Fiber Laser Marker

MX-Z2000H-V1 series

OMRON

Fast, High Quality, Easy

Marking Flexibility

CE | FDA

c UL us

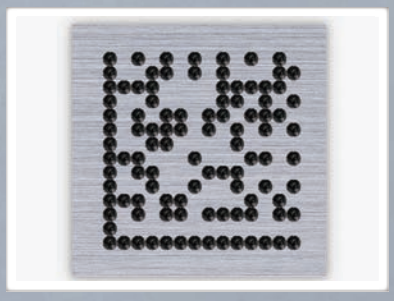
Great for either deep or shallow engraving in metals, marking on plastics/resins or plastic films, and for fine processing.

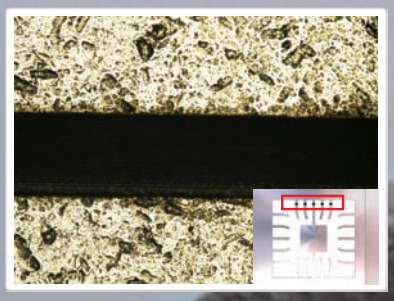
Mark anything from electronic parts to automotive parts.

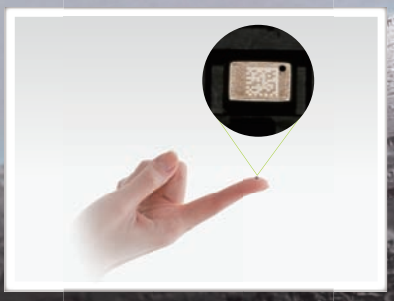

Deep engraving in metal


Shallow engraving in metal


Marking on plastics/resins


Deep engraving


Fine processing


Fine marking

The MX-Z2000H Series Provides Benefits in Many Arenas

High Speed and High Quality for a Wide Variety of Applications

Marking Flexibility

Metals | Plastics/ Resins | Plastic Film

Two operating modes meet the application marking demands.

Enhanced 3D marking features.

G-DAC enables high-speed, clear marking.

≫P4

Fiber Laser Marker

MX-Z2000H Series

Enhanced functionality Improves Productivity

Connectivity & Traceability

- Direct finder link
- Traceability log
- EtherNet/IP™ ready
- Data can be shared with external storage

≫P6

Withstands Severe Ambient Conditions and Meets International Standards

Durability/Safety

- IP65 protection
- Meets domestic and international safety standards

≫P8

High Speed and High Quality
in a Wide Variety of Applications

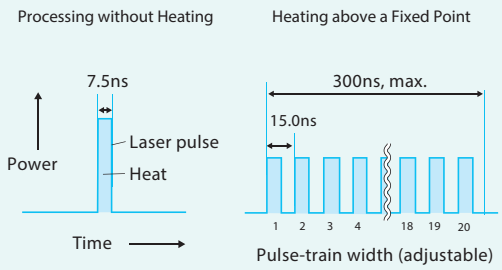
Marking Flexibility

Two Operating Modes Provide Fine Detail to Deep Engraving

Standard Mode

Our exclusive flexible pulse control (up to 1MHz, adjustable 1 - 20 pulses) enables optimum marking and processing for a variety of materials and applications, for a variety of materials and applications, including both heated and non-heated marking/processing, etc.
For example, even for small character when thermal effects are problem, Fine marking is possible.

Laser Wave Examples



Color Marking (SUS304)

Solid material

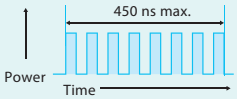
Hairline processing

Optional EE Mode (Energy Enhanced Mode)

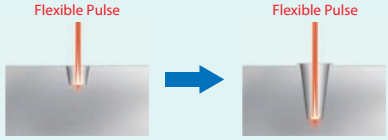
Deep engraving of metal, rough polishing, and other energy-intense processing become possible with an expanded and enhanced flexible pulse control, which provides pulse streams of up to 30 pulses.
For example, deep engraving suitable for camera reading is possible even after heating process.

Omron Laser(EE Mode)

Laser Wave Example



Process image

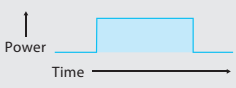


Flexible pulse laser increases output per pulse. Furthermore, by continuous irradiation, continuous irradiation transmits heat in the depth direction, enabling deep engraving.

Cross section image

Typical Laser

Laser Wave Example



Process image

The output power per pulse of general laser is lower than that of flexible pulse laser. The heat mostly stays on the surface, resulting in a shallow engraving.

Cross section image

* Because this mode is an option, you need to purchase the license "EE Mode Activation Key" to enable it.

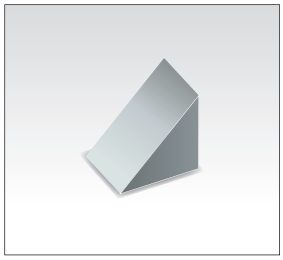
Marking 3D Objects Is Simple Even on Cones and Spheres

High-precision Z-axis Flexibility

Clean marking is now possible for 3D surfaces, such as stepped, sloped, curved, conical and spherical surfaces without any additional software.


Cylinder

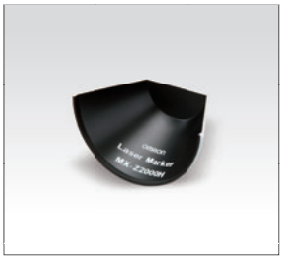

Steps

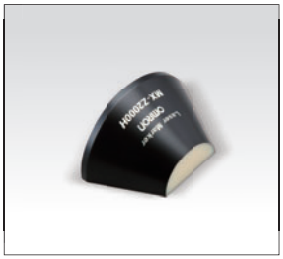

Slope


Sphere exterior


Truncated Cone


Truncated Cone interior


Half-cone interior


Half-cone exterior

The focus point can be moved 170±10mm for the MX-Z2000H, and 220±10mm for the MX-Z2050H/Z2055H.

Mark Clearly and Cleanly Even at High Speed

〈G-DAC〉

G-DAC stands for the OMRON-developed Galvano Dynamic Acceleration Control.

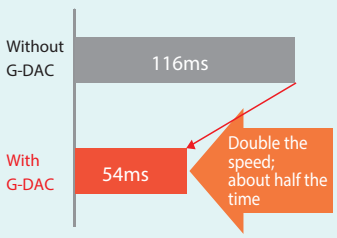
The G-DAC feature adjusts the laser marking speed for optimum performance, based on the marking details. This speed flexibility enables high-speed, clean marking.

With/Without G-DAC

Marking time with the same data

Note: Marking conditions shown to the right.

Workpiece: Aluminium
Letter height: 1mm



Marking at the same speed

Note:
Laser conditions: 100kHz, 100%; Workpiece: Aluminium

Note: G-DAC performance depends on the application. Be sure to test your application in advance.

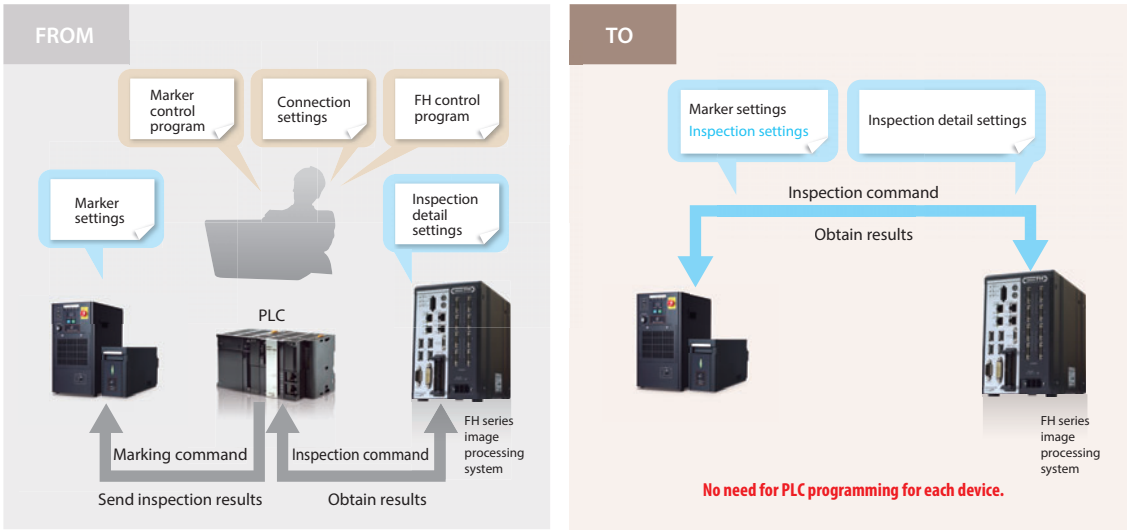
Enhanced Functionality
Improves Productivity

Connectivity & Traceability

Position-correction without the need of a PLC

Direct Finder Link

The MX-Z2000H series enables direct connectivity between the image processing system and the laser marker that traditionally required PLC processing . This means, there is no need for a PLC to do the linking between the vision system and the laser marker.

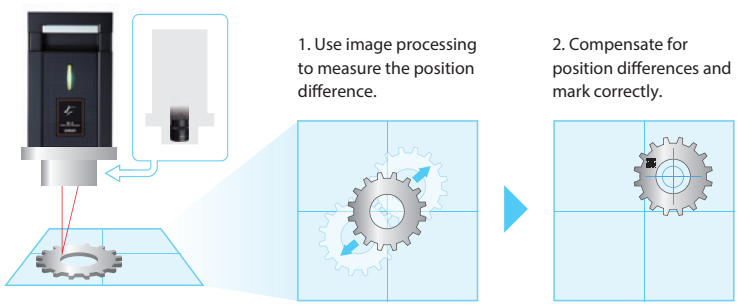


Notes:1. The optional finder feature is required to use this function.
2. As the end of April 2017, corresponding image processing system is OMRON FH series and part of FQ2 series.
Please refer to finder option catalogue Q255-E1 to select image processing system.

Example Application

To mark a product in the same area everytime, an image processing system measures the position reference, transfers the position coordinates and the laser marker adjusts itself to mark in the correct place. After the laser marking is completed, the image processing system can also read a 2D code or any other inspection of the data or images just marked on the product.

MX-Z2000H series laser marker
+
Finder option
+
FH series image processing device

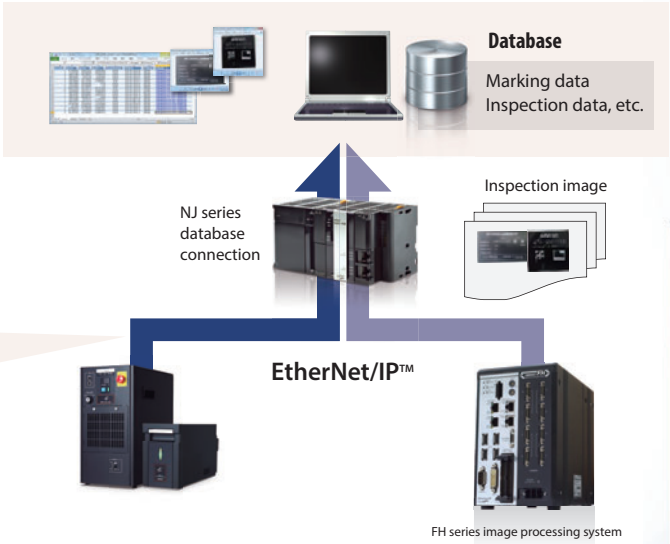


Easily Configure a Traceability System

Traceability Log

Archive marking data, and other data to a log, etc. Simplify both traceability and preventive maintenance.

System Concept Example



Smoothly Integrate External Control

EtherNet/IP™ Compatibility

The MX-Z2000H series is compatible with various kinds of external control. Built-in I/O connections, RS-232C, Ethernet, and EtherNet/IP™ simplify programming to control the system from a PLC.

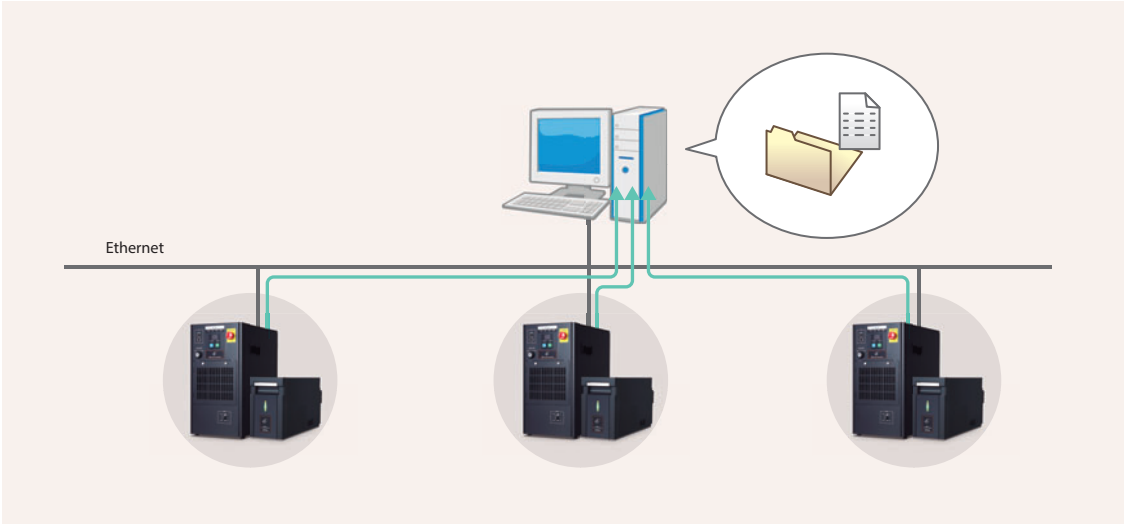
*Please check the user's manual before using available functions and commands.

EtherNet/IP™

Marking for Small Lots with Multiple Variants

Data can be shared with external storage

The MX-Z2000H series can access the marking data that is stored on an Ethernet server to keep up with the tremendous amount of data used for multi-variant, small lot productions. This simplifies the switching of marking data for each variant.



Withstands Severe Conditions
and Meets International Standards

Durability/Safety

Stable Operation Even in Dusty/Wet Environments

Durable IP65 Head

The laser head (where the laser light is emitted) has a double glass cover to keep dust and moisture away and ensure air-tightness.

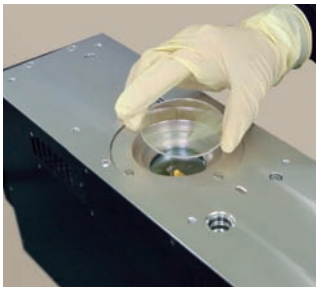
IP65 means dust-proof and wash-down capable, compatible with IEC60529. It consists of the two numbers, 6 and 5.

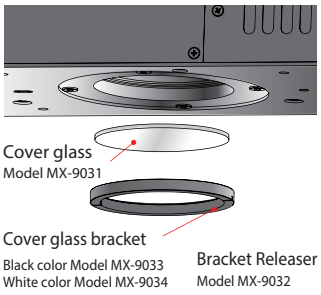
IP 6 5

Protection against water
5: Protection from water, up to water projected by a nozzle against the enclosure from any direction.

Protection against solid objects
6: Complete protection from dust.

The double glass cover makes it easier and safer to change the glass.



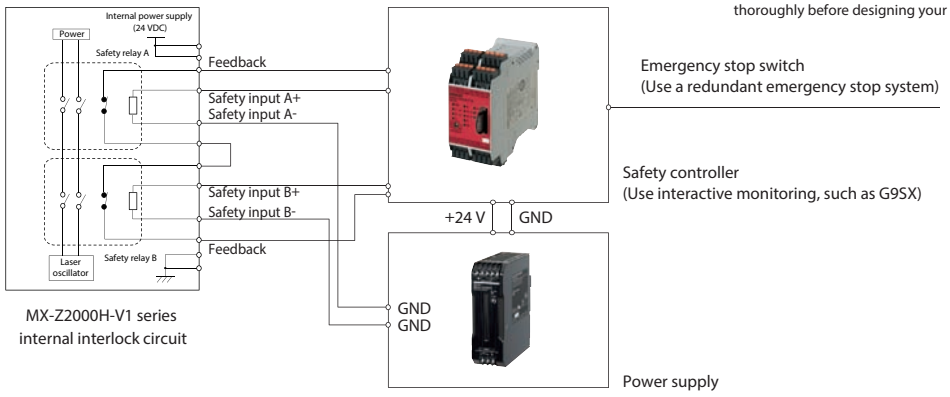


Meets Safety Requirements and Standards

NEW Built-in Safety Relay Circuit

When building a machine to meet the ISO 13849-1 (JIS-B9705-1) criteria, you have to provide safety measures for the total machine in which the laser marker is installed. The MX-Z2000H series has 2 safety relays in the controller, and sending an emergency stop signal from an external controller to the interlock terminals will absolutely stop the power supply to the laser. The safety relays installed on the back of the controller can be easily replaced in case of failure.
The laser beam can be emitted within 1 second after returning from laser shutdown by Omron's original fiber laser system.

Interlock System Configuration Example



Note: Be sure to read the manual and other materials thoroughly before designing your system.

Meets International Standards and Regulations

The laser markers meet each standard and regulation. They can now be used internationally.
Note: For details about exact countries and areas, contact your local OMRON representative.

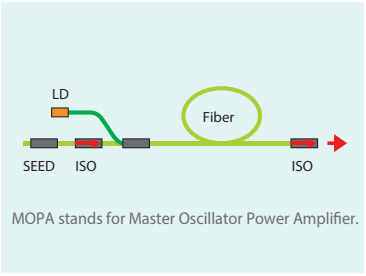
OMRON's Fiber Lasers

All-fiber Lasers Provide High Quality, High Stability, Long Life

MOPA Fiber Laser

Typical solid-state lasers use mirrors to resonate and amplify the laser, and then Q-switching to output the laser. However, this approach makes it difficult to achieve a high quality and flexible laser. It also leaves something to be desired in the areas of reliability and durability. OMRON has achieved high quality, high stability, long life and flexibility by eliminating the resonator configuration and using the MOPA approach.

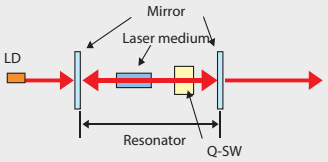
OMRON MOPA Fiber Laser



MOPA stands for Master Oscillator Power Amplifier.

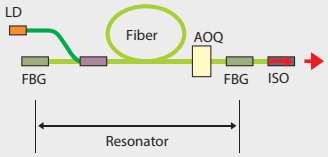
- Wide range of pulse repetition frequency settings.
- High flexibility for setting the pulse width and shape.
- High beam quality, high stability, long life.

Typical Solid-state Laser



- Pulse width depends on the repetition frequency.
- The laser diode is always on, accelerating deterioration.
- Issues with the durability of the Q switch, mirrors, etc.

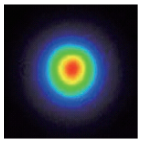
Typical Fiber Laser



- Difficult to achieve a high peak output.
- Narrow range of pulse repetition frequency settings.
- Pulse width depends on the frequency.

High Beam Quality

The closer the beam is to a perfect circle, the higher the quality of the laser. OMRON lasers have a very round, high quality beam, as shown to the right.



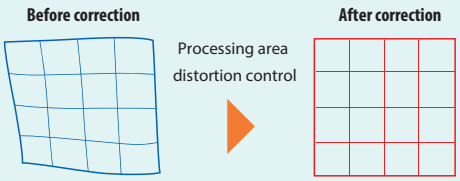
High beam quality

Corrects for Lens Distortion

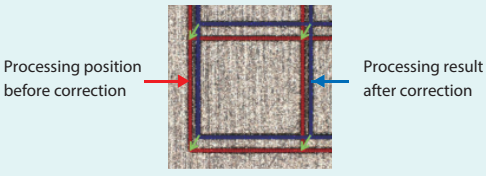
High Position Resolution/Coordinate Correction

Precision positioning is now possible for fine detail, and processing area distortion is minimized.
Coordinate correction is provided to eliminate errors based on installation.

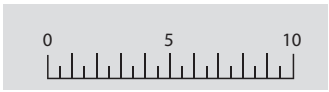
High Position Resolution



Coordinate Correction



Example Applications



Marking a scale

Marking on electronic parts in a tray

Operation Flexibility Increases Throughput With Less Effort

Edit the Marking Data Directly on the Laser Marker

Editing Data

There is no need to buy separate editing software, or a computer to edit data. Data editing functionality is built right into the laser marker itself, simplifying the process.

Editing Data Offline
Create and edit the marking data directly.

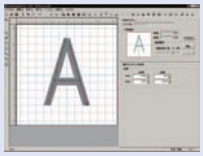
Editing Fonts and Logos
Optimize fonts, logos (graphics), and pattern data directly.

Offline Editing Software is Also Standard

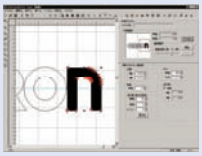
You can also use a separate computer if you choose, to create and edit the print data, including graphics, with the same functionality as is built into the laser marker.

■Creating Marking Data

■Creating Original Data



■Creating Logo Data



Simplifying Positioning and Other Floor Work

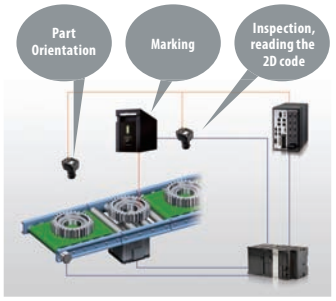
Optional Features

Finder (Vision Attachment)

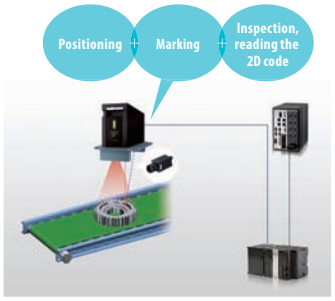
The Finder feature enables visual positioning of small parts for marking or processing, as well as automated positioning and inspection with a vision system.
This simplifies the system configuration, reducing processes, cycle time, and costs.

Please refer to the catalogue Q255-E1

Before Various devices and processes were required. **Now** All processes are consolidated in one single step.

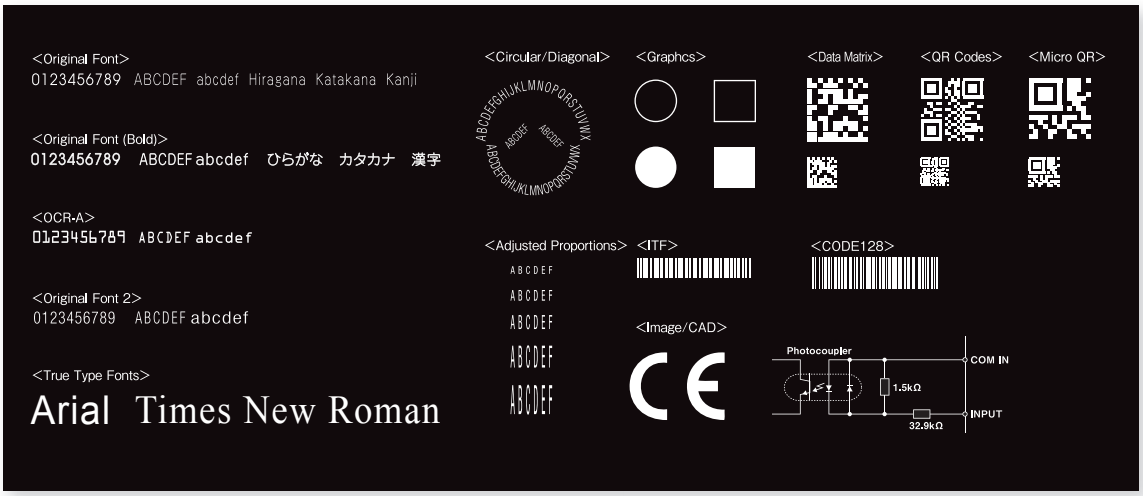


Cost and labor for the design, implementation and execution were high.



Design, implementation, and execution are greatly simplified.

Laser Marking Samples



Specifications

Item		MX-Z2000H-V1	MX-Z2050H-V1	MX-Z2055H-V1*1
Processing laser	Type	Fiber laser Wavelength : 1,062nm		
	Laser class	Class 4 (IEC60825-1)		
	Average output	20W (Fiber laser transmitter output)		
	Laser output mode	Standard mode/EE mode*2		
	Repetition frequency	Standard mode 10kHz to 1,000kHz in 0.1-kHz steps/EE mode*2 10kHz to 100kHz in 0.1-kHz steps		
	Pulse-train width(pattern)setting	Standard mode 7.5ns~300ns(15patterns)/EE mode*2 150ns~450ns (3patterns)		
Guide laser and focus pointer	Type	Semiconductor laser wavelength: 655nm		
	Laser class	Class 2 (IEC60825-1)		
Optical specifications	Marking area	90×90mm	160×160mm	160×160mm
	Working distance	170±10mm	220±10mm	220±10mm
Scanning specifications	Scan speed	1~12,000mm/s		
	Marking resolution	2µm	4µm	4µm
Detail of marking	Text	original / original2 / OCR-A / OCR-B / SEMI / LM font / True Type font		
	Bar code	CODE39 / NW-7 / ITF / CODE128 / JAN GS1 Databar Omni-directional / GS1 Databar Truncated/GS1 Databar Limited / GS1 Databar Expanded		
	2D code	QR code / Micro QR code / DataMatrix(ECC200)/ GS1 DataMatrix(ECC200)		
	shape	Fixed point / Straight line / Rectangle / Circle / Arc		
	3D shapes	Slope / Step / Cylinder / Truncated Cone / Sphere		
	Image and CAD	BMP/JPG/PNG/DXF		
Settings	No. of data/blocks	Marking data :10,000. ; blocks :2,048		
	Text setting	0.1mm~120mm		
Cables	Fiber cable	4.5m Minimum bending radius: 100mm		
	Marker head control cable Marker head power supply cable	5m Minimum bending radius: 100mm		
External interface*3	Terminal block and I/O connector	Terminal block input 20pins(NPN/PNP compatible); terminal block 14pins(NPN/PNP compatible) I/O connector 37pins(NPN/PNP compatible),interlock terminal : input/output 8pins		
	Serial communications	RS-232C/RS-422A		
	Ethernet communication	Ethernet(1000BASE-T/100BASE-TX/10BASE-T) / EtherNet/IP™		
Power supply voltage		100 to 120VAC,50/60Hz ; 200 to 240VAC,50/60Hz		
Over voltage category		CAT II		
Power consumption		at 100VAC: maxmum 390VA , at 200VAC : maxmum 420VA		
Ambient conditions	Operating ambient temperature*4,humidity	0 to 40℃, 35 to 85%RH(no condensation)		
	Strage ambient temperature,humidity	-10 to 60℃(no freezing) / 35 to 85%RH(no condensation)		
	Installation environment	Indoor , 3,000m, max		
Pollution degree		2		
Protection structure(head)*5		IP65		
Coolin method		Forced air cooling		
Weight		Marker head Approx.15kg, Controller Approx.25kg		
Size		Marker head W140×H230×D415mm(excluding projections), Controller W225×H430×D390mm(excluding projections)		
Installation direction		Marker head All directions of up, down, left and right (intake vent on the left side face must not be blecked.)Controller Must be installed vertically.		
USB interface*6		USB memory : Controller front panel, Type A connector, keyboard/mouse :controller back panel ,TypeA connector		
Accessories		Marker head control cable, Marker head power supply cable, System key , Removable terminals(input and output, 1each), Instruction sheet, CD-ROM(Office editing software*7, User's manual, Setup manual., Translation table between Japanese ,Chinese and Korean). Interlock release connector, Terminal opener, Cable tie, Warring labels.		

Notes

*1 Faster marking for resins and plastics films (1.8x faster than MX-Z2050H, 2.0x faster than MX-Z2000H. In case of the fill marking on a plastic film)

*2 EE mode : Energy Enhanced mode (optional)

*3 There are restrictions on functions and commands that can be used by each external interface. Please check the user's manual before use.

*4 The operating temperature may be limited due to the processing conditions. When using ther laser continuously or close to continuously for laser processing,etc. ,please contact OMRON in advance.

*5 The head of this product is constructed for environmental protection under the conditions specified in IEC 60529(JIS C0920) , and is not guaranteed under any other conditions.

*6 Do not use the USB interfaces for anything other than ther specified applications.

*7 The following environment is required for using the offline editing software and font logo editor
: Computer with a USB 2.0. or 1.1 port , Microsoft Windows®7 / Windows®8 / 8.1 / Windows®10, Available hard disk space : 1GB, min. Display resolution : 1,024×768, min.

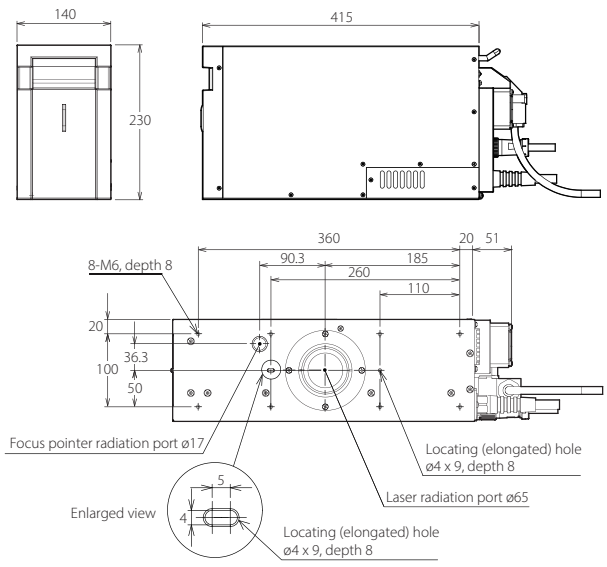
<Items Sold Separately>

MX-9301	Controller power supply cable (PSE,UL) plug type B
MX-9302	Controller power supply cable (VDE,AS) plug type F
MX-9230	EE mode activation key
Finder option	Please refer to the catalogue Q255-E1.
Other	Contact your local OMRON representative about details.

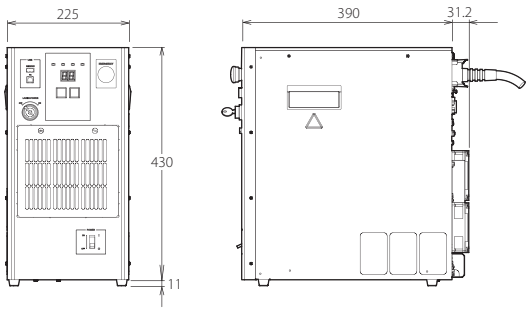
Note: Use commercially available products for the other devices required: USB keyboard, USB mouse< and monitor (VGA 3-row 15-pin, or DVI-D input with 1,024×768 minimum resolution).

External dimensions

Marker head (Unit: mm)



Controller



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