

# LVP<sup>PlusII</sup> SERIES

Mitsubishi Laser Systems



# LVP<sup>lusII</sup> SERIES

## THE HEAVY-DUTY PERFORMANCE LEADER IN HIGH-SPEED LASER CUTTING SYSTEMS

The LVP<sup>lusII</sup> is designed to meet the needs of the most demanding users in today's 24/7 competitive manufacturing environment. Built on a heavy-duty, single platform, the LVP<sup>lusII</sup> incorporates the latest technology into a high-speed, user-friendly system. For decades, Mitsubishi Laser has designed and manufactured the most technologically advanced laser cutting systems in the world.

## DISTINGUISHED BY DESIGN

Mitsubishi designs and manufactures each critical component that goes into every Mitsubishi Laser system. Every individual component is performance-matched to excel in the most demanding environments. Advanced CAE models were employed to develop the stable and accurate high-speed LVP<sup>lusII</sup> system design. Solid Dianite machine casting ensures high rigidity, strength and system stability while oversized precision linear guides on both X and Y axes result in longer life. When combined with a machine tool, resonator and power supply that are integrated onto a single platform, the result is superb design and solid productivity.



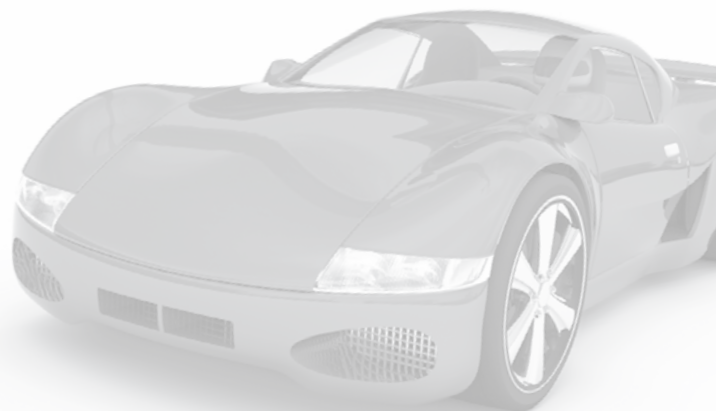
## UNIQUE FEATURES MAKE THE DIFFERENCE IN PERFORMANCE

- High-speed, heavy-duty motion system reduces processing time
- Diamond Path™ advanced beam delivery system
- Latest PC-based 64-bit NC control has touch-screen user interface and full network capability
- Windows® XP operating system
- The easily accessed processing area makes setup and changes easier
- Ultra-rigid, single-platform, Dianite-cast machine frame provides ultimate stability to ensure high-speed processing accuracy
- Mitsubishi's safety package includes full side covers and automatic door for processing area
- LVP<sup>PlusII</sup> offers our advanced process monitoring system to assist in maintaining machine productivity



## ON THE MOVE

The LVP<sup>PlusII</sup> Series is perfect for 2D part manufacturing in aerospace, automotive, energy and other fast-moving markets.



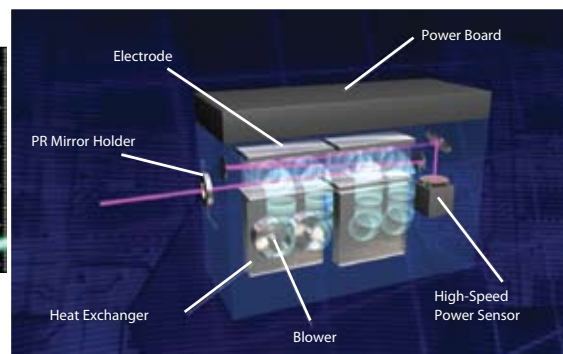
# RESONATORS

## Lowest cost of ownership

Mitsubishi resonators are so reliable and efficient that they've never needed to be replaced – eliminating a potentially expensive repair. The innovative Cross-Flow design consumes up to 90% less gas than traditional fast-flow systems, giving our resonators the lowest cost of ownership on the market.

## MITSUBISHI'S EXCLUSIVE X-FLOW R SERIES RESONATOR

- Revolutionary “Dual” Cross-Flow design maximizes beam quality and stability
- DiamondClean™ Technology provides ultra-clean resonator materials that yield higher performance and greater stability
- Lower gas costs – consumes up to 90% less gas than traditional fast-flow systems
- Extended maintenance intervals equal less maintenance
- Improved power supply provides high efficiency, stability, reliability and lower maintenance
- Fast startup – ready to cut at full power only 45 seconds after power on
- Designed and manufactured exclusively by Mitsubishi
- 4.0kW resonators available
- Enhanced rectangular wave pulse



## MITSUBISHI'S SUPERIOR “CUTTING POWER”

Output power alone does not define cutting performance or cut edge quality. It takes superior “cutting power” to achieve high-performance results. Cutting power is optimized by creating the perfect blend of output power, beam quality, beam stability and power control. The results are visible through superior edge quality, lower thermal effects, precision cutting ability and greater overall processing control.

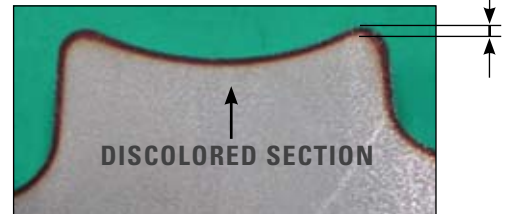
### BRILLIANT NEW TECHNOLOGY

Mitsubishi's new state-of-the-art BrilliantCUT technology can produce a cutting surface near-machined finish – eliminating secondary operations and decreasing production times. The LVP<sup>plus</sup> Series reaps the benefits of this innovative, optimal machine tool beam path design. The new CF-R resonator has increased beam characteristics and a new control method for the high-peak rectangular-pulse platform, providing optimal processing conditions for the resonator. It also features new nozzle technology for improved cutting surface quality.

BrilliantCUT is ideal for stainless steel applications 3/8" (9.5 mm) and up. With an increased focus margin, processing stability is increased for a more consistent cut. BrilliantCUT also provides better part straightness by controlling the Kerf on the bottom of the part. And, the ability to control the heat affected zone of the material (bottom of part) eliminates the need for secondary processes. Simply brilliant.

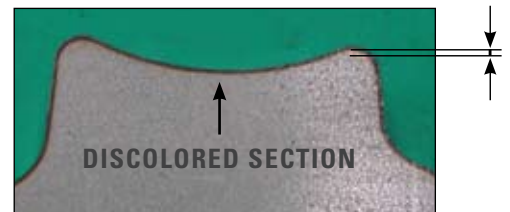
\*Data to the right is for reference. Surface discoloration may differ depending on material, thickness, processing condition or state of the processing machine.

Discolored area 1.1mm\*

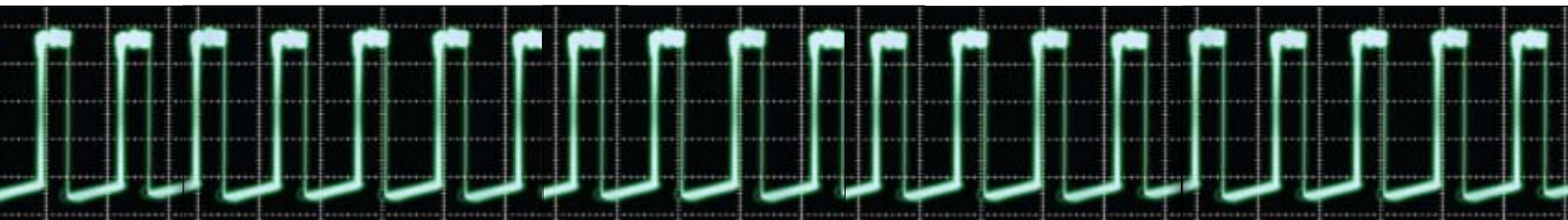


Bottom of cut part utilizing conventional method

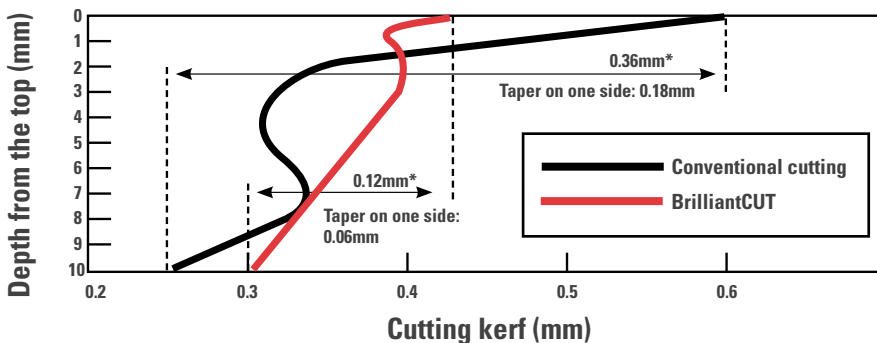
Discolored area 0.4mm\*



Bottom of cut part utilizing BrilliantCUT

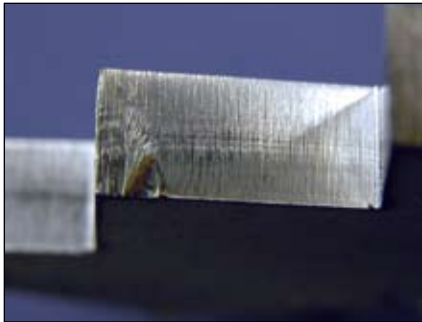


Width of cutting groove and taper of one side

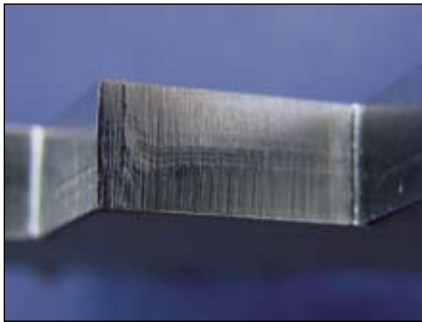


\*Above data is for reference. Surface roughness may differ depending on material, thickness, processing condition or state of the processing machine.

# RESONATORS cont'd



**Plasma Guard Control off**



**Plasma Guard Control on**

## PLASMA GUARD CONTROL

Conventional lasers exhibit a crude transition as speed increases from starting point to corner. Plasma Guard Control restricts the generation of plasma in mid-thick stainless steel, allowing for a much smoother acceleration. Increased corner speeds maintain superior cutting quality and stability for maximum precision production.

## INTELLIGENT PROCESS MONITORING SYSTEM THROUGH MELS EYE (OPTION)

**BURN DETECTION** – Great for mild steel applications. This allows LVP<sup>usil</sup> to track each cut and automatically stop processing when it's no longer sustained. Nozzle cleaning is carried out as a preventative measure, then processing continues.

**PIERCE DETECTION** – Increases productivity of conventional oxygen-piercing by eliminating a buffer in the pierce time. The function detects when the beam has gone all the way through the material.

**PLASMA DETECTION** – Minimizes scrap in high-production runs by detecting plasma and readjusting cutting speed to ensure part quality.

**AUTO FOCUSING** – This aspect of MELS EYE allows the machine to automatically find the focal point with consistency and reduces set-up time.



## NEW MITSUBISHI JET PIERCE

Mitsubishi's new Jet Pierce dramatically improves piercing resulting in faster, more consistent times. Jet Pierce comes standard on all LVP<sup>usil</sup> Series machines.

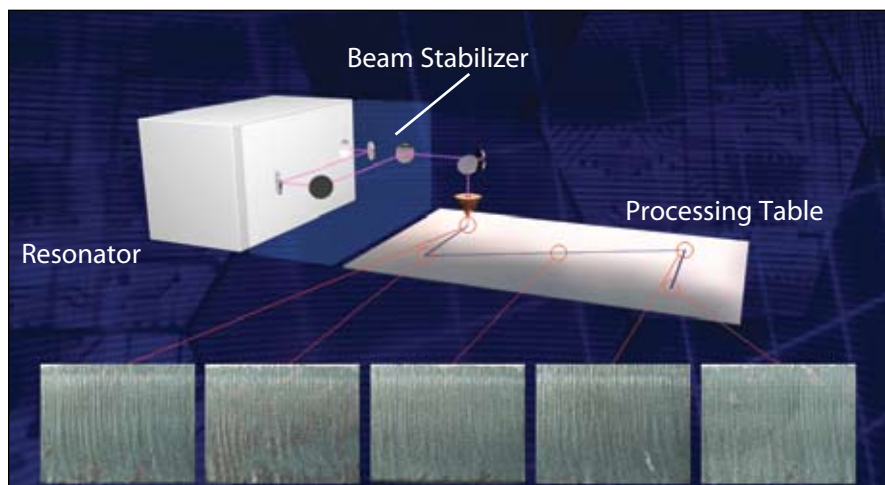
# HEAD & MOTION SYSTEM

## HIGH-PERFORMANCE MOTION SYSTEM

Packed with a proven Mitsubishi Smart Digital AC servo motor technology and advanced drive system on X and Y axes, the motion system offers greater system accuracy at high speeds. Automatic lubrication of the motion system provides greater reliability and reduced maintenance while Mitsubishi's exclusive One-Touch Dynamic Accuracy Technology allows the user to select between high-productivity and high-precision modes. Heavy-duty bellows with spark guards seal and protect the motion system from dust, dirt and other processing contaminants, resulting in performance that is head and shoulders above the competition.

## ADVANCED HIGH-SPEED PROCESSING HEAD

- Heavy-duty, high-speed design developed exclusively by Mitsubishi
- Versatile nozzle configurations for ease of operation and excellent cut edge quality over a wide range of materials
- Quick-change lens cartridge system allows for easy exchange between 5 in. (127 mm) and 7.5 in. (190.5 mm) focal length lenses
- High-speed, anti-plasma technology for high-speed cutting of mild steel, galvanized steel, stainless and aluminum using nitrogen or air-assist gas
- Automatic focus adjustment using motorized lens system (standard)
- Ability to quick-pierce material utilizing proprietary cutting nozzle technology
- Better lens stability, increased lens life and improved cutting capability
- Long lens stroke enhances negative focus ability and improves overall cutting



**Material: 3/4-inch, thick mild steel • Output power: 2.6kW**  
**Processing speed: 32 inches per minute**

### Mitsubishi's patented Diamond Path™ technology

- Maintains a constant beam quality by fixing the system's beam path length regardless of processing head location, achieving superior cut edge quality over the entire work area
- Provides a stable cutting beam at high speeds across all processing areas at speeds of up to 1,180 inches per minute
- Integrated Beam Optimizer automatically adjusts the beam characteristics for maximum processing speed and efficiency

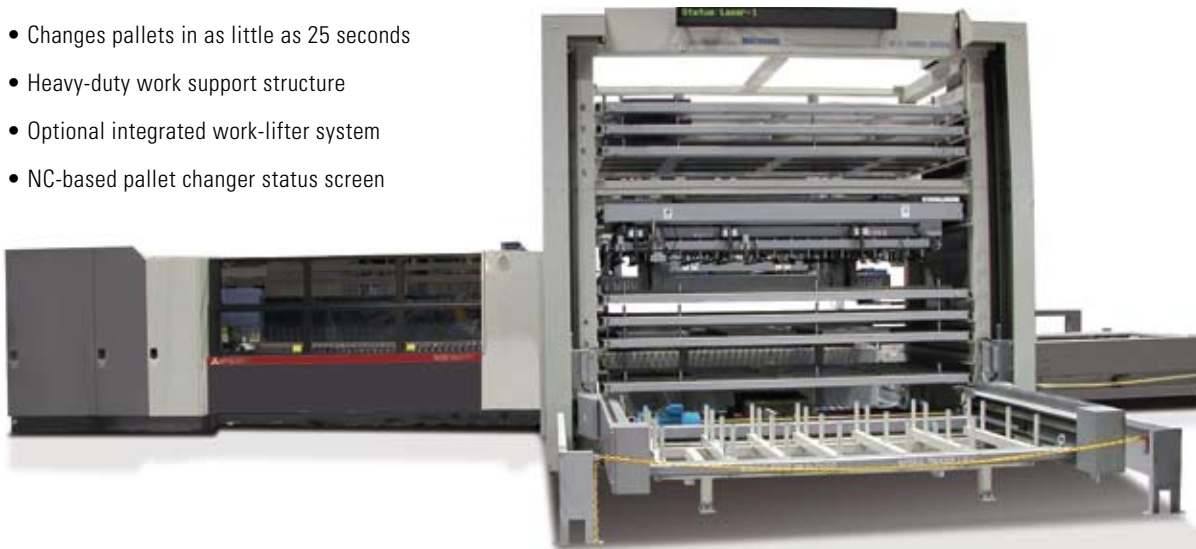
# AUTOMATION

## VERSATILE AND EXPANDABLE AUTOMATION

Auto-Flex MSCIII (Multiple Shelf Changer) Series is versatile and expandable. Mitsubishi offers several high-production options that can transform and expand the LVPlus<sup>II</sup> System for maximum versatility and throughput.

### Heavy-duty, high-speed pallet changer maximizes throughput

- Up to 2,200 lb capacity per pallet
- Changes pallets in as little as 25 seconds
- Heavy-duty work support structure
- Optional integrated work-lifter system
- NC-based pallet changer status screen



## AUTOMATED MATERIAL HANDLING

- Completely modular FMS system allows for 24/7 unattended processing for both job shops and OEMs
- Aerial sheet positioning for high accuracy and TRUE positive sheet gauging on the cutting table
- Powerful Mitsubishi Ncell online control software provides the ultimate in system throughput and flexibility
- Vacuum load system with thickness detection and sheet separator
- Heavy-duty clamshell fork unload system with built-in sheet raking system

## AUTO-FLEX ADVANCED AUTOMATION SERIES

Mitsubishi automation allows you to selectively expand your existing FMS system base with additional material handling units with up to four material carts (44,000 lbs. total capacity) and up to four product carts (44,000 lbs. total capacity) to store and segregate laser-cut product by material, part number, customer or other user-defined categories. For even more efficiency, add automatic clamps for holding thin sheet metal material during high-speed cutting (optional).

### MULTIPLE SHELF TOWER

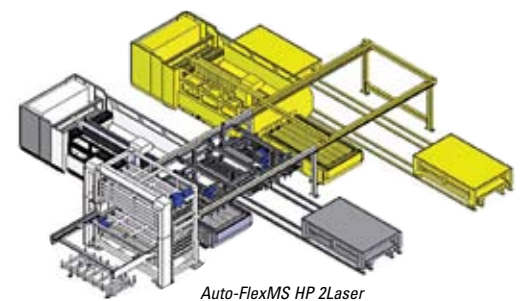
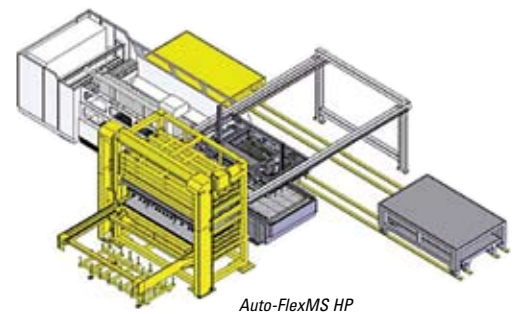
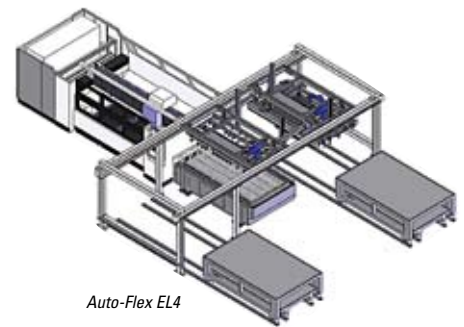
- Integrates a low-profile storage tower with 6,000 lb shelf capacity
- Up to 20 shelves can be added to one tower for a total of 120,000 lbs. of material capacity

### TANDEM LOAD/UNLOAD SYSTEM

- Full load/unload cycle in approximately 65 seconds
- Heavy duty with up to 1 inch full sheet load/unload capacity
- Second material pickup loading station allows simultaneous preparation

### TWO LASER SYSTEM

- Add a second laser to maximize productivity. A two laser FMS system allows up to six product carts for total capacity of 66,000 lbs.



## MITSUBISHI'S 64-BIT, PC-BASED TOUCH SCREEN CONTROL

- Advanced 64-bit, Windows NC control improves cut quality and reduces cycle times as much as 50%
- Windows® XP operating system
- Advanced touch-screen control provides an efficient and easy-to-use operator interface
- DR (Dross Reduction) Control uses real-time advanced NC program “look-ahead” technology to intelligently determine maximum processing speeds based on material type, thickness and part geometry, resulting in reduced dross while maximizing throughput
- Built-in advanced Help Screens to guide the operator through machine setup and maintenance
- Full Ethernet network-compatible for fast and easy transfer of NC programs
- Built-in rectangular nesting program for added productivity
- Large NC program storage capacity using integrated 10 GB hard drive
  - Memory is capable of storing up to 10,000 cutting conditions
  - Spanish language capability

**On-screen keypad makes programming faster and easier.**



## MC DIAMOND SOFT® CAD/CAM SOFTWARE

- Powerful and easy-to-use, Windows® based software
- Available modules for 2D and 3D cutting
- Dynamic nesting
- Rotary cutting
- Fold/Unfold capabilities
- Windows® XP and Windows® 2000 compatible

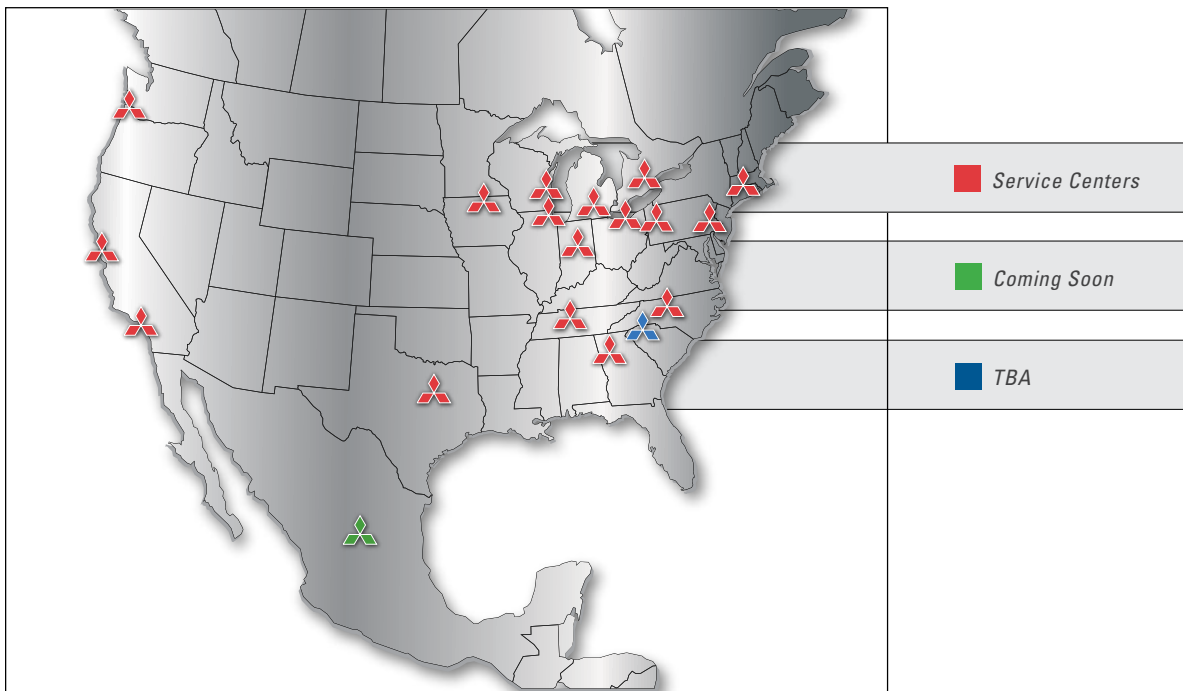


### THE INDUSTRY'S MOST RESPONSIVE SERVICE AND SUPPORT

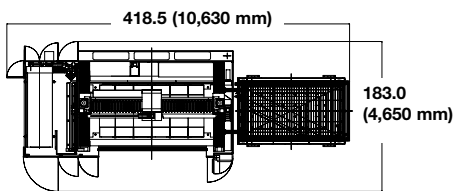
With more than 100 employees, our regionalized Service Network is the most advanced and responsive team in the industry. We're here for you with phone support, operation training, on-site service, parts inventory, and a robust, interactive website. With 20 locations throughout North America and more scheduled to open, we can respond promptly to your service needs. For the best on-site customer service capabilities, we have more than 25 vans in the field – three times more than any other company in the industry.



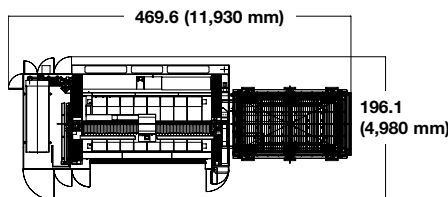
From installation and on-site training, to support and service throughout the life of your system, our national service network is just a phone call away. No other company has a greater depth of experience and resources than Mitsubishi and MC Machinery Systems. Access 24/7 support with our interactive website, a detailed interactive parts catalog, printable machine manuals, and software.



3015LVP<sup>plusII</sup> - 40CF-R Top View



3718LVP<sup>plusII</sup> - 40CF-R Top View



### Processing Machine Specifications

| Model Name                                 |                            | 3015 LVP <sup>plusII</sup>   | 3718 LVP <sup>plusII</sup>   |                  |
|--|----------------------------|--|--|------------------|
| Machine structure                          |                            | Precision Rack & Pinion, Direct Drive                              |  |                  |
| Travel drive method                        |                            | X-Y-Z simultaneous 3 axes (Z axis height control is also possible) |  |                  |
| Specifications and Performance             | Max. workpiece size (inch) | 120.1 x 60.0 (3,050 x 1,525 mm)                                    | 144.1 x 72.0 (3,660 x 1,830 mm)                                      |                  |
|  | Table pass height          | 33.5 (850 mm)  |  |                  |
|  | Processing access          | Automatic Up/Down Door   |  |                  |
|  | Pallet changer             | Provided   |  |                  |
|  | Stroke                     | X-axis stroke (inch)   | 122 (3,100 mm)   | 145.7 (3,700 mm) |
|  |                            | Y-axis stroke (inch)   | 61 (1,550 mm)  | 72.8 (1,850 mm)  |
|  |                            | Z-axis stroke (inch)   | 3.54 (90 mm)   |                  |
|  | Speed                      | Rapid travel speed (X, Y) (inch / min)                             | 3345 (85 m/min) (single axis), 4730 (120 m/min) (simultaneous)       |                  |
|  |                            | Max. processing feedrate (inch / min)                              | 1180 (30 m/min)  |                  |
|  | Precision                  | Positioning precision (inch)                                       | 0.0019/20 (0.05/ 500mm) (X, Y axis), 0.0039/4 (0.01/ 100mm) (Z axis) |                  |
| Repeatability (inch)                       |                            | (+/-)0.00039/ (+/-) -0.01 mm (X, Y axis)                           |  |                  |
| Drive motor type                           |                            | Intelligent AC Servo   |  |                  |
| Max. workpiece weight (lb)                 |                            | 2050 (930 kg)  | 2200 (1000 kg)   |                  |
| Machine unit dimensions (W x H x D) (inch) |                            | 418.5 x 90.6 x 183.0 (10,630 x 2,300 x 4,650 mm)                   | 469.6 x 90.6 x 196.1 (11,930 x 2,300 x 4,980 mm)                     |                  |
| Machine system weight (lb)                 |                            | 26325 (11,940 kg)  | 28910 (13,115 kg)  |                  |
| Installation dimensions (W x D) (inch)     |                            | 473.4 x 227.7 (12,025 x 5,785 mm)                                  | 549.6 x 243.6 (13,960 x 6,190 mm)                                    |                  |
| Floor space requirement (sq ft)            |                            | 750 (69.7 m <sup>2</sup> )   | 930 (86.4 m <sup>2</sup> )   |                  |
| Machine power requirements                 |                            | 71 KVA<br>3Ø 208 VAC ±5% 60Hz<br>202 Full Load Amps                | 81 KVA<br>3Ø 208 VAC ±5% 60Hz<br>231 Full Load Amps                  |                  |

### Control System Specifications

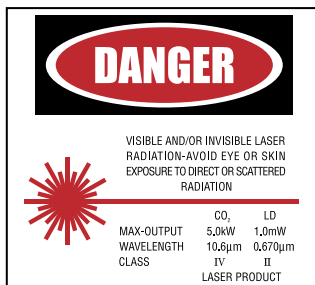
| Type                        | Self-contained                           |
|-----------------------------|--|
| CPU                         | 64-bit                                   |
| Display screen              | 10.4" TFT color LCD Touch screen         |
| Hard disk                   | 10.0GB                                   |
| Generator output control    | Output Power, Frequency, Duty            |
| Generator operation control | Beam ON/OFF, laser gas change, etc.      |
| Drive system                | X, Y, Z simultaneous control             |
| Position detection system   | Encoder                                  |
| Min. command input          | .001mm / .0001"                          |
| Program input system        | 3.5" floppy, Computer Link, Ethernet LAN |

### Pallet Changer Specifications

| Type                       | P5                                       |  |
|----------------------------|--|--|
| Drive mechanism            | Chain                                    |  |
| Pallet change time (sec)   | Approx. 25                               | Approx. 33                               |
| Work clamps                | Automatic (Optional)                     |  |
| Pallet capacity (lb)       | 2050/pallet (930 kg)                     | 2200/pallet (1000 kg)                    |
| Pallet changer weight (lb) | 4500 (2,040 kg)                          | 6000 (2,720 kg)                          |
| Applicable machine size    | 3015<br>(5' x 10')<br>(1,525 x 3,050 mm) | 3718<br>(6' x 12')<br>(1,830 x 3,660 mm) |

### CO<sub>2</sub> Laser Specifications

| Model   |                      | 40CF-R   |  |
|---|----------------------|--|--|
| Excitation method   |                      | 3-axis cross flow, silent discharge                  |  |
| Performance   | Laser power          | Maximum output power (W)                             | 4000   |
|   |                      | Rated output power (W)                               | 4000   |
|   |                      | Control method                                       | Power feedback   |
|   |                      | Power stability                                      | Less than ±1% of rated power                               |
|   | Beam characteristics | Beam mode  | Low-order (main component TEM <sub>01</sub> <sup>*</sup> ) |
| Beam outer diameter (inch)                                  |                      | 1.02 (26 mm)   |  |
| Beam divergence (mrad)                                      |                      | Approx. 3.5 or less (total angle)                    |  |
| Laser gas composition                                       |                      | CO <sub>2</sub> , CO, N <sub>2</sub> , He 8:4:60:28  |  |
| Laser gas consumption rate (liter/Hr)                       |                      | 3  |  |
| Gas sealing time (during rated continuous oscillation) (Hr) |                      | 24 (during rated continuous oscillation)             |  |
| Wave length (µm)  |                      | 10.6   |  |
| Frequency setting range (Hz)                                |                      | 10~3000  |  |
| Duty range (%)  |                      | 0~100 adjustable                                     |  |
| Output power adjustable range (%)                           |                      | 0~100 of rating                                      |  |
| Resonator unit dimensions (W x H x D)                       |                      | 98.4 x 71.3 x 31.5 (2,500 x 1,800 x 800 mm)          |  |
| Resonator unit weight (lb)                                  |                      | 4850 (2,200 kg)                                      |  |
| Chiller power requirements                                  |                      | 42 KVA<br>3Ø 208 VAC ±10% 60Hz<br>118 Full Load Amps |  |



This product complies with CFR 1040. 10.  
Data provided in this brochure is for reference only.