Perfection and reliability of the laser
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TCI Cutting
LASER DIVISION
TCI Cutting is very experienced in the development and manufacturing of laser cutting machines and waterjet cutting machines. As well as developing software to minimize costs and maximize productivity.

TCI Cutting is committed to innovation and technological development, therefore we have added a new series of laser cutting machines: The Smartline 3015 Series, available with CO2 and Fiber technology.

We offer our clients technical support, training, spare parts and consumables, all of the highest quality and with excellent personal attention.
Laser Characteristics

- **CO₂**

CO₂ lasers use a mixture of gases to generate the laser beam. The high voltage required in the resonator to excite the gas, is generated by wear-free semiconductors which are small, efficient and reliable.

CO₂ technology is suitable for cutting a variety of materials such as thick metal sheets, wood, acrylic, glass, paper, textiles, plastics, leather and stone. It delivers high productivity for all sheet thicknesses up to 30mm and tubular parts.

- **Fiber**

Fiber lasers are the latest development in laser cutting. The laser beam is generated in an active fiber and is guided to the cutting head of the machine through a transport fiber via diodes and fiber cables.

Fiber lasers tend to be more compact than CO₂ lasers and deliver double the power output with the same power supply. They are best suited for fine and medium sheet thickness up to 12mm and non-ferrous materials such as copper and brass.

Access to the fiber laser machine is restricted for safety reasons. The reflections of the laser are very dangerous to eyesight. The focal diameter is very small, with an intensity a hundred times higher than with CO₂.
Advantages

**CO₂**

Excellent cutting quality and low production costs

- Exceptional access to the machine because the wavelength does not cause damage to eyesight.
- It allows the cutting of square tubes without installation of options. Platina and other elements such as IP can be cut very easily.
- Automatic changing of the focal length. Great autonomous operation thanks to collision detection, the lens cassette changer, the nozzle changer and the centering of the nozzle. This all reduces stoppage time and increases safety.
- The operator has to intervene less frequently allowing him to concentrate on the planning and control.
- Higher finish quality than with fiber laser technology for thicknesses greater than 10 mm.
- High production for all sheet thicknesses and for working on tubular parts. Suitable for high volume cutting and for all thicknesses.
- Low production costs thanks to wear-free semiconductors for excitation and maintenance-free magnetic turbine bearings.

**Fiber**

Flexible and energy efficient

- Great flexibility. Even non-ferrous metals such as copper and brass can be cut easily with exceptional quality.
- Unmatched high production output for pieces of fine thickness.
- High speed cutting for thicknesses less than 4mm.
- Low production and maintenance costs due to low power consumption and because no resonator gas is required.
- The compact design requires minimal space but there is no limitation in machine size.
- The replacement of the lens is required yearly and has to be performed in a clean room. The same lens is used for all thicknesses and material types. The lifecycle of the lens expectancy is between 4,000 and 5,000 hours.
- The great efficiency of the fiber laser ensures a greatly reduced energy consumption. It is 86% more energy efficient than the CO₂ laser.
- The fiber laser is very suitable for marking, finishing and detailing the parts.
- Easy installation and quick start up.
- The cutting speed of the fiber laser for thicknesses below 6mm, when cutting using N₂, is up to 5 times faster.
Regarding the sheet thickness that can be cut, the CO₂ laser can cut up to 30mm, while the fiber laser can only cut fine and medium thickness sheets up to 20mm.

With regard to machine access, the comparative wavelength of the fiber laser beam with that of the CO₂ laser is 1.064 μ and 10.6 μ respectively, the fiber laser beam being ten times smaller. For this reason, the fiber laser requires a much higher level of safety precautions because the laser reflections emitted cause damage to the eyesight. The CO₂ on the other hand, has exceptional access to the machine with no risk of damage to the eyesight.

Thanks to being more energy efficient and not requiring resonator gas, the operating costs of the fiber laser are lower than with the CO₂ laser. The CO₂ laser system effectively uses 8% to 10% of the energy that passes through it, for a fiber laser system this is between 25% and 30%.

In order to direct the beam to the lens, the CO₂ laser utilizes mirrors that have to be placed at specified distances, this machine therefore takes up more space than the fiber laser that thanks to its compact design, requires little space.

The CO₂ laser requires two lenses which must be changed depending on the material and the thickness being cut, and have a life-cycle of about 1,000 hours. In comparison, the fiber laser cutter only uses one single lens with a life-cycle of about 4,000 to 5,000 hours.
Smartline®
series
• **CO₂**

Excellent cutting quality and low production costs

**Smartline®**

L-Power

CO₂ laser series with sealed resonators and power output ranging from 100 W to 600 W.

**Smartline®**

CO₂

Available in power output ranging from 1.000 W to 3.000 W.

This series offer high quality cutting, both for fine materials and thick materials. It is the best suited technology for high volume iron cutting in all thicknesses. It offers high productivity with minimal maintenance costs.

• **Fiber**

Flexible and energy efficient

**Smartline®**

Fiber

This series offers an unmatched piece production output and cutting quality for fine and medium sheets, depending on the laser power used. The high energy efficiency of the fiber laser ensures a very low power consumption. They are available in power output ranging from 1.000 W to 6.000 W.

TCI has the laser cutting solution to meet your cutting needs and expectations, for every dimension, material type and thickness, with maximum productivity and minimal maintenance.
Specifications

- Acceleration: 9.8 m/s² (1G)
- Maximum simultaneous positioning speed: 160 m/min
- Precision: ± 0.05 mm
- High performance with minimal maintenance costs
- Excellent cut quality for fine thickness materials
- The Smartline L-Power series: sealed CO₂ ROFIN resonator
  Resonator power output ranging from 100 W to 600 W
- Compact design with operator protection
- Effective system to change from high to low gas pressure
- Changing lenses with interchangeable cartridges of 3.75”, 5”, 7.5”, 10”
- Capacitive Sensor, high pressure cutting head
- TCI Cutting parameter tables
- Pre-cut protective film
- Power output control function for automatic nesting and machining (corners, lead-ins)
- Automatic time and cost calculation for pieces
- Network connection via external PC
- Automatic table exchanger (included for some models)
- Smoke extraction system (included for some models)
- 3 Point reference sensor (sheet rotation detection)
- Collection of workpieces and trimmings
- Dual proportional valve control for different gas pressures with special system
  for high pressure cutting
<table>
<thead>
<tr>
<th>Models in the Smartline L-Power Series</th>
<th>Power Output - Resonator</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartline 3015 CO₂</td>
<td>Rofin, Power output from 100 W to 600 W</td>
<td>3,000x1500x100 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Technical Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum permitted load</td>
<td>950 kg/m²</td>
</tr>
<tr>
<td>Number of cutting heads</td>
<td>1</td>
</tr>
<tr>
<td>Maximum simultaneous positioning speed</td>
<td>160 m/min</td>
</tr>
<tr>
<td>Maximum axial acceleration</td>
<td>9.8 m/s² (1G)</td>
</tr>
<tr>
<td>Machine Tolerance</td>
<td>± 0.05 mm/m</td>
</tr>
<tr>
<td>Repeatability precision</td>
<td>± 0.025 mm/m</td>
</tr>
<tr>
<td>Power Output</td>
<td>From 100 W to 600 W</td>
</tr>
<tr>
<td>Smoke extraction system</td>
<td>Only optional with power output of 100 W-600 W</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Only optional with power output of 100 W-600 W</td>
</tr>
<tr>
<td>Automatic table exchanger</td>
<td>Only optional with power output of 100 W-600 W</td>
</tr>
<tr>
<td>Manual table exchanger</td>
<td>Only available with power output of 100 W-600 W</td>
</tr>
<tr>
<td>Automatic load and unloader</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Specifications

- Acceleration rate: 19.6 m/s² (2G)
- Maximum simultaneous positioning speed: 160 m/min
- Precision: ± 0.05 mm
- High performance with minimal maintenance costs
- Excellent cutting quality for both low and high thickness materials
- The Smartline CO₂ Series: FANUC Resonator. Power output from 1kW to 3kW. FANUC Control
- Compact design with operator protection
- Effective system to change from high to low gas pressure
- System for air drying and filtration
- Changing lenses with interchangeable cartridges of 3.75", 5", 7.5", 10"
- Capacitive Sensor, high pressure cutting head
- The best cutting results with constant focal compensation using the adaptive mirror
- TCI Cutting parameter tables
- Pre-cut protective film
- Power output control function for automatic nesting and machining (corners, lead-ins)
- Automatic time and cost calculation for pieces
- Network connection via external PC
- Automatic table exchanger (included for some models)
- Smoke extraction system (included for some models)
- 3 Point reference sensor (sheet rotation detection)
- Piercing sensor
- Collection of workpieces and trimmings
- Dual proportional valve control for different gas pressures with special system for high pressure cutting
<table>
<thead>
<tr>
<th>Models in the Smartline CO₂ Series</th>
<th>Power Output - Resonator</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartline 3015 CO₂</td>
<td>Fanuc. Power output from 1,000 W to 3,000 W</td>
<td>3,000x1,500x100 mm</td>
</tr>
</tbody>
</table>

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</tr>
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<tbody>
<tr>
<td>Maximum permitted load</td>
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</tr>
<tr>
<td>Number of cutting heads</td>
<td>1</td>
</tr>
<tr>
<td>Maximum simultaneous positioning speed</td>
<td>160 m/min</td>
</tr>
<tr>
<td>Maximum axial acceleration</td>
<td>19.6 m/s² (2G)</td>
</tr>
<tr>
<td>Machine Tolerance</td>
<td>± 0.05 mm/m</td>
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<tr>
<td>Repeatability precision</td>
<td>± 0.025 mm/m</td>
</tr>
<tr>
<td>Power Output</td>
<td>From 1,000 W to 3,000 W</td>
</tr>
<tr>
<td>Smoke extraction system</td>
<td>Included</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic Table Exchanger</td>
<td>Optional</td>
</tr>
<tr>
<td>Automatic loader and unloader</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Specifications

- Acceleration rate: 19.6 m/s² (2G)
- Maximum simultaneous positioning speed: 160m/ min
- Precision: ± 0.05 mm
- Energy efficiency: greatly reduced power consumption
- Excellent cutting quality for both fine and medium thickness sheets
- IPG Resonator. Power output from 1kW to 6kW
- Precitec Light Cutter cutting head for power output up to 2kW
- Precitec / Highyag cutting head for power output greater than 2kW
- Fully enclosed and cabined machine to ensure maximum protection for the operator
- Effective system to change from high to low gas pressure
- Capacitive Sensor, high pressure cutting head
- TCI Cutting parameter tables
- Pre-cut protective film
- Power output control function for automatic nesting and machining (corners, lead-ins)
- Automatic time and cost calculation for pieces
- Network connection via external PC
- Automatic table exchanger (included for some models)
- Smoke extraction system (included for some models)
- 3 Point reference sensor (sheet rotation detection)
- Piercing Sensor (optional)
- Collection of workpieces and trimmings
- Dual proportional valve control system for different gas pressures and special system for high pressure cutting
- CNC Fanuc 31iLB
- Sistema refrigeracion
- Automatic nozzle cleaning
- Automatic focus control
- MultiTouch Screen with remote control
- Ultrafast Heightregulation
- TCI Smart Touch 6.0
- TCI Fly Cutting 3.0
- TCI Fast Piercing 2.0
- TCI Automatic cutting system 3.2: Automation of job lists
### Characteristics

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<tbody>
<tr>
<td>Maximum permitted load</td>
<td>950 kg/m²</td>
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<tr>
<td>Number of cutting heads</td>
<td>1</td>
</tr>
<tr>
<td>Maximum simultaneous positioning speed</td>
<td>160 m/min</td>
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<tr>
<td>Maximum axial acceleration</td>
<td>19.6 m/s² (2G)</td>
</tr>
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<tr>
<td>Repeatability precision</td>
<td>± 0.025 mm/m</td>
</tr>
<tr>
<td>Power Output</td>
<td>From 1.000 W to 6.000 W</td>
</tr>
<tr>
<td>Fully enclosed and cabined machine</td>
<td>Included</td>
</tr>
<tr>
<td>Smoke extraction system</td>
<td>Included</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic table exchanger</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic loader and unloader</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Speedline® series
Flexibility and energy efficiency

**Speedline® Fiber**

This series offers unmatched parts production and excellent cutting quality in accordance with the laser power for thin sheets and sheets of medium thickness. The very energy efficient fiber laser ensures highly reduced electricity consumption.

Available in power ratings from 1.000 W to 6.000 W

**TCI Cutting** has the laser cutting solution to meet your cutting expectations or needs, for different types of actions, materials and thicknesses, with maximum performance and low maintenance.
Specifications

- Acceleration rate: 19.6 m/s² (2G)
- Maximum simultaneous positioning speed: 160m/min
- Precision: ± 0.05 mm
- Energy efficiency: greatly reduced power consumption
- Excellent cutting quality for both fine and medium thickness sheets
- IPG Resonator. Power output from 1kW to 6kW
- Precitec Light Cutter cutting head for power output up to 2kW
- Precitec / Highyag cutting head for power output greater than 2kW
- Fully enclosed and cabined machine to ensure maximum protection for the operator
- Effective system to change from high to low gas pressure
- Capacitive Sensor, high pressure cutting head
- TCI Cutting parameter tables
- Pre-cut protective film
- Power output control function for automatic nesting and machining (corners, lead-ins)
- Automatic time and cost calculation for pieces
- Network connection via external PC
- Automatic table exchanger (included for some models)
- Smoke extraction system (included for some models)
- 3 Point reference sensor (sheet rotation detection)
- Piercing Sensor
- Collection of workpieces and trimmings
- Dual proportional valve control system for different gas pressures
  and special system for high pressure cutting
- CNC Fanuc 31iLB
- Sistema refrigeracion
- Automatic nozzle cleaning
- Automatic focus control
- MultiTouch Screen with remote control
- Ultrafast Heightregulation
- TCI Smart Touch 6.0
- TCI Fly Cutting 3.0
- TCI Fast Piercing 2.0
- TCI Automatic cutting system 3.2 (Automation of job lists)
<table>
<thead>
<tr>
<th>Models in the Speedline Fiber Series</th>
<th>Power Output - Resonator</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speedline 1530 Fiber</td>
<td>IPG, Power output from 1.000 W to 6.000 W</td>
<td>3.000x1500x100 mm</td>
</tr>
<tr>
<td>Speedline 2040 Fiber</td>
<td></td>
<td>4.000x2.000x100 mm</td>
</tr>
<tr>
<td>Speedline 2060 Fiber</td>
<td></td>
<td>6.000x2.000x100 mm</td>
</tr>
<tr>
<td>Speedline 3060 Fiber</td>
<td></td>
<td>6.000x3.000x100 mm</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Technical Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum permitted load</td>
<td>950 kg/m²</td>
</tr>
<tr>
<td>Number of cutting heads</td>
<td>1 to 2</td>
</tr>
<tr>
<td>Maximum simultaneous positioning speed</td>
<td>160 m/min</td>
</tr>
<tr>
<td>Maximum axial acceleration</td>
<td>19.6 m/s² (2G)</td>
</tr>
<tr>
<td>Machine Tolerance</td>
<td>± 0.05 mm/m</td>
</tr>
<tr>
<td>Repeatability precision</td>
<td>± 0.025 mm/m</td>
</tr>
<tr>
<td>Power Output</td>
<td>From 1.000 W to 6.000 W</td>
</tr>
<tr>
<td>Fully enclosed and cabined machine</td>
<td>Included</td>
</tr>
<tr>
<td>Smoke extraction system</td>
<td>Included</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic table exchanger</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic loader and unloader</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Powerline® series
Laser precision and reliability

The Powerline CO₂ series laser features a compact and stable design. An additional great advantage is the high-frequency excitation that minimizes the emission of gases and reduces maintenance costs.

The Powerline series CO₂ laser cutting machine allows easy commissioning and the software, control and programming transform the cutting plans into finished pieces.

This series can be expanded by adding different accessories or automation components that increase productivity, optimize work processes and improves logistics.
Specifications

- Acceleration rate: 14.7m/s² (1.5G)
- Maximum simultaneous positioning speed: 160m/min
- Precision: ± 0.05 mm
- Highly reliable and rigid bridge
- Low gas and electricity consumption
- Latest generation FANUC Resonator technology
- 30-ILB FANUC control
- Secure machine casing for operator protection
- Effective system to change from high to low gas pressure
- System for air drying and filtration
- Changing lenses with interchangeable cartridges of 3.75”, 5”, 7.5”, 10”
- Capacitive Sensor, high pressure cutting head
- The best cutting results with constant focal compensation along the compensation axis (B)
- TCI Cutting parameter tables
- Pre-cut protective film
- 3 different cutting technologies for working with different materials and thicknesses
- Power output control function for automatic nesting and machining (corners, lead-ins)
- Automatic time and cost calculation for pieces
- Network connection via external PC
- Automatic table exchanger
- 3 Point reference sensor (sheet rotation detection)
- Piercing Sensor
- Collection of workpieces and trimmings
- Dual proportional valve system for different gas pressures and special system for high pressure cutting
<table>
<thead>
<tr>
<th>Models in Powerline CO₂ Series</th>
<th>Power Output - Resonator</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powerline 3015</td>
<td>Fanuc. Power output from 3.000 W to 6.000 W</td>
<td>3.000x1.500x100 mm</td>
</tr>
<tr>
<td>Powerline 4020</td>
<td>Fanuc. Power output from 3.000 W to 6.000 W</td>
<td>4.000x2.000x100 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Technical Data Powerline 3015</th>
<th>Technical Data Powerline 4020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum permitted load</td>
<td>950 kg/m²</td>
<td>950 kg/m²</td>
</tr>
<tr>
<td>Number of cutting heads</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maximum simultaneous positioning speed</td>
<td>160 m/min</td>
<td>160 m/min</td>
</tr>
<tr>
<td>Maximum axial acceleration</td>
<td>14.7 m/s² (1.5G)</td>
<td>9.8 m/s² (1G)</td>
</tr>
<tr>
<td>Machine Tolerance</td>
<td>± 0.05 mm/m</td>
<td>± 0.05 mm/m</td>
</tr>
<tr>
<td>Repeatability precision</td>
<td>± 0.025 mm/m</td>
<td>± 0.025 mm/m</td>
</tr>
<tr>
<td>Power Output</td>
<td>From 3.000 W to 6.000 W</td>
<td>From 3.000 W to 6.000 W</td>
</tr>
<tr>
<td>Smoke extraction system</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic table exchanger</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Automatic loader and unloader</td>
<td>Optional</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Divergence compensation system

The TCI Cutting Powerline series laser cutting machines are manufactured according to the 'floating optics' standard. The sheet is supported by the table during the cutting process and the cutting head moves above it.

The machine uses FANUC motors for the movement on the X and Y axes. A servo motor is used for the Z axis (vertical movement of the cutting head). The positioning accuracy on axes is 0.02mm and the repeatability precision is 0.05mm. The use of servomotors allows high positioning speed and, more importantly, an acceleration of up to 14.7m/s².

The mono-block frame is robust and reliable, while the bridge is constructed of tension free structural steel that is rigid and light weight. The compensation axis (B) and the X axis work in perfect synchronization with the cutting head, so that the length, diameter and distribution of the energy beam are always consistent. With this system, the cutting quality is always consistent at any point on the table.

- **Constant distance** between the laser and the cutting head.
- **The same cutting quality** at any point on the table.
- **The laser beam can be adjusted** depending on the application.
Laser sources & software
ROFIN Sealed CO₂ Laser resonator

More than 38,000 systems installed worldwide confirm their experience.

ROFIN manufactures a wide variety of CO₂ lasers ranging from totally sealed machines to multi-kW lasers, all with a selection of power output from 30 to 8,000 watts. Whether used for laser soldering, structuring, perforating, drilling or marking, the ROFIN CO₂ lasers are always a great choice. Their high reliability, low maintenance cost and excellent HAZ (heat affected zone) quality have ensured that these machines are an essential tool for today’s productivity.

The revolutionary principle of the SC series of sealed lasers, with outputs ranging from 100 to 600 watts, completes the powerful CO₂ laser range available from ROFIN. The SC lasers are completely sealed so there is no need for gas recirculation equipment such as vacuum pumps or pressure control systems. The interior gas only has to be changed every 16,000 hours of operation, resulting in minimal costs. The complete range of SC lasers is based on a unique design and the resonator produces the laser light using linear polarization.

Power and precision are the defining characteristics of the SC series and their application is universal. The lasers are lightweight and extremely robust, making it easy to integrate them into machines and equipment.
# Laser sources

<table>
<thead>
<tr>
<th>ROFIN</th>
<th>SCX10</th>
<th>SCX20</th>
<th>SCX40</th>
<th>SCX60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power output (W)</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>Recommended cooling power (kW)</td>
<td>≥2</td>
<td>≥5</td>
<td>≥7</td>
<td>≥14</td>
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<tr>
<td>Electrical supply (kW)</td>
<td>2.1</td>
<td>4.5</td>
<td>7.5</td>
<td>15</td>
</tr>
</tbody>
</table>

*Maximum sheet thickness*:

<table>
<thead>
<tr>
<th>Material</th>
<th>SCX10</th>
<th>SCX20</th>
<th>SCX40</th>
<th>SCX60</th>
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<tbody>
<tr>
<td>Steel (mm)</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Stainless steel (mm)</td>
<td>0.5</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

*To cut the maximum thickness, the following conditions must be met:*
- Optimal adjustment and maintenance of the laser cutting equipment.
- Metals must be of the quality specified by TCI Cutting.
FANUC CO₂ Laser resonator

More than 13,000 systems installed worldwide confirm their experience.

FANUC is the main manufacturer of CNC (Computer Numerical Control) and servo motors, they have developed the 'laser cutting package' solution. The laser source, the CNC computer numerical control system and the servo motors work perfectly together as a completely integrated system. All the control algorithms for the laser and the diagnostics are part of the CNC computer numerical control system, so the laser source does not require a separate controller. The advantages of this integrated package are clear: effective and reliable start up and operation, complete diagnostics, monitoring and maintenance of the laser machine. It also allows the integration of numerous special functions available for users with a comprehensive specialized knowledge in laser applications.

The FANUC CO₂ laser sources employ the most advanced technology available, including fully transistorized RF Discharge Units, combined with intelligent solutions to further increase the reliability and working life of the machine.

The continuous carbon dioxide lasers are very powerful yet easily accessible. They are also highly effective, as the pump (excitation power) to output power ratio reaches 20%. The CO₂ lasers emit IR (infrared) light, the main wavelength band is between 9.4 and 10.6 μm (micrometer).

CO₂ carbon dioxide laser cutting is the main application for molecular lasers. The active medium is carbon dioxide and the laser transitions are created by means of the CO₂ energy levels. The N2 nitrogen gas and HE helium gas are important for the excitation and de-excitation process of the CO₂ molecule.
Laser sources

<table>
<thead>
<tr>
<th>FANUC</th>
<th>C1000i-C</th>
<th>C2000i-C</th>
<th>C3000i-C</th>
<th>C4000i-C</th>
<th>C6000i-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power output (W)</td>
<td>1.000</td>
<td>2.000</td>
<td>3.000</td>
<td>4.000</td>
<td>6.000</td>
</tr>
<tr>
<td>Recommended cooling power (kW)</td>
<td>11</td>
<td>22</td>
<td>33</td>
<td>44</td>
<td>66</td>
</tr>
<tr>
<td>Electrical supply (kW)</td>
<td>18</td>
<td>33</td>
<td>44</td>
<td>55</td>
<td>75</td>
</tr>
</tbody>
</table>

Maximum sheet thickness*:

<table>
<thead>
<tr>
<th>Material</th>
<th>C1000i-C</th>
<th>C2000i-C</th>
<th>C3000i-C</th>
<th>C4000i-C</th>
<th>C6000i-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel (mm)</td>
<td>10</td>
<td>15</td>
<td>22</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>Stainless steel (mm)</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Aluminium (mm)</td>
<td>3</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

* To cut the maximum thickness, the following conditions must be met:
  - Optimal adjustment and maintenance of the laser cutting equipment.
  - Metals must be of the quality specified by TCI Cutting.
IPG Fiber Laser Resonator

IPG-PHOTONICS is the leading supplier in the world market for high output fiber lasers and fiber amplifiers and is revolutionizing profitability and application in the processing of a significant variety of materials, micro-machining, telecommunications, medical applications and other advanced systems.

IPG-PHOTONICS has manufacturing facilities in the United States, Germany, Russia and Italy and has regional sales offices situated in many countries.

IPG-PHOTONICS was established in 1990 by the physicist Valentin P. Gapontsev, a pioneer in the field of fiber laser technology. The modern fiber laser is composed of multimode high power diodes with a single emitter or diode bars, usually passing through a cladding layer surrounding a single mode nucleus. This unique style of nucleus ranges between 5 to 12μm micrometer in diameter.

The double clad fiber-optic cable consists of a unique internal nucleus doped with ions, such as neody, erbium, ytterbium and thulium. The cladding is made of undoped glass with a small refractive index. The pump light is injected into the cladding and then propagates along the structure passing through the active nucleus core and producing a population inversion. The emission wavelength depends on the options offered by the doped fiber and of the type of reflector used (a typical example would be Bragg gratings).
## Laser sources

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power output (W)</td>
<td>1,000</td>
<td>2,000</td>
<td>3,000</td>
<td>4,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Recommended cooling power (kW)</td>
<td>2.1</td>
<td>4.2</td>
<td>6.4</td>
<td>8.5</td>
<td>12.6</td>
</tr>
<tr>
<td>Electrical supply (kW)</td>
<td>3.1</td>
<td>6.1</td>
<td>9.1</td>
<td>12.1</td>
<td>18.2</td>
</tr>
</tbody>
</table>

### Maximum sheet thickness:

<table>
<thead>
<tr>
<th>Material</th>
<th>Steel (mm)</th>
<th>Stainless steel (mm)</th>
<th>Aluminium (mm)</th>
<th>Brass (mm)</th>
<th>Copper (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>12</td>
<td>10</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>15</td>
<td>12</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

*To cut the maximum thickness, the following conditions must be met:*

- Optimal adjustment and maintenance of the laser cutting equipment.
- Metals must be of the quality specified by TCI Cutting.
Fiber lasers are already accepted as high performance and reliable tools in industrial environments. Our group continues to develop this technology and presents the launch of the third generation of its FL Series fiber lasers.

With the integration of more powerful pumping modules and an advanced optical unit, ROFIN is capable of generating a laser power of 2kW from a single active fiber laser unit, which sets a new technological standard.

The extensive experience of ROFIN in the development, manufacturing and commissioning of high power fiber laser sources, coupled with the information provided to us by our customers has led us to develop this new generation of fiber laser, which means taking a new leap forward in laser technology.

In addition to including all the advantages of previous versions, this new generation adds improved performance and a reduced space requirement. The standard version of the FL Series includes an area for up to 4 laser beam transport fiber outputs and thus feeds up to 4 workstations.

Furthermore, it is possible to couple optical fibers with diameters from 50 to 1.000 microns, so we can adapt the beam quality for each application and thus make this laser a universal tool for industrial production.

Meanwhile, the Compact version is very small and has a fixed output of 50 to 100 microns, facilitating their integration into other machines, such as 2D cutting machines.

The ROFIN FL Series includes equipment with powers ranging from 500 to 8.000 W. Its modular and robust construction makes it reliable in harsh industrial environments. The equipment includes ROFIN Control Unit (RCU), with which you can make remote adjustments as well as the easy integration of scanner based applications.
# Laser sources

<table>
<thead>
<tr>
<th>ROFIN</th>
<th>FL050</th>
<th>FL075</th>
<th>FL010</th>
<th>FL015</th>
<th>FL020</th>
<th>FL030</th>
<th>FL040</th>
<th>FL060</th>
<th>FL080</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power output (W)</td>
<td>500</td>
<td>750</td>
<td>1,000</td>
<td>1,500</td>
<td>2,000</td>
<td>3,000</td>
<td>4,000</td>
<td>6,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Recommended cooling power (kW)</td>
<td>2,1</td>
<td>2,9</td>
<td>3,6</td>
<td>5</td>
<td>6,6</td>
<td>9,9</td>
<td>12,8</td>
<td>19</td>
<td>25,6</td>
</tr>
<tr>
<td>Electrical supply (kW)</td>
<td>2</td>
<td>2,7</td>
<td>3,3</td>
<td>4,7</td>
<td>6,1</td>
<td>9,2</td>
<td>11,9</td>
<td>17,7</td>
<td>23,8</td>
</tr>
</tbody>
</table>

**Maximum sheet thickness**:  

<table>
<thead>
<tr>
<th></th>
<th>ROFIN</th>
<th>FL050</th>
<th>FL075</th>
<th>FL010</th>
<th>FL015</th>
<th>FL020</th>
<th>FL030</th>
<th>FL040</th>
<th>FL060</th>
<th>FL080</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel (mm)</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>18</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>+25</td>
<td></td>
</tr>
<tr>
<td>Stainless steel (mm)</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>20</td>
<td>+20</td>
<td></td>
</tr>
<tr>
<td>Aluminium (mm)</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>+15</td>
<td></td>
</tr>
<tr>
<td>Brass (mm)</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>+10</td>
<td></td>
</tr>
<tr>
<td>Copper (mm)</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>+10</td>
<td></td>
</tr>
</tbody>
</table>

* To cut the maximum thickness, the following conditions must be met:  
  - Optimal adjustment and maintenance of the laser cutting equipment.  
  - Metals must be of the quality specified by TCI Cutting.
Automation
Loading and unloading
TCI Cutting offers a full range of automated sheet loaders, with the loading and unloading of material on cutting tables, it becomes a simple process within the workflow.

We also have highly trained engineers to create custom storage centers, thus providing a complete solution for your cutting center.
PROmanager, the ERP from TCI Cutting

TCI Cutting in its process of innovation and optimization, has created PROmanager. A powerful software that makes INDUSTRY 4.0 a reality.

PROmanager brings together all the information a company needs, from employees to processing of materials, stock and shipping.

PROmanager digitally connects with all the elements of the company, collecting and sending data and information with a single purpose, the control and optimization of each process.

Thus reaching a greater profitability of the company.
SMARTTOUCH, the HMI from TCI Cutting

The TCI Cutting engineers have created SMARTTOUCH, the HMI from TCI Cutting, from the experience of manufacturing our waterjet and laser cutting systems. An agile and intuitive software that makes life easy for the operators.

SMARTTOUCH is the cutting process tool that integrates perfectly in INDUSTRY 4.0. SMARTTOUCH connects digitally to other areas of the company, collecting and sending data from the production processes. One more element within the digitalization of the working environment.
New and very intuitive human machine interface offering all functions to manage the machine. It incorporates the possibility to change and program cutting parameters, allows constant control of the extraction system, consumable management, etc.

It allows continuous visual monitoring of the cutting program status, with color indication for the status of the pieces, as well as the possibility to move pieces, edit the program, etc. SMARTTOUCH has been created by the TCI engineers to control our machines in the most intuitive and easy way. Integration with INDUSTRY 4.0 is now a reality. SMARTTOUCH can connect to any ERP system, generating data collection and exchange of the production data and processes, turning the TCI Cutting Machines into another element of INDUSTRY 4.0.

For seamless integration with SMARTTOUCH and INDUSTRY 4.0, TCI Cutting has created PROmanager, a new software (ERP) for control, management and optimization of industrial processes.
TCI EXPERT CUT 2D

Expert Cut is a CAD / CAM system specially designed for automating the laser cutting machine programming. It perfectly combines technology with programming needs and client management.

Technology.

Expert Cut configures and manages the lead-ins for each contour. Common cuts between various pieces can be realized, or limited to only pairs of pieces, with notches and pre-cuts. The software detects errors in both design and machining. It includes automatic lead-ins, manual and automatic cutting, mechanical copying, customization of machines and post-processors. Technology tables for laser cutting specified for every machine are available, speed reduction for corners, special penetrations and multi head operation.
Technical features

Integration of all the options offered by Expert Cut in one single program enabling the user to design a piece, import it, create the Nesting (automatic or manual), generate the cutting, generate the CNC, monitor the sheet metal storage, etc. This can all be managed from the same software program without having to change to another.

Expert Cut includes:

• Production management and team work
• Shape management, 2D design and an extensive library of catalogue of parametric shapes
• Sheet metal storage using open databases
• Calculation of real times and costs
• Smart Import / Export function
  (connecting to the leading CAD systems on the market: DXF, DWG, IGES, etc.)

Nesting

Manual and semi-automatic nesting offers the perfect combination of powerful manual Nesting functions such as: copying, moving, rotating, etc.

Automatic nesting optimizes the arrangement of parts on the sheet and makes optimal use of the material, including the remnants.
TCI Cutting Representatives

- Algeria
- Australia
- Austria
- Belgium
- China
- Colombia
- Czech Republic
- Denmark
- Egypt
- USA
- England
- Finland
- France
- Germany
- Holland
- Hungary
- India
- Italy
- Jordan
- Morocco
- Mexico
- Middle East
- Poland
- Portugal
- Romania
- Russia
- South Africa
- Spain
- Sweden
- Switzerland
- Taiwan
- Turkey
- Venezuela