Laser Frontier Spirits

The LMX, LMR and LZM 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 disproved 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>Starting research and development of laser processing technology</td>
</tr>
<tr>
<td>1989</td>
<td>Introducing the world first oscillator integrated laser cutting machine, LMX-TF2500 into the market</td>
</tr>
<tr>
<td>1994</td>
<td>Launching the world first 6kW oscillator integrated laser cutting machine, LMXII-TF3500/6000</td>
</tr>
<tr>
<td>1997</td>
<td>Establishing high-speed, high precision and high-power more than conventional, LMXIII-TF3500/6000</td>
</tr>
<tr>
<td>2001</td>
<td>Introducing the world first twin head laser cutting machine, LMXV-TWIN TF4000</td>
</tr>
<tr>
<td>2004</td>
<td>Launching the high-power, long-time operable laser cutting machine mounted with the brand new 6kW oscillator, LMXIII-TF4000/6000</td>
</tr>
<tr>
<td>2010</td>
<td>Introducing the TANAKA Laser landmark Compact body with 6kW oscillator LMRV-TF4000/TF6000</td>
</tr>
<tr>
<td>2012</td>
<td>No.1 Gantry Laser Sales Record, Advanced Bevel Laser Machine Reborn! LMZV-TF6000/6000</td>
</tr>
</tbody>
</table>
**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 reduces through 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>TF2000</th>
<th>TF4000</th>
<th>TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output (W)</td>
<td>2kW</td>
<td>4kW</td>
<td>6kW</td>
</tr>
<tr>
<td>Cutting capacity</td>
<td>≤3kW</td>
<td>≤6kW</td>
<td>≤9kW</td>
</tr>
<tr>
<td>External dimensions (W×D×H)</td>
<td>1,400×600×1,780mm</td>
<td>1,440×950×1,800mm</td>
<td>1,640×950×1,800mm</td>
</tr>
<tr>
<td>Air weight (kg)</td>
<td>435</td>
<td>697</td>
<td>774</td>
</tr>
<tr>
<td>Number of units</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cooling water circulator specification**

- Model: TF2000
- Model: TF4000
- Model: TF6000

**Cooling water circulator**

- Input power: 1.5kW
- Water flow: 6L/min

**Standard cutting specification**

<table>
<thead>
<tr>
<th>Material</th>
<th>SS400 (JIS Standard)</th>
<th>SS430 (JIS Standard)</th>
<th>stainless steel (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10mm</td>
<td>10mm (10mm)</td>
<td>10mm (10mm)</td>
<td>10mm (10mm)</td>
</tr>
<tr>
<td>8mm</td>
<td>8mm (8mm)</td>
<td>8mm (8mm)</td>
<td>8mm (8mm)</td>
</tr>
<tr>
<td>6mm</td>
<td>6mm (6mm)</td>
<td>6mm (6mm)</td>
<td>6mm (6mm)</td>
</tr>
<tr>
<td>4mm</td>
<td>4mm (4mm)</td>
<td>4mm (4mm)</td>
<td>4mm (4mm)</td>
</tr>
</tbody>
</table>

- 1 Material: SS400 (JIS Standard)
- 2 Material: SS430 (JIS Standard)
- 3 Material: Stainless steel (mm) with corner radius 5mm
- 4 Material: SS400 (JIS Standard)
- 5 Material: SS430 (JIS Standard)
- 6 Material: Stainless steel (mm) with corner radius 5mm

**Speed specification (mm/min)**

- Maximum feed speed: 4,000mm/min
- Cutting feed speed: 2,000mm/min
- Minimum feed speed: 1,000mm/min

**Equipment configuration**

- Blank top panel
- Blank top panel
- Blank top panel
- Blank top panel

- *Print device/bevel cutting device cannot be installed.*
**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 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 (LO-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 is.

**Equipment configuration**
- Cutting machine body
- 500 laser (TF4000 / TF6000)
- FANUC AC Servo motor (FANUC SERIES MOTOR PANEL)
- Bevel head
- Main operation panel
- Cutting water circulation

**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>2,000</td>
<td>3,100</td>
</tr>
<tr>
<td>Top/bottom V bevel 40 deg</td>
<td>79mm</td>
<td>79mm</td>
</tr>
<tr>
<td>Top/Bottom V bevel 45 deg</td>
<td>99mm</td>
<td>99mm</td>
</tr>
<tr>
<td>Vertical cutting</td>
<td>16mm (24mm)</td>
<td>16mm (24mm)</td>
</tr>
<tr>
<td>High Quality</td>
<td>20mm/4</td>
<td></td>
</tr>
<tr>
<td>Speed specification (mm/min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial feed speed</td>
<td>1,000mm/min</td>
<td></td>
</tr>
<tr>
<td>Rapid feed speed</td>
<td>4,000mm/min</td>
<td></td>
</tr>
<tr>
<td>Manual travel feed speed</td>
<td>12,000mm/min</td>
<td></td>
</tr>
<tr>
<td>Cutting head front speed</td>
<td>20,000mm/min</td>
<td></td>
</tr>
<tr>
<td>Cutting head approach speed</td>
<td>11,000mm/min</td>
<td></td>
</tr>
<tr>
<td>Head retum speed</td>
<td>24,000mm/min</td>
<td></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 laser oscillator from the CNC, enabling automatic control from start to stop of the oscillator and laser gas pressure, while monitoring the condition of the oscillator.

<table>
<thead>
<tr>
<th>Oscillator specification</th>
<th>TF2000</th>
<th>TF4000</th>
<th>TF6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>TF2000</td>
<td>TF4000</td>
<td>TF6000</td>
</tr>
<tr>
<td>Oscillation system</td>
<td>High-frequency discharge excitation high-speed short from the gas layer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Oscillator-power supply integrated type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum output power</td>
<td>2,000W</td>
<td>4,000W</td>
<td>6,000W</td>
</tr>
<tr>
<td>Output stability</td>
<td>0.81%</td>
<td>0.81%</td>
<td>0.81%</td>
</tr>
<tr>
<td>Focal spot size</td>
<td>0.2 to 0.25 or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retracting characteristic length</td>
<td>146μm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam mode</td>
<td>Laser-stabilized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam diameter</td>
<td>About 1.6 to 2.1mm</td>
<td>About 3.4 to 4.1mm</td>
<td>About 3.4 to 4.1mm</td>
</tr>
<tr>
<td>Beam divergence angle</td>
<td>0.35mrad</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse output command frequency</td>
<td>5 to 2,000Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse output duty</td>
<td>1 to 100Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser gas composition</td>
<td>CO2, He, N2, Ar, Hz, Hz, Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical dimensional size</td>
<td>220mm 130mm 130mm/220mm 130mm 130mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>About 700kg</td>
<td>About 900kg</td>
<td>About 1,100kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jig &amp; tool</th>
<th>Input power supply capacity</th>
<th>LNR-BF-TE2000</th>
<th>LNR-BF-TE4000</th>
<th>LNR-BF-TE6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td>LNR-BF-TE2000</td>
<td>LNR-BF-TE4000</td>
<td>LNR-BF-TE6000</td>
</tr>
<tr>
<td>Mirror body</td>
<td>190W 170W 150W</td>
<td>170W 150W 130W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oscillator</td>
<td>380VA 310VA 260VA</td>
<td>380VA 310VA 260VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling water oscillator</td>
<td>170VA 270VA 440VA</td>
<td>170VA 270VA 440VA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluid used</th>
<th>LNR-BF-TE2000</th>
<th>LNR-BF-TE4000</th>
<th>LNR-BF-TE6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>LNR-BF-TE2000</td>
<td>LNR-BF-TE4000</td>
<td>LNR-BF-TE6000</td>
</tr>
<tr>
<td>Laser gas</td>
<td>0.38Pa 0.38Pa 0.38Pa</td>
<td>0.38Pa 0.38Pa 0.38Pa</td>
<td>0.38Pa 0.38Pa 0.38Pa</td>
</tr>
<tr>
<td>Oxygen</td>
<td>10 m3/hv 10 m3/hv 10 m3/hv</td>
<td>10 m3/hv 10 m3/hv 10 m3/hv</td>
<td></td>
</tr>
<tr>
<td>Dry air for cutting</td>
<td>0.789Pa 0.789Pa 0.789Pa</td>
<td>0.789Pa 0.789Pa 0.789Pa</td>
<td></td>
</tr>
<tr>
<td>Dry air for torching</td>
<td>10 m3/hv 10 m3/hv 10 m3/hv</td>
<td>10 m3/hv 10 m3/hv 10 m3/hv</td>
<td></td>
</tr>
</tbody>
</table>

High-quality cut edge finish that only TANAKA can provide.

- Mild steel with black skin, SS400
- 6mm thick with common cutting
- 9mm thick
- 12mm thick
- 25mm thick with witness mark reduction
- 32mm thick
- Coated steel plate
  (Zinc rich primer material)
- Bevel Cutting
- Stainless steel SUS304
- 16mm thick
- Mild Steel 16mm thick
- Stainless Steel 12mm thick
- Stainless steel SUS304
- 16mm thick
- 16mm thick with high quality cutting
- 25mm thick with high quality cutting
- Stainless steel SUS304
- Aluminum
- 28mm thick separation cutting
- 8mm thick

The sample pictures are for reference only. No warranty is given for actual cutting.
Varieties of functions are available enabling system upgrading in accordance with use Standard function.

- **Automatic lens positioning controlled by NC**
- **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.**

**Machining standard for LMV**

- **AIRC**
- **This function suppresses delay due to acceleration/deceleration in high-speed cutting and delay of the servo system to minimize the processing shape error. 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**
- **The scheduled operation up to 32 places is possible. Inputting the original point of each plate and designating a program can automatically cut all of the plates.**

- **Capacitance height sensor controlled by NC**
- **(with automatic correction function)**
- **This function keeps constant the distance between the cutting head and the material to be cut to achieve stable cutting at all time. Stand-off correction work is automatically performed in an interlaced manner with scheduled operation.**

- **Constant beam path length**
- **This function maintains the optical path length constant for the oscillator to the work to maintain stable cutting.**

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

- **Piercing completion detection**
- **This function detects automatically the completion of piercing to make the machine proceed to cutting, so that laborers for extending and releasing the piercing time can be avoided.**

- **Self burning detection**
- **This function automatically detects self burning during automatic operation, and automatically stops machine temporarily when burning occurs.**

- **Beam line misalignment detection**
- **This function automatically detects optical deviation in the beam of CO2 laser to secure work safely.**

- **Coordinate system rotation**
- **This function enables the machine to positively cut even a plate positioned on the cutting table at an arbitrary angle by rotating the machine.**

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

- **Rety cut recovery**
- **This function makes the machine repeat torch lifting. This performs another piercing and beam-on and wait alarm release to continue cutting when the machine goes to a temporary stop due to disconnection of spatter to the nozzle during automatic operation.**

- **Fault skipping**
- **This function automatically trims the nozzle to the next piercing position to restart cutting when the machine goes to a temporary stop due to disconnection of spatter to the nozzle during automatic operation.**

- **Rety/Skip log for re-cutting**
- **This function stores the point where rety 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**
- **It is possible to mount a set of three color warning lights on the upper part of the machine body. The lighting condition can clearly be seen.**

- **Ultra high-speed feed**
- **It is possible to travel the machine at a maximum speed of 50m/min by increasing the power of the 6kW 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 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 aperture coil is automatically performed in an interlaced 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**
- **This function protects the maintenance interval or replacement of any of the condenser lens by extending the longevity of the optical path.**

- **Reverse travel**
- **This function makes the cutting machine travel backwards the programmed path in execution. The number of blocks to be backedward 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 1-2 seconds (in case of 6x80). Great reduction in piercing time is now available. Also, burning less occurs in leading in after piercing to stabilize leading.**

- **[Fine ultra-piercing]**
- **High-quality piercing with reduced spattering quantity can be performed by changing the configuration of assist 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.**

<table>
<thead>
<tr>
<th>Machine Type</th>
<th>LMV</th>
<th>LMV</th>
<th>LMV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>500m/Mm</td>
<td>500m/Mm</td>
<td>500m/Mm</td>
</tr>
<tr>
<td>Beam Power</td>
<td>500m/Mm</td>
<td>500m/Mm</td>
<td>500m/Mm</td>
</tr>
</tbody>
</table>

**Optional function for LMV**

- **Preceding burning function (PAT. 28151350)**
- **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.**

- **Embossing device**
- **Embossing mark (0.5mm width and letter marking (100mm height) can be written by ink-jet marking device.**

- **Pen marking device**
- **Letter marking of numerals, alphabets and special marks is available with NC command.**

- **Letter printing device**
- **By mounting a printing device of dot matrix and print marking, high-speed, high-quality letter printing is performed on the steel plate in a non-contact manner.**

**Safety function**

- **Coordinate rotation TV**
- **A TV monitor can be mounted on the operation panel. Positioning of the cutting head and coordinate rotation are easily viewed by means of the monitor.**

- **Nozzle monitoring TV**
- **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 incidence equipment**
- **Automatic power-on**
- **The function starts one to ten hours and turns power on to the machine body at designated time every day.**

- **Laser gas automatic switching device**
- **(Stainless cutting)**
- **This function sets the secondary lower limit pressure and automatically switches A and B line cylinders to prevent interruption in cutting.**

- **Laser cutting table**
- **This is called “Die block” that was born from customer needs and is the cutting table for laser cutting. In addition to obtaining high-quality cutting, the table avoids distortions of the cutting area, 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 control.**

- **Steel plate stocker**
- **This can store two plate stocker storing various sizes of plates for the cutting machine, so that non-manual continuous operation is made possible.**