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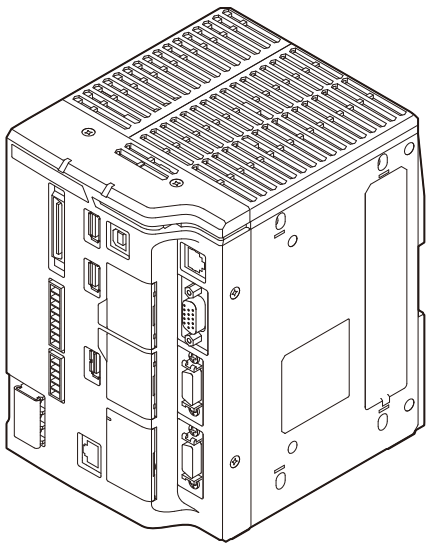
96M16607

Intuitive Vision System

CV-X400/X300 Series

Controller Instruction Manual

Read this manual thoroughly before using the CV-X400/X300 Series.
Always keep this manual in a safe place for future reference.



Documentation for the installation and configuration methods of the controller, software, and CAD data can be downloaded from the following URL.

www.keyence.com/cvxus

Introduction

This manual describes the hardware information. Read this manual thoroughly to understand how the CV-X400/X300 Series works in order to maximize the performance of the system.

- This manual is for the CV-X400/X300 Series. All references however, unless otherwise noted, pertain to the CV-X472. For more details about the differences between the models, see "Main Specifications" (page 12) and the "CV-X Series User's Manual".
- Always keep this manual in a safe location for future reference.
- Please ensure that the manual is passed to the end user of the controller.

Symbols

The following warning symbols are used to ensure safety and to prevent human injury and/or damage to property when using the system.

DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a situation which, if not avoided, could result in product damage as well as property damage.
Important	Indicates cautions and limitations that must be followed during operation.
Point	Indicates additional information on proper operation.
Reference	Indicates tips for better understanding or useful information.

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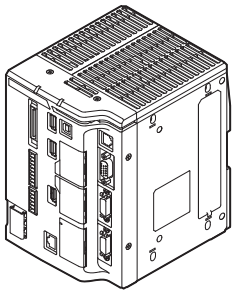
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- You may obtain a copy of the source code corresponding to the binaries for GPL/LGPL-licensed file by sending a request to Keyence customer service at "soft-license@keyence.co.jp". There will be a charge to cover the costs of providing the source code.

Package Contents

The equipment and accessories listed below are included in the package when shipped. After opening the carton, check that you have received all of the equipment and accessories listed below.

Standard Package

- Controller Unit × 1
  (CV-X402/X422/X452/X472/X482/X480LJ/X492/X302/X322/X352)
- SD Card × 1
  (OP-87133(512MB): CV-X402/X422/X302/X322, CA-SD1G(1GB): CV-X452/X472/X482/X480LJ/X352, CV-SD4G(4GB): CV-X492 (pre-installed in SD1 slot))
- Dedicated mouse (OP-87506) × 1
- Controller instruction manual (this manual)



Safety Precautions

General Precautions

DANGER	• Do not use this product for the purpose to protect a human body or a part of human body. • This product is not intended for use as explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere. • Do not use this product in an application that may cause death, serious injury or serious property damage due to a failure with this product should occur, such as nuclear power plants, on aircraft, trains, ships, or vehicles, used within medical equipment, playground equipment, roller coasters and other rides, etc.

WARNING	You must perform a sufficient risk assessment and confirm that risks have been reduced for the machine where this product is to be installed prior to installing this product. Provide appropriate protective failsafe measures on the machine independent from this product to ensure this machine operates safely in case a failure with this product should occur.

CAUTION	You must verify that this product is operating correctly in terms of functionality and performance before the start and the operation of this product.

NOTICE	• If the system is operated beyond its published specifications or if the system is modified, its functions and performance cannot be guaranteed. • When this product is used in combination with other instruments, functions and performance may be degraded, depending on the operating conditions and surrounding environment. • Do not subject the controller or connected devices to a sudden change in temperature. There is the risk of condensation occurring.

General cautions for the controller

WARNING	• Do not use with any power voltage other than 24 VDC. Doing so may cause fire, electric shock, or product malfunction. • Do not disassemble or modify the unit. Doing so may cause fire or electric shock.

Operating environment and conditions

CAUTION	To use this product properly and safely, avoid installing it in the following locations. Doing so may cause fire, electric shock, or product malfunction. • Locations that contain moisture or dust, or that are poorly ventilated. • Locations where the system is exposed to direct sunlight or temperature increases. • Locations where there are flammable or corrosive gases. • Locations where the unit may be directly subjected to vibration or impact. • Locations where water, oil or chemicals may splash onto the unit. • Locations where static electricity is present or electric discharge may occur.

NOTICE	• Keep this unit and cables away from high-tension cables and power lines. Otherwise, noise may cause malfunction or accidents. • Bundle cables with a camera cable protector (OP-88208) or with spiral tubing material. Direct bundling will concentrate the cable load on the bindings, which can result in cable damage or short circuit. • The controller and optional devices are precision components. To maintain performance do not subject them to vibration or shock.

Measures to be taken when an abnormality occurs

CAUTION	In the following cases, turn the power OFF immediately. Using the unit in an abnormal condition may cause fire, electric shock, or product malfunction. Contact your local Keyence office for repair. • If water or debris enters the system • If the system is dropped or the case is damaged • If smoke or a burning smell emits from the controller

Usage

NOTICE	• Before making any connections/disconnections, be sure to turn off the power of this unit and connected devices. Failure to do so may result in a malfunction of the controller or connected devices. • Do not turn the power off while you are programming. Otherwise, all or part of the program settings may be lost. • Do not block the ventilation holes. Otherwise, the inside temperature may rise and a malfunction may occur. • Do not allow an excessive amount of sunlight or bright indoor light to enter the camera for a long period of time. Doing so may cause damage to the image capture surface inside the camera.

Maintenance

NOTICE	• Do not clean with benzene, thinner, or alcohol. Doing so may cause discoloration or deformation of the unit. • If the unit has any dirt on it, wipe it off with a cloth moistened with a mild detergent, then wipe with a dry cloth.

Precautions on Regulations and Standards

CE and UKCA Marking

Keyence Corporation has confirmed that this product complies with the essential requirements of the applicable EU Directive(s) and UK regulations, based on the following specifications. Be sure to consider the following specifications when using this product in the Member States of European Union and United Kingdom.

EMC Directive (CE) and Electromagnetic Compatibility Regulations (UKCA)

- Applicable standard (BS)EN61326-1, Class A
- This product is intended to be used in an industrial electromagnetic environment.
- Use cables shorter than or equal to 30 m to connect this product and its external devices.
- Be sure to connect the ground terminal to a grounding.
- When connecting the LJ-V input unit CA-E100LJ/CA-E110LJ, for the head cables, attach the following ferrite core (furnished accessory CA-E100LJ/CA-E110LJ) at a position 200 mm or less from the controller's head connecter.
  Model: ZCAT2035-0930A-BK (manufactured by TDK)

Remarks: These specifications do not give any guarantee that the end-product with this product incorporated complies with the essential requirements of EMC Directive and Electromagnetic Compatibility Regulations. The manufacturer of the end-product is solely responsible for the compliance on the end-product itself according to EMC Directive and Electromagnetic Compatibility Regulations.

FCC Regulations

This product complies with the following regulations specified by the FCC.

- Applicable regulation FCC Part 15 Subpart B Class A
- 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,includinginterferencethatmaycauseundesiredoperation.
- FCC CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

KC mark (Republic of Korea)

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

Safety precautions on laser product

The LJ-V7000 series head laser classes which are to be connected to the CA-E100LJ/E110LJ are classified as per the following.

Models		LJ-V7020K/ LJ-V7020KB	LJ-V7020/ LJ-V7020B	LJ-V7060K/ LJ-V7060KB	LJ-V7060/ LJ-V7060B	LJ-V7080/ LJ-V7080B	LJ-V7200/ LJ-V7200B	LJ-V7300/ LJ-V7300B
Wavelength		405nm						
IEC60825-1, FDA(CDRH) Part 1040.10 *	Output	10mW	10mW	4.8mW	10mW	4.8mW	4.8mW	4.8mW
	Laser class	Class 2M	Class 2M	Class 2	Class 2M	Class 2	Class 2	Class 2

* The laser classification for FDA(CDRH) is implemented based on IEC60825-1 in accordance with the requirements of Laser Notice No. 56.

⚠ WARNING

- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
  Follow the instructions mentioned in this manual. Otherwise, injury to the human body (eyes and skin) may result.

  Precautions on Class 2M Laser Product
  - Do not stare into the direct or specularly reflected beam.
  - Do not direct the beam at other people or into areas where other people might be present.
  - Be careful of the path of the laser beam. If there is a possibility that the operator may be exposed to the specular or diffuse reflections, block the beam by installing a protective enclosure.
  - Install this product so that the path of the laser beam is not as the same height as that of human eye.
  - Do not direct the beam into an area where telescopic optical instruments (for example, telescopes and binoculars) are likely to be used. Viewing the laser output with the telescopic optical instruments may pose an eye hazard.

  Precautions on Class 2 Laser Product
  - Do not stare into the direct or specularly reflected beam.
  - Do not direct the beam at people or into areas where people might be present.
  - Be careful of the path of the laser beam. If there is a possibility that the operator may be exposed to the specular or diffuse reflections, block the beam by installing a protective enclosure.
  - Install this product so that the path of the laser beam is not as the same height as that of human eye.
- Do not disassemble this product. Laser emission from this product is not automatically stopped when it is disassembled.

Warning labels

The contents of warning indications and locations for attaching warning labels are described below.
The IEC (English) warning labels are attached to the unit when shipped from the factory. Use the suitable warning label included in the package of this product according to the countries and/or regions where this product is used. In this case, it can be affixed on the IEC (English) warning label, which has already been affixed to this product.

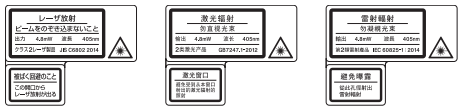
- **Warning label display content**

LJ-V7060K/LJ-V7060KB/LJ-V7080/LJ-V7080B/LJ-V7200/LJ-V7200B/LJ-V7300/LJ-V7300B

IEC (English) DIN (German) CEI (French) CEI (Italian)



JIS (Japanese) GB (Simplified Chinese) IEC (Traditional Chinese)



LJ-V7020/LJ-V7020B/LJ-V7020K/LJ-V7020KB/LJ-V7060/LJ-V7060B

IEC (English) DIN (German) CEI (French) CEI (Italian)

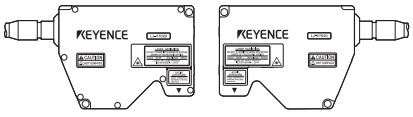


JIS (Japanese) GB (Simplified Chinese) IEC (Traditional Chinese)

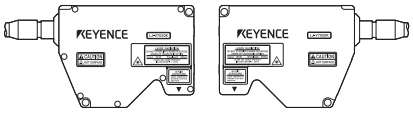


- **Warning label attachment positions**

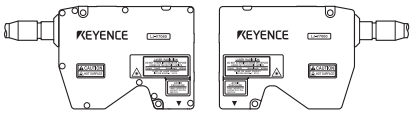
LJ-V7020/LJ-V7020B



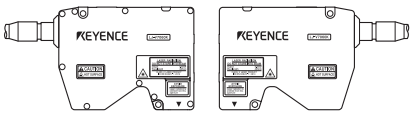
LJ-V7020K/LJ-V7020KB



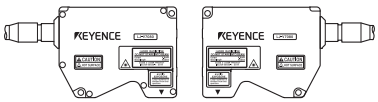
LJ-V7060/LJ-V7060B



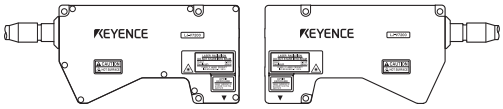
LJ-V7060K/LJ-V7060KB



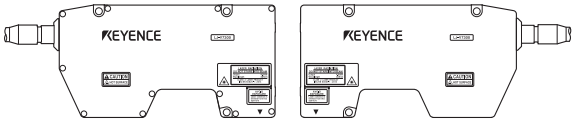
LJ-V7080/LJ-V7080B



LJ-V7200/LJ-V7200B

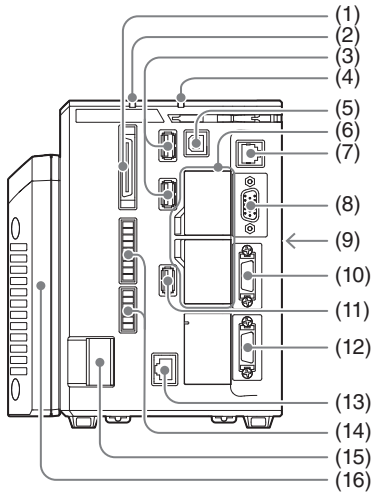


LJ-V7300/LJ-V7300B

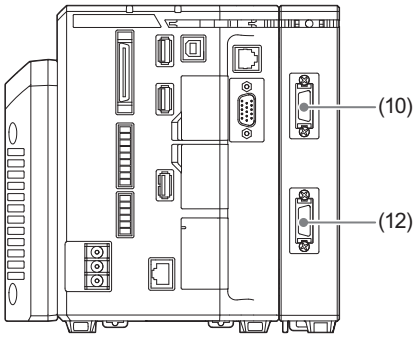


Identifying Controls and Connectors

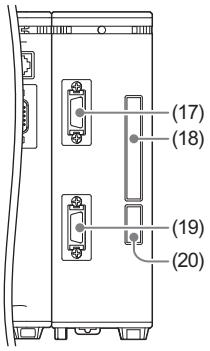
CV-X402/X422/X452/X472/X302/X322/X352



CV-X482/X492+CA-E100

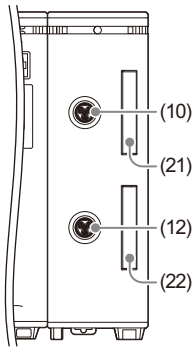


CV-X482/X480LJ+ CA-E100LJ/E110LJ*



* The CV-X480LJ does not support the CA-E110LJ.

CV-X482/X492+ CA-E200/200L



(1) I/O (Parallel I/O) connector

Use to connect the parallel input/output signals.

(2) Power supply LED

Lights up when the power supply is being fed to the unit.

(3) USB connector for the dedicated mouse

Connects the dedicated mouse (OP-87506, included in the package).

NOTICE	The USB connector for the dedicated mouse is used exclusively to connect the dedicated mouse (OP-87506). Connecting other equipment including a commercial USB mouse can cause a malfunction or damage to the controller or connected devices.

(4) Error LED

Lights up in conjunction with the ERROR output terminal turning ON.

(5) USB connector

Use to connect a USB cable.

(6) SD2 slot (upper), SD1 slot (lower)

Insert an SD card.

The accessory SD card (CA-SD4G: 4GB, CA-SD1G: 1 GB, or OP-87133: 512 MB) is inserted as SD card 1 in the lower slot (SD1).

Point	SD Card 1 must be inserted while the device is operating.

(7) RS-232C port

Use to connect an optional RS-232C communication cable (OP-26487: 2.5 m) or an optional RS-232C modular cable for touch panels (OP-87264: 3 m/ OP-87265: 10 m).

Reference	By default, RS-232C port 1 is used for data output and command control. For details about how to change the setting, see the CV-X Series User's Manual.

(8) MONITOR (RGB output) terminal

Use to connect to an external monitor.

NOTICE	The unit's power GND (0V) is shared in common with the connector seals and signal GND. If there is a potential difference with the connection for the external monitor, this may result in breakdowns or malfunctions of the unit and the connected external monitor. (Recommended monitors: CA-MP120/CA-MP120T)

Point	The unit's monitor output is XGA (1024 × 768 pixels). If commercial analog RGB monitors other than XGA monitors are used, the display quality may worsen depending on the monitor's specifications, and images may not properly be displayed.

(9) Expansion unit connector (right side)

Use when connecting all kinds of expansion units (camera input units, illumination expansion units, and communication expansion units).

(10) CAMERA 2 connector

Use to connect camera 2.

(11) USB HDD connector

Use to connect VisionDataStorage (CA-SDB2T: sold separately) or a USB 3.0/2.0 compatible hard disk.

NOTICE	The unit's power GND (0V) is shared in common with the connector seals and signal GND. If there is a potential difference with the connection for the USB HDD, this may result in breakdowns or malfunctions of the unit and the USB HDD.

Point	To connect the USB Cable for VisionDataStorage OP-88263, see the OP-88263 Instruction Manual and the VisionDataStorage User's Manual.

Reference	If there are concerns about the potential difference with the connections, then use a USB HDD which supports bus powered drives. The unit's bus power feed capacity is 900 mA (USB 3.0 compatible). Check with the USB HDD manufacturer concerning compatibility with the bus powered USB HDD that you are using. In addition, do not use USB hubs since they may cause the feed capacities and the data transmission speeds to decrease.

(12) CAMERA 1 connector

Use to connect to the camera 1.

(13) ETHERNET connector

Use to connect an Ethernet cable.

(14) OUT/IN connector (Terminal block)

Use for signal input and output (OUT/IN).

(15) Power and ground terminals

Use to connect power (24 V DC) and the ground wire.

(16) Fan unit (only CV-X472, X482, X480LJ and X492)

Equipped with controller cooling fan unit (CA-F100).

NOTICE	Since the equipped fan units can be detached and replaced for maintenance, the units cannot be operated with them detached.

(17) LJ-V HEAD B (LJ-V series head B connection) connector

Use to connect to the LJ-V series head B.

(18) ENCODER (Encoder signal connection) connector

Connects the encoder signal (RS-422 or open collector).

(19) LJ-V HEAD A (LJ-V series head A connection) connector

Use to connect to the LJ-V series head A

NOTICE	Don't connect any device except LJ-V series head. Otherwise it may cause a malfunction.

(20) I/O connector (terminal block)

Used in encoder 5 V out, and laser remote interlock inputs (short-circuited is factory default).

(21) (22) ENCODER (Encoder signal connection) connector (only CA-E200L)

Not used with the unit.

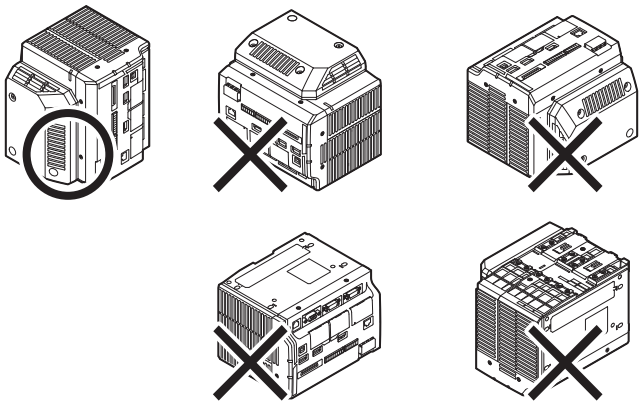
Installing the Controller Unit

Install the controller unit to DIN rail, or use the holes on the bottom of the controller to secure it with screws.

NOTICE	• Do not install the controller in a location with lots of dust or water vapor. The controller does not have a mechanism to protect it from dust or water. Dust or water entering the controller can cause damage to the controller. • Turn off the power to the controller when connecting or removing an expansion unit, a cable, or a terminal block. Connecting or removing the camera expansion unit, the cable, or the terminal block while the power is being supplied may damage the controller or peripheral devices. • When an expansion unit is not connected, place the connector protection cover back on the controller. Using the controller with the connector exposed may cause damage to the controller.

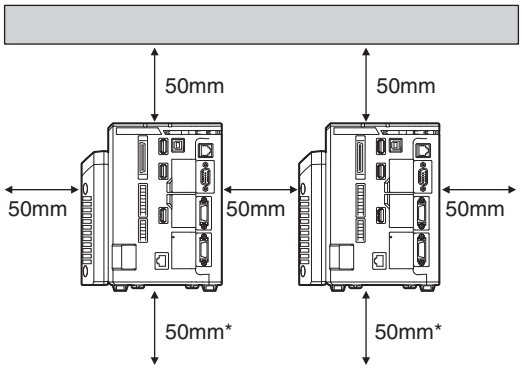
Caution on Direction of Controller Mounting

- Install the controller in the direction indicated by the circle shown below. Do not install the controller in any other direction.



Be careful in regard to cooling the unit in the installation site

- For ventilation, keep the space free of objects for 50 mm or more above the controller and 50 mm or more for both sides. Keep the space free of objects for 90 mm or more in the front of the connector panel in order to connect the cables safely.
- If the controller units are to be installed in rows, make sure that there are spaces of 50 mm or more between the controllers, and spaces of 50 mm or more above them.
  If spaces of 50 mm or more are ensured of even on the underside orientations of DIN rail mounts, etc., then the units can be used at higher than rated temperatures.



NOTICE	• Do not block the ventilation openings on the top and bottom of the controller. If the vents are blocked, heat will accumulate inside the controller and can cause a system failure. • If the temperature inside the control panel (temperature at the bottom of the controller) exceeds the rating, use forced air-cooling or increase the free space around the system to improve ventilation until the operating ambient temperature decreases below the rating. • When the temperature gets high inside the controller unit, the unit may display abnormal heat generation alerts such as the following. (1) Warning: you are being notified that it is likely that operations may be terminated due to high temperatures, (2) Operations terminated: since it is likely that thermal runaway and damage to the unit are being generated, and as the unit is in an error state, operations are terminated. If these alerts are displayed, quickly implement countermeasures such as lowering the ambient temperature to the rated temperature or lower and cooling the controller main unit.

- Some of the model in the CV-X400 series are factory equipped with fan units (CA-F100) on their left sides. Since the fan units can be detached and replaced for maintenance, the units cannot be operated with them detached.

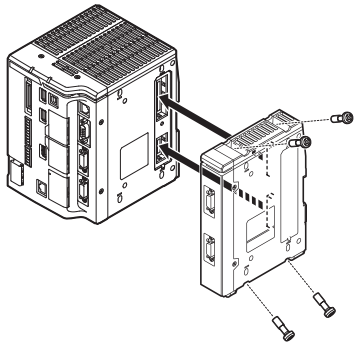
Installing the Expansion Unit

NOTICE	• Turn off the controller when connecting or disconnecting an expansion unit. Connecting or disconnecting a expansion unit while connected to a power source may damage the controller or peripheral devices. • When an expansion unit is not connected, keep the connector protection cover. Using the controller with the connector exposed may cause damage to the controller.

Point	Illumination expansion units and communication expansion units cannot be installed between camera input units and controllers.

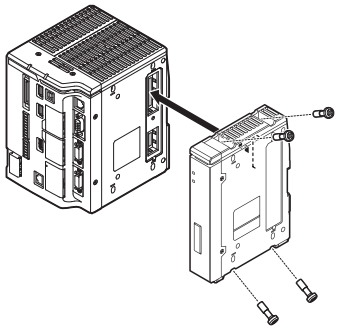
Installing the Camera Input Unit

Use a camera input unit in order to increase the number of cameras to connect. In addition, since the CV-X482, X480LJ and CV-X492 do not have camera connectors, camera input units which are compatible with the cameras that are to be used must surely be installed.
Remove the protective cover of the expansion unit connector from the right side of the controller, and then install the camera input unit as shown on the right.



Installing the Communication Expansion Unit

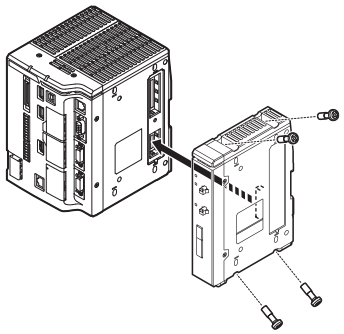
When using communication via a communication expansion unit, one of each type of optional communication expansion unit (EtherCAT: CA-NEC20E, EtherNet/IP: CA-NEP20E, PROFINET: CA-NPN20E) can be attached.
Remove the protective cover from connector 2 on the right side of the controller and install the communication expansion unit as shown on the right.



Point	Multiple communication expansion units cannot be used at the same time.

Installing the Illumination Expansion Unit

If the illumination is to be controlled from the controller, up to a maximum of eight optional illumination expansion units (CA-DC40E/DC50E/DC60E*) can be added (note that the maximum allowable number of CA-DC50E units and CA-DC60E* units is two, respectively). Remove the protective cover from connector 2 on the right side of the controller and install the illumination expansion unit as shown on the right.

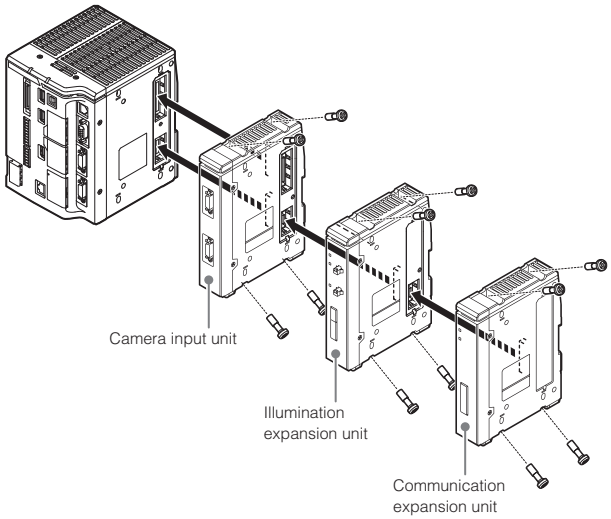


* The CV-X300 Series does not support the CA-DC60E.

NOTICE	Turn off the controller when connecting or removing an illumination expansion unit. Connecting or removing the illumination expansion unit while connected to a power source may damage the controller or peripheral devices.

When Using the Camera Input Unit, Illumination Expansion Unit, and Communication Expansion Unit Together

Mount the camera input unit directly to the controller, then mount the illumination expansion unit and communication expansion unit to the right side of the camera input unit.

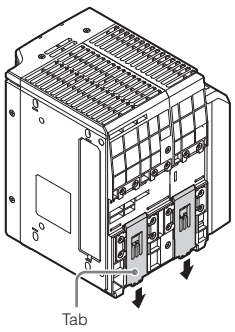


Installing the Controller

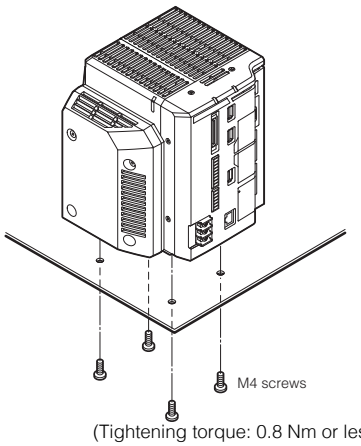
NOTICE	Mount the controller in a stable location that is free from vibration.

Installing the Controller on a DIN Rail

The controller and the expansion unit are designed to be mounted on a DIN rail.
Pull the tab on the bottom in the direction of the arrow to mount or dismount the controller.



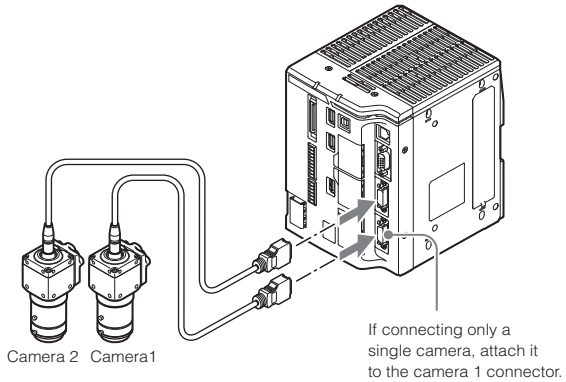
Mounting to the Bottom of the Controller



(Tightening torque: 0.8 Nm or less)

Connecting the Camera Cables

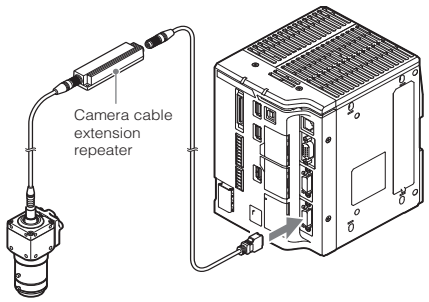
Connect the camera to the camera connector of the controller unit or camera input unit.
If connecting only a single camera, attach it to the CAM1 connector.



NOTICE	• Make sure that there is no power to the controller before connecting cables. Connecting cables while the power is turned on may cause damage to the camera or peripherals. • Bundle cables with a camera cable protector (OP-88208) or with spiral tubing material. Direct bundling will concentrate the cable load on the bindings, which can result in cable damage or a short circuit. • In the absence of other specifications, the minimum cable flexibility (R) should be 3 times or greater the external diameter (5 times or greater is recommended). Additionally, repeated curvature and screw stress should be avoided. The minimum bend radius is the same, even when using high-flex cable. When using a cable carrier, select one with R100 or greater unless otherwise stated. • Do not connect cameras, LJ-V series heads, or cables, etc. which the controller does not support. This may cause failures, or breakdowns of the unit and connected devices. • For details about the cameras and cable combinations that the controller supports, see the CV-X Series Setup Manual.

Using the repeater for camera cable extension

The camera cable can be extended by using the extension repeater for the camera cable (excluding the LJ-V Series head and the CA-HF camera).
For more information on connection, read the instructions provided with the camera extension repeater.



Connecting the 24 VDC Power Source

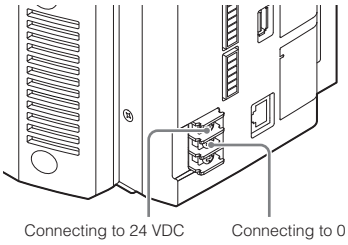
NOTICE

- Use electrical wiring AWG14 to AWG22.
- Make sure to connect the frame ground terminal for the 24 VDC power source to a type D ground.
- The sizes of solderless connectors are shown below. Use connectors that fit M3 screws.



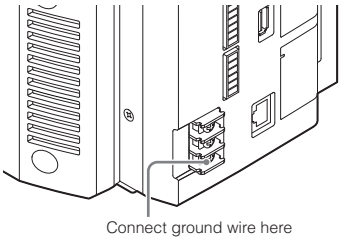
- Tighten the screws with a torque of 0.5 to 0.75 Nm.

1 Connect 24 VDC and 0 V to the power supply terminals.



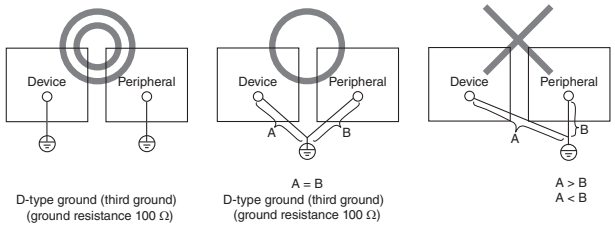
NOTICE Do not connect the 0 V power supply terminal to the ground terminal or ground wire.

2 Connect the ground wire to the ground terminal.

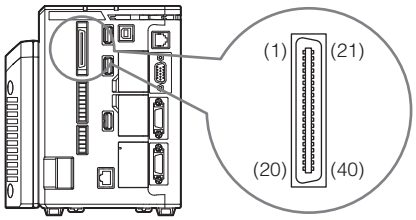


NOTICE

- Ground each device separately.
- Use a D type ground.
- Keep ground resistance to 100 Ω. or less.
- Keep the ground wire as short as possible.
- If it is not possible to ground each device separately, ground them together. However, make sure that the electrical cables are the same as shown below.



Parallel I/O Interface



Reference Use the specialized parallel connection cable (3 m) OP-51657 (option) when connecting to the connector.

Pin layout: The cable color when the OP-51657 (option) is used.

Reference

*1 It is the default assigned value on the terminal where the signal assignment can be changed. These assignments may vary if the Global settings have been changed.

*2 For more details about the signal description, see the "CV-X Series User's Manual".

No.	Terminal name	Signal	Signal Description*2	Circuit diagram	Cable color
1	COMIN2	–	Connector input common terminal	–	Brown
2	IN0	CMD_PARAM0	Command parameter bit 0	B	Red
3	IN1	CMD_PARAM1	Command parameter bit 1	B	Orange
4	IN2	CMD_PARAM2	Command parameter bit 2	B	Yellow
5	IN3	CMD_PARAM3	Command parameter bit 3	B	Green
6	IN4	CMD_PARAM4	Command parameter bit 4	B	Blue
7	IN5	CMD_PARAM5	Command parameter bit 5	B	Purple
8	IN6	CMD_PARAM6*1	Command parameter bit 6 *1	B	Gray
9	IN7	CMD_PARAM7*1	Command parameter bit 7 *1	B	White
10	IN8	CMD_CODE0	Command input bit 0	B	Black
11	IN9	CMD_CODE1	Command input bit 1	B	Brown
12	IN10	CMD_CODE2	Command input bit 2	B	Red
13	IN11	CMD_CODE3	Command input bit 3	B	Orange
14	IN12	CST	Command execution input	B	Yellow
15	IN13	RESET	Reset	B	Green
16	IN14	PST*1	Output data cycle input *1	B	Blue
17	COMOUT2	–	Connector output common terminal	–	Purple
18	OUT0	ACK*1	Verification of successfully executed command input*1	C	Gray
19	OUT1	NACK*1	Verification of unsuccessfully executed command input*1	C	White
20	OUT2	BUSY*1	Busy signal*1	C	Black
21	OUT3	CMD_READY	Command input permission	C	Brown
22	OUT4	READY1	Trigger 1 input permission	C	Red
23	OUT5	READY2	Trigger 2 input permission	C	Orange
24	OUT6	OUT_DATA0*1	Data output bit 0 *1	C	Yellow
25	OUT7	OUT_DATA1*1	Data output bit 1 *1	C	Green
26	OUT8	OUT_DATA2	Data output bit 2	C	Blue
27	OUT9	OUT_DATA3	Data output bit 3	C	Purple
28	OUT10	OUT_DATA4	Data output bit 4	C	Gray
29	OUT11	OUT_DATA5	Data output bit 5	C	White
30	OUT12	OUT_DATA6	Data output bit 6	C	Black
31	OUT13	OUT_DATA7	Data output bit 7	C	Brown
32	OUT14	OUT_DATA8	Data output bit 8	C	Red
33	OUT15	OUT_DATA9	Data output bit 9	C	Orange
34	OUT16	OUT_DATA10	Data output bit 10	C	Yellow
35	OUT17	OUT_DATA11	Data output bit 11	C	Green
36	OUT18	OUT_DATA12*1	Data output bit 12 *1	C	Blue
37	OUT19	OUT_DATA13*1	Data output bit 13 *1	C	Purple
38	OUT20	OUT_DATA14*1	Data output bit 14 *1	C	Gray
39	OUT21	OUT_DATA15*1	Data output bit 15 *1	C	White
40	COMOUT2	–	Connector output common terminal	–	Black

Point

- COMOUT2 for Pin 17 and Pin 40 are common.
- Power source 0V, COMIN1, COMIN2, COMOUT1, COMOUT2, COMOUT_F are all isolated.
- COMIN2 is the common terminal for input for Parallel I/O connectors 2 to 16.
- COMOUT2 is the common terminals for Parallel I/O connectors 18 to 39.

Terminal Block Interface

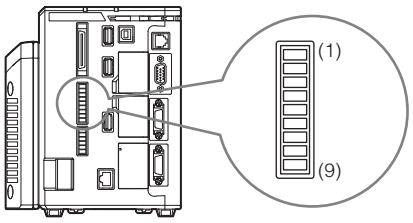
Standard Specifications

Terminal block specifications for the controller are as follows.

NOTICE	Tightening with a force above the standard torque may cause damage to the terminal block.

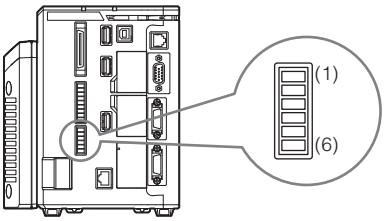
OUT connector

- Suitable wiring
  AWG 16 - 28
- Terminal block screw torque
  0.25 Nm or less



IN connector

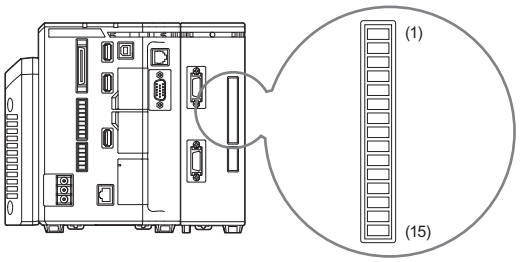
- Suitable wiring
  AWG 16 - 28
- Terminal block screw torque
  0.25 Nm or less



ENCODER connector

When connecting LJ-V input unit CA-E100LJ/E110LJ (sold separately)

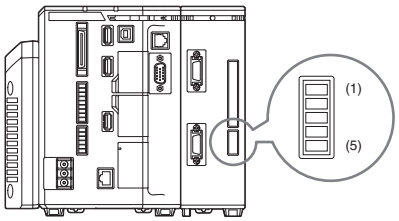
- Suitable wiring
  AWG 16 - 28
- Terminal block screw torque
  0.25 Nm or less



IO connector

When connecting LJ-V input unit CA-E100LJ/E110LJ (sold separately)

- Suitable wiring
  AWG 16 - 28
- Terminal block screw torque
  0.25 Nm or less



Pin layout

Reference

*1 It is the default assigned value on the terminal where the signal assignment can be changed. These assignments may vary if the Global settings have been changed.

*2 For more details about the signal description, see the "CV-X Series User's Manual".

OUT connector

No.	Terminal name	Signal	Terminal block display at time of shipment	Signal description*2	Circuit diagram
1	OUT22	STO	STO	Output timing indicator	C
2	OUT23	OR	OR	Total status output	C
3	F_OUT2	ERROR*1	ERR	Error output*1	C
4	F_OUT3	RUN*1	RUN	Run mode output*1	C
5	COMOUT1	–	COMOUT	Common for terminal block outputs	–
6	F_OUT0	FLASH 1	FLS1	Strobe light output for trigger 1	C
7	F_OUT1	FLASH 2	FLS2	Strobe light output for trigger 2	C
8	N.C	–	–	–	–
9	COMOUT_F	–	COMF	Common terminal for F_OUT	–

IN connector

No.	Terminal name	Signal	Terminal block display at time of shipment	Signal description*2	Circuit diagram
1	COMIN1	–	COMIN1	Common for terminal block inputs	–
2	IN15	PLC*1	PLC	Command read request from PLC*1	B
3	F_IN0	TRG1	TRG1	Trigger 1 input	A
4	F_IN1	TRG2	TRG2	Trigger 2 input	A
5	F_IN2	TEST*1	TEST	Trial run input*1	A
6	F_IN3	EXT*1	EXT	Disable trigger input*1	A

Point

- Power source 0V, COMIN1, COMIN2, COMOUT1, COMOUT2, COMOUT_F are all isolated.
- COMOUT1 is the common terminal for output for OUT connectors 1 to 2.
- COMOUT_F is the common terminals for OUT connectors 3 to 4 and 6 to 7.
- COMIN1 is the common terminals for IN connectors 2 to 6.

ENCODER connector

When connecting LJ-V input unit CA-E100LJ/E110LJ (sold separately)

No.	Terminal name ( ) indicates labels printed on terminal blocks at time of shipment	Terminal explanation	Circuit diagram
1	OC A 24(24V)	Open collector Encoder input A (24V)	D
2	OC A 12(12V)	Open collector Encoder input A (12V)	D
3	OC A 5(5V)	Open collector Encoder input A (5V)	D
4	422 A+(+)	RS-422 Encoder input A+	D
5	ENC A COM (COM(-))	Encoder input A common (-)	D
6	OC B 24(24V)	Open collector Encoder input B (24V)	D
7	OC B 12(12V)	Open collector Encoder input B (12V)	D
8	OC B 5(5V)	Open collector Encoder input B (5V)	D
9	422 B+(+)	RS-422 Encoder input B+	D
10	ENC B COM (COM(-))	Encoder input B common (-)	D
11	OC Z 24(24V)	Open collector Encoder input Z (24V)	D
12	OC Z 12(12V)	Open collector Encoder input Z (12V)	D
13	OC Z 5(5V)	Open collector Encoder input Z (5V)	D
14	422 Z+(+)	RS-422 Encoder input Z+	D
15	ENC Z COM (COM(-))	Encoder input Z common (-)	D

Reference

- Use a shield cable that supports an RS-422 signal for the connection, and always connect the Cable shield to the FG.
- There is continuity between each input circuit. Pay attention so that potential differences are not generated between the signals.
- The ENC A COM, ENC B COM, ENC Z COM, 0V OUT and REMOTE COM are respectively insulated with the controller and the other expansion unit commons.

I/O connector

When connecting LJ-V input unit CA-E100LJ/E110LJ (sold separately)

No.	Terminal name ( ) indicates labels printed on terminal blocks at time of shipment	Terminal explanation	Circuit diagram
1	5V OUT(5V OUT)	Encoder service power supply (150mA MAX)	–
2	0V OUT(0V OUT)		–
3	N.C	–	–
4	RMT COM(COM)	Laser remote interlock input common	E
5	REMOTE(RMT)	Laser remote interlock input	E

Reference

- The rated output for the 5 V OUT is 150 mA. When using encoders which are going to exceed that, prepare an external 5 V power supply.
- The laser remote interlock inputs are non-voltage inputs. The laser emits from the LJ-V sensor head which is connected to CA-E100LJ/E110LJ via a short-circuit with the input commons, if it is open the emissions terminate (factory default is that it is short-circuited via a shorting pin).
- The ENC A COM, ENC B COM, ENC Z COM, 0V OUT and REMOTE COM are respectively insulated with the controller and the other expansion unit commons.

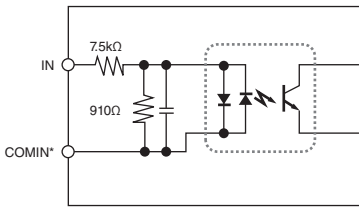
Input/Output Circuit

Input Circuit

Input circuit diagram

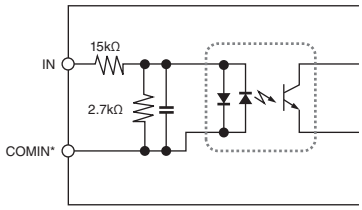
Circuit A (F_IN0 to 3 only, EV compatible)

- Max. imposed voltage: 26.4 V
- ON voltage: 19 V or greater
- ON current: 2.2 mA or greater
- OFF voltage: 5 V or less
- OFF current: 1 mA or less

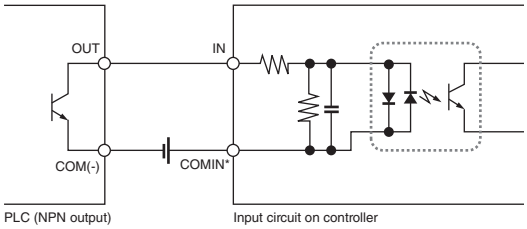


Circuit B (other inputs)

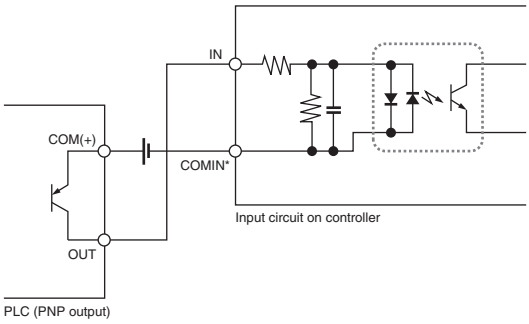
- Max. imposed voltage: 26.4 V
- ON voltage: 19 V or greater
- ON current: 1.2 mA or greater
- OFF voltage: 3 V or less
- OFF current: 0.3 mA or less



Example of connections :
When connecting a NPN PLC output to the system input



Example of connections :
When connecting a PNP output to the controller input



Point

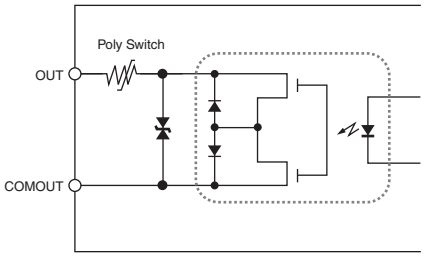
* The commons which are connected differ according to the IN terminals. The common terminal for IN connectors 2 - 6 is COMIN1, and the common terminals for parallel I/O connectors 2 - 16 is COMIN2.

Output Circuit

Output circuit diagram

Circuit C (share in common all output terminals)

- Max. imposed voltage: 30 V
- Leakage current: 50 mA
- Leakage current: 0.1 mA or less
- Residual voltage: 1.4 V or less (50 mA) 1.0 V or less (20 mA)



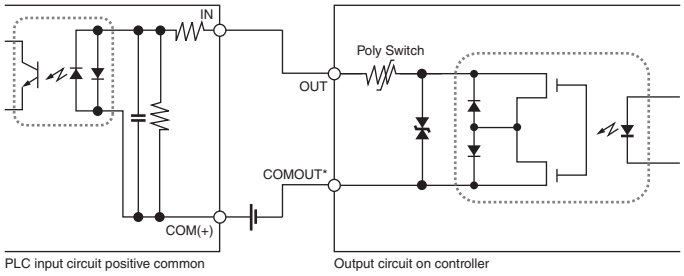
Point

Since this instrument utilizes a photo MOSFET in the output elements, any one of the NPN inputs, or PNP inputs is connectable.

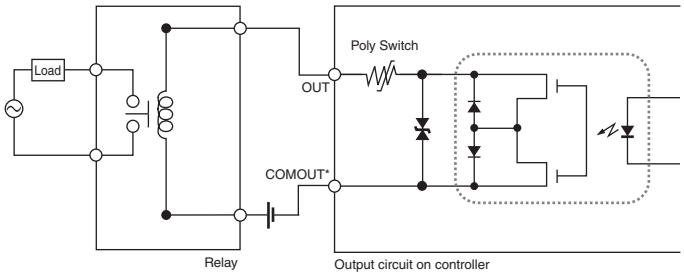
Connection example:
when connecting this instrument's outputs via a positive common

Point If the input instrument is compatible with the NPN open collector outputs, then refer to this connection example.

- When connecting a output from the controller to a PLC with a positive common



- When connecting a output from the controller to a relay



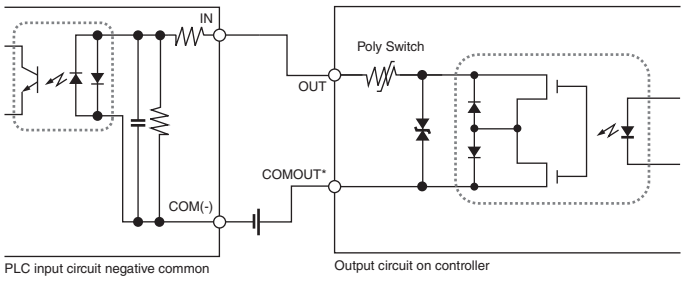
Point

* The commons which are connected differ according to the OUT terminals. The common terminal for OUT connectors 1 - 2 is COMOUT1, and the common terminal for OUT connectors 3 - 4/6 – 7 is COMOUT_F, and the common terminal for parallel I/O connectors 18 - 39 is COMOUT2.

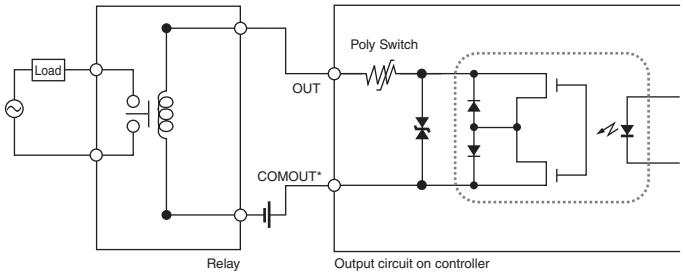
Connection example:
when connecting this instrument's outputs via a negative common

Point If the input instrument is compatible with the PNP open collector outputs, then refer to this connection example.

- When connecting a output from the controller to a PLC with a negative common



- When connecting a output from the controller to a relay



Point

* The commons which are connected differ according to the OUT terminals. The common terminal for OUT connectors 1 - 2 is COMOUT1, and the common terminal for OUT connectors 3 - 4/6 – 7 is COMOUT_F, and the common terminal for parallel I/O connectors 18 - 39 is COMOUT2.

Encoder Input/Output Circuit

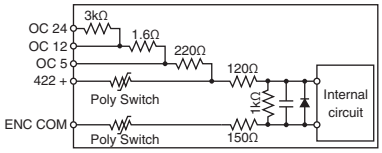
CA-E100LJ/E110LJ ENCODER Connector

Input circuit diagram

Circuit D

Input specifications for the open collector encoder inputs (24VDC/12VDC/5VDC)

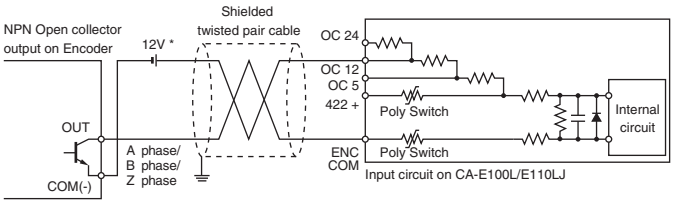
- Max. imposed voltage: 26.4V/13.2V/5.5V
- ON voltage: 21.6 V or greater/ 10.8 V or greater/ 3.5V or greater/
- ON current: 2 mA or greater
- OFF voltage: 3.6 V or less/2.4 V or less/1.0 V or less/



Input specifications for the RS-422 Encoder inputs

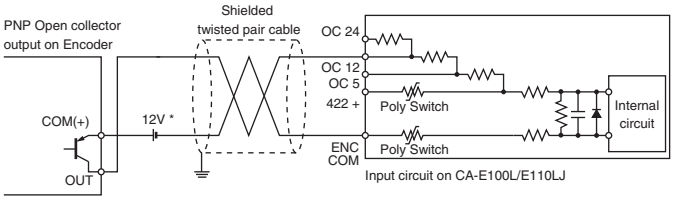
- Equivalent AM26LS32

Connection example: when connecting the NPN open collector output encoder



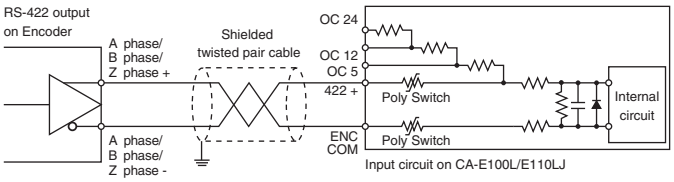
* 12 V was used for this example. Match 5V/12V/24V in accordance with the power supply.

Connection example: when connecting the PNP open collector output encoder



* 12 V was used for this example. Match 5V/12V/24V in accordance with the power supply.

Connection example: when connecting the RS-422 output encoder



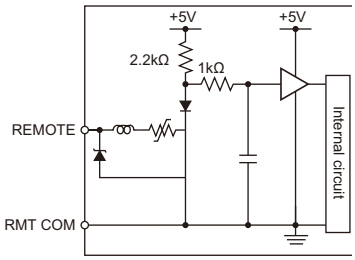
Laser Remote Interlock Input Circuit

CA-E100LJ/E110LJ REMOTE

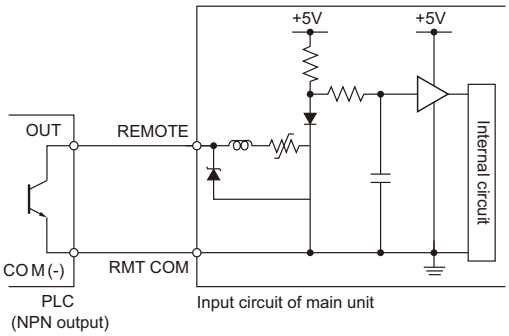
Input circuit diagram

Circuit E

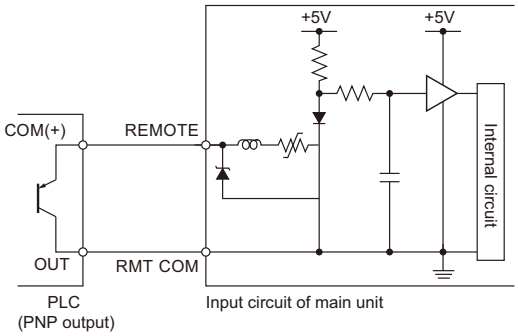
- Non-voltage input
- ON voltage: 1V or less
- ON current: 0.6 mA or less
- Short-circuit current (Typ.): 2 mA



Connection example:
when connecting the NPN open collector output PLC



Connection example:
when connecting the PNP open collector output PLC



Main Specifications

Model type[*1]		CV-X472	CV-X452	CV-X422	CV-X402
Camera input		2 color/monochrome cameras			
		A maximum of up to four are connectable by connecting one optional area camera input unit CA-E100			–
	Trigger input	Simultaneous capture by up to 4 cameras/individual capture can be selected. (when CA-E100 is not connected, up to 2 cameras can be connected simultaneously)			Simultaneous capture by up to 2 cameras/individual capture can be selected.
Supported cameras / Number of pixels		• With CA-035C/HS035C/H035C/035M/HS035M/H035M connected 310 k pixel mode: 640(H) x 480(V), approx. 310,000 pixels 240 k pixel mode: 512(H) x 480(V), approx. 240,000 pixels			
		• With CA-H048CX/H048MX connected 470 k pixel mode: 784(H) x 596(V), approx. 470,000 pixels 310 k pixel mode: 640(H) x 480(V), approx. 310,000 pixels 240 k pixel mode: 512(H) x 480(V), approx. 240,000 pixels			
		• With CA-200C/HS200C/H200C/200M/HS200M/H200M connected 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels 1 mega-pixel mode: 1024(H) x 960(V), approx. 980,000 pixels			
		• With CA-H200CX/H200MX connected 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels			
		• With CA-H500C/H500M connected 5 mega-pixel mode: 2432(H) x 2050(V), approx. 4.99 mega-pixels			
		• With CA-H500CX/H500MX connected 5 mega-pixel mode: 2432(H) x 2040(V), approx. 4.96 mega-pixels 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels			
		• With CA-H2100C/H2100M connected 21 mega-pixel mode: 5104(H)x4092(V), approx. 20.89 mega-pixels 5 mega-pixel mode: 2432(H)x2050(V), approx. 4.99 mega-pixel			
Main image processor		DSP (High-speed)	DSP		
Registered number of inspection settings		SD cards 1 and 2 can each hold 1000 programs (depending on the size of the SD card and the size of the programs), external switching possible			
Number of reference screens		Each setting supports 900 screens per camera (depending on SD card capacity), supports reference image registration by way of the image compression function and position adjusted images			
SD card		• SD card slot x 2 • Compatible with OP-87133 (512MB), CA-SD1G (1GB: installed standard to SD1), CA-SD4G (4GB), and CA-SD16G (16GB)		• SD card slot x 2 • Compatible with OP-87133 (512MB: installed standard to SD1), CA-SD1G (1GB), CA-SD4G (4GB), and CA-SD16G (16GB)	
Interface	Controlled input	• 20 input (including four high speed inputs designed for trigger input) • Input rating 26.4 V or lower, 1.2 mA or greater (2.2 mA or greater for high speed input terminal)			
	Controlled output	• 28 output (including four high speed outputs designed for FLASH outputting linked to external device) • Photo MOSFET [*2] Maximum 50 mA (30 V or less)			
	Monitor output	Analog RGB Output, XGA (1024 x 768, 24 bit color)			
	Operation indicators	LED display for Power ON and ERROR			
	RS-232C	• Can perform numerical value output, control input/output, and switching the functions of CA series touch panel interface (Cannot be used with PLC-Links using the RS-232C port) • Supports a max. baud rate of up to 230400 bps			
	PLC link	• Can output numerical values and perform control input/output using the Ethernet or RS-232C port (Cannot be used in conjunction with EtherNet/IP, PROFINET, and EtherCAT) • The following PLCs are supported via link unit:[*3] KEYENCE: KV-8000/7000/5000/3000/1000/700 Series, KV Nano Series Mitsubishi Electric: MELSEC iQ-R/L/Q Series, MELSEC A Series (RS-232C only), MELSEC iQ-F Series, MELSEC FX Series (RS-232C only) OMRON: SYSMAC CJ2/CJ1/CS1/CP1 Series, SYSMAC C Series (RS-232C only) YASKAWA Electric Corporation: MP2000 Series, MP900 Series (RS-232C only)			
	Ethernet	• Numerical value output, and control input/output enabled. • Connecting to KEYENCE PC application software makes it possible to output measured data and image data to a PC, upload and download settings, and use the remote desktop function. • For the FTP client/server function and the SFTP client function • The VNC server function (for clients other than for PC it will be only for the screen display), and BOOTP function. • 1000BASE-T/100BASE-TX/10BASE-T • Supports jumbo frames (when the CA-NEC20E/NEP20E/NPN20E is connected)			
	USB	• Connecting to KEYENCE PC application software makes it possible to output measured data and image data to a PC, upload and download settings, and use the remote desktop function. • USB2.0			
	EtherNet/IP™	• Can perform numerical value input/output and control input/output using the Ethernet port or optional EtherNet/IP unit CA-NEP20E. (Cannot be used in conjunction with PLC Link, PROFINET, and EtherCAT) • Compatible to the cyclic communication (max.1436 byte), and message communication • Maximum number of connections 32 (ETHERNET)/1: Exclusive Owner, 4: Input Only (CA-NEP20E) • Compatible with the conformance test Version.CT15 (ETHERNET)/CT17 (CA-NEP20E)			
	PROFINET	• Can perform numerical value input and control input/output using the Ethernet port or optional PROFINET unit CA-NPN20E. (Cannot be used in conjunction with PLC Link, EtherNet/IP, and EtherCAT) • Compatible to the cyclic communication (max. 1408 byte(ETHERNET)/max. 1252byte(CA-NPN20E)) • Compatible to the aperiodic (recorded data) communication • Compatible with the Conformance Class A (ETHERNET)/C (CA-NPN20E)			
	EtherCAT	• By connecting the optional EtherCAT unit CA-NEC20E, numerical value output and control input/output can be performed (Cannot be used in conjunction with PLC Link, EtherNet/IP, and PROFINET) • Compatible to the cyclic communication (process data object communication) (input: max. 536 byte/output: max. 532 byte) • Compatible to the noncyclic communication (mailbox communication) • Compatible to CoE • Explicit Device Identification • Compliant with the conformance test V2.2.1.0			
	SNTP	By connecting to an SNTP server, the date and time of the controller can be automatically adjusted			
	Mouse	Possible to control various menus via the dedicated mouse (OP-87506: included in the package)			
	Touch Panel	Setting operation from the CA Series touch panel used by the RS-232C port is possible (When RS-232C is used, the nonprocedural communication and PLC-Links that use the RS-232C port cannot be used.)			
	USB HDD	By connecting a HDD (maximum 2 TB) to a proprietary USB port (USB 3.0 and bus powered compatible: rated output 900 mA), various kinds of data including image data can be output			
Display language		Switched among English, Japanese, Simplified Chinese, Traditional Chinese, Korean, Thai, German, French, Italian, Mexican Spanish, Indonesian, Vietnamese, Brazilian Portuguese, Czech, Hungarian, and Polish			
Illumination control		By connecting the optional illumination expansion unit CA-DC40E/DC50E/DC60E, the lighting and light intensity of the LED illumination can be controlled.[*4]			
Cooling fan		Cooling fan unit CA-F100 is standard equipment	-		
Rating	Power source voltage	24 VDC ±10%			
	Consumption current	3.8 A			2.4 A
Environmental resistance	Ambient temperature	0 to +45°C (DIN rail mounted)/0 to +40°C (Bottom mounted)			
	Ambient operating humidity	35 to 85% RH (no condensation)			
Weight		Approx. 1800 g	Approx. 1600 g		

*1 The letter at the end of the model number indicates the difference of the installed software function. For details, see the "CV-X Series User's Manual".
*2 Either positive common connecting which is compatible with NPN input instruments, or negative common connecting which is compatible with PNP input instruments is feasible.
*3 Models equipped with the Ethernet port in the CPU unit support Ethernet port direct connection.
*4 Connect up to eight illumination expansion units (note that the maximum allowable number of CA-DC50E units and CA-DC60E units is two, respectively).

Model type[*1]		CV-X492	CV-X482	CV-X480LJ
Camera input[*2]		• With area camera input unit CA-E100 connected 2 color/monochrome cameras per one CA-E100, up to 4 cameras via a maximum of 2 units can be connected		• With LJ-V input unit CA-E100LJ connected Up to 2 identical models of the LJ-V series heads per one CA-E100LJ can be connected
		• With area camera input unit CA-E200/E200L connected 2 color/monochrome cameras per one CA-E200/E200L, up to 4 cameras via a maximum of 2 units can be connected		
			• With LJ-V input unit CA-E100LJ/E110LJ connected Up to 2 identical models of the LJ-V series heads per one CA-E100LJ/E110LJ can be connected	
	Trigger input	Simultaneous capture by up to 4 cameras/individual capture can be selected. (when CA-E100 is not connected, up to 2 cameras can be connected simultaneously)		Up to 2 cameras can be connected simultaneously
Supported cameras / Number of pixels	Area camera	• With CA-035C/HS035C/H035C/035M/HS035M/H035M connected 310 k pixel mode: 640(H) x 480(V), approx. 310,000 pixels 240 k pixel mode: 512(H) x 480(V), approx. 240,000 pixels		
		• With CA-H048CX/H048MX connected 470 k pixel mode: 784(H) x 596(V), approx. 470,000 pixels 310 k pixel mode: 640(H) x 480(V), approx. 310,000 pixels 240 k pixel mode: 512(H) x 480(V), approx. 240,000 pixels		
		• With CA-200C/HS200C/H200C/200M/HS200M/H200M connected 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels 1 mega-pixel mode: 1024(H) x 960(V), approx. 980,000 pixels		
		• With CA-H200CX/H200MX connected 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels		
		• With CA-H500C/H500M connected 5 mega-pixel mode: 2432(H) x 2050(V), approx. 4.99 mega-pixels		
		• With CA-H500CX/H500MX connected 5 mega-pixel mode: 2432(H) x 2040(V), approx. 4.96 mega-pixels 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels		
		• With CA-H2100C/H2100M connected 21 mega-pixel mode: 5104(H) x 4092(V), approx. 20.89 mega-pixels 5 mega-pixel mode: 2432(H) x 2050(V), approx. 4.99 mega-pixel		
		• With CA-HF2100C/HF2100M connected 21 mega-pixel mode: 5104(H) x 4092(V), approx. 20.89 mega-pixels 5 mega-pixel mode: 2432(H) x 2050(V), approx. 4.99 mega-pixel		
		• With CA-HF6400C/HF6400M connected 64 mega-pixel mode: 8192(H) x 7808(V), approx. 63.96 mega-pixels 41 mega-pixel mode: 7168(H) x 5768(V), approx.41.35 mega-pixel 21 mega-pixel mode: 5104(H) x 4092(V), approx. 20.89 mega-pixels		
	LJ-V Sensor Head[*3]		• With LJ-V7020/7020K/7060/7060K/7080/7200/7301 connected 512(H) x 16384(L), approx. 8.39 mega-pixels 1024(H) x 8192(L), approx. 8.39 mega-pixels 2048(H) x 4096(L), approx. 8.39 mega-pixels	
Main image processor		DSP (High-speed)		
Registered number of inspection settings		SD cards 1 and 2 can each hold 1000 programs (depending on the size of the SD card and the size of the programs), external switching possible		
Number of registered screens		Each setting supports 400 screens per camera for the LJ-V or 900 screens per camera for area cameras (depending on SD card capacity), supports reference image registration by way of the image compression function and position adjusted images.		
SD card		• SD card slot x 2 • Compatible with OP-87133 (512 MB), CA-SD1G (1 GB: installed standard to SD1 of the CV-X482/X480LJ), CA-SD4G (4 GB: installed standard to SD1 of the CV-X492), CA-SD16G (16 GB)		
Interface	Controlled input	• 20 input (including four high speed inputs designed for trigger input) • Input rating 26.4 V or lower, 1.2 mA or greater (2.2 mA or greater for high speed input terminal)		
	Controlled output	• 28 output (including four high speed outputs designed for FLASH outputting linked to external device) • Photo MOSFET [*4] Maximum 50 mA (30 V or less)		
	Encoder input		• When connecting CA-E100LJ/E110LJ, 1 system per 1 unit, up to 2 systems via a maximum of 2 units (up to 1 system via a maximum of 1 unit for CV-X480LJ) • RS-422 line scan output (5 V output supplied maximum 150 mA), combined open collector output.	
	Monitor output	Analog RGB Output, XGA (1024 x 768, 24 bit color)		
	Operation indicators	LED display for Power ON and ERROR		
	RS-232C	• Can perform numerical value output, control input/output, and switching the functions of CA series touch panel interface (Cannot be used with PLC-Links using the RS-232C port) • Supports a max. baud rate of up to 230400 bps		
	PLC link	• Can output numerical values and perform control input/output using the Ethernet or RS-232C port (Cannot be used in conjunction with EtherNet/IP, PROFINET, and EtherCAT) • The following PLCs are supported via link unit:[*5] KEYENCE: KV-8000/7000/5000/3000/1000/700 Series, KV Nano Series Mitsubishi Electric: MELSEC iQ-R/L/Q Series, MELSEC A Series (RS-232C only), MELSEC iQ-F Series, MELSEC FX Series (RS-232C only) OMRON: SYSMAC CJ2/CJ1/CS1/CP1 Series, SYSMAC C Series (RS-232C only) YASKAWA Electric Corporation: MP2000 Series, MP900 Series (RS-232C only)		
	Ethernet	• Numerical value output, and control input/output enabled. • Connecting to KEYENCE PC application software makes it possible to output measured data and image data to a PC, upload and download settings, and use the remote desktop function. • For the FTP client/server function and the SFTP client function • The VNC server function (for clients other than for PC it will be only for the screen display), and BOOTP function. • 1000BASE-T/100BASE-TX/10BASE-T • Supports jumbo frames (when the CA-NEC20E/NEP20E/NPN20E is connected)		
	USB	• Connecting to KEYENCE PC application software makes it possible to output measured data and image data to a PC, upload and download settings, and use the remote desktop function. • USB2.0		
	EtherNet/IP™	• Can perform numerical value input/output and control input/output using the Ethernet port or optional EtherNet/IP unit CA-NEP20E. (Cannot be used in conjunction with PLC Link, PROFINET, and EtherCAT) • Compatible to the cyclic communication (max.1436 byte), and message communication • Maximum number of connections 32 (ETHERNET)/1: Exclusive Owner, 4: Input Only (CA-NEP20E) • Compatible with the conformance test Version.CT15 (ETHERNET)/CT17 (CA-NEP20E)		
	PROFINET	• Can perform numerical value input and control input/output using the Ethernet port or optional PROFINET unit CA-NPN20E. (Cannot be used in conjunction with PLC Link, EtherNet/IP, and EtherCAT) • Compatible to the cyclic communication (max. 1408 byte(ETHERNET)/max. 1252byte(CA-NPN20E)) • Compatible to the aperiodic (recorded data) communication • Compatible with the Conformance Class A (ETHERNET)/C (CA-NPN20E)		
	EtherCAT	• By connecting the optional EtherCAT unit CA-NEC20E, numerical value output and control input/output can be performed (Cannot be used in conjunction with PLC Link, EtherNet/IP, and PROFINET) • Compatible to the cyclic communication (process data object communication) (input: max. 536 byte/output: max. 532 byte) • Compatible to the noncyclic communication (mailbox communication) • Compatible to CoE • Explicit Device Identification • Compliant with the conformance test V2.2.1.0		
	SNTP	By connecting to an SNTP server, the date and time of the controller can be automatically adjusted		
	Mouse	Possible to control various menus via the dedicated mouse (OP-87506: included in the package)		

Model type[*1]		CV-X492	CV-X482	CV-X480LJ
Interface (continued)	Touch Panel	Setting operation from the CA Series touch panel used by the RS-232C port is possible (When RS-232C is used, the nonprocedural communication and PLC-Links that use the RS-232C port cannot be used.)		
	USB HDD	By connecting a HDD (maximum 2 TB) to a proprietary USB port (USB 3.0 and bus powered compatible: rated output 900 mA), various kinds of data including image data can be output		
Display language		Switched among English, Japanese, Simplified Chinese, Traditional Chinese, Korean, Thai, German, French, Italian, Mexican Spanish, Indonesian, Vietnamese, Brazilian Portuguese, Czech, Hungarian, and Polish		
Illumination control		By connecting the optional illumination expansion unit CA-DC40E/DC50E/DC60E, the lighting and light intensity of the LED illumination can be controlled.[*6]		-
Cooling fan		Cooling fan unit CA-F100 is standard equipment		
Rating	Power source voltage	24 VDC ±10%		
	Consumption current	5.3 A		3.2 A
Environmental resistance	Ambient temperature	0 to +45°C (DIN rail mounted)/0 to +40°C (Bottom mounted)		
	Ambient operating humidity	35 to 85% RH (no condensation)		
Weight		Approx. 1750 g		

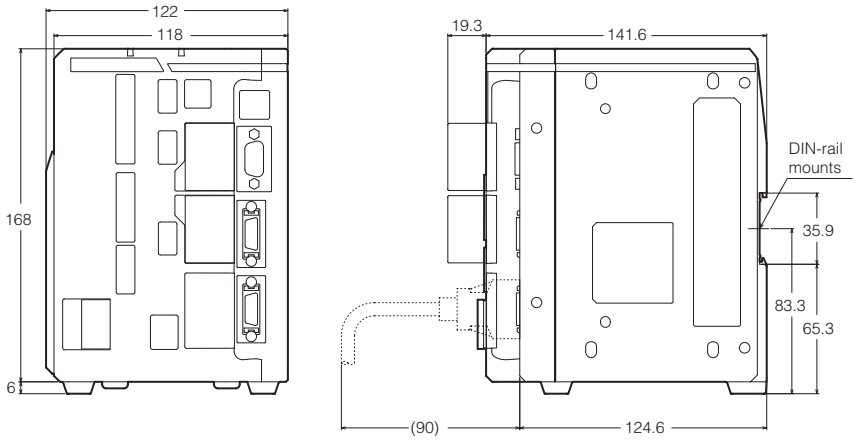
*1 The letter at the end of the model number indicates the difference of the installed software function. For details, see the "CV-X Series User's Manual".
*2 Since the controller unit does not support camera inputs, at least 1 camera input unit (optional) or more is required.
*3 LJ-V Series heads whose models end in “B” are luminance output types. To connect to a luminance output type, the CV-X482 and the CA-E110LJ are required.
*4 Either positive common connecting which is compatible with NPN input instruments, or negative common connecting which is compatible with PNP input instruments is feasible.
*5 Models equipped with the Ethernet port in the CPU unit support Ethernet port direct connection.
*6 Connect up to eight illumination expansion units.

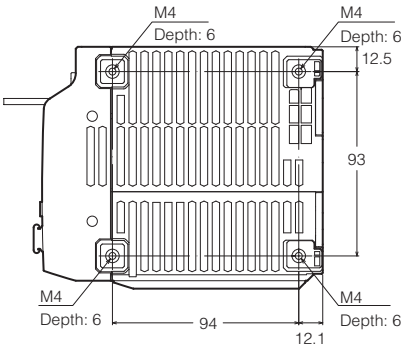
Model type[*1]		CV-X352	CV-X322	CV-X302
Camera input		2 color/monochrome cameras		
		A maximum of up to four are connectable by connecting one optional area camera input unit CA-E100		–
	Trigger input	Simultaneous capture by up to 4 cameras/individual capture can be selected. (when CA-E100 is not connected, up to 2 cameras can be connected simultaneously)		Simultaneous capture by up to 2 cameras/ individual capture can be selected.
Supported cameras / Number of pixels		• With CA-035C/HS035C/H035C/035M/HS035M/H035M connected 310 k pixel mode: 640(H) x 480(V), approx. 310,000 pixels 240 k pixel mode: 512(H) x 480(V), approx. 240,000 pixels		
		• With CA-H048CX/H048MX connected 470 k pixel mode: 784(H) x 596(V), approx. 470,000 pixels 310 k pixel mode: 640(H) x 480(V), approx. 310,000 pixels 240 k pixel mode: 512(H) x 480(V), approx. 240,000 pixels		
		• With CA-200C/HS200C/H200C/200M/HS200M/H200M connected 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels 1 mega-pixel mode: 1024(H) x 960(V), approx. 980,000 pixels		
		• With CA-H200CX/H200MX connected 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels		
		• With CA-H500C/H500M connected 5 mega-pixel mode: 2432(H) x 2050(V), approx. 4.99 mega-pixels		
		• With CA-H500CX/H500MX connected 5 mega-pixel mode: 2432(H) x 2040(V), approx. 4.96 mega-pixels 2 mega-pixel mode: 1600(H) x 1200(V), approx. 1.92 mega-pixels		
Main image processor		DSP		
Registered number of inspection settings		SD cards 1 and 2 can each hold 1000 programs (depending on the size of the SD card and the size of the programs), external switching possible		
Number of reference screens		Each setting supports 900 screens per camera (depending on SD card capacity), supports reference image registration by way of the image compression function and position adjusted images		
SD card		• SD card slot x 2 • Compatible with OP-87133 (512MB), CA-SD1G (1GB: installed standard to SD1), CA-SD4G (4GB), and CA-SD16G (16GB)	• SD card slot x 2 • Compatible with OP-87133 (512MB: installed standard to SD1), CA-SD1G (1GB), CA-SD4G (4GB), and CA-SD16G (16GB)	
Interface	Controlled input	• 20 input (including four high speed inputs designed for trigger input) • Input rating 26.4 V or lower, 1.2 mA or greater (2.2 mA or greater for high speed input terminal)		
	Controlled output	• 28 output (including four high speed outputs designed for FLASH outputting linked to external device) • Photo MOSFET [*2] Maximum 50 mA (30 V or less)		
	Monitor output	Analog RGB Output, XGA (1024 x 768, 24 bit color)		
	Operation indicators	LED display for Power ON and ERROR		
	RS-232C	• Can perform numerical value output, control input/output, and switching the functions of CA series touch panel interface (Cannot be used with PLC-Links using the RS-232C port) • Supports a max. baud rate of up to 230400 bps		
	PLC link	• Can output numerical values and perform control input/output using the Ethernet or RS-232C port (Cannot be used in conjunction with EtherNet/IP, PROFINET, and EtherCAT) • The following PLCs are supported via link unit:[*3] KEYENCE: KV-8000/7000/5000/3000/1000/700 Series, KV Nano Series Mitsubishi Electric: MELSEC iQ-R/L/Q Series, MELSEC A Series (RS-232C only), MELSEC iQ-F Series, MELSEC FX Series (RS-232C only) OMRON: SYSMAC CJ2/CJ1/CS1/CP1 Series, SYSMAC C Series (RS-232C only) YASKAWA Electric Corporation: MP2000 Series, MP900 Series (RS-232C only)		
	Ethernet	• Numerical value output, and control input/output enabled. • Connecting to KEYENCE PC application software makes it possible to output measured data and image data to a PC, upload and download settings, and use the remote desktop function. • For the FTP client function, the VNC server function (for clients other than for PC it will be only for the screen display), and BOOTP function. • 1000BASE-T/100BASE-TX/10BASE-T • Supports jumbo frames (when the CA-NEC20E/NEP20E/NPN20E is connected)		
	USB	• Connecting to KEYENCE PC application software makes it possible to output measured data and image data to a PC, upload and download settings, and use the remote desktop function. • USB2.0		
	EtherNet/IP™	• Can perform numerical value input/output and control input/output using the Ethernet port or optional EtherNet/IP unit CA-NEP20E. (Cannot be used in conjunction with PLC Link, PROFINET, and EtherCAT) • Compatible to the cyclic communication (max.1436 byte), and message communication • Maximum number of connections 32 (ETHERNET)/1: Exclusive Owner, 4: Input Only (CA-NEP20E) • Compatible with the conformance test Version.CT15 (ETHERNET)/CT17 (CA-NEP20E)		
	PROFINET	• Can perform numerical value input and control input/output using the Ethernet port or optional PROFINET unit CA-NPN20E. (Cannot be used in conjunction with PLC Link, EtherNet/IP, and EtherCAT) • Compatible to the cyclic communication (max. 1408 byte(ETHERNET)/max. 1252byte(CA-NPN20E)) • Compatible to the aperiodic (recorded data) communication • Compatible with the Conformance Class A (ETHERNET)/C (CA-NPN20E)		
	EtherCAT	• By connecting the optional EtherCAT unit CA-NEC20E, numerical value output and control input/output can be performed (Cannot be used in conjunction with PLC Link, EtherNet/IP, and PROFINET) • Compatible to the cyclic communication (process data object communication) (input: max. 536 byte/output: max. 532 byte) • Compatible to the noncyclic communication (mailbox communication) • Compatible to CoE • Explicit Device Identification • Compliant with the conformance test V2.2.1.0		
	SNTP	By connecting to an SNTP server, the date and time of the controller can be automatically adjusted		
	Mouse	Possible to control various menus via the dedicated mouse (OP-87506: included in the package)		
	Touch Panel	Setting operation from the CA Series touch panel used by the RS-232C port is possible (When RS-232C is used, the nonprocedural communication and PLC-Links that use the RS-232C port cannot be used.)		
	USB HDD	By connecting a HDD (maximum 2 TB) to a proprietary USB port (USB 3.0 and bus powered compatible: rated output 900 mA), various kinds of data including image data can be output		
Display language		Switched among English, Japanese, Simplified Chinese, Traditional Chinese, Korean, Thai, German, French, Italian, Mexican Spanish, Indonesian, Vietnamese, Brazilian Portuguese, Czech, Hungarian, and Polish		
Illumination control		By connecting the optional illumination expansion unit CA-DC40E/DC50E, the lighting and light intensity of the LED illumination can be controlled.[*4]		
Cooling fan		-		
Rating	Power source voltage	24 VDC ±10%		
	Consumption current	3.8 A		2.4 A
Environmental resistance	Ambient temperature	0 to +45°C (DIN rail mounted)/0 to +40°C (Bottom mounted)		
	Ambient operating humidity	35 to 85% RH (no condensation)		
Weight		Approx. 1600 g		

*1 The letter at the end of the model number indicates the difference of the installed software function. For details, see the "CV-X Series User's Manual".
*2 Either positive common connecting which is compatible with NPN input instruments, or negative common connecting which is compatible with PNP input instruments is feasible.
*3 Models equipped with the Ethernet port in the CPU unit support Ethernet port direct connection.
*4 Connect up to eight illumination expansion units (note that the maximum allowable number of CA-DC50E units is two).

Dimensions

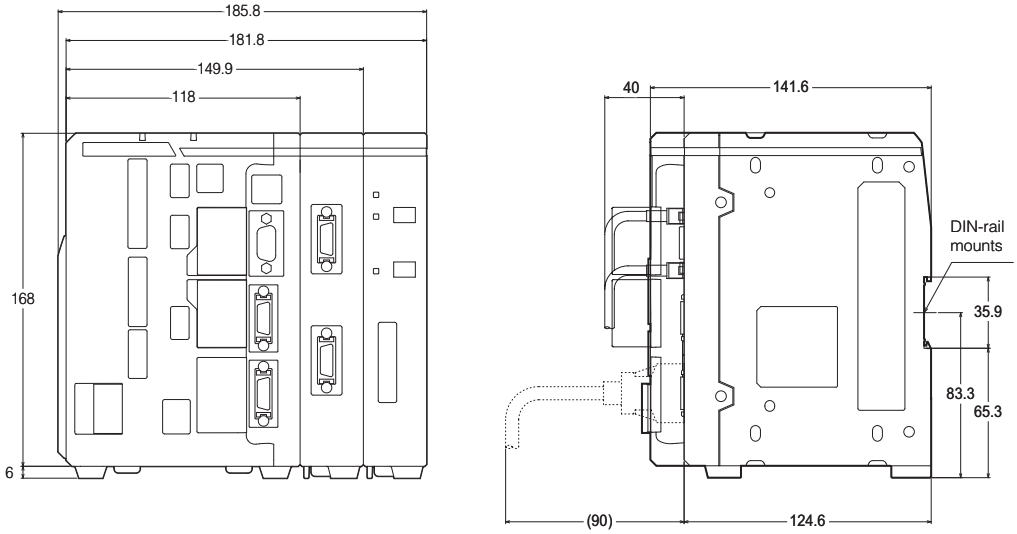
Controller Unit CV-X402/X422/X452/X302/X322/X352

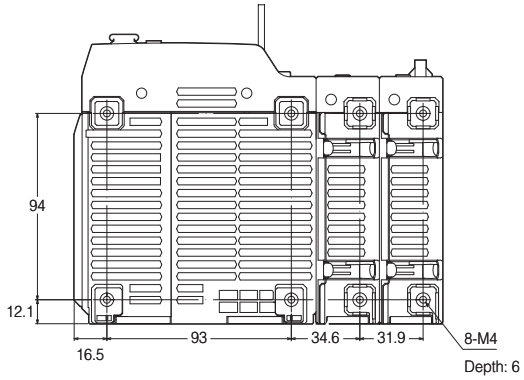




Unit: mm

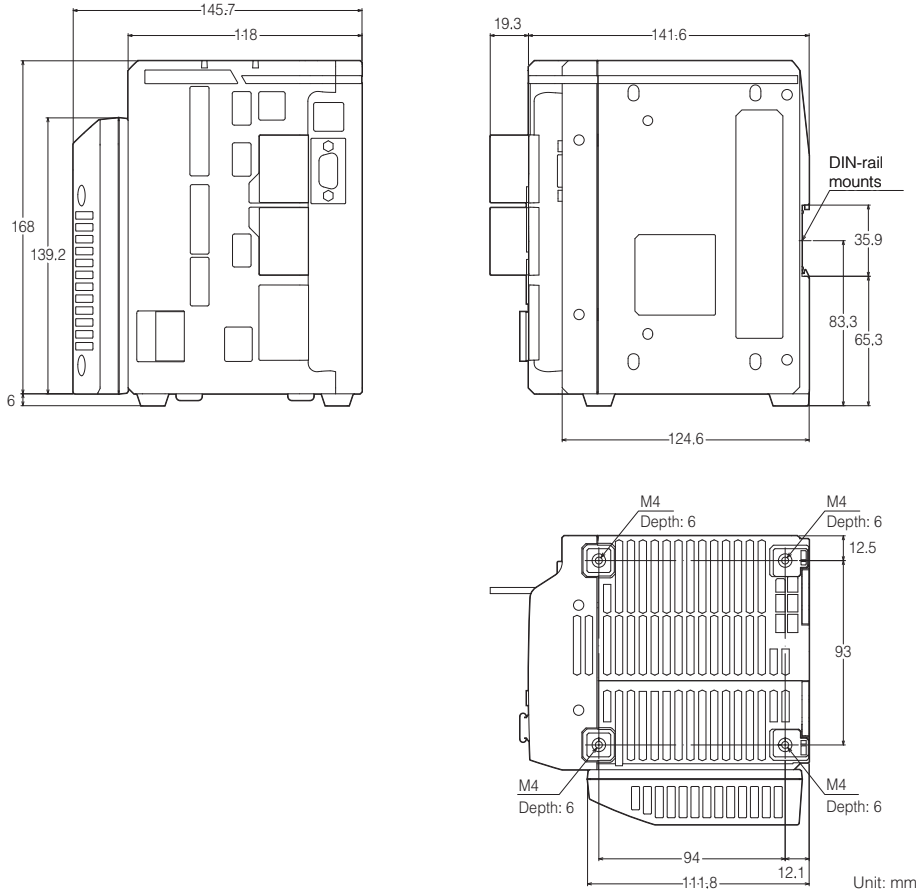
With Area Camera Input Unit CA-E100/Illumination expansion unit CA-DC40E installed





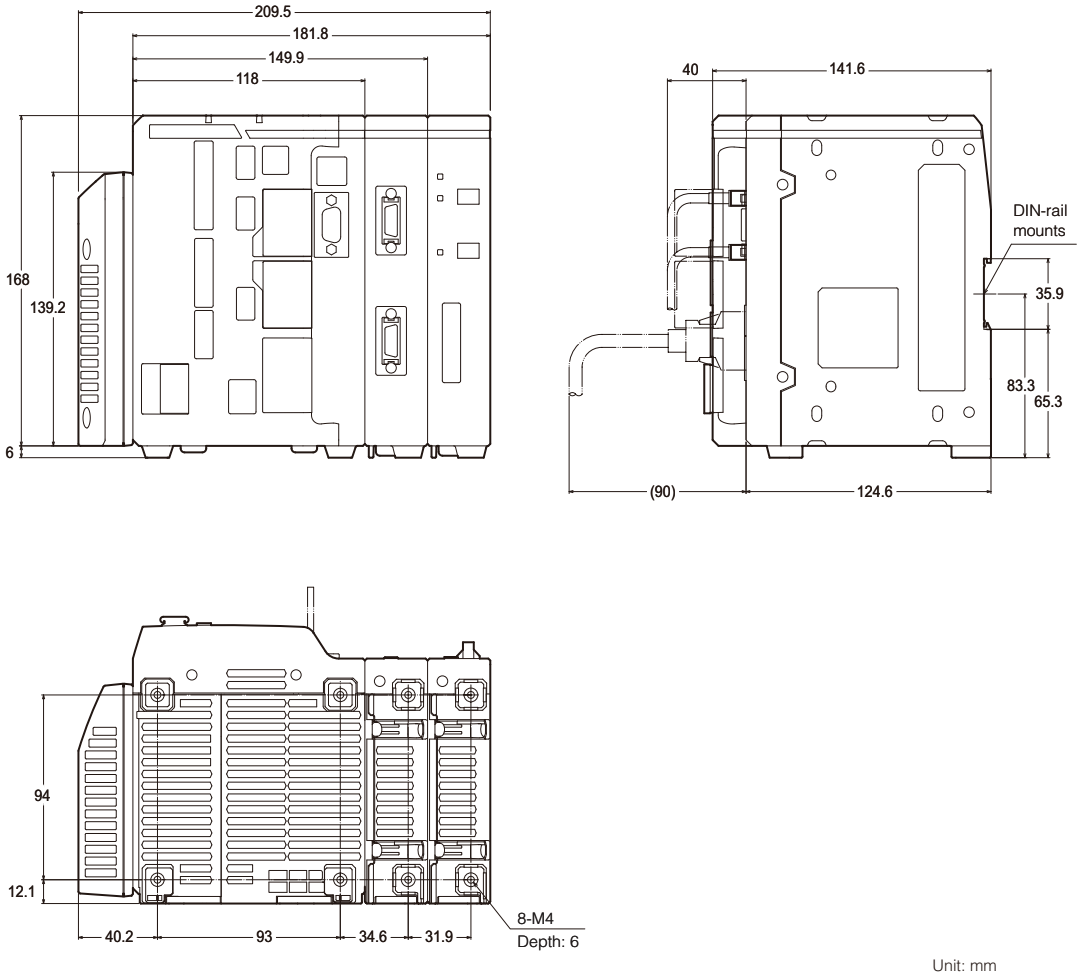
Unit: mm

Controller Unit CV-X472*/X482/X480LJ/X492

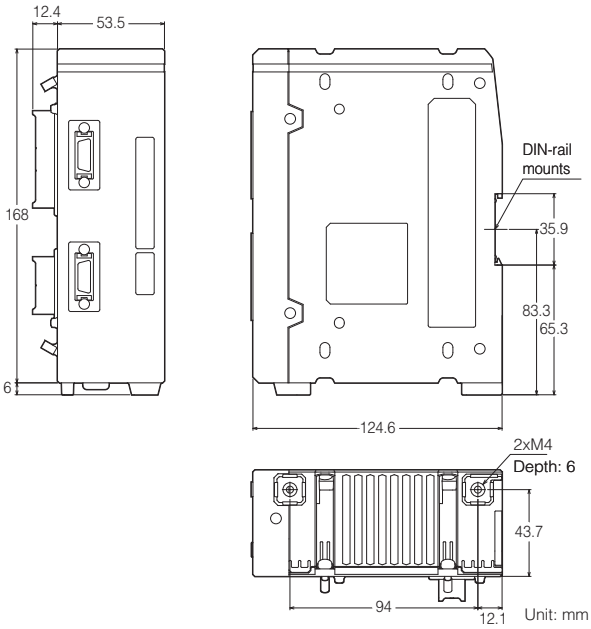


* Only the CV-X472 is equipped with camera connectors in the same place as the CV-X402.

With Area Camera Input Unit CA-E100/Illumination Expansion Unit CA-DC40E Installed

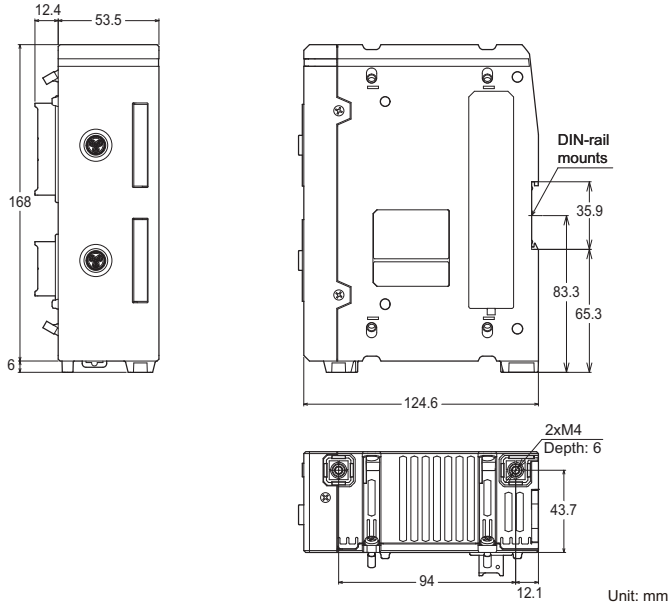


LJ-V Input Unit CA-E100LJ/E110LJ



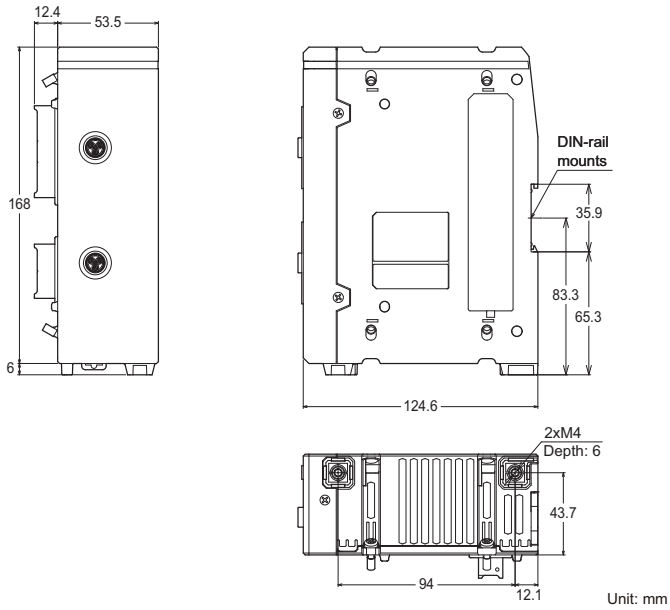
Unit: mm

High-speed Line Scan Camera Input Unit CA-E200L



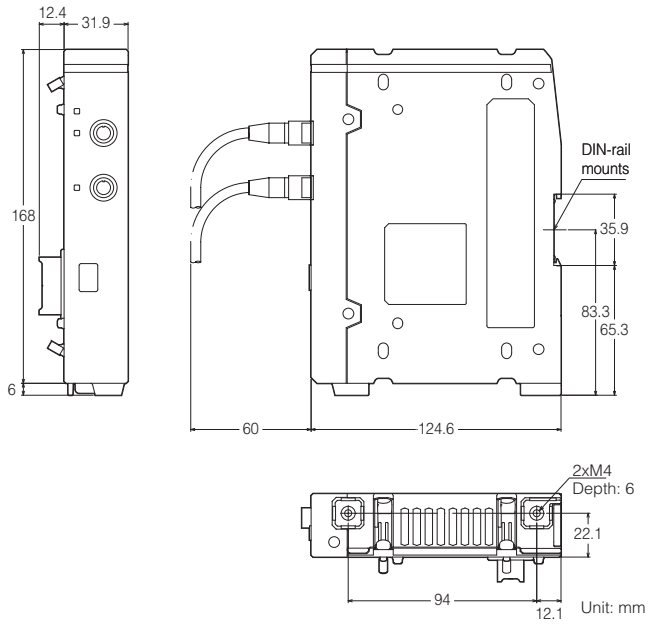
Unit: mm

Input unit Area Camera: 64M pixel camera supporting type CA-E200



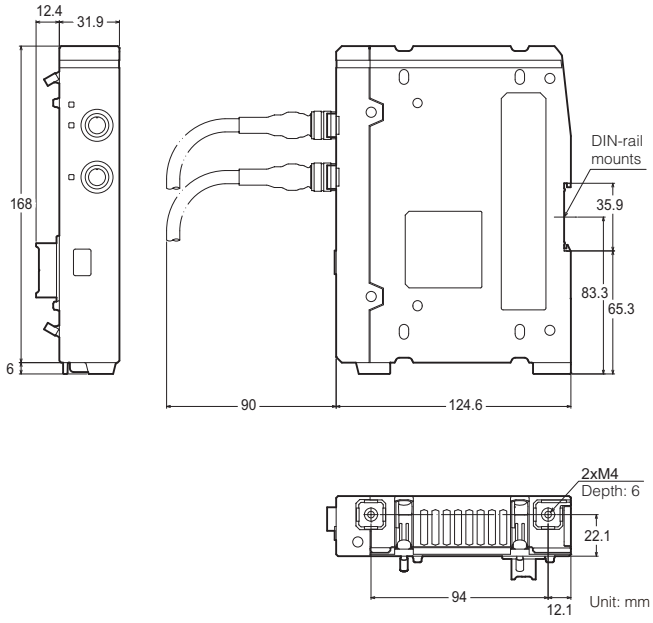
Unit: mm

Illumination expansion unit CA-DC50E

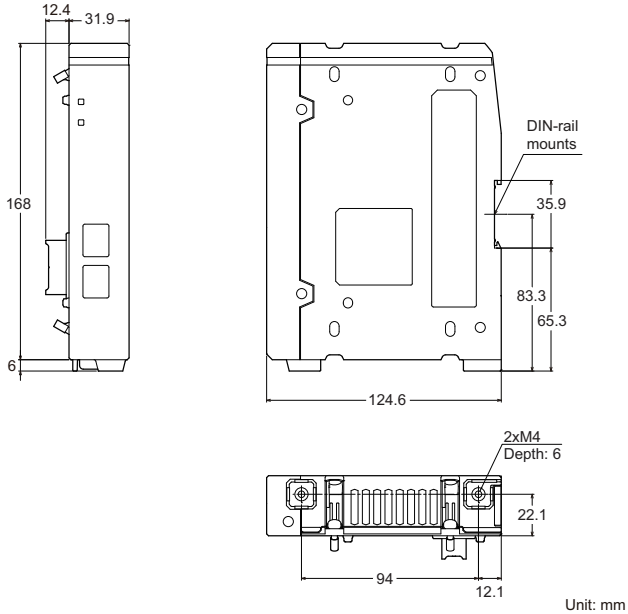


Unit: mm

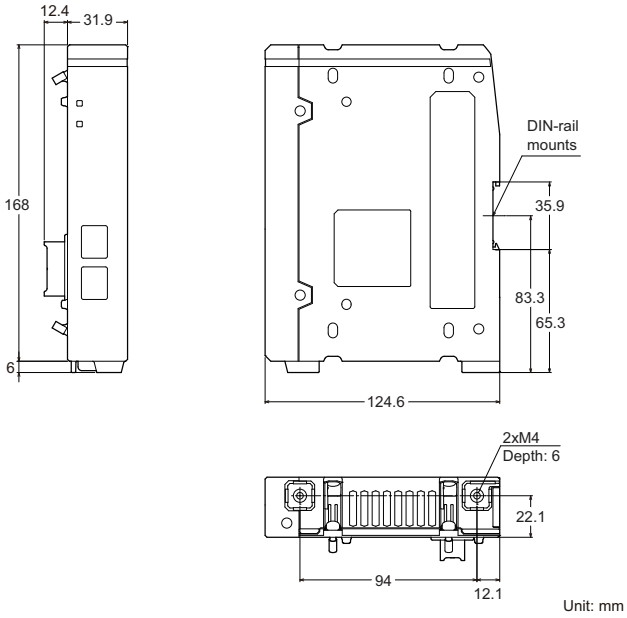
Illumination expansion unit CA-DC60E



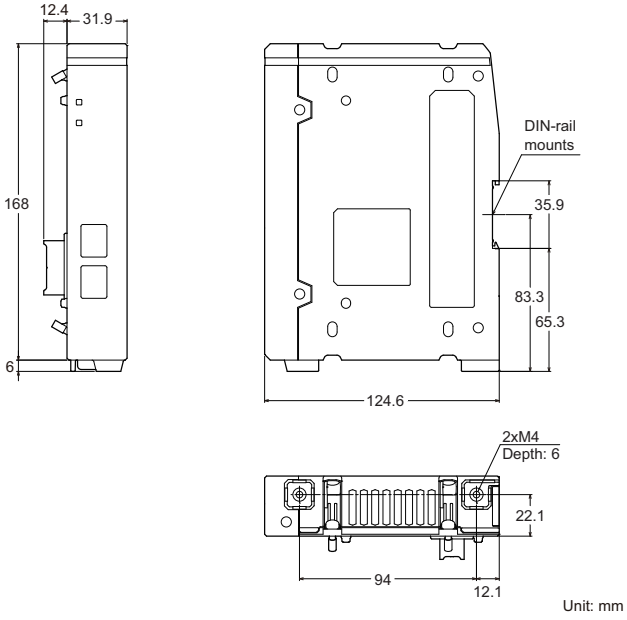
EtherNet/IP Unit CA-NEP20E



EtherCAT Unit CA-NEC20E



PROFINET Unit CA-NPN20E



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