KEYENCE

NEW **Telecentric Laser Marker**

MD-T1000

Integrated Telecentric Lens

Uniform Quality Across Entire Area
Micron Level Marking Resolution

MD-T1000

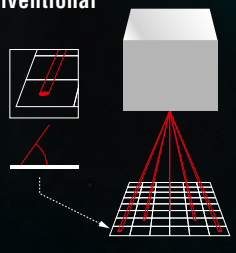
The form that has been Reached after Pursuing Micro-Level Detail and Accuracy.

T-Centric
T-Centric SHG LASER MARKER

TELECENTRIC LENS

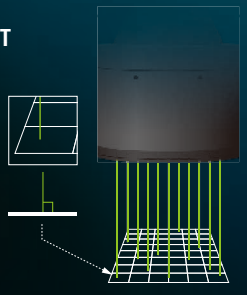
A lens that transmits light rays parallel to the optical axis, in other words, a lens that comes as close as possible to a viewing angle of 0 degrees. By equipping the laser marker with a telecentric lens, high-accuracy marking that transmits light perpendicularly to the marking surface has been achieved.

Conventional



Laser beam is emitted at an angle

MD-T



Emitted perpendicularly in all areas

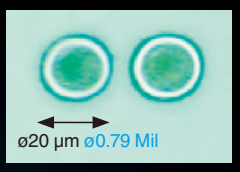
ULTRA-HIGH DEFINITION

Large Diameter Telecentric Lens

Achieves a uniform beam spot beam in all areas

ø20 µm (ø0.79 Mil) SHG Laser

Allows for marking of 2D codes with a cell size of 25 µm (0.98 Mil)



HIGH STABILITY

Ultra-High Rigidity Monocoque Body

Significantly improved accuracy and stability, eliminating distortion during installation

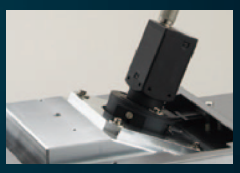
Thermopile Power Monitor

With no external devices necessary, easy power measurement and preventative maintenance are a standard feature

HIGH FUNCTIONALITY

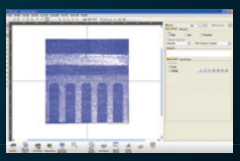
Built-in Concentric Camera

Equipped with a high mag camera, positioning can be performed with micron level accuracy.



Marking Builder 2 "Ver. 3"

Anyone can setup and edit marking with the Marking Builder 2 software package.



NEW

Telecentric Laser Marker

MD-T1000

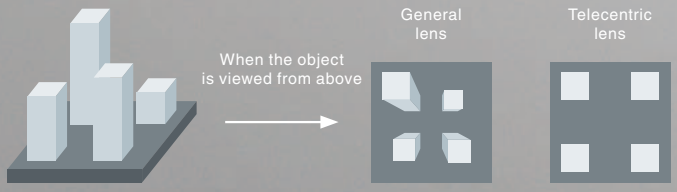
MD-T1000 Features **01**

TELECENTRIC LENS

Ultra-High Defintition

Improved "Clarity and Uniformity"

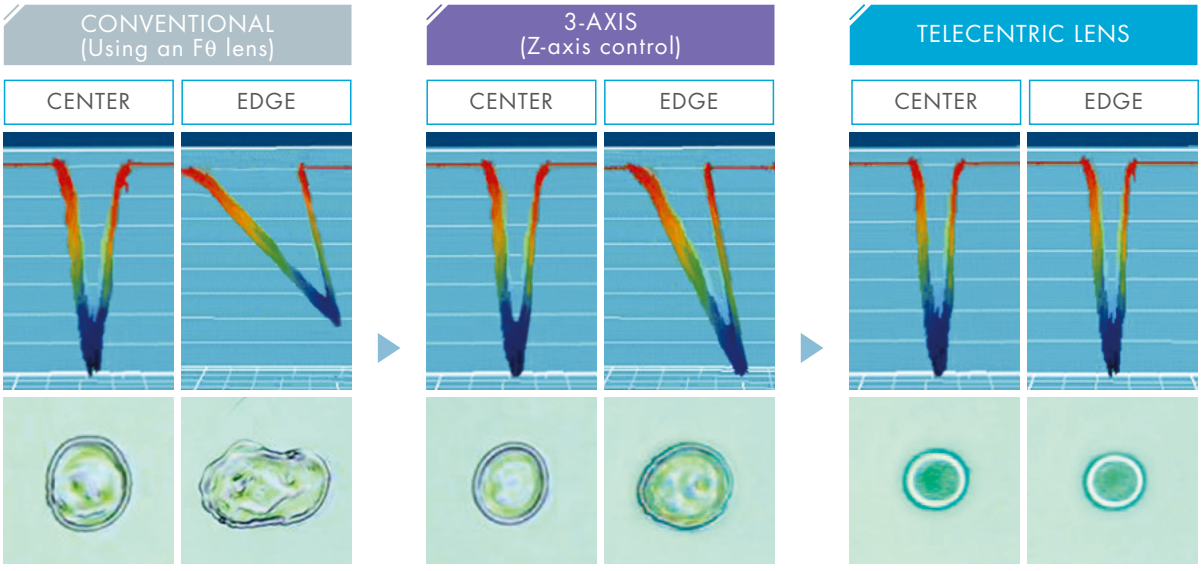
What is a telecentric lens?



Normally, the object becomes smaller as it is distanced from the lens and conversely forms a larger image as it comes closer to the lens. On the other hand, with a telecentric lens, the image appears the same regardless of the distance of the object from the lens. This characteristic makes it possible to mark the entire area of an image as if it were being viewed directly from above.

Ultra-high definition marking

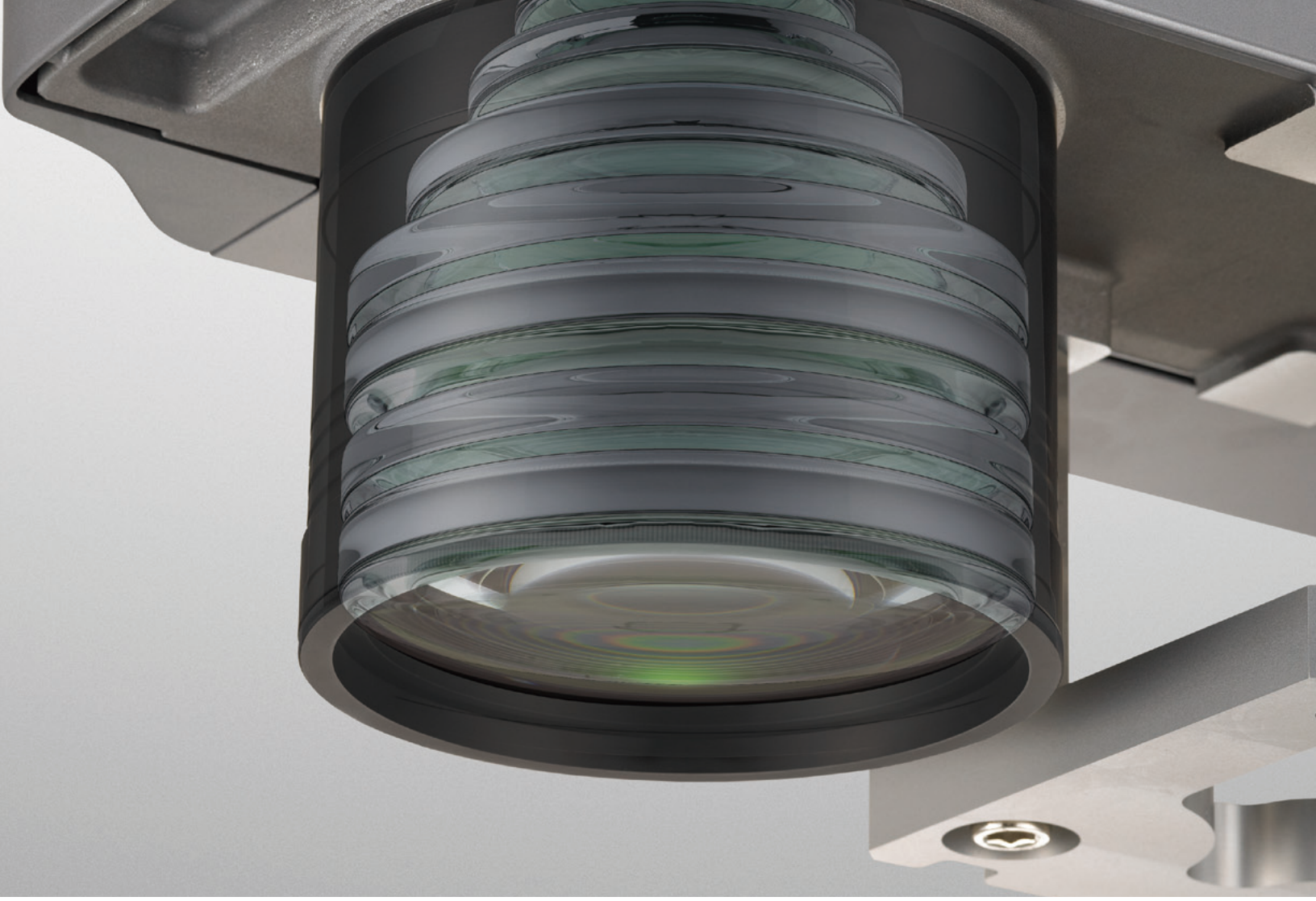
Because the entry angle is completely perpendicular to the marking area, the beam spot will not become elliptical in shape, even at area edges. Through this, uniform marking has been achieved throughout the entire area. This also aids in cutting or processing applications to ensure a uniform cut in the entire marking area.



At the edge, the focus blurs, changing the depth and the shape of the beam spot.

Even at the edge, it is in focus but its shape has become elliptical due to the entry angle.

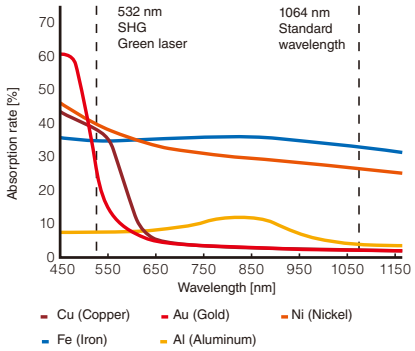
Even at the edge of the area, the beam spot does not change from the center.



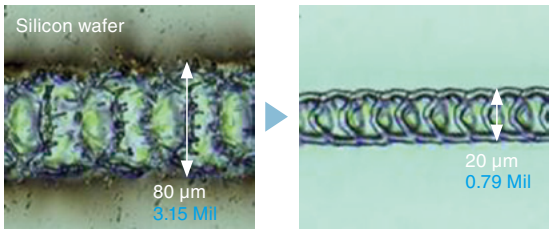
ø20 µm ø0.79 Mil SHG laser

The MD-T1000 is equipped with a SHG (wavelength: 532 nm) laser. Compared to the standard wavelength, SHG has a high absorption rate for a variety of materials, making it possible to limit heat stress. By combining this with a 20 µm 0.79 Mil beam spot, it is possible to create characters without causing unwanted damage to the surface of the target and limiting the amount of heat transfer.

[Laser absorption rate for metal]

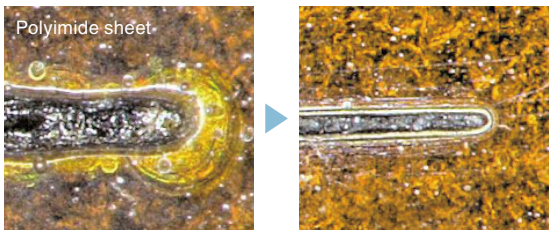


ULTRA-SMALL SPOT BEAM

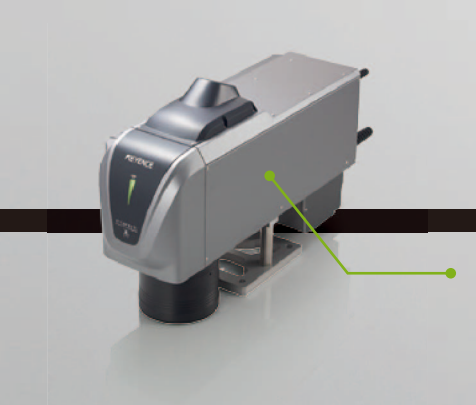


Standard wavelength MD-T

PROCESSING QUALITY



Standard wavelength MD-T



MD-T1000 Features **02**

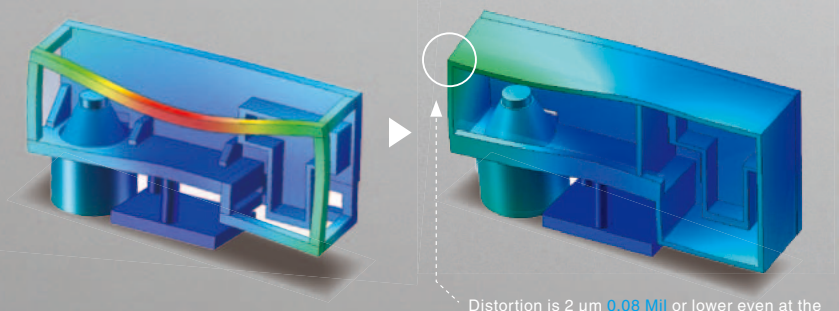
ULTRA-HIGH RIGIDITY
MONOCOQUE BODY

High Stability

Improved "Stability and Accuracy"

Monocoque body structure analysis

This laser enclosure was designed after analyzing the slight distortions caused by the enclosure's own weight. Distortion that occurs during installation is limited to 2 µm 0.08 Mil or lower at the area of maximum displacement.



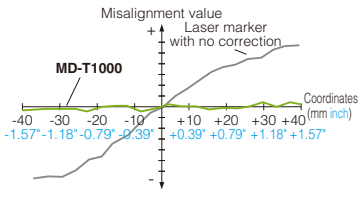
Distortion is 2 µm 0.08 Mil or lower even at the area of maximum displacement

Unparalleled accuracy and stability

The MD-T1000 has a highly rigid, monocoque body that limits warping under stress and temperature changes. By adopting a single-body structure, it achieves a degree of accuracy and stability that until now could not be successfully attained with a conventional laser marker.

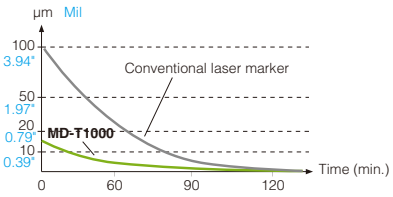
MARKING POSITION ACCURACY: ±30 µm ±1.18 Mil

Executes correction at 6400 points within the marking area. The correction control resolution has been improved to achieve a marking position accuracy of ±30 µm ±1.18 Mil.



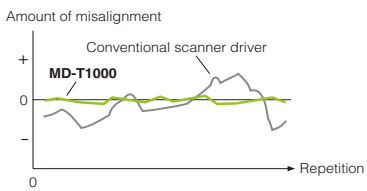
INITIAL DRIFT: ±15 µm ±0.59 Mil

In addition to the head structure, the scanner motor/drivers have been upgraded. High accuracy can be maintained even while the laser warms up. The initial drift from thermal expansion is only ±15 µm ±0.59 Mil.



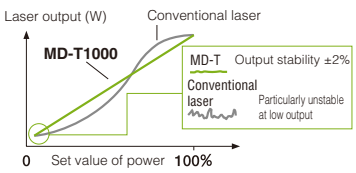
MARKING POSITION REPEATABILITY : ±4 µm ±0.16 Mil

New scanner motor/drivers have been developed in order to thoroughly pursue accuracy. The MD-T has a marking position repeatability of ±4 µm ±0.16 Mil.

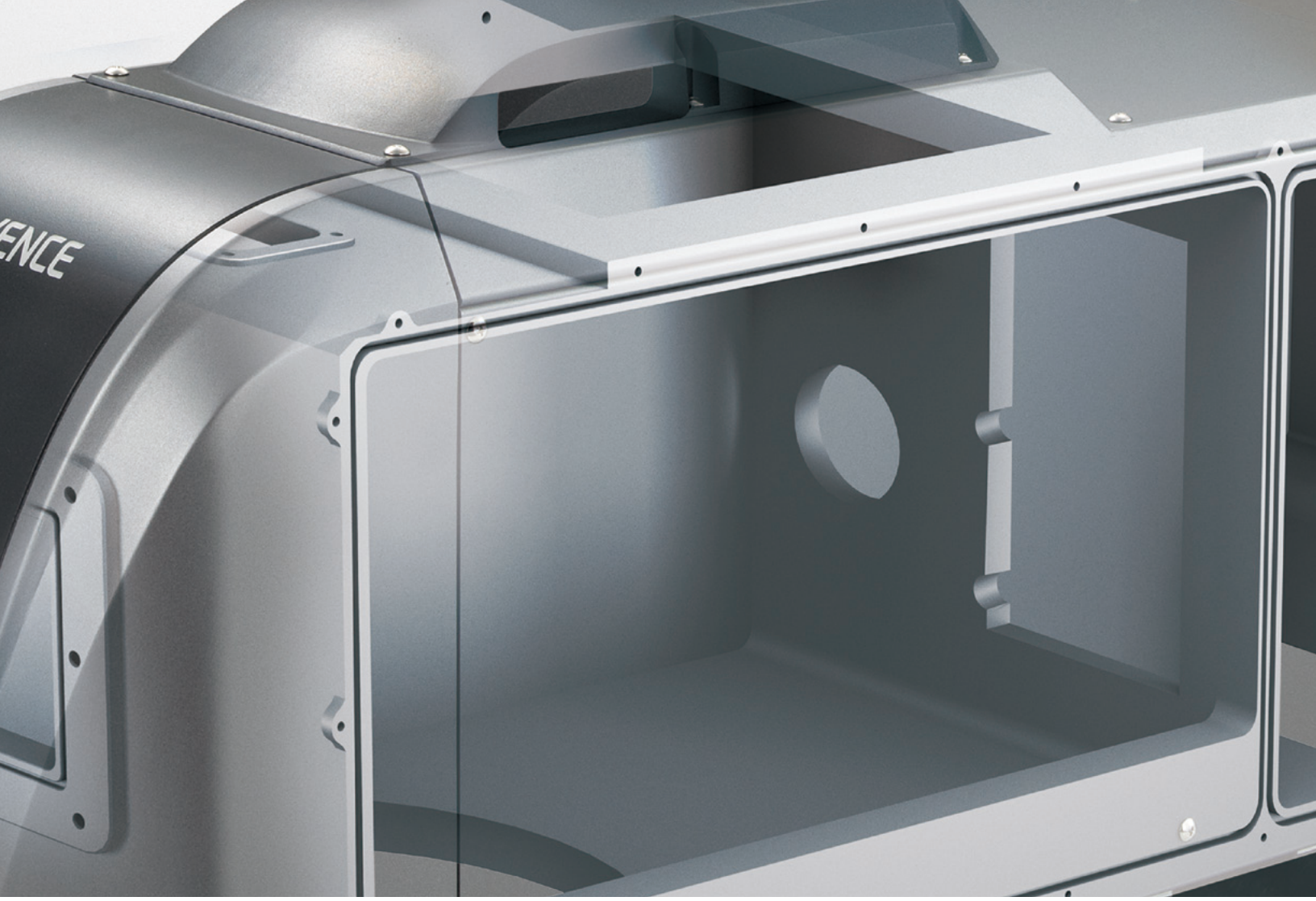


OUTPUT STABILITY: ±2%

Achieves output power stability of ±2%. Even at low power, worry free marking is achievable.

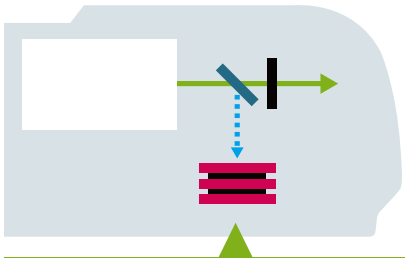


The items listed above are typical values.



Thermopile power monitor

What is a thermopile?



Thermopiles measure laser energy by the amount of heat transmitted from the laser. Differing from systems that detect the amount of light, a thermopile can display the power measurement in actual wattage values.

Can be measured in absolute values to achieve more accurate equipment maintenance.

3 advantages that are possible due to its internalized power monitor

ADVANTAGE 01

Safely automates measurement

Eliminates exposure of maintenance personnel to harmful radiation and inaccuracies caused from human error. Measurements can now be performed with a single push of a button.

ADVANTAGE 02

Auto-calibration

Automatically corrects laser output using the auto-calibration setting. Marks will never change in appearance even after long term use because the system corrects for natural power loss.

ADVANTAGE 03

Marking energy check

The energy of each mark can be measured and checked in real time for every mark. If the power level changes a warning output will be sent from the laser.

MD-T1000 Features **03**

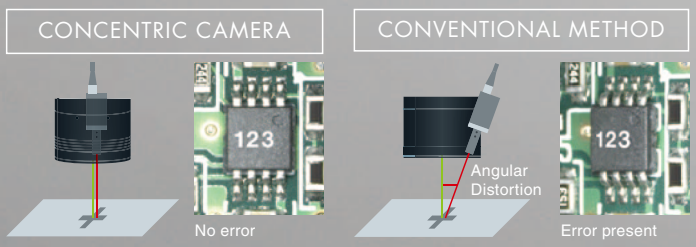
CONCENTRIC CAMERA PORT

High Functionality

Improved "Reliability and Control"

What are the advantages of a built-in concentric camera?

When installed at an angle, distortion due to the oblique-view as well as mismatches between the marking laser and camera coordinates occur. With a concentric camera port, errors from angle do not occur and accurate positioning is possible.



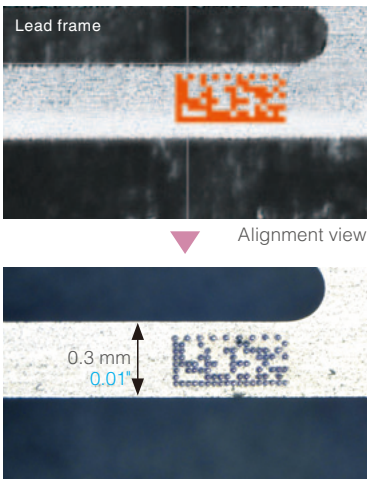
Enhanced positioning control

Achieves a positioning accuracy of ±10 µm ±0.39 Mil using the high magnification, built-in concentric camera.
Easily and reliably perform positioning for marking and processing with microscopic accuracy previously impossible with visual alignment.
The built-in internal lighting clearly illuminates the target surface.

VIEWFINDER FUNCTION

Easy position alignment

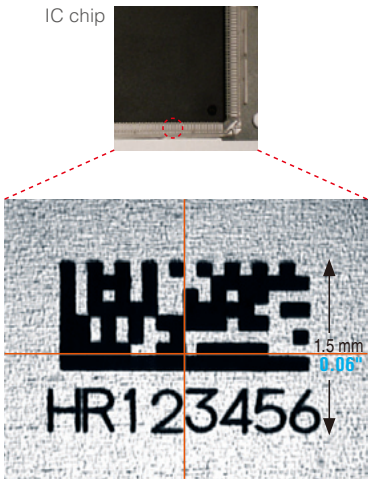
Positioning can easily be performed while checking the camera image, even in microscopic spaces. This eliminates trial runs that generate unnecessary scrap parts.



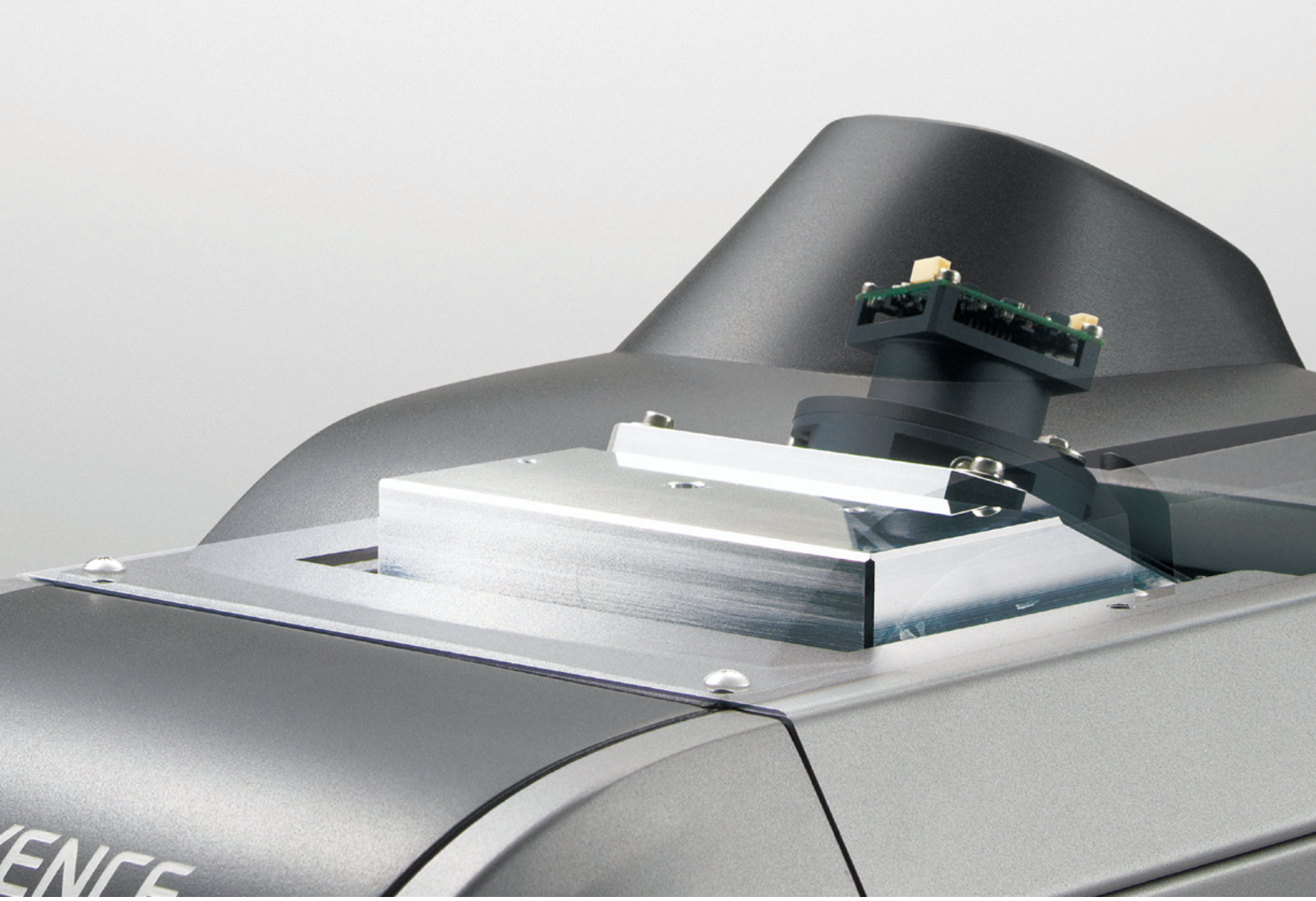
VHX-1000 microscope image

Easy marking verification

With its high magnification camera and built-in lighting, marking can be clearly checked. It is also unnecessary to open and close the protective enclosure.



Built-in camera image

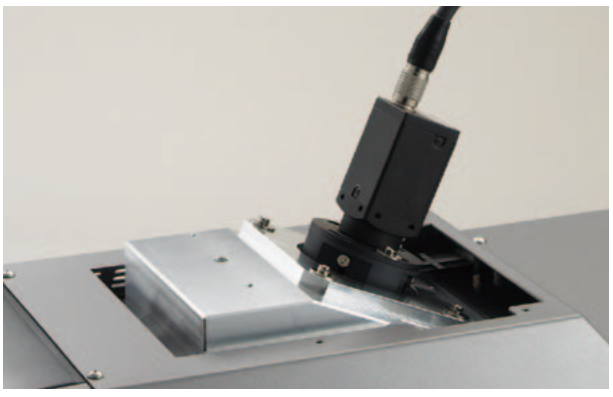


Real-time Automation & Inspection by Integrating a Vision System

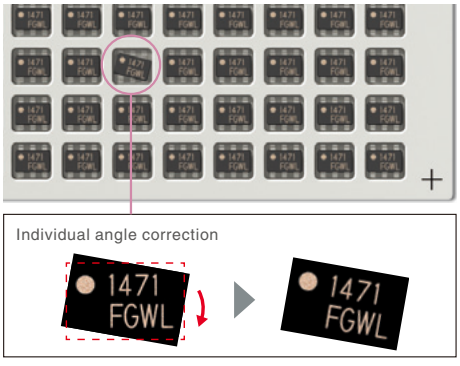
Easily integrate a C-mount vision system with the MD-T1000 for real-time alignment and inspection.

KEYENCE XG Series

Easy installation using a C-mount camera



Auto-alignment and coordinate measurement



Advanced technology that achieves the ideal

Marking

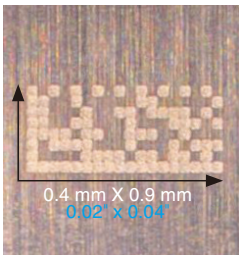
MARKING

In recent years, quality control has been steadily enhanced and there has been a demand for management at the smallest component level.
In order to enter information in a limited space, marking with microscopic detail is necessary.

The MD-T has a ø20 µm ø0.79 Mil SHG laser and advanced control technology, which achieve microscopic marking that until now, could not be attained with most conventional laser markers. A multitude of marking methods can be selected, including marking that reduces damage to the product or settings that mark more deeply into the target surface.

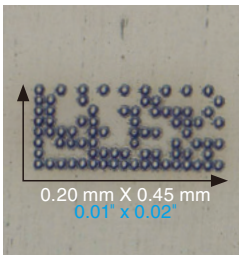
Microscopic 2D code (Typical marking examples, separated by material)

COPPER



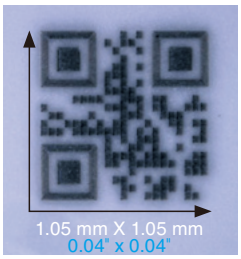
Lead frame

SUS



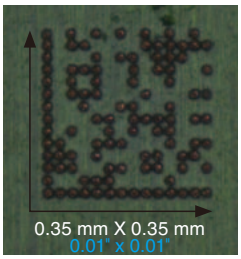
Small steel object

CERAMIC



LED chip

GLASS EPOXY



BGA board

MD-T TECHNOLOGY

An algorithm that delivers the best code settings

"Find" the best code conditions

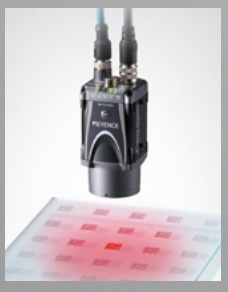
With the MD-T, 2D codes can be marked while varying condition settings. Using the KEYENCE SR-D100 2D code reader to perform batch reading, the degree of readability between settings can be tested. It is possible to find the best condition settings for codes with a cell size as small as 25 µm 0.98 Mil.

MARKING SAMPLE

Samples are marked with different settings.

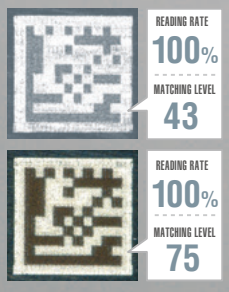
<Code pattern example>

READ



Batch read

FIND

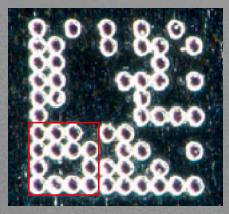


Understand the degree of leeway in reading

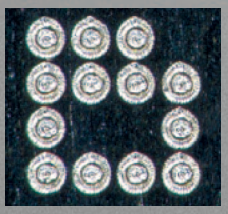
"Select" the best code patterns

Specify the number of dots per cell and cell shape to best match the material being mark and processing time needed.

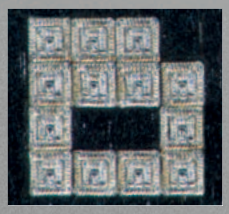
CELL: DOT (1 X 1)



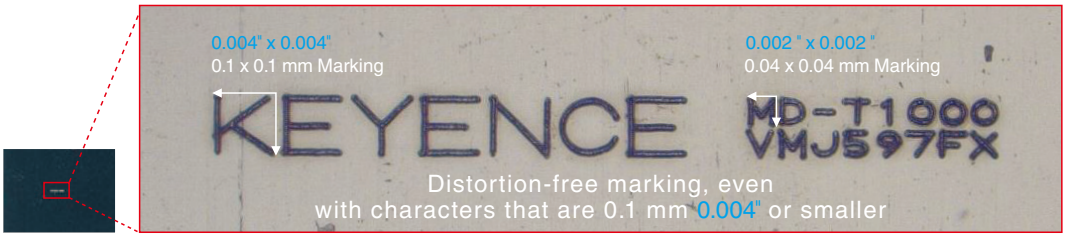
CELL: CIRCLE



CELL: SPIRAL

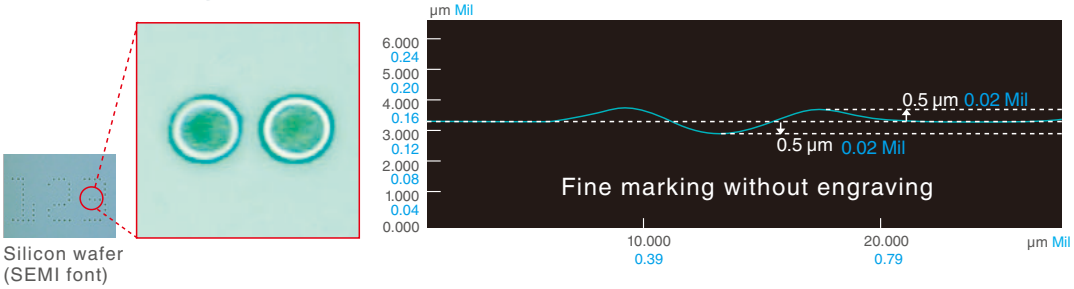


Micro marking



Actual size

Soft marking

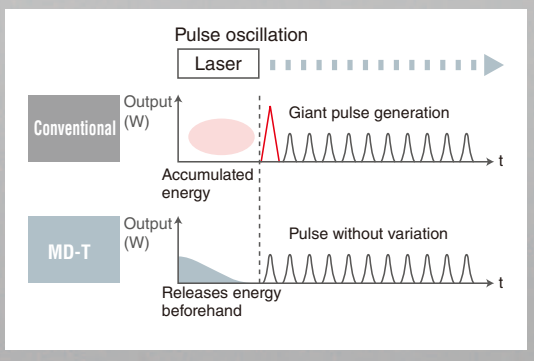


Silicon wafer
(SEMI font)

Innovative pulse control technology

"i-Sec" excess energy control technology

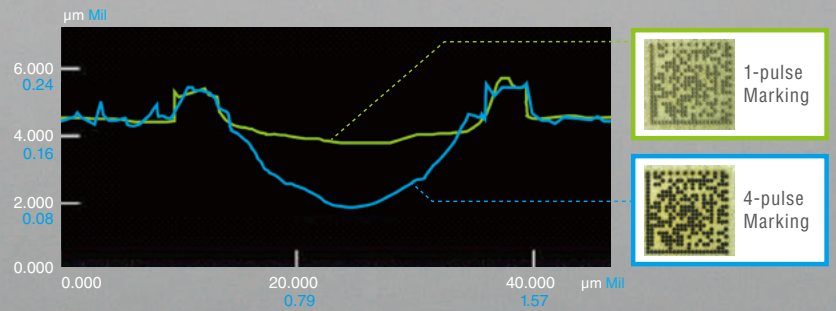
With a conventional laser, there is a phenomenon where the laser's initial pulse is stronger than normal (giant pulse). With the MD-T, energy is released just prior to the initial pulse of the laser eliminating the giant pulse and damage to the target. This maintains the unparalleled stability in beam power even when marking on a microscopic level.



i-Sec (Intelligent Stored Energy Control)

Multi-step marking

It is possible to specify the number of times that a cell is marked to adjust darkness and depth of mark.



Advanced technology that achieves the ideal

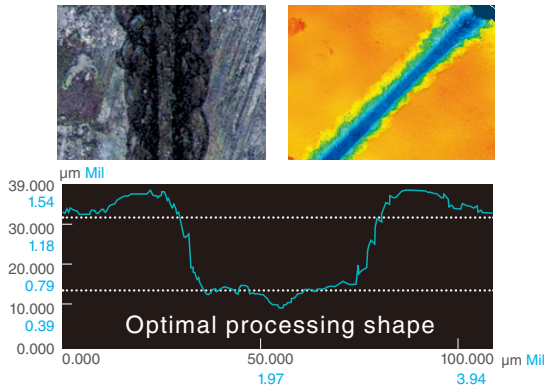
Trimming & Cutting

TRIMMING

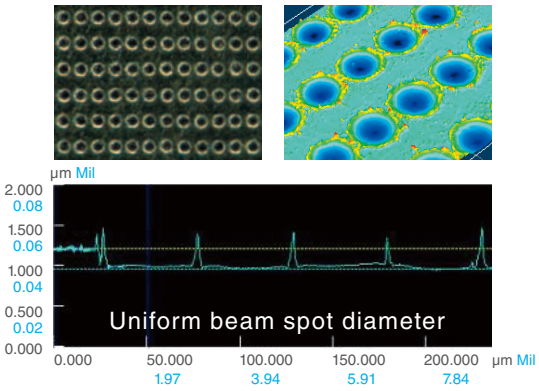
Trimming is a process that removes resistor material, circuit patterns, or vapor-deposited film with a laser to bring electronic components closer to their desired capabilities. This is a process that is essential for high quality electronics products.

The microscopic, high quality beam is capable of processing parts with ideal accuracy and control. Combining a telecentric lens with specialized software allows for "processing optimization" that is critical to trimming applications.

RESISTOR TRIMMING



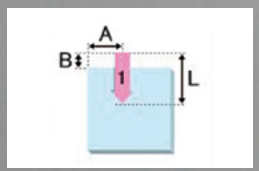
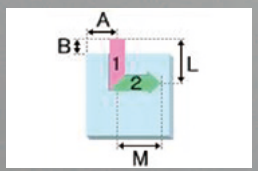
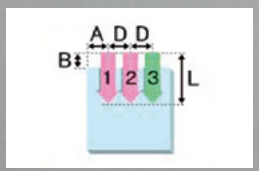
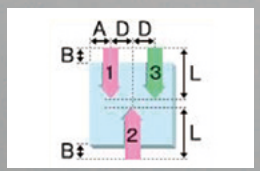
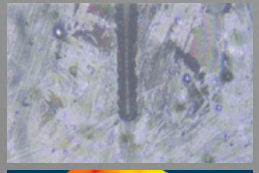
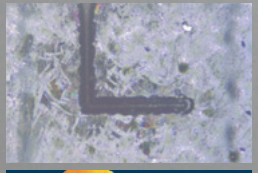
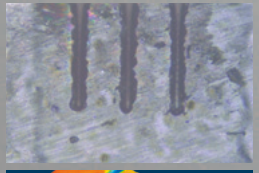
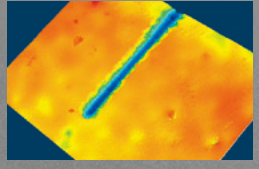
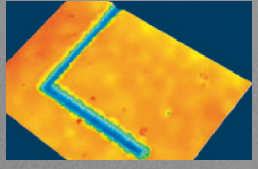
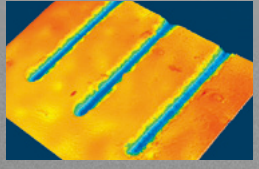
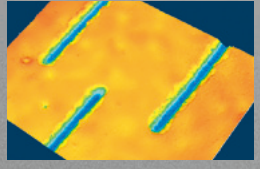
VAPOR-DEPOSITED FILM PROCESSING



MD-T TECHNOLOGY

NEW Newly equipped trimming mode

In addition to including a standard cutting mode, a customized trimming mode that can respond to commands to change the cut on the fly is also a standard. In order to come even closer to ideal quality, the trimming function of the MD-T can change the spot size, speed and direction of travel on the fly as the laser is processing.

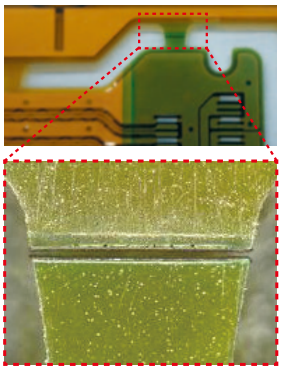
SINGLE CUT	L-SHAPED CUT	MULTI-PLUNGE	SERPENTINE
			
			
			

CUTTING

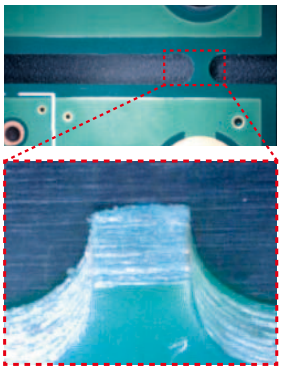
Because laser marking is a non-contact method of marking, damage can be eliminated along with the short-term maintenance required with physical cutting instruments. Compared to conventional laser processing equipment, the MD-T is compact and easy to integrate.

With conventional laser markers, there are problems with the processing accuracy at the edge of an area and surface defects from heat absorption. With a SHG laser focused to a precise spot and an unrivaled telecentric lens system, the MD-T can achieve cutting accuracy in the entire field of view that cannot be matched by conventional laser systems.

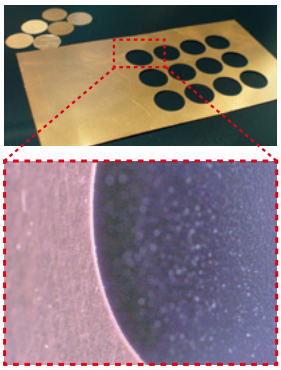
FPC



PC BOARDS

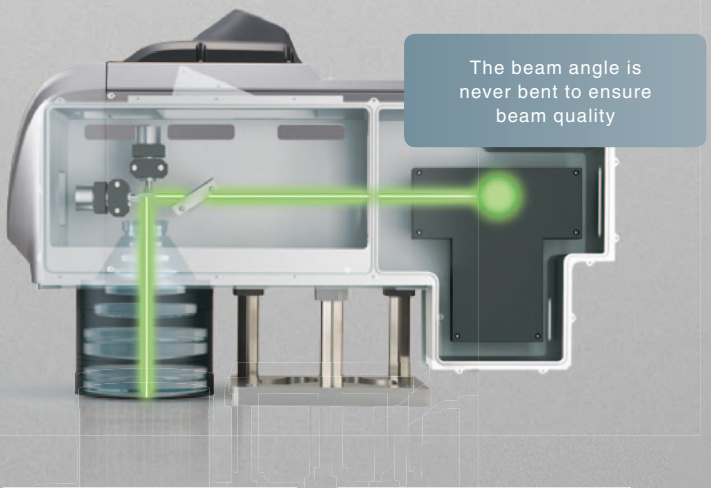


COPPER FOIL



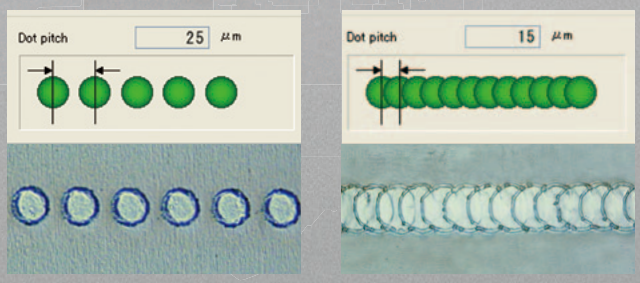
Straight-line axis

With the aim of ultimate beam quality and accuracy, the MD-T has adopted a straight-line optical axis that does not bend the laser. This limits the deterioration of positional alignment caused by the reflection angle to achieve the highest accuracy possible for processing.



Beam overlap control

Finely controlling the overlapping of pulses, makes it possible to control resistance with greater detail. The MD-T also automatically calculates the dot interval in response to the speed and Q-switch frequency.



The width of pulses can be adjusted to perform processing exactly as intended

Cutting-edge editing software

Marking Builder 2

Ver. 3

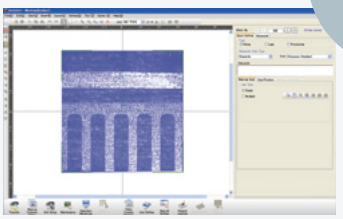
"Quick" positioning that anyone can program

Camera view layout

STEP.01

Capture the product image

Easy capture with a single button



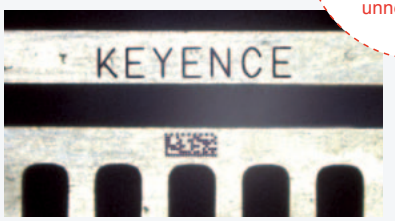
STEP.02

Adjust positioning

STEP.03

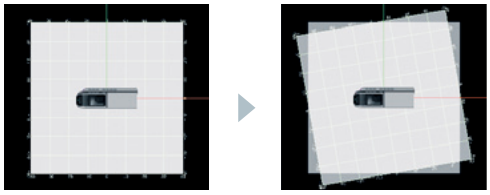
Mark the target

Settings are completed to match the actual image, thus making complicated position adjustment unnecessary.



Installation position adjustment

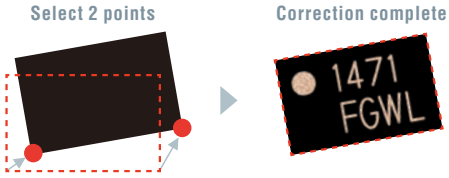
A function that corrects position misalignment during device setup. In addition to direct input of the amount of misalignment, adjustment is possible with only 2 specified coordinates using the built-in camera.



Easily correct position misalignment during setup.

Target position adjustment

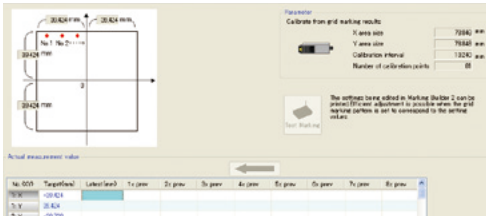
Just select any 2 points while viewing the target in the camera. Correct the targets angular position with ease.



Eliminate miss-alignment of the target during setup.

Area point correction

Easy calibration is possible using a glass scale to ensure that your marks fit your production needs down to micron accuracy.

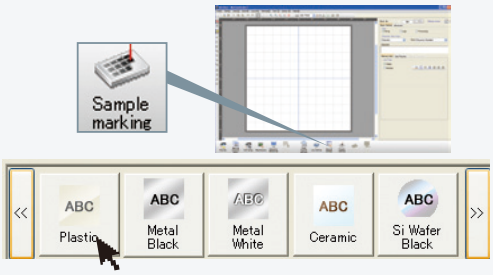


High-accuracy correction to match installation criteria.

"Optimal" conditions that anyone program

Sample marking function

STEP.01 Select the material



STEP.02

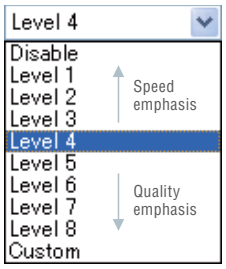
Mark the target

STEP.03

Quickly find the optimal conditions

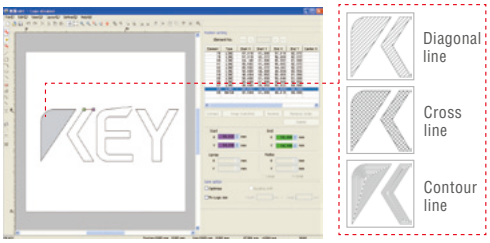
Quality adjustment level

Previously, in order to mark with "greater speed and greater clarity", fine adjustment for a variety of parameters was required. With the MD-T, the best conditions can easily be derived just by selecting the quality level.



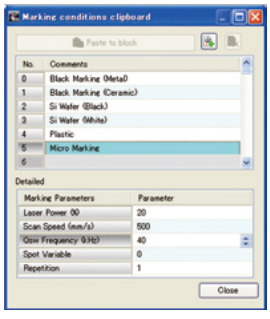
Logo designer * optional

Convert DXF and AI files and create a variety of fill patterns using the MB-HLD software package. It also allows for manipulation of files not possible by standard software packages. Find optimal condition settings to match any target.



Marking condition clipboard

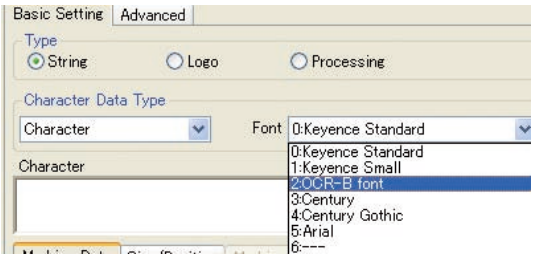
Conditions that are often used are registered as favorites in the clipboard. Marking condition data can be managed in desired categories, such as separating the conditions by material.

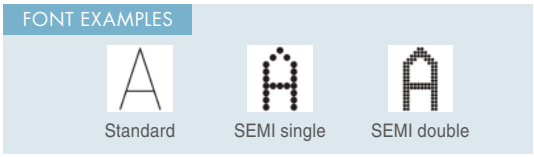


Various functions for ease of use

Font architect

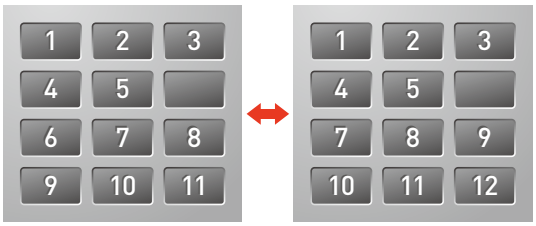
In addition to standard fonts, SEMI fonts have also been included as a standard. Furthermore, 10 varieties of fonts can be added for flexible marking to meet the needs of the user.





Pallet marking layout

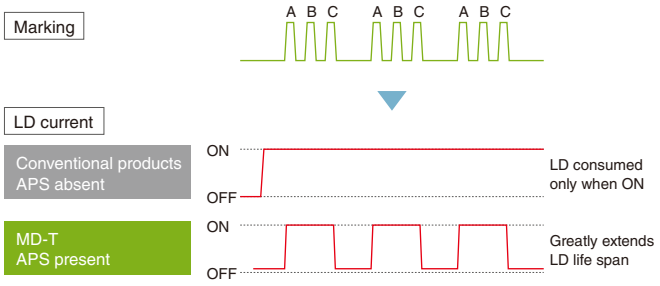
Easily create a pallet layout with a maximum of 65025 targets. It is also possible to setup marking in all areas through the built in camera and telecentric lens. Count conditions can also be flexibly arranged.



It is possible to turn on/off marking in the pallet according to the presence/absence of the target.

Auto power-save (APS)

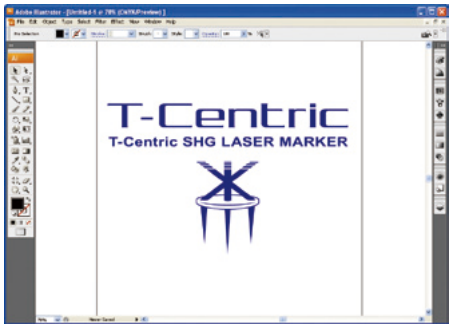
When marking is not being performed, the current level for the LD light source is automatically lowered to reduce the load on the LD. Because it lowers the current level without completely turning the laser off, it is possible to instantly return to a marking state.



Adobe Illustrator Plug-in

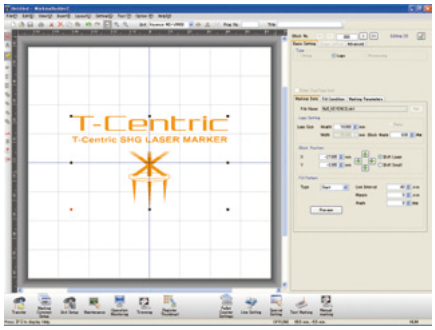
A logo created with Adobe Illustrator can be directly imported into the Marker Builder 2 software using the Illustrator Plug-in. The imported logo designs can be fully edited and hatched using the Logo Designer software.

Create a logo with Adobe® Illustrator®



Create a design with Adobe Illustrator.

The logo can be directly imported into Marking Builder

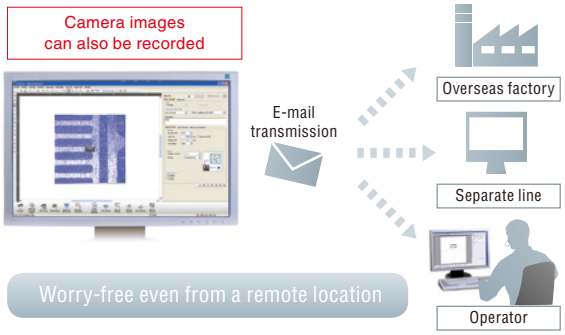


Hatching can be easily done on the Marking Builder screen.

* Adobe® Illustrator® is a registered trademark of Adobe Systems Incorporated

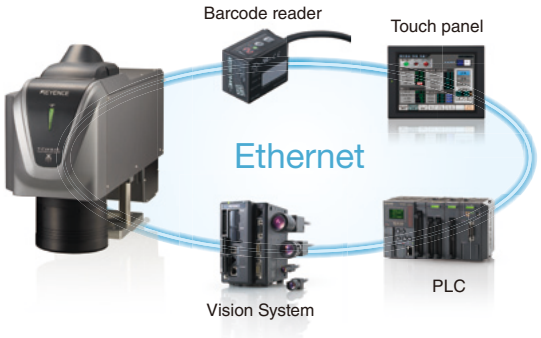
Screen recorder & Player

Operations in Marking Builder 2 can be recorded, and video files can be created and played. Because e-mail transmission is also possible, it can be used remotely without having to manually create a video or address problems when they occur.

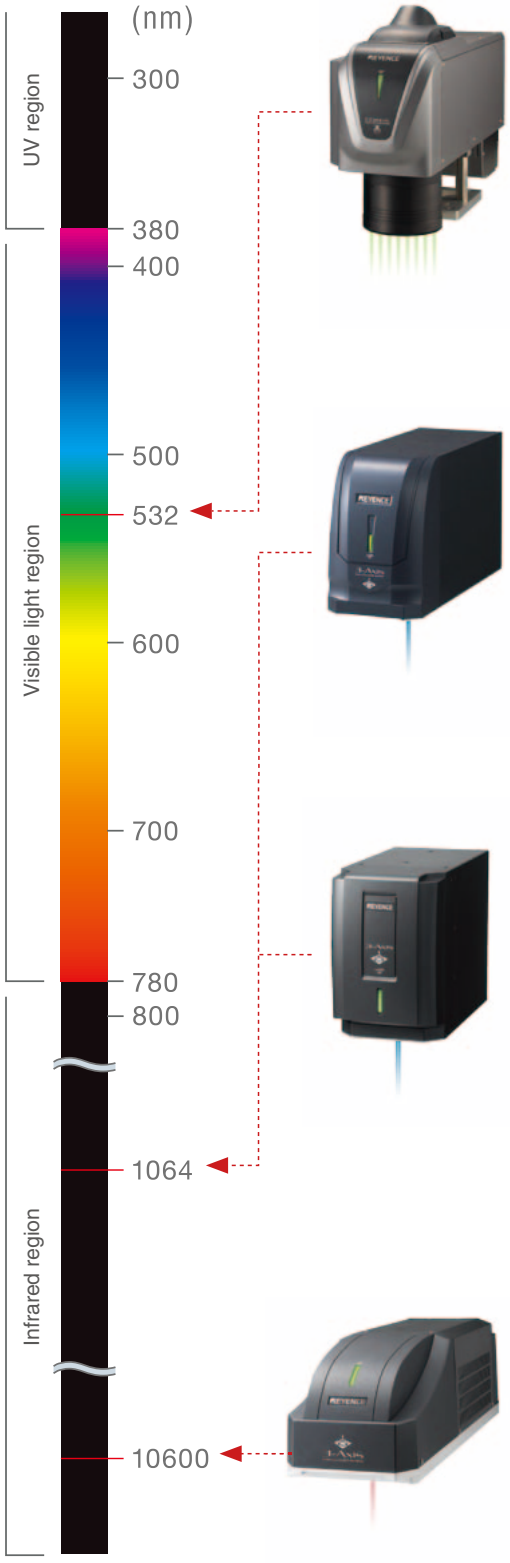


Ethernet equipped

External device connectivity is improved with advanced networking capabilities provided through Ethernet communication. It also makes it possible to remote connect to devices to check on operations.



Laser selection based on application
Enhanced marking lineup

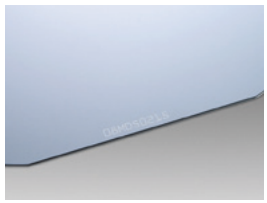


Unparalleled high definition and high accuracy

Telecentric laser marker

MD-T1000

(Wavelength: 532 nm)



Wafer

High performance standard

3-Axis YVO_4 laser marker

MD-V9900A

(Wavelength: 1064 nm)

Mobile phone key board

The world's smallest high-power

3-Axis fiber laser marker

MD-F3000

(Wavelength: 1090 nm)

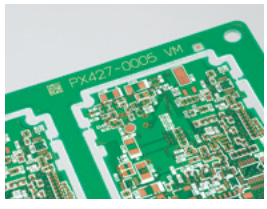
Bearings

Ultra-high speed

3-axis CO_2 laser marker

ML-Z9500

(Wavelength: 10600 nm)

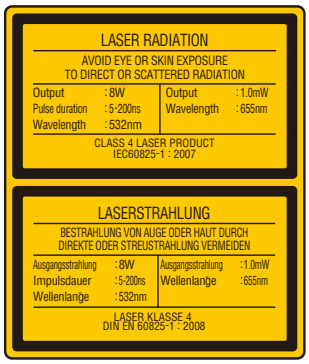


PC boards

SPECIFICATIONS

Model	Main unit (controller/head)		MD-T1000W/1010W
	PC software		MB-H2D3-DVD Supported OS*1: Windows 7/Vista (SP1 or higher)/XP (SP3 or higher), Supported languages: Japanese/English/Chinese*2/German
	PC software (Logo designer)		MB-HLD Supported OS*1: Windows 7/Vista (SP1 or higher)/XP (SP3 or higher), Supported languages: Japanese/English/Chinese*2/German
	Console		MC-P1
Marking laser			YVO_4 laser, Class 4 Laser Product (IEC60825-1, FDA(CDRH) Part 1040.10 *5)
	Wavelength		532 nm
	Output		4W (at 30kHz)
Q-switch frequency			1 to 400kHz
Guide laser			Semiconductor laser, Class 2 Laser Product (IEC60825-1, FDA(CDRH) Part 1040.10 *5), Wavelength 655nm, Output 1.0mW
Marking area			80 x 80 mm 3.15" x 3.15"
Standard working distance			189 mm 7.44"
Marking resolution			2 µm 0.08 Mil
Scan speed			Max. 12000 mm/s
Spot variable width			±5 mm ±0.20"
Character type	Font		Original fonts (numbers, alphabet, Katakana, Hiragana, Kanji)/user fonts/True Type fonts/ Dot font (SEMI single-density/SEMI double-density)
	Barcode		CODE39/ITF/2of5/NW7 (CODABAR)/JAN/CODE128
	2D code		QR code /Micro QRcode/DataMatrix (ECC200)/GS1 DataMatrix
	GS1 DataBar		GS1 DataBar/GS1 DataBar CC-A/GS1 DataBar Stacked/GS1 DataBar Stacked CC-A/ GS1 DataBar Limited/GS1 DataBar Limited CC-A
	Logo image		Custom character font/logo data DXF/BMP/JPEG/PNG/TIF
	Machinery operation		Fixed point/straight line/dashed line/circle/oval
	Trimming		Single cut/L-shaped cut/multi-plunge/serpentine/free line/specify end point/relative shift
Marking conditions	Marking style		Stationary marking
	Character size (marking height/width)		0.01 to 80 mm 0.0004" to 3.15"
	Settings	Number of registered programs	Max. 2000 programs
		Number of blocks	256 blocks
Input/Output			Terminal block I/O/MIL connector I/O
Interface			RS-232C/RS-422A/USB2.0*3 /Ethernet (100BASE-TX/10BASE-T)
CF memory card slot			Compact flash memory card*4 only
Marking head unit installation direction			Up and down (vertical)
Head cable length			5 m 16.4'
Cooling method			Air cooling, thermoelectric cooling
Power supply voltage			100 to 120 VAC/200 to 240 VAC, 50/60 Hz
Rated power consumption			550 VA max.
Environmental resistance	Ambient temperature for storage		-10 to +60°C (No freezing) 14 to 140 °F
	Ambient temperature for usage		15 to 35°C 59 to 95 °F
	Ambient humidity for usage		30 to 85% (No condensation)
Weight	Controller		23 kg
	Marking head unit		35 kg
	Console		2.0 kg

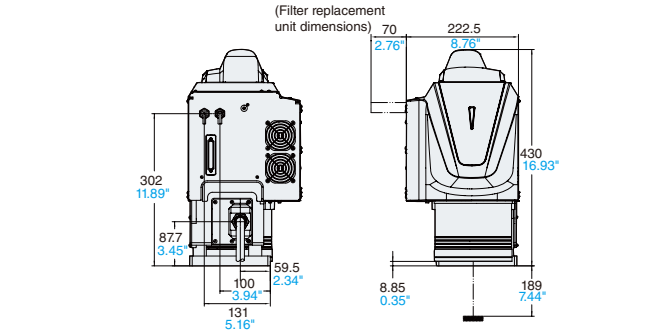
*1: For Windows 7/Vista, the 32-bit or 64-bit versions are supported, for XP only the 32-bit version is supported. Windows is a registered trademark of Microsoft Corporation, U.S.A.
*2: For Chinese, simplified Chinese display is supported and Chinese input is not supported.
*3: Port dedicated for PC software
*4: SanDisk cards are recommended.
*5: The laser classification for FDA(CDRH) is implemented based on IEC60825-1 in accordance with the requirements of Laser Notice No.50.

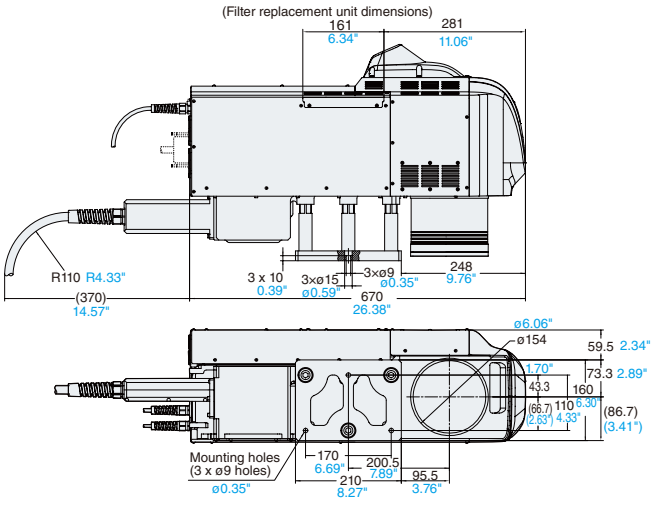


DIMENSIONS

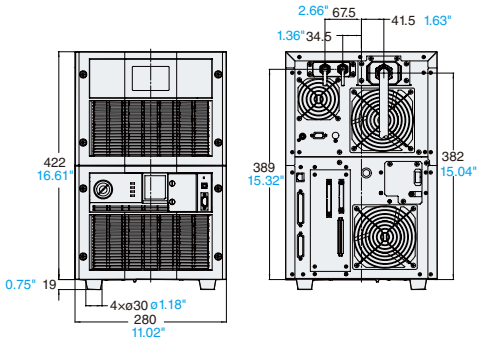
Unit: mm inch

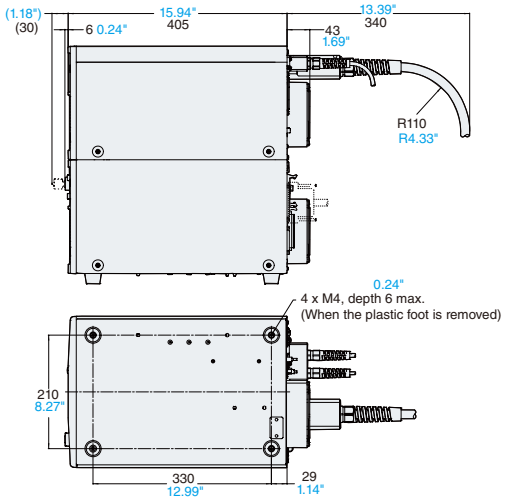
Head





Controller





Console MC-P1