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Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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CS1PC-PCI01-DRM
CS1PC-PCI01H-DRM
CS1PC-EIC01

SYSMAC CS1 Board

OPERATION MANUAL

OMRON

CS1PC-PCI01-DRM
CS1PC-PCI01H-DRM
CS1PC-EIC01
SYSMAC CS1 Board

Operation Manual

Revised July 2005

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

⚠ **DANGER**   Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.

⚠ **WARNING**   Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.

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

OMRON Product References

All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation "Ch," which appears in some displays and on some OMRON products, often means "word" and is abbreviated "Wd" in documentation in this sense.

In this manual "PLC" is used as the abbreviation for Programmable Controller.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note   Indicates information of particular interest for efficient and convenient operation of the product.

1, 2, 3...   1.   Indicates lists of one sort or another, such as procedures, checklists, etc.

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DeviceNet is a registered trademark of the Open DeviceNet Vendor Association, Inc.

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About this Manual:

This manual describes the installation and operation of SYSMAC CS1 Board PLC (Programmable Controllers). The SYSMAC CS1 Board is a PCI Board that provides functionality equivalent to a SYSMAC CS-series PLC.

The following manuals may also be required to install and run a PLC System based on the SYSMAC CS1 Board.

Name	Contents	Catalog number
SYSMAC CS1 Board Operation Manual (This manual)	Describes how to use the SYSMAC CS1 Board, especially the information required to connect the Board to a PCI slot. Refer to the CS1 PLC manuals for further information on the PLC functions and the *CS/CJ Series DeviceNet Unit Operation Manual* for further information on DeviceNet functions.	V220
SYSMAC CS Series CS1G/H-CPU☐☐H CS1G/H-CPU☐☐-EV1 Programmable Controllers Operation Manual	Describes the installation and operation of the CS-series PLCs. Refer to this manual when connecting the SYSMAC CS1 Board to Expansion Racks, mounting Units in the Racks, and wiring the Units.	W339
SYSMAC CS/CJ Series Programmable Controllers Instructions Reference Manual	Describes the ladder diagram programming instructions supported by CS/CJ-series PLCs. Refer to this manual when writing programs for the SYSMAC CS1 Board.	W340
CS/CJ Series DeviceNet Unit Operation Manual	Describes operation of the CS/CJ-series DeviceNet Units. Refer to this manual for information on DeviceNet specifications and functions, including Slaves and overall Network operation. This manual is required to use the DeviceNet functions of the SYSMAC CS1 Board.	W380
DeviceNet Configurator Ver. 2.☐ Operation Manual	Describes operation of the DeviceNet Configurator. Refer to this manual when making special settings for a DeviceNet Network, such as user-set allocations for remote I/O.	W382

Please read this manual and all other related manuals carefully and be sure you understand the information provided before attempting to install and operate a SYSMAC CS1 Board. You will also need the manuals for your personal computer.

This manual includes the following sections.

Section 1 describes the features, specifications, and configuration of the SYSMAC CS1 Board. Read this section before reading the rest of the manual.

Section 2 explains how to make the hardware settings on the SYSMAC CS1 Board, install the Board in the computer, and wire the Board to I/O devices and DeviceNet devices.

The *Appendix* describe how to replace the SYSMAC CS1 Board's backup battery.

> ⚠ **WARNING** Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY
OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON–INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY
OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted. IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

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.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

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.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PRECAUTIONS

This section provides general precautions for using the SYSMAC CS1 Board Programmable Controller (PLC) and related devices. **The information contained in this section is important for the safe and reliable application of the PLC. You must read this section and understand the information contained before attempting to set up or operate a PLC System.**

1   Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

• Personnel in charge of installing FA systems.

• Personnel in charge of designing FA systems.

• Personnel in charge of managing FA systems and facilities.

2   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, 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.

This manual provides information for programming and operating OMRON PLCs. Be sure to read this manual before attempting to use the software and keep this manual close at hand for reference during operation.

⚠ **WARNING**   It is extremely important that a PLC and all PLC Units be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying a PLC System to the above-mentioned applications.

3   Safety Precautions

⚠ **WARNING**   Do not attempt to disassemble or touch the inside of the SYSMAC CS1 Board while the power is being supplied. Doing so may result in electric shock.

⚠ **WARNING**   Provide safety measures in external circuits, i.e., not in the Programmable Controller (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-V DC 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.

⚠️ **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 changing the I/O memory area. Doing either of these without confirming safety may result in injury.

⚠️ **Caution** CS1PC-PCI01H-DRM automatically back up the user program and parameter data to flash memory when these are written to the CS1 Board. I/O memory (including the DM, EM, and HR Areas), however, is not written to flash memory. The DM, EM, and HR Areas can be held during power interruptions with a battery. If there is a battery error, the contents of these areas may not be accurate after a power interruption. If the contents of the DM, EM, and HR Areas are used to control external outputs, prevent inappropriate outputs from being made whenever the Battery Error Flag (A40204) is ON. Areas such as the DM, EM, and HR Areas, the contents of which can be held during power interrupts, is backed up by a battery. If a battery error occurs, the contents of the areas that are set to be held may not be accurate even though a memory error will not occur to stop operation. If necessary for the safety of the system, take appropriate measures in the ladder program whenever the Battery Error Flag (A40204) turns ON, such as resetting the data in these areas.

⚠️ **Caution** Be careful when connecting a personal computer mounted with a SYSMAC CS1 Board to an Expansion Backplane to which is mounted a non-insulated Unit (CS1W-CLK12/52(-V1) or CS1W-ETN01) connected to an external power supply. A short-circuit will be created if the 24 V side of the external power supply is grounded and the 0 V side of the personal computer mounted with a SYSMAC CS1 Board is grounded. When connecting an Expansion Backplane to this type of PLC, either ground the 0 V side of the external power supply or do not ground the external power supply at all.

Incorrect
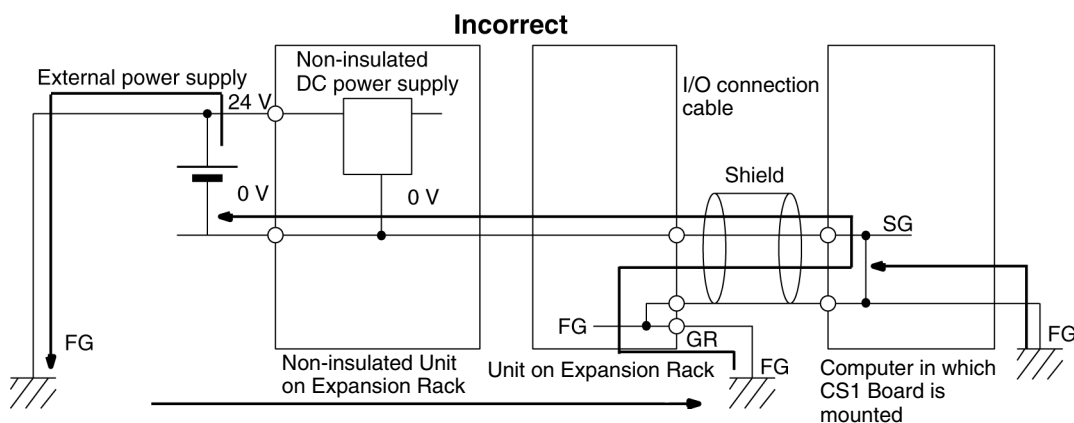
4 Operating Environment Precautions

Do not operate the 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 shock or vibration
- Locations subject to exposure to water, oil, or chemicals

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.

5 Application Precautions

Observe the following precautions when using the SYSMAC CS1 Board.

⚠️**WARNING** Failure to abide by the following precaution could lead to serious or possibly fatal injury. Always heed this precaution.

- Always ground the system to 100 Ω or less when installing the system to protect against electrical shock.

⚠️**Caution** Failure to abide by the following precautions could lead to faulty operation of the SYSMAC CS1 Board or the system. Always heed these precautions.

- You must use the CX-Programmer (programming software that runs on Windows) if you need to program more than one task. A Programming Console can be used to program only one cyclic task plus interrupt tasks. A Programming Console can, however, be used to edit multitask programs originally created with the CX-Programmer.
- Always turn OFF the power supply to the SYSMAC CS1 Board 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, CS1 Boards, Inner Boards, or any other Units.
  - Assembling the Units.
  - Setting DIP switches or rotary switches.
  - Connecting cables or wiring the system.
  - Connecting or disconnecting the connectors.
- When using a CS1PC-PCI01-DRM for the first time, install the CS1W-BAT1 Battery provided with the Unit and clear all memory areas from a Programming Device before starting to program. (The Battery is installed in advance for CS1PC-PCI01H-DRM, so initial Battery installation and the memory clear operation are not required.)
- When using the internal clock for a CS1PC-PCI01-DRM, turn ON power after installing the battery and set the clock from a Programming Device or using the

DATE(735) instruction. The clock will not start until the time has been set. (The Battery is installed in advance for CS1PC-PCI01H-DRM, so clock does not need to be set.)

- The user program and parameter area data in CS1PC-PCI01H-DRM is backed up in the built-in flash memory. The BKUP indicator will light on the front panel when the backup operation is in progress. Do not turn OFF the power supply to the SYSMAC CS1 Board when the BKUP indicator is lit. The data will not be backed up if power is turned OFF.

- If, when using a CS1PC-PCI01H-DRM, the PLC Setup is set to specify using the mode set on the Programming Console and a Programming Console is not connected, the CPU Unit will start in RUN mode. This is the default setting in the PLC Setup. (A CS1PC-PCI01-DRM will start in PROGRAM mode under the same conditions.)

- When creating an AUTOEXEC.IOM file from a Programming Device (a Programming Console or the CX-Programmer) to automatically transfer data at startup, set the first write address to D20000 and be sure that the size of data written does not exceed the size of the DM Area. When the data file is read from the Memory Card at startup, data will be written in the CS1 Board starting at D20000 even if another address was set when the AUTOEXEC.IOM file was created. Also, if the DM Area is exceeded (which is possible when the CX-Programmer is used), the remaining data will be written to the EM Area.

- Always turn ON power to the SYSMAC CS1 Board before turning ON power to the control system. If the SYSMAC CS1 Board power supply is turned ON after the control power supply, temporary errors may result in control system signals because the output terminals on DC Output Units and other Units will momentarily turn ON when power is turned ON to the SYSMAC CS1 Board.

- Interlock circuits, limit circuits, and similar safety measures in external circuits (i.e., not in the Programmable Controller) must be provided by the customer.

- Do not turn OFF the power supply to the SYSMAC CS1 Board when data is being transferred. In particular, do not turn OFF the power supply when reading or writing a Memory Card. Also, do not remove the Memory Card when the BUSY indicator is lit. To remove a Memory Card, first press the memory card power supply switch and then wait for the BUSY indicator to go out before removing the Memory Card.

- If the I/O Hold Bit is turned ON, the outputs from the PLC will not be turned OFF and will maintain their previous status when the PLC is switched from RUN or MONITOR mode to PROGRAM mode. Make sure that the external loads will not produce dangerous conditions when this occurs. (When operation stops for a fatal error, including those produced with the FALS(007) instruction, all outputs from Output Unit will be turned OFF and only the internal output status will be maintained.)

- The contents of the DM, EM, and HR Areas in the SYSMAC CS1 Board are backed up by a Battery. If the Battery voltage drops, this data may be lost. Provide countermeasures in the program using the Battery Error Flag (A40204) to re-initialize data or take other actions if the Battery voltage drops.

- Do not apply a force greater than 100 N on the terminal block when tightening the terminals.

- Install Units as far as possible away from devices that generate strong, high-frequency noise.

- Wire all connections correctly.

- Do not drop the product or subject it to excessive vibration or shock.

- Mount Units only after checking terminal blocks and connectors completely.

- Check switch settings, the contents of the DM Area, and other preparations before starting operation. Starting operation without the proper settings or data may result in an unexpected 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 SYSMAC CS1 Board (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 SYSMAC CS1 Board the contents of the DM Area, HR Area, and other data required for resuming operation. Not doing so may result in an unexpected operation.

- Always use the special cables listed in this manual or make cables according to manual specifications.

- Before touching a CS1 Board, be sure to first touch a grounded metallic object in order to discharge any static build-up. Not doing so may result in malfunction or damage.

- When transporting or storing circuit boards, cover them in antistatic material to protect them from static electricity and maintain the proper storage temperature.

- Do not touch circuit boards or the components mounted to them with your bare hands. There are sharp leads and other parts on the boards that may cause injury if handled improperly.

- Do not short the battery terminals or charge, disassemble, heat, or incinerate the battery. Do not subject the battery to strong shocks. Doing any of these may result in leakage, rupture, heat generation, or ignition of the battery. Dispose of any battery that has been dropped on the floor or otherwise subjected to excessive shock. Batteries that have been subjected to shock may leak if they are used.

- UL standards required that batteries be replaced only by experienced technicians. Do not allow unqualified persons to replace batteries.

- Unexpected operation may result if inappropriate data link tables or parameters are set. Even if appropriate data link tables and parameters have been set, confirm that the controlled system will not be adversely affected before starting or stopping data links.

- CPU Bus Units will be restarted when routing tables are transferred from a Programming Device to the SYSMAC CS1 Board. Restarting these Units is required to read and enable the new routing tables. Confirm that the system will not be adversely affected before allowing the CPU Bus Units to be reset.

- 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.

- Always use the power supply voltage specified in the operation manuals. An incorrect voltage may result in malfunction or burning.

- Install external breakers and take other safety measures against short-circuiting in external wiring. Insufficient safety measures against short-circuiting may result in burning.

- Make sure that wire chips or other particles are not attached to the SYSMAC CS1 Board.
  Short-circuits between the component terminals caused by wire chips or other particles may result in malfunction.

- Do not attempt to disassemble, repair, or modify the SYSMAC CS1 Board. Any attempt to do so may result in malfunction, fire, or electric shock.

- Be sure that all the SYSMAC CS1 Board screws and cable connector screws are tightened to the torque specified in this manuals. Incorrect tightening torque may result in malfunction.

- Double-check all the wiring before turning ON the power supply. Incorrect wiring may result in burning.
- Be sure that the connectors, 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 system. Not checking the program may result in an unexpected operation.
- Confirm that no adverse effect will occur in the system before changing the operating mode of the SYSMAC CS1 Board. Not doing so may result in an unexpected operation.
- Confirm that no adverse effect will occur in the system before force-setting/force-resetting any bit in memory. Not doing so may result in an unexpected operation.
- Confirm that no adverse effect will occur in the system before changing the present value. Not doing so may result in an unexpected operation.
- Confirm that no adverse effect will occur in the system before changing the set value. Not doing so may result in an unexpected operation.
- Do not pull on or bend the communications cables beyond their natural limit. Doing either of these may break the cables.
- Do not place objects on top of the communications cables. Doing so may break the cables.
- 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.
- Before proceeding to these operations, check carefully to be sure that there will be no adverse effects due to differences with the CPU Unit.

6 Conformance to EC Directives

6-1 Applicable Directives

- EMC Directives

6-2 Concepts

EMC Directives

OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards (see the following note). Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer.

EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

Note Applicable EMC (Electromagnetic Compatibility) standards are as follows:

EMS (Electromagnetic Susceptibility):   EN61131-2 or EN61000-6-2
EMI (Electromagnetic Interference):   EN61000-6-4
                                        (Radiated emission: 10-m regulations)

6-3 Conformance to EC Directives

The SYSMAC CS1 Board comply with EC Directives. To ensure that the machine or device in which the CS-series PLC is used complies with EC Directives, the PLC must be installed as follows:

1, 2, 3...
1. When using a CS-series Unit, it must be installed within a control panel.
2. You must use reinforced insulation or double insulation for the DC power supplies used for the communications power supply and I/O power supplies.
3. SYSMAC CS1 Boards also conform to the Common Emission Standard (EN61000-6-4). Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. You must therefore confirm that the overall machine or equipment complies with EC Directives.

This section describes the features, specifications, and configuration of the SYSMAC CS1 Board.

1-1 Features

The SYSMAC CS1 Board (CS1PC-PCI01-DRM and CS1PC-PCI01H-DRM) is an expansion board for personal computers which provides functionality equivalent to an OMRON CS1G-CPU45-EV1 and CS1G-CPU45H CPU Unit with unit version 3.0. It can be connected to the PCI bus of a personal computer. If an CS1PC-EIC01 Expansion I/O Board is installed, CS-series Expansion Racks can be connected. (CJ-series Expansion Racks cannot be used.) Also, DeviceNet communications functionality is provided as standard equipment, enabling remote control equivalent to an OMRON CS-series DeviceNet Unit (CS1W-DRM21-V1).

The SYSMAC CS1 Board provides the features described below.

Functions as PLC Inside Computer for Optimum Space Saving

When the SYSMAC CS1 Board is installed in a personal computer, it operates as a PLC equivalent to a CS1G-CPU45-EV1 or CS1G-CPU45H with unit version 3.0, independent of the personal computer.

Remote Communications Between CS1 Board and Computer Via PCI Bus

Connecting the SYSMAC CS1 Board to the PCI bus of a personal computer makes it possible to perform operations from the computer such as reading from and writing to memory on the Board using a SYSMAC CS1 Board Driver (Windows NT/2000/XP compatible; sold separately), as well as reading status and executing control operations. Ordinarily a host computer would be connected to the PLC by communications cable, but the Board enables faster communications via the PCI bus.

Standard-equipment DeviceNet Communications for Reduced Wiring Requirements

The SYSMAC CS1 Board provides a built-in DeviceNet communications function as standard equipment, and a DeviceNet slave can be connected as a CS-series DeviceNet Unit (CS1W-DRM21-V1). The I/O (contact) status of a slave on DeviceNet is always reflected automatically at the CS1 Board, so the slave's I/O is executed simply by reading to and writing from that data area. Also, the Board provides a message communications function for sending and receiving Explicit and FINS messages, and a remote I/O slave function for operating slaves.

Note DeviceNet is a floor-level FA network accepted as a global standard. Data can be input and output to and from slaves distributed at remote locations through a single cable. For details, refer to the *CS/CJ Series DeviceNet Unit Operation Manual (W380)*.

Same Power Interruption Processing as for PLC

If a power interruption or reset occurs at the personal computer, the same power interruption processing can be executed for the SYSMAC CS1 Board as for the CS1G-CPU-45-EV1 and CS1G-CPU45H with unit version 3.0. Even in the event of unexpected interruptions due to factors such as power outages, the contents of data area such as the DM Area and HR Area maintain their status prior to the interruption. It is also possible to power the Board from a separate power supply (5 V DC) that is independent of the computer's power supply so that the Board can continue executing the ladder program even if the computer is turned OFF.

Note The maximum allowable time for CS1PC-PCI01-DRM CS1 Board's Power OFF Interrupt task is 2.0 ms. The maximum allowable time for the CS1PC-PCI01H-DRM CS1 Board's Power OFF Interrupt task is 1.0 ms. In addition, the power OFF detection extension time cannot be set to anything other than 0 ms.

The C200PC-PD024 Sub-power Supply Board for the C200PC-ISA02/ISA13 cannot be used.

Continuous Operation During Computer Reset

A jumper setting on the SYSMAC CS1 Board specifies whether the Board will also be reset or will continue operation when the personal computer is reset. This feature is useful, for example when it is desirable to continue Board operation while the personal computer is reset for purposes such as OS hang-up.

| **Programming as a CS-series CPU Unit Using a Programming Device** | When a Programming Device (CX-Programmer or Programming Console) is connected to the CS1 Board's peripheral port, the SYSMAC CS1 Board can be used for programming just like a CS-series CPU Unit. |

DeviceNet Configurator Connectable to Peripheral Port

By connecting a DeviceNet Configurator (Ver. 2.0) to the SYSMAC CS1 Board's peripheral port, it is possible to make the same settings as with a DeviceNet Unit.

Up to Seven CS-series Expansion Racks or Three C200H-series Expansion I/O Racks

Although the SYSMAC CS1 Board has no I/O other than DeviceNet, connecting a CS1PC-EIC01 Expansion I/O Board allows up to seven CS-series Expansion Racks (or up to three C200H-series Expansion I/O Racks) to be connected. Mounting a Basic I/O Unit allows for I/O processing. It is not possible, however, to use CS-series Long-distance Racks or CJ-series Expansion I/O Racks.

Basic I/O Units, Special I/O Units, and CPU Bus Units Connectible

Basic I/O Units, Special I/O Units, and CPU Bus Units used by the CS Series can be mounted on CS-series or C200H-series Expansion Racks, just like CS-series CPU Units. (There are limitations depending on the type of Unit and Rack. For example, Units such as Interrupt Input Units are incompatible because they must be mounted to the CPU Rack.)

Memory Card Connectible

A Memory Card can be mounted, just as with the CS1G-CPU45-EV1 and CS1G-CPU45H with unit version 3.0. Mounting and removal from the personal computer's rear panel is not possible, however, so mount the Memory Card before the SYSMAC CS1 Board is installed in the personal computer. The functions related to the Memory Card are the same as for the CS1G-CPU45-EV1 and CS1G-CPU45H with unit version 3.0.

Note   1. With the SYSMAC CS1 Board, it is not possible to use Interrupt Input Units and Loop Control Units, which must be mounted to a CS-series CPU Backplane. It is also not possible to use Inner Boards.

2. The SYSMAC CS1 Board's DeviceNet master functions are the same as the functions of a CS1W-DRM21-V1 DeviceNet Unit mounted in a CS-series CPU Rack.

1-2   List of Available Models

The following table provides a list of SYSMAC CS1 Boards that are currently available.

1-2-1   Main Board (CS1PC-PCI01-DRM)

The SYSMAC CS1 Board is composed of a CPU Unit Module and a DeviceNet Unit Module. These Modules are equivalent in functionality to the CS1G-CPU45-EV1 and CS1G-CPU45H CPU Unit with unit version 3.0 and the CS1W-DRM21-V1 DeviceNet Unit.

Board Model	Suitable PLC	Peripheral port	Max. No. of Expansion Racks	Program capacity	DeviceNet communications
CS1PC-PCI01-DRM	CPU Unit Module: CS1G-CPU45-EV1 DeviceNet Unit Module: CS1W-DRM21-V1	Yes	7	60 Ksteps	Yes
CS1PC-PCI01H-DRM	CPU Unit Module: CS1G-CPU45H with unit version 3.0 DeviceNet Unit Module: CS1W-DRM21-V1	Yes	7	60 Ksteps	Yes

Note   1. The DeviceNet communications function is the same as for a CS1W-DRM21-V1 CS-series DeviceNet Unit.

2. The SYSMAC CS1 Board occupies one PCI slot.

1-2-2 Expansion I/O Board (CS1PC-EIC01)

Board Model	Connectors
CS1PC-EIC01	Same as the connector on the left side of the CS-series CPU Backplane. (CS-series I/O Connecting Cable can be connected.)

Note 1. The CS1PC-PCI01-DRM SYSMAC CS1 Board or CS1PC-PCI01H-DRM SYSMAC CS1 Board and CS1PC-EIC01 Expansion I/O Board are connected by the special flat cable provided with the Expansion I/O Board.

2. The Expansion I/O Board is allocated one PCI bus slot. Resources (I/O port, memory, IRQ), however, are not allocated.
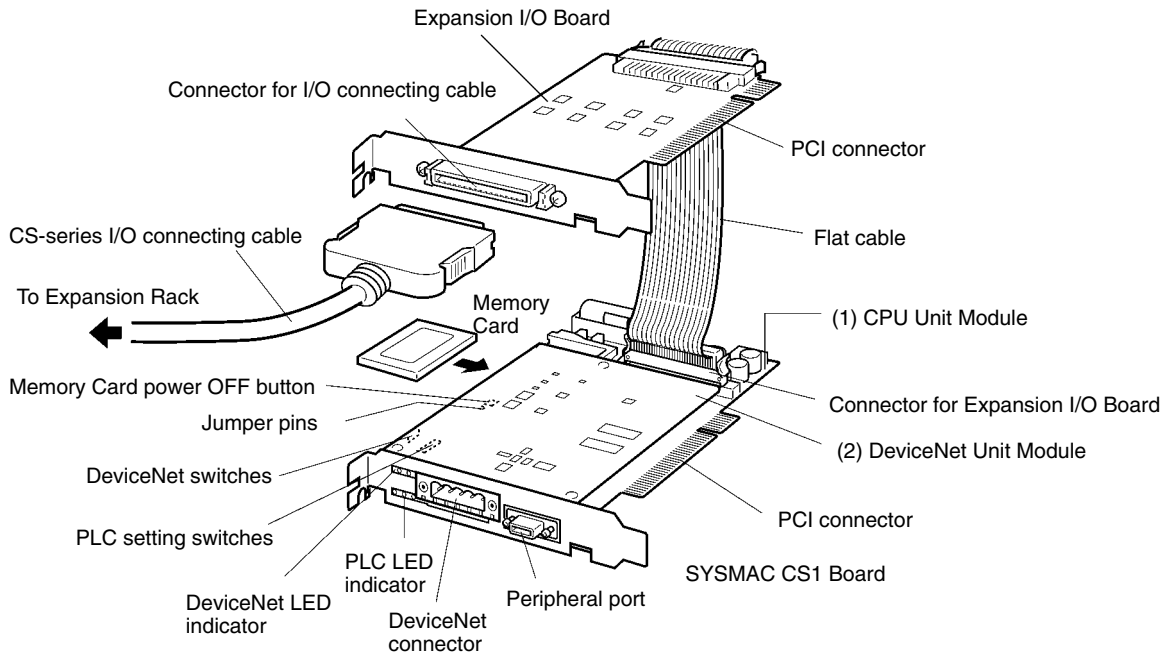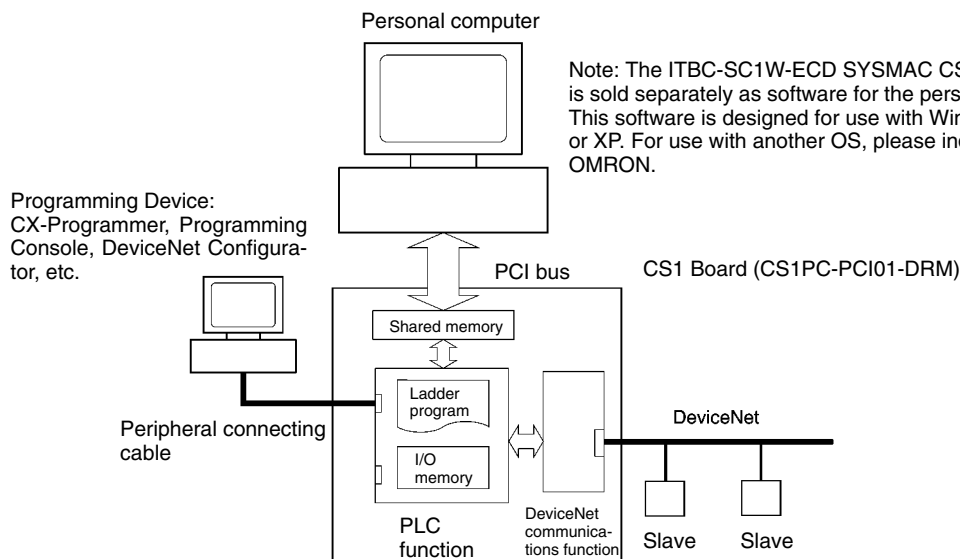

(1) CPU Unit Module: Equivalent to CS1G-CPU45-EV1 or CS1G-CPU45H with unit version 3.0

(2) DeviceNet Unit Module: Equivalent to CS1W-DRM21-V1
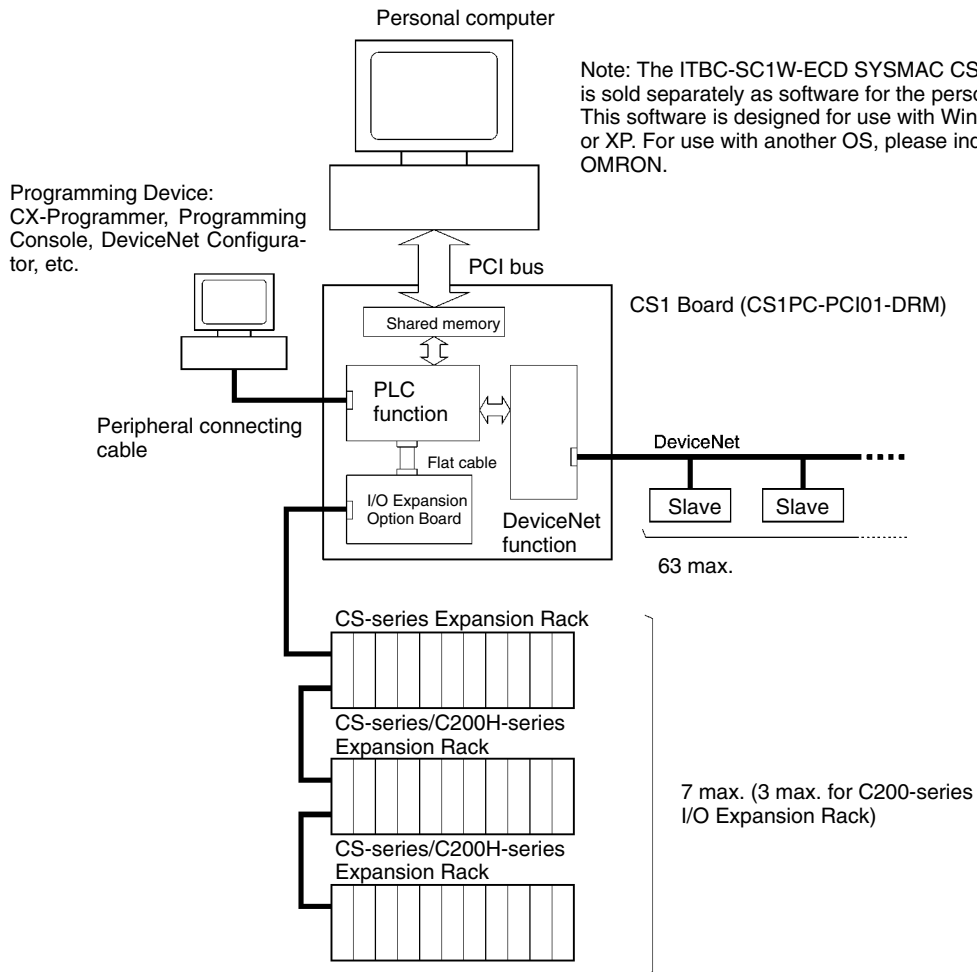
1-3 System Configuration

The following illustrations show the system configurations for the CS1 Board.

When Expansion I/O Board is Not Used (With No Expansion)

Note: The ITBC-SC1W-ECD SYSMAC CS1 Board Driver is sold separately as software for the personal computer. This software is designed for use with Windows NT, 2000, or XP. For use with another OS, please inquire at OMRON.

When Expansion I/O Board is Used (With Expansion)

Personal computer

Note: The ITBC-SC1W-ECD SYSMAC CS1 Board Driver is sold separately as software for the personal computer. This software is designed for use with Windows NT, 2000, or XP. For use with another OS, please inquire at OMRON.

Programming Device: CX-Programmer, Programming Console, DeviceNet Configurator, etc.

PCI bus

CS1 Board (CS1PC-PCI01-DRM)

Shared memory

Peripheral connecting cable

PLC function

DeviceNet

Flat cable

I/O Expansion Option Board

DeviceNet function

Slave   Slave

63 max.

CS-series Expansion Rack

CS-series/C200H-series Expansion Rack

7 max. (3 max. for C200-series I/O Expansion Rack)

CS-series/C200H-series Expansion Rack

1-3-1 Peripheral Connecting Cable

Personal computer	Connecting cable model	Cable length	Connector at personal computer
IBM PC/AT or compatible	CS1W-CN226	2.0 m	D-Sub 9-pin
	CS1W-CN626	6.0 m	D-Sub 9-pin

1-3-2 I/O Connecting Cable

CS-series I/O Connecting Cable	CS1W-CN313	For connecting a CS1PC-EIC01 Expansion I/O Board or a CS-series Expansion Rack to a CS-series Expansion Rack.	0.3 m
	CS1W-CN713		0.7 m
	CS1W-CN223		2 m
	CS1W-CN323		3 m
	CS1W-CN523		5 m
	CS1W-CN133		10 m
	CS1W-CN133B2		12 m
CS-series → C200H I/O Connecting Cable	CS1W-CN311	For connecting a CS1PC-EIC01 Expansion I/O Board or a CS-series Expansion Rack to a C200H Expansion I/O Rack.	0.3 m
	CS1W-CN711		0.7 m
	CS1W-CN221		2 m
	CS1W-CN321		3 m
	CS1W-CN521		5 m
	CS1W-CN131		10 m
	CS1W-CN131B2		12 m
C200H I/O Connecting Cable	C200H-CN311	For connecting a C200H Expansion I/O Rack to another C200H Expansion I/O Rack.	0.3 m
	C200H-CN711		0.7 m
	C200H-CN221		2 m
	C200H-CN521		5 m
	C200H-CN131		10 m

1-3-3 Application Conditions

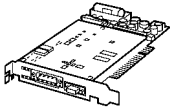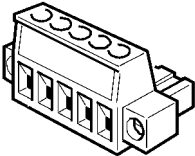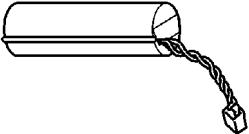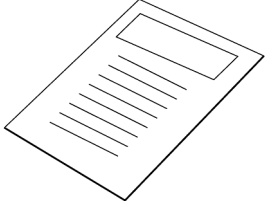Use the CS1 Board in the following environment.

Item	Content
Personal computer	IBM PC/AT compatible (PCI slot)

1-4 Package Contents

Confirm the contents of the package as soon as you open it to be sure everything is included and in proper condition.

SYSMAC CS1 Board

	SYSMAC CS1 Board	1
	DeviceNet Connector	1
	Memory Backup Battery **Note** Already connected to the SYSMAC CS1 Board when using a CS1PC-PCI01H-DRM.	1
	Safety Precautions	1