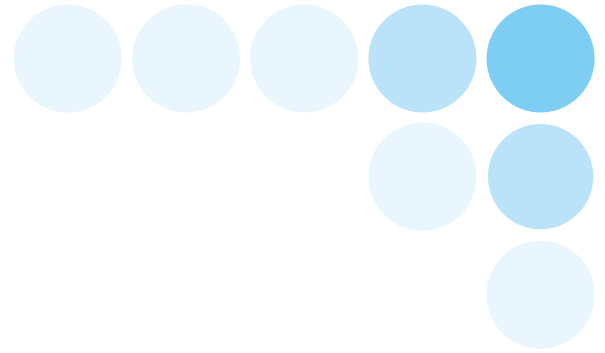


## Fiber Laser Marker

MX-Z2000H-V1 series



## Setup manual



# Introduction

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Thank you for purchasing Fiber Laser Marker MX-Z2000H-V1 series.

This manual describes the functions, performance, how to use and other information you need to know to use the MX-Z2000H-V1 series.

Take heed of the following when using the MX-Z2000H-V1 series:

- The MX-Z2000H-V1 series should be handled by experts with knowledge of laser and electrical engineering.
- Read this manual carefully and understand the content fully to ensure the correct use.
- Keep this manual in good care so that it can be referenced at any time.

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- EtherNet/IP is a trademark of ODVA.
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## ●Types and purposes of manuals

The main content of the manuals are below. Select and read the manual that meets your specific purpose.

### Instruction sheet

This manual provides basic information you need to know to use safely and correctly this product. And it primarily covers the information contained in the setup manual including the explanation of installation/connection and basic operating procedures.

### Manuals contained in the CD-ROM (PDF files)

Setup manual (Japanese, English)

User's manual (Japanese, English)

Information including how to install software and how to use the Font logo editor is provided.

### Note

Adobe Reader® by Adobe® must be installed to view the Manual (PDF file).  
Download it from Adobe®'s website.

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### **Warranties.**

- (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.
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OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

### **Suitability of 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 and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, 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.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Omron assumes absolutely no liability for any losses or damages incurred either directly or indirectly along with any associated costs that may be incurred to Omron products, installed software or any computer equipment, computer programs, networks or databases that may be infected as a result of a DDoS (distributed denial of service) attack, a computer virus or some other technically harmful program, or from unauthorized access.

We ask that you take sufficient measures including (1) anti-virus protection, (2) data input/output, (3) restoring any lost data, (4) preventing the spread of computer viruses to Omron products or to the software installed on them, and (5) preventing unwanted access to Omron products.

### **Programmable Products.**

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

### **Performance Data.**

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

### **Change in Specifications.**

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

### **Errors and Omissions.**

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

## 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


	<ul style="list-style-type: none"> <li>● Laser beam</li> </ul> <p>Indicates a possibility of injury or damage due to laser beam.</p>
	<ul style="list-style-type: none"> <li>● Caution for electric shock</li> </ul> <p>Indicates a possibility of electric shock in certain conditions.</p>
	<ul style="list-style-type: none"> <li>● Prohibited</li> </ul> <p>Indicates a prohibition in general.</p>
	<ul style="list-style-type: none"> <li>● Caution for explosion</li> </ul> <p>Indicates a possibility of explosion in certain conditions.</p>
	<ul style="list-style-type: none"> <li>● Wear protective glasses</li> </ul> <p>Indicates a situation that requires eye guard to be worn.</p>
	<ul style="list-style-type: none"> <li>● Contact prohibited</li> </ul> <p>Indicates a possibility of injury caused by touching a certain part of the device in certain conditions.</p>
	<ul style="list-style-type: none"> <li>● Execute</li> </ul> <p>Indicates an action of a non-specific, general user.</p>
	<ul style="list-style-type: none"> <li>● Always connect a grounding wire.</li> </ul> <p>Indicates an instruction to the user to always connect a grounding wire when using a device with a safety ground terminal.</p>
	<ul style="list-style-type: none"> <li>● Disassembly prohibited</li> </ul> <p>Indicates that disassembly of the device is prohibited as doing so may cause an electric shock or other injury.</p>
	<ul style="list-style-type: none"> <li>● Caution for high temperature</li> </ul> <p>Indicates a possibility of injury due to high temperature in certain conditions.</p>



● **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.



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.










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.














<p>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.</p>	
<p>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.</p>	
<p>A serious personal injury may result in some extreme circumstances. Never put a metal object through the opening of the case.</p>	
<p>A serious personal injury may result in some extreme circumstances. Never put a finger through the opening of the case.</p>	
<p>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.</p>	
<p>A serious personal injury may result in some extreme circumstances. Use the dedicated software installed on the main unit.</p>	
<p>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.</p>	
<p>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.</p>	
<p>A serious personal injury may result in some circumstances. Always reset the error manually.</p>	
<p>A serious personal injury may result in some circumstances. Sufficiently purify and discharge the gases generated during processing.</p>	
<p>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.</p>	
<p>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.</p>	
<p>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.</p>	

## Security Measures

<p><b>Anti-virus protection</b></p> <p>Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.</p>	
<p><b>Security measures to prevent unauthorized access</b></p> <p>Take the following measures to prevent unauthorized access to our products.</p> <ul style="list-style-type: none"><li>• Install physical controls so that only authorized personnel can access control systems and equipment.</li><li>• Reduce connections to control systems and equipment via networks to prevent access from untrusted devices.</li><li>• Install firewalls to shut down unused communications ports and limit communications hosts and isolate control systems and equipment from the IT network.</li><li>• Use a virtual private network (VPN) for remote access to control systems and equipment.</li><li>• Adopt multifactor authentication to devices with remote access to control systems and equipment.</li><li>• Set strong passwords and change them frequently.</li><li>• Scan virus to ensure safety of USB drives or other external storages before connecting them to control systems and equipment.</li></ul>	
<p><b>Data input and output protection</b></p> <p>Validate backups and ranges to cope with unintentional modification of input/output data to control systems and equipment.</p> <ul style="list-style-type: none"><li>• Checking the scope of data</li><li>• Checking validity of backups and preparing data for restore in case of falsification and abnormalities</li><li>• Safety design, such as emergency shutdown and fail-soft operation in case of data tampering and abnormalities</li></ul>	
<p><b>Data recovery</b></p> <p>Backup data and keep the data up-to-date periodically to prepare for data loss.</p>	
<p>When using an intranet environment through a global address, connecting to a SCADA or an unauthorized terminal such as an HMI or to an unauthorized server may result in network security issues such as spoofing and tampering. You must take sufficient measures such as restricting access to the terminal, using a terminal equipped with a secure function, and locking the installation area by yourself.</p>	
<p>When constructing an intranet, communication failure may occur due to cable disconnection or the influence of unauthorized network equipment. Take adequate measures, such as restricting physical access to network devices, by means such as locking the installation area.</p>	
<p>When using a device equipped with the SD Memory Card function, there is a security risk that a third party may acquire, alter, or replace the files and data in the removable media by removing the removable media or unmounting the removable media. Please take sufficient measures, such as restricting physical access to the Controller or taking appropriate management measures for removable media, by means of locking the installation area, entrance management, etc., by yourself.</p>	



 Caution

<p>In rare cases, property damage may result. When using the product, be sure to observe the installation conditions and provide necessary space for it.</p>	
<p>Do not use the product in any of the following environments as the product may, in rare cases, be damaged.</p> <ul style="list-style-type: none"><li>(a) Dusty area</li><li>(b) Area with oil mist floating in the air</li><li>(c) Area subject to impact or vibration</li><li>(d) Area with high humidity (of 85% RH or higher)</li><li>(e) Wet floor surface</li><li>(f) Installation on a table other than an affixed frame (movable part)</li></ul> <p>Securely tighten the marker head with screws and provide appropriate amount of space.</p>	
<p>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.</p>	
<p>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.</p>	
<p>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.</p>	
<p>In rare cases, the product may be damaged. Do not touch the cover glass with bare hands.</p>	
<p>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.</p>	
<p>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.</p>	
<p>When transporting the marker head, be sure to hold the concaved section in front and handle at the back with both hands.</p>	
<p>If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.</p>	

## 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.



"2.6 Connection of Devices (page 2-20)"

### 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.



"4.3 Terminal Block/Connector Specifications (page 4-12)"

### 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.
- Do not step on the cables.

### 2. Operating Environment

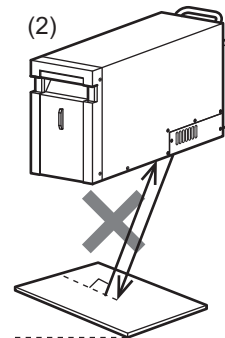
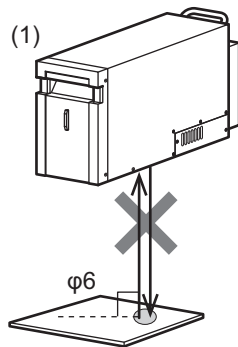
- To prevent power supply noise or radiant noise from occurring, be sure to implement measures against noise, such as a spark killer, at the locations where a surge can occur, such as the point of contact with the motor used for surrounding devices.
- Refrain from using a cellular phone as it may cause 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  $\phi 6$  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 product. 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 this product in EU countries and UK.

### 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 manual.
- 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 a device.



### Precautions for Safe Use

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.



" For Safe Use of Laser Products (page 1-13)"

#### ■ Machinery

When incorporating this product into a device that complies with IEC60204-1 "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 on documents such as manuals or MSDS included in the package.

Perchlorate Material - special handling 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
FCC	47 CFR Part15 Subpart B Class A 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 the user of the product understands the functions of these measures. Accordingly, please keep in mind that JIS C6802-compliant products are products in which the safety measures specified by JIS C6802 are incorporated, and that the products, on their own, are not necessarily safe.

This product is categorized as class 4 based on the JIS C6802 classification. The product incorporates the function of the safety measures based on JIS C6802 for the protective casing of the laser oscillator part, cover interlock, remote interlock (external interlock), key control, laser emission display, opening label, classification label, warning label, radiant output information label, and optical 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 in handling 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 location not being exposed to laser beams.



"Chapter 8 Functions via Controller Operation (page 8-1)"

#### (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 radiation exposure 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 the gaps 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	Not required					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	No required item	Same as class 3B	No required item	Same as class 3R	Avoid unintended reflection.		
Eye protection	No required item					Required when the technical and administrative procedures cannot be executed, and when the laser level exceeds the MPE <sup>(*1)</sup> .	
Protective clothes	No required item					Required in some cases.	Requires specific instructions.
Practice	No 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".

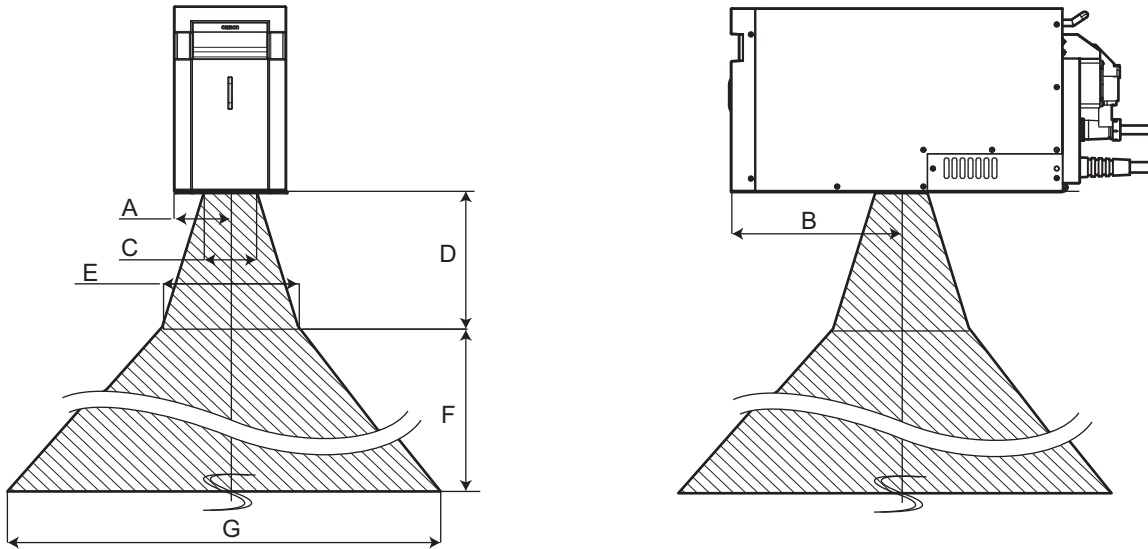
Item	Specification			Remarks
	MX-Z2000H-V1	MX-Z2050H-V1	MX-Z2055H-V1	
Wavelength	1062 nm			Invisible laser
Laser medium	Yb: Fiber			-
Maximum output* <sup>1</sup>	40 W			-
Average output	20 W (fiber laser oscillator output)			-
Laser oscillation type	Pulse oscillation			-
Pulse cycle	10 kHz to 1000 kHz			-
Pulse width	1 to 500 ns			-
Class	4			-
NOHD* <sup>2</sup>	 " ■ Radiation range (page 16)"			Nominal Ocular Hazard Distance
MPE* <sup>3</sup>	MPE for the cornea: 50 W/m <sup>2</sup>			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	22 m	29 m	57 m
G: Laser radiation range in NOHD	φ17 m	φ31 m	φ60 m

■ Class 2 laser (guide laser, focus pointer)

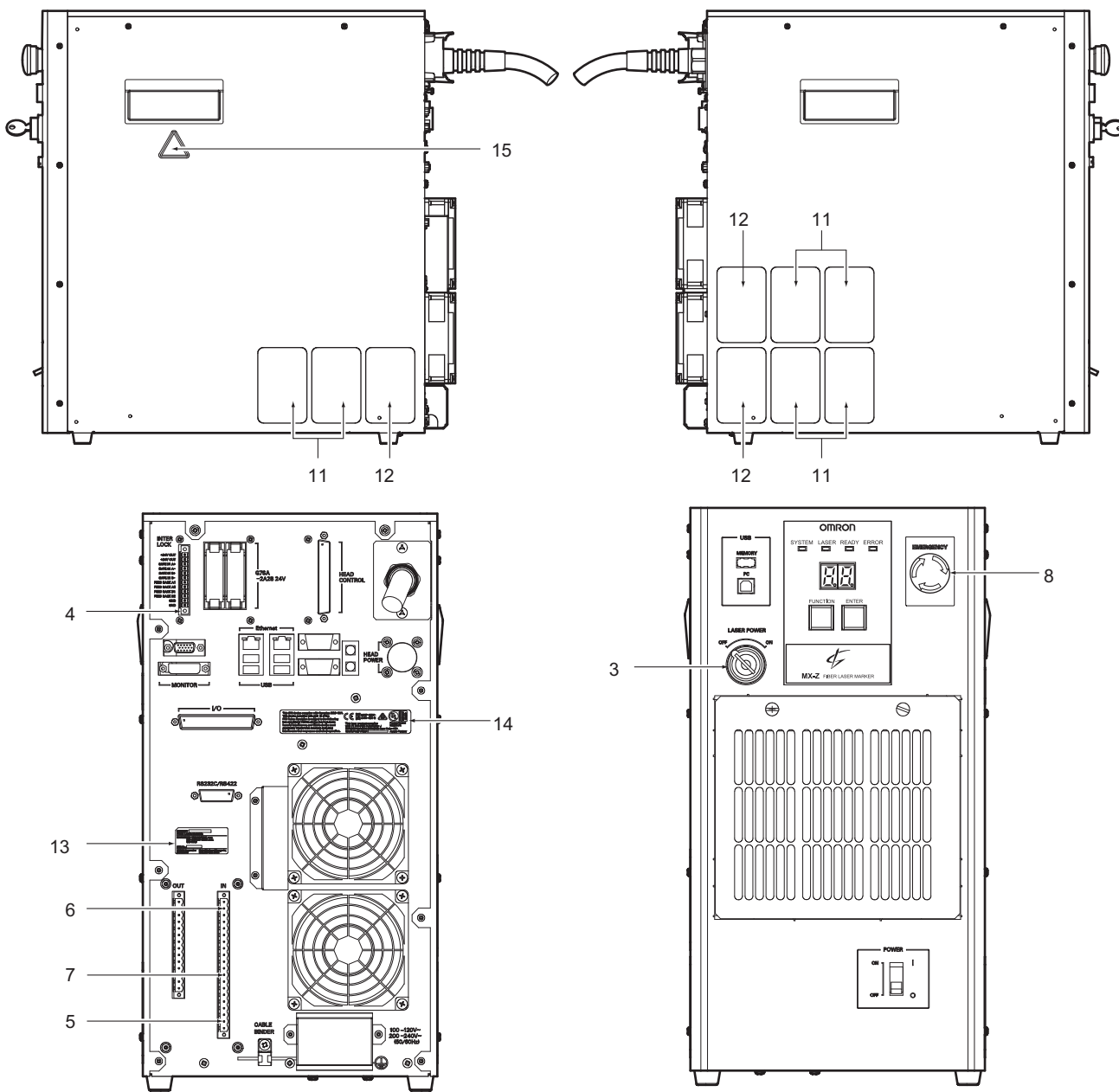
Class 2 lasers are defined as "laser products that are safe when exposure is momentary and the eye is protected by defensive reactions such as blinking, but are hazardous when the beam is stared into deliberately".

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			-

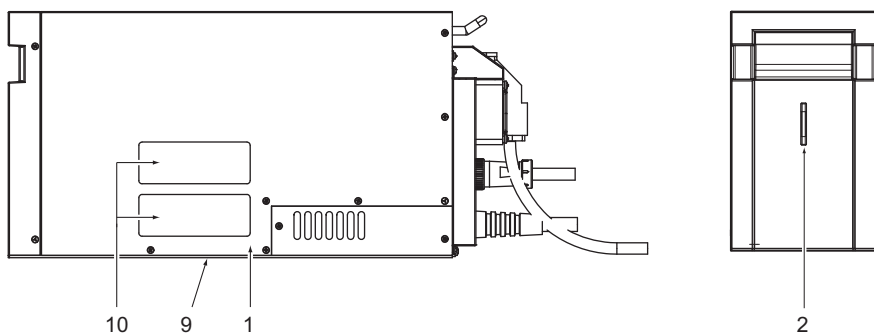
■ Safety Functions of Laser Marker









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	<p>The laser warning indicator light indicates the following statuses.</p> <table border="1"> <thead> <tr> <th>Color</th> <th>Status</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>Unlit</td> <td>Laser power OFF</td> <td>The laser power is OFF.</td> </tr> <tr> <td>Green</td> <td>Laser power ON</td> <td>The laser power is ON and laser can be irradiated (laser standby mode).</td> </tr> <tr> <td>Red</td> <td>Processing laser irradiating</td> <td>Processing laser is being irradiated (marking is in progress).</td> </tr> <tr> <td>Green/red</td> <td>Guide laser irradiating</td> <td>Guide laser is being irradiated.</td> </tr> </tbody> </table>	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.
Color	Status	Meaning															
Unlit	Laser power OFF	The laser power is OFF.															
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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	<p>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).</p> <p> "Chapter 7 Safety Control via Interlock (page 7-1)"</p>															
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.															
10	JIS/EN laser warning label	 JIS/EN laser warning label (Japanese/English) (page 19)															
	EN laser warning label (German/French)	 EN laser warning label (German/French) (page 19)															
11	Electric shock warning label	 Electric shock warning label (page 20)															
12	Igniting or explosion warning label	 Igniting or explosion warning label (page 20)															
13	Name plate	 Name plate (page 21)															
14	Standard label	 Standard label (page 21)															
15	Caution label for fall hazards	 Caution label for fall hazards (page 21)															

## 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)

<b>危険—可視及び不可視レーザー放射</b> ビームや散乱光の目又は皮膚への被ばくを避けること	<b>DANGER—VISIBLE AND INVISIBLE LASER RADIATION</b> AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
Yb: Fiber レーザ 最大出力: 40W 最大ピークパワー: 30kW パルス幅: 1-500ns 波長: 1062nm	半導体レーザー 最大出力: 1mW パルス幅: CW 波長: 655nm
クラス4 レーザ製品 JIS C 6802: 2014	
	<b>被ばくを回避のこと</b> この開口から可視 (クラス2) 及び不可視 (クラス4) レーザ放射が出る
<b>AVOID EXPOSURE</b> CLASS 2 VISIBLE AND CLASS 4 INVISIBLE LASER RADIATION IS EMITTED FROM THIS APERTURE	

#### • EN laser warning label (German/French)

<b>GEFAHR—SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG</b> BESTRAHLUNG VON AUGEN ODER HAUT DURCH DIREKTE ODER STREUSTRABUNG VERMEIDEN	<b>DANGER—RAYONNEMENT LASER VISIBLE ET INVISIBLE</b> ÉVITER EXPOSITION DANGEREUSE DE L'OEIL OU DE LA PEAU AU RAYONNEMENT DIRECT OU DIFFUS
Yb: Faserlaser Maximale Ausgangsleistung: 40W Maximale Spitzenleistung: 30kW Impulsdauer: 1-500ns Wellenlänge: 1062nm	Halbleiterlaser Maximale Ausgangsleistung: 1mW Impulsdauer: CW Wellenlänge: 655nm
LASER KLASSE 4 EN 60825-1: 2014	
	<b>BESTRAHLUNG VERMEIDEN</b> AUSTRITT VON SICHTBARER UND UNSICHTBARER LASERSTRAHLUNG
<b>ÉVITER LE RAYONNEMENT</b> UN RAYONNEMENT LASER VISIBLE ET INVISIBLE EST ÉMIS PAR CETTE OUVERTURE	

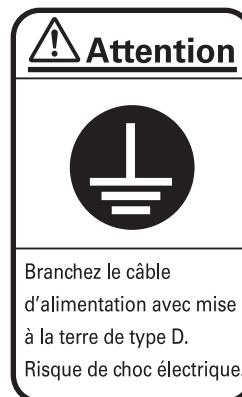
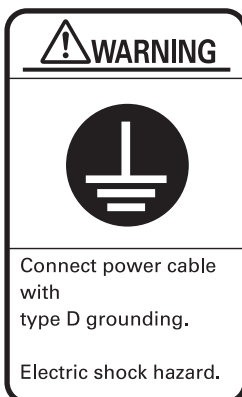
#### • GB/IEC laser warning labels (Simplified/Traditional Chinese)

<b>可见及不可见激光辐射</b> 避免眼睛或皮肤受到直射或散射照射	<b>可见及不可见雷射辐射</b> 避免眼睛或皮膚暴露於直射或散射輻射
Yb: Fiber 激光 最大輸出: 40W 最大峰值功率: 30kW 脈沖寬: 1-500ns 波長: 1062nm	半導體激光 最大輸出: 1mW 脈沖寬: 連續波 波長: 655nm
4 類激光產品 GB 7247.1-2012	
	
<b>可见及不可见激光窗口</b> 避免受到从本窗口射出的激光辐射的照射	<b>可见及不可见雷射孔徑</b> 避免受到此口徑射出之雷射辐射的照射

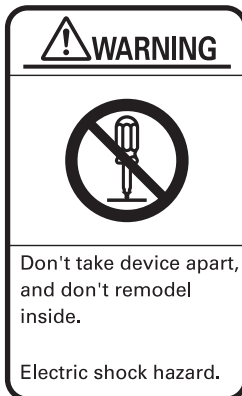
● Controller

Japanese, English, and French version of electric shock warning label (grounding), electric shock warning label (disassembly), igniting or explosion warning label (Lithium 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



Dispose of this product and parts that require replacement in accordance with applicable regulations.

This ISM device complies with Canadian ICES-001. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



This laser product complies with 21 CFR FDA Subchapter J (except for deviations pursuant to Laser Notice #50)

MANUFACTURED:  Kusatsu Factory



**Additional Information**

The manufacturing date on the standard label differs depending on the actual manufacture date.

• 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.

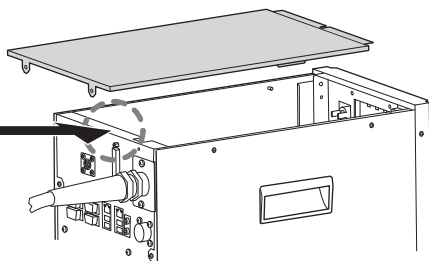


• Caution label for battery replacement

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.



Caution label for battery replacement



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

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# How to Use This Manual

## Page Structure

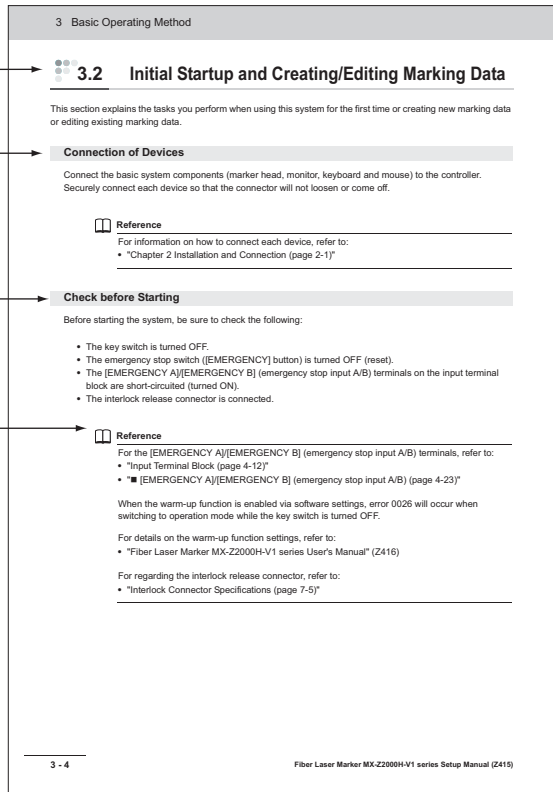
Pages of this manual are structured with components described below.

**Chapter title**  
Indicates the chapter title of the current page.

**Section title**  
Indicates the section title of the current page.

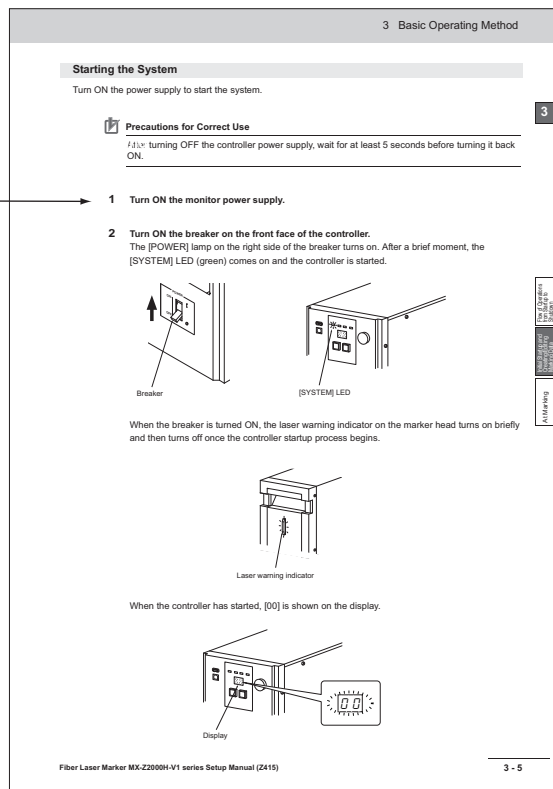
**Item title**  
Indicates the item title.

**Remarks**  
Indicates additional explanations or points that require special attention. (Refer to the next page.)



**Procedure number**  
Indicates the operation procedure number.

**Heading**  
Indicates the chapter number and section title included in the chapter.



## Symbol

In this manual, additional notes and information that require particular attention are indicated with the following symbols.



### **Precautions for Safe Use**

Indicates a caution and a limitation that need to be executed or avoided when using the product.



### **Precautions for Correct Use**

Indicates a caution for an operation that is error-prone.



### **Additional Information**

Indicates useful information and references.



### **Reference**

Indicates the name of a manual, section and page number to be referenced.



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# Chapter 1

## Overview of Product

This chapter provides an overview of the Fiber Laser Marker MX-Z2000H-V1 series.

---

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## 1.1 Features and Main Functions

Developed under the concept of "Making the difficult easy," the Fiber Laser Marker MX-Z2000H-V1 series offers a range of user-friendly functions.

This section explains those positioning functions that are particularly useful in marking and processing operations performed with this unit, as well as function to check laser output.

### ■ "Guide Laser" function and "Focus Pointer" function useful for positioning

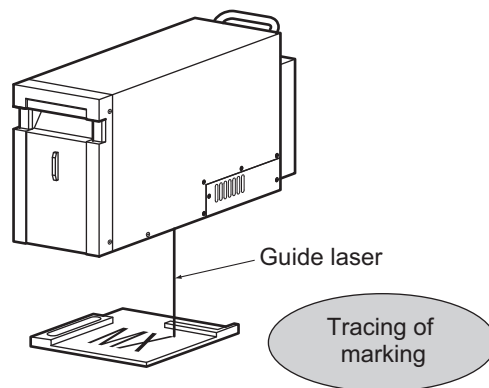
In marking and processing operations using the laser marker, one important point is positioning the work relative to the laser beam position.

This unit lets you visually check the marking/processing position (X-axis/Y-axis) and focus distance (Z-axis) using two types of visible laser lights, to facilitate rough-tuning of the position.

### ● "Guide Laser" function recreates actual markings to allow for visual check of marking/processing positions

The red guide laser lets you visually check the marking position on the work, size of mark, etc.

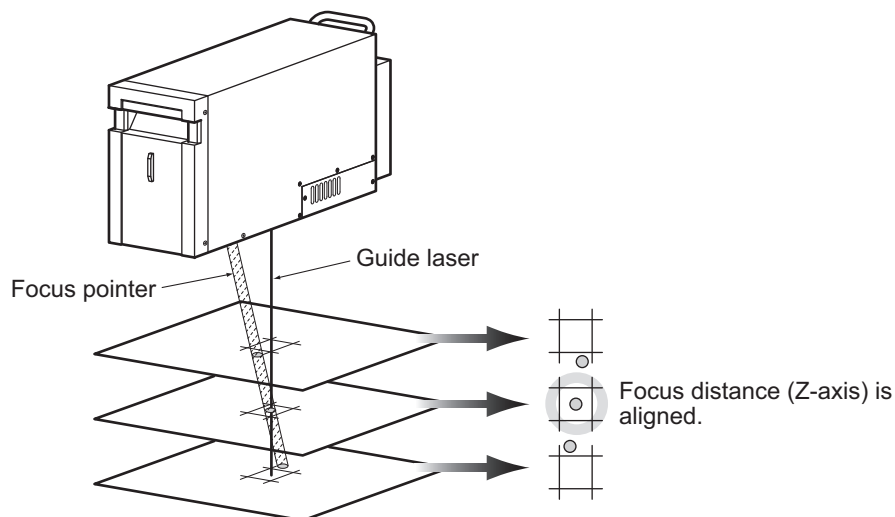
With the guide laser function, you can directly trace the marking details you have set, so accurate adjustment of marking/processing positions (X-axis/Y-axis) and adjustment of marker head and jigs/tools become easy.



### ● "Focus Pointer" function useful for rough-tuning of focus distance

In addition to the aforementioned guide laser function, this unit also provides the "Focus Pointer" function for adjusting the focus distance of the laser.

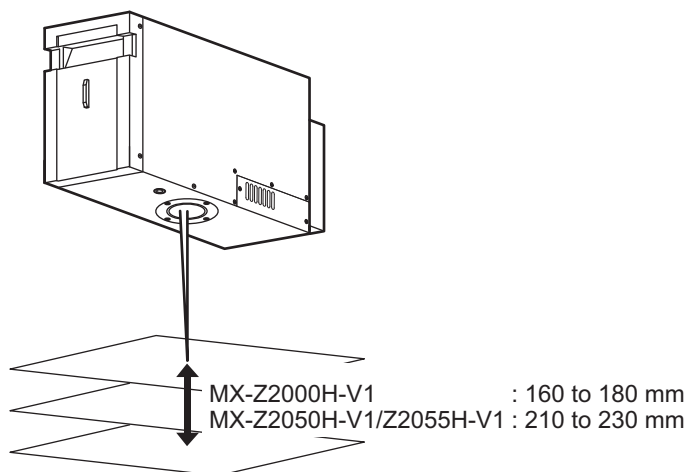
Use the red guide laser to irradiate "crossed" lines with a square in the middle onto the work, and then adjust the height of the work until the focus pointer comes to the center of the square. Now, the focus distance (Z-axis) has roughly been adjusted.



## ■ "Precision Z-axis Variable System" function useful for fine-tuning of focus distance

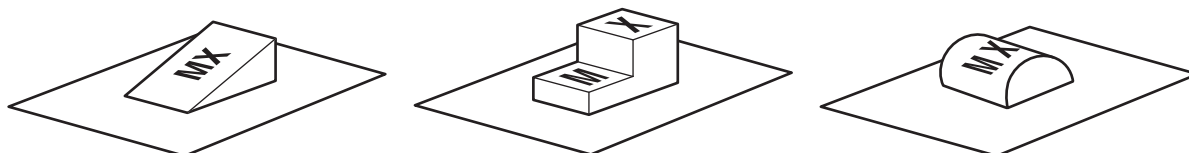
Since the focus distance (Z-axis) can be adjusted in a range from reference distance  $\pm 10$  mm, the focus distance can be fine-tuned quickly and accurately without changing the height of the marker head or work.

This means that, even on multi-variety, small-volume production lines where each work has a different height, this function makes it easy to change the facility setup.



## ■ 3D marking possible

By adjusting the focus distance (Z axis), marking can be performed on works such as that in the figure below with a slope or level difference or column shaped works.



## ■ "Power Monitor" function for monitoring of laser output

The built-in "Power Monitor" function measures the laser power in the unit.

This function lets you check the laser output without a power meter.

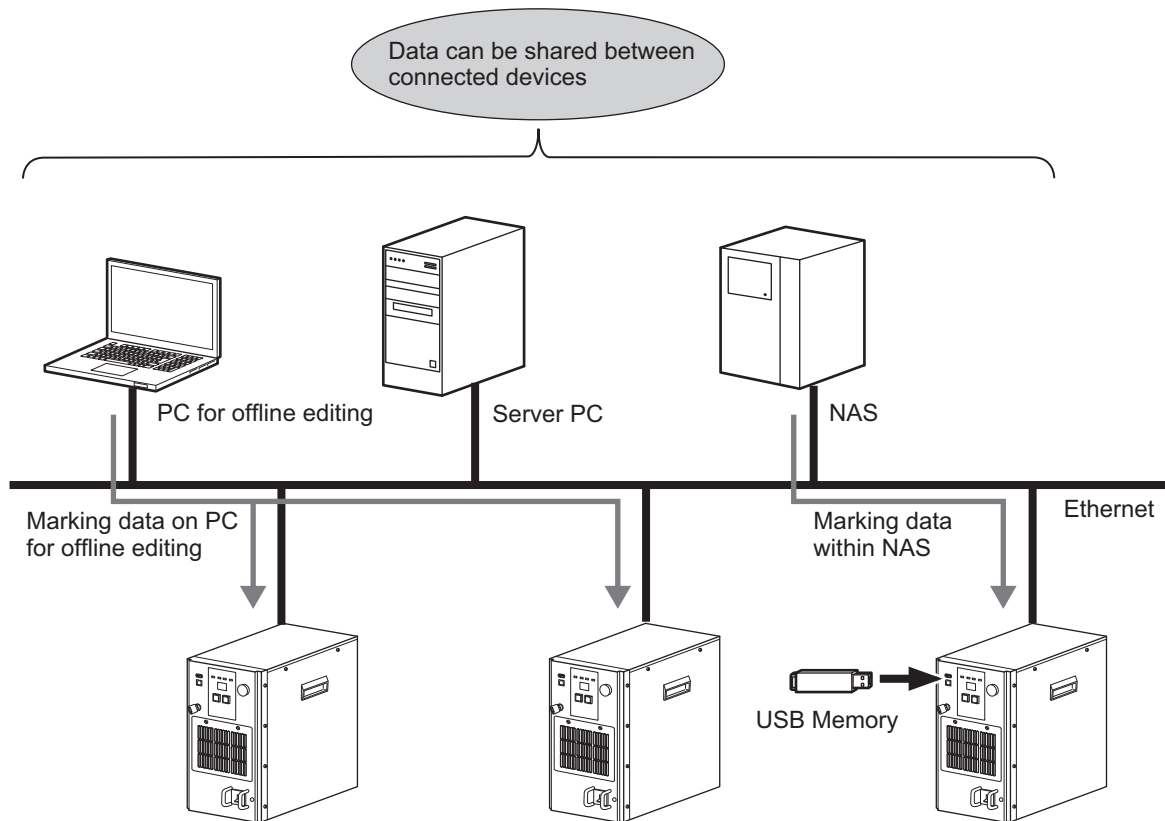
## ■ EE mode (Energy Enhanced mode) (optional)

A deeper marking than standard mode is possible by using EE mode. It is effective in solving problems such as the marking becoming less visible due to post processes after marking or when you want the marking to stand out more.

To use EE mode, you need the EE mode activation key MX-9230.

■ **Data can be shared with external storage**

Ethernet communication is available, which means that data used for marking can be shared between devices connected to the network.



■ **The system can be controlled from external devices with Ethernet communication/serial communication**

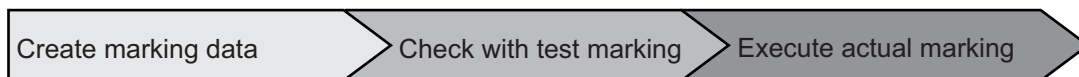
The system can be controlled from PC or PLC via Ethernet/RS232C/RS422 communications.

■ User-friendly marker software

The marker software consists of two screen modes that can be switched according to the work flow and function used.

Use the [Edit mode] screen to create and edit marking data, or [Operation mode] screen for actual marking and processing operations. You can switch the screens with a click of a button.

There is also a dedicated screen for test marking which is to easily simulate marking data you created or edited, by using the guide laser or in actual marking operations.

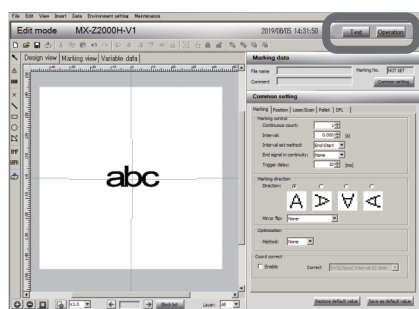


[Test marking] dialog box



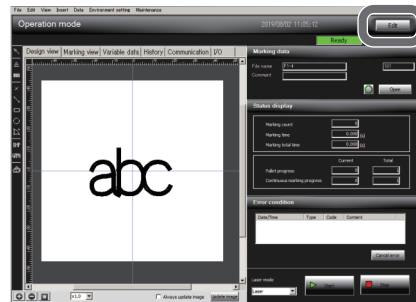
Perform test marking to check the marking data.

[Edit mode] screen



Create and edit the marking data.

[Operation mode] screen



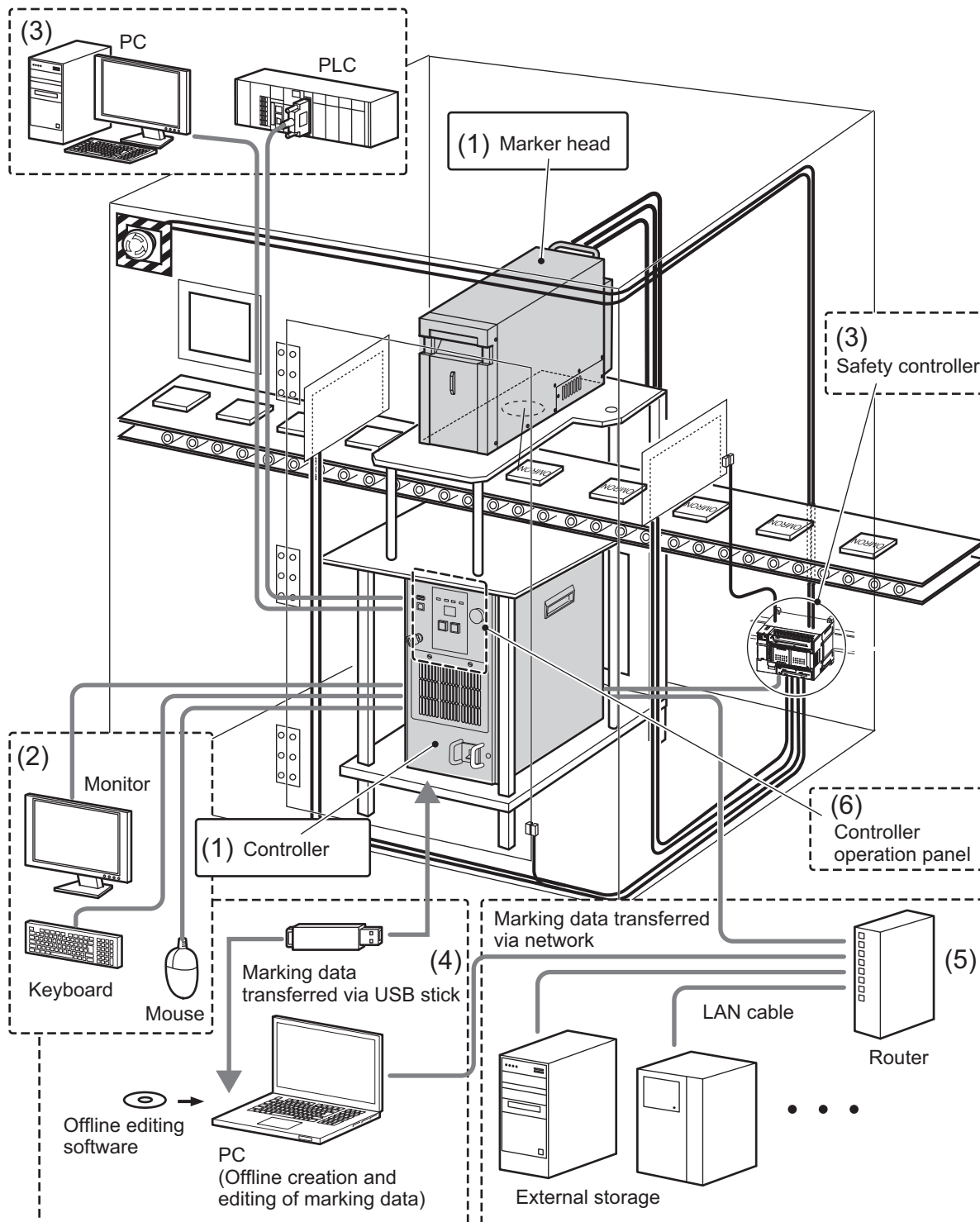
Select the marking data to perform marking. Also note that during marking, occurrence of error, number of marking operations, time required for marking, etc., are monitored.

Features and Main Functions

System Configuration

## 1.2 System Configuration

The system configuration for operating this machine is shown.



**(1) Basic system components**

These devices are needed at a minimum to perform marking.

Item name	Application
Controller	Control the marking system. Use the built-in marker software to instruct to create and edit marking data, start and end marking, etc.
Marker head	Laser is irradiated to perform marking.

 **Reference**

For information on how to connect each device, refer to:

- "Chapter 2 Installation and Connection (page 2-1)"

When using this product, always 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.

**(2) Items to be used during setup**

These items are necessary for setup.

Item name	Application
Monitor	This device is used to operate the marker software built into the controller. Connect each to the controller.
Keyboard	
Mouse	

**(3) Components required for external control**

External devices such as sensors and PLC can be connected to control the system via I/O communication, serial communication or Ethernet communication.

Item name	Application
Various sensors	Connect them to the controller to control the system via I/O communication, serial communication or Ethernet communication. To configure an emergency interlock circuit, connect the safety controller/safety relay to the controller.
PLC	
PC	
Safety controller	

 **Reference**

For information on how to connect each device, refer to:

- "Chapter 2 Installation and Connection (page 2-1)"
- "Chapter 4 Operation and Control by I/O Communication (page 4-1)"
- "Chapter 5 Operation and Control by Serial Communication (page 5-1)"
- "Chapter 6 Sharing Data and Control by Ethernet Communication (page 6-1)"
- "Chapter 7 Safety Control via Interlock (page 7-1)"
- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

**(4) Component devices needed to create and edit marking data by using offline editing software**

If you only need to create or edit marking data, you can do so on a separate PC without starting the controller (offline editing).

In this case, you must install in the PC beforehand the offline editing software provided in the attached CD-ROM.

To transfer marking data between the system and the PC, use USB memory. External storage can be used as the save destination for marking data with file sharing via Ethernet.

Item name	Application
PC	Install the offline editing software provided in the attached CD-ROM beforehand.
USB memory	Use the USB memory to transfer marking data from the controller to PC, or transfer to the controller the marking data you created or edited with the offline editing software.



**Precautions for Correct Use**

Special USB memories such as memories with security function are not supported. It is recommended that you check your USB memory beforehand to see if it works.

● **Operating environment of offline editing software**

The following environment is needed to operate the offline editing software:

Item	Specification
Applicable model	PC with USB port
Supported OS	Windows®7/Windows®8/8.1/Windows®10
CPU/Memory capacity	According to the OS specification
Available hard disk space	1 GB or more
Display resolution	1,024 × 768 pixels or more (Recommended)



**Reference**

For information on how to install the offline editing software, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

**(5) System components for sharing data via Ethernet communication**

To share marking data via Ethernet communication, connect the following devices to the Ethernet before use.

Item name	Application
Router	Intermediate devices used for network connections in order to connect multiple devices. Use as required.
Hub	
Server PC, NAS, etc.	Use as a file server when sharing data. Must be compatible with Ethernet communication.
LAN cable	Cable for performing Ethernet communication between connected devices.



**Reference**

For details on Ethernet communication, refer to:

- "Chapter 6 Sharing Data and Control by Ethernet Communication (page 6-1)"



**(6) Functions that can be performed via the controller operation panel**

You can enable/disable marking, install marking data you have created, edited and saved in the USB memory with the offline editing software, and perform various other functions using the controller buttons and display only.

**Reference**

---

For information on how to operate using the controller, refer to:

- "Chapter 8 Functions via Controller Operation (page 8-1)"
-



# Chapter 2

## Installation and Connection

This chapter explains how to install the Fiber Laser Marker and connect peripherals.

---

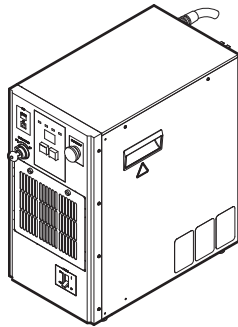
2.1	Preparation before Installation .....	2-2
2.2	Name and Function of Each Part .....	2-4
2.3	Installation Environment .....	2-10
2.4	Installation of Marker Head .....	2-15
2.5	Installation Direction .....	2-19
2.6	Connection of Devices .....	2-20

## 2.1 Preparation before Installation

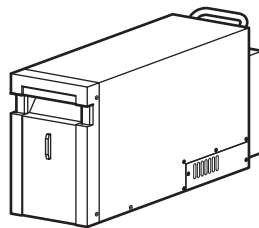
This section explains the things you should do before using the Fiber Laser Marker, such as checking the items in the package and preparing the peripherals.

### 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.



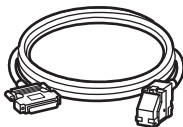
Controller.....1



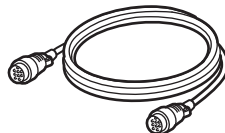
Marker head.....1



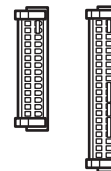
System key.....2



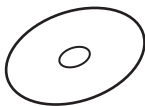
Marker head control cable.....1



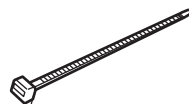
Marker head power supply cable.....1



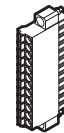
Removable terminal (For input/output) ..... 1 each



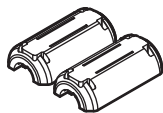
CD-ROM.....1  
(Supplied software, Setup manual, User's manual)



Cable tie.....1



Interlock release connector.....1




Ferrite cores.....2

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



### Precautions for Correct Use

- 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  "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<sup>®</sup> installed by Adobe<sup>®</sup> 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	<ul style="list-style-type: none"> <li>• DVI-D input specification</li> <li>• VGA input specification (15-pin, 3 rows)</li> </ul> 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.



#### Reference

For details on connection of external devices, refer to:

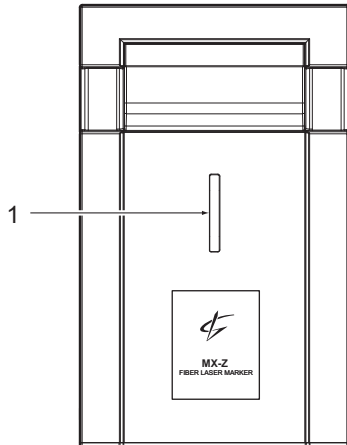
- "2.6 Connection of Devices (page 2-20)"
- "Chapter 4 Operation and Control by I/O Communication (page 4-1)"
- "Chapter 5 Operation and Control by Serial Communication (page 5-1)"
- "Chapter 6 Sharing Data and Control by Ethernet Communication (page 6-1)"
- "A.1 Specification (page A-2)"
- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

## 2.2 Name and Function of Each Part

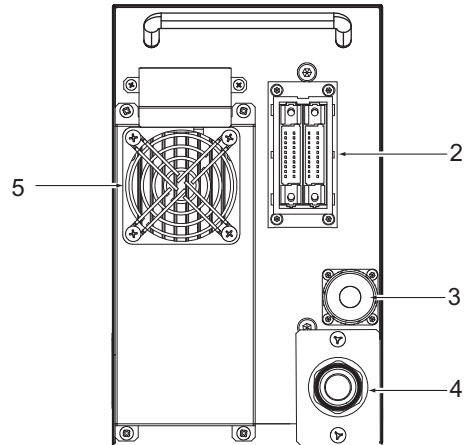
This section explains the name and function of each part of the marker head and controller.

### Marker Head

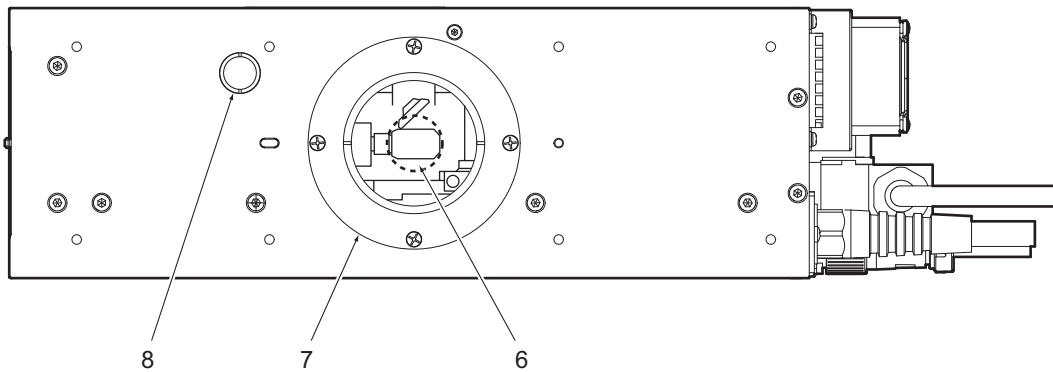
■ Front face



■ Rear face



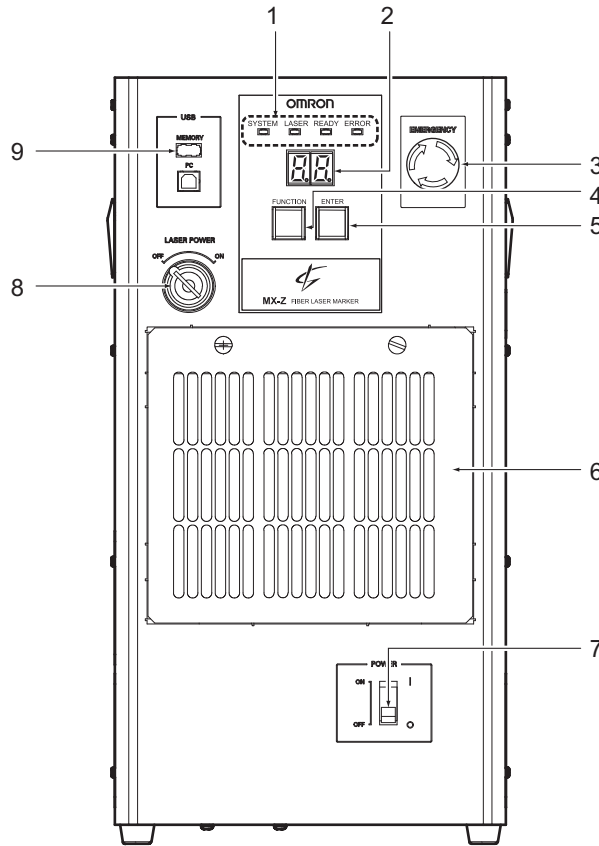
■ Rear face



No.	Name	Function	Reference page
1	Laser warning indicator	This indicator indicates the status of the marker head.	18
2	Marker head control connector	This connector is used for communication between the marker head and controller. Connects the marker head control cable.	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.	2-20
4	Fiber cable	This cable transmits laser. It comes pre-connected with the controller and cannot be disconnected.	2-20
5	Cooling fan	This fan cools the inside of the marker head.	9-10
6	Laser beam exit/ Guide laser exit	Laser, and guide laser used for positioning, are irradiated from this exit.	3-10
7	Cover glass	This glass protects the laser beam exit/guide laser exit. The glass must be cleaned periodically.	9-2
8	Focus pointer exit	Focus pointer used for adjustment of laser focus position is irradiated from this exit.	3-10

**Controller**

■ **Front face**



No.	Name	Function	Reference page
1	Controller status indicator LED	This LED indicates the status of the controller.	2-7
2	Display	This display shows the current marking status, execution of functions via controller operation and result of execution, error/alarm codes, etc.	2-8
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).	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.	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.	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.	9-6
7	Breaker (with earth leakage breaker function)	This breaker turns the laser marker power supply ON/OFF.	3-5 3-37



No.	Name	Function	Reference page
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.	3-6 3-36
9	[MEMORY] connector*1	Connects a USB memory to be used for data transfer. Specification: USB A connector	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)".

Preparation before Installation

Name and Function of Each Part

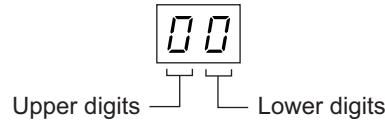
Installation Environment

Installation of Marker Head

Installation Direction

Connection of Devices

● Display



Application	Display	Meaning	Reference	
Status display	Upper digits	0	Normal	Chapter 3
		1	Alarm <sup>*2</sup>	
	Lower digits	0	Marking disabled <sup>*3</sup> (Guide laser can be irradiated)	
		1	Marking enabled <sup>*3</sup>	
		2	Marking	
Controller operation function selection <sup>*1</sup>	F0	Not specified (Nothing is done)	Chapter 8	
	F1	Switches from marking disabled to marking enabled (marking ready ON) <sup>*4</sup>		
	F2	Switches from marking enabled to marking disabled (marking ready OFF) <sup>*4</sup>		
	F3	Installs marking data from a USB memory <sup>*5</sup>		
	F4	Saves maintenance logs to a USB memory		
Controller operation function execution result <sup>*1</sup>	c0	Successful	Chapter 10	
	c1	USB error		
	c2	Copy error		
	c3	Inspection error		
	c4	Mode error		
Error display	E- → ** → **	After "E-" is displayed, a 4-digit code is shown in the order of upper two digits → lower two digits (repeated).	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.		

\*1 Use this function if the controller is not connected to a monitor, keyboard or mouse.

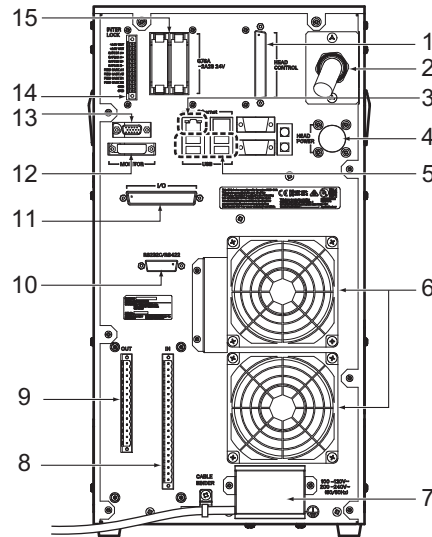
\*2 Pressing the [FUNCTION] button while the alarm is shown displays the applicable code.

\*3 Marking can be disabled/enabled using the applicable controller operation function buttons ([FUNCTION]/[ENTER]), marker software mode switching (edit mode/operation mode) or serial commands ([Start Edit]/[End Edit]). You can also use the marker software to specify the mode in which to start the system.

\*4 To enable marking, the system must be running, laser power must be ON, and shutter must be open.

\*5 To install marking data from a USB memory, you must "Switch from marking enabled to marking disabled" (F2) to disable the marking.

■ Rear face



No.	Name	Function	Reference page
1	Marker head control connector	Connects the marker head control cable.	2-20
2	Fiber cable	This cable comes pre-connected with the marker head. It cannot be disconnected.	2-20
3	Ethernet port	To perform Ethernet communication, connects the LAN cable. Specification: RJ-45	2-26
4	Marker head power supply connector	Connects the marker head power supply cable.	2-20
5	USB connector <sup>*1</sup>	Connects the keyboard or mouse.	2-24
6	Cooling fans	These fans cool the inside of the controller.	9-10
7	Power supply terminal block(with cover)	Connects the power supply cable.	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	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	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)	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)	2-25
12	Monitor connector (DVI)	Connects the monitor cable. Specification: DVI (female)	2-22
13	Monitor connector (D-sub)	Connects the monitor cable. Specification: D-sub, 15-pin, 3-row connector (female)	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.	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	7-1

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

Preparation before Installation  
 Name and Function of Each Part  
 Installation Environment  
 Installation of Marker Head  
 Installation Direction  
 Connection of Devices

## 2.3 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.

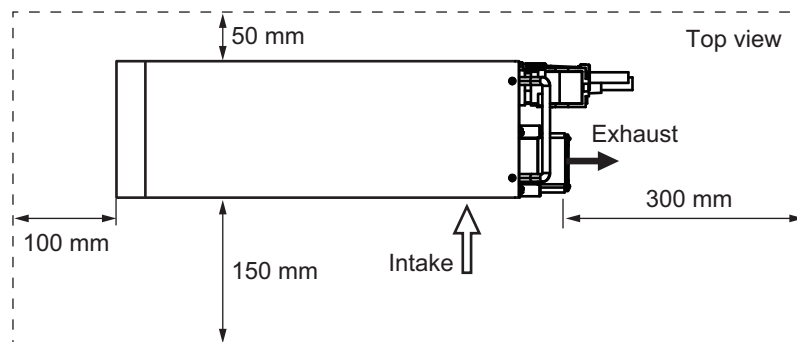
Item	Specification
Power supply	100 to 120 VAC, Frequency 50/60 Hz, Maximum 390 VA 200 to 240 VAC, Frequency 50/60 Hz, Maximum 420 VA
Ambient temperature*1	0 to 40 °C
Relative humidity	35 to 85% RH (No condensation)
Storage ambient temperature	-10 to 60 °C (No freezing)
Operating environment	<ul style="list-style-type: none"> <li>• Location exposed to minimum dust, dirt or oil mist</li> <li>• Location not subject to sudden temperature shift</li> <li>• Location free from strong vibration or impact</li> </ul>

\* 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.

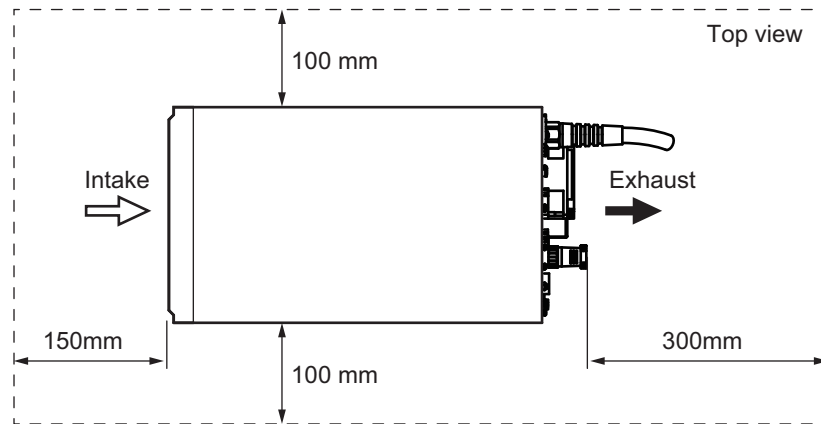
#### ■ Installation space

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



### Precautions for Correct Use

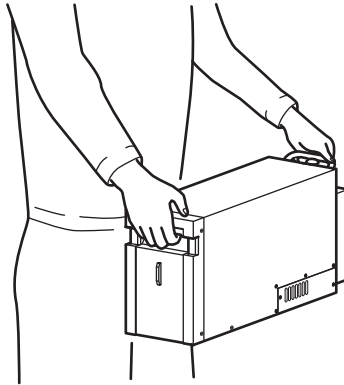
- Provide space as indicated in the illustration so as not to disturb the flow of the intake and exhaust. At this time, control exhaust heat to keep the ambient temperature of the operating system within the temperature range in compliance with the installation environment standard. If sufficient installation 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.

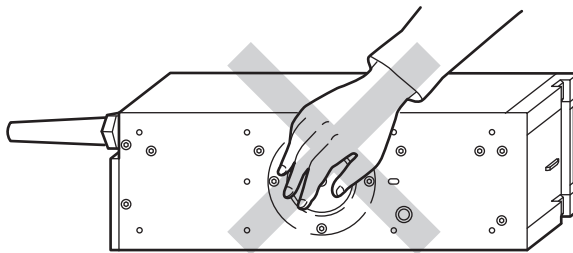


### ■ Handling of marker head

Do not touch the bottom face of the marker head with bare hands.

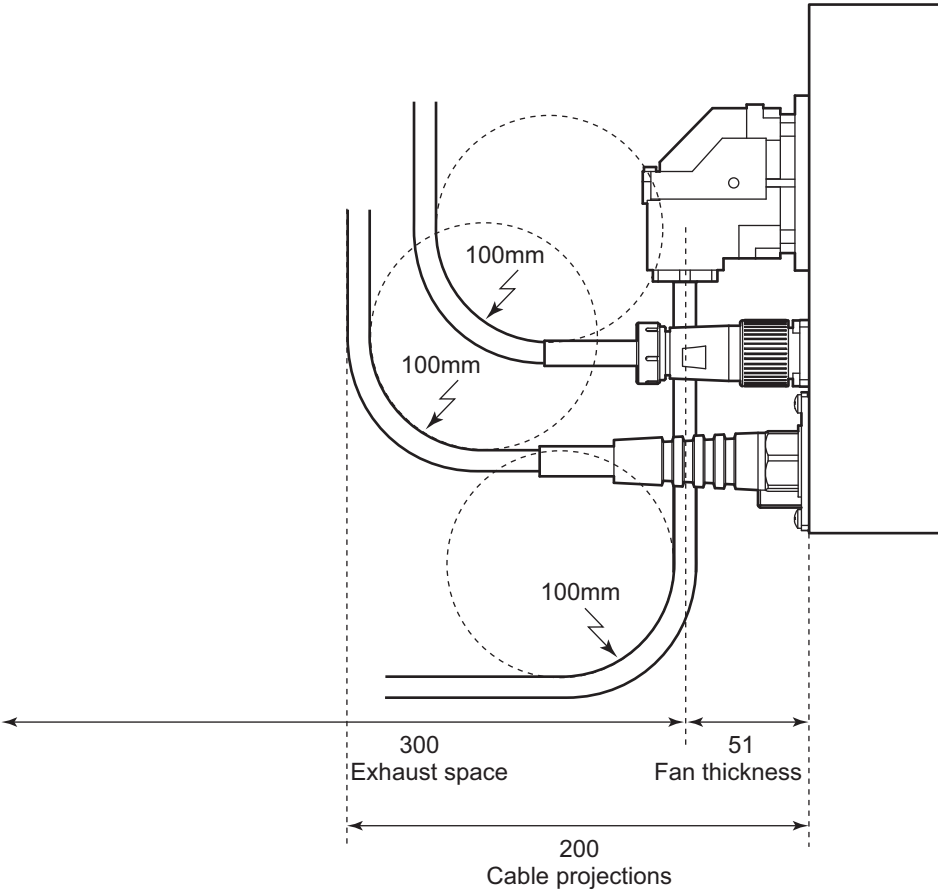
In particular, never touch the cover glass protecting the laser beam exit/guide laser exit.

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.

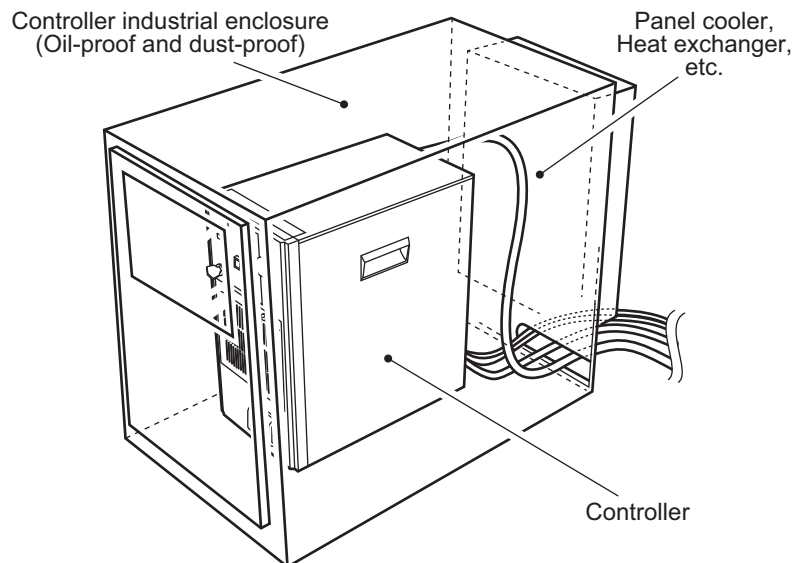


 **Precautions for Correct Use**

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.

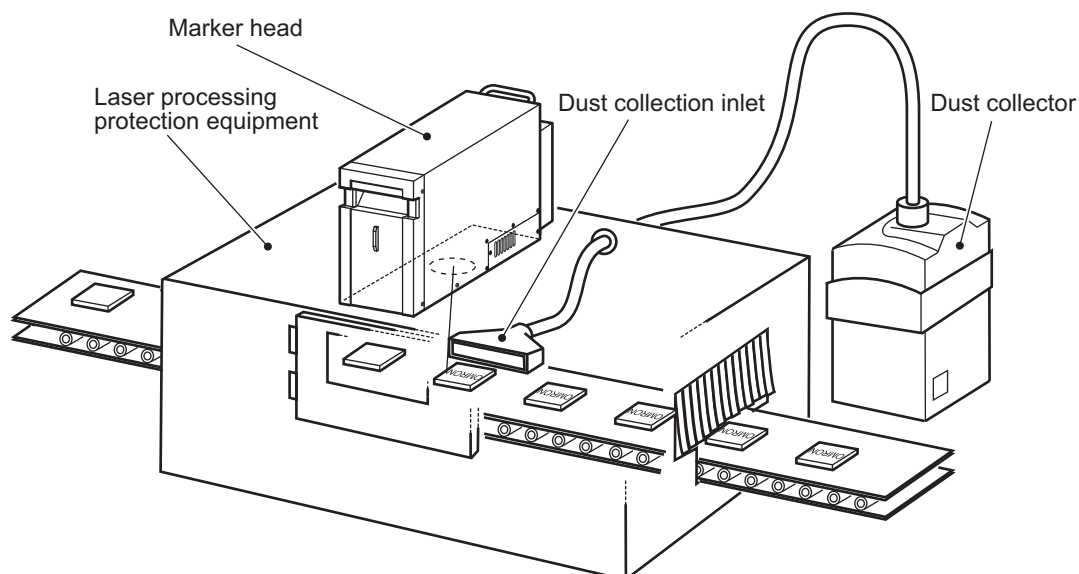


### ■ Installation of dust collector

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 compressed air from the processing surface to the dust collection inlet.



### Reference

For details on the installation space, refer to:

- "Installation space (page 2-10, 2-11)"



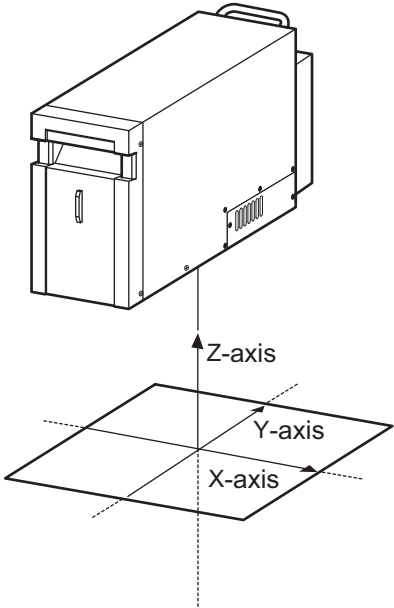


# 2.4 Installation of Marker Head

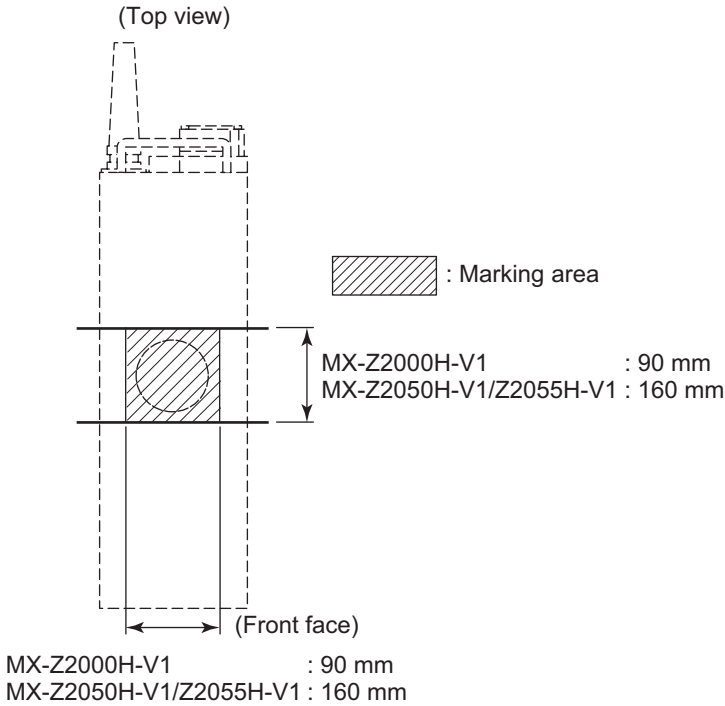
Install the marker head on the plate.  
The installation direction is not limited at all, and the market head can be installed in any direction.

## 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



Preparation before Installation

Name and Function of Each Part

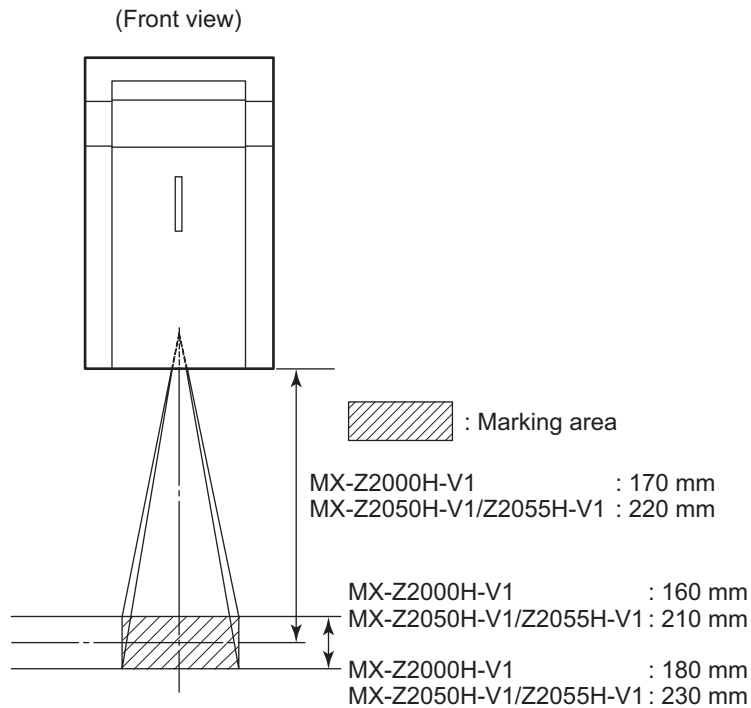
Installation Environment

Installation of Marker Head

Installation Direction

Connection of Devices

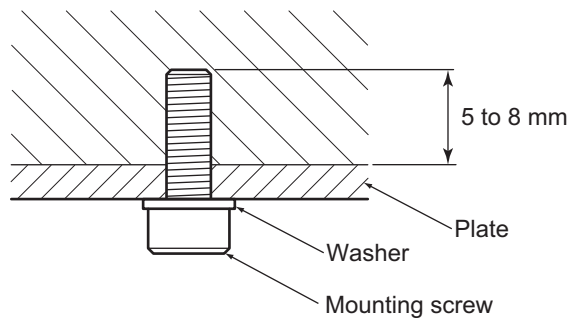
■ Z-axis



**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.

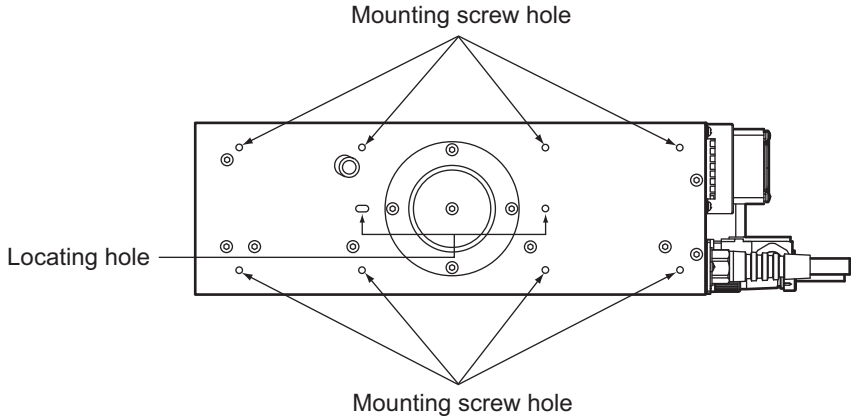


**Additional Information**

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

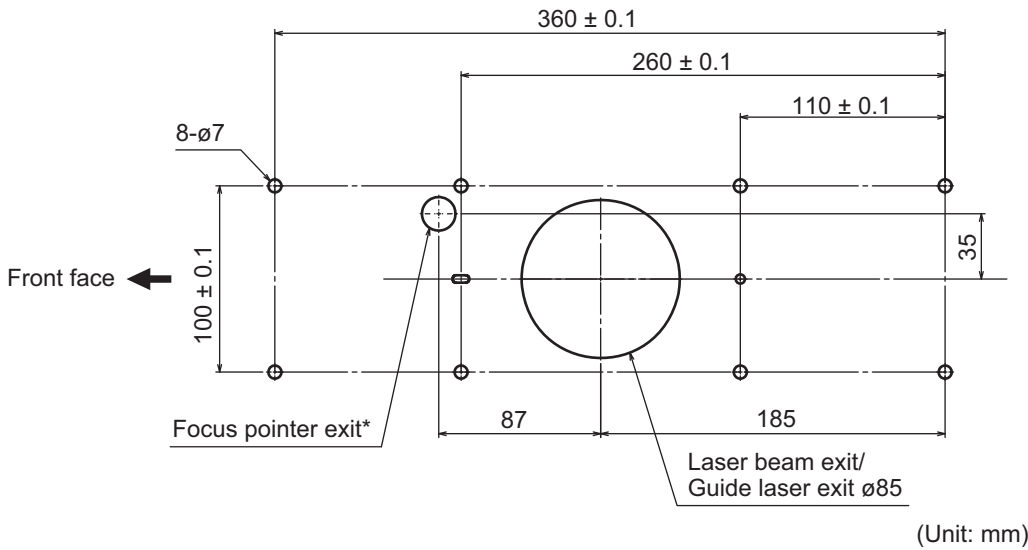
**Installation Method**

The positions of mounting screw holes (8 locations) in the marker head are shown below. Drill mounting screw holes by referring to the machining dimension diagrams in the next paragraph and be sure 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  
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)

Preparation before Installation

Name and Function of Each Part

Installation Environment

Installation of Marker Head

Installation Direction

Connection of Devices



### Precautions for Correct Use

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



### Reference

For the external dimensions of the marker head, refer to:

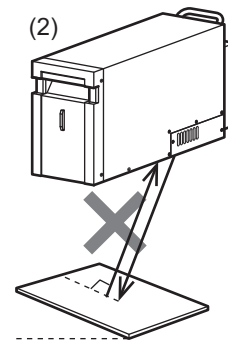
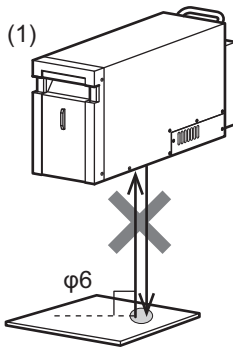
- "A.2 External Dimension (page A-4)"

## 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  $\phi 6$  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.

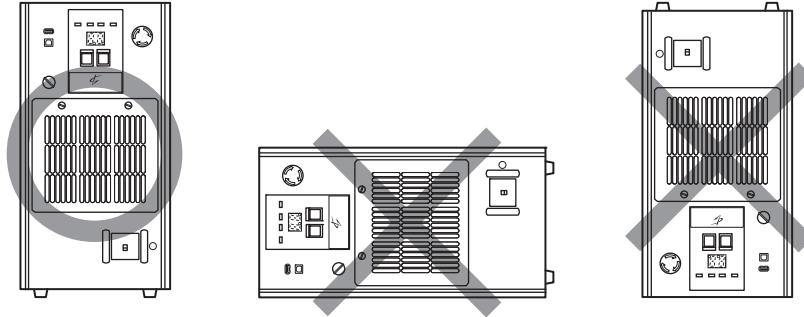


## 2.5 Installation Direction

2

### 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.

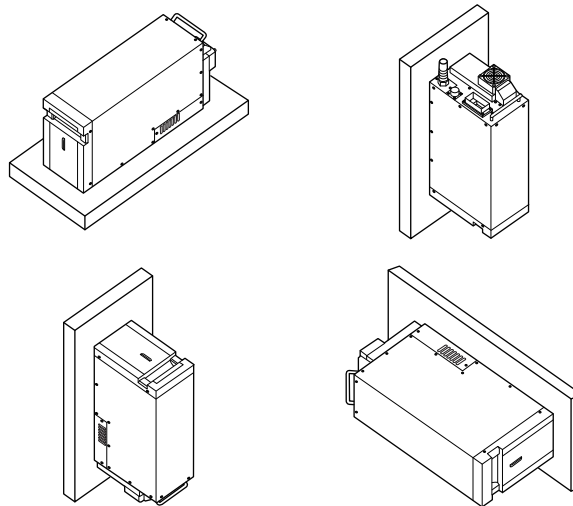


#### Precautions for Correct Use

- 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.



#### Precautions for Correct Use

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.

Preparation  
before  
InstallationName and  
Function of  
Each PartInstallation  
EnvironmentInstallation of  
Marker HeadInstallation  
DirectionConnection  
of Devices

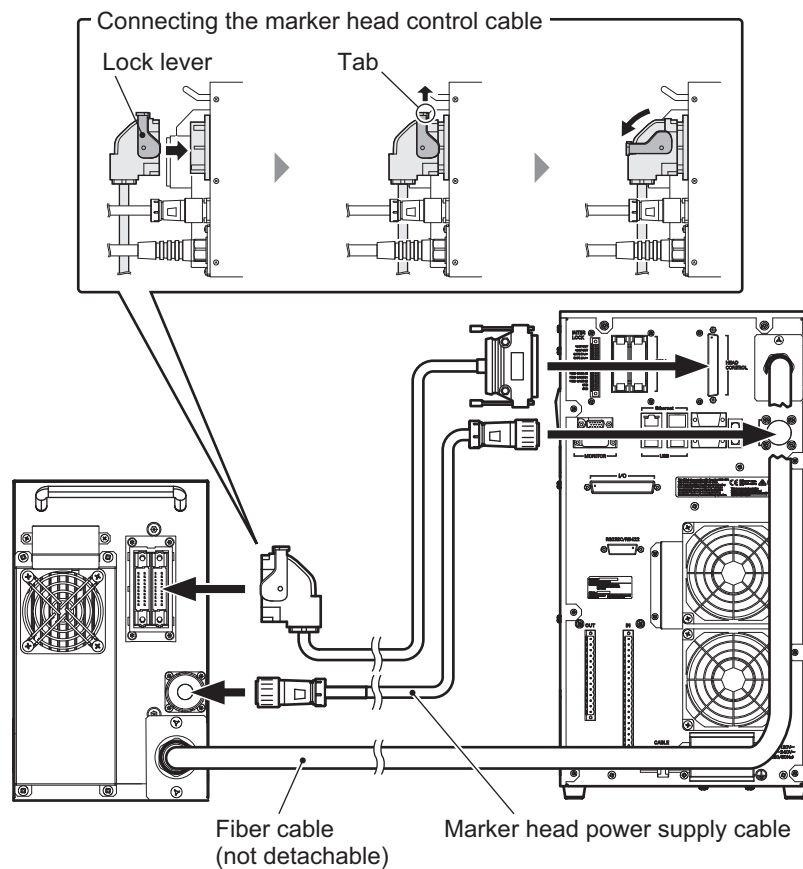
## 2.6 Connection of Devices

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.



#### Precautions for Correct Use

- 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.

### Precautions for Correct Use

- 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.

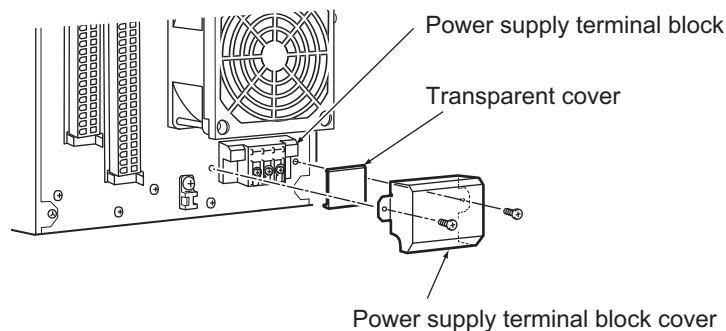
### Warning

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

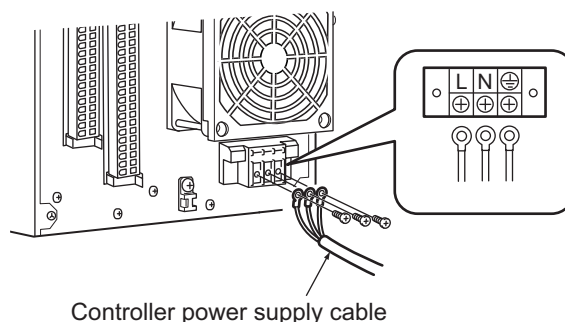
Do not wire the cable if the power supply plug is still connected to the power socket. Doing so may result in electric shock.

- 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.





### Precautions for Correct Use

- 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.



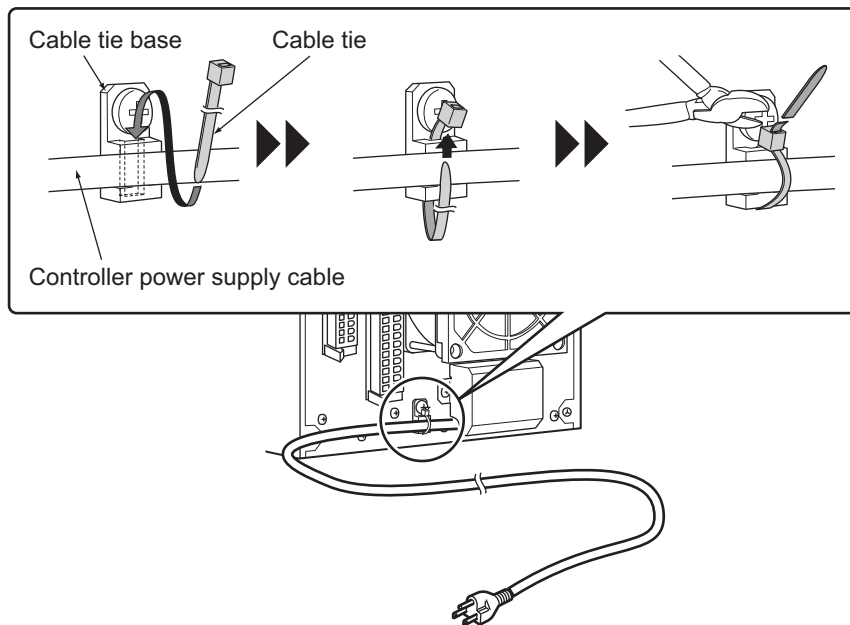
- Keep the controller power supply cable away from any high-voltage line, power wire or device that generates significant switching surge, etc. If noise is superimposed on the power supply, use a noise cutoff transformer, etc.

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

Tighten the screws to the torque of 0.48 N·m.

### 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.

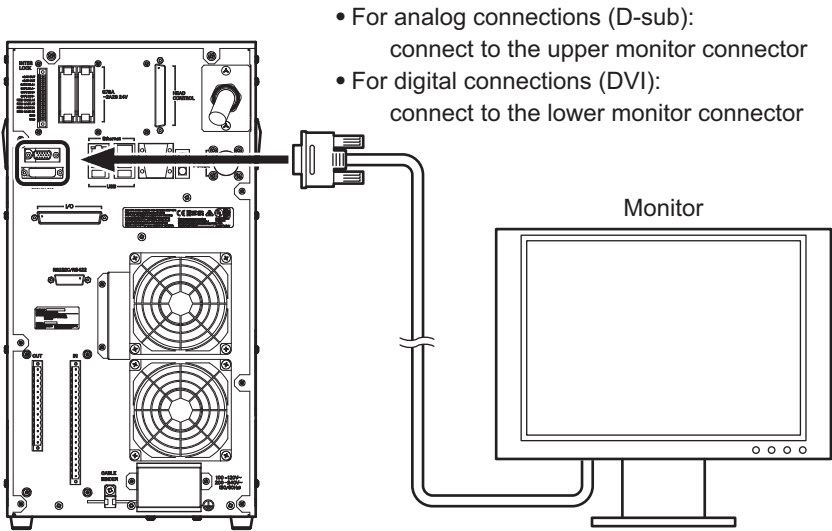


### 5 Connect the power supply plug of the controller power supply cable to the power socket.

## Connecting the Monitor

Connect the monitor cable to the monitor connector on the rear face of the controller.





Preparation  
before  
Installation

Name and  
Function of  
Each Part

Installation  
Environment

Installation of  
Marker Head

Installation  
Direction

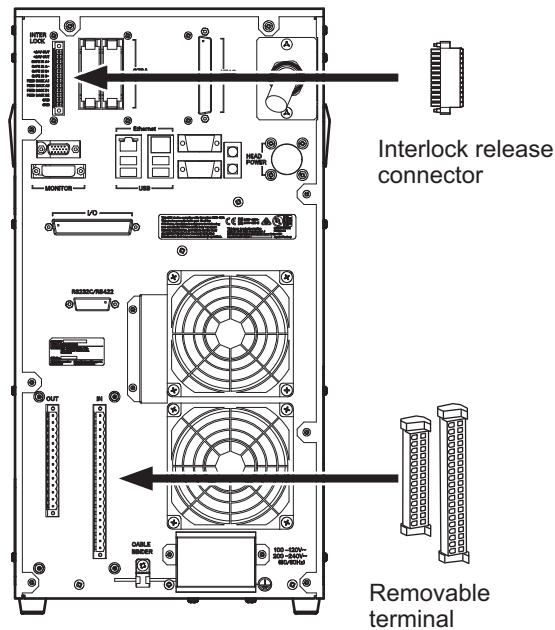
Connection  
of Devices

## Connecting Terminals

Install the supplied terminals to the back of the controller.

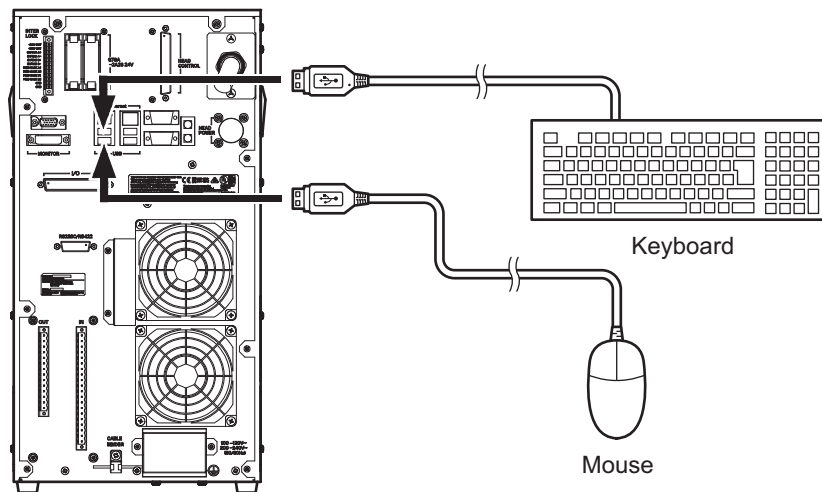
### Precautions for Correct Use

- 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.
- Be sure to operate correctly when connecting or removing the removable terminal. Incorrect operation may damage the removable terminal. For details, refer to "Removable terminal (page 4-8)".



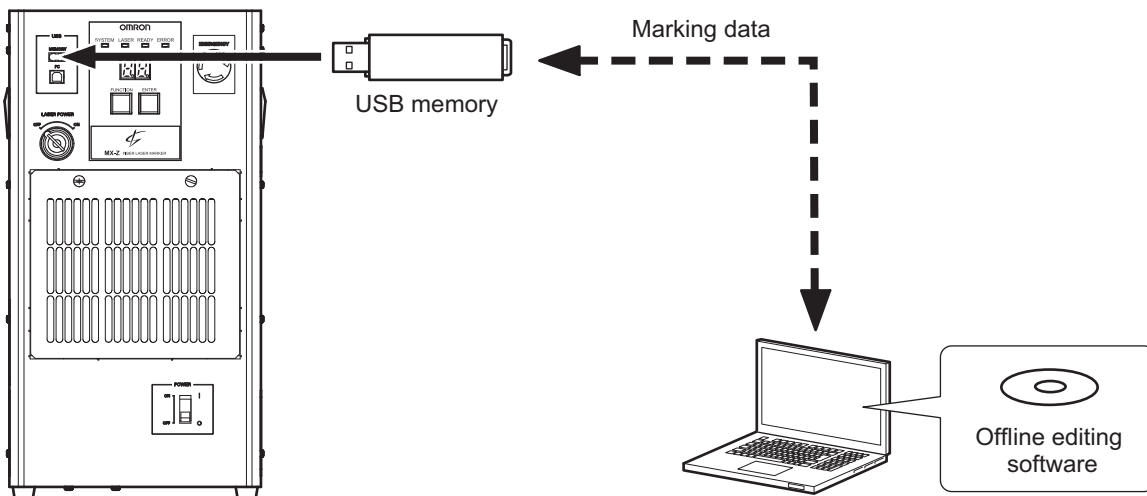
## Connecting the Keyboard and Mouse

Connect the keyboard and mouse to the USB connector on the rear face of the controller.



### Connecting the USB Memory

If you want to transfer the controller's marking data for offline editing or install offline-edited data from a PC to the controller, connect a USB memory to the [MEMORY] connector at the front of the controller.



#### Precautions for Correct Use

Special USB memories such as memories with security function are not supported. It is recommended that you check your USB memory beforehand to see if it works.

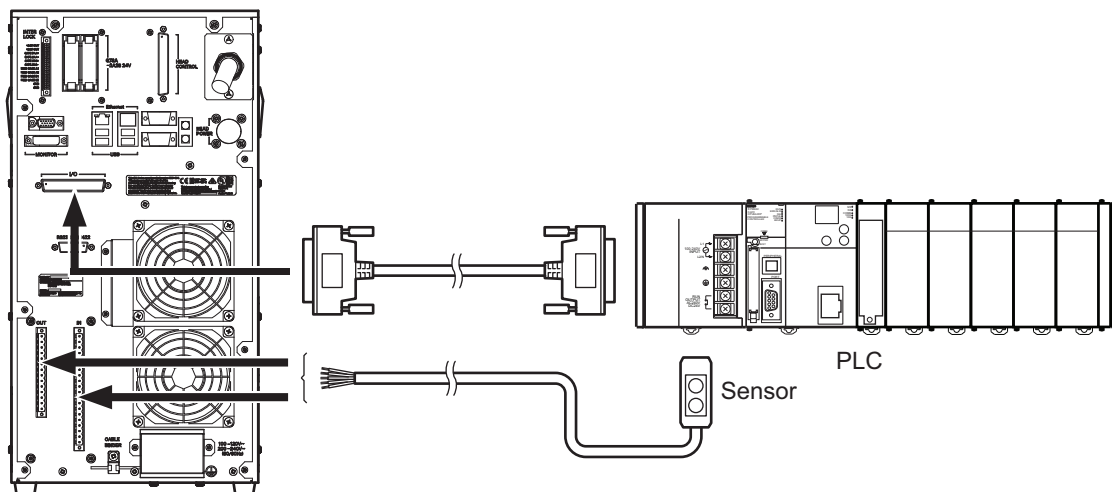
### Connecting the External Device

To allow for external control, connect each corresponding device to each connector on the rear face of the controller.

You can also connect devices to multiple connectors and perform control by I/O communication and control by serial communication in parallel.

#### ■ Control by I/O communication

Connect a corresponding device to the input terminal block, output terminal block or I/O connector.



Preparation before Installation

Name and Function of Each Part

Installation Environment

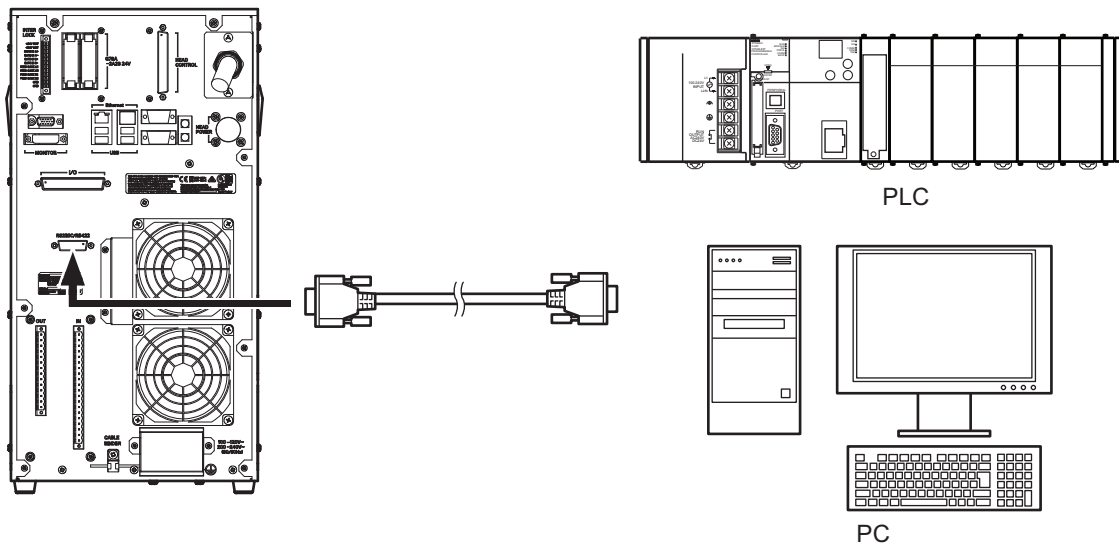
Installation of Marker Head

Installation Direction

Connection of Devices

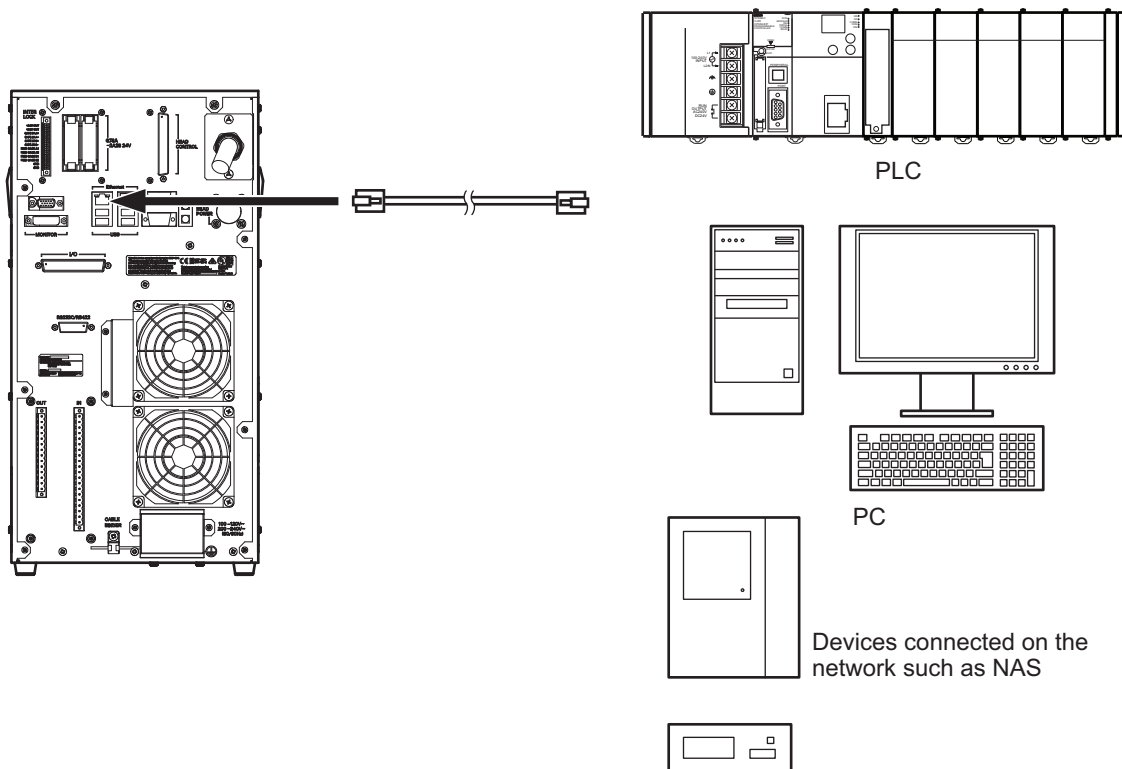
■ **Control by serial communication**

Connect a device to the RS-232C/RS-422A serial port.



**Ethernet Connection, EtherNet/IP™ Connection**

Connect the device to the Ethernet port.



 **Precautions for Correct Use**

- To connect directly to a PLC or PC use a crossover cable, or to connect to a hub, use a straight cable.
- Check "6.3 Ethernet Setting (page 6-5)" and use a LAN cable to suit the communication type (transfer speed).

# Chapter 3

## Basic Operating Method

This chapter explains how to operate the Fiber Laser Marker basically.

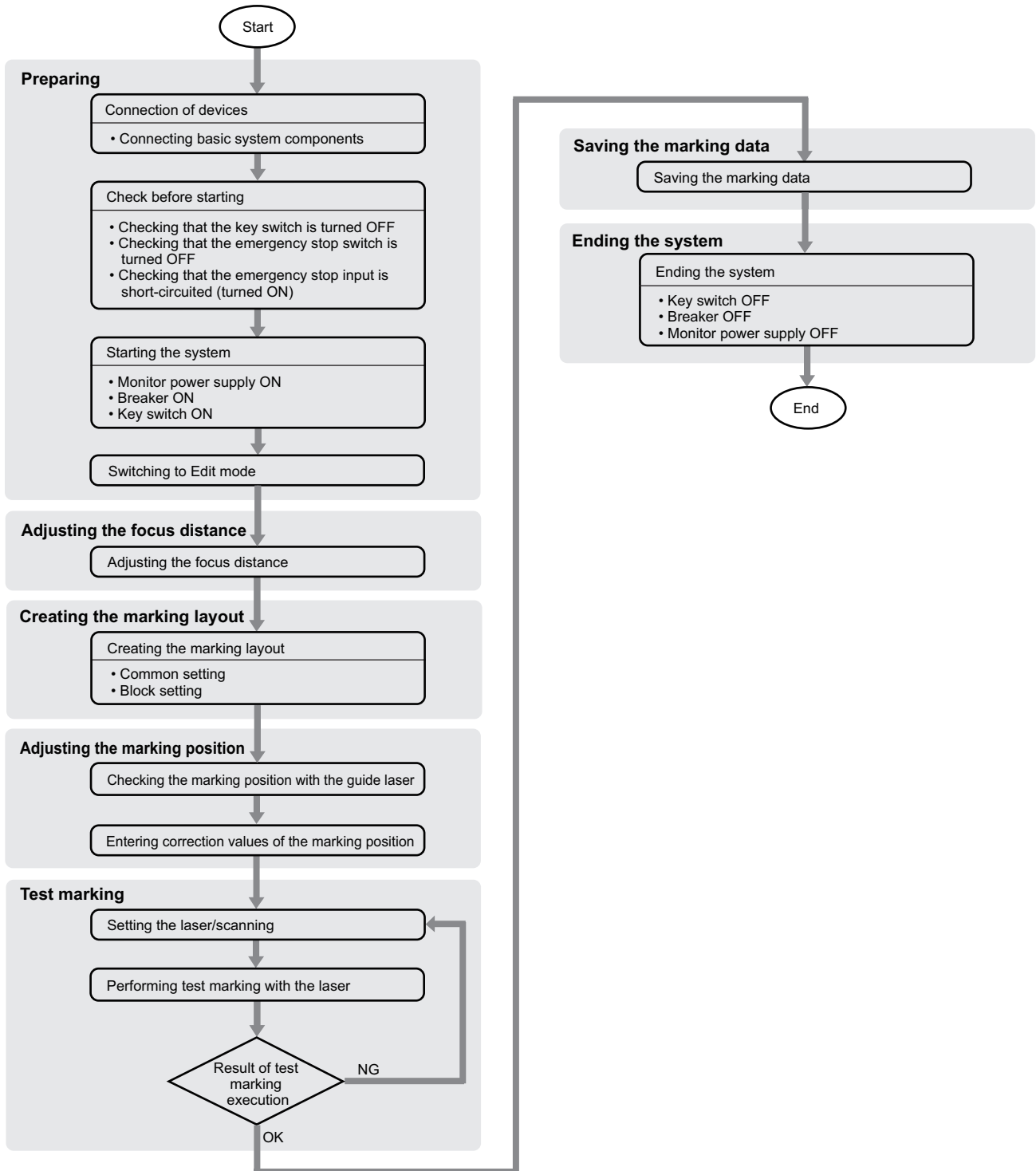
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3.1	Flow of Operations from Startup to Shutdown .....	3-2
3.2	Initial Startup and Creating/Editing Marking Data .	3-4
3.3	At Marking .....	3-38

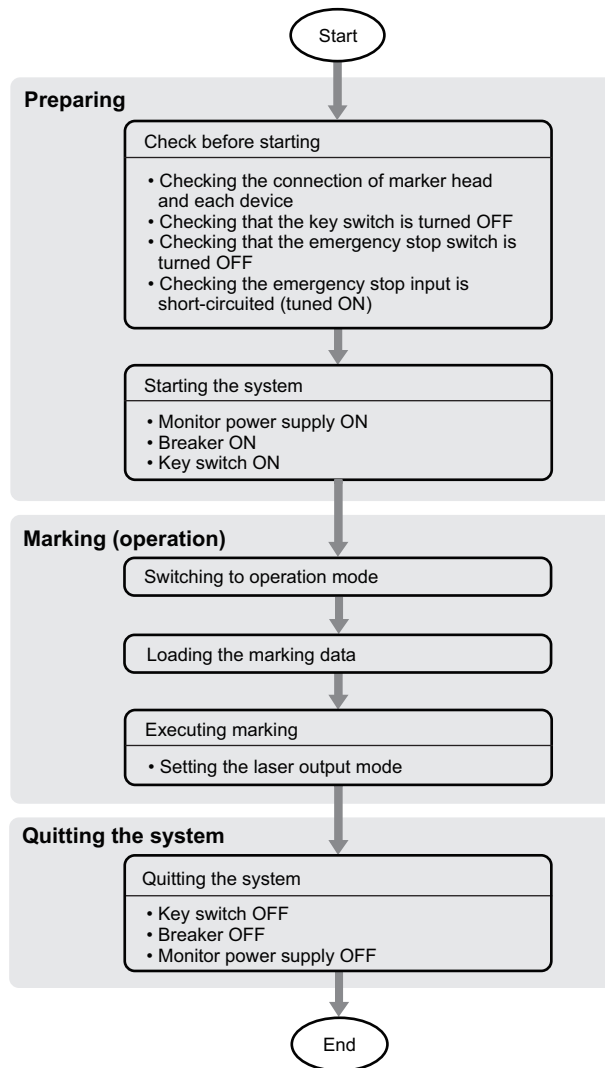
# 3.1 Flow of Operations from Startup to Shutdown

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).

## Initial Startup and Creating/Editing Marking Data



## Marking (Operation)



## 3.2 Initial Startup and Creating/Editing Marking Data

This section explains the tasks you perform when using this system for the first time or creating new marking data or editing existing marking data.

### Connection of Devices

Connect the basic system components (marker head, monitor, keyboard and mouse) to the controller. Securely connect each device so that the connector will not loosen or come off.



#### Reference

For information on how to connect each device, refer to:

- "Chapter 2 Installation and Connection (page 2-1)"

### Check before Starting

Before starting the system, be sure to check the following:

- The key switch is turned OFF.
- The emergency stop switch ([EMERGENCY] button) is turned OFF (reset).
- The [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) terminals on the input terminal block are short-circuited with [COM OUT].
- The interlock release connector is connected.



#### Reference

For the [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) terminals, refer to:

- "Input Terminal Block (page 4-12)"
- "■ [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) (page 4-24)"

When the warm-up function is enabled via software settings, error 0026 will occur when switching to operation mode while the key switch is turned OFF.

For details on the warm-up function settings, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

For regarding the interlock release connector, refer to:

- "Interlock Connector Specifications (page 7-5)"



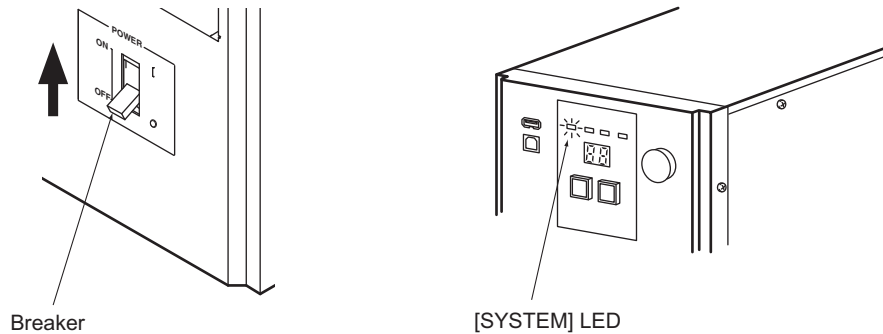
## Starting the System

Turn ON the power supply to start the system.

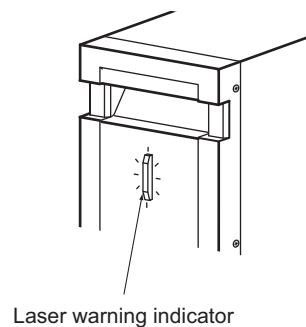
### Precautions for Correct Use

After turning OFF the controller power supply, wait for at least 5 seconds before turning it back ON.

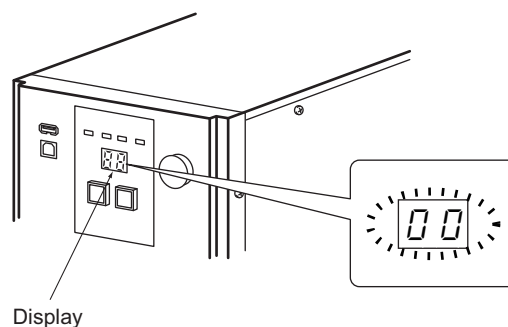
- 1 Turn ON the monitor power supply.
- 2 Turn ON the breaker on the front face of the controller.  
The [POWER] lamp on the right side of the breaker turns on. After a brief moment, the [SYSTEM] LED (green) comes on and the controller is started.



When the breaker is turned ON, the laser warning indicator on the marker head turns on briefly and then turns off once the controller startup process begins.



When the controller has started, [00] is shown on the display.





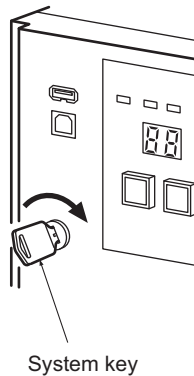
#### Additional Information

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If the [ERROR] LED turns on, it means an error has occurred. If the display shows [10], it means an alarm has generated. In this case, remove the cause of the abnormality by referring to "Chapter 10 What to Do in Case of Abnormality (page 10-1)" and resume operation after confirming [00] on the display.

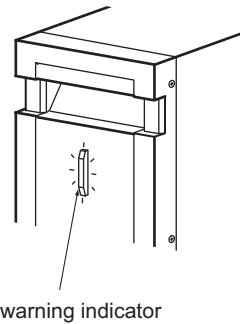
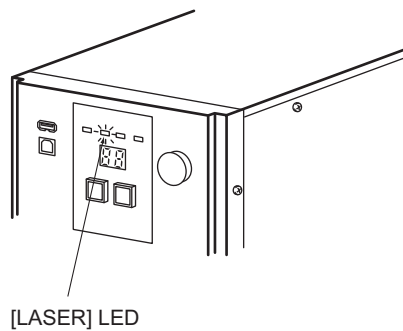
---

- 3** Insert the system key into the keyhole and turn the key to the [ON] position. (Key switch ON)



The laser power turns ON and the system is now ready to perform marking.

At the same time, the [LASER] LED (orange) on the controller comes on and the laser warning indicator on the marker head illuminates in green (laser standby mode).



#### Additional Information

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##### Warm-up

The controller and marker head are not stable immediately after the controller power supply is turned ON, so it is recommended that, after turning ON the power supply, you warm up the system before marking is started. For details, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

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## Initial Language Setup

When the laser marker is started for the first time, the [Language] dialog box is displayed.

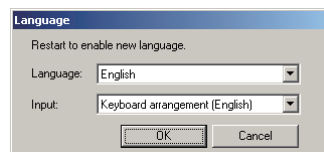


### Additional Information

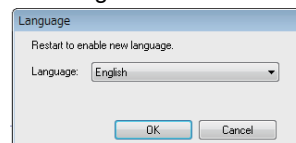
- The [Language] dialog boxes are different between the marker software and the offline editing software/font logo editor.
- Settings must be made individually for the marker software, online editing software, and font logo editor.

Specify the language to use, then click [OK].

<Marker software>



<Offline editing software/  
Font logo editor>



In the [Language] dialog box of marker software, the display language and the keyboard language can be set individually.

In the [Language] dialog box of offline editing software and font logo editor, Display language can be set.

- As a default, [Japanese] is set for both [Language] (display language) and [Input] (keyboard input language).
- When the setting is changed, the laser marker (in the case of marker software) or software (in the case of other softwares) is restarted and the language setting is switched to the set language.



### Additional Information

- Once the languages to use are set, the [Language] dialog box is not displayed the next time the power is turned ON.

## Switching to Edit Mode

When this system is started, the marker software starts by displaying one of the following two initial screens:

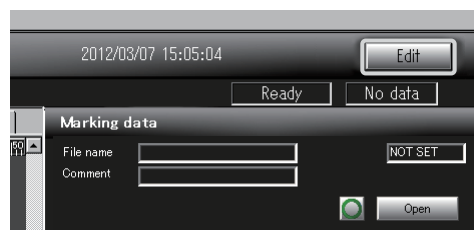
- [Edit mode] screen: Create/edit marking data (create block data, set blocks, set common items), set up the system, and perform test marking, etc.
- [Operation mode] screen: Start actual marking operation using the specified marking data, and end the marking.  
The [READY] LED (yellow green) on the controller remains lit in this mode.



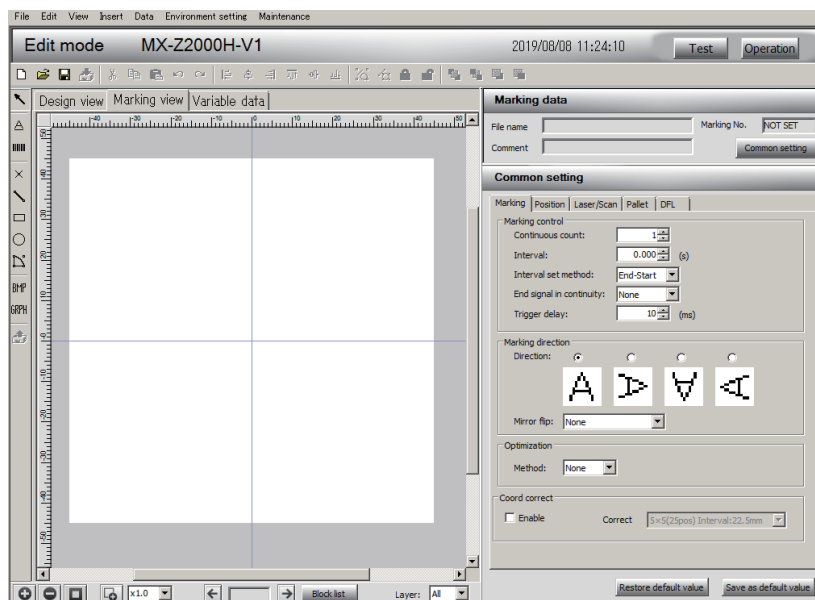
### Additional Information

You can specify either the edit mode or operation mode as the initial operation mode in which the software is started by clicking [Environment setting] on the menu bar, clicking [Marker operation], and then clicking [Operation Mode] on the displayed [Start setting] tab. For details on startup settings, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

- 1 If the marker software started by displaying the [Operation mode] screen, click [Edit].



The screen switches to [Edit mode].



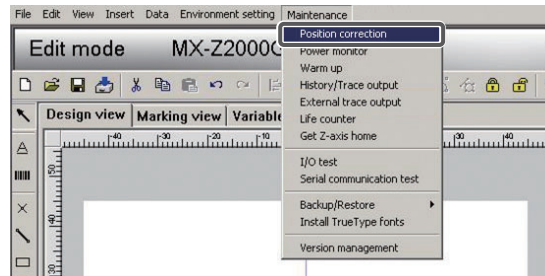
## Adjusting the Focus Distance

Before marking is started, adjust the focus distance from the work.

Use the guide laser and indicator light from the focus pointer to adjust the height of the work until the distance (Z-axis) between the marker head and work becomes the reference focus distance.

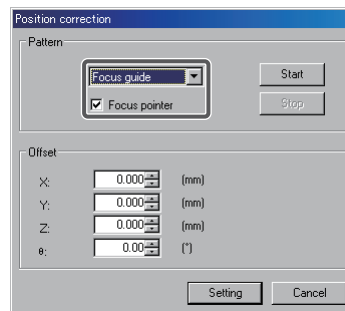
3

- 1 Click [Maintenance] on the menu bar, and then select [Position correction].

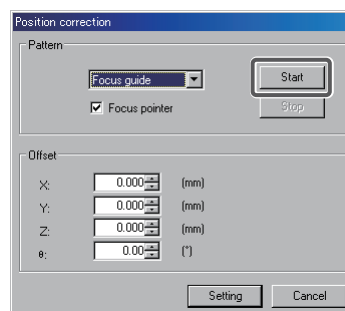


The [Position correction] dialog box is displayed.

- 2 Select "Focus guide" as the guide laser pattern, and then select the [Focus pointer] check box.

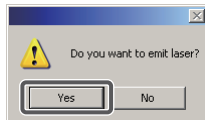


- 3 Click [Start].



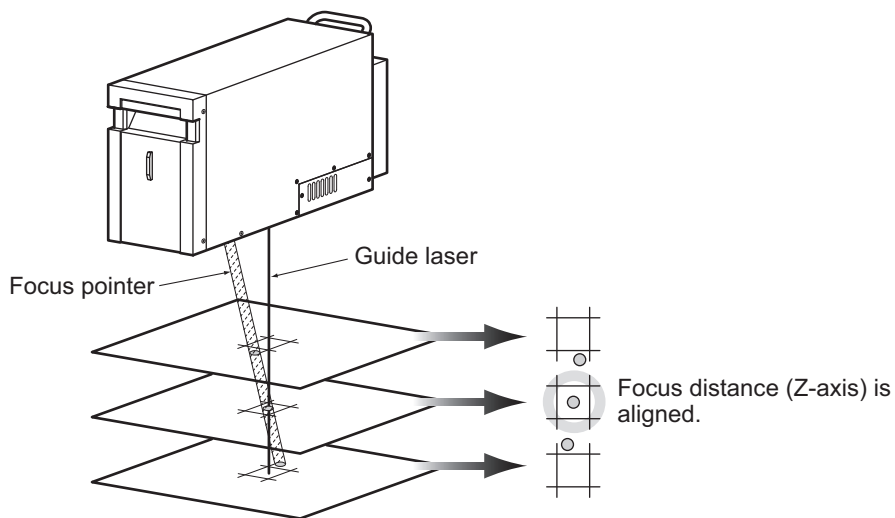
A message confirming an irradiation of laser is displayed.

**4 Click [Yes].**

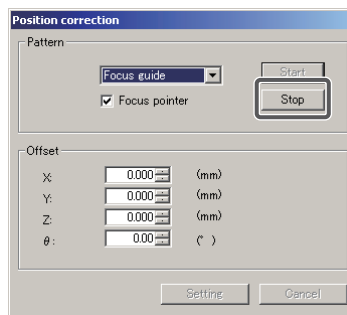


The guide laser and focus pointer are irradiated.

**5 Adjust the height of the work until the indicator light of the focus pointer aligns with the center of the guide laser pattern.**



**6 When the height has been adjusted, click [Stop].**



The guide laser and focus pointer turn off.

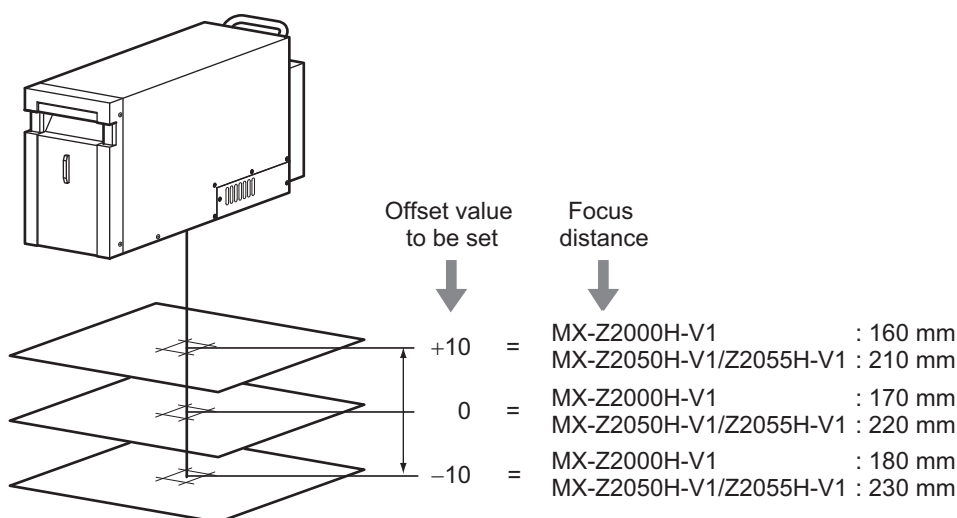


### Additional Information

For the focus distance, any distance can be set as long as it is within the reference distance range of reference distance  $\pm 10$  mm. The following two setting methods can be used:

- [1] Adjust the focus distance when the marker head is installed: Click [Maintenance] on the menu bar, and then select [Position correction] to open the dialog box. Click [Offset] and set a Z-axis offset value under [Z]. The positions of the guide laser and focus pointer change according to the offset value you have set.
- [2] Adjust the focus distance for each work saved with marking data: Click [Common setting] on the menu bar, and then select the [Position] tab. Click [Layer] and set a Z-axis offset value under [Z correction].

A different focus distance is set according to the Z-axis offset value, as shown below.



### Additional Information

Adjusting the focus distance alone may not achieve the desired marking result depending on the material of the work, laser settings and other conditions. It is recommended that you perform test marking and check the result of marking before performing actual marking operation. (Refer to "Adjusting the Marking Position (page 3-27)")

## Creating the Marking Layout

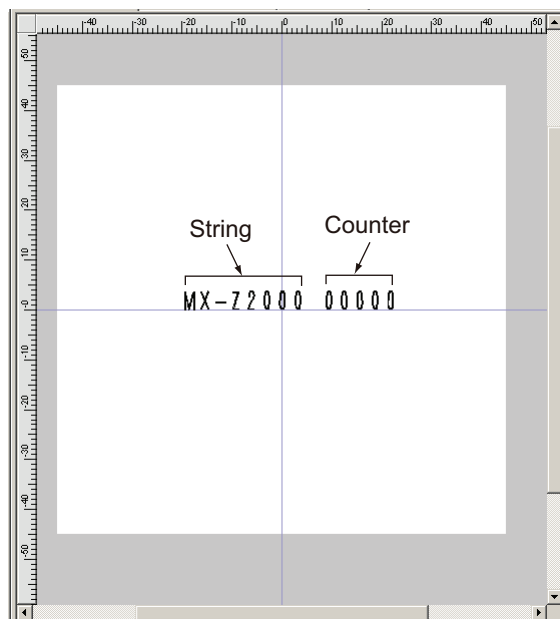
Create a marking layout on the [Edit mode] screen.

The method to create and set a marking layout varies depending on the type of block.

The following explains how to create a marking layout by giving a simple example of marking with MX-Z2000H-V1.

### ■ Marking example

Add a 5-digit counter to the string "MX-Z2000" and mark the work at its center.



### ■ Setting

Key setting items are shown below.

- **[Common setting] - [Marking] setting**
  - Marking direction : Forward
- **[Text property] - [Form/Position] setting**
  - Font type/Font name : Stroke/original2
  - Text width/Text height : 3 mm/4 mm
  - Text spacing : 0.1 mm
  - No font space : Do not select (Font space is available)
  - Text direction : Horizontal
  - Position Coordinate X/Coordinate Y : -20 mm/-0.2 mm
- **[Text property] - [Adjustment 1] setting**
  - Bold : Enable
  - Count/Width : 4/0.2 mm



- **[Counter] setting**

- Counter No. : 0
- Initial value/End value : 0/9
- Step : 1
- Initial timing : Change marking data
- Count timing : Marking
- Count end action : Error stop
- Count end output : A
- Output type : Pulse
- Zero suppression : No
- Digit : 5 digits
- Base : 10

## ■ Setting method

- **[Marking] setting**

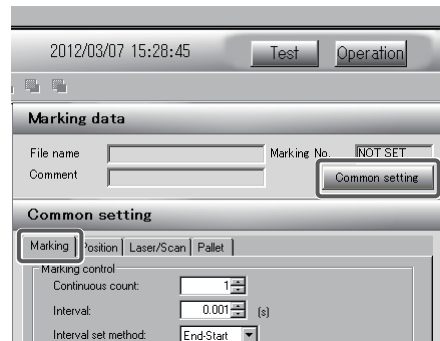
Set the direction of marking.



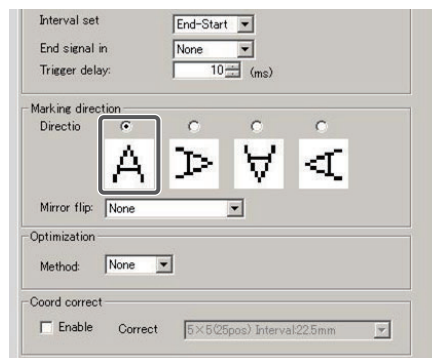
### Additional Information

The common settings will apply to all blocks included in the marking data to be created.

#### 1 Click [Common setting], and then select the [Marking] tab.



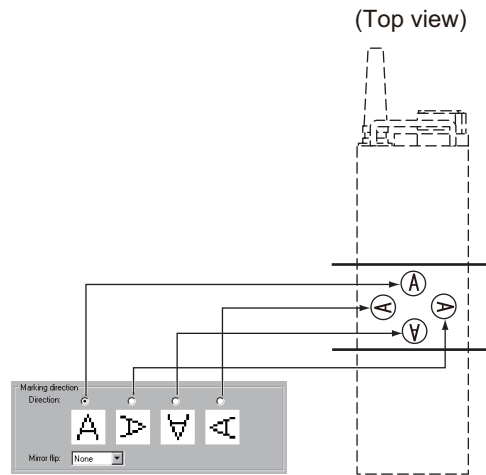
#### 2 Under [Marking direction], select "Forward."





**Additional Information**

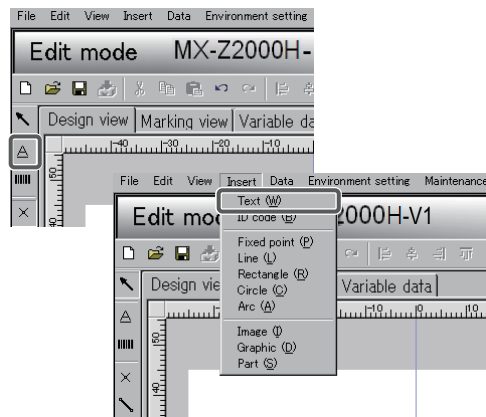
This sets the actual marking direction as follows.



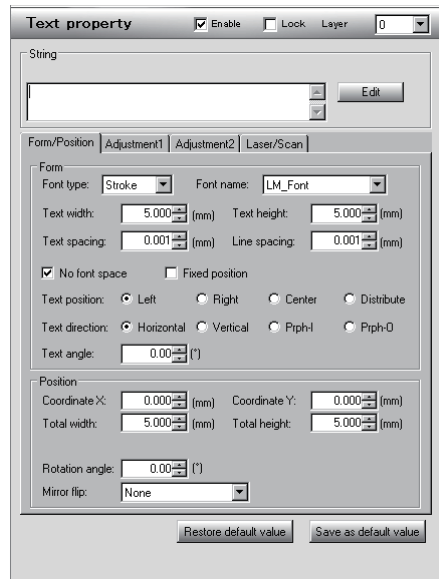
● **[Form/Position] setting**

Set the form and position of the string.

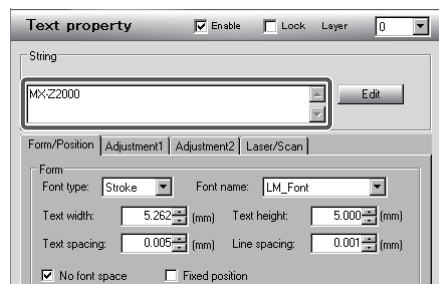
- 1 Click  on the block menu, or click [Insert] on the menu bar and then select [Text].



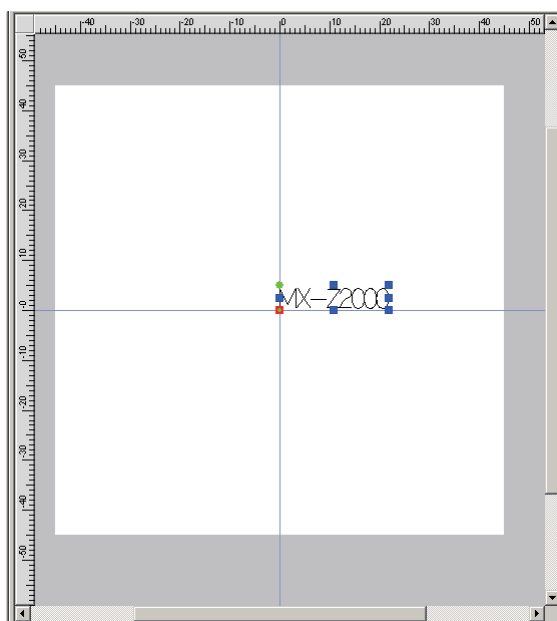
[Text property] is displayed.



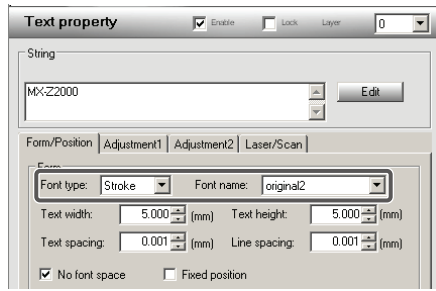
- 2 In the [String] text box, enter the string "MX-Z2000" to be marked.



The string "MX-Z2000" appears on the sheet based on the shape and position initially set.



**3 Select "Stroke" under [Font type] and "original2" under [Font name].**



**Additional Information**

This system only supports TrueType fonts or Stroke fonts for marking.

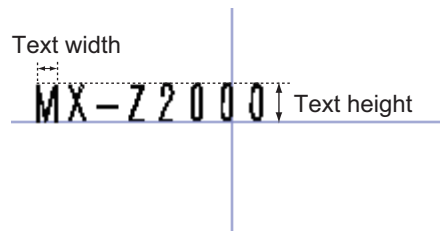
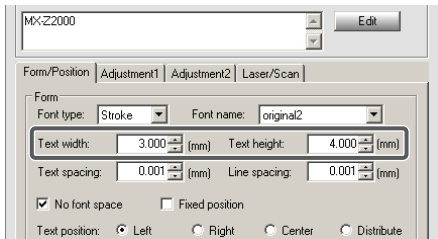
- TrueType font

OMRON

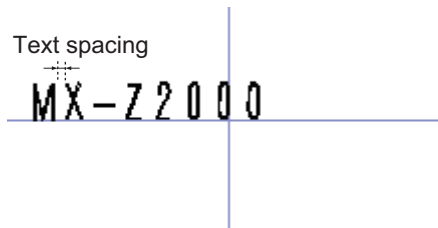
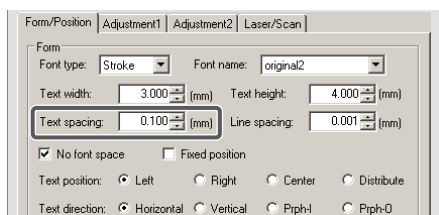
- Stroke font

OMRON

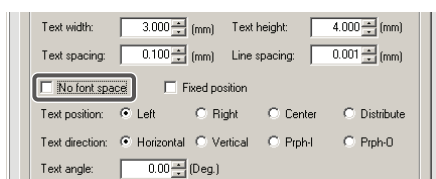
**4 Set "3" as the width of one character under [Text width], and "4" as the text height under [Text height] (unit: mm).**



**5 Set "0.1" as the pitch between adjacent characters under [Text spacing] (unit: mm).**



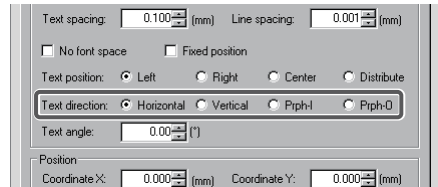
**6 If the [No font space] check box is selected, clear the check box.**



### Additional Information

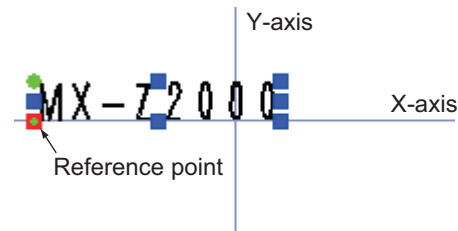
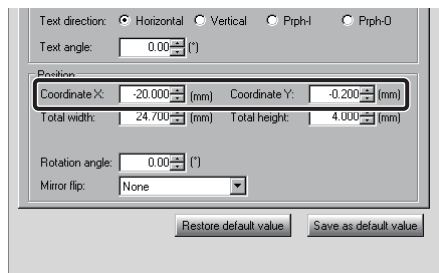
Marking is performed with an equal-width font only when a Stroke font is specified and the [No font space] check box is cleared. For details, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

#### 7 Select [Horizontal] under [Text direction].

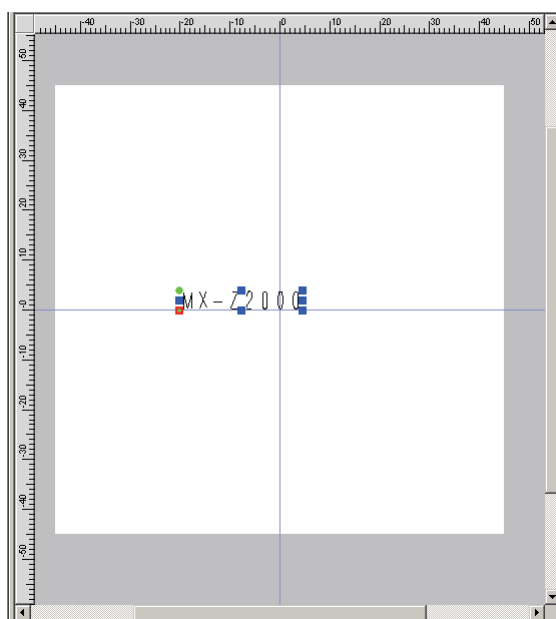


#### 8 Under [Coordinate X] and [Coordinate Y], set "-20" and "-0.2" as the X-coordinate and Y-coordinate of the reference point of the block, respectively (unit: mm).

The coordinates set here are the coordinates of the reference point in the bottom left-hand corner of the block.



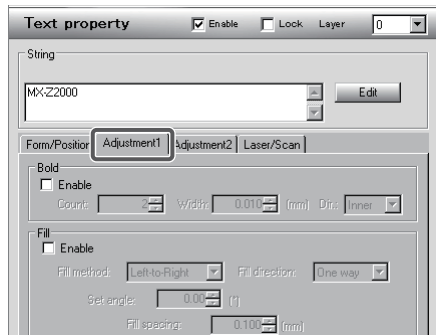
The string "MX-Z2000" on the sheet is displayed based on the layout and shape you have set.



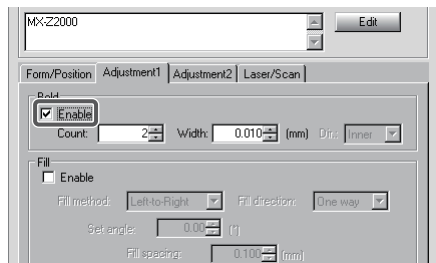
● **[Adjustment 1] setting**

Set the string to be shown in bold.

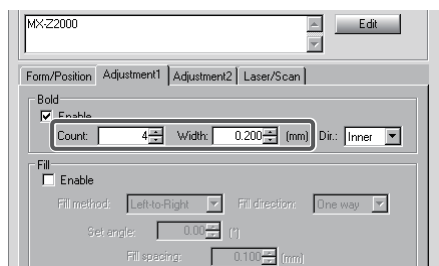
1 Select the **[Adjustment 1]** tab.



2 Select the **[Enable]** check box under **[Bold]**.

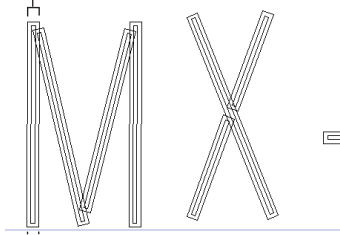


3 Under **[Count]** and **[Width]**, set "4" and "0.2" as the number of lines to be shown in bold and width of the bold line (distance between the outermost lines), respectively (unit: mm).



How a strong font becomes bold

Number of lines



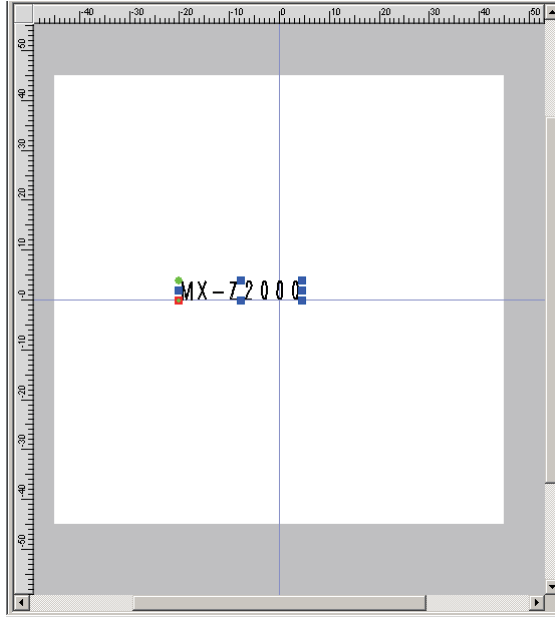
Line width



**Additional Information**

If a Stroke font has been selected, the text becomes bold. If a TrueType font has been selected, the border of the text becomes bold. For details, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

The string "MX-Z2000" on the sheet becomes bold.



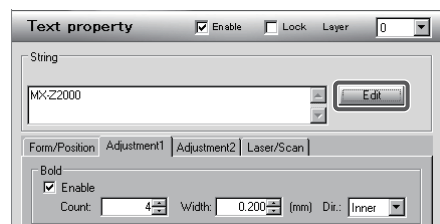
- **[Counter] setting**

Set the 5-digit counter to be added to the string "MX-Z2000."

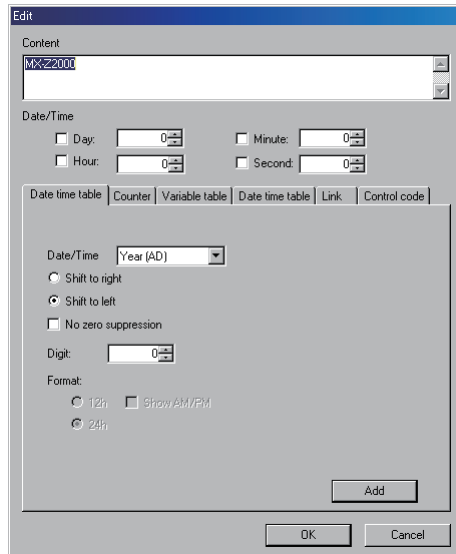
Here, the counter is set as follows.



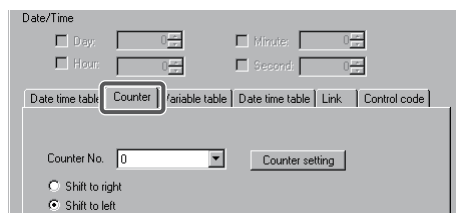
- 1 Click [Edit].



The [Edit] dialog box is displayed.



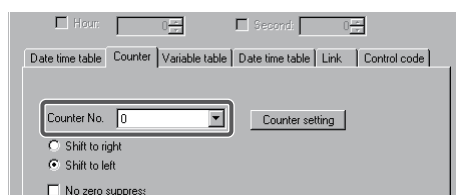
**2 Select the [Counter] tab.**



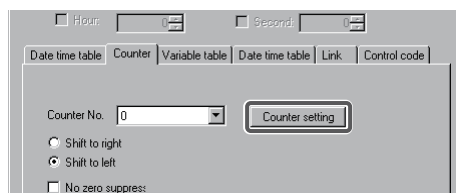
**3 Select "0" under [Counter No.].**

Specify the counter number used for marking.

Up to 16 types of counters (No. 0 to 15) can be specified.

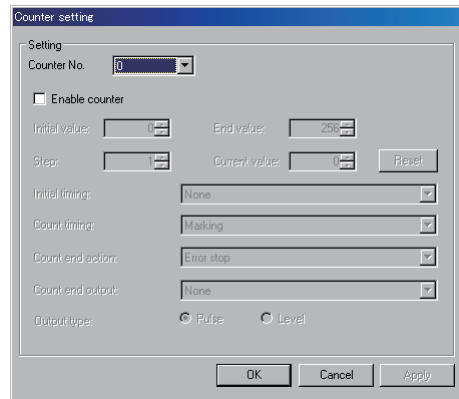


**4 Click the [Counter setting].**

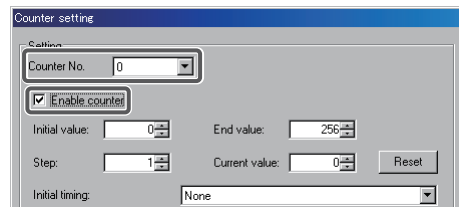




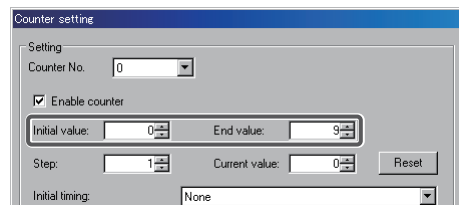
The [Counter setting] dialog box is displayed.  
In this dialog box, set the content of counter No. 0 used for marking.



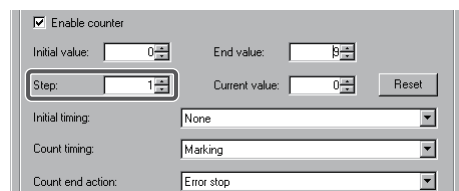
- 5** Select "0" under [Counter No.] and select the [Enable counter] check box.



- 6** Set "0" as the initial value of the counter under [Initial value], and "9" as the end value of the counter under [End value].  
Count will start from "0" and end when "9" is reached.

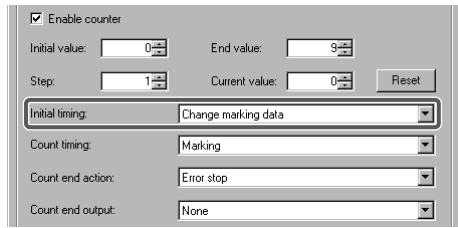


- 7** Set "1" as the step value of the counter under [Step].  
The count will increment by "1" at a time.



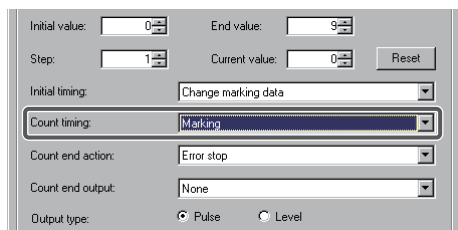
**8 Select "Change marking data" as the initialization timing of the counter under [Initial timing].**

The counter value will be initialized when the marking data is changed.



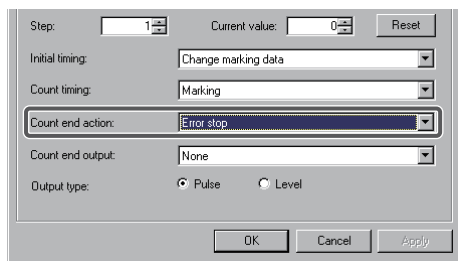
**9 Select "Marking" as the count timing under [Count timing].**

The count will increment every time marking is performed.



**10 Select "Error stop" as the operation that takes place when the end value of the counter is reached, under [Count end action].**

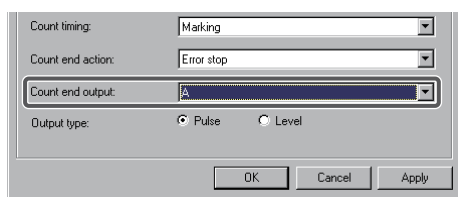
Marking will stop when the end value of the counter is reached.



**11 Select "A" as the location from which to output an I/O signal when the end value of the counter is reached, under [Count end output].**

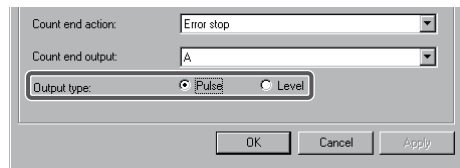
When the end value of the counter is reached, a counter end output signal will be output from [COUNT END]\_A (Pin No. 30) on the I/O connector.

You can select "None" or "A" (Pin No. 30)/"B" (Pin No. 31)/"C" (Pin No. 32)/"D" (Pin No. 33).



**12 Select [Pulse] as the type of the I/O signal to be output, under [Output type].**

When the end value of the counter is reached, a pulse signal will be output from the specified output terminal.



### Reference

For details on the I/O signals and I/O connector, refer to:

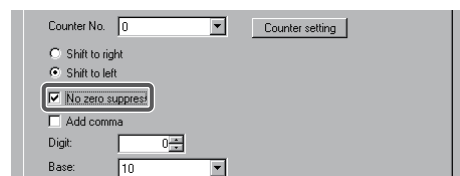
- "Chapter 4 Operation and Control by I/O Communication (page 4-1)"

**13 Click [OK].**

The [Counter setting] dialog box is closed.

**14 Select the [No zero suppression] check box.**

According to the number of digits you have set (procedures 15), "0" is inserted in front of the counter value.





**Additional Information**

- If zero suppression is "Yes" (the check box is cleared), the marking result will be displayed as follows depending on the [Shift to right]/[Shift to left] setting.

• Shift to right                      • Shift to left

" \_\_\_\_9"                              "9 \_\_\_\_"

( \_ indicates a space.)

- If zero suppression is "No" (the check box is selected), the result will be aligned to the right regardless of the [Shift to right]/[Shift to left] setting, with "0" inserted in front of the counter value according to the number of digits you have set.

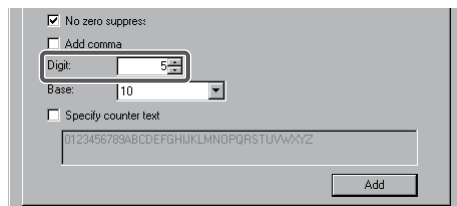
• No zero suppression

"00009"

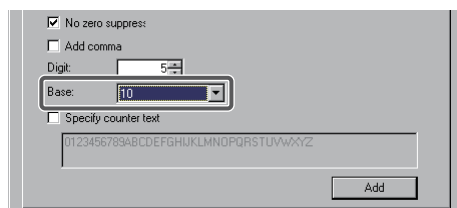
                  ↑

                  Counter value

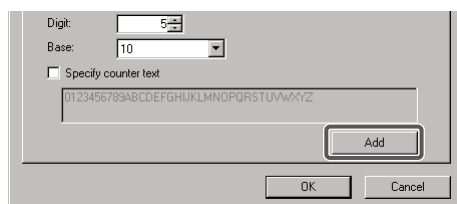
**15 Set "5" as the number of counter digits under [Digit].**



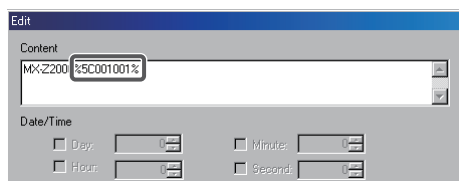
**16 Set "10" as the notation of counter value under [Base].**



**17 Click [Add].**



The counter settings you have made are displayed in the [Content] text box using the specified display codes.

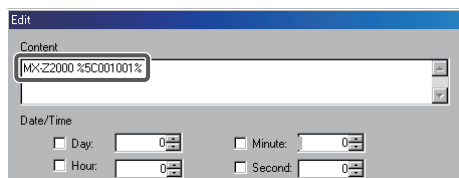


## Reference

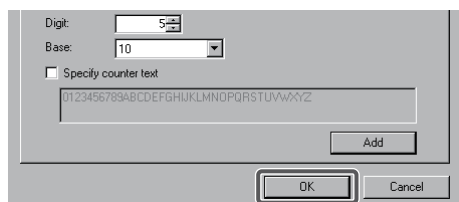
For details on counter control display code, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

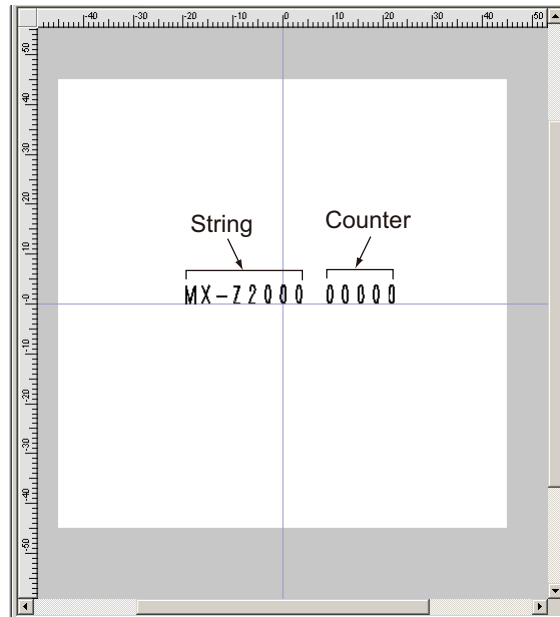
## 18 Enter a space between the string "MX-Z2000" and counter display codes as the "delimiter."



## 19 Click [OK].



The marking layout is now complete.



#### Reference

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For details on how to create and set a marking layout, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)
-

## Adjusting the Marking Position

Adjust the marking position by repeating the process of checking the marking position with the guide laser and then entering correction values the marking position.

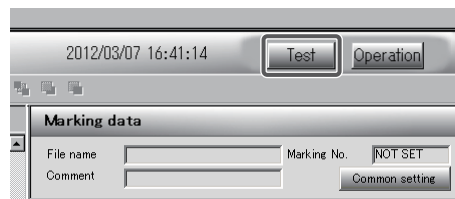
### ■ Checking the marking position with the guide laser

Irradiate the guide laser onto the work to check the marking position currently set.

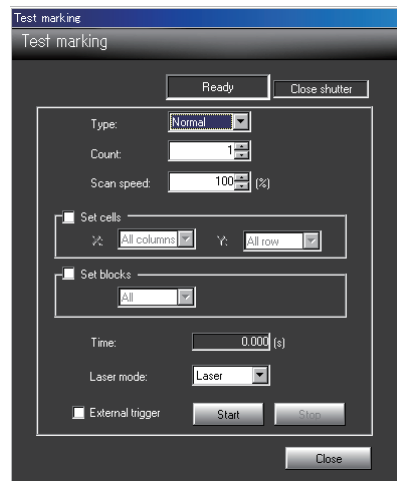
#### Danger

- When shining the laser in order to adjust the marking position, users are required to wear protective goggles in order to protect their eyes, as well as flame-retardant clothing. Use protective goggles with an optical density (OD) appropriate for 1,064 nm wavelengths, and which can be used to confirm laser radiation warnings.
- Do not stare into the laser, as this may result in blindness or burns even if you are wearing protective goggles.

#### 1 Click [Test] on the [Edit mode] screen.

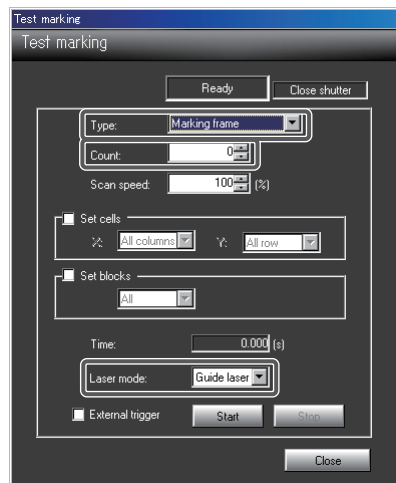


The [Test marking] dialog box is displayed.

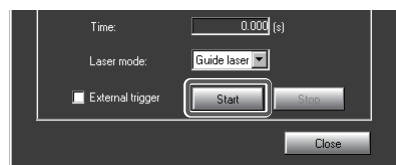


**2 Select "Marking frame" under [Type].**

"0" (infinitely large) and "Guide laser" will be selected automatically under [Count] and [Laser mode], respectively.

**Additional Information**

- One of the following patterns can be selected for [Type]:
  - Normal: Normal marking data
  - Marking frame: Frame specifying the area to be marked
  - Block frame: Frame of each block
  - Marking area: Largest frame for marking area (MX-Z2000H-V1: 90 × 90 mm / MX-Z2050H-V1/Z2055H-V1: 160 × 160 mm)
  - Area guide: Pattern of a square divided into four equal squares (MX-Z2000H-V1: 45 × 45 mm / MX-Z2050H-V1/Z2055H-V1: 80 × 80 mm)
  - Center point: Center point of the marking area
- There is a difference between the position indicated by "Guide laser" in [Laser mode] and the processing position by "Laser". If high-precision positioning is required, adjust the processing position with "Laser".
- When "Laser" is set for [Laser mode], actual marking will be performed with the laser based on the pattern selected above.

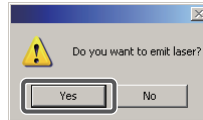
**3 Click [Start].**

A message confirming a start of marking is displayed.

**Precautions for Correct Use**

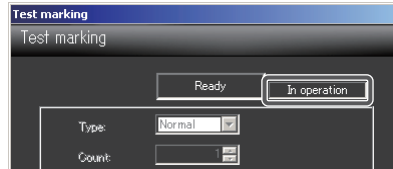
If the guide laser is used to adjust the marking position, be sure to confirm that "Guide laser" is selected under [Laser mode].



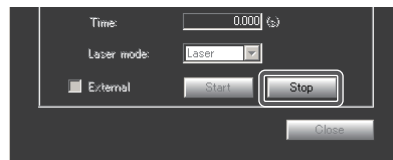
**4 Click [Yes].**

The guide laser will be irradiated onto the work to draw the marking frame.

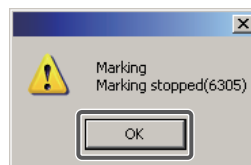
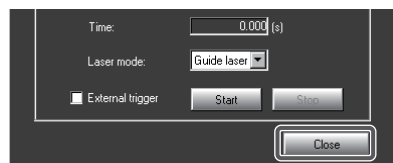
While the guide laser is being irradiated, [In operation] is shown on the right side of [Ready].



Check the marking position based on the marking frame that has been drawn.

**5 Click [Stop].**

When a message is displayed confirming a stopping of marking via user's operation, click [OK].

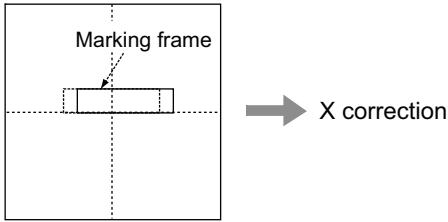
**6 Click [Close].**

The [Test marking] dialog box is closed.

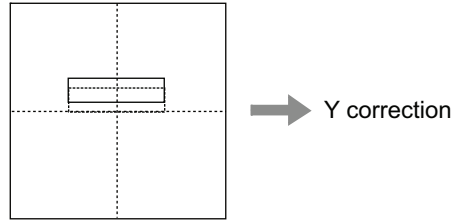
■ **Entering correction values of the marking position**

If the marking frame does not match the correct marking position, perform each correction specified below.

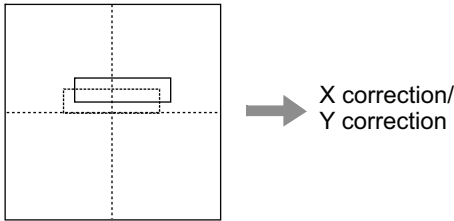
- Offset in lateral direction



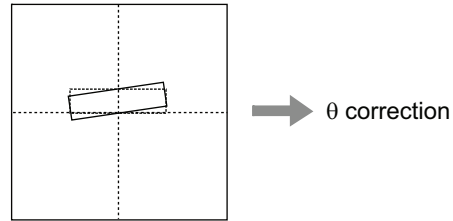
- Offset in longitudinal direction



- Offset in lateral/longitudinal directions



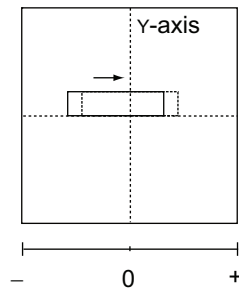
- Rotational offset



Set each correction value as follows depending on the direction in which the position is shifted:

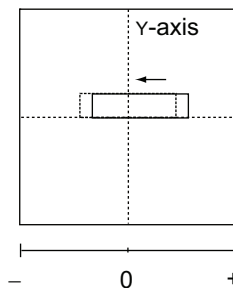
- X correction

- To offset in the + direction of the Y-axis:



↓  
Increase the value.

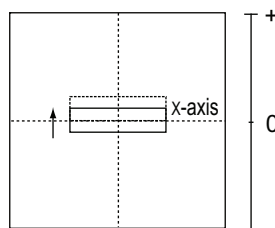
- To offset in the - direction of the Y-axis:



↓  
Decrease the value.

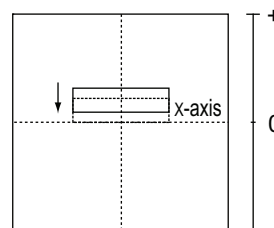
- Y correction

- To offset in the + direction of the X-axis:



↓  
Increase the value.

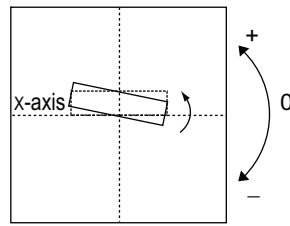
- To offset in the - direction of the X-axis:



↓  
Decrease the value.

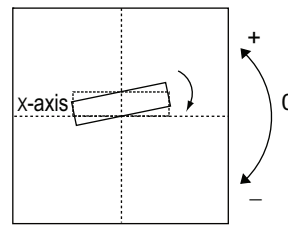
- $\theta$  correction

- To offset the angle in the + direction of the X-axis:



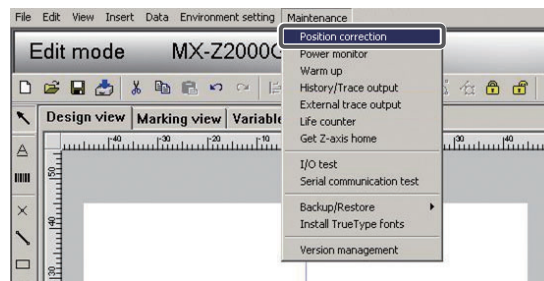
Increase the value.

- To offset the angle in the - direction of the X-axis:

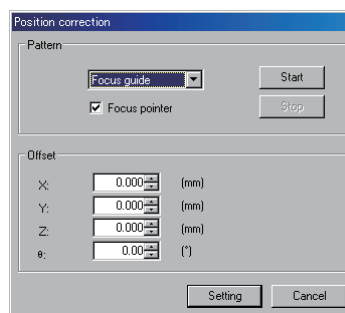


Decrease the value.

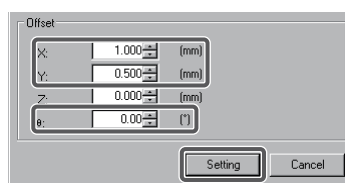
**1** Click [Maintenance] on the menu bar, and then select [Position correction].



The [Position correction] dialog box is displayed.



**2** Enter correction values for [X]/[Y]/[ $\theta$ ] under [Offset], and then click [Setting].



The setting ranges of correction values are as follows:

- [X]/[Y]: MX-Z2000H-V1 -45.000 to 45.000 (mm)  
MX-Z2050H-V1/Z2055H-V1 -80.000 to 80.000 (mm)
- [ $\theta$ ]: -45.00 to 45.00 (°)

**Additional Information**

If "Focus guide" has been set under [Pattern], changing the setting values of [X]/[Y] in the [Position correction] dialog box and then irradiating the guide laser will not change the focus guide position.

If "Cross line" or "Center point" has been set under [Pattern], the position will move according to the settings of [X]/[Y].

**3 Checking the marking position once again.**

Refer to "■ Checking the marking position with the guide laser (page 3-27)"

If further correction is required, repeat the process of entering correction values and checking the marking position.

**Additional Information**

The marking position can be adjusted in one of the following three methods:

- [1] Correct the position when the marker head is installed: Click [Maintenance] on the menu bar, and then select [Position correction] to open the dialog box.
- [2] Correct the position for each work saved with marking data: Click [Common setting], and then select the [Position] tab.
- [3] Correct the position for each block such as text or ID code: Click each block property and then select [Position] to make the necessary settings.

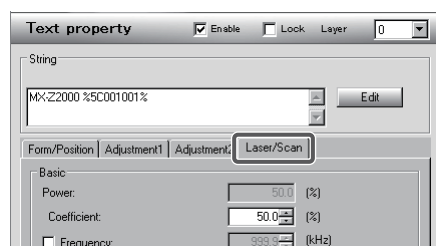
For details on [2] and [3], refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

**Test Marking**

Set up the laser and perform test marking with the laser, and check the actual marking result.

**Danger**

- When shining the laser in order to adjust the marking position, users are required to wear protective goggles in order to protect their eyes, as well as flame-retardant clothing. Use protective goggles with an optical density (OD) appropriate for 1,064 nm wavelengths, and which can be used to confirm laser radiation warnings.
- Do not stare into the laser, as this may result in blindness or burns even if you are wearing protective goggles.

**■ Setting the laser/scanning****1 Select the [Laser/Scan] tab from [Text property].**

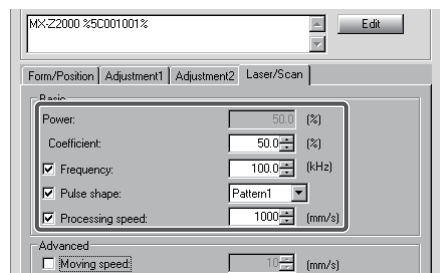


### Additional Information

- Specify laser settings that apply commonly within the system on the [Laser/Scan] tab accessed from [Common setting]
- The settings made on the [Laser/Scan] tab showing the properties of each block, such as the [Laser/Scan] tab accessed from [Text property] are given priority over the settings made on the [Laser/Scan] tab accessed from [Common setting]

## 2 Select and set the following check boxes under [Basic]:

- Coefficient : 50%
- Frequency : 100 kHz
- Pulse shape : Pattern 1
- Processing speed : 1,000 mm/s



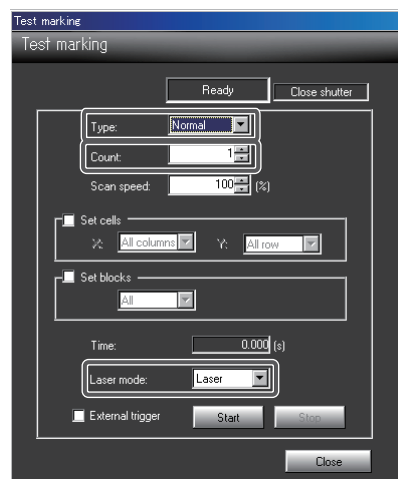
### Additional Information

- [Coefficient] represents a coefficient for the value set under [Power] from [Common setting]. The value of [Power] accessed from [Common setting] is multiplied with the coefficient set here, and the result is shown under [Power] as the set value of [Power] for this block.
- The value set above is only one example. An appropriate value to be set varies depending on the material of the work, etc. Normally you should start with a low power and gradually raise the set value while checking the marking condition.

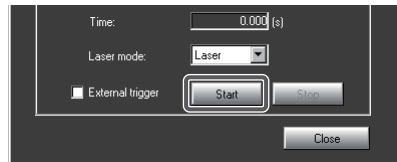
## ■ Performing test marking with the laser

### 1 Click [Test] and on the [Test marking] dialog box that opens, select "Normal" under [Type].

"1" and "Laser" will be set automatically under [Count] and [Laser mode], respectively.

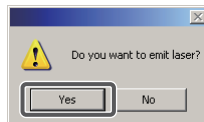


**2 Click [Start].**



A message confirming a start of marking is displayed.

**3 Click [Yes].**



As test marking is performed with the laser, you can visually check the marking condition.

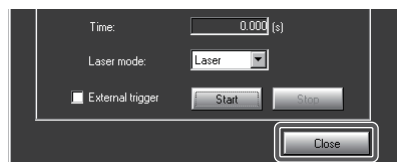
 **Precautions for Correct Use**

---

Do not turn OFF the breaker and key switch while test marking is being performed. To stop the laser irradiation in case of emergency, you can press the emergency stop switch ([EMERGENCY] button) to forcibly stop the system.

---

**4 Click [Close].**

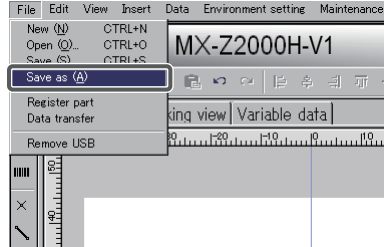


**5 If necessary, repeat the laser setting until optimal marking conditions are set.**  
Refer to "■ Setting the laser/scanning (page 3-32)"

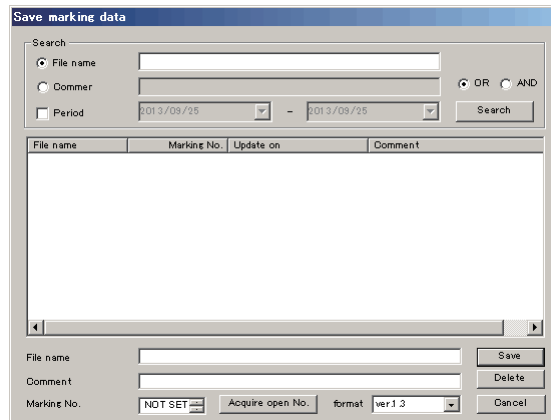
## Saving the Marking Data

Save the created marking data with a marking data number and comment.

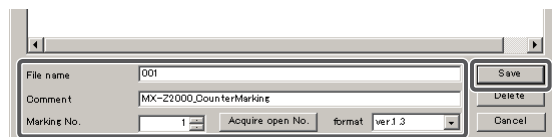
- 1 Click [File] on the menu bar, and then select [Save as].



The [Save marking data] dialog box is displayed.



- 2 Enter a desired file name in [File name], any desired comment in [Comment], the marking data number from 0 to 9999 in [Marking No.], select the marking marker software version with [format], then click [Save].



### Additional Information

To edit marking data, click [File] on the menu bar, select [Open], and load the target marking data.

## Quitting the system

When the marking data has been saved, shut down the system.



### Precautions for Correct Use

After turning OFF the controller power supply, wait for at least 5 seconds before turning it back ON.



### Additional Information

Or, you can perform marking right away using the marking data you have created, without shutting down the system.

Simply switch to the [Operation mode] screen, set the marking conditions, and perform marking. (Refer to "3.3 At Marking (page 3-38)".)

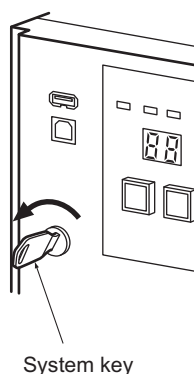
- 1 Before shutting down the system, confirm that the system is not performing marking or saving marking data.



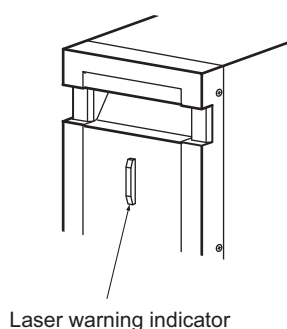
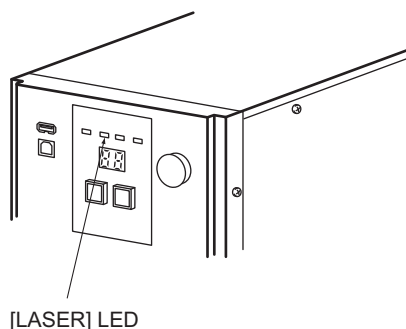
### Precautions for Correct Use

Never turn OFF the system power while the system is performing marking or saving marking data, as it may result in an unexpected accident or failure.

- 2 Turn the key switch to the [OFF] position.



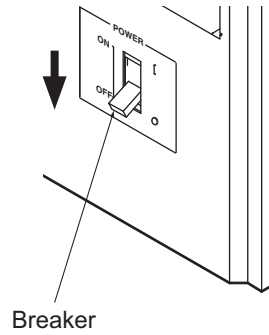
The [LASER] LED on the controller and laser warning indicator on the marker head turn off.





**3 Remove the system key from the keyhole.****⚠ Precautions for Safe Use**

While the laser marker is not in use, be sure to remove the system key from the keyhole and pass it to the Administrator for safekeeping.

**4 Turn OFF the breaker.****5 Turn OFF the monitor power supply.**

3

Flow of Operations  
from Startup to  
ShutdownInitial Startup and  
Creating/Editing  
Marking Data

At Marking

## 3.3 At Marking

This section explains the tasks involved in loading existing marking data and performing actual marking. Select marking data on the [Operation mode] screen before performing marking.

### Check before Starting

Before starting the system, be sure to check the following:

- The marker head and each device must be securely connected.
- The key switch is turned OFF.
- The emergency stop switch ([EMERGENCY] button) is turned OFF (reset).
- The [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) terminals on the input terminal block are short-circuited with [COM OUT].

### Reference

For the [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) terminals, refer to:

- "Input Terminal Block (page 4-12)"
- "■ [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) (page 4-24)"

### Starting the System

Turn ON the power supply to start the system.

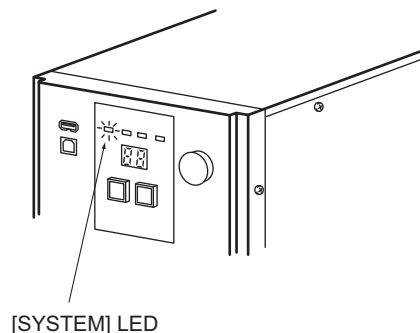
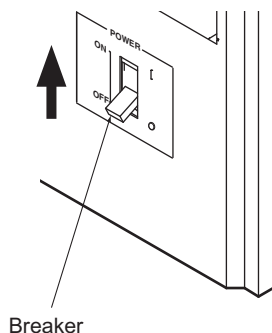
### Precautions for Correct Use

After turning OFF the controller power supply, wait for at least 5 seconds before turning it back ON.

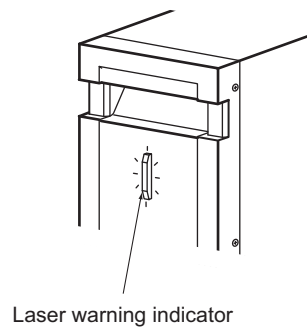
**1 Turn ON the monitor power supply.**

**2 Turn ON the breaker on the front face of the controller.**

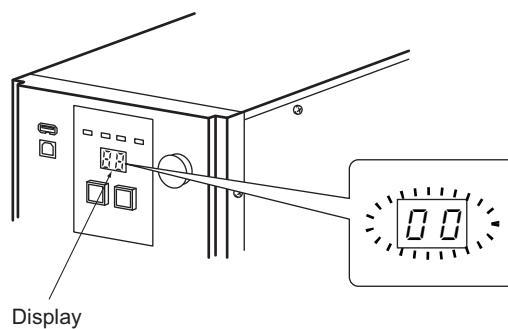
The [POWER] lamp on the right side of the breaker turns on. After a brief moment, the [SYSTEM] LED (green) comes on and the controller is started.



When the breaker is turned ON, the laser warning indicator on the marker head turns on briefly and then turns off once the controller startup process begins.



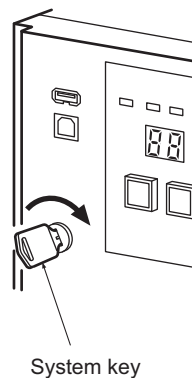
When the controller has started, [00] is shown on the display.



### Additional Information

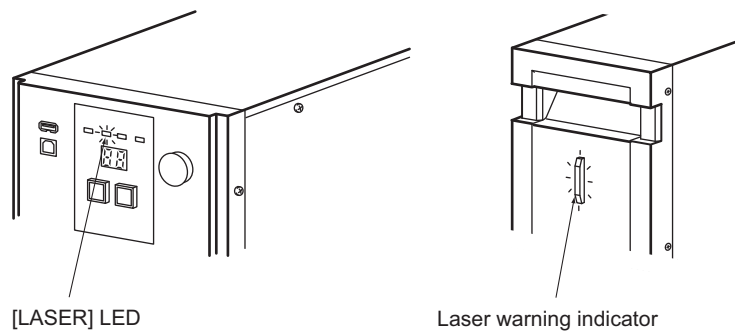
If the [ERROR] LED turns on, it means an error has occurred. If the display shows [10], it means an alarm has generated. In this case, remove the cause of the abnormality by referring to Chapter 8, "What to Do in Case of Abnormality," and resume operation after confirming [00] on the display.

- 3** Insert the system key into the keyhole and turn the key to the [ON] position. (Key switch ON)



The laser power turns ON and the system is now ready to perform marking.

At the same time, the [LASER] LED (orange) on the controller comes on and the laser warning indicator on the marker head illuminates in green (laser standby mode).



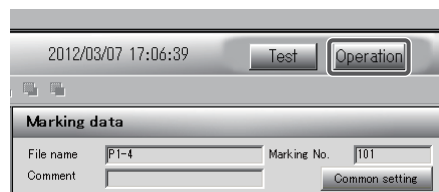
#### Additional Information

##### Warm-up

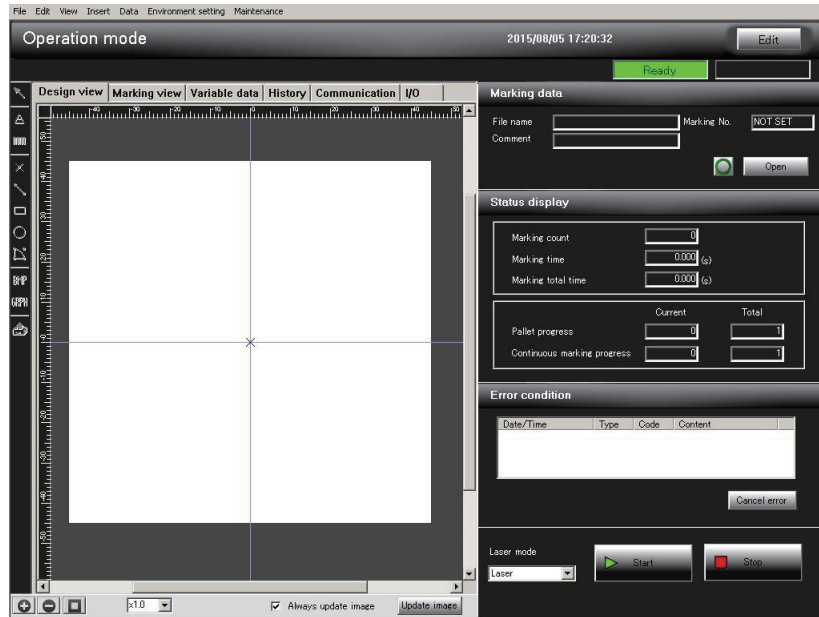
The controller and marker head are not stable immediately after the controller power supply is turned ON, so it is recommended that, after turning ON the power supply, you warm up the system before marking is started. For details, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

## Switching to Operation Mode

- 1 If the marker software started by displaying the [Edit mode] screen, click [Operation].



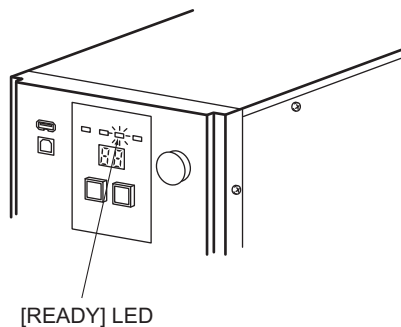
The screen switches to [Operation mode].



### Additional Information

You can specify either the edit mode or operation mode as the initial operation mode in which the software is started by clicking [Environment setting] on the menu bar, clicking [Marker operation], and then clicking [Operation Mode] on the displayed [Start setting] tab. For details on startup settings, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

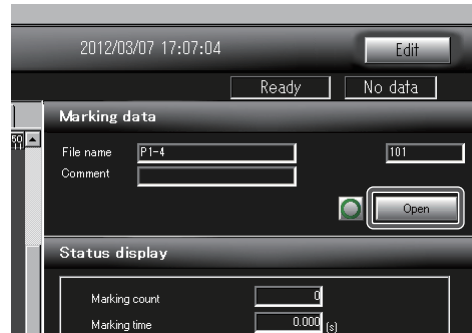
The [READY] LED (yellow green) on the controller also turns on.



## Loading the Marking Data

Select and load marking data.

### 1 Click [Open].



### Additional Information

- In the startup settings, the marking data that is loaded automatically when starting up can be specified, or marking data that was used when quitting the previous time can be loaded. This allows marking to be performed without loading the marking data.
- If [Open] is locked according to the startup settings, click the lock button to cancel the lock.

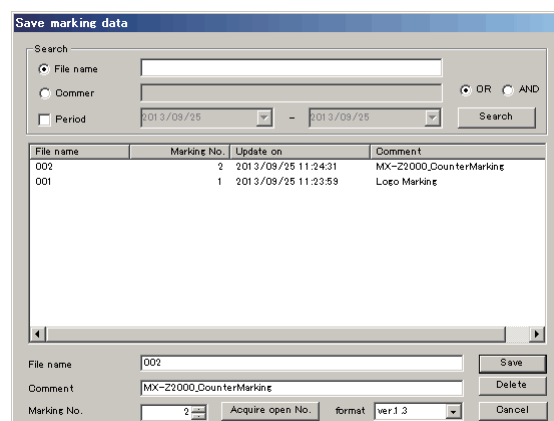
- [Open] is locked



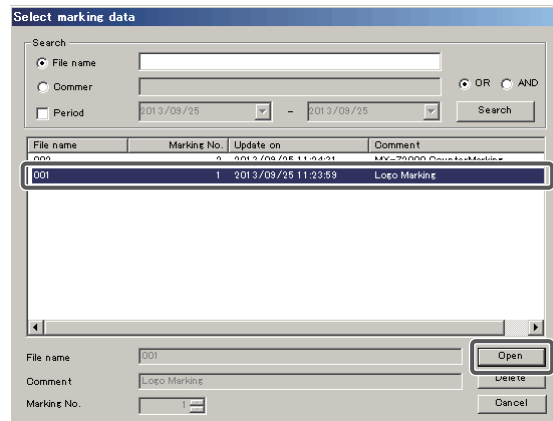
Lock button

- For information on startup setting, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

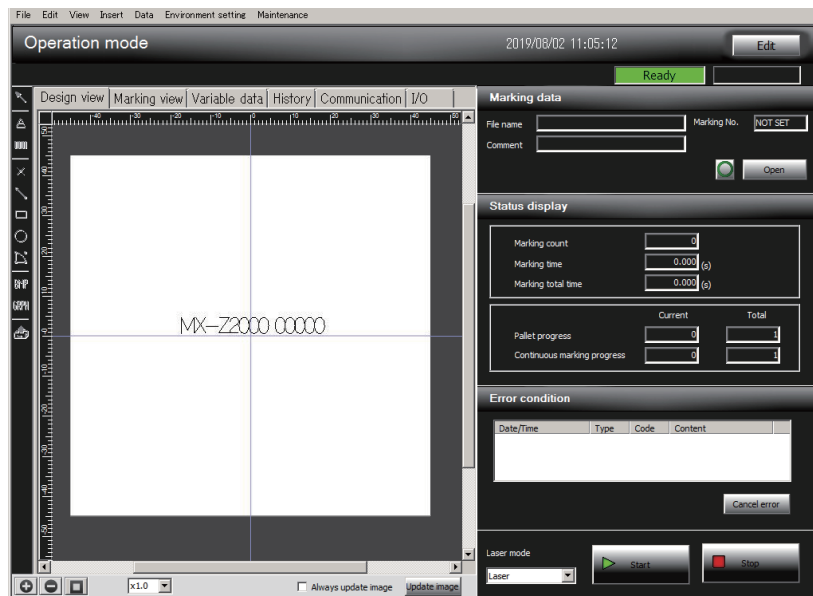
The [Select marking data] dialog box is displayed.



## 2 Select the marking data and click [Open].



The selected marking data is loaded and displayed on the screen.



## Executing Marking

Perform actual marking.

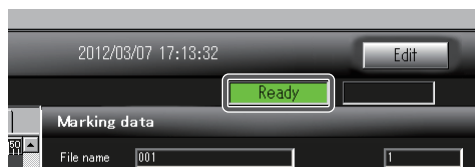
### Danger

- When shining the laser during marking, users are required to wear protective goggles in order to protect their eyes, as well as flame-retardant clothing. Use protective goggles with an optical density (OD) of at least 6 appropriate for 1,064 nm wavelengths, and which can be used to confirm laser radiation warnings.
- Do not stare into the laser, as this may result in blindness or burns even if you are wearing protective goggles.

### Additional Information

Marking and other instructions from the marker software are invalid during the warm-up.

- 1 Confirm that [Ready] at the top of the screen is illuminating in green (indicating that marking is enabled).



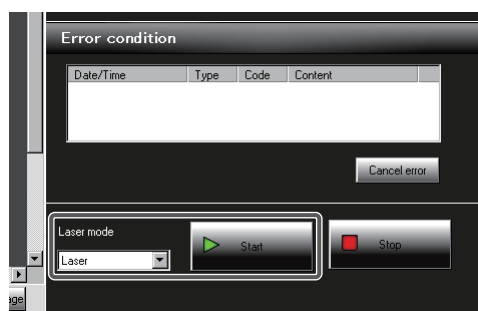
### Additional Information

If marking is not enabled, [Ready] does not turn on and a message appears on the right side. For description of the message, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

- 2 Set [Laser mode], and then click [Start].

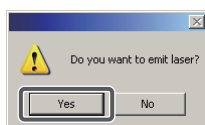
For the laser output mode, select one of the following modes:

- Laser: Irradiate the laser and perform marking.
- Guide laser: Irradiate the guide laser and scan the marking details.



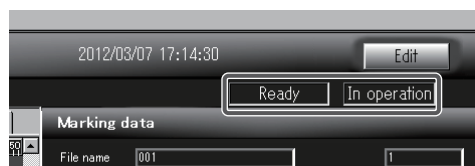
A message confirming a start of marking is displayed.

- 3 Click [Yes].



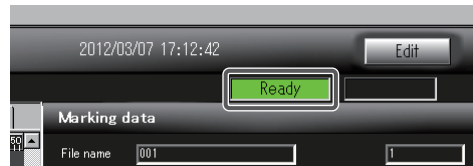
Marking is performed according to the conditions that have been set.

While marking is in progress, [Ready] remains unlit and [In operation] is displayed on the right side.





When marking is completed, laser irradiation stops and [Ready] turns on.



3

### Precautions for Correct Use

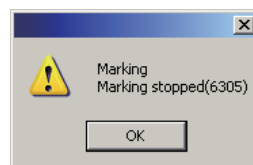
Do not turn OFF the breaker and key switch while marking is being performed. To stop the laser irradiation in case of emergency, you can press the emergency stop switch ([EMERGENCY] button) to forcibly stop the system.

### Additional Information

To stop marking in the middle, click [Stop].



When the following message appears, click [OK].



- 4** When shutting down the system, confirm that the system is not performing marking or saving marking data.

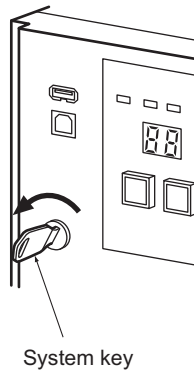
### Precautions for Correct Use

Never turn OFF the system power while the system is performing marking or saving marking data, as it may result in an unexpected accident or failure.

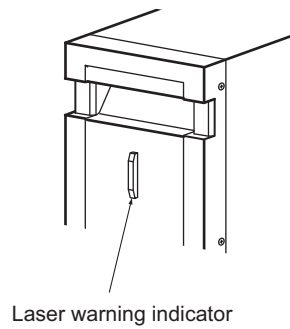
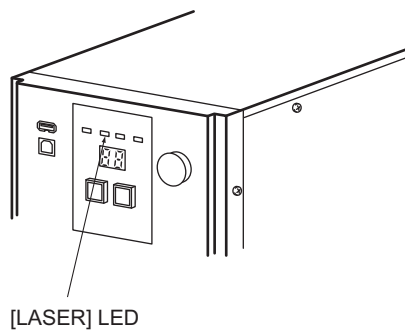
Flow of Operations  
from Startup to  
ShutdownInitial Startup and  
Creating/Editing  
Marking Data

At Marking

**5 Turn the key switch to the [OFF] position.**



The [LASER] LED on the controller and laser warning indicator on the marker head turn off.



**6 Remove the system key from the keyhole.**

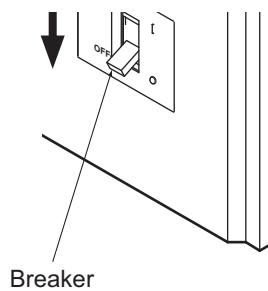
**Precautions for Safe Use**

---

While the laser marker is not in use, be sure to remove the system key from the keyhole and pass it to the Administrator for safekeeping.

---

**7 Turn OFF the breaker.**



**8 Turn OFF the monitor power supply.**

**Precautions for Correct Use**

---

After turning OFF the controller power supply, wait for at least 5 seconds before turning it back ON.

---

# Chapter 4

## 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.

---

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4.2	Hardware Specifications.....	4-9
4.3	Terminal Block/Connector Specifications .....	4-12
4.4	I/O Signal List.....	4-17
4.5	Function of I/O Signal.....	4-20
4.6	I/O Command.....	4-30
4.7	Timing Chart.....	4-37
4.8	Example of Operation by I/O Communication .....	4-48

## 4.1 I/O Communication

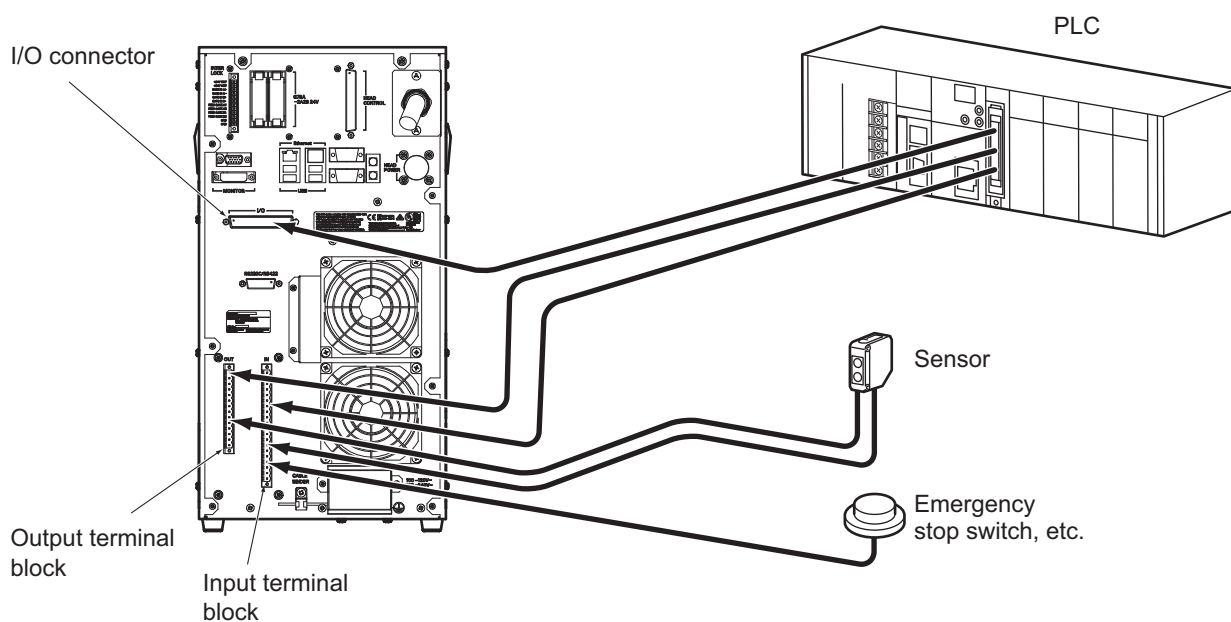
It is a method to connect a PLC, sensors and other external control devices to the controller to operate and control the system by input/output of I/O signals.

You can issue simple commands such as the marking start command, monitor the operating condition, and even issue complex I/O commands, simply by input/output of I/O signals.

To operate and control the system via I/O communication, input the commands to turn on the laser power, open the shutter, start marking, etc., (ON signals or OFF signals) to the I/O terminal blocks and I/O connector as shown in the figure below.

Responses corresponding to the input signals will be output.

Basic connections of external devices are explained below.



### Precautions for Correct Use

I/O communication is not supported in the edit mode. To perform I/O communication, be sure to confirm that the system is in the operation mode.

## 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).	<ul style="list-style-type: none"> <li>Remove the jumper pin connecting Pin No.1 (+24 V OUT) - No.2 (COM IN) or No.2 (COM IN) - Pin No.3 (GND).</li> <li>Connect the external power supply (+24 VDC) to Pin No. 2.</li> </ul>	<ul style="list-style-type: none"> <li>Remove the jumper pin connecting Pin No.1 (GND) - No.2 (COM OUT) or No.2 (COM OUT) - Pin No.3 (+24 V OUT).</li> <li>Connect the GND of the external power supply to Pin No. 2.</li> </ul>
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.	<ul style="list-style-type: none"> <li>Remove the jumper pin connecting Pin No.1 (+24 V OUT) - No.2 (COM IN) or No.2 (COM IN) - Pin No.3 (GND).</li> <li>Connect the GND of the external power supply to Pin No. 2.</li> </ul>	<ul style="list-style-type: none"> <li>Remove the jumper pin connecting Pin No.1 (GND) - No.2 (COM OUT) or No.2 (COM OUT) - Pin No.3 (+24 V OUT).</li> <li>Connect the external power supply (+30 VDC MAX) to Pin No. 2.</li> </ul>



#### Precautions for Correct Use

- 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.)



#### Reference

For information on internal circuit of each terminal, refer to:

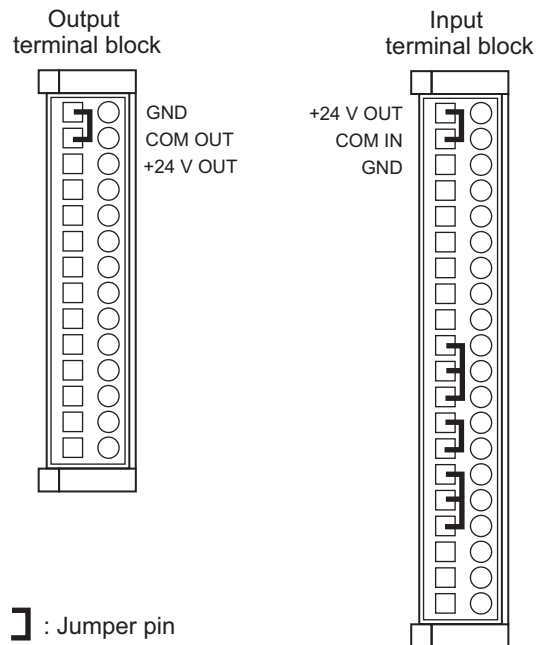
- "4.2 Hardware Specifications (page 4-9)"

For information on measures to reduce chattering, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

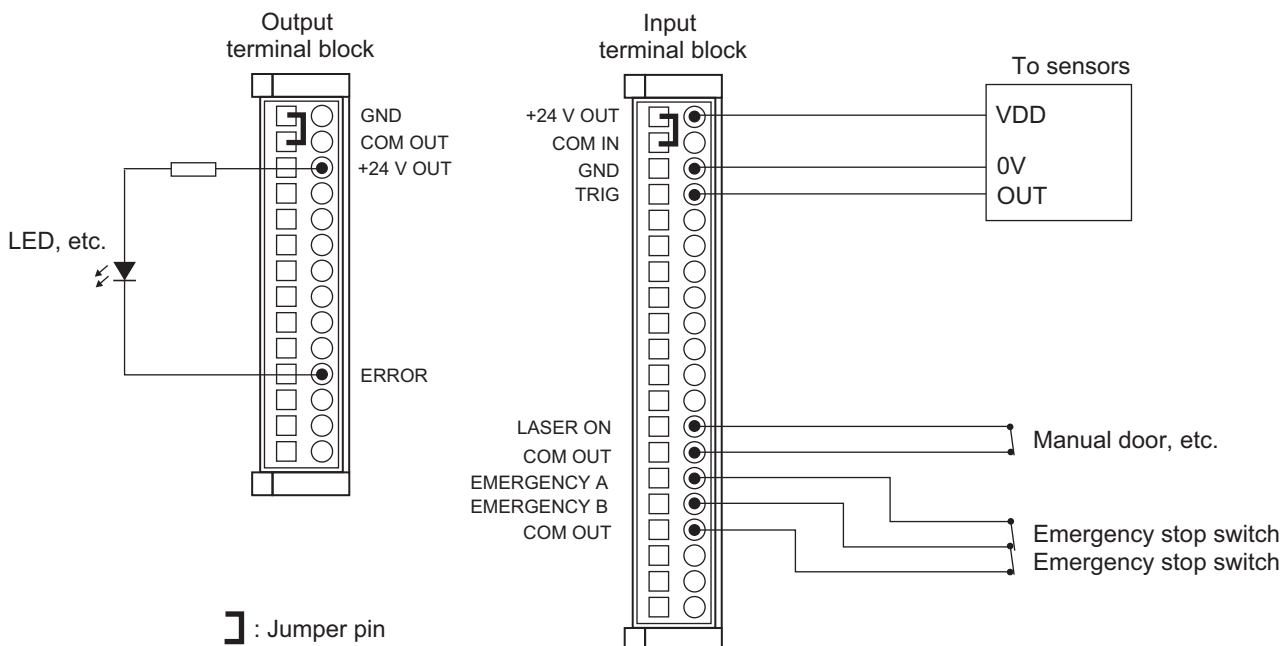
■ Connection example

● Factory setting (initial condition)

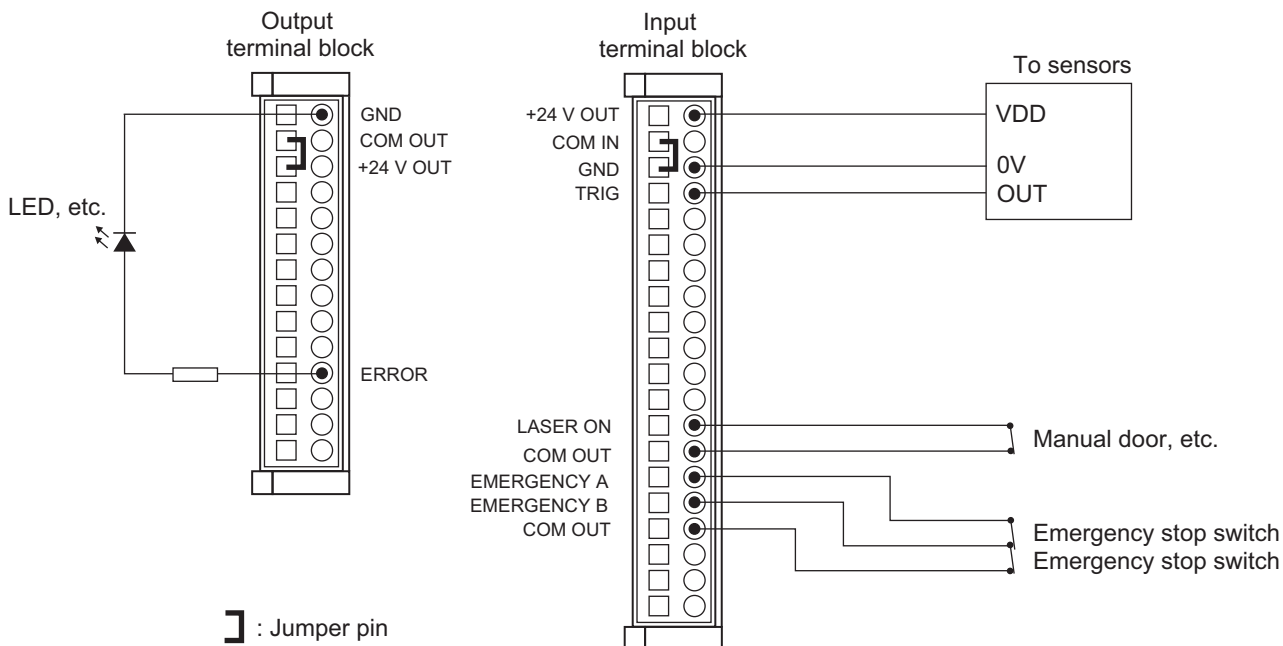


● When the internal power supply of the controller is used

- NPN method



- PNP method



**Precautions for Correct Use**

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

4

I/O Communication

Hardware Specifications

Terminal Block/Connector Specifications

I/O Signal List

Function of I/O Signal

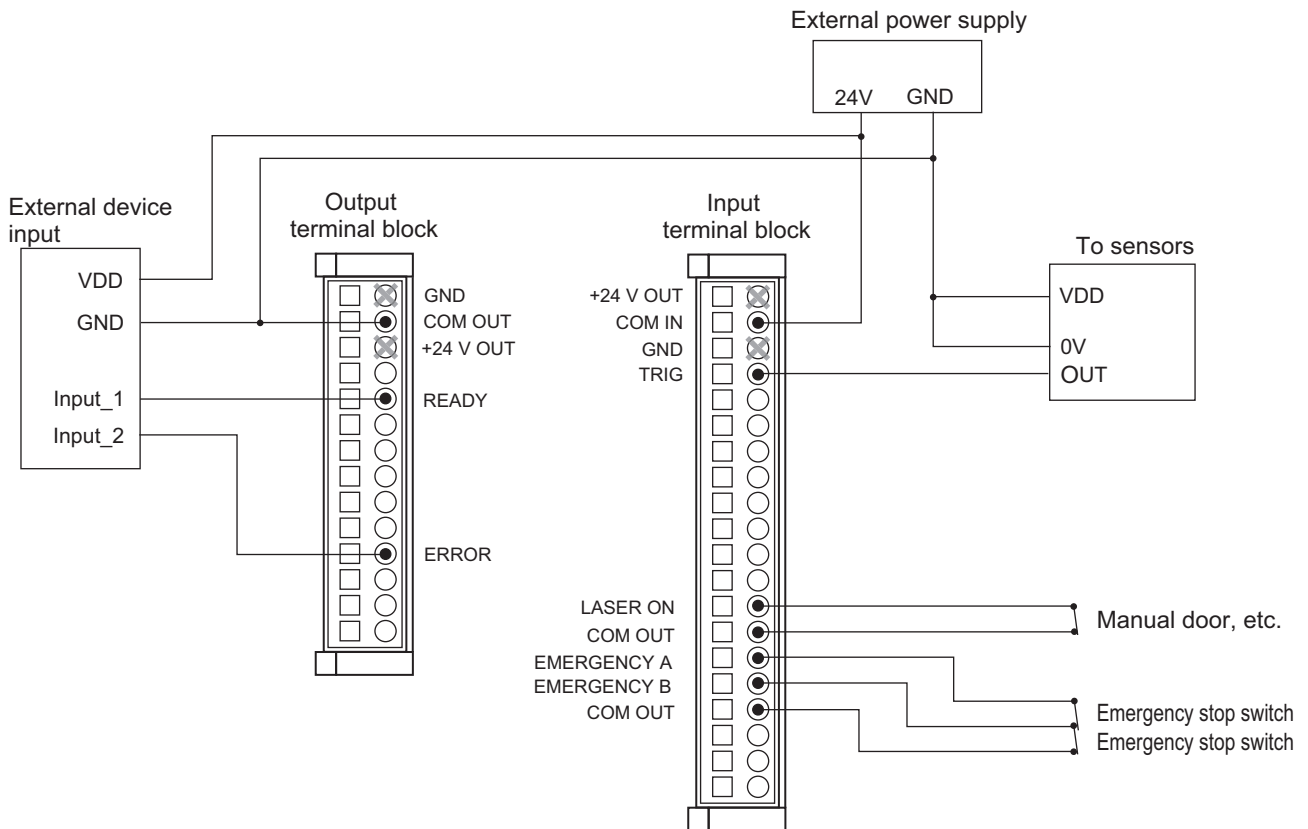
I/O Command

Timing Chart

Example of Operation by I/O Communication

● **When the power supply of the external device is used**

- NPN method

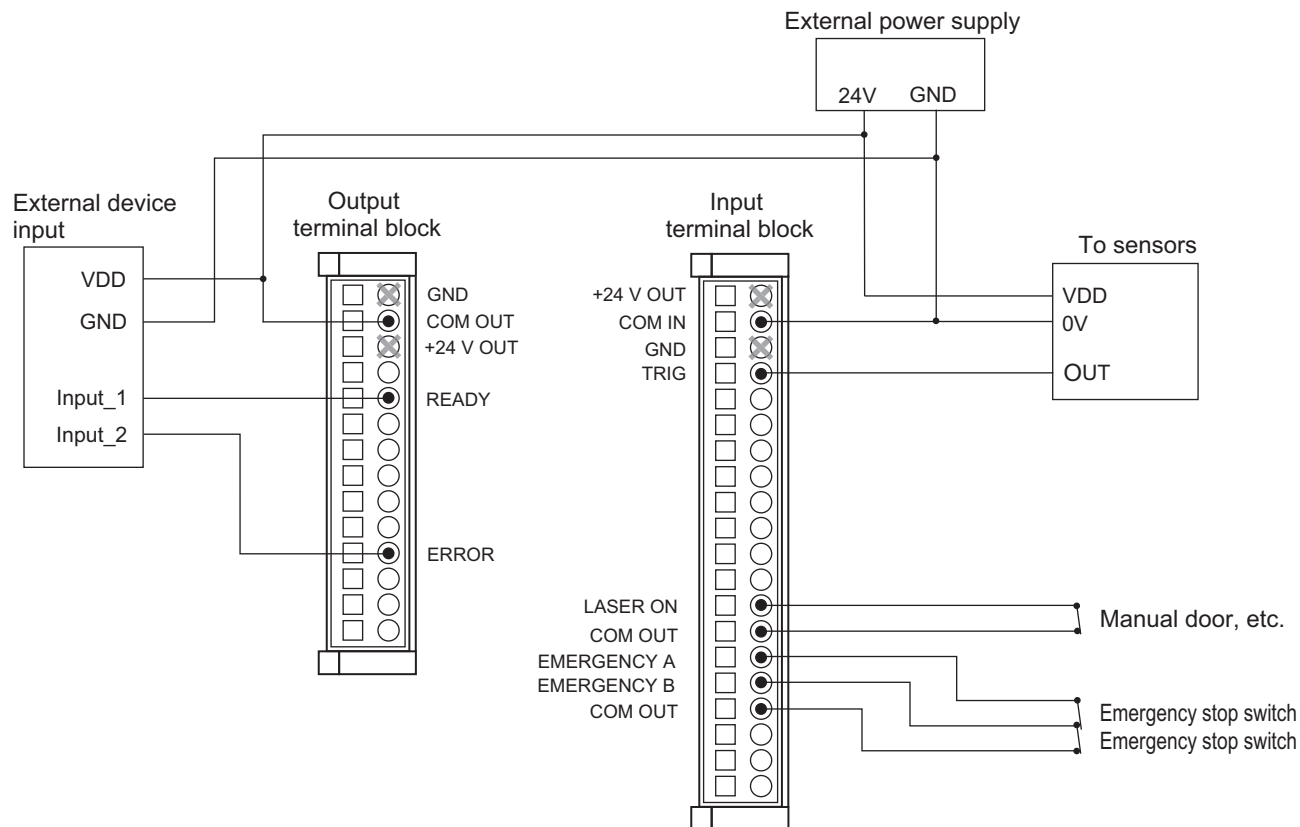


 **Precautions for Correct Use**

- Do not connect anything to the GND or the +24V OUT.
- The circuits between each COM IN are short-circuited inside of the controller. Combining NPN and PNP will cause a failure.



- PNP method



#### Precautions for Correct Use

- Do not connect anything to the GND or the +24V OUT.
- The circuits between each COM OUT are short-circuited inside of the controller. Combining NPN and PNP will cause a failure.



#### Reference

For the specifications of signals corresponding to the respective pins on the I/O terminal blocks, refer to:

- "4.3 Terminal Block/Connector Specifications (page 4-12)"



### Additional Information

#### Removable terminal

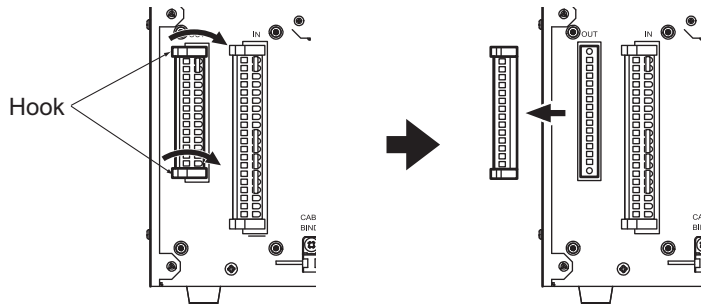
Use the attached screw-less, removable clamp terminals (that need not be screwed in) for wiring to the I/O terminal blocks.

These removable terminals let you connect a cable easily to the terminal when it is not yet connected. When all wirings are completed, you can connect the terminals with cables directly to the terminal block.

- Correct way to remove/connect the removable terminal

To remove the terminal, turn the hooks on the top and bottom of the terminal clockwise at the same time, hold the terminal body, and pull it straight out.

Follow the same steps in reverse when connecting the terminal.



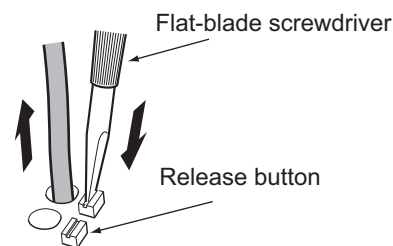
- How to connect cables

Be sure to attach rod terminals to the cables. (Insertion portion of  $\phi 0.2 \text{ mm}^2$  to  $\phi 2.5 \text{ mm}^2 \times L = 10 \text{ mm}$ )

Recommended: H0.5/16 OR H0.5/16 ZH OR Weidmüller

- How to remove the cable:

Push in the release button beside the terminal hole with a small flat-blade screwdriver and pull out the cable. Working while the removable terminal is connected to the terminal block will make it easier to operate.



### Precautions for Correct Use

- Be sure to operate correctly when connecting or removing the removable terminal. Incorrect operation may damage the removable terminal.
- 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  $100 \Omega$  (15 MHz to 40 MHz). (Recommended product: TDK ZCAT3035-1330)

## 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 (page 4-3)".

## 4.2 Hardware Specifications

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

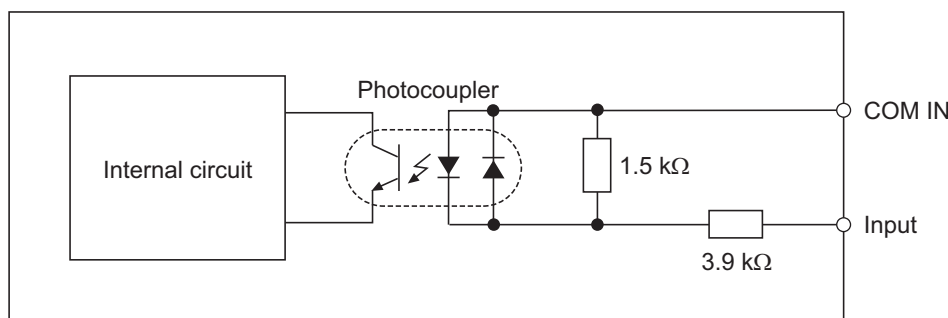
4

### Input Specifications

#### Rating

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

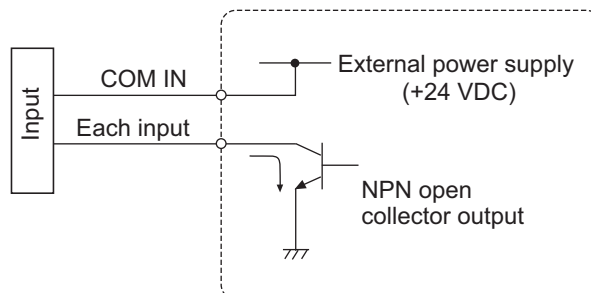
#### Internal circuit diagram



#### 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



I/O Communication

Hardware Specifications

Terminal Block/Connector Specifications

I/O Signal List

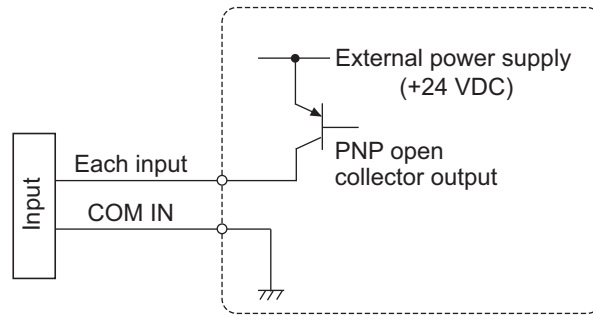
Function of I/O Signal

I/O Command

Timing Chart

Example of Operation by I/O Communication

● PNP input



**Precautions for Correct Use**

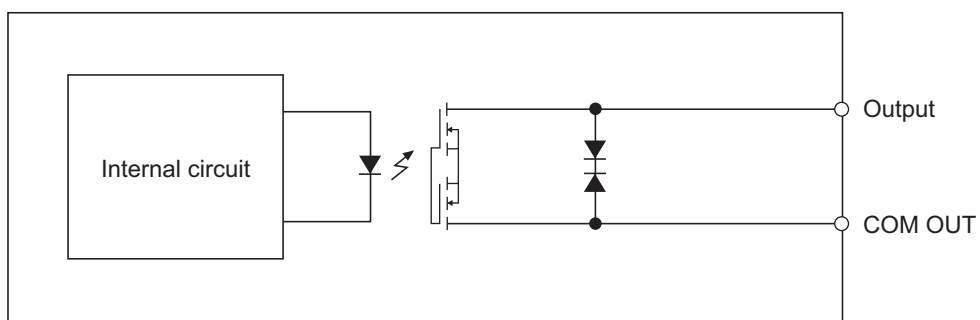
The circuits between each COM IN are short-circuited inside of the controller. Combining NPN and PNP will cause a failure.

**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	20 mA
Residual voltage	2 VDC or less	

■ Internal circuit diagram

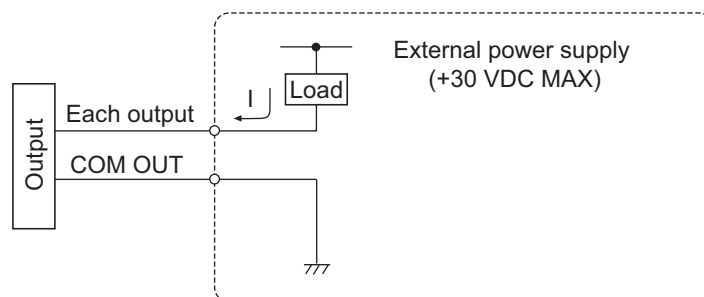


## ■ Connection

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.

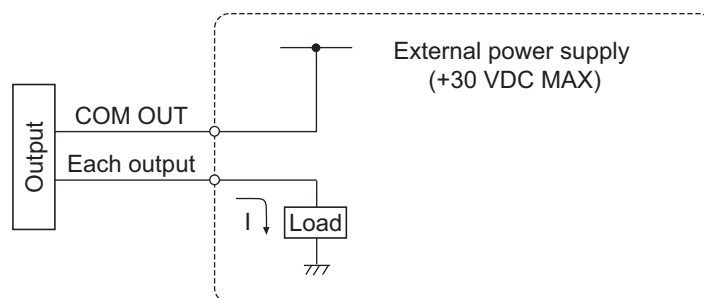
### ● NPN output

Sink current output (same as NPN open collector output)



### ● PNP output

Source current output (same as PNP open collector output)



### Precautions for Correct Use

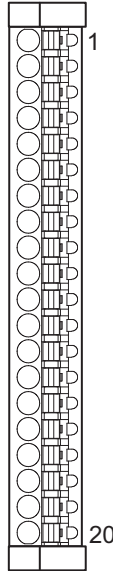
- The circuits between each COM IN are short-circuited inside of the controller. Combining NPN and PNP will cause a failure.
- Connect the load when wiring to each output. Shorting the circuit will cause a failure.

## 4.3 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. <ul style="list-style-type: none"> <li>• Level: Marking can be performed continuously for the specified input time.</li> <li>• Edge: Marking is performed when an input is received.</li> </ul> Marking can be performed continuously for the number of times and at the interval specified in the marker software. (Refer to "Continuous Marking Operation (page 4-40)".)
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)	–

Pin No.	Terminal name	Function
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 Manual" (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.



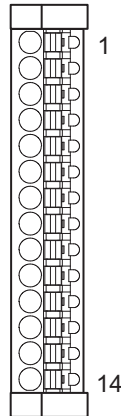
#### Additional Information


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.



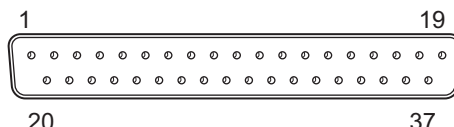
**Additional Information**

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. (Refer to "4.6 I/O Command (page 4-30)")
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. (Refer to "4.6 I/O Command (page 4-30)")
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) <ul style="list-style-type: none"> <li>• A marking start signal is input when the system is not ready to perform marking.</li> <li>• I/O command or parameter input is invalid.</li> </ul> The output method varies depending on the marker software setting. <ul style="list-style-type: none"> <li>• Pulse: When an I/O error occurs, an ON signal is output as a pulse of the specified width*.</li> <li>• 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.</li> </ul>
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. <ul style="list-style-type: none"> <li>• Pulse: When the end value is reached, an ON signal is output as a pulse of the specified width*.</li> <li>• Level: When the end value is reached, an ON signal is output as a signal level.</li> </ul>
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.



### **Additional Information**

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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
- 



### **Precautions for Correct Use**

---

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.

---

## 4.4 I/O Signal List

I/O signals used for operation and control via I/O communication are classified into the types specified below.

### Reference

For details on each I/O signal, refer to:

- "4.5 Function of I/O Signal (page 4-20)"

Category	Function	Signal name	Attribute	Location of terminal		Reference page
				Terminal block/ connector type	Pin No.	
I/O for System Status	Notification of the status of power supply to the system and whether or not I/O inputs are acceptable	POWER (power ON output)	OUT	Output terminal block	4	4-20
		READY (ready output)	OUT	Output terminal block	5	
		MARK READY (marking ready output)	OUT	Output terminal block	6	
I/O for Laser Control	Notification of laser power ON/OFF and the current status	LASER ON (laser control input)	IN	Input terminal block	13	4-21
		LASER (laser control status output)	OUT	Output terminal block	7	
I/O for Shutter Control	Notification of executing shutter open/close control and the current status	SHUTTER A (shutter control input A)	IN	Input terminal block	10	4-22
		SHUTTER B (shutter control input B)	IN	Input terminal block	11	
		SHUTTER (shutter status output)	OUT	Output terminal block	8	
I/O for Marking Control	Notification of start of marking and the current status	TRIG (marking trigger input)	IN	Input terminal block	4	4-23
		MARK BUSY (marking busy output)	OUT	Output terminal block	9	
		MARK END (marking complete output)	OUT	Output terminal block	10	
I/O for Laser Stopping	Stopping of marking and emergency shutdown of laser power	STOP (marking stop input)	IN	Input terminal block	9	4-24
		EMERGENCY A (emergency stop input A)	IN	Input terminal block	15	
		EMERGENCY B (emergency stop input B)	IN	Input terminal block	16	
I/O for Errors	Notification and clearing of errors and alarms	ERROR (error output)	OUT	Output terminal block	11	4-25
		ERROR RST (error reset input)	IN	Input terminal block	5	
		ALARM (alarm output)	OUT	Output terminal block	12	
		ALARM RST (alarm reset input)	IN	Input terminal block	6	
		IO ERROR (I/O error output)	OUT	I/O connector	29	

Category	Function	Signal name	Attribute	Location of terminal		Reference page
				Terminal block/ connector type	Pin No.	
I/O for Counter End	Notification of reaching of the counter end value	COUNT END (counter end output_A)	OUT	I/O connector	30	4-26
		COUNT END (counter end output_B)	OUT	I/O connector	31	
		COUNT END (counter end output_C)	OUT	I/O connector	32	
		COUNT END (counter end output_D)	OUT	I/O connector	33	
I/O for Date/Time Operation	Adjustment of marking date/time	TIME HOLD IN (time hold input)	IN	I/O connector	25	4-26
		TIME HOLD OUT (time hold output)	OUT	I/O connector	34	
I/O for I/O Command Input	A group of signals used for performing control via I/O commands	COMMAND SET (command confirmation input)	IN	I/O connector	20	4-28
		COMMAND (command input_0)	IN	I/O connector	21 to 24	
		COMMAND (command input_1)	IN			
		COMMAND (command input_2)	IN			
		COMMAND (command input_3)	IN			
		DI_0 (parameter input)	IN	I/O connector	4 to 19	
		DI_1	IN			
		DI_2	IN			
		DI_3	IN			
		DI_4	IN			
		DI_5	IN			
		DI_6	IN			
		DI_7	IN			
		DI_8	IN			
		DI_9	IN			
		DI_10	IN			
		DI_11	IN			
		DI_12	IN			
		DI_13	IN			
		DI_14	IN			
DI_15	IN					
COMMAND END (command reception complete output)	OUT	I/O connector	35			
Reserved	I/O signals reserved for future extension	RESERVE (input reserve_T1)	IN	Input terminal block	7, 18	-
		RESERVE (input reserve_T2)	IN	Input terminal block	8, 19	
		RESERVE (input reserve_C1)	IN	I/O connector	26	
		RESERVE (output reserve_C1)	OUT	I/O connector	27	
		RESERVE (output reserve_C2)	OUT	I/O connector	28	

Category	Function	Signal name	Attribute	Location of terminal		Reference page
				Terminal block/ connector type	Pin No.	
External Power Supply Terminal	Power supply for external devices	+24 V OUT (external power supply 24 V_A)	OUT	Input terminal block	1	4-29
		GND (external power supply GND_A)	OUT	Input terminal block	3	
		+24 V OUT (external power supply 24 V_B)	OUT	Output terminal block	3	
		GND (external power supply GND_B)	OUT	Output terminal block	1	
COM Terminal	Common to I/O signal	COM IN	IN	Input terminal block	2	4-29
				I/O connector	1 to 3	
		COM OUT	OUT	Input terminal block	12, 14, 17	
				Output terminal block	2	
I/O connector	36, 37					

## 4.5 Function of I/O Signal

This section explains the details of operation of each I/O signal.



### Precautions for Correct Use

To perform I/O communication, be sure to confirm that the system is in the operation mode.

### I/O for System Status

Notifies the status of power supply to the system, system status and whether or not marking can be started.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
POWER (power ON output)	OUT	Indicates whether the power is ON or OFF.	ON: Power supply ON OFF: Power supply OFF	Output terminal block Pin No. 4
READY (ready output)	OUT	Indicates whether I/O input or commands can be received during operation mode.	ON: Signals can be received OFF: Signals cannot be received	Output terminal block Pin No. 5
MARK READY (marking ready output)	OUT	Indicates whether or not marking can be started ([TRIG] (marking trigger input) is acceptable).	ON: Marking can be started OFF: Marking cannot be started	Output terminal block Pin No. 6

#### ■ [MARK READY] (marking ready output)

- This output turns ON only when all of the following conditions are met:
  - The shutter is open.
  - Marking data has been selected and is open.
  - The system is in the operation mode.

## I/O for Laser Control

Turns the laser ON/OFF and notifies current ON/OFF status.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
LASER ON (laser control input)	IN	Turns ON/OFF the laser power.	ON (short-circuit): Laser power ON OFF (open): Laser power OFF (The factory setting is ON (short-circuited).)	Input terminal block Pin No. 13
LASER (laser control status output)	OUT	Indicates the ON/OFF status of the laser power.	ON: Laser power is ON OFF: Laser power is OFF	Output terminal block Pin No. 7

### ■ [LASER ON] (laser control input)

- It may take a while for the laser to turn on immediately after the laser power is turned ON, because the laser must warm up.
- This input is valid only when the controller key switch is in the ON position.
- To turn ON/OFF the laser power via serial communication, this input must be turned ON. If this input remains OFF, turning the laser power ON signal ON via serial communication does not turn ON the laser power.
- If this input is turned OFF during marking, the laser turns OFF and marking stops.
- When STOP signal operation switching control is set to "ON" through the marker software, if [TRIG] (marking trigger input) is input while this input is OFF, the system will operate in the guide laser output mode.

## I/O for Shutter Control

Opens/Closes the shutter and notifies the current open/closed status.



### Precautions for Correct Use

The functions are different for SHUTTER A and SHUTTER B. Do not put both signals in together while the shutter is opening or closing.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
SHUTTER A (shutter control input A)	IN	Opens/closes the shutter.	ON (short-circuit): Open the shutter OFF (open): Close the shutter (The factory setting is ON (short-circuited).)	Input terminal block Pin No. 10
SHUTTER B (shutter control input B)	IN	Allows control over opening/closing the shutter via [SHUTTER A].	ON (short-circuit): Permit opening/closing of the shutter OFF (open): Do not permit opening/closing of the shutter (The factory setting is ON (short-circuited).)	Input terminal block Pin No. 11
SHUTTER (shutter status output)	OUT	Indicates the open/closed status of the shutter.	ON: Shutter is open OFF: Shutter is closed	Output terminal block Pin No. 8

### ■ How to use [SHUTTER A] (shutter control input A) and [SHUTTER B] (shutter control input B)

- The shutter can be opened/closed by turning [SHUTTER A] (shutter control input A) ON/OFF. If this input is turned OFF during marking, the shutter closes and marking stops.
- The shutter opens when [SHUTTER A] (shutter control input A) and [SHUTTER B] (shutter control input B) are both ON. The shutter closes if either input is OFF.  
If it would be dangerous for the shutter to open, turn [SHUTTER B] (shutter control input B) OFF; the shutter will not open even if [SHUTTER A] (shutter control input A) turns ON.
- Ensure that the input signals for [SHUTTER A] (shutter control input A) and [SHUTTER B] (shutter control input B) are not changed at the same time.  
NG: Turn both from OFF to ON at the same time.  
NG: Turn one from OFF to ON and the other from ON to OFF at the same time.



### Reference

For information on how SHUTTER signals are handled, refer to:

- "4.7 Timing Chart (page 4-37)"



## I/O for Marking Control

Starts marking and notifies that marking is in progress or completed.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
TRIG (marking trigger input)	IN	Starts marking.	ON: Marking start OFF: No command	Input terminal block Pin No. 4
MARK BUSY (marking busy output)	OUT	Indicates whether or not the processing laser is currently output.	ON: Laser is currently output OFF: Laser is not currently output	Output terminal block Pin No. 9
MARK END (marking complete output)	OUT	Indicates that marking is completed.	ON: Marking complete The output method varies depending on the marker software setting. • Pulse output When marking is completed, an ON signal is output as a pulse of the specified width. • Level output When marking is completed, an ON signal is output as a signal level and the signal will turn OFF when marking is started.	Output terminal block Pin No. 10

### ■ [TRIG] (marking trigger input)

- This input is valid only when [MARK READY] is ON.  
If this input is turned ON when [MARK READY] is OFF, an I/O error occurs. (Refer to "■ [MARK READY] (marking ready output) (page 4-20)")
- This input is also used to control the number of marking operations in the case of continuous marking. (Refer to "■ Specification of number of operations (page 4-40)")
- If the system is in the guide laser output mode, the guide laser is output when this input is received.

### ■ [MARK END] (marking complete output)

Switching between pulse output and level output is done using the marker software.



#### Reference

For information on the setting method, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

## I/O for Laser Stopping

Stops the laser (marking) or actuates an emergency stop command.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
STOP (marking stop input)	IN	Stops marking. The system remains in the guide laser output mode while this signal is ON.	ON: Marking stop OFF: No command	Input terminal block Pin No. 9
EMERGENCY A (emergency stop input A)	IN	Stops marking in case of emergency.	Short-circuit: No command Open: Emergency stop of marking	Input terminal block Pin No. 15
EMERGENCY B (emergency stop input B)	IN	Stops marking in case of emergency. The function is the same with [EMERGENCY A] (emergency stop input A) above.		Input terminal block Pin No. 16

### ■ [STOP] (marking stop input)

- When this signal is turned ON, marking stops immediately but the laser power will remain ON and shutter closed. Note that [MARK END] will remain OFF. (Refer to "■ [MARK END] (marking complete output) (page 4-23)")
- When STOP signal operation switching control is set to "OFF" through the marker software, if [TRIG] (marking trigger input) is input while this input is ON, the system will operate in the guide laser output mode.  
Also, if this input is ON during guide laser output mode, the guide laser stops.
- When STOP signal operation switching control is set to "ON" through the marker software, even if [TRIG] (marking trigger input) is input, marking does not start as long as this input is ON.

### ■ [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B)

- Opening this input has the same effect as pressing the emergency stop switch ([EMERGENCY] button) on the controller (= an error occurs).  
In this case, the system performs the following actions:
  - Turn OFF the laser power.
  - Close the shutter.
  - Enter an error state.
- After an emergency stop has been actuated, the following operations reset the error status:
  - Short-circuit [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) to [COM OUT].
  - Turn the key switch to the OFF position and then to the ON position. Or, turn ON [ERROR RST]. (Refer to "■ ERROR RST (page 4-25)")

## I/O for Errors

Notifies or clears the error or alarm.



### Precautions for Correct Use

- [ERROR RST] (error reset input) should always be operated by a person manually.
- [ERROR RST] (error reset input) should be turned ON at least 300 ms after [ERROR] (error output) has turned ON.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
ERROR (error output)	OUT	Indicates that an error (major trouble) occurred.	ON: Error occurred OFF: Normal	Output terminal block Pin No. 11
ERROR RST (error reset input)	IN	Clears the error and alarm status.	ON: Error and alarm status clear OFF: No command	Input terminal block Pin No. 5
ALARM (alarm output)	OUT	Indicates that an alarm (maintenance notification) generated.	ON: Alarm generated OFF: Normal	Output terminal block Pin No. 12
ALARM RST (alarm reset input)	IN	Clears the alarm status.	ON: Alarm status clear OFF: No command	Input terminal block Pin No. 6
IO ERROR (I/O error output)	OUT	Indicates that an invalid I/O input was received.	ON: Error occurred OFF: Normal The output method varies depending on the marker software setting. • Pulse output When an error occurs, an ON signal is output as a pulse of the specified width. • Level output When an error occurs, an ON signal is output as a signal level and the signal will turn OFF when a normal signal is subsequently input.	I/O connector Pin No. 29

#### ■ [ERROR RST] (error reset input)/[ALARM RST] (alarm reset input)

- If the causes of multiple errors/alarms are present, all of them are cleared.
- Even after resetting an error/alarm, the error/alarm will be output again if the cause of the error/alarm is not yet removed.

#### ■ [IO ERROR] (I/O error output)

- Switching between pulse output and level output is done using the marker software.



### Reference

For information on the setting method, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

## I/O for Counter End

Notifies, when marking data is counted up, etc., that the counter has reached the pre-set end value. Set beforehand in the marker software which counter end output is used to make this notification for each registered counter.

Terminal name	Attribute	Function	Meaning of signal	Location of terminal
COUNT END (counter end output_A)	OUT	Indicates that an active counter has reached the end value that has been set.	ON: Reached the end value OFF: Not yet reached the end value  The output method varies depending on the marker software setting. <ul style="list-style-type: none"> <li>• Pulse output When the end value is reached, an ON signal is output as a pulse of the specified width.</li> <li>• Level output When the end value is reached, an ON signal is output as a signal level.</li> </ul>	I/O connector Pin No. 30
COUNT END (counter end output_B)	OUT			I/O connector Pin No. 31
COUNT END (counter end output_C)	OUT			I/O connector Pin No. 32
COUNT END (counter end output_D)	OUT			I/O connector Pin No. 33

- These signals are output when the pre-set end value is reached or exceeded. If the end value has been set to "1,000," for example, these signals are output when the counter value is updated to "1,000" or more via a count-up signal.
- If a counter reset command is issued after the end value has been reached, [COUNT END] (counter end output) turns OFF the moment the command is received.
- Switching between pulse output and level output is done using the marker software.



### Reference

For information on the setting method, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

## I/O for Date/Time Operation

Shifts date/time for marking data (time hold) and notifies whether or not the date/time used is different from the actual date/time, when marking relating to date/time is being performed. This signal is used when the internal clock of the controller is used to set and mark date/time.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
TIME HOLD IN (time hold input)	IN	Sets shifted date/time for making data.	ON: When this signal is input, the date/time is acquired from the internal clock of the controller and the acquired date/time will remain reflected in marking data while the signal remains ON. OFF: The date/time is always acquired from the internal clock of the controller.	I/O connector Pin No. 25
TIME HOLD OUT (time hold output)	OUT	Indicates, when the time hold function is used, that the date/time used is different from the actual date/time (date/time has been shifted).	ON: Date/time shifted OFF: Date/time not shifted	I/O connector Pin No. 34

## I/O for optional control status

Notifies the specification status of the optional functions.

Signal name	Attribute	Meaning of signal	Location of terminal
REMOTE CONTROL (remote control output)	OUT	ON: Remote control is in operation OFF: Remote control is not in operation	Output terminal block Pin No.13
DFL CONTROL (DFL control output)	OUT	ON: DFL control is in operation OFF: DFL control is not in operation	Output terminal block Pin No.14

### ■ REMOTE CONTROL (remote control output)

- This output is ON while the remote command is being executed.  
When this signal is ON, do not issue any commands from other externally connected systems.

### ■ DFL CONTROL (DFL control output)

- This output is ON while inspections are being performed with DFL.  
When this signal is ON, do not start marking.

### I/O for I/O Command Input

When the system is controlled using I/O commands, each I/O command is specified as a combination of four signal bits (bit pattern).

Also, each I/O command has a corresponding parameter whose value is set using 16 signal bits.

I/O commands and parameters and I/O signal assignments are shown below.

Signal name	Attribute	Function	Meaning of signal	Location of terminal
COMMAND SET (command confirmation input)	IN	This input signal is used to load a command signal.	A command signal is loaded at the OFF → ON edge of this input.	I/O connector Pin No. 20
COMMAND (command input_0)	IN	Command notation bit 0 signal	These four parallel signals represent four bits comprising an I/O command. An I/O command is defined by the bit pattern specified by these signals.	I/O connector Pin No. 21
COMMAND (command input_1)	IN	Command notation bit 1 signal		I/O connector Pin No. 22
COMMAND (command input_2)	IN	Command notation bit 2 signal		I/O connector Pin No. 23
COMMAND (command input_3)	IN	Command notation bit 3 signal		I/O connector Pin No. 24
DI_0 (parameter)	IN	Parameter notation bit 0 signal	These parallel signals represent 16 bits comprising the parameter defined for each I/O command. A parameter value is defined by the bit pattern specified by these signals.	I/O connector Pins No. 4 to 19
DI_1	IN	Parameter notation bit 1 signal		
DI_2	IN	Parameter notation bit 2 signal		
DI_3	IN	Parameter notation bit 3 signal		
DI_4	IN	Parameter notation bit 4 signal		
DI_5	IN	Parameter notation bit 5 signal		
DI_6	IN	Parameter notation bit 6 signal		
DI_7	IN	Parameter notation bit 7 signal		
DI_8	IN	Parameter notation bit 8 signal		
DI_9	IN	Parameter notation bit 9 signal		
DI_10	IN	Parameter notation bit 10 signal		
DI_11	IN	Parameter notation bit 11 signal		
DI_12	IN	Parameter notation bit 12 signal		
DI_13	IN	Parameter notation bit 13 signal		
DI_14	IN	Parameter notation bit 14 signal		
DI_15	IN	Parameter notation bit 15 signal		
COMMAND END (command reception complete output)	OUT	Indicates that a command was successfully received and the corresponding processing is completed.	ON: Command successfully received OFF: Other than above	I/O connector Pin No. 35



## 4.6 I/O Command

An I/O command uses parallel signals representing four bits and the bit pattern specified by these signals defines the command. The signal pattern also defines the type of the parameter corresponding to this command. This section explains the details of I/O commands.



### Precautions for Correct Use

To perform I/O communication, be sure to confirm that the system is in the operation mode.

### I/O Command Specifications

The following shows I/O commands defined by different bit patterns specified, and corresponding functions.

Bit pattern	I/O command name	Function
0000	Marking data selection	Selects and switches marking data.
0001	Count up	Specifies a counter and performs count-up.
0010	Count down	Specifies a counter and performs count-down.
0011	Counter reset	Specifies a counter and resets the counter. The initial value is set with the marker software.
0100	Variable data table selection	Specifies a variable data table and index and switches data used for marking.
0101	Non-marking specification (block)	Specifies a block and disables marking of the block.
0110	Non-marking reset (block)	Specifies a block and enables marking of the block.
0111	Non-marking specification (pallet)	Specifies a cell in a pallet and disables marking of the cell in the pallet, when pallet marking is performed.
1000	Non-marking reset (pallet)	Specifies a cell in a pallet and enables marking of the cell in the pallet, when pallet marking is performed.
1001	Guide laser output (block)	Switches the processing laser output mode to the guide laser output mode so that the guide laser will be irradiated with a block frame.
1010	Guide laser output (pallet)	Switches the processing laser output mode to the guide laser output mode so that the guide laser will be irradiated with a pallet cell frame.
1011	Guide laser output (pattern)	Switches the processing laser output mode to the guide laser output mode by specifying a guide laser pattern. (Except for blocks and pallets)
1100	Guide laser output stop	Switches the processing laser output mode to the processing laser output mode.



## Parameters Defined by I/O Commands

The following shows the parameter types defined by each I/O command.  
For details, refer to the detailed explanation page of each I/O command.

Bit pattern	I/O command name	Parameter	Reference page
0000	Marking data selection	Marking data number	4-31
0001	Count up	Counter number	4-32
0010	Count down	Counter number	
0011	Counter reset	Counter number	4-32
0100	Variable data table selection	Table type, variable data table number, index number	4-33
0101	Non-marking specification (block)	Block number	4-33
0110	Non-marking reset (block)	Block number	
0111	Non-marking specification (pallet)	Cell row number, cell column number	4-34
1000	Non-marking reset (pallet)	Cell row number, cell column number	
1001	Guide laser output (block)	Block number	4-34
1010	Guide laser output (pallet)	Cell row number, cell column number	4-35
1011	Guide laser output (pattern)	Guide pattern	4-35
1100	Guide laser output stop	–	4-36

## Marking Data Selection Command

Selects marking data and switches to the data in the case of setup change, etc.

<b>Command bit</b>	0000
<b>Details of operation</b>	Switches marking data to the specified data and brings the system marking ready.
<b>Parameter</b>	Specifies a marking data number. • DI_15 to DI_0: Marking data number (binary specification)
<b>Completion timing</b>	Timing at which the marking data is read and [MARK READY] (marking ready output) turns ON
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>The specified marking data does not exist.</li> <li>The system is not marking ready.</li> </ul>
<b>Remarks</b>	If the laser power is ON and shutter is open, [MARK READY] (marking ready output) turns ON the moment the processing of this command is completed.

### Count Up/Count Down Command

Increments or decrements the value of a counter used with marking data (string/ID code).

<b>Command bit</b>	0001: Count up 0010: Count down
<b>Operation description</b>	<ul style="list-style-type: none"> <li>• Updates the counter value by incrementing or decrementing it by the step value set in the marker software.</li> <li>• Updates the marking data when the counter value is updated.</li> </ul>
<b>Parameter</b>	Specifies a counter number. <ul style="list-style-type: none"> <li>• DI_15 to DI_0: Counter number (bit specification)</li> </ul>
<b>Completion timing</b>	Timing at which [MARK READY] (marking ready output) turns ON following an update of the counter value and marking data
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>• The system is not operating.</li> <li>• The system is not marking ready.</li> </ul>
<b>Remarks</b>	<ul style="list-style-type: none"> <li>• The counter number is specified using a bit. Counter No. 0 corresponds to "DI_0," Counter No. 1 to "DI_1," ..., and Counter No. 15 to "DI_15."</li> <li>• By specifying multiple counter numbers (bits), multiple counters can be manipulated all at once.</li> </ul>

### Counter Reset Command

Resets the value of a counter used with marking data (string/ID code) to the initial value.

<b>Command bit</b>	0011
<b>Operation description</b>	<ul style="list-style-type: none"> <li>• Initializes the counter value to the value set in the marker software.</li> <li>• Updates the marking data when the counter value is initialized.</li> </ul>
<b>Parameter</b>	Specifies a counter number. <ul style="list-style-type: none"> <li>• DI_15 to DI_0: Counter number (bit specification)</li> </ul>
<b>Completion timing</b>	Timing at which [MARK READY] (marking ready output) turns ON following an initialization of the counter value and update of marking data
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>• The system is not operating.</li> <li>• The system is not marking ready.</li> </ul>
<b>Remarks</b>	<ul style="list-style-type: none"> <li>• The counter number is specified using a bit. Counter No. 0 corresponds to "DI_0," Counter No. 1 to "DI_1," ..., and Counter No. 15 to "DI_15."</li> <li>• By specifying multiple counter numbers (bits), multiple counters can be manipulated all at once.</li> </ul>

## Variable Data Table Selection Command

Selects a variable data table and index to be used with marking data.

<b>Command bit</b>	0100
<b>Operation description</b>	Specifies a table type, variable data table number, index number. This way, marking data that uses variable data is changed.
<b>Parameter</b>	Specifies a table type, variable data table number, index number. <ul style="list-style-type: none"> <li>DI_15 and DI_14: Table type (00: String, 01: Image, 10: Graphic symbol)</li> <li>DI_13 to DI_8: Variable data table number (binary specification)</li> <li>DI_7 to DI_0: Index number (binary specification)</li> </ul>
<b>Completion timing</b>	Timing at which [MARK READY] (marking ready output) turns ON following an update of marking data that uses the variable data specified by the index
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>"11" has been set by DI_15 and DI_14.</li> <li>The corresponding index is inappropriate.</li> <li>The system is not marking ready.</li> </ul>

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## Non-marking Specification/Reset (Block) Command

Specifies a marking data block to disable its marking (non-marking) or resets the disable setting to enable marking.

<b>Command bit</b>	0101 (Non-marking specification) 0110 (Non-marking reset)
<b>Operation description</b>	<ul style="list-style-type: none"> <li>Switches non-marking (disable marking)/reset non-marking (enable marking) for a specified marking data block.</li> <li>Updates the marking data when non-marking is specified/reset.</li> </ul>
<b>Parameter</b>	Specifies a block number. <ul style="list-style-type: none"> <li>DI_15 to DI_0: Block number (binary specification)</li> </ul>
<b>Completion timing</b>	Timing at which [MARK READY] (marking ready output) turns ON
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>No block exists that corresponds to the parameter.</li> <li>The system is not marking ready.</li> </ul>

I/O Communication

Hardware Specifications

Terminal Block/Connector Specifications

I/O Signal List

Function of I/O Signal

I/O Command

Timing Chart

Example of Operation by I/O Communication

### Non-marking Specification/Reset (Pallet) Command

Specifies a cell in a marking data pallet to disable its marking (non-marking) or resets the disable setting to enable marking.

<b>Command bit</b>	0111 (Non-marking specification) 1000 (Non-marking reset)
<b>Operation description</b>	<ul style="list-style-type: none"> <li>Specifies non-marking (disable marking)/reset non-marking (enable marking) for a specified cell when pallet marking is performed.</li> <li>Updates the marking data when non-marking is specified/reset.</li> </ul>
<b>Parameter</b>	<p>Specifies a cell using a row number and column number.</p> <ul style="list-style-type: none"> <li>DI_15 to DI_8: Cell row number (binary specification)</li> <li>DI_7 to DI_0: Cell column number (binary specification)</li> </ul>
<b>Completion timing</b>	Timing at which [MARK READY] (marking ready output) turns ON
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>No pallet is set for this marking data.</li> <li>No cell exists that corresponds to the parameter.</li> <li>The system is not marking ready.</li> </ul>

### Guide Laser Output (Block) Command

Switches the processing laser output mode to the guide laser output mode so that the guide laser will be irradiated with a block frame.

<b>Command bit</b>	1001
<b>Operation description</b>	Switches the processing laser output mode to the guide laser output mode so that the laser will be irradiated with the block frame of the specified block.
<b>Parameter</b>	<p>Specifies a block number.</p> <ul style="list-style-type: none"> <li>DI_15 to DI_0: Block number (binary specification)</li> </ul>
<b>Completion timing</b>	Timing at which the specification of guide laser output mode is completed
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>Marking data is not open.</li> <li>Marking data for which a pallet is set is open.</li> <li>No block exists that corresponds to the parameter.</li> <li>The system is not marking ready.</li> </ul>
<b>Remarks</b>	<ul style="list-style-type: none"> <li>Turning ON all parameter bits specifies all blocks.</li> <li>The guide laser is irradiated using the [TRIG] (marking trigger input) signal.</li> </ul>

## Guide Laser Output (Pallet) Command

Switches the processing laser output mode to the guide laser output mode so that the guide laser will be irradiated with a pallet cell frame.

<b>Command bit</b>	1010
<b>Operation description</b>	Switches the processing laser output mode to the guide laser output mode so that the laser will be irradiated with the cell frame of the specified cell.
<b>Parameter</b>	Specifies a cell using a row number and column number. <ul style="list-style-type: none"> <li>DI_15 to DI_8: Cell row number (binary specification)</li> <li>DI_7 to DI_0: Cell column number (binary specification)</li> </ul>
<b>Completion timing</b>	Timing at which the specification of guide laser output mode is completed
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>Marking data is not open.</li> <li>Marking data for which a pallet is set is open.</li> <li>No block exists that corresponds to the parameter.</li> <li>The system is not marking ready.</li> </ul>
<b>Remarks</b>	<ul style="list-style-type: none"> <li>Turning ON all parameter bits (cell row numbers/cell column numbers) specifies all cells.</li> <li>The guide laser is irradiated using the [TRIG] (marking trigger input) signal.</li> </ul>

## Guide Laser Output (Pattern) Command

Switches the processing laser output mode to the guide laser output mode by specifying a guide laser pattern. (Except for blocks and pallets)

<b>Command bit</b>	1011
<b>Operation description</b>	Switches the processing laser output mode to the guide laser output mode and specifies a guide laser pattern. (Except for blocks and pallets)
<b>Parameter</b>	Specifies a guide pattern number. <ul style="list-style-type: none"> <li>DI_15 to DI_8: Not used (input invalid)</li> <li>DI_7 to DI_0: Guide pattern number (binary specification)</li> </ul> [Guide pattern number] <ol style="list-style-type: none"> <li>Marking area</li> <li>Area guide</li> <li>Center point</li> <li>Marking pattern</li> </ol>
<b>Completion timing</b>	Timing at which the specification of guide laser output mode is completed
<b>An error occurs.</b>	<ul style="list-style-type: none"> <li>The system is not operating.</li> <li>The parameter value is invalid.</li> <li>The system is not marking ready.</li> </ul>
<b>Remarks</b>	The guide laser is irradiated using the [TRIG] (marking trigger input) signal.



### Reference

For details on guide pattern, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

**Guide Laser Output Stop Command**

Switches the guide laser output mode to the processing laser output mode.

<b>Command bit</b>	1100
<b>Operation description</b>	Switches the laser output mode from the guide laser output mode to the processing laser output mode.
<b>Parameter</b>	None
<b>Completion timing</b>	Timing at which the specification of processing laser output mode is completed
<b>An error occurs.</b>	The system is not in the operation mode.

## 4.7 Timing Chart

Timing charts of I/O signal inputs and outputs associated with various operations are shown.

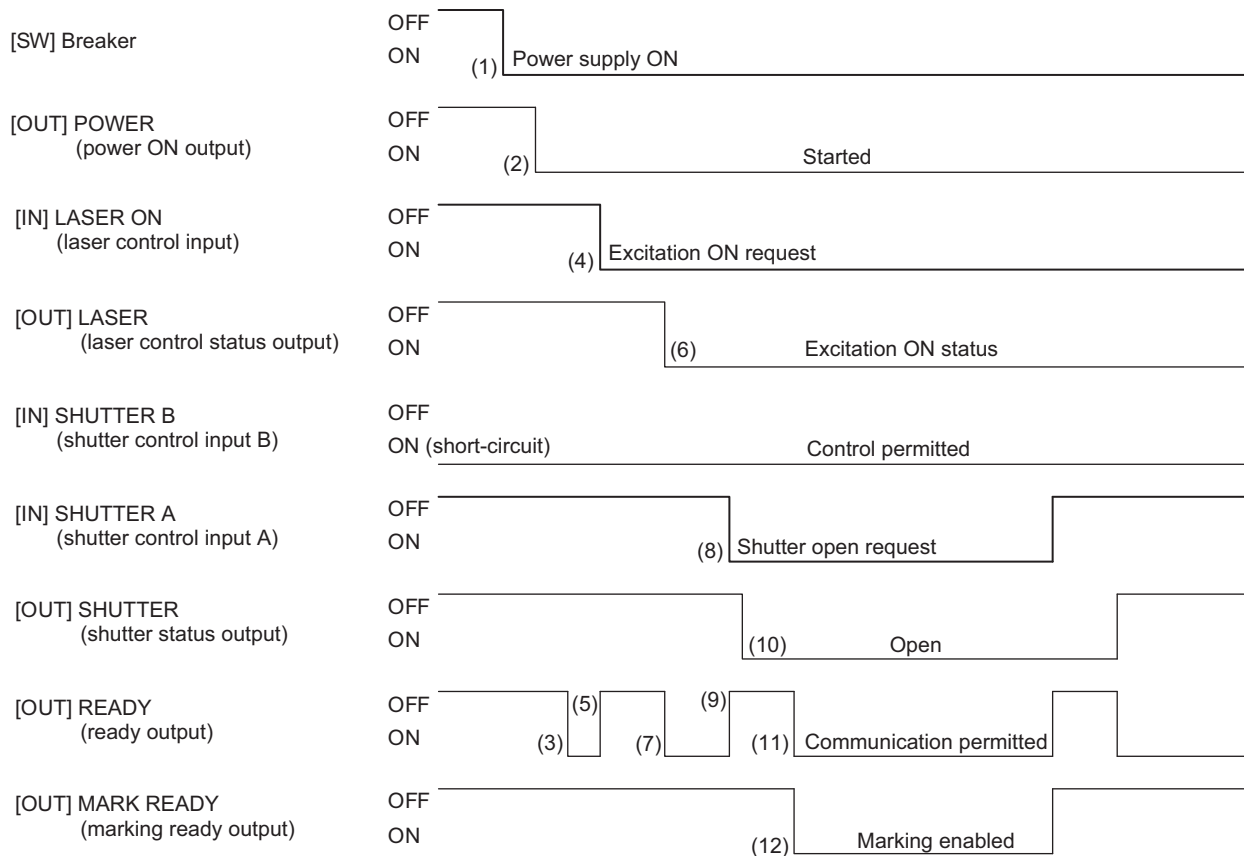
### Precautions for Correct Use

- To perform I/O communication, be sure to confirm that the system is in the operation mode.
- The response time of each signal varies depending on the settings of the laser marker. Please confirm with the settings to be used before actual operation.

When replacing the MX-Z2000H series with the MX-Z2000H-V1 series, response time may be longer depending on the settings. Please check in the same way.

- Do not opening and closing operation the safety relay during startup. It may cause malfunction.

### When Starting



#### [Explanation of operation]

##### 1. Breaker: ON (1)

This operation supplies the power to the system. As a result, [POWER] (power ON output) turns ON (2) and each startup process is started.

When the startup process is completed, [READY] (ready output) turns ON automatically (3) if the startup operation mode is "Operation." This way, the external devices recognize that the system has been started and will perform the necessary signal processing thereafter.

##### 2. [LASER ON] (laser control input): ON (4)

This operation starts excitation of the laser.

[READY] (ready output) remains OFF (5) while the laser is not fully excited and [LASER] (laser

control status output) turns ON (6) along with [READY] (7) once the excitation is completed.

If the LASER ON signal is turned ON as a result of operating the key switch when the breaker is turned ON or during the startup process in 1, excitation of the laser will start as soon as the startup process is completed.

### 3. [SHUTTER A] (shutter control input A): ON (open) (8)

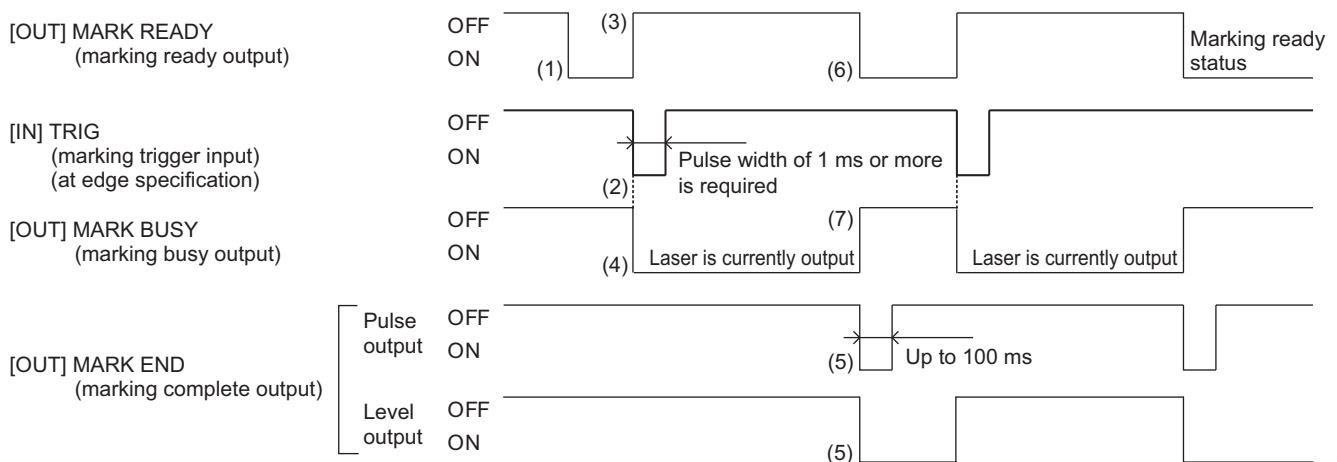
The shutter can be opened/closed while [LASER ON] (laser control input) is ON.

When [SHUTTER A] (shutter control input A) ON is received, [READY] (ready output) turns OFF (9) and [SHUTTER] (shutter status output) turns ON (open) (10).

When the shutter opening operation is completed, [READY] turns ON again (11) along with [MARK READY] (marking ready output) (12) (if the marking data number to be opened at start is specified by the startup settings in the marker software).

If [SHUTTER A] (shutter control input) ON is received before the excitation of the laser is completed in 2, the shutter will open as soon as the excitation of the laser is completed.

## Marking Operation



### [Explanation of operation]

#### 1. [MARK READY] (marking ready output): ON (1)

Marking can be performed when [MARK READY] (marking ready output) is ON.

#### 2. [TRIG] (marking trigger input): ON (2)

If "Edge" input is specified under [TRIG] (marking trigger input) in the marker software, a signal with a pulse width of 1 ms or more is input as a marking trigger.

When [TRIG] (marking trigger input) ON is received as a level or edge, [MARK READY] (marking ready output) turns OFF (3) and [MARK BUSY] (marking busy output) turns ON (4), indicating that marking is being performed.

#### 3. [MARK END] (marking complete output): ON (5)

When marking is completed, a marking complete signal is output. The output varies depending on the marker software setting.

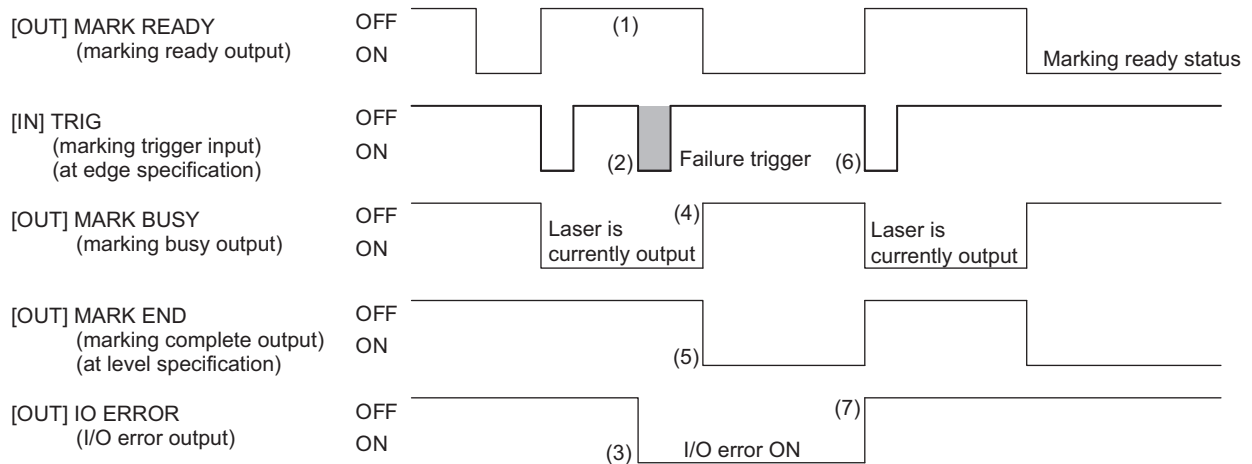
- Pulse output: A pulse of the specified width is output.

- Level output: An ON signal is output.

And then, [MARK READY] (marking ready output) turns ON again (6) and [MARK BUSY] (marking busy output) turns OFF (7).



## Occurrence of I/O Error



## [Explanation of operation]

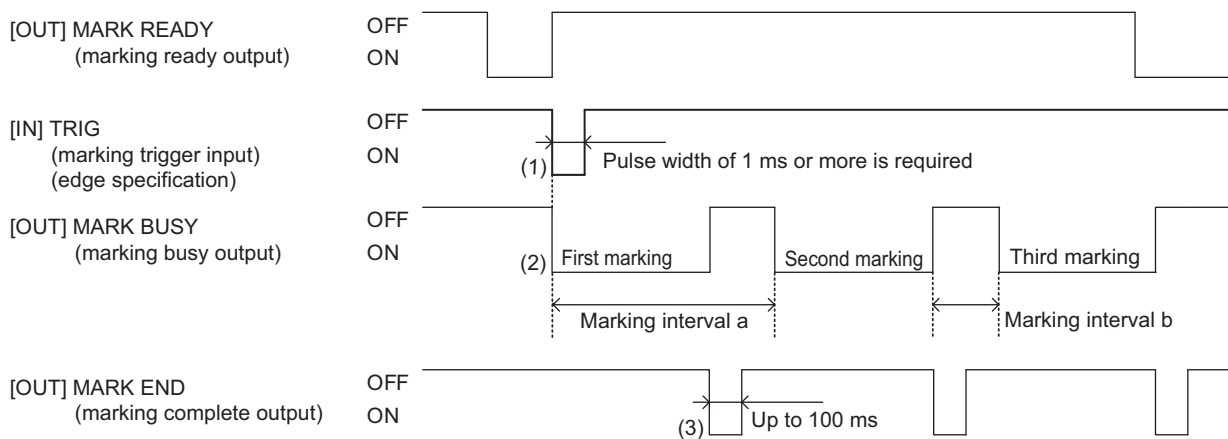
1. Occurrence of I/O error ([TRIG] (marking trigger input): ON (1) when [MARK READY] (marking ready output): OFF (2))  
When marking is started with the initial marking trigger input, [MARK READY] (marking ready output) turns OFF.  
If a marking trigger is input during this period, an I/O error occurs.
2. [IO ERROR] (I/O error output): ON (3)  
If an I/O error occurs, [IO ERROR] (I/O error output) turns ON and the error is notified externally. Note, however, that the marking started by the initial marking trigger input and currently in progress will continue regardless of whether or not an error occurs (4).  
When marking ends, [MARK END] (marking complete output) turns ON (5).
3. Reset of I/O error  
If a normal condition is subsequently restored and [TRIG] (marking trigger input) turns ON (6), [IO ERROR] (I/O error output) turns OFF (7).

## Continuous Marking Operation

Continuous marking operation is performed in two ways as explained below.

- Specification of number of operations  
Specify the number of marking operations and marking interval first, and then input a marking trigger only once to perform continuous marking.  
Specify "Edge" input under [TRIG] (marking trigger input) in the marker software.
- Continued while marking trigger input is ON  
Keep the marking trigger input ON for a specified time to perform continuous marking while the input is ON.  
Specify "Level" input under [TRIG] (marking trigger input) in the marker software.

### ■ Specification of number of operations



[Explanation of operation]

1. [TRIG] (marking trigger input): ON (1)  
If "Edge" input is specified under [TRIG] (marking trigger input) in the marker software, input a signal with a pulse width of 1 ms or more as a marking trigger signal only once.
2. Specification of marking interval  
The marking interval, specified in two ways as explained below, is set in the marker software.
  - Specify the time after one marking is started until the next marking is started (marking interval a)
  - Specify the time after the previous marking ended until the next marking is started (marking interval b)
 If the time spent on one marking operation is longer than the set marking interval, an error occurs.



### Reference

For information on how to set the marking interval, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

3. [MARK BUSY] (marking busy output): ON (2)  
[MARK BUSY] (marking busy output) remains ON while marking is in progress.  
This signal is output every time marking is performed.

## 4. [MARK END] (marking complete output): ON (3)

When marking is completed, [MARK END] (marking complete output) turns ON.

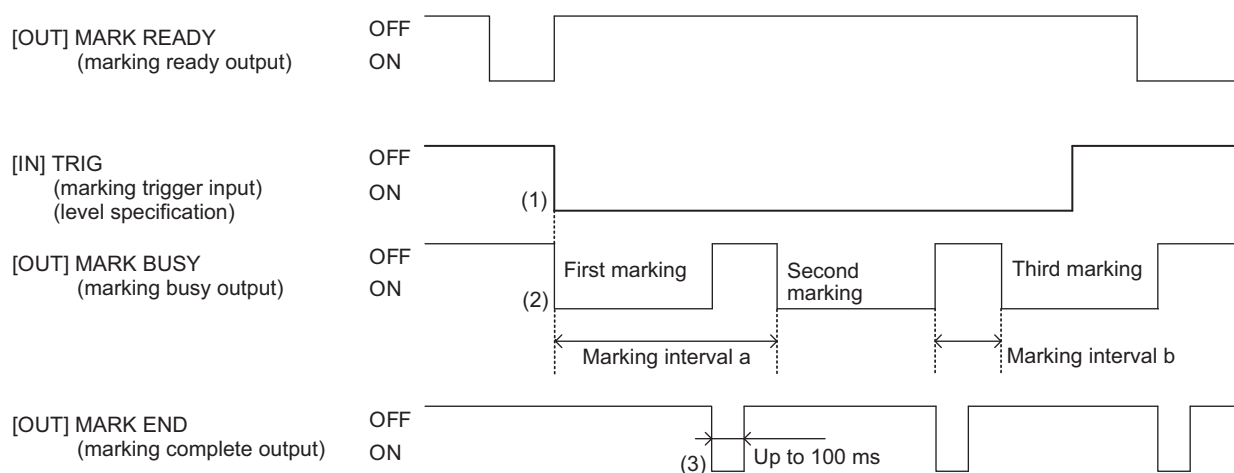
Set in the marker software whether to output the signal upon completion of every marking operation or the specified number of marking operations.

Note that, while this timing chart assumes the pulse output mode, the same timing applies in the level output mode. (Refer to "Marking Operation (page 4-38)".)

**Precautions for Correct Use**

If a number of operations is specified for continuous marking, marking will continue for the specified number of times once a marking trigger is input (marking is started). To stop the marking in the middle, the marking stop input signal must be turned ON or an emergency stop must be actuated.

### ■ Continued while marking trigger input is ON



## [Explanation of operation]

## 1. [TRIG] (marking trigger input) (1)

If "Level" input is specified under [TRIG] (marking trigger input) in the marker software, [TRIG] is checked at the two timings specified below, in this order.

- Every time marking ends: If [TRIG] is OFF, marking stops immediately.
- Every time marking starts: If [TRIG] is ON, the next marking will be performed.

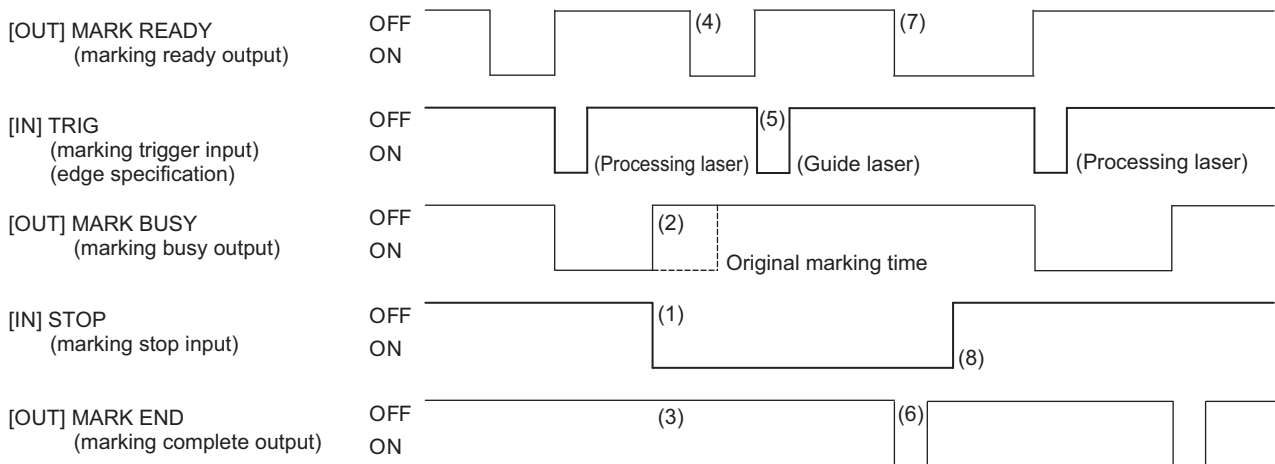
## 2. Specification of marking interval

## 3. [MARK BUSY] (marking busy output): ON (2)

## 4. [MARK END] (marking complete output): ON (3)

Same as under "Specification of number of operations."

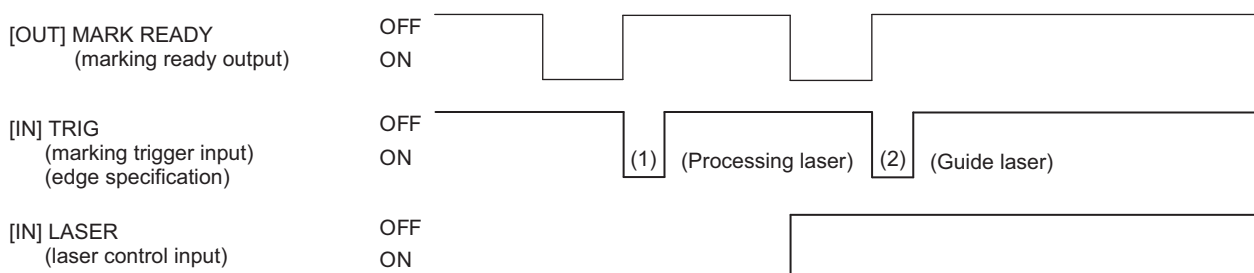
### Stopping during Marking (STOP Signal Switching Control is disabled)



#### [Explanation of operation]

1. [STOP] (marking stop input): ON (1)  
If [STOP] (marking stop input) turns ON during marking, the processing laser output and marking operation are stopped.
2. [MARK BUSY] (marking busy output): OFF (2)  
[MARK BUSY] (marking busy output) remains OFF while marking is stopped.
3. [MARK END] (marking complete output): OFF (3)  
If marking is stopped in the middle, [MARK END] (marking complete output) will remain OFF.
4. [TRIG] (marking trigger input): Marking operation in the guide laser output mode  
When [STOP] (marking stop input) is ON, marking operation is performed in the guide laser output mode. Input [TRIG] (marking trigger input) (4) after [MARK READY] (marking ready output) has turned ON (5). While the system is operating in the guide laser output mode, [MARK BUSY] (marking busy output) remains OFF. [MARK END] (marking complete output) is output (6) and [MARK READY] (marking ready output) turns ON (7) after the end of marking operation.
5. [STOP] (marking stop input): OFF (8)  
When [STOP] (marking stop input) is turned OFF, marking operation in the processing laser output mode is resumed.

### Laser Control Input Switching (STOP Signal Switching Control is enabled)

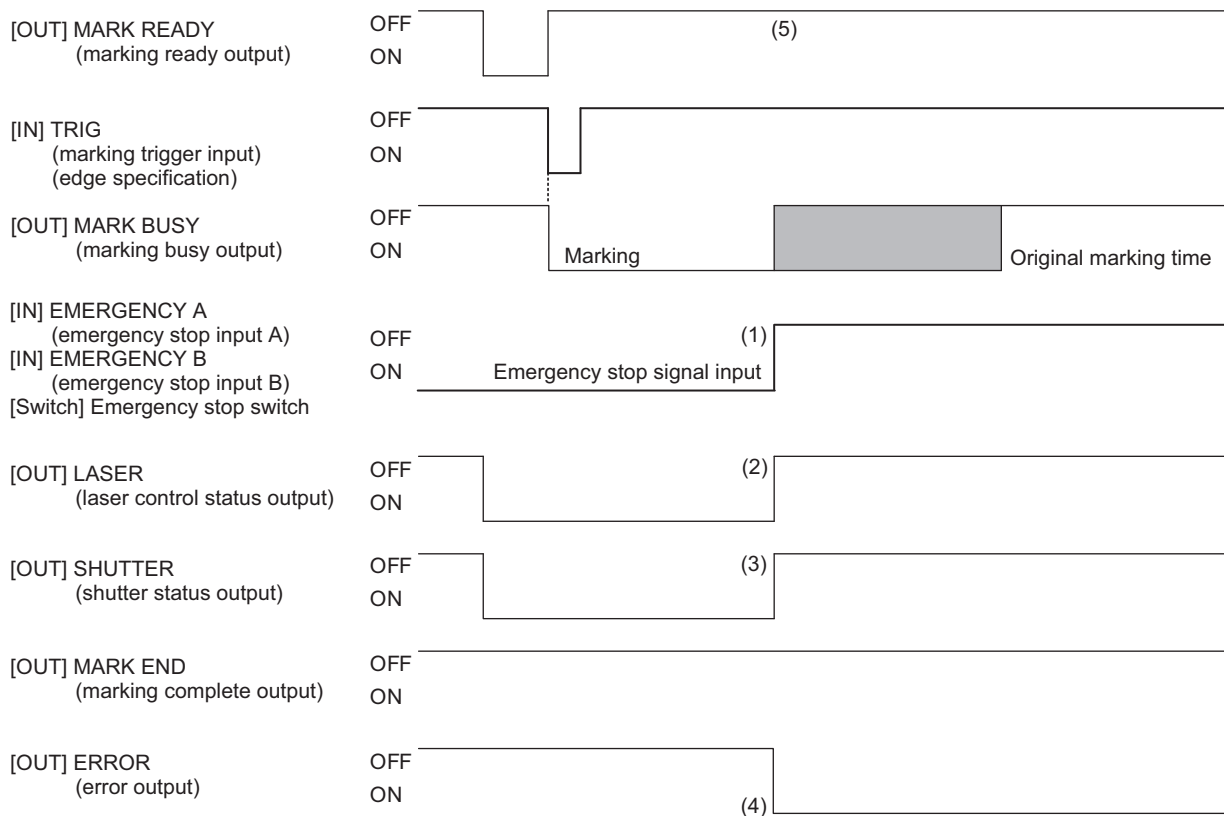


[Explanation of operation]

1. [TRIG] (marking trigger input) (1)

When [LASER] (laser control input) is ON, marking operation is performed in the processing laser output mode. When [TRIG] (marking trigger input) is turned ON while [LASER] (laser control input) is OFF, marking operation is performed in the guide laser output mode.

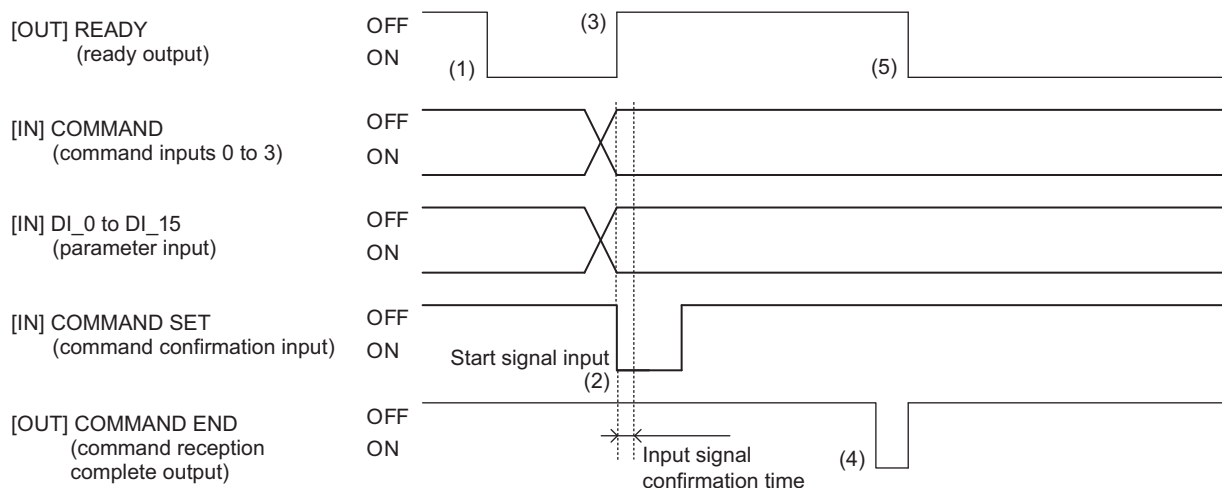
## Emergency Stop Operation



### [Explanation of operation]

1. [EMERGENCY A] (emergency stop input A) and [EMERGENCY B] (emergency stop input B):  
 OFF (open), or [EMERGENCY] button: ON (1)  
 Turning OFF (open) [EMERGENCY A] (emergency stop input A) or [EMERGENCY B] (emergency stop input B) or turning the emergency stop switch to the ON position while marking is in progress stops the marking and laser output immediately.
2. [LASER] (laser control status output): OFF (2)  
 Since the laser control stops, [LASER] (laser control status output) turns OFF.
3. [SHUTTER] (shutter status output): OFF (3)  
 Since the shutter closes, [SHUTTER] (shutter status output) turns OFF.
4. [ERROR] (error output): ON (4)  
 Since an emergency stop is recognized as an error, [ERROR] (error output) turns ON.
5. [MARK READY] (marking ready output): OFF (5)  
 [MARK READY] (marking ready output) remains OFF.

## Input of I/O Command



## [Explanation of operation]

1. [READY] (ready output): ON (1)  
I/O commands are acceptable only when [READY] (ready output) of this system is ON.
2. [COMMAND] (command inputs 0 to \_3)/[DI\_0] to [DI\_15] (parameter input)  
The external device outputs [COMMAND] (command inputs 0 to \_3) and [DI\_0] to [DI\_15] (parameter input).
3. [COMMAND SET] (command confirmation input): ON (2)  
When the external device turns ON [COMMAND SET] (command confirmation input), the system waits for the "input signal confirmation time" set in the marker software to elapse, and then acquire the command input 0 to 3/parameter input signals (parallel bits) and perform the applicable processing.  
At the same time, [READY] (ready output) turns OFF (3).



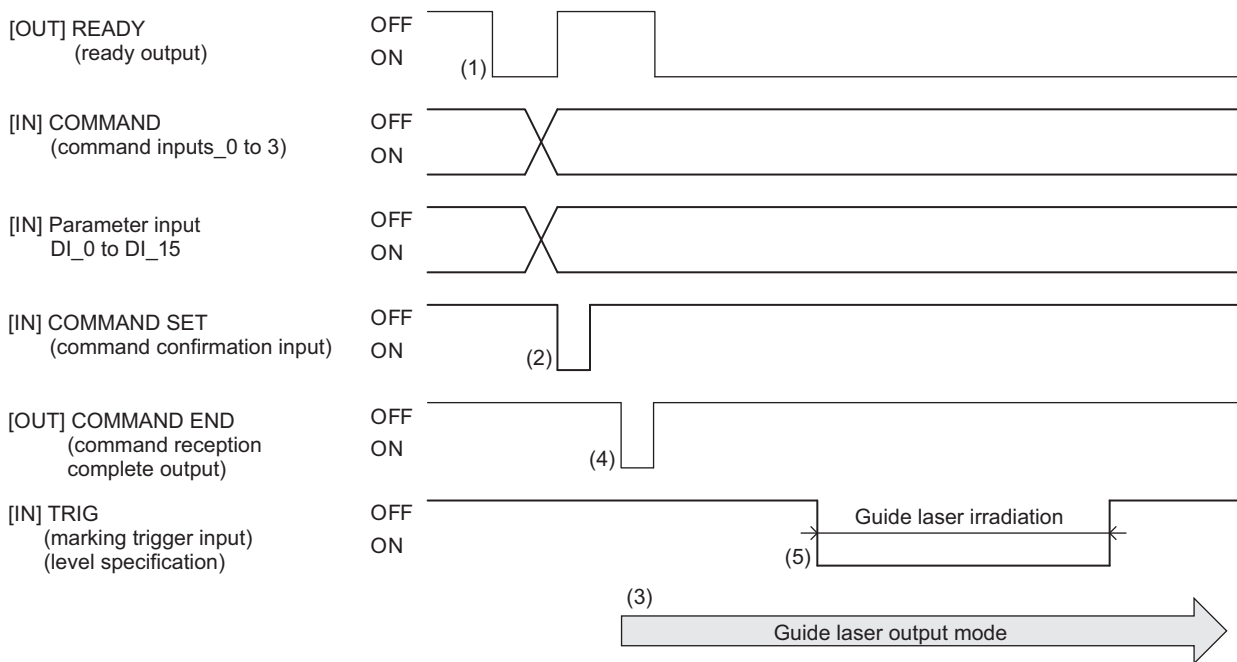
## Reference

For information on how to set the "input signal confirmation time", refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

4. [COMMAND END] (command reception complete output): ON (4)  
When the processing is completed, [COMMAND END] (command reception complete output) is output as a pulse of the specified width.  
At the same time, [READY] (ready output) turns ON again (5).

## Guide Laser Operation



### [Explanation of operation]

#### 1. Execution of "guide laser output" I/O command

When the external device outputs a "guide laser output" I/O command and parameter while [READY] (ready output) is ON (1) and then [COMMAND SET] (command confirmation input) is turned ON (2), this system switches to the guide laser output mode (3) and [COMMAND END] (command reception complete output) turns ON (4).

#### 2. [TRIG] (marking trigger input): ON (5)

If "Level" input is specified under [TRIG] (marking trigger input) in the marker software, and [TRIG] (marking trigger input) is turned ON, guide laser output continues.

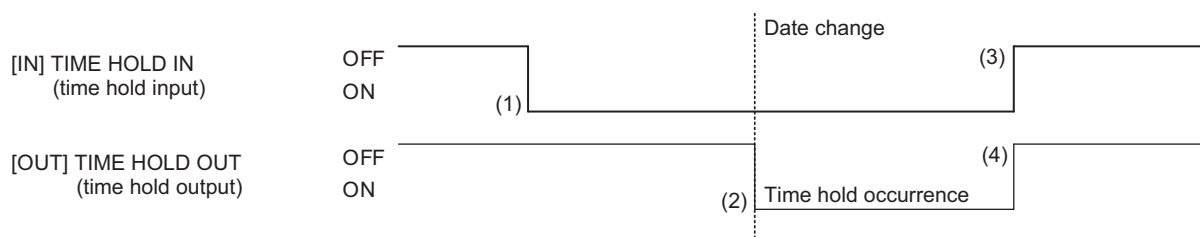


### Additional Information

- Guide laser output will continue until a "guide laser output stop" command is received.
- To stop the irradiation of guide laser, turn [STOP] (marking stop input) OFF and then turn it back ON.



## Time Hold Operation



### [Explanation of operation]

1. [TIME HOLD IN] (time hold input): ON (1)  
The time at which [TIME HOLD IN] (time hold input) was turned ON is acquired.
2. [TIME HOLD OUT] (time hold output): ON (2)  
When 12:00 am passes and the date changes, the date used for marking becomes different from the actual date. Accordingly, [TIME HOLD OUT] (time hold output) turns ON at this timing.
3. [TIME HOLD IN] (time hold input): OFF (3)  
When [TIME HOLD IN] (time hold input) is turned OFF (time hold reset), [TIME HOLD OUT] (time hold output) turns OFF (4) and the actual date will be used for making thereafter.

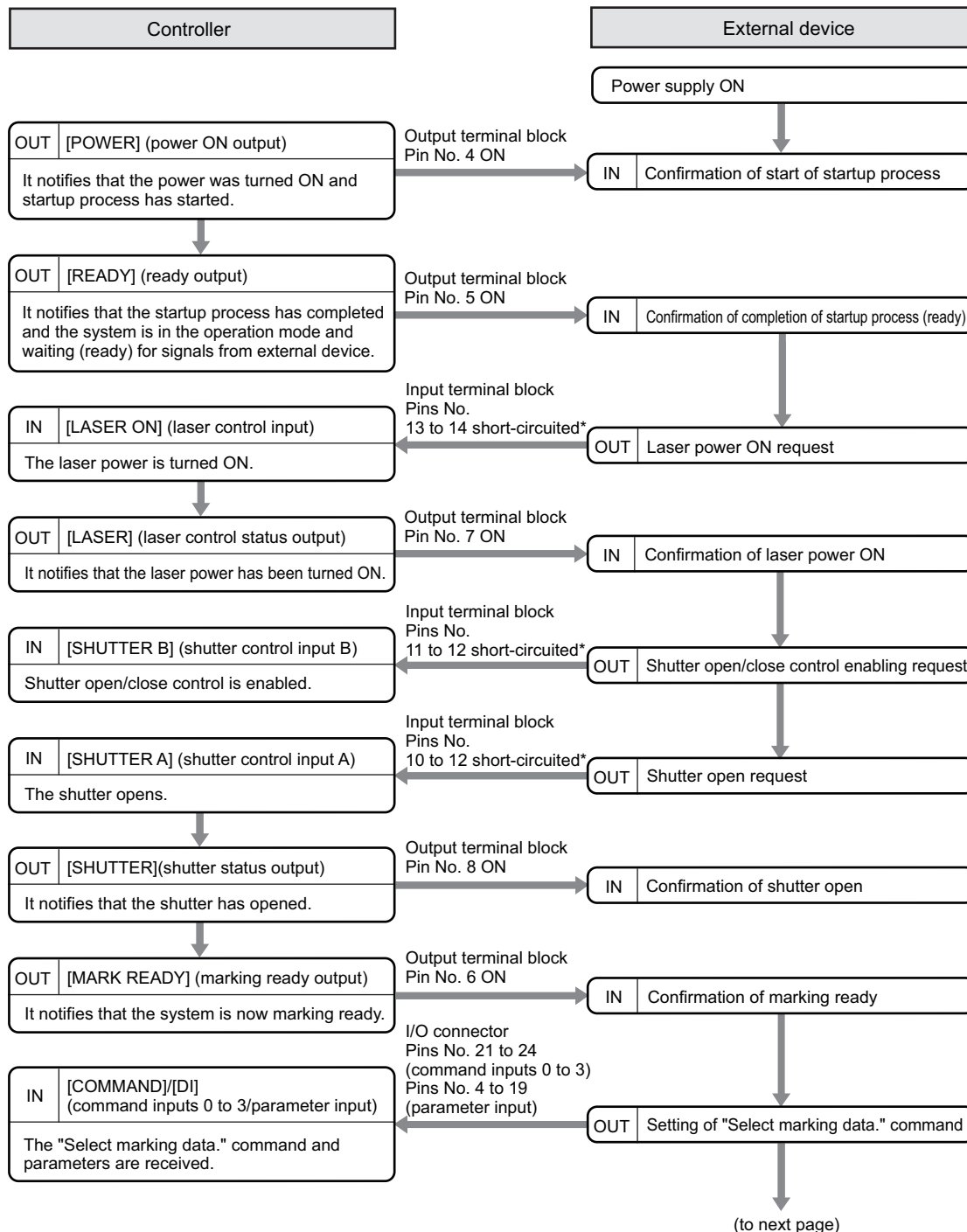
## 4.8 Example of Operation by I/O Communication

An example of operation steps via I/O control, from startup to selection of marking data and performance of marking, is shown below.

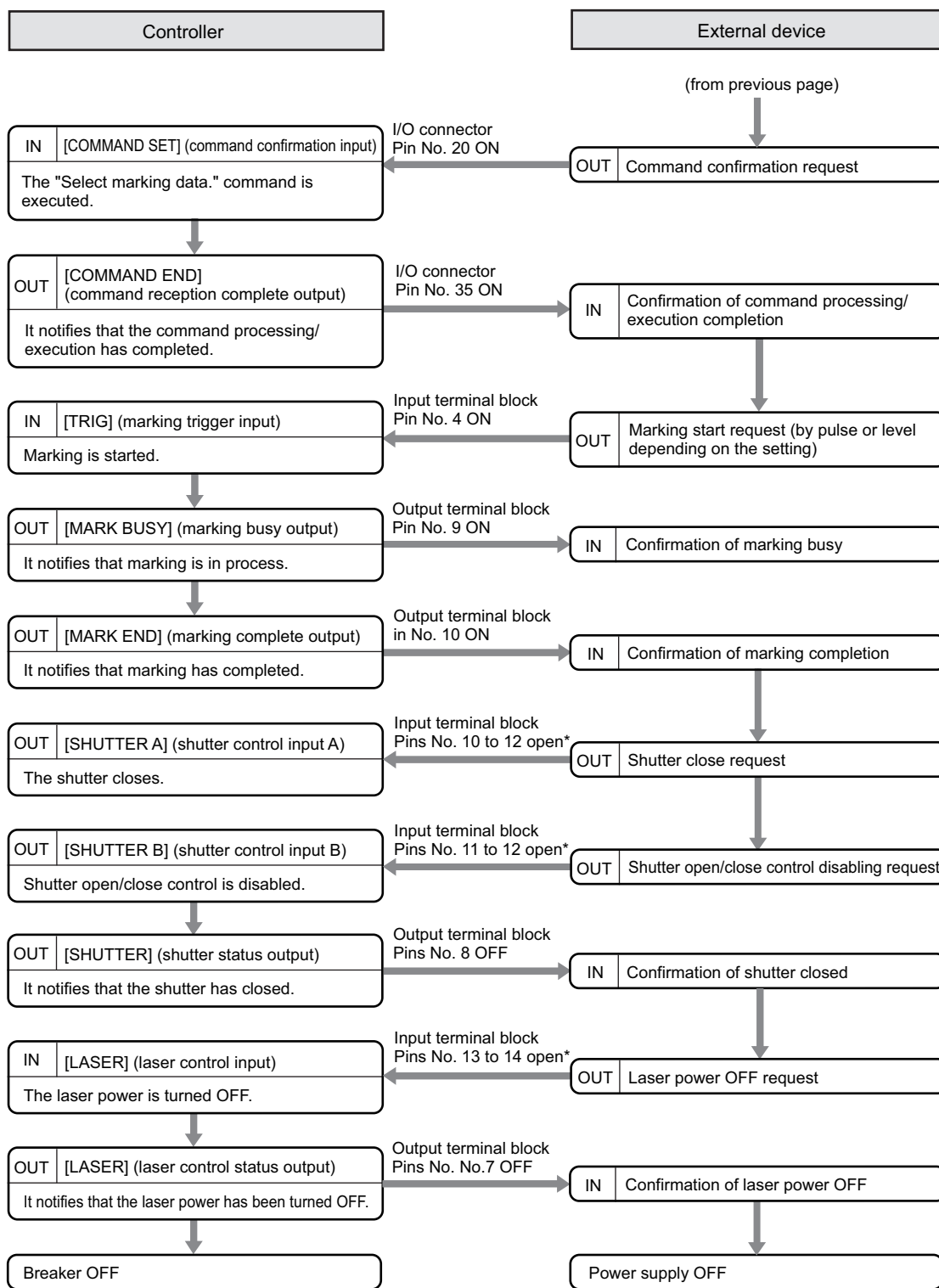
In this example, ON/OFF of the laser power and opening/closing of the shutter is controlled externally.

### Prerequisite

- The breaker of the controller shall be turned ON.
- The key switch of the controller shall be turned ON.
- The [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) terminal shall be short-circuited with [COM OUT].
- The controller shall be on the operation mode.



\* The product is shipped with these pins already short-circuited with a jumper pin.



\* The product is shipped with these pins already short-circuited with a jumper pin.



# Chapter 5

## 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.

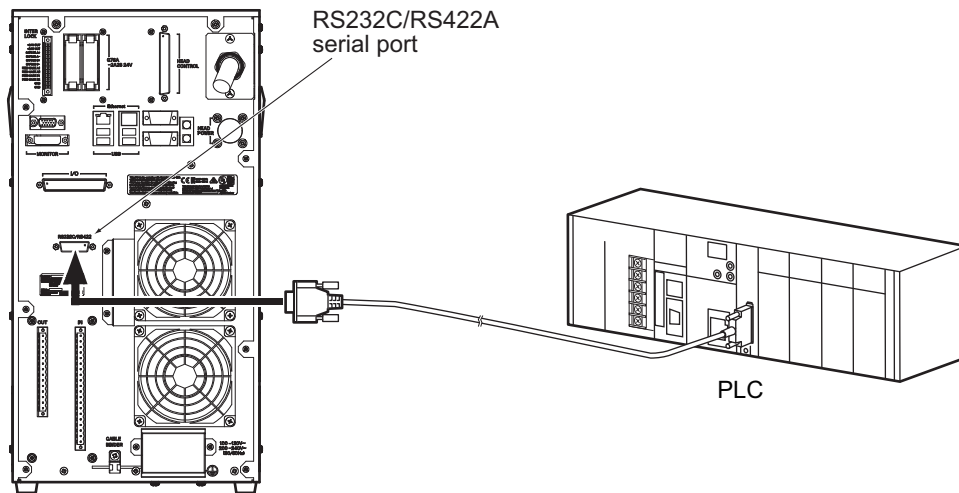
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5.1	Serial Communications .....	5-2
5.2	Hardware Specifications.....	5-3

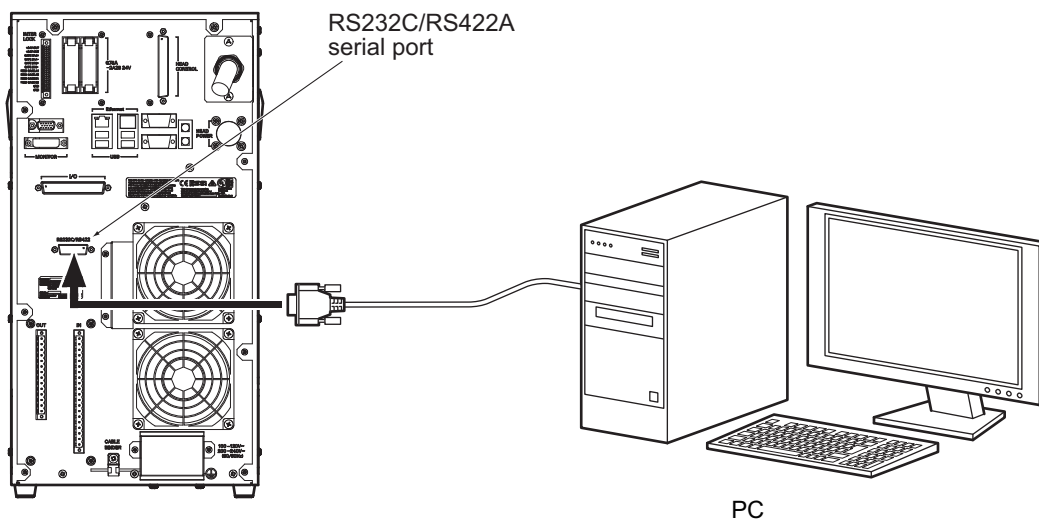
## 5.1 Serial Communications

You can connect a PC, PLC or other external device to the controller using a serial communication cable and operate/control the system by sending and receiving commands and response messages between the external device and controller.

### ■ Controlling marking via a PLC



### ■ Controlling marking via a PC



### Reference

For connection/control methods for serial communication control, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

## 5.2 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

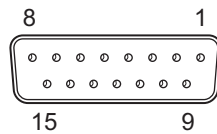
\* RS-232C and RS-422A cannot be used at the same time.

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.



### Precautions for Correct Use

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



### Additional Information

The following products are recommended for the connectors on the external device cable connected to the RS-232C/RS-422A serial port:

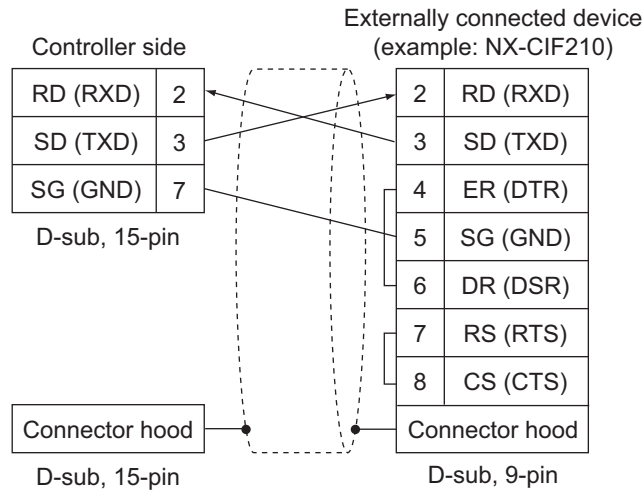
- Plug: OMRON XM3A-1521 (D-sub15 pin)
- Hood: OMRON XM2S-1511



## Example of Connection with External Device

This shows an wiring example between the controller and the external devices. The wiring on the external device side will differ, depending on the specifications. Check the manual for the externally connected device in order to make the cables.

### ■ RS-232C interface

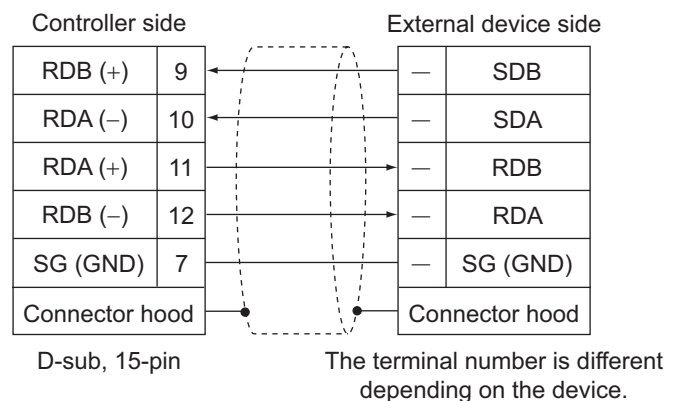
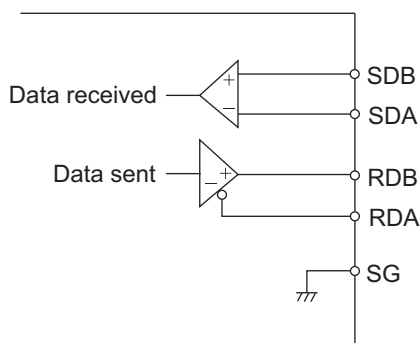


#### Precautions for Correct Use

Do not connect anything to those pins other than the pins No. 2, 3 or 7 on the controller side.

### ■ RS-422A interface

Cable wiring diagram



#### Precautions for Correct Use

Do not connect anything to those pins other than the pins No. 7, 9, 10, 11 or 12 on the controller side.



# Chapter 6

## 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.

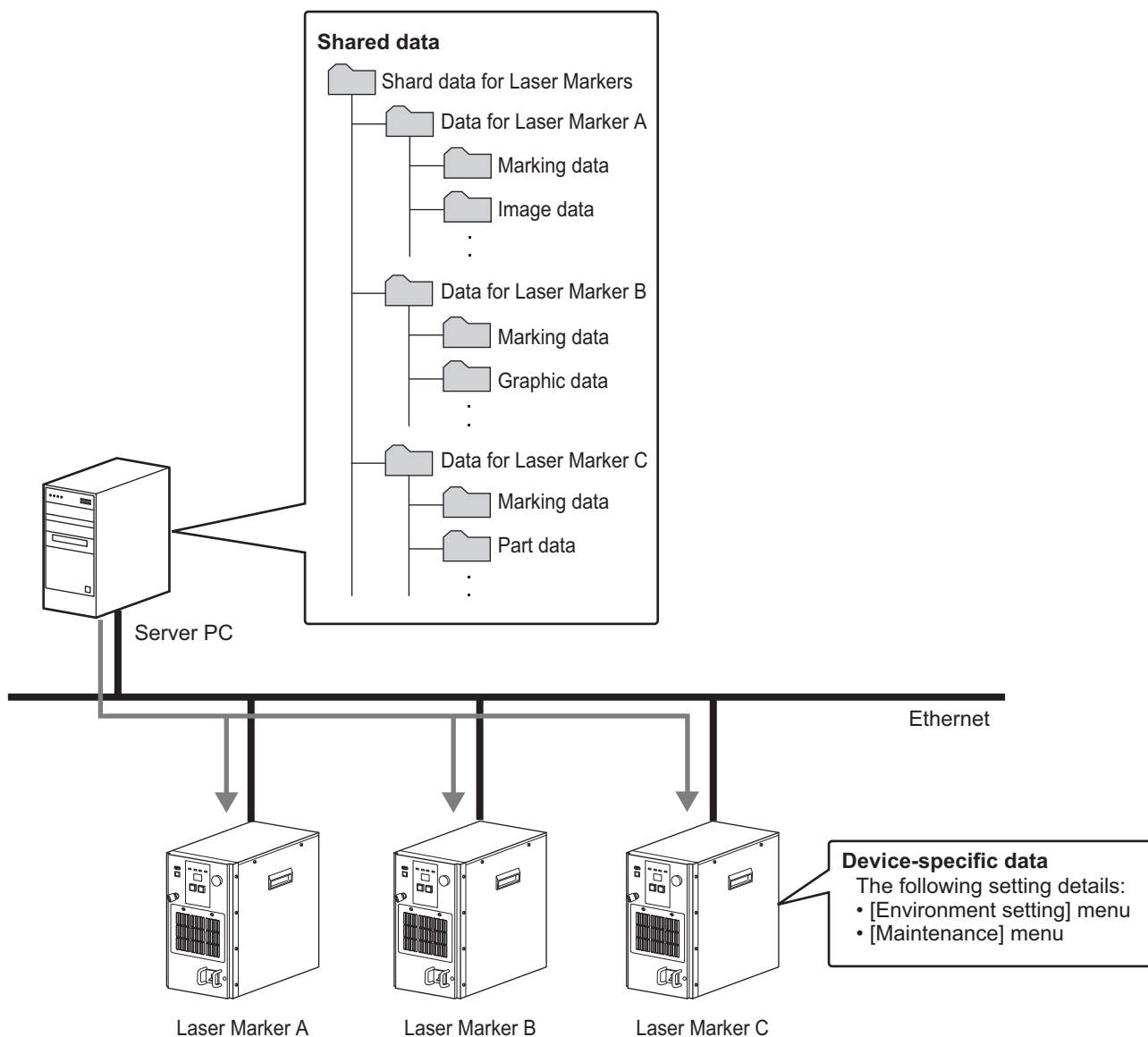
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6.1	Ethernet Communications .....	6-2
6.2	Hardware Specifications.....	6-4
6.3	Ethernet Setting.....	6-5
6.4	Reference Folder Setting Function.....	6-7

## 6.1 Ethernet Communications

### Sharing Set Data

Using Ethernet communication, marking data on external storage on the network can be referenced. Multiple laser marker marking data connected to the network can be managed, and set data can be shared between laser markers.



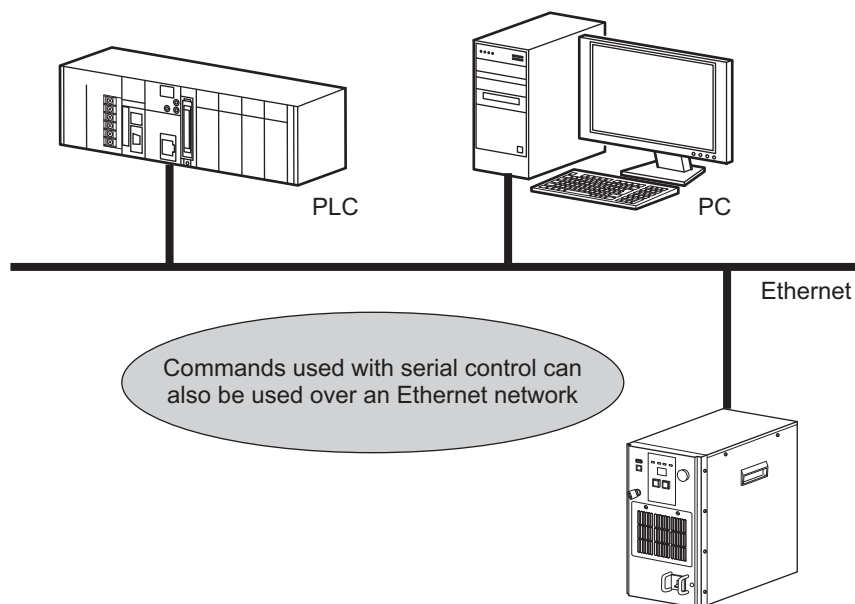
### Reference

For details on setting methods for performing Ethernet communication, refer to:

- "6.3 Ethernet Setting (page 6-5)"

## Ethernet Communication Control

You can connect a PC, PLC or other external device to the controller using an Ethernet cable and operate/control the system by sending and receiving commands and response messages between the external device and controller.



### Reference

For details on setting methods for performing Ethernet communication, refer to:

- "6.3 Ethernet Setting (page 6-5)"

## 6.2 Hardware Specifications

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

### Ethernet Communication Specifications

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.

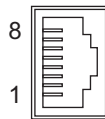
Note that the connected device must support the communication specifications listed below:

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



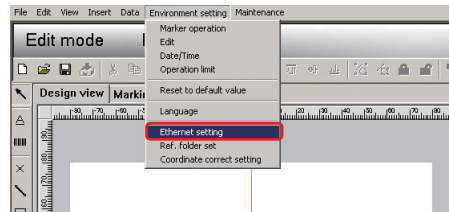
Pin No.	Terminal name	Function
1	TX (+)	Data sent (+)
2	TX (-)	Data sent (-)
3	RX (+)	Data received (+)
4	-	(Not used)
5	-	(Not used)
6	RX (-)	Data received (-)
7	-	(Not used)
8	-	(Not used)

## 6.3 Ethernet Setting

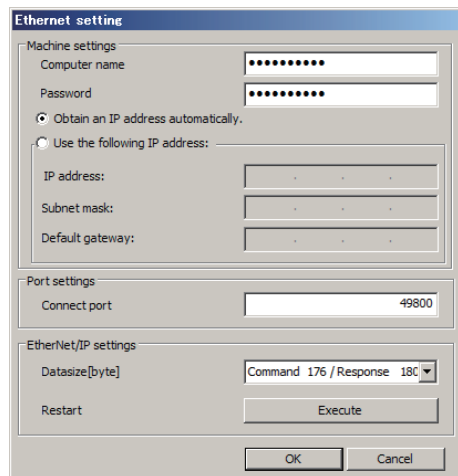
Set the network for using the Ethernet communication.

### ■ Setting procedure

- 1 Click [Environment setting] on the menu bar, and then select [Ethernet setting].  
The [Ethernet setting] dialog box is displayed.

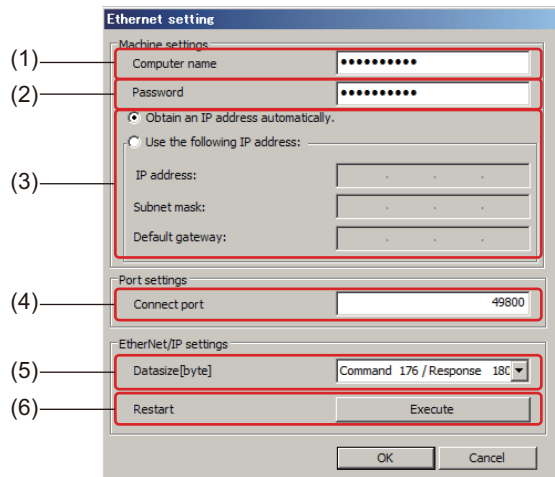


- 2 Set the following items in the [Ethernet setting] dialog box.  
Refer to "■ Setting (page 6-6)"



- 3 When the setting has been completed, click [OK].

## ■ Setting



### ● Machine settings

- (1) Computer name  
Sets the computer name.
- (2) Password  
When necessary, sets the password.
- (3) Obtain an IP address automatically. / Use the following IP address.  
Selects whether to obtain an IP address automatically or to use the set IP address.  
If you selected [Use the following IP address.], set [IP address], [Subnet mask], and [Default gateway].
- (4) Connect port  
Specifies the port numbers for connecting external devices, such as PC or PLC, to this system.  
Default: 49800

### ● EtherNet/IP settings

- (5) Data size  
Select the data size when making a data link over EtherNet/IP.  
Press the OK button to apply the selected data size.



#### Additional Information

- The default setting of MX-Z2000H-V1 Series is 176/180 bytes. However, this can be set to 92/96 bytes to ensure compatibility with MX-Z2000H Series.
- If this parameter is set to 92/96 bytes, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

- (6) Restart  
If MX-Z2000H-V1 Series is connected over EtherNet/IP to a PLC or other controller, this will disconnect the current connection and then reconnect it.



#### Additional Information

For items (1) through (5), press the OK button to apply the setting.  
For item (6), press the Run button to perform an immediate restart.



#### Reference

For the communication command in the Ethernet communication, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)



## 6.4 Reference Folder Setting Function

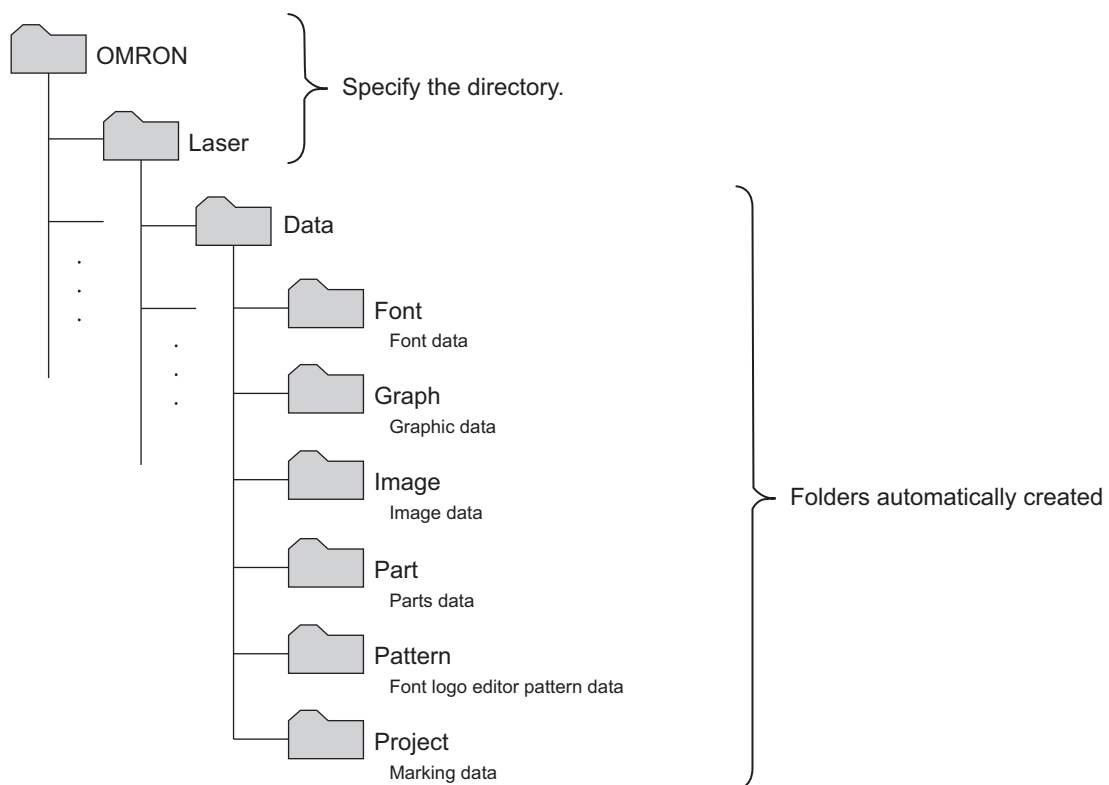
When data is shared via Ethernet communication, the save location of the marking data can be set to the laser marker unit or to any folder on a device connected on the network.

The saved data can be used on the laser marker unit or on any devices connected on the network as shared data.

### Save folder

The laser marker data save folders have the following configuration.

When you specify the directory to create the save folder in, the data folders are automatically created below the "Data" folder in the figure below.



If the "Data" folder already exists in the specified directory and some of the folders are missing, the missing folders are created when the directory is specified.

## Shared files and device-specific files

Data files that can be saved in shared folders can also be shared between devices. Device-specific files are saved in the laser maker unit.

The breakdown of shared files and device-specific files is as follows.

### ■ Shared files

File name	Format
Marking data	***.lmp
Variable data	VariableStringData ***.xml
Date/time variable data	DateTimeData ***.xml
Stroke font	***.osf
Graphic data	***.olg, ***.dxf
Image data	***.bmp
Parts data	***.osp
Pattern data	***.ptn

### ■ Device-specific files

File name	Format
Device settings (position correction values, environmental setting values)	LM.ini
Project counter data	ProjectCounters***.txt
System counter data	SystemCounters.txt
TrueType font	***.ttc, ***.tff
Files related to controller operations (operation logs etc.)	—



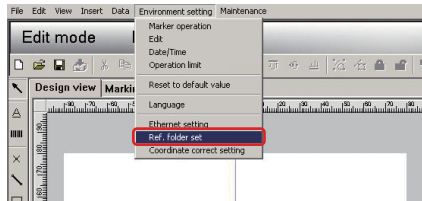
### Reference

For details on each data, refer to:

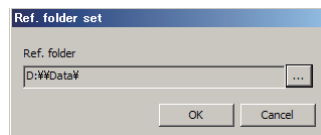
- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

## How to specify reference folder

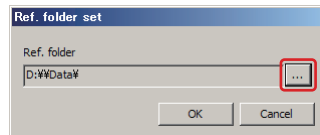
- 1 Click [Environment setting] on the menu bar, and then select [Ref. folder set].



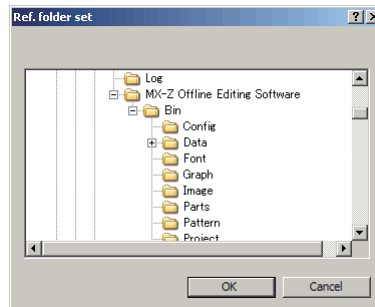
The [Ref. folder set] dialog box is displayed.



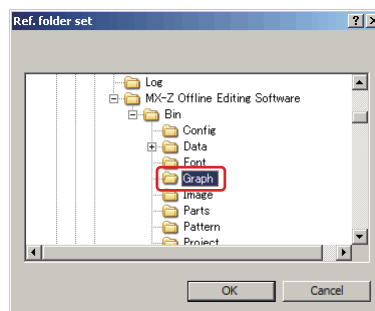
- 2 Click [...].



[Ref. folder set] dialog box is displayed.



- 3 Specify the folder, and then click [OK].





# Chapter 7

## Safety Control via Interlock

In addition to emergency stops via I/O, emergency stops via the interlock terminal can be performed from the external device.

This chapter explains how to connect and control the interlock terminal and external device.

---

7.1	Emergency Stop via Interlock Terminal .....	7-2
7.2	Interlock Connector Specifications .....	7-5
7.3	Hardware Specifications.....	7-6
7.4	Feedback Output Timing Chart .....	7-10

## 7.1 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.

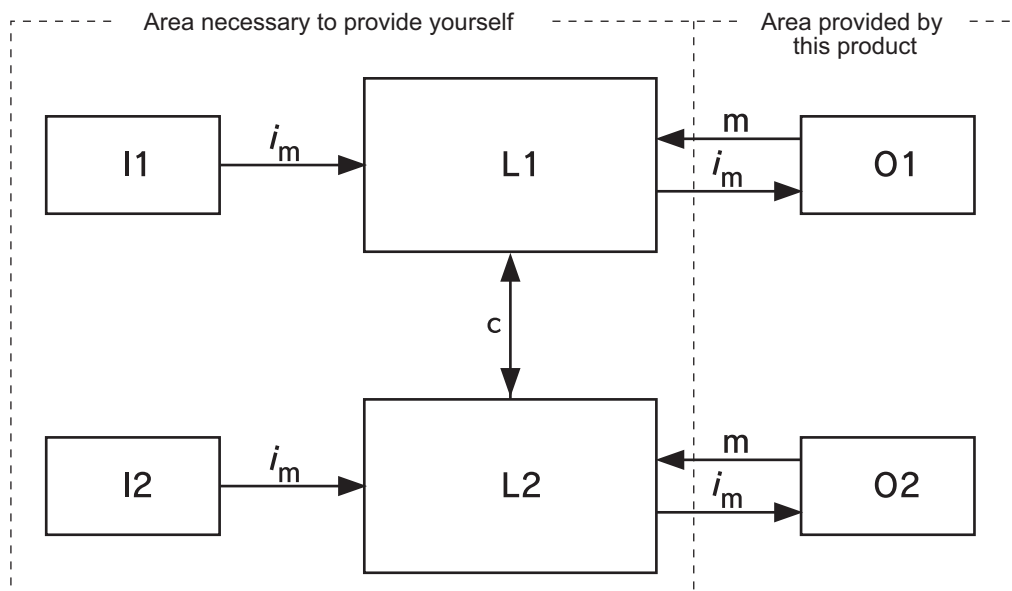
There are PLr (Required Performance Level) and PL (Performance Level). PLr is a performance level required for safety-related parts according to the risk level. PL is the result obtained by assessing the actual validity of the safety-related parts. The MX-Z2000H-V1 series laser markers irradiate Class 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.

### Safety Categories

Below is a conceptual diagram of the elements that constitute reliability of safety-related parts. Systems in safety category 3 or higher transmit one safety function with two channels (I1, L1, O1 and I2, L2, O2) in parallel so that they can stop the laser without fail by mutual diagnosis with the other channel even when a single point of failure (failure in any one location on either channel) occurs.

The interlock terminal of this product is shown on the right-hand side of this diagram. In order to construct a system in safety category 3 or higher, prepare the system indicated on the left-hand side of this diagram and input safety signals to the interlock terminal from the external safety controller.



The lines indicating the monitoring functions represent the logical fault detection possible.

## ■ Explanation of symbols

im: Interconnection diagnosis c: Mutual monitoring

I1, I2: Input device (sensors, etc.) m: Monitoring

L1, L2: Logic processing O1, O2: Output device (main contactor, etc.)

- Interlock devices such as door switches and the emergency stop switch correspond to I1 and I2 in the diagram.

Select and install interlock devices according to ISO 14119 (Interlocking devices associated with guards -Principles for design and selection).

Select and install the emergency stop switch according to ISO 13850 (Emergency stop function - Principles for design).

- Safety controllers, safety relay units, and other internal circuits in category 3 or higher correspond to L1 and L2. Safety controllers and safety relay units certified with performance level d or higher in ISO13849-1 or SIL2 or higher in IEC 62061 have built-in circuits equivalent to L1 and L2 for one redundant safety input (combination of I1 and I2).
- O1 and O2 are built into this product, and an Omron G7SA relay is used.



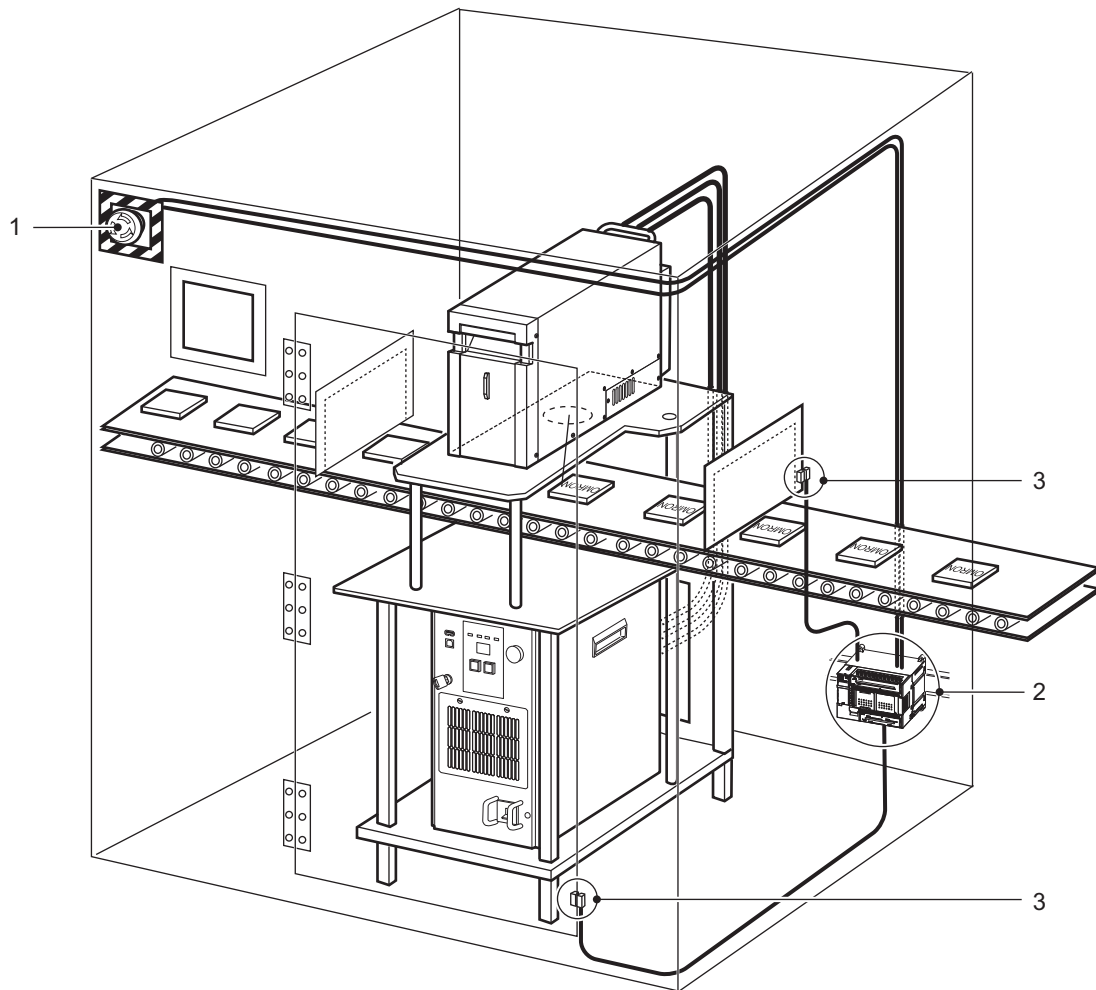
### Precautions for Correct Use

The open/close life of the safety relay is about 5 million times.

If you use this product beyond the open/close life of the safety relay, replace the parts according to "9.2 Parts Replacement (page 9-7)".

### Category 3 Interlock System Construction Example

Indicates an example of a Category 3 interlock system.



No.	Explanation	Control example
1	Emergency stop switch (external installation)	This switch is connected to the safety controller so that safety control is enabled when the switch is pushed.
2	Safety relay, safety controller	These parts connect to the interlock terminal of the controller to perform safety control externally.
3	Safety door switch	This switch is connected to the safety controller so that safety control is enabled when the door is open.



#### Additional Information

When using this product without an interlock terminal, connect an interlock release connector.



## 7.2 Interlock Connector Specifications

### How to connect cables

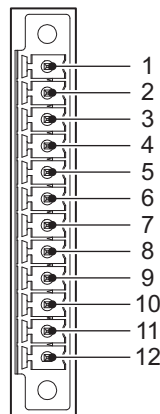
Be sure to attach rod terminals to the cables. (Insertion portion of 0.25 mm<sup>2</sup> to 0.75 mm<sup>2</sup> L=10 mm)

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	



### Additional Information

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



### Precautions for Correct Use

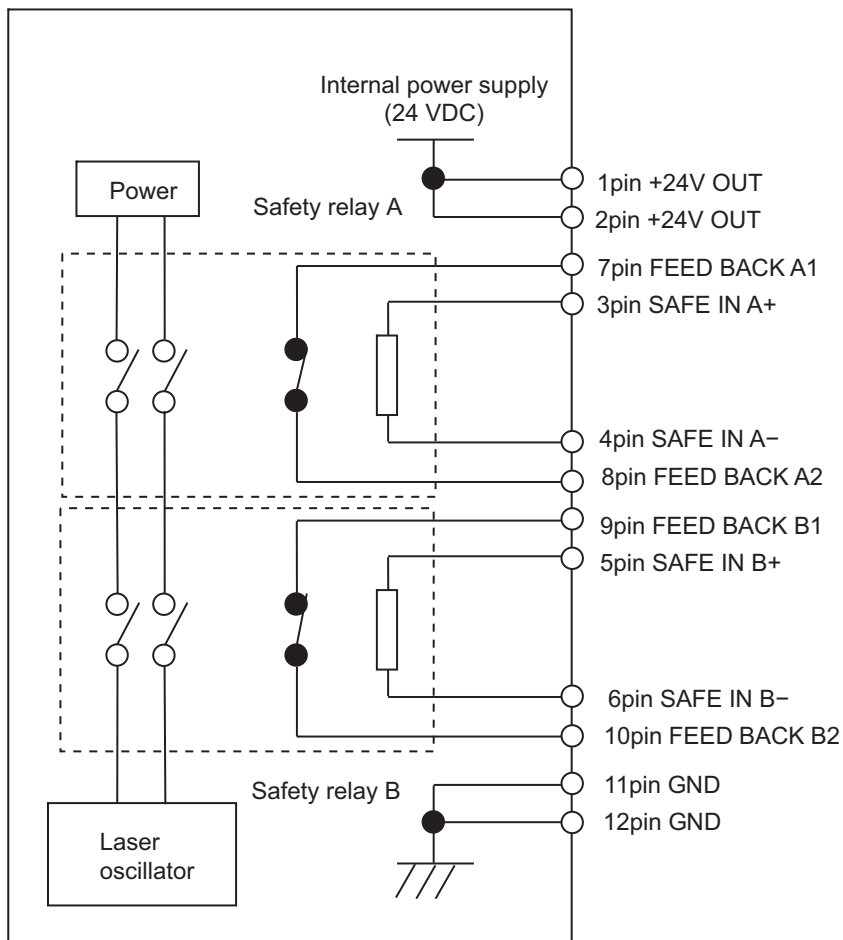
- Make sure to attach the included ferrite core to the wire connected to the interlock connector, at a position roughly within 200 mm from the interlock connector.
- If the cable does not fit in the ferrite core, the external dimension of the cable is too large. Use a cable with a minimum impedance of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

## 7.3 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



#### Precautions for Correct Use

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

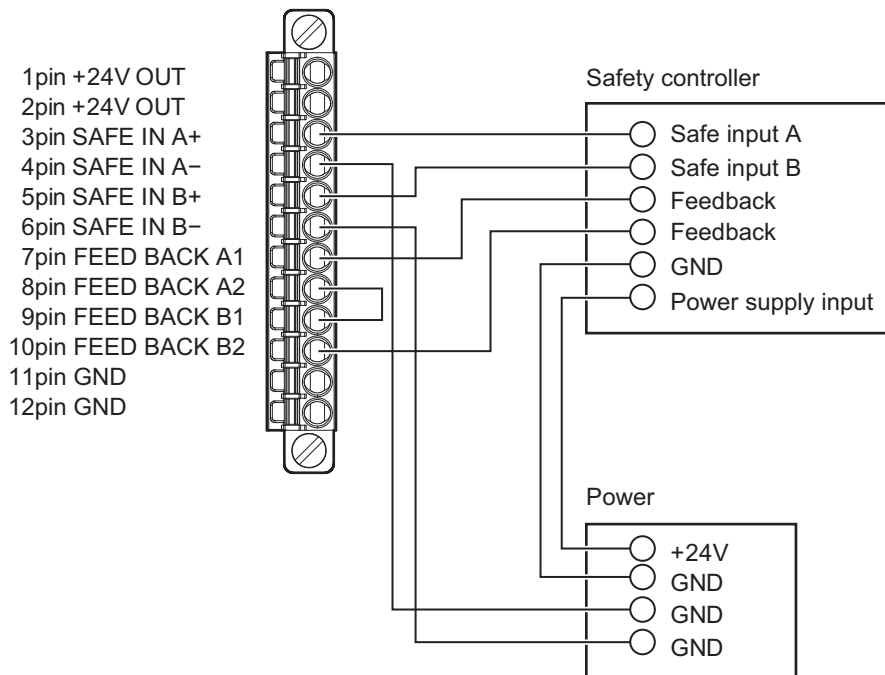
#### Input terminal rating

Item	Terminal no.	Specification value
Safe input A	3-4 pin	Applied voltage: 24 VDC $\pm$ 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

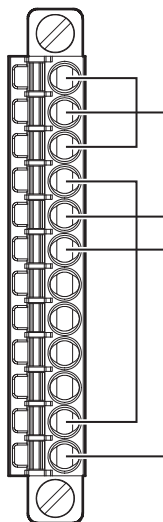
■ Connection example



■ 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

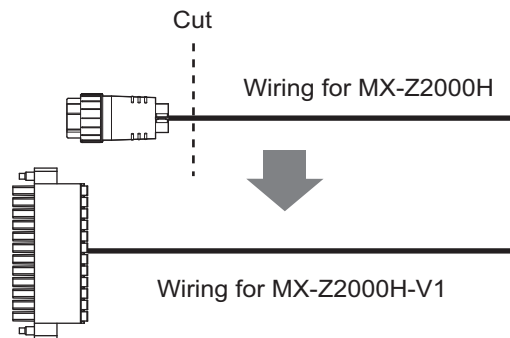
When converting the MX-Z2000H-V1 Series connector to the interlock connector built into the MX-Z2000H Series, perform wiring as shown below.

#### ■ 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.

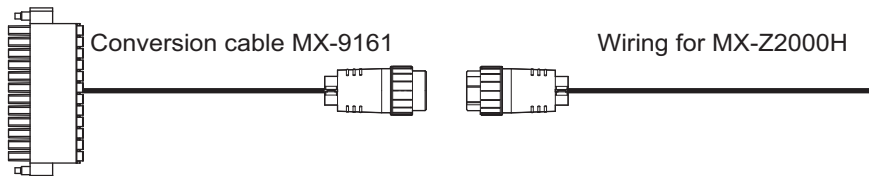
##### ● Method 1

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

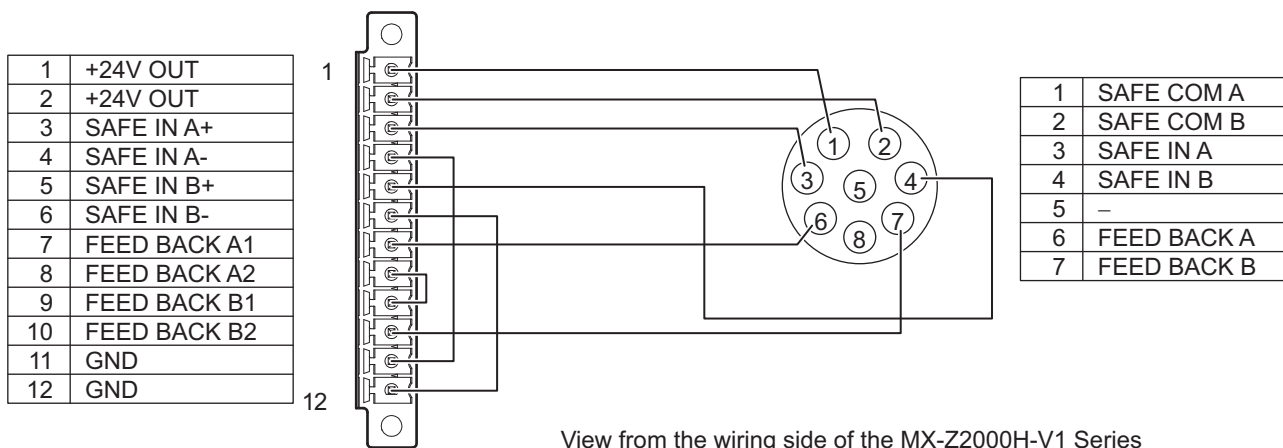
Use a conversion cable MX-9161 to connect the connector for the external device cable to connect to the MX-Z2000H interlock connector with the connector for the external device cable to connect to the MX-Z2000H-V1 Series interlock.



#### Additional Information

Conversion cables can also be made using the following products.

- Phoenix Contact FMC1.5/12-STF-3.5 (Insertion portion: 0.25 mm<sup>2</sup> to 0.75 mm<sup>2</sup> 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 mm<sup>2</sup>)



## ■ 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.

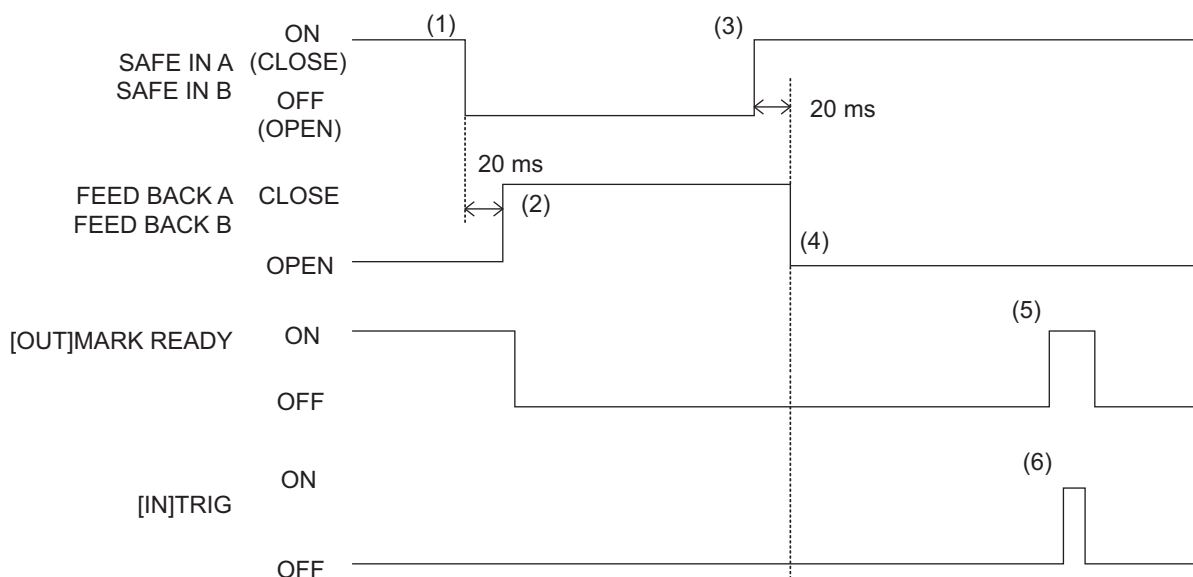
Marker operation when safety relay switches from CLOSE to OPEN

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."

## 7.4 Feedback Output Timing Chart

This timing chart illustrates the process when marking is possible, from inputting a signal to the interlock terminal and cutting off excitation voltage for the laser, to performing the next marking operation.



[Explanation of operation]

1. When [SAFE IN A]/[SAFE IN B] are turned OFF, the safety relay switches OPEN (1) and the excitation voltage for the laser is cut off. Make sure to turn OFF [SAFE IN A]/[SAFE IN B] at the same time.
2. The externally connected safety controller or other device reads the [FEED BACK A]/[FEED BACK B] status (2), and confirms that the excitation voltage for the laser has been cut off.
3. After the work to process has been prepared and the device has finished preparations for marking, when [SAFE IN A]/[SAFE IN B] are turned ON (3), the excitation voltage for the laser is also turned ON. Make sure to turn ON [SAFE IN A]/[SAFE IN B] at the same time.
4. The externally connected safety controller or other device reads the [FEED BACK A]/[FEED BACK B] status (4), and confirms that the excitation voltage for the laser is ON.
5. It next confirms that the [MARK READY] signal is ON (5).
6. Finally, it inputs the [TRIG] signal (6).



### Precautions for Correct Use

- When [SAFE IN A]/[SAFE IN B] are turned ON (CLOSE) for the first time after the marker power supply is started, an operation preparation time of approximately five seconds is required from when [FEED BACK A]/[FEED BACK B] turn OFF (OPEN) until [MARK READY] turns ON.
- The [MARK READY] signal in the timing chart shows operation when [STOP] signal operation switching control is set to "OFF" in the marker software.
- If [STOP] signal operation switching control is set to "ON" in the marker software, insert a wait time of 200 ms from the [FEED BACK A]/[FEED BACK B] signals switching to OPEN, before inputting the [TRIG] signal.
- The response time of each signal varies depending on the settings of the laser marker. Please confirm with the settings to be used before actual operation.

When replacing the MX-Z2000H series with the MX-Z2000H-V1 series, response time may be longer depending on the settings. Please check in the same way.

# Chapter 8

## Functions via Controller Operation

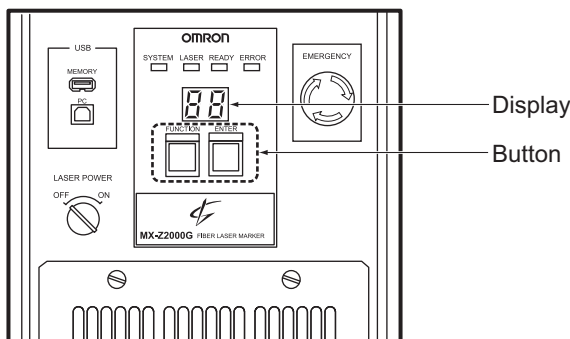
This chapter explains the functions that can be performed using the buttons on the controller when no monitor or keyboard is connected.

---

8.1	What You Can Do via Controller Operation.....	8-2
8.2	Basic Operating Procedure .....	8-3
8.3	Operation Example.....	8-7

## 8.1 What You Can Do via Controller Operation

When no monitor or keyboard is connected, you can operate the buttons on the controller to enable/disable marking, install marking data from a USB memory, and so on.



### Additional Information

When performing controller operations, the marker software must be put into operation mode. Before performing an operation, check that the software is in operation mode. (Refer to "Switching to Operation Mode (page 3-40)")

The functions that can be performed via controller operation are explained below.

#### ■ Enabling/disabling marking

Switches enabling (marking ready ON, display: [01])/disabling (marking ready OFF, display: [00]) marking.

#### ■ Installing the marking data

Marking data in the root folder of a USB memory can be installed to the controller. This function is available only when marking is disabled (marking ready OFF, display: [00]).



### Additional Information

To install via controller button operation any marking data that has been created/edited with the offline editing software, the marking data must be saved to the root folder of a USB memory beforehand.

#### ■ Saving the maintenance log

You can write a maintenance log of the maintenance tasks performed and save the log in the USB memory.

The following types of logs can be saved:

- Operation history
- Error history, etc.



## 8.2 Basic Operating Procedure

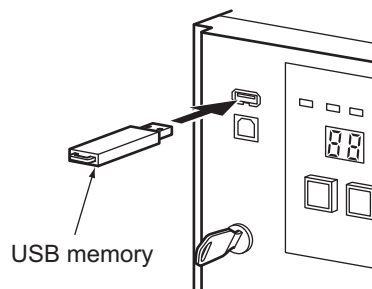
To perform each function via controller operation, select/confirm the function number corresponding to the function using buttons.

Function	Function No.
Not specified (Nothing is done)	F0
Switches from marking disabled to marking enabled (marking ready ON) *1	F1
Switches from marking enabled to marking disabled (marking ready OFF) *1	F2
Installs marking data from a USB memory*2	F3
Saves maintenance logs to a USB memory	F4

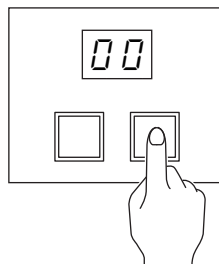
\*1 To enable marking, the system must be running, laser power must be ON, and shutter must be open.

\*2 To install marking data from a USB memory, you must "Switches from marking enabled to marking disabled" (F2) to disable the marking. (Refer to "8.3 Operation Example (page 8-7)".)

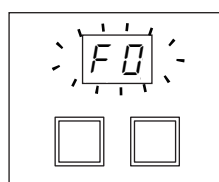
- 1 To use the "Installs marking data from a USB memory" (F3) or "Saves maintenance logs to a USB memory" (F4) function, insert a USB memory to the [MEMORY] connector on the controller.



- 2 Press and hold the [ENTER] button.



The system switches to the controller operation mode and [F0] (function number) blinks on the display.(Function selection mode)

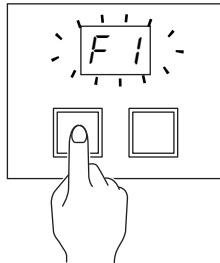




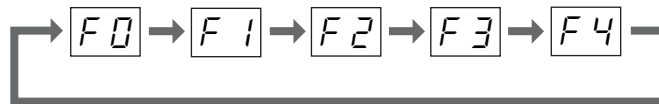
### Precautions for Correct Use

Take note that, if buttons are not operated for a specified period after switching to the controller operation mode, the system automatically returns to the normal mode.

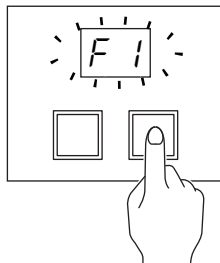
### 3 Press the [FUNCTION] button and select a desired function.



Every time the button is pressed, the function number shown on the display changes as follows.



### 4 Press the [ENTER] button.

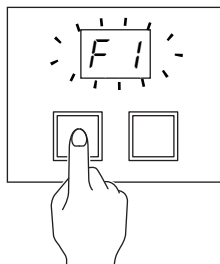


The displayed function number stops blinking and stays lit, indicating that the selected function has been confirmed.

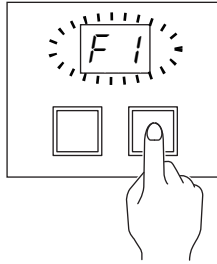


### Additional Information

To cancel the confirmed function, press the [FUNCTION] button. The displayed function number blinks and the system returns to the original mode (function selection mode).

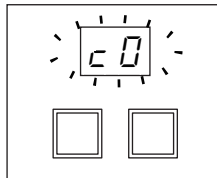


## 5 Press the [ENTER] button.



The displayed function number blinks quickly and the selected function is executed.

If the function was performed successfully, [c0] is displayed and then the system returns to the normal mode.

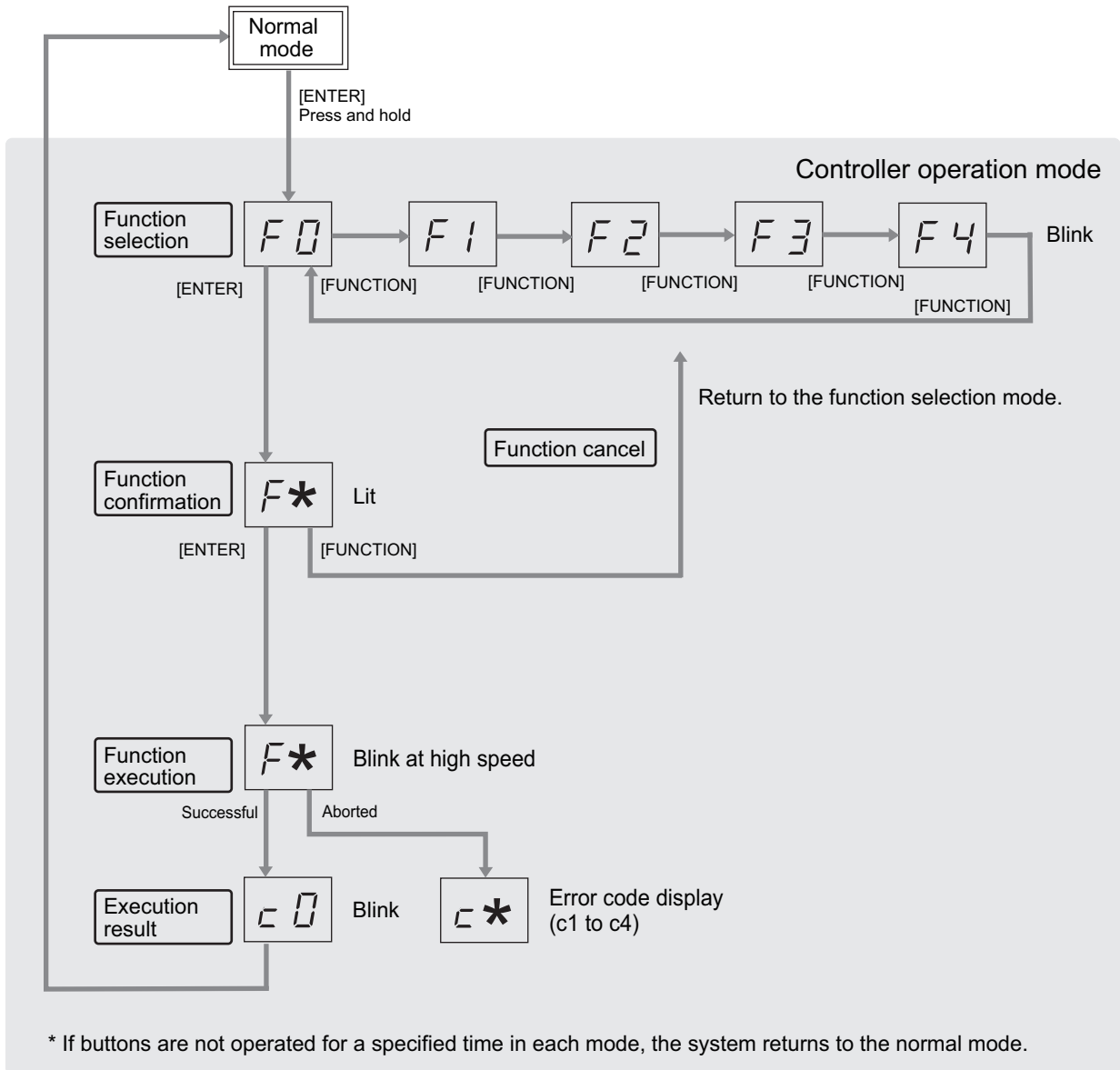


If an error occurred while the function was being performed, an error code ([c1] to [c4]) is displayed.

In this case, take a remedial action according to the table below.

Display	Meaning	Description and action
c1	USB error	No USB memory is connected to the [MEMORY] connector on the controller. Connect a USB memory.
c2	Copy error	An error occurred copying the marking data. Check if the marking data in the USB memory is correct.
c3	Inspection error	This is a maintenance error. It is not displayed in normal conditions.
c4	Mode error	To use the "Installs marking data from a USB memory" (F3) function, perform the "Switches from marking enabled to marking disabled" (F2) function to disable marking first. (Refer to "8.3 Operation Example (page 8-7)".)

■ Operation flow diagram



## 8.3 Operation Example

This section explains how the "Installs marking data from a USB memory" (F3) function can be used as an example of controller operation without connecting a monitor, keyboard or mouse.

Note that if the controller is currently marking-enabled (marking ready ON, display: [00]), the "Switches from marking enabled to marking disabled" (F2) function must be used to make the controller marking-disabled (marking ready OFF) before performing this function.

- 1 **Save marking data created/edited using the offline editing software, to the root folder of a USB memory, and then remove the USB memory from the PC.**

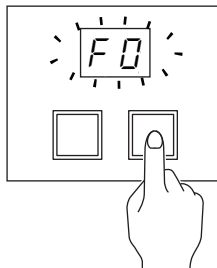


### Reference

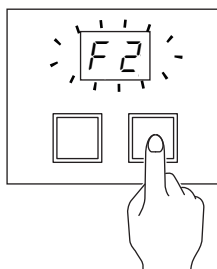
For details on offline editing software, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

- 2 **Insert the USB memory containing the marking data to the [MEMORY] connector on the controller.**
- 3 **Press and hold the [ENTER] button to switch to the controller operation mode.**

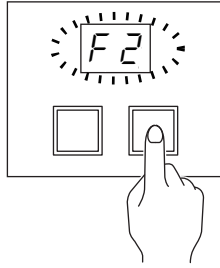


- 4 **If the controller is currently marking-enabled, press the [FUNCTION] button twice until [F2] is displayed, and then press the [ENTER] button.**

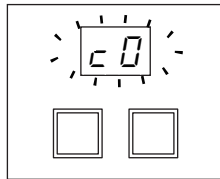


The "Switches from marking enabled to marking disabled" (F2) function is confirmed.

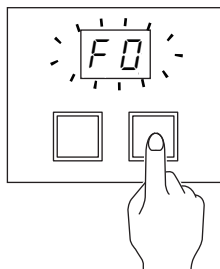
- 5 Press the [ENTER] button to perform the function.**



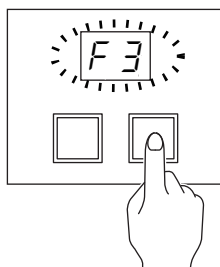
If the function was performed successfully, [c0] is displayed for several dozen seconds and then the system returns to the normal mode.



- 6 Press and hold the [ENTER] button again to switch to the controller operation mode.**



- 7 [Press the [FUNCTION] button three times until [F3] is displayed, and then press the [ENTER] button.**

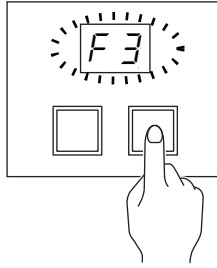


The "Installs marking data from a USB memory" (F3) function is confirmed.



#### **Additional Information**

When the marking data is installed, any marking data currently saved in the controller is overwritten.

**8 Press the [ENTER] button to perform the function.**

If the function was performed successfully, [c0] is displayed for several dozen seconds and then the system returns to the normal mode.

If necessary, use the "Switches from marking disabled to marking enabled" (F1) function to make the controller marking-enabled.





# Chapter 9

## 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.

---

9.1	Cleaning .....	9-2
9.2	Parts Replacement.....	9-7
9.3	Safety Inspection.....	9-14

## 9.1 Cleaning

If the system is dirty, marking may not be performed properly or the system may fail. Clean the system periodically according to the description below.

### Locations to be Cleaned

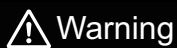
#### ■ Marker head

- Cover glass
- Fan duct
- Fan base (backside) and heat sink

#### ■ Controller

- Filter panel
- Air filter

### Cleaning Method



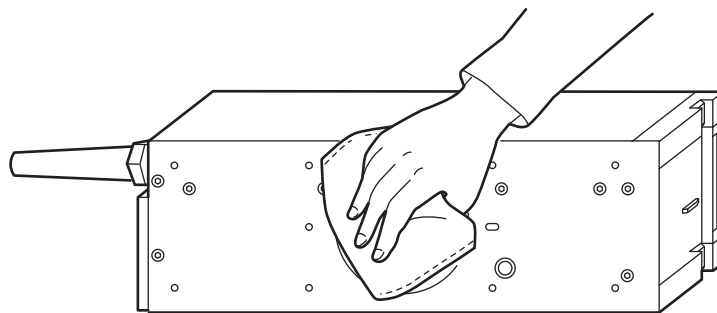
#### Warning

Be sure to perform cleaning with the power supply turned OFF. If the power supply is ON, electric shocks may result.

#### ■ Marker head

##### ● Cover glass

Gently wipe the surface of the cover glass with ethanol to remove soiling.



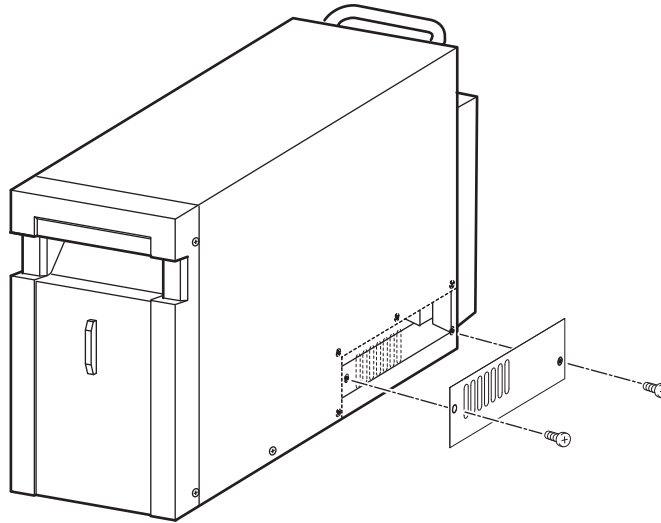
#### Precautions for Correct Use

- When wiping the cover glass, make sure laser irradiation is stopped.
- Never use any other solvent other than ethanol. Use of a dry cloth or volatile solvent may scratch the glass or cause the coating to peel.

- **Fan duct**

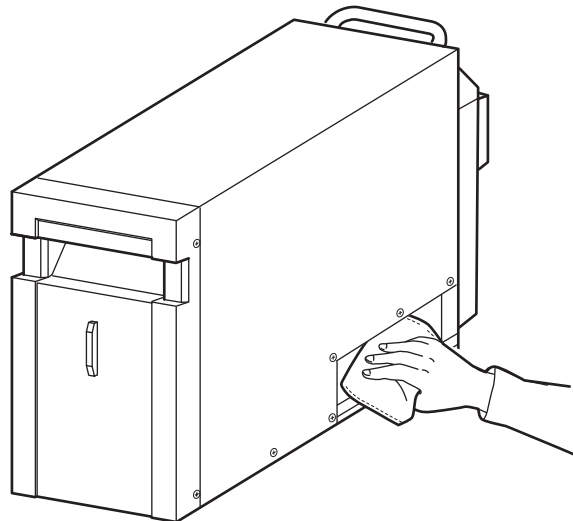
Remove the duct cover and clean the inside according to the following procedures.

- 1 Remove the screws (2 locations) and duct cover.**



- 2 Wipe off any dirt inside the duct with a dry cloth.**

If there is a large amount of dirt, wipe with a well-wrung cloth.



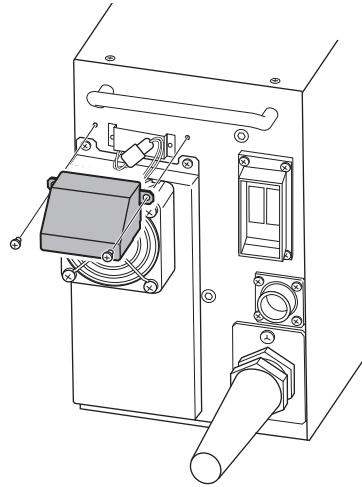
- 3 Put the duct cover back in place.**

Tighten the screws to the torque of 0.48 N·m.

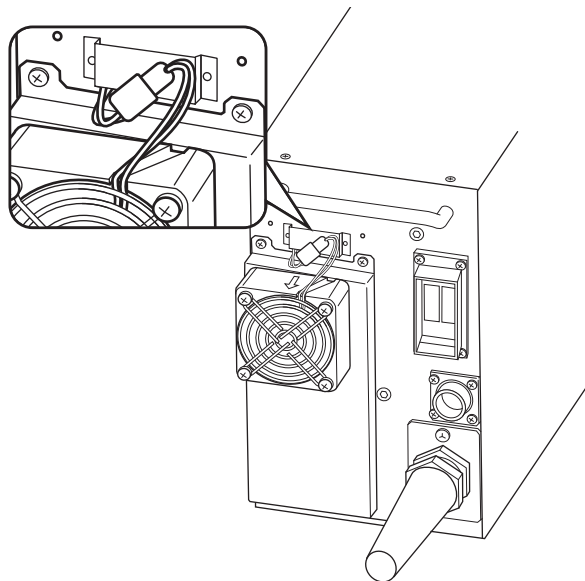
● **Fan base (backside) and heat sink**

Remove the fan base and clean the backside according to the following procedures. Also, clean the heat sink at the back of the head.

**1 Remove the screws (2 locations) and cable cover.**



**2 Remove the fan cable connector.**



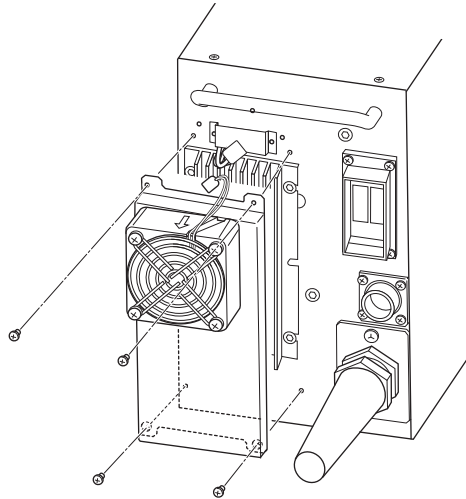
**Additional Information**

---

Directly hold the connector when disconnecting and connecting the connector. If excessive force is applied to the cable, it may cause an open circuit, etc.

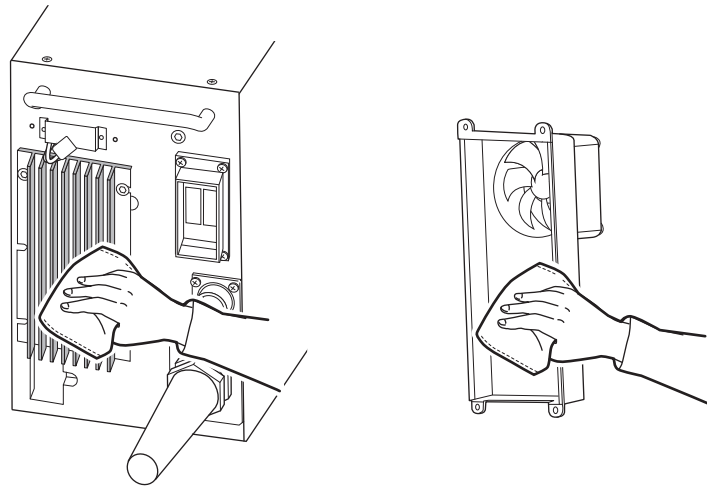
---

**3 Remove the screws (4 locations) and fan base.**



**4 Check the back of the fan base and heat sink of the marker head for dirt. Clean any dirty areas with a dry cloth.**

If there is a large amount of dirt, wipe with a well-wrung cloth.



**Additional Information**

Do not remove the heat sink when cleaning parts.

**5 Put the fan base back in place and secure it with the screws (4 locations).**

Tighten the screws to the torque of 0.63 N·m.

**6 Connect the fan cable.**



**Additional Information**

Directly hold the connector when disconnecting and connecting the connector. If excessive force is applied to the cable, it may cause an open circuit, etc.

**7 Put the cable cover back in place and secure it with the screws (2 locations).**

Tighten the screws to the torque of 0.48 N·m.

## ■ Controller

### ● Filter panel

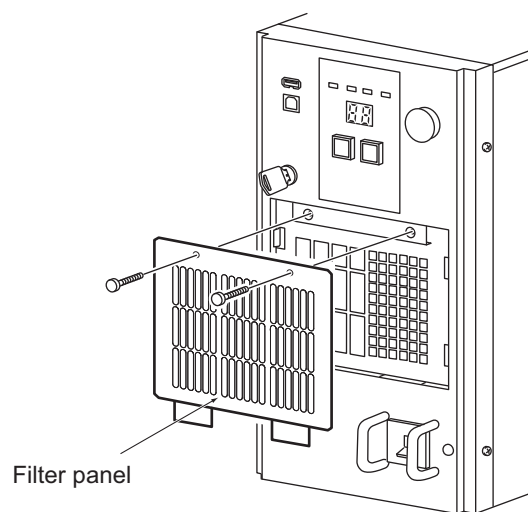
Wipe with a dry, soft cloth.

To remove stubborn soiling, moisten a cloth with amply diluted neutral detergent, wring the cloth tightly, and use the wringed cloth to wipe the soiled area.

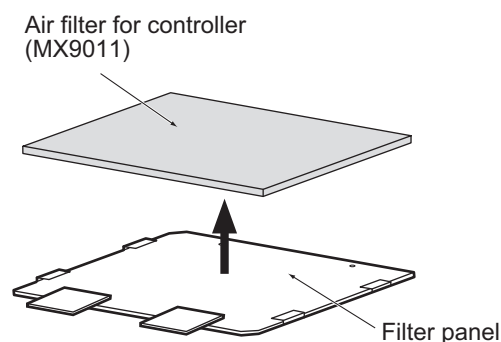
### ● Air filter

If the air filter is dirty, sufficient ventilation cannot be achieved, causing the internal temperature of the controller to rise abnormally and system to fail. Be sure to clean the air filter periodically by following the procedure below.

- 1 Remove the screws (2 locations) on the front face of the controller and take out the filter panel.**



- 2 Remove the filter from the filter panel, soak the filter with neutral detergent and rinse with water, and then let the filter dry naturally in shade.**



### Precautions for Correct Use

- Be careful not to break the filter.
- Do not dry the filter under the direct sunlight.
- Make sure the filter is dry when installed.
- Make sure the system is turned OFF when the filter is removed or installed. If the system power is ON when you remove or install the filter, you may hurt your hand.

- 3 Set the filter to the filter panel as before, and install the filter panel in the controller.**

## 9.2 Parts Replacement

This system uses parts that must be replaced periodically. Replace these parts correctly as specified below.

### Parts to be Replaced

The system uses the following parts that need to be replaced.

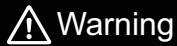
Part name	Model/specification	Application	Replacement guideline
Air filter for controller	MX-9011	Dust-proofing inside the controller	<ul style="list-style-type: none"> <li>Dust or soiling is attached and does not come off after cleaning</li> <li>Broken</li> </ul>
Button battery	CR2032 by Panasonic Voltage: 3 V	Battery for internal clock	Recommended replacement interval: Every 4 years
For MX-Z2000H series fan for controller*1	MX-9023	Controller cooling	Recommended replacement interval: Every 7 years
For MX-Z2000H series fan for marker head*1	MX-9022	Marker head cooling	Recommended replacement interval: Every 4 years
For MX-Z2000H series cover glass*1	MX-9031	Double protection at laser irradiation port	<ul style="list-style-type: none"> <li>Dust or dirt is attached and does not come off after cleaning</li> <li>Cracked</li> </ul>
For MX-Z2000H series cover glass bracket (W)*1	MX-9034	Fastening cover glass	–
Safety relay	G7SA-2A2BDC24	Safety relay for interlock connector	See the part data sheet.
Marker head power supply cable	MX-9410	Power supply from the controller to the marker head	<ul style="list-style-type: none"> <li>When the cable appearance is cracked or damaged</li> <li>When disconnection</li> </ul>
Marker head control cable	MX-9411	Control signal transmission between controller and marker head	<ul style="list-style-type: none"> <li>When the cable appearance is cracked or damaged</li> <li>When disconnection</li> </ul>

\*1 The same part is used for both MX-Z2000H Series and MX-Z200H-V1 Series.

#### Precautions for Correct Use

Be sure to use replacement parts meeting the above specifications. Use of a part not meeting the applicable specification may cause the system to fail. If you have any question, contact OMRON.

## Replacement Method



### Warning

Be sure to replace parts with the power supply turned OFF. If the power supply is ON, electric shocks may result.

#### ■ Air filter

Remove and replace the air filter by following the same procedures for cleaning (Refer to "● Air filter (page 9-6)").

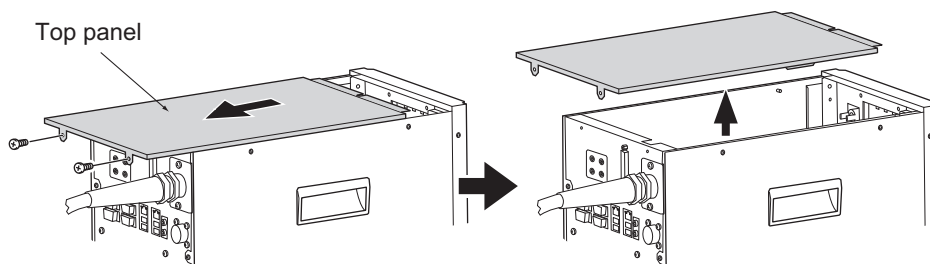
#### ■ Button battery



#### Precautions for Correct Use

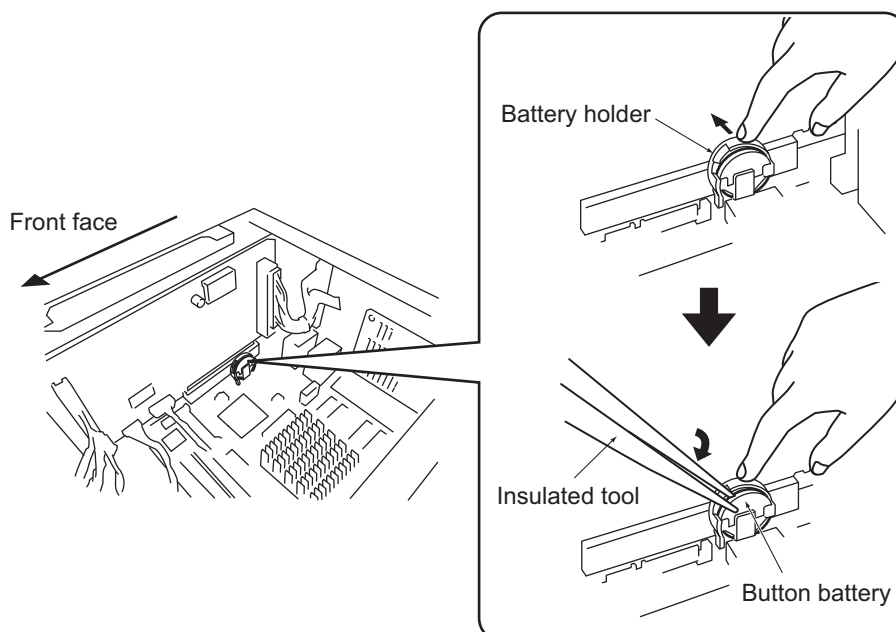
The button battery is used for the controller's internal clock. The current date/time setting is reset when this battery is removed. Accordingly, be sure to set date/time using the marker software after replacing the battery.

- 1 Remove the screws (2 locations) on the rear face of the controller and slide the top panel to remove.**



- 2 Remove the button battery from the battery holder.**

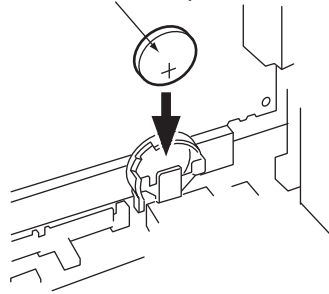
Pinch the battery using an insulated tool to remove the battery while gently press the battery folder.





### 3 Insert a new button battery in the battery holder.

Polarity: The front side represents +.



**Warning**

Insert the battery by making sure it is oriented for the correct polarities.



#### Precautions for Correct Use

- Insert the battery carefully without dropping.
- When disposing of the laser marker within the EU, remove the battery and dispose of it according to the EU battery directive (2013/56/EU).
- The used button battery must not be disposed of as general unburnable waste, but it should be brought to a recycle shop near you.



廢電池請回收

### 4 Install the top panel as before.

### 5 Start the controller and set date/time using the marker software.



#### Reference

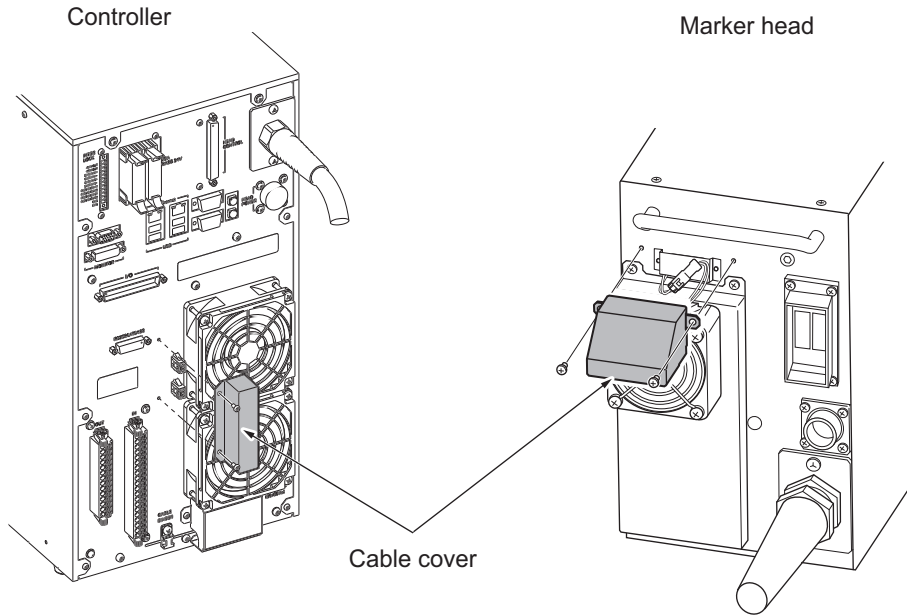
For information on how to set date/time, refer to:

- "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416)

■ Fan

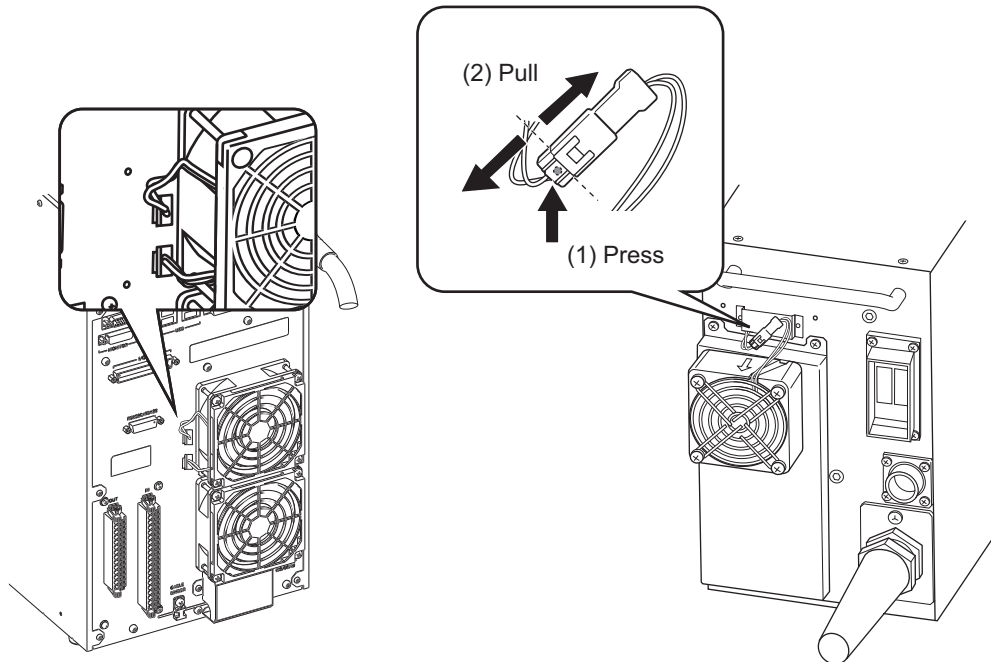
There are two internal cooling fans behind the controller and one behind the marker head. Replace the fans according to the following procedures.

- 1 Remove the screws (2 locations each) from behind the controller and marker head and remove the cable cover.**



- 2 Remove the fan cable connectors.**

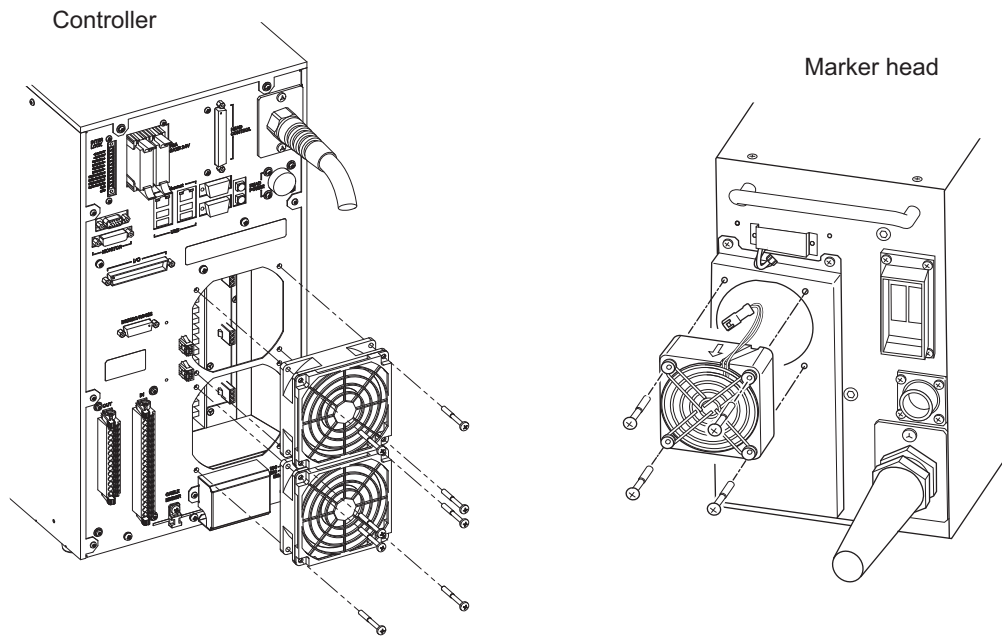
There are two connectors for the controller and one for the marker head.



**Additional Information**

Directly hold the connector when disconnecting and connecting the connector. If excessive force is applied to the cable, it may cause an open circuit, etc.

- 3** While holding the fan by hand, remove the screws (4 locations for each fan), and then remove the fan.



- 4** Install a new fan and secure it with the screws (4 locations for each fan).

Install the fan guard together with the fan.

Tighten the screws to the torque of 0.63 N·m.



#### Additional Information

The controller takes in air from the front side and exhausts it from the rear side. Place the fan so that the label sticking side is on the outside.

Also, arrange the upper fan cable of the controller so that it is pulled out from the connector side of the marker body. Arrange the lower fan so that the cable is pulled out from between it and the upper fan.

- 5** Connect the fan cable connectors.

There are two connectors for the controller and one for the marker head.



#### Additional Information

Directly hold the connector when disconnecting and connecting the connector. If excessive force is applied to the cable, it may cause an open circuit, etc.

- 6** Put the cable cover back in place and secure it with the screws (2 locations for each cover).

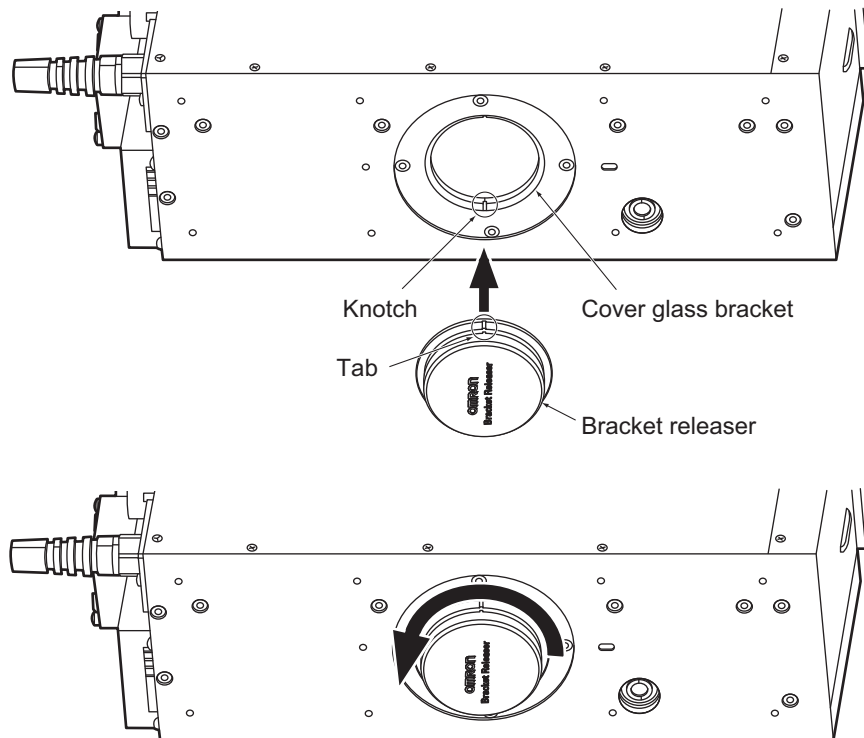
Tighten the screws to the torque of 0.48 N·m.

## ■ Cover glass

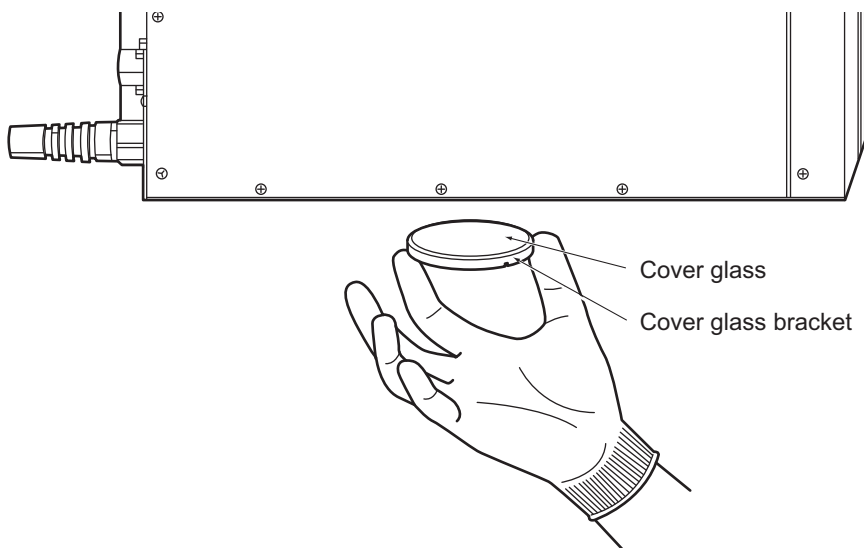
When dirt on the cover glass surface does not come off or the cover glass is cracked, replace the cover glass.

The cover glass on this product has a double-pane construction. The outer pane can be replaced. Follow the procedure below to replace the cover glass using the optional cover glass MX-9031 and bracket releaser MX-9032.

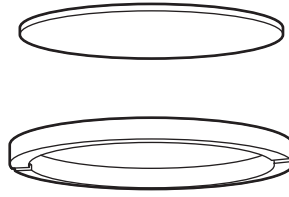
- 1** Wear gloves so as not to dirty the cover glass.
- 2** Align the tab on the bracket releaser (optional) with the notch on the cover glass bracket (hereinafter bracket). While securely fastening them together, turn the bracket releaser to loosen the bracket.



- 3** Further loosen the bracket by hand. The cover glass comes off on the bracket. Do not tilt the bracket after removing the cover glass so that the cover glass does not fall off.



- 4 Check that the cover glass to be installed is not dirty and place it on the bracket.



- 5 Lightly tighten the bracket by hand. At this time, check that the surface of the cover glass bracket is inserted further than the bottom surface of the marker.
- 6 Tighten the bracket in the same manner as described in step 2.



#### Precautions for Correct Use

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Securely tighten the cover glass bracket so that it does not get loose during operation.

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## 9.3 Safety Inspection

Perform safety inspection so that this system can be used in a safe condition.

Particularly when the system is used in a hot, humid environment or dusty environment, perform inspection regularly.

### Equipment Required for Inspection

- Thermometer
- Hygrometer
- Phillips screwdriver

### Inspection Method

Inspect the following items to see if they meet the specified judgment criterion.

If the judgment criterion is not met, improve the ambient environment and connections until the criterion is met.

Inspection item	Inspection detail	Inspection method	Judgment criteria
Environment	Is ambient temperature appropriate?	Temperature measurement	0 to 40 °C
	Is ambient humidity appropriate?	Humidity measurement	35 to 85%
	Is dust deposited on the panel?	Visual check	There shall be no deposit of dust.
Connector cable	Is the cable connector inserted all the way to the end?	Visual check	There shall be no looseness or detachment.
	Is the connector screw loose?	Screwdriver	There shall be no looseness.
	Is the cable about to break?	Visual check	No abnormality shall be found on the exterior.
Safety function	Emergency stop switch	I/O test <sup>*1</sup>	I/Os shall turn ON/OFF correctly.
	key switch	I/O test <sup>*1</sup>	I/Os shall turn ON/OFF correctly.
	Emergency stop input (2 circuits)	I/O test <sup>*1</sup>	I/Os shall turn ON/OFF correctly.
	Shutter control input (2 circuits)	I/O test <sup>*1</sup>	I/Os shall turn ON/OFF correctly.
	Laser warning indicator	Visual check	The display color shall change correctly <sup>*2</sup> .

<sup>\*1</sup>For details on I/O test, refer to "Fiber Laser Marker MX-Z2000H-V1 series User's Manual" (Z416).

<sup>\*2</sup> For the display color of the laser warning indicator, refer to "Laser warning indicator (page 18)".

# Chapter 10

## What to Do in Case of Abnormality

This chapter explains how to take remedial actions when abnormalities occur during operation.

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10.1	Operational Abnormality and Actions .....	10-2
10.2	Error Messages .....	10-7

## 10.1 Operational Abnormality and Actions

Key operational abnormalities of this system and actions to be taken to address these abnormalities are shown. Take remedial actions correctly by referring to the table below.

Phenomenon	Cause	Action	Reference page
The system does not start. • The [POWER] lamp does not turn ON. • The [SYSTEM] LED does not turn ON.	The controller power supply cable is not connected correctly.	Check the cable connection.	2-21
	The breaker is turned OFF.	Check the breaker.	3-5
The marker head does not start. • The laser warning indicator does not turn ON. • The [LASER] LED does not turn ON.	The marker head connection cable or marker head power supply cable is not connected correctly.	Check the connection of each cable.	2-20
	The key switch is turned OFF.	Check the key switch.	3-6
The [READY] LED does not turn ON when starting.	The system is not in the operation mode.	Switch to the operation mode using the marker software. (When a monitor is connected) Or, set the startup operation mode to [Operation mode] and restart the system. (This is set on the [Start setting] tab of the [Marker operation setting] dialog box opened from [Environment setting] on the menu bar.)	3-40 User's Manual
Marking is not enabled. • [01] or [11] is not shown on the display. • The [MARK READY] (marking ready output) does not turn ON.	The emergency stop switch ([EMERGENCY] button) is turned ON.	Check the switch.	2-6
	[EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) is open (when controlled via I/O communication control).	Short-circuit [EMERGENCY A]/[EMERGENCY B] (Pins No. 15 and 17, and 16 and 17) on the input terminal block.	4-13
	The key switch is turned OFF.	Check the key switch.	3-6
	[LASER ON] (laser control input) is turned OFF (when controlled via I/O communication control).	Turn ON [LASER ON] (Pin No. 13) on the input terminal block.	4-13
	AmSHUTTER A]/[SHUTTER B] (shutter control input A/B) is turned OFF (open) (when controlled via I/O communication control).	Turn ON (short-circuit) [SHUTTER A]/[SHUTTER B] (Pins No. 10 and 12, and 11 and 12) on the input terminal block.	4-13
	The "Open the shutter" command is not yet sent (when controlled via serial communication).	Send the "Open the shutter" command.	User's Manual
	[STOP] (marking stop input) is turned ON (when controlled via I/O communication control).	Turn OFF [STOP] (Pin No. 9) on the input terminal block.	4-13
	The "End Edit" command is not yet sent after the "Start Edit" command was sent (when controlled via serial communication.)	Send the "End Edit" command.	User's Manual
	The specified marking data is not open.	Check if the specified marking data can be opened.	3-42
The system is not operating/operation is not performed.	Switch to the operation mode using the marker software. (When a monitor is connected) Or, press the function button "F1."	3-40 8-3	



Phenomenon	Cause	Action	Reference page
Operation dose not start.	The startup operation mode is not "Operation."	Select [Environment setting] from the menu bar and open the [Marker operation setting] dialog box. On the [Start setting] tab, set the startup operation mode to [Operation mode].	User's Manual
	There is no marking data to use when the operation mode is selected by a startup setting or button operation.	Check the specified marking data.	3-42
The work cannot be marked.	The working distance is out of the specified range.	Check the installation position of the marker head and make sure the working distance falls within the specified range (MX-Z2000H-V1: $170 \pm 10$ mm / MX-Z2050H-V1/Z2055H-V1: $220 \pm 10$ mm).	2-15
	The correction value for Z coordinate is not set to an appropriate value on the [Position correction] dialog box opened from [Maintenance] on the menu bar.	Check and adjust the set value.	3-30
	[X correction]/[Y correction]/[Z correction] are not set to appropriate values on the [Position] tab opened from [Common setting] of marking data.		
	The correction values for X coordinate/Y coordinate are not set to appropriate values on the [Position correction] dialog box opened from [Maintenance] on the menu bar.	Adjust the set values by checking the work position and marking position using the guide laser.	3-30
	The X coordinate/Y coordinate are not set to appropriate positions on the [Form/Position] tab of the properties dialog box of each marking data block.		
	The X coordinate/Y coordinate are not set to appropriate positions on the [Pallet] tab opened from [Common setting] for marking data.		
	The laser power and processing speed are not set to appropriate values. • [Laser/Scan] tab opened from [Common setting] for marking data • [Laser/Scan] tab of the properties dialog box of each marking data block	Check the set value.	User's Manual
	Focus control is not performed correctly.	Decrease the set values of processing speed and moving speed. Thereafter, perform home seek.	User's Manual
The cover glass is dirty.	Visually check the cover glass for soiling. If the glass is dirty, gently wipe with ethanol.	9-2	

Phenomenon	Cause	Action	Reference page
Marking is unstable.	The marker head is not fixed.	Check if the marker head is installed properly.	2-16
	The work or system is vibrating.	Check the surroundings for existence of any vibration source and implement vibration-proofing measures.	–
	The work is not stationary.	Check if the work becomes stationary when marking is performed.	–
	Temperature changes significantly (especially when the processing requires greater fineness/accuracy).	Check for sudden temperature change. Select [Maintenance] from the menu bar, and then select to perform [Warm up].	User's Manual
	The material of work has changed.	Changing the material of work may affect the processing.	–
	Check that the cable is connected correctly. Also, check that there are no transformers or other noise sources near the main unit or wiring routes.	Check the cable wiring.	–
I/O communication cannot be performed correctly with the external device.	The communication cable is not connected correctly.	Check the cable connection.	2-25
	The connector is not wired correctly or making a poor contact.	Check the connector wiring. Use the recommended connector.	4-12 to 4-16
	The NPN/PNP connection is wrong.	Check the wiring of the terminal block and the [COM IN]/[COM OUT] terminal of the I/O connector.	4-12 to 4-16
	The signal input is wrong.	Select [Maintenance] from the menu bar and conduct an I/O test in the [I/O test] dialog box to check the signal inputs.	User's Manual
	The system is not in the operation mode.	Switch to the operation mode using the marker software. (When a monitor is connected) Or, set the startup operation mode to [Operation mode] and restart the system. (This is set on the [Start setting] tab of the [Marker operation setting] dialog box opened from [Environment setting] on the menu bar.)	3-40 User's Manual
	The input signal is chattering	<ul style="list-style-type: none"> <li>Connect a device that does not cause chattering.</li> <li>Set a longer I/O signal confirmation time in the marker operation settings. (This is set on the [I/O setting] tab in [Marker operation setting] opened from [Environment setting] on the menu bar.)</li> </ul>	4-3 User's Manual

Phenomenon	Cause	Action	Reference page
Serial communication cannot be performed correctly with the external device.	The communication cable is not connected correctly.	Check the cable connection.	2-26
	The connector is not wired correctly or making a poor contact.	Check the connector wiring. Use the recommended connector.	5-4
	The communication settings of the system do not match the communication settings of the external device.	Check each setting in the [Communication] tab of the [Marker operation setting] dialog box opened from [Environment setting] on the menu bar.	User's Manual
	The command input is wrong.	Select [Maintenance] from the menu bar and conduct a serial communication test in the [Communication test] dialog box to check.	User's Manual
	The system is not in the operation mode.	Switch to the operation mode using the marker software. (When a monitor is connected) Or, set the startup operation mode to [Operation mode] and restart the system. (This is set on the [Start setting] tab of the [Marker operation setting] dialog box opened from [Environment setting] on the menu bar.)	3-40 User's Manual
Ethernet communication cannot be performed correctly.	The LAN cable is not connected correctly	Check the cable connection.	6-4
	Non-standard LAN cable is being used.	Use a cable compatible with this system's specifications.	
	The Ethernet settings on this system are incorrect or duplicated on other devices.	Click [Environment setting] on the menu bar, and verify the settings in the [Ethernet setting] dialog box.	
	The command input is wrong.	Select [Maintenance] from the menu bar and conduct a serial communication test in the [Communication test] dialog box to check.	User's Manual
	The system is not in the operation mode.	Switch to the operation mode using the marker software. (When a monitor is connected) Or, set the startup operation mode to [Operation mode] and restart the system. (This is set on the [Start setting] tab of the [Marker operation setting] dialog box opened from [Environment setting] on the menu bar.)	3-40 User's Manual
	External devices connected to this system via Ethernet are not set up to be connected as clients.	Check the network settings of the external devices connected to this system via Ethernet. This system is always the server.	Manual of external device
Strings, counter values and other settings made via communication are not reflected in the [Operation mode] screen.	Displayed information is not updated.	Select the [Always update image] check box on the [Operation mode] screen.	User's Manual

Phenomenon	Cause	Action	Reference page
The power monitor value fluctuates.	When the wiring path of the fiber cable is changed, the quantity of light received by the sensor sometimes fluctuates by several percent.	If the wiring path of the fiber cable was changed, correct the sensor in the [Power monitor] dialog box opened from [Maintenance] on the menu bar.	User's Manual
Date/time is not accurate.	The button battery (for internal clock) in the controller is dead.	Replace the battery.	9-8
The [ERROR] LED turns ON and a buzzer sounds.	A serious error occurred.	Check the nature of the error according to 9-2, "Error Messages" and reset the error.	10-7

## 10.2 Error Messages

The following types of error messages are displayed on the system.

Name	Error type	Description	Notice method
Error	A	A major trouble that causes marking operation to stop. After resetting the error, the power supply must be reset (turned OFF → ON).	[ERROR] LED Buzzer Marker software
	B	A major trouble that causes marking operation to stop. After resetting the error, turn the key switch to the OFF position and then to the ON position, or send the "Cancel err" command.	
Information		A minor trouble that does not cause marking operation to stop.	Marker software
Alarm		A maintenance message notifying that the specified operation time has elapsed, etc.	Display Marker software



### Precautions for Correct Use

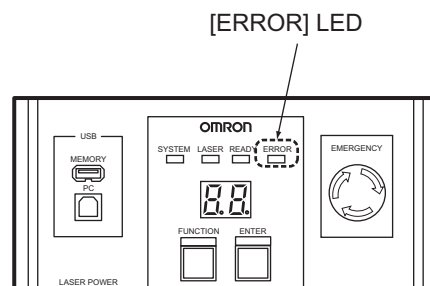
When resetting the controller power supply, turn OFF the power and then wait for at least 5 seconds before turning it back ON.

If any of the above errors occurs, it is notified in the manner explained below.

#### ■ [ERROR] LED

If an "Error" occurs, this LED illuminates in red.

In the case of an "Information"-level abnormality or "Alarm," the LED does not turn ON.

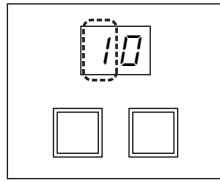


#### ■ Buzzer

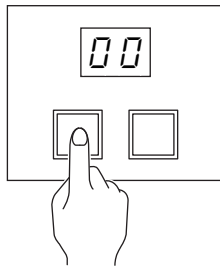
If an "Error" occurs, a buzzer sounds.

■ **Display**

If an "Alarm" occurs, "1" is shown in the upper digit on the display.  
 Nothing is shown in the case of an "Information"-level abnormality.



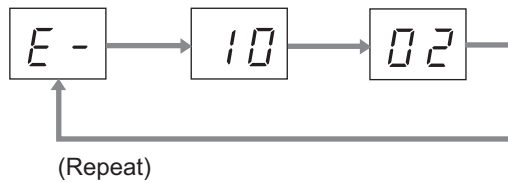
To check the details of an "Alarm," press the [FUNCTION] button, and the corresponding code will be shown on the display.



The code will be displayed in the order of "E-" (error)/"A-" (alarm) → upper 2 digits of the code → lower 2 digits of the code.

● **Display example**

- Error code "1002"



- Alarm code "9001"



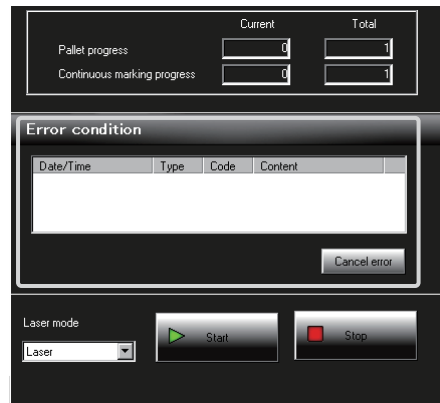
(The code will be displayed again when the [FUNCTION] button is pressed.)

## ■ Marker software

### ● [Operation mode] screen

If an "Error" or "Alarm" occurs, the date/time of occurrence, type of error, number (code) and description (error/alarm name) are shown in the [Error condition] area of the [Operation mode] screen.

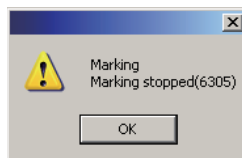
The same items are shown for an "Information"-level abnormality in the [Error condition] area.



To reset the error/alarm after taking the remedial action, click [Cancel error].

### ● Message

The following message appears depending on the type of "Information."



## 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 a 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.



### Precautions for Correct Use

When resetting the controller power supply, turn OFF the power and then wait for at least 5 seconds before turning it back ON. If the power supply is turned on again at short intervals, it may not start normally and an invalid error code may be output.

Code	Description	Action	Error type	Power supply Reset
0001	The fan in the controller is abnormal.	Check the condition of the fan.	A	Necessary
0002	A fan for the main power supply in the controller is abnormal.	Contact OMRON.	A	Necessary
0003	The main power supply is abnormal or the supply voltage has dropped.	Check the connection and wiring of the controller power cable.	A	Necessary
0004	The laser power supply is abnormal.		A	Necessary
0005 to 0009 0012 to 0016	An internal device is abnormal.	Contact OMRON.	A	Necessary
0018	Emergency stop condition • The emergency stop switch ([EMERGENCY] button) is turned ON • [EMERGENCY A]/[EMERGENCY B] (emergency stop input A/B) is open	<ul style="list-style-type: none"> <li>• Turn the emergency stop switch OFF.</li> <li>• Short-circuit [EMERGENCY 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].</li> <li>• 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.</li> <li>• Turn [SAFE IN A]/[SAFE IN B] of the interlock connector ON (short).</li> </ul>	B	Not necessary
0019 to 0029	The laser power is OFF, or the laser is abnormal.	Check the key switch is ON. If the error persists, contact OMRON.	A	Necessary
0030	The temperature of the laser is abnormal.	<ul style="list-style-type: none"> <li>• Check the operating temperature.</li> <li>• Check the surroundings to see if the correct installation space is provided.</li> <li>• Check the air filter for clogging.</li> </ul>	A	Necessary
0031	The fan for the laser is abnormal.		A	Necessary
0032 to 0038	The laser is abnormal.	Contact OMRON.	A	Necessary



Code	Description	Action	Error type	Power supply Reset
0039	Safety relay operation mismatch	The two safety relays in this product are designed to open and close at the same time according to ISO13849-1 Safety Category 3 or above. Determine why they do not open and close at the same time and replace the safety relay or otherwise resolve the issue.	A	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
1002	The fan at the back of the marker head is abnormal.	Check the condition of the fan.	A	Necessary
1003	The galvano-scanner is abnormal.	Contact OMRON.	A	Necessary
1004 1005	The shutter is abnormal.		A	Necessary
1007 to 1009	Focus control is abnormal.		A	Necessary
1010	Power monitor measurement values cannot be obtained.	Perform power monitor again.	A	Necessary
1011	Internal marker head temperatures cannot be obtained.	<ul style="list-style-type: none"> <li>• Check the operating temperature.</li> <li>• Check the surroundings to see if the correct installation space is provided.</li> </ul>	A	Necessary
1012	The temperature of the marker head is abnormal.	<ul style="list-style-type: none"> <li>• Check the operating temperature.</li> <li>• Check the surroundings to see if the correct installation space is provided.</li> <li>• Check the air filter for clogging.</li> </ul>	B	Not necessary
2000 to 2004	Marking data is invalid.	Check the marking data.	B	Not necessary
3010	The laser module does not start in the mode (standard/EE mode) that matches the startup mode of the GUI.	Restart the laser marker.	A	Necessary
3011	Laser module standard/EE mode switching malfunction.	Contact OMRON.	A	Necessary
3219	The counter value exceeded the end value.	Check the counter value.	B	Not necessary
3226	The laser power must be less than the lower limit threshold specified with the laser power check.	Check the laser output.	B	Not necessary
3231	The target block set for the marking data with DFL does not exist.	Set the target block specified with DFL.	B	Not necessary
3232	The target layer set for the marking data with DFL does not exist.	Set the target layer specified with DFL.	B	Not necessary
3233	An error was returned as a result of the marking position correction inspection.	Check the measurement on the vision sensor side.	B	Not necessary
3234	An error was returned as a result of the 2D code inspection.	Check the measurement on the vision sensor side.	B	Necessary
3235	An error was returned as a result of the scene switch processing.	Check the communication environment between the laser marker and vision sensor as well as the system settings of vision sensor.	B	Not necessary
3236	Communication with vision sensor is not established.		B	Not necessary
3237	Timeout occurred when the scene switch command was issued to vision sensor.		B	Necessary
3238	Timeout occurred when the measurement value clear command was issued to vision sensor.		B	Not necessary

Code	Description	Action	Error type	Power supply Reset
3239	Timeout occurred when the command to execute a marking position correction inspection once was issued to vision sensor.	Check to see if the timeout value set with DFL is too short.	B	Not necessary
3240	Timeout occurred when the command to execute a 2D code inspection once was issued to vision sensor.		B	Not necessary
3243	The current laser mode and the laser mode of loaded project file do not match.	Check the settings of laser frequency and pulse shape.	B	Not necessary
4515	Marking data set at the start cannot be read.	Check the specified marking data file.	B	Not necessary
6304	Marking cannot be started because the marking stop input is ON.	Turn OFF [STOP] (marking stop input).	B	Not necessary

## Information

This message is displayed upon occurrence of a minor trouble such as command error or communication error.

If an information-level abnormality occurs, a message is displayed on the screen, but marking operation does not stop.

Check the screen display and take a remedial action according to the table below. The power supply need not be reset (turned OFF → ON).

Code	Description	Action
3002	Installation of TrueType fonts failed.	Check if the TrueType fonts are correct.
3103	A communication command with an invalid parameter was received.	Check the parameter of the communication command.
3105	Command error (Laser power check setting is disabled.)	Enable the laser power check.
3206	A communication command was received during marking operation.	Send the command after confirming that [MARK READY] (marking ready output) is ON.
3207	A communication command not supported in the operation or edit mode was received.	Send the command after confirming the screen mode.
3210	There is no marking data.	Check the marking data.
3211	Marking data is abnormal.	
3213	Marking data is empty.	
3215	An attempt was made to perform marking when the laser power is OFF.	Turn ON the laser power.
3216	The specified cell does not exist.	Check the marking data as well as the I/O command or serial communication command.
3217	The specified block does not exist.	
3224	The size of the serial transmission buffer was exceeded during execution of a marking data list acquisition command.	Reduce the number of files to be saved.
3227	An invalid parameter was received during execution of a block parameter setting command.	Check the send command.
3228	An invalid parameter was received during execution of a layer parameter setting command.	Check the send command.
3229	An invalid ethernet communication command was received	Check the ethernet communication command.
4104	An attempt was made to mark outside the range.	Check the marking data.
4105	A graphic file cannot be imported.	Check the marking data and graphic file.
4106	A graphic file cannot be extracted.	Check the graphic file.
4107		
4108	An image file cannot be imported.	Check the marking data and graphic file.

Code	Description	Action
4117	Time for calculation exceeded	Calculation time exceeds the marking time. When performing continuous marking, create an interval before starting each marking.
4503	The specified file does not exist	Check the setting.
4518	The target folder does not exist	Check the setting.
6204	An invalid serial communication command was received (invalid SID).	Check the serial communication command.
6205	An invalid serial communication command was received (invalid C/R).	
6206	An invalid serial communication command was received (no code).	
6207	An invalid serial communication command was received (abnormal code).	
6208	An invalid serial communication command was received (invalid code size).	
6209	An invalid serial communication command was received (no parameter).	
6210	An invalid serial communication command was received (invalid parameter).	Check the serial communication command.
6211	An invalid serial communication command was received (invalid response).	
6212	An invalid I/O command was received (invalid code).	Check the I/O command.
6213	An invalid I/O command was received (invalid parameter).	
6214	Marking was started when an error was present.	Perform marking after resetting the error.
6215	Execution of an I/O command failed.	Check the I/O command.
6220	An invalid serial communication command was received (invalid parameter).	Check the serial communication command.
6221	An invalid serial communication command was received (invalid parameter value).	
6222	Serial communication was performed when READY was OFF.	<ul style="list-style-type: none"> <li>• Check that the system is running.</li> <li>• Check that marking is being performed.</li> <li>• Check that the system is in the operation mode.</li> </ul>
6223	I/O communication was performed when READY was OFF.	
6224	An invalid serial communication command was received (analysis failed).	Check the serial communication command.
6300	Marking cannot be started because READY is OFF.	Input a marking trigger signal after confirming that [MARK READY] (marking ready output) is ON.
6301	Marking cannot be started because the shutter is closed.	Turn ON [SHUTTER A]/[SHUTTER B] (shutter control input A/B). When [Shutter ext. command ctrl] is set to "ON", the shutter does not open automatically when the system transitions to the operation mode. Set the system so that the laser is emitted after the shutter is opened.
6302	Marking cannot be started because the laser power supply is turned OFF.	<ul style="list-style-type: none"> <li>• Turn ON the key switch.</li> <li>• Turn ON [LASER ON] (laser control input).</li> </ul>
6303	Marking cannot be started because the screen is in the edit mode.	Switch the screen to the operating mode.

Code	Description	Action
6305	Marking stopped because the marking stop input turned ON.	Marking may not have been successfully completed. Check the marking result.
6307	The interval timeout limit has been exceeded.	Check the continuous marking settings of marking data. (Setting items such as [Interval] and [Interval set method] on the [Marking] tab opened from [Common setting])
6308	Marking was interrupted.	Check the cause of marking interruption.
6450	A serial communication error occurred (overrun error).	Check the serial communication conditions and data format.
6451	A serial communication error occurred (parity error).	
6452	A serial communication error occurred (flaming error).	
6453	A serial communication error occurred (other).	
6454	A serial communication error occurred (send size over).	
6455	A serial communication error occurred (receive size over).	
6456	A serial communication error occurred (invalid node number).	
6457	A serial communication error occurred (invalid unit number).	
6458	A serial communication error occurred (invalid check code).	
6700	The laser power cannot be turned ON (key switch OFF).	Turn ON the key switch.
6701	The laser power cannot be turned ON (laser control input OFF).	Turn ON [LASER ON] (laser control input).
6702	The laser power cannot be turned ON (emergency stop switch ON).	Turn OFF the emergency stop switch ([EMERGENCY] button).
6703	The laser power cannot be turned ON (emergency stop A OFF).	Short-circuit [EMERGENCY A] (emergency stop input A).
6704	The laser power cannot be turned ON (emergency stop B OFF).	Short-circuit [EMERGENCY B] (emergency stop input B).
6750	The shutter cannot be opened (shutter control A OFF).	Turn ON [SHUTTER A] (shutter control input A).
6751	The shutter cannot be opened (shutter control B OFF).	Turn ON [SHUTTER B] (shutter control input B).
6752	The shutter cannot be opened (emergency stop switch ON).	Turn OFF the emergency stop switch ([EMERGENCY] button).
6753	The shutter cannot be opened (emergency stop A OFF).	Short-circuit [EMERGENCY A] (emergency stop input A).
6754	The shutter cannot be opened (emergency stop B OFF).	Short-circuit [EMERGENCY B] (emergency stop input B).
8002	A message was sent before a response was received.	Make sure that the next message is sent after the receipt of a response to a message sent is confirmed.

## Alarm

This message appears when the setting of [Alarm level] (time) made in the [Life counter] dialog box opened from [Alarm] on the menu bar was exceeded.

If an information-level abnormality occurs, a message is displayed on the screen, but marking operation does not stop.

Check the screen display and take a remedial action according to the table below. The power supply need not be reset (turned OFF → ON).

Code	Name	Description	Action
9000	Over laser op time	The total laser ON time exceeded the set alarm level.	–
9001	Over op time	The total system operation time exceeded the set alarm level.	–
9002	Over ttl marking time	The total marking time exceeded the set alarm level.	–
9005	Over maint. time	The maintenance setting time exceeded the set alarm level. (Optional function available to the user)	–
9006	Over btn cell use time	The total in-use time of the button battery (system OFF time) exceeded the set alarm level.	Replace the button battery.





# Appendix

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# A.1 Specification

Item	Specification		
	MX-Z2000H-V1	MX-Z2050H-V1/ MX-Z2055H-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		



Item	Specification	
	MX-Z2000H-V1	MX-Z2050H-V1/ MX-Z2055H-V1*1
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	<ul style="list-style-type: none"> <li>For USB memory (standard-A connector in front face of controller)</li> <li>For keyboard/mouse (standard-A connector in rear face of controller)</li> </ul>	
Attached software*9	Offline editing software <ul style="list-style-type: none"> <li>Font logo editor*10</li> </ul>	

\*1 Bold specifications

\*2 EE mode: Energy Enhanced mode (optional)

To use EE mode, you need the EE mode activation key MX-9230.

\*3 QR Code and Micro QR code are registered trademarks of DENSO WAVE INCORPORATED.

\*4 EtherNet/IP is a trademark of ODVA.

\*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 the environment, length of time, and testing methods listed in IEC 60529 (JIS C 0920). Its operations under conditions other than specified are 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 the controller.

\*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.

A

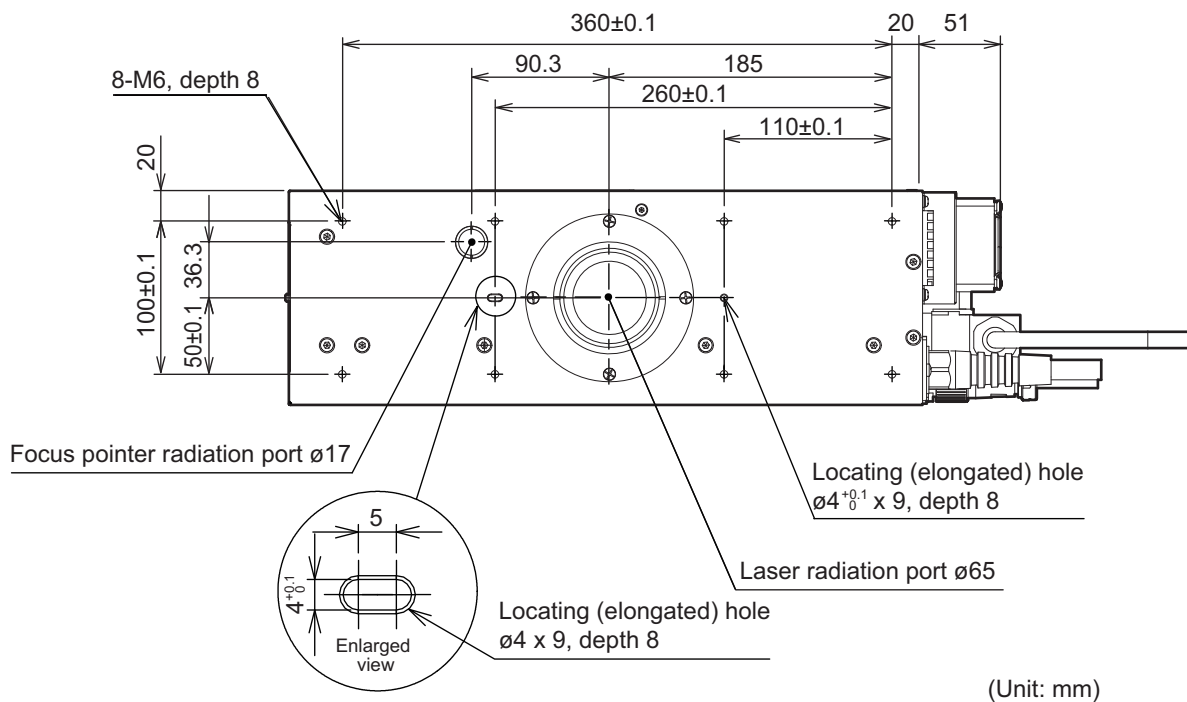
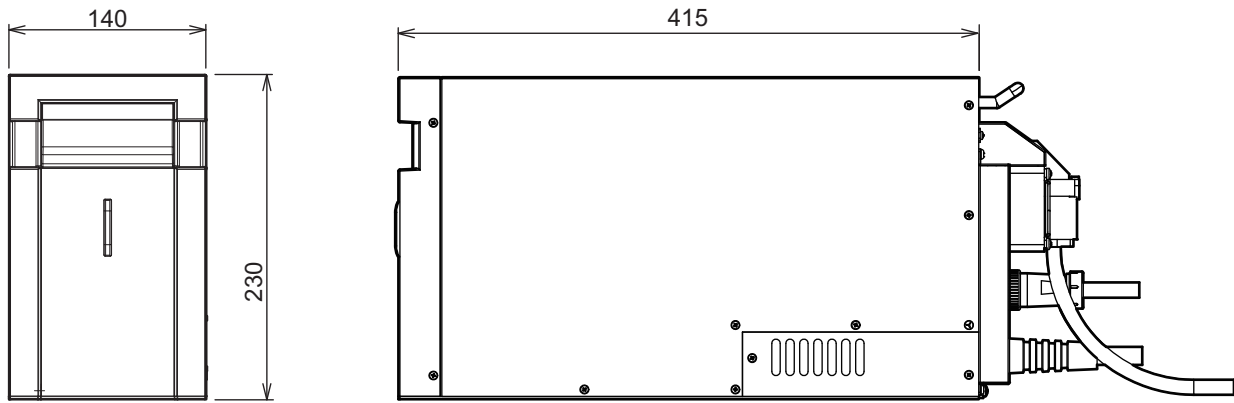
Specification

External Dimension

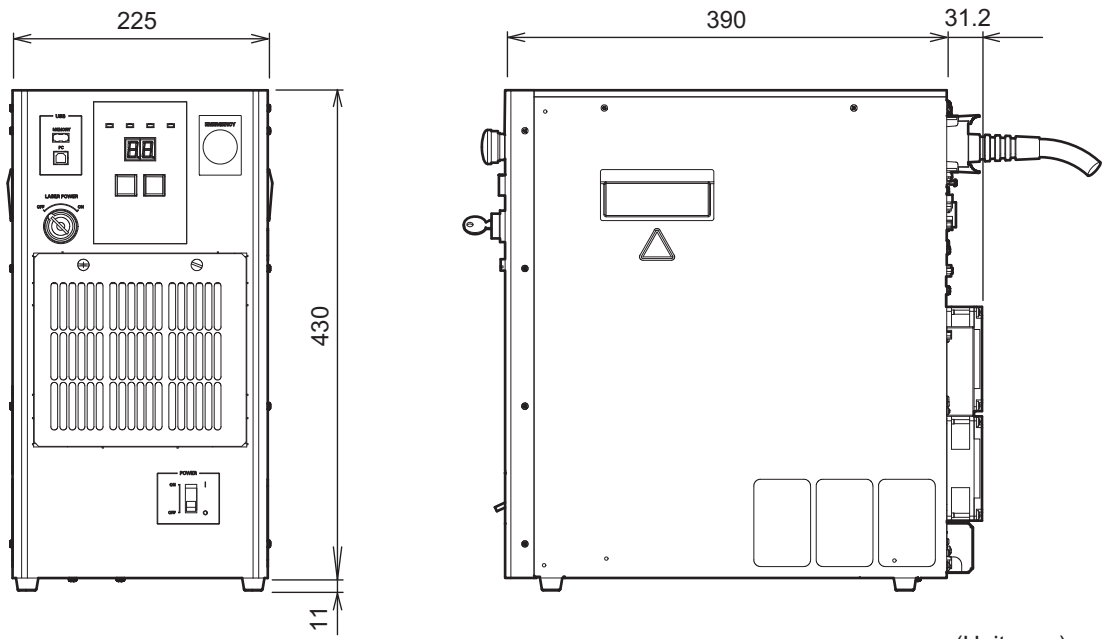
Compliance Information

## A.2 External Dimension

### Marker head



**Controller**



(Unit: mm)

**A**

Specification

External Dimension

Compliance Information

## A.3 Compliance Information

### General Compliance Information and Instructions for EU



#### OMRON Corporation (Manufacturer)

Shiokoji Horikawa, Shimogyo-ku, Kyoto, 600-8530, JAPAN

#### OMRON EUROPE B.V. (Importer in EU)

Wegalaan 67-69, NL-2132 JD Hoofddorp, THE NETHERLANDS

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EN
<p><b>General Compliance Information and Instructions for EU</b> (original)</p> <p>THIS PRODUCT IS AN INDUSTRIAL PRODUCT INTENDED FOR INCORPORATION AND USE IN INDUSTRIAL EQUIPMENT, APPLIANCES OR INSTALLATIONS. IT IS NOT INTENDED FOR DIRECT USE BY CONSUMERS UNLESS THE PRODUCT IS SPECIALLY DESIGNED FOR SUCH PURPOSE.</p> <p>Suppliers of such industrial equipment, appliances and installations are responsible to provide instructions for operation, maintenance and compliance to their customers and users.</p> <p>Compliance of our products to EU directives (EMCD, LVD, etc.) may be affected by the installation or device in which they are incorporated. Omron therefore provides further instructions for designers of equipment and installers and professional users of our products in English.</p> <p>Many of our products have a separate Operation Manual. This provides more detailed information on how to configure, install and use our products, as well as additional information and guidelines on application design and compliance.</p> <p>For the most up-to-date manuals, other languages and additional documentation, please refer to our websites.</p>
<p><b>Instructions for equipment, appliance or installation users</b></p> <p>Make sure to follow the instructions that came with the equipment or installation in which our products were incorporated.</p> <p>Additionally, make sure our products are installed and configured by authorised personnel that is sufficiently skilled and trained.</p>
<p><b>Instructions for equipment, appliance, installation designers and installers</b></p> <p>Before designing the equipment, appliance installation or application containing our products or using our product, refer to the documentation provided with the product and to the operation manual for installation, handling, use, compliance/safety information and instructions.</p>

DE	FR	IT
<p><b>Allgemeine Informationen und Anweisungen zur Einhaltung von Vorschriften in der EU</b> (translation)</p> <p>BEI DIESEM PRODUKT HANDELT ES SICH UM EIN INDUSTRIEPRODUKT, DAS ZUM EINBAU UND ZUR VERWENDUNG IN INDUSTRIELLEN MASCHINEN UND ANLAGEN GEDACHT IST. ES IST NICHT ZUR DIREKTEN VERWENDUNG DURCH PRIVATVERBRAUCHER GEDACHT, AUSSER DAS PRODUKT IST SPEZIELL FÜR DIESEN VERWENDUNGSZWECK AUSGELEGT.</p> <p>Hersteller von Maschinen und Anlagen sind dafür verantwortlich, ihren Kunden und Anwendern Anleitungen für Betrieb, Wartung und Einhaltung von Vorschriften zur Verfügung zu stellen.</p> <p>Die Einhaltung der EU-Vorschriften (EMCD, LVD etc.) unserer Produkte kann durch den Einsatz in Maschinen und Anlagen variieren. Aus diesem Grund stellen wir weiterführende Dokumentation für Konstrukteure und Anwender auch in englischer Sprache zur Verfügung. Daher stellt Omron den Gerätekonstrukteuren sowie den Monteuren und professionellen Benutzern seiner Produkte weitere Anleitungen in englischer Sprache zur Verfügung.</p> <p>Viele unserer Produkte haben ein eigenes Bedienerhandbuch. Darin finden sich genauere Informationen zur Konfiguration, Montage und Verwendung unserer Produkte sowie zusätzliche Angaben und Richtlinien zur Anwendungskonzeption und zur Einhaltung von Vorschriften.</p> <p>Die jeweils aktuellen Betriebshandbücher finden Sie in allen Sprachen auf unserer Webseite.</p>	<p><b>Informations et instructions de conformité générale pour l'UE</b> (translation)</p> <p>CE PRODUIT EST UN PRODUIT INDUSTRIEL DESTINÉ À ÊTRE INCORPORÉ ET UTILISÉ AVEC DES ÉQUIPEMENTS, DES APPAREILS OU DES INSTALLATIONS INDUSTRIELS. IL N'EST PAS DESTINÉ À ÊTRE UTILISÉ DIRECTEMENT PAR LES CONSOMMATEURS, SAUF SI LE PRODUIT A ÉTÉ CONÇU SPÉCIFIQUEMENT À CETTE FIN.</p> <p>Les fournisseurs de tels équipements, appareils et installations industriels ont la responsabilité de fournir aux utilisateurs des instructions concernant leur fonctionnement, leur entretien et leur conformité.</p> <p>La conformité de nos produits aux directives européennes (CEM, BT, etc.) peut être affectée par les installations ou les appareils dans lesquels ils sont incorporés. Omron fournit donc des instructions supplémentaires en anglais pour les concepteurs des équipements, les installateurs et les utilisateurs professionnels de nos produits.</p> <p>La plupart de nos produits sont accompagnés d'un manuel d'utilisation. Celui-ci fournit des instructions plus détaillées sur la façon de configurer, d'installer et d'utiliser nos produits, ainsi que des informations supplémentaires et des lignes directrices sur la conception et la conformité de leur application.</p> <p>Pour obtenir les manuels les plus à jour, des informations dans d'autres langues et de la documentation supplémentaire, veuillez consulter nos sites Web.</p>	<p><b>Istruzioni e informazioni generali sulla conformità per l'UE</b> (translation)</p> <p>È, QUESTO, UN PRODOTTO INDUSTRIALE DESTINATO A ESSERE INCORPORATO E UTILIZZATO IN ATTREZZATURE, APPARECCHIATURE O INSTALLAZIONI DI TIPO INDUSTRIALE. NON È DESTINATO ALL'USO DIRETTO DA PARTE DEI CONSUMATORI SE NON APPOSITAMENTE PROGETTATO ALLO SCOPO.</p> <p>I fornitori di queste attrezzature, apparecchiature e installazioni industriali sono responsabili di dare a clienti e utenti le opportune istruzioni per l'uso, la manutenzione e la conformità.</p> <p>La conformità alle direttive UE (su compatibilità elettromagnetica, bassa tensione, ecc.) può essere influenzata dall'installazione o dal dispositivo in cui vengono inseriti i nostri prodotti. Omron fornisce pertanto, insieme ai prodotti, ulteriori istruzioni in inglese per i progettisti di apparecchiature e per gli installatori e gli utenti professionali dei nostri prodotti.</p> <p>Molti dei nostri prodotti sono corredati di uno specifico Manuale operativo che contiene informazioni più dettagliate sulle rispettive modalità di configurazione, installazione e uso, oltre a ulteriori informazioni e linee guida sulla progettazione e la conformità delle applicazioni.</p> <p>Per informazioni sui manuali più aggiornati, su altre lingue e sull'ulteriore documentazione disponibile, si invita a visitare i nostri siti Web</p>
<p><b>Anweisungen für Konstrukteure von Maschinen und Anlagen</b></p> <p>Befolgen Sie die Anweisungen, die mit den Geräten oder Anlagen mitgeliefert wurden, in denen unsere Produkte zum Einsatz kommen.</p> <p>Stellen Sie sicher, dass unsere Produkte von ausgebildetem Fachpersonal installiert und konfiguriert werden.</p>	<p><b>Instructions pour les utilisateurs d'équipements, d'appareils ou d'installations</b></p> <p>Assurez-vous de suivre les instructions fournies avec les équipements ou les installations dans lesquels nos produits ont été incorporés.</p> <p>Par ailleurs, assurez-vous que nos produits sont installés et configurés par un personnel autorisé, suffisamment qualifié et formé.</p>	<p><b>Istruzioni per gli utenti di attrezzature, apparecchiature o installazioni</b></p> <p>Si raccomanda di seguire le istruzioni fornite con l'apparecchiatura o l'installazione in cui sono stati inseriti i nostri prodotti</p> <p>È inoltre necessario accertarsi che i nostri prodotti siano installati e configurati da personale autorizzato, che sia sufficientemente qualificato e competente.</p>
<p><b>Anweisungen für Konstrukteure von Maschinen und Anlagen</b></p> <p>Ziehen Sie vor Konzeption der Anlagen, Geräte, Installationen oder Anwendungen, in denen unsere Produkte zum Einsatz kommen, für Montage, Handhabung, Verwendung, Informationen zur Einhaltung von Vorschriften/Sicherheitsinformationen und Anleitungen die mit dem Produkt mitgelieferten Unterlagen und das Bedienerhandbuch zu Rate.</p>	<p><b>Instructions pour les concepteurs et les installateurs d'équipements, d'appareils et d'installations</b></p> <p>Avant de concevoir les équipements, appareils, installations ou applications contenant ou utilisant nos produits, veuillez consulter la documentation fournie avec le produit et le manuel d'utilisation relatif à l'installation, la manipulation, l'utilisation, ainsi que les informations de sécurité et de conformité.</p>	<p><b>Istruzioni per i progettisti e gli installatori di attrezzature, apparecchiature e installazioni</b></p> <p>Prima di progettare l'attrezzatura, l'apparecchiatura o l'installazione che dovrà contenere o utilizzare i nostri prodotti, consultare la documentazione fornita con i prodotti e il manuale operativo per informazioni e istruzioni sull'installazione, manipolazione, uso, conformità e sicurezza.</p>

A

Specification

External Dimension

Compliance Information

ES	BG	HR
<p><b>Información e instrucciones generales sobre cumplimiento de normativas de la Unión Europea</b> (translation)</p> <p>ESTE PRODUCTO ES UN PRODUCTO INDUSTRIAL DISEÑADO PARA SU INSTALACIÓN Y USO EN EQUIPOS, DISPOSITIVOS O INSTALACIONES INDUSTRIALES. NO SE HA DESARROLLADO PARA EL USO DIRECTO POR PARTE DE LOS CONSUMIDORES A NO SER QUE EL PRODUCTO HAYA SIDO DISEÑADO ESPECÍFICAMENTE PARA TAL FIN.</p> <p>Los proveedores de este tipo de equipos, dispositivos e instalaciones industriales son responsables de proporcionar instrucciones de funcionamiento, mantenimiento y cumplimiento de normativas a sus clientes y usuarios.</p> <p>El cumplimiento de las directivas europeas (EMCD, LVD, etc.) puede verse afectado por la instalación o el dispositivo al que se incorporen nuestros productos. Por ello los productos de Omron incluyen instrucciones adicionales en inglés para los diseñadores de equipos, instaladores y usuarios profesionales de nuestros productos.</p> <p>La mayoría de nuestros productos disponen de un manual de operación adicional. Dicho manual contiene información detallada acerca de la configuración, instalación y utilización de nuestros productos, además de información y directrices sobre el diseño de aplicaciones y cumplimiento de normativas.</p> <p>Si desea acceder a los manuales más actualizados en otros idiomas, y documentación adicional, consulte nuestra página web.</p>	<p><b>Обща информация за съответствие и инструкции за ЕС</b> (translation)</p> <p>ТОЗИ ПРОДУКТ Е ПРОМИШЛЕН ПРОДУКТ, ПРЕДНАЗНАЧЕН ЗА ВГРАЖДАНЕ И УПОТРЕБА В ПРОМИШЛЕНО ОБОРУДВАНЕ, УРЕДИ ИЛИ ИНСТАЛАЦИИ. ТОЙ НЕ Е ПРЕДНАЗНАЧЕН ЗА ДИРЕКТНА УПОТРЕБА ОТ ПОТРЕБИТЕЛИТЕ, ОСВЕН АКО ПРОДУКТЪТ НЕ Е СПЕЦИАЛНО КОНСТРУИРАН ЗА ТАКАВА ЦЕЛ.</p> <p>Доставчиците на това индустриално оборудване, уреди и съоръжения са отговорни за осигуряване на инструкции за експлоатация, техническо обслужване и съответствие на своите клиенти и потребители.</p> <p>Съответствието на нашите продукти с директивите на ЕС (Директиви за EMC, Директива за НН и т.н.) може да се влияе от инсталацията или устройството, в което те са вградени. Затова Omron осигурява допълнителни инструкции на английски език, предназначени за конструкторите на оборудване, монтажниците и професионалните потребители на нашите продукти.</p> <p>Много от нашите продукти имат отделно Ръководство за експлоатация. Това предоставя по-подробна информация за това как да конфигурирате, инсталирате и използвате нашите продукти, както и допълнителна информация и указания за проектиране и спазване при прилагане.</p> <p>За най-актуалните ръководства, други езици и допълнителна документация, моля вижте нашите уеб сайтове</p>	<p><b>Općenite upute i informacije o sukladnosti za EU</b> (translation)</p> <p>OVAJ JE PROIZVOD INDUSTRIJSKI PROIZVOD NAMIJENJEN UGRADNJI U INDUSTRIJSKU OPREMU, APARATE ILI INSTALACIJE I UPOTREBI U NJIMA. NIJE NAMIJENJEN IZRAVNOJ UPOTREBI OD STRANE KORISNIKA, OSIM U SLUČAJU KADA JE PROIZVOD POSEBNO DIZAJNIRAN ZA TU SVRHU.</p> <p>Odgovornost je dobavljača takve industrijske opreme, aparata i instalacija svojim kupcima i korisnicima pružiti upute za rukovanje, održavanje i sukladnost.</p> <p>Na sukladnost naših proizvoda EU direktivama (EMCD, LVD itd.) može utjecati montaža ili uređaj u koji su ugrađeni. Stoga Omron prilaže dodatne upute na engleskom jeziku za dizajnere opreme i montažere te profesionalne korisnike njihovih proizvoda.</p> <p>Mnogi od naših proizvoda imaju zasebni priručnik za rukovanje. On pruža detaljnije informacije o načinu konfiguracije, montaže i upotrebe naših proizvoda, kao i dodatne informacije i smjernice o dizajnu i sukladnosti za primjene.</p> <p>Najnovije priručnike, priručnike na drugim jezicima i dodatnu dokumentaciju potražite na našim web-mjestima</p>
<p><b>Instrucciones para equipos, dispositivos o usuarios de instalaciones</b></p> <p>Asegúrese de seguir las instrucciones que se incluyen en el equipo o la instalación que incorpora nuestros productos.</p> <p>Asegúrese además de que nuestros productos son instalados y configurados por personal autorizado con la formación y especialización adecuadas.</p>	<p><b>Инструкции за потребителите на оборудване, уреди или съоръжения</b></p> <p>Уверете се, че следват инструкциите, доставени с оборудването или инсталацията, в която са вградени нашите продукти.</p> <p>Освен това се уверете, че продуктите ни се монтират и конфигурират от оторизиран персонал, който е достатъчно квалифициран и обучен.</p>	<p><b>Upute za korisnike opreme, aparata ili instalacije</b></p> <p>Svakako pratite upute isporučene s opremom ili instalacijom u koju su ugrađeni naši proizvodi.</p> <p>Osim toga, pobrinite se da naše proizvode montira i konfigurira ovlašteno osoblje s dovoljnom razinom vještine i obuke.</p>
<p><b>Instrucciones para equipos, dispositivos, diseñadores de instalaciones e instaladores</b></p> <p>Antes de diseñar equipos, instalaciones de dispositivos, aplicaciones o de usar nuestros productos, consulte la documentación que se proporciona, así como el manual de operación con las instrucciones e información de instalación, manejo, uso y seguridad/cumplimiento de normativas.</p>	<p><b>Инструкции за конструктори и монтажници на оборудване и уреди</b></p> <p>Преди проектиране на оборудване, монтаж на уред или приложение, съдържащи или използващи нашите продукти, вижте документацията, предоставена с продукта и на ръководството за експлоатация при инсталиране, боравене, употреба, информация за спазване/безопасност и инструкции.</p>	<p><b>Upute za dizajnere i montažere opreme, aparata i instalacija</b></p> <p>Prije dizajniranja opreme, instalacije aparata ili primjene koja obuhvaća naše proizvode ili u kojoj se koristi naš proizvod, pročitaite dokumentaciju isporučenu s proizvodom i priručnik za rukovanje u kojima ćete pronaći informacije i upute o instalaciji, rukovanju, upotrebi i sukladnosti/sigurnosti.</p>

CS	DA	NL
<p><b>Obecné informace o shodě a pokyny pro EU</b> (translation)</p> <p>TENTO PRODUKT JE PRŮMYSLOVÝM PRODUKTEM URČENÝM pro zabudování A POUŽITÍ V PRŮMYSLOVÝCH ZAŘÍZENÍCH, přístrojích NEBO INSTALACÍCH. NENÍ URČEN K PŘÍMÉMU POUŽITÍ koncovým uživatelem, POKUD NENÍ PRO TAKOVÝ ÚČEL SPECIÁLNĚ NAVRŽEN.</p> <p>Dodavatelé takových průmyslových zařízení, přístrojů nebo instalací zodpovídají za to, že zákazníkům a uživatelům poskytnou návody k provozu, údržbě a dodržování předpisů.</p> <p>Shoda našich produktů se směnicemi EU (EMCD, LVD apod.) může být ovlivněna instalací nebo zařízením, ve kterých jsou začleněny. Společnost Omron proto poskytuje další pokyny pro konstruktéry zařízení, montéry a profesionální uživatele našich produktů v anglickém jazyce.</p> <p>Mnoho z našich produktů má samostatný návod k použití. Ten poskytuje podrobnější informace o konfiguraci, instalaci a použití našich produktů, stejně jako dodatečné informace a pokyny k návrhu aplikací a dodržování norem.</p> <p>Nejnovější příručky, materiály v jiných jazycích a další dokumentaci najdete na našich webových stránkách</p>	<p><b>Generelle oplysninger og instruktioner, som skal overholdes i EU</b> (translation)</p> <p>PRODUKTET ER ET INDUSTRIPRODUKT OG ER BEREGNET TIL AT BLIVE INDARBEJDET OG ANVENDT I INDUSTRIUDSTYR, -MASKINER OG -INSTALLATIONER. PRODUKTET ER IKKE BEREGNET TIL SLUTBRUGERES DIREKTE BRUG, MEDMINDRE DET ER SPECIELT DESIGNET TIL ET SÅDANT FORMÅL.</p> <p>Leverandørerne af sådant industriudstyr, -maskiner og -installationer er ansvarlige for at give deres kunder og brugere vejledning i drift, vedligeholdelse og overholdelse af instruktioner.</p> <p>Vores produkters overholdelse af EU-direktiverne (EMC-direktivet og Lavspændingsdirektivet osv.) kan blive påvirket af den installation eller enhed, som vores produkter er indarbejdet i. Omron giver derfor yderligere instruktioner på engelsk til designere af udstyret samt til montører og professionelle brugere af vores produkter.</p> <p>Mange af vores produkter har en særskilt betjeningsvejledning. Denne giver mere udførlige oplysninger om konfiguration, installation og brug af vores produkter samt yderligere oplysninger og retningslinjer om applikationsdesign og -instruktionsoverholdelse.</p> <p>Find de nyeste vejledninger, øvrige sprog og yderligere dokumentation på vores hjemmesider</p>	<p><b>Algemene conformiteitsinformatie en -instructies voor de EU</b> (translation)</p> <p>DIT PRODUCT IS EEN INDUSTRIEEL PRODUCT DAT IS BEDOELD OM TE WORDEN GEÏNTEGREERD EN TOEGEPAST IN INDUSTRIËLE UITRUSTING, APPARATUUR OF INSTALLATIES. HET PRODUCT IS NIET BEDOELD VOOR RECHTSTREEKS GEBRUIK DOOR CONSUMENTEN, TENZIJ HET DAARVOOR SPECIAAL IS ONTWORPEN.</p> <p>Het is de verantwoordelijkheid van leveranciers van dergelijke industriële uitrusting, apparatuur en installaties om bedienings-, onderhouds- en conformiteitsinstructies aan hun klanten en gebruikers te verstrekken.</p> <p>De conformiteit van onze producten met EU-richtlijnen (EMCD, LVD, etc.) kan worden beïnvloed door de installatie of het apparaat waarin ze worden geïntegreerd. Omron verstrekt daarom nadere instructies in de Engelse taal voor ontwerpers van uitrusting, installateurs en professionele gebruikers van onze producten.</p> <p>Veel van onze producten hebben een eigen bedieningshandleiding. Daarin is meer uitgebreide informatie opgenomen voor de configuratie, de installatie en het gebruik van onze producten, evenals aanvullende informatie en richtlijnen voor toepassingsontwerp en conformiteit.</p> <p>Ga naar onze websites voor de meest recente handleidingen, andere talen en aanvullende documentatie</p>
<p><b>Pokyny pro uživatele zařízení, přístrojů nebo instalací</b></p> <p>Vždy postupujte podle pokynů, které jsou dodávány se zařízením nebo instalací, jejichž součástí jsou naše produkty.</p> <p>Dále se ujistěte, že naše produkty jsou instalovány a konfigurovány autorizovaným personálem, který je dostatečně zkušený a vyškolený.</p>	<p><b>Instruktioner til brugere af udstyr, maskiner og installationer</b></p> <p>Sørg for at følge de instruktioner, der fulgte med udstyret eller installationen, i hvilket/hvilken vores produkter er blevet indarbejdet.</p> <p>Sørg endvidere for, at vores produkter installeres og konfigureres af autoriseret personale med de rette færdigheder og den rette oplæring.</p>	<p><b>Instructies voor gebruikers van uitrusting, apparatuur of installaties</b></p> <p>Neem de instructies in acht die zijn meegeleverd met de uitrusting of installatie waarin onze producten zijn geïntegreerd.</p> <p>Zorg er bovendien voor dat onze producten worden geïnstalleerd en geconfigureerd door voldoende vakbekwaam en opgeleid personeel dat daartoe bevoegd is.</p>
<p><b>Pokyny pro montéry a konstruktéry zařízení, přístrojů, instalací</b></p> <p>Předtím, než začnete navrhovat zařízení, instalaci přístroje nebo aplikace obsahující naše produkty nebo tyto produkty používající, prostudujte si dokumentaci dodávanou s produktem a části provozní příručky věnované instalaci, manipulaci, používání a pokyny k dodržování norem a bezpečnostních předpisů.</p>	<p><b>Instruktioner til designere og montører af udstyr, maskiner og installationer</b></p> <p>Inden udstyret, maskinen, installationen eller applikationen, der indeholder vores produkter eller anvender vores produkt, bliver designet, henvises til den dokumentation, der følger med produktet, samt til betjeningsvejledningen, som indeholder oplysninger og instruktioner vedrørende installation, håndtering, brug og sikkerhed, der skal overholdes.</p>	<p><b>Instructies voor ontwerpers en installateurs van uitrusting, apparatuur en installaties</b></p> <p>Raadpleeg voordat de uitrusting wordt ontworpen of het apparaat wordt geïnstalleerd of toegepast waarin onze producten zijn opgenomen of worden gebruikt, de met het product meegeleverde documentatie en de bedieningshandleiding voor informatie en instructies met betrekking tot installatie, handling, gebruik, conformiteit/veiligheid.</p>

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Specification

External Dimension

Compliance Information

ET	FI	EL
<p><b>ELi üldine vastavusteave ja juhendid</b> (translation)</p> <p>ANTUD TOODE ON TÖÖSTUSLIK TOODE, MIS ON MÕELDUD INTEGREERIMISEKS JA KASUTAMISEKS KOOS TÖÖSTUSLIKU APARATUURI, SEADMESTIKU VÕI PAIGALDISTEGA. SEE POLE MÕELDUD KASUTAMISEKS LÕPPTARBIJATELE, VÄLJA ARVATUD JUHUL, KUI TOODE ON SPETSIAALSELT SELLEKS OTSTARBEKS KONSTRUEERITUD.</p> <p>Selle tööstusliku aparatuuri, seadmestiku ja paigaldiste tarnijad vastutavad kasutus- ja hooldusjuhendite ning vastavuskinnituste kaasaandmise eest oma klientidele ja kasutajatele.</p> <p>Vastavust EL-i direktiividele (elektromagnetilise ühilduvuse direktiivile, madalpingedirektiivile jne) võib mõjutada paigaldis või seade, millega tooted integreeritakse. Seetõttu annab Omron tootega kaasa ka ingliskeelsed juhised paigaldise projekterijatele ja paigaldajatele ning meie toodete professionaalsetele kasutajatele.</p> <p>Paljudel meie toodetel on eraldi Kasutusjuhend. See sisaldab üksikasjalikumad teavet meie toodete konfigureerimise, paigaldamise ja kasutamise kohta ning täiendavad teavet ja juhiseid rakenduste projekteerimise ja vastavuse kohta.</p> <p>Ajakohased juhendid, muudes keeltes juhendid ja täiendavad dokumendid leiata meie veebisaitidelt</p>	<p><b>Yleiset vaatimustenmukaisuustiedot ja ohjeet EU:ta varten</b> (translation)</p> <p>TÄMÄ TUOTE ON TEOLLISUUSKONEISSA, -LAITTEISSA JA -LAITTEISTOISSA KÄYTETTÄVÄKSI TARKOITETTU TEOLLINEN TUOTE. TUOTETTA EI OLE TARKOITETTU KULUTTAJAKÄYTTÖÖN, ELLEI TUOTE OLE ERITYISESTI SUUNNITELTU TÄLLÄISEEN KÄYTTÖTARKOITUKSEEN.</p> <p>Tällaisten teollisuuskoneiden, -laitteiden ja -laitteistojen toimittajat ovat vastuussa käyttö- ja huolto-ohjeiden sekä vaatimustenmukaisuustietojen toimittamisesta asiakkailleen ja käyttäjilleen.</p> <p>Laitteet tai laitteistot, joissa tuotteitamme käytetään, voivat vaikuttaa EU-direktiivien (esimerkiksi sähkömagneettista yhteensopivuutta koskeva EMC-direktiivi ja LVD-pienjännitedirektiivi) vaatimusten täyttymiseen. Tämän vuoksi Omron toimittaa englanninkieliset lisäohjeet laitteistojen suunnittelijoille ja asentajille sekä tuotteiden ammattikäyttäjille.</p> <p>Monissa tuotteissamme on erillinen käyttöohje. Siinä on tarkempia ohjeita tuotteidemme asetusten määrittämisestä, asentamisesta ja käyttämisestä sekä lisätietoja ja ohjeita sovellussuunnitteluun ja vaatimustenmukaisuuden täyttämiseen.</p> <p>Ajantasaisimpia käyttöohjeita, muunkielisiä ohjeita ja täydentäviä ohjeita on saatavilla verkkosivuillamme.</p>	<p><b>Γενικές πληροφορίες συμμόρφωσης και οδηγίες για την Ε.Ε.</b> (translation)</p> <p>ΤΟ ΠΡΟΪΟΝ ΑΥΤΟ ΕΙΝΑΙ ΕΝΑ ΒΙΟΜΗΧΑΝΙΚΟ ΠΡΟΪΟΝ, ΤΟ ΟΠΟΙΟ ΠΡΟΟΡΙΖΕΤΑΙ ΓΙΑ ΕΝΣΩΜΑΤΩΣΗ ΚΑΙ ΧΡΗΣΗ ΣΕ ΒΙΟΜΗΧΑΝΙΚΟ ΕΞΟΠΛΙΣΜΟ, ΣΥΣΚΕΥΕΣ Ή ΕΓΚΑΤΑΣΤΑΣΕΙΣ. ΔΕΝ ΠΡΟΟΡΙΖΕΤΑΙ ΓΙΑ ΑΠΕΥΘΕΙΑΣ ΧΡΗΣΗ ΑΠΟ ΤΟΥΣ ΚΑΤΑΝΑΛΩΤΕΣ, ΕΚΤΟΣ ΕΑΝ ΤΟ ΠΡΟΪΟΝ ΕΧΕΙ ΣΧΕΔΙΑΣΤΕΙ ΕΙΔΙΚΑ ΓΙΑ ΑΥΤΟΝ ΤΟΝ ΣΚΟΠΟ.</p> <p>Οι προμηθευτές αυτού του είδους βιομηχανικού εξοπλισμού, των συσκευών και των εγκαταστάσεων είναι υπεύθυνοι να παρέχουν στους καταναλωτές και στους χρήστες τους οδηγίες που αφορούν τη λειτουργία, τη συντήρηση και τη συμμόρφωση.</p> <p>Η συμμόρφωση των προϊόντων μας με τις οδηγίες της ΕΕ (Οδηγία περί Ηλεκτρομαγνητικής Συμβατότητας, Οδηγία περί Χαμηλής Τάσης κ.λπ.) μπορεί να επηρεαστεί από την εγκατάσταση ή από τη συσκευή στην οποία έχουν ενσωματωθεί τα προϊόντα. Συνεπώς, η Omron παρέχει περαιτέρω οδηγίες στα Αγγλικά για τους σχεδιαστές του εξοπλισμού, τους υπεύθυνους εγκατάστασης και τους επαγγελματίες χρήστες των προϊόντων μας.</p> <p>Πολλά από τα προϊόντα μας συνοδεύονται από ένα ξεχωριστό Εγχειρίδιο λειτουργίας. Σε αυτό παρέχονται πιο λεπτομερείς πληροφορίες σχετικά με τον τρόπο διαμόρφωσης, εγκατάστασης και χρήσης των προϊόντων μας, καθώς και συμπληρωματικές πληροφορίες και οδηγίες σχετικά με τη σχεδίαση των εφαρμογών και τη συμμόρφωση.</p> <p>Για να βρείτε τα πιο ενημερωμένα εγχειρίδια, άλλες γλώσσες και πρόσθετη τεκμηρίωση, ανατρέξτε στους σχετικούς ιστότοπους της Omron</p>
<p><b>Juhised aparatuuri, seadmestiku või paigaldise kasutajatele</b></p> <p>Järgige kindlasti juhiseid, mis olid kaasas aparatuuri või seadmestikuga, millesse meie tooted on integreeritud.</p> <p>Lisaks kontrollige, et meie tooted oleks paigaldatud ja konfigureeritud volitatud personali poolt, kellel on piisavad oskused ja kes on läbinud vastava koolituse.</p>	<p><b>Ohjeita koneen, laitteen tai laitteiston käyttäjille</b></p> <p>Noudata tuotteitamme käyttävän koneen tai laitteiston mukana toimitettuja käyttöohjeita.</p> <p>Varmista myös, että asianmukaisesti koulutetut ja valtuutetut henkilöt ovat asentaneet tuotteemme ja määrittäneet niiden asetukset.</p>	<p><b>Οδηγίες για χρήστες εξοπλισμού, συσκευών ή εγκαταστάσεων</b></p> <p>Βεβαιωθείτε ότι ακολουθείτε τις οδηγίες που συνοδεύουν τον εξοπλισμό ή την εγκατάσταση στα οποία ενσωματώνονται τα προϊόντα μας.</p> <p>Επιπλέον, βεβαιωθείτε ότι η εγκατάσταση και η διαμόρφωση των προϊόντων μας πραγματοποιούνται από εξουσιοδοτημένα άτομα, τα οποία διαθέτουν τις κατάλληλες δεξιότητες και εκπαίδευση.</p>
<p><b>Aparatuuri ja seadmestiku juhendid paigalduse projekterijatele ja paigaldajatele</b></p> <p>Enne tooteid sisaldava aparatuuri või seadmestiku paigalduse projekteerimist tutvuge tootega kaasasoleva dokumentatsiooniga ning paigaldus-, käsitsemis-, kasutusjuhendiga, samuti vastavus-/ohutusteabega ning juhenditega.</p>	<p><b>Ohjeita koneiden, laitteiden ja laitteistojen suunnittelijoille ja asentajille</b></p> <p>Ennen kuin aloitat meidän tuotteitamme käyttävän tai sisältävän koneen, laitteen tai laitteiston suunnittelun, katso tuotteen asennus-, käsittely- ja käyttöohjeet sekä vaatimustenmukaisuus- ja turvallisuustiedot tuotteen mukana toimitetuista ohjeista ja käyttöohjeesta.</p>	<p><b>Οδηγίες για σχεδιαστές και υπεύθυνους εγκατάστασης εξοπλισμού, συσκευών και εγκαταστάσεων</b></p> <p>Πριν από το σχεδιασμό του εξοπλισμού, της εγκατάστασης της συσκευής ή της εφαρμογής που περιέχουν τα προϊόντα μας ή πριν από τη χρήση του προϊόντος μας, ανατρέξτε στην τεκμηρίωση που παρέχεται με το προϊόν, καθώς και στο εγχειρίδιο λειτουργίας, για πληροφορίες και οδηγίες σχετικά με την εγκατάσταση, το χειρισμό, τη χρήση, τη συμμόρφωση και την ασφάλεια.</p>



HU	GA	LV
<p><b>Általános információk a megfelelőségrel kapcsolatban és javaslat az EU számára</b> (translation)</p> <p>JELEN TERMÉK EGY IPARI TERMÉK, MELY IPARI BERENDEZÉSKÉNT, IPARI KÖRNYEZETBEN VALÓ HASZNÁLATRA LETT TERVEZVE. A TERMÉK NEM FOGYASZTÓK ÁLTALI KÖZVETLEN FELHASZNÁLÁSRA LETT TERVEZVE, KIVÉVE, HA KIFEJEZETTEN ERRE A CÉLRA SZOLGÁL.</p> <p>Az ilyen ipari berendezések beszállítói felelősek azért, hogy az ügyfelek és a felhasználók számára biztosítsák a berendezés üzemszerű üzemeltetéséhez és karbantartásához szükséges utasításokat.</p> <p>Termékeink EU irányelveknek (EMCD, LVD, stb.) való megfelelését befolyásolhatja, hogy a berendezés hol vagy milyen eszközben lett elhelyezve. Az Omron ezért a termék mellé további – angol nyelvű – javaslatokat fogalmaz meg gépépítők és az üzembe helyezők, valamint a termékeinket használó szakemberek számára.</p> <p>Számos termékünkhöz jár egy külön használati kézikönyv. Ez részletesen ismerteti termékeink konfigurálásának, üzembe helyezésének és használatának módját, továbbá további információkkal és útmutatásokkal szolgál a felhasználás céljára és a megfelelőségre vonatkozóan.</p> <p>A kézikönyvek aktuális változatai, a kézikönyvek egyéb nyelvű változatai és a további dokumentumok honlapunkon érhetők el.</p>	<p><b>Faisnéis Ghinearálta Comhlíonta agus Teoracha i gcomhair an Aontais Eorpaigh</b> (translation)</p> <p>TÁIRGE TIONSCLAÍOCH IS EA AN TÁIRGE SEO ATÁ BEARTAITHE LENA IONCHORPRÚ AGUS LENA ÚSÁID I dTREALAMH, I bhFEARAI S NÓ I nGLÉASRA TIONSCLAÍOCH. NÍL SÉ BEARTAITHE LENA ÚSÁID AG TOMHALTÓIRÍ GO DÍREACH ACH AMHÁPRODUCT MÁ BHÍONN SÉ IONCHORPRAITHE I dTREALAMH NÓ I nGLÉASANNA ATÁ SAINCHEAPTHA DÁ LEITHÉID D'FHEIDHM.</p> <p>Tá de dhualgas orthu siúd a sholáthraíonn an trealamh, na fearais agus an gléasra tionsclaíoch seo teoracha oibriúcháin, cothabhála agus comhlíonta a chur ar fáil dá gcustaiméirí agus dá n-úsáideoirí.</p> <p>D'fhéadfadh an gléasra nó an gléas a n-ionchorpraítear táirgí dár gcuid ann teacht salach ar an gcaoi a gcomhlíonann ár dtáirgí teoracha ón AE (Comhoiriúnacht Leictreamaighnéadach, Voltas Íseal, srl.). Is dá bharr sin a chuireann Omron teoracha breise i mBéarla ar fáil do dhearthóirí trealaimh, do shuiteálaithe, agus d'úsáideoirí gairmiúla táirgí dár gcuid, i dteannta an táirge féin.</p> <p>Baineann Treoirleabhar Oibriúcháin ar leith le cuid mhaith dár gcuid táirgí. Tugtar sa treoirleabhar seo mionfhaisnéis ar an tslí leis an táirge a chumrú, a shuiteáil agus a úsáid, mar aon le breis faisnéise agus treoirlínte maidir le dearadh agus comhlíonadh feidhme.</p> <p>Leis na treoirleabhair is déanaí, treoirleabhair i dteangacha eile agus cáipéisíocht eile a fháil, téigh chuig ár láithreáin ghréasáin.</p>	<p><b>ES valstīm paredzēta vispārīga informācija par izstrādājuma atbilstību prasībām un instrukcijas</b> (translation)</p> <p>ŠIS IZSTRĀDĀJUMS IR RŪPNIECISKS PRODUKTS, KAS PAREDZĒTS UZSTĀDĪŠANAI UN IZMANTOŠANAI RŪPNIECISKI RAŽOTĀS IEKĀRTĀS, IERĪCĒS VAI IETAISĒS. PRODUKTS NAV PAREDZĒTS PATĒRĒTĀJIEM TIEŠAI IZMANTOŠANAI, JA VIEN NAV ĪPAŠI IZSTRĀDĀTS ŠĀDAM NOLŪKAM.</p> <p>Šādu rūpnieciski ražotu iekārtu, ierīču un ietaišu piegādātāji ir atbildīgi par lietošanas un uzturēšanas instrukciju un atbilstības informācijas sniegšanu saviem klientiem un lietotājiem.</p> <p>Mūsu produktu atbilstību ES direktīvām (EMCD, LVD, utt.) var ietekmēt ietaises vai ierīces, kurās tie uzstādīti. Tāpēc <i>Omron</i> izstrādājumam pievieno iekārtu projektētājiem, uzstādītājiem un šo izstrādājumu profesionāliem lietotājiem paredzētas papildu instrukcijas.</p> <p>Daudziem izstrādājumiem ir pievienota atsevišķa Eksploatācijas rokasgrāmata. Tajā sniegta plašāka informācija par to, kā konfigurēt, uzstādīt un izmantot mūsu izstrādājumus, kā arī papildu informācija un norādījumi attiecībā uz to konstrukciju un atbilstību prasībām.</p> <p>Jaunākās rokasgrāmatas, informācija citās valodās un papildu dokumentācija ir pieejama mūsu tīmekļa vietnēs.</p>
<p><b>Mūszakī tanácsok a berendezés felhasználói számára</b></p> <p>Mindig tartsa be a berendezéshez vagy a termékünket magában foglaló berendezéshez mellékelt kézikönyvben foglalt utasításokat.</p> <p>Emellett ügyeljen rá, hogy termékeink üzembe helyezését és konfigurálását szakember végezze.</p>	<p><b>Treoracha d'úsáideoirí trealaimh, fearais nó gléasra</b></p> <p>Bí cinnte go leanfaidh tú na teoracha a ghabhann leis an trealamh nó leis an ngléasra ar ionchorpraíodh táirgí dár gcuid ann.</p> <p>Bí cinnte gur pearsanra údaraithe, a bhfuil fios a ngnó acu agus atá oile go cuí, a dhéanann táirgí dár gcuid a shuiteáil agus a chumrú.</p>	<p><b>Instrukcijas iekārtu, ierīču vai ietaišu lietotājiem</b></p> <p>Rūpīgi ievērojiet instrukcijas, kas pievienotas iekārtai vai ietaisei, kurā uzstādīti mūsu izstrādājumi.</p> <p>Tāpat nodrošiniet, ka mūsu izstrādājumus uzstāda un konfigurē tikai attiecīgi pilnvaroti un pietiekami prasmīgi un apmācīti darbinieki.</p>
<p><b>Utasítások a gépépítők és az üzembe helyezők számára</b></p> <p>A berendezés vagy a termékünket tartalmazó vagy használó berendezés megtervezése előtt tekintse meg a termékhez mellékelt dokumentumokat és az üzembe helyezésre, kezelésre, üzemeltetésre, megfelelőségre/biztonságra vonatkozó információkat és utasításokat.</p>	<p><b>Treoracha do dhearthóirí agus do shuiteálaithe trealaimh, fearais nó gléasra</b></p> <p>Sula ndéanfar an trealamh, an gléasra nó an fheidhm a dhearadh a mbeidh ár dtáirge mar chuid de nó a úsáidfidh ár dtáirge, breathnaigh ar an gcáipéisíocht a chuirtear ar fáil i dteannta an táirge agus ar an treoirleabhar oibriúcháin le haghaidh faisnéise maidir le suiteáil, le láimhseáil, le húsáid, agus le comhlíonadh/sábháilteacht, mar aon le teoracha.</p>	<p><b>Instrukcijas iekārtu, ierīču un ietaišu projektētājiem un uzstādītājiem</b></p> <p>Pirms iekārtas, ierīces, ietaises vai aplikācijas, kura satur mūsu izstrādājumus vai kurā tie tiek izmantoti, projektēšanas iepazīstieties ar izstrādājumam pievienoto dokumentāciju un Eksploatācijas rokasgrāmatu, kurā sniegta informācija par uzstādīšanu, apkalpošanu un izmantošanu, kā arī informācija par atbilstību prasībām/drošību un instrukcijas.</p>

A

Specification

External Dimension

Compliance Information

LT	MT	PL
<p><b>Bendroji informacija apie atitiktis ir nurodymai ES</b> (translation)</p> <p>TAI YRA PRAMONINIS GAMINYS, SKIRTAS SUMONTUOTI IR NAUDOTI PRAMONINĖJE ĮRANGOJE, PRIETAISUOSE AR ĮRENGINIUOSE. GAMINYS NEPRITAIKYTAS TIESIOGIAI NAUDOTI VARTOTOJAMS, NEBENT JIS YRA SPECIALIAI SUKURTAS TAM TIKSLUI.</p> <p>Tokios pramoninės įrangos, prietaisų ir įrenginių tiekėjai savo klientams bei naudotojams privalo pateikti eksploatacijos, techninės priežiūros nurodymus ir atitiktis.</p> <p>Mūsų gaminių atitiktis ES direktyvoms (EMS, žemos įtampos direktyva ir t. t.) priklauso nuo įrenginio ar prietaiso, kuriame jie yra sumontuoti. Todėl bendrovė „Omron“ įrangos projektuotojams ir mūsų gaminių montuotojams bei profesionaliems naudotojams pateikia daugiau nurodymų anglų kalba.</p> <p>Daugelis mūsų gaminių turi atskirus eksploatacijos vadovus. Juose pateikiama detalesnė informacija, kaip sukongūruoti, įdiegti ir naudoti mūsų gaminius, taip pat papildoma informacija ir gairės apie atitiktis ir kaip suprojektuoti aparatūrą.</p> <p>Pačių naujausių vadovų, kitų kalbų ir papildomos dokumentacijos ieškokite mūsų svetainėse</p>	<p><b>Informazzjoni dwar il-Konformità u Struzzjonijiet Ġenerali</b> (translation)</p> <p>DAN IL-PRODOTT INDUSTRIJALI HUWA MAHSUB GĦALL-INKORPORAZZJONI U L-UŽU F'TAGĦMIR, APPARATI JEW INSTALLAZZJONJIEI INDUSTRIJALI. MHUWIEK MAHSUB GĦALL-UŽU DIRETT MILL-KONSUMATURI SAKEMM MA JKUNX INKORPORAT F'TAGĦMIR JEW F'APPARATI DDISINJATI APPOSTA GĦAL SKOP BĦAL DAN.</p> <p>Il-fornituri ta' dan it-tagħmir, apparati u installazzjonijiet industrijali huma responsabbli biex jiprovdu struzzjonijiet għat-tħaddim, il-manutenzjoni u l-konformità lill-konsumaturi u lill-utenti tagħhom.</p> <p>Il-konformità mad-Direttiva dwar l-EMC u dwar il-Vultaġġ Baxx tista' tiġi affettwata mill-installazzjoni jew l-apparat li fihom huma inkorporati l-prodotti tagħna. Għaldaqstant, Omron tipprovdi struzzjonijiet ulterjuri għad-disinjaturi tat-tagħmir u l-installaturi u l-utenti professjonali tal-prodotti tagħna, flimkien mal-prodott bl-Ingliż.</p> <p>Ħafna mill-prodotti tagħna jkollhom Manwal tat-Tħaddim separat. Dan jipprovdi informazzjoni ddetaljata dwar kif għandu jiġi kkonfigurati, installat u użat il-prodott tagħna, kif ukoll informazzjoni u linji gwida addizzjonali dwar id-disinn tal-applikazzjoni u l-konformità.</p> <p>Għal manwali l-aktar aġġornati, lingwi oħrajn u dokumentazzjoni addizzjonali, jekk jogħġbok irreferi għal websajts tagħna</p>	<p><b>Ogólne informacje i instrukcje dotyczące zgodności z przepisami w UE</b> (translation)</p> <p>NINIEJSZY PRODUKT JEST PRODUKTEM PRZEMYSŁOWYM PRZEZNACZONYM DO WYKORZYSTANIA I STOSOWANIA W SPRZĘCIE, URZĄDZENIACH LUB INSTALACJACH PRZEMYSŁOWYCH. NIE JEST PRZEZNACZONY DO BEZPOŚREDNIEGO UŻYTKU PRZEZ KONSUMENTÓW, CHYBA ŻE ZOSTAŁ SPECJALNIE PRZEZNACZONY DO TEGO CELU.</p> <p>Dostawcy takiego sprzętu przemysłowego, urządzeń oraz instalacji odpowiadają za dostarczenie klientom i użytkownikom instrukcji obsługi oraz informacji na temat użytkowania, konserwacji i zgodności z przepisami.</p> <p>Instalacja lub urządzenie, w których zostały zastosowane nasze produkty, może naruszać postanowienia dyrektyw UE (EMCD, LVD itp.). Dlatego wraz z produktem firma Omron przekazuje projektantom sprzętu oraz monterom i profesjonalnym użytkownikom naszych produktów dalsze instrukcje w języku angielskim.</p> <p>Wiele naszych produktów jest oferowanych z osobną instrukcją obsługi. Zawiera ona bardziej szczegółowe informacje na temat konfiguracji, instalacji i użytkowania naszych produktów, jak również dodatkowe informacje i wskazówki na temat projektowania rozwiązań i zachowania zgodności z przepisami.</p> <p>Aktualne instrukcje obsługi, instrukcje w innych językach oraz dodatkowe dokumenty można pobrać z naszych stron internetowych.</p>
<p><b>Nurodymai įrangos, prietaisų arba įrenginių naudotojams</b></p> <p>Būtinai vadovaukitės kartu su įranga arba įrenginiu, kuriame yra sumontuoti mūsų gaminiai, pateiktais nurodymais.</p> <p>Be to, būtinai mūsų gaminius turi įdiegti ir sukongūruoti pakankamai kvalifikuotas ir išmokytas įgaliotasis personalas.</p>	<p><b>Struzzjonijiet għall-utenti tat-tagħmir, l-apparat jew l-installazzjoni</b></p> <p>Kun żgur li ssegwi l-istruzzjonijiet fornuti mat-tagħmir jew l-installazzjoni li fihom ġew inkorporati l-prodotti tagħna.</p> <p>Barra minn hekk, kun żgur li l-prodotti tagħna jiġu installati u kkonfigurati minn personal awtorizzat li huwa tas-sengħa u mħarreġ biżżejjed.</p>	<p><b>Instrukcje obsługi sprzętu, urządzeń lub instalacji</b></p> <p>Należy przestrzegać instrukcji dołączonych do sprzętu lub instalacji, w których zastosowano nasze produkty.</p> <p>Należy również dopilnować, aby instalację i konfigurację naszych produktów przeprowadziły osoby do tego upoważnione, o odpowiednich kwalifikacjach i przeszkoleniu.</p>
<p><b>Nurodymai įrangos, prietaisų ir įrenginių projektuotojams ir montuotojams</b></p> <p>Prieš projektuodami įrangą, prietaisą, įrenginį ar aparatūrą, kuriuose sumontuoti mūsų gaminiai, arba naudodami mūsų gaminių, informacijos, kaip įdiegti, tvarkyti, naudoti, taip pat informacijos apie atitiktis / saugą ir nurodymų ieškokite kartu su gaminiu pateiktoje dokumentacijoje ir eksploatacijos vadove.</p>	<p><b>Struzzjonijiet għad-disinjaturi u għall-installaturi tat-tagħmir, l-apparat, u tal-installazzjoni</b></p> <p>Qabel tiddisinja, l-installazzjoni jew l-applikazzjoni tat-tagħmir jew l-apparat li jkun fihom il-prodotti tagħna jew qabel tuża il-prodott tagħna, irreferi għad-dokumentazzjoni pprovduta mal-prodott u mal-manwal tat-tħaddim għall-installazzjoni, l-immaniġġar, l-użu, l-informazzjoni dwar il-konformità/sigurtà u l-istruzzjonijiet.</p>	<p><b>Instrukcje dla projektantów i monterów sprzętu, urządzeń i instalacji</b></p> <p>Przed rozpoczęciem projektowania sprzętu, instalacji lub aplikacji wykorzystującej nasze produkty należy zapoznać się z dokumentacją dostarczoną z produktem oraz z instrukcją obsługi zawierającą informacje i instrukcje dotyczące instalacji, obsługi, użytkowania, zgodności z przepisami i bezpieczeństwa.</p>

PT	RO	SK
<p><b>Informações e instruções gerais sobre conformidade para a UE</b> (translation)</p> <p>ESTE É UM PRODUTO INDUSTRIAL DESTINADO À INTEGRAÇÃO E UTILIZAÇÃO EM EQUIPAMENTOS, APARELHOS OU INSTALAÇÕES INDUSTRIAIS. NÃO SE DESTINA À UTILIZAÇÃO DIRECTA POR CONSUMIDORES, EXCEPTO SE O PRODUTO TIVER SIDO ESPECIALMENTE CONCEBIDOS PARA TAL FIM.</p> <p>Os fornecedores de tais equipamentos industriais, aparelhos e instalações são responsáveis pela disponibilização de instruções de utilização, manutenção e conformidade aos respectivos clientes e utilizadores.</p> <p>A conformidade dos nossos produtos com as directivas da UE (CEM e BT, etc.) poderá ser afectada pela instalação ou o pelo dispositivo nos quais estes estão integrados. Por este motivo, a Omron disponibiliza instruções adicionais em inglês, para técnicos de concepção de equipamentos, instaladores e utilizadores profissionais.</p> <p>Muitos dos nossos produtos são fornecidos com um manual de funcionamento individual. Assim, o utilizador obtém informações mais detalhadas sobre os procedimentos de configuração, instalação e utilização dos nossos produtos, bem como informações e orientações adicionais de conformidade e projecto da aplicação.</p> <p>Para aceder a manuais mais actualizados, noutros idiomas e a documentação adicional, consulte os nossos Websites.</p>	<p><b>Instrucțiuni și informații generale privind conformitatea pentru UE</b> (translation)</p> <p>ACESTA ESTE UN PRODUS INDUSTRIAL DESTINAT INTEGRĂRII ÎN ȘI UTILIZĂRII CU ECHIPAMENTE, APARATE SAU INSTALAȚII INDUSTRIALE. ACESTA NU ESTE DESTINAT UTILIZĂRII DIRECTE DE CĂTRE CLIENȚI, DECÂT ÎN CAZUL ÎN CARE PRODUSUL ESTE SPECIAL PROIECTAT PENTRU ASTFEL DE SCOPURI.</p> <p>Furnizorii unor astfel de echipamente, aparate și instalații industriale au responsabilitatea să furnizeze clienților și utilizatorilor instrucțiuni privind operarea, întreținerea și conformitatea.</p> <p>Conformitatea produselor noastre cu directivele UE (EMCD, LVD, etc.) poate fi afectată de instalația sau dispozitivul în care sunt integrate. Prin urmare, Omron oferă instrucțiuni suplimentare în engleză pentru proiectanții de echipamente, instalatorii și utilizatorii profesioniști ai produselor noastre.</p> <p>O mare parte din produsele noastre beneficiază de un Manual de funcționare separat. Acesta oferă mai multe informații detaliate despre modul de configurare, instalare și utilizare a produselor noastre, cât și informații suplimentare și instrucțiuni privind design-ul și conformitatea aplicației.</p> <p>Pentru majoritatea manualelor actualizate, alte limbi și documentație suplimentară, consultați site-urile noastre Web</p>	<p><b>Všeobecné informácie a pokyny k dodržaniu predpisov pre EÚ</b> (translation)</p> <p>TENTO PRODUKT JE PRIEMYSELNÝM PRODUKTOM URČENÝM NA ZAKOMPOVAVANIE DO PRIEMYSELNÝCH ZARIADENÍ, SPOTREBIČOV ALEBO INŠTALÁCIÍ A POUŽÍVANIE V NICH. NIE JE URČENÝ NA PRIAME POUŽÍVANIE SPOTREBITEĽOM, POKIAL PRODUKT NIE JE NA TAKÝ ÚČEL URČENÝ.</p> <p>Dodávateľia takýchto priemyselných zariadení, spotrebičov a inštalácií sú povinní poskytnúť spotrebiteľom a používateľom pokyny k prevádzke, údržbe a dodržiavaniu predpisov.</p> <p>Súlad našich produktov so smernicami EÚ (EMCD, LVD atď.) môže ovplyvniť inštalácia alebo zariadenie, ktorého sú súčasťou. Spoločnosť Omron preto poskytuje ďalšie pokyny pre dizajnérov zariadení, montérov a profesionálnych používateľov produktov, a to v angličtine.</p> <p>K mnohým našim produktom je priložený samostatný manuál. Uvádzajú sa v ňom podrobnejšie informácie o tom, ako nastaviť, inštalovať a používať naše produkty, ako aj dodatočné informácie a usmernenia k návrhu aplikácií a dodržaniu súvisiacich predpisov.</p> <p>Ak máte záujem o najnovšie manuály, iné jazyky a ďalšiu dokumentáciu, navštívte naše webové stránky.</p>
<p><b>Instruções para utilizadores do equipamento, aparelho ou instalação</b></p> <p>Certifique-se de que respeita as instruções fornecidas com o equipamento ou a instalação equipado(a) com os nossos produtos.</p> <p>Além disso, assegure-se de que os nossos produtos são instalados e configurados por pessoal autorizado, com as competências e formação adequadas.</p>	<p><b>Instrucțiuni pentru utilizatorii de echipamente, aparate și instalații</b></p> <p>Asigurați-vă că urmați instrucțiunile oferite împreună cu echipamentul sau instalația în care au fost integrate produsele noastre.</p> <p>În plus, asigurați-vă că produsele noastre sunt instalate și configurate de personalul autorizat care este suficient de instruit și competent.</p>	<p><b>Pokyny pre používateľov zariadení, spotrebičov alebo inštalácií</b></p> <p>Nezabudnite sa riadiť pokynmi priloženými k zariadeniu alebo inštalácii, ktorej súčasťou sú naše produkty.</p> <p>Okrem toho zabezpečte, aby naše produkty inštalovali a nastavovali dostatočne vyškolení a kvalifikovaní oprávnení pracovníci.</p>
<p><b>Instruções para equipamento, aplicação, instaladores e projectistas de instalações.</b></p> <p>Antes de conceber o equipamento, aparelho, instalação ou aplicação equipado(a) com os nossos produtos, ou antes de utilizar o nosso produto, consulte a documentação fornecida com o mesmo e o manual de funcionamento para obter informações e instruções sobre instalação, manuseamento, utilização e conformidade/segurança.</p>	<p><b>Instrucțiuni pentru proiectanții și instalatorii de echipamente, aparate și instalații</b></p> <p>Înainte de proiectarea instalațiilor sau a aplicațiilor pentru aparate și echipamente ce conțin sau utilizează produsele noastre, consultați documentația oferită împreună cu produsul și manualul de funcționare pentru instrucțiuni și informații privind instalarea, manipularea, utilizarea, conformitatea/securitatea muncii.</p>	<p><b>Pokyny pre dizajnérov a montérov zariadení, spotrebičov a inštalácií</b></p> <p>Pred navrhnutím zariadenia, inštaláciou spotrebiča alebo aplikáciou obsahujúcou naše produkty, resp. pred použitím nášho produktu, si prečítajte dokumentáciu priloženú k produktu a manuál, v ktorom nájdete informácie a pokyny k jeho inštalácii, zaobchádzaniu, používaniu, k dodržiavaniu predpisov a bezpečnosti.</p>

A

Specification

External Dimension

Compliance Information

SL	SV	TR
<p><b>Splošne informacije o skladnosti in navodila za EU</b> (translation)</p> <p>TA IZDELEK JE INDUSTRIJSKI IZDELEK, NAMENJEN VDELAVI IN UPORABI V INDUSTRIJSKI OPREMI, NAPRAVAH ALI NAPELJAVAH. NI NAMENJEN NEPOSREDNI UPORABI POTROŠNIKOV, RAZEN ČE JE POSEBEJ ZASNOVAN ZA TAK NAMEN.</p> <p>Za zagotavljanje navodil za uporabo, vzdrževanje in skladnost so odgovorni dobavitelje take industrijske opreme, naprav ter napeljav.</p> <p>Na skladnost naših izdelkov z direktivami EU (EMCD, LVD in tako naprej) lahko vpliva napeljava ali naprava, v katero so vdelani naši izdelki. Omron zato snovalcem, monterjem in profesionalnim uporabnikom naših izdelkov zagotavlja dodatna navodila v angleščini.</p> <p>Veliko naših izdelkov ima svoja navodila za uporabo. V njih so dodatne podrobnosti o konfiguriranju, nameščanju in uporabi naših izdelkov, pa tudi dodatne informacije in smernice o zasnovi in skladnosti opreme.</p> <p>Najnovejša navodila, gradiva v drugih jezikih in dodatno dokumentacijo si lahko ogledate na naših spletnih mestih</p>	<p><b>Allmän information och instruktioner gällande inom EU</b> (translation)</p> <p>DENNA PRODUKT ÄR EN INDUSTRIELL PRODUKT AVSEDD FÖR ANVÄNDNING I INDUSTRIELLA UTRUSTNINGAR, APPARATER ELLER INSTALLATIONER. DEN ÄR INTE AVSEDD FÖR DIREKT ANVÄNDNING AV KONSUMENTER OM INTE PRODUKTEN ÄR SÄRSKILT UTFORMAD FÖR DET ÄNDAMÅLET.</p> <p>Leverantörer av sådan industriell utrustning, apparater och installationer är skyldiga att tillhandahålla sina kunder och användare instruktioner om drift, underhåll och efterlevnad.</p> <p>Våra produkter uppfyller kraven i EU-direktiven (EMCD, LVD osv.), men kan variera beroende på de installationer eller enheter där produkterna ingår. Omron tillhandahåller därför ytterligare instruktioner om produkten på engelska för konstruktörer av utrustning, installatörer och yrkesverksamma användare av våra produkter.</p> <p>För många av våra produkter finns en separat manual. Den ger mer detaljerad information om konfigurering, installation och användning av produkten, samt ytterligare information och riktlinjer för utformning och efterlevnad.</p> <p>Vi hänvisar till våra webbplatser för de senast uppdaterade manualerna, andra språk och ytterligare dokumentation.</p>	<p><b>AB Genel Uyum Bilgileri ve Talimatları</b> (translation)</p> <p>BU ÜRÜN, ENDÜSTRİYEL EKİPMAN, ALET VE TESİSATLARA YERLEŞİK YA DA BUNLARDA KULLANILMAK ÜZERE TASARLANMIŞ BİR ENDÜSTRİYEL ÜRÜNDÜR. ÜRÜN, ÖZELLİKLE BU AMAÇLAR İÇİN TASARLANMAMIŞSA TÜKETİCİLERİN DOĞRUDAN KULLANIMINA UYGUN DEĞİLDİR.</p> <p>Bahsi geçen endüstriyel ekipman, alet ve tesisatların tedarikçileri, müşterilerine ve kullanıcılarına kullanım, bakım ve uyum konularında gerekli talimatları sunmakla yükümlüdür.</p> <p>Ürünlerimizin yerleşik olduğu tesisat ya da cihazlar, bu ürünlerin AB Yönergeleriyle (EMCD, LVD vb.) uyumunu etkileyebilir. Bu sebeple Omron, ekipman tasarımcıları ile montajcılar ve ürünlerimizin profesyonel kullanıcıları için İngilizce dilinde ek talimatlar sağlar.</p> <p>Pek çok ürünümüz ayrı bir Kullanım El Kitabına sahiptir. Kullanım El Kitabında, ürünlerimizin nasıl yapılandırılacağı, kurulacağı ve kullanılacağı konusunda daha ayrıntılı bilgilere ve uygulama tasarımı ile uyum hakkında ek bilgi ve kılavuzlara yer verilir.</p> <p>En güncel kılavuzlar, diğer diller ve ek dokümantasyon için lütfen web sitelerimize başvurun</p>
<p><b>Navodila za uporabnike opreme, naprav ali napeljav</b></p> <p>Upoštevajte navodila, ki ste jih dobili z opremo ali napeljavo, v katero so bili vdelani naši izdelki.</p> <p>Poleg tega se prepričajte, da naše izdelke namestijo in konfigurirajo ustrezno usposobljene pooblaščenec osebe.</p>	<p><b>Instruktioner för användare av utrustning, apparater eller installationer</b></p> <p>Följ instruktionerna för utrustningen eller installationen där våra produkter ingår.</p> <p>Se också till att våra produkter installeras och konfigureras av behörig personal med tillräcklig kunskap och utbildning.</p>	<p><b>Ekipman, alet ve tesisat kullanıcıları için talimatlar</b></p> <p>Ürünlerimizin yerleşik olduğu ekipman veya tesisat ile birlikte sunulan talimatlara uymaya özen gösterin.</p> <p>Ayrıca, ürünlerimizin kurulum ve yapılandırmasının yeterli nitelik ve eğitime sahip yetkili personel tarafından gerçekleştirildiğinden emin olun.</p>
<p><b>Navodila za snovalce in monterje opreme, naprav ali napeljav</b></p> <p>Pred snovanjem opreme, naprave ali napeljave, ki vsebuje naše izdelke, ali pred uporabo našega izdelka si oglejte dokumentacijo, ki ste jo dobili z izdelkom, in priročnik za namestitev, ravnanje in uporabo ter informacije in navodila za skladnost ter varnost.</p>	<p><b>Instruktioner för konstruktörer av utrustning, apparater och installationer, samt installatörer</b></p> <p>Före konstruktion av utrustning, installation av apparat eller applikation innehållande vår produkt hänvisas till medföljande produktokumentation. För rätt installationsförfarande samt godkännande/säkerhetsinformation och vidare instruktioner hänvisas till installationsmanualen.</p>	<p><b>Ekipman, alet ve tesisat tasarımcıları ve montajcılar için talimatlar</b></p> <p>Ekipman ve alet kurulumunu gerçekleştirmeden önce ya da ürünlerimizi içeren uygulamayı veya ürünümüzü kullanmadan önce, kurulum, kullanım, uyum/emniyet bilgileri ve talimatları için ürün ile birlikte sunulan dokümantasyona başvurun.</p>

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# Manual Revision History

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The manual revision code is appended at the end of the control number printed at the bottom of the cover and back cover.

Cat. No. Z415-E1-08

↑  
Revision code

Revision code	Revision date	Revision description
01	September, 2019	First version
02	June, 2020	Add replacement parts
03	February, 2021	Corrected mistakes
04	June, 2021	Corrected mistakes
05	February, 2022	Corrected mistakes
06	April, 2022	Add notes
07	October, 2022	<ul style="list-style-type: none"><li>• Added safety precautions regarding security</li><li>• Corrected mistakes</li></ul>
08	November, 2022	Standard label change







## **OMRON Corporation Industrial Automation Company**

**Kyoto, JAPAN**

**Contact : [www.ia.omron.com](http://www.ia.omron.com)**

### **Regional Headquarters**

#### **OMRON EUROPE B.V.**

Wegalaan 67-69, 2132 JD Hoofddorp  
The Netherlands  
Tel: (31) 2356-81-300 Fax: (31) 2356-81-388

#### **OMRON ASIA PACIFIC PTE. LTD.**

438B Alexandra Road, #08-01/02 Alexandra  
Technopark, Singapore 119968  
Tel: (65) 6835-3011 Fax: (65) 6835-2711

#### **OMRON ELECTRONICS LLC**

2895 Greenspoint Parkway, Suite 200  
Hoffman Estates, IL 60169 U.S.A.  
Tel: (1) 847-843-7900 Fax: (1) 847-843-7787

#### **OMRON (CHINA) CO., LTD.**

Room 2211, Bank of China Tower,  
200 Yin Cheng Zhong Road,  
PuDong New Area, Shanghai, 200120, China  
Tel: (86) 21-5037-2222 Fax: (86) 21-5037-2200

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