KEYENCE

96M17055

CPU Unit
KV-8000/KV-8000A
Instruction manual

Read this manual before using the product in order to achieve maximum performance.
Keep this manual in a safe place after reading it so that it can be used at any time.

Introduction

This instruction manual describes the handling, operation, and safety information for the KV-8000 Series CPU unit. Read this manual thoroughly in order to take full advantage of the KV-8000 Series CPU Unit features, and use the product only after fully understanding its contents.
Take care to store this manual in a convenient location so that it is readily accessible for reference whenever necessary.
Please take care that the personnel who will actually operate the product have access to this manual.

■ How to see symbols on the product

"⏚" means functional earth terminal.
"⎓" means direct current.

Safety Precautions

● Symbols

The following symbols alert you to important messages. Be sure to read these messages carefully.

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

● General precautions

DANGER	• **Do not use this product for the purpose to protect a human body or part of a human body.** • **This product is not intended for use as an 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 which requires functional safety. It should not be used in situations where death or serious property damage is possible, such as nuclear power plants, on aircraft, trains, ships, or vehicles, used within medical equipment, playground equipment, roller coasters and other rides, etc.
WARNING	• **Provide a safety circuit that does not pass via the programmable controller to enable failsafe operation of the entire system in the event that the programmable controller fails.** • Output circuit or internal circuit malfunctions sometimes prevent control from being performed normally. Be sure to provide a safety circuit in control systems where circuit malfunction may lead to fire or other serious accidents. • **Do not touch it as it may be hot during power-up or immediately after stopping.**
CAUTION	• Please be sure to check that the function and performance of this product are working properly at start of work or operation. • If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
NOTICE	• Proceed with care when modifying the product, or when using it in a manner that falls outside of the ranges indicated in its specifications, as KEYENCE is unable to guarantee device functionality or performance in such situations. • Use this product in combination with other devices only after careful consideration, as it may fail to satisfy its functionality and performance capabilities as a result of the conditions and environment in which it is used. • **Wipe off any adhesion of dirt with a clean, 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) EN61131-2, Class A
  - When installing the KV8000- Series, it must be installed in an conductive enclosure (e.g. an industrial control panel) with IP54 or higher
  - Be sure to ground the enclosure (e.g. an industrial control panel) to an FG (positive grounding is not possible).
  - Use a shielded cable for the signal lines located outside of the conductive enclosure (e.g. an industrial control panel). The shielded cable must be grounded to the enclosure (e.g. industrial control panel). However, do not ground the CPU unit's serial communication cable or the shielded USB cable.
- Be sure to use the functional earthing terminal on the unit for grounding, if applicable.
- Wrap the CPU unit's USB cable twice around a ferrite core*1.
  * The ferrite core used for evaluation by KEYENCE:TDK ZCAT-3035-1330

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.

■ UL Certification

This product complies with the following UL and CSA standards, and has been certified by UL.

•UL File No.	E207185
•Category	NRAQ, NRAQ7
•Applicable standard	UL61010-1 UL61010-2-201 CAN/CSA C22.2 No.61010-1 CAN/CSA C22.2 No.61010-2-201

Be sure to consider the following specifications when using this product as a UL certified product.

- Install this product in an enclosure (e.g. an industrial control panel) with IP54 or higher.
- Use stranded copper wire with a wire gauge of AWG #16 to #22 and temperature rating of 105°C or higher when wiring to the terminal block. The tightening torque is 0.5 N·m.
- Use this product under pollution degree 2.
- Indoor use only.
- Install at an altitude of 2000 m or less.
- Use this product with one of the following power supplies.
  - UL/CSA certified power supply that provides Class 2 output as defined in the NFPA70 (NEC: National Electrical Code) and CEC (Canadian Electrical Code).
  - UL/CSA certified power supply that has been evaluated as a Limited Power Source as defined in UL60950-1 and CAN/CSA-C22.2 No. 60950-1.
- Ensure the circuits to be connected to the input/output terminals are SELV circuits
- Do not supply power via terminal block on the CPU unit when you use KV-PU1.

■ North American Regulations

This product complies with the following North American regulations.

- Applicable regulation
  FCC Part 15 Subpart B Class A Digital Device
  ICES-003, Class A Digital Apparatus
- 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.
- 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)

사용자안내문
이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

Specifications

Item	Specifications	
System configuration	For systems that use KV-5000/3000 Series expansion units	For systems that use KV-8000/7000 Series expansion units only
Power supply voltage	24 V DC (±10%)	24 V DC (-15%+20%)
Surrounding air temperature	0 to +50°C (no freezing)*1*2	0 to +55°C (no freezing)*1*2
Relative humidity	10 to 95% RH (no condensation)*1	5 to 95% RH (no condensation)*1
Operating atmosphere	No excessive dust or corrosive gases	
Operating altitude	2,000 m or less	
Pollution degree	2	
Overvoltage category	Ⅰ (When using KV-PU1 Ⅱ)	
Withstand voltage	1,500 V AC for 1 min. between the power terminal and I/O terminals and between all external terminals and case	
Insulation resistance	50 MΩ or more(500 V DC megger used to perform measurements between the power terminal and I/O terminals and between all external terminals and cases)	
Internal power consumption*3	400 mA or less	
Weight	KV-8000/KV-8000A: approx. 340g KV-B1 (battery): approx. 10 g	

*1 Guaranteed range as a system.
*2 Stipulated by the temperature at the bottom side of the unit, inside the control panel.
*3 Maximum current consumption when using expansion unit is 3.2 A.

Installation cautions

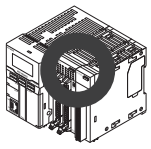
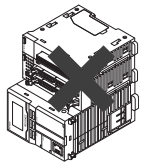
■ Installation environment

Do not install KV-8000 Series devices in the following locations:

- Locations where series devices are exposed to direct sunlight.
- Locations where the surrounding air temperature range exceeds 0 to +55°C.
- Locations where relative humidity exceeds 5 to 95% RH.
- Locations subject to condensation due to rapid change in temperature.
- Locations where corrosive or flammable gases are present.
- Locations where there is excessive dust, salt, iron powder, or soot.
- Locations where series devices are subject to direct vibrations or mechanical shocks.
- Locations where series devices are exposed to splashes of substances such as water, oil, or chemical agents.
- Locations where strong magnetic or electrical fields are generated.
- Locations where the altitude exceeds 2,000 m.
- Locations where may be affected by the radioactive radiation.

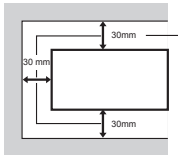
■ Installation orientation

When installing the KV-8000 Series in a control panel, always orient the KV-8000 CPU Unit so that its front panel and input/output connectors are accessible from the front.

■ Surrounding space

Allow a space of at least 30 mm between the device and any walls or other equipment surrounding it.



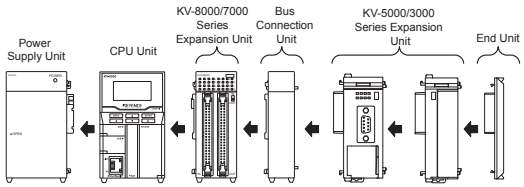
Space above, on the left and below of the device
Allow 30 mm of space for heat dissipation.

NOTICE	**When the temperature inside the control panel (temperature on bottom surface of unit) exceeds the ambient operating temperature, lower the temperature, for example, by installing forced air cooling or providing more space around the unit to improve ventilation. When the Extension Unit is used, allow at least 60 mm of space between the units on the upper and lower racks to compensate the effect of heat.**

Installation

Be sure to follow these guidelines when connecting units.

- Always connect <Power Supply Units> to the left of the <CPU Unit>.
- When using a Bus Connection Unit or KV-5000/3000 Series Expansion Unit, be sure to connect an <End unit> to the right of the last unit connected.



NOTICE	**Be sure to turn the power off before connecting the units.**
Point	**When using an Bus Connection Unit, an end unit is required regardless of whether the KV-5000/3000 Series Expansion Unit is used. If there is no end unit, an end unit not connected error (Error 57) will occur.**

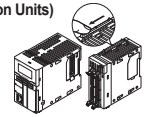
■ Maximum connectable units

For more information see each unit's instruction manual.

Installation

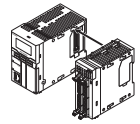
■ Assembling the units (for KV-8000/7000 Series Expansion Units)

1 Release the lock levers on the top and bottom of the right unit.



2 Connect the units by inserting the right unit's lock lever into the left unit's lock lever slot.

3 Lock the lock levers on the top and bottom of the right unit.



■ Assembling the units (when using KV-5000/3000 Series Expansion Units)

1 Remove the expansion unit connector cover of the last KV-8000/7000 Series expansion unit installed on the right.

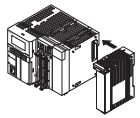
2 Install a Bus Connection Unit.

3 Release the lock lever on the KV-5000/3000 Series expansion unit.

4 Connect the units by inserting the KV-5000/3000 Series expansion unit's lock lever into the Bus Connection Unit's lock lever slot.

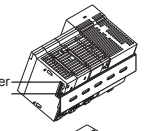
5 Lock the lock levers on the top and bottom of the right unit.

6 Attach an end unit to the far right unit.



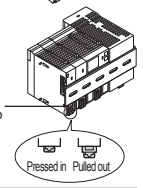
Mounting the units on a DIN track

1 Latch the DIN track mount fastener on the top of each unit onto the groove on the top of the DIN track.



2 Insert the bottom of the DIN track into the DIN mount fastener on the bottom of each unit.

3 Check whether the bottom DIN track mount fastener is pushed in (locked).



Installing the Power Supply Unit

This section describes how to install the KV-PU1 Power Supply Unit to the KV-8000 Series CPU Unit.

■ Installing

1 Remove the AC power connection connector cover on the left of the KV-8000 Series CPU Unit.

2 Release the lock lever on the KV-8000 Series CPU unit.

3 Connect the units by inserting the KV-8000 Series CPU unit's lock lever into the power supply connector slot.

The KV-8000 Series can also be connected directly to a 24 V power supply without using Power Supply Unit KV-PU1.
For details, refer to the KV-8000 Series Instruction Manual.

Wiring

■ Precautions when grounding devices

- Establish individual ground connections (D-type ground connections) for each device.The ground resistance for each connection should be 100 Ω or less.
- When individual ground connections cannot be established, use a common ground. In this case all wires must be kept to the same length.

Battery replacement

When using a battery, it must be replaced as soon as [CPU エラー E83] or [CPU Error E83] is displayed. (*This error does not occur when not using a battery)
When using a battery, CR2306 turns ON.
Once a battery error has occurred, data can be held by the battery for a minimum of one week at room temperature.
When the battery is discharged, data can be backed up in the backup condenser.

Purchase the following product for use as a replacement battery.

Replacement Lithium battery model No.: KV-B1

CAUTION	• **Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.** • **Replace battery with KEYENCE KV-B1 only. Use of another battery may present a risk of fire or explosion.**

NOTICE	• **The life span of the battery is as follows:**
	  • **25°C: 5 years**
	  • **240°C: 2 years**
	  • **75°C: 1 year**
	• **The battery can be replaced while the power is on.**
	• **Always energize the device for ten minutes before replacing the battery. Otherwise, data might be lost. Complete battery replacement within ten minutes.**

1 Press the catch on the bottom of the backup battery cover and remove the old battery.

2 Insert the new battery.

3 Turn on the device and verify that no error messages are displayed in the access window.

WARRANTIES AND DISCLAIMERS:

(1)KEYENCE warrants the Products to be free of defects in materials and workmanship for a period of one (1) year from the date of shipment. If any models or samples were shown to Buyer, such models or samples were used merely to illustrate the general type and quality of the Products and not to represent that the Products would necessarily conform to said models or samples. Any Products found to be defective must be shipped to KEYENCE with all shipping costs paid by Buyer or offered to KEYENCE for inspection and examination. Upon examination by KEYENCE, KEYENCE, at its sole option, will refund the purchase price of, or repair or replace at no charge any Products found to be defective. This warranty does not apply to any defects resulting from any action of Buyer, including but not limited to improper installation, improper interfacing, improper repair, unauthorized modification, misapplication and mishandling, such as exposure to excessive current, heat, coldness, moisture, vibration or outdoors air. Components which wear are not warranted.
(2)KEYENCE is pleased to offer suggestions on the use of its various Products. They are only suggestions, and it is Buyer's responsibility to ascertain the fitness of the Products for Buyer's intended use. KEYENCE will not be responsible for any damages that may result from the use of the Products.
(3)The Products and any samples ("Products/Samples") supplied to Buyer are not to be used internally in humans, for human transportation, as safety devices or fail-safe systems, unless their written specifications state otherwise. Should any Products/Samples be used in such a manner or misused in any way, KEYENCE assumes no responsibility, and additionally Buyer will indemnify KEYENCE and hold KEYENCE harmless from any liability or damage whatsoever arising out of any misuse of the Products/Samples.
(4)OTHER THAN AS STATED HEREIN, THE PRODUCTS/SAMPLES ARE PROVIDED WITH NO OTHER WARRANTIES WHATSOEVER. ALL EXPRESS, IMPLIED, AND STATUTORY WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF PROPRIETARY RIGHTS, ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL KEYENCE AND ITS AFFILIATED ENTITIES BE LIABLE TO ANY PERSON OR ENTITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM LOSS OF USE, BUSINESS INTERRUPTION, LOSS OF INFORMATION, LOSS OR INACCURACY OF DATA, LOSS OF PROFITS, LOSS OF SAVINGS, THE COST OF PROCUREMENT OF SUBSTITUTED GOODS, SERVICES OR TECHNOLOGIES, OR FOR ANY MATTER ARISING OUT OF OR IN CONNECTION WITH THE USE OR INABILITY TO USE THE PRODUCTS, EVEN IF KEYENCE OR ONE OF ITS AFFILIATED ENTITIES WAS ADVISED OF A POSSIBLE THIRD PARTY'S CLAIM FOR DAMAGES OR ANY OTHER CLAIM AGAINST BUYER. In some jurisdictions, some of the foregoing warranty disclaimers or damage limitations may not apply.

BUYER'S TRANSFER OBLIGATIONS:

If the Products/Samples purchased by Buyer are to be resold or delivered to a third party, Buyer must provide such third party with a copy of this document, all specifications, manuals, catalogs, leaflets and written information provided to Buyer pertaining to the Products/Samples.

KEYENCE CORPORATION

1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku,
Osaka, 533-8555, Japan
PHONE: +81-6-6379-2211
www.keyence.com/glb

AUSTRIA Ph: +43 (0)2236 378266 0
BELGIUM Ph: +32 (0)15 281 222
BRAZIL Ph: +55-11-3045-4011
CANADA Ph: +1-905-366-7655
CHINA Ph: +86-21-3357-1001
CZECH REPUBLIC Ph: +420 220 184 700
FRANCE Ph: +33 1 56 37 78 00
GERMANY Ph: +49-6102-3689-0
HONG KONG Ph: +852-3104-1010
HUNGARY Ph: +36 1 802 7360
INDIA Ph: +91-44-4963-0900
INDONESIA Ph: +62-21-2966-0120
ITALY Ph: +39-02-6688220
KOREA Ph: +82-31-789-4300
MALAYSIA Ph: +60-3-7883-2211
MEXICO Ph: +52-55-8850-0100
NETHERLANDS Ph: +31 (0)40 206 6100
PHILIPPINES Ph: +63-(0)2-8981-5000
POLAND Ph: +48 71 368 61 60
ROMANIA Ph: +40 (0)269 232 808
SINGAPORE Ph: +65-6392-1011
SLOVAKIA Ph: +421 (0)2 5939 6461
SLOVENIA Ph: +386 (0)1 4701 666
SWITZERLAND Ph: +41 (0)43 455 77 30
TAIWAN Ph: +886-2-2721-8080
THAILAND Ph: +66-2-369-2777
UK & IRELAND Ph: +44 (0)1908-696-900
USA Ph: +1-201-930-0100
VIETNAM Ph: +84-24-3772-5555

Specifications are subject to change without notice. A6WW1-MAN-2090

17055GB 2111-1 96M17055 Printed in Japan

96M17055