IZICODE

Laser marking system

C230

HARDWARE MANUAL

TAECHU ENGINEERING CO., LTD.

Revision.1.1

Document Information

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※ Warning

This product is a Class 4 laser product. The precaution concerning this class must be strictly observed.

The safety precautions mentioned and proposed in this manual must be strictly observed. Extra care during use is mandatory to minimize the possibility of equipment damage or personal injuries. Users must not abruptly disengage or apply strong force to the equipment as well as emitting the laser beam to humans. Severe damage can be caused when the laser beam touches the eyes of human. Therefore, users must use protection goggles to prevent eye injury. In addition, we recommend wearing safety glasses and other safety equipment since every direct/indirect exposure of laser beams are very dangerous.

The safety mechanisms and hazard prevention mechanisms supplied by IZI-CODE does not fully satisfy the local factory inspection organizations of clients, safety rules, and national regulations of the competent country, and it does not guarantee that it is in compliance with legal or other requirements. Therefore, the system installer shall be responsible for verifying any necessary regulations prior to installing the safety mechanisms to prevent potential hazards that may be caused by the laser marking equipment.

1. Laser Safety Information

1.1 Laser Type

Laser is categorized into many types depending on the stimulating mechanism. Laser beam radiation is very hazardous if exposed to human bodies. Consequently, many countries have established related requirements and compliance requirements, and the lasers are classified according to its level of risk.

ANSI Z136.1-2014	
Class 1	Lowest risk level, non-hazardous
Class 1M	Hazardous if using focused optical system
Class 2	Blinking the eyes can prevent hazards (0.25 seconds)
Class 2M	Potential hazard even under 0.25 seconds of using focused optical system
Class 3R	Hazardous if laser beam enters the eyes
Class 3B	Hazardous if looking into visible or invisible laser beam source that may damage the eyes due to direct or indirect reflections. Reflected light at maximum output is also hazardous
Class 4	Projecting direct or indirect laser beam is very dangerous Risk of casing damage to eyes, skin, or risk of fire Strict control measures are required

1.2 Related Regulations

IZI-CODE laser system complies with the basic safety requirements of ANSI Z.136.1-2014(American National Standards Institute) and IEC60825-1 regulations (requirements), which are commonly applied internationally. Amendments to these regulations have recently been renewed. The amendments prescribe that only trained personnel shall have restricted access to the laser equipment, and signs indicating potential risks must be attached.

1.3 Management Method

Furthermore, laser products belonging to this class require extreme care when handling, and operation manuals, risk prevention mechanisms, etc. must be established to lower the class (risk level) for safer operation. We propose a management method that finely divides technical management areas and administrative management areas. Please strictly observe the management methods for implementation in your industrial site.

Technical Management Methods

- Technical management is an installation that are integrated in the laser system to contemplate the possible exposures.

Interlock System

- Interlocks are a common safety feature and are designed so that work can only be performed when the laser equipment is ready for operation. While the system operates and this signal activates, the error alarm LED lit and the laser stops working. Types of interlock includes UI interlock signals, laser source abnormality alarm signals, etc.

Access Key

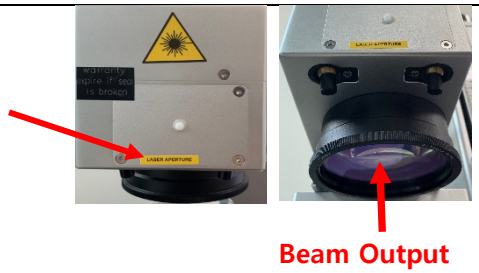
- According to safety regulations, the equipment is designed to convey power to the laser source only after turning on the power and the access key.

Administrative Management

- Administrative management refers to a guidebook that provides information for technical management, explaining regulation and operation.

Audible and Visible Emission Indicator

- Warning signs concerning exposure to radiation. Laser beams irradiate invisible infrared lasers, which may cause serious eye damage or burns. Therefore, safety stickers must be attached to the equipment to increase risk awareness for users.



- This label should be located at the entrance of laser and there is a label in front of the laser head. In hence, all users have to treat the equipment more carefully.

※ Warnings

When the laser system is operating, be aware not to expose your eyes or skin directly to the Laser beam emitting from the marking head lens.

(See picture above)

Use and Education for Personal Protection Equipment

- Eye Protection: Equip protection goggles depending on the laser type, wavelength and output level. (OD 3+, DI LB4 @ 5200-10,600nm)
- Skin Protection: Do not expose your skins to the laser and clothes, gloves must be fire resistant.

Restrictions and SOP (Standard Operating Procedure) from the manufacturer company, Laser Safety Officer (LSO) or Laser Safety Committee

※ Laser Control Restriction

- **Equipment must be used by a professional employee from the manufacturer or a laser safety manager.**
- **Access to the place where the laser is installed must be regulated for ensuring safety.**

※ Standard Operating Procedure

- **Operation manual and emergency measurements should be placed next to the equipment to use at any time.**

Appropriate Environment for Installation

- Clean and Cool Area: The installation site must be isolated from dust, oil, or other contaminants. Such elements may lead to difficulties for maintenance and repair, or shorten the lifespan of the laser equipment. The fan opening of the controller and the head part must be kept clean at all times. Also, it is recommended to install a vacuum system or air conditioning system.

- A controlled room with warning labels: Preparations for potential hazards must be provided at all times, and safety must be the first and foremost priority. (Safety cover, authorized personnel only)

Fire and Electrical Safety

※ All reflective objects must be removed from the laser installation area.

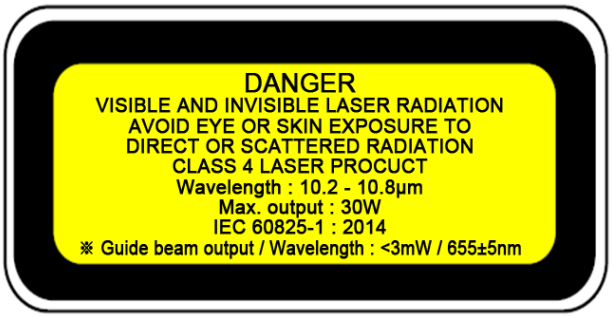
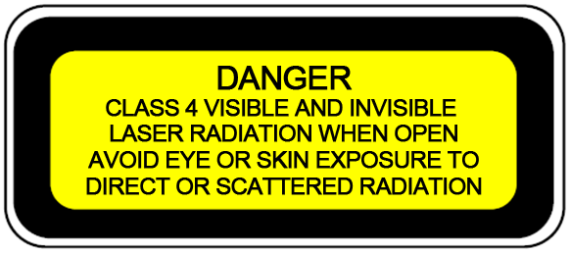
- Fire safety: If the laser beam comes into contact with combustible substances, it may cause fire. In order to prevent such incidents, a fire extinguisher must be available near the laser equipment at all times. Also, in order to prevent laser beam reflections, adequate provisions must be made to all surface that surrounds the laser equipment, including the walls. The window curtains must be treated for flame resistance.

- Electrical safety: Considering the fact that the laser equipment has high-voltage electrical circuits, an adequate electrical safety measures must be practiced at all times. Proper power must be supplied to the laser equipment and the use of extension cables for supplying power to the laser equipment is prohibited.

- Electric shock accident: The laser equipment must be grounded and the bottom of the equipment must be free of moisture. Also, operators must have caution to prevent spillage of liquid over the laser equipment which could lead to unexpected electric shock accidents.

- Inspection: Installation of electrical safety mechanism to prevent accidental laser irradiation is mandatory. Functional safety inspections on all cords, switches, circuit breakers, etc. must be performed on a regular basis.

1.4 Safety Warning and Sticker Information

Label info	Safety Warning and Labels
· Laser Beam Warning Label 1 (Stick to top of marking head)	
· Laser Beam Warning Label 2 (Stick to side part of controller and top of marking head)	
· Laser Beam Warning Label 3 (Stick to the front-top part of marking head)	
· Caution and Warning Label	
· Laser Danger Label (Stick to top of marking head)	

Label info	Safety Warning and Labels
· Laser Aperture Label (Stick to the front-bottom part of marking head)	
· Product Label (Stick to the rear-bottom part of controller)	

※ The manifacturer adjusts the voltage according to the national standard. User cannot change it arbitrarily
Ex) Europe: 220V, North America: 110V etc.

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.

Any changes or modifications (including the antennas) to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Label info	Safety Warning and Labels

- Lens Label

2. Laser Introduction

2.1 Laser Introduction and Structure

IZI-CODE laser series are designed to mark (dynamic or static) serial numbers, desired characters, or images on the surface of paper or plastic manufactured products. Basic laser wavelength is 10,600nm and it is within the infrared range of the light spectrum meaning that it is not visible to our eyes.

The wavelengths generated from this laser system requires extra caution because it could potentially cause serious damage to the eyes. Also, damage to the skin or other body parts may vary depending on the laser's power level and exposure duration.

2.2 Before Starting

※ All users are required to wear a certified laser protection goggles at all times when operating a laser equipment that doesn't have a safety cover.

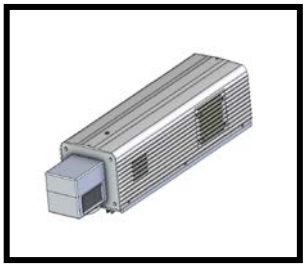
If you operate the equipment without understanding the function of each component, it may cause serious damage to the equipment. Therefore, it should be operated under the authorization of an expert or trained personnel after acquiring sufficient knowledge. This equipment must never be operated with interlocks or any other components disengaged. By turning OFF the Locker Switch (Main Power Switch), the product's power completely cuts off.

Box Contents

- The box includes a controller assembly and a head assembly on the top, securely packaged with PE foam. Various accessories (cables, manuals, etc.) are included in the bottom space.

Basic Parts & Accessories Provided

A list of parts and accessories given when purchasing the equipment

· Controller	
· Marking Head	
· CO2 Cable	
· Scanner Cable	
· UI cable(Option)	

· Key Interlock		
· Laser Power Key		
· Power Cable		 This is an AC Power Cable with two ferrite cores applied. Model Name: ZCAT2035-0930 Manufacturer: TDK
· 110mm x 110mm Lens		
· USB	Hardware Manual	
	Quick Start Manual	
	Software Manual	
	Software Backup File	
· QC Card, QC Report		

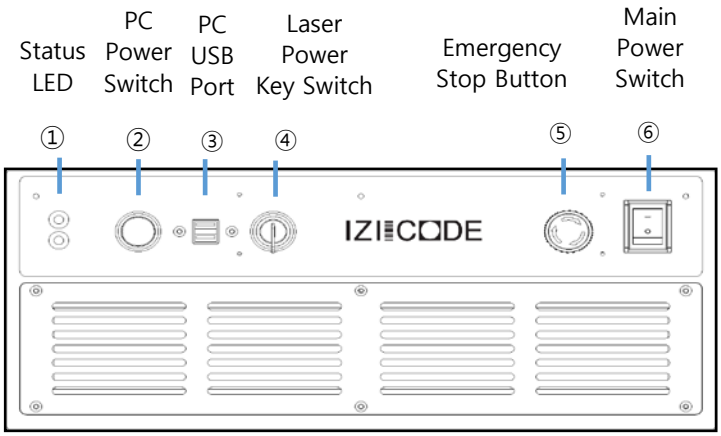
·	Fuse 2EA (Spare)
·	Wrench Bolts 4EA (M6 *10)
·	Square Spring Nuts 4EA

2.3 Structure

Hardware Components

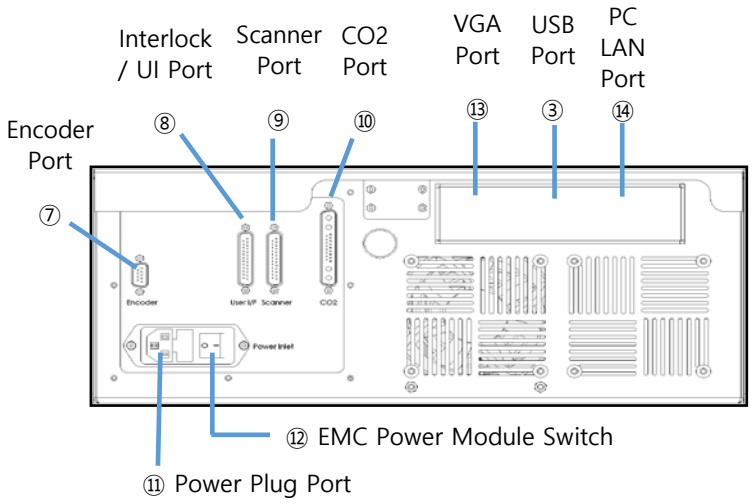
- IZI-CODE Laser C series is comprised with controller and marking head. The controller's interior consists of a power supply, laser source, and a signal processing system (Control board, interface boards, etc.).
- The marking head's interior are composed of laser head which emits the laser beam, scanner, F-Theta lens and other parts. The marking head and controller must be installed within 2m distance. Also, this product is capable of syncing with barcode readers and automated equipment processing system to be used as a Built-in equipment.
- The Controller fits into a 19" Rack (4U), and the marking head can be mounted by using the sliding spring nut on the bottom of the head (Intervals between nuts are 80mm) and M6 Bolts.

Front View (Controller)



①	· Ready(Blue light, source ready) · Error(Red light, safety issue or condition missing)
②	PC power switch
③	USB port (2 front, 4 rear)
④	Laser source power ON/OFF key switch
⑤	Emergency stop button
⑥	Main power ON/OFF switch

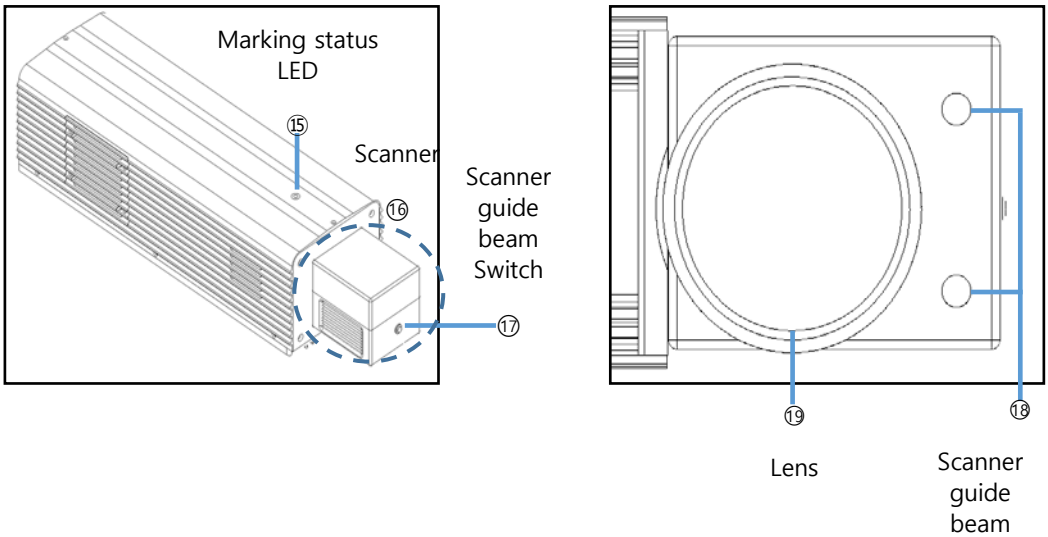
Rear view (Controller)



※ DC PORT, HDMI, DVI and Aux ports cannot be used.

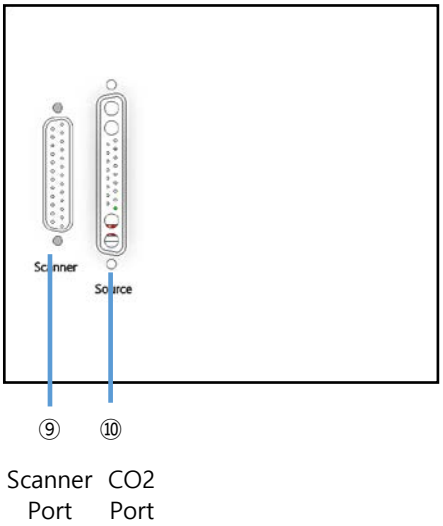
⑦	24V Open collector type encoder port
⑧	Interlock key or UI cable port
⑨	Controller and scanner cable port
⑩	Controller and CO2 laser source cable port
⑪	Power plug port to supply main power
⑫	EMC Power module switch
⑬	VGA Monitor port
⑭	PC LAN port (2 rear)

Front view (Marking Head)



⑮	BLUE LED ON: Marking(in process) / BLUE LED OFF : Marking(ready to mark)
⑯	The scanner will target the object and emit a laser beam that were generated from the laser source.
⑰	Scanner guide beam ON / OFF switch
⑱	The interval between these two scanner guide beams are 65mm and its used for adjusting the height between the marking head and the targeting object(refer to page 34, focal length)
⑲	F-Theta lens (refer to page 34)

· Rear view (Marking Head)



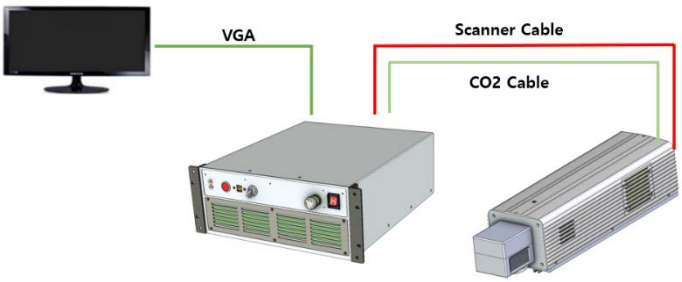
⑨	Controller and scanner cable port
⑩	Controller and CO2 laser source cable port

Hardware Connection

- Each part of the laser marking system must be interconnected using shielded cables. When control signals are sent from the laser control board to the interface board attached to the controller, the interface board converts the received signals into an independent signal system to send to each control part.

- The independent signals converted from the control board are connected to the CO2 cable and scanner cable, allowing the laser source and scanner control unit to synchronize and mark the target.

- The connection terminals are illustrated in the image below. These connectors have been designed according to a pre-planned Pin map, thus, it must be connected correctly.



Schematic for the hardware contacting

- One of the power lead-in wires which is grounded must be separated from the power line and must be connected to the laser system at all times. The reason for using a ground connection between the laser system and the electrical power is for personal safety and system protection.

- In regards to operation safety, the ground connection can be regarded as low impedance (solely for safety purposes), which helps to protect the user and the equipment from the occurrence of dangerously high voltage while using the system. Impedance connection at high-frequency level cannot be presumed, and protection at high frequency cannot be guaranteed.

※ Warning

The electrical system must be grounded at all times, and the ground connection must be inspected for safe operation. The ground connection must not be removed for any reason.

System Structure	
Laser Beam Generator	A laser source which emits and controls the laser beam by receiving a signal from the electronic control part.
Scanner	The laser beam comes out from the source to reach the target surface by refracting through the reflective mirrors (X and Y mirrors) and F-Theta lens.
Electronics Control	It is the main part for controlling the marking system. It is largely divided into power control, scanner control, source output control, and external interface.
Cooling Unit (Forced Air Cooling)	Since lasers irradiate a lot of heat, it is necessary to maintain adequate system temperature at all times through a cooling system. IZI-CODE laser system contains a cooling fan installed inside the controller.

※ Warning

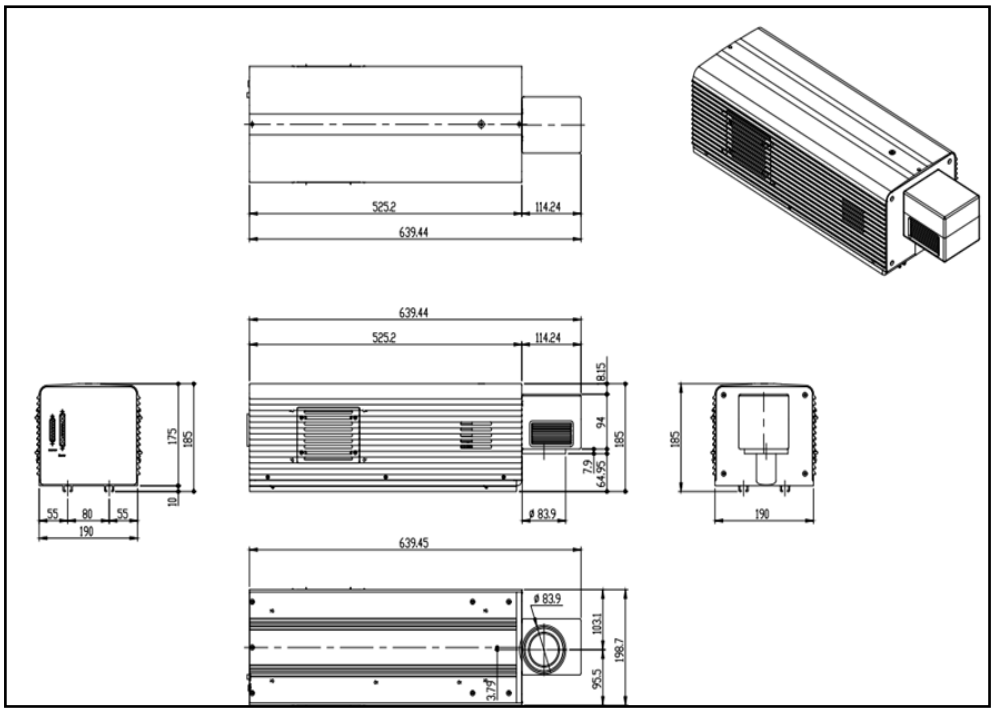
A specific amount of free space must be assured for the fan openings. Please be aware that obstructing the air circulation path could incur high temperature which could lead to laser malfunction.

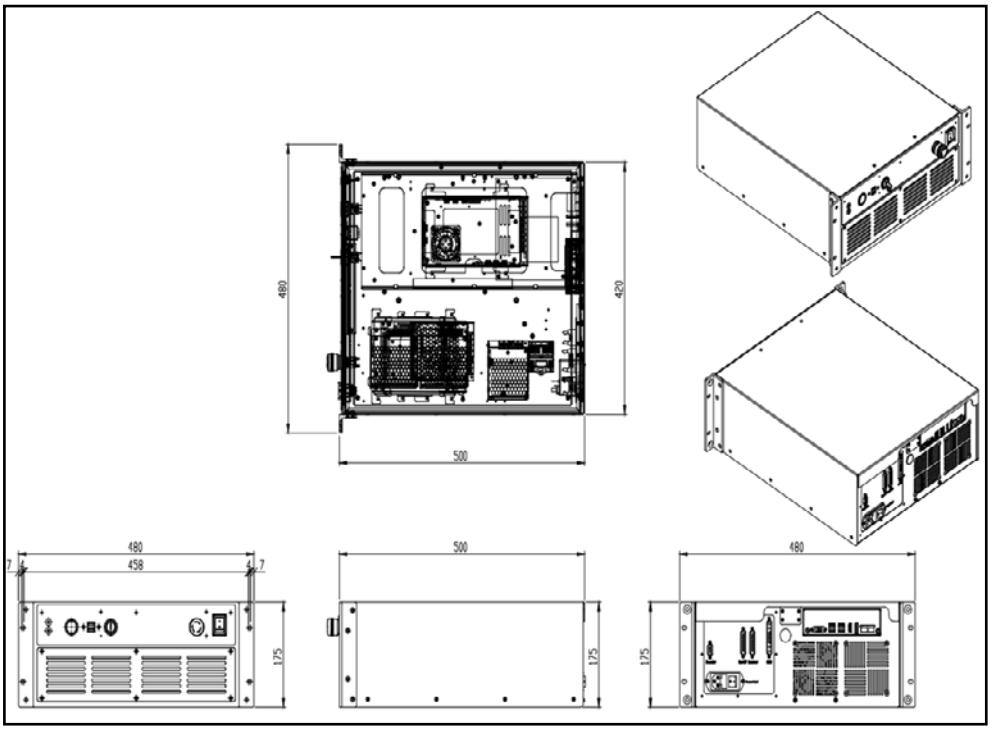
2.4 Technical Information

Specifications

·	Model name	C230
·	Laser output	30W (Wavelength: 10600 nm)
·	Scanner guide beam output	Up to 1mW peak (Wavelength: 655nm)
·	Lens	110mm X 110mm (Basic) 70mm X 70mm (Option), 175mm X 175mm (Option)
·	Main power supply	100~120VAC / 200~240VAC, 50/60Hz, 1000 W
·	Environmental condition	Temperature: 15°C(59°F) ~ 40°C(104°F), optimal workplace temperature Humidity: Not condensed from 10% to 80% without vibration
·	Operation method	Pulse Wave, Continuous Wave
·	Pulse	0kHz ~ 100kHz , 0% ~ 100%(Duty Cycle)
·	Marking head	Laser Source Scanner F-Theta Lens
·	Subsidiaries	Cables and other accessories
·	Cooling method	Forced air cooling
·	Weight	Total: 31.3kg Controller: 15kg Marking Head: 16.4kg
·	Control	Full graphic interface software using PC Encoder, sensor, user interface (UI)
***Safety Specification**		
·	Used place	Indoor
·	Pollution degree	2
·	OVERVOLTAGE CATEGORY	2
·	MAINS supply voltage fluctuations	±10 %
·	Altitude	Up to 2000m

Hardware Schematics





3. Laser Operation

3.1 Order of Operation

※ Warning

Using the equipment arbitrarily without following the guideline could cause injury from the emitted laser beam.

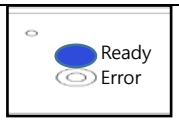
Preparation

- Check all connections and power cords.
- Connect the interlock key or UI cable to the User I/F port.
- Connect the CO2 cable from controller CO2 port to marking head CO2 port.
- Connect the scanner cable from controller scanner port to marking head scanner port.

Power

- Turn ON the main power switch.
- Soon the error LED (red) will light up along with powering the system.
- The illuminating components (LED, normal lamp, warning lamp, etc.) connected to the UI cable will light.
- There is some noise when the audible components (buzzer, etc.) are connected.

Laser Preparation



- Turn the key switch (Laser Power) to ON position to activate the laser source.
- The error LED will turn off and ready LED (blue) will light up.
- The illuminating components (LED, normal lamp, warning lamp, etc.) connected to the UI cable will maintain its light.
- There is consistent noise when the audible components (buzzer, etc.) are connected.

PC Setup

- Press the PC ON switch to boot the PC.
- Later on, the PC ON switch (white) will light up.

Software Setup

- Run the EzCad software from your PC.
- Check laser and software status.
- Check marking data and parameter settings.

※ When creating new marking data, test the marking first before applying the

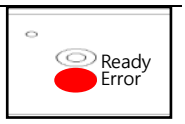
parameters.

Start Marking

- Below the screen of the software, click the Mark button or press F2 to start marking.

3.2 Emergency Stop

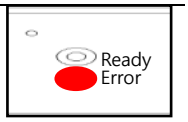
Emergency Stop



- Press the "Emergency Stop" button on the front panel when unexpected situations occur
- When pressed, the error LED will light.

3.3 Emergency Stop Release

Turn Off the Laser Source Power

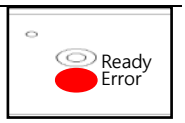


- Turn OFF the key switch on the controller's front panel.
- Soon the error LED will light up.

Environmental Inspection after Emergency Stop

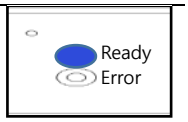
- Inspect the cause of the emergency stop and the nearby environment to rearrange.

Releasing the Emergency Stop



- Turn the emergency stop button on the controller's front panel to return to its normal state.
- Soon the error LED will light up.

Laser Preparation after Emergency Stop



- On the front panel, turn ON the key switch to power the laser source.
- The error LED will go out and ready LED will light up.
- Check your target and start marking again.

4. User Interface

4.1 User Interface Pin Map (D-SUB 25P Connector)

Pin No.	Pin Name	Type
1	Not used	
2	Not used	
3	Not used	
4	Not used	
5	INCOM	IN
6	Binary 8	IN
7	Binary 7	IN
8	Binary 6	IN
9	Binary 5	IN
10	Binary 4	IN
11	Binary 3	IN
12	Binary 2	IN
13	Binary 1	IN
14	G24V	OUT
15	Marking Start	IN
16	P24V	OUT
17	Not used	
18	Interlock Stop	IN
19	Interlock COM	IN
20	Not used	
21	Not used	
22	OUTCOM	IN
23	Marking Done	OUT
24	Marking Ing	OUT
25	Software Ready	OUT

4.2 User Interface (Pin description)

Pin Name	Pin Description
· **INCOM(5)**	COMMON terminal for the user input signals. This terminal is used with binary combination when selection message signals are used.
· **Binary 1~8(6~13)**	The message selection signal designated from user. User can select the message with binary combination using these bits. A maximum of 256 messages can be allocated and users can choose either the exterior control message to mark. Pins of Binary 1 ~ 8 and INCOM pins are interconnected.
· **G24V(14)**	A ground sensor power input for marking start operation. (Do not use for any other purpose than supplying power to the sensor. It could cause damage to the equipment.)
· **Marking Start(15)**	Sensor signal input for marking start signal. (Connects only NPN type)
· **P24V(16)**	A +24V Sensor Power input for marking start operation. (Do not use for any other purpose than supplying power to the sensor. It could cause damage to the equipment.)
· **Interlock Stop(18)**	This is the interlock pin. The two pins must be interconnected to operate the laser.
· **Interlock COM(19)**	
· **OUTCOM(22)**	COMMON terminal for the user output signals. The common terminal reads off the state of the laser equipment and where the supplied voltage to the OUTCOM terminal has been activated, the relevant signal goes through the internal relay and meets. (Use external power unit +24V or GND)
· **Marking Done(23)**	The output signal after completion of printing. User can change the signal output time in software settings.
· **Marking Ing(24)**	The output signal while laser is printing. (Marking head LED turns on and prints concurrently)
· **Software Ready(25)**	The output signal notifying that software is at normal state and ready.

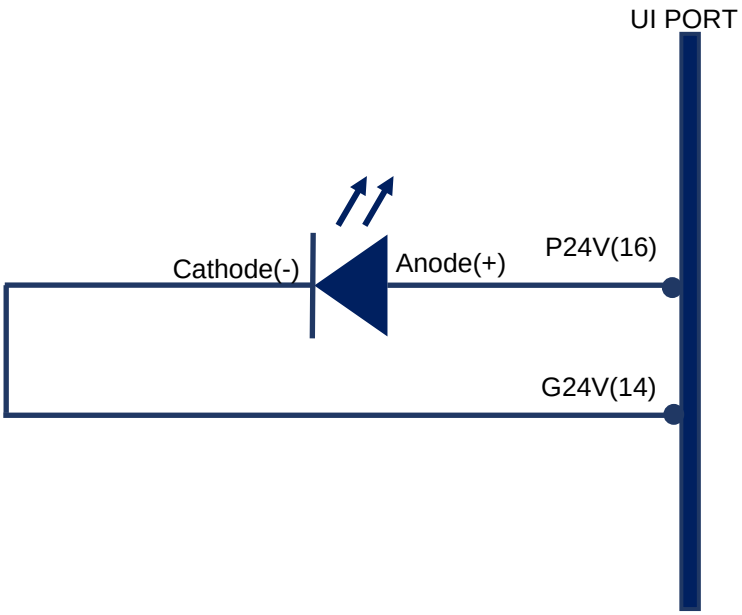
4.3 Binary Input Signal Table

The user input signals are designed to allow the simple automatic operation. Through the implementation of binary codes (See the bottom table), there are a maximum of 255 signal table. With selected bits you can mark by selecting a certain message number. Please refer to the software manual for detailed information.

Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Position in Table
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	0	2
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
1	1	1	1	1	1	1	0	254
1	1	1	1	1	1	1	1	255

4.4 User Interface Connection Examples

Machine Status LED Example

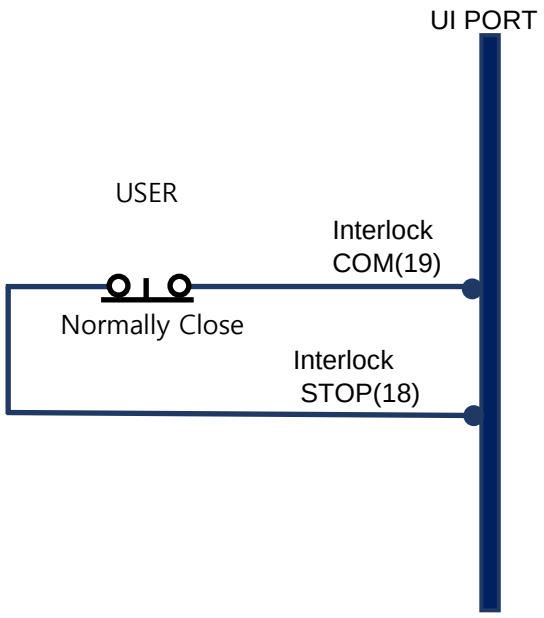


- Connect P24V pin to Anode(+) pin, and connect G24V pin to Cathode(-) pin.
- LED will light when the laser system's main power is at normal input state.

※ Warning

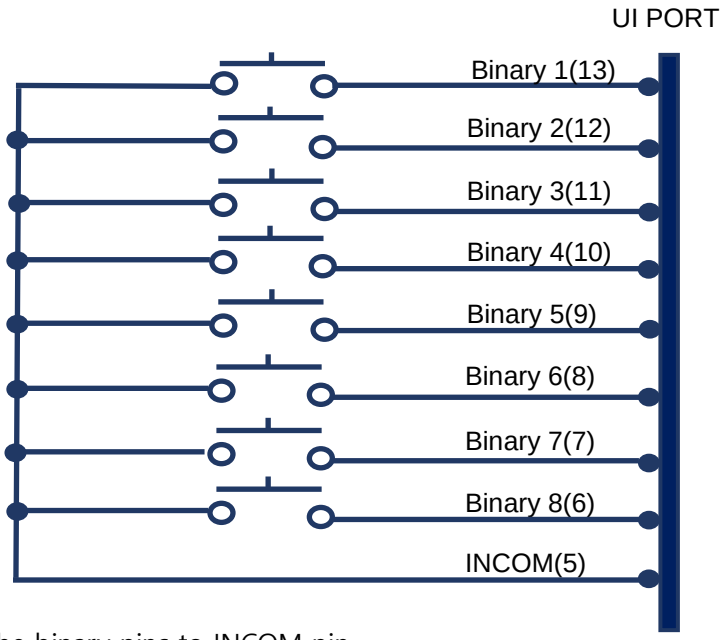
The above figure is an example of an LED connection. Such devices other than LED can be installed under the user's request. (refer to page 22) Please be aware this part of the UI connection is pre-installed by the manufacturer and thus should not be arbitrarily removed or replaced.

Interlock Example



- Connect the Interlock STOP pin and the Interlock COM pin.
- Laser system stops when both pins are open.
- **Caution : Laser system will operate when both pins are connected. (Normally Close)**

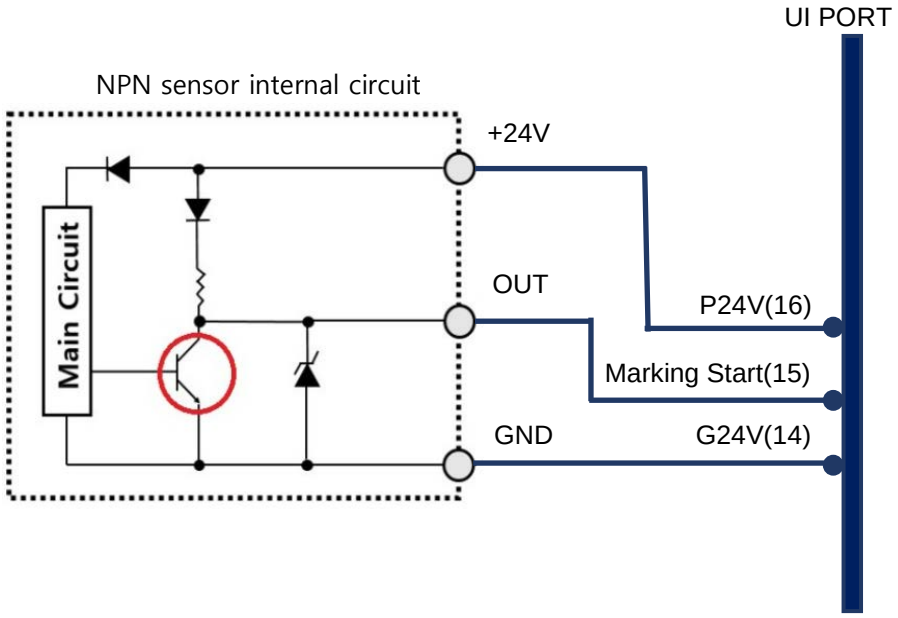
Input Pin (Binary) Example



- Connect the binary pins to INCOM pin.
- **Caution : INCOM pin must not be connected to external powers. (System will malfunction)**

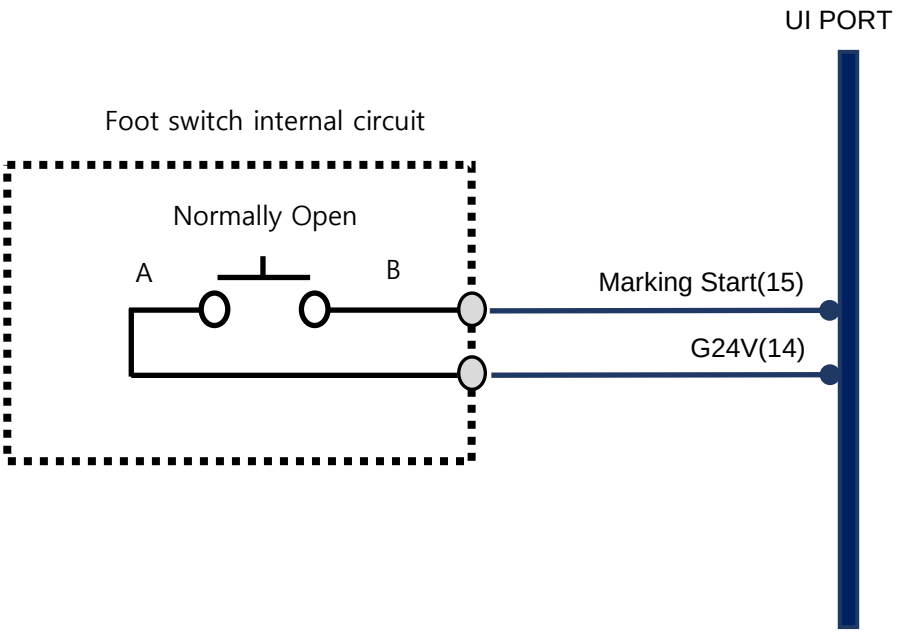
Input Pin (Marking Start) Example

NPN Sensor



- Joint the P24V and G24V to the sensor's power supply pin, and connect the sensor's output pin to the marking start pin.

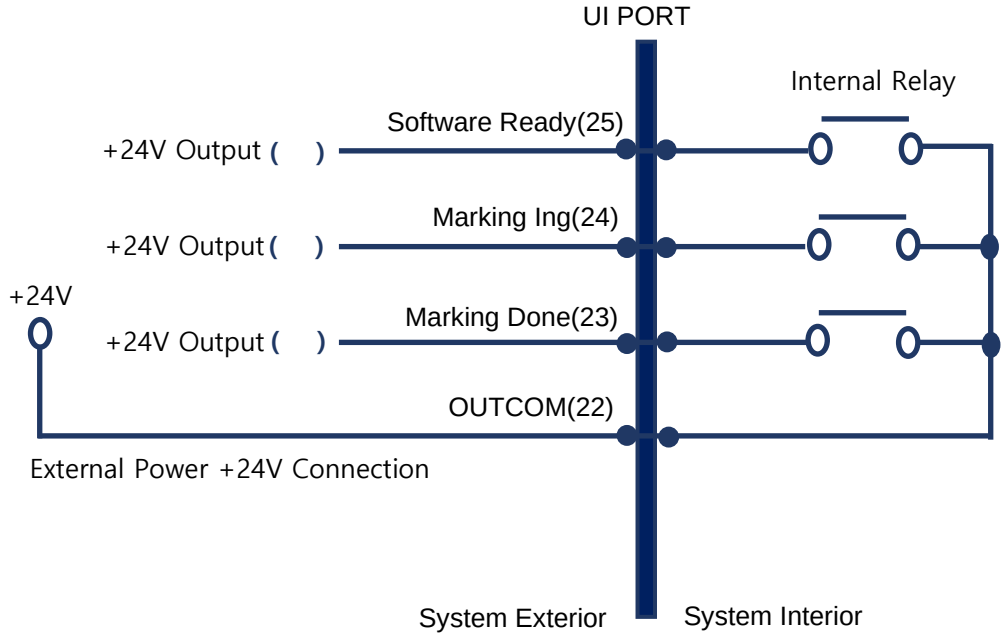
Foot Switch



- Joint the G24V pin to the "A" pin (Pole or COM), and connect the "B" pin (Normally Open) to the marking start pin.

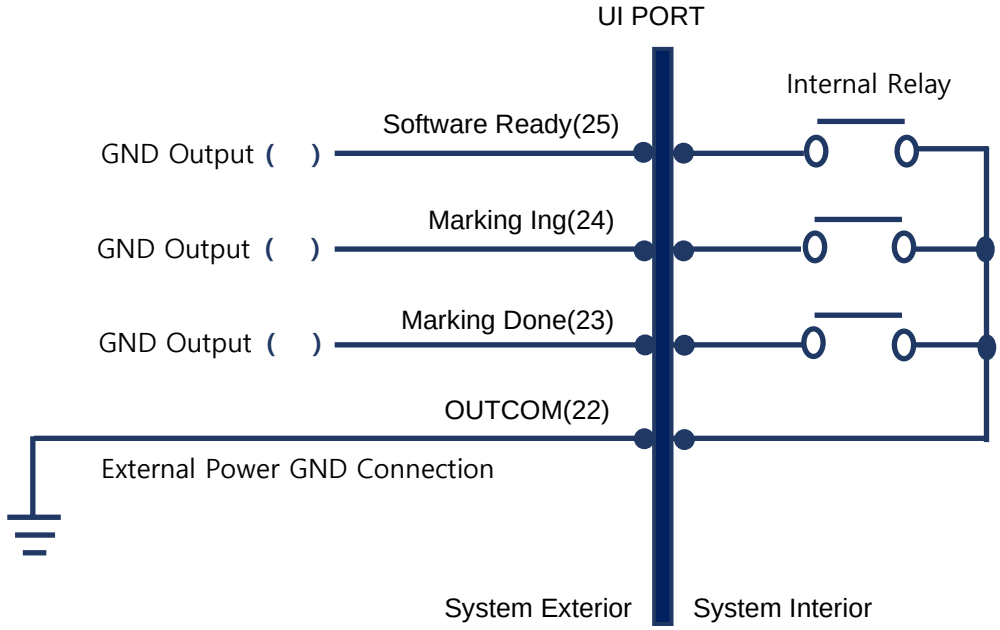
Output Pin Example

External Power +24V



- When OUTCOM pin and +24V is connected, the +24V connected to the OUTCOM will output.

External Power GND



- When OUTCOM pin and GND is connected, the GND connected to the OUTCOM will output.

4.5 Encoder (D-SUB 9P connector)

Pin No.	Pin Name	Type
1	P24V	OUT
2	Not used	
3	Encoder A+	IN
4	Encoder B+	IN
5	Not used	
6	Not used	
7	Not used	
8	G24V	OUT
9	G24V	OUT

※ Only 24V Open collector type encoder can be used.

5. Hardware

5.1 Laser Source

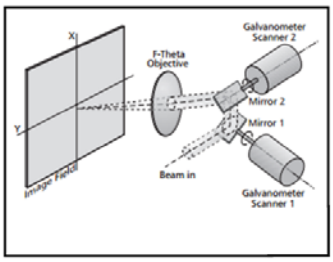
Laser Source Main Specifications

· Output	Wavelength	10.6μm
	Power Output	30W
	Power Stability (typical, after 3min)	±3%
	Mode Quality (M^2)	≤1.2
	Beam Waist Diameter (at $1/e^2$)	2.5 mm ± 0.5 mm
	Beam Divergence (full angle)	<7.0 mrad
	Ellipticity	<1.2
	Polarization	Linear(horizontal)
	Rise Time	<100 μs
	Operating Frequency	0kHz - 100kHz
· Power Supply	DC Input Voltage	48 VDC
	Maximum Current	10 A
· Cooling	Maximum Heat Load	480 W
	Coolant Temperature	<60°C
	Minimum Flow Rate	140CFM, 2 required (air)
· Environmental	Operating Ambient Temperature	15°C to 40°C
	Maximum Humidity	95%, non-condensing
· Physical	Dimensions (L × W × H)	427×89×139 mm (16.8×3.5×5.5 inches)
	Weight	6.5 kg (14 lbs)

IZI-CODE CO2 Laser consists of a body and head assembly, and these two parts are connected by a Scanner cable and a CO2 dedicated cable. Therefore, it requires extra care because the source will be unusable if this cable is severely bent or cut. This laser generator unit detects overheating and DC voltages to automatically create an error signal and stop the laser generator whenever a negative influence is caused to the laser source.

5.2 Scanner

The laser beam's marking speed and precision are completely dependent on the scanner mirror movements because it has nearly no mass or any transposition. Therefore, the laser marking controller operates by receiving the position data from the electro-current sensors connected to the X, Y Galvanometer fixed on the scanner axis. The angular movement of mirrors corresponds with one of the axis (X or Y) and one of the message dots of X/Y polar coordinate. In the case of dynamic printing, while creating the message properties the mirrors will move as the conveyor moves.



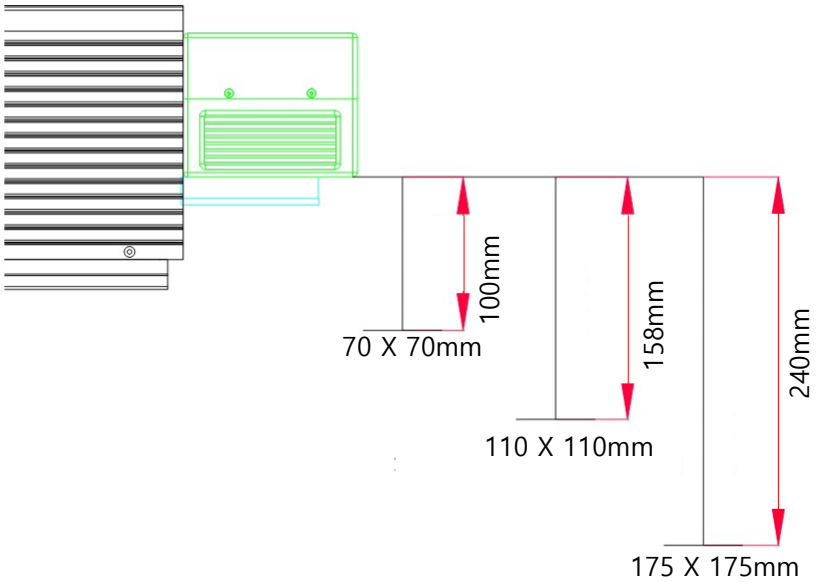
Scanner Specifications

	Type	**Normal**	**High Speed**
· Basic Performance	Aperture	10mm	10mm
	Wavelength	10.6 μm	
	Galvo Protocol	XY2-100	
· Dynamic Performance	Repeatability	<22 μrad	<8 μrad
	1%Of Full Scale	0.3ms	0.21ms
	10%Of Full Scale	0.7ms	0.71ms
	Non-Linearity	<0.4%	<0.2%
	Drift Over 8 Hours	<0.3mrad	<0.5mrad
· Typical Speeds	Max. Scanning Speed	6000mm/s	12000mm/s
	Max. Positioning Speed	15m/s	23m/s
· Optical Performance	Gain Error	<5mrad	<5mrad
	Zero Offset	<5mrad	<5mrad
	Operating Temperature	10-40℃	0-45℃
	Power Requirements	±15V 3A	±15V 2A
	Weight	1.9kg	1.95kg

5.3 Lens

The F-theta lens concentrates the laser wavelength's focus radiating from the laser generator to apply markings on the product surface. The F-theta lenses are categorized according to the size of the lens, and each lens size has varying marking areas and focal lengths. Check the focal length according to your lens size to adjust the distance between the scanner and the marking product. . Also, the focal length is fundamentally set to have two scanner guide beams correspond. (Refer to the figure below) There are three lens size: 70mm X 70mm, 110mm X 110mm and 175mm X 175mm. Users can select a product with their desired specification. Lenses are very fragile and it requires extra care for maintenance and handling. Refrain from making any contact with the lens surface and it must be cleaned with optical tissues and designated solvents (acetone or alcohol).

Focal length



Cleaning Sequence for Lens and Scanner Mirror

Laser Off

↓

Remove the lens from the head scanner and move to a safe spot

↓

Carefully clean the lens surface using clean paper and acetone

↓

Use ethanol to clean the inside of the scanner mirror

(Using acetone to clean the mirror could remove the surface coating)

↓

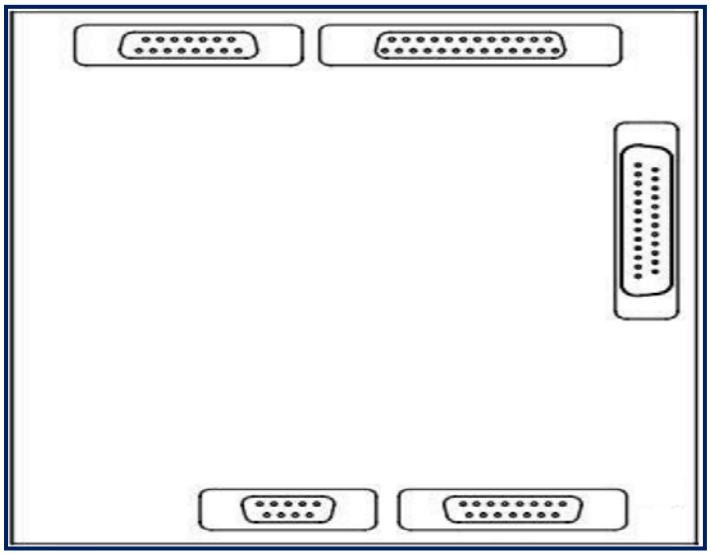
Repeat until the lens is completely clean. Check the status of the lens surface and reassemble

※ The lens and scanner must be cleaned on a regular basis to prevent pollution. Contaminants on the lens surface may reduce the lens transmission rate and it may lead to the degradation of marking power and quality.

5.4 Control Board

The control board is inserted into the Controller and it must be connected to the laser system using cables. The scanner's X and Y axis movement is controlled according to the supply of the digital signal format sent from the internal control board. Moreover, the laser generator's output control and user interface port, encoder, sensor etc. are synchronized through the exterior signals which allows to control the laser system.

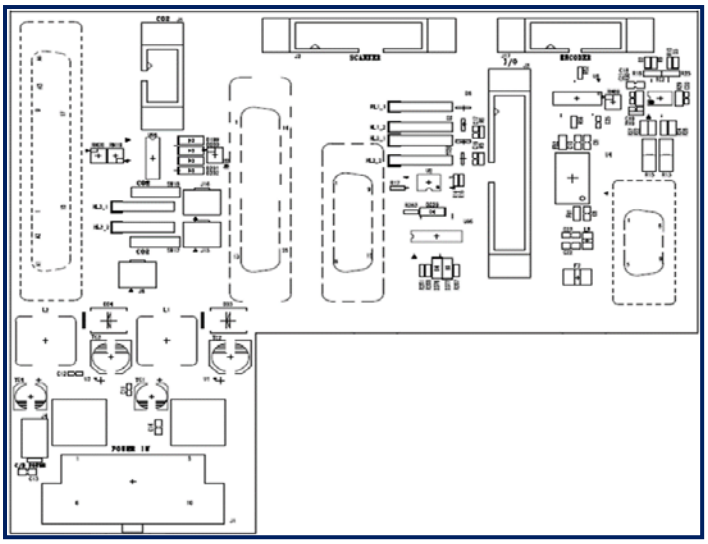
Control Board Drawing



5.5 Interface Board

The internal interface board is designed to transmit signals using photo couplers and diodes to ensure the safety of each component. It is an integrated signal transmission board designed to control various types of input signals.

Interface Board Drawing



5.6 Power Supply

Each part of the laser system requires maintaining a stabilized and adequate volume of power supply

Power Supply Main Specifications

· Laser Source	Input Spec	100~132 VAC / 180~264VAC, 50/60Hz
	Output Spec	48VDC, 12.5A
	Working Temp	-20~+60℃
	Working Humidity	20~90% RH non-condensing
· Internal Main	Input Spec	100~264 VAC, 50/60Hz
	Output Spec	24VDC, 4.5A
	Working Temp	-30~+70℃
	Working Humidity	20~90% RH non-condensing
· Scanner	Input Spec	100~264 VAC, 50/60Hz
	Output Spec	15VDC, 5A
	Working Temp	-30~+70℃
	Working Humidity	20~90% RH non-condensing
· PC	Input Spec	100~264 VAC, 50/60Hz
	Output Spec	12VDC, 4.2A
	Working Temp	-30~+70℃
	Working Humidity	20~90% RH non-condensing

5.7 Cooling System

Since laser generation produces high temperatures, it is necessary to maintain an adequate system temperature using a cooling system. Fail to do so may cause overheating of the equipment, which may lead to system malfunction. To prevent such incidents, IZI-CODE laser system has 1 fan installed inside the controller and 2 fans inside the marking head.

Cooling System Main Specifications

·	Rated Voltage	24VDC
·	Operating Voltage Range	14 to 26.4VDC
·	Input Current	0.4A(max 0.5)
·	Input Power	9.6W
·	Speed	4800RPM
·	Max. Air flow	102.59 (Min 92.33) CFM
·	Size	92mm * 92mm * 25mm

6. Maintenance and Repair

Frequent Inspection	Regular Inspection
Lens contaminants	Check once a week
CONTROLLER NET FILTER	Check once a month
MARKING HEAD NET FILTER	Check once a month
Equipment exterior	Check once a month
Computer	Frequently scan virus and back up computer

※ Caution - Use of control or maintenance and repair of equipment may result in hazardous radiation exposure.

7. Troubleshooting

7.1 Level.1 Abstract

The manual is comprised with useful information for IZI-Code laser users to cope with common technical issues. Our objective is to ensure user safety along with protecting the laser system from undergoing severe damage.

Troubleshooting Level 1 provides a procedure of what users should check to handle the equipment properly. It is a basic procedure for users to effectively solve problems sequentially by referring to the questionnaires. We recommend users to deal with certain issues by following through this troubleshooting process.

If users cannot solve the issue or needs further information, please send an RMA to our CS department for inquiry and request. (RMA form is on the last page)

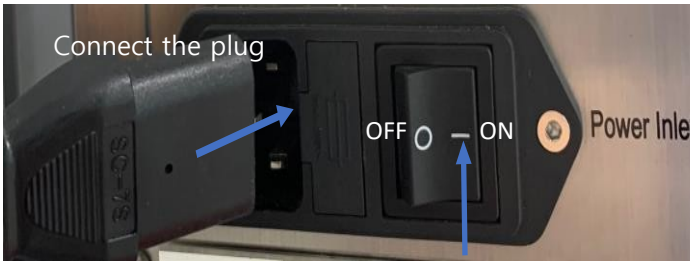
7.2 Level.1 Main Power Failure

①Status check

· Procedure

Unsolved

Check the EMC power module switch



Turn ON the EMC power module switch

Solved

Normal

② Status check

· Procedure

Unsolved

Check the fuse socket

Solved

Normal

③ Status check

· Procedure

Unsolved

Check the electricity supply

Inspect the assembly lines that shares the same electricity.

Solved

Normal

④RMA Application

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7.3 Level.1 · Key Switch Error

· Ready LED Malfunction

· Consistent error LED

①Status check

· Procedure

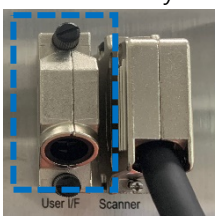
Check the rear panel connection

Solved

Normal

Unsolved

① Check interlock key connection.



①-2 Connect the interlock pin if using a UI cable.

② Status check

· Procedure

Did you reset the emergency switch?

Solved

Normal

Unsolved

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7.4 Level.1 Laser Shooting Error

①Status check

· Procedure

Are there lights emitting in Ready LED?

※Refer to Troubleshooting (Page 39)

· Level.1 Key Switch Error

· Ready LED Malfunction.

· Consistent error LED.

Solved → Normal

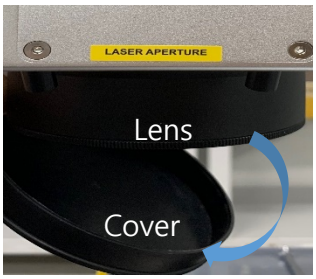
Unsolved

②Status check

· Procedure

Check the lens cover

Remove the lens cover.



Solved → Normal

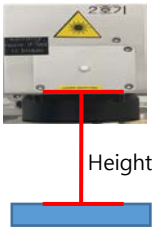
Unsolved

③Status check

· Procedure

How's the marking distance?

Adjust the distance of marking product and laser scanner.



Lens Size	70x70	110x110	175x175
Height	100mm	158mm	240mm

※ The lens size indicated are standard.
Height may differ depending on the lens size

Solved → Normal

Unsolved

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7.5 Level.1 Marking Power Adjustment

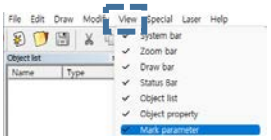
①Status check

· Procedure

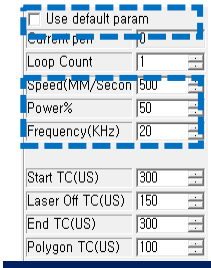
Check software settings

Check marking parameter

Solved
Normal



Unsolved



① 'Uncheck' User default param

② Increase power(%) to appropriate rate

③ Decrease frequency and speed(mm/s) value

②Status check

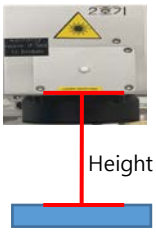
· Procedure

Check marking distance

Adjust the distance of marking product and laser scanner

Solved
Normal

Unsolved



Lens Size	70x70	110x110	175x175
Height	100mm	158mm	240mm

※ The lens size indicated are standard.
Height may differ depending on the lens size

③Status check

· Procedure

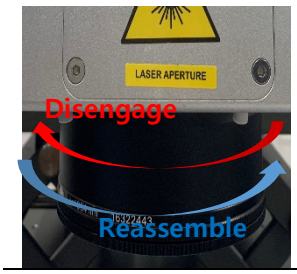
Are there any contaminants in lens?

Clean the lens

Solved
Normal

① Turn OFF the engine and disengage the lens
② Use acetone and paper towel to clean lens
*Wipe it out by moving your hands clockwise, counterclockwise.
Keep cleaning until all contaminants are removed.
③ Assemble the lens back to the scanner

Unsolved



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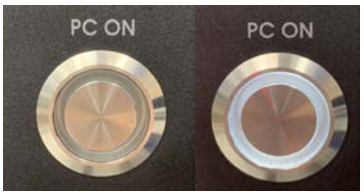
7.6 Level.1 PC Start Failure

①Status check

· Procedure

Check PC's power switch

Look at the front panel to confirm that the ON/OFF switch operates



When OFF When ON

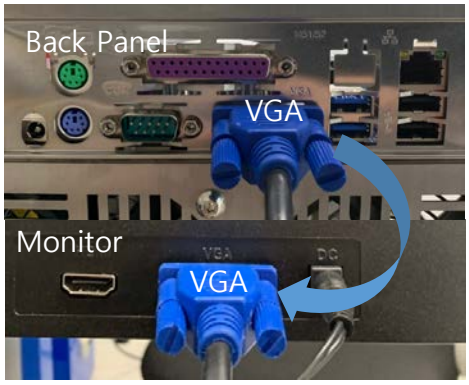
Solved → Normal

Unsolved

②Status check

· Procedure

Check PC monitor cable



① Re-connect the cable that are plugged on the back panel.

② Re-connect the cable that are plugged onto the monitor

③ Replace a new cable
※HDMI cannot be used.

Solved → Normal

Unsolved

③RMA Application

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7.7 Level.1 EZCAD2 Software Driver Error Imc_OpenDriver Fail

① Status Check

· Procedure

Check PC driver

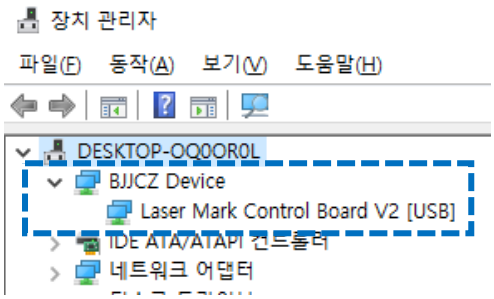
Verify driver installation:

Device manager → Bjjcz device → Laser mark control board V2 (USB)

Solved

Normal

Unsolved



② Status Check

· Procedure

Reboot your PC and open the program

Solved

Normal

Unsolved

③RMA Application

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8. RMA

Found any mechanical flaws or repairment is needed, please fill in the form below and reach to our closest service center or contact TAECHU ENGINEERING CO., LTD.

Return Material Authorization

Customer information

Company name		**Contact person**	
Street		**City**	
State		**Zip code**	

IZI-CODE information

Date Of Purchase		**Model**		**Serial No.**	

Product State

Damage	☐NO	**impact**	☐No	**Warranty sticker state**	☐Pass
	☐YES( )		☐YES( )		☐Fail( )
F-theta lens pollution	☐Pass	**Fiber state**	☐Pass	**Fuse state**	☐Pass
	☐Fail( )		☐Fail( )		☐Fail( )

Picture

Description

9. Customer Inquiries

Head Office: 1, Deokjeolchangmal-gil, Jeongnam-myeon, Hwaseong-si, Gyeonggi-do

R&D Center: 27, Dongtancheomdansaneop 1-ro, Hwaseong-si, Gyeonggi-do, Geumgang-Pentarium IX Tower #A3109, Republic of Korea

TEL: 82+ 31-359-9601

Fax: 82+ 31-359-3605