



# SYSMAC CJ-series Programmable Controllers



## Safety Precautions

Thank you for purchasing an OMRON Programmable Controller (PLC). To ensure safe operation, please be sure to read the safety precautions provided in this document along with all of the user manuals for the Programmable Controller. Please be sure you are using the most recent versions of the user manuals. Contact your nearest OMRON representative to obtain manuals. Keep these safety precautions and all user manuals in a safe location and be sure that they are readily available to the final user of the products.

## OMRON Corporation

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### General Precautions

The user must operate the product according to the performance specifications described in the operation manuals. Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, petrochemical plants, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative. Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

### Safety Precautions

#### Definition of Precautionary Information

**WARNING** Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

**Caution** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

#### Warnings and Cautions

**WARNING** Do not attempt to take any Unit apart while the power is being supplied. Doing so may result in electric shock.

**WARNING** Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.

**WARNING** Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock.

**WARNING** Provide safety measures in external circuits, i.e., not in the Programmable Controller (CPU Unit including associated Units; referred to as "PLC"), in order to ensure safety in the system if an abnormality occurs due to malfunction of the PLC or another external factor affecting the PLC operation. Not doing so may result in serious accidents.

- Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.
- The PLC will turn OFF all outputs when its self-diagnosis function detects any error or when a severe failure alarm (FALS) instruction is executed. As a countermeasure for such errors, external safety measures must be provided to ensure safety in the system.
- The PLC outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system.
- When the 24-VDC output (service power supply to the PLC) is overloaded or short-circuited, the voltage may drop and result in the outputs being turned OFF. As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system.

**WARNING** Fail-safe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes. Not doing so may result in serious accidents.

**WARNING** Do not apply a voltage or current outside the specified range to the PLC. Doing so may cause a malfunction or fire.

**Caution** Pay careful attention to the polarities (+/-) when wiring the DC power supply. A wrong connection may cause malfunction of the system.

**Caution** Execute online edit only after confirming that no adverse effects will be caused by extending the cycle time. Otherwise, the input signals may not be readable.

**Caution** Confirm safety at the destination node before transferring a program to another node or editing the I/O area. Doing either of these without confirming safety may result in injury.

**Caution**

Tighten the screws on the terminal block of the AC Power Supply Unit to the torque specified in the operation manual. The loose screws may result in burning or malfunction.

**Caution**

Do not touch the Power Supply Unit during power-on, and immediately after power-off. Hot surface may cause heat injury.

**Caution**

After programming (or re-programming) using the IOWR instruction, confirm that correct operation is possible with the new ladder program and data before starting actual operation. Any irregularities may cause the product to stop operating, resulting in unexpected operation in machinery or equipment.

**Caution**

When the battery power is low or when no battery is inserted with the CJ2□-CPU□□(-EIP) or CJ1□-CPU□□(H/H-R) Units, the contents of the user memory are saved in non-volatile memory. (Operation is not stopped due to a memory error.) Accordingly, the PLC System can be operated even when the battery power is low or no battery is inserted, but the DM, EM and HR areas become unstable in this condition. When the contents of the DM, EM and HR areas are output with a program, use the Battery Error Flag (A402.04) to stop output.

### Operating Environment Precautions

**Caution** Do not operate the control system in the following places:

- Locations subject to direct sunlight
- Locations subject to temperatures or humidity outside the range specified in the specifications
- Locations subject to condensation as the result of severe changes in temperature
- Locations subject to corrosive or flammable gases
- Locations subject to dust (especially iron dust) or salts
- Locations subject to exposure to water, oil, or chemicals
- Locations subject to shock or vibration

**Caution** Take appropriate and sufficient countermeasures when installing systems in the following locations:

- Locations subject to static electricity or other forms of noise
- Locations subject to strong electromagnetic fields
- Locations subject to possible exposure to radioactivity
- Locations close to power supplies

**Caution** The operating environment of the PLC System can have a large effect on the longevity and reliability of the system. Improper operating environments can lead to malfunction, failure, and other unforeseeable problems with the PLC System. Be sure that the operating environment is within the specified conditions at installation and remains within the specified conditions during the life of the system

### Application Precautions

**WARNING** Always heed these precautions. Failure to abide by the following precautions could lead to serious or possibly fatal injury.

- Always connect to a ground of 100 Ω or less when installing the Units. A ground of 100 Ω or less must be installed when shorting the GR and LG terminals on the Power Supply Unit.
- When connecting a personal computer or other peripheral device to a PLC to which a non-insulated Power Supply Unit (CJ1W-PD022) is mounted, either ground the 0 V side of the external power supply or do not ground the external power supply at all ground. A short-circuit will occur in the external power supply if incorrect grounding methods are used. Never ground the 24 V side.
- Always turn OFF the power supply to the PLC before attempting any of the following. Not turning OFF the power supply may result in malfunction or electric shock.
  - Mounting or dismounting Power Supply Units, I/O Units or any other Units, and CPU Units, Option Boards and Pulse I/O Module
  - Assembling the Units
  - Setting DIP switches or rotary switches
  - Connecting or wiring the cables
  - Connecting or disconnecting the connectors

**Caution** Failure to abide by the following precautions could lead to faulty operation of the PLC or the system, or could damage the PLC or PLC Units. Always heed these precautions.

- Always use the power supply voltage specified in the operation manuals. An incorrect voltage may result in malfunction or burning.
- Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in malfunction.
- Install external breakers and take other safety measures against short-circuiting in external wiring. Insufficient safety measures against short-circuiting may result in burning.
- Do not apply voltages or connect loads to the Output Units in excess of the maximum switching capacity. Excess voltage or loads may result in burning.
- Separate the line ground terminal (LG) from the functional ground terminal (GR) on the Power Supply Unit before performing withstand voltage tests or insulation resistance tests. Not doing so may result in burning.
- Install the Unit properly as specified in the operation manual. Improper installation of the Unit may result in malfunction.
- Do not allow wire clippings, shavings, or other foreign material to enter any Unit. Otherwise, Unit burning, failure, or malfunction may occur. Cover the Units or take other suitable countermeasures, especially during wiring work.
- Do not allow foreign matter to enter the openings in the Unit. Doing so may result in Unit burning, electric shock, or failure
- Wire correctly and double-check all wiring and check all setting switches and DM Area settings before turning ON the power supply. Incorrect wiring may result in burning. Incorrect settings may cause malfunction or unexpected operation.
- Mount terminal blocks and connectors only after checking the mounting location carefully.
- Be sure that the terminal blocks, connectors, Memory Cards, expansion cables, and other items with locking devices are properly locked into place. Improper locking may result in malfunction.
- Check the user program for proper execution before actually running it on the Unit. Not checking the program may result in an unexpected operation.
- Check that the DIP switches and data memory (DM) are properly set before starting operation.

- Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation.
  - Changing the operating mode of the PLC (including the setting of the startup operating mode).
  - Force-setting/force-resetting any bit in memory.
  - Changing the present value of any word or any set value in memory.
- Resume operation only after transferring to the new CPU Unit, Special I/O Units, CPU Bus Units and/or externally connected devices the contents of the DM and HR Areas required for resuming operation. Not doing so may result in an unexpected operation.
- Do not pull on the cables or bend the cables beyond their natural limit. Doing either of these may break the cables.
- Do not place objects on top of the cables. Doing so may break the cables.
- When replacing parts, be sure to confirm that the rating of a new part is correct. Not doing so may result in malfunction or burning.
- Before touching the Unit, be sure to first touch a grounded metallic object in order to discharge any static built-up. Not doing so may result in malfunction or damage.
- Do not turn OFF the power supply to the Unit while data is being transferred.
- When transporting or storing the product, cover the PCBs with electrically conductive materials to prevent LSIs and ICs from being damaged by static electricity, and also keep the product within the specified storage temperature range.
- Do not touch the mounted parts or the rear surface of PCBs because PCBs have sharp edges such as electrical leads.
- Double-check the pin numbers when assembling and wiring the connectors.
- Wire correctly according to specified procedures.
- Do not drop the PLC or subject abnormal vibration or shock to it.
- Check that data link tables and parameters are properly set before starting operation. Not doing so may result in unexpected operation. Even if the tables and parameters are properly set, confirm that no adverse effects will occur in the system before running or stopping data links.
- Transfer a routing table to the CPU Unit only after confirming that no adverse effects will be caused by restarting CPU Bus Units, which is automatically done to make the new tables effective.
- The user program and parameter area data in CJ2□-CPU□□(-EIP) or CJ1□-CPU□□(H/H-R) Unit is backed up in the built-in flash memory. The BKUP indicator will light on the front of the CPU Unit when the backup operation is in progress. Do not turn OFF the power supply to the CPU Unit when the BKUP indicator is lit. The data will not be backed up if power is turned OFF.
- Do not turn OFF the power supply to the PLC or remove the Memory Card while the Memory Card is being accessed. Before removing a Memory Card, press the button to stop power supply to the Memory Card and wait for the BUSY indicator to go out.
- When replacing the battery for a Unit, be sure to follow the procedure described in that Unit's operation manual.
- When replacing the battery, turn ON the power for at least five minutes, and then replace it within five minutes after turning OFF the power. Not doing so may damage the memory.
- Dispose of the product and batteries according to local ordinances as they apply. Have qualified specialists properly dispose of used batteries as industrial waste.



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- The following precaution must be displayed on all products containing lithium primary batteries with a perchlorate content of 6 ppb or higher when exporting them to or shipping them through California, USA.

Perchlorate Material - special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate>

- The CJ2□-CPU□□(-EIP) or CJ1H-CPU□□H-R Unit contain a lithium primary battery with a perchlorate content of 6 ppb or higher. When exporting a product containing the CJ2□-CPU□□(-EIP) or CJ1H-CPU□□H-R Unit to or shipping such a product through California, USA, label all packing and shipping containers appropriately.
- This product is EMC compliant when assembled in a complete PLC system of the specified PLC Series. For EMC compliant, be sure to observe the following precautions and follow the instructions in this document for installation.
  - Always install this product in a control panel.
  - Use a DC power supply of reinforced insulation or double insulation for connection to a DC Power Supply Unit, Communication Unit or I/O Unit.
 Also refer to the manual for each product.
- This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

### Unit Assembly Precautions

- When connecting the Power Supply Unit, CPU Unit, I/O Units, Special I/O Units, or CPU Bus Units, slide the upper and lower sliders until a click sound is heard to lock them securely. Desired functionality may not be achieved unless Units are securely locked in place.
- Be sure to mount the end cover supplied with the CPU Unit to the rightmost Unit. Unless the end cover is properly mounted, the CJ-series PLC may not function properly.

### Reference Manuals

Please be sure to read the related user manuals in order to use the PLC safely and properly. Be sure you are using the most current version of the manual.

Name	Cat. No.
SYSMAC CJ-Series CJ2H-CPU□□-EIP, CJ2H-CPU□□, CJ2M-CPU□□ CJ2 CPU Unit W472 Hardware User's Manual	W472
SYSMAC CJ-Series CJ2H-CPU□□-EIP, CJ2H-CPU□□, CJ2M-CPU□□ CJ2 CPU Unit Software User's Manual	W473
SYSMAC CJ-Series CJ1H-CPU□□H-R, CJ1G/H-CPU□□H, CJ1G-CPU□□P, CJ1M-CPU□□, CJ1G-CPU□□ Programmable Controllers Operation Manual	W393
SYSMAC CS/CJ-series CS1G/H-CPU□□-EV1, CS1G/H-CPU□□H, CS1D-CPU□□S, CJ1G-CPU□□, CJ1G/H-CPU□□H, CJ1H-CPU□□H-R, CJ1M-CPU□□ Programmable Controllers Programming Manual	W394
SYSMAC CS/CJ-series CS1□-CPU□□□-□□, CJ2H-CPU□□-EIP, CJ2H-CPU□□, CJ2M-CPU□□, CJ1□-CPU□□□-□□ Programmable Controllers Programming Manual	W474
SYSMAC CJ-Series CJ2M-CPU□□ + CJ2M-MD21□, CJ2M-CPU Unit Pulse I/O Module User's Manual	W486
SYSMAC CS/CJ-series CS1G/H-CPU□□-EV1, CS1G/H-CPU□□H, CS1D-CPU□□S, CJ1G-CPU□□, CJ1G/H-CPU□□H, CJ1M-CPU□□ Programmable Controllers Communications Commands Reference Manual	W342
Serial Communications Units CJ1W-SCU□□-V1, CJ1W-SCU□2 Operation Manual	W336
Ethernet Unit CJ1W-ETN11 Operation Manual	W343

Name	Cat. No.
Ethernet Unit (100Base-TX Type) CJ1W-ETN21 Operation Manual Construction of Networks	W420
Ethernet Unit (100Base-TX Type) CJ1W-ETN21 Operation Manual Construction of Applications	W421
CompoNet Master Unit CJ1W-CRM21 Operation Manual	W456
FL-net Unit (100BASE-TX) CJ1W-FLN22 Operation Manual	W440
DeviceNet Operation Manual	W267
DeviceNet Unit CJ1W-DRM21 Operation Manual	W380
DeviceNet Slaves DRT1 Series Operation Manual	W347
DRT2 Series DeviceNet Slaves Operation Manual	W404
SmartSlice DeviceNet Communications Unit GRT1-DRT Operation Manual	W454
SmartSlice Slice I/O Units GRT1 Series Operation Manual	W455
CompoBus/S C200HW-SRM21, CJ1W-SRM21 Operation Manual	W266
C-series PC Link System Manual	W135
C-series Rack PCs Optical Remote I/O System Manual	W136
C-series Rack PCs Wired Remote I/O System Manual	W120
Controller Link Units (Wired Type) CJ1W-CLK23/21-V1, Repeater Units CS1W-RPT01/02/03 Operation Manual	W309
GP-IB Interface Unit CS1W-GPI01 Operation Manual	W410
Loop-control CPU Units CJ1G-CPU□□P Operation Manual	W406
Loop-control CPU Units CJ1G-CPU□□P Function Block Reference Manual	W407
Loop Controllers for Gradient Temperature Control Function CJ1G-CPU45P-GTC Operation Manual	W460
Universal Input Unit CJ1W-AD04U Operation Manual	W466
Analog I/O Unit CJ1W-PTS□□/PDC□□/PH□□U Operation Manual	W368
Analog I/O Units CJ1W-AD041-V1/081-V1/042, CJ1W-DA021/041/08V/08C/042V, CJ1W-MAD42 Operation Manua	W345
Temperature Control Unit CJ1W-TC□□□ Operation Manual	W396
SYSMAC CJ-series Simple Communications Unit CJ1W-CIF21 Operation Manual	W400
High-speed Counter Unit CJ1W-CT021 Operation Manual	W401
High-speed Counter Unit CJ1W-CT042 Operation Manual	W478
Position Control Unit CJ1W-NC113/213/413/133/233/433 Operation Manual	W397
Position Control Unit CJ1W-NC214/414/234/434 Operation Manual	W477
Position Control Unit CS1W-NC271/471/F71, CJ1W-NC271/471/F71-MA Operation Manual	W426
Position Control Unit CJ1W-NC□81/□82 Operation Manual	W487
Motion Control Unit CJ1W-MCH71 Operation Manual	W435
ID Sensor Unit CJ1W-V600C11/12 Operation Manual	Z174
SYSMAC SPU Unit CJIW-SPU01 Operation Manual	V229
SPU-Console WS02-SPTC1 Operation Manual	V230
CS/CJ-series Programming Consoles CQM1H-PRO01-E/CQM1-PRO01-E/ C200H-PRO27-E Operation Manual	W341
CX-One FA Integrated Tool Package CXONE-AL□□C-V□/AL□□D-V□ Setup Manual	W463
CX-Integrator CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W464
CX-Programmer Ver.□□ CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W446
CX-Programmer Ver.□□ CXONE-AL□□C-V□/AL□□D-V□, CS1-H, CJ1-H, CJ1M CP1H CPU Units Operation Manual Function Blocks/Structured Text	W447
CX-Protocol CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W344
CX-Simulator CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W366
CX-Position CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W433
CX-Motion-MCH CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W448
CX-Motion-NCF CXONE-AL□□C-V□/AL□□D-V□ Operation Manual	W436
CX-Process Tool WS02-LCTC1-E Operation Manual	W372
CX-Process Monitor Plus WS02-LCMC1-E Operation Manual	W428

#### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products. Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Please know and observe all prohibitions of use applicable to the products. NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also product catalogs for Warranty and Limitations of Liability.

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**Note:** Specifications subject to change without notice.