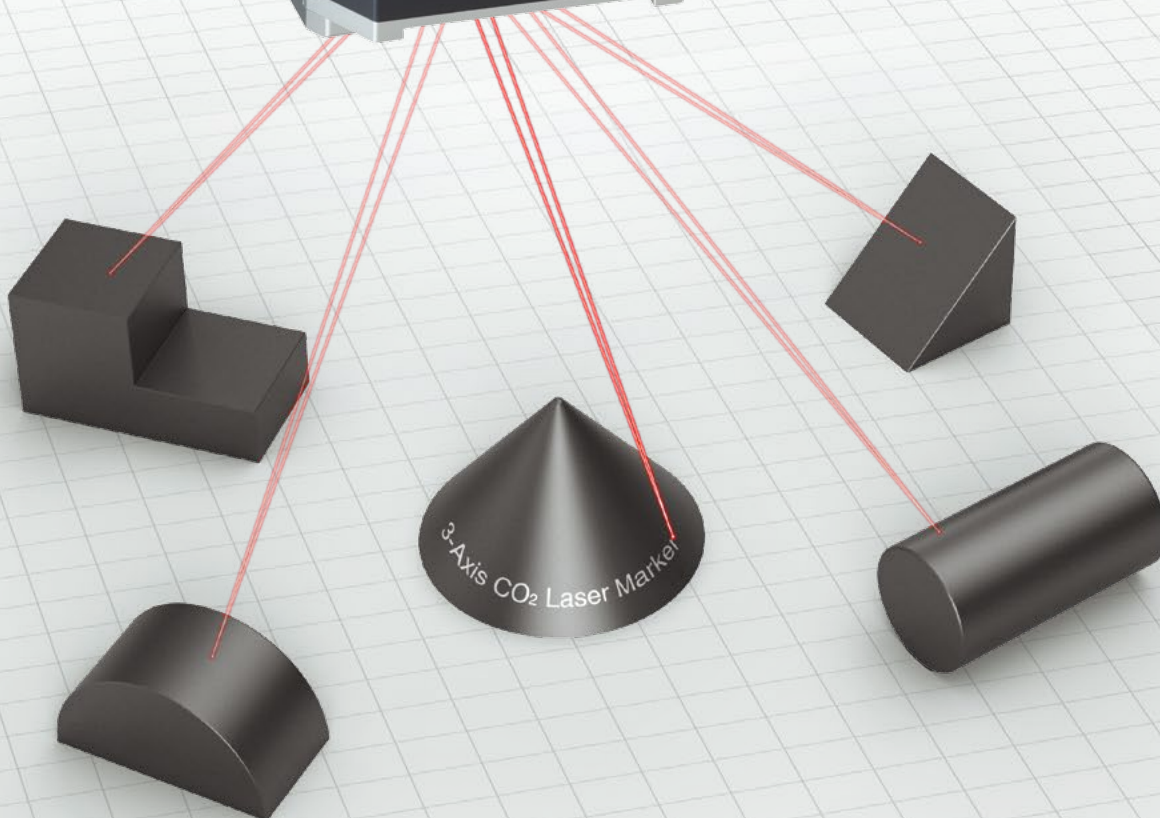




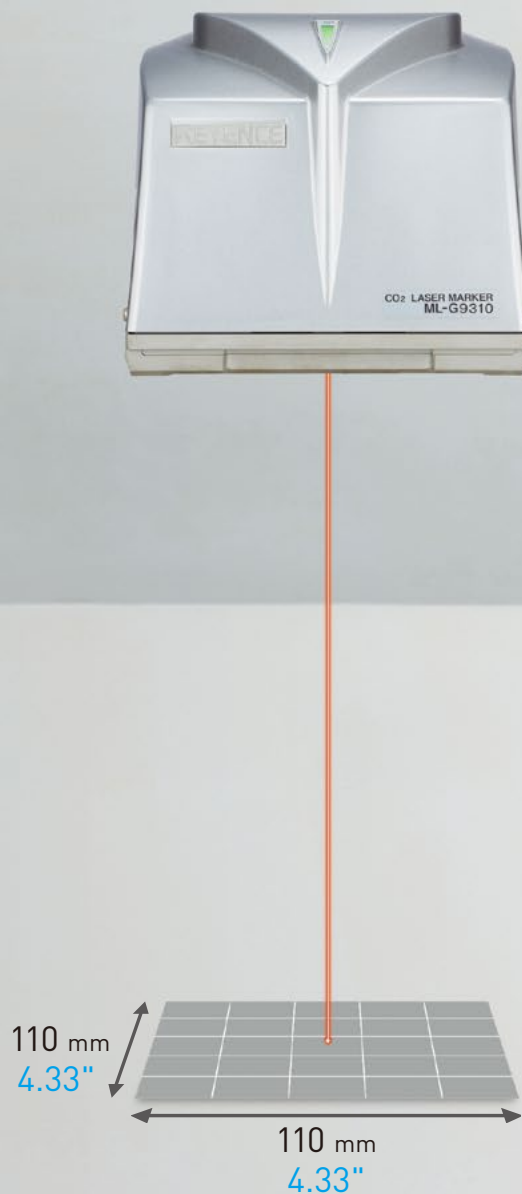
High Efficiency CO₂ Marking with Superior Flexibility

3-Axis Control CO₂ Laser Marker



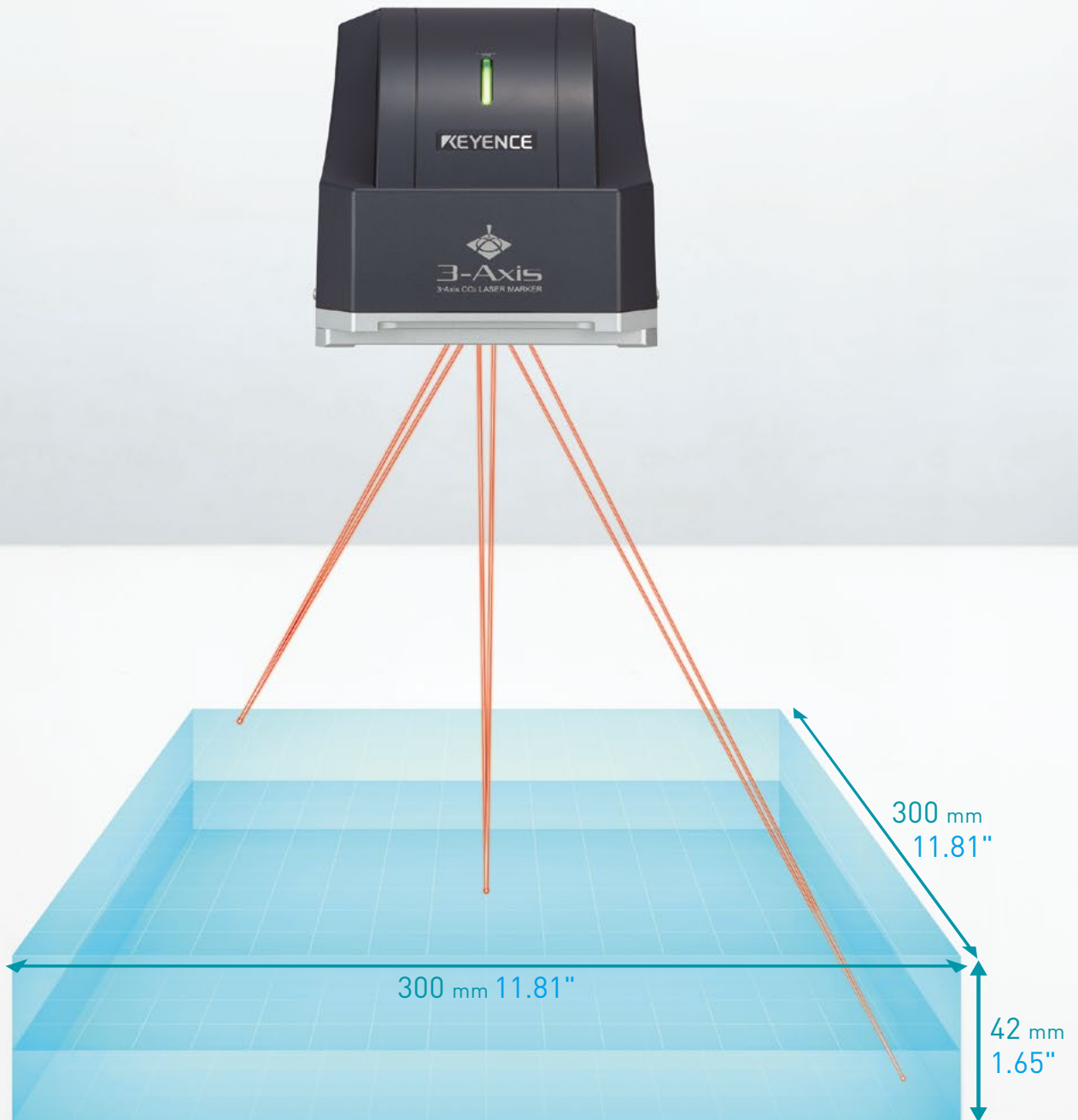
Conventional Laser Marker

With conventional models, marking is limited to a fixed area.

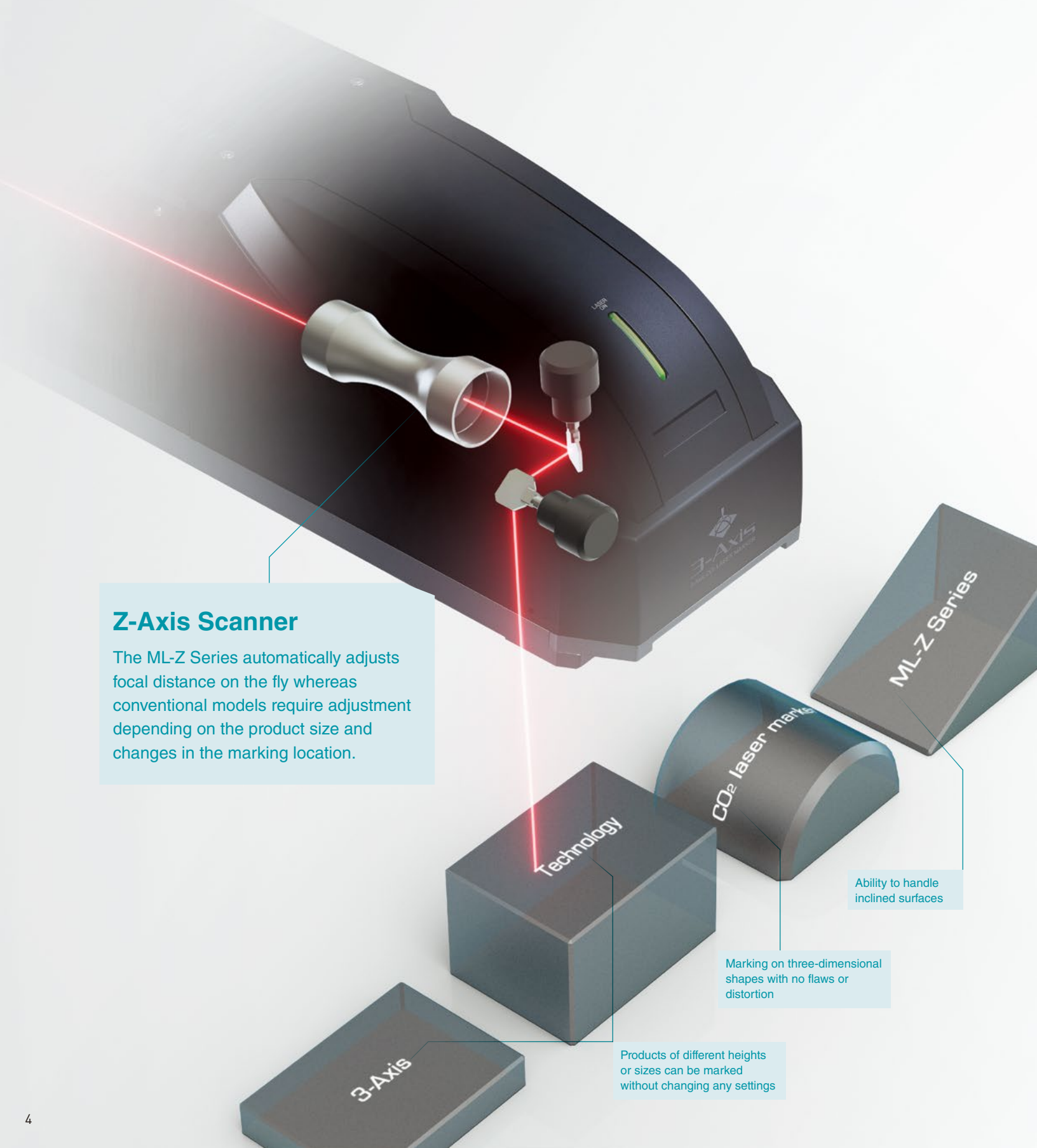


3-Axis Control ML-Z Series

With the ML-Z Series,
high quality marking is possible
over a wider area using 3-Axis control.



3-Axis Control Designed with Superior Flexibility for Installation and Product Changeover



Z-Axis Scanner

The ML-Z Series automatically adjusts focal distance on the fly whereas conventional models require adjustment depending on the product size and changes in the marking location.

Ability to handle inclined surfaces

Marking on three-dimensional shapes with no flaws or distortion

Products of different heights or sizes can be marked without changing any settings

3-Axis

ML-Z Series

CO2 laser marking

Technology

1

Significantly Reduce Changeover Time

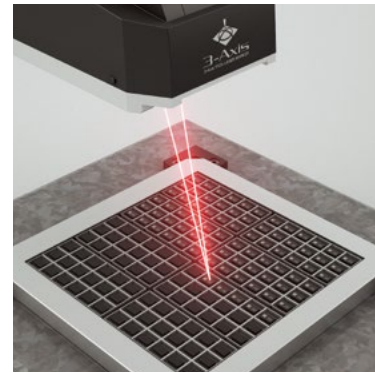
With 3-Axis control, the focal distance to the product is adjusted by the laser marker. This reduces the time and effort required for fine-tuning the focal distance compared to conventional models.



2

Simplify Equipment and Improve Production Efficiency

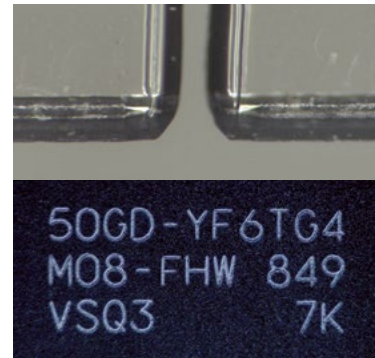
High-accuracy marking and processing is possible over a wide 300 × 300 mm 11.81" × 11.81" area. This drastically improves production efficiency when working with a large number of products at once.



3

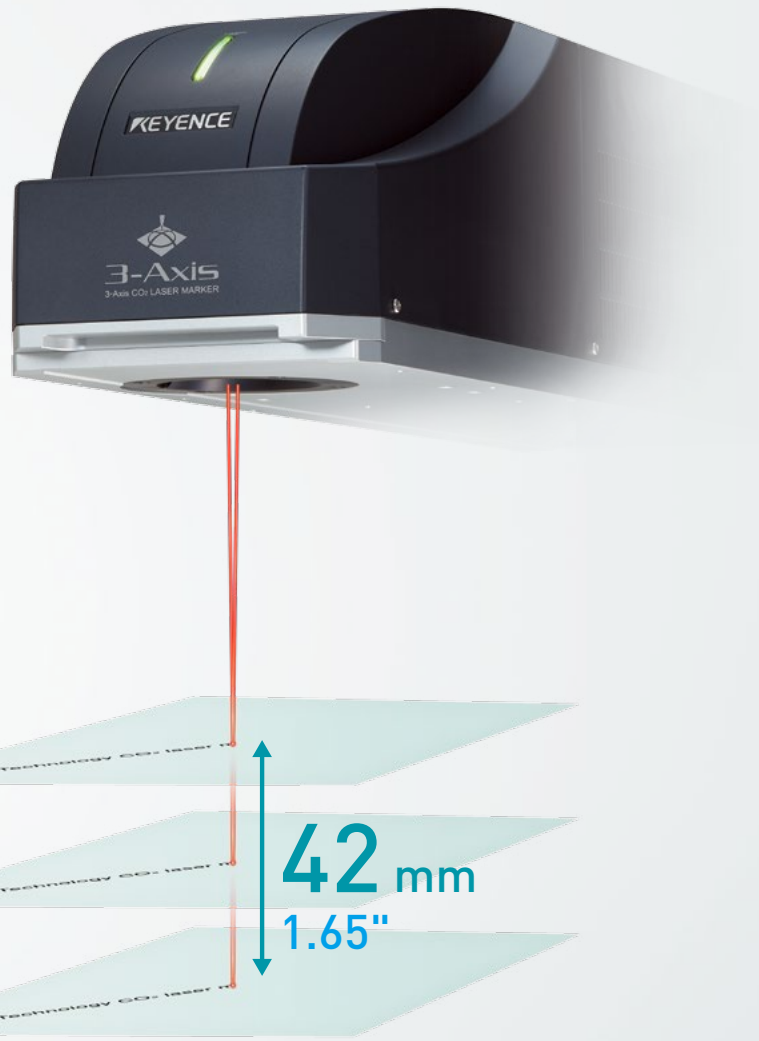
Unparalleled Quality and Precision

The ML-Z Series lineup includes short-wavelength and thin beam models for unparalleled marking and processing quality. These models not only eliminate unnecessary product damage but also contribute to more refined marking and processing as well as reducing total takt time.



3-Axis CO₂ Laser Marker
ML-Z Series

3-Axis control reduces changeover time by automatically adjusting the focal point internally



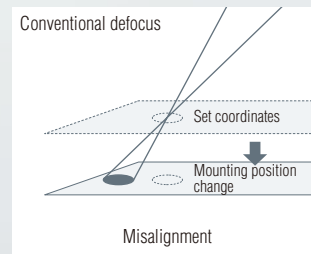
3D Marking

The ML-Z Series is equipped with 3-Axis control, a function for controlling the marking laser three-dimensionally to match the target shape. With the ability to mark on stepped, inclined, cylindrical, and conical targets, character distortion and flaws are kept to a minimum.

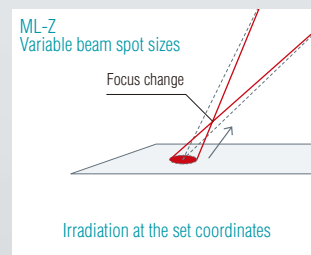
	Conventional	ML-Z
Step	Faded	Clear
Inclined surface	Faded, stretched	Clear
Cylinder	Distorted, stretched	Clear
Circular cone	Distorted	Clear

Variable Beam Spot and Defocusing

Unlike conventional beam spot defocusing techniques, the ML-Z Series can mark thin, thick, shallow or deep characters without changing coordinates or character sizes. This means that the ML-Z can mark uniform defocused characters at any point within the marking area.



Because the mounting position is physically shifted, the irradiation position and character size are also misaligned in relation to their settings.



Only the spot size is changed by adjusting the focal point. Laser irradiation at the desired coordinates with the desired spot size is possible.

Device Improvements

Inline Focal Distance Adjustment

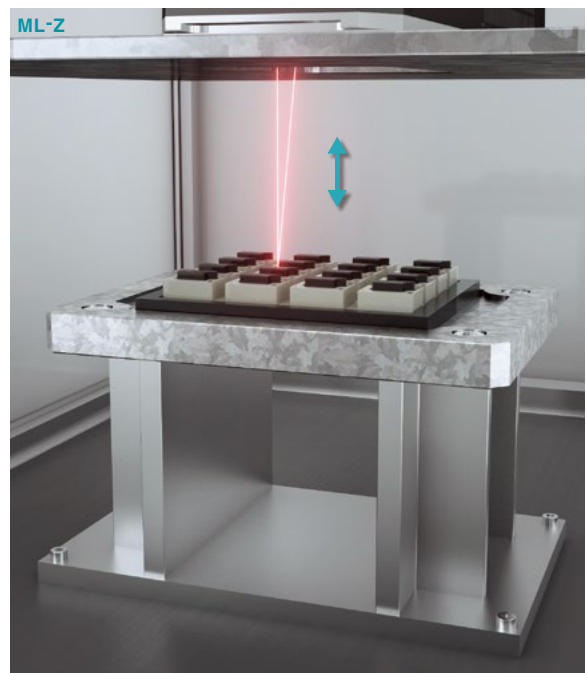
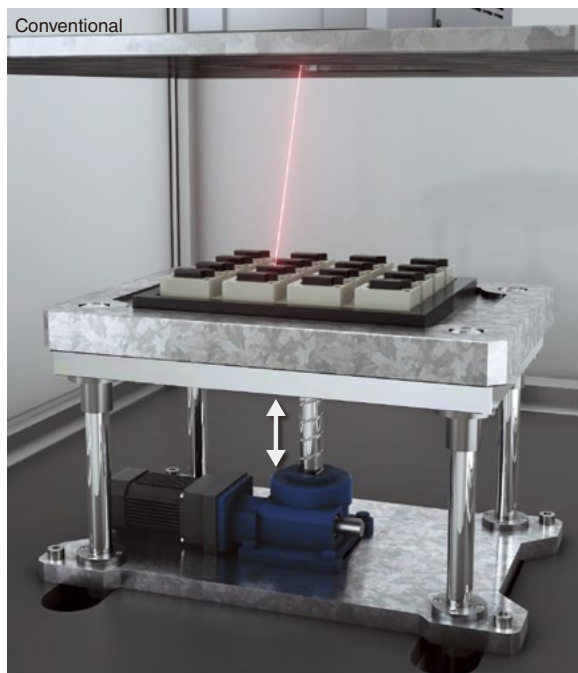
The ability to automatically adjust the focal distance allows for greater flexibility with different product sizes, shapes and inconsistencies. This eliminates the hassle of fine adjustments that require physically moving the laser head, as is required with conventional models.



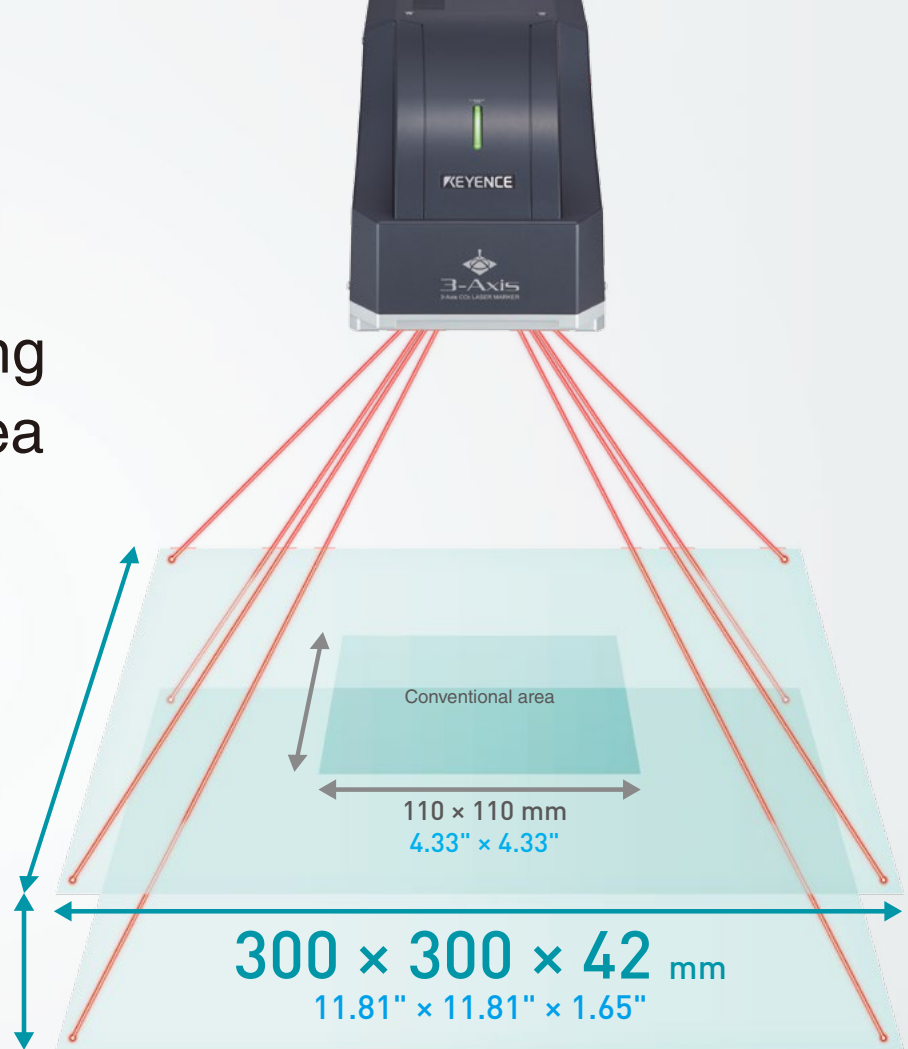
Device Improvements

Offline Focal Distance Adjustment

Automatic adjustment of the focal distance eliminates the need for fine adjustment as required with conventional models. With the ML-Z Series, simply switch the focal point setting in the software.



Efficient marking over a wide area

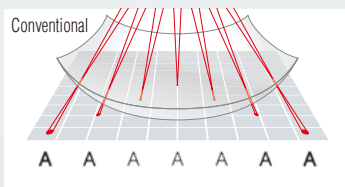


High-Accuracy Wide Area

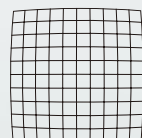
The 300 × 300 × 42 mm 11.81" × 11.81" × 1.65" wide area reduces cost by simplifying the indexing process and improves productivity by reducing indexing time. Additionally, 3-Axis control ensures the focal point reaches the entire area for high-accuracy marking and processing.

Matrix Marking Function

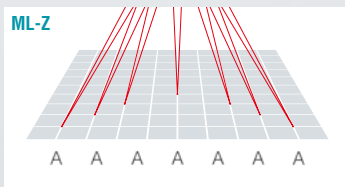
Up to 65,025 items can be arranged in a single marking layout. This allows optimum marking and processing of multiple parts in a single tray. The ML-Z Series is also capable of accommodating misaligned targets using tilt correction.



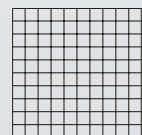
Characters become thicker and their positions are offset the closer they are to the edge of the area.



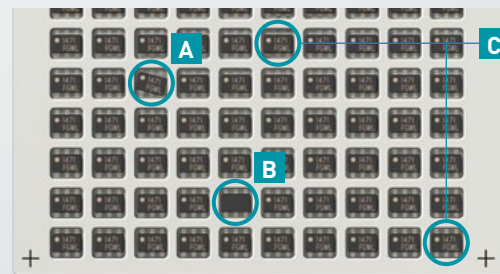
Area is distorted by the lens characteristics



Uniform line width and high quality are maintained in the entire area.



Area is free of deformation/distortion



A Individual angle correction



B Individual marking OFF



C No misalignment or character blurring
Center of area



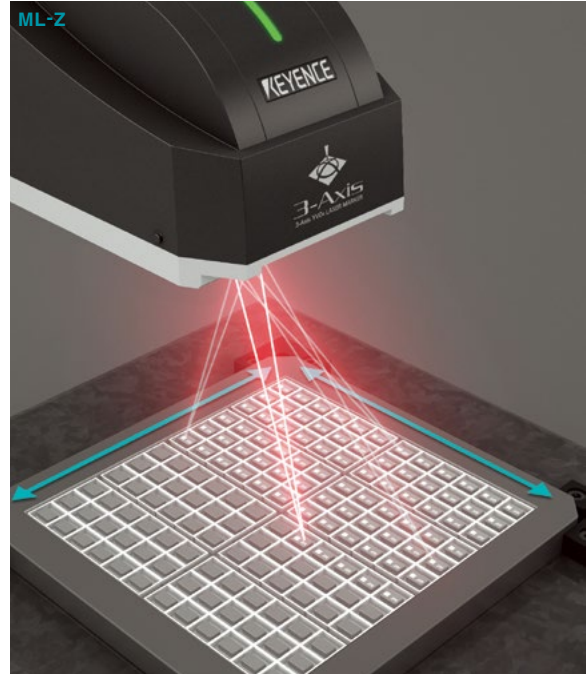
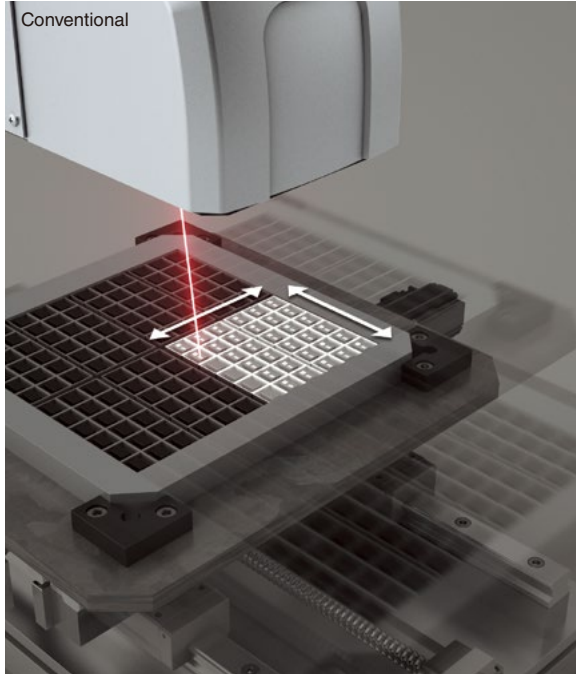
Edge of area



Device
Improvements

Reduce XY Motion with Larger Marking Area

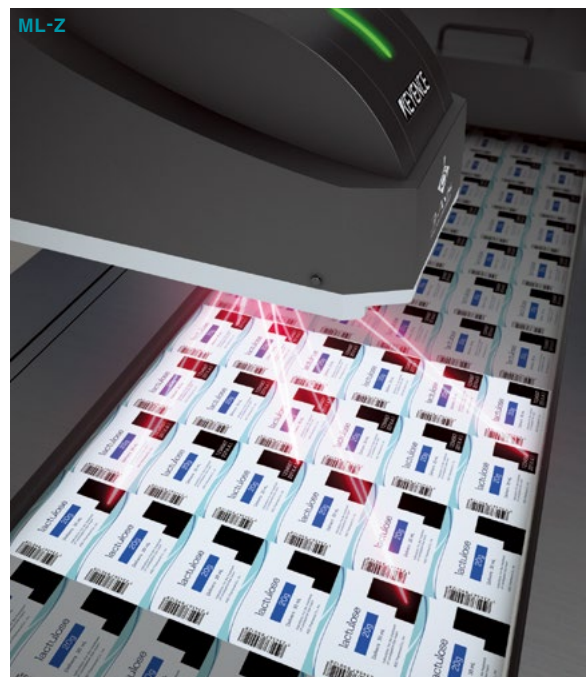
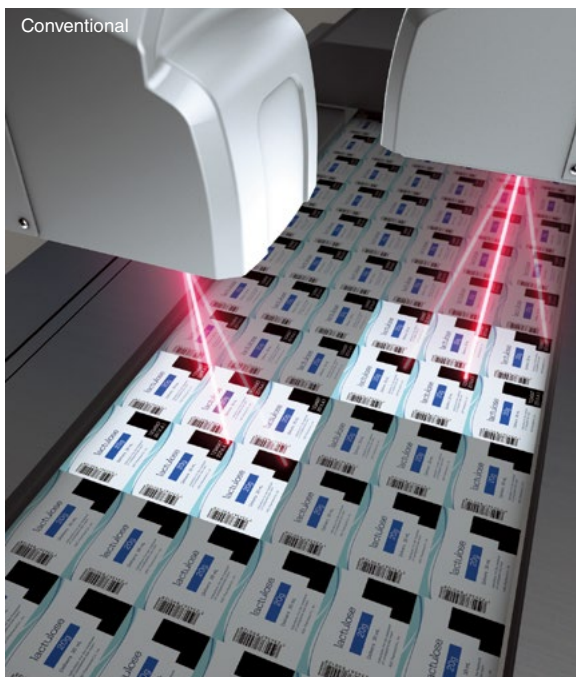
With conventional models, products that did not fit within the marking area had to be moved using an XY stage. With the ML-Z, marking can be performed uniformly over a wide area, so stage mechanisms and control programs can be reduced or eliminated all together.

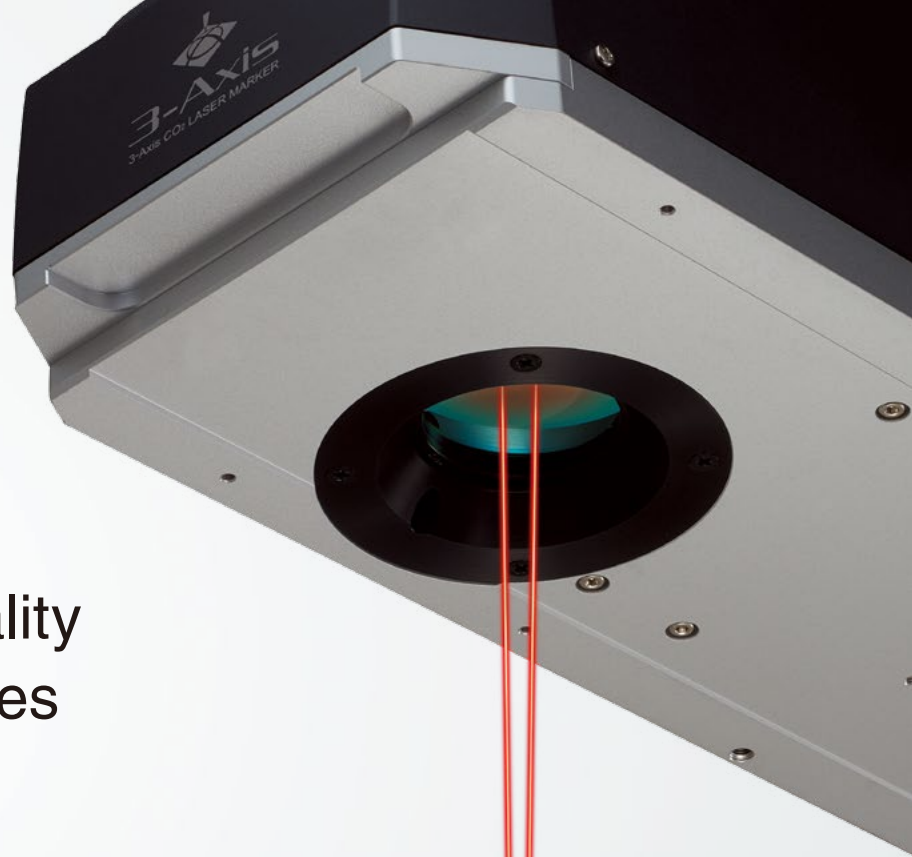


Device
Improvements

Batch Marking of Multiple Targets

With a larger marking area than conventional models, the ML-Z Series is able to mark multiple products at once over a larger area or a higher quantity of products. This allows for improved production efficiency.

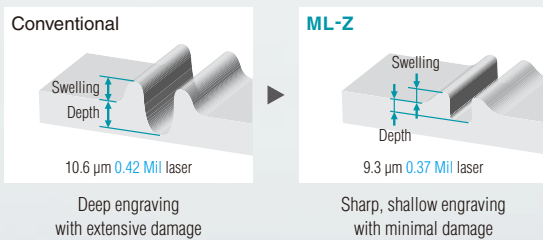




Extensive lineup provides higher quality and shorter takt times

9.3 μm 0.37 Mil Short Wavelength Model

The wavelength of the ML-Z Series' laser is available at 10.6 μm 0.42 Mil as well as a shortened 9.3 μm 0.37 Mil to better suit the heat absorption characteristics of various resins. With a higher absorption rate in resin, this shorter wavelength allows for more precise marking with shallower engraving and less surface swelling.



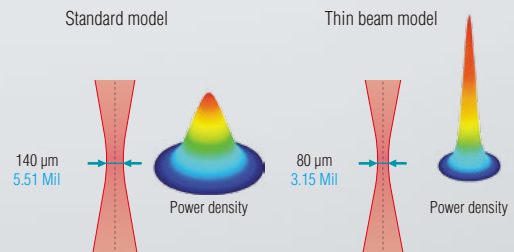
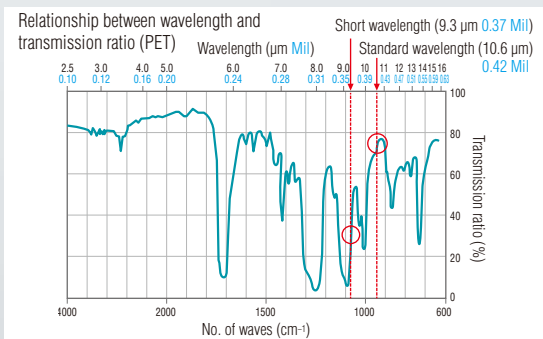
Thin Beam Model

Compared with standard models, the laser spot diameter is smaller, enabling even finer marking. The smaller spot diameter allows for greater power density, which in turn allows for more efficient processing such as cutting and drilling.

Comparison of Laser Spot Diameter and Power Density

	Standard model	Thin beam model
Spot diameter	140 μm 5.51 Mil	80 μm 3.15 Mil
Power density	2.0 kW/mm ²	6.0 kW/mm ²

* These are representative values.

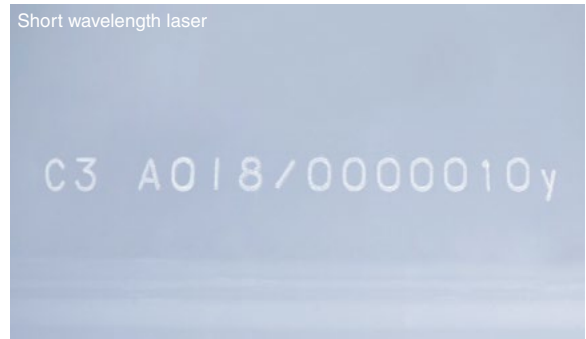


Thin laser beam models provide greater power density with a narrower spot diameter.

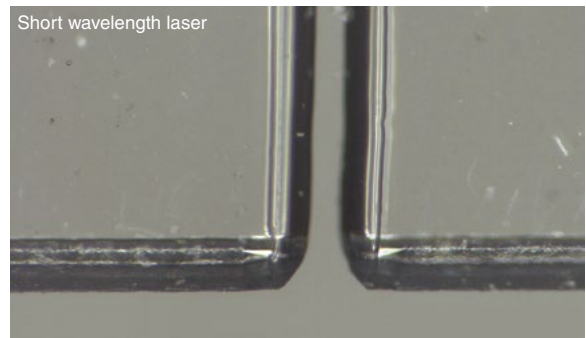
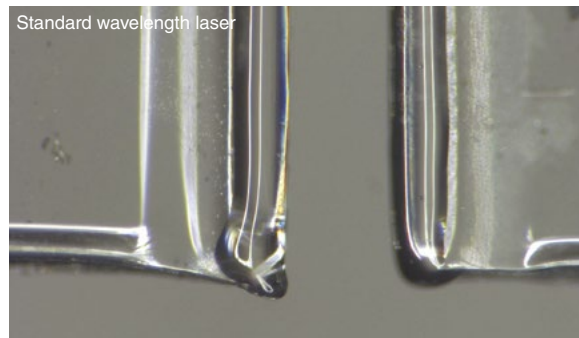
Sharper Results Through Reduced Product Damage

Marking on PET bottle

Short Wavelength Model



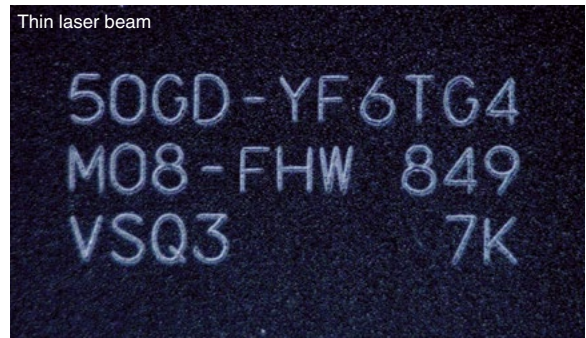
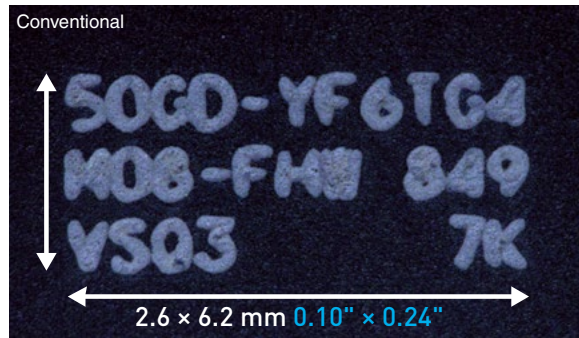
Cross section of cut film



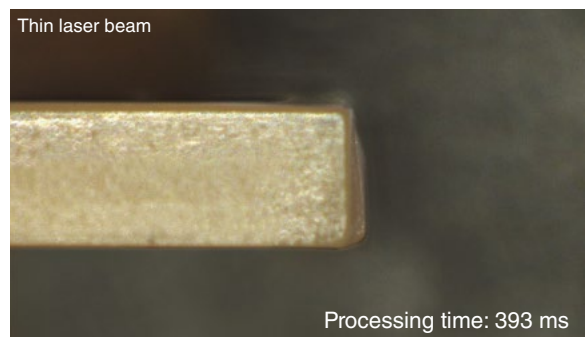
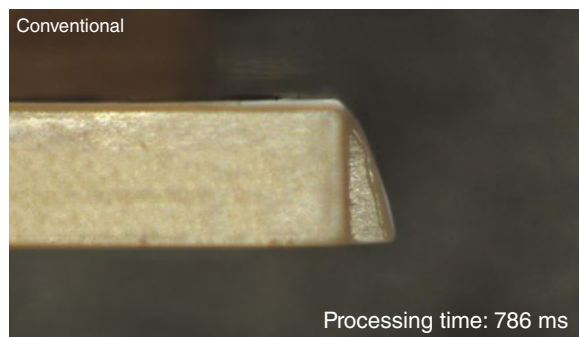
Improve Efficiency and Clarity Through Finer Marking

Marking on IC chips

Thin Beam Model



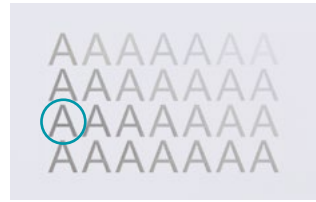
Cross section of cut gate



Marking Builder 3 Software

Sample Marking Function

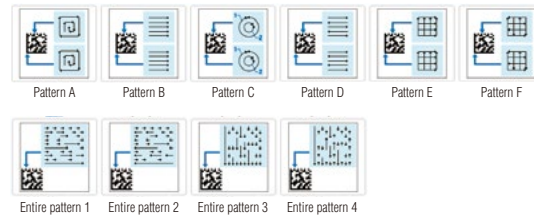
The optimal marking settings can easily be found by varying multiple parameters at once. By simply selecting the optimum sample from the provided marking results, anyone can quickly and easily obtain the best marking settings with minimal effort or knowledge of the system.



The listed marking results makes it easy to see which settings are best.

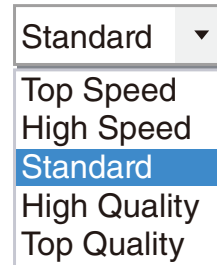
2D Code Pattern Selection

Marking patterns can affect the way a barcode is illuminated and how well it is identified by the code reader. The Marking Builder 3 software allows for ultimate flexibility in pattern selection with more than 10 patterns to choose from and many more combinations possible.



Quality Adjustment Level

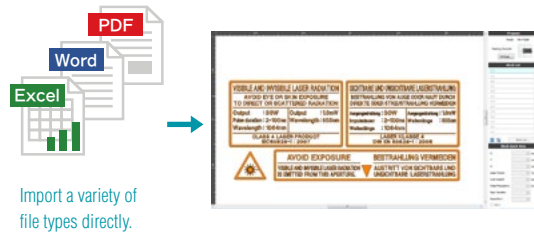
The software automatically calculates the adjustments needed to either emphasize higher speed or higher quality by simply selecting the quality level desired.



Simply select one of the five available adjustment levels.

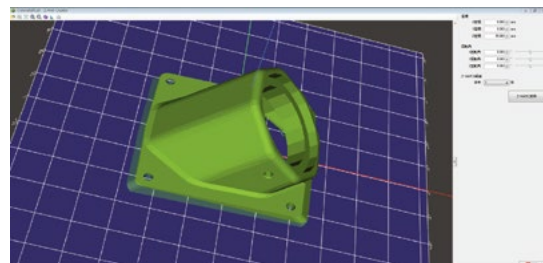
Printer Driver Function

A variety of file types—such as Excel, Word, PDF, and bitmap—can be imported directly into the laser marker software. With the printer driver function, the laser marker is able to print similarly to your standard office printer.



Z-MAP Creator

Using 3D CAD data (STL format), the actual profile of the target can be imported into Marking Builder 3 and used as the base of the layout. This enables users to configure settings and perform marking on targets that have complicated profiles which cannot be expressed with basic shapes such as cylinders and step height changes.



Global Models

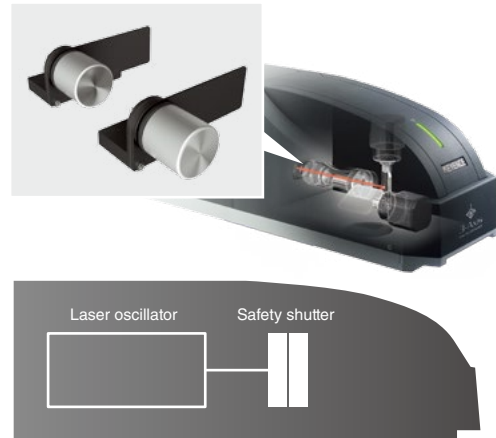
ISO 13849-1 Compliant

Built-in safety shutters

Two safety shutters that comply with the ISO 13849-1 international standard are incorporated in the marking unit. These shutters are used to shut off the laser light directly.

Significantly reduce downtime

The emergency stop input for conventional models cuts power to the laser oscillator power supply, so restarting the system can take a long time. The safety shutter, however, prevents the need to cut power completely, allowing for improved efficiency by reducing the recovery time to no more than 0.5 seconds.



Easy Connection to Peripheral Equipment

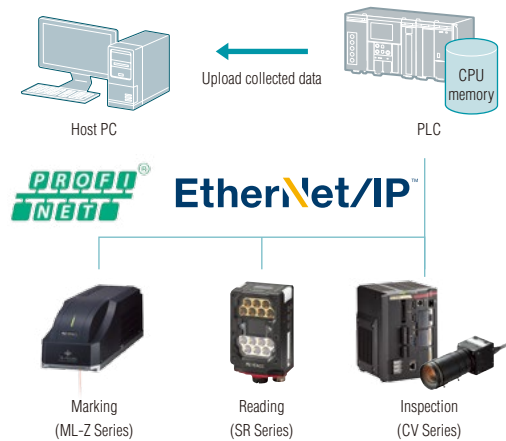
PROFINET, EtherNet/IP™

Peripheral equipment connectivity and networking capabilities have been improved with the addition of PROFINET and EtherNet/IP™ communication. This also makes it possible to connect to devices remotely in order to check on operations and save communication history. In addition, connection between individual devices is possible with just a single LAN cable via Ethernet. Visualization of product information and individual equipment statuses makes creation of a traceability system easy.

Total support from KEYENCE

KEYENCE also offers peripheral marking process equipment. With equipment provided by the same manufacturer, cooperation between devices increases and installation and setup effort is reduced. Responding to unforeseen troubles is also quicker.

Traceability system construction example

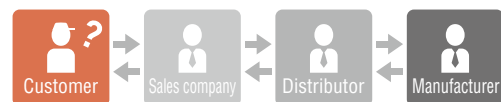


Global Support System

Follow-up assistance from both national and local staff

KEYENCE provides generous support from both national technical staff and local technical staff even for customers with production bases overseas. Because KEYENCE is a direct sales manufacturer, customers are able to receive responses in a very short time. When going through a distributor, troubleshooting takes time and often is only available in the local tongue.

Ordinary manufacturers



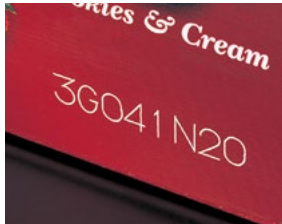
Onsite line operations stall while waiting for support

KEYENCE



Applications

Food/Pharmaceutical Industry



Cartons



Bottles



PTP sheets



Heat seals

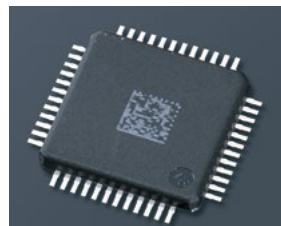
Electronic Devices Industry



Glass wafers



Electronic PCBs



IC chips



Ceramics

Automotive Industry



Seat rails



Weatherstripping



Nameplates



Air filters

Processing/Decorative Applications



Film cutting and hole cutouts



Gate cutting



Sheathing cutting



Design marking

<p>Character size (typical examples)</p> <p>0123456789 ABCDEFGHIJKLMNPQRSTUWXYZ 0123456789 ABCDEFGHIJKL abcde fghij k l</p>	<p>Logo mark</p>  <p>Barcode</p> 	<p>2D code</p>  <p>Data Matrix QR</p>	<p>GS1 DataBar</p> 	<p>BMP/JPEG data</p> 
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Specifications

		Standard model		Wide area type		Thin laser beam	
Model	Marking unit	ML-Z9610	ML-Z9610T	ML-Z9620	ML-Z9620T	ML-Z9650	ML-Z9650T
	Controller	ML-Z9600					
		MC-P1					
Marking style		XYZ 3-Axis simultaneous scanning method					
		CO ₂ Laser, Class 4 Laser Product (IEC/EN60825-1, JIS C6802, FDA (CDRH) Part 1040.10*)					
Marking laser	Wavelength	10.6 μm 0.42 Mil	9.3 μm 0.37 Mil	10.6 μm 0.42 Mil	9.3 μm 0.37 Mil	10.6 μm 0.42 Mil	9.3 μm 0.37 Mil
	Output*2	30 W	20 W	30 W	20 W	30 W	20 W
Guide laser / working distance pointer		Semiconductor laser, Wavelength: 655 nm, Output: 1.0 mW Class 2 Laser (IEC/EN60825-1, JIS C6802, FDA (CDRH) Part 1040.10*)					
Marking area		120 × 120 × 42 mm 4.72" × 4.72" × 1.65"		300 × 300 × 42 mm 11.81" × 11.81" × 1.65"		50 × 50 × 4 mm 1.97" × 1.97" × 0.16"	
Standard working distance (±variation width)		189 mm 7.44" (±21 mm ±0.83")		300 mm 11.81" (±21 mm ±0.83")		92 mm 3.62" (±2 mm ±0.08")	
Marking resolution		2 μm 0.08 Mil		5 μm 0.20 Mil		1 μm 0.04 Mil	
Scan speed		12000 mm 39.37/s max.		6000 mm 19.69/s max.		6000 mm 19.69/s max.	
Character type	Font	KEYENCE original font (numerical value, alphabet, katakana, hiragana and kanji) / user font / TrueType font / OpenType font*3					
	Barcode	CODE39/CODE93/CODE128/ITF/2of5/NW7(Codabar)/JAN/EAN/UPC-A/UPC-E					
	2D code	QR code / micro QR code / DataMatrix (ECC200 / GS1 DataMatrix)					
	GS1 DataBar	GS1 DataBar (Truncated)/GS1 DataBar Stacked/GS1 DataBar Limited/GS1 DataBar (Truncated) CC-A/GS1 DataBar Stacked CC-A/GS1 DataBar Limited CC-A					
	Logo image	Custom font, logo (DXF) data BMP/JPEG/PNG/TIF					
Marking conditions	Marking style	Stationary marking / movement marking (constant speed / encoder)					
	Character size (height × width)	0.2 to 120 mm 0.008" to 4.72"		0.3 to 300 mm 0.012" to 11.81"		0.1 to 50 mm 0.004" to 1.97"	
	Number of registered programs	2000 settings max.					
	Number of blocks	256 blocks					
Input / Output		Terminal block input and output / MIL connector input and output / European input and output					
Interface		RS-232C/USB2.0/Ethernet (100BASE-TX/10BASE-T)*4					
Marking unit installation direction		All directions					
Marking unit cable length		5 m 16.40'					
Cooling method		Forced air cooling					
Rated voltage and power consumption		Single-phase 100 to 240 VAC ±10%, 50/60 Hz, 1000 VA max.					
Overvoltage category		II					
Pollution degree		2					
Environmental resistance	Ambient temperature for storage	-10 to +60°C 14 to 140°F, No freezing					
	Ambient temperature for usage	0 to 40°C 32 to 104°F					
	Ambient humidity for storage						
	Ambient humidity for usage	30 to 85%, No condensation					
Weight	Controller			10.5 kg			
	Marking unit	16.3 kg		16.4 kg		16.3 kg	
	Console			2.0 kg			
Compatible regulations		EU Directives/EN Standards, CSA Standards and UL Standards, North American Regulations					

*1 The laser classification for FDA (CDRH) is implemented based on IEC60825-1 in accordance with the requirements of Laser Notice No.50.

*2 Laser tube monolithic output

*3 The only TrueType and OpenType fonts supported are those fonts whose "Font embeddability" property is set to "Installable" or "Editable". This property can be viewed from the Properties dialog box of the font shown on the [Fonts] screen in [Control Panel].

*4 The USB port is designed for use with USB memory sticks, USB mouses, barcode readers (A connector), and Marking Builder 3 (ActiveX) (B connector). The Ethernet port supports communication with Marking Builder 3 (ActiveX), TCP/IP communication, PROFIBUS connection, and EtherNet/IP™ connection.

PC software specifications (optional)

Model	Description
MB3-H2D4-DVD	Marking Builder 3 Version 4*1 2D setting and editing software (focal distance, inclination correction, variable spot, distance pointer adjustment)
MB3-H3D1	3D add-in software for Marking Builder 3 (marking on plane, cylinder, cone, or sphere; Z-MAP marking)

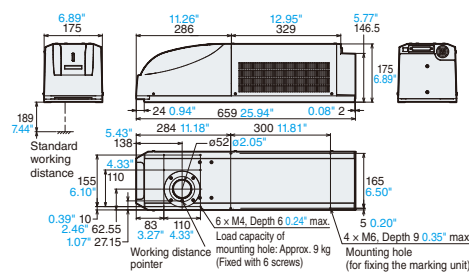
*1 Marking Builder 3 Version 2 and Version 3, and Marking Builder 2 Version 7 are also available.

• Supported operating systems: Windows 10, 8.1, 8, 7 (SP1 or later). Supported languages: English, Japanese, Simplified Chinese, German, Korean, French, Spanish, Thai, Italian.

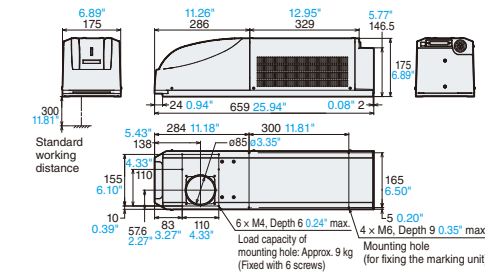
• Windows is either registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

Unit: mm inch

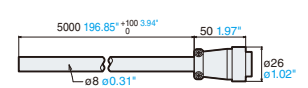
Marking unit ML-Z9610(T)



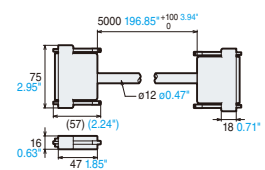
Marking unit ML-Z9620(T)



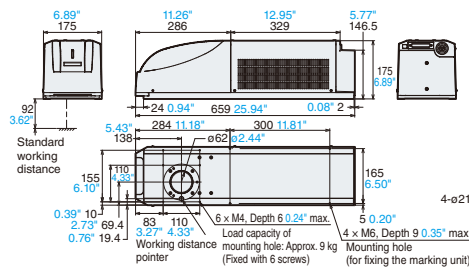
Laser power cable



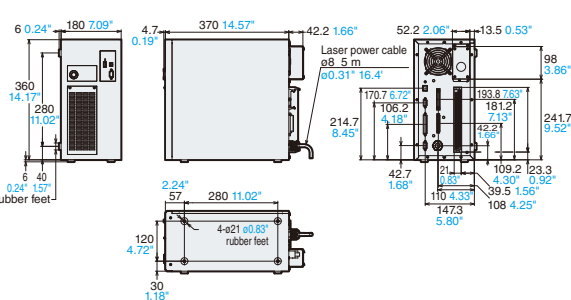
Control cable



Marking unit ML-Z9650(T)



Controller ML-Z9600



LASER MARKERS USED AROUND THE WORLD

The ML-Z Series supports various international standards and regulations. Through our world-wide direct-sales network, KEYENCE provides its customers with direct support no matter what country our customers are in.



LOCAL, IN-HOUSE TESTING LABS

Our customers have access to these test services provided by our dedicated sales engineers.

To request a test, visit the KEYENCE website or contact your nearest KEYENCE office.



SAFETY PRECAUTIONS

- Be sure to read the manual and fully understand its contents before using the product.
- Do not allow your eyes or skin to be exposed to a directly irradiated laser beam or a diffused reflection laser beam.

VISIBLE AND INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION Output : 80W Output : 1.0mW Wavelength : 10.6µm Wavelength : 655nm CLASS 4 LASER PRODUCT IEC60825-1 : 2014	SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRALUNG VERMEIDEN Ausgangsstrahlung : 80W Ausgangsstrahlung : 1.0mW Wellenlänge : 10.6µm Wellenlänge : 655nm LASER KLASSE 4 DIN EN 60825-1 : 2015	VISIBLE AND INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION Output : 80W Output : 1.0mW Wavelength : 9.3µm Wavelength : 655nm CLASS 4 LASER PRODUCT IEC60825-1 : 2014	SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRALUNG VERMEIDEN Ausgangsstrahlung : 80W Ausgangsstrahlung : 1.0mW Wellenlänge : 9.3µm Wellenlänge : 655nm LASER KLASSE 4 DIN EN 60825-1 : 2015
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SAFETY INFORMATION
 Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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