The Latest VZ Series, Delivering the Utmost Performance

Ongoing innovations have further evolved Mitsubishi Electric's VZ Series. Provides high level performance required for all 3D laser applications.

Zero-offset type
VZ10 Series
- For existing users of zero-offset lasers
- For those whose main purpose is to cut pre-formed 3D parts
- For those who require shorter processing time
- For those who prioritize a wider processing range

Offset type
VZ20 Series
- For existing users of offset type lasers
- For those who frequently process deep-drawn parts
- For 3D welding applications*1
- For 2D thick sheet cutting*2
*1, *2: Requires optional attachments
High productivity
Processing performance
VZ10 High Productivity and Performance

High productivity
Delivers greatly improved productivity, shorter processing time and lower running cost utilizing the latest control technologies, in addition to faster axial movement and higher processing speed.

Comparison when cutting 100 of the work piece shown above

Processing time

<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
<th>VZ10-20CF</th>
<th>H1-5000D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td></td>
<td>42 mins</td>
<td>55 mins</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>4 mins</td>
<td>6 mins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20% reduced</td>
<td>33% reduced</td>
</tr>
</tbody>
</table>

Operating cost

<table>
<thead>
<tr>
<th>Tool</th>
<th>Quantity</th>
<th>VZ10-5000D</th>
<th>H1-5000D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td></td>
<td>27,560 y.e.</td>
<td>35,980 y.e.</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>2,756 y.e.</td>
<td>3,598 y.e.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28% reduced</td>
<td>33% reduced</td>
</tr>
</tbody>
</table>

Technologies Supporting High Productivity

Faster axial movement
Faster axial movement and latest control technology offers fast cutting speeds at corners, two times faster than the predecessor model.

<table>
<thead>
<tr>
<th>Zero-offset</th>
<th>VZ10</th>
<th>VZ10-20CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currents</td>
<td>15 A</td>
<td>15 A</td>
</tr>
<tr>
<td>Feed</td>
<td>60 mm/min</td>
<td>60 mm/min</td>
</tr>
</tbody>
</table>

Independent height control axis
Height calibration using the independent height control axis allows for faster cutting speeds.

Faster processing speeds
NC control of high-pressure gas, assist gas optimization technology, and 3mm laser cutters deliver faster cutting speeds.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Stainless steel (SU304)</th>
<th>Aluminum alloy (A0052)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VZ10-20CF</td>
<td>7.5 times faster</td>
<td>1.5 times faster</td>
</tr>
<tr>
<td>VZ10-20CFH</td>
<td>10 times faster</td>
<td>3.0 times faster</td>
</tr>
</tbody>
</table>

High-speed thin sheet cutting
Equipped with DP (dross reduction) coated as standard, delivering fast and high-quality cutting with less dross at corner sections.

[Images of different cutting scenarios]

2D parts
Capable of cutting thicker stainless and aluminum sheets due to NC control of high-pressure gas and assist gas optimization technology.

<table>
<thead>
<tr>
<th>Material</th>
<th>Stainless steel (SU304)</th>
<th>Aluminum alloy (A0052)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>1.0mm stainless (assist gas: nitrogen)</td>
<td>1.1mm stainless (assist gas: oxygen)</td>
</tr>
<tr>
<td>Left</td>
<td>1.0mm stainless (assist gas: nitrogen)</td>
<td>1.1mm stainless (assist gas: oxygen)</td>
</tr>
</tbody>
</table>

Laser tube cutting
Six-axis simultaneously controlled NC turn table allows for all types of tubes to be cut.

[Images of different laser tube cutting scenarios]
High productivity
Processing performance
VZ20
High Productivity and Performance

- High productivity
Delivers greatly improved productivity, shorter processing time and lower running cost utilizing the latest control technologies, in addition to faster axial movement and higher processing speed.

- Technologies Supporting High Productivity
High-speed, highly accurate control
- Achieves shorter cutting time due to 2 times faster axial movement compared to the predecessor model and the same HP control of the processing head as the zero-offset type.

Operating cost
<table>
<thead>
<tr>
<th>Operating cost</th>
<th>T63200</th>
<th>VZ20-200F3</th>
<th>Approx. 30% reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liv. year</td>
<td>5.94 yen/kw</td>
<td>4.7 year</td>
<td>3.2 year</td>
</tr>
<tr>
<td>Liv. year</td>
<td>5.94 yen/kw</td>
<td>4.7 year</td>
<td>3.2 year</td>
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<td>5.94 yen/kw</td>
<td>4.7 year</td>
<td>3.2 year</td>
</tr>
</tbody>
</table>

Processing Using Various Options

- Laser cutting on deep-draw parts
Slim offsets head with advanced work accessibility reduces interference with deep-draw parts.

<table>
<thead>
<tr>
<th>Laser cutting on deep-draw parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1mm thick aluminum alloy (assist gas: air)</td>
</tr>
<tr>
<td>0.1mm thick high-tensile steel (assist gas: oxygen)</td>
</tr>
<tr>
<td>0.1mm thick mild steel (assist gas: oxygen)</td>
</tr>
</tbody>
</table>

- 2D parts
Capable of cutting thicker stainless and aluminum sheets due to NC control of high-pressure gas and assist gas optimization technology.

<table>
<thead>
<tr>
<th>2D parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3 (Stainless 304S14/4), Assist gas: Nitrogen</td>
</tr>
<tr>
<td>M3 (Aluminum alloy (A900)), Assist gas: Air</td>
</tr>
</tbody>
</table>

| Left: 0.1mm stainless (assist gas: nitrogen)| Right: 0.2mm thick aluminum alloy (assist gas: air) |

- Processing using various options
- NC turn table
6-axis simultaneous control delivers precise cutting of various types of parts, including beveling.

<table>
<thead>
<tr>
<th>Processing using various options</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC turn table</td>
</tr>
<tr>
<td>6-axis simultaneous control</td>
</tr>
</tbody>
</table>

- Thick sheet cutting head
High-quality cutting of mild steel up to 1.0mm thick, using a 2D processing nozzle and thick sheet attachment.

<table>
<thead>
<tr>
<th>Thick sheet cutting head</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0.1mm thick mild steel</td>
</tr>
</tbody>
</table>

- Welding head
It may be used for laser welding applications by changing the processing nozzle. Appropriately tubes and plates when used in combination with an NC turn table.

<table>
<thead>
<tr>
<th>Thick sheet cutting head</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0.1mm thick mild steel</td>
</tr>
</tbody>
</table>

- Laser tube cutting using the NC turn table

<table>
<thead>
<tr>
<th>Laser tube cutting using the NC turn table</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1mm thick mild steel (assist gas: oxygen)</td>
</tr>
</tbody>
</table>

- Laser tube welding using the NC turn table

<table>
<thead>
<tr>
<th>Laser tube welding using the NC turn table</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1mm thick mild steel (assist gas: oxygen)</td>
</tr>
<tr>
<td>0.1mm thick stainless tube (assist gas: nitrogen)</td>
</tr>
</tbody>
</table>

Stainless tube, thickness: 0.1mm
Coated tube, thickness: 0.1mm
Bulb weld (assist gas: argon)
**GUI Interface**
The GUI-based 15-inch TFT touch panel offers easy operation with Help screens for new users.

**Self-check Function**
Checks the main parts of the machine on a regular basis and notifies the result. Preventive maintenance supports long-term stable operation.

**Counter Function**
Equipped with a counter function which keeps a count and records the number of times a program has been executed on the control unit.

**Shorter Setup Times**
- **P point setting**
  Automatically calculates the link length and shift volume by following the procedure on the screen and pressing the set button (V220).

- **Focus adjustment**
  Focal point may be adjusted by turning the focus adjustment dial without having to remove the head (V220).

**Teaching Function**
Upgraded hole cutting functions

**On-path Control**
Avoids collision between head and work piece during stop feed/return (circular interpolation).

**Welding Function**
Slopes up/down function

**Offline conversion**
Enhanced functions related to off-line teaching.

**Spring-type Damage Reduction**
Reduces the damage in case of a collision between the nozzle and work piece caused by a teaching error.

**Enhanced 2D cutting functions**
Equipped with cutting functions available on Mitsubishi's control unit LC208 for 2D laser machines, such as "Retry", "Shell pass recut", "PC control", "End point", and "Automatic gap purge". Delivers improved cutting quality and stability (only for 2D programs, head pointing down).
Resonator

3-axis cross flow SD (silent discharge) excited resonator

**Unique Technologies Supporting High Reliability**

Mitsubishi Electric's unique technologies are the basis of our highly reliable resonators which provide superior processing and stability.

**High-speed power sensor**

Equipped with Mitsubishi's unique "high-speed power sensor" which monitors the laser output in real time. Strictly maintains the specified power, and the power stability is less than ±1%. Able to cut highly reflective materials such as aluminum and copper.

**Gas-sealed operation**

The gas-sealed mechanism cuts back on laser gas consumption to about one cylinder per year (240L annual operating hours on ML20C/F). Ensures operation at rated power for 24 hours continuously without having to refill laser gas. Leads to drastic reduction in running cost and eliminates the need for frequent gas change.

**Just-On-Time Discharge**

The Just-On-Time discharge method drastically cuts down on electricity cost by reducing laser power consumption when beam is OFF and supplying power instantly while the beam is ON.

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### Resonator Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ML20CP3</th>
<th>ML20CP4</th>
<th>ML20CP5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excitation Method</td>
<td>RFL, RFL2</td>
<td>RFL, RFL2</td>
<td>RFL, RFL2</td>
</tr>
<tr>
<td>Laser output (W)</td>
<td>1,000/1,500</td>
<td>2,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Power supply (water-cooled)</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Laser beam diameter</td>
<td>0.15 x 0.15 mm</td>
<td>0.15 x 0.15 mm</td>
<td>0.15 x 0.15 mm</td>
</tr>
<tr>
<td>Cooling unit specifications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water-cooled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply (water-cooled)</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power supply (air-cooled)</td>
<td>220V/440V</td>
<td>220V/440V</td>
<td>220V/440V</td>
</tr>
</tbody>
</table>

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### Equipment

**Main Components/Options**

**Cutting Head**

- Independent height control (150 mm)
- Provides stable height control and cutting speed in corners.

**Riveting Head**

- Equipped with a beam collimator unit applicable to welding applications.

**3D Thin Sheet Cutting Head**

- Can move 2-dimensional arrays with higher performance and stability.

**Non-vacuum Static Head**

- Static head with almost accessibility to various work pieces.

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### Options

- **NZ Table**
  - The air-cooled, controllable table supports table cutting.

- **2D Sheet Processing Package**
  - Includes custom chucks and clamps.

- **Teaching Panel with Joystick**
  - The joystick allows for intuitive initial movement.

- **Manual Operation Controller**
  - The manual operation box starts and stops the program of remote location away from the main program controller.
Off line teaching  Offline Teaching System

Offline teach functions available on computers maximize productivity

Nozzle Angle Data Output
The new VZ10/20 delivers higher cut quality at sections where the nozzle is not perpendicular to the surface of the work piece by automatically setting the optimum cutting speed according to the nozzle angle. The nozzle tilt data from CamMagic TL-II will further reduce the time for speed correction and the number of cutting defects.

Creating Jigs
Capable of creating jigs simply by setting parameters and specifying the support positions of the jig. Dramatically reduces production time, 2D NC data may also be created when used in combination with CamMagic LA.

Creating the Cut Path
Creates cut paths with the nozzle perpendicular to the surface of the work piece by setting the piece and cutting direction. Automatically identifies openings on flat surfaces and enables simple setting of macro programs.

Checking the Cut Path
Checks for stroke overruns and possible collisions between the processing head and work piece. Also checks the changes in axis angle and lift of the head against the surface of work piece to avoid any cutting defects that may occur.

Adjusting the Nozzle Direction
Adjusts the nozzle direction to prevent interference with the work piece. Also corrects the movement of the head to achieve a smoother cut surface.

Adjusting Teaching Points
Teaching points are created automatically, but positions and types may not always be as intended. In this case, teaching points may be added, changed and deleted as you wish.

Creating NC Data and Setting the Speed
Modify start and end codes, beam ON/OFF codes, etc. as you wish. Cutting speed may be set according to the specified NC data. (Same function available on the processing machine)

Creating Jigs

Creating the Cut Path

Checking the Cut Path

Adjusting the Nozzle Direction

Adjusting Teaching Points

Creating NC Data and Setting the Speed

CamMagic TL-II

Compatible with various CAD data
The convertors in blue are provided as standard; the convertors in green are optional.

Compatible models
- ML1519VZ10
- ML3129VZ10
- ML3112VZ20
- ML2019VZ1
- ML3129VZ11
- ML2019VZ2
- ML3112VZ21
- ML3029V1T

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Creating Jigs

Creating the Cut Path

Checking the Cut Path

Adjusting the Nozzle Direction

Adjusting Teaching Points

Creating NC Data and Setting the Speed

NC Reverse Conversion
NC data modified on the processing machine may be re-converted to path data where new data may be added and nozzle direction may be modified.