The Laser of Lasers
Providing solutions with customer satisfaction
Laser Frontier Spirits

The LMX, LMR and LMZ series are pioneering, global standard laser cutting machines. These machines enable extended operation hours while ensuring consistent and dependable cutting power.

As a pioneer in laser processing

TANAKA started basic research for practical use of laser in metal processing in 1969. TANAKA completed a laser machine, the first one in the related business field in 1979. Further in 1989, TANAKA introduced into the market the world first “Oscillator integrated-type medium-thick plate laser cutting machine” that disproves established common sense on the laser machine until then. Since then, TANAKA has continued building up a steady position in the steel industry as a leading company of the laser cutting machine including a total automation system from loading of material to processing, manufacturing management and delivery.

TANAKA laser system history

1969 | Starting research and development of laser processing technology
1989 | Introducing the world first oscillator integrated laser cutting machine, LMX-TF2500 into the market
1994 | Launching the world first 6kW oscillator integrated laser cutting machine, LMXII-TF3500/6000
1997 | Establishing high-speed, high precision and high-power more than conventional, LMXIII-TF3500/6000
2001 | Introducing the world first twin head laser cutting machine, LMY: TWIN TF4000
2004 | Launching the high-power, long-time operable laser cutting machine mounted with the brand new 6kW oscillator, LMXIV-TF4000/6000
2010 | Introducing the TANAKA Laser landmark Compact body with 6kW oscillator LMYV-TF2000/TF4000/TF6000
2012 | No.1 Gantry Laser Sales Record, Advanced Bevel Laser Machine Reborn! LMYV-TF6000/6000

Table Type Cutting Machine:
- The machine is located in fixed position, and laser head moves in limited area.
- Thin plate will be applied with pallet changer.

Gantry Type Cutting Machine:
- The machine is mounted to the parallel rail, and machine with oscillator creates limitless cutting area. Large and thick plate will be applied to make higher efficient operation.
**TANAKA Laser landmark compact body with 6kW oscillator!**

The LMR series, improves cost performance of medium to thick mild steel plate laser cutting. The LMR series has gained a reputation for excellent cut quality while operating economically. To further this, the LMR series is improved by increasing the power level. A 6kW oscillator can now be mounted on the LMR series. An improved optical configuration translates directly to improved cut quality. The LMR series achieves high speed, high output and high efficiency while maintaining low running cost and easiness in use. Further promoting laser cutting in wider varieties of industrial fields.

**Features:**
- Oscillator: 2kW/4kW/6kW
  You can make choice of one out of three types, TF2000 (2kW), TF4000 (4kW), and TF6000 (6kW) according to your usage. The small-dimension, high-performance CO2 laser offers high-precision, high-quality processing to meet your needs at a low running cost.
- Applicable to a long span
  The effective cutting width ranges from 2.6m to 5.6m, and the effective cutting length is endless, which enables continuous cutting of materials of various sizes.
- Low running cost
  The LMR employs "Stand By Mode" to lower cost when machine is idle. Stand by power consumption thereby by reducing costs.
- Automated operation function
  Lens position and GDS shielding are automatically adjusted by the NC. This allows different thickness to be processed with out operator intervention.

**Machine Specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>21</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>41</th>
<th>50</th>
<th>55</th>
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</thead>
<tbody>
<tr>
<td>Effective cutting length (mm)</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
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<tr>
<td>Effective cutting length (mm)</td>
<td>6,000</td>
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<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Maximum length (mm)</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
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<tr>
<td>Optical machine length</td>
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<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
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<tr>
<td>Overall machine length</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
</tr>
<tr>
<td>Overall machine height</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
</tr>
<tr>
<td>Overall machine width</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
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<tr>
<td>Equipment configuration</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
</tr>
<tr>
<td>Cutting head</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
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<tr>
<td>Main operation panel</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
<td>1 set</td>
</tr>
<tr>
<td>Coolant tank volume</td>
<td>500L</td>
<td>500L</td>
<td>500L</td>
<td>500L</td>
<td>500L</td>
<td>500L</td>
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</tr>
</tbody>
</table>

**Cooling water circulator specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>TF2000</th>
<th>TF4000</th>
<th>TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling capacity</td>
<td>22.1kW</td>
<td>39.9kW</td>
<td>59.9kW</td>
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<tr>
<td>External dimensions</td>
<td>1,404 x 1,860 x 1,700 mm</td>
<td>1,480 x 3,050 x 1,800 mm</td>
<td>1,560 x 3,510 x 1,800 mm</td>
</tr>
<tr>
<td>Number of units</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Standard cutting specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>TF2000</th>
<th>TF4000</th>
<th>TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>1.5mm</td>
<td>1.5mm</td>
<td>1.5mm</td>
</tr>
<tr>
<td>Normal</td>
<td>8mm</td>
<td>10mm</td>
<td>12mm</td>
</tr>
<tr>
<td>High Quality</td>
<td>6mm</td>
<td>8mm</td>
<td>10mm</td>
</tr>
<tr>
<td>Hitachi</td>
<td>6mm</td>
<td>8mm</td>
<td>10mm</td>
</tr>
</tbody>
</table>

**Speed specification (mm/min)**

- Maximum feed speed: 8,000mm/min
- Rapid feed speed: 20,000mm/min
- Manual feed speed: 12,000mm/min
- Cutting feed speed: 20,000mm/min
- Cutting feed approach speed: 15,000mm/min
- Return feed speed: 20,000mm/min
The industry No. 1 delivery record the bevel Laser cutting machine was born to evolve furthermore.

The Laser cutting machine that is getting a good reputation from start sales since 2002 evolved furthermore. Equipped with a slim bevel torch block on the compact body and redesigned the bevel position control. The bevel Laser cutting machine LMZV series will respond to needs of the various bevels Laser cutting.

Features:
- Saved the installation area (Increased an effective cutting area)
  Decrease the installation area by making the machine body to compact. Increase the effective cutting area by equipped with the renewed slim bevel torch block on the compact machine body. It is possible the effectively utilize of the installation space.
- Reduced the total processing time
  Redesigned the bevel position control (Angle, rotation), realized the bevel smooth movement without a loss. Also to reduce 30% of the time required until to piercing start of the bevel cutting by carrying out fast lifting speed of the bevel torch. Allow to significantly reducing the total working time.
- Energy saving design
  Adopt of the power regeneration system of returning the energy of deceleration motor to the power, or it is possible to reduce 10–15% power consumption compared with our ratio by the power reduction of the oscillator by the standby function. Further, reduces the running cost by reduce maintenance parts.
- Cutting quality of TANAKA original
  Laser cutting machine is equipped with a standard functions to control the burning (K.O.S function) at the time of cutting, or to reduce of melting scratch (witness mark reduction) which generated at the end portion of cutting. Also, shorten the piercing time, and reducing the burning of after piercing by the ultra high speed piercing function, and realized the cutting plate thickness of 32mm with the bevel torch of as.

Machine Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>TF4000</th>
<th>TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective cutting width (mm)</td>
<td>2550</td>
<td>5100</td>
</tr>
<tr>
<td>Vertical (mm)</td>
<td>2550</td>
<td>5100</td>
</tr>
<tr>
<td>Top/Bottom V Bevel 30 deg</td>
<td>17mm</td>
<td>17mm</td>
</tr>
<tr>
<td>Top/Bottom V Bevel 45 deg</td>
<td>9mm</td>
<td>25mm</td>
</tr>
<tr>
<td>Top/Bottom V Bevel 60 deg</td>
<td>9mm</td>
<td>25mm</td>
</tr>
<tr>
<td>Horizontal (mm)</td>
<td>4500</td>
<td>9000</td>
</tr>
</tbody>
</table>
| Standard cutting specification

| Mild steel black skin material | Vertical cutting | 16(mm)24(mm) / 13 | 20(mm)25(mm) / 13 |
| Stainless steel material | Vertical cutting | 16(mm)24(mm) / 13 | 20(mm)25(mm) / 13 |

<table>
<thead>
<tr>
<th>Speed specification (mm/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal feed speed</td>
</tr>
<tr>
<td>Rapid feed speed</td>
</tr>
<tr>
<td>Manual feed speed</td>
</tr>
<tr>
<td>Cutting backfeed speed</td>
</tr>
<tr>
<td>Cutting heat approach speed</td>
</tr>
<tr>
<td>Manual return speed</td>
</tr>
</tbody>
</table>

*The figures are subject to change in case of adding functions.*
Compact and high-power laser oscillators are newly arranged!

**Features:**

- **Stable output**
  - The radio frequency (RF) discharge is employed, replacing existing DC discharge excitation, which achieves excellent oscillation efficiency and stable output.

- **Eliminating in tube contamination**
  - The external electrode eliminates gas contamination due to electrode deterioration.

- **Providing optimum beam mode**
  - High quality in beam mode is obtained through high-frequency discharge excitation.

- **Start-up without idling**
  - Machine operation can be started without idling (warm-up operation) after turning power on by employing power feedback control. Also, laser power control in proportion to the cutting speed enabling sharp angle corner edge processing.

- **CNC automatic control**
  - Interlocking with CNC makes it possible to directly control the oscillators from the CNC, enabling automatic control from start to stop of the oscillator and laser gas pressure, while monitoring the condition of the oscillator.

**Oscillator specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>TF2000</th>
<th>TF4000</th>
<th>TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscillation system</td>
<td>High-frequency discharge excitation for high-speed work from the gas laser</td>
<td>High-frequency discharge excitation for high-speed work from the gas laser</td>
<td>High-frequency discharge excitation for high-speed work from the gas laser</td>
</tr>
</tbody>
</table>

**Structural parameters:**

| Beam output power input/output integrated type | 2,500W | 4,000W | 5,000W |
| Beam output power | 2,500W | 4,000W | 5,000W |
| Beam output power | 2,500W | 4,000W | 5,000W |

**Beam mode:**

- Laser mode
- Laser mode
- Laser mode

**Beam diameter:**

- About 0.1 to 0.2 mm
- About 0.1 to 0.2 mm
- About 0.1 to 0.2 mm

**Beam divergence angle:**

- About 0.1 to 0.2 mm
- About 0.1 to 0.2 mm
- About 0.1 to 0.2 mm

**Beam output command frequency:**

- 5 ~ 2,000Hz
- 5 ~ 2,000Hz
- 5 ~ 2,000Hz

**Pulse output duty:**

- 150 ~ 95% within 0.1 ~ 100Hz
- 150 ~ 95% within 0.1 ~ 100Hz
- 150 ~ 95% within 0.1 ~ 100Hz

**Laser gas composition:**

- CO2, Ar, N2, He, H2, He ~ 35%
- CO2, Ar, N2, He, H2, He ~ 35%
- CO2, Ar, N2, He, H2, He ~ 35%

**External dimensions:**

<table>
<thead>
<tr>
<th>Model</th>
<th>LMRV-TF4000</th>
<th>LMRV-TF6000</th>
<th>LMRV-TF6000</th>
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</thead>
<tbody>
<tr>
<td>Model</td>
<td>LMRV-TF4000</td>
<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
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<tr>
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<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
</tr>
<tr>
<td>Model</td>
<td>LMRV-TF4000</td>
<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
</tr>
</tbody>
</table>

**Weight:**

- About 700kg
- About 900kg
- About 1,100kg

**Cooling water:**

<table>
<thead>
<tr>
<th>Model</th>
<th>LMRV-TF4000</th>
<th>LMRV-TF6000</th>
<th>LMRV-TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>LMRV-TF4000</td>
<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
</tr>
<tr>
<td>Model</td>
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<td>LMRV-TF4000</td>
<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
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</tbody>
</table>

**Fluid used:**

<table>
<thead>
<tr>
<th>Model</th>
<th>LMRV-TF4000</th>
<th>LMRV-TF6000</th>
<th>LMRV-TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>LMRV-TF4000</td>
<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
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<tr>
<td>Model</td>
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<td>LMRV-TF6000</td>
<td>LMRV-TF6000</td>
</tr>
</tbody>
</table>

**Dry air for use in cutting and optical path purging includes dry air for use in GOX function and ultra-high-speed piercing:**

- Dry air for use in cutting and optical path purging includes dry air for use in GOX function and ultra-high-speed piercing.
Varieties of functions are available enabling system upgradation in accordance with use Standard function.

- **Standard function** [MARK]
- **Standard function for LWV** [MARK]
- **Standard function for LWVY**

- **Automatic lens positioning controlled by NC** [MARK]
  - Change in focus position can be NC-controlled that is necessary in cutting dissimilar materials, enabling programmed operation including continuous and pulse cutting. The condenser lens can be easily removed.

- **AUC** [MARK]
  - This function suppresses delay due to acceleration/deceleration in high speed cutting and delay of the servo-system to minimize the processing shape errors. Especially for high-speed cutting of a small circle and for maintaining accuracy in preceding burning, 2-marking and small member cutting, this is effective.

- **Scheduled operation** [MARK]
  - The scheduled operation up to 32 plates is possible. Inputting the original point of each plate and designating a program can automatically cut all of the plates.

- **Constant beam path length** [MARK]
  - This function maintains the optical path length constant for the oscillators to the work to stabilize cutting accuracy.

- **High-speed piercing** [MARK]
  - This function reduces piercing time in cutting medium-thick plates, which is effective for plates of 12mm or more.

- **Piercing completion detection** [MARK]
  - This function detects automatically the piercing of the machine proceeds to cutting, so that labor for extending and releasing the piercing time can be avoided.

- **Self burning detection** [MARK]
  - This function automatically detects self-burning during automatic operation, and temporarily stop beam irradiation and machine travel. Thereafter, the machine transfers to retry and automatic operation will be resumed.

- **Machine beam misalignment detection** [MARK]
  - This function automatically detects optical deviation in the bellows of CO2 laser to secure work safety.

- **Coordinate system rotation** [MARK]
  - This function enables the machine to positively cut even a plate position on the cutting table at arbitrary angles by rotating the table.

- **Laser spot function** [MARK]
  - This makes the positioning of the cutting head easy by using a semiconductor laser.

- **Retry cut failure recovery** [MARK]
  - This function makes the machine repeat the piercing phase. This is drumming an unnecessary beam-on and wait alarm release to continue cutting when the machine goes to a temporary stop due to adhesion of spatter to the nozzle during automatic operation.

- **Fault skipping** [MARK]
  - This function automatically travels the nozzle to the next position to restart cutting when the machine goes to a temporary stop due to adhesion of spatter to the nozzle during automatic operation.

- **Retry/Log for re-cutting** [MARK]
  - This function stores the point where retry and skip are performed in the NC, enabling that position to be confirmed on the screen of the NC device after cutting. After confirmation, it is possible to return to the skipped position to restart cutting.

- **Revolving warning light** [MARK]
  - It is possible to mount a set of three color warning lights on the upper part of the machine body. The lighting condition can be freely set.

- **Ultra high-speed feed**
  - It is possible to travel the machine at a maximum speed of 50m/min by increasing the power of the 5kW drive motor coupled with the lowered center of gravity of the machine.

- **Obstacle detection**
  - Photoelectric sensors are provided in the front and rear of the machine body and can detect an intruder or obstacle to secure safe work.

**Maintenance screens**

- The NC device measures time of every maintenance item to warn the correct time for maintenance.

**Automatic laser power calibration**

- When performing a long continuous operation, automatic correction work of the laser power is automatically performed in an interlocked manner with the scheduled function.

**Operator’s desk**

- The operator’s desk is mounted in the front of the main operation panel on the machine body.

**Lens long-life feature**

- The maintenance interval or replacement time of the condenser lens by enhancing the anti-glare of the optical path.

**Reverse cutting**

- This function makes the cutting machine travel backward the programmed path in execution. The number of blocks to be backward traveled is about 40 to 80 blocks, which depends on program contents commanded.

**Ultra-high-speed piercing**

- With this function, piercing of mild steel plates up to 22mm in thickness can be done within 1-2sec (in case of 6kW). Great reduction in piercing time is now available. Also, burning less occurs in leading in after piercing to stabilize leadin.

**Fire ultra-piercing**

- High-quality piercing with reduced spattering quantity can be performed by changing the assist of gas and laser beam during piercing to make the piercing diameter small. Switching from existing ultra-high speed piercing to this function or vice versa is possible in accordance with use.

**Control function**

- **Preceding burning function (PAT.2815150)**

  - Pre-burning the coating of the coated plates (wash primer material) can enhance cutting performance.

**Cutting/Marking function**

- **Stainless steel nitrogen cutting up to 2MPa**

  - Stainless steel material can be cut using nitrogen as assist gas.

- **Stainless steel oxygen cutting**

  - Stainless steel material can be cut using oxygen as assist gas.

- **Z marking device**

  - Powder line marking for welding lines or welding marks is performed with NC command.

- **Ink marking device**

  - Ink marking device (0.5mm width and letter marking (15mm height) can be written by ink-jet marking device. [Letter: Alphabetic characters, roman sign, defined sign, defined letter by user]

**Cutting material**

- **Nitrogen gas**

  - Cutting material is controlled so as to avoid excessive oxidation reaction occurring.

**Applications**

- **Stand-by**

  - This function automatically stops discharge of the oscillator and decreases power consumption of the cutting machine when performing work other than cutting such as marking and in standby. As a method for starting/stopping discharge of the oscillator, there are two methods, one is to instruct by an auxiliary function, and the other is to stop discharge after scheduled operation, and then start it at a time preset by a timer. When starting discharge of the oscillator by the auxiliary function, the cutting machine is held stopped for about 6 minutes until completion of the light beam and oscillator.

- **Shape drawing**

  - This function enables the programmed path during cutting to be drawn on the NC screen. Enabling the cost of cutting speed to check and confirm the shape of the cutting program and present progress status. Also, it is possible to render the cutting (processing) program read into the cutting machine or cutting programs stored in the machine such as a USB memory on the NC screen. Further, in execution of automatic切割 operations, it is possible to render the program for cutting and identify the execution position on the rendered drawing.

**Safety function**

- **Coordinate rotation ITV**

  - A TV monitor can be mounted to the operation panel. Positioning of the cutting head and coordinate rotation are easily performed viewing the monitor.

- **Nozzle monitoring ITV**

  - Cutting work is monitored with a color monitor.

- **Collision prevention function**

  - In case of installing a plurality of machine bodies on the same track rail, the collision prevention device is provided to avoid collision of machine bodies.

**Unattended operation and incidental equipment**

- **Automatic power-on**

  - This function starts for a time of one and turns power on to the machine body at designated time every day.

- **Laser gas automatic switching device**

  - This function adjusts the secondary lower limit pressure and automatically switches A and B line cylinders to prevent interruption in cutting.

- **Laser cutting table**

  - This is called “Pie block” which was born from customer needs and is the cutting table for laser cutting. In addition to obtaining high-quality cut, the table avoids drops from the unit and provides advantages such as operator safety, simple and economical partial replacement and so on.

- **Air compressor**

  - This compressor supplies compressed air for use in optical path purging, ultra-high-speed piercing and gas function.

- **Steel plate stocker**

  - This can automatically transfer steel plate stockers storing various sizes of plates in the cutting machine, so that non-manual continuous operation is made possible.