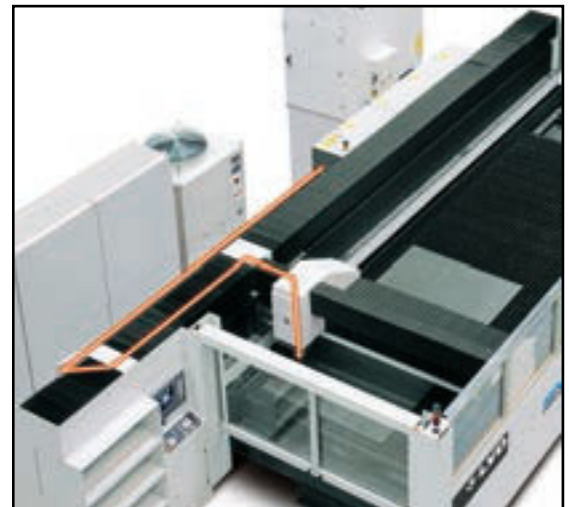
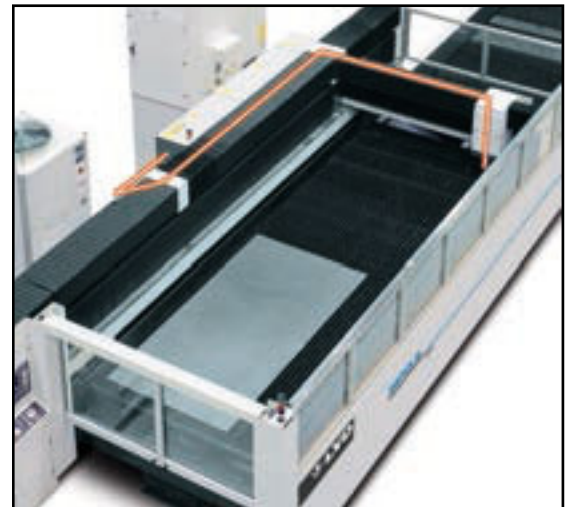
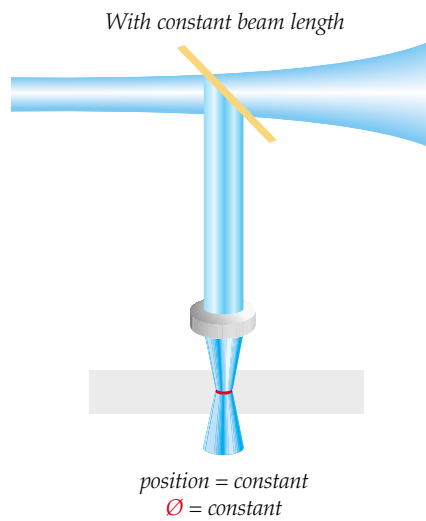
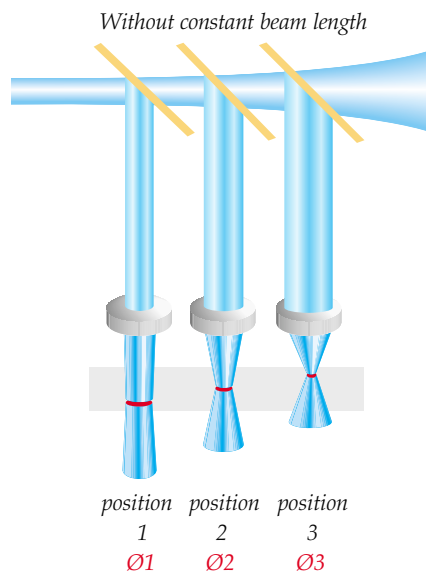
- **NC Focus:** programmable adjustment of the focal position of the lens in relation to the nozzle
  - Operator intervention to adjust the focal point is no longer required
  - Piercing time drastically reduced
  - Improved piercing stability in thicker material
- **Automatic lens calibration:** after inserting a new lens, the exact focal point of the lens will be determined without operator intervention
- **Piercing sensor** guarantees perfect piercing in thicker material, irrespective of variations in chemical composition and surface condition of the plate
- **Plasma detection** continuously controls the cutting process. In case of a cutting failure, plasma will occur and the system will either slow down, or stop and activate the retry function. This allows unmanned processing of stainless steel and aluminum, higher cutting speeds, and helps reduce scrap
- **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
- **High pressure (clean cut) cutting head** (standard) equipped for a 5", 7.5" or 10" cutting lens
- **Built-in scrap conveyor**
- **Cutting technology database** for a wide variety of materials
- **User-friendly control** with extensive diagnostic functions

# Cutting Accuracy

Impuls lasers achieve high productivity and accuracy by combining high axis speeds with optimal cutting conditions over the entire cutting area, using a unique constant beam length system.

In most machines, the divergence of a laser beam is compensated by use of a telescope and/or adaptive optics. With these systems, however, a variation in cut quality over the cutting area can occur because of a change in the focal position and/or focal spot size. The constant beam length system of the Impuls eliminates the divergence of the laser beam, ensuring identical results over the entire cutting area, at optimal speeds, with superior edge quality.

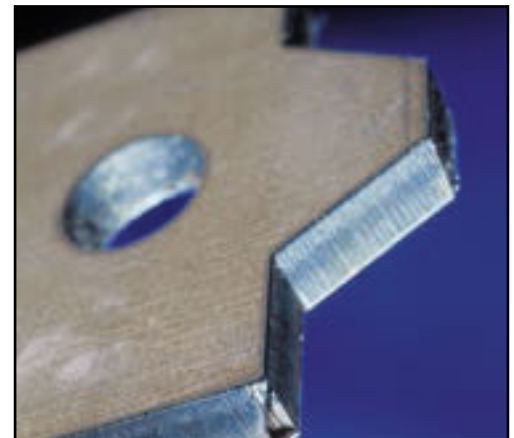
The edge function feature facilitates cutting sharp corners, particularly in thicker plate.



A unique beam length compensation system eliminates the divergency of the laser beam, ensuring identical cutting results at any location within the cutting area at optimal speed.

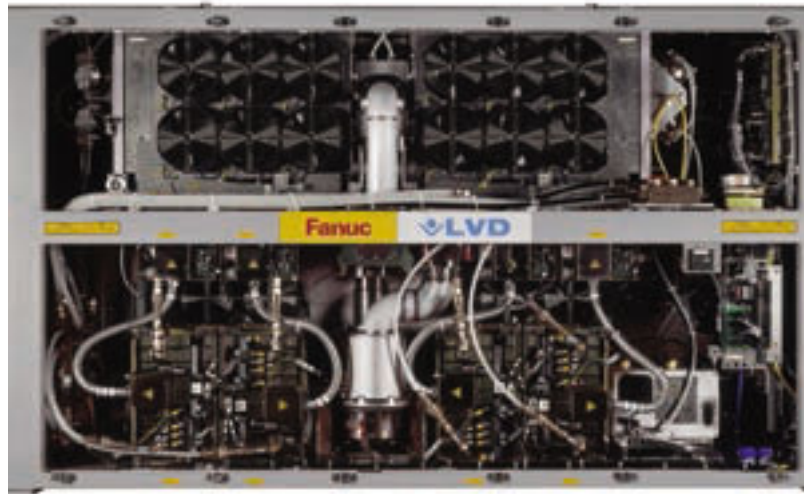


With edge function



Without edge function

# Integrated Fanuc Laser Package



All LVD lasers systems feature the Fanuc laser package.

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 Fanuc laser package includes a laser, CNC controller, and digital servo drives. The package 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.

Impuls systems use a 4 or 6 kW fast axial flow high power CO<sub>2</sub> laser with high frequency (HF) excitation utilizing MOSFET semiconductor technology. 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). All resonators feature the latest radio frequency excitation technology for high reliability.

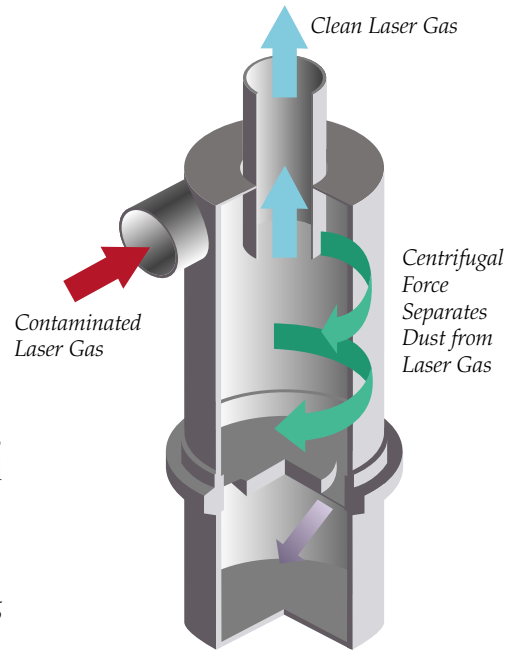


*The photo-catalytic element.*

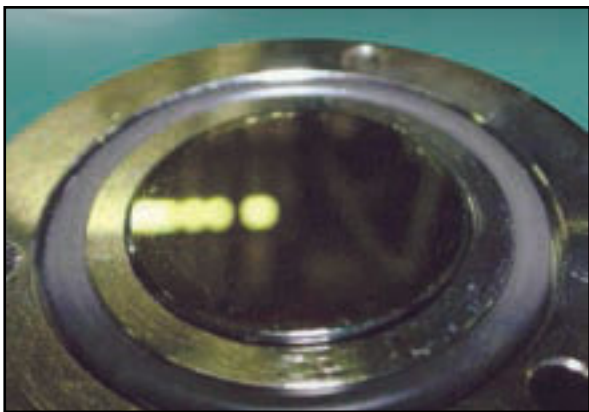
■ Photo-catalytic element: Used to remove contamination from laser gas, reducing the need for mirror cleaning. The photo-catalytic element employs a  $\text{TiO}_2$ -coated ceramic ring located in the resonator. Ultraviolet rays create a photo catalytic effect, which dissociates hydrocarbons into carbon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

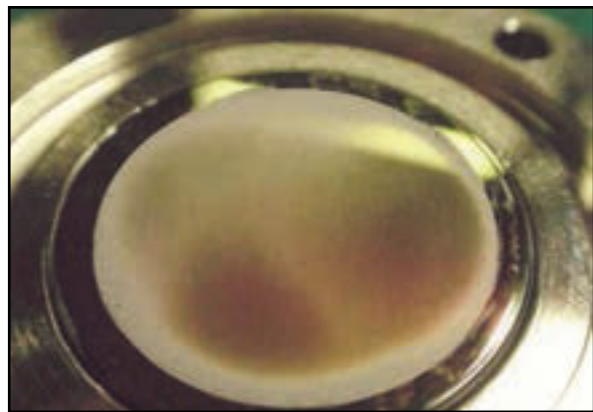
### *Cyclone Cleaner Unit*



*Dust Falls Through a Slit in the Lower Collecting Chamber*



*The resonator mirror with a cyclone cleaner unit.*



*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.*

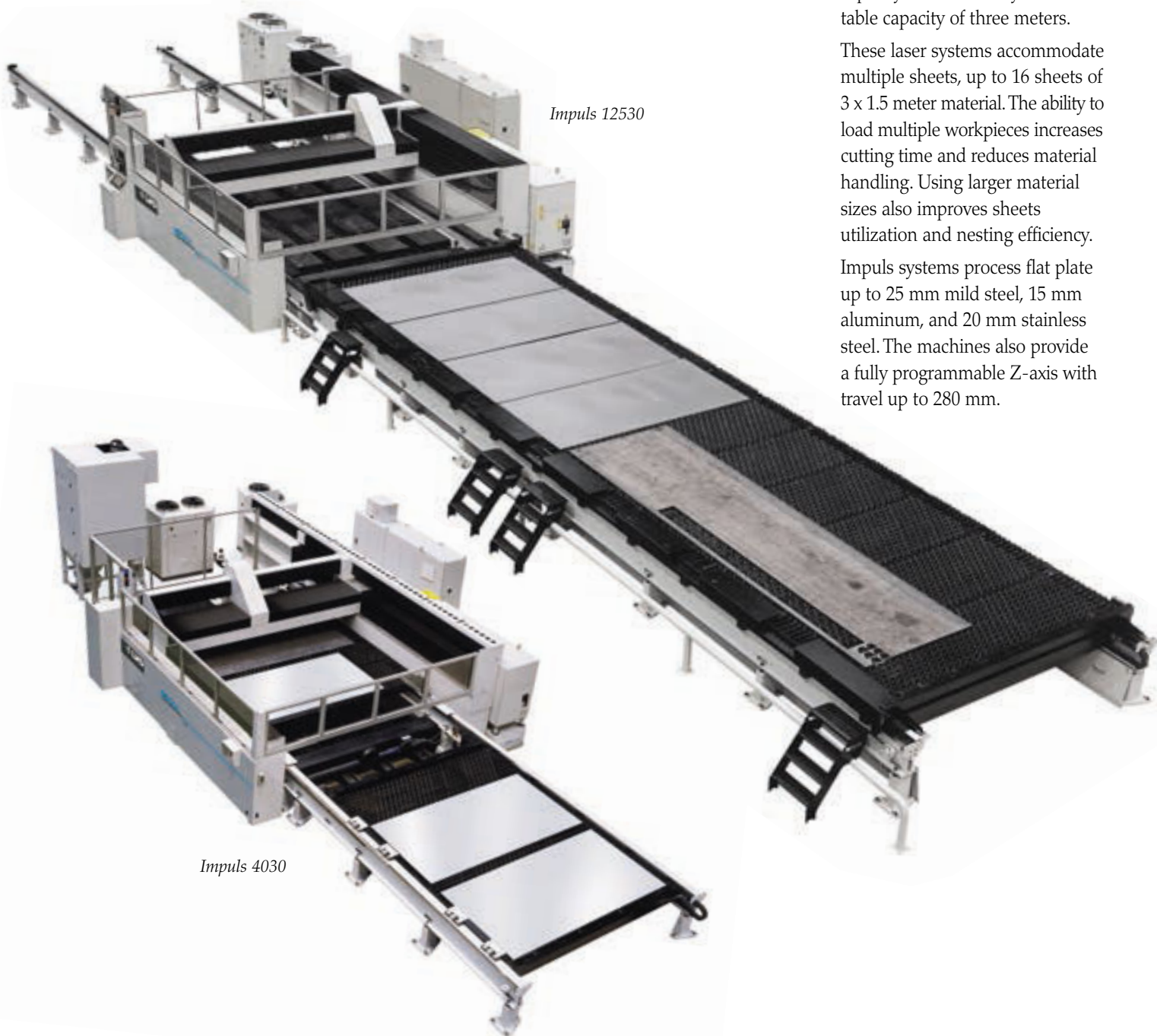
# Impuls 4030, 6530, 8030, 12530

Impuls 4030, 6530, 8030 and 12530 laser systems combine high processing accuracy and large table capacity to uniquely address heavy plate fabrication requirements.

Impuls heavy-duty laser systems provide the largest sheet carrying capacity in the industry with a table capacity of three meters.

These laser systems accommodate multiple sheets, up to 16 sheets of 3 x 1.5 meter material. The ability to load multiple workpieces increases cutting time and reduces material handling. Using larger material sizes also improves sheets utilization and nesting efficiency.

Impuls systems process flat plate up to 25 mm mild steel, 15 mm aluminum, and 20 mm stainless steel. The machines also provide a fully programmable Z-axis with travel up to 280 mm.



*Impuls 12530*

*Impuls 4030*



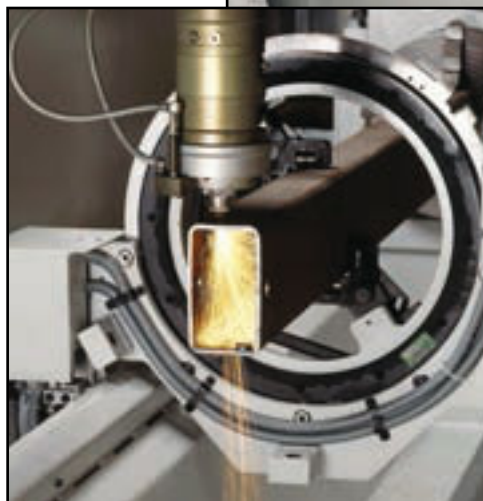
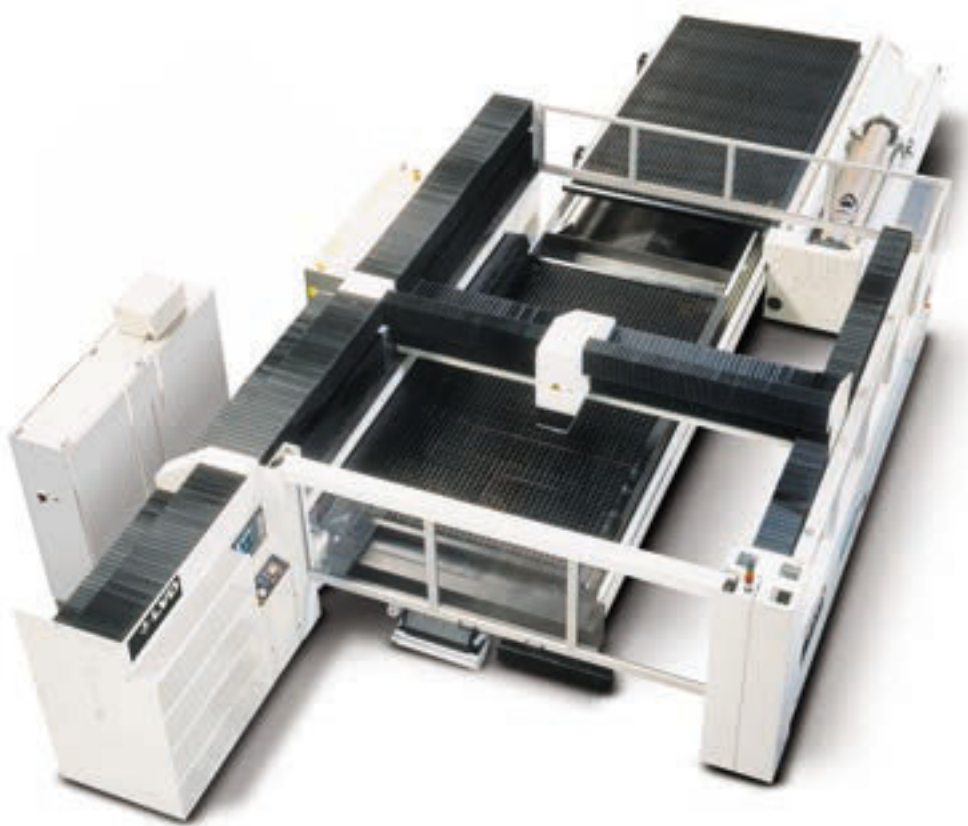
# Impuls 4020-R

Flexibility is the key to productivity in laser cutting. With the capability to process flat plate, pre-formed parts and tubes, the Impuls 4020-R offers the highest level of flexibility available in the market today.

The standard configuration provides two shuttle tables and a 280 mm fully programmable Z-axis for use with a rotary axis or for processing pre-formed parts. The shuttle table allows the user to load/unload one table while the machine processes flat plate or load the table while processing pre-formed parts. Changeover from flat sheet to rotary can be achieved within seconds.

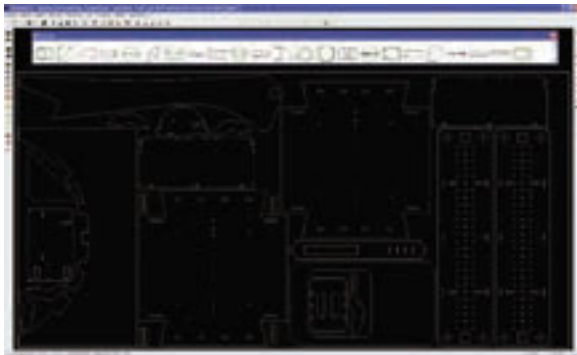
The Impuls 4020-R processes larger diameter tubes (up to 500 mm) and pre-formed parts than any other system and is the only machine of its type to combine rotary and flat plate cutting with ease for the ultimate in processing flexibility.

The Impuls 4020-R processes tubes up to 500 mm diameter with a weight of 950 kg. Even when processing a single part, the 4020-R is the ideal tool, since flat sheet cutting can continue during rotary set-up or loading/unloading of the tubes.



*The chuck of the rotary axis allows processing of square or round tubes up to 500 mm diameter. The rotary carriage is automatically transported into the cutting area to facilitate fast changeover.*

# CADMAN® Offline Programming System



The productivity of Impuls laser systems is enhanced using LVD's CADMAN® offline programming software.

CADMAN's automatic functions simplify programming and increase the productivity and flexibility of the sheet metal fabrication process, while its complete integration provides a total fabricating solution with just a single CAD/CAM tool.

CADMAN-L 3D incorporates fully automatic, semi-automatic or manual nesting and optimizes cutting and machine parameters to maximize sheet utilization. This software module allows the user to configure lead-ins/lead-outs and allows for cutting path optimization, common line cutting,

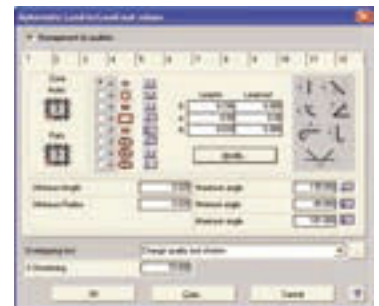
and high-speed communications and networking to maximize machine productivity.

**CADMAN-L 3D offers:**

- Interactive CAD techniques
- DXF file importation
- Automatic or interactive determination of cutting sequences
- Nesting
- Full cutting path simulation

**CADMAN-A provides complete management of laser and warehouse system, providing:**

- Visualisation of cutting technologies
- Graphic simulation of tool path
- Positions of sheet/plate on the table
- Job List



| Impuls Machine                       | 4020 R                                 | 6020        | 4030        | 6530        | 8030        | 12530        |
|--------------------------------------|--|-------------|-------------|-------------|-------------|--------------|
| Max. Sheet Size (mm)                 | 4000 x 2000                            | 6250 x 2050 | 4000 x 3100 | 6500 x 3100 | 8000 x 3100 | 12500 x 3100 |
| Max Workpiece Weight                 | 1600 kg                                | 2500 kg     | 2400 kg     | 3900 kg     | 4800 kg     | 7600 kg      |
| X-Axis Travel                        | 3150 mm                                | 2100 mm     | 3150 mm     | 3150 mm     | 3150 mm     | 3150 mm      |
| Y- Axis Travel                       | 4070 mm                                | 6260 mm     | 4070 mm     | 4070 mm     | 4070 mm     | 4070 mm      |
| Z-Axis Travel                        | 280 mm                                 | 280 mm      | 280 mm      | 280 mm      | 280 mm      | 280 mm       |
| Max. Positioning Speed               | 85 m/min.                              | 85 m/min.   | 85 m/min.   | 85 m/min.   | 85 m/min.   | 85 m/min.    |
| Repetitive Accuracy                  | ± 0,025 mm                             | ± 0,025 mm  | ± 0,025 mm  | ± 0,025 mm  | ± 0,025 mm  | ± 0,025 mm   |
| Positioning Accuracy (1)             | ± 0,05 mm/m                            | ± 0,05 mm/m | ± 0,05 mm/m | ± 0,05 mm/m | ± 0,05 mm/m | ± 0,05 mm/m  |
| Rotary capacity<br>(only for 4020 R) | 500 mm diameter<br>over 4000 mm length |             |             |             |             |              |

**Space Requirements**

Overall Dimensions (2)

|        |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|
| L (mm) | 14000 | 17000 | 16000 | 19000 | 22000 | 30000 |
| W (mm) | 8700  | 8700  | 8700  | 8700  | 8700  | 8700  |
| H (mm) | 3100  | 3100  | 3300  | 3300  | 3300  | 3300  |

**Laser**

|                       |  |                  |
|-----------------------|--|------------------|
| Type                  | Fanuc HF excited fast axial flow CO <sub>2</sub> laser |                  |
| Laser Power (± 2 %)   | 4 kW, 6 kW   |                  |
| Power Stability       | ± 2 %  |                  |
| Wave Length           | 10,6 µm  |                  |
| Mode                  | D  |                  |
| Directional Stability | < 0,2 mrad   |                  |
| Pulses                | up to 2 kHz  |                  |
| Polarization          | Circular   |                  |
| Laser gas consumption | 10l/hour (4 kW)  | 20 l/hour (6 kW) |

**Material Capacities**

|                                   | 4 kW  | 6 kW  |
|-----------------------------------|-------|-------|
| Max. Sheet Thickness              |       |       |
| Steel                             | 20 mm | 25 mm |
| Stainless Steel (N <sub>2</sub> ) | 15 mm | 20 mm |
| Aluminum                          | 10 mm | 16 mm |

(1) The achievable accuracy depends, among other things, on the type of workpiece, its pre-treatment and sheet size. According to VDI/DGQ 3441.

(2) Approximate value shown. Exact data can be found on the installation plan.





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