OMRON

MX-Z2000H-V1
MX-Z2050H-V1
MX-Z2055H-V1

Fiber Laser Marker

INSTRUCTION SHEET

Thank you for selecting OMRON product. This sheet primarily describes precautions required in installing and operating the product.
Before operating the product, read the sheet thoroughly to acquire sufficient knowledge of the product. For your convenience, keep the sheet at your disposal.

■ Reference Manual

Manual Name	Man.No.	Model
Fiber Laser Marker MX-Z2000H-V1 Series Setup Manual	Z415	MX-Z2000H-V1 MX-Z2050H-V1 MX-Z2055H-V1
Fiber Laser Marker MX-Z2000H-V1 Series User's Manual	Z416	

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Notes on Safety

● **Safety Labels and Definitions**

In this manual, the precautions are indicated with the following labels and symbols so that MX-Z2000H-V1 series can be used safely. The precautions described here contain information critical to ensuring safety. Be sure to observe them. The labels and symbols are as follows.

⚠ Danger	Improper handling will lead to a hazardous situation where a death or serious injury may result. It may also result in serious property damage.
⚠ Warning	Improper handling will lead to a hazardous situation where a minor or moderate injury or, in the worst case, serious injury or death may result. It may also result in critical property damage.
⚠ Caution	Improper handling will lead to a hazardous situation where a minor or moderate injury, or property damage may result.

● **Meaning of Graphic Symbols**

	● Laser beam Indicates a possibility of injury or damage due to laser beam.
	● Caution for electric shock Indicates a possibility of electric shock in certain conditions.
	● Prohibited Indicates a prohibition in general.
	● Caution for explosion Indicates a possibility of explosion in certain conditions.
	● Wear protective glasses Indicates a situation that requires eye guard to be worn.
	● Contact prohibited Indicates a possibility of injury caused by touching a certain part of the device in certain conditions.
	● Execute Indicates an action of a non-specific, general user.
	● Always connect a grounding wire. Indicates an instruction to the user to always connect a grounding wire when using a device with a safety ground terminal.
	● Disassembly prohibited Indicates that disassembly of the device is prohibited as doing so may cause an electric shock or other injury.
	● Caution for high temperature Indicates a possibility of injury due to high temperature in certain conditions.
	● Caution for falling Indicates a possibility of falling due to strongly pushing and pulling certain parts of the device.

● **Warning display**

⚠ Danger

A serious personal injury may result.
Do not operate the product unless you have received laser safety training or operation training, or have understood the content of this manual.
Set up the laser controlled area and enclose the laser irradiation area with a shield so that the laser emission does not exceed the class 1 (IEC 60825-1, JIS C6802) level.

A serious personal injury may result.
Voltage is applied to some parts inside the product. Do not touch the inside of the product.

A serious personal injury may result.
When you must touch the electrical system of the product for maintenance or cleaning, disconnect the controller power supply cable of the main unit from the outlet and wait for at least 10 minutes, and then make sure, using a tester, that there is no residual voltage.

⚠ Danger

A serious personal injury may result in some extreme circumstances.
Do not have your hand or any other body part come close to the laser emission port. Furthermore, never open the head cover because the extremely strong, near-infrared laser beam, which is invisible to the eye, is being emitted inside the marker head.

A serious personal injury may result in some circumstances.
Construct an interlock system with which the laser stops when the laser safety gate is opened.

⚠ Warning

A serious personal injury may result in some extreme circumstances.
Do not disassemble the product or modify the inside parts for purposes other than the specified maintenance.

A serious personal injury may result in some extreme circumstances.
Always remove the power plug from the wall outlet before wiring, installing, or performing maintenance on the product.
Be sure to observe the instructions for connections in the manual.

A serious personal injury may result in some extreme circumstances.
Install the product in a location that is as bright as possible.
Since the diameter of pupil is larger in a dark place, laser beam may cause an even more serious injury if it were to hit the eye.

A serious personal injury may result in some extreme circumstances.
Do not place a highly reflective object with a smooth surface near the laser beam path.

A serious personal injury may result in some extreme circumstances.
Do not place a flammable or combustible object around the product or near the laser beam path.
Smoke generating or igniting accident may result.

⚠ Warning

A serious personal injury may result in some extreme circumstances.
Never disconnect the marker head, the controller and the fiber cable.
Stop the use of the product if any of them is disconnected. The product will need to be collected and repaired by OMRON.

A serious personal injury may result in some circumstances.
Always reset the error manually.

A serious personal injury may result in some circumstances.
Sufficiently purify and discharge the gases generated during processing.

A serious personal injury may result.
Unauthorized operation of the product by a person who has not received laser safety training may, in rare cases, result in an injury or other personal accident.
Be sure to have the laser safety manager manage the key switches.

A serious personal injury may result.
Any procedures or adjustments made outside of those specified in this manual may cause exposure to dangerous laser radiation. This product must be controlled and operated using the procedures specified in this manual.

A serious personal injury may result.
Wear protective glasses when emitting laser beam. Laser beam, if it hits the eye, may cause blindness.
Do not look into it.

⚠ Caution

In rare cases, property damage may result.
When using the product, be sure to observe the installation conditions and provide necessary space for it.

Do not use the product in any of the following environments as the product may, in rare cases, be damaged.
(a) Dusty area
(b) Area with oil mist floating in the air
(c) Area subject to impact or vibration
(d) Area with high humidity (of 85% RH or higher)
(e) Wet floor surface
(f) Installation on a table other than an affixed frame (movable part)
Securely tighten the marker head with screws and provide appropriate amount of space.

⚠ Warning

A serious personal injury may result in some extreme circumstances.
Never forcibly continue to operate the product when an error or failure occurs as doing so may result in smoke generating or igniting accident.

A serious personal injury may result in some extreme circumstances.
If you feel a sense of danger due to abnormal behavior or noise while operating the product, do not hesitate to press the emergency stop switch ([EMERGENCY] button) and turn off the power supply to the product.

A serious personal injury may result in some extreme circumstances.
Never +/– short-circuit, charge, disassemble, change the shape by pressure, or put in fire a button battery.

A serious personal injury may result in some extreme circumstances.
Never put a metal object through the opening of the case.

A serious personal injury may result in some extreme circumstances.
Never put a finger through the opening of the case.

A serious personal injury may result in some extreme circumstances.
Terminate the laser beam path with a reflecting diffuser or absorber with appropriate reflectance and heat characteristic.
Do not install the marker head at the height of the eye.
Usage other than specified within this manual is prohibited. There is risk of radiation exposure from the laser beam.

A serious personal injury may result in some extreme circumstances.
Use the dedicated software installed on the main unit.

A serious personal injury may result in some extreme circumstances.
Deposits of dust generated during processing may result in smoke or ignition at a low temperature. Install a suction duct to prevent dust from accumulating.
Do not store the product in a dusty area.

⚠ Caution

In rare cases, the product may be damaged.
Be sure to conduct periodic inspections to maintain the level of product performance and to ensure safety.

In rare cases, property damage may result.
Do not bend the optical fiber cable to a radius of 100 mm or less, or apply excessive load or impact to it.
Do not move the marker head by holding or pulling the fiber cable.

Touching it may, in rare cases, cause a burn due to high heat.
Do not touch while the power is being supplied or immediately after the power is turned off.

In rare cases, the product may be damaged.Do not touch the cover glass with bare hands.

Conducting maintenance in an unnatural posture may, in rare cases, result in an injury or other personal injury.
Provide a space for maintenance when installing the product.

A serious personal injury may result.
Be sure that excessive force is not placed on the area above the caution label for falling on the side of the controller.

When transporting the marker head, be sure to hold the concaved section in front and handle at the back with both hands.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Safety Points

Be sure to observe the following points that are necessary to ensure safety.

1. Usage

This product was developed and manufactured to be integrated with systems, machines, equipment and so on in an industrial environment. When using this product, follow all applicable standards, laws and regulations. Also, the customer is responsible for confirming the compatibility of the product. If these actions are not carried out, OMRON shall not be liable for the compatibility of the product.

2. Installation Location

Do not install the product in any of the following environments.

- Area with an ambient temperature that exceeds the rated range
- Area with sudden temperature shift (area where condensation can occur)
- Area with a humidity level that exceeds the 35 to 85% RH range
- Area subject to direct sunlight or near a heating appliance
- Area where a ferromagnetic field or an intense electric field is present
- Area where a carrier machine, etc. moves
- Area where corrosive gas or flammable gas is present
- Area where dust, salt, or iron powder is present
- Area where water, oil or chemical splashes or mist may be present

3. Power Supply, Connection and Wiring

- Do not use a voltage that exceeds the rated voltage or AC power source.
- Make the separate wiring for high-voltage line, power wire and power to the product. Using the same wire or duct will result in induction, which then may cause malfunction or damage.
- Use the dedicated cables that are specified in this document.
- Connect the controller power supply cable to a 3P outlet with grounding (D-class grounding). If a D-class grounding is not used, there is a risk of electric shock.
- Use SELV (Safety Extra Low Voltage) circuit for all external circuits connected to this product. SELV is an ungrounded circuit separated from dangerous voltage by double insulation or higher insulation, and it does not exceeds safe voltage (peak 42.4 V or 60 V (DC)) even in single failure condition.

4. Interlock

The product is equipped with the interlock function.Set the terminal of the input terminal block [EMERGENCY A] (emergency stop input A) or [EMERGENCY B] (emergency stop input B) to open (OPEN) to forcibly close the shutter inside the marker head and stop the laser emission.
When constructing an interlock system according to Category 3 indicated in International Standards ISO13849-1 (JIS B 9705-1) (classification of the safety-related parts of a control system in respect to their resistance to faults and their subsequent behavior under the fault condition), use the interlock terminal.

5. Emission Direction

The product assumes laser emission in the downward direction. When setting the emission direction to a direction other than downward, at your own risk, please thoroughly implement safety measures, as well as protective measures to prevent dust from sticking to the cover glass.

6. Dust and Gas Generated during Marking

Dust or gas generated during marking can cause damage to the laser oscillator or the optical system. Be sure to protect the laser marker by collecting the dust or gas generated during marking.
When using a suction duct to suck in fine particles, such as metal, oxidized and carbide material, generated during marking, welding, cutting or other processes, use a duct with straight interior walls with which fine particles are hard to accumulate, and install the duct so that fine particles do not accumulate. Furthermore, periodically clean the inside of the duct to prevent fine particles from accumulating and to prevent a dust explosion.

7. Other

- Do not disassemble, repair, modify, change the shape by pressure, or incinerate this product.
- When disposing of the product, follow the instructions of the local government and other authorities and dispose of it as industrial waste.
- Connect the dedicated products (marker head, controller and cable). Use of non-dedicated products may lead to malfunction or failure.
- If you feel a sense of error, immediately stop using the product and turn off the power supply, and contact your OMRON representative.
- Do not move the product with the cable still attached.
- Do not cut the fiber cable. If the fiber cable is cut accidentally, please stop using the product and consult your OMRON representative.

Notes on Operation

Observe the following points to prevent the product from becoming inoperative or malfunctioning, or to avoid adverse effects on its performance or device.

1. Power Supply, Connection and Wiring

- Never bundle the marker head control cable and the marker head power supply cable together with 200/100 [VAC] power wires or the power wire or control wire of the AC motor, AC servo motor, or electromagnetic valve, etc. that is being used on your system.Bundling them together will cause noise to enter the galvanometer control cable and the I/O cable for the external control device, which may result in a laser marker malfunction.
- If there is a surge in the power supply line, connect a surge absorber depending on the operating environment.

2. Operating Environment

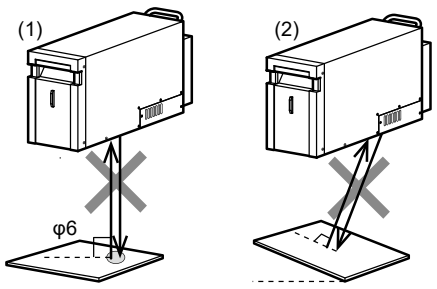
- To prevent power supply noise or radiant noise from occurring, be sure to implement measures against noise, such as a spark killer, at the locations where a surge can occur, such as the point of contact with the motor used for surrounding devices.
- Refrain from using a cellular phone as it may cause the laser marker to malfunction.

3. Work materials

Follow the instructions below when using this product with gold, silver, copper, or other highly reflective materials. Reflected beams may damage the marker head.

(1) For a work positioned horizontally to the marker, do not mark within φ6 mm of the center of the marking area.
(2) If the marking surface of the work is slanted or curved, ensure that the specular reflection beam is not reflected back into the marker head.

Please consult with our sales center when using this product within these conditions.



4. Maintenance Inspection

- If the cover glass of the marker head laser irradiation port gets dirty, the laser output may drop or a failure may occur. Do not use this product while the cover glass is dirty.
- Do not use thinner, benzene, acetone or kerosene items to clean the marker head or the controller.Carefully remove dirt or dust on the cover glass without scratching it by moistening with cleaning agent a piece of cleaning paper specifically for use on an optical device.

5. Storage

Do not store the product in an environment described below.

- Storage temperature: -10 to 60 °C (Non condensation or freezing)
- Storage humidity: 35 to 85% RH (No condensation)
- Outdoor or area subject to direct sunlight
- Area where corrosive gas, flammable gas, oil or mist may be present
- Area that is constantly vibrating or subject to startling vibration
- Very dusty area

The aforementioned points do not guarantee any unforeseen situations that may arise from storing of the product.

6. Packing and Transporting

This product is a precision machine.Please carefully observe the following points to avoid damaging the product if you are packing and transporting the roduct. When transporting the product, use the packing materials that were used at the factory setting by OMRON.

- Do not stack it on top of anything.
- Do not apply strong pressure on the cables.
- Pack and transport the product in the same direction as it was installed.
- Protect the control panel, display panel, connector and other parts from damage.
- Prevent condensation.
- Prevent the product from rolling over or falling, or do not apply strong impact.
- Refer to the previous item, "Storage," for details of storing the product that is packed and is in transit.

The aforementioned items do not guarantee any unforeseen situations that may arise from packing or transporting of the product.

Applicable Standards

1.EU directives and UK legislations

We have confirmed that this product satisfies the requirements of EU directives and UK legislations on the basis of the following requirements. Keep the following requirements in mind when you use

EMC Standards

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

- Make sure to attach the ferrite core to the position specified in this INSTRUCTION SHEET.
- When RS-232C or RS-422A serial port is used, use a shielded twisted pair cable (AWG24) equivalent to UL2464U-TKVVBS (Tachii Electric Wire).
  MX-9160-1M, 3M, and 5M (option) cables are available for RS-232C to connect this product with the PLC.
- Use a shielded cable 5m or less for connecting to the Ethernet port.
- Use a shielded cable (AWG12 to 26) for connecting to the removable terminals (for input and output) and I/O connector.
- We do not guarantee that this product works with any monitor, mouse, or keyboard. Check the compatibility before selecting adevice.

These requirements do not guarantee that all machinery and equipment with this product incorporated satisfy the requirements of EMC. Manufacturers of the machinery and equipment are responsible for verifying the compatibility of the product with all the machinery and equipment.

Safety Standards

■ Low Voltage

EN61010-1 "Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements" EN60825-1 "Safety of laser products - Part 1: Equipment classification and requirements"

- Install in a place with an altitude of 3000 m or less.
- Install indoors.
- The laser marker is a class 4 product. It is your responsibility to build your own safety system when using the product.

■ Machinery

When incorporating this product into a device that complies with IEC60204-1 Standard | Safety of machinery - Electrical equipment of machines - Part 1: General requirements, the exterior of the product may need to be changed. Please purchase the "Masking set" (MX-9190) that helps you easily change the exterior of your laser marker.

2.UL standards

We have confirmed and received certification that this product satisfies the requirements of the UL standard on the basis of UL 61010-1.

3.Regulation of perchlorate in California, United States

This product uses parts that contain perchlorate. When you bring this product or a device with this product incorporated into California in the United States, the following statement must be indicated on the individual packing box and shipping box or ondocuments such as manuals or MSDS included in the package.

Perchlorate Material - special handing may apply, see http://www.dtsc.ca.gov/hazardouswaste/perchlorate/

4.Korean Radio Waves Act

This device has been evaluated for compatibility in industrial use. When used in a household setting, the device may cause radio interference.

사 용 자 안 내 문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다

5. List of Applicable Standards

This product complies with the following standards. Note that this product is not certified by safety standards in countries and regions not listed. When exporting the laser marker overseas alone or incorporated into a machine or device, always check the laws and standards in the country or region the product is exported to.

Applicable Standards	Details
JIS (Japanese Industrial Standards)	Compliant with JIS C 6802 "Safety Standards for Laser Products"
Radio Act (Japan)	Not applicable (Corresponds to facilities not requiring permission)
FDA (U.S. Food and Drug Administration) regulations	21 CFR1040.10 except for deviations pursuant to Laser Notice No. 50 "PART 1040 PERFORMANCE STANDARDS FOR LIGHT-EMITTING PRODUCTS" Evaluated under IEC60825-1:2007
FCC	47 CFR Part15 SubpartB ClassA Digital Device
ICES	ICES-001 Class A ISM equipment
Korean Radio Waves Act	Korean Radio Waves Act Electromagnetic interference (EMI) • KN11 • KN61000-6-4 Electromagnetic susceptibility (EMS) • KN61000-6-2
EU directives / UK legislations	2014/30/EU "EMC directive" and Electromagnetic Compatibility Regulations 2016 Electromagnetic interference (EMI) • EN61000-3-2 Class A "Harmonic emission" • EN61000-3-3 "Voltage fluctuations and flicker" • EN61000-6-4 "Emission standard for industrial environments" Electromagnetic susceptibility (EMS) • EN61000-6-2 "Immunity standard for industrial environments" 2014/35/EU "Low Voltage Directive" and Electrical Equipment (Safety) Regulations 2016 • EN61010-1 "Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements" • EN60825-1 "Safety of laser products - Part 1: Equipment classification and requirements"
UL, CSA Standards	UL61010-1, CAN/CSA C22.2 No.61010-1
GB Standards	GB7247.1
RCM	EN61000-6-4

For Safe Use of Laser Products

Although JIS C6802-compliant safety measures are incorporated in this product, the safety measures can be effective only when theuser of the product understands the functions of these measures.Accordingly, please keep in mind that JIS C6802-compliantproducts are products in which the safety measures specified by JIS C6802 are incorporated, and that the products, on their own, arenot necessarily safe.
This product is categorized as class 4 based on the JIS C6802
classification.The product incorporates the function of the safetymeasures based on JIS C6802 for the protective casing of the laser oscillator part, cover interlock, remote interlock (externalinterlock), key control, laser emission display, opening label, classification label, warning label, radiant output information
label, andoptical path cut-off (internal shutter).
Users of the product must use these functions to apply the safety measures..

Safety Measures for Class 4 Products

(1) Assignment of the laser safety manager
A laser safety manager is "a person who has the sufficient knowledge required to evaluate the danger of laser and to ensure safety and who is responsible for the laser management," and is selected based on the level of knowledge and experience inhandling laser devices and prevention of interference due to laser emission. Such a person must conduct tasks equivalent to those of a laser device manager based on the "Measures to prevent interference caused by laser beams" issued by the Ministry of Health, Labour and Welfare (March 25, 2005).

(2) Setting and management of the laser controlled area
Separate the area from other areas and place a sign to clearly indicate that the area is a laser controlled area. Ensure that only authorized personnel are allowed to enter the area.
Do not allow any hazardous materials such as explosives and flammables to be brought into the controlled area.

(3) Warning displays and signs
- Post signs of danger and hazard of a laser beam and its handling precautions in locations where the signs are easily seen.
- Post the name of the laser safety manager.

(4) Use of remote interlock
When using this product, construct an interlock system and surround the laser emission area with protection in order to prevent radiation exposure due to reflections from the object to be marked or the surrounding area. Also, install the controller in a locationnot being exposed to laser beams.

(5) Management of the keys to operate the laser devices
While a laser device is not in use, be sure to remove the system key and pass it to the safety manager for safekeeping in order to keep the laser from being operated by unauthorized personnel or without permission.

(6) Setting and verification of the beam path position
Setting the beam path position lower than the eye level of a seated person or higher than the eye level of a standing person can prevent laser beams from getting in the eye accidentally.

(7) Handling of the end terminal
Take into consideration when no work exists and terminate the laser radiation range with a reflecting diffuser or absorber with appropriate reflectance and heat resistance.

(8) Prevention of specular reflection
Do not use a specular reflector at the terminal.

(9) Cut-off and attenuation of beam
Be sure to install a protective enclosure around the laser radiation range and scattered beams in order to prevent radiationexposure due to unexpected reflection from the printed object and surrounding objects. Scattered beams may exceed class 1 level. Take measures to prevent laser exceeding class 1 level from leaking through thegaps in the protective casing joints.

(10) Inspection and maintenance of protective gear (safety glasses, protective wear, flame-resistant materials)
- Wearing laser safety glasses for eye protection in the laser controlled area must be mandatory. Use laser safety glasses that covers wavelength range of 1062 nm.
  Do not look at a direct or reflected laser beam even with safety glasses on. Safety glasses are for protecting eyes from scattered beams, not for protecting eyes from direct or reflected beams.
- Laser beam irradiation to the skin may cause burns and irradiation to clothing may cause it to burn.
  Wear flame-retardant clothing with as little skin exposure as possible.

(11) Safety training/practice

(12) Occupational health (Medical examinations (anterior part of the eye and ocular fundus))

(13) Other measures to prevent any interference due to laser radiation (system protective casing, safety inspections, etc.)

Caution--use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Risk Level and Safety Measure

Summary of safety measures requirements for users (JIS C6802)

Requirements	Classification						
	Class 1	Class 1M	Class 2	Class 2M	Class 3R	Class 3B	Class 4
Laser safety manager	Not required, but recommended to have one in place for an application that involves direct observation of the laser beam.				Not required for visible radiation. Required for non-visible radiation.	Required	
Remote interlock	Not required					Connect to the room or the door circuit.	
Control with a key	Not required					Unlock when not in use.	
Beam attenuator	Not required					Avoid inadvertent emission when in use.	
Emission indicator	Not required				Indicates that laser is being emitted in non-visible wavelengths.	Indicates that laser is being emitted.	
Warning sign						Follow the safety measure described on the warning sign.	
Beam path	Not required	Same as class 3B	Not required	Same as class 3B	Terminate the beam at an end of an effective length.		
Specular reflection	Not required item	Same as class 3B	No required item	Same as class 3R	Avoid unintended reflection.		
Eye protection	Not required item					Required when the technical and administrative procedures cannot be executed, and when the laser level exceeds the MPE(*1).	
Protective clothes	Not required item					Required in some cases.	Requires specific instructions.
Practice	Not required item	Same as class 3R	No required item	Same as class 3B	Required for all operators and maintenance personnel.		

*1: MPE (Maximum Permissible Exposure)
Maximum value of the level of laser irradiation to which a person may be exposed without hazardous effects in a normal environment.

Note: The table lists the required elements for your convenience.

Laser Information

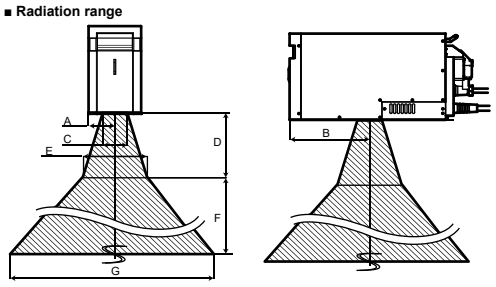
■ Class 4 laser (processing laser)

Class 4 lasers are defined to "have a possibility of causing acute vision disturbances and skin damage with direct and scattered beams and causing a fire".

Item	Specification			Remarks
	MX-Z2000H-V1	MX-Z2050H-V1	MX-Z2055H-V1	
Wavelength	1062 nm			Invisible laser
Laser medium	Yb: Fiber			-
Maximum output *1	40 W			-
Average output	20 W (fiber laser osillator output)			-
Laser oscillation type	Pulse oscillation			-
Pulse cycle	10 kHz to 1000 kHz			-
Pulse width	1 to 500 ns			-
Class	4			-
NOHD*2	See the figure below.			Nominal Ocular Hazard Distance
MPE *3	MPE for the cornea: 50 W/m^2			Maximum Permissible Exposure
NOHA	Indicates an area where the laser beam radiation intensity or radiation exposure exceeds the maximum permissible exposure. The maximum hazard distance and range are the same as a sphere that has the radius of NOHD. It changes according to the workpiece reflectance and surface conditions. Calculate the value taking the actual usage conditions into consideration.			Nominal Ocular Hazard Area

*1: Maximum output refers to the maximum power of the laser beam that the device may output under all operating conditions including during a single point of failure. (The maximum output may exceed the highest output during normal operation.)
*2: Indicates the distance from the source at which the beam radiation intensity or radiation exposure becomes equal to the maximum permissible exposure for the cornea.
*3: The value is calculated with the exposure time set to 10 seconds.

■ Radiation range



Unit: mm

Position	Specification		
	MX-Z2000H-V1	MX-Z2050H-V1	MX-Z2055H-V1
A: Laser irradiation port center position	70		
B: Laser irradiation port center position	210		
C: Laser irradiation port diameter	65		
D: Working distance	170	220	
E: Laser radiation range in focusing surface	φ342	φ423	
F: NOHD	22m	29m	57m
G: Laser radiation range in NOHD	φ17m	φ31m	φ60m

■ Class 2 laser (guide laser, focus pointer)

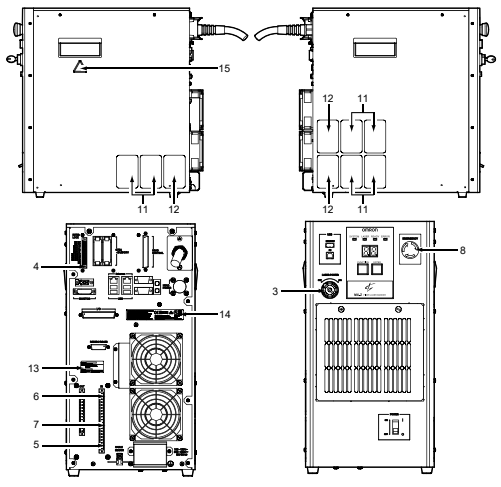
Class 2 lasers are defined as "laser products that are safe when exposure is momentary and the eye is protected by defensive reactions such as blinking, but are hazardous when the beam is stared into deliberately".

Item	Specification			Remarks
	MX-Z2000H-V1	MX-Z2050H-V1	MX-Z2055H-V1	
Wavelength	655 nm			Visible laser
Laser medium	Semiconductor laser			-
Maximum output	1 mW			-
Laser oscillation type	CW (continuous wave)			-
Class	2			-

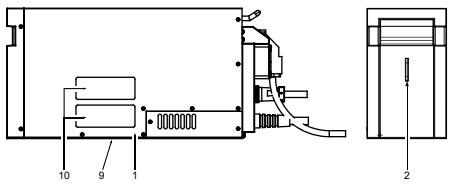
■ Safety Functions of Laser Marker

This product is equipped with the following safety functions.

• Controller



• Marker head



No.	Name	Function
1	Shutter	This shutter is located inside the head. Closing this shutter can block the emission of the laser beam.
2	Laser warning indicator	The laser warning indicator light indicates the following statuses. Color / Status / Meaning Unlit / Laser power OFF / The laser power is OFF. Green / Laser power ON / The laser power is ON and laser can be irradiated (laser standby mode). Red / Processing laser irradiating / Processing laser is being irradiated (marking is in progress). Green/red / Guide laser irradiating / Guide laser is being irradiated.
3	Key switch	The laser power ON/OFF can be controlled with the key switch. While a laser system is not in use, the safety manager must keep the system key in order to keep the laser from being operated without permission.
4	Interlock connector	This connector is used to construct a mechanism that forcibly turns OFF the laser and stops the laser emission. Use this connector to utilize a device into which the laser marker is incorporated as the interlock system to comply with International Standards ISO13849-1 (JIS B 9705-1). refer to: Setup Manual "Chapter 7 Safety Control via Interlock (page 7-1)"
5	I/O emergency stop input	Set the [EMERGENCY A] (emergency stop input A) or [EMERGENCY B] (emergency stop input B) terminal to open (OPEN) to forcibly close the shutter inside the marker head and stop the laser emission.
6	Marking stop input	Input a signal to [STOP] to stop the processing laser emission and operate in the guide laser mode.
7	Shutter control input	Open the [SHUTTER A] (shutter control input A) or [SHUTTER B] (shutter control input B) terminal to close the shutter.
8	Emergency stop switch	If you want to immediately stop the marking, press this switch to turn OFF the laser power.
9	Laser beam exit	This is the laser irradiation port.

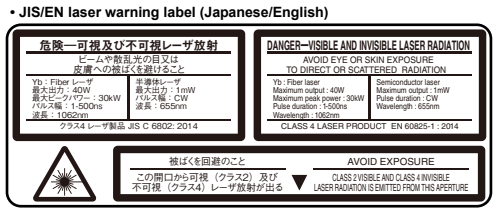
No.	Name	Function
10	JIS/EN laser warning label	See the figure below.
11	Electric shock warning label	
12	Igniting or explosion warning label	
13	Name plate	
14	Standard label	
15	Caution label for fall hazards	

Warning Label Display

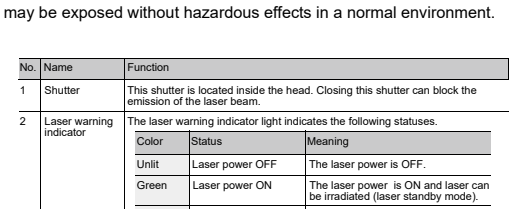
● Marker Head

The JIS (Japanese), EN (English), and EN (German/French) laser warning labels are affixed on the marker head. GB (simplified) and IEC (traditional) warning labels are also included. Affix the appropriate label according to the regulations and standards in the country/region the product is used.

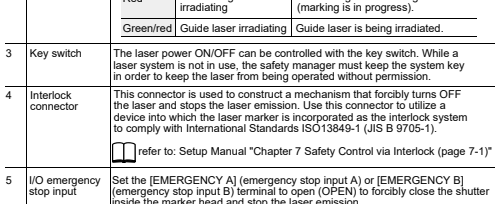
• JIS/EN laser warning label (Japanese/English)



• EN laser warning label (German/French)



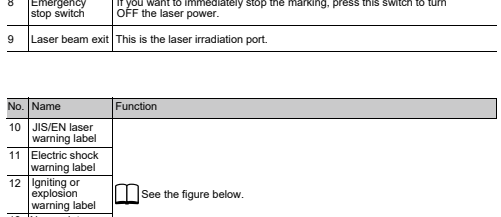
• GB/IEC laser warning labels (Simplified/Traditional Chinese)



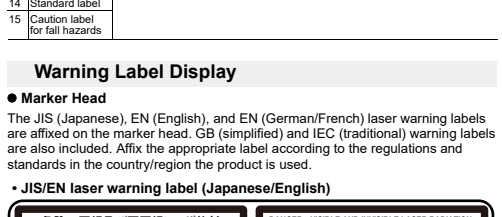
● Controller

Japanese, English, and French version of electric shock warning label (grounding), electric shock warning label (disassembly), igniting or explosion warning label (Litium batteries) are affixed on the controller.

• Electric shock warning label (grounding)

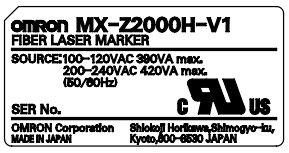


• Electric shock warning label (disassembly)



• Igniting or explosion warning label (Lithium batteries)

• Name plate



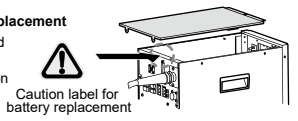
• Standard label

• Caution label for fall hazards

If you press hard on the side of the controller or apply an impact, it may fall over. Please install after safety measures.

• Caution label for battery replacement

The button battery is mounted inside the controller. Please use Panasonic CR2032 button battery to replace.
Using different batteries may lead to smoke and fire accidents.



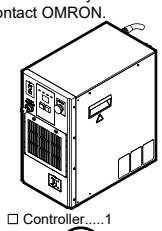
The caution label for battery replacement is attached to the top of the back plate and can only be seen when the lid opened.

■ Preparation before Installation

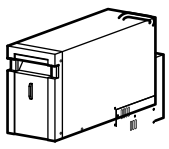
This section explains the things you should do before using the Fiber Laser Marker, such as checking the items in the package and preparing the peripherals.

Checking the Items in the Package

The package of your Fiber Laser Marker MX-Z2000H-V1 series contains the items specified below. Check the content and if you find anything missing, please contact OMRON.



☐ Controller.....1

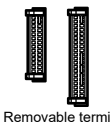


☐ Marker head.....1

☐ System key.....2

☐ Marker head control cable.....1

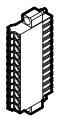
☐ Marker head power supply cable.....1



☐ Removable terminal (For input/output) ..... 1 each

☐ CD-ROM.....1 (Supplied software, Setup manual, User's manual)

☐ Cable tie.....1



☐ Interlock release connector.....1

☐ Ferrite cores.....2

☐ GB/IEC laser warning labels (Simplified/Traditional Chinese)..... 1

☐ Instruction sheet (this manual)..... 1

Do not throw away the packing materials, but keep them with the package. When transporting or moving the Fiber Laser Marker, be sure to use the original packing materials.
The controller and marker head come pre-connected with a fiber cable. The cable cannot be disconnected or reconnected.
Controller power supply cable is not included. For details on the controller power supply cable, refer to: Setup manual "Controller Power Supply Cable Connection (page 2-21)"
Please prepare a PC that can read the CD-ROM to refer to the manual. You need to have Adobe Reader® installed by Adobe® on your PC.

Peripherals to be Prepared

In addition to the aforementioned items in the package, the customer should prepare the peripherals specified below. Prepare them as necessary.

■ Peripherals used in the basic system configuration

The following peripherals are used in the basic system configuration:

Item name	Specification
Monitor	• DVI-D input specification • VGA input specification (15-pin, 3 rows) Number of pixels: 1,024 × 768 pixels or more (Recommended)
Keyboard	USB connector specification
Mouse	USB connector specification

■ Peripherals used for I/O communication, serial communication or Ethernet communication

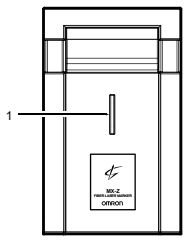
To control the system from an external device with I/O communication, serial communication, Ethernet communication or other type of communication, or to share data via Ethernet communication, use an appropriate device and cable meeting the specific purpose.In this case, be sure to check beforehand whether the communication specification, wiring, etc., meet the controller specification.

■ Name and Function of Each Part

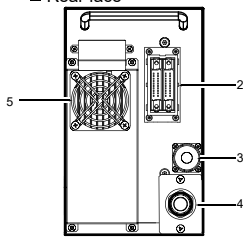
This section explains the name and function of each part of the marker head and controller.

Marker Head

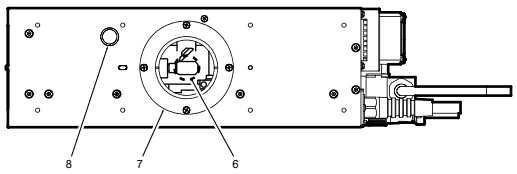
■ Front face



■ Rear face



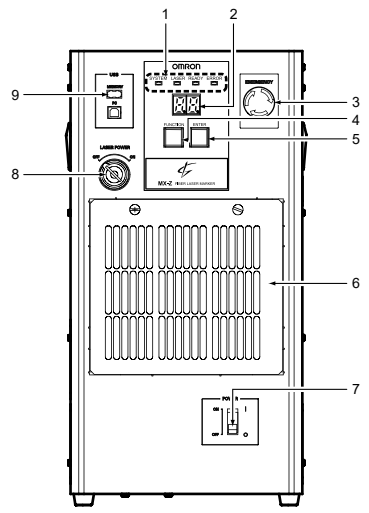
■ Rear face



No.	Name	Function	Reference page
1	Laser warning indicator	This indicator indicates the status of the marker head.	refer to: Setup manual 17
2	Marker head control connector	This connector is used for communication between the marker head and controller.Connects the marker head control cable.	refer to: Setup manual 2-20
3	Marker head power supply connector	This connector supplies power from the controller to the marker head. Connects the marker head power supply cable.	refer to: Setup manual 2-20
4	Fiber cable	This cable transmits laser. It comes pre-connected with the controller and cannot be disconnected.	refer to: Setup manual 2-20
5	Cooling fan	This fan cools the inside of the marker head.	refer to: Setup manual 9-10
6	Laser beam exit/Guide laser exit	Laser, and guide laser used for positioning, are irradiated from this exit.	refer to: Setup manual 3-10
7	Cover glass	This glass protects the laser beam exit/guide laser exit. The glass must be cleaned periodically	refer to: Setup manual 9-2
8	Focus pointer exit	Focus pointer used for adjustment of laser focus position is irradiated from this exit.	refer to: Setup manual 3-10

Controller

■ Front face

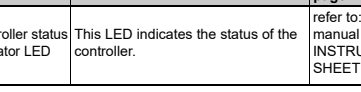


No.	Name	Function	Reference page
1	Controller status indicator LED	This LED indicates the status of the controller.	refer to: Setup manual 2-7, INSTRUCTION SHEET 3/6

No.	Name	Function	Reference page
2	Display	This display shows the current marking status, execution of functions via controller operation and result of execution, error/alarm codes, etc.	refer to: Setup manual 2-8, INSTRUCTION SHEET 3/6
3	Emergency stop switch ([EMERGENCY] button)	If you want to immediately stop the marking due to occurrence of abnormality, pressing this switch forcibly stops the system. In this case, the unit generates an error. Turn the switch in the direction of the arrow to turn it off (reset the emergency stop).	refer to: Setup manual 3-45
4	[FUNCTION] button	This button is pressed if you want to enable/disable marking, install marking data from a USB memory or switch between functions when the controller is not connected to a monitor, keyboard or mouse.	refer to: Setup manual Chapter 8
5	[ENTER] button	This button is pressed if you want to confirm a given function set with the [FUNCTION] button when the controller is not connected to a monitor, keyboard or mouse.	refer to: Setup manual Chapter 8
6	Filter panel	An air filter for protecting the interior of the controller is attached on the rear face.This air filter must be cleaned/replaced periodically.	refer to: Setup manual 9-6
7	Breaker (with earth leakage breaker function)	This breaker turns the laser marker power supply ON/OFF.	refer to: Setup manual 3-5 3-37
8	[LASER POWER] key switch	When the system key is inserted and turned to the [ON] position, the laser power will turn ON and the unit will be ready to irradiate laser. When the system key is turned to the [OFF] position, the laser power will turn OFF.	refer to: Setup manual 3-6 3-36
9	[MEMORY] connector*1	Connects a USB memory to be used for data transfer. Specification: USB A connector	refer to: Setup manual 2-25

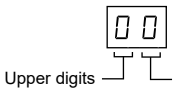
*1 Do not use the USB interface for anything other than specified.

● Controller status indicator LED



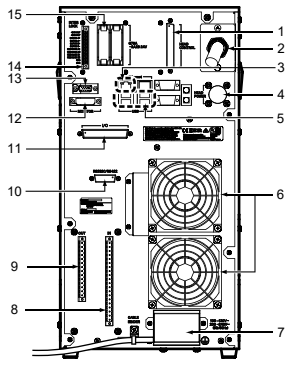
Name	Color	Status	Meaning
[SYSTEM] LED	Green	System power supply ON	This LED comes on when the system is started.
[LASER] LED	Orange	Laser power ON	This LED comes on when the laser power is turned ON.
[READY] LED	Yellow green	Running and ready	This LED comes on when the system is running and ready to operate. I/O signals and communication commands can be received in this state.
[ERROR] LED	Red	Error	When an error (major trouble) occurs, this LED comes on and buzzer sound is output. The controller does not operate while this LED is lit.For the remedial action, refer to "Chapter 10 What to Do in Case of Abnormality (page 10-1)".

● **Display**



Application	Display	Meaning	Reference
Error display	E- → ** → **	After "E-" is displayed, a 4-digit code is shown in the order of upper two digits → lower two digits (repeated).	refer to: Setup manual Chapter 10
Alarm display	A- → ** → **	After "A-" is displayed, a 4-digit code is shown in the order of upper two digits → lower two digits.	

■ Rear face



No.	Name	Function	Reference page
1	Marker head control connector	Connects the marker head control cable.	refer to: Setup manual 2-20
2	Fiber cable	This cable comes pre-connected with the marker head. It cannot be disconnected.	refer to: Setup manual 2-20
3	Ethernet port	To perform Ethernet communication, connects the LAN cable. Specification: RJ-45	refer to: Setup manual 2-26
4	Marker head power supply connector	Connects the marker head power supply cable.	refer to: Setup manual 2-20
5	USB connector*1	Connects the keyboard or mouse.	refer to: Setup manual 2-24
6	Cooling fans	These fans cool the inside of the controller.	refer to: Setup manual 9-10
7	Power supply terminal block (with cover)	Connects the power supply cable.	refer to: Setup manual 2-21
8	Input terminal block	Connects an external device using the supplied removable terminal when operating/ controlling the system via I/O communication using a sensor, PLC, etc.Specification: 20-pin	refer to: Setup manual 2-25
9	Output terminal block	Connects an external device using the supplied removable terminal when operating/ controlling the system via I/O communication using a sensor, PLC, etc.Specification: 14-pin	refer to: Setup manual 2-25
10	RS-232C/RS-422A serial port	Connects an external device when operating/controlling the system via serial communication using a PLC or PC.Specification: D-sub, 15-pin (female)	refer to: Setup manual 2-26
11	I/O connector	Connects an external device when operating/controlling the system via I/O communication using a sensor, PLC, etc. Specification: D-sub, 37-pin (male)	refer to: Setup manual 2-25
12	Monitor connector (DVI)	Connects the monitor cable. Specification: DVI (female)	refer to: Setup manual 2-22
13	Monitor connector (D-sub)	Connects the monitor cable. Specification: D-sub, 15-pin, 3-row connector (female)	refer to: Setup manual 2-22
14	Interlock connector	When constructing an interlock system according to Safety Category 3 or above, connect with a safety controller or other device.	refer to: Setup manual 7-1
15	Safety relay	A relay which turns the laser power ON/OFF based on the signal from the interlock connector. Model: G7SA-2A2B DC24	refer to: Setup manual 7-1

*1 Do not use the USB interface for anything other than specified.

■ Installation Environment

This section explains the environment and conditions needed to install the product, as well as items to note.

Installation Environment and Conditions

■ Installation environment

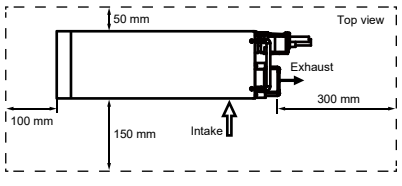
Install or store the controller and marker head in the following environment.

- Location exposed to minimum dust, dirt or oil mist
- Location not subject to sudden temperature shift
- Location free from strong vibration or impact

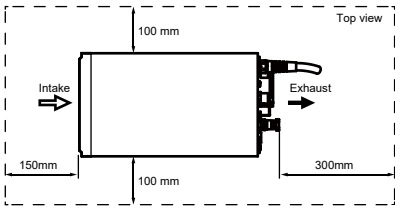
■ Installation space

Before installing the marker head or the controller, be sure to confirm that the space shown below can be provided around the equipment.

● **Marker head**



● **Controller**

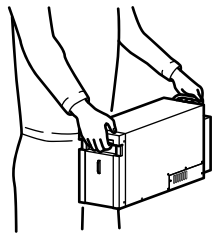


Provide space as indicated in the illustration so as not to disturb the flow of the intake and exhaust.
At this time, control exhaust heat to keep the ambient temperature of the operating system with in the temperature range in compliance with the installation environment standard. If sufficient installation space cannot be ensured, the temperature in the marker head and controller will rise abnormally and may cause the laser power to drop or a failure to occur. Install the controller in a flat, secure place not subject to vibration.
Do not arrange the circuit breaker to make it difficult to operate.

Notes on Installation

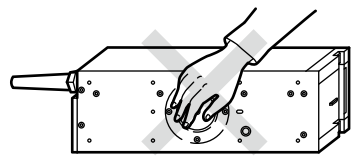
■ Transportation of marker head

When transporting the marker head, be sure to hold the concaved section in front and handle at the back with both hands.Do not hold the marker head by one hand or carry it by the cable.



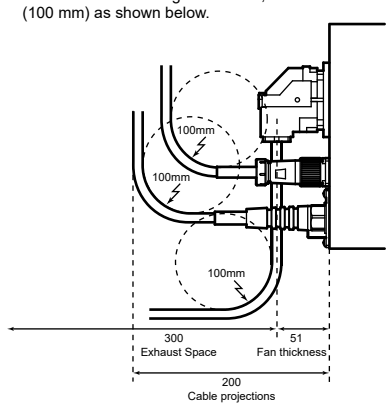
■ Handling of marker head

Do not touch the bottom face of the marker head with bare hands. In particular, never touch the cover glass protecting the laser beam exit/guide laser exit.Doing so may affect the quality of marking.



■ Ensuring of cable bending space

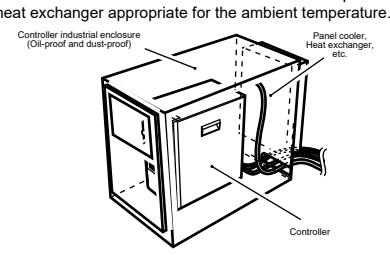
Each cable connected to the marker head has a minimum bending radius. When installing each cable, ensure the minimum radius (100 mm) as shown below.



Do not forcibly bend the cable, as it may cause the cable to break.

■ Controller industrial enclosure

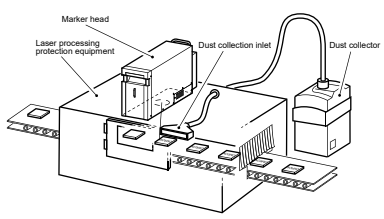
Avoid installing the controller in a production site that has a lot of oil mist and dust, as this may lead to failure. Install the controller in an industrial enclosure so that oil mist and dust cannot enter the internal part of the controller. Also, use an industrial enclosure that does not interfere with the air flow and cooling of the controller. Please select an industrial enclosure which has a panel cooler and heat exchanger appropriate for the ambient temperature.



■ Installation of dust collector

When marking is performed with this unit, dust, smoke and gas will generate.Always provide ventilation and be sure to install a dust collector to remove generated dust, smoke and gas.

- Placing the dust collection inlet near the marking point is effective.
- In cases where oil is attached to the work, dust and smoke is likely to stick to the laser irradiation port of the marker head. In such an environment, thoroughly collect dust by creating a flow of compressedair from the processing surface to the dust collection inlet.

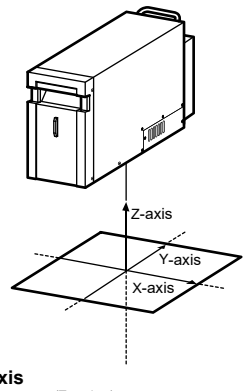


■ Installation of Marker Head

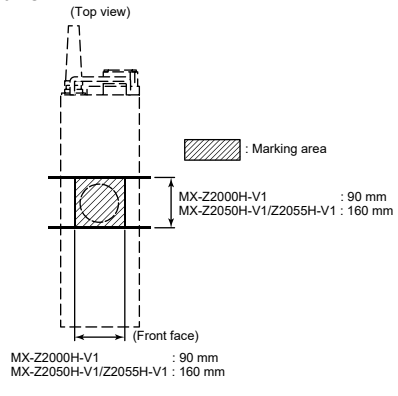
Install the marker head on the plate.
The installation direction is not limited at all, and the market head can be installed in any direction.

Marking Area and Working Distance

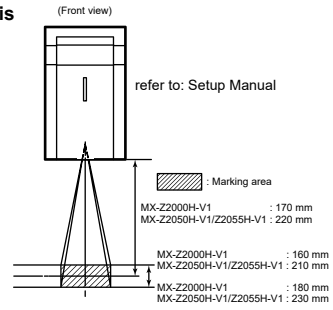
The marker head's marking area (X-axis/Y-axis) and working distance (Z-axis) are shown below. Install the marker head by considering these dimensions and distance.



■ X-axis/Y-axis

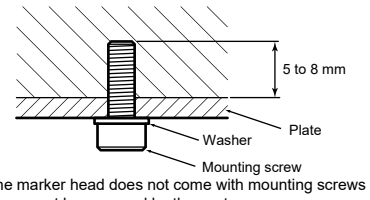


■ Z-axis



Dimensions of Marker Head Mounting Screw

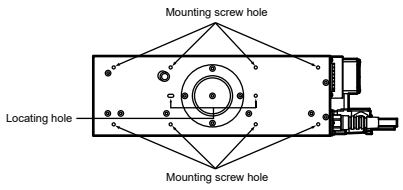
The thread size of the mounting screw is M6.
Also consider the thicknesses of the plate and washer to be installed and use a screw of an appropriate length so that the thread will be inserted by 5 to 8 mm into the mounting screw hole in the marker head, as shown below.



The marker head does not come with mounting screws and washers. They must be prepared by the customer.

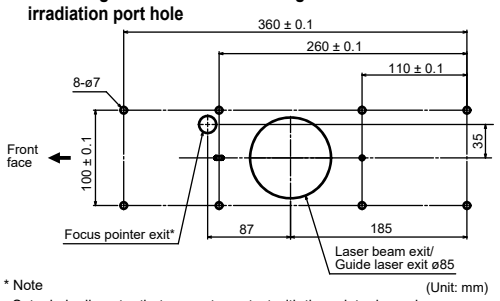
Installation Method

The positions of mounting screw holes (8 locations) in the marker head are shown below.Drill mounting screw holes by referring to Asure to secure the marker head at four or more locations.
Tighten the mounting screws to the torque of 2.4 N·m.



Also drill holes for the laser beam exit and focus pointer exit.

■ Machining dimensions of mounting screw hole/ irradiation port hole



* Note (Unit: mm)
Set a hole diameter that prevents contact with the pointer beam by considering the thickness of the mounting base. (Focus pointer irradiation angle: MX-Z2000H-V1 28.9° / MX-Z2050H-V1/Z2055H-V1 23.1°)

Thickness of mounting base	Recommended hole diameter
10 max.	23
15	29
20	35

(Unit: mm)

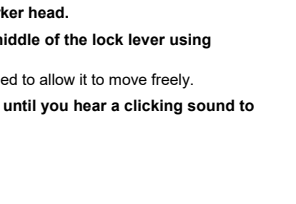
Provide sufficient space around the marker head so as not to disturb air intake/exhaust.
Also pay attention not to block the ventilation port.

For information on the external dimensions of the marker head, refer to "A.2 External Dimension (page A-4)" in the setup manual.

Work materials

Follow the instructions below when using this product with gold, silver, copper, or other highly reflective materials. Reflected beams may damage the marker head.
(1) For a work positioned horizontally to the marker, do not mark within φ6 mm of the center of the marking area.
(2) If the marking surface of the work is slanted or curved, ensure that the specular reflection beam is not reflected back into the marker head.

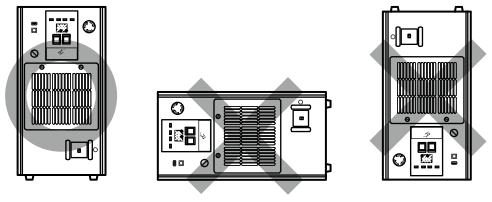
Please consult with our sales center when using this product within these conditions.



■ Installation Direction

Controller

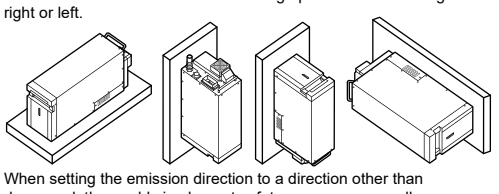
Be sure to place the controller longitudinally on a flat surface.If the controller is placed laterally or upside down, a failure may occur.



Provide sufficient space around the controller so as not to disturb air intake/exhaust.
Do not arrange the circuit breaker to make it difficult to operate.

Marker Head

The marker head can be installed facing up or down and facing to the right or left.



When setting the emission direction to a direction other than downward, thoroughly implement safety measures, as well as protective measures to prevent dust from sticking to the cover glass.

■ Connection of Devices

Connect the marker head and necessary peripherals to the controller.

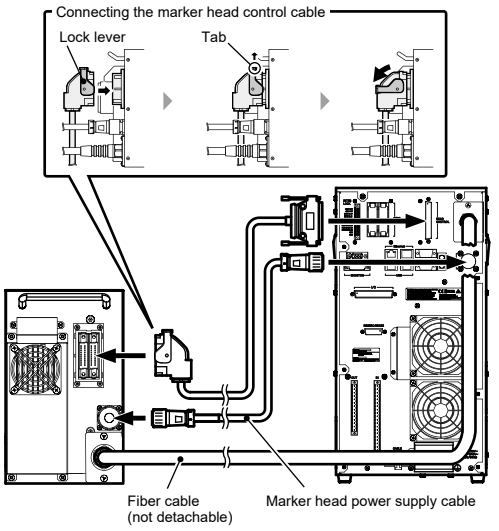
Connecting the Marker Head

Connect the supplied marker head power supply cable, then connect the marker head control cable.
Follow the procedure below when connecting the marker head control cable to the marker head.

1 Lightly insert the cable into the marker head control connector on the marker head.

2 Raise the tab in the middle of the lock lever using fingernails.
The lock lever is released to allow it to move freely.

3 Press down the lever until you hear a clicking sound to fasten the cable.



Be sure to use the supplied dedicated cable. If any other cable is used, a failure may occur.
Insert the cable connector straight and all the way to the end.
The pre-connected fiber cable cannot be disconnected. Also, do not forcibly bend the cable or apply an unreasonable force to the cable, as it may cause the cable to break.
Do not wire the cable near other power wire or bundle it with a power wire. It may cause malfunction due to noise, etc.

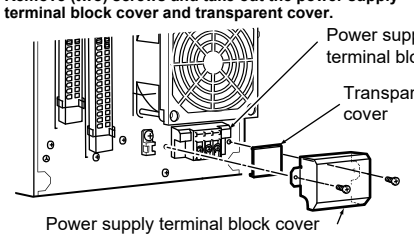
Controller Power Supply Cable Connection

Connect the controller power supply cable to the power supply terminal block on the rear face of the controller.

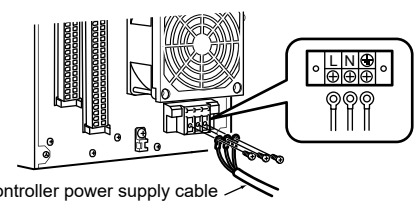
The MX-9301 (cable length: 2.9 m) (optional) can be used as a PSE (Japan) or UL (USA)/CSA (Canada) compliant cable.
The MX-9301 (optional) power supply plug is categorized as type B (mainly used in Japan, the USA and Canada) by National Electrical Manufacturers Association (NEMA).
When using this product in a country or region that cannot use the MX-9301 (optional),
prepare the appropriate cable suitable for use in your country or region according to country/regional regulations.
Use the AWG18 power supply cable.
Screw specifications for power supply terminal block: M4 × 0.7 × 8L
Provide an over-current protection device on the power supply side (building side) so that current exceeding 20 A does not flow to the laser marker.
Use copper wire for the power cable conductor.
The "⏦" mark on the controller indicates an alternating current. The power supply frequency is 50 Hz or 60 Hz, and use 100 V to 120 V AC or 200 V to 240 V AC.

⚠Warning	Connect each core wire of the controller power supply cable correctly to the corresponding terminal on the power supply terminal block. Connect the wire firmly so that it will not come off. Wrong connection may result in fire or electric shock.
⚠Warning	Do not wire the cable if the power supply plug is still connected to the power socket. Doing so may result in electric shock.

1 Remove (two) screws and take out the power supply terminal block cover and transparent cover.



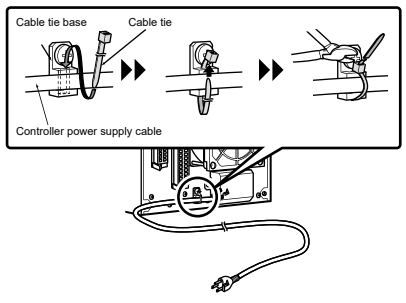
2 After removing the screws from the power supply terminal block, install the core wires of the controller power supply cable to the corresponding terminals, respectively, and then securely tighten the screws.
Tighten the screws to the torque of 1.4 N·m.



Securely tighten the screws on the power supply terminal block so that they will not come off.
The mark in the figure below on the controller is the protective conductor terminal. Be sure to ground the protective lead terminal.
Keep the controller power supply cable away from any high-voltage line, power wire or device that generates significant switching surge, etc. If noise is superimposed on the power supply, use a noise cutoff transformer, etc.

3 Install the transparent cover and power supply terminal block cover as before.

4 Secure the power supply cable to the cable tie base with a included cable tie.
Securely tighten the cable ties so that the power supply cable does not slip.

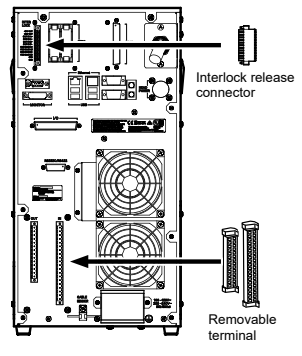


5 Connect the power supply plug of the controller power supply cable to the power socket.

Connecting Terminals

Install the supplied terminals to the back of the controller.

Even when not using I/O communication, always connect the supplied removable terminals (one for input and one for output). If these are not connected, the marker will be in a fault state.
When not performing safety control using the interlock terminal, connect the supplied interlock release connector. If this is not connected, the marker will be in a fault state.



■ Flow of Operations from Startup to Shutdown

The basic flow of tasks from starting to shutting down the Fiber Laser Marker is shown below.
The flow that applies at the initial startup and when creating/editing marking data is different from the one that applies to actual marking (operation).

Refer to "Fiber Laser Maker MX-Z2000H-V1 series Setup Maual" (Z415)

Operation and Control by I/O Communication

This chapter explains how to operate and control the system via I/O communication by connecting external devices.

Refer to "Fiber Laser Maker MX-Z2000H-V1 seies Setup Maual" (Z415)

Connecting to the I/O Terminal Block

Connect each I/O signal wire from a sensor, PLC or other external device directly to a corresponding terminal on the I/O terminal block.

Among others, the power line is connected differently depending on the connection method of the external device (output type of the device) and the power supply to be used. Connect the wires correctly by referring to the information below.

■ How connection varies by connection method/type of power supply of external device

Connection method	When the internal power supply of the controller is used		When the power supply of the external device is used	
	Input terminal block	Output terminal block	Input terminal block	Output terminal block
NPN connection	Connect Pin No. 1 (+24 V OUT) and No. 2 (COM IN) using a jumper pin (factory setting).	Connect Pin No. 1 (GND) and No. 2 (COM OUT) using a jumper pin (factory setting).	• Remove the jumper pin connecting Pin No.1 (+24 V OUT) - No.2 (COM IN) or No.2 (COM IN) - Pin No.3 (GND). • Connect the external power supply (+24 VDC) to Pin No. 2.	• Remove the jumper pin connecting Pin No.1 (GND) - No.2 (COM OUT) or No.2 (COM OUT) - Pin No.3 (+24 V OUT). • Connect the GND of the external power supply to Pin No. 2.
PNP connection	Connect Pin No. 3 (GND) and No. 2 (COM IN) using jumper pin.	Connect Pin No. 3 (+24 V OUT) and No. 2 (COM OUT) using jumper pin.	• Remove the jumper pin connecting Pin No.1 (+24 V OUT) - No.2 (COM IN) or No.2 (COM IN) - Pin No.3 (GND). • Connect the GND of the external power supply to Pin No. 2.	• Remove the jumper pin connecting Pin No.1 (GND) - No.2 (COM OUT) or No.2 (COM OUT) - Pin No.3 (+24 V OUT). • Connect the external power supply (+30 VDC MAX) to Pin No. 2.

- Make sure to attach the included ferrite core to the wire connected to the removable terminal, at a position roughly within 200 mm from the removable terminal.
- If the cable does not fit in the ferrite core, the external dimension of the cable is too large. Use a cable with a minimum impedance of 100 Ω (15 MHz to 40 MHz). (Recommended product: TDK ZCAT3035-1330)
- This system supports both NPN and PNP devices, but all of the connected devices connected must be either NPN or PNP. Make sure all devices are of the same type.
- Select a device to connect that does not cause chattering, as this could cause a malfunction. If connecting a device that causes chattering, confirm its operation and then configure the marker operation settings as required. (This is set on the [I/O setting] tab in [Marker operation setting] opened from [Environment setting] on the menu bar.)

For information on internal circuit of each terminal, refer to: Setup Manual "4.2 Hardware Specifications (page 4-9)"
For information on measures to reduce chattering, refer to: "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

Connecting to the I/O Connector

Connect each I/O signal wire from a sensor or PLC to a corresponding terminal on the I/O connector (D-sub, 37-pin).

Note that the COM IN/COM OUT terminals on the I/O connector are connected inside the controller to the COM IN/COM OUT terminals on the I/O terminal blocks.
Connect the jumper pin to the I/O terminal blocks depending on the specific application of the system according to "Connecting to the I/O Terminal Block (Setup Manual page 4-3)".

■ Hardware Specifications

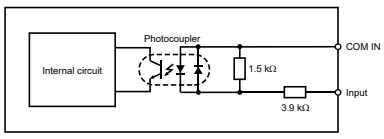
This section explains the input and output specifications of the terminal blocks and I/O connector, as well as connection examples.

Input Specifications

■ Rating

Item	Common to input terminal block / I/O connector
Input form	Bi-directional photocoupler
Applied voltage	24 VDC ± 10%

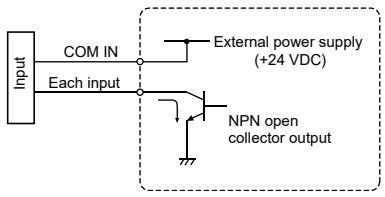
■ Internal circuit diagram



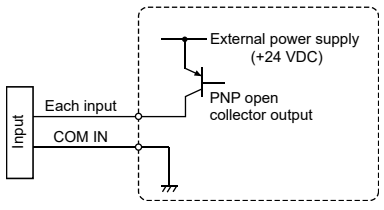
■ Connection

This system supports both NPN and PNP devices, but all of the connected devices connected must be either NPN or PNP. Make sure all devices are of the same type.

● **NPN input**



● **PNP input**



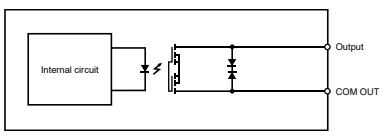
The circuits between each COM IN are short-circuited inside of the controller. Combining NPN and PNP will cause a failure.

Output Specifications

■ Rating

Item	Output terminal block	I/O connector
Output form	NPN/PNP photocoupler insulation output	
Maximum applied voltage	30 VDC	
Maximum output current	50 mA	
Residual voltage	2 VDC or less	20 mA

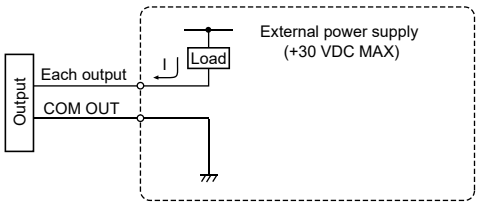
■ Internal circuit diagram



■ Connection

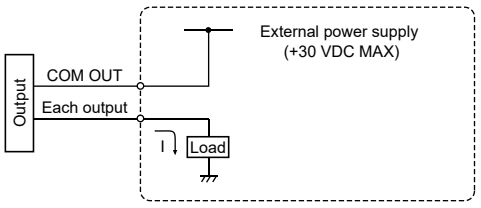
● **NPN output**

Sink current output (same as NPN open collector output)



● **PNP output**

Source current output (same as PNP open collector output)



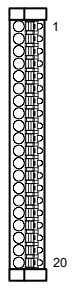
The circuits between each COM OUT are short-circuited inside of the controller. Combining NPN and PNP will cause a failure.
Connect the load when wiring to each output. Shorting the circuit will cause a failure.

■ Terminal Block/Connector Specifications

This section explains the specifications of the terminal blocks and I/O connector.

Input Terminal Block

Number of pins: 20 pins
Screw-less clamp type

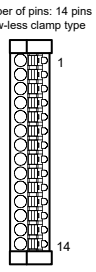


Pin No.	Terminal name	Function
1	+24 V OUT Factory setting: Short-circuited with Pin No. 2 using a jumper pin.	Outputs 24-VDC power supply to external devices. The maximum supply current is 300 mA.
2	COM IN Factory setting: Short-circuited with Pin No. 1 using a jumper pin.	A common input terminal.
3	GND	A ground terminal for supplying power to an external device.
4	TRIG (marking trigger input)	Marking is started when an ON signal (pulse width 1 ms or more) is input. An input is received when [MARK READY] (marking ready output) is ON. A desired detection method can be selected by setting it in the marker software. • Level: Marking can be performed continuously for the specified input time. • Edge: Marking is performed when an input is received. Marking can be performed continuously for the number of times and at the interval specified in the marker software. (📖Set up manual "4.7 Timing chart Continuous Marking Operation".)
5	ERROR RST (error reset input)*	Errors (major trouble) and alarms (maintenance notifications) are reset when an ON signal is input. To reset an error, the cause of the error must be removed first. After confirming the cause of the errors, always have a person manually reset the error. Do not implement a way to automatically reset errors.
6	ALARM RST (alarm reset input)*	Alarms (maintenance notifications) are reset when an ON signal is input.
7 to 8	RESERVE (reserved)	–
9	STOP (marking stop input)	Marking is stopped when an ON signal is input. If the ON signal is input continuously, irradiation of the processing laser will be inhibited and the system will switch to the guide laser mode. * Using the STOP signal operation switching control setting of the marker software, emission of both the processing laser and guide laser can be prohibited. * Using the STOP signal operation switching control setting of the marker software, emission of the guide laser can be performed when this signal is OFF. For details on STOP signal operation switching control, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416.)
10	SHUTTER A (shutter control input A) Factory setting: Short-circuited with Pins No.11 and 12 using a jumper pin.	The shutter opens when this terminal is short-circuited to the COM OUT terminal (this signal turns ON). Note, however, that an input of this signal is disabled if [SHUTTER B] (shutter control input B) is not ON (Pins No. 11 and 12 are not short-circuited). An input of this signal has no effect, either, while the marker software is showing the [Edit mode] screen. * If the frequency of open/close is high, consider using [LASER ON] (laser control input). The processing laser can be stopped by opening (OFF) [LASER ON] (laser control input). (The internal shutter remains open.)
11	SHUTTER B (shutter control input B) Factory setting: Short-circuited with Pins No.10 and 12 using a jumper pin.	When this terminal is short-circuited to the COM OUT terminal (the signal turns ON), shutter open/close control ([SHUTTER A] (shutter control input A) ON/OFF) is enabled.
12	COM OUT Factory setting: Short-circuited with Pins No.10 and 11 using a jumper pin.	A common output terminal for Pins No. 10 and 11.
13	LASER ON (laser control input) Factory setting: Short-circuited with Pin No.14 using a jumper pin.	When this terminal is short-circuited to the COM OUT terminal (the signal turns ON), the laser power turns on. If the key switch is in the OFF position, however, short-circuiting these terminals does not turn on the laser power. * Using the STOP signal operation switching control setting of the marker software, emission of the guide laser can be performed when this signal is OFF. For details on STOP signal operation switching control, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's anual" (Z416.)
14	COM OUT Factory setting: Short-circuited with Pin No. 13 using a jumper pin.	A common output terminal for Pin No. 13.
15	EMERGENCY A (emergency stop input A) Factory setting: Short-circuited with Pins No. 16 and 17 using a jumper pin.	When the [EMERGENCY A] (emergency stop input A) or [EMERGENCY B] (emergency stop input B) terminal is opened, the laser power turns OFF and the shutter closes. In this case, the system generates an error.
16	EMERGENCY B (emergency stop input B) Factory setting: Short-circuited with Pins No. 15 and 17 using a jumper pin.	
17	COM OUT Factory setting: Short-circuited with Pins No. 15 and 16 using a jumper pin.	A common output terminal for Pins No. 15 and 16.
18 to 19	RESERVE (reserved)	–
20	NC	Do not connect anything to this terminal.

* Resetting via key switch operation, serial communication or marker software operation is also possible.
The following product is used as the input terminal block.
• Weidmüller BLF5.08HC/20/180LR

Output terminal block

Number of pins: 14 pins
Screw-less clamp type



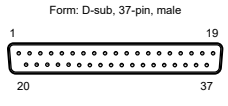
Pin No.	Terminal name	Function
1	GND Factory setting: Short-circuited with Pin No. 2 using a jumper pin.	A ground terminal.
2	COM OUT Factory setting: Short-circuited with Pin No. 1 using a jumper pin.	A common output terminal.
3	+24 V OUT	Outputs 24-VDC power supply to external devices. The maximum supply current is 300 mA.
4	POWER (power ON output)	An ON signal is output while the system power supply is ON.
5	READY (ready output)	An ON signal is output while the system is operating and ready. An external input (I/O signal, I/O command or serial command) can be received.
6	MARK READY (marking ready output)	An ON signal is output in the marking ready mode. ([TRIG] (marking trigger input) is acceptable.)
7	LASER (laser control status output)	An ON signal is output while the laser power is ON.
8	SHUTTER (shutter status output)	An ON signal is output while the shutter is open.
9	MARK BUSY (marking busy output)	An ON signal is output while the processing laser is irradiated (marking is in process).
10	MARK END (marking complete output)	Output when marking is complete. The output method varies depending on the marker software setting. • Pulse: When marking is completed, an ON signal is output as a pulse of the specified width*. • Level: When marking is completed, an ON signal is output as a signal level. The signal turns OFF when marking is started.
11	ERROR (error output)	An ON signal is output while an error (major trouble) is present.
12	ALARM (alarm output)	An ON signal is output when an alarm (maintenance notification) generates.
13	REMOTE CONTROL (remote control output)	An ON signal is output during remote control.
14	DFL CONTROL (DFL control output)	An ON signal is output during DFL control. 📖For details on DFL, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416.)

* Specify using the marker software.

The following product is used as the output terminal block.
• Weidmüller BLF5.08HC/14/180LR

I/O connector

Form: D-sub, 37-pin, male



Pin No.	Terminal name	Function
1 to 3	COM IN	A common input terminal.
4 to 19	DI (parameter input)	Enters a parameter value for each command. Specifies with 16 bits from DI_0 to DI_15. (📖Set up manual "4.6 I/O Command")
20	COMMAND SET (command confirmation input)	Confirms a command and parameter input. The command is executed at the OFF → ON edge of the signal input.
21 to 24	COMMAND (command inputs 0 to 3)	Enters a command. Specifies a command using four bits from inputs 0 to 3. (📖Set up manual "4.6 I/O Command")
25	TIME HOLD IN (time hold input)	When an ON signal is input to this terminal, the date/time is acquired. The acquired date/time is held while the ON signal is input.
26 to 28	RESERVE (reserved)	–
29	IO ERROR (I/O error output)	This signal is output when an invalid input is received via I/O communication. (Example) • A marking start signal is input when the system is not ready to perform marking. • I/O command or parameter input is invalid. The output method varies depending on the marker software setting. • Pulse: When an I/O error occurs, an ON signal is output as a pulse of the specified width*. • Level: When an I/O error occurs, an ON signal is output as a signal level.The signal will turn OFF when a normal signal is subsequently input.
30 to 33	COUNT END (counter end outputs A to D)	This signal is output when the end value of the counter is reached. The terminal to output a signal from can be set as one of A to D for each registered counter. The output method varies depending on the marker software setting. • Pulse: When the end value is reached, an ON signal is output as a pulse of the specified width*. • Level: When the end value is reached, an ON signal is output as a signal level.
34	TIME HOLD OUT (time hold output)	An ON signal is output in the time hold mode.
35	COMMAND END (command reception complete output)	An ON signal is output upon completion of the processing of a command processing which was received successfully.
36, 37	COM OUT	A common output terminal.

* Specify using the marker software.

For the connectors on external device cables to be connected to the I/O connector, the following products are recommended:
Socket: OMRON XM3D-3721 (D-sub, 37pin)
Hood: OMRON XM2S-3711

Wire the COM IN and COM OUT so that they do not touch the shell. If you do not do this, it may result in a failure.

Operation and Control by Serial Communication

This chapter explains an overview of how to operate and control the system via serial communication by connecting external devices.

Refer to "Fiber Laser Maker MX-Z2000H-V1 series Setup Maual" (Z415)

■ Hardware Specifications

This section explains the specifications of the serial communication and connector.

Serial Communication Specifications

The following explains the serial communication specifications.
Communication settings on the controller side are done with the marker software.
For the communication settings on the external device side, refer to the manual for the applicable device.
Note that any connected external device must support the communication specifications listed below.

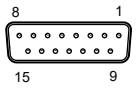
Item	Specification
Interface	RS-232C/RS-422A *
Full-duplex/half-duplex	Full-duplex communication
Synchronous method	Asynchronous method
Transmission control procedure	No procedure
Baud rate (bps)	9,600/19,200/38,400/57,600/115,200
Data bit length	7/8
Parity	None/EVEN (even number)/ODD (odd number)
Stop bit length	1/2

* RS-232C and RS-422A cannot be used at the same time.
If RS-422A is selected, one-to-one communication is performed and multi-drop connection is not supported.

Connector Specifications

Connect the serial communication cable to the RS-232C/RS-422A serial port (D-sub, 15-pin connector) on the rear face of the controller.

Form: D-sub, 15-pin, female



Application	Pin No.	Terminal name	Function
RS-232C	1	–	(Not used)
	2	RD (RXD)	Enters data from the external device.
	3	SD (TXD)	Outputs data from the controller.
	4	–	(Not used)
	5	–	(Not used)
	6	–	(Not used)
	7 *	SG (GND)	A signal ground. Connects the SG (GND) terminal on the external device.
	8	–	(Not used)
RS-422A	9	RDB (+)	Enters data from the external device.
	10	RDA (–)	Enters data from the external device.
	11	SDB (+)	Outputs data from the controller.
	12	SDA (–)	Outputs data from the controller.
	13	–	(Not used)
	14	–	(Not used)
	15	–	(Not used)

* Even when RS-422A is selected, Pin No. 7 is still used as the SG (GND) terminal.
Do not use the RS-232C terminals and RS-422A terminals at the same time.

Do not connect anything to those pins that are denoted "(Not used)." If these pins are connected by mistake, the system may fail.

The following products are recommended for the connectors on the external device cable connected to the RS-232C/RS-422A serial port:
Plug: OMRON XM3A-1521 (D-sub15 pin)
Hood: OMRON XM2S-1511

Sharing Data and Control by Ethernet Communication

This chapter explains how to share and manage set data with devices connected to the network using Ethernet communication.
This chapter also explains how to operate and control the system via Ethernet communication by connecting external devices.

Refer to "Fiber Laser Maker MX-Z2000H-V1 series Setup Maual" (Z415)

■ Hardware Specifications

This section explains the specifications of the Ethernet communication and connector.

Ethernet Commuicatio Specificatios

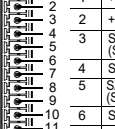
The following explains the Ethernet communication specifications. Communication settings on the controller side are done with the marker software.
For the communication settings on the connected device side, refer to the manual for the applicable device.
Note that the connected device must support the communication specifications listed below:

Item	Specification
Type	1000BASE-T / 100BASE-TX / 10BASE-T
Compatible LAN cable	Category 5, 5e, 6 or 7

Connector Specifications

Connect the LAN cable to the Ethernet port (RJ-45, 8-pole modular connector) on the rear face of the controller.

Form: RJ-45 modular connector



Pin No.	Terminal name	Function
1	TX (+)	Data sent (+)
2	TX (-)	Data sent (-)
3	RX (+)	Data received (+)
4	–	(Not used)
5	–	(Not used)
6	RX (−)	Data eceived (−)
7	–	(Not used)
8	–	(Not used)

■ Emergency Stop via Interlock Terminal

When risk reduction measures are based on control, the hardware and software used in safety-related parts of control systems are required to perform safety functions according to the risk level. This is the Performance Level (PL) specified in the International Standard ISO13849-1.
There are PLr (Required Performance Level) and PL (Performance Level). PLr is a performance level required for safety-related parts according to the risk level. PL is the result obtained by assessing the actual validity of the safety-related parts. The MX-Z2000H-V1 series laser markers irradiate Class 4 laser beams during marking.
Inadequate safety measures may result in eyesight loss or other serious injury. Generally, PLr is "d or higher" in cases with a high risk like this.
The MX-Z2000H-V1 series laser markers partially satisfy the structure requirements of category 3 or higher required to achieve "d or higher" performance level. However, as performance level is determined by assessing the safety-related parts as a whole, the external circuits connected to the interlock terminal must be constructed with a system in safety category 3 or higher.

Refer to "Fiber Laser Marker MX-Z2000H-V1 series Setup Manual" (Z415)

■ Interlock Connector Specifications

How to connect cables

Be sure to attach rod terminals to the cables.
(Insertion portion of 0.25 mm² to 0.75 mm² × L 10 mm)
Recommended sleeve: H0.5/16 OR H0.5/16 ZH OR Weidmüller
Insert the cable all the way into the terminal hole.
Also, when removing the rod terminals, hold down the release button and rotate the rod terminals to remove them.

Pins: 12 / Push-in connection type

Pin No.	Terminal name	Function
1	+24V OUT	+24 V is output. When releasing the interlock without connecting to an external safety controller, connect SAFE IN A+ and SAFE IN B+.
2	+24V OUT	
3	SAFE IN A+ (Safe input A)	This is the plus side terminal for safety relay A.
4	SAFE IN A-	This is the minus side terminal for safety relay A.
5	SAFE IN B+ (Safe input B)	This is the plus side terminal for safety relay B.
6	SAFE IN B-	This is the minus side terminal for safety relay B.
7	FEED BACK A1	This the feedback terminal for safety relay A.
8	FEED BACK A2	
9	FEED BACK B1	This the feedback terminal for safety relay B.
10	FEED BACK B2	
11	GND	When releasing the interlock without connecting to an external safety controller, connect SAFE IN A- and SAFE IN B-.
12	GND	

- Make sure to attach the included ferrite core to the wire connected to the interlock connector, at a position roughly within 200 mm from the interlock connector.
- If the cable does not fit in the ferrite core, the external dimension of the cable is too large. Use a cable with a minimum impedance of 100 Ω (15 MHz to 40 MHz). (Recommended product: TDK ZCAT3035-1330)

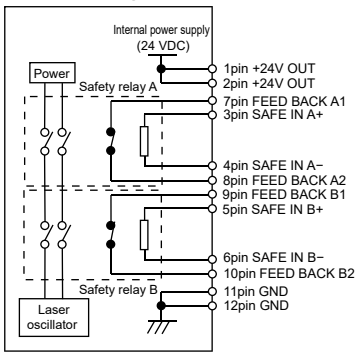
The following products are used as the connectors for the external device cables that connect to the interlock.
- Phoenix Contact FMC1,5/12-STF-3,5

■ Hardware Specifications

Connecting the interlock terminal

Connect the interlock terminal by following the safety controller manual, while referring to the internal circuit diagram and connection example.

■ Internal circuit diagram



Do not use +24 V OUT for any purpose other than releasing the interlock.

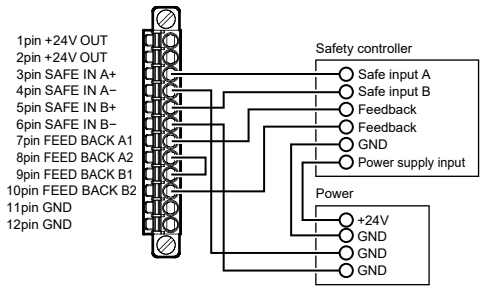
■ Input terminal rating

Item	Terminal no.	Specification value
Safe input A	3-4 pin	Applied voltage: 24 VDC ±10%
Safe input B	5-6 pin	

■ Output terminal rating

Item	Terminal no.	Specification value
Feedback signal A	7-8 pin	Maximum applied voltage: 30 VDC
Feedback signal B	9-10 pin	Maximum output current: 100 mA or less

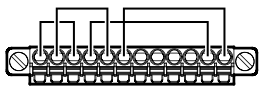
■ Connection example



■ Connecting without using an interlock terminal

Connect the supplied interlock release connector to use this product.

- **Factory setting (initial condition)**



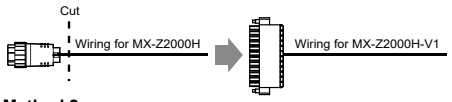
Compatibility with the MX-Z2000H Series

When converting the MX-Z2000H-V1 Series connector to the interlock connector built into the MX-Z2000H Series, perform wiring as shown below.

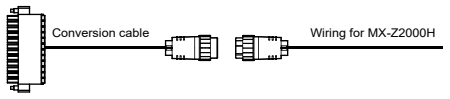
■ Wiring compatibility

Connectors for external connection to interlock connectors in MX-Z2000H Series can be connected to MX-Z2000H-V1 Series using the methods described below.

- **Method 1**
  Cut the connector portion of the connector for external connection to the interlock connector in the MX-Z2000H Series, connect a rod terminal to each signal wire, and then push-in wire the external device cable connector to the MX-Z2000H-V1 Series interlock.

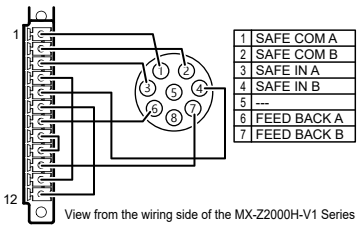


- **Method 2**
  Create a conversion cable to connect the connector for the external device cable to connect to the MX-Z2000H interlock connector with the connector for the external device cable to connect to the MX-Z2000H-V1 Series interlock.



The following products are used as the connectors for the conversion cable.
- Phoenix Contact FMC1.5/12-STF-3.5 (Insertion portion: 0.25 mm² to 0.75 mm² L=10 mm)
- Nanaboshi electric mfg co.,ltd. model NJC-168-AdF (Applicable cable outer diameter φ7.0 to 8.5 mm, conductor cross-section area: 0.3 mm²)

1	+24V OUT
2	+24V OUT
3	SAFE IN A+
4	SAFE IN A-
5	SAFE IN B+
6	SAFE IN B-
7	FEED BACK A1
8	FEED BACK A2
9	FEED BACK B1
10	FEED BACK B2
11	GND
12	GND



■ Operational compatibility

For MX-Z2000H-V1 Series, operation when a signal is input to the safety terminal while marking is possible differs from that of MX-Z2000H Series.
As shown in the following table, when replacing MX-Z2000H Series, there is no longer any need to input an [ERROR RST] signal. However, the product can be used without changing the sequence for inputting [ERROR RST] using MX-Z2000H Series upon confirming the operation.

■ Marker operation when safety relay switches from CLOSE to OPEN

I/O signal name	MX-Z2000H Series	MX-Z2000H-V1 Series
ERROR	From OFF to ON [ERROR RST] signal input is required to resume marking.	Left OFF
MARK READY	From ON to OFF	From ON to OFF Turns back ON when safety relay switches to CLOSE.

* This describes operation when STOP signal control is set to "OFF."

What to Do in Case of Abnormality

This chapter explains how to take remedial actions when abnormalities occur during operation.
Refer to "Fiber Laser Maker MX-Z2000H-V1 series Setup Maual" (Z415) Chapter 10 What to Do in Case of Abnormality.

Error

This message appears upon occurrence of a major trouble such as abnormal operating environment, connection error, hardware error or invalid marking data.
If a trouble error occurs, marking operation stops, the [ERROR] LED (red) on the controller turns on, and a buzzer sounds. Close the shutter and stop the laser without delay.
Check the code (E-****) on the display and also check the screen display, take an remedial action according to the table below, and turn the key switch to the OFF position and then to the ON position or send the "Cancel err" command. This resets the error and stops the buzzer. If the error is not reset, the [ERROR] LED turns on and a buzzer sounds again.
If the type of error is "A," reset the power supply (turn OFF → ON).If the error persists, contact OMRON.
When resetting the controller power supply, turn OFF the power and then wait for at least 5 seconds before turning it back ON.

Code	Description	Action	Error type	Power supply Reset
0018	Emergency stop condition • The emergency stop switch ([EMERGENCY] button) is turned ON • [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) is open	• Turn the emergency stop switch OFF. • Short-circuit the [EMERGENC A] / [EMERGENCY B] with [COM OUT]. When a removable terminal is inserted into the I/O terminal block in its factory setting, [EMERGENCY A]/ [EMERGENCY B] is short-circuited with [COM OUT]. • After taking a remedial action, turn the key switch to the OFF position and then to the ON position to reset the error, or send the "Cancel err" command.	B	Not necessary
1000	The marker head control cable is not connected.	Check the cable connection.	A	Necessary
1001	The marker head power supply cable is not connected.		A	Necessary

Maintenance

This chapter explains how to clean, replace parts and perform other maintenance tasks on devices.
These tasks should be performed by experts with laser and electrical knowledge. If you touch the high voltage part by mistake, there is a risk of electric shock.
Be sure to use the specified type / specification for replacement parts such as the controller built-in battery.

Refer to "Fibe Fiber Laser Maker MX-Z2000H-V1 series Setup Maual" (Z415) Chapter 9 Maintenance.

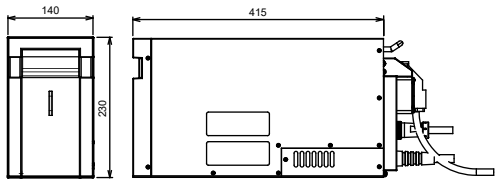
■ Specification

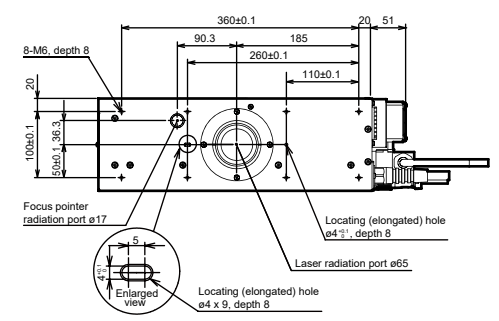
Item		Specification	
		MX-Z2000H-V1	MX-Z2050H-V1/MX-Z2050H-V1*1
Processing laser	Type	Fiber laser Wavelength: 1,062 nm	
	Laser class	Class 4 (JIS C6802)	
	Average output	20 W (Fiber laser transmitter output)	
	Laser output mode	Standard mode/EE mode*2	
	Repetition frequency	Standard mode 10 kHz to 1,000 kHz in 0.1-kHz steps EE mode*2 10 kHz to 100 kHz in 0.1-kHz steps	
	Pulse-train width (pattern) setting	Standard mode 7.5 to 300 ns (15 patterns) EE mode*2 150 to 450 ns (3 patterns)	
Guide laser and focus pointer	Type	Semiconductor laser Wavelength: 655 nm	
	Laser class	Class 2 (JIS C6802)	
Optical specifications	Marking area	90 × 90 mm	160 × 160 mm
	Working distance	170 ± 10 mm	220 ± 10 mm
Scanning specifications	Scan speed	1 to 12,000 mm/s	
	Marking resolution	2 μm	4 μm
Details of marking	Text	Type: English alphabet (upper/lower case letters) / numbers / symbols / hiragana / katakana / kanji (JIS level 1, level 2) / other languages (UNICODE (Basic Multilingual Panel)) Printable fonts: • TrueType font • Stroke font (original / original2 / OCR-A /OCR-B / SEMI / LM 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*3 / 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	
Setting	Number of marking data registrations	10,000	
	Number of block registrations	2,048	
	Text setting (setting interval)	0.1 to 120 mm (0.001 mm)	
Cable	Fiber cable	4.5 m Minimum bending radius: 100 mm	
	Marker head control cable Marker head power supply cable	5 m Minimum bending radius: 100 mm	
External interface	Terminal block and I/O connector	Terminal block input: 20 pins (NPN/PNP) Terminal block output: 14 pins (NPN/PNP) I/O connector input/output:37 pins (NPN/PNP) Interlock terminal: input/output 12 pins	
	Serial communications	RS-232C / RS-422A	
	Ethernet communication	No procedure (TCP), EtherNet IP™*4, 1000BASE-T, 100BASE-TX,10BASE-T	
Power supply voltage		100 to 120 VAC Frequency 50/60 Hz 200 to 240 VAC Frequency 50/60 Hz	
Overvoltage category		II	
Power consumption		At 100 VAC: Maximum 390 VA At 200 VAC: Maximum 420 VA	
Environmental resistance	Operating temperature*5	0 to 40 °C	
	Operating humidity	35 to 85% RH (No condensation)	
	Storage temperature	−10 to 60 °C (No freezing)	
	Storage humidity	35 to 85 % RH (No condensation)	
	Operating height above sea level	3000 m max.	
Pollution degree		2	
Protective structure (head)		IP65*6*7	
Cooling method		Forced air cooling	
Weight	Marker head	Approx. 15 kg	
	Controller	Approx. 25 kg	
Size	Marker head	W140 × H230 × D415 mm (excluding projections)	
	Controller	W225 × H430 × D390 mm (excluding projections)	
Installation direction	Marker head	All directions of up, down, left and right (Intake vent on the left side face must not be blocked.)	
	Controller	Must be installed vertically.	
USB interface*8		• For USB memory (standard-A connector in front face of controller) • For keyboard/mouse (standard-A connector in rear face of controller)	
Attached software*9		Offline editing software • Font logo editor*10	

*1 Bold specifications
*2 EE mode: Energy Enhanced mode (optional)
*3 QR Code and Micro QR code are registered trademarks of DENSO WAVE INCORPORATED.
*4 EtherNet/IP is a trademark of ODVA. There are restrictions on available functions and commands. Please refer to the user's manual (Z416) before use.
*5 Continuously emitting a laser beam for a long time will cause the internal head temperature to rise. This could cause the protection function to stop marking. If the protection function operates, wait some time before using the laser again, or use air conditioning or the like to lower the ambient temperature prior to use.
*6 The electronic and optical components of the head are placed within an IP65 enclosure.
*7 The head of this product has a protective structure that withstands harsh environment under specified conditions such as theenvironment, length of time, and testing methods listed in IEC 60529 (JIS C 0920). Its operations under conditions other than specifiedare not guaranteed.
*8 Do not use the USB interface for anything other than specified. Also, do not connect anything to the type B connector on the front of thecontroller.
*9 The following environment is needed to operate the "offline editing software" and "font logo editor."
[Compatible functions] PC with USB port [Compatible OS] Microsoft Windows®7/8/8.1/10 [CPU and memory] Depends on OS specification [Free hard disk space] At least 1 GB [Display resolution] At least 1,024 × 768 pixels
*10 Only the Shift-JIS character codes can be saved with the Font logo editor.

■ External Dimension

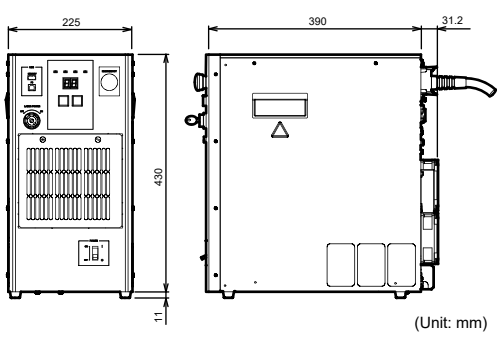
Marker head





(Unit: mm)

Controller



(Unit: mm)

Suitability for Use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer' s application or use of the Product. At Buyer' s request, Omron will provide applicable third party certification documents identifying ratings
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system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer' s application, product or system. Buyer shall take application responsibility in all cases.
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